7A

Council Synopsis

September 22, 2015

From: Michael G. Pitcock, Director of Development Services/ City Engineer

Prepared and Presented by: Debra A. Whitmore, Deputy Director of Development Services/ Planning

Agendized by: Roy W. Wasden, City Manager

1. ACTION RECOMMENDED:

Motion: Determining that the adoption of General Plan Amendment 2015-02 (Active Transportation Plan) is exempt from the California Environmental Quality Act (CEQA) pursuant to Section 15162 (Projects consistent with a previous EIR); Section 15183 (Projects consistent with the General Plan); and/or Section 15162 (Feasibility and planning studies) of the CEQA Guidelines

Resolution: Approving the Active Transportation Plan and adopting General Plan Amendment 2015-02 (Active Transportation Plan)

2. DISCUSSION OF ISSUE:

Chapter 5 of the Turlock General Plan identifies the circulation network (streets, bikeways, transit facilities, and so on) that are necessary to support the various modes of travel used within the City. Pedestrian and bicycle circulation is addressed in Section 5.3 of the General Plan. Figure 5-3 of the General Plan (depicted in Figure 6-1 of the Active Transportation Plan) identifies the bikeway improvements and classifications that were envisioned to serve existing residents and businesses as well as support the future growth of the City. This chapter also identifies the more general policies and actions necessary to carry out the vision presented in the General Plan.

Policy 5.3-k of the General Plan states that the City will prepare a Bicycle Mater Plan consistent with the requirements of the Streets and Highways Code in order to be eligible for funding that would be available from various State and federal funding programs. The primary purpose of the Active Transportation Plan is to accomplish these requirements. The City Council awarded a contract to Alta Planning + Design, Inc., on January 28, 2014, to prepare the Active Transportation Plan.

COMMUNITY OUTREACH

The Active Transportation Plan contract included an extensive outreach and communication plan to ensure that the community had adequate opportunity to participate in the development of the Plan. A Citizen's Advisory Team (CAT) was formed to help staff in developing the Active Transportation Plan by providing more direct community input on biking and walking needs and priorities established in the Plan. An open invitation was offered to the public to join the CAT. Ultimately, about 20 members of the community participated on the CAT.

Several meetings were held with the CAT as well as formal public meetings with the community and more informal settings, such as booths at the Farmer's Market and bicycle rodeos held at various schools throughout the City. Many of these events were organized by or attended by members of the CAT. At these events, a community survey was made available to identify the community's opinion on the range of bicycling and walking transportation problems, needs, strategies, and other issues. The input from this survey, as well as the input received at these events, helped shape the recommendations on the bicycle and pedestrian routes, the designation of routes, the priority infrastructure projects, and the ranking of the priority projects, as well as the development of the policies and programs necessary to help people use the system as it develops.

A website has been maintained throughout the process to make materials available to the public and to encourage public input on the various elements of the Plan as they were being developed.

THE ACTIVE TRANSPORTATION PLAN

The Active Transportation Plan is attached to this report and, if approved, would be incorporated into the General Plan, by reference. Figure 5-3 of the General Plan would be amended to identify the bicycle routes and classifications contained within the Active Transportation Plan (Figure 6-3). Responding to comments from the public, the Planning Commission recommended that the roadway typologies of the Active Transportation Plan be incorporated into the General Plan. These modifications are described in more detail below under "Planning Commission Recommendation".

The Active Transportation Plan will serve as the blueprint for the development of bicycle and pedestrian projects within the City. The priorities established in the Plan will provide guidance to City staff on which projects should be pursued for funding and in what order. It should be mentioned that, although the Plan contains funding priorities, these priorities are not fixed in stone and will be driven largely by funding availability. Certain State and federal funding programs have specific criteria for funding of transportation projects which may dictate that the City apply to fund a project that is not necessarily the highest project on the list; however, the City will strive to tackle the highest priority projects first.

The Active Transportation Plan contains other recommendations that are intended to facilitate biking and walking. The Plan contains recommended design standards for streets and roads that can be applied in new master plan areas to facilitate bicycling and walking within the City. The Plan also contains specific recommendations on how to improve biking and walking to schools throughout the City.

ENVIRONMENTAL DETERMINATION

The proposed amendment is consistent with the currently adopted General Plan. The Active Transportation Plan is intended to refine the policies and programs as it relates to the projects and programs that support biking and walking in the City of Turlock. Adoption of the Active Transportation Plan will not result in a significant adverse impact on the environment. Additional environmental assessment and review is required prior to the implementation of any project that could result in an environmental impact. Staff is recommending that the City Council find the project exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15162 (Projects consistent with a previous EIR); Section 15183 (Projects consistent with the General Plan); and/or Section 15162 (Feasibility and planning studies). The Active Transportation Plan does not create any impacts that were not considered in adopting the 2012 General Plan. This is a planning study that identifies the types of projects that would be needed to meet the City's goals but does not authorize and provide clearance for any specific projects that are not already considered ministerial.

PLANNING COMMISSION RECOMMENDATION

At the August 6 meeting, after hearing public testimony on the proposed General Plan amendment, the Planning Commission unanimously recommended approval of the Active Transportation Plan and General Plan Amendment 2015-02. Although many of the comments received during the public hearing were supportive of adopting the Active Transportation Plan, there were some concerns (see excerpt from the August 6 Planning Commission meeting in Attachment 1).

One member of the public expressed concern about the lack of bicycle improvements in the Safe Routes to School portion of the report. The consultant responded that bicycle needs were assessed for each school location and that those facilities needed to improve safety have been identified where necessary. The consultant invited the community to suggest additional improvements that may be necessary to improve bicycle transportation.

Another member of the public recommended that the roadway typologies included in the Active Transportation Plan be made a part of the General Plan. The specific concern was that developers need to be required to make such improvements and that incorporating the roadway typologies would provide greater support to staff to enforce these new standards. In its recommendation, the Planning Commission recommended that the roadway typologies in the Active Transportation Plan be incorporated into the General Plan.

The following changes in the General Plan are recommended to more directly incorporate the Active Transportation Plan typologies into the General Plan:

ADD:

> ***"3.2-o Roadway cross sections in master plan areas. To improve the safety of pedestrian and bicycle travelers, the roadway typologies identified in the Active Transportation plan shall be required in new master plan areas."***

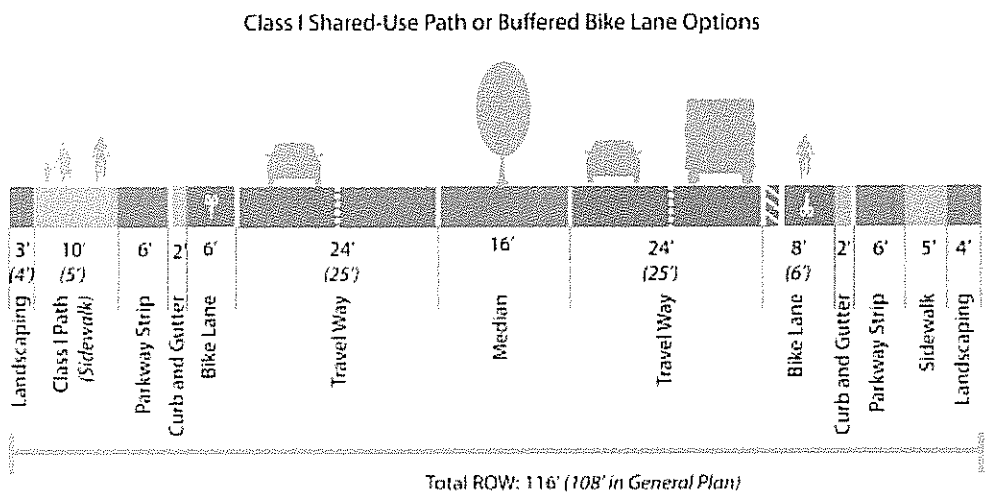
MODIFY:

> "5.2-d **Design for street improvements.** The roadway facility classifications indicated on the General Plan circulation diagram (Figure 5-2) shall be the standard to which roads needing improvements are built, ***except that in master plan areas, the roadway typologies adopted in the Active Transportation Plan shall be the standard.*** The circulation diagram depicts the facility types that are necessary to match the traffic generated by General Plan 2030 land use build-out, and therefore represent the maximum standards to which a road segment or intersection shall be improved. LOS is not used as a standard for determining the ultimate design of roadway facilities.
>
> ***The alternative cross sections in the Active Transportation Plan may also be considered within the existing built environment where: (1) adequate right-of-way is available; (2) impacts to adjacent land uses can be avoided or adequately mitigated to General Plan standards (see Policy 5.2-s of the General Plan); (3) the alternative transportation cross section is in harmony and compatible with the surrounding land use and transportation environment; and (4) implementation of the alternative transportation cross section provides for a continuous, consistent, and safe travel corridor for bicyclists and/or pedestrians."***

The addition of these policies will result in development within new master plans being required to utilize the new roadway standards contained with the Active Transportation Plan. In addition, where certain criteria are met, the City Engineer will consider applying the Active Transportation Plan roadway typologies in infill sites. The standards adopted in the General Plan will still apply to the existing parts of the City. Staff does not recommend substituting the cross sections in the General Plan with the Active Transportation Plan typologies because additional right-of-way would be required to achieve the ATP standards and would generate significant impacts to adjacent development if applied in the existing built environment.

The principal differences between the standards that have been applied historically within the City and the standards proposed in the Active Transportation Plan are the roadway widths and types of facilities designed in each facility type. The amount of land required to support the Active Transportation Plan roadway typologies is larger than the General Plan standards that generally apply to the remainder of the City. For example, the standard for the 4-lane expressway adds eight (8') feet to, and is approximately 7.4% wider than, the General Plan roadway cross section. To accommodate this change, landscaping and travel ways are reduced in width, while pedestrian paths and bike lane widths are increased (see illustration below). The General Plan standards are shown in parenthesis.

Figure 5-2: Potential Expressway Cross Section (General Plan standard in italics)



(NOTE: In the illustration above, two types of pedestrian and bicycle improvements are illustrated. From the median, the left half of the diagram is a Shared-Use Path option, while the right half accommodates a buffered bike lane option.)

The resolution before the City Council incorporates these changes.

3. BASIS FOR RECOMMENDATION:

A. The Planning Commission unanimously recommended approval of General Plan Amendment 2015-02 with the proposed amendments outlined above.

B. Policy 5.3-k of the General Plan states that the City will prepare a Bicycle Mater Plan consistent with the requirements of the Streets and Highways Code in order to be eligible for funding that would be available from various State and federal funding programs.

C. Strategic Plan Initiative: F. INTELLIGENT, PLANNED, MANAGED GROWTH

Goal(s): a. Ensure all growth adds value to the current and future community

4. FISCAL IMPACT / BUDGET AMENDMENT:

Fiscal Impact: None

Budget Amendment: None

5. CITY MANAGER'S COMMENTS:

Recommend approval.

6. ENVIRONMENTAL DETERMINATION:

Exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15162 (Projects consistent with a previous EIR); Section 15183 (Projects consistent with the General Plan); and/or Section 15162 (Feasibility and planning studies)

7. ALTERNATIVES:

A. <u>The City Council may choose not to adopt General Plan Amendment 2015-02 (Active Transportation Plan):</u> Staff does not recommend this alternative as the Active Transportation Plan fulfills a policy in the General Plan.

B. <u>The City Council may choose to amend the Active Transportation Plan prior to adoption</u>

ATTACHMENT 1

EXCERPT FROM DRAFT MINUTES OF THE AUGUST 6, 2015 PLANNING COMMISSION MEETING

2. **GENERAL PLAN AMENDMENT 2015-02 – ACTIVE TRANSPORTATION PLAN:** The City of Turlock is proposing to adopt an Active Transportation Plan ("Plan") to implement Policy 5.3-k of the Turlock General Plan which calls for the preparation of a Bicycle Master Plan. This project is EXEMPT from the California Environmental Quality Act pursuant to Section 15162 (Projects consistent with a previous EIR); Section 15183 (Projects consistent with the General Plan); and/or Section 15162 (Feasibility and planning studies).

Debbie Whitmore acknowledged Wayne York and Rose Stillo for their work and effort on this project.

John Leiswyn, of Alta Planning, acknowledged Omni Means for their work on the plan. Mr. Leiswyn provided information on the Plan development; data collection; existing conditions; project sheets; how the Plan will be implemented; the public draft Plan review process, and Plan approval. He thanked the Citizens Advisory Team for their participation, including the Claes family, Rose Stillo, and City staff. Mr. Leiswyn provided an outline of the Active Transportation Plan structure; the percentages of people carpooling and using public transportation; the number of bicycle and pedestrian trips at various intersections; a gap analysis that showed a need for additional sidewalks, bike lanes and maintenance needs. He also reviewed the priority projects that had been identified as part of the review process.

Commissioner Pedroza asked if grant funds were available to fund any of the priority projects.

Capital Project Coordinator Wayne York advised that funds may be available in 3-year cycles, as well as other funding sources identified in the Plan. He advised that certain funds must be spent on specific projects, and that these funding programs might not be available to fund a priority project.

There was discussion about funding and grant sources and the availability for funds based on new development.

Public Hearing:
Chairwoman Fregosi opened the public hearing.

Elizabeth Claes commented about the Active Transportation Plan process that included community meetings and the ideas generated from these meetings. She asked if the Plan could be modified to meet any new laws, and invited members of the community to join her in biking around Turlock.

Development Services Director Mike Pitcock advised that the City will update the document as needed.

Jeffrey Sparks shared his perspective of biking in Turlock, including the potential this area has for young people to want to relocate here due to the amenities young professionals look for in a community.

Rose Stillo expressed her concern that, if the roadway typologies are not included in the General Plan, staff would not have any backing to require developers to install bicycle and pedestrian improvements as described in the Active Transportation Plan.

Hearing no additional comments, Chairwoman Fregosi closed the public hearing.

Commissioner Pedroza commented that the Active Transportation Plan should not conflict with the General Plan.

Development Services Director Mike Pitcock advised that the Commission could recommend the City Council amend the General Plan to include the standards of the Active Transportation Plan.

Commissioner Pedroza commented about traffic problems around the Dutcher School entrance on Colorado and Hawkeye Avenue.

Development Services Director Mike Pitcock said that if the school is interested in a left-turn only movement at that entrance the City will pursue it.

Chairwoman Fregosi re-opened the public hearing.

Roger Smith, representing Turlock Unified School District, advised that the school Board has authorized a new location for the central kitchen which is currently located on the Dutcher School site. This will provide for additional classrooms, driveways and entrances in to the school which will alleviate some of the traffic congestion in the area. Mr. Smith commended the City for the effort put in to this Plan, and noted that the School District is looking forward to working with the City on the various projects.

Hearing no further comment, Chairwoman Fregosi closed the public hearing.

Commissioner Dias commented that the Plan will allow the Commission to look not only at parking, but what type of bike and pedestrian amenities could be provided with a new project.

There was discussion that this Plan, along with public education, will encourage more bike riding and walking, and will require new development to provide new amenities and roads that would be consistent with the Active Transportation Plan.

<u>MOTION:</u> Commissioner Hillberg moved, Commissioner Bean seconded, that the Planning Commission finds the action to approve the Active Transportation Plan and General Plan Amendment 2015-02 is exempt from the California Environmental Quality Act pursuant to Section 15162 (Projects consistent with a previous EIR); Section 15183 (Projects consistent with the General Plan); and/or Section

15162 (Feasibility and planning studies). Motion carried unanimously with Commissioners Gonsalves and Hackler absent.

MOTION: Commissioner Hillberg moved, Commissioner Pedroza seconded, that the Planning Commission recommend the City Council approve the Active Transportation Plan and General Plan Amendment 2015-02, having made the findings contained in the draft Planning Commission Resolution 2015-24 and recommending the General Plan be amended to include the roadway typologies. Motion carried unanimously with Commissioners Gonsalves and Hackler absent.

Deputy Director Debbie Whitmore noted that this item will be presented to the City Council for final approval on September 22.

EXHIBIT 1

BEFORE THE CITY COUNCIL OF THE CITY OF TURLOCK

IN THE MATTER OF APPROVING THE ACTIVE TRANSPORTATION PLAN AND ADOPTING GENERAL PLAN AMENDMENT 2015-02 (ACTIVE TRANSPORTATION PLAN)	**RESOLUTION NO. 2015-**

WHEREAS, in accordance with General Plan Policy 5.3-k of the Turlock General Plan, the City has prepared that Active Transportation to fulfill its commitment to prepare a Bicycle Master Plan consistent with the requirements of the Streets and Highway Code in order to be eligible for further funding of improvements; and

WHEREAS, after a public hearing held on August 6, 2015, the Planning Commission unanimously recommended that the City Council adopt General Plan Amendment 2015-02 (Active Transportation Plan); and

WHEREAS, as part of its action, the Planning Commission recommended that the roadway typologies in the Active Transportation Plan be incorporated into the Turlock General Plan; and

WHEREAS, on September 22, 2015, the City Council held a duly noticed public hearing to consider the proposed amendments to the Turlock General Plan, the Planning Commission recommendations, the Environmental Review documentation and testimony for the project.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Turlock does hereby determine that the evidence in the record supports the following findings:

1. That the proposed General Plan amendment conforms to the provisions and standards of the General Plan.
2. That the proposed General Plan amendment is consistent with the balance of the General Plan.
3. That the proposed General Plan amendment is necessary to implement the goals and objectives of the General Plan.
4. That the proposed General Plan amendment will not cause substantial environmental damage.

BE IT FURTHER RESOLVED that the Turlock General Plan be amended to incorporate the Active Transportation Plan by reference, attached hereto as Exhibit A, and make the following changes to the Turlock General Plan:

Section 1. Amend Figure 5-3 of the General Plan (Existing and Proposed Bikeways) as depicted in Figure 6-3 of the attached Active Transportation Plan.

Section 2. Add the following policy in Chapter 3 (New Growth Areas and Infrastructure) of the General Plan:

> ***"3.2-o Roadway cross sections in master plan areas. To improve the safety of pedestrian and bicycle travelers, the roadway typologies identified in the Active Transportation plan shall be required in new master plan areas."***

Section 3. Modify Policy 5-2-d in Chapter 5 (Circulation) of the General Plan as follows (changes shown in bold, italic, underline):

> "5.2-d **Design for street improvements.** The roadway facility classifications indicated on the General Plan circulation diagram (Figure 5-2) shall be the standard to which roads needing improvements are built, ***except that in master plan areas, the roadway typologies adopted in the Active Transportation Plan shall be the standard.*** The circulation diagram depicts the facility types that are necessary to match the traffic generated by General Plan 2030 land use build-out, and therefore represent the maximum standards to which a road segment or intersection shall be improved. LOS is not used as a standard for determining the ultimate design of roadway facilities.
>
> ***The alternative cross sections in the Active Transportation Plan may also be considered within the existing built environment where: (1) adequate right-of-way is available; (2) impacts to adjacent land uses can be avoided or adequately mitigated to General Plan standards (see Policy 5.2-s of the General Plan); (3) the alternative transportation cross section is in harmony and compatible with the surrounding land use and transportation environment; and (4) implementation of the alternative transportation cross section provides for a continuous, consistent, and safe travel corridor for bicyclists and/or pedestrians."***

PASSED AND ADOPTED at a regular meeting of the City Council of the City of Turlock this 22nd day of September, 2015, by the following vote:

AYES:
NOES:
NOT PARTICIPATING:
ABSENT:

ATTEST:

____

Kellie E. Weaver, City Clerk,
City of Turlock, County of Stanislaus,
State of California

EXHIBIT A

Turlock Active Transportation Plan
FINAL DRAFT

June 2015

PREPARED BY:
Alta Planning + Design

WITH:
Omni Means

PREPARED FOR:
City of Turlock

Project Number 13-64

CITY OF TURLOCK INC. 1908

alta PLANNING + DESIGN

Plan Composition

The Turlock Active Transportation Plan is comprised of three volumes:

Volume I contains Chapters 1 through 7.

Volume II contains Chapter 8, the Implementation Plan.

Volume III contains the Appendices.

In addition, several companion volumes were developed in conjunction with the Active Transportation Plan and are available as separate documents. These include:

Volume IV: Turlock Safe Routes to School Report

Volume V: Suggested Routes to School Maps

Volume VI: Active Transportation Design Toolkit

Volume VII: Walk- and Bike-Friendly Turlock: Ideas to Encourage Walking and Biking

All volumes can be printed on standard 8.5 by 11 inch paper, except for volumes II and V which can be printed on 11 by 17 inch stock.

This page intentionally left blank.

Table of Contents

Table of Figures

Table of Tables

1 Introduction

The City of Turlock and the Stanislaus Council of Governments (StanCOG) recognize that bicycling and walking are important parts of daily transportation for residents, commuters, and visitors to the city. This Plan is for all residents who desire to improve their level of daily physical activity or broaden their transportation choices by bicycling or walking to school, work, and other local destinations.

At the most basic levels, Turlock possesses a number of great assets that make it an ideal community for walking and bicycling. The temperate climate and short rainy season make being outside pleasant for much of the year. Most destinations within Turlock are within reach by bicycle—the town is a rough square about 5 miles across. Its grid street system makes it easy to navigate, even for visitors, and provides many route choices.

Getting more residents in Turlock to walk and bike for their everyday travel can address several interrelated challenges including traffic congestion and safety, improve public health and air quality, create a sense of community, and support a vibrant local economy. By creating an Active Transportation Plan to support walking and biking, Turlock can address these challenges and improve the quality of life for residents and visitors alike.

1.1 The Five E’s

Communities that support high levels of walking and bicycling demonstrate achievement across five categories, often referred to as the Five E’s.

Engineering

Creating operational and physical improvements to the infrastructure that reduce speeds and potential conflicts with motor vehicle traffic, and establish safer and fully accessible crossings, walkways, trails, and bikeways

One of the largest impediments to active transportation is a built environment that feels unsafe to pedestrians and bicyclists. Engineering projects can range from relatively low-cost improvements like painting crosswalks, trimming landscaping, or installing stop signs; to more costly projects like completing missing sidewalk connections, installing curb ramps, or building a bicycle/pedestrian overpass.

Education

Teaching children and adults about the broad range of transportation choices, instructing them in important lifelong bicycling and walking safety skills and launching driver safety campaigns

Bicycle and pedestrian safety trainings offer children and adults a safe space to learn the basic skills for navigating their communities on foot or by bike. Motorist education is an important component of a walk- and bike-friendly community.

Encouragement

Using events and activities to promote or incentivize walking and bicycling and to generate enthusiasm for active transportation throughout the community

Special events like Walk and Bike to School or Work Days can motivate people to try walking or biking for the first time. Contests or campaigns where people log miles, days, or trips taken using active transportation to be entered to win rewards are a fun way to kick-start data collection for Evaluation, which is discussed below. Other ways to encourage more people to walk or bike include arranging 'walking school buses' where neighborhood parents rotate the responsibility of walking multiple children to school, or working with large employers to offer incentives and facilities for employees who bike.

Enforcement

Partnering with local law enforcement to ensure that traffic laws are obeyed—including enforcement of vehicle speeds, yielding to pedestrians in crosswalks, and proper walking and bicycling behavior—and initiating community enforcement such as crossing guard programs

Enforcement helps ensure all road users are behaving respectfully and abiding by the rules of the road. Beyond issuing tickets or citations, police can increase their presence in the community or near schools to discourage unsafe driving. Working with your local police department to have officers patrol the city by bicycle can contribute to a deeper understanding of the challenges facing cyclists, and lend legitimacy to bicycling as a mode of transportation.

Evaluation

Monitoring and documenting outcomes, attitudes, and trends through the collection of data before and after the intervention(s)

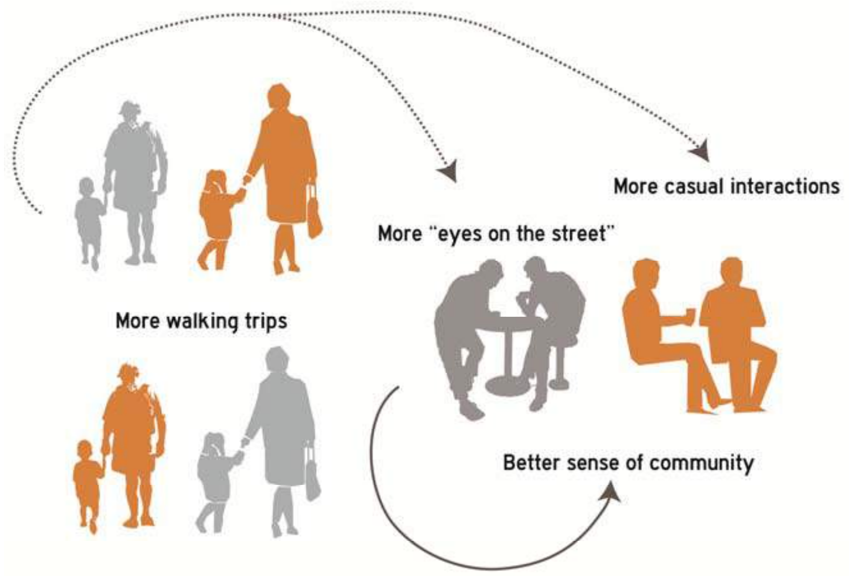
Evaluation efforts help reveal areas in the community where significant improvements are needed, and can point to strategies that have been particularly successful in increasing walking and bicycling. Evaluation methods may include bicycle and pedestrian counts, analysis of collision frequency or severity, and travel surveys.

1.2 Benefits of Walking and Biking

Walking and bicycling are healthy, efficient, low-cost modes of travel, available to nearly everyone. Walking is the most basic form of transportation. Everyone is a pedestrian at some point during a trip, whether you walk the entire way, walk to a transit stop to catch a bus, or walk from your car to your destination after parking. Pedestrians also include persons using skateboards and scooters, as well as wheelchairs and other mobility assistance devices. Bicycling is an inexpensive, active mode of transportation that can extend the range of trips for many people by allowing for faster travel than walking.

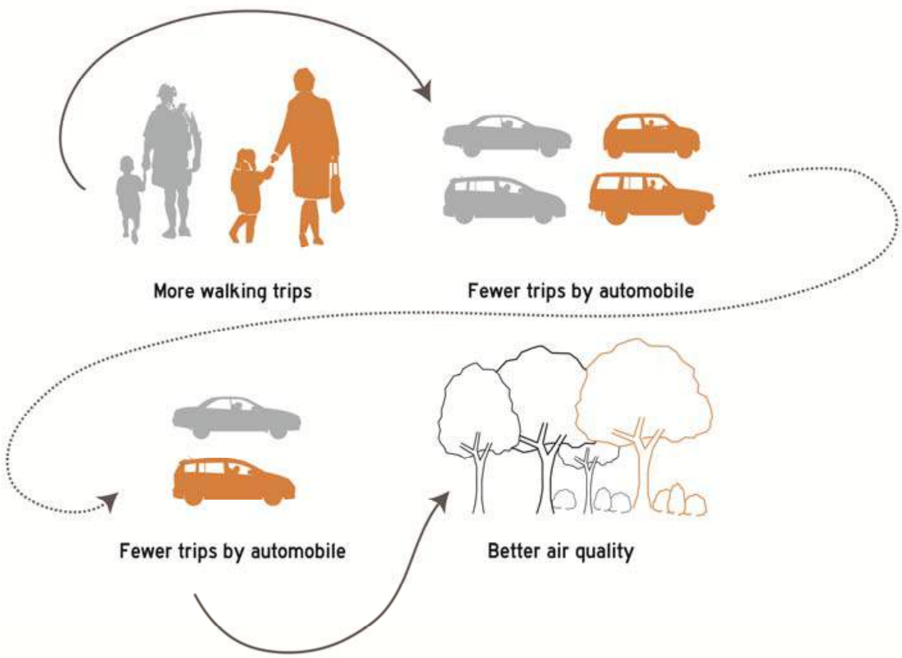
Walking and bicycling help develop and maintain "livable communities," make neighborhoods safer and friendlier, save on personal and public transportation costs, and reduce transportation-related environmental impacts, automobile emissions, and noise. They create transportation system flexibility by providing transportation choices, particularly in combination with transit systems, to people of all ages, abilities, and income status.

Streets that are busy with bicyclists and pedestrians are working at a human scale, fostering a sense of neighborhood and community. They create opportunities for chance encounters with neighbors, and put more "eyes on the street" to discourage crime and violence. Communities with high levels of walking and bicycling often have lower crime rates, and are generally attractive and friendly places to live.



The design of our communities directly affects our ability to reach the daily levels of recommended physical activity—30 minutes for adults and 60 minutes for youth. According to the Centers for Disease Control and Prevention, "physical inactivity causes numerous physical and mental health problems, is responsible for an estimated 200,000 deaths per year, and contributes to the obesity epidemic."[1] The increased rate of disease associated with inactivity reduces quality of life for individuals and increases medical costs for families, companies, and local governments. Creating places that support active transportation, on the other hand, can result in a 25 percent increase in the number of people who exercise at least three times a week.

In recent years, public health professionals and urban planners have become increasingly aware that the impacts of vehicles on public health extend far beyond asthma and other respiratory conditions caused by air pollution. Dependency on vehicles has also decreased the amount of physical activity incorporated into everyday life.



Walking and bicycling can improve the health of all those living and working in Turlock, not just those who walk or bike. People choosing to ride or walk may be replacing short automobile trips, which contribute disproportionately high amounts of pollution to the environment. Reducing these automobile emissions by shifting more trips to active modes of transportation may also save Turlock residents money in the form of lower health care costs.

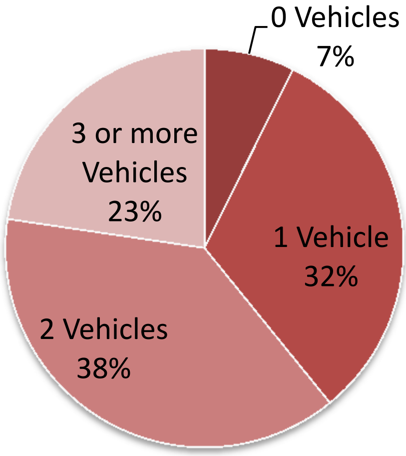
Compared with driving, walking and bicycling are extremely affordable modes of transportation. According to the Pedestrian and Bicycle Information Center, the cost of operating a bicycle for a year is approximately $120. By comparison, AAA estimates the annual average cost to operate a car at $10,374.

---

[1] *U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (1996) Physical activity and health: A report of the Surgeon General. Washington, DC: Government Printing Office.*

As Figure 1-1 shows, over 60% of households in Turlock have two or more vehicles—costing them just over $20,000 annually.

Figure 1-1: Household Vehicles Available in Turlock



Source: 2012 American Community Survey

In addition, bicycling and walking require less space and infrastructure compared with automobile facilities. Improvements made for bicyclists often result in better conditions for other transportation facility users as well. For instance, paved shoulders, wide curb lanes, and bicycle lanes not only provide improved conditions for bicyclists, but also create safe locations for disabled vehicles to pull over, can reduce traffic speeds, and provide additional turning room for large vehicles, among other benefits.

Walking and bicycling are also good choices for families. Bicycles enable young people to explore their neighborhoods and visit places without being driven by their parents, fostering a sense of independence and the freedom of personal decision-making. More children walking and bicycling can mean less traffic congestion around schools, and reduces the time parents must spend chauffeuring their children.

1.3 Active Transportation Program Compliance

To comply with California's Active Transportation Program, bicycle and pedestrian plans must contain a number of required items. These are listed in Appendix A, along with information on where in the plan each item is addressed.

This page intentionally left blank.

2 Existing Plans & Policies

Over the past decade, transportation policy in the Turlock region has become increasingly supportive of active transportation. Plans or policies that encourage walking and bicycling are present at every level from local government to the national scale.

This Active Transportation Plan is built on and consistent with local and regional plans and policies that affect walking and bicycling in Turlock. Those plans, policies, and practices that are most relevant to the Plan are depicted in Figure 2-1, with a focus on their impact on active transportation. A more in-depth review of relevant plans and policies is included in Appendix B.

Figure 2-1: Relationship of Active Transportation Plan to Existing Documents

NATIONAL

Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations
US Department of Transportation, 2010

STATE

California Assembly Bill No. 32, Global Warming Solutions Act, California Assembly, 2006

California Senate Bill No. 375, Sustainable Communities and Climate Protection Act, California Senate, 2009

California Assembly Bill No. 1358, Complete Streets Act, California Assembly, 2008

California Senate Bill No. 99, Active Transportation Program Act, California Senate, 2013

Complete Streets Policy and Deputy Directive 64, California Department of Transportation, 2001

California Transportation Plan 2025, California Department of Transportation, 2006

REGION

San Joaquin Valley Blueprint and Smart Valley Places Partnership, San Joaquin Valley, 2005

Stanislaus Council of Governments Non-Motorized Transportation Master Plan, StanCOG, 2013

LOCAL

Turlock General Plan
City of Turlock, 2012

Downtown Design Guidelines and Zoning Regulations
City of Turlock, 2003

TURLOCK ACTIVE TRANSPORTATION PLAN

Existing Conditions
Vision & Values
Bicycle and Pedestrian Facility Design Guidelines
Priority Projects
Implementation Challenge - The Beginning of Action
Alta Planning + Design and Omni-Means, 2015

3 Needs Analysis

3.1 Active Transportation Attractors and Generators

Throughout the Turlock community, there are a variety of destinations that may attract significant bicycle and pedestrian traffic. Improvements to the active transportation network near these destinations have great potential to increase walking and bicycling in Turlock, and these routes should be considered priorities for investments in sidewalks and bikeway facilities. A map of all activity generators can be seen in Figure 3-1.

3.1.1 Parks and Community Centers

Turlock has 25 park facilities including ball fields, BMX parks, playgrounds, and picnic areas that serve as recreational destinations for the community. In addition to the many neighborhood parks with playgrounds, picnic areas, and open space, the following parks may be destinations for cyclists and pedestrians in Turlock:

Bike Park: Located in the northwest corner of the Walnut/Christoffersen Storm Basin, the City of Turlock BMX Bike Park offers a variety of terrains and obstacles for riders. (0.5 acre)

Brandon Koch Memorial Skate Park: Located on Starr Avenue near N. Denair Avenue, the park offers 28 skating elements in addition to amenities such as shade trees and picnic areas. (1.25 acres)

Central Park: This park is also a layover site for the Stanislaus County Bus System, and is adjacent to the Chamber of Commerce Building on S. Golden State Boulevard. It offers shade trees, seating areas, and a water fountain. (0.5 acres)

Christoffersen Park/Basin: One of the largest parks in Turlock, it also serves as a storm basin. This park offers a large playground area, two large open space areas, picnic areas with barbeques, and shade trees. It is located at E. Christoffersen Parkway and Fosberg Road. (10 acres)

Columbia Park: Located at Columbia and Farr streets, Columbia Park includes a community building and swimming pool. The park also offers covered picnic areas with barbeques, a playground, horseshoe pits, basketball courts, and a field with soccer goals. (4 acres)

Crane Park: One of Turlock's oldest parks, it offers a large playground, tennis courts, horseshoe pits, public restrooms, basketball, picnic areas, and open spaces. It is located at Canal Drive and Berkeley Ave, and is one of the most popular parks in the city. (7.5 acres)

Donnelly Park: Opened in 1974, Donnelly Park is Turlock's premier community park. It covers one square mile, including a 10 acre storm basin, basketball courts, a playground, and covered picnic areas. It is located at Dels Lane and W Hawkeye Avenue. (40 acres)

Pedretti Park: At Tegner Road and Tuolumne Road, this sports complex offers a wide variety of recreational opportunities including softball fields, volleyball courts, a large covered picnic area, a tot playground, and a large open space with over 100 shade trees. (25 acres)

Summerfaire Park: At Soderquist Road and Fulkerth Road, this park offers a large expanse of open space in addition to a playground, picnic areas, and a storm basin. (16 acres)

Turlock Regional Sports Complex: This large park offers tournament facilities for the region in addition to local recreation opportunities. It includes 14 soccer fields, a playground, and a baseball diamond. (30 acres)

3.1.2 Schools

Children below driving age represent a large population of existing and potential bicyclists or pedestrians. There are fifteen schools in the city of Turlock that present opportunities for Safe Routes to School or other programs encouraging students, faculty, and staff to use active modes of transportation for their commutes. These schools are listed in Table 3-1.

Table 3-1: Turlock K-12 Schools

Turlock K-12 Schools		
Elementary Schools		
Brown	Earl	Osborn
Crowell	Julien	Wakefield
Cunningham	Medeiros	Walnut
Junior High and Middle Schools		
Turlock Junior High	Dutcher Middle School	
High Schools		
Turlock	Pitman	

Nestled into residential neighborhoods, many of the elementary schools should be considered priorities for 'model' programs because many children at those schools likely have short commutes that could be converted to walking or biking trips.

In addition to elementary, middle, junior high, and high schools, Turlock is also home to California State University (CSU) Stanislaus. As of fall 2012, CSU Stanislaus enrolled a total of 8,882 undergraduate and graduate students.

3.1.3 Retail and Employment Centers

Located in the southern portion of the city, Downtown Turlock is comprised of several blocks and features restaurants, retail shops, entertainment uses, and professional services. City Hall is also located downtown.

Major commercial centers are located along Geer Road from North Avenue to Monte Vista Avenue, at Monte Vista Avenue and Countryside Drive, and at various locations along Golden State Boulevard. Additional smaller retail clusters are scattered throughout Turlock.

Large retail developments such as the Monte Vista Crossings present a challenge for walking and bicycling with minimal or no sidewalks, large parking lots, and large distances between stores.

Major Employers

Over 8,000 people are employed by Turlock's top ten employers. Making walking and bicycling to work convenient through increased access to employment centers and City or privately sponsored encouragement programs can target this large pool of potential cyclists and pedestrians. Table 3-2 lists the top ten employers in Turlock.

Table 3-2: Top Ten Employers

Employer	Address	Number Employed
Turlock Unified School District[2]	1574 E. Canal Drive	2,200
Emanuel Medical Center	825 Delbon Avenue	1,549
Foster Farms	500 F Street	1,512
CSU Stanislaus	1 University Circle	1,100
Turlock Irrigation District	333 E. Canal Drive	495
Wal-Mart	2111 Fulkerth Road, and 2480 Geer Road	415
City of Turlock	156 S. Broadway	373
Varco Pruden	530 S. Tegner Road	245
Mid-Valley Dairy	2600 Spengler Way	205
Sensient	151 S. Walnut Road	180

[2] The Turlock Unified School District office is not considered a major activity generator because its employees are dispersed at school sites throughout the community rather than concentrated in a central office. Schools are all considered activity generators.

3.1.4 Transit

Public transit riders often face the "first and last mile" dilemma: how to connect their home and final destination with the actual transit route. For instance, a transit bus may take a passenger to within a mile of their employment site, but that might be outside the range of their walking capability or tolerance.

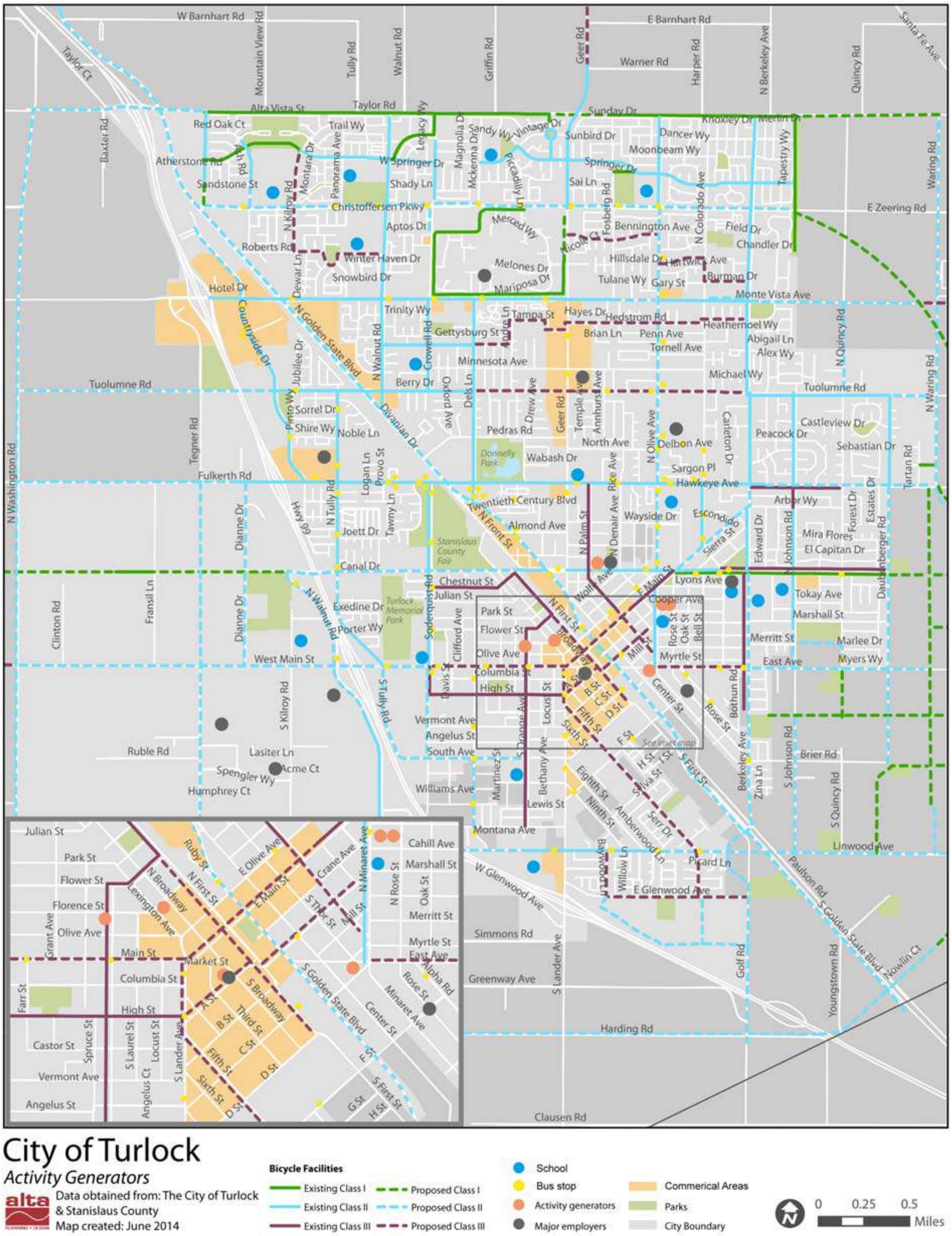
Bicycle racks on buses and bike parking at transit stops help ensure that bicycling is a complementary solution to the transit connectivity issue, and providing amenities like benches and shade structures can make walking to transit more comfortable. Most bus stops in Turlock provide shelters with seating and accessible sidewalks.

The Bus Line Service of Turlock (BLaST) offers local service on weekdays and Saturdays throughout Turlock. Four fixed-routes provide residents with service to destinations including CSU Stanislaus, Emanuel Medical Center, downtown Turlock, and the Stanislaus County Fairgrounds. BLaST buses are equipped with racks to accommodate bicycles.

Stanislaus Regional Transit (StaRT) also provides connections to Modesto, Ceres, Patterson, Merced, and other destinations in the region.

According to the 2012 American Community Survey, only 0.32 percent of Turlock workers currently commute on public transit, but many more residents may use the local bus services to run errands, visit friends or family, or for other trips.

Figure 3-1: Active Transportation Activity Generators



3.2 Existing Bicycle and Pedestrian Facilities

The following sections offer a brief overview of the bicycle and pedestrian facilities in Turlock today. The City has a number of roadway projects moving forward in 2014, listed in Appendix C.

3.2.1 Pedestrian Facilities

In the City of Turlock, construction and maintenance of sidewalks and other frontage improvements are the responsibility of individual property owners. As a result, the connectedness of the pedestrian network varies widely throughout the community. Some blocks are mostly complete but missing one or two sidewalk segments, and other blocks have sidewalks only along one or two properties. The maintenance and repair status varies similarly. The City does not maintain an inventory of pedestrian facilities, though they do include them in designs for all new development projects.

Newer neighborhoods in northern Turlock tend to have more complete sidewalk networks than older developments southeast of Golden State Boulevard. Because sidewalks are provided by each property owner, the widths and amenities vary from 4' wide sidewalks adjacent to on-street parking, to broad 8' paths separated from the curb by a parkway strip.

Intersection treatments for pedestrians include marked crosswalks and pedestrian-activated signals. Curb extensions are present throughout the downtown area, reducing the crossing distance for pedestrians. There is often a long distance between marked crossings, however, which may contribute to some pedestrians choosing to cross midblock at unprotected and unmarked locations.

The Union Pacific railroad tracks present a major barrier to pedestrian travel in Turlock. Where sidewalks are present approaching the railroad, they often end short of the tracks, forcing pedestrians to walk in the gravel or the roadway. This presents a particular challenge for pedestrians in wheelchairs, using mobility devices, or for parents pushing strollers.

3.2.2 Bicycle Facilities

Turlock has a growing but discontinuous network of bikeways including Class I shared-use paths, Class II bike lanes, and Class III bike routes, shown in Figure 3-2. While this network spans much of the city, it lacks continuous bikeways through challenging arterial intersections and at places where the available right-of-way is entirely allocated to vehicle lanes or parking. Figure 3-3 shows the existing and proposed bikeway network in Turlock as adopted in the 2013 General Plan (see also Figure B-4 in Appendix B).

Class I bikeways, or shared-use paths, provide for bicycle and pedestrian travel on a paved right-of-way completely separated from any street or highway. These paths are commonly used by bicyclists, pedestrians, joggers, in-line skaters, and others. Shared-use paths are separated from roadways, paved, and preferably ten feet wide with two foot wide shoulders. The paths along the canals on Canal Drive and Taylor Road are popular among pedestrians and cyclists alike in Turlock, along with the path that partially encircles the CSU Stanislaus campus.

Class II bike lanes are striped lanes on roadways for one-way bicycle travel. Bike lanes are at least five feet wide, and include bike signage. There are bike lanes along many arterial roads in Turlock. Because they are adjacent to higher speed traffic, some cyclists may perceive these facilities to be uncomfortable or stressful to ride in. Pavement quality is poor in many locations, and debris and glass was observed—indicating a need for more regular sweeping. Bike lanes also frequently 'drop' to accommodate vehicle right-turn lanes at intersections, creating potential conflict points between bicyclists and cars.

Class III bike routes are roadways where bicyclists and motorists share a travel lane, and are designated by bike route signs or shared lane markings. Turlock's bike routes are primarily in the downtown area, where slower speeds make sharing the road more appropriate and comfortable. In the Circulation Element of the Turlock General Plan, additional bike routes are proposed on residential streets to connect other bike facilities in the community.

Bicycle parking is provided at some destinations in Turlock, though there is considerable community demand for additional bike parking in the downtown area, at parks, and other locations.

Figure 3-2: Bikeway Classifications

CLASS I

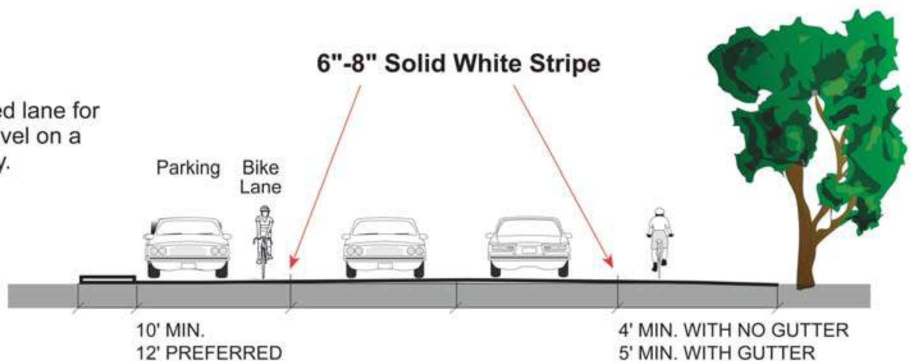
Shared Use Path

Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with crossflow minimized.

CLASS II

Bike Lane

Provides a striped lane for one-way bike travel on a street or highway.



CLASS III

Bike Route
Signed Shared Roadway

Provides for shared use with pedestrian or motor vehicle traffic, typically on lower volume roadways.

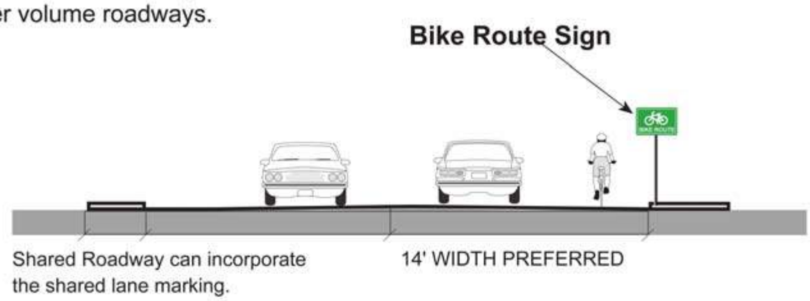
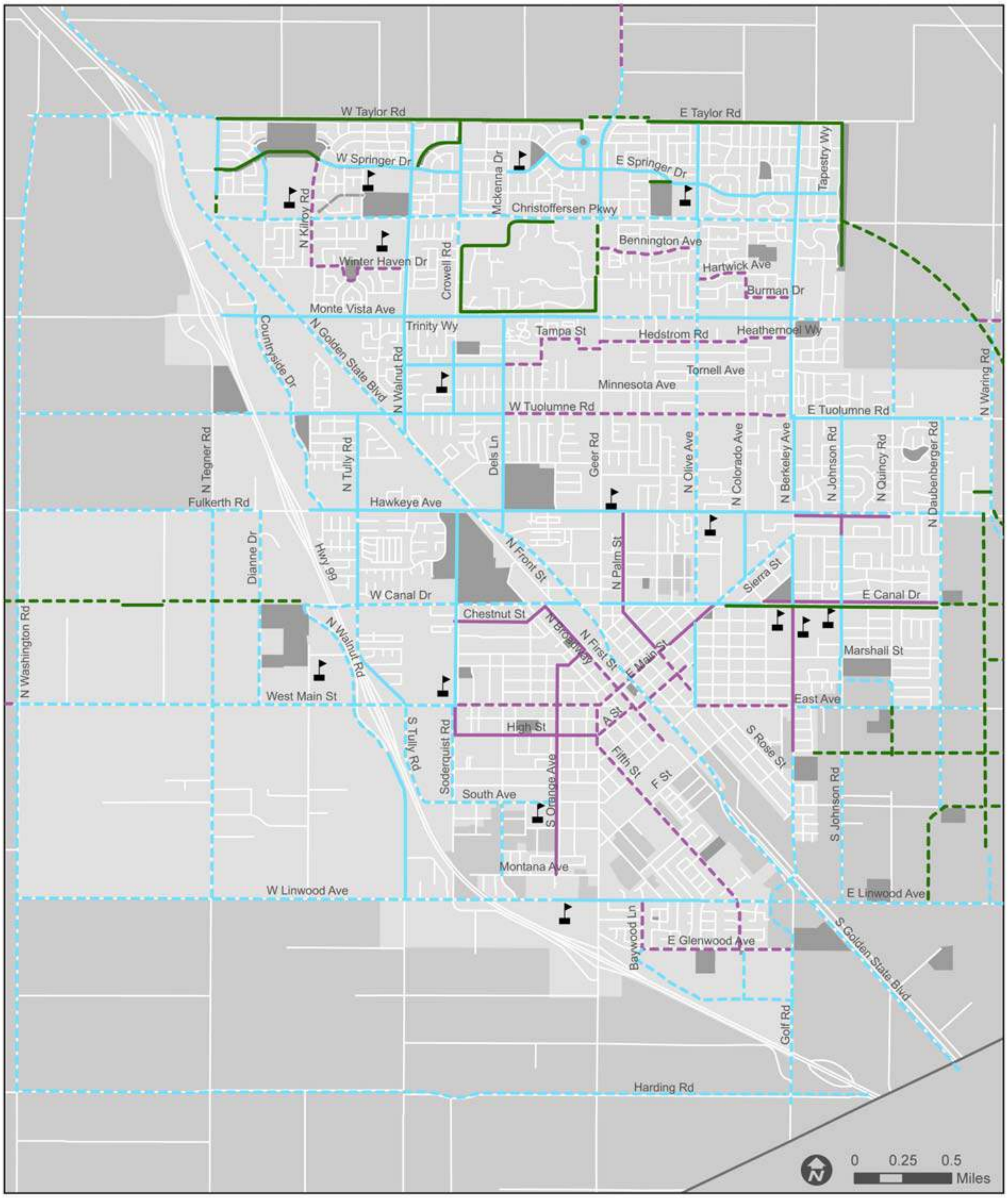


Figure 3-3: General Plan Existing and Proposed Bikeways



General Plan Recommendations

alta Data obtained from: The City of Turlock & Stanislaus County
Map created: October 2014

Facilities
Existing / Proposed
Class I Shared-use Path
Class II Bike Lane
Class III Bike Route
Parks
Schools

3.3 Existing Bicycle and Pedestrian Programs

3.3.1 Education

Bicycle Rodeos

As part of this planning process, bicycle skills rodeos were offered at four elementary schools in May 2014. The rodeos were open to all members of the community, and taught basic bicycle handling and safety skills including starting and stopping, signaling and turning, and yielding to other bicyclists.

3.3.2 Encouragement

No encouragement programs were documented.

3.3.3 Enforcement

Targeted Enforcement

Multiple schools in Turlock coordinate with local law enforcement, to include the motorcycle police officers of Turlock Police Traffic Safety Unit, on targeted enforcement efforts. These efforts, which occur periodically throughout the year, focus on encouraging safe driver, pedestrian, and bicyclist behavior in school areas.

Crossing Guard Program

Crossing guards monitor crosswalks at major intersections near all primary and secondary school campuses in Turlock, encouraging motorists to yield to pedestrians and bicyclists in the crosswalk and managing the large volumes of pedestrians near schools during arrival and dismissal times. Crossing guards are on duty during morning arrival and afternoon dismissal every school day, and are often parents or faculty.

3.3.4 Evaluation

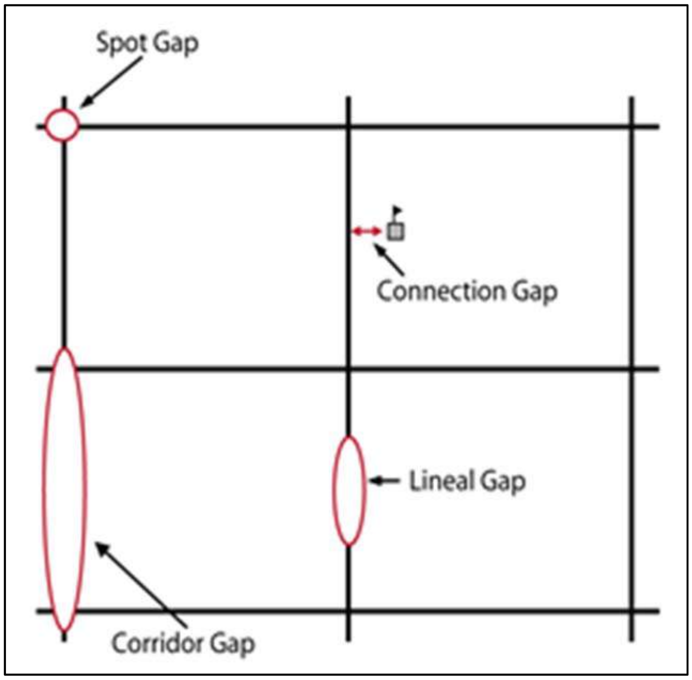
No evaluation programs were documented.

3.4 Gap Analysis

This section describes the five types of gaps that can occur in a bicycle and pedestrian network, and organizes gaps in Turlock into these categories. Identifying gaps will help prioritize which improvements should be prioritized to have the greatest impact on connectivity through the community. Figure 3-4 illustrates the various types of gaps we will discuss.

3.4.1 Types of Gaps

Figure 3-4: Types of Gaps



Spot Gaps

Spot gaps refer to point-specific locations lacking dedicated bicycle facilities, sidewalks, or other treatments to accommodate safe and comfortable travel. Spot gaps primarily include intersections and other conflict areas that pose challenges for bicyclists and pedestrians. Examples include bike lanes on a major street "dropping" to make way for right turn lanes at an intersection, or a lack of crossing safety measures as pedestrians cross a major intersection.

Connection Gaps

Connection gaps are missing segments (1/4 mile long or less) on a clearly-defined and otherwise well-connected bikeway or sidewalk. Major barriers standing between bicycle destinations and clearly defined routes also represent connection gaps. Examples include bike lanes on a major street "dropping" for a block to make way for on-street parking; a discontinuous sidewalk or shared-use path; or a freeway interchange along a bikeway route between homes and a school.

Lineal Gaps

Similar to connection gaps, lineal gaps are 1/4 mile to one-mile long missing links on clearly defined and otherwise well-connected bicycle or pedestrian facilities.

Corridor Gaps

Corridor gaps are missing links longer than one mile. These gaps will sometimes encompass an entire street corridor where bicycle or pedestrian facilities are desired but do not currently exist.

System Gaps

Larger geographic areas (e.g., a neighborhood or business district) where few or no bikeways or sidewalks exist are identified as system gaps. System gaps exist in areas where a minimum of two intersecting bikeways or sidewalks would be required to achieve the target network density. Gaps typically exist where physical or other constraints impede network development.

Neighborhood streets where traffic volumes and speeds are relatively low are not considered to be system gaps even if dedicated bikeways are not present. The roadway conditions make it safe and comfortable for bicyclists to share space with cars.

3.4.2 Analysis of Existing Network Gaps

Gaps in the pedestrian and bicycle network were identified based on input from Turlock residents at public workshops, through an online survey, and from observations and analysis by the consultant team. Mapped in Figure 3-5 and Figure 3-6, these gaps represent locations in Turlock where bicycle or pedestrian facilities are missing entirely from one or both sides of the roadway. These gaps will guide the development of recommended improvements to help target investments where they will have the greatest connectivity benefits.

Figure 3-5: Pedestrian Network Gaps

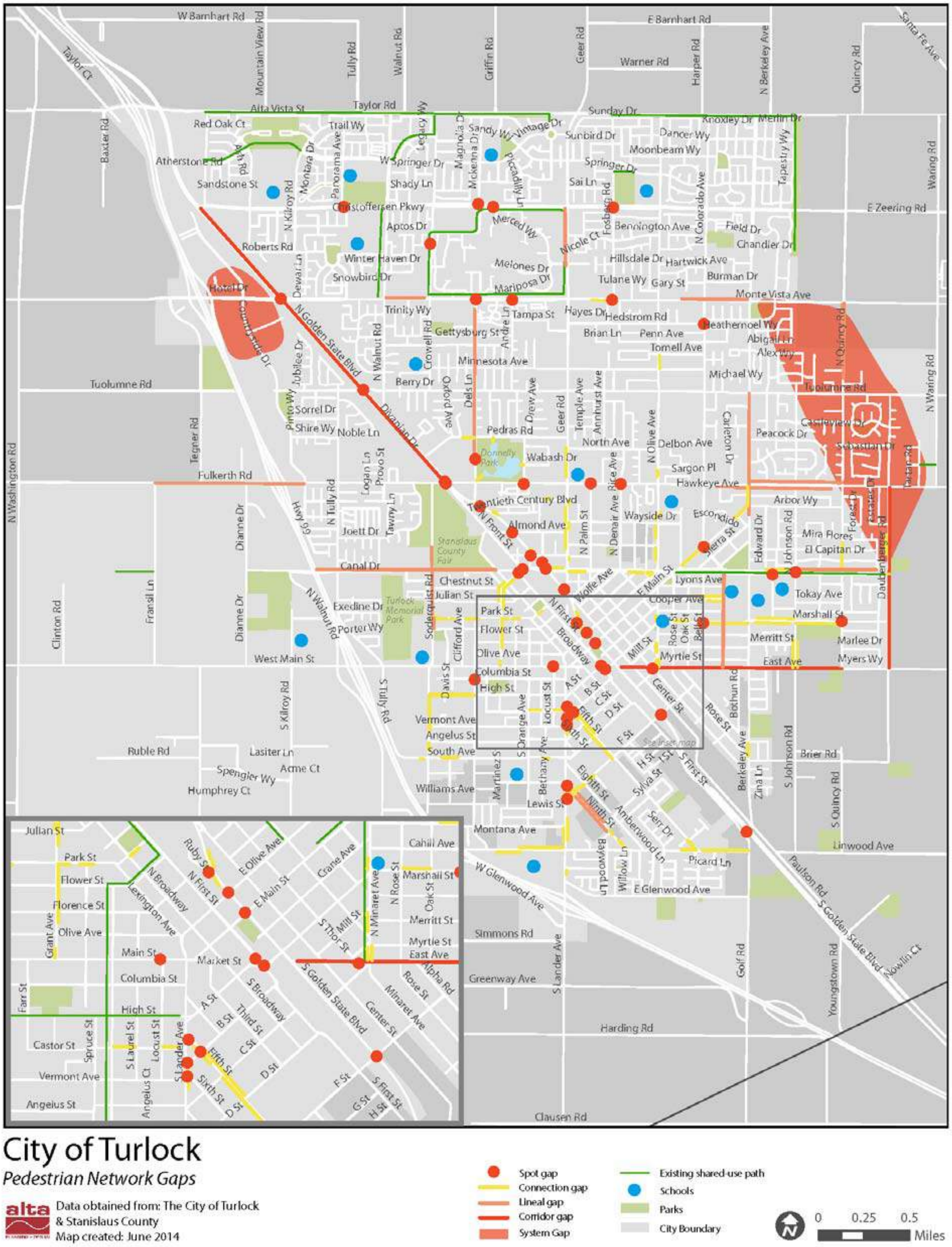
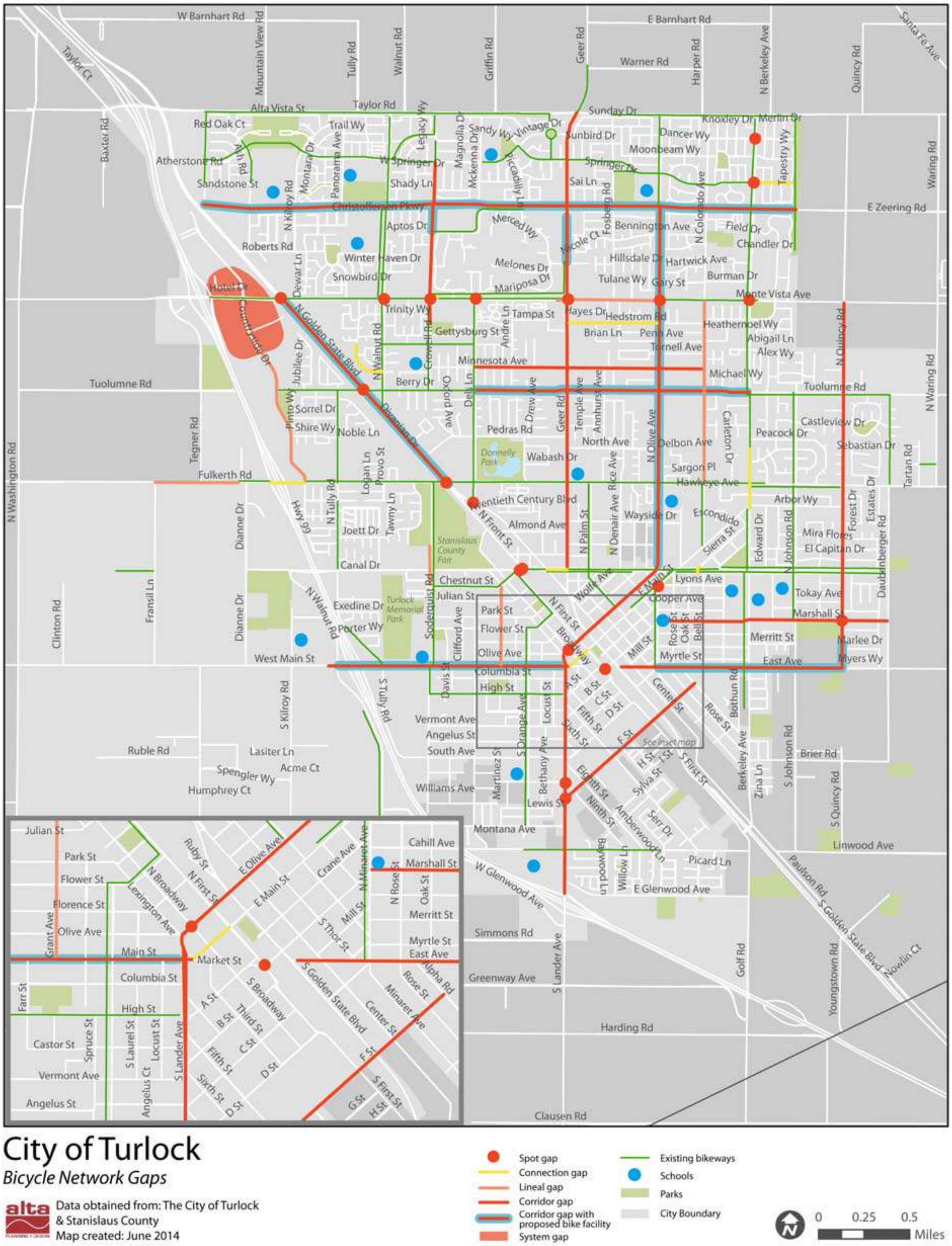


Figure 3-6: Bicycle Network Gaps



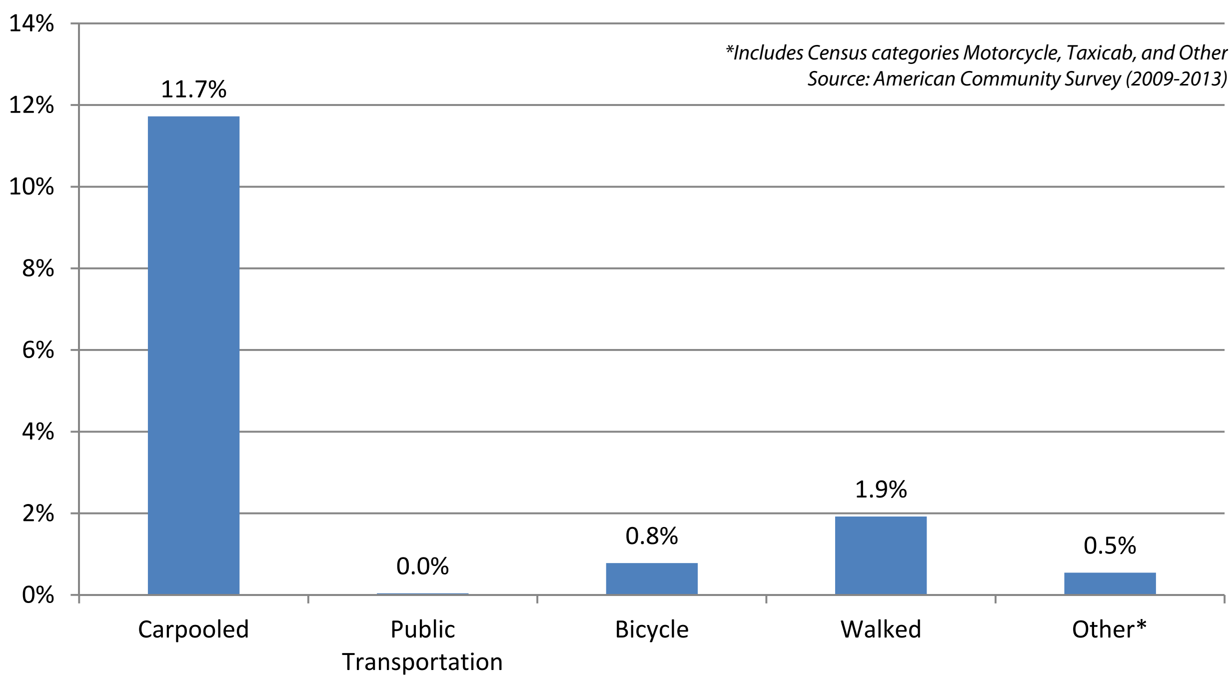
3.5 Current Commute Patterns

The United States Census collects information about the primary mode of transportation that residents use when commuting to work. While this provides important data about commute trips, these data only tell us about employed residents over 16 years of age, and how they typically travel to work. The data do not capture the many other walking trips Turlock residents take, including those to school, to shops, or for recreational purposes. Additionally, the Census does not capture walking or biking trips made after parking a car or in conjunction with public transit, nor does it capture visitors to Turlock.

Data tables are included in Appendix D.

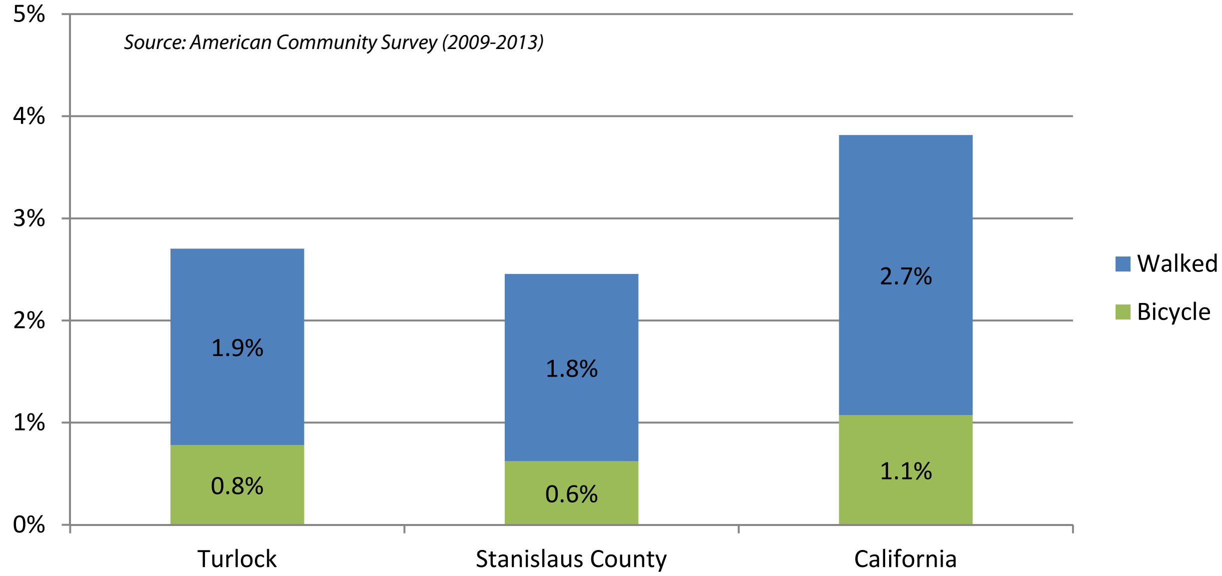
According to the American Community Survey (ACS) 2009-2013 estimates, an overwhelming majority of Turlock's workers commute by driving alone—among all workers 16 and over who did not work from home, 84.6 percent reported this as their primary mode of transportation to work. Carpooling is the second most-used mode of transportation, at 11.7 percent. All remaining modes— including walking, bicycling, riding public transportation, and others—together amount to fewer than 4 percent of commute trips. Of these "active transportation" modes, walking was the most frequent choice for Turlock workers at 1.9 percent. Figure 3-7 shows the percentages of Turlock workers who used modes other than driving alone as their primary commute method.

Figure 3-7: Mode of Transportation to Work Other than Driving Alone



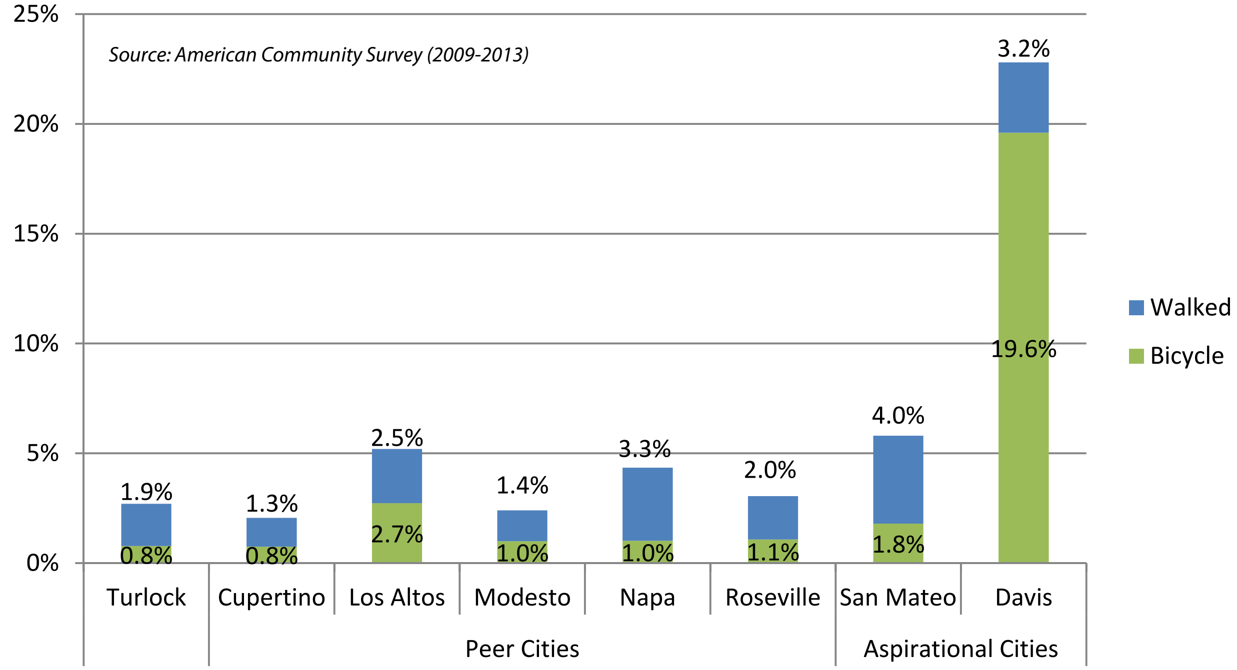
When compared to Stanislaus County and the state of California in Figure 3-8, a slightly higher percentage of commuters walk or bike to work in Turlock than in Stanislaus County, while fewer commuters in Turlock use active transportation compared to the state as a whole.

Figure 3-8: Walking and Bicycling Commute Trips in the County and State



Other communities in the Central Valley and East Bay have varying percentages of active transportation commuters, as shown in Figure 3-9. Cities like Cupertino, Los Altos, Modesto, Napa, and Roseville have similar commute patterns to Turlock, while San Mateo and Davis show that significantly higher levels of active transportation are achievable. Turlock and Davis share many similarities that bode well for high levels of walking and bicycling: they are both relatively compact communities with temperate climates, flat topography, and college campuses.

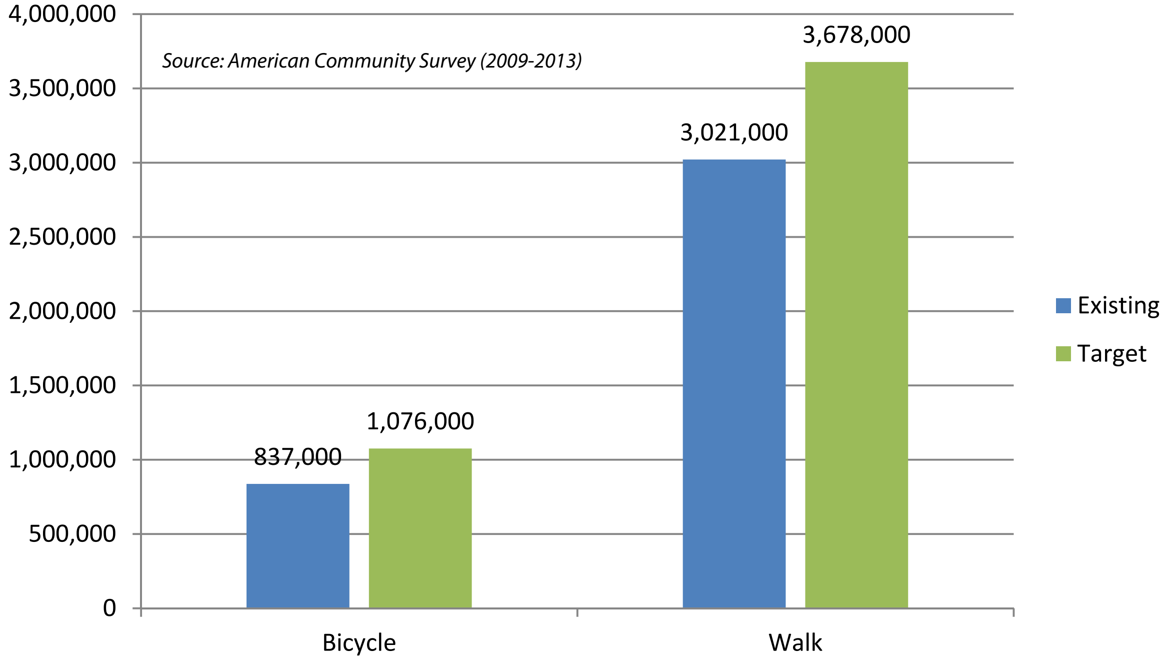
Figure 3-9: Walking and Bicycling Commute Trips in Peer and Aspirational Cities



Based on the difference between commute bicycle and pedestrian mode splits in Turlock and its peer cities (Cupertino, Los Altos, Modesto, Napa, and Roseville), target mode split numbers can be calculated. The difference between Turlock's existing bicycle commute share and the 25th percentile bicycle mode share of peer cities would result in a 0.21% higher target commute bicycle mode split (0.75% to 0.96%). The difference between Turlock's existing walk commute share and the 75th percentile walk mode share of peer cities would result in a 0.40% higher target commute walk mode split (1.84% to 2.24%).

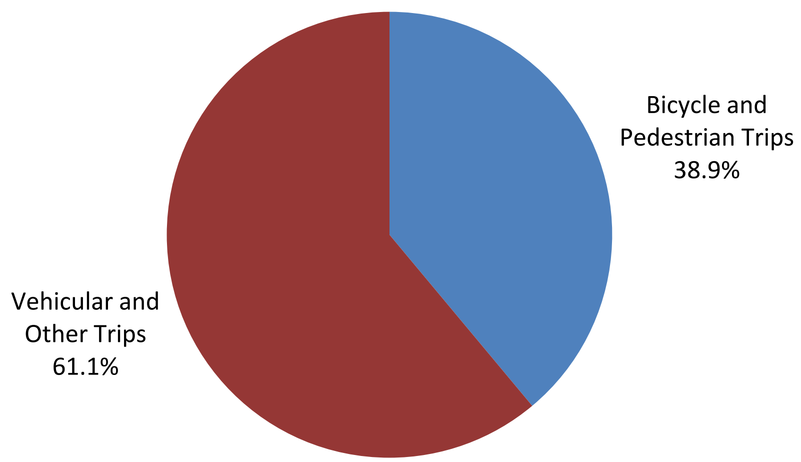
Using an impact model that calculates the benefits that could result from Turlock meeting these target bicycle and pedestrian mode shares, Turlock could experience 239,000 more bicycle trips and 657,000 more walk trips per year (See Figure 3-10). This is the equivalent of 310,000 more miles bicycled and 169,000 more miles walked each year, or 435,000 fewer vehicle-miles travelled.

Figure 3-10: Existing and Projected Annual Walk and Bicycle Trips



Commute trips only make up a portion of overall trips in Turlock. Not reflected in the ACS data are school, utilitarian, and social and recreational trips, among others. The 2009 National Household Travel Survey (NHTS) provides national-level estimates of non-commute trips from which trip ratios can be calculated. Using these ratios, for every commute trip that takes place in Turlock, approximately 1.6 bicycle and 4.3 pedestrian utilitarian trips are generated. Extrapolating from ACS commute data and NHTS non-commute trip ratios, the number of bicycle and pedestrian trips as a percent of all trips can be calculated. Figure 3-11 shows that approximately 38.9 percent of all trips in Turlock are by walking or bicycling.

Figure 3-11: Walking and Bicycling as a Percentage of All Trips

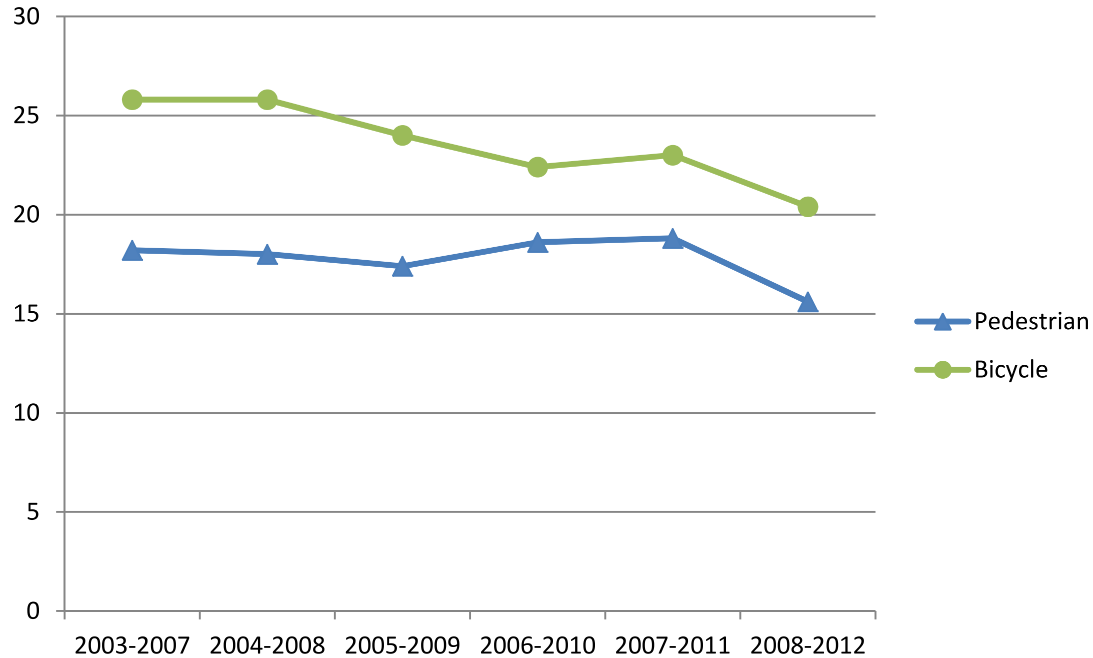


3.6 Bicycle- and Pedestrian-Involved Collisions

Analysis of bicycle and pedestrian related collision data provides the City of Turlock with a basis for infrastructure and program recommendations that can improve safety. Collision data comes from the Statewide Integrated Traffic Report System (SWITRS). Because this is a statewide repository for all police departments to submit records, data is sometimes incomplete due to varying reporting methods. While collision data is sometimes incomplete and does not capture the "near misses," it does provide a general sense of the safety issues facing bicyclists and pedestrians in Turlock.

Figure 3-12 shows the number of bicycle and pedestrian collisions in Turlock from 2003 to 2012, represented in five-year rolling averages. This allows us to better evaluate trends over time, rather than using annual totals that can vary considerably from year to year. Between 2003 and 2012, there were 169 total reported pedestrian collisions and 231 reported bicycle collisions.

Figure 3-12: Five-Year Rolling Averages of Bicycle- and Pedestrian-Involved Collisions

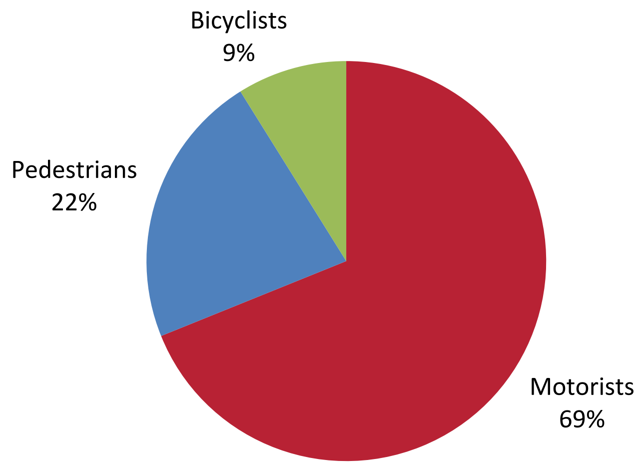


Source: SWITRS 2003-2012

Without additional data, such as trends in bicycle or pedestrian volumes over the same period, the downward trends in Figure 3-12 may not provide a complete picture of the bicycling and walking experience in Turlock—it may be the case that fewer people are walking for all trips.

While bicycling and walking together make up fewer than three percent of commute trips in Turlock, Figure 3-13 indicates they are grossly overrepresented in traffic fatalities. Between 2003 and 2012 in Turlock, over 30 percent of people killed in collisions were bicyclists or pedestrians.

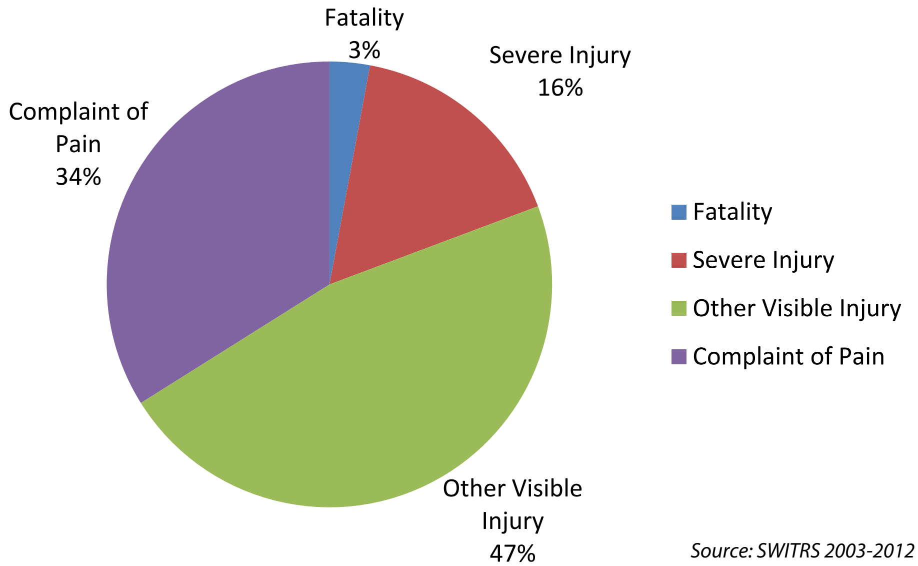
Figure 3-13: Traffic Fatalities by Victim Mode from 2003-2012



Source: SWITRS 2003-2012

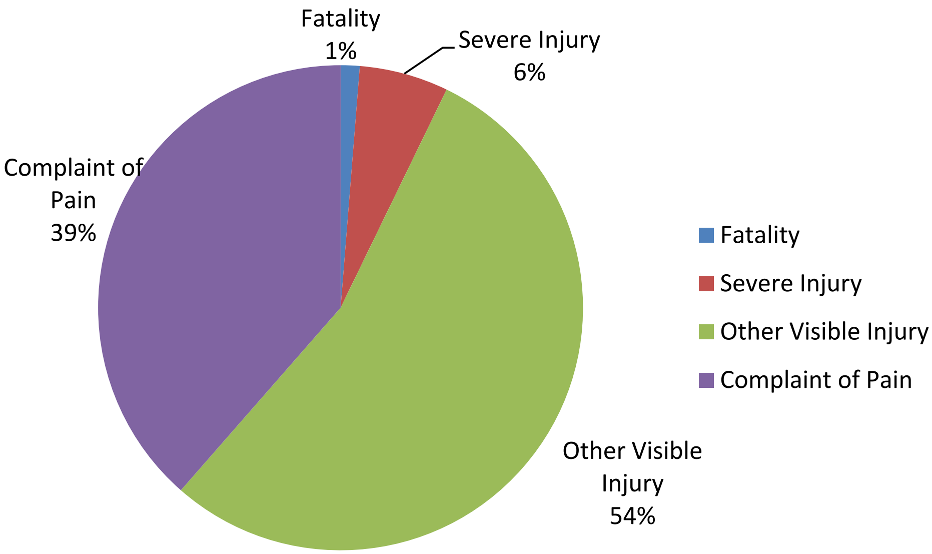
Pedestrians are more likely than bicyclists to sustain severe or fatal injuries in collisions, as illustrated in Figure 3-14 and Figure 3-15. Nineteen percent of pedestrian-involved collisions resulted in fatal or severe injuries in Turlock between 2003 and 2012, compared to seven percent of bicycle-involved collisions.

Figure 3-14: Pedestrian Injury Severity



Source: SWITRS 2003-2012

Figure 3-15: Bicyclist Injury Severity



Source: SWITRS 2003-2012

By taking a closer look at the locations in Turlock where high numbers of bicycle and pedestrian collisions have occurred over the last ten years, priority intersections and corridors emerge that should be studied for safety improvements. The red areas on the two maps—indicating the highest frequency of collisions—have significant overlap, indicating that both bicyclists and pedestrians face similar safety challenges in these areas. Table 3-3 shows the ten corridors with the highest number of bicycle and pedestrian crashes between 2003 and 2012. Many of the corridors have speed limits and widths that may create stressful environments for walking and bicycling, potentially leading to cyclists riding on sidewalks or against the flow of traffic. Both of these behaviors can increase the risk for collisions. As shown in Figure 3-16 and Figure 3-17, these collisions tend to be clustered in the central and southern parts of Turlock along Geer Road/Lander Avenue, Fulkerth Road, Main Street, and Canal Drive.

Table 3-3: Top Ten Collision Corridors

Street Name	Collisions			Speed Limit (mph)	Lanes
	Ped	Bike	Total		
Geer Rd	10	24	34	35-45	4
Main St	17	13	30	25-35	3
Golden State Blvd	10	19	29	30-50	6
Lander Ave	10	16	26	35-40	5
Olive Ave	9	12	21	30-35	5
Canal Dr	11	8	19	30-40	6
Hawkeye Ave	6	12	18	35-40	5
Monte Vista Ave	4	14	18	45	6
Walnut Rd	6	6	12	30-40	5
Fulkerth Rd	5	4	9	40	5

Figure 3-16: Heat Map of Bicycle-Involved Collisions from 2003-2012

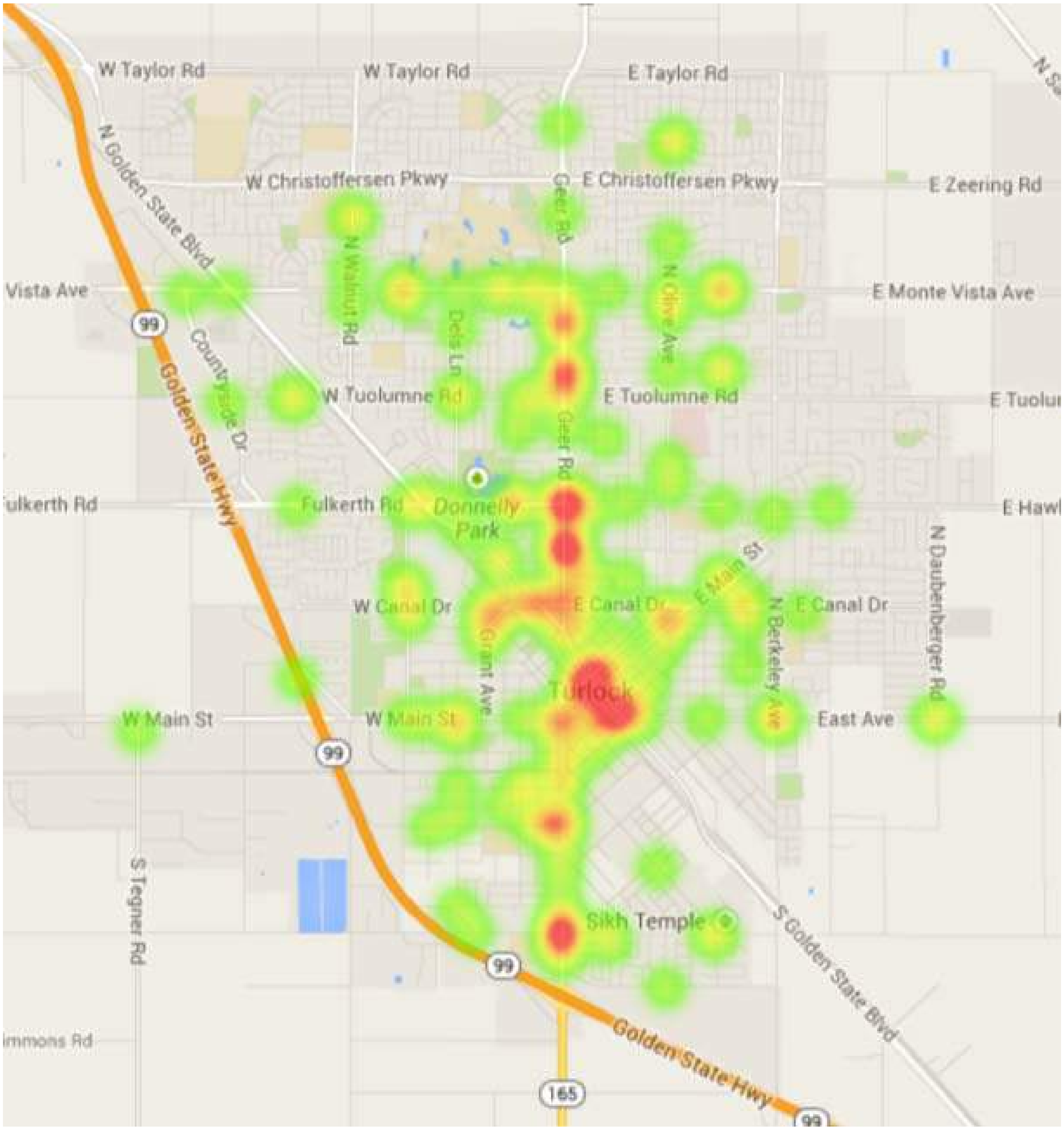
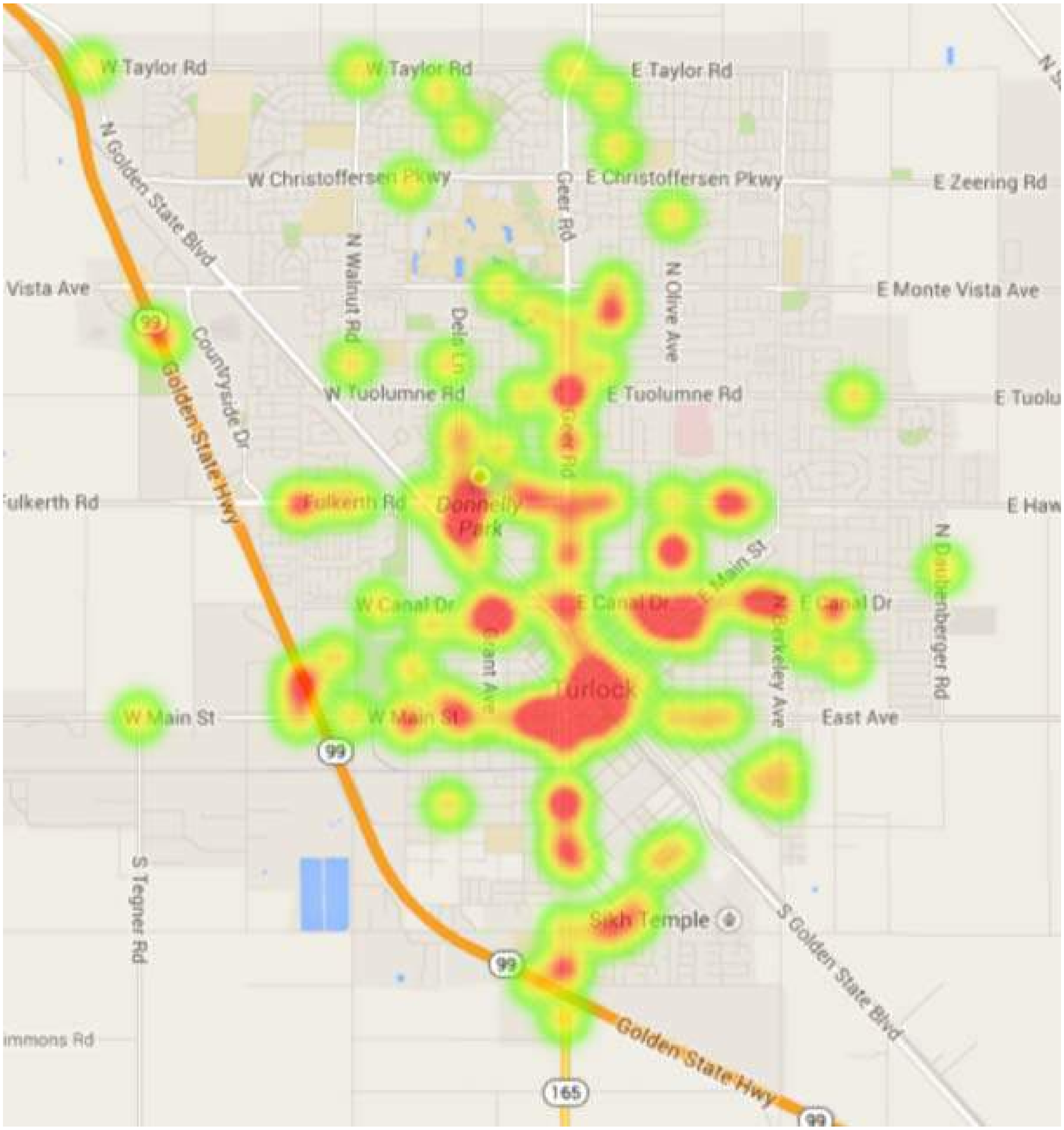


Figure 3-17: Heat Map of Pedestrian-Involved Collisions from 2003-2012



3.7 Bicycle and Pedestrian Counts

Between May 13 and May 28, 2014, a group of volunteers conducted bicycle and pedestrian counts at 15 intersections in Turlock. The counts were conducted at various times of day and days of the week, but all counts lasted at least two hours and were recorded in 15-minute intervals. From these intervals, the peak hour was selected with the highest total number of active transportation users counted. Bicyclists and pedestrians were recorded separately; additional information about bicyclists was collected at 14 of the count sites. This included gender and age, based on volunteer observations, as well as cyclists observed riding the wrong way. The weather was fair during all count sessions, ranging in temperature from cool mornings to hot and sunny afternoons. At all 15 intersections, peak hour counts totaled 762 pedestrians and 217 bicyclists. Counts for each intersection are listed in Table 3-4 and mapped in Figure 3-18 and Figure 3-19.

