RSG INC.
RESOURCE SYSTEMS GROUP, INC.

MEMORANDUM

To: Millbrook Village Planning Board
From: J. Choi, R. Chamberlin PE/PTOE
Subject: Bennett College Site Traffic Impact Study Review
Date: 28 September 2006
Cc: David Clouser

This memorandum is a technical review of the *Traffic Impact Study, Bennett College Site* (7 August 2006) prepared by TRC Raymond Keyes. In general, the traffic study appears to be competently performed. We agree with most of the procedures and assumptions set forth in it. After a thorough review, we recommend that the traffic engineer provide additional information and analysis for 3 issues before the Planning Board accept the study's findings. Of particular importance is the need to clarify the safety record of the immediate roadway area.

Note that, as of the writing of this critique, RSG staff has not visited the project site. A site visit is scheduled for the week of October 2, and findings from this site visit may produce additional comments and recommendations.

1.0 GEOGRAPHIC SCOPE OF THE STUDY

The proposed project site is on the northeast corner of the NYS 343/US 44/NYS 82 intersection. The proposed development would consist of 90 condominium/townhouse units and 13 single-family detaching housing units.

The traffic study estimates peak hour vehicle trip generation of 66 trips during the AM peak hour and 72 trips during the PM peak hour. These are reasonable estimates. Given this, the study uses an appropriate geographic scope.

2.0 CHOICE OF STUDY PERIODS (PEAK HOURS AND ANALYSIS YEARS)

Congestion is analyzed during the AM and PM peak hours for one study year. The two peak hours are appropriate for a residential development such as the proposed project.

The study uses an appropriate base year of 2009, which is the year the development is expected to be completed and occupied.

55 Railroad Row, White River Junction, Vermont 05001
TEL 802.295.4999 ▪ FAX 802.295.1006 ▪ www.rsginc.com

3.0 TURNING MOVEMENT VOLUME DATA SOURCES

It is unclear which turning movement count data are used in the analysis or whether data from multiple days are averaged. Generally, it is recommended that traffic data be collected on a Tuesday, Wednesday, or Thursday. Monday and Friday volumes tend to be more influenced by weekend traffic patterns. One of the AM counts was conducted on a Friday, and it is not clear if it was used in the analysis.

4.0 ADJUSTMENT FACTORS

It is unclear which NYSDOT data source was used to calculate the 2% growth rate per year. It would be helpful if the data source was included in an appendix. However, NYSDOT data that Resource Systems Group collected and analyzed in the study area yield an annual growth rate of less than 1% per year. Thus, a 2% growth rate is conservative and is acceptable for this study.

5.0 TRIP GENERATION/DISTRIBUTION AND SCENARIO VOLUMES

The trip generation estimates in the study use the Institute of Transportation Engineers' publication, *Trip Generation,* and are reasonable.

There are assumptions used in estimating arrival and departure patterns that are not necessarily supported by the existing traffic patterns in the area. There are 3 issues to highlight:

1. Based on the traffic counts performed for the traffic study, traffic at Carroll Boulevard is greater than traffic at Bennett Common Way (Figure 1-Figure 2). Further, it appears from the site plan that the development would have access to both streets. Thus, it would make sense if a greater proportion of the project's trips would use the Carroll Boulevard access point. The study currently has 61% of trips using the Bennett Common Way access point and 39% using the Carroll Boulevard access point. The traffic study suggests that "existing traffic patterns" were utilized to develop arrival and departure patterns, but the traffic data do not necessarily lead to this conclusion.

