Compliant Curb Ramp Solutions

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Content in this presentation is for information only. Design guidance and Standards for curb ramps can be found on the INDOT website.
Quick Question

Last year INDOT gave an ADA curb ramp presentation here a Road School. One of the items to remember was, “All curb ramps need to be designed and detailed.”

How many admit, having to design a few in the last year, this was a needed change?

In my opinion: INDOT was asking a lot of the Contractors.
Two Items to Remember

- Curb ramps, sidewalks and sidewalk driveway crossings are to be designed to the maximum extent feasible in accordance with the Public Rights-of-Way Accessibility Guidelines (PROWAG).

- If you have questions, want a curb ramp design reviewed, or need help with suggestions for a tough curb ramp, ask the Technical Advisory Committee.

Give time for review and possible coordination time with the committee. It may be best to submit an inquiry or infeasibility request soon after Preliminary Field Check. Time may be needed to work through a request.

LPA Projects do not wait until Stage 3.
Frequently Asked Questions:

- What to do at alleys?
- Do not understand the maximum length of 15 ft for a ramp.
- Can we mix return curbs and flared sides?
- If the existing sidewalk stops before intersecting the street do we still need to construct a curb ramp?
- We do not turn the corner with resurface. Do we still need to review and possibly correct the existing curb ramp?
- What is level?
Frequently Asked Questions:

- In a dedicated Curb Ramp Project, do I have to replace this non-compliant curb ramp?
- Where crossing a steep s-line on a Resurface Project, do we have to reconstruct the s-line to get the proper cross walk cross slope?
- Do I have to worry about the railroad crossing?
- Do all curb ramps need to be designed to preferred cross slopes and running slopes?
Frequently Asked Questions:

- **What to do at alleys?**
  - An alley should be treated like a commercial driveway. (IDM 51-1.03(07) Item #7 & 8, 51-1.04(02) item #5b)
    - Where an alley has a stop sign, yield sign, or traffic signal a curb ramp with detectable warning surface must be used. (604-SDWK-03 Note #2)
      - This is for new construction, reconstruction, and preventative maintenance projects.
    - Where an alley does not have a stop sign, yield sign, or traffic signal a driveway crossing should be used.
      - This is for new construction and reconstruction projects, but should be considered on preventative maintenance projects.
Frequently Asked Questions:

- **What to do at alleys?**

  **Example:**
  - Kouts, IN
  - Small town
  - Completely accessible after the resurface project except for 3 alleys.
  - TAC recommended that the 3 alleys be updated to include sidewalk transitions to allow the entire pedestrian route from north to south be accessible.
Frequently Asked Questions:

- Do not understand the maximum length of 15 ft for a ramp.
  - The ramp with a preferred maximum running slope of 8.0% and preferred maximum cross slope of 1.5% does not need to exceed the length of 15 ft.
  - Outside the 15 ft ramp the sidewalk should be transitioned back to existing sidewalk with a maximum running grade of 2% plus the roadway grade. Within this transition the cross slope should also be transition back to existing cross slope as well.
Frequently Asked Questions:

- Maximum length of 15 ft for a ramp.

One-Way Directional Curb Ramp Profile

- 6" Curb Height
- 15 ft Max. Ramp Length
- 19 ft, at 11% (9% + 2%)
- 9% (Existing Grade)

- 8.0% Preferred
- Sidewalk transition prevents chasing the grade for the ramp.
Frequently Asked Questions:

- Maximum length of 15 ft for a ramp.

This is not correct

The Ramp is not compliant with 1.5% and 5.0% cross slope.
Frequently Asked Questions:

- Maximum length of 15 ft for a ramp.

- Match existing cross slope at the end of the transition.

- Grade of transition should be street grade plus 2.0%.

- Get the ramp to be ADA compliant.

- The transition prevents chasing the grade for the ramp.
Frequently Asked Questions:

- Can we mix return curbs and flared sides?
  - Yes
Frequently Asked Questions:

- If the existing sidewalk stops before intersecting the street do we still need to construct a curb ramp?
  - Short answer, Yes
  - Normally this comes into consideration within a town where the sidewalk stopped between blocks, 10 to 20 ft short of the intersection. In this case placing a curb ramp and highly consider placing sidewalk if it is needed to connect the curb ramp to the existing sidewalk.
Frequently Asked Questions:

- We do not turn the corner with resurface. Do we still need to review and possibly correct the existing curb ramp?
  - Yes
Frequently Asked Questions:

- We do not turn the corner with resurface. Do we still need to review and possibly correct the existing curb ramp?

