Innovative Designs: Diverging Diamond

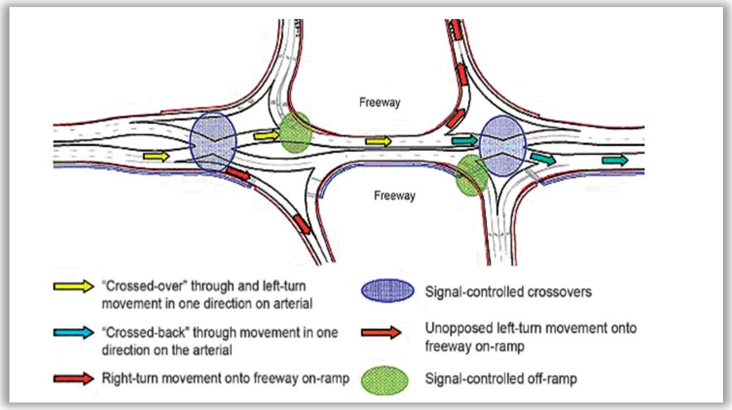


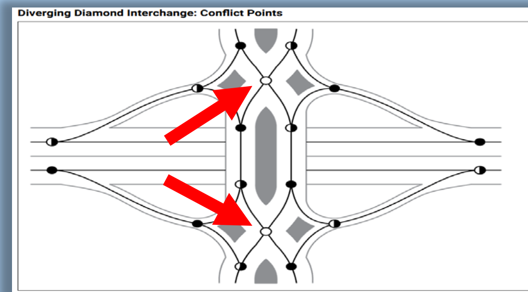
Image Credit – FHWA

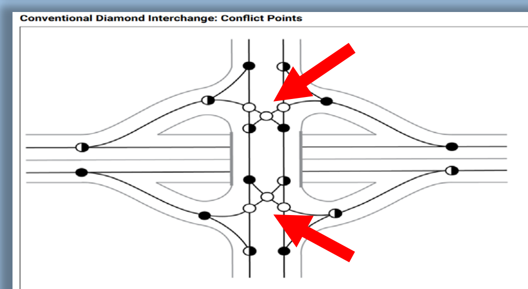
Diverging Diamond Interchanges (DDIs) are a novel design meant to promote safety while also increasing capacity and decreasing congestion. They accomplish this by moving traffic to the opposite side of the road, eliminating left turn signal phases.

This also eliminates potential crossing conflicts for those lefts. Crossing conflict crashes are among the most severe crashes, reducing them is considerable safety improvement.

Source – FHWA Safety Research

Conflict Points: Diverging vs. Standard Diamond Interchanges (SDIs)





Legend

- ● = Diverging
- ◐ = Merging
- ○ = Crossing

DDI – 2 Crossing Conflicts
SDI – 6 Crossing Conflicts

Image Credit – Virginia DOT

Example for Analysis Below: I-69 DDI between Fishers and Noblesville

Before

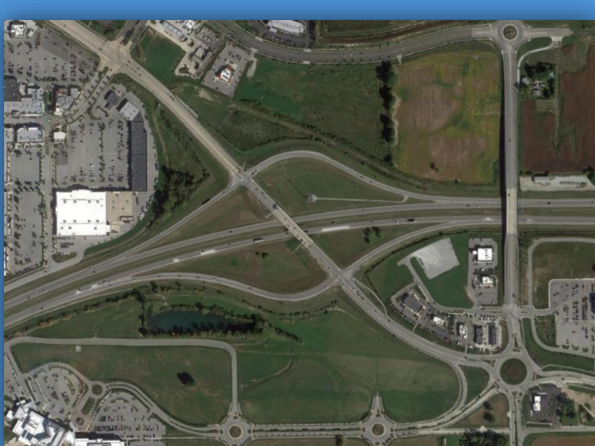


Image Credit – Google

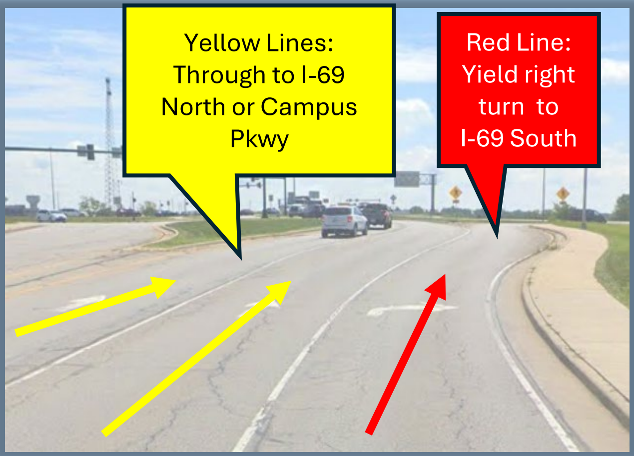
After

Image Credit – Google

Approaching?
What are the options?

