December 13, 2024

Mr. Tyler Morrow
City of Hendersonville
Community Development Department
100 N. King Street
Hendersonville, NC 28712

**RE: *Old Sunset Hill Road TIA Review***

Dear Tyler,

At the request of the City of Hendersonville, Kimley-Horn has conducted a review of the traffic impact analysis (TIA) prepared for the Old Sunset Hill Road development dated September 13, 2024, by Impact Designs, Inc. The proposed site is located on Old Sunset Hill Road off Howard Gap Road. The proposed site will have access off Old Sunset Hill Road at a new intersection as well as through interconnectivity via Half Moon Trail to US 64 (Chimney Rock Road).

This specific review focused on the unsignalized intersections noted for inclusion within the approved TIA scope document by the North Carolina Department of Transportation (NCDOT). The NCDOT *Policy on Street and Driveway Access to North Carolina Highways*, NCDOT *Congestion Management Capacity Analysis Guidelines*, and City of Hendersonville *Zoning Ordinance.* This memo outlines our technical review of the unsignalized intersections, specifically the turn lane warrants, and corresponding recommendations.

## TECHNICAL REVIEW

The September 13th, 2024, TIA submitted by Impact Designs included four (4) existing signalized intersections and one (1) new site access (Access A). The following review looks are each of the unsignalized intersections related to the existing and proposed traffic volumes and how they relate to NCDOT's turn lane warrant nomograph. The NCDOT *Policy on Street and Driveway Access to North Carolina Highways* contains a nomograph warrant for left and right turn lanes, page 80. Each of the locations are discussed below along with the findings and recommendations.

*US 64 at Half Moon Trail*

The existing intersection of US 64 at Half Moon Trail currently has a left-turn lane from US 64 onto Half Moon Trail. A right turn lane from US 64 onto Half Moon Trail is also present. Furthermore, Half Moon Trail's approach to US 64 is a single lane with a shared left and right-turn lane. A summary of the traffic volumes, as taken from the sealed TIA, for each of these movements are as follows:

- Right turn from US 64 EB onto Half Moon Trail = AM (5 trips), PM (20 trips)
- Left turn from Half Moon Trail onto US 64 = AM (14 trips), PM (10 trips)
- Right turn from Half Moon Trail onto US 64 = AM (2 trips), PM (0 trips)

The proposed site will add the following trips to these movements:

- Right turn from US 64 EB onto Half Moon Trail = AM (3 trips), PM (9 trips)
- Left turn from Half Moon Trail onto US 64 = AM (4 trips), PM (3 trips)
- Right turn from Half Moon Trail onto US 64 = AM (12 trips), PM (8 trips)

Since there are already right and left turn lanes from US 64 onto Half Moon Trail, and the cumulative volume from the site for the AM and PM peak hours sums less than 20 trips per each movement, additional capacity lanes are not needed on Half Moon Trail.

*US 64 at Ballantyne Commons Circle*

The existing intersection of US 64 at Ballantyne Circle currently has a right turn lane from US 64 onto Ballantyne Commons Circle. Furthermore, Half Moon Trail's approach to US 64 is a single lane for right turns only. Since this section of US 64 is one way where Ballantyne Commons Circle intersections, additional turn lanes are not needed. Furthermore, the site is adding less than 5 trips per movement for the AM and PM peak hours, the existing infrastructure is sufficient for the development.

*Howard Gap Road at Old Sunset Hill Road (Eastern)*

The existing intersection of Howard Gap Road at Old Sunset Hill Road is a tee intersection that does not have left or right turn lanes on any of the three approaches. A summary of the traffic volumes, as taken from the sealed TIA, for each of these movements are as follows:

- Left turn from Howard Gap Road onto Old Sunset Hill Road = AM (100 trips), PM (147 trips)
- Right turn from Howard Gap Road onto Old Sunset Hill Road = AM (8 trips), PM (6 trips)
- Left-turn from Old Sunset Hill Road onto Howard Gap Road = AM (9 trips), PM (7 trips)
- Right turn from Old Sunset Hill Road onto Howard Gap Road = AM (222 trips), PM (101 trips)

The proposed site will add the following trips to these movements:

- Left turn from Howard Gap Road onto Old Sunset Hill Road = AM (12 trips), PM (40 trips)
- Right turn from Howard Gap Road onto Old Sunset Hill Road = AM (3 trips), PM (9 trips)
- Left-turn from Old Sunset Hill Road onto Howard Gap Road = AM (8 trips), PM (5 trips)
- Right turn from Old Sunset Hill Road onto Howard Gap Road = AM (47 trips), PM (32 trips)

