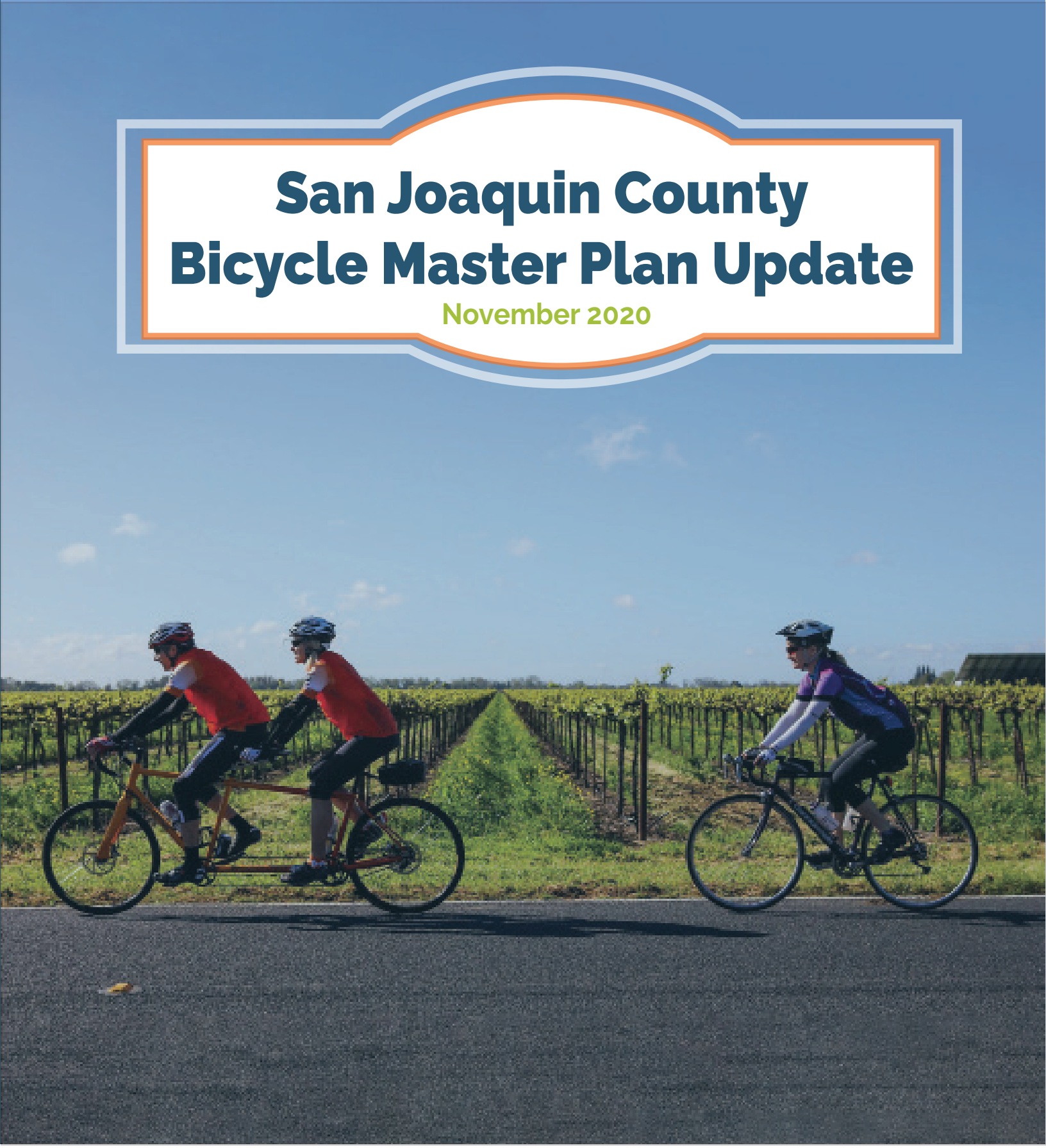
San Joaquin County Bicycle Master Plan Update

November 2020



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01.

INTRODUCTION

San Joaquin County has undertaken the process to update its 2010 Bicycle Master Plan. This Bicycle Master Plan Update (Plan) is the product of this process. The Plan is intended to provide a blueprint for creating a safe, comfortable, and efficient bicycle network and bicycling experience for the County's residents and visitors in the years to come.

The Plan presents policies, bicycle infrastructure projects, programs, and action plans to support the improvement and expansion of the County's bicycling network.

The recommendations presented apply to the unincorporated areas of San Joaquin County. Although connections to the bicycle network of incorporated cities like Stockton, Tracy, and Manteca were considered, this Plan's sphere of influence applies to the unincorporated areas only.

The Plan's recommendations were developed through engagement of and input from stakeholders throughout San Joaquin County. Other key considerations included improvements made to the network since 2010, safety data, and levels of traffic stress.

Plan Contents

Chapter 1: Introduction lays out the purpose of this Plan Update and provides an Executive Summary of the Plan's contents.

Chapter 2: Existing Conditions provides background information on the current state of bicycling San Joaquin County.

Chapter 3: Goals, Objectives, Policies presents the County's policy framework which served as a foundation for this Plan.

Chapter 4: Public Engagement describes the process through which stakeholders were invited to guide the development of the Plan and its recommendations.

Chapter 5: Recommended Projects describes and illustrates the countywide bicycle network recommendations.

Chapter 6: Recommended Programs describes the countywide bicycle programmatic recommendations. These are intended to complement future improvements to the network and advance safe and accessible bicycling for more County residents and visitors.

Chapter 7: Implementation describes the implementation process, identifies high priority projects, and provides potential funding sources for the program and network improvements recommended in this Plan.

Appendices provide additional documentation on the project recommendations, prioritization results, and outreach materials.

Executive Summary

Vision Statement: *San Joaquin County is a place where bicycling is encouraged as a safe and practical means of transportation that provides access to schools, parks, shopping, trails, beautiful scenery, and other community destinations.*

This Plan establishes a long-term vision for improving bicycling in San Joaquin County through policy, program, and project recommendations. Through the implementation of this Plan, the County can further its goal of encouraging bicycling throughout the community and prioritizing the health of its residents and environmental sustainability. This Executive Summary provides an overview of the challenges and opportunities currently experienced by bicyclists in the County, along with a high-level summary of the Plan's goals and implementation framework.

Needs and Challenges

- San Joaquin County has invested in over 30 miles of bicycle facilities but the reach of this network is limited.
- The lack of comfortable bikeways along many roadways leave people who want to bike disconnected from the many destinations within San Joaquin County.
- Travel along, and crossings of, the highways that crisscross San Joaquin County are significant barriers for people bicycling.
- These factors likely contribute to the small percentage of people who bicycle to work and other destinations. Over 90 percent of residents drive to work (ACS 2019).[1]

Opportunities

- San Joaquin County has a reputation for beautiful scenery. With flat topography and a temperate climate, San Joaquin County is ideal for bicycling. This fact can be used to expand interest in bicycling among residents and visitors of San Joaquin County.
- There is a strong existing recreational bicycle riding culture in San Joaquin County. In the past, this culture has predominantly been road-bicycling; however, the COVID-19 pandemic led to an increase in casual recreational bicycling. This culture can be leveraged to expand bicycle ridership in the County for utilitarian trips (riding a bike to work, school, shopping, or to run other errands) as well as expanding interest in recreational riding (such as riding a bike to a destination for pleasure or exercise).
- There are several possibilities for 'Vision Projects' in San Joaquin County. These projects can enhance connectivity across the County, while also establishing the County as a destination for bicycle tourism.
- Many neighborhood streets within unincorporated towns are good candidates for bicycle boulevards, with slower speeds and lower traffic volumes. This produces a safer environment for those bicycling and walking in this area, as well as helping facilitate a 'Main Street' feel for visitors.
- There are many low-cost bicycle infrastructure and programmatic recommendations that San Joaquin County can begin implementing in the near-term.
- The build-out of the bicycle network and implementation of intersection improvements can transform San Joaquin County into a more connected and accessible County.

1 United State Census Bureau. (2019) San Joaquin County, California. Retrieved from https://censusreporter.org/data/table/?table=B08006&primary_geo_id=05000US06077&geo_ids=05000US06077,04000US06,01000US

Bicycle Master Plan Update Goals

In the first stages of this planning process, the consultant team collaborated with San Joaquin County Department of Public Works (SJCDPW) staff to review and revise the goals, objectives, and policies of the 2010 Master Plan. As part of this, they also reviewed any bicycle- related goals, objectives and policies in the County General Plan and other relevant County documents adopted since the 2010 Bicycle Master Plan.

A final set of goals, objectives, and policies was approved by SJCDPW. Taken together, these provided key guidance for development of the overall Plan, community outreach, and identification of project recommendations. The five goals are:

- Invest in a high quality, low stress, and efficient bikeway network in San Joaquin County.
- Make the transportation network more accessible to bikes now and in the future.
- To expand ridership, systematically improve safety for people who currently ride bicycles in San Joaquin County and those who may wish to do so in the future.
- Promote ridership and bicycling skills through education and encouragement programs.
- Increase accessibility of bicycling in San Joaquin County by incorporating equity into considerations for bicycle infrastructure investments and programs.

The detailed objectives and policies that support the five goals can be found Chapter 3. As explained in Chapter 3, the Goals, Objectives, and Policies framework works in tandem with project evaluation criteria. The criteria are specific factors that are assigned points and used to score and prioritize the project recommendations throughout the County.

Implementing This Plan

This Plan recommends over 530 miles of new and upgraded miles of on-street bicycle facilities, over 39 miles of off-street shared-use paths, and 7 Spot Improvements (improvements at intersections) to make it safer and easier for pedestrians and bicyclists to cross at seven locations.

In addition, the Plan recommends 9 corridor studies throughout the County that cover just over 100 miles of roadway. These are corridors where it is recommended that SJCDPW coordinate with the California Department of Transportation (Caltrans), as resources allow, to determine feasibility and appropriateness of bicycle facility type and location.

Recognizing that the County has limited resources, this Plan constructed a framework for prioritizing the recommended projects. This framework identifies projects that produce the greatest benefits to the community. The process used seven criteria to evaluate each recommended project: Safety, Connectivity, Demand, Feasibility and Cost, Equity, Community Priorities, and Competitiveness.

The projects were evaluated on a 0-7 point scale. Projects that received four or more points were categorized as high priority, projects that scored 2-3 points were categorized as medium priority, and projects that received one point were categorized as low priority.

The prioritization process produced 33 high priority projects, as shown in Table 1-1. For a complete list of projects and location details, see Chapter 7 and Appendix C.

Table 1-1: Prioritization Process Results

High Priority	
Total Number of Projects	*Mileage*
33 projects	66.4
Medium Priority	
Total Number of Projects	*Mileage*
77 projects	244.2
Low Priority	
Total Number of Projects	*Mileage*
80 projects	334.5

02.

EXISTING CONDITIONS

San Joaquin County is situated in the heart of California's Central Valley, a region renowned for its mild climate and proud agricultural heritage. The topography of San Joaquin County is flat, making it ideal for bicycling. San Joaquin County is also home to many scenic corridors. These factors present many opportunities to foster a vibrant bicycling community.

San Joaquin County Today

San Joaquin County lays in the middle of California's Central Valley. The County is bounded by the Sierra foothills to the east, the San Francisco Bay Area to the west, Sacramento County (home to California's capitol) to the north, and Stanislaus County to the south. The County is renowned for its Mediterranean climate, its diverse geography, and its productive agricultural sector.

San Joaquin County is a semirural county with a strong agricultural history that continues to this day. Much of the land in the County's unincorporated areas (regions administered and overseen directly by San Joaquin County) is devoted to agriculture. San Joaquin County's 2019 agricultural production was valued at over $2.6 billion.[1]

Many of San Joaquin County's residents are concentrated in its incorporated cities (areas administered and overseen directly by the municipalities, or cities, such as Stockton, Lodi, or Manteca). Because of the concentration of residents within cities, San Joaquin County has a comparatively high population density, despite its rural nature outside of the cities.[2] This concentration of people in smaller areas produces an opportunity to shift trips to bicycling, as distances between potential destinations (like work, school, or the stores) are much shorter than other areas in the County. This trend of urbanization (or increasing concentration of people in cities) is accelerating due to the overflow of residents and commuters of the San Francisco Bay Area.

Bicycling in San Joaquin County Today

San Joaquin County is known for its beautiful bike rides, and strong recreational biking culture. There is the potential for high-quality recreational riding as well as commuter bicycling. Biking in San Joaquin County can be stressful for the inexperienced cyclist. Few roads in the County have bicycle facilities. Many destinations, including employment centers, parks, and recreational or tourist sites, like local vineyards, lack connections to the bicycle network in San Joaquin County.

While the bicycling network throughout the County has grown and generally become more connected in the last ten years, there are still several challenges and opportunities.

Recreational bicycling continues to grow in popularity but is generally enjoyed by residents and visitors with a higher degree of confidence and less concern about proximity of passing vehicles.

Bicycling for everyday transportation and commuting remains very limited. Connectivity between key facilities and destinations is still lacking in locations and several routes are defined by shoulders that lack a designated bicycle facility such as a standard bicycle lane or a buffered bicycle lane.

1 San Joaquin County Agricultural Commissioner's Office. 2019. San Joaquin County Crop Report: Life of a Crop. (2019). https://www.sjgov.org/WorkArea//DownloadAsset.aspx?id=33165. Retrieved on October 5, 2020.

2 United State Census Bureau. (2019) San Joaquin County, California. Retrieved from https://censusreporter.org/data/table/?table=B08006&primary_geo_id=05000US06077&geo_ids=05000US06077,04000US06,01000US

Demographics

San Joaquin County is home to 762,148 residents. The rapid growth the County has experienced in recent years is in part due to the transfer of growth pressure from the San Francisco Bay Area. More than 100,000 employees commute into the County each day from surrounding counties.

The median age of County residents is 34.5 years. Children and young adults under the age of 24 account for approximately 34 percent of the County's total population, while those aged 65 and over account for about 12 percent of the population. People aged 5-17 years old represent over 20 percent of the County's total population. In the context of this Plan Update, it's important to note that this cohort is less likely to have access to a motorized vehicle for transportation given age and economic resources. This cohort is more likely to be partially or entirely reliant on other modes for everyday mobility including bicycling, walking, and transit. About 3 percent of workers over the age of 16 walk, bike, or take public transit to work, and 1.8 percent do not have access to a vehicle.[1]

The median household income in San Joaquin County is $61,145, lower than the state of California's median of $75,277. About 14 percent of the population is below the poverty line in San Joaquin County.[2]

1 U.S. Census Bureau (2018). Means of Transportation to Work by Vehicles Available for Workplace Geography American Community Survey 1-year estimates. Retrieved from https://censusreporter.org

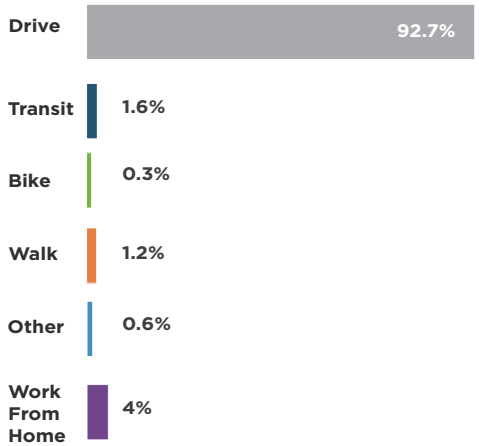
2 United State Census Bureau. (2019) San Joaquin County, California. Retrieved from https://www.census.gov/quickfacts/sanjoaquincountycalifornia

Commute Trends

The American Community Survey (ACS) is a survey that is administered by the Census Bureau. The ACS provides vital insight about our nation and its people on a yearly basis. According to the ACS, in 2018 over 90 percent of the commuters in San Joaquin County commute by driving alone. These numbers can likely be attributed to the County's low-density development and zoning patterns, as well as personal preferences. Currently only 0.3 percent of residents report bicycling as their primary mode of transportation to work.[1]

It should be noted that this data does not always account for commuters with multiple modes of travel to and from work. Because the census data fails to capture people who commute by walking or bicycling only one or two days per week, the number of actual commuter walking and biking trips could be higher than what is represented through census numbers. Furthermore, the Census only asks about one's primary mode of transportation, and respondents generally choose the mode by which they travel the longest distances. As such, somebody who walks or bikes to transit, for example, may not have that part of the trip counted.

Figure 2-1: Commute by Means of Transportation



1 United State Census Bureau. (2019) San Joaquin County, California. Retrieved from https://censusreporter.org/data/table/?table=B08006&primary_geo_id=05000US06077&geo_ids=05000US06077,04000US06,01000US

Existing Bicycle Network

Relatively few bicycle facilities of any class currently exist within the County. Most that do are located within the County's incorporated cities. The bicycle facilities that have been implemented in the unincorporated areas of the County are concentrated along, or near, the borders of larger incorporated communities like Stockton, Lodi, and Manteca or in newer developments, like Mountain House. Table 2-1 below lists the mileage of existing bicycle facilities in the unincorporated areas of San Joaquin County. Figure 2-2 on page 13 displays existing bicycling facilities in San Joaquin County. Existing bicycle facilities are shown within incorporated cities so that the overall County bicycle network can be better understood.

Much of the existing network is made up of Class III Bicycle Routes around the incorporated areas in the County. Very few roads in the County have bicycle facilities. Only 33.5 miles (2 percent) of the County's 1,647.39 miles of roads have any kind of bicycle facility in the unincorporated areas.

Table 2-1: Existing Bikeway Network

Facility Type	Mileage
Class I Shared-Use Path	8.1 miles
Class II Bicycle Lane	4.2 miles
Class III Bicycle Route	21.2 miles
Complete Network	33.5 miles

* While included in the mileage counts because they are within the unincorporated County, the 8.1 miles of Class I Shared Use Path (such as the California Aqueduct Trail), are outside the County's right-of-way and therefore not under County jurisdiction.

Barriers to Bicycling

San Joaquin County can be an ideal location for bicycling. It experiences mild winters and has scenic corridors throughout the County. However, there are barriers that hinder bicycle interest and ridership in San Joaquin County. Among these are the sparse existing bicycle network, long distances between destinations in the unincorporated areas of the County, and the prevalence of high-stress roadways along the direct routes between destinations.

Sparse Existing Bicycle Network

Although the County has made progress in installing bicycle facilities since the 2010 Bicycle Plan, the bicycle network is disjointed in the unincorporated areas of the County. Many destinations lack connectivity to the bicycle network in San Joaquin County, including connections between many of the cities.

Long Distances Between Destinations

During the previous decade, development in San Joaquin County has increased significantly. However, even as the County follows the urbanization trend of the rest of the country, much of the County's land is devoted to its productive agricultural sector. This makes the distance between destinations in the unincorporated areas too long for some to feasibly ride a bicycle for anything besides recreational riding.

High-Stress Roadways

Many popular destinations in San Joaquin County are not accessible via low stress roadways, which may dissuade people who are interested in bicycling, but are inexperienced or uncomfortable riding on higher stress roadways. The LTS of the County's roadways are shown in Table 2-4 and Figure 2-10 later in this chapter.

Existing Bicycle Facility Types

Class I

Shared-Use Path

- Paths completely separated from motor vehicle traffic used by people walking and biking, making them comfortable for people of all ages and abilities.
- Typically located immediately adjacent and parallel to a roadway or in its own independent right-of-way, such as within a park or along a body of water.

Class II

Bicycle Lane

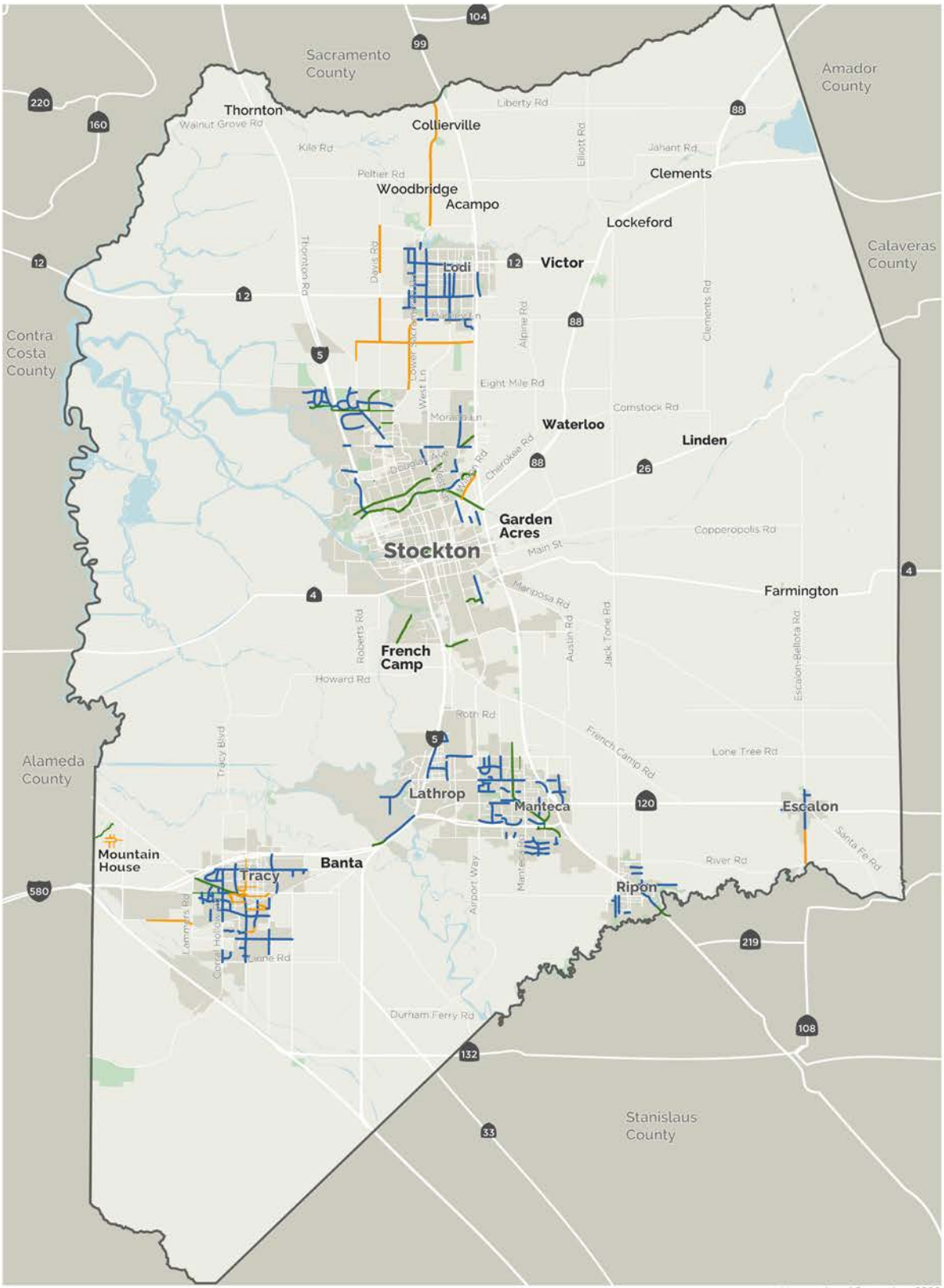
- A dedicated lane for bicycle travel adjacent to traffic.
- A painted white line separates the bicycle lane from motor vehicle traffic.

Class III

Signed Bicycle Route

- Signs and/or pavement markings indicate that people biking share the travel lane with motor vehicles.
- Comfortable facility for more confident bicyclists.
- Often located on roadway shoulders where sufficient width exists.
- Recommended when space for a bicycle lane may not be feasible.

Figure 2-2: Existing Bikeway Network



EXISTING BIKEWAY NETWORK

San Joaquin County Bicycle Master Plan Update

Map produced September 2020

0 2.5 5 MILES

Bicycle Facilities

- Class I Shared Use Path
- Class II Bicycle Lane
- Class II Buffered Bicycle Lane
- Class III Bicycle Route

Boundaries

- Incorporated City
- San Joaquin County
- Park

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Bicycling Safety in San Joaquin County Today

The safety of bicycling in San Joaquin County now and in the years ahead is a key element of this Plan Update. Safety for people bicycling, walking, and driving is a priority of the County.

Addressing real and perceived safety concerns is crucial to fostering a bicycling culture and making bicycling more accessible to people of all ages and abilities in San Joaquin County.

Collisions are, unfortunately, an occurrence for almost any transportation system. A collision does not, by default, mean a facility is unsafe but it does provide an important data point for determining how that facility or the system as a whole is serving bicyclists.

Understanding the locations, causes, and severity of past collisions provides insight into how and where to address safety concerns in San Joaquin County. This analysis provided a foundation for recommendations in Chapters 5 and 6.

Collision Analysis Methodology

This analysis uses countywide collision data for the five most recent years available (2013-2017). The data is from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS) and was accessed through UC Berkeley's Transportation Injury Mapping System (TIMS).

All collision records for San Joaquin County were pulled and then filtered to remove those that occurred within City boundaries. A buffer of 100 feet was applied to capture and include collisions that occurred on City/County boundaries, given the high number of County pockets within urbanized areas and possible discrepancies in reporting location. Collisions that were listed as "Property Damage Only" were also removed.

Data Limitations

Official motor vehicle collision data such as SWITRS have been shown to underestimate the number of bicycle collisions that occur. SWITRS data is almost entirely limited to motor vehicle-related collisions that occur on public roadways and in which a police report was filed, which creates a sample bias. Bicyclist involved collisions may not be reported if they do not involve motor vehicles, if they occur in non-roadway locations such as parking lots or trails, or if a police report is not filed, which is the case in many less-serious collisions.

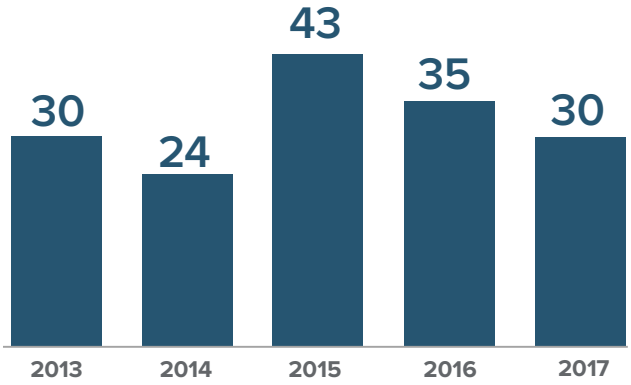
Collision Analysis Findings

A total of 162 bicycle-related collisions were reported in San Joaquin County during the study period, with an average of 32 collisions per year. The number of collisions per year varied, with the highest number of collisions (43 collisions) occurring in 2015.

Bicycle-related collisions were most likely to result in either 'Other Visible Injury" or "Complaint of Pain," although 22 percent resulted in a fatality or severe injury (FSI). Figure 2-4 shows collision severity type percentages.

The complete Safety Analysis can be found in Appendix D.

Figure 2-3: Number of bicyclist involved-collisions by year



Collision Trends

Bicycle involved collisions are mapped in Figure 2-6 on page 16.

Key takeaways from this analysis include:

- Of the 162 vehicle-bicyclist collisions that occurred during the study period, 35 resulted in a fatality or a severe injury.
- Bicyclist-involved collisions accounted for 2.4 percent of all traffic collisions, and 4.2 percent of FSI collisions within the County. These are disproportionately higher than the County's bicycle mode share (0.6 percent).
- The three most frequent bicycle collision factors include riding on wrong side of road (39 total) improper turning (34 total), and automobile right-of-way (ROW) (27 total). Improper turning denotes collisions where the driver or bicyclist did not take appropriate care while turning and caused a collision. Automobile right-of-way is a generalized violation category that includes any ROW violation by both drivers or bicyclists. Drivers were found at fault in 59 percent of bicycle-involved collisions where the primary collision factor violation was automobile right-of-way. The occurrence of 27 collisions within this category warrants consideration of a high priority on closing gaps within the existing network of bicycling facilities.
- San Joaquin County's bicycle-related collisions happen disproportionately during commute hours and weekdays.

Figure 2-4: Severity of bicyclist involved-collisions

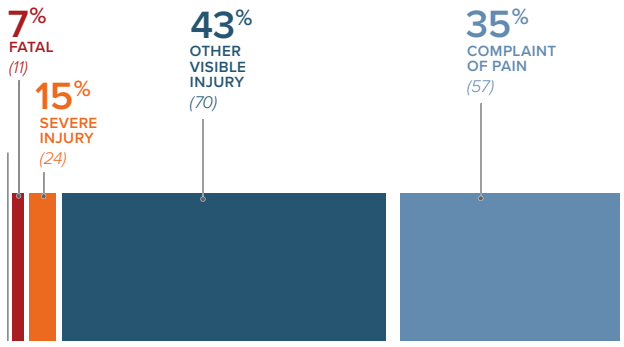


Figure 2-5: Number of bicyclist involved-collisions by Primary Collision Factor

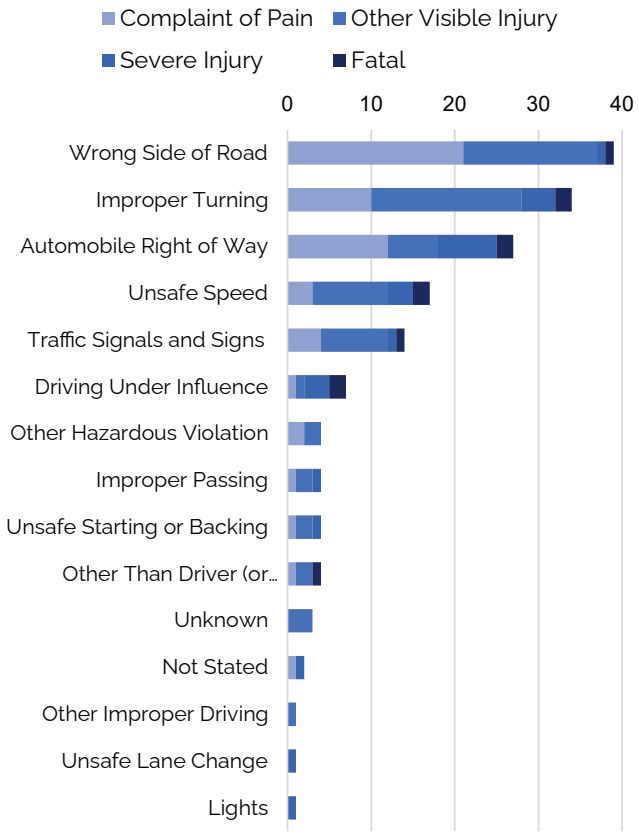
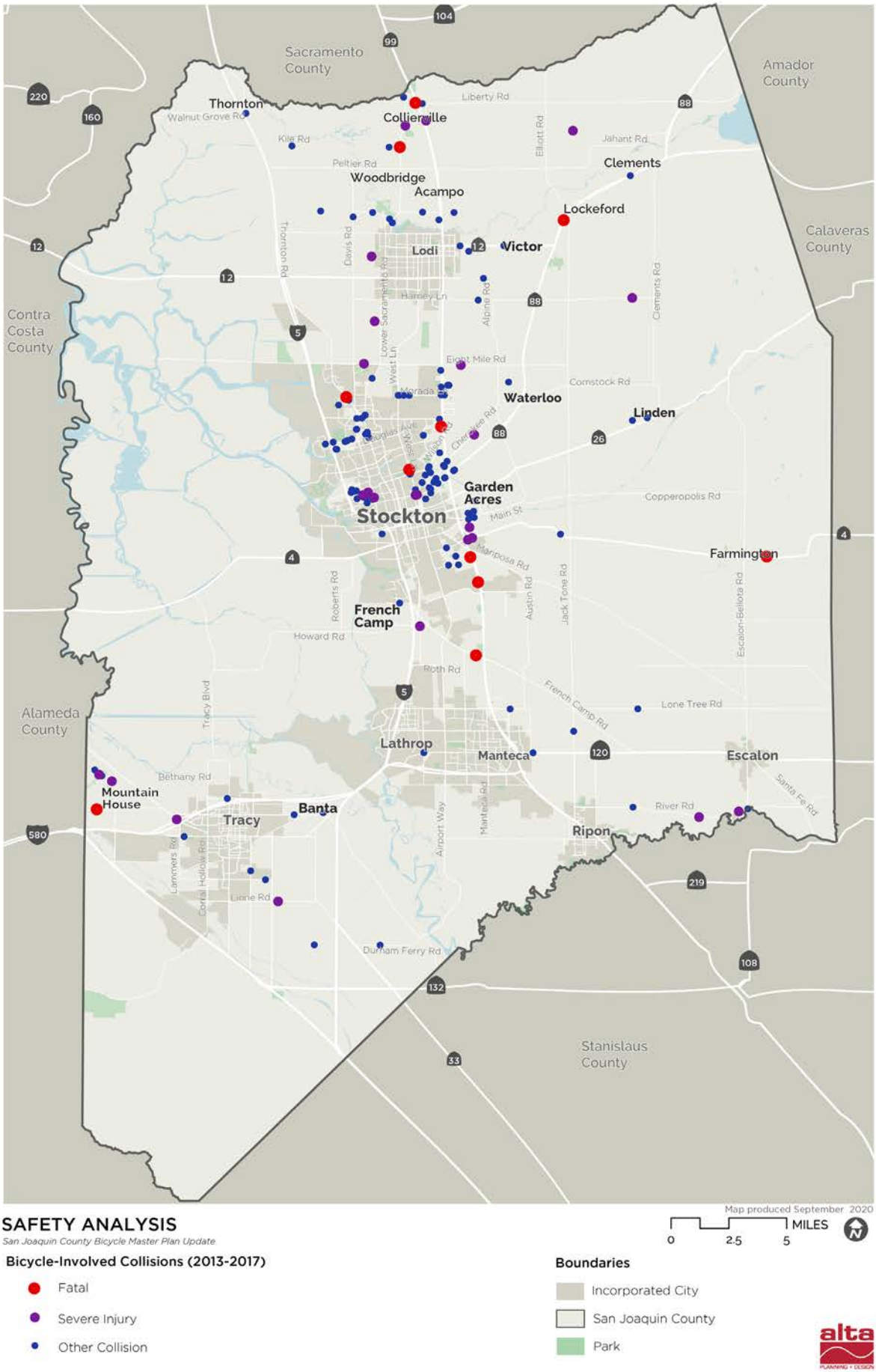


Figure 2-6: Collisions



Multi-Collision Corridors

In order to better understand the distribution of bicycle related collisions, the project team reviewed roads with multiple collisions. Pedestrians were included in this analysis to assess protection for active transportation at large.

Thirteen multiple-collision corridors were identified through this analysis as listed in Table 2-2 and shown in Figure 2-7. These are corridors where at least 2 collisions involving bicyclists occurred and where 3 or more collisions involving bicyclists or pedestrians occurred between 2013 and 2017. It should be noted that recent safety improvements have been made to the East Main Street and Thornton Road corridors.

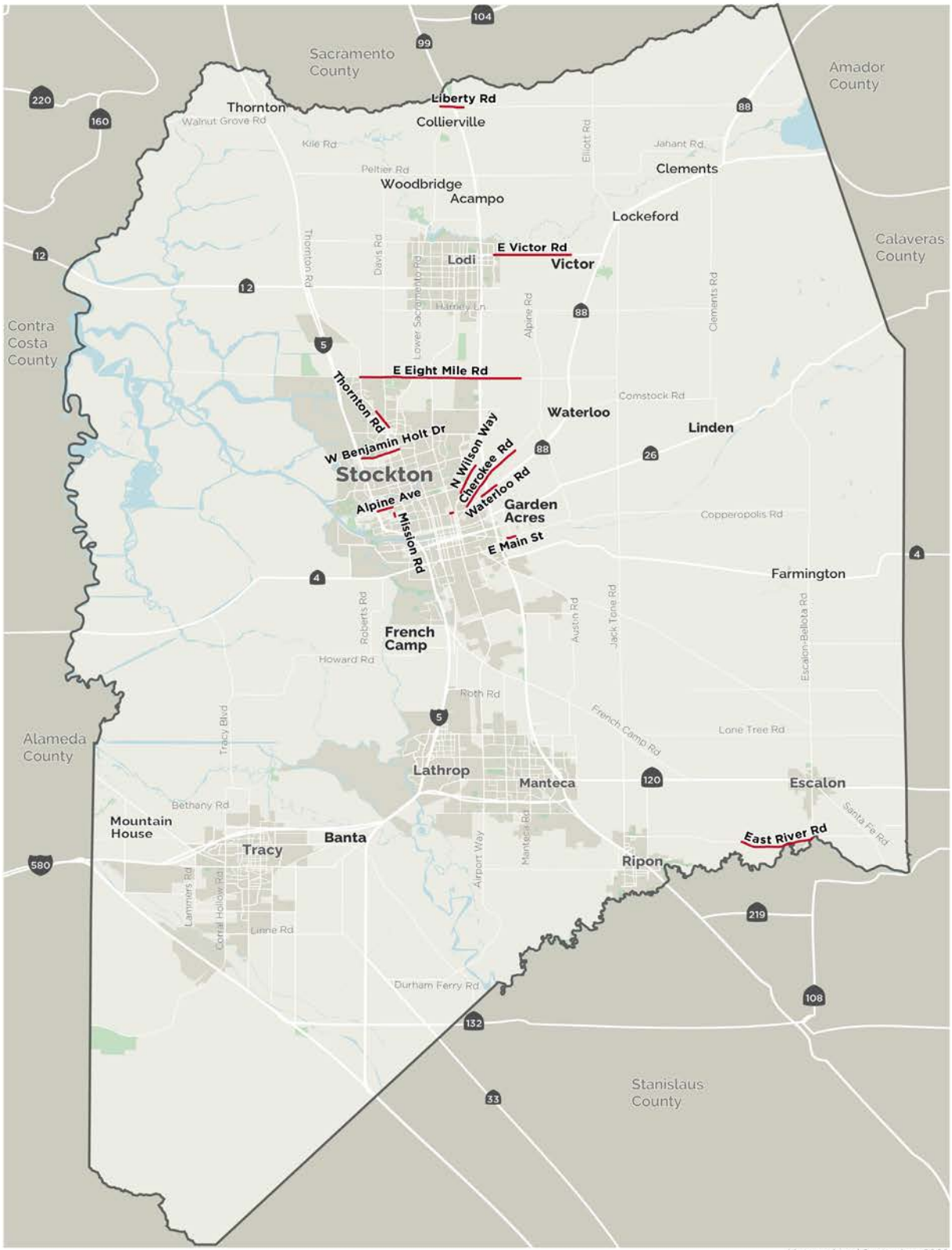
Identifying where collisions have historically occurred does not necessarily mean a street or road is inherently dangerous. This analysis allows for a deeper understanding for the reason and locations of bicyclist- and pedestrian-involved collisions in San Joaquin County. By better understanding these reasons and locations, improvements can be made to effectively address any real or perceived safety concerns.

