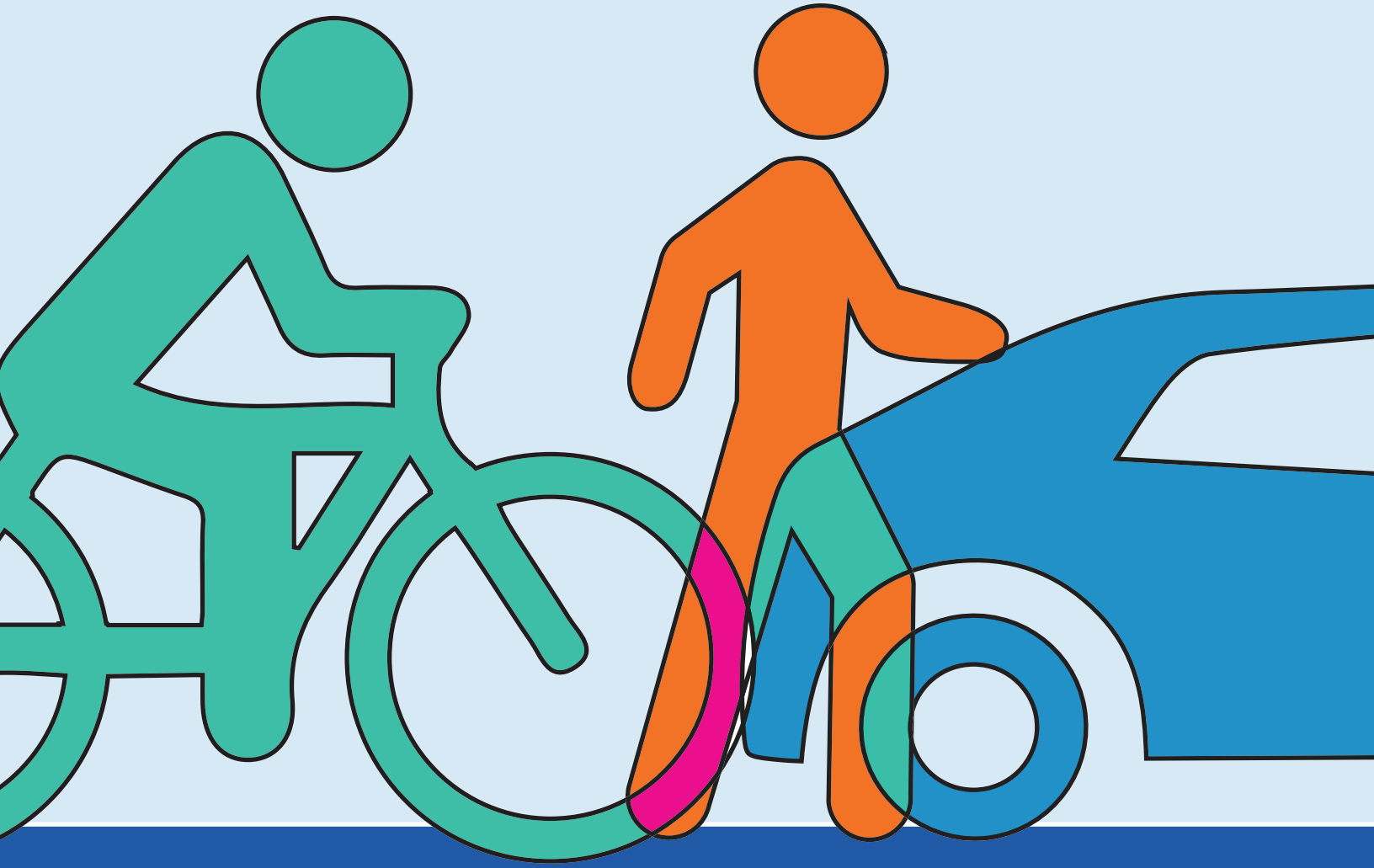
Fresno Council of Governments

REGIONAL SAFETY PLAN



DECEMBER 2021

REGIONAL SAFETY PLAN

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Project No. 25631

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1. INTRODUCTION AND PURPOSE

The number of people killed or severely injured on Fresno County's roadways is on the rise in recent years. Today, Fresno County's fatality rate is approximately 50 percent higher than California's overall. More than 100 people die and over 300 are severely injured on our roads every year.

Responding to the urgent need for change, the Fresno Council of Governments (COG) has committed to integrating safety into its transportation planning and funding processes. This Regional Safety Plan (RSP) sets forth a roadway safety vision for Fresno County and provides information and strategies to help the COG and its member agencies make decisions that will improve roadway safety through projects, policies, programs, and funding decisions.

The RSP formalizes safety planning for the COG and aligns its efforts with the State of California's Strategic Highway Safety Plan. It was developed in partnership with COG member agencies through engagement with a Regional Safety Steering Committee.

More than 100 people die and over 300 are severely injured on our roads every year.

The RSP is organized into the following sections:

- **Vision & Goals**—Lays out the transportation safety future the COG and its stakeholders envision and how this RSP process can help realize it.
- **Plan Development Process**—Describes how the RSP was developed.
- **Existing Safety Conditions** – Summarizes current roadway safety performance based on recent reported crashes, and patterns and trends identified through data analysis.
- **Recommendations**—Presents recommended strategies (engineering and non-engineering) to improve roadway safety by reducing crash risk.
- **Funding**—Discusses potential funding sources that could be used to implement the recommendations.
- **Implementation**—Discusses partnerships and roles that will be needed to carry out the RSP and track progress towards goals.

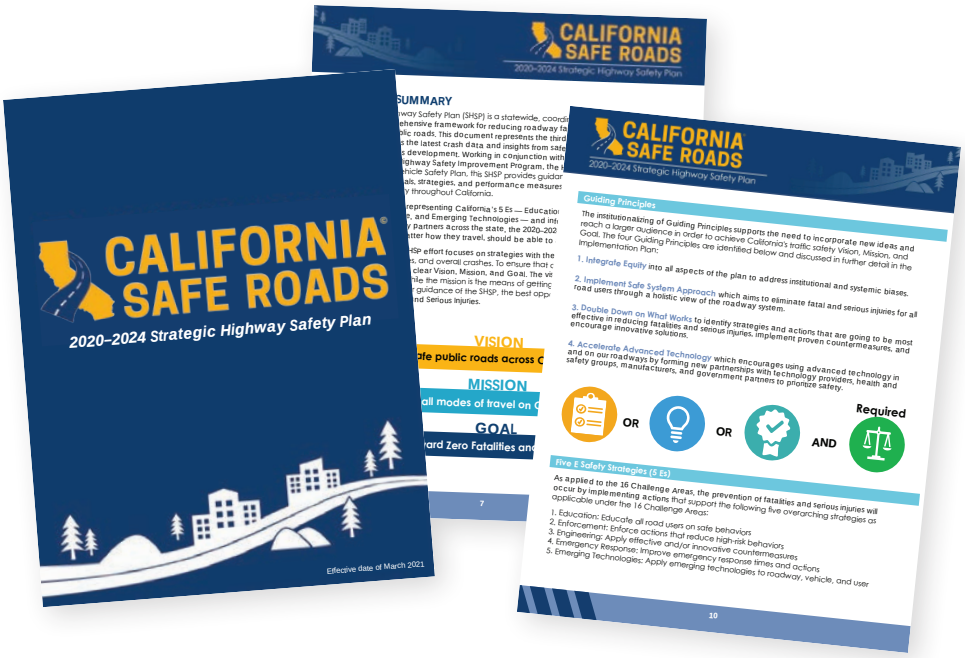
1.1 Relationship to State Strategic Highway Safety Plan

Each state is required to develop a data-driven traffic safety plan called a strategic highway safety plan (SHSP). The SHSP guides coordination across a wide range of organizations to reduce deaths and serious injuries caused by crashes on public roadways. Coordinating the efforts of federal, state, local and private sector safety stakeholders, the SHSP establishes goals, objectives, and emphasis (or challenge) areas. **The SHSP has historically addressed the four Es of traffic safety: engineering, enforcement, education, and emergency services**. As the transportation planning and engineering industry's approach to evaluating and improving roadway safety evolves, there is a greater emphasis on a "safe systems" approach to enhancing roadway safety.

The safe systems approach is based on the following principles[1]:

- Deaths and serious injuries due to roadway crashes are unacceptable
- Humans make mistakes
- Humans are vulnerable
- Responsibility is shared
- Safety is proactive
- Redundancy is crucial

These principles together are moving the industry toward roadway safety strategies that proactively reduce the risk of crashes, and of severe injury or death if a crash does occur. Such strategies encourage things like slower vehicle speeds, systemically implementing changes to roadways before severe crashes occur, addressing a risk with multiple solutions, engaging more stakeholders to share in the responsibility of implementing changes, and serving road users to meet their needs rather than placing sole responsibility for safety on the road user themselves.



2020–2024 Strategic Highway Safety Plan

1 Source: https://safety.fhwa.dot.gov/zerodeaths/docs/FHWA_SafeSystem_Brochure_V9_508_200717.pdf

This RSP provides a bridge between the SHSP and the COG's member agencies' local roadway safety plans (LRSPs). The RSP identifies regional emphasis areas based on extensive crash and roadway data analysis. It also identifies multidisciplinary strategies to enhance roadway safety. It incorporates principles of the safe systems approach in the following ways:

- Establishing a vision and goals to further enhance roadway safety by continually providing resources and support to local agencies to reduce crash risk.
- Identifying systemic countermeasures that can be used proactively throughout the region to improve roadway conditions by providing multiple messages to road users about conditions (e.g., warning signs, improving visibility of signs and signals, using pavement markings and signs in combination to alert road users to risks), make the consequences of mistakes less severe (e.g., removing roadside objects, designing the roadside so drivers can easily recover if they run off the road), and providing more protection to vulnerable road users, such as people on foot and riding bicycles (e.g., adding sidewalks, improving pedestrian crossings, providing separate bicycle lanes).
- Providing educational materials to further communicate key roadway safety information and messages.
- Serving as a collective resource for the local agencies as a partner in the shared responsibility to improve roadway safety.

The RSP further translates the SHSP's intentions to the local level by providing a regional resource that the cities and unincorporated Fresno County can leverage to further roadway safety improvements locally.

1.2 RELATIONSHIP TO MEMBER AGENCY LOCAL ROAD SAFETY PLANS

A local agency must have an LRSP or equivalent planning document to pursue Highway Safety Improvement Program (HSIP) grant funds from Caltrans.

An LRSP provides a local-level assessment of roadway safety, identifying locations for improvements and a range of strategies to implement. Local agencies collaborate and partner with key stakeholders who have a role in implementing the improvements. These stakeholders include representatives from law enforcement, education, and the broader community.

The collection of LRSPs across the state complement California's SHSP, providing intentional and continual assessment and improvements to enhance roadway safety.

This RSP furnishes a regional assessment of roadway safety. It pinpoints areas where regionwide coordination on education, enforcement, data collection, data maintenance, and other strategies can benefit each local agency's progress towards achieving their local roadway safety vision and goals.

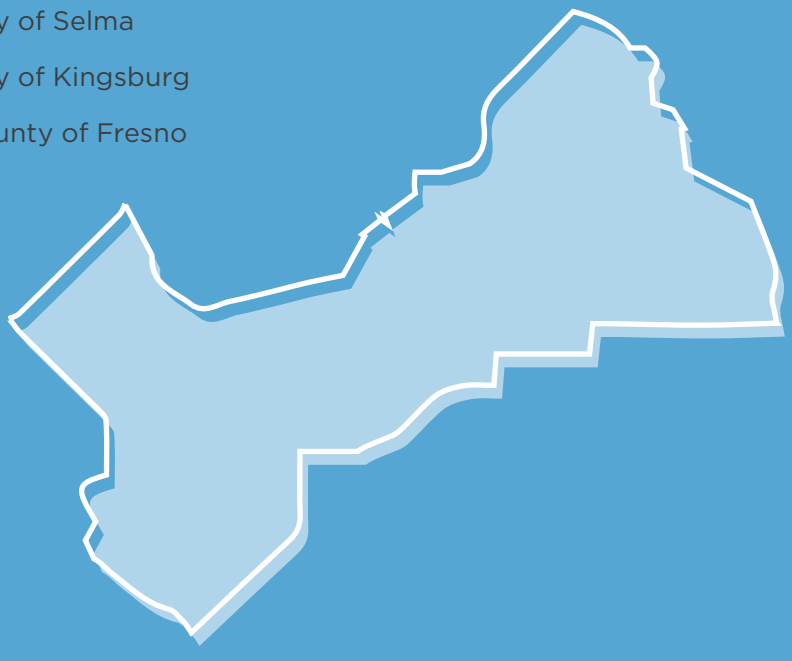
The RSP is also a resource for local agencies to:

- Gauge how their roadway safety performance compares to regional trends
- Identify systemic engineering countermeasures from the RSP's Countermeasure Toolbox that can be applied to locations within their jurisdiction
- Obtain educational materials that are ready for use and can be distributed in various forums to promote safer behavior on the region's roadways
- Gather information on ways to coordinate further with local and state law enforcement
- Identify potential funding sources for improvements the local agencies have identified
- Gather information that can be used in support of grant funding pursuits

The content of this RSP has been used to help inform 10 LRSPs being developed concurrently for the cities of Clovis, Coalinga, Firebaugh, Huron, Kerman, Mendota, Orange Cove, Selma, San Joaquin, and unincorporated Fresno County. Future updates to those or other LRSPs within the region can also draw from the information in this RSP.

FRESNO COG'S MEMBER AGENCIES

- City of Clovis
- City of Mendota
- City of Coalinga
- City of Orange Cove
- City of Firebaugh
- City or Parlier
- City of Fowler
- City of Reedley
- City of Fresno
- City of San Joaquin
- City of Huron
- City of Sanger
- City of Kerman
- City of Selma
- City of Kingsburg
- County of Fresno



2. VISION & GOALS

The RSP vision and goals were informed by the COG's role in the region, best practices in safety planning, and input gathered from the Regional Safety Steering Committee over the course of the RSP's development.

Vision:

A region of diverse partners sharing in the resources and responsibility to improve roadway safety for all communities.

Goals:

- **Collaborate with member agencies** to eliminate fatalities and severe injuries due to crashes on public roadways within the region.
- **Provide resources**, such as best practice information, for local agencies to use to implement projects and engineering countermeasures that continually and proactively reduce the risk of crashes from occurring.
- **Assist local agencies** in identifying and securing funding to implement safety improvements.
- **Maintain a regional crash database and analysis tool** to be able to provide local agencies with as complete data as possible to inform decisions.
- **Serve as a partner** in facilitating coordination between local agencies and Caltrans to enhance safety on state facilities also serving as main streets or thoroughfares for local communities.
- **Create and establish a forum** for regular discussion and coordination to improve roadway safety across the region.

3. PLAN DEVELOPMENT PROCESS

The RSP was developed through a combination of data analysis, data-informed recommendations, engagement with the COG's member agencies, and input gathered from targeted community stakeholders and the general public. This section discusses how the various participants in the process were engaged.

3.1 REGIONAL SAFETY STEERING COMMITTEE

The Regional Safety Steering Committee (RSSC) roster included representatives from the COG, Fresno County, City of Fresno, City of Clovis, City of Kerman, City of Reedley, Caltrans, California Highway Patrol, City of Fresno Disability Advisory Commission, Fresno County Bicycle Coalition, West Hills College—Coalinga, and Fresno County Rural Transit Agency.

The RSSC met six times over the course of the RSP's development. Due to pandemic conditions, each of the RSSC meetings was conducted virtually.

RSSC MEETING DATES AND TOPICS

December 16, 2020

- RSP purpose and scope, role of the RSSC
- Existing and recent related roadway safety efforts
- Interests and concerns from the RSSC

March 25, 2021

- Relationship to the multijurisdictional LRSP
- Existing conditions report draft findings
- Preview of priority locations and countermeasures

May 4, 2021

- Draft priority locations discussion
- Draft countermeasure recommendations

August 4, 2021

- Update on selected locations for concept designs
- Update on Transportation Safety Education Program

November 2021

- Draft Regional Safety Plan
- Draft Transportation Safety Education Program

The RSSC provided input on the draft data analysis findings and recommendations. Meeting agendas and presentation slides are included in Appendix A.

3.2 OUTREACH AND ENGAGEMENT

The consultant team and COG staff hosted a series of events to engage the local community as part of the RSP development. The main goals of the outreach and engagement process were as follows:

- **Engage Authentically:** Develop, communicate, and facilitate meaningful engagement activities that are geographically accessible (engaging residents in both the urban and rural areas of Fresno County) and culturally appropriate.
- **Center Equity:** Center the voices of residents and stakeholders who have historically been left out of planning processes, and create opportunities to meaningfully participate in the project, especially for people with Limited English Proficiency.
- **Promote Balance:** Create an equitable and balanced plan with recommendations that reflect the needs of all roadway users, including people who are walking, bicycling, driving, using micromobility devices (such as scooters and skateboards), and riding motorcycles.
- **Support Implementation:** Build momentum and support for the future implementation of the safety countermeasures identified in the RSP.

More detailed information on the public engagement process is presented in the Public Engagement Strategy and Public Engagement Memoranda, included in Appendix B.

The community engagement efforts for this RSP gathered community input in three main phases:

1

IMAGINE

Existing conditions and concerns around transportation safety and identifying possible locations and ideas for improvements

- CBO partnership
- Steering committee
- Project web page
- Interactive map and survey—DONE
- Digital and traditional media outreach

2

ITERATE

Proposed recommendations and transportation safety education program

- Promote map and survey
- Digital and traditional outreach
- Workshop with public safety representatives
- CBO focus groups

3

IMPLEMENT

The draft RSP

- Reconnect with CBO participants
- Public feedback on draft plan

Figure 1. Project Web Page

3.2.1 COVID-19 PANDEMIC CONSIDERATIONS

Because of the ongoing COVID-19 pandemic, the public engagement events were a combination of online and in-person activities. For the same reason, the consultant team was unable to engage with community-based organizations (CBOs). When contacted, multiple CBOs indicated that more urgent and immediate pandemic-related community needs meant they did not have sufficient staff or volunteers to support the RSP's development.

3.2.2 ONLINE PUBLIC SURVEY

A project webpage, shown in Figure 1, was launched as part of Phase 1. The webpage allowed the team to share project resources and updates and gather public input.

To better understand community needs and concerns, the project team launched a month-long online survey in June 2021. The survey focused on respondents' travel patterns and their perceptions of traffic safety issues related to infrastructure and individual behavior.

The survey was offered in English, Spanish, Hmong, and Punjabi (the county's four most prevalent languages), with multilingual social media and email promotion by the COG and its partners. The materials were vetted for cultural appropriateness to make sure the project team asked the right questions to engage a culturally diverse cross section of the region's residents.

The survey gathered a total of 842 responses.

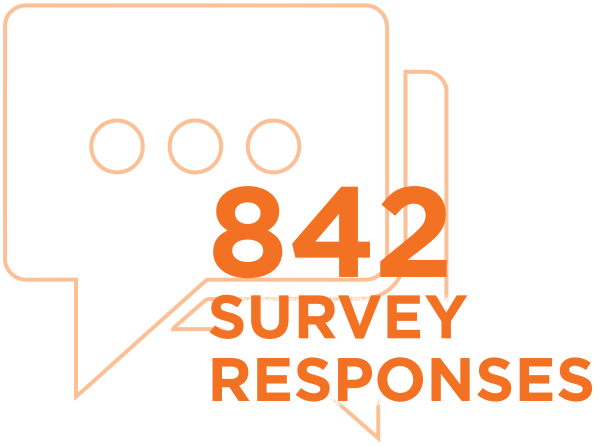
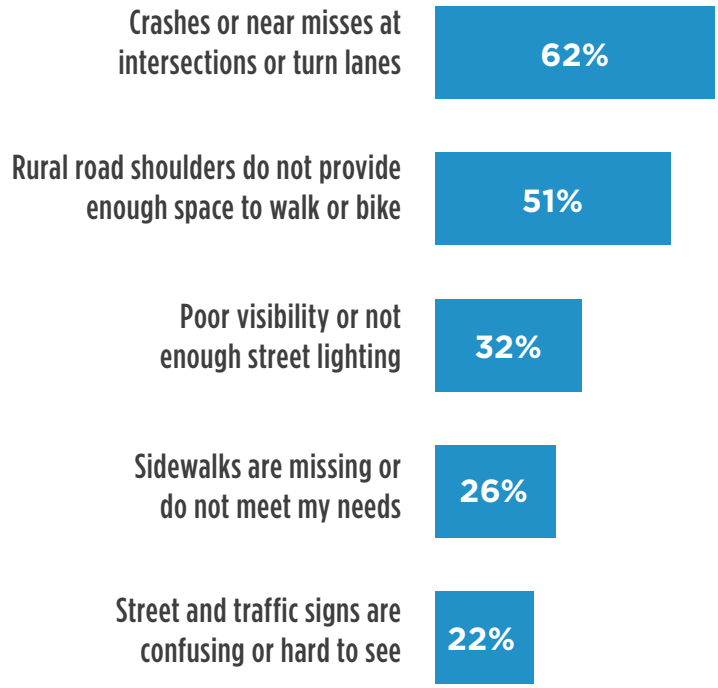


Figure 2. Top Safety Concerns Among Survey Participants



The project team conducted a separate analysis for the survey's Latino/x respondents to explore differences reported by those who used the English language survey and those who used the Spanish language survey. Limited English proficiency can be associated with reduced access to transportation and other resources, and the COG wished to explore any equity issues revealed by the survey results. The analysis found the following:

/ Compared to English speaking Latino/x respondents, Spanish speakers were less likely to drive (48 percent) than the English-speaking population (78 percent).

/ Errands were a primary reason for travel for Spanish speakers, whereas work/school was the main reason for English-speaking Latino/xs and general respondents.

/ Spanish speakers were more likely to raise concerns about the pedestrian environment, such as poor lighting and wide gaps between pedestrian crossings.

Further study is required to fully understand the travel needs and travel behavior of Fresno County's Latino/x communities with limited English proficiency. However, these findings and analysis offer preliminary insight into this population's travel behavior and which safety issues affect their travel experiences.

Figure 3. Common Unsafe Behaviors Reported by Survey Participants

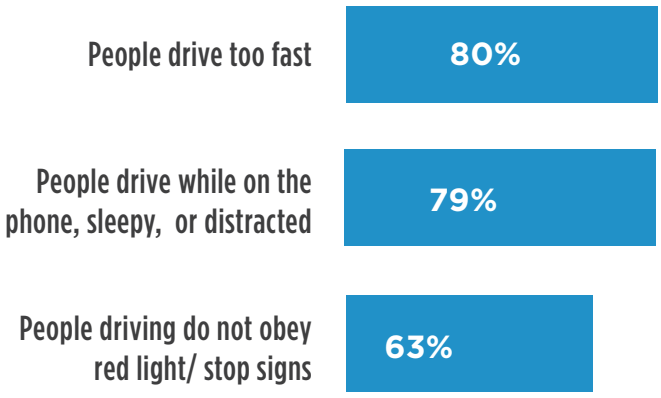
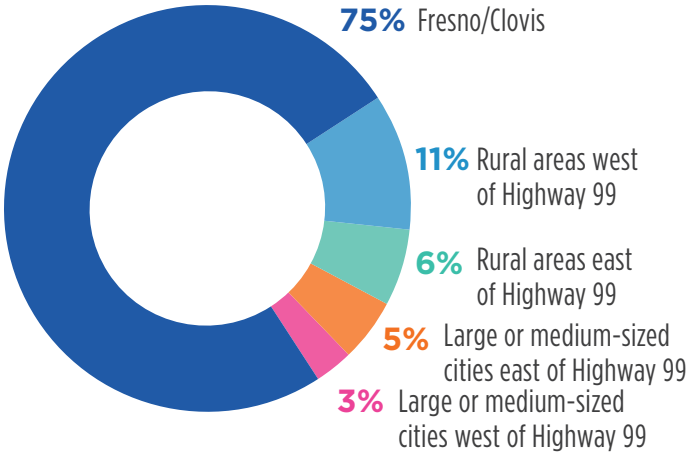


Figure 4. Respondents' Current Place of Living or Stay



4. EXISTING SAFETY CONDITIONS

This section discusses current roadway safety conditions across Fresno County at the time this report was written. It is organized into the following subsections:

- **Existing Regional Safety Practice and Culture**—Highlights existing regional plans, studies, and practices that include roadway safety considerations.
- **Summary of Regional Safety Performance**—Describes the crash patterns and trends for the region and identifies the higher priority locations based on crash and roadway data analysis.
- **Emphasis Areas**—Identifies the emphasis areas for the region based on the roadway safety performance assessment.

Existing safety conditions information was used to directly inform the RSP recommendations presented in Section 5.

4.1 EXISTING REGIONAL SAFETY PRACTICE AND CULTURE

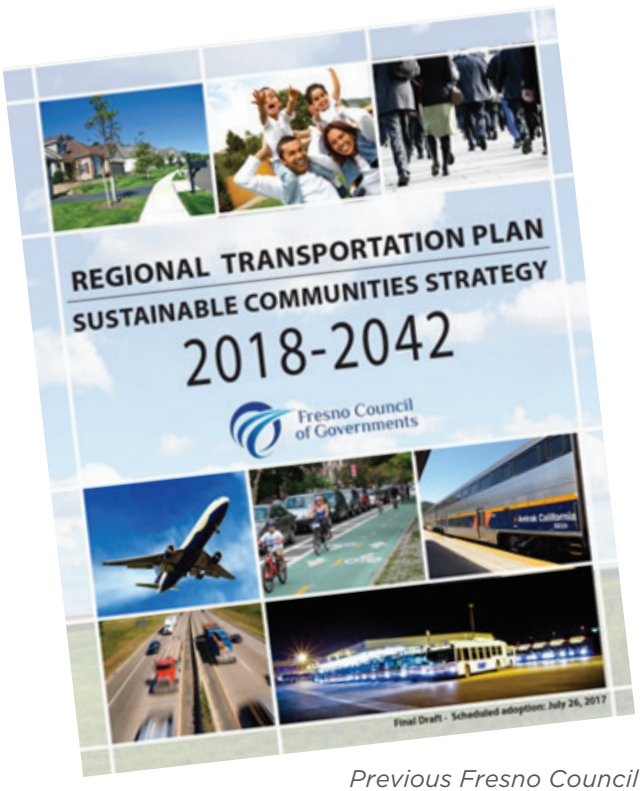
The COG has been engaged in planning and programming efforts to improve roadway safety before the RSP was developed. Relevant planning efforts are described below.

4.1.1 2018-2042 FRESNO REGIONAL TRANSPORTATION PLAN (2017)

Fresno COG adopted its 2018-2042 Regional Transportation Plan (RTP) in July 2017. The purpose of the RTP is to assess all transportation modes available in incorporated and unincorporated Fresno County, as well as necessary movement of goods through 2042. The RTP is updated every four years, per federal requirements.

The RTP set specific safety targets. Progress toward these targets is evaluated by reviewing the number of fatalities, rate of fatalities, number of serious injuries, rate of serious injuries, number of non-motorized fatalities, and non-motorized serious injuries. Along with the review, annual safety targets are established to incrementally approach the safety targets set in the RTP. These annual targets are developed by working closely with the safety steering committee mainly comprised of representatives from the Cities of Fresno and Clovis and unincorporated Fresno County.

The RTP set safety targets using an evidence-based method (taking into account historical trends) and a vision-based method (irrespective of trends). The RTP set vision-based targets to align with California's SHSP and with State targets.



Previous Fresno Council of Governments RTP

To achieve the set safety targets, Fresno COG outlined the following steps within the RTP:

- Assist member agencies with safety data analysis and other technical matters so safety issues can be addressed both locally and regionally
- Develop a regional implementation mechanism through the COG's funding process to advance safety projects and achieve safety targets
- Encourage and support member agencies to prioritize transportation projects that address safety issues
- Work with law enforcement and emergency medical service on developing strategies and programs to reduce crashes and casualties
- Support and work with responsible agencies and the public about safe driving practice; support development of an education program/plan to increase awareness of risky driving behaviors

4.1.2 2018-2042 FRESNO COUNTY REGIONAL ACTIVE TRANSPORTATION PLAN (2018)

Fresno COG adopted the Fresno County Regional Active Transportation Plan (ATP) in January 2018 to help each jurisdiction in the County identify its bicycle and pedestrian project needs and secure funds to plan, design, and build them. The ATP recognizes the need to be sensitive to each jurisdiction's context and to work separately with local staff and community.

The ATP outlines goals for supporting bicycling, walking, and other human-powered transportation within each jurisdiction that include increasing safety through engineering and facility improvements. To quantify its goals, the ATP outlines the length of each type of bikeway and the number of intersections and bicycle parking locations that would be improved through the actions outlined in the ATP.

