Transportation Impact Assessment

Proposed Residential Development

Milton, MA

Prepared for:

Northland Residential Corporation
Burlington, Massachusetts

Vanasse & Associates, Inc.
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TRANSPORTATION IMPACT ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT
MILTON, MASSACHUSETTS

Prepared for:

Northland Residential Corportation
Burlington, Massachusetts

May 2015

Prepared by:

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EXECUTIVE SUMMARY

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential traffic impacts associated with the residential development located off Brush Hill Road, in Milton, Massachusetts. This assessment identifies and analyzes existing and future traffic conditions both with and without the project and reviews access requirements and safety considerations.

As documented in this report, the proposed development is not projected to result in a notable increase to area traffic volumes, with minimal projected impacts to traffic operations along roadways and intersections serving the project site.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions on the study area roadways was conducted in April 2015. The field investigation consisted of an inventory of existing roadway geometrics, traffic volumes, and operating characteristics, as well as posted speed limits and land use information within the study area. The study area was selected to contain the major roadway providing access to the project site, Brush Hill Road, along with the nearest intersections of Brush Hill Road at Dana Avenue and Brush Hill Road at Cushing Road.

Existing Traffic Volumes

In order to establish baseline traffic-volume demands and flow patterns within the study area, manual turning movement counts (TMCs) and vehicle classification counts were completed at the study area intersections in April 2015 during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods. Based on a review of Massachusetts Department of Transportation (MassDOT) traffic count data, April traffic volumes are above average conditions, and therefore were not adjusted in accordance with state traffic study guidelines.

A review of the peak-period traffic counts indicates that the weekday morning peak hour generally occurs between 7:45 and 8:45 AM, with the weekday evening peak hour generally occurring between 4:30 and 5:30 PM. In all instances individual peak hour traffic volumes for each intersection were utilized for analysis purposes.

Motor Vehicle Crash Data

Motor vehicle crash data for the study area intersections were provided by the Massachusetts Department of Transportation Safety Management/Traffic Operations Unit for the most recent five-year period available (2007 through 2011) in order to examine crash trends occurring within the study area. Based on a review of this data, the study area intersections had a total of 3 motor vehicle collisions. The average accident rate for this intersection falls beneath MassDOT's average motor vehicle crash rate for unsignalized intersections within this District.

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2022, which reflects a seven-year planning horizon consistent with State traffic study guidelines. Independent of the project, traffic volumes on the roadway network in the year 2022 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated project-generated traffic volumes superimposed upon the 2022 No-Build traffic network reflect the 2022 Build conditions with the project.

Specific Development by Others

The Town of Milton Planning Department was contacted to determine whether there are any planned or approved development projects that are expected to influence future traffic volumes within the study area. Based on consultation with the Department, no specific area development projects were identified.

General Background Traffic Growth

In order to account for background traffic growth, independent of site related traffic, a 1.0 percent per year compounded annual background traffic growth rate was applied to existing traffic volumes over the seven-year planning horizon.

Roadway Improvement Projects

The Town of Milton Planning Department was contacted to determine whether there are any planned or approved roadway improvement projects that are expected to influence future traffic volumes within the study area. Based on consultation with the Department, no specific roadway improvement projects were identified.

No-Build Traffic Volumes

The 2022 No-Build peak-hour traffic-volumes were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2015 Existing peak-hour traffic volumes.

Project-Generated Traffic

In order to develop the traffic characteristics of the proposed project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)[1] for similar land uses as those proposed were used. ITE Land Use Code (LUC) 230, Residential Condominium/Townhouse,

[1]ITE - *Trip Generation Manual,* Ninth Edition; Institute of Transportation Engineers; Washington, DC; 2012.

with the independent variable of number of units equal to 36 was used to develop the anticipated traffic characteristics of the project.

The proposed condominiums are expected to generate approximately 264 vehicle trips on an average weekday (132 entering and 132 exiting), with approximately 23 vehicle trips (4 entering and 19 exiting) during the weekday morning peak hour and 26 vehicle trips (17 entering and 9 exiting) during the weekday evening peak hour.

Trip Distribution and Assignment

The directional distribution of generated trips to and from the proposed development was determined based on existing travel patterns at the study area intersections during the commuter peak periods.

In summary 55 percent of project-related traffic was assigned to/from Brush Hill Road, north of the project site; and 45 percent to/from Brush Hill Road, south of the project site.

Build Condition Traffic-Volume Networks

The 2022 Build condition traffic-volume networks were developed by adding project-generated traffic to the 2022 No-Build peak-hour traffic volumes.

TRAFFIC OPERATIONS ANALYSIS

In order to assess the impacts of the proposed project on the roadway network, traffic operations and vehicle queue analyses were performed at the study intersections under 2015 Existing, 2022 No-Build, and 2022 Build conditions. These analyses indicate that the proposed residential development will not result in a significant change in traffic operations or vehicle queuing as compared to future No-Build conditions.

RECOMMENDATIONS

Access to the project site will be provided by way of the existing driveway on Brush Hill Road. It is recommended that the site drive be placed under STOP-sign control with illumination provided.

