

Transportation Impact Assessment

Proposed Skilled Nursing Facility and
Workforce Housing
490 Edgartown-Vineyard Haven Road
Edgartown, Massachusetts

Prepared for:

Pesce Engineering & Associates, Inc.
Plymouth, Massachusetts

October 2020

Prepared by:

 **Vanasse &
Associates inc**
Transportation Engineers & Planners

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Dear Reviewer:

This letter shall certify that this *Transportation Impact Assessment* has been prepared under my direct supervision and responsible charge. I am a Registered Professional Engineer (P.E.) in the Commonwealth of Massachusetts (Massachusetts P.E. No. 38871, Civil) and hold Certification as a Professional Traffic Operations Engineer (PTOE) from the Transportation Professional Certification Board, Inc. (TPCB), an independent affiliate of the Institute of Transportation Engineers (ITE) (PTOE Certificate No. 993). I am also a Fellow of the Institute of Transportation Engineers (FITE).

Sincerely,

VANASSE & ASSOCIATES, INC.



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

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EXECUTIVE SUMMARY

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a skilled nursing facility and associated workforce housing to be located at 490 Edgartown-Vineyard Haven Road in Edgartown, Massachusetts (hereafter referred to as the Project). This assessment was prepared in consultation with the Town of Edgartown, the Martha's Vineyard Commission (MVC), and the Massachusetts Department of Transportation (MassDOT), and was performed in accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines* and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports.

Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the Institute of Transportation Engineers (ITE),¹ the Project is expected to generate approximately 356 vehicle trips on an average weekday (two-way, 24-hour volume), with 30 vehicle trips expected during the weekday morning peak-hour and 43 vehicle trips expected during the weekday evening peak-hour;
2. The Project will not have a significant impact (increase) on motorist delays or vehicle queuing over Existing or anticipated future conditions without the Project (No-Build conditions), with all movements at the study intersections shown to continue to operate at a level-of-service (LOS) C or better under all analysis conditions. For context, we note that an LOS of "D" or better is defined as "acceptable" operating conditions;
3. No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study area intersections; and
4. Lines of sight at the Project site roadway intersection with Edgartown-Vineyard Haven Road were found to exceed the recommended minimum distance for safe and efficient operation based on the appropriate approach speed.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with implementation of the recommendations that follow.

¹*Trip Generation*, 10th Edition; Institute of Transportation Engineers; Washington, DC; 2017.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The following improvements have been recommended as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

Project Access

Access to the Project site will be provided by way of a new driveway that will intersect the south side of Edgartown-Vineyard Haven Road opposite Tower Lane. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation, many of which are reflected on the Site Plans:

- The Project site driveway and circulating drives within the Project site should be a minimum of 22-feet in width and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle.
- Where perpendicular parking is proposed, the drive aisle behind the parking should be a minimum of 23-feet in order to facilitate parking maneuvers.
- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided. The STOP-sign and STOP-line should be installed in advance of the shared-use path that crosses the Project site driveway.
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices (MUTCD)*.²
- A sidewalk should be provided along at least one side of the Project site driveway and along the circulating drive within the Project site that should extend to the shared-use path along the south (Project) side Edgartown-Vineyard Haven Road.
- Americans with Disabilities Act (ADA) compliant wheelchair ramps should be provided at all pedestrian crossings internal to the Project site.
- Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas should be designed and maintained so as not to restrict lines of sight.
- Snow windrows within sight triangle areas should be promptly removed where such accumulations would impede sight lines.

Transportation Demand Management

Public transportation services are provided within the study area by the Martha's Vineyard Transit Authority (VTA) and will be accessible to residents and employees of the Project. The VTA operates year-round, fixed-route bus service along Edgartown-Vineyard Haven Road by way of Route 1, which includes a stop located opposite the Project between Tower Lane and 19th Street North. Connections to other VTA bus routes can be made at the Steamship Authority Terminal (Route 3); at the Barns Road roundabout, the Skate Park, Martha's Vineyard Regional High School,

²*Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

Martha's Vineyard Community Services and Woodside Village (Routes 7 and 9); and at Church Street in Edgartown (Route 13).

In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following Transportation Demand Management (TDM) measures will be implemented as a part of the Project:

- Information regarding public transportation services, maps, schedules and fare information will be posted in a central location and/or otherwise made available to employees and residents;
- A "welcome packet" will be provided to new residents and employees detailing available public transportation services, bicycle and walking alternatives, and commuter options;
- Pedestrian accommodations will be incorporated into the Project site; and
- Secure bicycle parking should be provided in an appropriate location.

In addition, consideration should be given to providing a crosswalk across Edgartown-Vineyard Haven Road between the Project site driveway and Tower Lane with an accompanying pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) and pedestrian crossing warning signs to link the Project to the bus stop along the north side of Edgartown-Vineyard Haven Road between Tower Lane and 19th Street North.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a skilled nursing facility and associated workforce housing to be located at 490 Edgartown-Vineyard Haven Road in Edgartown, Massachusetts (hereafter referred to as the Project). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing traffic conditions and future traffic conditions, both with and without the Project, along Edgartown-Vineyard Haven Road, and the following specific intersections defined by the Martha's Vineyard Commission (MVC): Edgartown-Vineyard Haven Road at Tower Lane and Edgartown-Vineyard Haven Road at 19th Street North.

PROJECT DESCRIPTION

The Project will entail the construction of a 70-bed skilled nursing facility with an associated 24-unit multifamily residential community³ to be located at 490 Edgartown-Vineyard Haven Road in Edgartown, Massachusetts. The Project site encompasses approximately 27.5± acres of undeveloped land that is bounded by Edgartown-Vineyard Haven Road to the north; areas of open and wooded space to the south and east; residential properties to the west. Figure 1 depicts the Project site location in relation to the existing roadway network.

Access to the Project site will be provided by way of a new driveway that will intersect the south side of Edgartown-Vineyard Haven Road opposite Tower Lane. On-site parking will be provided for 120 vehicles, which is within the requirements of Section 2.2D, *Bulk, Area and Parking Requirements*, of the Zoning Bylaw of the Town of Edgartown.⁴

³The multifamily residential community is intended to be used as workforce housing, but will not be income qualified.

⁴A minimum of one (1) parking space per two (2) bedrooms is required.



Figure 1

Site Location Map

STUDY METHODOLOGY

This study was prepared in consultation with the Town of Edgartown, the MVC, and the Massachusetts Department of Transportation (MassDOT); was performed in accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines* and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports; and was conducted in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; pedestrian and bicycle facilities; on-street parking; public transportation services; observations of traffic flow; and collection of pedestrian, bicycle and vehicle counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A seven-year time horizon was selected for analyses consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any, identified in stage two of the study.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in August 2020. The field investigation consisted of an inventory of existing roadway geometrics; pedestrian and bicycle facilities; public transportation services; traffic volumes; and operating characteristics; as well as posted speed limits and land use information within the study area. The study area that was assessed for the Project was developed in consultation with the MVC and consisted of Edgartown-Vineyard Haven Road and the following specific intersections: Edgartown-Vineyard Haven Road at Tower Lane and Edgartown-Vineyard Haven Road at 19th Street North.

The following describes the study area roadway and intersections.

Roadways

Edgartown-Vineyard Haven Road

- Two-lane urban principal arterial roadway under Town jurisdiction
- Traverses study area in a general east-west direction between State Road and Beach Road
- Provides two 10 to 12-foot wide travel lanes that are separated by a double-yellow centerline north of the Project site and a single-yellow centerline to the south with 1 to 3-foot wide marked shoulders provided
- The posted speed limit is 40 miles per hour (mph) within the study area
- An 8-foot wide shared-use path is provided along the south (Project) side of the roadway
- Illumination is provided by way of street lights mounted on wood poles
- Land use within the study area consists of the Project site, residential properties, and areas of open and wooded space

Intersections

Table 1 and Figure 2 summarize existing lane use, traffic control, and pedestrian and bicycle accommodations at the study area intersections as observed in August 2020.

