Vanasse & Associates inc
Transportation Engineers & Planners

35 New England Business Center Drive
Suite 140
Andover, MA 01810

Ref: 9193

February 9, 2022

Ms. Janet Carter Bernardo, P.E.
Horsley Witten Group
112 Water Street, 6th Floor
Boston, MA 02109

Re: Traffic Engineering Peer Review
Alta Nashoba Valley - 580 Main Street
Bolton, Massachusetts

Dear Janet:

Vanasse & Associates, Inc. (VAI) has completed a review of the materials that have been submitted by A Limited Dividend Affiliate of WP East Acquisitions, LLC (the "Applicant") in support of the proposed Alta Nashoba Valley multifamily residential development to be located at 580 Main Street in Bolton, Massachusetts (hereafter referred to as the "Project"). Our review focused on the following specific areas as they relate to the Project: i) vehicle and pedestrian access and circulation; ii) Massachusetts Department of Transportation (MassDOT) design standards; iii) Town Zoning requirements as they relate to access, parking and circulation; and iv) accepted Traffic Engineering and Transportation Planning practices. The Applicant has submitted the following supporting materials which are the subject of this review:

1. *Project Narrative & Drainage Report to Accompany Comprehensive Permit Application*, Multi-Family Development, 580 Main Street, Bolton, MA; Allen & Major Associates, Inc.; September 10, 2021;

2. *Architectural Plans*, Alta Nashoba Valley, 580 Main Street, Bolton, MA; Market Square Architects; September 10, 2021;

3. *Preliminary Application for Comprehensive Permit*, Alta Nashoba Valley, 580 Main Street, Bolton, MA; Allen & Major Associates, Inc.; September 10, 2021 (the "Site Plans"); and

4. *Traffic Impact Assessment*, 580 Main Street, Bolton, Massachusetts; The Engineering Corp (TEC); September 30, 2021 (the "September 2021 TIA").

In addition, VAI reviewed the site locus in order to validate the existing conditions context of the Project and to observe factors related to the design and location of the access to the Project site, internal circulation and potential off-site improvements.

Based on our review of the aforementioned materials that have been submitted in support of the Project, we have determined that the materials were prepared in a professional manner and following the applicable standards of care. That being said, the Applicant should address the following comments that were identified as a part of our review, a detailed summary of which is attached:

September 2021 TIA

T1. The study area should be expanded to include the intersection of Route 117 at Wattaquadock Hill Road given that operating conditions at this intersection have a direct impact on the flow of traffic and motorist delays along the Route 117 corridor.

T2. In accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*, motor vehicle crash rates should be calculated for the study area intersections and compared to the MassDOT statewide and District 3 average crash rates for similar intersections. In addition, a review of the MassDOT High Crash Location database should be undertaken and more information should be provided with regard to the details of the motor vehicle crash that resulted in a fatality at the Route 117/I-495 northbound ramps intersection.

T3. The Town of Bolton and MassDOT should be consulted in order to determine if there are any planed future roadway improvement projects that may impact traffic operations or travel patterns within the study area.

T4. The Applicant's engineer should review Figure 4 as there are discrepancies between the traffic volumes shown on the figure and the trip-generation calculations, and minor deviations in traffic volumes between intersections. We note that correction of these discrepancies will not impact the analysis results or the findings with regard to the relative impact of the Project over No-Build conditions.

T5. The traffic operations analysis should be expanded to include the Route 117/Wattaquadock Hill Road intersection.

T6. In the absence of recommendations put forth as a part of the September 2021 TIA, we would suggest consideration of advancement of the following improvements as a part of the Project, which are commensurate with the predicted impact of the Project on the transportation infrastructure and are focused on improving access to the Project site and encouraging the use of alternative modes of transportation to single-occupancy vehicles:

1. To the extent so desired by the Town, "Do Not Block" pavement markings and accompanying signs should be installed on Route 117 at the Bolton Office Park Driveway

2. The Applicant should commit to the implantation of a formal Transportation Demand Management (TDM) program that is inclusive of the following elements:

   - A transportation coordinator should be assigned for the Project to coordinate the TDM program;
   - Information regarding public transportation services, maps, schedules and fare information should be posted in a central location and/or otherwise made available to residents;
   - A "welcome packet" should be provided to new residents detailing available public transportation services, bicycle and walking alternatives, and other commuting options;

- Work-at-home work spaces should be included within Project, and may take the form of meeting space and a business office in the clubhouse; and
- Secure bicycle parking should be provided consisting of both weather protected bicycle parking and exterior bicycle racks.

