



The Statewide Pedestrian Master Plan

CH2MHILL

FEDERAL-AID PROJECT No. SPR-0010(31)


CAC Meeting #4 **2/25/11**



Welcome & Introductions

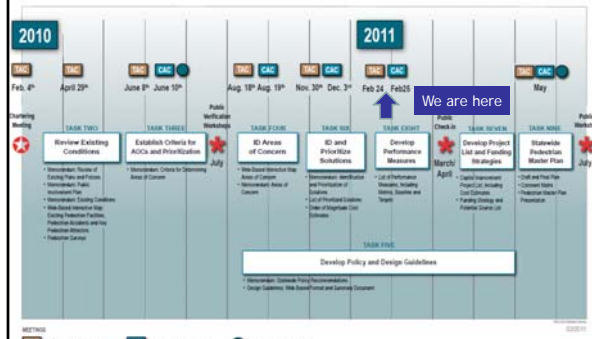
Statewide Pedestrian Master Plan

- Welcome!
- Roundtable Introductions
- Agenda Review
- Handouts

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Work Plan Review



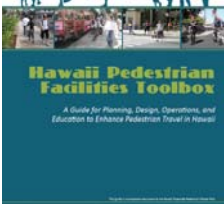

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Meeting Goals

Statewide Pedestrian Master Plan


- Review Area of Concern solutions
- Discuss Performance Measures
- Review the Design Guidelines

CAC input is critical at each phase of the Plan.

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Areas of Concern



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Areas of Concern: Selection Considerations

Statewide Pedestrian Master Plan

- AOC Factors
- TAC Input
- CAC Input
- Other Input
- Types of Projects
- Types of Programs
- Types of Locations
- Population representation
- Geographic representation

Island	AOCs (goal)	Population	Lane Miles	Revenue
Kauai	5	5%	9%	6%
Maui	5	11%	18%	11%
Hawaii	4	13%	31%	7%
Oahu	16	70%	40%	76%

GOAL: 30 Locations



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Areas of Concern: Draft Location List

1. Review the Draft List
2. Assess the proposed solutions

DRAFT

Draft Areas of Concern Location List

Statewide Pedestrian Master Plan
Public Working Draft of Pedestrian Concerns for Review and Response
November 16, 2010

North

1. Interstate Highway - Orange Road
2. Interstate Highway - Orange Road
3. Interstate Highway - Orange Road
4. State Highway - Orange Road

West

5. Interstate Highway - Orange Road
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100. Interstate Highway - Orange Road



Areas of Concern: Next Steps

1. Get feedback from stakeholders
2. Finalize Area of Concerns and the solutions
3. Conduct planning level cost estimates
4. Prioritize based on the Prioritization Criteria
5. Project/Program list becomes part of the Pedestrian Master Plan
6. Re-prioritize the list every few years due to changes in land use, priorities, costs, etc.

Performance Measures

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Performance Measures

- Review Updated Vision, Goals and Objectives

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Performance Measures

- Measures achievement
- Provides transparency and accountability
- Supports future decision making/priorities
- Intended to be realistic (data is available)

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Performance Measures

- Performance Measure Discussion
 - Is the Measure appropriate to capture achievement of the objective?
 - Is the data source available?
 - Is the appropriate monitoring agency/program identified?

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BREAK



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draft Design Guidelines



Hawaii Pedestrian Facilities Toolbox
A Guide for Planning, Design, Operations, and Education to Enhance Pedestrian Travel in Hawaii

- Introduction to the Guidelines
- Toolbox 1: Thinking About Pedestrians
- Toolbox 2: Pedestrian-Friendly Streets
- Toolbox 3: Accessibility
- Toolbox 4: Sidewalks and Walkways
- Toolbox 5: Intersections and Crossings



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Standards vs. Guidelines

- Design guidelines presented are the preferred design approaches
- Some are mandatory, some are strongly encouraged, and some are optional
- Look for language usages to understand the degree of flexibility

Standard: Look for the words “shall” or “shall not,” and “must” or “must not.” Also look for the words “is required” or “are required.”

Guideline: Look for the words “should” or “should not.” The words “preferred,” “encouraged,” or “recommended” may also be used.

Optional: Prescribed options or optional treatments use the words “may” or “may not.”