Table 2-2: Multi-Collision Corridors

Roadway	From	To
N Wilson Way	Sanguinetti Lane	E McAllen Road
E Harding Way	Stanford Avenue	N Airport Way
Cherokee Road	Sanguinetti Lane	Lagorio Way
Thornton Road*	Encino Avenue	Wagner Heights Road
E Eight Mile Road*	Thornton Road	Hildreth Lane
East River Road	Van Allen Road	McHenry Avenue
W Benjamin Holt Drive	Plymouth Road	Pacific Avenue
E Main Street	Carroll Avenue	S Olive Avenue
Liberty Road	Lower Sacramento Road	N Nichols Road
Alpine Avenue	Plymouth Road	Mission Road
Mission Road	Bristol Avenue	County Club Boulevard
Waterloo Road	Wilcox Road	Chronicle Avenue
E Victor Road	N Guild Avenue	Kroll Road

*Portions of the Thornton Road and E Eight Mile Road segments are within incorporated City jurisdiction.

Figure 2-7: Multi-Collision Corridors



Collision Hotspot Analysis

Since bicycle collisions only account for a small percentage of total collisions in San Joaquin County, a weighted collision analysis was conducted to better understand where safety issues may exist within the County, regardless of travel mode. Weighting the collisions by travel mode and severity made it possible to analyze all collisions, while retaining a focus on bicycle collisions. Figure 2-8 shows where high, medium, and low concentrations of collisions occurred throughout the County over the five year period.

The analysis was informed by Crash Costs for Highway Safety Analysis,[1] a study done by the Federal Highway Administration. It used the Economic Property Damage Only (EPDO) method to weight collisions. Based on sensitivity testing of the weights, the baseline weights were simplified into fewer categories (FSI vs. non-FSI) and scaled down so that the justifiable weights were not over-emphasizing FSI collisions relative to the general patterns of collisions across the study area. This tool used the analysis factors to weight bicycle, pedestrian, and vehicular collisions based on the severity of the collision. FSI collisions received a weight of 10 for all three categories, while a collision with an evident or possible injury received a weight of 1 in all categories.

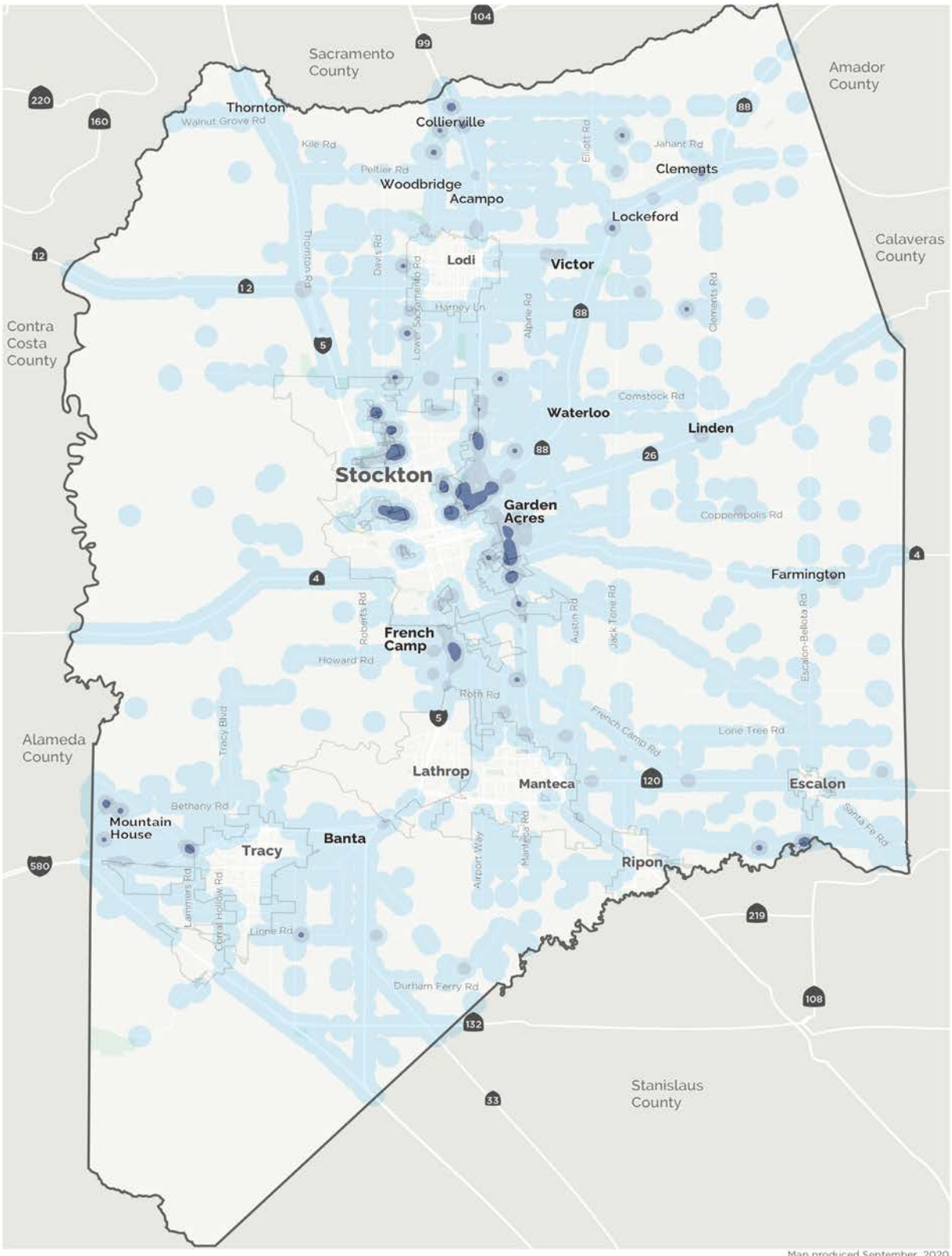
A second weighting was performed to prioritize bicycle safety. This was accomplished by assigning the highest weight to bicycle FSI collisions. Pedestrian FSI collisions received the second highest weight, followed by motor vehicle collisions. Table 2-3 shows the weights assigned to each collision type.

Table 2-3: Collision Weight Scores

Type of Collision	Weight for FSI Collision	Weight for Evident or Possible Injury Collision
Bicycle	10	1
Pedestrian	5	0.5
Vehicle	0.5	0.05

1 *Federal Highway Administration (2018). Crash Costs for Highway Safety Analysis (FHWA-SA-17-071). Retrived from https://safety.fhwa.dot.gov/hsip/docs/fhwasa17071.pdf*

Figure 2-8: Collision Hotspots



Types of People Bicycling

Research indicates that the majority of people in the United States would bicycle if dedicated bicycle facilities were provided. However, only a small percentage of Americans (1-3 percent)[1] are willing to ride if no facilities are provided. This research into how people perceive bicycling as a transportation choice has indicated that most people fall into one of four categories, illustrated below.

Figure 2-9: Bicycling comfort survey results

1-3%

STRONG & FEARLESS

Very comfortable and willing to ride on streets with no designated bike facilities

5-10%

ENTHUSIASTIC & CONFIDENT

Very comfortable riding but prefer streets with designated bike lanes

50-60%

INTERESTED, BUT CONCERNED

Comfortable on trails & streets with buffered or separated bikeways and interested in biking more

30%

NOT CURRENTLY INTERESTED

Physically unable or very uncomfortable biking even on streets with separated bikeways

LTS In San Joaquin County

Bicycle Level of Traffic Stress (LTS) quantifies perceived levels of roadway stress for bicyclists based on several factors. The analysis uses roadway network data, including number of lanes, posted speed limit, traffic volumes, and the presence of existing bike facilities to determine bicyclist comfort level. This analysis identifies locations within the County's road network that may attract or deter people from riding bicycles.

The methodology includes four levels and the types of riders that would feel comfortable riding on that particular road.[1]

- LTS 1: Low Traffic Stress, which requires less attention and is suitable for all ages and abilities.
- LTS 2: Lower Traffic Stress, which requires more attention and is suitable for the average adult. Vehicle speeds and volumes are slightly higher.
- LTS 3: Moderate Traffic Stress, which is suitable for observant, confident adults. Vehicle speeds and volumes are moderate.
- LTS 4: High Traffic Stress, which is suitable for skilled and experienced bicyclists.

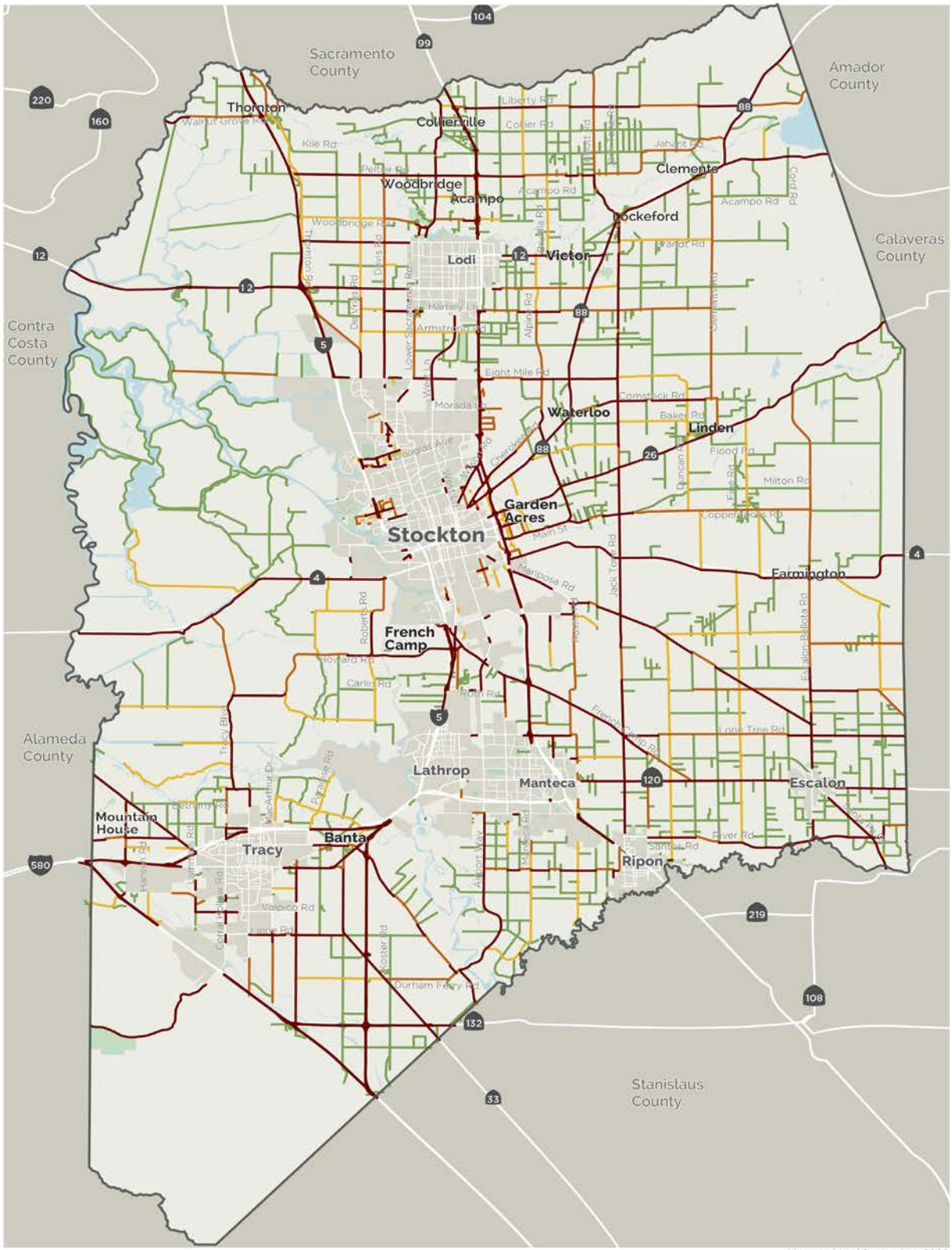
Proportionally, a lower percentage of roads are designated as LTS 2 or LTS 3 (Figure 2-10 and Table 2-4).

Table 2-4: LTS of San Joaquin County Roadways

LTS Designations	Mileage	% of Total Roadways
LTS 1	916 miles	52%
LTS 2	163 miles	9.2%
LTS 3	198 miles	11.2%
LTS 4	586 miles	33.3%

1 *Jennifer Dill and Nathan McNeil, "Revisiting the Four Types of Cyclists: Findings from a National Survey," Transportation Research Record: Journal of the Transportation Research Board, 2587: 90-99, 2016.*

Figure 2-10: Bicycle Levels of Traffic Stress



BICYCLE LEVELS OF TRAFFIC STRESS (BLTS)

San Joaquin County Bicycle Master Plan Update

Map produced September 2020

0 2.5 5 MILES

BLTS RATING

- 1
- 2
- 3
- 4

Boundaries

- Incorporated City
- San Joaquin County
- Park

alta PLANNING + DESIGN

Disadvantaged Communities

Disadvantaged communities are often affected disproportionately by transportation policy and investments. Residents of these communities are often less likely to have access to a motorized vehicle, more reliant upon walking, biking, and transit, and stand to benefit most from local air and environmental quality improvements. Prioritizing bikeability in San Joaquin County within disadvantaged communities acknowledges that active transportation options provide economic, social, and health-promoting opportunities.

San Joaquin County has a proportionally large number of disadvantaged communities.

CalEnviroScreen

For this analysis, CalEnviroScreen was utilized to identify disadvantaged communities within the County. CalEnviroScreen identifies communities that are most affected by sources of pollution and where communities are especially vulnerable to pollution's effects. CalEnviroScreen 3.0 is a tool developed by the California Environmental Protection Agency (CalEPA) and the Office of Environmental Health Hazard Assessment (OEHHA) that utilizes concentration of pollution and sociodemographic data to assess social and environmental equity.

The tool combines data related to pollution exposure (such as local PM2.5 concentrations) and population characteristics (such as percentage of households below the poverty line) to assign a score to each census tract in California. The disadvantaged community designation is defined by CalEPA according to the guidelines set forth in SB 535.

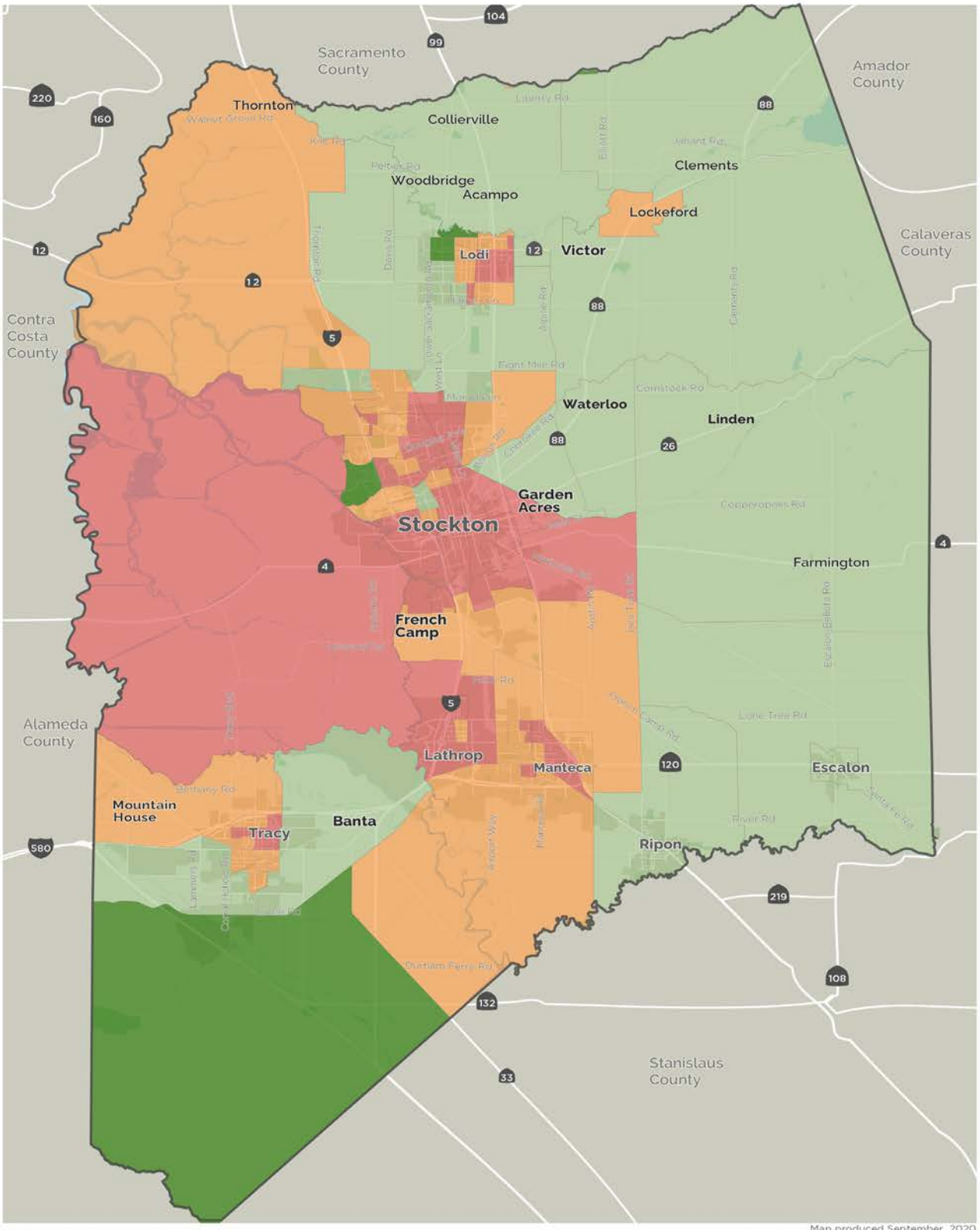
An area with a higher score experiences a much higher pollution burden than those areas with lower scores. An area is considered a disadvantaged community if it is one of the 25 percent highest scoring census tracts in CalEnviroScreen.

Figure 2-11 on the following page maps the CalEnviroScreen percentile scores throughout San Joaquin County.

CalEnviroScreen Scores

Disadvantaged communities, which appear in red on the map, are those that have a percentile score of 75 percent or higher. As shown, the eastern portion of the County has a lower score than its western parts. In particular, areas in and around cities like Stockton, Lathrop, Manteca, Lathrop, and Lodi received the highest scores across the County.

Figure 2-11: CalEnviroScreen Scoring



03.

GOALS, OBJECTIVES, AND POLICIES

The Bicycle Master Plan Update is a blueprint for how San Joaquin County can achieve its vision of being a bikeable community. The Goals, Objectives, and Policies presented in this chapter work towards this vision.

What Are Goals, Objectives, and Policies?

The Alta team worked with SJCDPW staff to review and revise the goals, objectives, and policies from the 2010 County Bikeway Plan. The framework presented below is a result of that collaboration.

- Goals are broad statements of purpose that reflect the community's collective vision of the future. The goals guided the development of this Plan and the included recommendations.
- Objectives provide detailed descriptions of the goals. They describe specific conditions that are desirable in order to attain a given goal.
- Policies are recommendations for the County Board of Supervisors and staff to consider as tools for achieving the identified goals and objectives.

The 2016 County General Plan contains several policies that support the furtherance of safe and accessible bicycling for all ages and abilities. These are also summarized below.

Taken together, these goals, objectives and policies provided direction for the development of recommendations presented in Chapter 5 and support the future implementation of them.

It's evident from a policy standpoint that the County is committed to improving its bicycling network; its safety, connectedness, and accessibility. The recommendations made in Chapter 5 are therefore founded on a very solid, forward thinking policy foundation.

Relationship to Other Documents

San Joaquin County General Plan

The 2016 General Plan guides the long term physical development of the County. The Bicycle Plan Update addresses many of the goals and policies laid out in the Transportation and Mobility chapter of the General Plan, including but not limited to those under TM-1.3 (Multimodal System), TM-1.10 (Eliminate Gaps) and TM-2.2 (Urban Complete Streets). Other County policies that this Bicycle Master Plan Update align with are identified later in this chapter.

San Joaquin County's Bicycle Plan (2010)

The 2010 Bicycle Plan provided the vision for creating a comprehensive bicycling network in San Joaquin County. This Plan builds on the robust recommendations provided in the previous Plan, accounts for improvements made in the last ten years, and brings the recommendations up to date with current best practices.

GOAL 1

Invest in a high quality, reduced stress, and efficient bikeway network in San Joaquin County.

Objective 1A: Construct bikeways identified in the San Joaquin County Bicycle Master Plan and provide for the maintenance of existing and new facilities.

Policy 1.1: Prepare and maintain a bikeway plan that identifies existing and future needs, and provide specific recommendations for facilities and programs, including provisions for bicycle use and bikeways in all new developments.

Policy 1.2: Create a bikeway system that is cost-effective to construct and maintain; respects landowners, utilities, agriculture, and special districts' property rights; and minimizes the potential for conflicts with other types of vehicles and users.

Policy 1.3: Require all bikeways to conform to design standards contained in the California Highway Design Manual, Chapter 1000: Bike Transportation Design and Topic 1002: Bike Facilities, unless otherwise established by San Joaquin County.

Policy 1.4: Update local roadway design standards, if necessary, to include sufficient pavement sections and adequate rail height to accommodate bikeway facilities, e.g. appropriate space for Class I, II, III and IV bikeways. Including standards as defined in the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide is recommended.

Policy 1.5: Consider a proposed route's importance in providing access to regional bikeway facilities when recommending local routes for implementation.

Policy 1.6: Coordinate with agencies such as Caltrans, adjacent counties, and the cities of Escalon, Lathrop, Lodi, Manteca, Ripon, Stockton, and Tracy regarding the implementation of the proposed system.

Policy 1.7: Provide connections to the proposed system from all existing and planned transit facilities, stations, and terminals in San Joaquin County.

Objective 1B: Work to fund construction of the bicycle improvements in this Plan and maximize the amount of local, state, and federal funding for bikeway facilities that can be received by agencies in San Joaquin County.

Policy 1.8: Maintain current information regarding regional, state, and federal funding programs for bikeway facilities along specific funding requirements and deadlines.

Policy 1.9: Prepare joint grant applications with other local and regional agencies for state and federal funds, as appropriate.

Policy 1.10: Pursue non-traditional revenue streams that enable it to partner with other agencies and organizations to deliver projects that might not be financially feasible through the sole expenditure of limited County revenue.

Policy 1.11: Prioritize bike facilities in traditionally underserved communities to promote equitable access to San Joaquin County's bicycle network.

Policy 1.12: Prioritize low-stress bicycle facility implementation to promote safe network connectivity and access for bicyclists.

GOAL 2

Make the transportation network more accessible to bikes now and in the future.

Objective 2: Encourage future development projects to include on-site circulation for bicycle travel, on-site bicycle parking, and connections to the proposed system to encourage ridership.

Policy 2.1: For any development / redevelopment projects involving changes to County roadways, determine if those changes present an opportunity for timely or more cost-efficient implementation of Plan recommendations.

Policy 2.2: Encourage future, large-scale development to provide support facilities such as bicycle racks, personal lockers, and showers at appropriate locations such as parks, major recreational destinations, park-and-ride facilities, employment centers, schools, and commercial centers.

Policy 2.3: Consider landowner concerns when planning and acquiring off-street bikeway easements.

Policy 2.4: Meet the requirements of the Americans with Disabilities Act (ADA) when constructing facilities contained in the proposed system.

Policy 2.5: Encourage the County / Development Services Division to evaluate and accommodate for bicyclist access to parks and schools when reviewing circulation plans for subdivisions and other developments.

Policy 2.6: Explore the development of an annual or semi-annual maintenance program to monitor and maintain the conditions of bicycle facilities on County roads including the removal of potential hazards from bike lanes and routes such as overgrown vegetation, debris deposits (e.g. glass, sediment, etc).

GOAL 3

To expand ridership, systematically improve safety for people who currently ride bicycles in San Joaquin County and those who may wish to do so in the future.

Objective 3: Improve safety for people riding bicycles by understanding and addressing collision trends and applying proven countermeasures.

Policy 3.1: Consider and incorporate standard signing and traffic controls to ensure a high level of safety for the bicyclist and motorist.

Policy 3.2: Consider and incorporate proven safety countermeasures as identified by the Federal Highway Administration to address common collision factors for bicyclists.

Policy 3.3: Review the number, locations, and contributing factors of bicycling related collisions to identify and implement ongoing improvements at key locations throughout the transportation network.

Policy 3.4: Review bicycle collision factors in traditionally under-served communities to devise strategies and infrastructure recommendations.

GOAL 4

Promote ridership and bicycling skills through education and encouragement programs.

Objective 4: Develop and implement ridership encouragement programs aimed at youth, adult bicyclists, and motorists. Increase public awareness of bicycling, available resources, and facilities.

Policy 4.1: Work with local law enforcement agencies, local and regional bicycle coalitions, and local school districts to cooperatively develop or select from existing materials a comprehensive bicycle education program that is taught to school children in San Joaquin County.

Policy 4.2: Support the development of adult and youth bicycle education, encouragement and safety programs. Programs could include: bicycle rodeos for youth, 'Bicycling 101' courses for adults, targeted enforcement to help educate motorists and bicyclists on legal and safe behavior, or similar programs.

Policy 4.3: Publicize the health, economic, and environmental benefits of bicycling.

Policy 4.4: Distribute bicycle education and enforcement programs throughout the County. Communities traditionally underserved should receive priority consideration, and partnerships should be developed with existing community organizations to facilitate program implementation.

GOAL 5

Increase accessibility of bicycling in San Joaquin County by incorporating equity into considerations for bicycle infrastructure investments and programs.

Objective 5: Incorporate equity and sustainability considerations into investment decisions to make the bicycle network in San Joaquin County more accessible to users of all abilities and backgrounds.

Policy 5.1: Invest in bicycle infrastructure in traditionally underserved communities. Prioritize low-stress bicycle facilities in traditionally underserved communities.

Policy 5.2: Partner with traditionally underserved communities in public engagement efforts. Work with the communities to develop culturally-appropriate outreach and engagement methods and practices.

Policy 5.3: Solicit and meaningfully consider community input in the design and location of bikeway facilities.

Policy 5.4: Identify and address gaps in infrastructure which produce larger barriers for traditionally underserved communities.

Policy 5.5: Estimate reductions in greenhouse gas (GHG) emissions and vehicle miles traveled (VMT) as a result of changes in mode split and support the development of reduction goals.

Relevant Goals and Policies

San Joaquin County General Plan

The San Joaquin County General Plan (General Plan) includes a chapter on Land Use, Community Development, and Transit and Mobility, including discussion of Congestion Management and Transportation Control Measures. The General Plan identifies goals and policies that support bicycling and walking. The General Plan also includes policies to require new rural and urban complete streets in new developments and the potential reconstruction of streets that do not have bicycle and pedestrian amenities if there is community support and it is financially feasible. There are additional policies that relate to expansion of the existing bicycle network.

Goals and Policies

Goal TM-1

To maintain a comprehensive and coordinated multimodal transportation system that enhances the mobility of people, improves the environment, and is safe, efficient, and cost effective.

Goal TM-2

To improve County roadways to include pedestrian, bicycle, and transit facilities to better serve people who use these active transportation modes.

Policy TM-1.3: Multimodal Systems

The County shall encourage, where appropriate, development of an integrated, multimodal transportation system that offers attractive choices among modes including pedestrian ways, public transportation, roadways, bikeways, rail, waterways, and aviation, and reduces air pollution and greenhouse gas (GHG) emissions.

Policy TM-1.10: Eliminate Gaps

The County shall strive to eliminate "gaps" in roadways, bikeways, and pedestrian networks by planning and seeking funding to construct grade-separated crossings of rail lines, canals, creeks, and other barriers to improve connectivity and encourage construction of new bikeways and pedestrian ways in and between existing communities, where appropriate.

Policy TM-4.1: Pedestrian and Bicycle Network Continuity

The County shall strive to eliminate gaps in the rural bicycle network by constructing or designating new bicycle facilities, where appropriate, and in accordance with the San Joaquin County Bicycle Master Plan.

Policy TM-4.3: Bicycle Safety

The County shall support bicycle safety programs for children and commuters in the County.

Policy TM-4.6: Bicycle Route System

The County shall encourage bicycle facilities and routes in unincorporated areas to interface with City bicycle routes and provide for inter- and intra-County bicycle circulation.

Policy TM-4.7: Bicycle Connectivity

The County shall support development of the bicycle system to connect residential areas with commercial areas, employment centers, educational facilities, local and regional recreational facilities, and other major attractions.

Policy TM-4.8: Bicycle Route Facilities

The County shall ensure County roads planned as part of the regional bicycle route network are constructed to have adequate width.

Policy TM-4.10: Bicycle Master Plan

The County shall maintain the Bicycle Master Plan and implement it, as funding is made available.

Policy LU-3.4: Walkable and Bikeable Streets

The County shall encourage new streets within Urban and Rural Communities. The County shall also encourage City Fringe Areas to be designed and constructed to not only accommodate auto and truck traffic, but also to serve as comfortable pedestrian and cyclist environments and to reflect public health goals by encouraging physical activity. These should include, but not be limited to:

- Street tree planting adjacent to curbs and between the street and sidewalk to provide a buffer between pedestrians and automobiles, where appropriate;
- Minimize curb cuts along streets, sidewalks on both sides of streets;
- Bicycle lanes and walking paths, where feasible on collectors and arterials, and traffic calming devices such as roundabouts, bulb-outs at intersections, and traffic tables.

04.

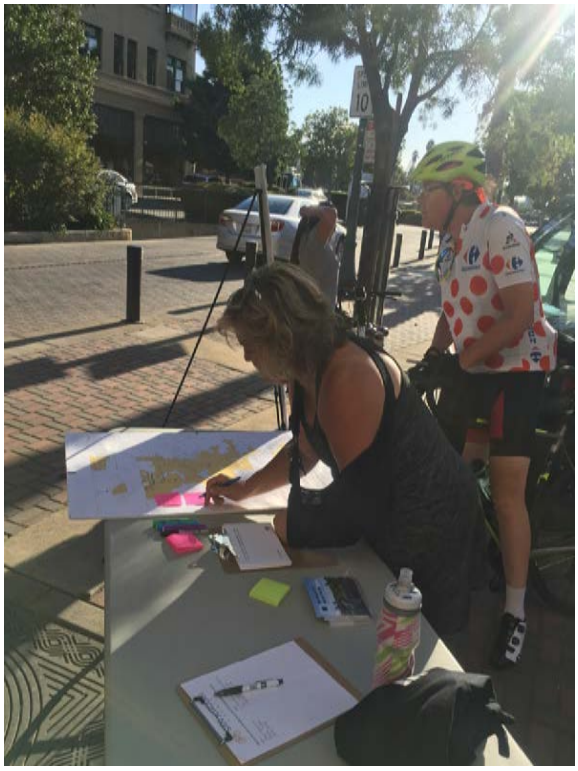
PUBLIC ENGAGEMENT

Community input was sought to establish the vision for this Plan, understand biking needs in the County, and to refine the recommendations.

Public Engagement

The County and the project team employed a variety of methods over the course of the project to inform stakeholders about the Plan update, to request input on existing conditions, and to help inform recommendations. These are summarized below and include:

- Small group presentations
- Pop-up events
- A project-specific web page with an interactive map and survey
- Notifications to County Board of Supervisors
- Press releases
- Social media posts
- Materials at County community centers
- Flyers and postcards



County residents provide feedback on the Plan

Small Group Presentations

Project presentations were made early in the Plan development process to Municipal Advisory Councils (MACs) throughout the northern part of the County. MACs are comprised of residents from unincorporated communities, and serve as an advisory body to the Board of Supervisors on matters important to the well-being of residents. A total of four MAC presentations were made including:

- Woodbridge - September 6, 2019
- Thornton - November 6, 2019
- Morada - November 12, 2019
- Lockeford - November 21, 2019

Each MAC meeting was also open to members of the public, who were given the opportunity along with council members to ask questions of the project team and provide feedback on the needs and interests of their respective community. While needs varied by community, common themes included a desire for safe routes to local schools and the need for better bicycle and pedestrian connectivity from residential neighborhoods to main street commercial destinations. Attendees were also provided with comment cards and project postcards to distribute to friends and neighbors that included a link to the project web page and online survey.

In addition, a focused network design working session was held with key stakeholders in early 2020 to discuss countywide connectivity and solicit initial feedback on routes to change, add, and prioritize. Representatives were invited from the San Joaquin Bike Coalition, Stockton Bicycle Club, Bike Lodi, Central Valley Velo, and local agencies, given their extensive knowledge of the transportation system in the County and involvement in other planning efforts throughout the region. Using enlarged maps of the County that illustrated the location and type of previously planned facilities, stakeholders

provided direct comments on the barriers and opportunities. The resulting discussions and map comments focused on a few key themes – how to provide connectivity between cities, preferred routes for recreational riding, and existing network barriers (including information on how bicyclists currently navigate around them).

Recommendations from the network design working session were used to help inform development of the overall proposed project list and bicycle network.

Pop-up Events

A series of pop-up events were hosted early in the project to raise awareness about the Plan update and gain insight on residents' experience of bicycling in San Joaquin County. Pop-ups were hosted in coordination with other established events across the County to reach a broader cross-section of the community and hear from residents who may not normally participate in traditional planning efforts. The five events members of the project team attended were:

- September 5, 2019 | 5:00 pm - 8:00 pm Lodi Farmers' Market
- September 13, 2019 | 5:00 pm - 6:00 pm Stockton – Full Moon Ride
- October 6, 2019 | 11:00 am - 2:00 pm Escalon – Sunday in the Park
- October 12, 2019 | 10:00 am - 4:00 pm Manteca – Great Valley Bookfest
- October 27, 2019 | 9:00 am - 1:00 pm Mountain House Farmer's Market

At each of these pop-up events, the project team had a table display that included an enlarged map of the County, comment cards, and a handout with a link to the project web page where an interactive comment map and survey were available. Event attendees were invited to provide input through comment cards and by noting specific locations on the County map where they would like to travel by bike, or experienced challenges. Many attendees expressed the desire for greater connectivity between communities, more family-friendly places to ride, and the need for greater education for all road users.

County resident provides feedback on the Plan

Project-Specific Web Page

As a means of promoting and branding the project for greater public recognition and participation, a project-specific web page was created. The page provided County staff and the project team with a singular 'platform' where project information and updates could be provided. The page was available through the link bikesjc.org. It included information on ways in which stakeholders could participate in the Plan update process, a list of upcoming and past events, and a 'Contact Us' form that people could complete to be added to the project subscriber list.

Most recently, the project web page was used to host the six project recommendation maps that can be found in Chapter 5. To provide the optimal scale for public review and comment, the project team divided the County into six areas and created associated maps so recommendations could more easily be viewed.

Interactive Online Map

The project web page also provided an online, interactive map that allowed visitors to the site to pinpoint barriers to bicycling and identify desired routes and places of interest. In total, members of the public provided 110 inputs on the map, which were considered in the development of the draft project recommendations.

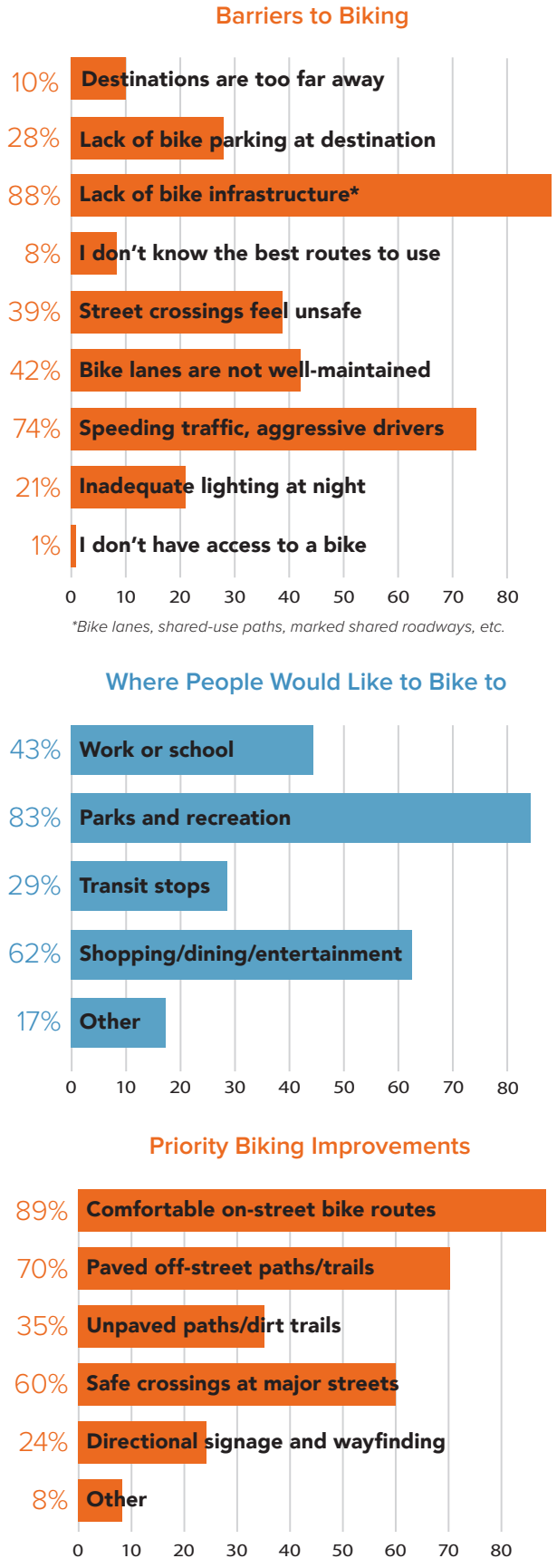
Online Survey

The online project survey was another key tool used to collect input from the public throughout the County. It was broadly promoted to a variety of audiences to maximize participation. The project consultant team worked with County staff to draft and finalize the content and sequence of the questions that were ultimately included. The survey was available in both English and Spanish for a four-month period between early September 2019 and early January 2020. In the end, a total of 123 people completed the survey, providing valuable input on constraints, opportunities, solutions, values, and destinations relating to the County's bicycling network.

Overall, 123 individuals completed an online survey. Respondents indicated that their top three barriers to biking in San Joaquin County were lack of bicycle infrastructure (88 percent), speed traffic and aggressive drivers (74 percent), and poorly maintained bicycle lanes (42 percent). Their top three choices for priority biking improvements were comfortable on-street bicycle routes (89 percent), paved off-street paths/trails (70 percent), and safe crossings at major streets (60 percent). When asked where they would like to bike, respondents' top three destinations were parks and recreation (83 percent), shopping/dining/entertainment (62 percent), and work or school (43 percent). These results are shown in Figure 4-1.

Question 13 of the survey was open-ended, offering respondents to share additional input rather than select a response from a pre-determined list.

Figure 4-1: Online Survey Results



Fifty-seven (57) of the 123 respondents provided additional input, offering unique insights that were considered in the development of the Plan recommendations. Some key themes that emerged from the input were the desire for increased roadway safety for bicyclists, improved connections between existing bicycle facilities or routes, reducing motor vehicle speeds throughout the County, and providing more comfortable, lower stress options for students and families of students to walk and bicycle to and from schools. While not representative of all the input provided, the following comments convey the general natures of opinions shared.

"It would be nice if the county connected the cities in the county on rural roads with bike paths so that riding from city to city would be safer."