Site Plans

S1. A vehicle turning analysis should be provided using the AutoTurn© software for service and delivery vehicles (SU-30 or SU-40 design vehicle). The turning analysis should depict all maneuvers required to enter and exit the Project site, loading areas and the locations for trash/recycling, and should demonstrate that the subject vehicles can access the Project site and circulate in an unimpeded manner.

S2. A narrative should be provided that describes how tenant moves and trash/recycling pick-up will be accommodated/managed. The narrative should be consistent with and inform the vehicle turning analysis.

S3. "Keep Right" signs should be installed in the leading edge (nose) of the median of the Bolton Office Park driveway facing Route 117 and for motorists exiting the Project site.

S4. "Only" pavement markings should be installed to accompany the turn arrows in the lane approaching Route 117 and a lane use regulatory sign should be installed prior to the entrance to the turn lanes.

S5 STOP-signs and STOP-lines should be added for the drive aisles that intersect the main drive from Route 117.

S6. "One-Way" and "Do Not Enter" signs should be installed to regulate the flow of traffic where one-way traffic is to be conveyed (mail center and between Building 1 and Building 4).

S7 Pedestrian crossing warning signs should be installed at the crossings at the mail center and between Building 1 and Building 3.

S8. The sight triangle areas for the Bolton Office Park driveway intersection with Route 117 should be shown along with a note to indicate: "Signs, landscaping and other features located within sight triangle areas shall be designed, installed and maintained so as not to exceed 2.5-feet in height. Snow accumulation (windrows) located within sight triangle areas that exceed 3.5-feet in height or that would otherwise inhibit sight lines shall be promptly removed."

S9. Consideration should be given to installing electric vehicle (EV) charging stations.

S10. Bicycle racks should be provided at the clubhouse and at appropriate locations proximate to each residential building. Interior, weather protected bicycle parking should also be provided within each building.

This concludes our review of the materials that have been submitted to date in support of the Project. If you should have any questions regarding our review, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.

Jeffrey S. Dirk

Jeffrey S. Dirk, P.E., PTOE, FITE
Managing Partner

Professional Engineer in CT, MA, ME, NH, RI and VA

Attachment

JSD/jsd

TRAFFIC ENGINEERING PEER REVIEW
ALTA NASHOBA VALLEY - 580 MAIN STREET
BOLTON, MASSACHUSETTS
FEBRUARY 9, 2022

The following details Vanasse & Associates, Inc.'s (VAI's) review of the September 30, 2021 *Transportation Impact Assessment* (the "September 2021 TIA") prepared by The Engineering Corp (TEC) and the September 10, 2021 *Preliminary Application for Comprehensive Permit* (the "Site Plans") prepared by Allen & Major Associates, Inc. in support of the proposed Alta Nashoba Valley multifamily residential development to be located at 580 Main Street in Bolton, Massachusetts (hereafter referred to as the "Project"). Our comments are indicated in *italicized* text, with those requiring responses or additional information ***bolded***.

PROJECT DESCRIPTION

The Project will entail the construction of a 229 unit multifamily residential development to be located at 580 Main Street (Route 117) in Bolton, Massachusetts, which will be comprised of four (4) three-story buildings with a separate clubhouse/amenities building. The Project will be situated on a 32.43± acre lot that will be subdivided from a lager 39± acre parcel of land, a portion of which is occupied by a 105,000± square foot (sf) office building with associated parking areas and appurtenances, and is bounded by Main Street, the office building and Bolton County Manor to the north; areas of open and wooded space under the control of the Town of Bolton to the south; the existing office building and areas of open and wooded space under the control of the Town of Bolton to the east; and Bolton County Manor and areas of open and wooded space under the control of the Town of Bolton to the west. In conjunction with the Project, a portion of the existing office building will be demolished and 50,000± sf will be retained and located on a separate lot (Lot 1) that will be created by the subdivision of the larger parcel.

