

# Driveway Crossings

Driveway crossings permit cars to cross the sidewalk and enter the street. They serve the same basic purpose for cars

as curb ramps serve for pedestrians. Therefore, they consist of many of the same components found in curb ramps.

It is the driver's responsibility to yield to the pedestrian at the driveway-sidewalk interface. Unfortunately, this does not always happen, and pedestrians are put at risk. Minimizing the number of driveway crossings in



**Figure 5-1.** To enhance pedestrian access, a driveway crossing should maintain a level pedestrian zone.

a sidewalk significantly improves pedestrian safety.

Driveway crossings should be designed so that both the pedestrians and the drivers are able to use them effectively. However, a driveway crossing must provide a way for cars to negotiate the elevation change between the street and the sidewalk. This is generally achieved by ramping all or a portion of the driveway crossing. When the ramp for the motorist crosses the pedestrian's path of travel, significant cross slopes and changes in cross slope must be negotiated by the pedestrian. The cross slope problem at driveway crossings along with several innovative solutions will be discussed in this chapter. Supplemental information about good design principles and specifications is contained in Table 5-1.

## 5.1 Change in cross slope

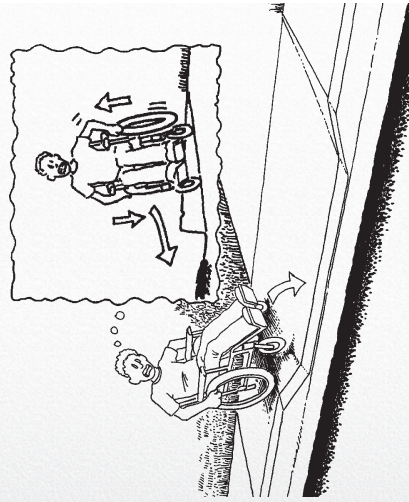
A change in cross slope is an abrupt difference between the cross slope of two adjacent surfaces. ADAAG does not permit cross slope to exceed 2 percent

(changes in cross slope are allowed between 0–2 percent only). Changes in cross slope are commonly found at driveway crossings without level crossings. When considering the needs of pedestrians, change in cross slope is evaluated over a 610 mm (24 in) interval, which represents the approximate length of a single walking pace and the base of support of assistive devices, such as wheelchairs or walkers. The design recommendations for change of cross slope specify the relationship between two adjacent surfaces, not the actual cross slope of either surface.

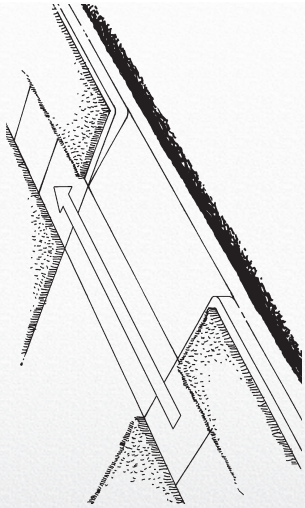
If the surfaces are sloped in opposite directions, the change in cross slope can be determined by adding together the cross slope of each surface. For example, if the cross slope of the sidewalk was 2 percent in the direction of the property line and the cross slope of the driveway crossing was 10 percent toward the street, the change in cross slope would equal 12 percent. If the surfaces are sloped in the same direction, the change in cross slope can be determined by subtracting the cross slope of the two surfaces.

Driveway crossings are the most common location for changes in cross slope within the sidewalk corridor. When the change of cross slope is severe, one wheel of a wheelchair or one leg of a walker may lose contact with the ground causing the user to fall. Other walking pedestrians are also more prone to stumble or fall on surfaces with rapidly changing cross slopes. As the wheelchair moves from the level surface of the sidewalk to the sloped surface of the driveway ramp, it will first balance on the two rear wheels and one front caster. As the wheelchair moves forward, it then tips onto both front casters and one rear wheel. During the transition from the rear wheels to the front wheels, the chair is only on one front wheel and one rear wheel. Since hard contact with both rear wheels is necessary to steer the wheelchair, this transition may cause the wheelchair user to lose control and possibly tip over. Therefore, whenever possible, driveway crossings without level landings should be replaced.

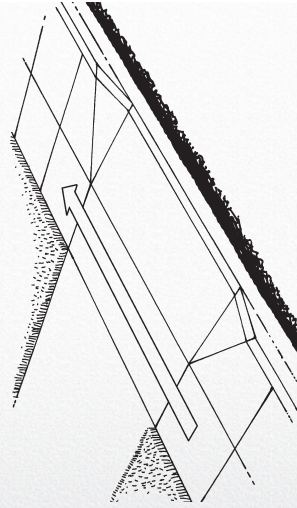
In addition to driveway crossings, changes in cross slope may occur on older sidewalks and occasionally on newer



**Figure 5-2. PROBLEM:** This driveway design is not allowed by ADAAG. Driveway crossings without level landings force users to travel over the sidewalk flare. This design results in rapid changes in cross slope, which compromises balance and stability for people who use wheelchairs.