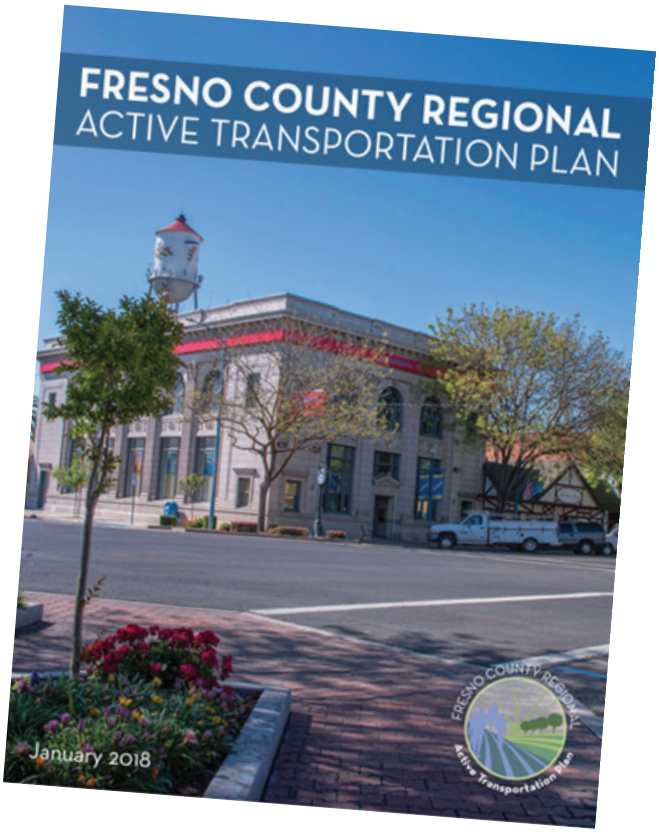
The ATP predicts that implementing comprehensive measures throughout the County will significantly reduce crashes involving bicyclists and pedestrians. The ATP states that a 50% or greater reduction in injuries and fatalities is reasonable.

4.1.3 EASTSIDE TRANSPORTATION CORRIDOR IMPROVEMENT STUDY (DRAFT)

Fresno COG's Eastside Transportation Corridor Improvement Study (ETCIS) report had been published in draft form at the time this report was written.

The purpose of the ETCIS is to determine future transportation needs for the eastern part of the Fresno County, with a focus on the major transportation corridors that serve that area: Academy Avenue and Manning Avenue. The goal of the study was to address mobility, access, safety, and connectivity for all modes of transportation.

The draft ETCIS report presents safety improvements as one of the key outcomes of the project. A detailed safety analysis was conducted along the Eastside Corridors, Academy Avenue, and Manning Avenue. The multimodal improvement recommendations proposed in the ETCIS are an outcome of this safety study.



4.1.4 CALIFORNIA SAFE ROADS STEERING COMMITTEE

The COG participates in the California Safe Roads Steering Committee that oversees SHSP development. The steering committee establishes the strategies and processes to implement the SHSP and provides direction and oversight to challenge area teams, which evaluate and track best practices related to SHSP challenge areas (see Table 1).

Challenge Areas for SHSP 2020-2024

- Aging Drivers (>=65)
- Bicyclists
- Commercial Vehicles
- Distracted Driving
- Driver Licensing
- Emergency Response
- Emerging Technologies
- Impaired Driving
- Intersections
- Lane Departures
- Motorcyclists
- Occupant Protection
- Pedestrians
- Speed Management/Aggressive Driving
- Work Zones
- Young Drivers (15-20)

As a member of steering committee, the COG is privy to emerging best practices and proposed actions related to SHSP development as well as potential changes to the statewide vision for SHSP implementation.

4.2 SUMMARY OF REGIONAL SAFETY PERFORMANCE

While Fresno County represents approximately 2.5 percent of California's population and vehicle miles traveled, approximately 4 percent of the state's traffic fatalities happen here. The following section describes regional roadway safety performance based on reported crash data from January 1, 2015 through December 31, 2019. The crash patterns and trends noted below helped inform the recommendations in Section 5 of this RSP.

4.2.1 REGIONAL CRASH PATTERNS AND TRENDS

Based on recurring crash patterns and trends, Fresno County's greatest opportunity to improve roadway safety comes through implementing strategies that are effective at addressing the following emphasis areas:

- Improving pedestrian and bicycle safety
- Reducing the risk of broadside crashes
- Reducing the risk of hit-object crashes
- Managing and reducing vehicle speeds
- Helping motorists accurately gauge appropriate gaps in traffic and expected road user behavior

The results from the crash analysis, detailed below, support these key findings.

Table 1. Crash Severity by Road User Involved

Road Users Involved	Fatal (% of column)	Severe Injury (% of column)	Visible Injury (% of column)	Complaint of Pain (% of column)	Property Damage Only (% of column)	Total (% of column)
Pedestrian Involved	138 (23%)	195 (14%)	388 (9%)	350 (4%)	142 (1%)	1,213 (3%)
Bicycle Involved	31 (5%)	78 (6%)	290 (7%)	299 (4%)	148 (1%)	846 (2%)
Vehicle Only or Vehicle-Fixed Object	424 (72%)	1,150 (81%)	3,699(84%)	8,039 (93%)	23,748 (99%)	37,060 (95%)
Reported Crashes (% of total)	**593 (2%)**	**1,423 (4%)**	**4,377 (11%)**	**8,688 (22%)**	**24,038 (62%)**	**39,119 (100%)**

Road Users and Severity

Overall trends in mode and severity are presented in Table 1.

NOTABLE TRENDS

/ Pedestrians are overrepresented in fatal and severe injury crashes. Pedestrians are involved in 3 percent of total reported crashes, but 17 percent of reported fatal or severe injury crashes.

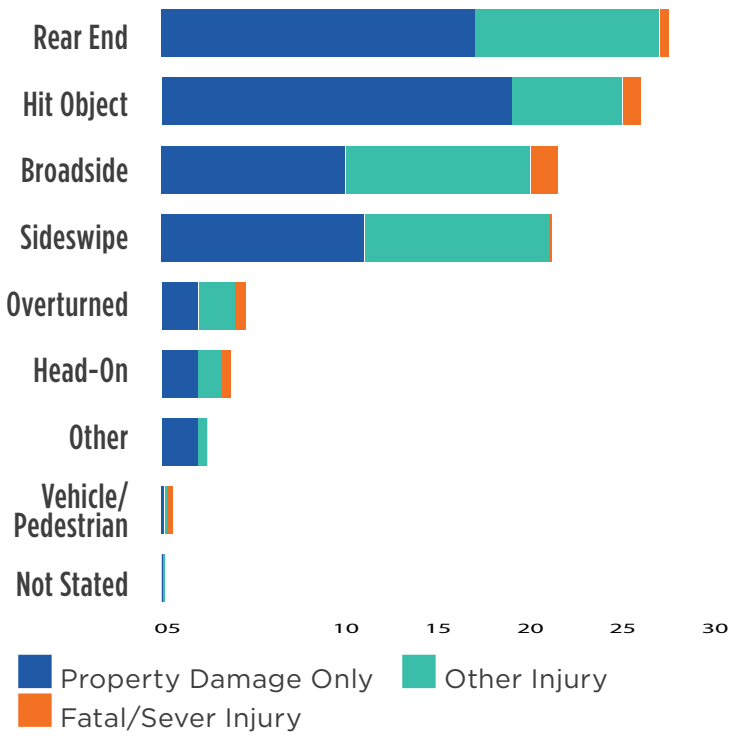
/ Bicyclists are also overrepresented in fatal and severe injury crashes. Bicyclists are involved in 2 percent of reported crashes but 5 percent and 6 percent of fatal and severe injury crashes, respectively.

Crash Types, Locations, and Primary Collision Factors

The analysis included crashes by crash type, location, and cited primary collision factor.

The top three crash types resulting in death or severe injury were broadside crashes (26 percent of reported fatal/severe injury crashes), hit-object crashes (21 percent), and vehicle/pedestrian crashes (15 percent). These three collectively account for 62 percent of reported fatal/severe injury crashes in the region.

Figure 5. Crashes by Type and Severity



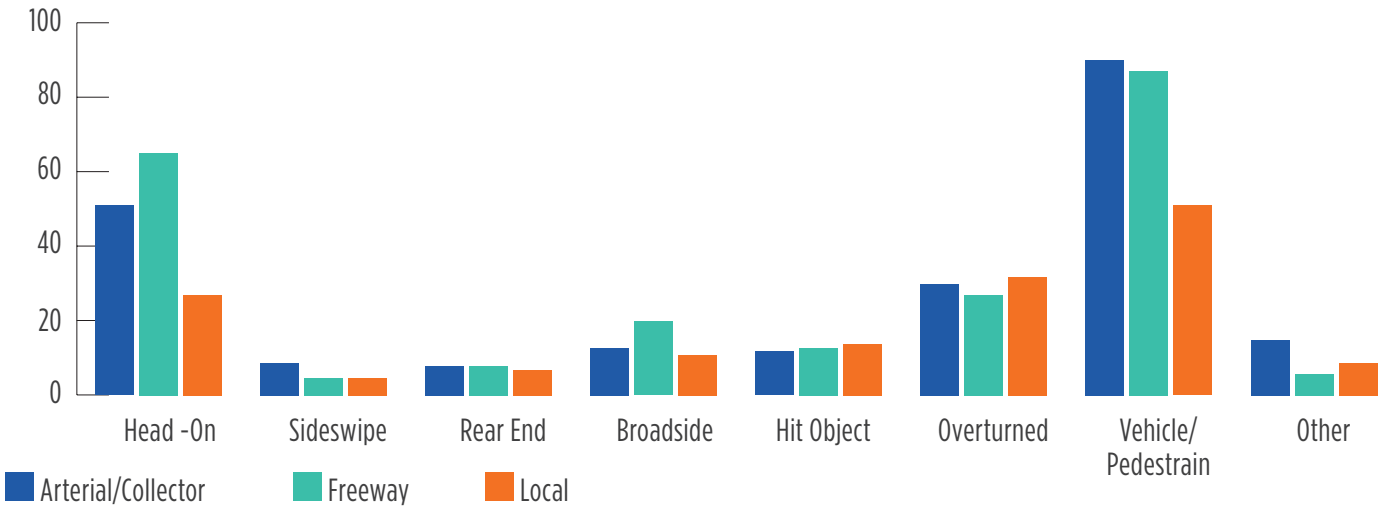
Relative Severity

Throughout the county, the severity of crash types may vary depending on where they take place (i.e., intersection or segment). A relative severity index (RSI) can aid understanding by making it possible to compare the average severity of crash types and locations and determine which combinations result in the most severe outcomes. RSI values allow agency planners to focus on areas that are most closely associated with risk and present the greatest opportunity for improvement.

To calculate RSI, every reported crash is assigned a cost based on its severity using average values provided by Caltrans.[2] The values are then averaged for each crash type and location and can be compared to one another.

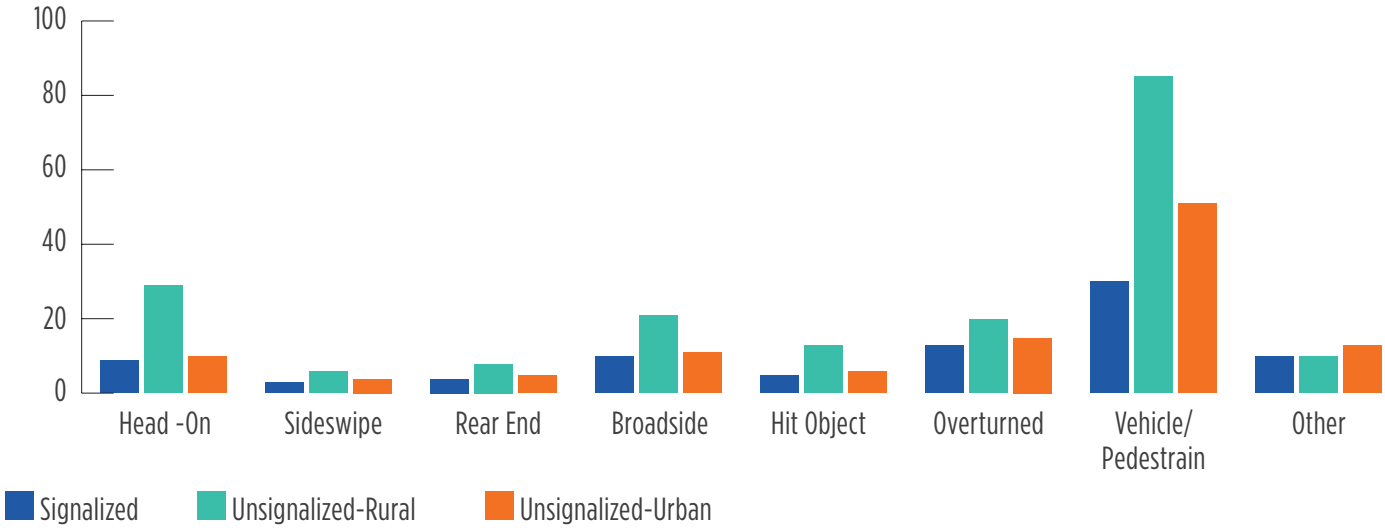
Figure 6 and Figure 7 present RSI values for segment and intersection crashes.

Figure 6. Segment Relative Severity Index



Source: City of Fresno, SWITRS, TIMS

Figure 7. Intersection Relative Severity Index



Source: City of Fresno, SWITRS, TIMS

2 This concept is discussed in more detail in the Regional High Injury Network section.

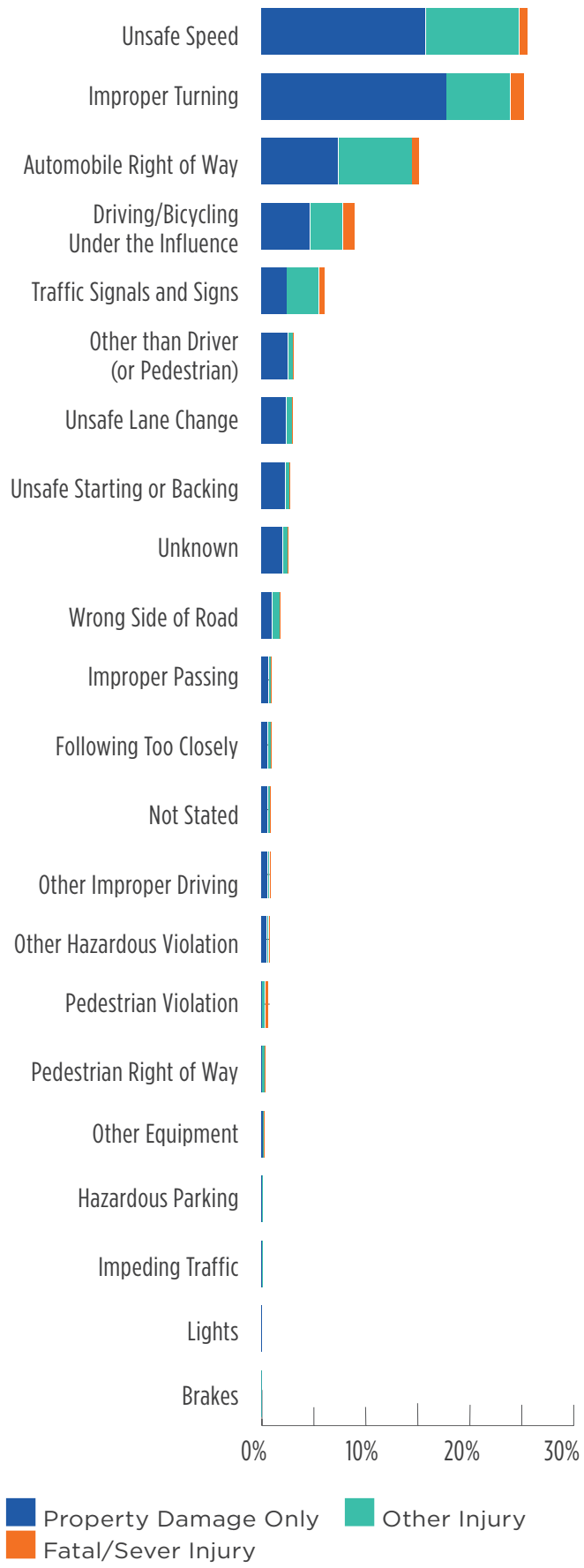
The RSI analysis indicated the following:

- **Vehicle/pedestrian crashes result in notably higher severities than other crash types**. Vehicle/pedestrian crashes on arterials and collectors are almost twice as severe on average as the next-highest crash type.
- **Higher-order roadways are associated with higher severities**. Average RSI for head-on crashes and vehicle/pedestrian crashes is notably higher on arterials and collectors and on freeways than it is on local roadways.
- **Vehicle/pedestrian crashes also result in the most severe outcomes across all locations**, particularly at rural unsignalized intersections. Vehicle/pedestrian crashes at rural unsignalized intersections result in almost twice as severe outcomes compared to other locations.
- **Other crash types that exhibit high relative average severities include head-on, broadside, and overturn crashes—all at unsignalized intersections.** This finding coincides with the discussion of the top crash types in the prior section, which identified broadside, hit object, and vehicle/pedestrian crashes as the top three crash types among fatal/severe injury crashes.
- **At intersections, vehicle/pedestrian crashes also have much higher average severity than other crash types**—especially at rural unsignalized locations. Head-on crashes at rural unsignalized intersections are also associated with higher average severity compared to other crash types and to head-on crashes at other location types.

Reporting officers identify a primary collision factor (PCF) for each crash. There are a number of different PCFs from which they can select. Officers use their judgment and information available at the scene to select the factor that is most relevant, selecting from a list of PCFs based on violations and road user behavior.

Figure 8 shows the share of crashes by reported PCF and severity.

Figure 8. Share of Crashes by Reported PCF and Severity



- The three most frequently-reported PCFs among reported crashes include unsafe speed (24 percent of reported crashes), improper turning (21 percent), and automobile right of way (14 percent). These three account for 59 percent of reported crashes.
- The same three PCFs are the most frequent among fatal/severe injury crashes, with improper turning and unsafe speed each accounting for 23 percent and automobile right of way accounting for 14 percent—a total of 60 percent between the three.

4.2.2 PEDESTRIAN AND BICYCLE CRASHES

Key findings for crashes involving pedestrians and bicyclists include:

- Pedestrian crashes are four times more likely to result in death or severe injury than crashes overall. Of the 1,123 pedestrian crashes in the County, 27 percent resulted in death or severe injury.
- Among fatal or severe injury pedestrian crashes, 40 percent occurred while a pedestrian was crossing a roadway outside a crosswalk, which was disproportionately higher than the share of the same pedestrian action among the total reported pedestrian crashes (32 percent).
- Crashes that occurred in the dark make up 45% of total reported crashes, but account for 71% of fatal and severe injury crashes.
- Bicycle crashes occurring in the dark or in dusk/dawn conditions account for 29 percent of reported bicyclist crashes but 44 percent of fatal/severe injury crashes.

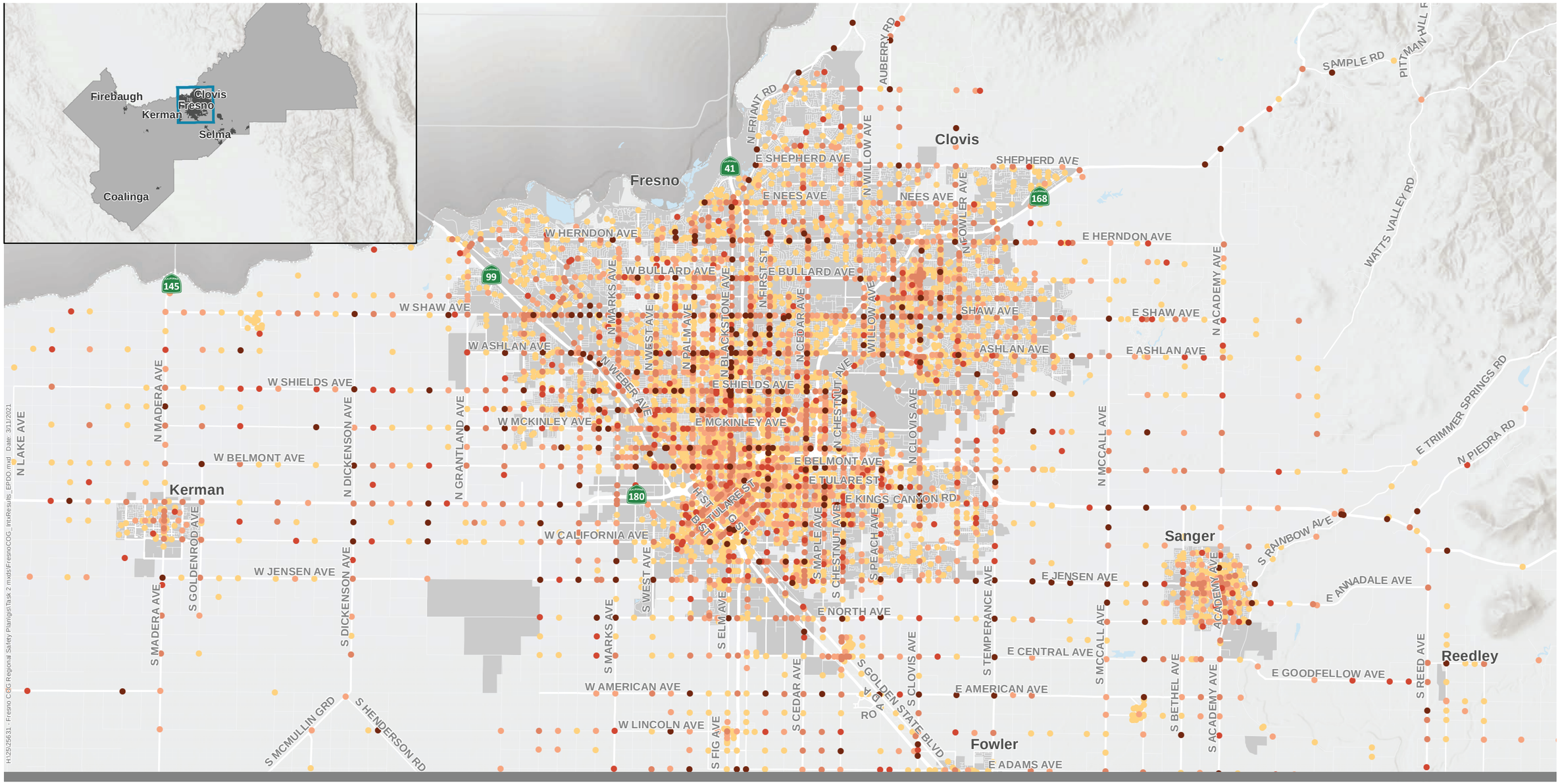
4.2.3 PRIORITY LOCATIONS

The locations used in this section serve as a benchmark for understanding how similar locations compare across the region for number and severity of crashes between January 1, 2015 through December 31, 2019. Many of the region's local agencies have their own local road safety plans or equivalent assessments of road safety in their jurisdictions. The analysis evaluated crashes on public streets in unincorporated and incorporated areas of Fresno County, including state highway facilities.

To identify priority locations, a severity score was calculated for each intersection and roadway segment across the region. The severity score is based on the number and severity of crashes. The more severe a crash, the greater the weight it was given in the severity score. The weighting aligns with how the state prioritizes grant funding for safety projects. Highest ranked locations based on severity score are the ones most likely to be competitive for safety project grant funding through the state's Highway Safety Improvement Program (HSIP). Figure 9 and Figure 10 show the results of the crash severity scoring.

Appendix C contains the Existing Conditions Report from the RSP's development, which provides more detail on the methodology and results by local jurisdiction.

Figure 9.1 Intersection Crash Severity Score Screening by Percentile, Countywide



Collision Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 2.7 Miles

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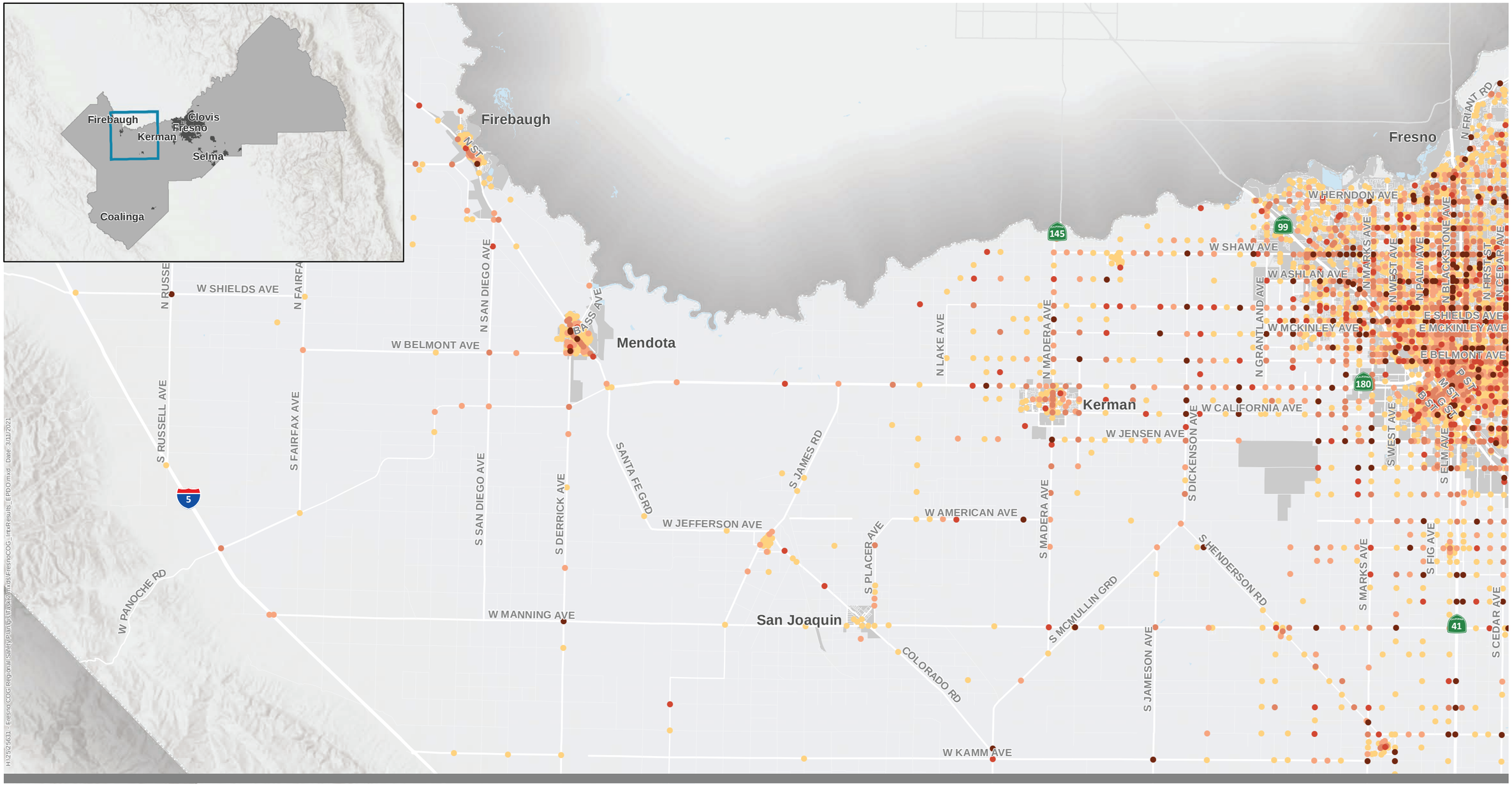
Figure 9.2 Intersection Crash Severity Score Screening by Percentile, Countywide