Access to the Project site will be provided by way of the existing driveway that serves the Bolton Office Park and intersects the south side of Main Street approximately 1,200 feet west of the Interstate 495 (I-495) southbound ramps. The existing driveway will be reconstructed and improved as a part of the Project, and will include the addition of individual driveways to serve specific elements of the Project, with access to the remaining portion of the office building and to Bolton County Manor retained.

On-site parking will be provided for 382 vehicles, or an overall parking ratio of 1.67 parking spaces per unit, which will consist of 28 parking spaces to be situated in three (3) detached garages and 354 surface parking spaces that will be dispersed throughout the Project site.

SEPTEMBER 2021 TIA

General

Comment: *The September 2021 TIA was prepared in a professional manner and following the applicable standards of care, and was prepared under the responsible charge of Elizabeth M. Oltman, P.E. (MA P.E. No. 53398, Civil).*

Existing Conditions

Study Area

The study area that was assessed in the September 2021 TIA consisted of Main Street (Route 117) and the following specific intersections:

- Route 117 at the Bolton Office Park Driveway
- Route 117 at the I-495 Southbound Ramps
- Route 117 at the I-495 Northbound Ramps

Comment: *This study area includes all intersections where the Project is predicted to result in an increase in peak hour traffic volumes by: a) five (5) percent or more, or b) by more than 100 vehicles per hour.*

Comment T1: The study area should be expanded to include the intersection of Route 117 at Wattaquadock Hill Road given that operating conditions at this intersection have a direct impact on the flow of traffic and motorist delays along the Route 117 corridor.

Traffic Volumes and Data Collection

Traffic volume data was collected by means of: i) automatic traffic recorder counts (ATRs) conducted on Route 117 in the vicinity of the Project site on Wednesday, June 9th through Thursday, June 10th, 2021, inclusive; and ii) manual turning movement counts (TMCs) and vehicle classification counts conducted at the study intersections on Thursday, June 10, 2021, during the weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods. A review of seasonal adjustment data available from MassDOT indicated that traffic volumes within the study area during the month of June are representative of conditions that are approximately 8.0 percent above average-month conditions. As such, the June traffic volumes did not require a seasonal adjustment as the data is representative of above-average conditions.

In addition to the seasonal adjustment, a review of historic traffic count data in the vicinity of the Project site available from MassDOT was undertaken in order to determine if an adjustment was required in order to account for the impacts on traffic volumes and trip patterns resulting from the COVID-19 pandemic. Based on this review, it was determined that traffic volumes within the study area as measured in June 2021 are approximately 11 percent lower than comparable pre-pandemic traffic volumes. As such, the June traffic volumes were increased by 11 percent in order to reflect pre COVID-19 traffic volume conditions.

Comment: *The data collection effort, seasonal adjustment (none required) and COVID-19 impact review and adjustment were completed following MassDOT standards and the guidance for Transportation Impact Assessments (TIAs) conducted during the COVID-19 pandemic,[1] and we are in general agreement with the resulting traffic volumes.*

[1] *Guidance on Traffic Count Data*; MassDOT; revised April 2020.

Pedestrian and Bicycle Facilities

A description of pedestrian facilities within the study area was included in the September 2021 TIA. As described therein, a sidewalk is provided along the south side of Route 117 to the west of the Bolton Office Park driveway, with no sidewalks provided to the east within the study area. Formal bicycle facilities are not identified within the study area and the study area roadways do not provide sufficient width on a continuous basis to support bicycle travel in a shared traveled-way configuration (i.e., bicyclists and motor vehicles sharing the traveled-way).[2]

Public Transportation

Regularly scheduled public transportation services are not currently provided within the study area.

