

**Delaware Department of Transportation  
Division of Transportation Solutions  
Design Guidance Memorandum**

**Memorandum Number 1-16**

- |                       |                            |                                  |
|-----------------------|----------------------------|----------------------------------|
| 1. Road Design Manual | 2. Bridge Design Manual    | 3. Utilities Design Manual       |
| 4. Real Estate Manual | 5. Standard Specifications | 6. Standard Construction Details |

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Title: Curb Ramps Effective date: 5/8/06

Sections to Implement:

- |   |   |   |
|---|---|---|
| <input checked="" type="checkbox"/> Project Development | <input checked="" type="checkbox"/> Planning                    | <input checked="" type="checkbox"/> DTC     |
| <input checked="" type="checkbox"/> Bridge              | <input checked="" type="checkbox"/> Quality                     | <input checked="" type="checkbox"/> Traffic |
| <input checked="" type="checkbox"/> Team Support        | <input checked="" type="checkbox"/> Maintenance &<br>Operations | <input type="checkbox"/> Other _____        |
| <input checked="" type="checkbox"/> Utilities           |   |   |

**I. Purpose**

To give guidance for: 1) the location of curb ramps; and 2) criteria for curb ramp construction details including layout. Also refer to: DelDOT's Standard Construction Details, Standard No. C-2, for curb ramp details; and the ADA Accessibility Guidelines for Buildings and Facilities (ADAAG) [<http://www.access-board.gov>] which gives requirements under the Americans with Disabilities Act (ADA) of 1990. Please contact the Quality Section for any questions or additional information.

**II. Design Guidance**

**Curb Ramp Locations**

Curb ramps shall be installed/upgraded for a project where the scope of work includes roadway reconstruction, resurfacing or any sidewalk construction. Examples of projects that do not require curb ramp installation are those that only consist of signing, pavement marking, lighting, and patching. For projects that fall into the qualifying categories, the following shall apply:

1. Curb ramps shall be provided where an accessible route crosses one or more curb lines. An accessible route is a continuous unobstructed path, which includes sidewalks and other exterior pathways with an improved surface, intended for pedestrian use.
2. Curb ramps shall be provided at the termini of all existing and proposed crosswalks within the project limits if there is existing sidewalk or the project includes proposed sidewalk. Crosswalks may be marked or unmarked.
3. Curb ramps at marked crosswalks shall be placed within the crosswalk lines.
4. The curb ramp shall not be compromised by other highway features such as guardrail, utility poles, signs, drainage inlets, manholes or other obstacles. All options for working around obstacles must be considered. If an accessible route cannot be provided around an obstacle, then the obstacle should be relocated. If the obstacle cannot be relocated then the project manager should work with his or her supervisor and assistant director to determine the best solution for the location. Curb ramps must be installed at all required

locations when new sidewalk is constructed, existing sidewalk is reconstructed or a road is repaved. All curb ramp locations must be addressed and cannot be skipped when the road is repaved. Some obstacles may not be able to be relocated in order to make a pedestrian facility accessible, including structural elements such as bridge piers and buildings. In these limited cases where it may be technically infeasible to install a curb ramp at a specific location, the reason(s) must be documented. Once the Department publishes a Transition Plan, the location can be rated for repairs or identified as a “technically infeasible” curb ramp location following the guidance in that document.

