



**Stantec Consulting Services Inc.**  
55 Green Mountain Drive  
South Burlington, VT 05403

April 3, 2020  
File: 179450514

**Attention: Alex Weinhagen, Director of Planning & Zoning**

Town of Hinesburg  
10632 Route 116,  
Hinesburg, VT 05461

Dear Alex,

**Reference: Haystack Crossing**

Per your request, we completed a peer review of the traffic investigations prepared by the applicant for the above referenced project. Stantec considered documents prepared by RSG Inc. for the applicant including an August 20, 2018 traffic impact study and an April 22, 2019 addendum that described proposed changes to the development program. Our review comments and recommendations are provided below.

## Project Description

Black Rock Construction proposes to construct Haystack Crossing, a phased, mixed-use development in Hinesburg's village growth area on the west side of Route 116. The latest Phase I program, described in the RSG Addendum, includes 193 residential dwelling units of various types and 20,000 square feet of mixed commercial uses. Vehicular access is proposed by way of a southerly extension of Haystack Road into the site. Haystack Road intersects Shelburne Falls Road from the south approximately 500 feet west of VT 116. Access is also proposed by way of a new right-in/right-out only driveway to be constructed at Route 116 opposite Riggs Road. Under Phase II, a connection to the Hinesburg Center Project, south of the subject site, is also contemplated. The Phase I project is undergoing subdivision review and the DRB requested an independent, technical review of the traffic impact study and addendum.

## Recommendations

Based on our review of the RSG studies we recommend preparation of a revised study that considers the current Phase I land use program and the Phase II program. An updated study will better inform decision-making regarding the redesign of the Shelburne Falls Road/VT 116 intersection and potential safety improvements along VT 116 near the proposed site driveway. The revised study should address the points discussed in this letter. Some of the major issues are listed below.

1. Provide Synchro/Highway Capacity Manual reports for intersection operations to define operations by lane group including volume-to-capacity ratios.

Design with community in mind



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2. Review crash reports to better understand the cause of crashes occurring at the proposed VT 116 site drive location. Summarize findings and recommend near-term and long-term mitigation strategies as appropriate. (Lowering the VT 116 speed limit in this area has been discussed in the past. Lowering the crest vertical curve on VT 116 may also be a consideration.)
3. Update the No Build conditions to reflect the current status of the Hannaford Bros. project. Omit Hannaford Bros. traffic and Hannaford Bros. mitigation from the No Build and Build conditions.
4. Include the Lantman's entrance driveway intersection in the traffic networks and analysis results.
5. Incorporate the current land use program and appropriate trip estimates into the Build condition. Identify trips associated with the proposed town house units.
6. Review and revise if appropriate trip generation adjustments made to account for accommodations for alternative modes and internal trip making. Provide documentation to support assumptions made in this regard.
7. Define the improvements proposed by VTrans at the Shelburne Falls Road/VT 116 intersection and the schedule for implementing these improvements. Suggest modifications to these improvement plans, if appropriate, to accommodate full-Build (Phase I plus Phase II) condition traffic volumes.
8. Expand the study to include the Phase II development program. This should be done as a second Build scenario. An understanding of Phase II impacts can inform decisions regarding proposed site access conditions and area roadway improvements currently under consideration.
9. Evaluate left-turn lane warrants for both site access points including the left-turn condition for traffic entering Riggs Road from VT 116 southbound.
10. Evaluate operations for affected intersections assuming full access is provided at the VT 116 access point. (Full access is being considered for the Phase II program.) Explain why providing full access is not appropriate for Phase I.
11. Describe any traffic mitigation measures offered by the proposed development. Consider if mitigation measures associated with the Hannaford Bros. project should still be pursued.

The above recommendations are discussed in greater detail below as they relate to various sections of the RSG traffic impact study.



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## Review Comments

In general, the RSG traffic impact study was completed consistent with standard professional practice including reasonable assumptions leading to valid technical analyses. However, due to changes in the proposed development program and a change in the status of the Hannaford Bros. supermarket project, the traffic study no longer provides an accurate forecast of future traffic conditions. Also, the study lacks certain information that would provide a more complete picture of traffic conditions in the study area. No information was provided relative to future traffic conditions under Phase II of the project.

### 1. Study Area Limits

The project study area includes seven intersections along VT 116 and Shelburne Falls Road. These intersections include the proposed site access points and most major intersections along VT 116 in Hinesburg center. As such, the study area is comprehensive and reasonable. However, information regarding traffic volumes and operating conditions at the Lantman's entrance driveway/VT 116 intersection are not fully reported in the study. The Lantman's entrance driveway is included in the traffic model printouts in the report appendix but there are no traffic volumes presented for this location.

