A TECHNICAL GUIDE FOR CONDUCTING PEDESTRIAN SAFETY ASSESSMENTS

FOR CALIFORNIA CITIES

University of California Berkeley
Institute of Transportation Studies
Technology Transfer Program

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PREFACE

During the last 10 years, California has averaged over 730 pedestrian fatalities per year. Pedestrian safety has been a challenge to many California cities/communities, and improvement in pedestrian safety is among priorities for these cities. With funding from the California Office of Traffic Safety, through the National Highway Traffic Safety Administration, the Institute of Transportation Studies Technology Transfer Program, University of California Berkeley (known briefly as Tech Transfer) will be offering free Pedestrian Safety Assessments (PSA) to California cities starting in 2008.

This report describes technical components of the California PSA program, and will serve as a technical guide for evaluators to conduct PSAs. This guide was built on the material contained in the recently published FHWA report titled *Pedestrian Road Safety Audit Guidelines and Prompt Lists* (July 2007). We incorporated additional technical elements as deemed appropriate for California and available resources.

Many individuals and agencies have contributed input and ideas to this guide. Particular thanks are due for Christopher Murphy and Lisa Dixon of OTS, Ken Kochevar of FHWA, William Kootsikas and Rosalind Tianco of NHTSA, Richard Haggstrom and Ken McGuire of Caltrans, Bruce Appleyard of UC Berkeley, and Charles Zegeer of UNC Chapel Hill. We also owe special thanks to Dan Burden of Glatting Jackson, who reviewed several drafts of this manual and provided invaluable suggestions. Rudolph Umbs of FHWA provided very helpful comments for the final draft.

Opinions and ideas expressed in this report are those of the authors and may not necessarily reflect the opinions of the agencies mentioned herein.

1. INTRODUCTION

Each year in California, over 4,000 motorists, pedestrians and bicyclists die as the result of traffic collisions. Pedestrian fatalities represent about 17% of total traffic fatalities in California, significantly exceeding the national average of 11%. During the last 10 years, California has averaged over 730 pedestrian fatalities per year. Pedestrian safety has been a significant challenge to many California cities/communities, and therefore improved pedestrian safety has been among top priorities for these cities. Pedestrian Safety Assessments (PSA) are one approach to improving pedestrian safety within California communities, as a PSA enables cities to systematically identify pedestrian safety issues/problems and effective remedial options. Improved pedestrian safety and improved pedestrian infrastructure in turn can lead to enhanced walkability and economic vitality of communities.

With funding from the California Office of Traffic Safety, through the National Highway Traffic Safety Administration, the Institute of Transportation Studies Technology Transfer Program (Tech Transfer), University of California Berkeley, will be offering Pedestrian Safety Assessments as a *free* statewide service to California cities/communities *upon request* starting in 2008.

For brevity, this program will be referred to as the "California PSA" in this report.

This report presents a technical guide developed specifically for use in conducting Pedestrian Safety Assessments for California cities.

1.1 OBJECTIVE OF THE CALIFORNIA PSA

The objective of the California PSA is to enable California communities to:

- Improve pedestrian safety at specific locations and citywide
- Create safe, comfortable, accessible, and welcoming environments for pedestrians
- Enhance walkability, livability, and economic vitality

1.2 SCOPE OF THE CALIFORNIA PSA

OTS would like recommendations from the California PSAs to focus primarily on pedestrian safety and accessibility needs that are related to infrastructure, engineering, and planning/policy measures. This is because improved pedestrian safety and infrastructure can potentially result in enhanced walkability, livability, and economic well-being of communities. Recommendations on education, enforcement, and zoning may be secondary considerations. Furthermore, consultation with OTS led to the determination that each PSA will be conducted by two evaluators (who collectively have expertise over a wide range of pedestrian safety related issues) visiting the city for two days to conduct a Pedestrian Safety Assessment.

In light of the above project scope, the California PSA can be defined as an evaluation of pedestrian safety and accessibility at existing or future roadways and the public realm in a California city by independent pedestrian safety experts, with a view to providing recommendations to enable the city to significantly improve pedestrian safety and accommodation, create safe and comfortable environments for pedestrians, and enhance economic vitality through infrastructure, engineering, and planning/policy measures.

1.3 PEDESTRIAN SAFETY AND ECONOMIC VITALITY

Improved pedestrian safety, accessibility, and walkability of a community can offer many benefits (Litman, 2007), for example:

- improved accessibility (particularly for non-drivers)
- reduced transportation costs
- increased parking efficiency
- support for transit
- reduced pollution
- increased neighborhood interactions
- increased opportunities for cultural resource preservation
- reduced land needs for roads and parking
- open space preservation
- improved aesthetics
- increased fitness and health of its citizens
- reduced auto dependency and reductions in VMT growth

All of these benefits in turn can lead to the clear economic benefit of walkable environments, for example: increasing property values, attracting tourists, improving retail sales, and attracting workers. As Dan Burden of Walkable Communities, Inc., explains “Fix the streets, then the people and businesses will follow” (California Local Government Commission). By illustrating the economic benefits of improving walkability through a PSA, California communities may be motivated to improve their pedestrian-oriented infrastructure and land uses by applying for grants, reallocating transportation funds to pedestrian projects, creating a Pedestrian Master Plan, etc.

The experience of the City of El Cajon in Southern California offers an example of the economic vitality benefits of improving walkability. In 1999 the city launched a downtown revitalization effort, which included a "road diet," or reduction in the number of lanes/ road width on East Main Street. The road diet led to slower traffic and created room for widened sidewalks with outdoor dining, landscaping, street furniture, and bulb-outs at intersections. In addition to the road diet, the city adopted a land use plan to add significant new housing units, offices, and retail; issued development guidelines to ensure that new development occurs with an urban form that supports walking; and enhanced nearby pedestrian walkways to connect to East Main Street. The Community Development Corporation also began sponsoring events to attract people downtown. The downtown revitalization has been significant. Property values have increased by 181 percent and taxable sales have increased by 66 percent downtown (compared to 75 percent and 45 percent, respectively, in the city at large). Additionally, hotel taxes have increased by 36 percent, lease rates have increased by 56 percent, and crime has decreased by 16 percent. The private sector has invested more that $43 million downtown, and 179 new businesses and 746 new jobs have been created (Pedestrian and Bicycle Information Center).

There are other similar economic vitality "success stories," as shown in the brochure, "Economic Benefits of Walkable Communities," published by the California Local Government Commission (www.lgc.org).

Economic vitality is an integral part of the following technical components of the California PSA.

Figure 1: Sidewalk Cafes after East Main Street Road Diet (walkinginfo.org)

2. TECHNICAL COMPONENTS OF THE CALIFORNIA PSA

Each Pedestrian Safety Assessment for a California city will include the following technical components:

- Identify locations in the city for evaluation
- Obtain relevant information from the city
- Convene a kickoff meeting with key city staff and other local members, as identified by the city
- Perform field audits/reviews under various conditions
- Identify best practices
- "Benchmark" the city's policies, programs, and practices on pedestrian safety and accommodation
- Prepare a technical report

Each of these technical components is elaborated in the following sections.

2.1 IDENTIFY LOCATIONS IN THE CITY FOR EVALUATION

This consists of two parts: (1) ranking the city by pedestrian safety performance, and (2) identifying locations in the city for evaluations.

Ranking the City by Pedestrian Safety Performance

Prior to visiting the city, the evaluators will determine how the overall pedestrian safety in that city compares with other California cities of similar population size. This is a useful first indicator of the overall pedestrian safety in that city, and it can be done by using OTS pedestrian safety ranking data, in which California cities are divided into six population groups:

- Over 250,000 (13 cities)
- 100,001 to 250,000 (50 cities)
- 50,001 to 100,000 (103 cities)
- 25,001 to 50,000 (97 cities)
- 10,001 to 25,000 (105 cities)
- 2,501 to 10,000 (74 cities)

In ranking California cities with respect to their pedestrian safety performance, evaluators can use frequencies as well as rates (per 10,000 population and/or per million VMT) of the following crash parameters:

- Total pedestrians killed or injured
- Pedestrians age 1-14 killed or injured
- Pedestrians age 15-21 killed or injured
- Pedestrians age 65+ killed or injured

Identifying Locations in the City for Evaluation

Identification of locations in the city for pedestrian safety and accommodation evaluation can be accomplished in a number of ways, including the following:

- Analysis of SWITRS data to identify high pedestrian collision/casualty locations —intersections as well as road segments (corridors).
- Examinations of pedestrian collision/casualty "pin maps" (i.e., collision density maps) based on local collision database or SWITRS.
- City staff will identify locations in the city to be evaluated based on their familiarity with local pedestrian issues/problems; areas of importance such as main streets, new redevelopment areas, or corridors to receive significant changes; and/or citizens' requests/complaints.
- Upon arrival in the city for the audit, the evaluators conduct a windshield survey (i.e., driving review) of pedestrian facilities in the city to identify potential Focus Areas.

2.2 OBTAIN RELEVANT INFORMATION FROM THE CITY

Prior to visiting the city, the evaluators will contact the city's representative(s) to request data, documents, and other information deemed relevant for the Pedestrian Safety Assessment. Relevant information is shown in Tables 1 – 3 below.

In addition, the evaluators will also conduct a telephone (and/or email) survey with city staff regarding the city's General Plan and Pedestrian Master Plan, and related programs, activities, and policies, as applicable. Examples of interview questions are shown in Table 4. These questions may be provided to the city in advance of the interview to allow time for preparation and staff consultation. The city's responses to this survey will be used later as input for benchmarking the city's policies, programs, and practices on pedestrian safety.

TABLE 1: DATA REQUEST CHECKLIST

Please provide this data citywide and/or for pedestrian safety focus locations, as available.
Please provide available GIS layers for any of the requested data.

