Designing for Individuals who are visually impaired or blind

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Accessible Design for the Blind

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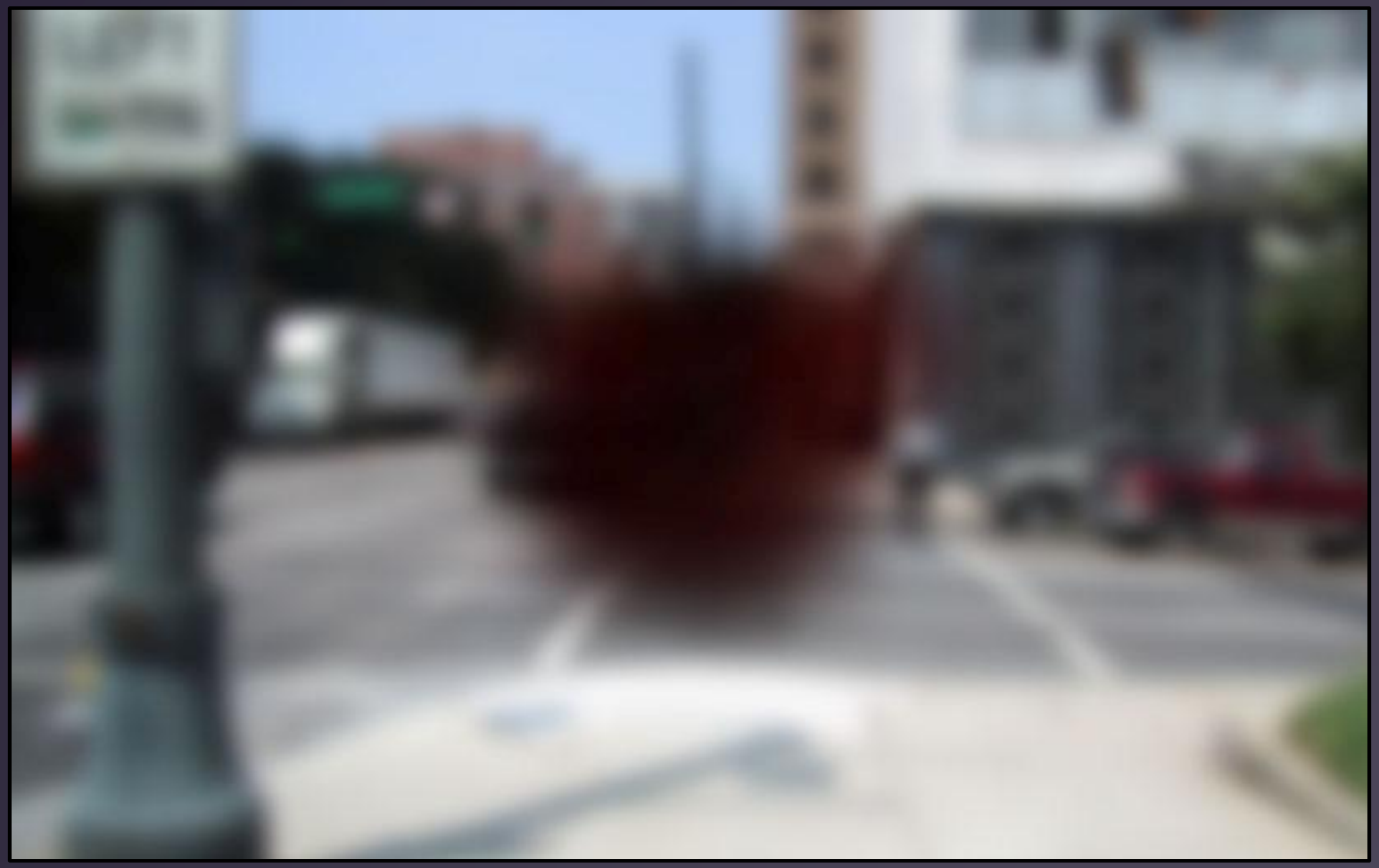
What do we mean by visually impaired or blind?