### 2. Traffic Operations Analysis Tool

Traffic operations for intersections in the study area were analyzed using SimTraffic. The SimTraffic model was used to calculate travel delays and vehicle queues at study area intersections. The calculated SimTraffic queues were also compared to observed conditions as a way of validating the model. The model results are generally consistent with observed queue conditions. Consequently, the SimTraffic model appears to provide reasonably accurate descriptions of traffic operations across the network under the conditions analyzed. However, the model outputs (the worksheets included in the report appendix), do not provide sufficient information to fully understand operating conditions, the causes of congestion, and possible remedies. Information related the assumed geometric, traffic control and travel demand conditions at the study intersections are not well documented. They also do not show operating volume-to-capacity ratios for intersection approaches and individual lane groups.

The SimTraffic model is linked to the Synchro traffic model. Synchro model outputs provide a more complete understanding of operating conditions at individual intersections.

### 3. Traffic Volumes

Traffic volume data for the study area intersections were collected from several sources and compiled to define existing AM and PM peak hour traffic volume networks. The traffic volumes were balanced between intersections. Omitted from the network diagrams are turning



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movements into the Lantman's driveway however, these volumes appear to have been considered at the upstream and downstream intersections along VT 116.

The balanced flow networks were adjusted to reflect design hour volumes (DHV) and growth rates were applied to older data to match more current data. Overall, the approach taken reflects standard practice and the resulting existing traffic volume networks reflect a reasonable if not conservative condition.

**4. Field Observations**

The traffic study reports on traffic delays and vehicle queuing conditions observed in the study area. The reported long queues on VT 116 headed northbound during the AM peak hour and southbound during the PM peak hour are consistent with Stantec's understanding of existing conditions and reasonably consistent with the existing conditions analysis model results.

**5. Trip Generation**

The ITE *Trip Generation* manual was used to estimate project generated vehicle trips. Stantec checked these calculations and confirmed the trip estimates provided in the traffic study. Updated trip generation estimates are provided in the addendum based on some changes in the proposed land use program. Also, the addendum applies adjustments for internal trips that were not considered in the original analysis. Such adjustments are reasonable under certain circumstances however, the adjustments provided here may be overstated. No documentation is provided to support the adjustments.

In the addendum there is some confusion regarding the new land use program. The proposed town house units are listed separately in the table providing peak hour traffic forecasts however no trips are assigned to the town house units.

**6. Other Development Volumes**

The traffic study provides future No Build traffic forecasts by considering other planned development projects in Hinesburg. Three projects are considered including: an expansion of NRG Systems; the Hinesburg Town Center project; and, a new Hannaford Bros. supermarket. Traffic associated with each project was estimated based on ITE trip rates. New traffic from the three projects is assigned to the roadway network and combined. Examining the projected traffic increases at each project driveway the traffic forecasts are reasonable. However, the Hannaford Bros. supermarket project is no longer active.

**7. Existing Conditions Operations Analysis**

The existing conditions operations analysis are reported by intersection approach and an overall level of service is reported for signalized intersections. The analysis results are consistent with the field observations of existing vehicle queues and delays.

**8. Future Operations Analysis**

The future analysis results are presented for No Build and Build conditions. A 2021 design year is considered which assumes existing volumes are grown by one percent per year to reflect



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design year conditions. The 2021 design year is the assumed opening year of the project. A later design year, five years after project completion, is more typical in traffic studies. However, the 2021 forecasts provided are conservative in that they reflect DHV's, the 30<sup>th</sup> highest hourly volumes of the year.

The traffic study references geometric improvements proposed at the Commerce Way/VT 116 intersection and signal timing changes proposed at other intersections by Hannaford Bros. The changes are assumed under No Build and Build conditions. Details regarding the timing changes are not provided.

**9. Congestion Analysis Findings – No Build**

The traffic study compares operation analysis results for Existing and No Build conditions. The study concludes that traffic operations become worse under the No Build conditions throughout the study area. Significant degradations in peak hour operations are cited for the Commerce Street/VT 116 intersection and for the Charlotte Road/VT 116 intersection. These results assume that mitigation proposed by the Hannaford Bros. project is in place.

**10. Congestion Analysis Findings – Build**

The traffic study compares operations analysis results for No Build and Build conditions. For Build conditions, no significant delays are reported at the site access drives. (This is due in part to the proposed restriction on left turns at the VT 116 driveway.) At the Shelburne Falls Road/VT 116 intersection, modest increases in delay are attributed to the project during the AM peak hour and significant increases in delay are attributed to the project during the PM peak hour. The project impacts at this location are also due in part to the left-turn restrictions at the VT 116 driveway. Left-turn movements that would not be allowed at the VT 116 driveway are assigned as left turns at the Shelburne Falls Road intersection.

