



Associates

Traffic, Transportation & Civil Engineering

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November 2, 2021

Mr. James Venincasa
Whitney Street Home Builders
1 Golden Court
Westborough, MA

RE: Responses to Stantec's Comments
Relative to Traffic Study for
Rice Road Residential Development Project

Dear Mr. Venincasa:

In response to your request, I am pleased to forward this memorandum that contains my responses to the comments submitted on Tuesday, October 19, 2021, by the firm of Stantec, the peer reviewer for the town of Millbury Planning Board. In support of the application for definitive site plans to the town of Millbury Planning Board, I am submitting the following responses relative to the comments pertaining to the traffic study dated March 2021. It should be noted however, the traffic study was prepared following standard traffic engineering practice and was based on engineering judgment and knowledge of the local roadway network in the town of Millbury.

Comment

Stantec recommends the study include average and peak speeds along at least Rice Road, per traffic impact assessment section of the Millbury Bylaws. If this data is unavailable, Stantec recommends clarification as to why this information is unavailable.

Response

It should be noted that there are no speed data available for Rice Road in the massDOT traffic volumes database. Additionally, this is a very short residential street with pavement width of 20'-22', and serving a total of approximately 40 residential homes, thus little opportunity exists for motorists to drive at speeds greater than the Massachusetts statutory prima facie speed of 30 miles per hour, particularly if some residents occasionally park on the street. Regardless, the speed on Rice Road is not expected to influence the analysis, findings, and recommendations in the traffic study.

Comment

Stantec recommends the study include average daily volumes along Rice Road, per the traffic impact assessment section of the Millbury Bylaws. If a daily volume was not counted, Stantec recommends clarification as to why this information is unavailable.

Response

As stated herein above, there are no such data available for Rice Road from the massDOT traffic volumes database. Also, as a traffic engineer and familiarity with the area, and based on the turning movement counts conducted for the intersection of Rice Road and Thomas Hill Road, it is easy to estimate and conclude the daily volume along Rice Road is minimal. As such, if the seasonally adjusted turning movement counts (baseline) are used in accordance with the massDOT default K factor of 0,09, the daily traffic for Rice Road can be estimated at 333 vehicles per day. If the number of homes along Rice Road, Thomas Hill Road, Aldrich Avenue, and Capt. Peter Simpson Road were used to estimate daily traffic along Rice Road using ITE land use code 210, Rice Road estimated volume would be anywhere from 378 to 448 daily trips. Regardless of which estimate is used, Rice Road carries little traffic to warrant collecting a set of new daily counts. Nevertheless, the Rice Road daily volume will have no meaningful impact on the analysis, findings, and recommendations in the traffic study.

Comment

Stantec recommends the study be reviewed for inconsistency found between the annual growth rate calculation identified in this section (Traffic Volumes) and the Future Conditions section of Chapter 4 – Traffic Operations. Although the study included the correct annual growth rate for R4-7 roadways from MassDOT’s most current growth rate data (0.0034 or 0.34%), the study described multiplying the growth rate by 2 to account for COVID-19 and then multiplied the rate further by 5 to extrapolate to future conditions. Within the study, this meant a rate of 0.0068 would mean a 0.0175 rate for future conditions. The correct rate for a seven-year outlook from 2019 to 2026 if utilizing a 0.0034 (0.34%) growth rate would lead to a growth rate factor of 1.024, or an increase of 2.4 % from 2019 conditions, by utilizing the average annual compounding growth rate method. Even if the initial growth rate was doubled to 0.0068 (0.68%) when accounting for additional development in the area, this means the growth factor to 2026 is 1.0485. Within the second paragraph of the Future Conditions section of Chapter 4 – Traffic Operations identify simply using the 0.0034 growth rate over five years from 2019 to 2026, which appears to be different than described in Chapter 2’s section on Traffic Volumes. Stantec recommends clarification and further calculation tables or worksheets to represent the annual growth rate used for the study.

Response

It should be noted that the growth rate for both COVID correction and determination of future intersection volumes were projected using the massDOT guidelines and the massDOT Yearly Growth Rates on page 29 of the traffic study (also shown below). The average rate of 0.0034, or 0.34% per year was calculated for R4-7 roads. Therefore, the volumes were multiplied by this factor twice to achieve COVID correction for the year 2021. After the data were subjected to seasonal correction, the data were then multiplied by this rate five times to reflect future no build year of 2016. Regardless, because the intersection volumes are not significant, the growth rates will have no meaningful effect on the analysis, findings, and recommendations in the traffic study.