Table 3-4: Bicycle and Pedestrian Peak Hour Count Totals

Count Location	Pedestrians	Bicyclists
Canal Drive and First Street/Front Street/Chestnut Street	14	10
Christoffersen Parkway and Crowell Road	38	11
Christoffersen Parkway and Walnut Road	81	41
East Avenue and Minaret Avenue/Minerva Street	24	13
Main Street and Bonita Avenue/Lyons Avenue/Minaret Avenue	33	28
Main Street and Broadway	54	12
Main Street and Soderquist Road	161	7
Minnesota Avenue and Dels Lane	22	3
Monte Vista Avenue and Crowell Road	69	8
Monte Vista Avenue and Geer Road	46	11
Park Street and Grant Avenue	21	21
South Avenue and Lander Avenue	17	21
Tuolumne Road and Geer Road	34	12
Tuolumne Road and Golden State Boulevard	3	4
Wayside Drive and Olive Avenue	145	15
Total	762	217

The two locations with significantly larger pedestrian volumes—Wayside Drive and Olive Avenue, and Main Street and Soderquist Road—were counts that coincided with either morning arrival or afternoon dismissal at a nearby school. That the bicyclist counts are not also increased at these locations tells us that walking to school in Turlock is likely more common than biking.

The largest number of youth bicyclists was observed at Christoffersen Parkway and Walnut Drive, adjacent to Walnut Elementary School and Turlock Junior High. The same location also had the highest number of female bicyclists observed, shown in Table 3-5, which may suggest a large number of women collecting children from school by bicycle.

Table 3-5 : Bicyclist Demographics

Gender	**Male**	160	74.8%
	Female	54	25.2%
Age	**Adult**	170	79.4%
	Youth	44	20.6%
Wrong-Way Riding		50	23.4%

Gender of bicyclists can be a good indicator of the comfort level provided by a community's bicycle network. Experienced bicyclists will generally ride on almost any roadway, having the confidence to 'take the lane' when necessary to avoid hazards or make turning movements. Bikeways that offer greater separation from motorized traffic are generally more likely to attract a wider cross section of the public[3] and therefore generate a 'safety in numbers' effect.[4] Communities and countries with more protected bikeways have a more equal distribution of men and women riding bicycles.[5]

Of the cyclists counted, 74.8 percent were male, while only 25.2 percent were female. This indicates Turlock's current bicycle network may be appropriate for confident, fearless riders, but is not supportive of cyclists who prefer more comfortable bikeways with greater separation from vehicles.

Nearly one-quarter of the bicyclists observed were riding on the wrong side of the roadway, against the flow of traffic. This may lead to an increase in bicycle-involved collisions, since motorists are unlikely to anticipate bicyclists approaching from the wrong side.

---

[3] *Geller, R. (2009) Four Types of Cyclists. Portland: Office of Transportation.*

[4] *Jacobsen, P. L. (2003) Safety in numbers: More walkers and bicyclists, safer walking and bicycling. Injury Prevention, 9 (3), 205-209.*

[5] *Garrard, J., Rose, G., and Lo, S. K. (2008) Promoting transportation cycling for women: The role of bicycle infrastructure. Prev Med, 46 (1), 55-59; and Dill, J. and Gliebe, J. (2008) Understanding and Measuring Bicycling Behavior: A Focus on Travel Time and Route Choice. Portland: Center for Urban Studies.*

Figure 3-18: Pedestrian Counts

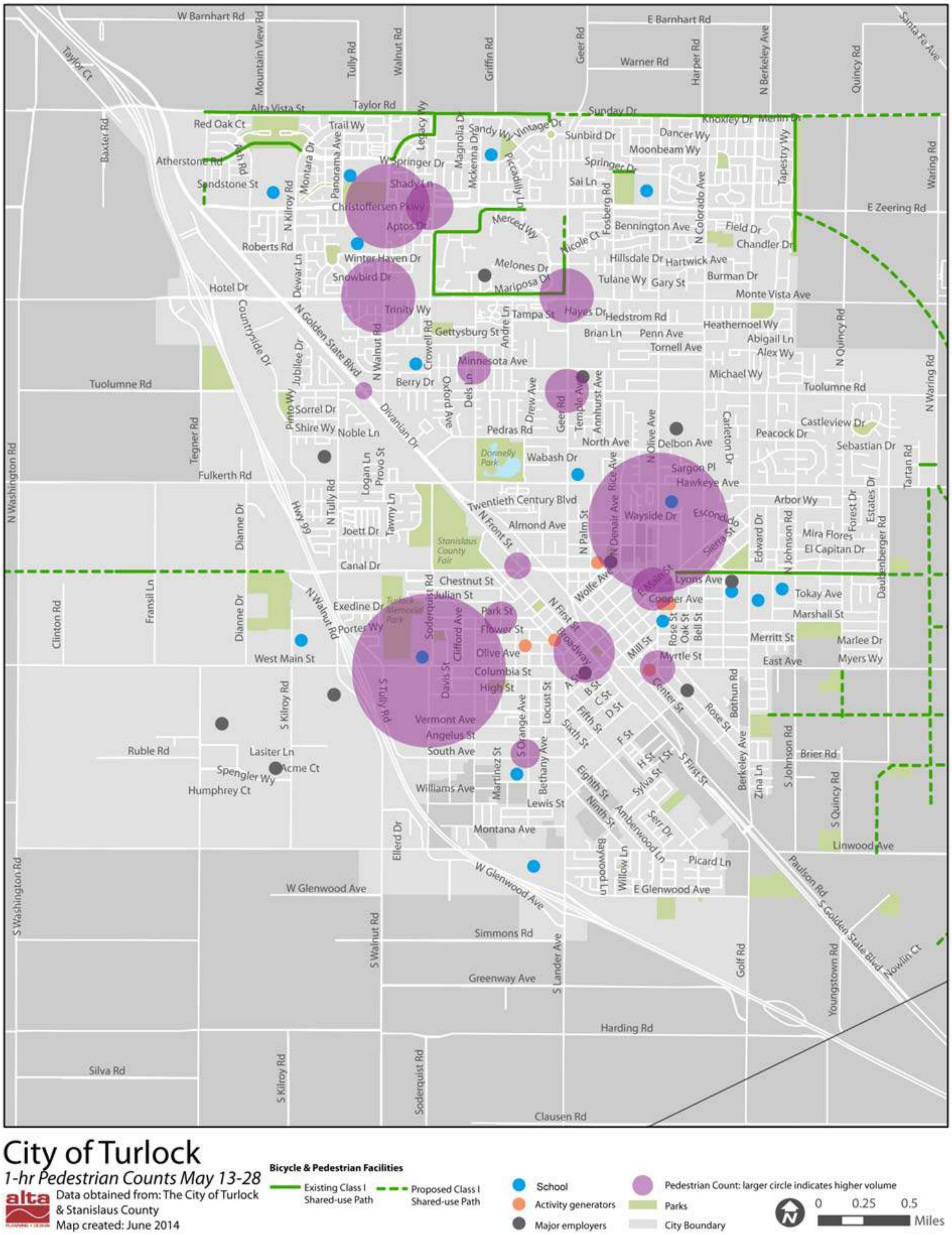
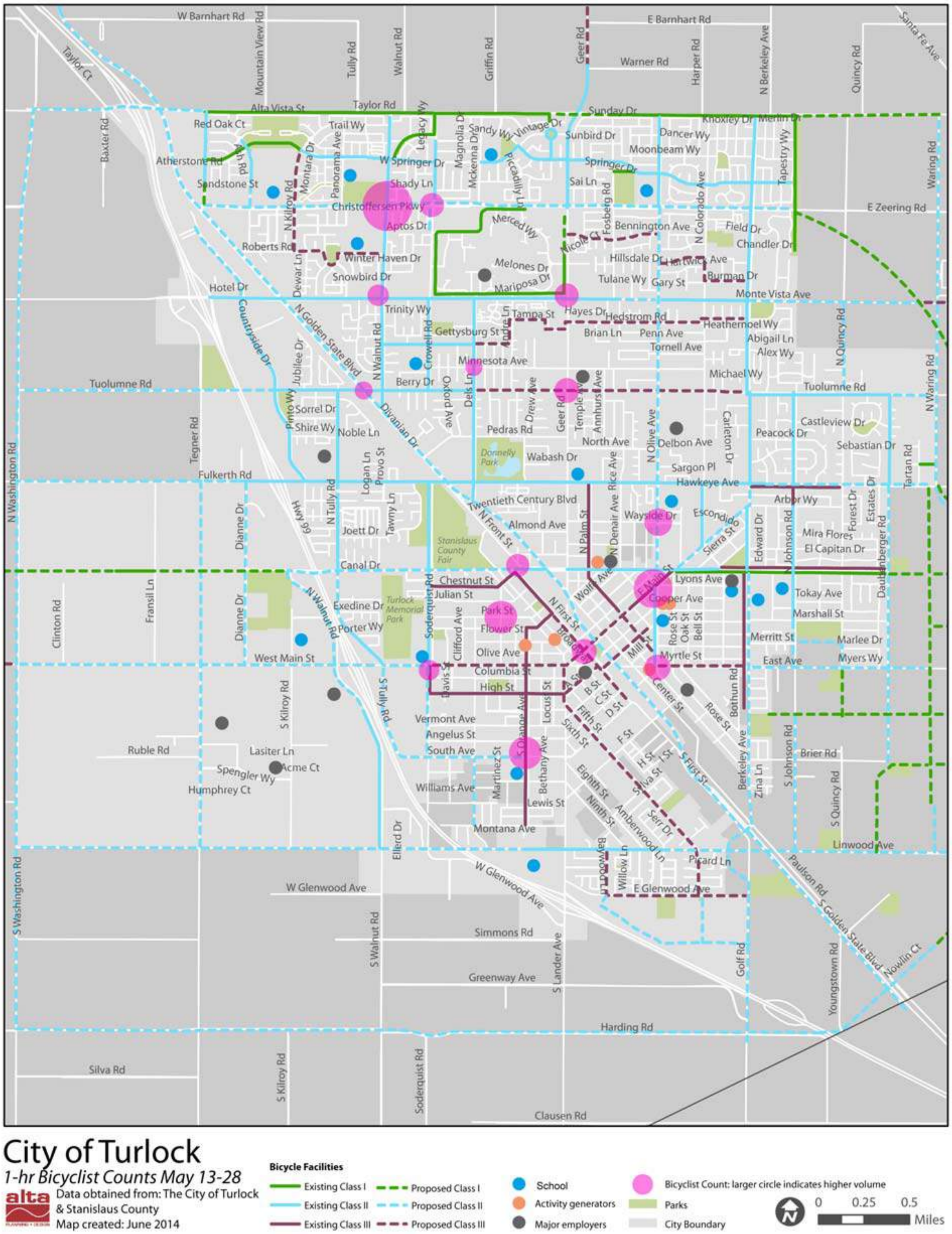


Figure 3-19: Bicyclist Counts

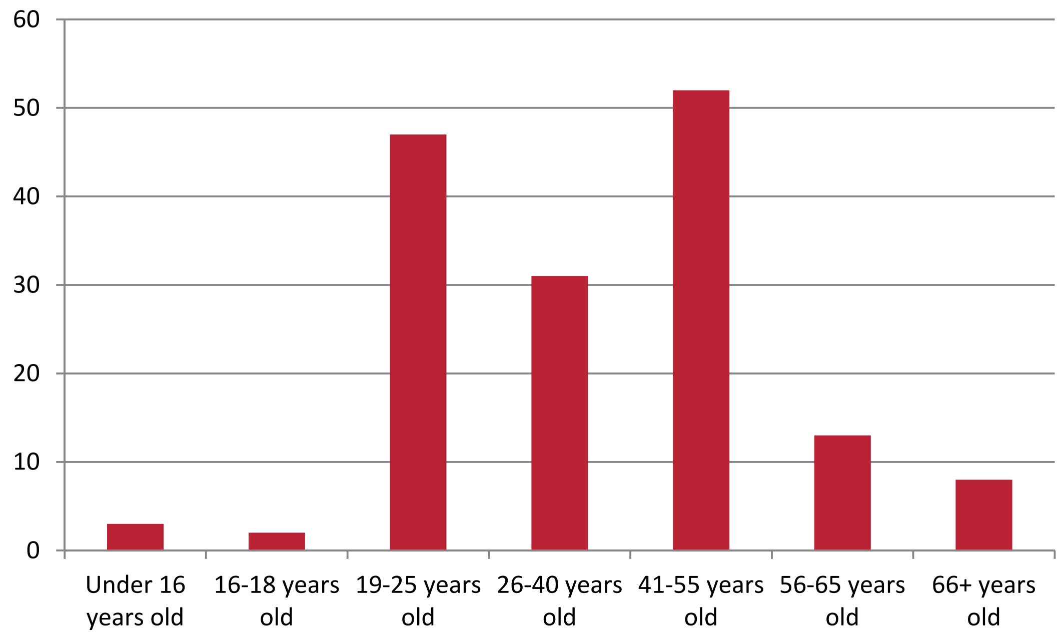


3.8 Online Community Survey

An online public survey tool was developed to gather input from Turlock residents, students, and business owners on the current state of active transportation in the community, and where they feel improvements to walking and biking facilities would have the greatest impact.

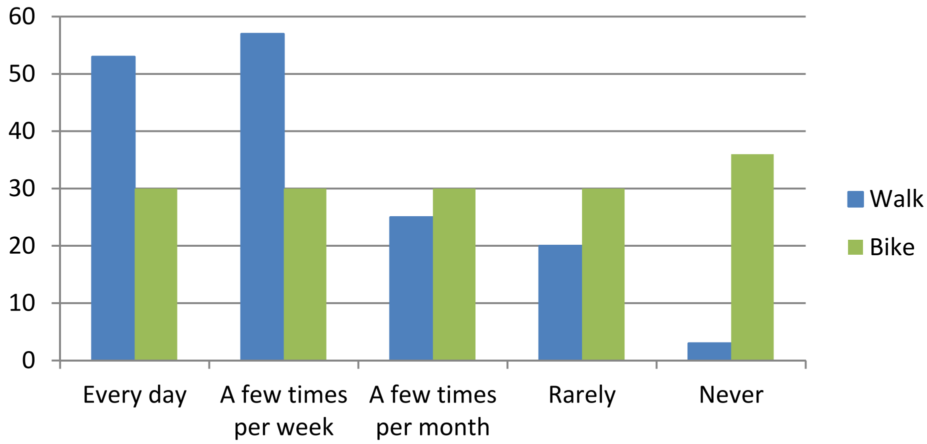
As of June 24, 2014, 168 people have responded to the survey. 143 of the respondents live in Turlock, 71 work in the community, and 61 attend school there. Four respondents own businesses in the community, and 92 of the respondents indicated that they shop in Turlock. As seen in Figure 3-20, respondents cover a broad range of age categories. 59 percent of the surveyed group is female, and 40 percent are male. Less than one percent of respondents declined to indicate their gender.

Figure 3-20: Age of Survey Respondents



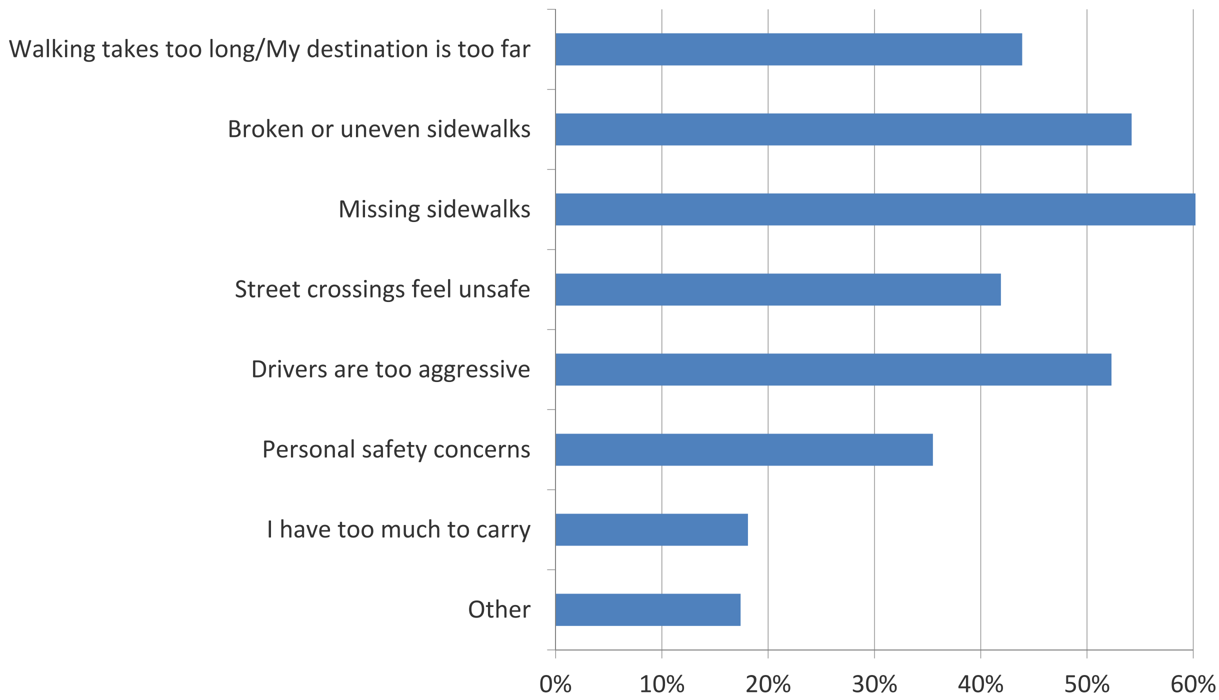
All of the respondents indicated that they walk in Turlock, with 53 walking on a daily basis and 57 walking a few times per week; fewer respondents indicated that they bike in Turlock, with just 30 biking daily and 30 biking a few times per week. See Figure 3-21 for all responses.

Figure 3-21: Active Transportation among Survey Respondents



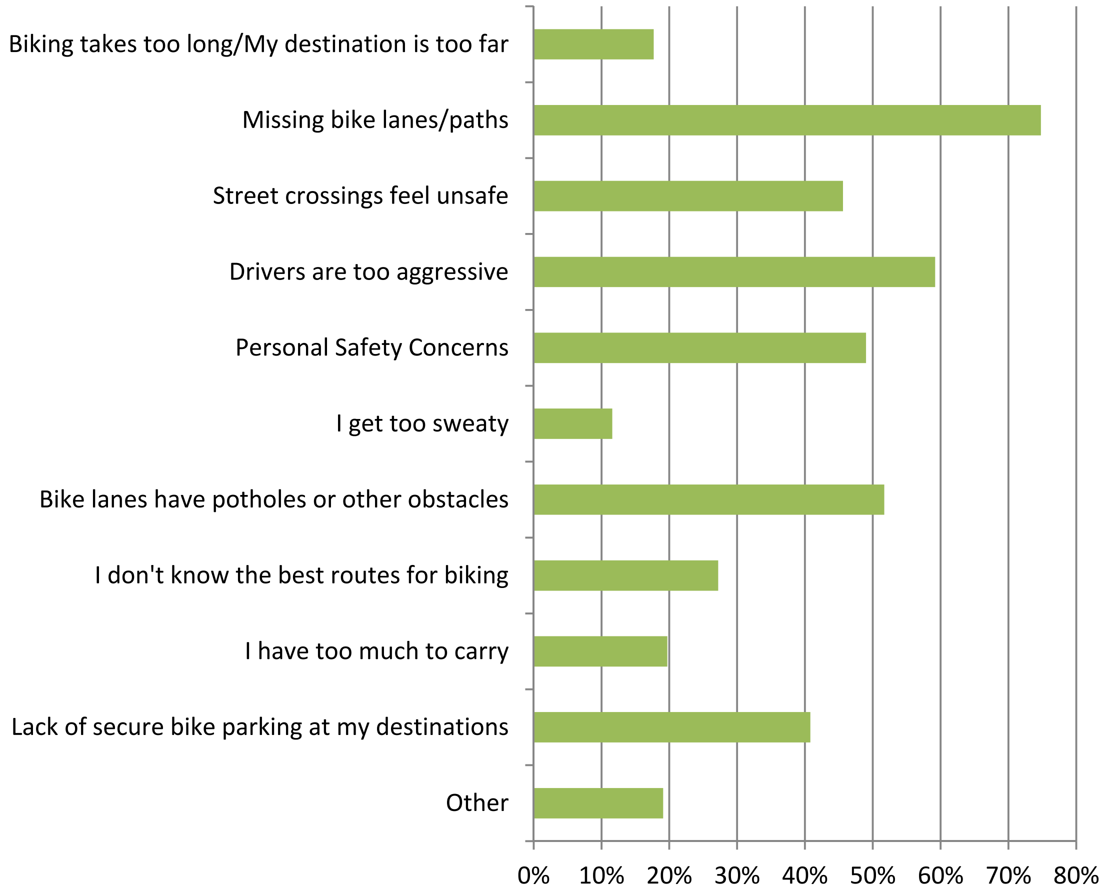
Factors that discourage walking in Turlock are listed in Figure 3-22; respondents were asked to select the five things that most affected their decision not to walk. The top three reasons people said they didn't walk more often were: drivers are too aggressive (52 percent), missing sidewalks (61 percent), and broken or uneven sidewalks (54 percent). This suggests that improving the quality of sidewalks in Turlock and filling in gaps in the pedestrian network could contribute to increased walking. Among the answers supplied by those who selected 'other' were concerns about heat and lack of shade, safety for small children, and fear of aggressive dogs not on leashes.

Figure 3-22: Factors that Discourage Walking in Turlock



When asked what discourages them from biking more in Turlock, respondents ranked a lack of bike lanes or paths as the factor that most influenced their decision not to bike—75 percent of respondents selected this answer (see Figure 3-23). Other factors that were selected by a large percentage of respondents were aggressive drivers (59 percent), potholes or other obstacles in bike lanes (52 percent), and personal safety concerns (49 percent).

Figure 3-23: Factors that Discourage Bicycling in Turlock



Respondents were also asked to identify and describe locations in Turlock they feel are particularly challenging, where they wish they could walk or bicycle. For both walking and bicycling, the three challenging locations mentioned most frequently by respondents were Monte Vista Avenue, Golden State Boulevard, and Geer Road.

When describing what makes these and other locations challenging for walking, respondents overwhelmingly mentioned three characteristics. Missing or broken sidewalks were identified in 83 responses, a lack of safe crossings was mentioned 38 times, and respondents said they felt uncomfortable with speeding traffic or aggressive drivers 32 times.

Conditions that respondents felt contributed to challenges for bicycling included a lack of adequate bike facilities, mentioned 98 times. Similar to pedestrian concerns, 29 responses also mentioned traffic moving too quickly or drivers being aggressive as a deterrent to bicycling. Roads that were too narrow or in poor condition were mentioned in 49 responses.

Several locations in Turlock were identified where respondents find it enjoyable to walk or bike, as well. The two most frequently mentioned locations for both walking and bicycling were the CSU Stanislaus campus, and the shared-use path along Canal Drive. Things respondents enjoyed about these and other locations included the presence of adequate sidewalks and bike lanes (mentioned 16 and 14 times respectively), lower traffic volumes (mentioned a total of 13 times), and shade trees or other greenery (mentioned a total of 7 times).

This page intentionally left blank.

4 Vision and Policies

4.1 Community Vision & Values

One of the core tasks of the Citizen Advisory Team was to develop a vision statement for walking and bicycling in Turlock. At their kickoff meeting on April 2, 2014, they generated the following aspirations for their community:

> *No one thinks of driving their child to school on a daily basis—walking or bicycling is the norm.*
>
> *I can leave my house and have complete connectivity in bikeways to all my destinations.*
>
> *Bicycling and walking are legitimate forms of transportation, no longer disrespected by motorists.*
>
> *Children are independent, able to travel through the community without being chauffeured.*
>
> *I don't have to teach my 9 year old how to be aggressive and ride in traffic, because there is always a safe route for him to ride.*
>
> *Parents are unafraid of strangers and traffic, and there is 'safety in numbers' because the whole community rides.*
>
> *Bike paths and walking trails are shaded and pleasant.*
>
> *Schools aren't clogged with parent drop-off.*
>
> *All road users are educated and have a thorough understanding of how to use & share the facilities safely.*
>
> *Bike parking is convenient and available at all destinations.*
>
> *Kids are excited about walking and biking, and parents are supported when they allow it by a safe street network.*
>
> *Major bikeways provide access to each part of town.*

With this valuable input in mind, the following vision statement was developed:

> Turlock is a place where people of all ages and abilities are comfortable walking and bicycling to school, work, shopping, and for recreation. A seamless walking and bicycling network is part of an integrated, sustainable transportation system that supports a high quality of life and a vibrant economy.

4.2 Policy Recommendations

In addition to the existing policies reviewed in Appendix B, the following policies should be considered for adoption.

- Create Land Use policies in the General Plan that support walking and bicycling, including reducing or removing minimum parking requirements, and amending setback requirements to place surface parking behind buildings that front onto the sidewalk.
    - Reducing parking requirements as trips shift from driving alone to modes of active transportation allows valuable land to be used for other purposes, including bicycle parking, pedestrian amenities, or small storefronts.
    - Creating setback standards that place parking in commercial areas behind buildings that embrace the sidewalk creates streets that are more inviting to pedestrians by providing continuous storefronts with visual interest along the sidewalks.
- Revise functional classifications of roadways to include bicycle and pedestrian facility standards as outlined in Chapter 5.
    - Defining the preferred bicycle and pedestrian facilities on each roadway typology will encourage consistent development of active transportation networks throughout the city.
- Adopt a bicycle parking policy with minimum bicycle parking requirements for the following uses, listed in Table 4-1. Consider allowing developers to substitute additional bicycle parking and remove some vehicle parking spaces.

Table 4-1: Recommended Bicycle Parking Guidelines

Land Use or Location	Physical Location	Quantity
Parks	Adjacent to restrooms, picnic areas, fields, and other attractions	8 bicycle parking spaces per acre
Schools	Near office and main entrance with good visibility	8 bicycle parking spaces per 40 students
Public Facilities (libraries, community centers)	Near main entrance with good visibility	8 bicycle parking spaces per location
Commercial, retail and industrial developments over 10,000 square feet	Near main entrance with good visibility	1 bicycle parking space per 15 employees or 8 bicycles per 10,000 square feet
Shopping Centers over 10,000 square feet	Near main entrance with good visibility	8 bicycle parking spaces per 10,000 square feet

    - Providing adequate bicycle parking in convenient locations can encourage more people to ride their bicycle for daily transportation needs instead of driving.
- Consider recommended facilities in the Design Toolkit for adoption as standard practice throughout the city.
- Include proactive bike lane maintenance as part of routine city operations.
    - Currently, bike lanes are swept with streets, but pavement repairs and other maintenance are only performed in response to complaints from community members. Proactive maintenance can improve bicyclist safety by ensuring lanes are comfortable to ride in, thereby reducing the need for bicyclists to merge into vehicle lanes to avoid debris or potholes.

- Work with property owners to complete gaps in sidewalk networks. Develop a plan to provide street frontage improvements along undeveloped parcels.
  - Under current policies, property owners are required to provide improvements only when a parcel is developed. Some parcels may sit vacant for several years, contributing to a disconnected pedestrian network.
- Set targets to reduce bicycle- and pedestrian- involved collisions by 50 percent, and increase bicycling and walking trips by 50 percent.

This page intentionally left blank.

5 Street Typology

The Circulation Element of Turlock's General Plan organizes the city's network of roads into six 'functional classifications' that designate street width, configuration, and access restrictions. The General Plan text describing these classifications is provided as follows, with alternative active transportation facility types included as bulleted text below each class.

Typical cross sections have been adopted in the General Plan for each street type defined in this typology. The alternative active transportation cross sections are shown in Figure 5-2 through Figure 5-6, and may require deviations from the dimensions adopted in the General Plan. Where the illustrated cross sections deviate from the General Plan dimensions, the width shown is in standard font style text while the General Plan width is indicated in italics and parentheses below. The General Plan dimension shall be considered the starting point, with the alternative dimension a context-sensitive option that should be considered for new master plan areas.

The alternative cross section may also be considered within the existing built environment where: (1) adequate right-of-way is available; (2) impacts to adjacent land uses can be avoided or adequately mitigated to General Plan standards (see Policy 5.2-s of the General Plan); (3) the alternative transportation cross section is in harmony and compatible with the surrounding land use and transportation environment; and (4) implementation of the alternative transportation cross section provides for a continuous, consistent, and safe travel corridor for bicyclists and/or pedestrians.

Further information on planning and design details may be found in the Turlock General Plan and the Turlock Active Transportation Plan Design Toolkit.

5.1 Freeways

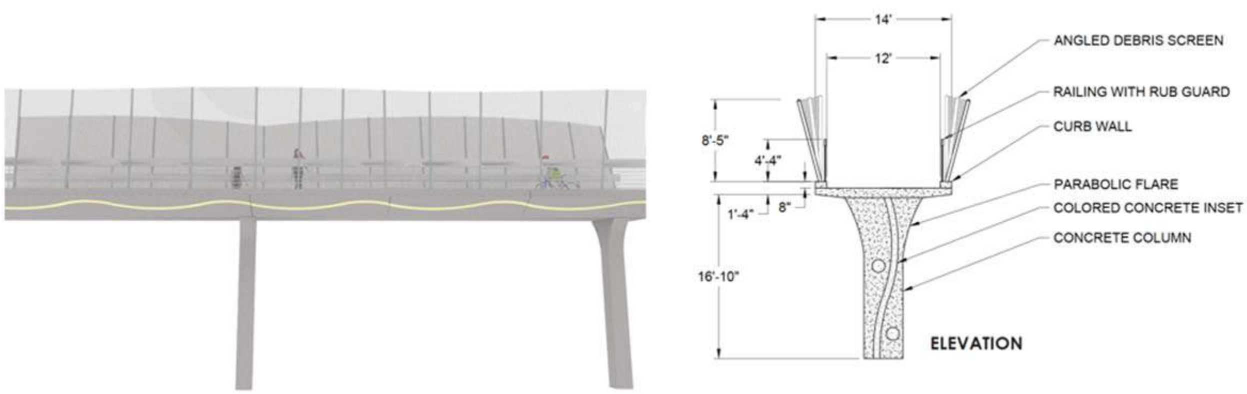
The General Plan describes Freeways as:

> Freeways provide for intra-and inter-regional mobility, generally having four to six lanes in the vicinity of the Study Area. Access is restricted to arterials and expressways via interchanges. Crossings are grade-separated, and continuous medians separate lanes traveling in opposite directions. Typical speeds are 55 miles per hour or higher. State Route (SR) 99 is the only freeway in the Study Area. No access is provided to adjacent land uses.

Bicycle and pedestrian crossings can be achieved through undercrossing tunnels, overcrossing bridges, or provision for walking and cycling along a general roadway crossing. Tunnels require less effort for bicyclists because downhill speed on the approach can be turned into uphill momentum on the departure. Particular attention should be given to lighting and an airy spaciousness to minimize personal security issues. This Active Transportation Plan recommends that:

- To minimize barriers for active transportation, grade separated crossings should be designed to accommodate bicycle and pedestrian travel.
- Consideration should be given to dedicated bicycle and pedestrian overcrossings or undercrossings where high volumes of bicycle and/or pedestrian traffic are expected.

Figure 5-1: Typical shared use path overcrossing of a roadway with desirable dimensions



5.2 Expressways

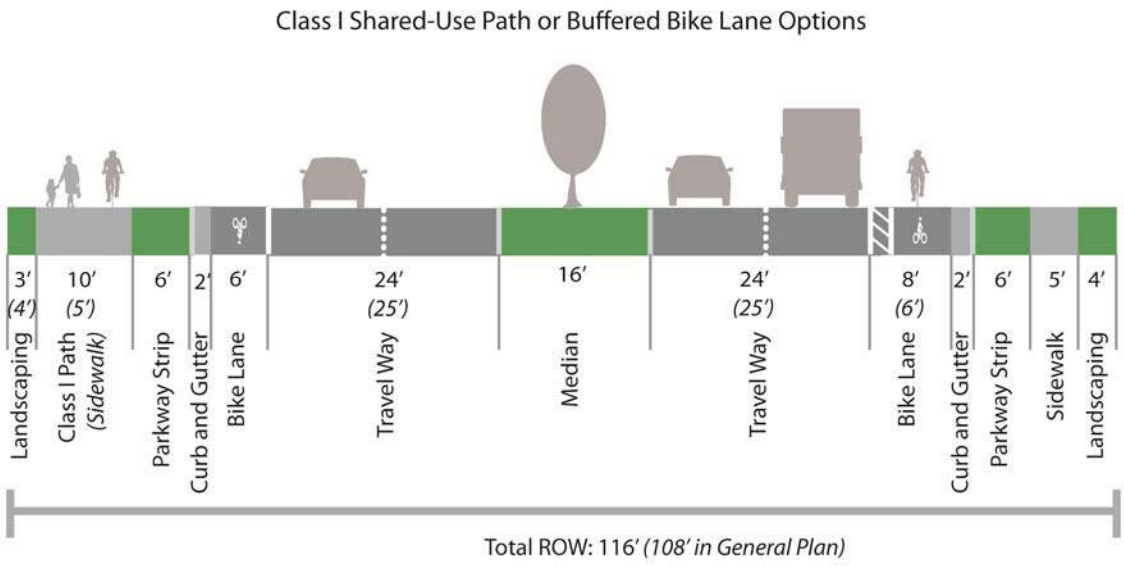
The General Plan describes Expressways as:

> Expressways provide for movement of through traffic both within the city and to other nearby regional locations. Parking is not permitted, and direct access is generally not provided to adjacent land uses. In those rare circumstances where access to an adjacent land use is required, access shall be by right turns only at prescribed intervals. In the Study Area, expressways generally range from two to four lanes, with some six-lane segments where necessary for operational purposes.

Intersections generally occur at one mile intervals. Collectors may intersect expressways at ¼ mile spacing, but with right-in and right-out only. Christoffersen Parkway and Golden State Boulevard are classified as expressways, and Geer Road is designated an expressway north of Christoffersen Parkway. This Active Transportation Plan recommends that:

- Given the relatively high speeds and traffic volumes anticipated on expressways, additional separation between nonmotorized and motorized users is preferred.
    - Class I paths should be provided where large volumes of young bicyclists are expected, as they offer the most separation from motor vehicles. On-street bike lanes should be provided as well, for confident bicyclists who may want to travel faster than a shared-space arrangement allows.
    - Where space for a Class I path is unavailable, buffered bike lanes can offer some additional separation for bicyclists.
- To minimize barriers created, marked crossings for bicyclists and pedestrians should be provided at all controlled intersections or by installing grade-separated overcrossings between intersections, where high volumes of bicycle and/or pedestrian traffic are expected.

Figure 5-2: Potential Expressway Cross Section (General Plan standard in italics)



5.3 Arterials

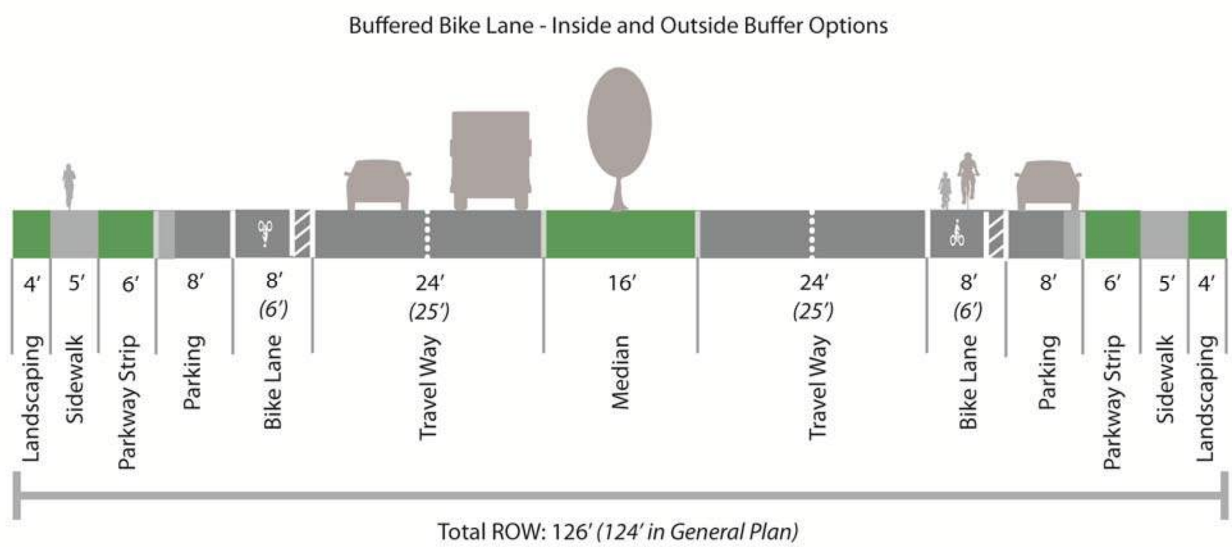
The General Plan describes Arterials as:

> Arterials collect and distribute traffic from freeways and expressways to collector streets, and vice versa. They also are designed to move traffic between adjacent jurisdictions. Major arterials in Turlock are four lane facilities and minor arterials are two lane facilities. Limited direct access may be provided to adjacent land uses, with a minimum driveway spacing of 300 feet.

This Active Transportation Plan recommends that:

- Continuous sidewalks should be provided on both sides of the street, and be buffered from moving vehicles by bike lanes, on-street parking, a planted strip, or some combination of these.
- Continuous bike lanes should be provided on both sides of the street, and be a minimum of 6 feet wide with gutter exclusion considered where width allows. Where feasible, bike lanes should be buffered from vehicle lanes and wide enough to allow bicyclists to ride outside the 'door zone' of parked cars.
- Safe and convenient crossings should be provided at controlled intersections.

Figure 5-3: Potential Arterial Cross Section (General Plan standard in italics)



5.4 Collectors

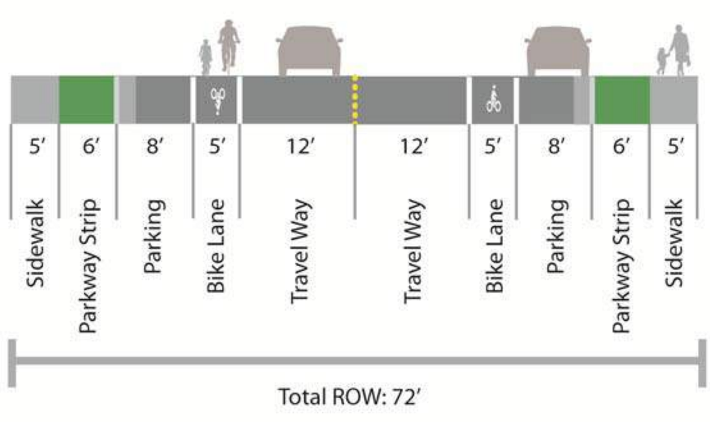
The General Plan describes Collectors as:

> Collectors provide a link between residential neighborhoods and arterials. Collectors typically provide two travel lanes, on-street parking, and bike lanes where identified in the General Plan. Collectors also provide access to adjacent properties. Direct access to adjacent land use is permitted, but, as these roadway classes are intended to funnel traffic from local streets to arterials and expressways, or carry larger amounts of traffic between major destinations within the City, driveways should be spaced at roughly 300 foot intervals in commercial and industrial areas. In residential areas, driveways may be provided to each parcel facing the collector.

This Active Transportation Plan recommends that:

- Continuous sidewalks should be provided on both sides of the street. Care should be taken to minimize conflicts and grade changes where sidewalks cross driveways.
- Continuous bike lanes should be provided on both sides of the street where identified in the General Plan, and be a minimum of 5 feet wide with gutter exclusion considered where width allows. Where this is not feasible, sharrows and/or traffic calming measures should be implemented to allow bicyclists to comfortably share the vehicle lane.
    - Along designated school routes, where right of way is limited, priority should be given to active transportation modes.
    - Although Figure 5-4 shows minimum widths, where bike lanes are adjacent to parallel parking, they should be a minimum of 6 feet wide wherever feasible to allow bicyclists to ride outside the 'door zone.' If sufficient space is available, a hatched buffer should be provided between the parking lane and the bike lane.
    - For narrow corridors, a shared use path option may be considered.

Figure 5-4: Potential Collector Cross Section



5.5 Local Streets

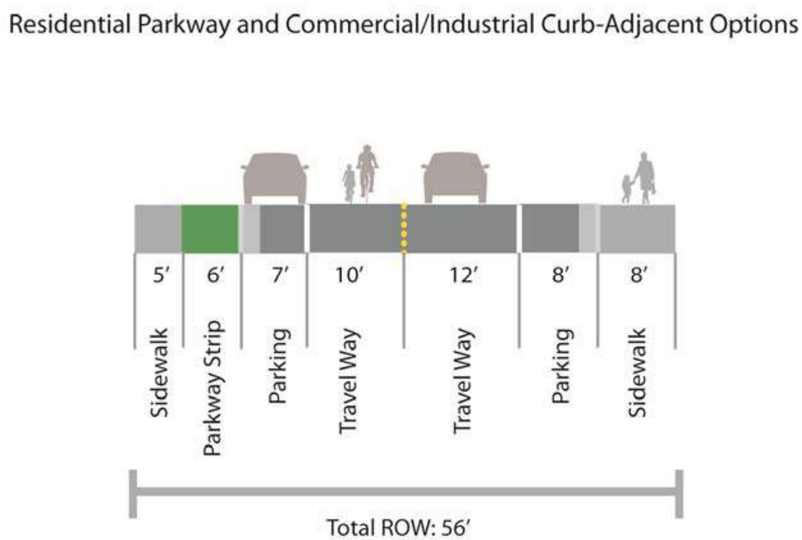
The General Plan describes Local Streets as:

> Local Streets constitute the largest part of Turlock's circulation system. They provide direct access to adjacent properties and have no access restrictions. Local streets provide two travel lanes, landscaped parkway strips, and sidewalks. While bike lanes are generally not required on local streets because of their low traffic volume, it is assumed that every local street is designed to be bike-friendly and may be informally treated as a Class-III bike route.

This Active Transportation Plan recommends that:

- A continuous sidewalk should be provided on both sides of the street wherever feasible. Where right of way is limited or no facilities currently exist, a continuous sidewalk should be provided on at least one side of the street.
- Where a landscaped buffer is provided, sidewalks may be a minimum of 5 feet wide.
- A crosswalk or other facility to enable a continuous path of travel should be provided where a local street intersects with a higher motor traffic volume class of roadway (i.e. collector or arterial).

Figure 5-5: Potential Local Street Cross Section



5.6 Industrial Streets

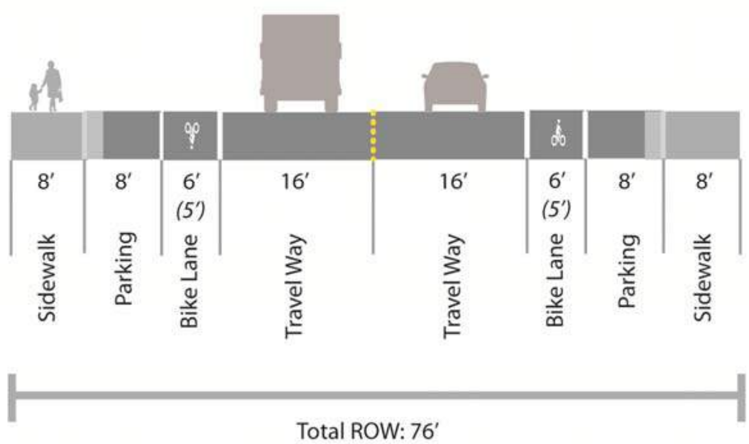
The General Plan describes Industrial Streets as:

> Industrial Streets are roadways designed to accommodate trucks serving industrial areas, and generally provide two travel lanes. They are primarily found in the Westside Industrial Park and in some older industrial areas south of Downtown. Their wide lanes are intended to accommodate multiple large trucks' turning movements. Access onto adjacent industrial properties is permitted, including multiple access points per parcel.

This Active Transportation Plan recommends that:

- To minimize barriers created, industrial streets should provide crossings for bicyclists and pedestrians at controlled intersections.
- Sidewalks should be provided along identified school routes, or where pedestrian destinations exist.
- Class II bike lanes should be provided where designated in the General Plan.

Figure 5-6: Potential Industrial Street Cross Section (General Plan Standard in italics)



This page intentionally left blank.

6 Infrastructure Recommendations

Recommendations in the following chapters were developed based on extensive community input through Citizen Advisory Team meetings, public workshops, and an online survey, along with an analysis of the existing bicycle and pedestrian network gaps.

Volume VI of this Plan is a Design Toolkit that presents infrastructure solutions the City may consider. The toolkit includes guidance on when to use treatments like high visibility ladder-style crosswalk markings or green pavement coloring at potential conflict points between motorists and bicyclists. The City will weigh the maintenance costs against safety benefits of such treatments on a case-by-case basis.

Draft recommendations were presented to the community and refined based on their feedback. For a list of comments received, see Appendix E.

6.1 Bicycle Infrastructure Projects

Proposed bikeways in the 2012 General Plan were carried forward as recommendations in this Plan, and additional recommendations for bikeways, intersection improvements, and pedestrian network improvements were identified to expand and enhance the bicycle and pedestrian environment.

Bikeways proposed in the General Plan are mapped in Figure 6-1. For a list of General Plan recommendations, see Appendix F.

This Active Transportation Plan adds to these recommendations the bikeways shown in Figure 6-2, and listed in Table 6-1 and Table 6-2. Priority projects are indicated in highlighted rows; for a discussion of the prioritization process see Chapter 8.1.

Projects originating in the General Plan are numbered with the prefix GP. Projects originating in the Active Transportation Plan are numbered with the prefix ATP. Because some projects were revised, reclassified, added, or removed during the iterative planning process, numbering may not be consecutive.

A map of these combined recommendations, representing the long-term vision for Turlock's bicycle network, is shown in Figure 6-3.

Figure 6-1: General Plan Bikeway Recommendations

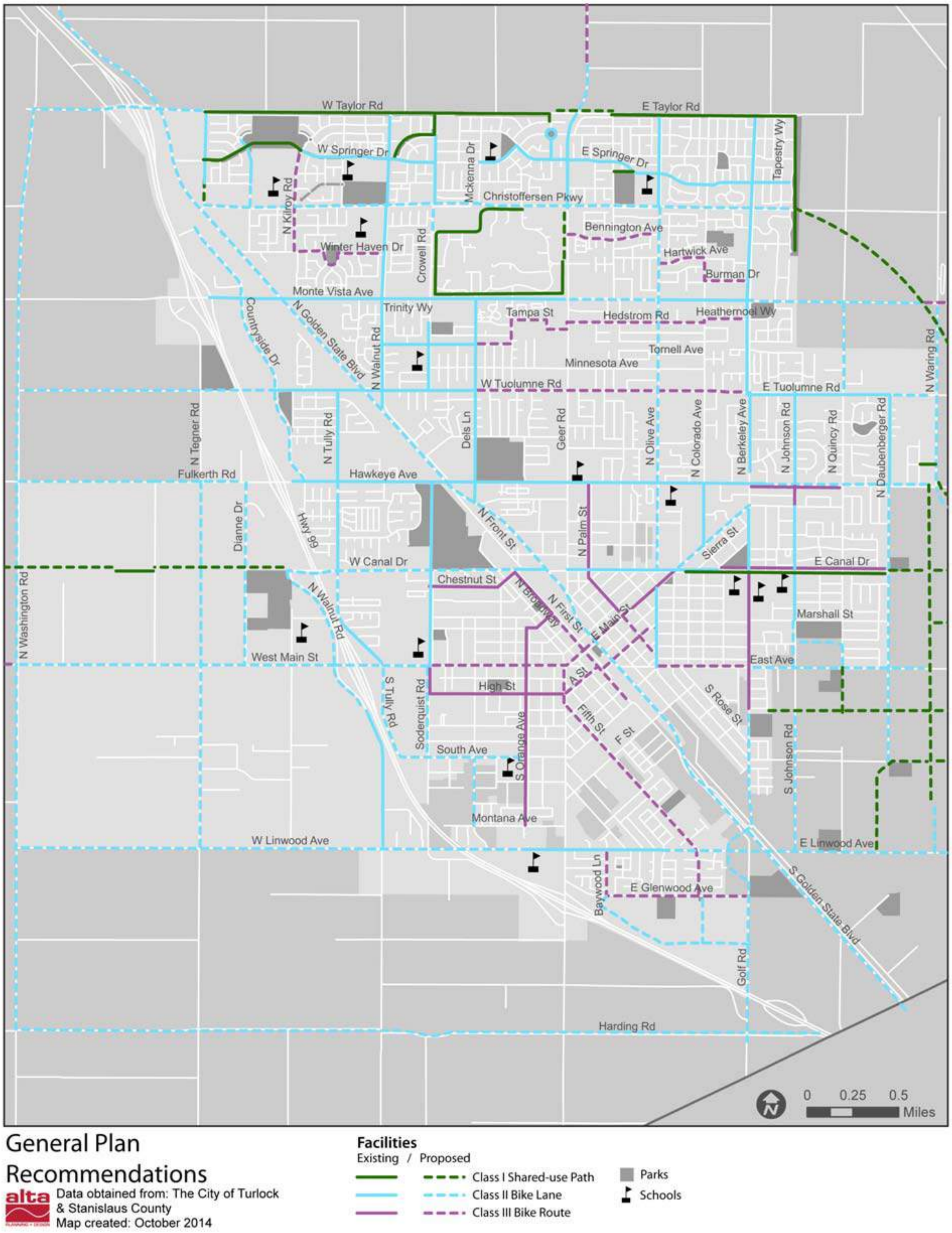


Figure 6-2: Active Transportation Plan Bikeway Recommendations

Figure 6-3: Long Term Bicycle Network Vision

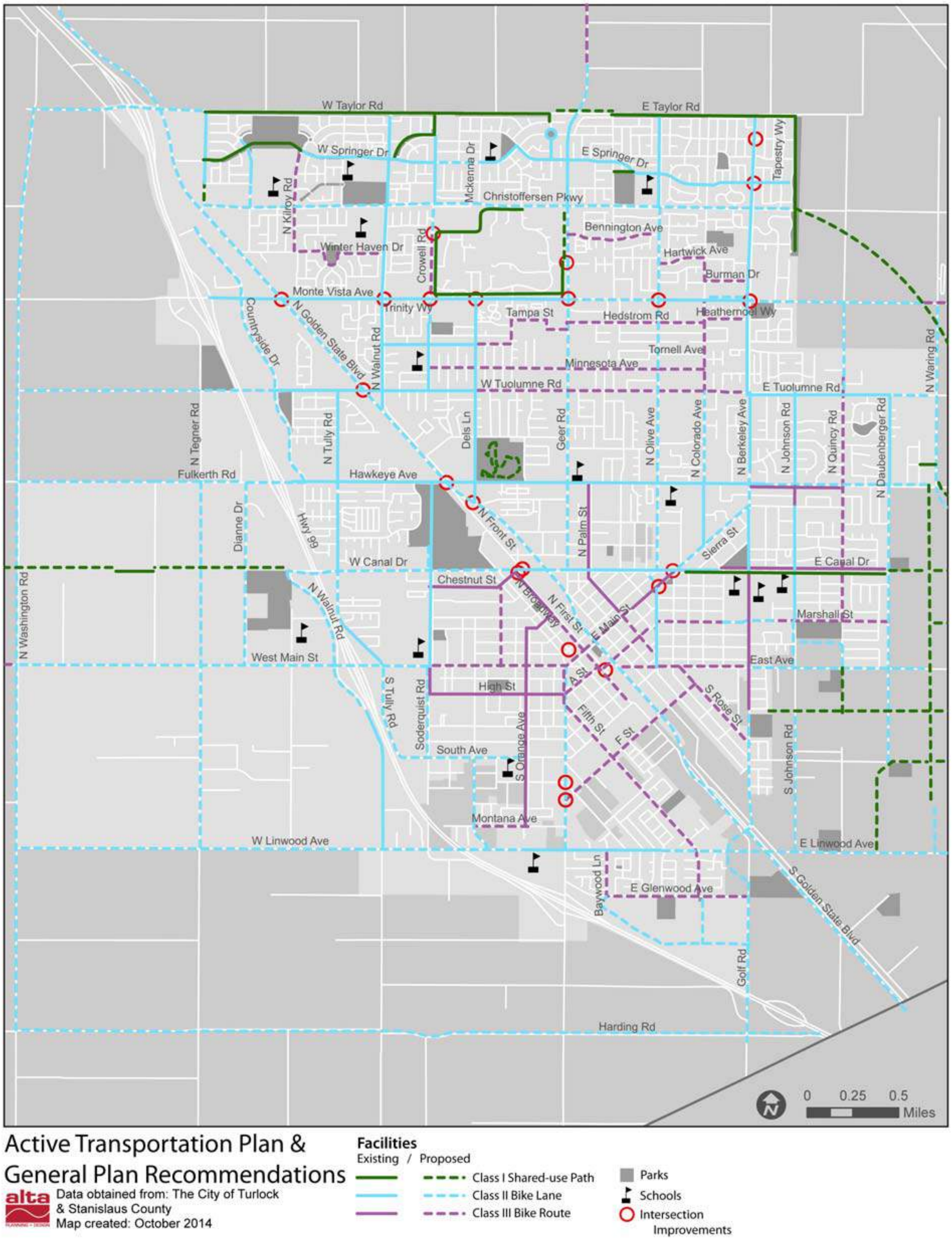


Table 6-1: Active Transportation Plan Bikeway Corridor Recommendations

ID#	Class	Corridor	Begin	End	Length (ft)	Notes
ATP-1	Class I	(Donnelly Park)	Lake edge		TBD	Path around the lake and around perimeter of park
ATP-2	Class II	Crowell Road	200 feet south of Rockhurst Lane	Monte Vista Avenue	670	
ATP-3	Class II	Geer Road	Christoffersen Parkway	Canal Drive	11,115	
ATP-4	Class II	Colorado Avenue	Tuolumne Road	Hawkeye Avenue	2,660	
ATP-5	Class II	Fulkerth Road	Highway 99 NB on/off ramps	350 feet east of Dianne Drive	1,325	
ATP-6	Class II	Lander Avenue	Main Street	Linwood Avenue	5,310	Supersedes General Plan recommendation
ATP-7	Class II	Marshall Street	Colorado Avenue	Wallace Street	1,420	
ATP-8	Class II	West Avenue	Montana Avenue	Linwood Avenue	805	Extension of General Plan recommendation
ATP-9	Class II	Soderquist Road	675 feet north of Canal Drive	Canal Drive	675	Only west side of road
ATP-10	Class II	Berkeley Avenue	100 feet north of Hawkeye Avenue	Main Street	715	
ATP-83	Class II	Springer Drive	Crowell Road	McKenna Drive	1,290	
ATP-84	Class II	Monte Vista Avenue	Colorado Avenue	Berkeley Avenue	1,300	Only north side of road
ATP-85	Class II	Canal Drive	Geer Road	Golden State Boulevard	500	
ATP-11	Class III	Minnesota Avenue	Crowell Road	Colorado Avenue	7,940	
ATP-12	Class III	Colorado Avenue	Monte Vista Avenue	Tuolumne Road	2,645	
ATP-13	Class III	Crowell Road	Christoffersen Parkway	Monte Vista Avenue	2,660	Implement with signs and sharrows
ATP-14	Class III	Quincy Road	Swan Park Drive	Marshall Street	12,260	
ATP-15	Class III	Grant Avenue	Chestnut Street	Main Street	2,260	Extension of General Plan recommendation
ATP-16	Class III	Marshall Street	Minaret Avenue	Colorado Avenue	1,900	
ATP-17	Class III	Marshall Street	Wallace Street	Daubenberger Road	3,345	
ATP-18	Class III	Alpha Road	East Avenue	Berkeley Avenue	2,980	
ATP-19	Class III	F Street	Lander Avenue	Alpha Road	5,020	
ATP-20	Class III	Montana Avenue	West Avenue	Orange Street	1,550	
ATP-21	Class III	East Avenue	Golden State Boulevard	Minaret Avenue	1,155	Extension of General Plan recommendation

Highlighted rows indicate priority projects.

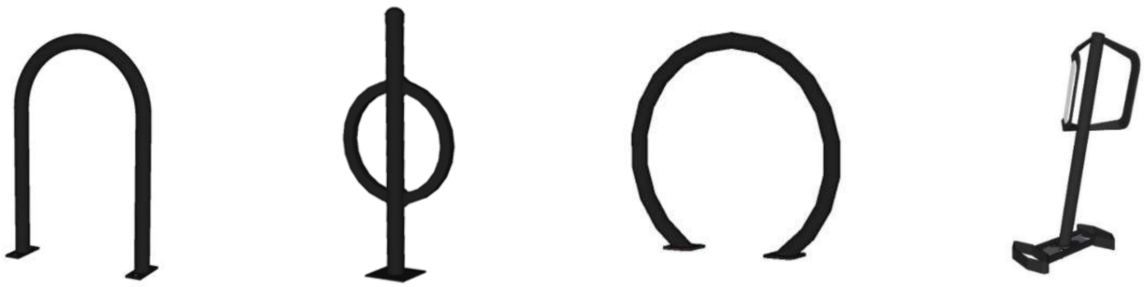
Table 6-2: Active Transportation Plan Bikeway Intersection Recommendations

ID#	Class	Street	Cross Street	Description
ATP-22	New	1st Street	A Street/Marshall Street	Construct connection on 1st Street between Class III facilities
ATP-23	Improve	Berkeley Avenue	Dancer Way	Remove bike lane stripes from traffic circle and curb extensions at sidewalks
ATP-24	Improve	Berkeley Avenue	Springer Drive	Remove bike lane stripes from traffic circle and curb extensions at sidewalks
ATP-25	New	Geer Road	Calaveras Way	Install traffic signal
ATP-26	Improve	Hawkeye Avenue	Golden State Boulevard	Extend westbound bike lane through right turn pocket
ATP-27	New	Lander Avenue	Bernell Avenue/9th Street	Will improve with proposed Class II on Lander
ATP-28	New	Lander Avenue	F Street	Improve with proposed Class II & III on Lander & F
ATP-29	New	Main Street	Canal Drive	Improve bike lane striping; provide new access to Class I path for westbound bicyclists
ATP-30	Improve	Monte Vista Avenue	Berkeley Avenue	Stripe westbound bike lane inside of right turn lane
ATP-31	Improve	Monte Vista Avenue	Olive Avenue	Stripe westbound bike lane inside of right turn lane
ATP-32	Improve	Monte Vista Avenue	University Circle	Recommend University stripes bike lanes
ATP-33	Improve	Monte Vista Avenue	Geer Road	Stripe eastbound bike lane inside of right turn lane
ATP-34	Improve	Monte Vista Avenue	Crowell Road	Stripe westbound bike lane inside of right turn lane
ATP-35	Improve	Monte Vista Avenue	Golden State Boulevard	Stripe westbound bike lane through right turn pocket
ATP-36	Improve	Tuolumne Road	Golden State Boulevard	Extend eastbound bike lane through right turn pocket
ATP-37	Improve	Walnut Road	Monte Vista Avenue	Stripe southbound bike lane inside of right turn lane
ATP-86	New	Crowell Road	Ansel Adams Boulevard	Install stop sign

Highlighted rows indicate priority projects.

Secure bicycle parking is an essential element of a functional bicycle network. Bicycle racks are a common form of short-term secure bicycle parking and can be installed in various locations, including sites adjacent to retail such as parking lots, as well as in the public right of way in the furnishings zone of the sidewalk. Figure 6-4 shows acceptable styles of bicycle racks. Racks are appropriate for locations where there is demand for short-term bicycle storage. Bicycle lockers provide secure and sheltered bicycle parking and are recommended in locations where long-term bicycle storage is needed, such as transit stations.

Figure 6-4: Bicycle Rack Styles

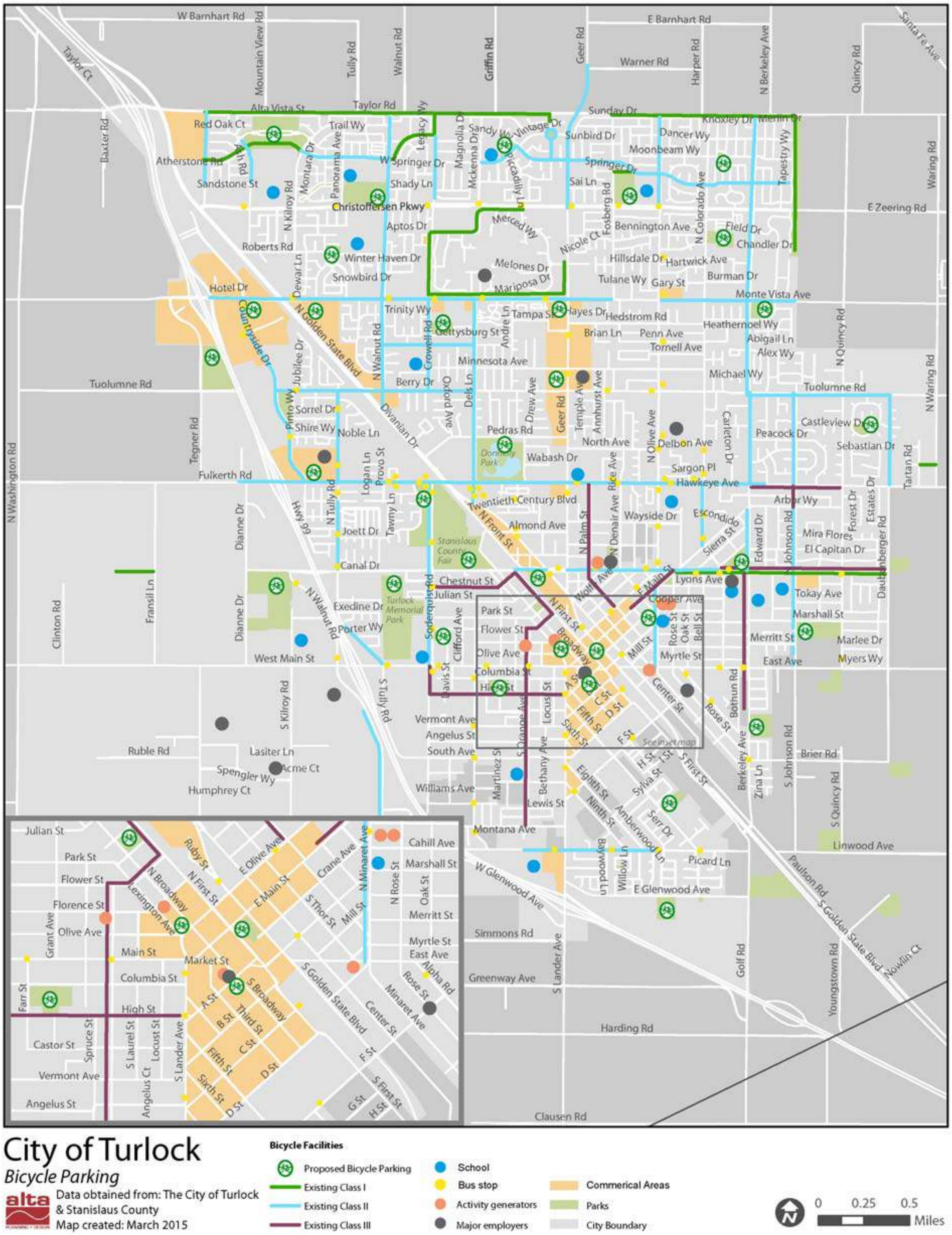


U-Rack ***Post and Loop*** ***Horseshoe*** ***Lightning Bolt™ Or Varsity Rack™***

Proposed locations in Figure 6-5 were based on community feedback and current best practices, and include bicycle parking at all public parks as well as key community destinations. At commercial centers, the city should work with property owners to provide bicycle parking on private property as desired.

All bicycle parking should be in a safe, secure area visible to passersby. Commuter locations such as the Turlock Regional Transit Center should provide secure indoor parking, covered bicycle corrals, or bicycle lockers. Short term bicycle parking facilities, such as bicycle racks, are best used to accommodate visitors, customers, messengers and others expected to depart within two hours. They are usually located at schools, commercial locations, and activity centers such as parks, libraries, retail locations, and civic centers. Bicycle parking on sidewalks in commercial areas should be provided according to specific design criteria, reviewed by merchants and the public, and installed as demand warrants.

Figure 6-5: Proposed Bicycle Parking Locations



6.2 Pedestrian Infrastructure Projects

Eleven corridors in Turlock were identified as priorities for pedestrian infrastructure improvements, including closing gaps in the sidewalk network and improving or providing new crossings at intersections. These corridors and a summary of the improvements recommended are provided in Table 6-3 and mapped in Figure 6-6.

Table 6-3: Pedestrian Project Corridors

ID#	Corridor	Begin	End	Length (mi)	Sidewalk Gaps (mi)	Crossing Gaps
ATP-38	Canal Drive	State Route 99	Daubenberger Road	1.88	1.29	4
ATP-39	Dels Lane	Monte Vista Avenue	Hawkeye Avenue	1.00	0.17	2
ATP-40	Geer Road	Pedras Road	Canal Drive	0.72	0.63	0
ATP-41	Golden State Boulevard	Christoffersen Parkway	F Street	3.77	2.98	14
ATP-42	Hawkeye Avenue	Golden State Boulevard	Quincy Road	2.17	1.11	4
ATP-43	Lander Avenue	Olive Avenue	Linwood Avenue	1.12	0.46	6
ATP-44	Main Street	Locust Street	Berkeley Avenue	1.40	0.18	4
ATP-45	Marshall Street	Minaret Avenue	Quincy Road	1.01	1.19	2
ATP-46	Monte Vista Avenue	Golden State Boulevard	Berkeley Avenue	2.57	1.36	9
ATP-47	Olive Avenue	Monte Vista Avenue	Canal Drive	1.48	0.30	3
ATP-48	Soderquist Road	Hawkeye Avenue	South Avenue	1.51	0.58	0

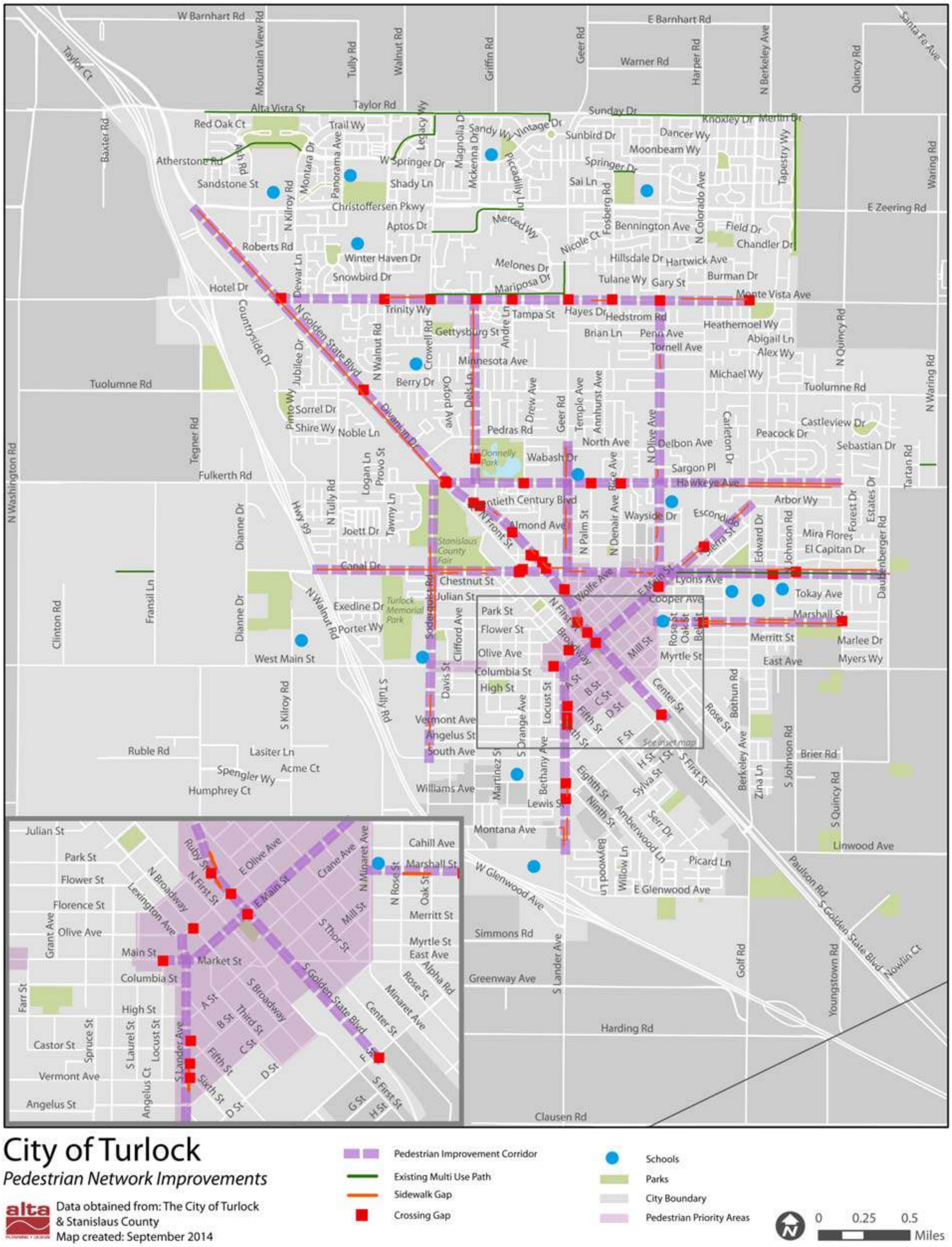
Note: corridor lengths are centerline measurements from start to end points; sidewalk gap lengths may represent gaps on both sides of a corridorand therefore have a maximum twice that of the corridor length.

Some specific pedestrian infrastructure improvements were identified during Safe Routes to School audits at each of the Turlock public schools. Some improvements fall on school district property, and will require coordination with the Turlock Unified School District to implement. This Plan recommends the City consider implementing the identified improvements on public right-of-way, listed in Table 6-4.

Table 6-4: Safe Routes to School Pedestrian Improvements

ID#	Corridor	Location	Recommended Improvement
ATP-50	Canal Drive	Johnson Road	Mark crosswalks with yellow high visibility markings. Install curb extensions on the south side of Canal Drive extending into the parking lane on Canal Drive. This will reduce the crossing distance for pedestrians without impeding bicycle travel.
ATP-51	Carrigan Street	Johnson Road	Provide yellow high-visibility crosswalk markings on all legs
ATP-56	Crowell Road	Minnesota Avenue	Provide ADA compliant curb ramp on west side of Crowell Road
ATP-57	Dels Lane	Georgetown Avenue	Convert to all-way stop
ATP-58	Georgetown Avenue	In front of Brown Elementary	Install sidewalk at loading zone; repair existing sidewalk to meet ADA standards
ATP-59	Georgetown Avenue	Brevard Lane	Install advance warning signs at crosswalk to meet CAMUTCD standards; mark crosswalk with yellow high visibility markings
ATP-60	Hawkeye Avenue	Palm Street	Install pedestrian hybrid beacon or RRFB at uncontrolled crossing
ATP-61	Linwood Avenue	Eastern edge of campus	Remove two angled parking spaces to widen walkway
ATP-62	Linwood Avenue	West of parking lot entrance	Provide midblock crosswalk with RRFB and sidewalk improvements along the north side of the street.
ATP-63	Linwood Avenue	School frontage	Repair damaged sidewalk.
ATP-64	Linwood Avenue	Lander Avenue	Provide curb ramps that meet ADA standards Repair broken pedestrian crossing signal
ATP-65	McKenna Drive	Woodland Drive	Consider providing crosswalk across McKenna Drive
ATP-66	North Avenue	Between Crowell Elementary driveways	Consider implementing a raised crosswalk with curb extensions
ATP-67	North Avenue	Near alleyway exit	Install flexible posts along North Avenue centerline to prevent left turns
ATP-69	North Avenue	Loyola Way	Install curb ramps at crosswalks to meet ADA requirements; mark crosswalks with yellow high visibility markings; install curb extensions. Install RRFB to increase motorist yielding.
ATP-70	Sandy Way	Memory Lane	Mark all crosswalks with high-visibility crosswalk markings
ATP-71	Soderquist Road	Osborn Elementary bus loop	Widen sidewalk
ATP-74	Soderquist Road	Julian Street to Osborn Elementary school frontage	Relocate utility poles that currently obstruct sidewalk, or provide sidewalk adjacent to utility poles that meets ADA standards
ATP-75	Soderquist Road	Main Street	Consider curb realignment to reduce crossing distance Prohibit right turns on red from southbound Soderquist Road to westbound Main Street
ATP-76	South Avenue	Wakefield Elementary school frontage	Consider removing diagonal parking and creating a Complete Streets based alignment including parking, bike lanes, and high visibility crosswalk markings
ATP-77	South Avenue	Martinez Street	Mark crosswalk with yellow high-visibility crosswalk markings
ATP-79	Springer Drive	Midblock crosswalk	Relocate crosswalk signage to planter area in curb extension to increase visibility Construct drainage inlet at low point to reduce water ponding
ATP-80	Wallace Street	Near Carrigan Street	Consider widening sidewalk to accommodate high volume of drop-off
ATP-82	Wayside Drive	Pioneer Avenue	Complete sidewalk gaps on Wayside Avenue to improve use of Pioneer Avenue school access

Figure 6-6: Pedestrian Improvement Corridors



6.3 Wayfinding

Wayfinding signage can encourage more people to walk and bicycle by advertising the presence of facilities and destinations accessible via those facilities.

6.3.1 Regional Routes

The Stanislaus County Non Motorized Transportation Plan (2013) proposes the following routes radiating from Turlock:

- Geer Road (Class III route) to Hughson
- N. Golden State Boulevard (Class II lanes) to Ceres
- Railway path parallel to N. Golden State Boulevard (Class I path) to Ceres
- West Main Street (Class III route) to Patterson
- E. Monte Vista Avenue (Class III route) to Denair
- South Golden State Boulevard (Class III route) to Delhi

Recommendation

The City should work with Stanislaus County to signpost the regional Class III routes with supplementary destination signs and a map display in downtown Turlock

6.3.2 Urban Routes

Bike route signs with supplementary destination plates can be positioned in places such as:

- Summerfaire Park: The pathway along the south edge of the Summerfaire Park to highlight connectivity between Soderquist Road and the residential neighborhoods accessed from Carousel Court
- East Canal Drive pathway
- Donnelly Park proposed pathways
- Principal Class III bike route corridors to major destinations such as CSUS, downtown, and schools

Recommendation

The City should add destination plates to existing Bike Route signs and install new signs at key locations on the bikeway network.

Sample wayfinding sign

7 Recommended Programs

Of the Five E's of bicycle, pedestrian, and Safe Routes to School planning, four are related to programs: encouragement, education, enforcement, and evaluation. Programs will complement engineering improvements (the fifth E) such as bike paths, lanes, and routes by giving Turlock students and adults the tools they need to safely and confidently travel by walking and bicycling.

The following section presents recommended programs to support the vision of this Plan. The recommendations include continuation of those the City currently administers and those identified by the community, as well additional programs that have proven to be popular and effective in other California cities.

7.1 Education

Education programs are important for teaching safety rules and laws as well as increasing awareness regarding walking and bicycling opportunities and existing facilities. Education programs may need to be designed to reach groups at varying levels of knowledge and there may be many different audiences: pre-school age children, elementary school students, teenage and college students, workers and commuters, families, retirees, the elderly, new immigrants, and non-English speakers. Education plays a key role for all these groups in reducing risk and the number of crashes.

Education programs can occur inside the classroom or in an assembly with transportation experts

7.1.1 Traffic Safety Campaign *(Priority Program)*

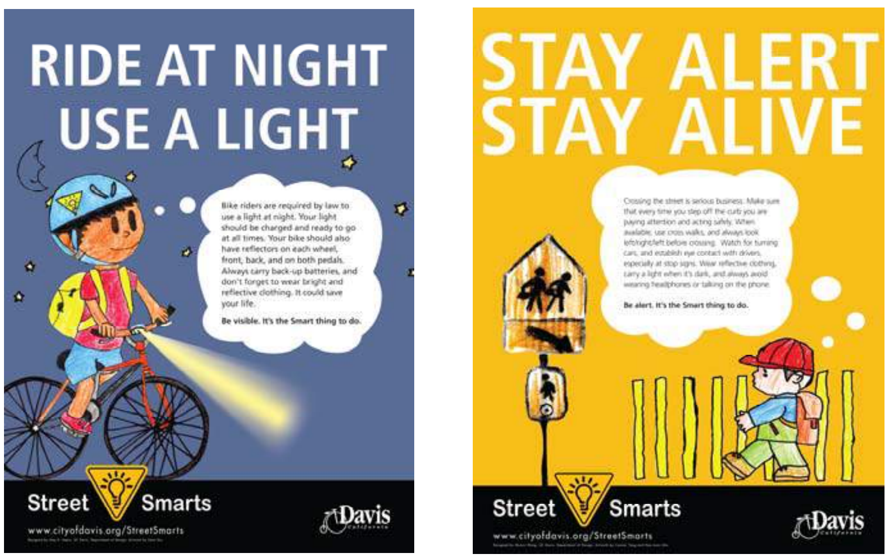
On a citywide scale, the City could start a StreetSmarts media campaign, similar to those in San Jose, Marin County, Davis, and other California cities. Developed by the City of San Jose, StreetSmarts uses print media, radio spots and television spots to educate people about safe driving, bicycling, skateboarding, and walking behavior. More information about StreetSmarts can be found at www.getstreetsmarts.org.

Local resources for conducting a StreetSmarts campaign can be maximized by assembling a group of local experts, law enforcement officers, businesspeople, civic leaders, and dedicated community volunteers. These allies could assist with a successful safety campaign goals based on the local concerns and issues. It may be necessary to develop creative media placement strategies to achieve campaign goals.

The Federal Highway Administration provides a resource on their website detailing the elements required to conduct a successful local safety campaign: http://safety.fhwa.dot.gov/local_rural/pedcampaign/guide.htm#2.

Recommendation

This Plan recommends the City consider implementation of a traffic safety program such as StreetSmarts.



Davis, CA StreetSmarts campaign posters designed by local students

7.1.2 Bicycle Resource Website *(Priority Program)*

Many cities in California host a bicycle resource website. These websites typically provide a bicycle map of the City, bicycle parking locations, and information about the local Bicycle and/or Pedestrian Committee and local advocacy groups.

The City of San Mateo dedicates a page of its website to bicycle information

Recommendation

This Plan recommends the City develop a resource website including the following components:

- Dynamic bikeway and bike parking map
- Walking map
- New bikeway announcements when implemented
- Bicycling tips, including how to:
  - Carry items using baskets and panniers
  - Properly lock a bicycle
  - Ride in the rain with help from fenders and rain gear
- The importance of bicycle lights and reflectors
- Bikeway maintenance and repair phone number
- Driver speed feedback sign request forms
- Bicycle and Pedestrian events calendar, including education and skills classes

This Plan also recommends that the City's website provide bicycle-related information in Spanish and other languages.

Sample websites:

- Los Angeles Department of Transportation Bicycle Services: http://www.bicyclela.org/
- Bike Santa Clarita: http://bikesantaclarita.com/
- City of San Mateo, CA: http://www.ci.sanmateo.ca.us/index.aspx?NID=2118

7.1.3 Bike Rodeos (Priority Program)

In conjunction with development of this Plan, the City and consultant team offered Bike Rodeos at four elementary schools using curriculum developed by the League of American Bicyclists. These after-school rodeos provided age-appropriate material about bicycling safety to children enrolled in Turlock schools, and included a bicycle safety check, a helmet fit check, and on-bike instruction on starting and stopping, avoiding obstacles, turning and signaling, and yielding.

More information on the Bike Rodeo process is included in Appendix G.

Recommendation

This Plan recommends the City offer bike rodeos on an annual basis at four schools minimum, rotating through all campuses in the district.

Students at Crowell Elementary School practice bicycle handling skills and traffic safety in an after school bicycle rodeo

7.1.4 Student Bicycle and Pedestrian Traffic Safety Education Classes

Student education programs are an essential component of a Safe Routes to School effort. Students are taught traffic safety skills that help students understand basic traffic laws and safety rules. Such education programs can occur inside the classroom with outside experts or in a school assembly. Potential pedestrian education curriculum elements include traffic sign identification and how to use a crosswalk.

Typical school-based bicycle education programs educate students about the rules of the road, proper use of bicycle equipment, biking skills, street crossing skills, and the benefits of biking. Education programs can be part of a Safe Routes to School program. These types of education programs are usually sponsored by a joint City/School District committee that includes appointed parents, teachers, student representatives, administrators, police, active bicyclists and engineering department staff.

Recommendation

This Plan recommends the City pursue a Safe Routes to School Program that includes annual youth pedestrian and bicycle safety education classes. The City should consider the need for multi-lingual instruction.

Sample programs:

- National Highway Traffic Safety Administration http://www.nhtsa.gov/ChildPedestrianSafetyCurriculum
- League of American Bicyclists: http://www.bikeleague.org/content/ride-smart-0
- Bicycle Transportation Alliance – Portland, OR: http://www.bta4bikes.org/resources/educational.php

7.1.5 Adult Bicycling Skills Classes

Community members can also particpate in private bicycling skills classes. The most common program is the League of American Bicyclists courses (including Traffic Safety 101, Traffic Safety 201, and Commuting), taught by League Certified Instructors. Courses cover bicycle safety checks, fixing a flat, on-bike skills, crash avoidance techniques, and traffic negotiation.

Recommendation

This Plan recommends that the City host or support adult bicycling skills classes on a bi-annual basis, at minimum. The City may also highlight local or nearby courses in outreach materials. The City should advertise the coursed in multiple languages and use responses to the advertisement to determine the need for multi-lingual instruction.

Sample programs:

- League of American Bicyclists: http://bikeleague.org/programs/education/courses.php

7.1.6 Diversion Class

Diversion classes are classes offered to first-time offenders of certain traffic violations, such as running a stoplight. The classes can be aimed at pedestrians, bicyclists, and/or motorists. In lieu of a citation and/or fine, individuals can take a one-time, free or inexpensive class. For example, in Marin County (www.marinbike.org/Campaigns/ShareTheRoad/Index.shtml#StreetSkills), interested citizens can take the class even if they did not receive a ticket.

This program is a good way to educate road users about rights and responsibilities, and can also increase public acceptance of enforcement actions against pedestrians.

Recommendation

This Plan recommends the City consider offering diversion classes for first-time offenders of minor traffic violations.

7.2 Encouragement

7.2.1 Safe Routes to School Program *(Priority Program)*

Helping children walk and bicycle to school is good for children's health and can reduce congestion, traffic dangers and air pollution caused by parents driving children to school. Safe Routes to School programs use a "5 Es" approach; using Engineering, Education, Enforcement, Encouragement, and Evaluation strategies to improve safety and encourage children walking and biking to school. The programs are usually run by a coalition of city government, school and school district officials, and teachers, parents, students, and neighbors.

A Turlock Safe Routes to School program will be a key element to implementing this Plan, especially considering Turlock's system of neighborhood schools that places most students within walking or bicycling distance of their school.

Recommendation

This Plan recommends that the City pursue grant funding to develop and implement a Safe Routes to School program.

Resource Guide: National Center for Safe Routes to School: http://www.saferoutesinfo.org/

7.2.2 Walking School Bus *(Priority Program)*

Walking school buses and bike trains are organized groups of children walking or biking to school with an adult. They address parental concerns about children walking or biking to school alone, which were expressed during community outreach conducted for this Plan. Parent or teacher volunteers can lead walking school buses for students, and can engage middle- or high-school students to help younger students get to school safely.

In addition, shifting parents away from driving to school may reduce congestion, improve air quality, and encourage active communities.

Recommendation

This Plan recommends the City support the development of walking school buses.

http://guide.saferoutesinfo.org/walking_school_bus/index.cfm

Walking school buses led by a parent or school volunteer can help address personal safety concerns

7.2.3 Bike to Work Day (Priority Program)

Bike to Work Day is a region wide event promoting bicycling to work and is typically the third Thursday in May. Among the most popular components of Bike to Work Day are energizer stations, where volunteers set up a table with promotional items, coffee, and snacks along popular bicycle commuting routes during the morning and afternoon commute hours.

Sample program: the Atlanta Bicycle Coalition organized energizer stations throughout the month of May offering snacks and beverages to cyclists, and partnered with a local bike shop to provide complimentary quick tune-ups as well.

Recommendation

This Plan recommends that the City consider sponsoring a Bike to Work Week. The week's lineup of events can include a Bike to Work Day celebration downtown with Pedal Pools (group rides), raffles and prizes, and speeches from Council Members or the Mayor. The type of events held can be developed through community input.

Bike to Work event hosted by a local business

7.2.4 Launch Party for New Bikeways *(Priority Program)*

When a new bikeway is built, some residents will become aware of it and use it, while others may not realize that they have improved bikeway options available. A launch party is a good way to inform residents about a new bikeway and can also be an opportunity to share other bicycling materials (such as maps and brochures) and answer questions about bicycling. It can also be a media-friendly event, with elected official appearances, ribbon cuttings, and a press release that includes information about the new facility, other existing and future facilities, and any timely information about bicycling.

Sample Program: When a new bikeway is built, the City of Vancouver throws a neighborhood party to celebrate. Cake, t-shirts, media and festivities are provided and all neighbors are invited as well as city workers (engineers, construction staff, planners) who participated in project planning and implementation.

Recommendation

This Plan recommends that the City host a launch party for all high priority projects recommended in this plan as well as inform the public of all new bikeways through its website and social media outlets.

7.2.5 Monthly Walk and Bike to School Days

Walk and Bike to School Day is a special event encouraging students to try walking or bicycle to school. Walk and Bike to School Day can be held yearly, monthly, or even weekly—depending on the level of support and participation from students, parents, and school and local officials. Some schools organize more frequent days – such as Walk and Roll Fridays—to give people an opportunity to enjoy the event on a regular basis. Parents and other volunteers accompany the students and staging areas can be designated along the route to school where groups can gather and walk or bike together. These events can be promoted through press releases, articles in school newsletters, and posters and flyers for students to take home and circulate around the community.

Recommendation

This Plan recommends the City support the development of monthly walk and bike to school days.

7.2.6 Bicycle Helmet Giveaway

In several cities, the local police department and their respective Police Activities League (PAL) host free bicycle helmet giveaways for children. Some departments even give helmets to children who are observed bicycling without one, provided they have their parents sign and return a "citation" issued by the officer. The State of California's Office of Traffic Safety offers grants to purchase bicycle helmets for giveaways.

The Police Activities League (PAL), a non-profit organization within the Police Department, continues to give away helmets from the same OTS grant. PAL's intention is to reinforce laws requiring safe bicycle use and promote trust between police officers and children.

Recommendation

This Plan recommends that the City coordinate with the local PAL to secure funding and organize a Bicycle Helmet Giveaway.

7.2.7 Employer-Based Encouragement Programs

Though the City cannot host these programs, it can work with or provide information to employers about commuting by bicycle. Popular employer-based encouragement programs include hosting a bicycle user group to share information about how to bicycle to work and to connect experienced bicyclists with novice bicyclists. Employers can host bicycle classes and participate in Bike to Work day.

Recommendation

This Plan recommends that the City collaborate with employers to implement bicycle related programs.

7.2.8 City Walking Map

City Walking Maps can help to make pedestrians more aware of existing opportunities and facilities for walking within the City of Turlock.

Recommendation

The Plan recommends the City provide a walking map that includes major destinations, trails, and approximate walking times between locations. The map could be made available on the City website.

7.3 Enforcement

7.3.1 Parent and Student Valet

School loading areas often become congested and disorderly without supervision. At the same time, expecting teachers or school staff to manage all the loading zones of a school can be infeasible. Training parent and student volunteers to manage traffic and assist in loading can significantly improve safety and the traffic flow around schools.

Under a valet program, parents and students are trained in how to keep traffic moving in a loading zone, how to properly assist students in and out of vehicles, and how to properly discourage unsafe or undesirable habits in the loading zone. Volunteers are often outfitted with florescent vests to increase their visibility and denote their role as a school representative.

While valet duties are not suitable for young children, students in the 4th grade and above can act effectively as valets when under adult supervision. Such programs also provide responsibilities and valuable character-building opportunities for students.

Recommendation

This Plan recommends the school district consider a parent and student valet program.

7.3.2 Targeted Enforcement

Targeted enforcement is focused efforts of police officers. For example, the Police Department conducts pedestrian stings at locations where pedestrians and motorists conflict and do not comply with traffic signals. Similar strategies may be applied to areas with bicycle traffic.

Recommendation

This Plan recommends the City coordinate with and/or consider funding the Police Department to conduct targeted enforcement stings at locations known for noncompliance with traffic laws and at high conflict or high bicycle-related collision areas.

7.3.3 Speed Feedback Signs

Speed feedback signs display the speed of passing motor vehicles, assuming that motorists will slow down if they are aware of their speed.

Recommendation

This Plan recommends that the City include information on how to request a speed feedback sign on its bicycling resource website.

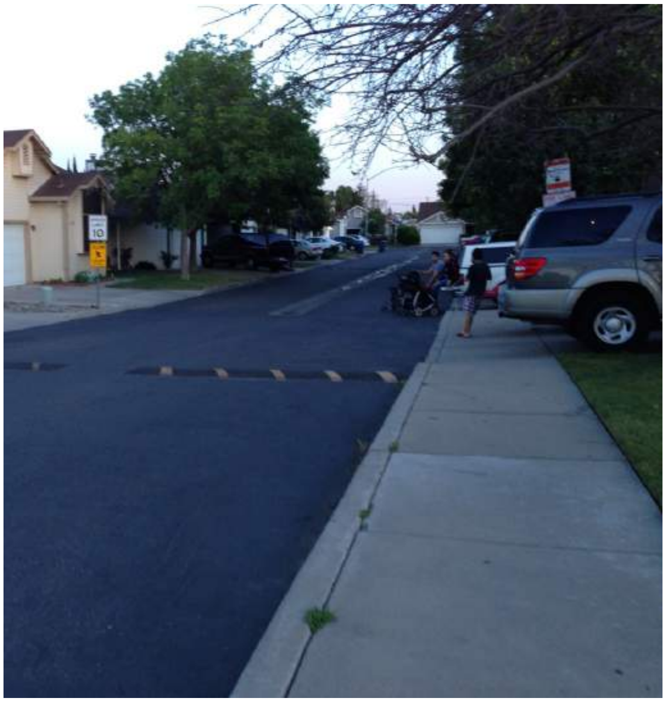
Speed Feedback signs can be an education and enforcement tool

7.3.4 Parking Enforcement

It is illegal to block the sidewalk or crosswalks with a motor vehicle. Vehicles parked on sidewalks or crosswalks impede pedestrian travel, particularly those who use wheelchairs and strollers, and force pedestrians to travel in the street to pass. Similarly, vehicles parked or stopped in bicycle lanes or blocking access to shared-use paths can force bicyclists to move into the vehicle lane, or make unpredictable movements to avoid the obstruction.

Recommendation

This Plan recommends the City increase its parking enforcement efforts.



7.4 Evaluation

7.4.1 Student Hand Tallies and Parent Surveys *(Priority Program)*

While distributing and collecting parent surveys is very time- and labor-intensive, student hand tallies are relatively easy to collect and can be analyzed quickly. The National Center for Safe Routes to School provides Student Hand Tally and Parent Survey forms and will enter the data from those forms. This can be a cost effective way to understand how families get to and from school and the reasons for their mode choice.

Recommendation

This Plan recommends the City and School District conduct student hand tallies and parent surveys every other year.

http://www.saferoutesinfo.org/data-central/data-collection-forms

7.4.2 Counts Program

Establishing an annual count program would help track trends and measure the success of projects and programs. The program should tally the number of pedestrians and bicyclists at key locations around the community, particularly at pinch points, in downtown, near schools, and on greenway trails. This will provide the city with information on walking and bicycling activity levels

It is recommended that the data collection program use methods developed by the National Bicycle and Pedestrian Documentation Project (NBPDP). Counts should be performed in the second week in September; one weekday count (from 5-7 PM on a Tuesday, Wednesday, or Thursday) and at least one Saturday count (12 noon – 2 pm) should be completed. Counters can be city staff or volunteers, as long as proper training is provided. The NBPDP website includes count and survey instructions, forms, and participant training materials:

http://www.bikepeddocumentation.org

Manual counts are inexpensive to implement and help gather behavioral data (gender, age group, sidewalk versus roadway riding). However, they necessarily gather a very small sample size and are subject to significant variability, and are therefore not statistically robust. Manual counts should be one part of a complete evaluation program that also includes automatic machine counters. New and increasingly affordable technologies including active infrared, inductive loops, and pneumatic tubes that exclude motor vehicles in mixed traffic environments can produce much larger and statistically significant datasets. A limited number of automatic counters can be rotated around the city in a mobile counting program and in many cities is funded out of the city's existing motor vehicle count budget.

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_797.pdf

Recommendation

This Plan recommends the City develop a program to conduct bicycle and pedestrian counts on a regular basis.

8 Implementation Plan

8.1 Project Prioritization

Projects and programs recommended in this Plan were prioritized for implementation phasing based on the following criteria.

Programmatic recommendations were prioritized based on an assessment of Turlock's progress towards becoming a walkable, bikeable community and a review of successful programs in comparable cities.