The length of storage necessary was determined based on the NCDOT turn lane warrant nomograph. These are shown in the table below.

| Approach | Existing | | With Site Traffic | |
|---|---|---|---|---|
| | AM | PM | AM | PM |
| Left turn from Howard Gap Road onto Old Sunset Hill Road | 75 ft | 100 ft | 75 ft | 125 ft |
| Right turn from Old Sunset Hill Road onto Howard Gap Road | 150 ft | 150 ft | 175 ft | 175 ft |

The volumes shown in the TIA show that turn lanes are warranted for a left turn from Howard Gap Road and a right turn from Old Sunset Hill Road. In review of the geometrics and the volumes from the intersection, a right turn lane, while warranted is not recommended. Upon review of the traffic volumes at the intersection, very few vehicles turn left from Old Sunset Hill Road in the AM or PM peak hour. With the site traffic, less 20 vehicles in the peak hours are projected to make this movement. That translates into a car every 3 minutes on average. As such the existing single lane operates as a dedicated right turn lane for the movement.

The left-turn movement from Howard Gap Road onto Old Sunset Hill Road is warranted and should be installed. While a turn lane is needed in both peak hours, the PM peak hour is the highest concern. In the PM peak hour, 147 existing vehicles turn left onto Old Sunset Hill Road. The proposed site will add 40 additional vehicles to this movement for a total of 187 vehicles. The 187 vehicles oppose 244 approaching vehicles and blocks 312 vehicles from passing the intersection. Furthermore, the skew of the intersection approach from Old Signal Hill Road does limit visibility for turning movement from Old Signal Hill Road and horizontal curvature of Howard Gap Road just past the intersection limits visibility for vehicles turning onto Old Signal Hill Road. The site constitutes 27% of the traffic turning left onto Old Signal Hill Road.

*Old Sunset Hill Road at Howard Gap Road (Western)*

The existing intersection of Howard Gap Road at Old Sunset Hill Road is a tee intersection that does not have left or right turn lanes on any of the three approaches. A summary of the traffic volumes, as taken from the sealed TIA, for each of these movements are as follows:

- Left turn from Howard Gap Road onto Old Sunset Hill Road = AM (8 trips), PM (14 trips)
- Right turn from Howard Gap Road onto Old Sunset Hill Road = AM (148 trips), PM (61 trips)
- Left-turn from Old Sunset Hill Road onto Howard Gap Road = AM (68 trips), PM (93 trips)
- Right turn from Old Sunset Hill Road onto Howard Gap Road = AM (16 trips), PM (6 trips)

The proposed site will add the following trips to these movements:

- Left turn from Howard Gap Road onto Old Sunset Hill Road = AM (0 trips), PM (0 trips)
- Right turn from Howard Gap Road onto Old Sunset Hill Road = AM (1 trips), PM (5 trips)
- Left-turn from Old Sunset Hill Road onto Howard Gap Road = AM (0 trips), PM (0 trips)
- Right turn from Old Sunset Hill Road onto Howard Gap Road = AM (0 trips), PM (0 trips)

With the low volume of traffic added to the intersection by the site, turn lanes are not recommended at this location.

## RECOMMENDATIONS

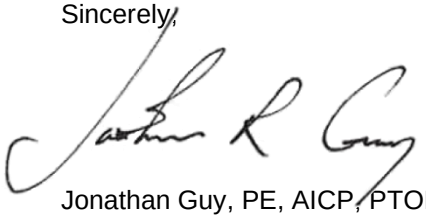
Based on the analysis contained in this memo, it is recommended that the City of Hendersonville consider requiring a left-turn lane from Howard Gap Road onto Old Signal Hill Road. The need for the turn lane, while present prior to the development, is further exacerbated with the addition of site traffic. The proposed site adds 40 vehicles in the PM peak hour, which equates to 27% of the total traffic for that movement. The additional traffic, the limited visibility, and the further impact to through movements on Howard Gap Road, all contribute to the need for the turn lane.

The design of the turn lane and the necessary storage length for the turn lane should be coordinated with the North Carolina Department of Transportation to determine the most optimal configuration for the turn lane. Consideration should be given to a partial symmetrical with a proportional offset to the outside (western side) of Howard Gap Road to minimize impacts to existing utilities, maximize visibility, and to utilize available right of way present to the existing pavement. This approach should minimize overall impacts and construction costs.

## CONCLUSIONS

Please contact me at (704) 488-3055 or jonathan.guy@kimley-horn.com should you have any questions regarding this analysis.

Sincerely,



Jonathan Guy, PE, AICP, PTOE
Senior Vice President