Collision Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 3 Miles

KITTELSON & ASSOCIATES

Figure 9.3 Intersection Crash Severity Score Screening by Percentile, Countywide

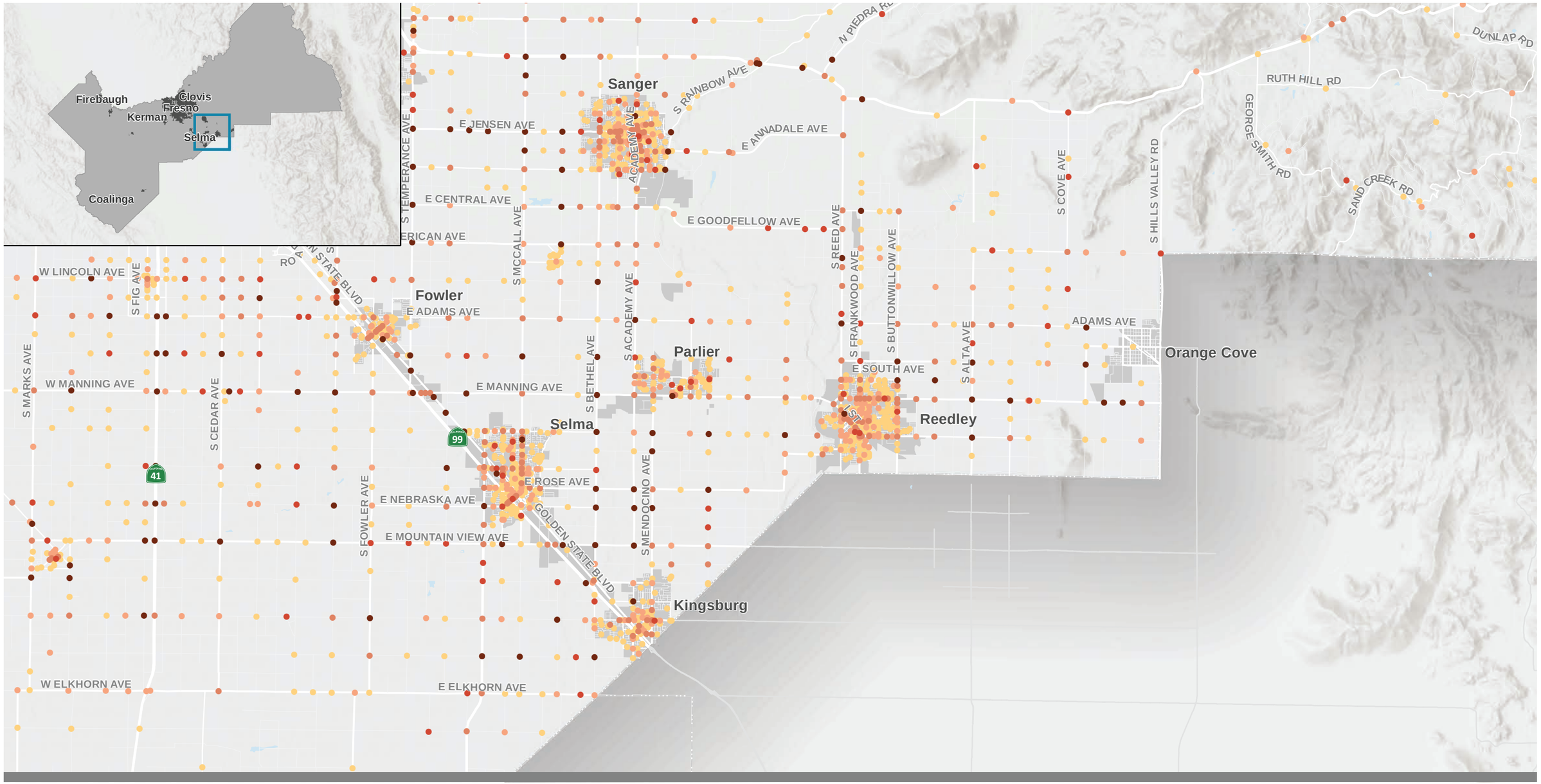


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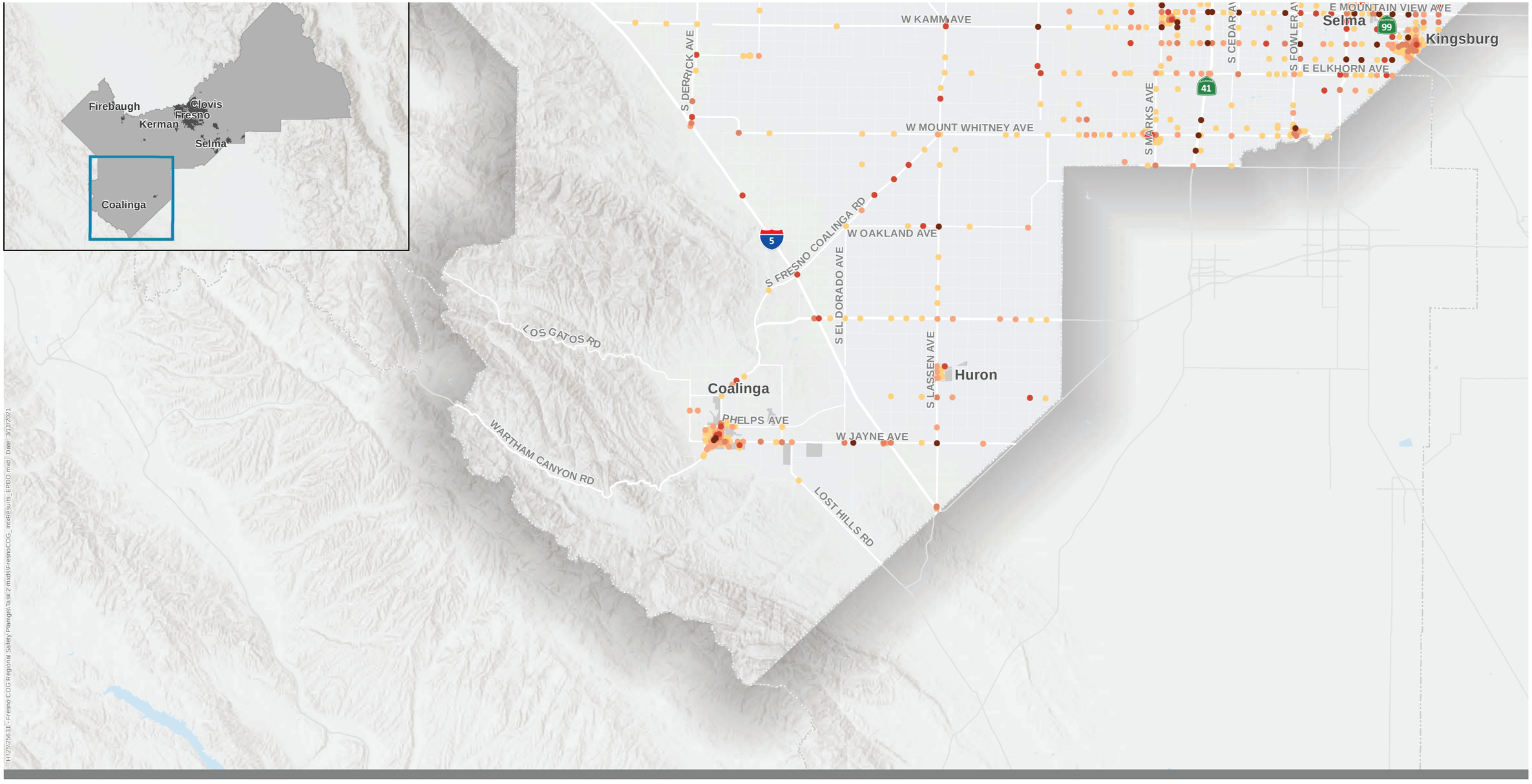
Figure 9.4 Intersection Crash Severity Score Screening by Percentile, Countywide



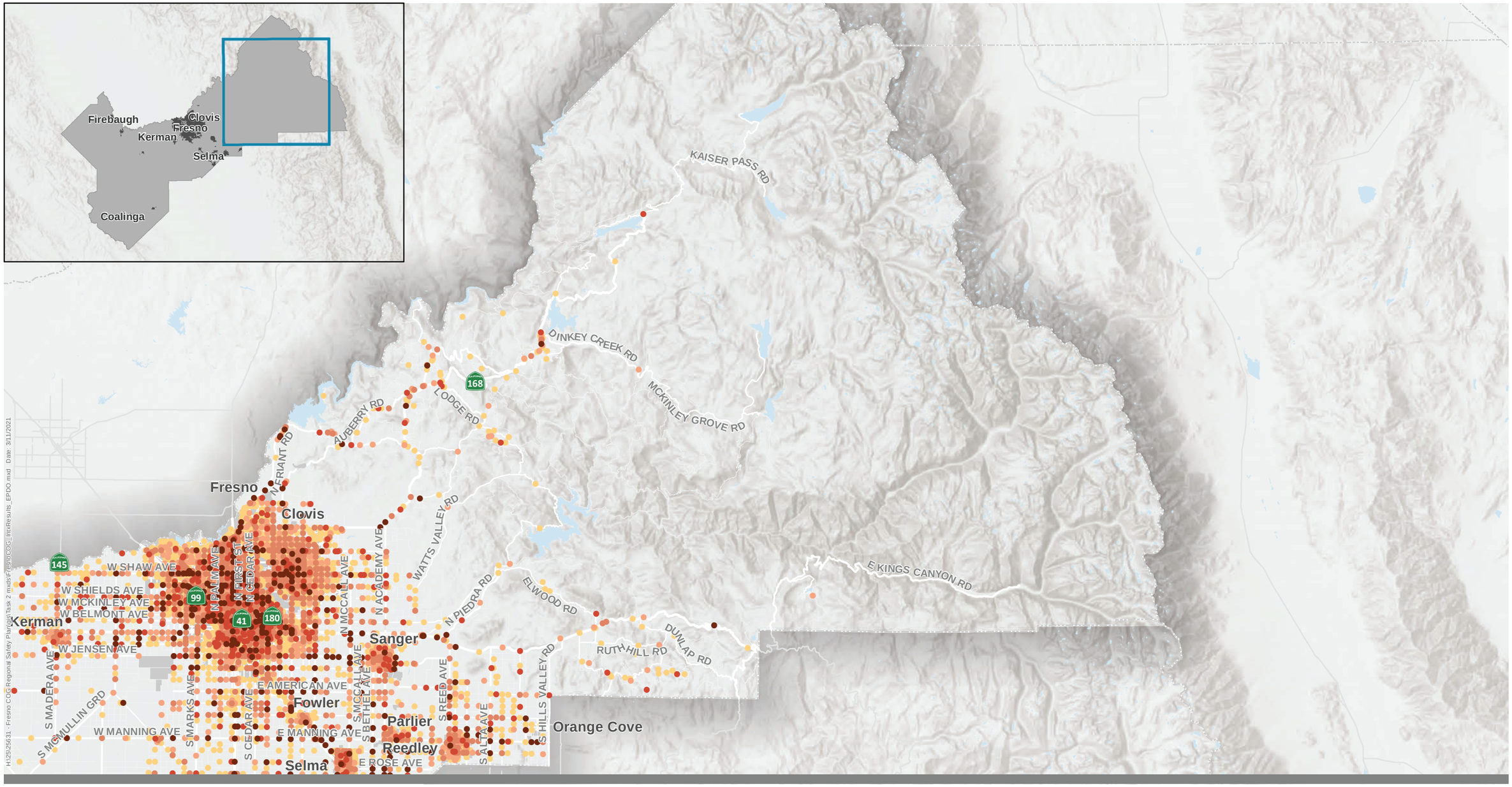
Collision Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 6 Miles

KITTELSON & ASSOCIATES

Figure 9.5 Intersection Crash Severity Score Screening by Percentile, Countywide



Collision Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile

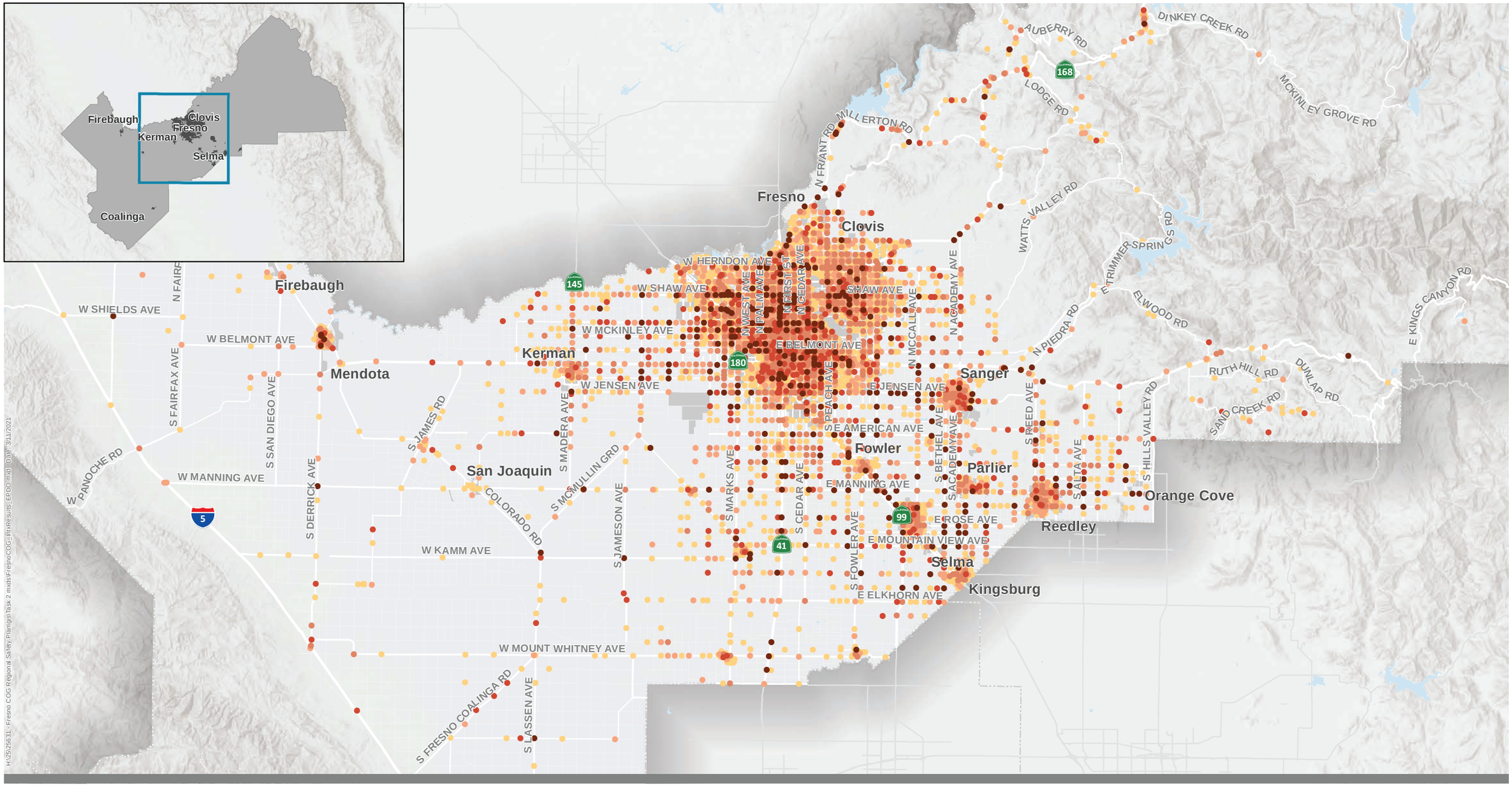
City Limits

County Boundary

0 9 Miles

KITTELSON & ASSOCIATES

Figure 9.6 Intersection Crash Severity Score Screening by Percentile, Countywide



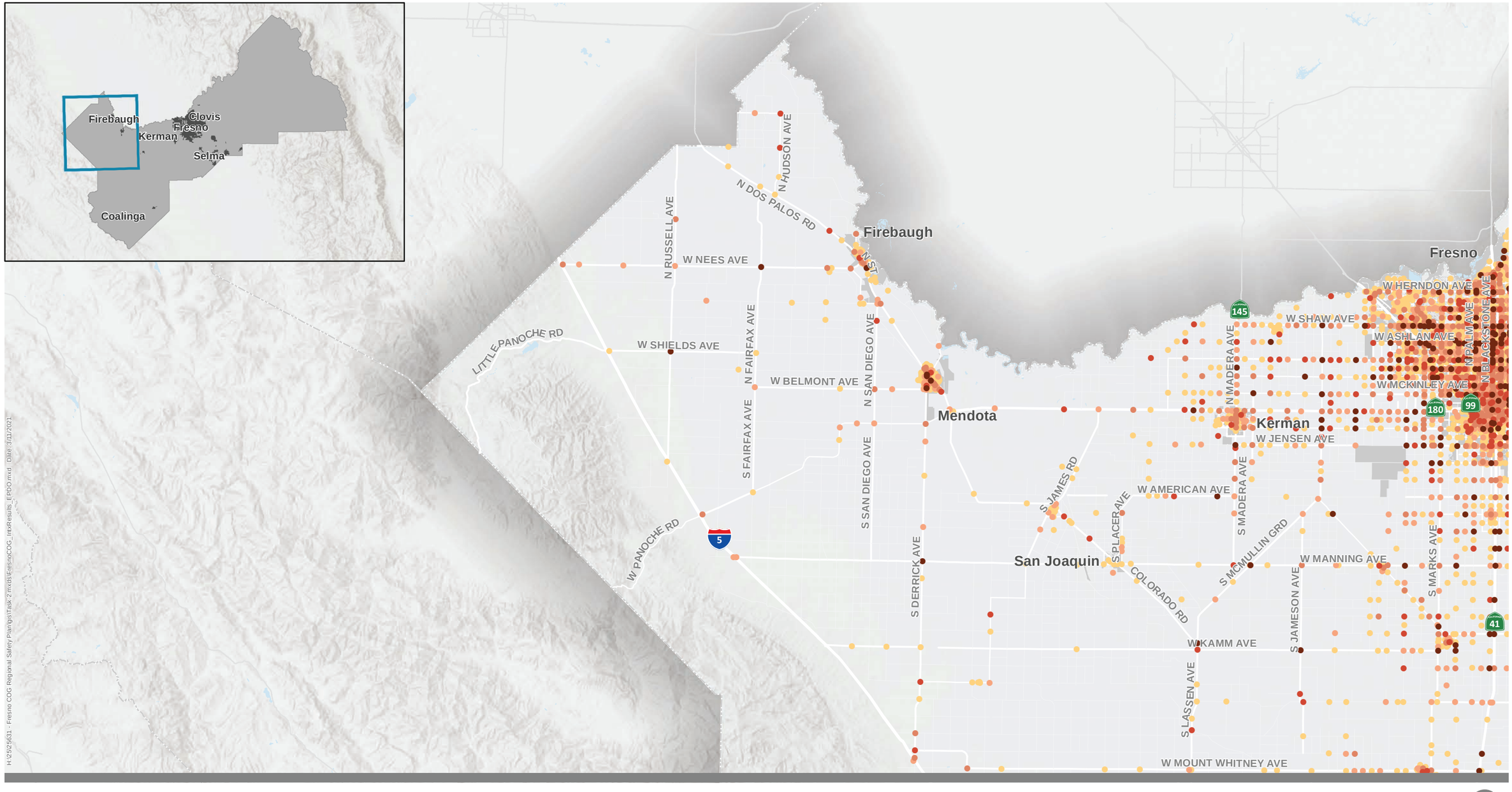
Collision Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 6 Miles

KITTELSON & ASSOCIATES

Figure 9.7 Intersection Crash Severity Score Screening by Percentile, Countywide



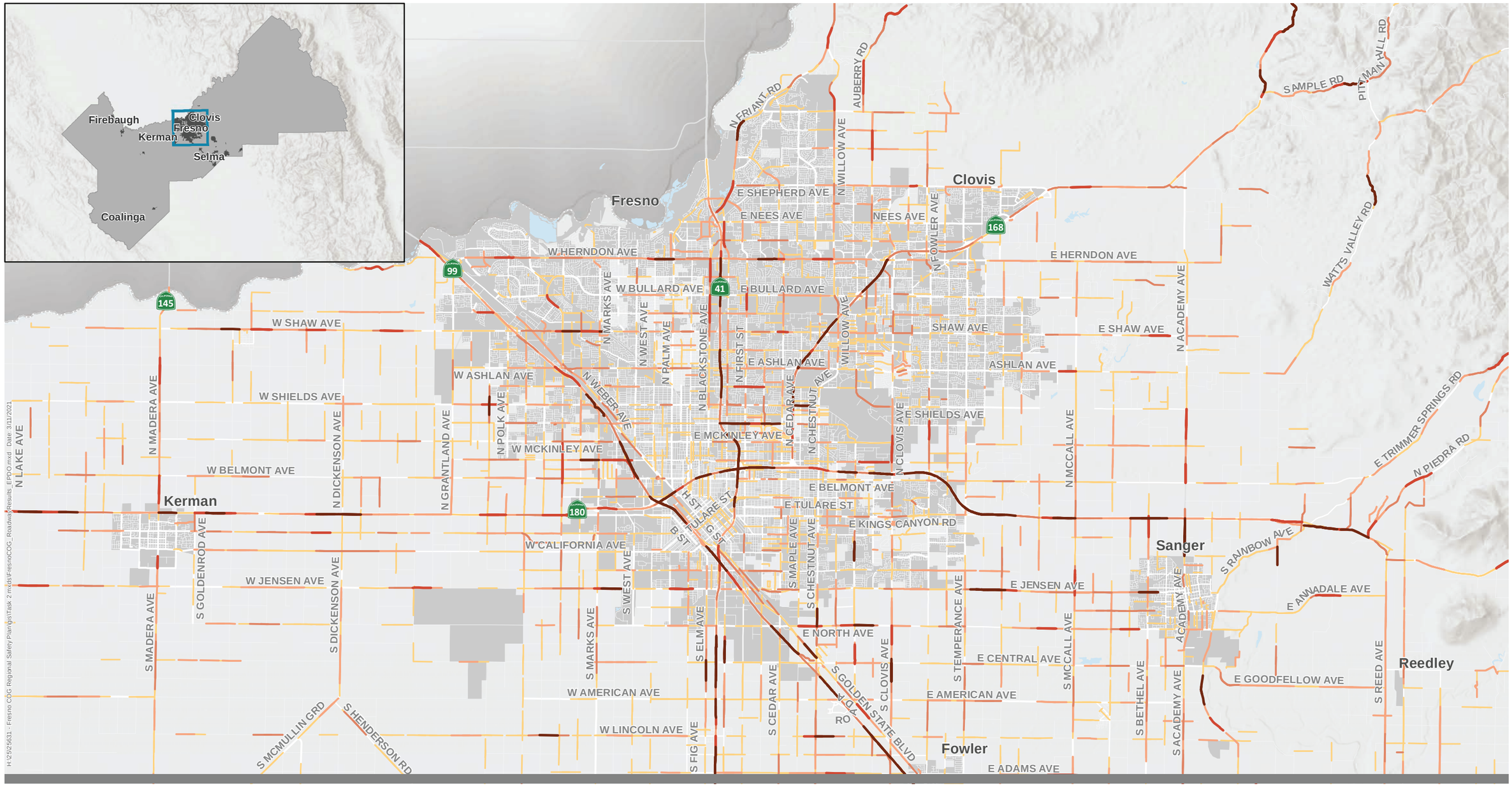
Collision Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 6 Miles

KITTELSON & ASSOCIATES

Figure 10.1 Roadway Crash Severity Score Screening by Percentile, Countywide



Collision Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 2.7 Miles

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Figure 10.2 Roadway Crash Severity Score Screening by Percentile, Countywide

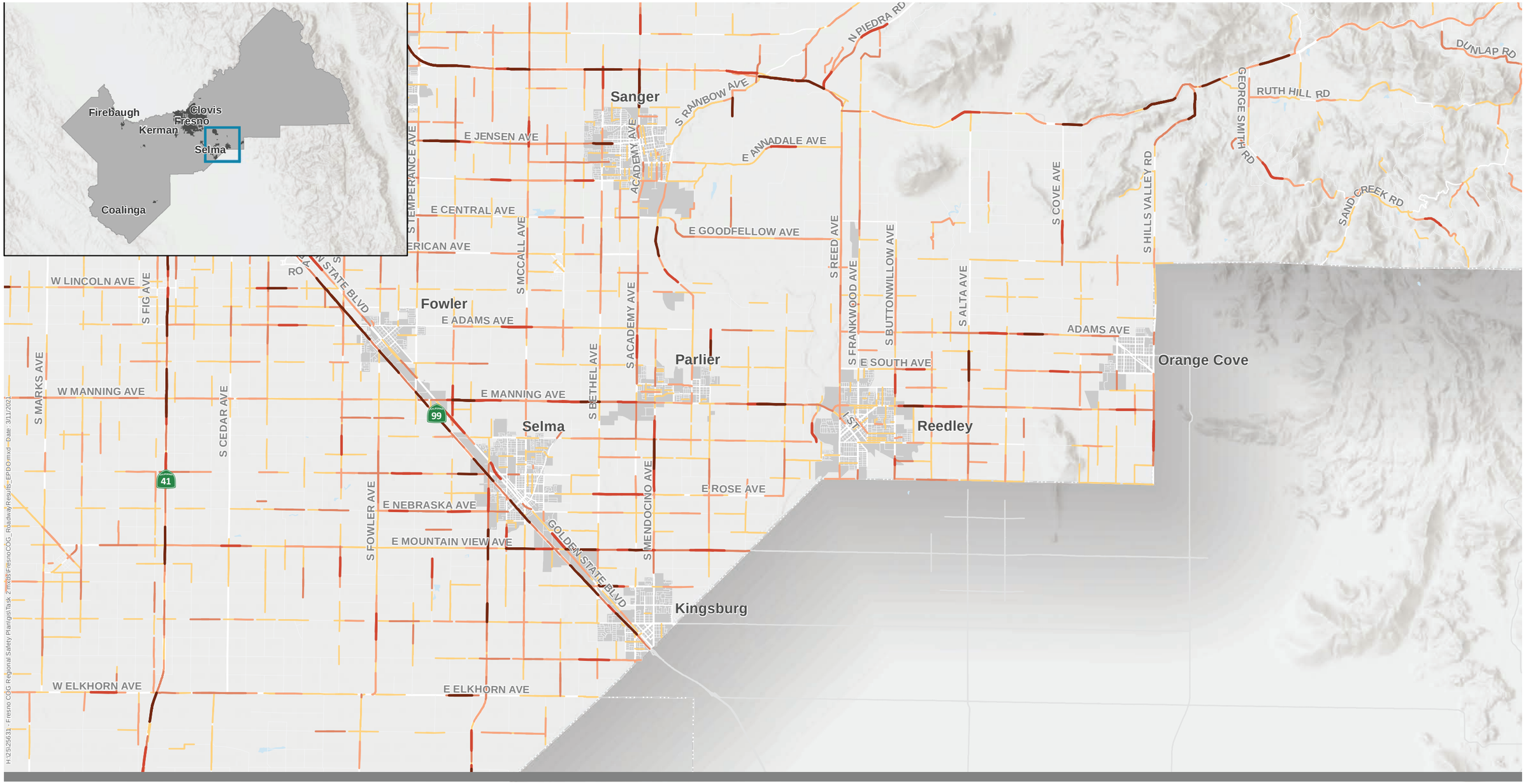
Collision Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 3 Miles

KITTELSON & ASSOCIATES

Figure 10.3 Roadway Crash Severity Score Screening by Percentile, Countywide



Collision Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 2.85 Miles

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Figure 10.4 Roadway Crash Severity Score Screening by Percentile, Countywide

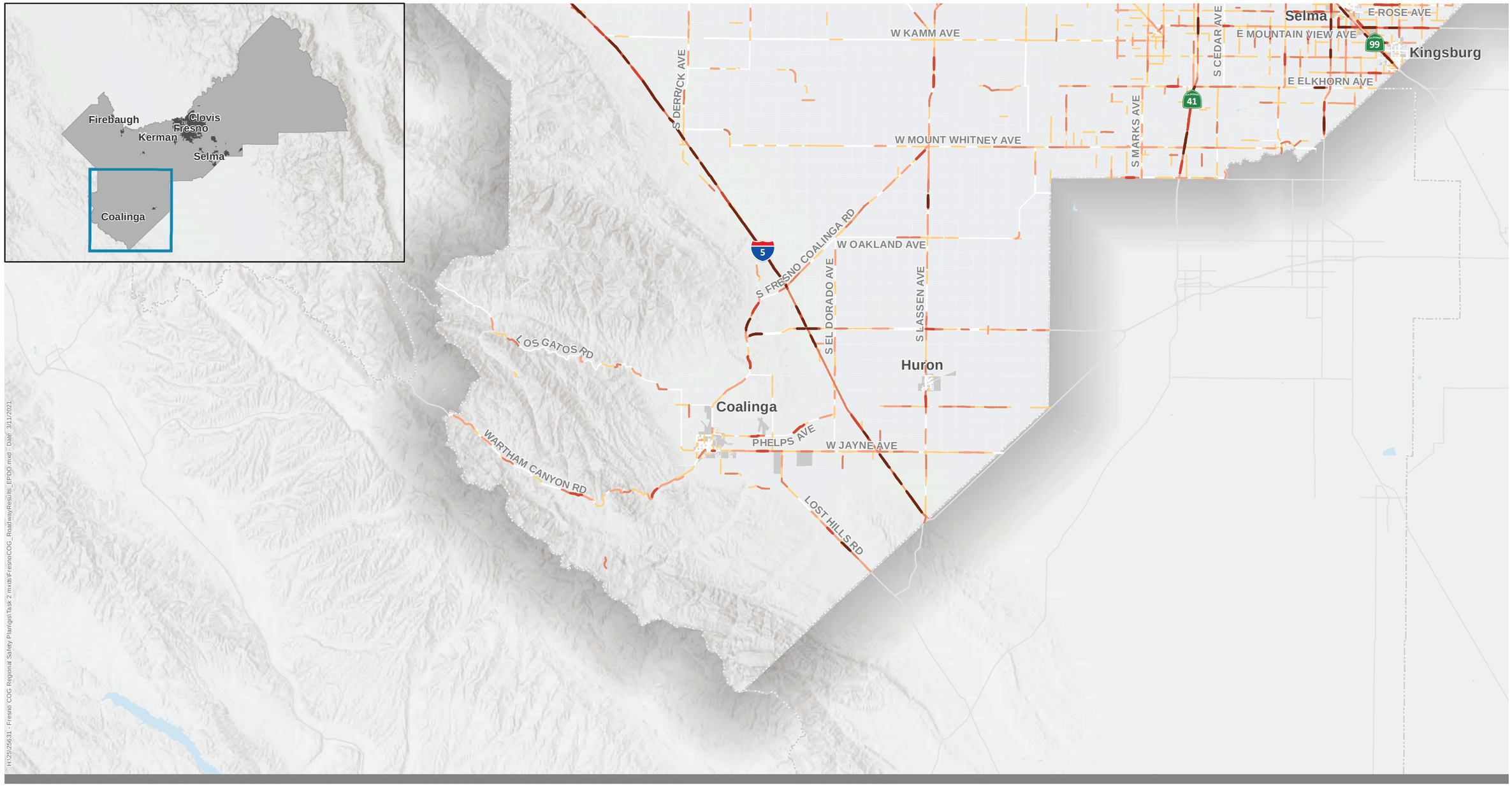
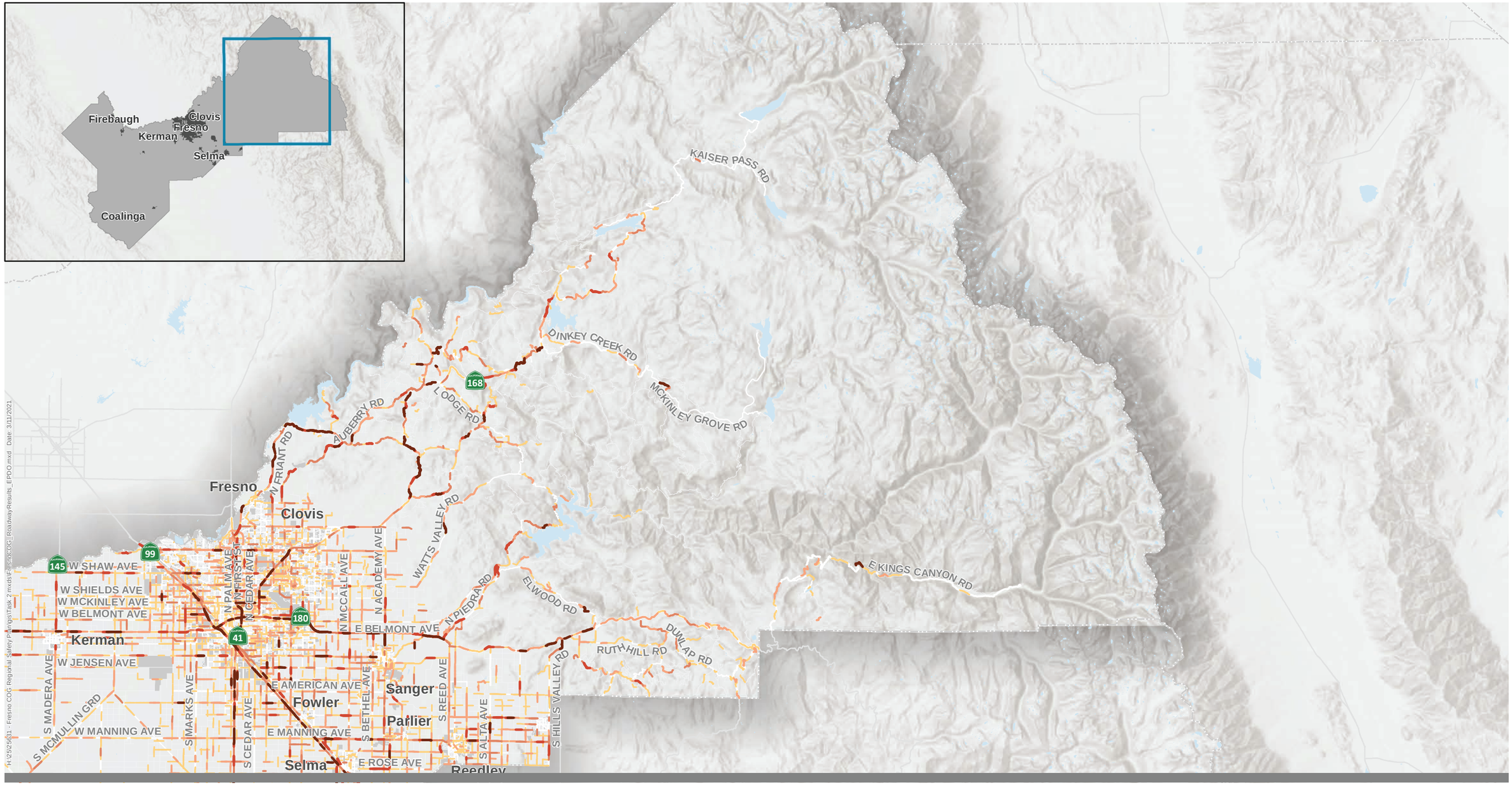


