Traffic & Mobility Consultants

MEMORANDUM

November 4, 2022

Re: Hoffner Avenue from Orange Avenue to Conway Road
Speed Zone Analysis Orange County, Florida Project №
20119.02-03, v1.1

1.0 INTRODUCTION

This Speed Zone Study was performed to evaluate the speed limit on Hoffner Avenue from Orange Avenue to Conway Road, based on existing and projected conditions of the corridor as development continues in the surrounding area. The study was conducted in accordance with the guidelines and procedures outlined in the Florida Department of Transportation (FDOT) *Speed Zoning for Highways Manual, FDOT Context Classification Guide, Manual of Uniform Traffic Control Devices (MUTCD)*, Orange County Traffic Engineering guidelines, and standard engineering practice.

Ideally the design speed, target speed, and posted speed limit of a roadway segment are consistent and provide the motoring public with matching cues that result in drivers naturally traveling at the desired speed that is safe for the corridor. However, due to changing and evolving conditions, these speeds may be different from each other, resulting in inconsistent driver expectation about the preferred operating speed. In situations where the current design speed and target speed do not match, design, operational, and/or regulatory changes may be considered to move the operating speed and posted speed toward the desired or target speed.

The following analysis and review evaluate the existing and projected conditions on the Hoffner Avenue corridor to provide a recommendation for the desired speed profile and regulatory speed limit(s) for the study corridor.

2.0 Corridor Characteristics

2.1 Roadway Geometry

The Hoffner Avenue study corridor is a minor collector roadway, approximately 2.85 miles long, which predominantly travels in the east-west direction. It is a 2-lane undivided roadway with double yellow centerline markings, flushed shoulders, and approximately 12-foot travel lanes. The corridor also has a 5-foot sidewalk on both sides of the roadway, except from Avocado Lane to St. Denis Court W, where it only has sidewalks on the eastbound side of the road, and no sidewalks are present between Orange Avenue and Hansel Avenue. This road has no dedicated bicycle lanes and no lighting poles along the corridor. The study corridor comprises three (3) signalized intersections and 128 access driveways. Crosswalks are present on all approaches at the signalized intersections. There are three (3) pedestrian midblock crosswalks; one (1) school crossing at Randolph Avenue, and two (2) pedestrian crossings with flashing beacons at Pleasure Island Drive and Monet Avenue. The *Annual Average Daily Traffic* (AADT) along the corridor is approximately 17,950 vehicles.

The general roadway alignment is winding with several broad horizontal curves along the corridor. The vertical alignment of the roadway is relatively flat, with no significant changes in elevation along the corridor. While specific sight distance limitations were not evaluated, the large radii of the horizontal curves and the absence of vertical curvature result in adequate sight distance on the corridor.

The roadway's Right-Of-Way (ROW) varies throughout the corridor, ranging from approximately 30 feet to 95 feet, depending on the location. The narrowest ROW of 30 feet is located west of Oak Island Drive and the widest ROW of 95 feet located at St. German Avenue.

2.2 Existing Speed Limit

Half of the corridor has a posted speed limit of 35 miles per hour (mph), close to Orange Avenue and to Conway Road. In the middle of the corridor, where the ROW reduces and horizontal curves are present, the speed limit is 25 mph. Additionally, the short segment between Orange Avenue and Hansel Avenue has a posted speed of 30 mph. There are two (2) school pavement markings on the corridor, one (1) within a school zone close to Randolph Avenue and one (1) with a pedestrian crossing beacon close to Monet Avenue. **Figure 1** illustrates the study corridor and the location of the signs for posted speed limits, advisory speeds, school crossings, school zones and pavement markings, and pedestrian crossings along Hoffner Avenue.

The change in speed from the three (3) different posted speeds on the corridor is consistent with the geometry and alignment of the corridor and its proximity to dense residential areas and schools.

Study Corridor Existing Characteristics
Hoffner Avenue Speed Zone Study
20119.02-03

Figure 1

2.3 Planned and Programmed Improvements

Roadway improvements programmed within the Metroplan Orlando *FY 2020/21–2024/25 Orlando Urban Area Transportation Improvement Program (TIP)* were reviewed. No roadway or intersection improvements were identified that are funded for construction within the study corridor.

2.4 Land Use Context

The 2.85-mile corridor currently serves a variety of land uses; however, residential land uses are predominant through the corridor. The corridor is located within the cities of Belle Isle, Orlando, and Edgewood, and part of unincorporated Orange County. At the western and eastern limits of the study corridor, the land uses are primarily commercial. The corridor's land uses are typical of an urban corridor that is fully developed. The existing land use is shown in **Figure 2**. The *Orange County InfoMap* and City *Future Land Use Maps (FLUM)* are included in the **Attachments**.

Orange County and Florida Department of Transportation (FDOT) recommend a context sensitive approach while determining target speed for corridors. Target speed is the highest speed at which vehicles should operate on a thoroughfare in a specific context, consistent with the level of multimodal activity generated by adjacent land uses, to provide both mobility for motor vehicles and a supportive environment for pedestrians, bicyclists, and public transit users. The overall context class for the study corridor is C4-Urban General. The allowable target speed range for a C4- Urban General corridor in the *FDOT Design Manual* is 25 miles per hour (mph) to 45 mph, as shown in the *FDOT Design Manual* (FDM) *Table 201.5.1* (included in the **Attachments**).

