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Ref: 7473

September 30, 2016

Mr. Andrew R. Port, AICP Director of Planning & Development Office of Planning & Development City of Newburyport 60 Pleasant Street Newburyport, MA 01950

Re: Traffic Engineering Peer Review Evergreen Commons Open Space Development – 18 Boyd Drive and 15 Laurel Road Newburyport, Massachusetts

Dear Andy:

Vanasse & Associates, Inc. (VAI) has completed a review of the materials submitted on behalf of Evergreen Commons LLC (the "Applicant") in support of the proposed Evergreen Commons residential community to be located at 18 Boyd Drive and 15 Laurel Road in Newburyport, Massachusetts (hereafter referred to as the "Project"). The Project has been submitted to the City for consideration of the issuance of a Special Permit for an Open Space Residential Development under Section XIV. - Open Space Residential Development (OSRD), of the City Zoning Ordinance. Our review focused on the following areas as they relate to the Project: i) vehicle and pedestrian access and circulation; ii) Massachusetts Department of Transportation (MassDOT) design standards; iii) City Zoning requirements as they relate to access, parking and circulation; and iv) accepted Traffic Engineering and Transportation Planning practices.

In support the Project, the Applicant submitted the following materials which are the subject of this review:

- 1. *City of Newburyport, Application for a Special Permit, Evergreen Commons LLC* c/o Lisa Mead, Esq., 30 Green Street, Newburyport, MA 01950; July 20, 2016;
- 2. *Traffic Impact and Access Study*, 18 Boyd Drive, Newburyport, Massachusetts; Design Consultants, Inc.; August 2016, Revised September 15, 2016;
- 3. *Existing Conditions Plan to Accompany ANRAD*, 18 Boyd Drive, Evergreen Golf Course, Newburyport, Massachusetts; Design Consultants, Inc.; January 18, 2016, last revised September 14, 2016; and
- 4. *OSRD Sketch Plan*, 18 Boyd Drive, Newburyport, Massachusetts; Design Consultants, Inc.; July 20, 2016, last revised September 14, 2016.

In addition, VAI reviewed the site locus in order validate the existing conditions context of the Project and the study area that was assessed in the September 15, 2016 *Traffic Impact and Access Study* (the "September 2016 TIAS"), and to observe factors that could impact the design and location of the access to the Project site and potential off-site improvements.

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Based on our review of the information 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. We have provided suggested recommendations concerning the design and operation of the Project site roadways that should be considered by the Applicant as the site plans are advanced. With respect to the access to the Project site, a secondary means of access, while desirable to facilitate the dispersal of traffic, is not required to accommodate the additional traffic demands that may be associated with the Project; however, secondary access should be provided for emergency vehicles given the number of existing and proposed residential units that will be served by Boyd Drive.

The following summarizes our review of the materials submitted in support of the Project. Our comments are indicated in *italicized* text, with those requiring responses or additional information **bolded**.

PROJECT DESCRIPTION

As proposed, the Project will entail the construction of up to 38 single-family homes configured as an open space residential development (OSRD) to be situated on the site of the Evergreen Valley Golf Course and located at 18 Boyd Drive and 15 Laurel Road in Newburyport, Massachusetts. In support of the request for an OSRD Special Permit, the Applicant submitted a Yield Plan that illustrated that the Project site could yield 44 conventional single-family home lots. The Project site encompasses $36.83\pm$ acres of land bounded by residential properties to the north and south; Boyd Drive and residential properties to the east; and Interstate 95 (I-95) to the west.

Access to the Project site is currently and will continue to be provided from Boyd Drive. Two (2) new roadways will be constructed to serve the Project site that will intersect the west side of Boyd Drive, with the southernmost roadway intersecting the cul-de-sac at the end of Boyd Drive and the northernmost access to be located approximately 400 feet north of the southern access. Secondary access for emergency vehicles is proposed by way of a 20-foot wide drive that will intersect the cul-de-sac at the end of Laurel Road.

Off-Street parking is proposed for each home in separate driveways that can accommodate a minimum of two (2) cars, or a parking ratio of 2.0 spaces per residential unit which meets the parking requirements of Section XIV - J. - Design Standards, of the City Zoning Ordinance. It is anticipated that many of the homes may also have a garage which would increase the off-street parking supply for the Project.

SEPTEMBER 2016 TRAFFIC IMPACT AND ACCESS STUDY

General

The Applicant's engineer provided a letter attesting that the September 2016 TIAS was prepared under the direction of Mr. David Giangrande, P.E., M.S. (MA P.E. No. 35844), and was completed in a professional manner and following the applicable standards of care.



