ENVIRONMENTAL PARTNERS
— An Apex Company —

MEMORANDUM

Date: January 10, 2022

To Ms. Sue Brown, Town Planner
Town Hall
10 Central Street
Manchester-by-the-Sea, MA 01944

From Greg E. Lucas, PE, PTOE, RSP

CC James D. Fitzgerald, PE, LEED AP – EP, Director of Transportation
Zoning Board of Appeals – Manchester-by-the-Sea

Subject The Sanctuary at Manchester-by-the-Sea – Transportation Peer Review

Environmental Partners (EP) has reviewed the September 2020 (revised December 2021) Transportation Impact Assessment (TIA) prepared by Vanasse & Associates, Inc. (VAI) for the proposed Multifamily Residential Development to be known as "The Sanctuary at Manchester-by-the-Sea", located on School Street in Manchester-by-the-Sea, MA. It is understood that 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.

In general, the TIA was prepared in a professional manner, consistent with standard engineering practices. The following is a summary of EP's review of transportation, traffic, parking and circulation.

Project Description

The TIA provides the following Project Summary:

"The Project will entail the construction of a 136-unit multifamily residential development to be known as The Sanctuary that will be located off School Street in Manchester-by-the-Sea, Massachusetts. The Project site is located along the west side of School Street, north of Route 128 Exit 50 and generally opposite Atwater Avenue, and encompasses approximately 23.3± acres of land that is bounded by areas of open and wooded space to the north; Yankee Division Highway (Route 128) and areas of open and wooded space to the south; School Street and areas of open and wooded space to the east; and Old School Street and areas of open and wooded space to the west. Figure 1 depicts the Project site location in relation to the existing roadway network. The Project site currently consist of areas of open and wooded space.

Access to the Project site will be provided by way of a new driveway that will intersect west side of School Street approximately 135 feet north of Atwater Avenue. On-site parking will be provided for 242 vehicles, or an approximate parking ratio of 1.78 spaces per unit. The proposed parking supply exceeds the number of parking spaces that are required for the Project pursuant to Section 6.2, Off-Street Parking and Driveway/Curb Cut Regulations, of the Town Zoning By- Law."

EP finds the overall project description to be accurate. Additional comments related to parking are provided in a later section of this memorandum.

Figure 1 – Site Location Map (Source: VAI TIA)

Existing Conditions

The TIA study area includes School Street and the following intersections through which project generated traffic is expected to travel:

- School Street at Atwater Avenue
- School Street at Route 128 southbound ramps
- School Street at Route 128 northbound ramps and Mill Street
- School Street at Pleasant Street
- School Street at Lincoln Street and Lincoln Avenue
- Central Street/Union Street (Route 127) at School Street

The TIA describes existing conditions, including lane width and lane designation, speed regulations, and traffic control type.

The study limits comply with the Massachusetts Department of Transportation (MassDOT) Traffic Impact Assessment (TIA) Guidelines. Study area descriptions appear to be accurate with the following minor exceptions:

- **The TIA identifies shared bicycle accommodations are provided on School Street and Pleasant Street. While shoulders of varying width are provided on School Street and bicycles are not specifically prohibited, no specific accommodations are provided and shoulders in some instances are too narrow to provide comfortable accommodations for bicyclists. While the TIA is correct that shared traveled way accommodations exist, this should not be construed to mean that specific accommodations are provided for bicyclists.**

Pedestrian and Bicycle Facilities

VAI conducted an inventory of pedestrian and bicycle facilities within the study area. Sidewalks are not provided on School Street in the vicinity of the proposed site drive, but are provided along the east side of School Street south of the Route 128 southbound ramps and on both sides of School Street from Windemere Park south to Vine Street, continuing on the west side of School Street south to Route 127. No formal bicycle facilities exist within the study area.