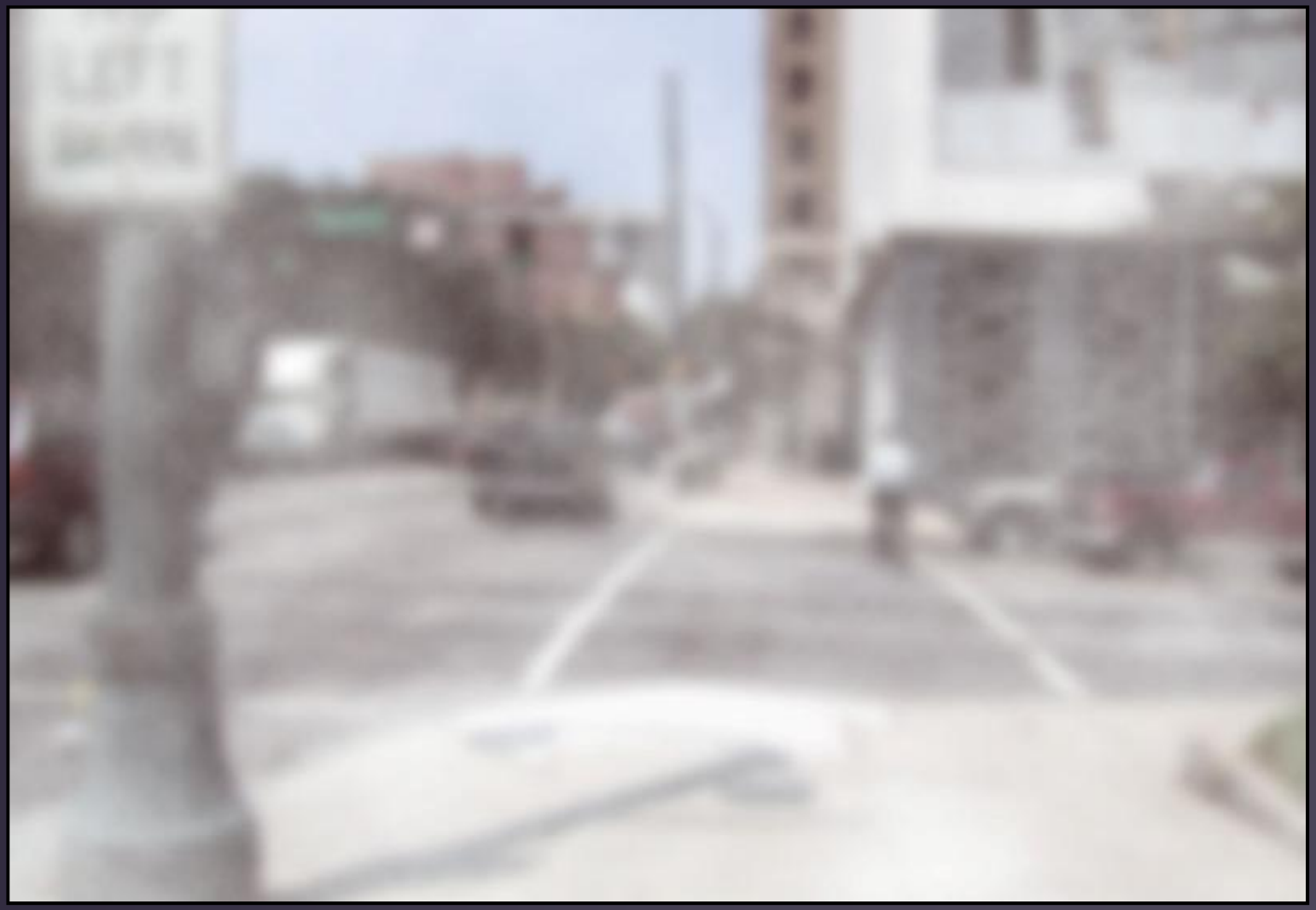
Intersection as seen by someone with “normal” vision

Central vision loss



Peripheral Vision Loss

Overall acuity loss



Totally blind

Pedestrians with low vision (many of our growing elderly population)

- May have difficulty with depth perception
  - Problems in judging location of vehicles
  - Problems in judging approach speed of vehicles
- May have reduced contrast sensitivity
- Difficulty reading signs and signals

How do pedestrians who are blind or visually impaired get around?

