



April 12, 2017

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

Re: Norfolk, MA – The Village at Norfolk
Traffic Peer Review

Dear Mr. Kulesza:

BETA Group, Inc. (BETA) has conducted a review of the October 2016 Traffic Impact and Access Study prepared for 32 residential townhouses proposed to be located at 25 Rockwood Road in Norfolk, Massachusetts. In general, the traffic study prepared by Green International Affiliates, Inc. for the proposed residential 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.

BASIS OF REVIEW

BETA received the following items:

- Traffic Impact and Access Study – Proposed Residential Development, 25 Rockwood Road, Norfolk, Massachusetts, dated October 2016, 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 April 11, 2017
- Applicable federal and state regulations

INTRODUCTION

The project site consists of a parcel of land located on the west side of Rockwood Road, less than 400 feet north of the Massachusetts Bay Transportation Authority (MBTA) Norfolk Commuter Rail Station and less than 600 feet south of the Freeman-Kennedy School driveway for elementary grades 3 through 6. 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.

Rockwood Road (Route 115) adjacent to the site is under Town of Norfolk jurisdiction and is functionally classified as an Urban Minor Arterial. The roadway provides northbound and southbound travel in a two-lane cross-section with directional flow separated by a double yellow centerline. The speed limit along

Rockwood Road is posted at 35 miles per hour (mph) north of the site and 25 mph south of the site. In the vicinity of the site, there is a sidewalk provided along the east side of Rockwood Road.

We note that the Traffic Impact and Assessment Study indicates a 36 unit development, but the site plans submitted show a 32 unit development. While it is not anticipated that this will significantly alter the conclusions of the study or our peer review, the study should be revised with the correct number of units.

FINDINGS, COMMENTS AND RECOMMENDATIONS

Study Area

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

- Rockwood Road and Boardman Street
- Rockwood Road and Ware Drive
- Rockwood Road, Union Street, and Main Street

In lieu of locally preferred thresholds, Institute of Transportation Engineers (ITE) methodologies¹ and Massachusetts Department of Transportation's (MassDOT's) *Transportation Impact Assessment Guidelines* suggest that an intersection should be evaluated when site-generated trips are projected to increase peak-hour traffic volumes by 100 vehicles or more. The rationale is that an increase of 100 vehicles per hour or more 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 Rockwood Road study area intersections with Boardman Street and with Ware Drive during the Weekday AM peak period (7-9 AM) and the Weekday PM peak period (4-6 PM) on Thursday, September 8, 2016. In addition, daily traffic and vehicular speed counts were collected along Rockwood Road north of the proposed site driveway between September 7 and 8, 2016.

- T1. For the Rockwood Road, Union Street, and Main Street roundabout, traffic counts were obtained from a separate traffic study (Boyde's Crossing) that were collected in April 2014. In accordance with MassDOT's *Transportation Impact Assessment Guidelines*, however, traffic counts used from other sources should be no more than 2 years old on the submittal date of the traffic study unless otherwise approved. Since the traffic study was prepared in October 2016 and submitted in January 2017, the traffic counts for the Rockwood Road roundabout (April 2014) are considered to be outdated. As such, it is recommended that more recent traffic counts be collected.

Based on the traffic counts provided in the Traffic Impact and Access Study, Rockwood Road in the vicinity of the site carries approximately 8,890 vehicles on a weekday. The Weekday AM peak hour occurred between 7:00 and 8:00 AM when approximately 790 vehicles traveled past the proposed site with a relatively even directional split (50.3% southbound). The Weekday PM peak hour occurred between 5:00 and 6:00 PM

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

when approximately 860 vehicles traveled past the proposed site with a slightly heavier directional split in the northbound direction (51.1%).

The critical time periods for a proposed development are generally associated with the peaking characteristics of both the estimated site trips and the adjacent roadway system. Although the school dismissal time period was not included for Freeman-Kennedy School, a review of the weekday daily traffic counts provided in the Traffic Impact and Access Study revealed that the traffic volumes along Rockwood Road are higher during the Weekday AM peak period (7-9 AM) and the Weekday PM peak period (4-6 PM). Additionally, the proposed residential development is anticipated to generate more trips during the Weekday AM and Weekday PM peak hours than during the school dismissal period.

- T2. Upon review of the trip-generation calculations provided in the Traffic Impact and Access Study, the proposed development is anticipated to generate slightly less vehicle trips during the Saturday Midday peak hour than the Weekday AM and Weekday PM peak hours. It is recommended that the Applicant confirm that the Saturday Midday peak hour is not a critical time period for the proposed development based on the combination of site trips and adjacent street traffic volumes.

Traffic on a given roadway typically fluctuates throughout the year depending on the area and the type of roadway. The Traffic Impact and Access Study used historical traffic-volume data from MassDOT Permanent Count Station #6189 to determine if the traffic counts should be adjusted to account for seasonal fluctuation. The MassDOT Permanent Count Station selected is located on Interstate 95 (I-95)/Route 128 in Dedham and the Traffic Impact and Access Study states that there are no other count stations in closer proximity to the site that could provide better seasonal variation data. Based on a review of the historical traffic volume for MassDOT Permanent Count Station #6189, the most recent traffic counts provided on MassDOT's Transportation Data Management System were collected in 2010.

