

## 6.0 Design Alternatives

### 6.1 No-Build Alternative

The No-Build Alternative represents the Existing Year (2019) lane geometry and traffic control features with the existing diamond interchange within the project area. There are no programmed projects listed as being funded for construction in the 2040 Cost Feasible Plan, therefore no additional improvements were included in the No-Build Alternative. This alternative is viable if the cost savings of not constructing the improvements outweigh the safety and operational benefits associated with implementing the Build Alternative.

### 6.2 Build Alternatives

The I-75/Pine Ridge Road interchange serves as one of the two central-most access points from the interstate highway serving the greater Naples Area. The expected increase in traffic volumes entering and exiting the Interstate from Pine Ridge Road, plus the anticipated growth in through traffic serving points east and west of the interstate, threatens the integrity of the interchange. As will be discussed in **Section 7**, the No-Build analysis indicates that the two signalized intersections will be unable to adequately handle the expected increase in traffic, resulting in substantial delays during peak periods. The adjacent arterial intersections west of the interchange also serve as bottlenecks, preventing motorists from reaching the I-75 on-ramps. Adding additional through lanes and turn lanes at the ramp terminal intersections to increase capacity would require additional right-of-way and require the reconstruction of the existing overpass, increasing the overall cost.

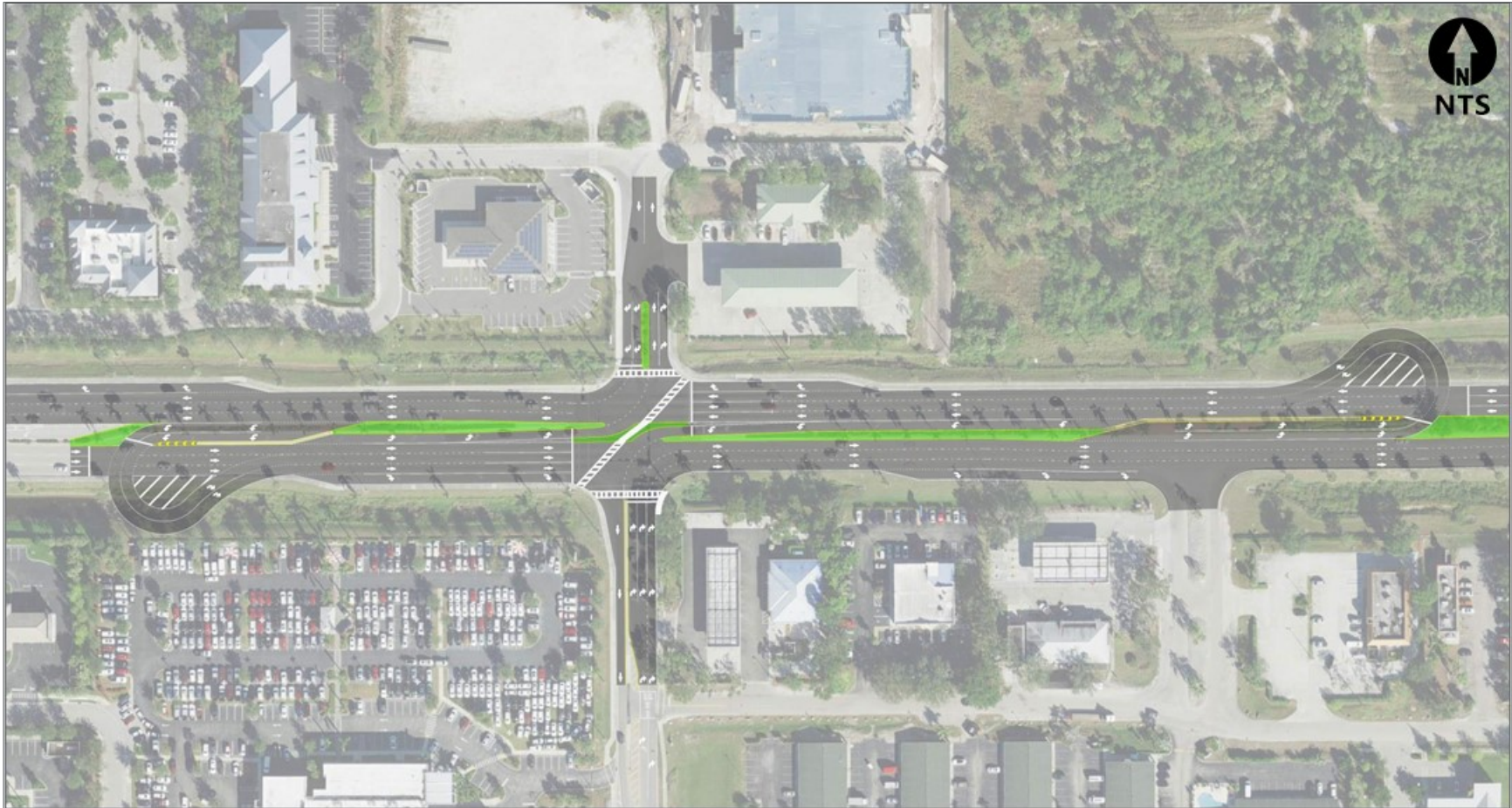
A less expensive alternative, finding success throughout the Country, is the Diverging Diamond Interchange (DDI). Consistent with the Pine Ridge Road Corridor Congestion Study, the Build alternative proposes the conversion of the existing diamond interchange configuration to a DDI. The DDI concept is depicted in **Figure 6.1**. The DDI concept retains the same two traffic signals, but they no longer require left turning vehicles to cross opposing streams of traffic. These signals also ensure the safe merging of I-75 ramp traffic to Pine Ridge Road. As the two main traffic signals no longer need the left-turn phases to accommodate the ramp traffic, it allows for the signals to be operated with only two phases, creating a substantial improvement in the throughput and operational efficiency of the interchange. Advanced signage and lane markings assist in managing the proper flow of traffic through the intersections. Additionally, the DDI's footprint fits within the existing right-of-way, and the new lane configuration fits beneath the existing overpass, avoiding the need to reconstruct the bridges. An added benefit to this interchange design is the potential reduction in crashes by reducing the total number of conflict points for both motorists and pedestrians.

