ENVIRONMENTAL PARTNERS
— An Apex Company —

MEMORANDUM

Date July 8, 2022

To Ms. Jacki Byerly, Town Planner
Town of Andover
36 Bartlett Street
Andover, MA 01810

From Jane R. Davis, P.E.

CC James D. Fitzgerald, P.E., LEED AP

Subject 3000 Minuteman Road Traffic Peer Review

Environmental Partners (EP) has reviewed the Traffic Impact Assessment (TIA) prepared by Vanasse & Associates, Inc. (VAI) for the proposed development ("the Project") located at 3000 Minuteman Road in the Town of Andover, dated June 10, 2022. The project proposes renovation and expansion of the former Philips Healthcare campus to provide laboratory/current Good Manufacturing Practice (cGMP) uses in multiple phases, and this TIA supports the initial phase of the Project.

In general, VAI has prepared this assessment in a professional manner, consistent with standard engineering practices. The following is a summary of EP's traffic review.

Project Description

The TIA outlines the following project description:

"The Project will entail the renovation and expansion of the former Philips Healthcare campus located at 3000 Minuteman Road in Andover, Massachusetts, to accommodate laboratory/cGMP uses. The campus currently contains four (4) buildings that encompass approximately 726,000± square foot (sf) of office/manufacturing space. The redevelopment plan will transform the former office/manufacturing campus into a life sciences campus consisting of a mix of laboratory, research and development, office, cGMP manufacturing and warehouse space, and will include an expansion of one (1) of the existing building (Building 1) and the addition of two (2) new future buildings. When complete, the campus will contain approximately 1.126± million sf of space. The Project site is bounded by areas of open and wooded space and the Merrimack River to the north and west, and commercial properties to the south and east. Figure 1 depicts the Project site in relation to the existing roadway network.

