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Title: **CURB RAMP DESIGN GUIDANCE**

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Approved:

Daniel D'Angelo 5/31/07

Daniel D'Angelo, P.E. — Date
~~Deputy~~ Chief Engineer, Design

ADMINISTRATIVE INFORMATION:

- Effective Date: This Engineering Instruction (EI) is effective with projects submitted for the letting of January 10, 2008.
- Superseded Issuances: No issuances are superseded by this EI.

PURPOSE: To issue curb ramp design guidance.

TECHNICAL INFORMATION:

- The guidance being issued is design guidance that will help in choosing among the various curb ramp configurations on the recently issued Standard Sheets M608-11 and M608-12. The curb ramp configuration details shown on the standard sheets are intended to offer designers several options that will fit the most common design situations encountered on Department projects. Each instance where curb ramps are installed are different, but not every situation requires a custom design. The majority of curb ramp installations fall within levels of grade and right of way parameters that permit using the standard approach of the configurations. However, there will be situations where the standard configurations will not work. For these situations, the new guidance helps to determine when the configurations are not suitable and custom designing may be necessary.
- The configurations are schematic only. The required dimensions that are standard for all curb ramps are found on standard sheet M608-10.

TRANSMITTED MATERIALS: Curb Ramp Design Guidance document is attached.

BACKGROUND: Several reviewers of the recently issued Curb Ramp Standard Sheets identified a need for additional Department design guidance to assist in selecting the alternatives on the Standard Sheets.

CONTACT: Bob Speece, Design Quality Assurance Bureau at (518) 457-0079, or
Email at rspeece@dot.state.ny.us.

Curb Ramp Design Guidance

The information in this section is intended to be used in correlation with the curb ramp configurations that are shown on the Department Standard Sheets M608-11 and M608-12. Curb ramp Types 1 - 13 shown on those sheets illustrate general configurations that are applicable for the majority of design situations. Standard Sheet M608-10 shows the minimum dimensional and geometric standards for curb ramps.

Each curb ramp site has unique characteristics. While many sites will be suitable for the use of at least one of the configurations shown, some situations may require site specific detailing. Modifications to one or more of the configurations may be needed for site specific conditions, or an entirely new design approach may be needed. Additional survey information may also be needed to adequately custom design curb ramps. For instance, spot grades for existing buildings and entrances may be needed when designing curb ramps and adjacent accessible routes in urban or developed locations in order to ensure that the design meets those grades.

Some of the more common challenges encountered when designing curb ramps are limited right of way, urban settings, steep slopes, limited motorist sight distance, pedestrian directionality, and long corner radii. These challenges will affect which configuration can be best used in a given situation (or if any of the Standard Sheet configurations will work).

Drainage may also present challenges where curb ramps need to provide landings or blended transitions (landing areas that may be warped to meet street grade) at the base of the ramp(s). The installation of curb ramps in locations where drainage is not adequate may compound the problem and cause ponding at the base of ramps. It is important to evaluate existing drainage prior to curb ramp installation. It may be necessary to install additional inlets uphill to collect runoff along the curb before it reaches the curb ramp.

Types 1, 3, 5 and 7 are preferred curb ramp types on typical street intersections where they can be built. They allow for separation of the pedestrian access route from the roadway and provision of a snow storage area (the width of the snow storage area may vary, but should be at least 0.6 m). They also provide generally good sight distance for motorists from the stop bar, good pedestrian directionality and are generally adaptable for long and short corner radii. Exhibit 18-16.1 summarizes the information in this Section and shows curb ramp types that are best suited to particular situations.

Type 8 is not a preferred configuration and should be used only when other types are not feasible. This curb ramp configuration may be a cost effective choice, but it requires the greatest width to construct properly and is less safe and convenient for many disabled pedestrians, so its use is not recommended.

Limited Right of Way

- Curb ramp types 2, 4 and 6 can typically be used in situations where available width within the right of way is limited. The reasons for limited width are usually due to adjacent buildings or adjacent steep slopes.
- Types 7 and 8 require about 2.2 m distance from the curb to landing at the maximum 1:12 slope. This may limit their use in some limited right of ways.

Length of Curb Radii

- Curb ramp types 1, 2, 3, 4 and 8 (Type 8 generally is not recommended for use for other reasons that were discussed previously) are best suited for short radii situations, because the crosswalk can be placed in close proximity to the corner. This provides greater sight distance for motorists, especially at intersections without signals where stop bars are placed as close to the intersection as practicable. Motorists coming up to the intersection will have greater visibility of cross traffic from the stop bar. This is more important at unsignalized intersections, due to a greater tendency by motorists to block the crosswalk while waiting for the ability to proceed through the intersection.
- Curb ramp types 5, 6 and 7 are the optimal choices for long corner radii. The elevated curb between ramps helps keep vehicles off of the sidewalk. Types 3 and 4 are suitable in long radius situations, however the depressed curb makes it more likely that vehicles will track over the sidewalk. These two types may also present winter maintenance problems as the depressed corner may allow snowplow operators to misjudge the curb edge and plow over the corner.
- Type 1 can also be used, but the use of this type with longer curb radii may create the potential for standing water in the landing area if drainage is not adequately handled.

