Vanasse & Associates inc
Transportation Engineers & Planners

35 New England Business Center Drive
Suite 140
Andover, MA 01810

Ref: 9425

December 12, 2023

Mr. Richard S. Novak, Chair
Sherborn Zoning Board of Appeals
Town Hall
19 Washington Street
Sherborn, MA 01770

Re: Response to Engineering Peer Review – Traffic (Revised November 7, 2023)
Farm Road Homes Residential Development – 55 and 65 Farm Road
Sherborn, Massachusetts

Dear Chair Novak and Member of the Zoning Board of Appeals:

Vanasse & Associates, Inc. (VAI) is providing responses to the comments that were raised in the September 28, 2023 (Revised November 7, 2023) *Engineering Peer Review – Traffic* letter prepared by Tetra Tech (TT) concerning their review of the October 18, *2023 Response to Engineering Peer Review - Traffic* letter prepared by VAI in support of the proposed residential development to be located at 55 and 65 Farm Road in Sherborn, Massachusetts (hereafter referred to as the "Project"). Listed below are the comments that were identified by TT in the subject letter that required followed by our response on behalf of the Project proponent.

Project Study Area Intersection

TT Comment 1: *The TIA evaluated four intersections Farm Road, including Farm Road at Route 27 and Farm Road at Lake Street. Tetra Tech recommends that the Applicant provide an evaluation of the Farm Road/Great Rock Road intersection given its proximity to the site (approximately 100 feet west of the site property boundary).*

TT 11/7/23 Update: *TT 11/7/23 Update: The VAI letter included a summary of existing and future projected traffic volumes at the Farm Road/Great Rock Road intersection. Additionally, the letter included capacity analyses which indicate that the Farm Road/Great Rock Road intersection operates at acceptable levels of service (LOS B or better) operations under existing and future year conditions (with or without the project). In our opinion, this comment is resolved.*

VAI Follow-Up: No response required.

Study Time Periods

TT Comment 2: *The study includes an impact analysis of the weekday morning (7am-9am) and weekday evening (4pm-6pm) peak periods when the combination of site-generated traffic and volumes on the adjacent roadways is expected to be greatest. The time periods chosen for detailed analysis are generally appropriate for the residential uses proposed.*

TT 11/7/23 Update: *In our opinion, this comment is resolved.*

VAI Follow-Up: No response required.

Traffic Volumes

TT Comment 3: *Automated traffic recorder counts (ATRs), including speed data, were conducted on Wednesday, September 14, 2022 and Thursday, September 15, 2022 on Farm Road, in the vicinity of the site. Turning movement count (TMC) data was also collected at the study area intersections on Wednesday, September 14, 2022 when schools were in session. To account for traffic volume fluctuations caused by the COVID-19 pandemic, the TIA applied a 5.9 percent adjustment (increase) to the observed traffic volumes, based on comparisons with pre-pandemic (2019) continuous count station data published by the Massachusetts Department of Transportation (MassDOT). No adjustments were made for seasonal fluctuations as the TIA indicates that September is an above-average traffic volume months based on MassDOT data. Tetra Tech generally agrees with this methodology. However, supporting traffic counts and adjustment calculations should be provided in the appendix material for the Town's review.*

TT 11/7/23 Update: *The VAI letter included the traffic counts and adjustment calculations requested. In our opinion, this comment is resolved.*

VAI Follow-Up: No response required.

Public Transportation

TT Comment 4: *The TIA states that regularly scheduled public transportation service is not provided within the Town of Sherborn. The TIA states that the Sherborn Council of Aging provides discounted taxi rides through an agreement with JFK Transportation. The trip generation estimates presented in the TIA do not take a credit (reduction) for transit use. Tetra Tech generally concurs with this methodology.*

TT 11/7/23 Update: *In our opinion, this comment is resolved.*

VAI Follow-Up: No response required.

