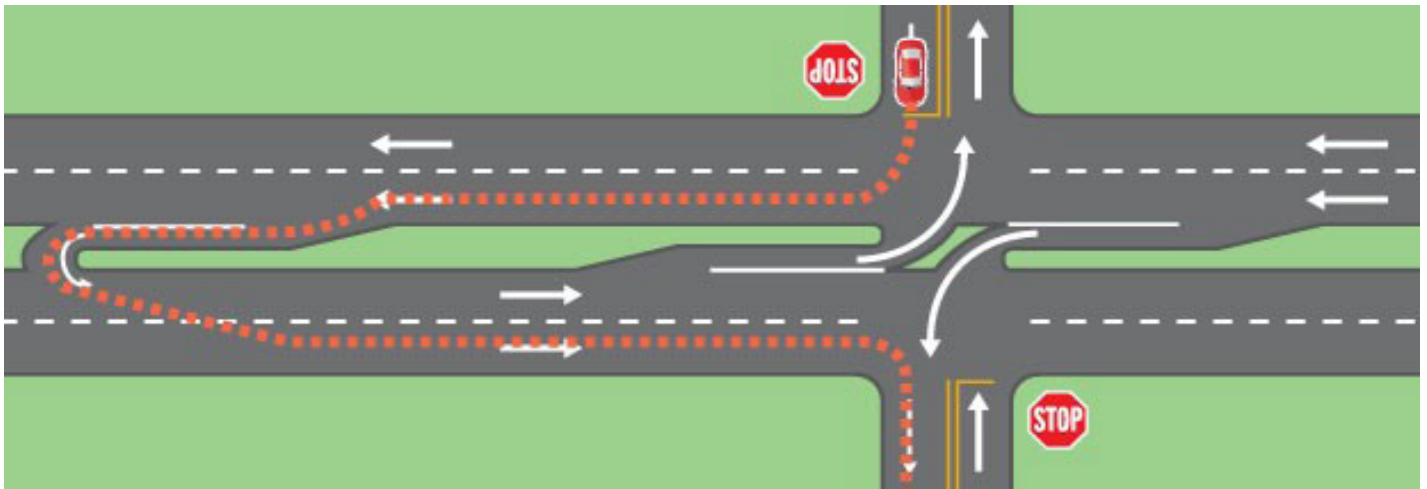


# Restricted Crossing U-Turn Intersection (RCUT)

A Restricted Crossing U-Turn (aka RCUT, Superstreet Intersection, or J-Turn) intersection falls under a group of strategies often referred to as “conflict point management.” The goal of an RCUT is to restrict, or relocate, certain movements to improve a road’s overall safety and reduce delays.



## BACKGROUND OF AN RCUT

The basic RCUT functions by restricting the incoming and outgoing side streets to right turn movements only. Vehicles that want to turn left, or cross to the opposite side street, must do so indirectly by first turning right onto the mainline, weaving across to the left most lane to complete a U-turn, and then traveling back to the intersection in question to complete their desired movement.

Pedestrian movements around an RCUT remain the same on the side streets, but vary in form on the mainline crossing. In some cases, only one path across the mainline is provided diagonally. This route directs pedestrians to cross to the center island separating the mainline left turn lanes and then to continue across to the opposite corner. While this path reduces pedestrian-vehicle conflicts, it also increases the overall distance travelled, and can result in pedestrians having to cross both side streets. Enforcing this type of crossing also requires landscaping, or other fixtures, to prevent illegal crossings.

Public acceptance of RCUTs varies greatly as the benefits are very alluring, but the inconvenience and complexity of the movement for both pedestrians and vehicles can be frustrating.

## BENEFITS OF AN RCUT

- ▶ Reduction in vehicle conflict points from the 42 found in a traditional intersection to either 18, or 24, depending upon whether mainline left turn movements have been restricted, or not.
- ▶ Approximately 30% reduction in the crash rate, and up to a 50% reduction in crash severity.
- ▶ Increased capacity and reduced delays in certain cases. Such as with roads that have high mainline left turn volumes.
- ▶ Lower construction costs compared to an interchange, or a new traffic signal with added turn lanes on the side streets.
- ▶ Shorter construction time compared to an interchange.



## DESIGN GUIDELINES FOR RCUTS

RCUTs are relatively new and specific design parameters as well as guidance for when to install an RCUT is still evolving. Here is general information to consider regarding making a recommendation for and designing an RCUT:

- ▶ An intersection comparison should be completed evaluating an RCUT against a traditional intersection in terms of at least safety, operations, and pedestrian traffic.
- ▶ Median widths of 47 to 71 feet may be needed depending upon the design of the vehicles expected to make the U-turn. Semi-trucks, for example, will require a larger turning radius.
- ▶ 800 feet of separation, or more, between the intersection and the U-turn locations. This distance should reflect a balance between the vehicle's need to change lanes, U-turn turn lane storage space needed, and appropriate spacing for approach signing and striping.
- ▶ Islands and medians are needed to reinforce the movement restrictions, both vehicular and pedestrian.

### LIMITATIONS OF RCUTS

- ▶ Increased distance and travel time for left turn and through movements from the side streets.
- ▶ Non-traditional pedestrian routes can be confusing, especially for the visually impaired.
- ▶ There are no established guidelines, or warrants, to assist in justifying an RCUT.
- ▶ Design guidance and standards are still evolving, and could change over time.
- ▶ Potential for increased right-of-way room needed compared to a traditional intersection.
- ▶ Increased signing and striping requirements to provide clear and timely information for drivers at, what amounts to be, three separate intersections.
- ▶ Public acceptance of RCUTs varies greatly.

- ▶ Acceleration lanes for the U-turn may be necessary to allow safe merging into mainline traffic.
- ▶ Traffic signals can be used if warranted and would require fewer phases since, at minimum, the side street movements have been restricted to right turns only.
- ▶ Overhead signing has not been shown to be necessary based on available data. However, increased signing and striping is necessary to clearly direct motorists through the intersection.
- ▶ Pedestrians may need additional way finding signs, and other landscaping treatments, to properly direct them along the desired path.
- ▶ An alternative path for bicyclists may be needed for those who are not comfortable riding in mainline traffic, or who do not want to travel the extra distance to use the U-turn.

### REFERENCES FOR RCUTS

FHWA, *Field Evaluation of a Restricted Crossing U-Turn Intersection*

FHWA, *Alternative Intersections/Interchanges: Informational Report*

WisDOT, *Facilities Design Manual 11-25 Intersections at Grade*

### ABOUT THIS GUIDE

This Engineering Guide is part of a series created by the expert traffic engineers that write for Mike On Traffic and are part of the Spack Enterprise family of transportation companies. The Engineering Guides are part of Spack Enterprise's vision to improve transportation globally. We believe in sharing our expertise, and providing practical content you can use in your professional life. This guide is provided under the Creative Commons Attribution License. Feel free to use, modify, and share this guide, but please give us credit in your document.

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