"Even though I do not have children, I am very concerned with the health of our citizens. I grew up when it was safe to walk and ride a bike to school. Now as an adult, I do not even feel safe on my daily walks. We need to make exercising safe in all our communities."

Other Outreach Tactics

Beyond the outreach described above, several other techniques were used to inform the public and key stakeholders about the Plan update and to solicit input to inform project recommendations.

"I'd focus on implementing the routes that have the highest possible VMT reductions associated with them because reducing GHG emissions should be an overriding priority right now. I'd imagine those routes would probably be daily commutes to school and work."

"Significant problem has always been bike lanes/sidewalks/shoulders that are discontinuous, i.e. that end abruptly w/o connecting to another rideable entity."

"Would appreciate drivers being educated on the rights of bike riders and how to share the roads with them."

County Board of Supervisors

During the summer and fall of 2019, County staff notified the Board of Supervisors of the Plan update, encouraged them to complete the online survey, and invited them to provide input through the online interactive map. In addition, the Board of Supervisors was encouraged to use their existing communication channels to inform their constituents about the project web page, map, and survey to extend the reach of public participation.

In the summer of 2020, prior to release of the complete Draft Plan, the project consultant team developed project maps specific to each district to give the Board of Supervisors an advance opportunity to view and ask questions about recommendations within their districts. This included an identification of near-term projects that, because of facility type, location or both, have an increased likelihood of being implemented within 12 to 18 months of Plan adoption.

Press Releases

In December 2019, the County's Public Information Officer issued a press release to numerous media outlets throughout San Joaquin County. The release highlighted the reasons why the 2010 Master Plan was being updated and encouraged members of the public to provide their input through the online survey and interactive map.

"This update represents a pivotal opportunity for us to hear what the community wants and needs for improved bicycling facilities. With more bike riders on the road than ever before, the Bicycle Master Plan will provide a guide for how we plan for bicycles on our roadways, and how we can enhance safety, expand and interlink routes and increase ridership throughout the County," stated Public Works Director, Kris Balaji.

– December 2019 Press Release

The County issued another press release in July 2020 to announce that draft project recommendation maps were available on the project web page for public review and input. Again, the release was distributed to numerous media outlets throughout the County. The release also announced the dates and times of two free virtual workshops available to the public and provided registration links.

The virtual workshops were held on August 25 and 27 between 5:30 – 6:30 pm. During these sessions, County staff and members of the consultant team provided attendees with information on the status of the Plan update and summarized project recommendations. Both sessions included an e-polling exercise through which attendees were asked:

- Where should the County prioritize creating better connectivity for bicyclists?
- What are your priorities for bicycling improvements in San Joaquin County?

The most common response to the first question was connections to schools followed by connections to transit, and then connections to employment centers, libraries and community centers, and between neighborhoods. The most common response to the second question was comfortable on-street bicycle routes followed by paved off-street paths / trails and then safe crossings at major streets.

Social Media

In concert with the two press releases, County staff posted comparable information on the Department of Public Works' Facebook page, which currently has 423 followers. A total of eight posts were made over the course of the project. Four posts were made in January 2019 to announce and promote the project web page, interactive map, and survey. Subsequently, in step with the second press release in August 2020, the County posted four additional updates to make the public aware of the draft project recommendation maps and the workshops on August 25th and 27th.

Community Center Outreach

There are eight community centers located throughout the County. Members of the consultant team made contact with the center directors at each facility to tell them about the project and encourage them to post English and Spanish flyers in highly visible locations (announcement board and at the front counter). Each director indicated a willingness to do so and received materials for posting.

Flyers and Postcards

As previously mentioned, one-page flyers and postcards in both English and Spanish were distributed to the public and key stakeholders throughout the project such as the MAC meetings, pop events, and Supervisor briefings.

Draft Plan Input

Upon its completion, the Draft Master Plan update was posted on the project web page for public review and comment. The County again provided notification through its Facebook page and members of the public and stakeholders that have provided their contact information over the course of the project were also notified. The draft Plan was available for review and comment for a two-week period. Comments received will be considered and addressed in development of the Final Plan update.

Figure 4-2: Comment card used at outreach events to capture input

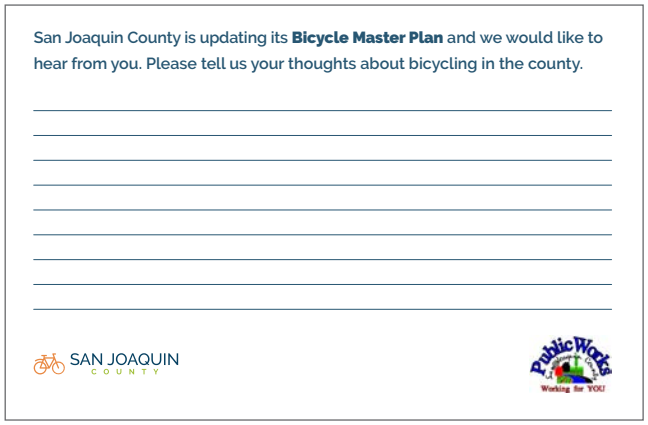


Figure 4-3: Postcard used to advertise outreach opportunities for this Plan

Figure 4-4: Poster used to advertise outreach opportunities for this Plan

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05.
RECOMMENDED PROJECTS

Safe and accessible bicycling begins with a robust network that meets people where they are.

Built on the needs and opportunities identified through the evaluation of existing conditions and robust community input, this chapter identifies and recommends the projects and plans for San Joaquin County to implement.

Project Development

Recommended projects included in this chapter were developed in accordance with current best practices and were guided through the extensive outreach process outlined in Chapter 4.

The input from the public will ensure that these facilities link communities throughout San Joaquin County with a safe and accessible network of bicycling infrastructure.

Special consideration was given to projects on roads where past collisions involving bicyclists and pedestrians occurred, including the multi-collision corridors identified in Chapter 2. Recommended projects on these corridors aim to improve the safety of all people traveling on these roads.

The project team developed seven major criteria to evaluate project's impact as listed below. These criteria were also used to prioritize each project, which is covered in Chapter 7.

- Improve safety at locations and along corridors where a collision involving a bicyclist has occurred. These projects will improve the safety for bicyclists in these areas.
- Improve or provide a connection to key destinations such as train stations or schools. These bicycle facilities will serve new, as well as existing, bicyclists.
- Serve the highest number of people. The bicycle network should serve all San Joaquin County residents, not just current riders.
- Be feasibly implemented within a one to five-year time frame. Prioritizing projects to be implemented in the near term ensures that concrete changes can be made to the network in a reasonable time frame.
- Improve bicycling access equitably and benefit CalEnviroScreen disadvantaged communities. Disadvantaged communities rely on active transportation. Servicing these communities is a priority of this network.
- Align with priorities identified by the local communities within the County. Creating a network that serves existing community members was a priority in this process.
- Rank well in competitive grant processes. Pursuing projects that will secure funding will aid the implementation of these projects.

Bicycle Network Projects

Bicycle network projects are categorized based on the four classifications recognized by Caltrans, along with two subclassifications, described in detail in Chapter 2 and the Bicycle Facility Guidelines in Appendix A. Facilities recommended in this Plan include:

- Class I Shared Use Path: Dedicated paths for walking and bicycling completely separate from the roadway.
- Class II Bicycle Lane: Striped lanes for people bicycling.
    - » Class IIB Buffered Bicycle Lane: Visually separated from traffic and/or parking, but lack any physical separation.
- Class III Bicycle Routes: Signed routes for bicyclists on low-speed, low-volume streets where lanes are shared with motorists.
    - » Class IIIB Bicycle Boulevard: Bicycle routes that are further enhanced with traffic calming features or other treatments to prioritize bicyclist comfort.
- Class IV Separated Bikeway: On-street bicycle facilities with a physical barrier between the bicycle space and motor vehicle lanes, including bollards, curbs, or parking.

Over 540 miles of new bicycle projects are proposed in this Plan Update. Upon full implementation, this would amount to more than 15 times the current 33.5 miles of bikeways within the County's jurisdiction. A summary of existing and proposed bicycle network improvements is provided in Table 5-1 and mapped in Figure 5-1 to 5-6. The full list of recommended bicycle projects is listed in Appendix B.

As part of the outreach process, a high demand was recognized for recreational routes on rural serving roads. Many of these roadways are currently used by confident bicyclists for recreational use, while also offering limited opportunities for improvement due to constraints such as available right of way, existing pavement width, or heavy agricultural use. As such, the installation of a Class II facility may prove challenging. Improved shoulders, ideally with a minimum width of 4-6 feet, are recommended for many of these routes identified as future Class III bicycle routes in the Plan to provide a more comfortable riding experience. In the interim, a comprehensive signage program should be developed in partnership with local bicyclists to denote these routes and alert road users to the possible presence of bicyclists. Opportunities to install a lower stress facility and upgrade from the proposed Class III should be considered wherever possible, should further evaluation indicate it is feasible to do so.

On some rural roadways, Class II facilities have been recommended where they can provide connection between destinations, are more heavily used by bicyclists (or offer the potential for heavier use), or have fewer construction constraints.

Network Connectivity

The recommended network significantly increases access to the destinations that San Joaquin County residents routinely access and care about. By increasing access to these facilities and destinations, this Plan will help create a more bikeable environment in San Joaquin County.

Spot Improvements

Seven select locations throughout the County's road network have been recommended for spot improvements. These were selected based on a review of collision data and the LTS findings presented in Chapter 2 of this Plan. Generally speaking, these are intersection-specific improvements intended to increase safety for all modes with a focus on access for and safety of more vulnerable roadway users, namely bicyclists and pedestrians. These types of improvements recommended for consideration include:

- Retrofitting of curb ramp angles to align with existing crosswalks.
- Restriping crosswalk lines with high durability paint where existing paint is faded.
- Restriping travel lane edge lines with high durability paint at intersections where they are faded.
- Moving painted stop bars (lines) back from intersection(s) to reduce the potential for stopping vehicles to encroach on the intersection(s) and create conflict with motorized and non-motorized vehicles passing through the intersection(s).
- Placement of stop signs and "Watch for Bicycles" signs.

A summary of improvements being recommended for consideration at the six intersections is provided in Table 5-2, mapped in Figures 5-1 to 5-6, and described in a detailed list of recommended bicycle projects in Appendix B.

End of Trip Facilities

The County will encourage the construction of bicycle storage facilities at major transportation terminals and employment centers, such as downtowns and retail centers.

Bicycle lockers should also be located in the most dense areas to serve people shopping or running multiple errands who would like a secure place to store their bicycle and deposit purchases or other items during their trip.

This Plan recommends the placement of 'Watch for Bicycles' signs on both approaches to the Union Pacific railroad underpass on Lower Sacramento Road, south of Woodson Road

This Plan recommends the placement of advanced yield markings on both sides of the existing crosswalk at Thornton Road at Sacramento Boulevard and Oak Street, and upgrading the crosswalk to a marked crosswalk with vertical / painted bars

Types of Proposed Bicycle Facilities

Class I

Shared-Use Path

- Paths completely separated from motor vehicle traffic used by people walking and biking, making them comfortable for people of all ages and abilities.
- Typically located immediately adjacent and parallel to a roadway or in its own independent right-of-way, such as within a park or along a body of water.

Class II

Bicycle Lane

- A dedicated lane for bicycle travel adjacent to traffic.
- A painted white line separates the bicycle lane from motor vehicle traffic.

Class IIB

Buffered Bicycle Lane

- A dedicated lane for bicycle travel separated from vehicle traffic by a painted buffer.
- The buffer provides additional comfort for users by providing space from motor vehicles or parked cars.

Class III

Bicycle Route

- Recommended when space for a bicycle lane may not be feasible or may conflict with agricultural uses, or on routes used by more confident bicyclists for recreational riding.
- Often located on roadway shoulders where sufficient width exists.
- Minimum shoulder width of 4-6 feet is recommended on roads with high traffic volumes or speeds.
- Where shoulders do not currently exist, signs and/or pavement markings indicate that people biking share the travel lane with motor vehicles.

Class IIIB

Bicycle Boulevard

- Calm, local streets where bicyclists have priority but share roadway space with motor vehicles.
- Shared roadway bicycle markings on the pavement as well as traffic calming features such as speed humps and traffic diverters to keep these streets more comfortable for bicyclists.

Class IV

Separated Bikeway

- An on-street bikeway separated from motor vehicle traffic by a curb, median, planters, parking delineators, or other physical barrier.

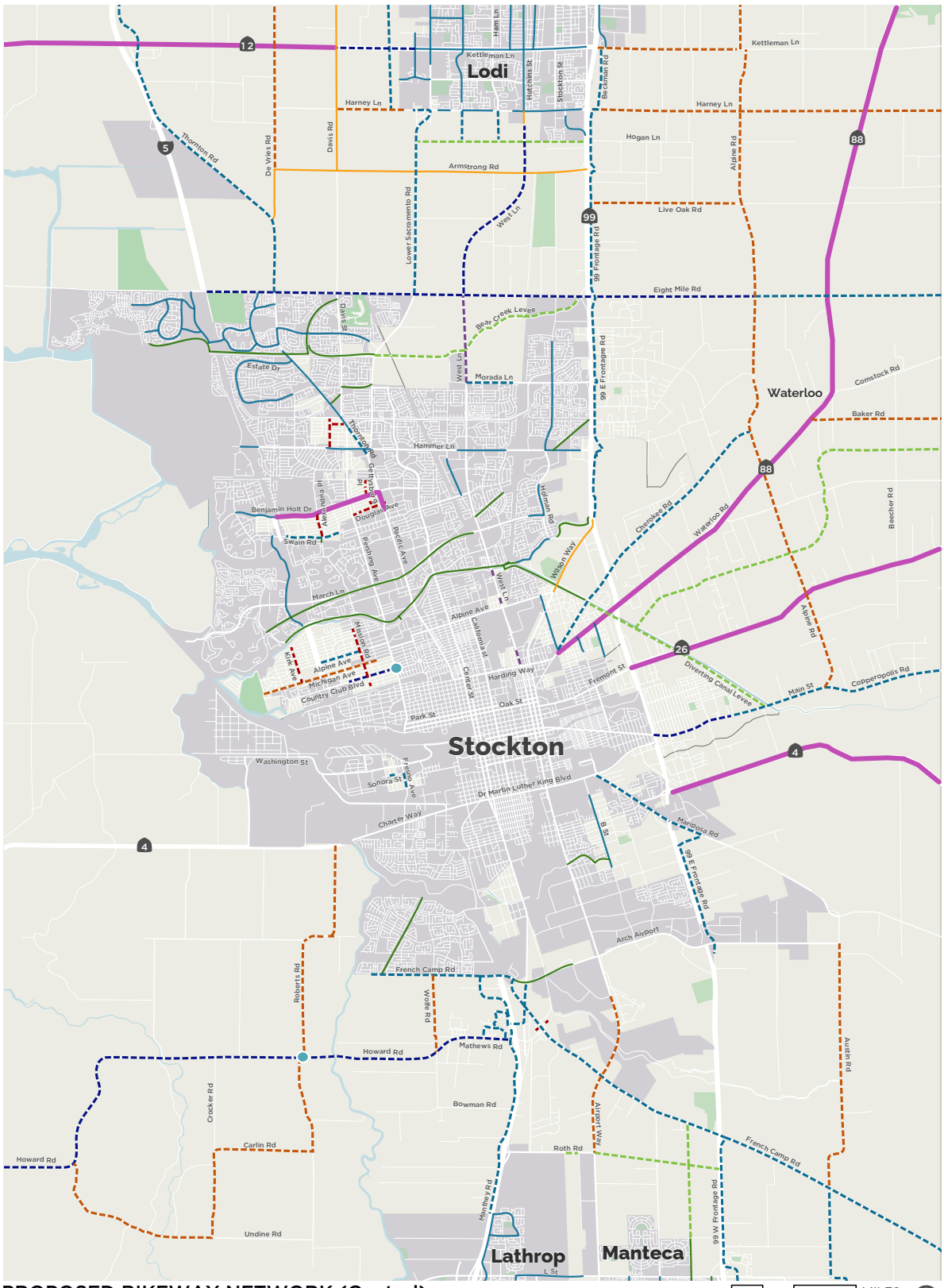
Table 5-1: Recommended Bikeways Mileage by Facility Type

Bikeway Type	Existing Mileage	Proposed New Facility Mileage	# of Proposed Projects	Total Existing + Proposed Mileage
Class I Shared-Use Path	8.1	39.7	16	47.8
Class II Bicycle Lane	4.2	176.2	57	180.4
Class IIB Buffered Bicycle Lane	0	29.4	8	29.4
Class III Bicycle Route	21.2	289.7	74	310.9
Class IIIB Bicycle Boulevard	0	7.6	16	7.6
Class IV Separated Bikeway	0	3.0	2	3.0
Corridor Study	0	99.5	10	99.5
Spot Improvement	-	-	7	-

Table 5-2: Spot Improvement Locations and Recommended Improvements to Consider

Spot Improvement Location	Recommended Improvements to Consider
Pershing Ave at Country Club Rd	Retrofit of curb ramp angles to align with existing crosswalks and restriping of crosswalk lines with high-durability paint where they are currently faded.
Tracy Blvd at Howard Rd	Repainting edge line striping on southeast approach (leg) of intersection where it is heavily faded to establish adequate spacing for bicyclists and pedestrians.
Roberts Rd at Howard Rd	Moving (painted) stop bar back (to the east) approximately 8 feet on eastern approach to intersection but ensure adequate line of sight to the south is maintained (for those stopping at intersection).
Clements Rd at Brandt Rd	Placement of stop signs on north and south legs of intersection and new 'Watch for Bicycles' sign on north and south bound shoulders (near intersection). The County would be required to conduct an all way stop warrant evaluation before installation of the stop signs.
Clements Rd at Harney Ln	Placement of stop signs on north and south legs of intersection and new 'Watch for Bicycles' sign on the north and southbound shoulders (near the intersection). The County would be required to conduct an all way stop warrant evaluation before installation of the stop signs.
Thornton Rd at Sacramento Blvd and Oak St	Placement of advance yield markings on roadway on Thornton Road on both sides of the existing crosswalk and upgrading the crosswalk to a marked crosswalk (with vertical / painted bars) to better signify the presence and visibility of the facility.
Lower Sacramento Rd at Woodson Rd	Placement of 'Watch for Bicycles' on both approaches to the railroad underpass to alert motorists that bikes may be present and that it's a shared lane. Signs should be placed at least 250 feet from the underpass location.

Figure 5-1: Proposed Bikeway Network (Central)



PROPOSED BIKEWAY NETWORK (Central)

San Joaquin County Bicycle Master Plan Update

MILES 0 1 2

Bicycle Facilities

Existing *Proposed*

- Class I Shared Use Path
- Class II Bicycle Lane
- Class II Buffered Bicycle Lane
- Class III Bicycle Route
- Class III Bicycle Boulevard
- Class IV Separated Bikeway

Improvements

Proposed

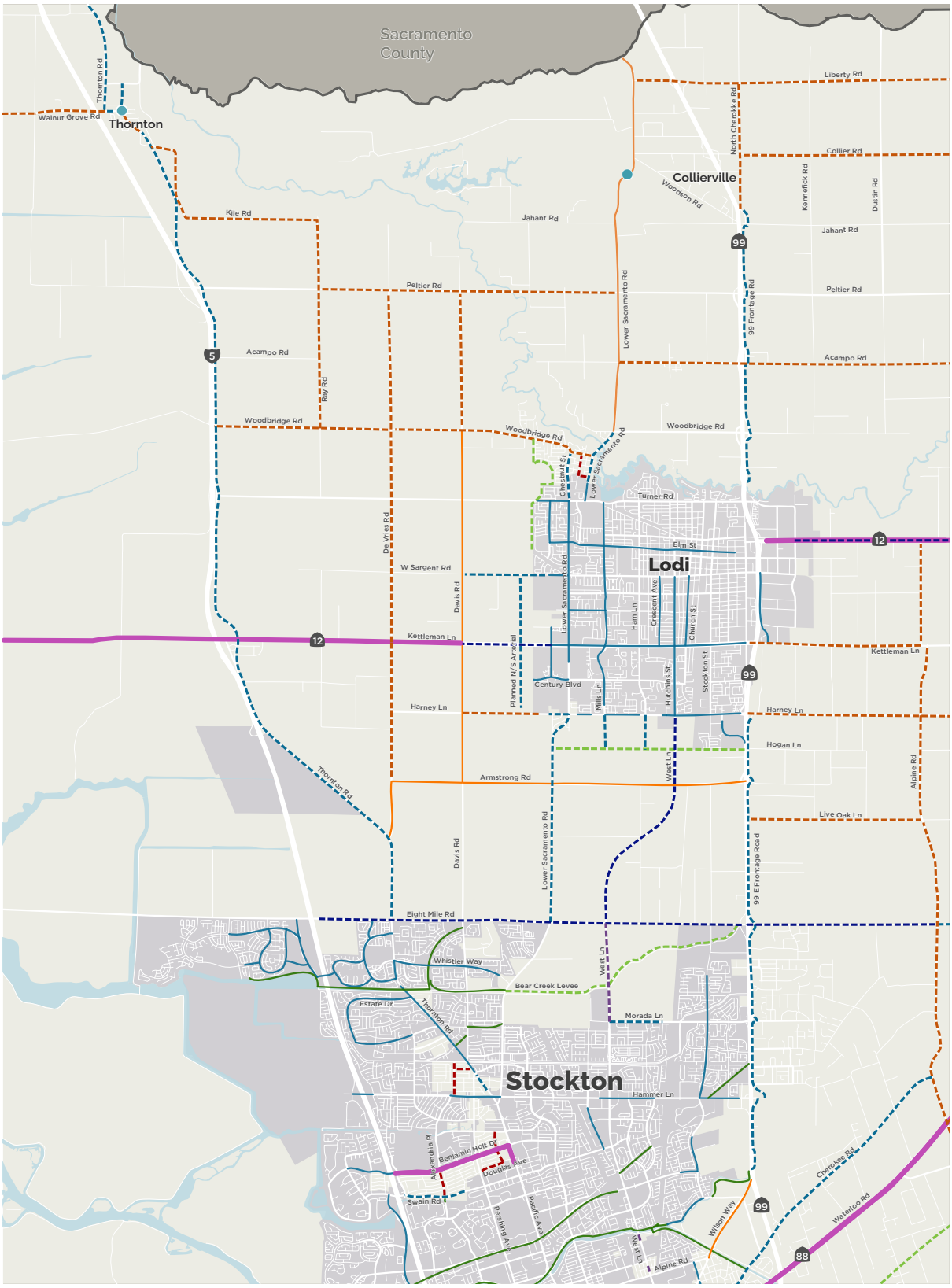
- Study*
- Spot Improvement

**Will require further study and / or coordination with CalTrans to determine feasibility and appropriateness of facility type and location*

- Incorporated City
- San Joaquin County
- Other County

alta PLANNING + DESIGN

Map produced September 2020



PROPOSED BIKEWAY NETWORK (Northwest)

San Joaquin County Bicycle Master Plan Update

MILES 0 1 2

Bicycle Facilities

Existing Proposed

- Class I Shared Use Path
- Class II Bicycle Lane
- Class II Buffered Bicycle Lane
- Class III Bicycle Route
- Class III Bicycle Boulevard
- Class IV Separated Bikeway

Improvements

Proposed

- Study*
- Spot Improvement

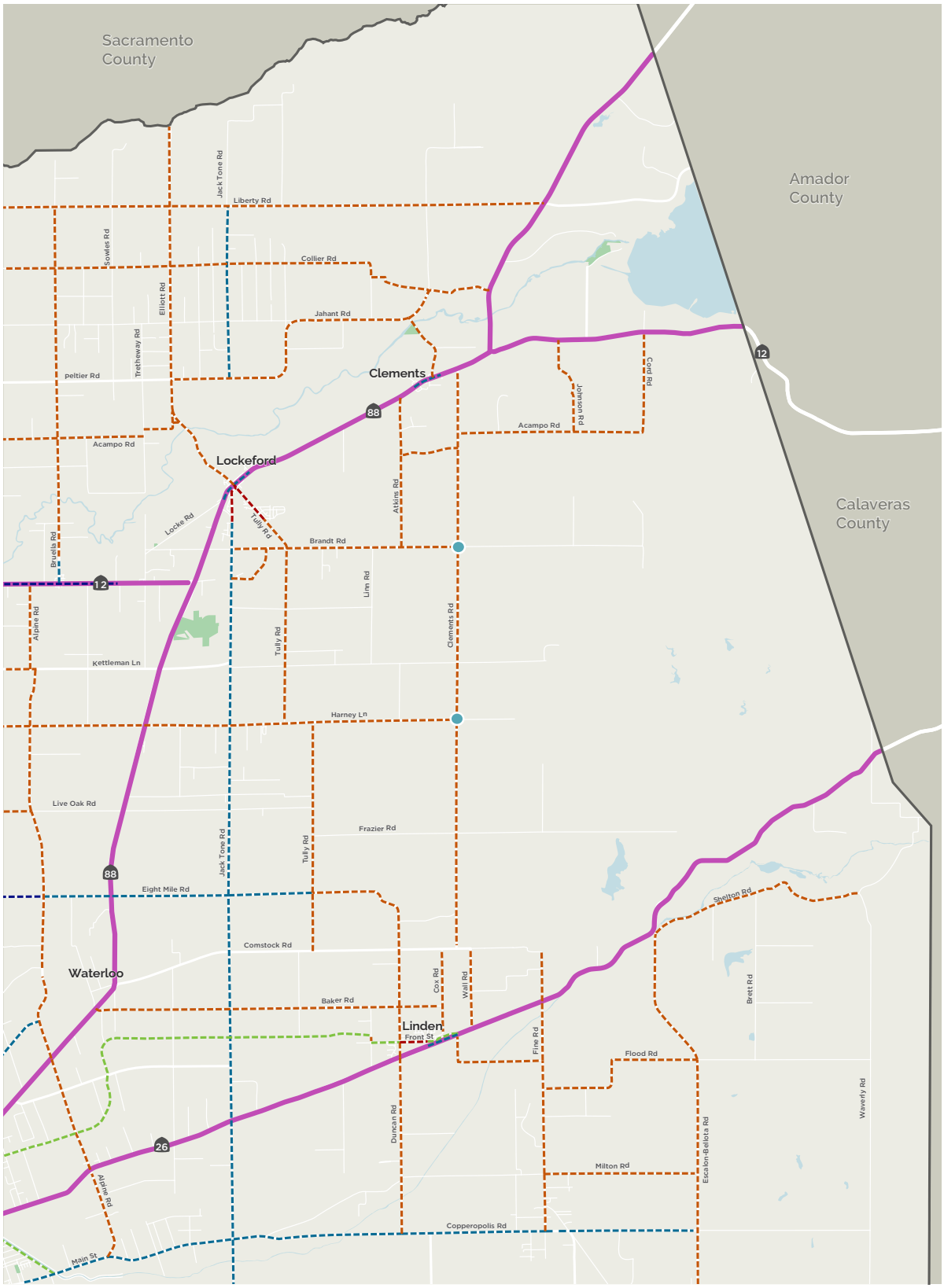
**Will require further study and / or coordination with CalTrans to determine feasibility and appropriateness of facility type and location*

Boundaries

- Incorporated City
- San Joaquin County
- Other County

Map produced September 2020

Figure 5-3: Proposed Bikeway Network (Northeast)



PROPOSED BIKEWAY NETWORK (Northeast)

San Joaquin County Bicycle Master Plan Update

Bicycle Facilities

Existing Proposed

- Class I Shared Use Path
- Class II Bicycle Lane
- Class II Buffered Bicycle Lane
- Class III Bicycle Route
- Class III Bicycle Boulevard

Improvements

Proposed

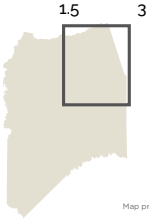
- Study*
- Spot Improvement

**Will require further study and / or coordination with CalTrans to determine feasibility and appropriateness of facility type and location*

Boundaries

- Incorporated City
- San Joaquin County
- Other County

MILES 0 1.5 3



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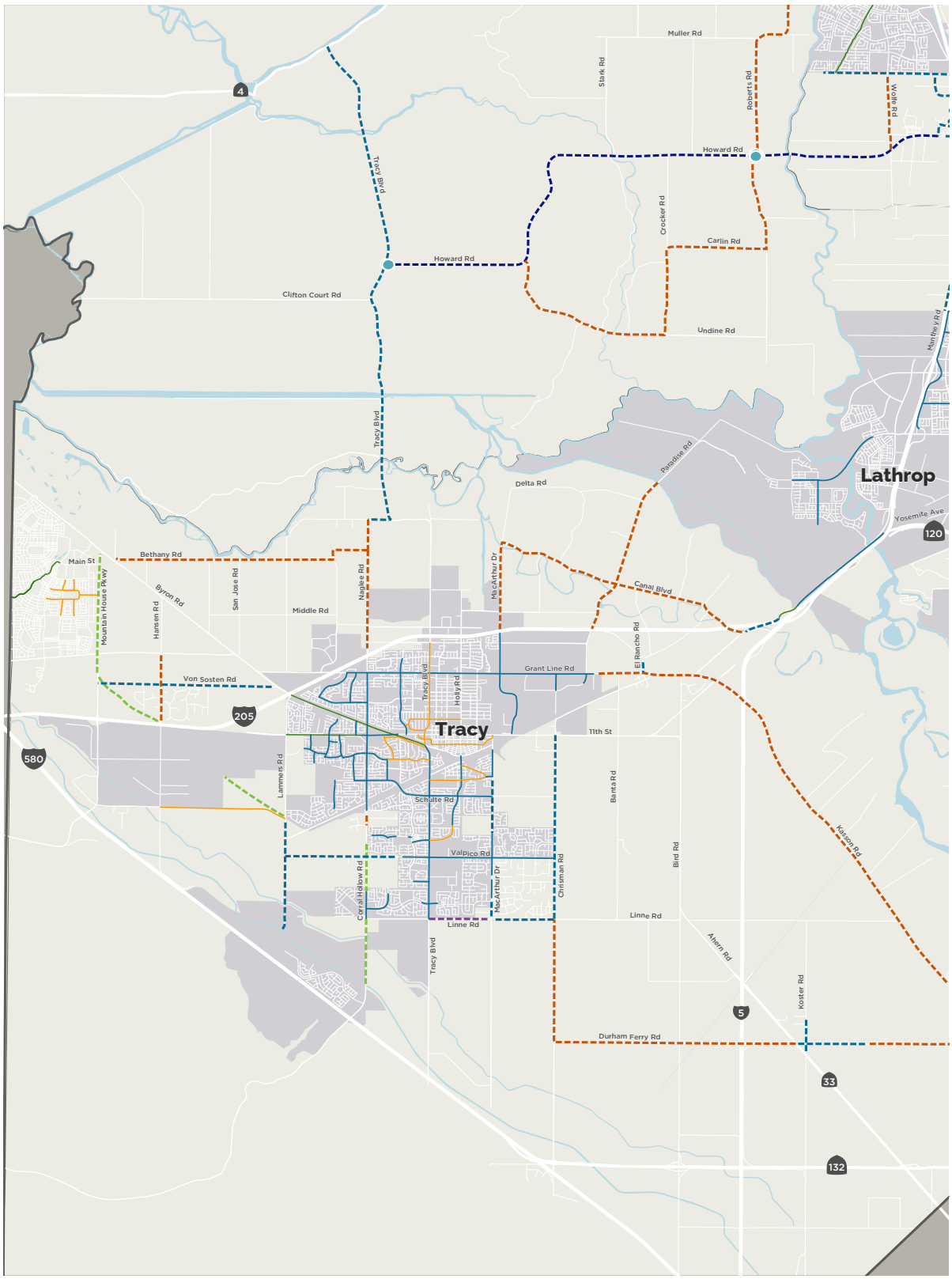
Map produced September 2020



PROPOSED BIKEWAY NETWORK (Southwest)

San Joaquin County Bicycle Master Plan Update

MILES 0 1 2

Bicycle Facilities

Existing Proposed

- Class I Shared Use Path
- Class II Bicycle Lane
- Class II Buffered Bicycle Lane
- Class III Bicycle Route
- Class III Bicycle Boulevard
- Class IV Separated Bikeway

Improvements

Proposed

- Study*
- Spot Improvement

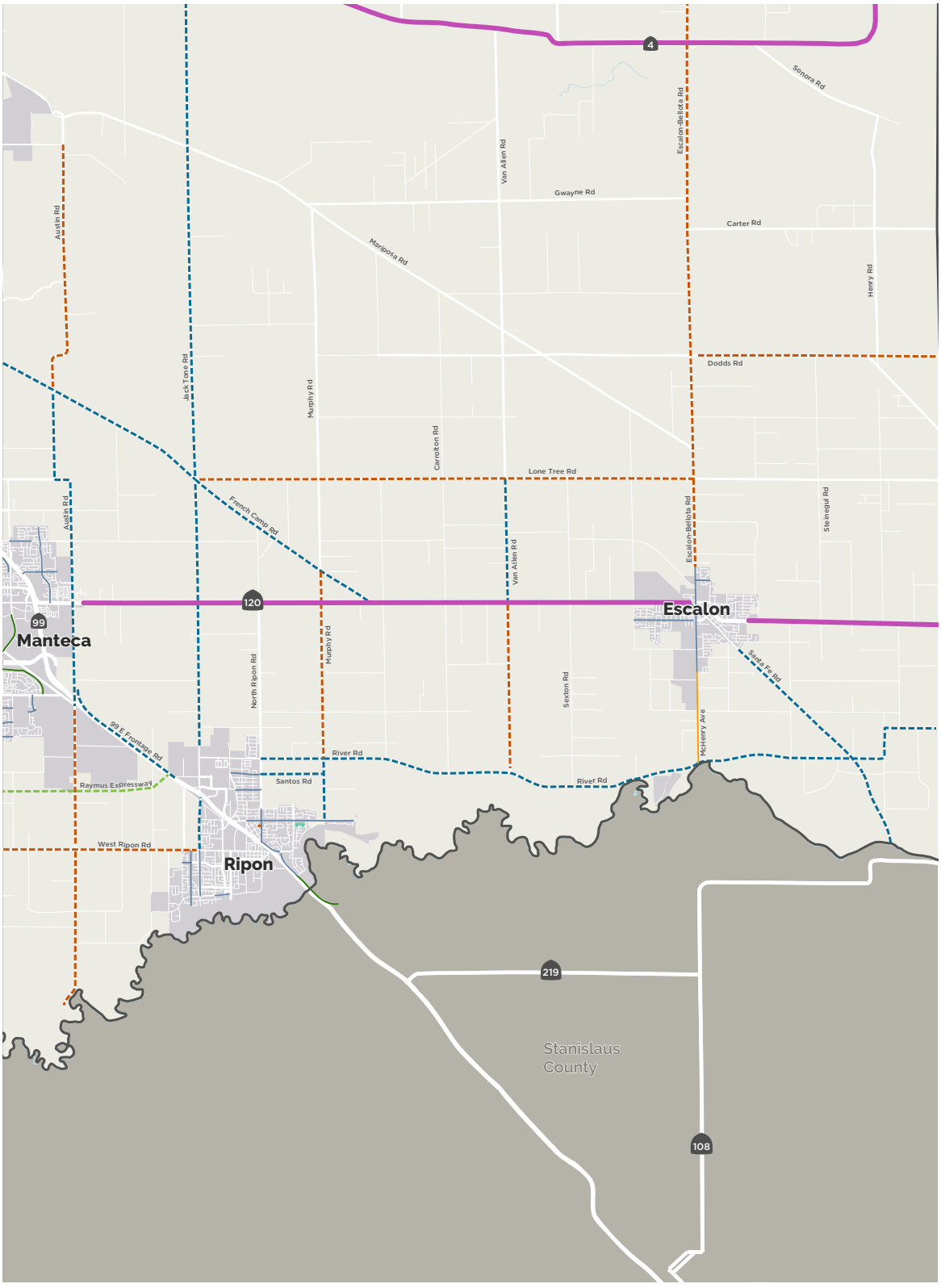
**Will require further study and / or coordination with CalTrans to determine feasibility and appropriateness of facility type and location*

Boundaries

- Incorporated City
- San Joaquin County
- Other County

Map produced September 2020

Figure 5-5: Proposed Bikeway Network (Southeast)



PROPOSED BIKEWAY NETWORK (Southeast)

San Joaquin County Bicycle Master Plan Update

MILES 0 1 2

Bicycle Facilities

Existing Proposed

- Class I Shared Use Path
- Class II Bicycle Lane
- Class III Bicycle Route

Improvements

Proposed

- Study*
- Spot Improvement

**Will require further study and / or coordination with CalTrans to determine feasibility and appropriateness of facility type and location*

Boundaries

- Incorporated City
- San Joaquin County
- Other County

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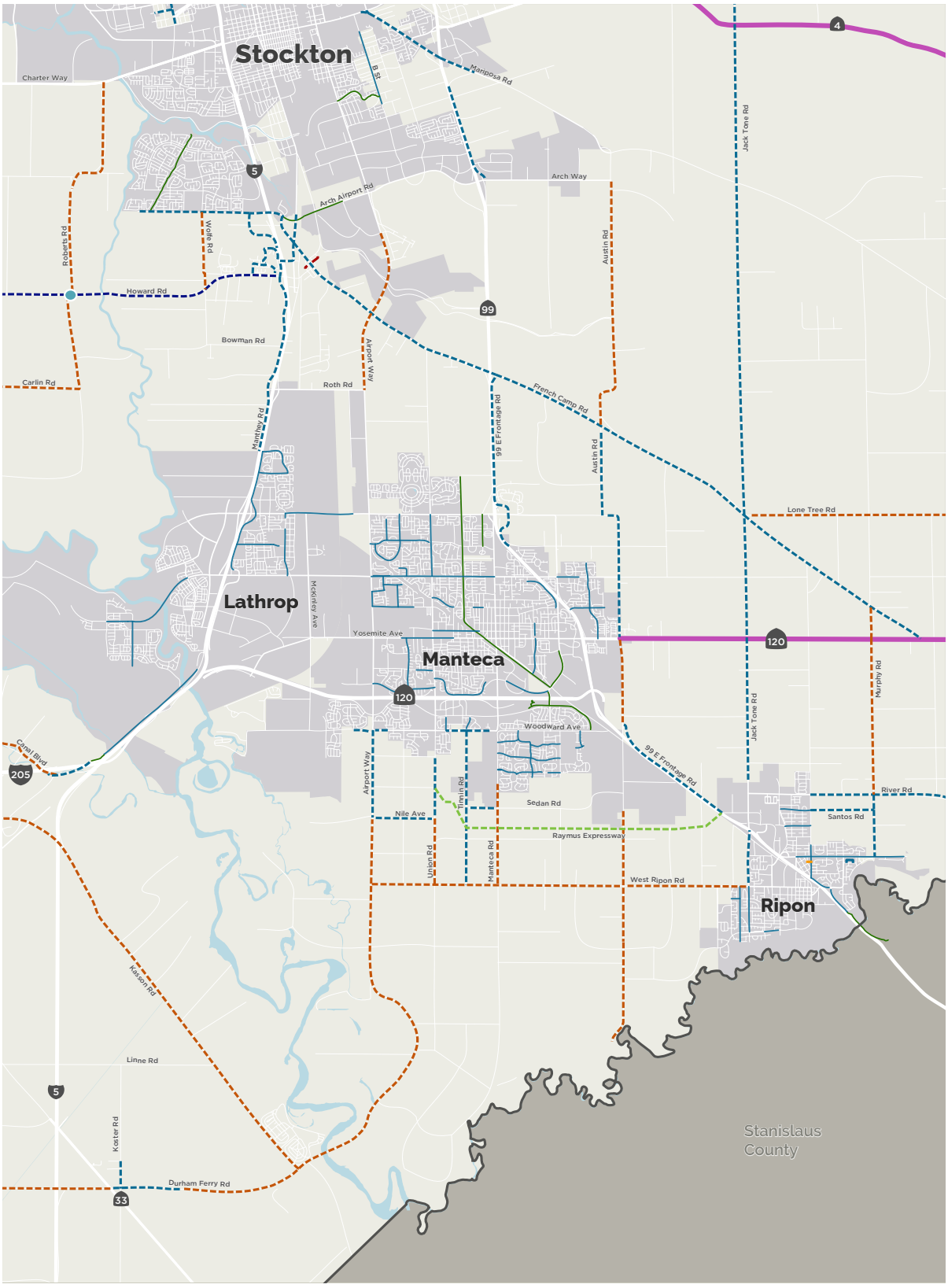
Map produced September 2020

Figure 5-6: Proposed Bikeway Network (South)



PROPOSED BIKEWAY NETWORK (South)

San Joaquin County Bicycle Master Plan Update

Bicycle Facilities

Existing Proposed

- Class I Shared Use Path
- Class II Bicycle Lane
- Class II Buffered Bicycle Lane
- Class III Bicycle Route
- Class III Bicycle Boulevard
- Class IV Separated Bikeway

Improvements

Proposed

- Study*
- Spot Improvement

**Will require further study and / or coordination with CalTrans to determine feasibility and appropriateness of facility type and location*

Boundaries

- Incorporated City
- San Joaquin County
- Other County

0 1 2 MILES

Map produced September 2020

Conceptual Greenways

During the planning phase of this project, conceptual greenways were identified as long term vision projects. These projects occupy a different time horizon than the projects listed in this chapter.