**Figure 5-3. GOOD DESIGN:** Driveway crossings on sidewalks with planting strips should be designed with level landings and returned curbs. Using returned curbs instead of flares benefits pedestrians by forcing motorists to enter the driveway crossing at more of a right angle and thus at a slower speed.



**Figure 5-4. GOOD DESIGN:** Driveway crossings on a wide sidewalk corridor should be designed to include level landings.

sidewalks, where tree roots and other environmental conditions warp the sidewalk surface and create difficult changes in level. Warped sidewalks create a situation of changing cross slopes because there is no planar surface over a 610 mm (24 in) interval. Routine maintenance should replace warped segments of the sidewalk to ensure continual access.

## 5.2 Driveway crossings on wide sidewalk corridors

Driveway crossings should be wide enough to accommodate both the driveway ramp and a level pedestrian zone. This can be easily accomplished on wide sidewalk corridors where either the entire sidewalk is paved or a planting strip is included between the sidewalk and the street. The ramp of the driveway on a sidewalk with a planting strip should be installed with a returned curb rather than a flare. In general, a flare is installed to prevent ambulatory pedestrians from tripping. However, if the ramp is not part of the pedestrian walkway, a returned curb is

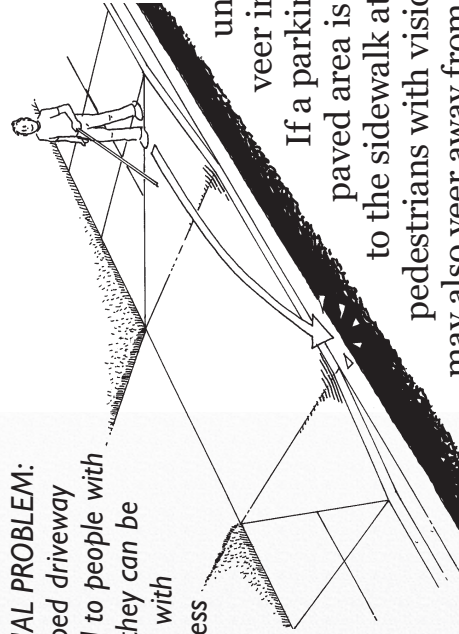
better for drainage and has the added affect of slowing drivers because of the tighter turning radius.

Wide sidewalk corridors provide enough space to maintain a level path of travel along the pedestrian pathway before the driveway ramp resumes sloping toward the street. This type of crossing also serves as a speed table to slow down cars and protect pedestrians. In addition, people with vision impairments can identify the driveway crossing more easily because they can usually detect the steep section of the driveway crossing at the side of the pedestrian zone. Steep driveway crossings designed without a level sidewalk result in severe cross slopes.

In some situations, the entire width of the sidewalk corridor is gradually sloped and offers a good travel area for pedestrians with mobility impairments but can pose safety issues for individuals with vision impairments. Without a graded segment leading from the sidewalk toward the street, the boundary of the driveway crossing is more difficult to detect for pedestrians with vision impairments.

### Figure 5-5. POTENTIAL PROBLEM:

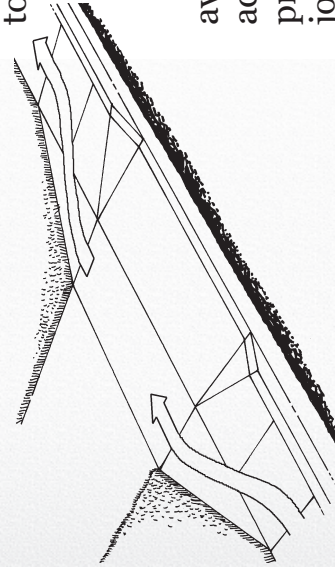
Although gradually sloped driveway crossings are beneficial to people with mobility impairments, they can be problematic for people with vision impairments unless there is a detectable difference in slope at the edge of the street. If a visually impaired person veers toward the street and isn't able to recognize where the driveway ends and the street begins, they may enter the street without realizing it.



This design flaw can make it difficult for users to realize when they unintentionally veer into the street.

If a parking lot or other paved area is provided adjacent to the sidewalk at the property line, pedestrians with vision impairments may also veer away from the street.

