

CITY OF REDDING

PEDESTRIAN SAFETY ASSESSMENT

Issues, Opportunities, and Enhancement Strategies



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TECHNOLOGY TRANSFER PROGRAM



**CITY OF REDDING
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APRIL 2010

FINAL REPORT

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¹ Charlie Alexander, of Fehr & Peers, was a contributing member of the PSA team for this study.

EXECUTIVE SUMMARY

The City of Redding requested that the Technology Transfer Program of the Institute of Transportation Studies at University of California, Berkeley conduct a Pedestrian Safety Assessment (PSA) study. A team of two pedestrian safety experts conducted the PSA for Redding in the spring of 2010 and prepared this report. The objectives of the PSA are to improve pedestrian safety and to enhance walkability and accessibility for all pedestrians in Redding.

Redding has a population of approximately 90,000 residents. Based on the 2008 California Office of Traffic Safety (OTS) safety rankings of California cities, Redding ranked 40th out of 103 California cities in the same population group for the number of pedestrian collisions by average population (with 1st being the worst and 103rd the best) in the “number of collisions involving pedestrians” category. This ranking is based on rate of collisions per “1000 daily-vehicle-miles-of-travel” and per “1000 average population”. From 2003 to 2008, the highest number of pedestrian-vehicle collisions (5) occurred at two intersections: Lake Boulevard/Masonic Avenue and Market Street/Grange Street. *Chapter 2* provides an overview of collision data for the City, including maps of pedestrian-vehicle collision locations.

The remainder of this report presents the findings and suggestions for potential improvement derived from:

- Benchmarking analysis of the City’s existing pedestrian programs, policies, and practices (*Chapter 3*)
- Field walking audit at various locations in Redding (*Chapter 4*)

Benchmarking Analysis of Policies, Programs, and Practices

A pedestrian safety interview was conducted with City staff in advance of the PSA field visit to gain an understanding of the existing pedestrian policies, programs, and practices in Redding. This interview formed the basis for a benchmarking process that categorized the City’s programs, practices, and policies into three groups:

- Key strength (areas where the City is exceeding national best practices)
- Enhancement (areas where the City is meeting best practices)
- Opportunity (areas where the City could potentially improve)

The benchmarking analysis aims to provide the City with information on current best practices and how the City compares. Cities have differing physical, demographic, and institutional characteristics that may make certain goals or policies more appropriate in some jurisdictions than others. Ultimately, City staff may determine where resources and efforts are best placed for meeting local development and infrastructure goals for pedestrians.

A discussion of the City’s pedestrian safety policies, programs, and practices, and ideas for enhancement is presented in *Chapter 3*. The suggestions for further enhancement to the City’s existing programs and policies for each group described above include the following:

Key Strengths

The City is excelling in these areas:

- Implementation of Americans with Disabilities Act (ADA) Improvements
- Collision History Reviews and Collision Reporting Practices
- Proper Use of Pedestrian Traffic Control Devices (Signs, Markings, and Signals)
- Proactive Approach to Institutional Challenges
- Safe-Routes-to-School Program and Grant Funding
- General Plan: Densities and Mixed-Use Zones
- Pedestrian-Oriented Specific Plans, Redevelopment Areas, and Overlay Zones
- Pedestrian-Oriented Historic Sites
- Street Tree Requirements
- Economic Vitality Practices
- Coordination with Health Agencies

Enhancement Area Suggestions

Collection of Pedestrian Volumes

- Consider routinely collecting pedestrian and bicycle volumes by requiring them to be conducted in conjunction with manual intersection counts; geo-code pedestrian volume data with GIS software along with other data such as pedestrian control devices and collisions

Pedestrian-Oriented Speed Limits and Speed Surveys

- Consider pedestrian volumes when setting speed limits and employ traffic calming strategies in locations where speed surveys suggest traffic speeds are too high for pedestrian areas
- Ensure design standards/ design speeds in pedestrian areas do not contribute to a routine need for traffic calming; consider establishing 15 MPH school zones

Inventory of Sidewalks, Informal Pathways, and Key Pedestrian Opportunity Areas

Geo-code the existing inventory of sidewalks, and add informal pathways and key pedestrian opportunity areas

Traffic Calming Programs

Consider formalizing the City's traffic calming practices and expanding the traffic calming toolbox

Pedestrian Safety Education Program

- Develop further pedestrian safety education programs by expanding the walking component of the Policies for Livable Active Communities and Environments (PLACE) program and by developing educational campaigns

Attention to Crossing Barriers

- Identify and create a GIS inventory of pedestrian barriers, and develop policies for reducing the barriers through prioritizing projects and requirements with future development

Crosswalk Installation, Removal, and Enhancement Policy

- Develop a crosswalk enhancement policy to reflect best practices and recent research with respect to the installation, removal, and enhancement of crosswalks, which includes removing crosswalks only as an option of last resort and providing midblock crossings where they serve pedestrian desire lines. Consider adopting the "triple four" crosswalk striping treatment

Adoption of Routine Accommodations for New Development

- Consider establishing a Complete Streets Policy and accommodating all modes in standard cross-sections for collectors and arterials

Design Policies and Development Standards

- Develop a Streetscape and/or Landscape Architecture Master Plan for the City; consider form-based zoning to influence the "look and feel" of neighborhoods throughout the City

Adoption of Bicycle Parking Requirements

- Adopt bicycle parking requirements by developing a bicycle parking ordinance providing requirements for location, style, and type of bicycle parking for existing uses and all new development

Adoption of Open Space Requirements

- Consider establishing City-wide in-lieu fees or other mechanisms for ensuring open space needs are addressed with all development

Use of Neighborhood-Sized Schools

- Work with the local school districts to establish a policy on neighborhood-sized and oriented schools as part of a Safe-Routes-to-School policy

Enforcement

- Implement sustained enforcement efforts and involve the media; use enforcement as an opportunity for education by distributing pedestrian safety pamphlets in-lieu of, or in addition to, citations

Pedestrian-Oriented Traffic Signal and Stop Sign Warrants

- Consider developing City-specific warrants for installation of signals and stop signs for adoption by City Council

Use of Leading Pedestrian Intervals

- Consider installing Leading Pedestrian Intervals (LPI)s in areas of high pedestrian activity throughout Redding, providing a right-turn on red restriction as necessary

Opportunity Area Suggestions

Updated ADA Transition Plan for Streets and Sidewalks

- Adopt an ADA Transition Plan for the public right-of-way to reflect current ADA standards and identify facilities with ADA deficiencies, and formalize the position of ADA Coordinator

Pedestrian Safety Program and Walking Audits

- Consider establishing a Citywide pedestrian safety program, to include regular walking audits, building off the PLACE Program and this PSA

Preparation of a Pedestrian Master Plan

- Develop a Pedestrian Master Plan to prioritize and implement capital and maintenance projects

Use of Newspaper Rack Ordinance

- Establish a Newspaper Rack Ordinance, in coordination with the General Plan update

Use of Street Furniture Requirements

- Establish a Street Furniture Ordinance, in coordination with the General Plan update

Pedestrian/Bicycle Coordinator

- Consider employing a full-time City Pedestrian/Bicycle Coordinator

Formal Advisory Committee

- Consider establishing a formal citizen's advisory committee(s) to address bicycle and pedestrian needs

Travel Demand Management Program

- Hire or identify a part-time TDM Coordinator and develop a TDM policy which incentivizes non-auto travel options (e.g., commuter checks, parking cash-out programs, transit passes, etc.) and creates support for major employers to implement a TDM program (e.g., emergency ride home programs)

Walking Audit Suggestions for Potential Improvement

A walking audit was conducted at various locations, as determined in coordination with City staff. Six focus areas were visited where the walking audit identified positive practices, as well as pedestrian safety and accessibility issues. The focus areas were:

1. Downtown Redding
2. Sacramento River Trail Head
3. Market Street Bridge
4. McDonalds Chapel
5. Beverly Crossing
6. End of Trail: Dana Drive to Downtown

The observations made during the walking audit were used to suggest policies and physical improvements that could enhance pedestrian safety and accessibility, and in some instances, economic vitality. Key findings from the Redding walking audit include:

- The City has a track record of implementing effective pedestrian facilities. The City has opened up the Downtown Mall with good pedestrian connections to the surrounding street system, and streetscape improvements have been made along portions of Market Street, Yuba Street, and Court Street that make the street more inviting to pedestrian activity.
- Additional opportunities for improving pedestrian accessibility and safety downtown would be realized by implementing road diets on East, Placer, South and Court Streets and making changes to SR 273 through downtown. Significant pedestrian improvements may also be made on Market Street north of the Downtown Mall.

- Relocation of Riverside Drive would allow improvement of pedestrian and bicycle connectivity between downtown and the Sacramento River Trail Head. A pedestrian refuge island on Court Street and other improvements would also be needed.
- It may be possible to improve pedestrian and bicycle access along the Market Street Bridge if a suspended or cantilevered Class I bike path could be attached to the existing bridge.
- It may be possible to improve the pedestrian and bicycle linkage between downtown and the Redding Convention Center if agreement can be obtained from the property owner and if a suitable trail connection could be developed.
- The Beverly Street pedestrian crossing of East Cypress Avenue could be significantly improved by installing a pedestrian refuge island, relocating the crosswalk and a bus stop and providing warning devices to draw attention to the crossing.
- The Sacramento River Trail could be better integrated with the existing transportation system by providing a connection to Browning Street and by extending the bike trail to the Mt. Shasta Mall Driveway along Dana Drive.

Detailed suggestions are summarized graphically in figures in *Chapter 4* (corresponding to the locations of walking audits). A narrative description of walking audit observations and suggestions is also summarized in *Chapter 4*.

Many suggestions in this report are appropriate for grant applications, including Office of Traffic Safety (OTS) or Safe-Routes-to-School funding. The suggestions may also be used as the starting point for a *Pedestrian Master Plan*, a document that would set forth pedestrian and streetscape policies for the City and identify and prioritize capital improvement projects.

The suggestions presented in this report are based on limited field observations and time spent in the City of Redding by the PSA evaluators. These suggestions, which are based on general knowledge of best practices in pedestrian design and safety, are intended to guide City staff in making decisions for future safety improvement projects in the City, and they may not incorporate all factors which may be relevant to the pedestrian safety issues in the City.

As this report is conceptual in nature, conditions may exist in the focus areas that were not observed and may not be compatible with suggestions in this report. Before finalizing and implementing any physical changes, City staff may choose to conduct more detailed studies or further analysis to refine or discard the suggestions in this report, if they are found to be contextually inappropriate or appear not to improve pedestrian safety or accessibility due to conditions including, but not limited to, high vehicular traffic volume or speeds, physical limitations on space or sight distance, or other potential safety concerns.

1. INTRODUCTION

1.1 OBJECTIVE

The City of Redding requested that the Technology Transfer Program of the Institute of Transportation Studies at University of California, Berkeley conduct a Pedestrian Safety Assessment (PSA) study. The objectives of the PSA are to improve pedestrian safety and to enhance walkability and accessibility for all pedestrians in Redding.



Redding City Hall

Image source: www.ci.redding.ca.us

1.2 EVALUATION APPROACH

Prior to visiting the City, the PSA Team (Team) conducted a pre-visit telephone interview with City staff on January 21, 2010. The results from this interview provided input into the benchmarking analysis. The Team visited the City on February 16, 2010. A meeting was held with the City staff on the first day of the visit to discuss initial results from the benchmarking analysis and logistics for the field visit.

The Team conducted walking field audits at a number of locations in the City. Walking audit participants included City staff from the Transportation and Engineering Department, Redevelopment Agency, and Development Services Department. Additionally, representatives from Caltrans, Shasta County Public Health, the McConnell Foundation, and Viva Downtown also attended the walking audit. The walking audits began with an introduction to pedestrian safety, where a series of photograph examples was presented to illustrate typical areas of concern for walkability as well as best practices for pedestrian safety and accommodation. The Team held an exit meeting with participants from the walking audit at the end of the visit. This meeting included a presentation of the draft suggestions for site-specific improvements based on the results of the walking audits.

1.3 ORGANIZATION OF THIS REPORT

Chapter 2 presents background information on pedestrian safety in Redding, including the safety rankings for Redding, the locations of the highest pedestrian-involved collisions, and locations where pedestrian fatalities occurred (from 2003 to 2008). *Chapter 3* presents the findings and suggestions from the benchmarking analysis. *Chapter 4* presents the findings and suggestions from the walking audit and illustrations of the site-specific suggestions.

There are two appendices at the end of the report: Appendix A presents a glossary of pedestrian improvement options, and Appendix B is a resource list.

1.4 ACKNOWLEDGEMENTS

Redding staff members contributed to the wide range of topics addressed in this report. In particular, they organized a successful field visit, which included several City staff member and local agency participants:

- Chuck Aukland, City of Redding Transportation and Engineering Department
- Brian Crane, City of Redding Transportation and Engineering Department
- Al Ortiz, City of Redding Transportation and Engineering Department
- Gary Otremba, City of Redding Transportation and Engineering Department
- Dennis Russo, City of Redding Transportation and Engineering Department
- Zach Bonnin, City of Redding Transportation and Engineering Department
- Steve Bade, City of Redding Redevelopment Agency
- Linda Burke, City of Redding Development Services Department
- Steve Pendergast, California Department of Transportation
- Brian Sindt, The McConnell Foundation
- John Truitt, Viva Downtown

1.5 DISCLOSURES

The benchmarking analysis aims to provide the City with information on current best practices and how the City compares. Cities have differing physical, demographic, and institutional characteristics that may make certain goals or policies more appropriate in some jurisdictions than others. Ultimately, City staff may determine where resources and efforts are best placed for meeting local development and infrastructure goals for pedestrians.

The suggestions presented in this report are based on limited field observations and time spent in the City of Redding by the PSA evaluators. These suggestions, which are based on general knowledge of best practices in pedestrian design and safety, are intended to guide City staff in making decisions for future safety improvement projects in the City, and they may not incorporate all factors which may be relevant to the pedestrian safety issues in the City.

As this report is conceptual in nature, conditions may exist in the focus areas that were not observed and may not be compatible with suggestions in this report. Before finalizing and implementing any physical changes, City staff may choose to conduct more detailed studies or further analysis to refine or discard the suggestions in this report, if they are found to be contextually inappropriate or appear not to improve pedestrian safety or accessibility due to conditions including, but not limited to, high vehicular traffic volume or speeds, physical limitations on space or sight distance, or other potential safety concerns.

2. BACKGROUND

The City of Redding is located in Shasta County and is the regional hub of California's northern Sacramento Valley with approximately 90,000 residents. Redding has developed such that residents' primary means of transportation is the private automobile. However, Redding has a historical downtown with a grid network and the City is conscious of its pedestrian activity and has been striving to accommodate both existing and future pedestrian demand, with efforts including:

- Completing construction of the Sundial Bridge at Turtle Bay, which provides pedestrian and bicyclist access across the Sacramento River, in 2004
- Maintaining a walkable downtown outdoor mall area
- Developing an extensive regional trail system, including the Sacramento River Trail
- Using high visibility crosswalk striping

2.1 PEDESTRIAN SAFETY OVERVIEW FOR REDDING

Based on the California Office of Traffic Safety (OTS) ranking statistics, the City ranked 40th out of 103 California cities in the same population group for the number of pedestrian collisions per population in 2008 (with 1st position being the worst ranking). From 2003 to 2008, 164 pedestrian collisions occurred in the City, 13 of which resulted in pedestrian fatalities.

The 2008 OTS safety rankings for Redding are shown in Tables 2-1 and 2-2. A city with the worst safety record (i.e., the highest rate) receives rank #1. On the other hand, higher numeric ranks indicate better safety records (i.e., lower rates).

| TABLE 2-1. REDDING SUMMARY STATISTICS | | | | |
|---------------------------------------|--------|------------|------------------|------------------------------------|
| Year | County | Population | Population Group | Daily Vehicle Miles Traveled (VMT) |
| 2008 | Shasta | 90,545 | C | 1,192,527 |

Source: California Office of Traffic Safety, www.ots.ca.gov/Media_and_Research/Rankings/default.asp

TABLE 2-2. REDDING TRAFFIC COLLISIONS AND RANKINGS, 2008

| Type of Collision | Victims Killed and Injured | Ranking by Daily Vehicle Miles Traveled (of 52 cities) | Ranking by Average Population (of 52 cities) |
|-------------------------------------|----------------------------|--|--|
| Total Fatal and Injury | 725 | 17/103 (17 percentile) | 2/103 (2 percentile) |
| Alcohol Involved | 94 | 9/103 (9 percentile) | 1/103 (1 percentile) |
| HBD (Had Been Drinking) Driver < 21 | 10 | 19/103 (18 percentile) | 7/103 (7 percentile) |
| HBD Driver 21 - 34 | 22 | 28/103 (27 percentile) | 7/103 (7 percentile) |
| Pedestrians | 29 | 57/103 (55 percentile) | 40/103 (39 percentile) |
| Pedestrians < 15 | 1 | 100/103 (97 percentile) | 100/103 (97 percentile) |
| Pedestrians 65+ | 5 | 35/103 (34 percentile) | 24/103 (23 percentile) |
| Bicyclists | 30 | 61/103 (59 percentile) | 36/103 (35 percentile) |
| Bicyclists < 15 | 8 | 44/103 (43 percentile) | 24/103 (23 percentile) |
| <i>Composite</i> | | <i>13/103 (13 percentile)</i> | <i>2/103 (2 percentile)</i> |
| Speed Related | 179 | 6/103 (6 percentile) | 1/103 (1 percentile) |
| Nighttime (9:00pm - 2:59am) | 56 | 75/103 (73 percentile) | 4/103 (4 percentile) |
| Hit and Run | 19 | 75/103 (73 percentile) | 62/103 (60 percentile) |
| DUI Arrests | 688 | - | 97/102 (95 percentile) |

Source: California Office of Traffic Safety, www.ots.ca.gov/Media_and_Research/Rankings/default.asp

Based on these rankings, the areas of highest concern for traffic safety in Redding in 2008 were:

- Alcohol Involved (all age groups)
- Pedestrians
- Pedestrians over 65
- Bicyclists (all age groups)
- Speed Related
- Nighttime collisions

This assessment and report emphasize safety issues associated with pedestrians, including a focus on older and younger pedestrians through suggested treatments such as road diets, bulbouts, and median refuge islands. Many of the suggestions in this report may also improve safety for bicyclists in Redding.

2.2 HIGH PEDESTRIAN COLLISION LOCATIONS

The California Highway Patrol provided pedestrian-vehicle collision data for the period from January 2003 to April 2008. Locations with two or more pedestrian-vehicle collisions are shown in Table 2-3. Primary and cross street locations for the 13 pedestrian fatalities are presented in

Table 2-4. Figure 2-1 on the following page provides a map of pedestrian-vehicle collisions from 2003 to 2008.

