

Designing Pedestrian Facilities for Accessibility

Module 2

PROWAG: R301 Pedestrian Access Route



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Public Right-of-Way Accessibility Guide

Module 2:
Pedestrian
Access Route

- Chapter R1 - Application and Administration
- Chapter R2 - Scoping Requirements
- Chapter R3 - Technical Provisions
- Chapter R4 - Supplementary Technical Provisions

- Focus will be on Chapter 3 Section R301



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- R301 Pedestrian Access Route
 - R301.2 Components
 - R301.3 Width
 - R301.4 Walkway Grade and Cross Slope
 - R301.5 Surface
 - R301.7 Horizontal Openings



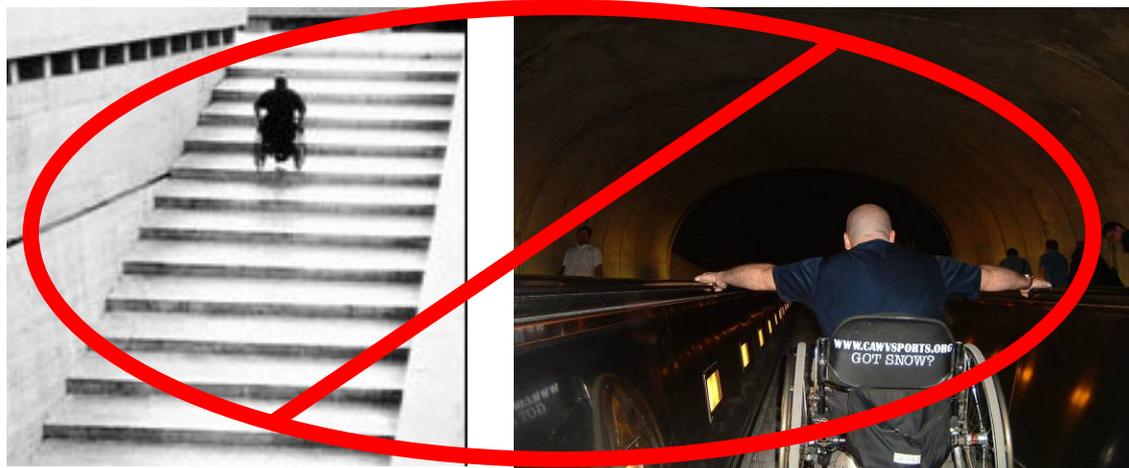
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R301.2 Components

Pedestrian access routes shall consist of one or more of the following components: walkways, ramps, curb ramps (excluding flared sides) and landings, blended transitions, crosswalks, pedestrian overpasses and underpasses, elevators, and platform lifts. Stairways and escalators shall not be part of a pedestrian access route.



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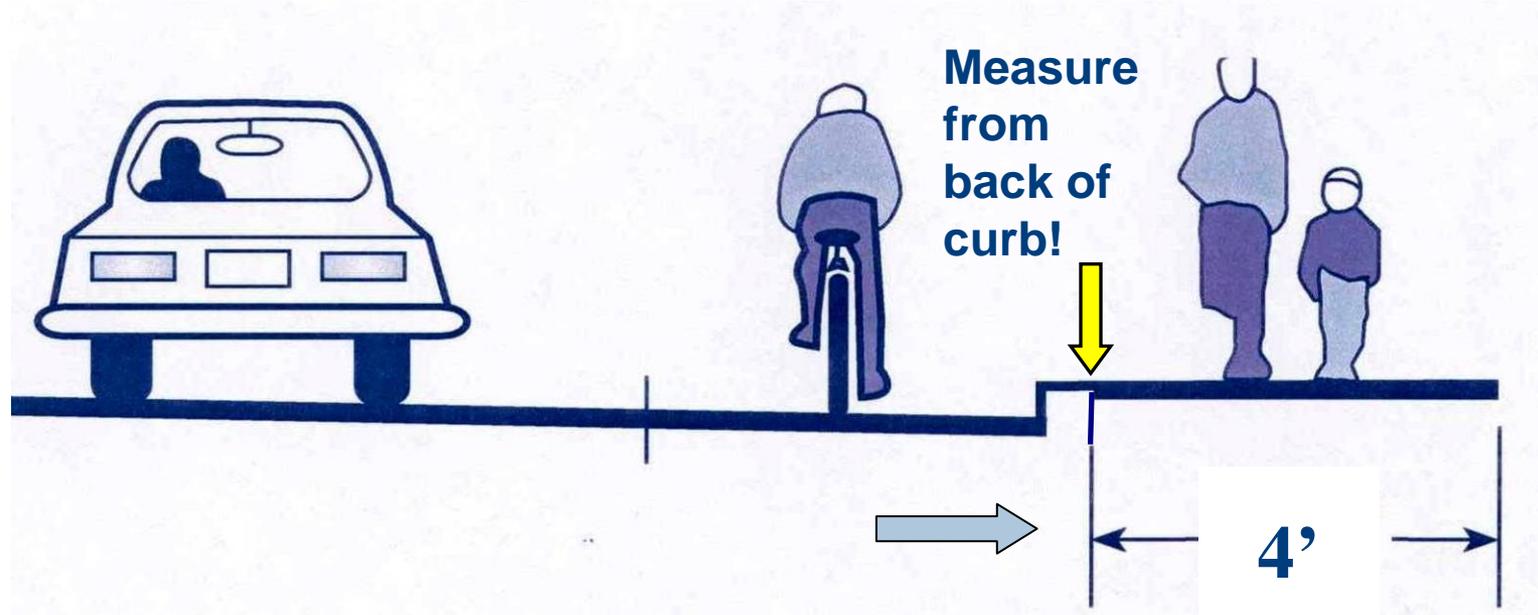


- US Access Board Video (click link below)
 - [with Ambulatory Impairments](#) 8 min
 - Copy the following address into browser if you encounter any problems
 - <http://fhwa.na3.acrobat.com/abambulatory/>
 - Remember to turn on your speakers
 - Also it may take a minute or two to load



R301.3.1 Continuous Width

- The minimum continuous and unobstructed clear width of a pedestrian access route shall be 4.0 ft, exclusive of the width of the curb.



3 feet for one wheelchair user

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3.5 feet for a person using crutches

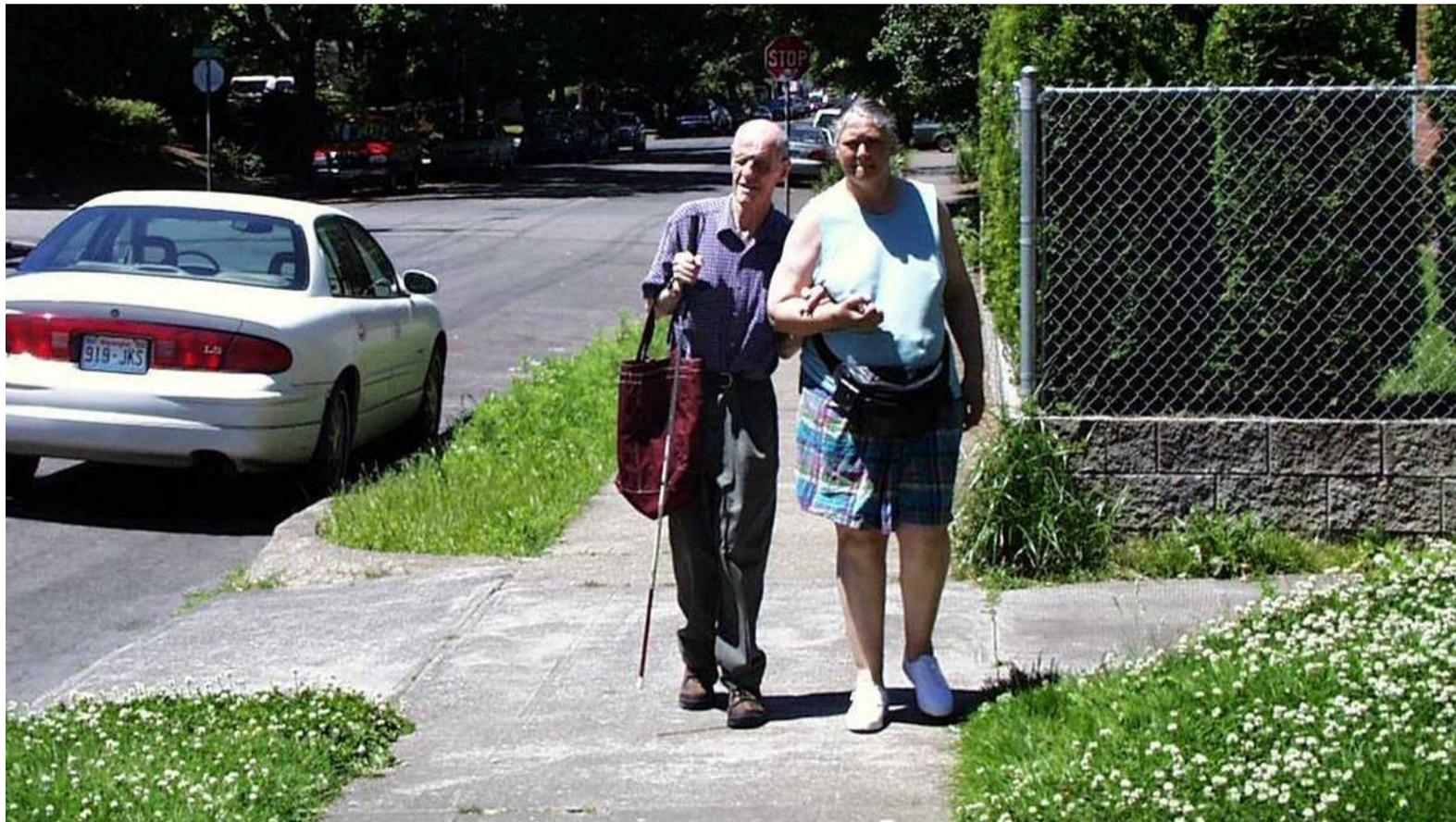
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4 ft. for user with guide dog,
sighted guide, or one person assisting another