The project is reported to have only minor impacts at the Commerce Street, Charlotte Road and Mechanicsville Road intersections with VT 116. While this is likely true, there is one counterintuitive result shown in the Level of Service tables. For the AM peak hour, delays at the Mechanicsville Road intersection decline when project traffic is added at this location.

The report does not describe impacts at the Silver Street intersection with VT 116. The level of service tables, however, show significant project impacts in the AM peak hour and a counterintuitive result in the PM peak hour. For the AM peak hour delays on Silver Street nearly double from 472 seconds per vehicle to 908 seconds per vehicle due to the project. (This is likely an overstatement of the project's impact at this location. As noted above, provision of Synchro calculations for this intersection would allow for a better understanding of the actual project impacts.) For the PM peak hour delays on the Silver Street approach drop from the Level of Service (LOS) E range to the LOS D range with project traffic added.

**11. Future Roadway Improvements**

The traffic study considers proposed improvements at the Shelburne Falls Road/VT 116 intersection and concludes that the intersection will operate at level of service LOS B during



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the AM peak hour and LOS C during the PM peak hour with the improvements in place and the proposed development occupied. There is no information provided describing the improvements or the timing for their implementation.

**12. Sight Distance Analysis**

The study reports that adequate sight distances are provide along VT 116 at the proposed site driveway to allow safe access. It is also reported that sight distances are substandard for the posted 40 mph speed limit just north of Riggs Road due a vertical curve in the roadway alignment.

**13. Safety**

Data is presented indicating a high crash rate on VT 116 in the vicinity of Riggs Road. A high percentage of rear end collisions is referenced to conclude that congestion plays a significant factor in these crashes however, there is no reporting of crashes by time of day to confirm that the rear end crashes are occurring under congested conditions.

Fifteen crashes over five years are reported for the Riggs Road/VT 116 intersection, the location of the proposed site driveway. No detailed analysis is provided of the crashes at this intersection.

**Addendum**

The traffic forecasts provided in the addendum for the updated land use program apply adjustments not considered in the traffic impact study. The adjustments reduced the trip generation forecasts to account for accommodations for alternative modes (providing an on-site sidewalk network) and internal trips (trips between different land uses on the site). These adjustments are appropriate in theory however, the adjustments may be overstated given the nature of the alternative mode accommodations and scale of the development. The multimodal accommodations relate to the provision of sidewalks internal to the site. It is likely that the sites studied by the ITE and used to develop the trip rates applied also have sidewalks. There is nothing exceptional about the sidewalk plan proposed and a trip reduction for the provision of sidewalks may not be appropriate. Regarding the internal trip capture rates, no calculations were provided to support these adjustments. The largest adjustments were made to the retail trip estimates, up to 30 trips per hour. This represents approximately 26 percent of the estimated residential trips at the site. This seems unrealistic since specialty retail trip rates were applied to the retail component of



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the project. It is unlikely that a small, specialty retail store will serve a significant volume of the daily shopping trips generated by project residents.

Independent of the above comments, reducing the trip adjustments would not likely change the findings of the traffic study in a meaningful way. However, it is recommended that less aggressive adjustments be made for the revised analysis.

## Staff Comments

Town planning staff reviewed the traffic investigations independently and provided questions and comments to Stantec. These are addressed below.

1. *Two-stage traffic study (2018 plus 2019 corrections) is confusing. Should we ask for a revised and comprehensive traffic impact study?*
  - a. As noted above, a report addendum was prepared describing changes in the land use program and associated project trip generation. The updated trip forecasts are comparable to those used in the original study. Presumably, the addendum provided no additional updated analyses for this reason. The calculated project impacts on the area roadway system would not be significantly different in an updated study relative to those reported in the current study. However, the study should be updated if only to provide a clean record of projected future traffic conditions since this study will likely be used as a baseline for future studies and as benchmark for comparing actual future project impacts against current projections. (One such future study would be a study for Phase II of this project however, as noted above, Stantec recommends that a Phase II analysis be provided now in an updated study.) The revised study should address the points raised above and summarized in the "Recommendations" section.
2. *Trip generation questionable for some dwelling units.*
  - a. *Peak hour trip generation for apartments and townhouse units seems very low – particularly peak am exits.*
    - i. Stantec applied ITE trip rates to the proposed land use program and confirmed the accuracy of the traffic forecasts. Apartment and townhouse units are both classified as Multifamily Housing, Low-Rise and typically generate approximately 0.46 AM peak hour trips per dwelling unit.
  - b. *Using the same ITE land use code (LUC) for apartments and townhouse-style dwelling units seems like it underestimates trip generation. In my opinion, the townhouse-style dwellings in this project will likely have trip generation more similar to single-family dwellings with a similar number of bedrooms.*
    - i. As noted above, townhouse units are classified as Multifamily, Low-Rise housing by the ITE and appropriate trip rates were applied. Applying the ITE Single