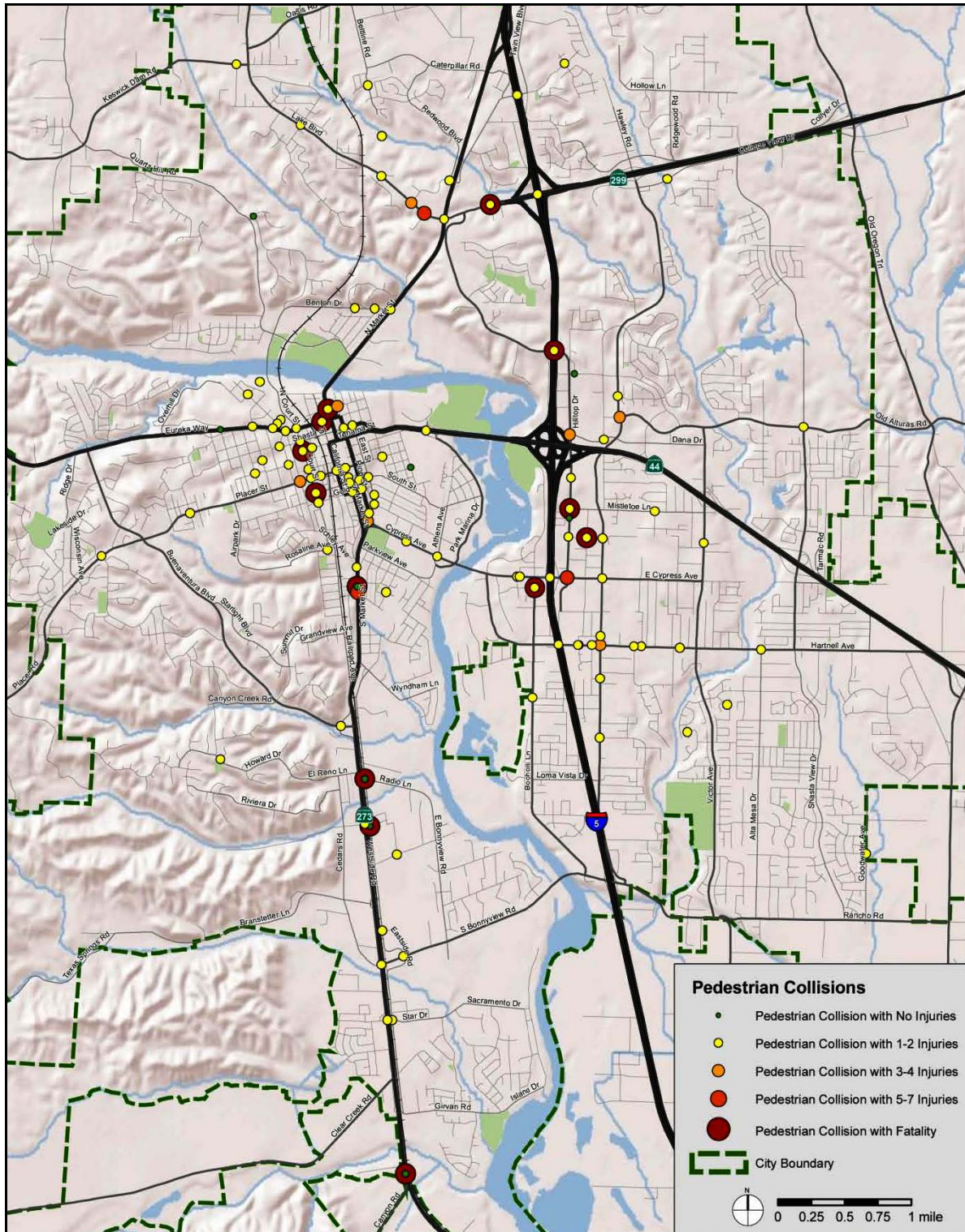
| TABLE 2-3 | |
|--|-----------------------------|
| LOCATIONS WITH TWO OR MORE PEDESTRIAN-VEHICLE COLLISIONS (JANUARY 2003 TO APRIL 2008) | |
| Intersection | Number of Collisions |
| Lake Boulevard/Masonic Avenue | 5 |
| Market Street (SR-273)/Grange Street | 5 |
| Placer Street/West Street | 4 |
| Churn Creek Road/Hartnell Avenue | 3 |
| Churn Creek Road/Old Alturas Road | 3 |
| Hilltop Drive/Cypress Avenue | 3 |
| Lake Boulevard/Northpoint Drive | 3 |
| Eureka Way/California Avenue | 2 |
| Beltline Road/Ormsby Way | 2 |
| Benton Drive/Delta Street | 2 |
| Centerbury Drive/Cherrywood Drive | 2 |
| Churn Creek Road/Lancers Lane | 2 |
| Court Street/Yuba Street | 2 |
| Cypress Avenue/Athens Avenue | 2 |
| Cypress Avenue/Hilltop Drive | 2 |
| Hartnell Avenue/Northwoods Way | 2 |
| I-5/Twin View Boulevard | 2 |
| Lake Boulevard/N. Boulder Drive | 2 |
| Placer Street/Continental Street | 2 |
| Market Street (SR-273)/Westwood Avenue | 2 |
| Shasta Street/Court Street | 2 |
| Tehama Street/Oregon Street | 2 |
| Trinity Street/Pine Street | 2 |

Source: California Highway Patrol (SWITRS).
 Notes: This list is based on number of collisions and does not adjust for vehicle or pedestrian volumes (exposure).
 Mid-block collisions were mapped to the nearest intersection.

| TABLE 2-4 | |
|---|-----------------------------|
| PEDESTRIAN FATALITY LOCATIONS (JANUARY 2003 TO APRIL 2008) | |
| Intersection | Number of Fatalities |
| Bechelli Lane/Leila Avenue | 1 |
| Court Street/South Street | 1 |
| Court Street/Tehama Street | 1 |
| Eastside Road/Radio Lane | 1 |
| Eastside Road/Wilsey Street | 1 |
| Eureka Way/California Avenue | 1 |
| Hilltop Drive/Mistletoe Avenue | 1 |
| I-5/Hilltop Drive | 1 |
| Industrial Street/Larkspur Lane | 1 |
| Lake Boulevard/Boulder Drive | 1 |
| Market Street (SR-273)/Trinity Street | 1 |
| Market Street (SR-273)/Canyon Road | 1 |
| Market Street (SR-273)/Spruce | 1 |
| Source: California Highway Patrol (SWITRS)s | |

Based on the collision data, high collision corridors include Court Street, California Street, Market Street, Hilltop Drive, Lake Boulevard, and Hartnell Avenue. This pedestrian safety assessment addresses prototypical locations on many of the high collision corridors in the City, including Court Street, Market Street, and Hilltop Drive.

Figure 2-1: Pedestrian-Vehicle Collisions Resulting in Injury or Fatality, 2003 to 2008



3. BENCHMARKING ANALYSIS RESULTS AND SUGGESTIONS FOR POTENTIAL IMPROVEMENT

Prior to the visit to the City, the PSA team conducted an in-depth telephone interview with City staff regarding the City’s pedestrian safety policies, programs, and practices. The City’s responses were analyzed with a benchmarking matrix, as shown in Table 3-1. The City’s policies, programs, and practices were compared with national best practices. The benchmarking analysis categorized the City’s programs, practices, and policies into three groups:

- Key strength (areas where the City is exceeding national best practices)
- Enhancement (areas where the City is meeting best practices)
- Opportunity (areas where the City could potentially improve)

The items in Table 3-1 are further elaborated in the following sections. The City may select suggestions for implementation based on local priorities. The PSA Team presented the results of this benchmarking analysis to City staff on first day of the field visit.

| TABLE 3-1 SUMMARY OF PROGRAMS, POLICIES, AND PRACTICES BENCHMARKING ANALYSIS FOR REDDING | | | |
|---|---|---|---|
| Benchmark Topic | Key Strength | Enhancement | Opportunity |
| Implementation of Americans with Disabilities Act (ADA) Improvements | Uses state-of-the- practice ADA improvements with consistent installation practices | Has clear design guidelines but no regular practices for ADA compliance | Has minimal design guidelines and practices related to ADA requirements |
| Collision History and Collision Reporting Practices | Creates annual reports or employs other comprehensive monitoring practice | Reviews data only following fatalities or other high-profile incident | Does not have set practices for data review |
| Pedestrian Traffic Control Audit (Signs, Markings, and Signals) | Maintains an inventory of pedestrian signs, markings, and signals | Does not have an inventory of signs, markings, and signals | N/A |
| Proactive Approach to Institutional Challenges | Has identified obstacles and has implemented efforts to overcome barriers | Has identified obstacles | Does not have any identified obstacles |
| Safe-Routes-to-School Program and Grant Funding | Has a Safe Routes to Schools program and funding for recent projects | Has a Safe Routes to Schools program but has not obtained funding for recent projects | Does not have a Safe Routes to Schools program |
| General Plan: Densities and Mixed-Use Zones | Has moderate to high densities in the CBD and mixed use zones | Has moderate densities with separate uses | Has low densities with separate uses |

**TABLE 3-1
 SUMMARY OF PROGRAMS, POLICIES, AND PRACTICES BENCHMARKING ANALYSIS FOR REDDING**

| Benchmark Topic | Key Strength | Enhancement | Opportunity |
|---|--|---|--|
| Specific Plans, Redevelopment Areas, Overlay Zones | Pedestrian-oriented design, "walkability", or place-making is stressed in the Plans | Plans require pedestrian accommodations | Plans do not address pedestrian needs |
| Historic Sites | Cultural and Historic Preservation Plans include a wayfinding and walkability focus | Cultural and Historic Preservation Plans require pedestrian accommodations | Cultural and Historic Preservation Plans do not address pedestrian needs |
| Adoption of Street Tree Requirements | Has an ordinance that improves pedestrian safety | Does not have an ordinance | N/A |
| Economic Vitality | Has several business improvement districts, an established façade improvement program, and/or aggressive downtown parking policies | Has a business improvement district, façade improvement program, or downtown parking policies | Does not have business improvement districts, façade improvement program, or downtown parking policies |
| Coordination with Health Agencies | Health agencies are involved in the planning of pedestrian facilities and/or programs and collection of collision data | Health agencies have programs to promote healthy lifestyles through active transportation | Health agencies are not involved in pedestrian safety or active transportation |
| Collection of Pedestrian Volumes | Collects pedestrian volumes routinely with intersection counts | Collects some pedestrian volumes, but not routinely | Does not collect pedestrian volumes |
| Pedestrian-Oriented Speed Limits and Speed Surveys | Employs comprehensive practice to proactively review speed limits such as USLIMITS | Reviews data only in response to reported concerns or frequent collisions | Does not have set practices for speed limit reviews |
| Inventory of sidewalks, informal pathways, and key pedestrian opportunity areas | Maintains an inventory of missing and existing sidewalks and includes sidewalk projects in the CIP | Maintains an inventory of missing sidewalks, informal pathways, and/or pedestrian opportunity areas | Does not have an inventory of missing sidewalks, informal pathways, or pedestrian opportunity areas |
| Traffic Calming Programs | Has a significant traffic calming program with a dedicated funding source | Has a traffic calming program but no dedicated funding source | Does not have a traffic calming program |
| Pedestrian Safety Education Program | In addition to pedestrian safety curriculum in schools, provides brochures and/or conducts education campaigns | Has pedestrian safety curriculum in schools and/or Community Centers | Does not have pedestrian safety education programs |
| Attention to Crossing Barriers | Has a recently updated policy and comprehensive inventory of barriers | Has an outdated policy | Does not have a policy for pedestrian crossings at railroads, freeways, etc. |

**TABLE 3-1
 SUMMARY OF PROGRAMS, POLICIES, AND PRACTICES BENCHMARKING ANALYSIS FOR REDDING**

| Benchmark Topic | Key Strength | Enhancement | Opportunity |
|---|--|--|---|
| Crosswalk Installation, Removal, and Enhancement Policy | Has a crosswalk policy that reflects best practices for signalized and uncontrolled crosswalk treatments | Has a crosswalk policy but it is not comprehensive or up to date with best practices | Does not have a crosswalk policy |
| Adoption of Routine Accommodations for New Development | Has Routine Accommodations Policy that applies to the development review process and assesses impact fees | Has Routine Accommodations Policy for public works projects only | Does not have a Routine Accommodations Policy |
| Design Policies and Development Standards | Has a Streetscape Master Plan and uses a Form Based Code for land use planning | Has minimal design policies and development standards | Does not have a Streetscape Master Plan or design policies for pedestrian treatments |
| Adoption of Bicycle Parking Requirements | Requires bicycle parking with new development | Does not require bicycle parking | N/A |
| Adoption of Open Space Requirements | Has an ordinance that improves pedestrian safety | Does not have an ordinance | N/A |
| Use of Neighborhood-sized Schools | Has a policy to encourage neighborhood sized schools | Does not have a policy to encourage neighborhood sized schools | Does not have a policy to encourage neighborhood sized schools and recent schools have been "mega schools" on the periphery |
| Enforcement | Police conduct sustained pedestrian safety-related enforcement efforts, which may include resource sharing with neighboring cities | Police conduct some pedestrian safety- related enforcement activities | Police department does not have Traffic Safety Officer(s) |
| Pedestrian-Oriented Traffic Signal and Stop Sign Warrants | Uses relaxed warrants for traffic signals and/or all-way stops | Uses MUTCD Warrants | N/A |
| Use of Leading Pedestrian Intervals | Has installed LPIs at appropriate locations | Has not installed LPIs | N/A |
| Updated ADA Transition Plan for Streets and Sidewalks | Has a recently-updated, comprehensive Plan and a dedicated Coordinator | Has an outdated Plan and no dedicated Coordinator | Does not have a Transition Plan or Coordinator |
| Pedestrian Safety Program and Walking Audits | Has significant and ongoing programs which include Walking Audits | Has some programs and may have conducted a Walking Audit | Does not have pedestrian safety programs |

**TABLE 3-1
 SUMMARY OF PROGRAMS, POLICIES, AND PRACTICES BENCHMARKING ANALYSIS FOR REDDING**

| Benchmark Topic | Key Strength | Enhancement | Opportunity |
|---|--|---|--|
| Preparation of a Pedestrian Master Plan | Has a recently-updated Plan and pedestrian projects have been completed recently | Has a Pedestrian Master Plan but it may be outdated and/or no recent projects from the Plan have been completed | Does not have a Pedestrian Master Plan |
| Adoption of Newspaper Rack Ordinance | Has an ordinance that improves pedestrian safety | Does not have an ordinance | N/A |
| Use of Street Furniture Requirements | Has an ordinance that improves pedestrian safety | Does not have an ordinance | N/A |
| Pedestrian/Bicycle Coordinator | Has a Coordinator on staff who manages a city Pedestrian Program | Occasionally uses a contract Coordinator | Does not have a Pedestrian Coordinator |
| Public Involvement and Feedback Process | Has a formal, active public feedback process (web-enabled) | Has an ad-hoc public feedback process | Does not have a public feedback process |
| Formal Advisory Committee | Has a formal, active Pedestrian Committee | Has an ad-hoc Pedestrian Committee | Does not have a Pedestrian Committee |
| Transportation Demand Management Programs | Has extensive TDM programs and enforces parking cash out, etc. | Has basic TDM programs (Commuter Checks, Guaranteed Ride Home) | Does not have a Travel Demand Management program or policy |

3.1 KEY STRENGTHS

(a) ADA Improvements

Compliance with the Americans with Disability Act (ADA) guidelines is important not only to enhance community accessibility, but also to improve walking conditions for all pedestrians.

Redding follows California's ADA guidelines. All new intersections are built to standards for ADA compliance and include curb ramps (directional when possible), audible pedestrian signals, and truncated domes. The City spends \$75,000 per year from Community Development Block Grant (CDBG) funds to retrofit and upgrade ramps at a prioritized list of existing



*Example of Two ADA-accessible Curb Ramps per Corner
 Image source: Armor-Tile*

intersections. Intersection improvement and traffic signal retrofitting projects also include ADA improvements; however, there is currently no mechanism to prioritize traffic signals that are not being improved as part of another project. On-street handicap parking spaces are provided on a one-by-one basis per requests from the public. In 2007, the City implemented new design standards that place sidewalks behind driveway aprons.

Suggestion for Potential Improvement

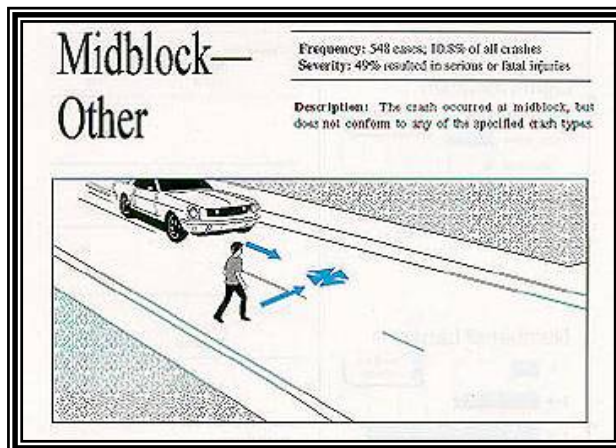
- *Identify a more substantial funding source for the City's ADA improvement program for items such as curb ramps, audible pedestrian signals, and truncated domes.*

(b) Collision History and Collision Reports

The City uses Crossroads software to geocode the location of all pedestrian/vehicle collisions. Additionally, a City-wide map showing four years of pedestrian/vehicle collision is shared between enforcement personnel and Public Works staff and used to make improvements in downtown Redding. The City is beginning to take a corridor approach to collision history by identifying key collision corridors, identifying potential safety improvements, and pursuing funding. There is no current requirement to do this routinely or publish annual reports.

Suggestion for Potential Improvement

- *To proactively implement safety projects, publish an annual report that summarizes pedestrian/vehicle collision statistics in the City. An annual report that inventories collision locations and pedestrian volume counts could enhance comprehensive monitoring by grouping collision types, locations, and potential countermeasures. With sufficient pedestrian volume data, the City could prioritize collision locations based on collision rates (i.e., collisions/daily pedestrian volume), a practice that results in a more complete safety needs assessment. Treatments could then be identified for each location and programmatic funding allocated in the City's Capital Improvements Program (CIP).*



(c) Pedestrian Traffic Control Devices

The 2009 federal *Manual of Uniform Traffic Control Devices* (MUTCD) requires the installation of countdown pedestrian signals for all new signals. Replacing traffic signal bulbs with LED bulbs is also suggested to increase visibility and improve energy efficiency. Best practices in pedestrian traffic control audits include:

- Developing a GIS inventory of all traffic control devices and markings and include maintenance records within the GIS database.

- Developing a crosswalk inventory by conducting audits of the adequacy of current crosswalks. A crosswalk policy may be informed by this audit and provide guidance for a systematic approach to crosswalk installation. Seattle's inventory of its marked crosswalks is a model: see http://www.seattle.gov/transportation/cwp_back.htm.
- Ensuring that locations with pedestrian desire lines have crosswalks. A crosswalk policy can help determine the appropriate crossing treatment at uncontrolled locations without marked crosswalks.