Long term vision projects require further collaboration and discussions between the relevant stakeholders. Often, these projects were identified on land or right of way not owned by the County. Acquiring access to these parcels or right of way would require extensive discussions between the owners and County.

Bear Creek Levee Pathway/Trail

This project will extend an existing, heavily used Class I path from Lower Sacramento Road in Stockton, northeast to Eight Mile Road. By creating a new low stress facility, the Bear Creek Trail extension will encourage physical activity and increase opportunities for recreational bicycling, as well as non-motorized access to community destinations like the forthcoming North Stockton Library and Ronald E. McNair High School. At the eastern end of the project, the trail will connect to proposed bicycle lanes on Eight Mile Road and the 99 Frontage Road, providing additional connectivity to the communities of Lodi, Morada, and Waterloo to the north, south, and east, respectively.

Stockton Diverting Canal

The Stockton Diverting Canal is a 3.3 mile segment of gravel levee extending from Cherokee Road to Main Street in an unincorporated pocket of Stockton. At the western end, and existing Class I path traces the Calaveras River through the City of Stockton, and is a heavily used corridor for trips by bike and on foot. Paving this section of the canal as a Class I path would formalize the existing bicycle and pedestrian trips that occur along the project length, and extend opportunities for recreation and healthy activity. The Canal Trail would create a low-stress connection to planned facilities on Main Street and Copperopolis Road, as well as to the Garden Acres community, which meets the CalEnviroScreen criteria for disadvantaged communities.

Linden Rails to Trails Greenway

This project would utilize an abandoned railroad corridor to create a transformative greenway through San Joaquin County. Beginning at the proposed Class I path on the Stockton Diverting Canal, the Linden Greenway would extend 9 miles, traveling east through scenic agricultural terrain before connecting with the unincorporated community of Linden near the Linden High School. This project would provide a low stress alternative to travel east and west through the County, allowing bicyclists to avoid high traffic corridors like State Route 26 or 88. The route would also travel near several agricultural processing facilities, and could serve workers traveling to those employers. By creating a new scenic, low-stress facility, the Linden Greenway may also attract bicycle tourism, thereby supporting broader economic development opportunities.

Delta-Mendota Canal / California Aqueduct

The Delta-Mendota Canal and California Aqueduct travel along the western edge of San Joaquin County outside of Mountain House and Tracy, and stretch south through the San Joaquin Valley. Both are part of the water conveyance system for California, and offer paved and/or gravel levee surfaces. This project would entail working collaboratively with the California Department of Water Resources and the San Luis & Delta-Mendota Water Authority to explore opportunities to open or increase access for bicyclists along the aqueduct. Short segments of the California Aqueduct are currently used by existing bicyclists in the region for recreational riding. The aqueducts would offer an additional low-stress opportunity for recreational bicycling and walking near Mountain House and Tracy, and could potentially connect to employment centers in the region.

06.

RECOMMENDED PROGRAMS

Making San Joaquin County better for people riding a bike means investing not only in infrastructure, but also programs that encourage bicycling.

What are Programs?

When paired with a safe and accessible bicycle network, programs can help people of all ages and abilities realize the full potential of San Joaquin County's existing and future bicycle network. Some programs teach community members about the range of available transportation choices and make sure they have the skills and know-how to be safe from traffic while bicycling. Others promote bicycling for both transportation and recreation through events, activities, and incentives. When paired with safe and comfortable bicycle networks, programs play a role in fostering safe bicycling behavior, especially among youth, at low or no cost. In addition to teaching bike riding and bike maintenance skills, programs can also provide safe places for people to find community through bicycling.

Existing Programs

San Joaquin County will build on existing countywide programs to help increase bicycle ridership, make bicycling safer, and integrate biking into residents' everyday life. Building on the success of these programs is crucial to maintaining momentum in increasing accessibility of bicycling in San Joaquin County.

Bike to Work Month

To encourage more bicycle commuting, events are held around the country throughout the whole month of May. In San Joaquin County, Dibs, the San Joaquin Bike Coalition, and the cities of Tracy, Stockton, Manteca, Lodi, and Escalon all partner to provide bike month events and group rides at many different locations.

Recommended Programs

The broad range of programs described below present several options for further cultivating and sustaining a bicycle-friendly culture throughout San Joaquin County. Intended to work in tandem with and support the gradual implementation of the projects in this Plan, the County should consider co-development and implementation of these programs as either a lead agency or a supporting partner when funding and staffing resources allow. It is recommended that County staff determine which program or combination of programs would provide the greatest benefit to existing and prospective bicyclists and establish a prioritized list that can be used as a roadmap for partnering discussions with stakeholder organizations (e.g. bicycle advocacy organizations throughout the County) and for grant applications to outside agencies (e.g. Caltrans or San Joaquin Council of Governments). While not required under this Plan, these programs would, if implemented, help create a more bicycle-friendly County for all ages and abilities.

Safe Routes to School Program

San Joaquin County residents would benefit from a robust Safe Routes to School (SRTS) program. SRTS programs have many goals including:

- Teaching students the rules of the road, so they are more prepared to navigate their community using active transportation and eventually become safe drivers;
- Encouraging active modes of getting to school, which will help students arrive at school more alert and ready to learn;
- Decreasing the prevalence of childhood obesity through increased physical activity; and
- Reducing traffic congestion around schools and cut-through traffic on residential streets due to school drop-off and pick-up.

The County can work with local school districts to seek grant funding for a SRTS Plan that documents existing active transportation infrastructure and evaluates existing program activities, and identifies priority programs and infrastructure projects at schools. The SRTS Plan would also include suggested routes to school maps for each school, which help families plan their walking or bicycling trip to school by highlighting active transportation facilities.

A SRTS program could first be piloted at select schools to assess interest in and viability of a countywide program.

Bicycle Safety Education Classes

Bicycle safety education classes can build confidence and improve safety by incorporating both presentations and on-bike practice, covering rules of the road and safe bicycling skills. This program can build off of the success of similar programs dedicated to educating school children on the benefits of bicycling and bicycling safety protocol.

Bicycle safety education classes can encourage bicyclists of all ages

The League of American Bicyclists offers multiple courses that are taught by League Certified Instructors in the area. Additionally, the County can also partner with local bicycling advocacy groups to offer educational opportunities to residents. The County can further support these efforts by advertising classes, providing meeting space, or by direct funding of classes.

While the aforementioned classes tend to be better for adults or teenagers, younger children can benefit from in-classroom education related to safe walking and bicycling. As part of the aforementioned SRTS program, the County can work with school districts to develop school curriculum for students to learn basic traffic and safety rules in addition to incorporating lessons across biology, earth science, math, and art that focus on the benefits of active transportation.

Bicycle Safety Campaign

Bicycle and pedestrian safety campaigns encourage all road users to abide by local laws and to be courteous to other users. They can be targeted at just one user type (e.g. drivers) or at multiple users. For example, many other California jurisdictions have implemented Street Smarts campaigns that aim to educate communities about safe driving, bicycling, and walking behavior to reduce traffic-related collisions and injuries. Street Smarts campaigns are promoted through public service announcements on local radio stations, features in local print publications, social media posts, and through signs on street poles, in front of schools, in residents' yards, and more.

Custom Street Smarts materials, Santa Cruz, CA

Local stakeholders such as the Bicycle and Pedestrian Advisory Board, County schools, business owners, civic leaders, and community advocates can help develop safety campaign goals based on local concerns and issues. These stakeholders can also contribute to the development of campaign messaging and branding. Additionally, the County can host a Traffic Safety Poster Contest for local student artwork or use photos of San Joaquin County streets that will be familiar to local residents to ensure that campaign branding speaks to local communities.

Open Streets and Demonstration Events

Open streets events temporarily close streets to car traffic, allowing people to use the streets for activities like bicycling, skating, walking, and other social and physical activities. These events are great for bringing the community together and promoting active transportation and public health. Open streets events are also excellent at


Community bicycle rides bring the community together

building community; they bring together neighbors, businesses, and visitors alike.

Open streets events also provide the County with additional opportunities to engage with the public about how their streets can better serve their needs. For example, the County can use open streets events as an opportunity to demonstrate new infrastructure ideas such as separated bikeways. These events provide an opportunity for the County to receive feedback on new ideas at the moment people are experiencing their streets in a new way.

Demonstration projects can also be done as standalone events (i.e., without a full open streets event). Unlike open streets events, demonstration projects typically maintain vehicle access so community members are able to experience how an existing street could function with projects such as new crossings, bicycle lanes, and more. Demonstrating potential future projects enables the County to work with local stakeholders to test out project ideas for a day or a few weeks before building permanent infrastructure.

Social Rides

Supporting social bicycle rides in San Joaquin County can provide many benefits to the community. People who are uncomfortable bicycling alone or who are unfamiliar with the best routes to use will benefit from having a group to show them the way. Rides can also be used as informal education opportunities to remind participants about safe bicycling behavior and sharing the road, or combined with other efforts like tours of historic neighborhoods. Rides can also target specific user groups, such as families with young children or women.

The County can pursue grants to fund and promote social rides and can partner with local community-based organizations to host rides.

Neighborhood Bike Stops

Certain locations throughout San Joaquin County currently provide bike parking options, but the County is lacking other amenities such as bike self-repair/fix-it stations. Being able to fix bikes and have access to water in a secure and welcoming place would allow County residents and visitors to engage in outdoor physical activity more frequently and more comfortably. The County can look into adding bicycle fix-it stations and hydration stations to various key destinations such as near a trail entrance, park, or public library.

Bike Rack Program

A bike rack program can help the County coordinate and streamline bike parking installations countywide, make sure bike racks are properly installed (e.g. they do not block sidewalks), and strengthen relationships with local artists, businesses, and community-based organizations. Custom branded bicycle racks double as public art and as ways to highlight San Joaquin County's identity as a bicycle-friendly community. The bike parking program can be designed to allow for local artists, businesses, or organizations to design their own bike racks.

Where appropriate, the County could also coordinate with local businesses to provide bicycle lockers or other secure long-term parking for employees and visitors. Secure long-term parking is a key component of the bicycle network to encourage employees to bicycle instead of driving, and helps prevent bicycle theft. Like bicycle racks, these corrals and lockers could feature custom branding for the County or the businesses they are located at.

The County can develop and implement a request system that allows businesses and other interested parties to apply for a complimentary bike rack. Such a program would be contingent upon the County or regional entity such as the San Joaquin Council of Governments being financially able to establish an annual set-aside to fund the program.

Bike Friendly Business Program

By recognizing businesses who support bicycling, the County can support the local economy while fostering partnerships with the Chamber of Commerce and business owners to build community support for bicycling projects and programs. Using the League of American Bicyclists' Bicycle Friendly Business program as a framework, the County can implement a local program to recognize businesses who make it easy and convenient for both employees and customers to arrive by bicycle.

A Bike Friendly Business program typically requires businesses to adopt various strategies that accommodate the needs of customers and employees. For employees, offering secure long-term parking for bicycles can be a key factor in encouraging employees to ride a bicycle to work more often. This could include a secure gated bicycle parking area, access to bicycle lockers, or some other safe parking option. Providing changing areas, showers, or lockers to store belongings can also make it more convenient for employees to bicycle to work.

Example of a local Bike Friendly Business sign, Oregon

To encourage customers to ride bicycles more often, member businesses and organizations can be asked to provide free access to a variety of bicycle-related amenities, such as:

- A bicycle rack, potentially customized to the business (see the Bike Rack Program on the previous page for more information).
- Bicycle information, such as a map of existing County bikeways.
- Public restrooms.
- Shelter from inclement weather.
- Discounts or incentives.

Being designated as a Bike Friendly Business would be a great way for businesses in San Joaquin County to show their employees and customers that they care about the environment, health and wellness, and their community.

Walk and Roll to School Days

The County can work with local school districts to host Walk and Roll to School Days, events that encourage students and families to try bicycling to school. They can be hosted as part of a full SRTS program, or as standalone events. A national event, Bike to School Day is held in early May and Walk to School Day is held in October each year. Many communities choose to celebrate walking and bicycling on both days, in addition to roller skating, skateboarding, and scootering.

Families that live too far from their school to walk or bicycle the full distance can be encouraged to park at a District-designated location a few blocks away from campus. From there, parents and students can complete their trip to school by walking or rolling, often with other parents and students.

The County, District, school staff, and/or parent volunteers can set up a welcome table for participating students, and may opt to provide refreshments, small incentive prizes, or an interactive poster that allows students to record

their mode of transportation used that day.

Once established on an annual basis, Walk and Roll to School Days can be expanded by adding monthly or weekly events, coordinating friendly competitions between classrooms, or by organizing groups to walk or bicycle together.

Adopt-a-Road and Adopt-a-Trail

Adopt-a-Road and Adopt-a-Trail programs provide an opportunity for community groups, businesses, or clubs to adopt a section of a road or trail. They then support their section of the road/trail with financial contributions and/or volunteer work. This offers residents a chance to keep nearby roadways and trails in good condition, and provides businesses the opportunity to enhance the streetscape near their place of business. The County can look into opportunities to partner with local organizations, groups, and businesses to enhance street and trail segments.

Full Moon Riders community bicycle ride and event

Share The Trail

The County can adopt a Share the Trail program the encourages residents and community members to walk, bike, and roll together safely on local San Joaquin County trails. Share the Trail programs often feature a combination of educational materials and community events that teach trail etiquette for all trail users. These events can be standalone events or included as a part of other County events, such as Bike to Work Month. Educational materials can be posted at trail entrances, rest stops, visitor centers, and can be distributed at County events.

Wayfinding

Wayfinding systems help people biking and walking navigate to community destinations such as transit stations, parks, libraries, schools, and commercial areas. They can also provide walking or biking time to destination information, helping people orient themselves, and encouraging the discovery of new places or services. Wayfinding can also be used to highlight the local identity of the County or a community.

Example of a Confirmation Sign, Oakland, CA

The County can engage with communities in a collaborative design process to develop wayfinding targeted at bicyclists. There is potential to customize the signage along specific routes, such as along the Class IIIB bike boulevards recommended in Chapter 5. To do so, the County can work with community members and local organizations to develop wayfinding signage that incorporates community identity, but is still tied to the existing wayfinding signage.

To provide a more comfortable experience, sometimes bike facilities are shifted off of high-stress roads onto parallel lower-stress routes. When bikeways change designations, it is not always clear how to navigate to the nearest route. The County can evaluate wayfinding needs where low-stress bikeways end and install wayfinding to nearby routes.

Enforcement Programs

The San Joaquin County Sheriff's Office currently conducts enforcement programs to ensure safe behavior of drivers and bicyclists, including obeying speed limits and traffic laws.

This Plan recommends continuing these efforts, with a focus on those behaviors that create the greatest risk or potential conflict, and care should be taken that programs do not unfairly target specific demographics or modes of transportation. This Plan also recommends continuing current educational enforcement activities, where officers stop individuals and discuss the unsafe behavior observed without issuing citations.

Behaviors and locations for targeted enforcement should be reviewed each year based on collision data and community input. Current behaviors cited as challenges during public outreach for this Plan include drivers failing to stop at red lights, parking in bicycle lanes, bicyclists crossing streets at undesirable locations, and bicyclists riding on the wrong side of the road.

Annual Report Card

The County can develop an Annual Report Card program to help assess progress made towards meeting the goals and objectives outlined in Chapter 3 and the infrastructure and programs outlined in Chapters 5 and 6. The League of American Bicyclists issues annual report cards for states, communities, and universities throughout the country, which could serve as a model for San Joaquin County's Annual Report Card program.

Metrics tracked through the Report Card could include number or mileage of installed bicycle projects, number of community members engaged around bicycling, any changes in the rates of bicycling, the rates of collisions involving bicyclists, and more. In addition to tracking these data metrics, the Annual Report Card can incorporate a review of the effectiveness of implemented programs to evaluate where investments may need to be adjusted to reflect community needs, cost-effectiveness, or other issues.

07.

IMPLEMENTATION

An updated San Joaquin County Bicycle Master Plan sets the framework for where and what kinds of improvements need to be completed to improve our bicycle network. This chapter describes the process for evaluating project recommendations in order to help San Joaquin County prioritize projects and outlines opportunities to fund them.

Bicycling in the San Joaquin County of Tomorrow

This chapter provides a roadmap for achieving the vision and goals established at the beginning of the Plan by outlining a prioritization strategy, cost estimates, maintenance, and funding sources. This Plan is compliant with the California Active Transportation Program (ATP) requirements and the California Environmental Quality Act.

San Joaquin County is responsible for the implementation of bicycle infrastructure projects and programs within its unincorporated communities, though in some cases, coordination with regional or local other agencies may be needed. Additionally, a safer and more active San Joaquin County is not possible without the involvement of community members, as residents have invaluable local knowledge about the streets in their communities. As the County moves forward with the implementation of the bicycle projects identified in this Plan, additional community engagement and outreach will continue to be an essential part of the process.

The County will regularly evaluate how well performance measures set forth in this Plan are met and whether the recommendations established in this Plan still meet the needs of residents and visitors in the future. The County aims to track progress on implementation annually, if feasible.

In addition, the recommendations in this Plan should be reevaluated at least every five years to ensure that these still constitute best practices and reflect the long-term vision for a safer and more active San Joaquin County.

Prioritization

A prioritization process enables the County to identify highest priority projects and phase the implementation of projects over the years. Some projects can also be implemented as part of routine roadway maintenance programs. Furthermore, this prioritization process is aligned with California's ATP grant criteria, which is the primary source of state funding the County pursues for pedestrian and bicycle infrastructure.

The intent of evaluating projects is to create a strategic list to guide implementation. The project list and evaluation results are flexible concepts that serve as guidelines. Over time, as development occurs or other changes to land uses and the transportation network take place, this framework can be used to reevaluate remaining projects and continue pursuing implementation of this Plan. A detailed list of all projects is included in Appendix B.

Prioritization Framework

A prioritization framework was developed to assess where projects would provide the greatest value to the community. A higher ranked project indicates a higher bicyclist need based on the criteria outlined in Table 7-1. A higher ranked project could also indicate that it may be easier to implement based on lower cost or few environmental impacts.

The prioritization process assigns a number value to all projects, including spot improvements. The possible points assigned to a project ranges from 0 to 7 based on the criteria outlined in Table 7-1. Projects that score higher were identified as higher priority projects.

Table 7-1: Prioritization Framework Weighting

Criteria	Measure	Points
Safety	Project is on a multi-collision corridor, or at a location with multiple collisions or reported/known safety issues.	0 or 1
Connectivity	Lowers the stress of corridors that provide access to key destinations. This can be done by reconfiguring high-stress streets in order to lower driving speeds, or by upgrading or adding bicycle facilities.	0 or 1
Demand	Project location is on a corridor with higher levels of pedestrian and bicycle traffic, or in areas with higher population densities.	0 or 1
Feasibility and Cost	Project has few issues or environmental impacts that require additional analysis, and can utilize funding efficiently.	0 or 1
Equity	Project serves people of all ages and demographics, especially those located in CalEnviroScreen disadvantaged communities.	0 or 1
Community Priorities	Project was identified by the local community in community planning and engagement events, and adheres to the local community's priorities.	0 or 1
Competitiveness	Promotes and adheres to the eight Caltrans sustainability grant program objectives: sustainability, preservation, mobility, safety, innovation, economy, health, and social equity.	0 or 1

Prioritization Methodology

The prioritization process utilized seven criteria to identify priority projects.

Safety

Bicyclists face unique safety concerns, and improving safety conditions can make the transportation network more accessible and attractive to people of all ages and abilities. The preferred safety evaluation criterion is the number of safety barriers that would be removed if a project was implemented. This evaluation criterion relies on expert analysis to identify challenges presented by the existing design of a travelway and potential opportunities presented by the proposed project. It allows for a more nuanced view of safety in a rural area like San Joaquin County, where low numbers of reported walking- or bicycling-related collisions may not accurately represent challenges or capture how these challenges limit a person's willingness or bicycle.

Connectivity

Projects that connect residents to employment centers, grocery stores, community centers, schools, and shops can have a large influence on one's willingness to walk or bicycle for short-distance trips. The preferred connectivity criterion is the lowering of the stress-levels of corridors that connect major destinations.

Demand

Forecasting demand helps identify projects that are more likely to be well used by local residents and visitors to San Joaquin County. Projects located on, or near, corridors with high levels of pedestrian and bicycle traffic or in areas with higher population densities will score higher through this criterion.

Feasibility and Cost

Improving the health of San Joaquin County's residents and visitors, the environment, meeting demand, and improving connectivity, safety, and equity come at a price. Being able to weigh the benefits of a proposed project against its costs helps place projects on an even playing field for evaluation. While a large project may show considerable benefits, its costs may be prohibitive and require substantial outside funding. Likewise, a small project may not show as many benefits as other projects, but its relatively low cost may make it a more cost-effective choice for implementation. The cost-effectiveness evaluation criterion is the estimated capital costs of a given proposed project. The feasibility evaluation criterion evaluates if a project needs additional analysis before implementation or not.

Equity

Without access to multiple transportation options, some people may have difficulty getting to work, accessing healthy food, going to school, or engaging in social activities. Ensuring equitable access to walking and bicycling facilities for transportation is particularly important for communities that have been historically disadvantaged, do not have access to a motor vehicle, rely heavily on walking and bicycling for their daily transportation needs, or are otherwise disconnected from active transportation opportunities. The preferred equity evaluation criterion is the diversity of population served by the population. Extra weight is given to a project that serves a population identified as disadvantaged through the CalEnviroScreen methodology (Chapter 3).

Community Priorities

Community input was prioritized throughout this planning process. This criterion evaluates if the location or facility of a project was identified through the public engagement process. Alternatively, this criterion can evaluate if a project achieves a local community priority (such as improving access to a particular set of destinations like schools, grocery stores, or employment centers) that was identified during the public outreach process.

Competitiveness

Many of the projects recommended in this Plan will require outside funding to ease the burden of implementing these facilities on San Joaquin County. A list of external funding sources is provided later in this chapter. Among these, the ATP grant administered by Caltrans is the largest funding source for active transportation projects across the state of California. Given this, projects that adhere to the eight Caltrans sustainability grant program objectives will score higher in this criterion. Ensuring that projects will be eligible for funding will be vital for implementing the projects recommended in this Plan.

The results from this prioritization methodology are provided on the following pages. In addition, a set of projects that were identified as "Faster Implementation" are also provided in this chapter. These projects were identified as high-need, low-hanging fruit that could be implemented quickly.

Prioritization Results

As shown in Table 7-2 and Figure 7-1, projects that received four or more points were categorized as high priority, projects that scored 2-3 points were categorized as medium priority, and projects that received one point were categorized as low priority.

Although this process evaluates each project's benefits and ranks them accordingly, consideration should be given to facility implementation with larger roadway projects. Where feasible, bikeway recommendations should be incorporated into roadway repaving projects. This would reduce the cost burden and planning process for each project implemented through this avenue.

The locations of high priority projects are shown in Figure 7-2 on the following page, and a full list of project prioritization and scoring can be found in Appendix C.

Table 7-2: Project Prioritization Results

High Priority	
Type of Project	*33 Total Projects*
Class I Shared-Use Path	3 projects
Class II Bicycle Lane	9 projects
Class IIB Buffered Bicycle Lane	4 projects
Class III Bicycle Route	1 project
Class IIIB Bicycle Boulevard	11 projects
Class IV Separated Bikeway	2 projects
Corridor Study	3 projects
Medium Priority	
Type of Project	*77 Total Projects*
Class I Shared-Use Path	10 projects
Class II Bicycle Lane	27 projects
Class IIB Buffered Bicycle Lane	3 projects
Class III Bicycle Route	24 projects
Class IIIB Bicycle Boulevard	5 projects
Corridor Study	1 project
Spot Improvement	7 projects
Low Priority	
Type of Project	*80 Total Projects*
Class I Shared-Use Path	3 projects
Class II Bicycle Lane	21 projects
Class IIB Buffered Bicycle Lane	1 project
Class III Bicycle Route	49 projects
Corridor Study	6 projects

Figure 7-1: Project Prioritization Scale

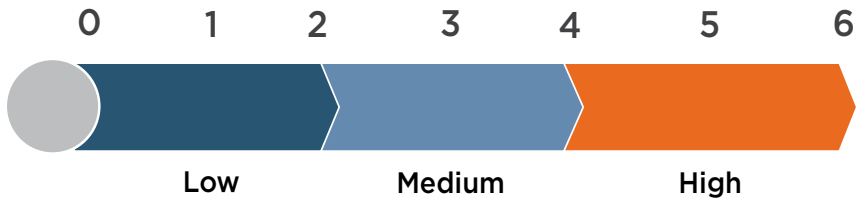
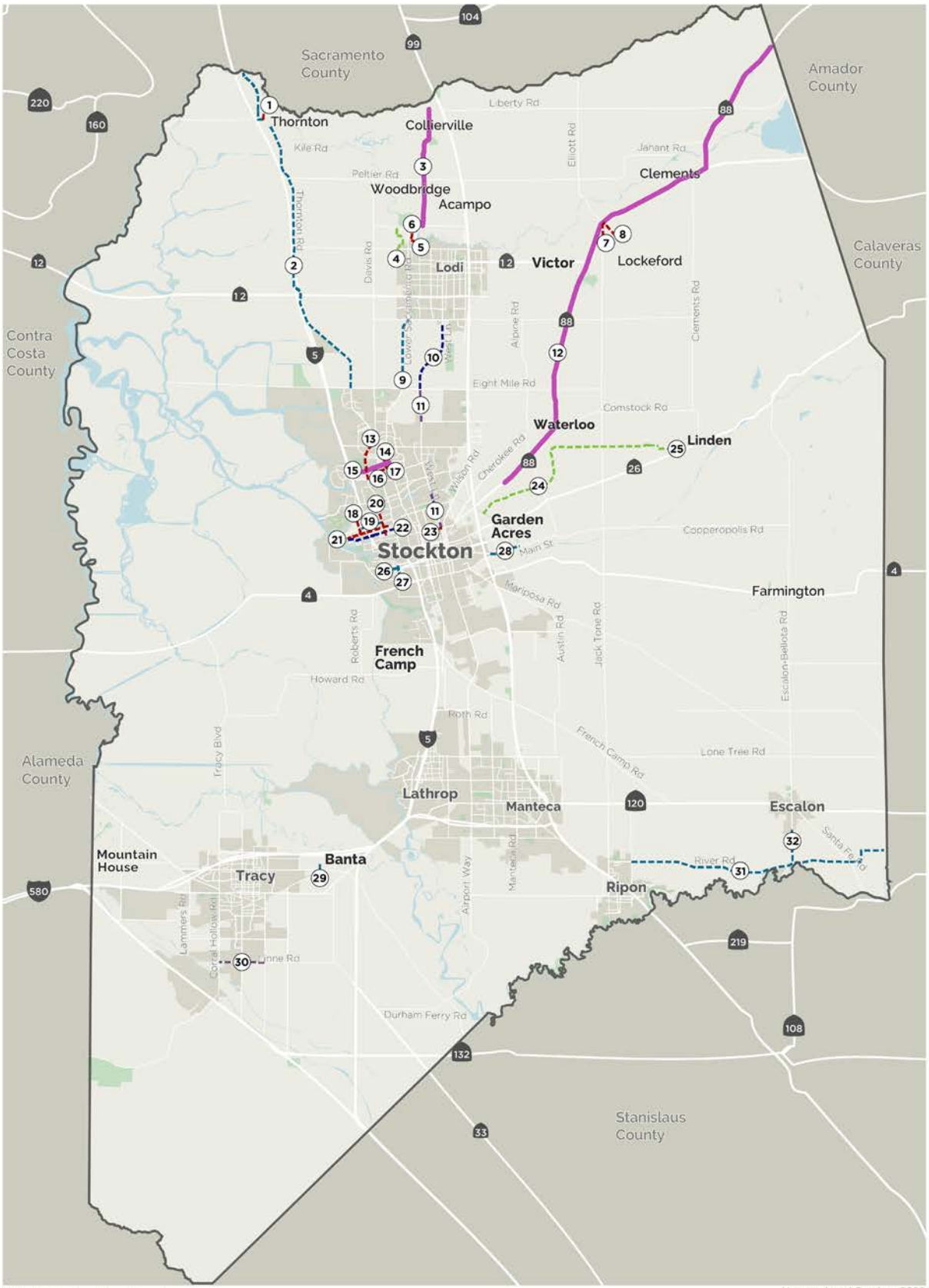


Figure 7-2: High Priority Projects



High Priority Projects

San Joaquin County Bicycle Master Plan Update

Map produced October 2020

MILES 0 2.5 5

High Priority Projects

- Class I Shared Use Path
- Class II Bicycle Lane
- Class II Buffered Bicycle Lane
- Class III Bicycle Boulevard
- Class IV Separated Bikeway
- Corridor Study

1. Sacramento Blvd
2. Thornton Rd
3. Lower Sacramento Rd
4. Woodbridge Irrigation Canal
5. Academy St
6. Lilac St
7. Jack Tone Rd
8. Tully Rd
9. Lower Sacramento Rd
10. West Ln
11. West Ln
12. Waterloo Rd
13. Alexandria Pl
14. Gettysburg Pl
15. Benjamin Holt Dr
16. Douglas Rd
17. Pacific Ave
18. Kirk Ave
19. Alpine Ave
20. Mission Rd
21. Michigan Ave
22. Country Club Blvd
23. Harding Way
24. Ketcham Ln
25. Front St
26. Sonora St
27. Fresno Ave
28. Main St
29. El Rancho Rd
30. Linne Rd
31. River Rd
32. McHenry Ave

alta PLANNING + DESIGN

Capital Cost Estimates

Planning-level unit cost assumptions were used to develop estimated project construction costs. These unit costs are typical or average costs of infrastructure for San Joaquin County Public Works. These cost assumptions do not factor in project-specific or location-specific details that may affect actual costs, such as acquisition of right-of-way or relocation of utilities. For some projects, actual costs may differ significantly from the planning level estimates, which are listed in Table 7-3.

Costs estimates are provided in 2020 dollars due to annual inflation, cost estimates will increase in the future. Cost estimates were not developed for recommended studies in this Plan since they can vary widely based on a number of factors such as the level of community engagement conducted.

Table 7-3: Bicycle Facility Planning Level Cost Estimates

Bikeway Type	Unit	Cost Estimate (Low)	Cost Estimate (High)
Class I Shared-Use Path	Per Mile	$225,000	$730,000
Class II Bicycle Lane	Per Mile	$5,000	$40,000
Class IIB Buffered Bicycle Lane	Per Mile	$12,000	$55,000
Class III Bicycle Route	Per Mile	$6,000	$72,000
Class IIIB Bicycle Boulevard	Per Mile	$50,000	$600,000
Class IV Separated Bikeway	Per Mile	$127,000	$3,400,000

Funding Sources

A variety of local, regional, state, and federal funding streams exist for funding bicycle infrastructure projects and programs. Some bicycle funding sources only allow use for maintenance of existing facilities, while others may be limited to new construction projects. Table 7-4 provides an overview of sources and the project types they apply to, while the following sections provide descriptions and detailed eligibilities for possible funding sources for the programs and projects presented in this Plan.

Table 7-4: Funding Eligibility

Funding Source	On-Street Bikeways	Trails	Safe Routes to School	Safe Routes to Transit	Crossings/ Intersections	Programs	Studies
Local and Regional Sources							
Measure K Funds	•	•	•	•	•	•	•
Partner Agencies	•	•	•	•	•	•	•
Competitive Grant Programs							
Active Transportation Program (CTC)	•	•	•	•	•	•	
Sustainable Transportation Planning Grants (Caltrans)							•
Highway Safety Improvement Program (Caltrans)	•		•	•	•		
Solutions for Congested Corridors (CTC)	•	•			•		
Office of Traffic Safety (CA OTS)						•	
Recreational Trails Program (CA DPR)		•					
Affordable Housing & Sustainable Communities (CA HCD)	•			•		•	
Cultural, Community, and Natural Resources (CA NRA)		•					
Urban Greening Grants (CA NRA)	•	•	•	•			
Other State Programs							
Local Partnership Program (CTC)	•		•	•			
Road Maintenance and Rehabilitation Program (Controller's Office)	•		•	•			

Local & Regional Opportunities

General Fund & Existing Pipeline Projects

When possible, bicycle projects identified in this Plan will be incorporated into the County's annual budget for transportation improvements. Some improvements may also be folded into larger, complementary projects. For example, bicycle lane striping could be added to certain roadway repaving projects that are already in the pipeline for SJCDPW.

Measure K Funds

Measure K is a half-cent sales tax within San Joaquin County that is dedicated to repairing the roads within San Joaquin County. In 2006, voters approved an amendment that allocated 30 percent of the Measure's funds to supporting alternative transportation projects, including bicycle projects.

Joint Funding via Partner Agencies

Multiple local partners may be interested in joining with San Joaquin County or its communities to improve health and safety through bicycling improvements. Relationships with local governments, community groups, and philanthropic groups will be fostered. Partners can be invited to discussions about projects that would benefit all stakeholders. The County's partner agencies may also be able to provide matching or leveraging funds for competitive grant programs.

Competitive Grant Programs

As with many jurisdictions in the region, San Joaquin County relies on regional, state, and federal funding sources to implement bicycle infrastructure projects and programs. Typically, funding for active transportation projects is distributed to jurisdictions throughout California through competitive grant processes.

Transportation funding can change drastically when there are modifications to policies and new taxes and fees are adopted. In 2017, state-level funding for transportation grew through increases in the statewide gas tax and vehicle registration fee (SB 1). The California State Legislature passed these increases to address the growing backlog of roadway maintenance issues statewide, coupled with the adoption of several climate initiatives, such as cap-and-trade, which brings new revenue to the state from the sale and transfer of emission credits.

Federal transportation funding is primarily secured through grant programs run by state and regional agencies such as San Joaquin Council of Governments and Caltrans. Federal funding is perhaps the most uncertain, as the primary federal source of funding—the gas tax—has not been raised since 1993. Federal revenue for transportation is allocated through the federal surface transportation bill, which is developed and authorized by Congress infrequently.

A list of potential funding sources and the types of projects eligible for these sources is provided in the follow pages of this chapter. As the funding environment is constantly changing, many of the sources identified may be discontinued or new funding opportunities may become available.

Active Transportation Program

California's ATP funds infrastructure and non-infrastructure projects that support the program goals of shifting trips to walking and bicycling, reducing greenhouse gas emissions, and improving public health. Competitive application cycles occur every one to two years, typically in late Spring or Summer.

Eligible projects include construction of new bicycling or walking facilities, new or expanded program activities, or projects that include a combination of infrastructure and program components. ATP funding can be used for all project phases, including design, environmental documents, and securing right of way in addition to construction.

Competitive projects in past cycles tend to be those that serve schools, address high-collision locations, incorporate public health concerns, and benefit disadvantaged communities—defined by the ATP as those with low median household income, high pollution burdens based on CalEnviroScreen, or high percentages of students who qualify for free or reduced price meals. Typically no local match is required, although points are awarded to communities who do identify leveraging funds.

These funds are distributed by the California Transportation Commission (CTC).

Transportation Planning Grants

Caltrans Transportation Planning Grants are available to communities for planning, study, and design work to identify and evaluate projects, including conducting outreach or implementing pilot projects. Applications are accepted multiple times per year. Communities are typically required to provide at least an 11.47 percent local match, but staff time or in-kind donations may be used for this match.

Competitive applications typically demonstrate strong potential to reduce greenhouse gas emissions, integrate land use planning with transportation, and articulate a strong project need, including collision data, health burdens, and environmental concerns.

These funds are distributed by Caltrans.

Highway Safety Improvement Program

Caltrans offers applications for Highway Safety Improvement Program (HSIP) grants every one to two years. Projects on any publicly owned road or active transportation facility are eligible, including bicycle and pedestrian improvements.

HSIP guidelines place a strong emphasis on safety, specifically by reducing collisions. Competitive projects should be able to demonstrate a strong need based on collision data at the project location, include nationally recognized collision reduction countermeasures, are cost-effective, and are implementation-ready.

Solutions for Congested Corridors Program

Funded by SB 1, the Congested Corridors Program strives to reduce congestion in highly traveled and congested corridors through performance improvements that balance transportation improvements, community impacts, and environmental benefits. This program can fund a wide array of improvements including bicycle facilities and pedestrian facilities.

Competitive projects must be detailed in an approved corridor-focused planning document. These projects must include aspects that benefit all modes of transportation using an array of strategies that can change travel behavior, dedicate right of way for bikes and transit, and reduce vehicle miles traveled. These funds are distributed by the CTC.

Office of Traffic Safety

Under the Fixing America's Surface Transportation (FAST) Act, five percent of Section 405 funds are dedicated to addressing nonmotorized safety. These funds may be used for law enforcement training related to pedestrian and bicycle safety, enforcement campaigns, and public education and awareness campaigns. These funds are distributed by the California Office of Traffic Safety.

Recreational Trails Program

The Recreational Trails Program helps provide recreational trials for both motorized and nonmotorized trail use. Eligible products include: trail maintenance and restoration, trailside and trailhead facilities, equipment for maintenance, new trail construction, and more.