**Table 1
STUDY AREA INTERSECTION DESCRIPTION**

Intersection	Traffic Control Type^a	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
Edgartown-Vineyard Haven Rd./Tower Ln.	S	1 general purpose travel lane on all approaches	Yes; 2 to 3-feet on Edgartown-Vineyard Haven Rd.	Yes; shared-use path along the south side of Edgartown-Vineyard Haven Rd.	Yes; shared-use path along the south side of Edgartown-Vineyard Haven Rd.
Edgartown-Vineyard Haven Rd./19 th St. North	S	1 general purpose travel lane on all approaches	Yes; 1 to 3-feet on Edgartown-Vineyard Haven Rd.	Yes; shared-use path along the south side of Edgartown-Vineyard Haven Rd.	Yes; shared-use path along the south side of Edgartown-Vineyard Haven Rd.

^aS = STOP-sign control.

TRAFFIC VOLUMES

In order to determine existing traffic-volume demands and flow patterns within the study area, automatic traffic recorder (ATR) counts, manual turning movement counts (TMCs) and vehicle classification counts were completed in August 2020. The ATR counts were conducted on August 19th through August 20th, 2020 (Wednesday through Thursday, inclusive) on Edgartown-Vineyard Haven Road in the vicinity of the Project site in order to record weekday traffic conditions over an extended period, with weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak period manual TMCs performed at the study intersections on August 19, 2020 (Wednesday). These time periods were selected for analysis purposes as they are representative of the peak-traffic-volume hours for both the Project and the adjacent roadway network.

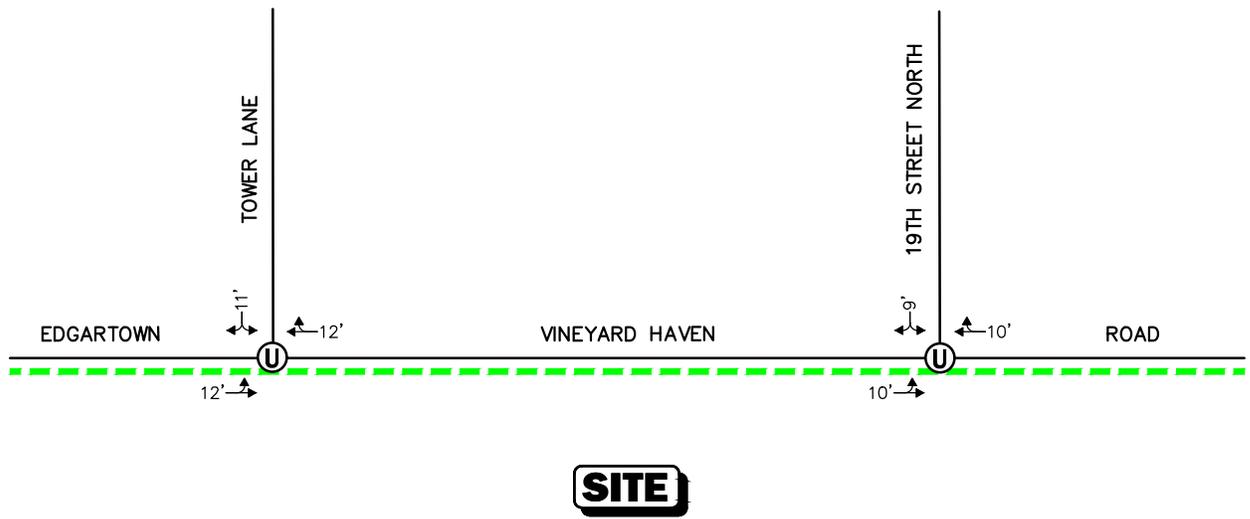
Traffic-Volume Adjustments

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, traffic volume data published by the Cape Cod Commission (CCC) was reviewed.⁵ Based on a review of this data, it was determined that traffic volumes for the month of August are approximately 24 percent above average-month conditions and are representative of peak-month conditions. As such, the August traffic volume data was adjusted downward by 24 percent to represent traffic volumes under average-month conditions, with no adjustment required to represent peak summer month (July-August) conditions.

⁵2018 Traffic Counting Report, Monthly Adjustment Factors for Cape Cod; Cape Cod Commission; 2018.

Legend:

- Ⓢ Unsignalized Intersection
- Shared Use Path
- xx' ↔ Lane Use and Travel Lane Width



Not To Scale



Figure 2
Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities

In order to account for the impact on traffic volumes and trip patterns resulting from the “safer-at-home” order and the phased “Reopening Massachusetts” plan that was issued by the Governor on May 18, 2020, in response to the COVID-19 pandemic, the August 2020 traffic volumes that were collected as a part of this assessment were adjusted upward by 8 percent based on a comparison of seasonally adjusted December 2019 and August 2020 traffic volume data obtained from MassDOT Continuous Count Station No. MVC260.

The 2020 Existing traffic volumes are summarized in Table 2 for both average and peak-month conditions, with the weekday morning and evening peak-hour traffic volumes graphically depicted on Figure 3. Note that the peak-hour traffic volumes presented in Table 2 were obtained from Figure 3.

Table 2
2020 EXISTING TRAFFIC VOLUMES

Location/Peak Hour	AWT ^a		VPH ^b		K Factor ^c	Directional Distribution ^d
	Average Month	Peak Month	Average Month	Peak Month		
<i>Edgartown-Vineyard Haven Road, south of Tower Lane:</i>	8,720	11,470	--	--	--	--
Weekday Morning (7:45-8:45 AM)	--	--	601	791	6.9	62.8% SB
Weekday Evening (4:00- 5:00 PM)	--	--	636	836	7.3	59.6% NB

^aAverage weekday traffic in vehicles per day.

^bVehicles per hour.

^cPercent of daily traffic occurring during the peak hour.

^dPercent traveling in peak direction.

NB = northbound; SB = southbound.

As can be seen in Table 2, under average-month conditions, Edgartown-Vineyard Haven Road in the vicinity of the Project site accommodates approximately 8,720 vehicles on an average weekday (two-way, 24-hour volume), with approximately 601 vehicles per hour (vph) during the weekday morning peak-hour and 636 vph during the weekday evening peak-hour.

Under peak-month conditions, Edgartown-Vineyard Haven Road in the vicinity of the Project site accommodates approximately 11,470 vehicles on an average weekday, with approximately 791 vph during the weekday morning peak-hour and 836 vph during the weekday evening peak-hour.

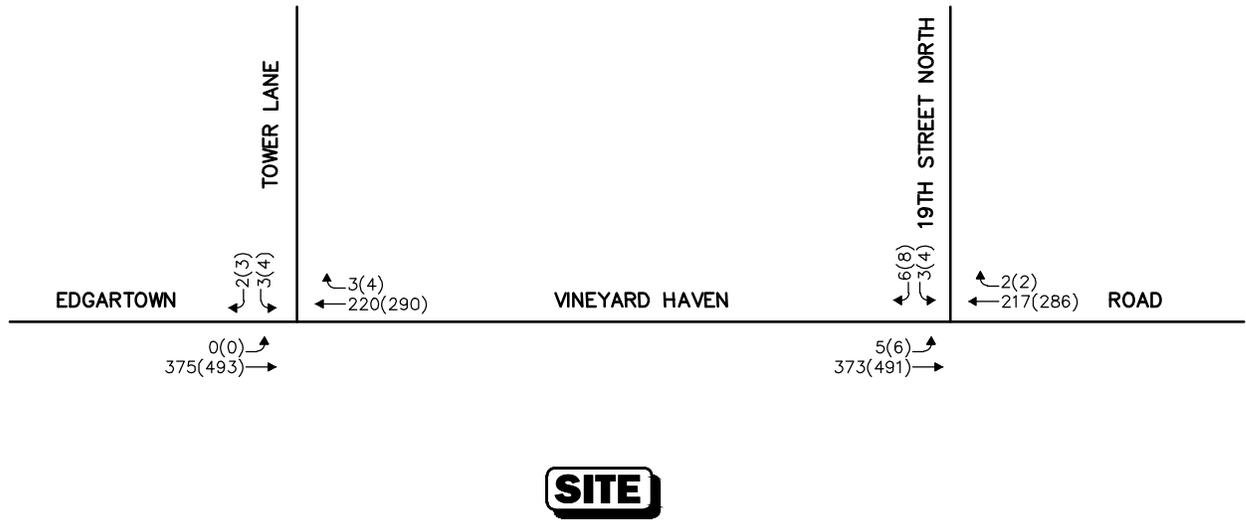
PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in August 2020. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadway and at the study area intersections. As detailed on Figure 2, a shared-use path is provided along the south (Project) side of Edgartown-Vineyard Haven Road that extends from Sanborn Way to Beach Road, and connects to other trails, sidewalks and pathways along its alignment.

