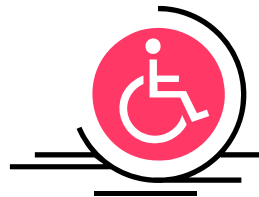




Solving ADA Design Challenges

FHWA Webinar

Tennessee
August 2021



Objectives

- Describe accessibility standards applicable to highways and streets
- Identify accessibility requirements and recommended safety practices
- Discuss design alternatives for complex pedestrian facilities

Why Accessible Design?

- 21 percent (or approximately 52 million) of the U.S. population over the age of 15 has a disability (2010 Census)



It's the Law

- Title II (28 CFR Part 35)
 - Must ensure that individuals with disabilities are not excluded from programs, services, and activities



Standards for Accessible Design

- Americans with Disabilities Act Accessibility Guidelines (ADAAG)

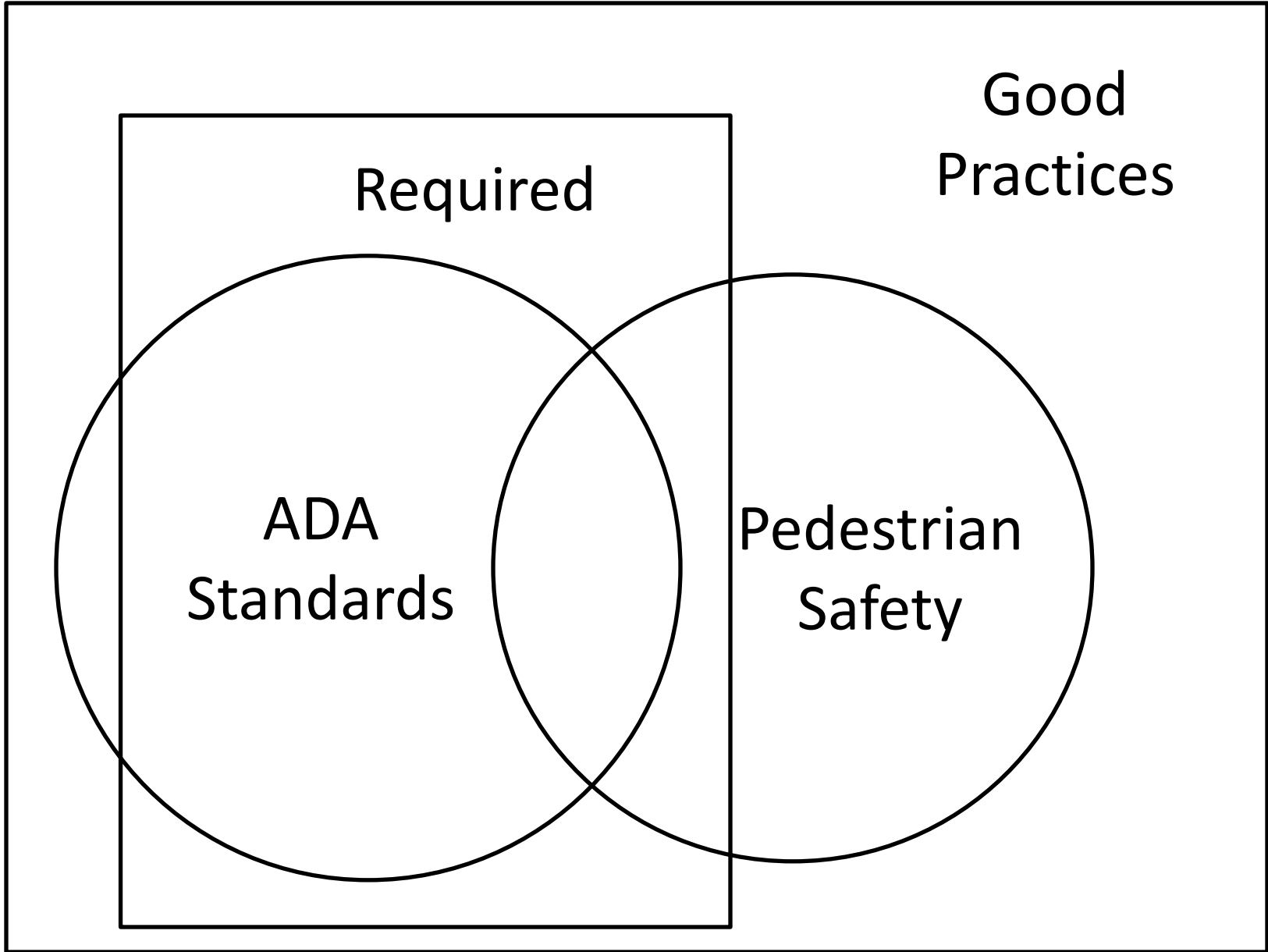
Pending:

- Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG)
- Supplemental Notice on Shared-use Paths (SNSUP)

Applicability to Highways & Streets

- New Construction
- Alteration of Existing Facilities
- Maintenance
- Work Zones





A Case for Smart Design



Accessibility Requirements and Good Practices

Key Features of Pedestrian Access Routes

- Sidewalk
- Curb Ramps
- Crosswalks
- Signals

Key to Slides Ahead

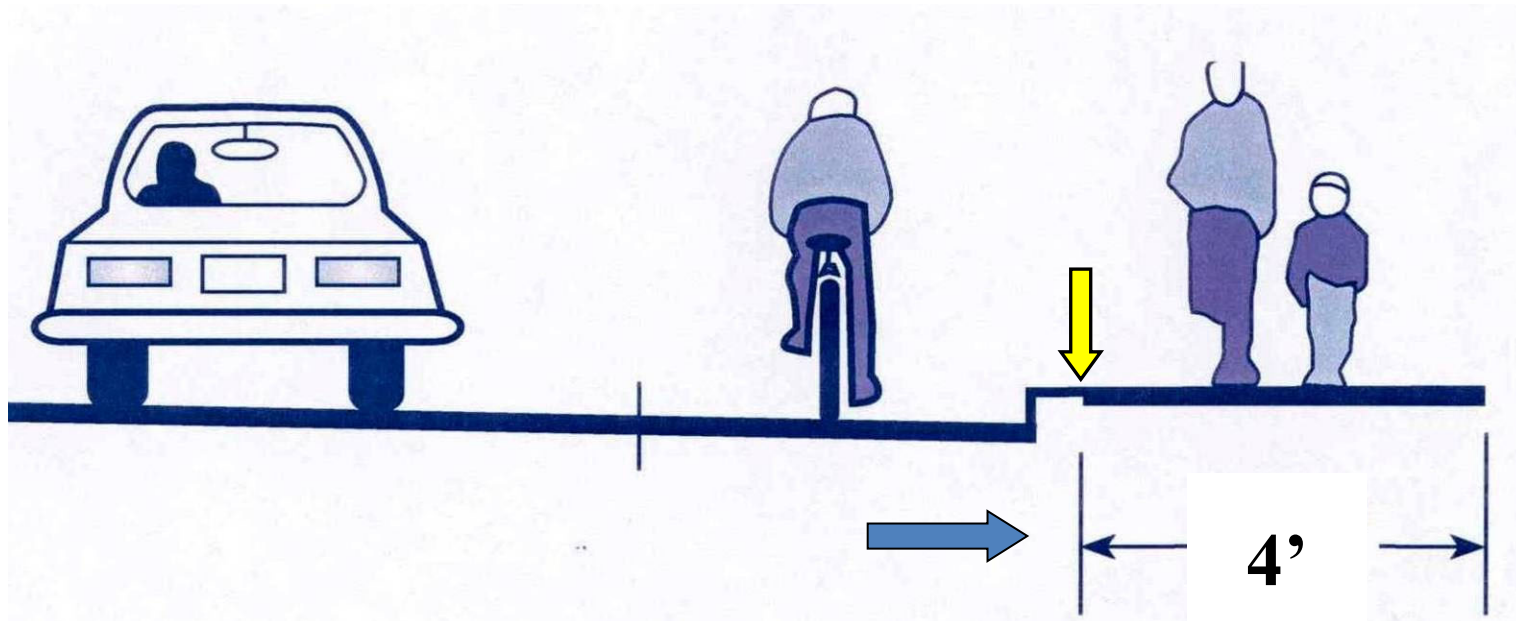
- PROWAG “Requirements” cited (RXXX.X.X)
- Good (or poor) Practices Marked with “thumbs up” or “thumbs down”



Sidewalk Width

Continuous Width (R302.3)

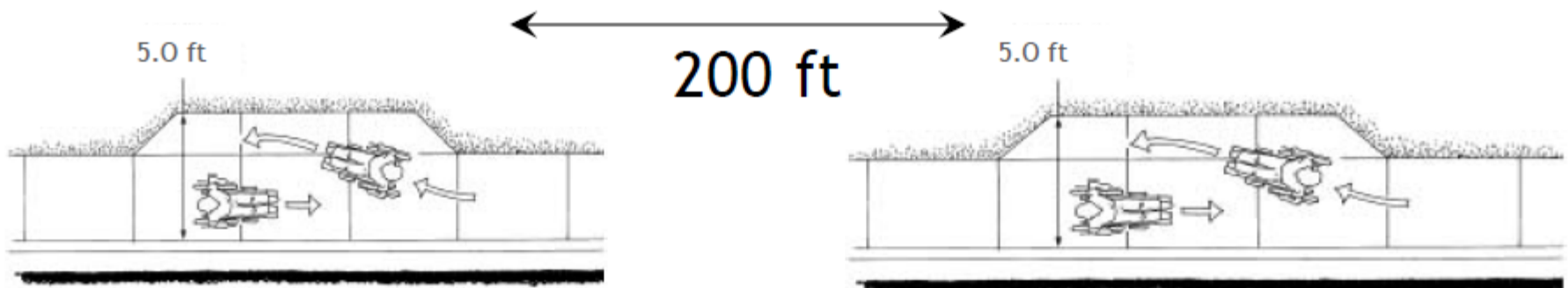
The MINIMUM continuous and unobstructed clear width of a pedestrian access route shall be 4.0 ft, exclusive of the width of the curb.