These funds are distributed by the California Department of Parks and Recreation.

Affordable Housing and Sustainable Communities Program

The AHSC program funds land-use, housing, transportation, and land preservation projects that support infill and compact development that reduces greenhouse gas emissions. Projects must fall within one of three project area types: transit-oriented development, integrated connectivity project, or rural innovation project areas. Fundable activities include: affordable housing developments, sustainable transportation infrastructure, transportation-related amenities, and program costs.

These funds are distributed by the California Strategic Growth Council and implemented by the California Department of Housing and Community Development.

Cultural, Community and Natural Resources Grant Program – Proposition 68

Proposition 68 authorizes the legislature to appropriate $40 million to the California Natural Resources Agency to protect, restore, and enhance California's cultural, community, and natural resources. One type of eligible project that this program can fund are projects that develop future recreational opportunities including: creation or expansion of trails for walking, bicycling, and/or equestrian activities and development or improvement of trailside and trailhead facilities, including visitor access to safe water supplies.

These funds are distributed by the California Natural Resources Agency.

Urban Greening Grants

Urban Greening Grants support the development of green infrastructure projects that reduce GHG emissions and provide multiple benefits. Projects must include one of three criteria, most relevantly: reduce commute vehicle miles traveled by constructing bicycle paths, bicycle lanes or pedestrian facilities that provide safe routes for travel between residences, workplaces, commercial centers, and schools. Eligible projects include green streets and alleyways and non-motorized urban trails that provide safe routes for travel between residences, workplaces, commercial centers, and schools.

These funds are distributed by the California Natural Resources Agency.

OTHER STATE FUNDING PROGRAMS

Road Maintenance and Rehabilitation Program

Senate Bill 1 (SB 1) created the Road Maintenance and Rehabilitation Program (RMRP) to address deferred maintenance on state highways and local road systems. Program funds can be spent on both design and construction efforts. On-street active transportation related maintenance projects are eligible if program maintenance and other thresholds are met. Funds are allocated to eligible jurisdictions.

These funds are distributed by the State Controller's Office with guidance from the CTC.

Local Partnership Program

This program provides SB1 funds to local and regional agencies that have passed sales tax measures, developer fees, or other transportation-imposed fees to fund road maintenance and rehabilitation, sound walls, and other transportation improvement projects. Jurisdictions with these taxes or fees are eligible for a formulaic annual distribution of no less than $100,000. These jurisdictions are also eligible for a competitive grant program. Local Partnership Program funds can be used for a wide variety of transportation purposes including roadway rehabilitation and construction, transit capital and infrastructure, bicycle and pedestrian improvements, and green infrastructure.

These funds are distributed by the CTC.

APPENDICES

TABLE OF CONTENTS

A:
DESIGN GUIDELINES

Overview

This Appendix presents facility design guidance to support completion of the Master Plan update. Taken together, the treatments presented herein present a range of options stemming from current, best practices. While it's understood that some of the treatments may not apply to the rural and semi-rural nature of the County's network, the memo intends to serve as a flexible menu of options for the development and refinement of project recommendations under Task 6.2.

The following standards and guidelines are referred to in this guide:

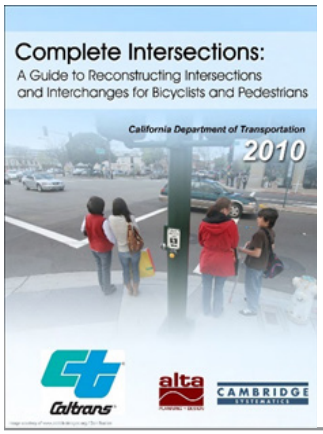
California Guidance

The California Manual on Uniform Traffic Control Devices (CA MUTCD) (2014) is an amended version of the Federal Highway Administration (FHWA) MUTCD 2009 edition modified for use in California. While standards presented in the CA MUTCD substantially conform to the FHWA MUTCD, the state of California follows local practices, laws and requirements with regards to signing, striping and other traffic control devices.


HIGHWAY DESIGN MANUAL

FOREWORD

The California Highway Design Manual (HDM) (Updated 2015) establishes uniform policies and procedures to carry out highway design functions for Caltrans.



Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians (2010) is a reference guide that presents information and concepts related to improving conditions for bicyclists and pedestrians at major intersections and interchanges. The guide can be used to inform minor signage and striping changes to intersections, as well as major changes and designs for new intersections.

Main Street, California: A Guide for Improving Community and Transportation Vitality (2013) reflects California's current manuals and policies that improve multi-modal access, livability and sustainability within the transportation system. The guide recognizes the overlapping and sometimes competing needs of main streets.

Memorandum

TIMOTHY CRAGGS
Chief
Division of Design

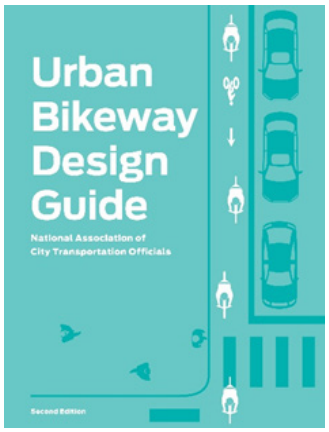
DESIGN FLEXIBILITY IN MULTIMODAL DESIGN

The Caltrans Memo: Design Flexibility in Multimodal Design (2014) encourages flexibility in highway design. The memo stated that "Publications such as the NACTO (National Association of City Transportation Officials) "Urban Street Design Guide" and "Urban Bikeway Design Guide," ... are resources that Caltrans and local entities can reference when making planning and design decisions on the State highway system and local streets and roads."

National Guidance

A blueprint for designing 21st century streets, the NACTO Urban Street Design Guide (2013) unveils the toolbox and tactics cities use to make streets safer, more livable, and more economically vibrant. The Guide outlines both a clear vision for complete streets and a basic road map for how to bring them to fruition. The document charts the principles and practices of the nation's foremost engineers, planners, and designers working in cities.

Separated Bike Lane Planning and Design Guide (2015) provides national guidance on the planning and design of separated bike lane facilities. Released by the FHWA, this guide documents best practices as demonstrated around the U.S., and offers ideas on future areas of research, evaluation, and design flexibility.



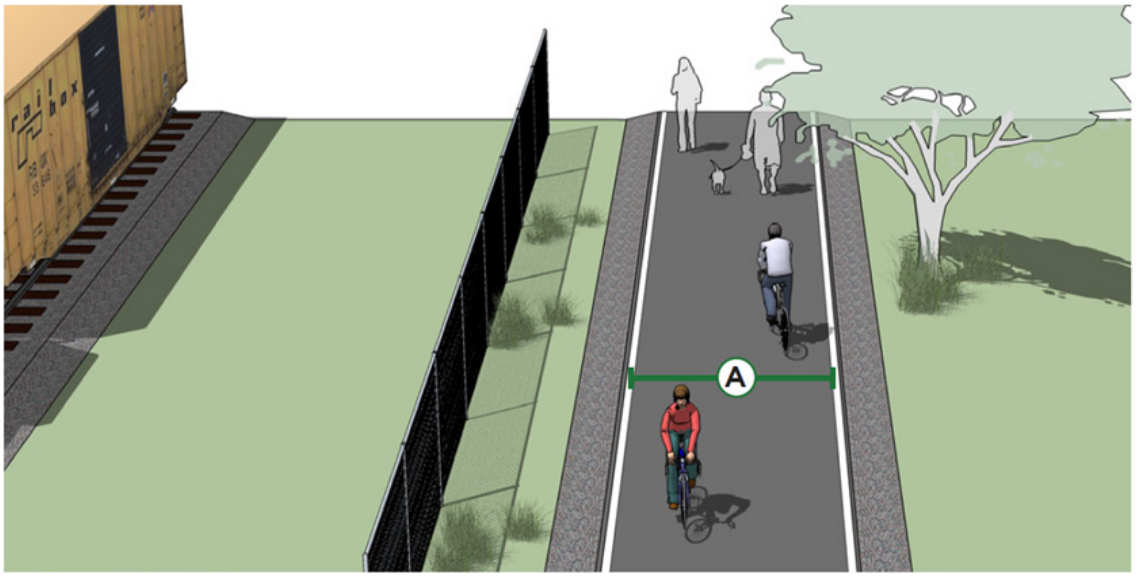
The NACTO Urban Bikeway Design Guide (2012) provides cities with state-of-the-practice solutions that can help create complete streets that are safe and enjoyable for bicyclists. The designs were developed by cities for cities, since unique urban streets require innovative solutions. In August 2013, the FHWA issued a memorandum officially supporting use of the document.

FACILITY TYPES

The following facility types and related guidance will be considered in the development of recommendations under Task 6.2. A variety of factors including but not limited to safety, user experience, existing conditions and available right of way (ROW), and stakeholder input will inform what the appropriate recommendation is for any given location.

Shared Use Path (Class I)

Shared use paths (Class I) are off-street facilities that can provide a desirable transportation and recreation connection for users of all skill levels who prefer separation from traffic. They often provide low-stress connections to local and regional attractions that may be difficult, or not be possible on the street network. Shared Use Paths can be used throughout the County, in the more densely-populated unincorporated areas as well as serving as low-stress connections through the less densely-populated areas.



TYPICAL APPLICATION

Class I paths can be developed in a variety of linear corridors, open spaces, or adjacent to roadways where sufficient separation exists.

DESIGN FEATURES

Eight feet is the absolute minimum width allowed for a two-way travel (with 2-foot shoulders) and is only recommended for constrained situations (Caltrans HDM).

- 10 feet is recommended (but not required) in most situations and will be adequate for moderate use.
- 12 feet is recommended (but not required) for heavy use situations with high concentrations of multiple users. A separate track (5 foot minimum) can be provided for pedestrian use but is not required.

FURTHER CONSIDERATIONS

Lateral Clearance

- A 2-foot or greater shoulder on both sides of the path should be provided (but is not required). An additional foot of lateral clearance (total of 3 feet) is required by the CA MUTCD for the installation of signage or other furnishings.

- If bollards are used at intersections and access points, it's recommended they be colored brightly and/or supplemented with reflective materials to be visible at night.

Overhead Clearance

- Clearance to overhead obstructions must be an 8-foot minimum, with 10 feet recommended, according to Caltrans HDM.

Striping

- When striping is desired, it's recommended that a 4-inch dashed yellow centerline stripe be used.

- Solid centerlines can be provided (but are not required) on tight or blind corners, and on the approaches to roadway crossings.

- 4-inch solid white edge lines are optional, but will narrow the effective width of the facility.

Materials and Maintenance

- Shared use paths must be regularly maintained so that they are free of potholes, cracks, root damage, and debris. Signage and lighting should also be regularly maintained to ensure shared use path users feel comfortable, especially where visibility is limited.

- Adjacent landscaping should be regularly pruned, to allow adequate sightlines, daylight, and pedestrian-scale lighting, and so as not to obstruct the path of travel of trail users.

Approximate Cost

- The cost of a shared use path can vary, but typical costs are between $225,000 to $730,000 per mile. These costs vary with materials, such as asphalt, concrete, boardwalk and other paving materials, lighting, other amenities and ROW acquisition.

Prince Memorial Greenway connects users to downtown Santa Rosa.
Source: Peter Stetson.

Local Neighborhood Accessways

Neighborhood accessways provide residential areas with direct bicycle and pedestrian access to parks, trails, greenspaces, and other recreational areas. They most often serve as small trail connections to and from the larger trail network, typically having their own rights-of-way and easements.

TYPICAL APPLICATION

- Neighborhood accessways should be designed into new subdivisions at every opportunity and can be required by City/County subdivision regulations.
- For existing subdivisions, neighborhood and homeowner association groups are encouraged to identify locations where such connections would be desirable.

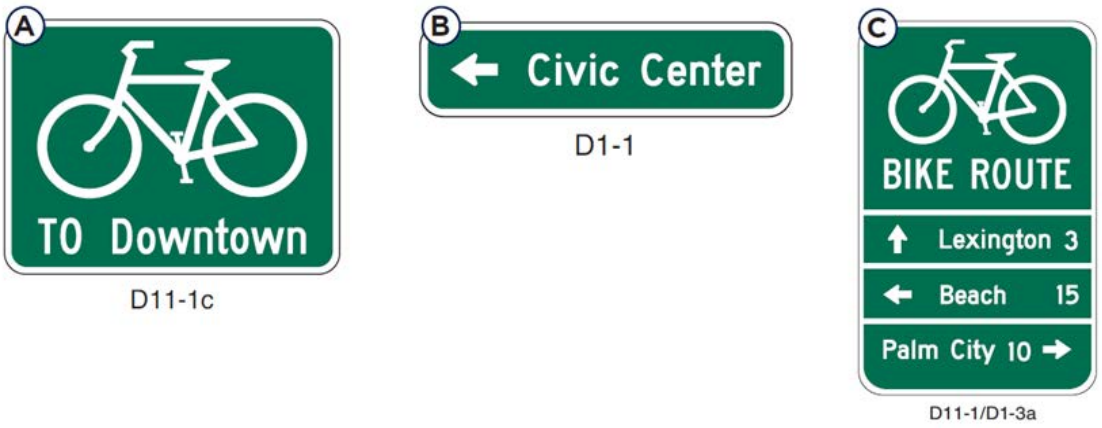
DESIGN FEATURES

Neighborhood accessways should remain open to the public.

- Accessways shall be designed with 12 feet minimum of ROW and 8 feet of pathway, to accommodate emergency and maintenance vehicles and be considered suitable for multi-use.
- Trail widths should be designed to be less than 8 feet wide only when necessary to protect mature trees over 18 inches in caliper, wetlands or other ecologically sensitive areas.
- Lighting and fencing may be included (but are not required) at accessways where additional security is desired.

Wayfinding Sign Types

The ability to navigate through a county is informed by landmarks, natural features, and other visual cues. Signs throughout the County should indicate to bicyclists the direction of travel, the locations of destinations and the travel time/distance to those destinations. A bicycle wayfinding system consists of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes.



TYPICAL APPLICATION

• There are many potential applications for wayfinding signage in a countywide bicycle network. Overall, signs can increase users' comfort with and accessibility to the bicycle network and achieve the following:

- o Help users identify the best routes to destinations.
- o Help address misconceptions about time and distance.
- o Help overcome a "barrier to entry" for people who are not frequent bicyclists (e.g. interested but concerned bicyclists).

DESIGN FEATURES

A. Confirmation signs indicate to bicyclists that they are on a designated bikeway, make motorists aware of the bicycle route, can include destinations and distance/time but do not include arrows.

B. Turn signs indicate where a bikeway turns from one street onto another street or from one trail to another. These can be used with pavement markings and include destinations and arrows.

C. Decision signs inform bicyclists of the designated bike route to access key destinations. These include destinations, arrows and distances. Travel times are optional but recommended.

Wayfinding signs can include a local community identification logo, as this example from Oakland, CA.

Custom street signs can also act as a type of confirmation sign, to let all users know the street is prioritized for bicyclists. This example is from Berkeley, CA.

FURTHER CONSIDERATIONS

- Bicycle wayfinding signs also visually cue motorists that they are driving along a bicycle route and should use caution. Signs are typically placed at key locations leading to and along bicycle routes, including the intersection of multiple routes.

- Too many road signs tend to clutter the right-of-way, and it is recommended that, provided the sign location satisfies established signage standards, the signs be posted at a level most visible to bicyclists rather than per vehicle signage standards.

- A countywide bicycle wayfinding signage plan would identify:
  - Sign locations.
  - Sign type – what type of sign should be used based on its intended function.
  - Destinations to be highlighted on each sign – key destinations for bicyclists.
  - Approximate distance and travel time to each destination.

- Green is the color used for directional guidance and is the most common color of bicycle wayfinding signage in the US, including those in the MUTCD.

- Check wayfinding signage along bikeways for signs of vandalism, graffiti, or normal wear and replace signage along the bikeway network as-needed.

- Language presented in the Community Wayfinding section of the MUTCD provides some flexibility on logos and colors, which may be integrated into a comprehensive system that reflects the local identify and integrates with pedestrian and vehicular wayfinding signage.

Approximate Cost

- Wayfinding signs range from $150 to $500.

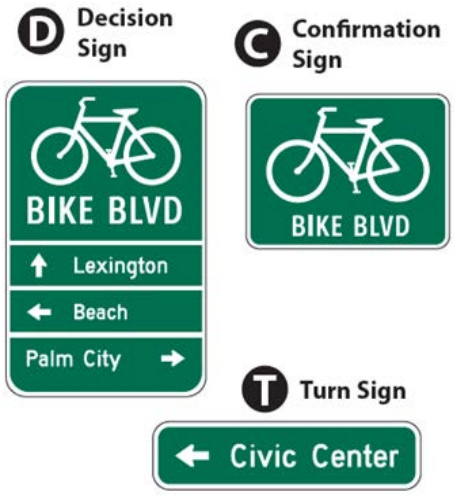
Wayfinding Sign Placement

Signs are placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes.

TYPICAL APPLICATION

Confirmation Signs

- Placed every ¼ to ½ mile on off-street facilities and every 2 to 3 blocks along on-street bicycle facilities, unless another type of sign is used (e.g. within 150 feet of a turn or decision sign).
- Should be placed soon after turns to confirm destination(s). Pavement markings can also act as confirmation that a bicyclist is on a preferred route.



Turn Signs

- Near-side of intersections where bike routes turn (e.g. where the street ceases to be a bicycle route or does not go through).
- Pavement markings can also indicate the need to turn to the bicyclist.

DECISION SIGNS

- Near-side of intersections in advance of a junction with another bicycle route.
- Along a route to indicate a nearby destination.

DESIGN FEATURES

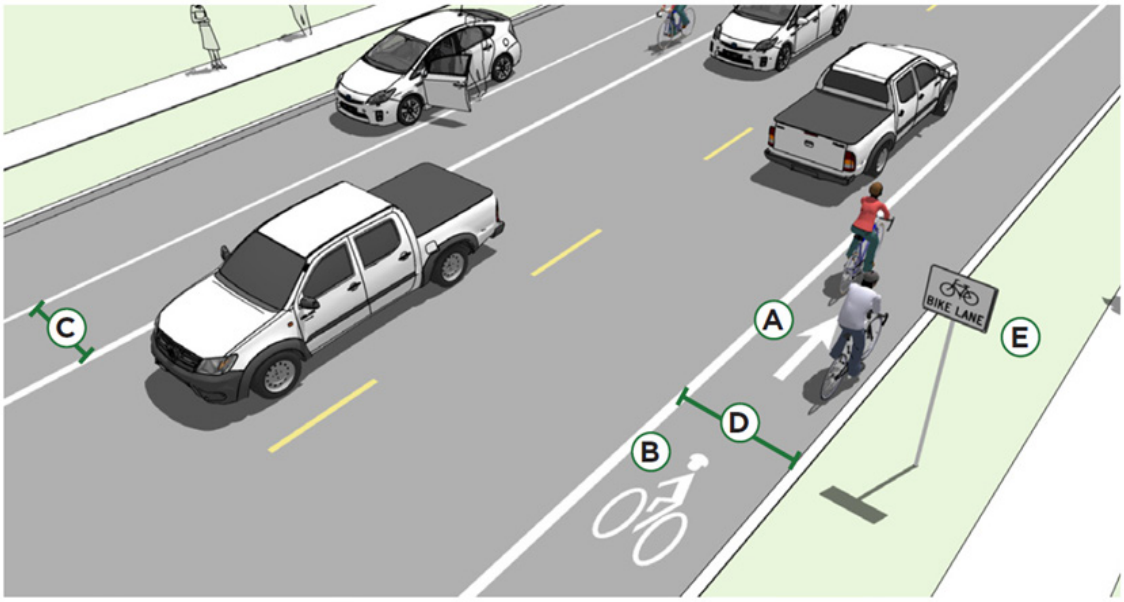
- MUTCD guidelines must be followed for wayfinding sign placement, which includes mounting height and lateral placement from edge of path or roadway.
- Pavement markings can be used to reinforce routes and directional signage.

FURTHER CONSIDERATIONS

- It can be useful to classify a list of destinations for inclusion on the signs based on their relative importance to users throughout the area. A particular destination's ranking in the hierarchy can be used to determine the physical distance from which the locations are signed. For example, primary destinations (such as the downtown area) may be included on signage up to 5 miles away. Secondary destinations (such as a transit station) may be included on signage up to two miles away. Tertiary destinations (such as a park) may be included on signage up to one mile away.

On-Street Bicycle Lanes (Class II)

On-street bike lanes (Class II) are a portion of the roadway that has been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists. Bike lanes enable bicyclists to ride at their preferred speed without interference from prevailing traffic conditions and facilitate predictable behavior and movements between bicyclists and motorists.



TYPICAL APPLICATION

- Bike lanes may be used on any street with adequate space, but are most effective on streets with moderate traffic volumes (greater than 6,000).
- Bike lanes are most appropriate on streets with low to moderate speeds of 30 to 40 miles per hour (mph).
- Appropriate for skilled adult riders on most streets.
- May be appropriate for children when configured as 6+ feet wide lanes on lower-speed, lower-volume streets with one lane in each direction.

DESIGN FEATURES

A. Mark inside line with 6-inch stripe. Mark 4-inch parking lane line or "Ts" (MUCTD 9C-101).

B. Bicycle lane markings must be included at the beginning of blocks (MUTCD 9C-3) and at regular intervals along the route based on engineering judgment (MUTCD 9C.04).

C. 6 feet width is preferred adjacent to on-street parking but 5 feet is the minimum requirement.

D. 6 feet is preferred adjacent to curb and gutter (5 feet is the minimum requirement) or 3 feet minimum/ 4 feet preferred wider than the gutter pan width.

E. Signage consists of an optional R81 (CA) sign, which must be placed at the beginning of each bike lane

and at major changes in direction. It should also be placed at every arterial street and at 1/2 mile intervals.

FURTHER CONSIDERATIONS

- On high speed streets (greater than or equal to 40 mph), it's recommended but not required that the minimum width for a bike lane should be 6 feet.

- On streets where bicyclists passing each other is to be expected, where high volumes of bicyclists are present, or where added comfort is desired, consider providing extra wide bike lanes up to 7 feet wide, or configure as a buffered bicycle lane.

- It may be desirable (but is not required) to reduce the width of general purpose travel lanes in order to add or widen bicycle lanes.

- On multi-lane and/or high speed streets, the most appropriate bicycle facility to provide for user comfort may be buffered bicycle lanes or physically separated bicycle lanes.

- It's required that bike lane word, symbol, and/or arrow markings (MUTCD Figure 9C-3) shall be placed outside of the motor vehicle tread path in order to minimize wear from the motor vehicle path (NACTO 2012).

Manhole Covers and Grates

- Manhole surfaces should be manufactured with a shallow surface texture in the form of a tight, nonlinear pattern

- If manholes or other utility access boxes are to be located in bike lanes within 50 feet of intersections or within 20 feet of driveways or other bicycle access points, special manufactured permanent nonstick surfaces are required to ensure a controlled travel surface for bicyclists breaking or turning.

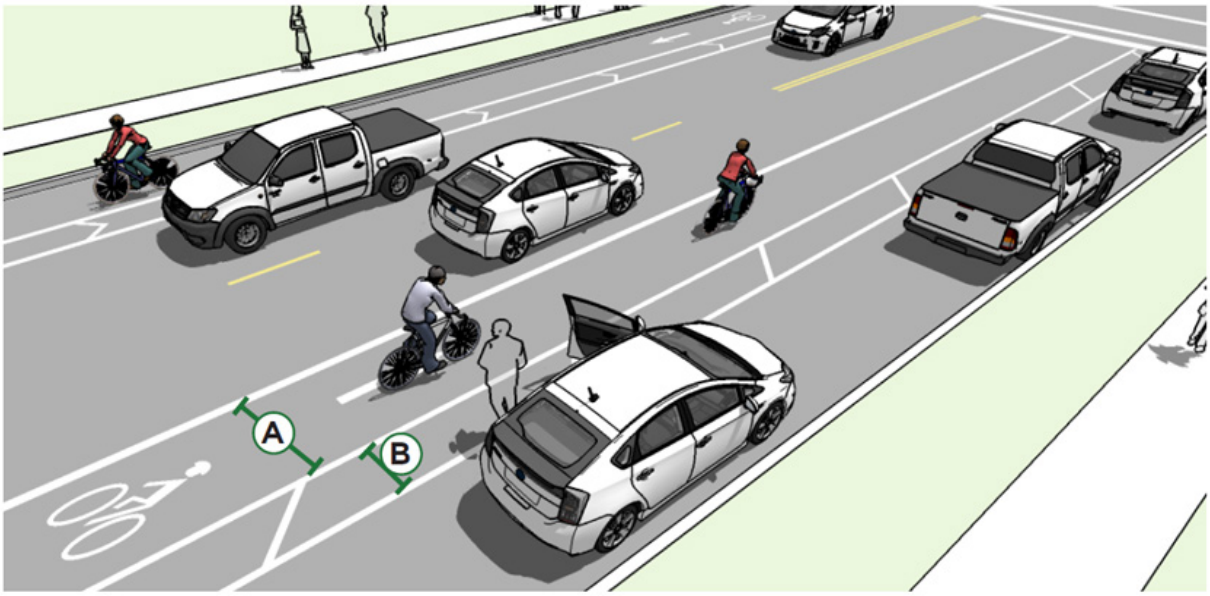
- Manholes, drainage grates, or other obstacles should be set flush with the paved roadway. Roadway surface inconsistencies pose a threat to safe riding conditions for bicyclists. Construction of manholes, access panels or other drainage elements will be constructed with no variation in the surface. The maximum allowable tolerance in vertical roadway surface will be 1/4 of an inch. Bicycle drainage grates must not have longitudinal slats that can catch a bicycle tire and potentially lead to a collision. The FHWA recommends grates that include bars or structures that run perpendicular to the direction of travel. Preferred designs include a hexagonal pattern and a transverse grate. Less preferred are modified longitudinal grates with no more than 6" between transverse supports.

Approximate Cost

- The cost for installing bicycle lanes will depend on the implementation approach. Typical costs are $5,000 to $40,000 per mile.

Buffered Bicycle Lanes (Class IIB)

Buffered bike lanes (Class IIB) are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane.



TYPICAL APPLICATION

- Anywhere a conventional bike lane is being considered.
- On streets with high speeds and high volumes or high truck volumes.
- On streets with extra lanes or lane width.
- Appropriate for skilled adult riders on most streets.

DESIGN FEATURES

A. The desired minimum bicycle travel area (not including buffer) is 5 feet wide, while the absolute minimum width is 4 feet (CA MUCTD).

B. Buffered area width must be at least 18 inches wide, but should be at least two feet wide. If buffered area is 4 feet or wider, white chevron or diagonal markings should be used (CA MUTCD 9C-104).

- For clarity at driveways or minor street crossings, dotted line (skip dashing) should be considered to identify path of bicycle travel but is not required.
- There is no standard for whether the buffer is configured on the parking side, the travel side, or a combination of both.

The use of pavement markings delineates space for bicyclists to ride in a comfortable facility.

FURTHER CONSIDERATIONS

- Color may be used but is not required within the lane to discourage motorists from entering the buffered lane.
- On multi-lane streets with high vehicles speeds, the most appropriate bicycle facility to provide for user comfort may be physically separated bike lanes.
- When space is limited, the National Cooperative Highway Research Program (NCHRP) Report #766 recommends installing a buffer space between the parking lane and bicycle lane rather than between the bicycle lane and vehicle travel lane.

Approximate Cost

- The cost for installing buffered bicycle lanes will depend on the implementation approach. Typical costs are $12,000 to $55,000 per mile. However, the cost of large-scale bicycle treatments will vary greatly due to differences in project specifications and the scale and length of the treatment.

Bike Route (Class III)

Bike Routes are facilities designated for bicycle travel. Bike routes can be either in-road facilities (where bicyclists share the travel lane with vehicles) or be visually separated facilities (where bicyclists ride on paved shoulder's adjacent to vehicular traffic). Bike routes should be accompanied by signs and appropriate markings to notify drivers.

TYPICAL APPLICATION

- Low volume roadways with limited roadway width and few intersections/driveways.

DESIGN FEATURES

Paved Shoulder Bike Route

- A paved shoulder should provide 4 to 6 feet for bicyclists. The absolute minimum allowable width is 2 feet when no obstructions are present.
- While not required, consider using contrasting paving materials between the paved shoulder and adjacent travel lanes to differentiate between the two.

FURTHER CONSIDERATIONS

Markings

- Wide solid white lines or buffer areas enhances the visual separation between shoulder and travel lane.
- While not required, if rumble strips are installed in the roadway, consider installing bicycle-friendly rumble strips. Ideal spacing should include 12 inch spacing (center-to-center), 6-8 inches long (perpendicular to roadway), 6 inches wide (measured parallel to roadway), and 3/8" deep, according to FHWA Technical Advisory 5040.39.

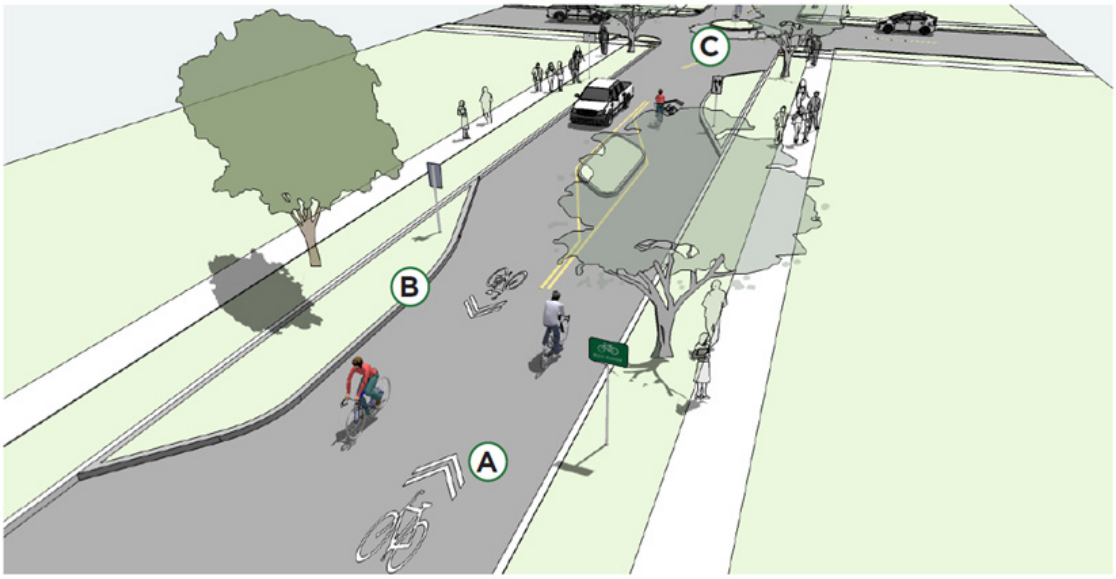
Signs

It's recommended that signs be used to alert road users of the designation of the shoulder or shared in-road facility.

- Bike Route Guide (D11-1c) signs are used to indicate to bicyclists that they are on a designated bikeway and alert motorists of the bike route.

Bicycle Boulevards (Class IIIB)

Bicycle boulevards (Class IIIB) are low-volume, low-speed streets modified to enhance bicyclist comfort by using treatments such as signage, pavement markings, traffic calming and/or traffic reduction, and intersection modifications. These treatments allow through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic.



TYPICAL APPLICATION

- Parallel with and in close proximity to major thoroughfares (1/4 mile or less).
- Follow a desire line for bicycle travel that is ideally long and relatively continuous (2-5 miles).
- Along routes that create sufficient network density of routes suitable for all ages and abilities.
- Avoid alignments with excessive zigzag or circuitous routing. The bikeway should have less than 10 percent out of direction travel compared to shortest path of primary corridor.
- Streets with travel speeds at 25 mph or less (20 mph recommended) and with traffic volumes of fewer than 1,500 vehicles per day.

DESIGN FEATURES

A. Signs and pavement markings are the minimum treatments necessary to designate a street as a bicycle boulevard.

B. Implement volume control treatments based on the context of the bicycle boulevard, using engineering judgment. Target motor vehicle volumes range from 1,000 to 1,500 vehicles per day.

C. Intersection crossings should be designed to enhance safety and minimize delay for bicyclists and pedestrians. Treatments should not be an attractor for vehicular access.

FURTHER CONSIDERATIONS

- Bicycle boulevards are typically located on streets without existing signalized accommodation at crossings of collector and arterial roadways. Without treatments for bicyclists and pedestrians, these intersections can become major barriers along the bicycle boulevard and compromise safety.

- Traffic calming can lower motorized vehicle speeds along bicycle boulevards and even deter motorists from driving on a street. Anticipate and monitor vehicle volumes on adjacent streets to determine whether traffic calming results in inappropriate volumes. Traffic calming can be implemented on a trial basis.

Approximate Cost

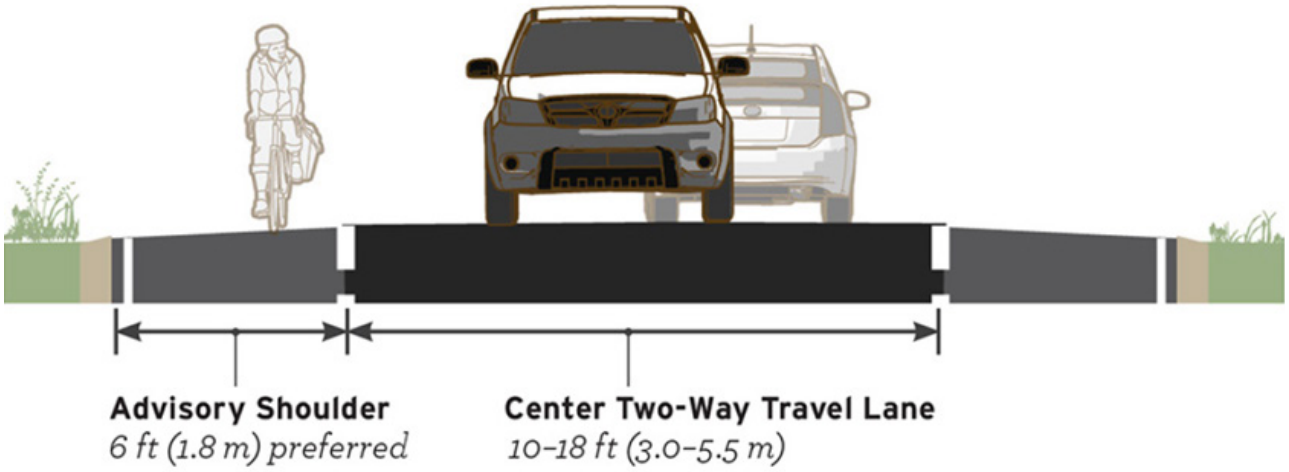
- Costs vary depending on the type of treatments proposed, and can range from $50,000 to $600,000. Simple treatments such as wayfinding signage and markings are most cost-effective, but more intensive treatments will have greater impact at reducing speeds and volumes, at a higher cost.

Bicycle boulevards are established on streets that improve connectivity to key destinations and provide a direct, low-stress route for bicyclists, with low motorized traffic volumes and speeds, designated and designed to give bicycle travel priority over other modes.

Neighborhood bikeways may require additional traffic calming measures to discourage through trips by motor vehicles.

Advisory Shoulder (Class III)

Advisory shoulders create usable shoulder for bicyclists and/or pedestrians on a roadway that is otherwise too narrow to accommodate one. The shoulder is delineated by pavement markings and optional pavement color. Motorists may only enter the shoulder when no bicyclists or pedestrians are present and must overtake these users with caution due to potential oncoming traffic. Width of the advisory shoulder should take preference over widening travel lanes. Wider travel lanes frequently encourage faster speeds, endangering pedestrians and bicyclists using the shoulder, as well as other drivers. Where applicable, travel lanes should be kept to 13.5 feet, with the remaining ROW dedicated to the Advisory Shoulder.



TYPICAL APPLICATION

- Low volume, low speed roadways with limited roadway width and few intersections/driveways.

DESIGN FEATURES

Advisory Shoulder

- Unlike a conventional shoulder, an advisory shoulder is a part of the traveled way, and it is expected that vehicles will regularly encounter meeting or passing situations where driving in the advisory shoulder is necessary and safe.

- The advisory shoulder space is a visually distinct area on the edge of the roadway, offering a prioritized space for people to bicycle and walk.

- The preferred width of the advisory shoulder space is 6 feet. Absolute minimum width is 4 feet when no curb and gutter is present.

- While not required, consider using contrasting paving materials between the advisory shoulder and center travel lane to differentiate between them and minimize unnecessary encroachment and reduce regular straddling of the advisory shoulder striping.

Two-Way Center Travel Lane

The two-way center travel lane is created from the remaining paved roadway space after the advisory shoulder has been accounted for.

- Preferred two-way center travel lane width is 13.5 to 16 feet, although may function with widths of 10 to 18 feet.

FURTHER CONSIDERATIONS

Markings

- A broken lane line used to delineate the advisory shoulder should consist of 3 feet line segments and 6 foot gaps between them.

- Where additional edge definition is desired, stripe a normal solid white edge line in addition to the broken advisory shoulder line.

- If the advisory shoulder is intended for bicycle use only, bicycle lane markings and green pavement can be used (but are not required) in a similar manner to conventional bicycle lanes.

- In general, do not mark a center line on the roadway. Short sections may be marked with center line pavement markings to separate opposing traffic flows at specified locations, such as around curves, over hills, on approaches to controlled intersections, and at bridges. At these locations, consider widening the paved roadway surface to provide space for paved bicycle-accessible shoulders and conventional width travel lanes.

Intersections

- Advisory shoulder designs work best on road segments without frequent stop or signal controlled intersections that require vehicles to stop within the roadway. The designer should strive to maintain the visual definition of the advisory shoulder through all driveways and street crossings, and provide a conventional shoulder at controlled intersections.

- At minor street crossings, use a dotted line extension on both sides of the advisory shoulder to maintain delineation of the advisory shoulder space.

- If contrasting pavement material is used to signify edge of shoulder, maintain the material through driveway crossings and minor intersections.

- Where the road is controlled by a stop sign or traffic signal, discontinue the advisory shoulder 50 feet in advance of the intersection. At these locations, provide a bicycle accessible paved shoulder outside of the full width travel lanes or design for operation as a shared roadway.

Signs

Use signs to warn road users of the special characteristics of the street. Potential signs for use with advisory shoulders include:

- Use an unmodified two-way traffic warning sign (W6-3) to clarify two-way operation of the road.
- Use a NO CENTER LINE warning sign (W8-12) to help clarify the unique striping pattern.
- Use a NO PARKING ON PAVEMENT (R8-1) to discourage parking within the advisory shoulder.

Accessibility

Advisory shoulders as described here are not intended for primary use by pedestrians. When advisory shoulders are intended for use by pedestrians, they should meet accessibility guidelines.

Implementation

In order to install advisory shoulders, an approved Request to Experiment is required as detailed in the MUTCD 2009, Sec. 1A.10. FHWA is also accepting requests for experimentation with a similar treatment called "dashed bicycle lanes".

