TRAFFIC IMPACT AND ACCESS STUDY

Milton CAT

Cranston, Rhode Island

PREPARED FOR

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1

Introduction

VHB has performed this traffic impact and access study to evaluate impacts associated with the proposed construction of a new Milton CAT development located in Cranston, Rhode Island. Based on current site plans, access to the site will be provided by two driveways (one entrance only and one exit only) located 530 feet apart located on the south side of Plainfield Pike (Route 14).

This report describes the proposed development program and analyzes the project-related traffic impacts on roadways adjacent to the site and the intersections with the access driveways.

Project Description

The development program consists of constructing two buildings (one 44,250 sf building and one 5,400 sf building) for sales, service, and warehouse on a +10-acre parcel of land located at 2110 Plainfield Pike in Cranston, Rhode Island. Based on current site plans, access to the site will be provided by two driveways on the south side of Plainfield Pike (Route 14). The West Driveway is proposed to be entrance only and located approximately 730 feet west of Starline Way. The East Driveway is proposed to be exit only and located approximately 200 feet west of Starline Way.

Study Methodology

This traffic assessment was conducted in three phases. The first phase involved an assessment of existing traffic conditions in and around the proposed development

area. This included an inventory of existing roadway geometrics and observations of traffic flow including daily and peak period traffic counts.

The second phase utilized information assembled in the first phase and established the framework for evaluating the transportation impacts of future traffic conditions. In this phase, future traffic demands were forecasted for the study area roadways based on historical growth trends and other nearby proposed mixed-use development. The year 2028, which reflects a five (5) year horizon, was selected as the design year for analysis of this traffic impact and access study. The traffic analysis conducted in this phase identified existing and expected future roadway operations without the development of the site.

The third and final phase utilized information assembled in the second phase and established the framework for evaluating the transportation impacts of the proposed development project. In this phase the future traffic demands of the year 2028, from the second phase, were used as well as the trip generation for the proposed development of the site. The traffic analysis conducted in this phase identified future roadway operations which include necessary measures to mitigate any traffic-related impacts associated with the proposed site developments.

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Existing Conditions

Existing roadway and traffic conditions in the study area were determined based on field visits and new traffic counts. The traffic counts were performed on Plainfield Pike (Route 14) in February 2023. The existing transportation conditions in the study area, including roadway geometrics, traffic controls, and peak hour traffic flows are described in the following sections.

Study Area

To effectively evaluate the transportation impacts associated with the proposed development, it was necessary to review the existing roadway system in the vicinity of the site. The area delineated for this study includes Plainfield Pike (Route 14) along the frontage of the proposed development. The critical intersections in the immediate vicinity of the site are the two proposed site driveways located on the south side of Plainfield Pike (Route 14). These intersections are only analyzed under future conditions.

Network Geometry

Roadways

Plainfield Pike (Route 14)

Plainfield Pike is a two-lane principal arterial roadway running in a generally east-west direction within the project area. Plainfield Pike provides access to Chopmist Hill Road (Route 102) to the west and I-295 to the east. The posted speed limit on Division Road is 45 miles per hour (mph) on the eastbound approach to the site. The speed limit is posted as 45 miles per hour. Land use along Plainfield Pike (Route 14) is a mix of commercial, residential, and agricultural within the project limits. The Plainfield Pike Flea Market is located on the north side of Plainfield Pike, across the street from the site.

