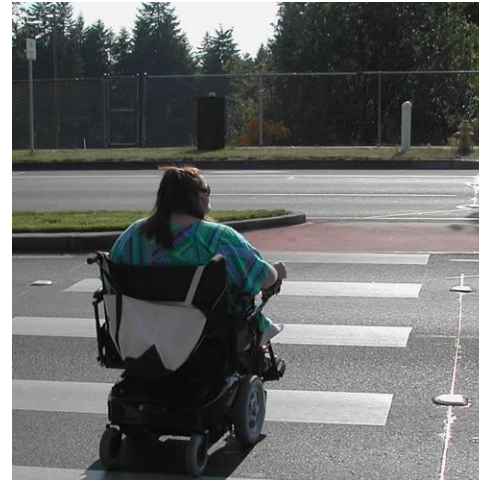


Pedestrian Facility Design

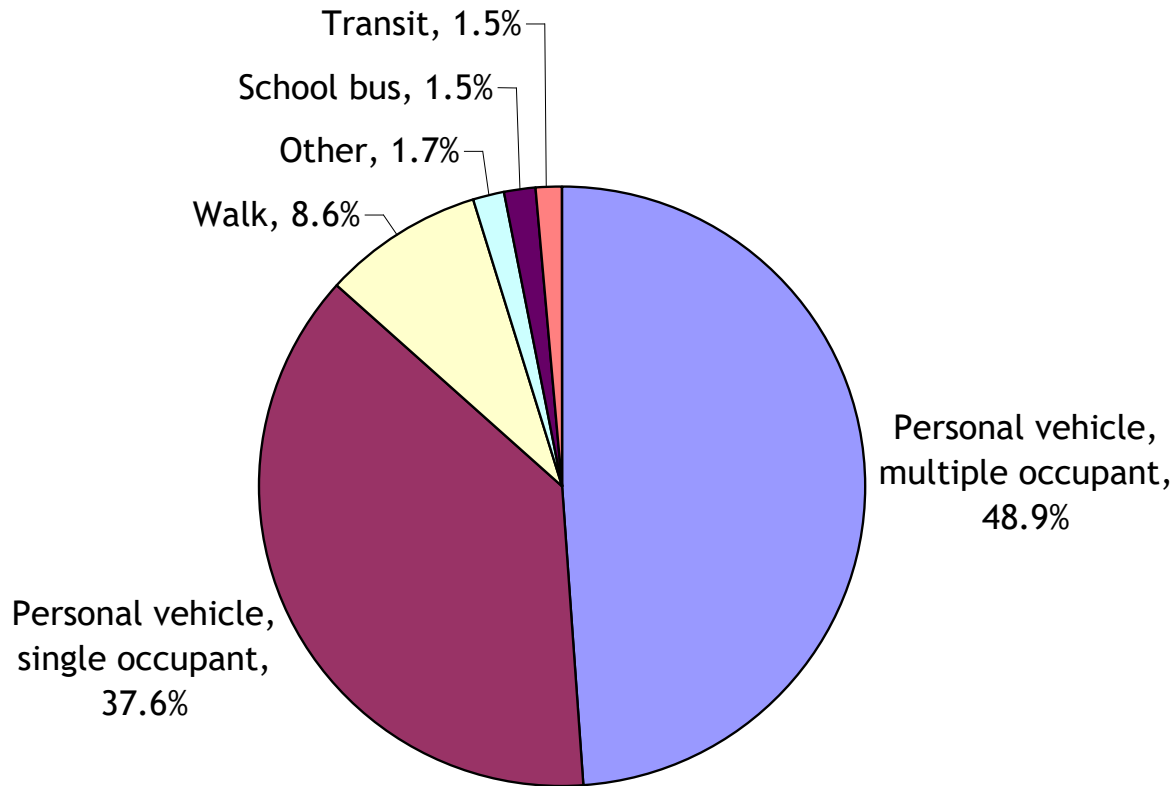


Lesson Outline

- Trends and issues.
- Why don't more people bike/walk?
- Pedestrian design issues.
- Design for accessibility.