In addition, it is recommended that when the stone wall is restored, it will not exceed a height of three feet above the driveway grade and vegetation adjacent to the driveway be maintained as not to obstruct sight distances.

CONCLUSIONS

On a typical day, the project will result in 264 vehicle trips on an average weekday (132 entering and 132 exiting), with approximately 23 vehicle trips (4 entering and 19 exiting) during the weekday morning peak hour and 26 vehicle trips (17 entering and 9 exiting) during the weekday evening peak hour. Overall, the additional traffic can be added to the roadway system with a minimal impact to existing traffic operations.

With the implementation of the above recommendations, safe and efficient access will be provided and the project can be constructed with minimal impact on the roadway system.

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential traffic impacts associated with the residential development located off Brush Hill Road, in Milton, Massachusetts. This assessment identifies and analyzes existing and future traffic conditions both with and without the project and reviews access requirements and safety considerations.

As documented in this report, the proposed development is not projected to result in a notable increase to area traffic volumes, with minimal projected impacts to traffic operations along roadways and intersections serving the project site.

PROJECT DESCRIPTION

The project entails the development of 36 condominiums, located on Brush Hill Road. Access to the project site will be by existing driveway off of Brush Hill Road, between Cushing Road and Dana Avenue. Figure 1 depicts the site location in relation to the local roadway network.

STUDY METHODOLOGY

This study was performed in accordance with Executive Office of Energy and Environmental Affairs/Executive Office of Transportation (EEA/EOT) guidelines for the preparation of traffic impact assessments, and was conducted in three distinct stages. The first stage involved an assessment of existing traffic conditions in the study area and included an inventory of roadway geometrics, observations of traffic flow, and collection of peak-period traffic 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. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity and traffic safety 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.

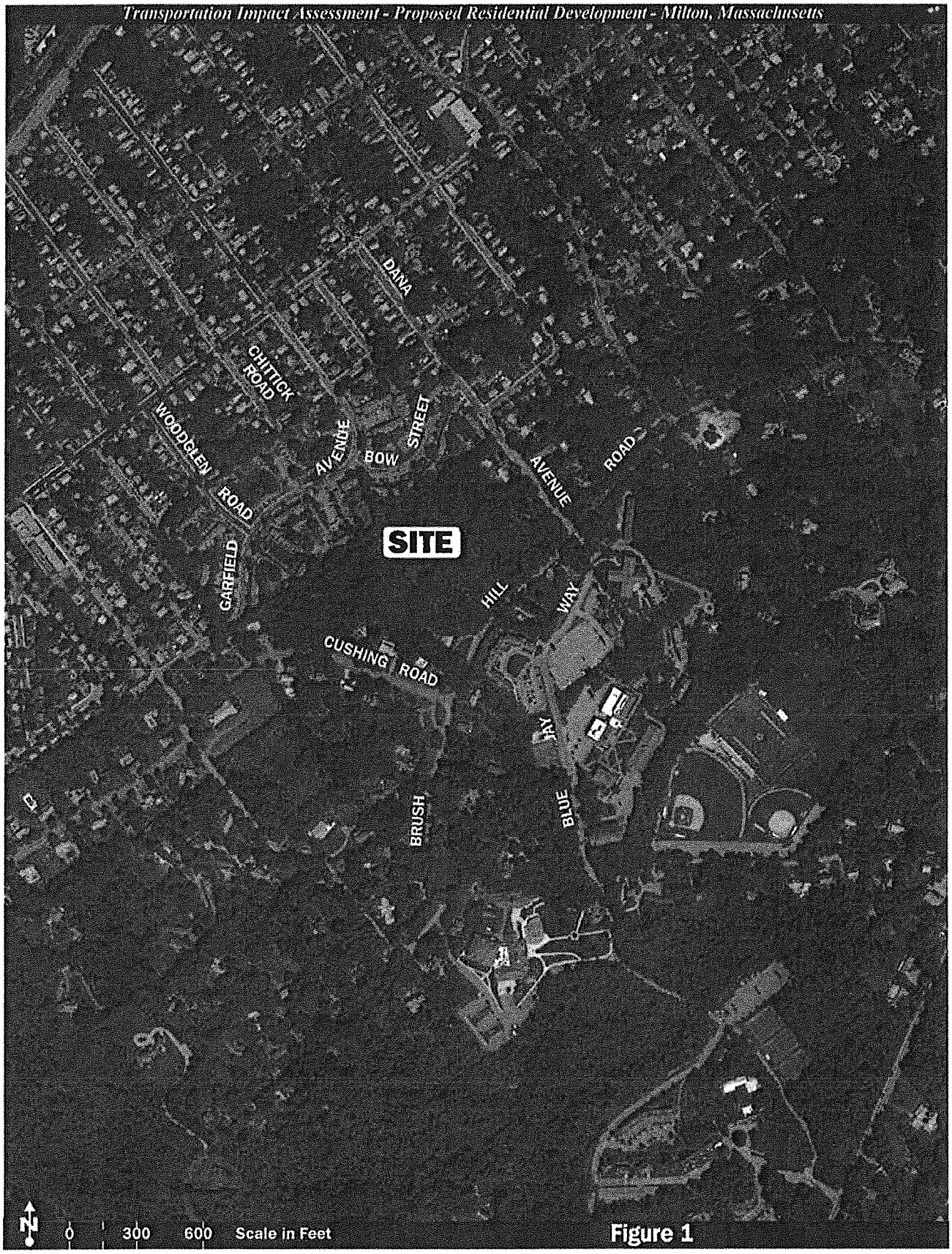

Figure 1

Site Location Map

Vanasse & Associates, Inc.