Yes! people who are blind do travel independently to new places

- Travel to unfamiliar destinations for shopping, errands, visiting friends, children's activities, work, or other purposes, just like those who are fully sighted
- May have to figure out intersections and intersection crossings when they arrive at them
- May be unaware of changes and may make dangerous decisions when familiar intersections have been changed

Techniques and aids used by individuals who are blind or visually impaired

- Sighted (human) guide
- White cane
- Dog guide
- Telescope or other low vision aids
- No aid

Aids and techniques for obstacle and curb detection

- Long white cane - used as a probe of the walking surface, identification

Aids and techniques for obstacle and curb detection

- Dog guide
  - Guides around obstacles
  - Stops at curbs or drop-offs
- Low vision aid, such as telescope
  - Used only for specific tasks, ie reading sign

Orientation and alignment cues

- Slight slopes and changes in surface textures
- Specific textures that are detectable
- Sidewalk and/or grass line or building line
- Traffic – both parallel to travel path and perpendicular to travel path
- Accessible pedestrian signals
- Other pedestrians, sun, other cues
- Awareness of intersecting streets and general layout of area

Street crossing tasks

- Locate edge of the street
- Determine where to begin crossing (locate crosswalk)
- Establish crossing direction and alignment
- Determine traffic control and use pushbutton, if necessary
- Decide when to begin crossing
- Maintain alignment during crossing

Traditional street crossing strategies

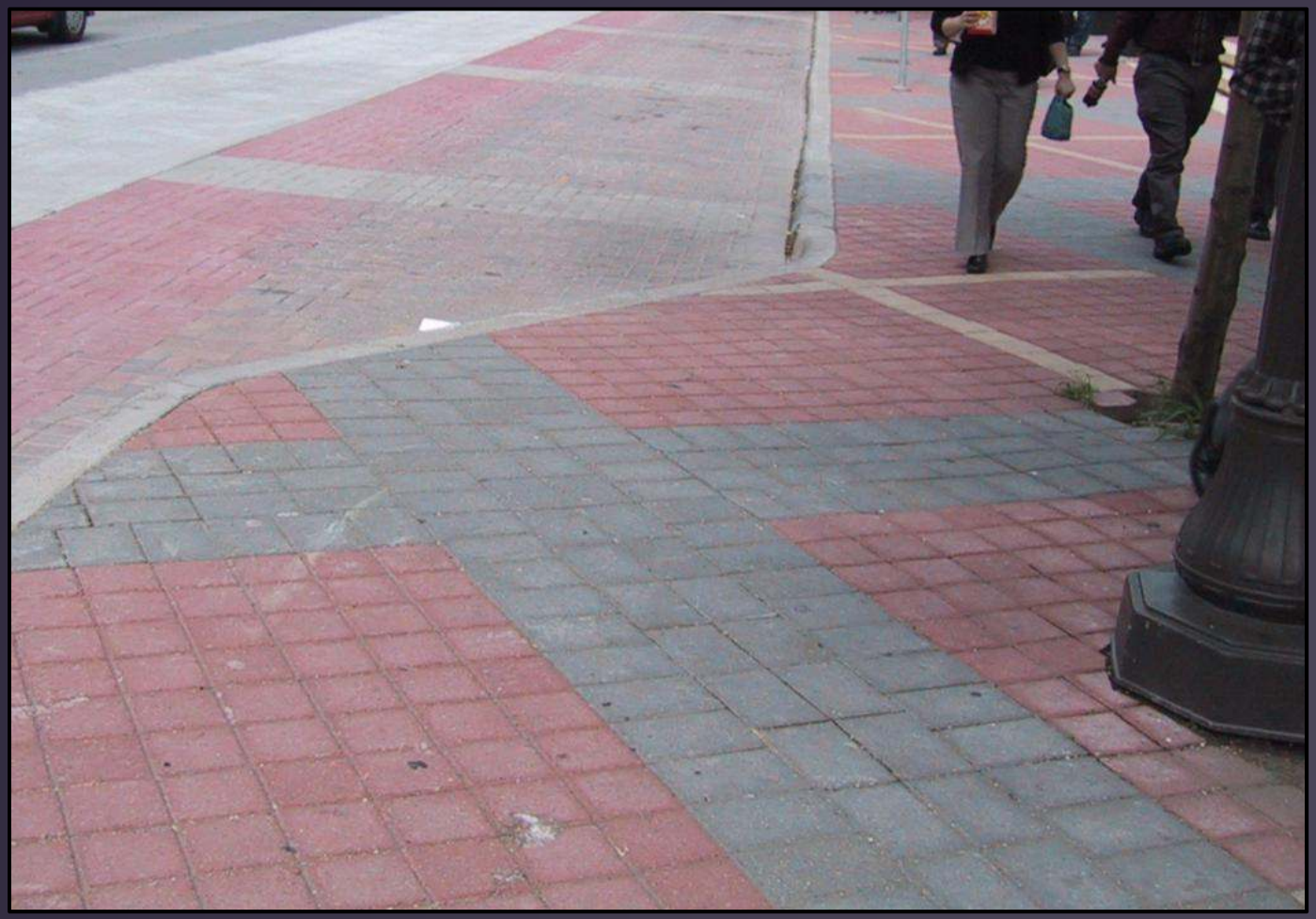
- Walk up to corner
- Maintain travel direction
- Listen through a signal cycle
- Cross with the surge of traffic traveling parallel to crosswalk
- Maintain direction by listening to vehicles and other cues