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Relationship to Other Documents

- The toolboxes are meant to complement State, City and County Standards
- The toolboxes are consistent with:
 - Americans with Disabilities Act (ADA) Federal Requirements
 - Manual on Uniform Traffic Control Devices (MUTCD), Federal Highway Administration
 - Guide for the Planning, Design and Operation of Pedestrian Facilities, American Association of State Highway and Transportation Officials (AASHTO)
 - Guide for the Development of Bicycle Facilities, AASHTO
 - A Policy on Geometric Design of Highways and Streets and Manual on Flexibility in Highway Design (the Green Book), AASHTO
 - International Building Code (IBC), International Conference of Building Officials uniform code and/or locally adopted building codes


THE TOOLBOX IS JUST ONE OF MANY SOURCES OF GUIDANCE
Be sure to check with the local, regional, state, and/or federal jurisdictions responsible for or involved in your specific project to confirm requirements.



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Dimensional Guidance



- Presented in terms of “desirable” or “minimum” dimensions
- Should be applied with professional judgment to achieve best solutions that are specifically tailored to the circumstances encountered.

For example, if a sidewalk receives a high amount of use, the project designer or local design reviewer may elect to apply the “desirable” dimension over the “minimum” for the sidewalk width.



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draft Toolbox 1: Pedestrians From the Start

What are Pedestrian Facilities?
Sidewalks, walkways, paths, trails, intersection treatments, crosswalks, signing, signals and actuation, curb ramps, grade separated structures, traffic calming, and other features, treatments, and strategies to encourage and enhance pedestrian travel and maximize safety.




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draft Toolbox 1: Pedestrians From the Start

Statewide Pedestrian Master Plan

- Developing Pedestrian Plans
- Effective Education, Enforcement and Encouragement Programs
- Develop Pedestrian-Friendly Communities
- Create a Continuous Pedestrian System
- Create an Effective Pedestrian System
- Plan at the Project-Level




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draft Toolbox 2: Pedestrian-Friendly Streets

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What are Pedestrian-Friendly Streets?

Pedestrian-friendly streets are often the most attractive and memorable streets in our communities. They are full of life and activity. Pedestrians are attracted to these streets not only because they are safe and accessible, but also because they are interesting places. They are the places people love to stroll, meet others, and go about their daily business.





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draft Toolbox 2: Pedestrian-Friendly Streets


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What are Complete Streets?

“Transportation facilities that are planned, designed, operated and maintained to provide safe access and mobility for all users, including bicyclists, pedestrians, transit riders, and motorists, and that are appropriate to the function and context of the facility.”



Adapted from the Caltrans Deputy Directive DD-64-R1





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draft Toolbox 2: Pedestrian-Friendly Streets

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Even though traffic calming is not specifically a “pedestrian facility,” it relates to pedestrians by improving their environment. Traffic calming techniques use various means to influence the behavior of motorists: physical, psychological, visual, social, and legal (regulatory and enforcement).

Traffic Calming



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draft Toolbox 2: Pedestrian-Friendly Streets

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Other Elements of Pedestrian-Friendly Streets

- Bicycle Facilities
- Signing and Wayfinding
- Street Trees and Landscaping
- Street Lighting and Pedestrian Lighting
- Safety in Work Zones
- Ongoing Facility Maintenance





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draft Toolbox 3: Accessibility

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- Considering Accessibility in the Scope of Each Project
- Spatial Needs for People with Disabilities and Older Adults
- Understanding the Americans with Disabilities Act (ADA)
- Designing for People with Disabilities
- Designing for Older Adults




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draft Toolbox 3: Accessibility

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Figure 3.5 Expanding sidewalk provided space for curb ramp and landing

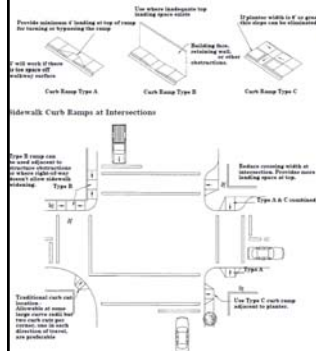


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draft Toolbox 3: Accessibility

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DESIGN OF SIDEWALK CURB RAMP

Sidewalk curb ramps provide accessibility at intersections, building entrances and other areas where elevated walkways are edged with curbing.

Figure 3.9 illustrates accessible curb ramp design options.



