Walk Audit Report

SafeRoutes
Napa County

REDWOOD
MIDDLE SCHOOL

REDWOOD MIDDLE SCHOOL

3600 OXFORD STREET NAPA, CA

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EXECUTIVE **SUMMARY**

THE NAPA COUNTY SAFE ROUTES TO SCHOOL PROGRAM

The Napa County Safe Routes to School (SRTS) Program is a partnership between the Napa County Office of Education (NCOE), Napa County Bicycle Coalition (NCBC) and Napa Valley Transportation Authority (NVTA). Since 2008, the Program has provided high-quality bicycle and pedestrian safety education and encouragement programs and has worked closely with the public agency and school stakeholders to make walking and bicycling safer and more accessible for children throughout Napa County.

According to 2015 California Office of Traffic Safety (OTS) data, the data available when the SRTS program was applying for grant funding, Napa County ranked 1st in per capita number of collisions of bicyclists under the age 15, 2nd in total fatal and injury-causing collisions, and 3rd in overall pedestrian collisions. According to the most recent OTS data (2018), Napa County ranked 8th for bicyclist collisions statewide (58 counties), 7th for speed-related collisions, and 6th for total fatal and injury-causing collisions. A decades-long decline in the number of students walking and biking to school, as well as increased awareness of the significant traffic congestion, air pollution, and related issues associated with students being driven to school galvanized local agency partners to expand the existing program.

> The goal of the Walk Audit Report is to **identify, evaluate, prioritize, and offer solutions** to infrastructure and non-infrastructure barriers to students safely walking and biking to school in Napa County.

In 2017, the Napa County SRTS program secured funding through the Caltrans Active Transportation Program (ATP) and One Bay Area Grant (OBAG) Cycle II programs to expand education programs and initiate a series of evaluations at each public school countywide. NCOE has been leading education and engagement programs under the current program, while NCBC has led evaluations of active transportation barriers at all 36 school sites.

WHY SAFE ROUTES TO SCHOOL?

Safe Routes to School is national initiative committed to increasing the number of students who walk or bike to school, and making it safe, convenient, and fun for kids to do so. In doing so, SRTS aims to improve kids' safety and increase health and physical activity. Concerned by the declining number of students walking and biking to school over recent decades and the related long-term health and traffic consequences, Congress made federal funding available for SRTS programs nationwide in 2005. Since then, SRTS programs have been implemented at more than 14,000 schools in all 50 states.

Studies have linked SRTS programs to increased walking and biking to school[ab] and reduced pedestrian-motorist collisions[cd]. This can lead to safer, healthier, and more focused students, while also benefitting local and school communities.

Regularly walking or biking increases children's daily levels of physical fitness and improves their cardiovascular health[e].

Student health has been linked to improved academic performance[fg]. When students walk or bike to school, the fresh air and exercise allow them to arrive refreshed, energized and ready to focus. Children have a greater sense of spatial awareness and knowledge when they are actively engaged in their transportation, allowing them to better recognize and navigate their neighborhoods independently[h]. Families are also provided with a low-cost transportation option that can significantly reduce their annual expenses[i].

When a greater share of students walk or bike to school, local and school communities benefit too. Fewer cars being driven to school can improve the air quality of surrounding neighborhoods by decreasing air pollutant emissions and increase street safety through reduced traffic congestion and noise pollution. This can also improve campus safety and reduce circulation hazards around the school site. Walking or biking is a reliable form of transportation, which can reduce student absence and tardiness. By reducing the number of short-distance school bus trips, increased student walking and biking can also help school districts save funds by decreasing costly bus service.

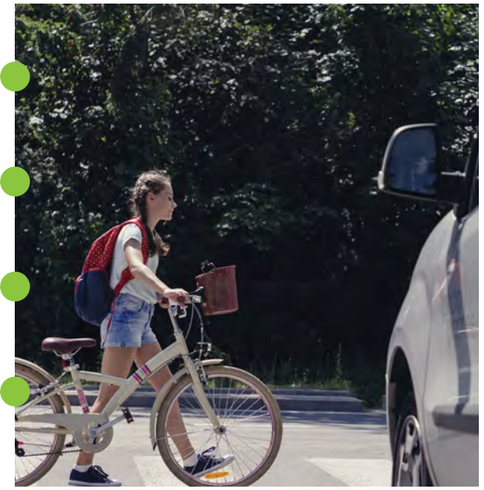
Schools and the community benefit immensely when students choose to walk or bike.

Student health has been linked to improved academic performance.

Walking or biking can provide a reliable form of transportation, leading to reduced student absence and tardiness.

Children arrive ready to learn and are less likely to experience discipline issues.

Fewer cars dropping off and picking up students improves campus safety and reduces circulation hazards.



THE SIX E'S

Safe Routes to School programs originally followed a comprehensive approach that addressed the "Five E's" – education, encouragement, enforcement, evaluation, and engineering. In 2017, when the Napa County SRTS program obtained funding to perform Walk Audit evaluations, the "Five E's" had recently been altered to add a sixth "E" – equity. In June 2020, after a significant portion of the Walk Audit evaluation work had been completed, the "Six E's" framework was again altered, dropping enforcement and adding engagement. These changes were led by the Safe Routes to School National Partnership.

The current "Six E's" framework is described below. Although enforcement is no longer one of the "Six E's", a brief definition of enforcement is included, as it was part of the approach used by the Napa County SRTS program during the majority of the Walk Audit evaluation process. Enforcement statistics are not emphasized in this report, as this element needs more study and review.

Engagement
Listen to community members and work with existing community organizations.

Equity
Recognize the unique barriers that different people face in living healthy, fulfilled lives, and craft policies, programs, and overall approaches with those various challenges and needs in mind.

Engineering
Design streets and schools for walkers and bikers to use safely and conveniently.

Encouragement
Promote walking and biking in the school community through events, programs and incentives.

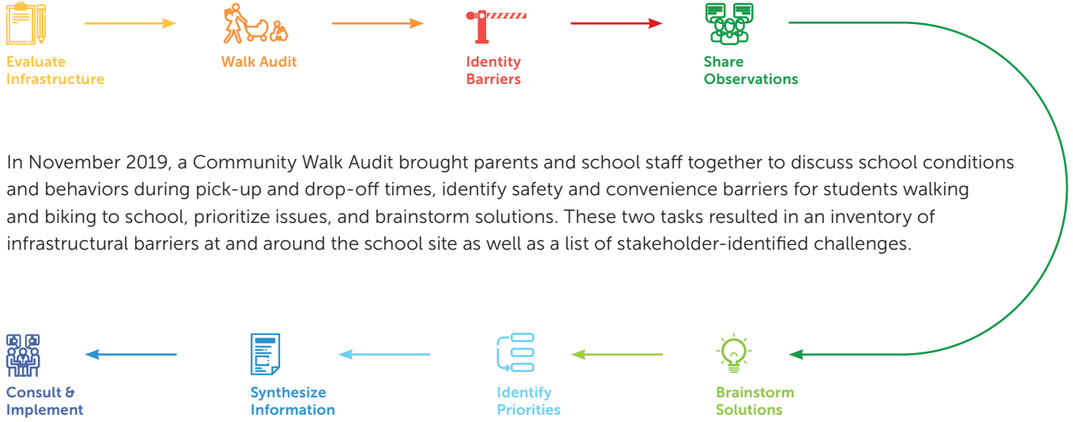
Education
Ensure that everyone learns how to travel safely and why biking and walking are important.

Evaluation
Track progress toward our shared safety goals, develop programs accordingly.

Enforcement (no longer an "E'):
Enforce traffic safety laws and school policies and target risky behaviors. No longer recommended as foundational to the start, maintenance, or growth of Safe Routes to School programs.

REPORT PROCESS

The SRTS team conducted a comprehensive evaluation of the barriers to students walking and biking to and from Redwood Middle School, starting in the summer of 2018. Information on physical and behavioral challenges was collected in two phases. In August 2018, the SRTS team completed an initial infrastructure audit of the school site and the surrounding neighborhood within a half-mile of the school. SRTS team members walked and rode bicycles throughout the school neighborhood, taking photographs of barriers and logging them into Fulcrum, a GPS-enabled data collection smartphone app.



In November 2019, a Community Walk Audit brought parents and school staff together to discuss school conditions and behaviors during pick-up and drop-off times, identify safety and convenience barriers for students walking and biking to school, prioritize issues, and brainstorm solutions. These two tasks resulted in an inventory of infrastructural barriers at and around the school site as well as a list of stakeholder-identified challenges.

A report draft was shared with the Napa Valley Transportation Authority, the Napa County Office of Education, law enforcement, public works and planning representatives from the City of Napa, the local school district, and school stakeholders, and their feedback was incorporated into the final version. As part of the larger countywide project, the SRTS team engaged EMC Research, a national public opinion research firm to conduct a comprehensive survey of parents' perceptions around walking and biking to school (see Appendix A). The Walk Audit report outlines the information gathered during this multi-year process and provides recommendations for improvements.

REDWOOD MIDDLE SCHOOL
SCHOOL SUMMARY

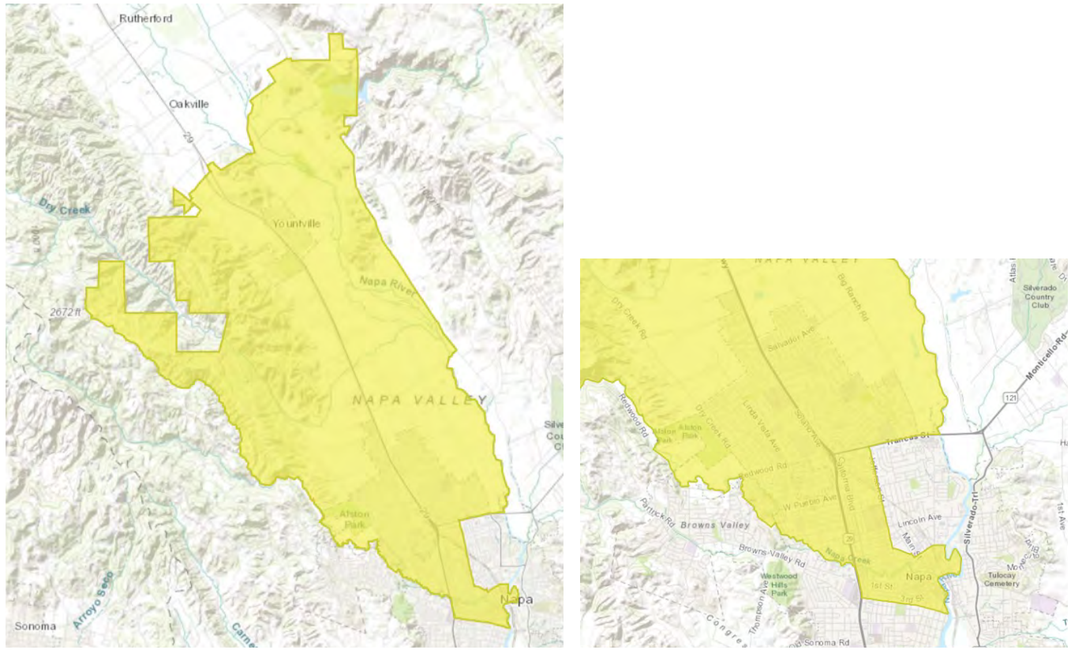
Principal	Maryanne Christoffersen	Grades	6-8
First Bell	8:00 AM	Enrollment	900
Last Bell	3:10 PM (1:50 PM on Wed.)	Street	3600 Oxford Street
District	Napa Valley Unified	City	Napa, CA 94558

Overall Facility Rating[j]: Good

While NVUSD has an open enrollment policy, Redwood Middle School's default enrollment area covers a large portion of downtown and central Napa, the city of Napa north of Redwood Road, and a large section of Napa County between north Napa and the Yountville Hills, including the city of Yountville.

Through the open enrollment policy, families may apply to NVUSD for their student to attend a school other than their school of residence. Out-of-district students may also apply through the open enrollment process. This often results in students living farther away from school, making them more likely to rely on driving for transportation. At schools where open enrollment students constitute a high proportion of their enrollment, this can cause higher vehicular traffic volumes around the school during pick-up and drop-off.

According to the most recent data (2020-21 school year), 8.8% of students attending Redwood Middle School reside outside of the school's enrollment boundary.



Map 1: To the left, the Redwood enrollment boundary within Napa County. To the right, the Redwood enrollment boundary within the City of Napa.

DATA

A hand tally survey collected by the Napa County Office of Education in Spring 2019 reflected that on average, roughly 15% of Redwood Middle School students walked or biked to school to school, while over two-thirds were driven in a family vehicle.

According to the results of the countywide EMC Research survey conducted in Spring 2021, 16% of respondents report that their K-8th grade children primarily walk to and/or from school and ~4% primarily bike. While nearly half (43%) say that their child has walked or biked to/from school at some point, 73% report using a single-family vehicle as the primary transportation method to and from school.

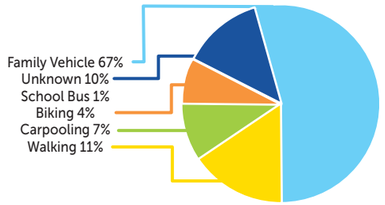


Figure 1: NCOE Hand Tally Data

Total Enrollment by Group (2019-20)

ETHNICITY	SHEARER ELEMENTARY SCHOOL	DISTRICT
Black or African American	0.3%	2.1%
American Indian or Alaska Native	0.6%	0.2%
Asian	1.0%	2.4%
Filipino	1.0%	6.9%
Hispanic or Latino	65.9 %	55.6%
Native Hawaiian or Pacific Islander	0.1%	0.2%
White	30.1%	28.4%
Two or More Races	1.0%	4.0%
EXPERIENCE		
Socioeconomically Disadvantaged	58.8%	51.2%
English Learners	21%	20.5%
Students with Disabilities	11.6%	12.5%
Foster Youth	0.9%	0.4%
Homeless	0.9%	1.1%

Figure 3: Enrollment Data by Group

Countywide K-8 Primary Transportation to/from School (EMC Research)

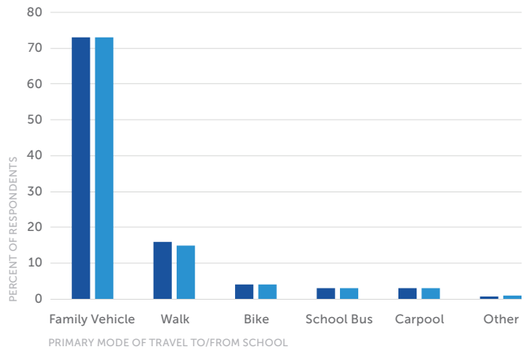


Figure 2: EMC Research Polling Results

Note: *Data from EMC Research survey represents countywide behaviors, and school or city-level breakdowns are not available. See Appendix A for details on survey methods and respondent profiles.*

Student Enrollment by Grade Level (2019-2020)

	NUMBER OF STUDENTS
Grade 6	255
Grade 7	311
Grade 8	334
Total	**900**

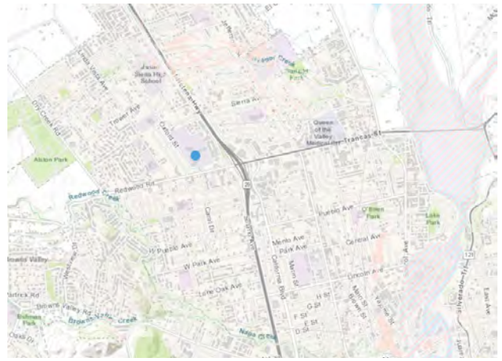
Figure 4: Enrollment Data by Grade

NEIGHBORHOOD CONTEXT

Redwood Middle School is located within the City of Napa's Linda Vista Planning Area. The area primarily consists of post-1970 single-family housing, with some commercial uses and multi-family and modular housing sites. The school is bordered by Oxford Street to the west, Carol Drive and Redwood Road, a busy east-west arterial, to the south, Devonshire Drive to the north, and Solano Avenue, a north-south collector, to the east. Between the school campus and Devonshire Drive is a row of single-family residences, and between the campus and Solano Avenue are apartment buildings, hotels, and a county transportation facility. The nearby neighborhoods are mostly deep-lot subdivisions with mainly fragmented parallel roads and post-war tract subdivisions characterized by curvilinear street designs. There are also many cul-de-sacs. These street patterns reduce pedestrian mobility by decreasing interconnectivity, access points, and route choice.