Crash Analysis

TT Comment 5: *The TIA includes a crash analysis for the existing study intersections between 2015 and 2019 based on MassDOT crash data. The current MassDOT crash database includes data through 2022 (years 2021 and 2022 are still open and subject to change pending MassDOT's completion of processing all crash reports for these two years). Tetra Tech recommends that the Applicant expand the crash assessment to include the additional years of data. The backup crash data and crash rate worksheets should be provided in the appendix for the Town's review.*

TT 11/7/23 Update: *The VAI letter included an expanded crash analysis including the additional study area intersection (Farm Road/Great Rock Road) and additional years of MassDOT data requested. The expanded analysis indicates that the study intersections and roadway segments experience less than one crash per year resulting in crash rates well below the MassDOT Statewide and Districtwide averages. In our opinion, this comment is resolved.*

VAI Follow-Up: No response required.

TT Comment 6: *Tetra Tech is aware of concerns made by the public during the Zoning Board of Appeals public hearing process regarding potential solar glare and existing drainage and icy conditions on Farm Road as they relate to traffic. Tetra Tech recommends that the Applicant request crash reports for all reported crashes on Farm Road in the study area for the last 5-years to identify any potential safety deficiencies that may not have been reported in the MassDOT crash database.*

TT 11/7/23 Update: *The VAI letter included a summary of reported crashes on Farm Road between and inclusive of the intersections with Route 27 and Lake Street for the most recent five-year period available based on preliminary police crash data from the Sherborn Police Department. The VAI letter states that there is no discernible crash trend attributable to solar glare or icy roadway conditions. The VAI letter states that the crash analysis will be revisited once the Applicant receives the requested detailed police crash reports from the Sherborn Police Department. Tetra Tech will reserve comment on the expanded crash analysis until the Applicant receives and evaluates the detailed crash reports from the Sherborn Police Department.*

VAI Follow-Up: The Police Department has informed VAI that they are unable to provide the detailed crash reports at this time. Accordingly, we refer to our review of the crash data from the October 18, 2023 response letter which indicated no discernable trend that would suggest an increase in crashes during the fall/winter months that could be attributable to solar glare/icy conditions. This observation was affirmed by the MassDOT crash data which indicated that only two (2) crashes were reported along Farm Road from 2015 through 2022 where a snow/ice covered roadway was identified.

Study Time Horizon

TT Comment 7: *The TIA utilized a seven-year planning horizon (2029 Future Year condition) which is consistent with MassDOT traffic study guidelines.*

TT 11/7/23 Update: *In our opinion, this comment is resolved.*

VAI Follow-Up: No response required.

Future No-Build Traffic Volumes

TT Comment 8: *A one-and-a-half percent per year growth rate was applied to the 2022 Existing Conditions peak hour traffic volumes (for the 7-year forecast period from 2022 to 2029) to estimate peak hour traffic volumes in the planning year 2029 based on MassDOT count data. Tetra Tech generally agrees with this methodology, however backup calculations should be provided in the appendix.*

TT 11/7/23 Update: *The VAI response letter included the background growth rate calculations requested. In our opinion, this comment is resolved.*

VAI Follow-Up: No response required.

TT Comment 9: *The TIA indicated that the Applicant consulted with Town of Sherborn Planning staff to identify specific background development Projects for consideration in the development of future traffic volumes. The TIA determined that the traffic associated with the background projects identified could be generally accounted for in the background growth rate. Several residential projects totaling more than 200 additional residential units proposed by others north and west of the site may use the study area intersections to access the Dover-Sherborn High School and Middle School. Tetra Tech recommends that the Applicant discuss the potential traffic-related cumulative impact of these projects and the proposed Farm Road residential project at these locations.*

TT 11/7/23 Update: *The VAI letter provided a discussion of potential school-related trips generated by four area residential development projects. The VAI letter stated that the number of school age children residing in these four developments is relatively small and are accounted for in the general background traffic growth rate used in the TIA analyses. In our opinion, this comment is resolved.*

VAI Follow-Up: No response required.

Trip Generation

TT Comment 10: *Vehicle trip generation estimates for the proposed Project were based on trip generation rates presented in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition for Land Use Code (LUC) 210 (Single-Family Detached Housing) applied to on 18 units and LUC 215 (Single-Family Attached Housing) applied to 14 units. Tetra Tech generally agrees with this methodology. However, trip generation calculations should be provided in the appendix.*

TT 11/7/23 Update: *The VAI letter included the trip generation calculations requested. In our opinion, this comment is resolved.*

Response: No response required.

