

# The Lanterns at Warren Woods

466 Chestnut Street, Ashland MA

PREPARED FOR

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Pickwick Development Corp  
c/o The Green Companies  
46 Glen Avenue  
Newton, MA 02459

PREPARED BY

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101 Walnut Street  
PO Box 9151  
Watertown, MA 02471  
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June 30, 2015



# Introduction

VHB, Inc. has been retained by the Green Company (the “Proponent”) to evaluate the traffic impacts associated with a proposed senior residential development on an approximately 39 acre parcel located in Ashland, Massachusetts.

This traffic impact and access study quantifies the existing and future transportation conditions and identifies potential capacity and other transportation improvements within the study area based on the proposed development’s impact. The evaluation is based on typical guidelines for the development of a traffic impact assessment, as well as traffic volume information obtained through field measurements and observations by VHB and through discussions with the developer, the Town of Ashland, and VHB’s familiarities with the general study area.

The general finding of this study is that deficiencies exist within the current roadway facilities, however, the additional traffic impacts associated with the proposed development are not expected to have a significant impact on the surrounding roadways.

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## Project Description

The parcel is located along Chestnut Street and Eliot Street in the Town of Ashland, Massachusetts. The site is bordered by Chestnut Street to the west, Eliot Street to the south. Figure 1 shows the site location map.

The project will include 93 age-restricted detached single-family homes, and will be served by a single driveway located along Chestnut Street (with a gated emergency access to the south on to Eliot Street). Each home provides garage parking for two vehicles, as well as space to park at least one car in a driveway. A total of 44 additional parking spaces are provided in small clusters spaced throughout the site for use by guests and visitors. The site plan is shown in Figure 2.

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## Study Area

Based on VHB’s knowledge of the area, and through discussions with the Town, it was agreed that the likely impacts of the project on the surrounding roadways system should focus on the intersections of Eliot Street at Chestnut Street and the proposed



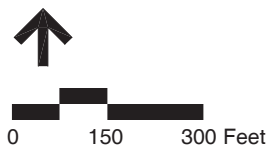
Source: MassGIS

Vanasse Hangen Brustlin, Inc.

Site Location

Figure 1

466 Chestnut Street  
Ashland, Massachusetts



Vanasse Hangen Brustlin, Inc.

Conceptual Site Plan Figure 2  
466 Chestnut Street  
Ashland, Massachusetts

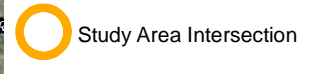


site driveway at Chestnut Street. Figure 3 shows the study area intersections in relation to the site.

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## Study Methodology

This traffic assessment is presented in three stages. First is the evaluation of the current transportation environment in the immediate vicinity of the parcel. Second is the forecast of traffic and assessment of the likely impacts associated with the proposed residential development on the study area intersections and roadways in consideration of the future roadway network. Lastly, recommended actions are proposed to mitigate the project's traffic impact on the current and future roadway networks.



Source: MassGIS

Vanasse Hangen Brustlin, Inc.

Study Area Intersection

Figure 3

466 Chestnut Street  
Ashland, Massachusetts



# Existing Conditions

Evaluation of the transportation impacts associated with the proposed project requires a thorough understanding of the existing transportation system in the project study area. The existing conditions evaluation consisted of an inventory of the traffic control, roadway, driveway, and intersection geometry in the study area; collection of peak period traffic volumes; and review of recent vehicular crash history. Each of these elements is described in detail below.

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## Roadway and Intersection Geometry

The major travel routes with the study area are described below and the study area intersections and roadway corridors were presented in Figure 3.

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### Chestnut Street

Chestnut Street is a north-south roadway that extends from Main Street in the north to Route 126 in the south. Chestnut Street is under local jurisdiction, and consists of one lane in each direction. Within the study area, land use along Chestnut Street consists mainly of residential uses and open space.

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### Eliot Street

Eliot Street is an east-west roadway that extends from Route 126 to the east to the Chestnut Street to the west. Within the study area, Eliot Street is under local jurisdiction, and consists of one lane in each direction. Within the study area, land use along Eliot Street is also mainly residential and open space.

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### Eliot Street at Chestnut Street

Eliot Street intersects Chestnut Street to form a three-way unsignalized T-intersection. Both Chestnut Street and Eliot Street consists of one lane in each direction.



## Traffic Volume Data

To identify current traffic flow characteristics along the major roadways serving the project study area, peak-hour turning movement counts (TMC) and daily traffic volumes were collected on roadways and intersections in and around the study area in June 2015.

Weekday daily volumes along roadways were collected using automated traffic recorders (ATRs) over a 48-hour period while weekday morning and evening peak hour (7:00 AM – 9:00 AM; 4:00 PM – 6:00 PM) volumes were collected using manual turning movement/ classification counts to identify current traffic volumes traveling through key intersections in the study area.

As Table 1 indicates, Chestnut Street (in the immediate vicinity of the proposed project site driveway) carries approximately 5,900 vehicles on an average weekday. Peak hour traffic accounts between approximately 10 percent of the daily traffic during the morning peak hour, and 11 percent during the evening peak hour.

**Table 1 Observed Traffic Volume Summary**

Location	Daily <sup>a</sup>	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Weekday	Volume <sup>b</sup>	K Factor <sup>c</sup>	Dir. Dist. <sup>d</sup>	Volume	K Factor	Dir. Dist.
Chestnut Street, north of Eliot Street	5,900	565	9.5%	79% NB	675	11.4%	69% SB

Source: VHB; based on automatic recorder counts conducted in June 2015

- a Average daily traffic expressed in vehicles per day
- b Expressed in vehicles per hour
- c percent of traffic occurs during the peak hour
- d directional distribution of peak hour traffic

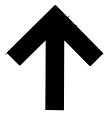
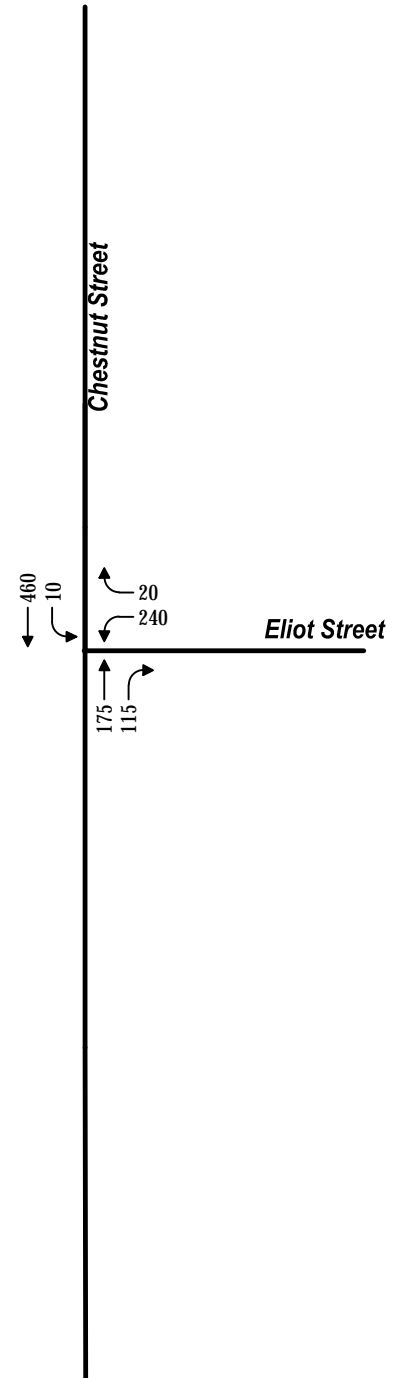
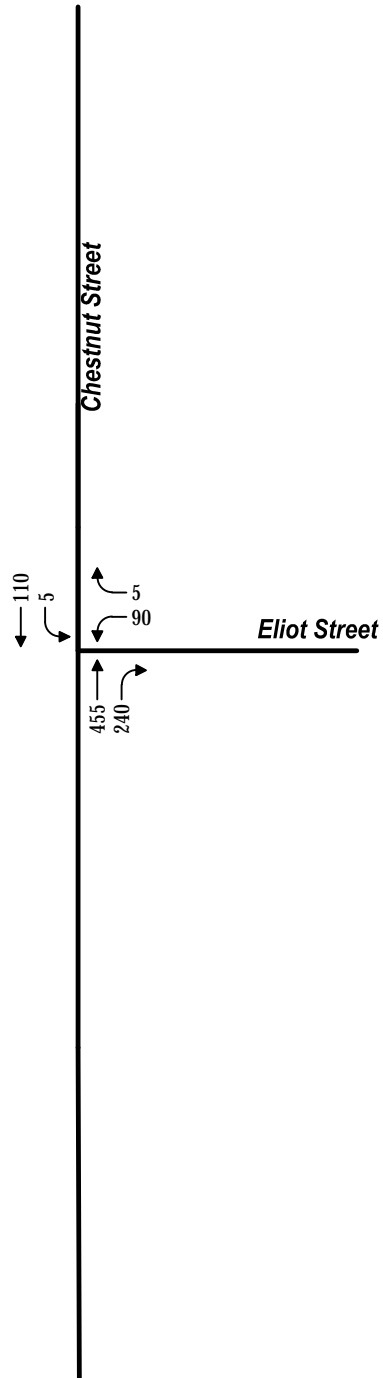
## Seasonality of Count Data