2001 National Household Travel Survey Data



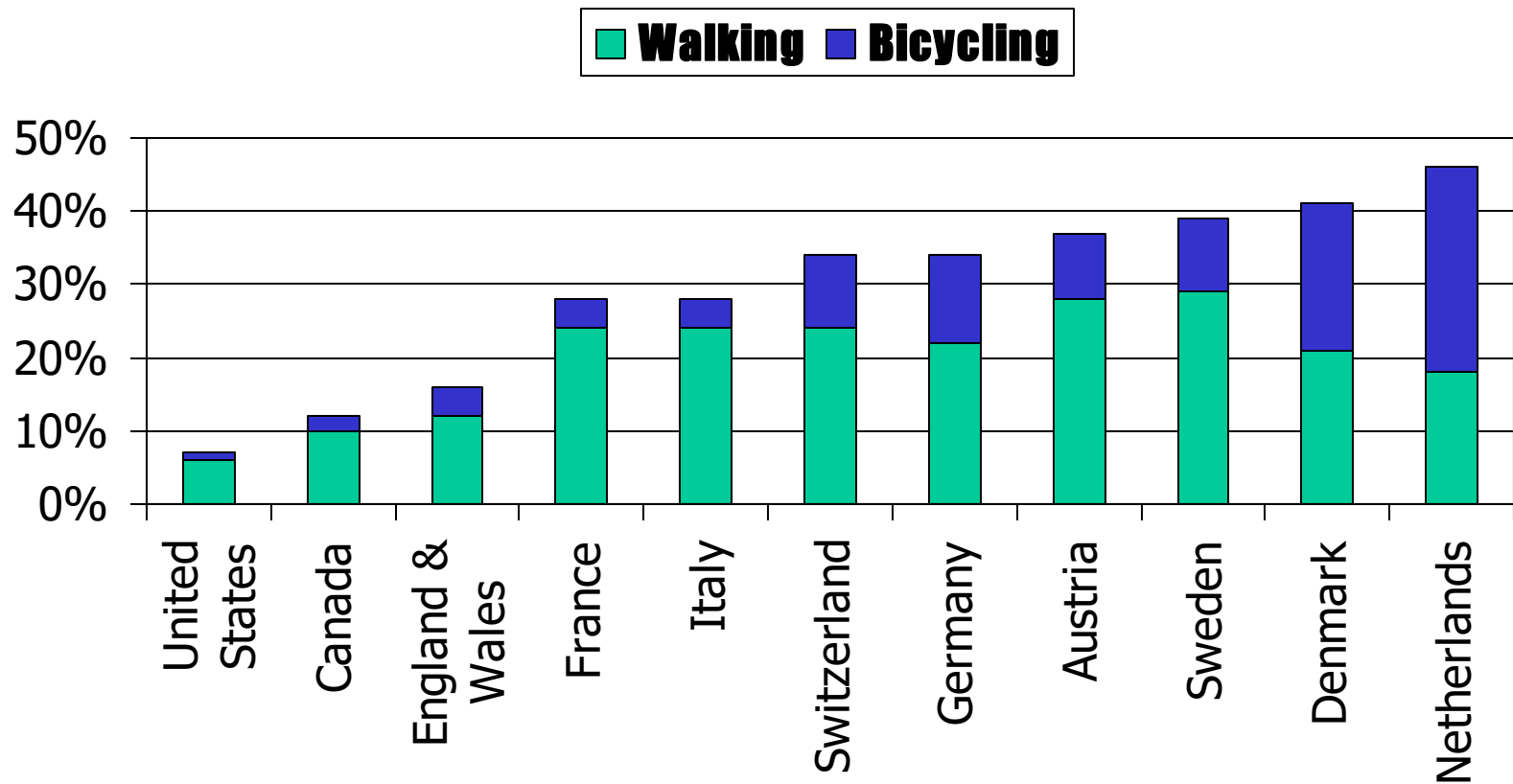
Regional Variations in Mode Choice

Mode of Transportation	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
Total Transit	1.8	5.8	1.3	0.6	1.6	0.4	0.7	0.8	2.2
Bus and Light Rail	0.7	3.0	0.9	0.5	1.2	0.4	0.7	0.8	2.0
Metro/Subway/ Heavy Rail	0.9	2.3	0.2	0.0	0.3	0.0	0.0	0.0	0.1
Commuter Rail	0.3	0.5	0.2	0.0	0.1	0.0	0.0	0.0	0.1
Total Nonmotorized	11.0	10.7	8.5	7.3	8.5	8.4	7.1	8.5	11.7
Walk	10.3	15.8	8.6	6.6	7.6	6.0	6.3	8.7	10.6
Bicycle	0.7	0.8	0.9	0.7	0.9	0.4	0.8	0.8	1.1

Source: Pucher, J., and J.L. Renne, "Socioeconomics of Urban Travel: Evidence from the 2001 NHTS," *Transportation Quarterly*, Vol. 57, No. 3, Summer 2003.



Bicycling and Walking Levels



What Can the United States Borrow from Other Countries?

- Better facilities for bicycling and walking.
- Areawide traffic calming of neighborhoods.
- Urban design oriented to people, not cars.
- Restrictions on motor-vehicle use.
- Better traffic education and enforcement.



Health Benefits



- There are nearly twice as many overweight children now as there were in 1980.
- Obesity and overweight are linked to the nation's number one killer—heart disease—as well as diabetes.
- Thirty minutes of routine exercise, such as walking, per day, can significantly improve health.



References: Centers for Disease Control, U.S. Surgeon General



Health Issues



35% of youth do not participate in regular physical activity.

Factors Influencing Walking/Biking Decisions



Distance/Time—Land Use Separation



Ease of Driving



Safety



Safety



Pedestrian Facility Design



Pedestrian Facilities

- Wide sidewalks and walkways.
- Setback/buffer from traffic lanes.
- Safe street crossings.
- Accommodations for pedestrians with disabilities.
- Convenient connection to popular destinations.



Sidewalk Width



Minimum	Desired
1.2 meters (m) (4 feet (ft))	1.5+ m (5+ ft) (depending on volume)

Source: PBIC, www.pedbikeimages.org



Border Areas and Buffers



Minimum	Desired
1.5–2.1 m (5–7 ft) (from lane) 0.3–0.9 m (1–3 ft) (from building)	3.0 m (10+ ft) (from lane) 0.9+ m (3+ ft) (from building)

Source: PBIC, www.pedbikeimages.org

Street Crossings

- Improved by using:
 - High-visibility markings and signing.
 - Curb extensions.
 - Median refuge islands.
 - Ped-activated flashing warning lights.
 - Traffic calming near crossings.