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Family Home rates would approximately double the trip forecast for the townhouse units

3. *The reduction of trip generation for TDM and internal capture are questionable as described in the 2019 TIS amendment. The project doesn't propose any formalized TDM practices – i.e., no transit accommodations, no employer-based commuting incentives, etc. Furthermore, this phase of the project (phase 1) does not include a direct southerly connection to the existing village core area. Instead, all traffic (vehicles and pedestrians) trying to flow south to rest of the village core area will be forced to exit on to Route 116 – i.e., less direct travel connection inhibiting pedestrian modes and adding congestion to Route 116.*
  - a. We concur, as noted above, that the TDM adjustments were not well supported. The concept of internal trips is applicable however, further justification and documentation of the assumptions is warranted.
  
4. *Perhaps more importantly, the 2019 TIS amendment concludes that with the TDM and internal capture trip generation reductions, "... the results show a modest reduction in expected trips compared to the 8/20/18 Traffic Impact Analysis." This makes no sense when the point of the 2019 amendment was to adjust the study to account for approximately 29% more dwelling units in the actual proposal than were assessed in the 2018 analysis. The 2018 analysis was based on 98 dwelling units (not including the senior housing building). The actual proposal is for 126 dwelling units (not including the senior housing building). Trip generation should be going up in comparison to the 2018 analysis, not down.*
  - a. We concur that if the same assumptions were applied in 2019 as used in 2018 the trip estimates would go up. However, in 2018 the applicant chose to be conservative in the trip estimates and did not to take credit for TDM and internal capture. The applicant chose to change assumptions and apply credits in 2019. We would recommend a less controversial approach keeping the "No adjustment" assumptions consistent between the two analyses. As noted above, taking the more conservative approach is not likely to significantly change the study findings.
  
5. *Design and geometry of the Route 116 intersection. See issue #7 in staff report. The right-in, right-out arrangement is the short-term solution that all parties have been discussing. Longer term, I anticipate this becoming an all-direction intersection, possibly a roundabout. With that said, the right-in, right-out design will be awkward – for drivers and for pedestrians. VTrans is working collaboratively with the applicant (and the Town), but they have yet to fully sign off on the specific design. We are interested in what your fresh pair of eyes sees here – potential pitfalls, opportunities for design improvements, ways to enable a Route 116 crosswalk and generally ensure pedestrian safety.*





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1. As noted above, a more rigorous review of available crash data for this high crash location should inform decisions regarding the design of this access point. In general, uniformity of design is preferred along a highway corridor to best meet driver expectations and support safe operations. In this regard, the right-in/right-out proposal would be unique in the VT 116 corridor and a potential hazard if drivers attempt to make left turns at this location. (Left turns are permitted in and out of Riggs Road. Drivers may therefore expect to be able to make left turns in and out of the proposed site driveway.) The geometric design proposed to discourage left turns is not prohibitive for passenger cars. As such, unexpected, illegal left turns could happen with the proposed geometry adding to safety concerns. Also as noted above, the proposed left-turn prohibitions at this location introduces left turns and adds to congestion at the Shelburne Falls Road/VT 116 intersection. Providing full access at the VT 116 driveway should be evaluated now particularly if it is to be pursued ultimately as part of Phase II of this project.

Full access at VT 116 could be provided by way of a roundabout or a four-way intersection. Dedicated northbound and southbound left turns on VT 116 should be considered as part of a four-way intersection. Stantec analyzed 2021 Build AM Peak Hour volumes and determined that a southbound VT 116 left-turn lane is warranted. With a four-way intersection, provision of a raised center median on VT 116 would provide a pedestrian refuge to accommodate staged pedestrian crossings and enhance safety.

Signalization may not be warranted but conduit could be installed as part of the intersection reconstruction should a signal be deemed necessary in the future. Plans to reconstruct the intersection should also consider lowering the crest vertical curve on VT 116 north of Riggs Road as it is reported to be a sight line constraint and may be contributing to the high crash rate on this roadway segment.

A roundabout may also be a viable solution. It would provide a gateway feature for traffic approaching the village from the north and serve to slow traffic. Slower speeds would allow for safer pedestrian crossings.