Public Transportation

The TIA notes that public transportation services are provided to Manchester-by-the-Sea via the MBTA Commuter Rail service to Manchester-by-the-Sea Station, which is located at 40 Beach Street, an approximate 7 minute driving distance from the Project site. **EP confirmed this approximation of driving time.** The TIA also noted that the Manchester-by-the-Sea Council on Aging (COA) provides transportation services to seniors for shopping and recreational activities. It is noted that regularly scheduled public transportation services are not provided to the Project site.

Existing Traffic Data

VAI collected traffic data in November 2021 and consisted of the following components:

Turning Movement Counts (TMCs)

TMCs were conducted at the study intersections on Tuesday, November 9, 2021 from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM.

The weekday morning peak hour was found to occur from 7:15 to 8:15 AM, while the weekday afternoon peak hour was found to occur from 4:00 to 5:00 PM.

Automatic Traffic Recorder (ATR) Counts

ATR counts were conducted for School Street on Tuesday, November 9 and Wednesday, November 10, 2021.

Traffic Volume Adjustments

The TIA reviewed permanent count station data maintained by MassDOT for Route 128 in Beverly and determined that traffic volumes for the month of November are approximately 4.6 percent below average-month conditions. As such, VAI adjusted raw traffic data volumes upwards by 4.6 percent in order to provide an average-month design condition. **EP concurs with this methodology.**

- In order to account for the ongoing impact of the COVID-19 pandemic, VAI reviewed traffic data for November 2021 for the same continuous count station on Route 128 in Beverly and compared it to data collected at the same count station in November 2019. The TIA states that "(t)he 2019 traffic volumes were expanded to 2021 by applying the traffic growth procedure detailed in the April 2020 "Guidance on Traffic Counting Data" published by MassDOT, and determines a 7.2 percent adjustment factor to account for the COVID-19 pandemic.

EP provides the following comments on traffic volume adjustments:

- **The April 2020 "Guidance on Traffic Counting Data" published by MassDOT establishes a procedure by which 2019 data is considered current data. It is unclear how this data were "expanded" to 2021; additional detail and backup calculations should be provided.**
- **Backup data should be provided for the permanent count station referenced to determine if it is appropriate to apply the same adjustment factor to both weekday morning and weekday afternoon peak hours. It is understood that the pandemic has greatly affected work and travel patterns, and different adjustment factors by time of day may be appropriate.**
- **Table 2 presents an unclear summary of existing traffic volumes using a mix of ATR data and TMC data at different locations. Daily traffic is taken from ATR data *south* of Atwater Avenue, while vehicle per hour data is taken from TMC data *north* of Atwater Avenue. EP recommends using adjusted hourly data from the ATR count for the peak hour values and calculation of K factor and directional distribution or using TMC data from the same location with respect to Atwater Avenue. We note that TMC data taken at this location results in higher adjusted hourly volumes of 723 for the weekday morning peak hour and 727 for the weekday afternoon peak hour.**

Spot Speed Measurements

Vehicle speeds were measured on School Street in conjunction with ATR counts. Data revealed an 85th percentile speed of 43 miles per hour (mph) in both directions on School Street. The 85th percentile speed is the speed at which 85 percent of the observed vehicles travel at or below. This measured speed well exceeds the posted speed limit of 35 mph. **EP takes no exception to the collected data.**

Crash Data

MassDOT recognizes crash rates as an effective tool to measure and compare the safety of intersections by quantifying the frequency of crashes against vehicle exposure. Intersection crash rates, expressed as crashes per Million Entering Vehicles (MEV), found to be higher than the Statewide and District averages could indicate a potential safety issue. The Statewide and District 4 average crash rate for an unsignalized intersection is 0.57.

The TIA presents crash data for a five year period from 2015 through 2019 for the study intersections, and calculates crash rates below the statewide average for all study intersections. Crash rates vary from 0.00 for School Street at Lincoln Street and Lincoln Avenue, where no crashes were recorded, to 0.40 for School Street at Pleasant Street, where eight (8) crashes were reported over the five year period. The critical intersections at the Route 128 southbound and northbound ramps have calculated crash rates of 0.33 and 0.17, respectively, with seven and four crashes reported, respectively.