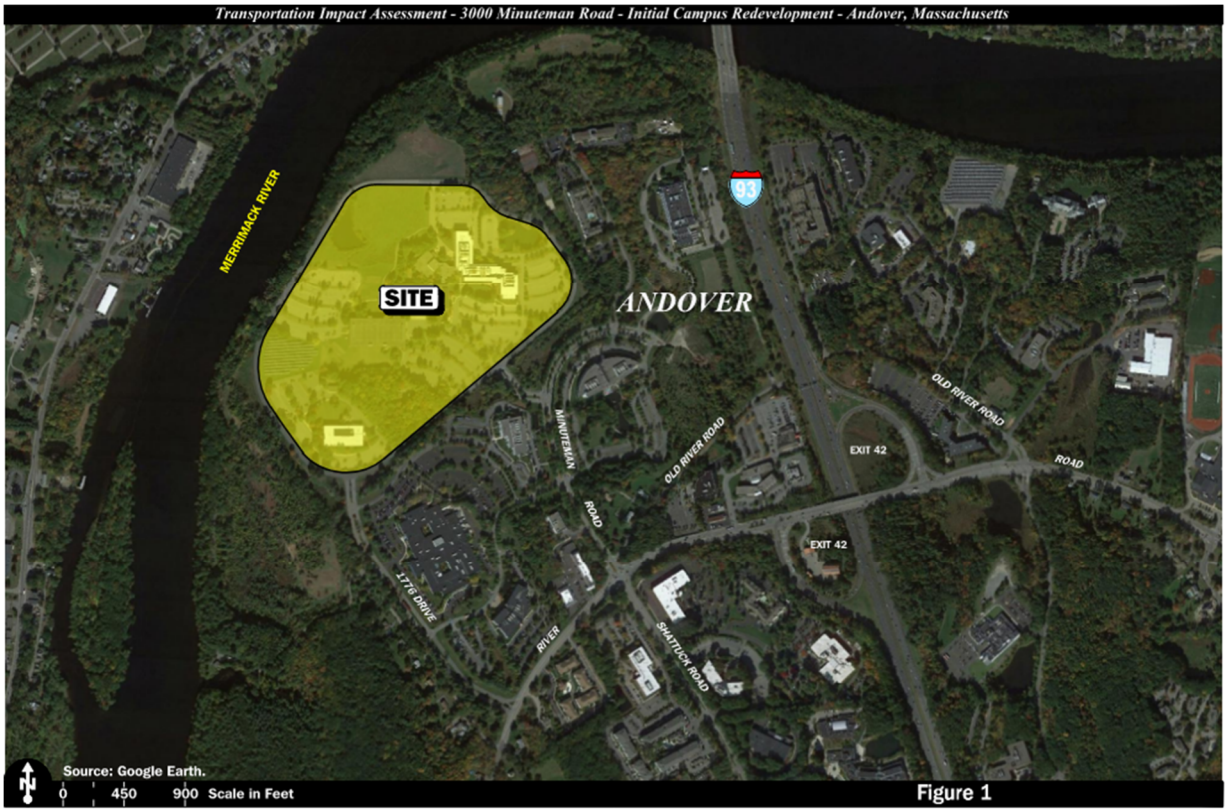

Figure 1 – Site Location Map (Source: VAI TIA)

The initial phase of the Project, which is the subject of this TIA, will involve the four (4) existing buildings within the campus and will consist of the following elements:

- Building 1: renovation of the existing 86,000± sf office building to accommodate lab/office (R&D) space and the construction of a 100,000± sf addition that will include cGMP and warehouse space.
- Building 2: renovation of the existing 164,100± sf building that was formerly used as office (41,025± sf) and associated electronics manufacturing space (123,075± sf) to accommodate a similar amount of laboratory/office (41,025± sf) and associated cGMP space (123,075± sf).
- Building 3: renovation of the existing 171,200± sf building that was formerly used as office (42,800± sf) and associated electronics manufacturing space (128,400± sf) to accommodate a similar amount of laboratory/office (42,800± sf) and associated cGMP space (128,400± sf).
- Building 4: renovation of the existing 256,700± sf building that was formerly used as office space to accommodate a similar amount (256,700± sf) of laboratory/office space.

The existing Link & Amenities Building (48,200± sf) will continue to provide accessory and supporting amenities for the campus, with no change to the existing function of the building.

Access to the Project site will continue to be provided by way of the existing driveways that serve the campus and are connected to 1776 Drive and Minuteman Road, both of which provide access to River Road. There are no changes proposed to the existing campus roadway network as it relates to 1776 Drive or Minuteman Road that would result in a change in travel patterns or the increased use

of 1776 Drive. In fact, the subsequent addition of buildings to the campus as a part of a later phase of the Project will occur in a portion of the campus that is more proximate to the Minuteman Road access."

Existing Conditions

The TIA included a description of the study area, which consists of three roadways, River Road, 1776 Drive, and Minuteman Road, as well as two intersections listed below:

- River Road at Minuteman Road/Shattuck Road (Signalized)
- River Road at 1776 Drive (Unsignalized)

Figure 1 shows the Project site location map provided by VAI.

The TIA describes the existing conditions, including geometry, jurisdiction, land use, speed limit, pedestrian and bicycle facilities, and illumination. The study limits comply with the Massachusetts Department of Transportation (MassDOT) Traffic Impact Assessment (TIA) Guidelines as presented and were determined in coordination with the Town of Andover Planning & Economic Development Division. Study area descriptions appear to be accurate with the following minor exceptions:

- **The TIA states that bicycle lanes are present along River Road between the 1776 Drive intersection and Minuteman Road/Shattuck Road intersection. EP notes that although a 5-foot-wide striping exists within that roadway segment, no bicycle lane markings are present.**
- **VAI noted that on study roadways other than the above-mentioned segment, bicycle accommodations exist in the form of a shared traveled-way. While EP concurs that these study roadways have a combined shoulder and travel lane width of 14-feet or wider, no specific bicycle accommodations are present on these roadways.**
- **The intersection of River Road at Minuteman Road/Shattuck Road was stated to include bicycle detection as part of the traffic signal system. During our site visit, EP was unable to verify bicycle detection at this intersection; the appropriate signage and pavement markings are not apparent.**

Existing Traffic Volumes

VAI collected traffic data in May 2022, which consisted of the following components:

Turning Movement Count (TMC) Data

TMCs were conducted at the study intersections on Wednesday, May 11, 2022 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 7:30 to 8:30 AM, while the weekday evening peak hour was found to occur from 4:30 to 5:30 PM.

Automatic Traffic Recorder (ATR) Data

ATR counts were conducted for River Road, east of the Minuteman Road/Shattuck Road intersection on Wednesday, May 11 and Thursday, May 12, 2022.

