

# Cascade Road – Diverging Diamond Interchange (DDI) Alternative

## Simulation Background and Narrative

### From the FHWA DDI Info Guide

*The diverging diamond interchange (DDI) is also known as a double crossover diamond (DCD) and is an alternative to the conventional diamond interchange or other alternative interchange forms. The primary difference between a DDI and a conventional diamond interchange is the design of directional crossovers on either side of the interchange. This eliminates the need for left-turning vehicles to cross the paths of approaching through vehicles. By shifting cross street traffic to the left side of the street between the signalized crossover intersections, vehicles on the crossroad making a left turn on to or off of ramps do not conflict with vehicles approaching from other directions.*

*The DDI design has shown to improve the operations of turning movements to and from the freeway facility and significantly reduces the number of vehicle-to-vehicle conflict points compared to a conventional diamond interchange. The DDI also reduces the severity of conflicts, as conflicts between left-turning movements and the opposing through movement are eliminated. The remaining conflicts are reduced to merge conflicts for turning movements, and the reduced speed crossover conflict of the two through movements.*

This alternative features a type of diamond interchange in which the two directions of traffic on Cascade Road cross to the opposite side on both sides of the I-285 bridge. It will require traffic on Cascade Road to briefly drive on the opposite side of the road from what is customary under the I-285 bridge and then return to the typical right side of the roadway as they travel further east or west along Cascade Road.

The spacing between the two I-285 ramp intersections and also the points of crossover is 350 feet. The crossovers are at an angle of 40 degrees. Eastbound and westbound drivers will have two travel lanes available to them in each direction under the I-285 bridge.

The video simulation starts with an aerial view of the Cascade Road/I-285 Interchange area. The traffic patterns shown in the simulation are representative of the evening peak hour projected for the year 2030.

As the video pans to Utoy Springs Road, you will see the following changes to the intersection configuration. First, the approaches on the north and south sides have been aligned to allow a smoother through movements for northbound and southbound vehicles, and to provide safer conditions. Next, the right turn only lane for westbound Cascade Road traffic has been shifted to the north and a third lane for traffic wanting to travel through the intersection to the west has been created. This third westbound lane is carried to Fairburn Road where it becomes a right turn only lane.

As the video pans to the east, you see an eastbound right turn only lane develop for access to the southbound I-285 on-ramp. You also see three westbound through lanes along Cascade Road.

As we move to see fully the southbound ramp intersection, you will notice the crossover of traffic from one side to the other. Other changes to this intersection are a three lane southbound off-ramp from I-285 in which two lanes will turn right to go west and one lane will turn left to go east. The right turn and left turn movements from the off-ramp will be controlled

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by traffic signals as well as the crossover for traffic on Cascade Road. The traffic signal needs only two phases which simplifies its operation and allows more green time to be given to the drivers on Cascade Road and the off-ramp.

From the view of both ramps, you can see how traffic crosses over to the left side at each ramp and then crosses back to the right side after traveling through the intersection of the following ramp. Left turns onto I-285 will be free flow and will not be stopped by a traffic signal.

The northbound ramp intersection is similar to the southbound ramp intersection. The left turns and right turns from the northbound off-ramp are controlled by traffic signals as well as the crossover for traffic on Cascade Road. Two left turn lanes and a right turn lane are provided for northbound ramp drivers. A right turn only lane is provided for westbound drivers to access the on-ramp to I-285 northbound. Again, this traffic signal only needs two phases which allows more green time to be given to the drivers on Cascade Road and on the ramp.

As we move further to the east, you'll see the signalized intersection of Cascade Parkway. For eastbound traffic, a left turn only lane, a through lane and a shared through/right turn lane are provided. For westbound traffic, two through lanes and a right turn only lane are provided.

Finally, the video pans to the Shanter Trail signalized intersection. You can see the addition of a second eastbound lane on Cascade Road from Cascade Parkway through the Shanter Trail intersection to the Melbenan Drive intersection where the right lane becomes a right turn only lane.