

December 10, 2017

Boxborough Planning Board
c/o Mr. Adam Duchesneau
29 Middle Road
Boxborough, MA 01719
aduchesneau@boxborough-ma.gov

Dear Planning Board Members,

We write this letter to

1. Request the Planning Board to deny the Fenton / Jeanson / Lyons Site Plan (hereafter referred to as the “proposed Site Plan”) because the 2012 Bylaws give the responsibility to the Planning Board to ensure roadways can “carry, without danger or congestion, the additional traffic that is generated from the development”. (refer to 11/20/17 Bond letter).
2. Request that the Planning Board obtain an opinion from another Traffic Engineering firm to assist in substantiating the claim that the proposed design can neither provide roadways “without congestion” nor can it provide roadways “without danger”. Mr. Jason Sobel of Green International Affiliates assessment should not be accepted. Please see below.

Chief Ryder Believes Proposed Site Plan Entrance / Exit will not be Safe

Firstly, we will address the “safety” issue. Boxborough Police Chief Warren Ryder is on record saying he is “very concerned about” the safety of the entrance / exit point for the proposed Site. (refer to 11/27/17 McGregor & Legere letter, and 11/20/17 Bond letter).

#1: REQUEST TO DENY DUE TO LACK OF SAFETY

We agree with Chief Ryder. The entrance / exit point has not been designed to take into account the safest standard, known as ‘Decision Sight Distance’ (DSD), for drivers traveling on Route 111, or the fact that the entrance / exit point is going to be used mostly by elderly drivers, who experience reduced visual acuity and cognitive function. In fact, the project plan does not even satisfy the 85th percentile minimum standard, known as ‘Stopping Sight Distance’ (SSD), which is the time it takes a driver on the road to stop his/her vehicle before striking a stationary object. The Massachusetts Highway Department’s Basic Design Controls specifies that *SSD does vary with the speed of the vehicle and the road grade*. With more complex conditions, a higher standard should be applied.

Green International Affiliates Failed to Account for Elderly Drivers

Mr. Sobel states, “The minimum required Stopping Sight Distances are based on a reaction time of 2.5 seconds (for drivers on the major road), and AASHTO states that this ‘exceeds the 90th percentile of reaction time for all drivers’ (including older drivers)”. This statistic is questionable, considering the current site plan application involves 100 homes owned by elderly drivers, all of whom will be exiting onto Route 111, at a section of road with problematic conditions.

The Stopping Sight Distance minimum used here does not take into account the stretch of Route 111 itself, with its hills, narrow pavement, lack of large shoulders, lack of streetlights, lack of curbing, lack of a passing lane or turning lane, proximity of large trees, dark conditions in rain and winter, and - for drivers heading east in the morning - the potential for sun blindness. In addition, because Route 111 is a major commuter route connecting to Routes 495 and Route 2, congestion issues will combine with the safety issues being discussed, and also merit serious examination.

Please note that research indicates, as quoted above, a perception-reaction time of 3.0 seconds should be used for elderly drivers—*many of whom will be traveling on Route 111 to and from their new homes. In other words, there is the potential for hundreds of new, elderly drivers on Route 111.* Why would the Town of Boxborough accept a Minimum Stopping Sight Distance based on calculations derived from an aggregate of

all drivers when this particular situation will be populated by predominantly elderly drivers?

Mr. Sobel ignores the fact that Desirable Site Distance, or arguably Decision Sight Distance, would be more sensible standards to use given the age of drivers that will be on Route 111 once the development is completed, the complex conditions that Route 111 presents to drivers, and the increase of congestion. Moreover, and especially considering the elderly population, the “posted speed limit” Minimum Sight Distance should not even be considered, even though he included it in his letter, since it requires an even shorter sight distance, and does not comply with standard practice.

Proposed Site Failed to Meet the “National Standard for Establishing Safe Speed Limits”

Buried in Mr. Sobel’s letter is the fact that, looking to the west, the “available sight distance” failed to meet the 85th percentile sight distance. In other words, the “available sight distance” - per his letter - failed to meet the “national standard for establishing safe speed limits” per the Mass DOT website. Thus, this fact in and of itself should be considered as very clear as grounds for denial with regards to clearing a minimal, recognized industry safety standard.