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draft Toolbox 3: Accessibility

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TECHNICAL ASSISTANCE Q&A FOR ALTERATIONS PROJECTS

Question: One corner of an intersection is being altered by curb and gutter reconstruction and paired curb ramps are being installed as part of this project. The other three corners of the intersection are not being altered. Must curb ramps be provided at the unaltered corners as part of this work?

Answer: No. The scope of the project requires curb ramps only at the altered corner.

Question: Countdown signal displays are being added to the existing pedestrian signal heads at an intersection, but the software and signal controller are not being altered. Must APS be installed?

Answer: No, simply adding a display to the existing WALK/DON'T WALK signal would not involve the system changes needed to implement APS.



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draft Toolbox 4: Sidewalks and Walkways

Statewide Pedestrian Master Plan



Priorities for Pedestrians Traveling Along Streets

- Safety and security
- Efficient mobility
- Defined space
- Visibility between motorists and pedestrians
- Accessibility - a firm, stable surface and clear path of travel
- A comfortable and attractive environment



Toolbox 4, Sidewalks and Walkways, Page 4.2



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draft Toolbox 4: Sidewalks and Walkways

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Determining When and Where Sidewalks and Walkways are Needed

ITE Criteria to be Analyzed to Determine Pedestrian Safety Deficiencies

- Roadway and traffic control device inventory
- Sight distance studies
- The adequacy of gaps in the stream of traffic for pedestrian crossings
- Collision summaries and diagrams
- Conflict analysis
- Pedestrian volumes and characteristics
- Traffic volumes and speeds

Source: Design and Safety of Pedestrian Facilities, A Proposed Recommended Practice of the Institute of Transportation Engineers, ITE Technical Council Committee 5A-5
Toolbox 4, Sidewalks and Walkways, Page 4.3



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draft Toolbox 4: Sidewalks and Walkways

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When Determining Sidewalk and Walkway Dimensions, Designers Should Consider:

- Local requirements and preferences
- ADA requirements
- Surrounding land uses
- Pedestrian volumes (existing and projected)
- Type of street/roadway
- Roadside environment
- Available space within the right-of-way
- Traffic characteristics (volume and speed)
- Characteristics of pedestrians using the facility
- Funding levels and requirements



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draft Toolbox 4: Sidewalks and Walkways



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State Highways as Main Streets and Community Connectors

- Primary arterial
- Functions as local road
- Provide sidewalks and/or walkways



Shoulders in Rural Areas

- Used by pedestrians
- Not formally recognized as pedestrian facilities
- Sidewalks/paths can be provided along developed frontage areas



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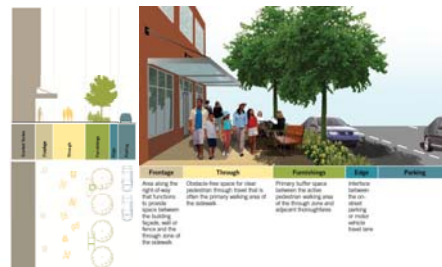
draft Toolbox 4: Sidewalks and Walkways



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URBAN CONTEXT

Sidewalks in Small Towns/Business Districts/Organizing the Street Edge



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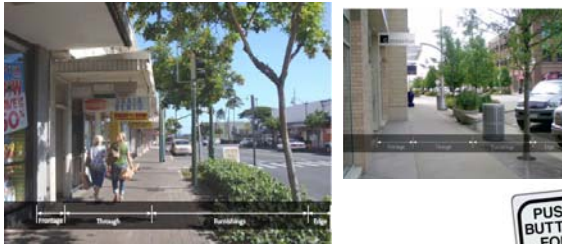
draft Toolbox 4: Sidewalks and Walkways



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URBAN CONTEXT

Sidewalks in Small Towns/Business Districts/Organizing the Street Edge



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draft Toolbox 4: Sidewalks and Walkways



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- Other Considerations
 - Paving and Surfacing
 - Streetscape Furnishings
 - Passing, Waiting, and Resting Areas
 - Meandering Sidewalks and Walkways
 - Adjacent Bicycle Use
 - Curbs and Concrete Barriers
 - Side slopes, Railings and Walls
 - Ongoing Maintenance



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draft Toolbox 4: Sidewalks and Walkways



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Maintenance Recommendations for Sidewalks

