

TECHNICAL MEMORANDUM

To: Andrew Jinks, Town of Vienna Transportation Engineer
Michael Gallagher, Town of Vienna Director of Public Works

From: David B. Samba P.E., PTOE
Kimley-Horn and Associates, Inc.

Date: February 7, 2020

Subject: ***Maple Avenue Multimodal Transportation and Land Use Corridor Study
Response to Comment on Draft Report (dated 12/20/2019)***

Introduction

This memorandum serves as a response and clarification to comments related to the 12/20/2019 submission of the Maple Avenue Multimodal Transportation and Land Use Corridor Study. The comments represent those items discussed in public Town Council work sessions and additional comments relayed by staff. It is noted that the comments as listed below are not verbatim, however they do capture the intent of the comments as understood by Kimley-Horn.

Comment Response

Comment 1: Within the report, please provide definition, details, and benefits of Multimodal Level of Service (LOS)

Response: The report will be updated to provide a brief overview of additional LOS criteria that could be applicable to multimodal analysis (i.e. such as pedestrian LOS, bicycle LOS, transit LOS, and overall urban street facility/segment LOS). The brief overview will identify the challenges and tradeoffs of incorporating these less traditional measures in an analysis and in the public discussion.

Comment 2: Discuss the Town's Maple Avenue signal upgrade project and how it will impact the Town (from a multimodal aspect).

Response: The report will be updated to provide a brief overview of the planned traffic adaptive signal system. The report will reference submitted reports as prepared by the traffic adaptive signal system consultant as well as more general information published by the Federal Highway Administration and/or Department of Transportation.

Comment 3: Provide additional crash analysis

Response: The results of a three-year crash history review are provided on page ES-9 and pages 4-1 through 4-4. The provided information meets the requirements of the scope of work, i.e. "Kimley-Horn will review, document, and map crash occurrence along Maple Avenue and/or within the influence area of study area intersections using the most recently available 3-year

VDOT crash information.” No further analyses will be included with the report; however, a brief narrative will be added to contextualize the type of improvements that could be deployed to correct the types of crashes that were revealed in the crash history review.

Comment 4: Address bus stop improvements

Response: The quality of existing bus stops is described on page 3-12 of the report. Bus stop enhancements are discussed on page 7-22 (and are classified as a mid-term recommendation). No changes to the report are proposed.

Comment 5: Index for the Appendix

Response: An index and/or Table of Contents will be added to the Appendices to assist the reader.

Comment 6: Question about the applicability of internal capture for studies relative to VDOT Guidance

Response: There are two VDOT source documents that are germane to this question: (1) Updated Administrative Guidelines for the Traffic Impact Analysis Regulations 24VAC30-155 (December 2018) and (2) Traffic Impact Analysis Regulations 24VAC30-155 (January 2012).

The council member questioned whether it was appropriate to use internal capture, quoting the following section of the documents during the work session:

24VAC30-155-40. Rezoning.

A. Proposal submittal. The locality shall submit a package to VDOT within 10 business days of receipt of a complete application for a rezoning proposal if the proposal substantially affects transportation on state-controlled highways. All trip generation calculations used for the purposes of determining if a proposal meets the criteria shall be based upon the rates or equations published in the Institute of Transportation Engineers Trip Generation, 8th Edition, 2008, and shall not be reduced through internal capture rates

First, it is relevant to state that VDOT review of plans and associated traffic impact analyses (TIAs), generally, may be **required** in a few situations:

1. Prior to any local approval of a comprehensive plan, transportation plan, plan amendment or small area plan (though TIA's are not required to be submitted specifically for comprehensive plans or plan amendments)
2. For rezoning in a jurisdiction in which VDOT **has** maintenance responsibility for the secondary highway system, TIAs are required to be submitted with a rezoning proposal that will generate more than 5,000 vehicle trips per day at the site's connection to a state highway
3. For rezoning in a jurisdiction in which VDOT **does not have** maintenance responsibility for the local highway system, TIAs are required to be submitted with a rezoning proposal that generates more than 5,000 vehicle trips per day and

whose nearest property line is within 3,000 feet, measured along public roads or streets, of a connection to a state highway

No submission of a TIA to VDOT shall be required under this section if the rezoning proposal consists of no changes in allowable land use.

No submission of a TIA to VDOT shall be required if the rezoning proposal results in lower maximum daily trip generation and no increase in maximum trip generation for AM Peak Hour of the adjacent street, PM Peak Hour of the adjacent street, and Weekend Peak Hour when compared to the hourly trip generation of land uses allowed by right under the current zoning, except governmental uses such as schools and libraries.

With the understanding of the above requirements and limitations, the section of the VDOT guidance that the council member referenced is saying that a consultant cannot use internal capture to reduce the trips generated by the site only when trying to verify whether the site exceeds the 5,000-trip threshold.