Sidewalk Width

Passing Spaces (R302.4)

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



Shared-use Path Width

Shared-use Paths (**SNSUP R302.4**)

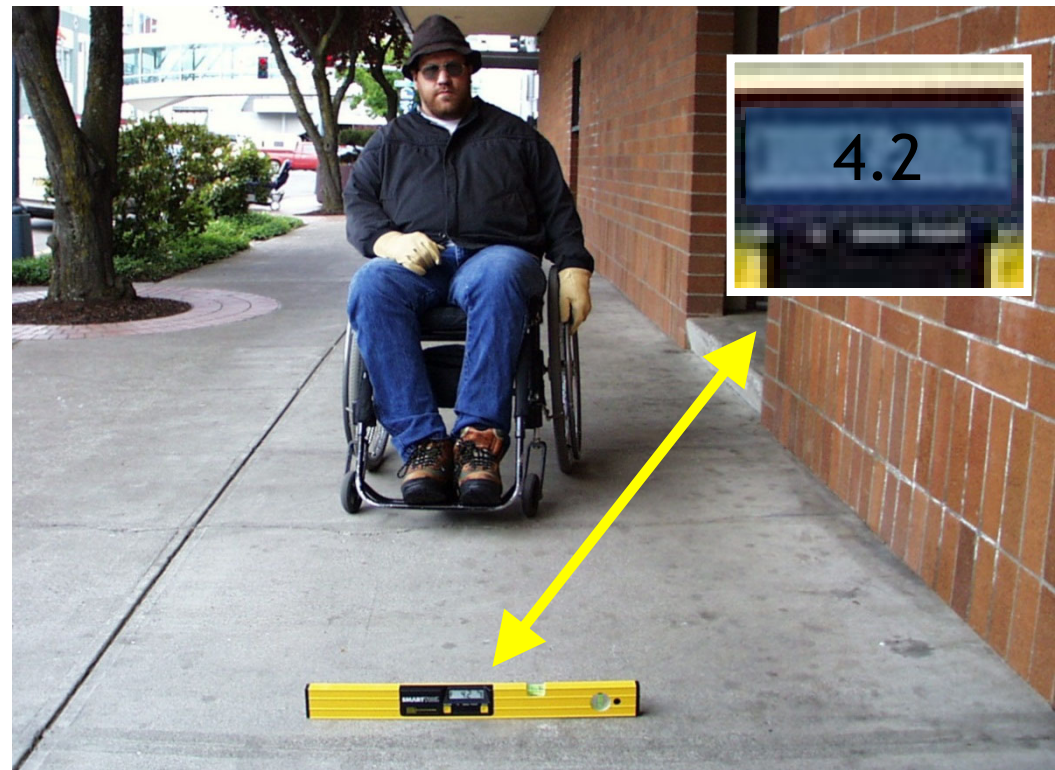
A pedestrian access route shall be provided for the full width of a shared use path.



Sidewalk Cross Slope

Cross Slope (R302.6)

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



Cross Slope Solutions

Pedestrian Access Route (PAR) does not need to extend the full width of the sidewalk
(R204.2)



Transition slope < 5% or ramp with landings & railings (R 204.2 & R407) tying PAR to curb ramp and street.

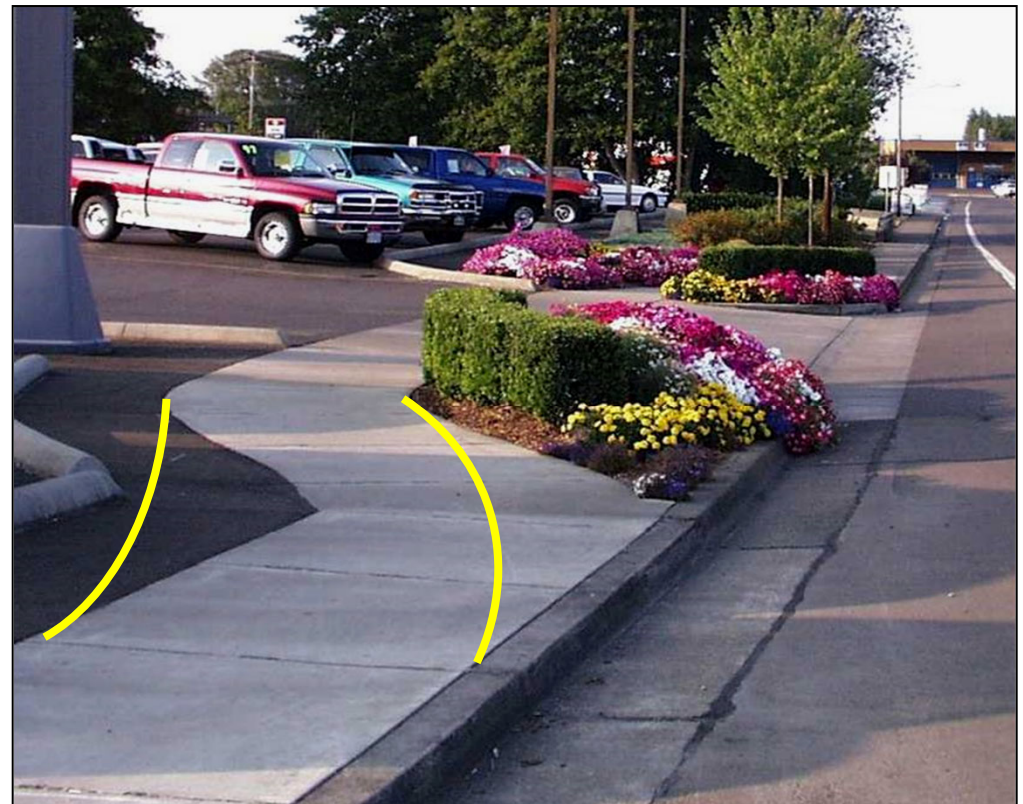
Sidewalks & Driveways

Accessible sidewalk at driveway requires:

- Cross slope 2% maximum (R302.6)
- Width 4' minimum (R302.3)

Factors to consider:

- Curb height
- Park strip
- Tapers





Existing Condition

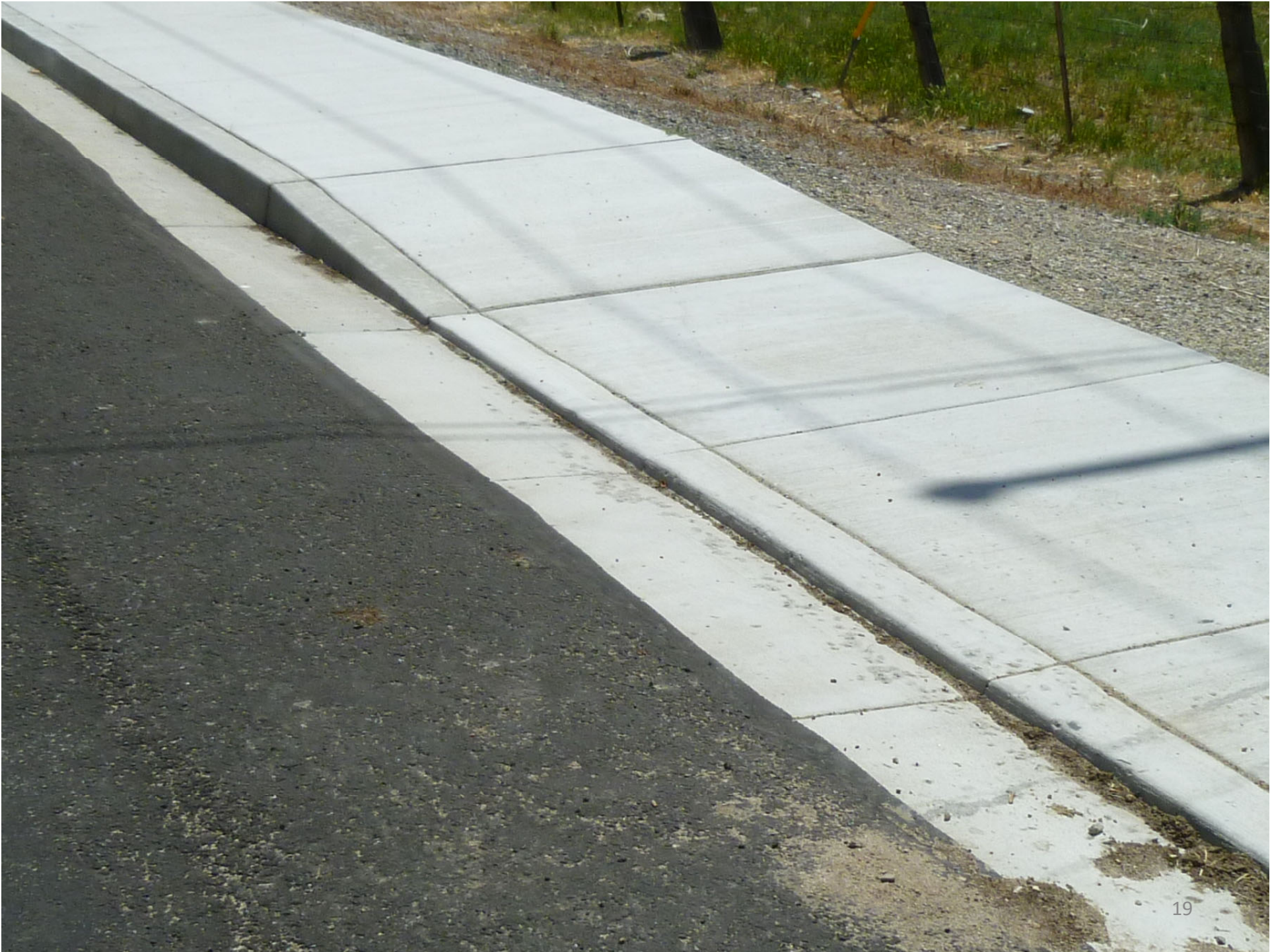
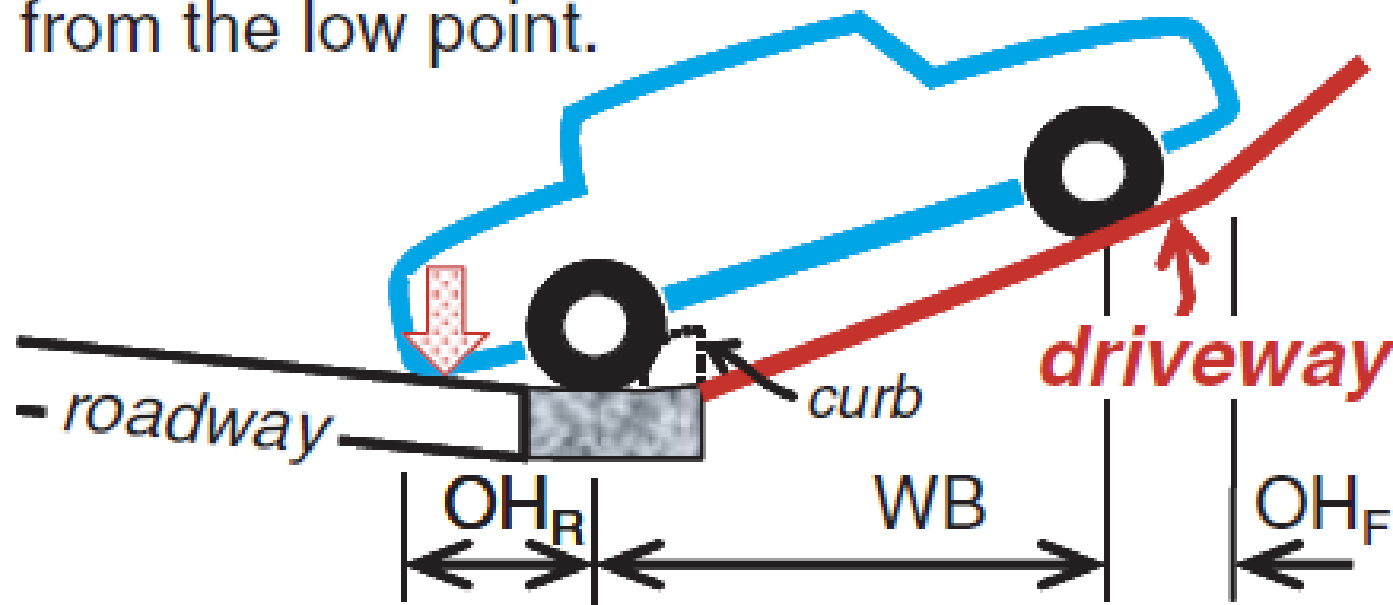


