



July 21, 2017

Michael Kulesza, Chairman  
Town of Norfolk – Zoning Board of Appeals  
One Liberty Lane  
Norfolk, MA 02056

Re: Norfolk, MA – Abbyville Commons  
Traffic Peer Review

Dear Mr. Kulesza:

BETA Group, Inc. (BETA) has conducted a review of the April 2017 Traffic Impact and Access Study prepared for 48 apartment units with access on Lawrence Street in Norfolk, Massachusetts. As part of a separate project, 148 single family homes would be constructed as part of a full build-out of the site. As proposed, access to the site would be provided by way of a full access driveway on Lawrence Street across from Cranberry Meadow Road (east site driveway) and a full access driveway on Lawrence Street between Eagle Drive and Bretts Farm Road (west site driveway). The east site driveway would be used primarily for the 48 apartment units. The west site driveway would be primarily used for the proposed 148 single family homes under full build-out.

In general, the traffic study prepared by Green International Affiliates, Inc. for the proposed apartment project was developed in accordance with industry standards. This peer review letter has been prepared to outline findings, comments, and recommendations on the traffic study. Since the proposed 48 apartment units (Abbyville Commons) and the 148 single family homes (The Preserve at Abbyville) have been evaluated under separate traffic studies, this peer review letter has been prepared with a focus primarily on the proposed apartment component of the overall development. Although a peer review has been conducted on the proposed single family homes in a separate letter, many of the comments and recommendations are similar as the same methodologies and assumptions were used in both traffic studies.

## BASIS OF REVIEW

BETA received the following items:

- Traffic Impact and Access Study – Abbyville Commons: Proposed 40B Residential Development, Norfolk, Massachusetts, dated April 2017, prepared by Green International Affiliates, Inc.

Review by BETA will include the above items for consistency with the following:

- Town of Norfolk Zoning By-Laws, amended through May 2016
- Town of Norfolk Rules and Regulations for Subdivision of Land and Site Plan Approval, amended September 16, 2010

- Site visit on June 22, 2017
- Applicable federal and state regulations

## INTRODUCTION

The project site is located on the north side of Lawrence Street, approximately 1,200 feet west of Park Street. The proposed project is an affordable housing development under the Chapter 40B state statute that allows local Zoning Board of Appeals approval with flexible rules if at least 20-25% of the units have long-term affordability restrictions.

Lawrence Street adjacent to the site is under Town of Norfolk jurisdiction and is functionally classified as Local Road. The roadway provides eastbound and westbound travel, but with no pavement markings to separate directional flow. The speed limit along Lawrence Street is posted at 30 miles per hour (mph) adjacent to the site.

## FINDINGS, COMMENTS AND RECOMMENDATIONS

### STUDY AREA

The traffic impacts of the proposed development were evaluated at the following 'study area' intersections:

- Main Street and Park Street
- Park Street and Lawrence Street
- Park Street and Maple Street
- Lawrence Street and Brett's Farm Road

In lieu of locally preferred thresholds, Institute of Transportation Engineers (ITE) methodologies<sup>1</sup> and Massachusetts Department of Transportation's (MassDOT's) *Transportation Impact Assessment Guidelines*<sup>2</sup> suggest that an intersection should be evaluated when site-generated trips are projected to experience a noticeable increase in peak-hour traffic volumes (i.e.,  $\geq 100$  vehicles and/or  $\geq 5\%$ ). The rationale is that an increase of 100 vehicles per hour or 5% could impact the vehicular operations on an intersection approach. Based on the trip-generation and distribution projections detailed within the Traffic Impact and Access Study, the study area intersections evaluated appear to be appropriate.

### EXISTING TRAFFIC VOLUME CONDITIONS

Traffic counts were collected at the study area intersections during the Weekday AM peak period (7-9 AM) and the Weekday PM peak period (4-6 PM) on Wednesday, September 9, 2015, and Thursday, September 10, 2015. In addition, daily traffic and vehicular speed counts were collected along Park Street north of Lawrence Street and along Lawrence Street east of Eagle Drive in September 2015.