West of the school is mostly occupied by single-family housing, though there is also a church, a retirement residence home, and an apartment complex. Northwood Elementary School sits less than half of a mile northwest of Redwood Middle School on Oxford Street. North of the school are more single-family residences, another church, and Justin-Siena High School. Beyond the buildings that border the middle school to the east are the Vine Trail shared-use path, a 7-11, and the Bel Air Plaza shopping center on the other side of SR 29. Running parallel to Solano Avenue is SR 29; however, it is grade-separated, with an overpass providing an east-west connection. South of the school are more single-family residences, a Catholic school, and Redwood Plaza.

Many destinations of interest exist within walking distance of the middle school. Destinations of interest include the 7-11; Northwood Elementary School; an orthodontics office southeast of the school; the Vine Trail multi-use path across Solano Avenue; and Redwood Plaza, which includes Starbucks, Baskin-Robbins, Squeeze Inn Hamburgers, Round Table pizza, and a taqueria.



Map 2: Redwood Middle School (indicated by a blue dot) is located in northwest Napa.

Redwood Middle School neighbors a variety of land uses, including residential and commercial uses.

The Redwood/Trancas overpass connection above SR 29.

The Vine Trail shared-use path just north of the Redwood Road and Solano Avenue intersection.

EXISTING **CONDITIONS**

The Safe Routes to School Team conducted an initial evaluation of the school site and surrounding area prior to conducting the Community Walk Audit. The Fulcrum App software was used to map and record significant point and segment issues within a half-mile range of the school. The team also collected information on local and school transportation policies and programs from conversations with the school's staff and administrators, as well as documents from the school and City websites.

SITE CIRCULATION

Redwood Middle School is located on the southwest corner of the block, so it can only be accessed from Oxford Street, Carol Drive, and a parking lot off of Redwood Road. There are several pedestrian and bicyclist access points to the campus: one on Redwood Road, two on Carol Drive, and three on Oxford Street.

Apart from red paint near intersections, next to parking lot entrances/exits, and in front of the bus stop in front of the school's main entrance on Oxford Street, the curbs on Oxford Street and Carol Drive are unpainted and are used by drivers to park and drop off children. Drivers often drop off students on Oxford Street near the intersection with Carol Drive, creating some congestion in that area. Traffic congestion on Redwood Road increases during morning commute hours as Redwood Road provides the surrounding residences with access to the many schools near Redwood Middle School, SR 29, and the rest of the City of Napa east of SR 29.

One of the school entrances on Oxford Street.

The school has two loading zones in its parking lots in front of the main entrance on Oxford Street. The smaller of the two is for school buses only during drop-off and pick-up times. The larger of the two is for student drop-off and pick-up and features a two-lane loading zone that extends the entire length of the parking lot's east side. Painted arrows direct cars to enter from the south end of the parking lot and exit through the north end. The north end also has a "Do Not Enter" sign posted near the exit.

The school does not have formal parking policies or circulation plans that are sent out to parents. There has historically been a crossing guard at the intersection of Trower Avenue and Oxford Street, near Northwood Elementary School; however, during the time of this audit, no crossing guards were stationed around the school. Staff occasionally help regulate the crosswalk at Carol Drive and Oxford Street.

The school loading zone in the Oxford Street parking lot.

Limited bus service through NVUSD is available for Redwood Middle School students. Bus service makes one stop in Yountville. Additionally, students who live beyond 3 miles walking distance from school and attend their school of residence may apply for transportation through NVUSD. The Vine transit N line, operated by the Napa Valley Transportation Authority, provides service in north/central Napa, mostly along Trancas Street and Jefferson Street, and has stops on Redwood Road near the school. Just east of the school on Solano Avenue is the Vine transit Redwood Park and Ride, which is served by the 10, 11, 11X, and 29 lines.

A bus stop and shelter near Redwood Middle School on Redwood Road.

BICYCLE AND PEDESTRIAN INFRASTRUCTURE

Redwood Middle School's several bike parking racks are located at the front of the school, near the main office and the loading zone, in a gated bike corral that is locked during school hours.

MAP OF EXISTING BICYCLE FACILITIES

Map 3: Existing Bicycle Facilities
(Map source: Napa Valley Transportation Authority Napa Countywide Bicycle Plan (2019))

MAP OF EXISTING PEDESTRIAN FACILITIES

ENCOURAGEMENT AND EDUCATION PROGRAMS

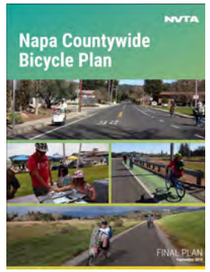
Redwood Middle School has consistently participated in annual countywide encouragement events, such as Bike to School Day and Walk and Roll to School Day. Bike to School Day and Walk and Roll to School Day are annual encouragement events facilitated by Napa County Safe Routes to School in the spring and fall, respectively, that celebrate students making the healthy choice to walk or bike to school. The school has not expanded its encouragement program beyond these annual events but has provided some bike safety education in its summer program. Bike safety education includes between 5-10 hours of bicycle specific curriculum, spent both in the classroom and on-bike.

A bicyclist rides on Bike to Work and School Day 2019.

YEAR	EVENT	STUDENT PARTICIPANTS
2015/16	Bike to School Day	85
2016/17	Bike Safety Education	30
2016/17	Bike to School Day	21
2018/19	Walk and Roll to School Day	43
2018/19	Bike Safety Education	20
2018/19	Bike to School Day	36
2019/20	Walk and Roll to School Day	68
Mar 2020	Walk and Roll Wednesday	119

Figure 5: Encouragement and Education Data

EXISTING PLANS



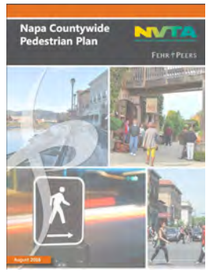
NVTA Napa Countywide Bicycle Plan (2019):

The Napa Countywide Bicycle Plan has some recommended improvements for bicycle facilities around the school site. Redwood Road is listed as a study corridor in the Plan. The Plan recommends completing both a Class III Urban Bikeway along Oxford Street and a segment of the Vine Trail from the bridge over 29, just south of Redwood Road, to the Park and Ride on Solano Avenue just north of Redwood Road.

NVUSD Facilities Master Plan (2016):

NVUSD's Facilities Master Plan lists several projects for Redwood Middle School. These projects include installation of fencing around the school perimeter, site ADA (Americans with Disabilities Act) improvements, and main parking lot repairs. Parking lot repairs may help encourage parents to utilize the main parking lot for parking and drop-off, rather than the surrounding streets, reducing traffic around the school site.

MEASURE H
BUILDING ON OUR VISION
NVUSD



NVTA Napa Countywide Pedestrian Plan (2016):

The Napa Countywide Pedestrian Plan lists two recommended improvements near the school site. The Overpass at Trower Avenue would erect a new bridge over Highway 29 north of the school, and the Pueblo Avenue Overpass would connect West Pueblo Avenue with Pueblo Avenue over Highway 29 south of the school.

NVTA Napa Valley Countywide Transportation Plan: Advancing Mobility 2045 (2021):

The NVTA Countywide Transportation Plan is a long-range plan of countywide transportation priorities that provides a direction for the four- to five-year plan while considering a 25-year planning horizon. This plan is part of the regional planning process for the Regional Transportation Plan by the Metropolitan Transportation Commission. There are 28 projects by the City of Napa listed in the Plan; three listed projects – SR 29 over Trower Avenue, Solano Avenue/Redwood Road Intersection Modifications, and Vine Trail Redwood Road Crossing, impact the school area.

CITY OF NAPA

City of Napa General Plan 2020 (1998) / 2040 (Not Yet Adopted):

The current General Plan for the City of Napa was adopted in 1998; a General Plan update began in 2018 and at the time of this report, is still ongoing. The General Plan update strives to build a more livable, sustainable, and inclusive future for the City of Napa by outlining the City's plan for land use, housing, transportation, climate change, and more. One of the draft guiding principles for the General Plan update is to "increase travel options through enhanced walking, bicycling, and public transportation systems, and promote mobility through increased connectivity and intelligent transportation management."

WALK **AUDIT**

Date: 11/08/19
Day of the Week: Friday

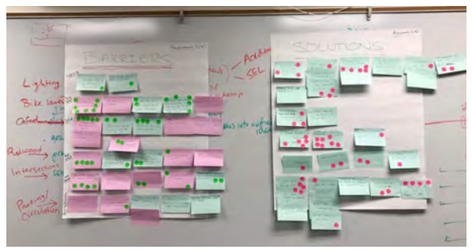
Meeting Time: 8:00 AM
Weather: Overcast/foggy

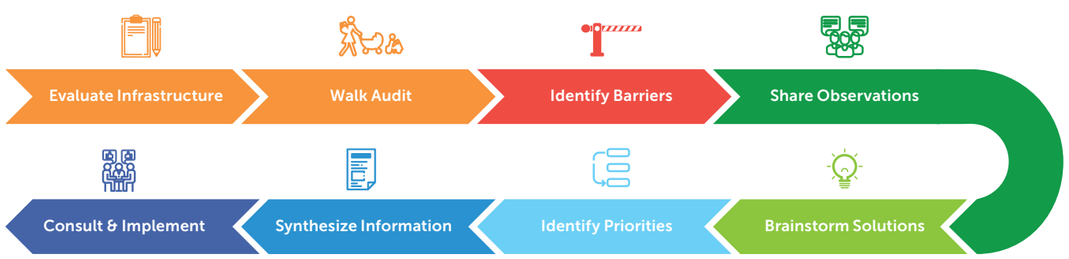
METHODOLOGY

The Community Walk Audit brought school stakeholders together to observe existing conditions during drop-off time, identify barriers to safe walking or biking, and explore solutions. The Walk Audit team consisted of five Redwood Middle School parents, three Napa County Office of Education ACE staff, the school's Community Liaison, and one of the school's Assistant Principals. The group met 30 minutes prior to the school bell for a brief presentation on the SRTS program and the process and purpose of Walk Audits.

The team then split up into two groups. One group walked through the school's back parking lot to Redwood Road, east along Redwood Road to the 7-Eleven, back west on Redwood Road, north on Carol Drive, and north on Oxford Street up to the main parking lot. The second group walked north on Oxford Street to Devonshire Drive, and then returned to campus. During this walk, participants observed and discussed the physical infrastructure around the school as well as the behavior of motorists, pedestrians, and bicyclists in the school site area. They also shared their own experiences traveling to and from school on foot and by car. Fifteen minutes after the bell, the team returned to the classroom to discuss their observations, map issue areas, and record and prioritize the major barriers identified during the exercise.

During the prioritization exercise, participants wrote down several barriers that were of high priority to them on sticky notes, placed them on a poster on the wall, and organized them into sections based on similar topics. Then, participants were given five round stickers to place on issues that they felt were most important and needed to be solved most urgently. Participants could spread their stickers out or put multiple stickers on one issue. The group then reviewed the major barriers and explored potential solutions to each issue. Participants repeated the prioritization process with potential solutions to the barriers identified.





WALK AUDIT FINDINGS

This section of the report lists the barriers identified by Walk Audit participants during the Walk Audit activity. The barriers listed in the following table are the results of the Walk Audit prioritization activities – the content and language used reflect what Walk Audit participants wrote on their sticky notes.

The barrier identification and prioritization exercise resulted in a list of location-specific and geographically general barriers organized by Vote Score in the table below. Vote Score was determined during the prioritization exercise by the number of stickers and sticky notes addressing a particular issue, with a higher number correlating to a higher Vote Score, indicating a higher importance to Walk Audit participants.

Stakeholder-Identified Barriers:

DESCRIPTION	LOCATION	VOTE SCORE
Narrow/obstructed sidewalk	Redwood Road	19
No bike facilities	Redwood Road	15
Motorists speeding though intersection, low pedestrian visibility, poor motorist yielding behavior	Oxford Street and Carol Drive	15
Low bicyclist visibility in existing bike lanes	Redwood Road	14
Narrow sidewalk	Oxford Street	9
Speeding	Redwood Road	5
Underutilized drop-off area	North parking lot on Oxford Street	5
No bike facilities	Oxford Street	4
Lack of ADA accessibility	Oxford Street and Carol Drive	3
Power outage turning off crossing signals	School site area; Redwood Road and Solano Avenue	3
Lack of crossing guards	School site area	3
Not enough adequate lighting	General school area	2
Inadequate lighting	School entrance on Redwood Road	2
Unsafe driving behavior	Parking lot on Oxford Street	2
No sidewalk	Carol Drive south of Redwood Road	
Traffic congestion	Oxford Street	1
Unsafe intersection	Linda Vista Avenue	1
Traffic congestion	School site area	1
Inadequate parking lot	Parking lot on Redwood Road	1
Unsafe parking lot circulation	Parking lot on Redwood Road	1
Lack of nearby bus stops	School site area	1

Figure 6: Walk Audit Stakeholder-Identified Barriers

Stakeholder-Identified Treatments:

DESCRIPTION	BARRIER ADDRESSED	LOCATION	PRIORITY
Bike lanes	No bicycle facilities	Redwood Road	19
Bike lanes	No bicycle facilities	Oxford Street	14
Increased lighting	Not enough lighting	Redwood Road	8
Rectangular Rapid Flashing Beacons	Poor motorist yielding behavior, low pedestrian visibility	Oxford Street and Carol Drive	8
Raised crosswalk	Poor motorist yielding behavior, low pedestrian visibility, motorist speeding	Oxford Street and Carol Drive	7
Road diet	Narrow sidewalks, no bicycle facilities, speeding, long crossing distances, auto-oriented road	Redwood Road	6
Widen sidewalk	Narrow sidewalks	Redwood Road	5
Bike lanes	No bicycle facilities	Carol Drive	5
Curb extension	Poor motorist yielding, low pedestrian visibility, motorist speeding	Oxford Street and Carol Drive	4
Bike box	Poor bicyclist visibility, no bicycle facilities	Redwood Road	3
Alternative energy	Power outage turning off traffic signals	Redwood Road and Solano Avenue	3
Raised crosswalks	Speeding, poor motorist yielding, low pedestrian visibility	School site area	3
Curb extension	Poor motorist yielding, low pedestrian visibility, motorist speeding	Oxford Street and Wales Street	3
Rectangular Rapid Flashing Beacons	Poor motorist yielding behavior, low pedestrian visibility	Redwood Road	3
Curb extensions	Poor motorist yielding, low pedestrian visibility, motorist speeding, long crossing distances	Redwood Road and Solano Avenue	2
Rectangular Rapid Flashing Beacons	Poor motorist yielding behavior, low pedestrian visibility	Trower Avenue and Fairfax Drive; Trower Avenue and Oxford Street	2
Speed bump	Speeding	Redwood Road	2
Law enforcement	Speeding	Redwood Road	2
Circulation policy	No circulation policy, unsafe motorist behavior	School site	2
Increased speed signage	Speeding	Redwood Road	2
Clear sidewalk of obstructions	Narrow/obstructed sidewalks	Redwood Road	1
Loading zone	Congestion, unsafe motorist behavior	Oxford Street	1
Curb extensions	Poor motorist yielding, low pedestrian visibility, motorist speeding, long crossing distances	Redwood Road and Oxford Street	1

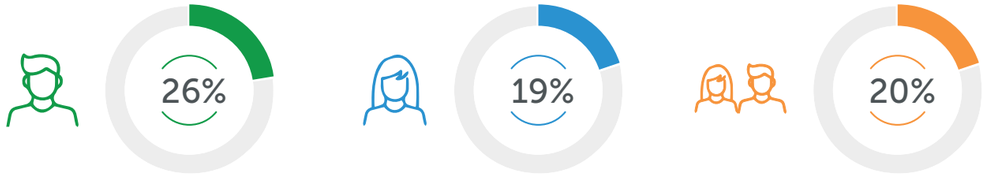
Figure 7: Walk Audit Stakeholder-Identified Treatments

CONTEXT FOR **RECOMMENDATIONS**

IMPACT OF BARRIERS/HAZARDS ON COMMUNITY

Barriers to safe walking and bicycling, both infrastructure and non-infrastructure, can greatly discourage communities from engaging in active transportation. The quality, accessibility, and connectivity of bicyclist and pedestrian travel networks strongly influence the rates of walking and bicycling as a mode of daily transport[1]. Public policies and attitudes, such as traffic-calming measure enforcement and parking limitations, also contribute to the efficacy of pedestrian/bicycle networks. Thus, barriers to accessibility and connectivity must be addressed in order to encourage increased and safe walking and cycling.