Exhibit 5-65. Geometry of ground clearance dragging.

SAG: Have problem if axle-to-bumper underclearance is inadequate. For symmetrical sag, is critical when one axle is at distance WB from the low point.



WB=wheelbase OH_F = front overhang OH_R = rear overhang

(b)

Exhibit 5-75. Example of a driveway vertical profile design.

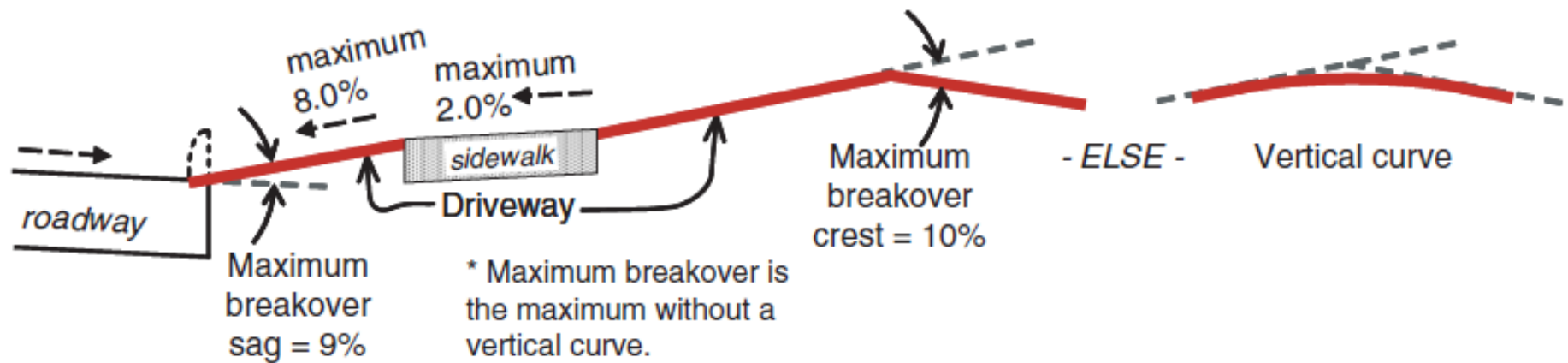


Exhibit 5-69. Minimum length of Type-II crest vertical curve to accommodate low-clearance vehicle.

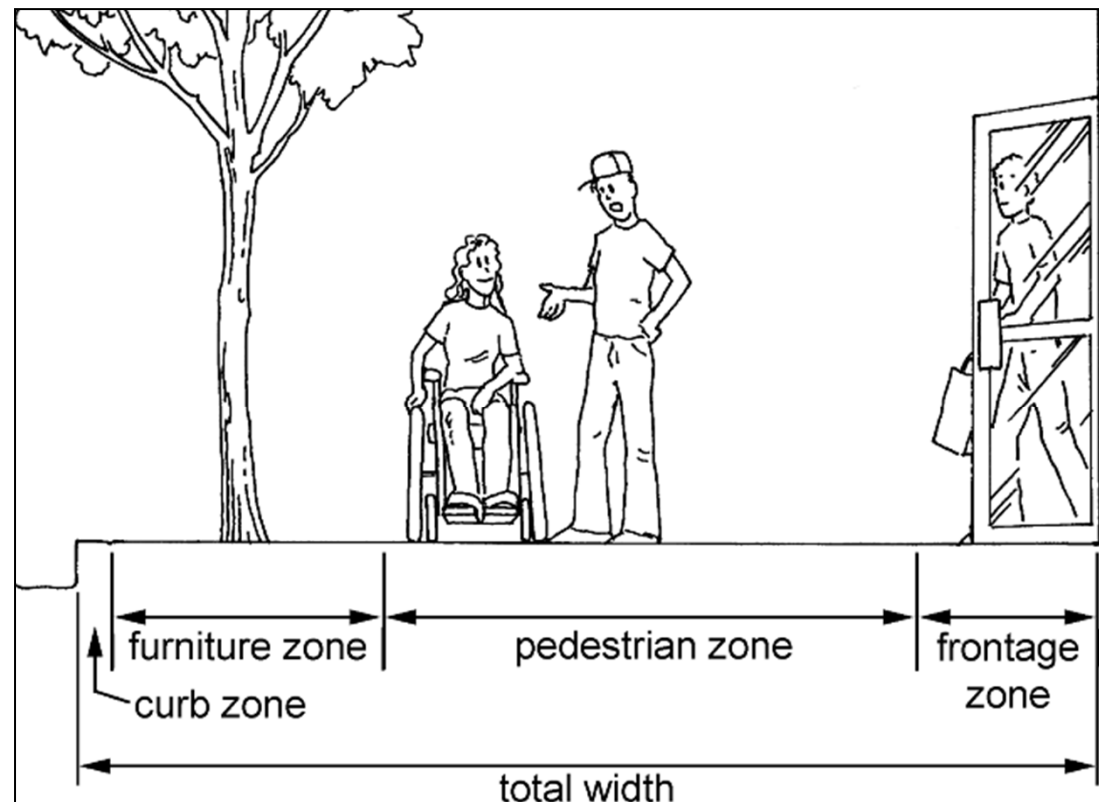
<u>Algebraic Difference (%)</u>	<u>Curve Length</u>	<u>ft (m)</u>
1	4	(1.2)
2	8	(2.4)
3	12	(3.7)
4	16	(4.9)
5	20	(6.1)
6	24	(7.3)
7	28	(8.5)
8	32	(9.8)
9	35	(10.7)
10	39	(11.9)

Sidewalk Zone System



The sidewalk corridor extends from the edge of roadway to the right-of-way and is divided into 4 zones:

- Curb zone
- Furniture zone
- Pedestrian zone
- Frontage zone



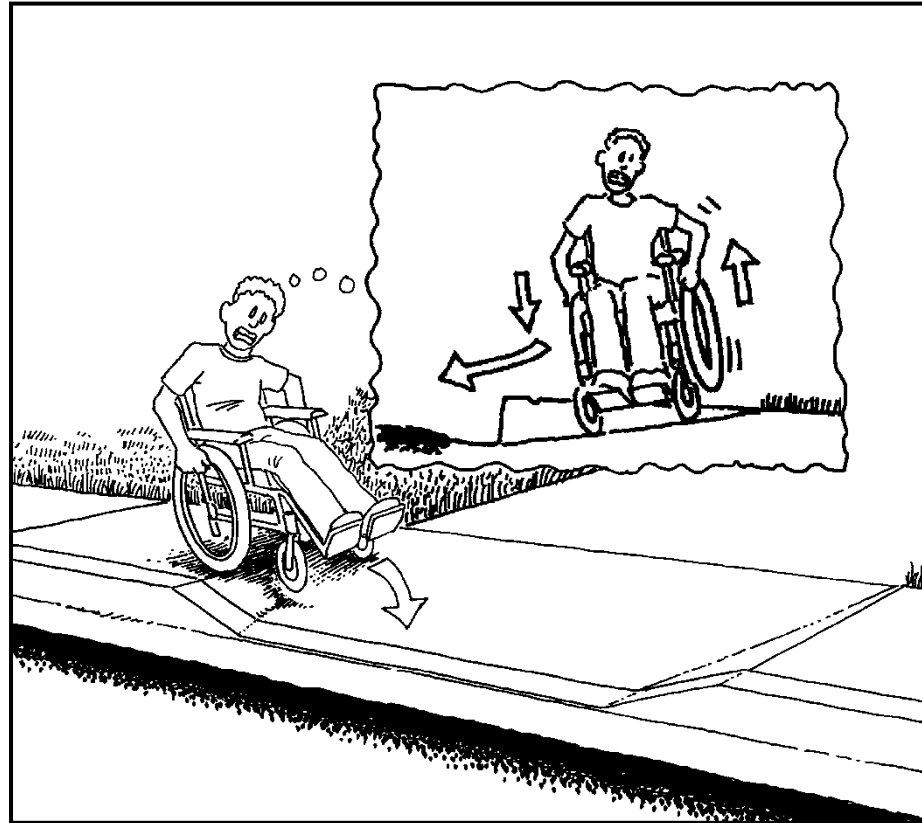
Without the Zone System



Without the Zone System



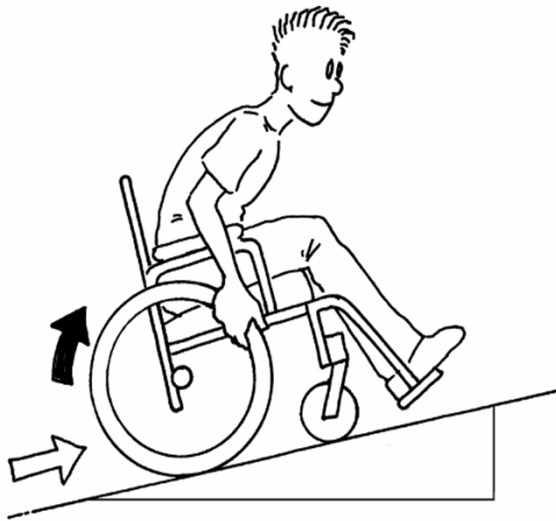
Without the Zone System (R302.5 & R302.6)



