CITY OF
MODESTO
CALIFORNIA

LOCAL ROADWAY SAFETY PLAN

FINAL | SEPTEMBER 2022

prepared by FEHR PEERS

Contents

Front Matter

STATEMENT OF PROTECTION OF DATA FROM DISCOVERY AND ADMISSIONS

Section 148 of Title 23, United States Code

Reports discovery and admission into evidence of certain reports, surveys, and information—notwithstanding any other provisions of law, reports, surveys, schedules, lists, or data, compiled or collected for any purpose relating to this section, shall not be subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at the location identified or addressed in the reports, surveys, schedules, or other data.

Under 23 U.S. Code § 409 and 23 U.S. Code § 148, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a federal or state court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

This study applies a systemic safety approach that identifies certain features on select roadways that are correlated with specific collision types and frequencies. This broad approach is necessitated by the inherent nature of covering an entire agency's facilities in one study and the limited scope/budget available to prepare Local Roadway Safety Plans. Limited time is available to perform field observations throughout the study area to contextualize the data, and therefore, it is beyond the scope of work to perform in-depth "hot spot" evaluations at all locations.

ACKNOWLEDGEMENTS

The 2020 City of Modesto Local Roadway Safety Plan (LRSP) was funded through an LRSP grant provided by the California Department of Transportation (Caltrans). Input was sought from an advisory group consisting of staff from the City of Modesto. Fehr & Peers assisted the City of Modesto in preparing the plan.

Caltrans LRSP Grant ID: LRSP142

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Introduction

The City of Modesto is committed to prioritizing safety and decreasing traffic-related deaths and serious injuries on city streets. This Local Road Safety Plan (LRSP) builds upon the work of the Systemic Safety Analysis Report (SSAR) to proactively evaluate hot spots and systemic risk factors throughout the city and identify proven countermeasures that can be implemented through the current and future Capital Improvement Plan (CIP), as well as key partnerships with safety stakeholders. This section defines the Safe System approach, the philosophy underpinning this LRSP, and provides background on safety work in Modesto.

THE SAFE SYSTEM APPROACH

Each day, people are killed and seriously injured on roads in the US and California. On average, a collision resulting in someone being killed or severely injured (KSI) occurs in Modesto once every six days. Crashes can irreversibly change the course of human lives, touching victims, their families and loved ones, and society as a whole. The City of Modesto believes all KSIs are unacceptable and is adopting a Safe System approach to improve safety in the city.

Figure 1 **The Safe System Approach**
Source: Fehr & Peers for FHWA

TRADITIONAL APPROACH		SAFE SYSTEM APPROACH
Prevent crashes	→	Prevent deaths and serious injuries
Improve human behavior	→	Design for human mistakes/limitations
Control speeding	→	Reduce system kinetic energy
Individuals are responsible	→	Share responsibility
React based on crash history	→	Proactively identify and address risks

Through collective action on the part of all roadway system stakeholders—from system operators and vehicle manufacturers to law enforcement and everyday users—a Safe System approach anticipates human mistakes with the goal of eliminating fatal and serious injuries for all road users.[1]

A Safe System approach acknowledges the vulnerability of the human body, in terms of the amount of kinetic energy transfer a body can withstand, when designing and operating a transportation network.

According to the World Health Organization, the goal of a Safe System is to ensure that if crashes occur, they "do not result in serious human injury."[2] A Safe System approach addresses the five elements of a safe transportation system—safe road users, safe vehicles, safe speeds, safe roads, and post-crash care—in an integrated manner, through a wide range of interventions (see **Figure 1**).

The Safe System approach to road safety started internationally as part of the Vision Zero proclamation that, from an ethical standpoint, no one should be killed or seriously injured on the road system.[3] Countries that have adopted the Safe System approach have had significant success reducing highway fatalities, with reductions in fatalities between 50 and 70%.[4]

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

2 World Health Organization (2011). Decade of Action for Road Safety 2011-2020. Retrieved from https://www.who.int/roadsafety/decade_of_action/plan/plan_en.pdf, pg. 9.

3 Johansson, R. (2009). Vision Zero - Implementing a policy for traffic safety. Safety Science, 47, 826-831; and Tingvall, C., & Haworth, N. (1999). An Ethical Approach to Safety and Mobility. Paper presented at the 6th ITE International Conference Road Safety and Traffic Enforcement. 6-7 September 1999, Melbourne, Australia.

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


START CROSSING
Watch For
Vehicles
DON'T START
Finish Crossing
If Started
FLASHING
STEADY
DON'T CROSS
PUSH BUTTON
TO CROSS

The Institute of Transportation Engineers (ITE) and the Road to Zero Coalition's Safe System Explanation and Framework articulate that in order to anticipate human mistakes, a Safe System seeks the following:

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

The recommendations in this LRSP have been organized to follow the Safe System approach elements, and to reflect the shared responsibility of system planners, designers, and users in support of the city's safety goals.

BACKGROUND

The City of Modesto recently developed a Systemic Safety Analysis Report (SSAR). The report identified opportunities for the city to improve safety for all modes of travel through roadway design projects that are relevant to project locations, feasible for implementation, and competitive for grant funding. The Local Road Safety Plan (LRSP) builds upon the infrastructure-focused work of the SSAR to provide a comprehensive safety strategy for Modesto that includes engineering as well as education, enforcement, and emergency services.

ABOUT MODESTO

The City of Modesto, situated on the Tuolumne River in the northern San Joaquin Valley, is home to approximately 212,600 people and is the largest city in Stanislaus County. It is located in the Central Valley, 68 miles south of Sacramento, 90 miles north of Fresno, and 92 miles east of San Francisco. Much of Modesto is surrounded by rich farmland and was once served by one of the busiest rail corridors in the country.

A majority of the existing roadway network was built with wide travel lanes and high posted speed limits, with a focus on motor vehicles. Owing to the suburban land-use patterns in much of Modesto, a major freeway and arterials dividing the city, and development pressures on the urban edge, multimodal traffic safety is a growing concern. To that end, this report identifies projects for future implementation.

Vision and Goals

Modesto Safety Vision Statement

Proactively implement multimodal transportation safety improvements to eliminate fatal and severe injuries throughout the City of Modesto

The Modesto Safety Vision Statement was developed based on work completed through the SSAR, including stakeholder feedback and input from city staff. The city's vision statement sets a concise yet comprehensive framework to guide the city's investments in multimodal safety, education, emergency services, and enforcement.