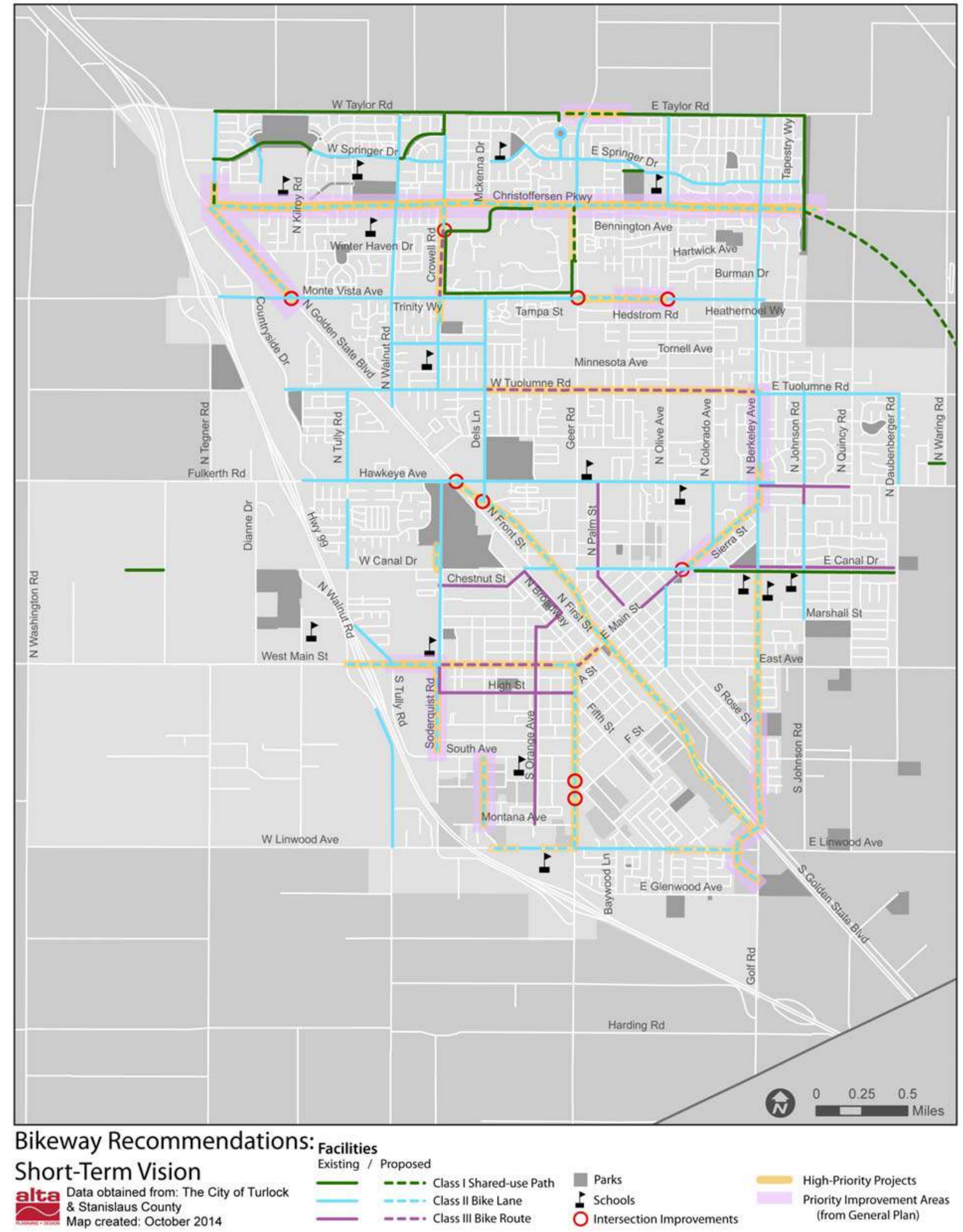
Pedestrian infrastructure improvements were prioritized based on an analysis of gaps identified in the current network, with corridors selected for improvements that contribute to a citywide pedestrian network.

Bicycle infrastructure improvements were prioritized where recommendations from the General Plan coincided with gaps identified during the Active Transportation Plan process, or where the City of Turlock had identified a Priority Improvement Area. Priority intersections include those recommendations that facilitate movement along a priority bikeway project corridor.

Priorities were also influenced by the Capital Improvement Program (CIP) and priorities identified by members of the public in workshops conducted on April 1, 2014 and November 2, 2014.

Priority bicycle infrastructure projects that represent the short-term vision for the bicycle network are shown in Figure 8-1 and listed in Table 8-1.

Figure 8-1: Short-Term Bikeway Vision



8.1.1 Phasing Plan

Priority bicycle projects can be divided into two phases of implementation. Priority I projects are relatively easy to implement, "easy win" projects that can be completed within one to three years of plan adoption. These include projects like striping bike lanes within existing right-of-way or completing short gaps in the bikeway network. Priority II projects may require some additional planning or acquisition of right-of-way, and should be completed within three to five years of plan adoption. All remaining projects are considered non-priority, intended for implementation between five and ten years from plan adoption.

Priority I and II projects are listed in Table 8-1. Minor revisions to the phasing plan may be made prior to plan adoption, in consultation with the City's capital projects staff.

Table 8-1: Bikeway Improvement Phasing Plan

ID#	Class	Corridor	Begin or Cross Street	End	Notes	Priority
Priority I						
GP-11	Class I	Tegner Road	Sandstone Street	Christoffersen Parkway		I
GP-18	Class II	Christoffersen Parkway	Golden State Boulevard	Wellington Lane		I
GP-20	Class II	Crowell Road	Christoffersen Parkway	Ansel Adams Boulevard		I
GP-26B	Class II	Golden State Boulevard	Christoffersen Parkway	Monte Vista Avenue		I
GP-26D	Class II	Golden State Boulevard	Hawkeye Avenue	F Street		I
ATP-6	Class II	Lander Avenue	Main Street	Linwood Avenue	Supersedes General Plan recommendation	I
GP-32B	Class II	Linwood Avenue	West Avenue	250 feet east of West Avenue		I
GP-32C	Class II	Linwood Avenue	1,230 feet west of Lander Avenue	Lander Avenue		I
GP-34	Class II	Main Street	Canal Drive	Berkeley Avenue		I
GP-36	Class II	Monte Vista Avenue	Geer Road	Olive Avenue		I
ATP-10	Class II	Berkeley Avenue	100 feet north of Hawkeye Avenue	Main Street		I
ATP-13	Class III	Crowell Road	Ansel Adams Boulevard	Monte Vista Avenue	Implement with signs and sharrows	I
GP-54	Class III	West Avenue	South Avenue	Montana Avenue		I
GP-56	Class III	Tuolumne Road	Dels Lane	Berkeley Avenue		I
GP-57	Class III	Main Street	Soderquist Road	Palm Street		I
ATP-27	Intersection	Lander Avenue	Bernell Avenue/9th Street		Improve with Class II on Lander Avenue	I
ATP-28	Intersection	Lander Avenue	F Street		Improve with Class II on Lander Avenue and Class III on F Street	I
ATP-31	Intersection	Monte Vista Avenue	Olive Avenue		Stripe westbound bike lane inside of right turn lane	I
ATP-33	Intersection	Monte Vista Avenue	Geer Road		Stripe eastbound bike lane inside of right turn lane	I
ATP-35	Intersection	Monte Vista Avenue	Golden State Boulevard		Stripe westbound bike lane through right turn pocket	I
ATP-86	Intersection	Crowell Road	Ansel Adams Boulevard		Install stop signs	I
Priority II						
GP-8	Class I	Geer Road	Christoffersen Parkway	Calaveras Way		II
GP-10	Class I	Taylor Road	End of existing path, 650 feet west of Geer Road	Fosberg Road		II
GP-16	Class II	Berkeley Avenue	Canal Drive	Golden State Boulevard		II
ATP-2	Class II	Crowell Road	200 feet south of Rockhurst Lane	Monte Vista Avenue		II
GP-27A	Class II	Golf Road	Golden State Boulevard	Glenwood Avenue		II
GP-35B	Class II	Main Street	Walnut Road	Soderquist Road		II
ATP-9	Class II	Soderquist Road	675 feet north of Canal Drive	Canal Drive	Only west side of road	II
GP-42	Class II	Soderquist Road	Main Street	South Avenue		II
ATP-29	Intersection	Main Street	Canal Drive		Improve bike lane striping on approaches; provide new access to Class I path on Canal Drive for westbound bicyclists	II

8.2 Project Sheets

Project sheets were developed for the following locations:

1. Class I path extension on Canal Drive and Class II lanes on Main Street (ATP-29)
2. Class I path on Taylor Road (GP-10)
3. Class II bike lanes on Berkeley Avenue from Canal Drive to Golden State Boulevard (GP-16)
4. Class II bike lanes on Berkeley Avenue to close a gap near Hawkeye Avenue (ATP-2)
5. Class II bike lanes on Golden State Boulevard from Hawkeye Avenue to F Street (GP-26D)
6. Class II bike lanes on Soderquist Road to close a gap near Canal Drive (ATP-10)
7. Class II bike lanes on West Avenue from South Avenue to Montana Avenue (GP-54)
8. Class III bike route on Main Street from Soderquist Road to Palm Street (GP-56)
9. Class I path around Donnelly Lake (ATP-1)
10. Class II bike lanes on Linwood Avenue between West Avenue and Lander Avenue (GP-32B and GP-32C)

Where feasible, project sheets address both pedestrian and bicycle connectivity.

These locations were selected for project sheet development based on public input and on conversations with City staff. They represent projects that may be high priority for near-term implementation or grant application development, or that may be complex and require additional detailed analysis.

Project sheets are included on the following pages.

This page intentionally left blank.

8.2.1 Main Street and Canal Drive Intersection (Sheet 1 of 1)

Main Street is an east/ west arterial from Washington Boulevard to West Avenue, a east/ west collector from West Avenue to Lander Avenue, and a northeast/ southwest collector from Lander Avenue to Berkeley Avenue. Canal Drive is a east/ west collector from Washington Road to Golden State Boulevard and an arterial from Golden State Boulevard to Verduga Road. The study area is at the intersection of Main Street and Canal Drive. The adopted General Plan identifies Canal Drive as a Class II bicycle facility at this location.

Existing Issues

Canal Drive has marked bike lanes at this location, but the transition at the intersection is not clearly marked. There is an existing shared use path along the canal frontage, but there is not paved connection or marked crossing to westbound Canal Drive.

Project Description

This project proposes to restripe westbound travel lanes at the intersection to provide three 11-foot lanes and a 4' bike lane. In the eastbound direction, this project proposes to restripe the receiving bike lane to align with the bike lanes on Canal Drive west of the intersection. An extension to the existing shared use path will also need to be constructed from the existing bridge to Main Street.

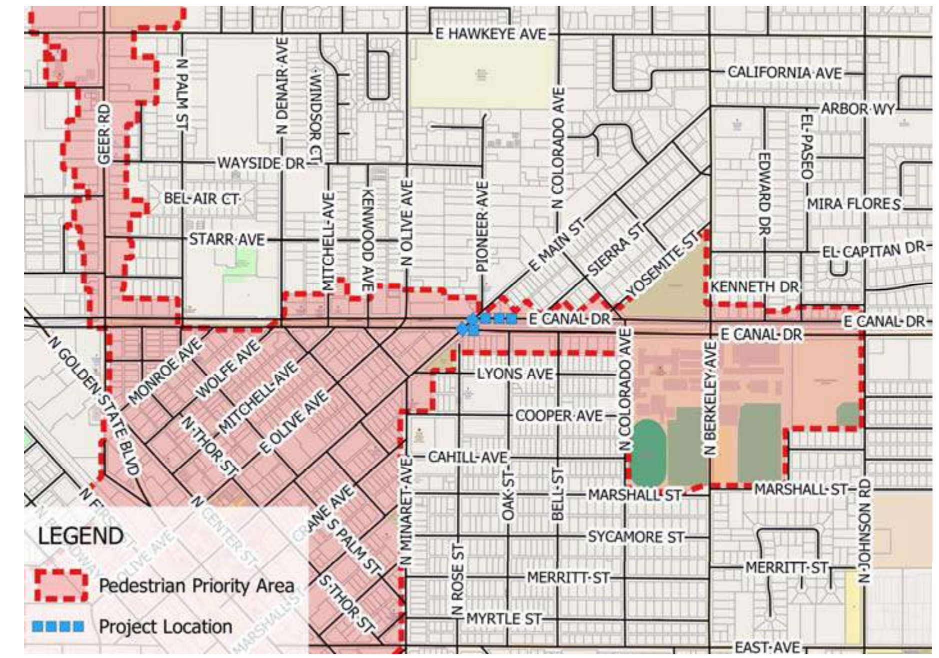
Destinations Served

- Residential Communities
- Crane Park
- Marvin Dutcher Middle School
- Turlock High School
- Julien Elementary School
- Transit Route (BLST Routes A & B)
- Pedestrian Priority Area

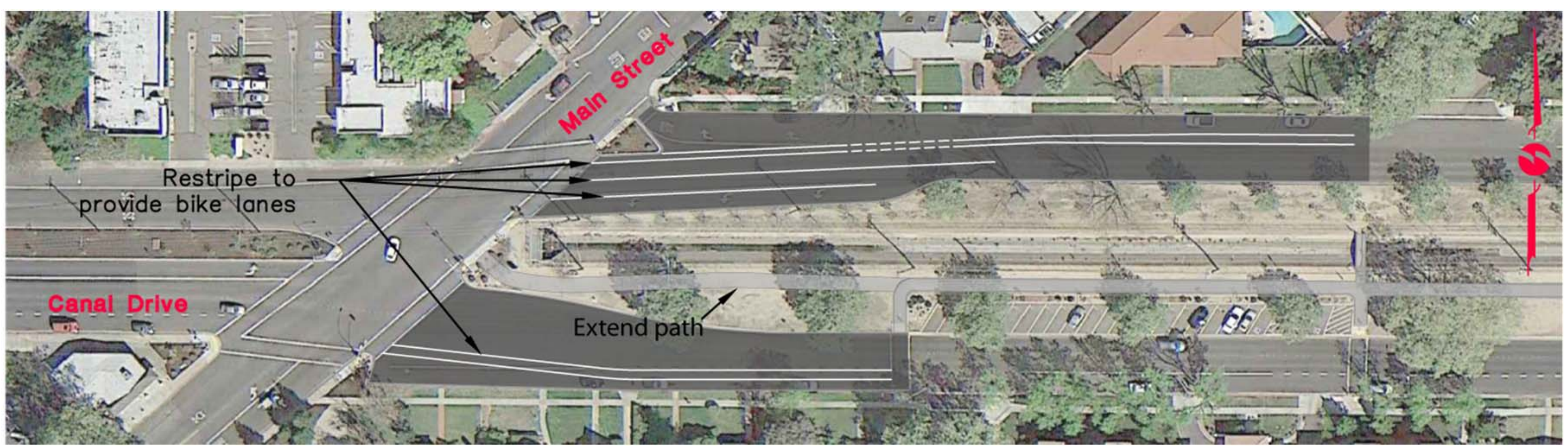
R/W Required

None

Vicinity Map



Project Illustration



Project Benefits

Provides dedicated space for bicycling up to and departing from intersection.

Provides connection to the existing shared use path.

Cost Estimate

$33,000 (Construction)

$ 0 (Right of Way)

$33,000 TOTAL

This page intentionally left blank.

8.2.2 Taylor Road (Sheet 1 of 1)

Taylor Road is an east/ west expressway that runs from Washington Rod to Waring Road. The study segment is about 1,800 feet long and runs between the termini of both Class I bike paths near Geer Road--from Ferreira Ranch Drive to Fosberg Road. The adopted General Plan identifies Taylor Road as a Class I bicycle facility.

Existing Issues

There is an existing Class I bike path that runs parallel to the eastbound travel lanes on Taylor Road from Tegner Road to Ferreira Ranch Drive and from Fosberg Road to Country Walk Lane. The paths are separated from Taylor Road by the canal and are directly adjacent to the east/ west frontage/ neighborhood streets: Golden Oak Court, Alta Vista Street, Caprice Drive, Homestead Way, Summerton Lane, Sunday Drive, Inspiration Way, Knoxley Drive, and Merlin Drive.

Project Description

This project proposes to connect the existing paths between Ferreira Ranch Drive and Fosberg Road (approximately 1,800 feet). The proposed path would be 15' wide with a retaining wall on the northern side with a new decorative fence on top of the retaining wall to match the existing wall at Fosberg Road. Sidewalks would be extended to Taylor Road with a fence (similar to the one at Walnut Avenue and Taylor Road) along Geer Road to a new marked crosswalk at the intersection with Taylor Road. A fence would encourage pedestrians to cross at the intersection. Bike lanes would be striped on Geer Road for the length of the improvements.

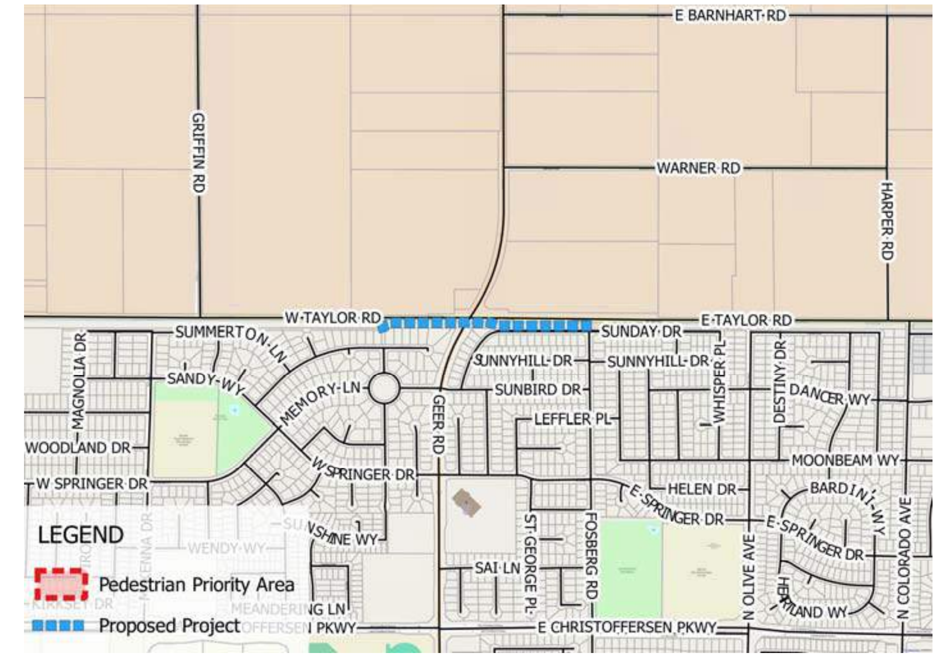
Destinations Served

- Residential Neighborhoods
- Recreational Use
- Turlock Regional Sports Complex
- Ferreira Ranch Park
- Christofferson Park

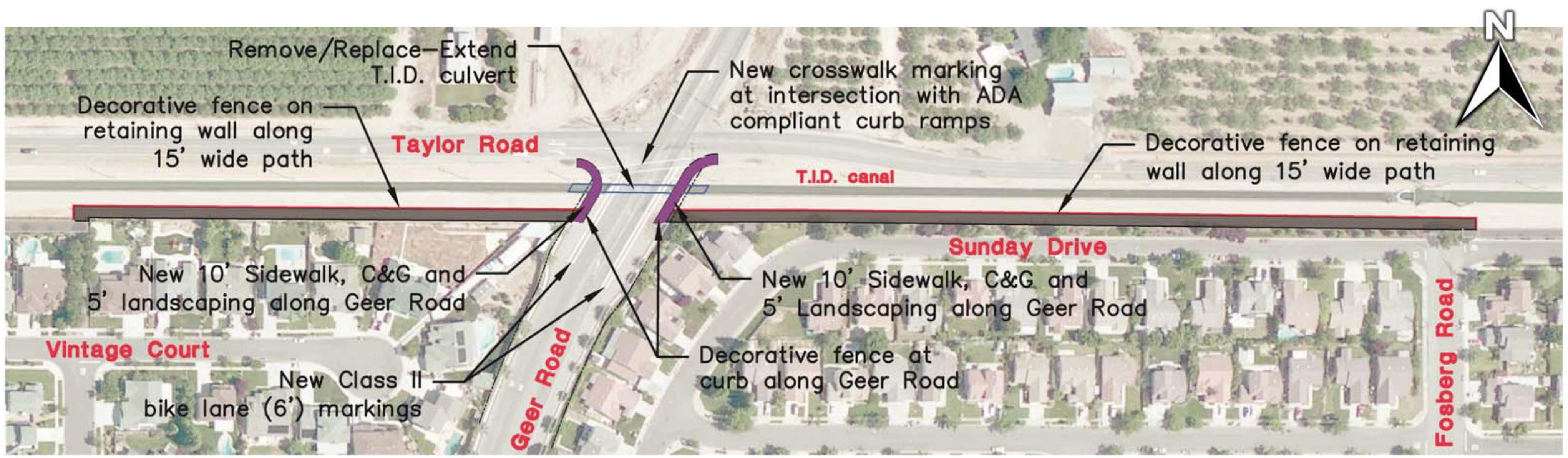
R/W Required

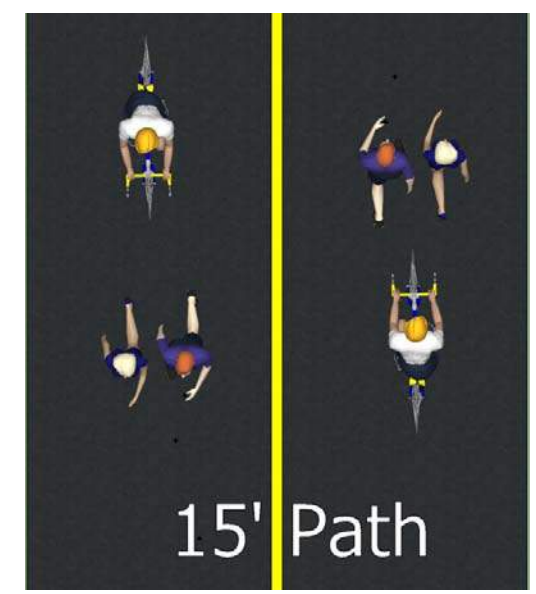
None

Vicinity Map



Project Illustration





Project Benefits

Provides connectivity between existing multi-purpose path terminals.
Provides dedicated space for bicycling and pedestrian recreation.

Cost Estimate

$1,270,000 (Construction)
<u>$ 0 (Right of Way)</u>
$1,270,000 TOTAL

This page intentionally left blank.

8.2.3 Berkeley Avenue (Canal Drive to Golden State Boulevard, Sheet 1 of 3)

Berkeley Avenue is a north/ south collector between Taylor Road and East Avenue and a north/south arterial between East Avenue and Golden State Boulevard. The study segment is about 7,600 feet long and runs from Golden State Boulevard to Canal Drive. The adopted General Plan identifies Berkeley Avenue as a Class II bicycle facility.

Existing Issues

Between Canal Drive and Golden State Boulevard, Berkeley Avenue does not have bike lanes. The existing cross section between Golden State Boulevard and just south of Ramson Drive is two 12' travel lanes with unpaved shoulders. From Ramson Drive to Brier Road the section is about 60' wide with sidewalks, on-street parking, and two travel lanes. The paved width for this segment is about 48'.

Project Description

The improvements shown on this sheet would be to widen Berkeley Avenue south of Ramson Drive to include 6' bike lanes, 5' sidewalks, 8' on-street parking on the northbound side, and a 11' two-way left-turn lane. From Ramson Drive to Brier Road, Berkeley Avenue should be restriped to achieve this same cross section.

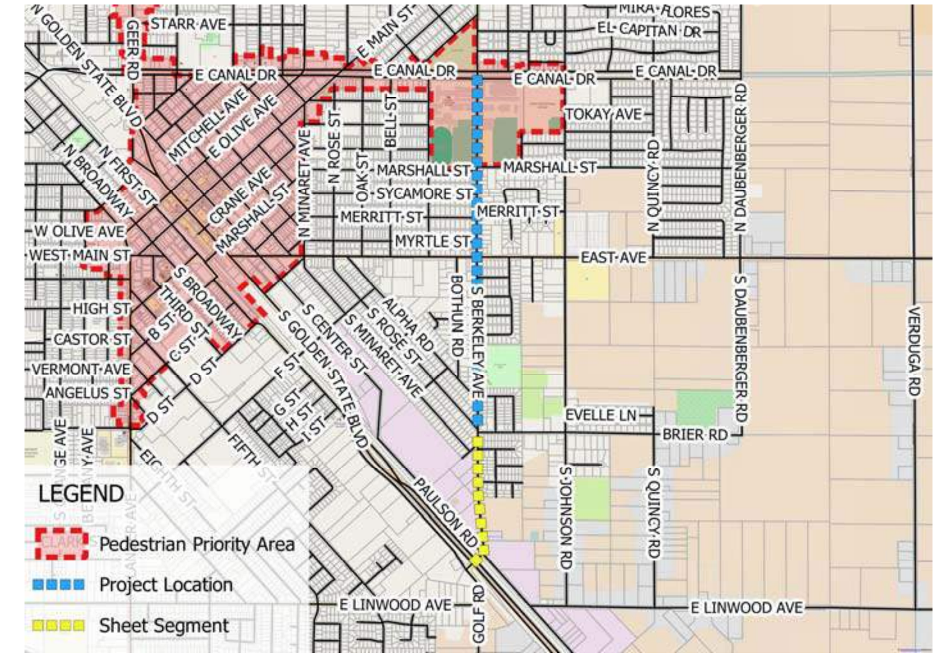
Destinations Served

- Residential Communities
- Sunnyview Park
- Turlock High School (north of East Avenue)
- Julien Elementary School (north of East Avenue)
- Transit Route (BLST Route D)

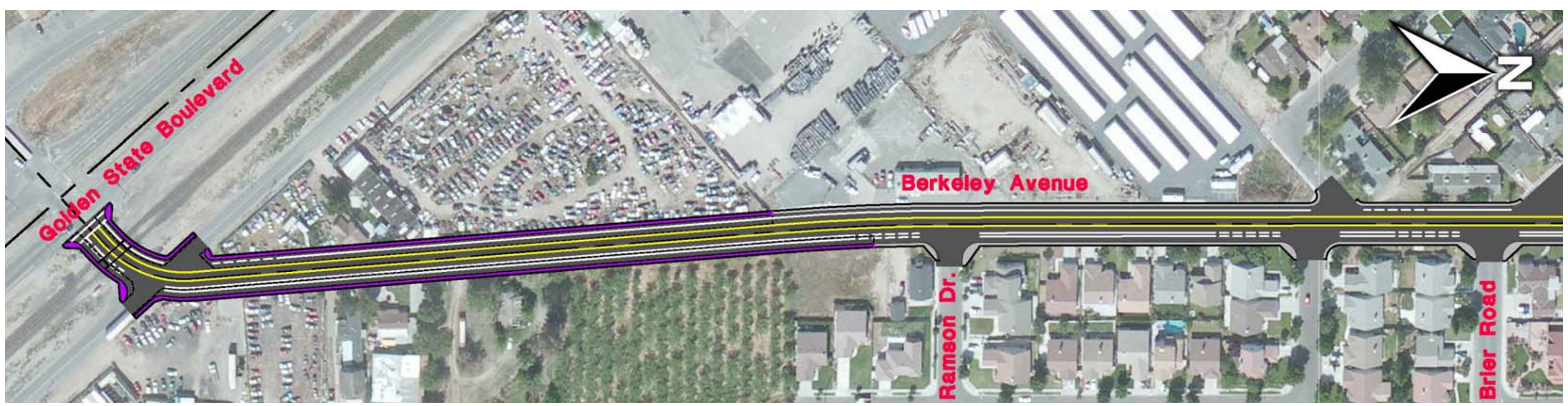
R/W Required

49,100 SQFT

Vicinity Map



Project Illustration



Project Benefits

Increases and extends bike and pedestrian connectivity along corridor.

Provides dedicated space for bicycling and walking.

Cost Estimate (Includes all sheets)

$1,110,000 (Construction)

$1,228,000 (Right of Way)

$2,338,000 TOTAL

Berkeley Avenue (Canal Drive to Golden State Boulevard, Sheet 2 of 3)

Berkeley Avenue is a north/ south collector between Taylor Road and East Avenue and a north/south arterial between East Avenue and Golden State Boulevard. The study segment is about 7,635 feet long and runs from Golden State Boulevard to Canal Drive. The adopted General Plan identifies Berkeley Avenue as a Class II bicycle facility.

Existing Issues

Between Canal Drive and Golden State Boulevard, Berkeley Avenue does not have bike lanes. The adopted General Plan identifies Berkeley Avenue between Canal Drive and Daffodil Lane as an existing Class III bicycle facility. The existing cross section between Brier Road and Alpha Road is about 60' wide with sidewalks, on-street parking, and two travel lanes. The paved width for this segment is about 48'. After Alpha Road, the section narrows down to about a 24' paved width with sidewalks on the northbound side.

Project Description

The improvements shown on this sheet would be to add sidewalks to the southbound side of Berkeley Avenue between Brier Road and Alpha Road. From Alpha Road to East Avenue widen Berkeley Avenue by about 13' to accommodate the section shown on sheet 3: 5' sidewalks on both sides, 6' bike lanes, 8' on-street parking on the northbound side, and 10' travel lanes.

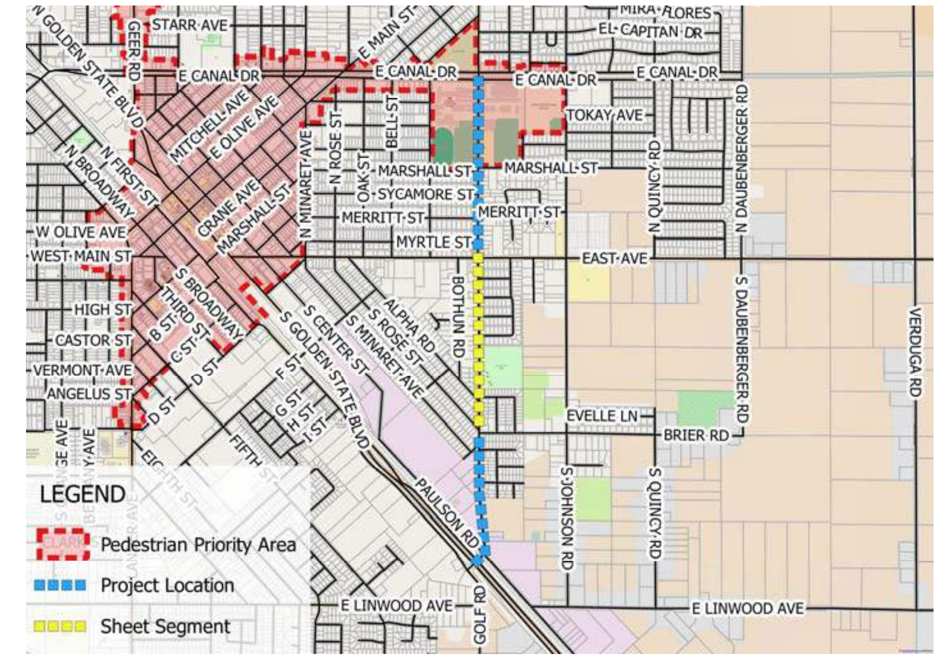
Destinations Served

- Residential Communities
- Sunnyview Park
- Turlock High School (north of East Avenue)
- Julien Elementary School (North of East Avenue)
- Transit Route (BLST Route D)

R/W Required

49,100 SQFT

Vicinity Map



Project Illustration

Project Benefits

Increases and extends bike and pedestrian connectivity along corridor.

Provides dedicated space for bicycling and walking.

Cost Estimate (Includes all sheets)

$1,110,000 (Construction)

$1,228,000 (Right of Way)

$2,338,000 TOTAL

Berkeley Avenue (Canal Drive to Golden State Boulevard, Sheet 3 of 3)

Berkeley Avenue is a north/ south collector between Taylor Road and East Avenue and a north/south arterial between East Avenue and Golden State Boulevard. The study segment is about 7,635 feet long and runs from Golden State Boulevard to Canal Drive. The adopted General Plan identifies Berkeley Avenue as a Class II bicycle facility.

Existing Issues

Between Canal Drive and Golden State Boulevard, Berkeley Avenue does not have bike lanes. The adopted General Plan identifies Berkeley Avenue between Canal Drive and Daffodil Lane as an existing Class III bicycle facility. The existing cross section between East Avenue and Canal Drive consists of about 40' paved width with two travel lanes and on-street parking. There are patches of existing sidewalk: on the northbound side between Merritt Street and Marshall Street and north of the school parking lot on both sides of the street.

Project Description

The improvements shown on this sheet would be to add sidewalks where there are none currently and to restripe the existing paved width to delineate the cross section shown on this sheet: 5' sidewalks on both sides, 6' bike lanes, 8' on-street parking on the northbound side, and 10' travel lanes.

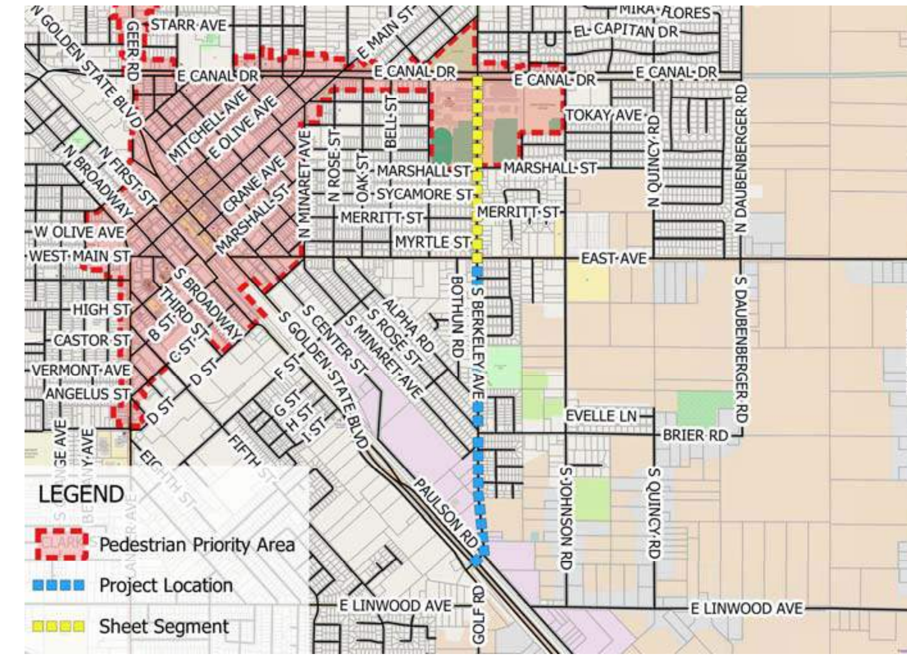
Destinations Served

- Residential Communities
- Sunnyview Park
- Turlock High School (north of East Avenue)
- Julien Elementary School (north of East Avenue)
- Transit Route (BLST Route D)

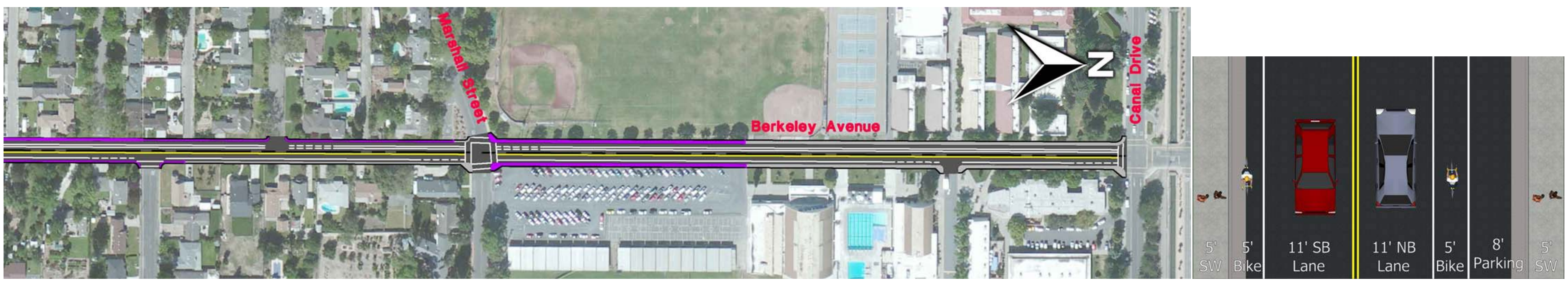
R/W Required

49,100 SQFT

Vicinity Map



Project Illustration



Project Benefits

Increases and extends bike and pedestrian connectivity along corridor.

Provides dedicated space for bicycling and walking.

Cost Estimate (Includes all sheets)

$1,110,000 (Construction)

$1,228,000 (Right of Way)

$2,338,000 TOTAL

This page intentionally left blank.

8.2.4 Berkeley Avenue at Hawkeye Avenue (Sheet 1 of 1)

Berkeley Avenue is a north/ south collector between Taylor Road and East Avenue and a north/south arterial between East Avenue and Golden State Boulevard. The study segment is about 715 feet long and runs from Main Street to 100' north of Hawkeye Avenue. The adopted General Plan identifies Berkeley Avenue as a Class II bicycle facility in this area.

Existing Issues

Between Main Street and 100' north of Hawkeye Avenue, Berkeley Avenue does not have bike lanes. The existing cross section between Main Street and California Avenue is about 60'-65' paved width with a through/left and right turn lane in both directions. There is a sidewalk on the northbound side and landscaped medians. From California Avenue to just north of Hawkeye Avenue the road transitions to a paved width of about 46' with one northbound lane and two southbound lanes. There are no existing sidewalks except for about 100' north of Hawkeye Avenue.

Project Description

Between Main Street and California Avenue in the southbound direction, to accommodate a bike lane the road would need to be widened by about 7', and sidewalk would need to be constructed. In the northbound direction, the existing pavement would need to be restriped to delineate the bike lane. Between California Avenue and Hawkeye Avenue, the road would need to be widened by about 2 feet on both sides to provide room for bike lanes, and sidewalk would need to be constructed on both sides. North of Hawkeye Avenue, the northbound roadway would need to be widened by about 4' to accommodate 8' on-street parking lane and a 6' bike lane, and sidewalk would also need to be constructed.

Destinations Served

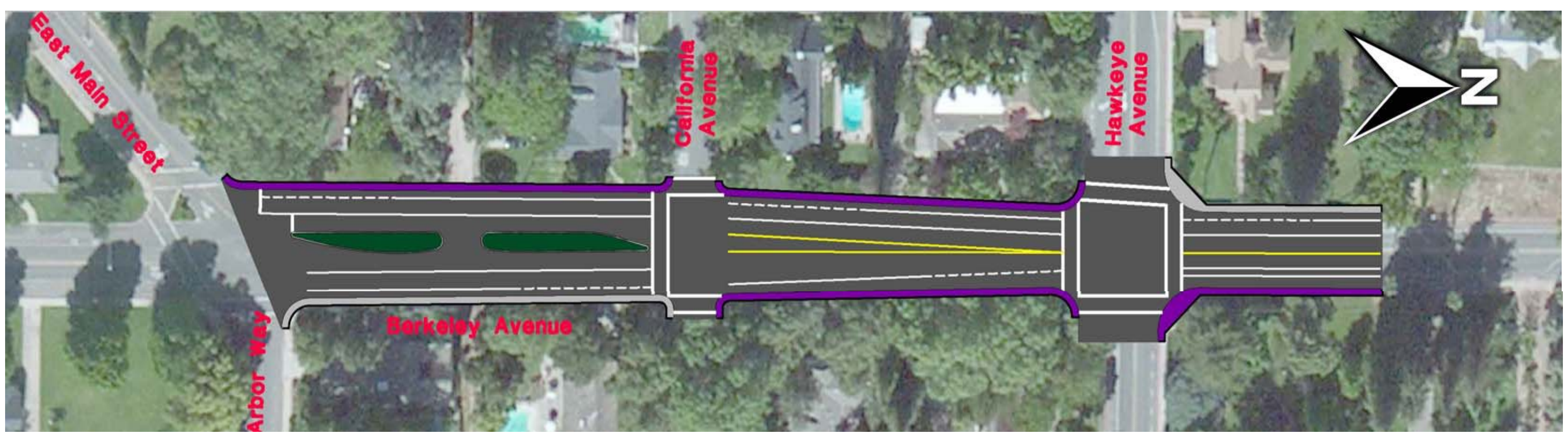
- Residential Communities
- Crane Park
- Marvin Dutcher Middle School
- Turlock High School
- Julien Elementary School
- Transit Route (BLST Route B)
- Pedestrian Priority Area

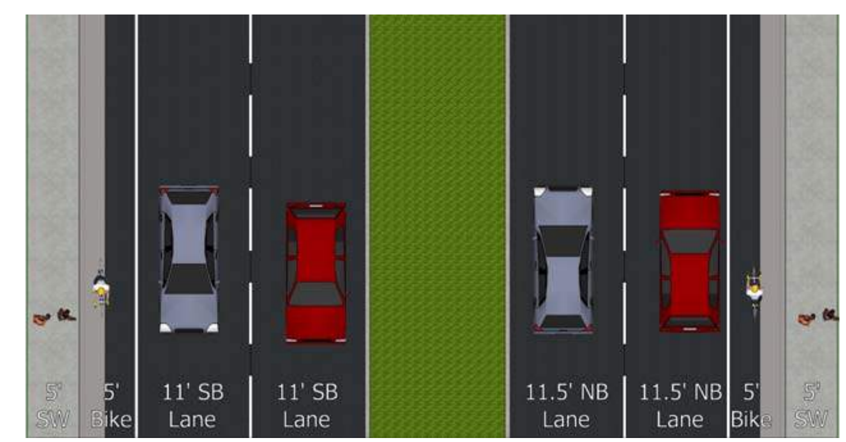
R/W Required

1300 SQFT

Vicinity Map

Project Illustration





Project Benefits

Increases and extends bike and pedestrian connectivity along corridor.

Provides dedicated space for bicycling and walking.

Cost Estimate

$149,000 (Construction)

$ 33,000 (Right of Way)

$182,000 TOTAL

This page intentionally left blank.

8.2.5 Golden State Boulevard (Sheet 1 of 4)

Golden State Boulevard is a southeast/ northwest expressway from the south of the City Limits at Griffith Road to the City Limits at F Street; an arterial from F Street to Hawkeye Avenue; and an expressway from Hawkeye Avenue to Taylor Road. The study segment is about 13,500 feet long and runs from F Street to Hawkeye Avenue. The adopted General Plan identifies Golden State Boulevard as a Class II bicycle facility.

Existing Issues

The segment shown on this street is a 5 lane section with about 72'-78' of existing pavement. There are sidewalks on both sides, but there are some gaps (shown in purple below). There are no existing bicycle facilities. There are wide (17'-18') outside lanes currently being used for minimal on-street parking.

Project Description

The existing lane geometries should remain the same; only the outside lane should be restriped as shown in the cross section. The improvements shown on this sheet would be to restripe the outside lane (approximately 17-18' wide) to remove on-street parking and delineate an 11' travel lane and a 6' bike lane. "No Parking" signs should also be installed to prohibit on-street parking. As shown in purple below, there are locations without existing sidewalk, so an 8' sidewalk would need to be constructed in these areas.

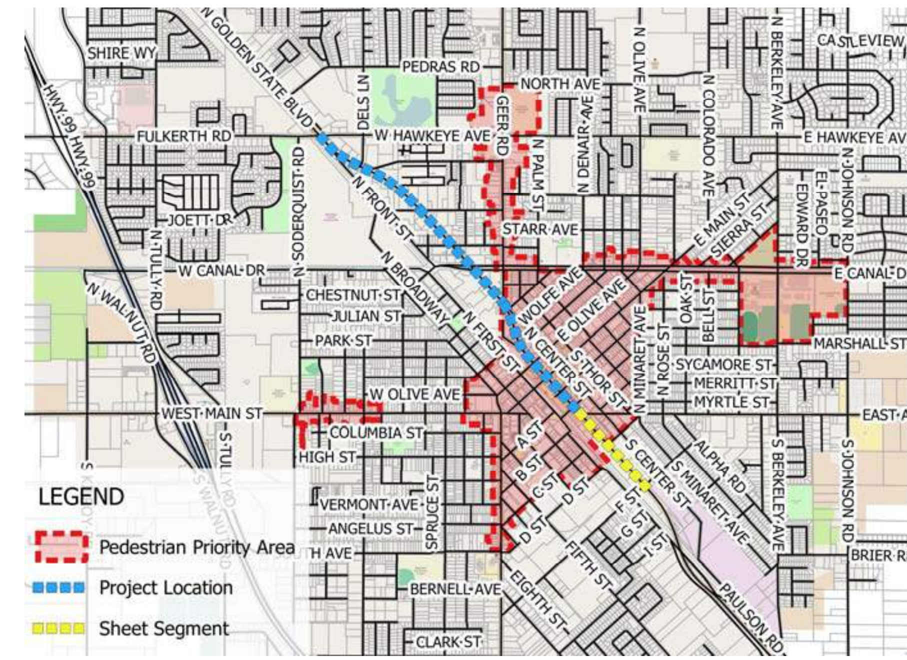
Destinations Served

- Downtown Core
- Commercial and Industrial Employment Centers
- Donnelly Park
- Central Park
- City Hall
- Transit (BLST) Transfer Hub
- Transit Route (BLST Route B)
- Pedestrian Priority Area

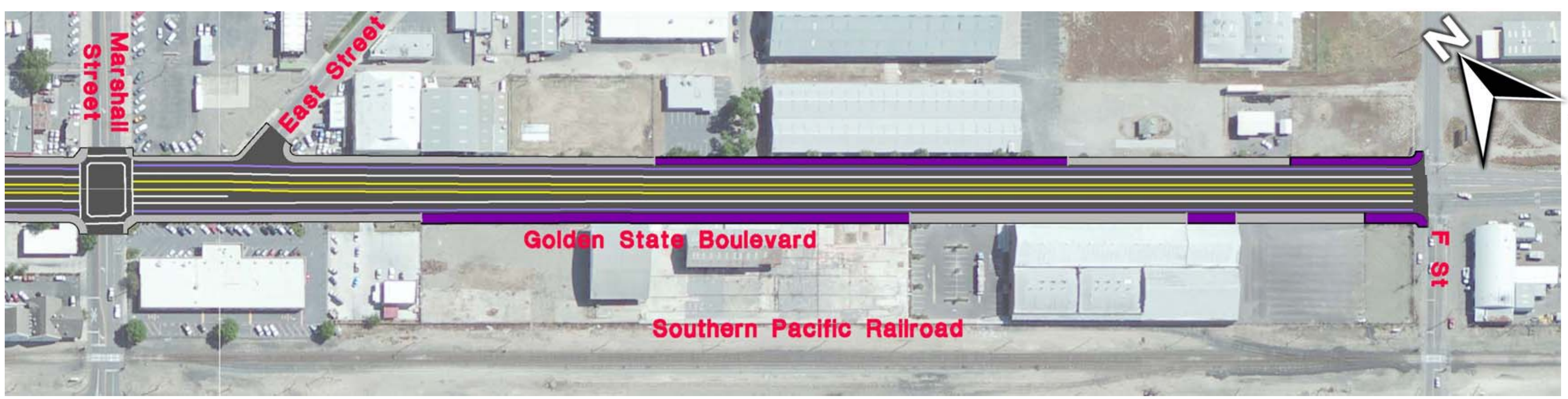
R/W Required

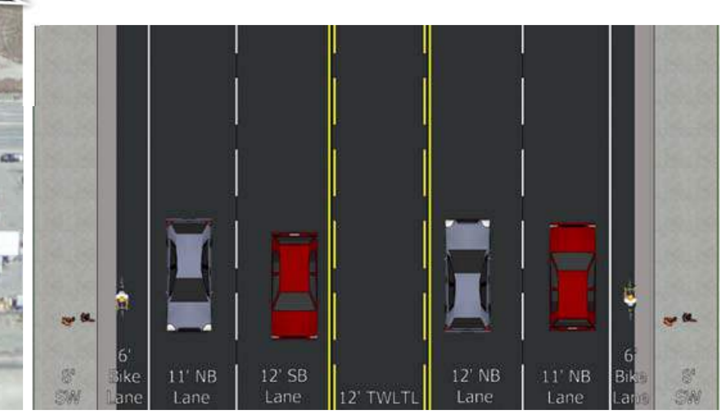
None

Vicinity Map



Project Illustration





Project Benefits

Increases and extends bike and pedestrian connectivity along corridor.

Provides dedicated space for bicycling and walking.

Cost Estimate (Includes all sheets)

$468,000 (Construction)

$ 0 (Right of Way)

$468,000 TOTAL

Golden State Boulevard (Sheet 2 of 4)

Golden State Boulevard is a southeast/ northwest expressway from the south of the City Limits at Griffith Road to the City Limits at F Street; an arterial from F Street to Hawkeye Avenue; and an expressway from Hawkeye Avenue to Taylor Road. The study segment is about 13,500 feet long and runs from F Street to Hawkeye Avenue. The adopted General Plan identifies Golden State Boulevard as a Class II bicycle facility.

Existing Issues

The segment shown on this street is a 5 lane section with about 72' of existing pavement. There are existing sidewalks on both sides. There are no existing bicycle facilities. There are wide (17'-18') outside lanes currently being used for minimal on-street parking.

Project Description

The existing lane geometries should remain the same; only the outside lane should be restriped as shown in the cross section. The improvements shown on this sheet would be to restripe the outside lane (approximately 17-18' wide) to remove on-street parking and delineate an 11' travel lane and a 6' bike lane. "No Parking" signs should also be installed to prohibit on-street parking. As shown in the graphic below, there is existing sidewalk for the length of this segment.

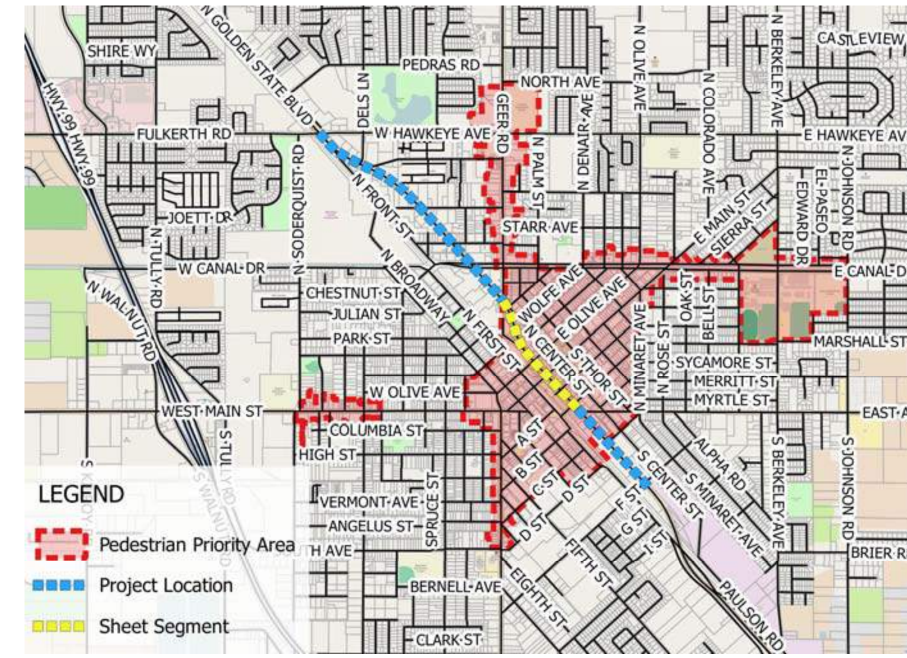
Destinations Served

- Downtown Core
- Commercial and Industrial Employment Centers
- Donnelly Park
- Central Park
- City Hall
- Transit (BLST) Transfer Hub
- Transit Route (BLST Route B)
- Pedestrian Priority Area

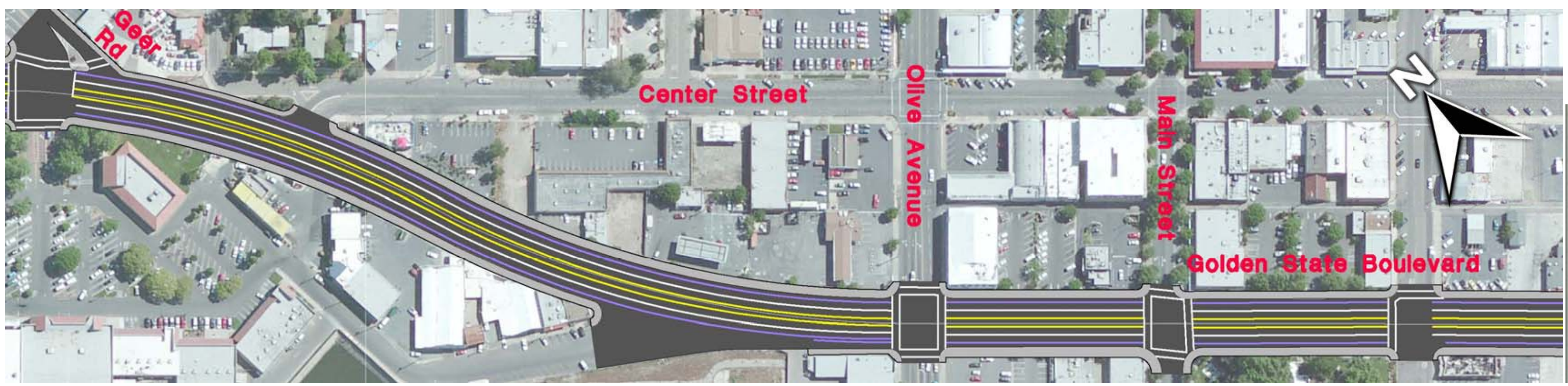
R/W Required

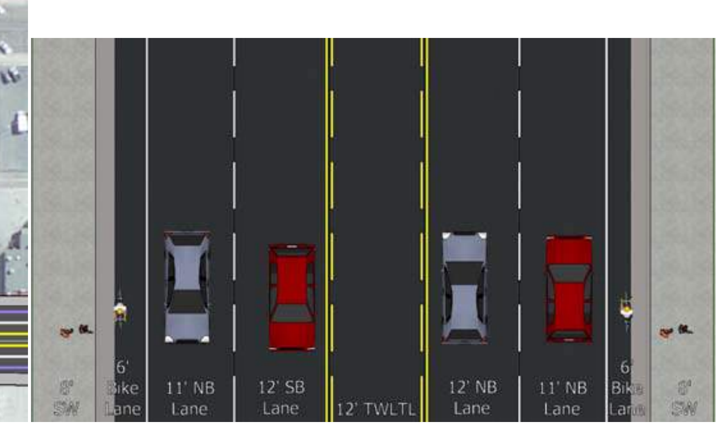
None

Vicinity Map



Project Illustration





Project Benefits

Increases and extends bike and pedestrian connectivity along corridor.

Provides dedicated space for bicycling and walking.

Cost Estimate (Includes all sheets)

$468,000 (Construction)

$ 0 (Right of Way)

$468,000 TOTAL

Golden State Boulevard (Sheet 3 of 4)

Golden State Boulevard is a southeast/ northwest expressway from the south of the City Limits at Griffith Road to the City Limits at F Street; an arterial from F Street to Hawkeye Avenue; and an expressway from Hawkeye Avenue to Taylor Road. The study segment is about 13,500 feet long and runs from F Street to Hawkeye Avenue. The adopted General Plan identifies Golden State Boulevard as a Class II bicycle facility.

Existing Issues

Between Geer Road and Canal Drive, Golden State Boulevard is a 6-lane section (80' paved width) with two thru lanes and a right turn lane in the southeastbound direction, a left-turn lane, and two northwestbound thru lanes. From Canal Drive to Almond Drive, the width is a 5-lane section over a paved width of 74'. There are existing sidewalks on both sides. There are no existing bicycle facilities. There are wide (17'-18') outside lanes currently being used for minimal on-street parking.

Project Description

The existing lane geometries should remain the same; only the outside lane should be restriped as shown in the cross section. The improvements shown on this sheet would be to restripe the outside lane (approximately 17-18' wide) to remove on-street parking and delineate an 11' travel lane and a 6' bike lane. "No Parking" signs should also be installed to prohibit on-street parking. As shown in the graphic below, there is existing sidewalk for the length of this segment.

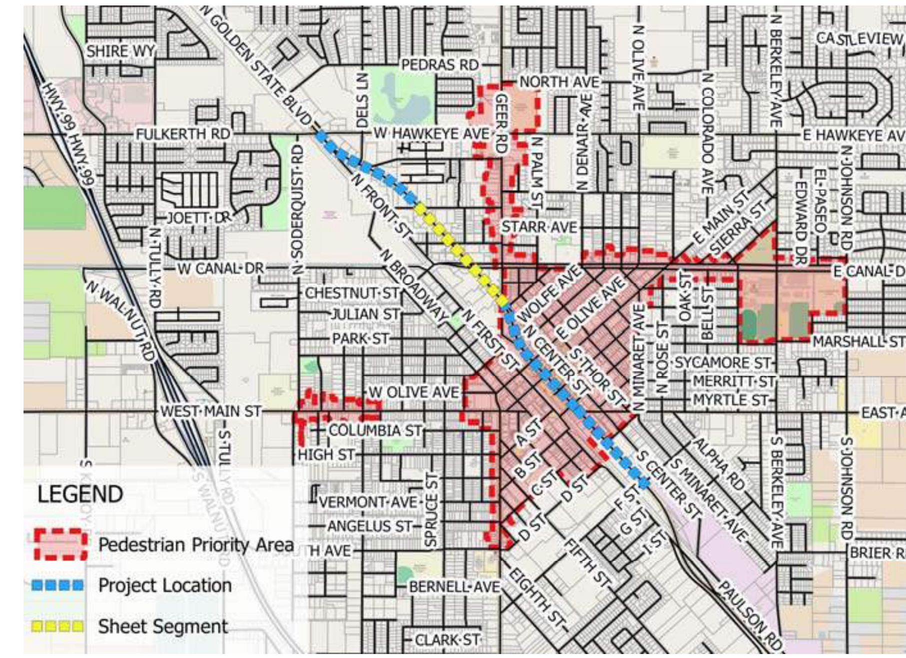
Destinations Served

- Downtown Core
- Commercial and Industrial Employment Centers
- Donnelly Park
- Central Park
- City Hall
- Transit (BLST) Transfer Hub
- Transit Route (BLST Route B)
- Pedestrian Priority Area

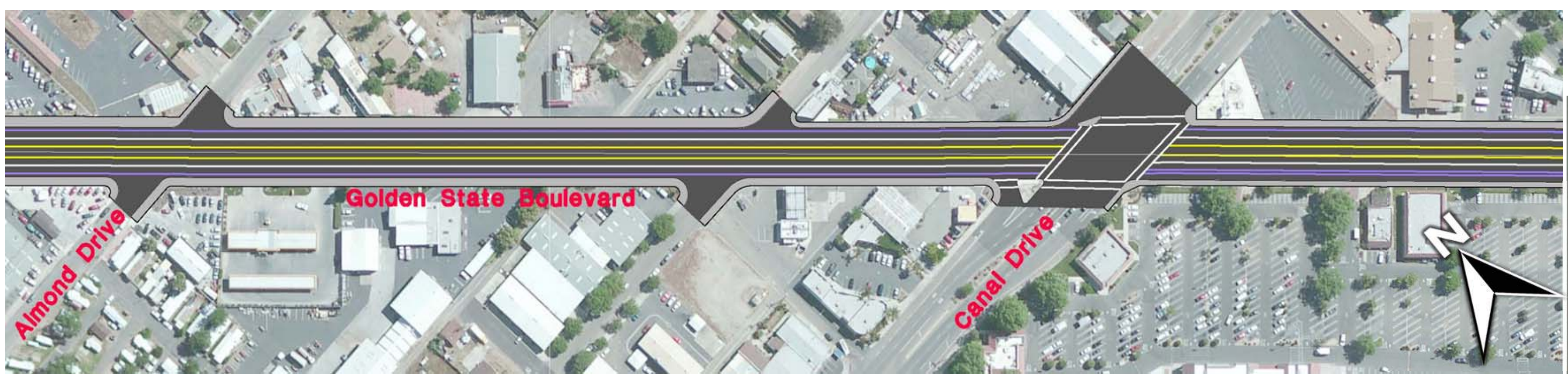
R/W Required

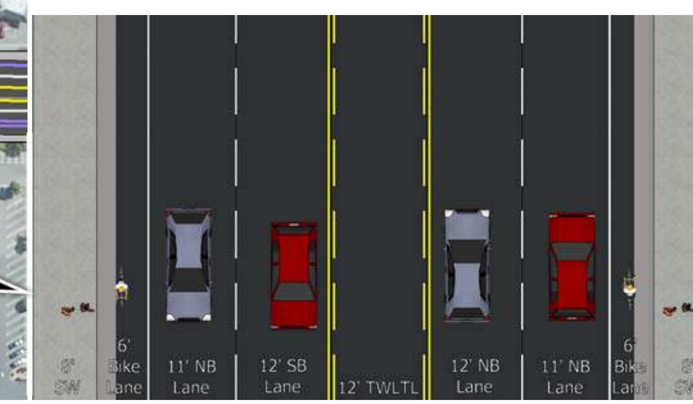
None

Vicinity Map



Project Illustration





Project Benefits

Increases and extends bike and pedestrian connectivity along corridor.

Provides dedicated space for bicycling and walking.

Cost Estimate (Includes all sheets)

$468,000 (Construction)

$ 0 (Right of Way)

$468,000 TOTAL

Golden State Boulevard (Sheet 4 of 4)

Golden State Boulevard is a southeast/ northwest expressway from the south of the City Limits at Griffith Road to the City Limits at F Street; an arterial from F Street to Hawkeye Avenue; and an expressway from Hawkeye Avenue to Taylor Road. The study segment is about 13,500 feet long and runs from F Street to Hawkeye Avenue. The adopted General Plan identifies Golden State Boulevard as a Class II bicycle facility.

Existing Issues

From Almond Drive to Hawkeye Avenue, the width is a 5-lane section over a paved width of 70'-74'. There are partial existing sidewalks on both sides the gaps are shown in purple below. There is a landscaped median just south of Hawkeye Avenue, and there are no existing bicycle facilities. There are wide (17'-18') outside lanes currently being used for minimal on-street parking.

Project Description

The existing lane geometries should remain the same; only the outside lane should be restriped as shown in the cross section. The improvements shown on this sheet would be to restripe the outside lane (approximately 17-18' wide) to remove on-street parking and delineate an 11' travel lane and a 6' bike lane. "No Parking" signs should also be installed to prohibit on-street parking. As shown in purple below, there are locations without existing sidewalk, so an 8' sidewalk would need to be constructed in these areas.

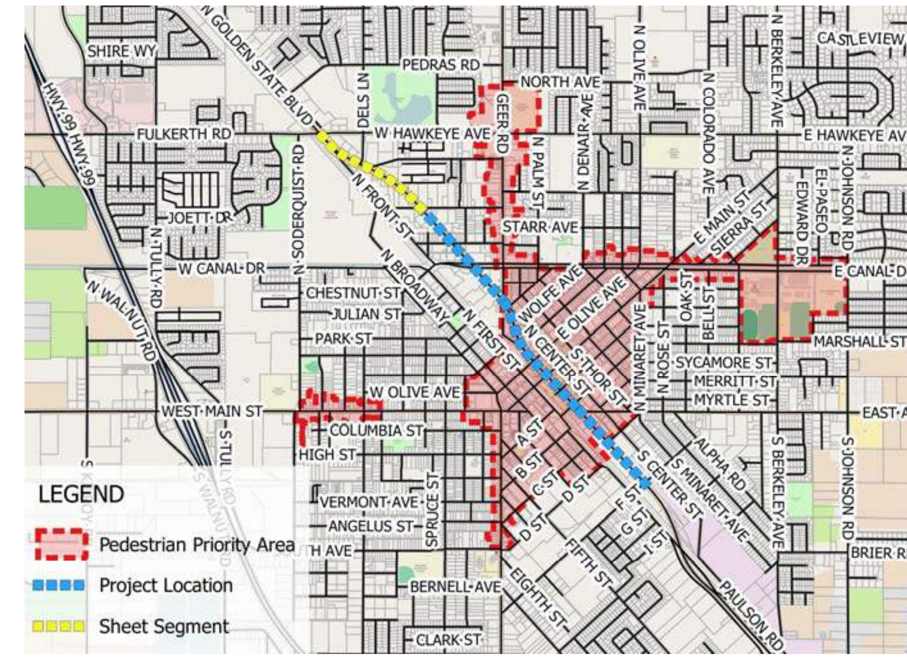
Destinations Served

- Downtown Core
- Commercial and Industrial Employment Centers
- Donnelly Park
- Central Park
- City Hall
- Transit (BLST) Transfer Hub
- Transit Route (BLST Route B)
- Pedestrian Priority Area

R/W Required

None

Vicinity Map



Project Illustration

Project Benefits

Consistent bike lanes and sidewalks.

Cost Estimate (Includes all sheets)

$468,000 (Construction)

$ 0 (Right of Way)

$468,000 TOTAL

8.2.6 Soderquist Road (Sheet 1 of 1)

Soderquist Road is a north/ south collector that runs from Fulkerth Road to a dead end 430' south of Williams Avenue. The study segment is a 675' long segment just north of Canal Drive. The adopted General Plan identifies Soderquist Road as a Class II bicycle facility.

Existing Issues

Soderquist Road has bike lanes along Summerfaire Park to Fulkerth Road, but there are no bike lanes from the southern edge of the park to Canal Drive. Currently, a cyclist would need to share this 12' lane with other traffic. The existing cross section is two 12' lanes and an 8' shoulder adjacent to the northbound lane and no sidewalks.

Project Description

This project proposes to widen southbound Soderquist Road about 10' to accommodate an 11' southbound travel lane, a 6' bike lane, an 8' paved shoulder, and a 5' sidewalk. There is an existing chain link fence adjacent to the southbound lane that would need to be relocated due to the widening.

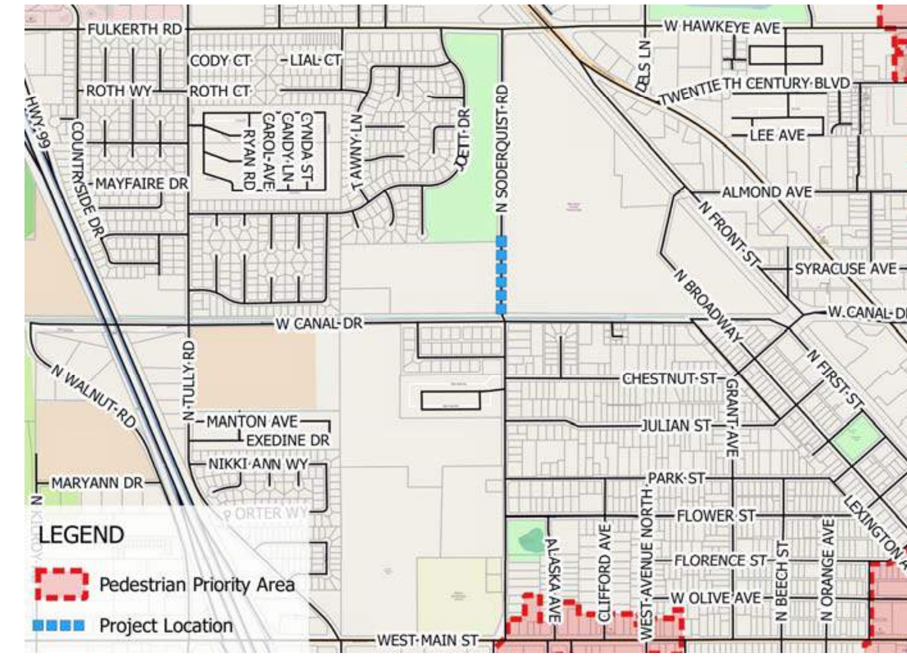
Destinations Served

- Residential Communities
- Stanislaus County Fairgrounds
- Summerfaire Park
- Soderquist Park
- Osborn Elementary School
- Transit Route (BLST Route D)

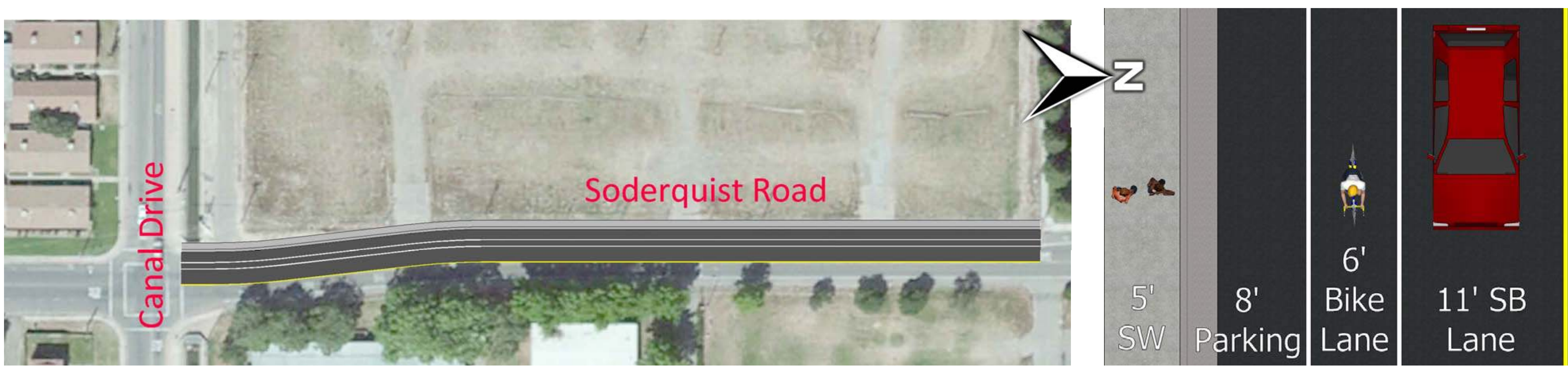
R/W Required

3308 SQFT

Vicinity Map



Project Illustration



Project Benefits

Provides connectivity between existing bike lane and sidewalk terminals.

Provides dedicated space for bicycling and walking.

Cost Estimate

$120,000 (Construction)

$ 83,000 (Right of Way)

$203,000 TOTAL

This page intentionally left blank.

8.2.7 West Avenue (Sheet 1 of 1)

West Avenue is a north/ south collector that begins at Linwood Avenue and terminates at Park Street. The study segment is about 1,980 feet long and runs from Montana Avenue to South Avenue. The adopted General Plan identifies Golden State Boulevard as a Class II bicycle facility.

Existing Issues

Between Montana Avenue and Jordan Avenue, the existing paved width is about 33' wide. There is sidewalk and on-street parking on the northbound side. The southbound lane is about 10' with an unpaved shoulder. There are no bike facilities in either direction.

From Jordan Avenue to South Avenue, the paved width is only about 20' with no on-street parking, sidewalks, or bike lanes.

Project Description

The section shown below is proposed for this corridor. Between Montana Avenue and Jordan Avenue an 8' on-street parking lane will be provided on the eastern side adjacent to the houses. New sidewalk will need to be constructed along most of the segment, as illustrated in purple below. West Avenue will need to be widened by about 9' on both sides to accommodate wider travel lanes and bike lanes, with the exception of the eastern side between Montana Avenue and Jordan Avenue.

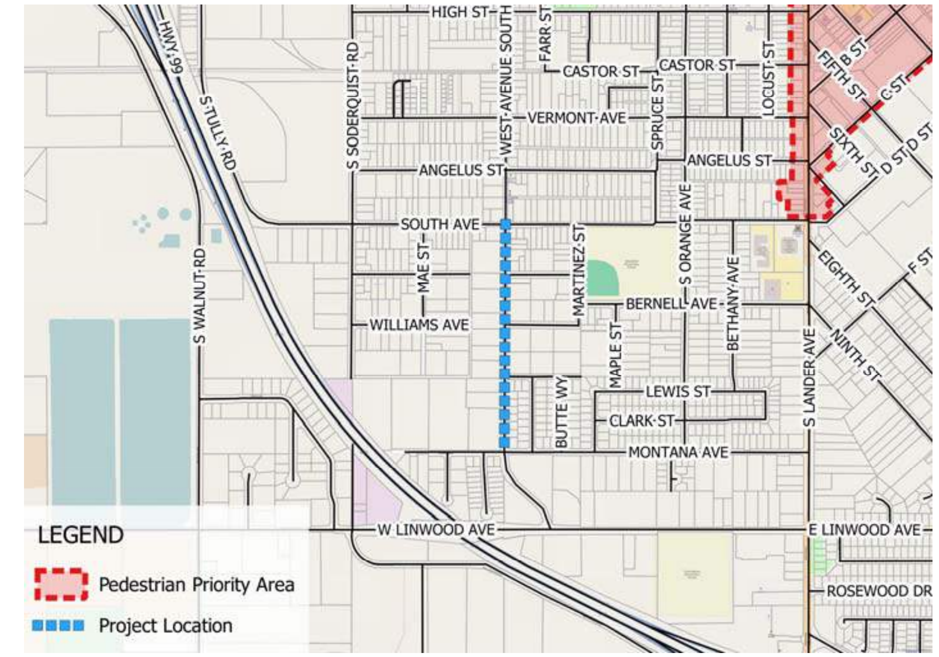
Destinations Served

- Residential Communities
- Columbia Park
- Wakefield Elementary School
- Cunningham Elementary School
- Transit Route (BLST Route D)

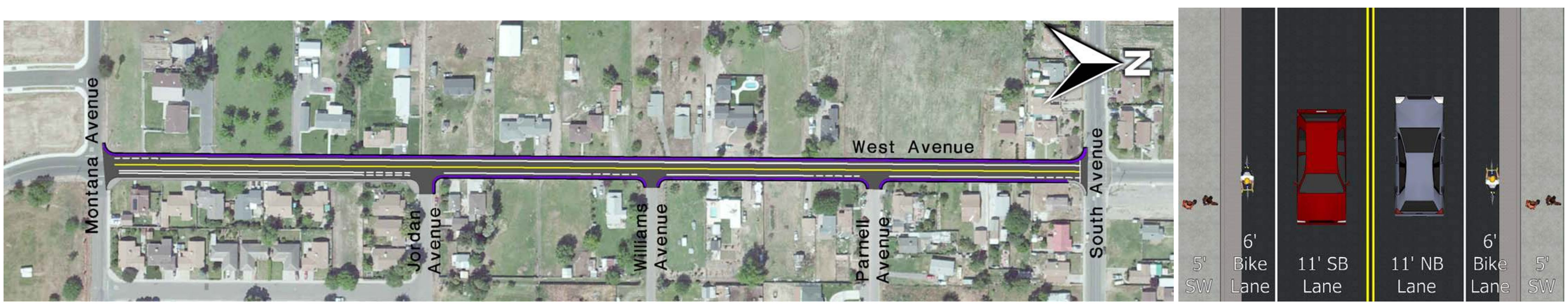
R/W Required

11,600 SQFT

Vicinity Map



Project Illustration



Project Benefits

Provides bike facilities and connects to the existing sidewalk network.

Cost Estimate

$570,000 (Construction)

$290,000 (Right of Way)

$860,000 TOTAL

This page intentionally left blank.

8.2.8 Main Street (Sheet 1 of 3)

Main Street is an east/ west arterial from Washington Road to West Avenue and a collector from West Avenue to Berkeley Avenue. The study segment is about 6,170 feet long and runs from Soderquist Road to Palm Street. The adopted General Plan identifies Main Street as a Class II bicycle facility between Soderquist Road and West Avenue and as a Class III bicycle facility between West Avenue and Palm Street. A traffic signal is proposed at West Avenue for implementation in the 2017/2018 fiscal year.

Existing Issues

Between Soderquist Road and West Avenue, Main Street is 4 lanes with a center landscaped median and sidewalks on both sides. There are no bike facilities along this corridor.

Project Description

This project proposes to provide Class III bike routes by signing and pavement markings as shown.

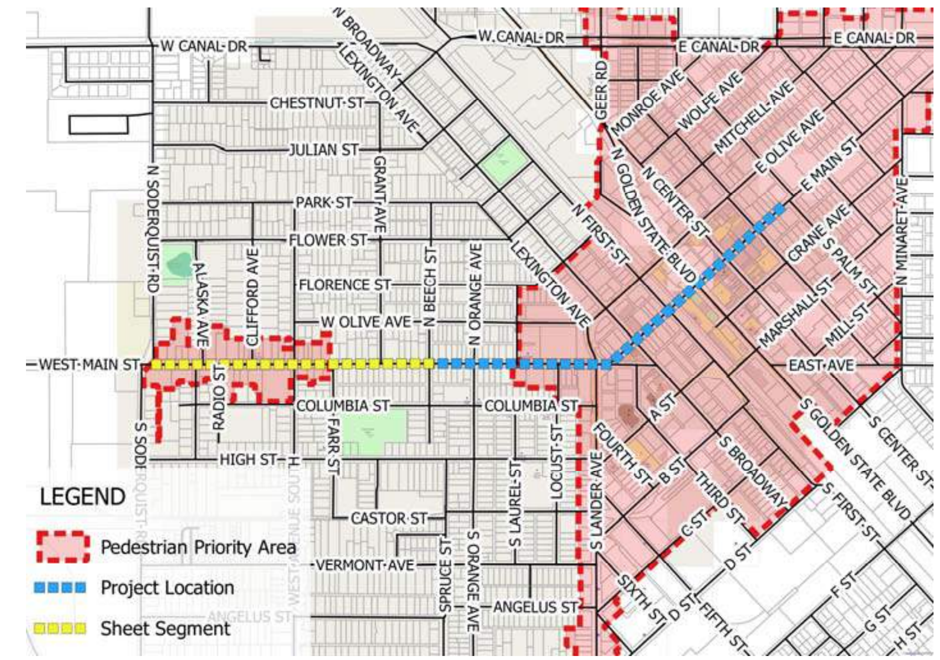
Destinations Served

- Downtown Core
- Commercial and Industrial Employment Centers
- Osborn Elementary School
- Columbia Park
- Central Park
- Soderquist Park
- City Hall
- Transit Routes (BLST Routes A & D)
- Pedestrian Priority Area

R/W Required

None

Vicinity Map



Project Illustration

Project Benefits

Increases bike connectivity along corridor.

Identifies shared space for bicycling on roadway.

Cost Estimate (Includes all sheets)

$23,000 (Construction)

$ 0 (Right of Way)

$23,000 TOTAL

Main Street (Sheet 2 of 3)

Main Street is an east/ west arterial from Washington Boulevard to West Avenue and a collector from West Avenue to Berkeley Avenue. The study segment is about 6,170 feet long and runs from Soderquist Road to Palm Street. The adopted General Plan identifies Main Street as a Class II bicycle facility between Soderquist Road and West Avenue and as a Class III bicycle facility between West Avenue and Palm Street.

Existing Issues

Between Beach Street and Laurel Street, Main Street is 4 lanes with sidewalks on both sides. Between Laurel Street and Lander Avenue, Main Street has a large paved width with existing sidewalks before narrowing down to a two lane collector from Lander to Palm Street. The downtown corridor has 10' lanes, existing on-street parking (parallel and angled), and sidewalks. There are no bike facilities along this corridor.

Project Description

Between Beech Street and Laurel Street provide signing and pavement markings (as shown in the illustration) to designate the street as a bike route. Between Laurel Street and Lander Avenue restripe existing pavement, as shown in the sections below, to provide Class II bike lanes (see http://nacto.org/usdg/review_lane_width_and_speed_parsons.pdf). Between Lander Avenue and Broadway Street provide signing and pavement markings (as shown in the illustration) to designate the street as a bike route.

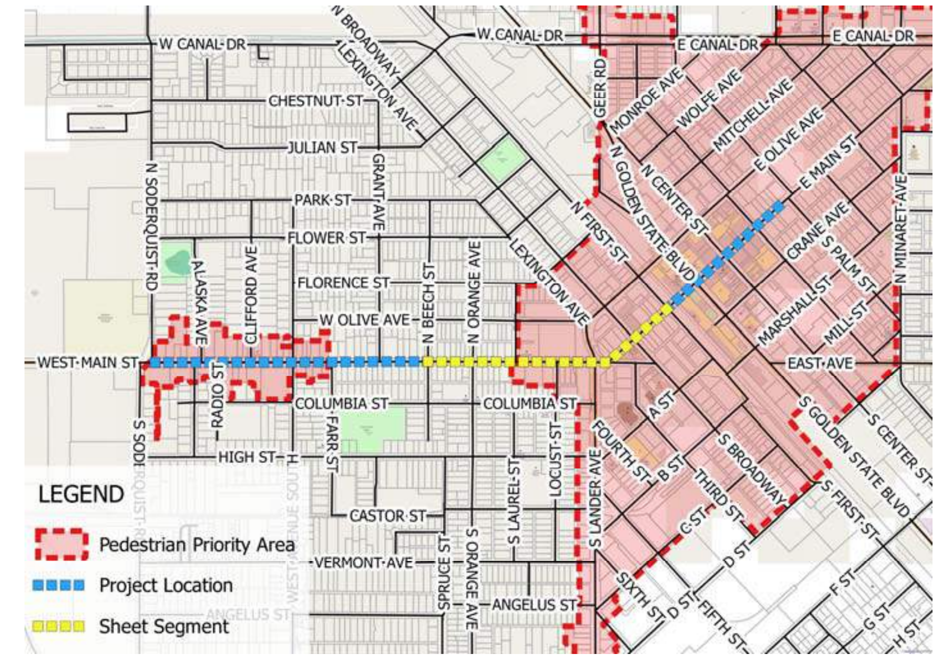
Destinations Served

- Downtown Core
- Commercial and Industrial Employment Centers
- Osborn Elementary School
- Columbia Park
- Central Park
- Soderquist Park
- City Hall
- Transit Routes (BLST Routes A & D)
- Pedestrian Priority Area

R/W Required

None

Vicinity Map



Project Illustration

A

B

Project Benefits

Increases and extends bike connectivity along corridor.
Provides dedicated space for bicycling.

Cost Estimate (Includes all sheets)

$23,000 (Construction)
$ 0 (Right of Way)
$23,000 TOTAL

Main Street (Sheet 3 of 3)

Main Street is an east/ west arterial from Washington Boulevard to West Avenue and a collector from West Avenue to Berkeley Avenue. The study segment is about 6,170 feet long and runs from Soderquist Road to Palm Street. The adopted General Plan identifies Main Street as a Class II bicycle facility between Soderquist Road and West Avenue and as a Class III bicycle facility between West Avenue and Palm Street.

Existing Issues

Main Street is a two lane collector from Broadway Street to Palm Street. This downtown corridor has 10' lanes, existing on-street parking (parallel and angled), and sidewalks. There are no bike facilities.

Project Description

This project proposes to provide Class III bike routes by signing and pavement markings as shown.

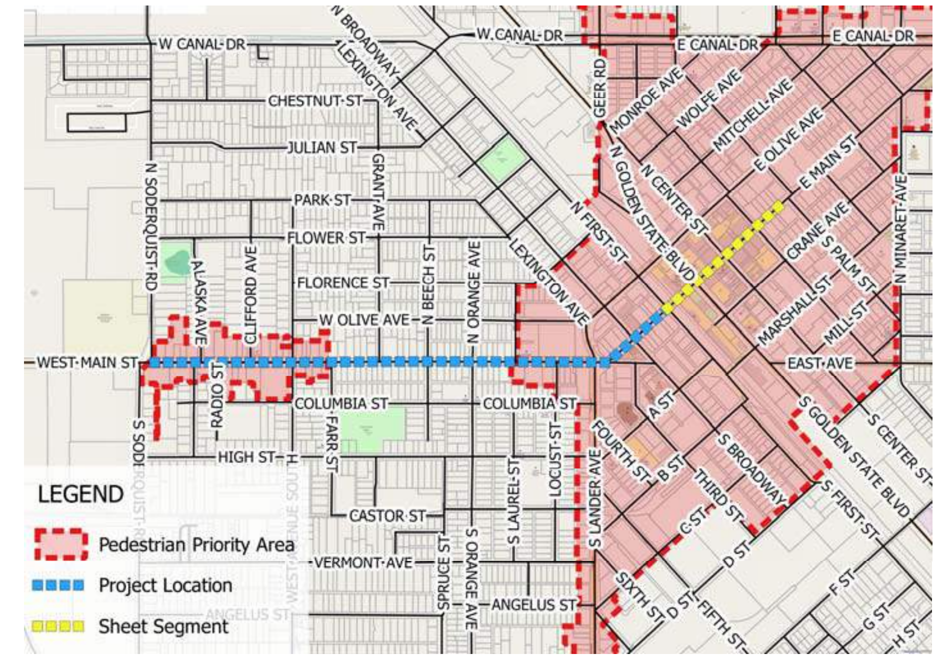
Destinations Served

- Downtown Core
- Commercial and Industrial Employment Centers
- Osborn Elementary School
- Columbia Park
- Central Park
- Soderquist Park
- City Hall
- Transit Routes (BLST Routes A & D)
- Pedestrian Priority Area

R/W Required

None

Vicinity Map



Project Illustration

Project Benefits

Increases bike connectivity along downtown corridor.

Identifies shared space for bicycling on roadway.

Cost Estimate (Includes all sheets)

$23,000 (Construction)

$ 0 (Right of Way)

$23,000 TOTAL

This page intentionally left blank.

8.2.9 Donnelly Park Shared Use Path (Sheet 1 of 1)

Donnelly Park is a 40-acre site, covering one square mile and includes a 10-acre man-made a storm basin. It is located at the northeastern corner of the intersection of Dels Lane and Hawkeye Avenue. This park is the City of Turlock's premier community park and has over 10 picnic areas with barbeques, playground areas, a half-basketball court, and a large pond.

Existing Issues

Donnelly Park is framed by four streets, and these streets have existing sidewalks along the full frontage length of the park. Within the park itself, however, there are very few sidewalks or paths. There are sidewalks from the parking lots to the main picnic and restroom areas. The pond bank is subject to erosion and consequent water quality issues.

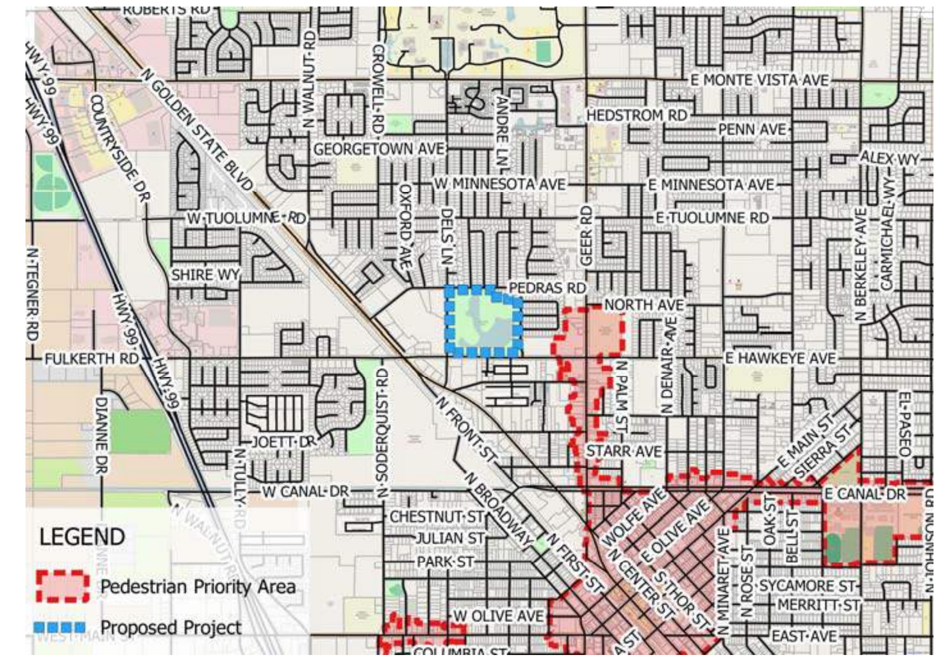
Project Description

This project proposes to construct a shared use path around the pond in Donnelly Park and along the perimeter of the park with connections to the existing sidewalks as shown in the illustration below. The pond path would be constructed in conjunction with bank stabilization work. The path should be 10' wide with 2' gravel shoulders. This path would meander about the park, following the shoreline of the pond while avoiding the removal of trees. Where the slope of the bank warrants it, a wooden split rail fence would be provided.

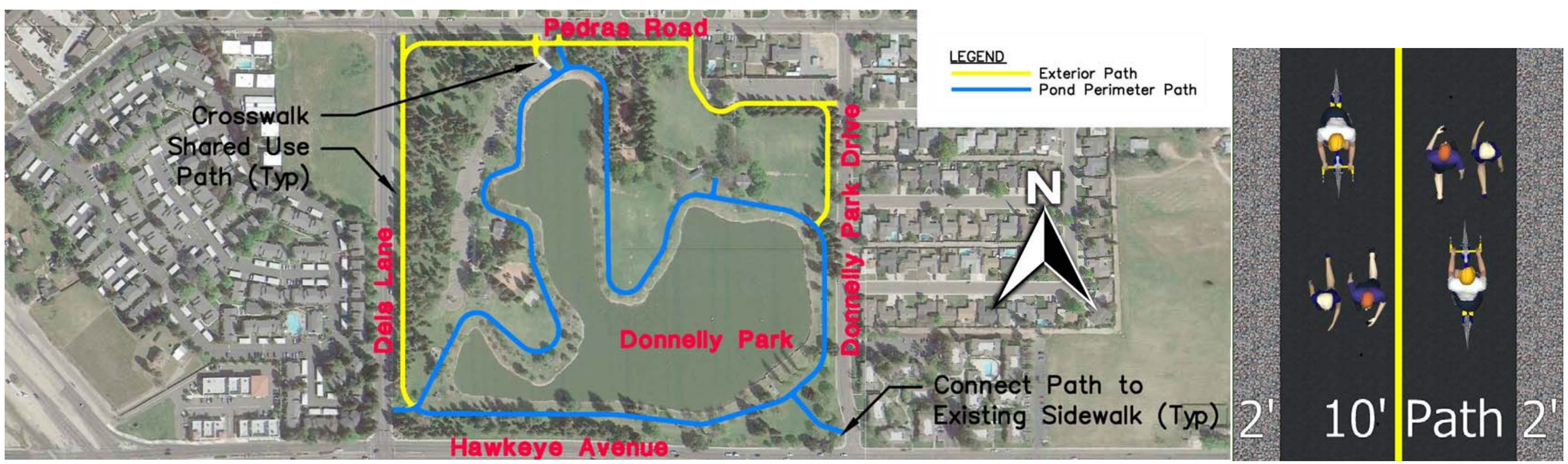
Destinations Served

- Residential Neighborhoods
- Recreational Use
- Donnelly Park

Vicinity Map



Project Illustration



Project Benefits

Provides a place to walk and bicycle for health and recreation in a scenic surrounding.
Provides a place for novice bicyclists to learn to ride in a motor traffic free environment.
Improves pond bank stability and water quality.

Cost Estimate

$ 87,000 (Exterior Path)
<u>$699,000 (Pond Perimeter Path)</u>
$786,000 Total

This page intentionally left blank.

8.2.10 Linwood Avenue (Sheet 1 of 1)

Linwood Avenue is an east/west collector in southern Turlock, connecting Walnut Avenue to Lander Avenue, and serving as the only access to Cunningham Elementary School. The adopted General Plan identifies Linwood Avenue as a Class II bicycle facility.

Existing Issues

While bike lanes and sidewalks are present on Linwood Avenue for a short segment west of Cunningham Elementary School, they do not connect to West Avenue South or to Lander Avenue, the nearest cross streets. The existing bike lanes and sidewalks end before the school campus, creating challenges for students walking and bicycling to school.

Project Description

The improvements shown on this sheet would close the connectivity gap between existing facilities and West Avenue South to the west, and between existing facilities and Lander Avenue to the east. Sidewalks with ADA curb ramps will be installed on both sides of the street, and Class II bicycle lanes will be striped the full length of the corridor (indicated in green shading on the illustration below).

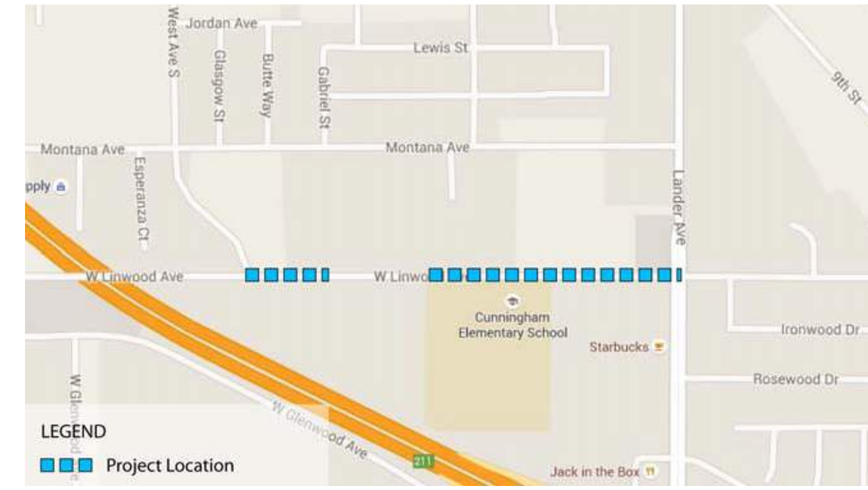
Destinations Served

- Residential Communities
- Cunningham Elementary School
- Transit Route (BLST Route D)
- Neighborhood Retail

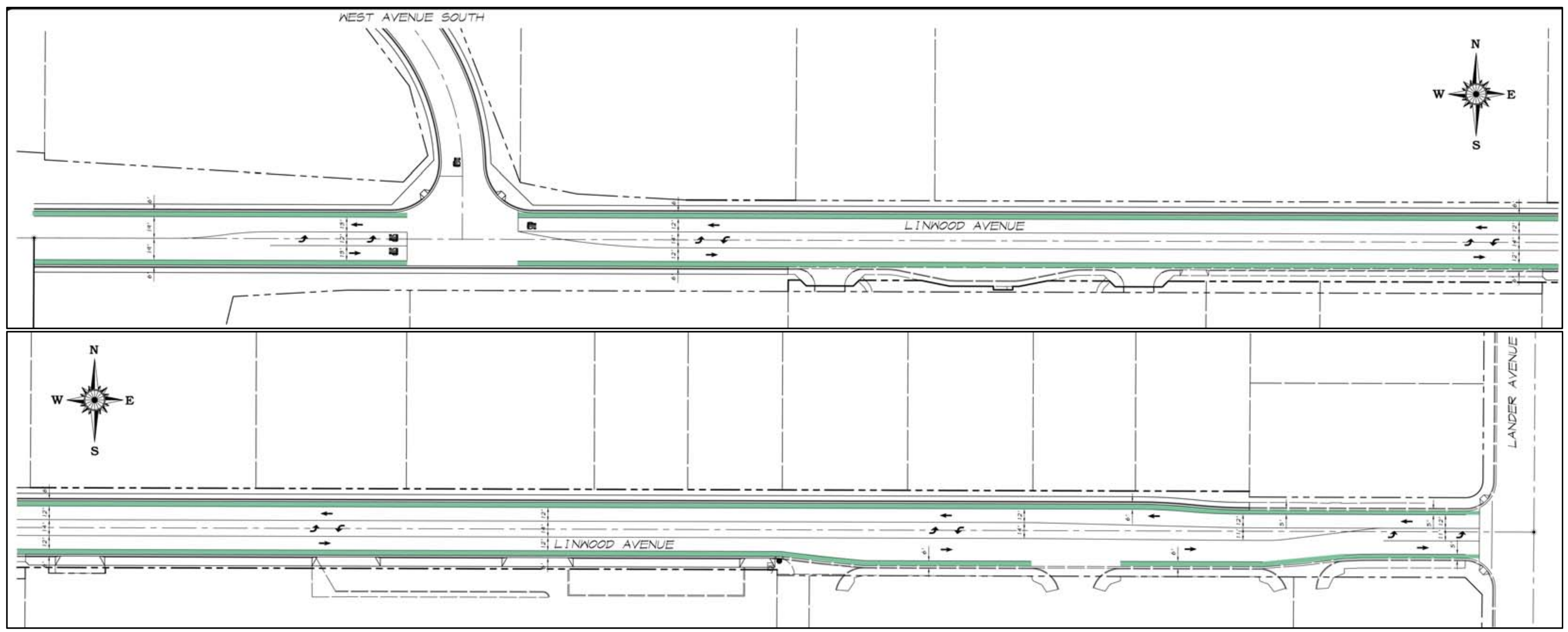
R/W Required

- On the south side, about 10' would be relinquished to three properties
- On the south side, 5' would be required from the school district
- On the north side, 15' would be required from nine properties

Vicinity Map



Project Illustration



Project Benefits

Increases and extends bike and pedestrian connectivity along corridor.
Provides dedicated space for bicycling and walking.
Improves bicycling and walking access to school.

Cost Estimate

$760,000 (Engineering and Construction)

$220,000 (Right of Way)

$980,00 TOTAL

This page intentionally left blank.

8.3 Opinions of Probable Costs

Cost opinions have been developed using typical unit rates and are rough order, planning level estimates for programming purposes only. Costs should be refined based on survey data and further design development. Contingencies included are 30% for minor and supplemental items and 30% for construction contingency.