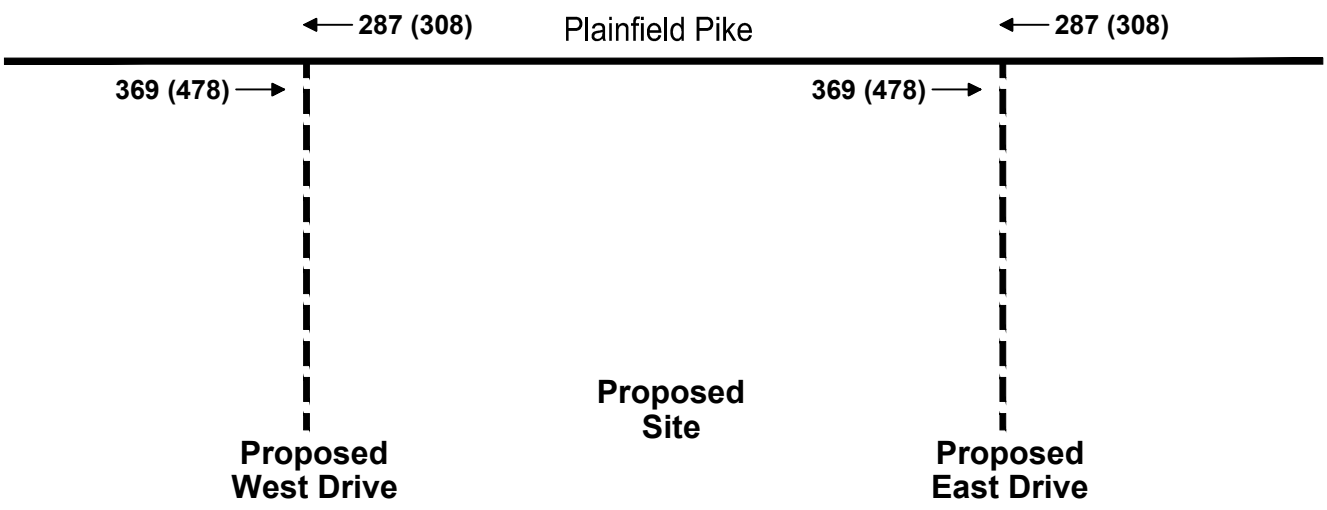
Observed Traffic Volumes

Automatic traffic recorder (ATR) counts were performed in February 2023 on Plainfield Pike (Route 14) in front of the site. The morning and afternoon peak hour volumes were observed to be from 8:45 AM to 9:45 AM on Friday, February 10, 2023, and from 4:15 PM to 5:13 PM on Wednesday February 8, 2023, respectively. The ATR counts are included in Appendix A. The existing 2023 morning and afternoon peak hour volumes are shown in **Figure 1**.

The capacity of a two-lane rural roadway is 1,000 vehicles per hour (vph) in each direction. The existing traffic on Plainfield Pike (Route 14) in front of the site is only 369 vph eastbound and 287 vph westbound during the weekday morning peak (478 vph eastbound and 308 vph westbound during the weekday afternoon peak hour). There is adequate capacity on Plainfield Pike to accommodate the existing peak hour traffic volumes.

Legend

XXX (XXX) AM (PM) Traffic Volumes



Not to Scale

2023 Existing Conditions
Peak Hour Traffic Volumes
Milton CAT
Cranston, Rhode Island

Figure 1

Crash Data

To identify crash trends in the study area, VHB reviewed the latest crash data along the study corridor including the study intersections. This data was obtained from the RIDOT crash database for the most recent five-year period, January 2018 to December 2022 Based on the five years of data reviewed, there were no reported crashes in front of the site.

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Future Conditions

Typically, transportation conditions in the study area can be expected to change in the future due to potential development/growth and planned transportation infrastructure improvements in the area. A five-year planning horizon was used to assess the Plainfield Pike (Route 14) corridor with the planned development. The traffic volumes were projected to the year 2028 to reflect growth without ("No-Build") and with ("Build") the development project and analyzed. The 2028 No-Build projected traffic volumes include growth in traffic volumes associated with generalized regional growth. The anticipated site-generated traffic volumes superimposed upon the 2028 No-Build peak hour traffic volume network reflect the 2028 Build peak hour conditions.

Background Traffic Growth

Traffic growth on area roadways is a function of the expected land development, economic activity, and changes in demographics. Several methods can be used to estimate this growth. A procedure frequently employed is to estimate an annual percentage increase and apply that increase to study area traffic volumes. Another procedure is to identify estimated traffic generated by planned new major developments that would be expected to impact the project study area roadways.

Both methods were utilized for this assessment. The following sections describe the procedures used to arrive at the No-Build traffic volume networks.

Background Traffic Growth

The latest US Census data shows that the population of Cranston decreased by 0.4 percent between 2020 and 2021. In order to remain conservative (overestimating the volume of traffic) a growth rate of 0.5 percent per year for five years (2.52%) through 2028.

Planned Developments

Based on discussions with the city, there are no planned development in the vicinity of the project that would have a significant impact on traffic volumes in the study area. Any additional minor developments that are constructed in the area will be accounted for in the annual background traffic growth discussed above.