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5 ft. for a wheelchair user and walking companion;
6 ft for two wheelchair users

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5 ft. for a turning wheelchair

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5 feet provides for two people to walk comfortably side by side (or to pass each other)

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Other Guideline minimums:

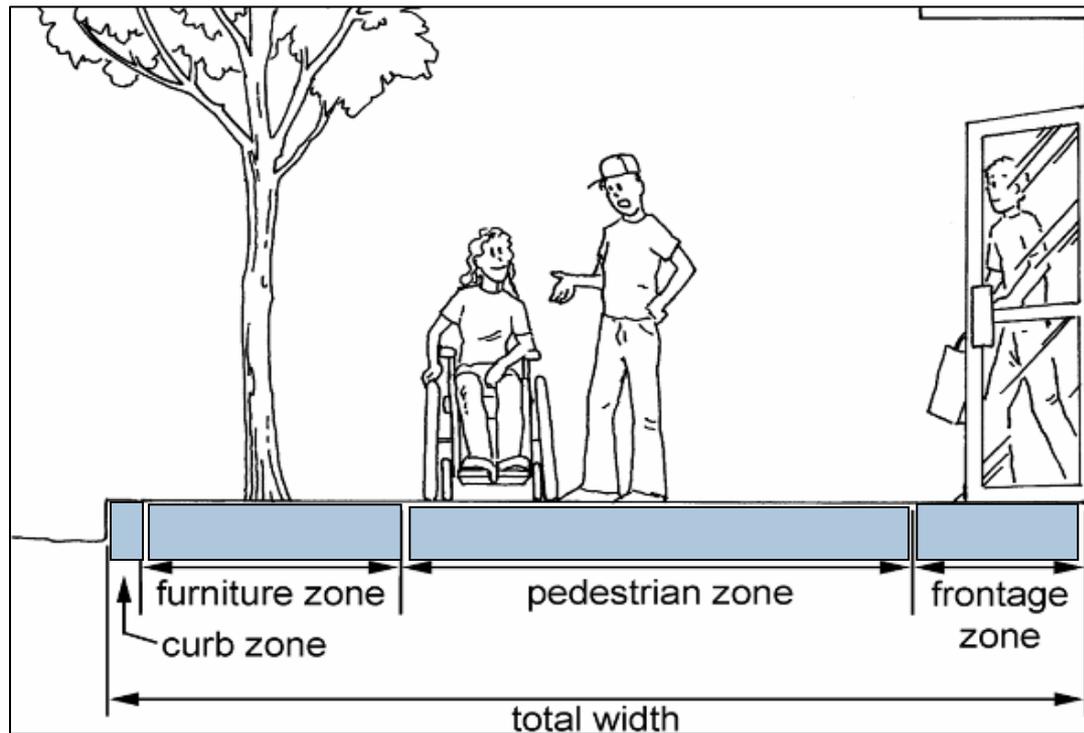
- 4 feet A Policy on Geometric Design of Highways and Streets (Green Book), AASHTO, 2001
- 4 feet AASHTO Pedestrian Guide, 2001
- 5 feet Designing Sidewalks and Trails for Access, FHWA, 2002
- 5 feet Building a True Community, U.S. Access Board, 2001



The Sidewalk Zone System

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- Curb Zone
- Furniture Zone
- Pedestrian Zone
- Frontage Zone



Curb Zone

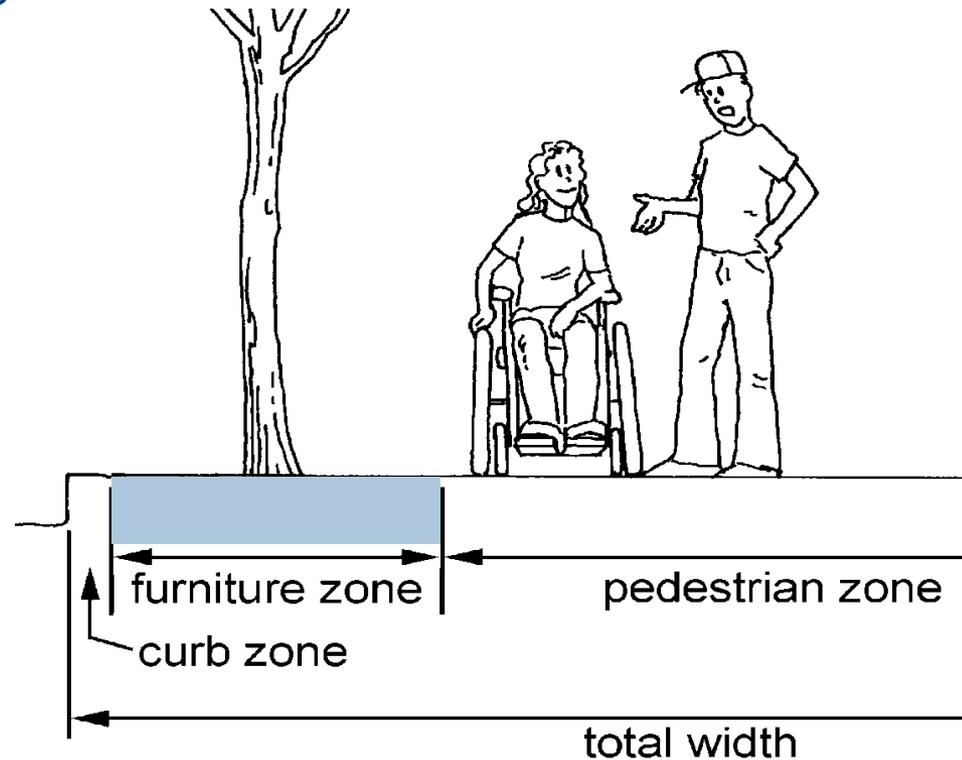
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Furniture Zone

- Keeps pedestrian zone free of obstacles
 - Space for street furniture (signs, benches, trees, fire hydrants)
- Buffers pedestrians
- Easier to provide accessible ramps and driveways



Furniture Zone

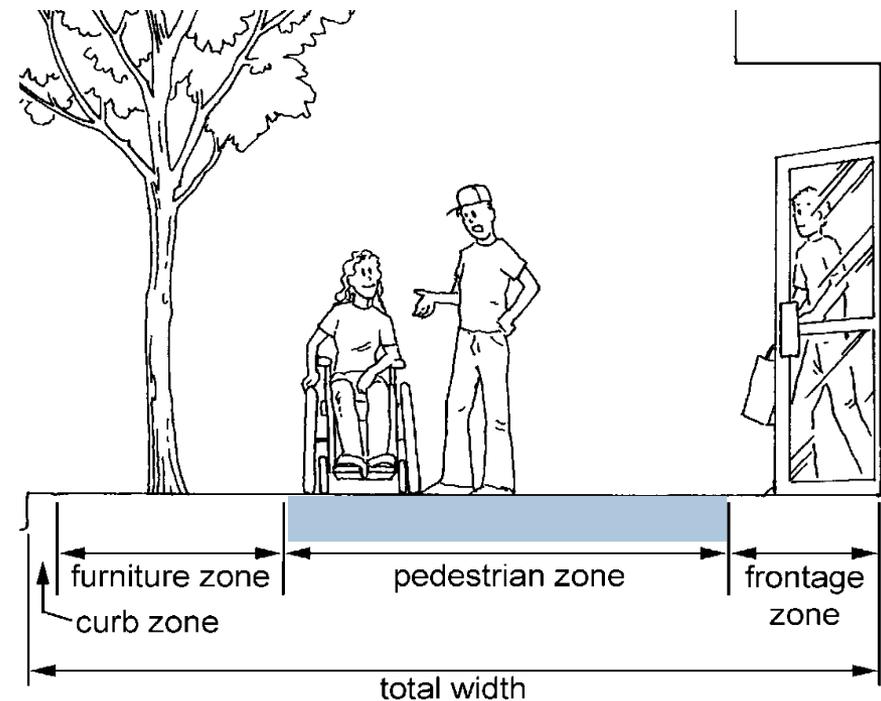
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Pedestrian Zone