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EXISTING CONDITIONS

A comprehensive field inventory of existing conditions on the study area roadways was conducted in April 2015. The field investigation consisted of an inventory of existing roadway geometrics, traffic volumes, and operating characteristics, as well as posted speed limits and land use information within the study area. The study area was selected to contain the major roadway providing access to the project site, Brush Hill Road, along with the nearest intersections of Brush Hill Road at Dana Avenue and Brush Hill Road at Cushing Road.

GEOMETRY

Roadways

Brush Hill Road

Brush Hill Road is a collector roadway under local jurisdiction that traverses the study area in a general north-south orientation. Within the study area Brush Hill Road provides a single approximate 12-foot wide travel lane in each direction separated by a double-yellow centerline, with no marked shoulders. The posted speed limit on Brush Hill Road, in the vicinity of the project site, is 30 miles per hour (mph). Land use consists primarily of residential properties and Curry College.

Intersections

Brush Hill Road at Dana Avenue

Dana Avenue intersects Brush Hill Road from the west to form a three-way unsignalized intersection that operates under STOP-sign control. The Brush Hill Road northbound approach provides a single approximate 12-foot wide general purpose travel lane with no marked shoulder provided. The Brush Hill Road southbound approach provides an approximate 11.5-foot wide general purpose travel lane, with no marked shoulder provided. The Dana Avenue eastbound approach consists of an approximate 15-foot wide general purpose travel lane, which operates under STOP-sign control. Sidewalks are provided along the south side of Dana Avenue. Land use in the vicinity of the intersection consists of residential properties and Curry College.

Brush Hill Road at Cushing Avenue

Cushing Road intersects Brush Hill Road from the west to form a three-way unsignalized intersection that operates under STOP-sign control. The Brush Hill Road northbound approach provides a single approximate 12-foot wide general purpose travel lane with no marked shoulder provided. The Brush Hill Road southbound approach provides an approximate 11.5-foot wide general purpose travel lane, with no marked shoulder provided. The Cushing Road eastbound approach consists of an approximate 15-foot wide general purpose travel lane, which operates under STOP-sign control. Sidewalks are provided along Cushing Road. Land use in the vicinity of the intersection consists of residential properties.

EXISTING TRAFFIC VOLUMES

In order to establish baseline traffic-volume demands and flow patterns within the study area, manual turning movement counts (TMCs) and vehicle classification counts were completed at the study area intersections in April 2015 during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods.

Seasonal Adjustment

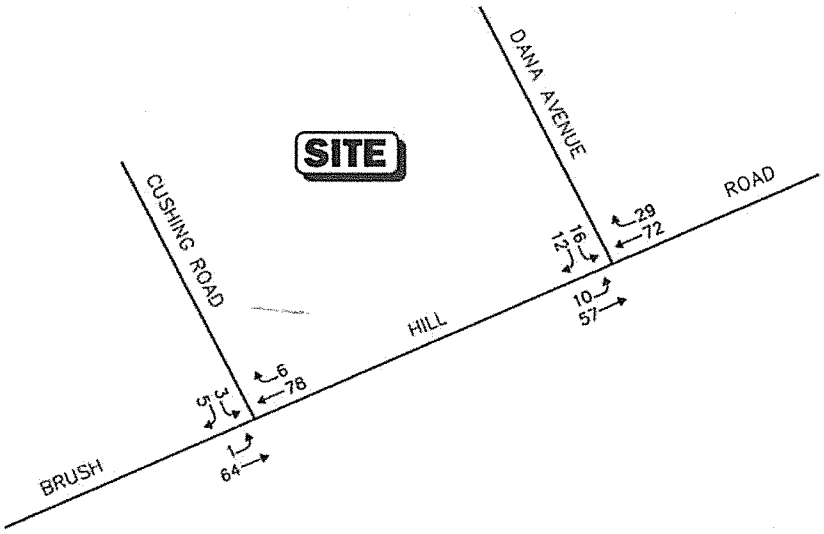
In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, the MassDOT 2011 Weekday Seasonal Factors for Group 6 Roadways (urban arterials, collectors and rural arterials) were reviewed. Based on a review of this data, it was determined that traffic volumes are representative of above average month conditions and are consistent with MassDOT guidelines for the base traffic condition. The 2015 Existing weekday morning and evening peak-hour traffic volumes are depicted on Figure 2.