Sidewalk Grade

Grade (R302.5)

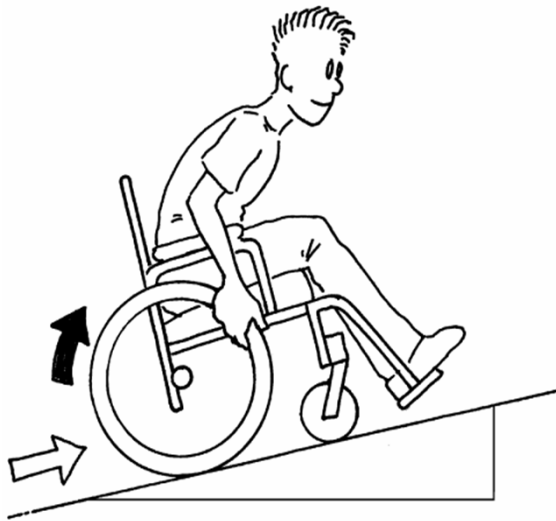
- In ROW and along road: follow general parallel roadway grade
- Where supported by a structure (i.e, bridge), should not exceed 5%



Shared-use Path Grade

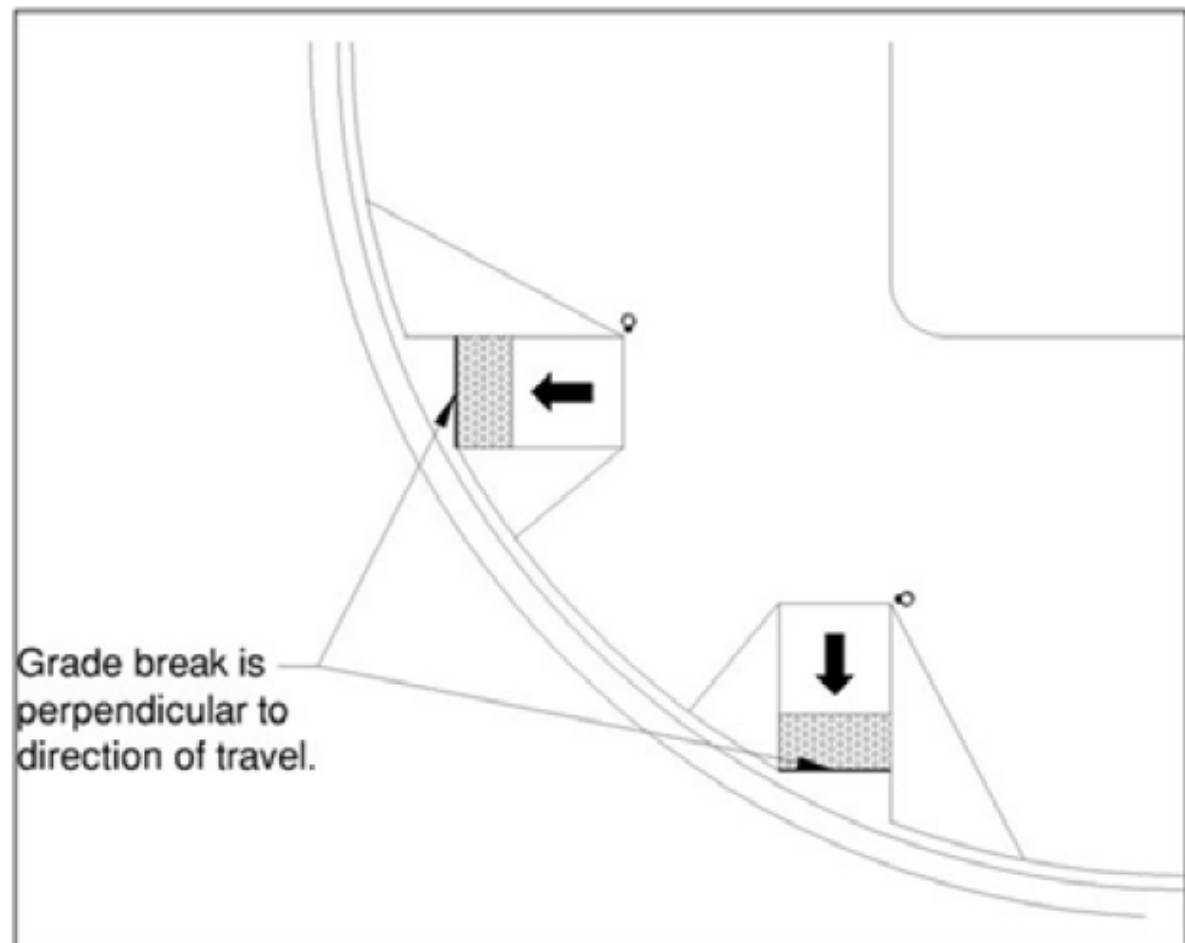
Not Within Street or Highway Right-of-Way (**SNSUP R302.5.2**)

- The grade of pedestrian access routes shall be 5% maximum



Curb Ramps Common Features

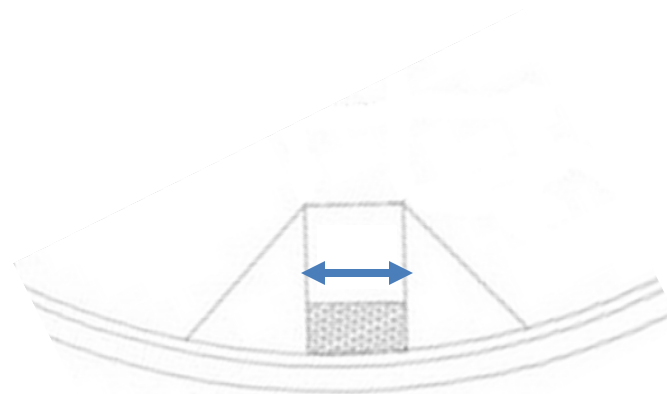
- Grade break perpendicular to ramp run
(R304.5.2)



Curb Ramps Common Features

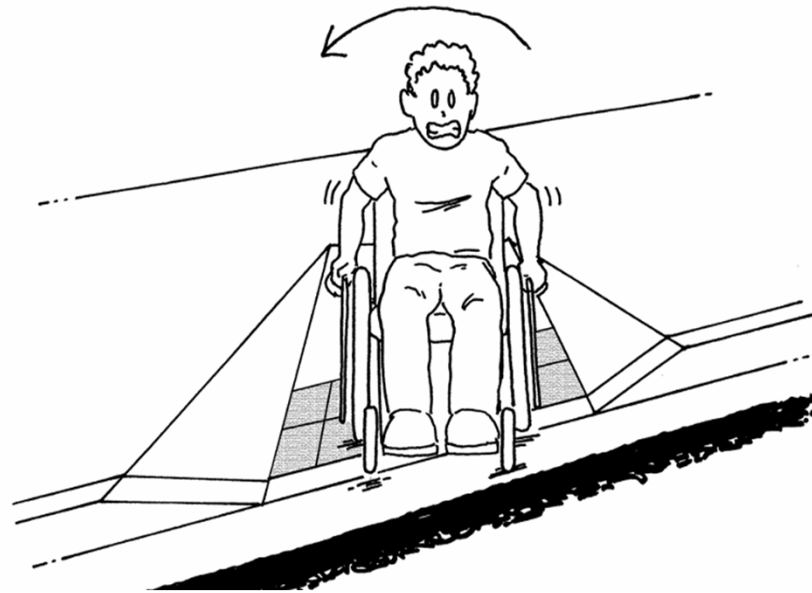
Curb ramp width (**SNSUP R304.5.1**)

- For sidewalks, 4.0 ft minimum
- For shared-use paths, width of the ramp shall be equal to the width of the path.



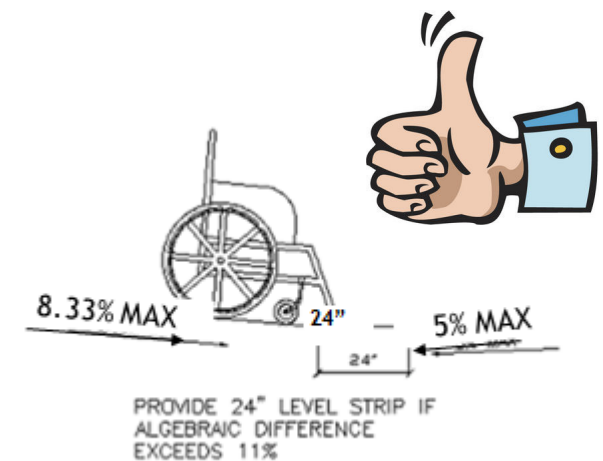
Curb Ramps Common Features

- Cross slope 2% maximum or match crosswalk
(R304.5.3)