Designs that make travel safer

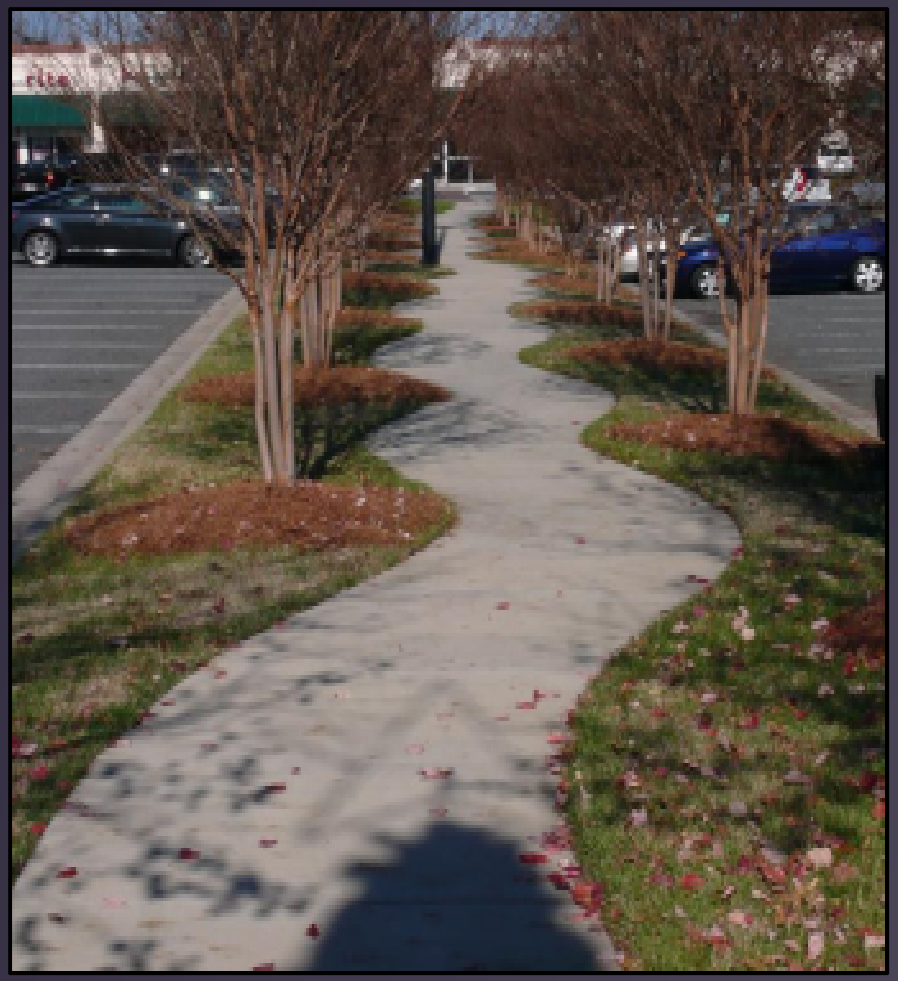
- Additional care is needed make streets and sidewalks accessible to individuals who are visually impaired
  - Sidewalk design features
  - Street crossings and access to information about signals

Sidewalks

Would this sidewalk design be a problem for someone who's visually impaired?



How about this sidewalk for someone who's blind?