Barriers that discourage walking and bicycling prevent communities from gaining the health benefits offered by active transportation. For children, physical activity can improve cognitive function, bone health, cardiorespiratory and muscular fitness, and mental wellness[2]. Adults benefit from lower risk of cardiovascular disease, hypertension, dementia, anxiety, and falls for older adults, as well as improved quality of life, physical function, bone health, and sleep.



However, only about **26% of men**, **19% of women**, and **20% of adolescents** are meeting the aerobic and muscle-strengthening guidelines developed by the Department of Health. Increased walking and biking to school can help boost that percentage by incorporating physical activity into one's daily routine and encouraging further active transportation choices.

Lack of safe bicycle/pedestrian facilities can also negatively impact the environment, as more people will choose to drive rather than bike or walk. Passenger cars and light-duty trucks produced **over half of the transportation sector emissions in 2017**[3].

50%

29%

The transportation sector produced the most greenhouse gas emission of any economic sector, releasing **up to 29% of total US greenhouse gas emissions** for the year.

Furthermore, **transportation emissions have increased around 400 million metric tons** since 1990 due to increased vehicle demand. Thus, decreasing vehicle use by creating bicycle/pedestrian networks that are safe from potential hazards and barriers can help mitigate these environmental effects.

400 MILLION

In addition to the consequences already discussed, barriers to safe walking and bicycling can lead to increased collisions and conflicts between motorists, pedestrians, and bicyclists. Safety barriers can lead to more people choosing to drive, even if the destination is within walking or biking distance, increasing traffic congestion. Children have fewer opportunities to develop their sense of independence through walking and biking to school, and the community is hindered from enjoying the social and economic benefits of bicycling and walking. Safety barriers and hazards that discourage increased walking and bicycling can considerably impact many different parts of a community, which is why it is so crucial to address and resolve them.

[1] Kuzmyak, Richard J., Dill, Jennifer. "Walking and Bicycling in the United States: The Who, What, Where, and Why." TR News May-June 2012: 4-15. Web. [2] U.S. Department of Health and Human Services. Physical Activity Guidelines for Americans, 2nd edition. Washington, DC: U.S. Department of Health and Human Services; 2018. [3] Sources of Greenhouse Gas Emissions, United States Environmental Protection Agency. Web.

RECOMMENDATIONS

Recommendations were determined by Napa County Safe Routes to School staff, taking into account the feedback and results from the Walk Audit activity, Fulcrum data, existing plans, and local stakeholder input. Priority levels for recommendations were calculated through consideration of vehicle, pedestrian, and bicyclist traffic volumes; vehicular traffic speed; collision history; presence of existing bicycle/pedestrian facilities; proximity to major identified routes to school; high-level potential cost/complexity of recommendation; and Walk Audit participant input.

This section outlines and explains high and medium priority recommendations specific to the school site. School site-specific recommendations of all priority levels can be found in the "Table of Recommendations" section. Universal recommendations that apply to all school sites are described in Appendix B. Recommendations that are focused on infrastructure treatments are denoted by "NAI," and recommendations that suggest programmatic treatments are denoted by "NAP." Please note that implementing these recommendations will often require further evaluation and study, as well as design, right-of-way acquisition, compliance checks with existing laws, and coordination with utility, public safety, and other local government departments.

RECOMMENDATIONS #NAI-109, NAI-110, NAI-112, AND NAI-114: REDWOOD ROAD HIGH PRIORITY RECOMMENDATIONS

Narrative – Redwood Road is a significant east-west arterial in north Napa that serves several neighborhoods in northwest Napa, and is along direct routes to schools, SR 29, commercial destinations, and Trancas Street on the east side of SR 29. There is one school entrance on Redwood Road through the staff parking lot, and due to the street network layout, many students must navigate Redwood Road to reach other school entrances on Carol Drive and Oxford Street, making it a key access corridor for Redwood Middle School. Redwood Road also leads to entrances to the Vine Trail shared-use path that runs from Yountville through the City of Napa, a key active transportation facility used by students. In the City of Napa's adopted Bike Plan (2019), Redwood Road is designated as a study corridor from Solano Avenue to Dry Creek Road, indicating necessary further analysis.

IDENTIFIED BARRIERS

- ***Auto-oriented corridor –*** Redwood Road's current design, featuring wide lanes on a relatively straight corridor with no traffic-calming and little traffic control, prioritizes vehicle speed, volumes, and convenience and facilitates frequent motorist speeding.
- ***High-speeds and volumes of traffic –*** Redwood Road carries extremely high volumes of high-speed traffic, which many bicyclists and pedestrians do not feel comfortable or safe navigating.
- ***Narrow/obstructed sidewalks –*** Sidewalks between Carol Drive and Solano Avenue are often obstructed by utility poles, sign posts, and other equipment. This is particularly an issue on the westbound sidewalk, which is already too narrow for the volumes of school-related pedestrians, and is made inaccessible for pedestrians with mobility assistance devices.
- ***Sidewalk gaps –*** Sidewalk gaps along eastbound Redwood Road from Carol Drive to Linda Vista Avenue may force pedestrians to walk in the road or cross the street in unmarked locations; large sections of missing sidewalks can prevent students from walking to school altogether.
- ***No bicycle facilities –*** The lack of bicycle facilities on the corridor (from Solano Avenue to Dry Creek Road) fails to provide a dedicated space for bicyclists and indicate to motorists where to expect bicyclists, making the corridor appear unwelcoming to bicyclists.

There are no bicycle facilities on Redwood Road.

RECOMMENDATIONS

- ***NAI-109 Road diet –*** Implement a road diet from Solano Avenue to Dry Creek Road to design the corridor to have two travel lanes and a center turn lane and to create space for Complete Streets infrastructure. Integrate specific recommendations from SRTS reports into road redesign.
- ***NAI-110 Widen sidewalks –*** Widen the existing sidewalks from Solano Avenue to Carol Drive to better accommodate high volumes of pedestrians and provide adequate pedestrian space around sidewalk obstructions.
- ***NAI-112 Fill sidewalk gaps –*** Fill eastbound sidewalk gaps from Carol Drive to Linda Vista Avenue to provide a continuous and connected pedestrian route.
- ***NAI-114 Protected bike lanes –*** Between Solano Avenue and Dry Creek Road, install Class IV protected bike lanes along segments where there is already no on-street parking with green conflict markings at commercial driveways. Install Class II buffered bike lanes with traffic-calming for areas between Carol Drive and Dry Creek Road where residential parking already exists.

RECOMMENDATION #NAI-116: REDWOOD ROAD AND CAROL DRIVE INTERSECTION

Narrative – Redwood Road and Carol Drive is a highly-travelled intersection in general, due to Redwood Road's role as an important east-west arterial and the close vicinity of the Carol Drive intersection to commercial destinations on Redwood Road and access points to Solano Avenue and SR 29. Multimodal traffic volume is increased during school arrival and dismissal times, as this intersection is along common routes to reach school entrances on Carol Drive and Oxford Street, and Carol Drive south of Redwood Road is the most direct north-south connection for many neighborhoods south of the school.

IDENTIFIED BARRIERS

- ***Faded crosswalks –*** At the time of the Walk Audit, the crosswalks were extremely faded, reducing pedestrian visibility.
- ***Long crossing distances –*** Long crossing distances across Redwood Road pushes bicyclists and pedestrians further out of the range of vision of motorists and requires them to be in the roadway for a longer time than necessary, increasing the risk of collisions.
- ***Offset intersection –*** The offset intersection configuration increases crossing distances for pedestrians across the north, west, and east legs of the intersection.


The offset intersection configuration increases pedestrian crossing distance across Redwood Road.

- ***Wide curb radii –*** Wide curb radii on the northwest, northeast, and southeast curbs facilitate fast motorist turning movements through the intersection.
- ***Curb space –*** Limited curb space for pedestrians to use as waiting space for the traffic light in a high pedestrian volume area may deter students from walking together in groups and may result in students stepping out into the roadway or crossing in unmarked locations.

RECOMMENDATIONS

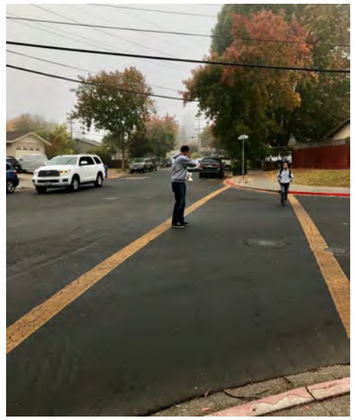
- ***Near term***
  - ***Crosswalk striping –*** The crosswalks have been repainted since the time of the Walk Audit. Maintain crosswalk paint quality and high-visibility school-zone striping pattern at the intersection to preserve pedestrian visibility benefits.
  - ***Limit lines –*** Push back limit lines on travel lanes to stop vehicles further from the crosswalk and improve pedestrian visibility.
  - ***Curb extensions –*** Install curb extensions on all crosswalk curbs to improve pedestrian visibility, reduce crossing distance, and slow motorists through the intersection.
- ***Long term***
  - ***Intersection redesign –*** Redesign intersection with recommended road diet on Redwood Road and corridor study. Prioritize bicyclist and pedestrian separation and safety and slow motorist speeds in redesign.

RECOMMENDATION #NAI-122: OXFORD STREET AND CAROL DRIVE CURB EXTENSIONS

Narrative – The Oxford Street and Carol Drive intersection is a key intersection for Redwood Middle School, as it is one of the closest intersections to the main entrance to the school on Redwood Road and is highly travelled by all modes of school-related traffic. Many student pedestrians and bicyclists traveling from west of the school cross Oxford Street at this location, due to the street network design, and many motorists dropping off/picking up students travel through the intersection to load students on Oxford Street or access the school parking lot. This intersection was identified by both Walk Audit participants and school administration as a high-conflict risk area, and school staff reported that a staff member is often sent to the intersection to help student pedestrians cross the street.

IDENTIFIED BARRIERS

- ***Busy intersection –*** This intersection is highly travelled by all modes of transportation to access the school, which can feel chaotic and challenging during peak school hours.
- ***Long crossing distance –*** The long crossing distance across Oxford Street pushes pedestrians further out of the range of vision of motorists and requires them to be in the roadway for a longer time than necessary, increasing the risk of collisions.
- ***Wide curb radii -*** Wide curb radii on both crosswalk curbs facilitate fast motorist turning through the intersection, which is exacerbated by the lack of traffic control on Carol Drive.
- ***Low-visibility crosswalk –*** The existing crosswalk across Oxford Street is painted with a standard, parallel line pattern, despite being located in a highly-travelled school zone.
- ***Poor motorist yielding behavior –*** Wide curb radii and uncontrolled traffic on Carol Drive facilitate fast motorist movement through the intersection, reducing motorist yielding behavior.



A school staff member assists a student crossing Oxford and Carol during morning arrival time.

- ***Vehicles obstructing visibility –*** Minimal red zones around the crosswalk allow motorists to park close or pick up/drop off students close to the crosswalk, which obstructs pedestrian visibility.

RECOMMENDATIONS

- ***Curb extensions –*** Install curb extensions on both sides of crosswalk to reduce crossing distance and curb radii, improve pedestrian visibility, and provide a daylighting effect on the intersection.
- ***High-visibility crosswalk –*** Upgrade the existing crosswalk to a high-visibility school-zone pattern to improve pedestrian visibility and motorist yielding behavior.

RECOMMENDATIONS #NAI-123 – NAI-124: CAROL DRIVE BIKE/ PEDESTRIAN IMPROVEMENTS

Narrative – Carol Drive between West Pueblo Avenue and Redwood Road is a key north-south connector for the Pueblo planning area neighborhoods south of Redwood Middle school. It is along the most direct route to school from many of the branching residential streets in the area, which are all in the school's default enrollment boundary and within reasonable walking or biking distance of the campus.

IDENTIFIED BARRIERS

- ***No sidewalks –*** The lack of sidewalks along the corridor forces pedestrians to walk in the road and can prevent students from walking to school altogether.
- ***No bicycle facilities –*** The lack of bicycle facilities on the corridor fails to provide a dedicated space for bicyclists and indicate to motorists where to expect bicyclists, making the corridor appear unwelcoming to bicyclists.

Carol Drive has no sidewalks or bicycle facilities.

RECOMMENDATIONS

- ***NAI-123 Sidewalks –*** Install sidewalks on both sides of the street and replace rolled curb with standard curb to discourage illegal parking behavior.
- ***NAI-124 Class III bike boulevard –*** Install Class III bike boulevard with sharrows, signage, and traffic-calming measures.

RECOMMENDATIONS #NAI-127 – NAI-128: REDWOOD ROAD AND SOLANO AVENUE INTERSECTION

Narrative – The Redwood Road and Solano Avenue intersection experiences high volumes of traffic throughout the day, as Redwood Road is an arterial, Solano Avenue is a collector, and both streets provide access to destinations near the intersection. Both the northwest and southeast corners are occupied by gas stations with multiple driveways on both streets, which increases conflict risks between vehicles and bicyclists and pedestrians. The southwest corner is occupied by the Redwood Plaza shopping mall, which includes destinations such as Starbucks and Baskin-Robbins that may attract Redwood Middle School students, and the northeast corner serves as the Vine transit Park and Ride location. Additionally, this intersection is part of the Vine Trail shared-use path route, and is the closest intersection to the middle school that has traffic control for Solano Avenue traffic, which may make it feel like a more comfortable entrance to the Vine Trail for Redwood Middle School students. As a result, high volumes of vehicles, buses, bicyclists, and pedestrians navigate this intersection regularly.

IDENTIFIED BARRIERS

- ***Large, busy intersection –*** This intersection of an arterial and a collector is a key intersection in the school area, as it is highly travelled by all modes of transportation, both school-related and non-school related, which can increase road user conflict risk and can feel chaotic and challenging for students. This intersection is part of the Vine Trail shared-use path route, which increases volume of bicyclists and pedestrians in the intersection.

The Redwood and Solano intersection.

- ***Long crossing distances –*** Long crossing distances on all legs of the intersection pushes bicyclists and pedestrians further out of the range of vision of motorists and requires them to be in the roadway for a longer time than necessary, increasing the risk of collisions.

- ***Wide curb radii –*** Wide curb radii on all corners of the intersection facilitate fast motorist turning movements through the intersection.

- ***Bike facilities end –*** The existing bicycle facilities on Solano Avenue disappear when approaching the intersection, greatly reducing bicyclist visibility and clarity on where bicyclists should position themselves in the road at a high conflict-risk area.

RECOMMENDATIONS

- ***NAI-127 Protected intersection –*** Install a protected intersection connected by Class I shared-use path facilities to improve bicyclist and pedestrian safety and comfort, particularly for Vine Trail users, and to provide bicycle facilities through the intersection.

