Incorporating ADA and APS Work on Traffic Contracts:  
*Design Guidance and Construction Standards*

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Traffic Administration, INDOT  

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Presentation Overview

• Background
• Design Policy
  • Chapter 40 on Design Controls
  • Figure 56-4F on Partial 3R Work (Roadside, Culvert, and Traffic Considerations)
  • Section 502-3.04 (05) on Pedestrian Signals
• Construction Standards
  • Standard Specifications §922.04
  • Standard Drawing Series 604-SWCR and 805-PBBA
  • Recurring Special Provision 805-T-202 (APS with Speech Walk Messages)
• Operations Policy (OM 14-01 on APS Studies)
• Summary
Background

• Americans with Disabilities Act (ADA)
  • Civil rights law enacted in 1990 to provide accessibility in employment, public service, public accommodations, and telecommunications.
• Accessible Pedestrian Signals (APS)
  • A device that communicates information about pedestrian signal timing in non-visual format such as audible tones, speech messages, and/or vibrating surfaces.
• Public Rights-of-way Accessibility Guidelines (PROWAG)
  • **Proposed 2011** PROWAG section on APS
  • **R209.1** Where pedestrian signals are provided at pedestrian street crossings, they shall include accessible pedestrian signals and pedestrian pushbuttons complying with sections 4E.08 through 4E.13 of the MUTCD (incorporated by reference, see R104.2). Operable parts shall comply with R403.
• INDOT APS Policy Statement

  • As an agency, INDOT is committed to implementing the installation of accessible pedestrian signals to ensure that where our pedestrian facilities communicate information, we also include features that provide information in a format that is accessible to individuals who are blind, have low vision, are deaf or have impaired hearing.
• INDOT APS Policy Statement
  • Adopted in January 2014 with concurrence from the FHWA Indiana Division Office.
  • INDOT has not adopted PROWAG with respect to APS. But INDOT will look at each project location to determine if APS is appropriate.
  • A 2014 multistate survey indicated that most state DOT’s (~60%) take a similar approach.
• INDOT APS Policy Statement
  • Requires an APS Study for all new or reconstructed traffic signals with pedestrian signals.
  • Requires an APS Study at existing traffic signals based on a public request for APS at a location.
  • APS studies are to be documented and available for public inspection.
Chapter 40 on Design Controls

- ADA Compliance is a Level One Design Criteria
- Exceptions must be documented under procedures in §40-8.04(01)
- Exceptions are available for:
  - Technical Infeasibility – an existing constraint that cannot be removed or adjusted.
  - Technical Inquiry – an existing constraint makes it impractical within the scope of work to comply.
# Design Policy (IDM Figure 56-4F)

<table>
<thead>
<tr>
<th>Pavement Treatment →</th>
<th>Prevent. Maint.</th>
<th>Functional</th>
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<tr>
<td>Culvert</td>
<td></td>
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<tr>
<td>Extend</td>
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<tr>
<td>Repair and Clean</td>
<td>E</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Replace</td>
<td>E</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Headwalls, Remove</td>
<td>C</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Kerb Edge, Grade and Seed or Sod</td>
<td>E</td>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>

**Guardrail End Treatment,**
- Repair Damaged: A A A
- Replace product not on apprv. list with apprv. prod.: E B B
- Replace type 1 with type MS or OS as required: E A A

**Highway Sign, Replace**
- C C B

**Impact Attenuator,**
- Repair Damaged: A A A
- Replace product not on apprv. list with apprv. prod: E B B

**Linear Grading**
- C C B

**Mailbox,**
- Adjust Mounting Height Where Required: A A A
- Replace Where Required: E B A

**Obstruction-Free-Zone Clearance,**
- Remove Fixed Object > 4 in, Above Ground: C B B

**Pavement Markings and Delineation,**
- Pavement Markings, Place: A A A
- Pavement Markings, Replace: E B B
- Roadside Delineators, Place or Replace: C B B
- Raised Pavement Markers, Place: E B B
- Raised Pavement Markers, Replace: E B B

**Sleu Ditch,**
- Reshape or Riprap: E B B

### Key to work incidental to paving:

A = Item should be included as part of the project.
B = Item may be included.
C = Item should not be included. If it is considered, it should be programmed separately as a spot improvement.