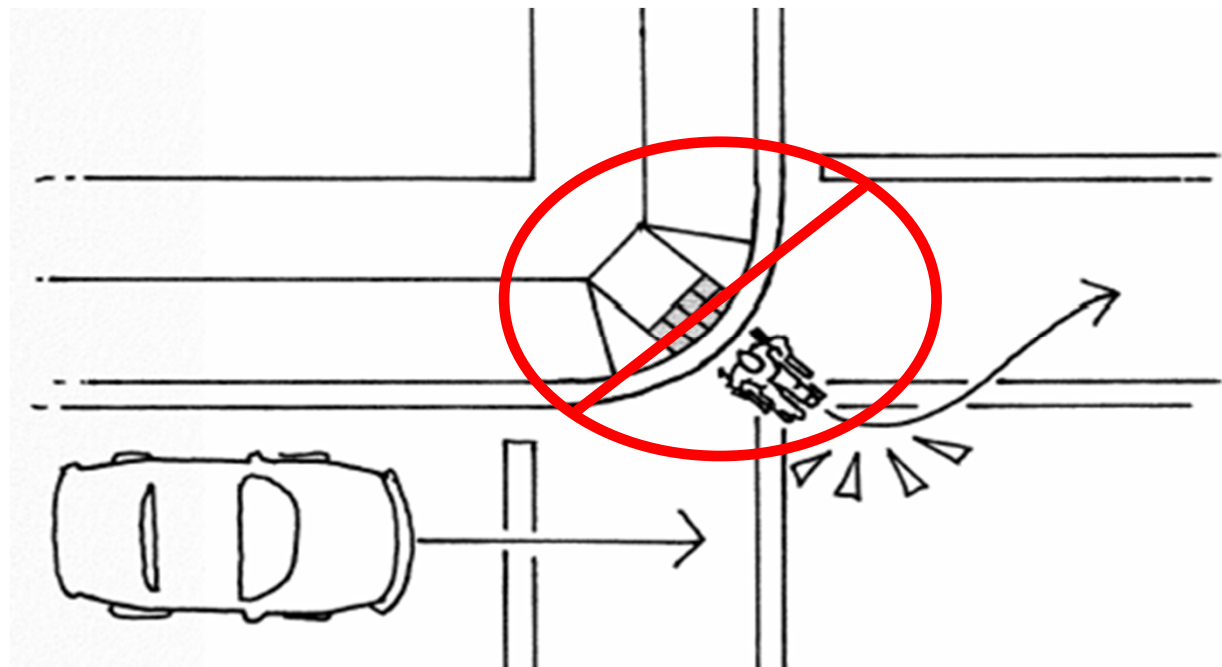
Curb Ramp Common Features

- Counter slope 5% maximum (R304.5.4)
- Provide 2' level space if grade break exceeds 11%



Curb Ramp Common Features

- Clear space 4 ft x 4 ft minimum (R304.5.5)
 - Entirely within crosswalk
 - Entirely outside travel lanes



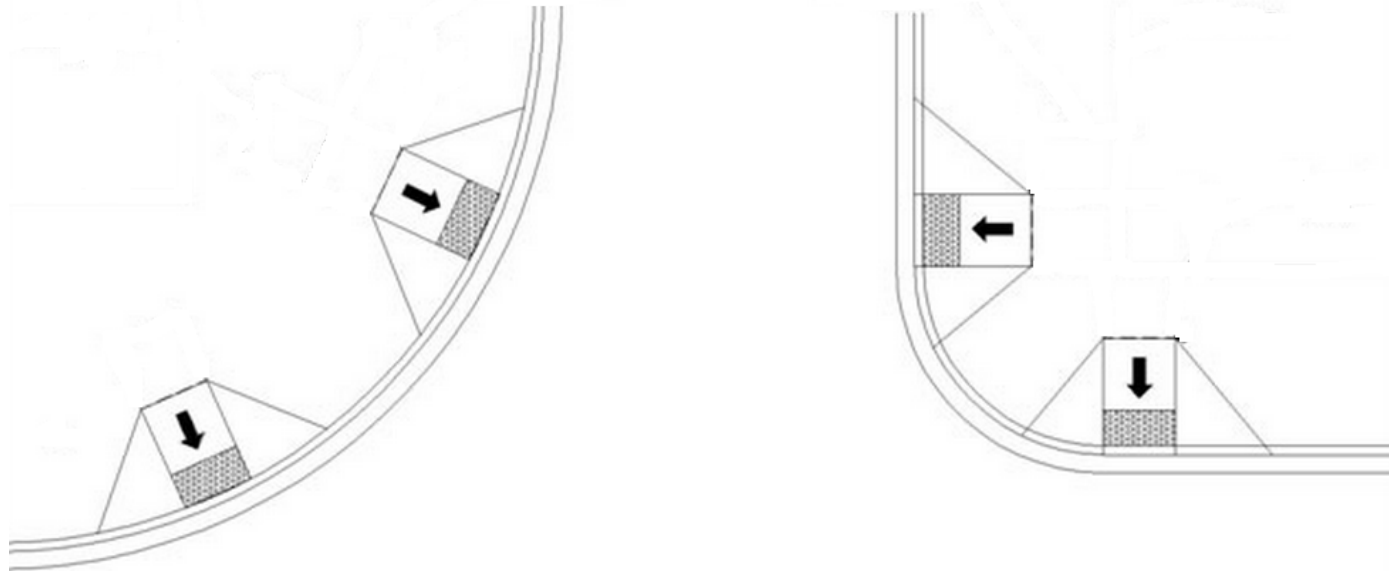
Curb Ramp Common Features

- Detectable warnings
 - Visual contrast (R305.1.3)
 - 2 ft minimum in direction of travel (R305.1.4)
 - Full width of curb ramp or blended transition (R305.1.4)
 - Aligned with grade break at street (R305.2)



Perpendicular Curb Ramps

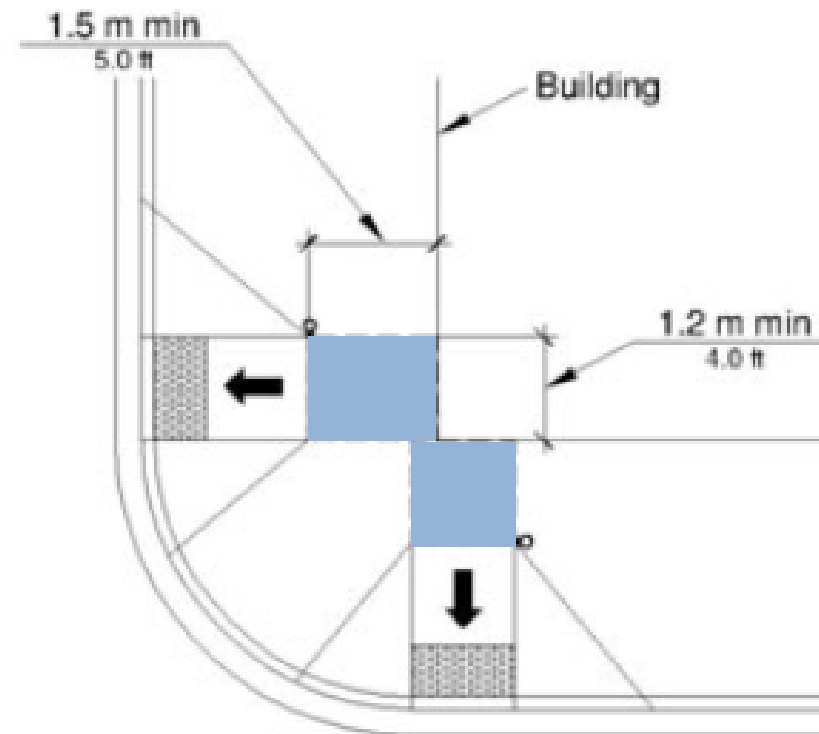
- Pedestrians turn at top of ramp (R304.2.1)
- Ramp run parallel (or nearly so) to the crosswalk (R304.2.2)
- Maximum slope 8.33% but not more than 15 ft in length (R304.2.2)



Perpendicular Curb Ramps

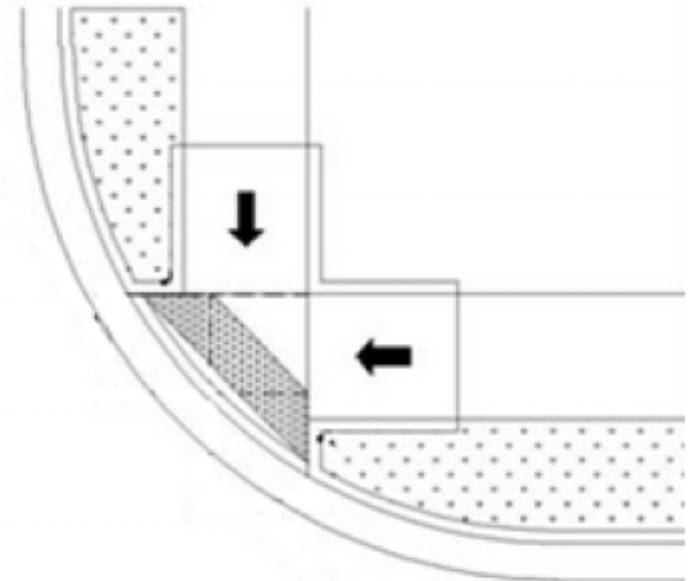
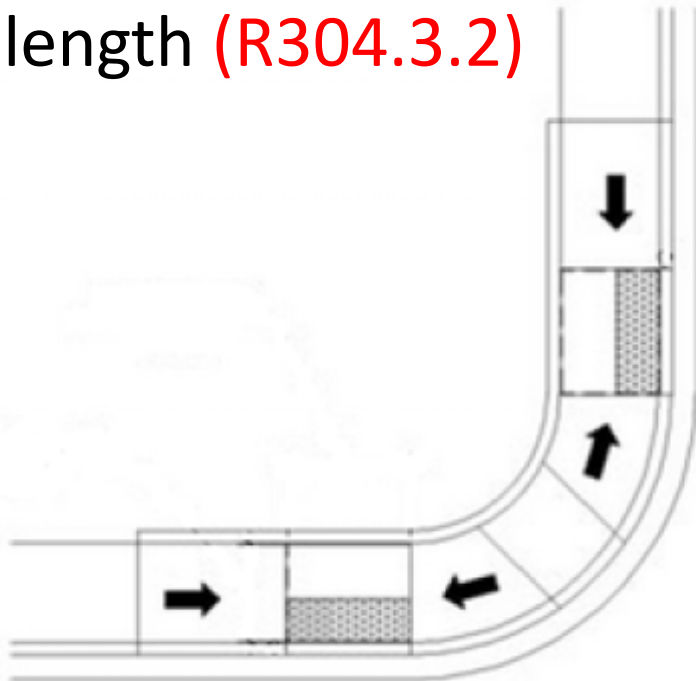
Turning space (R304.2.1)

- 4.0 ft by 4.0 ft at top of ramp
- If constrained at back of sidewalk, increase dimension to 5.0 ft in direction of ramp run.
- 2% maximum running slope (R304.2.2)



