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August 28, 2017

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

Subject: Responses to Comments from Traffic Peer Review for Preserve at Abbyville, Dated July 21, 2017

Dear Chairman Kulesza:

In response to peer review comments prepared by BETA Group, Inc. (BETA) for the Board, Green International Affiliates (Green), is pleased to submit the following responses on behalf of the Applicant and pertaining to the traffic analysis and plan. The comments are repeated in whole or part and are shown in in bold followed by the relevant response made in relation to the April 2017 TIAS[1] of the proposed Preserve at Abbyville project in Norfolk, MA. The responses provided in this letter also correspond to the comments specific to the Abbyville Commons development; comments pertinent to both components of the Abbyville development were included in the separate 8/28/17 response letter related to Abbyville Commons.

Future Build Traffic Volumes

1. **There appears to be a typo in Table 3.2 for the single family housing component estimates during the Weekday PM peak hour as the summation of the entering and exiting trips do not coincide with the total trips. This difference is not significant, but it is recommended that the trip-generation estimates be modified accordingly.**

   Response: The total number of trips listed in Table 3.2 for the single family housing component should read 151 trips, not 150. The calculation as shown in the appendix was rounded up to a total of 151. The figures and the analysis used the 151 figure. Figure 5 (Estimated Site-Generated Trips, Single Family Houses) shows 151 entering trips (95+56) and Figure 7 (full buildout estimate) shows 151+44 = 195 trips, and the volumes used in the analysis correspond to the volumes in Figure 7. An updated Table 3.2 is attached to include the correction.

2. **Projected site trips were not provided for a Saturday or during the Saturday Midday peak hour. Consistent with Institute of Transportation Engineers (ITE) methodologies and Massachusetts Department of Transportation's (MassDOT's) Transportation Impact Assessment 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.**

   Response: Weekday peak hour analysis is considered sufficient for residential projects, per Section II.D of the March 13, 2014, Transportation Impact Assessment Guidelines ("while most office / industrial / residential studies include the weekday a.m. and p.m. peak hours", as opposed to just

[1] Green International Affiliates, Inc. Traffic Impact & Access Study, Proposed The Preserve at Abbyville, Norfolk, MA, April 2017.

"weekday evening … peak hour analysis"). This is also consistent with ITE guidelines, which we have attached a relevant excerpt from the ITE Recommended Practice[2] that indicates the typical study periods for residential based developments. The predominant land use in the vicinity of the proposed development is residential. All of the roadways intersecting Lawrence Street and Park Street have only residential or some farm land uses. In conclusion, this is not a retail area or a unique (i.e. resort area) environment in which Saturday conditions could be substantively higher than the weekday periods. Consequently, it can be reasonably concluded that the study periods used for this assessment are adequate to understand its impacts and access requirements.

3. **Although the traffic study describes that Land 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.**

   Response: As discussed in the Commons response letter, there was a typographical error in the table and Land Use Code 220 was used in the forecasts and analysis.

4. **There appears to be a difference in the trip-generation estimates associated with the proposed apartment development component of the full build-out program as presented in the two traffic studies. Although this difference is not significant, it is recommended that the trip-generation estimates be modified accordingly.**

   Response: As indicated in previous responses, typographical errors were present in the summary tables. Trip generation estimates in the figures and those used in the analyses match in the two studies. The summary tables have been revised and are attached.

Intersection Analyses

5. **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). In 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.**

   Response: A proposed mitigation program has been outlined by the Applicant and is summarized later in the response as well as described in the April 2017 study. The intersection of Main Street at Park Street experiences long estimated delays during the peak hours under current conditions, however, there are no feasible alternatives to alleviate the delays due to the location and design of the MBTA bridge on Park Street. Safety related actions at this intersection, however, have been included in the proposed mitigation plan discussed in the next response.

[2] Institute of Transportation Engineers, Traffic Impact Analysis of Site Development, A Recommended Practice, Washington, D.C., 2010.

Improvement Measures

6. **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; reduce vehicle speeds along the Lawrence Street and Park Street corridors; and ensure available sight lines would be provided at the site driveways in accordance with American Association of State Highway and Transportation Officials (AASHTO) requirements.**

   Response: The Applicant has been working with the town on a comprehensive package of improvements that would enhance conditions along Lawrence Street and the study intersections. The proposed mitigation plan emphasizes enhancing safety including managing travel speeds, addressing the Lawrence Street bridge and working with the town to improve pedestrian facilities between Park Street and the Cranberry Village Drive/Site Drive intersection. The proposed actions as of 8/28/17 are listed in the attached Table A.