The traffic data collected for this Project was obtained during the month of June. To evaluate the potential of seasonal fluctuation of traffic volumes on roadways near the project site, the 2011 Weekday Seasonal Factors published by MassDOT were reviewed. According to published MassDOT seasonal factors, June traffic counts are higher than average month conditions. As such, to provide a conservative analysis, the existing traffic counts were not seasonally adjusted. Figure 4 reflects the 2015 existing weekday morning and evening peak hour traffic volumes at the intersection of Eliot Street and Chestnut Street.



WEEKDAY MORNING PEAK HOUR

WEEKDAY EVENING PEAK HOUR



Not to Scale

Vanasse Hangen Brustlin, Inc.

Figure 4: 2015 Existing Condition  
June 2015



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## Vehicular Crash History

In order to identify whether there are any pre-existing safety issues within the Project's study area, VHB conducted a review of the MassDOT Crash Database to document the number of vehicular collisions that have taken place over the most recent available five years (2008-2012).

Table 2 presents the number of crashes and crash characteristics for the intersection of Eliot Street at Chestnut Street. Results from the crash database show the intersection is experiencing about 2 ½ crashes every year (on average). The majority of crashes at this intersection are single vehicle crashes that resulted mostly in property damage only. As most of these crashes occur under clear weather and dry roadway conditions, weather is not a contributing factor for these crashes.

The posted speed limit along this stretch of Chestnut Street is 30 miles per hour (mph). However, based on the speed data collected using the automatic traffic recorder (ATR), the 85<sup>th</sup> percentile speed along Chestnut Street is between 39 to 40 miles per hour. While not uncommon for roadways such as Chestnut Street, vehicles are operating at speeds approximately 10 miles per hour higher than the posted speed limit and this may be a contributing factor in these crashes.



Table 2 Vehicular Crash Data 2008-2012

<b>Eliot Street at Chestnut Street</b>	
<b>Year</b>	
2008	2
2009	4
2010	2
2011	2
<u>2012</u>	<u>3</u>
Total	13
<b>Collision Type</b>	
Angle	2
Head-on	0
Rear-end	1
Rear-to-rear	0
Sideswipe, opposite direction	0
Sideswipe, same direction	0
Single vehicle crash	10
<u>Unknown/Not Reported</u>	<u>0</u>
Total	13
<b>Crash Severity</b>	
Fatal injury	0
Non-fatal injury	0
Property Damage Only	12
<u>Unknown/Not Reported</u>	<u>1</u>
Total	13
<b>Time of Day</b>	
Weekday, 7:00 AM - 9:00 AM	2
Weekday, 4:00 PM - 6:00 PM	1
Saturday, 11:00 AM - 2:00 PM	0
Weekday, other time	7
<u>Weekend, other time</u>	<u>3</u>
Total	13
<b>Pavement Conditions</b>	
Dry	9
Wet	2
Snow/Ice	2
Other	0
<u>Unknown/Not Reported</u>	<u>0</u>
Total	13
<b>Non-Motorist (Bike, Pedestrian)</b>	<b>0</b>

Source: Massachusetts Department of Transportation Crash Data 2008-2012.



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## Highway Safety Improvement Program

VHB reviewed the MassDOT's Highway Safety Improvement Program (HSIP) database to determine if the study area intersections are HSIP-eligible and determined that the intersection of Eliot Street at Chestnut Street is not an HSIP-eligible cluster.



# Future Conditions

Future conditions for the traffic assessment are conducted in two steps. First, the baseline traffic volumes in the study area are projected to year 2022, reflecting a seven-year traffic planning horizon (which is the normal horizon for traffic studies). Any anticipated roadway improvements that may affect the flow of traffic within the study area, and background traffic growth based on known development projects, would be included in the traffic volumes on the roadway network under the year 2022 No-Build Condition. Secondly, anticipated Project-generated traffic volumes were added to the year 2022 No-Build traffic volumes to reflect the year 2022 Build Condition in the study area.

This section describes the process used to arrive at these development conditions.

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## Background Traffic Growth

Traffic growth on area roadways is a function of the expected land development, economic activity, and changes in local and regional demographics. A frequently used procedure by the transportation engineering industry is to estimate the historical annual percentage increase in traffic volumes and apply that increase to the study-area traffic volumes. Another procedure involves estimation of traffic generated by specific planned major developments that would be expected to affect traffic volumes on the study area roadways. Through discussions with the Town staff, no major development projects have been identified that would drastically alter or impact traffic volumes along Eliot or Chestnut Streets. Therefore, for the purpose of this assessment, a 0.5 percent annual growth was used and will account for the anticipated traffic growth within the study area over the next seven year period. As such, VHB has used this growth rate to account for general background growth for the 2022 No-Build Conditions.