	Traffic Volumes
	Pedestrian Volumes
	Location Map of Key Pedestrian Generators or Nodes (i.e., schools, senior centers, parks)
	Traffic Control at Focus Locations
	Pedestrian Collision "Pin Maps", Collision History, and Collision Reports
	Aerial Photographs of Focus Locations
	Speed Limits and Speed Surveys
	As-built Drawings for Focus Locations
	Future Planned Improvements Public and Private (Commercial, Residential, and Business)
	Inventory of Curb Ramps
	Inventory of Missing Sidewalks, Informal Pathways, and Pedestrian Opportunity Areas (along desire lines connecting key generators)
	List of programmed roadway improvements
	Information on significant planned developments/ redevelopment areas
	Key land use features that influence crossings (e.g. parking lots across streets from key buildings)
	Transit maps including schedules
	Truck type and volumes on key roads
	Trails, greenways, and bike lanes
	Schools, Safe Routes to School

TABLE 2: DOCUMENT REQUEST CHECKLIST

	General Plan (especially the Circulation Element)
	Relevant Specific Plans
	Zoning Ordinance and Maps
	Crosswalk Policies and Standards
	Pedestrian Master Plan or Pedestrian/Bicycle Master Plan
	ADA Transition Plan for Streets and Sidewalks
	Traffic Calming Program Documentation or Sample Projects
	Recent Development Proposals
	Recent Traffic Studies
	Greenway Master Plans
	Trail Master Plans
	Parks and Open Space Master Plan(s)
	Transit Master Plan(s)
	Other Regional Transportation Plans
	Community Policies for approval of projects for traffic calming, sidewalks, etc.
	Land Use (Existing and Planned) Maps

TABLE 3: PARTICIPATING LOCAL MEMBERS

*Please provide names for local members who will participate in the two-day visit. Local members indicated by a * are important participants. Local members should be limited to no more than 12 people. Cities may choose to include Regional and State agency representatives in the PSA, but their participation is not required.*

	ADA Coordinator*	Name:
	Bicycle/Pedestrian Advisory Committee Members	Name:
	Bicycle/Pedestrian Coordinator*	Name:
	Business Owners or Residents in Focus Location(s)	Name:
	Business Associations	Name(s):
	Caltrans District/ Headquarters Staff	Name:
	City Architect	Name(s):
	City Landscape Architect	Name(s):
	City Manager or Assistant	Name(s):
	City Planning Department Staff (Long Range and Development Review)*	Name:
	Civic Engagement Department Staff	Name:
	Community Development Department Staff	Name:
	Community Associations	Name(s):
	Department of Aging	Name:
	Disability Rights Advocacy Organization	Name:
	Elected Officials	Name(s):
	Engineering/Public Works Department Staff (including maintenance staff)*	Name:
	Health Organizations including EMS	Name(s):
	Local/Regional Utilities Companies	Name:
	Neighborhood Preservation or Services Department Staff	Name:
	Parking Management Staff	Name:

TABLE 3: PARTICIPATING LOCAL MEMBERS

*Please provide names for local members who will participate in the two-day visit. Local members indicated by a * are important participants. Local members should be limited to no more than 12 people. Cities may choose to include Regional and State agency representatives in the PSA, but their participation is not required.*

	Pedestrian Advocacy Organization Members	Name:
	Planning Commission and/or Board Members	Name:
	Police Traffic Safety Enforcement Officer*	Name:
	Project Development/ Property Owners	Name(s):
	Redevelopment Agency Staff	Name:
	Regional Agency/ MPO Representative	Name:
	Representatives from Non-English Speaking Communities	Name(s):
	School District Staff/PTA/PTO Leaders	Name:
	Senior Citizen Advocates	Name:
	Traffic Safety Advisory Committee Members	Name:
	Transit Services Staff	Name:

TABLE 4: PROGRAMS, PRACTICES, AND POLICIES: PRE-VISIT INTERVIEW

Interview Topic	Subtopic	Suggested Interview Questions *For each area: Request examples of innovative case studies, policies, or programs if not provided with the document request*
Engineering/ Infrastructure Programs, Practices, and Policies	ADA improvements	• Do you have design guidelines or practices related to ADA improvements (examples: What is your practice on installing audible pedestrian signals? What is your practice on directional curb ramps? What are your practices on use of truncated domes? Do you have a practice for installing on-street handicap parking spaces? Do you have guidelines for using contrasting edge bands at commercial driveways and intersections?)? • What are your policies and practices for bringing existing facilities in line with ADA requirements? What are your guidelines for new streets and developments?
	Pedestrian volumes	• Do you routinely collect pedestrian volume data? • Do you require/request that pedestrian and bicycle volumes be counted as part of intersection counts (for Traffic Studies)?
	Collision history and collision reports	• What are your normal practices for reviewing pedestrian-vehicle collision data?
	Pedestrian traffic control devices (signs, markings and signals)	• Does your city have an inventory of signs, markings, and traffic signals with pedestrian facilities? • Do you conduct a regular assessment of traffic control devices and/or have a reporting system allowing you to correct basic problems? • Do you have a policy to replace signal heads with LED displays, or with countdown signals? • Are you currently using Pedestrian Lead Intervals in any locations?
	Speed limits and speed surveys	• What are your normal practices for collecting speed data or reviewing speed limits? • What is your policy/practice for setting speed limits? • What is your practice for posting speed limits in neighborhoods? • What is the default maximum speed limit in your town when signs are not placed?

TABLE 4: PROGRAMS, PRACTICES, AND POLICIES: PRE-VISIT INTERVIEW

Interview Topic	Subtopic	Suggested Interview Questions
Engineering/ Infrastructure Programs, Practices, and Policies	Inventory of sidewalks, informal pathways, and pedestrian opportunity areas (near key pedestrian generators)	• Do you maintain an inventory of existing or missing sidewalks (if not, do you have plans to do so)? • Do you maintain an inventory of informal pathways and/or pedestrian opportunity areas? • Are sidewalk projects included in your capital improvements program? • What is your annual funding level to replace sidewalks or to fill existing gaps? • What assistance, guidance, or practice do you provide to homeowners and other property holders who are requesting a change in use permit to make their properties supportive of walking? • Who is responsible for the maintenance of the sidewalks (the city or property owners)?
	Traffic signal and stop sign warrants	• Do you use warrants for installation of traffic signals or all-way stops that differ from the California Manual of Uniform Traffic Control Devices (if so, request copy)?
	Institutional Obstacles	• In your jurisdiction, what are the primary institutional obstacles to improving the pedestrian environment? • Describe one or more of your jurisdiction's most successful efforts to overcome such barriers.
	Safe Routes to Schools	• Do you have a Safe Routes to Schools program? • Have you applied for Safe Routes to Schools grants (and if yes, did you receive funding)? • Have you completed any Safe Routes to Schools projects recently (and if yes, request a copy of any documentation, etc.)?
	Traffic calming programs	• Do you have a traffic calming program (if yes, request a copy; if available, request a map of locations and measures)? • How have you funded traffic calming projects? • Do your traffic calming efforts exceed the basic use of speed humps?
	Pedestrian Safety	• Do you have programs aimed at improving pedestrian safety (if yes, request a copy)? • Have you conducted a Walking Audit in your city?
	ADA transition plan for streets and sidewalks	• Who serves as your ADA Coordinator? • Do you have an ADA Transition Plan? • When was the last update of your ADA Transition Plan? • What public facilities are addressed in your ADA Transition Plan (curb ramps at intersections, sidewalk obstacles, parking facilities, on-street handicap parking, etc.)?
	Pedestrian Crossings	• What is your policy for pedestrian crossings at railroads, freeways, light rail tracks, streams, or canal crossings? • Please describe additional crossing barriers, if any. • What is your practice/policy for bridge crossings (if available, request examples of bridges or barriers where safe accommodation is not provided)?

TABLE 4: PROGRAMS, PRACTICES, AND POLICIES: PRE-VISIT INTERVIEW

Interview Topic	Subtopic	Suggested Interview Questions
Engineering/ Infrastructure Programs, Practices, and Policies	Design Guidelines	• Do you have a Streetscape Master Plan and/or Landscape Architecture Plan? Is there a policy regarding what may be planted near the sidewalk (i.e., to prevent root problems)? • Do you have any design policies for pedestrian treatments such as narrow lanes, corner bulbs, etc? • Do you have development standards that affect the pedestrian environment (examples: building required to front streets, limits on number and widths of driveways, landscape and pedestrian access requirements within parking lots)?
	Crosswalk Policies	• Do you have a crosswalk policy? • Do you install crosswalks on all approaches of signalized intersections? • How do you make decisions regarding installation, removal, and enhancement treatments for uncontrolled crosswalks? • Do you have guidelines and practices for midblock crossings, especially when commercial block lengths are long?
Planning Programs, Practices, and Policies	General Plan	• How does density vary in your city and where is it concentrated? What are your average densities? Are accessory units/ secondary uses permitted? • Do you have any mixed-use zones? • Where are the pedestrian nodes in your city? How does the plan accommodate pedestrians in these areas? • Do you use form-based zoning? • Is transit-oriented development addressed in the Plan? • What are the off-street parking requirements for residential and commercial uses? Can parking be unbundled? Shared between uses?
	Specific plans, redevelopment areas, overlay zones	• Where are your designated redevelopment areas (if any)? What developments are planned/desired for these areas? How will they be financed? • Where are the key historic sites in your city? Are they listed on any historic registers? Do you have a historic and/or cultural preservation plan in place for the city? • Do you have any planned unit developments? How are pedestrians accommodated in these plans? • Do you have specific plans, redevelopment zones, or zoning overlays (such as historic districts) for any portion of the city? How are pedestrians accommodated in these plans? • How do your zoning and subdivision ordinances accommodate pedestrian rights-of-way?
	Pedestrian Master Plan	• Do you have a Pedestrian Master Plan? • When was it last updated? • Who participated in the development of the Plan? • Have you applied for any bicycle/pedestrian grants? • Have you completed any bicycle/pedestrian projects recently (if so, obtain project information)?

TABLE 4: PROGRAMS, PRACTICES, AND POLICIES: PRE-VISIT INTERVIEW

Interview Topic	Subtopic	Suggested Interview Questions
Planning Programs, Practices, and Policies	Pedestrian Master Plan (continued)	• How much did you spend on bicycle/pedestrian improvements on average over the past 3 to 5 years (versus bicycle and pedestrian mode shares)? • Do you have a Bicycle/Pedestrian Coordinator(s) on staff? • What percentage of time do they devote to pedestrian related work? • Which funding sources are typically used to fund improvements identified in your Master Plan? • Did you substantially integrate the needs of pedestrians in your latest update to your General Plan, Transit Plans, Parks Plans, School Renovation Plans (especially including policies and practices requiring all new development to be pedestrian supportive)?
	General Ordinances	• Do you have a newspaper rack ordinance? • Do you have a street furniture ordinance? • Do you have a bicycle parking ordinance? • Do you have a (street) tree ordinance? • Do you have open space requirements? • Do you require neighborhood sized schools?
	Routine Accommodations/ New Development	• Do you assess impact fees for new development programs to pay for transportation impact mitigations? If so, are these fund used for pedestrian infrastructure improvement? How are they distributed? • Do you have a routine accommodation, or complete streets, policy to consider pedestrian needs within all infrastructure projects? • If yes, how does this apply to the development review process? How does this apply during the planning, design, construction, and operations phases? • Do you require a high level of street connectivity for new projects? • What are your guidelines and practices for large commercial developments to provide safe and convenient access to buildings?
	Transit	• Do you have a Transit First Policy? • What are your policies regarding transit shelters and pedestrian connections to transit stops/stations (request a typical site plan for a new transit stop)? • Does your city have a Travel Demand Management (TDM) Program or Coordinator? • Are businesses that offer free parking to employees required to offer a cash-out alternative? • Do city employees or other groups have access to EcoPasses, CommuterChecks, etc.?
	Public Involvement	• Do you have a committee that addresses pedestrian issues (Pedestrian Committee (sometimes combined with a Bicycle Committee), Parks, or Recreation Committee)?