1. Implement roadway and intersection improvements that increase the visibility of road users, especially for people walking and biking.
2. Enhance roadway crossings, especially near schools and other high pedestrian activity areas, to promote and support safe travel for people walking and biking.
3. Increase the number of roadway and intersection improvements that promote safe turning movements of motorists at intersections and along high-speed roadways.
4. Encourage people to drive at lower speeds with roadway design improvements and signage.
5. Increase multi-jurisdictional collaboration through enhanced technology (such as shared databases) among city agencies, health care, and enforcement on post-crash care.
6. Discourage motorists from driving under the influence through educational and enforcement programs, and decrease the severity of DUI collisions through roadway infrastructure improvements.

Safety Partners

The city is excited to have engaged stakeholders representing engineering, law enforcement, and education to cover key perspectives of the Safe System elements and bring a multi-disciplinary set of safety strategies and implementation resources. The Technical Advisory Committee for the LRSP included representatives from the City of Modesto along with the following local and regional partners:

- **Stanislaus County Health Services Agency** Because traffic safety is fundamentally a public health issue, the Public Health Division of the Stanislaus County Health Services Agency (HSA) plays a key role in Modesto's traffic safety strategy. The HSA implements safety education and training programs aimed at helping parents and caretakers make sure their child is riding safely in a vehicle or on a bicycle, as well as pedestrian safety education programs.
- **Modesto Police Department Traffic Division** Police officers provide valuable insight into observed behavior on the roads, and are important partners in safety conversations so that jurisdictions can focus enforcement time on behaviors most closely associated with injuries and fatalities. Modesto Police officers also lead and participate in traffic safety education programs.

Additional safety partners in Modesto include Mothers Against Drunk Driving, Safe Kids Stanislaus, Modesto City Schools, the California Highway Patrol, and the League of American Bicyclists. On October 27, 2020, the Technical Advisory Committee met to discuss non-engineering emphasis areas from the SSAR. The committee was interested in prioritizing efforts that address driving under the influence, red-light running, speeding, and pedestrian and bicyclist safety.

Existing Efforts

In recent years, efforts to improve transportation safety in Modesto have included a thorough analysis of collisions and applicable engineering countermeasures through the Systemic Safety Analysis Report, and grants from the California Office of Traffic Safety for enforcement, education, and outreach programs.

MODESTO SYSTEMIC SAFETY ANALYSIS REPORT

Completed in 2020, the City of Modesto's Systemic Safety Analysis Report (SSAR) lays the groundwork and provides the resources necessary for the preparation of successful Highway Safety Improvement Program (HSIP) and other local and federally funded grant applications by the city. The study was largely funded through the SSAR program grant provided by the California Department of Transportation (Caltrans).

The SSAR program was initiated by Caltrans to help local agencies take a strategic approach identifying systemic and hot spot safety improvement projects by completing a system-wide, multi-year data-driven analysis of collisions. With a focus on engineering interventions, the SSAR includes collision and roadway database development, review of local collision data, a safety data analysis, collision profile development, safety countermeasure selection, and project development.

OFFICE OF TRAFFIC SAFETY GRANTS

The California Office of Traffic Safety (OTS) takes a leadership role in efforts to make California roadways safe for all users. Through grant funding provided by the National Highway Traffic Safety Administration (NHTSA), OTS supports California jurisdictions and organizations in implementing enforcement, education, and public information programs in ten priority program areas. In Modesto, OTS grants support existing efforts, such as

- **Modesto Police Department Enforcement** OTS funding supports DUI saturation patrols and check points. Saturation patrols are targeted at areas where DUI collisions have occurred, paired with social media campaigns and press releases to reduce and prevent driving under the influence. Officers from Modesto Police Department noted that while DUI enforcement has increased with grant funding, DUIs are still up since the start of the COVID-19 pandemic.

- **Modesto Police Department Bicycle and Pedestrian Safety** Grant funding supports free helmets and safety gear for the community, police participation in Walk and Bike to School Day, and safety videos and messaging in partnership with Safe Kids Stanislaus.

- **Health Services Agency Countywide Programs** OTS grants for the HSA focus on family engagement and safety equipment distribution, including child seat safety checks and educational classes. The HSA also provides bicycle education programs, and has new funding to build out local Bike Closets to reduce traffic in neighborhoods and increase outdoor activity. Bike Closets are a bicycle lending library program where area residents can check out bicycles for use and receive bicycle maintenance education. With the installation of Bike Closets around the city, education programs and safe routes of travel are increasingly necessary.

OTHER EXISTING EFFORTS

The Technical Advisory Committee discussed these additional existing efforts:

- The police department, along with Mothers Against Drunk Driving, promote DUI education campaigns and enforcement stops.
- Speed feedback trailers are installed at various hotspot locations and the Modesto Police Department has increased speed enforcement throughout the city.

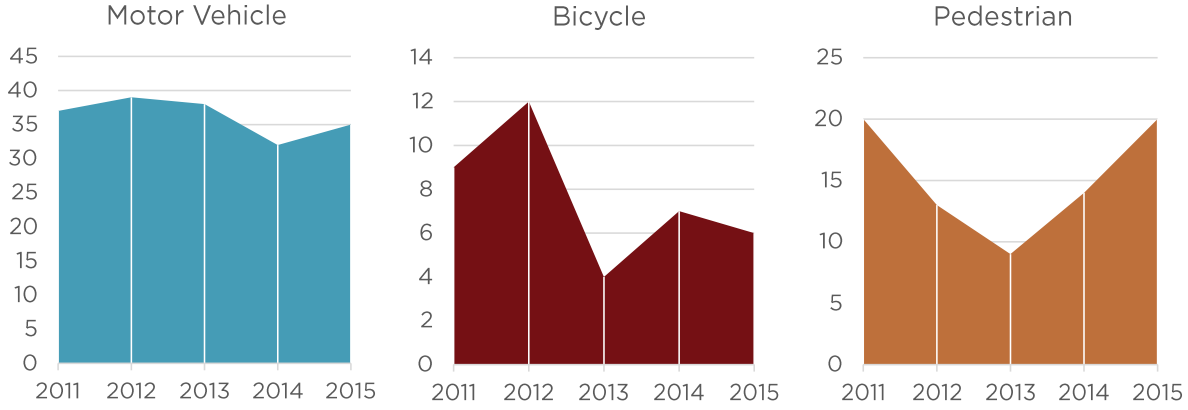
Collision History, Risk Factors, and Trends

For the SSAR, five years of the most current crash data available at the time (2011-2015) was extracted from the Statewide Integrated Traffic Records System (SWITRS) and Transportation Injury Mapping System (TIMS) databases. The datasets include extensive collision detail such as collision location, type, severity, parties involved, contributing factors, and more. The SSAR provides an in-depth analysis of this crash history data, identifying collision trends, location types, and hot spots for crashes resulting in a death or serious injury. For demographic context, Modesto's population is 44% non-Latino white, 40% Latino, 7% Asian, 4% Black, 3% two or more races, and 2% non-Latino Native American. Thirty-seven percent of residents speak a language other than English at home. Approximately 15% of Modesto residents are living in poverty, with a citywide median income of $59,300.