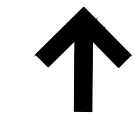
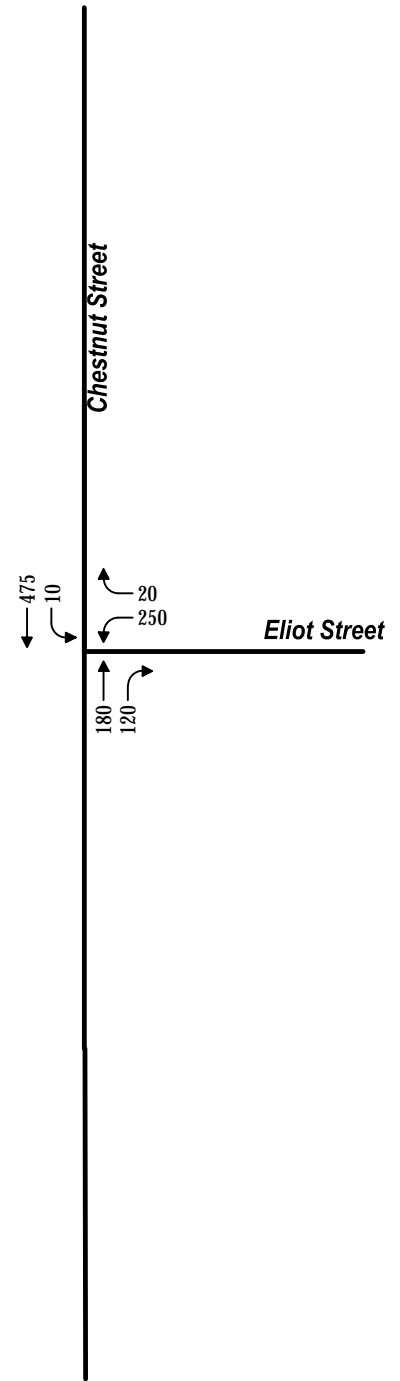
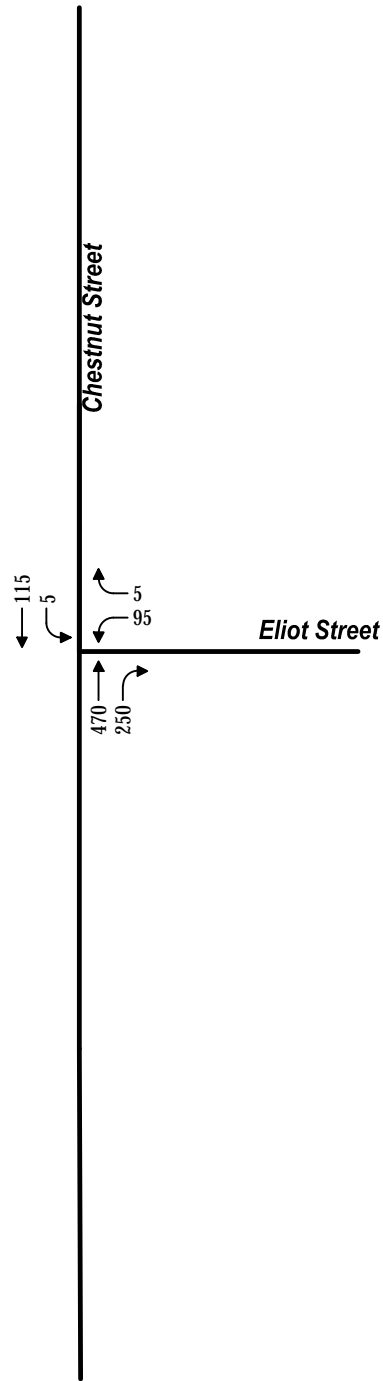
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## No-Build Traffic Volumes

The 2022 No-Build traffic volumes were developed by applying the 0.5 percent annual growth rate over the seven-year study horizon to the 2015 Existing Conditions traffic volumes. Figure 5 show the resulting 2022 No-Build peak hour traffic volumes.

WEEKDAY MORNING PEAK HOUR

WEEKDAY EVENING PEAK HOUR



Not to Scale

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Figure 5: 2022 No-Build Condition  
June 2015



## Trip Generation

The rate at which any development generates traffic is dependent upon a number of factors such as size, location, and concentration of surrounding developments. The number of vehicle-trips to be generated by the proposed project was estimated based on trip generation rates provided in the Trip Generation<sup>1</sup> manual, published by the Institute of Transportation Engineers (ITE). ITE land use code 251 (Senior Adult Detached Housing) was determined to be the most appropriate land use code for this development as it captures the general essence of the land use's being proposed. Table 4 summarizes the projected trip generation associated with the development based on the standardized ITE rates.

### Trip Generation Summary

As shown in Table 4, the proposed development is estimated to generate 45 morning peak hour trips, 40 evening peak hour trips, and a total of 440 daily trips.

Table 4 Trip Generation

Development Type ITE Land Use Code Size	Senior Adult Detached Housing <sup>a</sup> 251 93 units
<b>Weekday Daily<sup>b</sup></b>	440
<b>Weekday AM<sup>c</sup></b>	
Enter	15
Exit	30
Total	45
<b>Weekday PM</b>	
Enter	25
Exit	15
Total	40

a - Institute of Transportation Engineers, Trip Generation, 9th Edition - Land Use Code 251 [Senior Adult Detached Housing] 93 units; regression equation

b - expressed in vehicles per day

c - expressed in vehicles per hour

As noted, the proposed development will generate approximately 45 morning peak hour trips and 40 evening trips. This equates to less than one additional trip on the roadway system every minute.



<sup>1</sup> Trip Generation (9<sup>th</sup> edition), Institute of Transportation Engineers, Washington DC, 2013



## Comparison to Single Family Detached Housing

The traffic volumes forecasted for the proposed 93 age-restricted homes building program are comparable to those that could otherwise be generated by an alternative as-of right residential development program. Based upon conceptual lotting studies, the site can yield 36 to 39 single family homes lots via traditional subdivision under existing zoning and existing site constraints. Table 5 illustrates a side by side trip generation comparison between the proposed project and a traditional single family subdivision on the site.

Table 5 Single Family Detached Housing Trip Generation

Development Type	Senior Adult Detached Housing <sup>a</sup>	Single Family Detached Housing <sup>b</sup>	As-of Right Single Family Detached Housing <sup>b</sup>
ITE Land Use Code	251	210	210
Size	93 units	36 units	39 units
<b>Weekday Daily<sup>c</sup></b>	440	410	440
<b>Weekday AM<sup>d</sup></b>			
Enter	15	10	10
Exit	30	25	30
Total	45	35	40
<b>Weekday PM</b>			
Enter	25	25	30
Exit	15	15	15
Total	40	40	45

a - Institute of Transportation Engineers, Trip Generation, 9th Edition - Land Use Code 251 [Senior Adult Detached Housing] 93 units; regression equation

b - Institute of Transportation Engineers, Trip Generation, 9th Edition - Land Use Code 210 [Single Family Detached Housing] 36 units; regression equation

c - expressed in vehicles per day

d - expressed in vehicles per hour

## Trip Distribution and Assignment

Traffic distribution patterns for the development were estimated using the observed traffic patterns along the surrounding roadways. Since the only daily-use access for the proposed development is off of Chestnut Street, all traffic for the project will arrive and depart via the Chestnut Street driveway as shown in Table 6. Figure 6 illustrates the anticipated vehicular trip distribution pattern for the proposed development.