TABLE 4: PROGRAMS, PRACTICES, AND POLICIES: PRE-VISIT INTERVIEW

Interview Topic	Subtopic	Suggested Interview Questions
Planning Programs, Practices, and Policies	Public Involvement (continued)	• If so, what is the membership of this committee and what are their duties and functions? Are they tied into your regional MPO/RPC organization(s)? • Do you have a mechanism for obtaining public comments on bicycle/pedestrian issues (i.e., "Report a Pot Hole" program)?
	Economic Vitality	• Has a Business Improvement District(s) been established in your retail zones? If so, does it fund sidewalk or streetscape improvements? • Do you have a façade improvement program? • What are your downtown parking policies? Do they encourage non-auto access and/or a park-once environment?
	Enforcement	• Does your Police Department have Traffic Safety Officer(s)? If so, how much of their time is spent on pedestrian safety-related responsibilities? • Have law enforcement officers attended a course specifically focused on pedestrian safety and law enforcement? • Do you conduct pedestrian-oriented enforcement activities (including focused school drop-off enforcements)? • Do you share police resources, data, etc. with neighboring cities? • Is enforcement involved in the planning, design, construction, and operation of pedestrian facilities?
	Education	• Do you have a pedestrian safety or traffic-ed curriculum in your city's schools? At the city's Community Center? • Are pedestrian/walking safety brochures available? • Do you conduct pedestrian safety education campaigns (i.e., yard signs, bumper stickers, radio messages)? • Are motorists provided information or instruction specific to pedestrian laws and ordinances?
	Health Agencies including EMS	• Are Health Agencies (including EMS) involved in the planning or design of pedestrian facilities?

2.3 CONVENE A KICKOFF MEETING WITH CITY STAFF

On the first day of the city visit, the evaluators will meet with city staff and representatives to set the context of the Pedestrian Safety Assessment – the purpose and scope of the evaluation, Focus Area locations, and expected deliverables. At this meeting, city staff may offer, or the evaluators may request, additional information. Staff may invite other city agencies and/or other individuals to participate at this meeting as appropriate.

2.4 PERFORM FIELD AUDITS/ REVIEWS

The evaluators will conduct field audits/ reviews at identified locations. The field review format and participants will be selected based on the method applicable for the geographic location and characteristics of the Focus Areas.

Various alternative methods for field audits/reviews are available, and each is elaborated below. They include:

- Walking Audit
- Nighttime Audit
- Economic Vitality Walking Audit
- Target Citizen Group Walking Audit
- Windshield Audit
- Aerial Photograph Audit and/or GIS-based Audit
- Proposed Development Audit
- Existing Site Layout Audit, especially schools, retail areas, parks
- Intercept Surveys
- Focus Groups

Where possible, every PSA will include a Walking Audit of the Focus Areas (as this is considered the most effective method to observe issues/problems and identify improvement opportunities) as well as a Windshield Audit of the larger area(s). Any of the other above-mentioned field review methods can be performed as needed, based on the scope of the PSA, evaluators' judgment and time availability, and the availability of participants during the two-day visit.

A. Walking Audit (Walking Workshop)

A Walking Audit, also known as a "walking workshop," is appropriate for examining an intersection or cluster of intersections, a short corridor or road segment, an entire neighborhood that is to be traffic calmed, a school area, or a pedestrian zone or node. During a Walking Audit, positive practices are observed and issues and opportunity areas are noted. Observations are made on how motorists are behaving around pedestrians, and notes are taken on pedestrian behaviors, especially at intersections, or notations on where and why pedestrians are crossing to avoid the intersection. For each opportunity area, the team discusses possible recommendations to address pedestrian safety concerns.

A Walking Audit Route Map is developed in advance of the audit. The route may be selected to focus on collision "hot spots" and/or prototypical pedestrian concerns in the city (such as high-speed arterials). Stops are planned for every 200 to 400 feet along the route. The walking audit is highly interactive, with many observations and "teachable

moments" explored during the walk. It is a means to observing and learning how to "see through the eyes of the pedestrian" by staff. A sample route map is shown in Figure 2.

The Walking Audit Checklist is an important tool to guide the Walking Audit. Universal considerations (Table 5) and the example checklist (Table 6) should be tailored to fit the needs of each Focus Area. A more detailed Walking Audit checklist (shown in Appendix A) was published in the FHWA *Pedestrian Road Safety Audit Guidelines and Prompt Lists* and is also applicable for this purpose.

Where feasible, a walking audit should conclude with a debrief session. Observations should be noted on the aerial photograph(s) or route map as illustrated in the Figure 2 example. This debrief session may also be used as an opportunity to validate the location of key pedestrian generators and walking "desire lines" to connect the generators/nodes.

TABLE 5: UNIVERSAL CONSIDERATIONS

1. Needs of Pedestrians: Do pedestrian facilities address the needs of all pedestrians?
2. Connectivity and Convenience of Pedestrian Facilities: Are safe, continuous, and convenient paths provided along pedestrian routes throughout the study area?
3. Traffic: Are design, posted, and operating traffic speeds compatible with pedestrian safety?
4. Behavior: Do pedestrians or motorists regularly use or ignore pedestrian facilities?
5. Construction: Have the effects of construction on pedestrian safety and accessibility been addressed adequately?
6. School Presence: Is the safety of children in school zones adequately considered?
Adapted from *FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists*

TABLE 6: SAMPLE WALKING AUDIT CHECKLIST

Great Places

- Is there street activity (sidewalk cafes, vendors, etc.)?
- Are activities and uses (such as newspaper racks, sidewalk cafes) organized?
- Is traffic calmed (with bulbouts, roundabouts, chicanes, etc.)?
- Are links to transit provided?
- Are medium- to high-density land uses present?
- Is the street network a grid?
- Are street widths between two and four lanes?
- Is parking used on the street (helping create a buffer between moving cars and pedestrians)?
- Is a bike lane used on the street (helping create a buffer between moving cars and pedestrians?
- Is there public art?
- Do buildings provide a sense of enclosure (positioned near or at the sidewalk?
- Do buildings provide sufficient "transparency" (about 70-90% window glazing and set proximate to the street)?
- How many people do you see in this space? A great street always has dozens or hundreds of pedestrians in view during all business hours.
- Is there adequate tree canopy, or other means to achieve shade and create a sense of place?
- Is there an absence of interrupting driveways, or when there are a few driveways, are they designed for use by pedestrians?

Good Streets

- Are the sidewalk environments:
  - continuous and wide enough for couples?
  - buffered from traffic with landscape strips?
  - shaded with street trees?
- Are lanes narrow (10 to 11 feet) and/or appropriate for the area type (neighborhood, commercial, downtown, etc.)?
- Are medians present?
- Are bicycle accommodations (bicycle lanes, signs, etc.) provided?
- Is the number of lanes appropriate for the traffic volume?
- If there are any one-way streets, are motorists' speeds and yielding behaviors supportive of walking?

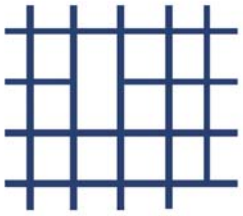


TABLE 6: SAMPLE WALKING AUDIT CHECKLIST

Good Intersections

- ➜ Are intersections compact (with curb extensions and refuge islands)?
- ➜ Are crosswalks provided on all approaches?
- ➜ At signalized intersections:
  - Are pedestrian priority signals (leading pedestrian intervals or scrambles) provided?
  - Are conflicts in crosswalks limited by prohibiting right turns on red or with protected left turn phases?
  - Are advance limit lines provided?
  - Are countdown signals provided?

Good Crossings

- ➜ Are crossings highly visible (with curb extensions, low profile landscaping, and high visibility markings)?
- ➜ Are crossings marked and signed?
- ➜ Are High Emphasis crosswalk markings used on arterial streets?
- ➜ Are quasi-signals (such as HAWK signals, in-pavement lighting, or overhead beacons) used where appropriate?
- ➜ If a multiple lane crossing, is the stop/yield bar set back from the crossing?
- ➜ Is adequate lighting present?
- ➜ If a multiple lane crossing, is there a median separating the crossing from each conflict direction?