Figure 1: AM Peak Hour Through Volumes at the Two Access Points

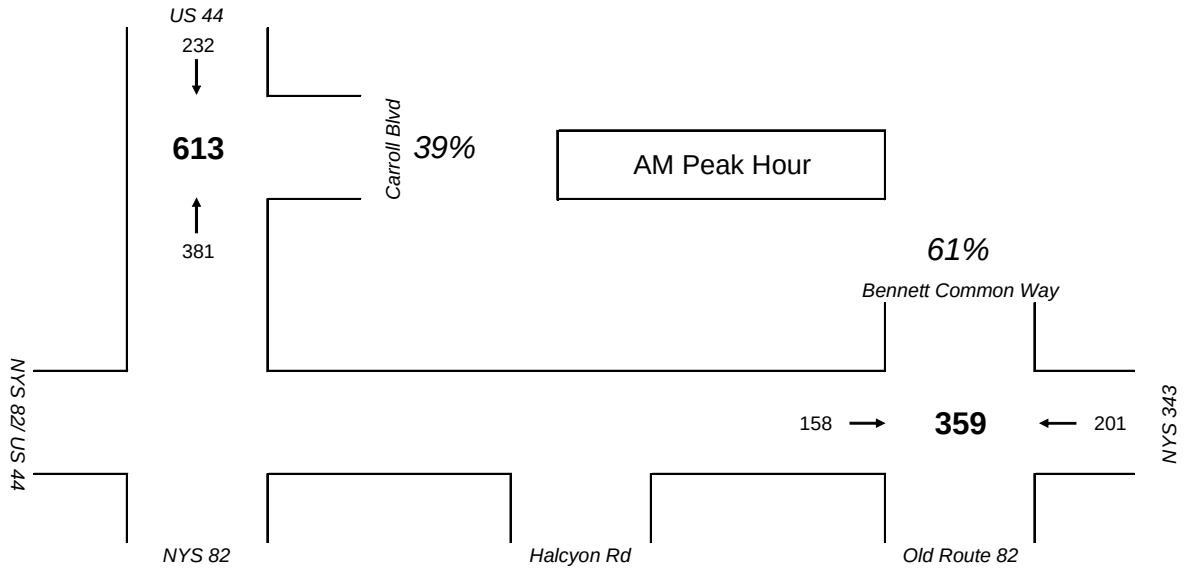
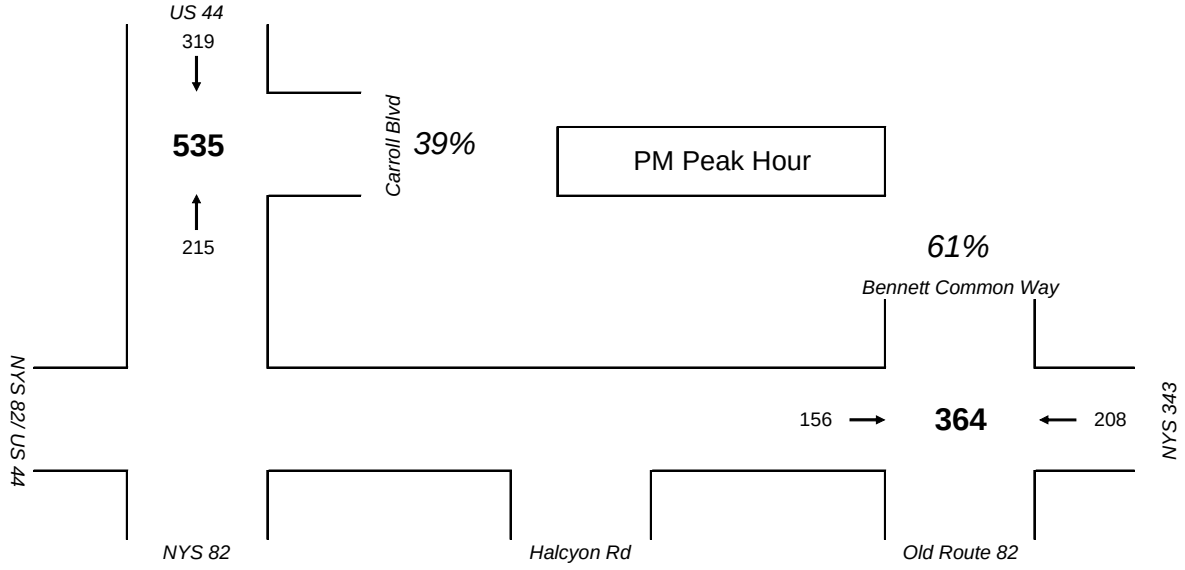


Figure 2: PM Peak Hour Through Volumes at the Two Access Points



2. As shown in Figure 1 and Figure 2, the use of each access drive by site traffic is the same for the AM and PM peak periods. This is usually not the case with housing developments. Without a stronger rationale, it is difficult to say if this assumption is reasonable.