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Trip Distribution

Figure 6

466 Chestnut Street  
Ashland, Massachusetts



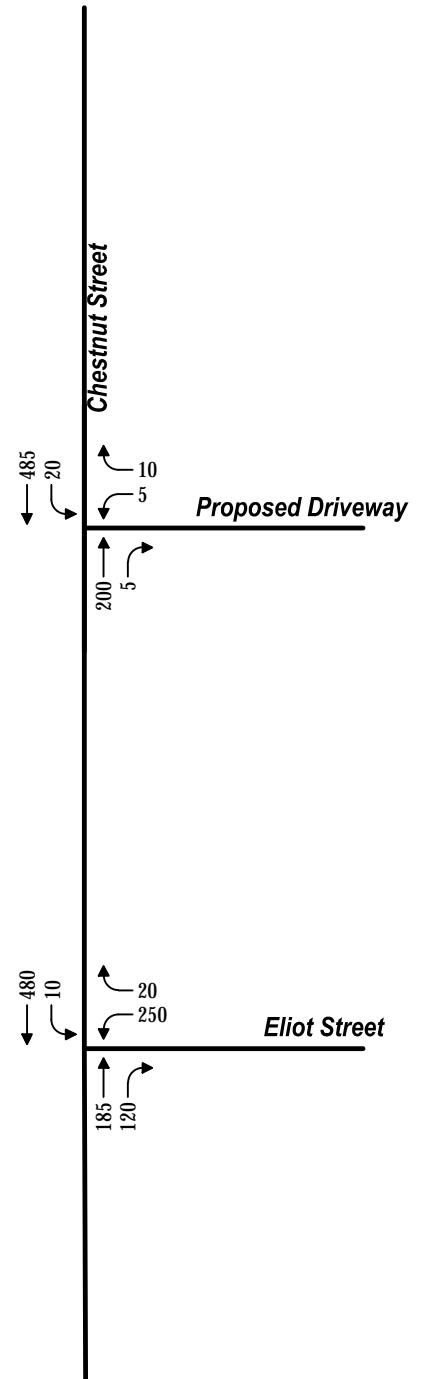
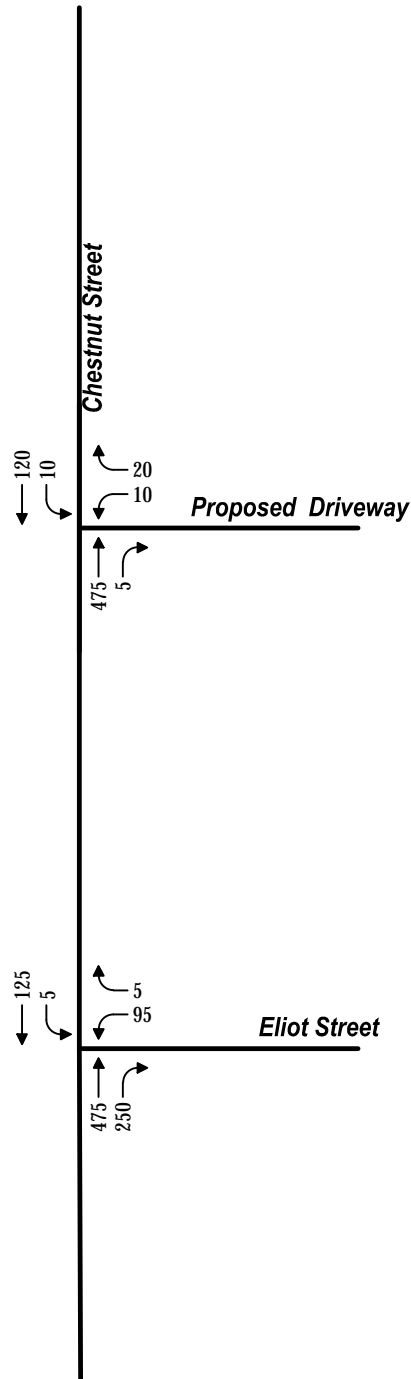
Table 6 Trip Distribution

Travel Route	Direction To/From	Distribution
Chestnut Street	North	75%
	<u>South</u>	<u>25%</u>
	Total	100%

The projected site-generated traffic volumes, as shown in Table 4, were distributed on the study area roadways using the trip distribution shown in Table 6 and added to the 2022 No-Build peak hour traffic volumes to develop the 2022 Build peak hour traffic volumes. These 2022 Build traffic volumes are shown in Figure 7.

WEEKDAY MORNING PEAK HOUR

WEEKDAY EVENING PEAK HOUR



Not to Scale

Vanasse Hangen Brustlin, Inc.

Figure 7: 2022 Build Condition  
June 2015



# Traffic Operations Analysis

Measuring existing traffic volumes and projecting future traffic volumes quantifies traffic within the study area. To assess quality of flow, roadway capacity analyses were conducted with respect to the 2015 Existing conditions and projected 2022 No-Build and Build traffic volume conditions. Capacity analyses provide an indication of the adequacy of the roadway facilities to serve the anticipated traffic demands.

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## Level of Service and Delay Criteria

The evaluation criteria used to analyze area intersections in this traffic study are based on the 2010 Highway Capacity Manual [HCM] <sup>2</sup>(with analysis results for signalized intersections being reported directly from the Synchro 8-analysis methodology).

- Level of service (LOS) is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure of a number of factors including roadway geometrics, speed, travel delay and freedom to maneuver. Level of service provides an index to the operational qualities of a roadway segment or an intersection. Level-of-service designations range from A to F, with LOS A representing the least congested operating conditions and LOS F representing the most congested conditions.
- Delay is a complex measure that depends upon a number of variables such as volume-to-capacity (v/c) ratio, freedom to maneuver, and traffic control. Of all the factors cited, v/c ratios have the least effect on delay. Thus, for any given v/c ratio, a range of delay values [and, therefore, levels of service] may result. Conversely, for a given level of service, the v/c ratio may lie anywhere within a broad range. Comparison of intersection capacity results therefore requires that *in addition to the LOS, the other measures of effectiveness [MOEs] also be considered.*

For unsignalized intersections, the analysis assumes that traffic on the mainline is not affected by traffic on the side streets. Thus, the LOS designation is for the critical movement exiting the side street, and is typically the left turn out of the side street or site driveway.

▼  
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<sup>2</sup> Highway Capacity Manual; Transportation Research Board; 2010.



## Level-of-Service Analysis

Levels-of-service analyses were conducted for the 2015 Existing, 2022 No-Build, and 2022 Build Conditions for the intersections of Eliot Street at Chestnut Street and the proposed site driveway at Chestnut Street. A summary of the capacity analyses for the morning and evening peak hour of the two intersections are presented in Table 7. The capacity analyses worksheets are included in the Appendix.

The analytical methodologies typically used for the analysis of unsignalized intersections use conservative analysis parameters, such as high critical gaps<sup>3</sup>. Actual field observations indicate that drivers on minor streets generally accept smaller gaps in traffic than those used in the analysis procedures and therefore experience less delay than reported by the analysis software. Consequently, the analysis results tend to overstate the actual delays experienced in the field. For this reason, the results of the unsignalized intersection analyses herein should be considered highly conservative.

**Table 7 Unsignalized Intersection Capacity Analysis Summary**

Morning Peak Hour													
Location	Critical Movement	2015 Existing Conditions				2022 No-Build Conditions				2022 Build Conditions <sup>6</sup>			
		Dem <sup>1</sup>	v/c <sup>2</sup>	Del <sup>3</sup>	LOS <sup>4</sup>	Dem	v/c	Del	LOS	Dem	v/c	Del	LOS
Proposed Driveway at Chestnut Street	WB L/R	N/A				N/A				30	0.07	13	B
Eliot Street at Chestnut Street	WB L/R	95	0.29	19	C	100	0.32	20	C	100	0.33	20	C
Evening Peak Hour													
Location	Critical Movement	2015 Existing Conditions				2022 No-Build Conditions				2022 Build Conditions <sup>6</sup>			
		Dem <sup>1</sup>	v/c <sup>2</sup>	Del <sup>3</sup>	LOS <sup>4</sup>	Dem	v/c	Del	LOS	Dem	v/c	Del	LOS
Proposed Driveway at Chestnut Street	WB L/R	N/A				N/A				15	0.03	12	B
Eliot Street at Chestnut Street	WB L/R	260	0.80	45	E	270	0.86	54	F	270	0.87	56	F

Source: VHB, Inc. using Synchro 8 (Build 804, Rev 775) software.

1 demand in vehicles per hour for unsignalized intersections; the demand applies to only the most critical street approach or lane group

2 volume-to-capacity ratio for the critical movement

3 delay of critical approach only, rounded to the nearest whole second

4 level of service

EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; SW = Southwestbound; R = right; L = left

As shown in Table 7, the proposed site driveway at Chestnut Street is projected to operate at LOS B during both morning and evening peak hours.



<sup>3</sup> 'critical gap' is defined as the minimum time, in seconds, between successive major-stream vehicles, in which a minor-street vehicle can make a maneuver



The level of service for Eliot Street at Chestnut Street currently operates at LOS E during the evening peak hour under existing conditions, and the analysis shows that the intersection is projected to deteriorate to LOS F under the 2022 No-Build Condition i.e., without any new traffic from the proposed project. The analysis also shows that the new traffic associated with the proposed residential development will have a negligible impact at this intersection and along the roadway.