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<sup>1</sup> *Transportation Impact Analyses for Site Development: An ITE Proposed Recommended Practice*. Washington, DC: Institute of Transportation Engineers, 2010.

<sup>2</sup> Massachusetts Department of Transportation. "Transportation Impact Assessment (TIA) Guidelines." *MassDOT Development Review – Planning Process*. Commonwealth of Massachusetts, 13 Mar. 2014.

In accordance with MassDOT's traffic study guidelines, traffic counts used should be no more than 2 years old on the submittal date of the traffic study unless otherwise approved.<sup>3</sup> Since the traffic study was prepared in April 2017 and submitted in June 2017, the traffic counts provided for the study area intersections (September 2015) are considered to be valid as they are within the 2 year timeframe.

Traffic on a given roadway typically fluctuates throughout the year depending on the area and the type of roadway. To determine if the September traffic-count data needed to be adjusted to account for this fluctuation, seasonal traffic-volume data were reviewed from nearby MassDOT Permanent Count Stations.<sup>4</sup> This information revealed that September traffic volumes are generally higher than annual average-month conditions. Therefore, the traffic counts were used as collected without a downward adjustment to conservatively reflect annual average traffic-volume conditions. This seasonal adjustment methodology is consistent with state guidelines and is found to be acceptable.

To represent 2017 traffic volume conditions, MassDOT historical traffic volumes were researched that indicated a 1.7% average annual increase.<sup>5</sup> Therefore, the September 2015 traffic counts were increased by a 1.7% annual growth rate to reflect 2017 baseline conditions.

T1. While we find this methodology of increasing the traffic counts to represent current traffic-volume conditions to be reasonable, MassDOT guidelines state that historical traffic counts should be increased by a seasonal adjustment, a background growth rate, and any new traffic from developments that have been completed subsequent to the time of the original counts.<sup>6</sup> Since the traffic study states that MassDOT guidelines were used in preparing the assessment, it is recommended that the Applicant confirm with the Norfolk Town Planner that no additional developments have been constructed after the September 2015 traffic counts that would increase traffic volumes within the study area.

Based on the traffic counts provided in the Traffic Impact and Access Study, Lawrence Street in the vicinity of the site carries approximately 865 vehicles on a weekday. The Weekday AM peak hour occurred between 7:00 and 8:00 AM when approximately 55 vehicles traveled past the proposed site. The Weekday PM peak hour occurred between 4:30-5:30 PM when approximately 80 vehicles traveled past the proposed site.

T2. Based on ITE methodologies, standard traffic engineering practice is to evaluate the impacts of a development during the time periods that would result in the highest cumulative directional demands (i.e., the combination of adjacent street traffic and site trips).<sup>7</sup> This approach is consistent with MassDOT standard operating procedures in that the peak periods for analysis should be based on the site trip generation and existing conditions.<sup>8</sup> Since the traffic study states that MassDOT and ITE guidelines were used in preparing the assessment, it is recommended that the Applicant confirm that the Saturday Midday peak hour is not a critical time period for the proposed development

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<sup>3</sup> Ibid. 2.

<sup>4</sup> Massachusetts Department of Transportation. "Station 3321 – Milford, Interstate 495 south of Route 85." "Station 6125 – Franklin, Interstate 495 north of Route 140." "Station 307 – Westborough, Route 9 west of Route 135." *MassDOT Highway Division, Transportation Data Management System*. Commonwealth of Massachusetts.

<sup>5</sup> Ibid. 3.

<sup>6</sup> Ibid. 2.

<sup>7</sup> Ibid. 1.

<sup>8</sup> Ibid. 2.

based on the combination of site trips and adjacent street traffic volumes. This effort could be accomplished by either collecting traffic counts within the study area during the Saturday Midday peak period (11 AM-1 PM) or researching available traffic counts on a Saturday from the records of the Town of Norfolk, Metropolitan Area Planning Council (MAPC), and MassDOT.

## SAFETY ANALYSIS

Crash data for the study area intersections were obtained from MassDOT between 2011 and 2014. In addition, incident occurrence was compared to the volume of traffic through each intersection to determine significance and whether potential safety problems exist. Accordingly, crash rates were calculated for each study area intersection and compared with the district-wide (MassDOT District 5) averages. Based on this evaluation, the study area intersections were not noted to have experienced a safety concerns.