MOTOR VEHICLE CRASH SUMMARY

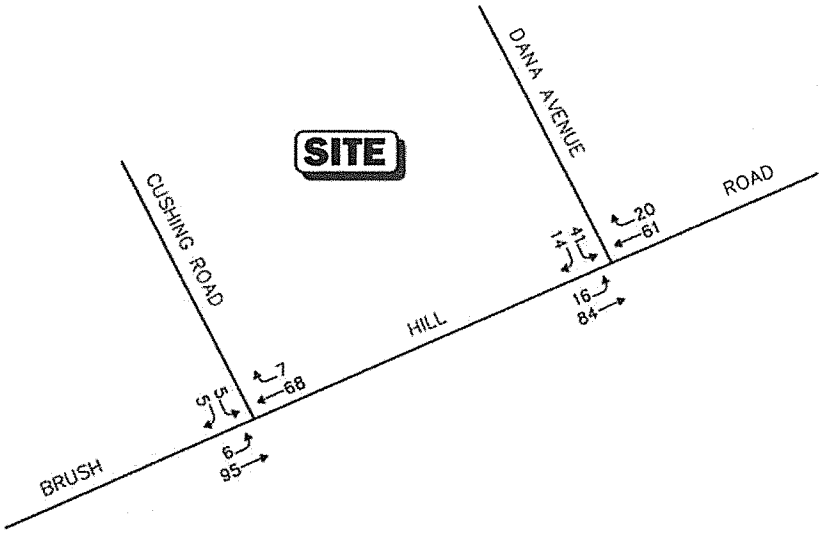
Motor vehicle crash data were obtained from the Massachusetts Highway Department Safety Management/Traffic Operations Unit for the five most recent years of data available (2007 to 2011) in order to identify reported crash trends and/or safety deficiencies within the study area. Motor vehicle crash data for the study area intersections were researched to determine the type of motor vehicle crash, severity, and roadway conditions for each incident. In addition, motor vehicle crash rates were determined for this intersection. These rates quantify the number of motor vehicle crashes per million entering vehicles and provide a basis for comparing reported crash rates to statewide averages. MassDOT's average motor vehicle crash rates for signalized and unsignalized intersections in District 6 are 0.76 and 0.58, respectively. A summary of the motor vehicle crash data is provided in Table 1 and is described below.

As summarized in Table 1, the study area intersections experienced a total of 3 motor vehicle collisions over the five-year review period, resulting in an average accident rate that falls beneath MassDOT's average motor vehicle crash rate for unsignalized intersections within this District. Of the three reported collisions, two resulted in personal injury while one resulted in property damage. No fatalities were reported at this location over the five-year review period. The majority of crashes were fixed object crashes (2 out of 3) and occurred during daylight (3 out of 3).

WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR



Not To Scale

Figure 2

Vanasse & Associates, Inc.

2015 Existing
Peak Hour Traffic Volumes

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Table 1
MOTOR VEHICLE CRASH SUMMARY

	Brush Hill Road at Cushing Road	Brush Hill Road at Dana Avenue
Year:		
2007	0	0
2008	0	2
2009	0	0
2010	1	0
2011	0	0
Total	1	2
Average	0.20	0.40
Crash Rate[b]	0.27	0.45
Significant[c]	No	No
Type:		
Angle	0	1
Rear-End	0	0
Sideswipe	0	0
Head-On	0	0
Fixed Object	1	1
Unknown/Other	0	0
Total	1	2
Severity:		
Prop. Damage Only	0	1
Personal Injury	1	1
Fatality	0	0
Other	0	0
Total	1	2
Conditions:		
Clear	0	1
Cloudy/Rain	0	1
Snow/Ice	1	0
Fog	0	0
Unknown	0	0
Total	1	2
Lighting Conditions:		
Daylight	1	2
Dawn/Dusk	0	0
Dark (lit)	0	0
Dark (unlit)	0	0
Unknown	0	0
Total	1	2

[a]Source: MassDOT Safety Management/Traffic Operations Unit records, 2007 through 2011.
[b]Motor vehicle crash rate per million entering vehicles (mev).
[c]Signalized intersections are significant if rate >0.76 crashes per mev, and unsignalized intersections are significant if rate >0.58 crashes per mev.

VEHICLE SPEED STUDY

Speed measurements were taken along Brush Hill Road, in the vicinity of the proposed site driveway to determine prevailing travel speeds along the corridor. The posted speed limit on Brush Hill Road, in the vicinity of the site is 30 mph. Vehicular speeds were recorded through radar detection in April of 2015 during off-peak conditions to determine prevailing free-flow speeds. The average speed in the northbound and southbound direction was 31 mph. The 85th percentile operating speed, which is utilized for roadway design and determination of required sight distances, was observed to be 36 mph in the northbound direction and 34 mph in the southbound direction. Table 2 summarizes the observed travel speeds along the Brush Hill Road corridor.

Table 2
SPEED OBSERVATION SUMMARY (MPH[a])

Roadway	Direction	Average Speed	85th Percentile Speed
Brush Hill Road	Northbound	31	36
	Southbound	31	34

[a]Miles per hour.

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at the proposed site driveway intersection with Brush Hill Road in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)[2] standards. 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. In accordance with AASHTO and MassDOT standards, at a minimum, sufficient stopping sight distances must be provided at an intersection. While the posted speed limit is 30 mph, the observed 85th percentile speeds were 36 mph in the northbound direction and 34 mph in the southbound direction. Table 3 presents the measured sight distances at the proposed site driveway intersecting with Brush Hill Road.