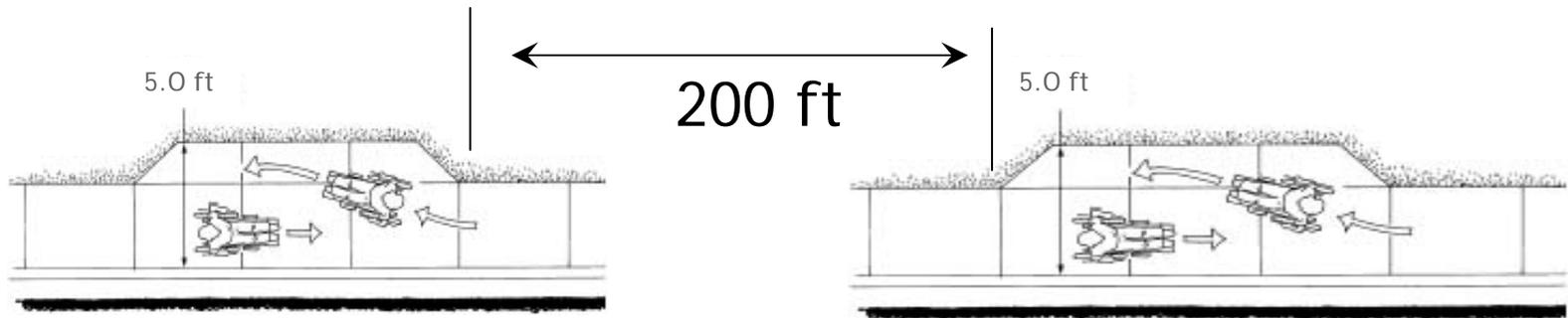
- Area reserved for pedestrian travel includes “pedestrian access route”
- Must be free of obstacles, protruding objects
- ADAAG - 3 ft min
- PROWAG 4 ft min



R301.3 Width

R301.3.2 Width at Passing Spaces

- Walkways in pedestrian access routes that are less than 5.0 ft in clear width shall provide passing spaces at intervals of 200 ft maximum. Pedestrian access routes at passing spaces shall be 5.0 ft wide for a distance of 5.0 ft



Sidewalk widened around pole

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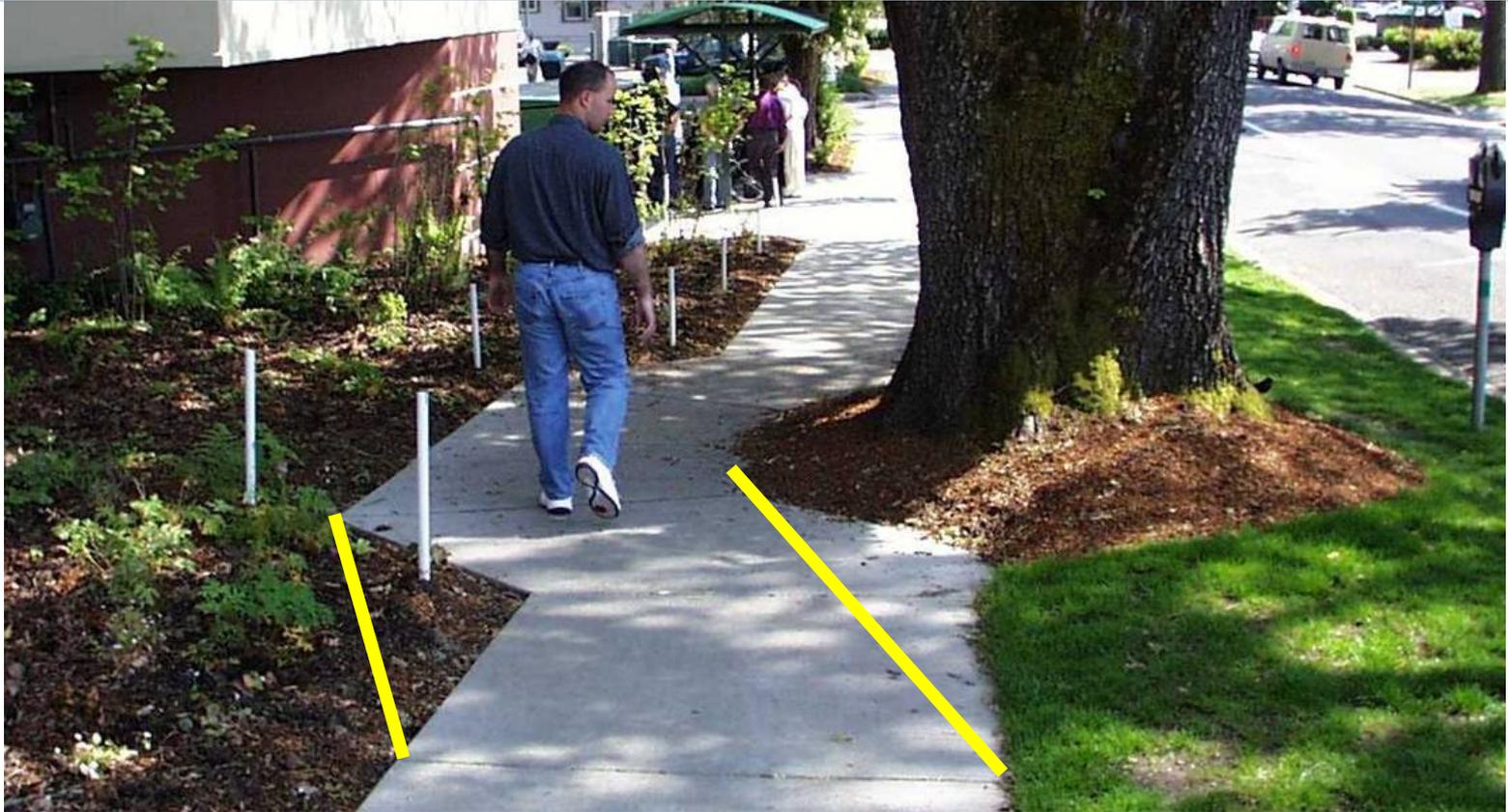


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Sidewalk wraps around large tree

Note that a longer taper would be easier to use.

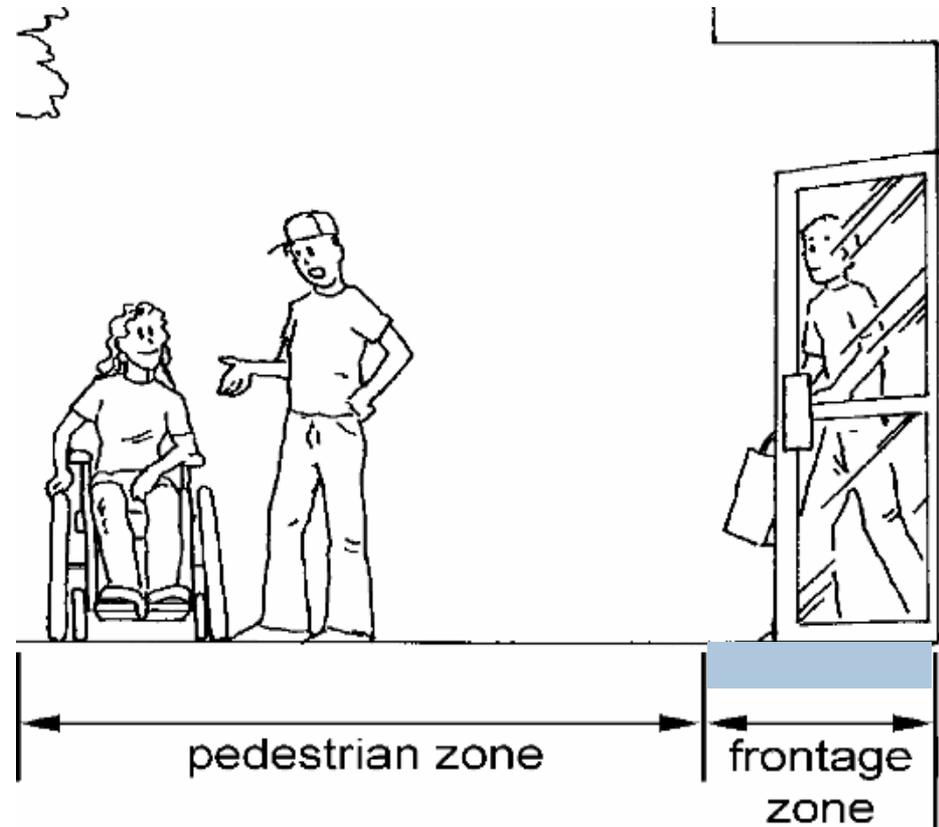
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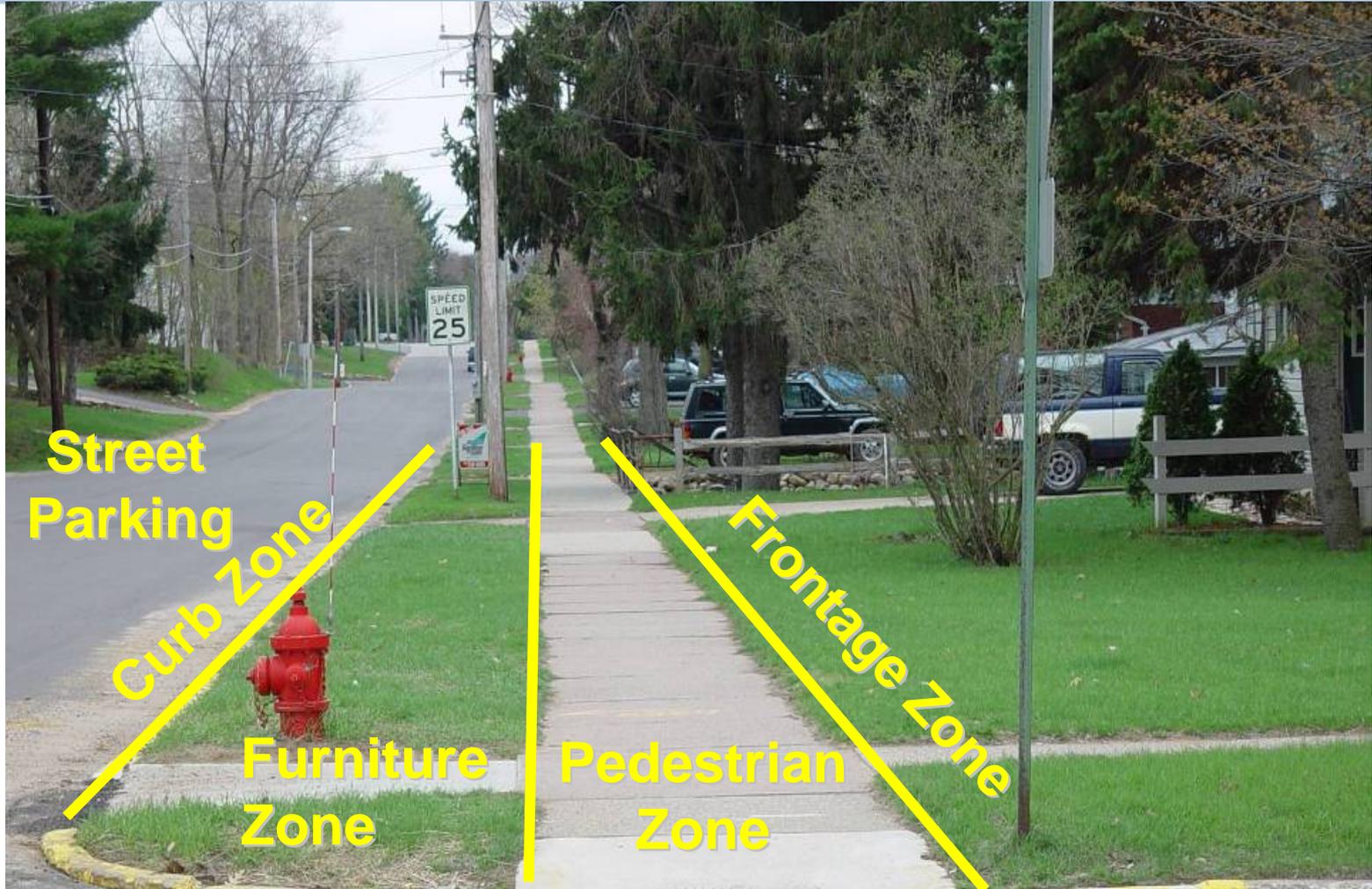
Frontage Zone