### Notes:
1. Obsolete guardrail should be treated as shown in Section 49-4.02.
2. Treat as described in Section 55-5.04.
3. For example, tree, bush, post, rock, private sign, etc. See Section 55-5.02 for obstruction-free-zone information.

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**PARTIAL 3R WORK**

Roadside, Culvert, and Traffic Considerations

**Figure 56-4F**

(Please refer to the image for this section.)
For Resurfacing Contracts, Design Manual Figure 56-4F provides guidance on when traffic items should be addressed. The guidance varies based on whether the resurfacing is:

- Preventative Maintenance
- Functional – correcting pavement deficiencies such as roughness or poor friction. Corrects distresses caused by traffic or environmental conditions.
- Structural – existing pavement structure has failed due to load related stresses.
Section 502-3.04 (05) on Pedestrian Signals:

• Pedestrian signal indications should be provided on new or modernized traffic signal installations per IMUTCD §4E.03. (a pedestrian or school crossing signal warrant is met or elsewhere based on engineering judgment).

• The use of APS at a location will be based on an APS study conducted by the designer or the district traffic engineer.

• If APS are needed and the pedestrian push buttons for the two crossing directions are less than 10 ft apart a speech walk message is required.
Design Policy (Cont’d)

- Traffic Contracts and Curb Ramp Review

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<th>Curb Ramp Status</th>
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<td>Pedestrian pushbuttons are newly placed, modified, updated, or relocated</td>
<td>Curb ramp review and/or reconstruction <strong>must</strong> be included in the traffic contract</td>
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<tr>
<td>Pedestrian signal heads are newly placed, modified, updated, or relocated</td>
<td>Curb ramp review and/or reconstruction <strong>must</strong> be included in the traffic contract</td>
</tr>
<tr>
<td>No pedestrian pushbutton or signal head work but there is existing sidewalk present in one or more quadrants</td>
<td>Curb ramp review and/or reconstruction <strong>may</strong> be included in the traffic contract</td>
</tr>
<tr>
<td>No pedestrian pushbutton or signal head work and no existing sidewalk</td>
<td>Curb ramp review and/or reconstruction <strong>does not need to be</strong> included in the traffic contract.</td>
</tr>
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</table>
Design Policy (Cont’d)

• APS Studies for Various Project Types

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*Optional unless upgrading the pedestrian signal heads
Construction Standards

- 2018 Standard Specifications §922.04
  - Defines APS and Non-APS Type Push Buttons
  - Standardizes Push Button Sign (R10-3e)
• 2018 Standard Specifications §922.04
  
  • Basic Pedestrian Push Buttons
      Pedestrian push buttons shall be ADA compliant with a red latching LED and audible tone to provide confirmation of an actuation call.
      • Housing: aluminum alloy, powder coated yellow.
      • Latching LED: when push button is activated the LED shall illuminate and remain on until the beginning of the walk phase.
      • Actuator: stainless steel with a minimum diameter of 2 inches, no moving plunger, nominal operating force of 5 lb.
Construction Standards (Cont’d)

• 2018 Standard Specifications §922.04
  • APS Type Push Buttons
    • Audible Features: automatic volume adjustment required up to a maximum of 89 dB.
    • Percussive tone used if the pushbuttons are at least 10 ft apart and a speech walk message is used if the pushbuttons are less than 10 ft apart.
    • Tactile Features: the arrow must be raised at least $\frac{1}{32}$” and must vibrate during the walk interval.
# Construction Standards (Cont’d)

**Standard Drawing E 604-SWCR-01**

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### GENERAL NOTES:

1. All slopes are approximate rather than relative to the sidewalk or roadway grade. Slopes at least 6:12 equals less than the maximum are preferred.
2. Ramps or blended transitions. A ramp or blended transition shall be used to enter or exit the sidewalk or crosswalk at an angle of 6:12 or higher.
3. Turning space. A turning space shall be provided at the top of a pedestrian or ramp, bottom of a pedestrian ramp, or where the pedestrian travel space requires a change in direction. A common turning space may be shared by adjacent�. The turning space shall have a minimum clear dimension of 6 ft. x 6 ft.
4. Plane slop. A plane slope shall be used adjacent to a walkable surface. A plane slope shall have a maximum slope of 10:12 or 45 degrees measured parallel to the back of the curb.
5. Return curb. A return curb shall be placed perpendicular to the roadway curb. A return curb may be used adjacent to a walkable surface. A return curb shall not be used adjacent to a walkable surface.
6. Clear space. A clear space shall provide beyond the bottom grade level of a curb ramp which contains within the crosswalks and is free of the pedestrian travel path. The clear space shall have a maximum clear dimension of 6 ft. x 6 ft.
7. Detachable warning surface. A detachable warning surface shall be placed on each side, high enough, or off crosswalk. A detachable warning surface shall remain in its position until it is pulled out of the curb and then placed the clear width of a ramp, blended transitions, or turning space.
8. Blended transition. The blending slope of a ramp, blended transition, or turning space shall be measured parallel to the direction of pedestrian travel.
9. A blended transition shall have a minimum blending slope of 1:3.0.
10. A blending transition shall have a maximum blending slope of 3.0:1.
11. A turning space shall have a maximum blending slope of 3.0:1.
12. Width. Unless otherwise noted, minimum width of a ramp or blended transition, or turning spaces, exclusive blend slop or return slopes, shall be 4 ft.
13. Grade breaks. A grade break at the top and bottom of a ramp, blended transition, or turning space shall be placed parallel to the curb and side. Grade breaks shall be not to be visible from the curb, blended transition, turning space, or the walk surface. Grade breaks shall be flush. Vertical discontinuity shall be less than 1/16 ft. Where a discontinuity is greater than 1/16 ft. The surface shall be levelled with a slope not greater than 1/16 ft.
14. Cross Slope Discontinuity. The cross slope of a ramp, blended transition, or turning spaces shall be measured perpendicular to the direction of pedestrian travel.
15. The maximum cross slope of a pedestrian street crossing without yield or stop control shall be 2.00%.
16. The maximum cross slope of a pedestrian street crossing with yield or stop control shall be 2.00%.
17. The maximum cross slope of a crosswalk crossing shall be the steepest grade of the adjacent roadway.
18. Objects such as a utility, wall, rail, trees, and grading shall be placed relative to the curb ramp.
19. Curb ramp shall be placed within the marked crosswalk area.
20. Drainage inlet should be located uphigh from a curb ramp to prevent pooling in the path of pedestrian travel.
Perpendicular Curb Ramp

**Construction Standards (Cont’d)**

- **Standard Drawing E 604-SWCR-02**

  ![Perpendicular Curb Ramp Diagram]

  **Notes:**
  1. Where insufficient width between the curb and back of sidewalk prevents a standard perpendicular curb ramp from being provided, a sidewalk transition may be used to lower the sidewalk grade. The sidewalk transition running slope shall not exceed 8.33%.
  2. The running space shall have a minimum clear dimension of 4 ft x 4 ft; however, the running space is determined at the back of the sidewalk. The minimum clear dimension in the direction of the ramp running slope where a standard perpendicular curb ramp is used, a controlled turning space shall have a minimum clear dimension of 5 ft x 5 ft.

  **Legend:**
  - Buffer or Other Non-Walkable Surface
  - Ramp
  - Deflected Warning Surface
  - Turning Space
  - Clear Space

  **Indiana Department of Transportation**
  **Perpendicular Curb Ramp**
  **Typical Placement**
  **September 2016**

  **Standard Drawing No.: E 604-SWCR-02**

  /E/Edward H. Phillips 03/15/21
  Design/Standard Engineer Date

  /H/Holly A. Stoll 03/15/21
  Drawing/Review Engineer Date
Construction Standards (Cont’d)