[2] *A Policy on Geometric Design of Highway and Streets,* 6th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2011.

Table 3
SIGHT DISTANCE MEASUREMENTS

Intersection/Sight Distance Measurement	Required Minimum (Feet) [a] 30 mph	35 mph	40 mph	Measured (Feet)[b]
Proposed Site Drive Exiting Sight Distance:				
Looking to the north from the driveway	200	250	305	320
Looking to the south from the driveway	200	250	305	>400

[a]Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets,* Fifth Edition; American Association of State Highway and Transportation Officials (AASHTO); 2011.

[b]This will be the sight distance for the future rebuilt wall, which will have a maximum height of 3 feet.

As shown in Table 3, the proposed driveway has acceptable sight distances for over 40 mph. It is important to note that the existing stone wall must remain no greater than three feet above the final driveway grade. In addition, vegetation must be cleared in both directions to maintain acceptable sight lines.

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2022, which reflects a seven-year planning horizon, and is consistent with state guidelines for the preparation of traffic impact assessments. Independent of the proposed project, traffic volumes on the roadway network under 2022 No-Build conditions, include all existing traffic and new traffic resulting from background traffic growth and specific area developments. Anticipated site-generated traffic volumes superimposed upon the No-Build traffic-volume networks reflect the Build conditions with the proposed project.

TRAFFIC GROWTH

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 particular planned development, which is realistically anticipated to have a major impact on study area roadways and intersections within the study timeframe, and assigns its estimated traffic to the area roadway network. This procedure helps to refine the estimate of growth for local traffic. However, the drawback of this procedure is that the potential growth in population and development external to the study area would not be accounted for in the traffic projections.

In order to provide a conservative analysis scenario, use of both procedures was investigated.

Specific Development by Others

The Town of Milton Planning Department was contacted to determine whether there are any planned or approved development projects that are expected to influence future traffic volumes within the study area. Based on consultation with the Department, no specific area development projects were identified.

General Background Traffic Growth

The Town of Milton Planning Department was contacted to identify any specific background developments that would have an impact on the traffic operating conditions within the study area by the 2022 design year. Based on these discussions, no projects were identified.

Roadway Improvement Projects

The Town of Milton Planning Department was contacted to determine whether there are any planned or approved roadway improvement projects that are expected to influence future traffic volumes within the study area. Based on consultation with the Department, no specific area roadway improvement projects were identified.

No-Build Traffic Volumes

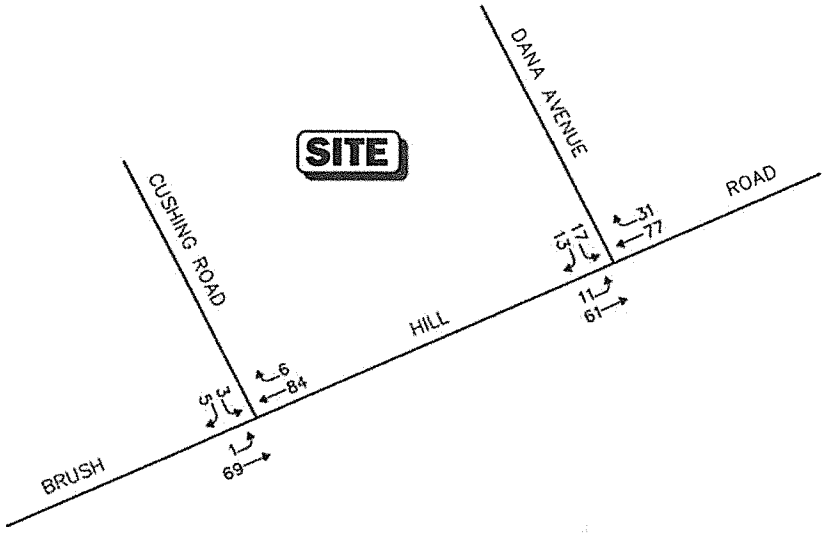
The 2022 No-Build peak-hour traffic-volumes were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2015 Existing peak-hour traffic volumes. The resulting 2022 No-Build weekday morning and evening peak-hour traffic volumes are shown on Figure 3.