- Room for doors, planter boxes, signs on buildings, etc.
- Must be free of overhanging and protruding obstacles



Zone System Summary: residential

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Zone System Summary: commercial

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R301.4 Walkway Grade & Cross Slope

R301.4.1 Cross Slope

- The cross slope of the walkway of a pedestrian access route shall be 2 percent maximum.



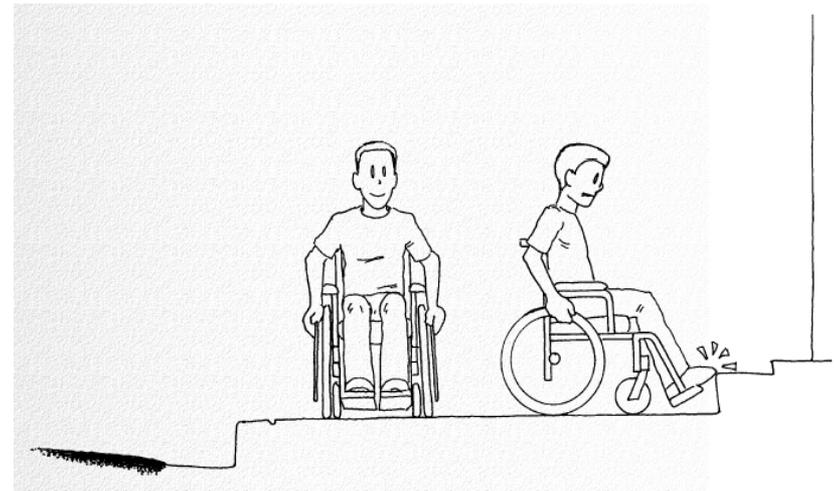
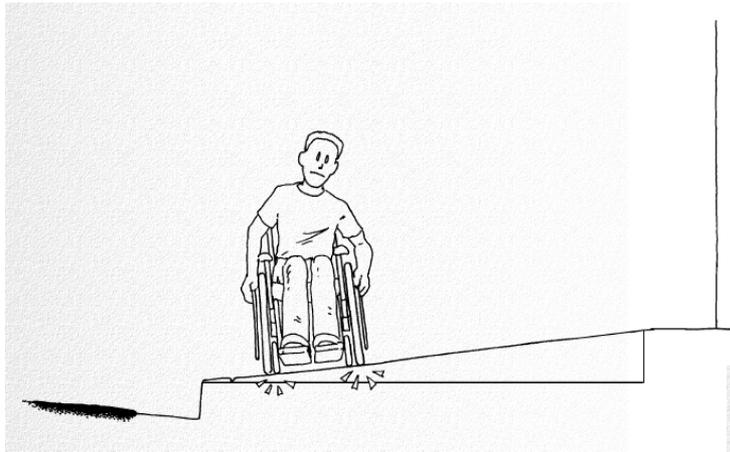
Cross Slopes Challenges

- Steep Cross Slopes
- Pedestrians must work against gravity
 - Crutch, walker, and prosthesis users may be forced to walk sideways
- Wheelchair users must make significant efforts just to travel straight



Cross Slope Challenges

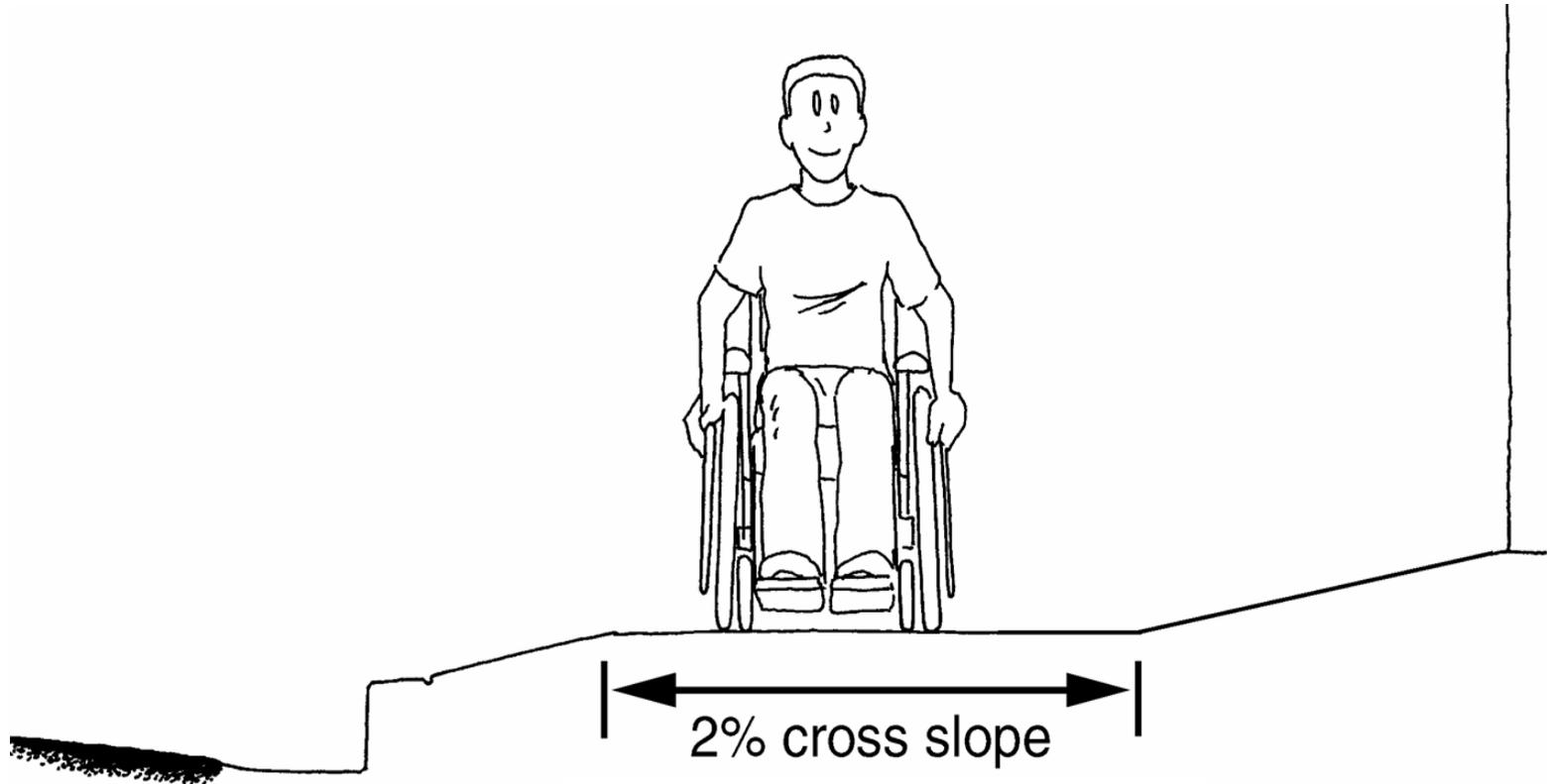
Sometimes building elevations make it difficult to create a proper cross slope