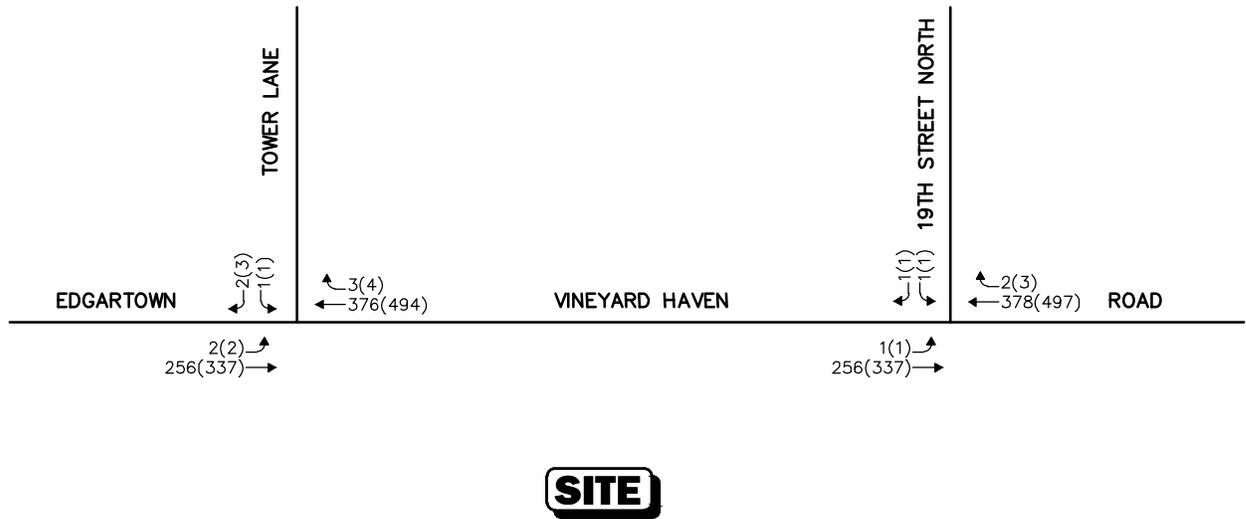
WEEKDAY MORNING PEAK HOUR (7:45 - 8:45 AM)

Legend:

- XX Average Month Condition
- (XX) Peak Month Condition



WEEKDAY EVENING PEAK HOUR (4:00 - 5:00 PM)



Not To Scale

Figure 3



2020 Existing Peak Hour Traffic Volumes

PUBLIC TRANSPORTATION

Public transportation services are provided within the study area by the Martha's Vineyard Transit Authority (VTA) and will be accessible to residents and employees of the Project. The VTA operates year-round, fixed-route bus service along Edgartown-Vineyard Haven Road by way of Route 1, which includes a stop located opposite the Project between Tower Lane and 19th Street North. Connections to other VTA bus routes can be made at the Steamship Authority Terminal (Route 3); at the Barns Road roundabout, the Skate Park, Martha's Vineyard Regional High School, Martha's Vineyard Community Services and Woodside Village (Routes 7 and 9); and at Church Street in Edgartown (Route 13).

The island is also served by the Steamship Authority, which provides year-round ferry service between the Vineyard Haven terminal and the Woods Hole terminal in Falmouth, and seasonal (mid-May to late October) service to Oak Bluffs terminal. Travel times between Woods Hole and Vineyard Haven are approximately 45-minutes.

The public transportation schedules and fare information are provided in the Appendix.

SPOT SPEED MEASUREMENTS

Vehicle travel speed measurements were performed on Edgartown-Vineyard Haven Road in the vicinity of the Project site in conjunction with the ATR counts. Table 3 summarizes the vehicle travel speed measurements.

Table 3
VEHICLE TRAVEL SPEED MEASUREMENTS

	Edgartown-Vineyard Haven Road	
	Northbound	Southbound
Mean Travel Speed (mph)	39	39
85 th Percentile Speed (mph)	43	43
Posted Speed Limit (mph)	40	40

mph = miles per hour.

As can be seen in Table 3, the mean vehicle travel speed along Edgartown-Vineyard Haven Road in the vicinity of the Project site was found to be 39 mph in both the north and southbound directions. The measured 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below, was found to be 43 mph in both the north and southbound directions, which is 3 mph above the posted speed limit in the vicinity of the Project site (40 mph). The 85th percentile speed is used as the basis of engineering design and in the evaluation of sight distances, and is often used in establishing posted speed limits.

MOTOR VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2013 through 2017, inclusive) in order to examine motor vehicle crash trends occurring within the study area. Based on this review, no (0) motor vehicle crashes were reported to have occurred at or in the immediate vicinity of the Project site over the five-year review period.

A review of the MassDOT statewide High Crash Location List indicated that there are no locations within the study area that are included on MassDOT's Highway Safety Improvement Program (HSIP) listing as high crash locations. ***Based on a review of the MassDOT motor vehicle crash data, no discernible safety deficiencies were apparent in the vicinity of the Project site.***

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2027, which reflects a seven-year planning horizon consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. Independent of the Project, traffic volumes on the roadway network in the year 2027 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2027 No-Build traffic volumes reflect 2027 Build traffic volume conditions with the Project.

FUTURE TRAFFIC GROWTH

Future traffic growth is a function of the expected land development in the immediate area and the surrounding region. Several methods can be used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This procedure produces a more realistic estimate of growth for local traffic; however, potential population growth and development external to the study area would not be accounted for in the resulting traffic projections.

To provide a conservative analysis framework, both procedures were used, the salient components of which are described below.

Specific Development by Others

The Town of Edgartown and the MVC were contacted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes at the study intersections. Based on this consultation, the following projects were identified for inclusion in this assessment:

- ***Proposed Stop & Shop Redevelopment, Upper Main Street, Edgartown, Massachusetts.***
This project consists of the expansion of an existing 25,289± square foot (sf) supermarket and 607± sf bank with three (3) drive-through lanes located at 225 Upper Main Street in

Edgartown to provide a 42,721± sf supermarket and 1,010± sf bank with two (2) drive-through lanes.

- ***Proposed Residential Development, Meeting House Way, Edgartown, Massachusetts.*** This project consists of the construction of 35 single family homes to be located at 139 Meeting House Way in Edgartown. Traffic volumes associated with this project within the study area are expected to be relatively minor and would be reflected in the general background traffic growth rate (discussion follows).

Traffic volumes associated with the aforementioned specific development projects by others were obtained from their respective traffic studies. No other developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general background traffic growth rate.

General Background Traffic Growth

Traffic-volume data compiled as a part of the July 2015 Martha's Vineyard Transportation Plan (MVTP) 2016-2040⁶ was reviewed in order to determine general background traffic growth trends. The MVTP noted that historically, traffic on the island grew at a 1.7 percent annual rate between 1981 and 1996. During the 1990's, peak-month traffic volumes were identified to have stabilized, with off-season traffic continuing to increase. The report attributes this to two factors: i) a general increase in year-round residents; and ii) capping ferry activity to a rate agreed upon by the island's residents. The most recent traffic-volume data analyzed in the MVTP noted that some of the island's roadways have experienced a general reduction in average daily traffic.