The Pine Ridge Road Corridor Congestion Study also identified recommended improvements west of the interchange that include a Restricted Crossing U-turn (RCUT) intersection at Whippoorwill Lane and a Continuous Flow Intersection (CFI) at Livingston Road. These County proposed improvements are shown below in **Figure 6.2** and **Figure 6.3** and will be included in the analysis of the Build condition. It should be noted that although the proposed configuration of the CFI shows a single northbound right-turn lane from Livingston Road to eastbound Pine Ridge Road, the analysis assumed a dual right-turn lane consistent with existing conditions. This modification was discussed and agreed upon with the County for inclusion in the IOAR.

Figure 6.1: I-75 Interchange Build Alternative Concept

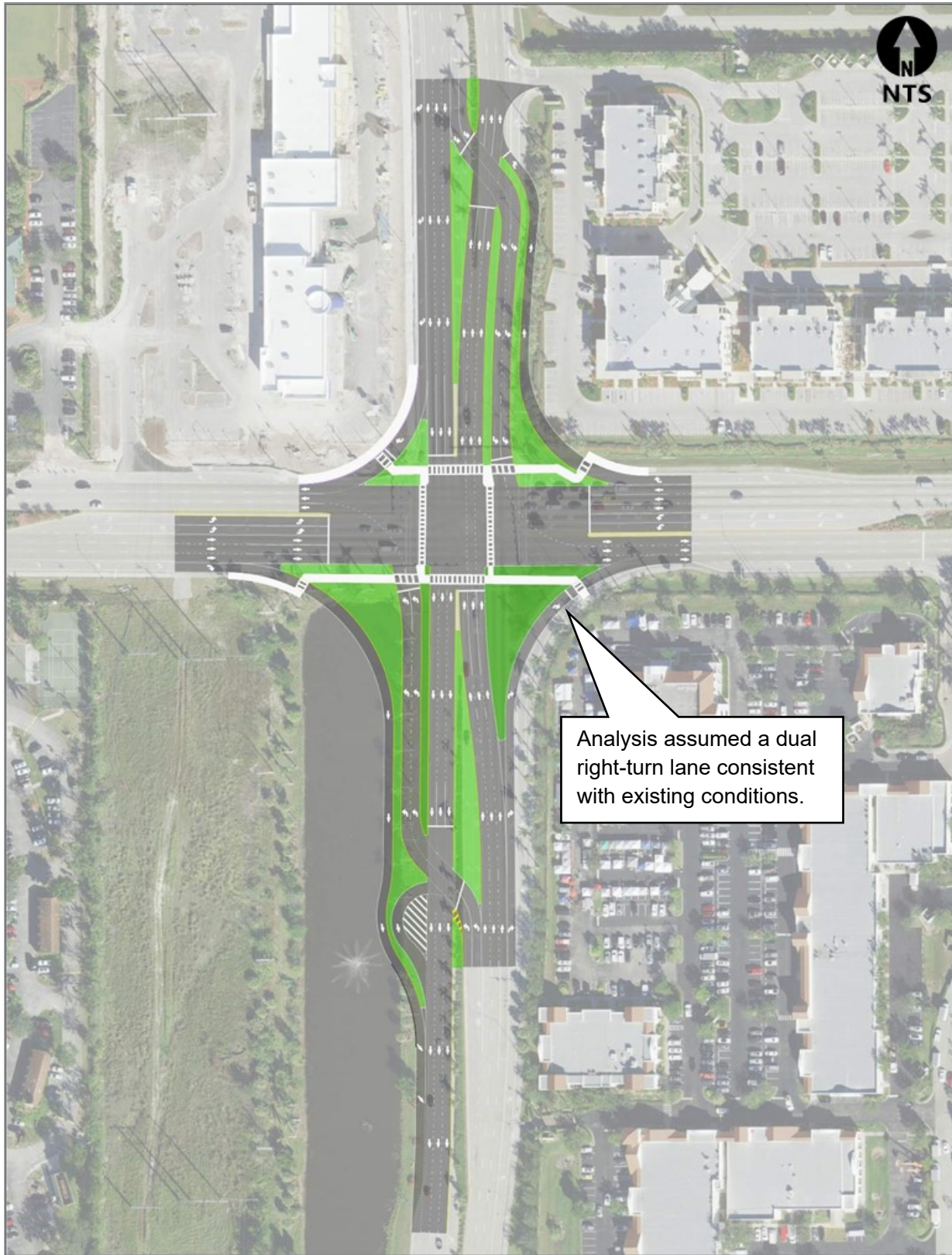


Figure 6.2: Whippoorwill Lane Intersection Build Alternative Concept



Note: County proposed concept was provided by others and has been provided for reference purposes only.

Figure 6.3: Livingston Road Intersection Build Alternative Concept



Note: County proposed concept was provided by others and has been provided for reference purposes only.

## 17.0 Conclusion and Recommendation

Considering the overall operations along I-75 ramp terminals and adjacent intersections at Pine Ridge Road, the Build Alternative is projected to provide better operating conditions than the No-Build Alternative. The Build Alternative was developed during the IOAR effort, with an intent to save cost and remain within the existing right-of-way, while accommodating both target LOS and future queues. The DDI performs well under operational analysis and will reduce the potential for queue spill back into the mainline. Hence, the Build Alternative is recommended for the following reasons:

- The transformation of the diamond interchange into a DDI allows the opposing left and through traffic to move together. Thus, it is expected to increase the capacity throughout the ramp terminals as well as mitigate the queue spillback on the ramp terminals or into the eastbound through or westbound through movements;
- The westbound left and eastbound left movements are not conflicting with the opposing through movements due to the DDI configuration. Therefore, this has the potential to reduce the overall crashes previously caused by these conflicts;
- The proposed modifications in the Build Alternative adhere to both of the FHWA Policy Points.

Other improvements may be needed by Design Year (2040) to further improve the operations of the interchange. Those improvements are currently being studied as part of the on-going I-75 Master Plan.