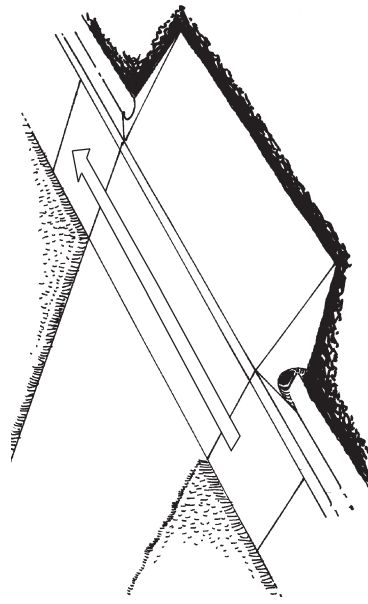
Including steeper grades on either side of the sidewalk at a driveway crossing makes driveway crossings more identifiable to users with vision impairments.



**Figure 5-6. GOOD DESIGN:** Securing additional right-of-way from the adjacent property is a good strategy for improving pedestrian access on narrow sidewalks.

### 5.4 Built-up driveway crossing

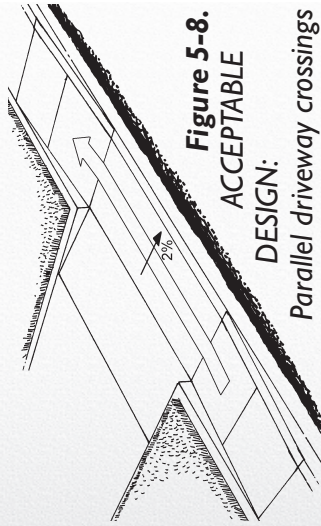
Additional right-of-way may also be secured from the gutter or roadway. This design is similar to a built-up curb ramp (Section 8.2.5) because the driveway ramp is projected into the street. Built-up driveway crossings are only appropriate on streets with parking. To promote good drainage for a built-up driveway crossing, a drainage pipe should be placed under the ramp, or drainage inlets should be



**Figure 5-7. SATISFACTORY DESIGN:** Built-up driveway crossings promote pedestrian access on narrow sidewalks by extending the ramp into the roadway and allowing the sidewalk to remain level. This ramp works better on roadways with on-street parking and in areas with no snow.

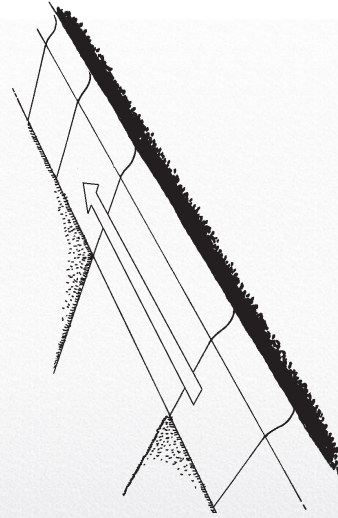
### 5.3 Jogged driveway crossing

If a wide sidewalk corridor is not available, planners should secure additional right-of-way from the adjacent property so that the sidewalk can be jogged away from the street. This will allow pedestrians to maintain a level path as they cross the driveway. Additional land can be purchased or obtained through an easement from the property owner.



**Figure 5-8.**  
ACCEPTABLE  
DESIGN:

*Parallel driveway crossings enhance pedestrian access at a driveway crossing when there is no room to provide a level landing. Parallel driveway crossings are not as desirable as other accessible driveway crossings because users are forced to negotiate two ramps instead of a level surface.*



**Figure 5-9.** ACCEPTABLE DESIGN:  
Rolled curbs enable drivers to travel over the curb and eliminate the need for a driveway ramp.

positioned on either side of the ramp. If these precautions are not taken, the driveway crossing will act like a dam, causing water to build up behind it.

### 5.5 Parallel ramped driveway crossing

If additional land cannot be secured to jog the sidewalk away from the street, another option would involve a retrofit situation. The sidewalk can be lowered to the elevation of the gutter where it crosses the driveway. The driveway ramp, which is needed to bridge the elevation change between the street and the sidewalk, is located behind the sidewalk. This design is very similar to a parallel curb ramp and requires the sidewalk to ramp down to the elevation of the gutter and then to ramp back up on the other side of the driveway. The landing between the two ramps must have a slight cross slope toward the gutter to prevent ponding and poor drainage.

Although parallel driveway crossings are preferable to driveway crossings with

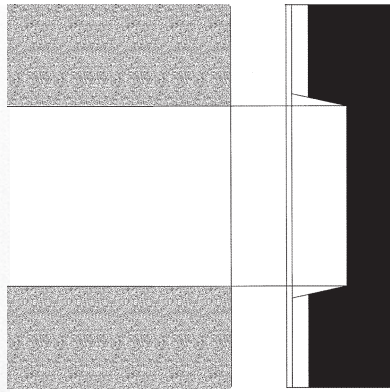
severe cross slopes, they are less desirable than jogged or built-up driveway crossings with level landings because pedestrians are forced to travel down and then up a ramp. Parallel curb ramps are also problematic because pedestrians with vision impairments may mistake a parallel driveway crossing for a curb ramp. Furthermore, drivers crossing the sidewalk at grade with the roadway have a tendency to travel at a faster speed than when the sidewalk is raised. Keeping the entrance width narrow on this type of driveway crossing forces the driver entering from the roadway to slow down, which improves conditions for pedestrians.