Parallel Curb Ramps

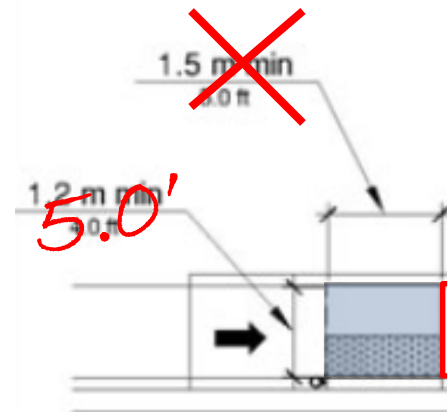
- Pedestrians turn at base of ramp (R304.3.1)
- Ramp run parallel to approaching sidewalk (R304.3.2)
- Maximum slope 8.33% but not more than 15 ft in length (R304.3.2)



Parallel Curb Ramps

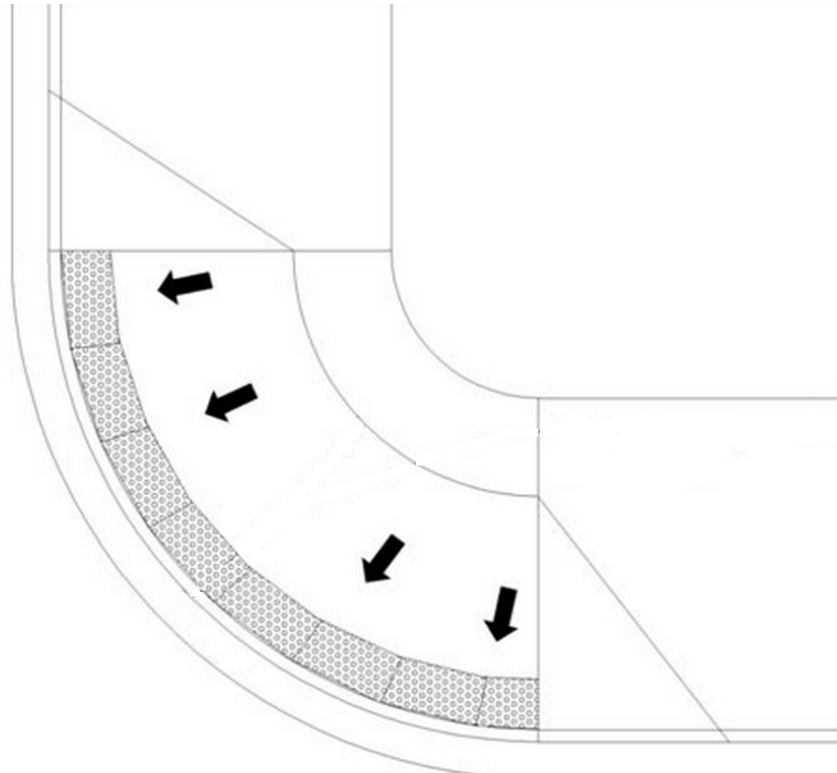
Turning space (R304.3.1)

- 4.0 ft by 4.0 ft at bottom of ramp
- If constrained on two sides, increase dimension to 5.0 ft in direction of street crossing.
- 2% maximum running slope (R304.2.2)



Blended Transition

- Blended Transition
 - Orientation varies
 - Maximum slope 5% (R304.4.1)



Combination Ramps



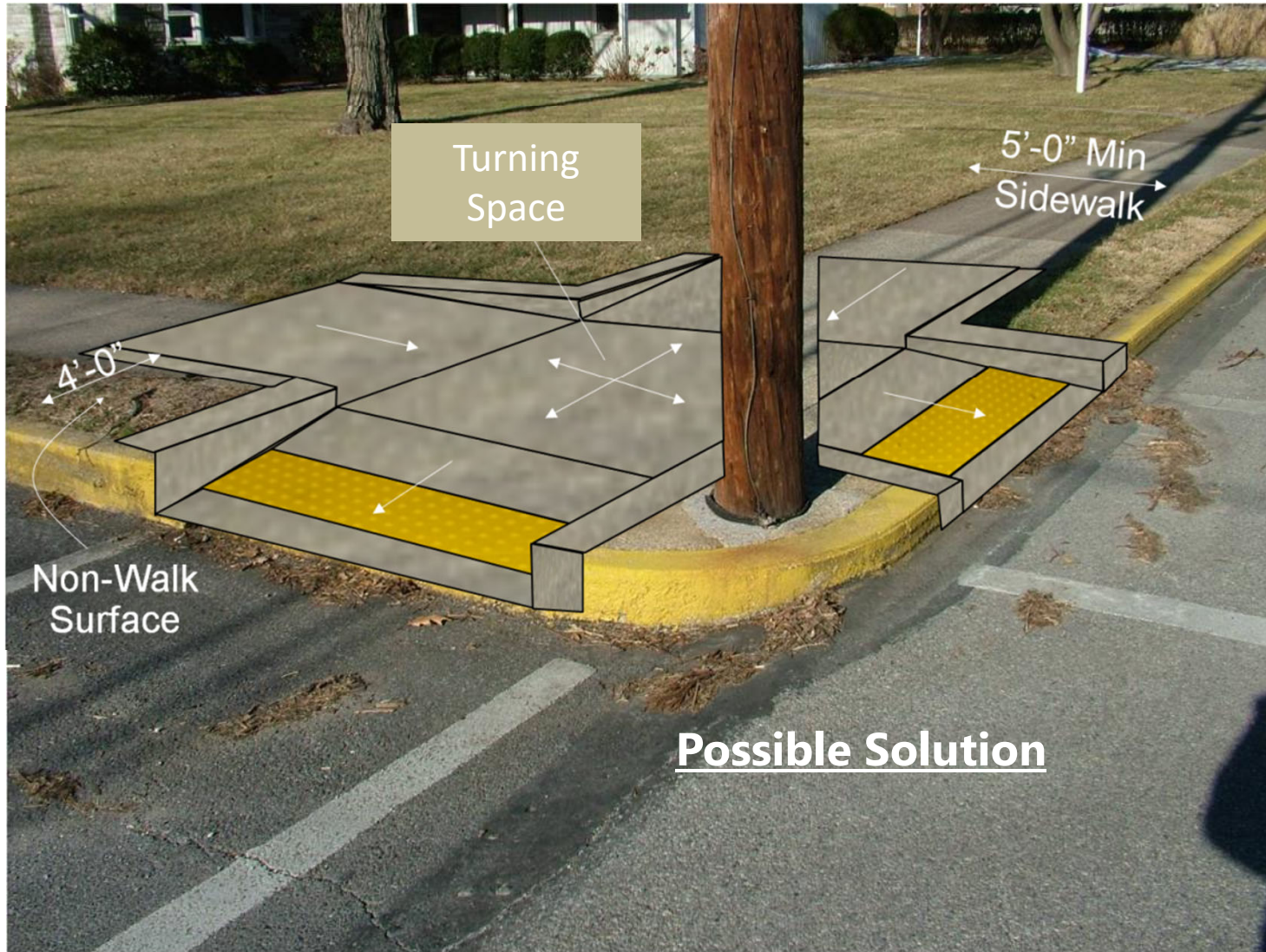
Crosswalks

Cross Slope

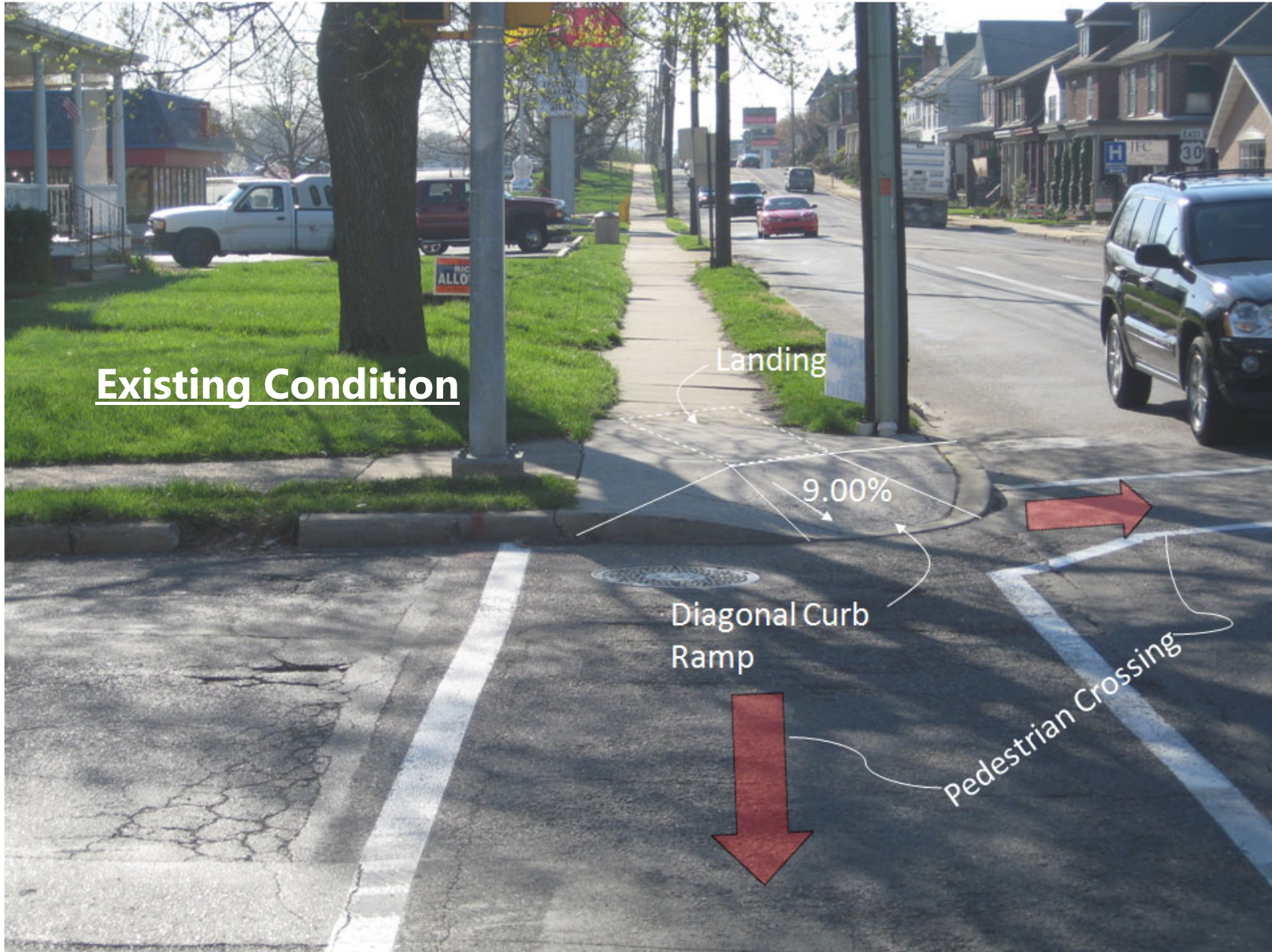
- 2% maximum where traffic must always slow or stop, as at a stop or yield sign (R302.6)
- 5% maximum where traffic can sometime proceed without slowing, as at a signal with a green light phase (R302.6.1)
- Match street grade at mid-block crossings (R302.6.2)