ANNUAL COLLISION TRENDS

Annual collision trends show a rise in collisions since 2011. The total number of collisions across all modes of transportation rose from 1,685 in 2011 to 2,080 in 2015. Fatal and severe injury (KSI) collisions dipped in 2013 and 2014, but show an upward trajectory. Fatal collisions increased to 15 in 2015, up from 10 to 11 per year in prior years.

Figure 2 **KSI Collisions, 2011-2015**



Motor vehicle KSI collisions remained relatively constant, averaging about 36 per year. By comparison, bicycle KSI collisions fluctuated between 4 to 12 per year, but appear to be trending down. Pedestrian KSI collisions follow a similar trend to pedestrian collisions overall: down in 2013, but on the rise by 2015.

COLLISION SEVERITY

Vulnerable road users, including bicyclists and pedestrians, are more susceptible to fatal or severe injury collisions. Broken down by mode, motor vehicle collisions accounted for 90% of all collisions but only 60% of fatal collisions. By contrast, pedestrian-involved collisions made up 5% of all collisions but 33% of fatal collisions. Bicycle collisions made up 5% of all collisions and 7% of fatal collisions.

COLLISION LOCATION

Across all modes, most collisions occurred at intersections; nearly 80% of all collisions either occurred at intersections or were intersection-related. However, a slightly higher share of KSI collisions occurred along roadway segments or midblock. The largest share of pedestrian collisions occurred with pedestrians crossing in a crosswalk at an intersection (47% of all pedestrian collisions). However, pedestrian collisions in a crosswalk at an intersection comprised only 37% of pedestrian KSI collisions and 15% of pedestrian fatal collisions. The largest share of pedestrian KSI and fatal collisions involved pedestrians crossing at an unmarked location (44% and 55%, respectively).

Figure 3 **Collision Mode Share by Severity, 2011-2015**

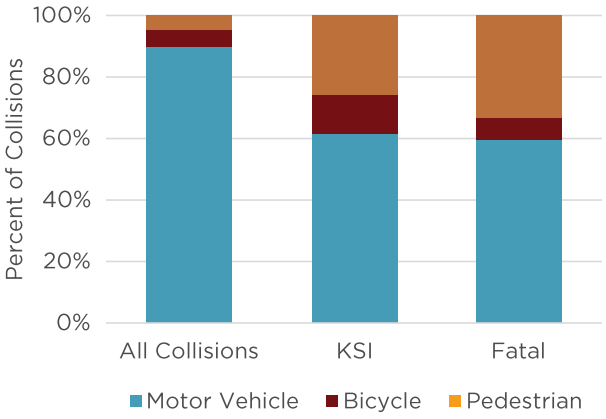
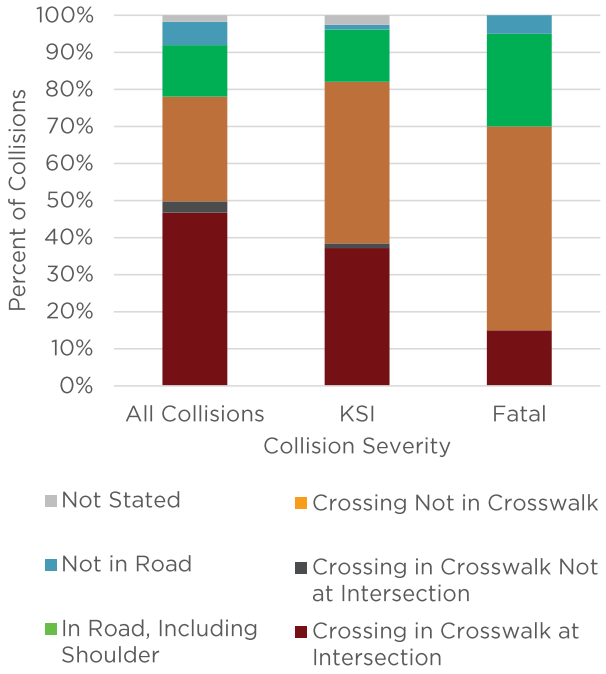


Figure 4 **Pedestrian Collisions by Severity and Pedestrian Location, 2011-2015**



CONTEXTUAL DATA AND SYSTEMIC ANALYSIS

The systemic analysis in the SSAR combined crash history with contextual data on roadway characteristics as well as input from local stakeholders to produce a set of 13 collision profiles to highlight the most common and severe collision patterns in Modesto:

1. Broadside vehicular collisions at signalized intersections with permissive left turns
2. Broadside vehicular collisions at intersections caused by signal violations
3. Broadside vehicular collisions on high-speed roadways
4. Driving under the influence
5. Vehicular collisions on six-lane roadways
6. Broadside collisions at large, signalized intersections involving bicycles
7. Broadside collisions at unsignalized intersections involving bicycles
8. Broadside collisions on high-speed roadways involving bicycles
9. Bicycle collisions involving wrong-way riding
10. Pedestrian collisions at crosswalks at large signalized intersections with permissive left turns
11. Pedestrian right-of-way collisions at uncontrolled crosswalks at large intersections
12. Pedestrian right-of-way collisions at uncontrolled crosswalks at small intersections
13. Pedestrian violation collisions on large roadways not at crosswalks


PUSH
BUTTON
FOR
R62DL5

PROJECT DEVELOPMENT

The 13 collision profiles provide a blueprint for Modesto to prioritize countermeasures to reduce KSI crashes. Chapter 3 of the SSAR provides an overview of each collision profile including a description of the profile, a map of the collisions, and identification of applicable countermeasures for feasibility and implementation consideration. Potential priority projects were identified in consideration of the 13 collision profiles along with identification of top hot spot locations. The SSAR Project Team and Stakeholder Advisory Group completed a two-day walking audit around the city on Tuesday, May 14 and Wednesday, May 15, 2019.