FIGURE 2: SAMPLE WALKING AUDIT ROUTE MAP

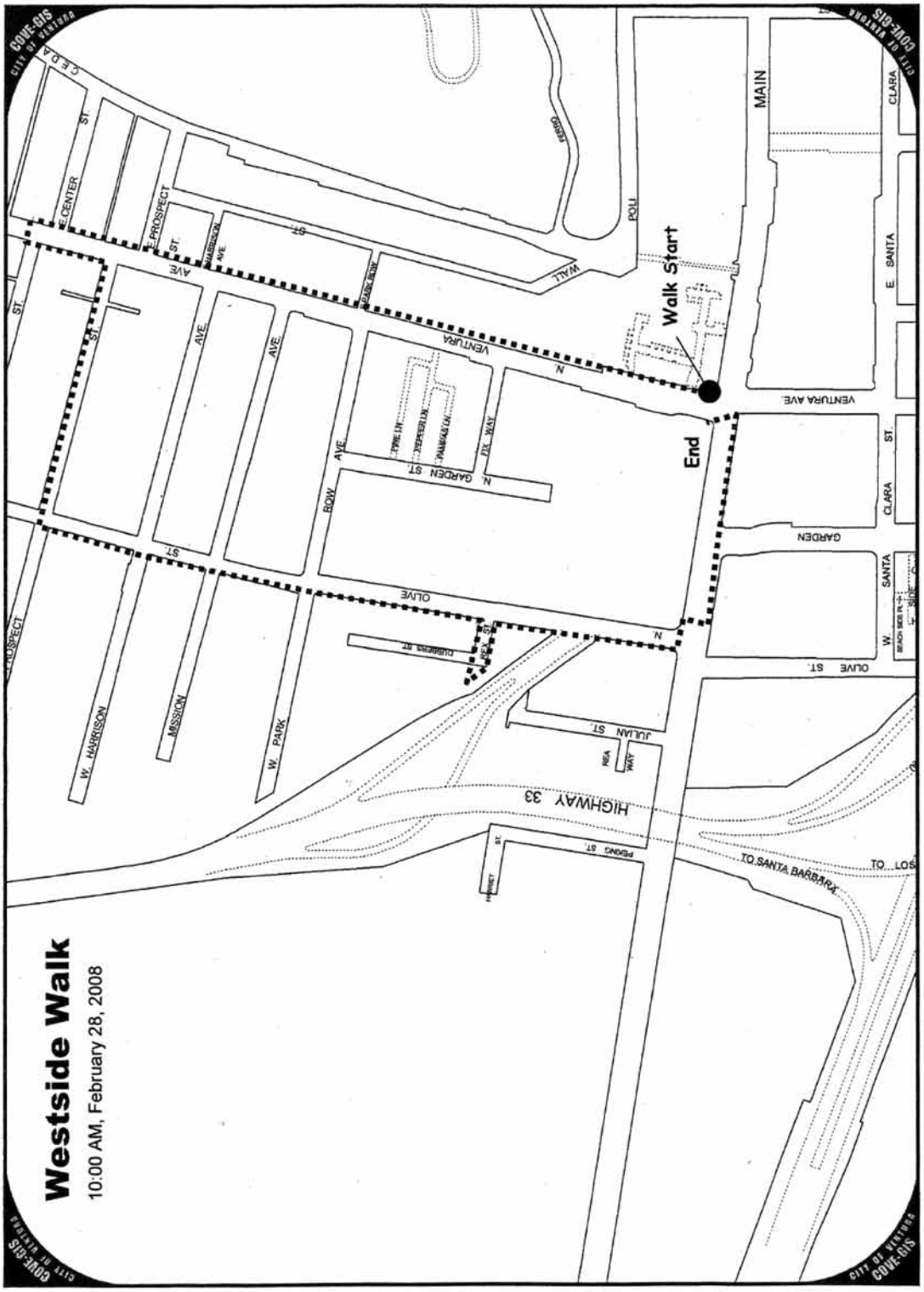
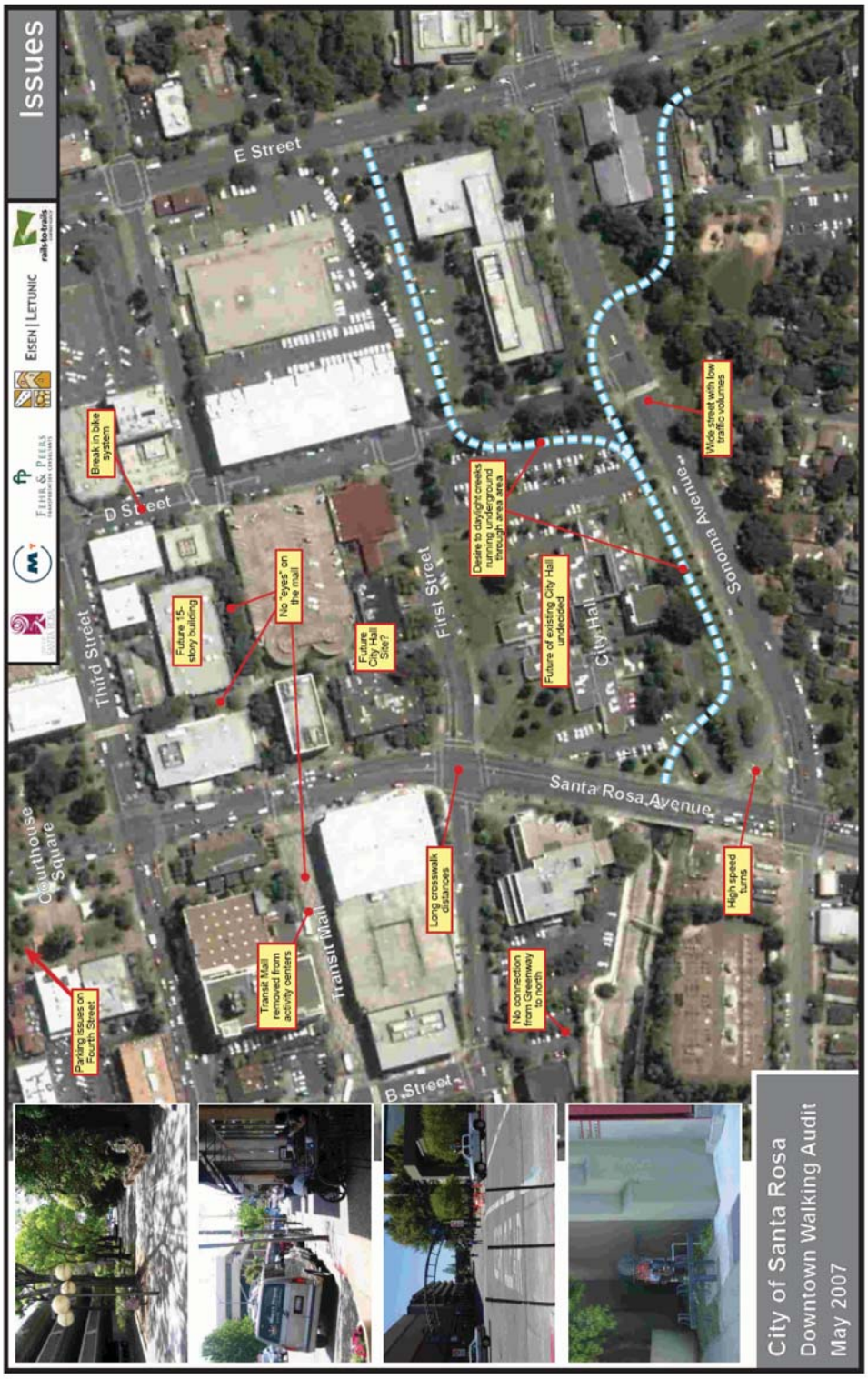


FIGURE 3: SAMPLE GRAPHICAL PRESENTATION OF ISSUES AND SOLUTIONS



Photographs should be taken throughout the Audit. The Caltrans photo log (*http://video.dot.ca.gov/photolog/*) and/or Google StreetView images can also be used to view the Focus Areas before/after the Walking Audit.

Other Resources: Evaluators may also wish to refer to the following additional resources for the Walking Audit:

- Walk Score™ (*www.walkscore.org*): this website provides a composite walkability score for an address and may be useful for comparing Focus Areas within a city. More details are included in Appendix C.
- *A Resident's Guide for Creating Safe and Walkable Communities* (*http://safety.fhwa.dot.gov/ped_bike/ped/ped_walkguide/index.htm*): This guide provides examples from other communities working to improve pedestrian safety. It includes information, ideas, and resources to help residents learn about issues that affect walking conditions; find ways to address or prevent these problems; and promote pedestrian safety.
- *A Transit Manager's Guide for Creating Safe and Walkable Communities* (to be posted on *http://safety.fhwa.dot.gov*)

Materials Required: Walking Audit Checklist, Walking Audit Route Map (if multiple sites will be reviewed), aerial photograph for each Focus Area, clipboards, pens, post its, camera, measuring tape or wheel, safety vests

Potential Participants: Based on their availability, participants in the Walking Audit may include those who can provide "real-time" information on the Focus Areas, such as pedestrian destinations, collision history and common "near misses," demographic or other relevant neighborhood context, and current city policies and practices. Additionally, persons who are (or will be) responsible for planning and/or implementing safety improvement measures may be included in the Audit. Potential participants include:

- Elected Officials
- Bicycle/Pedestrian Coordinator
- Police Traffic Safety Enforcement Officer
- Engineering/Public Works Department Staff
- ADA Coordinator
- Transit Services Staff (if transit is present in the Focus Area)
- Business Leaders or Residents in Focus Area(s)
- Business Associations
- Residents/Neighborhood Associations
- Downtown/ Neighborhood Planner or Redevelopment Agency Staff
- User Group or Advocacy Group Representative (such as Traffic Calming Advocacy Group)
- School Officials, PTA/PTO Leaders
- Parks and Recreation staff
- Parking Management staff
- Health Agencies and Organizations including EMS

B. Nighttime Audit

A Nighttime Audit is conducted when pedestrian collision data suggests that significant collisions in a Focus Area are occurring after dark or during sunrise/sunset times. The above-mentioned Walking Audit Checklist (Tables 5 and 6) can be followed, with particular emphasis on nighttime issues such as lighting or nighttime pedestrian generators (i.e., movie theaters or bars). The Audit can be conducted by observing conditions at the Focus Area from a parked vehicle. The Audit may include observations of any impaired or distracted pedestrians and their behavior and apparel (visible at night), as well as impaired or distracted motorists.

Materials Required: Walking Audit Checklist, Walking Audit Route Map (if multiple sites will be reviewed), aerial photograph for each Focus Area, clipboards, pens, post its, camera, measuring tape or wheel, safety vests, safety caps, flashlights. Safety vests must be retroreflective, and are not an optional item.

Potential Participants: The Nighttime Audit is usually conducted in addition to a daytime Walking Audit. As such, the two evaluators or the evaluators plus a city staff member may suffice.

C. Economic Vitality Walking Audit

As a component of the standard Walking Audit, the group can identify opportunities for improving walkability and economic vitality of the area as appropriate. This will include the identification of:

- Buildings which could be enhanced through façade improvement programs
- Redevelopment sites for mixed use development with ground floor retail
- Opportunities for streetscapes and street furniture
- Opportunities for sidewalk cafes
- Opportunities for relocating parking behind buildings
- Opportunities for increasing “eyes on the street”
- Parking management strategies to reduce cruising for parking and establish a “park once” environment
- Opportunities for connecting commercial areas to open space (waterfront, parks, etc.)
- Opportunities for traffic calming
- Opportunities for wayfinding enhancements and establishing a “sense of place”
- Opportunities for transit-oriented development
- Opportunities for bringing “feet to the pavement” in the evenings, on weekends, mid-day, etc. (land use mix of theatres, restaurants, gyms, residential, offices, etc.)

Potential Participants: Potential participants include staff from the redevelopment agency, property owners or developers, local residents, and local business owners, as applicable and as identified by the city.

D. Target Citizen Group Walking Audit

Target citizen groups may be helpful for addressing complex pedestrian safety or walkability issues. Target citizen groups may include seniors, children, non-English speaking persons, or disabled persons. The Walking Audit Checklist (Tables 5 and 6) should be followed, with emphasis on relevant target citizen group issues, such as crossing distances and walking speed, curb ramps and cross slopes, signs, etc.

Target Citizen Group Walking Audits are scheduled for key observation times (e.g. school drop off or pick up). Where necessary, the Audits may precede the Kickoff Meeting and the Kickoff Meeting may be replaced with Focus Groups (as discussed below).

Materials Required: Walking Audit Checklist, Walking Audit Route Map (if multiple sites will be reviewed), aerial photograph for each Focus Area, clipboards, pens, post its, camera, measuring tape or wheel, safety vests and caps.

Potential Participants: Target citizen group representatives can supplement participants in the standard Walking Audit as needed. These may include:

- School district representatives
- PTA representatives
- Senior citizens or their advocates (such as AARP)
- Disabled citizens or their advocates
- Representatives from non-English speaking communities (and a translator if necessary)

E. Windshield Audit

During a Windshield Audit, roadway and pedestrian conditions are observed while driving through the Focus Area(s). This method is appropriate for Focus Areas that are geographically dispersed and/or too large to observe on foot. It also provides an important view of the Focus Areas from the driver's perspective. Tables 5 and 6 should be followed throughout the driving tour as applicable.

Materials Required: Walking Audit Checklist, Windshield Audit Route Map and driving directions, aerial photograph for each Focus Area, clipboards, pens, post-its, camera, measuring tape or wheel, safety vests, vehicle(s)

Potential Participants: In addition to the potential participants for the standard Walking Audit, a non-participant driver should be identified for each vehicle. Ideally, all participants travel in the same vehicle to facilitate group discussions during the Audit.

F. Aerial Photograph Audit and/or GIS-Based Audit

An Aerial Photograph or GIS-Based Audit may supplement the standard Walking or Windshield Audit. This Audit uses larger scale aerial photographs and/or GIS layers to consider issues such as pedestrian path connectivity. The scope of this Audit is determined based on a review of the city's visioning and planning documents and the availability of GIS layers such as crosswalks and sidewalks.