Based on a review of the data presented in the MVTP and consistent with prior traffic studies conducted in Vineyard Haven,^{7,8} a 1.7 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

Roadway Improvement Projects

The Town of Edgartown and MassDOT were contacted in order to determine if there were any planned future roadway improvement projects expected to be complete by 2027 within the study area. Based on these discussions, no roadway improvement projects aside from routine maintenance activities were identified to be planned within the study area at this time.

No-Build Traffic Volumes

The 2027 No-Build condition peak-hour traffic-volumes were developed by applying the 1.7 percent per year compounded annual background traffic growth rate to the 2020 Existing peak-hour traffic volumes and then superimposing the peak-hour traffic volumes associated with the identified specific development project by others. The resulting 2027 No-Build weekday

⁶*Martha's Vineyard Transportation Plan (MVTP) 2016-2040*, Martha's Vineyard Commission and the Martha's Vineyard Joint Transportation Committee; July 2015.

⁷*Traffic Impact and Access Study*, Proposed Stop & Shop Redevelopment, Tisbury, Massachusetts; VHB; February 2013 and February 2017.

⁸*Transportation Impact Assessment*, Proposed Mixed-Use Development, Vineyard Haven, Massachusetts; VAI; June 2020.

morning and evening peak-hour traffic volumes are shown on Figure 4 for both the average and peak-month conditions.

PROJECT-GENERATED TRAFFIC

Design year (2027 Build) traffic volumes for the study area roadways were determined by estimating Project-generated traffic volumes and assigning those volumes on the study roadways. The following sections describe the methodology used to develop the anticipated traffic characteristics of the Project.

As proposed, the Project will entail the construction of a 70-bed skilled nursing facility with an associated 24-unit multifamily residential community. In order to develop the traffic characteristics of the Project, trip-generation statistics published by the ITE⁹ for similar land uses as those proposed were used. ITE Land Use Codes (LUCs) 220, *Multifamily Housing (Low-Rise)*, and 620, *Nursing Home*, were used to develop the traffic characteristics of the Project, the results of which are summarized in Table 4.

Table 4
TRIP GENERATION SUMMARY

Time Period/Direction	Vehicle Trips		
	(A) Skilled Nursing Facility (70 Beds) ^a	(B) Multifamily Residential Community (24 Units) ^b	(C=A+B) Total New Trips
<i>Average Weekday Daily:</i>			
Entering	107	71	178
<u>Exiting</u>	<u>107</u>	<u>71</u>	<u>178</u>
Total	214	142	356
<i>Weekday Morning Peak Hour of Generator:</i>			
Entering	9	4	13
<u>Exiting</u>	<u>6</u>	<u>11</u>	<u>17</u>
Total	15	15	30
<i>Weekday Evening Peak Hour of Generator:</i>			
Entering	11	10	21
<u>Exiting</u>	<u>15</u>	<u>7</u>	<u>22</u>
Total	26	17	43

^aBased on ITE LUC 620, *Nursing Home*.

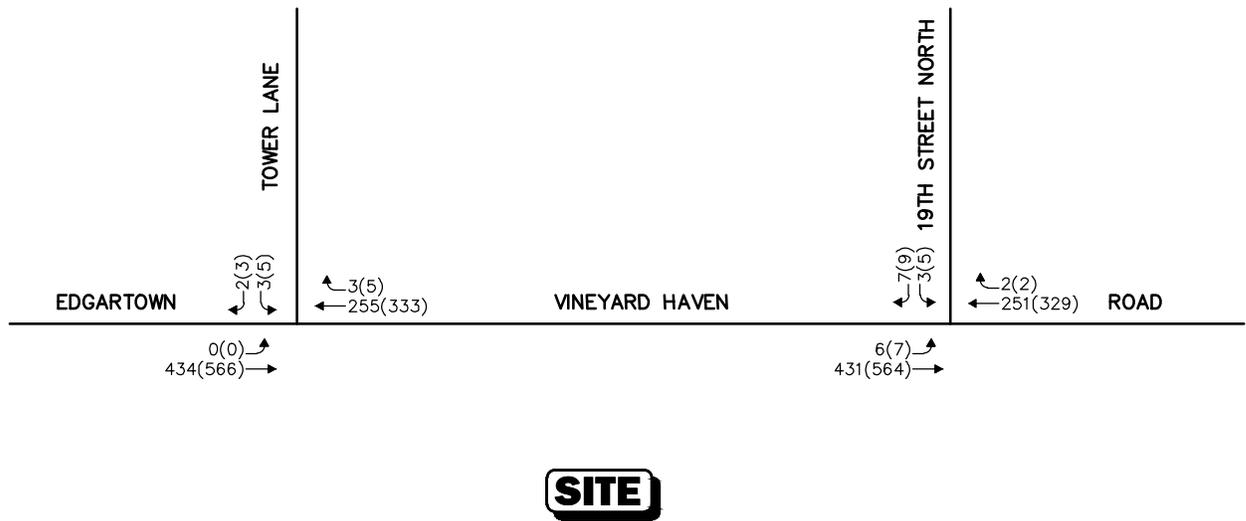
^bBased on ITE LUC 220, *Multifamily Housing (Low-Rise)*.

⁹Ibid 1.

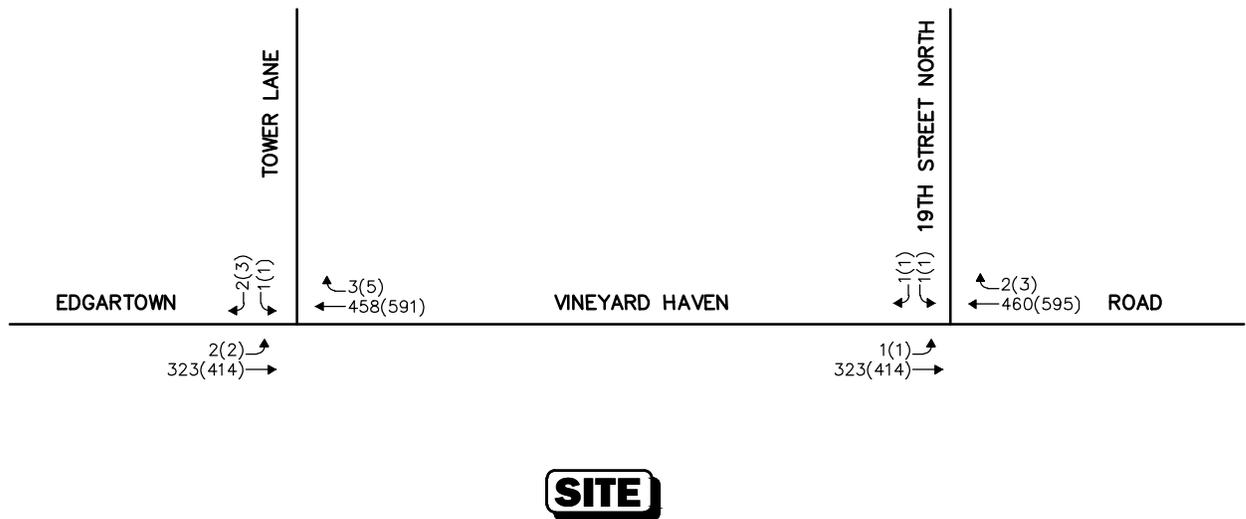
WEEKDAY MORNING PEAK HOUR (7:45 - 8:45 AM)

Legend:

- XX Average Month Condition
- (XX) Peak Month Condition



WEEKDAY EVENING PEAK HOUR (4:00 - 5:00 PM)



 Not To Scale

Figure 4



2027 No-Build
Peak Hour Traffic Volumes

Project-Generated Traffic Volume Summary

As can be seen in Table 4, the Project is expected to generate approximately 356 vehicle trips on an average weekday (two-way, 24-hour volume, or 178 vehicles entering and 178 exiting), with 30 vehicle trips (13 vehicles entering and 17 exiting) expected during the weekday morning peak-hour and 43 vehicle trips (21 vehicles entering and 22 exiting) expected during the weekday evening peak-hour.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of generated trips to and from the Project site was determined based on a review of existing traffic patterns within the study area during the peak periods. The general trip distribution for the Project is shown on Figure 5. The additional traffic expected to be generated by the Project was assigned on the study area roadway network as shown on Figure 6.