The TIA notes that no fatalities have been reported at any of the study intersections, and that no locations within the Town are identified as high crash locations as evaluated for MassDOT's Highway Safety Improvement Program (HSIP). **EP's independent research confirms these statements.**

EP offers the following comments on crash data as presented in the TIA:

- **Backup data has not been provided to support the crash data summary.**
- **A corridor crash analysis should be provided for the School Street corridor to identify mid-block and minor intersection crashes within the study area.**

Future Traffic Growth

Future traffic demands on the study area were determined through a consideration of background traffic growth and background development.

Background Development Projects

VAI consulted with the Town of Manchester-by-the-Sea to determine if any planned projects may impact future traffic at the study intersections. One project was identified:

- 9,745 sf Parish Building at 189-193 School Street south of the project site

Traffic volumes associated with this development are expected to be relatively minor and would be reflected in the general background growth rate. **EP agrees with this assumption.**

Background Traffic Growth

The TIA states that data were compiled by MassDOT from permanent count stations located in Manchester-by-the-Sea, Beverly, Wenham, and Gloucester to determine an average growth rate of 0.83 percent per year. VAI rounded this rate up to one percent per year to account for future traffic growth and presently unseen development in the study area; **EP concurs with this approach**.

Roadway Improvement Projects

VAI contacted both the Town and MassDOT to determine if any roadway improvement projects were expected to be completed by 2029 within the study area; none were identified.

No-Build Traffic Volumes

Since the TIA was published in late 2021, VAI applied a seven year planning horizon consistent with MassDOT'S TIA Guidelines to determine 2029 traffic volumes. A one percent per year compounded annual growth rate was applied to existing peak hour traffic volumes to determine the 2029 No Build peak hour traffic volumes. **EP takes no exception to this procedure**.

Trip Generation

VAI utilized the recently released 11th Edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual* to estimate the proposed project-generated vehicle trips. Trip generation projections included in the TIA are based on a 136-unit multifamily residential development using ITE Land Use Code (LUC) 220, Multifamily Housing (Low-Rise). The project is projected to generate 948 daily trips, with 65 (16 entering and 49 exiting) in the weekday morning peak hour, and 79 (50 entering, 29 exiting) in the weekday evening peak hour. **EP takes no exception to the trip generation calculations and confirms the appropriateness of LUC 220 for the development.**

Trip Distribution

The TIA distributed trips expected to be generated by the proposed development through the study area based on Journey-to-Work data obtained from the US Census for people living in Manchester-by-the-Sea. **EP confirms that this methodology is appropriate for a residential project site.** Figure 7 of the TIA shows distribution percentages, with the majority of trips (63%) traveling to/from Route 128 to the southwest via School Street. Pleasant Street and Lincoln Street serve as one-way pairs serving trips within Manchester-by-the-Sea, with 15% of trips departing via Lincoln Street and returning via Pleasant Street.

A review of backup data in the Appendix revealed that distribution percentages for Route 127 are transposed in Figure 7. Backup data suggests that 6% travel to/from Central Street and 3% via Union Street. This correction has a negligible impact, affecting one trip as shown in Figure 8.

Future Traffic Volumes – Build Condition

VAI developed 2021 Existing, 2029 No-Build and 2029 Build traffic volume conditions based upon data collection, calculations and assumptions presented in the TIA regarding existing traffic flow, background growth, background development, and trip generation and distribution, Table 6 of the TIA offers a comparison of these scenarios on study area roadways and shows percentage increases

between No-Build and Build varying between 0.0 and 6.6 percent. This table and its summary do not accurately convey the impact of the project. Table 6 should exclude roadways such as Mill Street which are not projected to be impacted by project-generated traffic, but include both Atwater Avenue and School Street between Atwater Avenue and the Route 128 ramps. EP's independent calculations show that School Street south of Atwater Avenue sees a 7.8 and 8.6 percent increase in traffic in the weekday morning and weekday evening peak hour respectively, a higher percentage increase than any other roadways summarized in Table 6. **EP requests revisions to Table 6 summarizing all projected traffic volume increases resulting from expected Project-generated traffic.**

Traffic Operations

Capacity analyses were conducted for each scenario for peak hour traffic conditions using Synchro software based upon methodology contained in the 2010 *Highway Capacity Manual* (HCM).