Materials Required: Neighborhood- or city-wide aerial photographs and/or GIS layers, pens, post its, computer and projector (as needed), relevant community visioning and planning documents

Potential Participants: Potential participants include persons familiar with city policies and practices related to infrastructure improvements, long-range planning, and community development:

- City Traffic Engineer
- City Transportation Planner
- City Bicycle/Pedestrian Coordinator
- Community Development Department Staff
- Neighborhood Preservation Department Staff
- Neighborhood Services Staff
- Redevelopment Agency Staff
- Planning/ Zoning Commissioner
- Elected Leader

G. Proposed Development Audit

A Proposed Development Audit includes a review of site plans for a proposed development. The review considers potential "walkability" issues associated with the site plan (e.g. wide streets, single uses, driveway and garage placements, street connectivity (block ratio index), transit, accessibility, proximity of parks and schools to all homes, mix of uses, and cul-de-sacs). This Audit is appropriate in cities where significant new developments have been proposed. Where feasible, the site plan review should be supplemented with a standard Walking Audit of the existing conditions for the development site.

Note that block circumferences of up to 1,400 feet are considered walkable. Blocks of greater circumferences are less supportive. Details on the block ratio index are shown in Appendix D.

The Smart Growth ScoreCard shown in Figure 4 is an example of a checklist for a Proposed Development Audit.

Materials Required: Site Plans for proposed development, Smart Growth ScoreCard, pens, post-its

Potential Participants: Potential participants in this Audit include persons familiar with city policies and practices related to infrastructure improvements, short-range planning, and the proposed development:

- City Traffic Engineer
- City Planner
- City Bicycle/Pedestrian Coordinator
- Community Development Department Staff
- Neighborhood Services Staff
- Project Developer

FIGURE 4: SAMPLE CHECKLIST FOR PROPOSED DEVELOPMENT REVIEW

Pedestrian Smart Growth Scorecard (From Sacramento Smart Growth Implementation Guide)

Section 1: Proximity

1.1: Walking distance to transit stop (Bus, Light Rail)	Assessment	Rating	Score:
On site/across the street	Excellent	4	☐
up to 1325 feet (approx. 5 minute walk)	Good	3	
up to 2650 feet (approx. 10 minute walk)	Acceptable	2	
up to 3975 feet (approx. 15 minute walk)	Minimal	1	
Not applicable/transit not available		0	

1.2: Proximity to off-site restaurants, entertainment centers, retail shops, libraries, civic centers, parks services (bank, post office, barber and the like)	Assessment	Rating	Score:
Adjacent/across street	Excellent	4	☐
up to 1325 feet (approx. 5 minute walk)	Good	3	
up to 2650 feet (approx. 10 minute walk)	Acceptable	2	
up to 3975 feet (approx. 15 minute walk)	Minimal	1	
Not applicable/none		0	

1.3: Residential development projects: proximity to grocery, convenience stores, household supplies	Assessment	Rating	Score:
On-site, adjacent/across street	Excellent	4	☐
up to 1325 feet (approx. 5 minute walk)	Good	3	
up to 2650 feet (approx. 10 minute walk)	Acceptable	2	
up to 3975 feet (approx. 15 minute walk)	Minimal	1	
Not applicable		0	

1.4: Residential development projects: proximity to schools or day care	Assessment	Rating	Score:
On-site, adjacent/across street	Excellent	4	☐
up to 1325 feet (approx. 5 minute walk)	Good	3	
up to 2650 feet (approx. 10 minute walk)	Acceptable	2	
up to 3975 feet (approx. 15 minute walk)	Minimal	1	
Not applicable		0	

1.5: Commercial development projects: proximity to residential, restaurant or retail shops services (bank, post office, barber, etc.)	Assessment	Rating	Score:
On-site	Excellent	4	☐
Adjacent/across street	Very good	3	
up to 1325 feet (approx. 5 minute walk)	Acceptable	2	
up to 2650 feet (approx. 10 minute walk)	Minimal	1	
Not applicable		0	

Section 2: Site Optimization and Compactness

2.1: Location of building(s) relative to public sidewalk	Assessment	Rating	Score:
Adjacent	Excellent	4	☐
Separated by open plaza or outdoor seating area	Good	3	
Separated by open landscaped area with connecting pathways	Acceptable	2	
Separated by fenced outdoor yard with connecting pathways	Minimal	1	
Not applicable		0	
2.2: Location of on-site parking relative to public sidewalk	**Assessment**	**Rating**	**Score:**
Located behind or within building	Excellent	4	☐
Located to side of building	Good	3	
Adjacent with connecting pathways	Acceptable	2	
Adjacent with landscape screening	Minimal	1	
Not applicable		0	

Pedestrian Smart Growth Scorecard (Page 2)

Section 3: Accessibility and Mobility

3.1: Provide pedestrian amenities for transit	Assessment	Rating	Score:
Direct pathway to light rail transit station	Excellent	4	☐
Direct pathway to bus shelter with seat, and schedule information	Good	3	
Adjacent to public sidewalk with loading area and seating	Acceptable	2	
Bus stop with signage	Minimal	1	
Not applicable		0	

3.2: Provide direct sidewalk connections	Assessment	Rating	Score:
Multiple entrances along all public sidewalks	Excellent	4	☐
At least one entrance along a public sidewalks	Good	3	
Shaded, well marked pathway from public sidewalk	Acceptable	2	
Paved area from public sidewalk	Minimal	1	
Not applicable		0	

3.3: Relationship to automobile access	Assessment	Rating	Score:
Drive on access to rear of building(s) or alley access	Excellent	4	☐
Driveway along public sidewalk with delineated pedestrian crossings	Good	2	
Driveway across public sidewalk	Minimal	1	
Not applicable		0	

3.4: Facilitate connections to public outdoor space	Assessment	Rating	Score:
Access to multi-use trails or pedestrian pathways	Yes	4	☐
Not applicable		0	

Section 4: Street Network

4.1: Street pattern	Assessment	Rating	Score:
Entire street pattern is a grid	Excellent	4	☐
Street pattern has mix of grid, loops and cul-de-sacs	Good	3	
Street pattern with loops and cul-de-sacs and pedestrian connections	Acceptable	2	
Street pattern with loops and cul-de-sacs	Minimal	1	
Not applicable		0	

4.2: Block lengths (long side)	Assessment	Rating	Score:
Less than 400 feet	Excellent	4	☐
400-500 feet	Good	3	
501-600 feet	Acceptable	2	
Greater than 600 feet	Minimal	1	
Not applicable		0	

4.3: Continuation of existing neighborhood street pattern into new project	Assessment	Rating	Score:
	Yes	4	☐
	No	1	
	Not applicable	0	

Overall Pedestrian Rating		
(Total of all scores)/(number of measures scored>0) ☐	4 =	Excellent
	3=	Good
	2 =	Moderate
	1 =	Poor

H. Existing Site Audit

An Existing Site Audit includes the review of site layouts for an existing land use. The review considers potential "walkability" issues associated with the site layout (e.g. wide streets, single uses, driveway and garage placements, street connectivity (block ratio index), transit, accessibility, proximity of parks and schools to all homes, mix of uses, cul-de-sacs, etc.). Where feasible, the Existing Site Audit should be supplemented with a standard Walking Audit of the site. Note that block circumferences of up to 1,400 feet are considered walkable. Blocks of greater circumferences are less supportive.

The Smart Growth ScoreCard may also be used as a checklist in a Existing Site Audit. More information on the block ratio index is included in Appendix D.

Materials Required: Site Plans, Smart Growth ScoreCard, pens, post-its

Potential Participants: Potential participants in this Audit include persons familiar with city policies and practices related to infrastructure improvements and the subject land use. They include:

- City Traffic Engineer
- City Planner
- City Bicycle/Pedestrian Coordinator
- Community Development Department Staff
- Neighborhood Services Staff
- School officials, PTA/PTO leaders
- Parks and recreation staff

I. Intercept Surveys

Intercept Surveys with pedestrians and/or motorists may be conducted during a standard Walking Audit when additional information is needed. These brief Surveys could address issues such as:

- Why is a pedestrian not using the marked crosswalk?
- Why is a pedestrian not using the overcrossing?

The decision to conduct Intercept Surveys may be made in advance or on the spot as needed.

Materials Required: Clipboards, pens, business cards

J. Focus Groups (Interviews)

Focus Groups or Small Group Interviews may be conducted before or after a standard Walking Audit to obtain additional information regarding the context, constraints, and opportunities for a Focus Area(s). Focus Groups can be especially helpful when paired with a Target Citizen Group Walking Audit. In this case the target group representatives can participate in a more in-depth debrief of the Walking Audit and brainstorm potential solutions.

Materials Required: Appropriate meeting room for Focus Group size (10-15), flip chart and markers, tape, nametags, aerial photographs of Focus Area(s), camera, computer and projector (as needed)

Potential Participants: Target group representatives may include:

- School District Representatives
- PTA Representatives
- School Children
- Senior Citizens or their Advocates (such as AARP)
- Disabled Citizens or their Advocates
- Representatives from non-English Speaking Communities (and a translator if necessary)
- Civic, Neighborhood, Business Associations

Standard Walking Audit participants can be invited to participate in the Focus Groups, especially those responsible for planning and/or implementing pedestrian improvement measures.

2.5 IDENTIFY PEDESTRIAN IMPROVEMENT MEASURES (BEST PRACTICES)

The evaluators will make recommendations for site-specific and citywide pedestrian improvements based on the findings from the field audits/reviews and data analysis. Some examples of best practices are shown in Table 7. The evaluators will also consult published standards, best practices, and safety resources as shown below in Table 8. Table 8 is mapped to the FHWA *Pedestrian Road Safety Audit Prompt Lists*, as shown in Appendix B, to facilitate the use of Table 8.

TABLE 7: EXAMPLE 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.
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.

TABLE 7: EXAMPLE PEDESTRIAN IMPROVEMENT MEASURES

Measure	Description	Benefits	Application
In-Roadway Warning Lights (continued)			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 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. Geometric Treatments	This measure increases the pedestrian's visibility to motorists, reduces the number of vehicles encroaching	Useful in areas where pedestrian visibility is low and in areas with aggressive drivers, as advance limit lines will help prevent drivers from

TABLE 7: EXAMPLE PEDESTRIAN IMPROVEMENT MEASURES

Measure	Description	Benefits	Application
Advanced Yield Lines (continued)		on the crosswalk, and improves general pedestrian conditions on multi-lane roadways. It is also an affordable option.	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.
Median Pedestrian 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

TABLE 7: EXAMPLE PEDESTRIAN IMPROVEMENT MEASURES

Measure	Description	Benefits	Application
Staggered Median Pedestrian 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.
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.

TABLE 7: EXAMPLE PEDESTRIAN IMPROVEMENT MEASURES

Measure	Description	Benefits	Application
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.
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.

TABLE 7: EXAMPLE 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 use 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 incorporated 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).