Figure 10.5 Roadway Crash Severity Score Screening by Percentile, Countywide



Collision Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 7.5 Miles

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Figure 10.6 Roadway Crash Severity Score Screening by Percentile, Countywide

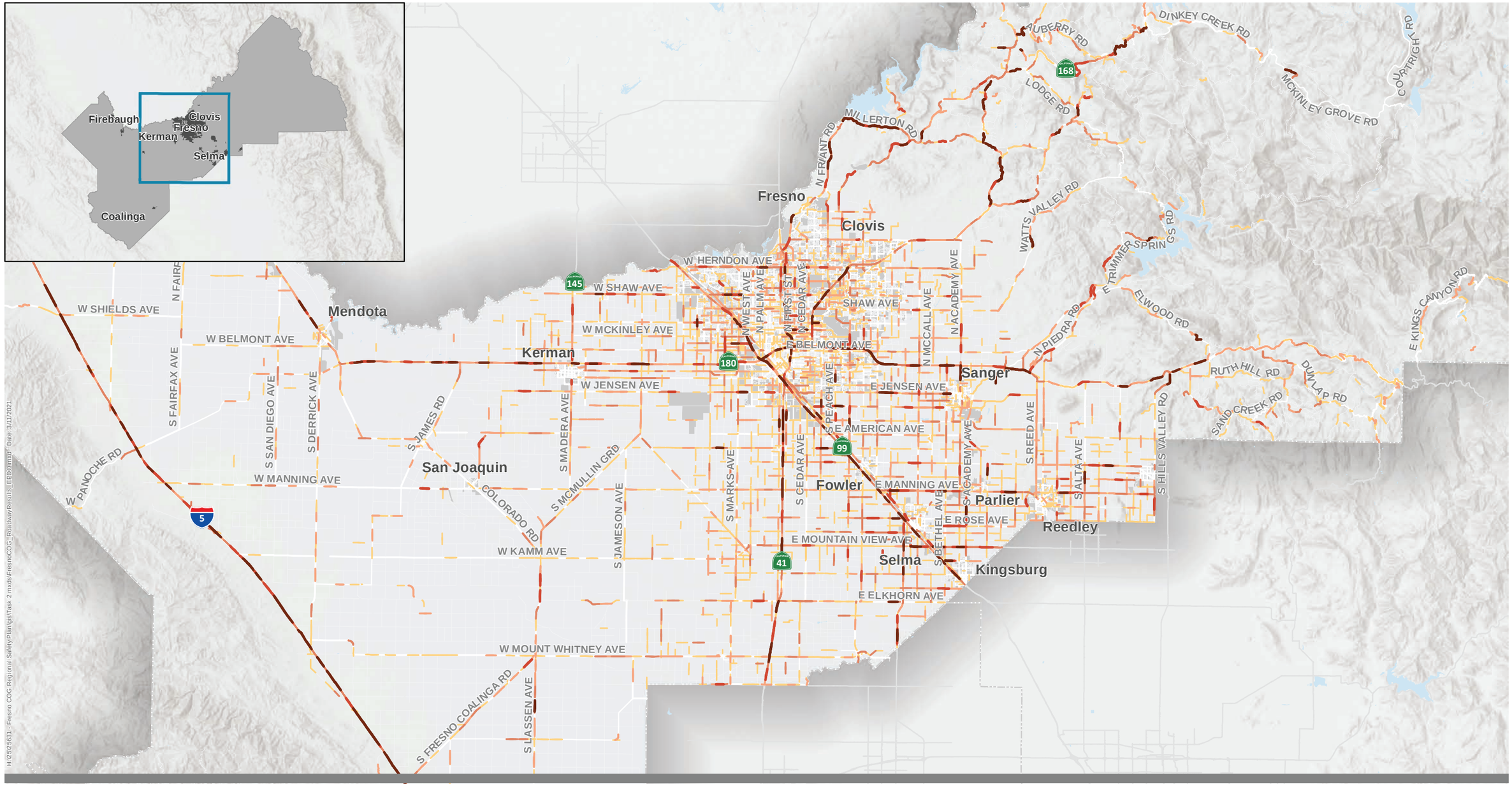
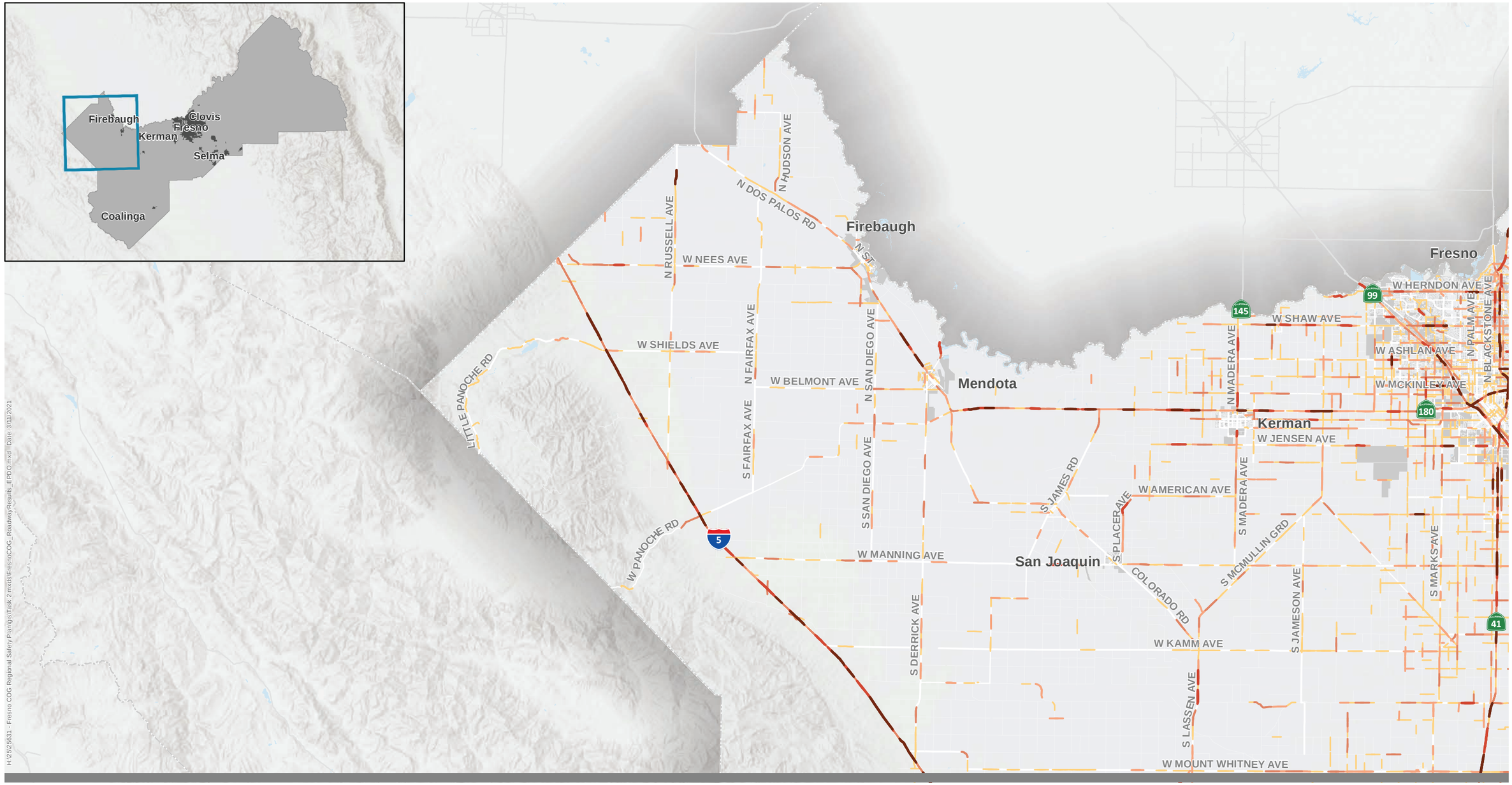


Figure 10.7 Roadway Crash Severity Score Screening by Percentile, Countywide



Collision Severity Scores

- 95-100th Percentile
- 90-95th Percentile
- 75-90th Percentile
- 50-75th Percentile
- 0-50th Percentile
- City Limits
- County Boundary

0 6 Miles

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5. RECOMMENDATIONS

Improving roadway safety regionwide will take coordinated effort. This section presents multidisciplinary recommendations for the COG and its member agencies to consider as they make investments and advancements in improving roadway safety across the region. The recommendations are organized into the following categories:

ENGINEERING STRATEGIES

EDUCATION AND PROMOTION STRATEGIES

EQUITABLE ENFORCEMENT STRATEGIES

EMERGENCY SERVICES STRATEGIES

The strategies presented below have been chosen based on regional safety performance. As conditions change over time in the region and as the transportation planning and engineering profession's approach to roadway safety progresses, the strategies in this section should be reviewed and updated to remain relevant and useful to the COG and its member agencies.

5.1 ENGINEERING STRATEGIES

Fresno County is diverse in its communities, land use development, roadway types, and infrastructure. The engineering strategies outlined in this section form a Regional Countermeasures Toolbox of potential countermeasures the COG and its member agencies can consider using to improve roadway safety. Also included in this section are concept designs for 20 different locations in the region illustrating potential safety improvements. The concept designs are illustrative examples of how the countermeasures in the Regional Countermeasure Toolbox can be applied to a variety of locations across the region. The complete Toolbox is available in Appendix C.

5.1.1 RECOMMENDED ENGINEERING COUNTERMEASURES

These countermeasures were selected based on the crash patterns and trends described in the previous section. A more detailed description of the countermeasures was prepared as a part of the Countermeasures and Safety Strategies Memorandum (July 2021) which is included in Appendix D.

Table 2 briefly describes each countermeasure, the type of crashes it is intended to address, the crash reduction factor (CRF), and whether the countermeasure is eligible for federal funding. Information regarding the estimated crash reduction and eligibility for federal funding is from the Local Roadway Safety Manual for California's Local Road Owners (LRSM, 2020), unless otherwise noted.

Table 2. Engineering Countermeasures

Countermeasure	Estimated Cost	Federal Funding Eligibility	Potential CRF	Types of Crashes Applied To	Brief Description
Roadway Segments					
Street Lighting (R1)	$7,000 - $10,000 per light	Yes (100%)	35%	Darkness	Improves visibility of non-motorized users and reduces potential conflicts and crashes. Improves driver's perception-reaction time.
Remove or Relocate Fixed Objects Outside of Clear Recovery Zone (R2)	$200 -$10,000 per object	Yes (90%)	35%	Hit object Unsafe speed	Provides a clear recovery zone that allows drivers to correct their path of travel when they leave the roadway.
Install Guardrail (R4)	$9.50 - $39 per linear foot of guardrail	Yes (100%)	25%	Hit object Unsafe speed	Reduces the frequency and severity of lane departure crashes by preventing vehicles from leaving the roadside.
Install Raised Median (R8)	$15,000 - $30,000 per 100 feet of the roadway	Yes (90%)	25%	Improper turning	Controls and restricts left turns and U-turns except at designated locations. Reduces turning-movement conflicts and the friction of opposing traffic streams.
Road Diet (R14)	$6-$10 per linear foot (changes to pavement markings only)	Yes (90%)	30%	Head-on Hit object Unsafe speed	Reducing the number of vehicle lanes manages vehicle speeds and reduces crash risk for all road users. Enables space for bicycle lanes and sidewalks.
Widen Shoulder (R15)	$10 per ft of added width per ft lane	Yes (90%)	30%	Hit object Unsafe speed	Gives a driver departing from a travel lane more time and space to correct their path. Provides a buffer space from objects such as guardrails, trees, and signs, reducing the likelihood of hit object and run-off-road crashes.
Improve Pavement Friction (High Friction Surface Treatment) (R21)	$35 per square yard	Yes (10%)	55%	Run-off-road (related to horizontal curves) Hard-breaking at intersection approaches	Improves pavement friction or skid resistance and gives a driver who is skidding more control and time to react.
Install/Upgrade Signs with New Fluorescent Sheeting (R22)	$500 per sign	Yes (100%)	15%	Hit object Unsafe speed Darkness	Gives drivers a visual warning of the presence of a specific roadway feature or regulatory requirement they may have missed with existing signs.

Countermeasure	Estimated Cost	Federal Funding Eligibility	Potential CRF	Types of Crashes Applied To	Brief Description
Install Dynamic/ Variable Speed Warning Signs (R26)	$2,000 - $11,000 per sign	Yes (100%)	30%	Hit object Unsafe speed	Displays a message when drivers exceed a certain speed threshold (or posted speed limit) when approaching a sharp curve.
Install Edgelines and Centerlines (R28)	$4 per linear foot	Yes (100%)	25%	Run-off-road (related to horizontal curves) Hit-object Unsafe speed	Helps clarify and increase visibility of road and lane boundaries. Helps drivers who depart the roadway or travel lane.
Install Centerline Rumble Strips/ Stripes (R30)	$0.70 per linear foot	Yes (100%)	20%	Head-on Sideswipe Unsafe speed	Alerts drivers who are drifting out of their travel lane before they cross the centerline, giving them time to correct and stay in their lane.
Install Edge line Rumble Strips/ Stripes (R31)	$0.70 linear foot	Yes (100%)	15%	Hit object Unsafe speed	Alerts drivers who are drifting out of their travel lane before they depart the roadway, giving them time to correct and stay in their lane.
Install Transverse Rumble Strips	$200 per location	Yes (90%)	20%	Broadside	Alerts drivers they are approaching a stop-controlled intersection that may be unexpected due to location on rural roadway or recurring fog conditions.
Convert Intersection to Roundabout (from signal) (S16)	$4,000,000 - $8,000,000 per intersection	Yes (100%)	35-67%	Broadside Unsafe speed	Roundabout has fewer conflict points compared to conventional intersections. Forces drivers to reduce speeds as they proceed through the intersection, which helps reduce crash severity.
Install Dynamic Regulatory Speed Warning Signs	$2,000 - $11,000 per sign	No	N/A	Hit object Unsafe speed	Displays a message to drivers exceeding a certain speed threshold (or posted speed limit) in urban areas. Provides a visual warning they may be traveling over the recommended speed for the roadway.
Install Variable Message Sign	$8,000 - $30,000 per sign	No	17%	Near roadway construction During rain or fog, or other events that temporary affect travel conditions	Electronic roadside signs post traveler information messages to inform drivers of crashes, travel times, detours, special events, weather conditions, road construction, and other useful road condition or travel information.

Countermeasure	Estimated Cost	Federal Funding Eligibility	Potential CRF	Types of Crashes Applied To	Brief Description
Intersections					
Add Intersection Lighting at Intersections (S1/NS1)	$7,000 - $10,000 per light	Yes (100%)	40%	Darkness	Improves visibility of non-motorized users to drivers and reduces potential conflicts and crashes.
Improve Signal Hardware - Lenses, Backplates with Retroreflective Border, Mounting Size, Number (S2)	$6,000 - $12,000 per intersection	Yes (100%)	15%	Broadside	Warns drivers of the upcoming signalized intersections by making signal heads more visible in daytime and nighttime conditions.
Provide Advanced Dilemma-Zone Detection (S4)	$5,000 - $25,000 per approach	Yes (100%)	40%	Rear-end Hard-stopping at intersection approaches	Detection system modifies signal timing to reduce the numbers of drivers needing to make a stopping decision and reduces the potential for conflicts due to phase changes.
Install/Upgrade Stop Signs or Intersection Warning/ Regulatory Signs (NS6)	$450 - $1,020 per sign	Yes (100%)	15%	Broadside	Larger stop, warning, or regulatory signs increases drivers' awareness at intersections and/ or approaches.
Upgrade Intersection Pavement Markings (NS7)	$500 - $5,000 per approach	Yes (100%)	25%	Broadside	Increases intersection visibility for approaching drivers and reduces potential conflicts by clarifying the intersection's footprint.
Install Flashing Beacons as Advance Warning (S10/NS9)	$5,000 - $25,000	Yes (100%)	30%	Rear-end Broadside Unsafe speed	Provides drivers advance warning of the presence of a traffic signal or stop sign at an intersection and reduces driver non-compliance with traffic control.
Install Splitter Islands for Minor Street Approaches (NS 13)	$10,000 per approach	Yes (90%)	40%	Broadside	Creates a physical separation between vehicles turning onto the stop-controlled approach and vehicles stopped on that same approach. Increases visibility of intersections, clarifies movements, provides space for a secondary stop sign on the approach.
No Turn on Red	$500-$5,000	No	7%	Non-yielding to crossing pedestrians and bicyclists	Prohibits vehicles from turning right when pedestrians have the right of way to cross the adjacent street.
Pedestrian and Bicycle					
Install Bike Lanes (R32 PB)	10$ per foot	Yes (90%)	35%	Bicycle	Provides greater separation from an adjacent traffic lane or on-street parking for bicyclists.

Countermeasure	Estimated Cost	Federal Funding Eligibility	Potential CRF	Types of Crashes Applied To	Brief Description
Install Sidewalk/ Pathway (R34 PB)	$25 per ft	Yes (90%)	80%	Pedestrian walking in road	Helps increase pedestrian comfort and their visibility. Helps prevent vehicles from departing the roadway and striking pedestrians
Install/Upgrade Pedestrian Crossing with Enhanced Features (R35 PB)	$60,000 - $160,000 per crossing	Yes (90%)	35%	Pedestrian crossing a road	Indicates preferred crossing locations for pedestrians and increases the visibility of those locations. Increases both pedestrian and driver awareness and emphasizes that drivers are required to yield the right of way to crossing pedestrians.
Install Pedestrian Countdown Signal Heads (S17 PB)	$1,800 per signal head	Yes (100%)	25%	Pedestrian crossing at intersections	Informs pedestrians about whether they have enough time to cross a road, thus reducing vehicle-pedestrian conflicts.
Install Pedestrian Crossing (S18 PB/NS 20 PB)	$2,500 - $8,000 per crossing	Yes (100%)	25%	Pedestrian crossing a road	Alerts drivers and enhances pedestrian and bicycle safety at pedestrian crossings.
Modify Signal Phasing to Implement a Leading Pedestrian Interval (S21 PB)	$550 - $6,000	Yes (100%)	60%	Pedestrian crossing at intersections	Gives pedestrians a head start when crossing at a signalized intersection, which increases driver awareness of pedestrians.
Install Pedestrian Refuge Islands (NS19 PB)	$120 per foot	Yes (90%)	45%	Pedestrian and bicyclist	Provides dedicated areas for pedestrians and bicyclists between vehicle travel lanes at intersections and mid-block locations
Install/Upgrade Pedestrian Crossing at Uncontrolled Locations (with Enhanced Safety Features) (NS21 PB)	$60,000 - $160,000	Yes (100%)	35%	Pedestrian crossing a road	Alerts drivers of crossing pedestrians with high visibility markings, warning signs, flashing beacons; and provides pedestrian refuge islands.
Bike Lane Extension Through Intersections	$200 - $5,000 per intersection	No	39%	Bicyclists at intersections	Guides bicyclists on a safe and direct path through an intersection. Draws clear boundary between paths of bicyclists and motorists.
Bike Boxes	$5,000 per box	No	35%	Bicyclists at intersections	Gives bicyclists a safe, visible way to get ahead of queuing motor vehicle traffic during the red signal phase.

5.1.2 EXAMPLE APPLICATIONS OF COUNTERMEASURE TOOLBOX

A mix of intersections and roadway segments from different parts of the county were selected to illustrate how the Regional Countermeasure Toolbox can be applied.

These 20 example locations were selected based on severity score (calculated as described under Section 4.2.3) and geographic location (e.g., east and west side cities, unincorporated county). The social equity index for the immediate surrounding community was also considered. The example locations selected are listed in full below.

Intersections

- Bethel Avenue & Dinuba Avenue, unincorporated Fresno County (unsignalized)
- Marks Avenue & Jensen Avenue, unincorporated Fresno County (unsignalized)
- McMullin Grade & Manning Avenue, unincorporated County (unsignalized)
- Bethel & Mountain View, Kingsburg (signalized)
- N Street & Saipan, Firebaugh (unsignalized)
- Shields Avenue & Chestnut Avenue, Fresno (signalized)
- Palm Avenue & Belmont Avenue, Fresno (signalized)
- Olive Avenue & Maple Avenue, Fresno (signalized)
- Ashlan Avenue & Fowler Avenue, Clovis (signalized)
- Clovis Avenue & Barstow Avenue (and Railroad Avenue & Barstow Avenue), Clovis (signalized)
- Barstow Avenue & Sunnyside Avenue, Clovis (signalized)
- Newmark Avenue & Annadale Avenue, Sanger (unsignalized)
- Derrick Avenue & Naples Street, Mendota (unsignalized)
- Whitson Street & Cinema Way/Gaither Street, Selma (unsignalized)
- Elm Avenue & First Avenue & Van Ness Street, Coalinga (unsignalized)

Roadway Segments

- State Route 33 from W Shaw Avenue to Lozano
- Shields Avenue from State 168 NB Ramp Terminal to Chestnut Avenue
- Whitesbridge Avenue from Madera Avenue to Vineland Avenue
- Jensen Avenue, Indianola Avenue to Greenwood Avenue
- Sunnyside Avenue, Birch Avenue to Herndon Avenue

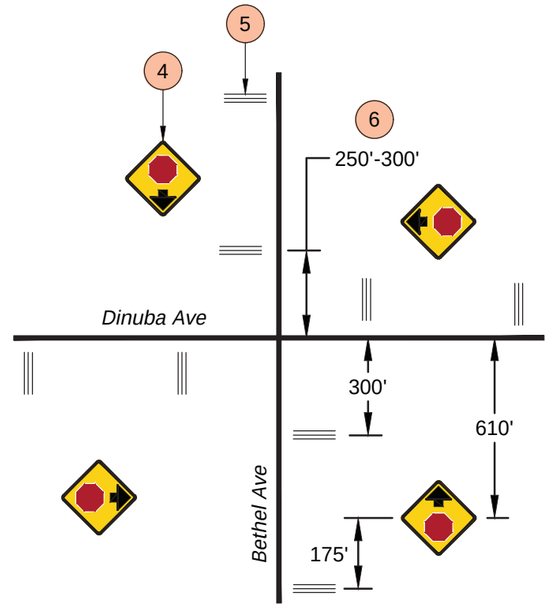
Figures 11 through Figure 32 show the concept designs for the locations. The concept designs are illustrative examples of potential countermeasures and are included in the RSP as ideas for consideration only. The agencies that own and operate these facilities have full decision-making authority regarding the appropriateness and feasibility of the potential improvements illustrated. The agencies that own and operate these facilities may choose to advance some or none of the concepts shown.

Some locations selected include Caltrans facilities. Caltrans has a well-established process for identifying locations with a crash frequency greater than expected given crash history at other similar locations. At the pre-project planning level, Caltrans currently uses the Safety Index (SI) to identify locations with statistically high crash rates. The analysis is conducted using Caltrans' Project Management and Control System (PMCS) and crash data from Caltrans' Traffic Accident Surveillance Analysis System (TASAS) database. The locations that are identified through those processes are developed into projects with a focus on improving safety and are prioritized based on their relative Safety Index value. The existing road safety management activities also include guidance for investigating those locations, identifying potential changes, and evaluating the potential effectiveness of different treatments. Much of that guidance is captured in Caltrans' existing Highway Safety Improvement Program Guidelines (2014) and Caltrans' Safety Investigations Manual. As a result of these current practices and processes, it should be noted that locations that are identified as high priorities for this Regional Safety Plan from a safety perspective may be lower priorities from a regional, Caltrans district, or statewide perspective. As a result, there may be sites within Fresno County, Caltrans District 6, or statewide that represent greater opportunities for safety improvements.

Figure 11. Bethel Avenue/Dinuba Avenue Concept Design

Recommended Treatments

1. Add/upgrade intersection lighting (LRSM ID: NS01)
2. Install additional stop signs (LRSM ID: NS06)
3. Install angled stop bars to the edge of pavement
4. Install flashing beacons with Stop Ahead sign to provide advanced warning (LRSM ID: NS09)
5. Install transverse rumble strips on approaches (LRSM ID: NS10)
6. Upgrade pavement markings to improve delineation (LRSM ID: NS07)



Not to Scale

N

Scale: 1" = 40'

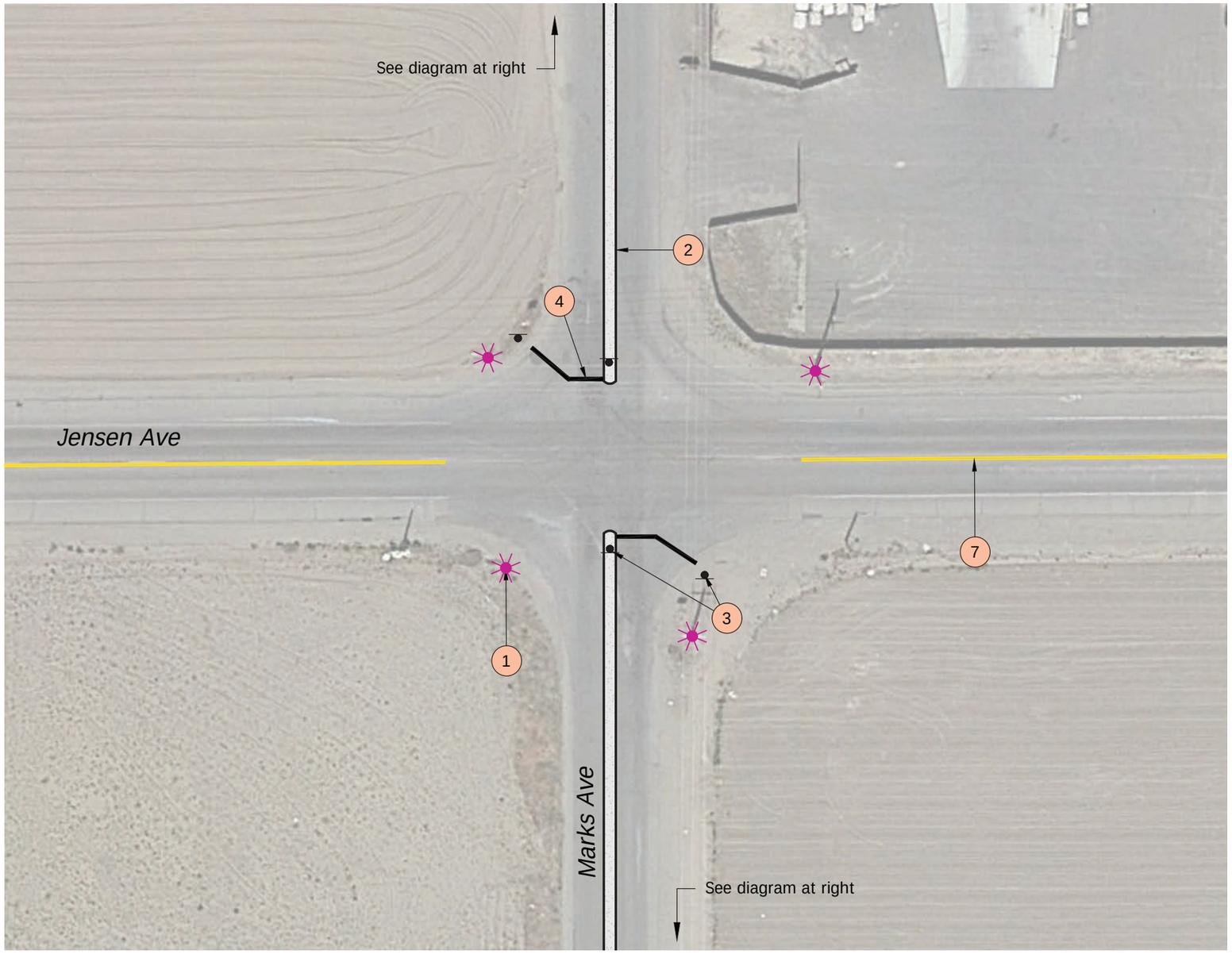
40 20 0 40

Note

Proposed white pavement markings are shown in black for clarity.

