PEDESTRIAN CROSSING TREATMENTS

BEST PRACTICES

Presented by:

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Cody Salo, P.E.
Doug Enderson, P.E., PTOE
Ped Crossing Experience:
• ADA Design-Build
• ADA Inventory & Retrofit
• RRFB
• HAWK
• Equestrian Signal Design
• Accessible Signal Upgrades
• Bulb-Outs
• Shared Use Paths

Cody Salo, P.E.
Ped Crossing Experience:
• RRFB
• HAWK
• Accessible Signal Upgrades
• ADA Transition Plans
• Pedestrian Bridges
• Bulb-Outs
• ADA Training
• Shared Use Paths
THE AGENDA

1. Regulations & Policies
2. Pedestrian Crossing Elements
3. Crossing Treatments
4. Funding Options
5. Questions

DISCLAIMER

IMAGES, PROJECTS, and EXAMPLES have been sourced from many various locations/entities. WE ARE NOT CLAIMING THESE AS OUR OWN!
Manual on Uniform Traffic Control Devices (MUTCD)

- National standards governing all traffic control devices
- Two revisions accepted in 2012
- Ensures uniformity of TC devices
REGULATIONS & POLICY

Americans with Disabilities Act (ADA) 1990

- Prohibits discrimination on the basis of disability by public entities (Title II).
- All publicly-owned intersections/facilities must comply with:
  - Americans with Disabilities Act Accessibility Guidelines (ADAAG) (Title III)
  - Public Rights-of-Way Accessibility Guidelines (PROWAG)

Entities may choose to comply with…
A public entity shall:

“Evaluate its current services, policies, and practices, and the effects thereof, that do not or may not meet the requirements... Identify physical obstacles in the public entity’s facilities that limit the accessibility of its program or activities to individuals with disabilities.”

ADA Transition Planning

- Provides baseline to document steps towards removal of barriers
Public Rights of Way Accessibility Guidelines (PROWAG) 2011

- United States Access Board created proposed guidelines
- Expands and clarifies ADA within context of the public right of way
- Access Board issued a notice in 2013 to include shared use paths
- PROWAG will be enforceable under Title II of the ADA when the Department of Justice adopts it
In the meantime:

Department of Justice

- Alteration vs. Maintenance of Public Right of Way July 8, 2013 Notice

**Alteration**: change that affects or could affect the usability of all or part of a...facility.

**Maintenance**: potholes and seals.

- Alterations trigger the obligation to provide curb ramps

For more information:

https://www.ada.gov/doj-fhwa-ta.htm
Excellent guidance for alterations to existing facilities!

For more information:
https://snohomishcountywa.gov/DocumentCenter/View/12189
PEDESTRIAN CROSSING ELEMENTS

Pedestrian Ramps

Elements:

- Landing
- Ramp
- Detectable Warning Device (DWD)
Pedestrian Ramps

Ramp Types:

- Use Access Board’s Guidelines for ramp type selection
- Designates preferred ramp types based on radii and available right of way
- Rule of thumb:

  Sidewalk is considered standard width if the sidewalk itself or the sidewalk plus the boulevard width is greater than 10 feet
PEDESTRIAN CROSSING ELEMENTS

Signing
- Warning Signs
- Regulatory Signs
- Guide (Way-Finding) Signs

Keep in mind:
- Special sheeting requirements at school crossings.
PEDESTRIAN CROSSING ELEMENTS

Pavement Markings

Pedestrian Types:
- Bars
- Ladders

Vehicular Types:
- Stop Bar
- Yield Line

Other:
- Sharrows
- Green Pavement and Bike Boxes

Note: MDT uses Yield Lines at uncontrolled locations.
PEDESTRIAN CROSSING ELEMENTS

Electrical
- Pedestrian Push Buttons
- Pedestrian Detection
- Pedestrian Indications
- Beacons (Round vs. Rectangular)
- Vehicular Signals

Figure 4E-1. Typical Pedestrian Signal Indications
A - With countdown display
PEDESTRIAN CROSSING ELEMENTS

Things to Consider

- Pedestrian refuge islands
- Chicanes
- Roadway cross slope
- Longitudinal slope
- Sight lines
CROSSING TREATMENTS