Seasonal Adjustment

The TIA indicated that based on a review of data at the MassDOT Continuous Count Station No. 5124, located on Interstate 93 in Andover, the month of May represents slightly above-average month conditions, and as such, VAI did not apply any volume adjustments to account for seasonal fluctuations. **EP agrees that volumes collected in May typically represent above-average month conditions, and we take no exception to VAI's approach.**

COVID-19 Adjustment

To account for COVID-19 pandemic impacts, VAI compared traffic data at the MassDOT Continuous Count Station No. 5124 between May 2016 and May 2022, with the May 2016 data adjusted to 2019 using MassDOT methodology. It was found that traffic volumes prior to COVID-19 pandemic were not significantly different from current volumes, and as such, VAI did not apply adjustments to account for COVID-19 impacts. **EP concurs with VAI's methodology and the resultant decision to not adjust the volumes.**

Spot Speed Measurements

VAI collected vehicle speeds on River Road in conjunction with ATR counts. Data revealed an 85th percentile speed of 38 miles per hour (mph) in the eastbound direction and 41 mph in the westbound direction. The 85th percentile speed is the speed at which 85 percent of the observed vehicles travel at or below. The measured speeds exceed the posted speed limit of 35 mph. **EP takes no exception to the collected data.**

Public Transportation Services

The TIA notes that the Merrimack Valley Regional Transportation Authority (MVRTA) operates bus Route 37, Beacon Street, in the vicinity of the Project site. This bus route provides service between Buckley Transportation Center in Lawrence and Marriot Springhill Suites, running along River Road and Minuteman Road with the closest stop to the Project site at the 150 Minuteman Road. The Buckley Transportation Center provides connection to the Massachusetts Bay Transportation Authority (MBTA) Commuter Rail service. **EP confirmed the provided information in the TIA.**

Motor Vehicle 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 average crash rate for a signalized intersection is 0.78, while the District 4 average rate is 0.73. Statewide and District 4 average crash rates for an unsignalized intersection are both 0.57.

VAI reviewed crash data provided by MassDOT for the five-year period from 2015 through 2019. The TIA stated there are four reported crashes at the intersection of River Road at Minuteman Road/Shattuck Road, and eight crashes at the intersection of River Road at 1776 Drive, resulting in crash rates below the Statewide and District 4 averages. VAI also noted that the study area does not fall within a Highway Safety Improvement Program (HSIP) cluster.

We note the following:

- **Backup data has not been provided to support the crash data summary. Our independent review of the MassDOT Crash Portal revealed minor inconsistencies that would not significantly impact the crash rates, which are expected to remain below the State and District 4 averages.**
- **EP typically recommends obtaining crash reports from the Police Department to further assess the crash history at the study area intersections.**

Future Conditions

VAI projected the 2022 baseline traffic volumes seven years to 2029 future traffic conditions. They used a 1.5 percent background growth rate per year over the seven-year period and identified other planned developments and/or roadway improvement projects in the area that may add vehicle trips or impact traffic volumes through the study area. **EP agrees with the methodology.**

We offer the following comments:

- **We assume that VAI's research and correspondence with the Town of Andover has adequately identified all major projects and developments that may impact travel patterns in the study period; verification from the Town is recommended.**
- **Backups have not been included for the trips associated with the nearby developments; as such, we cannot verify all the volumes in Figure 4 of the TIA for the 2029 No-Build Peak-Hour Traffic Volumes.**
- **It is our understanding that under existing conditions, the former Philips Healthcare facilities are partially or fully vacant and are currently generating fewer vehicles than a fully-occupied campus. To estimate the 2029 No-Build conditions, VAI incorporated the impacts of the fully-occupied campus, under which the site is currently approved to operate, though not currently experienced. Although we do not take exception to this methodology, we note that the 2029 No-Build conditions do not reflect a projection of the existing conditions were the site vacancies to remain.**

Future Build Conditions

Project-Generated Traffic

VAI applied the latest edition (11th Edition) of the Institute of Transportation Engineers (ITE) Trip Generation Manual to estimate the proposed project-generated vehicle trips using Land Use Code (LUC) 140 – "Manufacturing" (351,475 square feet (sf)) and LUC 760 – "Research and Development Center" (426,525 sf).

LUC 140 describes "an area where the primary activity is the conversion of raw materials or parts into finished products. Size and type of activity may vary substantially from one facility to another. In addition to the actual production of goods, a manufacturing facility typically has an office and may provide space for warehouse, research, and associated functions."

LUC 760 describes "a facility or group of facilities devoted almost exclusively to research and development activities. The range of specific types of businesses contained in this land use category

varies significantly. Research and development centers may contain offices and light fabrication areas."