Concern	Maintenance Activity
<ul style="list-style-type: none"> Tree roots cracking and heaving sidewalk Section pop-up of vertical height greater than 1/2 inch Cracked or spalling surface and poorly placed temporary patching Separation of expansion and construction joints to that spaces between adjoining sections are greater than 1/4 inch Trash, loose sand, oil and grease on walkways and sidewalks. Materials, signs, vending machines, etc. restricting effective sidewalk width Low hanging tree limbs, bushes, weeds, and other foliage growing into the sidewalk and/or posing obstructions 	<ul style="list-style-type: none"> Remove failed sidewalk, cut roots and install new sidewalk. A local arborist should be contacted prior to removing large roots. Replace defective sections or provide temporary asphalt shim. Replace defective sections. Fill joint with hardening expansion compound. Send notice to abutting landowners to clean and maintain sidewalks. Require responsible parties to remove obstructions. Enact and enforce local regulations requiring abutting land users to perform timely clearance activity. Hire private contractor to clear sidewalk and assess cost to abutting land users.



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draft Toolbox 5: Intersections and Crossings



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Table 5.1
Basic Principles of Intersection Design to Accommodate Pedestrians

- Design compact intersections.
- Eliminate unrestricted motor vehicle movements, or
- Force motor vehicles to reduce speeds substantially through intersections.
- Create crossings on all legs of an intersection.
- Design crossing in a direct line, at 90 degrees to the direction of vehicular travel.
- Clearly identify crossings to all pedestrians, including those with sight impairments.
- Avoid multiple and skewed intersections.



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draft Toolbox 5: Intersections and Crossings



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Create crossings on all legs of an intersection.

Crossings should be at right angles to the intersection.

Ladder bar markings are highly visible and clearly mark pedestrian crossings.

All crosswalks should be marked. Markings make pedestrians more visible to motorists and define the area where pedestrians have the right-of-way.

Figure 5.5 Typical Crosswalk Markings

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draft Toolbox 5: Intersections and Crossings



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On multiple lane roadways at controlled approaches, advance stop lines increase the safety of pedestrians by reducing the screening effect of vehicles in the right lane.

Figure 5.10 An advance stop bar gives both pedestrians and motorists better visibility. (Graphic adapted from state crossing recommendations - see State Square of Recommendations)

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draft Toolbox 5: Intersections and Crossings



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Advance Stop Bar

The advance stop bar increases the time for a vehicle to enter the intersection on green, and may result in a modest reduction in intersection capacity. However, advance stop bars may be of benefit in reducing the frequency of crashes from red-light running.

At the Crosswalk

In Advance of the Crosswalk

500 FT

HERE TO STOP FOR

NEW

AHEAD

Note: Diagonal arrow is required at crosswalk if mounted on a post. It may not be used if mounted overhead.

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draft Toolbox 5: Intersections and Crossings



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Pedestrian Signal Timing

- Concurrent Timing: green traffic signal and walk signal on simultaneously
- Exclusive Timing: stops traffic in all directions
- Leading Pedestrian Interval: walk signal goes on several seconds before the green traffic signal

Exclusive Timing on King Street in Chinatown

Pedestrian Signals

- Pedestrian Hybrid Beacon (HAWK)
- Pedestrian Actuated Signal
- Audible Devices

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draft Toolbox 5: Intersections and Crossings



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Right-Turn Channelization (Slip) Lane with Refuge Island

- At wide intersections, a triangular space is created between the through-lane and the right-turn lane
- Placing a raised island in this area provides pedestrians a refuge area when crossing
- Where curb return radii is larger than 30 feet
- Without a pedestrian refuge, the addition of a right turn lane increases the crossing distance and makes it harder for turning motorists to see the pedestrian
- At locations with extremely high numbers of right turning movements, slip lanes should be equipped with a signal to provide pedestrians opportunities to cross.

Figure 5.26 Slip lane with raised pedestrian refuge

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draft Toolbox 5: Intersections and Crossings



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Reduced Curb radii

Reduced curb radii also help to slow vehicles as they travel through the intersection, enabling drivers to respond more quickly to signal changes and crossing pedestrians.

Figure 5.27 Reducing curb radii can shorten crossing distances substantially.

It may not always be practical to reduce curb return radii. A radius that is too small can cause large vehicles and buses to jump the curb, causing deterioration of the curb and intrusion into the waiting and standing space for pedestrians.