Decision Sight Distance Should Be Used to Engineer the Entrance / Exit Points

If Decision Sight Distance were used in the design of the proposed Site Plan’s entrance / exit, the entrance / exit point would be significantly safer. Stopping sight distance is applicable where a single obstacle must be seen in the roadway and dealt with. Decision sight distance is appropriate when the path is more complex and/or requires the driver to attend to multiple obstacles at the same time, such as curves, pedestrians or bicycles, multiple driveways or turning lanes.

“Decision sight distance is suggested when there is evidence that it would be prudent to provide longer sight distance, such as when complex decisions are needed or when information is difficult to perceive. It is the distance needed for a driver to detect an unexpected or otherwise difficult-to-perceive information source or condition in a roadway environment that may be visually cluttered, recognize the condition or its potential threat, select an appropriate speed and path, and initiate and complete the maneuver safely and efficiently.” http://www.massdot.state.ma.us/Portals/8/docs/designGuide/CH_3_a.pdf
Refer to 11/20/17 Bond letter for specific Decision Sight Distances.

“Some common examples of DSD on the roadway include the distance required to slow down for a turn, a merge, a lane drop, or an exit. It is important to consider DSD at locations where drivers may require additional time or distance due to complex driving situations. Because DSD is a greater distance than SSD, advance warning signs of an upcoming maneuver or required action may be warranted.”
http://harwichnew.virtualltownhall.net/Public_Documents/HarwichMA_MinAg/HarwichMA_TrafficMin/DOCUMENTS/SIGHT%20DISTANCE/SightDistance.pdf

The proposed Site Plan positions the main access driveway in the middle of a complex curve, on a grade, and opposite two other private driveways, a clear example of the kind of complexity meant to be addressed by DSD. Failing to address this critical need in the Site Plan puts drivers, and the town, at serious risk.

Research on Elderly Driving Safety Should be Used to Engineer the Entrance / Exit Points

Additionally, research on the elderly and driving safety should be taken into account. According to *Older and Younger Driver Performance at Complex Intersections: Implications for Using Perception-Response Time and Driving Simulation*, C.J. Edwards, et al University of Calgary, “older drivers are at increased accident risk”, and have “significantly higher perception response time (PRT)” in complex intersections. (http://drivingassessment.uiowa.edu/DA2003/pdf/7_Creaserformat.pdf)

In *The Kiewit Center for Infrastructure and Transportation Stopping Sight Distance Discussion Paper #1* by Robert Layton and Karen Dixon, the authors conclude that “the changes in physical and cognitive abilities for

the elderly could have significant impacts on their abilities to understand conditions and react safely. Consequently, AASHTO has recommended that a design perception-reaction time of 3.0 seconds be used” (p. 7). This is in contrast to the 2.5 seconds that Mr. Sobel cited. Older drivers are considered to have particular challenges including: worsened visual acuity; less contrast sensitivity; lower ability to assess distance or depth perception by shifting from near view to far view (critical for making left turns); requiring far more illumination; and diminished working memory capacity as complexity increases. (<http://cce.oregonstate.edu/sites/cce.oregonstate.edu/files/12-2-stopping-sight-distance.pdf>)

Twenty percent of Boxborough’s population is over age 65 today, and this is expected to increase to nearly 30 percent by 2030 (Source: MAPC). We cannot ignore the changes that will occur on our population of drivers due to this growing demographic. This project requires elderly drivers to negotiate a complex driving situation, ***so Decision Sight Distance must be the standard required.***

#2 REQUEST A SECOND OPINION FROM ANOTHER TRAFFIC ENGINEERING FIRM

Mr. Jason Sobel of Green International Affiliates **did not take into account Decision Sight Distance**, and also did not take into account the fact that the elderly are the primary population using the entrance / exit of the proposed Site. Mr. Sobel also considered using the “posted speed limit” when the 85th percentile speed limit is “is the national standard for establishing safe speed limits”.

(https://www.massdot.state.ma.us/Portals/8/docs/traffic/speedZoning_0512.pdf) In addition, it is desirable to have a Traffic Engineering Firm **analyze congestion** in a development of 100 homes with only an exit / entrance at an intersection that Chief Ryder already considers a difficult one to navigate. This analysis was lacking from Mr. Sobel’s letter. Even if the entrance / exit were to be used by a typically aged population, Mr. Sobel did not emphasize that this site failed to meet the “national standard for establishing safe speed limits”.