VAI used the fitted curve method using the total square-footage for each type of use. Based on the available information, **EP agrees with the use of these land use code and the methodology.**

VAI also projected traffic volumes to reflect the former Philips Healthcare campus as being fully-occupied using ITE trip generation for (LUC) 140 – "Manufacturing" (251,475 sf), LUC 760 – "Research and Development Center" (83,825 sf), and LUC 710 – "General Office Building" (342,700 sf).

LUC 710 describes "General Office Building" as "a location where affairs of businesses, commercial or industrial organizations, or professional persons or firms are conducted. An office building houses multiple tenants that can include, as examples, professional services, insurance companies, investment brokers, a banking institution, a restaurant, or other service retailers."

Table 6 of the TIA shows the comparison of the trip generation between those of the proposed Project site (under LUC 140 and LUC 760) and those that would potentially be generated if the former Philips Healthcare campus was fully occupied (under LUC140, LUC 710, and LUC 760). EP offers the following comments:

- **The trip generation for the former Philips Healthcare campus uses LUC 760 – "Research and Development Center" for a small portion of the total square-footage, though the description of the existing buildings under the Project Description section of the TIA does not specify this land use. Clarification is requested.**
- **Table 6 states that the number of vehicle trips includes the trips associated with the Link & Amenities Building. However, based on the trip generation backups in the appendix for the total square-footage of each land use code, it does not seem that these trips have been included. Based on the description in the TIA, EP understands that this building will operate similarly under both former and proposed conditions, and therefore the trip generation will remain the same. Although the difference between the two uses in Table 6 will remain the same, any trips associated with this building should be included in the total trips.**
- **Table 6 indicates an increase in the average weekday daily trips of 314 trips when comparing the fully-occupied former Philips Healthcare campus to the proposed Project, but a decrease of 117 vehicle trips during the weekday morning peak hour and a decrease of 87 vehicle trips during the weekday evening peak hour. As discussed above regarding the projection of the existing conditions to the future no-build conditions, although we do not take exception to this methodology as the site is currently approved to operate under the fully-occupied conditions, we note that in actuality, there will not be a decrease in vehicle trips based on the current existing conditions (with vacancies), and in fact, there will be an increase of between 600 and 700 vehicle trips during each of the peak hours.**

Trip Distribution and Assignment

VAI determined the trip distribution of the project-generated trips based on a review of the Town of Andover Journey-to-Work data, provided by U.S. Census, and refined based on existing travel

patterns within the study area. River Road was assumed to carry 80 and 20 percent of project-generated traffic to/from east and west of the Project site, respectively. **EP concurs with this assumption.**

Build Traffic Volumes

VAI developed the 2029 Build conditions by adding the vehicle volumes generated by the proposed Project to the 2029 No-Build conditions, and subtracting the trips that were expected to be generated by fully-occupied former Philips Healthcare campus. **Based on the methodology and the assumptions, the 2029 Build conditions volumes appear to be accurate.**

Traffic Operations Analysis

VAI used Synchro software, which is based on the Highway Capacity Manual (HCM) methodology, to analyze each of the study intersections. With the provided analysis, all movements at both study intersections are expected to operate at a LOS C or better during both the weekday morning and evening peak hours under both No-Build (with 100% occupancy of the current site) and Build conditions, with exception of the following at the intersection of River Road and Minuteman Road/Shattuck Road:

- During the morning peak hour, the westbound left turn movement on River Road is expected to operate at a LOS F under both No-Build and Build conditions, with no significant change in vehicle delays and queues under Build conditions compared to No-Build conditions.
- During the evening peak hour, the southbound left turn and southbound through movements on Minuteman Road are expected to operate at a LOS F under both No-Build and Build conditions. The analysis shows improvements in vehicle delays and queues under Build Conditions compared to No-Build conditions.