Pedestrian Directionality

- Use of curb ramp types 1, 3, and 5, in the optimal situations, allows for continuous straight line (i.e. directional) flow of pedestrian traffic along the sidewalk and to the crossing. They are perpendicular to the curb and minimize surface warping at street level. When there are changes in direction to the accessible route it makes it more difficult for blind pedestrians, wheelchair users and others to navigate the route. See also the discussion in Section 18.7.3.1.
- When using Type 2, consideration should be given to increasing the width of the landing at the base of the ramp. In situations with standard landing width, the placement and alignment of the detectable warning field may make it more difficult for persons using wheelchairs to negotiate the transition from the detectable warning to the street. This is due to one side of the wheelchair entering the detectable warning prior to the wheels on the other side, potentially causing instability. This drawback can be alleviated by orienting the detectable warnings so that they are arrayed parallel with the path of travel.
- When using Type 7 it may be necessary to misalign the sidewalks with the curb ramps, due to the presence of buildings, etc. This misalignment should be kept to the minimum necessary.
- Diagonal curb ramps (Types 4 and 8) directionally misalign the sidewalk and crossing, and require that wheelchair users and vision impaired pedestrians change direction while in the intersection. This increases the time it will take a wheelchair user to cross the street, increasing their exposure to vehicular traffic. These curb ramps can also cause blind pedestrians to become disoriented. There are however, situations where diagonal ramps may be the only or best curb ramp solution. Examples of this are drastically skewed intersections or locations with very steep running grades.

Limited Sight Distance

- Curb ramp types 1, 2, 3, 4 and 8 are the primary choices if there is limited sight distance for motorists caused by street furniture or other appurtenances and if there is no signal control at the intersection. Also, see the Length of Curb Radii discussion above.
- The setbacks of the crosswalks for curb ramp types 5, 6 and 7 limit the sight distance for motorists entering or crossing the perpendicular street. The setback makes it more difficult for motorists to

see pedestrians while they are looking for oncoming motor vehicles. This may be less important at intersections with signals than intersections without.

Intersecting Pedestrian Access Routes

- The pedestrian access routes (PAR) at intersections should maintain adequate space for pedestrians traveling in opposite directions to avoid conflict of paths. The amount of space that can be maintained may be affected by the expected volume of pedestrians, as well as available right of way. Where pedestrian volumes are higher, additional width (over the minimum) should be provided at curb ramp landing(s) to allow for passing.
- Curb ramp types that provide large landing areas at the intersection of PAR's help to lessen conflicts. Larger areas will provide space for pedestrians to better avoid others that are crossing their path. These curb ramp types are 3, 4 and 7.
- In areas with higher pedestrian volumes, curb ramp types 5 and 6 can better provide for intersecting pedestrian movements with larger landing areas that can accommodate queuing of pedestrians. The available space may limit the ability to do this however.

Medians and Crossing Islands

- Curb ramp types 12 and 13 are appropriate choices for median and crossing island applications.

Midblock Crossings

- Curb ramp types 10 and 11 are the best choices for midblock crossings where they can be used.
- The use of Type 9 can result in standing water in the landing along the curb if drainage is not handled adequately.

Steep Running Grades

- Curb ramp types 1, 3, 5 and 7 generally are the best choices for streets with steep running grades. This is due to their more limited area needed for level landings.
- Curb ramp types 1 through 11 usually can be altered to fit the grade of most existing streets. When grades are steep they can be negotiated by many persons with disabilities and curb ramps must be provided.
- If the running grade of the street and sidewalk is greater than 8.33%, the slope of the ramp should be the least necessary to meet back up with the sidewalk grade. The maximum length necessary for a ramp in this situation (where it can be achieved) is 4.6 m.

Exhibit 18-16A Curb Ramp Configurations for Specific Applications

	CURB RAMP CONFIGURATION TYPES												
DESIGN SITUATIONS	1	2	3	4	5	6	7	8	9	10	11	12	13
LIMITED ROW	○	●	◎	●	◎	●	◎	◎	●	○	○	▨	▨
SHORT RADII	●	●	●	●	◎	○	◎	◎	▨	▨	▨	▨	▨
LONG RADII	◎	○	◎	◎	●	●	●	○	▨	▨	▨	▨	▨
PEDESTRIAN DIRECTIONALITY	●	◎	●	◎	●	◎	◎	○	○	●	●	▨	▨
LIMITED SIGHT DISTANCE	●	●	●	●	○	○	○	◎	▨	▨	▨	▨	▨
MIDBLOCK CROSSINGS	▨	▨	▨	▨	▨	▨	▨	▨	◎	●	●	▨	▨
INTERSECTING PAR	▨	▨	●	●	◎	◎	●	○	▨	▨	▨	▨	▨
MEDIANS AND CROSSING ISLANDS	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	●	●
STEEP RUNNING GRADES	●	◎	●	◎	●	◎	●	○	◎	●	●	▨	▨

● BEST SUITED
◎ SUITED, BUT WITH LIMITATIONS
○ LEAST SUITED
▨ NOT APPLICABLE

Note: This chart is intended to help identify at a glance the attributes of the curb ramp configurations. For additional information or guidance in determining which curb ramp configuration to use or for when to custom detail curb ramps, contact the Regional Landscape Architect.