5. Parking spaces shall not obstruct the accessible route associated with a curb ramp location.
6. Positive drainage must be provided to keep water from ponding on curb ramps and in the street along the accessible route.
7. The accessible route shall be along a safe path for pedestrians. Curb ramps shall not be installed where it would be unsafe for any pedestrian to cross due to conditions such as uncontrolled intersections with high vehicle speeds, unsafe sight distance, or physical obstacles that cannot be crossed such as median barriers on multi-lane highways. If it is determined that a safe crossing cannot be provided, then pedestrians shall be routed to a safe, accessible crossing, and the unsafe location shall be constructed with a barrier that will direct pedestrians (including the visually impaired) to a safer crossing. Examples of barriers that could be used at unsafe locations include a double-posted informational sign with two horizontal struts (one between 36 to 42 inches [0.9 to 1.1 m] and the other between 4 to 12 inches [0.1 to 0.3 m] above the ground), shrubbery, a grass strip, railings, bollards, etc. Whatever is used would have to consider detectability by the visually impaired as well as safe roadside design considerations for the clear zone. Locations thought to be unsafe shall be reviewed by DelDOT’s Traffic Section. If the crossing cannot be made safe then the project manager should work with his or her supervisor and assistant director to determine the best solution for the location.

### **Detectable Warnings**

Detectable warnings shall be installed at sidewalk curb ramps and at uncurbed sidewalks at the following locations:

- Crosswalks (marked & unmarked) and designated places where pedestrians cross public roadways (including medians and refuge islands);
- Signalized entrances;
- High volume entrances with ADT greater than about 400;
- Entrances with an operating speed of 25 m.p.h. or greater through the pedestrian area;
- Railroad crossings.

Detectable warnings may also be installed in other areas when determined necessary by engineering judgment. Factors which present a potentially hazardous situation may also be considered, including blind spots, complicated turning movements or other situations in which pedestrians with visual impairments should be signaled to stop. They should not be used at all entrances without consideration of the above criteria, since overuse can cause confusion for pedestrians with visual impairments.

## **Curb Ramp Design Criteria**

### **CURB RAMP GRADE**

The maximum running slope of curb ramps is 12:1. Flatter slopes should be provided where possible. A slope of 14:1 is preferred. Curb ramps in alterations where a 12:1 slope is not feasible may have a maximum running slope of 10:1 for a maximum rise of 6 inches [150 mm].

**CURB RAMP CROSS SLOPE:** The maximum cross slope of a curb ramp is 50:1 (2%).

**CURB RAMP WIDTH:** DelDOT's minimum curb ramp width is 48 inches [1.2 m], but 60 inches [1.5m] is preferred.

**CURB RAMP LENGTH:** Where a 12:1 maximum curb ramp slope will not meet the sidewalk grade within a length of 15 feet [4570 mm] due to a steep adjacent roadway, the curb ramp length may be limited to 15 feet [4570 mm], and the curb ramp slope allowed to exceed 12:1.