Table 8-2: Cost Summary for Top Priority Projects

Project	Cost Estimate
1. Class I path extension on Canal Drive and Class II lanes on Main Street (ATP-29)	$33,000
2. Class I path on Taylor Road (GP-10)	$1,270,000
3. Class II bike lanes on Berkeley Avenue from Canal Drive to Golden State Boulevard (GP-16)	$2,338,000
4. Class II bike lanes on Berkeley Avenue to close a gap near Hawkeye Avenue (ATP-2)	$182,000
5. Class II bike lanes on Golden State Boulevard from Hawkeye Avenue to F Street (GP-26D)	$468,000
6. Class II bike lanes on Soderquist Road to close a gap near Canal Drive (ATP-10)	$203,000
7. Class II bike lanes on West Avenue from South Avenue to Montana Avenue (GP-54)	$860,000
8. Class III bike route on Main Street from Soderquist Road to Palm Street (GP-56)	$23,000
9. Class I path around Donnelly Lake (ATP-1)	$787,000
10. Class II bike lanes and sidewalks on Linwood Avenue (GP-32B and GP-32C)	$980,000
TOTAL	$7,144,000

8.4 Funding

This section describes various sources of funding available to plan and construct bicycle and pedestrian facilities, including those related to school access and area improvement, as well as sources to provide education or encouragement programs.

Projects such as those described in this Plan can be funded through multiple sources, and not all sources apply to all projects. Many sources require a local funding match and most are competitive based on project merit and adherence to grant criteria.

This section covers federal, state, regional, and local sources of funding, as well as some non-traditional funding sources that have been used by local agencies to fund bicycle and pedestrian infrastructure and programs.

8.4.1 Federal Sources

Moving Ahead for Progress in the Twenty-First Century (MAP-21)

The largest source of federal funding for bicyclists and pedestrians is the US DOT's Federal-Aid Highway Program, which Congress has reauthorized roughly every six years since the passage of the Federal-Aid Road Act of 1916. The latest act, Moving Ahead for Progress in the Twenty-First Century (MAP-21) was enacted in July 2012 as Public Law 112-141. The Act replaces the Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU), which was valid from August 2005 - June 2012. SAFETEA-LU contained dedicated programs including Transportation Enhancements, Safe Routes to School, and Recreational Trails, which were all commonly tapped sources of funding to make non-motorized improvements nationwide. MAP-21 combines these programs into a single source called 'Transportation Alternatives' programs (TAP). More information on TAP, including eligible activities, can be found below and at: http://www.fhwa.dot.gov/map21/guidance/guidetap.cfm

MAP-21 authorizes funding for federal surface transportation programs including highways and transit. It is not possible to guarantee the continued availability of any listed MAP-21 programs, or to predict their future funding levels or policy guidance. Nevertheless, many of these programs have been included in some form since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, and thus may continue to provide capital for active transportation projects and programs.

In California (see Section 7.2.1 Active Transportation Program), federal monies are administered through the California Department of Transportation (Caltrans) and Metropolitan Planning Organizations (MPOs). Most, but not all, of these programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system.

There are a number of programs identified within MAP-21 that are applicable to bicycle and pedestrian projects. These programs are discussed below.

More information: http://www.fhwa.dot.gov/map21/summaryinfo.cfm

Transportation Alternatives

Transportation Alternatives (TA) is a new funding source under MAP-21 that consolidates three formerly separate programs under SAFETEA-LU: Transportation Enhancements (TE), Safe Routes to School (SR2S), and the Recreational Trails Program (RTP). These funds may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, multi-use paths, and rail-trails. TA funds may also be used for selected education and encouragement programming such as Safe Routes to School, despite the fact that TA does not provide a guaranteed set-aside for this activity as SAFETEA-LU did. MAP-21 provides $85 million nationally for the RTP.

Complete eligibilities for TA include:

1. **Transportation Alternatives** as defined by Section 1103 (a)(29). This category includes the construction, planning, and design of a range of bicycle and pedestrian infrastructure including "on–road and off–road trail facilities for pedestrians, bicyclists, and other active forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety–related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990." Infrastructure projects and systems that provide "Safe Routes for Non-Drivers" is a new eligible activity.

   For the complete list of eligible activities, visit:
   http://www.fhwa.dot.gov/environment/transportation_enhancements/legislation/map21.cfm

2. **Recreational Trails.** TA funds may be used to develop and maintain recreational trails and trail-related facilities for both active and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other active and motorized uses. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

   Recreational Trails Program funds may be used for:

   - Maintenance and restoration of existing trails
   - Purchase and lease of trail construction and maintenance equipment
   - Construction of new trails, including unpaved trails
   - Acquisition or easements of property for trails
   - State administrative costs related to this program (limited to seven percent of a state's funds)
   - Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a state's funds)

   Under MAP-21, dedicated funding for the RTP continues at FY 2009 levels – roughly $85 million annually. California will receive $5,756,189 in RTP funds per year through FY2014.

   More info: http://www.fhwa.dot.gov/environment/recreational_trails/funding/apportionments_obligations/recfunds_2009.cfm

3. **Safe Routes to School.** There are two separate Safe Routes to School Programs administered by Caltrans. There is the Federal program referred to as SRTS, and the state-legislated program referred to as SR2S. Both programs are intended to achieve the same basic goal of increasing the number of children walking and bicycling to school by making it safer for them to do so. All projects must be within two miles of primary or middle schools (K-8).
   The Safe Routes to School Program funds non-motorized facilities in conjunction with improving access to schools through the Caltrans Safe Routes to School Coordinator.
   More info: http://www.dot.ca.gov/hq/LocalPrograms/saferoutes/saferoutes.htm

   Eligible projects may include:

   - **Engineering improvements.** These physical improvements are designed to reduce potential bicycle and pedestrian conflicts with motor vehicles. Physical improvements may also reduce motor vehicle traffic volumes around schools, establish safer and more accessible crossings, or construct walkways, trails or bikeways. Eligible improvements include sidewalk improvements, traffic calming/speed reduction, pedestrian and bicycle crossing improvements, on-street bicycle facilities, off-street bicycle and pedestrian facilities, and secure bicycle parking facilities.
   - **Education and Encouragement Efforts.** These programs are designed to teach children safe bicycling and walking skills while educating them about the health benefits, and environmental impacts. Projects and programs may include creation, distribution and implementation of educational materials; safety based field trips; interactive bicycle/pedestrian safety video games; and promotional events and activities (e.g., assemblies, bicycle rodeos, walking school buses).
   - **Enforcement Efforts.** These programs aim to ensure that traffic laws near schools are obeyed. Law enforcement activities apply to cyclists, pedestrians and motor vehicles alike. Projects may include development of a crossing guard program, enforcement equipment, photo enforcement, and pedestrian sting operations.

4. **Planning, designing, or constructing roadways within the right-of-way of former Interstate routes or divided highways.** At the time of writing, detailed guidance from the Federal Highway Administration on this new eligible activity was not available.

Average annual funds available through TA over the life of MAP-21 equal $814 million nationally, which is based on a 2% set-aside of total MAP-21 authorizations. Projected MAP-21 apportionments for California total $3,546,492,430 for FY 2013 and $3,576,886,247 for FY 2014 (*http://www.fhwa.dot.gov/MAP21/funding.cfm*). The 2% set-aside for TA funds in California will be about $71,000,000 for the next two fiscal cycles. State DOTs may elect to transfer up to 50% of TA funds to other highway programs, so the amount listed above represents the maximum potential funding.

TA funds are typically allocated through MPOs and require a 20 percent local match.

Surface Transportation Program (STP)

The Surface Transportation Program (STP) provides states with flexible funds which may be used for a variety of highway, road, bridge, and transit projects. A wide variety of bicycle and pedestrian improvements are eligible, including on-street bicycle facilities, off-street trails, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities. Modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is also an eligible activity. Unlike most highway projects, STP-funded bicycle and pedestrian facilities may be located on local and collector roads which are not part of the Federal-aid Highway System. Fifty percent of each state's STP funds are suballocated geographically by population. These funds are funneled through Caltrans to the MPOs in the state. The remaining 50% may be spent in any area of the state.

Highway Safety Improvement Program (HSIP)

MAP-21 doubles the amount of funding available through the Highway Safety Improvement Program (HSIP) relative to SAFETEA-LU. HSIP provides $2.4 billion nationally for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. MAP-21 preserves the Railway-Highway Crossings Program within HSIP but discontinues the High-Risk Rural roads set-aside unless safety statistics demonstrate that fatalities are increasing on these roads HSIP is a data-driven funding program and eligible projects must be identified through analysis of crash experience, crash potential, crash rate, or other similar metrics. Infrastructure and non-infrastructure projects are eligible for HSIP funds. Bicycle and pedestrian safety improvements, enforcement activities, traffic calming projects, and crossing treatments for active transportation users in school zones are examples of eligible projects. All HSIP projects must be consistent with the state's Strategic Highway Safety Plan.

Last updated in 2006, the California SHSP is located here:
http://www.dot.ca.gov/hq/traffops/survey/SHSP/SHSP_Final_Draft_Print_Version.pdf

Pilot Transit-Oriented Development Planning

MAP-21 establishes a new pilot program to promote planning for Transit-Oriented Development. At the time of writing the details of this program are not fully clear, although the bill text states that the Secretary of Transportation may make grants available for the planning of projects that seek to "facilitate multimodal connectivity and accessibility," and "increase access to transit hubs for pedestrian and bicycle traffic."

Congestion Mitigation and Air Quality Improvement Program (CMAQ)

The Congestion Mitigation and Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality nonattainment and maintenance areas for ozone, carbon monoxide, and particulate matter which reduce transportation related emissions. These federal dollars can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Purely recreational facilities generally are not eligible.

To be funded under this program, projects and programs must come from a transportation plan (or State (STIP) or Regional (RTIP) Transportation Improvement Program) that conforms to the SIP and must be consistent with the conformity provisions of Section 176 of the Clean Air Act.

Partnership for Sustainable Communities

Founded in 2009, the Partnership for Sustainable Communities is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to "improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide." The Partnership is based on five Livability Principles, one of which explicitly addresses the need for bicycle and pedestrian infrastructure ("Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health").

The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including the TIGER grants). Turlock and StanCOG should track Partnership communications and be prepared to respond proactively to announcements of new grant programs.

More info: http://www.epa.gov/smartgrowth/partnership/

Federal Transit Act

Section 25 of the 1964 Urban Mass Transportation Act states that: "For the purposes of this Act a project to provide access for bicycles to mass transportation facilities, to provide shelters and parking facilities for bicycles in and around mass transportation facilities, or to install racks or other equipment for transporting bicycles on mass transportation vehicles shall be deemed to be a construction project eligible for assistance under sections 3, 9 and 18 of this Act." The Federal share for such projects is 90 percent and the remaining 10 percent must come from sources other than Federal funds or fare box revenues. Typical funded projects have included bike lockers at transit stations and bike parking near major bus stops. To date, no projects to provide bikeways for quicker, safer or easier access to transit stations have been requested or funded.

Community Transformation Grants

Community Transformation Grants administered through the Center for Disease Control support community–level efforts to reduce chronic diseases such as heart disease, cancer, stroke, and diabetes. Active transportation infrastructure and programs that promote healthy lifestyles are a good fit for this program, particularly if the benefits of such improvements accrue to population groups experiencing the greatest burden of chronic disease.

More info: http://www.cdc.gov/communitytransformation/

8.4.2 State Sources

Active Transportation Program (ATP)

In 2013, Governor Brown signed legislation creating the Active Transportation Program (ATP). This program is a consolidation of the Federal Transportation Alternatives Program (TAP), California's Bicycle Transportation Account (BTA), and Federal and California Safe Routes to School (SRTS) programs. The ATP program is administered by Caltrans Division of Local Assistance, Office of Active Transportation and Special Programs.

The ATP program goals include:

- Increase the proportion of trips accomplished by biking and walking,
- Increase safety and mobility for nonmotorized users,
- Advance the active transportation efforts of regional agencies to achieve greenhouse gas reduction goals,
- Enhance public health,
- Ensure that disadvantaged communities fully share in the benefits of the program, and
- Provide a broad spectrum of projects to benefit many types of active transportation users.

The second call for projects was issued in March 2015. The California Transportation Commission ATP Guidelines are available here: http://www.catc.ca.gov/meetings/agenda/2014Agenda/2014_03/03_4.12.pdf

Eligible bicycle and pedestrian projects include:

- Infrastructure Projects: Capital improvements that will further program goals. This category typically includes planning, design, and construction.
- Non-Infrastructure Projects: Education, encouragement, enforcement, and planning activities that further program goals. The focus of this category is on pilot and start-up projects that can demonstrate funding for ongoing efforts.
- Infrastructure projects with non-infrastructure components

The minimum request for non-SRTS projects is $250,000. There is no minimum for SRTS projects.

There is no local match requirement for any projects. Total available funds will be approximately $360 million for fiscal years 2016/2017, 2017/2018, and 2018/2019.

More info: http://www.dot.ca.gov/hq/LocalPrograms/atp/

State Highway Account

Section 157.4 of the Streets and Highways Code requires Caltrans to set aside $360,000 for the construction of non-motorized facilities that will be used in conjunction with the State highway system. The Office of Bicycle Facilities also administers the State Highway Account fund. Funding is divided into different project categories. Minor B projects (less than $42,000) are funded by a lump sum allocation by the CTC and are used at the discretion of each Caltrans District office. Minor A projects (estimated to cost between $42,000 and $300,000) must be approved by the CTC. Major projects (more than $300,000) must be included in the State Transportation Improvement Program and approved by the CTC. Funded projects have included fencing and bicycle warning signs related to rail corridors.

Office of Traffic Safety (OTS) Grants

Office of Traffic Safety Grants are supported by Federal funding under the National Highway Safety Act and SAFETEA-LU. In California, the grants are administered by the Office of Traffic Safety.

Grants are used to establish new traffic safety programs, expand ongoing programs or address deficiencies in current programs. Bicycle safety is included in the list of traffic safety priority areas. Eligible grantees are governmental agencies, state colleges, state universities, local city and county government agencies, school districts, fire departments, and public emergency services providers. Grant funding cannot replace existing program expenditures, nor can traffic safety funds be used for program maintenance, research, rehabilitation, or construction. Grants are awarded on a competitive basis, and priority is given to agencies with the greatest need. Evaluation criteria to assess need include potential traffic safety impact, collision statistics and rankings, seriousness of problems, and performance on previous OTS grants.

The California application deadline is January of each year. There is no maximum cap to the amount requested, but all items in the proposal must be justified to meet the objectives of the proposal.

More info: http://www.ots.ca.gov/

8.4.3 Regional & Local Sources

At the time of plan writing, no local or regional funding sources dedicated to bicycle and pedestrian improvements were identified.

A proposed transportation sales tax may be presented to voters in Stanislaus County in 2016. This Plan recommends approving such a funding source, and additionally recommends dedicating a portion of those revenues to be used specifically for bicycle and pedestrian improvements throughout the county.

Developer Impact Fees

As a condition for development approval, municipalities can require developers to provide certain infrastructure improvements, which can include bikeway projects. These projects have commonly provided Class 2 facilities for portions of on street, previously planned routes. They can also be used to provide bicycle parking or shower and locker facilities. The type of facility that should be required to be built by developers should reflect the greatest need for the particular project and its local area. Legal challenges to these types of fees have resulted in the requirement to illustrate a clear nexus between the particular project and the mandated improvement and cost.

Restoration

Cable TV and telephone companies sometimes need new cable routes within public rights of way. Recently, this has most commonly occurred during expansion of fiber optic networks. Since these projects require a significant amount of advance planning and disruption of curb lanes, it may be possible to request reimbursement for affected bicycle facilities to mitigate construction impacts. In cases where cable routes cross undeveloped areas, it may be possible to provide for new bikeway facilities following completion of the cable trenching, such as sharing the use of maintenance roads.

8.4.4 Private Sources

Private funding sources can be acquired by applying through the advocacy groups such as the League of American Bicyclists and the Bikes Belong Coalition. Most of the private funding comes from foundations wanting to enhance and improve bicycle facilities and advocacy. Grant applications will typically be through the advocacy groups as they leverage funding from federal, state and private sources. Below are several examples of private funding opportunities available.

Bikes Belong Grant Program

The Bikes Belong Coalition of bicycle suppliers and retailers has awarded $1.2 million and leveraged an additional $470 million since its inception in 1999. The program funds corridor improvements, mountain bike trails, BMX parks, trails, and park access. It is funded by the Bikes Belong Employee Pro Purchase Program.

More info: http://www.bikesbelong.org/grants/

Bank of America Charitable Foundation, Inc.

The Bank of America Charitable Foundation is one of the largest in the nation. The primary grants program is called Neighborhood Excellence, which seeks to identify critical issues in local communities. Another program that applies to greenways is the Community Development Programs, and specifically the Program Related Investments. This program targets low and moderate income communities and serves to encourage entrepreneurial business development.

More info: http://www.bankofamerica.com/foundation

Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation was established as a national philanthropy in 1972 and today it is the largest U.S. foundation devoted to improving the health and health care of all Americans. Grant making is concentrated in four areas:

- To assure that all Americans have access to basic health care at a reasonable cost
- To improve care and support for people with chronic health conditions
- To promote healthy communities and lifestyles
- To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs

More info: http://www.rwjf.org/applications/

Community Action for a Renewed Environment (CARE)

CARE is a competitive grant program that offers an innovative way for a community to organize and take action to re-duce toxic pollution in its local environment. Through CARE, a community creates a partnership that implements solutions to reduce releases of toxic pollutants and minimize people's exposure to them. By providing financial and technical assistance, EPA helps CARE communities get on the path to a renewed environment. Transportation and "smart-growth" types of projects are eligible. Grants range between $90,000 and $275,000.

More information: http://www.epa.gov/care/

Corporate Donations

Corporate donations are often received in the form of liquid investments (i.e. cash, stock, bonds) and in the form of land. Employers recognize that creating places to bike and walk is one way to build community and attract a quality work force. Bicycling and outdoor recreation businesses often support local projects and programs. Municipalities typically create funds to facilitate and simplify a transaction from a corporation's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented. Such donations can improve capital budgets and/or projects.

8.4.5 Other Sources

Local sales taxes, fees and permits may be implemented as new funding sources for bicycle projects. However, any of these potential sources would require a local election. Volunteer programs may be developed to substantially reduce the cost of implementing some routes, particularly multi use paths. For example, a local college design class may use such a multi-use route as a student project, working with a local landscape architectural or engineering firm. Work parties could be formed to help clear the right of way for the route. A local construction company may donate or discount services beyond what the volunteers can do. A challenge grant program with local businesses may be a good source of local funding, in which the businesses can “adopt” a route or segment of one to help construct and maintain it.

8.5 Maintenance

Bike Lane Maintenance

The City of Turlock maintains Class II bike lanes through regular street sweeping, roadway resurfacing, and striping maintenance programs.

The Design Toolkit recommends green colored pavement markings at points of potential conflict between motorists and bicyclists. These treatments are not costly to maintain if properly installed. More information is available here:

http://nacto.org/cities-for-cycling/design-guide/bikeway-signing-marking/colored-pavement-material-guidance/

Sidewalk Maintenance

Sidewalk repairs within the public right of way are the responsibility of the property owner. To make repairs, an encroachment permit must be submitted. The permit is available from the city offices or may be downloaded here:

http://www.cityofturlock.org/pdf/ImprovementPlandocument.asp?id=1

Inspections

City staff or contractors conduct regular inspections to observe the condition of bikeways noting surface quality, signage, pavement markings, and issues such as maintenance required, debris, or other conditions needing correction. Inspections may be coordinated based on a grid system to be systematically completed.

Reporting Conditions

The sweeping and resurfacing maintenance programs may not always address bike lane or shoulder maintenance issues as they develop, so it is important for members of the public to make reports.

Turlock residents are encouraged to report street conditions needing correction by calling (209) 668-5594 and pressing 0. The report should include where the issue is located (address, cross street, direction of travel). Service requests may also be emailed to the Parks, Recreation and Facilities Department at: recreation@turlock.ca.us

Recommendation: The City should create a street maintenance request form easily accessed on the City’s website, including a smartphone version.

Documentation

City employees maintain documents on infrastructure condition and repair needs. Best practices for documentation include:

- Inspections and/or reports of conditions needing correction should be well documented and repairs prioritized based on frequency of use, potential for risk of injury, and available resources.
- Once repairs or maintenance have been completed, documentation should be updated to reflect the action(s) taken.
- Employees should be instructed to observe their surroundings, beyond their normal job duties, and to notify the appropriate department when they observe a condition that appears to need correction.

8.6 Monitoring Progress Toward Implementation

Measuring the success of this plan can be as simple as annually publishing a tally of the number of miles of bikeways (by class) and the number of projects implemented. This could be published on the city's website or reported to the Parks, Arts and Recreation Commission.

Gateway Bike Plan Goals

1. Provide a prioritized system of routes that are contiguous and connected to other on and off road facilities.
2. Improve safety for all modes of transportation through the careful design and implementation of bicycle facilities.
3. Improve safety for all modes of transportation through the implementation of educational and enforcement programs.
4. Expand the public's view that bicycles are a viable/acceptable mode of transportation through encouragement programs.
5. Increase the commitment of public officials to support or initiate public policy for bicycling at all levels of government – state, local and regional.

Implementation of Bikeways

A+ rating on meeting our goal

Significant network additions in 2012 included the first green pavement marking in the City of St. Louis on Wydown Boulevard. The green bike marking alerts bicyclists and motorists of a potential conflict where the bikeway and travel lane merge across each other. While green bike markings will not be used everywhere, the material and application of this facility is in place to test the colored marking material, and the effectiveness of making the conflict area visible.

39 miles completed in 2012

181 miles completed to date

381 planned miles implemented by 2017

2012 Highlights

- The City of Richmond Heights implemented a City-wide bike marking project—adding 3 miles of bikeways in the plan, plus 6 additional miles on City streets.
- The City of O'Fallon implemented their bike loop project on City and MoDOT roadways—adding 11 miles of bikeways in the plan. Moreover, most of the added facilities were buffered bike lanes.
- MoDOT added 14 miles of bikeways in the plan. Many of these bikeways have been turned over to St. Louis County for maintenance.
- The City of St. Louis chose to perform road diets—reducing travel lanes to provide bikeways on Tower Grove and on Morganford. The first green bike lane was added to eastbound Wydown Boulevard. The City has also implemented shared lane markings on several additional routes.
- The City of Chesterfield added to 2 miles of bike lanes on Edison Boulevard.
- Great Rivers Greenway has provided access to technical help for public entities in the form of consultant services to help communities implement the plan. These services are provided to implement the plan as envisioned, including engineering final bikeway additions to the system.

Performance Management and Accountability

In 2012, the Great Rivers Greenway District and Trailnet formally began an annual on-street bicycle and pedestrian count program, using manual and automatic counts, to collect information on their travel behavior. A total of 2,811 people were counted on bicycles and 6,129 pedestrians. The gender make up was approximately three quarters male and one-quarter female. Crash data was also analyzed from the Missouri Department of Transportation. The five worst intersections, and the single worst travel corridor for crashes involving bicyclists, were identified, with improvement concepts developed to address known issues. The following locations were identified for improvements:

- St. Louis County: St. Charles Rock Road Corridor (from I-70 to Kingsland Avenue)
- City of St. Louis: Skinker Boulevard at Forest Park Parkway
- City of St. Louis: South Jefferson Avenue at Cherokee Street
- St. Louis County: North Lindbergh Boulevard at Washington Road
- St. Louis County: Olive Boulevard at Schulte Road
- St. Charles County: Route K at Feise Road

Supporting Policies

C rating on meeting our goal

It is critical that bicycling be at the forefront of discussions involving transportation improvements in the region. We can no longer think of active transportation modes as simply add-on elements of the transportation network. Instead, walking and bicycling should be fully integrated from the beginning of the planning process through implementation.

In 2012, the East-West Gateway Council of Governments revised their project solicitation guidance and selection criteria to emphasize the inclusion of Gateway Bike Plan network routes on proposed projects. This step was critical to better integrate the needs of bicyclists into the planning and design of roadways.

Emphasis of bikeway elements in local road projects resulted in several specialized trainings in 2012 with Missouri Department of Transportation (MoDOT) St. Louis district staff. These sessions were focused on best practices and policy and actions related to both MoDOT projects and local road projects. These trainings are intended to result in a policy of incorporating bikeways on roadway projects from planning, through design and construction, to maintenance throughout the St. Louis District.

Another component to measure the plan's implementation is to encourage and support local communities to endorse or adopt the Gateway Bike Plan. To date, ten (10) public entities have endorsed the Gateway Bike Plan.

Performance Measure	2011 Activities	2012 Activities	Target
Establish a citizen committee to support intergovernmental cooperation and review plan implementation	By laws prepared for a citizen committee at Great Rivers Greenway	Additional discussions took place to fomally establish the committee	Implement committee by the end of 2013
Fund a regional bicycle pedestrian coordinator	Alta Planning + Design retained by Great Rivers Greenway as the interim coordinator for the plan	Great Rivers Greenway continues to work with Alta	Establish a coordinator by 2014
Number of jurisdictions that have adopted complete streets ordinances	City of Clayton	None	4 Cities per year

Education

A+ rating on meeting our goal

The education component of the Gateway Bike plan is a critical element for its success. Public education help supports the safe operation of bicyclists as vehicles on roadways. The St. Louis region is lucky to have two established programs with this goal in mind: the League of American Bicyclist trainings and Cycle Savvy trainings. Both offered a variety of instructional classes for citizens around the region. In addition, several individuals underwent training and are now certified to teach courses which expand the number and diversity of instructors throughout the St. Louis region.

Education also involves training transportation engineers and planners the details of planning and designing bikeways as part of the transportation network. Last September, over 150 attendees participated in a two-day training workshop sponsored by Great Rivers Greenway and Trailnet. It was a milestone event for the region and featured state of the art design concepts, encouragement activities and mobile tours.

Performance Measure	2011 Sessions	2012 Sessions	Annual Target
Training programs offered by cycling instructors	4	22	5 - 10
Special focused trainings	1	4	4
Training workshops for planners, engineers, and decision makers	13	18	1
New cycling instructors in the region	0	14 League of American Bicyclists (10) Cycling Savvy (4)	1

Enforcement

A rating on meeting our goal

Last October, two police officers, from Washington University and the City of Clayton, attended a training for law enforcement officials in the application of motor vehicle laws related to bicyclists. These individuals are now certified to train other officers in the region in this POST certified course.

Performance Measure	2011	2012	Target
Training for law enforcement officials offered	0	1	1 Every two yrs.

Figure 8-2: A sample of an annual report card from St Louis, MO

This page intentionally left blank.

City of Turlock

Active Transportation Plan

Volume III: Appendices

Report Prepared For
City of Turlock
156 S Broadway
Turlock, CA 95380

City of Turlock Project 13-64

June 2015

This page intentionally left blank.

Table of Contents

This page intentionally left blank.

Appendix A: Active Transportation Program Compliance Checklist

In order to be compliant with California's Active Transportation Program, bicycle and pedestrian plans must include a number of required elements, listed in the table below. The location in this Turlock Active Transportation Plan where each item is addressed is indicated in the right hand column.

Subject	ATP Compliance Checklist	Location in Plan
Future Trip Estimates	The estimated number of existing bicycle trips and pedestrian trips in the plan area, both in absolute numbers and as a percentage of all trips, and the estimated increase in the number of bicycle trips and pedestrian trips resulting from implementation of the plan.	Chapter 3.5
Collision Report	The number and location of collisions, serious injuries, and fatalities suffered by bicyclists and pedestrians in the plan area, both in absolute numbers and as a percentage of all collisions and injuries, and a goal for collision, serious injury, and fatality reduction after implementation of the plan.	Chapter 3.6
Land Use Patterns	A map and description of existing and proposed land use and settlement patterns which must include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, major employment centers, and other destinations.	Chapter 3.1
Existing and Proposed Bikeways	A map and description of existing and proposed bicycle transportation facilities.	Chapter 3.2 and Chapter 6
End-of-Trip Bicycle Parking	A map and description of existing and proposed end-of-trip bicycle parking facilities.	Chapter 6.1
Bicycle Parking Policy	A description of existing and proposed policies related to bicycle parking in public locations, private parking garages and parking lots and in new commercial and residential developments.	Appendix B and Chapter 4.2
Bicycle Connections to other Modes	A map and description of existing and proposed bicycle transport and parking facilities for connections with and use of other transportation modes. These must include, but not be limited to, parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.	Chapter 6.1
Pedestrian Connections to other Modes	A map and description of existing and proposed pedestrian facilities at major transit hubs. These must include, but are not limited to, rail and transit terminals, and ferry docks and landings.	Chapter 3.1
Wayfinding	A description of proposed signage providing wayfinding along bicycle and pedestrian networks to designated destinations.	Chapter 6.3
Maintenance	A description of the policies and procedures for maintaining existing and proposed bicycle and pedestrian facilities, including, but not limited to, the maintenance of smooth pavement, freedom from encroaching vegetation, maintenance of traffic control devices including striping and other pavement markings, and lighting.	Chapter 8.5

Subject	ATP Compliance Checklist	Location in Plan
Education Programs	A description of bicycle and pedestrian safety, education, and encouragement programs conducted in the area included within the plan, efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the law impacting bicycle and pedestrian safety, and the resulting effect on accidents involving bicyclists and pedestrians.	Chapter 3.3
Community Involvement	A description of the extent of community involvement in development of the plan, including disadvantaged and underserved communities.	Chapter 3.8 and Appendix E
Regional Plan Coordination	A description of how the active transportation plan has been coordinated with neighboring jurisdictions, including school districts within the plan area, and is consistent with other local or regional transportation, air quality, or energy conservation plans, including, but not limited to, general plans and a Sustainable Community Strategy in a Regional Transportation Plan.	Chapter 2 and Appendix B
Project List	A description of the projects and programs proposed in the plan and a listing of their priorities for implementation, including the methodology for project prioritization and a proposed timeline for implementation.	Chapters 5 – 8
Past Expenditures and Future Financial Needs	A description of past expenditures for bicycle and pedestrian facilities and programs, and future financial needs for projects and programs that improve safety and convenience for bicyclists and pedestrians in the plan area. Include anticipated revenue sources and potential grant funding for bicycle and pedestrian uses.	Appendix D and Chapter 8.4
Implementation	A description of steps necessary to implement the plan and the reporting process that will be used to keep the adopting agency and community informed of the progress being made in implementing the plan.	Chapter 8
Adoption Resolution	A resolution showing adoption of the plan by the city, county or district. If the active transportation plan was prepared by a county transportation commission, regional transportation planning agency, MPO, school district or transit district, the plan should indicate the support via resolution of the city(s) or county(s) in which the proposed facilities would be located.	

Appendix B: Existing Plan & Policy Review

This Active Transportation Plan is built on and consistent with local and regional plans and policies. The following is a review of planning and policy documents relevant to this Plan. The review is organized by local, regional, state, and national documents and policies.

B.1 Local Plans and Policies

B.1.1 Turlock General Plan, 2012

The Turlock General Plan seeks to support community growth in a sensible, compact form that maintains a small-town feel, provides for future housing needs, enhances quality of life, and creates high quality jobs and recreation opportunities for the diverse Central Valley town. The General Plan is built around eight themes which are reflected in the plan's elements, goals, and policies. The following themes are relevant to the Turlock Active Transportation Plan:

> Theme 1: Establish limits to urban growth that will maintain Turlock as a freestanding city surrounded by productive agricultural land.
>
> Theme 4: Improve the local and regional circulation system to serve businesses and new residential development.
>
> Theme 5: Implement sustainable development and green building principles in City projects and new development projects. Foster development that encourages alternatives to auto use, especially for non-commute trips.
>
> Theme 8: Provide a wide variety of recreation and cultural activities for all ages.

California law requires seven general plan elements, and permits the contents of these elements to be combined at the discretion of local governments. The seven required elements are: Land Use, Circulation, Housing, Open Space, Conservation, Noise, and Safety.

The Housing element has more detailed and extensive requirements related to its contents and frequency of updates. Turlock has published this element as a separate document, although it is written to be consistent with the General Plan.

The remaining six mandatory elements are addressed with the following:

- Land Use and Economic Development (Land Use);
- Parks, Schools, and Community Facilities (Open Space);
- Circulation;
- Conservation (also addresses Open Space);
- Noise; and
- Safety.

In addition, the General Plan contains the following voluntary elements: New Growth Areas and Infrastructure, City Design, and Air Quality & Greenhouse Gases. Each element contains guiding policies which state a philosophy or intent, and implementing policies which commit to specific actions that are to be undertaken.

Land Use and Economic Development Element

The Land Use and Economic Development Element addresses the distribution of land uses, standards for intensity and density, growth management, intergovernmental relations, jobs and employment growth, and economic strategies. In addition to describing and mapping the City's existing land use patterns, it discusses the potential for future growth in Turlock. The following policies are relevant to the Turlock Active Transportation Plan.

Downtown

Implementing Policies:

2.4-f: Continue to improve access and wayfinding. Continue to improve access to and within Downtown. Issues addressed should include entrances to Downtown and signage.

2.4-g: Facilitate mixed use. Facilitate and encourage development of mixed-use projects in Downtown through the development review, permitting, and fee process.

Residential Areas

Guiding Policy

2.5-b: New neighborhood character. Foster the development of new residential areas that are compact, mixed use, and walkable, with a distinct identity, an identifiable center, and a "neighborhood" orientation.

Implementing Policies

2.5-h: Transit and pedestrian accessibility from housing. Work with developers of affordable and multifamily housing to encourage the construction of transit-oriented and pedestrian-oriented amenities and appropriate street improvements that encourage walking and transit use.

2.5-j: Redevelopment in existing neighborhoods. Preserve and enhance existing pedestrian-oriented neighborhoods and commercial districts by pursuing redevelopment that reinforces activity, making investments in the public realm, establishing overlay districts to preserve the neotraditional character of development, and avoiding designating competing commercial areas in close proximity.

Retail, Commercial, and Mixed Use Areas

Guiding Policy

2.6-d: Pedestrian orientation of commercial areas. Emphasize compact form and pedestrian orientation in new community and neighborhood commercial areas, in locations that many residents can reach on foot, by bicycle, or by short drives.

Implementing Policy

2.6-f: Regional commercial developments fund transportation improvements. Require regional commercial center developers to fund transportation improvements that will be necessary to accommodate the level of activity anticipated.

Economic Development

Guiding Policy

2.11-d: Support and maintain Downtown Turlock. Support and contribute to a clean, safe, pedestrian-friendly, and well-maintained Downtown.

New Growth Areas and Infrastructure Element

The New Growth Areas and Infrastructure Element formalizes Turlock's long tradition of successful growth management and master planning, and identifies infrastructure needs and priorities to support new growth and maintain service to existing urbanized areas. The following policies are relevant to the Turlock Active Transportation Plan.

Growth Strategy

Implementing Policy

3.1-l: Capital Facilities Fee program. Update the Capital Facilities Fee (CFF) to cover improvements and infrastructure that are used by residents and businesses citywide. The CFF shall include:

- Major new transportation infrastructure such as arterials, expressways, railroad and highway overcrossings, and interchanges
- New bicycle lanes, traffic signals on existing streets and other operational improvements
- New transit facilities and amenities
- Downtown parking lots and structures
- Regional rail facilities
- Public landscaping
- Park and ride facilities
- Traffic calming strategies
- Police and fire services
- General government services

The CFF shall not cover the costs of new collectors and local streets in new development areas, as these are to be funded through Master Plan fees. The CFF update shall also reflect the lower impacts of walkable neighborhoods within the city.

Master Area Plan Policy

3.1-g Parks and trails provided in new neighborhoods. The master plan areas will include park sites, a pedestrian/bicycle network of trails, and a multi-use agricultural buffer along the edge (serving park, stormwater detention, trail, and buffer purposes). When a school is present, a neighborhood park shall be located adjacent to it whenever feasible. The minimum amount of gross land area in a master plan devoted to parks and public facilities shall be 10 percent, and should generally be higher.

Land Use and Design of New Growth Areas

Master Area Plan Policies

3.2-j: Consistency with General Plan circulation diagram. In order to ensure connectivity to the existing city, through new neighborhoods, and to the freeway, collector and arterial streets in master plan areas must be designed, and sufficient right-of-way reserved, to comply with the citywide circulation plan described in Chapter 5. Minor deviations may be approved provided that they have no negative impact on the overall circulation network.

3.2-k: Maximum block sizes. Encourage a fine-grained street pattern, vehicular and pedestrian connectivity, and a human scale of development by requiring maximum block sizes, measured from street centerline to street centerline:

- In low density residential areas, block length shall not exceed 660 feet.
- In medium and high density residential areas, block length shall not exceed 500 feet, with the ideal block length around 300-400 feet.

3.2-n: Pedestrian and bicycle connections. Continuous and convenient pedestrian and bicycle connections shall be provided from every home in a master plan area to the nearest neighborhood center, school, and park. Pedestrian connections may be in the form of sidewalks, linear parks, or Class I multi-use trails. Bicycle connections may be in the form of Class I, Class II, or Class III bicycle facilities, and local streets.

Specific Improvements in Master Plan Areas that are relevant to the Turlock Active Transportation Plan include:

- Master Plan Area: Southeast 1
    - At minimum, Class II bicycle access is to be provided along the new Morgan Ranch Arterial, Golf Road, and the north/south collector between Glenwood Avenue and the Morgan Ranch Arterial.
    - At minimum, marked Class III bicycle access is to be provided along Glenwood Avenue.
- Master Plan Area: Southeast 2
    - Class I bicycle access shall be provided through the linear park that runs north/south through the center of the master plan area, through greenbelt buffer along the east side, along Central Drive, and between the linear park and the greenbelt buffer near the southernmost neighborhood park
    - At minimum, Class II bicycle access is to be provided along Daubenberger Road, Verduga Road/new East Side Arterial, and East Avenue.
- Master Plan Area: Southeast 3
    - Class I bicycle access shall be provided along all linear parks and greenbelt buffers, along the perimeter of the new community park, along the north side of the new middle/high school campus, and south from the community park to Linwood Avenue.
    - At minimum, Class II bicycle access shall be provided along Daubenberger Road, Linwood Avenue, Verduga Road/new East Side Arterial, East Avenue, and Berkeley Avenue.

Parks, Schools, and Community Facilities Element

The Parks, Schools, and Community Facilities Element covers the state-mandated recreational open space planning requirements, and highlights connections between schools, parks, and recreation. The following policies are relevant to the Turlock Active Transportation Plan.

Parks and Recreational Open Space

Implementing Policy

4.1-k: Recreation Corridors and Greenways. Develop a system of linear corridors designed to provide pedestrian and bicycle linkages through and between neighborhoods, connections between major open spaces and recreational facilities and greenbelts at the City's edge. In new development areas, these must be continuous.

Public Education Facilities

Implementing Policies

4.3-j: Campus-City Edge. Work with CSUS to realize stronger connections between the community and the university by enhancing pedestrian access, visual appeal, and active uses at the campus edge.

4.3-m: Traffic Circulation and Campus Access. To reduce the traffic impacts of campus activities, encourage CSUS to provide an additional campus access point from Christofferson Boulevard as identified in the 2009 Campus Master Plan.

Circulation Element

The Circulation Element establishes goals, policies and implementation programs for a balanced transportation system for residents and visitors while maintaining the rural character of the city. It includes the location and extent of existing and proposed transportation routes and facilities, and connects circulation plans to land use decisions to ensure the system will accommodate trips generated by future planned developments. The following policies are relevant to the Turlock Active Transportation Plan.

Roadway Network, Standards, and Improvements

Guiding Policies

5.2-a: A safe and efficient roadway system. Promote a safe and efficient roadway system for the movement of both people and goods.

5.2-b: Implement planned roadway improvements. Use Figure 12-1 and Figure B-2 to identify, schedule, and implement roadway improvements as development occurs in the future; evaluate future development and roadway improvement plans against standards for the classifications as set forth in Figure B-3.

Figure B-1: General Plan Circulation Diagram at Buildout

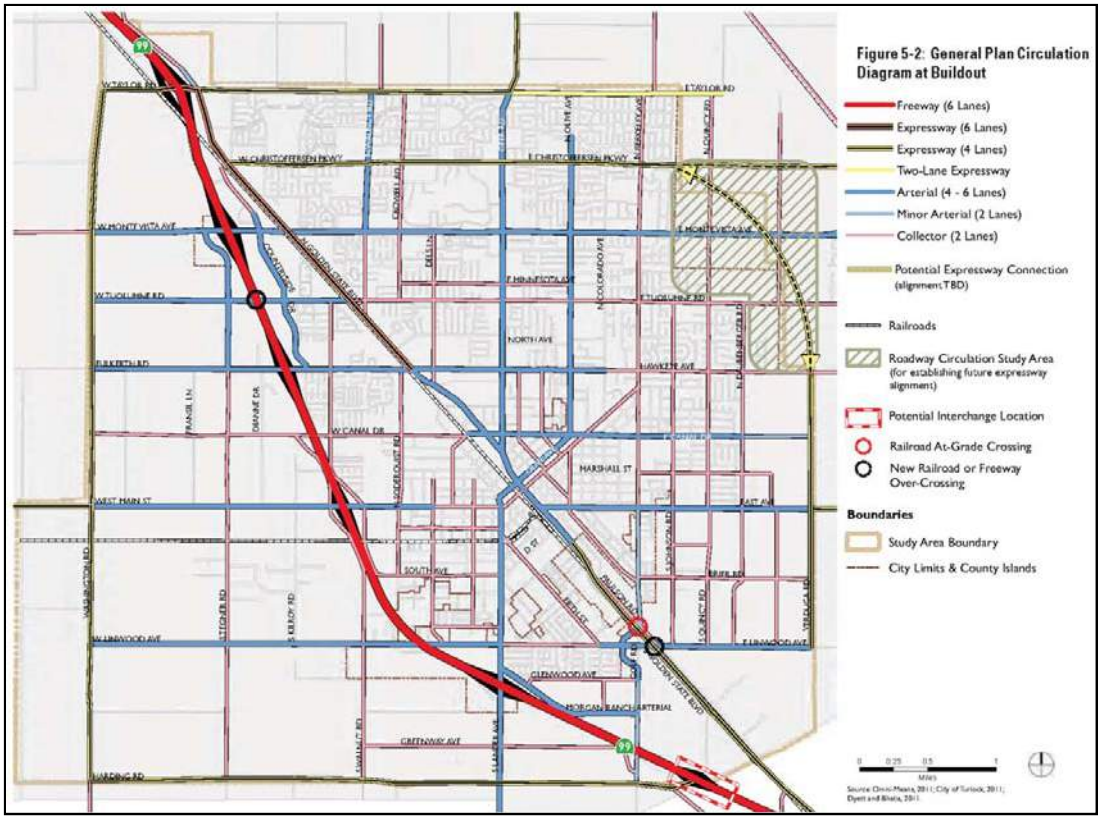


Figure B-2: Planned Roadway Improvements

TABLE B-1: PLANNED ROADWAY IMPROVEMENTS						
	EXTENTS					
STREET	FROM	TO	CURRENT ROADWAY TYPE AND # OF LANES	FUTURE CLASSIFICATION	GENERAL PLAN BUILDOUT (2030)	TYPE
Fulkerth Road	Tegner Road	Dianne Drive	2-Lane Rural	Arterial	4 Lanes	Commercial
Main Street	Washington Road	Tegner Road	2-Lane Collector	Arterial	4 Lanes	Commercial
Main Street	Tegner Road	Walnut Road	2-Lane Collector	Arterial	4 Lanes	Commercial
Golden State Boulevard	Taylor Road	Christofferson Parkway	4-Lane Collector	Expressway	6 Lanes	Commercial
Verduga Road	Hawkeye Avenue	East Avenue	2-Lane Collector	Expressway	4 Lanes	Residential
Verduga Road	East Avenue	Linwood Avenue	2-Lane Collector	Expressway	4 Lanes	Residential
Lander Avenue	Harding Avenue	West Glenwood Avenue	2-Lane Rural	Arterial	4 Lanes	Commercial
Washington Road	Fulkerth Road	Main Street	2-Lane Collector	Expressway	4 Lanes	Commercial
Washington Road	Main Street	Linwood Road	2-Lane Collector	Expressway	4 Lanes	Commercial
New Streets						
Canal Drive Extension	Washington Road	Tegner Road	N/A	Collector	2 Lanes	Commercial
Canal Drive Extension	Tegner Road	Walnut Road	N/A	Collector	2 Lanes	Commercial
Canal Drive Extension	Daubenberger Road	Verduga Road	N/A	Arterial	2 Lanes	Commercial
Tegner Road Extension	Main Street	Fulkerth Road	N/A	Arterial	2 Lanes	Commercial
Morgan Ranch Arterial	Lander Avenue	Golf Road	N/A	Arterial	4 Lanes	Residential
Morgan Ranch Arterial	Golf Road	West Glenwood Road	N/A	Arterial	2 Lanes	Residential
Northeast Expressway	Christofferson Parkway @ Berkeley Avenue	Hawkeye Avenue @ Verduga Road	N/A	Expressway	4 Lanes	Residential
Daubenberger Road Extension	Brier Road	Linwood Road	N/A	Collector	2 Lanes	Residential
Waring Road Extension	East Avenue	Linwood Road	N/A	Collector	2 Lanes	Residential

*Some arterials will be sub-standard facilities due to existing right-of-way constraints.

Source: Omni-Means, 2012

Figure B-3: General Plan Standards for Roadway Improvements

TABLE 5-4: TYPICAL STREET ELEMENTS AND WIDTHS (FEET): RESIDENTIAL FACILITIES											
DESIGNATION	TOTAL RIGHT OF WAY (ROW)	LANDSCAPE STRIP	SIDEWALK (S/W)	PARKWAY STRIP (P/WAY)	PARKING	BIKE LANE	STREET	CENTERLINE (C/L)	WIDTH TO CURB FROM MEDIAN (W)	TRAVEL WIDTH (TW)	MEDIAN (M)
Local - Parkway	56	N\A	5	6	7	N\A	34	17	N\A	10	N\A
Collector	62	N\A	5	6	8	N\A	40	20	N\A	12	N\A
Collector (Bike)	72	N\A	5	6	8	5	50	25	N\A	12	N\A
Minor Arterial (2 Lane)	90	4	5	6	N\A	6	60	30	22	16	16
Arterial (4 Lanes)	124	4	5	6	8	6	94	47	39	25	16
Expressway (4 Lanes)	108	4	5	6	N\A	6	78	39	31	25	16
Expressway (6 Lanes)	132	4	5	6	N\A	6	102	51	43	37	16

TABLE 5-5: TYPICAL STREET ELEMENTS AND WIDTHS (FEET): COMMERCIAL OR INDUSTRIAL FACILITIES											
DESIGNATION	TOTAL RIGHT OF WAY (ROW)	LANDSCAPE STRIP	SIDEWALK (S/W)	PARKWAY STRIP (P/WAY)	PARKING	BIKE LANE	STREET	CENTERLINE (C/L)	WIDTH TO CURB FROM MEDIAN (W)	TRAVEL WIDTH (TW)	MEDIAN (M)
Local - Curb Adjacent	56	N\A	8	N\A	8	N\A	40	20	N\A	12	N\A
Collector	62	3	8	N\A	8	N\A	40	20	N\A	12	N\A
Collector (Bike)	72	3	8	N\A	8	5	50	25	N\A	12	N\A
Industrial	76	N\A	8	N\A	8	N\A	60	30	N\A	22	N\A
Minor Arterial (2 Lane)	90	7	8	N\A	N\A	6	60	30	22	16	16
Arterial (4Lanes)	124	7	8	N\A	8	6	94	47	39	25	16
Expressway (4 Lanes)	108	7	8	N\A	N\A	6	78	39	31	25	16
Expressway (6 Lanes)	132	7	8	N\A	N\A	6	102	51	43	37	16

TABLE 5-6: INTERSECTION SPACING AND ACCESS RESTRICTIONS				
DESIGNATION	INTERSECTION SPACING STANDARDS	TYPICAL SPACING BETWEEN PARALLEL LIKE FACILITIES	ACCESS RESTRICTIONS	NOTES
Local	Maximum block length for local streets is 660 feet.	660 feet	No access restrictions; one driveway may be provided per parcel.	See more detail in Chapter 6.4: City Design for local street spacing and design.
Collector	¼ mile between intersections with other collector or larger streets preferred. Intersections with local streets permitted at greater frequency, at minimum intervals of 300 feet.	¼ mile	Driveways on collector streets should be no closer than 300 feet, except, for residential uses, one driveway may be permitted per parcel.	
Arterial	½ mile between intersections preferred; ¼ mile acceptable.	1 mile	Driveways to major traffic generators may be permitted within the ¼ mile spacing but no closer than 300 feet; other intersections closer than ¼ mile are restricted to right turn access only.	
Expressway	Intersections to be at 1 mile intervals. Collectors may intersect at ¼ mile spacing, but with right-in/right-out access only.	No typical spacing between expressways; these facilities occur in a loop around the city and as regional connectors	Limited access to abutting properties.	See Policy 5.2-u for further detail.

5.2-c: Complete Streets. Maintain and update street standards that provide for the design, construction, and maintenance of "Complete Streets." Turlock's Complete Streets shall enable safe, comfortable, and attractive access for all users: pedestrians, motorists, bicyclists, and transit riders of all ages and abilities, in a form that is compatible with and complementary to adjacent land uses, and promotes connectivity between uses and areas.

5.2-d: Design for street improvements. The roadway facility classifications indicated on the General Plan circulation diagram (Figure B-4) shall be the standard to which roads needing improvements are built. The circulation diagram depicts the facility types that are necessary to match the traffic generated by General Plan 2030 land use buildout, and therefore represent the maximum standards to which a road segment or intersection shall be improved. LOS is *not* used as a standard for determining the ultimate design of roadway facilities.

5.2-g: Reduce Vehicle Miles Traveled. Through layout of land uses, improved alternate modes, and provision of more direct routes, strive to reduce the total vehicle miles traveled.

5.2-h: Circulation system enhancements. Maintain projected levels of service where possible, and ensure that future development and the circulation system are in balance. Improve the circulation system as necessary, in accordance with the circulation diagram and spacing/access standards, to support multimodal travel of all users and goods.

Implementing Policies

5.2-u: Roundabouts. Roundabouts may be used in place of signalized intersections on any roadway facility or intersection type. Roundabouts are particularly encouraged at the intersection of two collector streets.

5.2-an: Raised medians. Medians shall be installed along newly constructed arterials and expressways that front new development. Raised medians shall also be installed along existing roadways (where medians exist or are added) as the City completed roadway rehabilitation projects, as deemed necessary by the City Engineer.

5.2-av: General transit and pedestrian access. In reviewing designs of proposed developments, ensure that provision is made for access to current and future public transit services. In particular, pedestrian access to arterial and collector streets from subdivisions should not be impeded by contiguous segments of sound walls.

Pedestrian and Bicycle Circulation

Guiding Policies

5.3-a: Promote walking and bicycling. Promote walking and bike riding for transportation, recreation, and improvement of public and environmental health.

5.3-b: Meet the needs of all users. Recognize and meet the mobility needs of persons using wheelchairs and those with other mobility limitations.

5.3-c: Develop a safe and efficient non-motorized circulation system. Provide safe and direct pedestrian routes and bikeways between places.

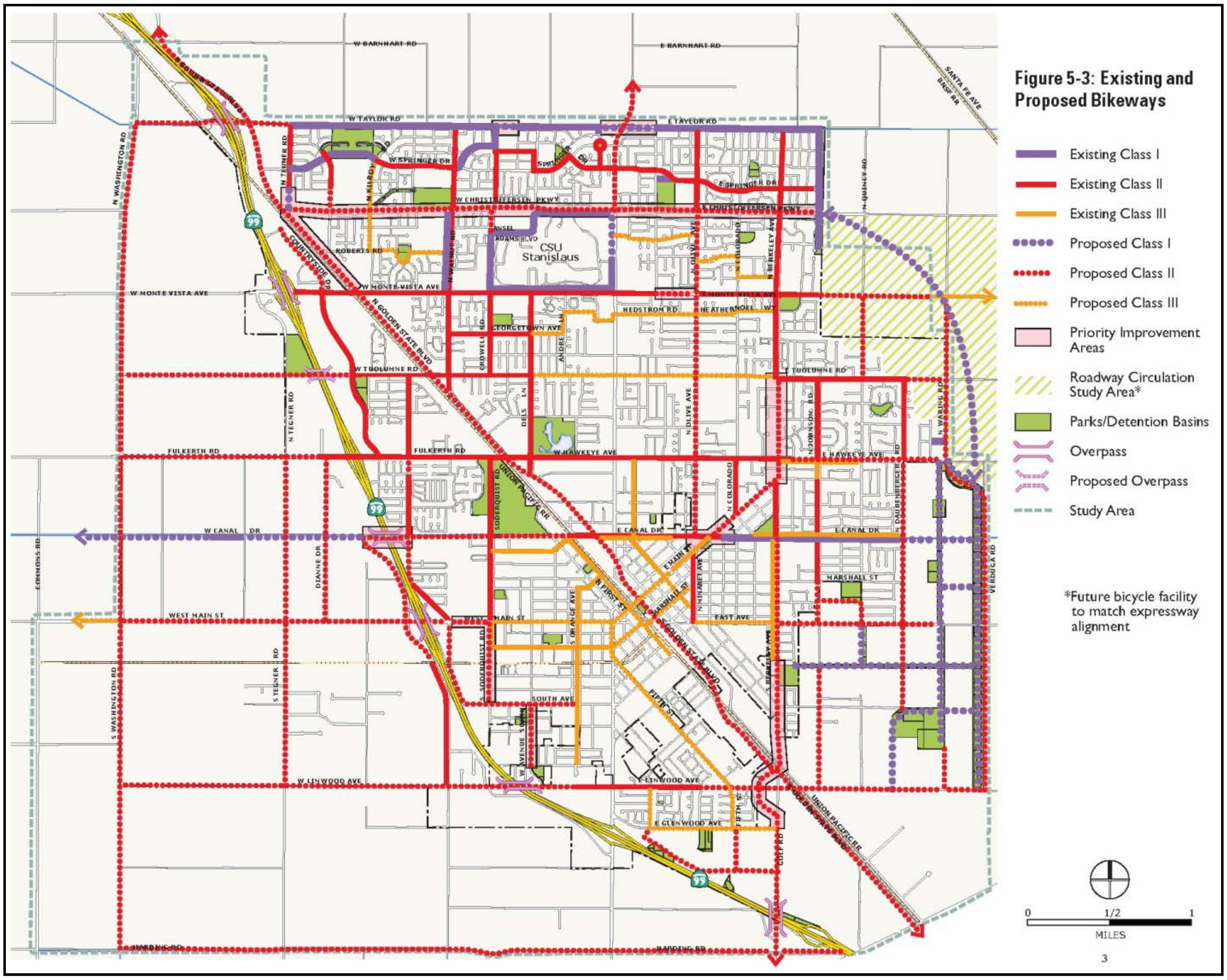
Implementing Policies

5.3-d: Integration of land use planning. Implement land use policies designed to create a pattern of activity that makes it easy to shop, play, visit friends, and conduct personal business without driving.

5.3-e: Provision of bicycle facilities. Facilities for bicycle travel (Class I bike/multiuse paths, Class II bike lanes, and Class III bike routes) shall be provided as shown on Figure B-4. Bike lane width shall follow the standards in tables 5-4 and 5-5. In cases where existing right of way constraints limit development of Class II facilities, Class III signage and demarcation may be permitted at the discretion of the City Engineer. Deviations from these standards and from the routing shown on the diagram shall only be permitted at the discretion of the City Engineer.

5.3-f: Street trees for shade and comfort. Ensure that planting plans for street trees take into consideration shade and comfort for pedestrians and bicyclists.

Figure B-4: General Plan Existing and Proposed Bikeways



5.3-h: Universal design. Provide pedestrian facilities that are accessible to persons with disabilities and ensure that roadway improvement projects address accessibility and use universal design concepts.

5.3-i: Air quality funding for bikeways plan. Establish a citywide program, similar to the use of the Air Quality Trust Fund in the Northwest Triangle Specific Plan, to assist in the funding of implementation of the Bikeways plan depicted in Figure 5-3. The fee will be developed and updated concurrently with the update of the CFF.

5.3-j: Funding for bikeways through street construction funds. Continue to designate a portion of the City's annual street construction and improvement fund for financing bikeway design and construction.

5.3-k: Bicycle Master Plan. Prepare a Bicycle Master Plan consistent with the requirements in the Streets and Highways Code in order to be eligible for further funding for improvements from the State, such as the Bicycle Lane Account funds.

5.3-n: Bicycle use by City employees. Establish a program to encourage bicycle use among City employees.

5.3-o: Bicycle access to parks. Provide safe bicycle access to and parking facilities at all community parks.

5.3-p: Bicycle safety. Increase the safety of those traveling by bicycle by:

- Sweeping and repairing bicycle paths and lanes on a regular basis;
- Ensuring that bikeways are delineated and signed according to Caltrans or City standards, and that lighting is provided where needed;
- Providing bicycle paths and lanes on bridges and overpasses;
- Ensuring that all new and improved streets have bicycle-safe drainage grates and are free of hazards such as uneven pavement or gravel;
- Providing adequate signage and markings warning vehicular traffic of the existence of merging or crossing bicycle traffic where bike routes and paths make transitions into or across roadways; and
- Work with the Turlock Unified School District to promote classes on bicycle safety in the schools.

.3-q: Demarcation of Class III Bikeways. In order to increase awareness of bicyclists sharing the road with motorized vehicles, demarcate Class III bicycle facilities by painting "sharrows" on streets. Because of high maintenance costs associated with sharrows, their use should be prioritized on areas with higher frequency of bicycle conflicts or where the bikeway may be obscured by traffic or geometrics. This shall apply only to Class III facilities shown on Figure 5-4, and not on local streets.

5.3-r: Improved bikeway visibility. Use visual cues, such as brightly-colored paint on bike lanes or a one-foot painted buffer strip, along bicycle routes to provide a visual signal to drivers to watch out for bicyclists and nurture a "share the lane" ethic. Start with areas of town where automobile-bicycle collisions have occurred in the past, based on data from the Statewide Integrated Traffic Records System maintained by the California Highway Patrol.

5.3-s: Pedestrian access to shopping centers. Install clearly marked crosswalks at intersections near all neighborhood commercial centers, as well as clearly marked pedestrian paths within parking areas. Crosswalks and signage indicating pedestrian activity should also be installed at mid-block entrances where existing shopping centers are adjacent to other high-intensity uses, such as parks and schools where necessary for safety; however, mid-block crossings are discouraged in new development.

5.3-t: Pedestrian connections at employment centers. Encourage the development of a network of continuous walkways within new office parks, commercial areas, or industrial areas to improve workers' ability to walk safely around and from their workplaces.

5.3-u: Bikeway improvements in infill areas. To address the Priority Infill Bikeway Improvement Areas indicated on Figure 5-3, complete a feasibility study within two years of the General Plan's adoption that identifies planned improvements and analyzes the cost and process associated with implementing those improvements. The feasibility study shall evaluate the identified areas for safety concerns and identify the minimum improvements necessary to address safety and usability issues. Funding for the feasibility study shall be provided through inclusion in the CFF.

Public Transportation

Implementing Policies

5.4-j: Transit usability. Situate transit stops at locations that are convenient for transit users, and promote increased transit ridership through the provision of shelters, benches, bike racks on buses, and other amenities.

5.4-l: Development that supports transit. Ensure that new development is designed to make transit a viable transportation choice for residents. Design options include:

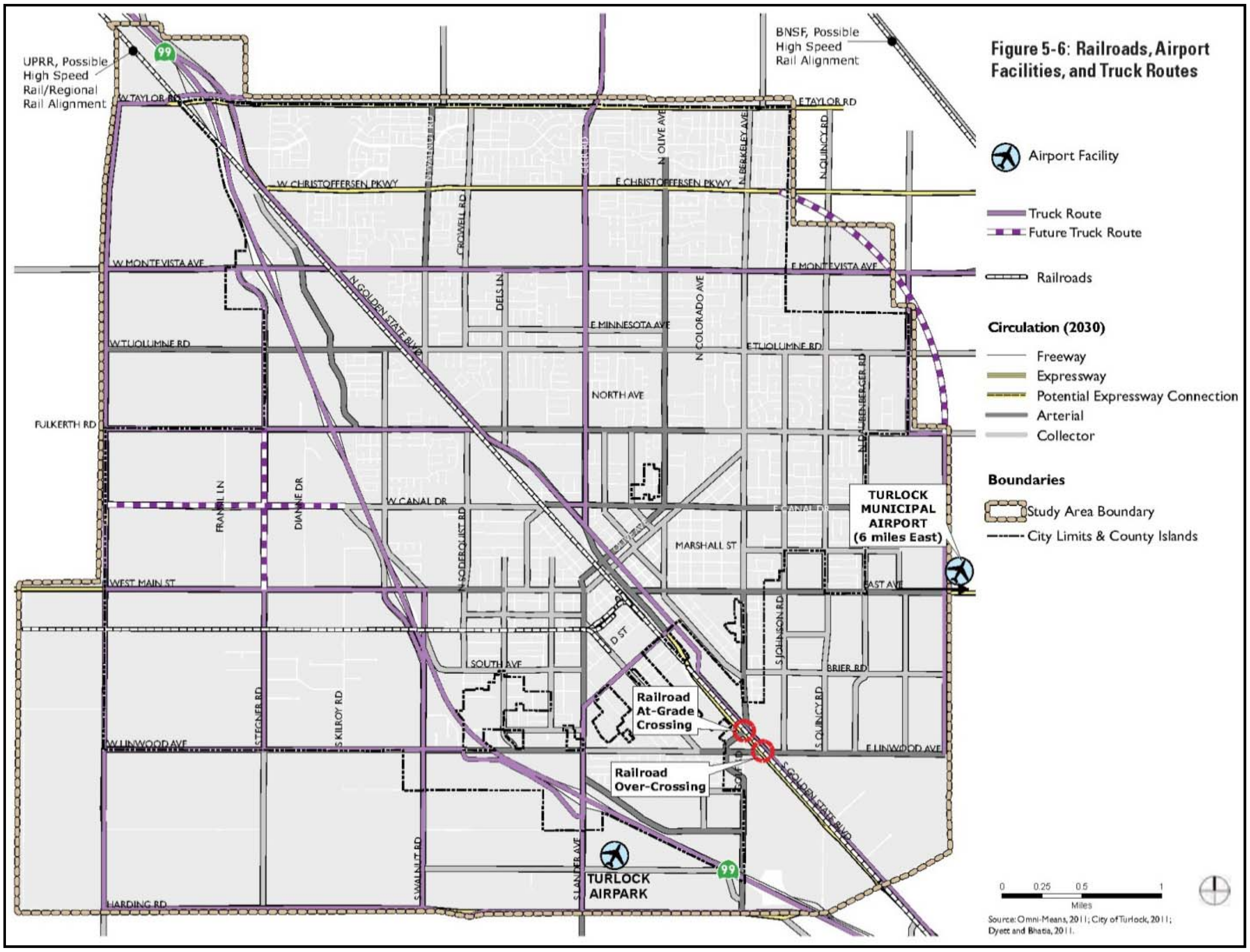
- Have neighborhood centers or focal points with sheltered bus stops;
- Locate medium and high density development on or near streets served by transit wherever feasible; and
- Link neighborhoods to bus stops by continuous sidewalks or pedestrian paths.

Aviation, Rail, and Goods Movement

Implementing Policy

5.5-q: New railroad crossings. Provide new grade-separated crossings across the Union Pacific Railroad (UPRR), as shown on Figure B-5, in conjunction with the planned roadway improvements shown on Figure 5-2. New grade-separated crossings will be at Linwood Avenue and the new east side expressway.

Figure B-5: General Plan Railroads, Airport Facilities, and Truck Routes



City Design Element

The City Design Element addresses the design, use, and management of the physical elements that shape Turlock, and the high standards of design aesthetics that residents hold their city to in both existing and new development. The following policies are relevant to the Turlock Active Transportation Plan.

Street Design and Connectivity

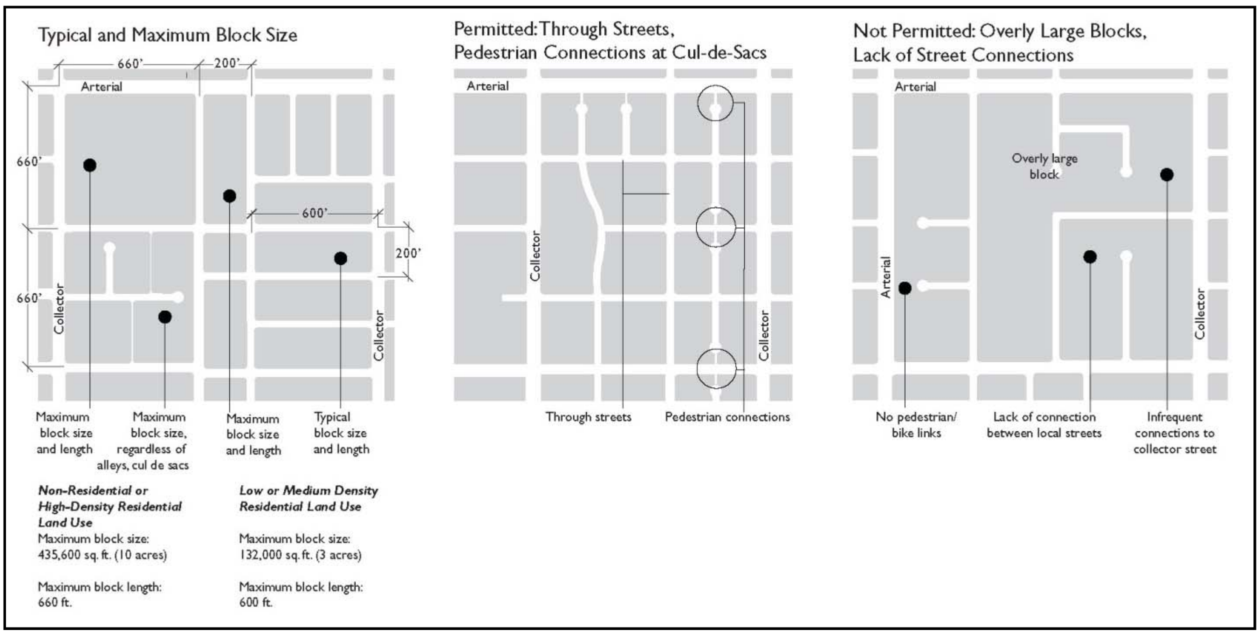
Guiding Policy

6.3-b: Encourage public and pedestrian orientation. Through circulation network and street design, reduce the perceived separation and introverted nature of projects.

Implementing Policies

6.3-e: Block size and maximum street spacing. Streets in neighborhoods should be designed to maximize connectivity for automobiles, cyclists, and pedestrians. Maximum spacing between local streets, or intersections of local streets with larger roads, shall be 660 feet. The preferable, typical block size in a residential neighborhood is in the range of 200 by 600 feet. As a condition of project approval, require circulation patterns of all residential and neighborhood centers to conform to maximum spacing between through-streets (exclusive of alleys), as depicted in Figure B-6 and Section 5.2, unless access conditions and standards prevent their attainment. Cul-de-sacs are generally discouraged.

Figure B-6: General Plan Block Size and Street Connectivity



6.3-l: Create "Pedestrian Priority Areas." Improve the experience of major commercial streets for pedestrians by designating Pedestrian Priority Areas. Areas to be included correspond to where vehicle trips may be reduced because of the orientation and relationship of land uses and street design, such as in Downtown, along existing pedestrian corridors, and in the mixed use centers of forthcoming master plan areas. They are shown on Figure 5-4: Properties within Pedestrian Priority Areas will have lower Capital Facilities Fees in recognition of their lower contribution to vehicle trips and impacts on roadway infrastructure.

The Pedestrian Priority Area shall extend approximately one-eighth of a mile (660 feet – one long block or two short blocks) on either side of the corridor, creating a quarter-mile-wide zone. These areas should have enhanced facilities to improve the pedestrian experience, such as:

- Adequately wide sidewalks
- Benches and shade structures and/or trees located at bus stops
- Intersection "bump-outs" to reduce walking distances across streets that are four lanes or wider
- Striped and lit crosswalks, signage, and walk signals at all signalized intersections and non-signalized intersections with high pedestrian activity
- Pedestrian-scale street lighting along sidewalks (maximum height of streetlamps: 12 feet)
- Clearly demarcated pedestrian walkways through surface parking lots when these are located in between the sidewalk and store entrances
- ADA-compliant curb ramps for universal access

6.3-m: Traffic calming devices. Traffic calming devices may be used to control speeding and improve traffic management in areas where increased traffic is negatively affecting level of service and/or quality of life, but where street widening is impossible or undesirable. Acceptable traffic calming strategies include, but are not limited to:

- Striped, lighted, and/or raised pedestrian crossings
- Curb extensions or intersection "bulb-outs"
- Pedestrian "refuges" or islands
- Changes of paving material or structure

Sustainable Site Planning

Implementing Policy

6.4-j: Bicycle and pedestrian network. Design sites to facilitate access to parks and other community facilities via non-automobile transportation (walking and biking).

Urban Design

Guiding Policies

6.7-c: Universal access. Accommodate the needs of all pedestrians, bicyclists, and mobility-challenged persons.

6.7-d: Neighborhood centers. Establish new neighborhood centers as high-quality mixed-use pedestrian-friendly environments, without excluding the automobile. These will be required in new growth areas.

Design emphasis should be on providing a fine-grained environment accommodating transit and pedestrian comfort and convenience.

6.7-e: Pedestrian scale and neighborhood character. Require buildings and signs to be scaled to a neighborhood character and designed to encourage pedestrian activity and comfort.

Implementing Policies

6.7-j: Multi-modal access and movement. Require new projects to facilitate pedestrian and bicycle movement and aid transit.

- Planning should anticipate and provide for future local and regional transit service even if the service is not feasible at the time of project plan preparation.
- Development may not be at intensities below the density ranges stipulated in the General Plan.
- Bikeways should be provided as designated in Figure 5-3.
- Pedestrian and bicycle connections to through-streets should be provided at the end of cul-de-sacs.
- Trees and shrubs along streets should buffer sidewalks and bicycle lanes from automobiles and be selected and spaced to provide uninterrupted shade to pedestrians and bicyclists.
- Large-size projects in neighborhoods should be broken down by providing through-streets and designing smaller units to provide individuality and distinction.

6.7-t: Pedestrian linkages. Develop clear pedestrian linkages between and within neighborhoods.

6.7-u: Sidewalks and the pedestrian environment. Provide sidewalks consistent with intended use, and trees to shade streets and pedestrians.

- Sidewalks should be provided on both sides of all streets, public and private. Sidewalk width shall be a minimum of 5 feet in residential areas and 8 feet in commercial and industrial areas (see Figure B-3). In residential areas, parkway strips in between the street and sidewalk shall be provided to provide greater distance between pedestrians and the roadway.
- In areas designated Very Low Density Residential, consider establishment of a more rural residential style of street-side public improvements.
- Street trees should be planted curb-adjacent and be consistent with the species stipulated in the Street Tree Master Plan and be no greater than 30 feet apart. Trees along local streets should be appropriately selected and planted no greater than 30 feet apart.

6.7-z: High quality business park design. Ensure that the Business Park is developed to high architectural and landscape standards and limited to non-polluting uses consistent with a Business Park setting, as enumerated in the Westside Industrial Specific Plan (WISP).

- The primary intended use in Business Park is offices consistent with a light industrial nature (i.e., research and development). Light manufacturing, wholesaling, retailing, and other uses should be permitted as ancillary uses only and should generally be limited to no more than 40 percent of the total building area of a development.
- Sidewalks with street-trees should be provided along all public and private streets. Sidewalk width, including a curbside planting area for street trees, should be at least 10 feet. Street trees should be provided at a maximum 30-foot interval and placed to provide shade to pedestrians and bicyclists. Trees along median strips should also be provided for all streets 50 feet or wider.
- Planted building setbacks of 10 to 20 feet should be provided along public streets. No setback is required of structures that provide uses of pedestrian interest, such as a shop or restaurant.
- Storage yards, parking areas, service areas, and other paved areas should be screened from off-street view by perimeter and tree-canopy planting.
- Large, flat-roofed areas and rooftop equipment should be screened from off-site views.
- Bicycle connections to designated routes should be provided from each development.
- Bicycle parking should be provided in Business Park parking lots at a ratio of one bicycle parking space per 10 automobile parking spaces.

Air Quality and Greenhouse Gases Element

The Air Quality and Greenhouse Gases Element reviews air pollution and strategies for improvement, in addition to describing climate change and its potential impacts on the city and region. The following policies are relevant to the Turlock Active Transportation Plan.

Air Quality

Implementing Policies

8.1-d: Transportation and Residential Density. Designate residential land sues to be higher density than in the past in order to meet population demand and reduce total vehicle miles traveled.

8.1-e: Establish Land Use Pattern That Supports Trip Reduction. Establish land use pattern that enables alternatives to automobile use and reduces trip lengths, including transit-oriented, mixed use development and neighborhood commercial areas.

8.1-o: Reduce Trips by City Government. Take the lead in implementing a trip-reduction program for City employees. The program may include carpooling and ridesharing; reimbursement of transit costs; encouragement of flexible work schedules, telecommuting, and teleconferencing.

Energy and Climate Change

Guiding Policy

8.2-b: Decrease Vehicle-Miles Traveled. Promote a broad range of transportation, land use, and site design measures that result in a decrease in the number of automobile trips and vehicle-miles traveled per capita.

Implementing Policies

8.2-g: Develop Circulation System That Facilitates Alternative Transportation Modes. Promote alternatives to automobile use by establishing a Circulation Plan and street design standards that enable safe, comfortable, and attractive access and travel for pedestrians, bicyclists, motorists, and transit users of all ages and abilities. Plan Elements include a citywide bike network and traffic calming street design.

8.2-i: Provide Bicycle Facilities. Require minimum bike parking for multi-family residential and commercial development, and encourage provision of additional end-of-trip facilities.

8.2-m: Pedestrian-Oriented Site Design. Orient development to encourage pedestrian and transit accessibility. Strategies include locating buildings and primary entrances adjacent to public streets; placing parking at the rear of sites or in structures above retail; and providing clear and direct pedestrian paths across parking areas.

B.1.2 Downtown Design Guidelines and Zoning Regulations, 2003

The Downtown Design Guidelines and Zoning Regulations, adopted in 2003, build on the vision for downtown Turlock outlined in the 1992 Downtown Master Plan. They emphasize the importance of pedestrian access and accessibility throughout the Downtown Area, and include a goal "to protect and enhance the pedestrian environment" in downtown Turlock. Figure B-7 shows the various zoning districts within downtown Turlock. An update to the Downtown Design Guidelines and Zoning Regulations launched in 2011 addresses the potential for a train station in the Downtown Area. The following design guidelines are relevant to the Turlock Active Transportation Plan.

General Design Guidelines

Bike racks shall be placed near transit stops and office buildings to encourage bicycling as an alternative to automobile use. The rack style shall remain consistent with the ones used in the downtown core.

Downtown Core Design Guidelines

14.g: Planter urns and enhanced crosswalks shall be introduced at key intersections such as Marshall Street, East Main Street, and Olive Avenue in order to emphasize the entry into the Downtown Core along Golden State Boulevard.

Downtown Core Transition Design Guidelines

21.3: Sidewalks shall be five feet (5') wide in order to accommodate pedestrians and separated from the street edge by a planting strip.

Transitional Commercial Design Guidelines

16.g: Parking lots shall provide areas for bicycle and motorcycle parking.

16.j: Parking areas shall be designed so that cars and pedestrians are separated. The need for pedestrians to cross parking aisles shall be minimized. Landscape island walkways shall be used to connect parking and building entries.

16.l: The on-site pedestrian circulation system shall be directly connected to off-site public sidewalks.

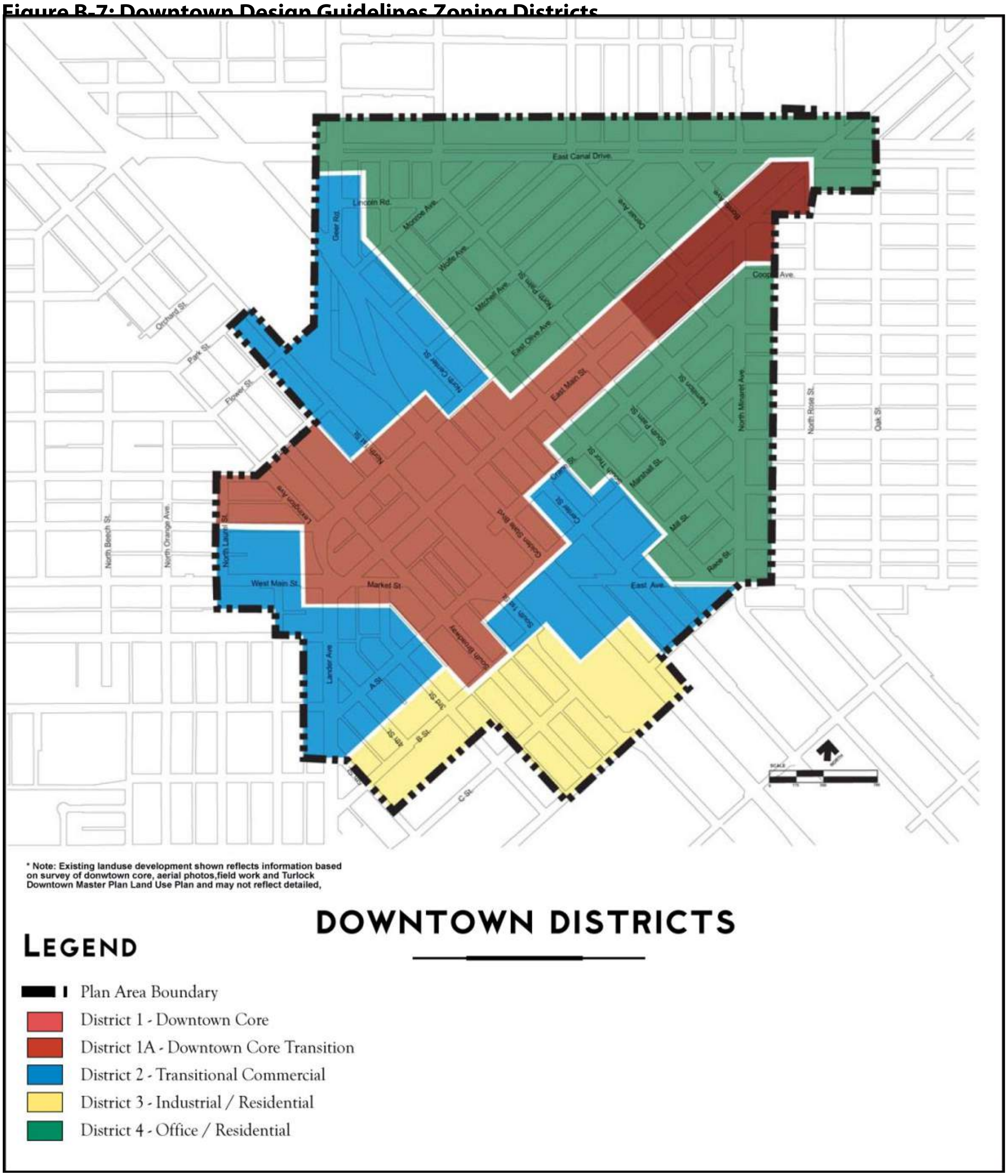
21.e: Sidewalks shall be a minimum twelve feet (12') wide in order to accommodate pedestrians, street trees, and street furnishings.

24.e: When walls are used to screen the railroad corridor, breaks shall be provided to allow pedestrian circulation and visual access for safety and security purposes.

Office/Residential Design Guidelines

19.d: Minimum five foot (5') concrete sidewalks shall be used in this district with parkway strips separating sidewalks from the street.

Figure B-7: Downtown Design Guidelines Zoning Districts



B.2 Regional Plans and Policies

B.2.1 San Joaquin Valley Blueprint and Smart Valley Places Partnership, 2005

Turlock is a partner city in an eight-county planning process known as the San Joaquin Valley Blueprint. Launched in 2005, this regional process seeks to develop a shared vision for land use and transportation in the San Joaquin Valley that will guide growth for the next 50 years. The 2010 "Blueprint Roadmap Summary Final Report" outlines the Preferred Scenario along with twelve Smart Growth Principles, in addition to providing an implementation plan.

The Smart Valley Places Partnership was established to continue the work of the San Joaquin Valley Blueprint. This network of cities, agencies, institutions, and nongovernmental organizations has adopted the HUD-EPA-DOT Livability Principles, which are:

Provide more transportation choices;

Promote equitable, affordable housing;

Enhance economic competitiveness;

Support existing communities;

Coordinate and leverage policies and investment; and

Value communities and neighborhoods.

Additionally, twelve Smart Growth Principles were adopted to guide decisionmaking and implementation for achieving the Blueprint. Those principles relevant to the Turlock Active Transportation Plan are:

Create walkable neighborhoods;

Encourage community and stakeholder collaboration;

Mix land uses; and

Provide a variety of transportation choices.

B.2.2 Stanislaus Council of Governments Non-Motorized Transportation Master Plan, 2013

The Stanislaus Council of Governments (StanCOG) Non-Motorized Transportation Master Plan lays out a vision for active transportation throughout Stanislaus County, and identifies steps toward implementation. It examines the existing network of bicycle and pedestrian facilities, and prioritizes investments that serve both countywide and local interests, with a focus on increasing accessibility of competitive grant funding sources. Each of the nine cities in the county are given their own standalone chapter which focus on countywide priority segments within these jurisdictions. The following goals, objectives, and policy actions are relevant to the Turlock Active Transportation Plan.

Goal 1: Increase Bicycle and Pedestrian Access and Safety

Expand bicycle and pedestrian facilities and access in and between local destinations such as neighborhoods, employment centers, shopping areas, schools, and recreational sites as well as throughout the region to increase the number of bicycling trips to five percent of all trips by 2030.

Objective 1.A: Implement the StanCOG Countywide Bicycle and Pedestrian Master Plan, which identifies existing conditions and planned networks, and provides specific short-term and long-term recommendations for countywide priority facilities and programs, including near-term (five- to ten-year) priority projects.

Policy Actions:

2. Implement the recommendations to regularly monitor bicycle- and pedestrian-related collision levels, and seek a reduction in these collision levels on a per capita basis over the next twenty years.

Objective 1.B: Complete a continuous network of bikeways and pedestrian facilities that are feasible, fundable, and serve the needs of bicyclists and pedestrians, especially for travel to employment centers, schools, commercial districts, transit stations, and institutions.

Policy Actions:

2. Complete existing gaps in the pedestrian network, especially in the vicinity of land use attractors such as schools, parks, and neighborhood commercial areas as well as over major barriers such as railroad tracks, highways, and water bodies.

3. Codify the existing practice of providing wide shoulders or bicycle lanes during overlay and widening projects as roadway space allows through the adoption of a "Complete Streets" policy to encourage construction of bikeways as a part of any roadway project, where feasible and appropriate.

4. Provide opportunities for bicycling for recreational purposes, especially to access parks and open space.

Objective 1.D: Improve access and integration with transit for bicycling and walking trips.

Policy Actions:

1. Assist transit providers in providing and promoting secure, covered bicycle racks and lockers at transit centers and along key bus routes to facilitate multi-modal trips.

2. Support and promote transit facility enhancements, such as bus stop access improvements, that will encourage increased bicycle and pedestrian access to transit.

3. Require future transit service in Stanislaus County to provide adequate bicycle and pedestrian access, bus mounted bicycle racks, and secure bicycle parking.

Goal 2: Increase Bicycle and Pedestrian Trips

Make bicycling and walking a viable option for shopping, school, and work trips in Stanislaus County and other trips of fewer than five miles by implementing and maintaining a bikeway network, providing end-of-trip facilities for bicyclists, improving access and integration with transit, and making walking and biking convenient and safer.

Objective 2.B: Provide secure, covered short- and long-term bicycle parking in employment and commercial areas, in multi-family housing, at schools, and at transit facilities.

Policy Actions:

1. Develop a bicycle parking policy, as described in this Plan, to encourage or require the inclusion of bicycle parking in new development projects.
2. Encourage the installation of short- and long-term bicycle parking in the public right-of-way, particularly adjacent to transit stops.
3. Encourage the installation of short- and long-term bicycle parking at local elementary, middle, and high schools to promote bicycle commuting.

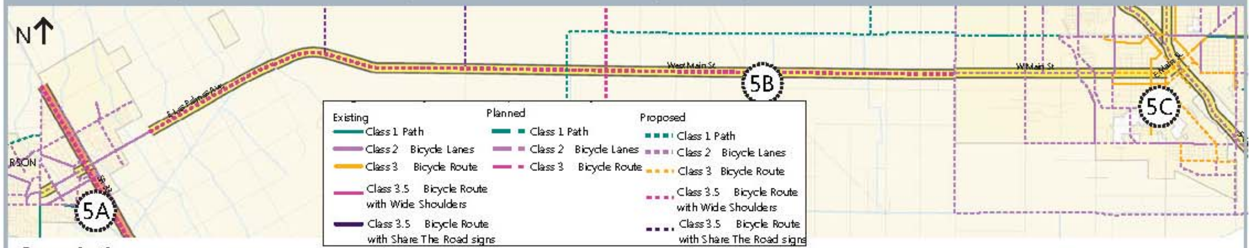
Priority Regional Bikeways Project Sheets

The StanCOG Non-Motorized Transportation Plan identifies several priority regional bikeway projects that connect communities throughout Stanislaus County. Figure B-8, Figure B-9, and Figure B-10 show project sheets for those priority regional bikeways that are relevant to the Turlock Active Transportation Plan.

Figure B-8: Priority Project Sheet No. 5 for Las Palmas Street – Main Street

5. Las Palmas Street - Main Street

Jurisdictions: City of Patterson, Unincorporated Stanislaus County, and City of Turlock



Description

This east-west bikeway connects Las Palmas Avenue in Patterson through the unincorporated County to Main Street in the City or Turlock, connecting to Downtown Turlock and the priority bikeway on Golden State Boulevard (#8).

Proposed Improvements

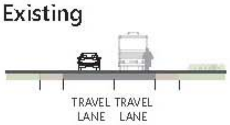
5A. Class 2 on Las Palmas Avenue between Ward Avenue and 9th Street and El Circulo and 1st Street
5B. Class 3.5 with wide shoulders on Las Palmas Avenue/Main Street between Sycamore Avenue and Walnut Road
5C. Class 3 on Main Street between Walnut Road and Golden State Boulevard

Design Requirements

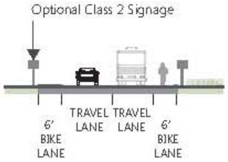
5A Class 2 Bicycle Lanes

- Widen roadway between Ward Avenue and 9th Street
- Stripe within existing right of way from El Circulo to 1st Street

Existing



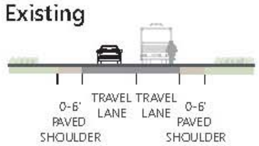
Proposed



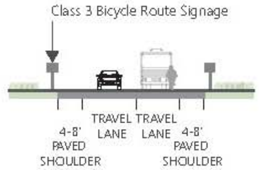
5B Class 3.5 with Wide Shoulders

- Widen shoulder to 4' minimum
- Existing shoulders are 0-6'
- Install Class 3 signs each 1/4 mile

Existing



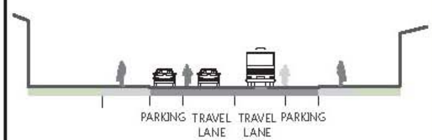
Proposed



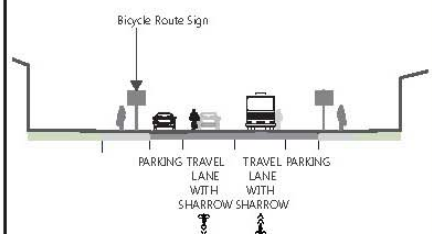
5C Class 3.5 Bicycle Route with Shar-rows

- Install Class 3 bicycle route signage
- Stripe sharrows 14' from face of curb
- Install Class 3 signs each 1/4 mile

Existing



Proposed



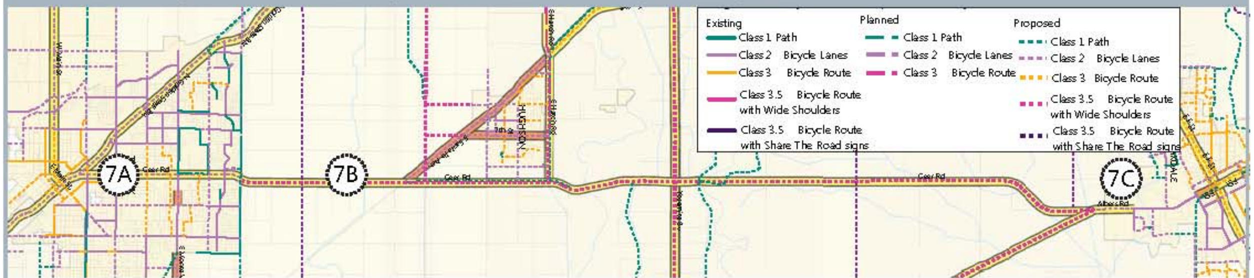
Implementation and Funding

- 4 pedestrian-auto collisions, 4 bicyclist-auto collisions on West Las Palmas Avenue/Main Street corridor between 2008-2010
- May be candidates for SJVAQD Remove II, CMAQ competitive funding, and HSIP funding
- Total project cost, including design, environmental, and contingency, is approximately $5,150,000

Figure B-9: Priority Project Sheet No. 7 for Geer Road – Albers Road

7. Geer Road-Albers Road

Jurisdictions: City of Oakdale, Unincorporated Stanislaus County, and City of Turlock



Description

Geer Road - Albers Road is a north-south arterial connecting the Cities of Turlock and Oakdale through the unincorporated County. The Geer Road – Albers Road bikeway would connect the proposed Golden State Boulevard Class 3.5 facility with existing Class 2 bicycle lanes on Albers Road in Oakdale, terminating at S. Yosemite Avenue. The north-south bikeway would also connect to a proposed Class 3.5 facility on SR 132-Yosemite Boulevard, which may require coordination with Caltrans.

Proposed Improvements

7A Class 2 bicycle lanes on Geer Road between Taylor Road and Golden State Boulevard
7B Class 3.5 wide shoulders on Albers Road-Geer Road between Albers Road/ Oakdale-Waterford Highway and Taylor Road
7C Class 2 bicycle lanes on Albers Road/Oakdale-Waterford Highway between Warnerville Road and Yosemite Boulevard

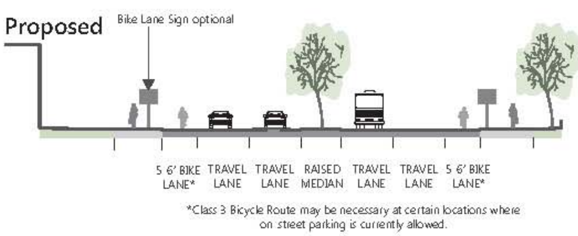
Design Requirements

7A & 7C Class 2 Bicycle Lanes

- Stripe within existing right-of-way
- Reduce width of outside travel lane and/or two-way left-turn lane

Existing

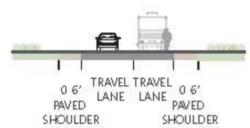
Proposed



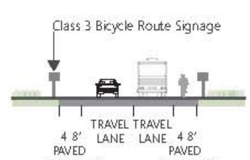
7B Class 3.5 Bicycle Route with Wide Shoulders

- Existing 6 foot shoulders between Claribel Road and Oakdale-Waterford Highway
- Widen shoulder to 4' minimum between Claribel Road and Turlock City Limits
- Shoulders widening planned between Claribel and Milnes Roads
- Install Class 3 signs each 1/4 mile

Existing



Proposed



Implementation and Funding

- 5 pedestrian-auto collisions and 3 bicylist-auto collisions between 2008-2010
- May be eligible for CMAQ Competitive Funds and HR3/HSIP
- Total project cost, including design, environmental, and contingency, is approximately $11,700,000
- Through Turlock, Olive Avenue could be considered as an alternative alignment, if preferred

Figure B-10: Priority Project Sheet No. 8 for Frontage Road – Rohde Road – 7th Street – Golden State Boulevard

8. Frontage Road - Rohde Road -7th Street - Golden State Boulevard

Jurisdictions: Unincorporated Stanislaus County and City of Turlock

Description

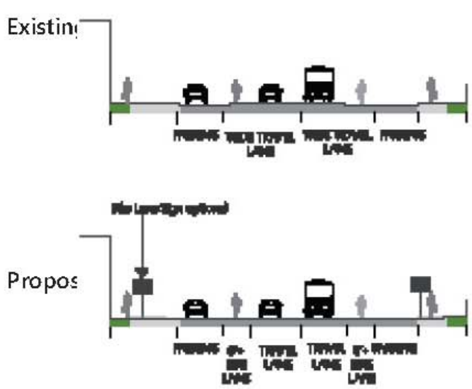
Golden State Boulevard is a north-south arterial connecting the future Moore Road TID Class 1 path Ceres with the unincorporated community of Keyes, the City of Turlock, and ending south of Turlock at SR 99. Through Keyes, Golden State Boulevard becomes 7th Street and the bikeway turns onto Nunes Road at the south end of Keyes before reconnecting with Golden State Boulevard.

Proposed Improvements

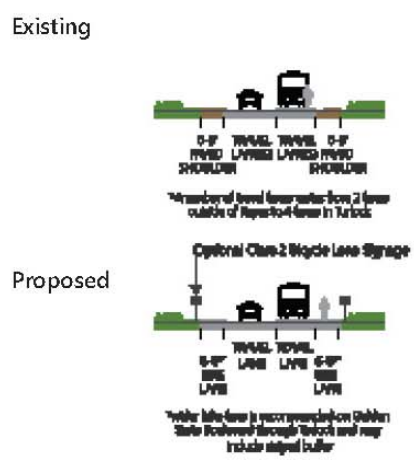
8A Class 2 bicycle lanes on Frontage Road between Moore Road (south of Ceres) and the Keyes limits
8B Class 2 bicycle lanes on Rohde Road, 7th Street, and Nunes Road through Keyes
8C Class 2 bicycle lanes on Golden State Boulevard between Nunes Road and southern Turlock city limit

Design Requirements

8A, 8C Class 2 Bicycle Lanes
- Stripe within existing right-of-way where feasible
- Widen roadway from existing 0-4' paved shoulders to 6-8' and stripe as bicycle lane



8B Class 2 Bicycle Lanes
- Stripe within existing right-of-way
- Prohibit parking on one-side of street if necessary



Implementation and Funding

- 7 pedestrian-auto collisions and 5 bicylist-auto collisions between 2008-2010
- May be eligible for CMAQ Competitive Funds, SJVAQD Remove II, and HR3/HSIP
- Total project cost, including design, environmental, and contingency, is approximately $339,300

B.3 State Plans and Policies

B.3.1 California AB 32 – Global Warming Solutions Act, 2006

California Assembly Bill (AB) 32, the Global Warming Solutions Act, establishes a comprehensive program to reduce greenhouse gas emissions using regulatory and market mechanisms. The California Air Resources Board is responsible for monitoring and reducing greenhouse gas emissions. The bill established a statewide target of reducing greenhouse gas emissions to 1990 levels by 2020.

B.3.2 California SB 375 – Sustainable Communities and Climate Protection Act, 2009

California Senate Bill (SB) 375 requires Metropolitan Planning Organizations, including the Stanislaus Council of Governments, to create a Sustainable Communities Strategy (SCS) as part of the Regional Transportation Plan. The SCS must identify the ways in which the region will meet the greenhouse gas emissions targets outlined by the California Air Resources Board. One strategy to meet the greenhouse gas emissions targets is to increase the mode share of alternative transportation. Enhancing Turlock's pedestrian and bicycle infrastructure can increase pedestrian, bicycle and transit mode share and reduce Turlock's greenhouse gas emissions.

B.3.3 California AB 1358 – Complete Streets Act, 2008

California Assembly Bill (AB) 1358 is known as the Complete Streets Bill. Effective in 2011, the bill requires revisions to a city or county's Circulation Element to include provisions for the accommodation of all roadway users including bicyclists and pedestrians. Accommodations include bikeways, sidewalks, crosswalks, and curb extensions.