TABLE 7: EXAMPLE 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

TABLE 8: RELEVANT STANDARDS, BEST PRACTICES, AND SAFETY RESOURCES

	Standards
S1	AASHTO, *A Policy on Geometric Design of Highways and Streets* (Green Book) https://bookstore.transportation.org/item_details.aspx?ID=110
S2	*ADA Accessibility Guidelines (ADAAG)* http://www.access-board.gov/adaag/html/adaag.htm
S3	*Manual on Uniform Traffic Control Devices (MUTCD)* http://mutcd.fhwa.dot.gov/ser-pubs.htm
S4	*California Manual on Uniform Traffic Control Devices (CMUTCD)* http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/
S5	United States Access Board, *Public Rights of Way (PROWAC)* http://www.access-board.gov/PROWAC/)
	Best Practices
P1	*FHWA, Designing Sidewalks and Trails for Access, Part I, A Review of Existing Guidelines* http://www.fhwa.dot.gov/environment/sidewalks/
P2	*FHWA, Designing Sidewalks and Trails for Access Part II, Best Practices Guide* http://www.fhwa.dot.gov/environment/sidewalk2/
P3	*FHWA, Accessible Sidewalks and Street Crossings - An Informational Guide (FHWA-SA-03-019)* http://www.bikewalk.org/pdfs/sopada_fhwa.pdf
P4	*AASHTO, Guide for the Planning, Design, and Operation of Pedestrian Facilities* https://bookstore.transportation.org/item_details.aspx?id=119
P5	*AASHTO, Guide for the Development of Bicycle Facilities* https://bookstore.transportation.org/Item_details.aspx?id=104
P6	*Parking Management Best Practices* http://www.planning.org/APAStore/Search/Default.aspx?p=3502
P7	Urban Land Institute (ULI), *The Dimensions of Parking* http://www.amazon.com/Dimensions-Parking-Urban-LandInstitute/dp/0874208270
P8	EPA, *Pedestrian and Transit Friendly Design Guidelines* http://www.epa.gov/dced/pdf/ptfd_primer.pdf
P9	Easter Seals/ FTA, *Bus Stop Checklist* http://www.walkinginfo.org/library/details.cfm?id=3126
P10	Pedestrian and Bicycle Information Center (PBIC), *Transit Waiting Environments* http://www.walkinginfo.org/library/details.cfm?id=2925
P11	United States Access Board, *A Checklist for Accessible Sidewalks and Street Crossings* http://www.walkinginfo.org/library/details.cfm?id=67
P12	ULI, *Shared Parking Second Edition* http://www.uli.org/
P13	ITE, *Electronic Toolbox for Making Intersections More Accessible for Pedestrians* http://www.ite.org/accessible/
P14	FHWA, *A Resident's Guide for Creating Safe and Walkable Communities.* http://safety.fhwa.dot.gov/ped_bike/ped/ped_walkguide/index.htm

TABLE 8: RELEVANT STANDARDS, BEST PRACTICES, AND SAFETY RESOURCES

P15	FHWA, *A Transit Manager's Guide for Creating Safe and Walkable Communities.* http://safety.fhwa.dot.gov/ (forthcoming)
P16	FHWA and Australian Road Research Board. *USLIMITS: Speed Limit Decision Tool.* http://www2.uslimits.org/
	Safety Resources
R1	NCHRP, *A Guide for Reducing Collisions Involving Pedestrians (NCHRP Report 500)* http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v10.pdf
R2	FHWA, *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations (HRT-04-100)* http://www.thrc.gov/safety/pubs/04100/index.htm
R3	FHWA, *How to Develop a Pedestrian Safety Action Plan* (FHWA-SA-05-12) http://www.walkinginfo.org/pp/howtoguide2006.pdf
R4	NCHRP, *Improving Pedestrian Safety at Unsignalized Crossings (NCHRP Report 562)* http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_562.pdf
R5	NCHRP, *Road Safety Audits: Case Studies (FHWA-SA-06-17)* http://safety.fhwa.dot.gov/rsa/rsa_cstudies.htm
R6	FHWA, PEDSAFE: The Pedestrian Safety Guide and Countermeasure Selection System (FHWA-SA-04-003) http://www.walkinginfo.org/pedsafe/
R7	FHWA, Pedestrian and Bicycle Crash Analysis Tool (PBCAT) http://www.bicyclinginfo.org/bc/pbcat.cfm

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

2.6 BENCHMARK CITY'S POLICIES, PROGRAMS, AND PRACTICES

Table 9 illustrates the concept and application of benchmarks. The evaluators will analyze the city's responses to the pre-visit survey regarding the latter's pedestrian policies, programs, and practices. Benchmarking is a standard tool used by NHTSA to evaluate safety programs.

In Table 9, the three shaded columns show a range from "*does not meet*" to "*meets*" and "*exceeds"* best practices, respectively. Depending on where the city's responses lie, the evaluators can recommend improvements and new opportunities to enhance the city's policies, programs, and practices.

TABLE 9: POLICY, PROGRAMS, AND PRACTICES BENCHMARKS

Interview Topic	Subtopic	Benchmarks		
Engineering Programs, Practices, and Policies	ADA improvements	Has minimal design guidelines and practices related to ADA requirements	Has clear design guidelines but no regular practices for ADA compliance	Uses state-of-the-practice ADA improvements with consistent installation practices
	Pedestrian volumes	Does not collect pedestrian volumes	Collects some pedestrian volumes, but not routinely	Collects pedestrian volumes routinely with intersection counts
	Collision history and collision reports	Does not have set practices for data review	Reviews data only following fatalities or other high-profile incident	Creates annual reports or employs other comprehensive monitoring practice
	Pedestrian traffic control devices (signs, markings, and signals) facilities	N/A	Does not have an inventory of signs, markings, and signals	Maintains an inventory of pedestrian signs, markings, and signals
	Speed limits and speed surveys	Does not have set practices for speed limit reviews	Reviews data only in response to reported concerns or frequent collisions	Employs comprehensive practice to proactively review speed limits such as USLIMITS
	Inventory of missing sidewalks, informal pathways, and pedestrian opportunity areas (near key pedestrian generators)	Does not have an inventory of missing sidewalks. informal pathways, or pedestrian opportunity areas	Maintains an inventory of missing sidewalks, informal pathways, and/or pedestrian opportunity areas	Maintains and inventory of missing and existing sidewalks and includes sidewalk projects in the CIP
	Traffic signal and stop sign warrants	N/A	Uses MUTCD Warrants	Uses relaxed warrants for traffic signals and/or all-way stops
	Institutional Obstacles	Does not have any identified obstacles	Has identified obstacles	Has identified obstacles and has implemented efforts to overcome barriers
	Safe Routes to Schools	Does not have a Safe Routes to Schools program	Has a Safe Routes to Schools program but has not obtained funding for recent projects	Has a Safe Routes to Schools program and funding for recent projects

Interview Topic	Subtopic	Benchmarks		
Engineering Programs, Practices, and Policies	Traffic Calming Programs	Does not have a traffic calming program	Has a traffic calming program but no dedicated funding source	Has a significant traffic calming program with a dedicated funding source
	Pedestrian Safety	Does not have pedestrian safety programs	Has some programs and may have conducted a Walking Audit	Has significant and ongoing programs which include Walking Audits
	ADA transition plan for streets and sidewalks	Does not have a Transition Plan or Coordinator	Has an outdated Plan and no dedicated Coordinator	Has a recently-updated, comprehensive Plan and a dedicated Coordinator
	Pedestrian Crossings	Does not have a policy for pedestrian crossings at railroads, freeways, etc.	Has an outdated policy	Has a recently updated policy and comprehensive inventory of barriers
	Design Guidelines	Does not have a Streetscape Master Plan or design policies for pedestrian treatments	Has minimal design policies and development standards	Has a Streetscape Master Plan and uses a Form Based Code for land use planning
	Crosswalk Policies	Does not have a crosswalk policy	Has a crosswalk policy but it is not comprehensive or up to date with best practices	Has a crosswalk policy that reflects best practices for signalized and uncontrolled crosswalk treatments
	Traffic Control Devices (Signs, markings, and signals)	Does not have TCD management program	Reviews only in response to reported concerns or frequent collisions	Has a sign, marking, and signal management system
Planning Programs, Practices, and Policies	General Plan: Densities and Mixed Use Zones	Has low densities with separate uses	Has moderate densities with separate uses	Has moderate to high densities in the CBD and mixed use zones
	General Plan: Pedestrian Nodes	Pedestrian nodes are not identified	Pedestrian nodes are identified but pedestrian accommodations are not	Pedestrian nodes are identified and pedestrian-oriented policies are in place for these nodes
	Specific plans, redevelopment areas, overlay zones	Plans do not address pedestrian needs	Plans require pedestrian accommodations	Pedestrian-oriented design, “walkability”, or place-making is stressed in the Plans

Interview Topic	Subtopic	Benchmarks		
Planning Programs, Practices, and Policies	Historic sites	Cultural and Historic Preservation Plans do not address pedestrian needs	Cultural and Historic Preservation Plans require pedestrian accommodations	Cultural and Historic Preservation Plans include a wayfinding and walkability focus
	Zoning and Subdivision Ordinances	Zoning and Subdivision Ordinances do not require Nonmotorized Circulation Plans or sidewalks for new development	Zoning and Subdivision Ordinances require sidewalks	Zoning and Subdivision Ordinances require Nonmotorized Circulation Plans and sidewalks
	Pedestrian Master Plan	Does not have a Pedestrian Master Plan	Has a Pedestrian Master Plan but it may be outdated and/or no recent projects from the Plan have been completed	Has a recently-updated Plan and pedestrian projects have been completed recently
	Pedestrian/Bicycle Coordinator	Does not have a Pedestrian Coordinator	Occasionally uses a contract Coordinator	Has a Coordinator on staff who manages a city Pedestrian Program
	General Ordinances (newspaper rack, street furniture, bicycle parking, street trees)	N/A	For each ordinance: Does not have an ordinance	Has an ordinance that improves pedestrian safety
	Routine Accommodations/ New Development	Does not have a Routine Accommodations Policy	Has Routine Accommodations Policy for public works projects only	Has Routine Accommodations Policy that applies to the development review process and assesses impact fees
	Transit	Does not have policies regarding transit shelters and pedestrian connections to transit	Has basic policies but does not actively enforce policies	Has a transit first policy
	Transportation Demand Management	Does not have a Travel Demand Management program or policy	Has basic TDM programs (Commuter Checks, Guaranteed Ride Home)	Has extensive TDM programs and enforces parking cash out, etc.

Interview Topic	Subtopic	Benchmarks		
Planning Programs, Practices, and Policies	Public Involvement	Does not have a Pedestrian Committee or public feedback process	Has an ad-hoc Pedestrian Committee or a public feedback process	Has a formal, active Pedestrian Committee and a public feedback process (web-enabled)
	Economic Vitality	Does not have business improvement districts, façade improvement program, or downtown parking policies	Has a business improvement district, façade improvement program, or downtown parking policies	Has several business improvement districts, an established façade improvement program, and/or aggressive downtown parking policies
	Enforcement	Police department does not have Traffic Safety Officer(s)	Police conduct some pedestrian safety- related enforcement activities	Police conduct sustained pedestrian safety-related enforcement efforts, which may include resource sharing with neighboring cities
	Education	Does not have pedestrian safety education programs	Has pedestrian safety curriculum in schools and/or Community Centers	In addition to pedestrian safety curriculum in schools, provides brochures and/or conducts education campaigns

2.7 PREPARE TECHNICAL REPORT

After the city visit, the evaluators will prepare a technical report for the city describing their findings and recommendations. The report will offer recommendations on collision "hot spots" as well as for key pedestrian nodes and along desire lines. Report contents may also include:

- Recommendations that can be implemented immediately
- Recommendations for prioritizing greatest safety and overall walkability
- Comparison of walkability opportunities with cities in its class
- Recommendations for future policies for new development and redevelopment
- Recommendations for citywide policies, programs, and practices

The report will include a list of additional resources and reference documents (examples of which are shown in Appendix E). Many pedestrian improvement measures recommended in the report would provide a basis for the city to apply for grants to implement the recommendations and/or conduct further studies.