All pedestrian signals installed in Redding in the past ten years have been countdown signals. City staff members prioritize the replacement of pedestrian signals with countdown signals near locations with high levels of pedestrian activity. Additionally, the City has a GIS database available to the public that includes signals and signs, but it does not include pavement markings or crosswalks. Routine signal maintenance is performed on a 60-day interval and the public can submit feedback via a web site or by phone. LED lighting is used on all traffic signals in the City and the citywide standard for pedestrian walking time at crosswalks is 3.5 feet per second.

Suggestions for Potential Improvement

- *Include crosswalks as part of the City's GIS inventory of signals and signs.*
- *Identifying the highest priority signal locations for replacement with countdown signals and a funding source.*
- *Begin using Pedestrian Lead Intervals (LPIs) in areas with high levels of pedestrian activity.*

(d) Institutional Coordination

Numerous agencies have jurisdiction over components of the Redding transportation network, including the City of Redding, Shasta County, and Caltrans. Institutional coordination associated with multiple agencies is necessary because of non-local control of right-of-way and differing policies regarding pedestrian accommodation. For example, Caltrans policies have historically discouraged proposals for bulbouts, wider sidewalks, and other pedestrian-oriented improvements.

Redding's past policies for transportation have focused on vehicular circulation, as evidenced by recent support for 10.5 foot lanes with medians in lieu of 12 foot lanes. Recently, that focus has shifted towards multimodal circulation. The City and Caltrans have successfully collaborated regarding pedestrian and bicycle issues as exhibited by the inclusion of sidewalks on new bridges crossing the Sacramento River.

Suggestion for Potential Improvement

- *Recent Context Sensitive Solutions and Routine Accommodations policies within Caltrans (refer to the revised Deputy Directive 64: www.calbike.org/pdfs/DD-64-R1.pdf) now require the agency to consider multimodal needs and engage in collaborative community planning. These new policies may reduce*

institutional challenges, and the City may work with Caltrans and other agencies to identify new opportunities for joint planning of transportation facilities.

(e) Safe Routes to School

Safe-Routes-to-School programs encourage children to safely walk or bicycle to school. The Marin County Bicycle Coalition was an early champion of the concept, which has spread nationally (refer to best practices at www.saferoutestoschools.org). Safe-Routes-to-School programs are important both for increasing physical activity (and reducing childhood obesity) and for reducing morning traffic associated with school drop-off (as much as 30% of morning peak hour traffic). Best practices include:

- Developing a comprehensive city-wide Safe-Routes-to-School program that encourages walking to school and highlights preferred walking routes. Such a program may involve schools, advocates, parents, City staff, community health representatives, and other stakeholders. A Coalition may be developed for the program, with committees for mapping/data collection, outreach, education and encouragement, enforcement and engineering, and traffic safety. School-specific committees may also be considered.
- Scheduling regular, ongoing meetings to maintain stakeholder involvement.
- Applying for grant funding for non-infrastructure as well as infrastructure projects.



Example Safe Routes to School Activity

Funding for Safe-Routes-to-School programs and/or projects is available: for state levels see: <http://www.dot.ca.gov/hq/LocalPrograms/saferoutes/sr2s.htm> and for federal levels see: <http://www.dot.ca.gov/hq/LocalPrograms/saferoutes/srts.htm>.

Redding applies for state and federal Safe Routes to Schools funding and has been awarded two projects in the past five years. Redding has used Safe-Routes-to-School funds for pedestrian infrastructure such as lighted crosswalks with medians, sidewalk gap filling, crosswalks, and median refuge islands. The City meets with local schools one to two times per year to discuss potential issues. Additionally, Shasta County Public Health Department has a non-infrastructure grant that provides for a Safe-Routes-to-School coordinator.

Suggestions for Potential Improvement

- *Continue applying for grant funding; apply for non-infrastructure as well as infrastructure projects.*
- *Consider developing a City-wide Safe-Routes-to-School program that encourages walking to school and highlights preferred walking routes.*
- *Form a steering committee for the program (or each school) comprised of City staff, school district staff, PTA leaders, and other stakeholders.*

(f) General Plan: Densities and Mixed-Use Zones

Planning principles contained in a city's General Plan can provide an important policy context for developing pedestrian-oriented, walkable areas. Transit-oriented development, higher densities, and mixed uses are important planning tools for pedestrian-oriented areas.

The City has very strong multi-modal policies that need "teeth" to implement. Communities in Redding vary with respect to density of residential land uses from single-family residential zones to the Central Business District (CBD) where densities exceed 15 households per acre. Mixed-use development is allowed throughout all of Downtown Redding and the City's *General Plan* includes a map of pedestrian nodes. There are no off-street parking requirements in the downtown core and several City parking lots are shared between different types of uses.



Suggestions for Potential Improvement

- *Consider policies that promote the unbundling of parking from housing costs.*
- *Consider incorporating form-based zoning and policies for transit oriented development (TOD) into the next General Plan update.*

(g) Specific Plans, Redevelopment Areas, and Overlay Zones

Transit-oriented development (TOD) includes mixed-use, walkable areas centered on transit stations and/or along transit corridors. When mixed-use development is convenient to transit service, long-distance travel can be accommodated on buses or trains, while short-distance travel is accommodated by bicycling or walking. TOD in turn has the potential to reduce automobile dependency and usage, and can result in reduced vehicle-miles traveled.

Redding has four Redevelopment Project Areas: Market Street, Canby-Hilltop-Cypress, Shastec, and Buckeye. Each area has its own implementation plan that defines Project Area goals and objectives. The City does not have any specific pedestrian overlay districts; the Level of Service (LOS) policy in downtown Redding is lowered to LOS D. Most of the City's historic sights are located in downtown Redding and are protected by a historical preservation ordinance and the City has a map available for downtown walking tours.

Suggestions for Potential Improvement

- *Develop a pedestrian overlay district in downtown Redding that does not have a vehicular Level of Service policy or uses a multi-modal level of service significance threshold.*
- *Consider TOD, mixed-uses, walkability, bikeability, and pedestrian orientation as a high priority for redevelopment.*
- *Create a pedestrian-orientation project checklist for the development review process.*

(h) Street Tree Requirements

Street trees enhance the pedestrian environment by providing shade and a buffer from vehicles. Street trees may also enhance property values, especially in residential neighborhoods. However, street trees, when improperly selected, planted, or maintained, may cause damage to adjacent public utilities.

The City of Redding has been recognized as a “Tree City USA” since 1982, and the City regulates tree preservation through a Tree Preservation Ordinance (Chapter 18.65 of their Municipal Code). Additionally, Redding’s Comprehensive Tree Plan addresses tree care and maintenance along City streets and in City parks (including spacing requirements, distance from curbs/sidewalks/corners/fire hydrants, and specifications for tree care).

Suggestion for Potential Improvement

- *Where sidewalk widths do not support the addition of street trees, consider placing trees in tree wells within on-street parking.*

(i) Economic Vitality

Improving pedestrian safety and walkability can enhance economic vitality. Similarly, enhancing economic vitality through innovative funding options such as Business Improvement Districts (BIDs), parking management and façade improvement programs can lead to more active pedestrian areas and encourage walking.

The City has two Business Improvement Districts (BIDs) established: the Hilltop Hotels BID and the Downtown BID. Sidewalks and streetscapes are both eligible for funding as part of the City’s BID program; the Hilltop Hotels district recently used funding for a large streetscape project. The City also has a façade improvement program that has provided funding for improvements to over 65 façades in downtown Redding. There is no minimum parking requirement for downtown redevelopment.

Suggestions for Potential Improvement

- *Apply BID funds towards pedestrian-related improvements and consider establishing additional BIDs in other commercial areas of the City.*
- *Consider implementing public parking pricing in the downtown to encourage multi-modal access and a park-once environment (parking policies in Redwood City may be a model).*

(j) Health Agencies

Involving non-traditional partners such as Emergency Medical Service (EMS) personnel, public health agencies, pediatricians, etc., in the planning or design of pedestrian facilities may create opportunities to be more proactive with pedestrian safety, identify pedestrian safety challenges and education venues, and secure funding. Additionally, under-reporting of pedestrian-vehicle

collisions could be a problem that may be partially mitigated by involving the medical community in pedestrian safety planning.²

The City's Safe-Routes-to-School leader is funded through a grant applied for by Shasta County Public Health, although Safe-Routes-to-School is not her primary responsibility. Additionally, the local healthcare community has demonstrated their support of promoting walking as a mode of transportation.

Suggestion for Potential Improvement

- *Continue to seek opportunities for technical collaboration and funding with public health and health care professionals.*

3.2 ENHANCEMENTS

(a) Pedestrian Volumes

Pedestrian volume data is important for prioritizing projects, developing collision rates, and determining appropriate pedestrian infrastructure. The City does not require that bicycle or pedestrian counts be collected with manual intersection counts; however, Redding does collect counts in reaction to complaints, crosswalk requests, or collisions.

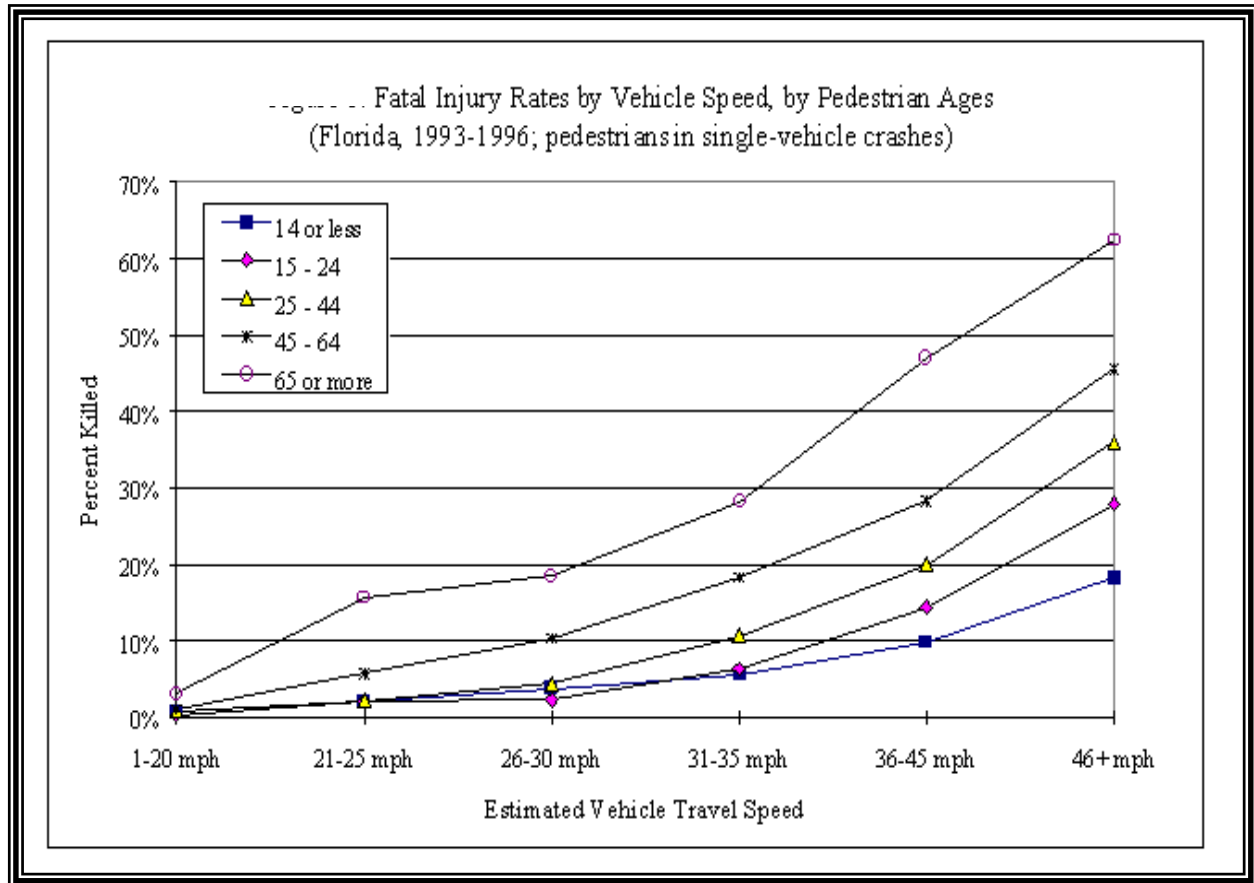
Suggestions for Potential Improvement

- *Consider routinely collecting pedestrian and bicycle volumes by requiring them to be conducted in conjunction with manual intersection turning movement counts.*
- *Geocode pedestrian volume data with GIS software along with other data such as pedestrian control devices and collisions to analyze data for trends or hotspots related to pedestrian safety.*

(b) Speed Limits and Speed Surveys

As shown in the following image, pedestrian fatality rates increase exponentially with vehicle speed. Thus, reducing vehicle speeds in pedestrian zones may be one of the most important strategies for enhancing pedestrian safety.

² Sciortino, S., Vassar, M., Radetsky, M. and M. Knudson, "San Francisco Pedestrian Injury Surveillance: Mapping, Underreporting, and Injury Severity in Police and Hospital Records," *Accident Analysis and Prevention*, Volume 37, Issue 6, November 2005, Pages 1102-1113



Fatal Injury Rates by Vehicle Speed for Several Pedestrian Age Groups
Image source: www.nhtsa.dot.gov/people/injury/research/pub/Image3.gif

In Redding, speed surveys are conducted every five to seven years by a licensed traffic engineer, following MUTCD guidelines. The City deploys a radar speed trailer and additional enforcement in areas with speed concerns

Suggestions for Potential Improvement

- Consider pedestrian volumes when setting speed limits and employ traffic calming strategies in locations where speed surveys suggest traffic speeds are too high for pedestrian areas.
- Consider establishing 15 MPH school zones.
- Ensure design standards/ design speeds in pedestrian areas do not contribute to a routine need for traffic calming.

(c) Inventory of Sidewalks, Informal Pathways, and Key Pedestrian Opportunity Areas

A GIS-based sidewalk inventory enables project identification and prioritization, as well as project coordination with new development, roadway resurfacing, etc. Best practices for sidewalk inventories include the delineation between development driven and City funded gap filling projects and policies that make it possible for the City to be reimbursed for filling a development driven sidewalk gap.

The City does not currently have a GIS layer showing where sidewalks are or are not present; there are several gaps in the sidewalk network, especially where development is yet to occur and in older neighborhoods. Approximately \$100,000 is available each year to perform sidewalk maintenance.

Suggestion for Potential Improvement

- *Inventory and Geocode sidewalks in the City and add informal pathways and key pedestrian opportunity areas.*

(d) Neighborhood Traffic Management Programs

Neighborhood Traffic Management Programs (NTMP) and policies set forth a consensus threshold on neighborhood requests and approvals, as well as standard treatments and criteria. Best practices resources for traffic calming include the following sites:

- www.trafficcalming.org
- Traffic Calming Guidelines from the City of Anaheim (<http://www.anaheim.net/article.asp?id=1703>)
- Traffic Calming Guidelines from City of La Habra (<http://www.ci.la-habra.ca.us/article.cfm?id=191>).

The City does not have a formal NTMP. Traffic calming programs in the City have been initiated by both the City and by communities. In several cases, residents concerned over vehicle speeds, public safety, cut-through traffic, or congestion, have requested that the City explore traffic calming options in their neighborhood. One neighborhood in Redding worked with the City to develop a traffic calming program of its own. There is not a dedicated funding source for traffic calming programs



Suggestion for Potential Improvement

- *Consider formalizing the City's traffic calming practices and expanding the traffic calming toolbox. A Neighborhood Traffic Management Program would provide a process for developing area-wide traffic calming improvements. Allocation of resources to an on-going program would allow for a proactive approach.*

(e) Pedestrian Safety Education Program

Education is a critical element for a complete and balanced approach to improving pedestrian safety. Education campaigns could include pedestrians of all ages, especially emphasizing education of school children where safe walking habits may be instilled as lifelong lessons.

Healthy Shasta currently offers educational workshops on pedestrian safety topics such as Safe-Routes-to-School and promotes walking and bicycling among both children and adults. Community Service Officers have led bike rodeos, delivered radio addresses, and written newspaper columns in the past; however, local schools recently have not shown interest. The City has pedestrian safety information available on both a brochure and on the website. In response to collisions, the Police Department generally tries to use media coverage as a means of educating the public.

Suggestions for Potential Improvement

- *Develop citywide educational campaigns:*
 - *Re-establish previous efforts with Community Service Officers*
 - *Campaigns may include advertisements on buses and bus shelters, an in-school curriculum, community school courses, public service announcements, and/or brochures, among many other strategies. The Street Smarts program in San José, California, provides a model pedestrian safety education program (see www.getstreetsmarts.org for more information).*
 - *The Bicycle Transportation Alliance has developed a pedestrian safety curriculum for 2nd-3rd graders, which incorporates physical education, health, and social responsibility (refer to www.bta4bikes.org/docs/PedSafetyCurriculumFinal.doc). Other safety curriculum resources are available at: www.saferoutespartnership.org/state/5638/5722.*
 - *Additional pedestrian safety brochures are available at: <http://safety.fhwa.dot.gov/media/brochures.htm>, and www.aaafoundation.org/products/index.cfm.*

(f) Attention to Crossing Barriers

Crossing barriers such as railroads, freeways, and major arterials may discourage or even prohibit pedestrian access. Additionally, crossing barriers are often associated with vehicle-pedestrian collisions (including severe injuries and fatalities). Identifying and removing barriers, as well as preventing new barriers, is essential for improving walkability and pedestrian safety.

The City does not have formal policies or development standards that identify and address barriers in the City. Several barriers exist in the City such as the Sacramento River, canals, at-grade Amtrak railroad tracks, freeways, and busy streets. Recent planning efforts have prevented the creation of new barriers in recent construction; two recently constructed bridges in the City were both built with pedestrian and bicycle facilities.

Suggestions for Potential Improvement

- *Identify and create a GIS inventory of pedestrian barriers.*
- *Develop policies for reducing the barriers through prioritizing projects and requirements with future development. This could be achieved as part of a Pedestrian Master Plan*

(g) Crosswalk Installation, Removal, and Enhancement Policy

A formal policy for crosswalk installation, removal, and enhancement provides transparency in decision-making and adopts best practices in pedestrian safety and accommodation.