Map View

Driver's View



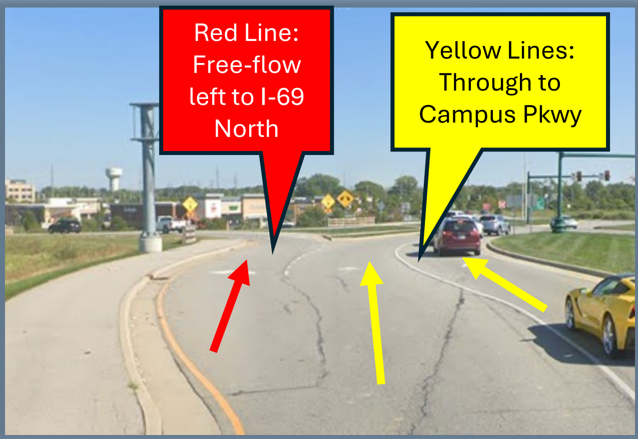


Image Credits – Google

Why make the change?

As demonstrated in the images above, making movements onto the interstate no longer needs to be signalized. This eliminates the signal phases for these turns, allowing through traffic to get through with less delay while also allowing free-flow turns onto the interstate.

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What are the mobility benefits?

Level of Service Grade: E

Level of Service Grade: C

Image Credits – 2010 Highway Capacity Manual, Exhibit 11-4

	Before	After
AM Delay:	28.4 sec.	18 sec. (36% less)
PM Delay:	56.3 sec.	24.7 sec. (56% less)
Max Queue	1200 feet 48 Veh.	475 feet (60% less) 19 Veh.
Level of Service Grade	AM North: C South: C	AM North: B South: B
	PM North: E South: E	PM North: C South: C

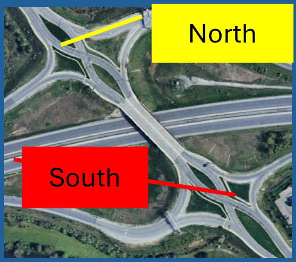

Image Credit – Google

*Delay numbers averaged for all DDI-impacted Intersections

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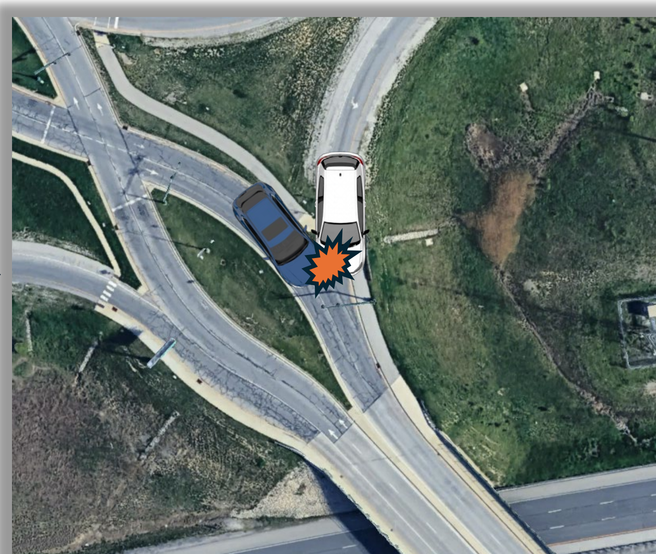
Safety Benefits: Slam or Scrape?

Right Angle Crash



Sideswipe Crash

Image Credits – Google

	Before	After
Crashes Per Year:	40.7 crashes	15 crashes (63% less)
Injuries Per Year:	12.3 injuries	1.5 injuries (88% less)
Right Angle Crashes Per Year:	3.67 crashes	0.75 crashes(80% less)

Zero Fatalities before and after the change!