



Traffic Signal Design Manual

ORIGINATOR Director, Bureau of Traffic Operations		3-4-3
CHAPTER 3	Project Scoping Process & Geometric Design Considerations	
SECTION 4	Operational Considerations	
SUBJECT 3	Pedestrian Phasing	

Due to the impacts on the geometric design, ADA requirements, signal placement, and potential impacts on capacity analysis, system analysis and signal timing, accommodating pedestrians *should* be explored early in the scoping process. The geometrics of signalized intersections **shall** be designed to accommodate pedestrian traffic now and in the future, however discretion *should* be exercised when determining where to install ped phases. To determine when to install pedestrian signal heads and push buttons refer to TEOpS 4-4-3 for pedestrian signal warrants. The surrounding area *should* be surveyed for schools, elderly and disabled housing, multipurpose trails, parks, and developments which *may* generate pedestrian traffic to help identify the need for pedestrian signals.

If it is determined that pedestrian phasing will be installed, early consideration *should* be given to the manner in which the pedestrian movement will be called. In most instances, a pedestrian push button *should* be installed to allow for on-demand call of a pedestrian phase. This is typically applicable to pedestrian movements across the mainline street and *may* also be applicable to pedestrian movements across the side street, especially at an isolated intersection. Calling pedestrian phase by push button increases the efficiency and decreases the delay and driver frustration by minimizing the number of times that the pedestrian phase is activated.

It is also possible to call the pedestrian phase each cycle by putting the phase on pedestrian recall. Typically pedestrian recall is the preferred application in downtown areas or where there is high transit usage where the pedestrian volumes are high and consistent. It is usually a function of pedestrian demand and the ability or need to implement the necessary timing parameters to accommodate pedestrians on a constant or call basis.

Pedestrian clearance time (don't walk time) *should* always be sufficient for pedestrians to cross the entire approach especially at fully actuated isolated signals with push buttons. When pedestrian phase(s) are being added to an existing signal that operates in coordination or a new signal that will operate in coordination, it is important to assess the impact on the cycle length. If a signal is pre-timed or operates in coordination there *may* be some constraints against providing the entire pedestrian clearance every cycle. Ideally the cycle length *should* be long enough to accommodate all ped phases every

cycle. However, at large intersections this *may* lead to extremely long cycle lengths, excessive delays, long queues and a decrease in LOS.

Depending on the controller type used, the timing can be set up to allow the controller to go out of coordination when a pedestrian phase is actuated. It will take several cycles to get back into coordination. This allows for the full pedestrian clearance to be provided and a feasible cycle length. Routine pedestrian actuations at a signal in a coordinated system *may* not allow for proper coordination.

An exclusive pedestrian phase (Barnes Dance) is not typically used., If an exclusive pedestrian phase is being considered for use, it shall be approved by the Regional Traffic Engineer.

Channelized Right-turns

If a pork chop island exists, the recommended practice is to cross pedestrians from the radius to the pork chop island, then cross the mainline or side street.

For single lane channelized right turns that are not signalized (STOP, YIELD or free-flow conditions), pedestrian signals **shall not** be used. Pedestrian signals *should* be considered at crossings of channelized right turns movements that are signalized. In that case, particular attention *should* be given to the placement of vehicular signal indications and whether those signals are readily viewable for the benefit of the pedestrian.

Two-stage Crossings

Per *MUTCD* 4E.06 where the pedestrian clearance time is sufficient only for crossing from the curb or shoulder to a median of sufficient width for pedestrians to wait, median-mounted pedestrian signals (with pedestrian detectors if actuated operations is used) **shall** be provided and signing such as the R10-3d sign **shall** be provided to notify pedestrians to cross only to the median to await the next WALKING PERSON (symbolizing WALK) signal indication.

ADA requirements **shall** be considered when designing two-stage pedestrian crossings.

At any intersection with medians where a pedestrian could become stranded pedestrian push buttons *should* be placed in the median.

T-Intersections

It is recommended to place pedestrian crossings on the right side of a T-intersection to reduce the likelihood of left turning vehicles conflicting with pedestrians occupying the crosswalk on the receiving approach, as shown in Figure 1.

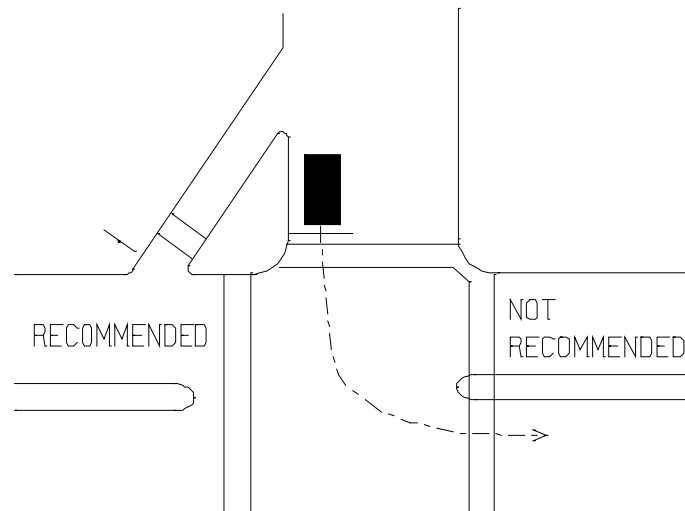


Figure 1. Pedestrian crossings at T-intersection

Visually Impaired Pedestrians

An engineering study *should* be conducted upon request for special accommodations for visually impaired pedestrians. Wide streets, right turn on reds, and complex signal operations are some of the factors that make it hard for visually impaired pedestrians to cross signalized intersections. Refer to MUTCD 4E.09 for guidance on when to install Accessible Pedestrian Signals for visually impaired.

Temporary Signals

Refer to TSDM 3-4-9, Temporary Signals for pedestrian accommodations during temporary signals.

Bicycle Phasing

Bicycles *should* be treated as pedestrians or vehicular traffic depending on the type of user. If bicyclists that use pedestrian facilities request detection, then other pedestrian devices such as pedestrian signal heads, *should* be installed,. For guidance on bicycle detection methods see Chapter 8, Detector and Controller Logic.