Site-Generated Traffic

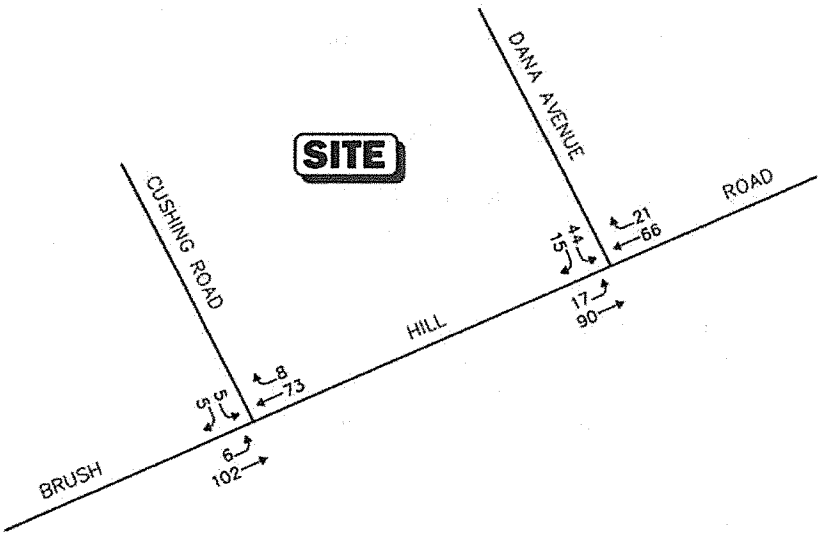
In order to develop the traffic characteristics of the proposed project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)[3] for similar land uses as those proposed were used. ITE Land Use Code (LUC) 230, Residential Condominium/Townhouse, with the independent variable of number of units equal to 36 was used to develop the anticipated traffic characteristics of the project. Table 4 summarizes the anticipated traffic characteristics of the project.

[3]ITE - *Trip Generation Manual,* Ninth Edition; Institute of Transportation Engineers; Washington, DC; 2012.

WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR



Not To Scale

Figure 3

Vanasse & Associates, Inc.

2022 No-Build
Peak Hour Traffic Volumes

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Table 4
TRIP-GENERATION SUMMARY

Time Period/Direction	Proposed Residential (36 units)[a]
Weekday Daily	264
Weekday Morning Peak Hour:	
Entering	4
Exiting	19
Total	23
Weekday Evening Peak Hour:	
Entering	17
Exiting	9
Total	26

[a]Based on ITE LUC 230, Residential Condominium/Townhouse

As can be seen in Table 4, the project is expected to generate approximately 264 vehicle trips on an average weekday (132 entering and 132 exiting), with approximately 23 vehicle trips (4 entering and 19 exiting) during the weekday morning peak hour and 26 vehicle trips (17 entering and 9 exiting) during the weekday evening peak hour.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of generated trips to and from the proposed development was determined based on existing travel patterns at the study area intersections during the commuter peak periods.

In summary 55 percent of project-related traffic was assigned to/from Brush Hill Road, north of the project site; and 45 percent to/from Brush Hill Road, south of the project site. The trip-distribution pattern is depicted on Figure 4. The weekday site-generated traffic volumes were assigned on the study area roadway network as shown on Figure 5.

BUILD TRAFFIC VOLUMES

The 2022 Build condition traffic-volume networks were developed by adding project-related traffic to the 2022 No-Build traffic-volume networks. The resulting 2022 Build weekday morning and evening peak-hour traffic-volume networks are shown on Figure 6.