B.3.4 California SB 99 – Active Transportation Program Act, 2013

California Senate Bill (SB) 99 establishes the Active Transportation Program for the state, in accordance with the federal Moving Ahead for Progress in the 21st Century (MAP-21) legislation, to encourage increased use of active modes of transportation and create a mechanism for distributing federal funds to local and regional efforts. The bill includes the following goals for the Active Transportation Program which are relevant to the Turlock Active Transportation Plan:

- Increase the proportion of trips accomplished by biking and walking.
- Increase safety and mobility for nonmotorized users.
- Advance the active transportation efforts of regional agencies to achieve greenhouse gas reduction.
- Enhance public health, including reduction of childhood obesity through the use of programs including, but not limited to, projects eligible for Safe Routes to School Program funding.
- Ensure that disadvantaged communities fully share in the benefits of the program.
- Provide a broad spectrum of projects to benefit many types of active transportation users.

B.3.5 Caltrans Complete Streets Policy, 2001

In 2001, the California Department of Transportation (Caltrans) adopted Deputy Directive 64, Accommodating Nonmotorized Travel, which established a routine accommodation policy for the department. A revised directive adopted in 2008, entitled Complete Streets—Integrating the Transportation System, significantly strengthened the policy beyond just "considering" the needs of pedestrians and bicyclists. Among the responsibilities that Caltrans assigned to itself under the revised directive are:

- Ensure pedestrian, bicycle, and transit interests are appropriately represented on interdisciplinary planning and project delivery development teams.
- Ensure pedestrian, bicycle, and transit user needs are addressed and deficiencies identified during system and corridor planning, project initiation, scoping, and programming.
- Ensure incorporation of pedestrian, bicycle, and transit travel elements in all plans and studies.
- Promote land uses that encourage pedestrian, bicycle, and transit travel.
- Research, develop, and implement multimodal performance measures.

After adoption of this policy, it was noted that more guidance was needed on which roadway projects to review for impacts on bicyclists and pedestrians, how to review them, at what stage of project development and, most importantly, how to provide for bicyclists and pedestrians, especially if local or countywide plans do not identify nonmotorized transportation priorities in the area. Caltrans' design guidance documents—for example, its Highway Design Manual—did not universally coincide with the department's complete streets policy.

In part to address these issues, Caltrans adopted the Complete Streets Implementation Action Plan in 2010. The plan sets forth actions under seven categories to be completed by various Caltrans districts and divisions within certain timelines to institutionalize complete streets concepts and considerations within the department. The action categories include updating departmental plans, policies, and manuals; raising awareness; increasing opportunities for training; conducting research projects; and actions related to funding and project selection. As one of its implementation activities, Caltrans updated the Highway Design Manual in large part to incorporate multi-modal design standards.

B.3.6 California Transportation Plan 2025, 2006

The California Transportation Plan is developed every five years by Caltrans, and outlines a holistic vision for California's transportation system in 2025. The existing plan was adopted in 2006 and updated in 2007, and a new plan with projections through 2040 is currently under development.

The stated vision of the Plan is to provide for the mobility and accessibility of people, goods, services, and information through an integrated, multimodal network that is developed through collaboration and achieves a prosperous economy, a quality environment, and social equity.

As stated by Speaker of the Assembly John A Perez, "over the coming years, the Active Transportation Program will increase the number of bicycling and walking trips in California, improve safety and mobility, [and] help achieve greenhouse gas reductions."

This vision is supported by a number of goals and policies; those relevant to the Turlock Active Transportation Plan are summarized below.

Goal: Improve mobility and Accessibility.

Policy: Manage and operate an efficient intermodal system.

Strategy:

Enhance connectivity between transportation modes. Include infrastructure to support non-motorized modes during the planning and design phases of project development.

Policy: Increase system capacity.

Strategy:

Incorporate safe pedestrian and bicycle facilities in roadway capacity improvement and rehabilitation projects.

Policy: Provide viable transportation choices.

Strategies:

Integrate bicycling into mainstream transportation models and modeling, including a cost benefit analysis of bicycle facilities.

Remove barriers to walking and bicycling

Educate California's youth on the health and air quality benefits of making trips by bicycle or foot.

Goal: Enhance Public Safety and Security.

Policy: Improve system and user safety.

Strategy:

Increase education and outreach programs that address safe transportation behavior, including drivers training, awareness of pedestrians and bicyclists, safe biking practices, and truck driver training.

B.4 Federal Plans and Policies

B.4.1 US DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, 2010

The United States Department of Transportation (US DOT) issued this Policy Statement to support and encourage transportation agencies at all levels to establish well-connected walking and bicycling networks. The following Policy Statement and actions are relevant to the Turlock Active Transportation Plan.

Policy Statement

The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide – including health, safety, environmental, transportation, and quality of life – transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes.

Recommended Actions

The DOT encourages States, local governments, professional associations, community organizations, public transportation agencies, and other government agencies, to adopt similar policy statements on bicycle and pedestrian accommodation as an indication of their commitment to accommodating bicyclists and pedestrians as an integral element of the transportation system. In support of this commitment, transportation agencies and local communities should go beyond minimum design standards and requirements to create safe, attractive, sustainable, accessible, and convenient bicycling and walking networks. Such actions should include:

- Considering walking and bicycling as equals with other transportation modes: The primary goal of a transportation system is to safely and efficiently move people and goods. Walking and bicycling are efficient transportation modes for most short trips and, where convenient intermodal systems exist, these nonmotorized trips can easily be linked with transit to significantly increase trip distance. Because of the benefits they provide, transportation agencies should give the same priority to walking and bicycling as is given to other transportation modes. Walking and bicycling should not be an afterthought in roadway design.
- Ensuring that there are transportation choices for people of all ages and abilities, especially children: Pedestrian and bicycle facilities should meet accessibility requirements and provide safe, convenient, and interconnected transportation networks. For example, children should have safe and convenient options for walking or bicycling to school and parks. People who cannot or prefer not to drive should have safe and efficient transportation choices.
- Going beyond minimum design standards: Transportation agencies are encouraged, when possible, to avoid designing walking and bicycling facilities to the minimum standards. For example, shared-use paths that have been designed to minimum width requirements will need

retrofits as more people use them. It is more effective to plan for increased usage than to retrofit an older facility. Planning projects for the long-term should anticipate likely future demand for bicycling and walking facilities and not preclude the provision of future improvements.

- Integrating bicycle and pedestrian accommodation on new, rehabilitated, and limited-access bridges: DOT encourages bicycle and pedestrian accommodation on bridge projects including facilities on limited-access bridges with connections to streets or paths.
- Collecting data on walking and biking trips: The best way to improve transportation networks for any mode is to collect and analyze trip data to optimize investments. Walking and bicycling trip data for many communities are lacking. This data gap can be overcome by establishing routine collection of nonmotorized trip information. Communities that routinely collect walking and bicycling data are able to track trends and prioritize investments to ensure the success of new facilities. These data are also valuable in linking walking and bicycling with transit.
- Setting mode share targets for walking and bicycling and tracking them over time: A byproduct of improved data collection is that communities can establish targets for increasing the percentage of trips made by walking and bicycling.
- Improving nonmotorized facilities during maintenance projects: Many transportation agencies spend most of their transportation funding on maintenance rather than on constructing new facilities. Transportation agencies should find ways to make facility improvements for pedestrians and bicyclists during resurfacing and other maintenance projects.

This page intentionally left blank.

Appendix C: Significant Capital Improvement Projects in 2014

Table C-1: Significant Capital Improvement Projects in 2014

City Project No.	Description	Est. Start of Construction
0763	**Monte Vista Ave./Colorado Ave.** – Install traffic signal, intersection widening, & reconstruction/rehabilitation of pavement, new striping, safety lighting.	April/May
11-48	**N. Golden State Boulevard/Dels Ln.** – Install traffic signal, rehab of pavement, new striping, safety lighting.	March/April
13-34	**Christoffersen Pkwy./Fosberg Rd.** – Install traffic signal, pre-emption conduit/cables between N. Olive Ave. & Geer Rd., new striping & safety lighting.	July/August
13-49	**Dianne Dr./Fulkerth Rd.** – Install traffic signal, realign roadway, new frontage improvements.	July/August
12-45	**Monte Vista Ave. (Crowell Rd. to Geer Rd.)** – Road rehabilitation project with new striping, new signal loops, ramp upgrades, sign upgrades.	March/April
12-35	**Colorado Ave. (Main to Canal), Main St. (Canal to Berkeley), and Fulkerth Road (Fransil to Countryside)** – Road rehabilitation project with new striping, new signal loops, ramp upgrades, sign upgrades.	July/August
13-62	**Hawkeye Ave. (Dels Ln. to N. Olive Rd.)** – Road rehabilitation project with new striping, new signal loops, ramp upgrades, sign upgrades.	August/ September
13-63	**Geer Rd. (Monte Vista Ave. to Taylor Rd.)** – Road rehabilitation project with new striping, new signal loops, ramp upgrades, sign upgrades, bike lane installation.	August/ September
11-58	**E. Main Street (S. of Canal Dr.)** – Waterline replacement with paving work, new striping.	Spring/ Summer
12-49	**N. Walnut Rd. (Christoffersen Pkwy. to Winter Haven Dr.)** – Install landscaped median island with fence.	June/July
12-53	**Crowell Rd. at Bittern Way and CSUS entrance** – Construct upgraded crosswalks with pedestrian bulb outs & solar-powered, push-button activated flashing lights on 1A poles.	June/July
13-44	**Fourth St. alley (next to Peterson's Garage)** – Replace underground wet utilities in alley, install new storm drain facilities.	Spring/ Summer

Additional significant capital improvement projects in future years:

1. Install traffic signal at Taylor Rd./N. Walnut Rd.
2. Install traffic signal at W. Main St./S. Tegner Rd.
3. Install traffic signal at N. Olive Ave./Wayside Dr.
4. Upgrade to signal, travel lanes, sidewalks, and RR crossing at N. Golden State Blvd./Fulkerth Rd.
5. Road rehabilitation of Monte Vista Ave. (Geer Rd. to 300' East of Amethyst)
6. Road rehabilitation of Lander Ave. (South Ave. to E. Glenwood Ave.)
7. Road rehabilitation of Hawkeye Ave. (N. Olive Ave. to Daubenberger Rd.)

This page intentionally left blank.

Appendix D: American Community Survey Data

All data is from the American Community Survey 5-year estimates (2008-2012). Data was downloaded on March 18, 2014.

Table D-1: Means of Transportation to Work - Turlock

Means of Transportation to Work - Turlock		
	Estimate	Margin of Error
Total:	27,542	+/–919
Car, truck, or van:	25,398	+/–933
Drove alone	22,554	+/–933
Carpooled	2,844	+/–412
Public Transportation (excluding taxicab)	89	+/–69
Taxicab	0	+/–30
Motorcycle	47	+/–42
Bicycle	213	+/–110
Walked	552	+/–184
Other Means	113	+/–57
Worked at Home	1,130	+/–247

Table D-2: Means of Transportation to Work – County and State

Means of Transportation to Work - County and State				
	California		Stanislaus County	
	Estimate	Margin of Error	Estimate	Margin of Error
Total:	16,282,943	+/–22,120	198,002	+/–1,765
Car, truck, or van	13,772,327	+/–23,789	179,936	+/–1,814
Drove alone	11,894,644	+/–20,155	157,597	+/–1,685
Carpooled	1,877,683	+/–15,054	22,339	+/–1,106
Public transportation (excluding taxicab)	837,820	+/–7,570	1,807	+/–347
Bicycle	169,860	+/–3,000	1,319	+/–276
Walked	449,779	+/–5,748	3,861	+/–474
Motorcycle	56,270	+/–1,704	514	+/–131
Taxicab	6,899	+/–598	0	+/–30
Other means	150,828	+/–3,719	1,914	+/–317
Worked at home	839,160	+/–7,430	8,651	+/–687

This page intentionally left blank.

Appendix E: Outreach

A Citizen Advisory Team was convened to provide input on challenges and opportunities to improve walking and bicycling in Turlock, and to review project deliverables throughout the planning process. The group met three times during the development of the plan: on April 2 and November 12, 2014, and on April 27, 2015.

Public workshops were also held on April 5, 2014, and January 14, 2015. The January 2015 workshop solicited input from the community on draft infrastructure recommendations. The draft plan was also published on the City website, and residents were invited to submit comments online. The following table presents feedback received.

Context or Location	Comment
Crowell Road from Christoffersen Parkway to Monte Vista Avenue	The entire length of Crowell along the university needs a dedicated bike lane. It's very dangerous and it's necessary to connect so many to getting to work and class. There also needs to be a 3 way stop or light and crosswalks where Ansel Adams rd intersects with Crowell. Extremely dangerous situation there.
Walnut Road from Christoffersen Parkway to Winter Haven Drive	Referring to existing Class I: This is not a Class I between Winter Haven and Christoffersen. Class II on that part.
Canal Drive from Golden State Boulevard to Geer Road	This needs to be a Class II or Class IV. High Priority! 1. On the north side of the street going west, there are parked cars (and sometimes semis) requiring bicyclists to move into traffic that for the most part is trying to turn right so there is a shuffle of lanes and cyclists are in the middle. 2. The dedicated right turn lane has to be crossed by bicyclists. Major bike/car conflict. 3. North of road is a frontage road that is not used and could be made into a Class IV
Class II on Christoffersen Parkway from Golden State Boulevard to Wellington Lane (GP-18)	Students access schools. Major E-W bikeway. Already approved; many intersections have curbing that prohibits space for bike infrastructure. The speed of cars requires better signage & road markings to lessen bike-car conflicts at intersections.
Class II on Lander Avenue from Main Street to Linwood Avenue (ATP-6)	Students (university & elementary/junior high) use this as access to school. Narrow road, parking on both sides. Very needed for students' safety, though it would be controversial bc of removal of parking.
Class II on Golf Road from Golden State Boulevard to Glenwood Avenue (GP-27A)	Access for lower income residents to the rest of Turlock. Currently no sidewalk, curbing, narrow roads.
Class II on Soderquist Road to complete gap on west side north of Canal Drive (ATP-9)	Many commuters & lower income people use this road for biking. Parking removal would be controversial, Cost would be high. I would love to see a Class IV on this stretch. Street is wide enough.
Class II on Main Street from Canal Drive to Berkeley Avenue (GP-34)	I don't agree that this is needed. Slow moving traffic, recently repaved.
Class III on Main Street from Soderquist Road to Palm Street (GP-57)	Good signage could make this a good alternative to Monte Vista
Intersection improvements at Main Street and Canal Drive (ATP-29)	Longer signal times needed. Massive intersection.
Geer Road from Christoffersen Parkway	Geer Road used for shopping (highly). Should be priority.

Context or Location	Comment
to Canal Drive	
Intersection of Christoffersen Parkway and Crowell Road	Should be a priority.
Crowell Road from Ansel Adams Road to Monte Vista Avenue	Priority.
Class I path along Walnut Road from Christoffersen Parkway to Monte Vista Avenue	Maybe doesn't exist.
Crowell Elementary School	Need to ride on Geer but always afraid.
Movie Theatre complex at W Main Street and Kilroy Road	Big need for bike parking. Huge parking lot, nothing for biking there.
Crowell Road from Monte Vista Avenue to Tuolumne Road, Existing Class II	Clearer markings or signs
Global	My issue is not any particular road, but that underground metal detectors do not work, or bike-crossing buttons are nonexistent or crosswalk buttons are not accessible from the road. This makes crossing roads on bikes take a long time.
Intersection improvements at Main Street and Canal Drive (ATP-29)	Improve lighting + control of crosswalk. Beacon or brighter signs. Narrower bike lane – cars use it for travel lane. Bike lane needs to be painted more clearly. Cars are using it for a lane.
Main Street; Downtown	More bike racks, especially near farmer's market and near restaurants.
Main Street and Palm Street, Thor Street, Center Street	There is no crosswalk signal at these crosswalks, so pedestrians do not know when to cross, only a green light.
Monte Vista Avenue and Geer Road	Lots of waiting for light to cross intersection
Monte Vista Avenue from Geer Road to Olive Avenue	Avoid return route in the late afternoon. I take Berkeley TO campus and Hedstrom HOME. Maybe more lighting?
Class II on Christoffersen Parkway from Golden State Boulevard to Wellington Lane (GP-18)	We need access to campus from the <u>north</u> of Christoffersen. There is no safe route on Crowell – too narrow, very <u>dense</u> housing. Crowell will become a thoroughfare but is a bottleneck.
Class II on Golden State Boulevard from Hawkeye Avenue to F Street (GP-26B)	Larger & wider bike lane. Speed limit may make it a challenge to encourage children to bike to school.
Class III on Main Street from Soderquist Road to Palm Street (GP-57)	Cars parked on road limit space.
Class II on Christoffersen Parkway from Golden State Boulevard to Wellington Lane (GP-18)	I think Class IV is so much safer with 5 schools on this corridor!
Class II on Monte Vista Avenue from Geer Road to Olive Avenue (GP-36)	Connects commerce & university with residential. Traffic moves quickly – is a lane safe enough?
Global	No signs to watch out for pedestrians & bikes (yield right of way) signs throughout the main streets!
Christoffersen Parkway between Geer Road and Crowell Road	Need midblock crossing
Class II on Soderquist Road from Main Street to South Avenue (GP-42)	Sidewalks. Not safe. Fairgrounds parking fee could provide some $$ for bike & ped improvements benefitting both the city & the fairgrounds.
Intersection improvements at Main Street and Canal Drive (ATP-29)	Add a path on the park side of Main between Minaret & Canal. While filling in potholes you could add a bike lane & a sign that says "Watch for bicyclists"

Context or Location	Comment
Geer Road from Monte Vista to Christoffersen	Need bike path. Just paint a path. Not a difficult or costly endeavor. It's merely an extension of the path coming about 50 feet from Monte Vista.
Soderquist Road near Osborn Elementary School	Need dedicated bike/ped on Soderquist in front of Osborn (Flower to Main)
Broadway, Tuolumne, and Canal Drive	No path & 80% no sidewalks from Broadway to Tuolumne Road, & W Canal Drive cross streets
Montana Avenue from West Ave to Lander Ave	Need connections
South Ave from Soderquist Road to West Ave	Bike paths end
Soderquist Road north of Canal Drive	Cut through park
Golden State Boulevard near Front Street	Tricky when crowded

This page intentionally left blank.

Appendix F: General Plan Bikeway Recommendations

Priority projects, highlighted in red, are intended for implementation within one to five years. Other projects may require further study and are intended for implementation within five to ten years.

Table F-1: General Plan Bikeway Recommendations

ID#	Class	Corridor	Begin	End
GP-1	Class I	(halfway between East Avenue and Brier Road)	650 feet east of Berkeley Avenue	1300 feet east of Daubenberger Road
GP-2	Class I	(unnamed, between Daubenberger Road and Verduga Road)	Hawkeye Avenue	Linwood Avenue (1300 feet north)
GP-3A	Class I	1000 feet east of Quincy Road	Linwood Avenue	Brier Road
GP-3B	Class I	Projection of Brier Road	Daubenberger Road	1300 feet east of Daubenberger Road
GP-4	Class I	Canal Drive	Washington Road	1300 feet east of Clinton Road
GP-5	Class I	Canal Drive	Fransil Road	Walnut Road
GP-6	Class I	Canal Drive	Daubenberger Road	(W edge of map)
GP-7	Class I	Future Expressway Alignment	Christoffersen Parkway	Verduga Road
GP-8	Class I	Geer Road	Christoffersen Parkway	Calaveras Way
GP-9	Class I	Projection of Quincy Street	East Avenue	1300 feet south of East Avenue
GP-10	Class I	Taylor Road	End of existing path, 650 feet west of Geer Road	Fosberg Road
GP-11	Class I	Tegner Road	Sandstone Street	Christoffersen Parkway
GP-12	Class II	(future projection of Merritt Road)	Johnson Road	Quincy Road
GP-13	Class II	(future road alignment 1300 feet west of Golf Road)	Glenwood Avenue	(future road alignment)
GP-14	Class II	(future road alignment)	Glenwood Avenue	Golf Road
GP-15	Class II	(unnamed, between Daubenberger Road and Verduga Road)	Linwood Avenue (1300 feet north)	Linwood Avenue
GP-16	Class II	Berkeley Avenue	Canal Drive	Golden State Boulevard
GP-17	Class II	Canal Drive	Walnut Road	Broadway Avenue
GP-18	Class II	Christoffersen Parkway	Golden State Boulevard	Wellington Lane
GP-19	Class II	Countryside Drive	Sun Valley Court	Hawkeye Avenue
GP-20	Class II	Crowell Road	Christoffersen Parkway	Ansel Adams Boulevard

ID#	Class	Corridor	Begin	End
GP-21	Class II	Daubenberger Road	Hawkeye Avenue	Brier Road
GP-22	Class II	Dianne Drive	Fulkerth Road	Main Street
GP-23	Class II	East Avenue	Berkeley Avenue	1300 feet east of Daubenberger Road
GP-24	Class II	Fulkerth Road	Washington Road	Dianne Drive (gap btwn this and existing?)
GP-25	Class II	Geer Road	Warner Road	Taylor Road
GP-26A	Class II	Golden State Boulevard	(N edge of map)	Christoffersen Parkway
GP-26B	Class II	Golden State Boulevard	Christoffersen Parkway	Monte Vista Avenue
GP-26C	Class II	Golden State Boulevard	Monte Vista Avenue	Hawkeye Avenue
GP-26D	Class II	Golden State Boulevard	Hawkeye Avenue	F Street
GP-26E	Class II	Golden State Boulevard	F Street	SE county line
GP-27A	Class II	Golf Road	Golden State Boulevard	Glenwood Avenue
GP-27B	Class II	Golf Road	Glenwood Avenue	Harding Road
GP-28	Class II	Harding Road	Washington Road	Highway 99
GP-29	Class II	Hawkeye Avenue	Palmer Drive	Waring Road
GP-30	Class II	Johnson Road	Marshall Street	East Avenue
GP-31	Class II	Johnson Road	1300 feet south of East Avenue	Linwood Avenue
GP-32A	Class II	Linwood Avenue	Washington Road	West Avenue
GP-32B	Class II	Linwood Avenue	West Avenue	250 feet east of West Avenue
GP-32C	Class II	Linwood Avenue	1,230 feet west of Lander Avenue	Lander Avenue
GP-33	Class II	Linwood Avenue	450 feet west of 5th Street	1300 feet east of Daubenberger Road
GP-34	Class II	Main Street	Canal Drive	Berkeley Avenue
GP-35A	Class II	Main Street	Washington Road	Walnut Road
GP-35B	Class II	Main Street	Walnut Road	Soderquist Road
GP-36	Class II	Monte Vista Avenue	Geer Road	Olive Avenue
GP-37	Class II	Monte Vista Avenue	Berkeley Avenue	Future expressway alignment
GP-38	Class II	Mountain View Road	Sandstone Street	Christoffersen Parkway
GP-39	Class II	Olive Avenue	Christoffersen Parkway	Canal Drive
GP-40	Class II	Quincy Road	Monte Vista Avenue	Tuolumne Road
GP-41	Class II	Quincy Road	Oppelt Way	East Avenue

ID#	Class	Corridor	Begin	End
GP-42	Class II	Soderquist Road	Main Street	South Avenue
GP-43	Class II	South Avenue	Tully Road	Orange Avenue
GP-44	Class II	Taylor Road	Washington Road	Tegner Road
GP-45	Class II	Tegner Road	Fulkerth Road	Linwood Avenue
GP-46	Class II	Tully Road	Canal Drive	Porter Way
GP-47	Class II	Tully Road	Main Street	South Avenue
GP-48	Class II	Tully Road	Hawkeye Avenue	Cody Court
GP-49	Class II	Tuolumne Road	Washington Road	Countryside Drive
GP-50	Class II	Tuolumne Road	Daubenberger Road	Waring Road
GP-51	Class II	Walnut Road	Canal Drive	(unnamed, connection between Walnut Road and Tully Road under Hwy 99)
GP-52	Class II	Waring Road	Monte Vista Avenue	Hawkeye Avenue
GP-53	Class II	Washington Road	Taylor Road	Harding Road
GP-54	Class II	West Avenue	South Avenue	Montana Avenue
GP-55	Class III	Fullerton Drive	Geer Road	Olive Avenue
GP-56	Class III	Tuolumne Road	Dels Lane	Berkeley Avenue
GP-57	Class III	Main Street	Soderquist Road	Palm Street
GP-58	Class III	Palm Street	Main Street	Olive Avenue
GP-59	Class III	Broadway Street	Flower Street	E Street
GP-60	Class III	East Avenue	Olive Avenue	Berkeley Avenue
GP-61A	Class III	Hartwick Avenue	Olive Avenue	Colorado Avenue
GP-61B	Class III	Colorado Avenue	Hartwick Avenue	Burman Drive
GP-61C	Class III	Burman Drive	Colorado Avenue	Berkeley Avenue
GP-62A	Class III	Georgetown Avenue	Dels Lane	Andre Lane
GP-62B	Class III	Andre Lane	Tampa Street	Georgetown Avenue
GP-62C	Class III	Tampa Street	Andre Lane	Niagra Street
GP-62D	Class III	Niagra Street	Tampa Street	Regis Street
GP-62E	Class III	Regis Street	Niagra Street	Geer Road
GP-62F	Class III	Geer Road	Hedstrom Road	Regis Street

ID#	Class	Corridor	Begin	End
GP-62G	Class III	Hedstrom Road	Geer Road	Colorado Avenue
GP-62H	Class III	Heathernoel Road	Colorado Avenue	Berkeley Avenue
GP-63	Class III	Geer Road	(edge of map)	Warner Road
GP-64A	Class III	A Street	Lander Avenue	1st Street
GP-64B	Class III	Marshall Street	1st Street	Minaret Avenue
GP-65A	Class III	Lander Avenue	Main Street	5th Street
GP-65B	Class III	5th Street	Lander Avenue	Glenwood Avenue
GP-66A	Class III	Baywood Lane	Linwood Avenue	Glenwood Avenue
GP-66B	Class III	Glenwood Avenue	Baywood Lane	Golf Road
GP-67A	Class III	Kilroy Road	Paseo del Sol	Roberts Road
GP-67B	Class III	Roberts Road	Kilroy Road	Seasons Park Drive
GP-67C	Class III	Seasons Park Drive	Roberts Road	Winter Haven Drive
GP-67D	Class III	Winter Haven Drive	Seasons Park Drive	Walnut Road

Highlighted rows indicate priority projects.

Class III routes on multiple streets that create a cohesive link are indicated by project ID numbers that finish with a letter. For example, project numbers GP-61A, GP-61B, and GP-61C form a connected route and should be implemented as a whole.

Appendix G: Bike Rodeos

G.1 Introduction

As part of the Turlock Active Transportation Plan, Alta Planning + Design organized and conducted bike rodeos at Julien, Earl, Crowell, and Medeiros Elementary Schools during May 12, 2014 through May 15, 2014. Alta reached out to school principals and vice principals to gauge interest and selected the four schools based on geographic distribution.

To promote the rodeos, the four schools sent flyers home with each student via backpack mail. Children brought their own bicycles and helmets, and required the signature of a parent or guardian to participate.

G.2 Curriculum

The rodeos followed the League of American Bicyclist's curriculum for children, titled Smart Cycling: Bicycling Skills 123. The curriculum included the first four stations of Bicycling Skills 123: starting and stopping, hazard avoidance, scanning and signaling, and turning and yielding. Instructors slightly modified the courses of each rodeo based on available space at the schools. The rodeos also included helmet fitting, bike safety checks, and an activity and helmet decorating station. Students and their parents/guardians received instruction on proper helmet fitting and a trained mechanic provided minor bicycle repairs prior to children entering the skills courses. If children finished the courses or needed a break, they could visit the activity station to complete bike safety-related crossword puzzles and worksheets, and decorate their helmets with stickers.

G.3 Volunteers and Instructors

City, School District, and Alta staff, as well as local advocates and Police Department representatives, served as volunteers and instructors at the rodeos. Prior to teaching, instructors viewed a 10 minute recorded online training that outlined the roles of each station. The training can be viewed at: www.anymeeting.com/613-179-915/EF57DF858547. In the event that volunteers or instructors were unable to view the online training, they received in person volunteer packets with a site layout, instructions on how to set up each station, and a copy of the rodeo layout from the League of American Bicyclists curriculum. The rodeo organizer, a League of American Bicyclists Certified Instructor (LCI) provided guidance and direction to volunteers and instructors on the day of the event. At least 10 volunteers attended each rodeo, providing a comfortable level of support.

G.4 Bike Rodeos

The table below outlines when and where each rodeo took place, and how many students attended, which decreased each day. The decline in students may have been a result of the increase in temperatures throughout the week.

Julien Elementary School	Earl Elementary School	Crowell Elementary School	Medeiros Elementary School
1924 E. Canal Drive	4091 N. Olive Avenue	118 North Avenue	651 W Springer Drive
May 12, 2014	May 13, 2014	May 14, 2014	May 15, 2014
21 students	18 students	17 students	12 students

G.5 Recommendations for Future Rodeos

When implementing rodeos in the future, the City of Turlock should consider the following successes and tasks that could be improved upon.

Rodeo coordinators should arrive one hour prior to the start of the rodeos to check in with the school and set up the courses. Some school secretaries were not aware that the rodeos would be happening or familiar with the space requirements. Providing an hour allowed rodeo coordinators enough time to address any issues and complete the set up process.

New volunteers should be asked to arrive 30 minutes prior to the rodeos starting to go through any necessary training. Volunteers that have participated in the City of Turlock's rodeos before (for example, they went to the Monday rodeo and were also volunteering on Tuesday) only need to arrive 10 minutes prior to the start of the rodeo.

The City should continue to provide a recorded online volunteer training to accommodate the varying schedules of volunteers and to minimize expenses associated with in-person trainings.

The City of Turlock should work with local organizations, such as bicycle advocacy groups, health non-profits, and Cal State Stanislaus student groups, to provide volunteers. Local coordination is more efficient as City staff is familiar with existing organizations and can offer in-person communication.

At the May 2014 rodeos, students were required to bring a parent with them to sign a waiver to participate. To provide an option for students whose parents cannot attend, the City should consider also sending the waiver home with the students prior to the rodeos so that students may bring the signed forms with them on the day of the event. To save resources, the waiver could be printed on the back of the flyer advertising the rodeos, provided in the office, or available for download on the City's website. Flyers should also be made available to other schools in the district to offer those students the chance to participate.

The City should consider hosting rodeos on Saturdays to minimize resources needed and to provide an option for families with after school commitments. The City could also work with local bike shops or organizations to provide a fleet of bicycles and helmets to allow students without to participate.

Safe Routes to School in Turlock

Part of the City of Turlock Active Transportation Plan

September 2014

Revised February 2015

Quality Assurance Statement		
Alta Planning + Design 129 L Street Sacramento CA 95814 www.altaplanning.com	Prepared by	Emily Tracy (Alta) and Daniel Kehrer (Omni)
	Project Manager	John Lieswyn
	Reviewed by	Brett Hondorp
	Project title	City of Turlock Active Transportation Plan
	Document title	Safe Routes to School in Turlock
	Client	Rose Stillo, City of Turlock
	Project Number	City of Turlock: 13-64 Alta:2014-028

Document Revision Schedule			
Rev. No.	**Date**	**Title**	**Description**
1	6/3/2014	Internal Draft	For principal review
2	9/26/2014	Final Draft	Reviewed by Marty Inouye
3	9/30/2014	Final Draft	For city review and approval
4	2/10/2015	Final Draft	Incorporating School District feedback; for city review & approval

Table of Contents

THIS PAGE INTENTIONALLY BLANK

1 Introduction

As part of the Turlock Active Transportation Plan, the project team has conducted Safe Routes to School infrastructure focused audits throughout the city. Those audits and the findings presented in this report are only one part of the equation. Accordingly, this report presents an overview of Safe Routes to School that may be used by schools, parents, the school district, and the City to support healthy travel to school and address congestion and safety at the school gate. This report can be used in the following ways:

Parents can use this report to understand the conditions at their children's school and to become familiar with the ways a SRTS program can work to make walking and biking safer. Concerned parents or city residents have a very important role in the Safe Routes to School process. Parent groups, both formal and informal have the ability and the responsibility to help implement many of the educational and encouragement programs suggested in this plan. Parent groups can also be critical to ongoing success by helping to fundraise for smaller projects and programs that are implementable without serious effort on behalf of the district or local agency.

School district and school administrative staff can use this report to prioritize improvements identified on District property and develop programs that educate and encourage students and parents to seek alternatives to single family vehicle commutes to school. District officials are perhaps the most stable of the stakeholders for a Safe Routes to School program and have the responsibility for keeping the program active over time. District staff can work with multiple schools sharing information and bringing efficiencies to programs at each school working on Safe Routes.

School Administrators can help with making policy and procedural changes to projects that are within school grounds and have the responsibility to distribute informational materials to parents within school publications.

City staff can use this report to identify citywide issues and opportunities related to walking and biking and to prioritize infrastructure improvements. City staff can also use this report to support Safe Routes to School funding applications to the state Active Transportation Program. For all infrastructure recommendations, a traffic study and more detailed engineering will be necessary to evaluate project feasibility, and additional public outreach may be required before final design and construction. For recommendations within the public right-of-way, the City will determine how (and if) to incorporate suggestions into local improvement plans and prioritize funding to best meet the needs of each school community.

Police Department staff can use this report to understand issues related to walking and biking to school and to plan for and prioritize enforcement activities that may make it easier and safer for students to walk and bike to school. The Police Department will also have a key role in working with school administration in providing officers and assistance to some of the proposed education and encouragement programs.

Public health staff can use this report to identify specific opportunities to collaborate with schools and the City to support safety improvements and encourage healthy behaviors in school children and their families.

2 A Primer on Safe Routes to School

2.1 What is Safe Routes to School?

Safe Routes to School (SRTS)[1] is a program with a simple goal: helping more children get to school by walking and bicycling. Envision active kids using safe streets, helped by engaged adults (from teachers to parents to police officers), surrounded by responsible drivers.

Safe Routes to School programs use a variety of strategies to make it easy, fun and safe for children to walk and bike to school. These strategies are often called the "Five Es."

- Education: programs designed to teach children about traffic safety, bicycle and pedestrian skills, and traffic decision-making.
- Encouragement: programs that make it fun for kids to walk and bike. These programs may be challenges, incentive programs, regular events (e.g. "Walk and Bike Wednesdays") or classroom activities.
- Engineering: physical projects that are built to improve walking and bicycling conditions.
- Enforcement: law enforcement strategies to improve driver behavior near schools.
- Evaluation: strategies to help understand program effectiveness, identify improvements, and ensure program sustainability.

Figure 1: Riding on Crowell Road near Brown Elementary School: students of all ages can bike to school with the right training, support, and infrastructure.

[1] Safe Routes to School is known by two acronyms in California: SRTS refers to federally funded and national programs, and SR2S refers to state funded programs.

2.2 Benefits of Walking and Bicycling to School

Safe Routes to Schools programs directly benefit schoolchildren, parents and teachers by creating a safer travel environment near schools and by reducing motor vehicle congestion at school drop-off and pick-up zones. Students that choose to bike or walk to school are rewarded with the health benefits of a more active lifestyle, with the responsibility and independence that comes from being in charge of the way they travel, and learn at an early age that biking and walking can be safe, enjoyable and good for the environment.

Safe Routes to Schools programs offer ancillary benefits to neighborhoods by helping to slow traffic and by providing infrastructure improvements that facilitate biking and walking for everyone. Identifying and improving routes for children to safely walk and bicycle to school is also one of the most cost-effective means of reducing weekday morning traffic congestion and can help reduce auto-related pollution.

In addition to safety and traffic improvements, a SR2S program helps integrate physical activity into the everyday routine of school children. Health concerns related to sedentary lifestyles have become the focus of statewide and national efforts to reduce health risks associated with being overweight. Walking or bicycling to school is an easy way to make sure that children get daily physical activity.

SRTS benefits children:

- Increased physical fitness and cardiovascular health
- Increased ability to focus on school
- A sense of independence and confidence about their transportation and their neighborhood

SRTS benefits neighborhoods:

- Improved air quality as fewer children are driven to school
- Decreased crashes and congestion as fewer children are driven to school
- More community involvement as parents, teachers and neighbors get involved and put "eyes on the street"

SRTS benefits schools:

- Fewer discipline problems because children arrive "ready to learn"
- Fewer private cars arriving to drop off and pick up children
- Opportunities to integrate walking, bicycling and transportation topics into curriculum
- Increased efficiency and safety during drop off and pick up times

2.3 Why is a Safe Routes to School Program Important?

Background

Although most students in the United States walked or biked to school pre-1980's, the number of students walking or bicycling to school has sharply declined. Statistics show that 48 percent of students between 5 and 18 years of age walked to school in 1969, with 87 percent walking or bicycling within a mile of school. In 2009 fewer than 14 percent of all students walked to get to school[2]. This decline is due to a number of factors, including urban growth patterns and school siting requirements that encourage school development in outlying areas, increased traffic, and parental concerns about safety. The situation is self-perpetuating: As more parents drive their children to school, there is increased traffic at the school site, resulting in more parents becoming concerned about traffic and driving their children to school.

According to a 2005 survey by the Center for Disease Control, parents whose children did not walk or bike to school cited the following barriers:

- Distance to school 61.5%
- Traffic-related danger 30.4%
- Weather 18.6%
- Crime danger 11.7 %
- Prohibitive school policy 6.0%
- Other reasons (not identified) 15.0%

A comprehensive Safe Routes to School program addresses the reasons for reductions in walking and biking through a multi-pronged approach that uses education, encouragement, engineering and enforcement efforts to develop attitudes, behaviors and physical infrastructure that improve the walking and biking environment.

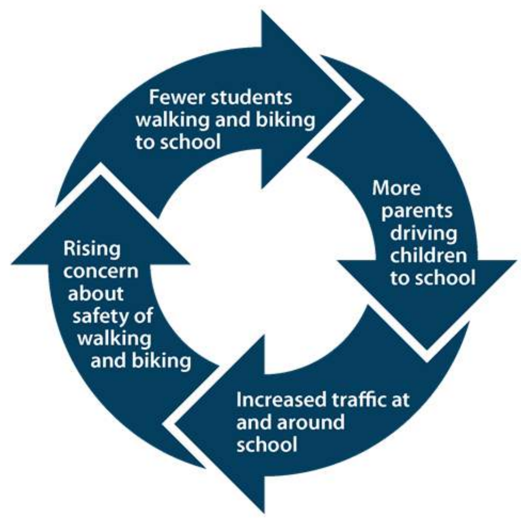


Figure 2: The downward cycle of traffic and reduced walking and bicycling

Figure 3: Crossing guards note that turning motorists often do not yield to students near Osborn Elementary School

[2] National Safe Routes Partnership, 2009

Target Audience: Middle School Students

Middle school students are a great audience for a Safe Routes to School program, because they have more developed cognitive ability than elementary school students, allowing them to judge unsafe conditions and understand why they need to exhibit safe behavior. Children this age are also likely to have a more comprehensive understanding of road rules and have the peripheral vision development to judge the speed of cars. Further, middle school students have an expanded awareness of social, cultural, and environmental issues and are more likely to understand the values of walking and bicycling.

Planning educational and encouragement activities for middle school students presents opportunities and challenges. This age group is seeking and gaining more independence, but is vulnerable to self-consciousness and peer pressure. Bicycling and walking are viable options for many children this age and may help provide their sought-after independence, but children may perceive walking and bicycling to school as "uncool" or they may be concerned about gaining peer approval. Fortunately for Turlock, biking to school is already a popular activity, and encouragement and education programs can build on this positive behavior.

The success of educational and encouragement programs lies in providing middle school students with opportunities for self-expression, hands-on learning, and playing a role in the implementation of their own Safe Routes to School programs. Students can design and create outreach materials, coordinate logistics for assemblies or publicity campaigns, and use technology and other skills to understand and share their understanding of the value of walking and bicycling.

Potential Programs

The following is a sample of possible programs. More ideas are available on the National Safe Routes to School Partnership website. For each program concept, the recommendation includes the primary intended outcomes, potential lead and partners, a recommended timeframe for implementation, resources and sample programs, and a short description.

Successful programs typically have the backing of a Safe Routes to School Coordinator for each school, who can be an administrator, teacher, or parent volunteer.

2.4 International Walk and Bike to School Day

Primary Outcomes	Increased walking and bicycling; youth empowerment
Potential Lead	Safe Routes to School Coordinator; teachers, administrators, and/or staff
Potential Partners	Teachers/administrators/staff; PTA/parents; TUSD, Stanislaus County Health Services, Turlock Police Department; City of Turlock
Timeframe	Annually on or around International Walk and Bike to School Day in October
Planning Resources	International Walk to School: http://www.iwalktoschool.org/ Walk Bike to School: http://www.walkbiketoschool.org/
Sample Program	Sonoma County Safe Routes To School Day: http://www.sonomasaferoutes.org/

Walk and Bike to School Day is an international event that attracts millions of participants in over 30 countries in October of each year. The event encourages students and their families to try walking or bicycling to school. Parents and other adults accompany students, and staging areas can be designated along the route to school where groups can gather and walk or bike together. These events can be held for one or more days.

Walk and Bike to School Day events are often promoted through press releases, backpack /folder/electronic mail, newsletter articles, and posters.

Figure 4: International Walk to School Day draws large numbers of students and families to walk to school

Incentives

Students often earn incentives for participating, such as healthy snacks, buttons, or stickers. The event planning team can work with local businesses, such as grocery stores, to provide donations to students participating in the events. There can also be a celebration at school following the morning event, such as an awards ceremony, lunch time party, or a raffle. Some schools have recruited “celebrity” walk leaders, such as local high school football team members, the mayor, police officers, etc. This can greatly increase participation.

Walking School Buses and Walkpools

Elementary age children are usually willing to walk to school with parents (whether informally or in an organized “Walking School Bus”). Middle school age children prefer independence from their parents. To address parental concerns about personal security, students can be encouraged to meet up with fellow students on their block and walk together in a “Walkpool” (instead of “carpool”).

2.5 "Open Your Front Door" Walk and Bike to School Maps

Primary Outcome	Improved walking and bicycling safety; increased walking and bicycling
Potential Lead	City of Turlock Planning Department
Potential Partners	Teachers/administrators/staff; PTA/parents; TUSD, Stanislaus County Health Services, Turlock Police Department
Timeframe	Distribute when students and families are adjusting to new habits, e.g., back-to-school, following winter/spring break, as weather gets warmer. Revise and redistribute annually, if possible.
Planning Resources	National Center for Safe Routes to School's Map-a-Route Tool: http://maps.walkbiketoschool.org/
Sample Maps	Bozeman, MT: http://www.bozeman.k12.mt.us/schools/safe_routes/ Santa Clarita, CA: http://www.santa-clarita.com/index.aspx?page=177 Rochester, NY: http://www.walkinginfo.org/pedsafe/casestudy.cfm?CS_NUM=33

One obstacle currently keeping kids from walking or biking is the perceived notion by parents that it takes too much time or is too dangerous. In truth, a high percentage of students live within two miles of their school (or shuttle school), and most streets and sidewalks near schools are safe for walking and biking. The "Open Your Front Door" maps will start to break down those perceptions by showing preferred routes through neighborhoods; distance and average travel time by foot and by bike; difficulty level based on the topography; locations of crosswalks, stop signs, and bike racks; and high-traffic areas where extra caution is needed.

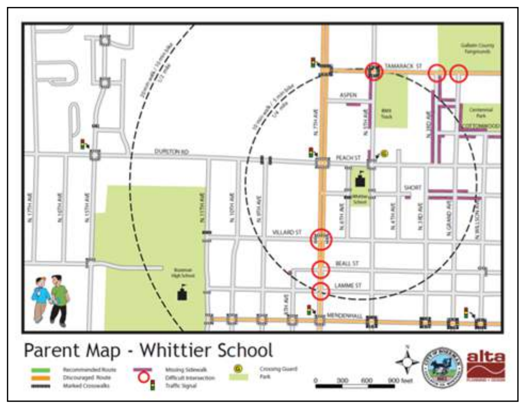


Figure 5: Walk and Bike to School Maps show the safest streets and crossings for getting to school

The Walk and Bike to School Maps may also show park and walk locations, traffic signals, bikeways, paths/trails, school entrances, and crossing guard locations to encourage walking and biking to school. Parent education and encouragement tips can be included on the maps, along with contact information for coordinating a walking school bus. These can be tailored to be directed towards the students themselves as well.

Based on the resources available, the lead agency will determine whether the maps will be distributed electronically or in paper form, as well as how the maps will be produced (e.g., using mapping or drawing technologies, such as GIS or Adobe Illustrator). The lead agency will also address any liability concerns and get approval from the district and administration. Based on any liability constraints, the lead will also determine whether the map will show suggested routes or just factual information that allows families to choose their own routes.

2.6 Law Enforcement: Digital Speed Signs

Primary Outcomes	Improved driving safety behavior
Potential Lead	Turlock Police Department
Potential Partners	City of Turlock Public Works Department
Timeframe	Periodically, perhaps quarterly, beginning at the start of the school year
Planning Resources	Safe Routes to School Online Guide: http://guide.saferoutesinfo.org/enforcement/index.cfm
Sample Programs	Charles County, MD: http://www.ccso.us/index.php?option=com_content&task=view&id=614 Chicago, IL: http://www.cityofchicago.org/city/en/depts/cdot/provdrs/ped/svcs/crosswalk_enforcementinitiatives.html

Enforcement tools are aimed at ensuring compliance with traffic and parking laws in school zones. Enforcement activities help to reduce common poor driving behavior, such as speeding, failing to yield to pedestrians, turning illegally, parking illegally, and other violations. Law enforcement actions include school zone speeding enforcement, crosswalk stings, and other enforcement activities.

Figure 6 Law enforcement efforts near schools, such as mobile speed feedback signs, complement education and encouragement activities

Several school administrators interviewed for this plan listed traffic congestion and traffic that's too fast as top safety issues. This enforcement "wake-up call" would act as a reminder to drivers about safe school-zone driving expectations and potentially a positive media event in an effort to start changing driving behaviors.

2.7 Walking Wednesdays / Park-and-Walk Program

Primary Outcomes	Increase bicycling and walking to school; reduced traffic congestion around schools
Potential Lead	PTA/parents or a Safe Routes to School Coordinator
Potential Partners	Teachers/administrators/staff; PTA/parents; TUSD; Turlock Police Department; City of Turlock Planning Department
Timeframe	Weekly on Wednesdays
Planning Resources	National Center for Safe Routes to School Guide: http://guide.saferoutesinfo.org/encouragement/park_and_walk.cfm
Sample Program	Arborfield, England: http://guide.saferoutesinfo.org/encouragement/park_and_walk.cfm

This program is designed to encourage families to park several blocks from school and walk the rest of the way to school. Not all students are able to walk or bike the whole distance to school; they may live too far away or their route may include hazardous traffic situations. It also helps reduce traffic congestion at the school.

Figure 7: A Park and Walk program engages students who live too far to walk or bike the whole distance to school

The team leading the effort could identify appropriate park-and-walk locations within a quarter mile of the school, typically parking lots that are vacant or underutilized during school drop-off and pick-up times. Once identified, the team could work with property owners to receive permission to use the parking lots for the park-and-walk activities.

On Wednesdays, schools could encourage parents to drop their children at a spot at least a quarter mile from school. To expand the reach, school buses would also drop students off at a park-and-walk location on Wednesdays so those students can walk a quarter mile before school. Parent park-and-walk locations could be recommended on the Open Your Front Door maps, and school bus park-and-walk locations could be designated for the school. Extra crossing guards could be provided to assist with crossing streets within a quarter mile of the school.

2.8 Bicycle Safety Training

Primary Outcomes	Improved bicycling safety behavior; youth empowerment
Potential Lead	City of Turlock Planning Department
Potential Partners	Teachers/administrators/staff; Stanislaus County Health Services Agency; PTA/parents; Turlock Unified District; Turlock Police Department ; League of American Bicyclists Instructors
Timeframe	Once each year for sixth graders (or another grade as decided by the school / program lead)
Planning Resources	National Center for Safe Routes to School Guide: http://guide.saferoutesinfo.org/education/key_messages_for_children.cfm#bicyclist
Sample Program	Oregon Bicycle Safety Curriculum: http://walknbike.org/bike-safety Marin County, CA: http://www.saferoutestoschools.org/curriculum.html

Currently, there is no ongoing program in the City of Turlock that provides bike safety training to students. A series of bike rodeos was held as part of the Turlock Active Transportation Plan development in 2014.

Bicycle safety training is generally most appropriate beginning in or after the third grade and helps children understand that they have the same responsibility as motorists to obey traffic laws. In-school curriculum often includes three parts: in-class lessons, mock street scenarios or skills practice, and on-street riding. Various existing curricula are available online from a number of sources at no cost, or schools may choose to develop one on their own.

Figure 8: In school lessons get students on the same page about safety and riding rules before skills practice

2.9 Kids on the Move! Media Campaign

Primary Outcomes	Increased walking, bicycling, transit, and/or carpooling; improved walking, bicycling, and/or driving safety behavior; health and/or environmental connections; youth empowerment
Potential Lead	Stanislaus County Health Services Agency and/or a Safe Routes to School Coordinator
Potential Partners	Teachers/administrators/staff; PTA/parents; Turlock Unified District; Turlock Police Department ; League of American Bicyclists Instructors
Timeframe	Ongoing/periodic, such as monthly newsletters
Planning Resources	National Center for Safe Routes to School Guide: http://guide.saferoutesinfo.org/media/index.cfm
Sample Programs	Alameda County, CA: http://www.alamedacountysr2s.org/events-and-news/#newsletter Portland, OR: http://www.portlandoregon.gov/transportation/45746

Some Turlock residents still view kids on our streets as irregular. The strongest Safe Routes to School efforts are those that, over time, begin to make change to the community culture by normalizing walking and bicycling. One of the ways to help promote walking and bicycling as normal, everyday activities is to disseminate consistent, ongoing communications to the school and surrounding community. A campaign could include newspaper articles, radio spots, Facebook posts, and videos on YouTube and local access TV. The campaign will give information about the benefits of walking and biking to school and how residents can work as a community to help students feel safe on our streets and sidewalks. Newspaper segments will be fun and eye-catching, while educating residents about benefits, providing quotes from kids about why they love walking and biking to school, and showing ways residents can help students feel safe on our roads.

2.10 Fix a Bike Program / Bike Swap

Primary Outcomes	Encouragement; youth empowerment
Potential Lead	Bicycle shop(s)
Potential Partners	PTA/parents; Stanislaus County Health Services; City of Turlock
Timeframe	Once each year
Planning Resources	Wheels for Winners Program: http://www.wheelsforwinners.org/curriculum.pdf
Sample Program	North Natomas 50 bike for 50 kids: http://northnatomastma.org/bike/50-bikes Davis bike swap: http://www.davisenterprise.com/local-news/briefly/get-ready-for-chavez-bike-swap/

Many children don't own a bike or when it gets a flat tire, parents don't have the skills, time or money to have it repaired. The program could begin as a small pilot in which select middle school students could work with volunteers to learn how to fix donated bikes. Students would be able to keep the first bike they fix; future bikes will go to other students in need. The program could include an education segment in which students learn safety, maintenance, and routes in their neighborhoods. Most importantly, at-risk students can attain bikes, and the "mechanics in training" will gain pride, ownership, mentors, and confidence.

Figure 9:North Natomas 50 bike for 50 kids event

2.11 Evaluation

Why Evaluate?

Evaluation is an important component of any Safe Routes to School effort. Not only does evaluation measure a program's reach and impact on a school community, it can also ensure continued funding and provide a path forward for ongoing and future efforts. Evaluation can measure participation and accomplishments, shifts in travel behavior, changes in attitudes toward biking and walking, awareness of the Safe Routes to School program, and/or the effectiveness of processes or programs.

Safe Routes to School evaluation is beneficial in the following ways:

- To demonstrate the value of continuing your program, with school faculty and administration, the district, parents, and elected officials.
- Provides a record of your efforts to serve as institutional memory, as parents and their children move on to other schools and as staff turns over.
- Confirms if you are accomplishing or working towards what you set out to do or if there is a mismatch in your efforts and your goals necessitating course corrections.
- Encourages continued funding for Safe Routes to School programs. Data collected and shared by local programs can influence decisions at the local, state and national level. In part, today's funding and grant programs exist because of the evaluations of past programs.

Evaluation Basics

At a minimum, SRTS evaluation should include the standard classroom hand tallies and parent surveys expected in order to be consistent with the national Safe Routes to School program. Evaluating the programs can - and should where possible - delve beyond this, but it need not be burdensome. Evaluating the program can be as simple as recording what you did and when you did it, and counting or estimating the number of students who participated or were reached. Recording planning efforts and taking photos is also helpful for the legacy of the program. In most cases, it is beneficial to measure more, such as school travel mode split and/or miles walked/biked, from which the school, district or city can estimate environmental, health, and other impacts.

There are two kinds of information that can be collected: quantitative data (numbers, such as counts, logs, and survey results) and qualitative data (words/images, such as observations, interviews, and records). Further, there are several different ways to collect information. This includes the following:

1. Conducting tallies/counts
2. Keeping logs (such as for mileage tracking)
3. Conducting surveys and interviews
4. Conducting observations and audits
5. Keeping planning and process records

Regardless of how elaborate you make your evaluation, it is important to plan ahead for measuring and tracking results. When you are designing your program, consider how you are going to evaluate it from the beginning, so that you can build in mechanisms for collecting the necessary data. For example, if showing changes in travel behavior over time is important to your effort, you will need to start by collecting baseline data s you know how students are getting to school currently in order to be able to demonstrate any change later.

Below is a series of basic steps to take in designing and executing your program evaluation:

1. Establish your goals and plan the specific program.
2. Decide what, how, and when to measure.
3. Collect baseline information, if necessary.
4. Conduct the program and monitor progress.
5. Conduct any post-program data collection, if necessary.
6. Interpret your data.
7. Use and share your results.

More resources for evaluation can be found on the National Center for Safe Routes to School's website here: http://guide.saferoutesinfo.org/evaluation/index.cfm.

3 School Infrastructure Audits

3.1 Method

Audits and recommendations have been conducted with reference to the California 2012 edition of the Manual of Uniform Traffic Control Devices (MUTCD), in particular Part 7 Traffic Control for School Areas. Alta and Omni Means transportation planners and engineers conducted the audits between May 12 and May 16, 2014.

3.2 Audit General Recommendations

Turlock's schools are geographically well distributed, which means that most students and parents are located within a feasible walking and cycling distance. The school district should:

1. Continue to provide neighborhood sized schools conveniently located throughout the community to support healthy travel choices and minimize the need to use automobiles. Resource: Smart School Siting http://changelabsolutions.org/publications/smart-school-siting

All stakeholders should initiate a Safe Routes to School Program to:

2. Minimize the need for parking and roadway expansion by encouraging healthy travel options
3. Continue the bicycle skills training program (described in more detail on page 10) to encourage safe and comfortable bicycle travel to school
4. Collect data on school travel mode through student "hands-up" counts at least twice annually, and counts of bicycles parked in bike racks at each school

The City of Turlock should:

5. Conduct speed surveys on streets around schools and consider traffic calming strategies where the surveys suggest traffic speeds are too high for pedestrian areas. Existing reduced speed limits are associated with "when children are present" signs which is defined as "while children are going to or leaving the school, either during school hours or during the noon recess period," under California Vehicle Code Section 22358.4. State Assembly Bill AB 321 (2008) allows local governments to extend school zones to 1,000 feet and reduce speed limits within 500 feet of a school site to 15 mph on residential streets or two-lane roads, where speed limits are already 30 mph or less
6. Replace all transverse crosswalk markings in school zones or along suggested routes to school with high-visibility crosswalk markings.
7. Perform an engineering audit of streets adjacent to older schools to assess potential ADA improvements. Develop an ADA prioritization plan and dedicate funding for such improvements
8. Educate bicyclists on riding 4' from parked cars; remark bike lanes with two stripes as per Figure 11 wherever possible during routine resurfacing and remarking program

The Turlock Police Department should:

9. Proactively engage with the school district each year to disseminate educational messages addressing recurrent parking infringements and unsafe behaviors
10. Continue random police patrols at each school 1-2 days per month to encourage good behavior
11. Utilize mobile speed feedback signs to remind motorists of their speed in reduced speed zones

Figure 10: A typical 13' wide shared bike / parking lane in Turlock, showing bicyclists at edge of door zone

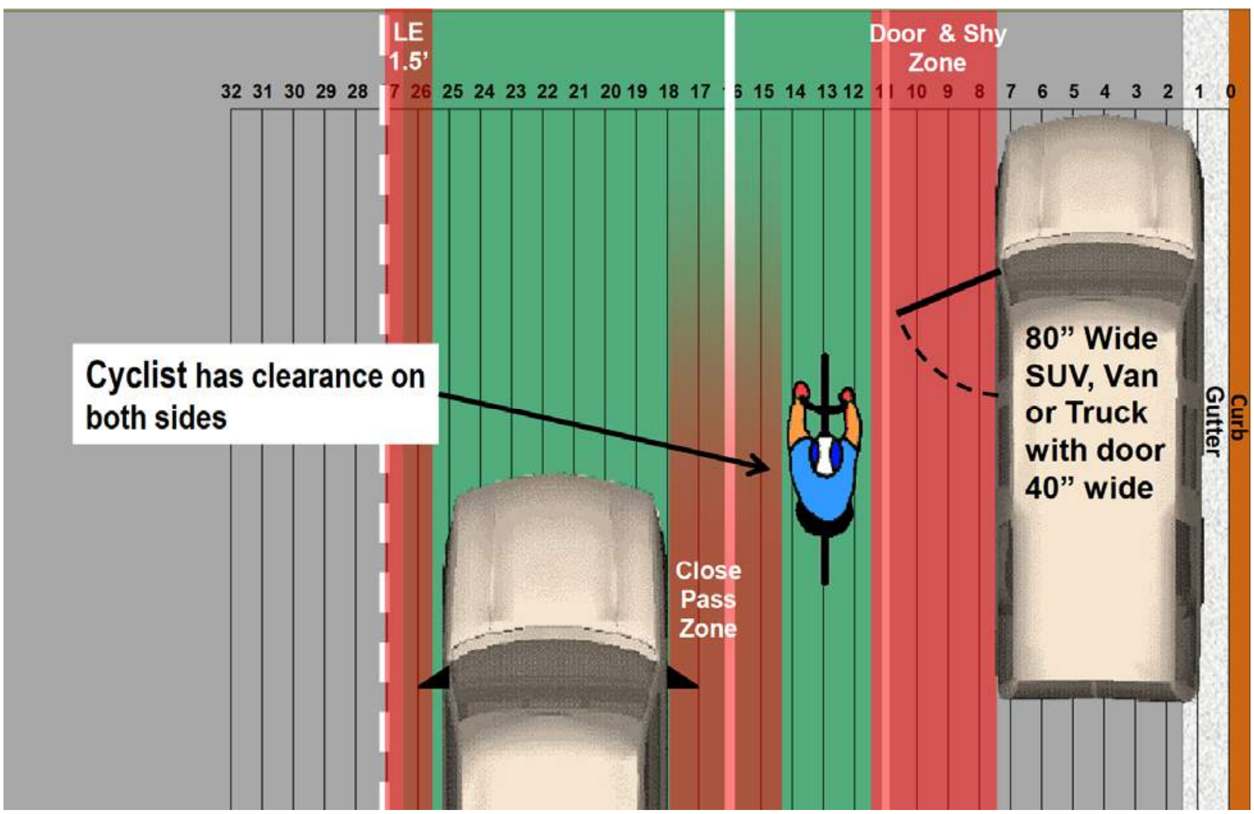
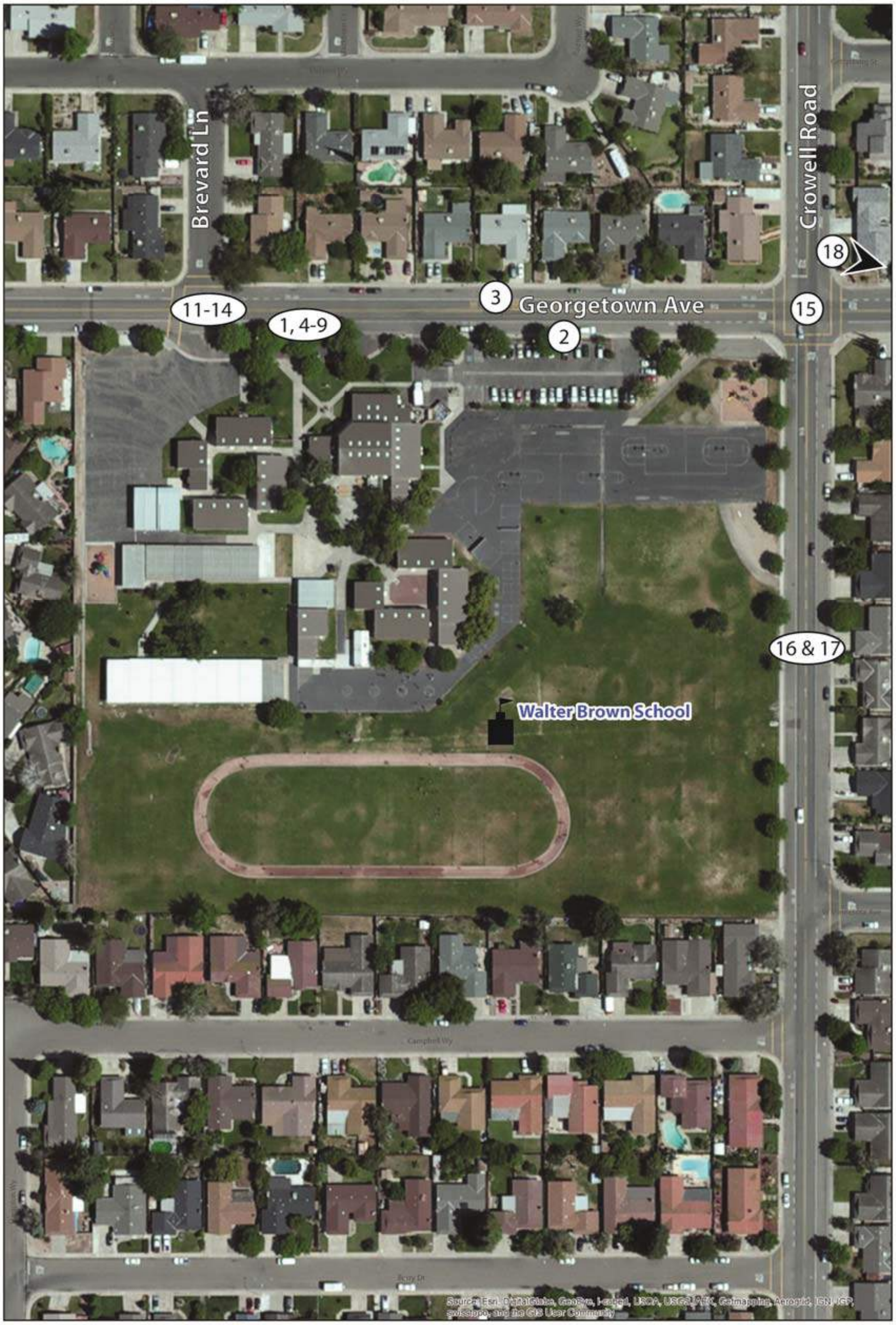


Figure 11: Bicyclist clearance zones. Scale is in feet from curb face (source: Caltrans seminar - Understanding Bicycle Transportation)

3.3 Brown Elementary School

Like many schools in Turlock, Class II bike lanes near this school are shared with parking, placing bicyclists in the door zone.

Observations and Existing Conditions	Recommendations
School Frontage – Georgetown Ave	
1. No sidewalk is paved at primary loading zone on Georgetown Ave. Children are dropped off in the grass, which becomes muddy during rainy season.	Install sidewalk along loading zone.
2. Sidewalk is uneven, creating challenges for wheelchair users or parents with strollers.	Repair sidewalk to meet ADA standards.
3. School zone pavement markings are faded.	Refresh markings.
4. Loading zone signage is not CAMUTCD compliant.	Update signage to meet CAMUTCD standards.
5. Children who are dropped off at primary loading zone must cross bus loop to access campus.	Install curb ramp and crosswalk through bus zone to align with existing curb ramp.
6. Some parents are parking in the loading zone, creating additional congestion.	Implement student valet program to encourage drivers to pull all the way forward, prevent parking in the loading zone, and assist students crossing the bus loop.
7. If loading zone is full, parents use bus loop or block entrances to bus loop and staff parking	Add drop-off prohibition signage, increase education and enforcement efforts
8. Parents double-park in bike lane to drop off kids.	Add drop-off prohibition signage, increase education and enforcement efforts
9. Illegal U-turns are being made in front of the school on Georgetown Ave.	Conduct periodic enforcement action Educate parents through newsletters
10. Monday trash collection and food delivery trucks conflict with morning student arrival time	Arrange for trash collection and food trucks to arrive after 8:45 a.m.
Georgetown Ave and Brevard Lane	
11. Uncontrolled crosswalk lacks advance warning signs; early morning sun makes it hard to see for eastbound traffic	Install advance warning signs to meet CAMUTCD standards; mark crosswalk with yellow high visibility ladder markings
12. Slow School Xing pavement markings are faded and too far from crosswalk.	Refresh markings and position them to meet CAMUTCD standards.
13. Low hanging tree foliage blocks crosswalk sign for eastbound traffic.	Trim tree to improve visibility and clearance for pedestrians.
14. Congestion at the loading zone/ bus loop / parking entrance makes the crosswalk difficult to navigate.	Station a crossing guard at this location
Georgetown Ave and Crowell Road	
15. Crossing guard advises need for a cone to prevent right turns while she is in the crosswalk	Conduct enforcement action to remind motorists of legal requirement to yield to crossing guards
Crowell Road	
16. Parents drop kids off on far side of Crowell Road leading to midblock crossings to access school gate.	Provide curb ramp at west end of the crosswalk at Minnesota Avenue; increase parent and student education
17. Parents double park in bike lanes to drop kids off.	Consider bike lane/no parking signage and/or red curbs Increase education and enforcement
Dels Lane and Georgetown Ave	
18. Two-way stop is challenging for students crossing Dels Lane; high speeds observed	Convert to all-way stop.



Brown Elementary School

Data obtained from: The City of Turlock, Sanislaus County, and Omni-Means
Map created: March 2014

0 0.01 0.02 Miles

3.4 Crowell Elementary School

This was one of the most enthusiastically attended Bike Rodeos indicating significant latent demand for active travel to school. A crossing of Hawkeye Avenue into Palm Street and prioritization of North Avenue for walking and bicycling can support active travel.

Observations and Existing Conditions	Recommendations
School Frontage – North Ave and Alleyway	
1. Long portion of North Ave curb is marked for bus zone and parents currently drop off at this curb	Match length of bus zone to number of buses
2. Staff parking lot driveway requires staff attendance to limit access to students with special needs.	Install signage at driveway regarding access rules
3. Parents park across the street and wave their kids across midblock, which the school discourages. Parents have responded rudely to attempts to enforce this rule.	Increase education about use of Geer and Loyola crosswalks Consider raised crosswalk with curb extensions west of the parking lot to minimize number of conflict points and match student desire lines to facilities.
4. A neighboring church has offered that parents may park at the back of their parking lot to walk their children into school. Many parents park at the front of this lot, to avoid walking through the parking lot to get to school. Pedestrian gate is locked.	Work with church to open this gate during morning arrival and afternoon dismissal to allow students to access campus directly instead of walking around to the front of the school. Mark crosswalk across drop-off alley from gate
5. One-way alley (Hawkeye Ave to North Ave) provides drop-off access for parents along the west edge of campus; long queues observed; exit is right turn only but many parents make lefts; right turners conflict with Loyola Ave crosswalk.	Install flexible posts along centerline to prevent left turns. As per recommendation 3, consider relocating this crosswalk west of the parking lot
6. Diagonal parking on left-hand side of alley is used by teachers; when school started this parking was almost fully utilized.	Consider reversing alley travel (southbound) to provide staff parking on the east side, allow loading adjacent to campus Consider implementation of a staff travel plan
North Ave and Loyola Way	
7. ADA ramps are missing at crosswalks. A wheelchair user and a mobility device user were both observed traveling in the street near these crosswalks to access driveway ramps.	Install curb ramps to meet ADA requirements.
8. Crosswalks on north and east legs are marked with yellow transverse markings.	Mark crosswalks with yellow high-visibility ladder-style crosswalk markings.
9. Slow school xing markings are not CAMUTCD compliant – should be 100' from crosswalk.	Replace markings to meet CAMUTCD
10. Advance warning signs are missing.	Install advance warning signs to meet CAMUTCD
11. Crossing guard has significant difficulty getting drivers to yield for pedestrians	Install RRFB Increase enforcement
12. Drivers illegally pass cars that have stopped to allow pedestrians to cross.	Consider installing curb extensions at crosswalk on North Ave to shorten crossing distance and prevent illegal passing.
Hawkeye Ave and Palm St	
13. No crosswalks are marked across Hawkeye Ave; many students live in the apartments across the street. Student desire line is between Palm Street and the path parallel to the alley.	Consider a pedestrian hybrid beacon or RRFB

Crowell Elementary School

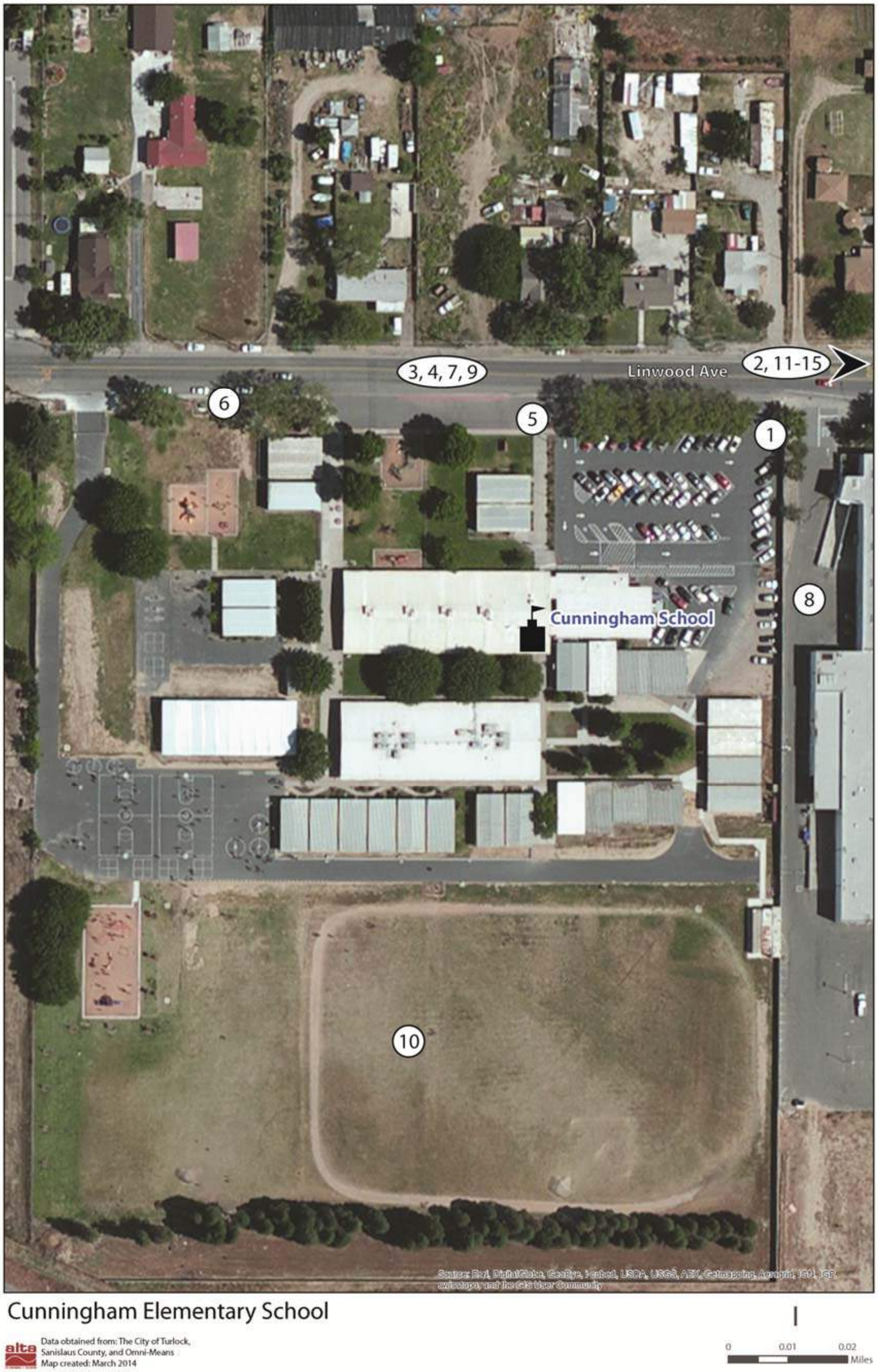
Data obtained from: The City of Turlock, Sanislaus County, and Omni-Means
Map created: March 2014

0 0.015 0.03 Miles

3.5 Cunningham Elementary School

The key infrastructure improvements for this school would be completion of street frontage improvements to West Linwood Avenue along the school frontage and filling in sidewalk and crossing gaps along Lander Avenue (corridor improvements would also benefit Wakefield Elementary)

Observations and Existing Conditions	Recommendations
School Frontage – Linwood Ave	
1. Congested fenced walkway at east edge of campus provides access without crossing parking lot.	Consider removal of two angled parking spaces at end of the double aisle to widen the walkway (TUSD)
2. New bike lanes west of campus on both sides of road are not well connected to Lander Ave	Complete street frontage improvements (long term) Mark bike lane on north side and narrow travel lanes to provide more space on south side (short term)
3. No crossings are provided to access the campus except at Lander Ave	Provide mid-block crossing to access school from the north side of Linwood, west of parking lot entrance, with RRFB and sidewalk improvements along the north side of the street.
4. Sidewalk is uneven along school frontage.	Reconstruct damaged sidewalk (short term)
5. Crosswalk across bus loop is missing ADA ramps and has irregular geometry and insufficient width.	Provide ADA compliant ramps and a shorter (perpendicular) crosswalk to access school entrance.
6. Continuous fencing is not provided along frontage.	Provide continuous fencing and gates to restrict unauthorized access to school.
7. Pavement is in poor condition along Linwood Ave, and markings do not meet CAMUTCD standards.	Repair failing asphalt and restripe the roadway to meet CA MUTCD standards.
8. Parents parking in private (commercial) driveway to drop children off and avoid Linwood Ave queues	Reconfigure drop-off area in parking lot to reduce the impacts to traffic along Linwood Ave.
9. When the pickup/drop-off area is filled in the school parking lot, queues form in both directions along Linwood: there was a 14 car queue in the WB direction waiting to turn left into parking lot. Through traffic was passing the queued cars in the bike lane. EB traffic had queued cars stopping along the painted red curb for fire access to avoid impacting through traffic.	Reconfigure drop-off area to reduce queuing on Linwood Avenue. Restripe roadway to provide left turn pocket to reduce unsafe passing maneuvers (this would be best implemented with road widening and full street frontage improvements so as to include bike lanes) Provide right turn pocket near bus drop-off area.
10. It is planned to construct staff parking in rear of school to provide better use of parking lot.	Improvements should move forward, increasing flexibility of reconfiguring parking and drop-off areas.
Linwood Ave and Lander Ave	
11. No bike lanes are provided along Lander Avenue.	Provide bicycle lanes along Lander Avenue and at signalized intersection with Linwood Avenue
12. No warning of school crossing at Linwood and Lander Signal;	Provide warning signage at intersection to watch for and yield to pedestrians.
13. Pedestrian ramps at Linwood/Lander Avenue do not meet ADA standards; the southwest curb ramp is severely damaged from truck tires.	Reconstruct pedestrian ramps to meet current standards. Redesign southwest curb return to accommodate truck movements.
14. Pedestrian crossing signal was not working on southwest corner of the intersection.	Repair broken pedestrian crossing signal.
15. Queue at Linwood/Lander Avenue signal backs up to school; left turn from Linwood Ave must yield to through traffic causing additional queuing.	Modify signal timing to accommodate school traffic. Or Provide a demand-actuated signal to reduce queuing.


3, 4, 7, 9
Linwood Ave
2, 11-15
6
5
1
8
Cunningham School
10
Cunningham Elementary School
Data obtained from: The City of Turlock, Sanislaus County, and Omni-Means
Map created: March 2014
0
0.01
0.02
Miles

3.6 Dutcher Middle School

The wider network in the vicinity of this school could benefit from rehabilitation and non-motorized network improvements. For example, North Olive Avenue and East Main Street have a number of sidewalk gaps, with the former being a prime candidate for a priority bicycle route.

Observations and Existing Conditions	Recommendations
Drop-off Loop (off Colorado Ave)	
1. Sidewalk does not extend the full length of the drop-off loop. Parents and buses drop off children into the grass.	Install sidewalk along full length of drop off loop to connect with existing sidewalk along Colorado Ave.
2. Congested at 'front' end of loop; parents pull up to first available curb space instead of pulling forward to allow room for other cars behind them.	Install "Do not block middle lane" signage Increase education to parents and students about proper use of loop
Bus Loop (off Hawkeye Ave)	
3. Many parents currently use bus loop for drop off.	Install signage; increase education and enforcement
4. Entrance and exit to bus loop conflict with bike lane on Hawkeye Ave.	Use green thermoplastic in bike lane at conflict points
5. Speed limit signs are posted in grass.	Move signs closer to the roadway to increase visibility.
School Frontage – Colorado Ave	
6. Parents park in bike lane to drop off at the curb instead of using drop-off loop.	Add green backed bike lane symbols to bike lane Consider bike lane / no parking signage
7. School zone markings are faded.	Refresh markings.
8. Pavement quality in bike lane is poor.	Resurface roadway (will require milling to provide flush joint to gutter pan)
9. Street sweeping occurs during arrival on Thursdays.	Reschedule street sweeping to begin after 8:45
10. Speeding along Colorado Ave is a concern.	Increase enforcement; provide active speed feedback sign
Hawkeye Ave and Colorado Ave	
11. Significant congestion from drop-off loop entrance creates challenges at this intersection.	Consider eastbound lane drop following Olive Ave intersection to eliminate right turn trap lane at Colorado. Provide buffered bike lane or minimum 6' bike lane adjacent to parking eastbound to Colorado. Consider west leg layout changes including parking prohibition westbound to provide a through bike pocket eastbound <u>or</u> staggered stop line for the curbside bike lane eastbound to highlight bicycle presence to right turning vehicles
Pioneer Ave Gate	
12. Open before and after school; locked during school hours; provides direct access to bike parking area	Encourage parents and students to use this route for walking and cycling access. Fill in sidewalk gaps on Wayside Drive to make better use of Pioneer Ave access route
Olive Ave Gate	
13. Leads to grass field	Develop paved path from gate to main campus

Dutcher Elementary School

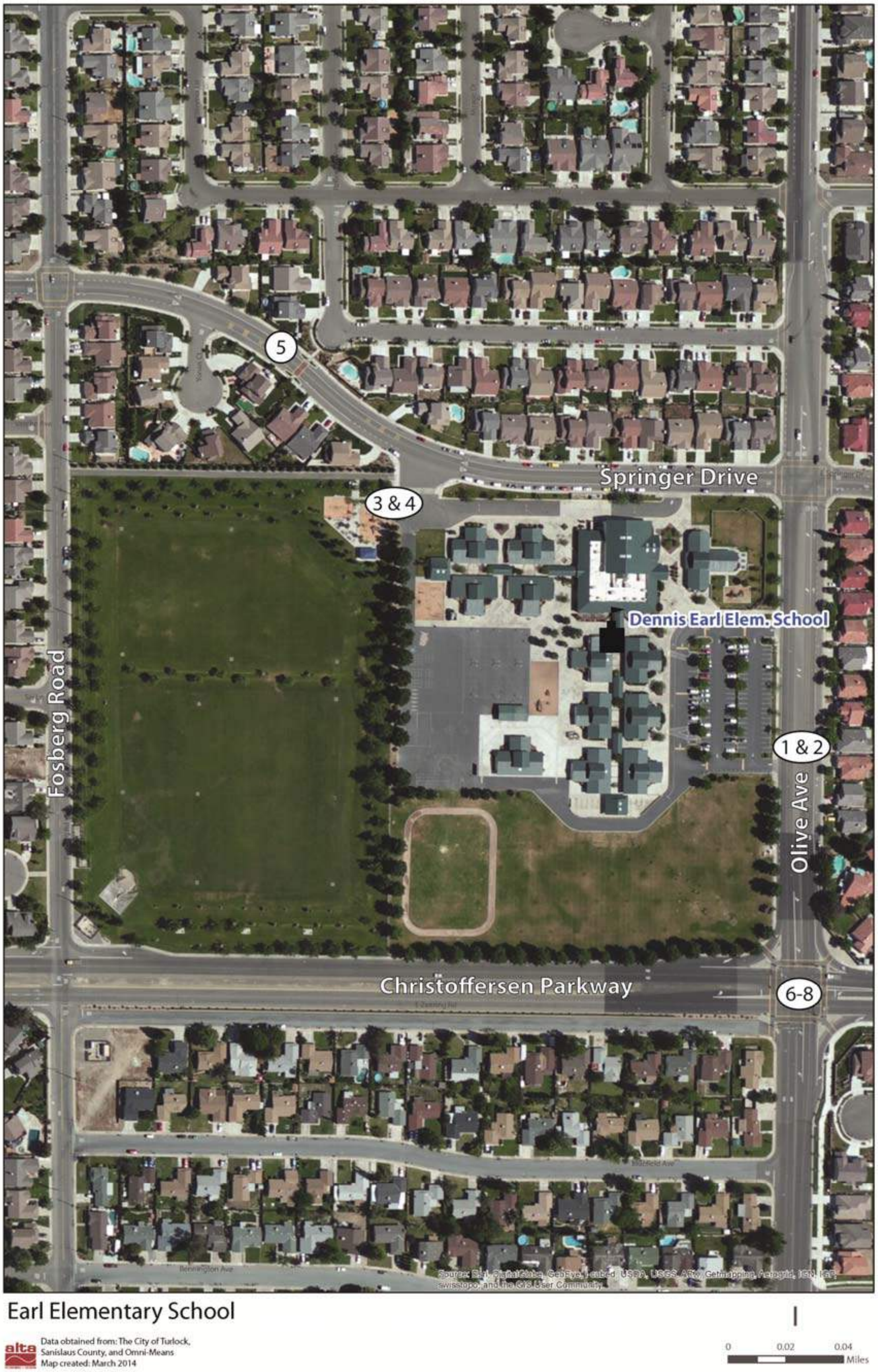
Data obtained from: The City of Turlock, Sanislaus County, and Omni-Means
Map created: March 2014

0 0.01 0.02 Miles

3.7 Earl Elementary School

This school has 8 bike parking racks that were lightly used on the day of the audit. An additional bike rack could be located near the school office for parent and staff use. A challenge to active travel here is the lack of a crossing at Fosberg Road, which cuts off many residents in the southern neighborhoods. West Springer Drive should be designated as a pedestrian and bicycle priority route as there are no high quality alternatives. The raised crosswalk on Springer Drive leading into Reflection Avenue / Helen Drive should be held up as a model for the rest of the city, although minor improvements are recommended.

Observations and Existing Conditions	Recommendations
School Frontage – Olive Ave	
1. Long queues form in median on Olive Avenue to enter school parking lot.	Median storage is sufficient, no improvement suggested.
2. Misleading pavement markings in median gives drivers the impression they can turn left into the school exit only driveway.	Remove left turn arrow pavement marking in median to avoid driver confusion.
Springer Drive	
3. Heavy foot traffic along shared use path at Christoffersen Park and westward along Springer Drive.	Potential to add additional access controlled gate along western edge of school to accommodate a natural desire line for pedestrians and cyclists through Christoffersen Park.
4. Access point on Springer Drive near the shared use path at Christoffersen Park is very wide. Observed vehicles blocking bus driveway, making illegal u-turns, parking in fire lane, pedestrians crossing street not at designated crosswalks.	Provide intersection control such as a mini roundabout or traffic circle to prohibit illegal maneuvers and reduce conflict points.
5. Midblock crossing on Springer Drive has poor sight distance and signage is difficult to see due to the geometry of the road. There is a low point on the southern landing of the crossing where water is ponding.	Relocate crosswalk signage to planter area in concrete bulb out to increase visibility. Construct drainage inlet at low point to reduce ponding.
Christoffersen Pkwy and Olive Ave	
6. No bike lanes are provided along Christoffersen Parkway (40' wide for two traffic lanes in each direction), currently people ride on the 5 foot sidewalk with pedestrians.	Provide buffered bike lanes on Christoffersen Pkwy
7. Olive Ave bike lanes are dropped at intersection; free right turns with short receiving lanes create conflict points between merging vehicles and through bicyclists	Consider removal of free right turns Install bike lanes up to the intersection on all approaches and departures, with green color at conflict / merge points
8. Northbound Olive Ave bike lane is shared with parking	Provide additional lane line to delineate between parking and bike lane; consider lane narrowing to achieve a wider bike lane.



Earl Elementary School

Data obtained from: The City of Turlock, Sanislaus County, and Omni-Means
Map created: March 2014

3.8 Julien Elementary School

This school had a full bike rack on the day of the audit, indicating a need for more bike parking capacity. A key opportunity would be to better link the Canal Dr Class I path to the north.

Observations and Existing Conditions	Recommendations
School Frontage: East Canal Drive	
1. In the PM condition, observed vehicles traveling above posted 25mph on Canal Street in the vicinity of the school while pickup/drop-off activities are occurring and pedestrians are crossing the Canal Street.	Increase enforcement and education Provide active speed feedback signage Increase the number of speed limit signs Install school zone pavement markings
2. In the PM condition, observed queues form and the pick-up drop-off area along Canal Street causing motorists to double park vehicles in attempt to stay out of the traveled way. It is planned to convert drop off lane into additional roadside parking.	The main vehicle pick-up drop-off area should be provided along Canal Street since this heavily used. Move forward with additional roadside parking stalls. Restripe roadway in front of school to provide larger waiting area with hatching to warn motorists of loading/unloading zone.
Johnson Road	
3. Alley corner sight distance to access Johnson Road is not sufficient.	Trim overgrown shrubs. Provide warning signage to alert motorists of the potential of cyclists.
Canal Drive and Johnson Road	
4. One crossing guard is utilized at the irregular intersection of Johnson Road and Canal Drive. It is difficult to control traffic safely with such a wide intersection.	Utilize an additional crossing guard on the north side of the intersection to help with traffic control through the intersection. Provide high visibility ladder style crosswalks Install curb extension on southwest corner to shorten Canal Drive crossing distance and improve pedestrian conspicuity Consider traffic signals or reduction in number of lanes on Canal Drive
Wallace Street and Carrigan Street	
5. Wallace Street is heavily congested with parent pickup and drop-off, with only one 5' wide sidewalk on the west side.	Consider widening the sidewalk into the roadway (prohibiting parking on west side only) and creating a bicycle boulevard / wide shared use path) or widening sidewalk into the school property.
6. Carrigan Street provides an opportunity for east/west route to the rear of the school and the high school but is potholed and rough	Repave Carrigan Street
7. There is no convenient crossing of Johnson Road	Provide high visibility ladder style crosswalks on all three legs of the Carrigan / Johnson intersection

Julien Elementary School

Data obtained from: The City of Turlock, Sanislaus County, and Omni-Means
Map created: March 2014

3.9 Osborn Elementary School

Located in an older part of town, this school appears to have a high walk and bike mode share. Bicycle network improvements on West Main Street and North Tully Road would further enhance active travel to this school. The key opportunity here would be improvements to the Soderquist / Main signalized intersection, which has long crosswalks on the mainline and aging pedestrian facilities.

Observations and Existing Conditions	Recommendations
School Site – Bus loop and main entrance	
1. In bus loop, the sidewalk is narrow given the high peak pedestrian volumes.	Widen sidewalk (TUSD)
School Frontage: North Soderquist Road	
2. Parents make u-turns on North Soderquist Road	Increase education and enforcement efforts
3. Parents stop in bike lane to drop off students	Install bike lane / no parking signs Increase education and enforcement efforts Advise parents of alternative drop-off points including Flower Street
4. Northbound bike lane is shared with parking, encouraging bicyclists to ride in the door zone; southbound lane is too narrow for comfortable cycling	Add a bike lane stripe between the bicycle operating space and parking lane to improve parking discipline against the curb; narrow travel lanes to 10' to widen bike lanes. Improve all markings for higher visibility; consider green bike lanes in conflict areas.
5. Sidewalk on west side of Soderquist Road has multiple utility poles and other obstructions that reduce the navigable width below ADA standards	Relocate utility poles OR provide sidewalk that meets minimum width standards
West Main Street	
6. Right turning vehicles into North Soderquist Road often do not yield to pedestrians, even with a crossing guard present. Guard uses a cone to help stop turning cars	Consider curb realignment of northeast corner to shorten crossing distance for Main Street and clarify lane use. Prohibit right turns on red from southbound Soderquist Road onto westbound Main Street.
7. Main Street has no bicycle facilities	Consider Class II bike lanes on corridor

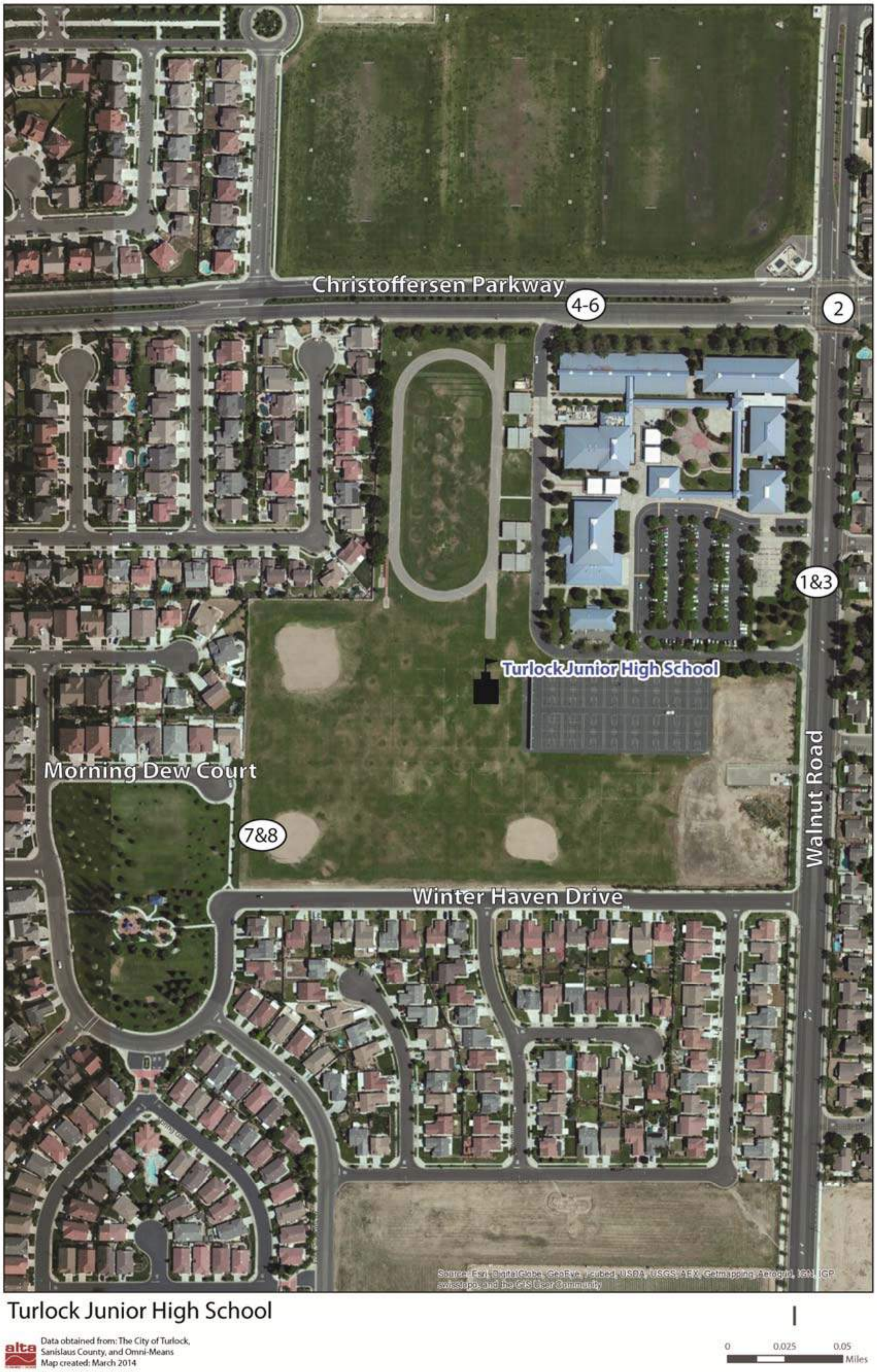
Osborn School

Data obtained from: The City of Turlock, Sanislaus County, and Omni-Means
Map created: March 2014

3.10 Turlock Junior High School

Many students bicycle to school, with the large bike parking area (16 stands with capacity of at least 20 bikes per stand) nearly full on the day of the audit. This was in spite of surrounding roadways which are oriented towards high speed, high capacity auto travel. A major opportunity to connect to neighborhoods through the sports fields should be investigated further. Administrators are very supportive of active travel but were surprised to hear about the learning benefits of such travel, indicating a need to disseminate such information at the school district level.

Observations and Existing Conditions	Recommendations
School Frontage – Walnut Road	
1. 40mph five lane cross section with 5' bike lanes is a minimal level of service for bicyclists.	During next repaving or remarking of Walnut Road, consider lane narrowings to widen and/or buffer the bike lane
2. Bike lanes are dropped at signalized intersection with Christoffersen Parkway.	Provide bike lanes at the signalized intersection to meet AASHTO and CAMUTCD standards.
3. Existing crosswalks are spaced ½ mile apart at Christoffersen and Monte Vista, leading to significant out-of-direction travel for pedestrians and bicyclists attempting to access the school from Winter Haven Drive, Wagtail Way or Bluethroat Drive.	Consider a mid-block crossing point with Pedestrian Hybrid Beacon or RRFB to encourage walking and cycling across this corridor.
Christoffersen Parkway	
4. No bike lanes are provided along Christoffersen Parkway, leading many people to ride on the sidewalk with pedestrians.	Provide bike lanes along Christoffersen Parkway to meet AASHTO and CAMUTCD standards.
5. Loading/unloading zone that is provided along Christoffersen Parkway was utilized. In the PM condition, observed that the loading zone was completely filled with waiting cars, forcing new arrivals to stop along the painted red curb for fire access and/or block the bus driveway provided on the north side of the school.	Increase length of loading/unloading zone west of bus driveway to provide more capacity or reduce demand through SR2S travel planning encouragement efforts
6. Observed vehicles traveling faster that posted 25 mph speed limit along Christoffersen Parkway.	Conduct speed survey Increase enforcement and education Provide active speed feedback signage Increase the number of speed limit signs
Winter Haven Drive / Morning Dew Ct	
7. No paved path is provided across field to access controlled gates along Winter Haven Drive. In bad weather, students could be traveling through muddy terrain.	Provide an all weather paved path between the sports fields (TUSD)
8. Morning Dew Ct is a logical connection that would save many students time and avoid busy roads	Provide an all weather paved path between the sports fields (TUSD)


Christoffersen Parkway
4-6
2
1&3
Turlock Junior High School
Walnut Road
Morning Dew Court
7&8
Winter Haven Drive
Turlock Junior High School
Data obtained from: The City of Turlock, Sanislaus County, and Omni-Means
Map created: March 2014
0
0.025
0.05
Miles

3.11 Wakefield Elementary School

This school is located in an older neighborhood with two lane roadways surrounding the school on all four sides. Although bike lanes are not provided and would not fit while retaining on-street parking, the speeds and volumes of traffic are likely to be compatible with active travel to school. South Avenue has existing traffic calming humps indicating previous efforts to address motorists' speeds. The most influential improvement in the area would be to enhance pedestrian crossings along four-lane Lander Avenue (with most being uncontrolled at present) and start a SR2S program at the school.