# Mitigation & Conclusions

The preceding study has outlined the general impacts of the proposed residential development on the study area roadways. In general, the Project's traffic impacts are expected to be minimal along area roadways and will be easily accommodated by the existing roadway infrastructure surrounding the site.

The overall increase in project-related traffic will be between 10 to 30 vehicles per hour during peak conditions on any given roadway near the project site. With over 550 peak hour trips already traveling along Chestnut Street, this additional volume represents only a small percentage increase and will not represent a significant (or even noticeable) new vehicle trip increase over current peak hour conditions. On this basis no mitigation actions are warranted.

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## Site Access

The primary driveway onto Chestnut Street will be constructed to provide a safe and efficient access point to the overall development given its location and roadway geometry. The driveway has adequate width to provide for reasonable entry and exit of the residents of the development, as well as, for emergency response vehicles; and the location on Chestnut Street affords safe sight lines for all turning movements and approaches.

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## Sight Distance

The primary site driveway has been shifted and will be constructed approximately 18 feet to the north of the current driveway location that remains from the prior office use on the site. Given the placement of the driveway and the noted speeds along Chestnut Street (presented previously in this study), VHB conducted a sight line evaluation to consider both stopping sight distance (SSD) and intersection sight distance (ISD).

SSD is the distance necessary for a vehicle traveling at a certain speed to stop before reaching a stationary object in its path. ISD is the distance provided at an intersection which allows drivers the ability to perceive and react to the presence of potentially conflicting vehicles. As noted, the posted speed limit along Chestnut Street is 30mph,



but the observed 85<sup>th</sup> percentile speed was noted to be 40mph. For safety and design purposes, the higher (observed) speed was utilized in the calculation of both SSD and ISD at this location.

SSD and ISD recommended distances are provided by the American Association of State Highway Transportation Officials (AASHTO).

The recommended SSD for a vehicle traveling 40mph is 305 feet (meaning a driver should be able to clearly see a distance of 305 feet in front of their vehicle as they travel along the roadway).

The recommended ISD for a vehicle turning left out of the Chestnut Street driveway is 445 feet, and is 385 feet for a driver turning right out of the Chestnut Street driveway.

In both cases (SSD and ISD), VHB reviewed the sight lines from a point where the proposed driveway is being considered. Assuming that minor vegetation clearing can be made on the site frontage along Chestnut Street, the following results were obtained:

- SSD provided along Chestnut Street exceeds 400 feet in each direction for approaching vehicles and, therefore, the SSD requirements for this driveway are met.
- ISD provided for drivers exiting the site exceeds 500 feet looking right out of the driveway (and ISD requirements are met in this direction).
- ISD provided for drivers exiting the site is approximately 450 feet looking left out of the driveway (ISD requirements are met also in this direction).

In order to maintain these sight lines, VHB recommends that annual clearing of any overgrown vegetation take place along the site frontage – particularly in the immediate vicinity of the proposed site driveway. Similarly, no signage should be erected that might impede the ability for drivers to see oncoming vehicles along Chestnut Street.

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## Pedestrian Accommodations

It is noted that the site plan proposes a trail connection to the trail network in Warren Woods across Eliot Street in the area of the farm house. While a striped pedestrian crosswalk and appropriate pedestrian crossing signs are recommended, these should be considered carefully in light of the Eliot Road's status as a designated scenic roadway in Ashland.





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## Conclusions & Findings

In reviewing the proposed residential development off of Chestnut Street in Ashland, this study has summarized the current traffic volumes and safety data, projected future conditions, and analyzed expected driveway operations. Based on the information gathered and assessed, the transportation impacts associated with this project will be negligible. Based on typical transportation engineering safety and operational standards, the driveway connection will provide for safe and efficient vehicular access and the pedestrian connectivity will meet the needs of the residents and visitors on the site.

## **APPENDIX**

- Turning Movement Counts
- Automatic Traffic Recorder Counts
- Intersection Capacity Analyses
  - Existing Condition
  - No-Build Condition
  - Build Condition

# TURNING MOVEMENT COUNTS



PRECISION  
D A T A  
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
Office: 508.481.3999 Fax: 508.545.1234  
Email: datarequests@pdillc.com

File Name : 154499 A  
Site Code : TBA  
Start Date : 6/9/2015  
Page No : 1

N/S: Chestnut Street  
E: Eliot Street  
City, State: Ashland, MA  
Client: VHB/ E. Chan

Groups Printed- Cars - Heavy Vehicles

Start Time	Chestnut Street From North			Eliot Street From East			Chestnut Street From South			Int. Total
	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	
07:00 AM	18	4	0	1	14	0	51	74	0	162
07:15 AM	24	0	0	1	27	0	60	100	0	212
07:30 AM	30	2	0	0	19	0	52	124	0	227
07:45 AM	30	2	0	1	26	0	74	116	0	249
<b>Total</b>	<b>102</b>	<b>8</b>	<b>0</b>	<b>3</b>	<b>86</b>	<b>0</b>	<b>237</b>	<b>414</b>	<b>0</b>	<b>850</b>
08:00 AM	26	3	0	3	19	0	55	116	0	222
08:15 AM	36	4	0	0	13	0	48	89	0	190
08:30 AM	34	0	0	2	23	0	31	76	0	166
08:45 AM	27	3	0	1	24	0	32	64	0	151
<b>Total</b>	<b>123</b>	<b>10</b>	<b>0</b>	<b>6</b>	<b>79</b>	<b>0</b>	<b>166</b>	<b>345</b>	<b>0</b>	<b>729</b>
<b>Grand Total</b>	<b>225</b>	<b>18</b>	<b>0</b>	<b>9</b>	<b>165</b>	<b>0</b>	<b>403</b>	<b>759</b>	<b>0</b>	<b>1579</b>
Apprch %	92.6	7.4	0	5.2	94.8	0	34.7	65.3	0	
Total %	14.2	1.1	0	0.6	10.4	0	25.5	48.1	0	
Cars	211	18	0	9	156	0	393	741	0	1528
% Cars	93.8	100	0	100	94.5	0	97.5	97.6	0	96.8
Heavy Vehicles	14	0	0	0	9	0	10	18	0	51
% Heavy Vehicles	6.2	0	0	0	5.5	0	2.5	2.4	0	3.2

Start Time	Chestnut Street From North				Eliot Street From East				Chestnut Street From South				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	24	0	0	24	1	27	0	28	60	100	0	160	212
07:30 AM	30	2	0	32	0	19	0	19	52	124	0	176	227
07:45 AM	30	2	0	32	1	26	0	27	74	116	0	190	249
08:00 AM	26	3	0	29	3	19	0	22	55	116	0	171	222
<b>Total Volume</b>	<b>110</b>	<b>7</b>	<b>0</b>	<b>117</b>	<b>5</b>	<b>91</b>	<b>0</b>	<b>96</b>	<b>241</b>	<b>456</b>	<b>0</b>	<b>697</b>	<b>910</b>
% App. Total	94	6	0		5.2	94.8	0		34.6	65.4	0		
PHF	.917	.583	.000	.914	.417	.843	.000	.857	.814	.919	.000	.917	.914
Cars	100	7	0	107	5	87	0	92	233	447	0	680	879
% Cars	90.9	100	0	91.5	100	95.6	0	95.8	96.7	98.0	0	97.6	96.6
Heavy Vehicles	10	0	0	10	0	4	0	4	8	9	0	17	31
% Heavy Vehicles	9.1	0	0	8.5	0	4.4	0	4.2	3.3	2.0	0	2.4	3.4