TT Comment 11: *The TIA assumed 18 detached units plus 14 attached units. However, the site plans indicate 12 detached units plus 16 attached units. Tetra Tech recommends that the Applicant confirm the currently proposed building program.*

TT 11/7/23 Update: *The VAI letter included the updated trip generation estimates for the current building program which indicate that the current building program generates traffic volumes similar to or less than the building program assumed in the TIA. In our opinion, this comment is resolved.*

VAI follow-Up: No response required.

Trip Distribution/Assignment

TT Comment 12: *The trip distribution patterns presented in the TIA were based on existing travel patterns and US Census Journey to Work data which is generally consistent with standard industry practice for the proposed residential land uses. However, the trip distribution calculations should be provided in the appendix.*

TT 11/7/23 Update: *The VAI letter included the trip distribution calculations requested. In our opinion, this comment is resolved.*

VAI Follow-Up: No response required.

Intersection Operational Analysis

TT Comment 13: *The TIA states that it utilized the capacity analysis methodologies from the Highway Capacity Manual (HCM) 2010 using Synchro software. Tetra Tech recommends that the HCM 6th Edition methdology, the currently approved version of the HCM for unsignalized intersections, be used as the basis for the analysis. The intersection capacity analysis worksheets should be provided for the Town's review.*

TT 11/7/23 Update: *The VAI letter included revised capacity analyses using HCM 6th edition methodology which indicates that the study area intersections are anticipated to generally operate at LOS D or better operations under future year conditions with or without the Project. The exception is the Farm Road westbound approach to Route 27 which is anticipated to operate with longer delays at LOS E operations. However, this approach to the intersection is anticipated to operate below capacity (volume to capacity ratio less than one). The incremental delay due to the Project is four seconds or less resulting in no change in LOS between future No Build (without project) and Build (with project) and vehicle queue increases of one vehicle or less during peak hours. The fire station driveway is located approximately 250 feet east of the Route 27/Farm Road intersection and the capacity analyses indicate that the 95th percentile vehicle queues are 7 vehicles*

or less (approximately 175 ft or less). Tetra Tech recommends that the Applicant discuss with the Sherborn Fire Department their experience responding to calls from the Farm Road Fire Station to determine what, if any, traffic enhancements for emergency vehicle access at the station are warranted as part of the project.

VAI Follow-Up: Written approval from the Sherborn Fire Department is required to obtain a Building Permit for the Project. The Applicant will discuss emergency response to the Project with the Fire Department as a part of this review and will address any comments that are raised at that time.

Sight Distance

TT Comment 14: *The TIA states that it conducted a sight distance analysis at the proposed site driveway on Farm Road based on AASHTO's A Policy on Geometric Design of Highways and Streets, 7th Edition (2018). It is recommended that the supporting sight distance calculations be provided to the Town for review.*

TT 11/7/23 Update: *The VAI letter included the sight distance measurements but did not include the sight distance calculations requested. Tetra Tech recommends that the Applicant include the sight distance calculations for the Town's review.*

VAI Follow-Up: The sight distance calculations are attached.

TT Comment 15: *Tetra Tech recommends that the sight distance plans and profiles for each site driveway be added to the site plans to confirm that adequate sight distance will be provided at this location. Any existing vegetation or rock walls required to be removed to provide adequate sight lines should be identified for the Town's review given that Farm Road is designated as a Scenic Roadway.*

TT 11/7/23 Update: *The VAI letter included an evaluation of horizontal sight distances. Tetra Tech continues to recommend that the horizontal and vertical sight distance plans and profiles be provided in the site plan package to document and confirm that adequate sight lines will be available and indicate to the Town and the contractor the areas which shall remain free of sight distance obstructions. Given the existing topography in this area, it will be critical that any proposed (or existing to remain) rock walls, fencing, signage and vegetation be limited so as not to obstruct sight lines.*

VAI Follow-Up: Topographic information within the sight triangle area was not obtained as a part of the survey. As such, VAI has updated the sight triangle plan to include: i) photographs of the features that are located within the sight triangles, none of which present a continuous obstruction to the available sight lines; and ii) a note stating the following:

"Signs, landscaping and other features located within sight triangle areas shall be designed, installed, and maintained so as not to exceed 2.5-feet in height. Snow accumulation (windrows) located within sight triangle areas that exceed 3.5-feet in height or that would otherwise inhibit sight lines shall be promptly removed."