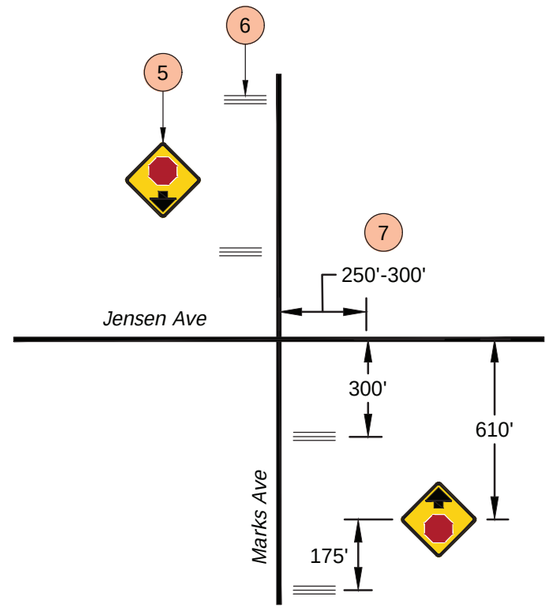
Unsignalized Intersection Treatments
Bethel Avenue / Dinuba Avenue
Fresno County, CA

Figure 12. Marks Avenue/Jensen Avenue Concept Design



Recommended Treatments

1. Add/upgrade intersection lighting (LRSM ID: NS01)
2. Install splitter islands on minor road approaches (LRSM ID: NS13)
3. Install additional stop signs (LRSM ID: NS06)
4. Install angled stop bars to the edge of pavement
5. Install flashing beacons with Stop Ahead sign to provide advanced warning (LRSM ID: NS09)
6. Install transverse rumble strips on approaches (LRSM ID: NS10)
7. Upgrade pavement markings to improve delineation (LRSM ID: NS07)



Not to Scale

N

Scale: 1" = 40'

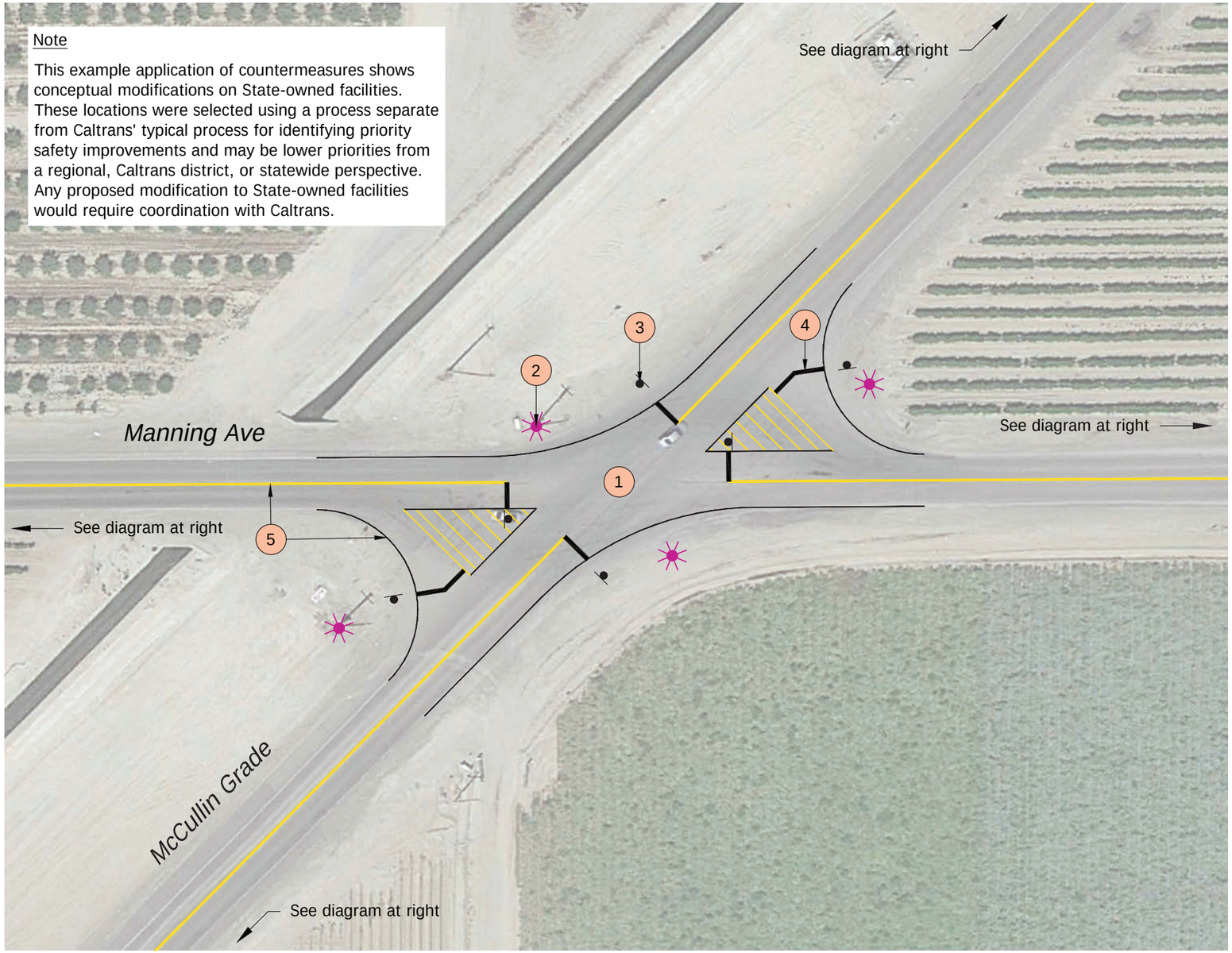
40 20 0 40

Note

Proposed white pavement markings are shown in black for clarity.

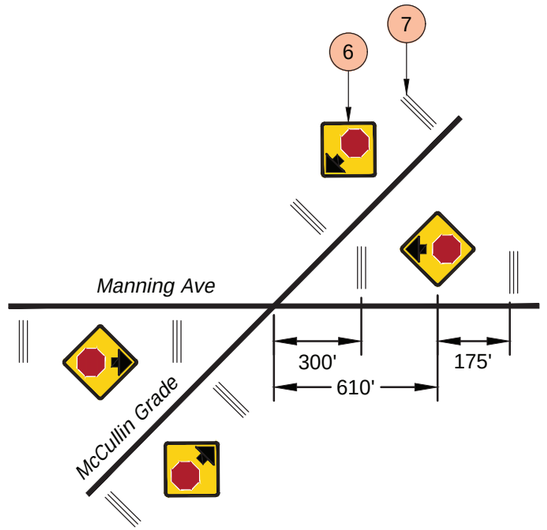
Unsignalized Intersection Treatments
Marks Avenue / Jensen Avenue
Fresno County, CA

Figure 13. McCullin Grade/Manning Avenue Concept Design



Recommended Treatments

1. Convert intersection to all-way stop control (LRSM ID: NS02)
2. Add/upgrade intersection lighting (LRSM ID: NS01)
3. Install additional stop signs (LRSM ID: NS06)
4. Install stop bars
5. Upgrade pavement markings to improve delineation (LRSM ID: NS07)
6. Install flashing beacons with Stop Ahead sign to provide advanced warning (LRSM ID: NS09)
7. Install transverse rumble strips on approaches (LRSM ID: NS10)



Not to Scale

N

Scale: 1" = 60'

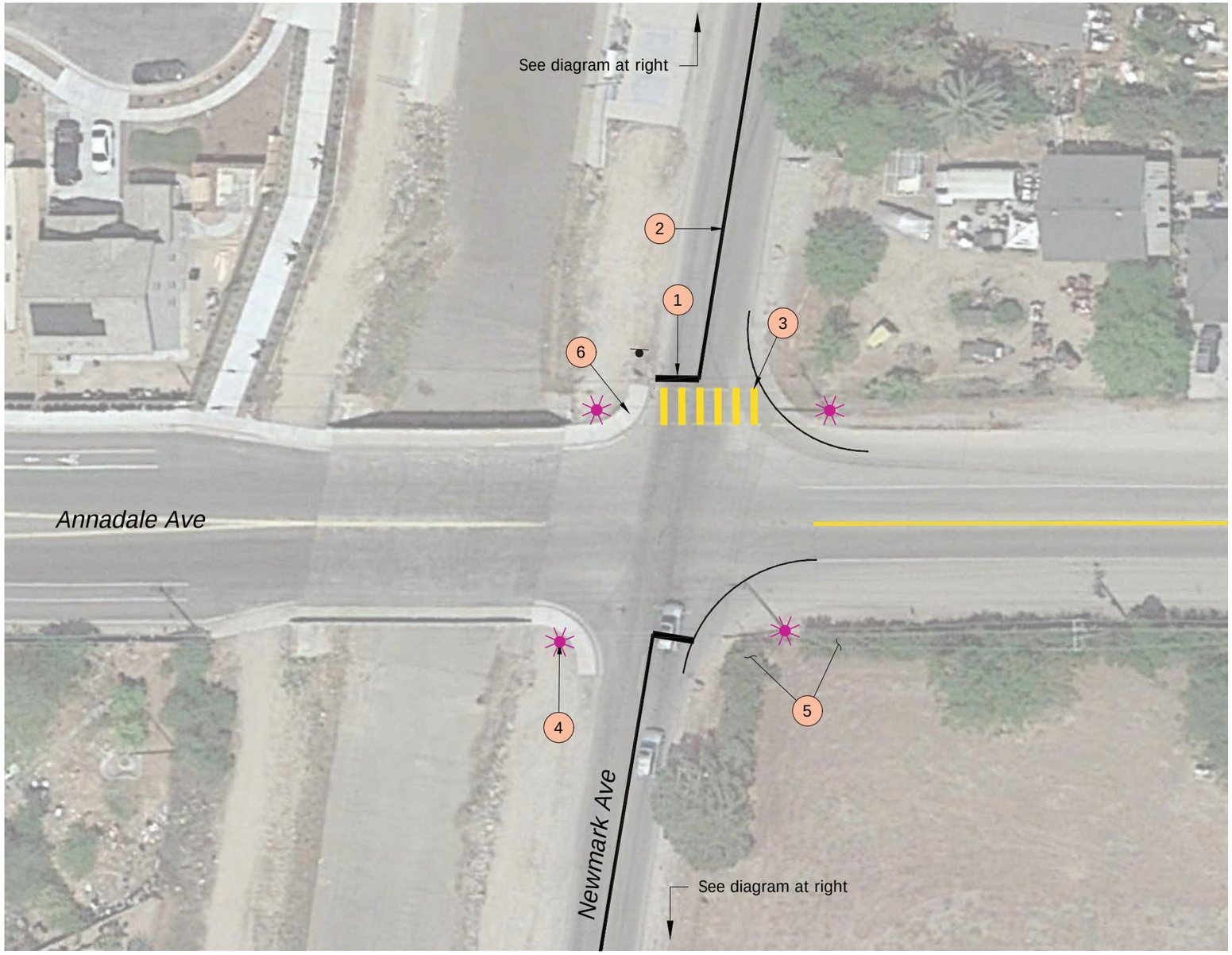
60 30 0 60

Note

Proposed white pavement markings are shown in black for clarity.

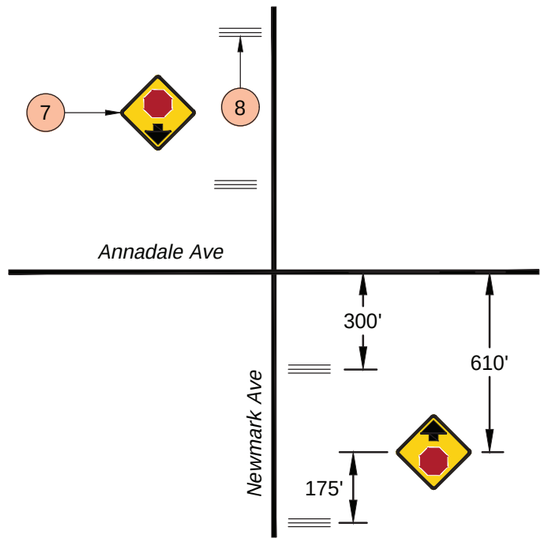
Unsignalized Intersection Treatments
McCullin Grade/ Manning Avenue
Fresno County, CA

Figure 14. Newmark Avenue/Annadale Avenue Concept Design



Recommended Treatments

1. Install advanced stop bar before crosswalk (LRSM ID: S20PB)
2. Install traffic separator on minor road approaches
3. Install yellow High Visibility Crosswalk
4. Add/upgrade intersection lighting (LRSM ID: NS01)
5. Consider vegetation maintenance to improve visibility
6. Install ADA-compliant curb ramp
7. Install flashing beacons with Stop Ahead sign to provide advanced warning (LRSM ID: NS09)
8. Install transverse rumble strips on approaches (LRSM ID: NS10)



Not to Scale

N

Scale: 1" = 40'

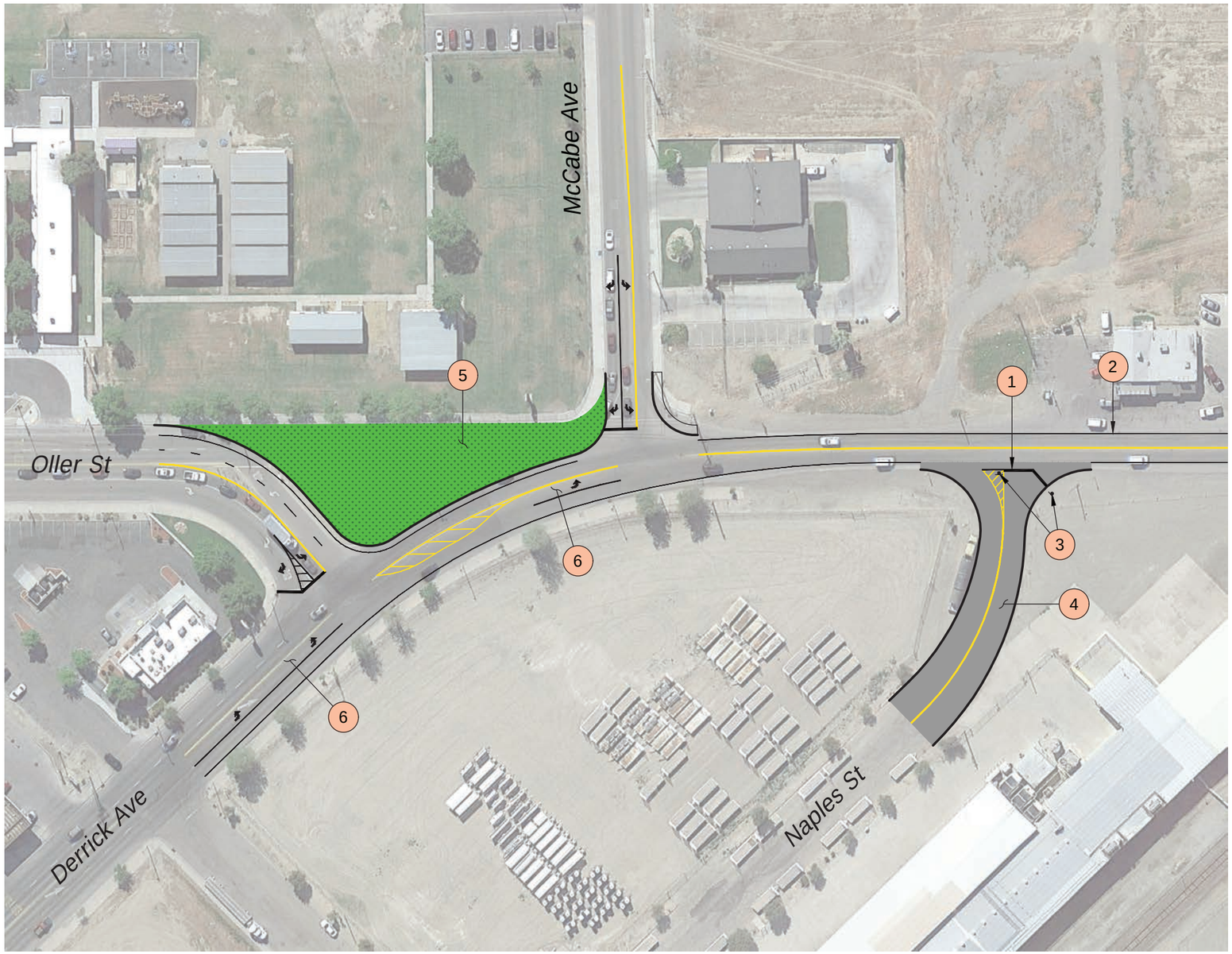
40 20 0 40

Note

Proposed white pavement markings are shown in black for clarity.

Unsignalized Intersection Treatments
Newmark Avenue / Annadale Avenue
Sanger, CA

Figure 15. Derrick Avenue/Naples Street Concept Design



Recommended Treatments

1. Install stop bars
2. Upgrade pavement markings to improve delineation (LRSM ID: NS07)
3. Install additional stop signs (LRSM ID: NS06)
4. Re-pave Naples Street approach
5. Close Derrick Avenue along school frontage
6. Convert through lane to left turn lane

Note

This example application of countermeasures shows conceptual modifications on State-owned facilities. These locations were selected using a process separate from Caltrans' typical process for identifying priority safety improvements and may be lower priorities from a regional, Caltrans district, or statewide perspective. Any proposed modification to State-owned facilities would require coordination with Caltrans.

N

Scale: 1" = 100'

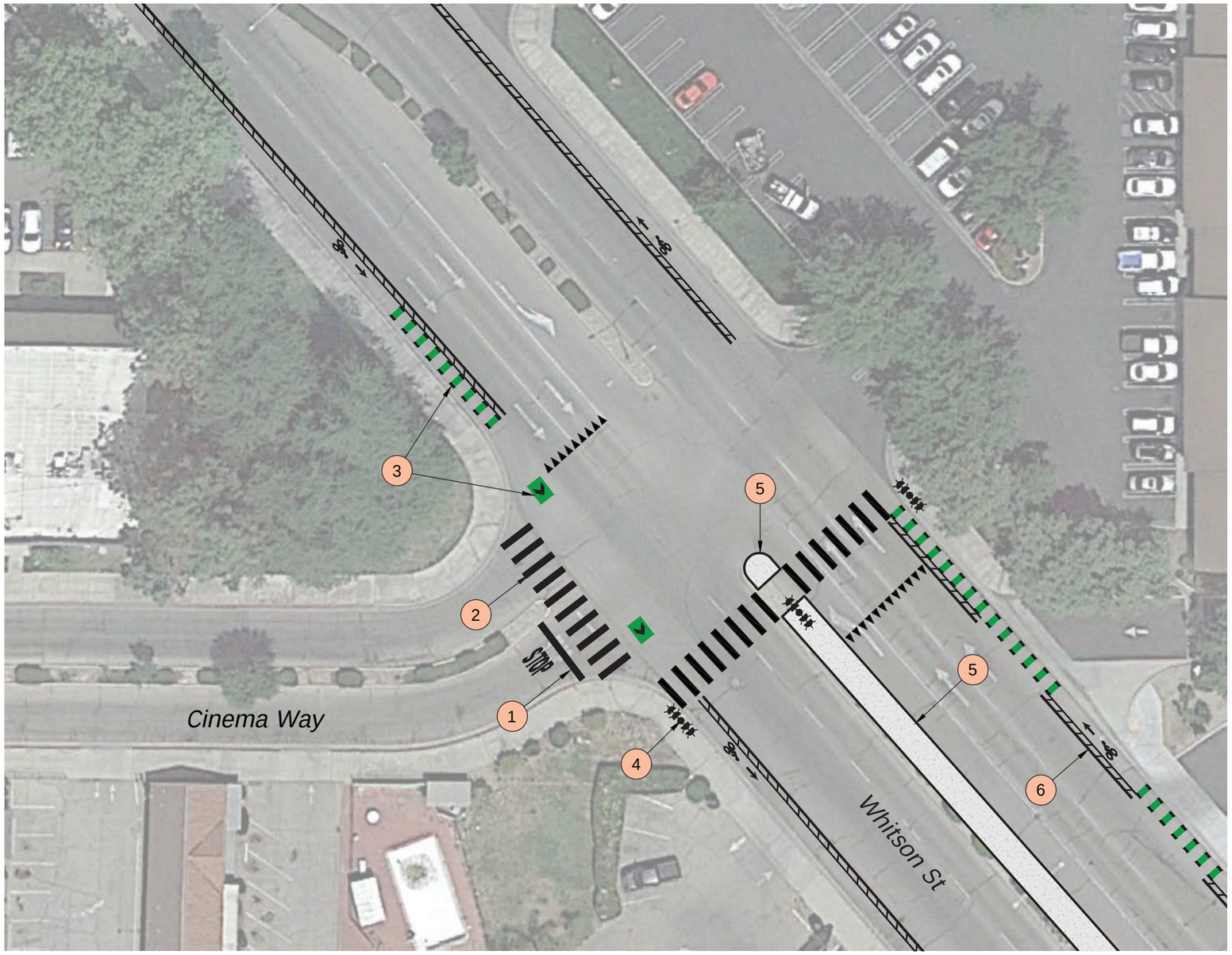
100 50 0 100

Note

Proposed white pavement markings are shown in black for clarity.

Unsignalized Intersection Treatments
Derrick Avenue / Naples Street
Mendota, CA

Figure 16. Whitson Street/Cinema Way Concept Design



Recommended Treatments

1. Install advanced stop bar before crosswalk (LRSM ID: S20PB)
2. Install High Visibility Crosswalks
3. Install green bicycle conflict area markings
4. Install Rectangular Rapid Flashing Beacons (RRFB) (LRSM ID: NS22PB)
5. Modify raised median to provide width for pedestrian refuge area
6. Add buffered bike lanes on Whitson Street

N

Scale: 1" = 40'

40 20 0 40

Note

Proposed white pavement markings are shown in black for clarity.

Unsignalized Intersection Treatments
Whitson Street / Cinema Way
Selma, CA

Figure 17. Elm Avenue/First Avenue/Van Ness Street Concept Design

Recommended Treatments

1. Install advanced stop bar before crosswalk (LRSM ID: S20PB)
2. Upgrade pavement markings to improve delineation (LRSM ID: NS07)
3. Install High Visibility Crosswalks
4. Install curb extension
5. Add delineation for on-street parking
6. Convert traffic pattern to one-way only

Note

This example application of countermeasures shows conceptual modifications on State-owned facilities. These locations were selected using a process separate from Caltrans' typical process for identifying priority safety improvements and may be lower priorities from a regional, Caltrans district, or statewide perspective. Any proposed modification to State-owned facilities would require coordination with Caltrans.

N

Scale: 1" = 60'

60 30 0 60

Note

Proposed white pavement markings are shown in black for clarity.

Unsignalized Intersection Treatments
Elm Avenue / First Avenue / Van Ness Street
Coalinga, CA

Figure 18. N Street/Saipan Avenue Concept Design

Recommended Treatments

1. Remove crosswalk markings
2. Install advanced stop bar before crosswalk (LRSM ID: S20PB)
3. Install High Visibility Crosswalk
4. Install ADA-compliant curb ramps
5. Install raised median with colored concrete and close northbound left-turn lane (LRSM ID: NS19PB)
6. Install yellow High Visibility Crosswalks
7. Add intersection lighting (LRSM ID: NS01)
8. Close driveway
9. Install colored concrete area flush with roadway grade
10. Evaluate applicability of RRFB upon initiating project planning and design
11. Install/upgrade sidewalk
12. Install curb extensions

N

Scale: 1" = 100'

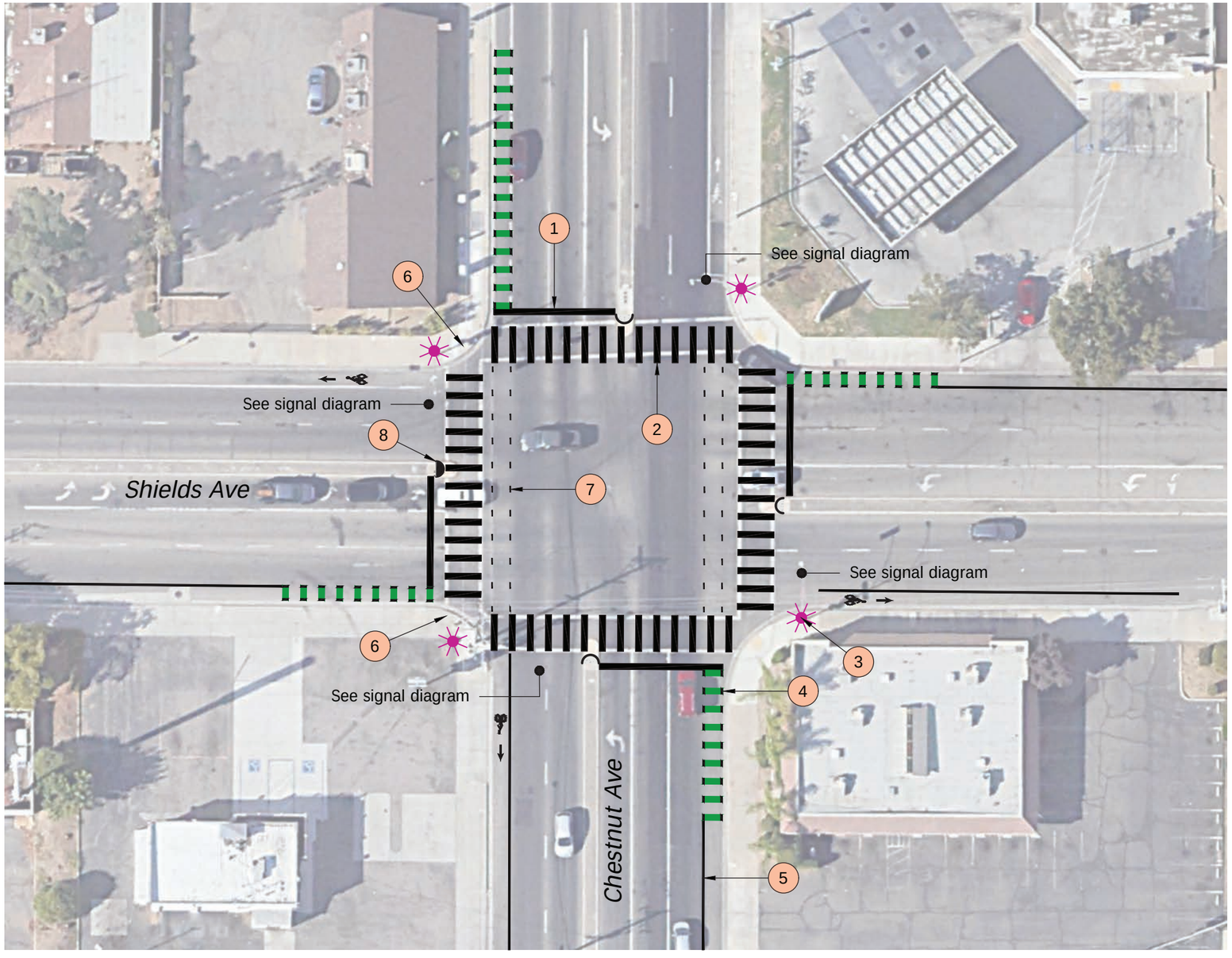
100 50 0 100

Note

Proposed white pavement markings are shown in black for clarity.