Cross Slope Solutions

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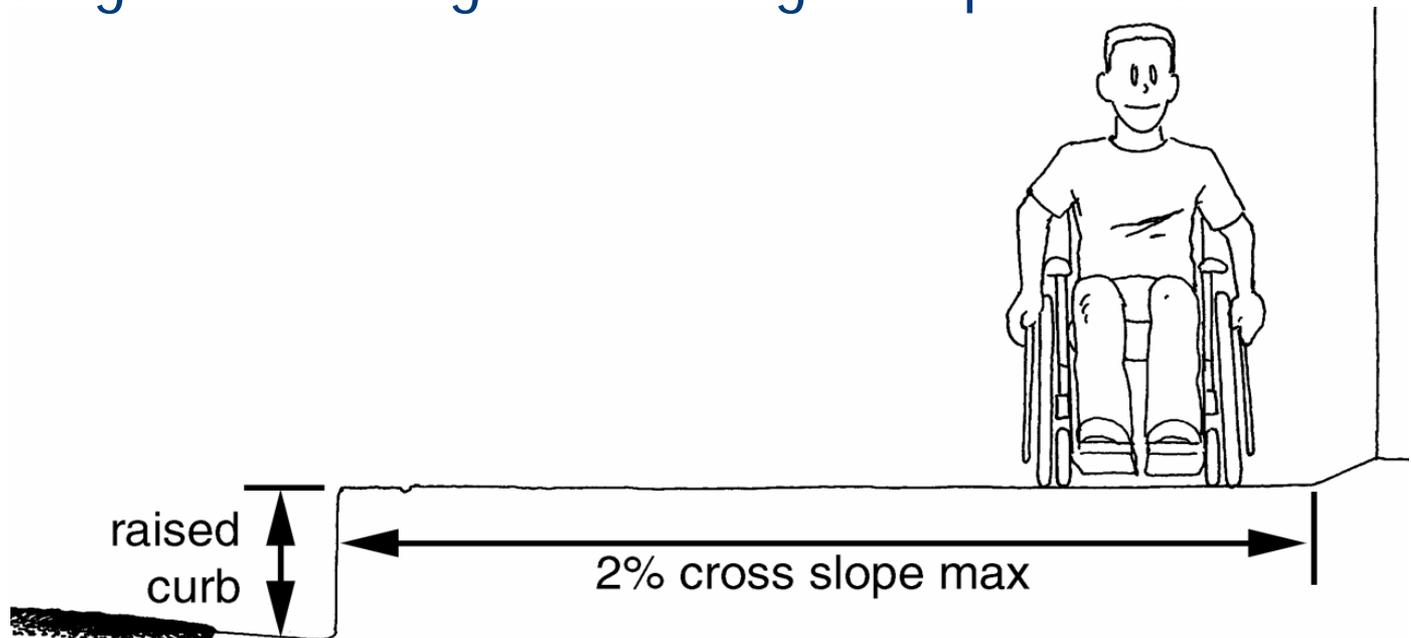
Create a level area of preferably 6 feet (4 feet min.)



Cross Slope Solutions

Acceptable solution:

- Raise the curb but remember curbs higher than 8" create parking concerns
- Parallel parking - doors cannot be opened
- Diagonal Parking - overhang is impossible



Cross Slope Solutions

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Here the curb is stepped to allow diagonal on-street parking & sidewalks with good cross slope



Cross Slope Solutions

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Cross Slope Solutions

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Elevation change occurs in the furniture zone

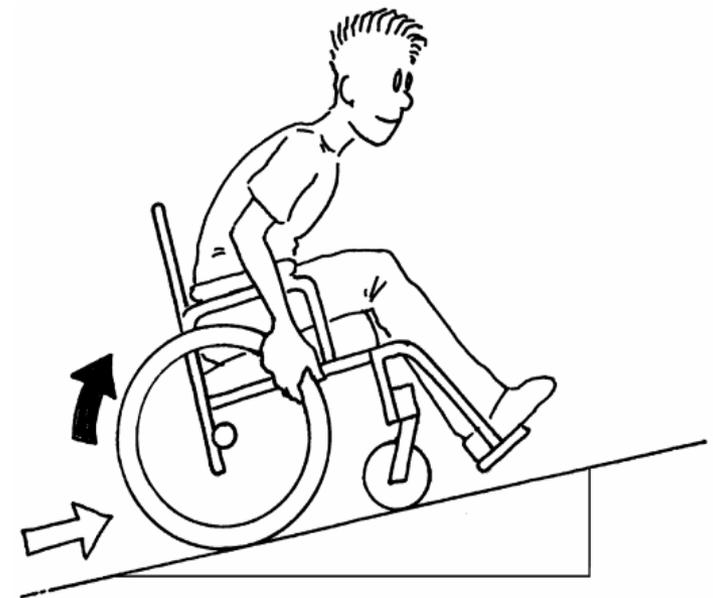


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R301.4 Walkway Grade & Cross Slope

R301.4.2 Street or Highway Grade

- Where the walkway of a pedestrian access route is contained within a street or highway border, its grade shall not exceed the general grade established for the adjacent street or highway.
- 5% maximum grade away from roadway (ADAAG 4.3.7)



Running Slope Challenges

- Uphill: requires people with mobility impairments to exert more energy
- Downhill: difficult for users of walkers, canes, crutches, prostheses



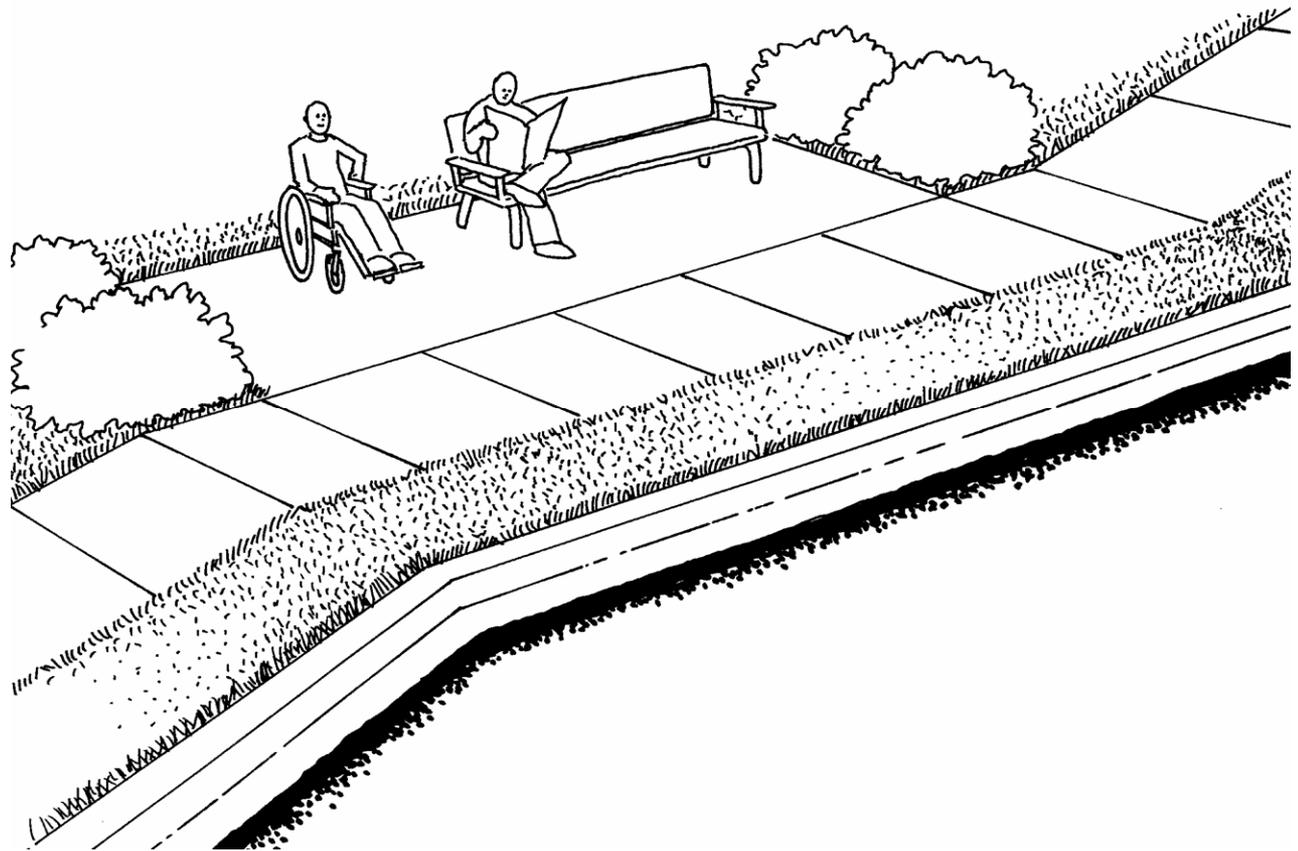
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Reducing the Impact of Steep or Long Grades