• Standard Drawing E 604-SWCR-05

One-Way Directional Perpendicular Curb Ramp
Construction Standards (Cont’d)

• Standard Drawing E 604-SWCR-08

Parallel Curb Ramp

NOTES:
1. The bottom edge of the turning space and top of curb shall be flush with the edge of adjacent pavement and gutter line.
2. The turning space shall have a minimum clear dimension of 6 ft x 4 ft and a running slope of 2.00% maximum. Where the turning space is contained at the back of the median, the minimum clear dimension shall be 4 ft x 5 ft, with the 5 ft dimension in the direction of the ramp running line.
3. The curb ramp surface shall be coarse broomed transversely to the running line.
4. Where there is no buffer between the sidewalk and curb, the preferred minimum sidewalk width is 6 ft. Where a buffer is placed between the sidewalk and curb, the preferred minimum sidewalk width is 9 ft. See Standard Drawing E 604-SWCR-08 for cross slope exceptions.

LEGEND:
- Ramp
- Detectable Warning Surface
- Turning Space

INDIANA DEPARTMENT OF TRANSPORTATION
PARALLEL CURB RAMP COMPONENT DETAILS
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-08

[Signatures and dates]
Construction Standards (Cont’d)

- Standard Drawing E 604-SWCR-09

Blended Transition Curb Ramp
Construction Standards (Cont’d)

Other Curb Ramp Designs

Diagonal Curb Ramp
(not allowed for new construction)

Depressed Corner Curb Ramp
Construction Standards (Cont’d)

• Standard Drawing E 805-PBBA-01
Construction Standards (Cont’d)

• Standard Drawing E 805-PBBA-02

NOTES:
1. Where two pedestrian pushbutton assemblies are provided on the same corner or median, the pedestrian pushbutton assemblies should be separated by at least 10 ft, where constraints permit a 10 ft separation, the assemblies should be placed together on the same pole. Where assembly pedestrian signal pushbutton assemblies are closer than 10 ft, the assemblies shall be in accordance with MUTCD 4E.10.
2. A minimum 4 ft minimum clear space shall be provided along a pedestrian pushbutton assembly where a pedestrian pushbutton assembly is placed along a sidewalk. A pedestrian pushbutton assembly should be adjacent a pushbutton clear space.
3. A pedestrian pushbutton assembly should be centered and adjacent to a pushbutton clear space.
4. A pushbutton clear space shall have minimum clear dimension of 4 ft x 4 ft.
5. A pedestrian pushbutton assembly should not be placed more than 1 ft outside this crosswalk.
6. A pedestrian pushbutton assembly should not be placed adjacent a ramp with a running slope greater than 2:1.
7. The distance from the nearest face of a pedestrian pushbutton assembly to the edge of the pavement should be between 6.5 ft and 6 ft and should not be greater than 10 ft.
8. The distance from the nearest face of a pedestrian pushbutton assembly to a grade break should not be less than 1.5 ft.

INDIANA DEPARTMENT OF TRANSPORTATION
TYPICAL PEDESTRIAN PUSHBUTTON ASSEMBLY LOCATIONS
SEPTEMBER 2017

STANDARD DRAWING NO. E 805-PBBA-02

/\David H. Burns/ 10/26/16
DESIGN STANDARDIZATION ENGINEER

/\Mark R. Miller/ 11/8/16
CHIEF ENGINEER
Construction Standards (Cont’d)

• Standard Drawing E 805-PBBA-03
Construction Standards (Cont’d)

- Recurring Special Provision 805-T-202 on Speech Walk Messages

**805-T-202 ACCESSIBLE PEDESTRIAN SIGNALS WITH SPEECH WALK MESSAGES**

*(Adopted 11-22-13)*

Accessible pedestrian push-buttons shall be provided at:

**Name of intersection**

The walk messages used shall be as follows:

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Push-button*</th>
<th>Walk Message**</th>
</tr>
</thead>
<tbody>
<tr>
<td>North leg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South leg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East leg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West leg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Enter “N/A”, or “APS”
** Leave blank, enter “percussive tone” if applicable, or text for speech walk message