Crosswalk Markings

Solid



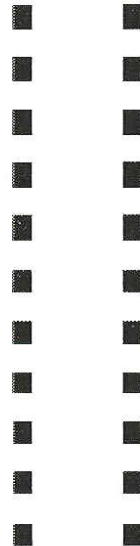
Standard



Continental



Dashed



Zebra



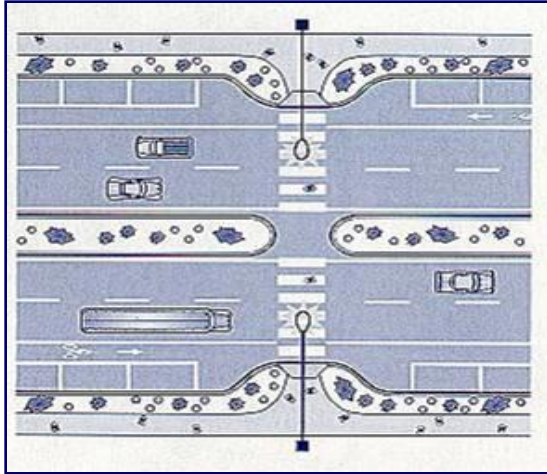
Ladder



Source: *Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled Locations*



Median Refuge Island and Curb Extension



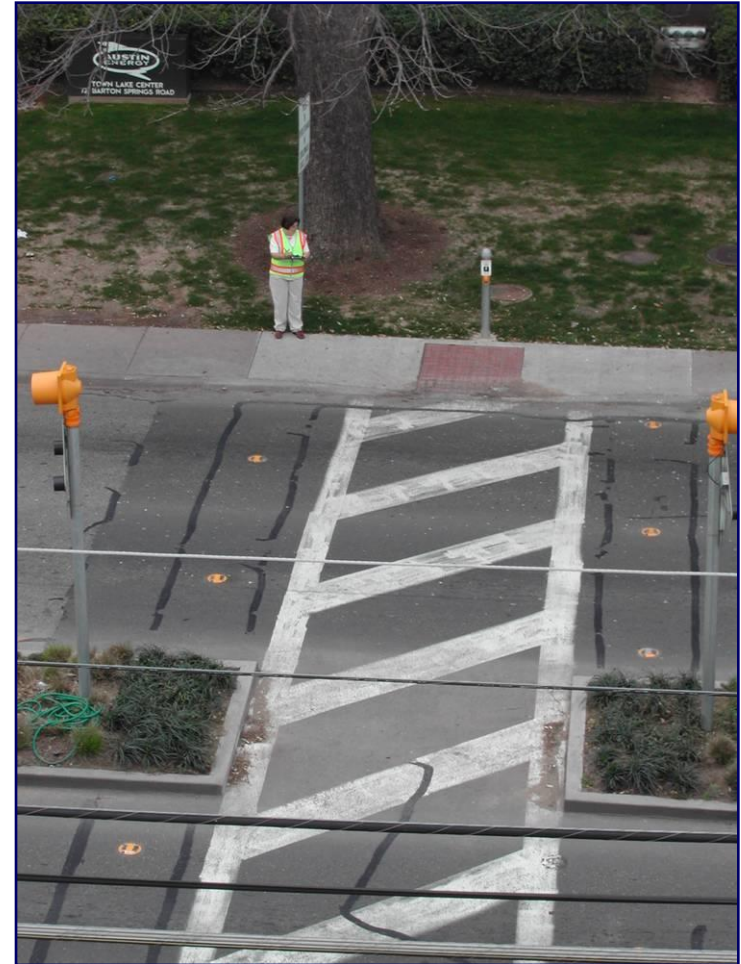
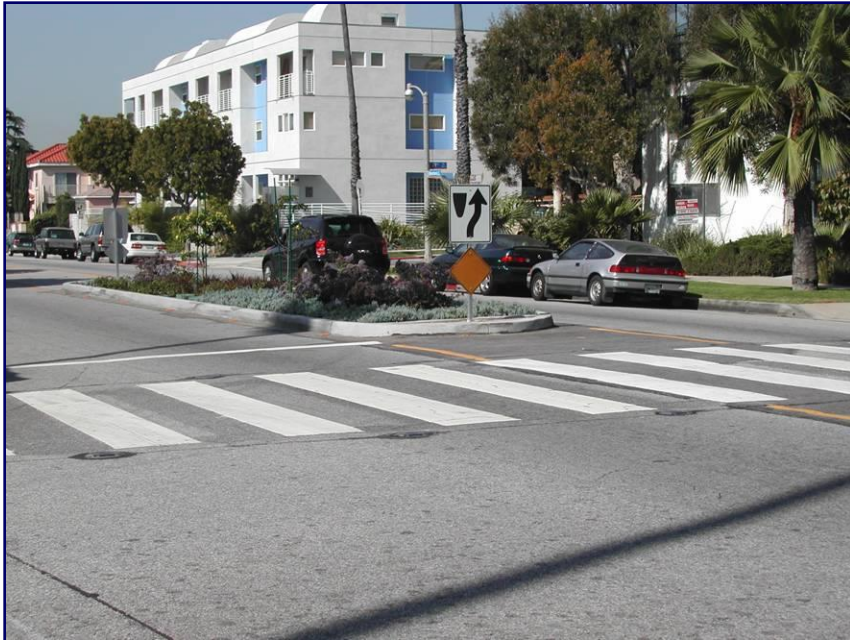
- Curb extensions to reduce crossing distance.
- Width:
 - 2.4 m (8 ft) desirable.
 - 0.6 m (2 ft) minimum.
- Ramps may be needed.
- Drainage.