### 5.6 Rolled curbs

A final option for providing a level pedestrian zone on a narrow sidewalk is to design a rolled curb and eliminate the driveway ramp. Drivers are able to travel over the curb, so the sidewalk corridor can remain level. Rolled curbs are most common in residential neighborhoods.

**Table 5-1: Driveway Crossings**

	<p><b>Good Design:</b> Driveway crossings with level landings on wide sidewalks.</p> <p><b>Design Specifications:</b> Landing slope = 2.0 percent Changes in level = flush Landing width = 915 mm (36 in) minimum Flare slope = 10 percent maximum</p> <p><b>Recommendations:</b> A level path of travel is maintained along the sidewalk corridor before the driveway ramp resumes sloping toward the street. If the ramp is located in the path of pedestrian travel, flares should be installed to prevent ambulatory pedestrians from tripping.</p>		<p><b>Good Design:</b> Driveway crossings with level landings and returned curb on sidewalk with a planting strip.</p> <p><b>Design Specifications:</b> Landing slope = 2.0 percent Changes in level = flush Landing width = 915 mm (36 in) minimum</p> <p><b>Recommendations:</b> A level path of travel is maintained along the sidewalk corridor before the driveway ramp resumes sloping toward the street. Wide sidewalk corridors with planting strips should be designed with a returned curb that allows for drainage and has the added effect of slowing drivers because of the tighter turning radius.</p>		<p><b>Good Design:</b> Driveway crossing with a level landing jogged away from the street.</p> <p><b>Design Specifications:</b> Landing slope = 2.0 percent Changes in level = flush Landing width = 915 mm (36 in) minimum Flare slope = 10 percent maximum</p> <p><b>Recommendations:</b> Existing narrow sidewalk corridors, without level pedestrian zones, can be improved if additional right-of-way is secured from the adjacent property and the landing is jogged away from the street.</p>
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#### Accessible Design/Not Recommended:

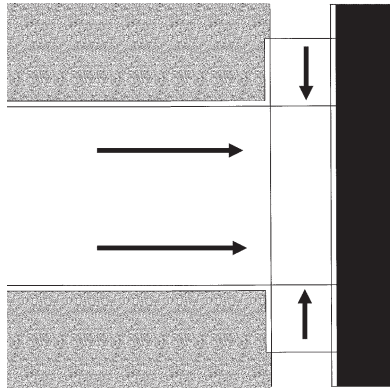
Driveway crossings with motorist ramp built-up into the street.

#### Design Specifications:

The design of the sidewalk corridor at a built-up driveway crossing is not influenced by the driveway crossing.

#### Recommendations:

Built-up driveway crossings are only appropriate on streets with parking. A drainage pipe should be placed under the ramp, or drainage inlets should be positioned on either side of the ramp. If these precautions are not taken, the driveway crossing will act like a dam, causing water and debris to build up behind it.



#### Acceptable Design:

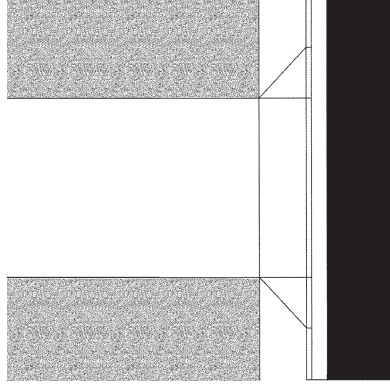
Driveway crossings with ramps parallel to the sidewalk and landing at grade with the street.

#### Design Specifications:

Landing slope = 2.0 percent  
Changes in level = flush  
Landing width = 915 mm (36 in) minimum

#### Recommendations:

Parallel driveway crossings are acceptable but not ideal because pedestrians are required to travel over two ramps. The landing between the two ramps should have a slight cross slope toward the gutter to prevent ponding and poor drainage. The entrance width should be kept narrow to force drivers entering from the roadway at a slower speed.



#### Inaccessible Design:

Driveway crossing without a level crossing.

#### Recommendations:

Driveway crossings without level landings create severe cross slopes and are particularly problematic for wheelchair users. Whenever possible, driveway crossings without level landings should be replaced. If a wide sidewalk corridor is not available, an additional right-of-way should be secured from the adjacent property so that the sidewalk can be jogged away from the street or a built-up driveway crossing should be installed.