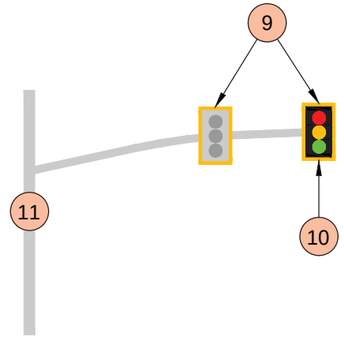
Unsignalized Intersection Treatments
N Street / Saipan Avenue
Firebaugh, CA

Figure 19. Shields Avenue/Chestnut Avenue Concept Design



Recommended Treatments

1. Install advanced stop bar before crosswalk (LRSM ID: S20PB)
2. Install High Visibility Crosswalks
3. Upgrade intersection lighting (LRSM ID: NS01)
4. Install green bicycle conflict area markings
5. Add bike lanes on west, south, and east intersection approaches
6. Install ADA-compliant curb ramps
7. Add bike crossing markings through intersection
8. Modify raised median to provide unobstructed path for pedestrian crossings
9. Install retroreflective backplates on all signal heads, all approaches (LRSM ID: S02)
10. Add additional signal head for through movements, all approaches (LRSM ID: S02)
11. Consider adjusting signal timing to provide 3.5 ft/sec pedestrian walk time



N

Scale: 1" = 40'

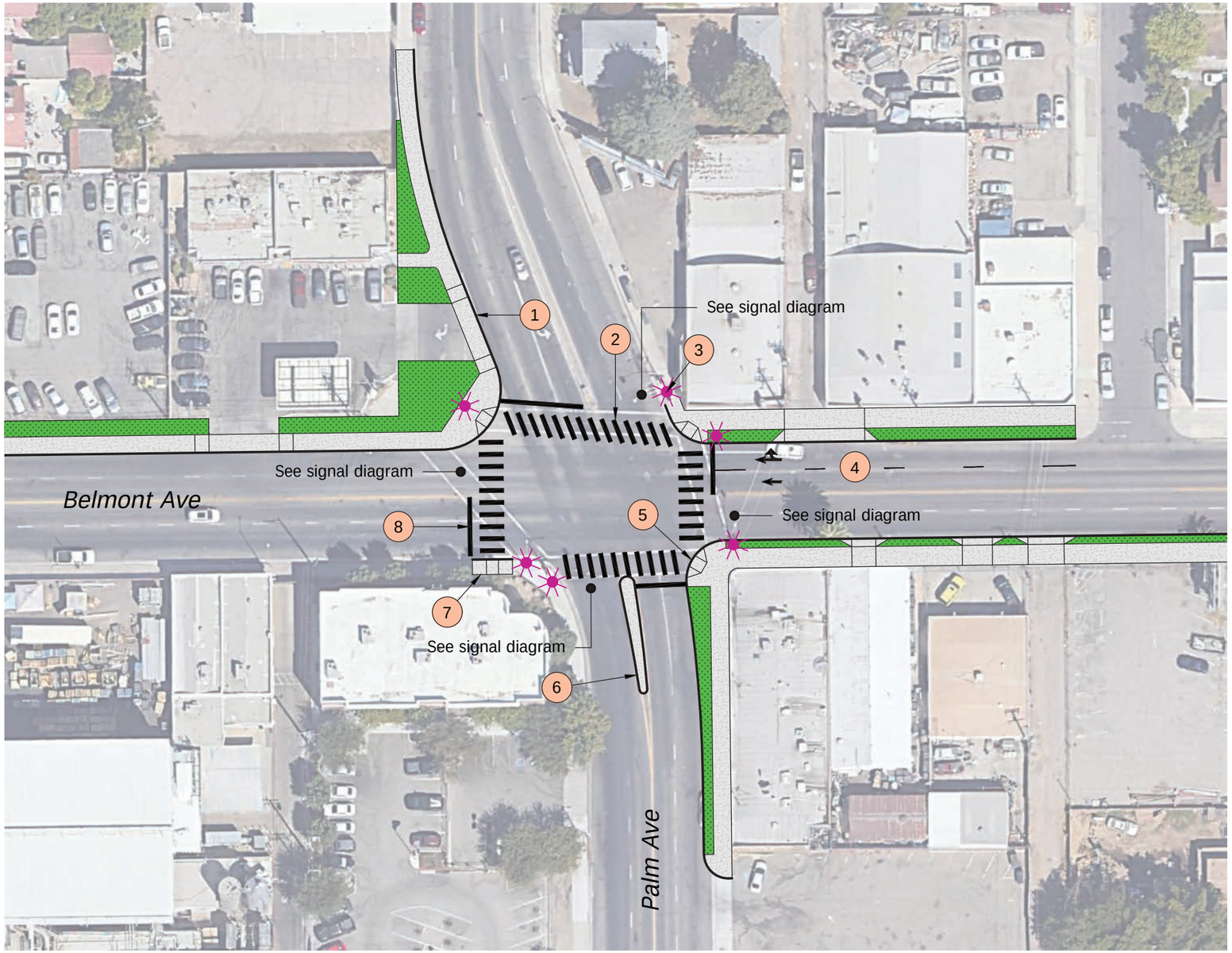
40 20 0 40

Note

Proposed white pavement markings are shown in black for clarity.

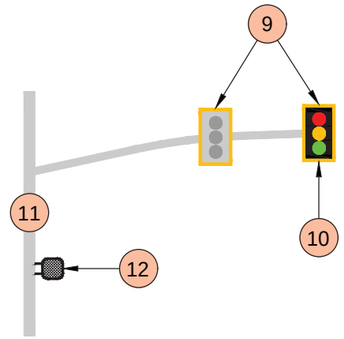
Signalized Intersection Treatments
Shields Avenue / Chestnut Avenue
Fresno County, CA

Figure 20. Palm Avenue/Belmont Avenue Concept Design



Recommended Treatments

1. Adjust curb line to shorten crossing distances and improve channelization
2. Install High Visibility Crosswalks
3. Upgrade intersection lighting (LRSM ID: NS01)
4. Convert dedicated right turn lane to combined through right turn lane
5. Install curb extension
6. Install raised median (LRSM ID: S12)
7. Align crosswalk perpendicular to roadway and install new curb ramp
8. Install advanced stop bar before crosswalk (LRSM ID: S20PB)
9. Install retroreflective backplates on all signal heads, all approaches (LRSM ID: S02)
10. Add additional signal head for through movements, all approaches (LRSM ID: S02)
11. Consider adjusting signal timing to provide 3.5 ft/sec pedestrian walk time
12. Install pedestrian countdown signal heads (LRSM ID: S17PB)



N

Scale: 1" = 60'

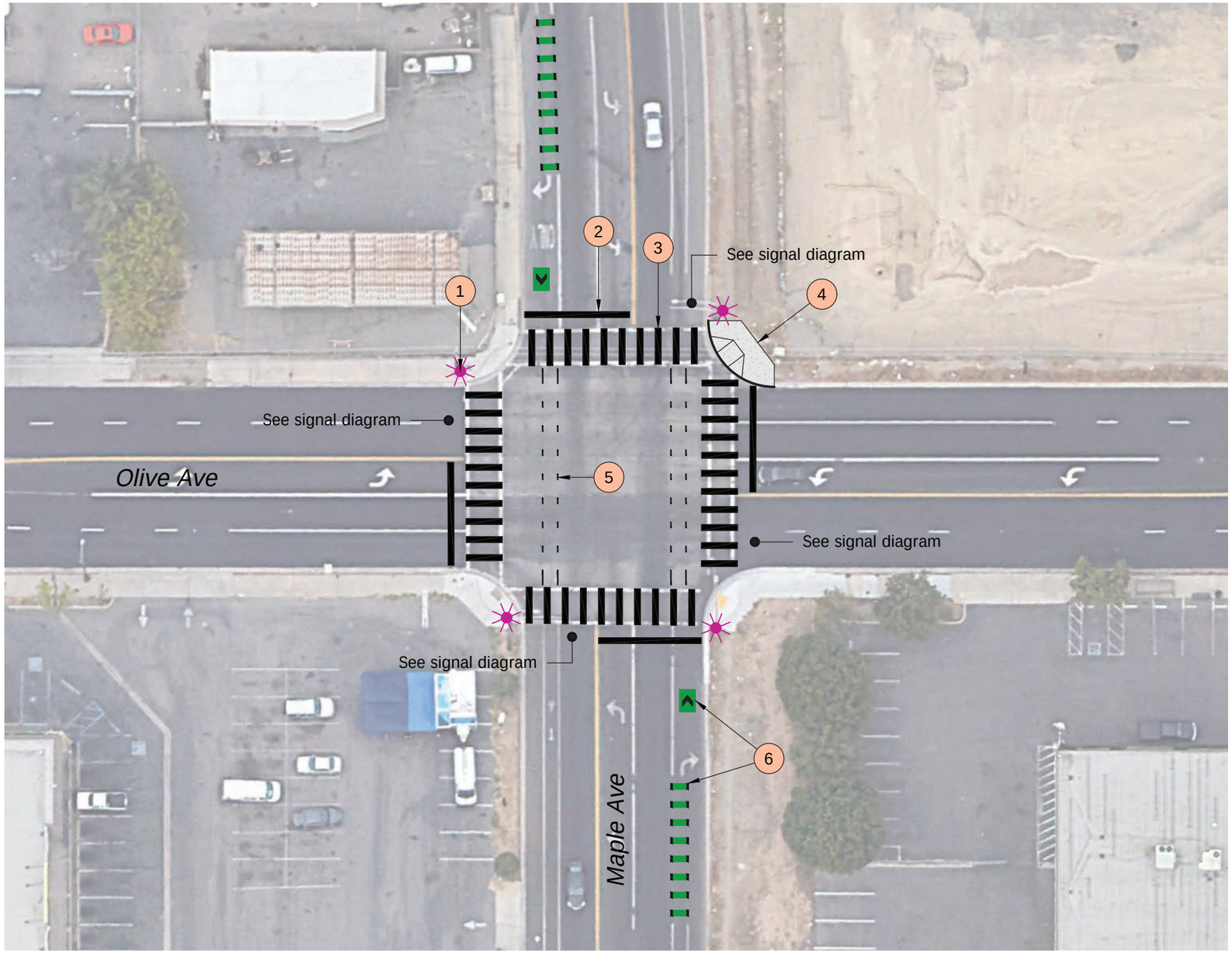
60 30 0 60

Note

Proposed white pavement markings are shown in black for clarity.

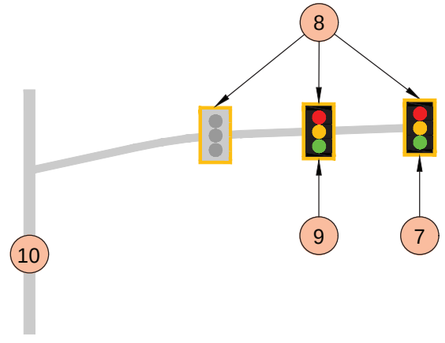
Signalized Intersection Treatments
Palm Avenue / Belmont Avenue
Fresno, CA

Figure 21. Olive Avenue/Maple Avenue Concept Design



Recommended Treatments

1. Upgrade intersection lighting (LRSM ID: NS01)
2. Install advanced stop bar before crosswalk (LRSM ID: S20PB)
3. Install High Visibility Crosswalks
4. Install ADA-compliant curb ramp and landing area
5. Add bike crossing markings through intersection
6. Add green bicycle conflict area markings and convert right turn lane to combined bike/right turn lane with shared lane markings
7. Provide protected left turn phase, all approaches (LRSM ID: S07)
8. Install retroreflective backplates on all signal heads, all approaches (LRSM ID: S02)
9. Add additional signal head for through movements, all approaches (LRSM ID: S02)
10. Consider adjusting signal timing to provide 3.5 ft/sec pedestrian walk time



N

Scale: 1" = 40'

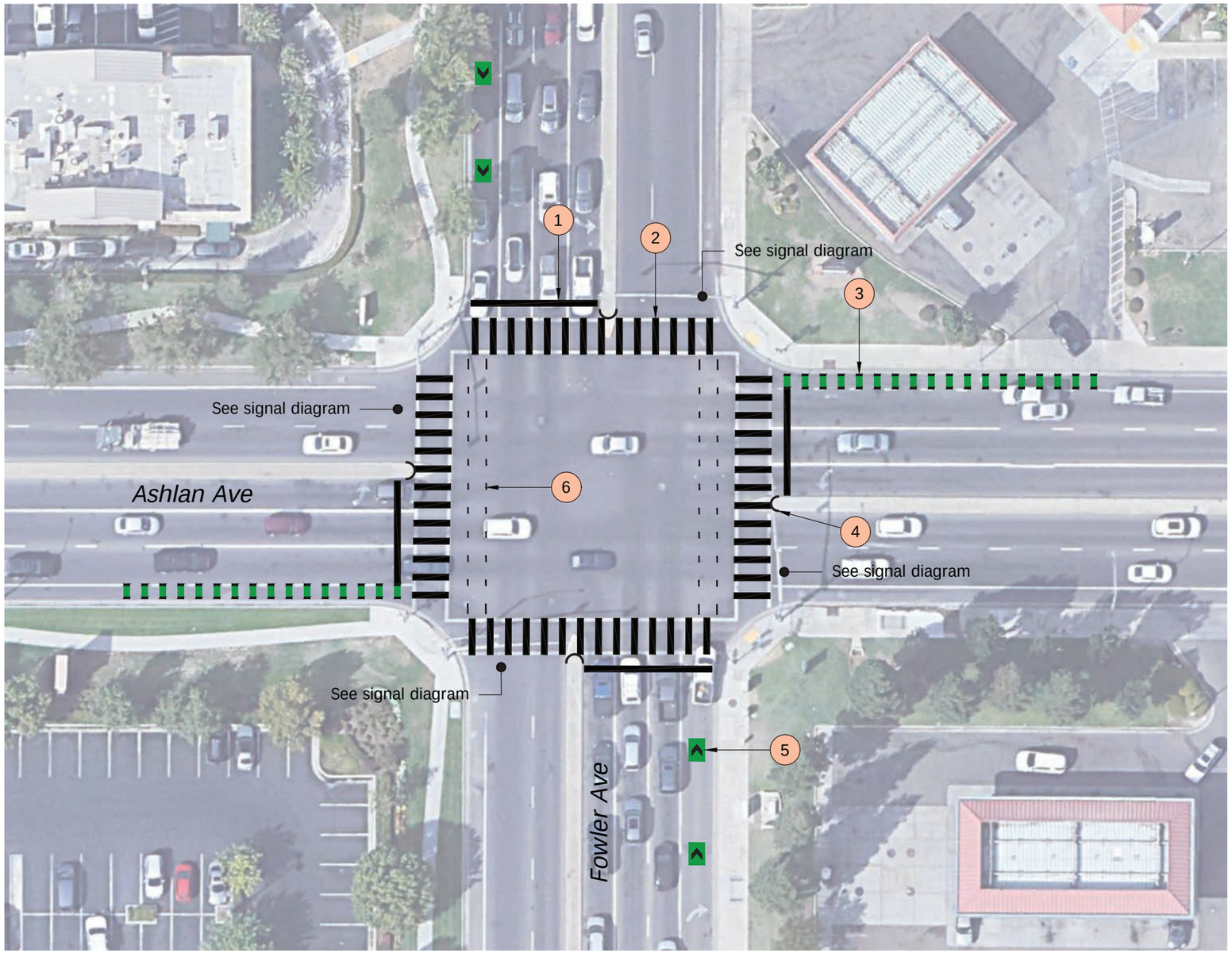
40 20 0 40

Note

Proposed white pavement markings are shown in black for clarity.

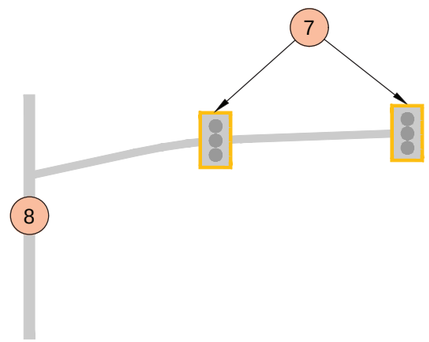
Signalized Intersection Treatments
Olive Avenue / Maple Avenue
Fresno, CA

Figure 22. Ashlan Avenue/Fowler Avenue Concept Design



Recommended Treatments

1. Install advanced stop bar before crosswalk (LRSM ID: S20PB)
2. Install High Visibility Crosswalks
3. Install green bicycle conflict area markings
4. Modify raised median to provide unobstructed path for pedestrian crossings
5. Add green bicycle conflict area markings and convert right turn lane to combined bike/right turn lane with shared lane markings
6. Add bike crossing markings through intersection
7. Install retroreflective backplates on all signal heads, all approaches (LRSM ID: S02)
8. Consider adjusting signal timing to provide 3.5 ft/sec pedestrian walk time



N

Scale: 1" = 40'

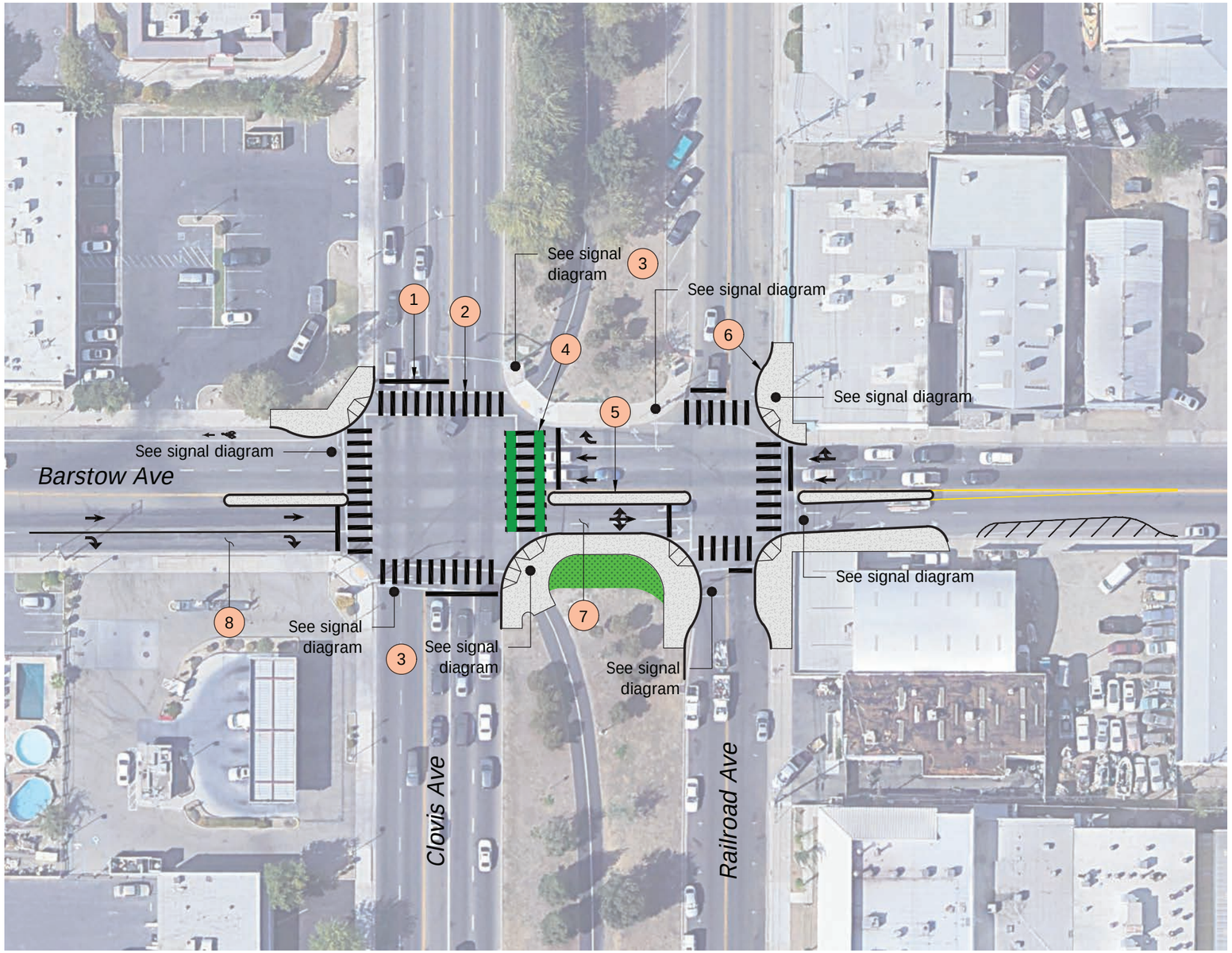
40 20 0 40

Note

Proposed white pavement markings are shown in black for clarity.

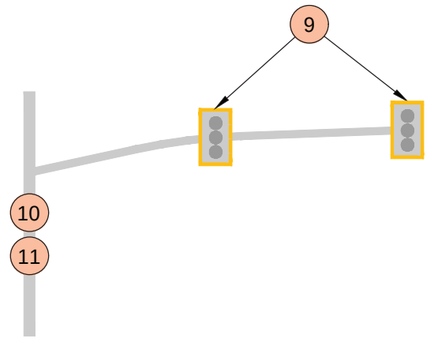
Signalized Intersection Treatments
Ashlan Avenue / Fowler Avenue
Clovis, CA

Figure 23. Clovis Avenue and Railroad Avenue/Barstow Avenue Concept Design



Recommended Treatments

1. Install advanced stop bar before crosswalk (LRSM ID: S20PB)
2. Install High Visibility Crosswalks
3. Install dedicated bike signal for pathway crossing
4. Install bike and pedestrian crosswalk
5. Install raised median (LRSM ID: S12)
6. Install curb extension
7. Remove dedicated eastbound right turn movement and create single combined through-right-left movement
8. Convert eastbound through-right movement to dedicated right turn movement
9. Install retroreflective backplates on all signal heads, all approaches (LRSM ID: S02)
10. Consider adjusting signal timing to provide 3.5 ft/sec pedestrian walk time
11. Consider adding protected ped/bike signal phase during weekends based on usage and ped/bike volumes



N

Scale: 1" = 60'

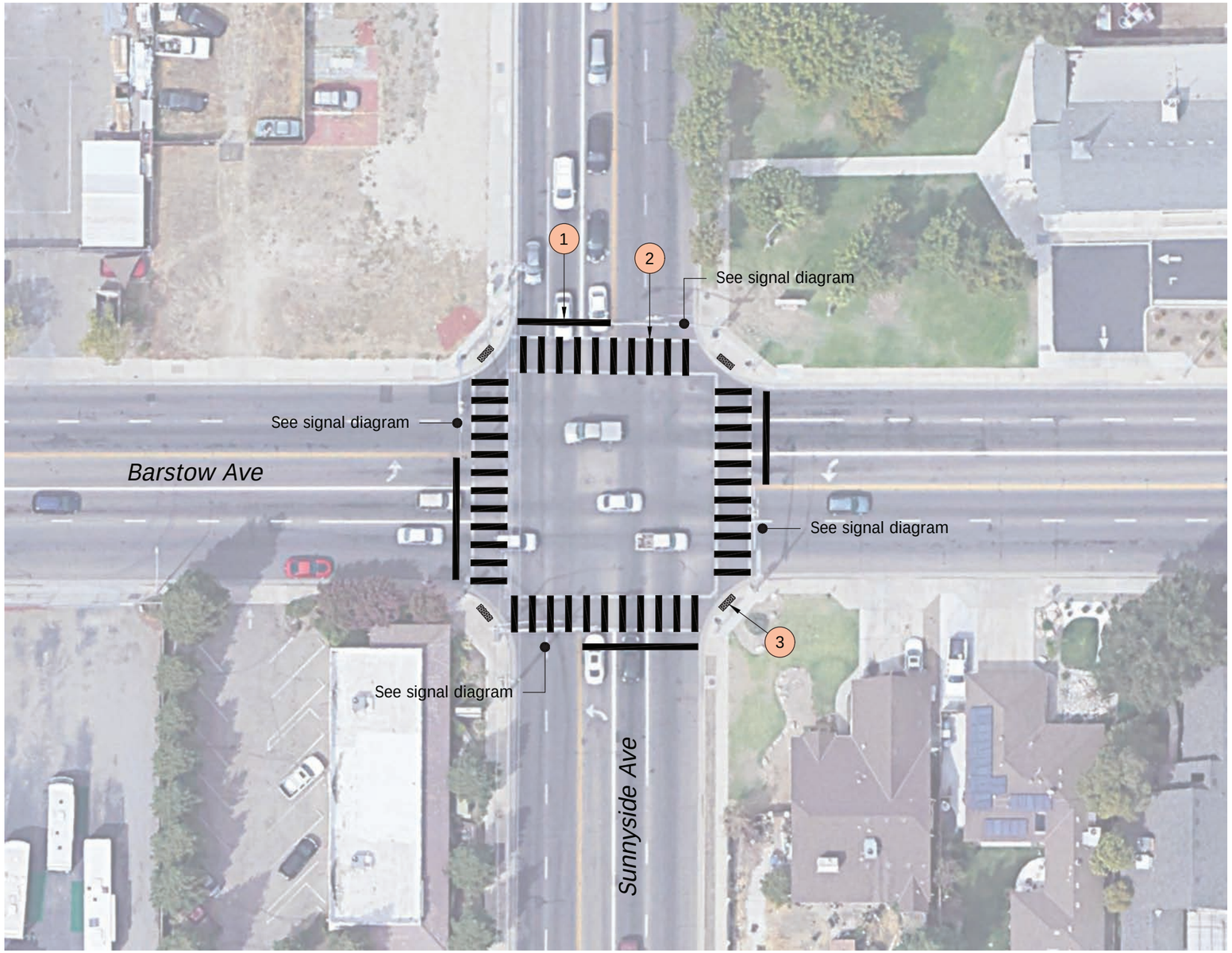
60 30 0 60

Note

Proposed white pavement markings are shown in black for clarity.

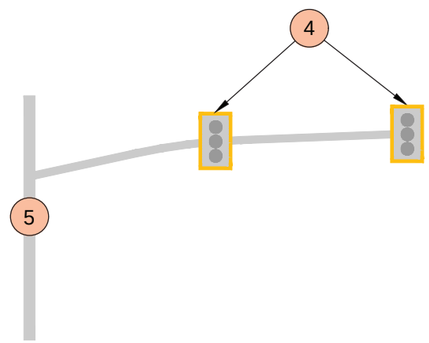
Signalized Intersection Treatments
Clovis Avenue and Railroad Avenue / Barstow Avenue
Clovis, CA

Figure 24. Barstow Avenue/Sunnyside Avenue Concept Design



Recommended Treatments

1. Install advanced stop bar before crosswalk (LRSM ID: S20PB)
2. Install High Visibility Crosswalks
3. Install Detectable Warning Strips on all intersection corners
4. Install retroreflective backplates on all signal heads, all approaches (LRSM ID: S02)
5. Consider adjusting signal timing to provide 3.5 ft/sec pedestrian walk time



N

Scale: 1" = 40'

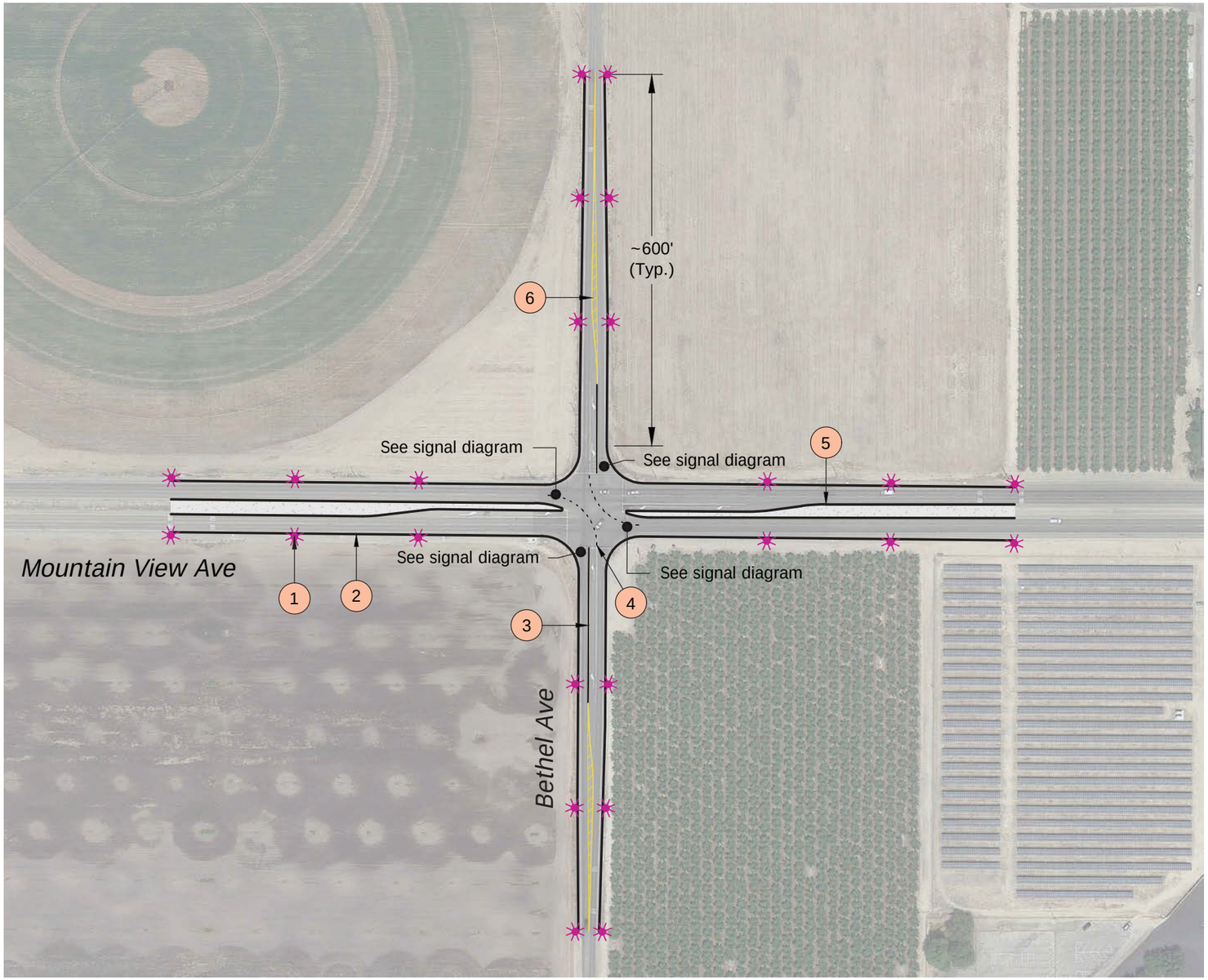
40 20 0 40

Note

Proposed white pavement markings are shown in black for clarity.