6. *Shelburne Falls Road turn lanes. The planned VTrans improvements to the Route 116, Shelburne Falls Road intersection will add a lane for eastbound traffic on Shelburne Falls Road. This improvement project is scheduled for 2020 construction but will likely not be finished until 2021. We want to be sure that the addition of this lane will accommodate all the new traffic from this project the way the traffic impact study indicates it will. Will this much new traffic drive the need for a dedicated left-hand turn lane at this approach?*
  - a. The traffic study reports that with the proposed VTrans improvements in place, the Shelburne Falls Road/VT 116 intersection will operate at LOS B during the AM peak hour



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and LOS C during the PM peak hour under Build conditions. Also, a 95<sup>th</sup> percentile queue of 196 feet is reported for the PM peak hour on Shelburne Falls Road eastbound. A shorter queue is reported for the AM peak hour. Improvement plans for the subject intersection indicate the addition of a 210 +/- feet right-turn lane on the Shelburne Falls eastbound approach.

The level of service calculations for Build conditions were checked using the planning level procedures defined in the Highway Capacity Manual. The results support the study findings indicating that the intersection will operate at 60 percent of capacity during the AM peak hour (typical for LOS B) and at 70 percent of capacity during the PM peak hour (typical for LOS C).

As noted above, the SimTraffic analysis results provided in the traffic study do not report operating results by lane group at intersections. The reported 95<sup>th</sup> percentile queue of 196 feet is less than the length of the proposed right-turn lane suggesting that the turn lane length is adequate for projected 2021 Build condition. However, the margin for error, 210 feet versus 196 feet, is slim. Also, the study does not indicate which approach lane will experience the 196-foot queue. The applicant should provide Synchro analysis results that report future queuing conditions by lane group. Assuming that projected queues are comparable to, or worse than, those reported from the SimTraffic model, consideration should be given to a reevaluation of the proposed improvement plan as the current plan would not provide significant reserve capacity to accommodate traffic growth above the projected 2021 levels. In this regard, it would also be reasonable to reexamine the operations analyses used to develop the current improvement plans and specifically the traffic volumes that were used in these analyses. The VTrans project plans indicate 2016 design hour volumes that are notably higher than the 2021 Build volumes considered in the Haystack Crossing traffic study.

7. *We also want your thoughts on the proposed left turn lane for westbound traffic on Shelburne Falls Road (turning on to Haystack Crossing). We feel this is necessary and should likely be installed early on in the project.*
  - a. The RSG study does not reference a left-turn lane on Shelburne Falls Road for westbound traffic entering Haystack Crossing. However, site plans shared with VTrans relative the proposed VT 116 also show the Haystack Crossing intersection with a left-turn lane on Shelburne Falls Road. The applicant should clarify plans for this location and provide supporting left-turn lane warrant analyses. Given the pending work by VTrans to reconstruct the Shelburne Falls Road/VT 116 intersection and to widen the eastbound Shelburne Falls Road approach to this intersection, this analysis should be done now. It should also consider full build out of the Haystack Crossing development and other parcels that may eventually use this driveway for access. The full build out



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analysis should be used to inform decisions regarding provision of a left-turn lane at this location and geometric conditions at the adjacent VT 116 intersection.

8. *We question whether the proposed right-hand turn lane for eastbound Shelburne Falls Road traffic approaching Haystack Crossing is necessary. I'd like to avoid widening Shelburne Falls Road to the west of Haystack Crossing if possible.*
  - a. Projected peak hour volumes turning right into the subject site from Shelburne Falls Road eastbound are 10 and 15 vehicles during the AM and PM peak hours, respectively. These volumes do not justify a dedicated right-turn lane.
  
9. *Masterplan considerations. At the time of the traffic impact study in 2018, we asked the applicant and the traffic consultant to model the full build out of the project and say something about future traffic considerations and potential improvements that would be needed. They elected not to address this, so the TIS focuses solely on phase 1 – i.e., the portion being reviewed by the DRB now. I'm concerned that we might be missing something given that more development is anticipated as part of a future phase. You can see a conceptual layout with unit counts for that future development on the masterplan. Your thoughts on this would be welcome.*
  - a. As noted above, reconstruction of the Shelburne Falls Road/VT 116 intersection is pending. Proper planning would consider all known development plans in the project design. As such, an analysis of Phase II conditions should be conducted now to inform the design of imminent, publicly funded improvements to the roadway system.

If you have any questions regarding the above, please do not hesitate to contact us. We are available at your convenience.

Regards,

**STANTEC CONSULTING SERVICES INC.**

A handwritten signature in blue ink that reads "Richard A. Bryant".

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