- T3. The traffic study notes a visibility constraint at the Park Street and Main Street intersection due to the horizontal curvature of Main Street to the west. Based on field reconnaissance, we noted limited sight lines from Park Street to the east and west due to vegetation on the southeast and southwest corners of the intersection. It is recommended that the Applicant coordinate with the Norfolk Police Department to determine whether any safety concerns exist within the study area. If safety issues are identified, it is recommended that the Applicant coordinate with the Norfolk Planner, Director of Public Works, and Police Department in developing safety improvement measures that should be considered.

## VEHICLE SPEED DATA

The speed limit along Lawrence Street is posted at 30 mph adjacent to the site. Based on speed data collected along Lawrence Street adjacent to the site, average vehicle speeds along Lawrence Street are generally consistent with the posted speed limit (eastbound = 31 mph, westbound = 30-31 mph). In addition, 85<sup>th</sup> percentile speeds along Lawrence Street were observed to be slightly higher than the posted speed limit (eastbound = 36 mph, westbound = 36 mph).

- T4. With the lack of pedestrian and bicycle facilities provided along Lawrence Street adjacent to the site, the high number of vehicles traveling faster than the posted speed limit (85<sup>th</sup> percentile speeds up to 6 mph above posted speed limit), and the horizontal and vertical curvatures of Lawrence Street, it is recommended that the Applicant coordinate with the Norfolk Planner, Director of Public Works, and Police Department in determining speed reduction measures that should be considered.

The speed limit along Park Street is posted at 35 mph south of Bush Pond Road. Based on speed data collected along Park Street, average vehicle speeds along Park Street are slightly higher than the posted speed limit (northbound = 37 mph, southbound = 40 mph). In addition, 85<sup>th</sup> percentile speeds along Lawrence Street were observed to be higher than the posted speed limit (northbound = 41-42 mph, southbound = 43 mph).

- T5. With the lack of pedestrian and bicycle facilities provided along Park Street between Bush Pond Road and Lawrence Street combined with the high number of vehicles traveling faster than the posted speed limit (85<sup>th</sup> percentile speeds up to 8 mph above posted speed limit), it is recommended that the Applicant coordinate with the Norfolk Planner, Director of Public Works, and Police Department in determining speed reduction measures that should be considered.

## FUTURE NO-BUILD TRAFFIC VOLUMES

To estimate the impact of the proposed development's traffic on the adjacent roadway system, existing traffic volumes were projected to the year 2024. This design horizon represents a 7-year projection, which is in accordance with MassDOT guidelines. Future traffic volumes within the study area would include existing traffic, new traffic due to normal traffic growth, and traffic related to any significant development by others expected to be completed by 2024. Consideration of these factors resulted in the development of 2024 No-Build traffic volumes, which assume that the proposed development is not built.

An annual average traffic-growth percentage was determined based on MassDOT historical traffic-volume data locations in Franklin, Milford, and Westborough. The MassDOT historical traffic data revealed an average annual growth rate of 1.7% that was also used to increase the 2015 traffic counts to reflect 2017 traffic volumes. The traffic study, however, only used a 1% annual growth rate with an attempt to justify the lower percentage.

- T6. Since there were no MassDOT historical traffic data provided in the Town of Norfolk, it is recommended that the Applicant coordinate with the Norfolk Planner and MAPC staff to confirm an appropriate growth rate for this area. This request is consistent with MassDOT guidelines in developing 'general background growth' for the area<sup>9</sup> and is important since the traffic study desires to use an arbitrary growth rate that is lower than actual annual traffic-volume trends.

In addition to utilizing a historical growth rate, traffic to be generated by planned developments anticipated to add substantial traffic volumes through the study area within the design horizon was considered in developing the 2024 No-Build traffic volumes. The Traffic Impact and Access Study identified the Boyde's Crossing residential development located on Main Street (Norfolk), the Eagle Brook Village mixed-use development located on Route 140 (Wrentham), and the Park Place residential development located off Park Street (Wrentham).