FUTURE TRAFFIC VOLUMES - BUILD CONDITION

The 2027 Build condition traffic volumes consist of the 2027 No-Build traffic volumes with the additional traffic expected to be generated by the Project added to them. The 2027 Build weekday morning and evening peak-hour traffic-volumes are graphically depicted on Figure 7 for both average and peak-month conditions.

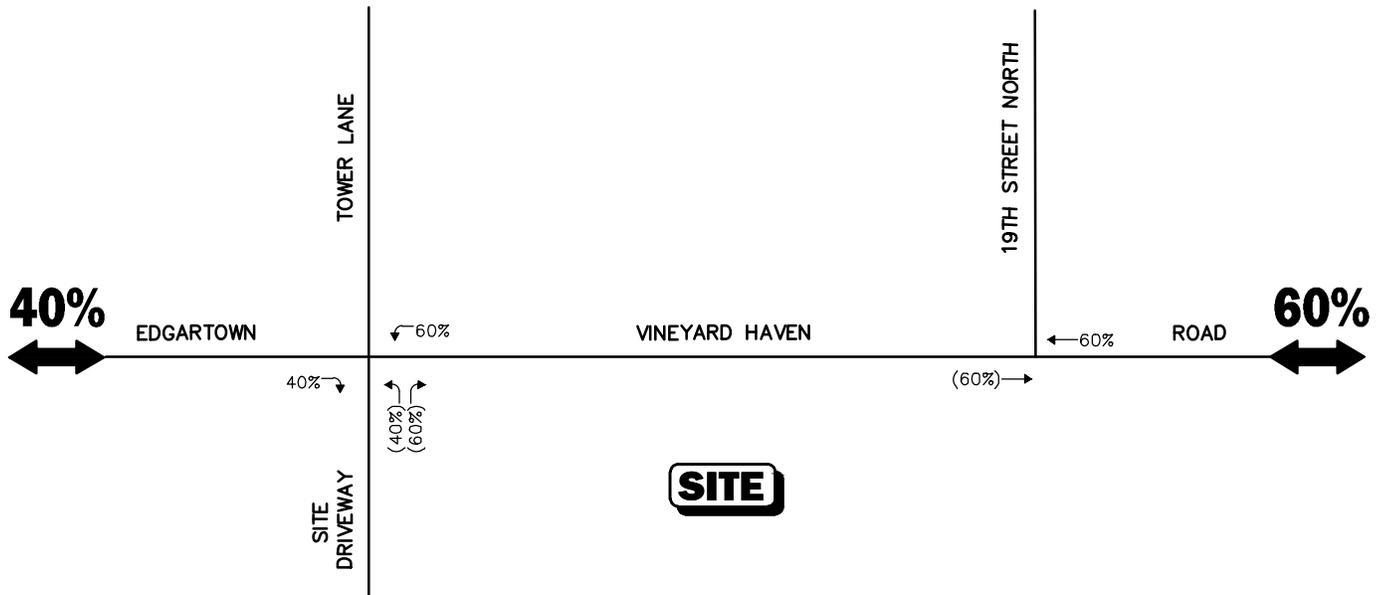
A summary of peak-hour projected traffic-volume changes outside of the study area that is the subject of this assessment is shown in Table 5. These changes are a result of the construction of the Project.

Table 5
PEAK-HOUR TRAFFIC-VOLUME INCREASES

Location/Peak Hour	2020 Existing Average/Peak Month	2027 No-Build Average/Peak Month	2027 Build Average/Peak Month	Traffic Volume Increase Over No-Build	Percent Increase Over No-Build Average/Peak Month
<i>Edgartown-Vineyard Haven Road, east of 19th Street North:</i>					
Weekday Morning	595/783	687/900	705/918	18	2.6/2.0
Weekday Evening	637/838	786/1,013	812/1,039	26	3.3/2.6
<i>Edgartown-Vineyard Haven Road, west of Tower Lane:</i>					
Weekday Morning	597/786	691/902	703/914	12	1.7/1.3
Weekday Evening	636/836	785/1,010	802/1,027	17	2.2/1.7

As shown in Table 5, Project-related traffic-volume increases outside of the study area relative to 2027 No-Build conditions are anticipated to range from 1.3 to 3.3 percent during the peak periods, with vehicle increases shown to range from 12 to 26 vehicles. *When distributed over the peak-hour, the predicted traffic volume increases would not result in a significant impact (increase) on motorist delays or vehicle queuing outside of the immediate study area that is the subject of this assessment.*