Bulb-Outs (aka Curb Extension)
- Better pedestrian visibility
- Parked Cars
- Vegetation
- Buildings/Structures
- Sidewalk Ornaments
- Intersections or mid-block use
- Challenging drainage conveyance
CROSSING TREATMENTS

Bulb-Outs
- Kitty corner intersection application
- Shortens all crosswalks, less $$
- Several styles at intersections

That should be easy to sweep/plow…
CROSSING TREATMENTS

Rail Crossings

- Detectable Warning Device at rail
- Flexible pavement at panels
- Panels are usually 6’ or 8’ long
CROSSING TREATMENTS

Raised Crosswalks

• Better pedestrian visibility
• Corridor Speed Control
• Intersections or mid-block use
• Challenging drainage conveyance

Other thoughts:

• Check design with local first responders!
• Plows love ‘em
CROSSING TREATMENTS

RRFB
Rectangular Rapid Flash Beacon

- Pedestrian activated
- Versatile
- High-visibility
- Intersections or mid-block use
- Solar-powered

FHWA Study:
- 88% compliance rate
CROSSING TREATMENTS

RRFB
Rectangular Rapid Flash Beacon

- Set flash duration based on 3 feet/second pedestrian velocity

Example:
- 2 – 11’ lanes
- 5’ to push button
- 27’ total feet to cross
- \( \frac{27'}{3'}/\text{sec} = 9 \text{ sec} \)

Too much time will lead to compliance issues!
PEDESTRIAN ENHANCEMENTS

FLOWCHART

START

EXISTING CROSSING WARRANTS MARKED CROSSWALK?

YES → ADDITIONAL PEDESTRIAN CROSSWALK ENHANCEMENTS NEEDED? (SEE TABLE 1)

NO → MEETS MUTCD SIGNAL WARRANT 4 (PEDESTRIAN VOLUME)?

YES → CANDIDATE FOR PEDESTRIAN TRAFFIC SIGNAL CROSSWALK (SEE NOTE 1 AND STD DWG SL 17A)

NO → CANDIDATE FOR MARKED CROSSWALK (SEE NOTE 1)

NO → MEETS GUIDELINES FOR INSTALLATION OF PEDESTRIAN HYBRID BEACONS?

YES → CANDIDATE FOR PEDESTRIAN HYBRID BEACONS (SEE NOTE 1 AND STD DWG SL 17B)

NO → CANDIDATE FOR POST MOUNTED FLASHING BEACONS (SEE NOTE 1, STD DWG SL 17C, AND STD DWG SL 17D)

NO → DOES THE POSTED SPEED EXCEED 35 MPH?

YES → CANDIDATE FOR OVERHEAD MOUNTED FLASHING BEACONS (SEE NOTE 1, STD DWG SL 17C, AND STD DWG SL 17D)

NO → END

RECOMMENDATIONS FOR INSTALLING MARKED CROSSWALKS AND ENHANCEMENTS

<table>
<thead>
<tr>
<th>ROADWAY TYPE</th>
<th>ADT &lt; 8,000</th>
<th>ADT 8,000 TO 12,000</th>
<th>ADT 12,000 TO 15,000</th>
<th>ADT &gt; 15,000</th>
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<tr>
<td></td>
<td>36 MPH</td>
<td>45 MPH</td>
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<tr>
<td>TWO LANES</td>
<td>C</td>
<td>C</td>
<td>C</td>
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<td>THREE LANES</td>
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<td>FOUR OR MORE LANES WITH MEDIAN</td>
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<td>C</td>
<td>P</td>
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<tr>
<td>FOUR OR MORE LANES WITHOUT MEDIAN</td>
<td>C</td>
<td>P</td>
<td>N</td>
<td>N</td>
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</table>

D = CANDIDATE SITE FOR MARKED CROSSWALK
P = POTENTIAL FOR ADDING PEDESTRIAN ENHANCEMENTS
N = NEEDS PEDESTRIAN ENHANCEMENTS

USE POSTED SPEED LIMIT
CROSSING TREATMENTS

LED Lighting

- Cost effective and low maintenance
- Enhances safety at crossings with low lighting
- In-Roadway Lighting (IRWL)
CROSSING TREATMENTS