EP reviewed the Synchro analysis and we offer the following comments:

- **The peak hour factor (PHF) and heavy vehicle percentage Synchro inputs are inconsistent in No-Build and Build conditions compared to the existing conditions and collected data.**
- **At the intersection of River Road and Minuteman Road/Shattuck Road, the channelized westbound right turn lane operates under free control, and the channelized southbound right turn lane operates under yield control, though both movements are modeled under signalized control in the analysis. However, we note that with the signalized control, the analysis still shows an acceptable level of service.**
- **In Table 7 of the TIA (Signalized Intersection Level-of-Service and Vehicle Queue Summary), we recommend presenting the actual delays when exceeding 80 seconds.**
- **Similar to the discussion above, comparing the 2029 No-Build conditions, which reflect the fully-occupied Philips Healthcare campus (although it is currently substantially vacant), to the 2029 Build conditions does not reflect the change in traffic operations compared to existing conditions. Based on the comparison of the proposed Project to the fully-occupied former use, we agree that the impacts of the proposed Project are minimal and in some instances provide an improvement in operations. However,**

when compared to the existing conditions which include site vacancies, the traffic operations are expected to degrade from the current LOS C to a LOS F along the impacted movements at the intersection of River Road at Minuteman Road/Shattuck Road with significant increases in delay. EP notes that the proposed mitigation discussed under the Recommendations Section includes optimization of the traffic signal timings, which improves the traffic operations such that all movements are expected to operate at a LOS D or better.

- **Although the intersections with the Interstate 93 (I-93) ramps at River Road were not included in the study area based on the impacts of the proposed Project as presented, we note that the increase in the number of vehicle trips due to the proposed Project as compared to the current existing conditions will likely have a significant impact on these intersections, as it is assumed a large portion of these trips will not be locally-generated trips and will be using I-93 to access the site. Optimization to the traffic signal timings at these intersections should also be considered.**

Sight Distance Assessment

VAI used the American Association of State Highway and Transportation Officials (AASHTO) guidelines to determine if the sight distance at the intersections of River Road at Minuteman Road/Shattuck Road and at 1776 Drive meets requirements. The AASHTO guidelines provide two criteria for determining adequate sight distance at an intersection:

Stopping Sight Distance (SSD) – the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path

Intersection Sight Distance (ISD) – the sight distance required by a driver entering or crossing an intersecting roadway to perceive an oncoming vehicle and safely execute a turning or crossing maneuver

The AASHTO guidelines indicate that if the sight distance at an intersection is at a minimum equal to the SSD, drivers have sufficient distance to avoid a collision in most cases; however, it is desirable to exceed this distance where possible, and therefore ISD is preferred.

VAI calculated the SSD along River Road using a speed of 45 mph, which conservatively exceeds the measured 85th percentile speeds. VAI also calculated ISD for Minuteman Road and 1776 Drive approaches turning onto River Road. Measured values exceed both minimum SSD and desirable ISD values; **EP takes no exception to the measured values reported.**

Recommendations

EP reviewed VAI's recommendations for project access, mitigation, and Transportation Demand Management (TDM). We also reviewed the site plan associated with the addition to Building 1 as part of the initial phase of the Project. In general, we agree with the proposed improvements, and we offer the following comments:

- **The TIA states that drive aisles will continue to be a minimum of 23-feet wide in places where perpendicular parking is proposed. We note that according to the Town of**

Andover zoning bylaws, a minimum width of 24-feet is required for two-way drive aisles.

- **The parking lot located south of the existing Building 1 is shown on the site plans to have 60-degree angled parking spaces. According to the Town of Andover zoning bylaws, a minimum drive aisle of 18-feet-wide is required when angled parking spaces from 46- to 60-degree are proposed. EP's measurements of both drive aisles at this parking lot appear to show narrower widths.**
- **Truck-turning templates should be provided for emergency vehicles, refuse vehicles, and other vehicles intended to use the Project site for review.**
- **Traffic sign and pavement marking plans should be provided for review.**
- **Accessible curb cut should be provided at the end of sidewalks in both the northern and southern parking lots.**
- **In the updated timing plans provided by VAI at the intersection of River Road and Minuteman Road/Shattuck Road, the exclusive pedestrian phase has been maintained at 26-seconds, which appears to be inadequate given the length of the crossings. We recommend reevaluating the pedestrian clearance and extending the phase as necessary to meet the requirements set forth in the Manual on Uniform Traffic Control Devices (MUTCD).**

Additional Off-Site Mitigation

The following outlines EP's recommendations for additional off-site mitigation. We recommend coordinating with the Town of Andover to implement any appropriate mitigation measures.

- **EP recommends providing shortest path pedestrian connections between the closest transit station serving the Project site and each of the buildings.**
- **As discussed above, depending on the level of impact, we recommend considering optimization of the traffic signal timings at the intersections of the I-93 ramps with River Road.**

We remain available for any further review or discussion and to attend the Town's meetings as required.