3. Finally, the same directional distribution percentages are used for both peak hours. For example, the same fraction of exiting traffic (22%) turns left out of the site at Bennett Common Way during AM peak periods as during PM peak periods (study Figures 4 and 5). This is an unusual, but not impossible, traffic tendency. It is reasonable to expect the desire lines to differ between the AM and PM peak hours. For example, those departing during the AM peak hour are likely headed to work while those departing during the PM peak hour could be headed out to a restaurant. It is possible that employment centers and retail centers are sited in the same direction from the development, but it is also possible that people would head off in different directions. Thus, it is important to review the data and/or rationale that the distribution percentages are based on.

The study appropriately investigated whether other major developments in the Village of Millbrook or the Town of Washington would affect traffic in the study area and found none.

6.0 CONGESTION ANALYSIS

The congestion analysis results are reasonable. However, it is unclear whether the signal timings used in the analysis of the US 44/NYS 82/NYS 343 intersection are the existing signal timings or the optimized timings. The basis for the signal timings used should be stated in the report.

The study appropriately addressed differences between No Build and Build conditions.

7.0 SAFETY ANALYSIS

The study states that a "minimal" number of accidents were experienced within the study area over the identified 3-year period (2000-2002). Table 2.3.1 lists only the crashes listed as occurring at an intersection. However, there are some crashes that occurred at the same mile marker as an intersection, but are listed as being "non-intersection" accidents. For example, there are 7 accidents identified as occurring at "Ref Mrkr: 44 8202 2133 Intersection Accidents – Jct NY 82 & NY 343", and we assume these are the 7 shown in Table 2.3.1. However, there are also 5 accidents identified as occurring at the identical reference marker (44 8202 2133) but designated as "Non-Intersection Accidents." Thus, it is impossible to conclude from the analysis whether the crash record is in fact minimal. We suggest that the traffic engineer produce a map locating each crash occurring within the study area for the period analyzed (2000-2002).

In addition, no accidents at Carroll Boulevard were included in the accident table in the report. There are no accidents in the appendix that are identified with this intersection name. It should be clarified as to whether zero crashes took place at this location.

An updated safety analysis should provide a map locating each crash, and calculate whether the crash rate exceeds the average accident rates for the state.

In addition, the safety analysis should classify all crashes according to readily available information shown on the crash reports, as follows:

- time of day,
- time of year,
- weather conditions,
- pre-accident actions, and
- apparent (causal) factors.

Tabulations and/or graphs of these factors could reveal if any patterns or tendencies exist that are addressable.

Stopping and intersection sight distances are not provided. These are important for safe access to and egress from the site.

8.0 WARRANT ANALYSIS

Turn lane warrant analyses should be conducted for the following two intersections:

- NYS 343/Bennett Common Way
- US 44/Carroll Boulevard

Turn lane warrant analyses would indicate whether a right-turn or left-turn lane is needed for safe access with minimal delays.

9.0 CONCLUSION

The geographic scope, study time periods, study year, annual growth rate, trip generation, investigation of other developments, and comparison of No Build to Build conditions are reasonable in this study.

In our opinion, there are 3 aspects of the traffic impact study need further clarification before the Planning Board can accept its findings:

1. Trip distribution percentages, both arrivals vs. departures and AM peak hour vs. PM peak hour. The traffic engineer should provide a clearer rationale for the distribution, both quantitative and judgment-based rationale, if appropriate. Generally it appears that congestion is not a problem at the study area intersections as all unsignalized movements operate at LOS B or better and the signalized intersection operates at overall LOS C or better. It is likely that the estimated delays at the study intersections would not significantly change as a result of any adjustments to trip distribution percentages.
2. The safety analysis should be improved. This is the biggest deficiency with the traffic study. This analysis should include a map of each crash listed in the Appendix, a calculation of actual accident rates, a comparison of these rates to statewide average accident rates for similar facilities, and a set of tables/graphics characterizing the crashes. Stopping and intersection sight distances should be provided.
3. Turn lane warrant analyses should be conducted at the two site driveways at US 44 and NYS Route 343.

Please let me know if you have any questions.