TT Comment 16: *The TIA recommends that any snow windrows at the proposed site driveway be promptly removed to sufficiently ensure adequate sight distance. Tetra Tech recommends that the Applicant also ensure that all proposed landscaping and signage internal to the site (where vehicle conflicts may occur) will not impede sight lines.*

TT 11/7/23 Update: *Tetra Tech recommends that the Applicant add a note to the site plans that states any signs, landscaping and snow windrows will not obstruct sight lines within the sight distance triangles.*

VAI Follow-Up: The requested note has been added to the attached Sight Triangle Plan and will also be added to the Site Plans.

Site and Emergency Vehicle Access/Circulation

TT Comment 17: *The TIA recommends that the site driveway and internal drives be a minimum of 22 feet if on-street parking will be restricted and 24 feet otherwise. The site plans show the site driveway and internal drives as 21 feet wide. Tetra Tech agrees with the TIA's recommendation to provide a minimum of 22 feet or 24 feet wide depending on the determination of on-street parking restrictions.*

TT 11/7/23 Update: *The Erosion Control Plan (Dated September 28, 2023 with revisions through October 5, 2023) shows 20 to 21 foot site driveway and internal site drive widths. Tetra Tech continues to recommend (consistent with VAI's recommendation) that the minimum site driveway and internal site drive widths be 22 feet if on-street parking will be restricted and 24 feet otherwise.*

VAI Follow-Up: The primary drive is proposed to be 21-feet in width and on-street parking will be prohibited. The spur drives that intersect the primary drive are proposed to be 20-feet in width and on-street parking will also be restricted along these drives with the exception of the parking area opposite Units 1 through 6 which is provided outside of the drive aisle. With consideration of the on-street parking restrictions and that snow will be removed from the entirety of the drive width, a 20-foot clear traveled-way is afforded which meets the requirements of NFPA®1.[1] A fire truck turning analysis was provided for the Project that that illustrates that the fire truck design vehicle is able to access and circulate within the Project site. As stated previously, approval of the access and circulation within the Project site is required from the Sherborn Fire Department to obtain a Building Permit for the Project.

TT Comment 18: *The Applicant included a turning analysis of a fire ladder truck. The analysis indicates that the fire truck would be required to reverse for an extended distance when accessing the rear of units 1-7. Tetra Tech recommends that the Applicant continue to review the site access and circulation with the Fire Department.*

TT 11/7/23 Update: *The site layout shown in the Erosion Control Plan (Dated September 28, 2023 with revisions through October 5, 2023) continues to show internal site drives*

[1] *NFPA®1, Fire Code*; National Fire Protection Association; Quincy, MA; 2015.

with no turnaround areas for emergency vehicles. Tetra Tech recommends that the Applicant obtain and provide written Fire Department approval of the proposed site access and circulation.

VAI Follow-Up: Written approval from the Fire Department will be obtained and is required before the issuance of a Building Permit.

TT Comment 19: *Tetra Tech recommends that the Applicant describe anticipated trash removal operations. Tetra Tech recommends that the Applicant conduct a truck turning analysis of trash removal vehicles to ensure that they can be adequately accommodated on-site without impeding site access and circulation particularly in areas where the site driveway would potentially require a trash truck to navigate the site in reverse.*

TT 11/7/23 Update: *Similar to Tetra Tech's Comment 18, the site layout shown in the trash/recycling truck turning analyses provided in the VAI letter show internal site drives with no turnaround areas for larger vehicles. Tetra Tech recommends that the Applicant explore the feasibility of providing site circulation that does not require larger vehicles to travel in reverse for extended distances.*

VAI Follow-Up: The Sherborn Fire Department has reviewed the Site Plan and found the site layout to be acceptable. There are no feasible changes to the site circulation that maintain the proposed building layout.

