



1120 SW Fifth Ave, Suite 1331, Portland OR 97204
Phone: 503-823-4000 Portland.gov/Transportation

Mingus Mapps Commissioner Millicent D. Williams Director

CITY TRAFFIC ENGINEER DIRECTIVE

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WC 005		April 23, 2024	(n/a)
Subject		Issuer	
No Turn on Red guidelines at signalized intersections		Wendy Cawley, P.E., City Traffic Engineer <i>Wendy Cawley</i>	

Purpose

This directive summarizes PBOT and MUTCD guidelines for posting No Turn on Red (NTOR) at signalized intersections. NTOR guidelines are intended to serve as a guide for capital projects moving forward and will be implemented incrementally as new right-of-way improvements are delivered.

Background

PBOT’s Vision Zero Action Plan and PedPDX both include action items to pilot No Turn on Red at select signalized intersections. This low-cost treatment can improve safety at intersections where there are conflicts between right turning vehicles and people walking or bicycling (or left turning vehicles on a one-way grid.) The Highway Safety Manual indicates prohibiting turns on red can reduce all crash types at an intersection by 9%.

Guidance

Oregon Revised Statute 811.360 allows turns on a red signal so NTOR prohibitions must be signed. In an effort to improve safety for all modes, this memo highlight’s locations where NTOR installation should be considered. PBOT priorities for NTOR installation are outlined below and in Table 1 on page 3:

- 1. Where there are exclusive pedestrian or bicycle phases, or leading intervals/head starts (MUTCD 2B.60)**
 - a. NTOR should be considered when exclusive pedestrian or bicycle phases are present.
 - b. NTOR combined with Pedestrian Head Starts provides additional safety benefits for people walking.
- 2. Where bike boxes are present, at Neighborhood Greenways, or where turns cross separated paths.**
 - a. MUTCD Section 9E.12 states that “turns on red shall be prohibited from the lane where a bike box is placed.” This applies to intersection bike box and turn bike box conflicts.
 - b. Given the level of ridership on PBOT’s greenways, NTOR should be considered on greenways at signalized intersections even where bike boxes are not present.
 - c. Where right turn movements cross a two-way cycle track or separated bike or shared use path.
- 3. High Conflict Intersections.**
 - a. When there are more than three right-turn-on-red crashes reported in a 12-month period for a particular approach of an intersection (MUTCD Section 2B.60.)



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- b. Given that bicycle and pedestrian crashes have the potential to result in serious injury, NTOR should be considered when two or more pedestrian or bicycle crashes occur in a 5-year period that may be correctable with installation of NTOR on a particular approach (adapted from PBOT bike box criteria.)
 - c. When there is an unacceptable number of conflicting bicycle or pedestrian movements with right-turn-on-red maneuvers, especially involving children, older pedestrians, or persons with disabilities (MUTCD Section 2B.60.)
4. **Geometric or operational characteristics** of an intersection that might result in unexpected conflicts, including but not limited to:
- a. Inadequate sight distance to vehicles approaching from the left (or right, if applicable).
 - b. Skewed angle intersections that may create difficulty for drivers to see traffic approaching from the left or right.
 - c. Where U-turns are allowed, to remind drivers they must yield to conflicting U-turn traffic.

Implementation

There is currently no budget set aside to retroactively install No Turn on Red signage at select signalized intersections across the city (costs would include installing signs on signal mast arms or span wires and potentially adjusting traffic signal heads). No Turn on Red guidelines are intended to serve as a guide for signal upgrade and capital projects moving forward and will be implemented incrementally as new right-of-way improvements are delivered. Moving forward, PBOT will implement Turn on Red prohibitions as follows:

- **PBOT capital projects.** New PBOT capital projects that include new signals or signal upgrades will prioritize NTOR installation according to the guidance in this technical memo. Public outreach regarding potential impacts will occur in conjunction with project-specific outreach.
- **Signal maintenance projects.** PBOT signals staff will submit work orders to implement NTOR in accordance with the guidance in this memo.
- **PBOT-reviewed private development activity.** PBOT's development review team should consider NTOR guidelines in conjunction with private development reviews. Pedestrian head starts and bike boxes should also be implemented concurrently where appropriate.

With additional funding, PBOT would be able to proactively install No Turn on Red signage in support of our Vision Zero Action Plan and PedPDX.

Installation

Consult the District Signal Engineer for sign placement.

- R10-11a "No Turn on Red [red ball]" should be used only when circular indications are in place.
- Install R10-11 "No Turn on Red" signs where arrow signal indications are used.
- Consider oversized signs (36"x 48") and/or supplemental near-side signage for large intersections to increase conspicuity of restriction.
- Where a right turn on red restriction is needed during certain times of the day, consider a part-time or variable message "No Turn on Red" sign.

Impacts

Prioritizing No Turn on Red installations in the City of Portland will improve safety for all modes but will be particularly beneficial in reducing conflicts for people walking and bicycling. Impacts related to driver delay are expected to be minimal.

References

MUTCD 2023 Edition, PBOT Traffic Design Manual, Boston Transportation Dept. Signal Design Policy

Table 1: PBOT Priority for No Turn on Red Installations

Pedestrian Priority		Shall	Should	May	Comments	Example(s)
	Exclusive Pedestrian Phase	x			Turn on red conflicts with signalized or unique ped phase	NW Couch/11th
	Pedestrian Head Starts		x		TOR conflict with head start portion of “walk”	
	Signals Adjacent to Schools, etc.			x	Potential to add NTOR in areas with slower pedestrians	
	Pedestrian Districts			x	Potential to add in geographic areas (downtown, Lloyd)	
Bicycle Priority						
	Intersection and Turn Bike Box Conflict	x			Turn on red conflicts with a waiting cyclist	Hawthorne/7th Burnside/7th NB
	Exclusive Bicycle Phase	x			Turn on red conflicts with bike phase	SW Naito/Market
	Neighborhood Greenways		x		Consider based on street characteristics	
	Unique Bike Movements		x		Drivers may not expect opposing bike, (two-way cycle track)	Naito/Midblock
Crash Risk						
	High Conflict Intersections		x		Potential to add NTOR as a response to crash history or potential for conflict	
Geometric or Operational Characteristics						
	Inadequate Sight Distance	x			Unable to determine gaps for right turns	NE Sandy/37th SB
	Streetcar, LRT or Heavy Rail Conflict, in street or separated	x			Turns in conflict with unique signal phase or crossing gates	NW Front/9 th , Downtown Transit Mall
	Multileg Intersection		x		Where a right-turn movement has more than one destination	45th/Multnomah W Burnside/19th NE Sandy/37th
	Approach Legs in Conflict with Right Turn		x		Turning drivers can’t see which approach has green; thru looks like right turn	Bertha/Capitol NE Sandy/14th
	Slip Lane w/ Unique Signal Phase		x		Slip lane geometry could limit visibility of approaching cars	Barbur/Terwilliger, Lombard/Sandy
	Conflict w/ U-Turn		x			SE Division/117th