

PBOT

PORTLAND BUREAU OF TRANSPORTATION

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CITY TRAFFIC ENGINEER DIRECTIVE

Number	Supersedes	Effective Date	Cancellation Date
LW-003	New	12/11/2019	
Subject		Issuer	
Half Signals		Lewis Wardrip, P.E., City Traffic Engineer	

PURPOSE:

Provide guidance on half signals and their location-based suitability.

BACKGROUND:

PBOT uses half signals to protect pedestrian and bicycle crossings at intersections with high volume roadways, typically along pedestrian and bicycle routes to schools, and near transit stops. Existing research, summarized in the Companion to this Directive, finds that half signals result in similar compliance and crash rates to fully signalized locations.

As of 2019 the Portland Bureau of Transportation (PBOT) maintains 47 half signals, most of which were installed in the 1970s. A full traffic signal often is not warranted at these intersections, and/or adding a full signal could attract motor vehicles trips to the residential street which would not be compatible with the City's Transportation System Plan designation for local service traffic streets.

By definition, half signals include the following features:

- Major streets are controlled by regular red-yellow-green vehicle indications;
- Marked crosswalks are provided across the major street and controlled by regular walk-don't walk pedestrian indications, and
- Minor streets are controlled by stop signs.

Portland half signals generally feature two pedestrian crossings. Major street signals remain green and the pedestrian head shows a solid don't walk unless a pedestrian or bicyclist places a call to initiate the pedestrian phase. This changes the vehicle signal to a red indication and provides a walk indication on the pedestrian signal.



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DIRECTIVE:

Under the authority of Portland City Code 16.10.200 B., the City Traffic Engineer regards half signals as compliant with the Manual on Uniform Control Devices (MUTCD) because MUTCD Section 4D.34 provides that STOP signs at signalized intersections are allowed when an extremely low potential for conflict exists with a minor street within the intersection.^{1 2} To maintain an extremely low potential for conflict, PBOT installs half signals at locations where major streets intersect minor streets with low volumes, and may prohibit left turns and/or through movements to and from minor streets.

PBOT generally relies on the following resources for determining appropriate pedestrian/bicycle crossing traffic control devices:

- The Manual on Uniform Traffic Control Devices (MUTCD)
- City of Portland Pedestrian Crossing Installation Guidelines³
- National Highway Cooperative Research Program (NCHRP) Report 562

PBOT follows the MUTCD 2009 Edition to evaluate the appropriateness of half signals:

- Section 4C.01 Studies and Factors for Justifying Traffic Control Signals
- Section 4D.34 Use of Signs at Signalized Locations
- Section 4F.01 Application of Pedestrian Hybrid Beacons

Further discussion of the evaluation of the appropriateness of half signals is provided in the *Criteria* section below.

CRITERIA:

Portland considers half signals at locations where NCHRP Report 562 indicates that the traffic control for a pedestrian/bicycle crossing should include a circular red indication for motor vehicles on the major street at the crossing location.

Half signals are recommended at locations:

- Where major streets intersect minor streets and the minor street has an approximate average daily traffic (ADT) volume of 1,500 motor vehicles or less. This is in line with PBOT's guidelines for Neighborhood Greenways that aim to limit vehicle traffic to 1,000 ADT (ideal), 1,500 ADT

¹ City of Portland Charter, Code and Policies. 16.10.200 Duties of the City Traffic Engineer.

<https://www.portlandoregon.gov/citycode/article/227045>.

² Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition Chapter 4D. Traffic Control Signal Features. Section 4D.34. Use of Signs at Signalized Locations. <https://mutcd.fhwa.dot.gov/hlm/2009/part4/part4d.htm>.

³ Crosswalk guidelines for Portland. <https://www.portlandoregon.gov/transportation/article/594882>.



(acceptable) or 2,000 ADT (maximum).⁴ At new half signal locations where the major street is a multilane roadway (four or more vehicle lanes), the minor street should be restricted to right-in, right-out motor vehicle movements only (i.e. motor vehicle left-turns to and from the minor street should be prohibited with physical barriers such as concrete median islands).

- That meet *MUTCD Section 4F.01 Application of Pedestrian Hybrid Beacons* guidelines to determine appropriate locations for pedestrian half signals.⁵ These guidelines rely on the following factors: major street vehicle speeds, major street volumes, and major street crosswalk lengths, as well as pedestrian volumes crossing the major street.
- Where an engineering study finds that the intersection of the major street and the minor street does not meet MUTCD Warrants in Section 4C.01 Studies and Factors for Justifying [full] Traffic Control Signals. And/or a full signal could attract motor vehicles trips to the minor street which would not be compatible with the City's Transportation System Plan designation for local service traffic streets.
- At locations where the use of stop signs to control low volume approaches is supported by the MUTCD in Section 4D.34: Use of Signs at Signalized Locations, which notes that STOP signs shall not be used in conjunction with any traffic control signal operation unless a minor street or driveway is located within or adjacent to the area controlled by the traffic control signal and an extremely low potential for conflict exists.⁶

Existing research suggests that when there are low traffic volumes on the minor street and the minor street is controlled by STOP signs, extremely low potential conflict exists.⁷

Please see *Companion to City Traffic Engineer Directive LW 003 - Half Signals* for supplemental information on informing documents, half signals design guidelines, ADA implications, asset documentation info and references.

⁴ Portland Bureau of Transportation, 2015. Neighborhood Greenways Assessment Report.

<https://www.portlandoregon.gov/transportation/article/542741>

⁵ Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition Part 4 Section 4F.01 Application of Pedestrian Hybrid Beacons. <https://mutcd.fhwa.dot.gov/htm/2009/part4/part4f.htm>.

⁶ Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition Chapter 4D. Traffic Control Signal Features. Section 4D.34. Use of Signs at Signalized Locations. <https://mutcd.fhwa.dot.gov/htm/2009/part4/part4d.htm>.

⁷ Johnson, Todd Robert, "Safety at Half-Signal Intersections in Portland, Oregon" (2015). Dissertations and Theses. Paper 2200.

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