The walking audit provided first-hand insight into the challenges roadway users face throughout the city. This project team identified 20 priority projects through the walking audit. These projects were then presented to the public though an evening community meeting on September 11, 2019 and a published survey to solicit feedback regarding project prioritization.

The two projects listed below were among those identified as projects that may compete well for grant funding, align with city priorities, and were ranked as a priority by the community:

- Pedestrian Hybrid Beacon (PHB) installation at the intersections of Standiford Avenue and Longbridge Drive and of Sylvan Avenue and Northamption Lane, as well as the addition of median pedestrian refuges.

- PHB and crosswalk installation at Oakdale Road and Celeste Drive, as well as a redesign of Oakdale Road from Celeste Drive south to Lancey Drive including intersection improvements and signal modifications.

As part of Caltrans' Highway Safety Improvement Program (HSIP) Cycle 10 funding, applications for the two projects were submitted for grant funding, and both projects received funding.

Counter-measures

The Modesto SSAR provides an in-depth guide on engineering countermeasures for each collision profile, including decision-making frameworks for safety improvements, detailed descriptions of countermeasures with cost estimates, and feasibility and implementation considerations for each engineering countermeasure. The detailed information can be found in Chapter 3 of the SSAR. This section presents additional safety countermeasures to include Road Users and Post Crash Care, supplementing the SSAR's engineering focused countermeasures on roadway design and speed reductions. Vehicle design does not fall within the city's current purview, though they acknowledge opportunities to consider autonomous vehicle planning and ITS technologies with future safety efforts.

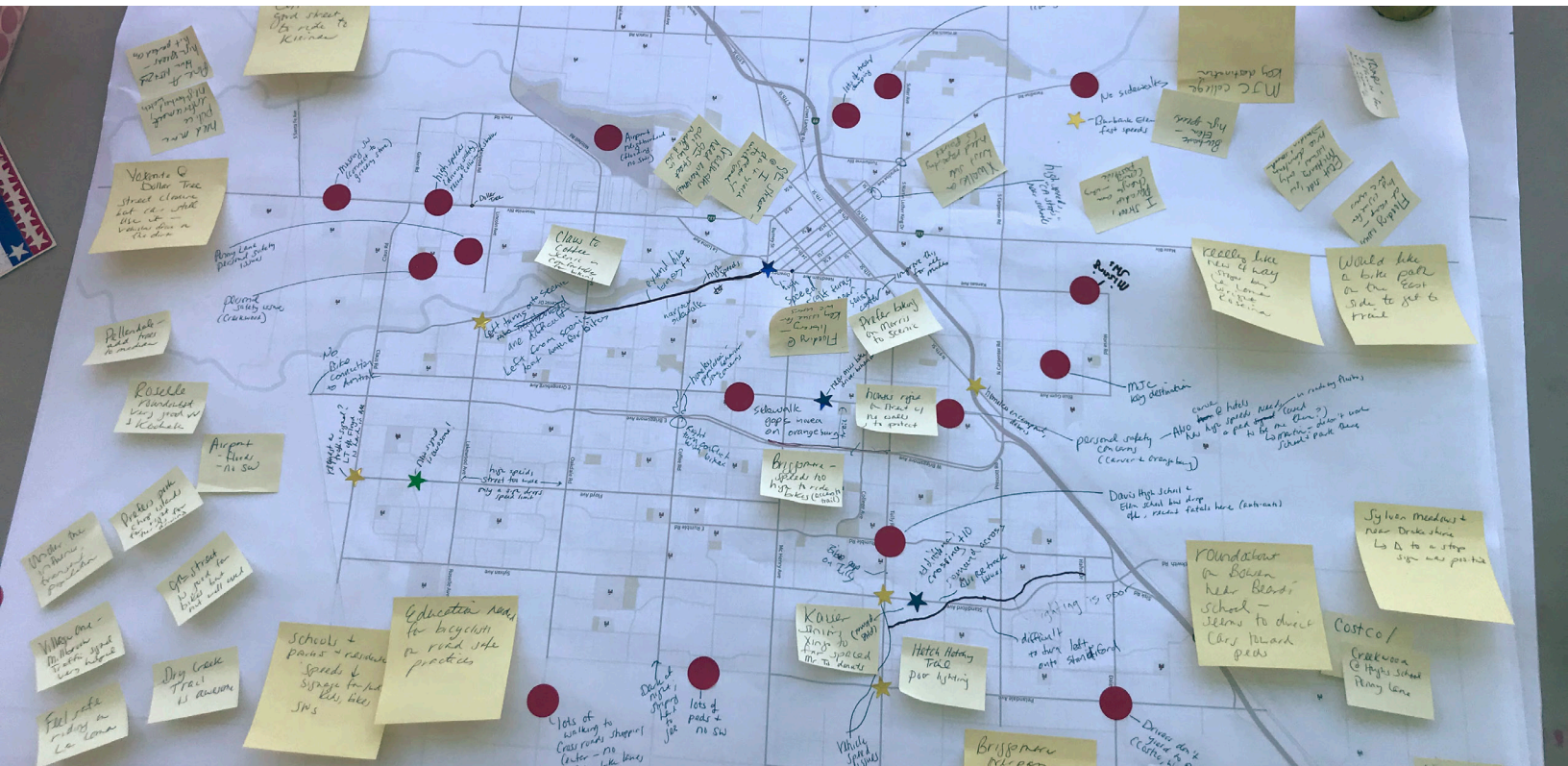
Safe Road Users

Safe Speeds

Post-Crash Care

Equity Considerations

Emerging Technology



Safe Road Users

Transportation safety education plays an important role in shaping and shifting behavior. Many cities, such as Seattle, Oakland, and Los Angeles, are including community engagement and education to make streets safer for all. For example, the Los Angeles Vision Zero Dignity-Infused Community Engagement (DICE) approach includes partnerships with local nonprofits, paid outreach work for those experiencing barriers to employment, and both large- and small-scale community engagement events.