Land Use Context
Hoffner Avenue Speed Zone Study
20119.02-03

2.5 Historical Crash Data

Crash data was obtained from January 1, 2017, to December 31, 2021, from *Signal Four Analytics (S4A)* for the study corridor. The crash data and heat map are included in the **Attachments**.

The historical crashes on Hoffner Avenue reveal that a total of 254 crashes were reported during the five (5) year study period. The crashes were analyzed to determine the most prevalent crash types reported on the corridor. Based on the summary presented in **Table 1**, approximately 63% of the of the crashes along the corridor were rear end and same direction sideswipe crashes.

Table 1
Crash Type Summary

Crash Type	2017	2018	2019	2020	2021	Total	Percent
Animal	0	0	0	0	1	1	**1%**
Backed Into	0	1	2	0	1	4	**2%**
Head On	2	1	0	1	3	7	**3%**
Left Entering	0	4	0	1	3	8	**3%**
Left Leaving	1	0	1	0	1	3	**1%**
Left Rear	0	1	0	2	2	5	**2%**
Opposing Sideswipe	2	1	1	1	2	7	**3%**
Off Road	2	3	2	4	4	15	**6%**
Other	1	0	3	3	1	8	**3%**
Parked Vehicle	0	0	1	1	2	4	**2%**
Pedestrian	0	0	0	1	0	1	**0%**
Rear End	32	22	35	29	17	135	**53%**
Right Angle	2	3	4	0	3	12	**5%**
Right/Through	0	2	1	1	2	6	**2%**
Right/U-Turn	0	0	1	0	0	1	**0%**
Rollover	0	0	1	0	0	1	**0%**
Same Direction Sideswipe	2	4	7	5	8	26	**10%**
Single Vehicle	3	1	1	1	0	6	**2%**
Unknown	1	1	0	0	2	4	**2%**
Total	***48***	***44***	***60***	***50***	***52***	***254***	***100%***

According to the *National Highway Traffic Safety Administration (NHTSA)*, the most common causes of rear end collisions are driver distractions, following too close, weather conditions, speeding, and driving under the influence. Further review of the data indicates that in 56 of the crashes (22%) the driver was distracted, and 3 crashes (1%) were alcohol related. In addition, most of the crashes occurred during the day (77%), during clear weather (82%), on dry surface conditions (91%), and intersection-related crashes (19%). The crash data statistics are provided in the **Attachments**.

Analysis of crash severity shows that a total of 92 of the 254 crashes (36%), were crashes with suspected or reported injuries of varying severity on the study corridor during the study period. None of the crashes resulted in fatalities. **Table 2** shows the crash severity using the *KABCO* scale established by the Federal Highway Administration (FHWA), which evaluates the severity of auto collision injuries.

Table 2
Crash Severity Summary

Injury Severity	2017	2018	2019	2020	2021	Total	Percent
Fatal - K	0	0	0	0	0	0	0%
Incapacitating Injury - A	3	0	0	0	4	7	3%
Non-Incapacitating Injury - B	3	6	5	3	4	21	8%
Possible Injury - C	12	6	16	20	10	64	25%
Property Damage Only - O	30	32	39	27	34	162	64%
Total	***48***	***44***	***60***	***50***	***52***	***254***	***100%***

While excessive speed was not directly indicated as the primary cause of any of the 254 crashes, the crash data indicates that speeding may be increasing the frequency and severity of crash events. A reduction in speed profile on Hoffner Avenue may mitigate some of the crash severity concerns.

3.0 Speed Limit Evaluation

3.1 85th Percentile Speed

Vehicle speed data, for a duration of 24 hours on Hoffner Avenue between Orange Avenue and Conway Road, was collected for five (5) locations on May 17-19, 2022 and September 14 & 21, 2022. The speed measurements were taken east of Foy Street, 300 feet east of Embassy Street, east of Pleasure Island Drive, east of Louvre Avenue and between Darden Avenue and Pelleport Avenue. The volume, average speed, 85th percentile speed, and 10-mile pace were evaluated for each count location. The 24-hour vehicle volume and speed data are included the **Attachments**.

The 85th percentile speed method takes the calculated 85th percentile speed, 10-mph pace, and speed limit reductions into consideration to determine the recommended posted speed limit, as outlined in the FDOT *Speed Zoning Manual*. The recommended posted speed limit is determined by the lowest identified speed from the rounded 85th percentile speed and rounded upper limit of the 10-mph pace.

The resulting speed profile may be reduced by up to 8 mph to account for roadway characteristics or desired target speeds based on land use context. Therefore, for the purposes of this study, the speed limit results were adjusted by 8 mph along most of the corridor to account for the prevalence of access driveways and lack of deceleration lanes. The speed was then rounded to the nearest 5 mph value to determine the resultant speed limit based on the prevailing speed profile with adjustments. The results of the speed data collection are provided in **Table 3**.