Table 8 of the TIA presents analysis results for the study area intersections. The table reports favorable expected operations for the Project site driveway intersection with School Street, but varying levels of existing operational deficiencies which are exacerbated both through expected annualized traffic growth seen in the 2029 No-Build condition and the resultant impact of added project trips in the 2029 Build condition. EP notes the following findings:

- Movements at the Route 128 ramps are expected to continue to operate at or degrade to unacceptable Levels of Service (LOS) under future conditions.
    - The southbound off-ramp left turn onto School Street operates at an acceptable LOS D in the weekday morning and weekday evening peak hours under 2021 Existing conditions, degrading to an unfavorable LOS E in the weekday evening under 2029 No Build condition, and further degrading to an unfavorable LOS E in the weekday morning and unacceptable LOS F in the weekday evening peak hours in the 2029 Build condition.
    - The northbound ramp left turn onto School Street operates at an unacceptable LOS F in both peak hours under Existing conditions, with a noteworthy increase in delay predicted between No Build and Build conditions (an expected increase of approximately 80 seconds during the weekday morning peak hour and 100 seconds during the weekday evening peak hour resulting from Project-generated traffic).
- The intersection of South Street at Pleasant Street experiences an unacceptable LOS F on Pleasant Street westbound and School Street southbound in the weekday morning peak hour under Existing conditions, with increasing delay predicted in the future No Build and Build conditions.
- The stop-controlled School Street approach at Route 127 operates at an unacceptable LOS F in both peak hours under Existing conditions, with increasing delay predicted in the future No Build and Build conditions.

EP offers the following comments on operations analyses:

- **Analysis results suggest that study area intersections are at or near capacity presently and in need of mitigation to support additional traffic load.**

- **A review of Synchro analysis contained in the Appendix revealed transposed peak hour factors (PHFs) for the eastbound and westbound movements at the intersection of School Street, the Route 128 northbound ramps, and Mill Street in the weekday morning peak hour. EP notes that a reduction in PHF for the Route 128 northbound off-ramp will further increase delays reported for this critical approach to the intersection.**

Sight Distance

VAI conducted and reported sight distance measurements in accordance with MassDOT and AASHTO requirements. Both Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD) were measured. Required minimum SSD and desirable ISD values were calculated based on a 45 mph design speed, which is appropriate as it exceeds the measured 85th percentile speed for the School Street corridor. Measured values exceed both minimum SSD and desirable ISD values; **EP takes no exception to the measured values reported.**

Site Access

Project access is proposed by way of a newly constructed driveway which will intersect School Street from the west approximately 135 feet north of Atwater Avenue. A raised island is proposed at the driveway separating entering and exiting traffic, transitioning to a 24 foot wide driveway serving the proposed building and parking areas. The driveway will be under STOP-sign control at School Street, and the TIA states that signs and landscaping will be located so as not to restrict sight lines, and that snow accumulation will be removed where it may impact sight lines.

EP offers the following comments on site access, based both on the TIA and on a cursory review of site plans:

- **The offset distance of 135 feet between the proposed site driveway and Atwater Avenue introduces the potential for conflicts between turning vehicles between the two intersections. EP notes that the project site lot provides frontage along School Street in the vicinity of Atwater Avenue; the Applicant should provide justification as to why the site driveway was not located opposite Atwater Avenue.**
- **The length of the driveway well exceeds Zoning By-Law requirements. Section 6.2.8 of the by-laws states that common driveways should have a maximum length of 500 feet. The proposed site driveway is approximately 1,800 feet from School Street to the parking garage entrance.**
- **The site topography requires the driveway to wrap around the building, increasing access and response times for emergency vehicles. An additional emergency access drive should be considered.**
- **EP recommends coordination with the Manchester-by-the-Sea Fire Department to obtain their concurrence with proposed emergency access.**

Parking

EP reviewed the proposed parking based on both Town by-laws and general engineering practices.