TT Comment 20 (1): *The TIA recommends that the site driveway be signed and marked with Stop sign control consistent with the Manual on Uniform Traffic Control Devices (MUTCD). Tetra Tech agrees with this recommendation.*

TT 11/7/23 Update: *Tetra Tech recommends that the site plans include a note that all proposed traffic signage and pavement markings be MUTCD compliant.*

VAI Follow-Up: The requested note will be added to the Site Plans.

TT Comment 20 (2): *Tetra Tech recommends that the Applicant label the snow storage areas and ensure that adequate snow storage will be available on-site without impeding parking, site access and circulation.*

TT 11/7/23 Update: *The Erosion Control Plan (Dated September 28, 2023 with revisions through October 5, 2023) shows several snow storage areas that would require a snow plow to maneuver in a way that may be infeasible (located on the sides of the internal site drives rather than the ends of the internal site drives) depending on the type of plow to be used. Additionally, the largest identified snow storage area to the north of the visitor parking field would likely be unable to be accessed due to the proposed solar canopy over the visitor parking field. Tetra Tech recommends that the Applicant identify alternative snow storage areas on site to minimize impacts to site access and circulation.*

VAI Follow-Up: Applicant will identify additional snow storage areas after the completion of the ZBA's review of other site plan issues, including stormwater

TT Comment 21: *Farm Road is designated by the Town as a Scenic Road and any improvements to Farm Road should be consistent with the Town's Scenic Road regulations to the extent feasible.*

TT 11/7/23 Update: *The VAI letter states that the Applicant will comply with the Town's Scenic Road regulations to the extent feasible. Tetra Tech recommends that this be included as a Condition should the Board approve the Project.*

VAI Follow-Up: The Applicant has no objection to such a condition.

TT Comment 22: *Tetra Tech recommends that the Applicant explore the feasibility of providing pedestrian and bicycle accommodations on Farm Road to connect to the proposed on-site sidewalks to be consistent with the Town's Master Plan and transportation circulation initiatives.*

TT 11/7/23 Update: *The VAI letter states that the Applicant will work with the Town to explore the feasibility of establishing pedestrian and bicycle accommodations along Farm Road that connect to the pedestrian pathways that are being established within the Project site. Tetra Tech recommends that this mitigative action be included as a Condition should the Board approve the Project.*

VAI Folow-Up: The Applicant has no objection to such a condition.

TT Comment 23: *There are two existing at-grade rail crossings on the study area roadways – one located on Farm Road approximately one-quarter mile west of the site and one on Route 27 approximately one-half mile north of Farm Road. Tetra Tech is aware of a collision between a motor vehicle on Route 27 and a train that occurred in July 2022. Tetra Tech recommends that the Applicant inventory the existing conditions of these two rail crossings in the study area to identify any potential safety deficiencies as well as improvements that may be warranted.*

TT 11/7/23 Update: *The VAI letter identified potential safety enhancements at the railroad crossings on Route 27 and Farm Road near the site. Tetra Tech recommends that the Applicant coordinate with the Board to identify which, if any, of these recommended measures be implemented as part of the Project. Any improvements should be reviewed and approved by the Sherborn DPW and potentially the owner(s) of the rail line in writing and provided to the Board.*

VAI Follow-Up: Subject to receipt of all necessary rights, permits and approvals, the Applicant will design and construct the following improvements at the Farm Road crossing as recommend in the October 18, 2023 response letter:

- Refresh the stop-line and RXR pavement markings with high visibility thermoplastic markings
- Relocate/install railroad crossing warning signs (W10-1) opposite the leading edge of the RXR pavement markings and positioned 100 feet from the centerline of the stop-line on the approach to the rail crossing.

TT Comment 24: *The TIA recommends a school bus waiting area widened sidewalk should be provided on site. Tetra Tech recommends that the Applicant discuss the potential bus stop location(s) with the Dover-Sherborn School Department staff.*

TT 11/7/23 Update: *The VAI letter states that the Applicant will discuss the school bus stop location for the Project with the Dover-Sherborn School Department and will provide the appropriate accommodations at the stop location. Similar to Tetra Tech Comment 18 and 19, the site circulation design requires larger vehicles to reverse direction. Tetra Tech recommends this be taken into consideration as the Applicant addresses all of Tetra Tech's site layout comments.*

VAI Follow-Up: It is expected that the school bus pick-up/drop-off will occur along Farm Road at the Project site driveway as it is not common for a school bus to enter a private property.