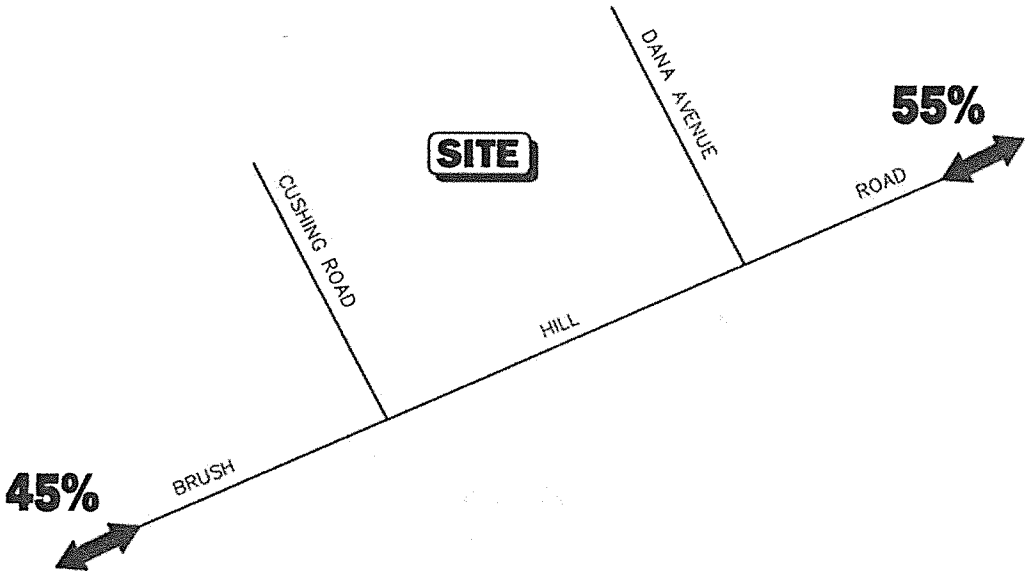

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Figure 4

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Trip Distribution Map

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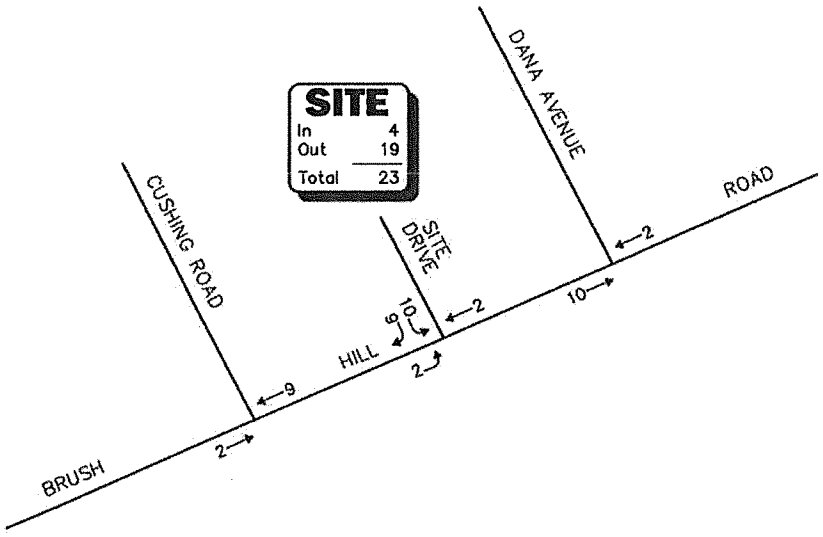
WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR

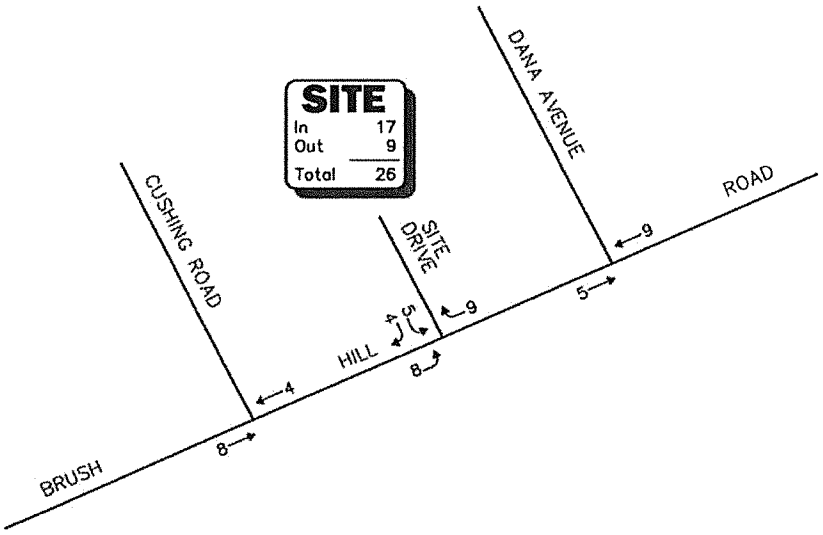


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Figure 5

Vanasse & Associates, Inc.

Site Generated Peak Hour Traffic Volumes

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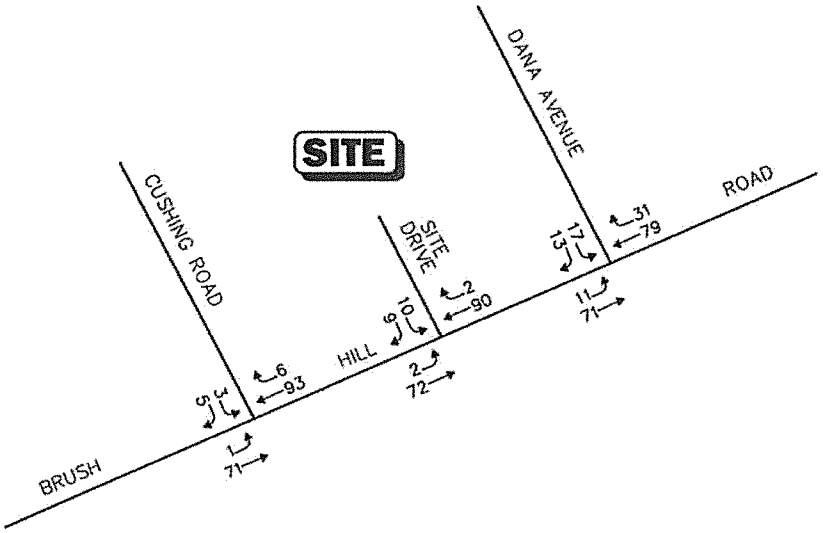
WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR

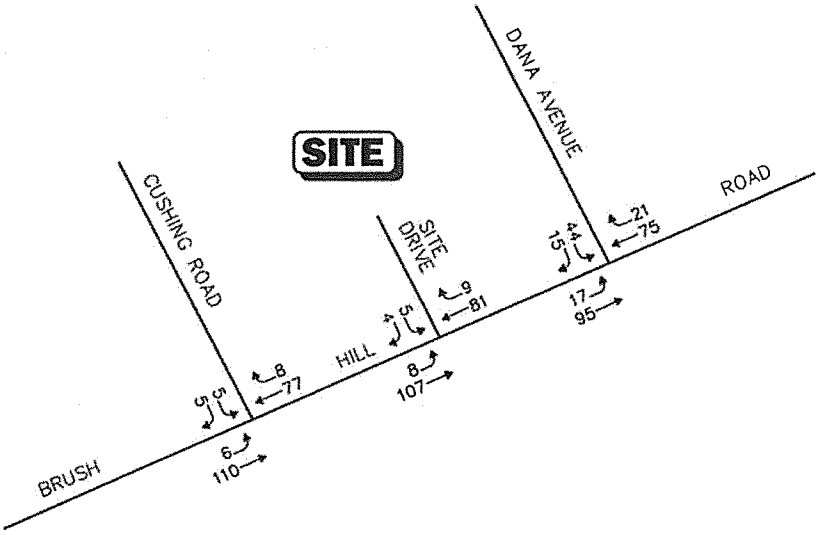


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Figure 6

Vanasse & Associates, Inc.