- ***NAI-128 Vine Trail –*** Connect Vine Trail to the north end of the Trancas Park and Ride with a continued Class I shared-use path and improved crossing conditions across Redwood Road for bicyclists and pedestrians.

RECOMMENDATIONS #NAI-131, NAI-132, AND NAI-134: LINDA VISTA AVE SIDEWALKS AND BIKE FACILITIES

Narrative – Linda Vista Avenue is a key north-south collector for the northwest Napa area, spanning from Lone Oak Avenue to the northern City limits and continuing into unincorporated County. Within a half-mile radius of Redwood Middle School, Linda Vista Avenue serves both Northwood Elementary School and Pueblo Vista Magnet School; further south, Linda Vista Avenue also serves West Park Elementary School. As a collector for several neighborhoods, Linda Vista Avenue experiences high volumes of motor vehicle traffic during peak morning and afternoon commute hours in addition to multimodal school-related traffic travelling to one of the many nearby schools. Given the significance of the corridor in the school area and the large geographic area of the school's default enrollment boundary, Linda Vista Avenue likely plays a role in routes to school for many Redwood Middle students.

IDENTIFIED BARRIERS

- ***No bicycle facilities –*** The lack of bicycle facilities on the corridor (from Trower Avenue to West Pueblo Avenue) fails to provide a dedicated space for bicyclists and indicate to motorists where to expect bicyclists, making the corridor appear unwelcoming to bicyclists.

- ***No traffic control/traffic-calming –*** Minimal traffic control and the lack of traffic-calming along the long, straight road can facilitate motorist speeding, which reduces motorists' range of vision, decreases motorist yielding behavior, and increases risk of collision.

Linda Vista Avenue just north of Redwood Road, facing north.

- ***Missing sidewalk –*** The northbound Linda Vista Avenue sidewalk from Redwood Road to Trower Avenue is missing, creating a significant gap in the pedestrian network and forcing pedestrians to either walk in the roadway or cross the road in an unmarked location (there is only one crosswalk across Linda Vista along this corridor, and may prevent students from walking altogether.

RECOMMENDATIONS

- ***NAI-131 Sidewalk –*** Install the northbound sidewalk where missing to fill the gap in the pedestrian network.

- ***NAI-132 Class III bike boulevard –*** From Trower Avenue to Redwood Road, install a Class III bike boulevard with sharrows, signage, and traffic-calming measures.

- ***NAI-134 Class II bike lanes –*** From Redwood Road to West Pueblo Avenue, install Class II bike lanes and implement traffic-calming elements at key intersections.

RECOMMENDATION #NAP-015: BICYCLE SAFETY EDUCATION

Narrative – Redwood Middle School has offered bicycle safety education, provided through the Napa County Safe Routes to School program, a couple of times in recent years through the school's ACE Summer Camp Program. Bicycle safety education is a crucial component of increasing biking mode share at a school site, as it teaches students rules of the road for bicyclists and safe biking behaviors such as scanning and signaling before turns. This understanding not only improves bicyclist safety, but also increases confidence and comfort for young bicyclists. Common unsafe behaviors that are done unknowingly due to lack of education, such as riding against traffic, riding on the sidewalk, and failing to stop at stop signs, are hazardous to student bicyclists, as this behavior is unpredictable to motorists and can increase risk of collisions. While many of these behaviors can be addressed through infrastructure, such as clearly marked bicycle facilities, implementing annual education on bicyclist safety within the school system can raise awareness of rules of the road and encourage safe behavior.

IDENTIFIED BARRIERS

- ***Limited bicycle education –*** Bicycle safety education at Redwood Middle School has been infrequently provided and has only been available to a small number of students. Irregularly/infrequently provided bicycle safety education can result in unintentional unsafe student bicyclist behavior and a sense of discomfort riding a bike.

RECOMMENDATIONS

- ***Annual bike safety education –*** Provide annual bike safety education for all students, such as in-class/on-bike hybrid classes. Such programming is available to all Napa County public schools through the Napa County Safe Routes to School program.

Annual bike safety education helps prepare and encourage students to bike to school safely. Photo credit: Napa County Office of Education.

RECOMMENDATION #NAP-016: ENCOURAGEMENT PROGRAMS

Narrative – Redwood Middle School has participated frequently in the annual encouragement events facilitated by Napa County Safe Routes to School, Bike to School Day and Walk and Roll to School Day, and has occasionally held independent Walk and Roll Wednesdays. While annual programming can remind and excite students about the option of using active transportation to travel to school, the infrequency of these events makes them less effective at encouraging students to adopt active transportation as an everyday form of transportation. Increasing the frequency of encouragement events, in conjunction with infrastructure improvements, can help increase mode shift towards active transportation.

IDENTIFIED BARRIERS

- ***Congestion in school zone –*** Congestion in the school zone during school arrival and dismissal times can increase conflict risk and make the school zone feel unpredictable and unsafe to bicyclists and pedestrians, especially in conjunction with infrastructure barriers.

- ***Infrequency of encouragement events –*** While annual countywide encouragement events are a great place to start, infrequent encouragement events are not effective enough in normalizing active transportation as an everyday mode of transportation.

Marin County middle school students ran a "Hot Walk-alot" event to encourage active transportation to school. Photo credit: Marin County Safe Routes to School.

RECOMMENDATIONS

- ***Encouragement programs –*** Continue to grow participation in annual encouragement events and organize additional encouragement events such as Walk and Roll Wednesdays throughout the year with the goal of increasing frequency over time. These programs are also an excellent opportunity for student organizations and clubs to develop leadership skills by helping to organize and carry out events.

- ***Encourage the formation of regularly-occurring bike trains/walking groups/carpools to reduce the number of vehicles in the school zone and improve visibility of student bicyclists/pedestrians through increased numbers.***

RECOMMENDATIONS #NAI-111, NAI-113 AND NAI-115: REDWOOD ROAD MEDIUM PRIORITY RECOMMENDATIONS

IDENTIFIED BARRIERS

- ***Narrow sidewalks –*** The existing sidewalks from Carol Drive to Dry Creek Road are narrow and do not accommodate groups of pedestrians in the school zone or pedestrians who use mobility assistance devices. This limited space is exacerbated along the corridor in areas where there are significant sidewalk gaps on the eastbound side.
- ***Low lighting –*** Low lighting can be a significant barrier to students walking and biking, especially during the winter season when days are shorter, as it reduces visibility of pedestrians and bicyclists as well as sense of safety for active transportation users.
- ***High-stress bike facilities –*** The existing Class II bike lanes on Redwood Road between Solano Avenue and the northbound SR 29 on/off ramps are stressful due to the lack of separation between bicyclists and high speeds and volumes of vehicle traffic.

The narrow westbound sidewalk on Redwood Road just west of Carol Drive carries all pedestrian traffic, due to the large eastbound sidewalk gap.

RECOMMENDATIONS

- ***NAI-111 Widen sidewalks –*** Widen the existing sidewalks between Carol Drive and Dry Creek Road to accommodate high volumes of student pedestrians, pedestrians walking in groups, and pedestrians who may need additional space, such as those who use mobility assistance devices.
- ***NAI-113 Street-scale lighting –*** Add/increase street-scale lighting along Redwood Road between Solano Avenue and Dry Creek Road, prioritizing the segment between Solano Avenue and Linda Vista Avenue given the high volumes of school-related bicycle and pedestrian traffic.
- ***NAI-115 Protected bike lanes –*** Narrow the travel lanes between Solano Avenue and the SR 29 northbound on/off ramps as needed to install Class IV protected bike lanes to lower bicyclist stress.

RECOMMENDATION #NAI-118: OXFORD STREET BICYCLE FACILITIES

IDENTIFIED BARRIERS

- ***No bicycle facilities –*** The lack of bicycle facilities on Oxford Street, a key access corridor to Redwood Middle School, fails to provide a dedicated space for bicyclists and indicate to motorists where to expect bicyclists, making the corridor appear unwelcoming to bicyclists.

RECOMMENDATIONS

- ***Class III bike boulevard –*** Install Class III bike boulevard with sharrows, signage, and traffic-calming measures.

There are no bicycle facilities on Oxford Street.

RECOMMENDATION #NAI-125: DEVONSHIRE DRIVE AND OXFORD STREET INTERSECTION

IDENTIFIED BARRIERS

- ***No crosswalk –*** There is no crosswalk across Devonshire Drive, reducing visibility of pedestrians and motorist yielding behavior.
- ***Wide curb radii –*** Wide curb radii on the east side of the intersection facilitate fast motorist turning movements.
- ***Long crossing distance –*** The long crossing distance across Devonshire Drive pushes pedestrians further out of the range of vision of motorists and requires pedestrians to be in the roadway for a longer time than necessary.

RECOMMENDATIONS

- ***Curb extensions –*** Install curb extensions on both sides of the existing crosswalk to slow motorists through the intersection and improve pedestrian visibility.
- ***High-visibility crosswalk –*** Upgrade the existing crosswalk to be high-visibility school-zone pattern to increase pedestrian visibility and motorist yielding behavior.

There is no crosswalk across Devonshire Drive at Oxford Street.

RECOMMENDATION #NAI-126: DEVONSHIRE DRIVE AND SOLANO AVENUE INTERSECTION

IDENTIFIED BARRIERS

- ***No crosswalks –*** There are no crosswalks at the Devonshire Drive and Solano Avenue intersection, which impedes access to the Vine Trail entrance at this intersection as bicyclists and pedestrians may feel unsafe or unable to cross Solano Avenue at this location. This Vine Trail entrance is the closest Vine Trail entrance along direct routes for students travelling north of the school, and with safety improvements, may be preferred to the busy Redwood/Solano entrance.

There is no crosswalk across Solano Avenue to access the Vine Trail shared-use path (see yellow bollards).

RECOMMENDATIONS

- ***Crosswalks –*** Paint a high-visibility crosswalk with Rectangular Rapid Flashing Beacons across Solano Avenue and a crosswalk across Devonshire Drive to improve pedestrian visibility at the Vine Trail entrance.

- ***Curb extension –*** Install a curb extension on southwest corner to reduce crossing distance for pedestrians and improve pedestrian visibility at the new crosswalk.

RECOMMENDATION #NAI-130: REDWOOD ROAD AND LINDA VISTA INTERSECTION

IDENTIFIED BARRIERS

- ***Low-visibility crosswalks –*** The existing crosswalks in the intersection are extremely faded and painted with a standard, parallel line pattern, despite being located in a highly-travelled school zone.

- ***High volume intersection -*** This intersection of an arterial and a collector is a key intersection in the school area, as it is highly travelled on routes to multiple schools in the area and can feel chaotic and challenging during school arrival and dismissal times.

Redwood Road and Linda Vista Avenue intersection looking north.

- ***Long crossing distance –*** The offset geometry of the intersection creates long crossing distances across Linda Vista Avenue and exacerbates the long crossing distance across several lanes of Redwood Road traffic. These long distances push pedestrians further out of the range of vision of motorists and require pedestrians to be in the roadway for longer than necessary.

- ***Wide curb radii –*** Wide curb radii facilitate fast motorist turning motions through the intersection.

RECOMMENDATIONS

- ***Short-term***
  - ***Crosswalks –*** Repaint crosswalks and upgrade to high-visibility school-zone pattern to increase pedestrian visibility.
  - ***Curb extensions –*** Install curb extensions on all four corners to reduce crossing distance, improve pedestrian visibility, and reduce curb radii.
- ***Long-term***
  - ***Intersection redesign –*** Redesign intersection with Redwood Road corridor study, as indicated in adopted Bike Plan, and recommended Redwood Road road diet.

RECOMMENDATION #NAP-014: CIRCULATION POLICY

IDENTIFIED BARRIERS

- ***Low loading zone use –*** Despite the large loading zone available in the school parking lot, many motorists use adjacent streets rather than the school loading zone, increasing congestion and vehicle back-up on adjacent streets such as Oxford Street.
- ***Congestion in school zone –*** High volumes of vehicle traffic in the school zone during arrival and dismissal times can make the school zone feel chaotic and unwelcoming to bicyclists and pedestrians.
- ***No formal circulation policy–*** The lack of a formal, written circulation policy can result in increased unpredictable road user behavior in the school zone during drop-off and pick-up.

Increased use of the school loading zone in the parking lot could decrease congestion on nearby streets.

RECOMMENDATIONS

- ***Circulation policy –*** Develop and distribute a comprehensive circulation policy to families. Emphasize use of loading zone in Oxford parking lot instead of on-street curb space to reduce congestion and vehicle back-up on adjacent streets.

ADDITIONAL CONSIDERATIONS

Improvements listed in this section are those within a half-mile radius that are either considered significant to the school area but are not located along routes to the school based on the school's enrollment boundary or were ranked as a higher priority during the Walk Audit for another nearby school. These barriers are listed as high or medium priority due to their impact on routes to nearby schools in the neighboring areas and will be analyzed in more depth in the reports for the affected schools.

RECOMMENDATION #NAI-120: OXFORD STREET MIDBLOCK CROSSWALK (NORTHWOOD)

IDENTIFIED BARRIERS

- ***Uncontrolled midblock crosswalk***
- ***Poor motorist yielding behavior***
- ***Low-visibility crosswalk pattern in school zone***
- ***High traffic volumes due to vicinity of loading zone and parking lot entrance***

RECOMMENDATIONS

- ***Curb extensions***
- ***Extend red zone on southbound Oxford***
- ***High-visibility crosswalk***
- ***Rectangular Rapid Flashing Beacons***

Relevant Reports:

- *Northwood Elementary School Walk Audit Report*

RECOMMENDATION #NAI-121: OXFORD STREET AND BRIARWOOD STREET INTERSECTION

IDENTIFIED BARRIERS

- ***No traffic control or calming on Oxford Street***
- ***Low-visibility crosswalk pattern in school zone***
- ***Wide curb radius on northeast side***
- ***Long crossing distance***
- ***Missing red zones on east side***

RECOMMENDATIONS

- ***Curb extensions***
- ***High-visibility crosswalk***

Relevant Reports:

- *Northwood Elementary School Walk Audit Report*

RECOMMENDATION #NAI-133: LINDA VISTA AVENUE NORTHBOUND SIDEWALK (WEST PUEBLO TO REDWOOD)

IDENTIFIED BARRIERS

- ***Displaced sidewalk in many locations***
- ***Missing sidewalk (Pueblo Vista campus to Ethel Porter Drive)***

RECOMMENDATIONS

- ***Repair displaced sidewalk***
- ***Fill sidewalk gap***

Relevant Reports:

- *Pueblo Vista Magnet Elementary School Walk Audit Report*

RECOMMENDATION #NAI-136: OXFORD STREET AND BERKS STREET INTERSECTION

IDENTIFIED BARRIERS

- ***Pushed-back north curb reduces visibility and increases crossing distance***
- ***No ADA-accessible curb ramps***

RECOMMENDATIONS

- ***Curb extensions***
- ***High-visibility crosswalk***
- ***Install curb ramps***

Relevant Reports:

- *Northwood Elementary School Walk Audit Report*

MAP OF RECOMMENDATIONS

Map 5: Recommendations

TABLE OF RECOMMENDATIONS

Infrastructure:

	LOCATION	ID #	BARRIER	RECOMMENDATION	COST	PRIORITY
1	Redwood Road from Solano Avenue to Dry Creek Road	NAI-109	High vehicle speed and volume arterial corridor with little traffic control and no traffic-calming, no bicycle facilities, and high-stress pedestrian infrastructure. Significant east-west connection for neighborhoods and 3 public schools within half-mile.	Implement road diet to two travel lanes and a center turn lane along corridor to create space for Complete Streets infrastructure*. Integrate specific recommendations from SRTS reports into road redesign.	$$$	**High**
		NAI-110	Narrow sidewalks*; sidewalks often obstructed by utility poles, sign posts, and other equipment.	Widen existing sidewalks from Solano Avenue to Carol Drive.	$$	**High**
		NAI-111	Narrow sidewalks* from Carol Drive to Dry Creek Road.	Widen existing sidewalks.	$$$	**Medium**
		NAI-112	Sidewalk gaps.*	Fill eastbound sidewalk gaps from Carol Drive to Linda Vista Avenue.	$$	**High**
		NAI-113	Not enough lighting.	Add street-scale lighting along corridor, prioritizing segment between Solano and Linda Vista.	$$	**Medium**
		NAI-114	No bicycle facilities.*	Install Class IV protected bike lanes with green conflict markings at commercial driveways along segments where there is already no on-street parking. Install Class II buffered bike lanes with traffic-calming for areas between Carol Drive and Dry Creek Road where residential parking already exists.	$$	**High**
		NAI-115	High-stress existing bicycle facilities between Solano Avenue and NB on/off ramps.	Narrow travel lanes and install Class IV protected bike lanes.	$$	**Medium**
2	Redwood Road and Carol Drive intersection*	NAI-116	High motorist-pedestrian conflict risk with cars turning left out of the parking lot and other motorists in school zone.	Near term: maintain crosswalk paint quality and high-visibility school-zone pattern. Push back limit lines and install curb extensions. Long term: Intersection will require redesign with Redwood Rd road diet and bike/ped infrastructure upgrades.	$$	**High**

	LOCATION	ID #	BARRIER	RECOMMENDATION	COST	PRIORITY
3	Oxford Street from Carol Drive to Trower Avenue	NAI-117	Narrow southbound sidewalk; narrow northbound sidewalk from north side of school parking lot to Trower Avenue.	Widen northbound sidewalk from north edge of Redwood parking lot to Devonshire Drive (can use median space for the most part). Widen sidewalks on both sides of Oxford from Trower to Briarwood (northbound) and to Berks (southbound).	$$	Low
		NAI-118	No bicycle facilities.	Install Class III bike boulevard with sharrows, signage, and traffic-calming measures.*	$	Medium
		NAI-119	No crosswalk to main school entrance, speeding on Oxford Street.	Create new high-visibility midblock crosswalk in front of campus connecting to path to campus with curb extensions.	$$	Low
		NAI-120	Midblock crosswalk between Briarwood Street and Berks Street missing traffic controls, poor motorist yielding behavior, low-visibility crosswalk pattern in school zone, adjacent to loading zone and parking lot entrance causes high traffic volumes around crosswalk to school entrance.	Install curb extensions on both sides of crosswalk and extend red zone on southbound Oxford St north of crosswalk, upgrade crosswalk to high-visibility pattern, install RRFB.	$$	High
4	Oxford Street and Briarwood Street intersection	NAI-121	No traffic control or calming, low-visibility crosswalk pattern in school zone, wide curb radius on northeast side facilitates fast motorist turning, long crossing distance, missing red zones on east side allows parking next to crosswalk.	Install curb extensions on both sides of crosswalk across Oxford, upgrade crosswalk to high-visibility pattern.	$-$$	Medium
5	School parking lot – Redwood Road	NAI-329	Poor sight lines at Redwood parking lot cause motorists to block sidewalk, motorists make fast turns into/out of parking lot due to high speeds on Redwood Road.	Add sidewalk around east side of Redwood Road parking lot to allow students to avoid driveway. Narrow driveway entrance to reduce fast turns into/out of parking lot. Use reclaimed space for wider sidewalks leading to Redwood Road.	$$	Low
6	Oxford Street and Carol Drive intersection	NAI-122	Long crossing distance, wide curb radii facilitate fast motorist turning, low-visibility crosswalk pattern in school zone, Carol Drive traffic uncontrolled, high multimodal traffic volumes, poor motorist yielding behavior, minimal red zones allow parking/loading near crosswalk, curbs are not ADA-compliant.	Install curb extensions on both sides of crosswalk, utilizing extensions to daylight intersection. Upgrade crosswalk to high-visibility pattern. Update curbs to be ADA-compliant.	$$	High

	LOCATION	ID #	BARRIER	RECOMMENDATION	COST	PRIORITY
7	Carol Drive from Redwood Road to West Pueblo Avenue	NAI-123	No sidewalks.	Install sidewalks on both sides of the road, replace rolled curb with standard curb to discourage illegal parking behavior.	$$$	High
		NAI-124	No bicycle facilities.	Install Class III bike boulevard with sharrows, signage, and traffic-calming measures.*	$$	High
		NAI-138	No crosswalks at any of the intersections from Ethel Porter Drive to Janette Drive.	Paint crosswalks north-south at Sandra Dr and Janette Dr, paint all four crosswalks at Ethel Porter Dr and Kathleen Dr.	$	Low
8	Devonshire Drive and Oxford Street intersection	NAI-125	No crosswalk across Devonshire Drive, no ADA-compliant curb ramps, wide curb radii and long crossing distance. Potential conflict between pedestrians and school-related motor traffic heading to Solano Ave.	Install curb extensions. Paint high-visibility school zone crosswalk across Devonshire Drive and install ADA-accessible curb ramps on both corners.	$-$$	Medium
9	Devonshire Drive and Solano Avenue intersection	NAI-126	No crosswalks at Solano Avenue intersection, impedes access to Vine Trail given high speeds/volumes of vehicle traffic on Solano.	Paint high-visibility crosswalk with Rectangular Rapid Flashing Beacon across Solano Avenue and crosswalk across Devonshire Drive. Install curb extension on southwest corner.	$$	Medium
10	Redwood Road and Solano Avenue intersection*	NAI-127	Large offset intersection with high vehicle traffic volumes/speeds. Long crossing distances. Wide curb radii facilitate fast motorist turning movements. Key intersection along Vine Trail shared-use path route and between arterial and collector. Bicycle facilities do not reach intersection.	Install protected intersection connected by Class I facilities.	$$$	High
		NAI-128		Connect Vine Trail to north end of Park and Ride with continued Class I shared-use path and improved crossing conditions across Redwood for bicyclists and pedestrians.*	$$-$$$	High
		NAI-129	Poor sight lines entering 76 station, high conflict risk between motorists and bicyclists/pedestrians, particularly with Vine Trail alignment.	Close northwest entrance to 76 station on Redwood to improve pedestrian/bicyclist safety approaching intersection.	$	Low
11	Redwood Road and Linda Vista intersection*	NAI-130	Faded, low-visibility crosswalk pattern in school zone, high traffic volume intersection, long crossing distances, wide curb radii facilitate fast motorist turning movements.	Short-term: Repaint crosswalks with high-visibility school-zone pattern, install curb extensions on all four corners. Long-term: Intersection will require redesign with Redwood road diet.	$$	Medium

	LOCATION	ID #	BARRIER	RECOMMENDATION	COST	PRIORITY
12	Linda Vista Avenue from Redwood Road to Trower Avenue	NAI-131	Northbound sidewalk missing.	Install missing northbound sidewalk.*	$$-$$$	**High**
		NAI-132	No bicycle facilities.	Install Class III bike boulevard with sharrows, signage, and traffic-calming.*	$$	**High**
13	Linda Vista Avenue from West Pueblo Avenue to Redwood Road	NAI-133	Northbound sidewalk between Kathleen Drive and Ethel Porter Drive displaced in many locations. Sidewalk missing between north edge of Pueblo Vista Magnet School and Ethel Porter Drive with no crosswalk to southbound side.	Repair northbound sidewalk where cracked/displaced and install sidewalk where missing.*	$	**Medium**
		NAI-134	No bicycle facilities; long, straight road with no traffic-calming or traffic control.	Install Class II bike lanes* and traffic-calming elements at key intersections (see intersection-specific recommendations).	$$	**High**
14	Carol Drive and Dover Street intersection	NAI-135	Missing ADA accessible curb ramps on both sides of crosswalk, low-visibility crosswalk in school zone.	Upgrade crosswalk to high-visibility pattern. Install ADA-accessible curb ramps on both sides of the crosswalk.	$-$$	**Low**
15	Oxford Street and Berks Street intersection	NAI-136	Pushed-back north curb reduces pedestrian visibility and creates longer crossing distance. No ADA-accessible curb ramps for crosswalk.	Install curb extensions and upgrade crosswalk to high-visibility pattern. Install ADA-accessible curb ramps.	$-$$	**Medium**
16	Berks Street and Dover Street intersection	NAI-137	Faded crosswalks, crosswalks do not have ADA accessible curb ramps.	Repaint crosswalks with high-visibility pattern, install curb extensions for all crosswalks, install ADA-accessible curb ramps.	$-$$	**Low**

** = projects included in Napa Countywide Pedestrian Plan (2016) or Napa Countywide Bicycle Plan (2019)*

Programmatic Improvements:

	ISSUE	ID #	RECOMMENDATION	LOCATION	FREQUENCY	COST	PRIORITY
1	Lack of use of school loading zones, congestion on adjacent roads, no circulation policy	NAP-014	Develop and distribute comprehensive circulation policy, emphasize use of loading zone in Oxford parking lot instead of curb space to reduce congestion on adjacent streets.	School site area	Develop once and update as needed; distribute annually or as needed	$	**Medium**
2	Limited bicycle safety education program – infrequently provided, only provided to small number of students	NAP-015	Provide bicycle safety education for all students.	School site	Annually	$	**High**
3	Congestion in school zone, infrequency of encouragement events	NAP-016	Continue growing participation in annual countywide events. Hold independent encouragement events quarterly, with a goal of increasing frequency over time. Encourage formation of regular bike trains/walking groups/ carpools to reduce number of vehicles in the school zone.	School site	Annually/ Quarterly	$	**High**

COLLISION MAP AND DATA

Map 6: Collision Map (2017-2021) (Source: UC Berkeley Transportation Injury Mapping System: SRTS Collision Map Viewer)

Summary Statistics

RADIUS	FATAL	SEVERE INJURY	VISIBLE INJURY	COMPLAINT OF PAIN	PEDESTRIAN	BICYCLE	TOTAL
< .25 mi.	0	0	1	0	0	1	1
.25-.5 mi.	1	2	5	5	4	9	13
Total	1	2	6	5	4	10	14

Collision List

Case ID	Date	Time	Primary	Secondary	Distance	Direction	Bike	Ped
8386058	2017-06-03	09:11	CAROL DR	REDWOOD RD	0.00	-	Yes	No
8404547	2017-06-29	21:22	REDWOOD RD	SOLANO AV	225.00	W	No	Yes
8433556	2017-08-21	15:12	OXFORD ST	RALEIGH ST	75.00	N	No	Yes
8494583	2017-10-30	07:15	SOLANO AV	REDWOOD RD	0.00	-	Yes	No
8357611	2017-04-21	13:36	REDWOOD RD	SOLANO AV	0.00	-	Yes	No
8783687	2019-01-15	08:29	REDWOOD RD	SOLANO AV	0.00	-	Yes	No
8802775	2019-02-06	19:01	TROWER AV	MAHER ST	0.00	-	Yes	No
8802795	2019-02-04	13:29	REDWOOD RD	SOLANO	0.00	-	Yes	No
9250514	2021-04-01	16:17	SIERRA AV	LASSEN ST	373.00	E	No	Yes
8713393	2018-10-15	17:25	REDWOOD RD	SOLANO AV	0.00	-	Yes	No
8813854	2019-02-01	18:45	RT 29	TRANCAS ST	0.00	-	No	Yes
8876769	2019-06-03	11:02	REDWOOD RD	SOLANO AV	55.00	E	Yes	No
9098200	2020-05-02	21:02	SOLANO AV	DUNHILL ST	50.00	E	Yes	No
9113977	2020-06-02	11:41	REDWOOD RD	TRANCAS ST	0.00	-	Yes	No

Figure 8: Collision Data (2017-2021) (Source: UC Berkeley Transportation Injury Mapping System: SRTS Collision Map Viewer)

APPENDICES

FIGURES & MAPS

FOOTNOTES

[a] Noreen McDonald, Ruth Steiner, Chanam Lee, Tori Rhoulac Smith, Xuemei Zhu and Yizhao Yang (2014). "Impact of the Safe Routes to School Program on Walking and Bicycling." Journal of the American Planning Association. Vol 80, Iss 2, p 153-167.

[b] Orion Stewart, Anne Vernez Moudon, and Charlotte Claybrooke (2014) Multistate Evaluation of Safe Routes to School Programs. American Journal of Health Promotion: January/February 2014, Vol. 28, No. sp3, pp. S89-S96.

[c] Peter A Muennig et al., 'The Cost-Effectiveness Of New York City's Safe Routes To School Program', American Journal Of Public Health, iss 0 (2014): 1-6.

[d] David Ragland, S Pande, J Bigham and FJ Cooper. (2014, January). Ten years later: examining the long-term impact of the California Safe Routes to School program. Presented at the Transportation Research Board 93rd Annual Meeting, Washington DC. Available at http://docs.trb.org/prp/14-4226.pdf.

[e] Davison K, Werder J and Lawson, C. "Children's Active Commuting to School: Current Knowledge and Future Directions." Preventing Chronic Disease, 5(3): A100, July 2008.

[f] Hillman CH, Pontifex MB, Raine LB, Castelli DM, Hall EE, Kramer AF. The effect of acute treadmill walking on cognitive control and academic achievement in preadolescent children. Neuroscience. 2009;159(3):1044-1054. doi:10.1016/j.neuroscience.2009.01.057

[g] Castelli, D.M., Glowacki, E., Barcelona, J.M., Calvert, H.G., & Hwang, J. (2015). Active Education: Growing Evidence on Physical Activity and Academic Performance. [Research brief.] Active Living Research. http://activelivingresearch.org/sites/default/files/ALR_Brief_ActiveEduc....

[h] Appleyard, B. (2017). The meaning of livable streets to schoolchildren: An image mapping study of the effects of traffic on children's cognitive development of spatial knowledge. Journal of Transport & Health, 5.

[i] AAA. Cost of Owning and Operating Vehicle in U.S. Increased 1.9% According to AAA's 2012 Your Driving Costs Study. 2012. http://newsroom.aaa.com/2012/04/costof-owning-and-operating-vehicle-in-u....

[j] Overall Facility Rating determined from 2019-20 School Accountability Report Card

APPENDIX A

EMC Survey Toplines

Safe Routes to School Walk Audit Report and Active Transportation Action Plan

Evaluation: Research & Methodology

- **Purpose: Gain insight into parent practices, perceptions, and attitudes around children walking and riding bicycles to and from school; explore barriers to behavior change**
- **Quantitative survey of 459 parents of K-8 students in Napa County**
  - Conducted online and by telephone, offered in English and Spanish
  - Conducted March 11 – April 12, 2021
  - Participants recruited via communications from school districts and targeted online and telephone contacts
  - *Survey methods were designed to include as many participants as possible; not a random sample*
- **Qualitative follow-up research**
  - One online focus group with 7 participants in English; 4 in-depth telephone interviews in Spanish
  - Conducted May 20 – 28, 2021
  - Targeted parents who lived within two miles of their school site and would like their children to walk or bike to school

Survey of Parents/Guardians of at least one child in K-8th Grade
Napa County, California
Hybrid Email-to-Web/Text-to-Web/Live Telephone Survey
Conducted March 11-April 12, 2021
n=459
EMC Research #21-6420

All numbers in this document represent percentage (%) values, unless otherwise noted.
Please note that due to rounding, percentages may not add up to exactly 100%.

INTRO: Your opinions are important! Thank you for participating in this survey EMC Research is conducting on behalf of the Napa County Safe Routes to School program in partnership with local school districts. You may have been contacted previously to complete this survey via telephone and we ask each individual only complete the survey once.

Your responses will remain completely confidential. Please try to answer every question even if you're not sure. If you need to, you may skip a question.