PUBLIC EDUCATION MEDIA CAMPAIGN

A public education media campaign focused on discouraging drinking and driving and/or speeding, along with encouraging increased awareness of pedestrians and bicyclists at night and appropriate crosswalk behaviors, could complement engineering interventions targeting these risk factors in the city. Targeted education can be directed at vulnerable populations, with the help of local partners, and at certain behaviors of drivers, pedestrians, and bicyclists to deter specific collision types. Specific locations on the high-injury network may also be appropriate for concentrated education messages, such as on bus shelters or billboards. Modesto can develop educational outreach campaigns that focus on common violations leading to fatalities and severe injuries in Modesto, based on the collision profiles identified in the SSAR.

Education and outreach campaigns could include the following:

- Reducing driving under the influence, as 8% of KSI collisions involved drugs or alcohol
- Emphasizing that speeding is deadly, as 18.7% of collisions were caused by unsafe speeding and 67% of KSI collisions were on roadways with speed limits of 35 mph or more.
- Reinforcing which road user has the right-of-way, including awareness of pedestrians in marked and unmarked crosswalks, as 28% of KSI collisions involved a vehicle right-of-way or pedestrian right-of-way violation.
- Encouraging pedestrians to cross in crosswalks, to complement engineering countermeasures addressing the need for safer crossings, as 51.6% of pedestrian KSIs occurred while a pedestrian was crossing outside of a crosswalk or a crosswalk was not present.

EDUCATIONAL MATERIALS ON NEW ROADWAY DESIGN CHANGES

Temporary demonstrations, like pop-up installations, can physically showcase proposed safety infrastructure and emergency response to the public in a tangible way. Preparing materials and videos focused on new types of roadway designs and Modesto's major violation issues can direct community conversations for meaningful outcomes.

PARTNER WITH LOCAL EXPERTS

Local partners can serve as community liaisons between the City and the public. Working with community partners and public institutions that have relationships with residents, such as the Stanislaus County Public Library, strengthens the engagement process by building trust and engaging an established base of stakeholders. Local partners can help tailor the engagement process or incorporate engagement into existing programs and resources to educate people more effectively about roadway safety.

PARTNER WITH LOCAL SCHOOLS ON TRANSPORTATION SAFETY

Local schools can be partners in promoting safe driver behavior. Education campaigns can involve students promoting safer driving to their parents by holding signs during pick-ups and drop-offs. Expanding existing youth programs led by the County Health Services Agency present an opportunity to provide ongoing Safe Routes to School education to all students each year. OTS grants also offer a variety of education programs that include Every 15 Minutes, Sober Graduation, and DUI mock trials in high schools intended to teach students about the dangers of alcohol and driving.

Safe Speeds

Roadway networks within the city should address safety of all road users, including those who walk, bike, roll, drive, and ride transit. Roadway design and management should encourage safe speeds and manipulate appropriate crash angles to ensure that collisions do not result in a fatality or serious injury. The SSAR provides engineering design recommendations to this effect, but these improvements should be complemented with enforcement tacics.

AUTOMATED ENFORCEMENT

Automated enforcement, such as red-light cameras or speed safety cameras, target the specific drivers who are behaving dangerously. A strictly data-driven approach to automated enforcement might place red-light or speed cameras in locations with the highest number of collisions. However, speed safety cameras are not currently allowed in California. The City should monitor potential changes to state legislation for future use of this critical tool, should it become available.

During the Technical Advisory Committee meeting, red-light running was identified as a high priority. Discussion centered around the opportunity to install red-light cameras and signal technology to both enforce and mitigate the safety impact of red-light running should it be considered again for Modesto in the future.

HIGH VISIBILITY ENFORCEMENT

High visibility enforcement is a multi-faceted approach to enforcement that involves garnering public attention to traffic safety laws through highly visible patrols such as checkpoints, saturation patrols, or message boards. The goal of high visibility enforcement is to promote voluntary compliance with traffic laws and is one of the most effective enforcement strategies for safety outcomes, according to NHTSA research.[5]

5 Richard, C. M., Magee, K., Bacon-Abdelmoteleb, P., & Brown, J. L. (2018). Countermeasures That Work: A Highway Safety Countermeasure Guide For State Highway Safety Offices, 2017 (No. DOT HS 812 478). United States. Department of Transportation. National Highway Traffic Safety Administration. https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/812478_countermeasures-that-work-a-highway-safety-countermeasures-guide-.pdf. Accessed May 3, 2021.

CROSS-SECTOR PARTNERSHIPS

Alternatives to law enforcement involve investing in cross-sector partnerships to promote transportation safety. Alternatives include the following:

- Community partners can be hired as Street Safety Ambassadors and canvas corridors with severe traffic fatalities or where communities are experiencing the most traffic stops or tickets for traffic violations. Hiring community members as Street Safety Ambassadors also serves as an opportunity to build trust between government agencies and the public since community partners typically have pre-existing relationships in the community.
- Hiring social workers, mental health counselors, addiction specialists, and other unarmed specially trained professionals can serve as a supplement to traffic enforcement. Partnering with local departments of mental health and public health may de-escalate traffic enforcement by treating traffic safety violations as a public safety issue.

Post-Crash Care

Victims involved in a collision have a higher chance of survival if they can quickly receive medical care. In many cases, law enforcement officers and fire department staff are the first responders to arrive at a collision location. In addition to equipping all first responders with the appropriate training, improving response times for Emergency Medical Services (EMS) will help improve collision victims' chances of survival. Additionally, collisions on their own can also put first responders' and other road users' lives at risk due to increased congestion during the crash response, which may lead to secondary crashes.

The City of Modesto should work with EMS to improve response times and ensuring safety in arriving at the scene, and while EMS is attending to patients at the scene. Strategies include designing emergency vehicles to be highly visible (e.g., retroreflective striping and chevrons, high-visibility paint, and built-in passive light) and implementing emergency vehicle signal preemption, which allows emergency vehicles to break a normal signal cycle and proceed through an intersection.

TRAUMA CARE

Effective emergency trauma care can increase crash survival rates by as much as 25%, and an effective citywide trauma care coordination system can reduce fatalities by 50%.[6] The city should work with EMS and identify funding sources to provide the highest care for victims. Recommended strategies to improve trauma care include providing funding for appropriate first responder equipment (e.g., hydraulic and pneumatic extrication tools), research and adoption of technology aimed at reducing triage time (e.g., automatic vehicle reporting of severe crashes to EMS, EMS vehicle collision avoidance systems, and geolocation of nearest EMS vehicles), and promotion of federal- and state-certified training programs.