Signalized Intersections

Standard

OTHER NOTABLES:

- Accessible push buttons are audible, vibro-tactile and must be placed at least 10’ apart
- If they are closer than 10’, they must have street-specific messages
Signalized Intersections
Pedestrian Scramble Phase (Exclusive Pedestrian)

- Pedestrian Signal Indication

You thought it was just for places like New York... but they have been discussed in Missoula.
CROSSING TREATMENTS

TOUCAN Traffic Signal
Two groups CAN cross (bikes and peds)

- Pedestrians and cyclists
- Standard signal system for motorists
- Pedestrian-activated
- Recommended for trail or bike boulevard crossings

More information:
https://www.tucsonaz.gov/files/transportation/Crossings_brochure_3-09.pdf
PELICAN Traffic Signal
PEdestrian LIght Control ActivatioN

- Two-stage crossing (median then opposite side)
- Standard signal system for motorists
- Pedestrian activated
- Mid-block use

More information:
https://www.tucsonaz.gov/files/transportation/Crossings_brochure_3-09.pdf
CROSSING TREATMENTS

**HAWK**
High-Intensity Activated CrossWalk

- aka: Pedestrian Hybrid Beacon
- Pedestrian activated
- Intersection or mid-block use
- Best in areas of high pedestrian activity in short intervals along high-volume roads
- 2-lane roundabouts and mid-block
- Dark until activated
CROSSING TREATMENTS

Signalized Intersections
Bicycle-Enhanced

- Separated bicycle lanes
- Bulb-outs for pedestrians
- Being analyzed/considered in Portland, Oregon
Roundabout Intersections
Single-Lane

- Standard ramps with pedestrian refuge at splitter island

OTHER NOTABLES:

5’ wide minimum path at splitter island with at least 4’ between the DWDs
CROSSING TREATMENTS

Roundabout Intersections

Multi-Lane

- HAWK or RRFB at pedestrian crossing of two lanes
- FHWA accepting RRFBs, HAWK has red indication rather than flashing yellow

PROWAG says...

“At roundabouts with multi-lane pedestrian street crossings, a pedestrian activated signal must be provided for each multilane segment of each crossing, including the splitter island.”

MDT informational site:
# CROSSING TREATMENTS

## BUDGET

### How much will it cost?

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Cost Details</th>
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<tbody>
<tr>
<td>Pedestrian Ramp</td>
<td>• $2,000-$3,500 per ramp</td>
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<tr>
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<td>• $8,000 to $16,000 per intersection</td>
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<tr>
<td>Signing</td>
<td>• $300 per sign assembly</td>
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<td>• $1,200 to $1,800 per intersection</td>
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<tr>
<td>Pavement Marking</td>
<td>• $300 per gallon (epoxy)</td>
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<tr>
<td></td>
<td>• $1,300 to $5,000 per intersection</td>
</tr>
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</table>
CROSSING TREATMENTS

How much will it cost?

**Bulb-Out**
- $5,000 per bulb-out
- Total Construction Range: $10,000 - $20,000

**RRFB**
- $16,000 per two-way system
- Total Construction Range: $16,000 - $26,000

**Raised Crosswalk**
- $30,000 per crossing (2-lane)
- Total Construction Range: $30,000 - $50,000
How much will it cost?

**HAWK**
- $60,000 (electrical only)
- Total Construction Range: $60,000 - $100,000

**TOUCAN**
- $100,000 (electrical only)
- Total Construction Range: $100,000 - $200,000

**PELICAN**
- $100,000 (electrical only)
- Total Construction Range: $100,000 - $200,000
Transportation Alternatives

- Competitive grant process, $6.5M awarded for 2017-2018 projects

MDT Contact:
Dave Holien
(406) 444-6118
dholien@mt.gov

For more information:
http://www.mdt.mt.gov/mdt/ta_application.shtml

Safety Funding & Congestion Mitigation and Air Quality (CMAQ)

- Contact MDT if there is an unsafe intersection on a state route in your community

MDT Contact:
Roy Peterson
(406) 444-9252
roypeterson@mt.gov
QUESTIONS