1. Are you the parent or guardian of any children currently attending kindergarten through eighth grade in one or more of the school districts located in Napa County below? *Please select the District(s) that your K-8th grade student(s) is/are currently enrolled in, check all that apply.* **(MULTIPLE RESPONSES ACCEPTED)**

Calistoga Joint Unified School District	0
Howell Mountain Elementary School District	-
Napa Valley Unified School District	97
Pope Valley Union Elementary School District	0
Saint Helena Unified School District	2
Another District or school in Napa County (please specify)	1
None of the above → **TERMINATE**	-
(No response) → **TERMINATE**	-

2. Please indicate below what grade(s) your child/children are in. *Please select all that apply.* **(MULTIPLE RESPONSES ACCEPTED)**

Kindergarten	22
1st grade	17
2nd grade	15
3rd grade	20
4th grade	15
5th grade	15
6th grade	14
7th grade	12
8th grade	9
9th through 12th grade → **TERMINATE IF ONLY RESPONSE SELECTED**	14
(No response) → **TERMINATE**	-

(IF MORE THAN ONE K-8 STUDENT: "Although you have multiple children in K-8, we ask that you please think about your **oldest K-8** child when answering the next questions."**)**

For these next few questions, please think back to when your **(**child was**/**children were**)** attending school **before** the COVID-19 pandemic.

3. On most days, what was the primary way your **(**K-8 child**/**oldest K-8 child**)** travelled **to** school?

Family vehicle (only children in your family)	73
Carpool (children from other families)	3
School bus	3
Other public transportation	0
Bike	4
Walk	16
Other (scooter, skateboard, inline skates, etc.)	0
(No response)	0

4. And on most days, what was the primary way your **(**K-8 child**/**oldest K-8 child**)** travelled **from** school?

Family vehicle (only children in your family)	73
Carpool (children from other families)	3
School bus	3
Other public transportation	1
Bike	4
Walk	15
Other (scooter, skateboard, inline skates, etc.)	0
(No response)	0

5. How long did it normally take your **(**K-8 child**/**oldest K-8 child**)** to get to/from school?

Less than 5 minutes	18
5-10 minutes	42
11-15 minutes	22
16-20 minutes	8
More than 20 minutes	9
(No response)	0

6. Has your **(**K-8 child**/**oldest K-8 child**)** ever walked or biked to/from school?

Yes	43
No	56
(No response)	0

7. **(ONLY ASKED IF Q6=1, 'Yes, has walked/biked to/from school')** In what grade did your child begin to walk or bike to/from school? **(n=199)**

Pre-school	7
Kindergarten	30
1st grade	9
2nd grade	6
3rd grade	10
4th grade	8
5th grade	9
6th grade	13
7th grade	6
8th grade	1
9th through 12th grade	1
(No response)	2

8. Thinking generally, what grade would you feel comfortable with a child walking or biking to/from school?

Pre-school	1
Kindergarten	5
1st grade	2
2nd grade	2
3rd grade	5
4th grade	14
5th grade	12
6th grade	16
7th grade	10
8th grade	7
9th through 12th grade	13
I would not feel comfortable at any grade	14
(No response)	1

9INT. Continuing to think about times **before** the COVID-19 pandemic, please indicate how comfortable **you** were with your **(**K-8 child**/**oldest K-8 child**)** doing each of the following.

SCALE:	Very Comfortable	Somewhat Comfortable	Not too Comfortable	Not at all Comfortable	(No Response)	Total Comfort.	Total Not Comfort.
(RANDOMIZE)							
9. Taking a bus to school	32	33	17	15	3	**65**	**32**
10. Walking to school without an adult	8	18	19	54	1	**26**	**73**
11. Riding a bike to school without an adult	7	17	22	53	2	**23**	**75**
12. Walking to school with an adult	66	19	6	8	1	**85**	**14**
13. Riding a bike to school with an adult	45	29	11	13	2	**74**	**24**
(END RANDOMIZE)							

14. **(ONLY ASKED IF Q10=3 OR 4, 'not comfortable')** What would you say is the **main** reason you were not comfortable with your **(**K-8 child**/**oldest K-8 child**)** **walking** to school without an adult?
(VERBATIM RESPONSES CODED INTO BELOW CATEGORIES) (n=335)

Worry for child's safety/Crime	28
Not old enough	19
Live too far away	17
Traffic/Busy streets	11
Street crossing/Intersections	6
Not enough sidewalks	5
Crossing Highway 29	3
Other	8
Don't know	1

15. **(ONLY ASKED IF Q11=3 OR 4, 'not comfortable')** What would you say is the **main** reason you were not comfortable with your **(**K-8 child**/**oldest K-8 child**)** **riding a bike** to school without an adult?
(VERBATIM RESPONSES CODED INTO BELOW CATEGORIES) (n=324)

Worry for child's safety/Crime	29
Not old enough	18
Traffic/Busy streets	13
Live too far away	9
Street crossing/Intersections	5
Crossing Highway 29	4
Can't ride a bike	4
Not enough sidewalks	3
No bike lanes	3
Other	10
Don't know	1

For these next few questions, please think back to when your **(**child was**/**children were**)** attending school **before** the COVID-19 pandemic.

16INT. Please indicate whether you agree or disagree with each of the following statements.

SCALE:	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	(No Response)	Total Agree	Total Disagree
(RANDOMIZE)							
16. I would generally like my K-8 **(**child**/**children**)** to be able to walk or bike to/from school.	43	32	12	12	0	**76**	**24**
17. My K-8 **(**child enjoys**/**children enjoy**)** walking and/or biking places.	57	31	8	4	0	**88**	**12**
18. I would never let my K-8 **(**child**/**children**)** walk or bike to/from school.	20	24	27	28	0	**44**	**55**
19. It is safe for children to walk or bike in my area.	13	45	22	20	-	**58**	**42**
20. There are enough bike paths and sidewalks for my K-8 **(**child**/**children**)** to walk or bike to/from school.	13	27	20	39	1	**40**	**60**
21. I am concerned about speeding or distracted drivers if/when my **(**child**/**children**)** walk or bike to/from school.	81	15	2	2	0	**96**	**4**
22. The school is too far away for my K-8 **(**child**/**children**)** to walk or bike there.	37	19	15	29	0	**55**	**45**
23. My K-8 **(**child**/**children**)** cannot bike to and from school because of their before- or after-school commitments.	13	26	25	35	1	**39**	**60**
24. Walking or biking to and from school is a good way for my K-8 **(**child**/**children**)** to get physical exercise.	69	25	3	3	1	**93**	**6**
25. Walking or biking to and from school is a good way for me to spend quality time with my K-8 **(**child**/**children**)**.	55	30	7	6	1	**85**	**14**
26. I would only allow my K-8 **(**child**/**children**)** to walk or bike to and from school if I, or another adult, can accompany them.	54	25	12	8	0	**79**	**21**
(END RANDOMIZE)							

27INT. Next, you will see some things that local schools and other organizations could do that may affect how you feel about your **(**K-8 child**/**oldest K-8 child**)** biking to school once the COVID-19 pandemic has ended. For each, please indicate if the item would make you feel more comfortable about allowing your **(**K-8 child**/**oldest K-8 child**)** to walk or bike to school once the COVID-19 pandemic has ended.

SCALE:	Much More Comfortable	Somewhat More Comfortable	A Little More Comfortable	(No Difference)	(Don't Know)
(RANDOMIZE)					
27. Limit how much children have to carry in their backpacks	36	25	14	24	1
28. Provide children and parents with information and maps on safe routes to and from school	37	24	16	22	1
29. Offer free bicycle safety courses for children to learn how to ride safely on local streets	43	21	21	15	0
30. Provide opportunities for children to practice biking in a car-free environment	42	23	14	20	-
31. Offer free pedestrian safety classes for children	39	20	21	19	1
32. Provide crossing guards at major intersections	62	22	10	6	-
33. Organize groups of students to walk or bike to/from school together	42	26	17	14	1
34. Provide a local parent or adult volunteer to walk or bike with children to/from school	36	27	15	20	1
35. Add designated bike lanes to roads	46	24	15	14	-
36. Improve the condition of existing bike lanes	47	23	14	16	1
37. Add more bike paths that are separated from the road	62	17	11	9	0
38. Add more sidewalks	53	21	13	12	1
39. Fix missing or broken sidewalks	56	19	15	10	1
40. Increase the visibility and safety of crosswalks	61	20	11	8	0
41. Increase the police presence on routes that lead to schools	52	23	13	12	1
42. Reduce the speed of traffic on streets that kids use to walk or bike to school	53	21	15	11	1
(END RANDOMIZE)					

43. Is there something else that could be done that would make you feel more comfortable about allowing your **(**K-8 child**/**oldest K-8 child**)** to walk or bike to school once the COVID-19 pandemic has ended? **(VERBATIM RESPONSES CODED INTO BELOW CATEGORIES)**

Nothing/No additional comments	42
Add or improve bike paths/Sidewalks/Crosswalks	15
Increase crossing guards/Supervision/Police presence	11
School is too far away/Can't use active modes	9
Speeding concerns/Increased road law enforcement	5
Increase safety related to Highway 29	2
Already walks/bikes/etc.	2
Provide bikes/Equipment/Storage	2
Other	10
Don't know/Refused	2

44. About how far does your **(**K-8 child**/**oldest K-8 child**)** live from school? If you're not sure, give your best guess.

Less than ½ mile	14
½ mile up to 1 mile	19
1 mile up to 2 miles	21
2 miles up to 3 miles	14
3 miles up to 5 miles	15
5 miles or more	16
(No response)	1

45. Does your **(**K-8 child**/**oldest K-8 child**)** currently have their own working bicycle?

Yes	79
No	21
(No response)	-

46. Did you ride a bicycle when you were your K-8 **(**child's**/**children's**)** age?

Yes	78
No	21
(No response)	0

These last questions are for statistical purposes only. Your responses will remain completely confidential.

47. Do you identify as…

Male	14
Female	83
Non-binary	-
Another gender identity	-
Prefer not to respond	3

48. What year were you born? **(YEARS CODED INTO CATEGORIES)**

18-29 (2003-1992)	5
30-39 (1982-1991)	36
40-49 (1972-1981)	45
50-64 (1957-1971)	12
65 or older (1956 or earlier)	1
Prefer not to respond	1

49. Do you consider yourself to be…

Hispanic or Latino	38
White or Caucasian	41
African American or Black	1
Asian or Pacific Islander	7
Something else	3
Prefer not to respond	10

50. Do you…

Own or are buying the home or apartment where you live	55
Rent or lease	35
Prefer not to respond	10

THANK YOU!

APPENDIX B

Universal Recommendations

Safe Routes to School Walk Audit Report and Active Transportation Action Plan

Appendix B
Napa County SRTS Walk Audit Report
Universal Recommendations

The Napa County Safe Routes to School (SRTS) Walk Audit Report Universal Recommendations apply to all public schools in Napa County, which reflects the schools served under the SRTS program. Universal recommendations are meant to supplement site-specific recommendations and address common barriers in the bicycle/pedestrian network around schools in a concise and consistent manner.

Universal Recommendation 1: High-Visibility School Zone Crosswalks

Federal Highway Administration data[1] indicates that high-visibility crosswalk striping improves the visibility of crosswalks compared to standard parallel lines and can improve yielding behavior by drivers[2]. Additionally, crosswalk visibility enhancements, which include but are not limited to high-visibility crosswalks, can reduce crashes by 23-48%[1].

- Recommendation: High-visibility (continental or ladder pattern) crosswalks should be implemented at the following locations:
    - Utilizing the California Vehicle Code (CVC) §21368 requirements for designating crosswalks as "school zone" crosswalks (painted yellow), all school zone crosswalks;
    - And, all marked crosswalks at an intersection with a designated collector or arterial roadway within 1320 feet (0.25 miles) of a school (following the same measuring method as CVC §21368)

This recommendation applies to existing and future crosswalks. It does not provide guidance for new crosswalk warrants; it is primarily focused on the improvement of crosswalks within the roughly ¼ mile radius examined through the Walk Audit process.

Universal Recommendation 2: Intersection Daylighting

Daylighting is the practice of removing visual barriers, including parked vehicles, within a certain distance of a crosswalk or intersection to greatly improve visibility for pedestrians, bicyclists, and motorists. The National Association of City Transportation Officials recommends removing parking within 20-25 feet of an intersection. Daylighting can be accomplished through permanent infrastructure, such as concrete curb extensions, or more cost-effective materials, such as paint and bollards.

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[1] https://safety.fhwa.dot.gov/ped_bike/step/docs/TechSheet_VizEnhancemt_508compliant.pdf

2 Pulugartha, S. S., V. Vasudevan, S. S. Nambisan, and M. R. Dangeti. Evaluating the Effectiveness on Infrastructure-Based Countermeasures on Pedestrian Safety. Presented at the 91st Annual Meeting of the Transportation Research Board, Washington, D.C., 2012.

- Recommendation: Daylighting strategies should be implemented at the following intersections:
    - Those that are in the school zone as defined by CVC §21368;
    - Those that are intersections with a designated collector or arterial roadway within 2640 feet (0.5 miles) of a school (following the same measuring method as CVC §21368).

Universal Recommendation 3: Sidewalk Width Adjacent to School Campus

A barrier frequently identified during Walk Audits throughout the county was that sidewalks immediately adjacent to the school were too narrow for the high volumes of pedestrians generated during school arrival and dismissal times. Most of these sidewalks were roughly 4 feet wide, including space for utility and signage poles. While these sidewalks may meet specific municipal standards, they do not accommodate high volumes of school-related pedestrians and can deter or prevent students from walking to school if they travel with their families, in groups, or use a mobility assistance device. This is especially so when sidewalks are obstructed by utility poles, signal boxes, and other objects.

- Recommendation: All sidewalks that lead to a school campus entrance should be a minimum of 6 feet wide within at least 250 feet of the school entrance; if a school has only one entrance, the sidewalk leading to that entrance should be a minimum of 8 feet wide within 250 feet of that entrance.

Universal Recommendation 4: Class III Bike Boulevard Traffic-Calming

Class III bicycle boulevards are on-street bicycle facilities that have traditionally been marked by signage and share-the-road stencils ("sharrows") painted in the vehicle travel lane. Class III facilities do not provide any separation between bicyclists and motorists and instead indicate to road users that bicyclists and motorists must share the road. Such facilities are intended to be installed on low-speed (25 mph or less*) and low-volume (<3,000 vehicles/day*) roadways; however, the current practice of implementing only signage and sharrows for Class III routes frequently does not meet the comfort and safety perception needs of the "Interested but Concerned" user profile of bicyclists, which includes an estimate of 51%-56% of the population and is typically the profile assumed for most school-age children. To create a lower stress bicycle network, the Federal Highway Administration describes improving bicycle boulevards by "slowing motor vehicle speeds and implementing other speed management measures."

- Recommendation: All Class III bicycle boulevards should be marked with sharrows and signage and must be treated with traffic-calming strategies to enforce the desired speed limit and prevent motorist speeding. Class III bicycle boulevards adjacent to school campuses or along roadways that facilitate

motorist speeding (long, straight, and/or minimal traffic control) should be prioritized for traffic-calming treatments.

* Metrics established by the Federal Highway Association in their 2019 Bikeway Selection Guide.

Universal Recommendation 5: Curb Ramps (Americans with Disabilities Act)

Some of the early Walk Audit reports specifically call out intersections or other pedestrian access points where curb ramps compliant with the Americans with Disabilities Act were missing, which creates a significant connectivity barrier for pedestrians who use mobility assistance devices. However, following these reports, the Napa County Safe Routes to School team recognized that many intersections and pedestrian access points were missing these curb ramps and that individually identifying each missing curb ramp would be redundant, particularly given data from the Napa Countywide Pedestrian Plan (2016). Consequently, though some early reports do mention lack of accessible curb ramps, a universal recommendation was created to address this important pedestrian barrier while avoiding redundancy in reports.

- Recommendation: In alignment with the Americans with Disabilities Act, when implementing recommendations made in Napa County Safe Routes to School reports that impact the curb at intersections, pedestrian crossings, or other pedestrian access points, curb ramps that are compliant with the Americans with Disabilities Act should be installed.