Other safety considerations—those that would protect the residents of the development as well as motorists, bicyclists and pedestrians on Route 111—that an independent traffic engineering firm should measure are:

- The unobstructed view needed as it is measured from the exiting driver’s eye
- How far out that driver must extend (the car) to see up or down the road, and the visible distance up or down the road each way
- The time between vehicles on Route 111 during morning and evening rush hours, and during school drop-off and pick-up periods
- How many seconds are needed for the exiting vehicle to merge into traffic going to the right
- The extra difficulty for the exiting vehicle to turn left, across traffic
- The compounding problem of simultaneous turning of vehicles off 111 while others turn right or left into the new roadway

Comments on Planning Board Draft Conditions #1

In addition, we would like to draw your attention to the flaws in the traffic safety *condition* included in your “Draft Conditions of Approval for Site Plan”. The primacy of traffic safety is underscored by the fact that this is the very first condition in your list. This condition reads “improvements to sight distance shall be made and sight distance field verified...as the poor existing sight distances pose a safety hazard to not only site contractors but the general public traveling on Mass. Ave.” What is particularly perplexing about this wording is that there is no stipulation as to how much distance you are requiring for the remediation.

It would be a very bad choice to leave this determination of distance up to the applicants, especially because the mitigation required to make this a safe driving experience would be extremely costly. Do you plan to require that the project meet Minimum Sight Distance at the 85th percentile? Desirable sight distance at the 85th percentile? Or Decision Sight Distance, the safest standard, particularly for senior drivers? **We maintain that the Decision Sight Distance is the standard to which the applicants must adhere.** The unsafe traffic situation promoted by the applicants has been a point of concern and discussion by many, including Police Chief Ryder.

IN CONCLUSION

The Planning Board has been granted the authority to deny the proposed Site Plan, as per the 2012 Bylaws, because of congestion and safety issues. ***Our Bylaws explicitly state this authority.*** Chief Ryder is on record stating that he is very concerned about the safety at the proposed Site Plan entrance / exit; the proposed Site Plan did not engineer the entrance and exit to meet Decision Site Distance measures; and the proposed Site Plan did not engineer the entrance and exit to take into account research regarding elderly driving. Without major road restructuring, which would be cost prohibitive, denial of the proposed Site Plan is the only option.

In addition, it is suggested that the Planning Board obtain a second opinion from another traffic engineering firm. This firm should analyze congestion at a very dense (100 home) elderly housing complex entrance / exit onto the complex busy state highway of Route 111. This firm should analyze Decision Sight Distance and research for the elderly population in order to establish safe sight distances at the proposed Site's entrance / exit. ***They should also examine whether this site requires that the entrance/exit road to the development have two lanes entering and two lanes exiting for safety purposes.*** In addition, an independent consultant should examine whether there are adequate parking spaces within the complex to accommodate large clubhouse or private events; and if not, how much additional parking is required. A spillover of excess parking onto Route 111 would be unsafe. This information can be used by the Town to inform whether, and likely substantiate our research findings that show that the proposed design is not safe.

Unless the road can be reengineered at the applicant/developer's expense

- to incorporate Decision Sight Distance
- to implement sight distances which consider research on elderly driving
- to handle the density of the project because of undue congestion (In fact, we maintain that the very density of the project itself presents unsafe conditions and must be reduced)
- to provide a turning lane onto / off of Route 111 (for turning into the area from the east and exiting the area to go west)

the Planning Board should deny the proposed Site Plan due to the lack of a safe, uncongested solution at the entrance / exit of the Proposed Site.

The town of Boxborough SHOULD NOT wait until the MassDOT process to address the very dire concern for the safety of Boxborough citizens.

Thank you,

Chris DeLise, 394 Sargent Road
Murdo Dowds, 161 Picnic Street
Barbara Salzman, 73 Cobleigh Road
Frances Nolde, 459 Sargent Road
Jodi Bond, 136 Coolidge Farm Road
Lynn Stahlberg, 343 Sargent Road
Heather Fleming, 140 Stow Road