MassDOT Yearly Growth Rates

Data from 2014 to 2018

Growth Factors					
Group	Grow 2014 to 2015	Grow 2015 to 2016	Grow 2016 to 2017	Grow 2017 to 2018	Grow 2018 to 2019
R4-7	-0.01	0.003	0.001	0.011	0.012

Comment

The crash data was reviewed for a three-year period from 2018 through 2020 and the review “revealed that no accidents were reported for any of these intersections during this three-year period.” Stantec reviewed the MassDOT Impact Tool for Crash Query and Visualization and identified a fatal crash just west of the intersection of Rice Road and South Main Street from August 22, 2020 (reported as not intersection related) and three crashes in the vicinity of the intersection of Rice Road and Providence Street (MA Route 122A).

Stantec recommends the applicant review these crashes and provide further analysis within the study of how the proposed development may affect, or be affected by, these crashes.

Response

The accident that occurred on August 22, 2020, at/near 69 South Main Street was not at the intersection of South Main Street and Rice Road. It involved a single vehicle (a motorcycle) and it occurred in the middle of the night (2:45 AM). The street was lighted, and records don’t indicate as to which direction the motorcyclist was traveling. This accident could be attributed to high speeds and loss of control of the vehicle. Therefore, no deficiencies could be attributed to the roadway segment, and particularly to the intersection of South Main Street and Rice Road.

As for accidents on Providence Street (Route 122A), there were three accidents reported at/near 48 Providence Street, the site of CK Smith Gas facility, which is approximately 500’ west of the Rice Road intersection. One accident was a single vehicle accident involving a driver losing control of the vehicle and hitting a fence on the side of the road. Two accidents were of rear-end type that involved a vehicle turning left onto the CK Smith facility. Again, these accidents occurred at an establishment approximately 500’ west of the Rice Road intersection, thus cannot be attributed to any deficiencies at this intersection.

Comment

This section begins with a first paragraph appearing to describe the Intersection Sight Distance (ISD) for the proposed development driveway. From the second paragraph on, the section describes calculating the Stopping Sight Distance (SSD). Stantec recommends the study provide clarification of the sight distance measurements performed and present the information in a table or figure of the results for ease of confirmation. The figures presenting Google Earth profiles do not appear to clearly cross-reference data or results within this section of the study.

Response

It should be noted that the intersection of Rice Road and Thomas Hill Road is an existing intersection, thus making intersection sight distance analysis would be pointless. Also, the Google Earth approximate profile was intended for visualization purposes only. Having said that, as stated in the traffic study, it was determined ample stopping sight distances are available

for the subject intersection. As for Intersection Sight Distances, the desired Intersection Sight Distances for the Massachusetts statutory prima facie speed limit of 30 miles per hour are given in the Exhibit 3-11 of massDOT Design Guide (see attached Sight Triangle) as 335' for left turns and 290' for right turns. As stated in the traffic study, the available sight distances are 500'+ to the right (west) and 350' to the left (east), thus exceeding the desired Intersection Sight Distances. The following table shows the relationship between the available sight distances, required stopping sight distances, and the desired intersection sight distances.

Sight Distances

Direction	Available SD	Required SSD	Desired ISD
Looking to right (west)	500'+	200'	335'(LT), 290'(RT)
Looking to the left (east)	350'	200'	335'(LT), 290'(RT)

Comment

AK Associates identify in this section that “the current land use designation for the proposed multifamily development site is R-1, and the site is currently undeveloped.” The existing condition for the parcel of the proposed residential development appears to include an existing single-family residence.

Response

The current land use designation for the proposed multifamily development site is R-1, and the site is currently mostly undeveloped. The parcel includes one existing single-family residence. Regardless, the presence of one existing single-family residence will have no impact on the analysis, findings, and recommendations in the traffic study. In fact, since the new trips associated with the proposed development are so low, the number of trips associated with the existing single-family residence was not subtracted from them, thus resulting in conservatively higher trip generation to reflect worst case scenario.

Comment

Stantec recommends additional description of the existing at-grade railroad crossing of Rice Road, just west of the intersection with Providence Street (MA Route 122A). The study should at least provide basic attributes of the crossing and identify the impact this crossing will have to the development or by the development.

Response

The at-grade railroad crossing was identified and described under Study Area Roadway Network section of the traffic study. Again, due to very low existing (less than one vehicle every two minutes during PM peak) and little anticipated traffic volumes and familiarity with the area, no impact is expected on the railroad crossing facility or on the development traffic.

Comment

- Trip Distribution Assignment – Second Paragraph – Final Sentence – Identify 91 vehicles departing during a typical day, however, is 191 according to the ITE Trip Generational results.*

Response

It is a typographical error. It should have read “Finally, a total of 190 vehicles will be arriving at and 191 vehicles will be departing from the proposed site during a 24-hour period on an average day”.