Use of Pedestrian Refuge Islands

- Purpose:
 - Provide a safe resting/waiting area for pedestrians.
 - Allow pedestrians to cross only one direction of traffic at a time.
- Design issues:
 - Accessible path through island.
 - Offset crosswalks to orient crossing pedestrians to oncoming traffic.
 - Minimum dimensions—1.8 meters (m) long by 3.7 m wide (12 feet (ft) long by 6 ft wide).
 - Highly visible approach nose.
 - Guide strips for the visually impaired.



In-Roadway Warning Lights



Pedestrian Countdown Signals



Pedestrians with Different Needs

- Children.
- Seniors.
- The mobility-impaired.



Source: PBIC, www.pedbikeimages.org

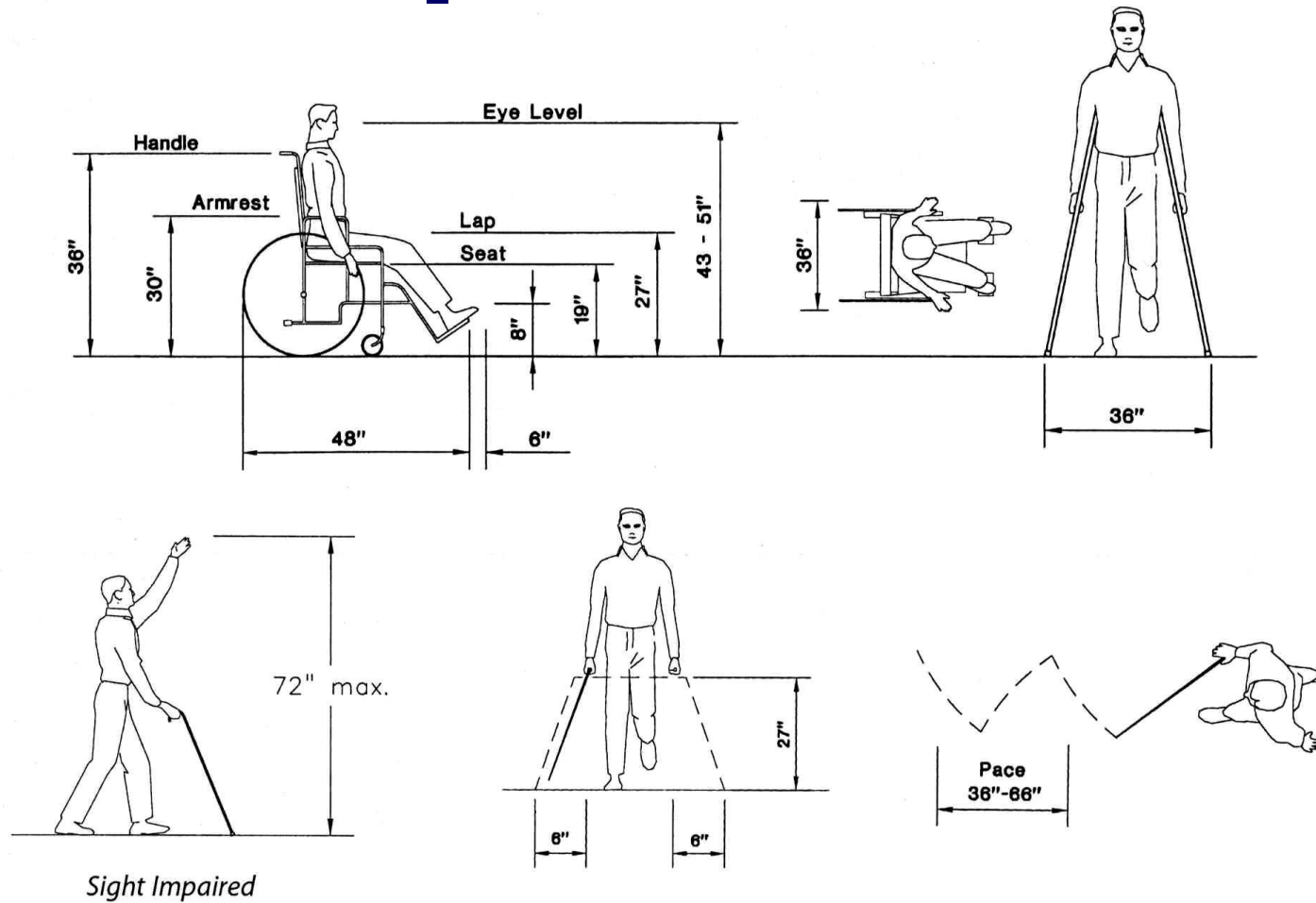


Walking Speeds

Pedestrian Type	Mean Walking Speed, ft/s
Average adult	4.00
Wheelchair user	3.55
Pedestrian with immobilized knee	3.50
Older/senior adult	2.80
Cane or crutch user	2.62
Below-knee amputee	2.46
Pedestrian with knee arthritis	2.46
Pedestrian with hip arthritis	2.24 to 3.66
Pedestrian with walker	2.07
Above-knee amputee	1.97

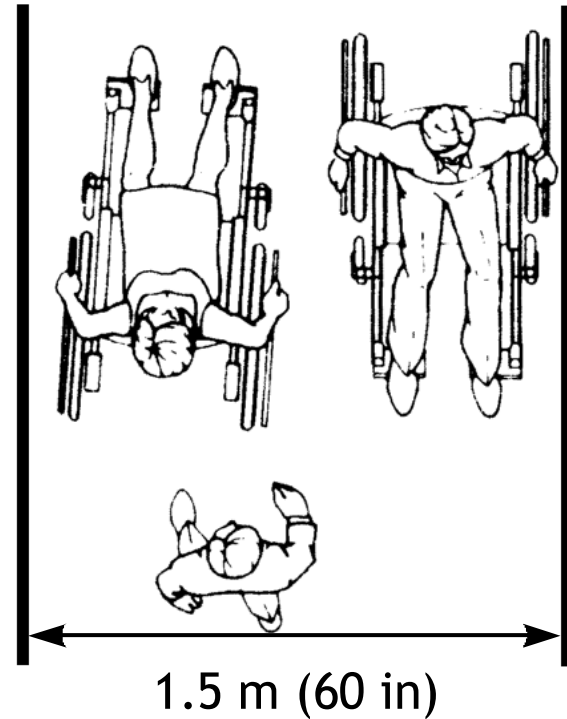


Spatial Needs



Source: *Pedestrian Facilities Guidebook*

Spatial Needs



Source: ADAAG, <http://www.access-board.gov/adaag/html/adaag.htm>

Accessible Design Issues

- Sidewalks.
- Ramps.
- Street furniture.
- Pushbuttons.
- Curb cuts/wheelchair ramps.