We believe all pertinent written questions, comments and requests have been responded to in a sufficient manner. There are additional items that were raised at the 8/22/17 public hearing and are in the process of being addressed. These include a description of the construction traffic management plan, the slight increase in units for The Preserve, and a more detailed sight line profile plan related to the proposed western site drive. Should the Board have any further questions, we would be happy to discuss.

Very truly yours,
GREEN INTERNATIONAL AFFILIATES, INC.

William J Scully

William J. Scully, P.E.
Director of Transportation Planning

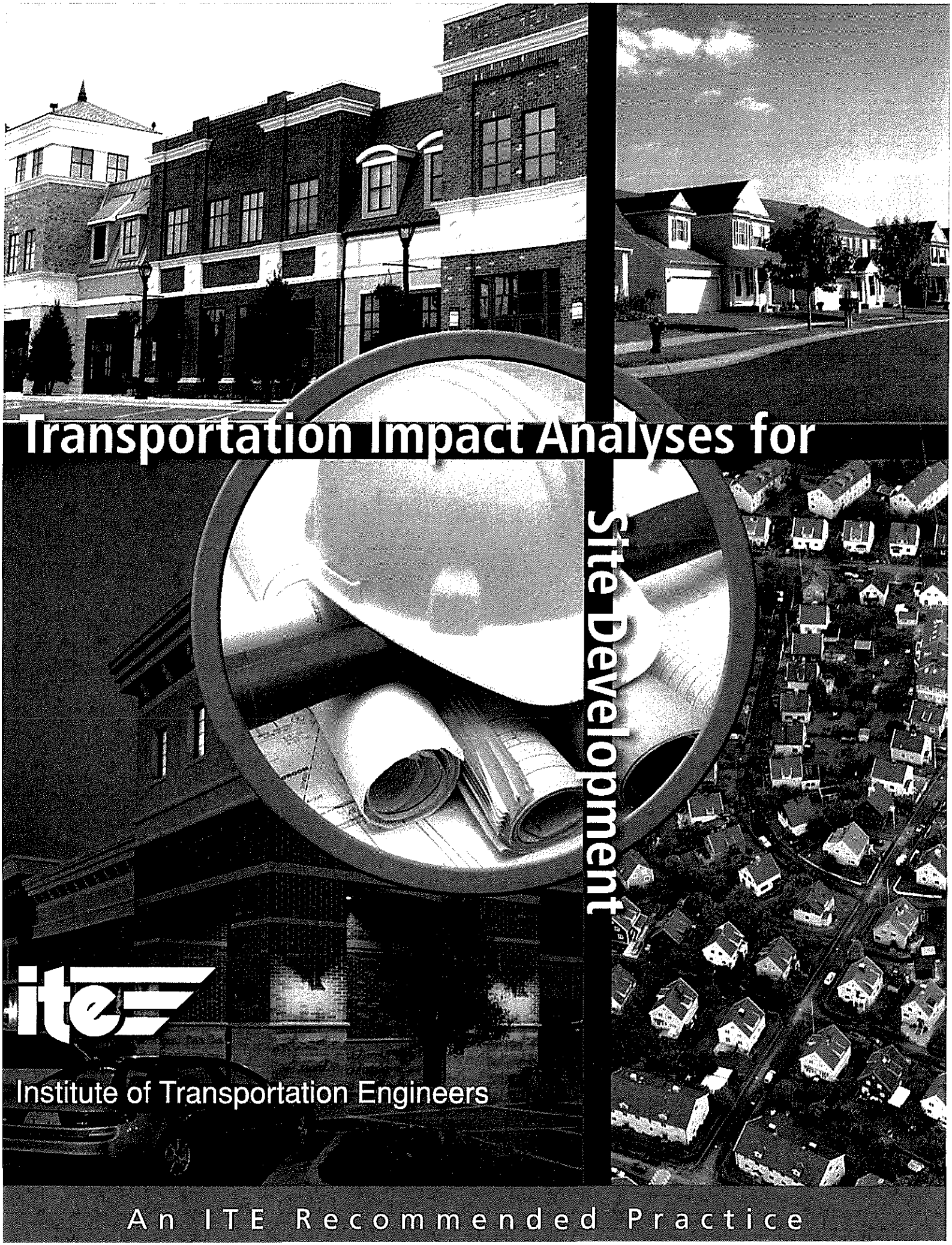
Attachments

Cc: T. DiPlacido
J. Smolak
J. Plourde, Beta Engineering

WJS/sm

TABLE A
SUMMARY OF PROPOSED TRANSPORTATION MITIGATION ACTIONS
ABBYVILLE COMMONS & THE PRESERVE AT ABBYVILLE

PROPOSED ACTION	LOCATION	NOTES
Vegetation clearing	Abutting site drives	Sight line triangle will be defined on approved site plans
Regrade roadside	On Lawrence Street abutting site drives	
STOP signs and markings	Site drive approaches to Lawrence Street	MUTCD compliant
Lawrence Street Bridge	East of site	Assist town with design and grant MassWorks application
Lawrence Street Improvement	Park Street to bridge	Includes 24-foot section with sidewalk; assisting town by providing design services
Lawrence Street Boardwalk	Bridge to Cranberry Village Drive/Site Drive intersection	Proposed as part of grant; would provide safe pedestrian connection without filling pond; providing design & permitting services
Advance warning signage	Eastbound approach to the Park Street / Main Street intersection	Could be W2-2R sign. Signage with LED lighting and solar power source; also possible vegetative trimming within town layout
Advance warning signage	Both approaches of Park Street at Lawrence Street	W2-2 signs



Transportation Impact Analyses for Site Development

Institute of Transportation Engineers

An ITE Recommended Practice

- The weighted average rate falls within the data cluster in the plot.

Collect local data when

- The study site is not compatible with the ITE land use code definition (Institute of Transportation Engineers, 2008);
- There are only one or two data points (preferably if there are five or fewer data points);
- The independent variable does not fall within the range of data; or
- Neither the weighted average rate line nor the fitted curve falls within the data cluster for the size of this specific development.

Choosing the Independent Variable