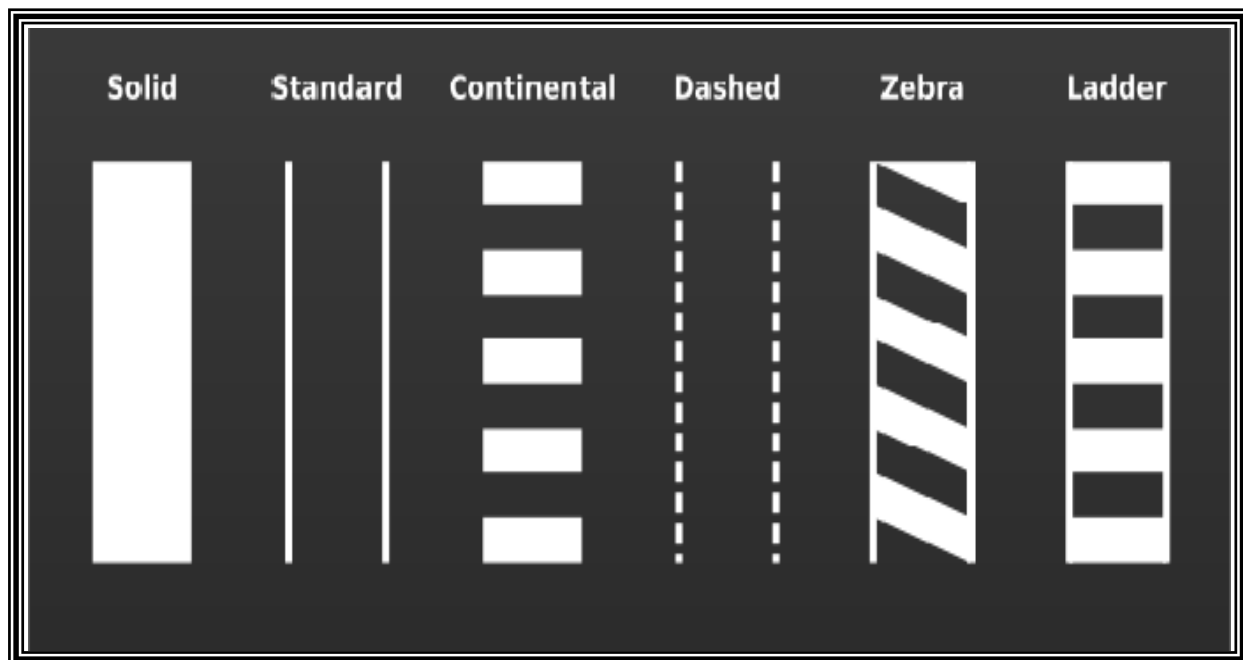
The City does not have a formal crosswalk policy. Public Works staff members are discussing implementing high visibility crosswalks and advanced yield lines where appropriate. Crosswalks are typically installed on all four legs of an intersection. The City is typically hesitant to install crosswalks midblock or crossing arterials and the City is working with Caltrans on a planned midblock pedestrian signal crossing a Caltrans facility. Crosswalk removal is subject to an independent review by Public Works staff - one crosswalk in Redding was recently removed.

Suggestion for Potential Improvement

- *Develop a crosswalk policy to reflect best practices and recent research with respect to the installation, removal, and enhancement of crosswalks, which includes removing crosswalks only as an option of last resort and providing midblock crossings where they serve pedestrian desire lines. This policy may consider adopting the “triple four” crosswalk striping treatment as used in Sacramento and other jurisdictions in California.*

Crosswalk policy resources include:

- Sacramento Crosswalk Policy:
www.cityofsacramento.org/dsd/development-engineering/documents/Ped_Safety.pdf
- Stockton Crosswalk Policy:
www.stocktongov.com/publicworks/publications/PedGuidelines.pdf
- Federal Highway Administration Study on Marked versus Unmarked Crosswalks:
http://safety.fhwa.dot.gov/ped_bike/docs/cros.pdf
- National Cooperative Highway Research Program Report on Crosswalks at Uncontrolled Locations:
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_562.pdf
- Caltrans/UC Berkeley Study on Pedestrian/Driver Behavior at Marked versus Unmarked Crosswalks:
<http://repositories.cdlib.org/its/tsc/UCB-TSC-RR-2007-4>



Standard Crosswalk Marking Patterns

Image source: FHWA, Planning and Designing for Pedestrian Safety Course, 2008

(h) Adoption of Routine Accommodations for New Development

Routine Accommodations or Complete Streets Policies accommodate all modes of travel and travelers of all ages and abilities. The City does not have a Routine Accommodations policy but does assess an impact fees that usually fund pedestrian improvements as part of other transportation projects

Suggestions for Potential Improvement

- *To support Complete Streets, the City may consider establishing a Complete Streets Policy and accommodating all modes in standard cross-sections for collectors and arterials. This policy could include a checklist for use during development application review.*
- *Consider adopting a Multi-Modal Level of Service methodology for transportation analysis in the City.*

The following cities have established practices for “Complete Streets and Routine Accommodations,” such as a multi-modal level of service implementation tool, and may serve as models for Redding:

- Fort Collins, Colorado’s Multi-Modal Level of Service Manual: www.fcgov.com/link-disclaimer.php?TABID=5&URL=http://www.co.larimer.co.us/engineering/GMARdStds/AppendixH%2010-01-02.pdf

- Charlotte, North Carolina's Urban Street Design Guidelines:
www.charmeck.org/Departments/Transportation/Urban+Street+Design+Guidelines.htm
- Sacramento Transportation and Air Quality Collaborative Best Practices for Complete Streets: www.completestreets.org/documents/FinalReportII_BPCompleteStreets.pdf
- San Francisco, California, Department of Public Health's Pedestrian Quality Index: www.sfphes.org/HIA_Tools/PEQI.pdf
- San Francisco County Transportation Authority's Multi-modal Impact Criteria: www.sfcta.org/images/stories/Planning/CongestionManagementPlan/2007%20-%20appendix%2005%20-%20tia.pdf

(i) Bicycle Parking Requirements

Bicyclists become pedestrians after parking their bicycles. Safe and convenient bicycle parking is essential for encouraging bicycle travel (especially in-lieu of vehicle travel).

The City has a bicycle parking requirement, which specifies the required number of bicycle spaces per vehicle space. The requirement is part of the City's development standards.

Suggestions for Potential Improvement

- *Develop a standalone bicycle parking ordinance providing requirements for location, style, and type of bicycle parking for existing uses and all new development.*
 - *The Bicycle Parking Guidelines, published by the Association of Pedestrian and Bicycle Professionals (APBP), is a resource for best practices in bicycle parking design (see <http://www.bfbc.org/issues/parking/apbp-bikeparking.pdf>). Additional information on bicycle parking is summarized on www.bicyclinginfo.org and <http://www.bicyclinginfo.org/engineering/parking.cfm>*
- *Consider implementation of "branded" racks for Redding (with a unique design or City symbol, such as that of Davis, CA).*
- *Provide and distinguish between short- and long-term bicycle parking requirements for bicycles in the Parking Ordinance. The bicycle parking ordinance in Oakland is a model (<http://www.oaklandpw.com/Page127.aspx#ordinance>).*



Suggested bicycle racks (image source: <http://www.cityofmadison.com/trafficEngineering/documents/MadisonBikeParking.pdf>)

(j) Open Space Requirements

Residents typically rate open space as among a city's key assets and needs.

Chapter 16.20.100 of the Redding Municipal Code establishes park and recreation facilities impact fees for new residential development unless land is dedicated to parks on as a part of the development's site plan.

Suggestions for Potential Improvement

- *Expand the impact fees for park and recreation facilities to non-residential development.*
- *Consider a City-wide goal of having one park within ½ mile of every home.*

(k) Neighborhood-sized Schools

Neighborhood-sized schools, as opposed to mega schools on the periphery, are a key ingredient for encouraging walking and bicycling to school. In addition, pedestrian and ADA improvements could be prioritized near schools. Although older schools in Redding are neighborhood-oriented, there is no requirement that new schools be neighborhood-sized; newer schools tend to be "mega schools" or charter schools.

Suggestion for Potential Improvement

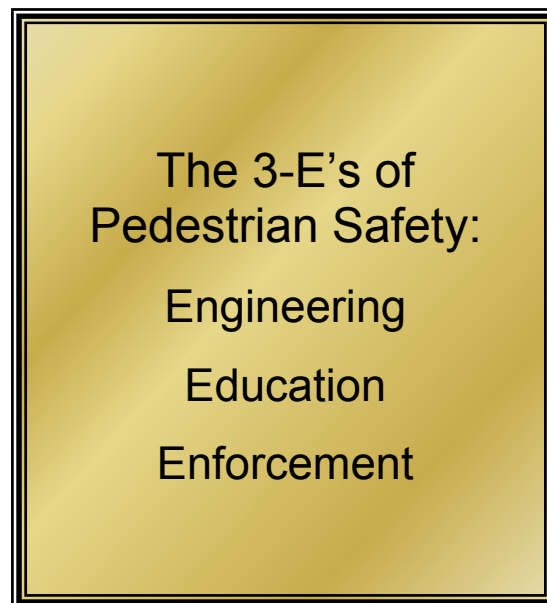
- *Consider working with the local school districts to establish a policy on neighborhood-sized and oriented schools as part of a Safe-Routes-to-School policy.*

(l) Enforcement

Enforcement of pedestrian right-of-way laws and vehicular speed limits is an important complement to engineering treatments and education programs. The Redding Police Department has four traffic safety officers. Supervisors and school resource officers take a pedestrian safety seminar as part of their training every 6-7 years. Enforcement efforts are focused around schools and school buses and on pedestrian violations. Sting operations have been publicly unpopular in the past and are not currently being conducted. Redding Police Department staff members participate in biweekly coordination meetings with City Public Works and Caltrans and were involved in the design of improvements on Court Street.

Suggestion for Potential Improvement

- *Implement sustained enforcement efforts and involve the media. Use enforcement as an opportunity for education by distributing pedestrian safety pamphlets in-lieu of, or in addition to, citations.*



(m) Pedestrian-Oriented Signal and Stop Warrants

Providing all-way stop control (stop signs for every approach) at an intersection improves pedestrian safety by reducing speeds and pedestrian-vehicle conflicts. Best practices include:

- Requiring a collision history of three instead of five collisions based on routine underreporting
- Reducing pedestrian volume thresholds based on latent demand
- Providing consideration for school children/pedestrians and traffic speeds

Redding follows MUTCD requirements for signal and stop sign warrants.

Suggestion for Potential Improvement

- *Consider developing City-specific signal and stop sign warrants for adoption by City Council and subsequent application.*

(n) Leading Pedestrian Interval

Leading Pedestrian Intervals (LPI) provide pedestrians with a “head start” signal timing before vehicles on the parallel street are allowed to proceed through an intersection. A 2000 study by the Insurance Institute for Highway Safety found that the LPI reduces conflicts between turning vehicles and pedestrians by enhancing the visibility of the pedestrian in the crosswalk.³ No LPIs are installed in Redding.

Suggestion for Potential Improvement

- *Consider installing LPIs in areas of high pedestrian activity throughout Redding, providing a right-turn on red restriction as necessary per recent research findings.⁴*

3.3 OPPORTUNITY AREAS

(a) Transition Plan for Streets and Sidewalks

An ADA Transition Plan sets forth the process for bringing public facilities into compliance with ADA regulations. An ADA Transition Plan could address public buildings, sidewalks, ramps, and other pedestrian facilities. An ADA Coordinator is typically responsible for administering a City's ADA Transition Plan.

Redding has an annual program to install new curb ramps; however, does not have an ADA Transition Plan that addresses other ADA compliance issues in the public right-of-way. The City

³ Van Houten, R.; Retting, R.A.; Farmer, C.M.; and Van Houten, J. 2000. Field evaluation of a leading pedestrian interval signal phase at three urban intersections. *Transportation Research Record* 1734:86-92.

⁴ Hubbard, S, Bullock, D and J. Thai, Trial Implementation of a Leading Pedestrian Interval: Lessons Learned, ITE Journal, October 2008, pp. 32-41.

does not have an official ADA Coordinator; those responsibilities are filled by the Assistant City Engineer or the Building Division's ADA specialist.

Suggestions for Potential Improvement

- *Adopt an ADA Transition Plan for the public right-of-way to reflect current ADA standards and identify facilities with ADA deficiencies.*
- *Formalize the position of ADA Coordinator.*

(b) Walking Audits

Walking audits provide an interactive opportunity to receive feedback from key stakeholders about a study area as well as discuss potential solutions and their feasibility. They can be led by city staff, advocacy groups, neighborhood groups, or consultants.

No walking audits focused on pedestrian safety have been conducted in Redding before this PSA.

Suggestion for Potential Improvement

- *Consider establishing a City-wide pedestrian safety program to include regular walking audits based on the suggestions of this PSA. This effort could complement other programs within the City to improve health and safety or to enhance sustainability.*

(c) Pedestrian Master Plan

This type of plan includes a large menu of policy, program, and practice recommendations, as well as site-specific (and prototypical) engineering treatment recommendations. A Pedestrian (or Pedestrian/Bicycle) Master Plan would document the City's vision for improving walkability and pedestrian safety; establish policies, programs, and practices; and outline the prioritization and budgeting process for project implementation. Combining this with a Complete Streets Policy would address other suggestions in this report. Redding is currently considering developing a Pedestrian Master Plan.

Suggestion for Potential Improvement

- *Develop a Pedestrian Master Plan to prioritize and implement capital and maintenance projects, which could address the following:*
 - *Accommodations of pedestrians during construction periods*
 - *Street trees and street furniture standards and requirements*



*Example Pedestrian Master Plan
from the City of Sacramento*

- *Pedestrian connectivity*
- *Treatment implementation consistency*
- *Interdepartmental coordination*

Model Pedestrian Master Plans are available at:
<http://www.walkinginfo.org/develop/sample-plans.cfm>.

(d) Newspaper Rack Ordinance

Newspaper racks may obstruct walkways and reduce accessibility and pedestrian conspicuity when ordinances are not in place. A Newspaper Rack Ordinance improves the pedestrian realm by reducing clutter and organizing sidewalk zones. The Newspaper Rack Ordinance details size, location, and maintenance requirements.

Redding does not have a Newspaper Rack Ordinance.

Suggestion for Potential Improvement

- *Develop a Newspaper Rack Ordinance that regulates the appearance and location of newspaper racks.*



(e) Street Furniture Requirements

Street furniture encourages walking by accommodating pedestrians with benches to rest along the route or wait for transit; trash receptacles to maintain a clean environment; street trees for shade, etc. Uniform street furniture requirements also enhance the design of the pedestrian realm and may improve economic vitality.

Redding does not have street furniture requirements.

Suggestion for Potential Improvement

- *Establish a Street Furniture Ordinance.*



(f) Pedestrian/Bicycle Coordinator

In a sampling of pedestrian-oriented California cities, a full-time pedestrian/bicycle coordinator is typically provided at a ratio of one per 100,000 population. The City does not have a Bicycle or Pedestrian Coordinator on staff; however, staff members from the Community Services and

Traffic and Engineering departments currently fulfill some of these duties. A part- or full-time coordinator could be tasked with convening a formal advisory committee and implementing many of the suggestions included in this report.

Suggestion for Potential Improvement

- *With a population of approximately 90,000, Redding may consider employing a full-time City Pedestrian/Bicycle Coordinator. Such a staff member could be involved in activities such as interdepartmental coordination, grant writing, and staff liaison to a new pedestrian/bicycle subcommittee, local non-profits and advocacy groups, and local schools.*

(g) Formal Advisory Committee

Advisory committees serve as important sounding boards for new policies, programs, and practices. A citizens' pedestrian advisory committee is also a key component of proactive public involvement for identifying pedestrian safety issues and opportunities.

The City does not have formal advisory committee for transportation issues in general, or specifically for issues relating to pedestrians or bicyclists. Several citizen groups and advocates do occasionally raise their issues to the City: the Shasta Wheelmen, Redding Police Department Citizens Advisory Committee, and the Redding Crusaders.

Suggestion for Potential Improvement

- *Consider establishing a citizen's advisory committee(s) to address pedestrian and bicycle needs.*

(h) Travel Demand Management Program

Transportation Demand Management (TDM) programs encourage multi-modal travel by incentivizing non-auto options. As new development occurs, TDM programs can be expanded, formalized, and strengthened. Redding does not currently have a TDM program.

Suggestions for Potential Improvement

As part of a comprehensive TDM program:

- *Develop a TDM policy which:*
 - *Incentivizes non-auto travel options (e.g., commuter checks, parking cash-out programs, transit passes, etc.)*
 - *Creates support for major employers to implement a TDM program (e.g., emergency ride home programs)*
 - *Involves the Redding Area Bus Authority (RABA) in major decisions*
- *As TDM policies develop, consider hiring or identifying a part-time TDM Coordinator*

San Mateo County's policy of requiring TDM programs with new development could serve as a model (see: <http://www.smccap.org/index.jsp>).

4. WALKING AUDITS RESULTS AND SUGGESTIONS

Walking audits are typically conducted as an initial step to improve the pedestrian environment within the selected area. Many individuals can participate in a walking audit: community residents, stakeholders, and affiliated individuals. During a walking audit, positive practices are observed and issues and opportunity areas are noted. Observations are based on how motorists are behaving around pedestrians and how pedestrians are behaving, especially at intersections (for example, if pedestrians are crossing at unmarked locations to avoid certain intersections). For each opportunity area, the group discusses possible suggestions to address pedestrian safety concerns. Walking audits are highly interactive, with many observations explored during the walk. They are a means to observing and learning how to “see through the eyes of the pedestrian.”



This chapter presents the observations and suggestions made during the walking audit conducted in the City of Redding on February 16, 2010. The suggestions are based on best practices and discussions with the participant group regarding local needs and feasibility. A glossary of the pedestrian improvement measures is presented in Appendix A.