Existing Condition



Possible Solution





Accessible Pedestrian Signals

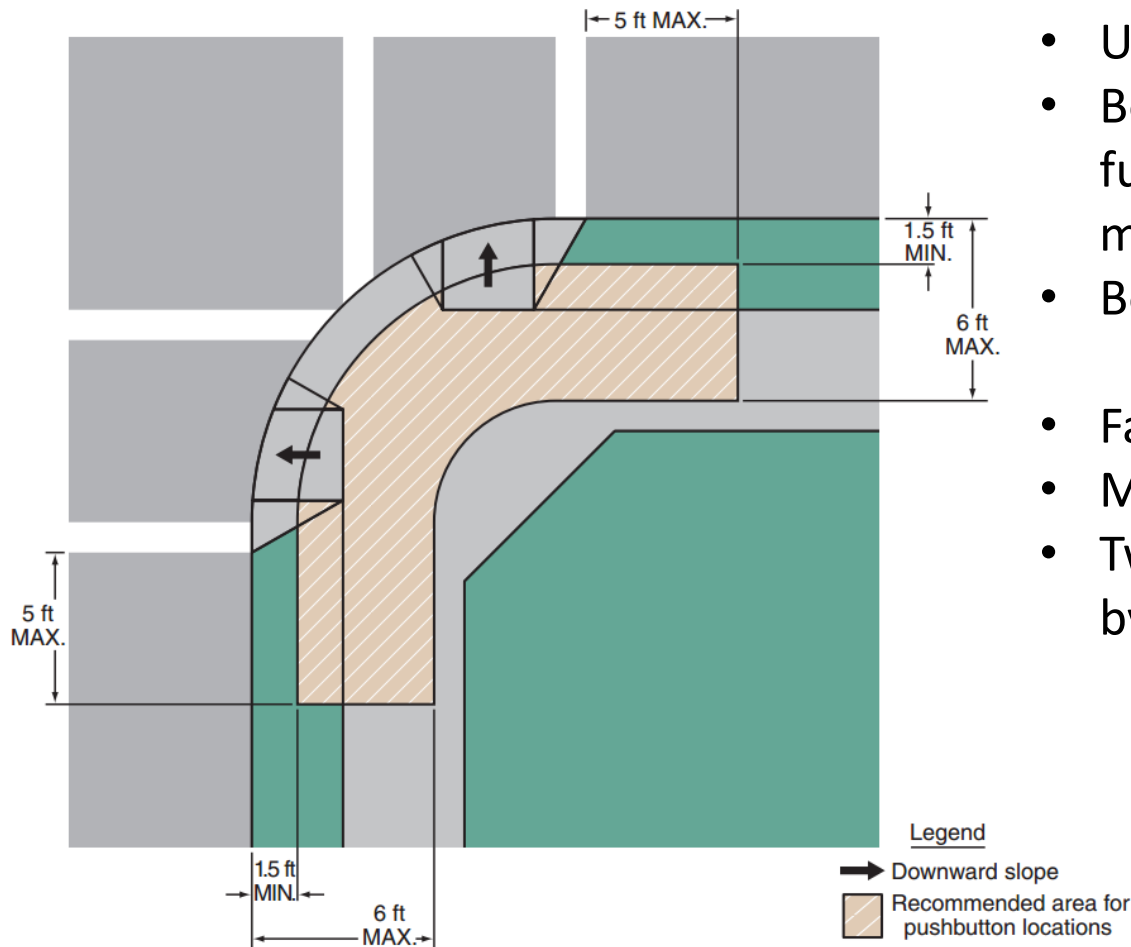
- Required wherever pedestrian signals are installed (R209.1)
- Audible and vibrotactile walk indications (MUTCD 4E.11)



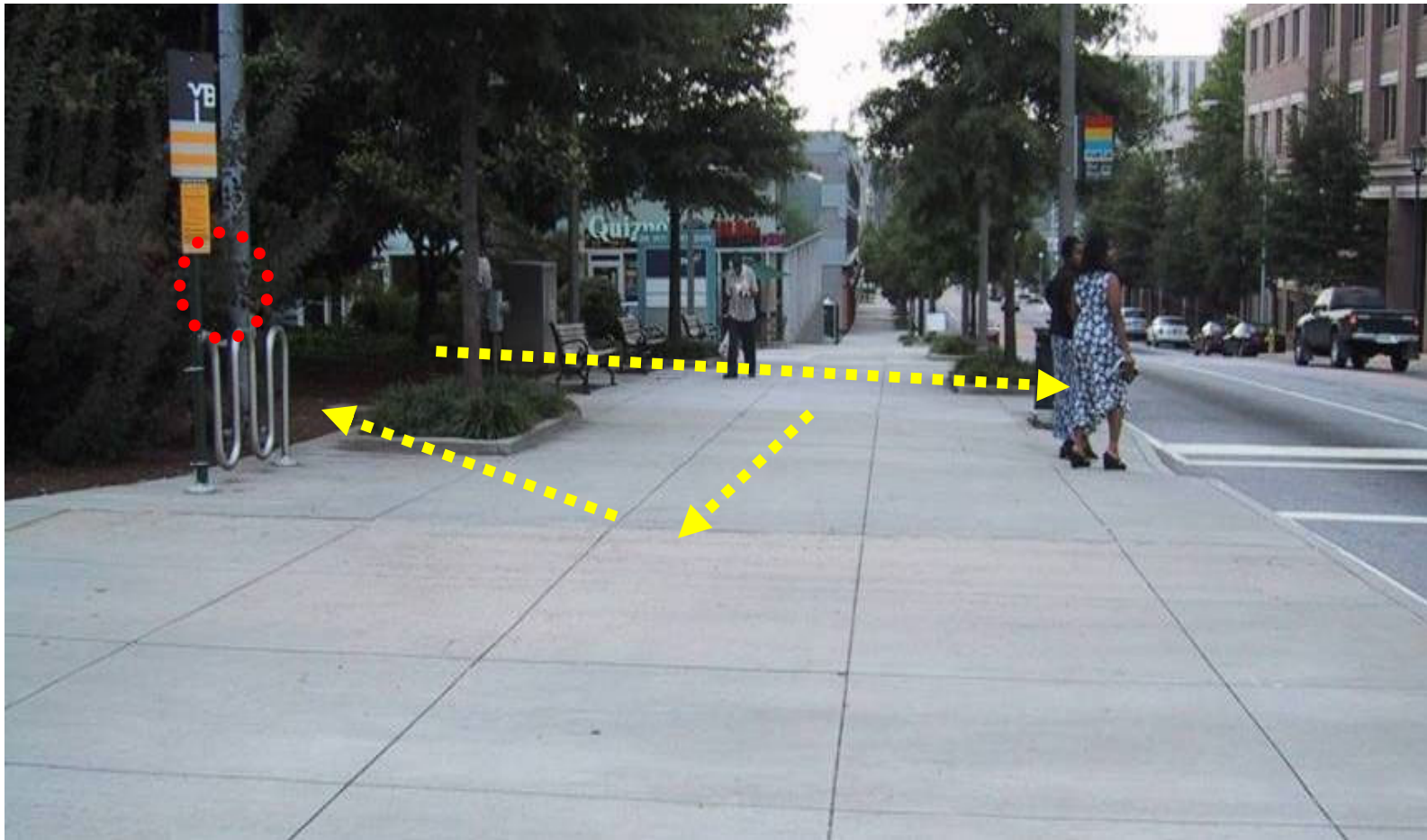
Push Button Placement

R 209.1 & MUTCD 4E.08

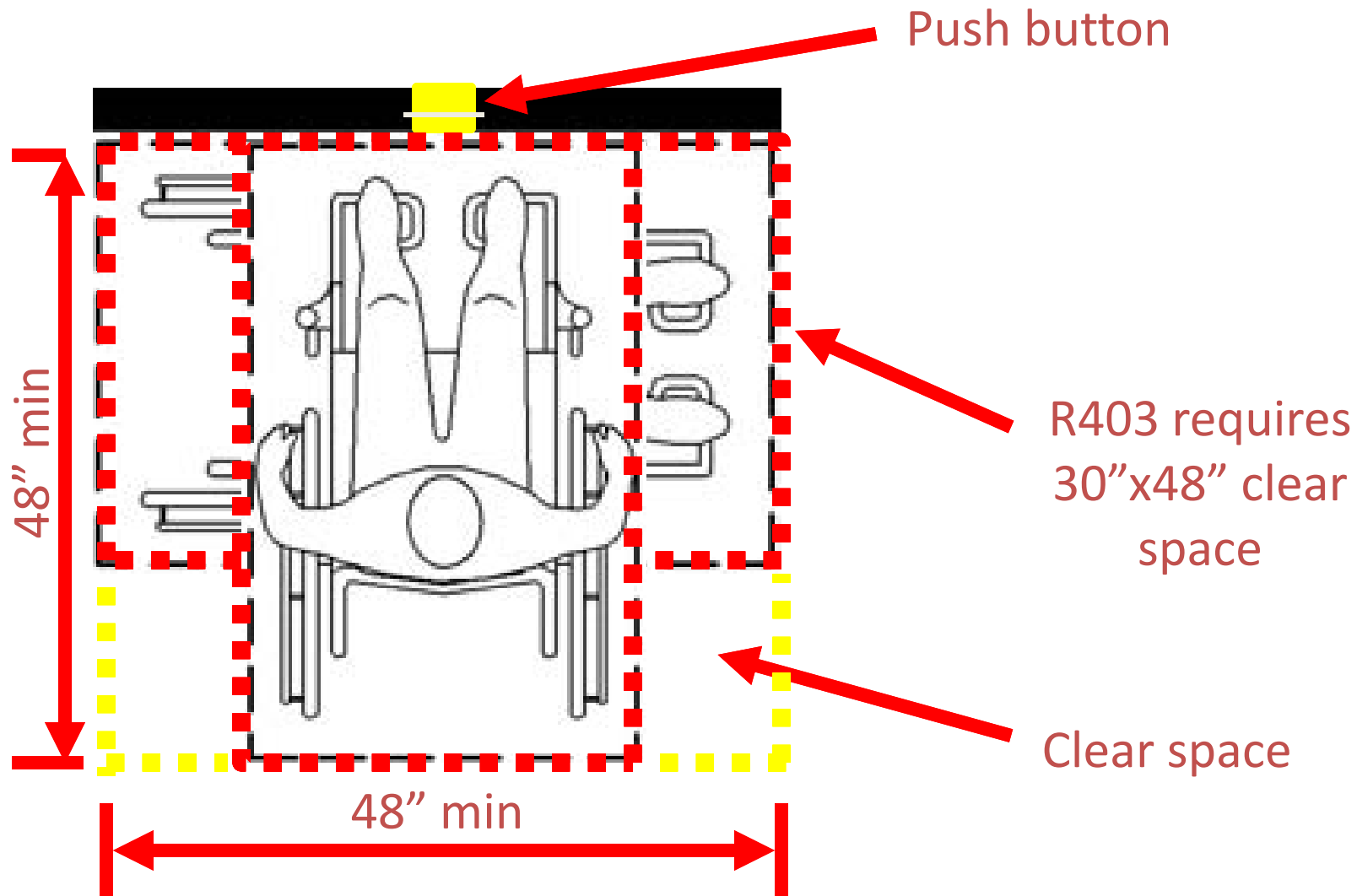
- Unobstructed & adjacent to PAR
- Between curb ramp & X-walk line furthest from intersection, but no more than 5 ft from X-walk line
- Between 1.5 and 6 ft from curb
 - Where constraints, 10 ft max.
- Face parallel to X-walk
- Mount ~ 3.5 ft high, 4 ft maximum
- Two pedestrian buttons separated by 10 ft
 - May be on same pole if there are constraints
 - See [MUTCD 4E.10](#)