The choice of the independent variable can be one of the most important decisions in estimating trip generation. The selected variable should be easily projected with reasonable accuracy. When information is available for more than one independent variable, the predictive accuracy of both the independent variable and the trip generation rate or equation should be considered. Ideally, the independent variable having the strongest logical relationship with trip making should be selected (for example, gross square feet of building instead of site acreage). However, it is also important to check the sample size for each given independent variable. In the case of two variables with similar correlations, the variable with the larger sample should be used. Trip rates or equations based on small sample sizes should be used with care.

In the planning stage, some variables, such as employment and parking, are estimated on the basis of other variables, such as gross square feet of building space. When little is known about the size of the generator except the proposed use of the land to be developed, common development densities can be used to obtain a preliminary estimate of the independent variable. The local zoning ordinance should also be checked to ensure density compatibility.

Floor area is one of the most commonly used independent variables. There are, however, different ways to compute floor area, and there are different definitions. These must be consistent when determining a trip generation rate and should correspond to accepted floor area definitions. For example, office buildings include gross floor area, gross rentable area and net rentable area (Mehra and Keller, 1985; Hooper, 1989). Care should be taken to exclude areas such as large atriums, which do not by themselves generate trips (in other words, use net leasable area or subtract atrium areas from gross floor area). Gross leasable area is commonly used for shopping centers (Hooper, 1989). (Definitions for each of these terms are included in *Trip Generation*.)

Choosing the Appropriate Time Periods

The range of average rates for different time periods should be examined to determine when the generator in question peaks in traffic flow and to define the relationship between the peak generation and the peaking characteristics of the adjacent street system.

Transportation impacts should be evaluated for weekday peak hours if the site generates significant traffic during those periods. Analyses should generally be completed for other peak periods of site trip generation to assess ingress and egress capacity and turn lane storage needs.

For example, residential and general office developments share the same peak periods as the adjacent streets. Other uses, such as shopping centers, may generate an impact during the normal afternoon (p.m.) peak hour of the street system but may have an even greater impact later in the evening or on Saturdays. Shopping centers also normally generate only minor (or negligible) impacts during the morning (a.m.) street peak hour. *Therefore, the critical time periods should be analyzed to determine both site-specific design requirements (such as storage lengths) and the effect on normal peak traffic flow on the street system.* Table 5–3 shows typical peak periods for several land uses.