(Leave remainder of this form blank if not applicable)

___ (___ leg of intersection)
Walk Message: ___
___ (___ leg of intersection)
Walk Message: ___
Special Instructions: ___
Construction Standards (Cont’d)

• Pedestrian Push Button Cost Information*
  • 2012 Unit Price Averages
    • 805-78370 Pedestrian Push Button = $171 each (avg.)
      Total quantity = 522 units
  • 2015 to 2017 Unit Price Averages
    • APS Unit Price
      805-11817 Pedestrian Push Button, APS = $808 each (avg.)
      Total quantity ~ 328 units installed per year
    • Non-APS Unit Price
      805-78370 Pedestrian Push Button, Non-APS = $310 each (avg.)
      Total quantity ~ 318 units installed per year
  *Note: Cost includes contractor labor and equipment charges in addition to materials
• APS Studies
  • INDOT Operations Memo 14-01 contains the procedures for conducting APS studies.
  • Designers are to conduct the APS Study for signal projects (new alignment or signal modernizations). The designer should conduct the APS Study concurrently with or prior to the preliminary field check.
  • District traffic engineer will conduct the APS Study for external requests from the public and for existing intersections that are to be signalized.
  • A three tiered approach is used for APS studies.
Operations Policy (OM 14-01)

- APS Studies (Cont’d)
  - Three Tiered Approach
    - First Tier factors automatically disqualify location from APS (e.g. no sidewalks, technical infeasibility, etc.).
    - Second Tier factors automatically qualify location for APS (e.g. certain traffic generators, city/town policy, etc.).
    - Third Tier factors are for a full study and include: vehicle traffic, signal phasing, and intersection geometry
Operations Policy (OM 14-01)

• APS Studies (Cont’d)

• Operations Memo 14-01 was revised on March 1, 2018. It contains a revised study report form and a new flow chart.

A. First Tier Criteria
1. Is the intersection a location without sidewalks or that will not have sidewalks if APS are installed? or
2. Is the ambient noise level above 100 dB? or
3. Is a larger signal controller cabinet necessary for APS but infeasible due to right-of-way constraints?

B. Second Tier Criteria
1. Are there relevant traffic generators within 2 blocks of the intersection? or
2. Is there special pedestrian phasing (e.g. exclusive pedestrian phase or leading pedestrian interval)? or
3. Is there demand for APS at the intersection from the visually impaired? or
4. Is the intersection in a community that installs APS at all pedestrian signals by local policy?

C. Third Tier Criteria
1. Any previous requests for APS? or
2a. Is the daytime hourly motor vehicle volume on the minor street < 120 vph for any hour during the day? or
2b. Is the motor vehicle right-turn on red volume > 90 vph for any hour for any approach? or
3. Is there split phasing or protected left-turn phasing? or
4a. Is a crosswalk length > 40 ft? or
4b. Is there a skewed crossing? or
4c. Is a curb ramp radius > 25 ft? or
4d. Is a curb ramp not aligned with crosswalk direction? or
4e. Is there a median with a width > 4 ft? or
4f. Is there a crosswalk slope greater than 5%? or
4g. Is a speed on any approach > 40 mph? or
5. Are bike lanes, a shared use path, or other similar features present? or
6. Is there APS at adjacent intersections? or
7. Are there any additional traffic generators (commercial, government, or similar land uses) within 2 blocks of the intersection? or
8. Are there any other relevant factors (pedestrian crashes, channelized right-turn lane with island, etc.)?

APS is likely recommended if any of the third tier criteria are met unless the weight of the data supports a decision not to install (must document the facts supporting the decision not to install).

APS not recommended, unless otherwise desired.

Study complete, no APS
Study complete, APS recommended
Summary

• Takeaways
  • Existing curb ramps that are not ADA compliant must be upgraded if the pedestrian signal heads or pedestrian pushbuttons will be upgraded on a project.
  • However, an ADA design exception is available under the technical inquiry category if an existing constraint makes full compliance impractical within the scope of work.
  • Designers are to conduct the APS study for signal modernization projects.
Conclusion

Questions?

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