- T3. A review of MassDOT Permanent Count Stations near the Town of Norfolk, however, revealed that there are locations that appear to be closer to the project site than the count station used: Bellingham (#6125 on I-495), Franklin (#6126 on I-495), Wrentham (#6127 on I-495), Wrentham (#6128 on I-495), Foxborough (#6247 on I-495), Mansfield (#10 on I-495), Foxborough (#6248 on I-95), Foxborough (#6093 on I-95), and Sharon (#6242 I-95). It is recommended that the Applicant provide support as to why MassDOT Count Station #6189 is more applicable for the seasonal fluctuation assessment than the other closer locations that have more recent traffic counts.

Vehicle Speed Data

The speed limit along Rockwood Road is posted at 35 mph north of the site and 25 mph south of the site. Based on speed data collected along Rockwood Road adjacent to the site, vehicles speeds along Rockwood Road southbound are generally consistent with the posted speed limit (average = 33 mph, 85th percentile = 37 mph). Along Rockwood Road northbound, however, vehicles were observed to travel faster than the posted speed limit (average = 32 mph, 85th percentile = 37 mph).

- T4. Due to the faster vehicle speeds along Rockwood Road northbound adjacent to the site (32-48% higher than the 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.

Safety Analysis

Crash data for the study area intersections were obtained from MassDOT between 2012 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.

- T5. The Rockwood Road, Union Street, and Main Street roundabout was noted to have experienced approximately 5 reported collisions per year and a crash rate higher than the district-wide average. In accordance with MassDOT guidelines, collision diagrams should be prepared for locations experiencing more than 3 incidents per year to help identify crash patterns, trends, possible causes, and geometric deficiencies in an effort to develop appropriate safety measures. It is recommended that the Applicant coordinate with the Norfolk Planner, Director of Public Works, and Police Department to identify concerns and develop measures that could potentially improve safety.

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 2023. This design horizon represents a 7-year projection, which is in accordance with MassDOT guidelines. Future traffic volumes within the study area will include existing traffic, new traffic due to normal traffic growth, and traffic related to any significant development by others expected to be completed by 2023. Consideration of these factors resulted in the development of 2023 No-Build traffic volumes, which assume that the proposed development is not built.

- T6. An annual average traffic-growth percentage was determined based on MassDOT historical traffic-volume data locations in Stoughton, Sutton, and Westborough. These historical data revealed that traffic volumes have increased annually by approximately 1% between 2007 and 2015. Since there were no MassDOT historical traffic data provided in the Town of Norfolk, it is recommended that coordination efforts be held with the Norfolk Planner and Metropolitan Area Planning Council (MAPC) staff to confirm an appropriate growth rate for this area.

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 2023 No-Build traffic volumes. The Traffic Impact and Access Study identified the Boyde's Crossing residential development located on Main Street east of Rockwood Road.

- T7. 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 ITE Trip Generation manual using Land Use Code 230 (Residential Condominium/Townhouse) for 36 residential townhouses. We find this land use code appropriate for the proposed site use. The proposed development is estimated to generate 264 vehicle trips on a typical weekday (132 entering and 132 exiting), 23 vehicle

trips during the Weekday AM peak hour (4 entering and 19 exiting), and 26 vehicle trips during the Weekday PM peak hour (17 entering and 9 exiting).

With the MBTA Norfolk Commuter Rail Station in the vicinity of the site, the Traffic Impact and Access Study identified that historical census work trip data suggest that 7.9% of Norfolk residents use public transportation to commute to work. As a result, a 7.9% trip-reduction credit was applied to the ITE trip-generation estimates.

- T8. While we do not disagree with the methodology in determining the different trip-generating characteristics of a residential development in close proximity to public transportation, the referenced census data were not provided within the Traffic Impact and Access Study for review. Based on our research of the 2011 to 2015 American Community Survey (ACS) data for the Town of Norfolk, only 1% of Norfolk residents were noted to utilize public transportation (excluding taxi cabs) to commute to work. Therefore, it is recommended that the Applicant justify the use of a 7.9% reduction in the trip-generation estimates for the proposed development.

In the vicinity of the site, there is a sidewalk along the east side of Rockwood Road without pedestrian amenities provided along the west side of the roadway where the project site is located. As identified in the Traffic Impact and Access Study, there will be pedestrian interaction between the proposed residential development and the MBTA Commuter Rail Station and there may be safety concerns with pedestrian crossing the Rockwood Road corridor. Therefore, the Traffic Impact and Access Study recommends that pedestrian connectivity be provided if public right-of-way is available by constructing a sidewalk along the west side of Rockwood Road southerly from the site driveway to the existing sidewalk at Ware Drive.

- T9. We concur that the Applicant should pursue this non-motorized transportation improvement by conducting survey along the Rockwood Road corridor between the site driveway and Ware Drive to demonstrate that a sidewalk can be constructed in this area. It is recommended that the Applicant coordinate these efforts and the construction of the sidewalk with the Norfolk Planner and Director of Public Works.