Legend:
XX Entering Trips
(XX) Exiting Trips



 Not To Scale

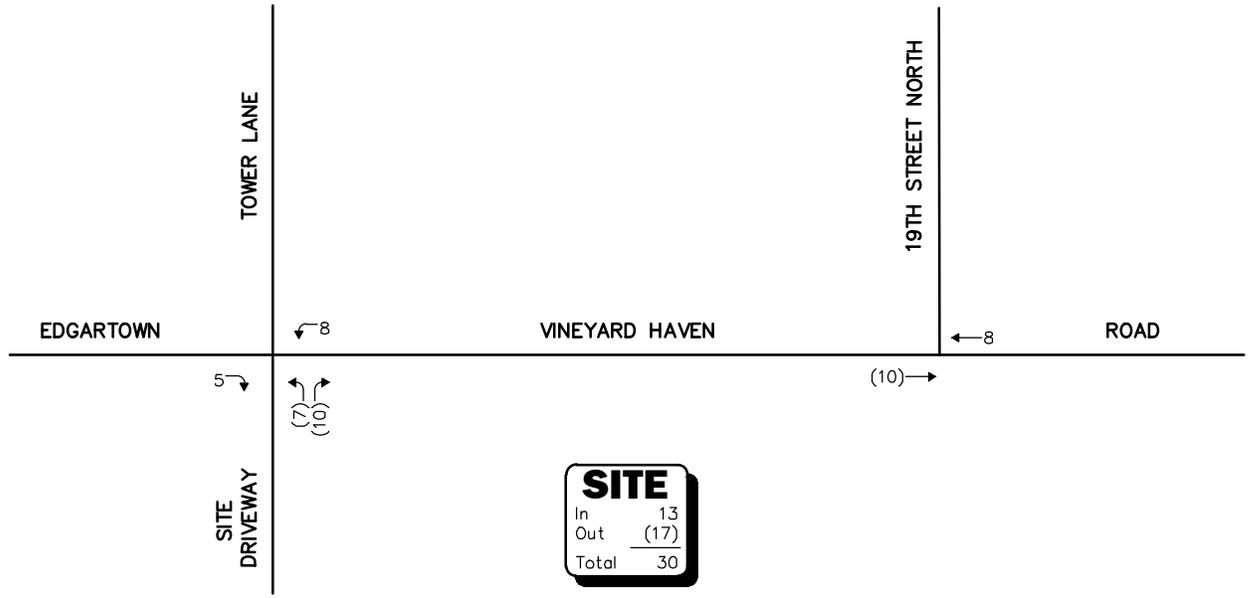
Figure 5

Trip Distribution Map

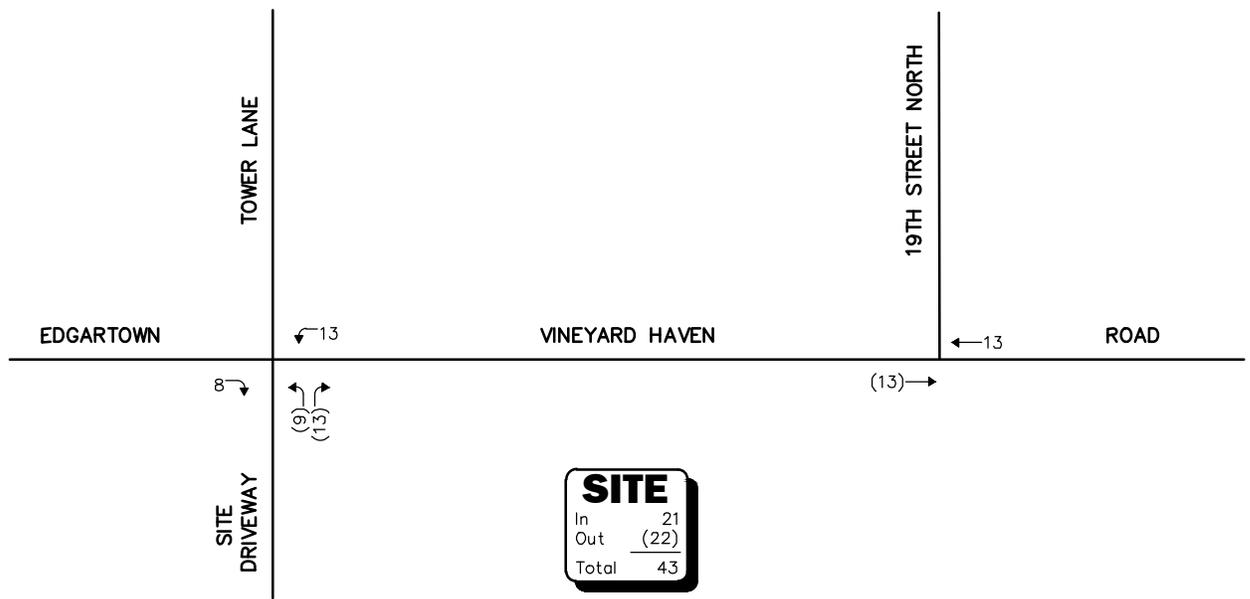


WEEKDAY MORNING PEAK HOUR (7:45 - 8:45 AM)

Legend:
 XX Entering Trips
 (XX) Exiting Trips



WEEKDAY EVENING PEAK HOUR (4:00 - 5:00 PM)



Not To Scale **Figure 6**



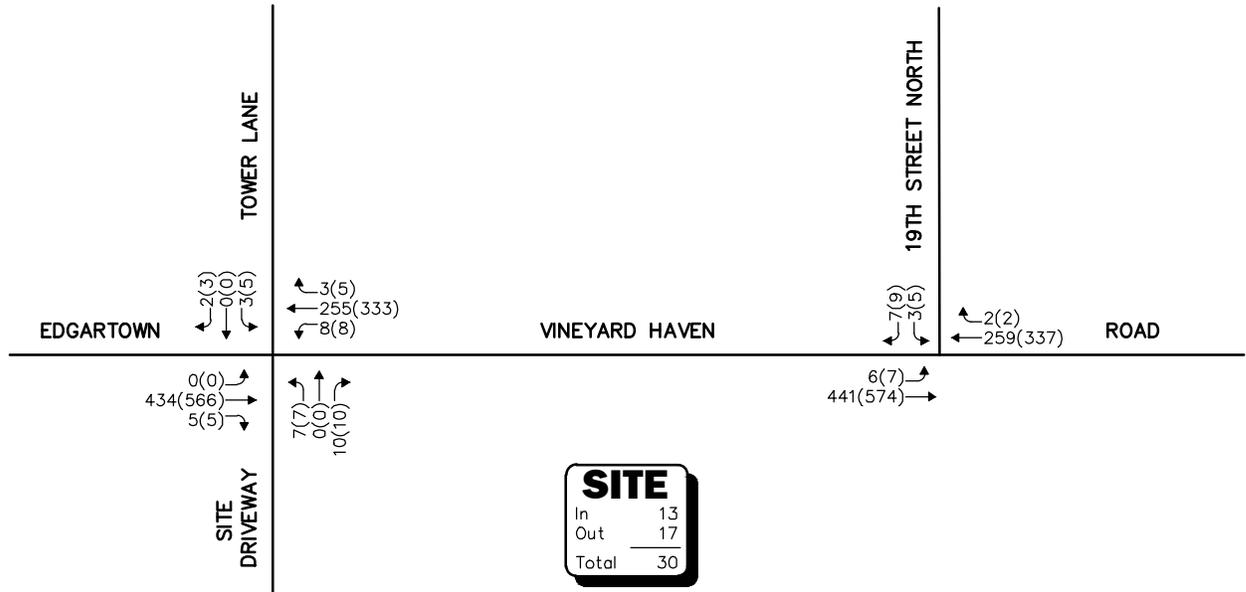
Project Generated Peak Hour Traffic Volumes

R:\8596\8596NT1.dwg, 9/30/2020 1:25:37 PM

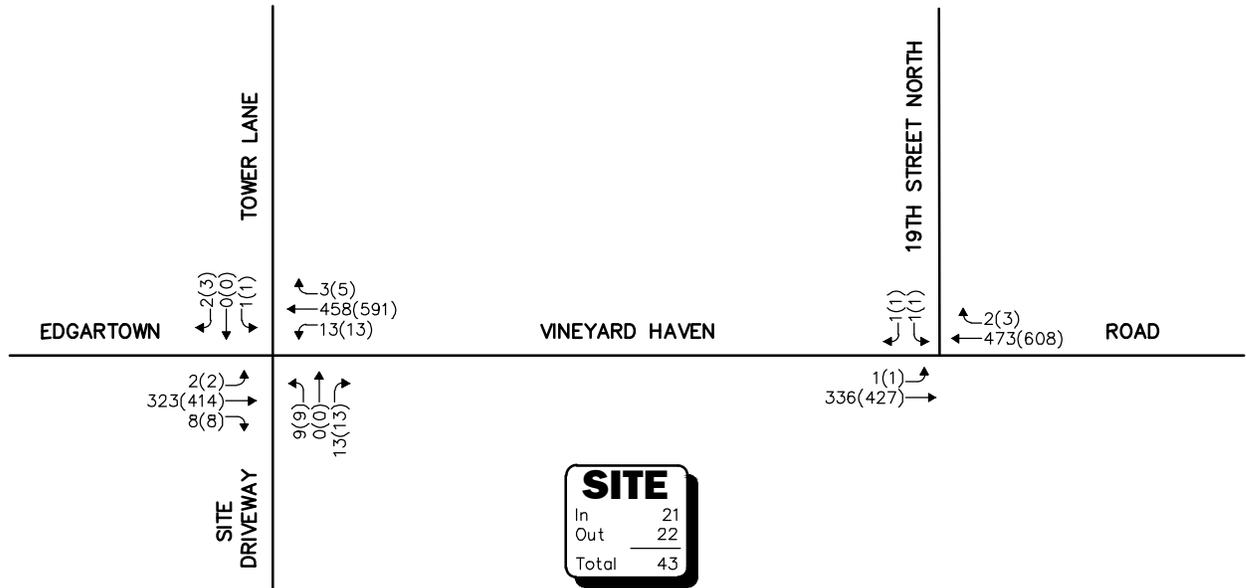
WEEKDAY MORNING PEAK HOUR (7:45 - 8:45 AM)

Legend:

- XX Average Month Condition
- (XX) Peak Month Condition



WEEKDAY EVENING PEAK HOUR (4:00 - 5:00 PM)



Not To Scale

Figure 7



2027 Build
Peak Hour Traffic Volumes

TRAFFIC OPERATIONS ANALYSIS

Measuring existing and future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity and vehicle queue analyses were conducted under Existing, No-Build and Build traffic volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study.

METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.¹⁰ The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with level-of-service (LOS) A representing the best operating conditions and LOS F representing congested or constrained operating conditions.

Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

¹⁰The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

Unsignalized Intersections

The six levels of service for unsignalized intersections may be described as follows:

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The levels of service of unsignalized intersections are determined by application of a procedure described in the 2010 *Highway Capacity Manual*.¹¹ Level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the 2010 *Highway Capacity Manual*. Table 6 summarizes the relationship between level of service and average control delay for two-way stop controlled and all-way stop controlled intersections.

Table 6
LEVEL-OF-SERVICE CRITERIA FOR
UNSIGNALIZED INTERSECTIONS^a

Level-Of-Service by Volume-to-Capacity Ratio		Average Control Delay (Seconds Per Vehicle)
$v/c \leq 1.0$	$v/c > 1.0$	
A	F	≤ 10.0
B	F	10.1 to 15.0
C	F	15.1 to 25.0
D	F	25.1 to 35.0
E	F	35.1 to 50.0
F	F	> 50.0

^aSource: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010; page 19-2.

¹¹*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

Vehicle Queue Analysis

Vehicle queue analyses are a direct measurement of an intersection's ability to process vehicles under various traffic control and volume scenarios and lane use arrangements. The vehicle queue analysis was performed using the Synchro® intersection capacity analysis software which is based upon the methodology and procedures presented in the 2010 *Highway Capacity Manual*. The Synchro® vehicle queue analysis methodology is a simulation based model which reports the number of vehicles that experience a delay of six seconds or more at an intersection. For signalized intersections, Synchro® reports both the average (50th percentile) the 95th percentile vehicle queue. For unsignalized intersections, Synchro® reports the 95th percentile vehicle queue. Vehicle queue lengths are a function of the capacity of the movement under study and the volume of traffic being processed by the intersection during the analysis period. The 95th percentile vehicle queue is the vehicle queue length that will be exceeded only 5 percent of the time, or approximately three minutes out of sixty minutes during the peak one hour of the day (during the remaining fifty-seven minutes, the vehicle queue length will be less than the 95th percentile queue length).

ANALYSIS RESULTS

Level-of-service and vehicle queue analyses were conducted for 2020 Existing, 2027 No-Build and 2027 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized in Tables 7 and 8 for the average and peak-month conditions, respectively, with the detailed analysis results presented in the Appendix.

The following is a summary of the level-of-service and vehicle queue analyses for the intersections within the study area. For context, we note that an LOS of "D" or better is generally defined as "acceptable" operating conditions.

Edgartown-Vineyard Haven Road at Tower Lane – Under average-month conditions, the addition of Project-related traffic was shown to result in an increase in average motorist delay of 1.8 seconds on the Tower Lane approach during the weekday morning peak-hour that caused a degradation in LOS from LOS B to LOS C with no predicted increase in vehicle queuing. All movements along Edgartown-Vineyard Haven Road were shown to operate at LOS A during the weekday morning and evening peak hours with negligible vehicle queuing predicted.

Under peak-month conditions, no-change in LOS or vehicle queuing is predicted to occur for any movement over No-Build conditions, with all movements predicted to operate at LOS C or better and Project-related impacts defined as an increase in average motorist delay of up to 3.5 seconds. All movements along Edgartown-Vineyard Haven Road were shown to operate at LOS A during the weekday morning and evening peak hours with negligible vehicle queuing predicted.

Under average month conditions, all movements exiting the Project site were shown to operate at LOS B with negligible vehicle queuing predicted. Under peak month conditions, all movements exiting the Project site were shown to operate at LOS C with vehicle queues of up to one (1) vehicle predicted.

Edgartown-Vineyard Haven Road at 19th Street North – Under both average and peak-month conditions, no-change in LOS or vehicle queuing is predicted to occur for any movement over No-Build conditions, with all movements predicted to operate at LOS C or better and Project-related impacts defined as an increase in average motorist delay of less than 1.0 seconds.

Table 7
AVERAGE MONTH UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Unsignalized Intersection/ Peak Hour/Movement	2020 Existing				2027 No-Build				2027 Build			
	Demand ^a	Delay ^b	LOS ^c	Queue ^d 95 th	Demand	Delay	LOS	Queue 95 th	Demand	Delay	LOS	Queue 95 th
Edgartown-Vineyard Haven Road at Tower Lane												
<i>Weekday Morning:</i>												
Edgartown-Vineyard Haven Road EB LT/TH	375	0.0	A	0	434	0.0	A	0	--	--	--	--
Edgartown-Vineyard Haven Road EB LT/TH/RT	--	--	--	--	--	--	--	--	439	0.0	A	0
Edgartown-Vineyard Haven Road WB TH/RT	223	0.0	A	0	258	0.0	A	0	--	--	--	--
Edgartown-Vineyard Haven Road WB LT/TH/RT	--	--	--	--	--	--	--	--	266	0.3	A	0
Project Site Roadway NB LT/TH/RT	--	--	--	--	--	--	--	--	17	14.8	B	0
Tower Lane SB LT/RT	5	12.4	B	0	5	13.4	B	0	--	--	--	--
Tower Lane SB LT/TH/RT	--	--	--	--	--	--	--	--	5	15.2	C	0
<i>Weekday Evening:</i>												
Edgartown-Vineyard Haven Road EB LT/TH	258	0.1	A	0	325	0.1	A	0	--	--	--	--
Edgartown-Vineyard Haven Road EB LT/TH/RT	--	--	--	--	--	--	--	--	333	0.1	A	0
Edgartown-Vineyard Haven Road WB TH/RT	379	0.0	A	0	461	0.0	A	0	--	--	--	--
Edgartown-Vineyard Haven Road WB LT/TH/RT	--	--	--	--	--	--	--	--	474	0.2	A	0
Project Site Roadway NB LT/TH/RT	--	--	--	--	--	--	--	--	22	14.8	B	0
Tower Lane SB LT/RT	3	11.9	B	0	3	13.2	B	0	--	--	--	--
Tower Lane SB LT/TH/RT	--	--	--	--	--	--	--	--	3	14.4	B	0
Edgartown-Vineyard Haven Road at 19th Street North												
<i>Weekday Morning:</i>												
Edgartown-Vineyard Haven Road EB LT/TH	378	0.1	A	0	437	0.1	A	0	447	0.1	A	0
Edgartown-Vineyard Haven Road WB TH/RT	219	0.0	A	0	253	0.0	A	0	261	0.0	A	0
19 th Street North SB LT/RT	9	11.2	B	0	10	11.8	B	0	10	11.9	B	0
<i>Weekday Evening:</i>												
Edgartown-Vineyard Haven Road EB LT/TH	257	0.0	A	0	324	0.0	A	0	337	0.0	A	0
Edgartown-Vineyard Haven Road WB TH/RT	380	0.0	A	0	462	0.0	A	0	475	0.0	A	0
19 th Street North SB LT/RT	2	12.5	B	0	2	14.2	B	0	2	14.4	B	0

^aDemand in vehicles per hour.

^bAverage control delay per vehicle (in seconds).

^cLevel-of-Service.