Curb Ramps Need to be compliant with PROWAG (maximum extent feasible)
Frequently Asked Questions:

- We do not turn the corner with resurface. Do we still need to review and possibly correct the existing curb ramp?

INDOT can not work within Private R/W without purchasing R/W

INDOT can coordinate with a Public R/W agency to work within the Public R/W.
Frequently Asked Questions:

- **What is level?**
  - A slope that is 2.00% Maximum or less.
  - Therefore a level surface is a 2.00% Maximum or less grade in any direction.
Frequently Asked Questions:

In a dedicated Curb Ramp Project, do I have to replace this curb ramp?

- Short answer, Yes.
- If funding is preventing some complicated curb ramps in the middle of the project from being reconstructed to full compliance with PROWAG, reduce the limits of the project from either end. Do not pick and choose though out the project.
Frequently Asked Questions:

- In a dedicated Curb Ramp Project, do I have to replace this curb ramp? (Con’t)
  - The only means by which targeting specific curb ramps could be justified would be if the designer were utilizing the ADA prioritization schedule from the city or town’s ADA Transition Plan and targeting locations by priority.
Frequently Asked Questions:

- Where crossing a steep s-line on a Resurface Project, do we have to reconstruct the s-line to get the proper cross walk cross slope?
  - Where possible, however always consider the scope of the project. Normally the scope of a resurface project is not to completely reconstruct an s-line approach.
  - Quick reminder:
    - Stop sign or yield sign the cross slope of the crosswalk is 2.00% maximum.
    - Signalized the cross slope of the crosswalk is 5.00% maximum.
Frequently Asked Questions:

Turning Space Cross Slope can be 1.50% Preferred

Pedestrian Crossing

2.00% Max

Stop Controlled

Turning Space Cross Slope can be 1.50% Preferred
Frequently Asked Questions:

- Turning Space Cross Slope can be 4.50%
- Preferred Pedestrian Crossing

Diagram:
- Pedestrian Crossing
- 5.00% Max
- Signal Contolled (Non-Stop Controlled)
- Turning Space Cross Slope can be 4.50% Preferred
Frequently Asked Questions:

- Crossing a steep s-line on a Resurface Project, (Con’t)

  Design to the maximum extend possible, keep 2.00% cross slope within the curb ramp where possible then transition to the cross slope required to match the grade of the s-line.

  Also if you happened to notice the border width will be fixed. It is greater than 2”.

This location, the resurface scope does not call for the reconstruction of this s-line. Reconstructing the s-line to accommodate a 2.00% crosswalk cross slope would be outside the scope.
Frequently Asked Questions:

- **Do I have to worry about the railroad crossing?**
  - Yes, this is just as important as a street crossing.
Frequently Asked Questions:

- Do all curb ramps need to be designed to preferred cross slopes and running slopes?
  - Yes
  - Preferred Slopes are 0.5% less than Maximum Slopes.
    - The curb ramp should be designed and detailed in the stamped construction plans with the preferred slope values.
    - Preferred slopes reduce the likelihood of exceeding the maximum allowable slope during construction.
Technical Infeasibility or Inquiry

- What if my curb ramp can not be design to meet PROWAG standards?
- Submit a Technical Infeasibility or Inquiry Request.
  - Technical infeasibility and technical inquiry requests should be submitted to the Director of Highway Design & Technical Services, John Wright.
  - They should be submitted as soon as possible to allow for coordination with the Technical Advisory Committee. Maybe soon after Preliminary Field Check.

A technical infeasibility or inquiry request should be submitted for any curb ramp that is not fully compliant with PROWAG.
Technical Inquiry

- Technical Inquiry Request is appropriate for curb ramp retrofits, e.g. on a resurface project where purchasing right-of-way or moving utilities to fully comply with PROWAG is outside the scope of work.

- PROWAG Question

- Review a Curb Ramp Design
  - The designer should design the curb ramp to the maximum extent possible.
  - The proposed curb ramp should always improve the existing curb ramp.
A Technical Inquiry should be requested for the following:

- General curb ramp question, about the INDOT Standard Drawings, PROWAG, or request for curb ramp design suggestions for a particular location.