Comment

• *Figure 4 – The AM entering volumes from South Main Street / Rice Road are imbalanced with the AM entering (7 to 4).*

Response

It is a typographical error in Figure 4. The analysis will have resulted in a more conservatively high resultant due to using 7 vehicles entering instead of 4 vehicles. Regardless, because of very low traffic volumes on Rice Road and those expected from the proposed development, the use of seven vehicles instead of four vehicles entering from South Main Street will have no impact on the analysis, findings, and recommendations in the traffic study.

Comment

• *Figure 4 – The PM entering volumes from Rice Road*

Response

The total entering traffic during PM peak is 21 vehicles, eight vehicles from the east and 13 vehicles from the west, as depicted in Figure 4. Of the eight vehicles coming from the east, five vehicles will be arriving from points north, and three vehicles from points south of the South Main Street intersection. Similarly, of the 13 vehicles arriving from the west, five will be from points north and eight from points south along Providence Street. Again, regardless of the above-mentioned typographical misprints, because the traffic volumes on Rice Road and those expected from the proposed development are insignificant, the use of seven vehicles instead of four vehicles entering from South Main Street will have no impact on the analysis, findings, and recommendations in the traffic study.

Comment

The study identifies Land Use 230 – Residential Condominiums / Townhouses were used to reference parking demand for the development’s dwellings. This land use differs from the Trip Generation analysis (LUC 220 – Multifamily Housing (Low-Rise) and LUC 230 – Residential Condominiums / Townhouses is not a code in the most current edition of the Parking Generation Manual (5th Edition). Stantec recommends AK Associates clarify why this land use code was used and from which edition of the ITE’s Parking Generation Manual. Also, AK Associates should further clarify where the peak parking demand rate in suburban areas originates from and why it is 1.68 parking spaces per unit. The Parking Generation analysis was not included in the Appendix for confirmation.

Response

As mentioned by the review engineer, there is no land use code 230 in the 5th edition of the Parking Generation Manual. However, the 3rd edition of ITE’s Parking Generation Manual has data for the correct land use code 230 that represents the proposed residential development which

was used in the traffic study. A copy of the Parking Generation Manual's land use code 230 is attached hereto. As mentioned in the traffic study, the 85th percentile parking demand was based on condominiums/Townhouses in suburban areas. Also, it should be noted that the demand for off-street parking is greatest for residences located in suburban areas primarily due to the lack of public transportation and long distances from daily conveniences.

Comment

Stantec recommends the traffic impact study include the following information for the Synchro reporting:

- The version of Synchro used for the analysis.*

Response

The 5th version of Synchro computer software which is based on the Highway Capacity Manual was used for analyzing the unsignalized intersections in the study area. It should be noted that any later version of the Synchro computer software should provide similar results as they are based on the same document (Highway Capacity Manual), and as well as particularly since we are talking about intersections with so little traffic volumes. Regardless, because the intersection volumes are not significant, the version of the Synchro software will have no meaningful effect on the analysis, findings, and recommendations in the traffic study.

- The traffic impact study also identified truck percentages within the study area, however the Synchro outputs cannot be used to verify that these truck percentages were applied.*

Response

As stated in the review, the traffic study identified truck percentage within the area to be 1.7%. However, the Synchro's default value of 2% was used throughout the analysis to assess worst-case scenario. Regardless, because the intersection volumes are not significant, the truck percentage will have no meaningful effects on the analysis, findings, and recommendations in the traffic study.

Comment

Stantec recommends rerunning the analysis based on the revisions or clarifications required for the annual growth rates as commented in the Traffic Volumes section.

Response

Again, regardless of the review comments relative to typographical errors, the lack of daily traffic volume for Rice Road, which version of the Parking Generation Manual or Synchro computer software was used, given the very low intersection volumes, reanalyzing the intersections will have no meaningful effects on the analysis outcome, findings, and recommendations in the traffic study. It should be noted that throughout the preparation of the traffic study, efforts were made at each step to analyze and assess the worst-case scenarios. Therefore, any reanalysis should result in the same outcome or better Levels Of Service.

Mr. James Venincasa
Whitney Street Home Builders

In conclusion, the assessment of the roadway conditions and assumptions used in evaluating the existing, future no build, and future build conditions were based on engineering judgement, as well as the knowledge of the area roadways in the town of Millbury. Also, because the existing traffic volumes and those expected from the proposed development are insignificant, any reanalysis of the intersections would have no effects on the operational qualities of the intersections studied, and therefore, will have no impact on the outcome of the study as it was presented.

I trust the above responses will suffice. Please feel free to contact me should you have any questions.