FATAL CRASH RESPONSE TEAM

In the event of a traffic fatality, analysis and evaluation are crucial in addressing the burden of traffic mortality and tracking progress toward eliminating fatalities on Modesto's roadways. One strategy is to establish a cross-agency fatal crash team of EMS, police, transportation, public health, and city officials to convene at the crash site after a fatal crash. This would assist with accurate investigation and documentation of potentially relevant infrastructural and environmental crash factors, while identifying other additional factors that may have contributed to the fatal crash outcome. It can also expedite interventions to improve the crash location/ circumstances and address similar risk factor locations and situations.

6 Office of Traffic Safety (OTS) (2020). California Highway Safety Plan 2020. Retrieved from https://www.ots.ca.gov/wp-content/uploads/sites/67/2020/02/HSP-Final-back-2-4.pdf, pg. 106.

POST-CRASH CARE

When a person is injured in a collision, they rely on emergency first responders to quickly locate them, stabilize their injury, and transport them to medical facilities. Post-crash care also includes forensic analysis at the crash site and traffic incident management so that traffic flow may be restored as safely and quickly as possible. Policy action through the justice system and appropriate design of roadways to lessen the risk of future crashes can also help inform our safety programs. To ensure a crash survivor receives the care needed to recover and restore their bodies and mines to an active life within society, medical rehabilitation with specialists can range from orthopedics, neurosurgery, physical and occupations therapy, prosthetics, psychology, and neuropsychology.

Crash reporting practices, such as complete data collection and documentation of road user behavior and infrastructure, and sharing data across agencies or organizations (e.g., among police departments, transportation officials, and hospitals) can help lead to a greater understanding of the holistic safety landscape, and thus lead to improved investments in safety.

6 Office of Traffic Safety (OTS) (2020). California Highway Safety Plan 2020. Retrieved from https://www.ots.ca.gov/wp-content/uploads/sites/67/2020/02/HSP-Final-back-2-4.pdf, pg. 106.

Equity Considerations

Creating an equitable framework for all modes of transportation in the city and removing transportation barriers for historically marginalized communities, especially communities of color, should ensure safe and fair transportation options and ensure all road users have a safe route and access to basic community services. The city must proactively work to address the inequities built into the current transportation system to keep vulnerable members of the community safe.[7]

TRAFFIC ENFORCEMENT

Enforcement of traffic laws is a common strategy to increase street safety, but historical enforcement techniques and strategies have raised concerns about racial profiling, police violence, and the impacts of policing on communities of color. According to the US Department of Justice, Black and Hispanic people are more likely than white people to experience use of force when they are stopped by police. To address these concerns, some cities have shifted to equity-based strategies that target specific reckless behaviors posing the highest safety risk while working to mitigate potential inequities in enforcement. Other cities are looking for opportunities for non-sworn officers to be engaged in transportation enforcement activities, as appropriate.

Equity can also be considered in a range of enforcement strategies, including progressive fine structures, analysis of demographic data in traffic citations, community-based alternatives to police enforcement, and investment in social programs that alleviate enforcement burdens.

Equity considerations in enforcement strategies, include the following:

- Progressive traffic fine structures, such as a sliding scale for traffic fines based on a driver's income, developing payment plans, or giving first offenders the opportunity to take a safety class focusing on driver behavior changes.
- Analyzing available demographic data and the location of traffic citations can help the city understand if traffic enforcement is being implemented universally or if specific communities are experiencing disparities in enforcement.
- Enforcement practices, like traffic stops, require the discretion of police offices. Implicit bias can affect how and to whom officers issue traffic citations. Assessing traffic citation demographic and geographic data can help uncover inequities in policing and the enforcement of traffic safety.

CULTURALLY RELEVANT ENGAGEMENT

Community engagement is not a one-size-fits-all model as different communities have different needs. By developing culturally relevant engagement strategies, all participants are invited into conversations about safety. Culturally relevant engagement strategies can help education and programming around traffic safety reach a larger audience and be more impactful. For example, including cultural markers of a local community, such as contracting with popular local food vendors to cater engagement activities, can be a creative and welcoming way of engaging residents. Meeting people "where they are" to gather input on safety issues at local parks can more effectively engage parents and children rather than expecting families to attend a meeting at a government building.

FUNDING AND PROJECT PRIORITIZATION

As mentioned previously in the report, 20 priority projects were identified and prioritized based on their perceived competitiveness for grant funding, alignment with city priorities, and were ranked as a priority by the community. Many grant funding opportunities, such as California's Active Transportation Program (ATP), prioritizes projects that increase safety and travel options for people walking and bicycling, and ensure that disadvantaged communities fully benefit from the ATP. CalEnviroScreen scores show much of Modesto within the 25% most disadvantaged areas, making the city a priority area for state and local funding opportunities.

7 FHWA (2018). Integrating the Safe System Approach with the Highway Safety Improvement Program. https://safety.fhwa.dot.gov/hsip/docs/fhwasa2018.pdf. Accessed May 3, 2021.

Emerging Technology

Recent advancements in transportation technology have not only introduced new transportation modes and travel patterns, but have also presented opportunities to better understand travel behavior and encourage safe behavior. Safe vehicles is an element of the Safe System approach. Leveraging connected and automated vehicle (CAV) technology and identifying accident avoidance systems with vehicle manufacturers is key in ensuring vehicles are safe for all road users in the future. It is not currently within the city's purview to design vehicles, but considerations to vehicle technology can be made in the future regarding policy and design of city roadways.

CRASH RISK INDICATORS

Surrogate safety measures such as "near miss" collisions, community-reported hazards, and high stress facilities, can provide for a fuller understanding of the safety landscape and enable proactive interventions. "Near misses" have historically been difficult to study in practical safety applications due to an overall lack of reported information. In the absence of sufficient crash data, near miss data is an important indicator for guiding crash prevention. A couple examples of surrogate safety measures that are helping to close the gap and provide key safety insights regarding near misses include the following:

- **Video Data** Video machine learning is an effective means of classifying collisions and collecting near miss data. The city should consider investing in these technologies (e.g., along key roadways and intersections) to better understand and monitor risk scenarios.
- **Public Crowdsourcing** Online web crowdsourcing platforms, like UC Berkeley's SafeTREC Street Story tool (available in English and Spanish), allow anyone to anecdotally report incidents of near misses. These data points are available publicly for analysis and contain important contextual information based on geographic location (e.g., road conditions, street lighting, and travel mode). Using a platform like Street Story could also advance community education and engagement around road safety by providing an outlet and way for people to connect around each other's stories.