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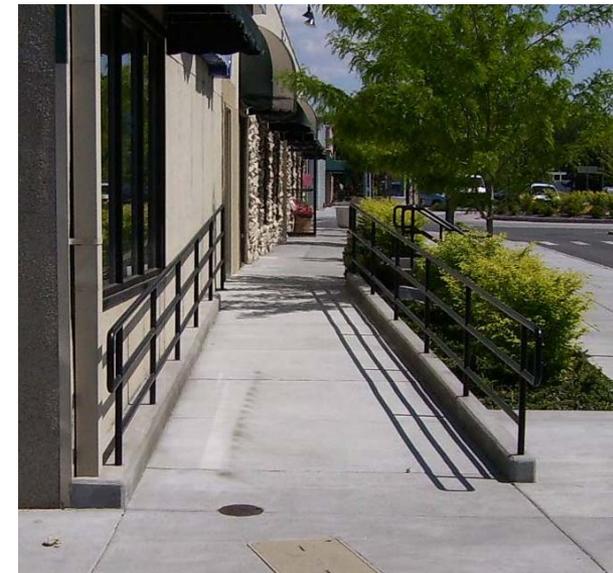
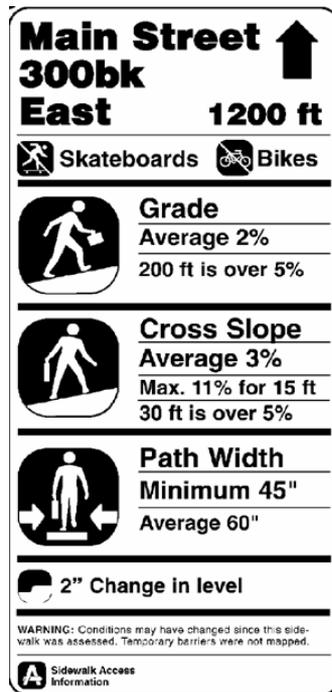
Provide rest areas with accessible benches, include space for wheelchair users



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Reducing the Impact of Steep or Long Grades

- Provide signs that indicate:
 - grade and length
 - alternative routes with lesser grades
- Provide handrails where possible



Driveway Coaster

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Driveways

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If driveways are not done right, sidewalks won't be used (most common reason given by wheelchair users using the street)

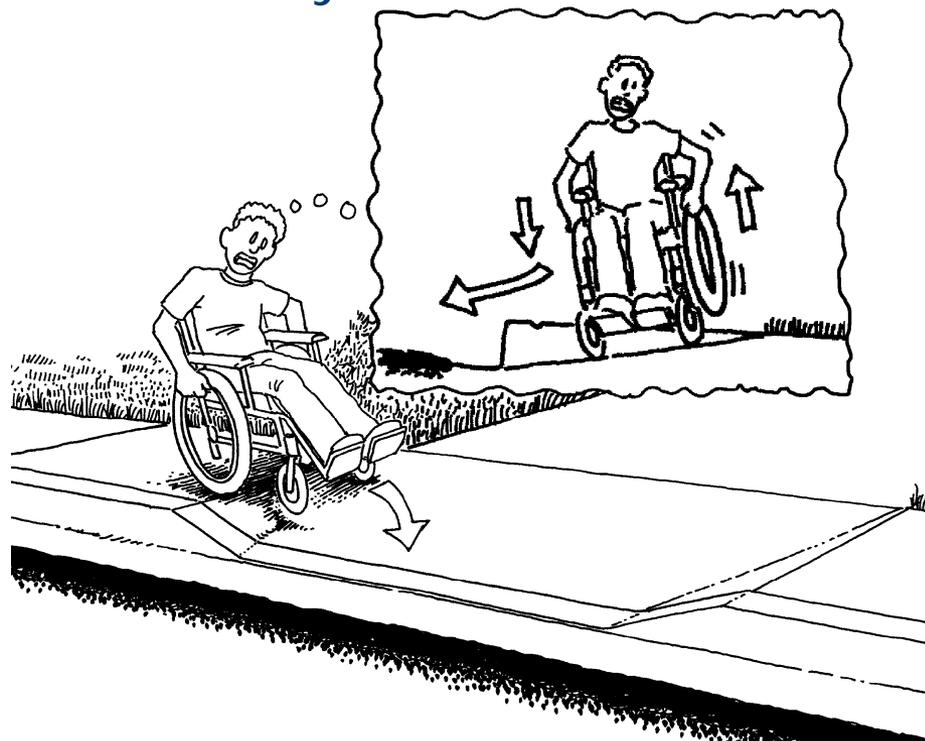


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Driveway = Major Cross Slope Challenge

At noncompliant driveways, sidewalk users encounter:

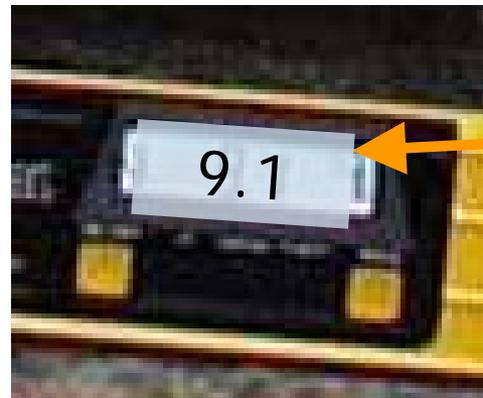
- Steep Cross slopes
- Rapid grade change at driveway flare



Cross Slope at Driveway

Cross-slope on an old-style sloped driveway is often 5 or 6 times higher than the 2% maximum

$$\begin{aligned}\text{Cross-slope} &= (\text{Curb height} - \text{lip at curb face}) / \text{sidewalk width} + 2\% \\ &= (6'' - 0'') / 60'' + 2\% \\ &= 12\% \text{ for } 0 \text{ lip at gutter}\end{aligned}$$



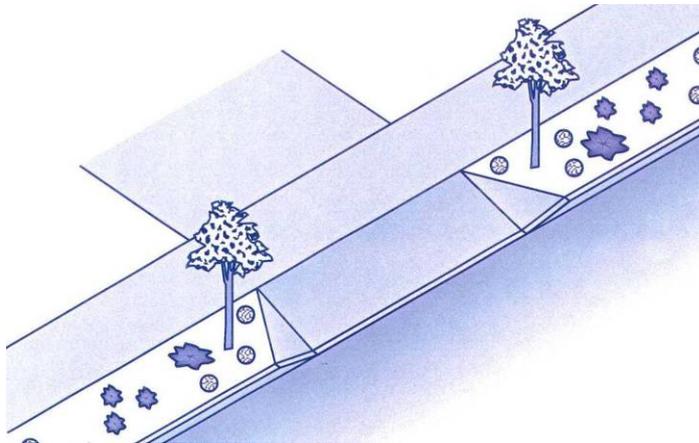
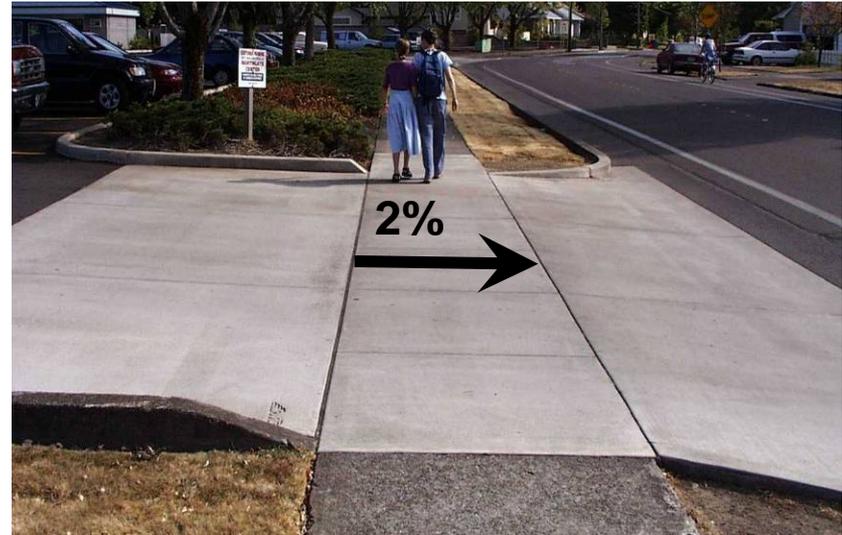
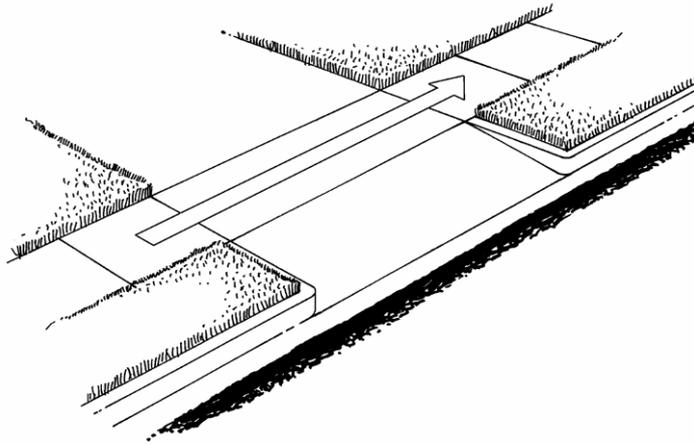
Design Solutions for Sidewalks at Driveways