The TIA states and the site plans confirm that on-site parking will be provided for 242 vehicles. The site plans further clarify that 16 spaces are surface parking stalls, with the remainder located within the podium/garage parking areas.

The TIA states that "the proposed parking supply exceeds the number of parking spaces that are required for the Project pursuant to Section 6.2, Off-Street Parking and Driveway/Curb Cut Regulations, of the Town Zoning By- Law." The Parking Summary Chart contained in the site plans differs from this opinion, stating that 383 spaces are required. **EP confirmed the requirements of the Zoning By-Law, noting that 383 spaces are required based on the number of bedrooms proposed within the 136 units.**

EP offers the following comments related to parking:

- **The proposed project is in deficit for proposed parking spaces in comparison with the Zoning By-Law requirements. Additional analysis must be provided to justify the proposed parking supply.**
- **Proposed parking stall dimensions of 9 feet by 18 feet do not comply with Section 6.2.2 of the Zoning By-Law, which requires off-street parking spaces with minimum dimensions of 9 feet by 20 feet.**
- **Details should be provided regarding garage access and the parking supply expected to be available to visitors and service providers.**

Evaluation of Recommendations

The TIA concludes that the project will not have a significant impact on motorist delays, noting that project-related impacts are generally characterized by an increase in delay that can result in an increase in vehicle queueing of up to five (5) vehicles. EP notes that while this is true based upon the resultant increase from No Build to Build condition operational analysis, both the Existing and No Build analyses indicate intersections that are near or at capacity and in need of mitigation to support additional traffic load.

Off-Site Improvements

The TIA quantifies the expected increases in delay and queueing for the Route 128 ramps at School Street, and states that the Project proponent will conduct an improvement study for the Route 128 northbound and southbound ramp intersections that will include performing a traffic signal warrant analysis in accordance with the methodology defined in the MUTCD and include the preparation of conceptual improvement plans for potential improvements, which will include evaluating the intersections as modern roundabouts. The TIA states that the study will provide the necessary information for the Town to apply for state funding for the recommended improvement strategy. **EP recommends additional commitment from the Proponent to fund design services for potential proposed improvements, which notably benefit Project access from the abutting highway.**

Transportation Demand Management

Transportation Demand Management (TDM) measures are proposed which include information on public transportation posted and/or made available to residents; a "welcome packet" detailing transportation services, bicycling and walking alternatives, and commuter options; pedestrian

accommodations incorporated into the project including sidewalks and ADA-compliant ramps at all pedestrian crossings constructed or modified by the project; work-at-home workspaces to support telecommuting; internal mail room; and both external and internal bicycle parking.

EP offers the following comments on Off-site Improvements and TDM measures:

- **A review of site plans for the Project site shows no pedestrian or bicycle focused connections between the site and the study area roadways, limiting the effectiveness of TDM measures intended to promote pedestrian and bicycle activity in the area. EP recommends consideration of off-site pedestrian improvements, potentially in connection with intersection improvements to be considered at School Street and the Route 128 ramps. Additionally, focused pedestrian improvements at study area intersections would benefit residents and the abutting neighborhoods, specifically at the intersection of School Street and Pleasant Street, which serves pedestrian connections to Manchester Essex Regional Middle and High School.**
- **Off-site improvements should consider traffic calming elements to reduce travel speeds. Recorded speeds well exceed posted speed limits for the School Street corridor.**

Evaluation of Requested Waivers

As requested by the Zoning Board of Appeals (ZBA) through the Town Planner, EP has provided an evaluation of waiver requests received by the Board in a document dated July 16, 2021.

