Intersection and Crossing Design Elements[10]

Type: Crosswalks and Crossings[11]

Definition

Marked crosswalks should be applied where pedestrian traffic is anticipated and encouraged. Where vehicle speeds and volumes are high and pedestrian access is expected at regular intervals, signalized crossings preserve a safe walking environment. Where anticipated pedestrian traffic is low or intermittent, or where vehicle volumes are lower and pedestrian crossings shorter, designers may consider the use of crossing treatments such as medians, hybrid or rapid flashing beacons, or raised crossings and intersections. Crossings can also be applied midblock where there is significant pedestrian travel.

Purpose

Safe and frequent crosswalks support a walkable urban environment. While application of crosswalk markings alone is not a viable safety measure in all situations, crosswalks benefit and guide pedestrians.

Additional Guidance

- Reference: NACTO's Urban Bikeway Design Guide.
- On streets with higher volume (>3000 ADT), higher speeds (>20 mph), or more lanes (2+), crosswalks should be the norm at intersections.
- At schools, parks, plazas, senior centers, transit stops, hospitals, campuses, and major public buildings, marked crosswalks may be beneficial regardless of traffic conditions.
- Pedestrian safety islands and median refuge islands can be applied to reduce exposure time.
- Raised crossings can increase visibility, improve yielding behavior, and create a safer crossing environment.
- Active warning beacons can be used to enhance active transportation users visibility.
- Title II of the Americans with Disabilities Act (ADA) requires that newly constructed or altered street level pedestrian walkways contain curb ramps or other sloped areas at intersections to streets, roads, or highways. (28 CFR 35.151(i)). [12]

Local Examples

- Aurora Ave N and 92nd Street in Seattle.
- Pike Street and 1st Ave in Downtown Seattle.
- 46th Ave S and S Henderson St in Seattle.
- RRFBs at Hewitt Ave/Pine St in Everett.

[10] Some of the facility types and treatments included in the typology currently require Interim Approval by the FHWA. More information is available here.

[11] For purposes of this typology, this definition only refers to marked crosswalks and crossings.

[12] More information on ADA requirements for curb ramps available here: U.S. Department of Justice. (2010). 2010 ADA Standards for Accessible Design.

Type: Bicycle Intersection Treatments

Definition

The configuration of a safe intersection for bicyclists may include elements such as color, signage, medians, signal detection, and pavement markings. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, whether bicycle facilities are intersecting, the adjacent street function and land use.

Purpose

Designs for intersections with bicycle facilities should reduce conflict between bicyclists (and other vulnerable road users) and vehicles by heightening the level of visibility, denoting a clear right-of-way, and facilitating eye contact and awareness with competing modes. Intersection treatments can resolve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals.

Additional Guidance

- Reference: NACTO's Urban Bikeway Design Guide.
- Intersection treatments for bicycles can include:
  - Bike boxes
  - Intersection crossing markings
  - Two-stage turn queue boxes
  - Through bike lanes
  - Combined bike lane/turn lane
  - Protected bike lane intersection approach
  - Protected Intersections
  - Leading Bike Intervals

Local Examples

- South 21st St & Fawcett Ave in Tacoma.
- Pacific Ave and Burwell St in Bremerton.

Type: Pedestrian Signals

Definition

There are many types of pedestrian signals. In general, fixed-time signals are the standard in urban areas for reasons of regularity, network organization, predictability, and reducing unnecessary delay. In certain, less-trafficked areas, actuated signals (push buttons, loop detectors) may be appropriate.

Purpose

Managing traffic signals is important because signals directly impact the quality of the transportation system. While geometric enhancements to a corridor may demarcate space for active transportation users and buses to create a more multi-modal cross-section, signal timing influences delay, compliance, safety, and mode choice.

Additional Guidance

- Reference: NACTO's Urban Bikeway Design Guide.
- Pedestrian signals at intersections can include:
  - Fixed and actuated signalizations
  - Leading Pedestrian Intervals (LPI)
  - Hybrid beacons (including HAWK signals)
  - Pedestrian scrambles
  - Accessible Pedestrian Signals (p. 1330-27)

Local Examples

- Pedestrian signal at 18000 Aurora Ave in Shoreline.
- HAWK signal at 21000 68th Ave S (W Valley Highway) in Kent.

Type: Bicycle Signals

Definition

Bicycle signals and beacons facilitate bicyclist crossings of roadways. Bicycle signals are traditional three lens signal heads with green-yellow and red bicycle stenciled lenses that can be employed at standard signalized intersections and Hybrid Signal crossings. Flashing amber warning beacons are utilized at unsignalized intersection crossings. Push buttons, signage, and pavement markings may be used to highlight these facilities for both bicyclists and motorists.

Purpose

Bicycle signals make crossing intersections safer for bicyclists by clarifying when to enter an intersection and by restricting conflicting vehicle movements.

Additional Guidance

- Reference: NACTO's Urban Bikeway Design Guide.
- Determining which type of signal or beacon to use for a particular intersection depends on a variety of factors. These include speed limits, average daily traffic (ADT), anticipated crossing traffic, and the configuration bicycle facilities.
- Signal detection and actuation is critical for alerting the signal controller of bicycle crossing demand on a particular approach.
- Bike scrambles are also sometimes used to mitigate intersection conflicts.

Local Examples

- 2nd Ave in Downtown Seattle.
- 6th St and Washington Ave in Bremerton.
- Bike signal at California St/Broadway in Everett.

Intersection and Crossing Design Elements[10]

Type: Pedestrian and Bicycle Bridges and Tunnels[13]

Definition

Pedestrian and bicycle bridges and underpasses separate pedestrians and bicyclists from vehicular traffic and allow for safe, uninterrupted pedestrian and bicycle traffic flow. They are most appropriate for crossing a freeway or other high-speed, high-volume arterial street or rail-line.

Purpose

Pedestrian and bicycle bridges and tunnels are sometimes appropriate to improve street or route connectivity or provide routes over or under roadways. Overpasses and underpasses are most appropriate when people would otherwise be forced to cross freeways or major multi-lane, high-speed arterial streets to travel. There are also situations where pedestrian signals are not warranted and/or feasible and overpasses and underpasses may be useful during these times.

Additional Guidance

- Reference: Safe Routes to School Guide.
- Bridges are best suited in areas where the topography allows for a structure without ramps.
- Underpasses work best when they can be designed to feel open, well-lit, and safe.
- Both bridges and underpasses should be accessible to all pedestrians, including those in wheelchairs.

Local Examples

- John Lewis Memorial Bridge in Seattle.
- Union Street Pedestrian Bridge in Seattle.
- Amgen Helix Pedestrian Bridge in Seattle.
- Grand Ave Park Bridge in Everett.

[13] Definition was sourced from the National Center for Safe Routes to School (SRTS) Guide (SRTS, 2015).