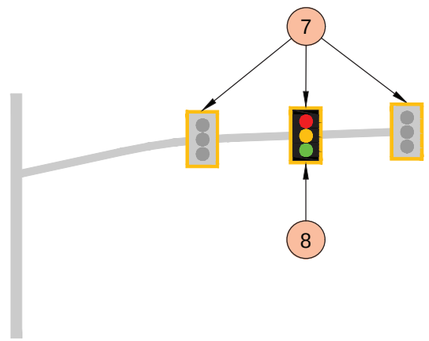
Signalized Intersection Treatments
Barstow Avenue / Sunnyside Avenue
Clovis, CA

Figure 25. Bethel Avenue/Mountain View Avenue Concept Design



Recommended Treatments

1. Add intersection lighting (LRSM ID: S01)
2. Install curb and gutter
3. Install traffic separator
4. Install lane line extensions through intersection
5. Install raised median on approaches (LRSM ID: S12)
6. Install flush median islands with yellow diagonal crosshatch markings
7. Install retroreflective backplates on all signal heads, all approaches (LRSM ID: S02)
8. Add additional signal head for through movements on Mountain View Ave approaches (LRSM ID: S02)



N

Scale: 1" = 200'

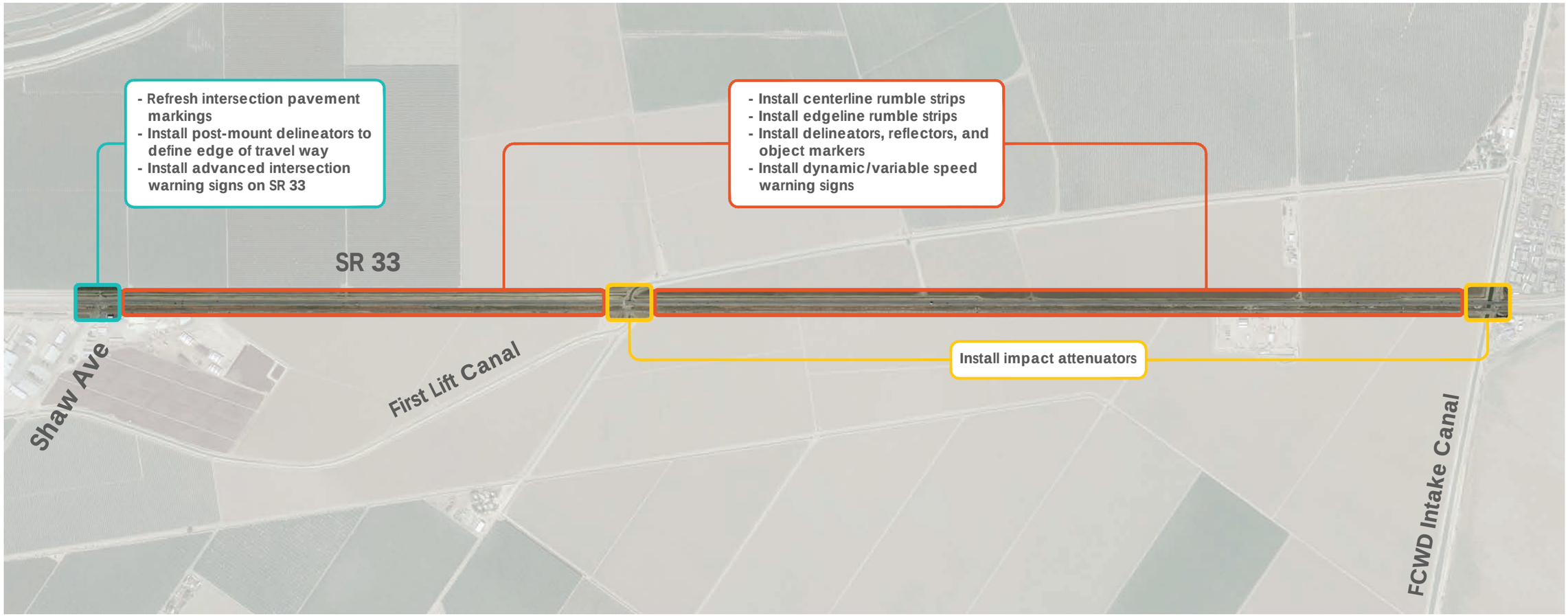
200 100 0 200

Note

Proposed white pavement markings are shown in black for clarity.

Signalized Intersection Treatments
Bethel Avenue / Mountain View Avenue
Kingsburg, CA

Figure 26. SR 33, Shaw Avenue to FCWD Intake Canal Concept Design

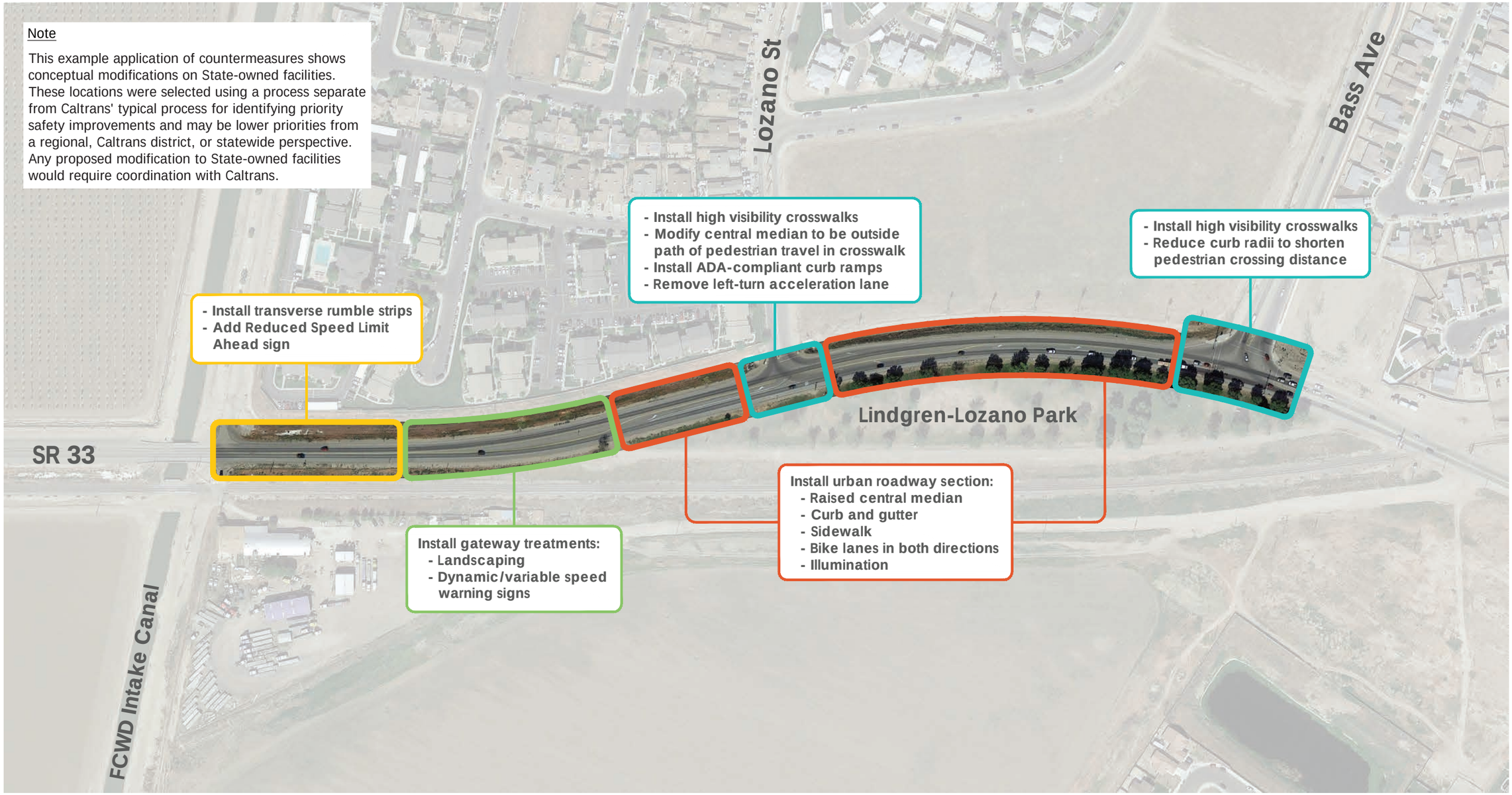


Note

This example application of countermeasures shows conceptual modifications on State-owned facilities. These locations were selected using a process separate from Caltrans' typical process for identifying priority safety improvements and may be lower priorities from a regional, Caltrans district, or statewide perspective. Any proposed modification to State-owned facilities would require coordination with Caltrans.

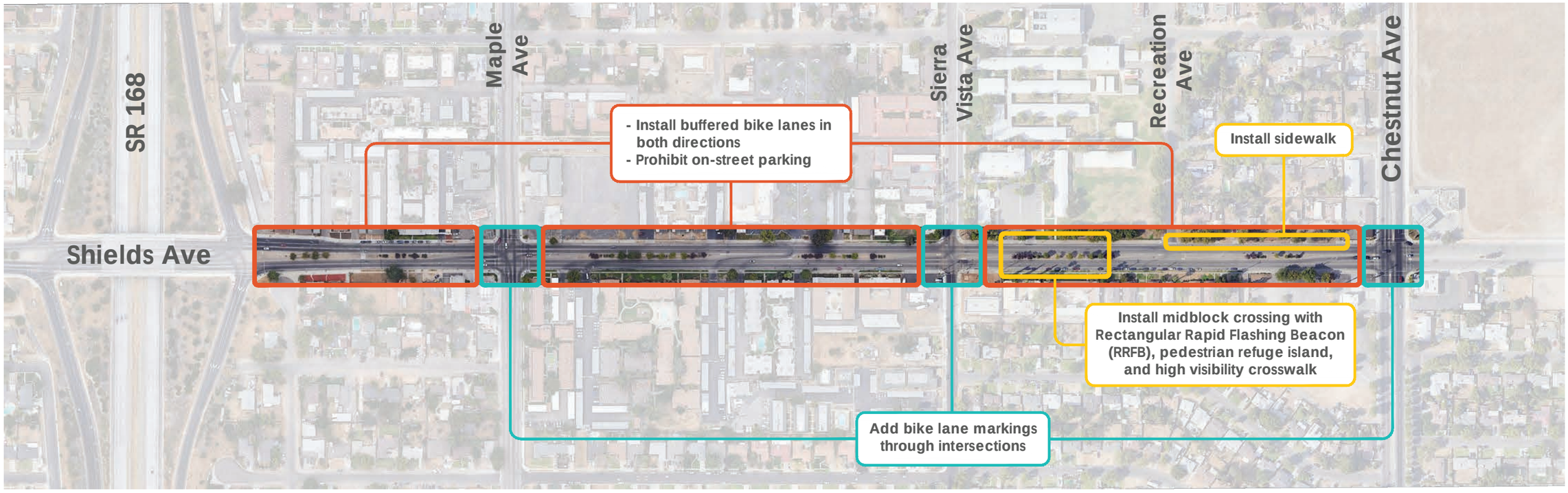
Roadway Segment Treatments
SR 33, Shaw Avenue to FCWD Intake Canal
Fresno County, CA

Figure 27. SR 33, FCWD Intake Canal to Bass Avenue Concept Design



Roadway Segment Treatments
SR 33, FCWD Intake Canal to Bass Avenue
Mendota, CA

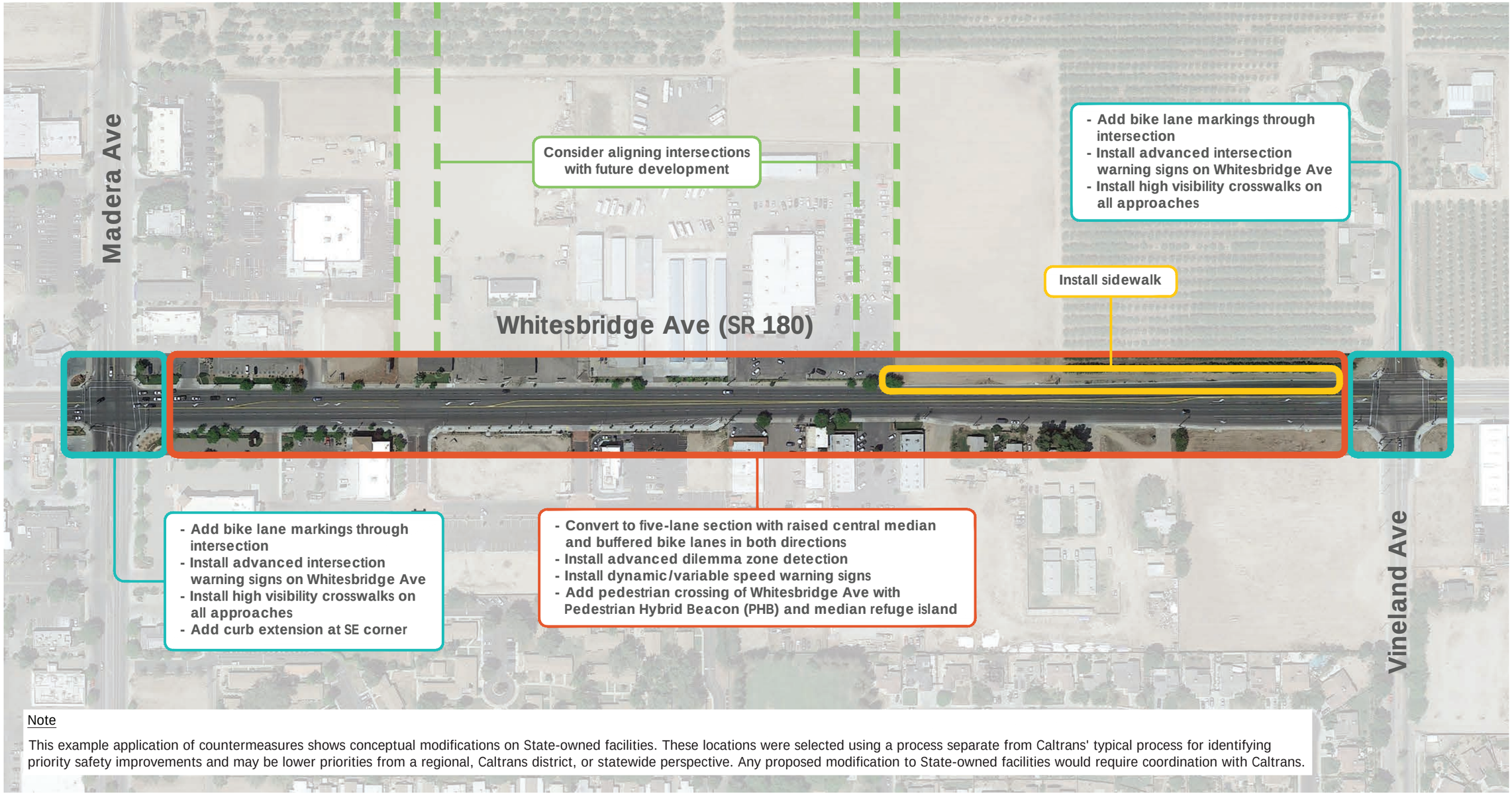
Figure 28. Shields Avenue, SR 168 Ramp Terminal to Chestnut Avenue Concept Design



N

Roadway Segment Treatments
Shields Avenue, SR 168 Ramp Terminal to Chestnut Avenue
Fresno, CA

Figure 29. Whitesbridge Avenue (SR 180), Madera Avenue to Vineland Avenue Concept Design



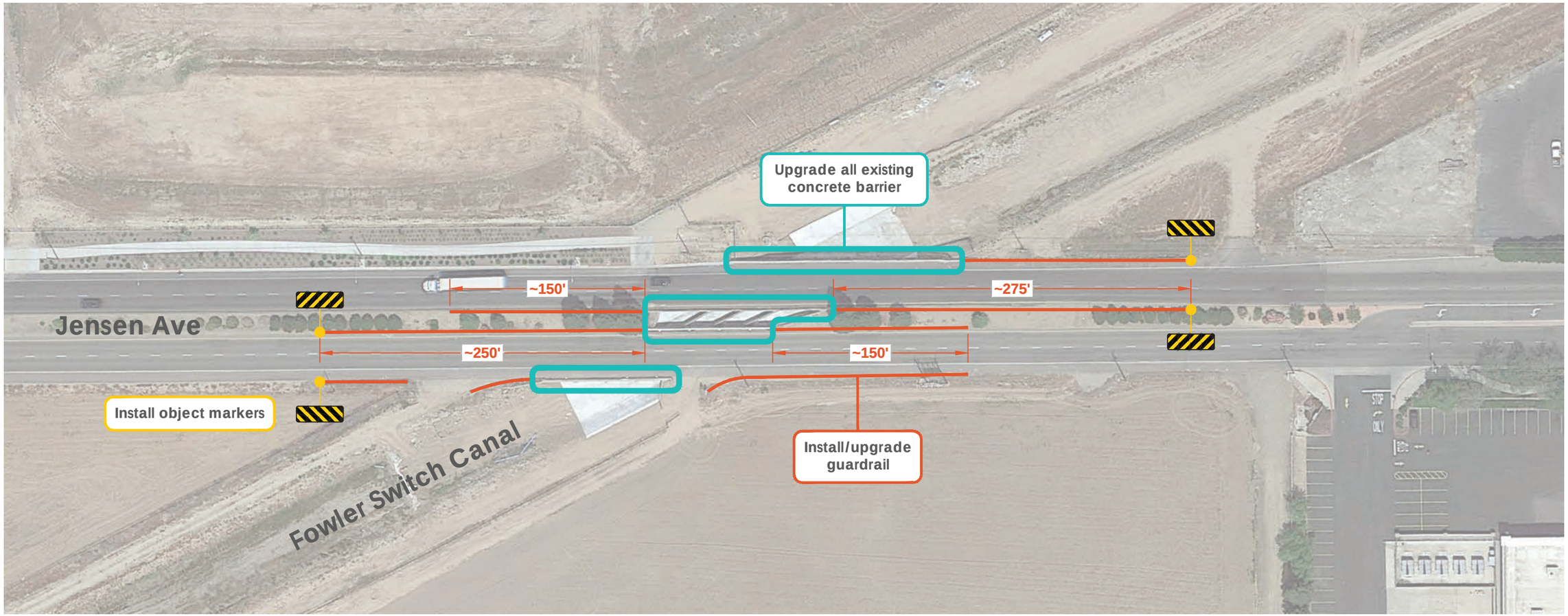
Note

This example application of countermeasures shows conceptual modifications on State-owned facilities. These locations were selected using a process separate from Caltrans' typical process for identifying priority safety improvements and may be lower priorities from a regional, Caltrans district, or statewide perspective. Any proposed modification to State-owned facilities would require coordination with Caltrans.

N

Roadway Segment Treatments
Whitesbridge Avenue (SR 180), Madera Avenue to Vineland Avenue
Kerman, CA

Figure 30. Jensen Avenue at Fowler Switch Canal Concept Design



N

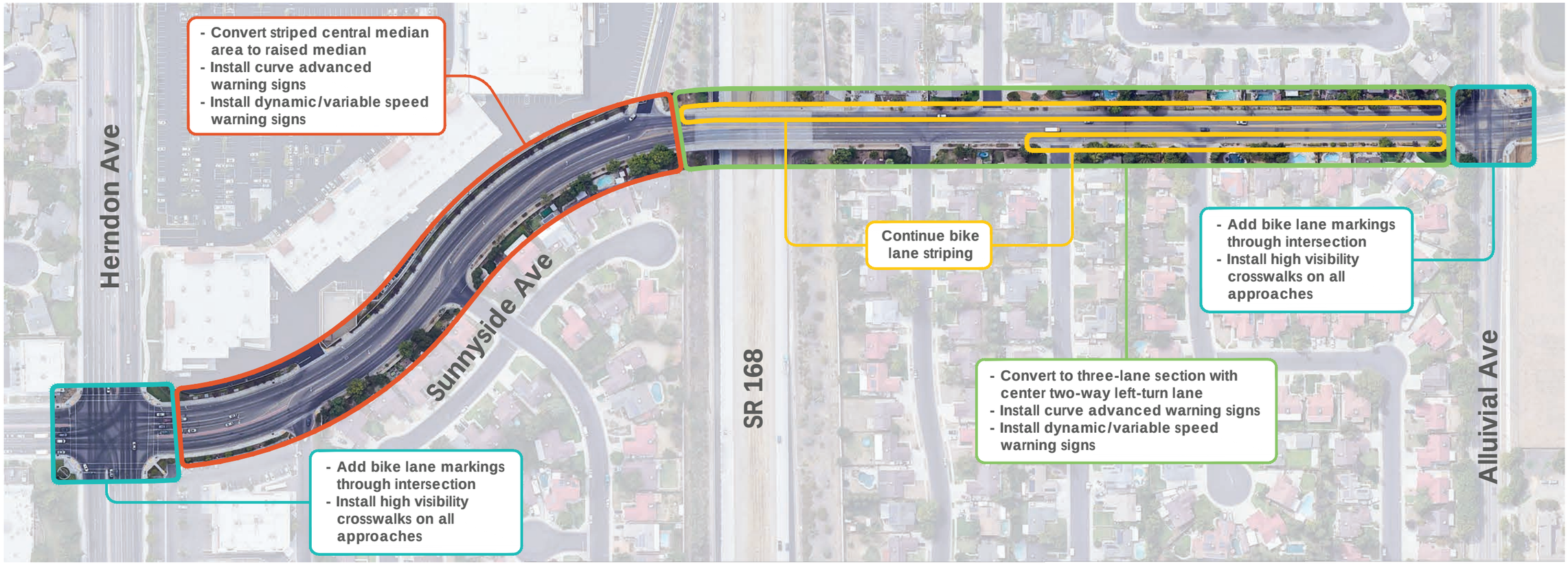
Roadway Segment Treatments
Jensen Avenue at Fowler Switch Canal
Sanger, CA

Figure 31. Jensen Avenue, Bethel Avenue to Greenwood Avenue Concept Design Figure

N

Roadway Segment Treatments
Jensen Avenue, Bethel Avenue to Greenwood Avenue
Sanger, CA

Figure 32. Sunnyside Avenue, Herndon Avenue to Alluvial Avenue Concept Design Figure



N

Roadway Segment Treatments
Sunnyside Avenue, Herndon Avenue to Alluvial Avenue
Clovis, CA

5.2 EDUCATION AND PROMOTION STRATEGIES

To make Fresno County's roadways safer, the COG and local agencies will need everyone to pitch in. Educating and informing the public is an important part of this plan. This section summarizes the transportation safety education program recommendations developed for the COG.

5.2.1 SAFE ROADS SAVE LIVES CAMPAIGN

Fresno COG's Safe Roads Save Lives campaign is a marketing effort to improve safety for all users on Fresno County Roadways. The campaign's materials were created to accomplish the following goals:

- Educate all road users on safe transportation behaviors
- Increase safety for people walking and biking
- Highlight behaviors that cause the most crashes in Fresno County—speeding and distracted driving

Figure 33. Safe Roads Save Lives campaign logo

SAFE ROADS SAVE LIVES

Creating a Transportation Education Campaign in Today's Context

This past year has been a challenge worldwide due to the COVID-19 pandemic, social justice movements, environmental disasters due to climate change, and more. While transportation safety is a significant factor in community health, it is important to recognize that any messaging will be received within the context of a rough year for many people.

After conducting reviews of various transportation safety and public health campaigns from across the county, the project team decided to take a tone that was different, and potentially surprising, to Fresno residents.

The resulting campaign leads with humor, then follows with hard facts and concrete behavior tips to educate and encourage Fresno residents to adopt safe roadway behaviors. The campaign also reflects local culture in Fresno and invokes positive stereotypes of the area to help connect with community members.

The Safe Roads Save Lives materials were created with the following target audiences in mind:

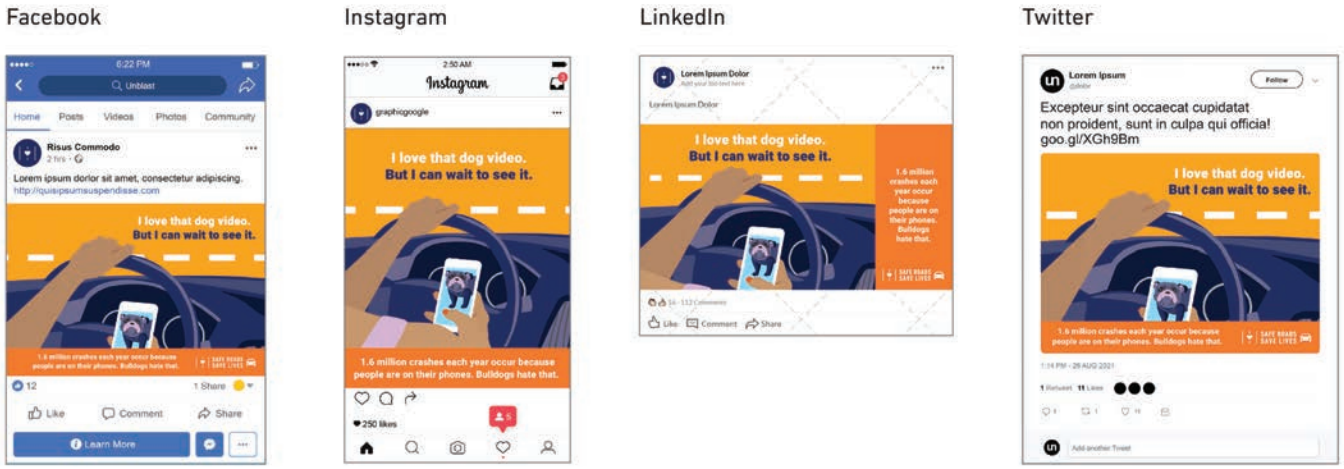
- Drivers
- People who walk and bike
- Fresno County residents ages 13+
- Rural and urban residents

Toolkit Contents

Any successful messaging campaign must include a variety of approaches to reach people where they are. The Safe Roads Save Lives campaign includes the following components:

- **Branding.** The Safe Roads Save Lives campaign has a recognizable brand, including a logo, font standards, and a color palette for use in print and digital materials.
- **Social media strategy.** Social media has a broad reach and has proven to be an influential (and free) method of reaching people no matter where they live.

Figure 34. Social media templates for the Safe Roads Save Lives campaign



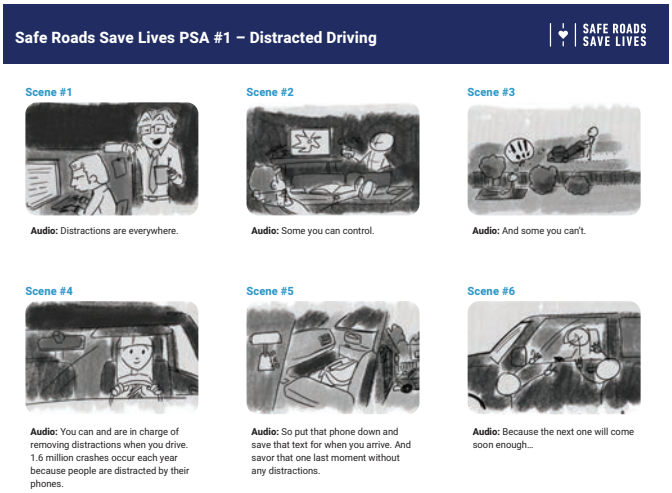
The campaign's social media strategy includes graphics, text, and a post release schedule to create a storyline that Fresno County residents can follow and participate in over the course of the Safe Roads Save Lives campaign.

/ **Print materials.** It is important for a campaign to have a suite of print materials ready to share at events. These materials can engage stakeholders who may be interested in the campaign but may not have time to stick around at an event table to learn more. The Safe Roads Save Lives campaign's print materials include a safety tip card, informational flyer, stickers, and bumper stickers for event needs.

/ **Radio and video resources.** Radio and video spots can be an effective way to spread the word about a safety campaign. The Safe Roads Save Lives toolkit offers 15 second radio spot scripts and video storyboards that the Fresno COG or partners can build on and create with additional program budget, if secured.

Figure 35. Safe Roads Save Lives educational flyer.

Figure 36. Storyboard for a Safe Roads Save Lives video PSA.



/ **School resources.** Young people are constantly learning new behaviors and gaining understanding that their actions have consequences and can impact others. As such, school-based and -focused transportation education strategies are essential to a holistic campaign. The Safe Roads Save Lives campaign includes an overview of strategies on how to reach out to schools, best practices on what type of messaging works best, how to partner with schools, and ideas about how to get schools to help implement the program.

/ **Campaign website.** The project team recommends that Fresno COG host and maintain a website dedicated to the Safe Roads Save Lives campaign. The website will serve as a one-stop shop for information about the campaign, resources, translated materials, and how to support the messages. The campaign includes graphic design elements for an attractive and easy-to-navigate home page that will allow users of all abilities to access the campaign online.