- Accessible driveway requires level pedestrian access route:
 - Cross slope: 2% maximum
 - Width: 4' minimum (PROWAG)
- Factors to consider when choosing accessible driveway option:
 - Sidewalk width
 - Planter strip width
 - Curb height
 - Available right-of-way



Best Solution - Planter strip allows for flat uninterrupted sidewalk

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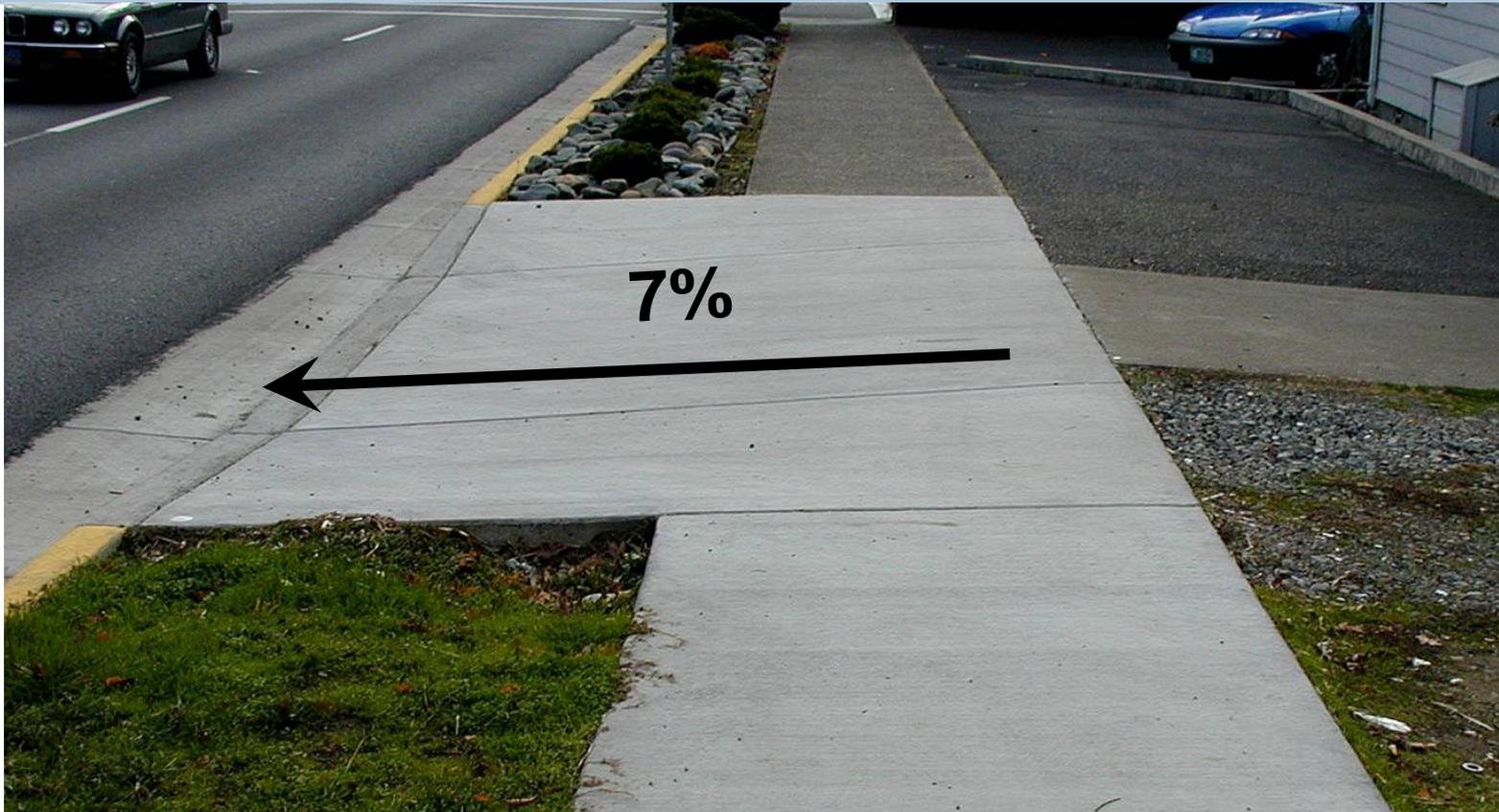
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Inaccessible design - Constant steep slope across planter strip and sidewalk

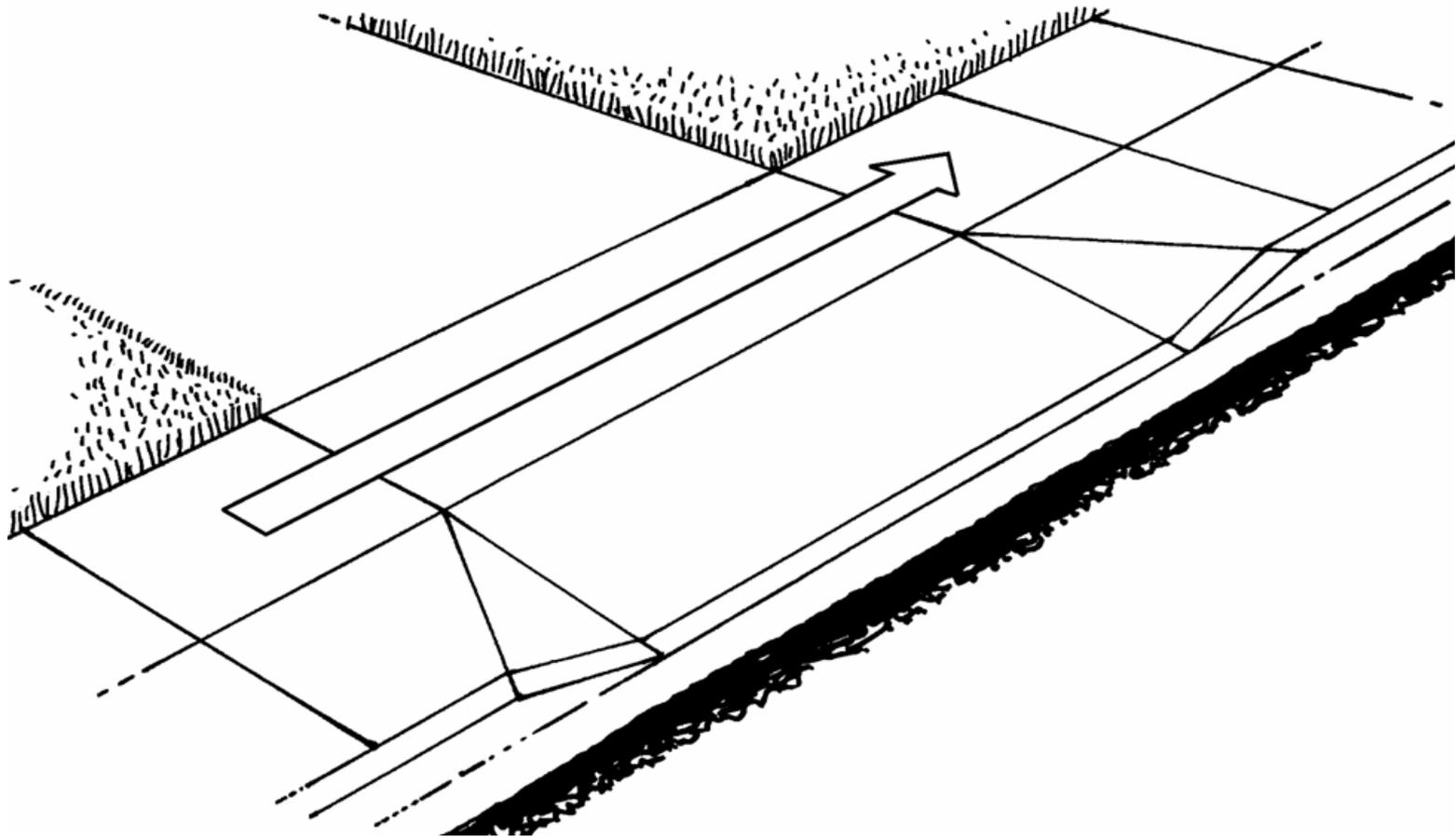
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Good Solution - Level accessible route at back of wide sidewalk

PROWAG specifies 4 ft. min. level area



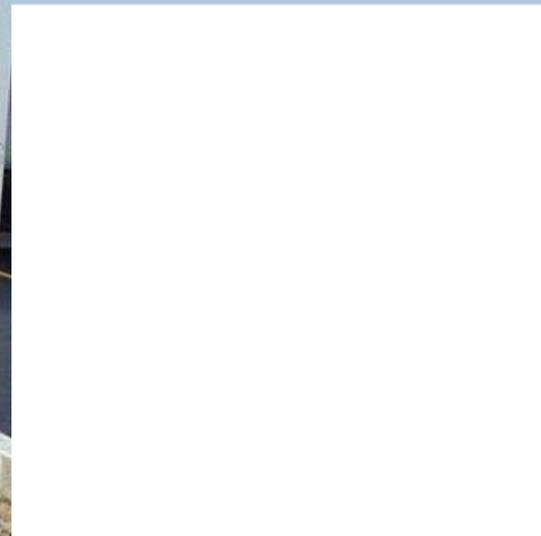
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Level Sidewalk within Driveway

