What is a Diverging Diamond Interchange?

- A type of diamond interchange in which the two directions of traffic on the non-freeway road cross to the opposite side on both sides of the bridge at the freeway. (Wikipedia)
- It requires traffic on the freeway overpass or underpass to briefly drive on the opposite side of the road from what is customary. (Wikipedia)

Safety Benefits

- Improves the operations of turning movements to and from the freeway facility.
- Significantly reduces the number of vehicle-to-vehicle conflict points compared to a conventional diamond interchange.
- Reduces the severity of conflicts, as conflicts between left-turning movements and the opposing through movements are eliminated. The remaining conflicts are reduced to merge conflicts for turning movements and the reduced speed crossover conflict of the two through movements. (FHWA)

Existing I-10/SR-181 Interchange

Preliminary Layout Along I-10
Crossing Angle

• A 45 Degree Crossing Angle is desirable.
• We implemented a 40 Degree Crossing Angle.

Factors
• Existing Site Conditions of the Project.
• Proximity of the Bridge to the Crossovers.
• The Location of the Ramps.
• No Additional ROW

2 LN North/South SR-181

3 LN Layout Lane Widths
Striping Layout at the Crossing Point South End

Sign Face Details

SR-181 Diverging Diamond Interchange
- Traffic Analysis of a DDI
Equations to Know for Signalized Intersection Methodology

- Chapter 18 – Adjusted Saturation Flow Rate
  - HCM 2010 Equation 18-5, Page 18-35

\[ f_s = \frac{s}{f_s f_1 f_2 f_3 f_4 f_5 f_6 f_7 f_8 f_9} \]

where:
- \( f_s \) = adjusted saturation flow rate (veh/hl)
- \( s \) = basic saturation flow rate (veh/ln)
- \( f_1 \) = adjustment factor for lane width
- \( f_2 \) = adjustment factor for heavy vehicles in traffic stream
- \( f_3 \) = adjustment factor for approach grade
- \( f_4 \) = adjustment factor for existence of a parking lane and parking activity adjacent to lane group
- \( f_5 \) = adjustment factor for blocking effect of local buses that stop within intersection area
- \( f_6 \) = adjustment factor for lane type
- \( f_7 \) = adjustment factor for lane utilization
- \( f_8 \) = adjustment factor for left-turn vehicle presence in a lane group
- \( f_9 \) = adjustment factor for right-turn vehicle presence in a lane group
- \( f_{10} \) = pedestrian adjustment factor for left-turn groups, and
- \( f_{11} \) = pedestrian bicyclist adjustment factor for right-turn groups

Equations to Know (Con’t)

- HCM 2010 Chapter 7, page 7-30, Bullet 4

- HCM procedures typically do not consider the effect of self-aggregating phenomena on the performance of a segment. For example, when traffic in a left-turn bay spills over into the adjacent through lane, the effect of the through lane performance is not considered. The inability of drivers to access their desired lane when queues back up from a downstream facility is not taken into consideration.

- HCM 2010 Chapter 18, page 18-29
  - Limitations of the Methodology
What is Spillover and Spillback?

DDI – Initial Design

2018 AM Existing LDS
2018 AM DDI LOS - Initial Design

2023 AM DDI LOS - Initial Design