APPENDIX A
MASTER AND DETAILED PROMPT LISTS

(Source: FHWA *Pedestrian Road Safety Audit Guidelines and Prompt Lists,* July 2007*)*

MASTER PROMPT LIST FOR FIELD REVIEW

Topic	Subtopic	PSA Zones			
		A. Streets	B. Street Crossings	C. Parking Areas/Adjacent Developments	D. Transit Areas
Pedestrian Facilities	1. Presence, Design, and Placement	Sidewalks, paths, ramps, and buffers	Crossing treatments, intersections	Sidewalks and paths	Seating, shelter, waiting/ loading/ unloading areas
	2. Quality, Condition, and Obstructions	Sidewalks, paths, ramps, and buffers	Crossing treatments, (see prompts in A)	Sidewalks and paths (see prompts in A)	Seating, shelter, waiting/loading/unloading areas (see prompts in A)
	3. Continuity and Connectivity	Continuity/ connectivity with other streets and crossing	Continuity/ connectivity of crossing to pedestrian network; channelization of pedestrians to appropriate crossing points	Continuity/ connectivity of pedestrian facilities through parking lots/adjacent developments	Connectivity of pedestrian network to transit stops
	4. Lighting	Pedestrian level lighting along the street	Lighting of crossing	Pedestrian level lighting in parking lots/adjacent developments	Lighting at and near transit stop
	5. Visibility	Visibility of all road users	Visibility of crossing/waiting pedestrians and oncoming traffic	Visibility of pedestrians and backing/turning vehicles; visibility of pedestrian path	Visibility of pedestrians/waiting passengers and vehicles/buses
Traffic	6. Access management	Driveway placement and design along streets	Driveway placement next to intersections	Driveway placement and use in relation to pedestrian paths	n/a
	7. Traffic Characteristics	Volume and speed of adjacent traffic, conflicting conditions	Volume and speed of traffic approaching crossing conflicting movements	Traffic volume and speed in parking lots and developments, conflicting conditions	Volume and speed of adjacent traffic and traffic at crossings to bus stops, conflicting conditions.
Traffic Control Devices	8. Signs and Pavement Markings	Use and condition of signs, pavement markings, and route indicators	Use and condition of signs, pavement markings, and crossing indicators	Use and condition of signs, pavement markings for travel path and crossing points	Use and condition of transit-related signs and pavement markings
	9. Signals	n/a	Presence, condition, timing, and phasing	n/a	See prompts in B

(adapted from *FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists*)

A. STREETS

Master Prompt	Detailed Prompt
A.1 Presence, Design, and Placement	A.1.1 Are sidewalks provided along the street? A.1.2 If no sidewalk is present, is there a walkable shoulder (e.g. wide enough to accommodate cyclists/pedestrians) on the road or there pathway/trail nearby? A.1.3 Are shoulder/sidewalks provided on both sides of bridges? A.1.4 Is the sidewalk width adequate for pedestrian volumes? A.1.5 Is there adequate separation distance between vehicular traffic and pedestrians? A.1.6 Are sidewalk/street boundaries discernable to people with visual impairments? A.1.7 Are ramps provided as an alternative to stairs?
A.2 Quality, Conditions, and Obstructions	A.2.1 Will snow storage disrupt pedestrian access or visibility? A.2.2 Is the path clear from both temporary and permanent obstructions? A.2.3 Is the walking surface adequate and well maintained?
A.3 Continuity and Connectivity	A.3.1 Are sidewalks/walkable shoulders continuous and on both sides of the street? A.3.2 Are measures needed to direct pedestrians to safe crossing points and pedestrian access ways?
A.4 Lighting	A.4.1 Is the sidewalk adequately lit? A.4.2 Does street lighting improve pedestrian visibility at night?
A.5 Visibility	A.5.1 Is the visibility of pedestrians walking along the sidewalk/shoulder adequate?
A.6 Driveways	A.6.1 Are the conditions at driveways intersecting sidewalks endangering pedestrians? A.6.2 Does the number of driveways make the route undesirable for pedestrian travel?
A.7 Traffic Characteristics	A.7.1 Are there any conflicts between bicycles and pedestrians on side walks?
A.8 Signals, Signs and Pavement Markings	A.8.1 Are pedestrian travel zones clearly delineated from other modes of traffic thought the use of striping, colored an/or textured pavement, signing, and other methods? A.8.2 Is the visibility of signs and pavement markings adequate during the day and night to both the pedestrian and motorists?
A.9 Pedestrian Push Buttons and Signals	A.9.1 Are the push buttons accessible to all pedestrians? Are the Pedestrian Signals visible to all pedestrians?

adapted from FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists

B. STREET CROSSINGS

Master Prompt	Detailed Prompt
B.1 Presence, Design, and Placement	B.1.1 Do wide curb radii lengthen pedestrian crossing distances and en courage high-speed right turns? B.1.2 Do channelized right turn lanes minimize conflicts with pedestrian? B.1.3 Does a skewed intersection direct drivers' focus away from crossing pedestrian? B.1.4 Are pedestrian crossings located in areas where sight distance may be a problem? B.1.5 Do raised medians provide a safe waiting area (refuge) for pedestrians? B.1.6 Are supervised crossings adequately staffed by qualified crossing guards? B.1.7 Are marked crosswalks wide enough? B.1.8 Do at-grade railroad crossings accommodate pedestrians safely? B.1.9 Are crosswalks sited along pedestrian desire lines? B.1.10 Are corners and curb ramps appropriately planned and designed at each approach to the crossing?
B.2 Quality, Condition, and Obstructions	See Prompts in Section A for potential issues on obstructions and protruding object that apply to street crossings B.2.1 Is the crossing pavement adequate and well maintained? B.2.2 Is the crossing pavement flush with the roadway surface?
B.3 Continuity and Connectivity	B.3.1 Does pedestrian network connectivity continue through crossings by means of adequate, waiting areas at corners, curb ramps, and marked crosswalks? B.3.2 Are pedestrians clearly directed to crossing points and pedestrian access ways?
B.4 Lighting	B.4.1 Is the pedestrian crossing adequately lit?
B.5 Visibility	B.5.1 Can pedestrians see approaching vehicles at all legs of the intersection/crossing and vice versa? B.5.2 Is the distance from the stop (or yield) line to a crosswalk sufficient for drivers to see pedestrians? B.5.3 Do other conditions exist where stopped vehicles may obstruct visibility of pedestrians?
B.6 Access Management	B.6.1 Are driveways placed close to crossings?
B.7 Traffic Characteristics	B.7.1 Do turning vehicles pose a hazard to pedestrians? B.7.2 Are there sufficient gaps in the traffic to allow pedestrians to cross the road? B.7.3 Do traffic operations (especially during peak periods create a safety concern for pedestrians?

adapted from FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists

B. STREET CROSSINGS (CONTINUED)	
Master Prompt	**Detailed Prompt**
B.8 Signs and Pavement-Markings	B.8.1 Is paint on stop bars and crosswalks worn, or are signs worn, missing, or damaged? B.8.2 Are crossing points for pedestrians properly signed and/or marked?
B.9 Signals	B.9.1 Are pedestrian signal heads provided and adequate? B.9.2 Are traffic and pedestrian signals timed so that wait times and crossing times are reasonable? B.9.3 Is there a problem because of an inconsistency in pedestrian actuation (or detection) types? B.9.4 Are all pedestrian signals and push buttons functioning correctly and safely? B.9.5 Are ADA accessible push buttons provided and properly located?

adapted from FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists

C. PARKING AREAS/ADJACENT DEVELOPMENTS

Master Prompt	Detailed Prompt
C.1 Presence, Design, and Placement	C.1.1 Do sidewalks/paths connect the street and adjacent land uses? C.1.2 Are the sidewalks/paths designed appropriately? C.1.3 Are buildings entrances located and designed to be obvious and easily accessible to pedestrians?
C.2 Quality, Conditions, and Obstructions	See prompts in Section A for potential issues on obstructions and protruding objects that apply to sidewalks and walkways at parking areas/adjacent developments
	See prompts in Section A for potential issues on surface conditions that apply to sidewalks and walkways at parking areas/adjacent developments C.2.1 Do Parked Vehicles obstruct pedestrian paths?
C.3 Continuity and Connectivity	C.3.1 Are pedestrian facilities continuous? Do they provide adequate connections for pedestrian traffic? C.3.2 Are transitions of pedestrian facilities between developments/ projects adequate?
C.4 Lighting	See prompts in Section A and B for potential issues on lighting that apply to sidewalks and walkways at parking areas/adjacent developments
C.5 Visibility	C.5.1 Are visibility and sight distance adequate?
C.6 Access Management	C.6.1 Are travel paths for pedestrians and other vehicle modes clearly delineated at access openings? C.6.2 Do drivers look for and yield to pedestrian when turning into and out of driveways?
C.7 Traffic Characteristics	C.7.1 Does pedestrian or driver behavior increase the risk of a pedestrian collision? C.7.2 Are buses, cars, bicycles, and pedestrians separated on the site and provided with their own designated areas for travel?
C.8 Signs and Pavement Markings	C.8.1 Are travel paths and crossing points for pedestrians properly signed and/or marked?

adapted from FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists

D. TRANSIT AREAS

Master Prompt	Detailed Prompt
D.1 Presence, Design, and Placement	D.1.1 Are bus stops sited properly? D.1.2 Are safe pedestrian crossings convenient for transit and school bus users? D.1.3 Is sight distance to bus stops adequate? D.1.4 Are shelters appropriately designed and placed for pedestrian safety and convenience?
D.2 Quality, Condition, and Obstructions	D.2.1 Is the seating area at a safe and comfortable distance from vehicle and bicycle lanes? D.2.2 Do seats (or persons sitting on them) obstruct the sidewalk or reduce its usable width? D.2.3 Is a sufficient landing area provided to accommodate waiting passenger, boarding/alighting passengers, and through/bypassing pedestrian traffic at peak times? D.2.4 Is the landing area paved and free for problems such as uneven surfaces, standing water, or steep slopes? D.2.5 Is the sidewalk free of temporary/permanent obstructions that constrict its width or block access to the bus stop?
D.3 Continuity and Connectivity	D.3.1 Is the nearest crossing opportunity free of potential hazards for pedestrians? D.3.2 Are transit stops part of a continuous network of pedestrian facilities? D.3.3 Are transit stops maintained during periods of inclement weather?
D.4 Lighting	D.4.1 Are access ways to transit facilities well lit to accommodate early-morning, late afternoon, and evening?
D.5 Visibility	D.5.1 Are open sightlines maintained between approaching buses and passenger waiting and loading areas?
D.6 Traffic Characteristics	D.7.1 Do pedestrians entering and leaving buses conflict with vehicles, bicycles, or other pedestrians?
D.7 Signs and Pavement markings	D.8.1 Are appropriate signs and pavement markings provided for school bus and transit stops?

adapted from FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists

APPENDIX B
BEST PRACTICES RESOURCES MAPPED TO FHWA PROMPT LISTS

BEST PRACTICES

In the following tables, pedestrian safety standards, best practices, and resources have been mapped to the applicable cell in the field review matrix.