Figure 5.28 A curb return radius as short as 20' can be used at some key locations.

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draft Toolbox 5: Intersections and Crossings



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Table 5.5 Non-Intersection Crossings	
<p>Locate Non-Intersection Crossings:</p> <ul style="list-style-type: none"> Where significant pedestrian crossings and substantial pedestrian/vehicle conflicts exist; should not be used indiscriminately. Where the crossing can serve to concentrate or channelize multiple pedestrian crossings to a single location. At approved school crossings or crossings on recommended safe routes to schools. Where land uses create high concentrations of pedestrians needed to cross (such as residential areas across from retail or recreation, and transit stops across from residential or employment). Where pedestrians could not otherwise recognize the proper place to cross or there is a need to delineate the optimal location to cross. 	<p>Avoid Locating Non-Intersection Crossings:</p> <p>Non-intersection crosswalks should generally be avoided under the following circumstances (unless they are stop controlled):</p> <ul style="list-style-type: none"> Immediately downstream (less than 300 feet) from a traffic signal or bus stop where motorists are not expecting pedestrians to cross (Knoblauch et. al.) Within 600 feet of another crossing point (Knoblauch et. al.), except in central business districts or other locations where there is a well-defined need. The recommended minimum separation is 300 feet. On streets with speed limits above 45 mph. On streets with high traffic volumes



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draft Toolbox 5: Intersections and Crossings



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Figure 5.1.1.4 and designed pedestrian refuge at a fully signalized and non-signalized crossing. (C) adopted from Howard County Pedestrian Safety Action Plan (draft, 2008)

Figure 5.2.2 Curb extensions create space for on-street parking and shorten crossing distance for pedestrians.

Figure 5.2.3 Speed humps can double as crossings and should be marked with crosswalk markings and speed bump markings. (Copyright adopted from 06/1/10 (Figure 5B.06))

Non-Intersection Crossings



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draft Toolbox 5: Intersections and Crossings



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Table 5.7 Reducing Turning Conflicts	
<ul style="list-style-type: none"> Design compact intersections with small turning radii that force slower speeds Prohibit right-turn-on-red When right-turn slip-lanes are used, place crosswalks as far upstream as possible to provide high visibility for both pedestrians and drivers Use a separate left-turn phase in conjunction with a pedestrian signal Restrict left turns at busy intersections during hours of high pedestrian activity Shorten crossing distance and exposure time with curb extensions or bulb-outs Provide medians and refuge islands Place signs to remind motorists of their duty to yield to pedestrians while turning Consider providing an exclusive "pedestrian only" signal phase at intersections of high pedestrian use 	



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draft Toolbox 5: Intersections and Crossings



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Other Innovative Technologies

- Soft Sandwich and Flop-over Signs
- In-Roadway Warning Lights
- PUFFIN (Pedestrian User Friendly Intelligent) Crossing
- PELICAN (Pedestrian Light CONTROLLED) Crossings

Figure 5.1.1.4 Pedestrian crossing a public crossing in Cambridge, England (Source: Courtesy of CH2MHILL)

Figure 5.2.2 In-roadway warning lights make pedestrians more visible at night or in dark, cloudy conditions. (Copyright adopted from Puffin: <http://www.walkinginfo.org.uk/puffin/556.html>)

Figure 5.2.2.2 Flop-over signs call attention to crossings. (Copyright: Howard County PEAP Draft 2008)



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draft Toolbox 5: Intersections and Crossings



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Effects of Pedestrian Improvements on Vehicle Capacity

- Current practices encourage design approaches that improve conditions for pedestrians and fully integrate them into the transportation system
- Many of the techniques to improve pedestrian safety may affect vehicle capacity
- Principal effects on capacity are caused by signalization, narrowing lanes, introducing curb extensions and bulb-outs, and reducing curb radii.
- Increased numbers of pedestrian crossings and bus stop relocations may also affect vehicle capacity.
- All effects must be accounted for in traffic engineering studies.



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draft Toolbox 5: Intersections and Crossings



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- ## Next Steps
- CAC comments on Areas of Concern solutions, Performance Measures and Design Guidelines, Due by March 15th
 - Confirm project/program list
 - Continue second half of Design Guidelines draft
 - Refine performance measure metrics
 - Second Round of Public Meetings in March/April
 - Next CAC Meeting:
 - May 2011



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