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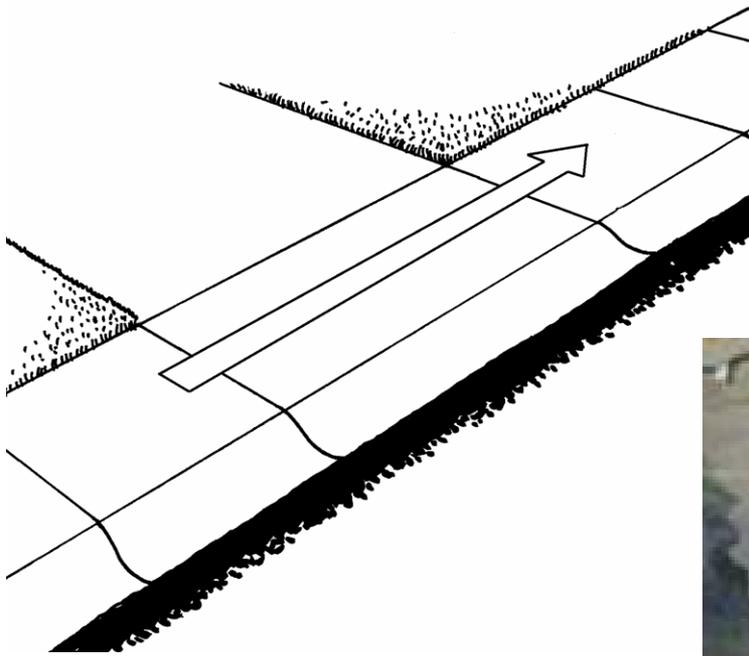


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Acceptable Variation - Driveway with mountable curb

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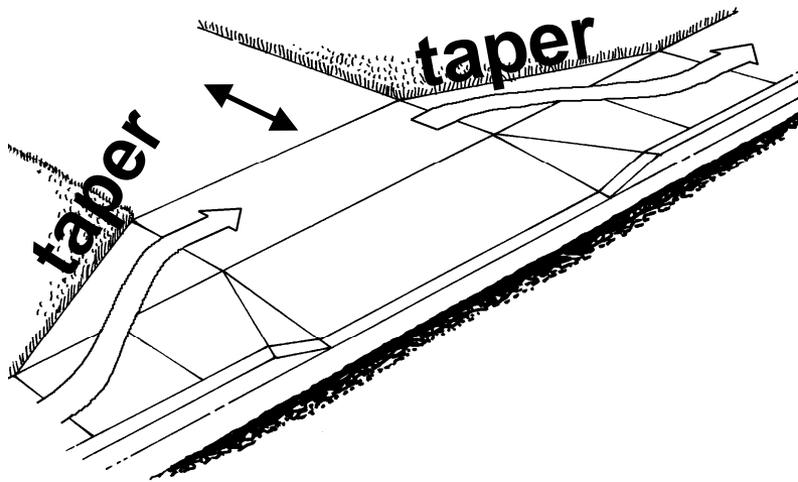
Revert to vertical curbs before and after the
driveway to discourage cars parking on sidewalk



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Good solution for narrow sidewalks

- Width of level area
 - 3 ft. min. (ADAAG)
 - 4 ft preferred min.
 - Best to use full sidewalk width
- Longer tapers are easier to use



Good use of Landscaping

- Nicely landscaped areas add curb appeal and direct pedestrians away from driveway apron.
- Note that a longer taper would be easier to use

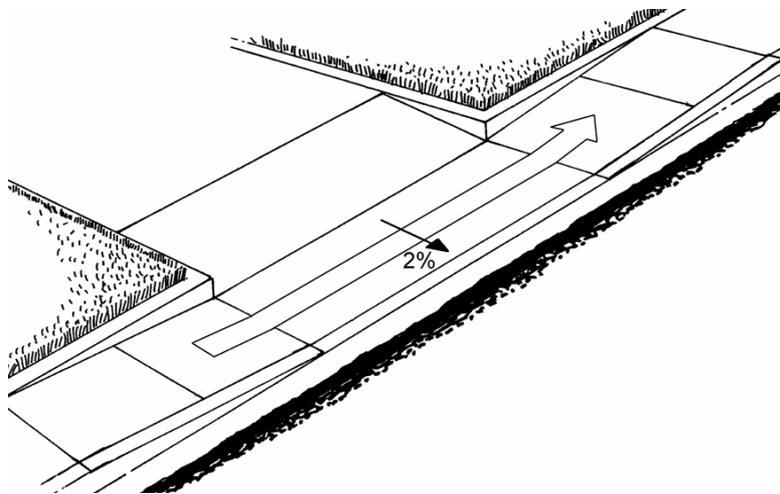


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Acceptable solution for narrow sidewalks

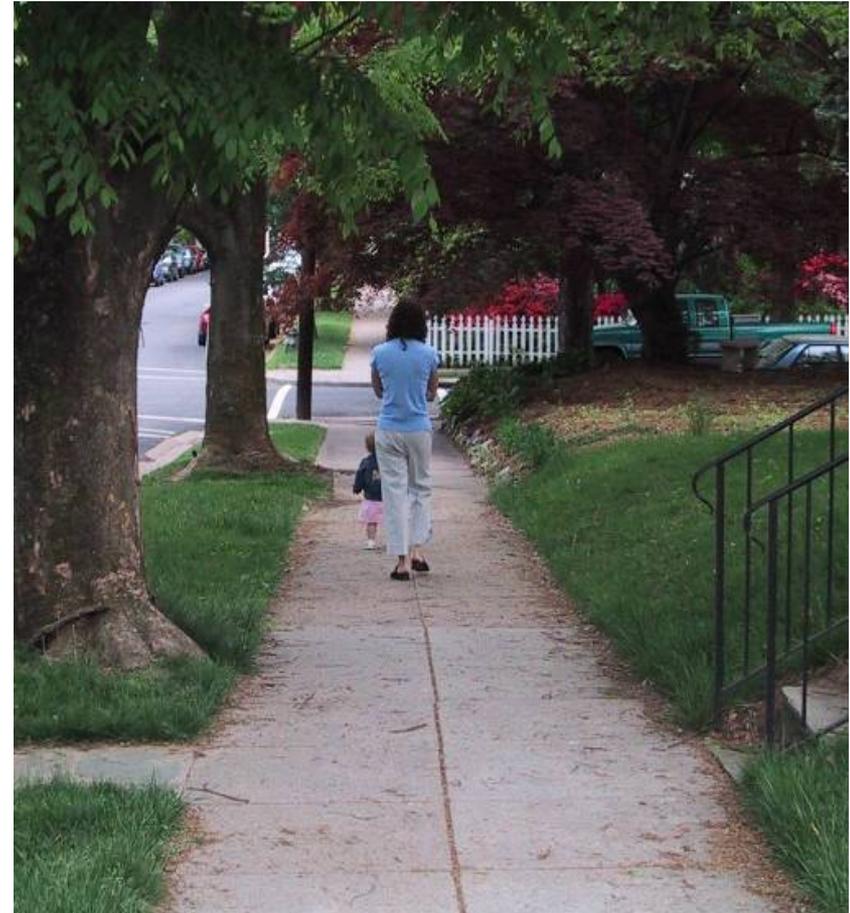
Fully lowered sidewalk

- Possible problems:
 - Drainage
 - Users must negotiate two ramps
 - Peds who are blind may veer into street
 - Allows drivers to turn at higher speeds



301.5 Surfaces

- R301.5 Surface
- R301.5.1 Vertical Alignment
- R301.5.2 Surface Discontinuities



301.5 Surfaces

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Vertical Alignment

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Changes in level are vertical elevation differences between adjacent surfaces



Changes In Level Greater than 1/2 inch

- Changes in level greater than 1/2 inch must be treated like a ramp (maximum grade 8.3% or 1:12)
- {ADAAG 4.5.2}



Vertical Alignment

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- Can be tripping hazards
- Can be inaccessible to wheelchair users



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Tree Roots

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Before



After



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Tree Roots

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Example of where rubberized sidewalk panels were used to address a tree root problem.



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Vertical Alignment

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Minimizing Changes in Level

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Temporary repairs often don't meet standards but is better than leaving it as is



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Utility Covers

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Bad



Good



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Rough Texture Surfaces

Rough surfaces can cause:

- Tripping hazards
- Confusion to people who are blind in detecting tactile cues
- Painful to people with spinal cord injuries due to vibrations
- Maintenance difficulties



Good Design: Concrete in the pedestrian zone, textured surface in furniture zone

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Visual Contrast of Surfaces

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Visual and Tactile Contrast

- Detectable warning
 - Truncated domes
- More to come in module 4



R301.7 Horizontal Openings

R301.7.1 Walkway Joints and Gratings. Openings shall not permit passage of a sphere more than 0.5 inch in diameter. Elongated openings shall be placed so that the long dimension is perpendicular to the dominant direction of travel.



Openings, Gaps, and Grates

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Grate openings shall be perpendicular to direction of travel (ADAAG 4.5.4)



Tree Grates

- Tree grates should be placed in the furnishing zone, outside the pedestrian zone
- Tree grates expand the pedestrian zone for some users



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Solutions to Eliminate Gaps

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Use of Wire Mesh Screen



Use of Straps Welded to Existing Grate



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Quality Control of Grades, Cross Slopes and Widths

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- Reliance on contractors & inspectors
- Tight construction tolerances are needed
- Inspections: actual measuring (not visual)
- Train carpenters, concrete finishers, and inspectors - some jurisdictions have certifications.



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End of Module 2

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