RELEVANT STANDARDS, BEST PRACTICES, AND SAFETY RESOURCES FOR ENGINEERING RECOMMENDATIONS	
Standards	
S1	*AASHTO, A Policy on Geometric Design of Highways and Streets* (Green Book) https://bookstore.transportation.org/item_details.aspx?ID=110
S2	*ADA Accessibility Guidelines* (ADAAG) http://www.access-board.gov/adaag/html/adaag.htm
S3	*Manual on Uniform Traffic Control Devices* (MUTCD) http://mutcd.fhwa.dot.gov/ser-pubs.htm
S4	*California Manual on Uniform Traffic Control Devices* (CMUTCD) http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/
S5	United States Access Board, *Public Rights of Way* (PROWAC) http://www.access-board.gov/PROWAC/)
Best Practices	
P1	*FHWA Designing Sidewalks and Trails for Access, Part I, A Review of Existing Guidelines* http://www.fhwa.dot.gov/environment/sidewalks/
P2	*FHWA Designing Sidewalks and Trails for Access Part II, Best Practices Guide* http://www.fhwa.dot.gov/environment/sidewalk2/
P3	*FHWA Accessible Sidewalks and Street Crossings - An Informational Guide* (FHWA-SA-03-019) http://www.bikewalk.org/pdfs/sopada_fhwa.pdf
P4	*AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities* https://bookstore.transportation.org/item_details.aspx?id=119
P5	*AASHTO Guide for the Development of Bicycle Facilities* https://bookstore.transportation.org/Item_details.aspx?id=104
P6	*Parking Management Best Practices* http://www.planning.org/APAStore/Search/Default.aspx?p=3502
P7	Urban Land Institute (ULI), *The Dimensions of Parking* http://www.amazon.com/Dimensions-Parking-Urban-LandInstitute/dp/0874208270
P8	*EPA Pedestrian and Transit Friendly Design Guidelines* http://www.epa.gov/dced/pdf/ptfd_primer.pdf
P9	Easter Seals/ FTA, *Bus Stop Checklist* http://www.walkinginfo.org/library/details.cfm?id=3126

adapted from FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists

RELEVANT STANDARDS, BEST PRACTICES, AND SAFETY RESOURCES FOR ENGINEERING RECOMMENDATIONS

P10	Pedestrian and Bicycle Information Center (PBIC), *Transit Waiting Environments* http://www.walkinginfo.org/library/details.cfm?id=2925
P11	United States Access Board, *A Checklist for Accessible Sidewalks and Street Crossings* http://www.walkinginfo.org/library/details.cfm?id=67
P12	ULI, *Shared Parking Second Edition* http://www.uli.org/
P13	ITE, *Electronic Toolbox for Making Intersections More Accessible for Pedestrians* http://www.ite.org/accessible/
P14	FHWA, *A Resident's Guide for Creating Safe and Walkable Communities* http://safety.fhwa.dot.gov/ped_bike/ped/ped_walkguide/index.htm
P15	FHWA, *A Transit Manager's Guide for Creating Safe and Walkable Communities* http://safety.fhwa.dot.gov/ (forthcoming)
P16	USLIMITS Speed Limit Selection Toolkit http://www2.uslimits.org/

Safety Resources

R1	*A Guide for Reducing Collisions Involving Pedestrians* (NCHRP Report 500) http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v10.pdf
R2	*Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations* (HRT-04-100) http://www.thrc.gov/safety/pubs/04100/index.htm
R3	*How to Develop a Pedestrian Safety Action Plan* (FHWA-SA-05-12) http://www.walkinginfo.org/pp/howtoguide2006.pdf
R4	*Improving Pedestrian Safety at Unsignalized Crossings* (NCHRP Report 562) http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_562.pdf
R5	*Road Safety Audits: Case Studies* (FHWA-SA-06-17) http://safety.fhwa.dot.gov/rsa/rsa_cstudies.htm
R6	PEDSAFE: The Pedestrian Safety Guide and Countermeasure Selection System (FHWA-SA-04-003) http://www.walkinginfo.org/pedsafe/
R7	Pedestrian and Bicycle Crash Analysis Tool (PBCAT) http://www.bicyclinginfo.org/bc/pbcat.cfm

adapted from FHWA Pedestrian Road Safety Audit Guidelines and Prompt Lists

APPENDIX B

MASTER PROMPT LIST WITH BEST PRACTICES

Topic	Subtopic	PSA Zones			
		A. Streets	B. Street Crossings	C. Parking Areas/Adjacent Developments	D. Transit Areas
Pedestrian Facilities	1. Presence, Design, and Placement	S1, S2, S5, P1, P2, P3, P4, P11, R1, R6, R7	S1, S2, S5, P1, P2, P3, P4, P11, P13, R1, R2, R4, R6, R7	S1, S2, S5, P1, P2, P3, P4, R1, P6, P7, P12, R1, R6, R7	S1, S2, S5, P1, P2, P4, P5, P8, P9, P10, R1, R6, R7
	2. Quality, Condition, and Obstructions	S1, S2, P1, P2, P3, P4, P11, R1, R6, R7	S1, S2, P1, P2, P3, P4, P11, P13, R1, R2, R4, R6, R7	S1, S2, P1, P2, P3, P4, P6, P7, R1, R6, R7	S1, S2, P1, P2, P4, P5, P8, P9, P10, R1, R6, R7
	3. Continuity and Connectivity	S2, S5, P1, P2, P3, P4, P11, R1, R6, R7	S2, S5, P1, P2, P3, P4, P11, P13, R1, R4, R6, R7	S2, S5, P1, P2, P3, P4, P6, P7, R1, R6, R7	S2, S5, P1, P2, P4, P8, P9, P10, R1, R6, R7
	4. Lighting	S1, P1, P2, P3, P4, R1, R6, R7	S1, P1, P2, P3, P4, P13, R1, R4, R6, R7	S1, P1, P2, P3, P4, P6, P7, R1, R6, R7	S1, P1, P2, P4, P8, P9, P10, R1, R6, R7
	5. Visibility	S1, S2, P1, P2, P3 P4, R1, R6, R7	S1, S2, P1, P2, P3, P4, P13, R1, R2, R4, R6, R7	S1, S2, S4, P1, P2, P3, P4, P6, P7, R1	S1, S2, P1, P2, P4, P8, P9, P10, R1, R6, R7
Traffic	6. Access management	S1, R1, R6, R7	S1, R1, R6, R7	S1, P3, P6, P7, P8, P12, R1, R6, R7	N/A
	7. Traffic Characteristics	S1, P5, R7, R1, R6, R7, P16	S1, P3, P5, R1, R2, R4, R6, R7, P16	P6, P7, R1, R6, R7, P14	P8, P9, R1, R6, R7, P15
Traffic Control Devices	8. Signs and Pavement Markings	S2, S3, S4, R1, R4, R6, R7	S2, S3, S4, R4, P3, P11, P13, R1, R4, R6, R7	S2, S3, S4, R4, P3, P6, P11, P12, R1, R6, R7	S2, S3, S4, P8, P10, R1, R6, R7
	9. Signals	N/A	S2, S3, S4, P13, R1, R2, R4, R6, R7	N/A	S2, S3, S4, P8, R1, R6, R7

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

APPENDIX C

WALK SCORE™

A Walk Score™ may be obtained from the website *www.walkscore.com.* The score offers an objective, quantitative method for assessing the walkability of an area based on nearby stores, restaurants, schools, parks, etc. The score is a number between 0 and 100 that may be interpreted as follows:

- **90 - 100 = Walkers' Paradise:** Most errands can be accomplished on foot and many people get by without owning a car.
- **70 - 90 = Very Walkable:** It's possible to get by without owning a car.
- **50 - 70 = Some Walkable Locations:** Some stores and amenities are within walking distance, but many everyday trips still require a bike, public transportation, or car.
- **25 - 50 = Not Walkable:** Only a few destinations are within easy walking range. For most errands, driving or public transportation is a must.
- **0 - 25 = Driving Only:** Virtually no neighborhood destinations within walking range. You can walk from your house to your car!

The score is calculated based on:

- The distance to walkable locations near an address.
- Calculating a score for each of these locations.
- Combining these scores into one easy to read Walk Score.

In the current version, however, the score does not include many variables such as:

- **Street width and block length:** Narrow streets slow down traffic. Short blocks make it easier to navigate the grid.
- **Safety:** How much crime is in the neighborhood? How many traffic [crashes] are there? Are crosswalks well marked and streets well lit?
- **Pedestrian-friendly design:** Are there walking paths? Are buildings close to the sidewalk with parking in back? Are sidewalks shaded by trees?
- **Topography:** Hills can make walking difficult, especially if you're carrying groceries.
- **Public transit:** Good public transit is important for walkable neighborhoods.
- **Freeways and bodies of water:** Freeways can divide neighborhoods. ...
- **Weather:** In some places it's just too hot or cold to walk regularly.

Sources: http://www.walkscore.com/how-it-works.shtml and *http://www.walkscore.com/how-it-doesnt-work.shtml*

APPENDIX D

BLOCK RATIO INDEX

BLOCK RATIO INDEX: MEASURING CONNECTIVITY

Jennifer Dill (2004) presents the following measures of street connectivity:

- Intersection density
- Street density
- Average block length
- Link/node ratio
- Connected node ratio = intersections/ (intersections + cul-de-sacs)
- Alpha index = number of actual circuits/ maximum number of circuits

  Where a circuit is a finite, closed path starting and ending at a single node
- Gamma index = number of links in the network/ maximum possible number of links between nodes
- Effective walking area = number of parcels within a one-quarter mile walking distance of a point/ total number of parcels within a one-quarter mile radius of that point
- Pedestrian route directness = route distance/ straight-line distance for two selected points

Dill determined that the pedestrian route directness (PRD) measure is the best connectivity measure to reflect minimizing trip distances and route directness. However, it is difficult to use in research and policy. The PRD may be applied in practice by randomly selecting origin-destination pairs and calculating a sample for the subject area.

APPENDIX E

PSA RESOURCE LIST

RESOURCE LIST
(FOR INCLUSION AS AN APPENDIX IN ALL PSA REPORTS)

- *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/pbcat.cfm
- FHWA, *A Resident's Guide for Creating Safe and Walkable Communities*
  http://safety.fhwa.dot.gov/ped_bike/ped/ped_walkguide/index.htm
- FHWA, *A Transit Manager's Guide for Creating Safe and Walkable Communities*
  http://safety.fhwa.dot.gov/ (forthcoming)
- 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

APPENDIX F

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