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Existing Conditions

Study Area

The study area evaluated for the Project consisted of Boyd Drive and Ferry Road/Pine Hill Road, and the following four (4) intersections:

- Spofford Street at Ferry Road
- Ferry Road at Boyd Drive
- Ferry Road at Elmira Avenue
- Ferry Road/Pine Hill Road at Laurel Road
- **Comment:** This study area is generally sufficient to evaluate the potential impact of the Project on the transportation infrastructure based on the expected trip-distribution pattern for the Project, and encompasses all major intersections located proximate to the Project site where the Project is expected to result in an increase in peak-hour traffic volumes by: i) five (5) percent or more; or ii) by more than 100 vehicles per hour. Outside of this immediate study area, the Project is predicted to result in peak-hour traffic volume increases of less than 30 vehicles (less than 1 additional vehicle every 2 minutes during the peak traffic volume periods), a level of impact that would not be readily apparent over existing conditions.

Traffic Volumes and Data Collection

Traffic volumes were collected along Ferry Road within the study area over a continuous 72-hour period (Tuesday through Thursday) in June 2016 by means of an automatic traffic recorder, with manual turning movement counts and vehicle classification counts conducted at the study intersections during the weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods in June and August 2016. A review of seasonal adjustment data available from MassDOT indicated that traffic volume conditions during the months of June and August are approximately 7.5 percent and 21.2 percent above average conditions, respectively, and, as such, the raw traffic count data did not require a seasonal adjustment as it represents an above average design condition.

In addition, vehicle travel speeds were also measured along Ferry Road in conjunction with the automatic traffic recorder counts. These measurements indicated that the average measured 85th percentile travel speed (the speed at which 85 percent of the observed vehicles travelled at or below) was approximately 33 miles per hour (mph) in the eastbound direction and 32 mph in the westbound direction, which is 2-3 mph above the posted speed limit in the vicinity of the Project site (30 mph).

Comment: The data collection effort (traffic counts and vehicle travel speed measurements) and establishment of the seasonal adjustment were completed in accordance with standard Traffic Engineering and Transportation Planning practices, and we are in agreement that the resulting data provides a reasonable basis from which to assess the potential impact of the Project on the transportation infrastructure.



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Pedestrian and Bicycle Facilities

An inventory of pedestrian facilities within the study area was presented in the September 2016 TIAS. As noted therein, a sidewalk is provided continuously along the west (Project) side of Boyd Drive and along the south side of Ferry Road west of Boyd Drive; sidewalks are not provided along the remaining study area roadways. It was also noted that a multi-use path is being constructed by MassDOT to the west of the Project site as a part of the Whittier Bridge/I-95 Improvement Project that will parallel I-95 and will be accessible from Ferry Road/Pine Hill Road at Laurel Road.

Comment: The description of pedestrian and bicycle facilities within the study area are generally consistent with field observations. While not mentioned in the study, we note that the study area roadways do not provide sufficient width to support bicycle travel.¹

Public Transportation

A description of public transportation services within the study area was provided in the September 2016 TIAS. The Project site and the immediate study area are not currently served by regularly scheduled public transportation services. Outside of the study area, the Applicant's engineer noted that the City of Newburyport is served by public transportation services provided by the Merrimack Valley Regional Transit Authority (MVRTA) and the Massachusetts Bay Transportation Authority (MBTA). The MVRTA provides fixed-route bus service along Storey Avenue to the south of the Project site (Route 54 bus), with the closest bus stop located at Port Plaza. The MBTA provides Commuter Rail services to the City of Newburyport by way of Newburyport Station which is located approximately 3.3 miles south of the Project site. In addition, a MassDOT park-and-ride facility is located off Storey Avenue at I-95/Exit 57, where bus service is provided to Boston (South Station), Logan International Airport, Portsmouth, NH and Dover, NH.

Motor Vehicle Crash Summary

Motor vehicle crash information was obtained from MassDOT for the study area intersections for the most recent 4-year period available (2011 through 2014, inclusive). Based on a review of this information, one (1) motor vehicle crash was reported at the Spofford Street/Ferry Road intersection over the 4-year review period, with no motor vehicle crashes reported to have occurred at the remaining study intersections. All of the study intersections were found to have a motor vehicle crash rate (average number of motor vehicle crashes reported per year per million vehicles travelling through an intersection) that was <u>below</u> the MassDOT average motor vehicle crash rate for an unsignalized intersection.

Comment: The motor vehicle crash analysis was completed in accordance with MassDOT standards and following standard Traffic Engineering and Transportation Planning practices, and we are in agreement with the findings of the analysis. A review of the MassDOT statewide High Crash Location List and the Highway Safety Improvement Program (HSIP) listing for the study area did not indicate any listed locations.