Comment: *The Montachusett Regional Transit Authority (MART) provides paratransit services to eligible persons residing within the Town of Bolton who cannot use fixed-route transit all or some of the time due to a physical, cognitive, or mental disability in compliance with the Americans with Disabilities Act (ADA).*

Motor Vehicle Crash Summary

Motor vehicle crash information for the study area intersections was obtained from MassDOT for the period 2014 through 2019, and a summary table was provided in the September 2021 TIA. Based on a review of the crash data, the study area intersections experienced an average of 8.83 or fewer reported motor vehicle crashes per year over the five-year review period, with the Route 117/I-495 southbound ramps/Sugar Road intersection found to have experienced the largest number of reported motor vehicle crashes (53 total). The majority of the crashes reported at the study area intersections occurred on a weekday, on dry pavement and involved angle or rear-end type crashes that resulted in property damage only. One (1) motor vehicle crash that resulted in a fatality was reported at the Route 117/I-495 northbound ramps intersection.

Comment T2: ***In accordance with MassDOT's Transportation Impact Assessment (TIA) Guidelines, motor vehicle crash rates should be calculated for the study area intersections and compared to the MassDOT statewide and District 3 average crash rates for similar intersections. In addition, a review of the MassDOT High Crash Location database should be undertaken and more information should be provided with regard to the details of the motor vehicle crash that resulted in a fatality at the Route 117/I-495 northbound ramps intersection.***

[2]A minimum combined travel lane and paved shoulder width of 14-feet is required to support bicycle travel in a shared traveled-way condition.

Future Conditions

No-Build Conditions

Traffic volumes within the study area were projected to 2028, which represents a 7-year planning horizon from the existing conditions base year (2021) consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. The future condition traffic volume projections were developed by: i) applying a background traffic growth rate to the 2021 Existing traffic volumes; and ii) adding traffic associated with specific development projects by others that may increase traffic volumes within the study area beyond that accounted for by the background traffic growth rate.

A 0.8 percent per year compounded annual background traffic growth rate was identified for use to reflect anticipated future traffic growth independent of specific development projects. The Applicant's engineer consulted with the Town of Bolton Planning Department in order to ascertain if there were any specific development projects by others that would result in an increase in traffic volumes within the study area that would exceed the background traffic growth rate. Based on this consultation, no planned development projects by others were identified that are expected to result in an increase in traffic that would exceed the general background traffic growth rate.

Comment: *We are in general agreement with the methodology that was used to develop the future No-Build condition traffic volume projections, including the background traffic growth rate (0.8 percent) and inclusion of the identified specific development projects by others.*

Comment T3: ***The Town of Bolton and MassDOT should be consulted in order to determine if there are any planed future roadway improvement projects that may impact traffic operations or travel patterns within the study area.***

Build Conditions

The traffic characteristics of the Project and those of the adjacent office building were developed by the Applicant's engineer using trip-generation statistics published by the Institute of Transportation Engineers (ITE).[3] ITE Land Use Code (LUC) 221, *Multifamily Housing (Low-Rise)*, was used to develop the trip characteristics for the Project and LUC 710, *General Office Building*, was used to determine the trip characteristics of the adjacent office building given that the occupancy of the office building was not known at the time that the September 2021 TIA was prepared. For the purpose of the assessment, it was assumed that all trips associated with the 50,000 sf of office space that will remain after the Project is constructed would be new trips to the area. Using the above methodology, the trip characteristics of the Project were defined as follows:

[3] *Trip Generation*, 10th Edition; Institute of Transportation Engineers; Washington, DC; 2017.

TRIP GENERATION SUMMARY

	(A) Residential Development (229 units)	(B) Remaining Office Space (50,000 sf)	(A + B) Total
Average Weekday:			
Enter	845	271	1,116
Exit	845	271	1,116
Total	1,690	542	2,232
Weekday Morning Peak-Hour:			
Enter	24	63	87
Exit	81	10	91
Total	105	73	178
Weekday Evening Peak-Hour:			
Enter	77	9	86
Exit	46	50	96
Total	123	59	182

In addition to estimating the trips associated with the Project, a comparative assessment was completed to provide context to the increase in trips that the Project represents over the fully occupied office building (105,000 sf). This comparative assessment indicated that the Project would result in 53 additional vehicle trips during the weekday morning peak-hour and 63 additional vehicle trips during the weekday evening peak-hour.

Traffic volumes associated with the Project (and the remaining office building) were assigned onto the roadway network and to the study area intersections based on a review of Journey-to-Work data obtained from the U.S. Census for residents of the Town of Bolton and refined based on existing traffic patterns.