The evaluation team worked with City staff to select the focus areas for the walking audit based on the following criteria:

- Demonstrated pedestrian safety concerns
- Presence of children/school-related pedestrians
- No other project has specifically addressed pedestrian safety needs in the area
- Proximity to key generators, such as transit, retail, parks, and schools
- Availability of prototypical sites for broader Citywide application of suggestions

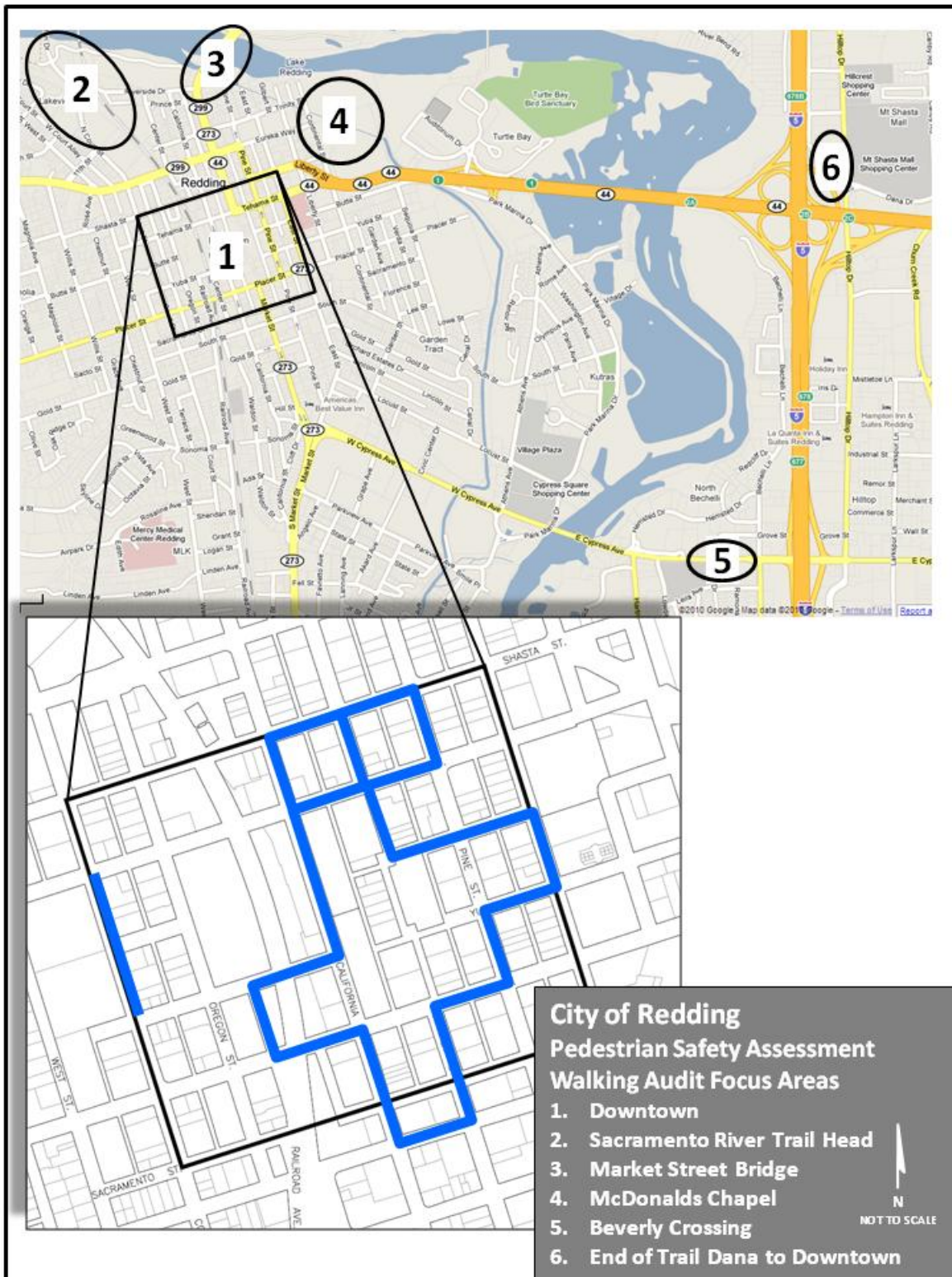
The walking audit covered eight focus areas in the City of Redding:

1. Downtown
2. Sacramento River Trail Head
3. Market Street Bridge
4. McDonalds Chapel
5. Beverly Crossing
6. End of Trail: Dana Drive to Downtown

An overview of the walking audit focus areas are shown in Figure 4-1. The following sections present the key issues identified during the walking audit. Suggestions are presented to respond to the issues at each site. Focus area summary graphics, which are a compilation of the suggestions, are provided in this chapter.



Figure 4-1 Walking Audit Locations



4.1 GENERAL CITYWIDE SUGGESTIONS

The following general suggestions have been noted as appropriate for City-wide implementation:

- Use a high visibility crosswalk striping pattern for uncontrolled crosswalks (the “triple four” is suggested)
- Use a parallel crosswalk striping pattern for controlled crosswalks
- Add advanced stop lines for stop-sign or signal controlled crossings
- Add advanced yield lines for multi-lane uncontrolled crossings
- Continue to maintain sidewalk clear zone
- Install pedestrian countdown signal heads at all signalized intersections based upon priority process
- Ensure signal timings are adequate for pedestrians
- Install new fluorescent yellow green (FYG) signage for all pedestrian locations
- Where possible, provide a buffer between vehicles and pedestrians by separating sidewalks from the curb
- Strive for “pedestrian-friendly” medians, which are wide enough (at least 6’) for pedestrian refuge
- Provide directional curb ramps, rather than diagonal ramps, where appropriate
- Maintain ADA-compliant crossings (truncated domes, cross slopes, audible signals, etc.)

4.2 FOCUS AREA 1: DOWNTOWN

Observations

The suggestions focus on the area generally bounded by Shasta, East, Sacramento, and Court Streets. The suggestions are for typical treatments that could be installed throughout downtown Redding.

The City of Redding has made significant progress in providing a walkable environment in the downtown area.

The following additional positive characteristics were observed:



- The City has opened up the Downtown Mall with good pedestrian connections to the surrounding street system.
- Streetscape improvements have been made along the south portion of Market Street, along the western portion of Yuba Street, and along Court Street that make the street more inviting to pedestrian activity.
- Good links are provided to transit stops and the RABA Downtown Transit Center.
- On-street parking provides a buffer for pedestrians.
- Angled parking has been installed along Butte Street, the eastern portion of Yuba Street, and Sacramento Street.
- The City has recently allocated funding to provide pedestrian improvements at railroad crossing at Yuba, Placer, and South Streets with construction expected in 2011.
- Wide sidewalks are provided with trees.
- High visibility crosswalk striping is provided.

Downtown Redding is at a confluence of three State highways. State Route 44 (SR 44) enters downtown Redding from the east, splitting into a one-way couplet on Shasta and Tehama Streets. SR 273 is a north-south route that flows through downtown as a one-way couplet primarily on Market, California and Pine Streets. SR 299 enters downtown from the west along Eureka Way and extends northward along Market Street. The State routes and primary one-way streets are shown in Figure 4-2.

Daily traffic volumes provided by the City of Redding staff are shown in Figure 4-3.



Figure 4-2 Primary One-Way Streets

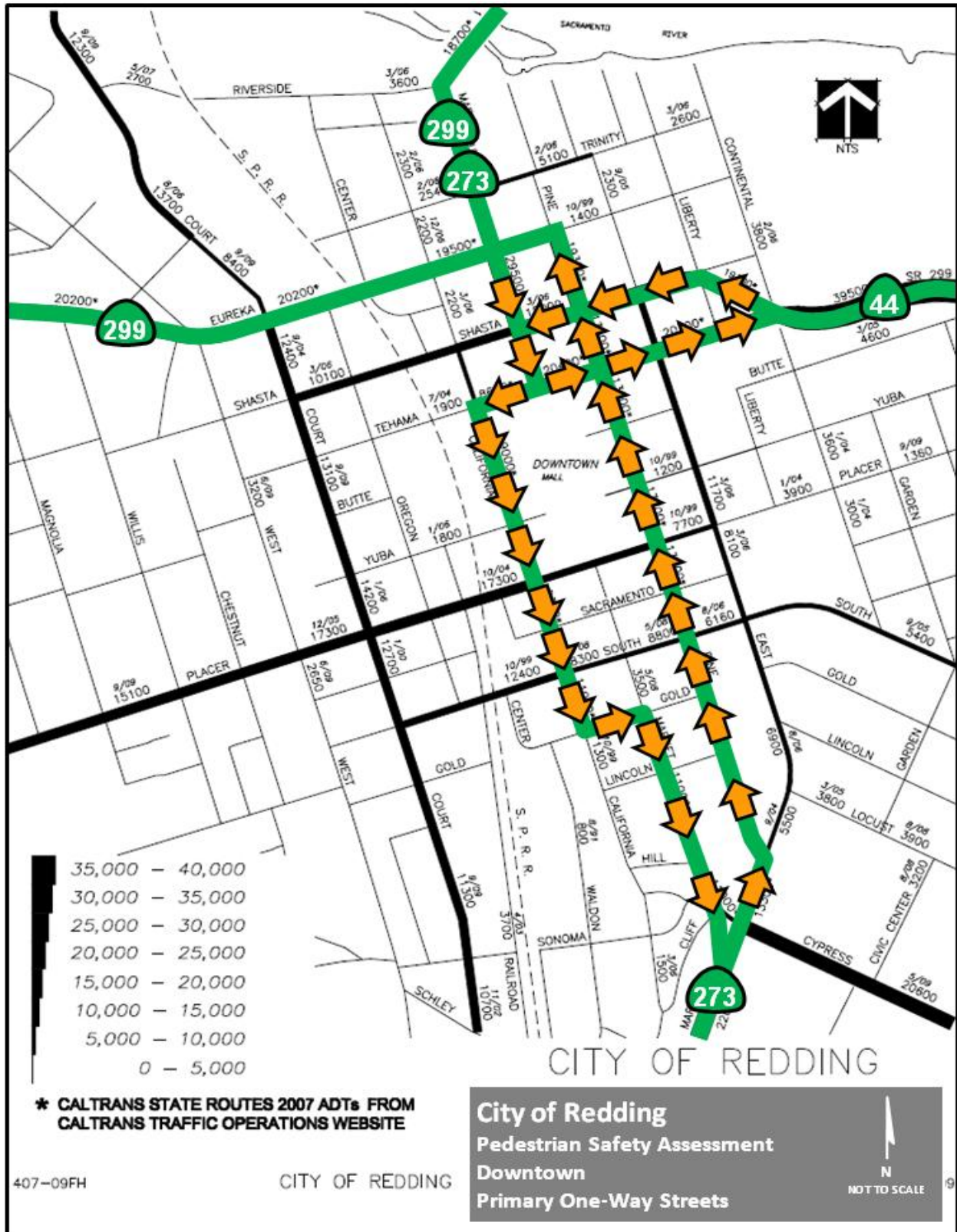
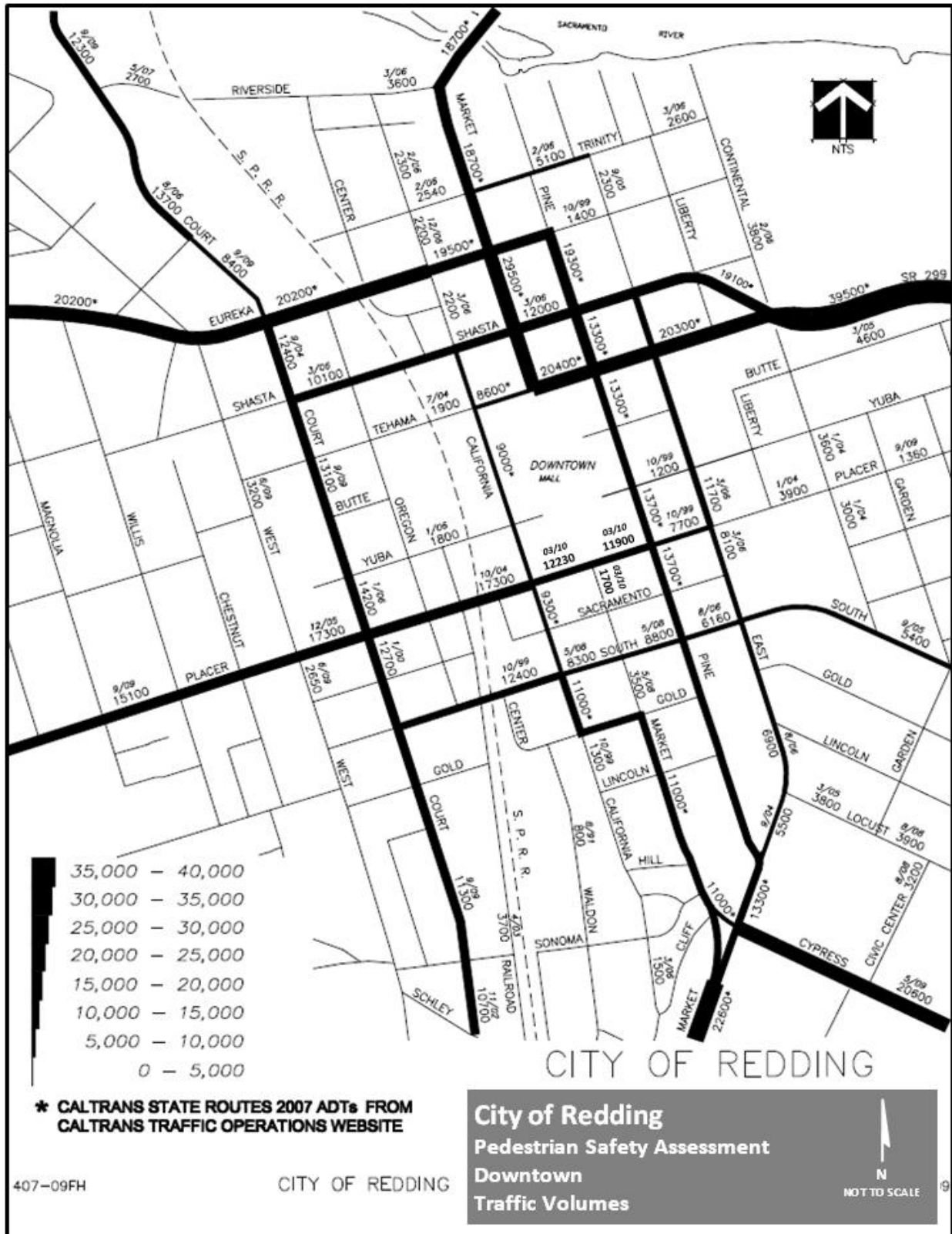


Figure 4-3 Downtown Traffic Volumes



Suggestions for Potential Improvement

The following are treatments suggested for general downtown traffic circulation in addition to those suggested city-wide:

- *Stripe high visibility crosswalks on all approaches at controlled intersections*
- *Install curb extensions where feasible*
- *Install protected left-turn signal phases where appropriate*
- *Consider leading pedestrian intervals*

Several options were developed for improving the balance between motor vehicle service and service for pedestrians and bicyclists along California Street and Pine Street consistent with Federal policies for development of complete streets. The options include implementation of road diets and alternatives for modifications to SR 273. As noted in Chapter 3, the City may consider reducing the service standard for automobiles or using a method of analysis that provides service levels for pedestrian, bicycle, and transit modes of travel.

Road diets would reduce the number of lanes of travel from four lanes (with no left-turn lanes) to three lanes including a median with left-turn lanes. Road diets are suggested for the following streets (shown in Figure 4-4):

- *East Street from Lincoln Street to Shasta Street*
- *Placer Street from Court Street to East Street*
- *South Street from Court Street to East Street*
- *Court Street from Eureka Way (SR 299) to Sonoma Street*

Any changes to traffic operations on SR 273 would require concurrence with Caltrans. Additional study would be required to ensure that motor vehicle traffic operations would function adequately (with possible consideration given for reduced level of service, as noted above).

SR 273 Alternative 1: The first alternative for SR 273 would be to reduce the basic number of lanes along both streets of the couplet through downtown from three to two lanes. Additional turn lanes would be needed at some intersections. One possible lane reduction strategy is illustrated in Figure 4-5. This strategy would reduce the number of lanes on:

- *Tehama Street from Market Street to California Street*
- *California Street from Tehama Street to Gold Street*
- *Gold Street from California Street to Market Street*
- *Market Street from Gold Street to Lincoln Street*
- *Pine Street from East Street to Shasta Street*

Implementation of SR 273 Alternative 1 would allow sidewalks to be widened along California and Pine Streets as illustrated in Figure 4-7 Downtown Alternative 1 Recommendations (Typical). It would also be possible to install Class II bike lanes (not illustrated).