If the 5,000-trip threshold is achieved and a VDOT traffic study is required, then the consultant **can** use internal capture for the analysis portion of the study, as well as following all other VDOT required methodology.

If the 5,000-trip threshold is not achieved, then none of the VDOT requirements apply in that case, and the use of internal capture and other methodologies would be based on the scoping agreements with Town of Vienna.

The use of internal capture in the analysis of the Maple Avenue Multimodal Transportation and Land Use Corridor Study is appropriate because (1) it is not a VDOT study and (2) the restriction on the use of internal capture is only relevant in checking against the 5,000-trip threshold, not in the analysis of conditions.

Lastly, it should be said that the Maple Avenue Multimodal Transportation and Land Use Corridor Study is a study. It is not a rezoning proposal, or a small area plan, or any other plan to be approved or adopted. While it could be integrated into a Long-Range Master Transportation Plan or the Comprehensive Plan, the study, alone, is neither of these. As such, other than a potential courtesy review, there is no requirement for VDOT action or involvement in the study nor a requirement to use VDOT methodology (though the study still generally aligns with VDOT recommended practice).

Comment 6: Show a combined Future Development Trip Figure (to complement the individual development figures in the Appendix)

Response: This figure is already included in the report as Figure 5-3. Additionally, a “total future with development trips” figure is already included in the report as Figure 5-4.

Comment 7: Provide an explanation for the increase in delays shown in Table 6-2 (specifically at James Madison Drive, Wade Hampton Drive, and Pleasant Street).

Response: First, the numbers presented in the report are correct based on the analysis.

Table 6-2 presents the delays and level of service for stop-controlled minor street approaches to Maple Avenue. Maple Avenue is the major street and does not have to stop (or yield) at these intersections; as such the side street movements have low priority and must wait for an opportunity to turn right, turn left, or to cross Maple Avenue.

This “opportunity” can be described as a concept known as the “critical gap” which is the minimum time needed for a driver to make their maneuver from a side street. Please note that the critical gap to make a right turn is different than the critical gap to make a left turn.

In laymen’s terms, this is the driver deciding how much time and distance exists between their position and the position of oncoming vehicles along Maple Avenue and whether that time and distance gap is sufficient to make a turn safely and completely (or partially if there is a median wait area).

In the analysis, during the peak hour, Maple Avenue is congested. The analysis, assuming typical driver behavior, does not find enough available gaps along Maple Avenue for vehicles to make their maneuvers from the side streets. This is why there is high delay in the existing conditions and higher delay in the future conditions.

A few statements regarding these delays need to be clarified/corrected:

- The “spike” in delay is not specifically due to a significant increase in development traffic volumes. Based on the lack of appropriate critical gaps, each added minor street vehicle experiences large delays. As such, even a small increase in traffic volumes results in these seemingly large average delay values for the minor street approach. The “spike” in delays is essentially the existing delay compounded onto additional vehicles.
- The model is a *macroscopic* model... it runs standard Highway Capacity Manual (HCM) equations based on assumptions and inputs and produces macroscopic level results about groups of vehicles (or flows).
- The model is not a *microscopic model*. It does not simulate or produce results on the individual behaviors of every single car and driver. Please note a microscopic analysis was not including in the scope of work. Because of this fact, in our analysis model, every driver accepts the same typical critical gap in the model (relative to certain variables in the traffic stream and in the transportation network).
- In the real world, there are a variety of behaviors and tendencies that would occur at the minor street approach – there are drivers who will accept a smaller gap in traffic to make their turn, there are drivers along Maple Avenue who will yield to allow a turn or at least not “block the box” when stopped in congestion and let someone out of a driveway or side street, there are driveways and commercial entrances in the network

that break up the traffic stream and create more gaps than are recognized in the model, there are minor street drivers who will position the front of their car out into traffic and force the gap to be created, etc.