WAIVERS FROM ZONING BYLAW OF THE TOWN OF MANCHESTER-BY-THE-SEA FOR THE SANCTURAY AT SHINGLE HILL		
LOCAL REGULATION	**REQUIREMENT**	**PROPOSED**
1. **Section 4.4 –** Limited Commercial District (LCD) Use Regulations • Multi-family/unit Dwelling	Use(s) not allowed in the LCD	Waiver granted to allow the Multi-family/unit Dwelling, Accessory Uses, Leasing offices, covered parking and associated Amenity areas for residents
2. **Section 5.5 –** Building Height	2.5 Stories (Max.)	Three (3) Stories
3. **Section 5.7.1 –** Lot Width	500'	291.2' (Existing Non-Conforming)
4. **Section 5.7.3 –** Building Setback	All Structures shall be set back from any street at least one hundred and fifty (150) feet, and from any other lot line at least one hundred (100) feet.	Street setback = 207.4' Side setback = 84.1' Rear setback = 84.3'
5. **Section 6.2.2 –** Parking Space Dimension	Off-street parking spaces shall be designed with minimum dimensions of 9'x20'	Off-street parking spaces shall be designed with minimum dimensions of 9'x18' and minimum 23' access drive aisles.
6. **Section 6.2 –** Number of Parking Spaces	383 Required Parking Spaces (See Parking Table for breakdown)	236 (See Parking Table for breakdown)
7. **Section 6.2.6** – Parking Lot Plantings	Parking lots containing five (5) or more parking spaces shall have at least one (1) tree per five (5) parking spaces.	Minimum one (1) tree per five (5) surface parking spaces will be planted. Waiver requested to clarify this is not applicable to the structured parking garage stalls.
8. **Section 6.2.7** - Driveway/Curb Cut Permit	Requirement of Driveway/Curb Cut Permit from Planning Board	Waiver granted to from Curb Cut/Driveway permit from Planning Board.
9. **Section 6.5 -** Site Plan Review	Requirement that this project is subject to Site Plan Review by the Planning Board	Waiver granted from Site Plan Review by Planning Board
10. **Section 6.9** – Site Plan Review Special Permit	Requirement that this project is subject to Site Plan Review Special	Waiver granted from Site Plan Review Special Permit by Planning Board

Waiver 1: In general, the Limited Commercial District (LCD) includes the portion of the Town north of the Route 128 highway, with Residential uses abutting this zone south of the highway. There appears to be no adverse effect on allowing a multi-family residential use in the LCD.

Waivers 2 through 6: These waivers generally involve design elements that contribute to the massing and density of the proposed structure. Waivers 2, 4, 5 and 6 request relief from elements that would require revisions to reduce the size and density of the building if waivers were not granted. Waiver 3 does note the existing non-conforming status of the lot width, but confirms the disassociation between the site density and what is intended by the Zoning By-Laws.

Waiver 7: This waiver requests a clarification on parking lot planting requirements; it seems clear that proposed plantings would not be required in the parking structure, where plantings would not survive.

Waivers 8 through 10: These address waivers already granted by the Planning Board, and are typical of 40B residential developments under ZBA review.

Conclusions

In general, EP is of the opinion that the TIA generally captures the expected impact of the proposed project, but undermines the importance of improvements within the study area to address existing operational deficiencies and mitigate the impact of project-generated traffic. We request additional clarification and verification as outlined in this memorandum. EP's more significant comments include the following:

- Additional detail and backup should be provided for traffic volume adjustments to account for the COVID-19 pandemic.
- Table 2 of the TIA should be updated to accurately reflect existing traffic volumes.
- Operational analysis results indicate that study area intersections are at or near capacity presently and in need of mitigation to support additional traffic load.
- The site topography requires an undesirable offset between the site driveway and Atwater Avenue, and a driveway design that results in a length well in excess of Zoning By-Law requirements.
- Parking design is in deficit for proposed parking spaces in comparison with the Zoning By-Law requirements. Additional analysis should be provided to justify the proposed parking supply.
- Parking stall dimensions do not comply with the Zoning By-Law.
- No pedestrian or bicycle-focused improvements are proposed, limiting the effectiveness of TDM measures intended to promote these uses.
- In general, waivers are introduced to allow non-conforming elements which support the size and density of the proposed project.