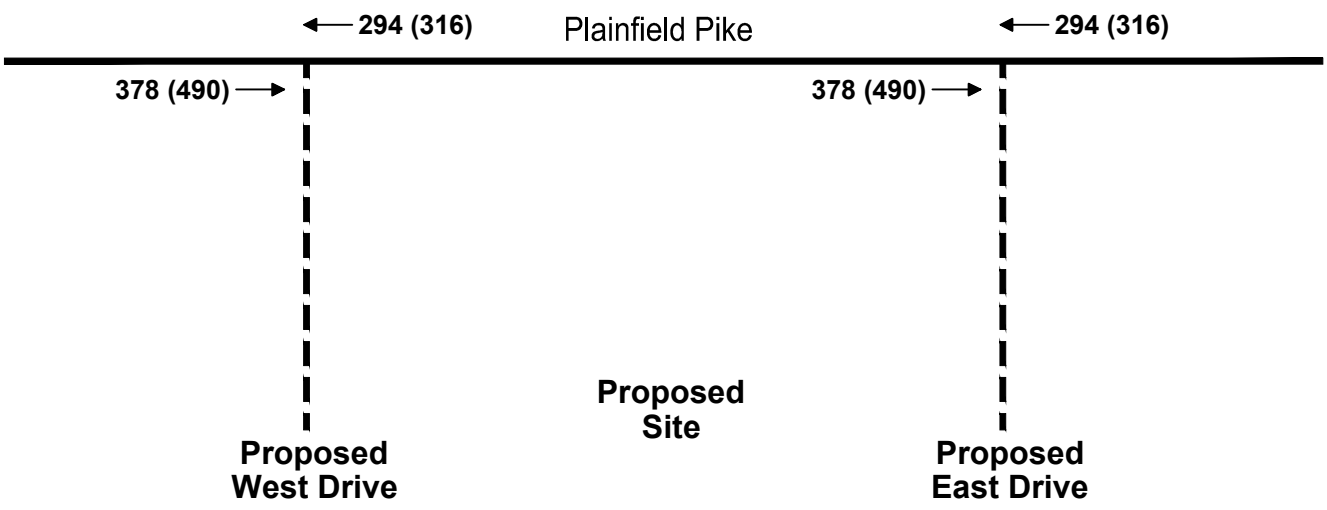
2028 No-Build Traffic Volumes

The 2028 No-Build peak hour traffic volumes were determined by applying the 0.5 percent annual growth rate for five years to the 2023 Existing peak hour traffic volumes. The 2028 No-Build condition peak hour traffic volumes for the weekday morning and afternoon peak hours are shown in **Figure 2**.

The capacity of a two-lane rural roadway is 1,000 vehicles per hour (vph) in each direction. The existing traffic on Plainfield Pike in front of the site is only 369 vph eastbound and 294 vph westbound during the weekday morning peak (490 vph eastbound and 316 vph westbound during the weekday afternoon peak hour). There is adequate capacity on Plainfield Pike to accommodate the projected 2028 No-Build peak hour traffic volumes.

Legend

XXX (XXX) AM (PM) Traffic Volumes



Not to Scale

2028 No-Build
Peak Hour Traffic Volumes
Milton CAT
Cranston, Rhode Island

Figure 2

Site-Generated Traffic Volumes

Design year 2028 Build traffic volumes were determined by estimating site-generated trips for the proposed development project and distributing these trips over the site driveways. These site-generated trips were added to the 2028 No-Build traffic volumes to develop the 2028 Build weekday morning and afternoon peak hour traffic volumes. The following sections describe the procedures used to arrive at the Build traffic volume networks.

Trip Generation

In order to estimate the traffic impacts of the proposed development, it is necessary to determine the traffic volumes expected to be generated. The following text discusses the procedures used to determine the expected trip generation of the proposed mixed residential development.

Proposed Trip Generation

It should be noted that there is no Land Use Code (LUC) in the Institute of Transportation Engineers (ITE) *Trip Generation*[1] manual; therefore, empirical data from a similar development was used to develop the trip generation for the proposed development. For the purpose of this study, traffic projections for the proposed development were derived from traffic counts performed at an existing Milton CAT facility located at 294 and 336 Ainsley Drive in Syracuse, New York. The existing Syracuse facility consists of two buildings with a total of 109,500 sf and 57 employees. The proposed Cranston facility is proposed to consist of a 42,130 sf of building space for sales and service and up to 36 employees. The Syracuse facility is a larger site that has more employees and generates more traffic than the new Cranston facility is projected to generate. In order to remain conservative in the trip generation at the new Cranston facility (projecting higher traffic volumes than are expected), the higher peak hour traffic volumes generated by the Syracuse site were used to project 2028 Build traffic volumes.

Table 1 summarizes the site-generated trips for the proposed development plan.

The traffic generated by the site will be all new traffic on study area roadways. None of the vehicle-trips generated by the proposed site will be drawn from the existing traffic streams passing the site in the form of pass-by traffic or from roadways in the vicinity of the site in the form of diverted-link traffic.