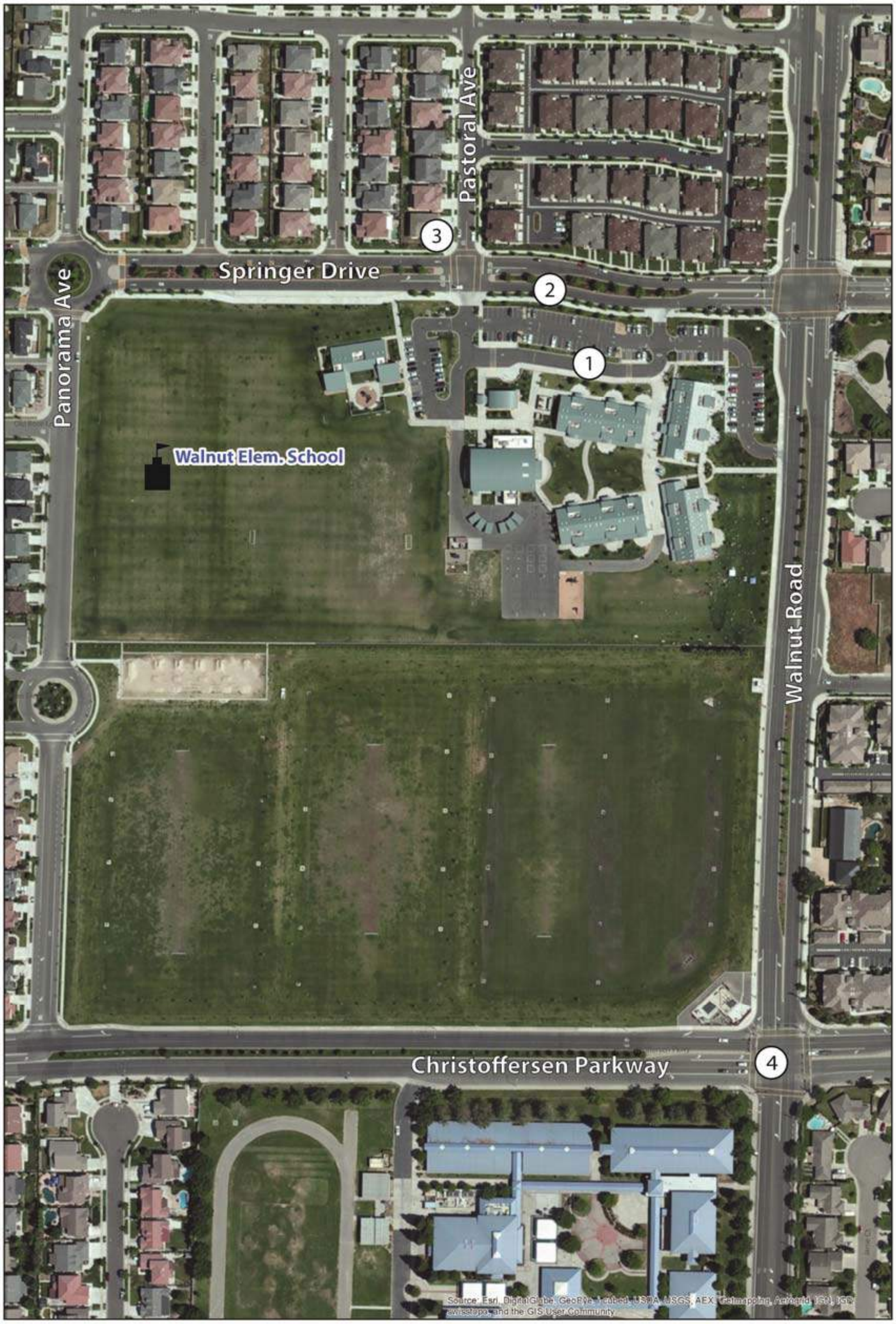
Observations and Existing Conditions	Recommendations
School Frontage – South Ave	
1. School markings are faded.	Refresh pavement markings to meet CAMUTCD standards.
2. Loop on South Ave is not marked to indicate loading or parking. It is currently used for parking, and minimal drop-off.	Formalize loading zone with CAMUTCD signage and curb paint, and conduct an outreach program to educate parents on its use.
3. Speeding traffic is an administrator concern.	Increase enforcement and education Provide active speed feedback signage Increase the number of speed limit signs
4. South Ave is overly wide in front of the school; parents use the extra road space to double park behind diagonal staff parking to drop off kids	Consider removal of diagonal parking on South Street, which is inconsistent with residential collector standard. Consider preparation of a Complete Streets based alignment design that includes parking, bike lanes and high visibility crosswalks on South Ave between Spruce Ave and S. Orange St.
South Ave and Martinez St	
5. Yellow transverse crosswalks are marked across south and east legs. Markings are faded.	Mark crosswalk with yellow high-visibility ladder-style markings.
6. Slow school xing markings are missing.	Install pavement markings to meet CAMUTCD standards.
South Ave and Orange Ave	
7. Crossing guard stationed at signal. Pedestrians don't obey don't walk signal and some drivers fail to yield when making right turns on red.	Review signal timing to determine pedestrian LOS Increase education and enforcement efforts Consider right on red restriction during school hours.
Orange Ave	
8. Pavement quality on Orange Ave is poor.	Repair or reconstruct roadway surface.
9. Parents double park at the cafeteria entrance on Orange Ave to drop off kids.	Increase education and enforcement efforts


Spruce Ave
2 & 3
South Ave
1-4
7
Wakefield School
Martinez Street
8&9
Orange Ave
Burnell Ave
Wakefield Elementary School
Data obtained from: The City of Turlock, Sanislaus County, and Omni-Means
Map created: March 2014
0
0.01
0.02
Miles

3.12 Walnut Elementary School

This school has by far the most extreme congestion and frustration issues in the City, based on the auditor's findings. The main parking lot is accessed from an attractive tree lined two-lane traditional neighborhood street, limiting car access while Christoffersen Parkway severs walking and cycling access to and from southern neighborhoods. Along with a reallocation of space at the Christoffersen / Walnut intersection (removal of free rights and reduction in pedestrian crossing distances), it may be that this school is the best candidate in the city for a very strong SR2S program to help alleviate traffic congestion and provide more choices to parents and students.

Observations and Recommendations	Recommendations
School Frontage – Springer Drive	
1. Parking lot filled with waiting vehicles, causing major queuing and delay east and west of the school along Springer Drive, and affecting through traffic. Queues form all the way to the intersections of Walnut Drive (signal) and Panorama Avenue (roundabout) Driver confusion and frustration was evident as some motorists did not want to block the intersection; other cars were observed passing in incorrect lanes to enter parking lot	Provide additional loading areas on campus to reduce impacts to frontage roads. Increase the amount of storage in turning lanes to avoid delay in through traffic movements. Improve signage and pavement markings to clearly delineate which movements are acceptable.
Walnut Drive	
2. Cars parked along Walnut Drive blocking bike lane; area is signed for no parking but curb is not painted red.	Extend painted red curb along Walnut Drive to minimize obstruction of bike lanes.
Springer Drive and Pastoral Ave	
3. The entrance to the school parking lot at the intersection of Springer Drive and Pastoral Avenue provides crosswalks on the west, north, and eastern legs. However, current policy is that crossing guards can only accommodate movements on the west and northern crossing, leaving east crosswalk pedestrians unprotected.	Add another crossing guard or install a temporary sign on the curb at the east crosswalk encouraging pedestrians to use the staffed crosswalk
Christoffersen Parkway	
4. No bike lanes are provided along Christoffersen Parkway, forcing cyclists to share the 5 foot sidewalk with pedestrians. Bike lanes are dropped at the signalized intersection of Christoffersen Parkway and Walnut Avenue.	Provide bike lanes along Christoffersen Parkway and at signalized intersection with Walnut Road to meet AASHTO and CA MUTCD standards. Remove free right turns and decrease pedestrian crossing distances.



Walnut Elementary School

alta

Data obtained from: The City of Turlock, Sanislaus County, and Omni-Means
Map created: March 2014

0 0.02 0.04 Miles

3.13 Medeiros Elementary

This very new school has excellent facilities for non-motorized access, including a wide concrete path meandering along the east frontage through grassy fields. The school district should consider installation of shade structures in the playground area and over bicycle parking areas.

16 bikes were parked in the bike parking area and the Bike Rodeo was well attended, although many more students would have attended had the helmet and parental signature requirements been better advertised.

Observations and Recommendations	Recommendations
School Frontage – West Springer Drive	
1. Bike lanes are shared with parking, placing bicyclists in the door zone. Travel lanes are 12' wide.	Add a bike lane stripe between the bicycle operating space and parking lane to improve parking discipline against the curb; narrow travel lanes to 11' to widen bike lanes
Sandy Way	
2. There are no crosswalks on Sandy Way except at McKenna Drive.	Install crosswalks on all four legs of Sandy Way and Memory Ln
McKenna Drive	
3. There are no crosswalks on McKenna Drive except at West Springer Drive and Sandy Way; this leaves students traveling to/from Ashford Drive and Woodland Drive with a long out of direction route.	Consider mid-block crosswalk at Woodland Drive with crossing guard


Sandy Way
2
Sandy Way
3
McKenna Drive
Sandra Tovar - Medeiros Elem. School
Springer Drive
1
Madison Lane
Medeiros Elementary School
Data obtained from: The City of Turlock, Sanislaus County, and Omni-Means
Map created: March 2014
0
0.015
0.03
Miles

3.14 Summary

A separate spreadsheet summarizing the above issues and recommendations has been produced. Analyzing the number of recommendations per school (by lead responsible agency) yields the totals given in the following table.

School	POLICE	CITY	TUSD	School Admin
Brown	6	14	1	6
Crowell	1	11	1	3
Cunningham		12	5	1
Dutcher	2	12		2
Earl		7		
Julien		8		
Medeiros		3		
Osborn	2	6	2	3
Turlock Jr High	1	8	2	1
Wakefield	3	9		3
Walnut	1	4		1
Grand Total	**16**	**94**	**11**	**20**

While all schools should undertake regular bicycle rack counts to assess the need for capacity improvements, Julien Elementary and Turlock Junior High schools were observed to have nearly full bicycle racks on the day of the audit.

Figure 12: Julien Elementary School bike parking is often overflowing

4 Infrastructure Toolkit

Design of the physical environment around schools are integral to a Safe Routes to School Program that ensures walking, biking, and other "green" forms of travel are easy and safe. The engineering improvements presented in this report follow the standards and guidelines set forth by the California Department of Transportation (Caltrans). Most of the proposed signage and striping improvements are relatively simple and cost effective to install when compared to more intensive engineering devices, such as curb extensions and paths.

In accordance with Caltrans and industry standard terms, "shall" "should" or "may" are used to denote when to install the example engineering devices. *Shall* is used when an improvement is required to be installed under pre-defined conditions. *May* is used when an improvement installation is optional under pre-defined conditions. *Should* is used when an improvement supports the effectiveness of required improvements.

This toolkit is intended to provide an introduction to the specific infrastructure improvements commonly used for Safe Routes to School. It is included in this report in an effort to make it an easily available reference. The City of Turlock Active Transportation Plan includes a more comprehensive toolkit that should be referenced along with all applicable federal, state and local standards and guidelines. Not all treatments are appropriate at every school location. In all cases, engineering judgment should be exercised when determining the best infrastructure solution.

Figure 13: Path leading into Earl Elementary School

4.1 Signage

School related signage warns motorists of a school zone or crosswalk and regulates their movements to ensure the safest conditions possible for pedestrians and bicyclists.

Warning Signs

Assembly A

May be installed up to 500 feet in advance of a school.

Assembly B

Shall be installed at an uncontrolled crosswalk (no stop sign).

Assembly D

Shall be installed 100 feet in advance of an uncontrolled crosswalk.

In-Pavement Yield Paddle

May be installed in an uncontrolled crosswalk

Regulatory Signs

No Turn

No Right and Left Turn signs are typically used to improve circulation and reduce queue lengths.

No U-Turn

No U-Turn signs are typically used to reduce conflicts with pedestrians and motorists.

Loading Zone

Loading zones designate a pick up/drop off location and may include a plaque allowing parking during off-loading times.

School Speed Limit

May be installed up to 500 feet in advance of a school. Engineers determine the posted speed.

4.2 Striping & Markings

School related striping includes crosswalks and curb colors. Bicycle lane striping and markings can be also considered school-related. Durable thermoplastic is recommended for striping improvements.

Curb Colors

- School Loading Zone curbs are white.
- Freight/Bus Loading Zone curbs are yellow.
- Accessible curbside parking curbs are blue.
- No Parking Zone curbs are red.

Crosswalks

Crosswalks connect one corner of a street to the opposite side and do not have to be marked with paint or thermoplastic unless where no corner exists (mid-block crosswalk). In California, yellow crosswalks can be used on roadways where students frequently cross. Caltrans standard is for all crosswalks contiguous to schools to be yellow. Crosswalk may also be yellow if within 600 feet of a school or school grounds. White crosswalks are used in all other areas.

High Visibility Crosswalk

High visibility crosswalks have longitudinal and latitudinal lines.

Transverse Crosswalk

Transverse crosswalks have latitudinal lines.

Lighted Crosswalk

Pedestrian activated lights may be installed on a sign and/or in the pavement.

School Crossing Pavement Markings

As a supplement to a marked crosswalk, the SCHOOL word marking may provide additional warning to drivers about the potential presence of school children.

4.3 Additional Tools

Active Warning Beacon

Active warning beacons are user-actuated flashing lights that supplement warning signs at unsignalized intersections or mid-block crosswalks. Rectangular Rapid Flash Beacons (RRFBs), a type of active warning beacon, use an irregular flash pattern similar to emergency flashers on police vehicles.

Pedestrian Hybrid Beacon

Pedestrian hybrid beacons are traffic control signals commonly used to stop traffic along a major street to permit safe crossing by pedestrians or bicyclists. The signals provide very high levels of compliance by using a red signal indication, while offering lower delay to motorized traffic than a conventional signal.

In-Street Yield to Pedestrian Sign

In-street pedestrian crossing signs reinforce the presence of crosswalks and remind motorists of their legal obligation to yield for pedestrians in marked or unmarked crosswalks. This signage is often placed at high-volume pedestrian crossings that are not signalized. On streets with multiple lanes in each direction, additional treatments such as median islands or active warning beacons may be more appropriate.

Median Refuge Island

Median refuge islands are protected spaces placed in the center of the street to facilitate bicycle and pedestrian crossings. Crossings of two-way streets are simplified by allowing bicyclists and pedestrians to navigate only one direction of traffic at a time. This may also function as a *traffic calming* technique when configured to manage access to streets.

No Turn On Red

No Turn on Red restrictions prevent turns during the red signal indication to reduce motor vehicle conflicts with bicyclists and pedestrians using the crosswalk.

Raised Crosswalk

Raised crosswalks are crossings elevated to the same grade as the sidewalk or shared-use path. Raised crosswalks may be designed as speed tables, and have a slowing effect on crossing traffic.

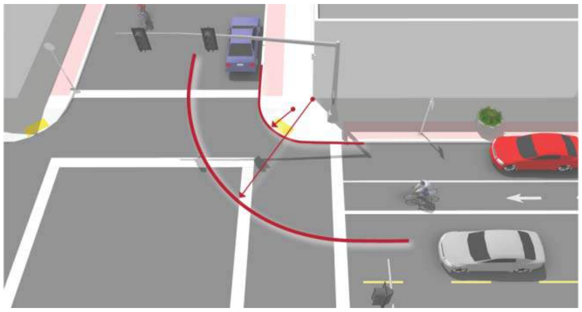
Leading Pedestrian Interval

A leading pedestrian interval is a condition where a pedestrian signal displays a WALK signal for pedestrians prior to displaying a green signal for adjacent motor vehicle traffic. This early display gives pedestrians a head start and may increase the percentage of drivers who yield to crossing pedestrians.

Countdown Pedestrian Signal

Countdown pedestrian signals are particularly valuable for pedestrians, as they indicate whether a pedestrian has time to cross the street before the signal phase ends. Countdown signals should be used at all signalized intersections.

Signals should be timed to provide enough time for pedestrians to cross the street. The MUTCD recommends a longer pedestrian clearance time in areas where pedestrians may walk slower than normal, including the elderly and children.



Minimize Corner Radii

The size of a curb's radius can have a significant impact on pedestrian comfort and safety. A smaller curb radius provides more pedestrian area at the corner, allows more flexibility in the placement of curb ramps, results in a shorter crossing distance and requires vehicles to slow more on the intersection approach. During the design phase, the chosen radius should be the smallest possible for the circumstances.

ADA Compliant Curb Ramps

Curb ramps allow all users to make the transition from the street to the sidewalk. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access.

Although diagonal curb ramps might save money, they create potential safety and mobility problems for pedestrians, including reduced maneuverability and increased interaction with turning vehicles, particularly in areas with high traffic volumes.

Curb Extensions

Curb extensions are areas of the sidewalk extended into the roadway, most commonly where a parking lane is located. Curb bulbs help position pedestrians closer to the street centerline to reduce crossing distances and improve visibility and encourage motorists to yield at crossings.

Advance Stop Bar

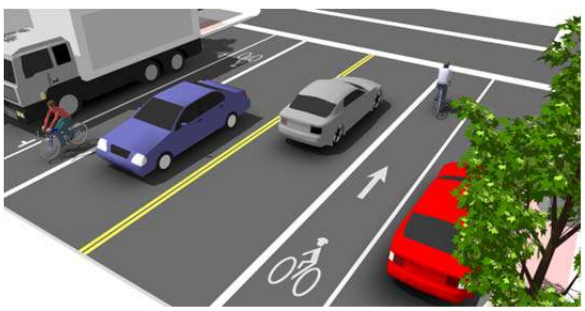
Advance stop bars increase pedestrian comfort and safety by stopping motor vehicles well in advance of marked crosswalks, allowing vehicle operators a better line of sight of pedestrians and giving inner lane motor vehicle traffic time to stop for pedestrians.

Shared Use Paths

Shared Use paths may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, or as neighborhood cut-throughs to shorten connections and offer an alternative to busy streets.

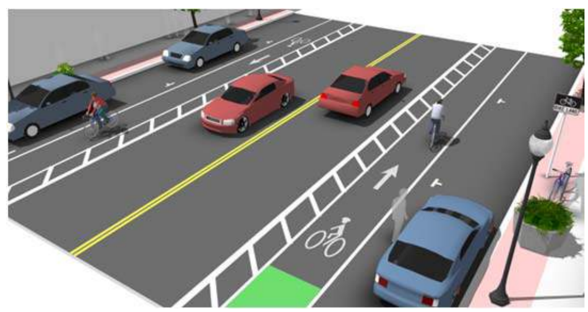
Traffic Calming

Reducing speeds or volumes along streets improves the pedestrian environment by limiting exposure, enhancing drivers' ability to see and react, and diminishing the severity of crashes if they occur. Common traffic calming techniques include speed humps, neighborhood traffic circles, chicanes, and pinch points.



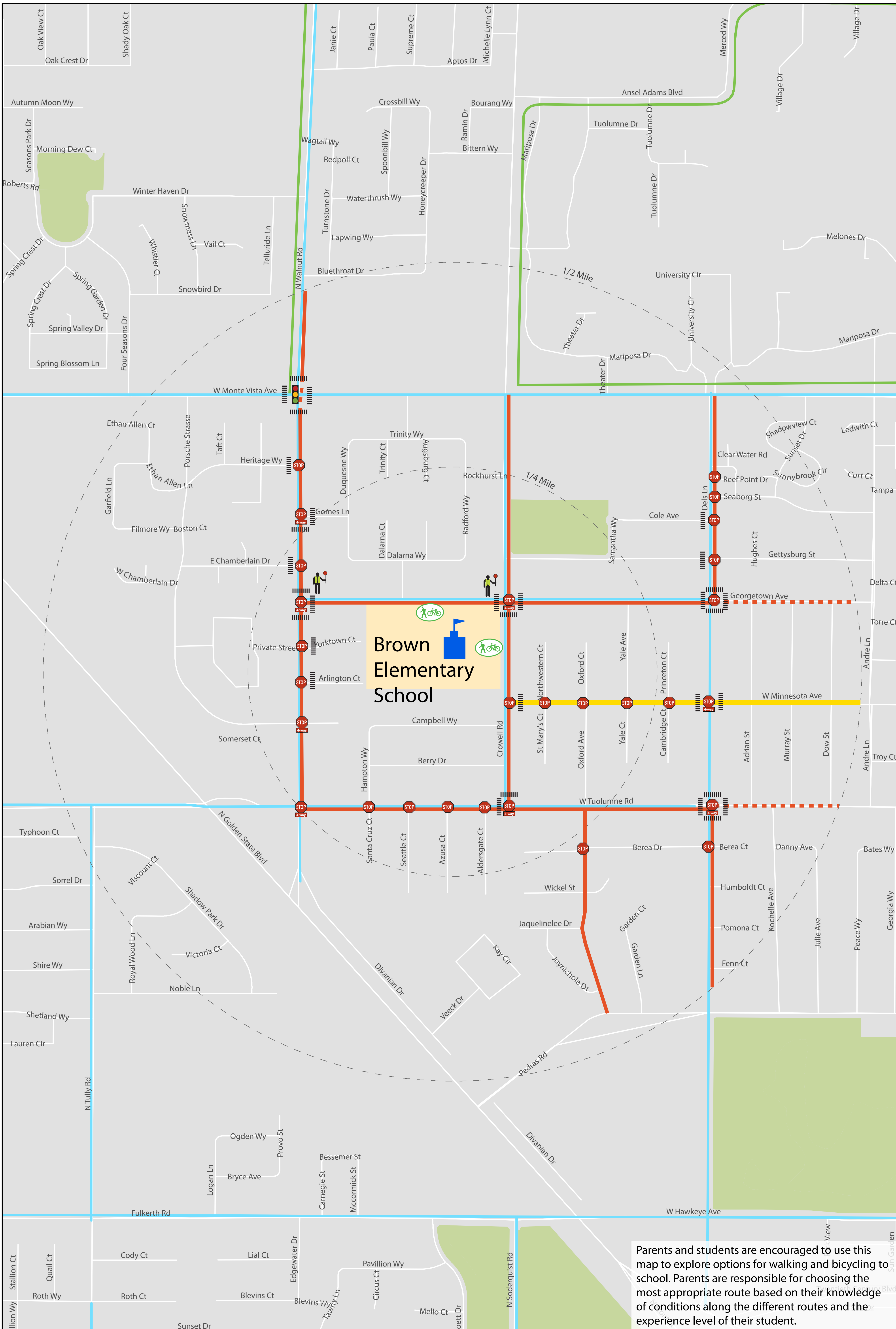
Bike Lanes

Bicycle lanes designate an exclusive space for bicyclists with pavement markings and signage. The bicycle lane is located adjacent to motor vehicle travel lanes and bicyclists ride in the same direction as motor vehicle traffic. Bicycle lanes are typically on the right side of the street (on a two-way street), between the adjacent travel lane and curb, road edge or parking lane.



Buffered Bike Lanes

Buffered bicycle lanes 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.

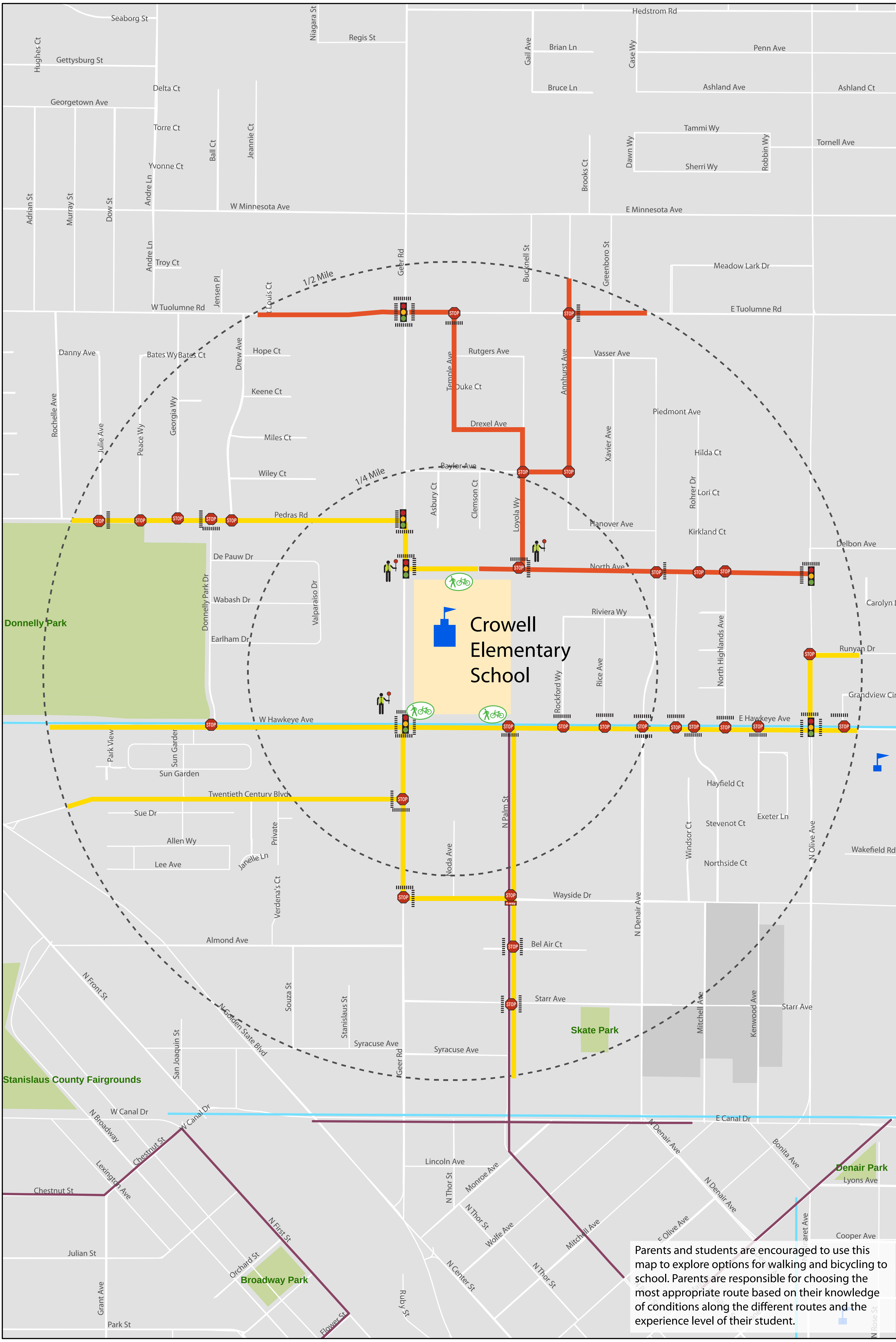


Brown Elementary

Data obtained from: The City of Turlock, Stanislaus County, and Omni-Means
Map created: October 2014

School
Parks
Marked Crosswalk
4-way Stop
2-way Stop
Signalized Intersection
Crossing Guard Location
Bicycle and Pedestrian Access
Suggested Route (Walking and Biking)
Limited Bicycle and/or Pedestrian Facility—Use Caution
Suggested Route (Walking Only)
Existing Class I
Existing Class II

0 0.075 0.15 Miles

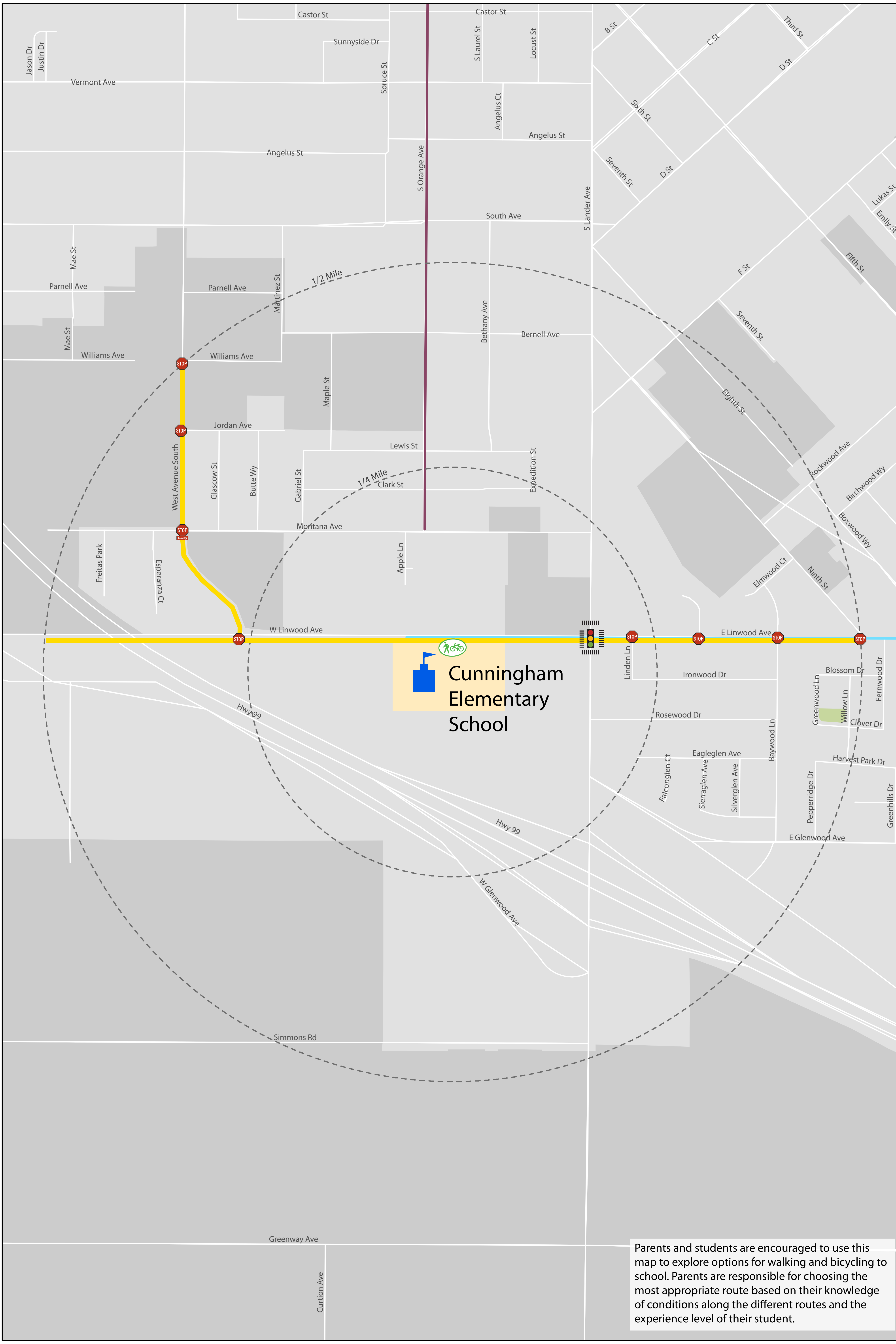


Crowell Elementary

Data obtained from: The City of Turlock, Stanislaus County, and Omni-Means
Map created: October 2014

- School
- Parks
- Marked Crosswalk
- 4-way Stop
- 2-way Stop
- Signalized Intersection
- Crossing Guard Location
- Bicycle and Pedestrian Access
- Suggested Route (Walking and Biking)
- Suggested Route (Walking Only)
- Existing Class II
- Existing Class III

0 0.075 0.15 Miles



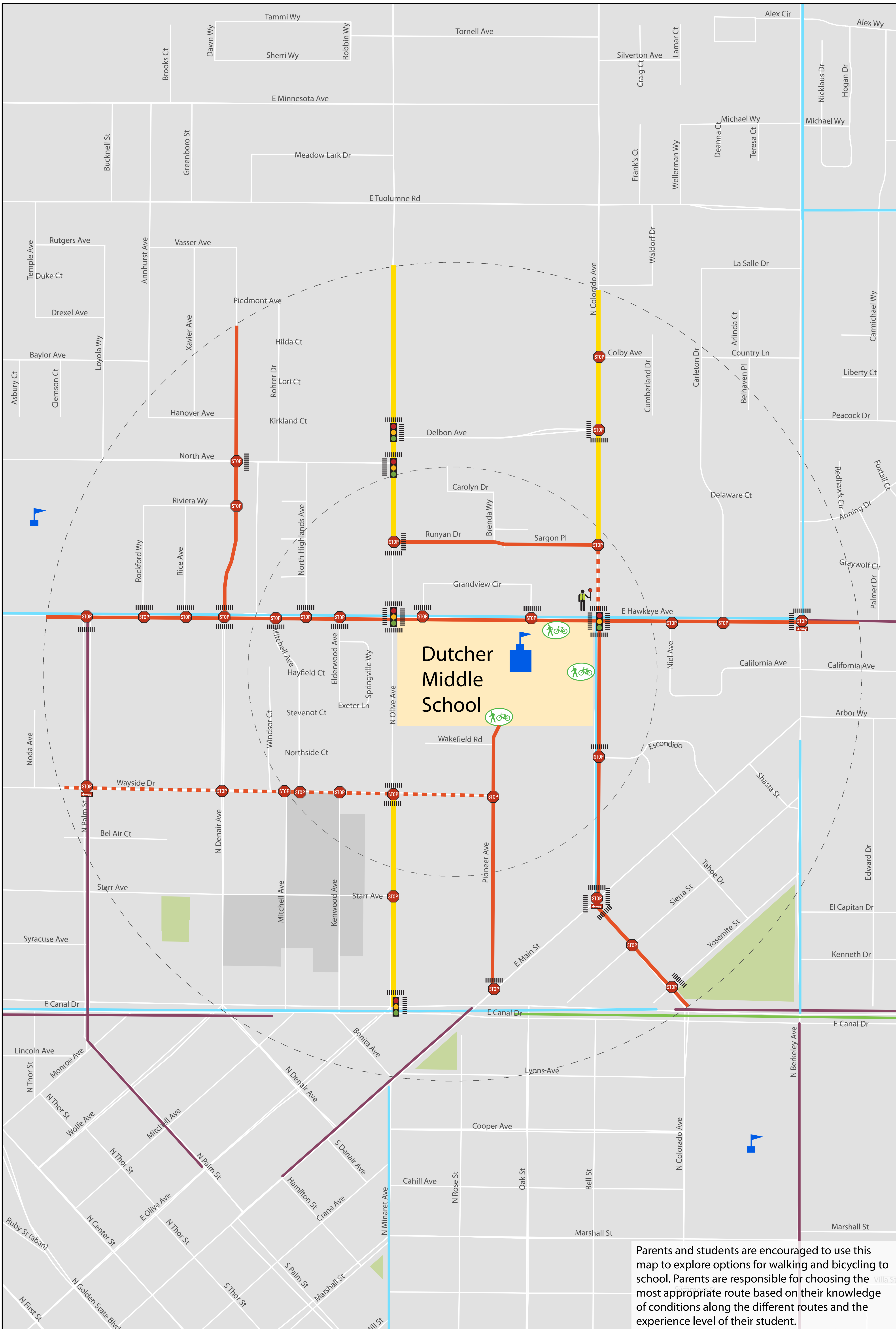
Parents and students are encouraged to use this map to explore options for walking and bicycling to school. Parents are responsible for choosing the most appropriate route based on their knowledge of conditions along the different routes and the experience level of their student.

Cunningham Elementary

School
Parks
Marked Crosswalk
4-way Stop
2-way Stop
Signalized Intersection
Bicycle and Pedestrian Access
Suggested Route (Walking Only)
Existing Class II
Existing Class III

0 0.075 0.15 Miles

alta
Data obtained from: The City of Turlock, Stanislaus County, and Omni-Means
Map created: October 2014



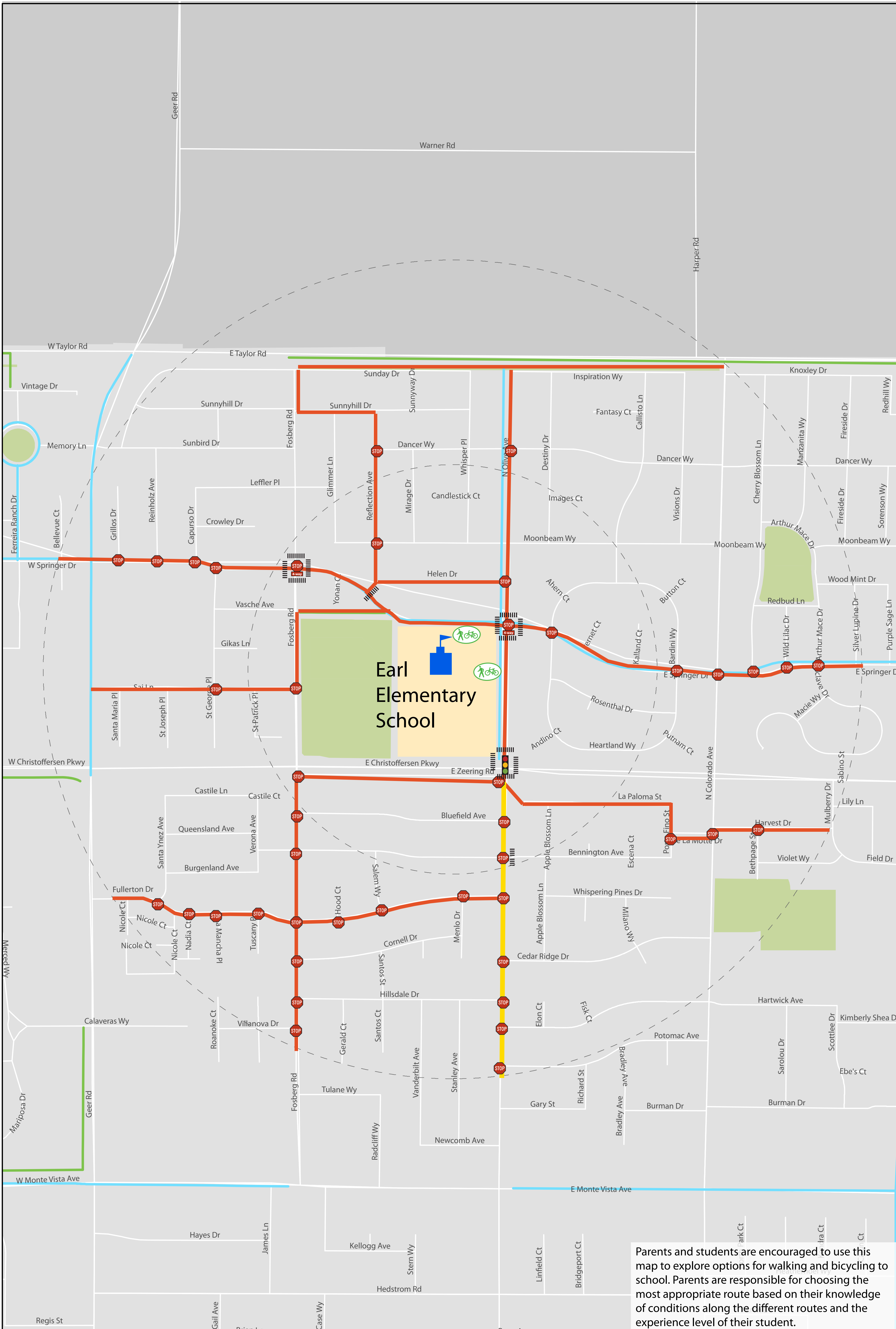
Parents and students are encouraged to use this map to explore options for walking and bicycling to school. Parents are responsible for choosing the most appropriate route based on their knowledge of conditions along the different routes and the experience level of their student.

Dutcher Middle

Data obtained from: The City of Turlock, Sanislaus County, and Omni-Means
Map created: March 2014

School
Parks
Marked Crosswalk
4-way Stop
2-way Stop
Signalized Intersection
Crossing Guard Location
Bicycle and Pedestrian Access
Suggested Route (Walking and Biking)
Limited Bicycle and/or Pedestrian Facility—Use Caution
Suggested Route (Walking Only)
Existing Class I
Existing Class II
Existing Class III

0 0.075 0.15 Miles

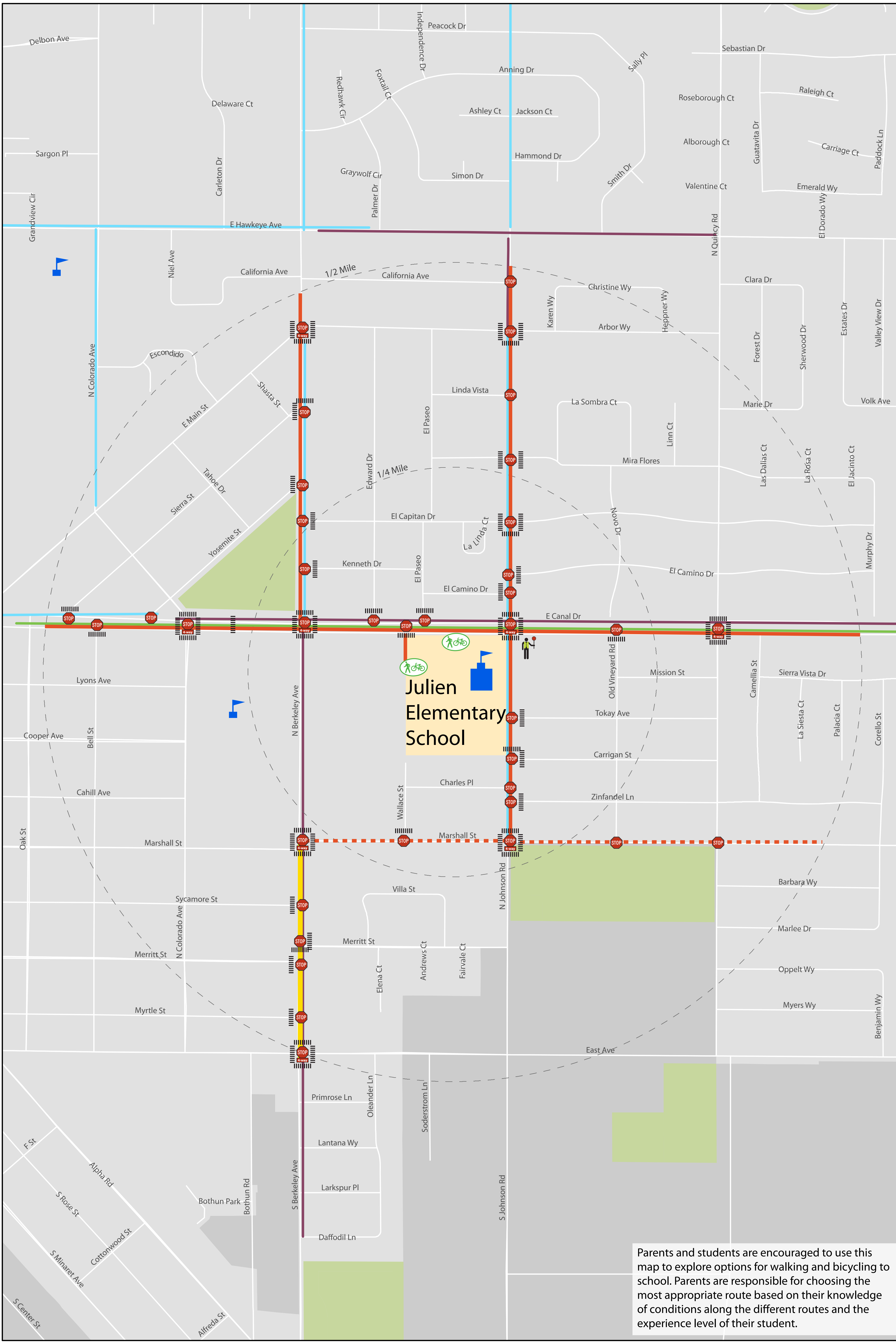


Earl Elementary

School
Parks
Marked Crosswalk
4-way Stop
2-way Stop
Signalized Intersection
Crossing Guard Location
Bicycle and Pedestrian Access
Suggested Route (Walking and Biking)
Suggested Route (Walking Only)
Existing Class I
Existing Class II

0 0.075 0.15 Miles

Data obtained from: The City of Turlock, Stanislaus County, and Omni-Means
Map created: October 2014



Julien Elementary

School

Parks

Marked Crosswalk

4-way Stop

2-way Stop

Crossing Guard Location

Bicycle and Pedestrian Access

Suggested Route (Walking and Biking)

Limited Bicycle and/or Pedestrian Facility—Use Caution

Suggested Route (Walking Only)

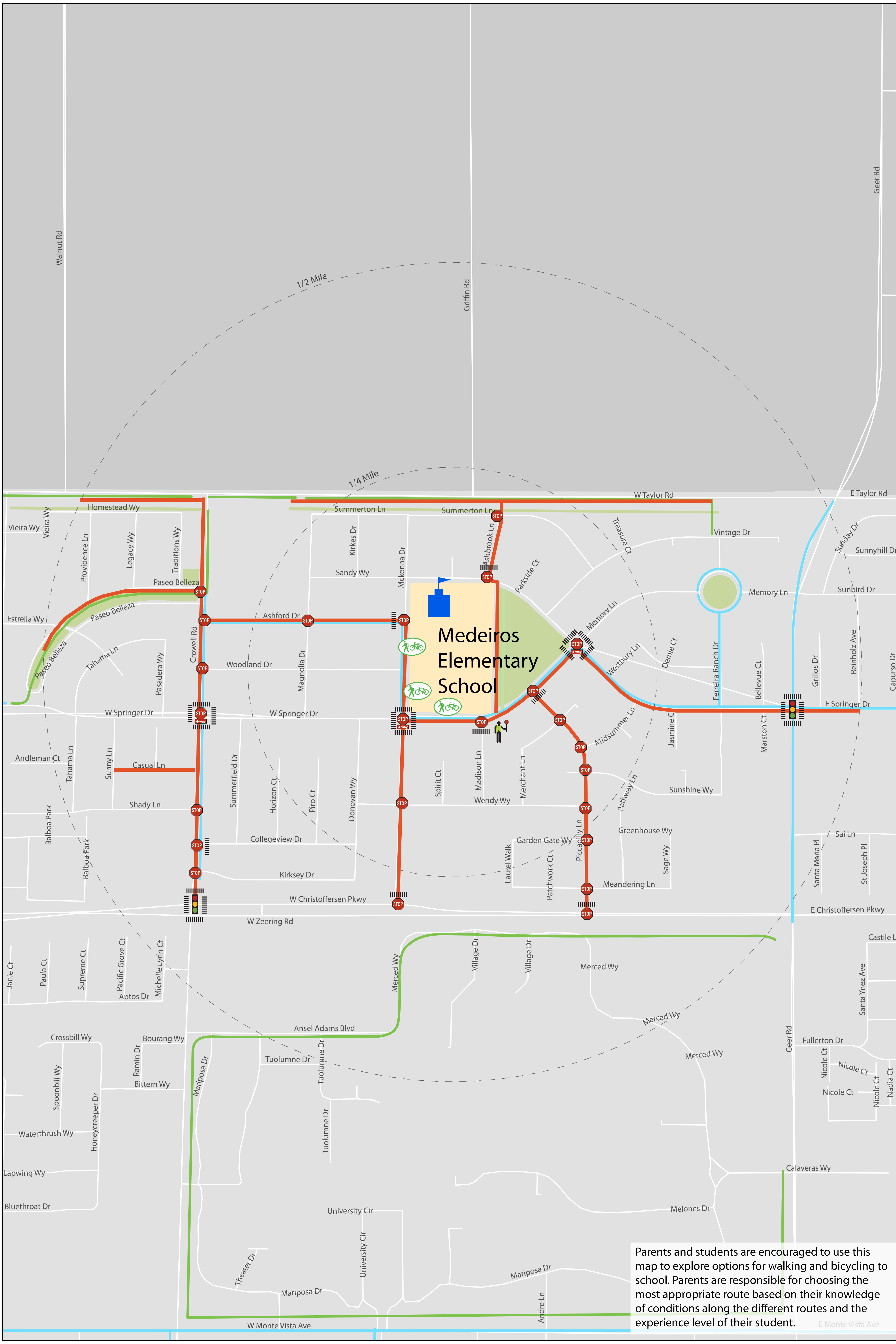
Existing Class I

Existing Class II

Existing Class III

0 0.075 0.15 Miles

Data obtained from: The City of Turlock, Stanislaus County, and Omni-Means
Map created: October 2014



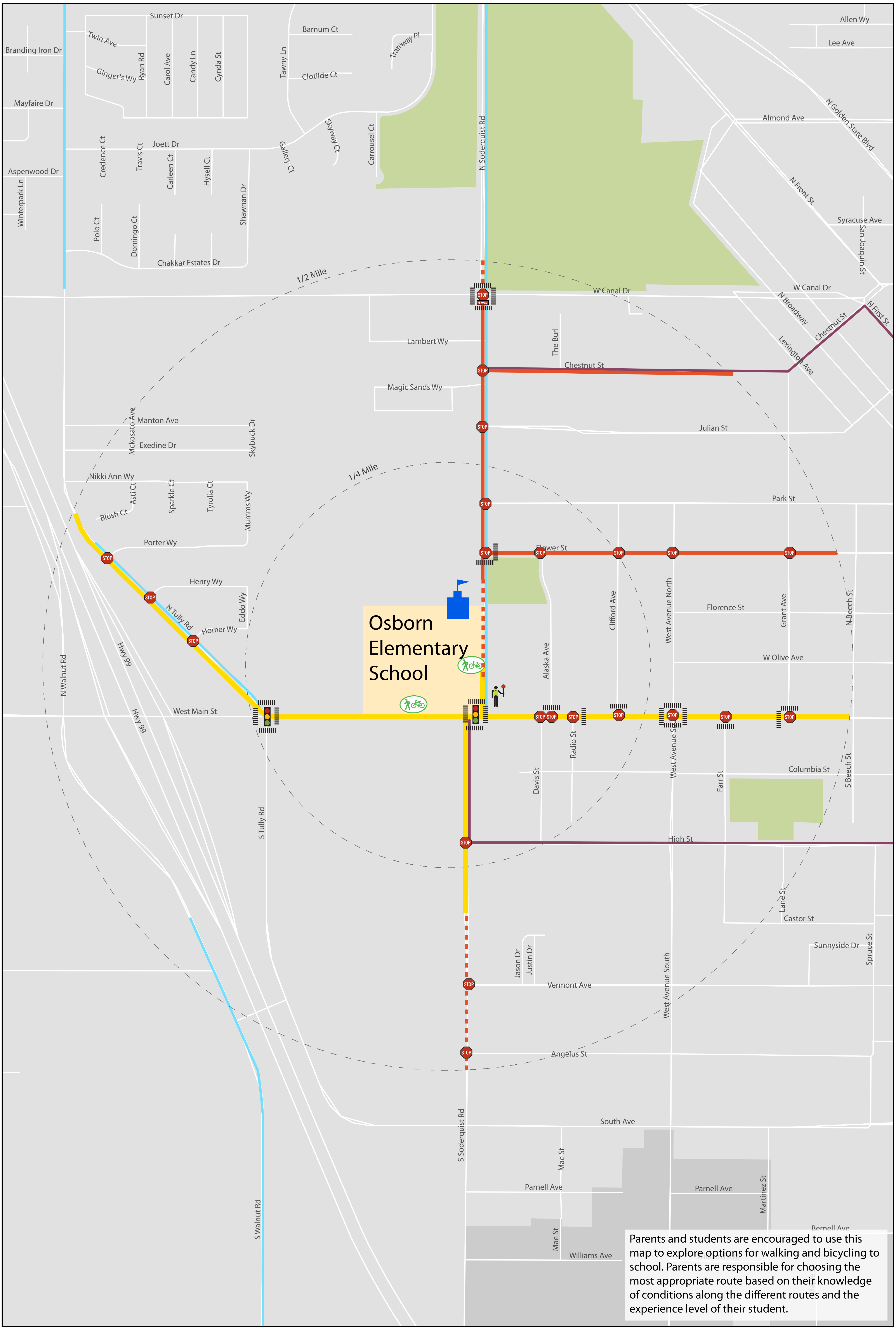
Parents and students are encouraged to use this map to explore options for walking and bicycling to school. Parents are responsible for choosing the most appropriate route based on their knowledge of conditions along the different routes and the experience level of their student.

Medeiros Elementary

Data obtained from: The City of Turlock, Stanislaus County, and Omni-Means
Map created: October 2014

- School
- Parks
- Marked Crosswalk
- 4-way Stop
- 2-way Stop
- Signalized Intersection
- Crossing Guard Location
- Bicycle and Pedestrian Access
- Suggested Route (Walking and Biking)
- Existing Class I
- Existing Class II

0 0.075 0.15 Miles



Osborn Elementary

Data obtained from: The City of Turlock, Stanislaus County, and Omni-Means
Map created: October 2014

- School
- Parks
- Marked Crosswalk
- 4-way Stop
- 2-way Stop
- Signalized Intersection
- Crossing Guard Location
- Bicycle and Pedestrian Access
- Suggested Route (Walking and Biking)
- Limited Bicycle and/or Pedestrian Facility—Use Caution
- Suggested Route (Walking Only)
- Existing Class II
- Existing Class III

0 0.075 0.15 Miles

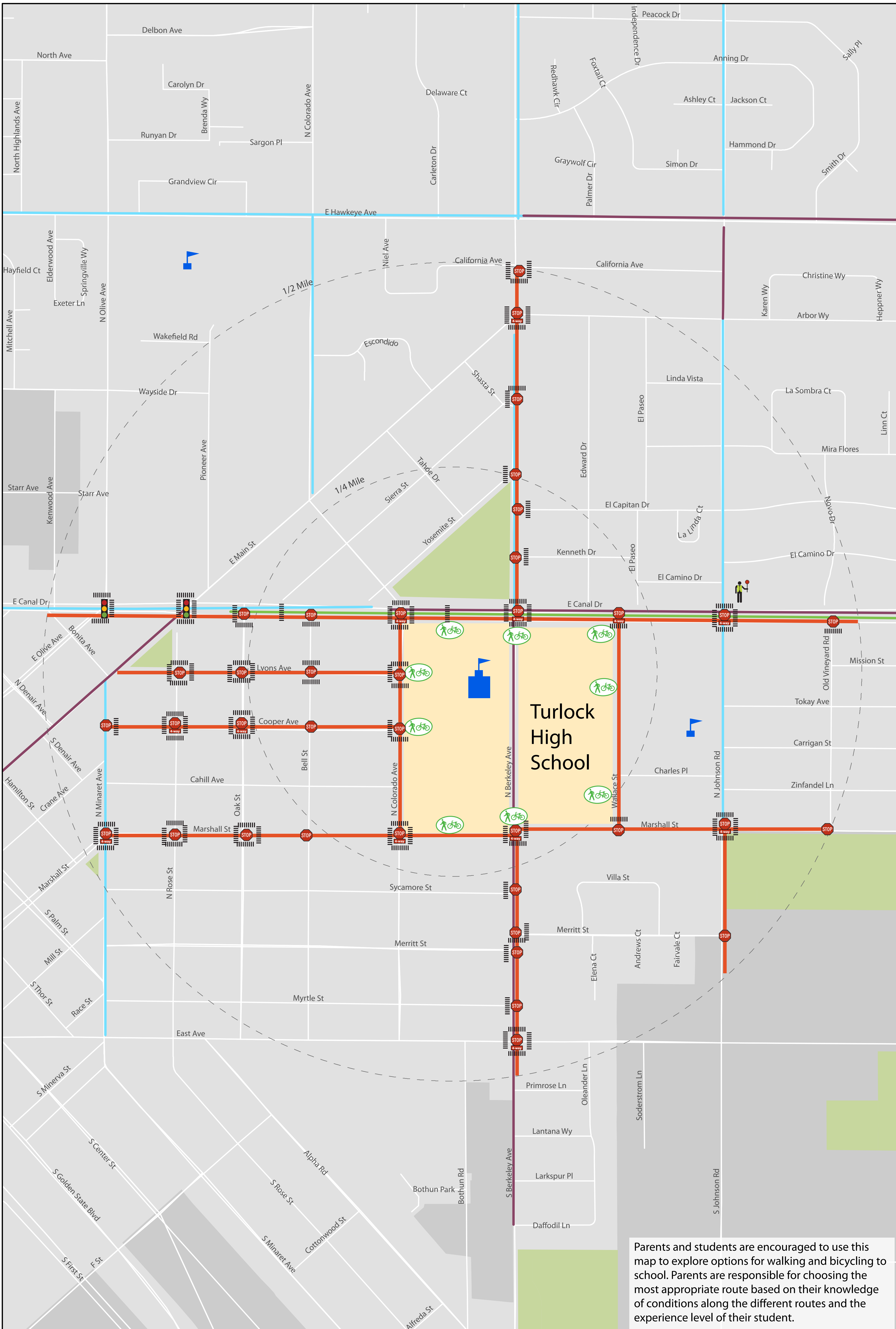
Pitman High School

School
Parks
Marked Crosswalk
4-way Stop
2-way Stop
Signalized Intersection
Roundabout
Bicycle and Pedestrian Access
Suggested Route (Walking and Biking)
Suggested Route (Walking Only)
Existing Class I
Existing Class II

0 0.075 0.15 Miles

alta

Data obtained from: The City of Turlock, Stanislaus County, and Omni-Means
Map created: October 2014



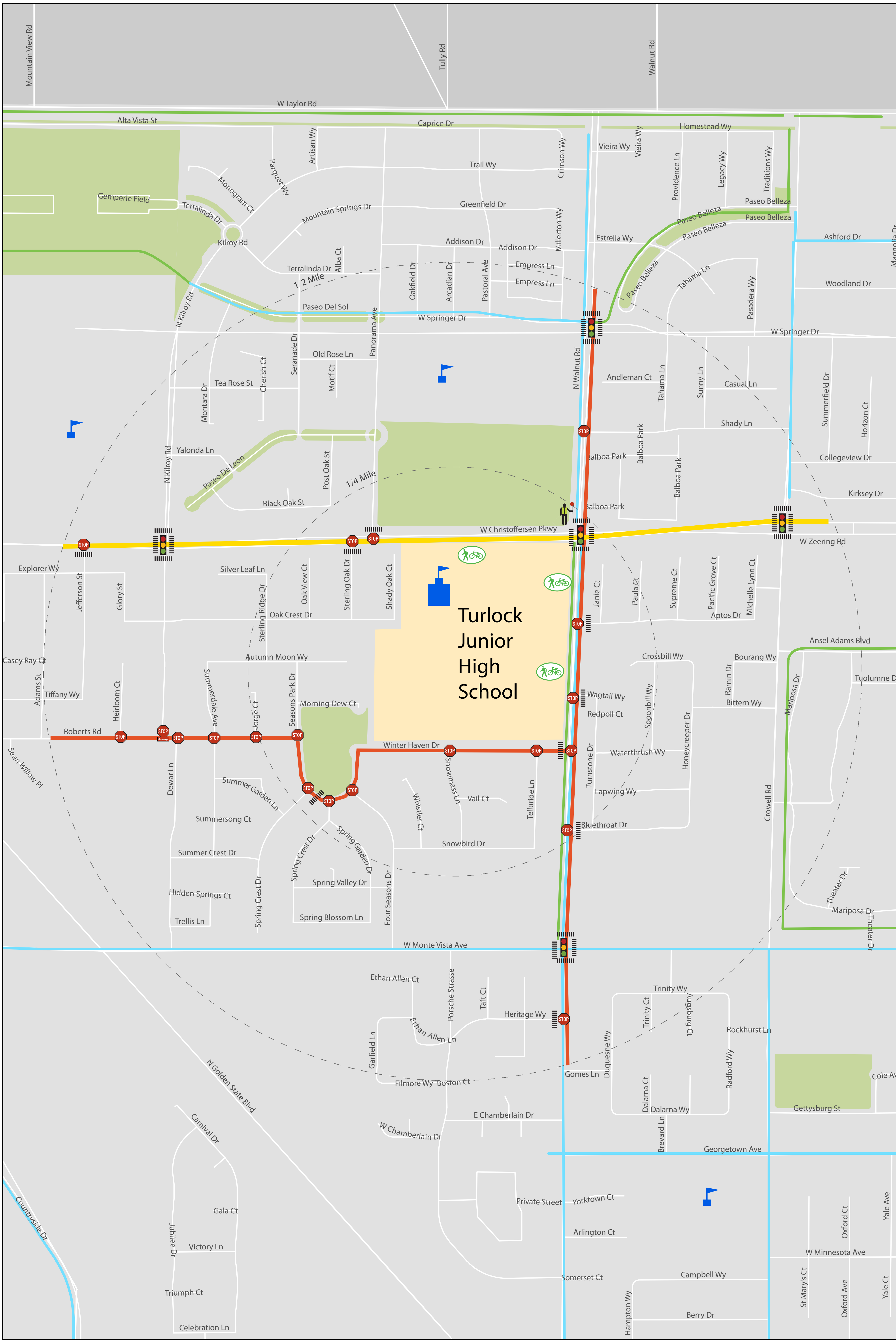
Parents and students are encouraged to use this map to explore options for walking and bicycling to school. Parents are responsible for choosing the most appropriate route based on their knowledge of conditions along the different routes and the experience level of their student.

Turlock High School

Data obtained from: The City of Turlock, Stanislaus County, and Omni-Means
Map created: October 2014

School
Parks
Marked Crosswalk
4-way Stop
2-way Stop
Signalized Intersection
Crossing Guard Location
Bicycle and Pedestrian Access
Suggested Route (Walking and Biking)
Existing Class I
Existing Class II
Existing Class III

0 0.075 0.15 Miles



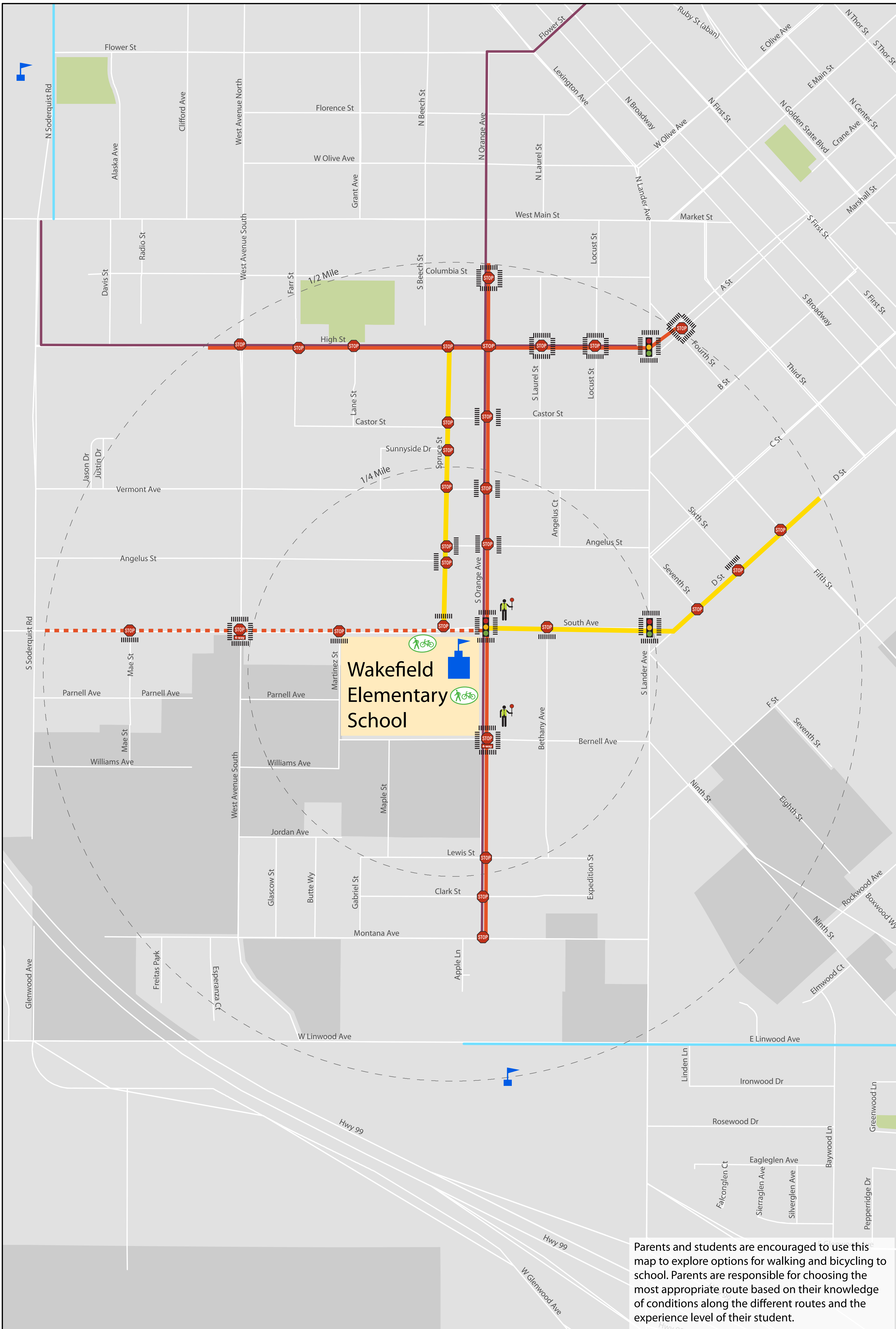
Turlock Junior High

School
Parks
Marked Crosswalk
4-way Stop
2-way Stop
Signalized Intersection
Crossing Guard Location
Bicycle and Pedestrian Access
Suggested Route (Walking and Biking)
Limited Bicycle and/or Pedestrian Facility—Use Caution
Suggested Route (Walking Only)
Existing Class I
Existing Class II

0 0.075 0.15 Miles

alta

Data obtained from: The City of Turlock, Stanislaus County, and Omni-Means
Map created: October2014

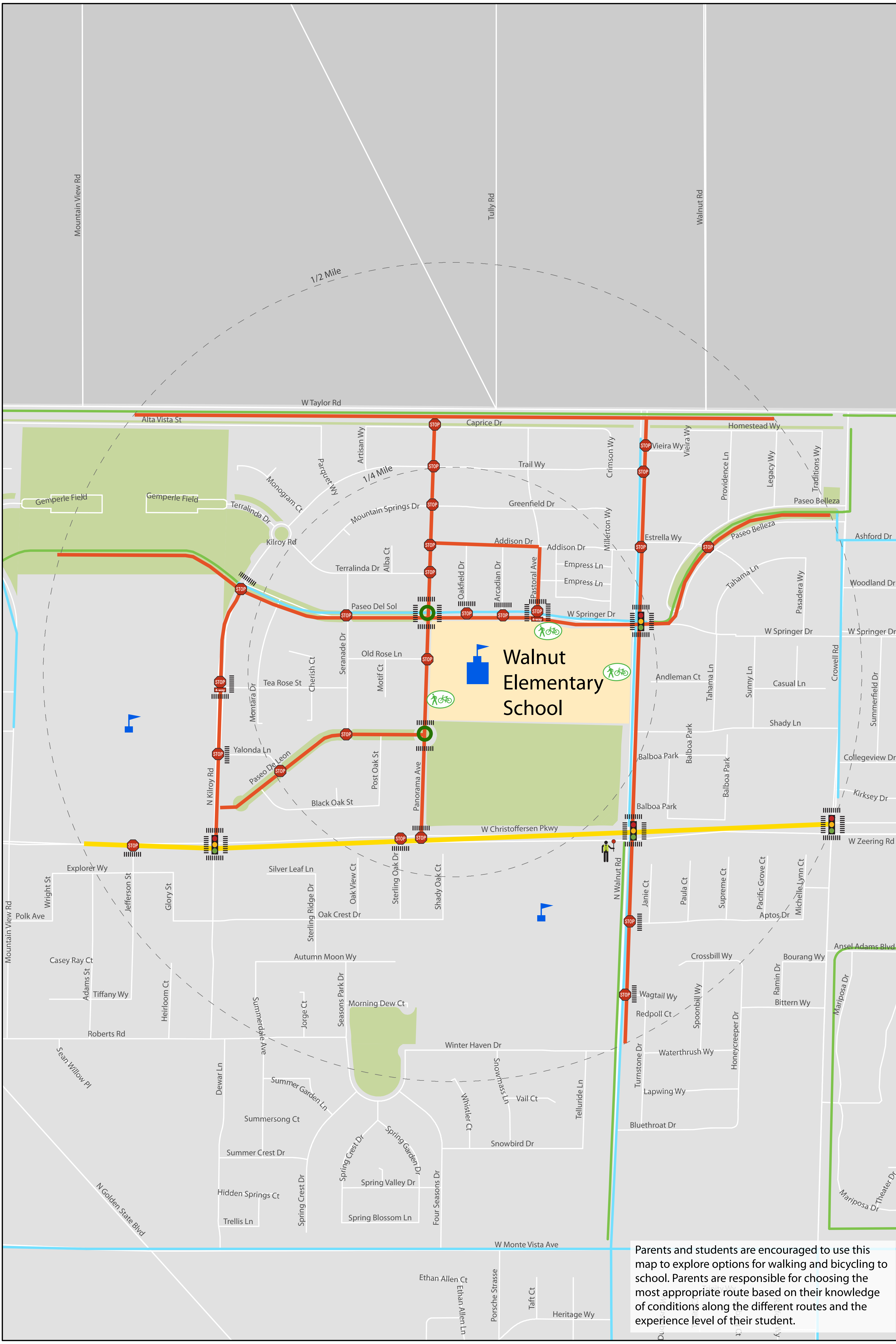


Wakefield Elementary

Data obtained from: The City of Turlock, Stanislaus County, and Omni-Means
Map created: October 2014

- School
- Parks
- Marked Crosswalk
- 4-way Stop
- 2-way Stop
- Signalized Intersection
- Crossing Guard Location
- Bicycle and Pedestrian Access
- Suggested Route (Walking and Biking)
- Limited Bicycle and/or Pedestrian Facility—Use Caution
- Suggested Route (Walking Only)
- Existing Class II
- Existing Class III

0 0.075 0.15 Miles



Parents and students are encouraged to use this map to explore options for walking and bicycling to school. Parents are responsible for choosing the most appropriate route based on their knowledge of conditions along the different routes and the experience level of their student.

Walnut Elementary

- School
- Parks
- Marked Crosswalk
- 4-way Stop
- 2-way Stop
- Signalized Intersection
- Crossing Guard Location
- Roundabout
- Bicycle and Pedestrian Access
- Suggested Route (Walking and Biking)
- Suggested Route (Walking Only)
- Existing Class I
- Existing Class II

0 0.075 0.15 Miles

Data obtained from: The City of Turlock, Stanislaus County, and Omni-Means
Map created: October 2014

Design Toolkit

for the City of Turlock Active Transportation Plan

November 2014

PREPARED BY:
Alta Planning + Design
129 L Street
Sacramento, CA 95814

Contents

Introduction

This technical handbook is intended to assist the City of Turlock in the selection and design of bicycle facilities. The following chapters pull together best practices by facility type from public agencies and municipalities nationwide. Within the design guidance, treatments are covered within a single sheet tabular format relaying important design information and discussion, example photos, schematics (if applicable), and existing summary guidance from current standards. Existing standards are referenced throughout and should be the first source of information when seeking to implement any of the treatments featured here.

Guiding Principles

The following are guiding principles for this design manual:

- **The walking and bicycling environment should be safe.** All bicycling and walking routes should be physically safe and perceived as safe by all users. Safe means minimal conflicts with external factors, such as noise, vehicular traffic and protruding architectural elements. Safe also means routes are clear and well marked with appropriate pavement markings and directional signage.

- **The pedestrian and bicycle network should be accessible.** Sidewalks, shared use paths, bike routes and crosswalks should permit the mobility of residents of all ages and abilities. The pedestrian and bicycle network should employ principles of universal design. Bicyclists have a range of skill levels, and facilities should be designed with a goal of providing for inexperienced/recreational bicyclists (especially children and seniors) to the greatest extent possible.

- **Pedestrian and bicycle network improvements should be economical.** Pedestrian and bicycle improvements should achieve the maximum benefit for their cost, including initial cost and maintenance cost, as well as a reduced reliance on more expensive modes of transportation. Where possible, improvements in the right-of-way should stimulate, reinforce and connect with adjacent private improvements.

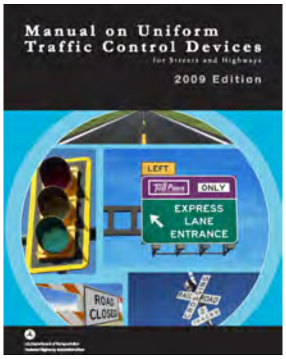
- **The pedestrian and bicycle network should connect to places people want to go.** The pedestrian and bicycle network should provide continuous direct routes and convenient connections between destinations such as homes, schools, shopping areas, public services, recreational opportunities and transit. A complete network of on-street bicycling facilities should connect seamlessly to existing and proposed shared use paths to complete recreational and commuting routes.

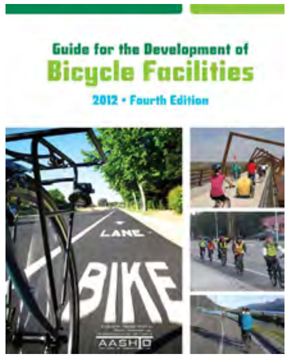
- **The walking and bicycling environment should be clear and easy to use.** Sidewalks, shared use paths and crossings should allow all people to easily find a direct route to a destination with minimal delays, regardless of whether these persons have mobility, sensory, or cognitive disability impairments. All roads are legal for the use of pedestrians and bicyclists (except freeways, from which each is prohibited unless a separate facility on that right of way is provided). This means that most streets are bicycle facilities and should be designed, marked and maintained accordingly.

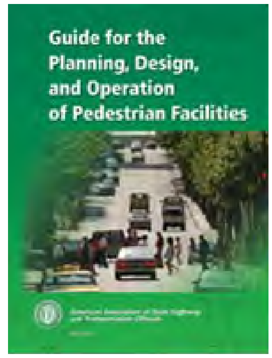
- **The walking and bicycling environment should be attractive and enhance community livability.** Good design should integrate with and support the development of complementary uses and should encourage preservation and construction of art, landscaping and other items that add value to communities. These components might include open spaces such as plazas, courtyards and squares, and amenities like street furniture, banners, art, plantings and special paving. These along with historical elements and cultural references, should promote a sense of place. Public activities should be encouraged and the municipal code should permit commercial activities such as dining, vending and advertising when they do not interfere with safety and accessibility.

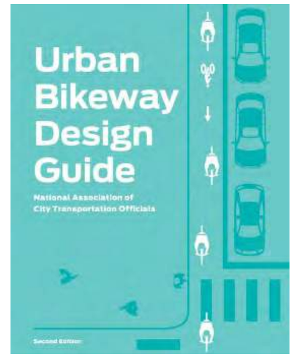
- **Design guidelines are flexible and should be applied using professional judgment.** This document references specific national guidelines for bicycle and pedestrian facility design, as well as a number of design treatments not specifically covered under current guidelines. Statutory and regulatory guidance may change. For this reason, the guidance and recommendations in this document function to complement other resources considered during a design process, and in all cases sound engineering judgment should be used.

National Standards









The Federal Highway Administration's **Manual on Uniform Traffic Control Devices** (MUTCD) defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public traffic. The MUTCD is the primary source for guidance on lane striping requirements, signal warrants, and recommended signage and pavement markings.

To further clarify the MUTCD, the FHWA created a table of contemporary bicycle facilities that lists various bicycle-related signs, markings, signals, and other treatments and identifies their official status (e.g., can be implemented, currently experimental). See **Bicycle Facilities and the Manual on Uniform Traffic Control Devices.**[1]

Bikeway treatments not explicitly covered by the MUTCD are often subject to experiments, interpretations and official rulings by the FHWA. The **MUTCD Official Rulings** is a resource that allows website visitors to obtain information about these supplementary materials. Copies of various documents (such as incoming request letters, response letters from the FHWA, progress reports, and final reports) are available on this website.[2]

American Association of State Highway and Transportation Officials (AASHTO) **Guide for the Development of Bicycle Facilities**, updated in June 2012 provides guidance on dimensions, use, and layout of specific bicycle facilities. The standards and guidelines presented by AASHTO provide basic information, such as minimum sidewalk widths, bicycle lane dimensions, detailed striping requirements and recommended signage and pavement markings.

The National Association of City Transportation Officials' (NACTO) 2012 **Urban Bikeway Design Guide**[3] is the newest publication of nationally recognized bicycle-specific design standards, and offers guidance on the current state of the practice designs. The NACTO Urban Bikeway Design Guide is based on current practices in the best cycling cities in the world. The intent of the guide is to offer substantive guidance for cities seeking to improve bicycle transportation in places where competing demands for the use of the right of way present unique challenges. All of the NACTO Urban Bikeway Design Guide treatments are in use internationally and in many cities around the US.

Offering similar guidance for pedestrian design, the 2004 AASHTO **Guide for the Planning, Design and Operation of Pedestrian Facilities** provides comprehensive guidance on planning and designing for people on foot.

Some of these treatments are not directly referenced in the current versions of the AASHTO Guide or the MUTCD, although many of the elements of these treatments are found within these documents. In all cases, engineering judgment is recommended to ensure that the application makes sense for the context of each treatment, given the many complexities of urban streets.

1 *Bicycle Facilities and the Manual on Uniform Traffic Control Devices. (2011). FHWA. http://www.fhwa.dot.gov/environment/bikeped/mutcd_bike.htm*
2 *MUTCD Official Rulings. FHWA. http://mutcd.fhwa.dot.gov/orsearch.asp*
3 *http://nacto.org/cities-for-cycling/design-guide/*

State Standards

California Manual on Uniform Traffic Control Devices (MUTCD) (2012)

The California MUTCD 2012 an amended version of the 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.

California Highway Design Manual (HDM) (2012)

This manual establishes uniform policies and procedures to carry out highway design functions for the California Department of Transportation. The 2012 edition incorporated Complete Streets focused revisions to address the Department Directive 64 R-1.

Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians (2010)

This California Department of Transportation reference guide 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)

This Caltrans informational guide reflects California's current manuals and policies that improve multimodal access, livability and sustainability within the transportation system. The guide recognizes the overlapping and sometimes competing needs of main streets.

Caltrans Memo: Design Flexibility in Multimodal Design. April 2014.

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

Additional US Federal Guidelines

Meeting the requirements of the Americans with Disabilities Act (ADA) is an important part of any bicycle and pedestrian facility project. The United States Access Board's proposed Public Rights-of-Way Accessibility Guidelines[4] (PROWAG) and the 2010 ADA Standards for Accessible Design[5] (2010 Standards) contain standards and guidance for the construction of accessible facilities. This includes requirements for sidewalk curb ramps, slope requirements, and pedestrian railings along stairs.

The 2011 AASHTO: A Policy on Geometric Design of Highways and Streets commonly referred to as the "Green Book," contains the current design research and practices for highway and street geometric design.

4 http://www.access-board.gov/prowac/
5 http://www.ada.gov/2010ADAstandards_index.htm

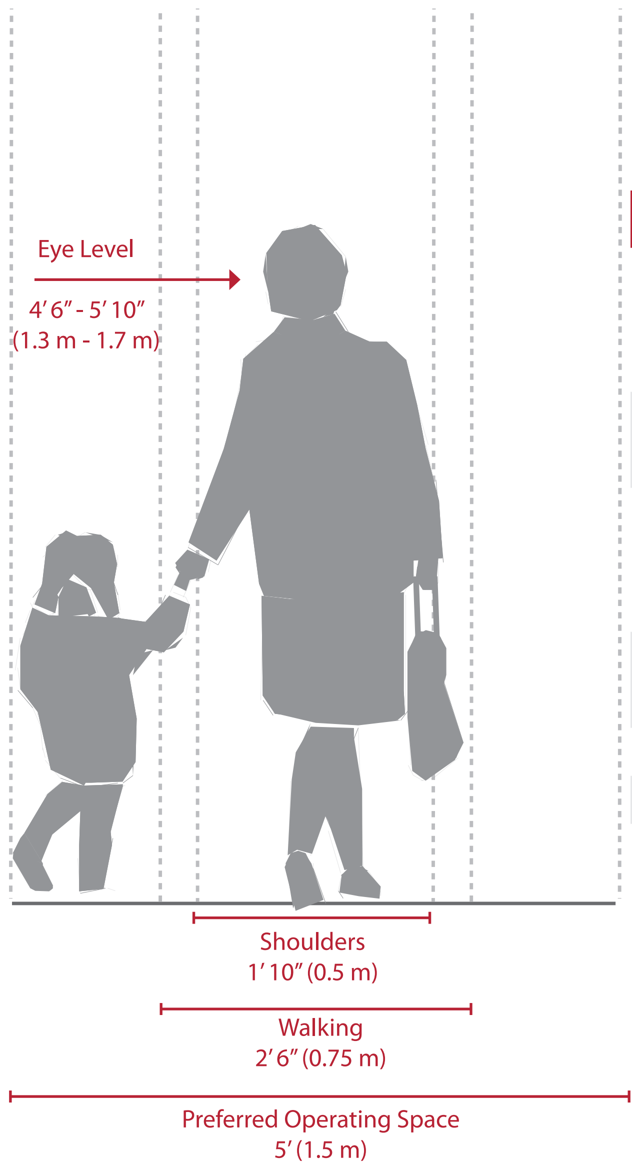
PEDESTRIANS

Design Needs of Pedestrians

Types of Pedestrians

Pedestrians have a variety of characteristics and the transportation network should accommodate a variety of needs, abilities, and possible impairments. Age is one major factor that affects pedestrians' physical characteristics, walking speed, and environmental perception. Children have low eye height and walk at slower speeds than adults. They also perceive the environment differently at various stages of their cognitive development. Older adults walk more slowly and may require assistive devices for walking stability, sight, and hearing. The table below summarizes common pedestrian characteristics for various age groups.

The MUTCD recommends a normal walking speed of 3.5 feet per second when calculating the pedestrian clearance interval at traffic signals. The walking speed can drop to 3 feet per second for areas with older populations and persons with mobility impairments. While the type and degree of mobility impairment varies greatly across the population, the transportation system should accommodate these users to the greatest reasonable extent.



Pedestrian Characteristics by Age

Age	Characteristics
0-4	Learning to walk
	Requires constant adult supervision
	Developing peripheral vision and depth perception
5-8	Increasing independence, but still requires supervision
	Poor depth perception
9-13	Susceptible to "dart out" intersection dash
	Poor judgment
	Sense of invulnerability
14-18	Improved awareness of traffic environment
	Poor judgment
19-40	Active, fully aware of traffic environment
41-65	Slowing of reflexes
65+	Difficulty crossing street
	Vision loss
	Difficulty hearing vehicles approaching from behind

Source: AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, Exhibit 2-1. 2004.

The table below summarizes common physical and cognitive impairments, how they affect personal mobility, and recommendations for improved pedestrian-friendly design.

Disabled Pedestrian Design Considerations

Impairment	Effect on Mobility	Design Solution
Wheelchair and Scooter Users	Difficulty propelling over uneven or soft surfaces.	Firm, stable surfaces and structures, including ramps or beveled edges.
	Cross-slopes cause wheelchairs to veer downhill.	Cross-slopes of less than two percent.
	Require wider path of travel.	Sufficient width and maneuvering space.
Walking Aid Users	Difficulty negotiating steep grades and cross slopes; decreased stability.	Smooth, non-slipperly travel surface.
	Slower walking speed and reduced endurance; reduced ability to react.	Longer pedestrian signal cycles, shorter crossing distances, median refuges, and street furniture.
Hearing Impairment	Less able to detect oncoming hazards at locations with limited sight lines (e.g. driveways, angled intersections, channelized right turn lanes) and complex intersections.	Longer pedestrian signal cycles, clear sight distances, highly visible pedestrian signals and markings.
Vision Impairment	Limited perception of path ahead and obstacles; reliance on memory; reliance on non-visual indicators (e.g. sound and texture).	Accessible text (larger print and raised text), accessible pedestrian signals (APS), guide strips and detectable warning surfaces, safety barriers, and lighting.
Cognitive Impairment	Varies greatly. Can affect ability to perceive, recognize, understand, interpret, and respond to information.	Signs with pictures, universal symbols, and colors, rather than text.

Sidewalks

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel that is separated from vehicle traffic. Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped planting strip area. Sidewalks are a common application in both urban and suburban environments.

Attributes of well-designed sidewalks include the following:

Accessibility: A network of sidewalks should be accessible to all users.

Adequate width: Two people should be able to walk side-by-side and pass a third comfortably. Different walking speeds should be possible. In areas of intense pedestrian use, sidewalks should accommodate the high volume of walkers.

Safety: Design features of the sidewalk should allow pedestrians to have a sense of security and predictability. Sidewalk users should not feel they are at risk due to the presence of adjacent traffic.

Continuity: Walking routes should be obvious and should not require pedestrians to travel out of their way unnecessarily.

Landscaping: Plantings and street trees should contribute to the overall psychological and visual comfort of sidewalk users, and be designed in a manner that contributes to the safety of people.

Drainage: Sidewalks should be well graded to minimize standing water.

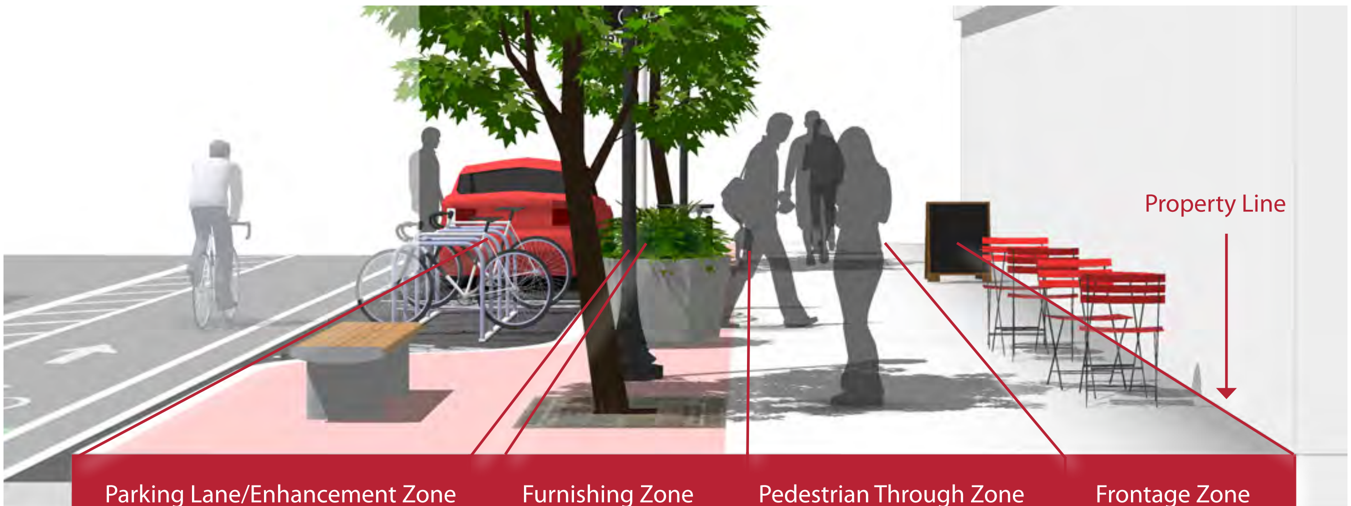
Social space: There should be places for standing, visiting, and sitting. The sidewalk area should be a place where adults and children can safely participate in public life.

Quality of place: Sidewalks should contribute to the character of neighborhoods and business districts.

Zones in the Sidewalk Corridor

Description

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel separated from vehicle traffic. A variety of considerations are important in sidewalk design. Providing adequate and accessible facilities can lead to increased numbers of people walking, improved safety, and the creation of social space.



Parking Lane/Enhancement Zone

The parking lane can act as a flexible space to further buffer the sidewalk from moving traffic. Curb extensions and bike corrals may occupy this space where appropriate.

In the edge zone there should be a 6 inch wide curb.

Edge Zone

Furnishing Zone

The furnishing zone buffers pedestrians from the adjacent roadway, and is also the area where elements such as street trees, signal poles, signs, and other street furniture are properly located.

Pedestrian Through Zone

The through zone is the area intended for pedestrian travel. This zone should be entirely free of permanent and temporary objects.

Wide through zones are needed in downtown areas or where pedestrian flows are high.

Frontage Zone

The Frontage Zone allows pedestrians a comfortable "shy" distance from the building fronts. It provides opportunities for window shopping, to place signs, planters, or chairs.

Not applicable if adjacent to a landscaped space.

Discussion

Sidewalks should be more than areas to travel; they should provide places for people to interact. There should be places for standing, visiting, and sitting. Sidewalks should contribute to the character of neighborhoods and business districts, strengthen their identity, and be an area where adults and children can safely participate in public life.

Additional References and Guidelines

United States Access Board. *Proposed Accessibility Guidelines for Pedestrian Facilities in the Public-Right-of-Way (PROWAG)*. 2011.
AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities.* 2004.
NACTO. *Urban Street Design Guide*. 2013.
Caltrans. *Main Street, California.* 2013.

Materials and Maintenance

Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped space. Colored, patterned, or stamped concrete can add distinctive visual appeal.

Sidewalk Widths

Description

The width and design of sidewalks will vary depending on street context, functional classification, and pedestrian demand. Below are preferred widths of each sidewalk zone according to general street type. Standardizing sidewalk guidelines for different areas of the city, dependent on the above listed factors, ensures a minimum level of quality for all sidewalks.

Street Classification	Parking Lane/ Enhancement Zone	Furnishing Zone	Pedestrian Through Zone	Frontage Zone	Total
Local Streets	Varies	2 - 5 feet	4 - 6 feet	N/A	6 - 11 feet
Commercial Areas	Varies	4 - 6 feet	6 - 12 feet	2.5 - 10 feet	11 - 28 feet
Arterials and Collectors	Varies	2 - 6 feet	4 - 8 feet	2.5 - 5 feet	8 -19 feet

Areas that have significant accumulations of snow during the winter may prefer a wider furnishing zone for snow storage.

Six feet enables two pedestrians (including wheelchair users) to walk side-by-side, or to pass each other comfortably

Discussion

It is important to provide adequate width along a sidewalk corridor. Two people should be able to walk side-by-side and pass a third comfortably. In areas of high demand, sidewalks should contain adequate width to accommodate the high volumes and different walking speeds of pedestrians. The Americans with Disabilities Act requires a 4 foot clear width in the pedestrian zone plus 5 foot passing areas every 200 feet.

Additional References and Guidelines

United States Access Board. *Proposed Accessibility Guidelines for Pedestrian Facilities in the Public-Right-of-Way (PROWAG).* 2011.
AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities.* 2004.
NACTO. *Urban Street Design Guide.* 2013.
Caltrans. *Main Street, California.* 2013.

Materials and Maintenance

Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped boulevard. Surfaces must be firm, stable, and slip resistant. Colored, patterned, or stamped concrete can add distinctive visual appeal.

Sidewalk Obstructions and Driveway Ramps

Description

Obstructions to pedestrian travel in the sidewalk corridor typically include driveway ramps, curb ramps, sign posts, utility and signal poles, mailboxes, fire hydrants and street furniture.

Guidance

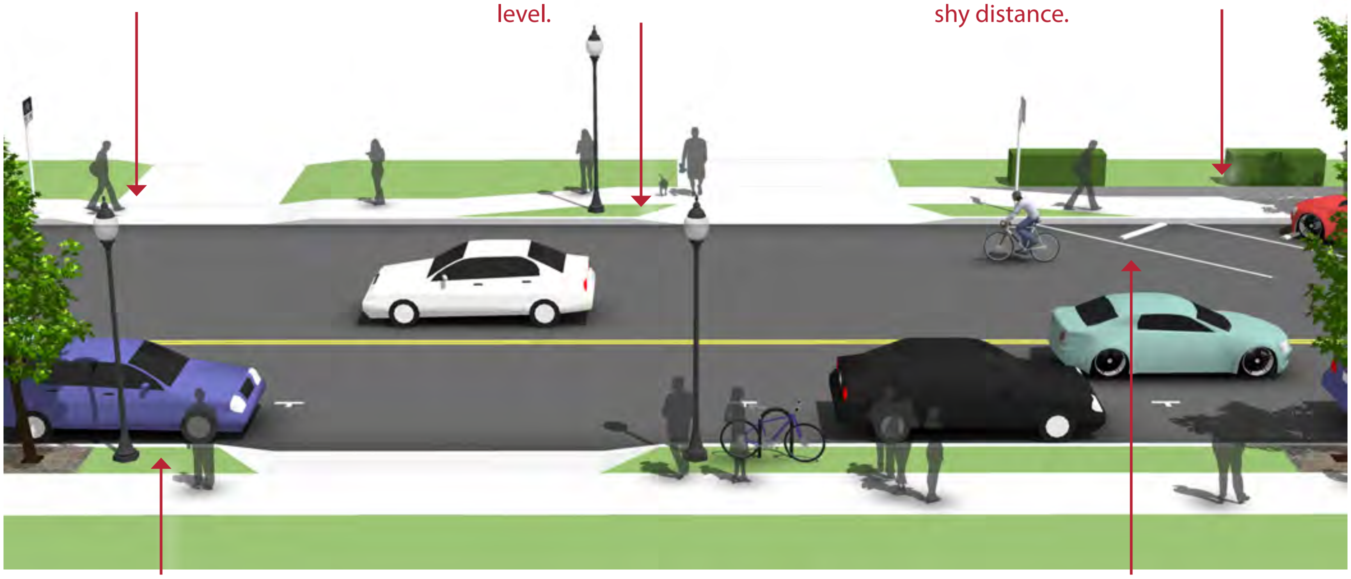
Reducing the number of accesses reduces the need for special provisions. This strategy should be pursued first.

Obstructions should be placed between the sidewalk and the roadway to create a buffer for increased pedestrian comfort.

Dipping the entire sidewalk at the driveway approaches keeps the cross-slope at a constant grade. This is the least-preferred driveway option.

Where constraints preclude a planter strip, wrapping the sidewalk around the driveway allows the sidewalk to still remain level.

When sidewalks abut hedges, fences, or buildings, an additional two feet of lateral clearance should be added to provide appropriate shy distance.



Planter strips allow sidewalks to remain level, with the driveway grade change occurring within the planter strip.

When sidewalks abut angled on-street parking, wheel stops should be used to prevent vehicles from overhanging in the sidewalk.

Discussion

Driveways are a common sidewalk obstruction, especially for wheelchair users. When constraints only allow curb-tight sidewalks, dipping the entire sidewalk at the driveway approaches keeps the cross-slope at a constant grade. However, this may be uncomfortable for pedestrians and could create drainage problems behind the sidewalk.

Additional References and Guidelines

USDOJ. *ADA Standards for Accessible Design.* 2010.
United States Access Board. *Proposed Accessibility Guidelines for Pedestrian Facilities in the Public-Right-of-Way (PROWAG).* 2011.
AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities.* 2004.

Materials and Maintenance

Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped space. Surfaces must be firm, stable, and slip resistant.

Pedestrian Amenities

Description

A variety of streetscape elements can define the pedestrian realm, offer protection from moving vehicles, and enhance the walking experience. Key features are presented below.

Street Trees

In addition to their aesthetic and environmental value, street trees can slow traffic and improve safety for pedestrians. Trees add visual interest to streets and narrow the street's visual corridor, which may cause drivers to slow down. It is important that trees do not block light or the vision triangle.

Street Furniture

Providing benches at key rest areas and viewpoints encourages people of all ages to use the walkways by ensuring that they have a place to rest along the way. Benches should be 20" tall to accommodate elderly pedestrians comfortably. Benches can be simple (e.g., wood slats) or more ornate (e.g., stone, wrought iron, concrete). If alongside a parking zone, street furniture should be placed to minimize interference with passenger loading.

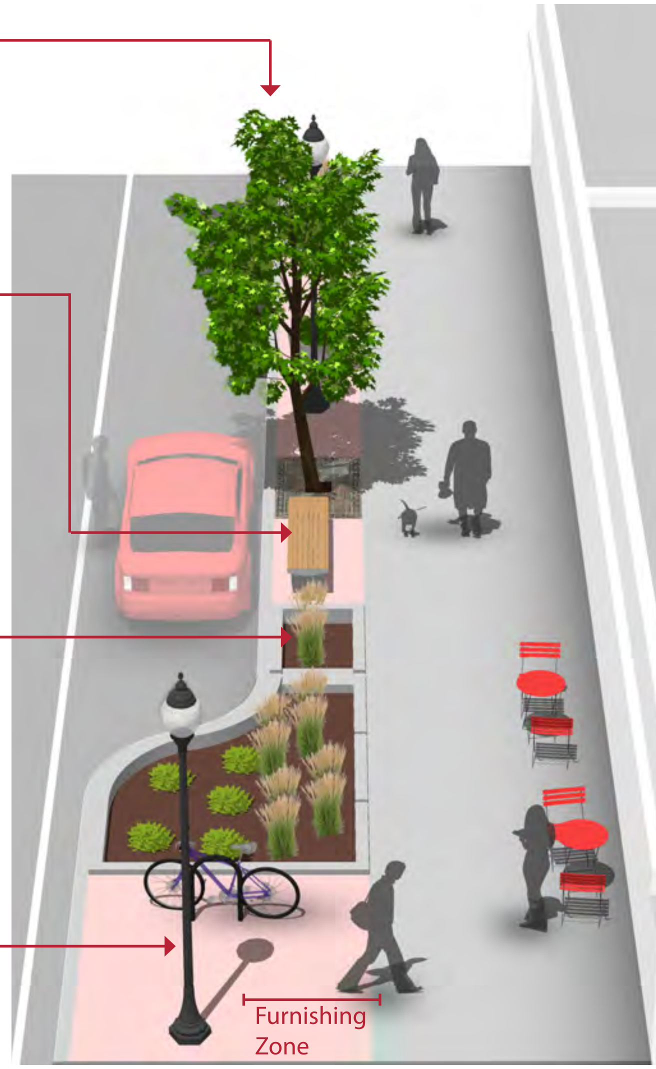
Green Features

Green stormwater strategies may include bioretention swales, rain gardens, tree box filters, and pervious pavements (pervious concrete, asphalt and pavers).