Figure 4-4 Suggested Road Diets

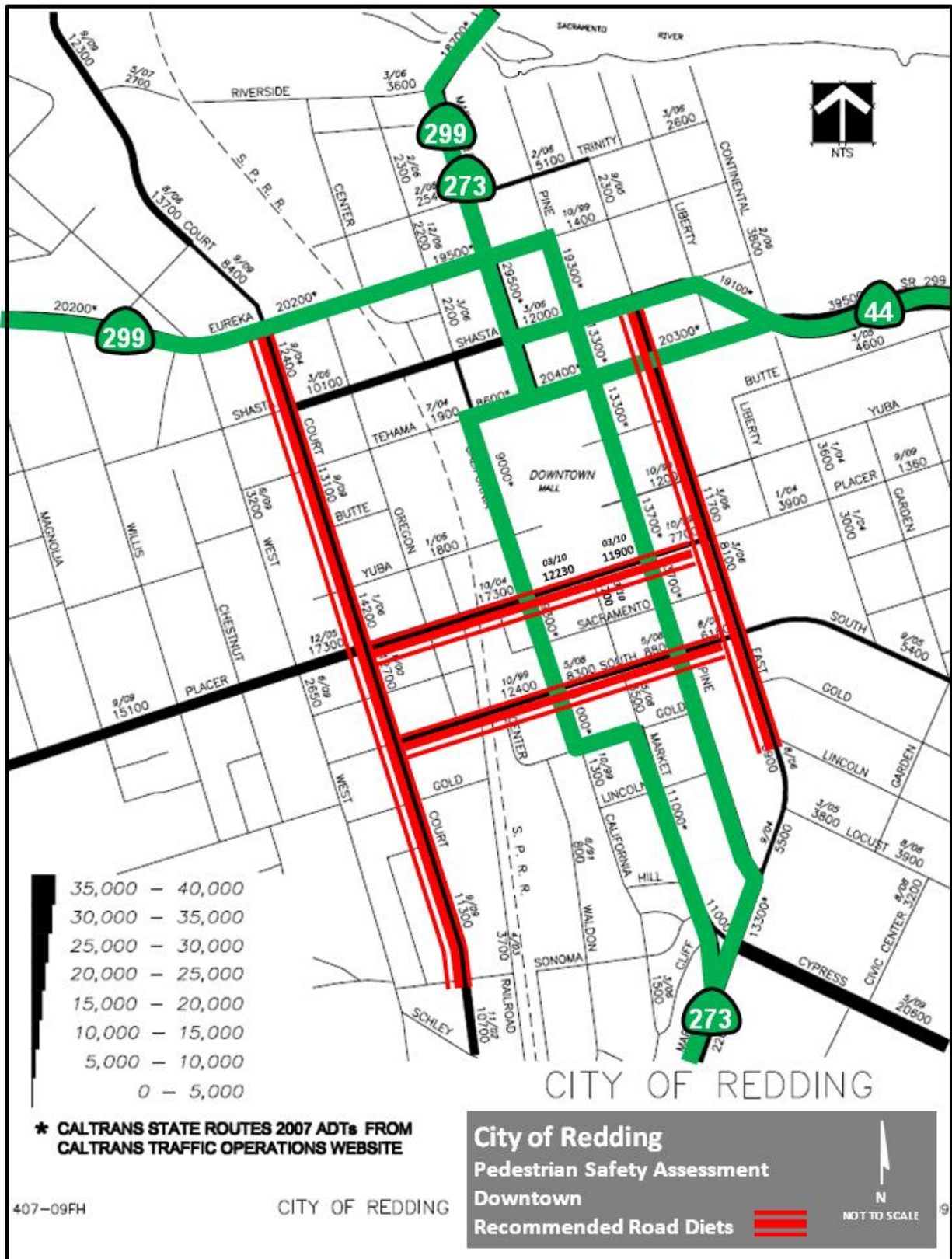
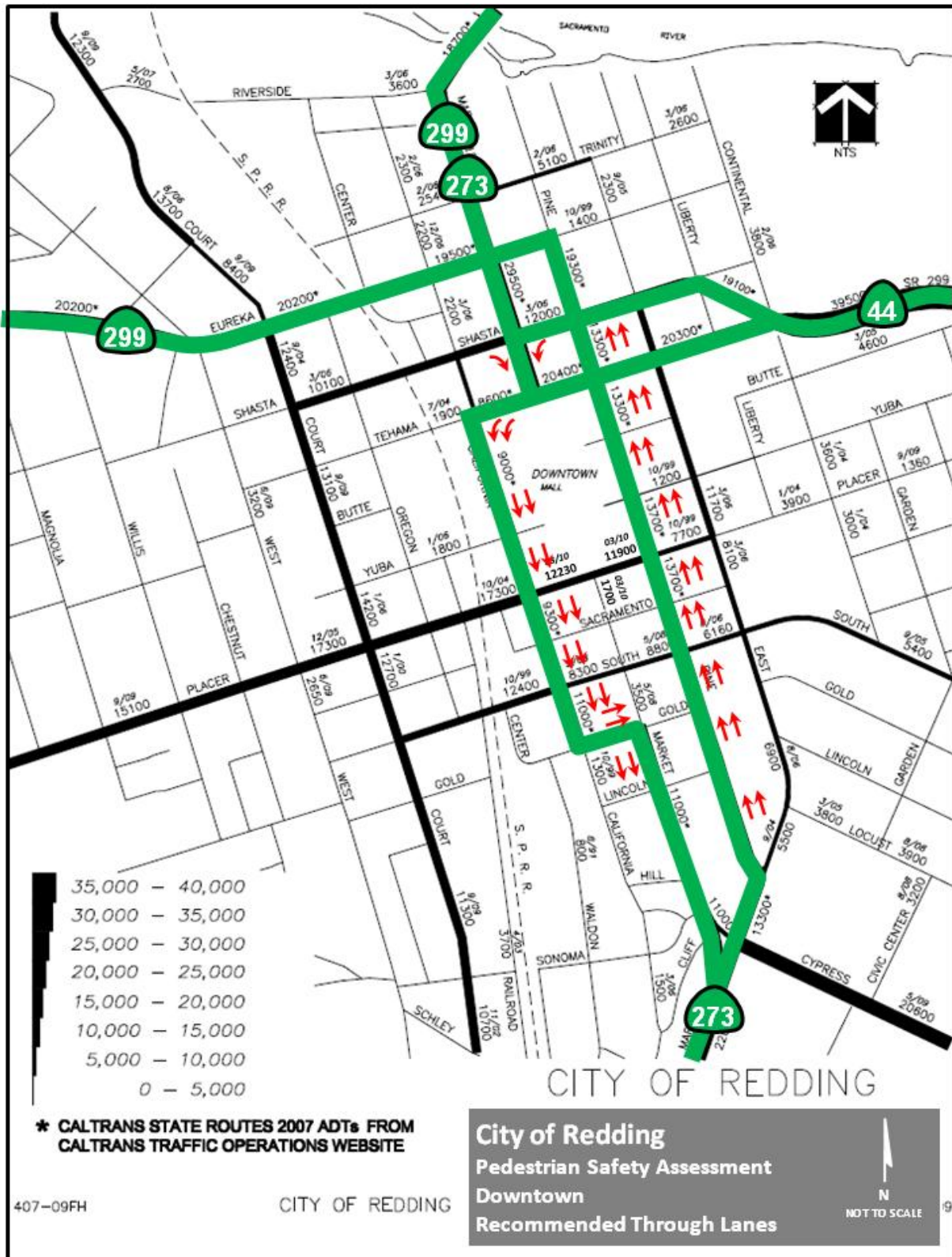


Figure 4-5 Suggested Through Lanes



SR 273 Alternative 2: The second alternative for SR 273 would require a significant shift in the approach to traffic handling in Downtown Redding. Alternative 2 would be to convert California and Pine Streets from one-way to two-way traffic operations from Shasta Street to Gold Street. There appears to be sufficient space and adequate capacity to serve existing traffic demand with two-way operations. The combined traffic volume for California and Pine Streets is less than 25,000 average daily traffic (ADT). If the streets were converted to two-way operations each street might need to serve 10,000 to 15,000 ADT, which is in the range of traffic volumes that can be accommodated by a two-way street section with one lane in each direction and a two-way-left-turn-lane in the center median. This alternative likely would not allow for the reduced street width provided with Alternative 1. These two-way street suggestions for Alternative 2 are not illustrated.

The following are treatments suggested for the intersection of Shasta Street and Market Street with Alternative 1 or 2:

- *Widen the sidewalk (or install curb extensions with parking) along the south side of Shasta Street to eliminate one eastbound right turn lane at the Market Street intersection. Provide a mandatory right turn lane for the eastbound Shasta Street approach to California Street.*
- *Install a curb extension on the southeast corner to eliminate one westbound left turn lane at the Market Street intersection with Shasta Street.*
- *Install a marked crosswalk across the south leg of the intersection*
- *Install directional curb ramps*
- *Install advance stop lines*
- *Add pedestrian countdown signals and audible signals*



The following are treatments suggested for the intersection of Market Street at Tehama Street with Alternative 1 or 2:

- *Reallocate the southbound lanes on Market Street to provide more efficient flow of motor vehicles. It appears that traffic flow could be improved by providing two left turn lanes and one combination left-right turn lane.*
- *Relocate island on the west leg and provide pedestrian refuge.*
- *Consider elimination of eastbound traffic movement on Tehama Street.*
- *Consider exclusive pedestrian phase.*



Other treatments would be needed at specific locations if the road diets and/or changes to SR 273 are implemented. The following discussion is provided for the Placer Street and East Street intersection but would apply at other locations downtown. A recent death of a pedestrian at the intersection of Placer Street and East Street emphasizes the need to improve pedestrian safety downtown. The treatments suggested above for downtown and citywide would improve pedestrian safety at the intersection of Placer Street at East Street and other downtown intersections.

Traffic operations through the Downtown Mall were evaluated as a result of comments raised during the walking audit. Traffic flow patterns through and around the Downtown Mall are shown in Figure 4-6. The current directions of travel in the California-Market Alley and the Market-Pine Alley are in the same direction as the adjacent one-way streets resulting in greater out-of-direction travel than would otherwise be necessary. Closure is planned for a portion of the California-Market Alley. In addition, the parking structure at the southwest corner of the mall will eventually need to be replaced. There is no vehicular passage through the mall along Butte and Yuba Streets.

The following treatments are suggested for alleys through the Downtown Mall:

- Reverse the direction of travel of the California-Market Alley and the Market-Pine Alley to reduce recirculation on major public streets.
- Consider extending Yuba Street through the Downtown Mall as plans are developed for parking structure replacement or other mall improvements.

Figure 4-6 Downtown Mall One-Way Streets and Alleys

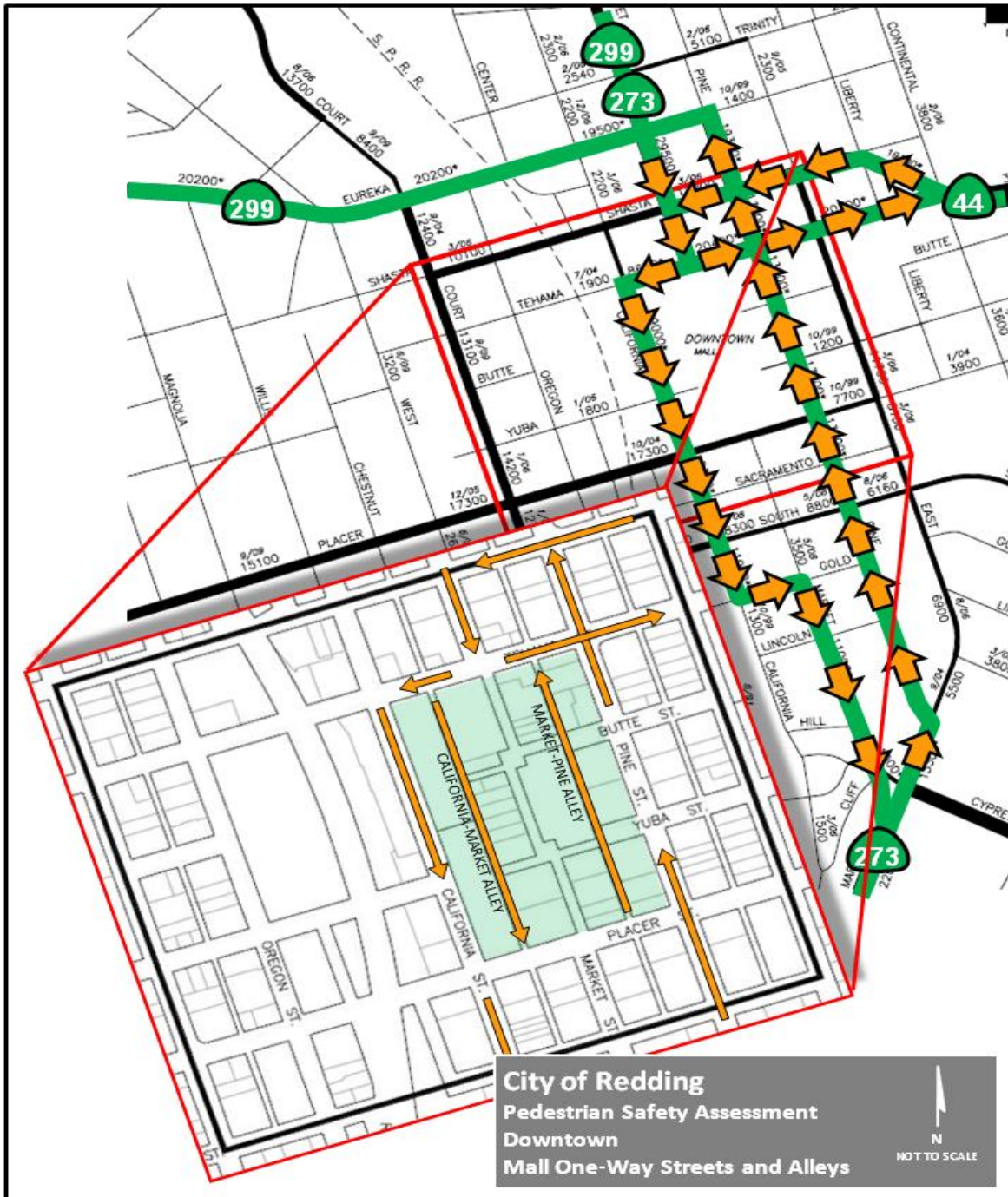


Figure 4-7 Downtown Alternative 1 Recommendations (Typical)

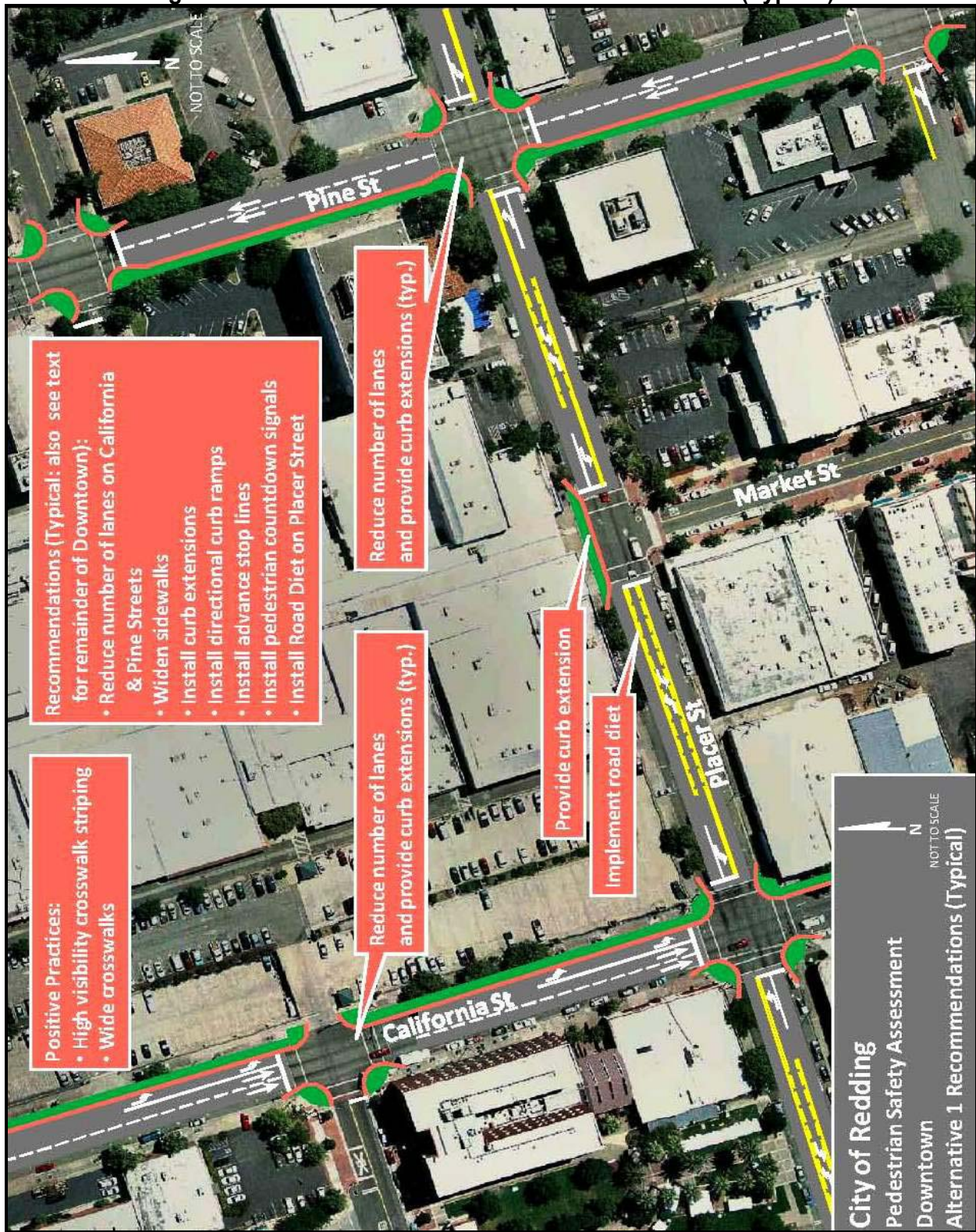
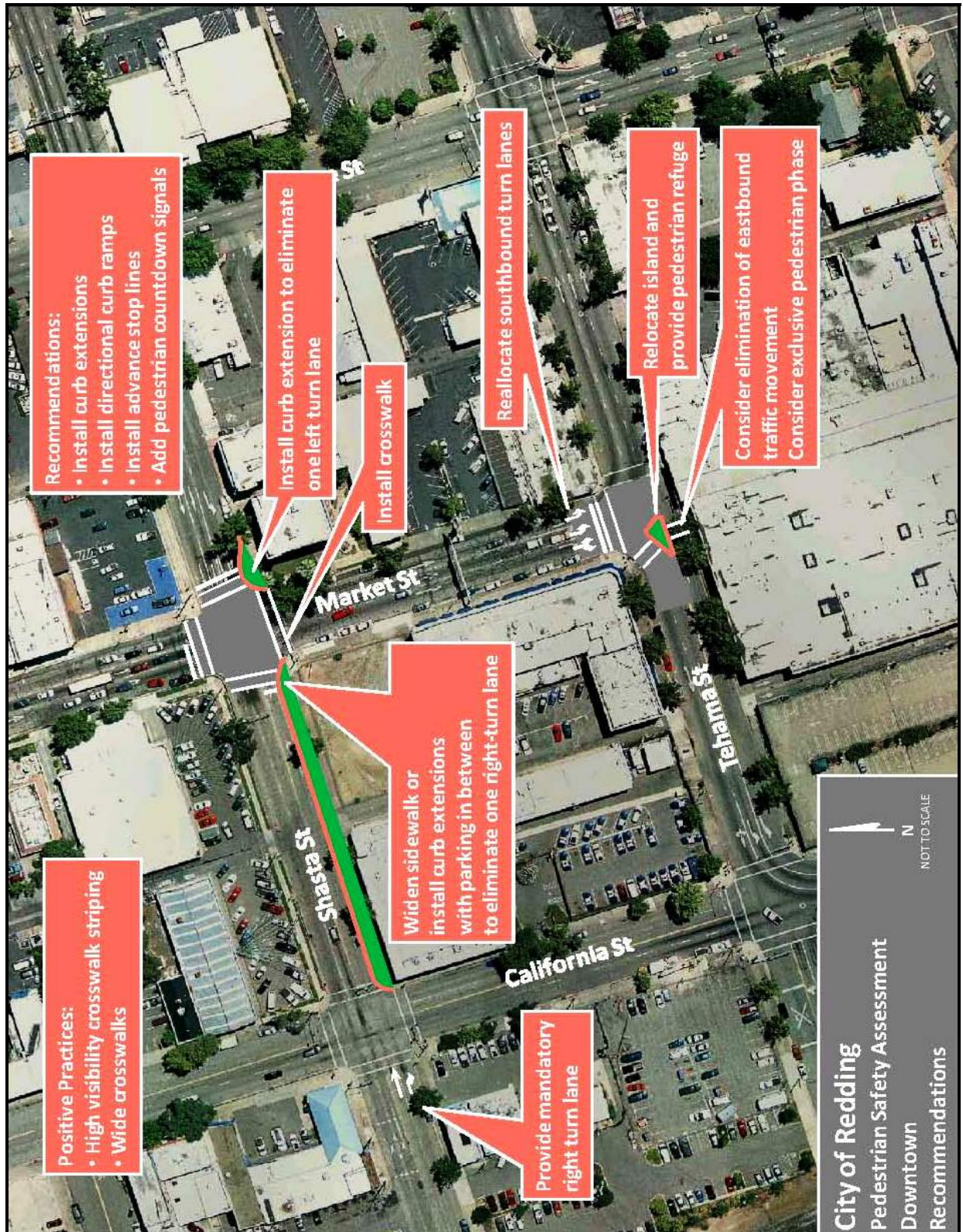


Figure 4-8 Downtown Recommendations



4.3 FOCUS AREA 2: SACRAMENTO RIVER TRAIL HEAD

Observations

The Sacramento River Trail Head provides a recreational activity that would benefit from improved pedestrian and bicycle linkages to downtown and other parts of the City. A natural route for a pedestrian and bicycle link would be along Riverside Drive. Two major obstacles obstruct development of an effective linkage along Riverside Drive. First, Riverside Drive passes under a railroad bridge that leaves no room for sidewalks or bike lanes. City staff has been informed by the Public Utilities Commission that if changes are made to the roadway, a structure sufficient to support train traffic would have to be constructed above the street. A second obstacle to an effective linkage is the lack of an adequate crossing of Court Street.