¹A minimum combined travel lane and paved shoulder width of 14-feet is required to support bicycle travel in a shared travelledway condition.



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Future Conditions

No-Build Conditions

Traffic volumes within the study area were projected to 2023, which represents a 7-year planning horizon from the existing conditions base year (2016) in accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. The future condition traffic volume projections were developed by applying a background traffic growth rate to the 2016 Existing traffic volumes. A background traffic growth rate of 0.74 percent per year was established based on discussions with the Central Transportation Planning Staff (CTPS) and verified by the Metropolitan Area Planning Council (MAPC), and is consistent with the traffic growth rate that is used in the CTPS Long Range Transportation Plan as updated through 2013.

Comment: We are in general agreement with the methodology that was used to develop the future No-Build condition traffic volume projections for the Project, including the background traffic growth rate used in the base calculations. Based on our discussions with the City of Newburyport Office of Planning & Development, there are currently no known development projects in the area that would result in an increase in traffic volumes that would exceed the general background traffic growth rate (0.74 percent per year).

Build Conditions

Future Build condition (with the Project) traffic volume projections were developed by the Applicant's engineer following standard Traffic Engineering and Transportation Planning practices. In order to determine the traffic characteristics of the Project, trip-generation methodologies established by the Institute of Transportation Engineers (ITE)² were used. The ITE provides trip-generation information for various types of land uses developed as a result of scientific studies that have been conducted over the past 50 plus years. This data includes trip estimates for land uses similar to those that are to be located within the Project site (single-family homes). ITE Land Use Code (LUC) 210, *Single-Family Detached Housing*, was determined by the Applicant's engineer to be the most appropriate ITE land use classification to establish the traffic characteristics of the Project. The Applicant's engineer provided trip projections for both a 38 home and 44 home development, as well as projections for the existing golf course that currently occupies the Project site for context. The following table summarizes the base trip-generation calculations for the Project as presented in the September 2016 TIAS.



²*Trip Generation*, 9th Edition; Institute of Transportation Engineers; Washington, DC; 2012.

	Proposed Resider		
Time Period/Direction	(38 Homes)	(44 Homes)	Existing Golf Course (9 holes) ^b
Average Weekday Daily:			
Entering	216	247	161
Exiting	216	247	161
Total	432	494	322
Weekday Morning Peak Hour:			
Entering	9	10	15
Exiting	<u>27</u>	<u>31</u>	4
Total	36	41	19
Weekday Evening Peak Hour:			
Entering	28	32	13
Exiting	<u>16</u>	<u>19</u>	<u>13</u>
Total	44	51	26

EVERGREEN COMMONS TRAFFIC VOLUME PROJECTIONS

^aBased on ITE LUC 210, *Single-Family Detached Housing*. ^bBased on ITE LUC 430, *Golf Course*.

The Applicant's engineer converted the base trip-generation calculations, which are expressed in vehicle trips, to person trips using an average vehicle occupancy ratio of 1.1 persons per vehicle which was obtained from demographic data for the City of Newburyport as presented in the U.S. Census Bureau's 2014 American Community Survey. The person trip estimates were then adjusted (reduced) to account for persons that may work from home, which was established as 5 percent based on the U.S. Census data. After accounting for these adjustments, the base peak-hour trip-generation calculations presented in the table above for both development scenarios were reduced by approximately 2 vehicle trips, with the average weekday daily traffic volumes reduced by 24 to 27 vehicle trips.

The traffic volumes associated with the Project were assigned onto the study area roadway network based on a review of existing travel patterns within the study area. This approach was used given the predominant residential nature of the land use along study area roadways and, as a result, that the traffic patterns during the peak hours are representative of commuter travel patterns within the study area.

Comment: We are in general agreement with the methodology that was used to develop the anticipated traffic characteristics of the Project (ITE data) and the trip distribution pattern (exiting traffic patterns), and we concur with the resulting traffic volume projections and trip assignments.



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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 2016 Existing, 2023 No-Build and 2023 Build (with the Project) conditions. 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 60 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.

All movements at the study area intersections were shown to operate at LOS "C" or better during the peak-hours under all analysis conditions (Existing, No-Build and Build), with vehicle queues of up to one (1) vehicle. Project-related impacts were identified as an increase in average motorist delay of less than 1.0 seconds, with no material increase in vehicle queuing and no change in LOS predicted to occur under either the 38-home or 44-home development scenarios.