Clear straight sidewalk path with grouping of furniture

Avoid obstacles (protruding objects) that cannot be detected by cane

Tree maintenance needs attention

Barrier where crossing is closed

Street crossings

Blended transitions – can't tell where the plaza ends and the street begins

Add detectable warnings (truncated domes) to indicate location of street

NOT detectable warnings

Detectable warning = truncated domes

Crosswalk offset from corner can be problematic

Provide guidance to crosswalk

Crosswalk in line with sidewalk

Potential treatments – wayfinding

- Design of sidewalk
- Tactile features or fences
- Sound cues from audible signals

Signal features intended to help pedestrians may not be usable without accessible pedestrian signals

- LPI
- Exclusive pedestrian phases, including at midblock crossings
- Protected left turns
- Pedestrian pushbuttons

Traffic cues may not be available or usable where there are:

- Low volumes of traffic parallel to crosswalk
  - Crossing major street
  - T intersections (crossing top of T)
- Exclusive pedestrian phases
- Leading pedestrian intervals
- Heavy turning traffic volumes
- Masking sounds

Pedestrian Pushbuttons

- Is there a pushbutton?
- Where is it?
- Have I found the pushbutton for the street I'm crossing?

Access may be provided by Accessible Pedestrian Signals (APS)

- Features of new APS
  - Speakers at the pushbutton
  - Pushbutton Locator tone
  - Audible and Vibrotactile Walk indications
  - Tactile arrow
  - Automatic volume adjustment

Pushbutton-integrated APS

- Pushbutton locator tone during FDW and DW
- Rapid tick WALK indication

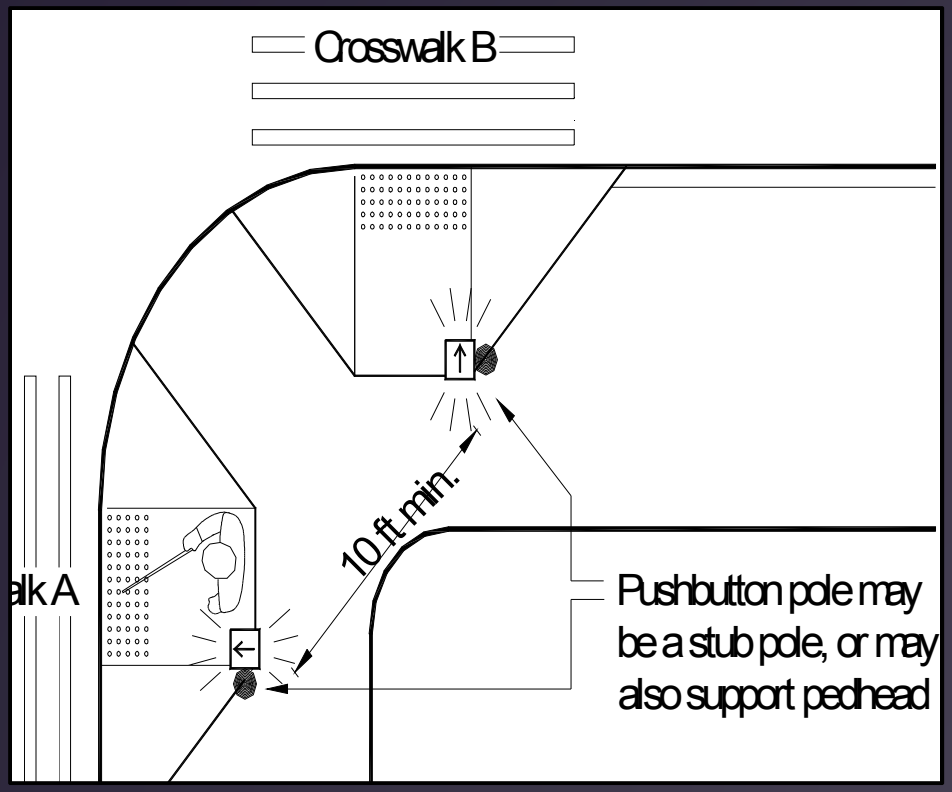
Pushbutton-integrated APS

- Pushbutton locator tone during FDW and DW
- Speech WALK indication

APS Location is critical

- Provide information to the user through proximity to the departure point
- Signal can be quieter due to proximity

Installation recommendations



- Beside the landing of the curb ramp
- Separated by more than 10 feet from other APS on corner
- Nearest the crosswalk line furthest from the center of the intersection

Installation example - APS aligned with crosswalk lines

Reachable from level landing, within 10 ft of curb, within 5 feet of crosswalk lines

Modifications that make programs and facilities accessible to pedestrians who are blind or who have low vision are helpful to **ALL** pedestrians

Questions??

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