- T7. Since the traffic study did not state whether coordination efforts took place with Town of Norfolk officials, it is recommended that the Applicant coordinate with the Norfolk Planner and MAPC staff to determine whether additional developments should be considered within the future traffic-volume projections.

## FUTURE BUILD TRAFFIC VOLUMES

Project-generated traffic volumes were determined by utilizing trip-generation statistics published in the Institute of Transportation Engineers (ITE) Trip Generation manual for 48 residential units. The proposed development is estimated to generate 414 vehicle trips on a typical weekday (207 entering and 207 exiting), 27 vehicle trips during the Weekday AM peak hour (5 entering and 22 exiting), and 44 vehicle trips during the Weekday PM peak hour (29 entering and 15 exiting).

- T8. Although the traffic study describes that Lane Use Code 221 (Low-Rise Apartment) was used to estimate site trips for the proposed apartment development, the trips tabulated within Table 3.2 and provided in the Appendix were calculated using Land Use Code 220 (Apartment). Therefore, it is recommended that the methodology used in determining the projected site trips be clarified.

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<sup>9</sup> Ibid. 2.

- T9. Projected site trips were not provided for a Saturday or during the Saturday Midday peak hour. Consistent with ITE and MassDOT guidelines, it is recommended that traffic generation estimates be provided for these conditions to help determine whether the Saturday Midday peak hour is a critical time period for the proposed development based on the combination of site trips and adjacent street traffic volumes.

As part of a separate project, 148 single family homes would be constructed as part of a full build-out of the site. The trips for the full build-out program (48 apartment units and 148 single family homes) were projected by utilizing trip-generation data published in the ITE Trip Generation manual. Full build-out of the site is shown to generate 1,920 vehicle trips on a typical weekday (960 entering and 960 exiting), 140 vehicle trips during the Weekday AM peak hour (34 entering and 106 exiting), and 194 vehicle trips during the Weekday PM peak hour (194 entering and 71 exiting).

- T10. The full build-out traffic volume estimates tabulated in Table 3.2 may need to be modified depending on which land use code is supposed to be used for the proposed apartment component.
- T11. There appears to be a typo in Table 3.2 for the full build-out projections as the entering site trips and the total site trips during the Weekday PM peak hour are the same (194 trips). It is recommended that the estimated site trips for the full build-out of the site be reevaluated.

Trips were assigned to the study area based on existing traffic patterns. This methodology was selected because the existing uses in the vicinity of the site are residential in nature and the proposed development is anticipated to experience similar distribution patterns. BETA concurs with this trip-distribution methodology.

## INTERSECTION ANALYSES

Capacity analyses were performed for the study area intersections with the 2017 Existing, 2024 No-Build, and 2024 Build traffic volumes based on the methodology and procedures set forth in the *Highway Capacity Manual* (HCM). A traffic engineering measure is the volume-to-capacity ratio ( $v/c$ ), which compares roadway demand (traffic volumes) with roadway supply (carrying capacity) and identifies when a lane or movement operates over capacity ( $v/c > 1.00$ ).

The Park Street northbound approach to the Main Street intersection currently experiences long delays (LOS E) during the Weekday AM and Weekday PM peak hours. With the addition of future traffic-volume growth without the apartment development (2024 No-Build), these delays are anticipated to be exacerbated to a point of operating over capacity during the Weekday AM peak hour ( $v/c = 1.13$ , LOS F, and 130 seconds of delay) and the Weekday PM peak hour ( $v/c = 1.14$ , LOS F, and 161.5 seconds of delay). Under 2024 Build traffic-volume conditions, the delays along the Park Street northbound approach increase during the Weekday AM peak hour ( $v/c = 1.18$ , LOS F, and 147.5 seconds of delay) and the Weekday PM peak hour ( $v/c = 1.24$ , LOS F, and 199.7 seconds of delay).