- Review of a curb ramp design that is not fully compliant with PROWAG and the location and obstacles preventing the curb ramp from being designed in full compliance with PROWAG are limited by the scope not a physical obstacle that can not be moved, for example a building. So if your obstacle is right-of-way or a utility these can be moved in a future project where as a building may not.
Technical Infeasibility

- Technical Infeasibility Request is appropriate for a curb ramp that cannot be constructed to comply with PROWAG because of an obstacle that cannot be removed, e.g. a historical building.
- The letting date, lack of right-of-way and need for utility relocation do not meet the threshold for infeasibility.
- Technical infeasibility approvals will be rare. No matter what the obstacle is, the designer should try to make the curb ramp better, even if the curb ramp is not fully compliant.
Technical Infeasibility

- A Technical Infeasibility should be requested for the following:
  
  - Review of a curb ramp design that is not fully compliant with PROWAG and the location and obstacles preventing the curb ramp from being designed in full compliance with PROWAG are limited by a physical obstacle that cannot be moved, for example a building. So if your obstacle is right-of-way or a utility an Inquiry should be requested not an Infeasibility.
Curb ramp design can be tricky
- Limited right-of-way
- Steep grades on the mainline or s-line
- Obstructions

The following slides show some of the trickier curb ramp designs that have surfaced within the last year.
Example Curb Ramp Designs:

- Lets admitted it, previous engineers did not make it easy for us!
Example Curb Ramp Designs:

- Timber at back of sidewalk
- Utility pole creating Less than a 3 ft clear width.
- More utilities

The assumption given the location of the utilities and timber was made that INDOT did not own RW behind the sidewalk.
Example Curb Ramp Designs:

After reviewing the right-of-way it was determined that INDOT did have some room to work.
Example Curb Ramp Designs:

The final design a 4 ft clear width was provided at this location.
Example Curb Ramp Designs:

Fence at back of sidewalk

In this case there was not right-of-way outside of the sidewalk. We did have a buffer to work with but it was not needed.
Example Curb Ramp Designs:

The final design both sidewalks were ramped down to a turning space. Basically a modified Depressed Corner Curb Ramp.
Example Curb Ramp Designs:

Entrance to a building

Wide sidewalk

Steep grade on mainline

Only one-way pedestrian crossing needed, across s-line

Steep grade on s-line

In this case there was not right-of-way outside of the sidewalk.
Example Curb Ramp Designs:

- Ramp down to a turning space
- Final design was a modified depressed corner. During the pour, slopes and grades were checked. Some adjustments had to be made during the pour given how close the slopes were to maximums.
- Pedestrian assess as not required across the main line. Flared the sidewalk down.

Turning space
Example Curb Ramp Designs:

Perpendicular Curb Ramp was originally proposed.

This would not have allowed pedestrian movement in this direction.
Example Curb Ramp Designs:

Final design was a modified depressed corner. During the pour slopes and grades were checked. Some adjustments had to be made during the pour given how close the slopes were to maximums and the slope of the intersecting roadways.
Example Curb Ramp Designs:

- Curb Ramp Construction Testimonial

On most of these you can see the amount of sidewalk that we needed to replace in order to make them compliant. Without modifying them and working with the contractor during the installation of the ramps and continually measuring them as they were being poured, we would have had more sidewalk removal and replacing than what we ended up with.
Example Curb Ramp Designs:

- Obstructions
- Two-way pedestrian crossing needed, across s-line
- Steep grade on s-line
- Park
- In this case there was not right-of-way outside of the sidewalk.
Example Curb Ramp Designs:

- Curb to avoid utility pole
- Ramp down to a turning space
- Final design is a modified depressed corner with a curb used to avoid the signal pole.

4 ft clear width

Ramp down to a turning space
Example Curb Ramp Designs:

Union St.  US 231
Example Curb Ramp Designs:

Note Option 1, flared sides should be used because there is walkable surface from the street to the back of sidewalk.

**OPTION 1: Perpendicular Curb Ramp**

Compliant turning space, ramp slope would be greater than 9%.

**OPTION 2: Parallel Curb Ramp**

Existing Sidewalk Edge

**OPTION 3: Partial Parallel Curb Ramp**

Existing Sidewalk Edge

From back of curb to Ex. R/W 4 ft min. is met.
Example Curb Ramp Designs:

OPTION 3: Partial Parallel Curb Ramp

Note, to design this curb ramp correctly it took considering 3 design options. Every location is unique.