DATA COLLECTION, INVENTORY, AND MANAGEMENT

Up to date data on transportation infrastructure, including roadway characteristics, intersection characteristics, and signs are valuable for planning and implementing future improvements. An updated inventory can also allow for the identification of project synergies, such as including a safety countermeasure with a repaving project. Examples of service providers who can assist with this work include the following:

- Mapillary uses crowdsourced or privately provided street level imagery to extract and map signs, streetlamps, sidewalks, signals, and other objects: https://www.mapillary.com/
- Ecopia uses satellite imagery to extract features such as road centerlines, roadway cross-sections, sidewalks, and more: https://www.ecopiatech.com/

CONNECTED SYSTEMS AND VEHICLES

As part of its strategy to bolster road safety, the city could explore the feasibility of deploying smart signal technology on its roadways. Smart signal technology enables cities to collect data at multiple intersections, providing a high-resolution understanding of how people are using the roadway in real time. Connected vehicles are another part of this system. They wirelessly communicate with other vehicles and infrastructure (like signals) to provide data for instantaneous decision-making (e.g., reporting driver speed or collisions). Data from signals in combination with data from vehicles can allow for real time speed-related signal operations, allowing for enhanced safety through adaptable systems.

DUI Strategies and Considerations

The **Collision History, Risk Factors, and Trends** chapter of this report includes the 13 collision profiles from the SSAR that highlight the most common and severe collision patterns in Modesto. Education and enforcement strategies focusing on speeding prevention, right-of-way and red-light compliance, and bicycle and pedestrian safety can complement engineering countermeasures for all 13 emphasis areas.

One profile, driving under the influence (DUI), is a major factor in fatal and severe collisions in Modesto. With limited opportunities for engineering countermeasures, DUI collisions require special attention for non-infrastructure prevention programs. The policy instruments to reduce rates of driving under the influence generally fall under three categories:

1. **Deterrence policies** focus on raising the actual and perceived risk of detection of driving under the influence. These policies should be highly visible to increase awareness of the risks of driving under the influence. Publicized sobriety checkpoints, saturation patrol, and other forms of high-visibility enforcement are effective for safety outcomes.
2. **Prevention and education policies** focus on mobilizing and educating the community, and intervening before driving under the influence takes place. According to NHTSA research, alcohol problem assessment and treatment programs, as well as alcohol intervention in settings such as a doctor's office, are highly effective strategies for improving safety outcomes.[9]
3. **Limited access policies** focus on making underage access to alcohol and drugs more difficult and limiting excessive alcohol consumption.

Modesto has received funding for deterrence programs such as DUI saturation patrols and check points paired with social media campaigns. Increasing funding for efforts that focus on prevention and education, such as alcohol problem assessment and treatment programs, would support less-punitive measures to reduce DUI collisions.

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9 National Academies of Sciences, Engineering and Medicine (2005). A Guide for Reducing Alcohol-Related Collisions. Retrieved from https://doi.org/10.17226/23419. pg. 106.

Evaluation and Implementation

IMPLEMENTATION CONSIDERATIONS

To successfully implement programs and projects outlined in this LRSP, partnerships, trust, funding, and coordination need to be proactively managed. Successful implementation requires sustained and coordinated support from key stakeholders, elected officials, and city staff. Some strategies include the following:

- **Oversight, Accountability, and Partnerships** To ensure effective delivery of safety projects and programs, establishing a committee or Task Force with key officials and stakeholders (inside and outside of the city) that meets biannually or quarterly is recommended. Having appointed leadership will be a crucial part of maintaining buy-in and support for the LRSP from not only officials, but the community as well. Leadership could additionally include members from identified project partners (Modesto Police Department, Stanislaus County Health Services). Routine collaboration between stakeholders and partners will ensure that city-led engineering countermeasures are supported by coordinated enforcement, education, and engagement programs led by local and regional partners. Strategies for mutual accountability could include conducting briefings and presentations at board and agency meetings, collecting and sharing information on a regular basis, and updating a public-facing database (or scorecard) on LRSP goal progress.

- **Communication** Having continued communication and transparency with stakeholders and community members can allow for greater trust and support of the LRSP's goals. Some strategies include communication across diverse channels (e.g., updated webpage, news, and social media), actively addressing community concerns, publishing updated factsheets on plan progress, and regular public meetings using effective community engagement techniques. An oversight committee or Task Force (as proposed above) can aid with leading efforts on communication and trust-building.

EVALUATION STRATEGIES

Evaluation is an essential component of a robust safety plan; it provides an opportunity to re-prioritize as new areas of concern arise and take advantage of additional tools, knowledge, and stakeholders that become available over time. Recommendations include the following:

- **Identify Target Metrics and Measure Goal Performance** To understand progress and safety conditions, several metrics should be used in LRSP evaluation. Examples of measuring goal performance include the following:
  - monitoring KSIs, specific to the goals outlined in this plan and the SSAR
  - monitoring the number of safety infrastructure improvements installed from the SSAR
  - monitoring public engagement and response to non-infrastructure countermeasures

  Additionally, regular measurement of goal progress in priority areas should be performed each year (e.g., with a safety scorecard). Safety scorecards that are released annually can be a powerful tool for measuring effectiveness, highlighting areas that need further attention and resources, and identifying tasks and deadlines for responsible stakeholder parties.

- **Continued Community Engagement** Modesto should consider conducting pre- and post-surveys with community members to measure how their actions and views have shifted after engagement around traffic safety. Local partners can be tasked with disseminating the pre- and post-surveys to residents. Surveys should evaluate whether respondents express a shift in behavior and attitude after having participated in traffic safety programming. The metrics for evaluation can also be developed in partnership with local partners to ensure accessibility for the public.

FUNDING

The SSAR includes local, state, and federal funding sources related to transportation safety as listed below.

- **SB1 Funding** The U.S. Department of Transportation's Senate Bill 1 (SB 1), also known as the Road Repair and Accountability Act of 2017, is a landmark transportation investment to rebuild California by fixing neighborhood streets, freeways, and bridges in communities across California and target funding toward transit and congested trade and commute corridor improvements. The largest portion of SB 1 funding goes to California's state-maintained transportation infrastructure. With this funding, Caltrans has a goal of repairing or replacing 17,000 miles of pavement in ten years, spending $250 million annually for congestion solutions, over $700 million for better transit commutes and supporting freight improvements. The other portion of SB 1 funding will go to local roads, transit agencies, and expanding the state's pedestrian and cycle routes. SB 1 funds various grants, which can be found below.

