

Median U-Turn Intersections

Median U-Turn (MUT) intersections refer to any intersection replacing direct left turns at an intersection with indirect left turns that rely on a U-turn/right-turn combination.

Design Features

- Direct left turns are prohibited from either or both major and minor roads.
- Conventional through movements and right turns are allowed from both the major and minor roads.
- The main intersection can operate with fewer traffic signal phases through the elimination of direct left turns.
- Install overhead lighting to illuminate bikeway and pathway networks and in advance of all intersection crossings.

Benefits

- MUT intersections reduce the overall number of vehicular conflict points and present all users with fewer conflicting movements to cross at a time.
- The main intersection is signalized but requires fewer traffic signal phases than a traditional intersection due to the elimination of direct left turns, facilitating shorter traffic signal cycle lengths and less delay.
- Fewer turn lanes reduce the number of conflict points and lower pedestrian and bicyclist exposure. A large median provides more refuge (though it may increase total crossing distance).
- There is an opportunity to increase connectivity when controlled midblock crossings are incorporated with the downstream U-turn intersections.



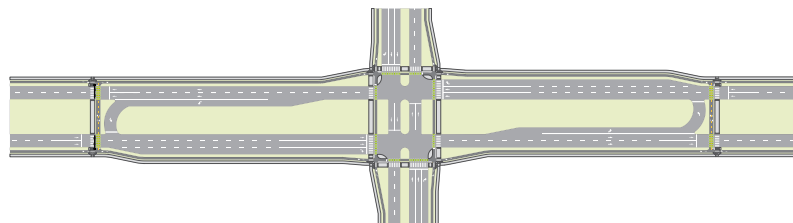
All graphics source: FHWA



Intersection Types

SEPARATED BIKE LANE

This design features separated bike lanes parallel to the sidewalks and a protected intersection design. There are marked crosswalks and green colored pavement in the bike lanes through the intersection. The downstream U-turn intersections incorporate midblock crossings with signal control.

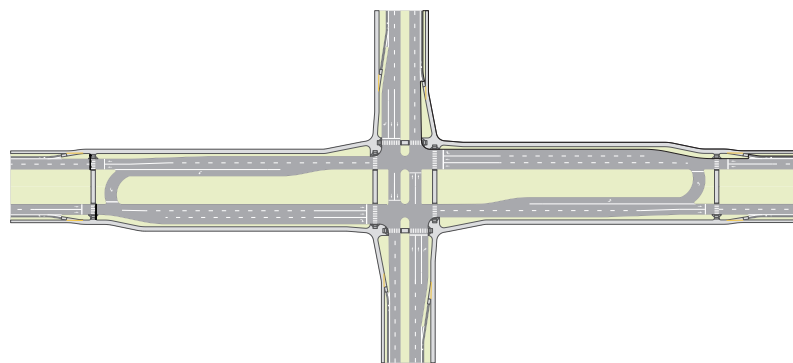


CONSIDERATIONS

- The major road crossing may be times as a two-stage crossing for pedestrians. Consider timing as a one-stage crossing for bicyclists to reduce delay.
- Rectangular Rapid Flashing Beacons (RRFBs) or Pedestrian Hybrid Beacons (PHBs) may also be considered at the midblock crossings as appropriate.

SIDEPATH

This design features sidepaths through the intersection. On-street bike lanes merge with the sidewalk using ramps upstream of the U-turn intersections. The downstream U-turn intersections incorporate midblock crossings with signal control.

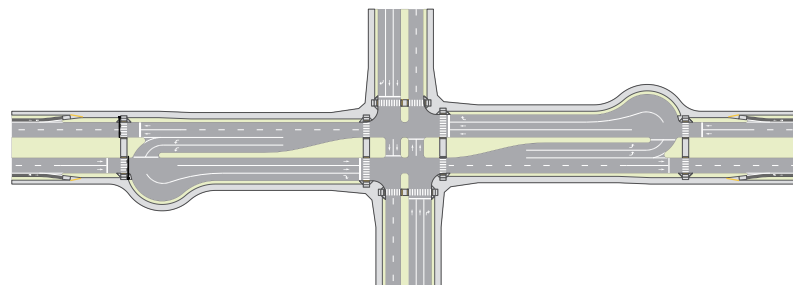


CONSIDERATIONS

- Rectangular Rapid Flashing Beacons (RRFBs) or Pedestrian Hybrid Beacons (PHBs) may also be considered at the midblock crossings as appropriate.
- It is important to design the width of shared paths, crosswalks, medians, and queuing areas to accommodate groups of people of all abilities.
- Shared facilities may be appropriate even where only low volumes of bicyclists and pedestrians are expected to use the intersection under present and future conditions.

SIDEPATH WITH BULB

This design features sidepaths along with U-turn bulbs, or "loons," at the U-turn intersections. These allow vehicles, especially large trucks, to make U-turns while minimizing the necessary median width (and thus reducing the overall intersection footprint).



CONSIDERATIONS

- The narrowed median decreases pedestrian and bicyclist crossing distance while still providing refuge.
- The sidepath follows the curve of the bulb-out, and changes in direction of travel are a design consideration for bicyclists or pedestrians with disabilities. However, the separation between the sidepath and the travel lanes, usually landscaping of some kind, helps provide some contrast and non-visual guidance along the perimeter of the bulb-out.

References

Reid, J., Sutherland, L., Ray, B., Daleiden, A., Jenior, P., & Knudsen, J. (2014). Median U-Turn Informational Guide [FHWA-SA-14-067]. Federal Highway Administration, Washington, DC. Retrieved from <https://safety.fhwa.dot.gov/intersection/rltci/fhwasa14069.pdf>.

FHWA (2020). Proven Safety Countermeasure: Reduced Left-Turn Conflict Intersections [FHWA-SA-18-048]. Federal Highway Administration, Washington, DC. Retrieved from <https://safety.fhwa.dot.gov/intersection/rltci/fhwasa18048.pdf>.



U.S. Department of Transportation
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For more information refer to *Improving Intersections for Pedestrians and Bicyclists Informational Guide* [FHWA-SA-22-017].