- T12. Based on MassDOT guidelines, the proponent may need to commit to a mitigation program if the development is anticipated to add vehicle trips to an intersection that is already performing with poor operations (e.g., LOS D or below in rural areas and LOS E or below in urban areas).<sup>10</sup> In

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<sup>10</sup> Ibid. 2.

addition, state guidelines suggest that a development might have a significant impact at an intersection that should be mitigated if the addition of site trips results in an increase of 10 seconds of delay (Weekday AM = +17.5 seconds, Weekday PM = +38.2 seconds). Since the traffic study states that MassDOT guidelines were used in preparing the assessment, it is recommended that the Applicant coordinate with the Norfolk Planner and Director of Public Works to develop and implement mitigation measures to improve operations and offset the project's impacts at this intersection.

## SIGHT DISTANCES

As proposed, access to the site would be provided by way of a full access driveway on Lawrence Street across from Cranberry Meadow Road (east site driveway) and a full access driveway on Lawrence Street between Eagle Drive and Bretts Farm Road (west site driveway). The east site driveway would be primarily used for the proposed 48 unit apartment development. The west site driveway would be used primarily for the 148 single family homes under full build-out.

To identify potential safety concerns associated with site access, sight distances have been evaluated at the site driveway locations to determine if the available sight distances for vehicles exiting the site meet or exceed the minimum distances required for approaching vehicles to safely stop. The available sight distances were compared with minimum requirements, as established by the American Association of State Highway and Transportation Officials (AASHTO).

Sight distance is the length of roadway ahead visible to the driver. The Stopping Sight Distance (SSD) is the minimum distance required for a vehicle traveling along the major roadway to safely stop before reaching a stationary object in its path. The Intersection Sight Distance (ISD) is provided on minor street (driveway) approach to allow the motorists of stopped vehicles sufficient view of the major roadway to decide when to enter the major roadway. The available SSD and ISD at the site driveway location were measured and compared to minimum requirements as established by AASHTO.

As presented in the traffic study, sight distances were noted to be limited due to vegetation at the proposed east and west site driveways. In addition, limited sight distances were identified to the east of the proposed west site driveway due to the existing horizontal curvature of Lawrence Street. Since the proposed site driveways will not meet minimum AASHTO site distance requirements, sight line plans were provided in the traffic study (Figures 9 and 10) to depict the areas of vegetation trimming/clearing.

- T13. The traffic study identified that the horizontal curvature of Lawrence Street hinders sight lines. In addition, our field reconnaissance revealed that Lawrence Street adjacent to the site has a vertical curve that could contribute to limited sight lines at the proposed site driveways. It is recommended that Sight Line Profile Plans be prepared to demonstrate that sight lines would be available to meet minimum AASHTO requirements to provide safety for the future residents of the development as well as for the traveling public along this section of Lawrence Street.
- T14. On the sight line plan for the west site driveway (Figure 10), site lines from the site driveway to the east are shown cross onto an abutting property. If this abutting property is not part of the subject site, it is recommended that the Applicant pursue a sight line easement to prevent the use of the land identified.

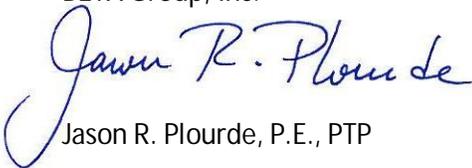
## IMPROVEMENT MEASURES

As recommended in the Traffic Impact and Access Study, any proposed landscaping and signage would be low and/or set back from the proposed site driveways to allow for adequate sight lines. To further improve sight lines, vegetation along the site frontage would be trimmed and selectively cleared, and land would be regraded as needed. After the proposed water main is installed, Lawrence Street would be repaved to provide a consistent roadway width. Advance intersection warning signs (W2-2) would be posted at the Lawrence Street and Park Street intersection.

T15. In addition, the Applicant should develop and propose measures to alleviate safety issues and improve vehicular operations at the Park Street and Main Street intersection (see Comments T3 and T12); reduce vehicle speeds along the Lawrence Street and Park Street corridors (see Comments T4 and T5); and ensure available sight lines would be provided at the site driveways in accordance with AASHTO requirements (see Comments T13 and T14).

If we can be of any further assistance regarding this matter, please contact us at our office.

Very truly yours,  
BETA Group, Inc.



Jason R. Plourde, P.E., PTP  
Project Manager

cc: **Ray Goff – Norfolk Town Planner**  
Amy Brady – Norfolk Zoning Clerk

Job No: 4980