Comment: *We are in agreement with the methodology and approach that was used to develop the traffic characteristics of the Project and to establish the trip distribution pattern for the Project.*

Comment T4: ***The Applicant's engineer should review Figure 4 as there are discrepancies between the traffic volumes shown on the figure and the trip-generation calculations, and minor deviations in traffic volumes between intersections. We note that correction of these discrepancies will not impact the analysis results or the findings with regard to the relative impact of the Project over No-Build conditions.***

Traffic Operations Analysis

In order to assess the potential impact of the Project on the transportation infrastructure, a detailed traffic operations analysis was performed for the study intersections under 2021 Existing, 2028 No-Build (without the Project) and 2028 Build conditions (with the Project). In brief, traffic operations are described by six "levels of service" which are defined by letter grades from "A" through "F", with a level-of-service (LOS) "A" representing the best operating conditions (average motorist delays of less than 10 seconds and little or no apparent vehicle queuing) and a LOS "F" representing constrained operating conditions (average

motorist delays of 50 to 80 seconds or more and often with apparent vehicle queuing). A LOS of "E" is representative of an intersection or traffic movement that is operating at its design capacity, with a LOS of "D" typically representing the limit of acceptable traffic operations.

A review of the traffic operations analysis indicates that the addition of Project-related traffic to the I-495 ramp intersections with Route 117 will not result in a significant increase in motorist delays or vehicle queuing over anticipated future conditions without the Project (i.e. No-Build conditions). Project-related impacts at these intersections were generally defined by an increase in overall average motorist delay of up to 3.2 seconds and in vehicle queuing of up to four (4) vehicles, with all movements continuing to operate LOS D or better.

Independent of the Project, left-turn movements from the Bolton Office Park driveway (the access to the Project site) were identified to be operating over capacity (i.e., LOS "F") during both peak hours as a result of the relatively large volume of conflicting traffic travelling along Route 117 during these periods. It was also noted that vehicle queues from the Route 117/Wattaquadock Hill Road intersection extend to and beyond the Bolton Office Park driveway, further increasing delays during the peak periods. Residual vehicle queues along the driveway were shown to range from two (2) to four (4) vehicles and can be contained along the driveway without impeding the movement of vehicles, pedestrians or bicyclists along Route 117.

Comment: *We are in agreement with the methodology that was used to complete the traffic operations analysis and the overall conclusion that the Project will not result in a significant impact (increase) on motorist delays or vehicle queueing over No-Build conditions.*

Comment T5. ***The traffic operations analysis should be expanded to include the Route 117/ Wattaquadock Hill Road intersection.***

Sight Distance

An evaluation of sight lines at the Bolton Office Park driveway with Route 117 was completed following American Association of State Highway and Transportation Officials (AASHTO)[4] standards and using the measured 85th percentile vehicle travel speed along Route 117 (40 mph eastbound and 43 mph westbound). Based on this evaluation, it was concluded that the available sight lines at the intersection exceed the recommended minimum distance for safe operation (360 feet is required for an approach speed of 45 mph, with the available sight lines found to exceed 400 feet).

Comment: *We note that the approach speeds that are presented in Tables 2 and 3 are transposed. That being said, we are in agreement that the available lines of sight at the Bolton Office Park driveway with Route 117 exceed the recommended minimum distance for safe operation based on the appropriate approach speed along Route 117. Recommendations for sight line maintenance are provided as a part of the Site Plan review comments that follow.*

[4]Ibid 1.

Recommendations

Recommendations were not provided in conjunction with the September 2021 TIA.