CURB RAMP DETAIL
US 231 AND UNION ST - SE CORNER
Example Curb Ramp Designs:
Example Curb Ramp Designs:

6th AVE. - NW QUADRANT
Scale: 1"=10'

TBM 6-NW
North Rim of Traffic Signal Manhole; 14.3 Ft. East of the Back of Walk Intersection
El.=400.00 (Assumed)
Example Curb Ramp Designs:

- Two Ramps, running slope < 8%
- Sidewalk, cross slope < 2%
- Blended Transition, running slope < 5%
- This design is a combination of a Depressed Corner and Blended Transition Curb Ramp
- Flared Side
Example Curb Ramp Designs:
Example Curb Ramp Designs:

15th Avenue SW Quadrant has a building entrance on the corner, has nearly a foot of elevation difference between building entrance and gutter line, and utilities near the corner. Paired perpendicular ramps did not work because of building/building entrance and significant elevation differences. A depressed corner nor a blended transition did not work because of the building entrance at the corner. A diagonal ramp was also analyzed and would not meet both ADA slope requirements and sidewalk turning space from E-W pedestrian traffic to N-S pedestrian traffic. A retrofit was the “best” alternative.
Example Curb Ramp Designs:
Example Curb Ramp Designs:

- Kept this existing edges flush with the pavement outside of the curb ramp to allow pedestrians to get around the utility poles in the sidewalk.

- If return curbs were placed at the back of the curb ramp the clear width would have been < 4 ft.

- The gutter line was raised at the landing to allow water to flow away from the corner of the landing and no additional inlet structure was required. The raised gutter line also allowed for the slopes in the landing to meet ADA criteria and tie into the existing concrete beyond the assumed existing R/W. A return curb could not be used at the back of the curb ramp due to the existing utilities within the sidewalk.
Example Curb Ramp Designs:
Example Curb Ramp Designs:

- Combine a Perpendicular Curb Ramp with Depressed Corner Curb Ramp

- Return curbs were placed at the back of sidewalk to maintain compliant cross slopes and running slopes

- Perpendicular Curb Ramp with Flared Sides

- Flared Sides

- Depressed Corner Curb Ramp
Example Curb Ramp Designs:

Existing curb line curves inward.

Reclaim the curb area if possible.
Example Curb Ramp Designs:

After reclaiming the curb area, paired perpendicular curb ramps could be placed.

Existing curb line curves inward.

Reclaim the curb area if possible.
Example Curb Ramp Designs:

Existing curb line curves inward.

Reclaim the curb area if possible.
Along with reclaiming the curb area, this project had the funds to fix a drainage problem. One inlet was removed and two more added. Moving the drainage structure allowed the midpoint of the curb radius to be raised and the curb ramps to be compliant.

- Existing line curves inward.
- Existing Inlet Removed
- Reclaim the curb area if possible.
Example Curb Ramp Designs:

Pocket Park Surrounded by Roads
Example Curb Ramp Designs:

Pocket Park Surrounded by Roads
Example Curb Ramp Designs:

Parallel Curb Ramp

Depressed Corner Curb Ramp

One step further, the designers coordinated with the city to make the path to the monument accessible as well.
Example Curb Ramp Designs:

Existing Condition the slopes were out of compliance and the DWS was worn down.
Example Curb Ramp Designs:

Originally this was the final reconstructed curb ramp. Placing the raised curb is compliant however, this is a small radius. Drivers were having a hard time making the turn and not hitting the raised curb and the town indicated it may not be the best solution for snow plows. In addition some residents also felt it was a tripping hazard for both pedestrians and bicyclist.
Example Curb Ramp Designs:

The final solution for the corner raised the ramps back up and made sure there was still a curb for the inlet.

The final solution for the corner.
Example Curb Ramp Designs:

The DWS was not placed to serve both directions of pedestrian traffic.

The DWS does not serve this direction of pedestrian traffic.
Placed the DWS where the ramp was flush with the street and it also services both directions of pedestrian traffic.
Two Items to Remember

- Curb ramps, sidewalks and sidewalk driveway crossings are to be designed to the maximum extent feasible in accordance with the Public Rights-of-Way Accessibility Guidelines (PROWAG).

- If you have questions, want a curb ramp design reviewed, or need help with suggestions for a tough curb ramp. Ask the Technical Advisory Committee.
Good or Bad?
NEW!!

General Email for Design Manual Inquiries

DesignManualInquiries@indot.in.gov