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File Name : 154499 A  
Site Code : TBA  
Start Date : 6/9/2015  
Page No : 1

N/S: Chestnut Street  
E: Eliot Street  
City, State: Ashland, MA  
Client: VHB/ E. Chan

Groups Printed- Cars

Start Time	Chestnut Street From North			Eliot Street From East			Chestnut Street From South			Int. Total
	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	
07:00 AM	16	4	0	1	14	0	51	72	0	158
07:15 AM	22	0	0	1	27	0	58	99	0	207
07:30 AM	25	2	0	0	18	0	50	120	0	215
07:45 AM	28	2	0	1	24	0	72	112	0	239
Total	91	8	0	3	83	0	231	403	0	819
08:00 AM	25	3	0	3	18	0	53	116	0	218
08:15 AM	34	4	0	0	13	0	48	85	0	184
08:30 AM	34	0	0	2	22	0	30	74	0	162
08:45 AM	27	3	0	1	20	0	31	63	0	145
Total	120	10	0	6	73	0	162	338	0	709
Grand Total	211	18	0	9	156	0	393	741	0	1528
Apprch %	92.1	7.9	0	5.5	94.5	0	34.7	65.3	0	
Total %	13.8	1.2	0	0.6	10.2	0	25.7	48.5	0	

Start Time	Chestnut Street From North				Eliot Street From East				Chestnut Street From South				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	22	0	0	22	1	27	0	28	58	99	0	157	207
07:30 AM	25	2	0	27	0	18	0	18	50	120	0	170	215
07:45 AM	28	2	0	30	1	24	0	25	72	112	0	184	239
08:00 AM	25	3	0	28	3	18	0	21	53	116	0	169	218
Total Volume	100	7	0	107	5	87	0	92	233	447	0	680	879
% App. Total	93.5	6.5	0		5.4	94.6	0		34.3	65.7	0		
PHF	.893	.583	.000	.892	.417	.806	.000	.821	.809	.931	.000	.924	.919



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File Name : 154499 A  
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Start Date : 6/9/2015  
Page No : 1

N/S: Chestnut Street  
E: Eliot Street  
City, State: Ashland, MA  
Client: VHB/ E. Chan

**Groups Printed- Heavy Vehicles**

Start Time	Chestnut Street From North			Eliot Street From East			Chestnut Street From South			Int. Total
	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	
07:00 AM	2	0	0	0	0	0	0	2	0	4
07:15 AM	2	0	0	0	0	0	2	1	0	5
07:30 AM	5	0	0	0	1	0	2	4	0	12
07:45 AM	2	0	0	0	2	0	2	4	0	10
<b>Total</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>6</b>	<b>11</b>	<b>0</b>	<b>31</b>
08:00 AM	1	0	0	0	1	0	2	0	0	4
08:15 AM	2	0	0	0	0	0	0	4	0	6
08:30 AM	0	0	0	0	1	0	1	2	0	4
08:45 AM	0	0	0	0	4	0	1	1	0	6
<b>Total</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>4</b>	<b>7</b>	<b>0</b>	<b>20</b>
<b>Grand Total</b>	<b>14</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>10</b>	<b>18</b>	<b>0</b>	<b>51</b>
Apprch %	100	0	0	0	100	0	35.7	64.3	0	
Total %	27.5	0	0	0	17.6	0	19.6	35.3	0	

Start Time	Chestnut Street From North				Eliot Street From East				Chestnut Street From South				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	5	0	0	5	0	1	0	1	2	4	0	6	12
07:45 AM	2	0	0	2	0	2	0	2	2	4	0	6	10
08:00 AM	1	0	0	1	0	1	0	1	2	0	0	2	4
08:15 AM	2	0	0	2	0	0	0	0	0	4	0	4	6
<b>Total Volume</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>4</b>	<b>6</b>	<b>12</b>	<b>0</b>	<b>18</b>	<b>32</b>
<b>% App. Total</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>100</b>	<b>33.3</b>	<b>66.7</b>	<b>0</b>	<b>100</b>	<b>100</b>
PHF	.500	.000	.000	.500	.000	.500	.000	.500	.750	.750	.000	.750	.667



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Page No : 1

N/S: Chestnut Street  
E: Eliot Street  
City, State: Ashland, MA  
Client: VHB/ E. Chan

**Groups Printed- Peds and Bikes**

Start Time	Chestnut Street From North				Eliot Street From East				Chestnut Street From South				Int. Total
	Thru	Left	Peds EB	Peds WB	Right	Left	Peds SB	Peds NB	Right	Thru	Peds WB	Peds EB	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	1	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	1	0	0	1
Apprch %	0	0	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	0	0	0	0	0	0	0	100	0	0	

Start Time	Chestnut Street From North					Eliot Street From East					Chestnut Street From South					Int. Total
	Thru	Left	Peds EB	Peds WB	App. Total	Right	Left	Peds SB	Peds NB	App. Total	Right	Thru	Peds WB	Peds EB	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																
Peak Hour for Entire Intersection Begins at 07:00 AM																
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
% App. Total	0	0	0	0	0	0	0	0	0	0	0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.250



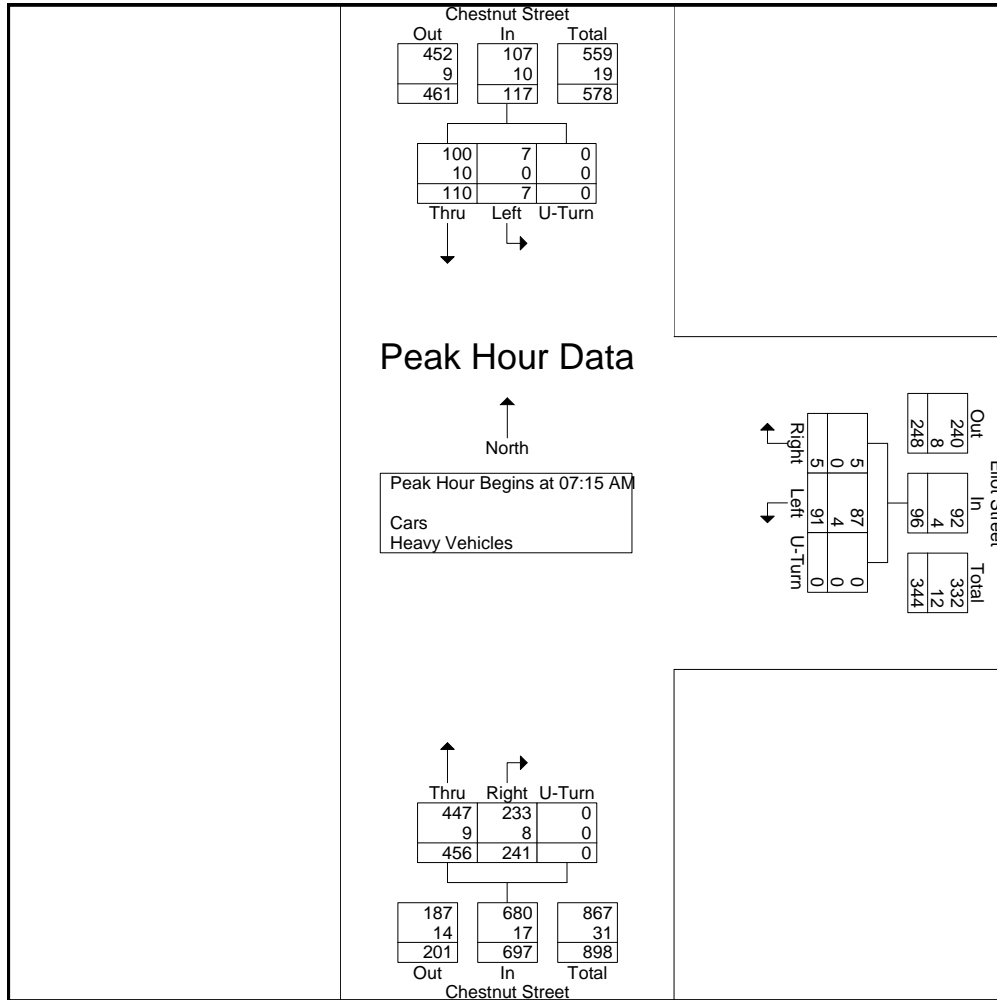
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City, State: Ashland, MA  
Client: VHB/ E. Chan