Bioswales are natural landscape elements that manage water runoff from a paved surface. Plants in the swale trap pollutants and silt from entering a river system.

Lighting

Pedestrian scale lighting improves visibility for both pedestrians and motorists - particularly at intersections. Pedestrian scale lighting can provide a vertical buffer between the sidewalk and the street, defining pedestrian areas. Pedestrian scale lighting should be used in areas of high pedestrian activity.



Discussion

Additional pedestrian amenities such as banners, public art, special paving, along with historical elements and cultural references, promote a sense of place. Public activities should be encouraged and commercial activities such as dining, vending and advertising may be permitted when they do not interfere with safety and accessibility.

Pedestrian amenities should be placed in the furnishing zone on a sidewalk corridor. Signs, meters, tree wells should go between parking spaces.

Additional References and Guidelines

United States Access Board. *Proposed Accessibility Guidelines for Pedestrian Facilities in the Public-Right-of-Way (PROWAG)*. 2011.
NACTO. *Urban Street Design Guide*. 2013.
Caltrans. *Main Street, California*. 2013.

Materials and Maintenance

Establishing and caring for your young street trees is essential to their health. Green features may require routine maintenance, including sediment and trash removal, and clearing curb openings and overflow drains.

Pedestrians at Intersections

Attributes of pedestrian-friendly intersection design include:

Clear Space: Corners should be clear of obstructions. They should also have enough room for curb ramps, for transit stops where appropriate, and for street conversations where pedestrians might congregate.

Visibility: It is critical that pedestrians on the corner have a good view of vehicle travel lanes and that motorists in the travel lanes can easily see waiting pedestrians.

Legibility: Symbols, markings, and signs used at corners should clearly indicate what actions the pedestrian should take.

Accessibility: All corner features, such as curb ramps, landings, call buttons, signs, symbols, markings, and textures, should meet accessibility standards and follow universal design principles.

Separation from Traffic: Corner design and construction should be effective in discouraging turning vehicles from driving over the pedestrian area. Crossing distances should be minimized.

Lighting: Adequate lighting is an important aspect of visibility, legibility, and accessibility.

These attributes will vary with context but should be considered in all design processes. For example, suburban and rural intersections may have limited or no signing. However, legibility regarding appropriate pedestrian movements should still be taken into account during design.

Marked Crosswalks

Description

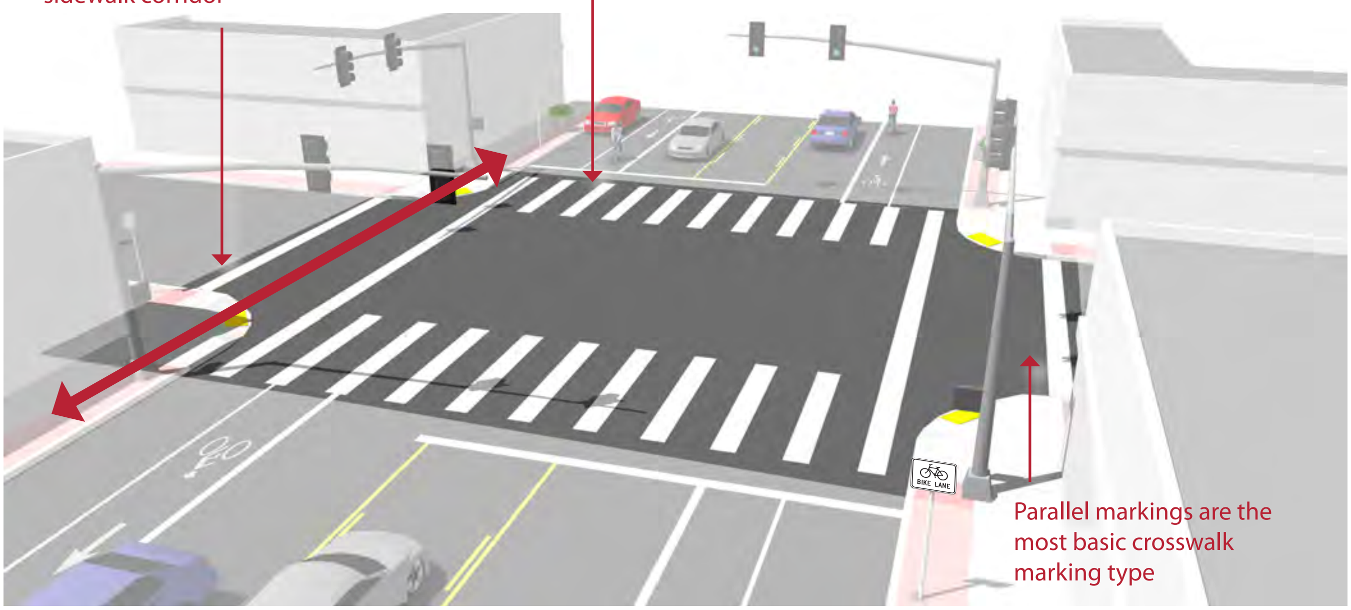
A marked crosswalk signals to motorists that they must stop for pedestrians and encourages pedestrians to cross at designated locations. Installing crosswalks alone will not necessarily make crossings safer especially on multi-lane roadways.

At mid-block locations, crosswalks can be marked where there is a demand for crossing and there are no nearby marked crosswalks.

Guidance

At signalized intersections, all crosswalks should be marked. At un-signalized intersections, crosswalks may be marked under the following conditions:

- At a complex intersection, to orient pedestrians in finding their way across.
- At an offset intersection, to show pedestrians the shortest route across traffic with the least exposure to vehicular traffic and traffic conflicts.
- At an intersection with visibility constraints, to position pedestrians where they can best be seen by oncoming traffic.
- At an intersection within a school zone on a walking route.



Discussion

High visibility crosswalk markings should be used at crossings with high pedestrian use or where vulnerable pedestrians are expected, including: school crossings, across arterial streets for pedestrian-only signals, at mid-block crosswalks, and at intersections where there is expected high pedestrian use and the crossing is not controlled by signals or stop signs.

Additional References and Guidelines

FHWA. *Manual on Uniform Traffic Control Devices. (3B.18). 2009.*
AASHTO. Guide for the Planning, Design, and Operation of Pedestrian Facilities. 2004.
FHWA. *Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations.* 2005.
FHWA. *Crosswalk Marking Field Visibility Study.* 2010.
NACTO. *Urban Street Design Guide*. 2013.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority. Thermoplastic markings offer increased durability than conventional paint.

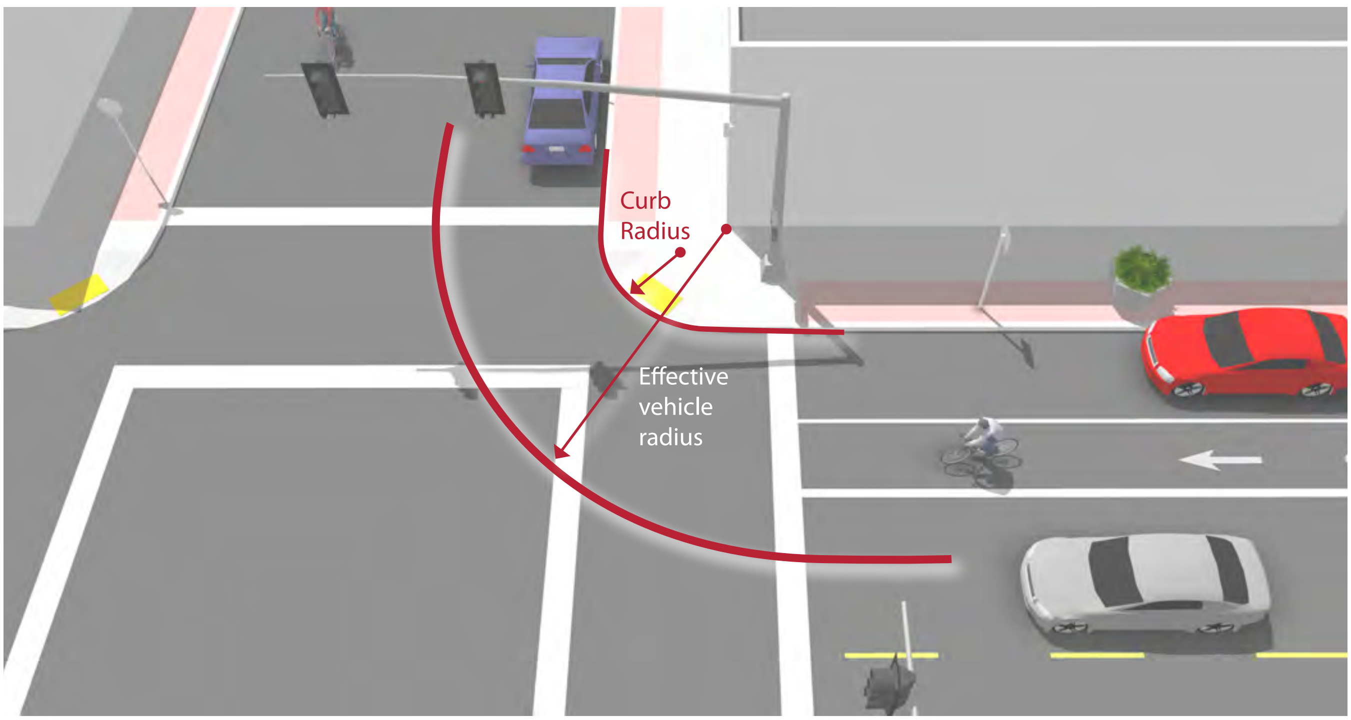
Minimizing Curb Radii

Description

The size of a curb's radius can have a significant impact on pedestrian comfort and safety. A smaller curb radius provides more pedestrian area at the corner, allows more flexibility in the placement of curb ramps, results in a shorter crossing distance and requires vehicles to slow more on the intersection approach. During the design phase, the chosen radius should be the smallest possible for the circumstances.

Guidance

The radius may be as small as 3 ft where there are no turning movements, or 5 ft where there are turning movements, adequate street width, and a larger effective curb radius created by parking or bike lanes.



Discussion

Several factors govern the choice of curb radius in any given location. These include the desired pedestrian area of the corner, traffic turning movements, street classifications, design vehicle turning radius, intersection geometry, and whether there is parking or a bike lane (or both) between the travel lane and the curb.

Additional References and Guidelines

AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities.* 2004.
Caltrans. *Complete Intersections.* 2010.
NACTO. *Urban Street Design Guide*. 2013.

Materials and Maintenance

Improperly designed curb radii at corners may be subject to damage by large trucks.

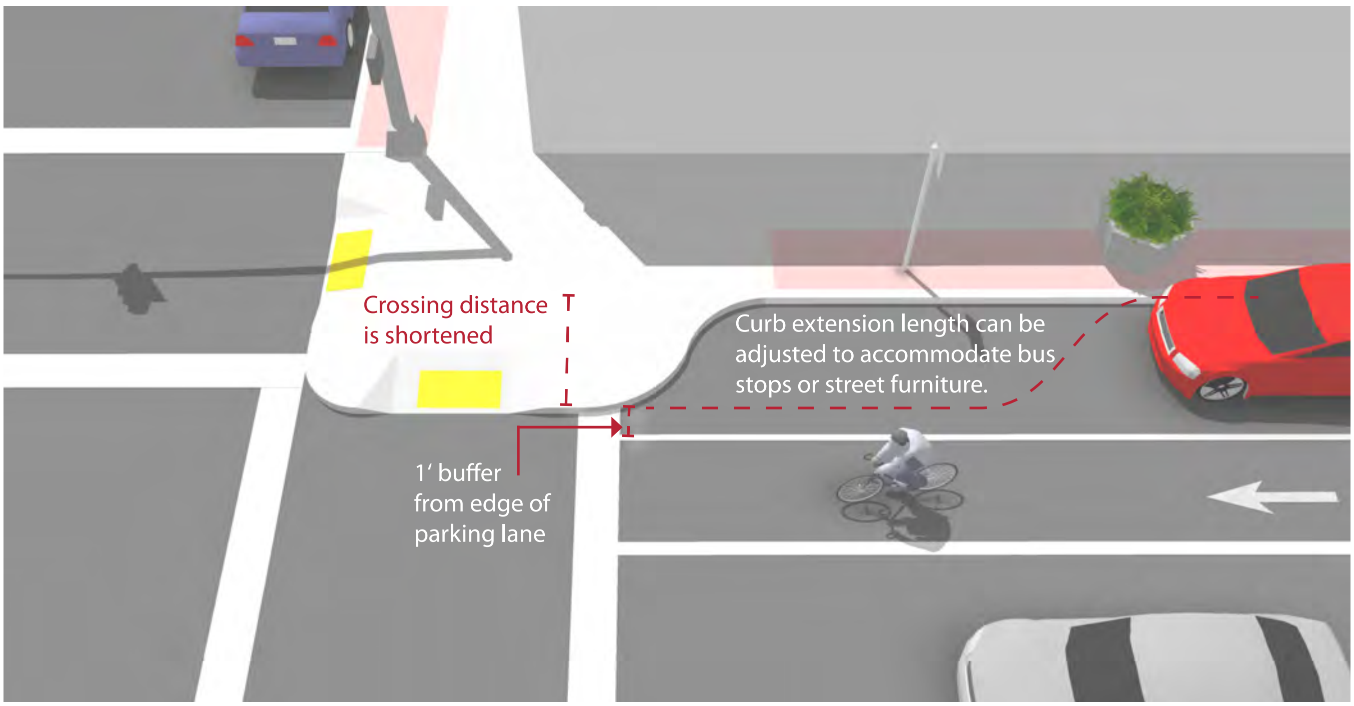
Curb Extensions

Description

Curb extensions minimize pedestrian exposure during crossing by shortening crossing distance and giving pedestrians a better chance to see and be seen before committing to crossing. They are appropriate for any crosswalk where it is desirable to shorten the crossing distance and there is a parking lane adjacent to the curb.

Guidance

- In most cases, the curb extensions should be designed to transition between the extended curb and the running curb in the shortest practicable distance.
- For purposes of efficient street sweeping, the minimum radius for the reverse curves of the transition is 10 ft and the two radii should be balanced to be nearly equal.
- Curb extensions should terminate one foot short of the parking lane to maximize bicyclist safety.



Discussion

If there is no parking lane, adding curb extensions may be a problem for bicycle travel and truck or bus turning movements.

Additional References and Guidelines

AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities.* 2004.
Caltrans. *Complete Intersections.* 2010.
NACTO. *Urban Street Design Guide*. 2013.

Materials and Maintenance

Planted curb extensions may be designed as a bioswale, a vegetated system for stormwater management.

ADA Compliant Curb Ramps

Description

Curb ramps are the design elements that allow all users to make the transition from the street to the sidewalk. There are a number of factors to be considered in the design and placement of curb ramps at corners. Properly designed curb ramps ensure that the sidewalk is accessible from the roadway. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access.

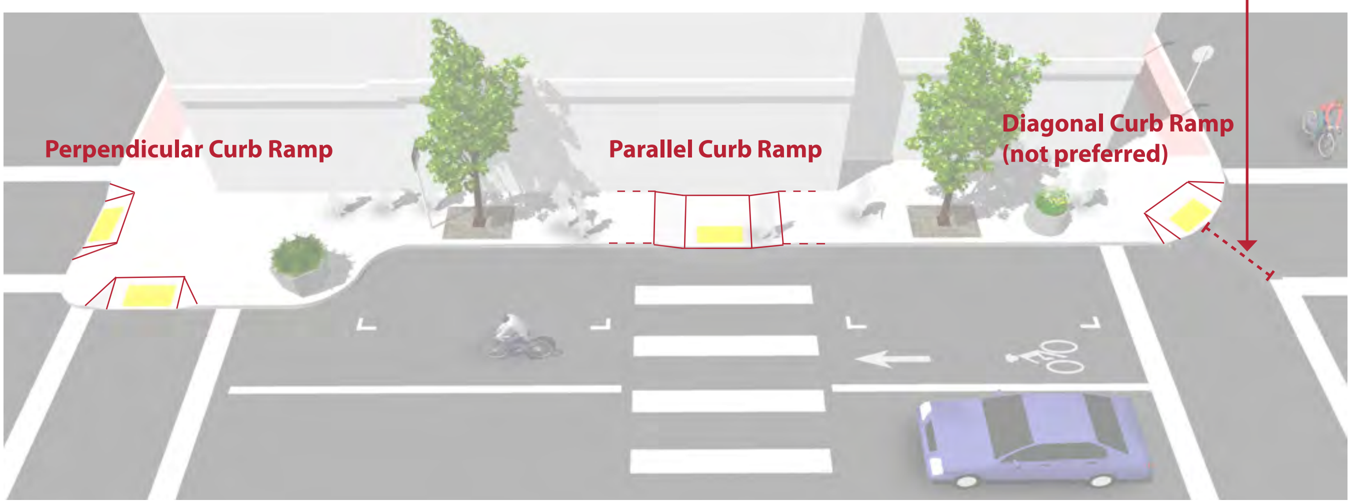
Although diagonal curb ramps might save money, they create potential safety and mobility problems for pedestrians,including reduced maneuverability and increased interaction with turning vehicles, particularly in areas with high traffic volumes. Diagonal curb ramp configurations are the least preferred of all options.

Guidance

- The landing at the top of a ramp shall be at least 4 feet long and at least the same width as the ramp itself.
- The ramp shall slope no more than 1:12 , with a maximum cross slope of 2.0%.
- If the ramp runs directly into a crosswalk, the landing at the bottom will be in the roadway.
- If the ramp lands on a dropped landing within the sidewalk or corner area where someone in a wheel-chair may have to change direction, the landing must be a minimum of 5'-0" long and at least as wide as the ramp, although a width of 5'-0" is preferred.

Curb ramps shall be located so that they do not project into vehicular traffic lanes, parking spaces, or parking access aisles. Three configurations are illustrated below.

Diagonal ramps shall include a clear space of at least 48" within the crosswalk for user maneuverability



Crosswalk spacing not to scale. For illustration purposes only.

Discussion

The edge of an ADA compliant curb ramp may be marked with a tactile warning device (also known as truncated domes) to alert people with visual impairments to changes in the pedestrian environment. Contrast between the raised tactile device and the surrounding infrastructure is important so that the change is readily evident. These devices are most effective when adjacent to smooth pavement so the difference is easily detected. The devices should provide color contrast so partially sighted people can see them.

Additional References and Guidelines

United States Access Board. *Accessibility Guidelines for Buildings and Facilities.* 2002.
United States Access Board. *Proposed Accessibility Guidelines for Pedestrian Facilities in the Public-Right-of-Way (PROWAG).* 2011.
USDOJ. *ADA Standards for Accessible Design.* 2010.

Materials and Maintenance

It is critical that the interface between a curb ramp and the street be maintained adequately. Asphalt street sections can develop potholes at the foot of the ramp, which can catch the front wheels of a wheelchair.

Crossing Beacons and Signals

Crossing beacons and signals facilitate crossings of roadways for pedestrians. Beacons make crossing intersections safer by clarifying when to enter an intersection and by alerting motorists to the presence of pedestrians.

Flashing amber warning beacons can be utilized at unsignalized intersection crossings. Push buttons, signage, and pavement markings may be used to highlight these facilities for pedestrians, bicyclists and motorists.

Determining which type of signal or beacon to use for a particular intersection depends on a variety of factors. These include speed limits, traffic volumes, and the anticipated levels of pedestrian traffic.

An intersection with crossing beacons may reduce stress and delays for a crossing users, and discourage illegal and unsafe crossing maneuvers.

Pedestrians at Signalized Crossings


Active Warning Beacons

Hybrid Beacon

Pedestrians at Signalized Crossings

Description

Pedestrian Signal Head

Pedestrian signal indicators demonstrate to pedestrians when to cross at a signalized crosswalk. All traffic signals should be equipped with pedestrian signal indications except where pedestrian crossing is prohibited by signage.

Countdown pedestrian signals are particularly valuable for pedestrians, as they indicate whether a pedestrian has time to cross the street before the signal phase ends. Countdown signals should be used at all signalized intersections.

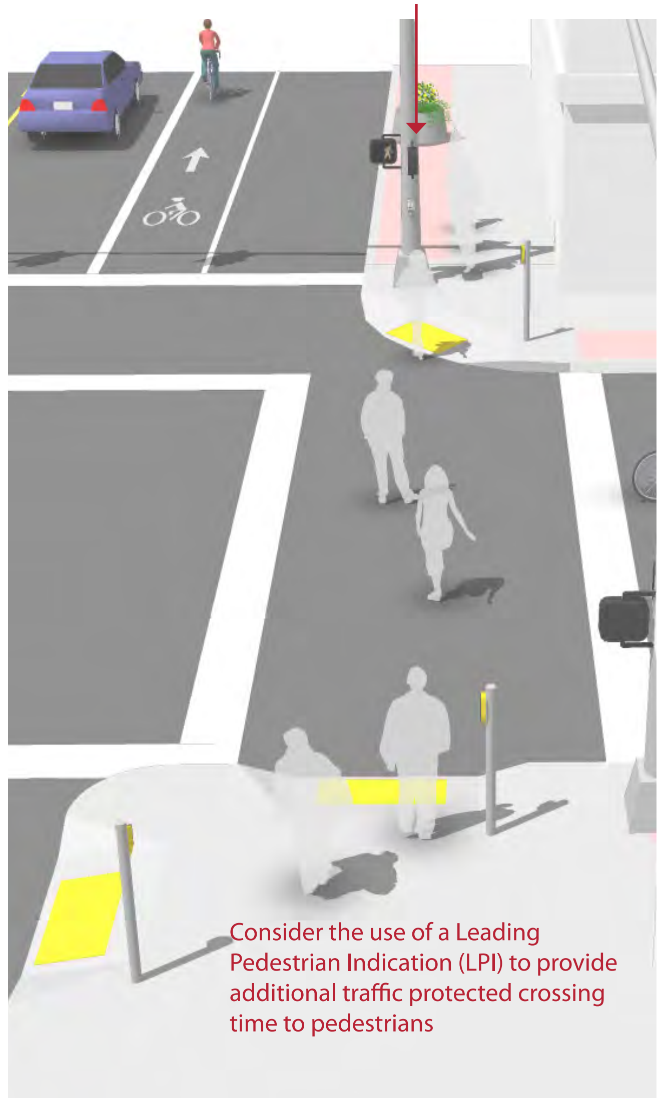
Signal Timing

Providing adequate pedestrian crossing time is a critical element of the walking environment at signalized intersections. The MUTCD recommends traffic signal timing to assume a pedestrian walking speed of 4' per second, meaning that the length of a signal phase with parallel pedestrian movements should provide sufficient time for a pedestrian to safely cross the adjacent street.

At crossings where older pedestrians or pedestrians with disabilities are expected, crossing speeds as low as 3' per second may be assumed. Special pedestrian phases can be used to provide greater visibility or more crossing time for pedestrians at certain intersections.

In busy pedestrian areas such as downtowns, the pedestrian signal indication should be built into each signal phase, eliminating the requirement for a pedestrian to actuate the signal by pushing a button.

Audible pedestrian traffic signals provide crossing assistance to pedestrians with vision impairment at signalized intersections



Consider the use of a Leading Pedestrian Indication (LPI) to provide additional traffic protected crossing time to pedestrians

Discussion

When push buttons are used, they should be located so that someone in a wheelchair can reach the button from a level area of the sidewalk without deviating significantly from the natural line of travel into the crosswalk, and marked (for example, with arrows) so that it is clear which signal is affected.

In areas with very heavy pedestrian traffic, consider an all-pedestrian signal phase to give pedestrians free passage in the intersection when all motor vehicle traffic movements are stopped.

Additional References and Guidelines

United States Access Board. *Proposed Accessibility Guidelines for Pedestrian Facilities in the Public-Right-of-Way (PROWAG).* 2011.
AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities.* 2004.
NACTO. *Urban Street Design Guide.* 2013.

Materials and Maintenance

It is important to repair or replace traffic control equipment before it fails. Consider semi-annual inspections of controller and signal equipment, intersection hardware, and loop detectors.

Active Warning Beacons

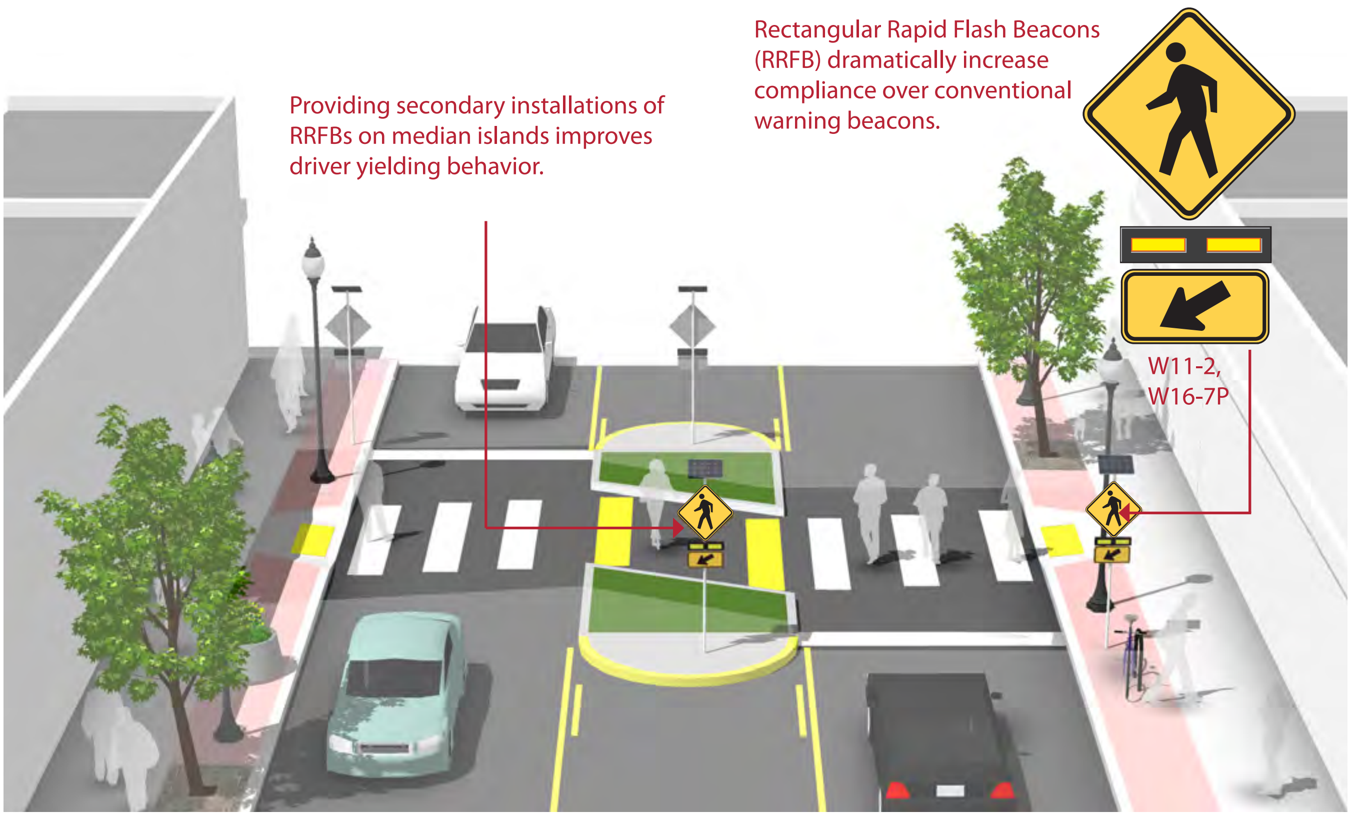
Description

Active warning beacons are user actuated illuminated devices designed to increase motor vehicle yielding compliance at crossings of multi lane or high volume roadways.

Types of active warning beacons include conventional circular yellow flashing beacons, in-roadway warning lights, or Rectangular Rapid Flash Beacons (RRFB).

Guidance

- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic signals.
- Warning beacons shall initiate operation based on pedestrian or bicyclist actuation and shall cease operation at a predetermined time after actuation or, with passive detection, after the pedestrian or bicyclist clears the crosswalk.



Discussion

Rectangular rapid flash beacons have the most increased compliance of all the warning beacon enhancement options.

A study of the effectiveness of going from a no-beacon arrangement to a two-beacon RRFB installation increased yielding from 18 percent to 81 percent. A four-beacon arrangement raised compliance to 88 percent. Additional studies over long term installations show little to no decrease in yielding behavior over time.

Additional References and Guidelines

NACTO. *Urban Bikeway Design Guide.* 2012.
Caltrans *CA-MUTCD. 2012.*
FHWA. *MUTCD - Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11).* 2008.
Caltrans. *Complete Intersections.* 2010.

Materials and Maintenance

Depending on power supply, maintenance can be minimal. If solar power is used, RRFBs should run for years without issue.

Hybrid Beacon for Mid-Block Crossing

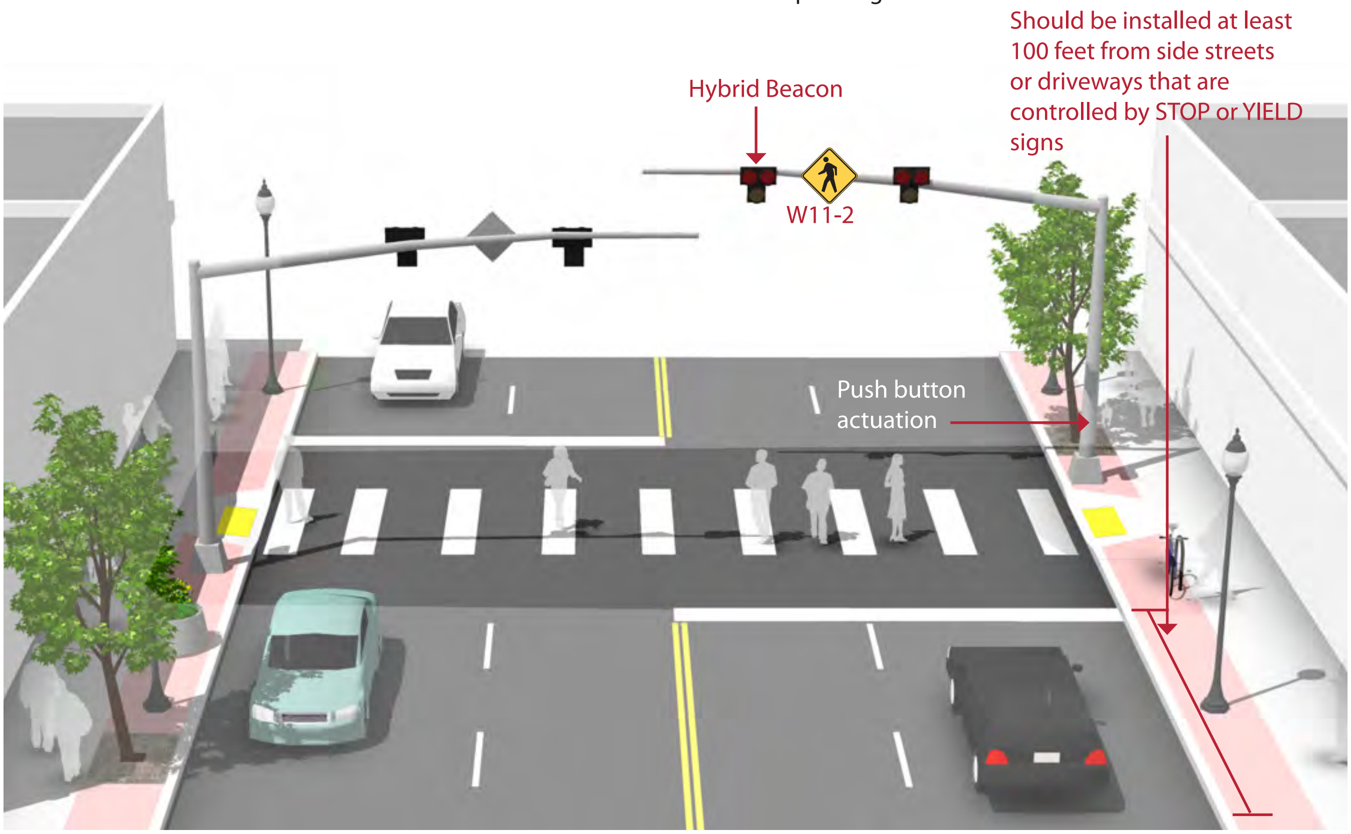
Description

Hybrid beacons are used to improve non-motorized crossings of major streets. A hybrid beacon consists of a signal-head with two red lenses over a single yellow lens on the major street, and a pedestrian signal head for the crosswalk

Guidance

Hybrid beacons may be installed without meeting traffic signal control warrants if roadway speed and volumes are excessive for comfortable pedestrian crossings.

- If installed within a signal system, signal engineers should evaluate the need for the hybrid signal to be coordinated with other signals.
- Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk to provide adequate sight distance.



Discussion

Hybrid beacon signals are normally activated by push buttons, but may also be triggered by infrared, microwave or video detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street.

Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity, and safety.

Additional References and Guidelines

FHWA. *Pedestrian Hybrid Beacon Guide.* 2014.
Caltrans. *Main Street, California, 3rd Edition*. 2013. p 56
Caltrans. *CA-MUTCD. 2012.*
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Hybrid beacons are subject to the same maintenance needs and requirements as standard traffic signals. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

BICYCLISTS

Design Needs of Bicyclists

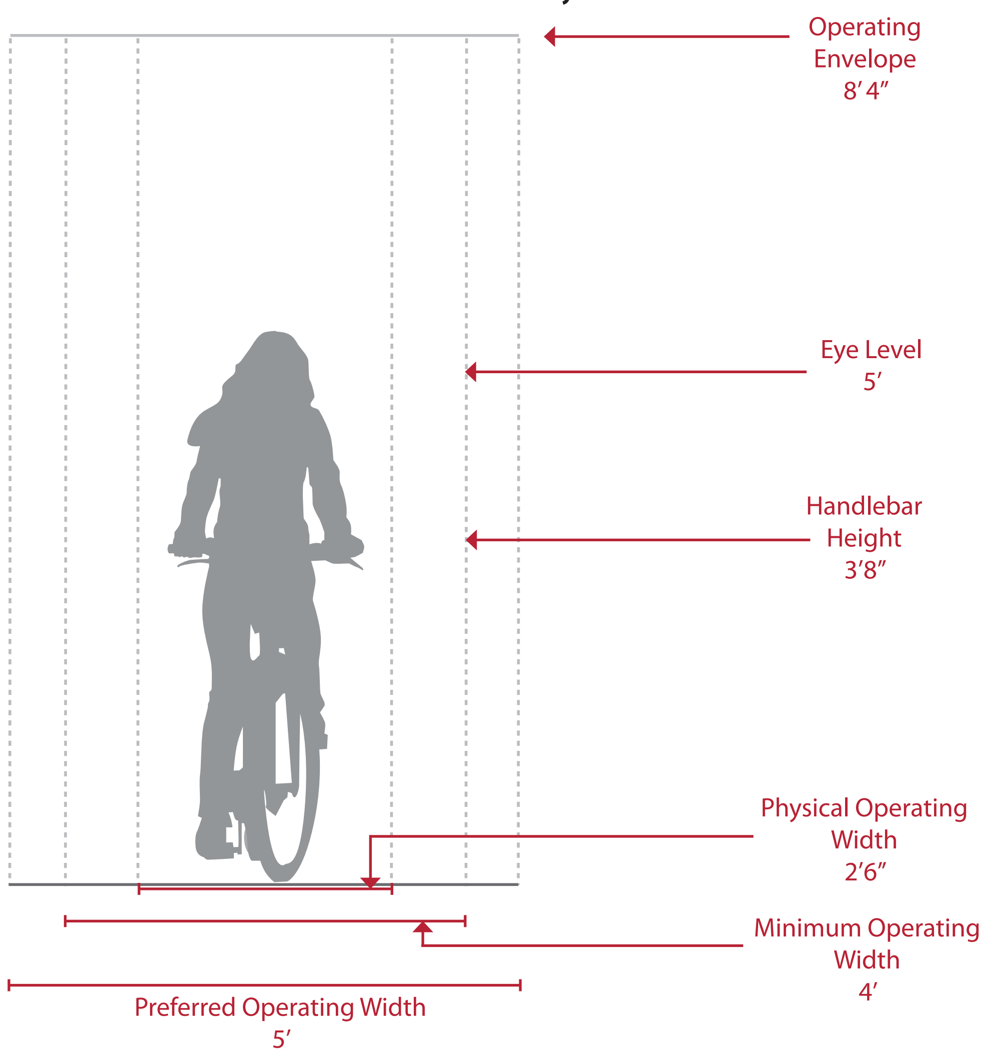
The purpose of this section is to provide the facility designer with an understanding of how bicyclists operate and how their bicycle influences that operation. Bicyclists, by nature, are much more affected by poor facility design, construction and maintenance practices than motor vehicle drivers. Bicyclists lack the protection from the elements and roadway hazards provided by an automobile's structure and safety features. By understanding the unique characteristics and needs of bicyclists, a facility designer can provide quality facilities and minimize user risk.

Bicycle as a Design Vehicle

Similar to motor vehicles, bicyclists and their bicycles exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle or a tricycle), and behavioral characteristics (such as the comfort level of the bicyclist). The design of a bikeway should consider reasonably expected bicycle types on the facility and utilize the appropriate dimensions.

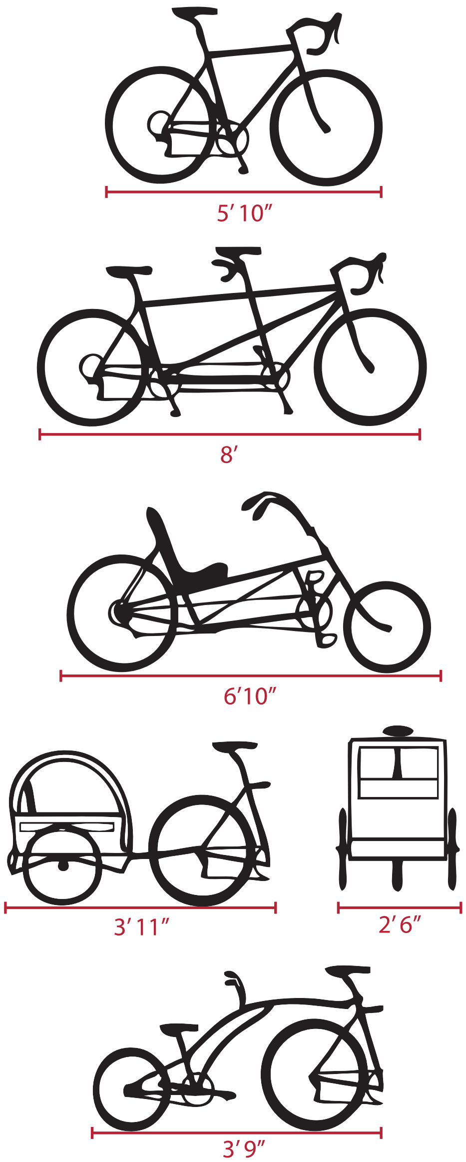
The figure below illustrates the operating space and physical dimensions of a typical adult bicyclist, which are the basis for typical facility design. Bicyclists require clear space to operate within a facility. This is why the minimum operating width is greater than the physical dimensions of the bicyclist. Bicyclists prefer five feet or more operating width, although four feet may be minimally acceptable.

Standard Bicycle Rider Dimensions



Source: AASHTO Guide for the Development of Bicycle Facilities, 4th Edition. 2012.

In addition to the design dimensions of a typical bicycle, there are many other commonly used pedal-driven cycles and accessories to consider when planning and designing bicycle facilities. The most common types include tandem bicycles, recumbent bicycles, and trailer accessories. The figure and table below summarize the typical dimensions for bicycle types.



Bicycle as Design Vehicle - Typical Dimensions

Source: AASHTO *Guide for the Development of Bicycle Facilities*, 4th Edition *AASHTO does not provide typical dimensions for tricycles.

Bicycle as Design Vehicle - Typical Dimensions

Bicycle Type	Feature	Typical Dimensions
Upright Adult Bicyclist	Physical width	2 ft 6 in
	Operating width (Minimum)	4 ft
	Operating width (Preferred)	5 ft
	Physical length	5 ft 10 in
	Physical height of handlebars	3 ft 8 in
	Operating height	8 ft 4 in
	Eye height	5 ft
	Vertical clearance to obstructions (tunnel height, lighting, etc)	10 ft
	Approximate center of gravity	2 ft 9 in - 3 ft 4 in
Recumbent Bicyclist	Physical length	8 ft
	Eye height	3 ft 10 in
Tandem Bicyclist	Physical length	8 ft
Bicyclist with child trailer	Physical length	10 ft
	Physical width	2 ft 6 in

Design Speed Expectations

The expected speed that different types of bicyclists can maintain under various conditions also influences the design of facilities such as shared use paths. The table to the right provides typical bicyclist speeds for a variety of conditions.

Path designers should tailor the curvature and sight distance needs based on the typical speed of the fastest expected user. See data tables in the AASHTO Guide for the Development of Bicycle Facilitate and the California Highway Design Manual for detailed guidance.

Bicycle as Design Vehicle - Design Speed Expectations

Bicycle Type	Feature	Typical Speed
Upright Adult Bicyclist	Paved level surfacing	8-15 mph
	Downhill	20-30+ mph
	Uphill	5 -12 mph
Recumbent Bicyclist	Paved level surfacing	11-18 mph

*Tandem bicycles and bicyclists with trailers have typical speeds equal to or less than upright adult bicyclists.

Types of Bicyclists

It is important to consider bicyclists of all skill levels when creating a non-motorized plan or project. Bicyclist skill level greatly influences expected speeds and behavior, both in separated bikeways and on shared roadways. Bicycle infrastructure should accommodate as many user types as possible, with decisions for separate or parallel facilities based on providing a comfortable experience for the greatest number of people.

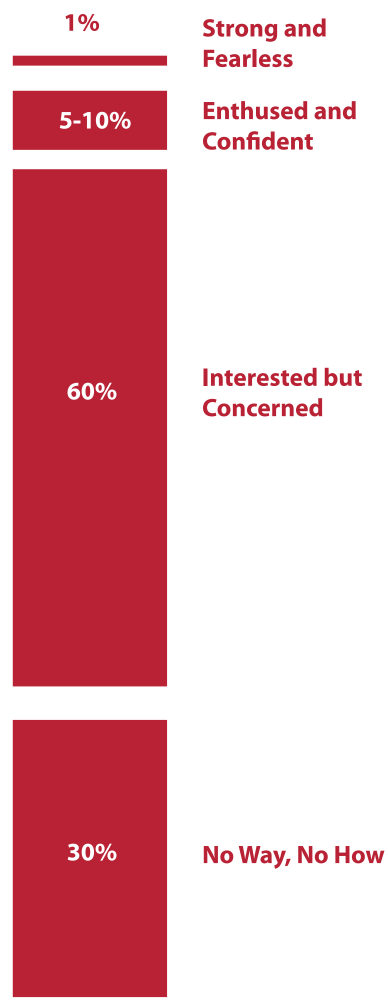
The bicycle planning and engineering professions currently use several systems to classify the population which can assist in understanding the characteristics and infrastructure preferences of different bicyclists. The current AASHTO Guide to the Development of Bicycle Facilities encourages designers to identify their rider type based on the trip purpose (Recreational vs Transportation) and on the level of comfort and skill of the rider (Causal vs Experienced). A more detailed framework for understanding of the US population's relationship to transportation focused bicycling is illustrated in the figure below. Developed by planners in Portland, OR[1] and supported by research[2], this classification provides the following alternative categories to address varying attitudes towards bicycling in the US:

- **Strong and Fearless** (approximately 1% of population) – Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections -- even if shared with vehicles -- over separate bicycle facilities such as shared use paths.

- **Enthused and Confident** (5-10% of population) - This user group encompasses bicyclists who are fairly comfortable riding on all types of bikeways but usually choose low traffic streets or shared use paths when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists such as commuters, recreationalists, racers and utilitarian bicyclists.

- **Interested but Concerned** (approximately 60% of population) – This user type comprises the bulk of the cycling population and represents bicyclists who typically only ride a bicycle on low traffic streets or shared use paths under favorable weather conditions. These bicyclists perceive significant barriers to their increased use of cycling, specifically traffic and other safety issues. These people may become "Enthused & Confident" with encouragement, education and experience.

- **No Way, No How** (approximately 30% of population) – Persons in this category are not bicyclists, and perceive severe safety issues with riding in traffic. Some people in this group may eventually become more regular cyclists with time and education. A significant portion of these people will not ride a bicycle under any circumstances.



Typical Distribution of Bicyclist Types

1 *Roger Geller, City of Portland Bureau of Transportation. Four Types of Cyclists. http://www.portlandonline.com/transportation/index.cfm?&a=237507. 2009.*

2 Dill, J., McNeil, N. *Four Types of Cyclists? Testing a Typology to Better Understand Bicycling Behavior and Potential.* 2012.

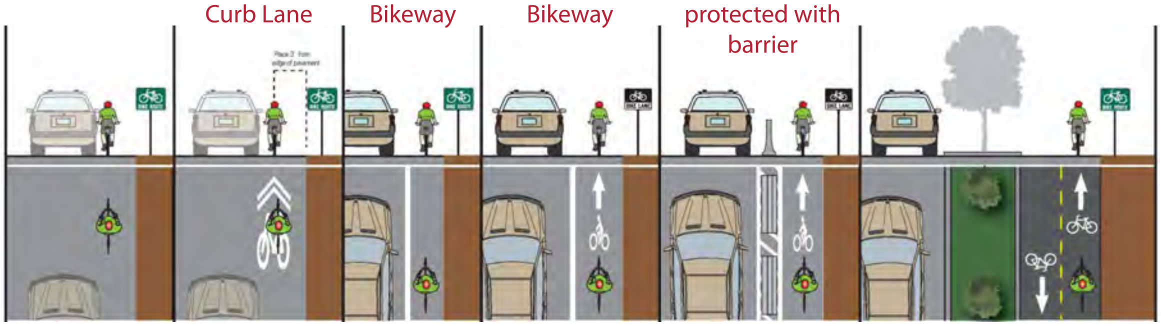
Facility Continua

The following continua illustrate the range of bicycle facilities applicable to various roadway environments, based on the roadway type and desired degree of separation. Engineering judgment, traffic studies, previous municipal planning efforts, community input and local context should be used to refine criteria when developing bicycle facility recommendations for a particular street. In some corridors, it may be desirable to construct facilities to a higher level of treatment than those recommended in relevant planning documents in order to enhance user safety and comfort. In other cases, existing and/or future motor vehicle speeds and volumes may not justify the recommended level of separation, and a less intensive treatment may be acceptable.

Least Protected → Most Protected

Arterial/Highway Bikeway Continuum (without curb and gutter)

Shared Lane | Marked Wide Curb Lane | Shoulder Bikeway | Wide Shoulder Bikeway | Cycle Track: protected with barrier | Shared Use Path

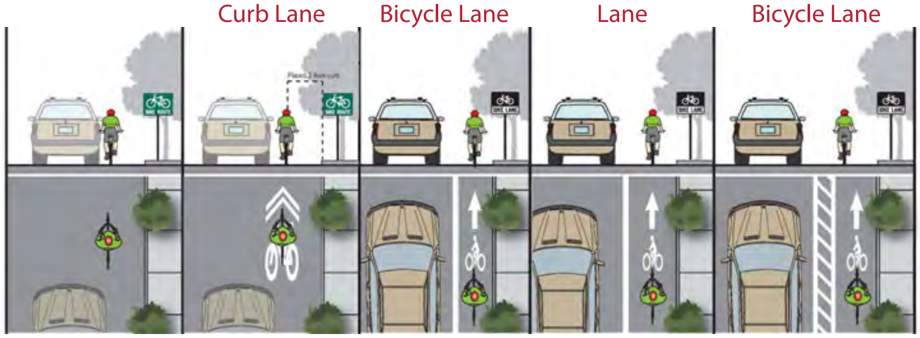


Arterial/Highway Bikeway Continuum (with curb and gutter)

Marked Wide Curb Lane | Conventional Bicycle Lane | Buffered Bicycle Lane | Cycle Track: at-grade, protected with parking | Cycle Track: protected with barrier | Cycle Track: curb separated | Shared Use Path: curb separated

Collector Bikeway Continuum

Shared Lane | Marked Wide Curb Lane | Conventional Bicycle Lane | Wide Bicycle Lane | Buffered Bicycle Lane



Shared Roadways

On shared roadways, bicyclists and motor vehicles use the same roadway space. These facilities are typically used on roads with low speeds and traffic volumes, however they can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

Shared roadways employ a large variety of treatments from simple signage and shared lane markings to more complex treatments including directional signage, traffic diverters, chicanes, chokers, and/or other traffic calming devices to reduce vehicle speeds or volumes.

Signed Shared Roadway

Marked Shared Roadway

Signed Shared Roadway

Description

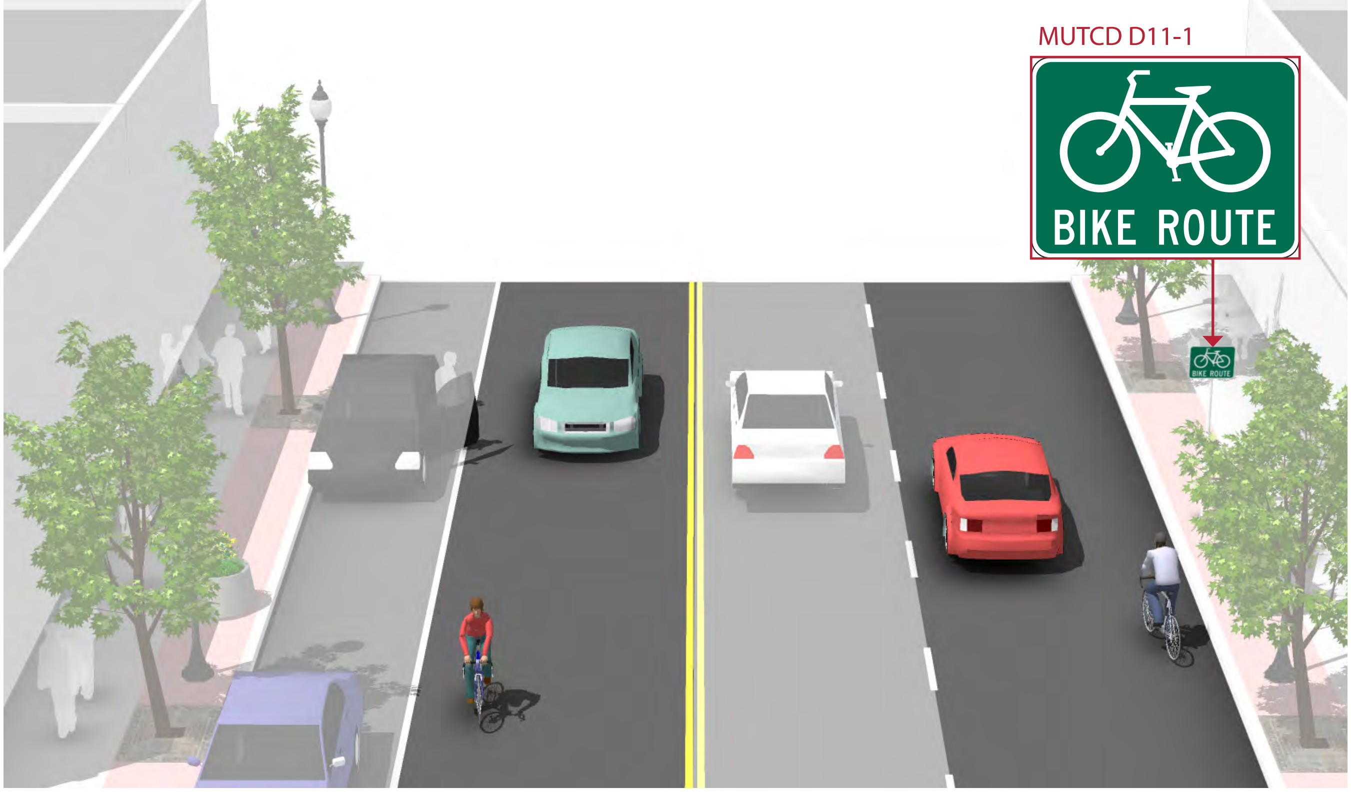
Signed shared roadways are facilities shared with motor vehicles. They are typically used on roads with low speeds and traffic volumes, however can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

Guidance

Lane width varies depending on roadway configuration.

Bike route signage (D11-1) should be applied at intervals frequent enough to keep bicyclists informed of changes in route direction and to remind motorists of the presence of bicyclists. Commonly, this includes placement at:

- Beginning or end of Bicycle Route.
- At major changes in direction or at intersections with other bicycle routes.
- At intervals along bicycle routes not to exceed ½ mile.



Discussion

Signed Shared Roadways serve either to provide continuity with other bicycle facilities (usually bike lanes) or to designate preferred routes through high-demand corridors.

This configuration differs from a bicycle boulevard due to a lack of traffic calming, wayfinding, pavement markings and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
Caltrans. *CA-MUTCD. 2012.*
Caltrans. *California HDM.* 2012.

Materials and Maintenance

Maintenance needs for bicycle wayfinding signs are similar to other signs, and will need periodic replacement due to wear.

Marked Shared Roadway

Description

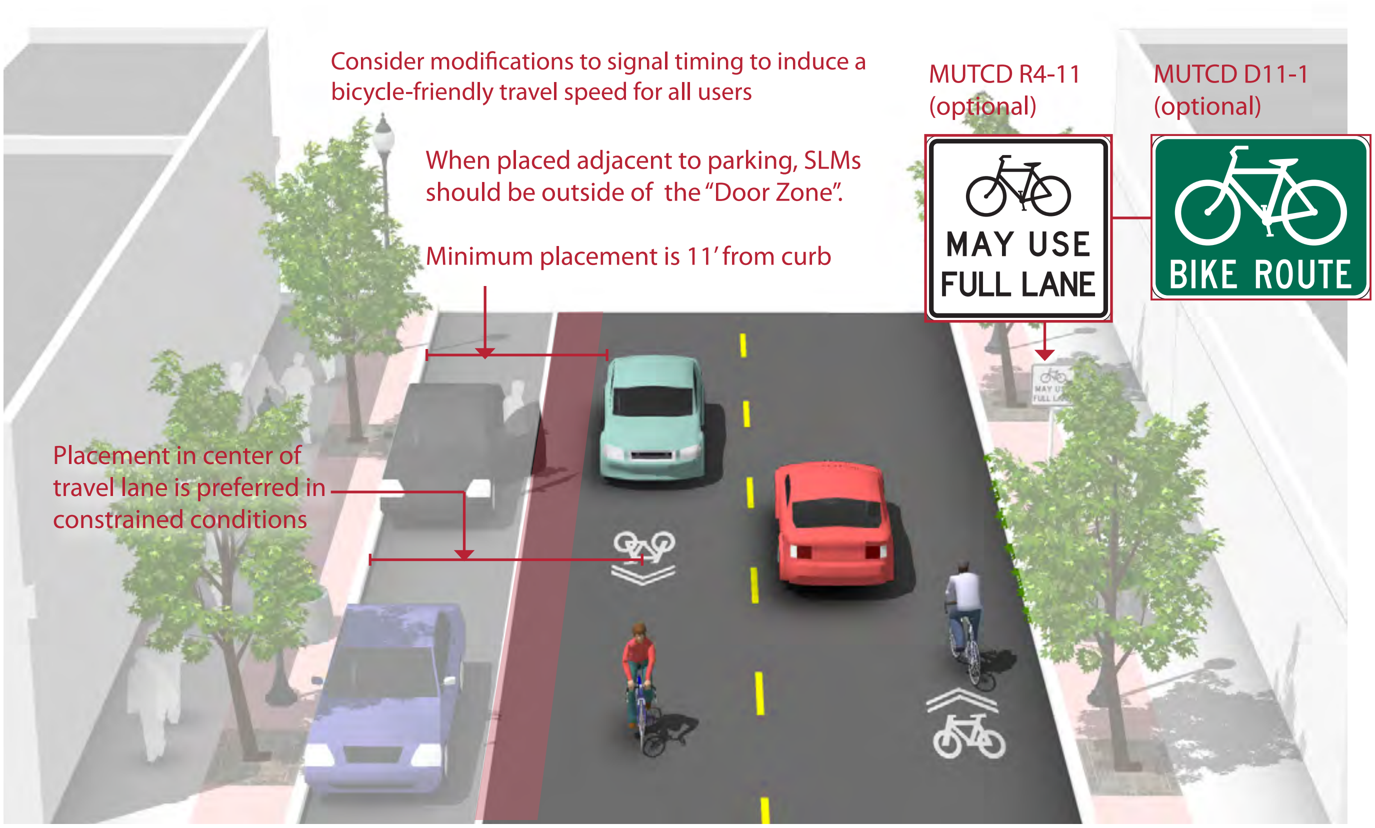
A marked shared roadway is a general purpose travel lane marked with shared lane markings (SLM) used to encourage bicycle travel and proper positioning within the lane.

In constrained conditions, the SLMs are placed in the middle of the lane. On a wide outside lane, the SLMs can be used to promote bicycle travel to the right of motor vehicles.

In all conditions, SLMs should be placed outside of the door zone of parked cars.

Guidance

- Lower than 35 mph speed limit preferred.
- In extreme circumstances, SLMs may be placed on roadways above 35 mph.
- In constrained conditions, preferred placement is in the center of the travel lane to minimize wear and promote single file travel.
- Minimum placement of SLM marking centerline is 11 feet from edge of curb where on-street parking is present, 4 feet from edge of curb with no parking.



Discussion

If collector or arterial, this should not be a substitute for dedicated bicycle facilities if space is available.

Bike Lanes should be considered on roadways with outside travel lanes wider than 15 feet, or where other lane narrowing or removal strategies may provide adequate road space. SLMs shall not be used on shoulders, in designated bike lanes, or to designate bicycle detection at signalized intersections. (MUTCD 9C.07)

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
Caltrans. *CA-MUTCD. 2012.*
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

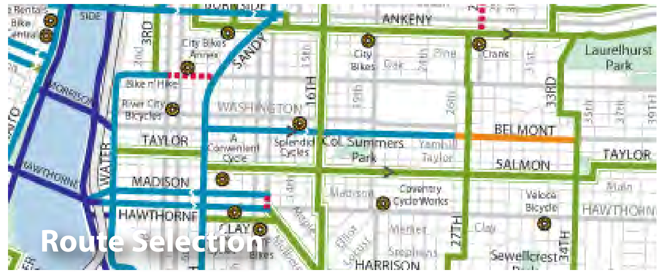
Placing SLMs between vehicle tire tracks will increase the life of the markings and minimize the long-term cost of the treatment.

Bicycle Boulevards on the Family Friendly Network

Bicycle boulevards are low-volume, low-speed streets modified to enhance bicyclist 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.

Jurisdictions throughout the country use a wide variety of strategies to determine where specific treatments are applied. While no federal guidelines exist, several best practices have emerged for the development of bicycle boulevards. At a minimum, bicycle boulevards should include distinctive pavement markings and wayfinding signs. They can also use combinations of traffic calming, traffic diversion, and intersection treatments to improve the bicycling environment. The appropriate level of treatment to apply is dependent on roadway conditions, particularly motor vehicle speeds and volumes.

Traffic conditions on bicycle boulevards should be monitored to provide guidance on when and where treatments should be implemented. When motor vehicle speeds and volumes or bicyclist delay exceed the preferred limits, additional treatments should be considered for the bicycle boulevard.



Route Selection


Basic Treatments

Traffic Calming

Traffic Diversion


Intersection Treatments

Bicycle Boulevard Route Selection

Description

Bicycle boulevards should be developed on streets that improve connectivity to key destinations and provide a direct route for bicyclists. Local streets with existing traffic calming, traffic diversions, or signalized crossings of major streets are good candidates, as they tend to be existing bicycle routes and have low motor vehicle speeds and volumes. Other streets where residents have expressed a desire for traffic calming are also good options.

Bicycle boulevards parallel to commercial streets improve access for "interested but concerned" bicyclists and complement bike lanes on major roadways.

Guidance

- Streets are signed at 25 mph or less to improve the bicycling environment and decrease the risk and severity of crashes.
- Traffic volumes are limited to 3,000 vehicles per day (ideally less than 1,500) to minimize passing events and potential conflicts with motor vehicles.
- Use of streets that parallel major streets can discourage non-local motor vehicle traffic without significantly impacting motorists.
- Use of streets where a relatively continuous route for bicyclists exists and/or where treatments can provide wayfinding and improve crossing opportunities at offset intersections.
- Use of streets where bicyclists have right-of-way at intersections or where right-of-way is possible to assign to bicyclists.

In Portland, OR, the bicycle network includes a high density of bicycle boulevards parallel to streets with bike lanes.

Discussion

Bicycle boulevards should form a continuous network of streets or off-street facilities that accommodate bicyclists who are less willing to ride on streets with motorized traffic. Most bicycle boulevards are located on residential streets, though they can also be on commercial or industrial streets. Due to the presence of trucks and commercial vehicles, as well as the need to maintain good traffic flow and retain motor vehicle parking, bicycle boulevards on commercial or industrial streets can tolderate higher automobile speeds and volumes than would be desired on neighborhood streets. Vertical traffic calming can minimize impacts to large vehicles and parking.

Additional References and Guidelines

Alta Planning + Design and IBPI. *Bicycle Boulevard Planning and Design Handbook.* 2009.
City of Berkeley. *Bicycle Boulevard Design Tools and Guidelines.* 2000.
City of Emeryville. *Bicycle Boulevard Treatments.* 2011.

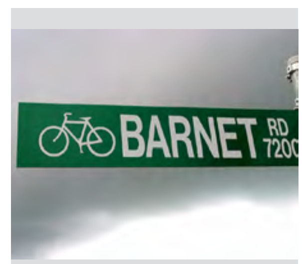
Materials and Maintenance

Repaving, street sweeping and other maintenance should occur with higher frequency than on other local streets.

Bicycle Boulevard Basic Treatments

Description

Signs and pavement markings are the minimum treatments necessary to designate a street as a bicycle boulevard. Together, they visibly designate a roadway to both bicyclists and motorists. Signs, and in some cases pavement markings, provide wayfinding to help bicyclists remain on the designated route.



Guidance

Pavement Markings

Place symbols every 250-800 feet along a linear corridor, as well as after every intersection.

On narrow streets where a motor vehicle cannot pass a bicyclist within one lane of traffic, place stencils in the center of the travel lane.

A bicycle symbol can be placed on a standard road sign, along with distinctive coloration.

Signs

Some cities have developed unique logos or colors for wayfinding signs that help brand their bicycle boulevards.

Be consistent in content, design, and intent; colors reserved by the Manual on Uniform Traffic Devices (MUTCD) for regulatory and warning road signs are not recommended.

Signs can include information about intersecting bikeways and distance/time information to key destinations.

Discussion

Wayfinding signs displaying destinations, distances, and "riding time" can dispel common misperceptions about time and distance while increasing users' comfort and accessibility to the bicycle boulevard network. Bicycle boulevards frequently include offset intersections or 'jog' onto another street. Signs and pavement markings can help bicyclists remain on the route. In addition, fewer businesses or services are located along local streets, and signs inform bicyclists of the direction to key destinations, including commercial districts, transit hubs, schools and universities, and other bikeways.

Additional References and Guidelines

City of Milwaukie. *Milwaukie Bicycle Wayfinding Signage Plan.* 2009.
City of Oakland. *Design Guidelines for Bicycle Wayfinding Signage.* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Pavement markings should be repainted and signs replaced as needed. Wayfinding signs should be regularly updated with new major destinations and bikeways.

Bicycle Boulevard Vertical Traffic Calming

Description

Motor vehicle speeds affect the frequency at which automobiles pass bicyclists as well as the severity of crashes that can occur. Maintaining motor vehicle speeds closer to those of bicyclists' greatly improves bicyclists' comfort on a street. Slower vehicular speeds also improve motorists' ability to see and react to bicyclists and minimize conflicts at driveways and other turning locations.

Vertical speed control measures are composed of slight rises in the pavement, on which motorists and bicyclists must reduce speed to cross.

Guidance

- Bicycle boulevards should have a maximum posted speed of 25 mph. Use traffic calming to maintain an 85th percentile speed below 22 mph.
- Speed humps are raised areas usually placed in a series across both travel lanes. A 14' long hump reduces impacts to emergency vehicles. Speed humps can be challenging for bicyclists, gaps can be provided in the center or by the curb for bicyclists and to improve drainage. Speed humps can also be offset to accommodate emergency vehicles.
- Speed lumps or cushions have gaps to accommodate the wheel tracks of emergency vehicles.
- Speed tables are longer than speed humps and flat-topped. Raised crosswalks are speed tables that are marked and signed for a pedestrian crossing.
- For all vertical traffic calming, slopes should not exceed 1:10 or be less steep than 1:25. Tapers should be no greater than 1:6 to reduce the risk of bicyclists losing their balance. The vertical lip should be no more than a 1/4" high.


Speed Hump


Offset Speed Hump


Temporary Speed Cushion

Raised Crosswalk

Discussion

Emergency vehicle response times should be considered where vertical deflection is used. Because emergency vehicles have a wider wheel base than passenger cars, speed lumps/cushions allow them to pass unimpeded while slowing most other traffic. Alternatively, speed tables are recommended because they cannot be straddled by a truck, decreasing the risk of bottoming out. Traffic calming can also deter motorists from driving on a street. Monitor vehicle volumes on adjacent streets to determine whether traffic calming results in inappropriate volumes. Traffic calming can be implemented on a trial basis.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
Alta Planning + Design and IBPI. *Bicycle Boulevard Planning and Design Handbook.* 2009.
BikeSafe. *Bicycle countermeasure selection system.*
Ewing, Reid. *Traffic Calming: State of the Practice.* 1999.
Ewing, Reid and Brown, Steven. *U.S. Traffic Calming Manual.* 2009.
NACTO. *Urban Street Design Guide*. 2013.

Materials and Maintenance

Traffic calming should be designed to minimize impacts to snowplows. Vegetation should be regularly trimmed to maintain visibility and attractiveness.

Bicycle Boulevard Horizontal Traffic Calming

Description

Horizontal traffic calming devices 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.

Guidance

- Maintain a minimum clear width of 20 feet (or 28 feet with parking on both sides), with a constricted length of at least 20 feet in the direction of travel.
- Chicanes are a series of raised or delineated curb extensions, edge islands, or parking bays on alternating sides of a street forming an "S"-shaped curb, which reduce vehicle speeds by requiring motorists to shift laterally through narrowed travel lanes.
- Pinchponts are curb extensions placed on both sides of the street, narrowing the travel lane and encouraging all road users to slow down. When placed at intersections, pinchpoints are known as chokers or neckdowns. They reduce curb radii and further lower motor vehicle speeds.
- Traffic circles are raised or delineated islands placed at intersections that reduce vehicle speeds by narrowing turning radii and the travel lane. Traffic circles can also include a paved apron to accommodate the turning radii of larger vehicles like fire trucks or school buses.

Temporary Curb Extension

Chicane

Choker or Neckdown

Pinchpoint with Bicycle Access

Discussion

Horizontal speed control measures should not infringe on bicycle space. Where possible, provide a bicycle route outside of the element so bicyclists can avoid having to merge into traffic at a narrow pinch point. This technique can also improve drainage flow and reduce construction and maintenance costs. Traffic calming can also deter motorists from driving on a street. Monitor vehicle volumes on adjacent streets to determine whether traffic calming results in inappropriate volumes. Traffic calming can be implemented on a trial basis.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
Alta Planning + Design and IBPI. *Bicycle Boulevard Planning and Design Handbook.* 2009.
BikeSafe. *Bicycle countermeasure selection system.*
Ewing, Reid. *Traffic Calming: State of the Practice.* 1999.
Ewing, Reid and Brown, Steven. *U.S. Traffic Calming Manual.* 2009.
NACTO. *Urban Street Design Guide.* 2013.

Materials and Maintenance

Traffic calming should be designed to minimize impacts to snowplows. Vegetation should be regularly trimmed to maintain visibility and attractiveness.

Bicycle Boulevard Traffic Diversion

Description

Motor vehicle traffic volumes affect the operation of a neighborhood greenway. Higher vehicle volumes reduce bicyclists' comfort and can result in more conflicts.

Implement volume control treatments based on the context of the neighborhood greenway, using engineering judgment. Target motor vehicle volumes range from 1,000 to 3,000 vehicles per day, above which the route should be striped as a bike lane or considered a signed shared roadway.

Guidance

- Traffic diversion treatments reduce motor vehicle volumes by completely or partially restricting through traffic on a neighborhood greenway.
- Partial closures allow full bicycle passage while restricting vehicle access to one way traffic at that point.
- Diagonal diverters require all motor vehicle traffic to turn.

Median diverters (see Major Intersection Treatments) restrict through motor vehicle movements while providing a refuge for bicyclists to cross in two stages.

- Street closures create a "T" that blocks motor vehicles from continuing on a neighborhood greenway, while bicycle travel can continue unimpeded. Full closures can accommodate emergency vehicles with the use of mountable curbs (maximum of six inches high).

Partial Closure

Diagonal Diverter


Median Diverter


Full Closure

Discussion

Neighborhood greenways on streets with volumes higher than 3,000 vehicles per day are not recommended, although a segment of a neighborhood greenway may accommodate more traffic for a short distance if necessary to complete the corridor. Providing additional separation with a bike lane, cycle track or other treatment is recommended where traffic calming or diversion cannot reduce volumes below this threshold.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
Alta Planning + Design and IBPI. *Bicycle Boulevard Planning and Design Handbook.* 2009.
Ewing, Reid. *Traffic Calming: State of the Practice.* 1999.
Ewing, Reid and Brown, Steven. *U.S. Traffic Calming Manual.* 2009.
Oregon Department of Transportation. *Right-In Right-Out Channelization.* 1998.

Materials and Maintenance

Depending on the diverter type, these treatments can be challenging to keep clear of snow and debris. Vegetation should be regularly trimmed to maintain visibility and attractiveness.

Bicycle Boulevard Minor Intersection Treatments

Description

Treatments at minor roadway intersections are designed to improve the visibility of a bicycle boulevard, raise awareness of motorists on the cross-street that they are likely to encounter bicyclists, and enhance safety for all road users.

Guidance

- On the bicycle boulevard, the majority of intersections with minor roadways should stop-control cross traffic to minimize bicyclist delay. This will maximize bicycling efficiency.
- If a stop sign is present on the bicycle boulevard, a second stop bar for bicyclists can be placed closer to the centerline of the cross street than the motorists' stop bar to increase the visibility of bicyclists waiting to cross the street.
- Curb extensions can be used to move bicyclists closer to the centerline to improve visibility and encourage motorists to let them cross.

Stop Signs on Cross-Street


Bicycle Forward Stop Bar


Curb Extension

Discussion

Stop signs increase bicycling time and energy expenditure, frequently leading to non-compliance by bicyclists and motorists, and/or use of other less desirable routes. Bicycle boulevards should have fewer stops or delays than other local streets. A typical bicycle trip of 30 minutes can increase to 40 minutes if there is a STOP sign at every block (*Berkeley Bicycle Boulevard Design Tools and Guidelines*). If several stop signs are turned along a corridor, speeds should be monitored and traffic-calming treatments used to reduce excessive vehicle speeds on the bicycle boulevard.

Additional References and Guidelines

City of Berkeley. *Bicycle Boulevard Design Tools and Guidelines.* 2000.
City of London Transport for London. *Advanced stop lines (ASLS) background and research studies.*
Transportation Research Board. *Improving Pedestrian Safety at Unsignalized Crossings.* NCHRP Report # 562. 2006.

Materials and Maintenance

Vegetation in traffic circles and curb extensions should be regularly trimmed to maintain visibility and attractiveness. Repaint bicycle stop bars as needed.

Bicycle Boulevard Major Intersection Treatments

Description

The quality of treatments at major street crossings can significantly affect a bicyclist's choice to use a bicycle boulevard, as opposed to another road that provides a crossing treatment.

Guidance

- Bike boxes increase bicyclist visibility to motorists and reduce the danger of right "hooks" by providing a space for bicyclists to wait at signalized intersections.
- Median islands provided at uncontrolled intersections of bicycle boulevards and major streets allow bicyclists to cross one direction of traffic at a time as gaps in traffic occur.
- Hybrid beacons, active warning beacons and bicycle signals can facilitate bicyclists crossing a busy street on which cross-traffic does not stop.
- Select treatments based on engineering judgment; see National Cooperative Highway Research Program (NCHRP) Report # 562 *Improving Pedestrian Safety at Unsignalized Crossings* (2006) for guidance on appropriate use of crossing treatments. Treatments are designed to improve visibility and encourage motorists to stop for pedestrians; with engineering judgement many of the same treatments are appropriate for use along bicycle boulevards.

Bike Box

Median Island

Hybrid Beacon

Rectangular Rapid Flash Beacon (RRFB)

Discussion

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

Additional References and Guidelines

Transportation Research Board. *Improving Pedestrian Safety at Unsignalized Crossings.* NCHRP Report # 562. 2006.
Federal Highway Administration. *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations.* FHWA-RD-04-100. 2004.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Maintain signs, markings, and other treatments and replace as needed. Monitor intersections for bicyclist delay to determine if additional treatments are warranted.

Separated Bikeways

Designated exclusively for bicycle travel, separated bikeways are segregated from vehicle travel lanes by striping, and can include pavement stencils and other treatments. Separated bikeways are most appropriate on arterial and collector streets where higher traffic volumes and speeds warrant greater separation.

Separated bikeways can increase safety and promote proper riding by:

- Defining road space for bicyclists and motorists, reducing the possibility that motorists will stray into the bicyclists' path.
- Discouraging bicyclists from riding on the sidewalk.
- Reducing the incidence of wrong way riding.
- Reminding motorists that bicyclists have a right to the road.

Bicycle Lane without Parking

Bicycle Lane and Parallel Parking

Bicycle Lane and Diagonal Parking

Buffered Bike Lane

Cycle Track

Bike Lane without On-Street Parking

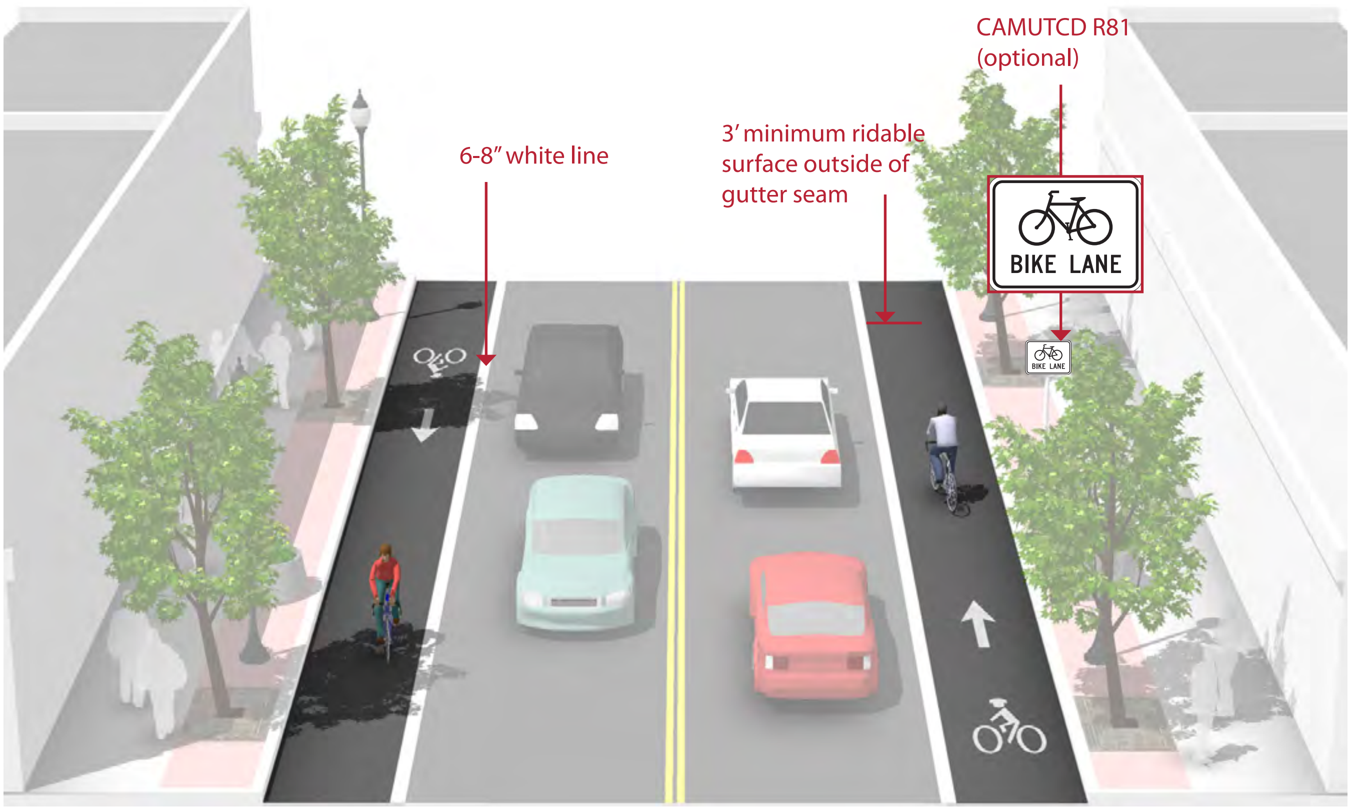
Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is typically located on the right side of the street, between the adjacent travel lane and curb, and is used in the same direction as motor vehicle traffic.

A bike lane width of 7 feet makes it possible for bicyclists to ride side-by-side or pass each other without leaving the bike lane, thereby increasing the capacity of the lane.

Guidance

- 4 foot minimum when no curb and gutter is present.
- 5 foot minimum when adjacent to curb and gutter or 3 feet more than the gutter pan width if the gutter pan is wider than 2 feet.
- 7 foot maximum width for use adjacent to arterials with high travel speeds. Greater widths may encourage motor vehicle use of bike lane. Configure as buffered bicycle lanes when a wider facility is desired.



Discussion

Wider bicycle lanes are desirable in certain situations such as on higher speed arterials (45 mph+) where use of a wider bicycle lane would increase separation between passing vehicles and bicyclists. Appropriate signing and stenciling is important with wide bicycle lanes to ensure motorists do not mistake the lane for a vehicle lane or parking lane. Consider buffered bicycle lanes when further separation is desired.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
Caltrans *CA-MUTCD. 2012.*
NACTO. *Urban Bikeway Design Guide.* 2012.
Caltrans. *California HDM.* 2012.

Materials and Maintenance

Paint can wear more quickly in high traffic areas. Bicycle lanes should be cleared of debris through routine street cleaning operations and on an as-needed basis.

Bike Lane Adjacent to On-Street Parallel Parking

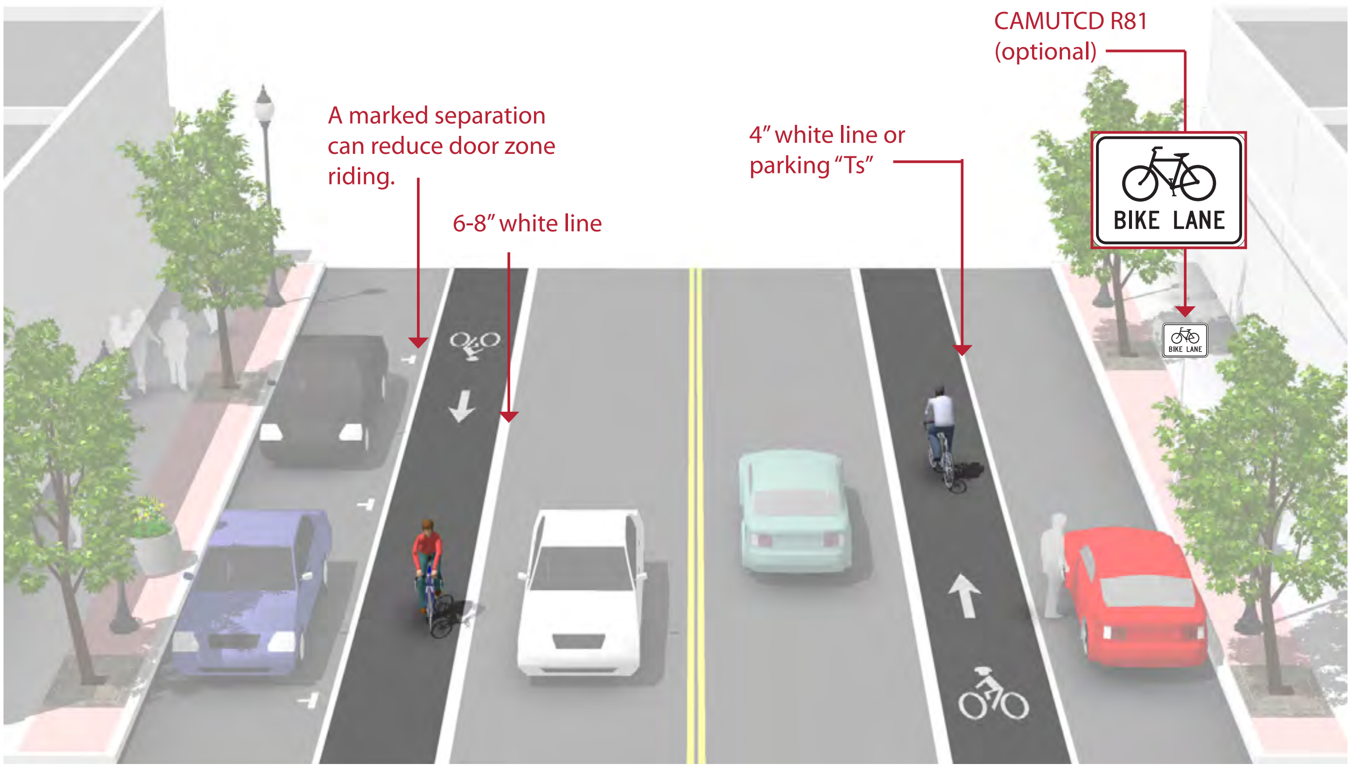
Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is located adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge or parking lane.

Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway than if they are expected to share a lane with vehicles.

Guidance

- 12 foot minimum from curb face to edge of bike lane.
- 14.5 foot preferred from curb face to edge of bike lane.
- 7 foot maximum for marked width of bike lane. Greater widths may encourage vehicle loading in bike lane. Configure as buffered bicycle lanes when a wider facility is desired.



Discussion

The bike lane should have sufficient width to allow bicyclists to stay out of the door zone while not encroaching into the adjacent vehicular lane. In Turlock, many bike lanes omit the white line between the bike space and the parking space. This is permitted by the CA-MUTCD 2012 section 3B.07, however new or remarked bike lanes should include the white line or parking T's.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
Caltrans *CA-MUTCD. 2012.*
NACTO. *Urban Bikeway Design Guide*. 2012.
Caltrans. *California HDM*. 2012.

Materials and Maintenance

Paint can wear more quickly in high traffic areas. Bicycle lanes should be cleared of debris through routine street cleaning operations and on an as-needed basis.

Bike Lanes and Diagonal Parking

Description

In certain areas with high parking demand such as urban commercial areas, diagonal parking can be used to increase parking supply.

Back-in diagonal parking improves sight distances between drivers and bicyclists when compared to conventional head-in diagonal parking. Back-in parking is best paired with a dedicated bicycle lane.

Conventional front-in diagonal parking is not compatible or recommended with the provision of bike lanes, as drivers backing out of conventional diagonal parking have limited visibility of approaching bicyclists. Under these conditions, shared lane markings should be used to guide bicyclists away from reversing automobiles.

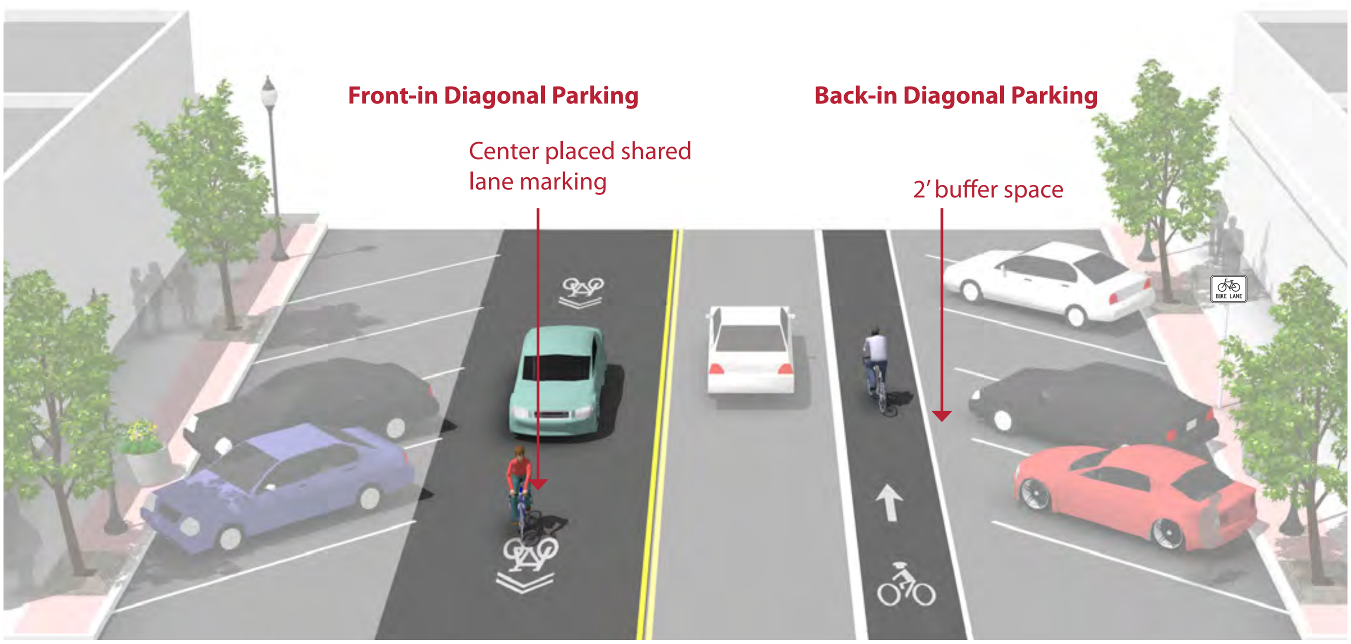
Guidance

Front-in Diagonal Parking

- Shared lane markings are the preferred facility with front-in diagonal parking

Back-in Diagonal Parking

- 5 foot minimum marked width of bike lane
- Parking bays are sufficiently long to accommodate most vehicles (so vehicles do not block bike lane)



Discussion

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
Caltrans. *Main Street, California.* 2013.

Materials and Maintenance

Paint can wear more quickly in high traffic areas. Bicycle lanes should be cleared of debris through routine street cleaning operations and on an as-needed basis.

Buffered Bike Lane

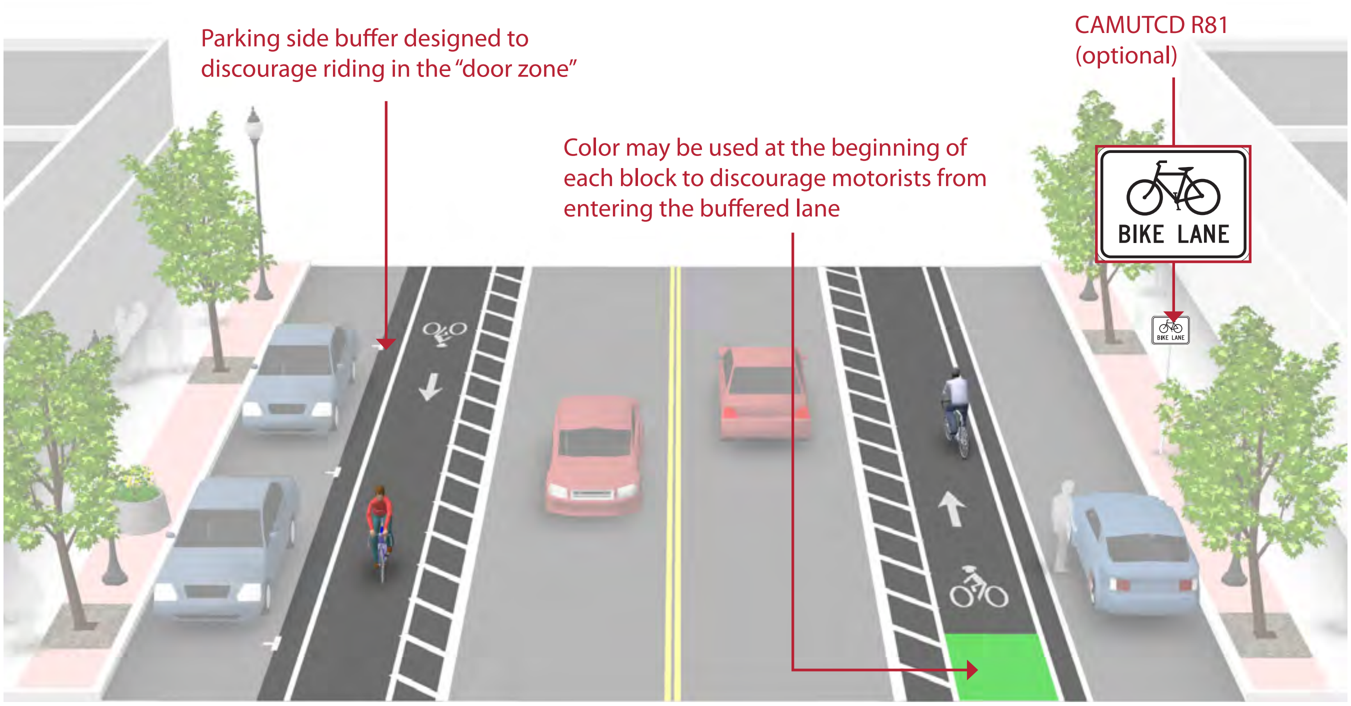
Description

Buffered bike lanes 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. Buffered bike lanes follow general guidance for buffered preferential vehicle lanes as per MUTCD guidelines (section 3D-01).

Buffered bike lanes are designed to increase the space between the bike lane and the travel lane and/or parked cars. This treatment is appropriate for bike lanes on roadways with high motor vehicle traffic volumes and speed, adjacent to parking lanes, or a high volume of truck or oversized vehicle traffic.

Guidance

- The minimum bicycle travel area (not including buffer) is 5 feet wide.
- Buffers should be at least 2 feet wide. If 3 feet or wider, mark with diagonal or chevron hatching. For clarity at driveways or minor street crossings, consider a dotted line for the inside buffer boundary where cars are expected to cross.
- Buffered bike lanes can buffer the travel lane only, or parking lane only depending on available space and the objectives of the design.



Discussion

Frequency of right turns by motor vehicles at major intersections should determine whether continuous or truncated buffer striping should be used approaching the intersection. Commonly configured as a buffer between the bicycle lane and motor vehicle travel lane, a parking side buffer may also be provided to help bicyclists avoid the 'door zone' of parked cars.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices. (3D-01).* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.
Caltrans *CA-MUTCD.* 2012

Materials and Maintenance

Paint can wear more quickly in high traffic areas. Bicycle lanes should be cleared of debris through routine street cleaning operations and on an as-needed basis.

Cycle Tracks

Guidance

Cycle tracks should ideally be placed along streets with long blocks and few driveways or mid-block access points for motor vehicles.

One-Way Cycle Tracks

- 7 foot recommended minimum to allow passing. 5 foot minimum width in constrained locations.

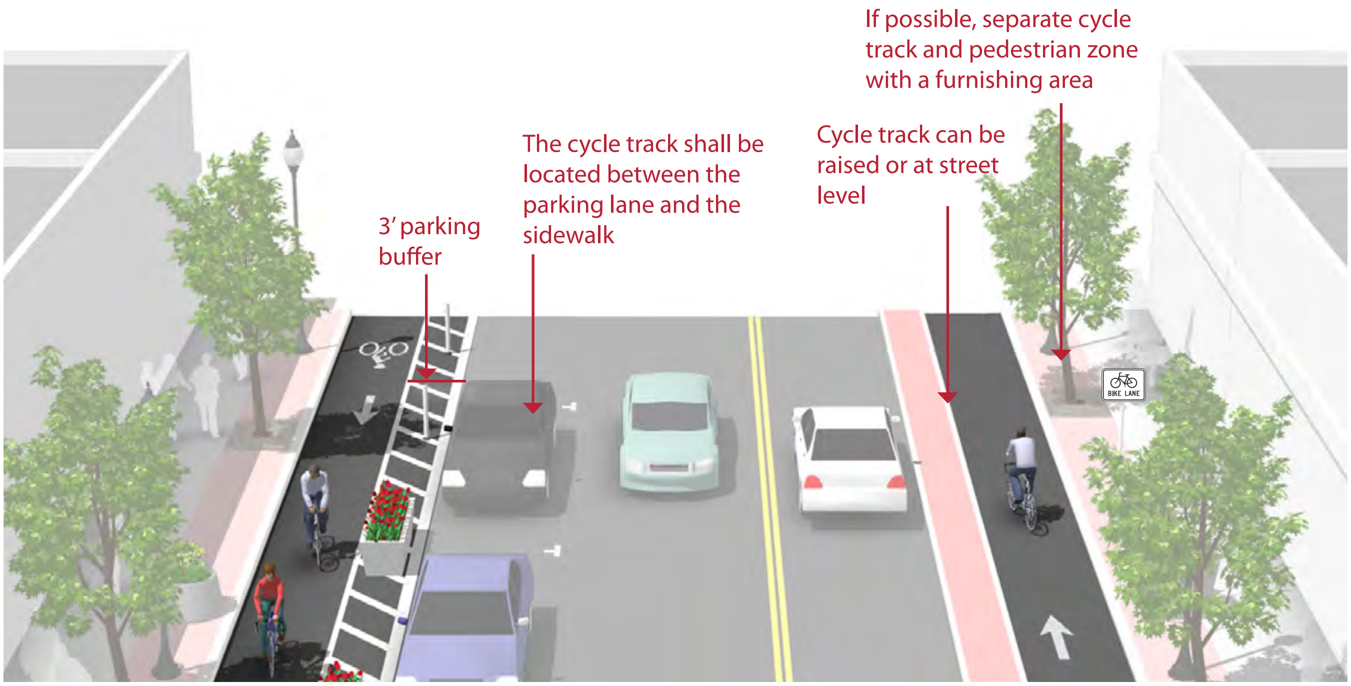
Two-Way Cycle Tracks

- Cycle tracks located on one-way streets have fewer potential conflict areas than those on two-way streets.
- 12 foot recommended minimum for two-way facility. 8 foot minimum in constrained locations

Description

A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. Cycle tracks have different forms but all share common elements—they provide space that is intended to be exclusively or primarily used by bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks.

Raised cycle tracks may be at the level of the adjacent sidewalk or set at an intermediate level between the roadway and sidewalk to separate the cycle track from the pedestrian area.



Discussion

Special consideration should be given at transit stops to manage bicycle and pedestrian interactions. Driveways and minor street crossings are unique challenges to cycle track design. Parking should be prohibited within 30 feet of the intersection to improve visibility. Color, yield markings and "Yield to Bikes" signage should be used to identify the conflict area and make it clear that the cycle track has priority over entering and exiting traffic. If configured as a raised cycle track, the crossing should be raised so that the sidewalk and cycle track maintain their elevation through the crossing.