Trips were assigned to the study area based on existing traffic patterns, US Census Journey to Work information, and engineering judgment. BETA concurs with this methodology, with 40% of site traffic expected to travel to and from the north along Rockwood Road, 30% to and from the south along Union Street, 15% to and from the east along Main Street, and the remaining 15% evenly distributed between Main Street west, Boardman Street east, and Boardman Street west. Based on the trip-generation and distribution estimates for the proposed residential development, the site-specific traffic volumes associated with the residential development were assigned to the roadway network.

On-Site Parking

As proposed, the residential development would provide a total of 110 on-site parking spaces, with 44 spaces in a garage, 48 spaces for visitors, and 16 spaces along the driveway. Based on Town of Norfolk's Zoning requirements, a residential development (other than a single family dwelling) requires 1.5 parking spaces per unit (Section F.7.b.1.a). Based on the proposed 36 townhouse units, the total number of on-site parking spaces required would be 54 spaces (1.5 spaces/unit x 36 units).

To determine the parking demand anticipated to be generated by the proposed residential development, ITE parking generation data were researched for Land Use Code 230 (Residential Condominium/Townhouse). The average peak period parking demand is 1.38 spaces per dwelling unit and the 85th percentile parking demand is 1.52 spaces per dwelling unit. Applying these ratios, the proposed 36 townhouse units would be expected to experience parking demands between 50 and 55 parking spaces (1.38 spaces/unit x 36 units, and 1.52 spaces/unit x 36 units).

Based on these methodologies, the residential development would provide 110 parking spaces which exceed the Town of Norfolk's minimum requirement of 54 spaces and ITE's parking demands of 50 to 55 spaces.

Sight Distances

To identify potential safety concerns associated with site access, sight distances have been evaluated at the site driveway location 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 indicated in the Traffic Impact and Access Study, the AASHTO minimum required sight distances can be achieved with selective vegetation clearing and property regrading.

T10. Based on a field visit, the sight lines to and from the north of the driveway appear to be limited by existing vegetation, the topography of the property, and the horizontal curvature of Rockwood Road. It is recommended that a Sight Distance and Sight Line Profile Plan be prepared to demonstrate that sight lines would be available to meet minimum AASHTO requirements to provide safety for the future residents of the townhouse development as well as for the traveling public along this section of Rockwood Road. The areas of vegetation and property regrading should also be identified on the plan.

T11. To ensure the safe and efficient flow of traffic to and from the site, it is recommended that proposed plantings, vegetation, landscaping, and signing along the site frontage be kept low to the ground (no more than 3.0 feet above street level) or set back sufficiently from the edge of the site driveway and along the western side of Rockwood Road so as not to inhibit available sight lines.

Intersection Analyses

Capacity analyses were performed for the study area intersections with the 2016 Existing, 2023 No-Build, and 2023 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

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roadway demand (traffic volumes) with roadway supply (carrying capacity) and identifies when a lane or movement operates over capacity ($v/c > 1.00$).

- T12. The Boardman Street eastbound approach to the Rockwood Road intersection currently experiences long delays (LOS F) during the Weekday AM and Weekday PM peak hours. With the addition of future traffic-volume growth without the residential development (2023 No-Build), this delay is anticipated to be exacerbated to a point of reaching capacity ($v/c = 1.00$) during the Weekday AM peak hour. Under 2023 Build traffic-volume conditions during the Weekday AM peak hour, the Boardman Street eastbound approach operates over capacity ($v/c > 1.00$). Therefore, 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.
- T13. Since the traffic counts collected in April 2014 for the Rockwood Road, Union Street, and Main Street roundabout were not provided with the Traffic Impact and Access Study, the input values (e.g., traffic volumes, peak hour factors, percent of heavy vehicles) used for intersection analysis purposes could not be reviewed for accuracy. If the Town of Norfolk determines that the Applicant needs to provide updated traffic counts at the roundabout (see Comment T1), it is recommended that the Applicant provide updated intersection analyses for this location.

Improvement Measures

As recommended in the Traffic Impact and Access Study, a Reduced Speed Limit Ahead (W3-5) sign would be posted facing Rockwood Road southbound vehicles approximately 100 feet in advance of the posted speed limit reduction from 35 mph to 25 mph. An Intersection Warning (W2-1) sign would be posted on the Rockwood Road northbound and southbound approaches to the Boardman Street intersection. Pedestrian Crossing (W11-2 and W16-7P) signs would be posted at the striped crosswalks on Rockwood Road at Boardman Street, 700 feet south of Boardman Street, and at Ware Drive.

- T14. In addition, the Applicant should develop and propose measures to reduce vehicle speeds along the Rockwood Road corridor (see Comment T4); alleviate safety issues at the Rockwood Road, Union Street, and Main Street roundabout (see Comment T5); provide pedestrian facilities along the west side of Rockwood Road (see Comment T9); ensure available sight lines at the site driveway in accordance with AASHTO requirements (see Comments T10 and T11); and improve vehicular operations at the Rockwood Road and Boardman Street intersection (see Comment T12).

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



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

Job No: 4980