File Name : 154499 A  
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Start Time	Chestnut Street From North				Eliot Street From East				Chestnut Street From South				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	24	0	0	24	1	27	0	28	60	100	0	160	212
07:30 AM	30	2	0	32	0	19	0	19	52	124	0	176	227
07:45 AM	30	2	0	32	1	26	0	27	74	116	0	190	249
08:00 AM	26	3	0	29	3	19	0	22	55	116	0	171	222
Total Volume	110	7	0	117	5	91	0	96	241	456	0	697	910
% App. Total	94	6	0		5.2	94.8	0		34.6	65.4	0		
PHF	.917	.583	.000	.914	.417	.843	.000	.857	.814	.919	.000	.917	.914
Cars	100	7	0	107	5	87	0	92	233	447	0	680	879
% Cars	90.9	100	0	91.5	100	95.6	0	95.8	96.7	98.0	0	97.6	96.6
Heavy Vehicles	10	0	0	10	0	4	0	4	8	9	0	17	31
% Heavy Vehicles	9.1	0	0	8.5	0	4.4	0	4.2	3.3	2.0	0	2.4	3.4







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File Name : 154499 AA  
Site Code : TBA  
Start Date : 6/9/2015  
Page No : 1

N/S: Chestnut Street  
E: Eliot Street  
City, State: Ashland, MA  
Client: VHB/ E. Chan

Groups Printed- Cars - Heavy Vehicles

Start Time	Chestnut Street From North			Eliot Street From East			Chestnut Street From South			Int. Total
	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	
07:00 AM	73	2	0	1	48	0	36	41	0	201
07:15 AM	95	1	0	3	42	0	23	30	0	194
07:30 AM	112	3	1	3	61	0	21	26	0	227
07:45 AM	71	4	0	5	52	0	32	47	0	211
Total	351	10	1	12	203	0	112	144	0	833
08:00 AM	121	3	0	3	52	0	30	48	0	257
08:15 AM	134	2	0	2	68	0	24	36	0	266
08:30 AM	106	1	0	5	67	0	27	53	0	259
08:45 AM	98	6	0	8	55	0	34	39	0	240
Total	459	12	0	18	242	0	115	176	0	1022
Grand Total	810	22	1	30	445	0	227	320	0	1855
Apprch %	97.2	2.6	0.1	6.3	93.7	0	41.5	58.5	0	
Total %	43.7	1.2	0.1	1.6	24	0	12.2	17.3	0	
Cars	796	22	1	30	442	0	225	309	0	1825
% Cars	98.3	100	100	100	99.3	0	99.1	96.6	0	98.4
Heavy Vehicles	14	0	0	0	3	0	2	11	0	30
% Heavy Vehicles	1.7	0	0	0	0.7	0	0.9	3.4	0	1.6

Start Time	Chestnut Street From North				Eliot Street From East				Chestnut Street From South				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	121	3	0	124	3	52	0	55	30	48	0	78	257
08:15 AM	134	2	0	136	2	68	0	70	24	36	0	60	266
08:30 AM	106	1	0	107	5	67	0	72	27	53	0	80	259
08:45 AM	98	6	0	104	8	55	0	63	34	39	0	73	240
Total Volume	459	12	0	471	18	242	0	260	115	176	0	291	1022
% App. Total	97.5	2.5	0		6.9	93.1	0		39.5	60.5	0		
PHF	.856	.500	.000	.866	.563	.890	.000	.903	.846	.830	.000	.909	.961
Cars	453	12	0	465	18	240	0	258	115	175	0	290	1013
% Cars	98.7	100	0	98.7	100	99.2	0	99.2	100	99.4	0	99.7	99.1
Heavy Vehicles	6	0	0	6	0	2	0	2	0	1	0	1	9
% Heavy Vehicles	1.3	0	0	1.3	0	0.8	0	0.8	0	0.6	0	0.3	0.9



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Start Date : 6/9/2015  
Page No : 1

N/S: Chestnut Street  
E: Eliot Street  
City, State: Ashland, MA  
Client: VHB/ E. Chan

Groups Printed- Cars

Start Time	Chestnut Street From North			Eliot Street From East			Chestnut Street From South			Int. Total
	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	
07:00 AM	72	2	0	1	48	0	36	35	0	194
07:15 AM	93	1	0	3	42	0	22	28	0	189
07:30 AM	110	3	1	3	60	0	21	24	0	222
07:45 AM	68	4	0	5	52	0	31	47	0	207
Total	343	10	1	12	202	0	110	134	0	812
08:00 AM	117	3	0	3	52	0	30	48	0	253
08:15 AM	134	2	0	2	66	0	24	35	0	263
08:30 AM	105	1	0	5	67	0	27	53	0	258
08:45 AM	97	6	0	8	55	0	34	39	0	239
Total	453	12	0	18	240	0	115	175	0	1013
Grand Total	796	22	1	30	442	0	225	309	0	1825
Apprch %	97.2	2.7	0.1	6.4	93.6	0	42.1	57.9	0	
Total %	43.6	1.2	0.1	1.6	24.2	0	12.3	16.9	0	

Start Time	Chestnut Street From North				Eliot Street From East				Chestnut Street From South				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	117	3	0	120	3	52	0	55	30	48	0	78	253
08:15 AM	134	2	0	136	2	66	0	68	24	35	0	59	263
08:30 AM	105	1	0	106	5	67	0	72	27	53	0	80	258
08:45 AM	97	6	0	103	8	55	0	63	34	39	0	73	239
Total Volume	453	12	0	465	18	240	0	258	115	175	0	290	1013
% App. Total	97.4	2.6	0		7	93	0		39.7	60.3	0		
PHF	.845	.500	.000	.855	.563	.896	.000	.896	.846	.825	.000	.906	.963



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Page No : 1

N/S: Chestnut Street  
E: Eliot Street  
City, State: Ashland, MA  
Client: VHB/ E. Chan

**Groups Printed- Heavy Vehicles**

Start Time	Chestnut Street From North			Eliot Street From East			Chestnut Street From South			Int. Total
	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	
07:00 AM	1	0	0	0	0	0	0	6	0	7
07:15 AM	2	0	0	0	0	0	1	2	0	5
07:30 AM	2	0	0	0	1	0	0	2	0	5
07:45 AM	3	0	0	0	0	0	1	0	0	4
<b>Total</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>10</b>	<b>0</b>	<b>21</b>
08:00 AM	4	0	0	0	0	0	0	0	0	4
08:15 AM	0	0	0	0	2	0	0	1	0	3
08:30 AM	1	0	0	0	0	0	0	0	0	1
08:45 AM	1	0	0	0	0	0	0	0	0	1
<b>Total</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>9</b>
<b>Grand Total</b>	<b>14</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>11</b>	<b>0</b>	<b>30</b>
Apprch %	100	0	0	0	100	0	15.4	84.6	0	
Total %	46.7	0	0	0	10	0	6.7	36.7	0	