Comment: The traffic operations analysis was completed using the appropriate methodologies and we are in agreement with the reported results and the overall conclusion that the addition of Project-related traffic to the study area roadways and intersections will not result in a significant impact (increase) on motorist delays or vehicle queuing over existing or anticipated future conditions without the Project (i.e., the "No-Build" condition).

We note that the Applicant's engineer used the Synchro 7^{TM} analysis software which is not the current software version approved for use by MassDOT (Synchro 8^{TM} is currently approved for use). That being said, the underlying methodology with respect to the unsignalized intersection analysis is similar and use of the updated software would not result in a material change to the analysis results or the comparative impact of the Project relative to No-Build conditions.

Sight Distance

An evaluation of sight distances at the intersections of Boyd Drive at the Project site roadways, Ferry Road at Boyd Drive and Ferry Road at Laurel Road was conducted by the Applicant's engineer in accordance with American Association of State Highway and Transportation Officials (AASHTO)³ standards and based on a 30 mph approach speed along Boyd Drive, which is consistent with the "prima facie" speed limit,⁴ and a 35 mph approach speed along Ferry Road, which exceeds the measured 85th percentile vehicle travel speed along this roadway (32-33 mph). Based on these measurements, the Applicant's engineer identified that the available lines of sight at the subject intersections meet or exceed the required minimum distance for safe operation (stopping sight distance) for the applicable approach speed (30 mph on Boyd Drive and 35 mph on Ferry Road).

⁴The "prima facie" speed is defined in M.G.L. Chapter 90, Section 17, as the speed which would be deemed reasonable and proper to operate a motor vehicle given the nature of the abutting land use (thickly settled residential district).



³A Policy on Geometric Design of Highway and Streets, 6th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2011.

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Comment: We are in agreement with the Applicant's engineer that the available lines of sight at the subject intersections currently meet or exceed the required minimum distance for safe operation based on the identified approach speeds on the intersecting roadways.

We note that the Applicant's engineer applied the sight distance criteria for an uncontrolled intersection to the Project site roadway intersections with Boyd Drive. While this may be applicable to the south roadway, vehicles exiting the north roadway will be under stop control given the conflicting traffic on Boyd Drive. As such, the stop controlled intersection criteria should have been applied to the northern Boyd Drive access. That being said, sight lines at the intersection would continue to meet or exceed the recommended minimum sight distance for safe operation.

We have offered specific recommendations concerning sight line maintenance that should be considered as conditions of the approval of the Project should the Planning Board be inclined to grant the Special Permit for the Project.

Recommendations

The Applicant's engineer concluded that there were no identified roadway, intersection or traffic control deficiencies within the study area, and that sufficient capacity is afforded by the existing roadway network to accommodate the relatively minor impact of the Project. As such, no specific recommendations were offered as a part of the September 2016 TIAS.

- Comment: While we are in agreement with the overall conclusion that the Project will not result in a pronounced impact on the roadway network over existing or anticipated future conditions without the Project, we would suggest that the Applicant consider the following recommendations by way of guidance in the development of the final site plans for the Project and to ensure that safe and efficient access is provided and maintained to the Project site:
 - 1. Internal circulating roadways within the Project site should be a minimum of 22-feet in width or as required to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle as defined by the City of Newburyport Fire Department, and should be designed with appropriate geometry (horizontal and vertical) to accommodate a safe travel speed of 25 miles per hour (mph).
 - 2. Vehicles exiting the Project site roadways to Boyd Drive should be placed under STOP-sign control with marked STOP-lines provided.
 - 3. Given the number of existing and proposed residential units that will be access by way of Boyd Drive, a secondary means of access for life safety should be provided in accordance with the requirements of NFPA 1⁵ or as directed by the Fire Chief. The emergency vehicle access roadways should be a minimum of 20-feet in width and constructed of a suitable material that will support travel by the largest anticipated

⁵*National Fire Protection Association (NFPA) 1, Fire Code*, Seventh Edition; NFPA; Quincy, Massachusetts; 2015; as amended per 527 CMR.



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> responding emergency vehicle as defined by the City of Newburyport Fire Department. Further, the connection should be secured in a manner that is acceptable to the Fire Department to restrict use by general traffic but that allows for snowplowing and maintenance so that the connection is kept clear for passage at all times.