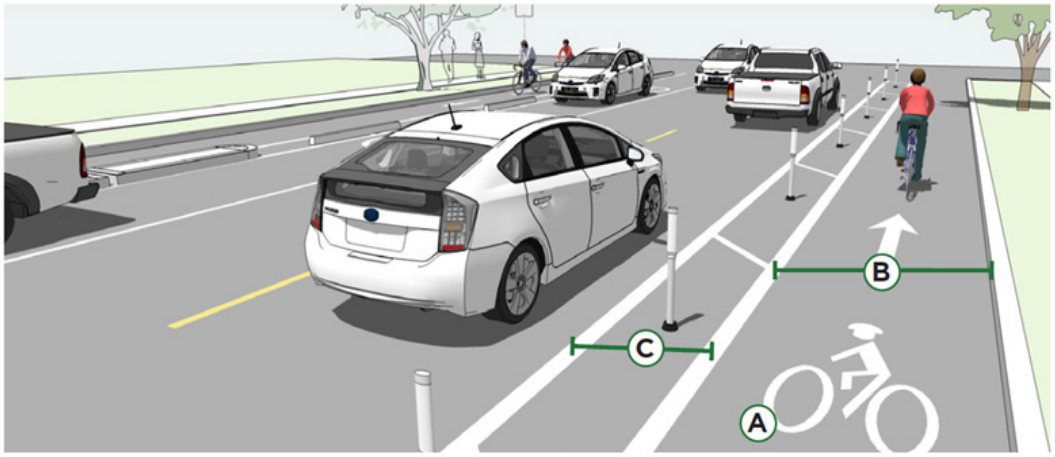
Signs can reduce potential confusion about the configuration of the roadway. Some local examples demonstrate the correct yielding procedures for drivers, pedestrians, and bicyclists.

The Federal Highway Administration's Small Town and Rural Guidelines recommends installing an unmodified two-way traffic warning sign (W6-3).

Separated Bikeways (Class IV)

Separated Bike Lanes (Class IV) have different forms but all share common elements—they provide space that is intended to be exclusively or primarily used for bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks. In situations where on-street parking is allowed they are located to the curb-side of the parking (in contrast to bike lanes).

Class IV bikeways may be at street level, at sidewalk level, or at an intermediate level. When retrofitting separated bikeways onto existing streets, a one-way street-level design may be most appropriate. This design provides protection through physical barriers and can include flexible delineators, curbs, on-street parking or other barriers (i.e. planters).



TYPICAL APPLICATION

- Street retrofit projects with limited funds for relocating curbs and drainage.
- Streets with high motor vehicle volumes and/or speeds and high bicycle volumes.
- Streets for which conflict at intersections can be effectively mitigated using parking lane setbacks, bicycle markings through the intersection, and other signalized intersection treatments.
- If buffer area is 4 feet or wider, white chevron or diagonal markings are recommended the intersection, and other signalized intersection treatments.
- Appropriate for most riders on most streets.

DESIGN FEATURES

A. Pavement markings, symbols and/or arrow markings must be placed at the beginning of the protected bikeway and at intervals along the facility (MUTCD 9C.04).

B. For a one-way cycle track, a 5 foot minimum width is required to allow for passing, with a 7 foot width preferred. For a two-way cycle track a 12 foot minimum width is desired, but an 8 foot minimum is required for constrained locations. (NACTO, 2012).

C. 3 foot minimum buffer width is required when adjacent to parking. For facilities adjacent to travel lanes, an 18 inch width is the minimum required. Channelizing devices (i.e. flex posts) should be placed in the buffer area (NACTO, 2012).

Protected Bikeways can be separated from the street with parking, planters, bollards, or other design elements.

FURTHER CONSIDERATIONS

- Protected bikeway buffers and barriers are covered in the MUTCD as preferential lane markings (section 3D.01) and channelizing devices (section 3H.01). Curbs may be used as a channeling device, see the section on islands (section 3I.01).

- A retrofit protected bikeway lane has a relatively low implementation cost compared to road reconstruction by making use of existing pavement and drainage and by using a parking lane as a barrier.

- Gutters, drainage outlets and utility covers should be designed and configured so to not impact bicycle travel.

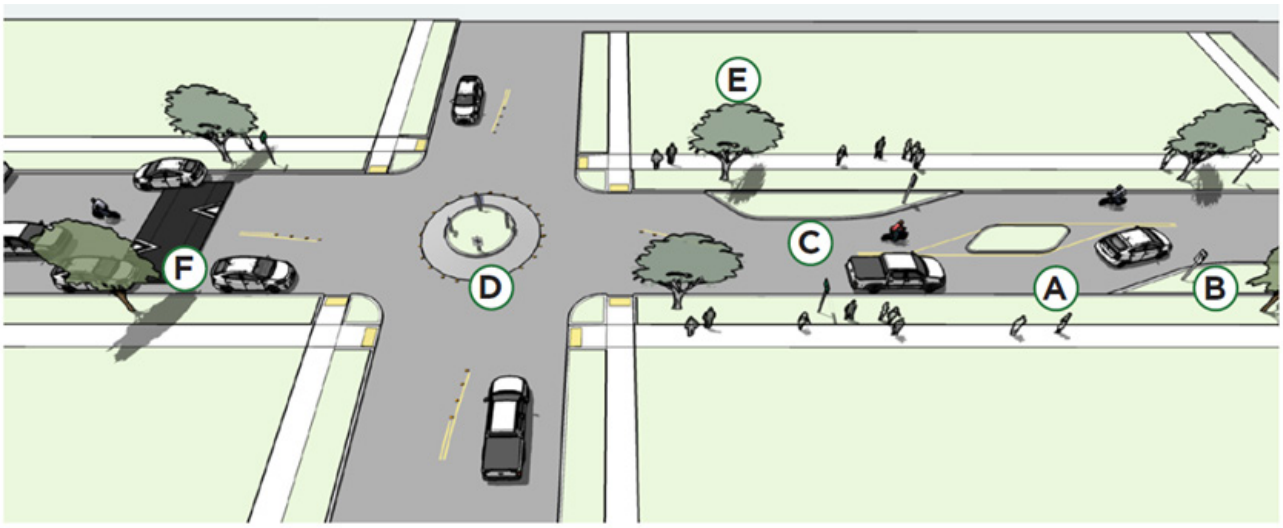
- Special consideration should be given at transit stops to manage bicycle and pedestrian interactions.

Approximate Cost

- The implementation cost is comparatively low if the project uses existing pavement and drainage, but the cost significantly increases if curb lines need to be moved. Typical costs range from $127,000 to $3,400,000. A parking lane is the low-cost option for providing a barrier. Other barriers might include concrete medians, bollards, tubular markers, or planters.

Traffic Calming Strategies

Traffic calming may include elements intended to reduce the speeds of motor vehicle traffic to be closer to bicyclist travel speeds, or may include design elements that restrict certain movements for motorized travel to discourage the use of bicycle boulevard corridors for through travel by automobiles. Traffic calming treatments can cause drivers to slow down by constricting the roadway space or by requiring careful maneuvering. Such measures may reduce the design speed of a street, and can be used in conjunction with reduced speed limits to reinforce the expectation of lowered speeds. They can also lower vehicle volumes by physically or operationally reconfiguring corridors and intersections along the route.



TYPICAL APPLICATION

- Use traffic calming to:
  - o Maintain an 85th percentile speed below 20 mph (25 mph maximum).
  - o Bring traffic volumes down to 1,500 cars per day (3,000 cars per day maximum). Bikeways with daily volumes above this limit should be considered for traffic calming measures.

DESIGN FEATURES

Speed Reduction

A. Median islands create a pinchpoint for traffic in the center of the roadway and offer shorter crossing distances for pedestrians when used in tandem with a marked crossing.

B. Chicanes slow drivers by requiring vehicles to shift laterally through narrowed lanes and reducing what would otherwise be uninterrupted sightlines.

C. Pinchpoints, chokers, or curb extensions restrict motorists from operating at high speeds on local streets by visually narrowing the roadway.

D. Neighborhood traffic circles reduce speed of traffic at intersections by requiring motorists to move cautiously through conflict points.

E. Street trees narrow a driver's visual field, subconsciously queuing drivers to slow down.

F. Maintain a minimum clear width of 14 feet with a constricted length of at least 20 feet in the direction of travel.

Volume Reduction

- Partial closure diverters allow bicyclists to proceed straight across the intersection but forces motorists to turn left or right. All turns from the major street onto the bikeway are prohibited. Curb extensions can be incorporated with stormwater management features and/or a mountable island.

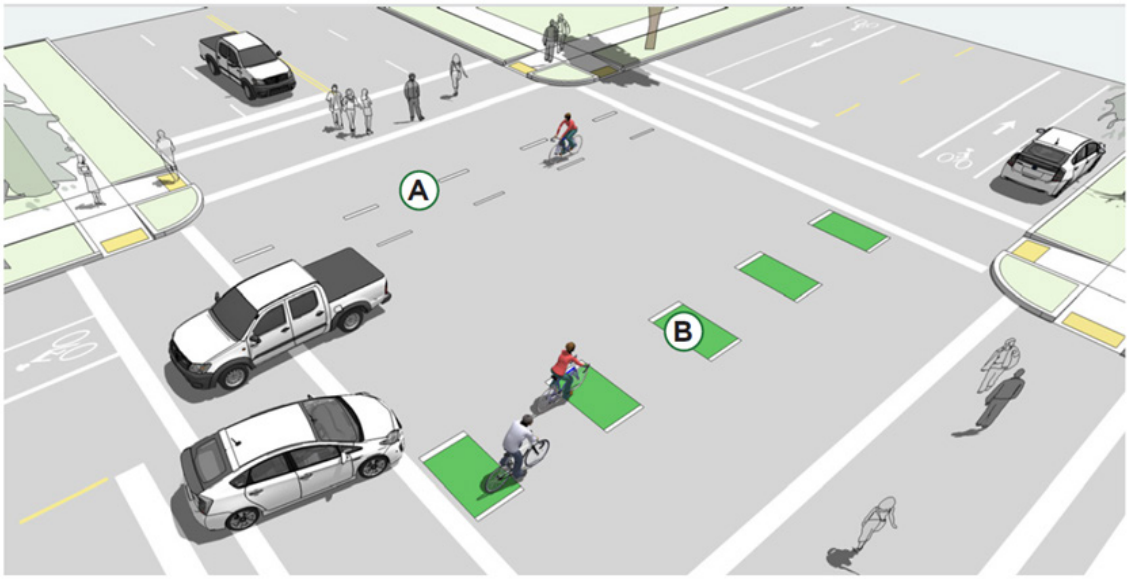
- Right-in/right-out diverters force motorists to turn right while bicyclists can continue straight through the intersection. The island can provide a through bike lane or bicycle access to reduce conflicts with right-turning vehicles. Left turns from the major street onto the bikeway are prohibited, while right turns are still allowed.

- Median refuge island diverters restrict through and left-turn vehicle movements along the bikeway while providing refuge for bicyclists to cross one direction of traffic at a time. This treatment prohibits left turns from the major street onto the bikeway, while right turns are still allowed.

- Full diverters block all motor vehicles from continuing on a neighborhood bikeway, while bicyclists can continue unrestricted. Full closures can be constructed to be accessible to emergency vehicles.

Bike Intersection Crossings

Bicycle pavement markings through intersections guide bicyclists on a safe and direct path through the intersection and provide a clear boundary between the paths of through bicyclists and vehicles in the adjacent lane.



TYPICAL APPLICATION

- Streets with conventional, buffered, or separated bike lanes.
- Streets with high volumes of adjacent traffic.
- Where potential conflicts exist between through bicyclist and adjacent traffic.

DESIGN FEATURES

A. Intersection markings should be the same width and in line with leading bike lane.

- Dotted lane line extensions should be 2 foot line segments with 2 to 6 foot gaps between them based on engineering judgments (CA MUTCD 3B.08).
- All markings must be white, skid resistant and retro reflective (CA MUTCD 9C.02.02).

B. Dotted white lines may be (but are not required to be) enhanced with solid green, or dashed green within the same extents as the dotted line itself.

Intersection crossing markings can be used at signalized intersections or high volume minor street and driveway crossings.

FURTHER CONSIDERATIONS

The National Committee on Uniform Traffic Control Devices has submitted a request to include additional options for bicycle lane extensions through intersections as a part of future MUTCD updates. Their proposal includes the following options for striping elements within the crossing:

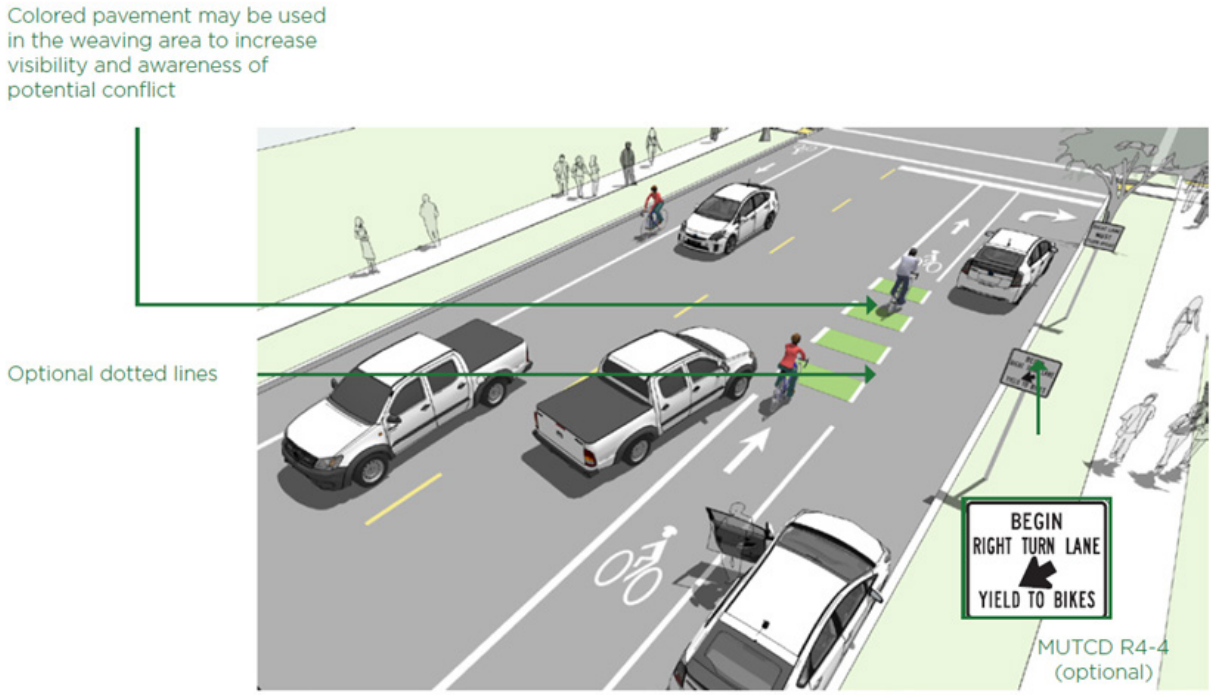
- Bicycle lane markings.
- Double chevron markings, indicating the direction of travel.
- Green colored pavement.

Approximate Cost

The cost for installing intersection crossing markings will depend on the implementation approach. On roadways with adequate width for reconfiguration or restriping, costs may be negligible when provided as part of routine overlay or repaving projects. Typical thermoplastic green markings (such as those shown at the intersection in the exhibit above) range from $8-15 per square foot depending on quantity.

Bike Lanes at Right-Turn Lanes

At right-turns, it's recommended that bike lanes be placed between the right-turn lane and the right-most through lane or, where right-of-way is insufficient, to use a shared bike lane/turn lane. The design (below) illustrates conflict markings in green, with signage indicating that motorists should yield to bicyclists through the conflict area.



TYPICAL APPLICATION

- Locations where vehicular traffic must cross over dedicated bike facilities to enter into a right-turn lane.
- At auxiliary right turn only lanes or where a through lane becomes a right turn only lane.

DESIGN FEATURES

- Continue existing bike lane width; standard width of 5 to 6 feet or 4 feet in constrained locations.
- Use R4-4 signage should be used to indicate that motorists should yield to bicyclists through the conflict area.
- Consider (but not required) use of colored conflict areas to promote visibility of the mixing zone.

Drivers wishing to enter the right turn lane must transition across the bicycle lane in advance of the turn.

FURTHER CONSIDERATIONS

- The bicycle lane maintains a straight path, and drivers must weave across, providing clear right-of-way priority to bicyclists.
- Maintaining a straight bicycle path reinforces the priority of bicyclists over turning cars. Drivers must yield to bicyclists before crossing the bike lane to enter the turn lane.
- Through lanes that become turn only lanes are difficult for bicyclists to navigate and should be avoided.
- The use of dual right-turn-only lanes should be avoided on streets with bike lanes (AASHTO, 2013). Where there are dual right-turn-only lanes, the bike lane should be placed to the left of both right-turn lanes; however, this merge is uncomfortable for most bicyclists. Keeping the bike lane to the right of the turn lanes is possible if a bicycle signal phase is implemented to separate bicyclists from right-turning vehicles.

Approximate Cost

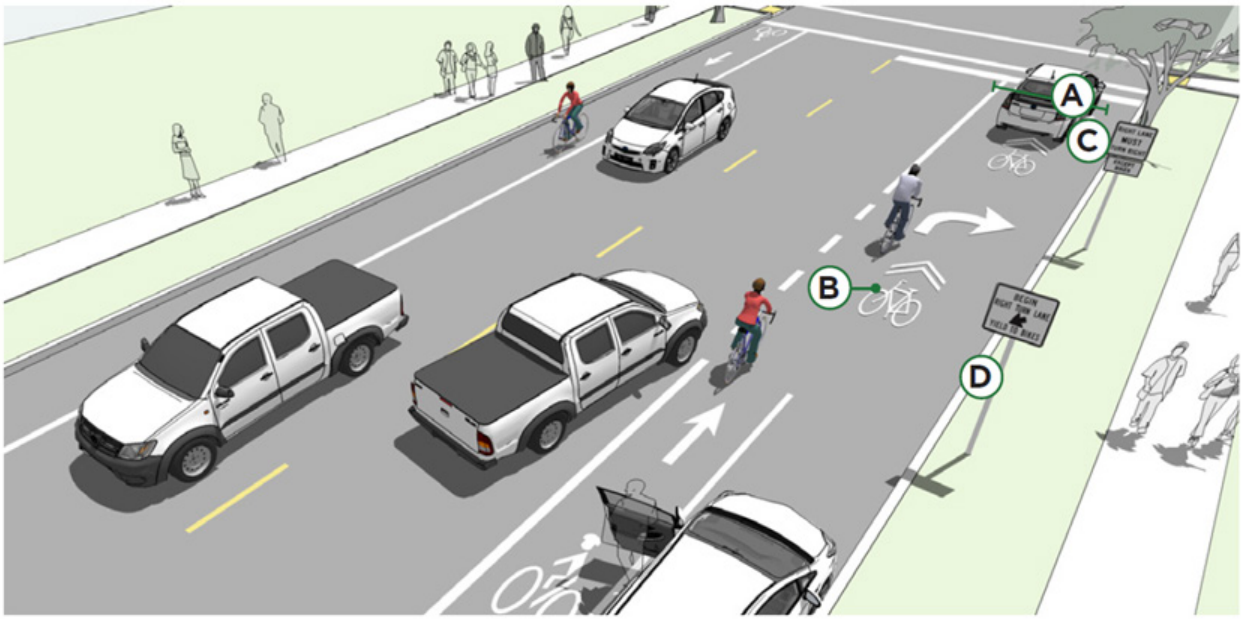
- The cost for installing bicycle lanes will vary depending on the implementation approach. On roadways with adequate width for reconfiguration or restriping, costs may be negligible when provided as part of routine overlay or repaving projects.

Materials and Maintenance

- Because the effectiveness of markings depends entirely on their visibility, maintaining the visibility of markings should be a high priority.

COMBINED BIKE LANE/TURN LANE

Where there isn't room for a conventional bicycle lane and turn lane, a combined bike lane/turn lane creates a shared lane where bicyclists can ride and turning motor vehicles yield to through traveling bicyclists. The combined bicycle lane/turn lane places shared lane markings within a right turn only lane.



TYPICAL APPLICATION

- Most appropriate in areas with lower posted speeds (25 MPH or less) and with lower traffic volumes.
- May not be appropriate for high speed arterials or intersections with long right turn lanes or for intersections with large percentages of right-turning vehicles.
- This treatment is recommended (but not required) at intersections lacking sufficient space to accommodate both a standard through bike lane and right turn lane.

DESIGN FEATURES

A. Maximum shared turn lane width is 13 feet; narrower is preferable (NACTO, 2012).

B. Shared Lane Markings should indicate preferred positioning of bicyclists within the combine lane.

C. A "Right Lane Must Turn Right" (CA MUTCD R3-7R) sign with an "EXCEPT BIKES" plaque may be needed to permit through bicyclists to use a right turn lane.

D. "Begin Right Turn Lane Yield To Bikes" signage (CA MUTCD R4-4) are recommended to indicate that motorists should yield to bicyclists through the conflict area.

- There should be a receiving bicycle lane or shoulder on the far side of the intersection.

Shared lane markings and signs indicate that bicyclists should ride on the left side of this right turn only lane.

FURTHER CONSIDERATIONS

- Combined bike lane/turn lane creates safety and comfort benefits by negotiating conflicts upstream of the intersection area.

Approximate Cost

- The cost for installing a combined bike/turn lane will depend on the implementation approach. On roadways with adequate width for reconfiguration or restriping, costs may be negligible when improvements are included as part of routine overlay or repaving projects. Some roadways can be retrofitted with simple shared lane markings and accompanying signage.

Materials and Maintenance

- Because the effectiveness of markings depends entirely on their visibility, maintaining the visibility of markings should be a high priority.

B: RECOMMENDED PROJECTS

Table B-1: Recommended Bicycle Facilities

Project (Road Name)	From	To	Project Type	Length (miles)
Academy Street	Lilac Street	Lower Sacramento Road	Class IIIB Bicycle Boulevard	0.15
Acampo Road	Lower Sacramento Road	Elliott Road	Class III Bicycle Route	6.99
Acampo Road	Clements Road	Cord Road	Class III Bicycle Route	3.24
Airport Way	Woodward Avenue	Nile Avenue	Class II Bicycle Lane	1.42
Airport Way	Performance Drive	Roth Road	Class III Bicycle Route	2.66
Airport Way	Nile Avenue	Kasson Road	Class III Bicycle Route	6.78
Alexandria Place	Benjamin Holdt Drive	Swain Road	Class IIIB Bicycle Boulevard	0.40
Alpine Avenue	Plymouth Road	Mission Road	Class IIB Buffered Bicycle Lane	0.66
Alpine Road	SR 12	Copperopolis Road	Class III Bicycle Route	12.08
Archerdale Road	Ketcham Lane	Front Street	Class III Bicycle Route	0.13
Atkins Road	Hwy 88	Brandt Road	Class III Bicycle Route	2.66
Austin Road	Moffat Boulevard	Austin Road	Class III Bicycle Route	4.70
Austin Road	Arch Road	French Camp Road	Class III Bicycle Route	4.15
Baker Road	Waterloo Road (SR 88)	Cox Road	Class III Bicycle Route	6.08
Balboa Avenue	Alexandria Place	Mosher Slough	Class IIIB Bicycle Boulevard	0.47
Bear Creek	Lower Sacramento Road	Eight Mile Road	Class I Shared-Use Path	3.65
W Benjamin Holt Drive	Plymouth Road	Pacific Avenue	Corridor Study	1.66
Bethany Road	Naglee Road	Corral Hollow Road	Class III Bicycle Route	0.55
Bethany Road	Byron Road	Naglee Road	Class III Bicycle Route	3.43
Brandt Road	Jack Tone Road	Clements Road	Class III Bicycle Route	3.97
Bruella Road	E Victor Road	Victor Elementary School	Class II Bicycle Lane	0.39
Bruella Road	Victor Elementary School	Liberty Road	Class III Bicycle Route	6.26
W Canal Road	Berry Avenue	Mac Arthur Drive	Class III Bicycle Route	4.21

Project (Road Name)	From	To	Project Type	Length (miles)
Carlin Road	Roberts Road	Crocker Road	Class III Bicycle Route	1.58
Central California Traction Railroad	Track line begins on Ketcham Lane	E to N Confer Road, SW to Alpine Road , W along Arata Road to Diverting Canal/ Cardinal Avenue	Class I Shared-Use Path	9.50
Cherokee Road	Sanguinetti Lane	Alpine Road	Class II Bicycle Lane	4.76
Cherokee Lane	Liberty Road	SR 99 Jahant Road Exit	Class III Bicycle Route	1.97
Chrisman Road	Linne Road	Durham Ferry Road	Class III Bicycle Route	2.00
S Chrisman Road	11th Street	Linne Road	Class II Bicycle Lane	3.00
Clements Road	Hwy 88	Comstock Road	Class III Bicycle Route	10.25
Clements Road	Brandt Road	-	Spot Improvement	-
Clements Road	Harney Lane	-	Spot Improvement	-
Collier Road E	N Linne Road	SR 88	Class III Bicycle Route	10.93
Copperopolis Road	Main Street	Escalon-Bellota Road	Class II Bicycle Lane	10.39
Cord Road	SR 12	Acampo Road	Class III Bicycle Route	1.76
Corral Hollow Road	Lammers Road	Tracy City Limits	Class III Bicycle Route	2.10
Corral Hollow Road*	Canal at Ponderosa Drive	Ellis Town Drive	Class I Shared-Use Path	0.62
Corral Hollow Road	Parkside Drive	Midway Drive	Class I Shared-Use Path	0.25
Corral Hollow Road*	Linne Road	Delta Mendota Canal	Class I Shared-Use Path	1.11
Cortez Avenue	Balboa Avenue	Thornton Road	Class IIIB Bicycle Boulevard	0.25
Country Club Boulevard	Pershing Avenue	Rainier Avenue	Class IIB Buffered Bicycle Lane	0.78
Country Club Boulevard	Pershing Avenue	-	Spot Improvement	-
County Hospital	El Dorado Street	South Loop Road	Class II Bicycle Lane	0.27
County Hospital - North Loop Road**	Cesar Chavez Road	South Loop Road	Class II Bicycle Lane	0.41
County Hospital - Cesar Chavez Road**	South Loop	North Loop	Class II Bicycle Lane	0.91

*This recommendation is located within the future expansion of the City of Tracy

**This recommendation is located on County Hospital grounds and the roadway is not maintained by the County

Project (Road Name)	From	To	Project Type	Length (miles)
County Hospital - Freedom Road**	South Loop	Mathews	Class II Bicycle Lane	0.11
Cox Road	Grace Street	Comstock Road	Class III Bicycle Route	1.49
Crocker Road	Undine Road	Carlin Road	Class III Bicycle Route	1.44
Davis Road	SR 12	Armstrong Road	Class III Bicycle Route	2.01
Devries Road	W Woodbridge Road	Armstrong Road	Class III Bicycle Route	7.07
S Delivery Drive	South Loop Road	Mathews Road	Class II Bicycle Lane	0.19
Dodds Road	Escalon-Bellota Road	County Limits	Class III Bicycle Route	4.01
Douglas Road	N Pershing Avenue	Pacific Avenue	Class IIIB Bicycle Boulevard	0.52
Duncan Road	Eight Mile Road	SR-26	Class III Bicycle Route	6.19
Durham Ferry Road	SR 33	Chrisman Road	Class III Bicycle Route	3.86
Durham Ferry Road	Durham Ferry Road	Airport Road	Class III Bicycle Route	2.14
Durham Ferry Road	Hwy 33	New Jerusalem Elementary	Class II Bicycle Lane	1.18
Eight Mile Road	Alpine Road	Tully Road	Class II Bicycle Lane	4.71
Eight Mile Road	N Tully Road	Duncan Road	Class III Bicycle Route	1.18
E Eight Mile Road	I-5	Alpine Rd	Class IIB Buffered Bicycle Lane	8.82
El Dorado Street	Stockton City Limits	County Hospital	Class II Bicycle Lane	0.76
El Rancho Road	Grant Line Road	California Avenue	Class II Bicycle Lane	0.23
Elliott Road	County Limits	SR 12	Class III Bicycle Route	6.81
Elm Street	Seventh Street	2nd Street	Class IIIB Bicycle Boulevard	0.26
Escalon-Bellota Road	SR 26	Escalon City Limits	Class III Bicycle Route	17.04
N Fine Road	E Comstock Road	Copperopolis Road	Class III Bicycle Route	4.93
N Flood Road	SR 26	Escalon-Bellota Road	Class III Bicycle Route	5.13
French Camp Road	Beginning of Street	SR 120	Class II Bicycle Lane	14.83
S Fresno Avenue	Washington Street	Scotts Avenue	Class II Bicycle Lane	0.38

**This recommendation is located on County Hospital grounds and the roadway is not maintained by the County

Project (Road Name)	From	To	Project Type	Length (miles)
E Front Street	Duncan Road	Archerdale Road	Class I Shared-Use Path	0.50
E Front Street	Duncan Road	N Ione Street	Class IIIB Bicycle Boulevard	0.49
Front Street	Ione Street	SR 26	Class I Shared-Use Path	0.57
Gettysburg Place	Lincoln Road	Douglas Road	Class IIIB Bicycle Boulevard	0.46
Ham Lane extension	Harney Lane	Hogan Road	Class II Bicycle Lane	0.49
Hansen Road	Grant Line Road	Schulte Road	Class III Bicycle Route	2.51
E Harding Way	Stanford Avenue	N Airport Way	Class IIIB Bicycle Boulevard	0.13
Harney Lane	Lower Sacramento Road	Jefferson Middle School	Class II Bicycle Lane	0.28
Harney Lane	Davis Road	Jefferson Middle School	Class III Bicycle Route	1.08
Harney Lane	Beckman Road	Clements Road	Class III Bicycle Route	9.75
Hillside Drive	Brandt Road	N Jack Tone Road	Class III Bicycle Route	0.99
Hogan Road Extension	Lower Sacramento Road	SR 99	Class I Shared-Use Path	2.72
Howard Road	Mathews Rd	Tracy Boulevard	Class IIB Buffered Bicycle Lane	10.03
Howard Road	Tracy Boulevard	-	Spot Improvement	-
Howard Road	Roberts Road	-	Spot Improvement	-
Jack Tone Road	West Ripon Road	Dawson Road	Class II Bicycle Lane	30.72
N Jack Tone Road	E Jack Tone Road	N Tully Road	Class IIIB Bicycle Boulevard	0.64
N Johnson Road	SR 12	Acampo Road	Class III Bicycle Route	1.74
Grant Line Road / Kasson Road	Chabot Court	Durham Ferry Road	Class III Bicycle Route	9.10
Kettleman Lane/SR 12	Davis Road	Lodi City Limits	Class IIB Buffered Bicycle Lane	1.26
Kettleman Lane	Cherokee Lane	Alpine Road	Class III Bicycle Route	2.47
W Kile Road	Thornton Road	N Ray Road	Class III Bicycle Route	3.20
Kirk Avenue	Del Rio Drive	Michigan Avenue	Class IIIB Bicycle Boulevard	0.60
S Koster Road	Hwy 33	Edna Court	Class II Bicycle Lane	0.63

Project (Road Name)	From	To	Project Type	Length (miles)
Lammers Road	Tracy Boulevard	Corral Hollow	Class II Bicycle Lane	0.36
S Lammers Road	West Side Irrigation Canal Bicycle Path	Tracy City Limits	Class II Bicycle Lane	1.22
Austin Road	French Camp Road	Moffat Boulevard	Class II Bicycle Lane	5.35
Liberty Road	Lower Sacramento Road	SR 88	Class III Bicycle Route	13.05
Lilac Street	Mokelumne Street	Academy Street	Class IIIB Bicycle Boulevard	0.32
Linne Road	Corral Hollow Road	S MacArthur Drive	Class IV Separated Bikeway	1.00
Linne Road	MacArthur Drive	S Chrisman Road	Class II Bicycle Lane	1.01
Live Oak Road	Alpine Road	N Tully Road	Class III Bicycle Route	2.47
Lone Tree Road	Jack Tone Road	Escalon-Bellota Road	Class III Bicycle Route	8.03
Lower Sacramento Road	Eight Mile Road	Lodi City Limits	Class II Bicycle Lane	3.08
Lower Sacramento Road	Woodbridge Road	450 Ft South of Academy Street	Class II Bicycle Lane	0.87
Lower Sacramento Road	1320 ft South of E Woodson Road	-	Spot Improvement	-
MacArthur Drive	E Mt Diablo	Linne Road	Class II Bicycle Lane	1.10
N MacArthur Drive	W Canal Drive	I-5	Class III Bicycle Route	1.42
Mackville Road	Collier Road E	SR 12/88	Class III Bicycle Route	1.24
E Jahant Road	N Tully Road	Collier Road E	Class III Bicycle Route	2.67
Main Street	Bird Avenue	Copperopolis Road	Class III Bicycle Route	1.52
E Main Street	SR 99	Bird Avenue	Class II Buffered Bicycle Lane	1.35
Manteca Road	Rina Drive	W Ripon Road	Class III Bicycle Route	1.64
Manthey Road	Stockton City Limits	Lathrop City Limits	Class II Bicycle Lane	4.27
E Mariposa Road	E Charter Way	E Munford Avenue	Class II Bicycle Lane	2.15
Mathews Road	Manthey Road	Howard Road	Class II Bicycle Lane	0.76
McHenry Avenue	E Narcissus Way	River Road	Class II Bicycle Lane	1.57
Michigan Avenue	Rainer Avenue	Grange Avenue	Class III Bicycle Route	1.90

Project (Road Name)	From	To	Project Type	Length (miles)
Mills Avenue	Harney Lane	Hogan Road	Class II Bicycle Lane	0.48
Milton Road	Fine Road	Escalon-Bellota Road	Class III Bicycle Route	2.69
Mission Road	River Drive	S Tuxedo Avenue	Class IIIB Bicycle Boulevard	0.98
Morada Lane	Fox Creek Drive	West Lane	Class II Bicycle Lane	0.75
Mountain House Parkway	Byron Road	West Side Irrigation Canal	Class I Bicycle Route	2.01
Munford Avenue	99 Frontage Road	Mariposa Road	Class II Bicycle Lane	0.51
Murphy Road	French Camp Road	E River Road	Class III Bicycle Route	3.04
Murphy Road	E River Road	E Milgeo Avenue	Class II Bicycle Lane	1.01
Naglee Road	Bethany Road	Bethany Road	Class III Bicycle Route	0.16
Nile Avenue	Oleander Avenue	Union Road	Class II Bicycle Lane	1.00
N Pacific Avenue	W Benjamin Holt Drive	Douglas Road	Corridor Study	0.20
Paradise Road	Old River	I-5	Class III Bicycle Route	2.68
Peltier Road	Ray Road	Lower Sacramento Road	Class III Bicycle Route	4.23
Planned N/S Arterial*	Sargent Road	Harney Lane	Class II Bicycle Lane	2.00
N Ray Road	W Kile Road	W Woodbridge Road	Class III Bicycle Route	3.00
Raymus Parkway**	Union Road	SR 99	Class I Shared-Use Path	4.98
E River Road	N Ripon Road	County Limits	Class II Bicycle Lane	11.65
Roberts Road*	SR 4	Carlin Road	Class III Bicycle Route	5.56
Roth Road Extension**	S Airport Way	SR 99	Class I Shared-Use Path	1.76
N Sacramento Boulevard	New Hope Road	Thornton Road	Class IIIB Bicycle Boulevard	0.41
Santa Fe Road	Escalon City Limits	County Limits	Class II Bicycle Lane	4.07
Santos Avenue	N Ripon Road	Murphy Road	Class I Shared-Use Path	1.01

*This planned arterial is located between North Davis Road and Lower Sacramento Road from Harney Lane to West Lodi Avenue and within the future expansion of the City of Lodi

**This recommendation is located within the future expansion of the City of Manteca

Project (Road Name)	From	To	Project Type	Length (miles)
Sargent Road	Davis Road	Lower Sacramento Road	Class II Bicycle Lane	1.51
Sedan Avenue	Tinnin Road	Manteca Road	Class II Bicycle Lane	0.50
E Shelton Road	Escalon-Bellota Road	N Shelton Road	Class III Bicycle Route	3.94
Sonora Street	Fresno Avenue	Venture Avenue	Class II Bicycle Lane	0.29
SR 4	Stockton City Limits	County Limits	Corridor Study	17.71
SR 12	SR 88	County Limits	Corridor Study	4.46
SR 12	Beckman Road	SR 88	Corridor Study	5.10
SR 12	Athearn Street	6th Street	Class II Bicycle Lane	0.52
SR 12	Davis Road	County Limits	Corridor Study	13.52
SR 26	Ione Street	Flood Road	Class II Bicycle Lane	0.55
SR 26	Diverting Canal Levee	County Limits	Corridor Study	18.49
SR 88	Locke Road	Cherry Street	Class II Bicycle Lane	0.67
SR 88	Wilmarth Road	County Limits	Corridor Study	23.83
SR 99 Frontage Road / Rail Spur*	Manteca City Limits	North Cherokee Road	Class II Bicycle Lane	17.86
SR 120	Manteca City Limits	County Limits	Corridor Study	11.88
E Stampede Road	Atkins Road	Clements Road	Class III Bicycle Route	1.02
Stockton Diverting Canal	Cherokee Road	Main Street	Class I Shared-Use Path	3.30
Swain Road	Harrisburg Place	Plymouth Road	Class II Bicycle Lane	0.86
Thornton Road	Midsection Road	Sacramento Boulevard	Class III Bicycle Route	0.39
Thornton Road	Eight Mile Road	County Limits	Class II Bicycle Lane	15.16
Thornton Road	Mac Duff Avenue	Stockton City Limits	Class II Bicycle Lane	0.29
Thornton Road	Sacramento Road and Oak Road	-	Spot Improvement	-
Tidewater Bikeway	Brunswick Road	French Camp Road	Class I Shared-Use Path	1.87

*This recommendation includes multiple, disconnected sections of the same roadway, and mileage reflects only sections falling within unincorporated County.