APPENDIX C

Quick Build Brochure

Safe Routes to School Walk Audit Report and Active Transportation Action Plan

QUICK-BUILD BIKEWAY NETWORKS FOR SAFER STREETS

Delivering Safer Streets in Weeks or Months, Instead of Years

How to Meet Public Demand for Safe Bikeway Networks—Affordably, Quickly, and Inclusively

Photo credit: Alta Planning + Design

CASE STUDY

Adeline Street in Berkeley got protected bike lanes 20 years ahead of schedule, when Bike East Bay worked closely with the city to incorporate planned lanes into the repaving schedule, saving time and money by simply adding bike infrastructure to an existing project, one funded through a local infrastructure bond measure. The City of Berkeley garnered extensive public input on the Adeline Corridor, making this a great example of quick-build speeding up existing bike infrastructure planning, bringing bike lanes to Berkeley in 2019 instead of 2039.

WHY QUICK-BUILD? WHY NOW?

Biking is up in many communities in California, including those that started with low rates of bicycling, as people seek out healthy and safe transportation and recreation. Californians are discovering they can be healthier and happier simply by getting out on two wheels.

Meanwhile, agency budgets are down. Plans to spend millions on infrastructure may no longer be realistic. More than ever, the public demands that transportation projects are equitable and responsive to the needs of neglected communities.

Quick-build is a method of building bike and pedestrian safety improvements—protected bike lanes, pedestrian crossings, slow streets, parklets, and more—now, within your budget. In challenging times, quick-build projects are crucial to building trust in the government's ability to deliver public benefit. And quick-build infrastructure can engage the public better than ever, and be more inclusive and equitable than traditional infrastructure.

> *"We as transportation experts need to be thinking strategically about whether or not we need to spend three years talking about doing something important, or three weeks to just try something."*
>
> — Warren Logan
>
> *Transportation Policy Director of Mobility and Interagency Relations at Oakland Mayor's Office*

WHAT IS QUICK-BUILD?

The Basics

- Quick-build projects use materials that can be installed quickly and at low cost. Build projects from posts, planters, and stripes of paint, not new pavement or curb alignments.
- **Quick-build projects are installed on a trial basis.** Temporary installations allow for adjusting or removing elements in response to public feedback. Successful projects may become permanent, exactly as installed, or upgraded with more durable materials.
- **Quick-build should incorporate rigorous community engagement.** A project on the ground can serve much more effectively than a PowerPoint or rendering for trying something out and allowing community residents to respond. Gather feedback and input, and change designs accordingly.

Materials

From paint, traffic cones, and A-boards to concrete curb barriers, planters, and temporary raised crosswalks, a wide variety of materials work well for creating quick-build projects. The full Quick-Build Toolkit provides thorough, detailed descriptions of materials that can make for an effective and inexpensive project to meet your community's needs.

Photo credits, top to bottom: Alta Planning + Design; Real Hartford; Alta Planning + Design; Street Plans Collaborative

CASE STUDY

In August of 2020, the City of San Luis Obispo converted one of the three motor vehicle lanes of downtown Higuera Street into a buffered bike lane, as part of Open SLO, the city's pilot program to expand the use of public spaces (with parklets and bike/ped spaces) during the COVID-19 pandemic. The project was installed with paint, took less than a week to install, and cost a mere $15K instead of the more than $150K it would have taken to put in a traditional bike lane by sealing and restriping the whole street as the city would normally do.

Photo credit: Bike SLO County

WHO?

Your Quick-Build Project Team

Team leader. Quick-build projects need a "chief" (usually city staff) tasked with project facilitation, keeping the momentum going, establishing lines of communication, and accepting and evaluating feedback.

Community leaders. Because evaluation and adjustment are essential for successful quick builds, make sure community leaders are on board from the beginning. Look to businesses, residential associations, places of worship, and nearby schools. Bring in bike/ped advocacy organizations and other CBOs, including those based in disadvantaged communities and led by people of color.

Department liaisons. Your project may impact transit, street sweeping, parking enforcement, maintenance, waste management and recycling, and emergency response. Involve other agencies as necessary to ensure you don't forget a critical aspect.

Elected Officials. They have the power to marshal funding for quick-build projects. They will hear from constituents, so communication channels between the project team and electeds must be open for effective project evaluation.

Communications. Ideally, include a dedicated communications person on your team. Because this is a new method, and people are used to years of discussion, publicize quick-build's temporary nature. Talk about the project's intended benefits, and listen to feedback about the actual impacts.

Community Engagement

Community engagement is essential and also very effective, because it's easy to engage people in providing feedback on real-world solutions that they can see and use. Here are the keys:

- Start engaging with the community before you install the project so that residents' opinions are included from the get-go.
- Be inclusive in your outreach, including perspectives from disadvantaged communities and people of color.
- Emphasize the project's temporary nature, and the ability to change the project after it's installed.
- Implement effective feedback mechanisms during the project, making sure to plan and budget for project adjustments in response to input.

CASE STUDY

The El Cajon Boulevard Business Improvement Association ("The Boulevard") got city councilmembers and the mayor on board to fund a pilot bus and bike lane along a 3-mile stretch of San Diego's El Cajon Boulevard. The Boulevard staff brought in diverse stakeholders and built on longstanding relationships to push the city to dedicate a lane for El Cajon Boulevard's new bus rapid transit line, and got bikes included on this Vision Zero corridor. The entire three-mile project, which launched in January 2020, cost $100K, funded by San Diego's general fund.

Photo credit: Holly Raines

WHERE?

Which Projects are Best for Quick-Build?

Some projects are better than others for the quick-build method.

- **Look to existing plans.** Your community's current active transportation plan already identifies key improvements and priorities. Most such plans will take decades to complete with traditional methods and funding. Quick-build can take those plans to reality much sooner.
- **Fill gaps in the bikeway network, especially now when more people are bicycling.** Look to improve intersections that are dangerous to navigate, short sections of crosstown routes that use busy streets, or long sections of streets that could become "slow streets" to connect neighborhoods.
- **Put disadvantaged communities first.** If your plan doesn't already incorporate an equity analysis to set priorities, this is your chance. Look at a model plan like Oakland's "Let's Bike Oakland" bicycle plan which incorporates a framework of equity and a focus on improving well-being for the city's most vulnerable groups.

If a project is funded and on schedule to be built within a year or two, turn your attention to projects that will take years without quick build. Projects that require expensive modifications—new traffic signals, bridges, reconfigured curbs—are not good quick-build candidates.

Photo credit: Alta Planning + Design

Funding for Quick-Build

POTENTIAL FUNDING SOURCES IN CALIFORNIA

Available funding for quick-build projects varies a lot from one municipality to the next. But here are a few ideas.

- Public works departments' essential repaving and repair projects are great opportunities to put in quick-build projects at low cost.
- Local and regional funds such as general fund, sales tax revenue, and Air Quality Management District funds can be used for quick-build projects.
- Tack on costs to another publicly-funded transportation project, or even a private project. For example, a development project that is required to repave and stripe new bike lanes might install a protected bike lane using quick-build materials instead.
- In 2020, the **Active Transportation Program** piloted a special quick-turnaround funding pot for quick-build projects, with an earlier (summer) deadline. Keep an eye on the ATP to see if they continue to offer this funding in future years. CalBike will be pushing them to do so.
- PeopleForBikes has a **small grant program** for infrastructure projects.
- AARP's **Community Challenge grant** could fund a quick-build project.

This resource was prepared in partnership with Alta Planning + Design. For more information see our complete **Quick-Build Guide**.

CALIFORNIA BICYCLE COALITION

APPENDIX D

Bike Parking Guidance

Safe Routes to School Walk Audit Report and Active Transportation Action Plan

ESSENTIALS OF

BIKE PARKING

Selecting and installing bicycle parking that works

apbp

Association of Pedestrian and Bicycle Professionals

Expertise for Active Transportation

Essentials of Bike Parking
Revision 1.0, September 2015

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Cover image: *Sign D4-3 from Standard Highway Signs, 2004 Edition, http://mutcd.fhwa.dot.gov/ser-shs_millennium_eng.htm*

APBP is an association of professionals who plan, implement and advocate for walkable and bicycle-friendly places.

Association of Pedestrian and Bicycle Professionals

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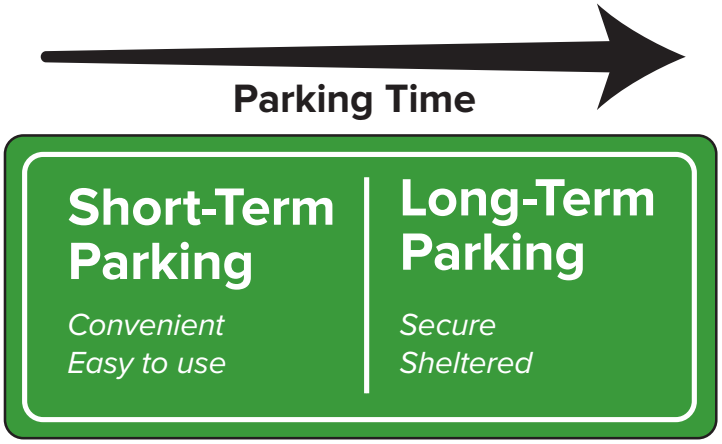
TABLE OF CONTENTS

INTRODUCTION

Among the necessary supports for bicycle transportation, bike parking stands out for being both vital and easy. Still, it requires some attention to get it right. Bike parking may go unused if it's not more appealing to users than the nearest sign post. A minor mistake in installation can make a quality rack unusable. The variety of bicycle sizes, shapes, and attachments continues to increase, and good bike parking should accommodate all types.

The Association of Pedestrian and Bicycle Professionals (APBP) prepared this guide for people planning to purchase or install bike parking fixtures on a limited scale. It is a brief overview of APBP's comprehensive *Bicycle Parking Guidelines* handbook, available at www.apbp.org.

This guide divides bike parking into short-term and long-term installations. These two kinds of parking serve different needs, and the starting point for most bike parking projects is recognizing whether the installation should serve short-term users, long-term users, or both. If users will typically be parking for two hours or longer, they are likely to value security and shelter above the convenience and ease that should characterize short-term parking.



SHORT-TERM PARKING

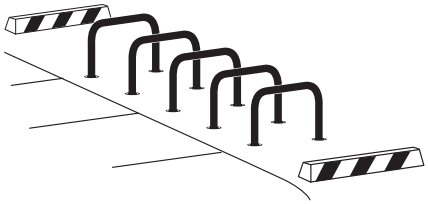
Effective bike parking for short-term users depends on two main factors: 1) proximity to the destination and 2) ease of use.

Short-term parking is designed to meet the needs of people visiting businesses and institutions, and others with similar needs—typically lasting up to two hours. Short-term users may be infrequent visitors to a location, so the parking installation needs to be readily visible and self-explanatory.

INVERTED U

POST & RING

CORRAL



SITE PLANNING

Location

Short-term bike parking should be visible from and close to the entrance it serves—50' or less is a good benchmark. Weather-protected parking makes bicycle transportation more viable for daily and year-round use, and it can reduce the motivation for users to bring wet bicycles into buildings. Area lighting is important for any location likely to see use outside of daylight hours.

Security

All racks must be sturdy and well-anchored, but location determines the security of short-term parking as much as any other factor. Users seek out parking that is visible to the public, and they particularly value racks that can be seen from within the destination. Areas with high incidence of bicycle theft may justify specific security features such as specialty racks, tamper-proof mounting techniques, or active surveillance.

Quantity

Many jurisdictions have ordinances governing bike parking quantity. APBP's full *Bicycle Parking Guidelines* offers complete recommendations for the amount and type of parking required in various contexts. In the absence of requirements, it's okay to start small—but bear in mind that perceived demand may be lower than the demand that develops once quality parking appears.

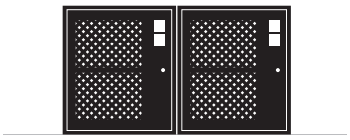
BIKE CORRALS

Some cities with limited sidewalk space and strong bicycle activity place bike parking in on-street "bike corrals" located in the street area adjacent to the curb. Bike corrals can sometimes make use of on-street areas that are unsuitable for auto parking. When replacing a single auto parking space, a corral can generally fit 8 to 12 bicycles. APBP's full *Bicycle Parking Guidelines* provides details about designing and siting bike corrals. **apbp.org**

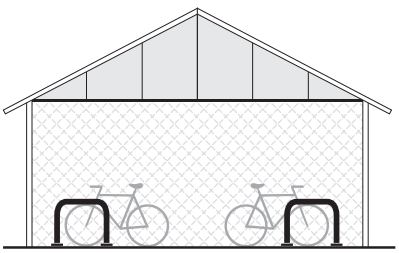
LONG-TERM PARKING

Users of long-term parking generally place high value on security and weather protection. Long-term parking is designed to meet the needs of employees, residents, public transit users, and others with similar needs. These users typically park either at home or at a routine destination such as a workplace. They often leave their bicycles unmonitored for a period of several hours or longer, so they require security and weather protection that let them park without unreasonable concern for loss or damage.

Long-term parking can take a variety of forms, including a room within a residential building or workplace, a secure enclosure within a parking garage, or a cluster of bike lockers at a transit center. Some long-term parking is open to the public—such as a staffed secure enclosure at a transit hub—and some of it is on private property with access limited to employees, residents, or other defined user groups.



BIKE LOCKERS



SHELTERED SECURE ENCLOSURE

SITE PLANNING

Location

Appropriate locations for long-term parking vary with context. Long-term parking users are typically willing to trade a degree of convenience for weather protection and increased security. Long-term installations emphasize physical security above public visibility. Signage may be needed for first-time users.

Security

Security is paramount for quality long-term parking. Access to parked bicycles can be limited individually (as with lockers) or in groups (as with locked bike rooms or other secure enclosures). Options for access control include user-supplied locks, keys, smart cards, and other technologies.

Quantity

Refer to local ordinances or the comprehensive APBP *Bicycle Parking Guidelines* to determine the amount and type of parking required for various contexts.

SPECIAL CONSIDERATIONS FOR LONG-TERM PARKING

In many ways, short-term and long-term parking function similarly and are served by the same guidelines. Some exceptions are noted below.

Density

The competition of uses for high-security and sheltered locations creates particular pressure on long-term parking to fit more bicycles in less space. When parking needs cannot be met with standard racks and spacing recommended in this guide, consider rack systems designed to increase parking density. See the high-density racks table on page 7. Note that increasing density without careful attention to user needs can create parking that excludes people because of age, ability, or bicycle type. This may result in people parking bicycles in other less desirable places or choosing not to bike at all.

Bicycle design variety

Long-term parking facilities should anticipate the presence of a variety of bicycles and accessories, including—depending on context—recumbents, trailers, children's bikes, long-tails, and others. To accommodate trailers and long bikes, a portion of the racks should be on the ground and should have an additional 36" of in-line clearance.

Performance criteria

The bike rack criteria in the next section apply to racks used in any installation, regardless of its purpose. Long-term installations often use lockers and group enclosures not discussed in this guide. Such equipment raises additional considerations that are discussed in detail in APBP's full *Bicycle Parking Guidelines*. **apbp.org**

INSTALLATION

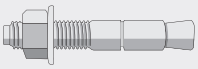
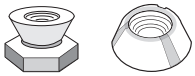
Selecting an appropriate installation surface and technique is key to creating bicycle parking that remains secure and attractive over time.

INSTALLATION SURFACE

A sturdy concrete pad is an ideal surface for installing bicycle parking. Other surfaces often encountered include asphalt, pavers, and soft surfaces such as earth or mulch. These surfaces can accommodate in-ground mounting or freestanding bike racks such as inverted-U racks mounted to rails. See APBP's *Bicycle Parking Guidelines* for details. **apbp.org**

INSTALLATION FASTENERS

When installing racks on existing concrete, consider the location and select appropriate fasteners. Drill any holes at least three inches from concrete edges or joints. Some locations benefit from security fasteners such as concrete spikes or tamper-resistant nuts on wedge anchors. Asphalt is too soft to hold wedge and spike anchors designed for use in concrete. Installing bike parking on asphalt typically requires freestanding racks and anchor techniques specific to asphalt.