Sidewalks



Source: PBIC, www.pedbikeimages.org

FHWA Course on Bicycle and Pedestrian Transportation

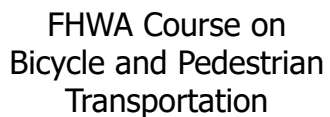


Ramps



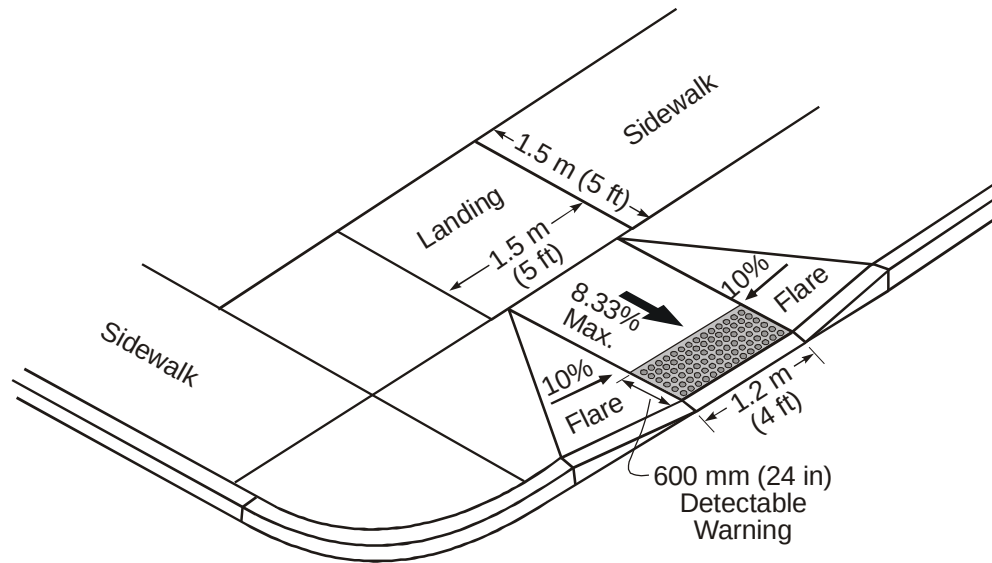
Source: PBIC, www.pedbikeimages.org



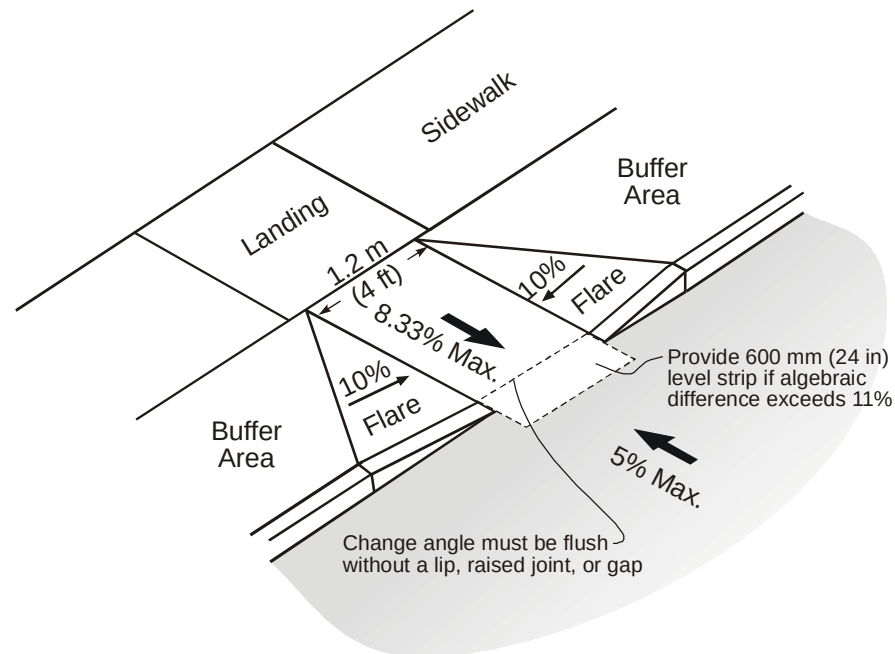
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Curb Ramp Slopes



Slope and Counter Slope





FHWA Course on Bicycle and Pedestrian Transportation

Pedestrian Connections to Transit



Pedestrian waiting for the bus



Bus stop with sidewalk and bench

Cul-de-sacs



Source: PBIC, www.pedbikeimages.org

Lesson Summary

- Design “Complete Streets” that can be safely used by everyone, not just drivers.
- Numerous design guidelines and manuals exist – USE THEM.
- Ask pedestrian design specialists or pedestrians themselves if you need advice.
- Good things happen if you finish early.