Additional References and Guidelines

NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Barrier separated and raised cycle tracks may require special equipment for sweeping and maintenance.

Separated Bikeways at Intersections

An intersection facilitates the interchange between bicyclists, motorists, pedestrians and other modes in order to advance traffic flow in a safe and efficient manner. Designs for intersections with bicycle facilities should reduce conflict between bicyclists and vehicles by heightening the level of visibility, denoting clear right-of-way and facilitating eye contact and awareness with other modes. Intersection treatments can improve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals.

The configuration of a safe intersection for bicyclists may include elements such as color, signage, medians, signal detection and pavement markings. Intersection design should take into consideration existing and anticipated bicyclist, pedestrian and motorist movements. In all cases, the degree of mixing or separation between bicyclists and other modes is intended to reduce the risk of crashes and increase bicyclist comfort. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, whether bicycle facilities are intersecting, and the adjacent street function and land use.

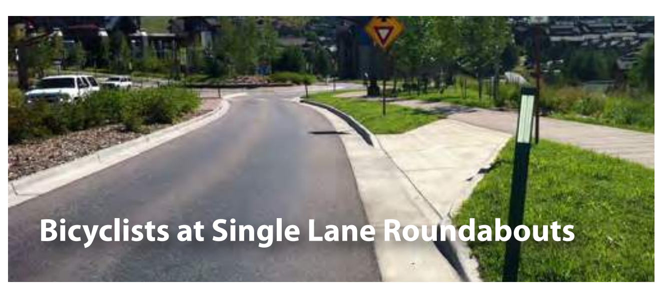

Bike Box


Colored Bike Lanes in Conflict Areas

Shared Bicycle/Right Turn Lane


Two Stage Turn Boxes


Channelized Turn Lanes


Bicyclists at Single Lane Roundabouts

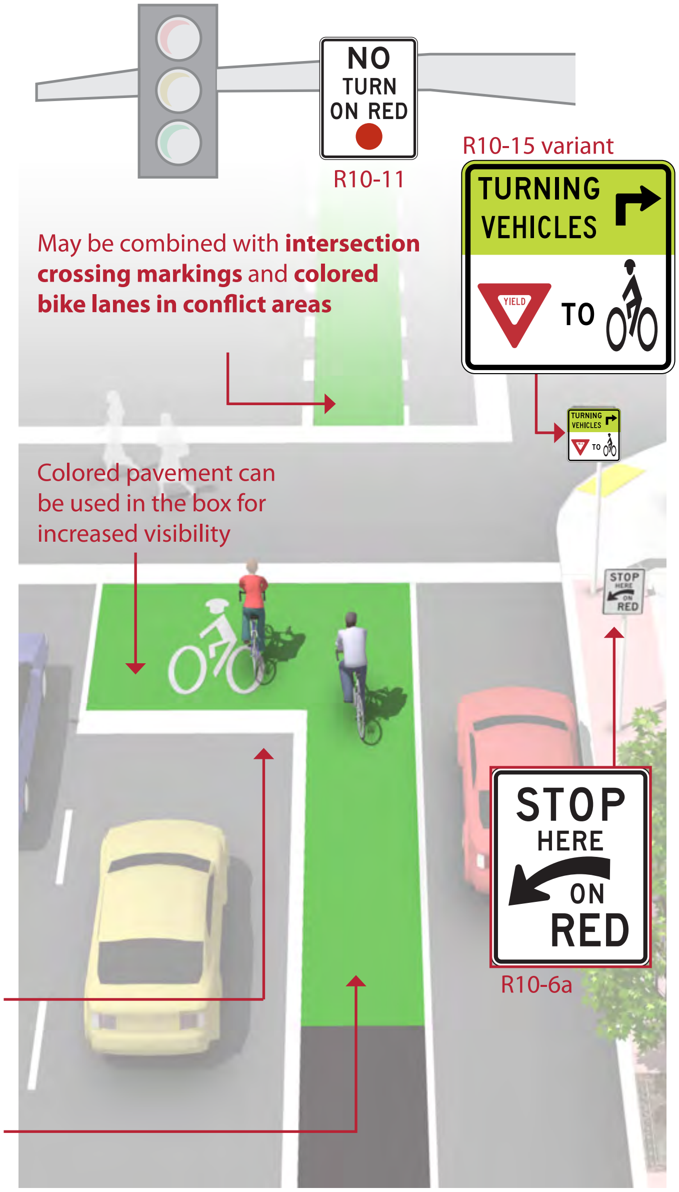
Bike Box

Description

A bike box is a designated area located at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible space to get in front of queuing motorized traffic during the red signal phase. Motor vehicles must queue behind the white stop line at the rear of the bike box.

Guidance

- 14' minimum depth
- A "No Turn on Red" (MUTCD R10-11) sign shall be installed overhead to prevent vehicles from entering the Bike Box.
- A "Stop Here on Red" sign should be post-mounted at the stop line to reinforce observance of the stop line.
- A "Yield to Bikes" sign should be post-mounted in advance of and in conjunction with an egress lane to reinforce that bicyclists have the right-of-way going through the intersection.
- An ingress lane should be used to provide access to the box.
- A supplemental "Wait Here" legend can be provided in advance of the stop bar to increase clarity to motorists.



Discussion

Bike boxes are considered experimental by the FHWA.
Bike boxes should be placed only at signalized intersections, and right turns on red shall be prohibited for motor vehicles. Bike boxes should be used in locations that have a large volume of bicyclists and are best utilized in central areas where traffic is usually moving more slowly. Prohibiting right turns on red improves safety for bicyclists yet does not significantly impede motor vehicle travel.

Additional References and Guidelines

NACTO. *Urban Bikeway Design Guide.* 2012.
FHWA. Interim Approval (IA-14) has been granted. Requests to use green colored pavement need to comply with the provisions of Paragraphs 14 through 22 of Section 1A.10. 2011.

Materials and Maintenance

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

Colored Bike Lanes in Conflict Areas

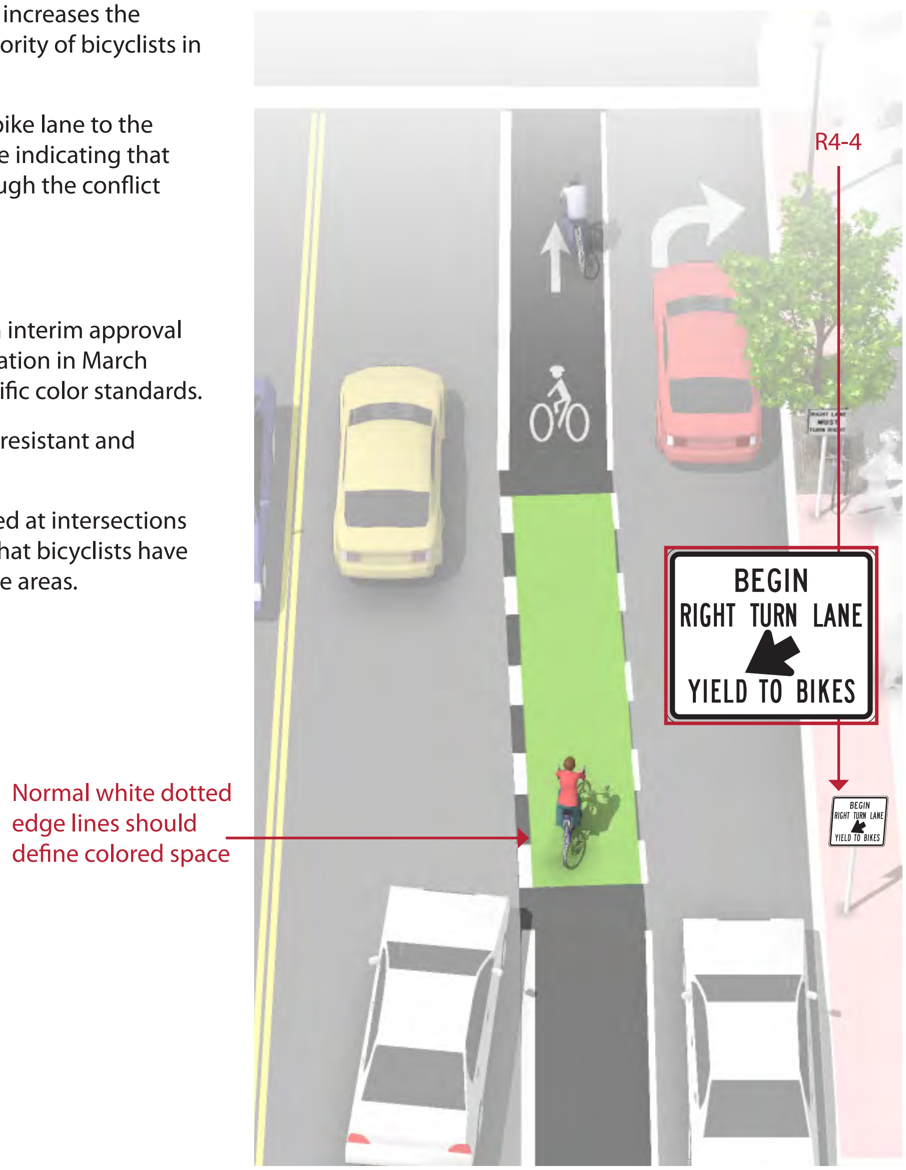
Description

Colored pavement within a bicycle lane increases the visibility of the facility and reinforces priority of bicyclists in conflict areas.

The design (right) illustrates a through bike lane to the left of a right turn only lane with signage indicating that motorists should yield to bicyclists through the conflict area.

Guidance

- Green colored pavement was given interim approval by the Federal Highways Administration in March 2011. See interim approval for specific color standards.
- The colored surface should be skid resistant and retro-reflective.
- A "Yield to Bikes" sign should be used at intersections or driveway crossings to reinforce that bicyclists have the right-of-way in colored bike lane areas.



Discussion

Evaluations performed in Portland, OR, St. Petersburg, FL and Austin, TX found that significantly more motorists yielded to bicyclists and slowed or stopped before entering the conflict area after the application of the colored pavement when compared with an uncolored treatment.

Additional References and Guidelines

FHWA. Interim Approval (IA-14) has been granted. Requests to use green colored pavement need to comply with the provisions of Paragraphs 14 through 22 of Section 1A.10. 2011.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

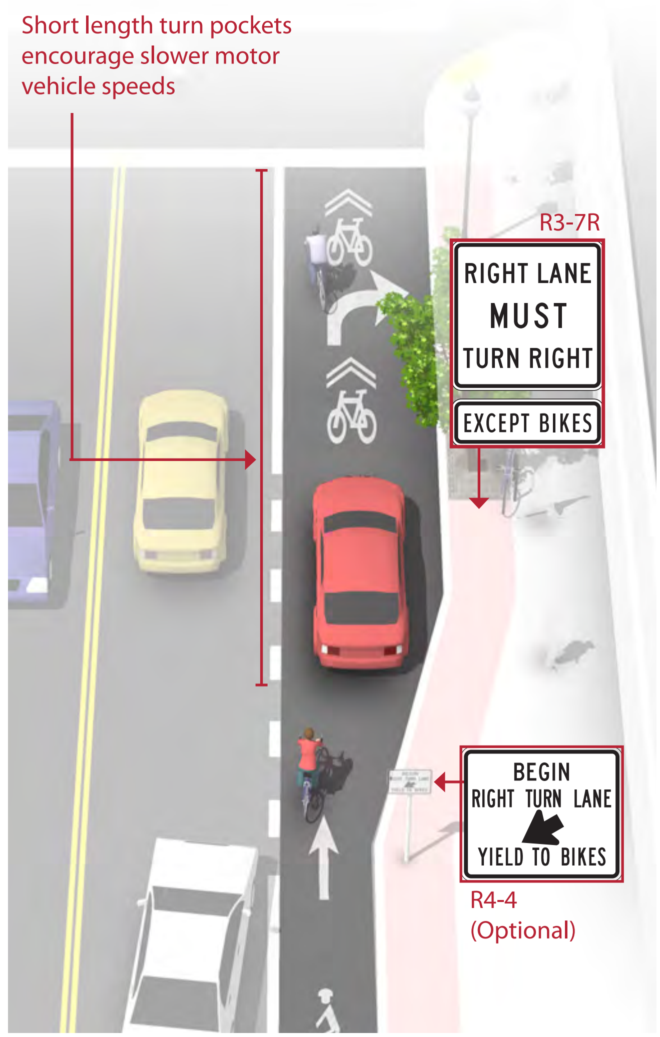
Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

Combined Bike Lane / Turn Lane

Description

The combined bicycle/right turn lane places shared lane markings within a right turn only lane.

This treatment is recommended at intersections lacking sufficient space to accommodate both a standard through bike lane and right turn lane.



Guidance

- Maximum shared turn lane width is 13 feet; narrower is preferable.
- Shared Lane Markings should indicate preferred positioning of bicyclists within the combine lane.
- A "RIGHT LANE MUST TURN RIGHT" sign with an "EXCEPT BIKES" plaque may be needed to make it legal for through bicyclists to use a right turn lane.
- The BEGIN RIGHT TURN LANE YIELD TO BIKES (R4-4) sign may be used where motor vehicles entering an exclusive right-turn lane must weave across bicycle traffic in bicycle lanes. The R4-4 sign should not be used when bicyclists need to move left because of a right-turn lane drop situation. Refer CA-MUTCD Section 9B.05.

Discussion

Case studies cited by the Pedestrian and Bicycle Information Center indicate that this treatment works best on streets with lower posted speeds (30 MPH or less) and with lower traffic volumes (10,000 ADT or less). May not be appropriate for high-speed arterials or intersections with long right turn lanes. May not be appropriate for intersections with large percentages of right-turning heavy vehicles.

Additional References and Guidelines

NACTO. *Urban Bikeway Design Guide*. 2012.

CA-MUTCD 2014, Section 9B.05

Materials and Maintenance

Locate markings out of tire tread to minimize wear. Because the effectiveness of markings depends on their visibility, maintaining markings should be a high priority.

Two-Stage Turn Box

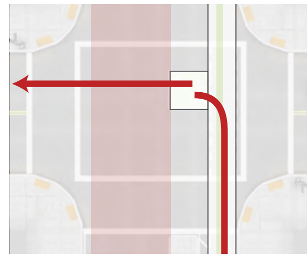
Description

Two-stage turn boxes offer bicyclists a safe way to make left turns at multi-lane signalized intersections from a right side bike lane or cycle track.

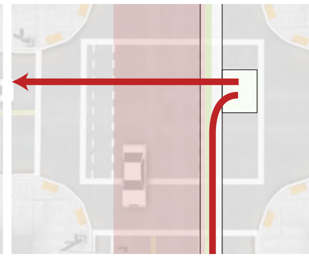
On right side bike lanes, bicyclists are often unable to merge into traffic to turn left due to high traffic volumes and speeds. On cycle tracks, bicyclists cannot merge due to physical separation.

In both cases, the provision of two-stage left turn boxes is important to allow for access and mobility on the bike network.

Cycle track turn box protected by physical buffer:

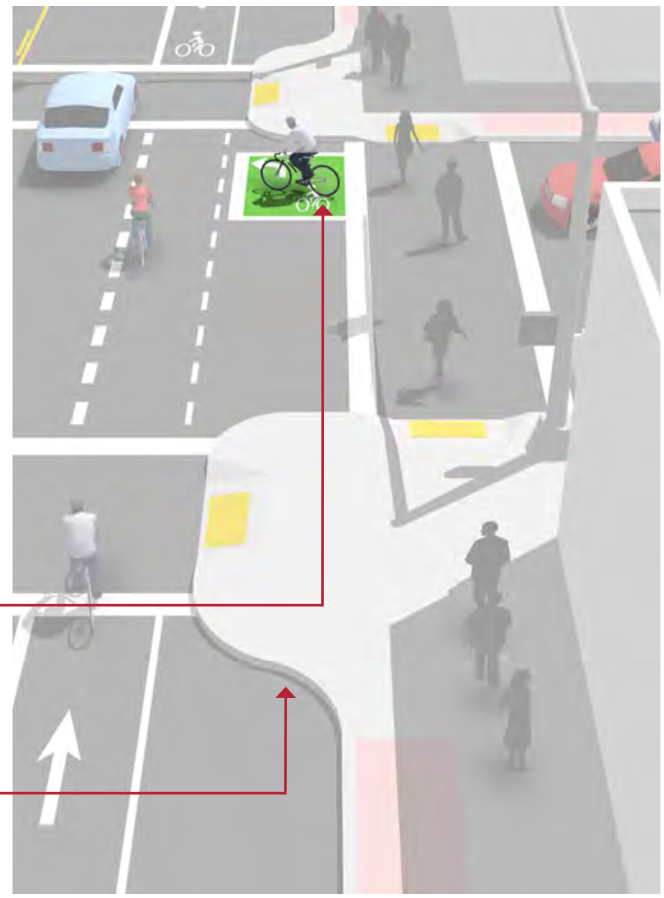


Bike lane turn box protected by parking lane:



Guidance

- The queue box shall be placed in a protected area. Typically this is within an on-street parking lane or cycle track buffer area.
- 6 Foot minimum depth of bicycle storage area. 8' feet preferred.
- Bicycle stencil and turn arrow pavement markings shall be used to indicate proper bicycle direction and positioning.
- A "No Turn on Red" (MUTCD R10-11) sign should be installed on the cross street to prevent vehicles from entering the turn box.



Consider using colored pavement inside the box to further define the bicycle space

Turns from a bicycle lane should be protected by a curb extension

Discussion

Two-Stage Turn boxes are considered experimental by FHWA, unless configured as a "jug handle" turn integrated into the sidewalk.
While two stage turns may increase bicyclist comfort in many locations, this configuration will typically result in higher average delay for turning bicyclists due to the need to receive two separate green signal indications (one for the through street, followed by one for the cross street) before proceeding.

Additional References and Guidelines

NACTO. *Urban Bikeway Design Guide*. 2012.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates.

Channelized Turn Lanes

Description

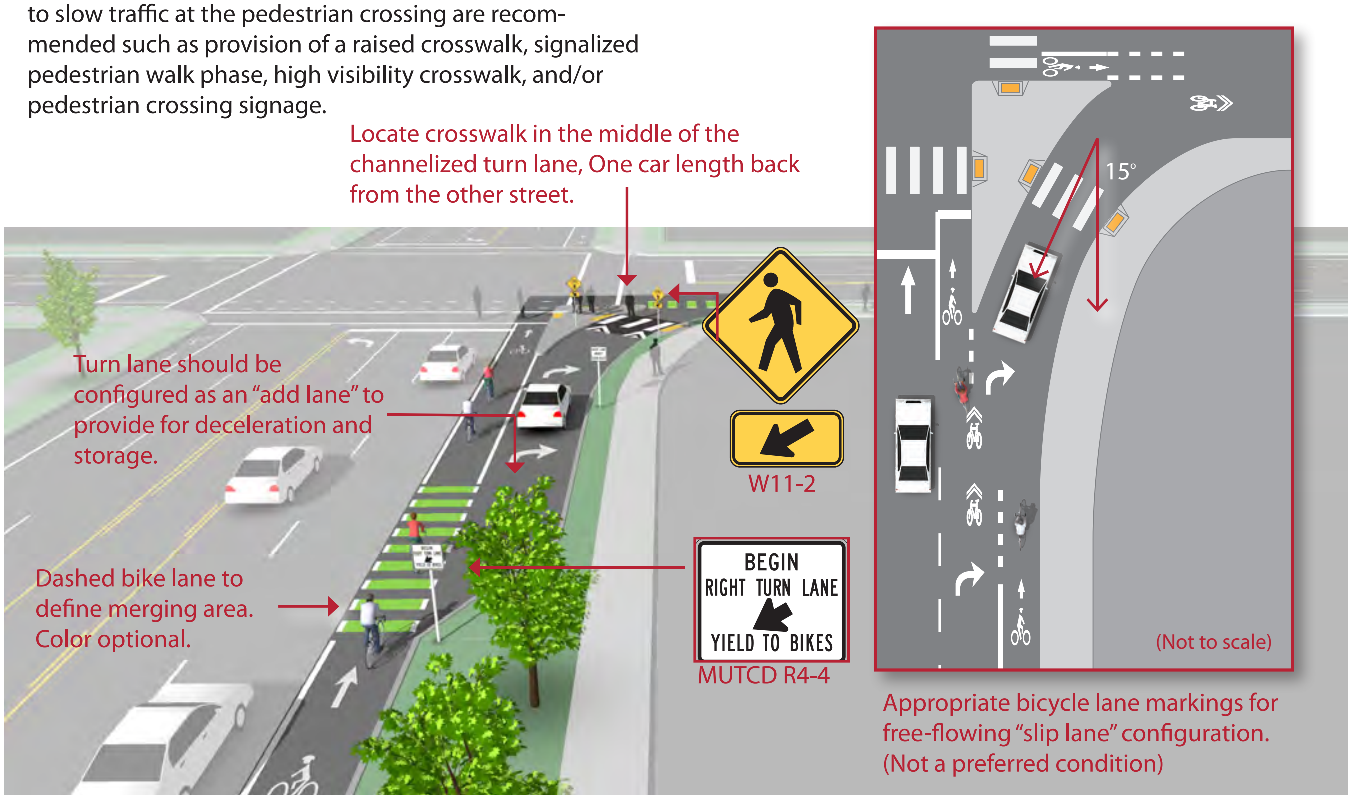
In some intersections of arterials streets, design vehicle requirements or intersection angles may result in wide turning radii at corners. Configuring the intersection as a channelized (or free-right) turn lane with a raised refuge island can improve conditions for pedestrians trying to cross the street.

Similar to a median refuge island, the raised refuge island can reduce crossing distances, allow staged crossing of the roadway, and improve visibility of pedestrians crossing the roadway.

To improve safety and comfort for pedestrians, measures to slow traffic at the pedestrian crossing are recommended such as provision of a raised crosswalk, signalized pedestrian walk phase, high visibility crosswalk, and/or pedestrian crossing signage.

Guidelines

- The preferred angle of intersection between the channelized turn lane and the roadway being joined is no more than 15 degrees to allow for simultaneous visibility of pedestrians and potential roadway gaps.
- Design with a maximum 30-35 foot turning radius.
- Signing: Pedestrian crossing sign assembly (W11-2) or Yield (R1-2) to encourage yielding. Yield to Bikes (R4-4) or similar if bike lanes are present.
- Raised crossings in the channelized turn lane may slow driver speed through the turning area.



Discussion

This design requires trucks to turn into multiple receiving lanes, and may not be appropriate on the approach to streets with one through lane.

Channelized turn lanes can be very challenging for blind pedestrians. NCHRP 674 identified the use of sound strips (a full lane rumble strip-like device) in conjunction with flashing beacons to increase yielding compliance.

Additional References and Guidelines

TRB. *NCHRP 674 Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities.* 2011.
ITE. *Designing Walkable Urban Thoroughfares.* 2010.
Caltrans. *CA-MUTCD.* 2012
Caltrans. *Complete Intersections.* 2010.

Materials and Maintenance

Signage and striping require routine maintenance.

Bicyclists at Single Lane Modern Roundabouts

Description

Roundabouts are circular intersection designed with yield control for all entering traffic, channelized approaches and geometry to induce desirable speeds. They are used as an alternative to intersection signalization.

Other circulatory intersection designs exist but they function differently than the modern roundabout. These include:

Traffic circles (also known as rotaries) are old style circular intersections used in some cities in the US where traffic signals or stop signs are used to control one or more entry.

Neighborhood Traffic Circles are small-sized circular intersections of local streets. They may be uncontrolled or stop controlled, and do not channelize entry.

Guidelines

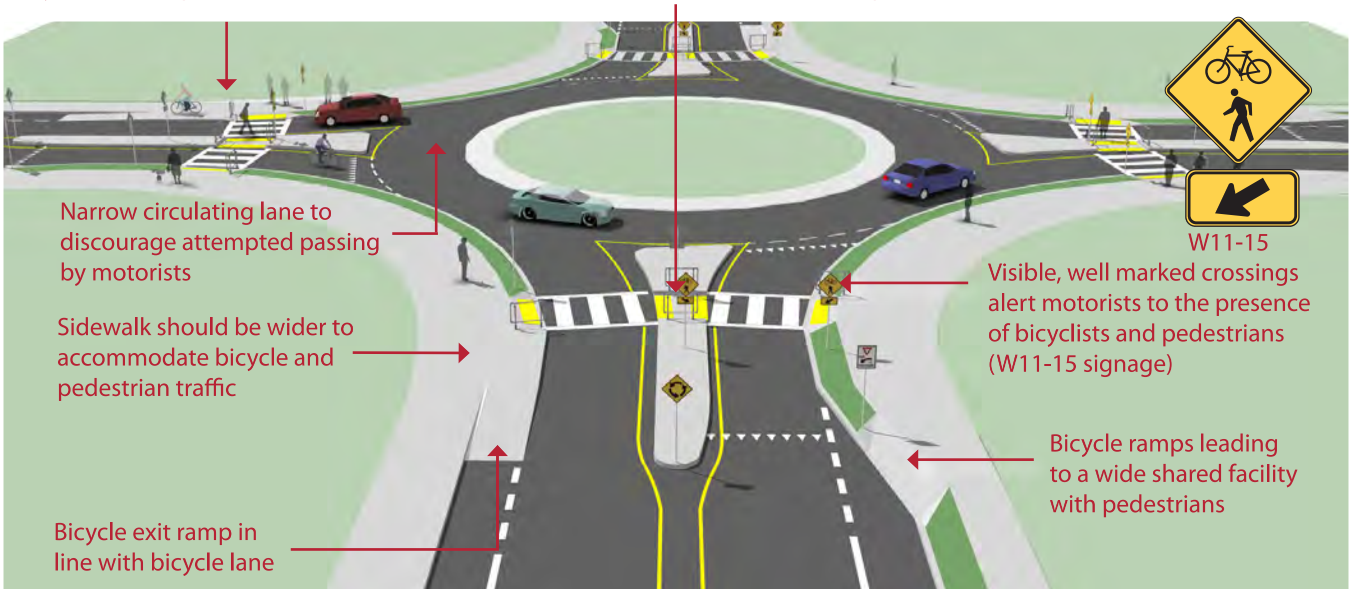
It is important to indicate to motorists, bicyclists and pedestrians the right-of-way rules and correct way for them to circulate, using appropriately designed signage, pavement markings, and geometric design elements.

- 25 mph maximum circulating design speed.
- Design approaches/exits to the lowest speeds possible.
- Encourage bicyclists navigating the roundabout like motor vehicles to "take the lane."
- Maximize yielding rate of motorists to pedestrians and bicyclists at crosswalks.
- Provide separated facilities for bicyclists who prefer not to navigate the roundabout on the roadway.

Holding rails with bicycle foot rests can provide support for elderly pedestrians or bicyclists waiting to cross the street.

Crossings set back at least one car length from the entrance of the roundabout

Truck apron can provide adequate clearance for longer vehicles



Discussion

Research indicates that while single-lane roundabouts may benefit bicyclists and pedestrians by slowing traffic, multi-lane roundabouts may present greater challenges and significantly increase safety problems for these users.

On bicycle routes a roundabout or neighborhood traffic circle is preferable to stop control as bicyclists do not like to lose their momentum due to physical effort required. At intersections of multi-use paths, pedestrian and bicycle only roundabouts are an excellent form of non-motorized user traffic control.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
TRB. *NCHRP 672 Roundabouts: An Informational Guide.* 2010.
TRB. *NCHRP Report 572 Roundabouts in the United States.* 2007.
Hourdos, John et al. *Investigation of Pedestrian/Bicyclist Risk in Minnesota Roundabout Crossings.* 2012
TRB. *NCHRP 674 Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities*. 2011.
Shaw and Moler. *Bicyclist- and Pedestrian-Only Roundabouts.* 2009. FHWA.
Brown, Rick. *The Case of Roundabouts: Doing Laps Around the Circle City.* 2012.

Materials and Maintenance

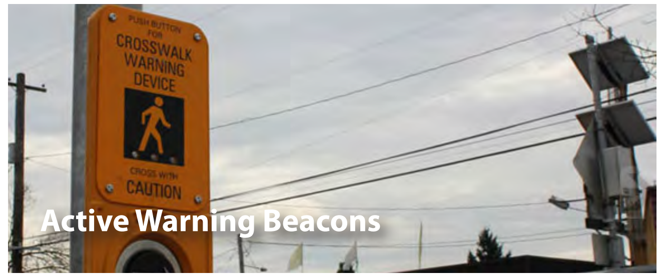
Signage and striping require routine maintenance.

Bicycles at Signals and Beacons

Designs for bicycles at signalized crossings should allow bicyclists to trigger signals an safely maneuver the crossing.

Warning beacons can be utilized at unsignalized intersection crossings. Push buttons, signage, and pavement markings may be used to supplement these facilities for both bicyclists and motorists.


Bicycle Detection and Actuation



Active Warning Beacons


Hybrid Beacons for Bike Route Crossings

Bicycle Detection and Actuation

Description

Push Button Actuation

User-activated button mounted on a pole facing the street.

Loop Detectors

Bicycle-activated loop detectors are installed within the roadway to allow the presence of a bicycle to trigger a change in the traffic signal. This allows the bicyclist to stay within the lane of travel without having to maneuver to the side of the road to trigger a push button.

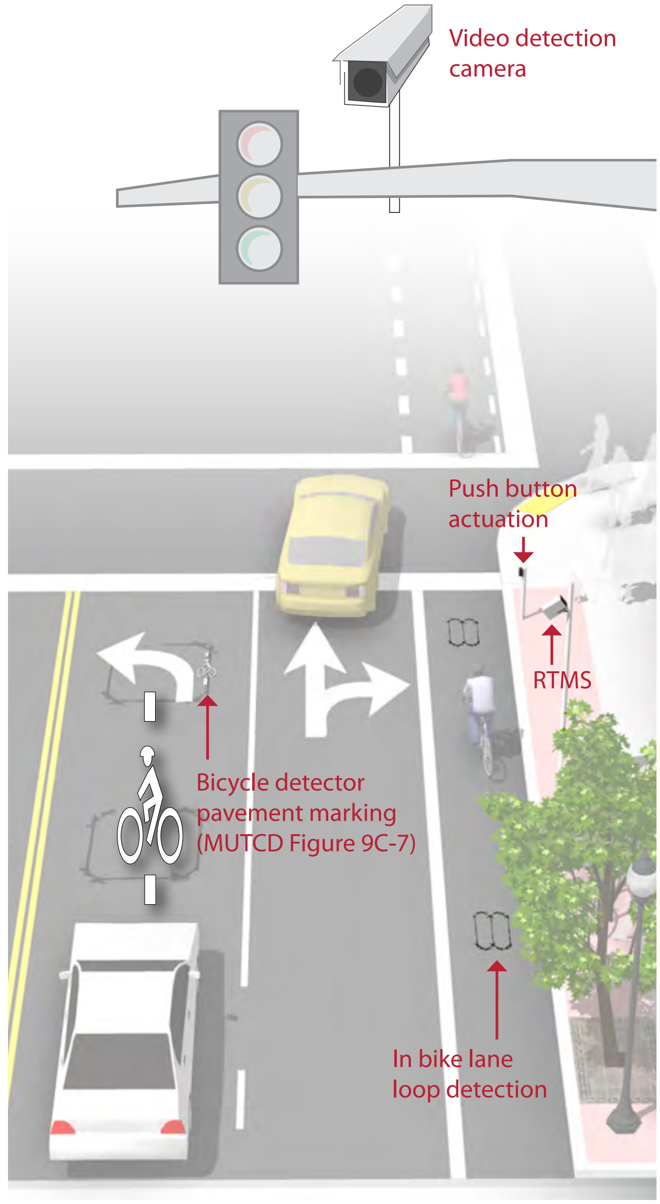
Loops that are sensitive enough to detect bicycles should be supplemented with pavement markings to instruct bicyclists how to trip them.

Video Detection Cameras

Video detection systems use digital image processing to detect a change in the image at a location. These systems can be calibrated to detect bicycles. Video camera system costs range from $20,000 to $25,000 per intersection.

Remote Traffic Microwave Sensor Detection (RTMS)

RTMS is a system which uses frequency modulated continuous wave radio signals to detect objects in the roadway. This method marks the detected object with a time code to determine its distance from the sensor. The RTMS system is unaffected by temperature and lighting, which can affect standard video detection.



Discussion

Proper bicycle detection should meet two primary criteria: 1) accurately detects bicyclists and 2) provides clear guidance to bicyclists on how to actuate detection (e.g., what button to push, where to stand).

Bicycle loops and other detection mechanisms can also provide bicyclists with an extended green time before the light turns yellow so that bicyclists of all abilities can reach the far side of the intersection.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
Caltrans *CA-MUTCD. 2012.*
NACTO. *Urban Bikeway Design Guide*. 2012.
Caltrans. *Policy Directive 09-06.* 2009.
Caltrans. *Complete Intersections.* 2010.

Materials and Maintenance

Signal detection and actuation for bicyclists should be maintained with other traffic signal detection and roadway pavement markings.

Hybrid Beacons for Bike Route Crossings

Description

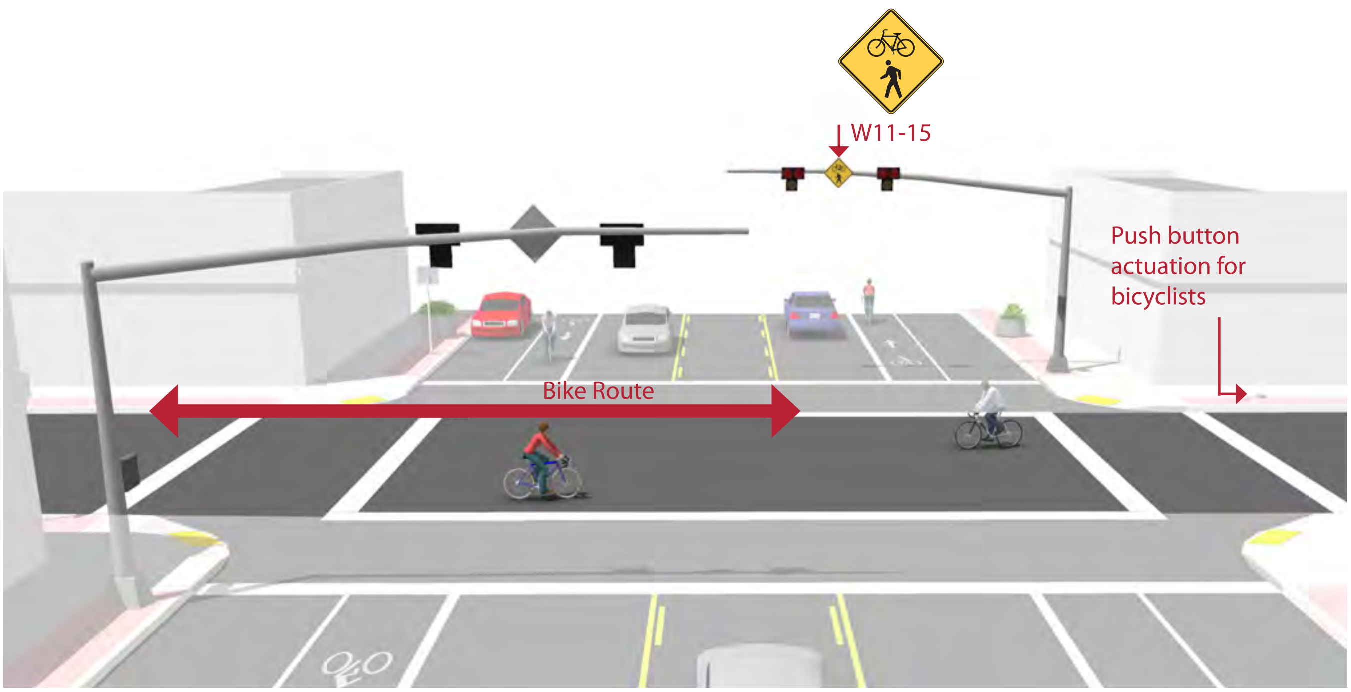
A hybrid beacon, formerly known as a High-intensity Activated CrosswalK (HAWK), consists of a signal-head with two red lenses over a single yellow lens on the major street, and pedestrian signal heads for the minor street. There are no signal indications for motor vehicles on the minor street approaches.

in addition to paths crossing roadways between traffic signals (i..e. midblock), hybrid beacons may be used at minor road / major road intersections where a normal traffic signal warrant is not met.

Guidance

Hybrid beacons may be installed without meeting traffic control signal warrants if roadway speed and volumes are excessive for comfortable user crossing.

- If installed within a signal system, signal engineers should evaluate the need for the hybrid signal to be coordinated with other signals.
- Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk to provide adequate sight distance.



Discussion

The hybrid beacon can significantly improve the operation of a bicycle route, particularly along bicycle boulevard corridors. Because of the low traffic volumes on these facilities, intersections with major roadways are often unsignalized, creating difficult and potentially unsafe crossing conditions for bicyclists.

Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity and safety.

Additional References and Guidelines

FHWA. *Pedestrian Hybrid Beacon Guide.* 2014.
NACTO. U*rban Bikeway Design Guide.* 2012.
Caltra*ns. CA-MUTCD. 2012.*

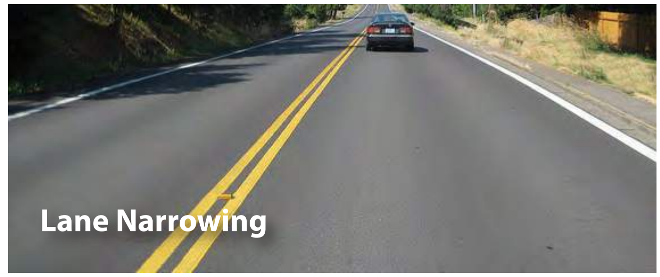
Materials and Maintenance

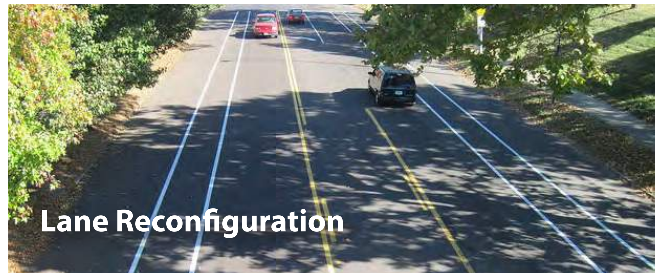
Hybrid beacons are subject to the same maintenance needs and requirements as standard traffic signals. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

Retrofitting Existing Streets to add Bikeways

Most major streets are characterized by conditions (e.g., high vehicle speeds and/or volumes) for which dedicated bike lanes are an appropriate facility to accommodate safe and comfortable riding. Although opportunities to add bike lanes through roadway widening may exist in some locations, many major streets have physical and other constraints that would require street retrofit measures within existing curb-to-curb widths.

Although largely intended for major streets, these measures may be appropriate for any roadway where bike lanes would be the best accommodation for bicyclists.





Lane Narrowing

Description

Lane narrowing utilizes roadway space that exceeds minimum standards to provide the needed space for bike lanes. Many roadways have existing travel lanes that are wider than those prescribed in local and national roadway design standards, or which are not marked. Most standards allow for the use of 11 foot and sometimes 10 foot wide travel lanes to create space for bike lanes.

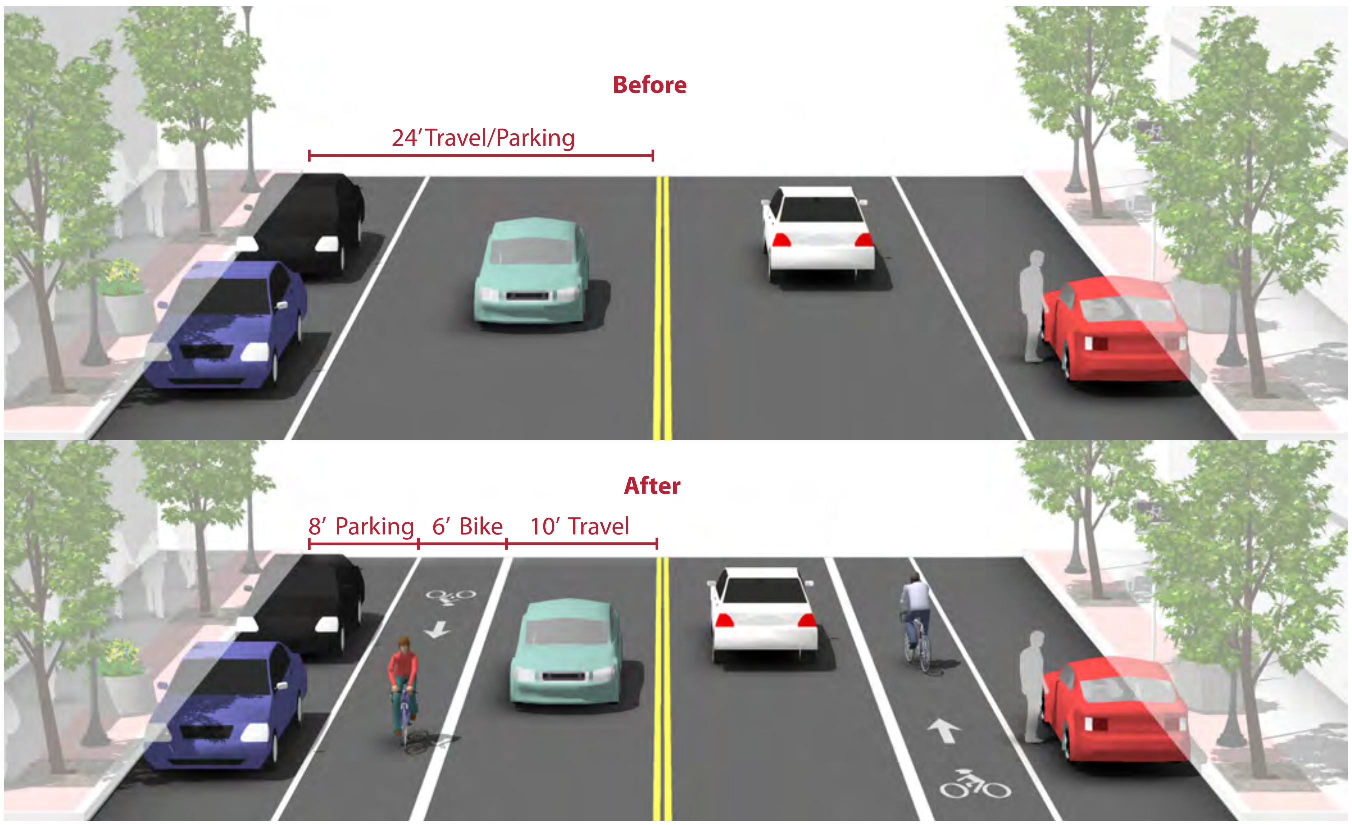
Guidance

Vehicle lane width:

- Before: 10-15 feet
- After: 10-11 feet

Bicycle lane width:

- Guidance on bicycle lanes applies to this treatment.



Discussion

Special consideration should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. Center turn lanes can also be narrowed in some situations to free up pavement space for bike lanes.

AASHTO supports reduced width lanes in *A Policy on Geometric Design of Highways and Streets: "On interrupted-flow operation conditions at low speeds (45 mph or less), narrow lane widths are normally adequate and have some advantages."*

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
AASHTO. *A Policy on Geometric Design of Highways and Streets.* 2004.
NACTO. *Urban Street Design Guide.* 2013.
Caltrans. *Main Street, California.* 2013.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

Lane Reconfiguration

Description

The removal of a single travel lane will generally provide sufficient space for bike lanes on both sides of a street. Streets with excess vehicle capacity provide opportunities for bike lane retrofit projects.

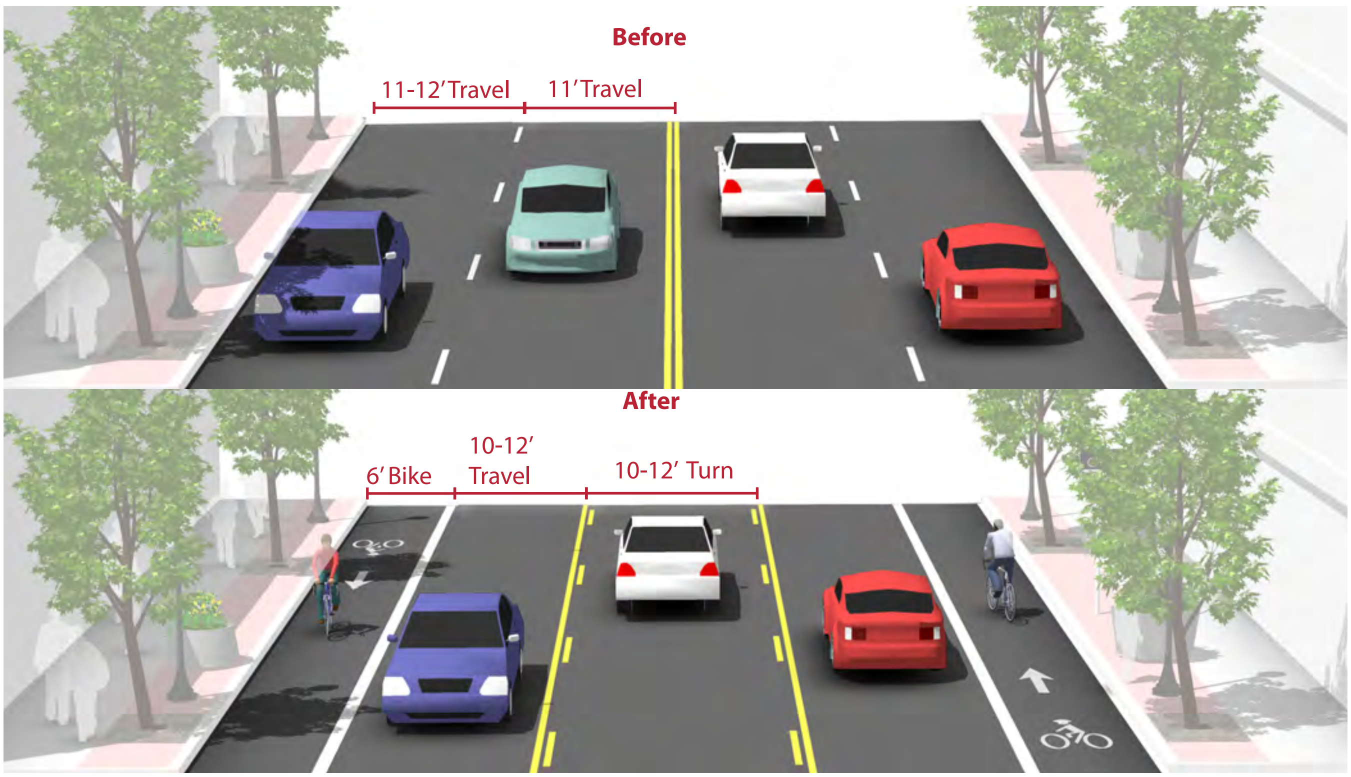
Guidance

Vehicle lane width:

- Width depends on project. No narrowing may be needed if a lane is removed.

Bicycle lane width:

- Guidance on bicycle lanes applies to this treatment.



Discussion

Depending on a street's existing configuration, traffic operations, user needs and safety concerns, various lane reduction configurations may apply. For instance, a four-lane street (with two travel lanes in each direction) could be modified to provide one travel lane in each direction, a center turn lane, and bike lanes. Prior to implementing this measure, a traffic analysis should identify potential impacts.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Evaluation of Lane Reduction "Road Diet" Measures on Crashes.* Publication Number: FHWA-HRT-10-053. 2010.
NACTO. *Urban Street Design Guide.* 2013.
Caltrans. *Main Street, California.* 2013.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

Bicycle Parking

Bicyclists expect a safe, convenient place to secure their bicycle when they reach their destination. This may be short-term parking of 2 hours or less, or long-term parking for employees, students, residents, and commuters.

Bicycle Racks

On Street Bike Corall

Bicycle Racks

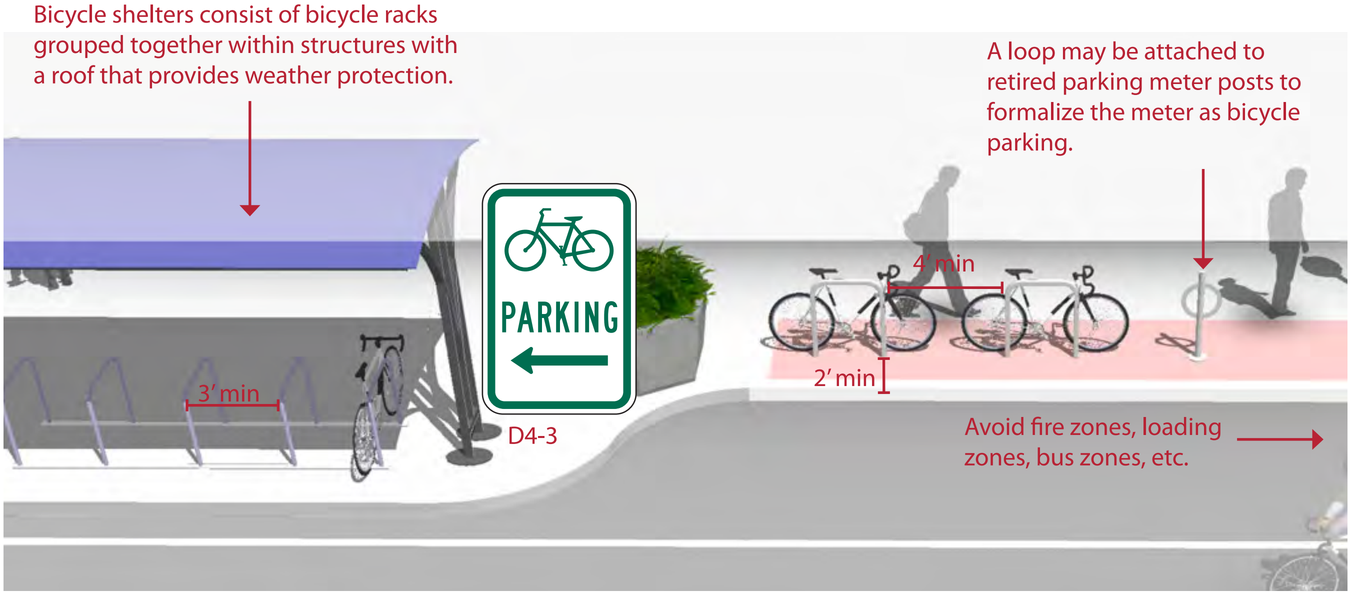
Description

Short-term bicycle parking is meant to accommodate visitors, customers, and others expected to depart within two hours. It should have an approved standard rack, appropriate location and placement, and weather protection. The Association for Pedestrian and Bicycle Professionals (APBP) recommends selecting a bicycle rack that:

- Supports the bicycle in at least two places, preventing it from falling over.
- Allows locking of the frame and one or both wheels with a U-lock.
- Is securely anchored to ground.
- Resists cutting, rusting and bending or deformation.

Guidance

- 2' minimum from the curb face to avoid 'dooring.'
- Close to destinations; 50' maximum distance from main building entrance.
- Minimum clear distance of 6' should be provided between the bicycle rack and the property line.
- Should be highly visible from adjacent bicycle routes and pedestrian traffic.
- Locate racks in areas that cyclists are most likely to travel.



Discussion

Where the placement of racks on sidewalks is not possible (due to narrow sidewalk width, sidewalk obstructions, street trees, etc.), bicycle parking can be provided in the street where on-street vehicle parking is allowed in the form of on-street bicycle corrals.

Some types of bicycle racks may meet design criteria, but are discouraged except in limited situations. This includes undulating "wave" racks, schoolyard "wheel bender" racks, and spiral racks.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
APBP. *Bicycle Parking Guide 2nd Edition.* 2010.

Materials and Maintenance

Use of proper anchors will prevent vandalism and theft. Racks and anchors should be regularly inspected for damage. Educate snow removal crews to avoid burying racks during winter months.

On-Street Bicycle Corral

Description

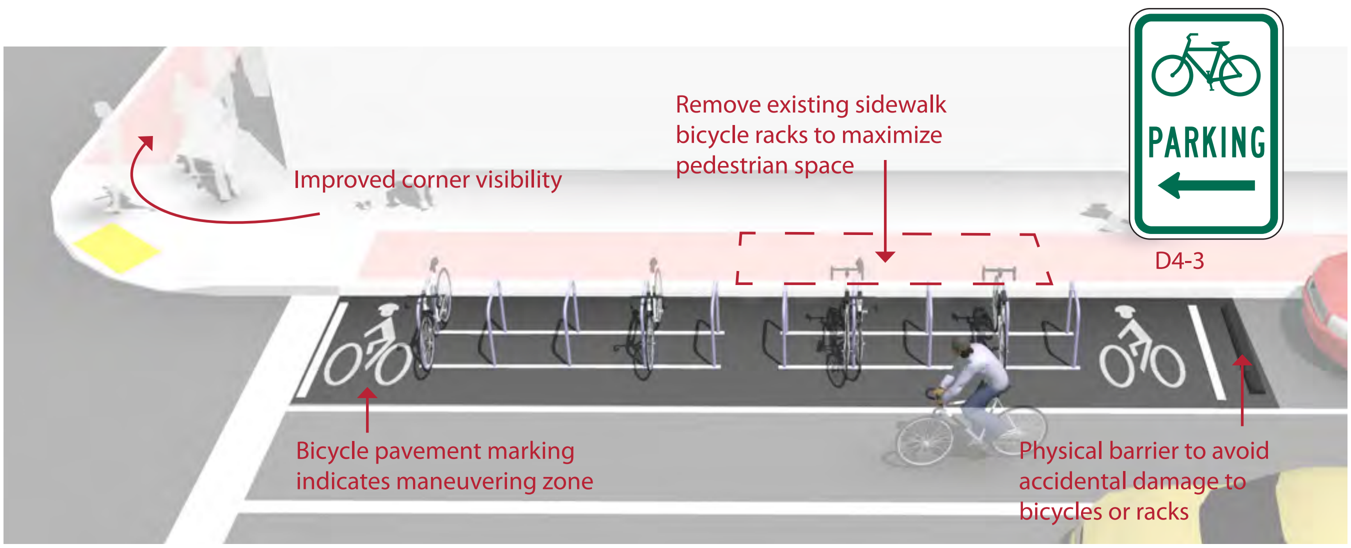
Bicycle corrals (also known as on-street bicycle parking) consist of bicycle racks grouped together in a common area within the street traditionally used for automobile parking. Bicycle corrals are reserved exclusively for bicycle parking and provide a relatively inexpensive solution to providing high-volume bicycle parking. Bicycle corrals can be implemented by converting one or two on-street motor vehicle parking spaces into on-street bicycle parking. Each motor vehicle parking space can be replaced with approximately 6-10 bicycle parking spaces.

Bicycle corrals move bicycles off the sidewalks, leaving more space for pedestrians, sidewalk café tables, etc. Because bicycle parking does not block sightlines (as large motor vehicles would do), it may be possible to locate bicycle parking in 'no-parking' zones near intersections and crosswalks.

Guidance

See the previous page for sidewalk bicycle rack placement and clear zones.

- Bicyclists should have an entrance width from the roadway of 5' – 6'.
- Can be used with parallel or angled parking.
- Parking stalls adjacent to curb extensions are good candidates for bicycle corrals since the concrete extension serves as delimitation on one side.



Discussion

In many communities, the installation of bicycle corrals is driven by requests from adjacent businesses, and is not a city-driven initiative. In such cases, the city does not remove motor vehicle parking unless it is explicitly requested. In other areas, the city provides the facility and business associations take responsibility for the maintenance of the facility. Communities can establish maintenance agreements with the requesting business. Bicycle corrals can be especially effective in areas with high bicycle parking demand or along street frontages with narrow sidewalks where parked bicycles would be detrimental to the pedestrian environment.

Additional References and Guidelines

APBP. *Bicycle Parking Guide 2nd Edition*. 2010.

Materials and Maintenance

Physical barriers may obstruct drainage and collect debris. Establish a maintenance agreement with neighboring businesses. In snowy climates the bicycle corral may need to be removed during the winter months.

Bikeway Maintenance

Regular bicycle facility maintenance includes sweeping, maintaining a smooth roadway, ensuring that the gutter-to-pavement transition remains relatively flat, and installing bicycle-friendly drainage grates. Pavement overlays are a good opportunity to improve bicycle facilities. The following recommendations provide a menu of options to consider to enhance a maintenance regimen.

Recommended Walkway and Bikeway Maintenance Activities

Maintenance Activity	Frequency
Inspections	Seasonal – at beginning and end of Summer
Pavement sweeping/ blowing	As needed, with higher frequency in the early Spring and Fall
Pavement sealing	5 - 15 years
Pothole repair	1 week – 1 month after report
Culvert and drainage grate inspection	Before Winter and after major storms
Pavement markings replacement	As needed
Signage replacement	As needed
Shoulder plant trimming (weeds, trees, brambles)	Twice a year; middle of growing season and early Fall
Tree and shrub plantings, trimming	1 – 3 years
Major damage response (washouts, fallen trees, flooding)	As soon as possible

Sweeping

Description

Bicyclists often avoid shoulders and bike lanes filled with gravel, broken glass and other debris; they will ride in the roadway to avoid these hazards, potentially causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks (pedestrians need a clean walking surface), nor should debris be swept from the sidewalk onto the roadway.

Guidance

- Establish a seasonal sweeping schedule that prioritizes roadways with major bicycle routes.
- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility.
- In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.
- Pave gravel driveway approaches to minimize loose gravel on paved roadway shoulders.
- Perform additional sweeping in the Spring to remove debris from the Winter, and in the Fall in areas where leaves accumulate .

Gutter to Pavement Transition

Description

On streets with concrete curbs and gutters, 1 to 2 feet of the curbside area is typically devoted to the gutter pan, where water collects and drains into catch basins. On many streets, the bikeway is situated near the transition between the gutter pan and the pavement edge. This transition can be susceptible to erosion, creating potholes and a rough surface for travel.

The pavement on many streets is not flush with the gutter, creating a vertical transition between these segments. This area can buckle over time, creating a hazardous condition for bicyclists.

Guidance

- Ensure that gutter-to-pavement transitions have no more than a ¼" vertical transition.
- Examine pavement transitions during every roadway project for new construction, maintenance activities, and construction project activities that occur in streets.
- Inspect the pavement 2 to 4 months after trenching construction activities are completed to ensure that excessive settlement has not occurred.
- Provide at least 3 feet of pavement outside of the gutter seam.

Maintenance Management Plan

Description

Bikeway users need accommodation during construction and maintenance activities when bikeways may be closed or unavailable. Users must be warned of bikeway closures and given adequate detour information to bypass the closed section. Users should be warned through the use of standard signing approaching each affected section (e.g., "Bike Lane Closed," "Trail Closed"), including information on alternate routes and dates of closure. Alternate routes should provide reasonable directness, equivalent traffic characteristics, and be signed.

Guidance

- Provide fire and police departments with map of system, along with access points to gates/bollards
- Enforce speed limits and other rules of the road
- Enforce all trespassing laws for people attempting to enter adjacent private properties

SHARED USE PATHS

Shared Use Paths and Off-Street Facilities

A shared use path allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles. Path facilities can also include amenities such as lighting, signage, and fencing (where appropriate).

Key features of shared use paths include:

- Frequent access points from the local road network.
- Directional signs to direct users to and from the path.
- A limited number of at-grade crossings with streets or driveways.
- Terminating the path where it is easily accessible to and from the street system.
- Separate treads for pedestrians and bicyclists when heavy use is expected.

The geometric design of shared use paths should be designed to support the speed and volume of expected user types. Bicyclist speeds can vary significantly depending on path grade. The table below lists typical bicyclists speeds.

Bicycle Design Speed Expectations

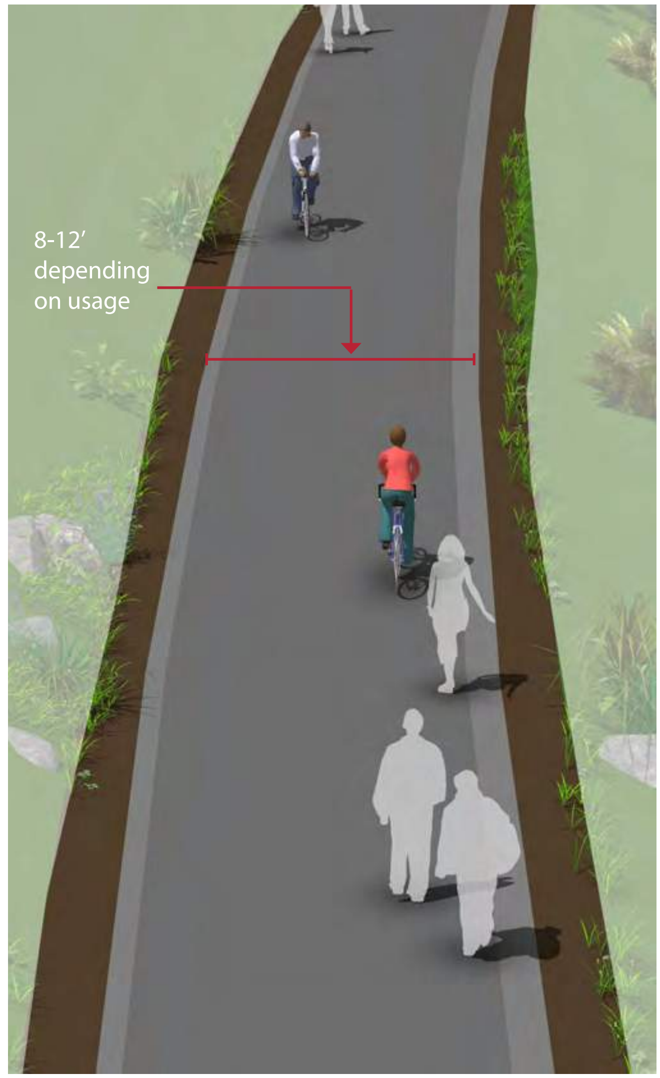
Bicycle Type	Feature	Typical Speed
Upright Adult Bicyclist	Paved level surfacing	8-15 mph
	Downhill	20-30+ mph
	Uphill	5 -12 mph
Recumbent Bicyclist	Paved level surfacing	11-18 mph

Source: AASHTO *Guide for the Development of Bicycle Facilities*, 4th Edition

General Design Practices

Description

Shared use paths can provide a desirable facility, particularly for recreation, and users of all skill levels preferring separation from traffic. Bicycle paths should generally provide directional travel opportunities not provided by existing roadways.



Guidance

Width

- 8 feet is the minimum allowed for a two-way bicycle path and is only recommended for low traffic situations.
- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users. A separate track (5’ minimum) can be provided for pedestrian use.

Lateral Clearance

- A 2 foot or greater shoulder on both sides of the path should be provided. An additional foot of lateral clearance (total of 3’) is required by the MUTCD for the installation of signage or other furnishings.
- If bollards are used at intersections and access points, they should be colored brightly and/or supplemented with reflective materials to be visible at night.

Overhead Clearance

- Clearance to overhead obstructions should be 8 feet minimum, with 10 feet recommended.

Striping

- When striping is required, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.

Discussion

Terminate the path where it is easily accessible to and from the street system, preferably at a controlled intersection or at the beginning of a dead-end street.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
Caltrans *CA-MUTCD.* 2012.
Flink, C. *Greenways: A Guide To Planning Design And Development.* 1993.
Caltrans. *California HDM.* 2012.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Shared Use Paths in Active Rail Corridors

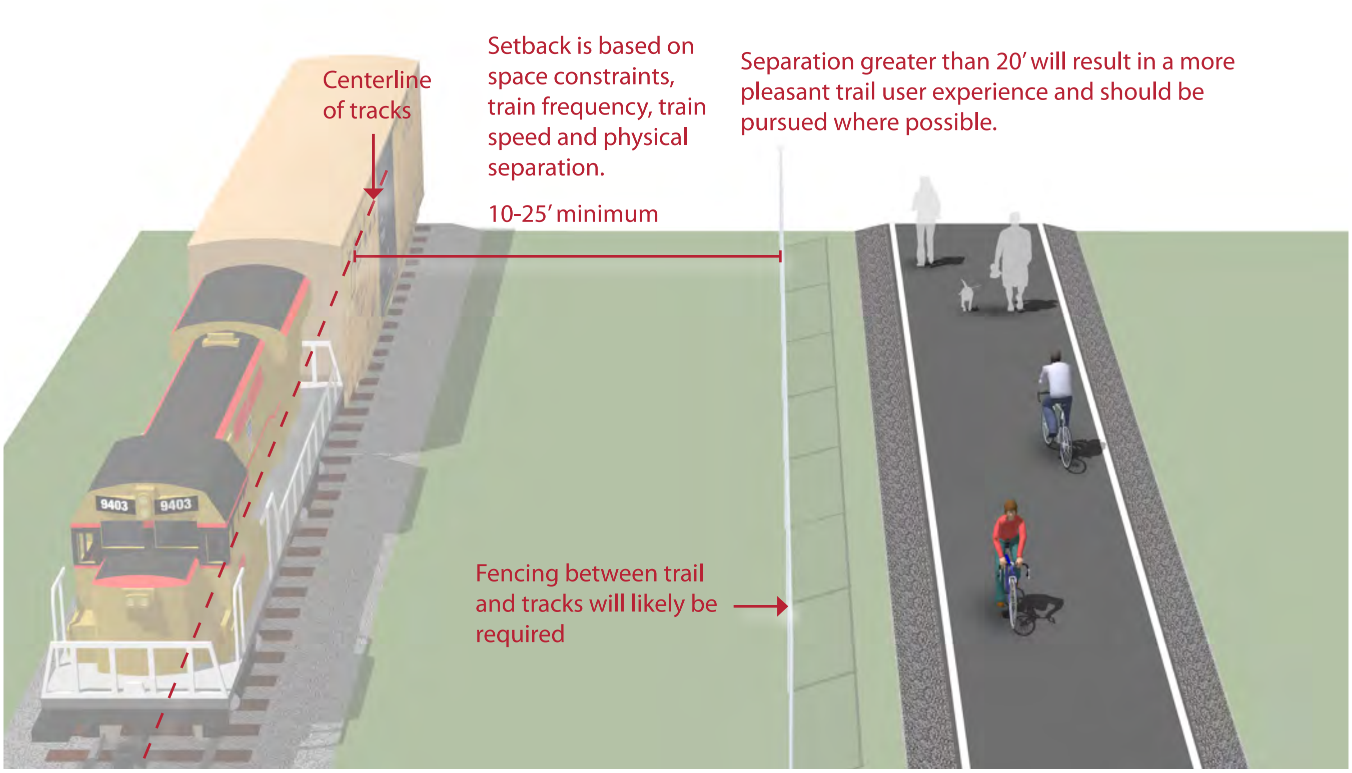
Description

Rails-with-Trails projects typically consist of paths adjacent to active railroads. It should be noted that some constraints could impact the feasibility of rail-with-trail projects. In some cases, space needs to be preserved for future planned freight, transit or commuter rail service. In other cases, limited right-of-way width, inadequate setbacks, concerns about safety/trespassing, and numerous mid-block crossings may affect a project's feasibility.

Guidance

Shared use paths in utility corridors should meet or exceed general design standards. If additional width allows, wider paths, and landscaping are desirable.

If required, fencing should be a minimum of 5 feet in height with higher fencing than usual next to sensitive areas such as switching yards. Setbacks from the active rail line will vary depending on the speed and frequency of trains, and available right-of-way.



Discussion

Railroads may require fencing with rail-with-trail projects. Concerns with trespassing and security can vary with the volume and speed of train traffic on the adjacent rail line and the setting of the shared use path, i.e. whether the section of track is in an urban or rural setting.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
Caltrans *CA-MUTCD.* 2012.
FHWA. *Rails-with-Trails: Lessons Learned.* 2002.
California Public Utilities Commission. General Orders.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Shared Use Paths in River and Utility Corridors

Description

Utility and waterway corridors often offer excellent shared use path development and bikeway gap closure opportunities. Utility corridors typically include powerline and sewer corridors, while waterway corridors include canals, drainage ditches, rivers, and beaches. These corridors offer excellent transportation and recreation opportunities for bicyclists of all ages and skills.

Guidance

Shared use paths in utility corridors should meet or exceed general design practices. If additional width allows, wider paths, and landscaping are desirable.

Access Points

Any access point to the path should be well-defined with appropriate signage designating the pathway as a bicycle facility and prohibiting motor vehicles.

Path Closure

Public access to the shared use path may be prohibited during the following events:

- Canal/flood control channel or other utility maintenance activities
- Inclement weather or the prediction of storm conditions

Discussion

Similar to railroads, public access to flood control channels or canals may be undesirable. Hazardous materials, deep water or swift current, steep, slippery slopes, and debris all may constitute risks for public access. Appropriate fencing may be desired to keep path users within the designated travel way. Creative design of fencing is encouraged to make the path facility feel welcoming to the user.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
Caltrans *CA-MUTCD. 2012.*
Flink, C. *Greenways: A Guide To Planning Design And Development.* 1993.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Shared Use Paths Along Roadways

Description

Shared Use Paths along roadways, also called sidepaths, are a type of path that run adjacent to a street.

Because of operational concerns it is generally preferable to place paths within independent rights-of-way away from roadways. However, there are situations where existing roads provide the only corridors available.

Along roadways, these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding where bicyclists enter or leave the path.

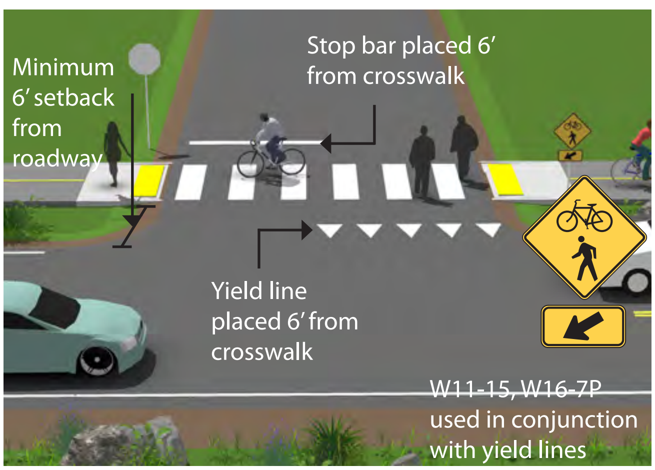
The AASHTO Guide for the Development of Bicycle Facilities cautions practitioners of the use of two-way sidepaths on urban or suburban streets with many driveways and street crossings.

In general, there are two approaches to crossings: adjacent crossings and setback crossings, illustrated below.

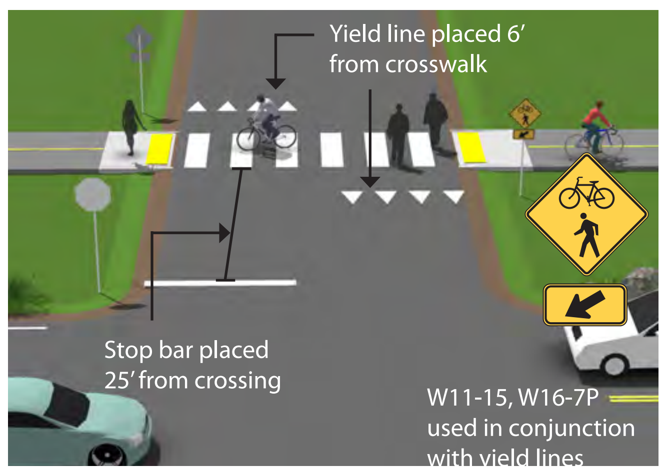
Guidance

- Guidance for sidepaths should follow that for general design practises of shared use paths.
- A high number of driveway crossings and intersections create potential conflicts with turning traffic. Consider alternatives to sidepaths on streets with a high frequency of intersections or heavily used driveways.
- Where a sidepath terminates special consideration should be given to transitions so as not to encourage unsafe wrong-way riding by bicyclists.
- Crossing design should emphasize visibility of users and clarity of expected yielding behavior. Crossings may be STOP or YIELD controlled depending on sight lines and bicycle motor vehicle volumes and speeds.

Adjacent Crossing - A separation of 6 feet emphasizes the conspicuity of riders at the approach to the crossing.



Setback Crossing - A set back of 25 feet separates the path crossing from merging/turning movements that may be competing for a driver's attention.



Discussion

Sidepaths differ from Cycle Tracks because of lack of separation from pedestrians, lack of bicycle-specific accommodation at intersections, and often lack of consideration at driveways or minor street crossings. When right of way is available, cycle track installations are preferred to sidepaths.
To reduce potential conflicts in some situations, it may be better to place one-way sidepaths on both sides of the street.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
NACTO. *Urban Bikeway Design Guide.* See entry on Raised Cycle Tracks. 2012.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

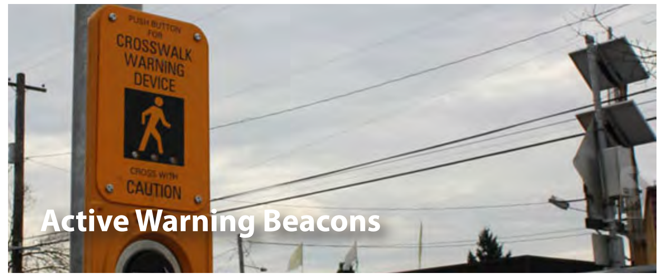
Path/Roadway Crossings

At-grade roadway crossings can create potential conflicts between path users and motorists, however, well-designed crossings can mitigate many operational issues and provide a higher degree of safety and comfort for path users. This is evidenced by the thousands of successful facilities around the United States with at-grade crossings. In most cases, at-grade path crossings can be properly designed to provide a reasonable degree of safety and can meet existing traffic and safety standards. Path facilities that cater to bicyclists can require additional considerations due to the higher travel speed of bicyclists versus pedestrians.

Consideration must be given to adequate warning distance based on vehicle speeds and line of sight, with the visibility of any signs absolutely critical. Directing the active attention of motorists to roadway signs may require additional alerting devices such as a flashing beacon, roadway striping or changes in pavement texture. Signing for path users may include a standard "STOP" or "YIELD" sign and pavement markings, possibly combined with other features such as bollards or a bend in the pathway to slow bicyclists. Care must be taken not to place too many signs at crossings lest they begin to lose their visual impact.

A number of striping patterns have emerged over the years to delineate path crossings. A median stripe on the path approach will help to organize and warn path users. Crosswalk striping is typically a matter of local and State preference, and may be accompanied by pavement treatments to help warn and slow motorists. In areas where motorists do not typically yield to crosswalk users, additional measures may be required to increase compliance.


Marked/Unsignalized Crossings



Active Warning Beacons


Route Users to Existing Signals


Pedestrian Hybrid Beacon Crossing


Full Traffic Control Signal Crossing

Marked/Unsignalized Crossings

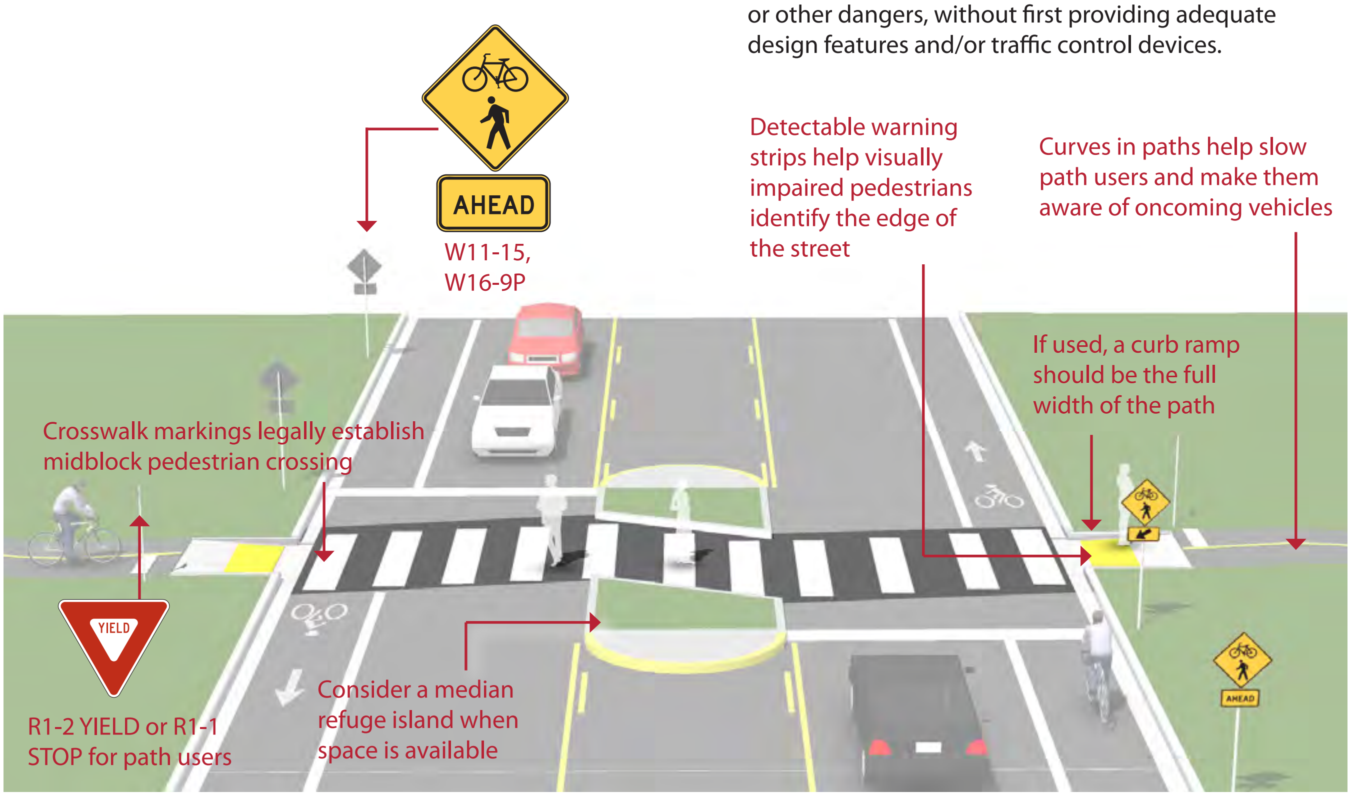
Description

A marked/unsignalized crossing typically consists of a marked crossing area, signage and other markings to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, pathway traffic, use patterns, vehicle speed, road type, road width, and other safety issues such as proximity to major attractions.

When space is available, using a median refuge island can improve user safety by providing pedestrians and bicyclists space to perform the safe crossing of one side of the street at a time.

Guidance

- Refer to the FHWA report, "Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations" for specific volume and speed ranges where a marked crosswalk alone may be sufficient.
- Where the speed limit exceeds 40 miles per hour, marked crosswalks alone should not be used at unsignalized locations.
- Crosswalks should not be installed at locations that could present an increased risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices.



Discussion

The assignment of right of way at path crossings requires a detailed understanding of user volumes, travel speeds, and approach sight distance. Installing unwarranted controls on path approaches can lead to a loss of respect for traffic control at more critical locations. Good engineering judgment should be used for deciding which treatment to use.

In conventional intersection design, right of way is assigned to the higher volume or higher speed approach. In many cases, path volumes will exceed that of minor crossed streets, and right of way may be assigned to the path traffic. In crossings with appropriate sight distances, "YIELD" control of the path or road can be an effective solution for users as it encourages caution without being overly restrictive. For further discussion see chapter 5 in the AASHTO *Guide for the Development of Bicycle Facilities.*

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012. Ch 5.
Caltrans *CA-MUTCD.* 2012
Caltrans. *California HDM.* 2012.

Materials and Maintenance

Locate markings out of wheel tread when possible to minimize wear and maintenance costs.

Active Warning Beacons

Description

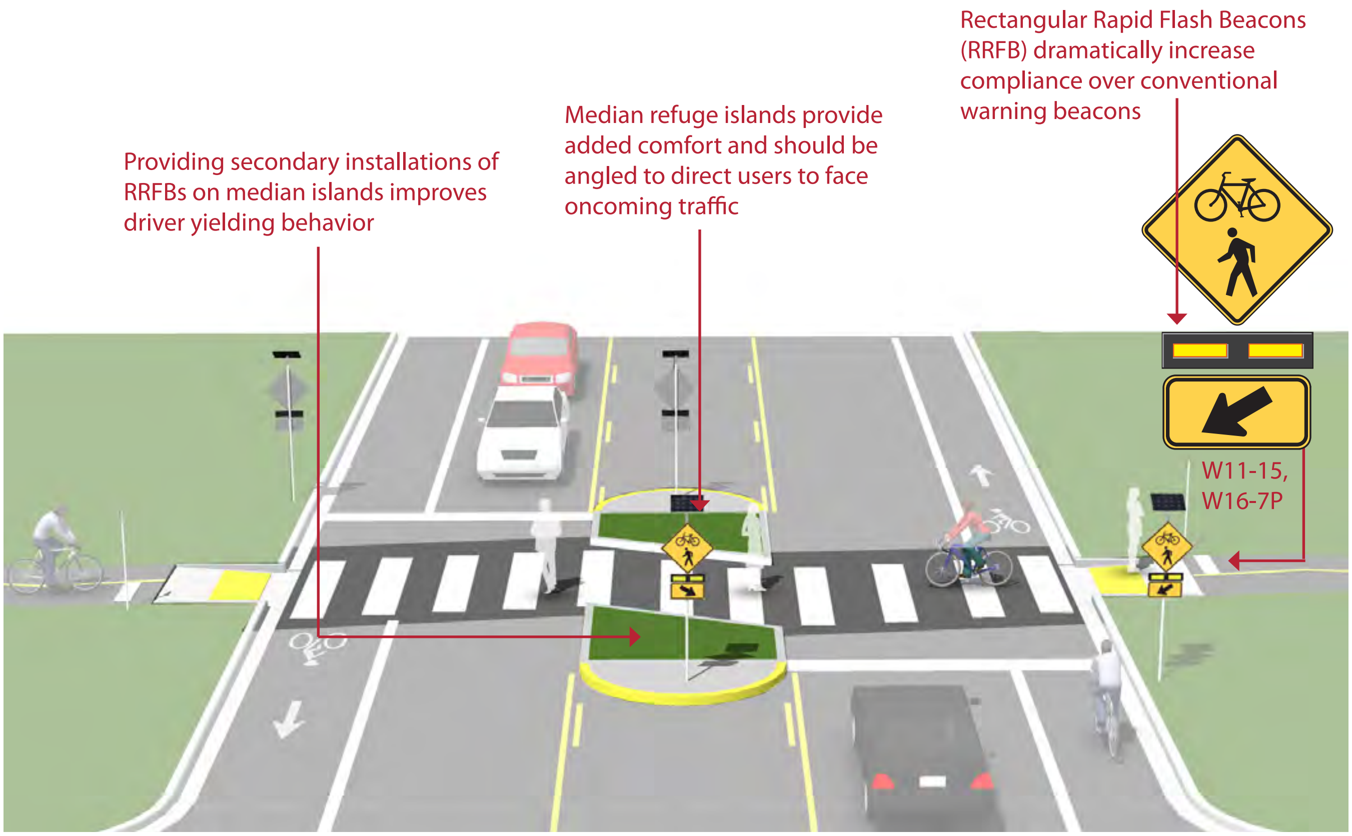
Enhanced marked crossings are unsignalized crossings with additional treatments designed to increase motor vehicle yielding compliance on multi-lane or high volume roadways.

These enhancements include pathway user or sensor actuated warning beacons, Rectangular Rapid Flash Beacons (RRFB) shown below, or in-roadway warning lights.

Guidance

Guidance for marked/unsignalized crossings applies.

- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic control signals.
- Warning beacons shall initiate operation based on user actuation and shall cease operation at a predetermined time after the user actuation or, with passive detection, after the user clears the crosswalk.



Discussion

Rectangular rapid flash beacons show the most increased compliance of all the warning beacon enhancement options.

A study of the effectiveness of going from a no-beacon arrangement to a two-beacon RRFB installation increased yielding from 18 percent to 81 percent. A four-beacon arrangement raised compliance to 88%. Additional studies of long term installations show little to no decrease in yielding behavior over time.

Additional References and Guidelines

NACTO. *Urban Bikeway Design Guide*. 2012.
Caltrans *CA-MUTCD. 2012.*
FHWA. *MUTCD - Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11).* 2008.

Materials and Maintenance

Locate markings out of wheel tread when possible to minimize wear and maintenance costs. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

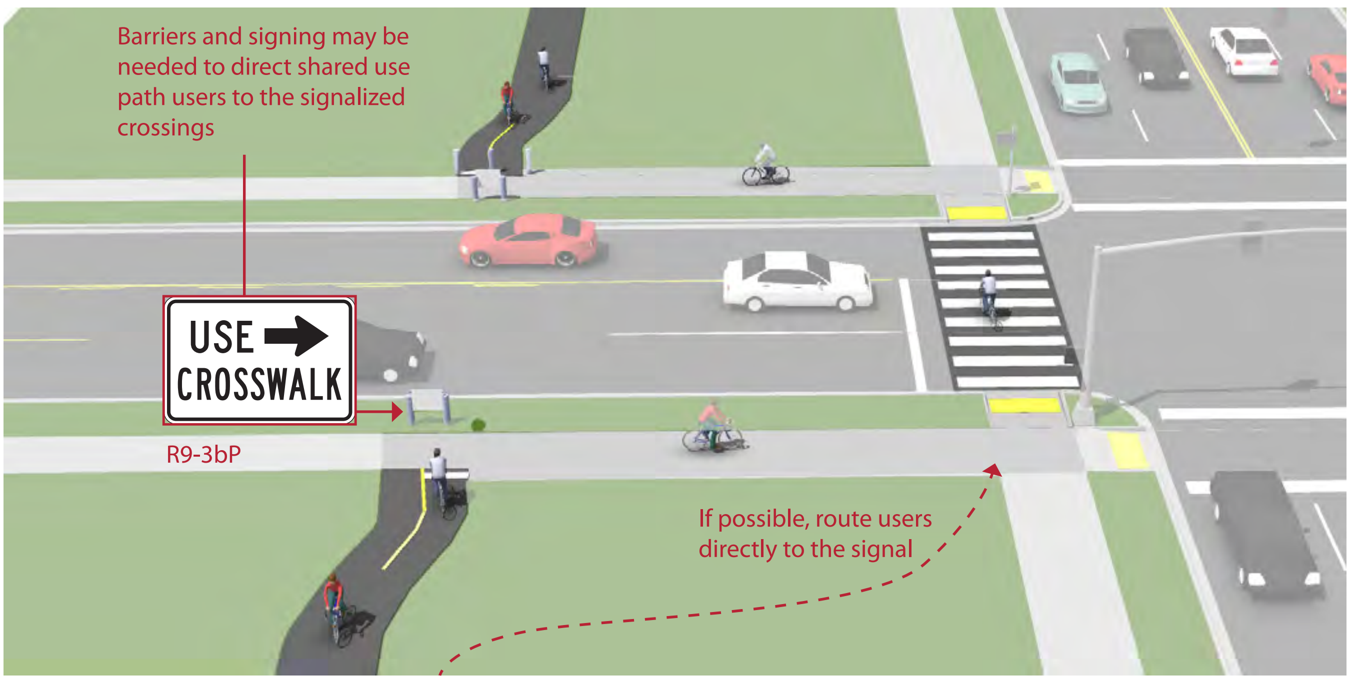
Route Users to Signalized Crossings

Description

Path crossings within approximately 400 feet of an existing signalized intersection with pedestrian crosswalks are typically diverted to the signalized intersection to avoid traffic operation problems when located so close to an existing signal. For this restriction to be effective, barriers and signing may be needed to direct path users to the signalized crossing. If no pedestrian crossing exists at the signal, modifications should be made.

Guidance

Path crossings should not be provided within approximately 400 feet of an existing signalized intersection. If possible, route path directly to the signal.



Discussion

In the US, the minimum distance a marked crossing can be from an existing signalized intersection varies from approximately 250 to 660 feet. Engineering judgement and the context of the location should be taken into account when choosing the appropriate allowable setback. Pedestrians are particularly sensitive to out of direction travel and jaywalking may become prevalent if the distance is too great.

Additional References and Guidelines

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities.* 2004.

Materials and Maintenance

If a sidewalk is used for crossing access, it should be kept clear of snow and debris and the surface should be level for wheeled users.

Pedestrian Hybrid Beacon Crossings

Description

Pedestrian hybrid beacons provide a high level of comfort for crossing users through the use of a red-signal indication to stop conflicting motor vehicle traffic.

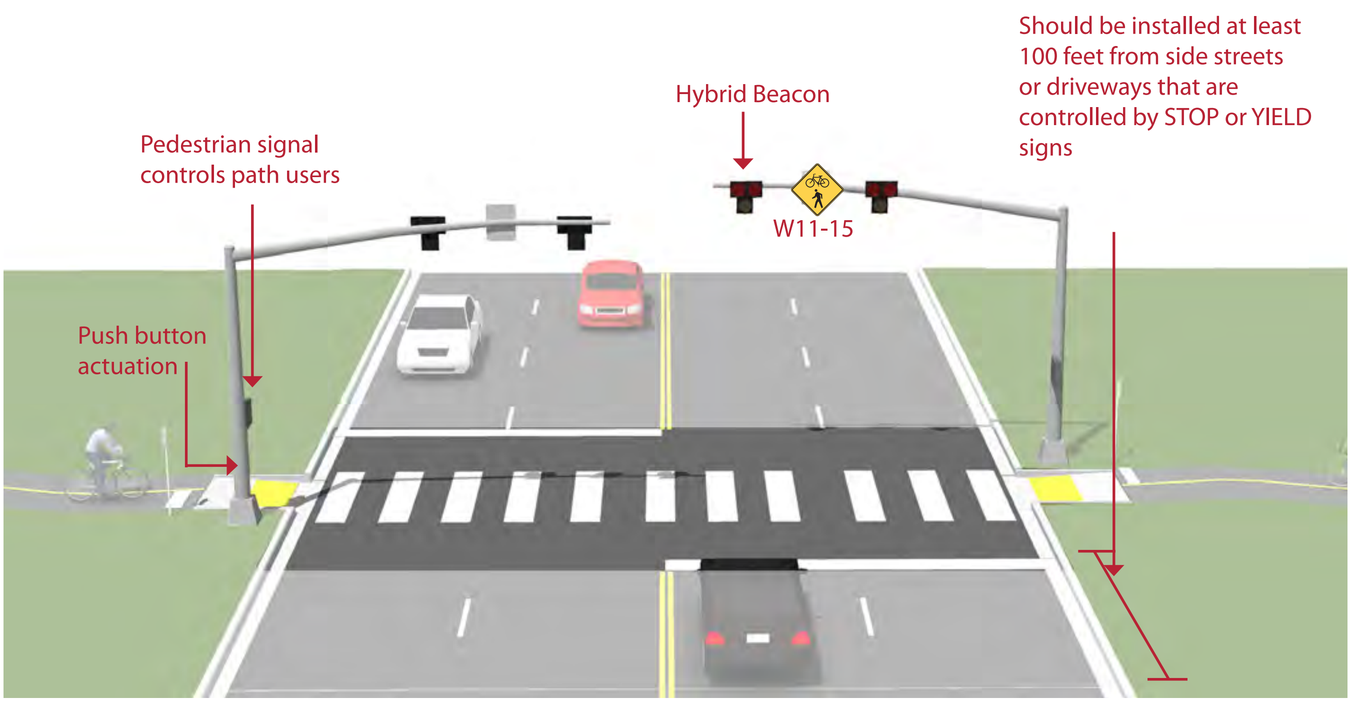
Hybrid beacon installation faces only cross motor vehicle traffic, stays dark when inactive, and uses a unique 'wig-wag' signal phase to indicate activation. Vehicles have the option to proceed after stopping during the final flashing red phase, which can reduce motor vehicle delay when compared to a full signal installation.

Guidance

Hybrid beacons (illustrated here) may be installed without meeting traffic signal control warrants if roadway speed and volumes are excessive for comfortable path crossings.

FHWA does not allow bicycle signals to be used with Hybrid beacons, though some cities have done so successfully.

To maximize safety when used for bicycle crossings, the flashing 'wig-wag' phase should be very short and occur after the pedestrian signal head has changed to a solid "DON'T WALK" indication as bicyclists can enter an intersection quickly.



Discussion

Shared use path signals are normally activated by push buttons but may also be triggered by embedded loop, infrared, microwave or video detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street.

Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity and safety.

Additional References and Guidelines

FHWA. *Pedestrian Hybrid Beacon Guide.* 2014.
NACTO. *Urban Bikeway Design Guide.* 2012.
Caltrans *CA-MUTCD. 2012.*

Materials and Maintenance

Hybrid beacons are subject to the same maintenance needs and requirements as standard traffic signals. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

Full Traffic Signal Crossings

Description

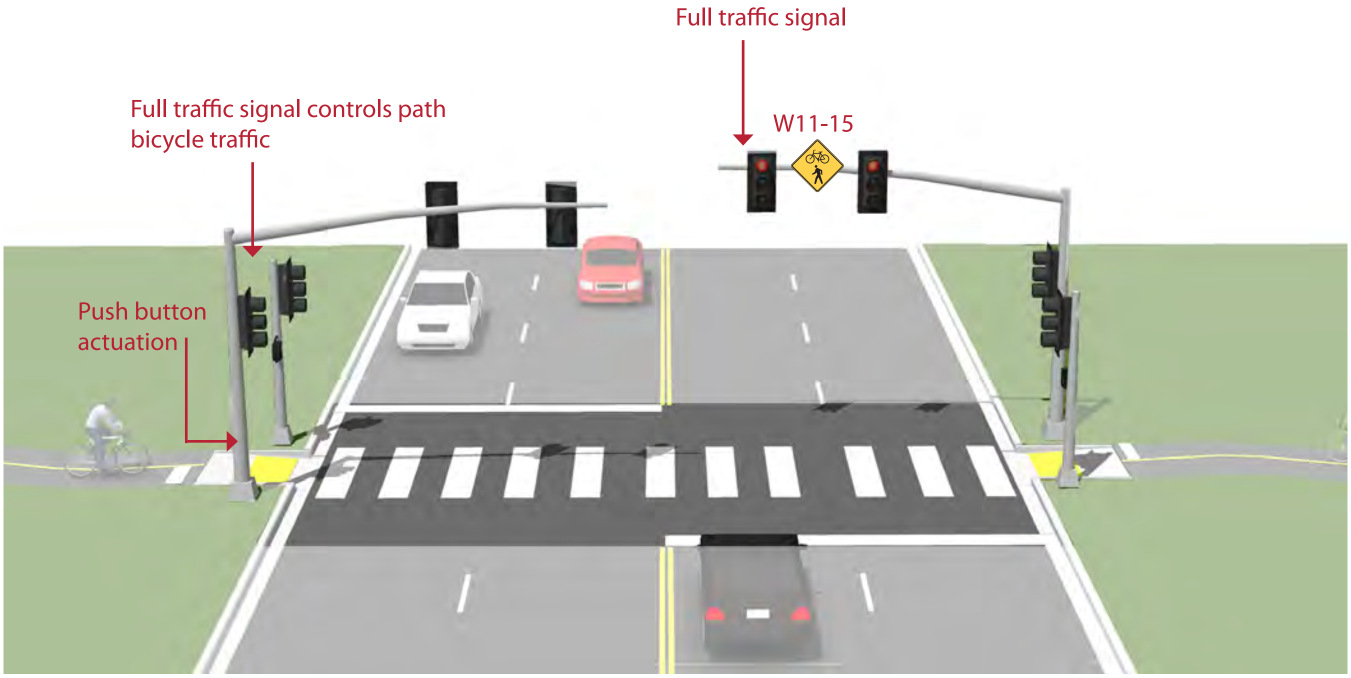
Signalized crossings provide the most protection for crossing path users through the use of a red-signal indication to stop conflicting motor vehicle traffic.

A full traffic signal installation treats the path crossing as a conventional 4-way intersection and provides standard red-yellow-green traffic signal heads for all legs of the intersection.

Guidance

Full traffic signal installations must meet MUTCD pedestrian, school or modified warrants. Additional guidance for signalized crossings:

- Located more than 300 feet from an existing signalized intersection
- Roadway travel speeds of 40 MPH and above
- Roadway ADT exceeds 15,000 vehicles



Discussion

Shared use path signals are normally activated by push buttons but may also be triggered by embedded loop, infrared, microwave or video detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street.

Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity and safety.

Additional References and Guidelines

Caltrans *CA-MUTCD. 2012.*
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Traffic signals require routine maintenance. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.