The following positive characteristics were observed:

- A sidewalk is located along the west side of Court Street
- Paved shoulders along Court Street provide space for bicyclists
- The posted speed on Court Street is 30 mph.

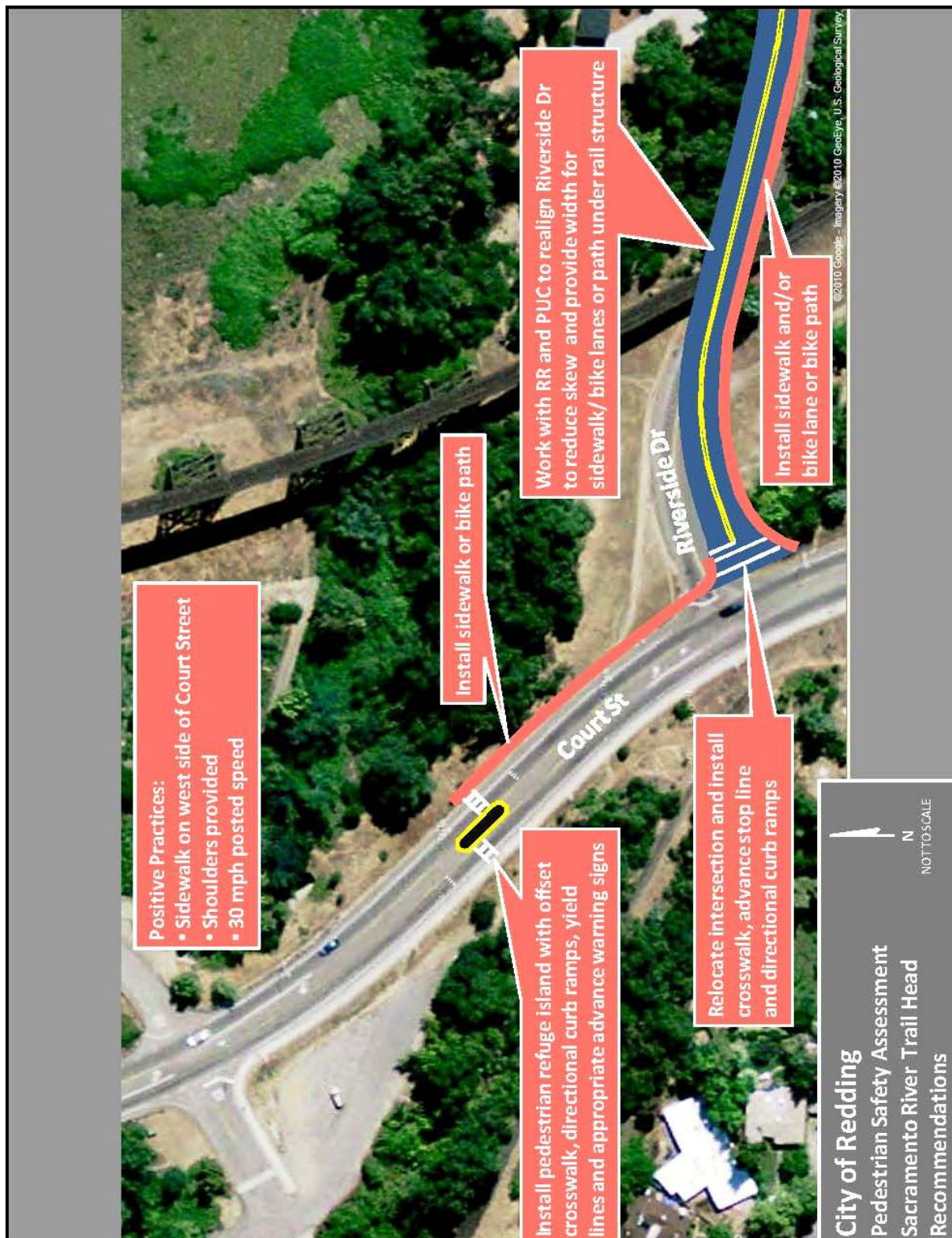


Suggestions for Potential Improvement

The following are treatments suggested for access to the Sacramento River Trail Head:

- *Work with the railroad and PUC to realign Riverside Drive to reduce skew and provide width for sidewalk and/or bike lanes or a path along Riverside Drive under the rail structure.*
- *Relocate intersection of Riverside Drive and Court Street with the above realignment of Riverside Drive*
- *Install a high visibility, marked crosswalk and advance stop lines on the Riverside Drive stop controlled approach to Court Street.*
- *To the north of the Riverside Drive and Court Street intersection, where sufficient sight-distance is available for a crossing, install a pedestrian refuge island in the Court Street median with offset marked crosswalk, advance yield lines, and appropriate advance warning signs.*
- *Install a sidewalk or path between the pedestrian refuge island and relocated Riverside Drive.*
- *Install directional curb ramps for all crosswalks.*

Figure 4-9 Sacramento River Trail Head Recommendations



4.4 FOCUS AREA 3: STOP LINES MARKET STREET BRIDGE

Observations

A windshield audit was performed while driving across the Market Street Bridge.

The following positive characteristics were observed:

- Sidewalks are provided along both sides of the bridge with a high curb and rail barrier to protect pedestrians from motor vehicles.

Suggestions for Potential Improvement

The following are treatments suggested for the Market Street Bridge:

- *Narrow the left lanes to 10 or 11 feet and provide additional width for the right lanes to better accommodate bicyclists.*
- *Consider construction of a suspended or cantilevered Class I bicycle path attachment to the existing bridge structure.*

4.5 FOCUS AREA 4: MCDONALDS CHAPEL

Observations

McDonalds Chapel provides an opportunity to improve pedestrian and bicycle linkage between downtown and the Redding Convention Center. The driveway into the memorial grounds, located directly across Continental Street from Eureka Way, carries very light motor vehicle traffic volumes and would be an ideal linkage if an arrangement could be developed for public access.

The following positive characteristics were observed:

- The Chapel driveway carries very little motor vehicle traffic
- Low volume streets connect the Chapel grounds to downtown

Suggestions for Potential Improvement

The following are treatments suggested for McDonalds Chapel:

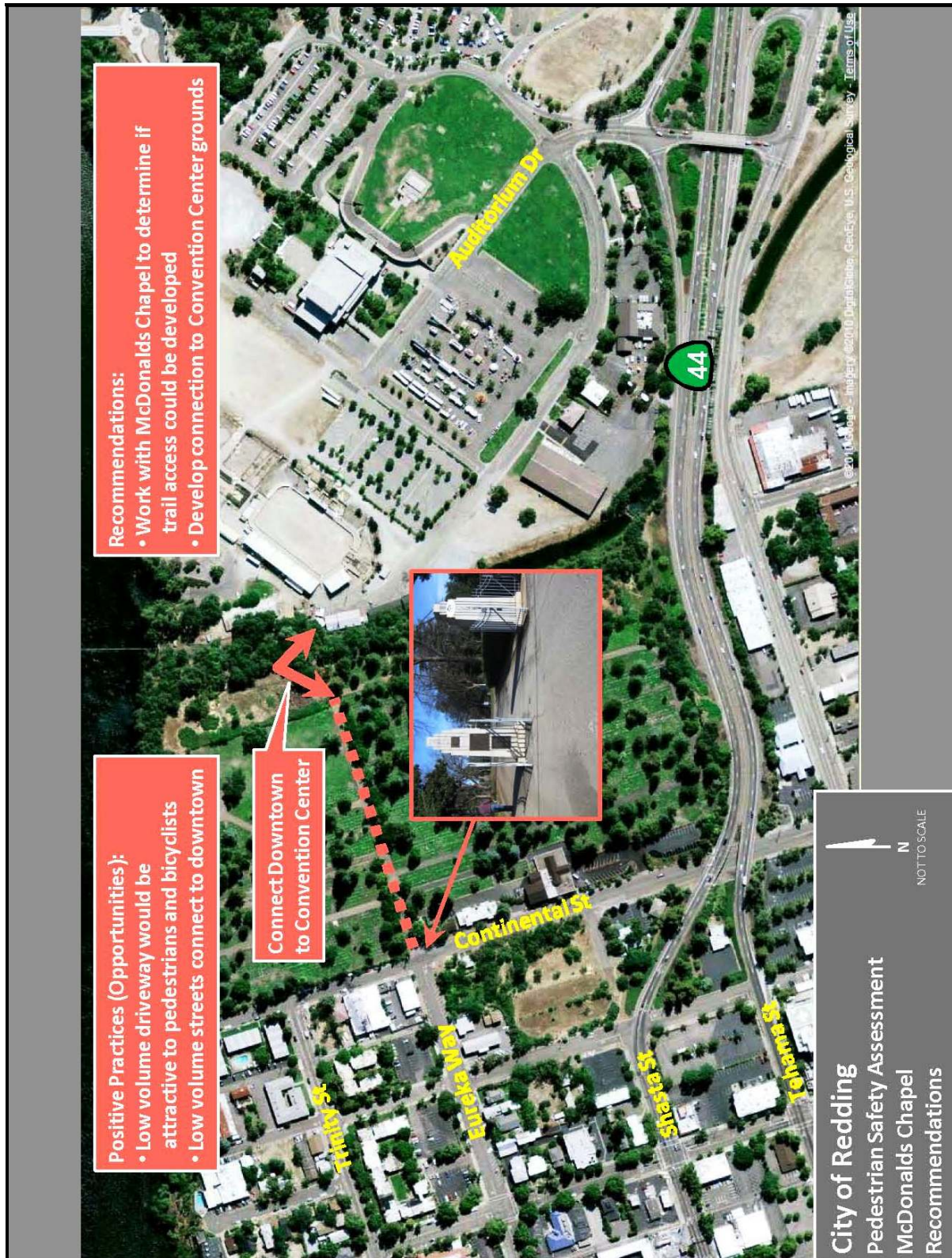
- *Work with McDonalds Chapel owners to determine if trail access could be developed to link*



downtown to the Convention Center. An agreement that would only provide access during daylight hours would be a significant improvement to pedestrian and bicycle mobility.

- *Develop a trail connection from the Chapel to the Convention Center. The topography is very steep and the location of buildings on the Convention Center grounds makes development of a trail connection challenging.*

Figure 4-10 McDonalds Chapel Recommendations



4.6 FOCUS AREA 5: BEVERLY CROSSING

Observations

An unsignalized pedestrian crossing of East Cypress Avenue at Beverly Street is located along a busy street that provides direct access to I-5, located just to the east. On occasion traffic queues extend from the interchange back to the existing crossing. Bus stops are provided on East Cypress Avenue just east and west of Beverly Street. Pedestrians wishing to access the bus stops have no nearby alternative to crossing at the Beverly Street Crossing. It is unlikely that any of the warrants for a pedestrian signal will be satisfied.



The following positive characteristics were observed:

- Transit service is provided
- A marked crosswalk is provided across East Cypress Avenue

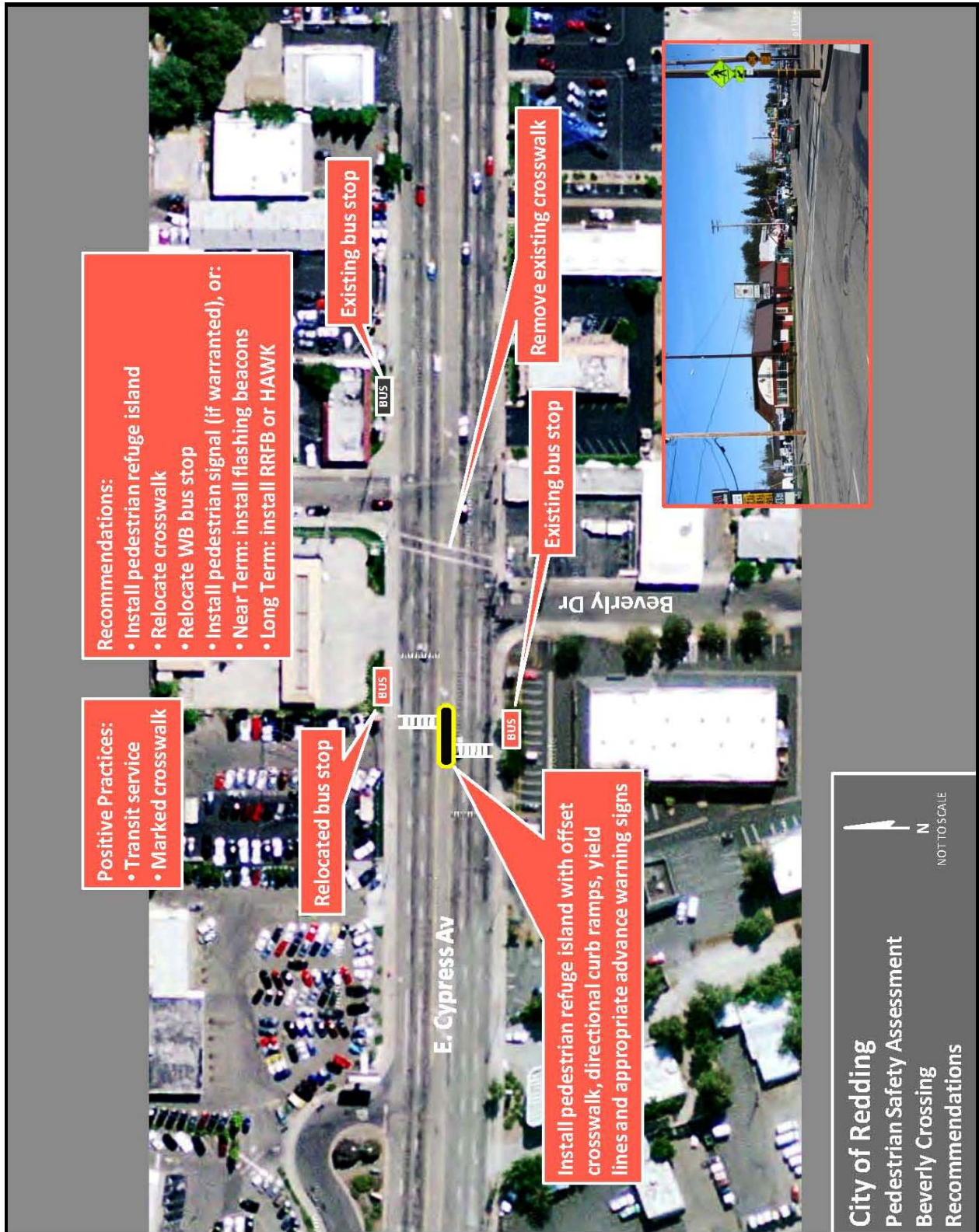
Suggestions for Potential Improvement

The following are treatments suggested for the Beverly Street Crossing:

- *Install a pedestrian refuge island in the East Cypress Avenue median to the west of Beverly Drive with offset high visibility, marked crosswalk, directional curb ramps, advance yield lines, and appropriate advance warning signs.*
- *Relocate the westbound bus stop across from the eastbound bus stop.*
- *Remove existing marked crosswalk.*
- *Consider near-term installation of a pedestrian signal if warranted, or post-mounted (road side and median) flashing beacons with push-button activation or activation by pedestrian detection.*
- *Consider longer-term installation of roadside and median rectangular rapid flash beacons (RRFB), or an overhead pedestrian hybrid beacon "HAWK" with push-button activation or activation by pedestrian detection.⁵*

⁵ Note that the RRFB and HAWK beacon are not currently permitted for use in California but are under consideration and permitted under Federal guidelines. If available, these devices would be preferable to an overhead flashing beacon at this location.

Figure 4-11 Beverly Crossing Recommendations



4.7 FOCUS AREA 6: END OF TRAIL: DANA DRIVE TO DOWNTOWN

Observations

A new bike trail extension has been recently constructed from the Sacramento River to Hilltop Drive at the intersection of Dana Drive. Pedestrians can use existing crosswalks and sidewalks to access the Mt. Shasta Shopping Center and points north and east but the trail currently ends abruptly with no connectivity to other bicycle facilities. The Hilltop Bridge across SR 44 is narrow and uninviting to bicyclists. Access to Dana Drive is difficult and the safest way to access points east is for bicyclists to walk their bikes along the pedestrian facilities to the signalized Mt. Shasta Mall Driveway. Access to the north is obstructed by a drainage ditch located along the northeast portion of the trail.