TT Comment 25: *Tetra Tech recommends that the Applicant [discuss] the planned easement at the site for horse activity as it relates to access and potential horse crossings across Farm Road.*

TT 11/7/23 Update: *Tetra Tech recommends that the Applicant describe the proposed access design to this easement area (i.e., driveway, horse path, etc.). Additionally, it is recommended that the Applicant determine whether or not a horse crossing across Farm Road will be anticipated and, if so, if adequate sight distance will be provided and what safety measures should be implemented (i.e., advance warning signage, pavement markings, etc.) at the horse crossing.*

VAI Follow-Up: There will be no change proposed to the easement area and a horse crossing is not necessary. The easement is for the benefit of two named individuals only and has never been used in the years it has existed.

We trust that this information is responsive to the comments that were identified in the September 28, 2023 (Revised November 7, 2023) letter prepared by TT concerning their review of the Project. If you should have any questions or would like to discuss our responses in more detail, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.

Jeffrey Dirk

Jeffrey S. Dirk, P.E., PTOE, FITE
Managing Partner

Professional Engineer in CT, MA, ME, NH, RI, and VA

JSD/jsd

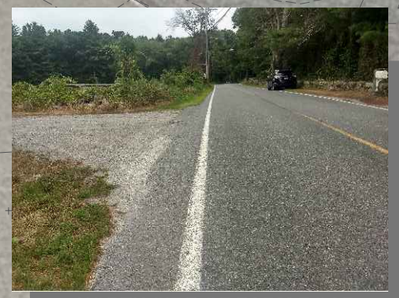
Attachments

SIGN LEGEND

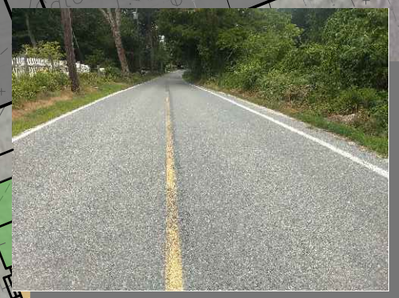
R1–1	STOP

SITE DRIVEWAY

FARM ROAD



NORTH SIDE OF FARM ROAD
EAST OF PROJECT SITE DRIVEWAY



NORTH SIDE OF FARM ROAD
WEST OF PROJECT SITE DRIVEWAY

DRIVER'S EYE LOCATION (TYP.)

14.5'

250' SIGHT DISTANCE PROVIDED

250' SIGHT DISTANCE PROVIDED

R1-1

NOTES:
1. THIS PLAN IS FOR REVIEW PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION.
2. BASE PLAN INFORMATION OBTAINED FROM BOHLER ENGINEERING AND GOOGLE EARTH.
3. NO OBJECTS SHALL BE PLACED WITH IN THE SIGHT TRIANGLE AREAS THAT WOULD EXCEED 2.5 FEET IN HEIGHT.
4. SNOW ACCUMULATIONS (WINDROWS) THAT EXCEED 2.5 FEET IN HEIGHT WILL BE PROMPTLY REMOVED.

N

0 20 40 Scale in Feet

Vanasse & Associates inc

Sight Distance Plan
Farm Road at Site Driveway

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Sight Distance Calculations

Stopping Sight Distance (SSD)

$$SSD = 1.47\,Vt + 1.075\frac{V^2}{a}$$

Where:

SSD = stopping sight distance
V = design speed
t = brake reaction time, 2.5 seconds
a = deceleration rate, 11.2 ft/s

$SSD = 1.47(35)(2.5) + 1.075\frac{35^2}{11.2}$ = 246.2 ft ~ 250 ft

Intersection Sight Distance (ISD)

$$ISD = 1.47\,V_{major}t_g$$

Where:

ISD = intersection sight distance
V_{major} = design speed of major roadway
t_g = time gap for minor road vehicles to enter major road

ISD for right-turn exiting Project site driveway

$ISD = 1.47\ (35)(6.5) =$ 334.4 ft ~ 335 ft

ISD for left-turn exiting Project site driveway

$ISD = 1.47\ (35)(7.5) =$ 385.9 ft ~ 390 ft