Project (Road Name)	From	To	Project Type	Length (miles)
Tinnin Road	Woodward Avenue	Sedan Avenue	Class II Bicycle Lane	2.50
Tracy Boulevard	SR 4	Lammers Road	Class II Bicycle Lane	8.05
E Peltier Road	Elliott Road	N Tully Road	Class III Bicycle Route	2.42
N Tully Road	E Juniper Avenue	Comstock Road	Class III Bicycle Route	7.78
N Tully Road	Peltier Road	E Jahant Road	Class III Bicycle Route	0.62
N Tully Road	E Juniper Avenue	Main Street (SR 88)	Class IIIB Bicycle Boulevard	0.80
Undine Road	Crocker Road	Howard Road	Class III Bicycle Route	2.97
Union Road	Manteca City Limits	Nile Avenue	Class II Bicycle Lane	1.04
Union Road	Nile Avenue	W Ripon Road	Class III Bicycle Route	1.07
Valpico Road	Corral Hollow Road	Existing Class II	Class II Bicycle Lane	1.80
S Van Allen Road	SR 120	Lone Tree Road	Class II Bicycle Lane	2.00
Van Allen Road	SR 120	River Road	Class III Bicycle Route	2.78
E Victor Road	N Guild Avenue	Kroll Road	Class IIB Buffered Bicycle Lane	3.28
Von Sosten Road	Grunauer Road	Mountain House Parkway	Class II Bicycle Lane	1.76
Wall Road	Comstock Road	SR 26	Class III Bicycle Route	1.42
Walnut Grove Road	Thornton	County Limits	Class III Bicycle Route	4.47
N Ward Road	Elliott Road	Acampo Road	Class III Bicycle Route	0.21
Waterloo Road	E Street	Wilmarth Road	Corridor Study	2.67
West Lane*	Harding Way	Eight Mile Road	Class IV Separated Bikeway	2.02
West Lane	Eight Mile Road	1000 ft South of Harney Lane	Class IIB Buffered Bicycle Lane	3.19
W Ripon Road	Airport Way	Jack Tone Road	Class III Bicycle Route	6.02
West Side Irrigation Canal Bicycle Path	Mountain House Parkway, 700 ft North of Von Sosten Road	Lammers Road at W Schulte Road	Class I Shared-Use Path	3.83
Wolfe Road	French Camp Road	Howard Road	Class III Bicycle Route	1.27

*This recommendation includes multiple, disconnected sections of the same roadway, and mileage reflects only sections falling within unincorporated County.

Project (Road Name)	From	To	Project Type	Length (miles)
W Woodbridge Road / Mokelumne Street	Woodbridge Road and Thornton Road	Mokelumne Street and Lower Sacramento Road	Class III Bicycle Route	5.44
Woodbridge Irrigation Canal	Elm Street	Woodbridge Road	Class I Shared-Use Path	2.06
Woodhaven Lane	Chestnut Street and Mokelumne	Woodhaven Lane and Turner Road	Class II Bicycle Lane	0.71
Woodward Avenue	Pagola Avenue	Laurie Avenue	Class II Bicycle Lane	0.70
Woodward Avenue	Bella Terra Drive	Oleander Avenue	Class II Bicycle Lane	0.80
			Total	645.11

C: PRIORITIZATION MATRIX

Table C-1: Project Prioritization Results

Location Name	Project Type	Safety	Connectivity	Demand	Feasibility/Cost	Equity	Community Priorities	Competitiveness	Final Score
High Priority Projects									
		Scores							
Academy Street	Class IIIB Bicycle Boulevard	0	1	1	1	0	1	0	4
Alexandria Place	Class IIIB Bicycle Boulevard	0	1	1	1	1	0	0	4
Alpine Avenue	Class IIB Buffered Bicycle Lane	1	0	1	1	1	0	1	5
Central California Traction Railroad	Class I Shared-Use Path	0	1	0	0	1	1	1	4
Country Club Boulevard	Class IIB Buffered Bicycle Lane	0	1	1	1	1	1	1	6
Douglas Road	Class IIIB Bicycle Boulevard	1	1	1	1	1	0	0	5
E Front Street	Class I Shared-Use Path	0	1	1	0	0	1	1	4
E Harding Way	Class IIIB Bicycle Boulevard	1	1	1	0	1	0	0	4
E Main Street	Class IIB Buffered Bicycle Lane	1	1	1	0	1	1	0	5
E River Road	Class II Bicycle Lane	1	1	0	0	1	1	0	4
El Rancho Road	Class II Bicycle Lane	0	1	1	0	0	1	1	4
Gettysburg Place	Class IIIB Bicycle Boulevard	0	1	1	1	1	0	0	4
Kirk Avenue	Class IIIB Bicycle Boulevard	0	1	1	1	1	0	0	4
Lilac Street	Class IIIB Bicycle Boulevard	0	1	1	1	0	1	0	4
Linne Road	Class IV Separated Bikeway	0	1	1	0	0	1	1	4
Lower Sacramento Road	Class II Bicycle Lane	1	0	1	1	0	1	0	4
Lower Sacramento Road	Class II Bicycle Lane	1	0	1	1	0	1	0	4
McHenry Avenue	Class II Bicycle Lane	0	1	1	1	0	1	0	4
Michigan Avenue	Class III Bicycle Route	0	1	1	1	1	0	0	4
Mission Road	Class IIIB Bicycle Boulevard	1	0	1	1	0	1	1	5
N Jack Tone Road	Class IIIB Bicycle Boulevard	0	1	1	1	0	1	0	4
N Pacific Avenue	Corridor Study	1	1	1	0	1	0	0	4
N Sacramento Boulevard	Class IIIB Bicycle Boulevard	0	1	0	0	1	1	1	4
N Tully Road	Class IIIB Bicycle Boulevard	0	1	1	1	0	1	0	4
S Fresno Avenue	Class II Bicycle Lane	0	1	1	1	1	0	1	5
Sonora Street	Class II Bicycle Lane	0	1	1	1	1	0	1	5
Thornton Road	Class II Bicycle Lane	1	1	1	1	0	1	0	5
Thornton Road*	Class II Bicycle Lane	1	1	1	1	0	1	0	5

*Same corridor containing two separate projects

Location Name	Project Type	Safety	Connectivity	Demand	Feasibility/Cost	Equity	Community Priorities	Competitiveness	Final Score
High Priority Projects									
	Scores								
W Benjamin Holt Drive	Corridor Study	1	1	1	1	1	0	1	6
Waterloo Road	Corridor Study	1	1	1	0	1	0	0	4
West Lane	Class IIB Buffered Bicycle Lane	0	1	1	0	0	1	1	4
West Lane*	Class IV Separated Bikeway	1	0	1	0	1	0	1	4
Woodbridge Irrigation Canal	Class I Shared-Use Path	0	1	1	0	0	1	1	4
Medium Priority Projects									
	Scores								
Airport Way	Class II Bicycle Lane	0	1	0	0	1	1	0	3
Airport Way*	Class III Bicycle Route	0	1	0	0	1	1	0	3
Airport Way*	Class III Bicycle Route	0	1	0	0	1	1	0	3
Alpine Road	Class III Bicycle Route	0	0	0	0	1	1	0	2
Archerdale Road	Class III Bicycle Route	0	1	0	0	0	1	0	2
Austin Road	Class III Bicycle Route	0	1	0	0	1	0	0	2
Austin Road *	Class III Bicycle Route	0	1	0	0	1	0	0	2
Austin Road *	Class II Bicycle Lane	0	1	0	0	1	0	0	2
Balboa Avenue	Class IIIB Bicycle Boulevard	0	1	1	1	0	0	0	3
Bear Creek	Class I Shared-Use Path	0	1	0	0	1	1	0	3
Bruella Road	Class III Bicycle Route	0	1	0	0	0	1	0	2
Cherokee Road	Class II Bicycle Lane	1	0	1	0	1	0	0	3
Clements Road at Brandt Road	Spot Improvement	1	0	0	0	0	1	0	2
Clements Road at Harney Lane	Spot Improvement	1	0	0	0	0	1	0	2
Cord Road	Class III Bicycle Route	0	1	0	0	0	1	0	2
Corral Hollow Road	Class I Shared-Use Path	0	0	1	0	0	1	0	2
Corral Hollow Road*	Class I Shared-Use Path	0	0	1	0	0	1	0	2
Corral Hollow Road*	Class I Shared-Use Path	0	0	1	0	0	1	0	2
Cortez Avenue	Class IIIB Bicycle Boulevard	0	1	1	1	0	0	0	3
Country Club Boulevard	Spot Improvement	1	0	1	0	0	1	0	3
County Hospital	Class II Bicycle Lane	0	1	1	0	1	0	0	3

*Same corridor containing two separate projects

Medium Priority Projects									
Location Name	*Project Type*	Safety	Connectivity	Demand	Feasibility/Cost	Equity	Community Priorities	Competitiveness	Final Score
		Scores							
County Hospital - Cesar Chavez Road	Class II Bicycle Lane	0	1	1	0	0	0	0	2
Devries Road	Class III Bicycle Route	0	1	0	0	0	1	0	2
Duncan Road	Class III Bicycle Route	0	1	0	0	0	1	0	2
E Eight Mile Road	Class IIB Buffered Bicycle Lane	1	0	1	0	1	0	0	3
E Front Street	Class IIIB Bicycle Boulevard	0	1	1	1	0	0	0	3
E Mariposa Road	Class II Bicycle Lane	1	0	1	0	1	0	0	3
E Victor Road	Class IIB Buffered Bicycle Lane	1	1	0	0	0	1	0	3
El Dorado Street	Class II Bicycle Lane	0	1	1	0	1	0	0	3
Elm Street	Class IIIB Bicycle Boulevard	0	0	1	1	1	0	0	3
Escalon-Bellota Road	Class III Bicycle Route	0	0	0	0	1	1	0	2
French Camp Road	Class II Bicycle Lane	0	0	1	0	1	0	0	2
Front Street	Class I Shared-Use Path	0	1	0	0	0	1	0	2
Grant Line Road / Kasson Road	Class III Bicycle Route	0	1	1	0	0	0	0	2
Harney Lane	Class II Bicycle Lane	0	1	0	0	1	0	0	2
Harney Lane*	Class III Bicycle Route	0	1	0	0	1	0	0	2
Harney Lane*	Class III Bicycle Route	0	1	0	0	1	0	0	2
Howard Road at Tracy Boulevard	Spot Improvement	1	0	0	0	0	1	0	2
Howard Road at Roberts Road	Spot Improvement	1	0	0	0	0	1	0	2
Kettleman Lane	Class III Bicycle Route	0	1	1	0	0	1	0	3
Kettleman Lane/SR 12*	Class IIB Buffered Bicycle Lane	0	1	0	1	0	0	0	2
Liberty Road	Class III Bicycle Route	1	0	0	0	0	1	0	2
Linne Road	Class II Bicycle Lane	0	1	1	0	0	0	0	2
Lower Sacramento Road	Spot Improvement	1	1	0	0	0	1	0	3
Main Street	Class III Bicycle Route	0	1	1	0	1	0	0	3
Morada Lane	Class II Bicycle Lane	1	1	1	0	0	0	0	3
Munford Avenue	Class II Bicycle Lane	0	1	0	0	1	0	0	2

*Same corridor containing two separate projects

Location Name	Project Type	Safety	Connectivity	Demand	Feasibility/Cost	Equity	Community Priorities	Competitiveness	Final Score
Medium Priority Projects									
		Scores							
Murphy Road	Class II Bicycle Lane	0	1	1	0	0	0	0	2
Nile Avenue	Class II Bicycle Lane	0	1	0	0	1	0	0	2
Paradise Road	Class III Bicycle Route	0	0	0	0	1	1	0	2
Peltier Road	Class III Bicycle Route	0	1	0	0	0	1	0	2
Raymus Parkway	Class I Shared-Use Path	0	0	0	0	1	1	0	2
Roth Road Extension	Class I Shared-Use Path	0	0	0	0	1	1	0	2
S Chrisman Road	Class II Bicycle Lane	0	1	1	0	1	0	0	3
S Lammers Road	Class II Bicycle Lane	0	1	0	0	0	1	1	3
S Van Allen Road	Class II Bicycle Lane	0	1	0	0	1	0	0	2
Santos Avenue	Class I Shared-Use Path	0	1	1	0	0	0	0	2
SR 12	Class II Bicycle Lane	0	1	0	0	0	1	1	3
SR 26	Class II Bicycle Lane	0	1	1	0	0	0	1	3
SR 88	Class IIIB Bicycle Boulevard	0	1	1	0	0	0	1	3
SR 88*	Corridor Study	0	0	0	1	1	0	1	3
Stockton Diverting Canal	Class I Shared-Use Path	0	1	0	0	1	1	0	3
Swain Road	Class II Bicycle Lane	0	1	1	0	1	0	0	3
Thornton Road	Spot Improvement	1	0	1	0	0	1	0	3
Thornton Road	Class III Bicycle Route	0	1	1	0	0	1	0	3
Tidewater Bikeway	Class I Shared-Use Path	0	1	0	0	1	1	0	3
Tinnin Road	Class II Bicycle Lane	0	1	0	0	1	1	0	3
Union Road	Class II Bicycle Lane	0	1	0	0	1	1	0	3
Valpico Road	Class II Bicycle Lane	0	0	0	0	1	1	0	2
Von Sosten Road	Class II Bicycle Lane	0	1	1	0	1	0	0	3
W Canal Road	Class III Bicycle Route	0	0	0	0	1	1	0	2
W Ripon Road	Class III Bicycle Route	0	0	0	0	1	1	0	2
W Woodbridge Road / Mokelumne Street	Class III Bicycle Route	0	1	1	0	0	1	0	3
Walnut Grove Road	Class III Bicycle Route	0	1	0	0	0	0	1	2
Woodhaven Lane	Class II Bicycle Lane	0	1	1	1	0	0	0	3
Woodward Avenue	Class II Bicycle Lane	0	1	0	0	1	1	0	3
Woodward Avenue*	Class II Bicycle Lane	0	1	0	0	1	1	0	3

*Same corridor containing two separate projects

Low Priority Projects										
Location Name	*Project Type*	*Scores*								
		Safety	Connectivity	Demand	Feasibility/Cost	Equity	Community Priorities	Competitiveness	Final Score
Acampo Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Acampo Road *	Class III Bicycle Route	0	0	0	0	0	1	0	1
Atkins Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Baker Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Bethany Road	Class III Bicycle Route	0	0	0	0	1	0	0	1
Bethany Road*	Class III Bicycle Route	0	0	0	0	1	0	0	1
Brandt Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Bruella Road	Class II Bicycle Lane	0	1	0	0	0	0	0	1
Carlin Road	Class III Bicycle Route	0	0	0	0	1	0	0	1
Cherokee Lane	Class III Bicycle Route	0	0	0	0	0	1	0	1
Chrisman Road	Class III Bicycle Route	0	1	0	0	0	0	0	1
Clements Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Collier Road E	Class III Bicycle Route	0	0	0	0	0	1	0	1
Copperopolis Road	Class II Bicycle Lane	0	0	0	0	1	0	0	1
Corral Hollow Road	Class III Bicycle Route	0	0	0	0	1	0	0	1
County Hospital - Freedom Road**	Class II Bicycle Lane	0	0	0	0	1	0	0	1
County Hospital - North Loop Road**	Class II Bicycle Lane	0	0	0	0	1	0	0	1
Cox Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Crocker Road	Class III Bicycle Route	0	0	0	0	1	0	0	1
Davis Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Dodds Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Durham Ferry Road	Class III Bicycle Route	0	0	0	0	0	0	0	0
Durham Ferry Road *	Class III Bicycle Route	0	0	0	0	0	0	0	0
Durham Ferry Road *	Class II Bicycle Lane	0	1	0	0	0	0	0	1
E Jahant Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
E Peltier Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
E Shelton Road	Class III Bicycle Route	0	0	0	0	0	1	0	1

*Same corridor containing two separate projects

Location Name	Project Type	Safety	Connectivity	Demand	Feasibility/Cost	Equity	Community Priorities	Competitiveness	Final Score
Low Priority Projects									
		Scores							
E Stampede Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Eight Mile Road	Class II Bicycle Lane	0	0	0	0	0	1	0	1
Eight Mile Road *	Class III Bicycle Route	0	0	0	0	0	1	0	1
Elliott Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Ham Lane extension	Class II Bicycle Lane	0	0	0	0	0	0	0	0
Hansen Road	Class III Bicycle Route	0	0	0	0	1	0	0	1
Hillside Drive	Class III Bicycle Route	0	0	0	0	0	1	0	1
Hogan Road Extension	Class I Shared-Use Path	0	0	1	0	0	0	0	1
Howard Road	Class IIB Buffered Bicycle Lane	0	0	0	0	1	0	0	1
Jack Tone Road	Class II Bicycle Lane	0	0	0	0	1	0	0	1
Lammers Road	Class II Bicycle Lane	0	0	0	0	1	0	0	1
Live Oak Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Lone Tree Road	Class III Bicycle Route	0	0	0	0	1	0	0	1
MacArthur Drive	Class II Bicycle Lane	0	0	0	0	1	0	0	1
Mackville Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Manteca Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Manthey Road	Class II Bicycle Lane	0	0	0	0	1	0	0	1
Mathews Road	Class II Bicycle Lane	0	0	0	0	1	0	0	1
Mills Avenue	Class II Bicycle Lane	0	0	0	0	0	0	0	0
Milton Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Mountain House Parkway	Class I Shared-Use Path	0	0	0	0	1	0	0	1
Murphy Road	Class III Bicycle Route	0	0	0	0	0	0	0	0
N Fine Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
N Flood Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
N Johnson Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
N MacArthur Drive	Class III Bicycle Route	0	0	0	0	0	1	0	1
N Ray Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
N Tully Road	Class III Bicycle Route	0	0	0	0	0	1	0	1

*Same corridor containing two separate projects

Location Name	Project Type	Safety	Connectivity	Demand	Feasibility/Cost	Equity	Community Priorities	Competitiveness	Final Score
Low Priority Projects									
		Scores							
N Tully Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
N Ward Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Naglee Road	Class III Bicycle Route	0	0	0	0	1	0	0	1
Planned N/S Arterial*	Class II Bicycle Lane	0	1	0	0	0	0	0	1
Roberts Road*	Class III Bicycle Route	0	0	0	0	1	0	0	1
S Delivery Drive	Class II Bicycle Lane	0	0	0	0	1	0	0	1
S Koster Road	Class II Bicycle Lane	0	1	0	0	0	0	0	1
Santa Fe Road	Class II Bicycle Lane	0	0	0	0	1	0	0	1
Sargent Road	Class II Bicycle Lane	0	1	0	0	0	0	0	1
Sedan Avenue	Class II Bicycle Lane	0	0	0	0	1	0	0	1
SR 12	Corridor Study	0	0	0	0	0	0	0	0
SR 12*	Corridor Study	0	0	0	0	0	0	0	0
SR 12*	Corridor Study	0	0	0	0	0	0	0	0
SR 120	Corridor Study	0	0	0	0	1	0	0	1
SR 26	Corridor Study	0	0	0	0	1	0	0	1
SR 4	Corridor Study	0	0	0	0	1	0	0	1
SR 99 Frontage Road /Rail Spur	Class II Bicycle Lane	0	0	0	0	1	0	0	1
Tracy Boulevard	Class II Bicycle Lane	0	0	0	0	1	0	0	1
Undine Road	Class III Bicycle Route	0	0	0	0	1	0	0	1
Union Road	Class III Bicycle Route	0	0	0	0	1	0	0	1
Van Allen Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
W Kile Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
Wall Road	Class III Bicycle Route	0	0	0	0	0	1	0	1
West Side Irrigation Canal Bicycle Path	Class I Shared-Use Path	0	0	1	0	0	0	0	1
Wolfe Road	Class III Bicycle Route	0	0	0	0	1	0	0	1

*Same corridor containing two separate projects

D:
SAFETY ANALYSIS

Methodology

For the project safety analysis, Alta and Fehr & Peers reviewed countywide collision data for the five most recent years available (2013-2017). The data is from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS) and was accessed through UC Berkeley's Transportation Injury Mapping System (TIMS). The ` severity of collisions involving bicyclists in San Joaquin County, along with the demographic information of those involved in each collision.

All collision records for San Joaquin County were pulled and then filtered to remove those that occurred within City boundaries. A buffer of 100 feet was applied to capture and include collisions that occurred on City/County boundaries, given the high number of County pockets within urbanized areas and possible discrepancies in reporting location. Collisions that were listed as "Property Damage Only" were also removed.

Data Limitations

Official motor vehicle collision data such as SWITRS have been shown to underestimate the number of bicycle collisions that occur. SWITRS data is almost entirely limited to motor vehicle-related collisions that occur on public roadways and in which a police report was filed, which creates a sample bias. Bicyclist involved collisions may not be reported if they do not involve motor vehicles, if they occur in non-roadway locations such as parking lots or trails, or if a police report is not filed, which is the case in many less-serious collisions.

Collision Summary

Collisions are unfortunately, an occurrence for almost any transportation system. While unfortunate, collisions involving bicyclists are not unique to San Joaquin County and the network analyzed in this report. Furthermore, a collision does not, by default, mean a facility is unsafe but it does provide an important data point for determining how that facility or the system on the whole is serving bicyclists.

Between 2013 and 2017, 162 vehicle-bicyclist collisions occurred within the study area. Of these, 35 were fatally or severely injured (FSI) collisions. Bicyclist-involved collisions accounted for 2.4 percent of all traffic collisions, and 4.2 percent of FSI collisions within the County study area. These are disproportionately higher than the County's bicycle mode share (0.6 percent).

San Joaquin County experiences a high rate of hit and run collisions involving bicyclists: 17 percent of bicycle collisions were misdemeanor or felony hit and run. Alcohol was involved in 7 percent (12) of the 162 reported bicycle collisions. Driving or Bicycling Under the Influence of Alcohol or Drugs was reported in 14 percent (5) of the 35 reported FSI bicycle collisions.

Figure 5 on the following page shows the count of annual bicycle related collisions in the last five years within the study area (Note: Collisions within 100 feet of a City boundary from the years 2013-2017 were included in this analysis).

San Joaquin County's bicycle-related collisions happen disproportionately during commute hours and weekdays. Figures 6 and 7 below illustrate the distribution of bicycle related collisions by time of day and the day of the week. "Improper turning" and "Wrong side of the road" constitute the largest collision factors for bicyclists within the study area. Figure 8 shows the most common types of bicycle collisions by the severity of injury.

Figure 5: Count and severity of bicycle collisions

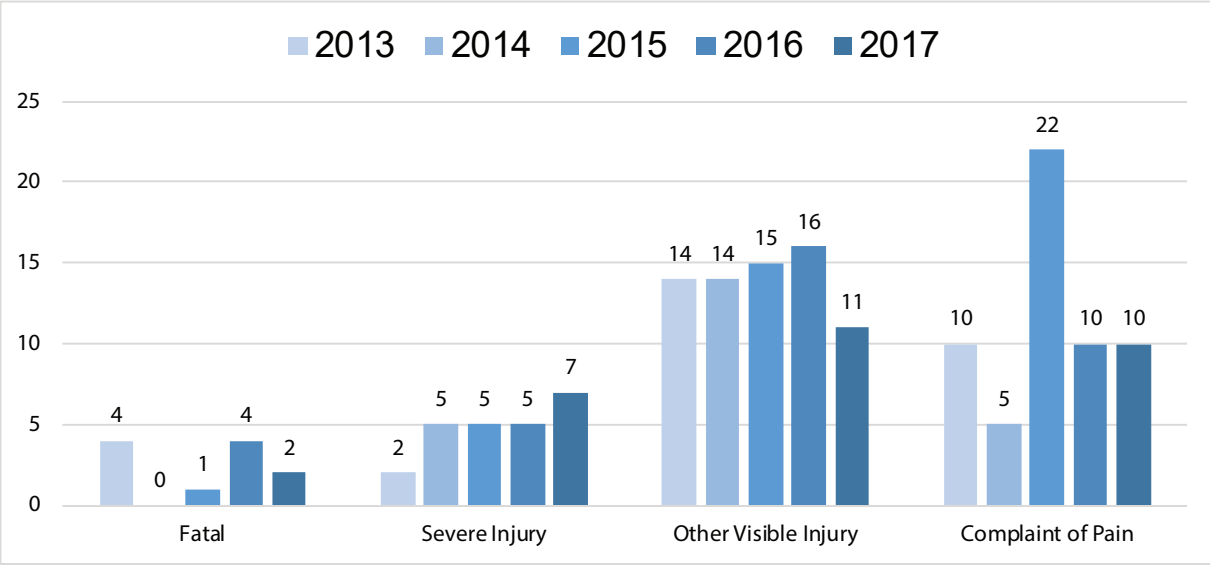


Figure 6: Severity of bicycle collisions by time of day

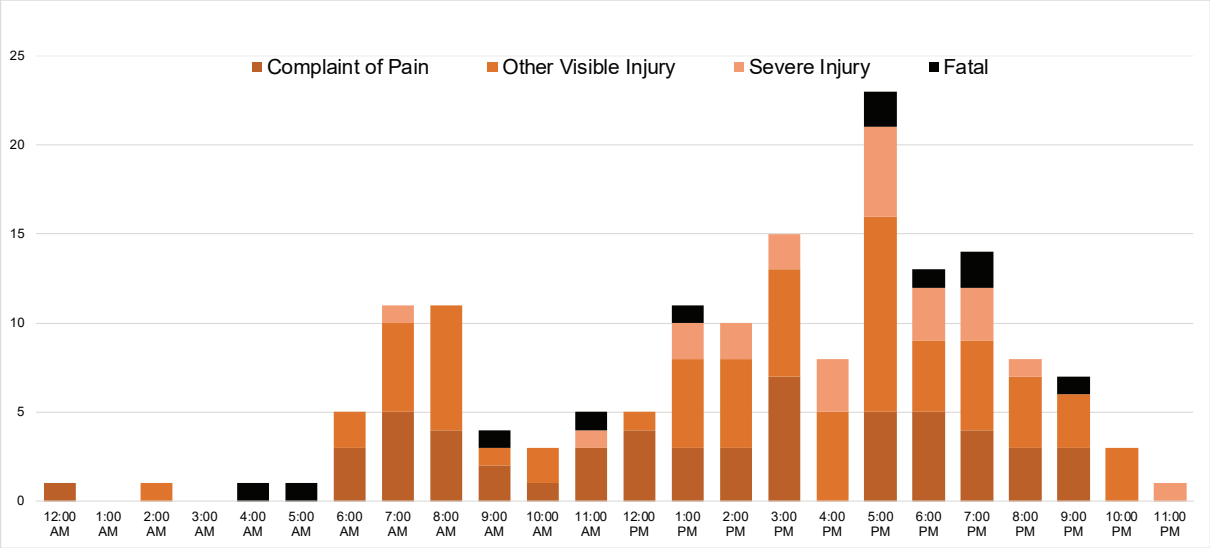


Figure 7: Severity of bicycle collisions by day of the week

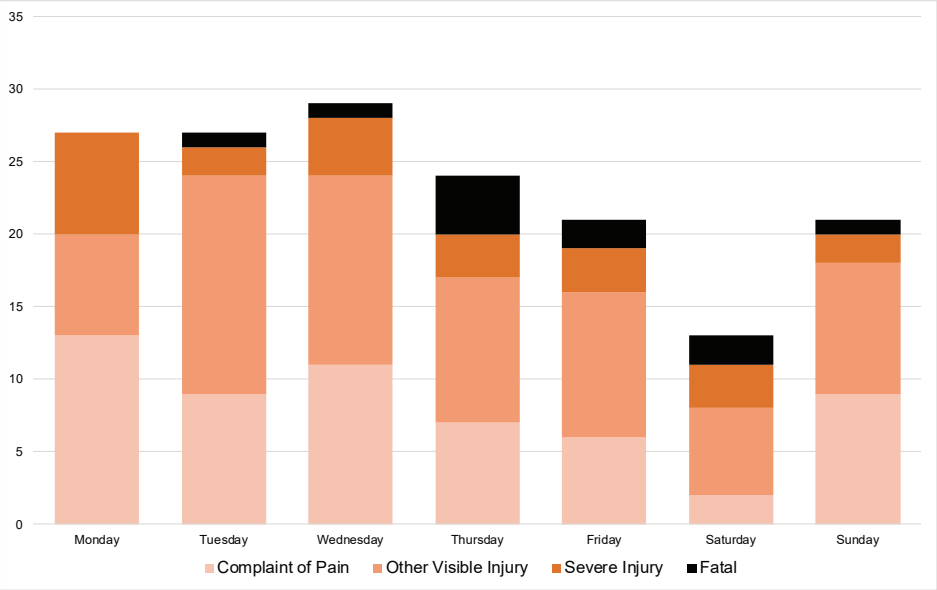


Figure 8: Cause of bicycle collisions by severity

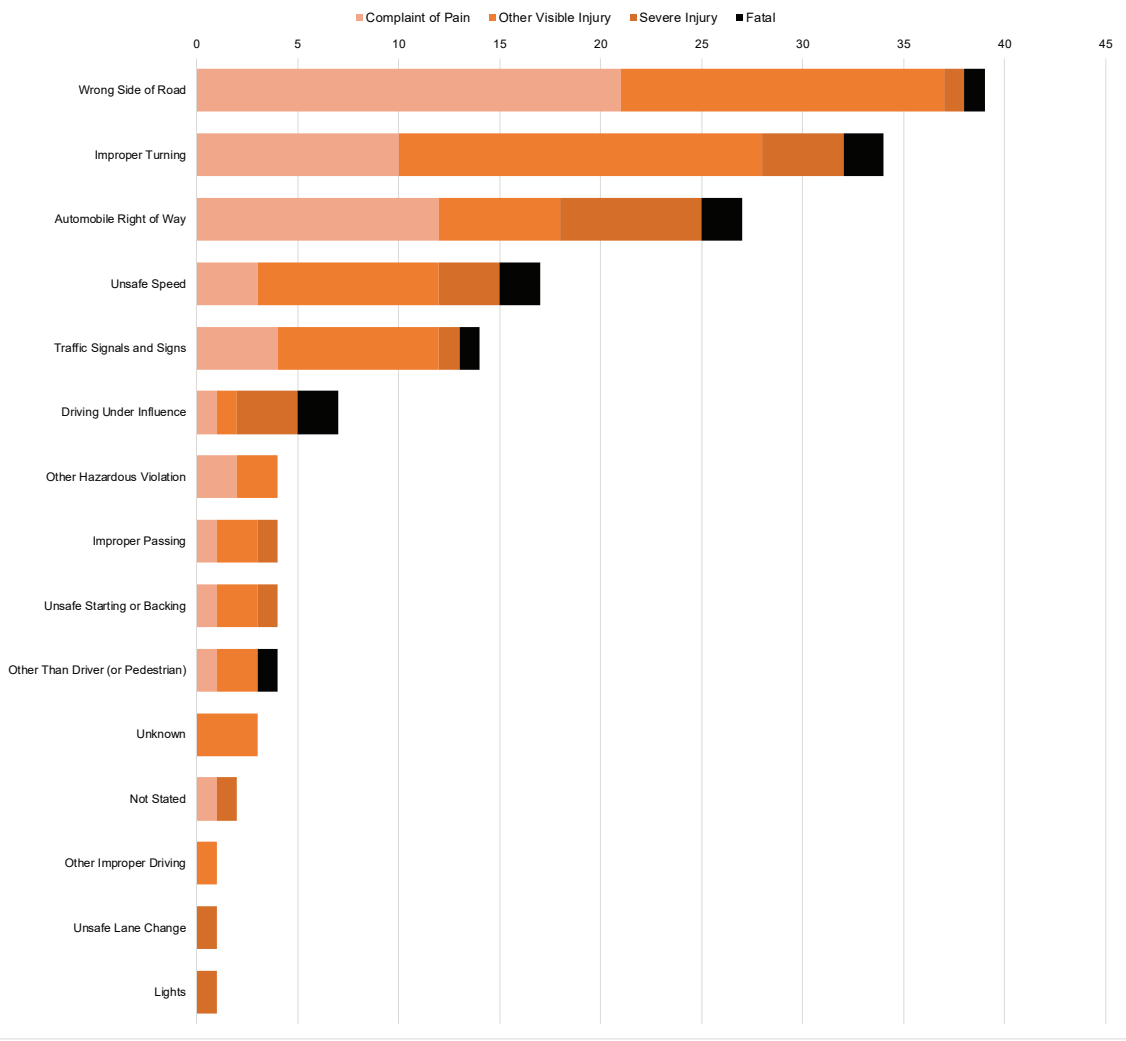


Figure 9: Type of bicycle collision by severity

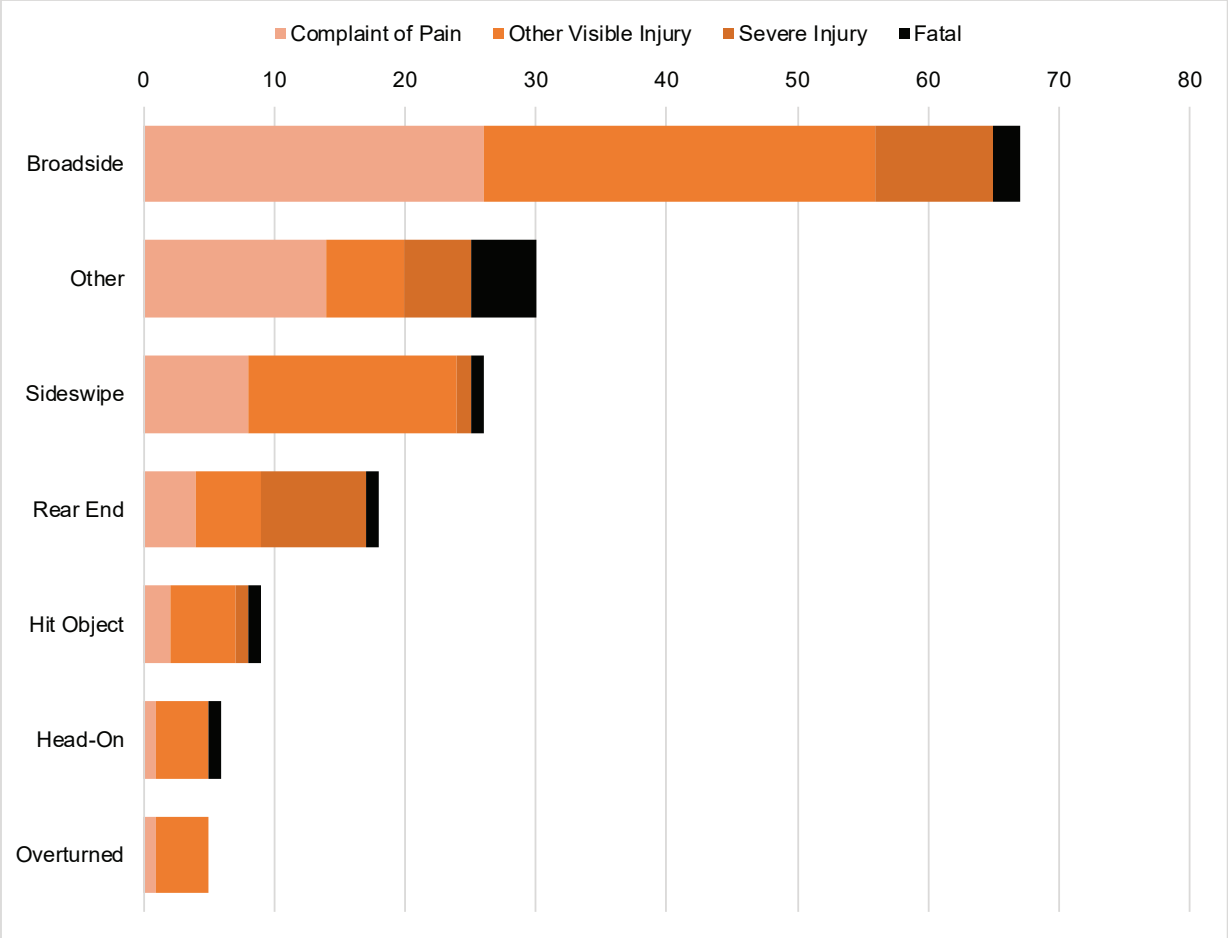
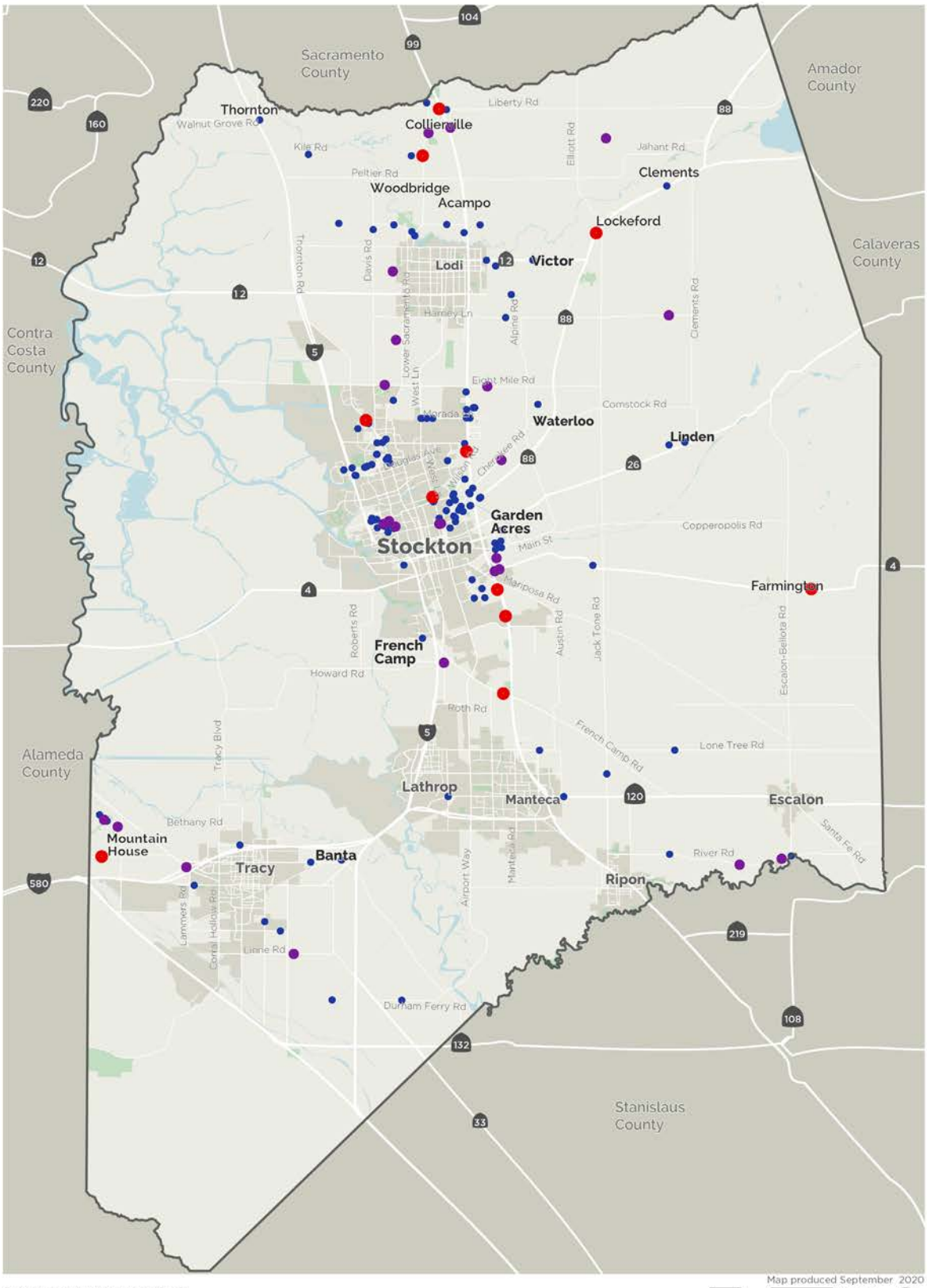


Figure 9 above shows the total number of collisions broken down by type of collision and severity. "Broadside" and "Other" constitute the largest group of collisions for both FSI and other collisions.