The following positive characteristics were observed:

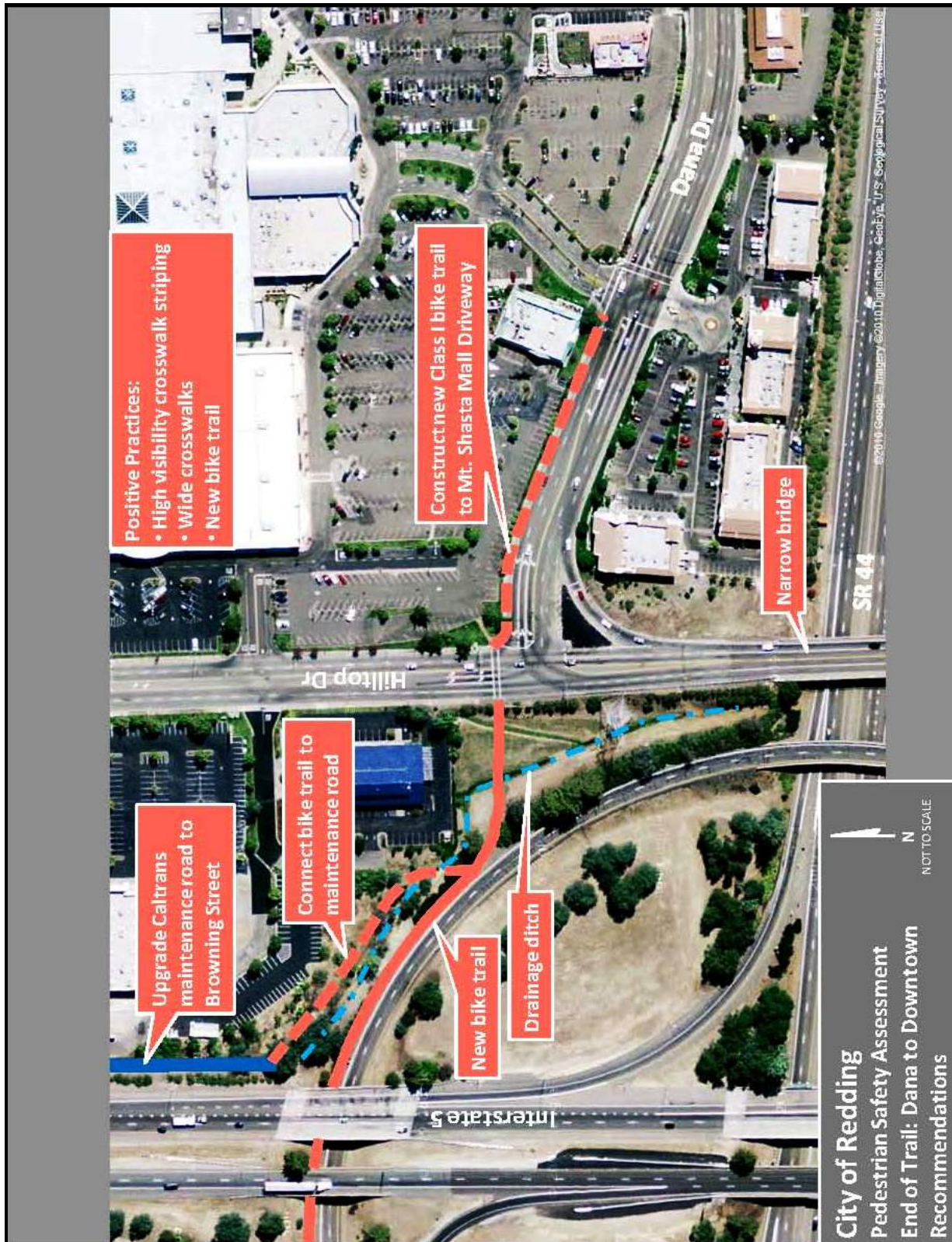
- New bike trail linked to the Sacramento River

Suggestions for Potential Improvement

The following are treatments suggested for the end of the multi-use trail at Hilltop and Dana Drive:

- *Connect the bike trail to the north to the maintenance road located along the east side of I-5, extending bicycle access to the intersection of Browning Street and Hilltop Drive. This extension would likely require negotiated agreements with Caltrans and possibly private property owners.*
- *Provide a new Class I bike trail along Dana Drive from Hilltop Drive to Mt. Shasta Mall Driveway.*
- *Provide wayfinding signage.*

Figure 4-12 End of Trail: Dana to Downtown Recommendations



APPENDIX A: GLOSSARY OF CANDIDATE TREATMENT OPTIONS

| PEDESTRIAN IMPROVEMENT MEASURES | | | |
|--|--|--|--|
| Measure | Description | Benefits | Application |
| Traffic Control Countermeasures | | | |
| Traffic Signal or All-Way Stop | Conventional traffic control devices with warrants for use based on the Manual on Uniform Control Devices (MUTCD). | Reduces pedestrian-vehicle conflicts and slows traffic speeds. | Must meet warrants based on traffic and pedestrian volumes; however, exceptions are possible based on demonstrated pedestrian safety concerns (collision history). |
| HAWK Beacon Signal | HAWK (High Intensity Activated Crosswalks) are pedestrian-actuated signals that are a combination of a beacon flasher and a traffic control signal. When actuated, HAWK displays a yellow (warning) indication followed by a solid red light. During pedestrian clearance, the driver sees a flashing red "wig-wag" pattern until the clearance interval has ended and the signal goes dark. | Reduces pedestrian-vehicle conflicts and slows traffic speeds. | Useful in areas where it is difficult for pedestrians to find gaps in automobile traffic to cross safely, but where normal signal warrants are not satisfied. Appropriate for multi-lane roadways. |
| Overhead Flashing Beacons | Flashing amber lights are installed on overhead signs, in advance of the crosswalk or at the entrance to the crosswalk. | The blinking lights during pedestrian crossing times increase the number of drivers yielding for pedestrians and reduce pedestrian-vehicle conflicts. This measure can also improve conditions on multi-lane roadways. | Best used in places where motorists cannot see a traditional sign due to topography or other barriers. |
| Stutter Flash | The Overhead Flashing Beacon is enhanced by replacing the traditional slow flashing incandescent lamps with rapid flashing LED lamps. The beacons may be push-button activated or activated with pedestrian detection. | Initial studies suggest the stutter flash is very effective as measured by increased driver yielding behavior. Solar panels reduce energy costs associated with the device. | Appropriate for multi-lane roadways. |

| PEDESTRIAN IMPROVEMENT MEASURES | | | |
|--|--|--|--|
| Measure | Description | Benefits | Application |
| In-Roadway Warning Lights | Both sides of a crosswalk are lined with pavement markers, often containing an amber LED strobe light. The lights may be push-button activated or activated with pedestrian detection. | This measure provides a dynamic visual cue, and is increasingly effective in bad weather. | Best in locations with low bicycle ridership, as the raised markers present a hazard to bicyclists. May not be appropriate in areas with heavy winter weather due to high maintenance costs. May not be appropriate for locations with bright sunlight. The lights may cause confusion when pedestrians fail to activate them and/or when they falsely activate. |
| High-Visibility Signs and Markings | High-visibility markings include a family of crosswalk striping styles including the "ladder" and the "triple four." One style, the zebra-style crosswalk pavement markings, were once popular in Europe, but have been phased out because the signal-controlled puffin is more effective (see notes). High-visibility fluorescent yellow green signs are made of the approved fluorescent yellow-green color and posted at crossings to increase the visibility of a pedestrian crossing ahead. | FHWA recently ended its approval process for the experimental use of fluorescent yellow crosswalk markings and found that they had no discernable benefit over white markings. | Beneficial in areas with high pedestrian activity, as near schools, and in areas where travel speeds are high and/or motorist visibility is low. |
| In-Street Pedestrian Crossing Signs | This measure involves posting regulatory pedestrian signage on lane edge lines and road centerlines. The In-Street Pedestrian Crossing sign may be used to remind road users of laws regarding right of way at an unsignalized pedestrian crossing. The legend STATE LAW may be shown at the top of the sign if applicable. The legends STOP FOR or YIELD TO may be used in conjunction with the appropriate symbol. | This measure is highly visible to motorists and has a positive impact on pedestrian safety at crosswalks. | Mid-block crosswalks, unsignalized intersections, low-speed areas, and two-lane roadways are ideal for this pedestrian treatment. The STOP FOR legend shall only be used in states where the state law specifically requires that a driver must stop for a pedestrian in a crosswalk. |

| PEDESTRIAN IMPROVEMENT MEASURES | | | |
|--|---|---|---|
| Measure | Description | Benefits | Application |
| Pedestrian Crossing Flags | Square flags of various colors, which are mounted on a stick and stored in sign-mounted holders on both side of the street at crossing locations; they are carried by pedestrians while crossing a roadway. | This measure makes pedestrians more visible to motorists. | Appropriate for mid-block and uncontrolled crosswalks with low visibility or poor sight distance. |
| Advanced Yield Lines | Standard white stop or yield limit lines are placed in advance of marked, uncontrolled crosswalks. | This measure increases the pedestrian's visibility to motorists, reduces the number of vehicles encroaching on the crosswalk, and improves general pedestrian conditions on multi-lane roadways. It is also an affordable option. | Useful in areas where pedestrian visibility is low and in areas with aggressive drivers, as advance limit lines will help prevent drivers from encroaching on the crosswalk. Addresses the multiple-threat collision on multi-lane roads. |
| Geometric Treatments | | | |
| Pedestrian Overpass/ Underpass | This measure consists of a pedestrian-only overpass or underpass over a roadway. It provides complete separation of pedestrians from motor vehicle traffic, normally where no other pedestrian facility is available, and connects off-road trails and paths across major barriers. | Pedestrian overpasses and underpasses allow for the uninterrupted flow of pedestrian movement separate from the vehicle traffic. | Grade separation via this measure is most feasible and appropriate in extreme cases where pedestrians must cross roadways such as freeways and high-speed, high-volume arterials. This measure should be considered a last resort, as it is expensive and visually intrusive. |
| Road Diet (aka Lane Reduction) | The number of lanes of travel is reduced by widening sidewalks, adding bicycle and parking lanes, and converting parallel parking to angled or perpendicular parking. | This is a good traffic calming and pedestrian safety tool, particularly in areas that would benefit from curb extensions but have infrastructure in the way. This measure also improves pedestrian conditions on multi-lane roadways. | Roadways with surplus roadway capacity (typically multi-lane roadways with less than 15,000 to 17,000 ADT) and high bicycle volumes, and roadways that would benefit from traffic calming measures. |

| PEDESTRIAN IMPROVEMENT MEASURES | | | |
|--|--|---|--|
| Measure | Description | Benefits | Application |
| Median Refuge Island | Raised islands are placed in the center of a roadway, separating opposing lanes of traffic with cutouts for accessibility along the pedestrian path. | This measure allows pedestrians to focus on each direction of traffic separately, and the refuge provides pedestrians with a better view of oncoming traffic as well as allowing drivers to see pedestrians more easily. It can also split up a multi-lane road and act as a supplement to additional pedestrian tools. | Recommended for multi-lane roads wide enough to accommodate an ADA-accessible median. |
| Staggered Median Refuge Island | This measure is similar to traditional median refuge islands; the only difference is that the crosswalks in the roadway are staggered such that a pedestrian crosses half the street and then must walk towards traffic to reach the second half of the crosswalk. This measure must be designed for accessibility by including rails and truncated domes to direct sight-impaired pedestrians along the path of travel. | Benefits of this tool include an increase in the concentration of pedestrians at a crossing and the provision of better traffic views for pedestrians. Additionally, motorists are better able to see pedestrians as they walk through the staggered refuge. | Best used on multi-lane roads with obstructed pedestrian visibility or with off-set intersections. |
| Curb Extension | Also known as a pedestrian bulb-out, this traffic-calming measure is meant to slow traffic and increase driver awareness. It consists of an extension of the curb into the street, making the pedestrian space (sidewalk) wider. | Curb extensions narrow the distance that a pedestrian has to cross and increases the sidewalk space on the corners. They also improve emergency vehicle access and make it difficult for drivers to turn illegally. | Due to the high cost of installation, this tool would only be suitable on streets with high pedestrian activity, on-street parking, and infrequent (or no) curb-edge transit service. It is often used in combination with crosswalks or other markings. |

| PEDESTRIAN IMPROVEMENT MEASURES | | | |
|--|--|---|---|
| Measure | Description | Benefits | Application |
| Reduced Curb Radii | The radius of a curb can be reduced to require motorists to make a tighter turn. | Shorter radii narrow the distance that pedestrians have to cross; they also reduce traffic speeds and increase driver awareness (like curb extensions), but are less difficult and expensive to implement. | This measure would be beneficial on streets with high pedestrian activity, on-street parking, and no curb-edge transit service. It is more suitable for wider roadways and roadways with low volumes of heavy truck traffic. |
| Curb Ramps | Curb ramps are sloped ramps that are constructed at the edge of a curb (normally at intersections) as a transition between the sidewalk and a crosswalk. | Curb ramps provide easy access between the sidewalk and roadway for people using wheelchairs, strollers, walkers, crutches, handcarts, bicycles, and also for pedestrians with mobility impairments who have trouble stepping up and down high curbs. | Curb ramps must be installed at all intersections and mid-block locations where pedestrian crossings exist, as mandated by federal legislation (1973 Rehabilitation Act and 1990 Americans with Disabilities Act). Where feasible, separate curb ramps for each crosswalk at an intersection should be provided rather than having a single ramp at a corner for both crosswalks. |
| Raised Crosswalk | A crosswalk whose surface is elevated above the travel lanes. | Attracts drivers' attention; encourages lower travel speeds by providing visual and tactile feedback when approaching the crosswalk. | Appropriate for multi-lane roadways, roadways with lower speed limits that are not emergency routes, and roadways with high levels of pedestrian activity, such as near schools, shopping malls, etc. |

| PEDESTRIAN IMPROVEMENT MEASURES | | | |
|--|---|---|---|
| Measure | Description | Benefits | Application |
| Improved Right-Turn Slip-Lane Design | Right-turn slip lanes (aka channelized right-turn lanes) are separated from the rest of the travel lanes by a pork chop-shaped striped area. This measure separates right-turning traffic and streamlines right-turning movements. Improved right-turn slip lanes would provide pedestrian crossing islands within the intersection and be designed to optimize the right-turning motorist's view of the pedestrian and of vehicles to his or her left. | This measure reduces the pedestrian's crossing distance and turning vehicle speeds. | Appropriate for intersections with high volumes of right-turning vehicles. |
| Chicanes | A chicane is a sequence of tight serpentine curves (usually an S-shape curve) in a roadway, used on city streets to slow cars. | This is a traffic-calming measure that can improve the pedestrian environment and pedestrian safety. | Chicanes can be created on streets with higher volumes, given that the number of through lanes is maintained; they can also be created on higher-volume residential streets to slow traffic. Chicanes may be constructed by alternating parallel or angled parking in combination with curb extensions. |
| Pedestrian Access and Amenities | | | |
| Marked Crosswalk | Marked crosswalks should be installed to provide designated pedestrian crossings at major pedestrian generators, crossings with significant pedestrian volumes (at least 15 per hour), crossings with high vehicle-pedestrian collisions, and other areas based on engineering judgment. | Marked crosswalks provide a designated crossing, which may improve walkability and reduce jaywalking. | Marked crosswalks alone should not be installed on multi-lane roads with more than about 10,000 vehicles/day. Enhanced crosswalk treatments (as presented in this table) should supplement the marked crosswalk. |

| PEDESTRIAN IMPROVEMENT MEASURES | | | |
|--|---|---|---|
| Measure | Description | Benefits | Application |
| Textured Pavers | Textured pavers come in a variety of materials (for example, concrete, brick, and stone) and can be constructed to create a textured pedestrian surface such as a crosswalk or sidewalk. Crosswalks are constructed with the pavers, or can be made of stamped concrete or asphalt. | Highly visible to motorists, this measure provides a visual and tactile cue to motorists and delineates a separate space for pedestrians, as it provides a different texture to the street for pedestrians and motorists. It also aesthetically enhances the streetscape. | Appropriate for areas with high volumes of pedestrian traffic and roadways with low visibility and/or narrow travel ways, as in the downtown area of towns and small cities. |
| Anti-Skid Surfacing | Surface treatment is applied to streets to improve skid resistance during wet weather. This is a supplementary tool that can be used to reduce skidding in wet conditions. | Improves driver and pedestrian safety. | Appropriate for multi-lane roadways and roadways with higher posted speed limit and/or high vehicle volumes or collision rates. |
| Accessibility Upgrades | Treatments such as audible pedestrian signals, accessible push buttons, and truncated domes should be installed at crossings to accommodate disabled pedestrians. | Improves accessibility of pedestrian facilities for all users. | Accessibility upgrades should be provided for all pedestrian facilities following a citywide ADA Transition Plan. |
| Pedestrian Countdown Signal | Displays a "countdown" of the number of seconds remaining for the pedestrian crossing interval. In some jurisdictions the countdown includes the walk phase. In other jurisdictions, the countdown is only displayed during the flashing don't walk phase. | Increases pedestrian awareness and allows them the flexibility to know when to speed up if the pedestrian phase is about to expire. | The forthcoming 2009 MUTCD is expected to require all pedestrian signals to incorporate countdown signals within ten years. The signals should be prioritized for areas with pedestrian activity, roadways with high volumes of vehicular traffic, multi-lane roadways, and areas with elderly or disabled persons (who may walk slower than others may). |

| PEDESTRIAN IMPROVEMENT MEASURES | | | |
|--|--|---|--|
| Measure | Description | Benefits | Application |
| Transit | | | |
| High-Visibility Bus Stop Locations | This measure should include siting bus stops on the far side of intersections, with paved connections to sidewalks where landscape buffers exist. | Provides safe, convenient, and inviting access for transit users; can improve roadway efficiency and driver sight distance. | Appropriate for all bus stops subject to sight distance and right-of-way constraints. |
| Transit Bulb | Transit bulbs or bus bulbs, also known as nubs, curb extensions, or bus bulges are a section of sidewalk that extends from the curb of a parking lane to the edge of the through lane. | Creates additional space at a bus stop for shelters, benches, and other passenger amenities. | Appropriate at sites with high patron volumes, crowded city sidewalks, and curbside parking. |
| Enhanced Bus Stop Amenities | Adequate bus stop signing, lighting, a bus shelter with seating, trash receptacles, and bicycle parking are desirable features at bus stops. | Increase pedestrian visibility at bus stops and encourage transit ridership | Appropriate at sites with high patron volumes. |

APPENDIX B: RESOURCE LIST

RESOURCE LIST

A Guide for Reducing Collisions Involving Pedestrians (NCHRP Report 500)

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v10.pdf

Pedestrian and Bicycle Information Center

<http://www.walkinginfo.org/>

National Center for Safe Routes to School

<http://www.saferoutesinfo.org/>

Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations (HRT-04-100)

<http://www.thrc.gov/safety/pubs/04100/index.htm>

How to Develop a Pedestrian Safety Action Plan (FHWA-SA-05-12)

<http://www.walkinginfo.org/pp/howtoguide2006.pdf>

Improving Pedestrian Safety at Unsignalized Crossings (NCHRP Report 562)

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_562.pdf

Road Safety Audits: Case Studies (FHWA-SA-06-17)

http://safety.fhwa.dot.gov/rsa/rsa_cstudies.htm

Pedestrian Road Safety Audit Guidelines and Prompt Lists

http://drusilla.hsrc.unc.edu/cms/downloads/PedRSA_reduced.pdf

PEDSAFE: The Pedestrian Safety Guide and Countermeasure Selection System (FHWA-SA-04-003)

<http://www.walkinginfo.org/pedsafe/>

Pedestrian and Bicycle Crash Analysis Tool (PBCAT)

<http://www.bicyclinginfo.org/bc/pbcats.cfm>

FHWA, *A Resident's Guide for Creating Safe and Walkable Communities*

http://safety.fhwa.dot.gov/ped_bicycle/ped/ped_walkguide/index.htm

FHWA, *Pedestrian Safety Guide for Transit Agencies (FHWA-SA-07-017)*

http://safety.fhwa.dot.gov/ped_bicycle/ped/ped_transguide/

FHWA Pedestrian Safety Training Courses:

Developing a pedestrian safety action plan (two-day course)

next California course: <http://www.google.com/calendar/embed?src=lssandt@email.unc.edu>

Designing for pedestrian safety (two-day course)

next California course: <http://www.google.com/calendar/embed?src=lssandt@email.unc.edu>

Planning and designing for pedestrian safety (three-day course)

next California course: <http://www.google.com/calendar/embed?src=lssandt@email.unc.edu>

Adapted from FHWA *Pedestrian Road Safety Audit Guidelines and Prompt Lists*

ABOUT THE TECHNOLOGY TRANSFER PROGRAM

The Technology Transfer Program, a division of the Institute of Transportation Studies at the University of California, Berkeley, is the California transportation community's source for professional training, expert assistance, and free resources for public agencies.

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