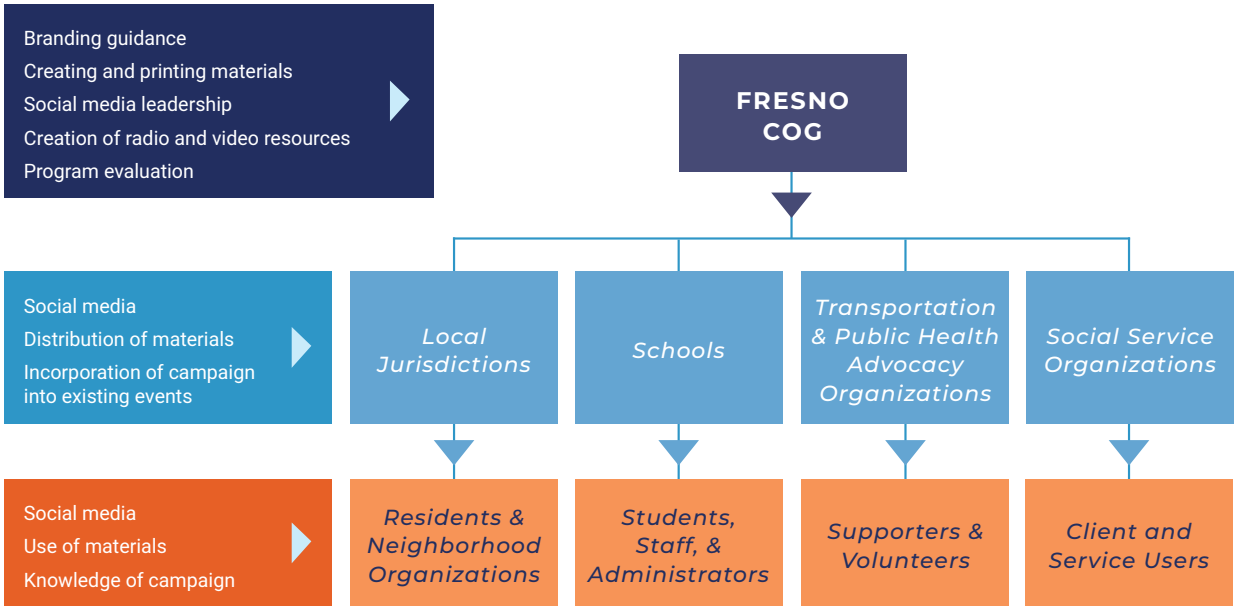
Figure 37. Landing page for the Safe Roads Save Lives website.

Program Implementation and Partnerships

Fresno COG anticipates finding funding and resources in the near future to roll out the campaign. Successful deployment will require champions and partners who can help share the messages throughout the community and achieve results.

Figure 38 shows the various roles that jurisdictions, organizations, and individuals that could play a part in the roll-out of Safe Roads Save Lives campaign. These roles could and should change depending on available resources and the energy around the campaign at each level. Fresno COG will take a leadership role to maintain proper branding, tone, and use of campaign materials to ensure that the right messages are communicated, and communicated correctly.

Figure 38. Roles in the rollout of the Safe Roads Save Lives Campaign



Program Evaluation

The success of a campaign, especially a transportation education campaign, is notoriously difficult to evaluate quantitatively. Many jurisdictions have conducted extensive and expensive evaluations and have turned up little useful information. Two main factors contribute to the challenge of quantifying campaign results:

1. Crash data often don't include many of the behaviors the campaign is trying to change, such as near misses or distracted driving incidents. Thankfully, not every poor behavior results in a crash, but since that is all crash data catches, it cannot paint a full picture of the actual transportation behavior environment.

2. Properly evaluating a broad education campaign requires ongoing contact with a large and diverse sample of the target audience, which demands significant time and resources for participants and public agencies.

For these reasons, the project team have developed a simple evaluation framework that can quickly capture how people feel about the campaign, whether their behaviors have changed, and where the campaign is succeeding or might be improved. The Safe Roads Save Lives campaign may be evaluated in the following ways:

Table 3. Safe Routes Save Lives evaluation framework

Part of Campaign	Evaluation Metrics	Evaluation Methods
Branding	/ Brand/Campaign Recognition / Approval of Campaign Look/Style	/ Intercept survey / Online survey
Social Media Strategy	/ Intercept survey / Online survey	/ Data counts / Tracking of jurisdiction, organizational, or individual participation
Print Materials	/ Number of materials produced / Types of materials most requested / Location of material distribution / Language of materials requested	/ Material inventory / Location tracking
Radio and Video Resources	/ Creation of materials / Airtime	/ Count of type of resource used / Survey of type of media where the resource was shared (e.g., genre of radio station, television program, etc.) / Post-survey of organizations that produced the resource
School Resources	/ Number of participating schools / Types of resources used at each school	/ School counts / Annual surveys of schools
Overall campaign	/ Behavior change	/ Before/after crash data / Survey of transportation stakeholders — law enforcement, jurisdictions, transportation advocates, etc.—on the efficacy of the campaign

5.3 EQUITABLE ENFORCEMENT STRATEGIES

Even with engineering countermeasures in place, road users can fail to obey traffic laws and cause crashes of varying severity. Police enforcement can increase driver awareness and reduce traffic crashes.

If enforcement strategies are to improve overall safety in a community, traffic laws must be applied equitably and with sensitivity toward communities where there may be limited rapport with law enforcement. Enforcement strategies should be undertaken with due caution to avoid inequitable enforcement activities and evaluated to determine the strategy's impact. The following considerations can help lead to more successful outcomes for roadway safety enforcement strategies:

- Appropriately train police officers and periodically refresh police officers' training related to enforcement activities.
- Incorporate social equity considerations in camera placement for automated enforcement, such as red-light-running cameras.
- Dedicate a portion of enforcement revenue to outreach and engagement with community groups about roadway safety.
- Tailor enforcement campaigns to suit the needs of different neighborhoods and demographics and incorporate education as part of those campaigns.
- Conduct enforcement with staff support and awareness of the courts.
- Use warnings and flyers before moving on to issuing citations.

Crash data can help identify priority intersections and/or road segments and the times of day when certain behaviors may be more prevalent. This information can inform and help officers choose the most appropriate type of enforcement strategy for a given location and time period. The COG or local agency staff can also help monitor the impact of the enforcement strategy by coordinating with the respective agency's police department to obtain and analyze enforcement records and help evaluate effectiveness and equity considerations.

5.3.1 PROGRESSIVE TICKETING

Issuing tickets is the strongest strategy of an enforcement program and is usually reserved for changing unsafe behaviors that other strategies failed to change or that pose a real threat to the safety of road users. There are three main steps in an effective progressive ticketing program:

- **Educating**—Establish community awareness of the problem. The public needs to understand drivers are speeding and the consequences of this speeding for road safety. Raising awareness about the problem will change some behaviors and create public support for the enforcement efforts to follow.
- **Warning**—Announce what action will be taken and why. Give the public time to change behaviors before ticketing starts. Fliers, signs, newspaper stories and official warnings from officers can all serve as reminders.
- **Ticketing**—After the warning period, hold a press conference announcing when and where the police operations will occur. If offenders continue their unsafe behaviors, officers issue tickets.

5.3.2 SPEED TRAILERS

Portable speed trailers visually display a driver's real-time speed compared to the speed limit and may be effective at reducing speeds and increasing awareness of local speed limits. Portable speed trailers are most effective when the trailer flashes "SLOW DOWN" or flashes a bright white light that mimics a photo speed camera or a blue and red light that mimics a police car when drivers are moving too fast. In some cases, back-up speed enforcement by officers may be needed when radar speed trailers are used.

5.3.3 SPEED ENFORCEMENT IN SCHOOL ZONES

Strict enforcement of speed laws in school zones is one law enforcement tool that can improve safety for children walking and bicycling to school as well as drivers. A zero tolerance policy for speeders in school zones and even an increase in fines for drivers who violate the posted school zone speed limit are potential approaches.

5.3.4 HIGH VISIBILITY SATURATION PATROLS

A saturation patrol (also called a blanket patrol or dedicated DWI patrol) consists of many law enforcement officers patrolling a specific area, looking for drivers who may be impaired. These patrols usually take place at times and locations where impaired driving crashes commonly occur. Like publicized sobriety checkpoint programs, the primary purpose of publicized saturation patrol programs is to deter driving after drinking by increasing the perceived risk of arrest.

5.4 EMERGENCY SERVICES STRATEGIES

Emergency medical services (EMS) or strategies focus on partnering to improve regionwide response times and sharing real-time information to improve overall coordination, particularly for more rural or remote areas. The effectiveness of EMS is tied closely to the time it takes for a person injured in a crash to receive medical care. Research indicates there is a "golden hour"—total pre-hospital time under 60 minutes is associated with a decrease in patient mortality. The following considerations can help lead to more successful outcomes for EMS strategies.

5.4.1 PARTNER WITH LOCAL HOSPITALS OR OUTREACH GROUPS

Partnership between local hospitals or outreach groups needs to be established to help provide bystander training courses to the public (i.e., train members of the public to respond to emergencies, since they are sometimes the first on the scene at a crash and may be the only ones for some time in rural areas). Educating and motivating individual drivers to assist at the scene of a crash may reduce severity outcomes. Opportunities for this include:

- Partnering with hospitals such as Community Regional Medical Center and trauma centers in the region to provide injury prevention programs
- Promoting the Community Emergency Response Team (CERT) program, which trains community members in first responder skills
- Working with local groups, such as fire departments, to be trainers themselves and then offer training more frequently in their local communities
- Establish an incentive or appreciation program for bystander participation in assisting at the scene of a crash.

5.4.2 COORDINATE WITH ALL STAKEHOLDERS INVOLVED WITH EMERGENCY MEDICAL SERVICES

The COG should work with the Central California Emergency Medical Services Agency (CCEMSA) and other stakeholders to maximize efficiency with urban and rural response times through evidence-based techniques. Opportunities for this include:

- Building advanced education EMS personnel capacity in rural areas
- Determining reasons for delay in transport for both ground EMS and helicopter EMS (using registry data and EMS records)
- Considering process improvement initiatives to increase EMS documentation and data collection
- Working with stakeholders to identify equipment upgrades, training, or enhancements that would improve patient outcomes.

5.4.3 WORK WITH THE COUNTY 911 TEAM

The COG should involve the County 911 team in appropriate project planning and design activities to identify opportunities to improve EMS access and location identification. Additional opportunities include involving the 911 team in enforcement and EMS grant opportunities and developing or modifying a system that allows County 911 dispatchers to quickly input reported road issues and send the information to the appropriate agency (i.e., the City, County, or other appropriate jurisdiction). Opportunities for this include:

/ Developing a pilot project for a system that allows a phone user to alert EMS within a mile radius of the accident location.

6. FUNDING

Funding for regional and local transportation projects, policies, and programs is available from various federal and state sources. The COG may also choose to identify or develop regional programs that could be used by local agencies to enhance roadway safety. As funding changes over time, the information provided in this RSP should be updated.

6.1 FEDERAL PROGRAMS

6.1.1 CONGESTION MANAGEMENT & AIR QUALITY (CMAQ)

Managing Agency: Federal Highway Administration

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

Website: https://www.fhwa.dot.gov/environment/air_quality/cmaq/

6.1.2 SURFACE TRANSPORTATION BLOCK GRANT (STBG) PROGRAM

Managing Agency: Federal Highway Administration

The Fixing America's Surface Transportation (FAST) Act converts the long-standing Surface Transportation Program (STP) into the Surface Transportation Block Grant Program (STBG) acknowledging that this program has the most flexible eligibilities among all federal-aid highway programs and aligning the program's name with how the Federal Highway Administration (FHWA) has historically administered it. The STBG promotes flexibility in State and local transportation decisions and provides flexible funding to best address State and local transportation needs. STBG funding may be used for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on qualifying public roads, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals. OBAG disburses federal funds in accordance with MTC's regional transportation priorities and associated land-use and housing goals.

Website: https://www.fhwa.dot.gov/specialfunding/stp/

6.1.3 LAND AND WATER CONSERVATION FUND (LWCF)

Managing Agency: National Park Service

The LWCF provides matching grants to states and local governments for acquisition and development of public outdoor recreation areas and facilities. The LWCF has provided more than $16.7 billion to acquire new federal recreation lands as grants to state and local governments. Projects can include acquisition of open space, development of small city and neighborhood parks, and construction of trails or greenways.

Website: https://www.nps.gov/subjects/lwcf/stateside.htm

6.1.4 RIVERS, TRAILS, AND CONSERVATION ASSISTANCE PROGRAM

Managing Agency: National Park Service

The National Park Service Rivers, Trails, and Conservation Assistance program supports community-led natural resource conservation and outdoor recreation projects across the nation. The National Park Service helps community groups, nonprofits, tribes, and state and local governments design trails and parks, conserve and improve access to rivers, protect special places, and create recreation opportunities.

Website: https://www.nps.gov/orgs/rtca/index.htm

6.1.5 OTHER FEDERAL GRANTS

The continued existence of these grant programs is at the discretion of Congress. Potential applicants should research the current state of funding before considering these sources.

6.1.6 BETTER UTILIZING INVESTMENTS TO LEVERAGE DEVELOPMENT (BUILD) GRANT

Managing Agency: United States Department of Transportation (USDOT)

The Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grant program provides a unique opportunity for USDOT to invest in road, rail, transit and port projects that promise to achieve national objectives. Previously known as Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grants, Congress has dedicated nearly $5.6 billion for nine rounds of national infrastructure investments to fund projects that have a significant local or regional impact. The eligibility requirements of BUILD allow project sponsors at the state and local levels to obtain funding for multimodal, multijurisdictional projects that are more difficult to support through traditional department of transportation programs. BUILD can fund port and freight rail projects, for example, which play a critical role in the ability to move freight but have limited sources of federal funds.

Website: https://www.transportation.gov/BUILDgrants

6.1.7 INFRASTRUCTURE FOR REBUILDING AMERICA (INFRA) GRANT

Managing Agency: USDOT

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

Website: https://www.transportation.gov/buildamerica/infragrants

6.2 STATE PROGRAMS

6.2.1 SENATE BILL 1

Senate Bill 1 (SB 1) was passed in 2017 as a long-term transportation reform and funding package. The bill includes new revenues that address a wide variety of transportation projects, such as road safety improvements, street repair, transit, and roadway and bridge construction. SB 1 provides $5.2 billion per year to fund transportation projects throughout California. The programs listed below are funded through SB 1.

6.2.2 HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) GRANT

Managing Agency: Caltrans

The Highway Safety Improvement Program (HSIP) is one of the core federal-aid programs in the federal surface transportation act, Fixing America's Surface Transportation Act (FAST). The purpose of the HSIP program is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned public roads and roads on tribal land. Example safety projects include but are not limited to crosswalk markings, rapid flashing beacons, curb extensions, speed feedback signs, guard rails, pedestrian refuge islands, slurry seal, and other pavement markings.

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

6.2.3 OFFICE OF TRAFFIC SAFETY (OTS) GRANTS

Managing Agency: Office of Traffic Safety

The California Office of Traffic Safety (OTS) strives to eliminate traffic deaths and injuries. It does this by making available grants to local and state public agencies for programs that help them enforce traffic laws, educate the public in traffic safety, and provide varied and effective means of reducing fatalities, injuries and economic losses from crashes.

Website: https://www.ots.ca.gov/

6.2.4 ACTIVE TRANSPORTATION PROGRAM (ATP) GRANTS

Managing Agency: California Transportation Commission (CTC)

The Active Transportation Program (ATP) consolidates existing federal and State transportation programs, including the Transportation Alternatives Program (TAP), Bicycle Transportation Account (BTA), and State Safe Routes to School (SR2S), into a single discretionary grant program with a focus to make California a national leader in active transportation. The purpose of the ATP is to encourage increased use of active transportation modes by increasing the proportion of trips made by bicycle or on foot and increasing non-motorized user safety; reduce greenhouse gases; enhance public health; and ensure that disadvantaged communities fully share in the benefits of the program.

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

6.2.5 STATE-LOCAL PARTNERSHIP PROGRAM (LPP)

Managing Agency: CTC

The Road Repair and Accountability Act of 2017 (Senate Bill 1) created the Local Partnership Program (LPP), which is modeled closely on the Proposition 1B State Local Partnership Program. The purpose of the Senate Bill 1 LPP program is to provide local and regional transportation agencies that have passed sales tax measures, developer fees, or other imposed transportation fees with a continuous appropriation of $200 million annually from the Road Maintenance and Rehabilitation Account to fund road maintenance and rehabilitation, sound walls, and other transportation improvement projects. Consistent with the intent behind Senate Bill 1, the CTC intends this program to balance the need to direct increased revenue to the State's highest transportation needs while fairly distributing the economic impact of increased funding. LPP provides funding to local and regional agencies to improve aging Infrastructure, road conditions, active transportation, and health and safety benefits.

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

6.2.6 SUSTAINABLE COMMUNITIES GRANTS

Managing Agency: Caltrans

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

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

6.2.8 STATE HIGHWAY OPERATION AND PROTECTION PROGRAM (SHOPP)

Managing Agency: Caltrans

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

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

6.2.9 STATE TRANSPORTATION IMPROVEMENT PROGRAM (STIP)

Managing Agency: CTC

The State Transportation Improvement Program (STIP) is a biennial five-year plan adopted by the CTC for future allocations of certain state transportation funds for state highway improvements, intercity rail, and regional highway and transit improvements. State law requires the CTC to update the STIP biennially, in even-numbered years, with each new STIP adding two new years to prior programming commitments. CTC staff recommendations are based on the combined programming capacity for the Public Transportation Account (PTA) and State Highway Account (SHA) as identified in the fund estimate adopted by the CTC. Projects must first be nominated by the Metropolitan Transportation Commission in its Regional Transportation Improvement Program (RTIP), or by Caltrans in its Interregional Transportation Improvement Program (ITIP) to be included in the STIP that is adopted by the CTC.

Website: https://catc.ca.gov/programs/state-transportation-improvement-program

6.2.10 RECREATIONAL TRAILS PROGRAM (RTP)

Managing Agency: California Department of Parks and Recreation

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

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

6.2.11 AFFORDABLE HOUSING AND SUSTAINABLE COMMUNITIES (AHSC) PROGRAM

Managing Agency: California Strategic Growth Council

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

Website: http://www.sgc.ca.gov/programs/ahsc/

6.2.12 TRANSFORMATIVE CLIMATE COMMUNITIES (TCC) PROGRAM

Managing Agency: California Strategic Growth Council

The Transformative Climate Communities Program was established by Assembly Bill (AB) 2722 to fund development and implementation of neighborhood-level transformative climate community plans that include multiple, coordinated GHG emissions reduction projects that provide local economic, environmental, and health benefits to disadvantaged communities. The TCC Program is also an opportunity to realize the State's vision of Vibrant Communities and Landscapes, demonstrating how meaningful community engagement coupled with strategic investments in transportation, housing, food, energy, natural resources, and waste can reduce GHG emissions and other pollution, while also advancing social and health equity and enhancing economic opportunity and community resilience. The TCC Program funds both implementation and planning grants. While the program can fund a variety of projects, transportation-related projects can include, but are not limited to: developing active transportation and public transit projects; support transit ridership programs and transit passes for low-income riders; expanding first/last mile connections; building safe and accessible biking and walking routes; and encouraging education and planning activities to promote increased use of active transportation modes.

Website: http://www.sgc.ca.gov/programs/tcc/

6.2.13 ENVIRONMENTAL ENHANCEMENT AND MITIGATION (EEM) GRANT PROGRAM

Managing Agency: California Natural Resources Agency

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

Website: http://resources.ca.gov/grants/environmental-enhancement-and-mitigation-eem/

6.2.14 URBAN GREENING GRANT PROGRAM

Managing Agency: California Natural Resources Agency

As part of the California State Senate Bill (SB) 859, the California Natural Resources Agency's Urban Greening Program was created and is funded by the Greenhouse Gas Reduction Fund (GGRF) to support the development of green infrastructure projects that reduce GHG emissions and provide multiple benefits. Projects should be focused in disadvantaged communities to maximize economic, environmental, and public benefits. The Urban Greening Program will fund projects that reduce greenhouse gases by sequestering carbon, decreasing energy consumption and reducing vehicle miles traveled, while also transforming the built environment into places that are more sustainable, enjoyable, and effective in creating healthy and vibrant communities. These projects will establish and enhance parks and open space, using natural solutions to improve air and water quality and reducing energy consumption, and creating more walkable and bikeable trails.

Website: http://resources.ca.gov/grants/urban-greening/

6.2.15 ENVIRONMENTAL JUSTICE (EJ) SMALL GRANTS PROGRAM

Managing Agency: California Environmental Protection Agency

The Environmental Justice (EJ) Small Grants Program offers funding opportunities to assist eligible non-profit community organizations and federally-recognized tribal governments to address environmental justice issues in areas disproportionately affected by environmental pollution and hazards. The EJ Small Grants are awarded on a competitive basis with a maximum amount $50,000 per grant. EJ Small Grants can be used for a variety of environmental purposes but can also be used to augment community engagement, health, trainings, and programmatic opportunities in underserved communities.

Website: https://calepa.ca.gov/EnvJustice/Funding/?mc_cid=b68bc95390&mc_eid=b4c201d657

7. IMPLEMENTATION

To improve roadway safety throughout region, the COG and its member agencies will need to collaborate and coordinate to implement roadway improvements alongside program, policy, and potentially funding changes. Here is a range of implementation activities the COG and its member agencies can work towards undertaking in the coming years to continually improve road safety in the region.

7.1 RESOURCES

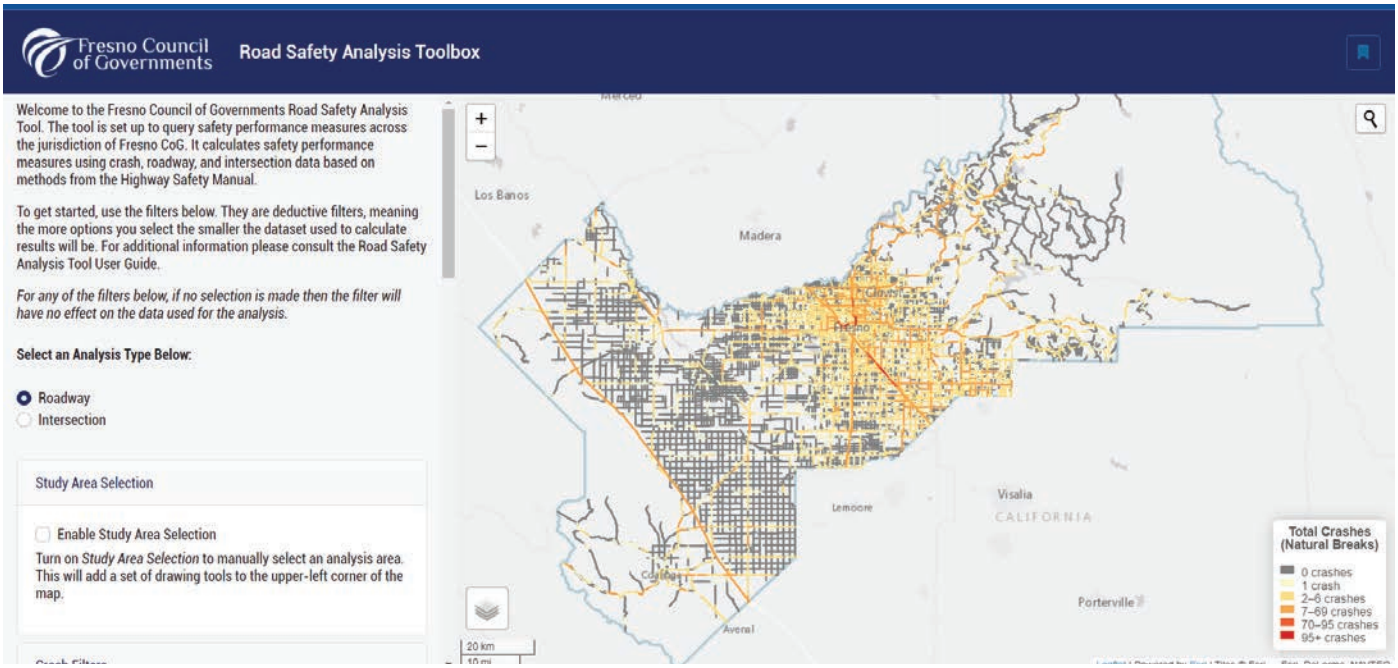
The following resources have been created as part of the development of the RSP. The COG will maintain these resources to provide its member agencies with information that can assist them in identifying and prioritizing safety needs, competing for safety related grant funding, and disseminating consistent education materials targeting safer road user behavior.

7.1.1 CONSOLIDATED REGIONAL CRASH DATABASE

The consolidated regional crash database will be owned and maintained by the COG. In addition to serving as a resource for regional planning efforts, it will support local agency efforts understand and evaluate transportation safety over time. The consolidated database was created through development of this RSP. Moving forward, regional planning staff will establish a framework for coordinating its maintenance and updates as other regional and local projects occur.

7.1.2 WEB-BASED SAFETY ANALYSIS TOOL

The web-based safety analysis tool was created as part of the RSP's development. The safety analysis tool works from data contained in the consolidated regional database and can be



used to evaluate roadway safety performance across the region. The analysis tool can be used to facilitate safety performance benchmark analysis to see how the region is progressing. The analysis tool can also be used to identify locations, either across the region or within a specific jurisdiction, most likely to be competitive for State safety grant funding. The tool has been established to allow for quick screening, prioritization, and assessment of progress at either the regional or local level. For the safety analysis tool to continue to be a relevant resource overtime, the COG will need to update the consolidated regional database with the most current crash data and any changes to the regional roadway network.

This tool was publicly available as a part of the project and as an example for a couple of months but is no longer posted publicly. The tool will remain accessible internally to the COG for future safety analyses and inquiries. Depending on future available funding, this kind of resource could be developed as a more permanent publicly available tool.

7.1.3 TRANSPORTATION SAFETY EDUCATION PROGRAM

The transportation safety education program and materials created through the RSP's development are intended to be used by the COG, its member agencies, and broader community partners to consistently disseminate key messages that encourage safe road user behavior throughout Fresno County. The education program materials are designed to be used across different mediums and by different types of organizations. The COG will continue to look for funding opportunities to support a broad, coordinated implementation of the program, while also making the education materials available to those organizations that are able to put them easily to use. The COG will continue to maintain these materials as a resource for local agencies.

7.1.4 REGIONAL COUNTERMEASURES TOOLBOX

The Regional Countermeasures Toolbox is provided in Appendix D and presents engineering countermeasures identified as most relevant to Fresno County based on the crash data analysis conducted to inform the RSP. The toolbox includes information regarding each countermeasure's effectiveness, planning level cost, and eligibility for grant funding. The toolbox is intended to be used by local agencies when seeking to improve road safety and when considering what improvements are eligible for grant funding. Future updates to the RSP should update the toolbox as safety performance within the region changes and countermeasures developed by the broader transportation engineering industry evolve.

The toolbox is used when considering safety improvements and determining which are eligible for grant funding

7.2 IMPLEMENTATION PARTNERS

The COG's partners for implementation are broad. Many organizations and agencies have a role in helping improve roadway safety. This includes each of the COG's member agencies, law enforcement, educational institutions, community-based organizations, local businesses, and major employers.

The responsibility of these partners covers a range of activities such as:

- Helping identify, fund, and implement roadway improvements
- Being a two-way conduit for information—sharing out educational materials and bringing to the COG the safety concerns of the community
- Ensuring that crashes are reported and recorded at the local as well as at the state level
- Providing information that supports the maintenance of the Regional Consolidated Database
- Participating in coordination across jurisdictions to enable the greatest overall safety benefits for the region

For the COG to be able to manage the ongoing efforts of improving roadway safety in collaboration with its many partners, a standing Regional Safety Steering Committee is needed. This standing RSSC could be initiated from the RSSC used to develop the RSP.

Membership on the committee could be rotated on a three-year basis, to maintain representation across the region while engaging new individual voices over time. The COG would be responsible for managing the RSSC activities. The intent of the standing RSSC would be to ensure roadway safety coordination is continuing at the regional level and the actions taken are steadily improving road safety over time.

7.3 PERFORMANCE TRACKING AND REPORTING

Performance tracking helps show progress towards goals and can also be used to identify where greater emphasis or different strategies may be needed to make more progress.

The following performance measures are organized under each of the regional safety goals. They can be used to assess progress over time at the regional and local levels. The performance measures are a combination of quantitative outcomes or investments and methods of qualitatively assessing the coordination or use of resources.

Table 4. Safe Routes Save Lives evaluation framework

Goal	Performance Measure(s)
Collaborate with member agencies to eliminate fatalities and severe injuries due to crashes on public roadways within the region.	/ Annual number of fatal and severe injury crashes in the region / Frequency and quality of engagement from the RSSC
Provide resources, such as best practice information, for local agencies to use to implement projects and engineering countermeasures that continually and proactively reduce the risk of crashes from occurring.	/ Frequency and level of use of safety-related resources by COG's member agencies
Assist local agencies in identifying and securing funding to implement safety improvements.	/ Annual amount of grant funding secured by COG's member agencies for safety improvements. / Geographic diversity of member agencies receiving grant funding for safety improvements.
Maintain a regional crash database and analysis tool to be able to provide local agencies with as complete data as possible to inform decisions.	/ Ability to maintain Consolidated Regional Database and Safety Analysis Tool for use by member agencies
Serve as a partner in facilitating coordination between local agencies and Caltrans to enhance safety on state facilities also serving as main streets or thoroughfares for local communities.	/ Frequency of coordination and ongoing collaboration between Caltrans and local agencies / Percentage of concerns related to state facilities reaching common resolution
Create and establish a forum for regular discussion and coordination to improve roadway safety across the region.	/ Frequency of RSSC meetings / Level of engagement and activities facilitated by or through the RSSC

To maintain continual focus on improving roadway safety, the COG will prepare a brief annual update on the status of these performance measures. Approximately every three to five years, the COG will update the RSP. Each update will include a complete review of the goals and performance measures and establish the next set of goals and performance measures related to roadway safety.

A. REGIONAL SAFETY STEERING COMMITTEE MEETING AGENDAS AND MATERIALS

B. OUTREACH & ENGAGEMENT SUMMARIES

C. EXISTING CONDITIONS REPORT

D. REGIONAL COUNTERMEASURES TOOLBOX & SAFETY STRATEGIES

E. EDUCATION PROGRAM MATERIALS