Daily and Seasonal Variations

Trip generation estimates for the average weekday are appropriate analyses for most but not all land uses. Uses such as shopping centers, banks and restaurants exhibit different daily patterns, which should be taken into account. For some land uses (such as movie theaters), more trips are generated on Friday or Saturday than on the average weekday (Institute of Transportation Engineers, 2008). Since there are 104 Fridays and Saturdays in a year, those days, rather than the average weekday, may be the design or analysis period for those land uses.

Table 5–3. Typical Peak Traffic Flow Hours for Selected Land Uses

Land Use	Typical Peak Hours[a]	Peak Direction
Residential	7:00–9:00 a.m. weekdays 4:00–6:00 p.m. weekdays	Outbound Inbound
Regional Shopping	5:00–6:00 p.m. weekdays 1:00–2:00 p.m. Saturdays 4:00–5:00 p.m. Saturdays	Total[b] Inbound Outbound
Office	7:00–9:00 a.m. weekdays 4:00–6:00 p.m. weekdays	Inbound Outbound
Industrial	Varies with employee shift schedule	---
Recreational	Varies with type of activity	---

[a] Hours may vary based on local conditions.
[b] Period of maximum weekday traffic impact.

SOURCE: Institute of Transportation Engineers, 2008.

Seasonal variations are also important for some land uses. As a prime example, U.S. shopping centers traditionally are busiest during the period between Thanksgiving (fourth Thursday in November) and Christmas. Consideration should be given to how such seasonal demands will be accommodated. Recreational and hotel land uses are often seasonal. Offices, resort hotels and tourist attractions are subject to vacation period impacts. Other types of development also vary by season.

Appropriate daily and seasonal variations should be taken into account in the collection and analysis of trip generation rates for such land uses.

Locational Variations

The use of trip generation data should take into account where the data were collected. For example, the database listed in *Trip Generation* contains data that were collected almost exclusively at suburban locations or outlying areas within the central cities (Institute of Transportation Engineers, 2008). Adjustments to estimates like these may have to be considered to reflect site-specific conditions, including the availability of public transportation and paratransit, the amount of walk-in business and the proximity of other developments (Institute of Transportation Engineers, 2008; Institute of Transportation Engineers, 2004; Mehra and Keller, 1985.)

Age of Database

Use of older trip generation data to predict future trips can be unreliable. The most recent data available should be used, even though a study conducted by the Federal Highway Administration showed no significant difference between pre-1973 and post-1973 trip generation data (except for apartments) (Mehra and Keller, 1985). A study conducted by ITE before the release of the 8th edition of *Trip Generation* in 2008 showed a difference between pre-2000 and post-2000 trip generation data for both drive-in banks and walk-in banks. The primary advantage of using up-to-date databases is that they may more accurately reflect the characteristics of current activity associated with a given land use.

Transit, Ridesharing and Other Demand Management Techniques

As previously indicated, most data currently available are from measurements made primarily at suburban locations, where there is little or no public transportation and few, if any, programs to manage traffic demand. If appropriate, the rates and/or equations may be adjusted to reflect the availability and use of alternate travel modes, ridesharing and other demand management programs. However, since a great deal of effort is often associated with such adjustments, any conclusions employing such assumptions should be discussed with the study reviewers in advance and then, if accepted, be carefully documented, scrutinized for reasonableness

Attachment

(Revised) Table 3.2 - Summary of Estimated Site Trip Generation

Apartment Component Only

TIME	ENTERING	EXITING	TOTAL
Weekday Daily	207	207	414
AM Peak Hour	5	22	27
PM Peak Hour	29	15	44

Source: ITE Trip Generation, 9th Edition, 2012; LUC 220

Single Family Housing Component Only

TIME	ENTERING	EXITING	TOTAL
Weekday Daily	753	753	1506
AM Peak Hour	28	85	113
PM Peak Hour	95	56	151

Source: ITE Trip Generation, 9th Edition, 2012; LUC 210

Total Site Including Single Family Housing & Apartments

TIME	ENTERING	EXITING	TOTAL
Weekday Daily	960	960	1920
AM Peak Hour	33	107	140
PM Peak Hour	124	71	195

Source: ITE Trip Generation, 9th Edition, 2012; LUC 210, 220