Comment T6. ***In the absence of recommendations put forth as a part of the September 2021 TIA, we would suggest consideration of advancement of the following improvements as a part of the Project, which are commensurate with the predicted impact of the Project on the transportation infrastructure and are focused on improving access to the Project site and encouraging the use of alternative modes of transportation to single-occupancy vehicles:***

1. ***The Bolton Office Park Driveway approaching Route 117 should be modified to provide separate left and right-turn lanes in order to separate turning movements on the approach (shown on the Site Plans).***

2. ***To the extent so desired by the Town, "Do Not Block" pavement markings and accompanying signs should be installed on Route 117 at the Bolton Office Park Driveway***

3. ***The Applicant should commit to the implantation of a formal Transportation Demand Management (TDM) program that is inclusive of the following elements:***

   - ***A transportation coordinator should be assigned for the Project to coordinate the TDM program;***
   - ***Information regarding public transportation services, maps, schedules and fare information should be posted in a central location and/or otherwise made available to residents;***
   - ***A "welcome packet" should be provided to new residents detailing available public transportation services, bicycle and walking alternatives, and other commuting options;***
   - ***Work-at-home work spaces should be included within Project, and may take the form of meeting space and a business office in the clubhouse; and***
   - ***Secure bicycle parking should be provided consisting of both weather protected bicycle parking and exterior bicycle racks.***

SITE PLANS

The following comments are offered with regard to our review of the September 10, 2021 Site Plans prepared by Allen & Major Associates, Inc.:

Comment S1. ***A vehicle turning analysis should be provided using the AutoTurn© software for service and delivery vehicles (SU-30 or SU-40 design vehicle). The turning analysis should depict all maneuvers required to enter and exit the Project site, loading areas and the***

locations for trash/recycling, and should demonstrate that the subject vehicles can access the Project site and circulate in an unimpeded manner.

Comment S2. ***A narrative should be provided that describes how tenant moves and trash/recycling pick-up will be accommodated/managed. The narrative should be consistent with and inform the vehicle turning analysis.***

Comment S3. ***"Keep Right" signs should be installed in the leading edge (nose) of the median of the Bolton Office Park driveway facing Route 117 and for motorists exiting the Project site.***

Comment S4. ***"Only" pavement markings should be installed to accompany the turn arrows in the lane approaching Route 117 and a lane use regulatory sign should be installed prior to the entrance to the turn lanes.***

Comment S5 ***STOP-signs and STOP-lines should be added for the drive aisles that intersect the main drive from Route 117.***

Comment S6. ***"One-Way" and "Do Not Enter" signs should be installed to regulate the flow of traffic where one-way traffic is to be conveyed (mail center and between Building 1 and Building 4).***

Comment S7 ***Pedestrian crossing warning signs should be installed at the crossings at the mail center and between Building 1 and Building 3.***

Comment S8. ***The sight triangle areas for the Bolton Office Park driveway intersection with Route 117 should be shown along with a note to indicate: "Signs, landscaping and other features located within sight triangle areas shall be designed, installed and maintained so as not to exceed 2.5-feet in height. Snow accumulation (windrows) located within sight triangle areas that exceed 3.5-feet in height or that would otherwise inhibit sight lines shall be promptly removed."***

Comment S9. ***Consideration should be given to installing electric vehicle (EV) charging stations.***

Comment S10. ***Bicycle racks should be provided at the clubhouse and at appropriate locations proximate to each residential building. Interior, weather protected bicycle parking should also be provided within each building.***

PARKING

On-site parking will be provided for 382 vehicles, or an overall parking ratio of 1.67 parking spaces per unit, which will consist of 28 parking spaces to be situated in three (3) detached garages and 354 surface parking spaces that will be dispersed throughout the Project site.

The Applicant has indicated that the Project site is located in the Limited Business Zoning District. Residential uses are not allowed in the Limited Business Zoning District and, as such, parking requirements are not listed in the Zoning Bylaw for a residential use in the Limited Business Zoning District.

Comment *A review of parking demand data documented by the ITE[5] for similar multifamily residential communities indicates that observed peak parking demand ratios for a low-rise multifamily residential community range from 0.58 to 2.50 spaces per dwelling unit, with an average peak parking demand of 1.21 spaces per dwelling unit and an 85th percentile peak parking demand of 1.52 spaces per dwelling unit. Applying the 85th percentile peak parking demand (1.52 spaces per dwelling unit) to the Project (229 dwelling units) would result in a peak parking demand of 348 parking spaces for the Project. As such, we are in agreement that the proposed parking supply should be sufficient to accommodate the parking demands of the Project.*

[5]*Parking Generation Manual*, 5th Edition; Institute of Transportation Engineers; Washington D.C.; 2019.