- 4. A secondary means of access for general traffic (non-emergency vehicles) is desirable for traffic dispersal but is not necessary to support either the 38-home or 44-home development proposals. Sufficient capacity is afforded by Boyd Drive to accommodate the projected increase in traffic volumes that is represented by either development proposal.
- 5. All Signs and pavement markings to be installed within the Project site should conform to the applicable specifications of the Manual on Uniform Traffic Control Devices (MUTCD).⁶ This note should be added to the Site Plans.
- 6. A Sidewalk should be provided along at least one side of the Project site roadway and should extend to Boyd Drive (and Laurel Road if a formal (not restricted to emergency vehicles only) access is proposed).
- 7. Marked crosswalks and Americans with Disabilities Act (ADA) compliant wheelchair ramps should be provided at all pedestrian crossings within the Project site.
- 8. Signs and landscaping to be installed along the roadways within the Project site and within the sight triangle areas of the Project site roadway intersections with Boyd Drive should be designed and maintained so as not to restrict lines of sight.
- 9. Snow windrows within the sight triangle areas of the Project site roadway intersections with Boyd Drive should be promptly removed where such accumulations would exceed 2.5-feet in height.
- 10. The Applicant should consider installing a STOP-sign and marked STOP-line on the Boyd Drive approach to Ferry Street in order to reinforce the vehicular right-of-way at the intersection.

SITE PLANS

The following comments are offered with respect to our review of the OSRD Sketch Plan prepared by Design Consultants, Inc. and dated July 20, 2016, last revised September 14, 2016 (hereafter referred to as the "Site Plans"), and are in addition to the suggested recommendations outlined above for the September 2016 TIAS that relate to the OSRD Sketch Plan.

1. A truck turning analysis should be completed for the Project using the following design parameters as guidance: i) the analysis should be completed using the AutoTurn® or similar analysis software for the following design vehicles: an SU-30/40 (small delivery/moving vehicle and trash/recycling vehicle) and the City of Newburyport Fire Department design vehicle; ii) the analysis should include the swept path for the front and rear tires of the design vehicles

⁶Manual on Uniform Traffic Control Devices (MUTCD); Federal Highway Administration; Washington, DC; 2009.



and any overhangs that may extend past the front and rear bumper of the vehicle (i.e., basket of the aerial ladder of the fire truck if so equipped); iii) the analysis should depict all maneuvers required to enter and exit the Project site by way of Boyd Drive and Laurel Avenue (both left and right-turn movements entering and exiting), and all turning and maneuvering required within the Project site; iv) Back-up maneuvers, where required, should be clearly identified and should comply with the requirements of NFPA 1^7 as such maneuvers relate to the Fire Department design vehicle.

- 2. All pedestrian crossings should include wheelchair ramps that are ADA compliant and include detectible panels and the base of the ramps.
- 3. A school bus waiting area should be provided within the Project site or at an appropriate location defined in consultation with the City of Newburyport School Department.
- 4. The sight triangle areas for the Project site roadway intersections with Boyd Drive should be added to the Site Plans along with a note to indicate: "Signs, landscaping and other features located within the sight triangle areas shall be designed, installed and maintained so as not to exceed 2.5-feet in height. Snow windrows located within the sight triangle areas that exceed 2.5-feet in height or that would otherwise inhibit sight lines shall be promptly removed."
- 5. The grade of the Project site roadways should not exceed 2 percent within 50-feet (two (2) car lengths) of Boyd Drive in order to provide a leveling area for vehicles exiting the Project site.

PARKING

Off-Street parking is proposed for each home in separate driveways that can accommodate a minimum of two (2) cars, or a parking ratio of 2.0 spaces per residential unit which meets the parking requirements of Section XIV - J. - Design Standards, of the City Zoning Ordinance. It is anticipated that many of the homes may also have a garage which would increase the off-street parking supply for the Project. Further, the roadway network internal to the Project site is proposed to be 24-feet wide, which is sufficient to accommodate on-street parking in a residential neighborhood setting.

SUMMARY

VAI has completed a review of the materials submitted on behalf of Evergreen Commons LLC in support of the proposed Evergreen Commons residential community to be located at 18 Boyd Drive and 15 Laurel Road in Newburyport, Massachusetts. Our review focused on the following areas as they relate to the Project: i) vehicle and pedestrian access and circulation; ii) MassDOT design standards; iii) City Zoning requirements as they relate to access, parking and circulation; and iv) accepted Traffic Engineering and Transportation Planning practices.



⁷Ibid 5.

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Based on our review of the information 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. We have provided suggested recommendations concerning the design and operation of the Project site roadways that should be considered by the Applicant as the site plans are advanced. With respect to the access to the Project site, a secondary means of access, while desirable to facilitate the dispersal of traffic, is not required to accommodate the additional traffic demands that may be associated with the Project; however, secondary access should be provided for emergency vehicles given the number of existing and proposed residential units that will be served by Boyd Drive.

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.

Grey S. Dirk

Jeffrey S. Dirk, P.E., PTOE, FITE Principal

JSD/jsd

cc: File