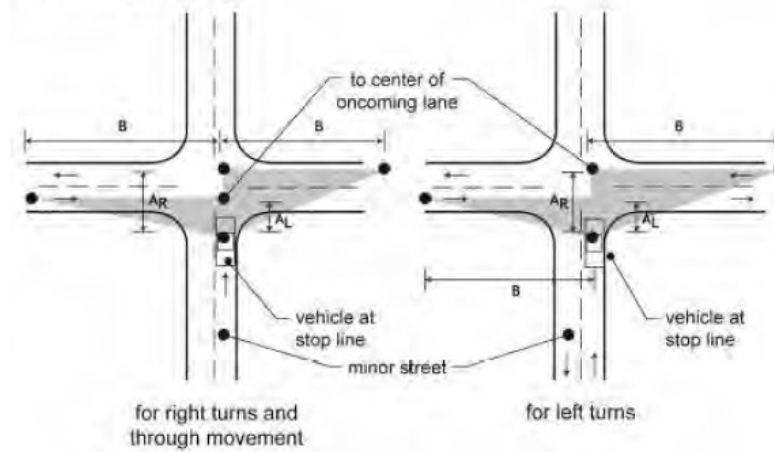
Sincerely,



Ali R. Khorasani

Attachments

Exhibit 3-11
Sight Triangle Case B
Departure Sight Triangles



Sight Triangle Legs: Case B – Stop Control on Cross Street

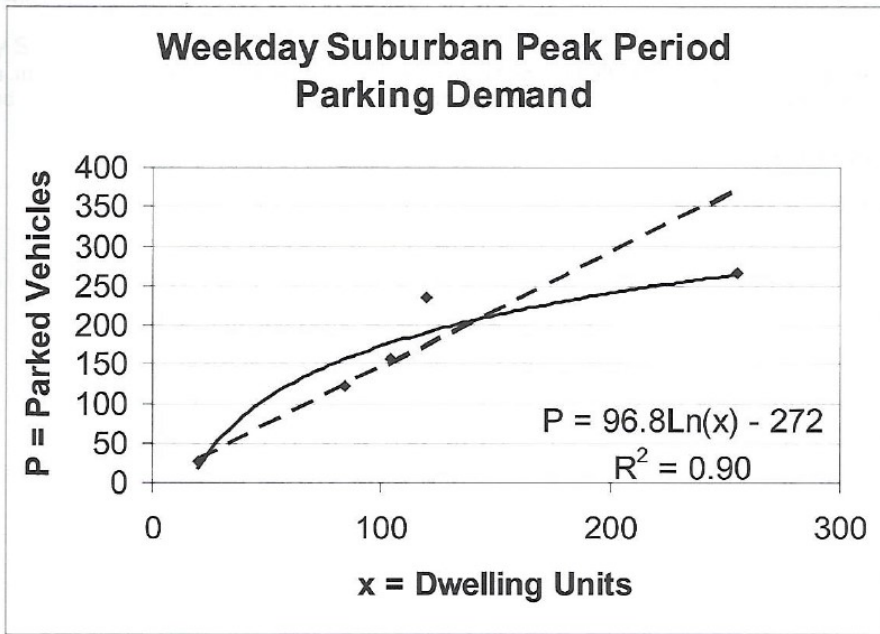
Major Street Design Speed (mph)	Length of Sight Triangle Legs (feet)			
	Minor Street for Vehicles Approaching From Right (AR, feet)	Minor Street for Vehicles Approaching From Left (AL, feet)	Major Street For Left Turns (B, feet)	Major Street for Right Turns or Through (B, feet)
15	32.5	20.5	170	145
20	32.5	20.5	225	195
25	32.5	20.5	280	240
30	32.5	20.5	335	290
35	32.5	20.5	390	335
40	32.5	20.5	445	385
45	32.5	20.5	500	430
50	32.5	20.5	555	480
55	32.5	20.5	610	530
60	32.5	20.5	665	575
65	32.5	20.5	720	625
70	32.5	20.5	775	670
75	32.5	20.5	830	720

Sight triangle legs shown are for passenger car crossing or turning into a two-lane street, with grades (all approaches) 3 percent or less. For other grades and for other major street widths, recalculate using AASHTO *Green Book* formulas.
Source: *A Policy on Geometric Design of Streets and Highways*, AASHTO, Washington DC, 2004. Chapter 3 Elements of Design

Land Use Group: 230 Residential Condominium/Townhouse

Average Peak Period Parking Demand vs: Dwelling Units
On a: Weekday
Location: Suburban

Statistic	Peak Period Demand
Peak Period	5:00–6:00 a.m.
Number of Study Sites	5
Average Size of Study Sites	120 dwelling units
Average Peak Period Parking Demand	1.46 vehicles per dwelling unit
Standard Deviation	0.33
Coefficient of Variation	23%
Range	1.04–1.96 vehicles per dwelling unit
85th Percentile	1.68 vehicles per dwelling unit
33rd Percentile	1.38 vehicles per dwelling unit



◆ Actual Data Points — Fitted Curve - - - Average Rate