FASTENERS		
CONCRETE SPIKE		Installs quickly in concrete with a hammer. Tamper-resistant. Removal may damage concrete and/or rack.
CONCRETE WEDGE ANCHOR		Allows for rack removal as needed. Not tamper-resistant, but can accommodate security nuts (below).
SECURITY NUTS		Use with concrete wedge anchors. Security nuts prevent removal with common hand tools.

INSTALLATION TECHNIQUES

When installing racks on existing concrete, choose those with a surface-mount flange and install with a hammer drill according to the specifications of the mounting hardware selected. When pouring a new concrete pad, consider bike parking fixtures designed to be embedded in the concrete. Because replacing or modifying an embedded rack is complicated and costly, this installation technique requires particular attention to location, spacing, rack quantity, and material.

BICYCLE RACK SELECTION

PERFORMANCE CRITERIA FOR BIKE PARKING RACKS

These criteria apply to any rack for short- or long-term use.

CRITERIA	DETAILS
Supports bike upright without putting stress on wheels	The rack should provide two points of contact with the frame—at least 6" apart horizontally. Or, if a rack cradles a bicycle's wheel, it must also support the frame securely at one point or more. The rack's high point should be at least 32".
Accommodates a variety of bicycles and attachments	The racks recommended on page 6 ("racks for all applications") serve nearly all common bike styles and attachments—if installed with proper clearances (see placement section). Avoid designs and spacing that restrict the length, height, or width of bicycles, attachments, or wheels.
Allows locking of frame and at least one wheel with a U-lock	A closed loop of the rack should allow a single U-lock to capture one wheel and a closed section of the bike frame. Rack tubes with a cross section larger than 2" can complicate the use of smaller U-locks.
Provides security and longevity features appropriate for the intended location	Steel and stainless steel are common and appropriate materials for most general-use racks. Use tamper-resistant mounting hardware in vulnerable locations. Rack finish must be appropriate to the location (see materials and coatings section).
Rack use is intuitive	First-time users should recognize the rack as bicycle parking and should be able to use it as intended without the need for written instructions.

RACK STYLES

The majority of manufactured bike racks fall into one of the categories on pages 6-8. Within a given style, there is wide variation among specific racks, resulting in inconsistent usability and durability. APBP recommends testing a rack before committing broadly to it.

RACKS FOR ALL APPLICATIONS

When properly designed and installed, these rack styles typically meet all performance criteria and are appropriate for use in nearly any application.

INVERTED U
also called staple, loop

Common style appropriate for many uses; two points of ground contact. Can be installed in series on rails to create a free-standing parking area in variable quantities. Available in many variations.

POST & RING

Common style appropriate for many uses; one point of ground contact. Compared to inverted-U racks, these are less prone to unintended perpendicular parking. Products exist for converting unused parking meter posts.

WHEELWELL-SECURE

Includes an element that cradles one wheel. Design and performance vary by manufacturer; typically contains bikes well, which is desirable for long-term parking and in large-scale installations (e.g. campus); accommodates fewer bicycle types and attachments than the two styles above.

This guide analyzes the most common styles of bike racks, but it is not exhaustive. Use the performance criteria on page 5 to evaluate rack styles not mentioned. Custom and artistic racks can contribute to site identity and appearance, but take care that such racks don't emphasize appearance over function or durability.

HIGH-DENSITY RACKS

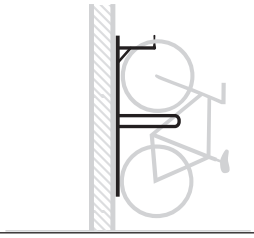
These rack styles do not meet all performance criteria but may be appropriate in certain constrained situations.

High-density rack systems can maximize the use of limited parking space, but they don't work for all users or bicycles. If installing these racks, reserve additional parking that accommodates bicycles with both wheels on the ground for users who are not able to lift a bicycle or operate a two-tier rack, or for bikes that are not compatible with two-tier or vertical racks.

STAGGERED WHEELWELL-SECURE

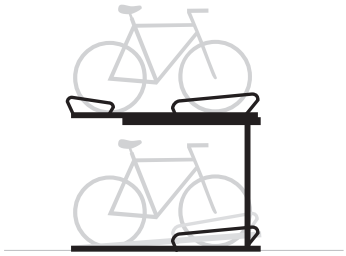
Variation of the wheelwell-secure rack designed to stagger handlebars vertically or horizontally to increase parking density. Reduces usability and limits kinds of bikes accommodated, but contains bikes well and aids in fitting more parking in constrained spaces.

VERTICAL



Typically used for high-density indoor parking. Not accessible to all users or all bikes, but can be used in combination with on-ground parking to increase overall parking density. Creates safety concerns not inherent to on-ground parking.

TWO-TIER



Typically used for high-density indoor parking. Performance varies widely. Models for public use include lift assist for upper-tier parking. Recommend testing before purchasing. Creates safety concerns not inherent to on-ground parking, and requires maintenance for moving parts.

RACKS TO AVOID

Because of performance concerns, APBP recommends selecting other racks instead of these.

WAVE
also called undulating or serpentine

Not intuitive or user-friendly; real-world use of this style often falls short of expectations; supports bike frame at only one location when used as intended.

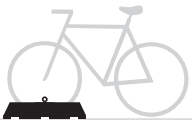
SCHOOLYARD
also called comb, grid

Does not allow locking of frame and can lead to wheel damage. Inappropriate for most public uses, but useful for temporary attended bike storage at events and in locations with no theft concerns. Sometimes preferred by recreational riders, who may travel without locks and tend to monitor their bikes while parked.

COATHANGER

This style has a top bar that limits the types of bikes it can accommodate.

WHEELWELL



Racks that cradle bicycles with only a wheelwell do not provide suitable security, pose a tripping hazard, and can lead to wheel damage.

BOLLARD

This style typically does not appropriately support a bike's frame at two separate locations.

SPIRAL

Despite possible aesthetic appeal, spiral racks have functional downsides related to access, real-world use, and the need to lift a wheel to park.

SWING ARM SECURED

These racks are intended to capture a bike's frame and both wheels with a pivoting arm. In practice, they accommodate only limited bike types and have moving parts that create unneeded complications.

RACK MATERIALS & COATINGS

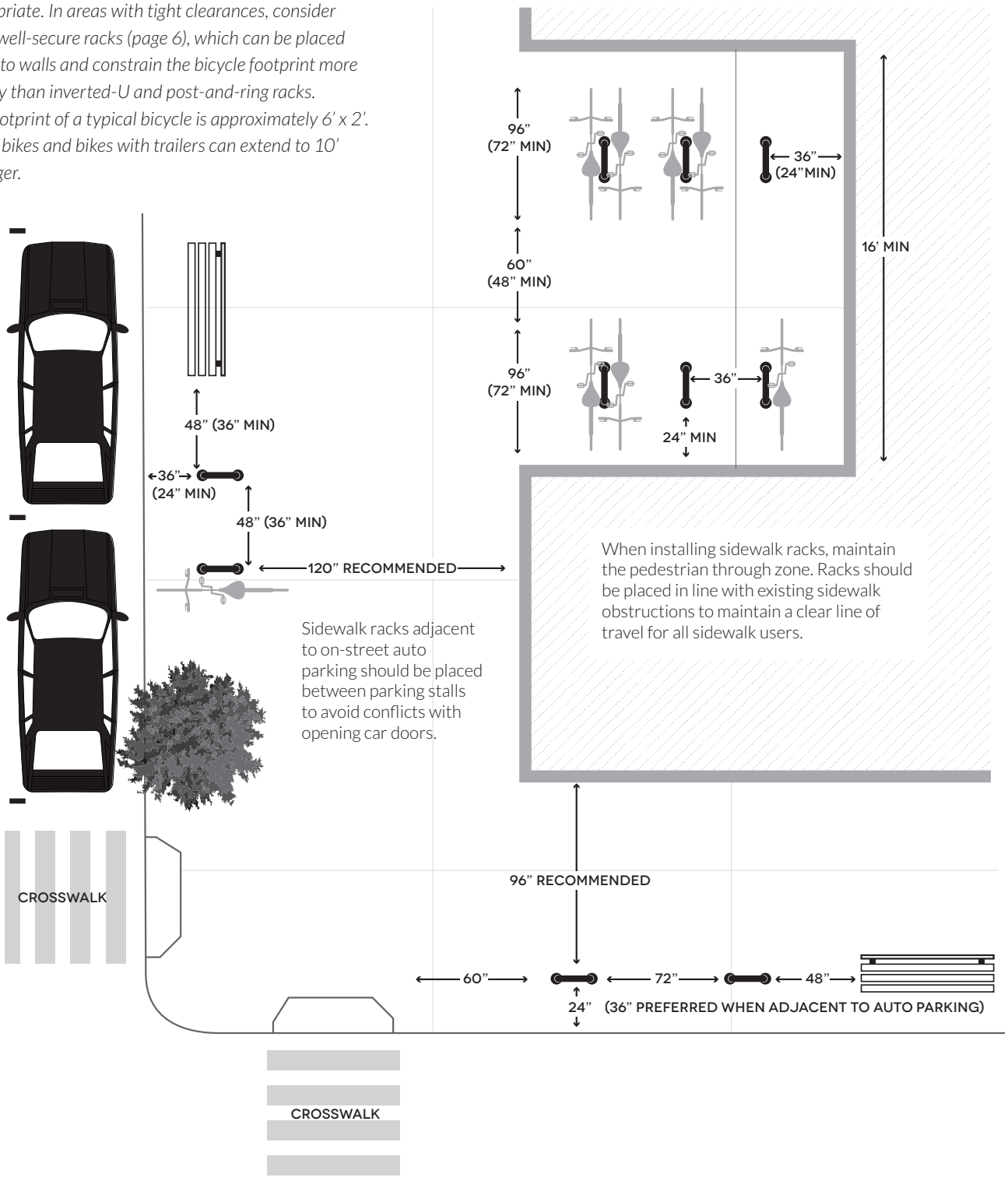
Most bicycle parking racks are made of carbon steel or stainless steel. Carbon steel requires a surface coating to resist rust while appropriate grades of stainless steel need no coating. Not all materials and coatings with the same name perform equally. Square tubing provides a security advantage as round tubing can be cut quietly with a hand-held pipe cutter. Before purchasing racks, talk to suppliers about your particular conditions and choose a material and coating that suit your needs. The following are common choices, depending on local considerations and preferences.

RACK MATERIAL – COATING	RELATIVE PURCHASE COST	DURABILITY	CAUTIONS
Carbon steel - galvanized	Usually lowest	Highly durable and low-maintenance; touch-up, if required, is easy and blends seamlessly	Utilitarian appearance; can be slightly rough to the touch
Carbon steel - powder coat* (TGIC or similar)	Generally marginally higher than galvanized	Poor durability	Requires ongoing maintenance; generally not durable enough for long service exposed to weather; not durable enough for large-scale public installations
Carbon steel - thermoplastic	Intermediate	Good durability	Appearance degrades over time with scratches and wear; not as durable as galvanized or stainless
Stainless steel - no coating needed, but may be machined for appearance	Highest	Low-maintenance and highest durability; most resistant to cutting	Can be a target for theft because of salvage value; maintaining appearance can be difficult in some locations

** When applied to carbon steel, TGIC powder coat should be applied over a zinc-rich primer or galvanization to prevent the spread of rust beneath the surface or at nicks in the finish.*

PLACEMENT

The following minimum spacing requirements apply to some common installations of fixtures like inverted-U or post-and-ring racks that park one bicycle roughly centered on each side of the rack. Recommended clearances are given first, with minimums in parentheses where appropriate. In areas with tight clearances, consider wheelwell-secure racks (page 6), which can be placed closer to walls and constrain the bicycle footprint more reliably than inverted-U and post-and-ring racks. The footprint of a typical bicycle is approximately 6' x 2'. Cargo bikes and bikes with trailers can extend to 10' or longer.



APPENDIX E

Recommendation
Cost Range Estimates

Safe Routes to School Walk Audit Report and Active Transportation Action Plan

Appendix E: Recommendation Cost Range Estimates

Cost estimate was one of many factors considered when prioritizing recommendations for Napa County Safe Routes to School Walk Audit reports. Recommendations in which a high cost estimate would considerably delay implementation of the recommendation may have been given a lower priority level in order to prioritize recommendations that are lower cost and therefore more likely to be installed more quickly. Cost was considered on a high-level scale; real cost ranges of recommendations may differ from cost range estimates included in Walk Audit reports.

Cost range estimates for Safe Routes to School Walk Audit recommendations are as follows:

$	< $25,000
$$	Between $25,000 and $250,000
$$$	$250,000 to $1 million
$$$$	> $1 million

APPENDIX F

Next Steps

Safe Routes to School Walk Audit Report and Active Transportation Action Plan

From Recommendations to Action: Next Steps

Napa County Bicycle Coalition (NCBC) has concluded the final task under the Napa County Safe Routes to School Program in coordination with the Napa County Office of Education, funded under the One Bay Area Grant and the Active Transportation Program.

Evaluation of active transportation barriers at school sites are complete and final reports of recommendations for each school in Napa County will be published in the spring of 2022. The NCBC team is already planning the next phase of Safe Routes to School that will help bring these recommendations into reality. Supported by a "Quick Strike" grant through the Metropolitan Transportation Commission (MTC), NCBC will continue its SRTS work over the course of this next year.

NCBC SRTS Quick Strike Program Elements (2022-2023):

- Engage parents in advocating for implementing the recommendations. Hold safety summits at various school sites that raise awareness of the recommendations and provide a forum for parents to discuss strategies and to plan next steps. Work with schools and other stakeholders to implement recommendations. Build a Safe Routes to School (SRTS) Advisory Committee, including "parent champions" from key school sites, to help guide the SRTS program into the next phase of growth and engagement and to help ensure the long-term viability of the program, providing a structure both for stakeholder feedback and input, as well as for increased local investment in future program activities.
    - Action Steps:
        - Hold up to seven safety summits at various school sites
        - Form SRTS advisory committee
- Provide education and encouragement programming at elementary and middle schools that includes bike rodeos throughout the year, Bike Month (and Bike to School Day) in the spring, and Walk and Roll to School Day in the fall. This programming aims to increase the number of students who walk or bike to school and to ensure that, as barriers are removed and facilities are improved, youth have the skills and confidence to take advantage of improvements.
    - Action Steps:
        - Hold up to 14 Bike Rodeos at elementary and middle schools
        - Provide outreach and support for Walk and Roll to School Day and Bike Month activities at up to seven school sites
        - Support local Agricultural & Hospitality Industry workers with bicycle safety education
- Conduct community-based safety education programming that reaches identified populations of concern. Through bilingual Family Biking Workshops, community rides in partnership with other local organizations, and safety education outreach to agricultural

and hospitality workers, NCBC will tailor our programming to help engage the full spectrum of our community.

    - Action Steps:
        - Conduct up to nine bilingual Family Biking Workshops
        - Conduct up to six community events and rides

- Secure future funding for the Safe Routes to School Partnership (SRTS). We believe that every student should be able to safely walk or ride a bike to school. The SRTS program provides vital safety education, encouragement, and community engagement programs to thousands of students annually while advocating for facilities that make active transportation safe and accessible. SRTS will be a key force in helping to make the Walk Audit recommendations a reality. Napa County is one of the only counties in the region that lacks dedicated, long-term funding for these programs and efforts, and without that support implementing the recommendations will face more barriers.
    - Action Steps:
        - Apply for competitive and discretionary grant funding
        - Seek funding support from jurisdictions
        - Seek funding support from community health
        - Provide annual program reports to stakeholders