2022 Build
Peak Hour Traffic Volumes

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TRAFFIC OPERATIONS ANALYSIS

Measuring existing and future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity 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.

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.[4] 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 LOS A representing the best operating conditions and LOS F representing the worst.

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.

Unsignalized Intersections

The levels of service of unsignalized intersections are determined by application of a procedure described in the 2010 *Highway Capacity Manual.* 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

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

service at unsignalized intersections are also given in 2010 *Highway Capacity Manual.* Table 5 summarizes the relationship between level of service and average control delay.

Table 5
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[a]

Level of Service	Average Control Delay (Seconds Per Vehicle)
A	≤ 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	>50.0

[a]Source: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

ANALYSIS OF RESULTS

Level-of-service analyses were conducted for 2015 Existing, 2022 No-Build and 2022 Build conditions for the intersections within the study area. The results of the unsignalized intersection capacity analysis is summarized in Table 6, with detailed analysis results presented in the Appendix. The following is a summary of level-of-service analyses for the intersections within the study area.

Unsignalized Intersection Results

Brush Hill Road at Dana Avenue

Under all conditions, the critical movements at this unsignalized intersection (turns from Dana Avenue) were shown to operate at LOS B or better during the weekday morning and weekday evening peak hours.

Brush Hill Road at Cushing Road

Under all conditions, the critical movements at this unsignalized intersection (turns from Cushing Road) were shown to operate at LOS A during the weekday morning and weekday evening peak hours.

Brush Hill Road at Site Drive

Under the 2022 Build condition, the critical movements at this unsignalized intersection (left and right-turns from Site Drive) were shown to operate at LOS A during both the weekday morning and evening peak hours.

Table 6
UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Unsignalized Intersection/ Peak Hour/Movement	2015 Existing			2022 No-Build			2022 Build		
	Demand[a]	Delay[b]	LOS[c]	Demand	Delay	LOS	Demand	Delay	LOS
Brush Hill Road at Dana Avenue									
Weekday Morning:									
Brush Hill Road NB LT	10	7.5	A	11	7.5	A	11	7.5	A
Dana Avenue SB LT/RT	28	9.6	A	30	9.7	A	30	9.7	A
Weekday Evening:									
Brush Hill Road NB LT	16	7.4	A	17	7.4	A	17	7.5	A
Dana Avenue SB LT/RT	55	9.9	A	59	10.1	B	59	10.2	B
Brush Hill Road at Cushing Road									
Weekday Morning:									
Brush Hill Road NB LT	1	7.4	A	1	7.4	A	1	7.4	A
Cushing Road SB LT/RT	8	9.0	A	8	9.1	A	8	9.2	A
Weekday Evening:									
Brush Hill Road NB LT	6	7.4	A	6	7.4	A	6	7.4	A
Cushing Road SB LT/RT	10	9.3	A	10	9.3	A	10	9.4	A
Brush Hill Road at Site Drive									
Weekday Morning:									
Brush Hill Road NB LT	--	--	--	--	--	--	2	7.4	A
Site Drive SB LT/RT	--	--	--	--	--	--	19	9.4	A
Weekday Evening:									
Brush Hill Road NB LT	--	--	--	--	--	--	8	7.4	A
Site Drive SB LT/RT	--	--	--	--	--	--	9	9.5	A

[a]Demand in vehicles per hour.
[b]Average control delay per vehicle (in seconds).
[c]Level-of-Service.
WB = westbound; NB = northbound; SB = southbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

CONCLUSIONS AND RECOMMENDATIONS

As documented in this study, the proposed residential development is conservatively projected to generate approximately 264 vehicle trips on an average weekday (132 entering and 132 exiting), with approximately 23 vehicle trips (4 entering and 19 exiting) during the weekday morning peak hour and 26 vehicle trips (17 entering and 9 exiting) during the weekday evening peak hour.

Based on the results of the capacity analyses, project-related traffic increases will result in minimal impacts to area traffic operations at the study area locations.

RECOMMENDATIONS

Access to the project site will be provided by way of the existing driveway on Brush Hill Road. It is recommended that the site drive be placed under STOP-sign control with illumination provided.

In addition, it is recommended that when the stone wall is restored, it will not exceed a height of three feet above the roadway grade and vegetation adjacent to the driveway be maintained as not to obstruct sight distances.

CONCLUSION

In summary, the addition of project-related traffic to the study area roadways, and intersections is not anticipated to impact traffic operations within the study area over No-Build conditions. With implementation of the above recommendations, safe and efficient site access will be provided and the proposed project can be built with minimal traffic impact on the roadway system.