- None of these behaviors are or can be fully captured in a macroscopic model and most of these behaviors can only be loosely programmed in a microscopic model, at least without extensive cost, time, and potential diminishing return on investment relative to overall differences in the analysis results.
- All of this is said to indicate that the results of a model must be interpreted. Kimley-Horn does not expect that there will be 442 seconds of delay for each vehicle, for example. While that is the model result, the interpretation of that result is (1) there is significant delay for that approach (LOS F) and it is the type of delay that is intolerable to most drivers, (2) one or more of the behaviors discussed above are likely going to occur at this intersection, with regularity, during the peak hours to serve as some measure of congestion relief, and (3) another behavior may occur.
- It was suggested that the “spike” in delay would result in cut through traffic. While the use of the available traffic network is certainly one of the other behaviors that could occur, it is not guaranteed nor is it the only option. Recall that the Kimley-Horn analysis has loaded all of traffic in the peak hour (i.e. the most congested point of the network) and this loading of traffic does not change regardless of the amount of congestion or the delay at specific locations.
- Again, in the real world, if a motorist knows that Wade Hampton at Maple Avenue is congested, they *could* choose to “cut through” and use rest of the network, but they could just as easily choose to leave 30 minutes earlier, or choose to leave 30 minutes later, or choose to work from home, or choose to walk/bike/take transit, or choose to carpool, etc. It should not be exclusively assumed that these delays (however intolerable) will result in “cut through” traffic when there are many alternate ways that people may choose to respond to these congested conditions.
- Lastly there was a question about whether these delays (and increases in delays) were consistent with previously approved studies that have been presented to the Town - They are consistent. See the excerpt from the 444 Maple Avenue study, prepared by Wells and Associates, shown as an example:

8 James Madison Drive/ Maple Avenue		STOP	EBL	A [9.2]	B [11.1]	A [9.7]	A [9.3]	B [11.6]	A [9.9]
Maple Avenue		EBTR	A [0.0]	A [0.0]	A [0.0]				
Maple Avenue		WBTR	B [11.7]	A [9.7]	B [12.4]	B [13.7]	B [10.7]	C [16.7]	C [16.7]
Driveway		NBLTR	A [0.0]	A [0.0]	A [0.0]				
James Madison Drive		SBLTR	F [110.1]	F [113.7]	F [254.6]	F [933.0]	F [789.9]	F [*]	F [*]
			F [92.4]	F [91.3]	F [147.5]	B [13.0]	C [15.6]	C [24.4]	C [24.4]

- Unsignalized residential side streets approaching major busy arterial streets can have exorbitant delays during peak hours – and there are limited mitigations to reduce those delays. This is because of the hierarchy and the priority that is placed on the major street movements relative to minor street movements.

Comment 8: Are there any recommendations for Windover Avenue?

Response: Windover Avenue was not in the study area as defined in the scope of work. A recommendation for Windover Avenue was developed, however, as part of the potential bicycle network, as shown on Figure 7-12.

Comment 9: Can the developments included in the analysis be specifically identified?

Response: The developments are specifically identified in Section 5.3, shown in Table 5-2, quantified with trips in Table 5-3 and Table 5-4, and shown in Figure 5-2. The developments were not detailed on page ES-11 for the sake of brevity in the Executive Summary. The list can be added to the executive summary if desired.

Comment 10: Further clarifications about LOS/Capacity (Section 3.4)

Response: This was extensively discussed by the Town Transportation Engineer and the Director of Public Works at the work session.

Our only additional response is that we concur that there is no specific value that can stand for the “absolute” capacity of Maple Avenue.

In the referenced section of the report, a few working numbers were developed (with justification) that could be considered appropriate (recognizing a host of caveats and assumptions) to satisfy the curiosity of Council. Specifically, we cited 2,800 to 3,600 vehicles per hour or 32,000 to 33,000 vehicles per day as appropriate capacity values for the 5-lane section of Maple Avenue.

It is noted that during the peak periods, there is no expectation that Maple Avenue should not be near, at, or overcapacity.

In the busy Northern Virginia region, excess capacity will be used.

If Maple Avenue provides a viable route between Fairfax County, Tysons, and beyond, the capacity that is there will be used during the peak periods.

The importance of how Maple Avenue functions relative to its capacity should be focused on how to get the most efficient operations out of the lanes and space that exist and how to manage multimodal travel demand most effectively. It should also be said that this “efficient” use of space should consider the hierarchy, priority, and provision of opportunities for other travel modes, where appropriate.

Comment 11: Discussion of eastbound/westbound split (page 3-13)

Response: During the work session, a council member referenced the eastbound/westbound splits discussed in the report and question the validity of the analysis if they were based on “before 12:00 PM” and “after 12:00 PM” east/west splits.

First, as a reminder, the Kimley-Horn analysis is based on the peak hours of traffic (7:30 AM to 8:30 AM and 4:45 to 5:45 PM). All analysis is based on the traffic volumes, flow rates, and eastbound / westbound splits that occur during the peak hours.

The “before 12:00 PM” and “after 12:00 PM” values that were reported are just statistics and have no bearing on the overall analysis.

For comparison, the eastbound / westbound splits for various times, including the peak hours and the typical commuter peak periods, are also provided below:

Directional Split	Before 12:00PM	After 12:00PM	Peak Hour		Peak Period	
			7:30 to 8:30 AM	4:45 to 5:45 PM	6AM to 9AM	4PM to 7PM
Eastbound (towards Tysons)	62%	42%	60%	40%	66%	40%
Westbound (towards Fairfax)	38%	58%	40%	60%	34%	60%