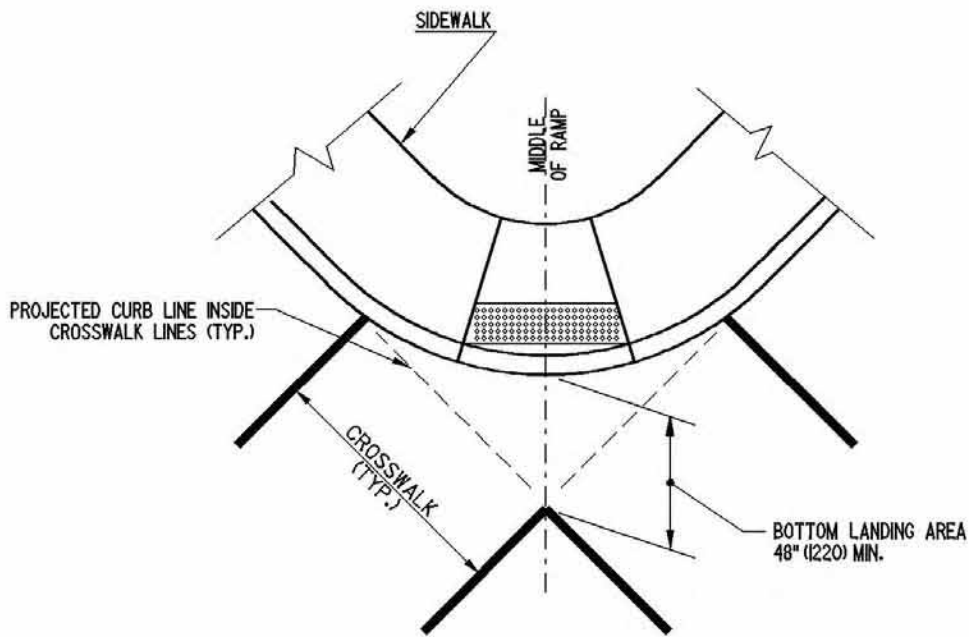
### **LANDINGS**

If turning or maneuvering is required within the curb ramp or landing area, a maximum slope of 50:1 (2%) in any direction must be provided.

The minimum landing area dimension shall be 48 inches [1220 mm] x 48 inches [1220 mm]. If space is not limited by right-of-way or obstructions, the landing area should be 60 inches [1525 mm] x 60 inches [1525 mm].

### **DIAGONAL CURB RAMPS**

Diagonal curb ramps (those placed at the curb radius, DelDOT Type 3) are not preferred when pedestrians will have to change direction in the roadway in order to complete their crossing. While it is recognized that there will be locations where they are the best option (such as at intersections with large turning radii), perpendicular curb ramps (DelDOT Types 2 and 4) are preferred. Diagonal curb ramps are often a good treatment when there are channelizing islands at right turn slip lanes. When diagonal curb ramps are used, a 48 inch [1220 mm] long bottom landing area must be provided between the curb radius and the curb line extensions, which is outside the direction of vehicle travel. (Refer to the figure below.) If this 48 inch [1220 mm] clear distance can not be provided, diagonal curb ramps shall not be used and another type of curb ramp must be provided. This clear distance is not necessary for right turn slip lane and channelizing island configurations or where there is a landing at the bottom of the ramp within the sidewalk.



### **Bottom Landing for Diagonal Curb Ramp**

N.T.S.

**DETECTABLE WARNINGS:** A 24 inch [600 mm] long strip of detectable warnings (truncated domes) must be placed along the fully depressed width of the curb ramp at the transition to the street. Detectable warnings must also be placed at cut-through medians and cut-through islands.

### **CHANGES IN LEVEL**

Transitions from curb ramp to gutter and streets should be flush and free of level changes. There should not be a bump at the gutter flow line or where the curb meets the pavement.

Changes in level up to ¼ inch [6 mm] may be vertical. Changes in level between ¼ inch [6 mm] and ½ inch [12 mm] must be sloped no greater than 2:1. Changes in level above ½ inch [12 mm] must be treated as a ramp and must be sloped at 12:1 or flatter.

### **MISCELLANEOUS**

DelDOT's Sidewalk Policy Implement No. O-02 requires new sidewalk to be at least 60 inches [1.5m] wide except at underpasses and overpasses where new sidewalk must be at least 48 inches [1.3 m] wide. The replacement of existing sidewalk should match the existing with a minimum width of 48 inches [1.3 m]. Designers should review the policy for exceptions to this requirement.

The maximum cross slope of sidewalk is 2% (50:1).

Avoid warped surfaces within the accessible route. Warped surfaces can cause a wheelchair to become unstable by causing a wheel to lose contact with the ground.

The designer needs to consider how curb ramp locations may negatively affect the operation and capacity of vehicular traffic.

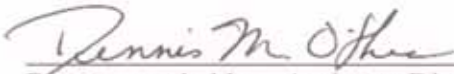
**Given the constraints and varying field conditions, each curb ramp must be evaluated and designed using the guidelines in this memorandum and the Standard Construction Details.**

### III. Justification

To improve pedestrian safety and accessibility and comply with federal law.

Prepared by: Quality Section

Date: 5/2/2006

  
\_\_\_\_\_  
Recommended by: Assistant Director – Design

5/2/06  
Date

  
\_\_\_\_\_  
Approved: Chief Engineer

5/3/06  
Date

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