Push Button Placement



Push Button Placement



Push Button Placement

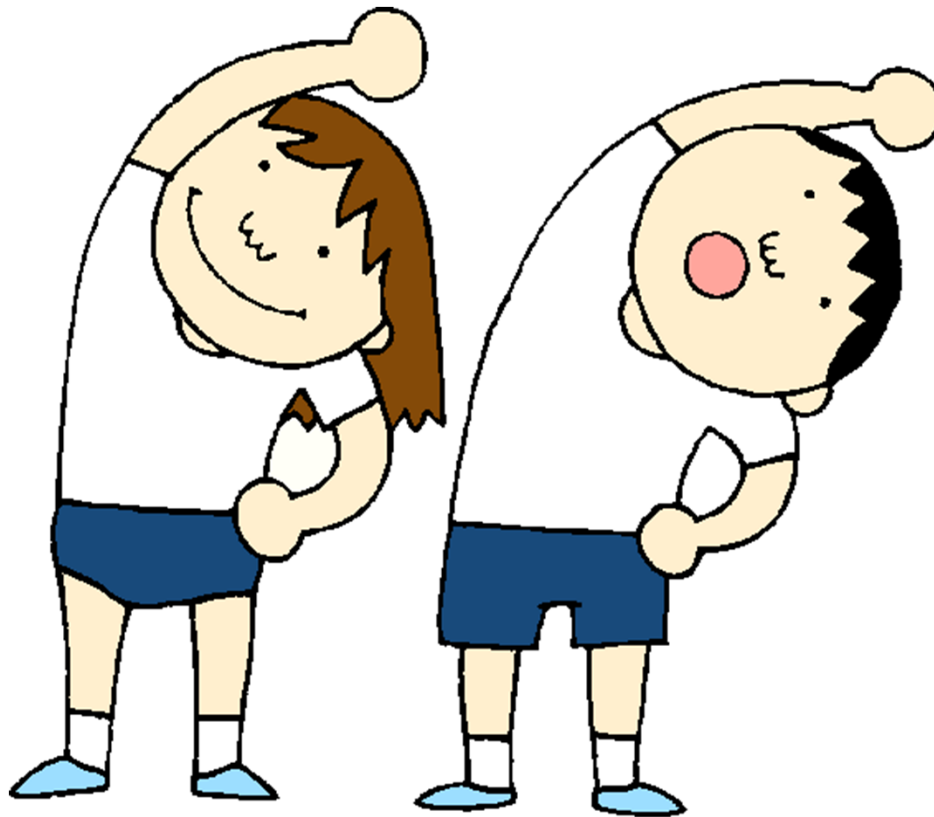


Learning Check

- Sidewalks
- Curb Ramps
- Crosswalks
- Signals



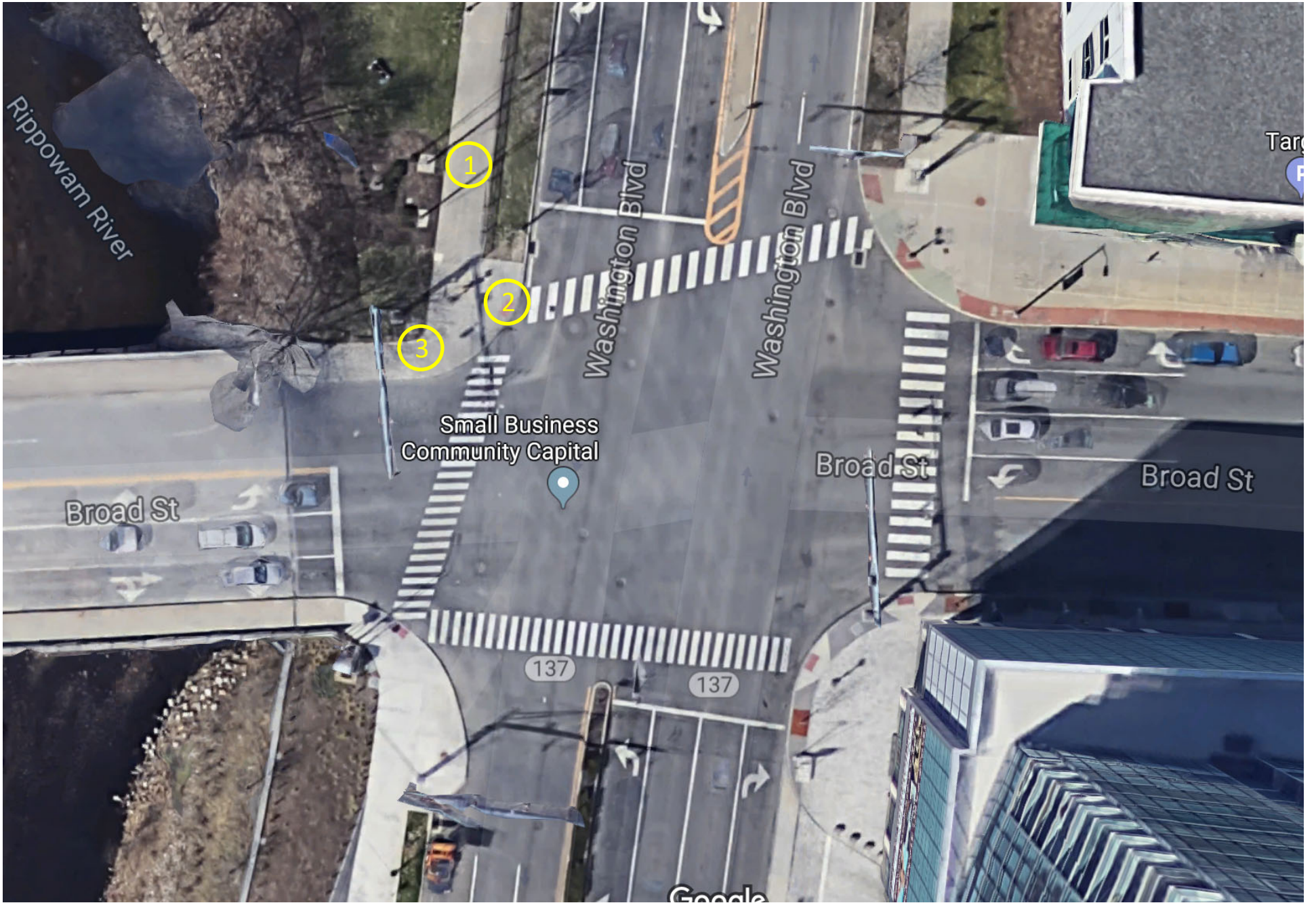
Case Studies



Food for Thought

- Are there elements that are providing good accessibility?
- Are there elements that are deficient or poor practice?
- Are there policies or practices that could have improved accessibility or prevented problems?
- How would you retrofit the site?

Case Study 1



Rippowam River

Tar
P

1

2

3

Washington Blvd

Washington Blvd

Small Business
Community Capital



Broad St

Broad St

Broad St

137

137

Google



1





Case Study 2



City of Saint George:
Streets Department

City of St.
George: Suntran

Rodeway Inn Red Hills

E Red Hills Pkwy

E Red Hills Pkwy

E Red Hills Pkwy

1

2

N 900 E

Panda Garden

Skyline Shopping Center

Motel 6

1000 E

Knights Inn St.

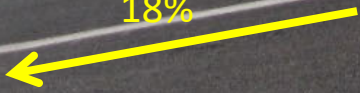


18%

1



18%



2

Scoping Requirements



Scoping Requirements

- New Construction (28 CFR 35.151)
 - Structurally impracticable due to unique characteristics of terrain
 - Made accessible to the extent structurally practicable
 - Public entity can demonstrate (Documentation!)



Scoping Requirements

- Alterations (R202.3.1)
 - Impracticable due to existing physical constraints, including:
 - Underlying terrain
 - Inability to obtain right-of-way
 - Underground structures
 - Adjacent developed facilities
 - Drainage
 - Notable natural or historic feature
 - Comply to maximum extent practical **within scope**

Scoping Requirements

- Curb ramp contained wholly within crosswalk served (R207)
 - Existing physical constraints
 - Single diagonal ramp permitted

Scoping Requirements

- Temporary & Permanent Facilities (R201.2)



Accessibility in Construction (R205)

- Edge detection
- Detours & signing
- Temporary PAR



Continuity

- Program Access/Transition Plan (28 CFR 35)
- Alterations



Prepare for Challenges

- Reasonable and Consistent
- Maximum extent practical
- Document, Document, **DOCUMENT!!!**