^dQueue length in vehicles.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Table 8
PEAK MONTH UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Unsignalized Intersection/ Peak Hour/Movement	2020 Existing				2027 No-Build				2027 Build			
	Demand ^a	Delay ^b	LOS ^c	Queue ^d 95 th	Demand	Delay	LOS	Queue 95 th	Demand	Delay	LOS	Queue 95 th
Edgartown-Vineyard Haven Road at Tower Lane												
<i>Weekday Morning:</i>												
Edgartown-Vineyard Haven Road EB LT/TH	493	0.0	A	0	566	0.0	A	0	--	--	--	--
Edgartown-Vineyard Haven Road EB LT/TH/RT	--	--	--	--	--	--	--	--	571	0.0	A	0
Edgartown-Vineyard Haven Road WB TH/RT	294	0.0	A	0	338	0.0	A	0	--	--	--	--
Edgartown-Vineyard Haven Road WB LT/TH/RT	--	--	--	--	--	--	--	--	346	0.2	A	0
Project Site Roadway NB LT/TH/RT	--	--	--	--	--	--	--	--	17	19.0	C	0
Tower Lane SB LT/RT	7	14.5	B	0	8	17.0	C	0	--	--	--	--
Tower Lane SB LT/TH/RT	--	--	--	--	--	--	--	--	8	20.5	C	0
<i>Weekday Evening:</i>												
Edgartown-Vineyard Haven Road EB LT/TH	339	0.1	A	0	416	0.0	A	0	--	--	--	--
Edgartown-Vineyard Haven Road EB LT/TH/RT	--	--	--	--	--	--	--	--	424	0.0	A	0
Edgartown-Vineyard Haven Road WB TH/RT	498	0.0	A	0	596	0.0	A	0	--	--	--	--
Edgartown-Vineyard Haven Road WB LT/TH/RT	--	--	--	--	--	--	--	--	609	0.2	A	0
Project Site Roadway NB LT/TH/RT	--	--	--	--	--	--	--	--	22	18.8	C	1
Tower Lane SB LT/RT	4	13.4	B	0	4	15.2	C	0	--	--	--	--
Tower Lane SB LT/TH/RT	--	--	--	--	--	--	--	--	4	16.8	C	0
Edgartown-Vineyard Haven Road at 19th Street North												
<i>Weekday Morning:</i>												
Edgartown-Vineyard Haven Road EB LT/TH	497	0.1	A	0	571	0.1	A	0	581	0.1	A	0
Edgartown-Vineyard Haven Road WB TH/RT	288	0.0	A	0	331	0.0	A	0	339	0.0	A	0
19 th Street North SB LT/RT	12	12.9	B	0	14	14.5	B	0	14	14.7	B	0
<i>Weekday Evening:</i>												
Edgartown-Vineyard Haven Road EB LT/TH	338	0.0	A	0	415	0.0	A	0	428	0.0	A	0
Edgartown-Vineyard Haven Road WB TH/RT	500	0.0	A	0	598	0.0	A	0	611	0.0	A	0
19 th Street North SB LT/RT	2	14.8	B	0	2	17.4	C	0	2	17.9	C	0

^aDemand in vehicles per hour.

^bAverage control delay per vehicle (in seconds).

^cLevel-of-Service.

^dQueue length in vehicles.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at the Project site driveway intersection with Edgartown-Vineyard Haven Road in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)¹² requirements. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is 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. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. In accordance with AASHTO standards, if the measured ISD is at least equal to the required SSD value for the appropriate design speed, the intersection can operate in a safe manner. Table 9 presents the measured SSD and ISD at the subject intersection.

¹²*A Policy on Geometric Design of Highway and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.

Table 9
SIGHT DISTANCE MEASUREMENTS^a

Intersection/Sight Distance Measurement	Feet		
	Required Minimum (SSD)	Desirable (ISD) ^b	Measured
<i>Edgartown-Vineyard Haven Road at the Project Roadway</i>			
<i>Stopping Sight Distance:</i>			
Edgartown-Vineyard Haven Road approaching from the north	360	--	500+
Edgartown-Vineyard Haven Road approaching from the south	360	--	500+
<i>Intersection Sight Distance:</i>			
Looking to the north from the Project Roadway	360	430	500+
Looking to the south from the Project Roadway	360	500	500+

^aRecommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018; and based on the following approach speeds: 45 mph along Edgartown-Vineyard Haven Road.

^bValues shown are the intersection sight distance for a vehicle turning right or left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed.

As can be seen in Table 9, the available lines of sight exceed the recommended minimum sight distances to function in a safe (SSD) and efficient (ISD) manner based on a 45 mph approach speed along Edgartown-Vineyard Haven Road, which is slightly above both the measured 85th percentile travel speed (43 mph) and the posted speed limit in this area (40 mph).

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

VAI has conducted a TIA in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a skilled nursing facility and associated workforce housing to be located at 490 Edgartown-Vineyard Haven Road in Edgartown, Massachusetts. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the ITE,¹³ the Project is expected to generate approximately 356 vehicle trips on an average weekday (two-way, 24-hour volume), with 30 vehicle trips expected during the weekday morning peak-hour and 43 vehicle trips expected during the weekday evening peak-hour;
2. The Project will not have a significant impact (increase) on motorist delays or vehicle queuing over Existing or anticipated future conditions without the Project (No-Build conditions), with all movements at the study intersections shown to continue to operate at LOS C or better under all analysis conditions. For context, we note that an LOS of “D” or better is defined as “acceptable” operating conditions;
3. No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study area intersections; and
4. Lines of sight at the Project site roadway intersection with Edgartown-Vineyard Haven Road were found to exceed the recommended minimum distance for safe and efficient operation based on the appropriate approach speed.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with implementation of the recommendations that follow.

¹³Ibid 1.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The following improvements have been recommended as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

Project Access

Access to the Project site will be provided by way of a new driveway that will intersect the south side of Edgartown-Vineyard Haven Road opposite Tower Lane. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation, many of which are reflected on the Site Plans:

- The Project site driveway and circulating drives within the Project site should be a minimum of 22-feet in width and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle.
- Where perpendicular parking is proposed, the drive aisle behind the parking should be a minimum of 23-feet in order to facilitate parking maneuvers.
- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided. The STOP-sign and STOP-line should be installed in advance of the shared-use path that crosses the Project site driveway.
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices (MUTCD)*.¹⁴
- A sidewalk should be provided along at least one side of the Project site driveway and along the circulating drive within the Project site that should extend to the shared-use path along the south (Project) side Edgartown-Vineyard Haven Road.
- Americans with Disabilities Act (ADA) compliant wheelchair ramps should be provided at all pedestrian crossings internal to the Project site.
- Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas should be designed and maintained so as not to restrict lines of sight.
- Snow windrows within sight triangle areas should be promptly removed where such accumulations would impede sight lines.

Transportation Demand Management

Public transportation services are provided within the study area by the Martha's Vineyard Transit Authority (VTA) and will be accessible to residents and employees of the Project. The VTA operates year-round, fixed-route bus service along Edgartown-Vineyard Haven Road by way of Route 1, which includes a stop located opposite the Project between Tower Lane and 19th Street North. Connections to other VTA bus routes can be made at the Steamship Authority Terminal (Route 3); at the Barns Road roundabout, the Skate Park, Martha's Vineyard Regional High School,

¹⁴Ibid 2.

Martha's Vineyard Community Services and Woodside Village (Routes 7 and 9); and at Church Street in Edgartown (Route 13).

In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following Transportation Demand Management (TDM) measures will be implemented as a part of the Project:

- Information regarding public transportation services, maps, schedules and fare information will be posted in a central location and/or otherwise made available to employees and residents;
- A "welcome packet" will be provided to new residents and employees detailing available public transportation services, bicycle and walking alternatives, and commuter options;
- Pedestrian accommodations will be incorporated into the Project site; and
- Secure bicycle parking should be provided in an appropriate location.

In addition, consideration should be given to providing a crosswalk across Edgartown-Vineyard Haven Road between the Project site driveway and Tower Lane with an accompanying pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) and pedestrian crossing warning signs to link the Project to the bus stop along the north side of Edgartown-Vineyard Haven Road between Tower Lane and 19th Street North.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

APPENDIX

PROJECT SITE PLAN

AUTOMATIC TRAFFIC RECORDER COUNT DATA

MANUAL TURNING MOVEMENT COUNT DATA

SEASONAL ADJUSTMENT DATA

COVID-19 ADJUSTMENT DATA

PUBLIC TRANSPORTATION SCHEDULES

VEHICLE TRAVEL SPEED DATA

GENERAL BACKGROUND TRAFFIC GROWTH

BACKGROUND DEVELOPMENT TRAFFIC-VOLUME NETWORKS

TRIP-GENERATION CALCULATIONS

CAPACITY ANALYSIS WORKSHEETS