1 Trip Generation, 10th Edition, Institute of Transportation Engineers, Washington, D.C.

Table 1 Trip Generation Summary

Time Period/ Movement	Total Trips
Morning Peak[4]	
Enter	40
Exit	18
Total	58
Afternoon Peak[4]	
Enter	11
Exit	54
Total	65

Source: Traffic Counts performed at the 294 and 336 Ainsley Drive site in Syracuse, NY

As shown in **Table 1**, the proposed development is projected to generate 58 (40 entering/18 exiting) new vehicle trips during the weekday morning and 65 (11 entering/54 exiting) new vehicle trips during the weekday afternoon peak hours.

Trip Distribution and Assignment

Having estimated project generated vehicle trips, the next step in the study is to determine the trip distribution of project traffic and assign these trips to the roadway network. The directional distribution of site traffic approaching and departing the development is a function of several variables. These include the population densities, shopping opportunities, work demographics, existing and proposed travel patterns, and the efficiency of the roadways leading to the site.

The trip distribution for this project was based on a combination of existing travel patterns and the fact that regional traffic will be traveling to/from the site via I-295 which is located to the east. The projected new trips associated with the proposed development were distributed on the study area roadways based on the following assumptions:

› 70% to/from the east on Plainfield Pike (Route 14)

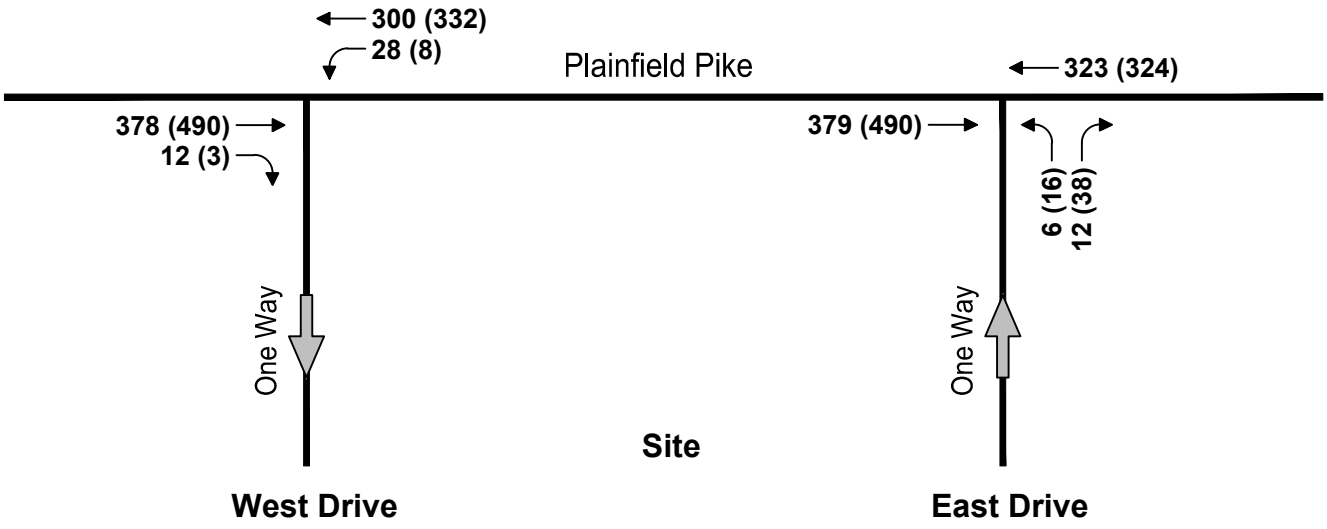
› 30% to/from the west on Plainfield Pike (Route 14)

2028 Build Traffic Volumes

In order to evaluate the 2028 Build Condition, these site-generated trips described above were added to the 2028 No-Build traffic volumes. The resulting 2028 Build condition weekday morning and weekday afternoon peak hour traffic volumes are shown in **Figure 3**.

Legend

XXX (XXX) AM (PM) Traffic Volumes



Not to Scale

2028 Build
Peak Hour Traffic Volumes
Milton CAT
Cranston, Rhode Island

Figure 3

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Traffic Operations

Measuring existing traffic volumes and projecting future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity analyses were conducted with respect to Existing and projected No-Build and Build conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them. Roadway operating conditions are classified by calculated levels of service as described in the following sections.

Level of Service Criteria

Level of Service (LOS) is the term used to describe the different operating conditions that occur on a given roadway segment or intersection under various traffic volume loads. It is a qualitative measure of the effect of a number of factors including roadway geometrics, travel delay, and freedom to maneuver. Level of service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions.