Figure 10 on the following page shows the distribution of bicycle related collisions in San Joaquin County from 2013-2017. The greatest number of collisions occurred in the City of Stockton. Mountain House also hosts a disproportionate amount of collisions, given its low population. A large number of collisions also occurred on roads connecting population centers just outside of San Joaquin County boundaries.

Figure 10: Bicycle Collisions Within San Joaquin County



Weighted Collision Analysis Documentation

Since bicycle collisions only account for a small percentage of total collisions, a weighted collision analysis was conducted to better understand where safety issues exist within the County, regardless of travel mode. Weighting the collisions by travel mode and severity made it possible to analyze all collisions, while retaining a focus on bicycle collisions.

The analysis was informed by Crash Costs for Highway Safety Analysis1, a study done by the Federal Highway Administration. It used the Economic Property Damage Only (EPDO) method to weight collisions. Based on sensitivity testing of the weights, the baseline weights were simplified into fewer categories (FSI vs. non-FSI) and scaled down so that the justifiable weights were not over-emphasizing FSI collisions relative to the general patterns of collisions across the study area. This tool used the analysis factors to weight bicycle, pedestrian, and vehicular collisions based on the severity of the collision. FSI collisions received a weight of 10 for all three categories, while a collision with an evident or possible injury received a weight of 1 in all categories.

A second weighting was performed to prioritize bicycle safety. This was accomplished by assigning the highest weight to bicycle FSI collisions. Pedestrian FSI collisions received the second highest weight, followed by motor vehicle collisions. Table 3 below shows the weights assigned to each collision.

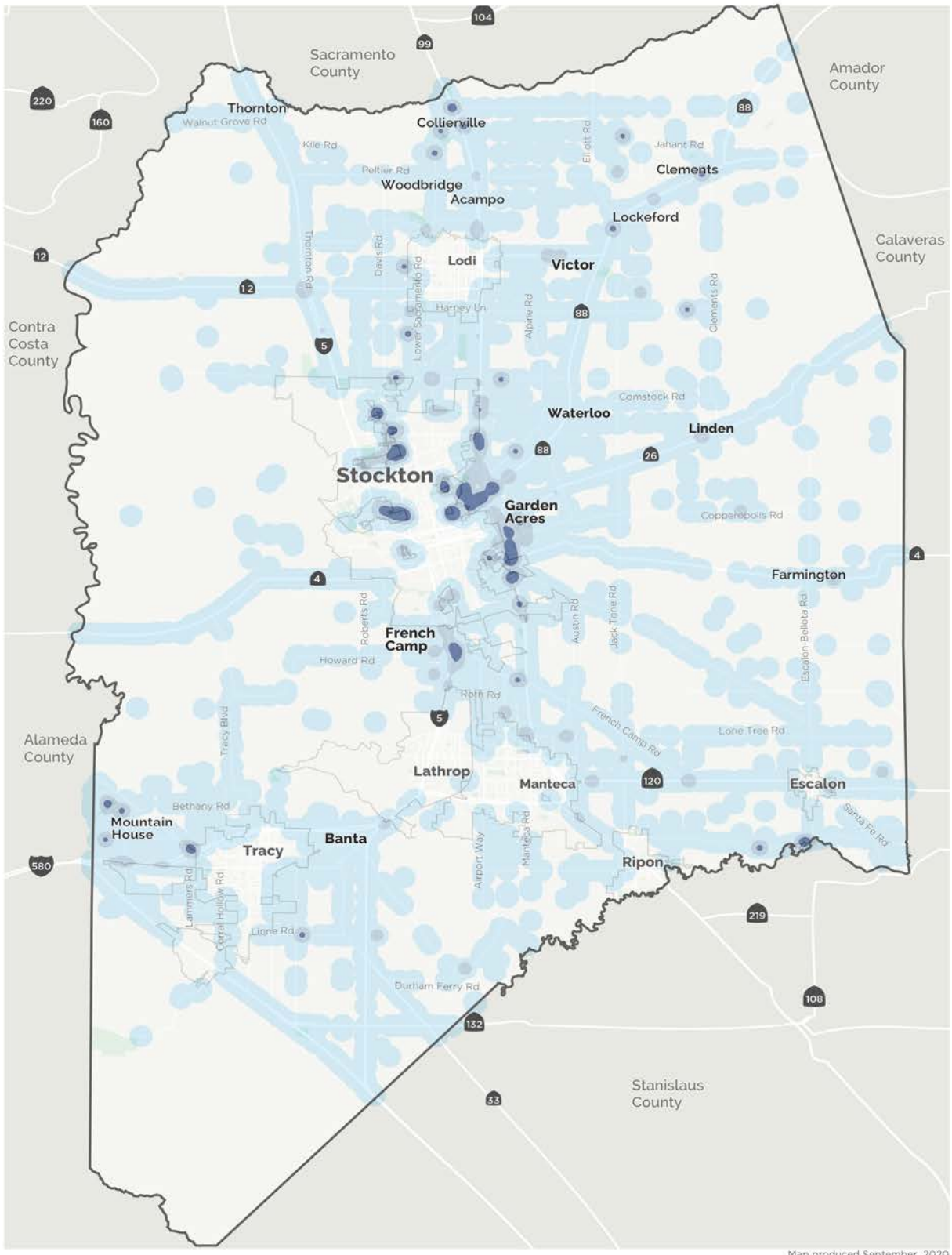
Table 3: Weighted Collision Analysis Factors

	Weight for FSI Collision	Weight for Evident or Possible Injury Collision
Bicycle	10	1
Pedestrian	5	0.5
Vehicle	0.5	0.05

Figure 11 below displays the distribution of the weighted collisions. Collisions hot spots are centered around the urbanized areas and connective roadways. Motorized collisions are widespread across the County's roads.

1 *Federal Highway Administration (2018). Crash Costs for Highway Safety Analysis (FHWA-SA-17-071). Retrived from https://safety.fhwa.dot.gov/hsip/docs/fhwasa17071.pdf*

Figure 11: Map of the results from the Weighted Collision Analysis



Multi-Collision Corridors

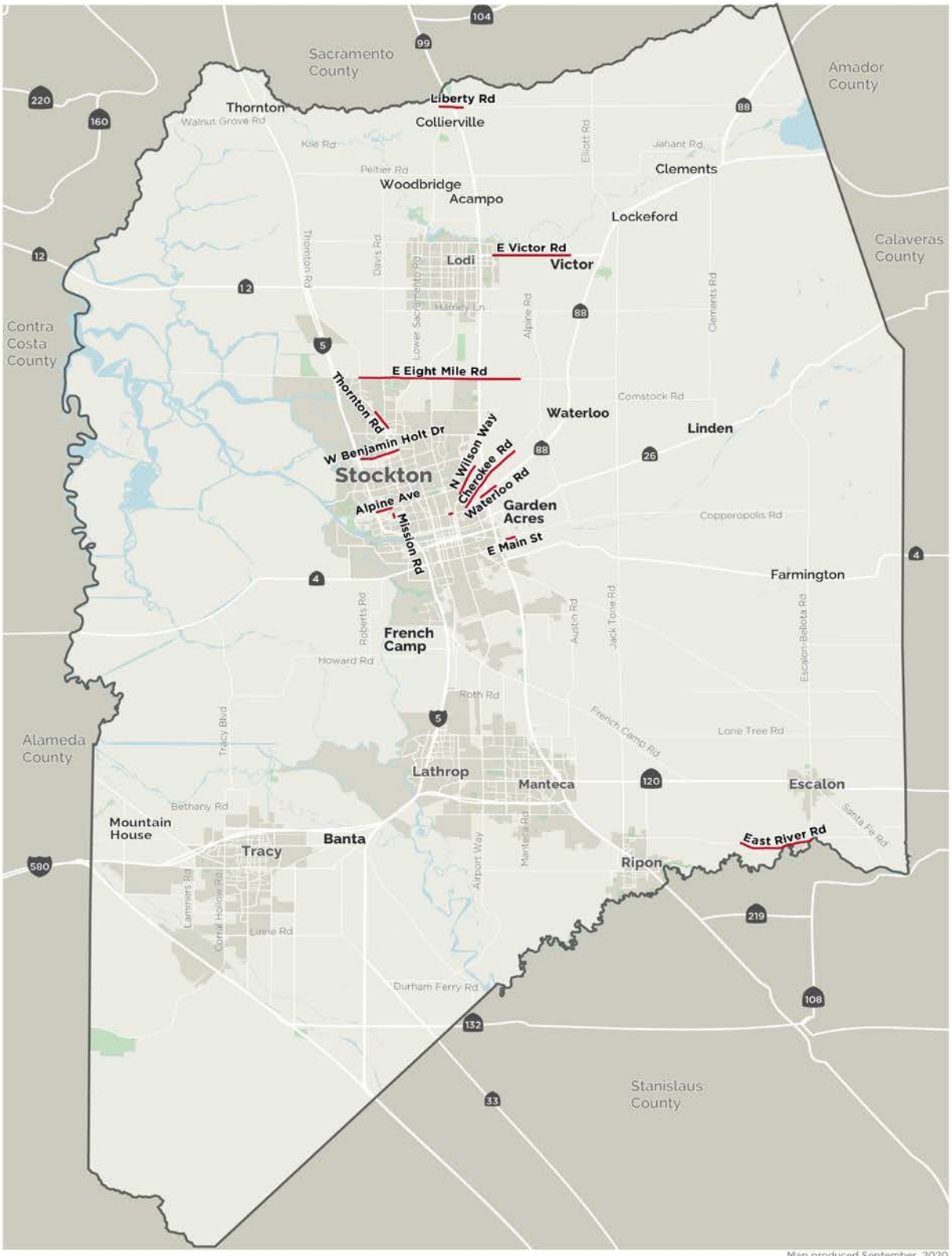
In order to better understand the distribution of bicycle related collisions, Alta reviewed corridors with multiple collisions. Pedestrians were included in this analysis to assess protection for active transportation at large. Thirteen multi-collision corridors were identified. These are corridors where at least 2 collisions involving bicyclists occurred and where 3 or more collisions involving bicyclists or pedestrians occurred between 2013 and 2017. It should be noted that recent safety improvements have been made to the East Main Street and Thornton Road corridors.

Table 4 and Figure 12 detail and map the identified multi-collision corridors.

Table 4: Multi-Collision Corridors for Bicyclists and Pedestrians

	Roadway	From	To	Corridor Length (miles)	Total Bicycle Collisions	Total Pedestrian Collisions	Bicycle Collisions / Mile	Pedestrian Collisions / Mile
1	N Wilson Way	Sanguinetti Ln	E McAllen Rd	1.39	3	6	2.2	4.3
2	E Harding Way	Stanford Ave	N Airport Way	0.13	3	2	23.5	15.7
3	Cherokee Rd	Sanguinetti Ln	Lagorio Rd	3.28	5	3	1.5	0.9
4	Thornton Rd	Encino Ave	Wagner Heights Rd	0.9	3	2	3.3	2.2
5	E Eight Mile Rd	Thornton Rd	Hildreth Ln	6.86	2	2	0.3	0.3
6	East River Rd	Van Allen Rd	McHenry Ave	3.14	3	1	1.0	0.3
7	W Benjamin Holt Dr	Plymouth Rd	Pacific Ave	1.66	7	8	4.2	4.8
8	E Main St	Carroll Ave	S Olive Ave	0.34	2	4	5.9	11.9
9	Liberty Rd	Lower Sacramento Rd	N Nichols Rd	0.99	3	0	3.0	0.0
10	Alpine Ave	Plymouth Rd	Mission Rd	0.66	4	4	6.0	6.0
11	Mission Rd	Bristol Ave	Country Club Blvd	0.16	2	1	12.7	6.4
12	Waterloo Rd	Wilcox Rd	Chronicle Ave	0.82	4	8	4.9	9.8
13	E Victor Rd	N Guild Ave	Kroll Rd	3.28	3	3	0.9	0.9

Figure 12: Multi-Collision Corridors in the County



Multi-Collision Corridors

San Joaquin County Bicycle Master Plan Update

Map produced September 2020

0 2.5 5 MILES

Identified Multi-Collision Corridor

Boundaries

Incorporated City

San Joaquin County

alta PLANNING + DESIGN

E:
PUBLIC COMMENTS AND RESPONSES

COMMENT:

Harney Lane is extremely dangerous for cyclists. There are no shoulders and cars and trucks travel well over the speed limit. Most cyclists in the region know to AVOID Harney as much as possible. Such a dangerous roadway should NOT be a priority unless you are going to put in a Class II buffered lane.

RESPONSE:

The County considered conditions for bicyclists on Harney Lane in developing plan recommendations. As indicated in the draft plan, a Class II Bike Lane is being recommended for a 0.28-mile section of Harney and an 11-mile section is being recommended for a Class III Bike Route. The County evaluated several factors in determining what the optimal facility recommendation would be for any given road or segment of road, including available right-of-way to make improvements. The constrained right-of-way along most of Harney makes a Class III facility the more achievable option in the near-term. Also, as noted in the plan's Design Guidelines (Appendix A), the recommended shoulder width for Class III facilities is 4-6 feet which, if achieved, would provide a notable improvement for bicyclists on Harney relative to existing conditions.

COMMENT:

I would like to see more emphasis on safety for cyclists – through a billboard campaign, heavier penalties for speeding, and maybe a camera ticketing program on roadways with the most egregious speeding and where the most accidents have been identified.

RESPONSE:

County staff is aware that speeding is a concern for many bicyclists. In fact, as noted in the summary of the on-line survey results in Chapter 4 of the draft plan, 74 % of respondents indicated that speeding and aggressive driving was a barrier to bicycling (the second highest across nine factors considered). As such, the County has considered how the project recommendations and programs could help reduce speeding and increase the safety and level of comfort for bicyclists of all ages and abilities.

As described in Chapter 6, one of the programs the County will consider for implementation under the plan is a Bicycle Safety Campaign. This effort could take a variety of forms but would generally be focused on making all roadway users more aware of the presence of bicyclists as vulnerable users and promote compliance with traffic laws among both motorists and bicyclists.

Enforcement is another program focus area identified in Chapter 6. As stated,

> The San Joaquin County Sheriff's Office currently conducts enforcement programs to ensure safe behavior of drivers and bicyclists, including obeying speed limits and traffic laws.
>
> This Plan recommends continuing these efforts, with a focus on those behaviors that create the greatest risk or potential conflict, and care should be taken that programs do not unfairly target specific demographics or modes of transportation. This Plan also recommends continuing current educational enforcement activities, where officers stop individuals and discuss the unsafe behavior observed without issuing citations.

Finally, all comments received on the draft plan related to roadway safety, namely for bicyclists, will be relayed to the San Joaquin County Sheriff's Office for consideration.

COMMENT:

Quick, cheap and dirty instant bicycle infrastructure use existing public sidewalks. The sidewalks would be changed into a Class I shared path via paint and signs. Currently the minimum for this is 10 feet. So change the law in town to use existing with and promise to make all future sidewalks ten feet. The sidewalk/path is on major connecting streets. The path needs to go where people need and want to go safely

RESPONSE:

As shown in Table 5-1 of the draft plan, nearly 40 miles of Class I Shared-Use Path are recommended for future implementation. Additional Class I facilities may be recommended through the outcomes of corridor studies that cover over 100 miles of additional roadway.

While bicycling on sidewalks is permitted throughout San Joaquin County, the primary intent of this plan is to create a safe and well-connected network of on-street facilities and off-street multi-use trails, but not to convert sidewalks into primary facilities for bicyclists. Sidewalks are primarily intended for pedestrians including those with ADA access needs.

It should also be noted that the County cannot require bicycle improvements or standards within any incorporated city.

COMMENT:

All paths need to fit into mass transit options. Put the pathway where all the traffic is….where all the shopping is……where the work is…..put it where it is needed and wanted. Pushing bicycling into basic transit and minimizing fossil fuel transit.

RESPONSE:

County staff recognize the importance of providing improved access for bicyclists to and from transit options. Nearly 30 percent of project survey respondents selected transit stops when asked for their opinion on where people like to bike in the County, and 1.6 percent commute by transit according to the most current data available.

While project recommendations included in the plan were not exclusively developed to improve access to and from transit by bike, several of them would do so.

COMMENT:

Quick Trick Two….. Paint the town green..bike path way green now. Class II street bike lane …paint bike lanes and signs for car drivers to see. The streets are public ways already no new money is necessary for use plus no building is necessary to start …..just paint and labor.

Quick trick two is cheap and dirty and you clean it up later. First make drivers aware of bikes.

RESPONSE:

Appendix A of the draft plan includes design guidelines that County staff will consider in its implementation of the recommended projects. The resources cited, such as the NACTO urban Bikeway Design Guide, provide direction on appropriate applications for the usage of green paint that complies with specifications in the Manual of Uniform Traffic Control Devices (MUTCD). The County will consider the guidelines when designing and implementing recommended facilities to identify appropriate applications of paint. In regard to the installation of bike lanes on a broader scale, all paint and labor, unless donated, will cost the County money. The County will also incur the costs associated with maintaining (e.g. restriping) bike lanes over time.

COMMENT:

Trick three…Band Wagon Bling…..Get free advertising from contacting local tv stations on

what is needed and showing what is done and starting volunteer groups to help the City paint and prep.. Also getting schools so support bicycle to school instead of bussing (example)……..

Getting City major on board….State governor involved with grants……Going on PBS TV telling people about tons of carbon and start bicycling now. Also t-shirt slogans….newspaper articles about the why of cycling etc.

RESPONSE:

One of the program recommendations described in Chapter 6 is a Bicycle Safety Campaign. Several of the suggestions provided in the comment could be included under such a campaign and will be considered by County staff. Walk and Roll to School Days and Safe Routes to School are two other programs that will be considered as part of plan implementation over time.

COMMENT:

In conclusion…..now is the time to go action jackson on this…I am 70 years old and a bad heart but still ride a few K s a day. Try to shop by bike as much as I can. So bicycle for transit daily…In europe you use your car only on weekends and vacations and you use your bike daily for transit needs…. shopping …work..pleasure…Superhero's bicycle for transit daily……

RESPONSE:

Comment noted. As explained throughout the plan, a primary goal is that a more accessible, well-connected bicycle network will better enable County residents to make trips by bicycle for commuting to work or school, recreation, or everyday errands as noted in your comment.

COMMENT:

I wanted to call out W. Schulte Rd in Tracy, CA between S. Central and S. Macarthur as needing improvement. It is currently a shared road without a dedicated lane and it's much too busy for that. I see many riders using sidewalks rather than risk their lives sharing that road.

RESPONSE:

This segment of roadway specified in the comment segment is within incorporated Tracy. The County does not have jurisdiction to make changes on this facility but will relay this comment to Tracy staff for consideration. Looking ahead, County staff will coordinate with the City of Tracy staff to identify projects that straddle shared boundaries and to prevent sudden discontinuation of a facility.

COMMENT:

Secondly Valpico Rd in Tracy, CA between Tracy Blvd and S. Macarthur. The ends of this stretch isn't to bad but in the middle the bike lane vanishes and riders must merge into fast traffic.

RESPONSE:

The segment of roadway referenced in the comment is within incorporated Tracy. The County does not have jurisdiction over this facility but will relay the comment to Tracy staff for consideration.

COMMENT:

S. MacArthur Dr in Tracy, CA from W. Schulte to E. 11th street is notoriously dangerous. There are schools nearby and this stretch not only lacks bike lanes but also sidewalks. Kids are forced to walk on the edge of the road to get through here.

RESPONSE:

The section of roadway specified is on the border of Tracy and the County. As shown on the Southwest area map in the draft plan, portions of this segment of MacArthur Drive contain an existing Class II bike lane, however others do not. As such, one of the project recommendations is to implement Class II bike lanes in those gap segments between Linne Road and E Mount Diablo Avenue to provide for a

consistent facility over the 2.3-mile distance.

COMMENT:

I was also curious why the Delta-Mendota canals aren't in the plans for those greenbelts mentioned. The paths are already in place, just need to open up a few areas and clean it up a bit.

RESPONSE:

The Conceptual Greenways section of Chapter 5 has been expanded to include a discussion of these canals as potential, future greenways. Currently, the County does not have jurisdiction over the areas adjacent to the canals that could potentially serve as greenways, whether they be Class I facilities or another type. Any County-led improvements of these corridors would require future coordination with the Department of Water Resources to obtain the necessary permits, easements or other approvals that may be required.

COMMENT:

I had a question about a path on the Southwest map. I noticed that there is a Class I Shared Use Path marked as existing from Chrisman Rd all the way to Lammers Rd. Is this marked as existing as it is currently there for use? or existing as in the current master plan and still needs to implemented?

RESPONSE:

The identification of this segment as an existing Class I facility was an error in the draft plan and has been removed from the Southwest area map in the final plan.

COMMENT:

Caltrans fog line rumble strips should only be added when they comply with the current guidelines of eight feet of paved right shoulder. Rumble strips should only be placed with the newer intermittent pattern so bicyclists may be able to leave the paved shoulder to avoid debris such as broken glass or vehicles parked on the shoulder. Caltrans needs to be reminded constantly that state highways are also frequently used by bicyclists. Since Caltrans engineering positions are frequently occupied by different employees due to job rotation, I don't think information is adequately passed down to include safety accommodations for bicyclists.

Caltrans has added fog line rumble strips on various state highways such as Route 12 in Calaveras County and Route 49 in Amador and Calaveras County that now expose dangerous riding conditions to bicyclists as it forces bicycle riding in the lane of traffic as the narrow paved shoulder is now unrideable. Caltrans needs to be advised to reevaluate these ill placed fog line rumble strips and remove them for bicyclist safety.

I am a retired Caltrans Maintenance Manager from Stockton and dialogued with Caltrans engineers about an unsafe location on Route 12 and the San Joaquin and Calaveras County line. I received a letter stating the rumble strip would not be removed but signs to "Share the Road" with bicyclists would be placed. The letter is about a year old and no signs have been placed.

Unfortunately, I don't see evidence that Caltrans is very concerned about the safety of bicyclists on state highways and feel it is appropriate to ignore the current design standards and policies of accommodating all modes of transportation.

RESPONSE:

While there are several Caltrans facilities within the County, County Public Works does not ultimately have jurisdiction over the construction or maintenance of Caltrans roads. That said, County staff understands that rumble strips are an issue of concern for many bicyclists and the concerns expressed in this comment will be forwarded to Caltrans District 10 staff for consideration.

For County roads, the Class III facility design guidance speaks to rumble strips. Should rumble strips be included on Class III facilities in the future, the following guidance will be considered:

While not required, if rumble strips are installed in the roadway, consider installing bicycle-friendly rumble strips. Ideal spacing should include 12 inch spacing (center-to-center), 6-8 inches long (perpendicular to roadway), 6 inches wide (measured parallel to roadway), and 3/8" deep, according to FHWA Technical Advisory 5040.39.

COMMENT:

I'm curious why the draft map for the Northwest ignores the Caltrans Sustainable Communities planning grant the City of Lodi received to prepare a feasibility study of a rail-to-trail conversion of the UPRR spur line extending from Locust St in the City into the unincorporated County in Woodbridge at Academy and Orange St.

I had added it to the interactive map months ago when Alta was accepting submissions, and David Ripperda connected on the map to a possible bikeway network in the County using irrigation sloughs shoulders, an active transportation network the City identified as desirable in its most recent General Plan and that the bicycling community in Northwest of the County would greatly appreciate.

RESPONSE:

This comment on the interactive map was received and considered in the development of the plan's recommendations. As shown on the Northwest area map in the draft plan and listed in the project tables, a Class IIIB Bicycle Boulevard is being recommended in two locations to, in concept, receive what may be a future trail on the UPRR spur line referenced. These include a 0.32-mile section of Class IIIB Bicycle Blvd on Lilac Street and a 0.15-mile section of Class IIIB on Academy Street. These facilities will not be added at this time, and further planning of these facilities may continue once the City of Lodi completes their study and shares proposed alternatives with the County.

COMMENT:

At first glance, I'm alarmed at the over priced cost estimates given in the updated report. Spending a $1 million per mile for paved bike way is outrageous, even where a bridge or ramp is required. The low estimates are not a discount. Even low price of $80k to paint a stripe and put up one sign per mile is just too expensive—how about $4k?

RESPONSE:

The planning-level cost estimates are based on recent information provided by the project consultant. The County will aim achieve cost savings through its procurement of materials and labor over the course of the plan's implementation; however, it can't dictate the pricing provided by vendors that may be used.

COMMENT:

Thanks to poor planning in the past street car and railroad right of ways have turned into a seemingly hopeless checkerboard of property ownership, but in many places the rail ballast still exists to create a reduced cost basis for new dedicated shared use or dedicated bike path. Add a little more road base, level, and layer over with crushed limestone to make smooth unpaved footpath that even road bikes can use. Later, when price of asphalt drops, project can be completed.

RESPONSE:

County staff understands that conversion of former (abandoned) railbeds to shared use or dedicated bike paths is an important project-type in the build out of a well-connected bicycle system that accommodates all ages and abilities. For example, the Linden Rails-to-Trails Greenway is described in the draft plan as a potential project under the Conceptual Greenways discussion in Chapter 5. This project would utilize an abandoned railroad corridor to create a 9-mile greenway through eastern San Joaquin County.

When opportunities for conversion of former railbeds present themselves, the County will examine them on a case-by-case basis. It's recognized that for many who currently bicycle in the County and those who wish to do so but are concerned about potential conflicts with motor vehicles, off-street shared use paths present an optimal facility type and an increased comfort level due to separation from motorized traffic.

COMMENT:

Focus on creative use and reduced cost. Commuter cyclists need direct point to point routes, not meandering neighborhood sojourns, but these paths can be narrowed or interrupted in places where they junction streets, parking lots, sidewalks and other awkward obstructions.

RESPONSE:

County staff understands that most bicycling commuters prefer the most direct route(s) to their places of work. As shown in the plan, many of the recommended facilities would provide the most direct option between commercial / employment nodes and residential land uses, for example.

Opportunities for cost savings on the siting and construction of Class I facilities depend on the physical context of a corridor and would need to be identified on a case-by-case basis.

COMMENT:

A great city like Vienna or Barcelona doesn't just have broad bicycle only paved paths, but also modifies and uses existing thruways cyclists are known to use. After that key is blocking access to motorcycles and other motorists. So, police need to patrol on bicycle as well.

RESPONSE:

Based on input received from residents and stakeholders throughout the County during the planning process, most of the project recommendations are on facilities where people indicated bicyclists either currently ride or would like to ride, but are hesitant to do so due a lack of a facility or the deficiency of an existing facility type.

Any future Class I facilities recommended under the plan would be non-motorized with the one exception being for emergency responder access. The San Joaquin County Sheriff's Department would determine whether bicycle patrol of these facilities is necessary and at what frequency.

COMMENT:

I noticed here in Stockton we have nothing off-road or dirt to ride Our mountain bicycles on.

What about lobbying for a dirt jump/pump track park for bicycles here in Stockton?

RESPONSE:

This plan update is focused on on-street facilities and off-street multi-use paths in the unincorporated County. A terrain / jump track as referenced in the comment would be a location-specific improvement and relates to (incorporated) Stockton. County staff will forward this comment to the City of Stockton Parks and Recreation Department for consideration.

COMMENT:

I cycle in the area regularly and hope to see further safety measures taken to ensure wide gravel free shoulders for cyclists. By allowing cyclists to be outside the main road lane it makes conflict of motorized vehicles and cyclists less likely.

RESPONSE:

As noted in the draft plan, over 100 miles of Class III facilities are recommended for future implementation. As specified in the Design Guidelines in Appendix A, it's recommended that a paved shoulder for this facility type provide 4 to 6 feet for bicyclists. The absolute minimum allowable width is 2 feet when no obstructions are present. County staff will consider this guidance when implementing Class III facilities.

In regard to gravel on roadway shoulders, the County operates and monitors an on-line issue / response program called GoRequest, available at https://www.sjgov.org/gorequest/request. On this site, any County resident is able to provide information and request a response to a non-emergency issue of concern. This includes removal of gravel on a roadway shoulder that based on location or volume, may pose a hazard to bicyclists or motorists. A user can provide information on the concern, including the specific location, and upload photos as well. For gravel accumulating on roadway shoulder, a user should select (click on) Topics / Roads and Streets /Miscellaneous Roadway Issue.

COMMENT:

One region of real concern for me is along Hwy 88 in Clements. To join Mackville Rd to either Clements Rd or Atkins Rd cycling on Hwy 88 is unavoidable and I have recently observed markings which give me concern that rumble strips may be planned in areas where the shoulder is narrow. By placing rumble strips here you would be forcing cyclist into the main carriageway which is undesirable for all concerned. Please save your funds and DO NOT install rumble strips in any location where the shoulders are narrow. CalTrans guidelines are very clear that if the shoulder is less than four feet wide rumble strips should not be present.

RESPONSE:

While there are several Caltrans facilities within the County that have been considered as part of the Plan's development, the County does not ultimately have jurisdiction over the construction or maintenance of Caltrans Roads, including whether or not rumble strips are used. That said, the County understands that rumble strips are an issue of concern for many bicyclists and the concerns expressed in this comment will be forwarded to Caltrans District 10 staff for consideration.

For County roads, the Class III facility design guidance in Appendix A speaks to rumble strips. Should rumble strips be implemented by the County on Class III facilities in the future, the following guidance will be considered.

> While not required, if rumble strips are installed in the roadway, consider installing bicycle-friendly rumble strips. Ideal spacing should include 12 inch spacing (center-to-center), 6-8 inches long (perpendicular to roadway), 6 inches wide (measured parallel to roadway), and 3/8" deep, according to FHWA Technical Advisory 5040.39.

COMMENT:

Signage

- Indicate with signage when a bike route will be ending at the intersection BEFORE the end occurs, giving the cyclist notice to make a change in course.

- Name major routes by their terminal streets (similar to bus routes)

RESPONSE:

The County recognizes that the placement of signs and the information provided on them can play a key role in improving the overall quality of the County's bicycle network. As described in Chapter 6 of the plan, wayfinding is one of the program areas that the County will consider as part of the plan's implementation. Furthermore, wayfinding design guidance in Appendix A will help County staff determine optimal locations for signs and what information should be included on them. As suggested in the comment, consideration will be given to how signs can alert bicyclists to the end point of a route before they arrive there and help bicyclists orient themselves by including terminal street names as route identifiers.

COMMENT:

Join Airport Way north to Arch Airport

RESPONSE:

The segment of Airport Way referenced in this comment is within the City of Stockton. The County doesn't have jurisdiction over the facility and so can't make a recommendation for its improvement. However, County staff will forward this comment to the City of Stockton staff following plan adoption so they can consider inclusion of the recommended Class III route extension into their planning documents.

COMMENT:

Complete all along Arch Airport from Arch to Austin Rd

RESPONSE:

This segment of Arch Airport Road referenced is also within the City of Stockton. The County will forward this comment to the City of Stockton so they are aware of the expressed interest and can consider integration of it into their planning documents.

COMMENT:

Existing portion of Pershing bike path from March to Swain is not indicated. Complete this route the entire length of Pershing, or at least from UOP to Delta College. It is the main route from midtown going north to Lodi.

The section from Swain to Hammer could easily go east of Pershing one block and continue north (paralleling Pershing) to Joan, back to Pershing to Hammer.

RESPONSE:

The bike path referenced in the comment is a sidewalk. While bicycles are permitted to use the facility, it is not a bike path as defined in the Draft Plan as a Class I Shared Use Path (see p. 12 of the Draft Plan). As such, it is not identified on Figure 2-2 (Existing Bicycle Facilities as a Class I path.

The suggestion about the 1.2-mile segment east of Pershing Avenue from Swain Road to Hammer Lane is noted. However, due to the lower motorized traffic volumes and posted speeds on roads just east of Pershing Avenue, such as Vicksburg Place, this route option already affords bicyclists lower stress facilities so no improvements are recommended under the Plan update.

COMMENT:

The 99 frontage road on the WEST side of 99 from Lodi Harney Lane (Harney to Frontage behind Costco is existing path/lane) to Hammer is great, much less traffic on this side of 99 than on the East frontage. The only thing that prevents this route from going smoothly all the way past the Hammer intersection is that there is only a narrow short poorly maintained existing path/walk way that crosses the Calavares River just south of where the frontage road crosses 99 and returns north. The pathway would be an easy fix.

RESPONSE:

The short section referenced (crossing of the Calaveras River) is under Caltrans jurisdiction. This comment will be forwarded to Caltrans District 10 staff for consideration.

COMMENT:

Absolutely continue to work on the proposed routes along Ben Holt, HWY 26, HWY 88 in particular.

RESPONSE:

Comment noted. Each of the routes referenced in the comment have been identified for a future corridor study in the Plan.

COMMENT:

Extend route south on Mariposa to Austin Road and complete 99 frontage road to Mariposa This would give a continuous North/south route from Charter Way to Ripon.

RESPONSE:

The segment of Mariposa Road referenced in this comment is within the City of Stockton. The County doesn't have jurisdiction over the facility and so can't make improvements to it. However, County staff will forward this comment to City of Stockton staff following plan adoption so they can consider integration of a Class II Bike Lane south to Austin Road into their master plan.

COMMENT:

The train underpass just south of Woodson road on Lower Sacramento road is extremely unsafe for road cycling. The underpass is on the same stretch as the remainder of Lower Sacramento road designated as a Class III bike route. A "pedestrian" path exists above the road, but it is overgrown with weeds, has a gate blocking access and a pile of railroad rocks in the path which makes the path impassable. Could this "pedestrian path" be improved, marked as a bike lane to allow safe cycling through the underpass?

RESPONSE:

As noted in the draft plan, this location has been identified for a spot improvement. Recommended improvements the County will consider include the placement of 'Watch for Bikes' signs on both approaches to the railroad underpass to alert motorists that bikes may be present and that it's a shared lane. Signs should be placed at least 250 feet from the underpass location

In the longer term, the County may pursue coordination with the railroad to determine if an easement could be established on which an off-street facility could be created on the south side of the road where a short segment of path or sidewalk exists under the railroad tracks.

COMMENT:

Collisions Trends — Automobile right-of-way — "Automobile right-of-way is often applied to collisions that happen on roads without bicycle facilities, where bicyclists are more likely to violate right-of-way laws." How about a bit of credit for cyclists that follow the law and get hit by motorists who violate the 3-foot law? Where do you get data to support that cyclists are at fault more than motorists?

RESPONSE:

The referenced text has been modified as follows:

> "The three most frequent bicycle collision factors include riding on wrong side of road (39 total) improper turning (34 total), and automobile right-of-way (ROW) (27 total). Improper turning denotes collisions where the driver or bicyclist did not take appropriate care while turning and caused a collision. Automobile right-of-way is a generalized violation category that includes any ROW violation by both drivers or bicyclists. Drivers were found at fault in 59 percent of bicycle-involved collisions where the primary collision factor violation was automobile right-of-way. The occurrence of 27 collisions within this category warrants consideration of a high priority on closing gaps within the existing network of bicycling facilities."

COMMENT:

Collisions Trends — I wish there was some kind of tracking on the number of 3-foot violations that were either reported with action taken or reported without any action taken by law enforcement. I ride mostly south County rural country roads and have had many near misses. I reported two of these, which was made more difficult because of uncertainty over where City/County boundaries end and start. In one case, a report was taken by the SJ Sheriff's Department. In spite of my video recording of the incident (both forward and rear facing) with copies given to the officer, he made only one try to contact the licensee and did not return my repeated phone calls. In the other instance, the CHP would

not even take a report, again in spite of my having video recording of the incident. In both incidents, there was clear violation of the 3-foot law but because there was no contact and no collision or injury, nothing was done. With law enforcement's clear disregard of cyclists safety, the 3-foot law is useless. In other words, I have to be hit before they will do anything.

RESPONSE:

Enhancing safety for all bicyclists in San Joaquin County is a central tenet of the plan. Of the five main goals in the plan, Goal 3 is:

> To expand ridership, systematically improve safety for people who currently ride bicycles in San Joaquin County and those who may wish to do so in the future.

This goal is supported by an objective and four policies when, taken together, intend to reduce the risks to bicyclists and reduce the frequency and severity of crashes involving bicyclists.

In addition, safety was one of the seven criteria used to score and prioritize projects recommended in the Plan. The specific criteria considered was:

> Improve safety at locations and along corridors where a collision involving a bicyclist has occurred. These projects will improve the safety for bicyclists in these areas.

The County recognizes that enforcement of the three-foot passing law and other traffic laws is important to the plan's overall success. As such, Chapter 6 states:

> The San Joaquin County Sheriff's Office currently conducts enforcement programs to ensure safe behavior of drivers and bicyclists, including obeying speed limits and traffic laws.
>
> This Plan recommends continuing these efforts, with a focus on those behaviors that create the greatest risk or potential conflict, and care should be taken that programs do not unfairly target specific demographics or modes of transportation. This Plan also recommends continuing current educational enforcement activities, where officers stop individuals and discuss the unsafe behavior observed without issuing citations.

Finally, this comment will be forwarded to the San Joaquin County Sheriff's Office for consideration.

COMMENT:

Page 27 and 28: Goals 3 (improve safety) and 4 (education programs): It is my belief from talking to motorists that the vast majority are unaware of the 3-foot law. It was started with a low degree of fan-fare years ago, but I have seen nothing in the newspaper, on radio, or TV, reminding motorists about the law. I've seen no public service announcements and nothing from DMV. This should be done in combination with a plan to educate law enforcement on the 3-foot law too.

RESPONSE:

As noted in Chapter 6 of the Plan, the County will consider development of a Bicycle Safety Campaign. Through a partnership with other County agencies, businesses, and advocacy groups, this campaign could include a focus on the 3-foot law to increase motorist awareness of it throughout the County. This suggestion will also be shared with the County Sheriff's Department so it can consider integration of relevant education and messaging into their ongoing community engagement and public-facing communications.

COMMENT:

Is there any plan to work with the incorporated cities to get their buy-in to connect into the County's plan?

RESPONSE:

County staff will send the final, adopted plan to relevant staff within the County's incorporated cities for their information and reference. In addition, County staff will coordinate with City staff, as needed, throughout plan implementation in regard to projects that would physically touch a County / City border. The County has reviewed all relevant and available City plans to ensure that the County network aligns with the City networks as much as possible.

COMMENT:

I noticed there is a lot of focus on recreational routes on currently wide, straight sections of road. The average rider is not going to be out on these routes and is likely more destination driven.

RESPONSE:

The recommendations in the plan strive to address the current and future needs of recreational as well as non-recreational bicyclists including those who need or want to bicycle to and from work, school, or for everyday transportation. County staff recognizes that recreational bicycling is popular in the County, but the plan also seeks to benefit and accommodate existing and prospective bicyclists who want to live a car-lite lifestyle as well as those with limited mobility options who may be entirely limited to biking, walking, or transit for transportation.

COMMENT:

There is no North South route through Stockton and no route from central Stockton to the industrialized south where there are many potential bike to work opportunities. It appears there some existing routes missing from the Proposed Central map also.

RESPONSE:

The project team will revisit the existing facilities map in the City of Stockton Bicycle Master Plan to ensure that maps in the final plan convey accurate information. In terms of proposed facilities, the County plan does not make any recommendations for roads within incorporated Stockton.