Table 3
Speed Study Summary

Location	Dir	Vol	Speed			10-mph	Speed Limt		
			Mean	50th %ile	85th %ile	Pace	Observed	Adjustment	Adjusted
Hoffner Ave, East of Foy St	EB	9,124	30	31	37	25-35	40	8	30
	WB	8,131	27	28	34	25-35	35	8	30
Hoffner Ave, 300' East of Embassy St	EB	8,617	32	32	36	25-35	35	8	25
	WB	8,342	31	32	36	25-35	35	8	25
Hoffner Ave, East of Pleasure Island Dr	EB	8,887	29	29	34	25-35	35	8	30
	WB	8,340	30	29	34	25-35	35	8	30
Hoffner Ave, East of Louvre Ave	EB	9,202	32	32	37	25-35	35	8	30
	WB	8,748	34	34	39	30-40	40	8	30
Hoffner Ave, From Darden Ave to Pelleport Ave	EB	8,739	33	34	39	30-40	40	8	30
	WB	8,508	34	35	44	30-40	45	8	30

Based on the prevailing speed/85th percentile speed method, the recommended posted speed limit is 25 mph for the middle segment of the Hoffner Avenue corridor from Embassy Street to Louvre Avenue and 30 mph at the starting and ending segments of the corridor, from Orange Avenue to Embassy Street and from Louvre Avenue to Conway Road.

3.2 USLIMITS 2

The web-based tool provided by the Federal Highway Administration (FHWA) called "*USLIMITS2*" was used to determine the speed limit. *USLIMITS2* considers various factors including the 85th and 50th percentile speeds, section length, Annual Average Daily Traffic (AADT), adverse alignment, statutory speed limit, roadway cross- section, terrain, access points, and crash history.

The operating speed method *USLIMITS2* recommends a speed limit of 30 mph for the 2-lane segment of Hoffner Avenue study corridor. The *USLIMITS2* report is provided in the **Attachments**.

4.0 Findings and Recommendations

4.1 Speed Zone Recommendations

Observations of prevailing speeds indicate that the current 85th percentile speeds range from 35 to 45 mph. The prevailing speed method (including allowable adjustments) indicates that the speed limit should be set to 30 mph in the segments where the current speed limit is 35 mph and maintain the current speed limits of 25 mph and 30 mph in the other segments of the corridor. The speed counts demonstrated that the drivers are speeding in the entire corridor; therefore, mitigation measures are required to enforce the recommended speed limit.

Based on this review, it is recommended that a posted speed limit on Hoffner Avenue from Orange Avenue to Conway Road is modified to 30 mph in the segments currently set at 35 mph and maintain the existing posted speeds (25 mph and 30 mph) on the other segments of the corridor. This speed limit modification will show a consistent speed limit for the straight segments of study corridor and will help to lower the rear end/sideswipe crashes.

4.2 Short-Term Mitigation Measures

The implementation of a dynamic speed feedback sign, a traffic calming device that displays message for drivers traveling over the threshold speed, could help reduce vehicle speeds. Other short-term mitigation measures include placing the speed limit on the pavement markings, providing reflective pavement markers (RPMs) along the roadway to provide better delineation and/or to provide a feeling of friction, and provide transverse pavement markings placed across the lane perpendicular to direction of travel.

4.3 Long-Term Mitigation Measures

If roadway improvements are implemented on Hoffner Avenue along the study corridor, the addition of curb and gutters and implementing landscaping changes to the roadside plantings to create vertical friction could help reduce the speeding behavior of drivers noted on the corridor. Additionally, adding street lighting along the corridor will improve nighttime visibility. Consideration should also be given to narrowing the width of the travel lanes for the entire corridor, along with adding sidewalks for the segments where sidewalks are missing to improve pedestrian connectivity given the high pedestrian activity along this corridor.

Furthermore, the following improvements are recommended for the corridor, which are based on the *Belle Isle Transportation Feasibility Study for Planned Hoffner Avenue (East and West) Improvements* and included in the **Attachments**.

- Add sidewalk segments to connect existing crosswalks with sidewalks.
- Add a single lane roundabout with enhanced crosswalks at the intersection of Hoffner Avenue and Wandsworth Avenue/St. Denis Court.
- Add median refuge islands between Peninsula Drive and Avocado Lane, between Louvre Avenue and Mortier Avenue, between St. Marie Avenue and Monet Avenue and between Pelleport Avenue and Darden Avenue.
- Widen Hoffner Avenue at the locations where the median refuge islands are proposed.
- Add a single lane roundabout with enhanced crosswalks at the intersection of Hoffner Avenue and St. Germain Avenue.
- Add bridge for proposed sidewalk over the Lake Conway connection channel located between Pleasure Island Drive and St. Denis Court.
- Add brick pavers (textured intersection) to the intersection of Hoffner and Oak Island Road.

THIS ITEM HAS BEN DIGITALLY SIGNED AND SEALED BY
AYMAN H AS-SAIDI
2022.11.21 11:42:43 -05'00'
ON THE DATE ADJACENT TO THE SEAL

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