  Local Streets and Roads Program (LSRP) California State Senate Bill 1 has dedicated approximately $1.5 billion per year appointed by the State Controller (Controller) to cities and counties for basic road maintenance, rehabilitation, and critical safety projects on the local streets and roads system. Cities and counties must submit a proposed project list adopted at a regular meeting by their board or council that is then submitted to the California Transportation Commission (Commission). Once reviewed and adopted by the Commission, eligible cities and counties receive funding from the Controller. An Annual Project Expenditure Report is sent to the Commission to maintain transparency regarding program funding received and expended.

  Local Partnership Program (LPP) The Local Partnership Program's purpose is to provide local and regional transportation agencies that have passed sales tax measures, developer fees, or other imposed transportation fees with a funding of $200 million annually from the Road Maintenance and Rehabilitation Account to fund aging infrastructure, road conditions, active transportation, and health and safety benefits projects. LPP funds are distributed through a 50% statewide competitive component and a 50% formulaic component. Both programs are eligible to jurisdictions with voter approved taxes, tolls, and fees dedicated solely to transportation and the competitive program. LPP also provides the opportunity for local governments to partner with Caltrans for enhancements on state facilities.

  ATP Funding The Active Transportation Program was created by Senate Bill 99 (SB 99) to encourage increased use of active modes of transportation such as walking and biking. The goals of the ATP include, but

are not limited to, increasing the proportion of trips accomplished by walking and biking, increasing the safety and mobility of non-motorized users, advancing efforts of regional agencies to achieve greenhouse gas reduction goals, enhancing public health, and providing a broad spectrum of projects to benefit many types of users, including disadvantaged communities. SB 1 directs $100 million annually from SB 1 to the ATP, with more than 400 of the funded projects being Safe Routes to School projects and programs that encourage a healthy and active lifestyle throughout students' lives.

Caltrans Sustainable Transportation Planning Grant

The Sustainable Transportation Planning Grants include two parts: Sustainable Communities Grants and Strategic Partnerships Grants. The Sustainable Communities Grants have $25 million set aside to encourage local and regional planning goals and best practices cited in the Regional Transportation Plan Guidelines. This is in addition to the $9.5 million in traditional State and federal grants. These grants were released for Fiscal Year 2022-23 and applications were are due October 27, 2021. Grant announcements are anticipated in spring 2022. There may be another grant on the horizon, but Caltrans has not released any new information yet.

Safe Routes to School (SRTS) Funding The SRTS program promotes walking and bicycling to school through infrastructure improvements, tools, safety education, and incentives to encourage these modes of travel. Nationally, 10 to 14% of car trips during the morning rush hour are for school travel. SRTS can be implemented at the state, community, or local school district level. Competitive federal funding is available through the Fixing America's Surface Transportation Act (FAST Act). Depending on the existing infrastructure, SRTS may require that education, transportation, public safety, and city planning agencies coordinate their efforts.

- **Developer Fees** California law allows local governments to establish and charge a fee on residential and non-residential development in order to fund public facilities and to service population growth. Local agencies should update their transportation impact assessment (TIA) guidance to reflect safety improvements for all modes of travel. Public facility fees can be charged to new development based on density and traffic impacts, and can go to a variety of public facilities, one being local roadways.

- **RAISE Grant** The U.S. Department of Transportation is committed to create high-quality jobs, improve safety, protect our environment, and generate equitable economic opportunity for all American's with their Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant. Project will be evaluated based on merit criteria that includes safety, environmental sustainability, quality of life,

economic competitiveness, state of good repair, innovation, and partnership. It is one of the few DOT discretionary programs for which regional and local governments can directly compete for multimodal transportation funding.

- **Affordable Housing and Sustainable Communities Program (AHSC)** The AHSC Program, administered by the Strategic Growth Council and implemented by the Department of Housing and Community Development (HCD), funds land use, housing, transportation, and land preservation projects to support infill and compact development that reduces greenhouse gas (GHG) emissions. This program will assist project areas by providing grants and/or loans, or any combination thereof, that will achieve GHG emission reductions and benefit Disadvantaged Communities, Low-Income Communities, and Low-Income Households through increased accessibility of affordable housing, employment centers, and key destinations via low-carbon transportation. This results in fewer vehicle miles traveled through shortened or reduced trip lengths or mode shifts from Single Occupancy Vehicles to use of transit, bicycling, or walking. The project areas this funding is geared toward are Transit-Oriented Development (TOD) Project Areas, Integrated Connectivity Project (ICP) Project Areas, or Rural Innovation Project Areas (RIPA).

- **Valley Air District** The Valley Air District develops and administers incentive programs targeted at reducing harmful emissions throughout the Valley. The district is consistently working to ensure the valley receives available federal, state, and local funding for these projects and has invested more than $2 billion through a combined public-private partnership. The district has set money aside for bicycle infrastructure projects, including Class I, Class II, or Class III bike routes. The program provides funding to assist with the development or expansion of a comprehensive bicycle transportation network which will provide a viable transportation option for travel to school, work, and commercial sites.

- **California Office of Traffic Safety (OTS) Grant Programs** OTS administers traffic safety grants in the following areas: alcohol impaired driving, distracted driving, drug-impaired driving, emergency medical services, motorcycle safety, occupant protection, pedestrian and bicycle safety, police traffic services, public relations, advertising, and roadway safety and traffic records.

- **Measure L** Measure L is a 35-year, half-cent sales tax that was approved by Stanislaus County voters in 2019. This measure provides funding for a variety of local transportation improvements including, but not limited to fixing and maintaining roadways, improving emergency response, providing safe routes to schools, providing senior,

veterans and disabled shuttle services, and improving safety and reducing traffic congestion on major arterials and Highway 99.

- **Transformative Climate Communities (TCC) Program**
  The TCC Program funds community-led development and infrastructure projects that strive to make major advances in environmental, health, and economic benefits in California's most disadvantages communities. Eligible improvements for this funding source include active transportation and public transit projects, transit ridership programs and passes for low-income riders, and encouraging education and planning activities to promote increased use of active modes of transportation.

While the SSAR identifies a broad set of infrastructure funding measures, Modesto is encouraged to continue exploring diverse funding sources for implementation of safety efforts, including for education and enforcement. The following grants can support education and enforcement safety efforts.