For signalized intersections, the analysis considers the operation of all traffic entering the intersection, and the LOS designation is for overall conditions at the intersection. For unsignalized intersections, the overall LOS designation is for the most critical movement, which is most often the left turn out of the side street/driveway. All study area intersections are unsignalized.

Unsignalized Intersections Capacity Analysis

Capacity analyses were conducted for the proposed unsignalized site driveways along Plainfield Pike (Route 14). For this study, the capacity analyses were completed using Synchro 11 software, with output based on the *2000 Highway Capacity Manual* (HCM). A summary of the unsignalized capacity analyses for the proposed driveways during the weekday morning and afternoon peaks are presented in **Table 2**. The full results of the capacity analysis are included in Appendix C.

Table 2 Unsignalized Intersection Capacity Analysis

Location	Time Period	Critical Movement	2028 Proposed Condition			
			Dem [1]	Del [2]	LOS [3]	Q [4]
West Driveway at Plainfield Pike	AM Peak	WB L/T	326	1	A	2
	PM Peak	WB L/T	340	0.3	A	1
East Driveway at Plainfield Pike	AM Peak	NB L/R	18	12	B	3
	PM Peak	NB L/R	54	14	B	11

Source: VHB using Synchro 11 software.
1 Dem- vehicle demand
2 Del - average delay in seconds per vehicle
3 LOS - level of service
4 Q – 95th percentile queue length, feet
EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; R = right; T = thru; L= left

As shown in Table 2, the West Driveway is projected to operate at level of service (LOS) A during the morning and afternoon peak hours with minimal delays. The East Driveway is projected to operate at LOS B during the morning and afternoon peak hours. As stated in the Trip Generation section of this report, traffic volumes used in this analysis are based on traffic counts performed at a larger site with more employees.

Sight Distance Evaluation

A sight distance evaluation was conducted for the proposed West and East Driveways on the south side of Plainfield Pike. Measurements were taken for Stopping Sight Distance and Intersection Sight Distance in accordance with guidelines provided by the American Association of State Highway and Transportation Officials (AASHTO).

Sight distance considerations are divided into two categories: Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD). Stopping sight distance (SSD) is the distance required for a vehicle approaching an intersection from either direction to perceive, react and come to a complete stop to avoid colliding with an object in the road. In this respect, SSD can be considered as the minimum visibility criterion for the safe operation of an unsignalized intersection. Intersection sight distance (ISD) is based on the time required for perception, reaction, and completion of the desired critical exiting maneuver (typically, a left turn) once the driver on a minor street approach (or a driveway) decides to execute the maneuver. Calculations for ISD include the time to (1) turn left and clear the near half of the intersection without conflicting with the vehicles approaching from the left; and (2) upon turning left, to accelerate to the operating speed on the roadway without causing approaching vehicles on the main road to unduly reduce their speed. In this context, ISD can be considered as a desirable visibility criterion for the safe operation of an unsignalized intersection.

A speed study was performed on March 23, 2023, at the locations of the West and East Driveways. Based on the speed study, the 85th percentile speed along Plainfield Pike was observed to be 47 miles per hour (mph) eastbound and 46 mph westbound at both access road locations. In order to remain conservative, a design speed of 50 mph was assumed. The speed studies used for the sight distance calculations are included in Appendix D.

Table 3 presents a summary of the ISD and SSD analysis, based on the observed 85th percentile speed along Division Road.

Table 3 Sight Distance Summary

	Stopping Sight Distance (feet)		Intersection Sight Distance (feet)	
Location	**Required [a]**	**Measured [b]**	**Desirable [a]**	**Measured [b]**
Proposed Site Access				
West Driveway	425	>600	555	>600
East Driveway	425	>600	555	>600

a Based on AASHTO guidelines for a design speed of 50 mph
b Based on field measurements

As shown in Table 3, the available SSD and ISD at the intersection meet or exceed the AASHTO requirements.

It should be noted that the West Driveway is entrance only: therefore, a review of the sight distance exiting this driveway is not necessary.

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Conclusions

As discussed in this report, the proposed development will result in a minimal increase in traffic volumes along study area roadways. The existing traffic volumes along Plainfield Pike (Route 14) are relatively low and can accommodate the projected site generated traffic.

Access to and from the proposed development will be provided via two access points along Plainfield Pike. The West Driveway is proposed to be entrance only and located approximately 730 feet west of Starline Way. The East Driveway is proposed to be exit only and located approximately 200 feet west of Starline Way.

There are projected to be minimal delays/queues at the driveways during the peak periods. The access points have been located along the Plainfield Pike alignment to provide adequate sight distance.