Start Time	Chestnut Street From North				Eliot Street From East				Chestnut Street From South				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	1	0	0	1	0	0	0	0	0	6	0	6	7
07:15 AM	2	0	0	2	0	0	0	0	1	2	0	3	5
07:30 AM	2	0	0	2	0	1	0	1	0	2	0	2	5
07:45 AM	3	0	0	3	0	0	0	0	1	0	0	1	4
<b>Total Volume</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>10</b>	<b>0</b>	<b>12</b>	<b>21</b>
<b>% App. Total</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>100</b>	<b>16.7</b>	<b>83.3</b>	<b>0</b>	<b>100</b>	
PHF	.667	.000	.000	.667	.000	.250	.000	.250	.500	.417	.000	.500	.750



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N/S: Chestnut Street  
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City, State: Ashland, MA  
Client: VHB/ E. Chan

**Groups Printed- Peds and Bikes**

Start Time	Chestnut Street From North				Eliot Street From East				Chestnut Street From South				Int. Total
	Thru	Left	Peds EB	Peds WB	Right	Left	Peds SB	Peds NB	Right	Thru	Peds WB	Peds EB	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
07:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	0	0	1	0	0	0	0	0	0	0	2
08:00 AM	0	0	0	0	0	0	0	0	1	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	1	0	0	0	1
Total	0	0	0	0	0	0	0	0	2	0	0	0	2
Grand Total	0	1	0	0	1	0	0	0	2	0	0	0	4
Apprch %	0	100	0	0	100	0	0	0	100	0	0	0	
Total %	0	25	0	0	25	0	0	0	50	0	0	0	

Start Time	Chestnut Street From North					Eliot Street From East					Chestnut Street From South					Int. Total
	Thru	Left	Peds EB	Peds WB	App. Total	Right	Left	Peds SB	Peds NB	App. Total	Right	Thru	Peds WB	Peds EB	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																
Peak Hour for Entire Intersection Begins at 07:15 AM																
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:30 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	
07:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	
08:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
Total Volume	0	1	0	0	1	1	0	0	0	1	1	0	0	0	3	
% App. Total	0	100	0	0		100	0	0	0		100	0	0	0		
PHF	.000	.250	.000	.000	.250	.250	.000	.000	.000	.250	.250	.000	.000	.000	.750	



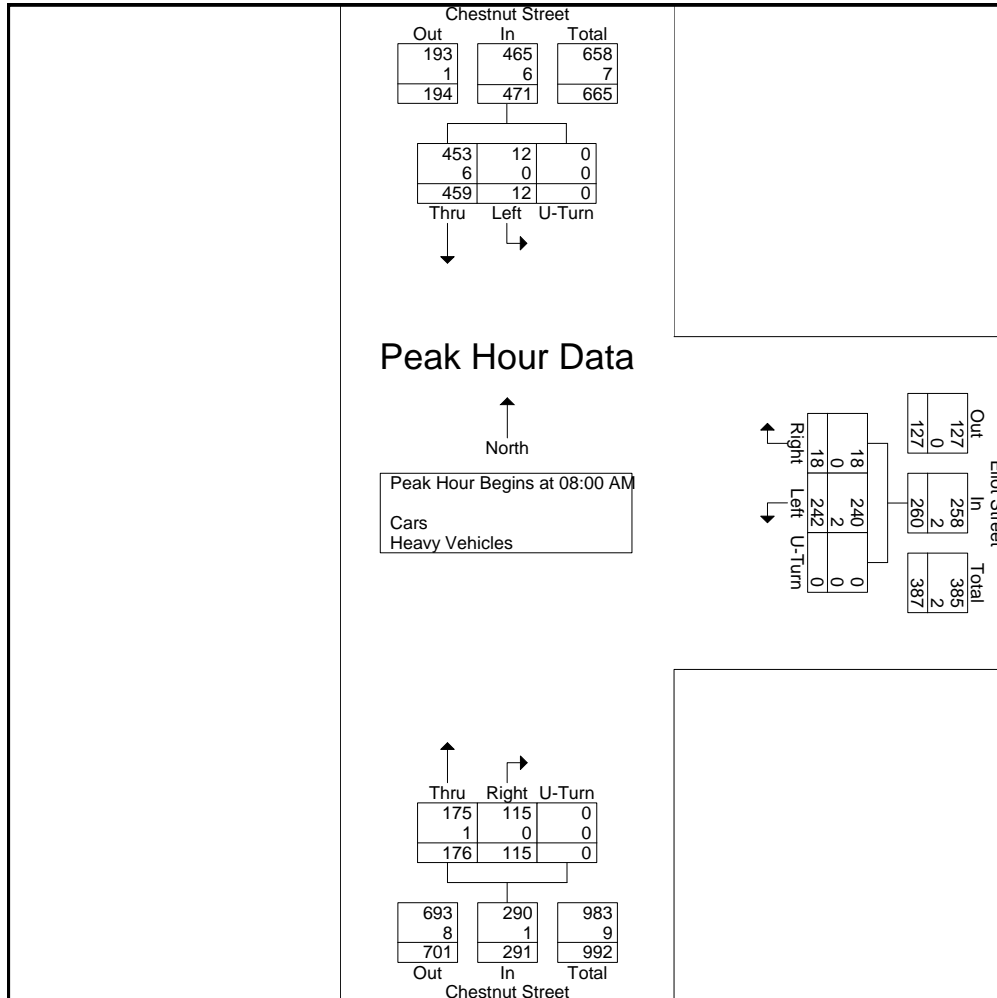
PRECISION  
D A T A  
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
Office: 508.481.3999 Fax: 508.545.1234  
Email: datarequests@pdillc.com

N/S: Chestnut Street  
E: Eliot Street  
City, State: Ashland, MA  
Client: VHB/ E. Chan

File Name : 154499 AA  
Site Code : TBA  
Start Date : 6/9/2015  
Page No : 1

Start Time	Chestnut Street From North				Eliot Street From East				Chestnut Street From South				Int. Total
	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	121	3	0	124	3	52	0	55	30	48	0	78	257
08:15 AM	134	2	0	136	2	68	0	70	24	36	0	60	266
08:30 AM	106	1	0	107	5	67	0	72	27	53	0	80	259
08:45 AM	98	6	0	104	8	55	0	63	34	39	0	73	240
Total Volume	459	12	0	471	18	242	0	260	115	176	0	291	1022
% App. Total	97.5	2.5	0		6.9	93.1	0		39.5	60.5	0		
PHF	.856	.500	.000	.866	.563	.890	.000	.903	.846	.830	.000	.909	.961
Cars	453	12	0	465	18	240	0	258	115	175	0	290	1013
% Cars	98.7	100	0	98.7	100	99.2	0	99.2	100	99.4	0	99.7	99.1
Heavy Vehicles	6	0	0	6	0	2	0	2	0	1	0	1	9
% Heavy Vehicles	1.3	0	0	1.3	0	0.8	0	0.8	0	0.6	0	0.3	0.9



# **AUTOMATIC TRAFFIC RECORDER COUNTS**

Chestnut Street  
north of Eliot Street  
City, State: Ashland, MA  
Client: VHB/E. Chen



PRECISION  
D A T A  
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
Office: 508.481.3999 Fax: 508.545.1234  
Email: datarequests@pdillc.com

154499 A Volume  
Site Code: TBD  
Date Start: 09-Jun-15

Start Time	SB		NB		Combin ed		09-Jun-15 Tue
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	
12:00	2	30	2	27	4	57	
12:15	3	37	0	28	3	65	
12:30	2	29	2	29	4	58	
12:45	2	9 50	146	2 6 25	109	4 15 75	255
01:00	4	31	1	26	5	57	
01:15	1	27	1	33	2	60	
01:30	1	36	1	30	2	66	
01:45	0	6 33	127	1 4 33	122	1 10 66	249
02:00	0	36	0	19	0	55	
02:15	1	45	1	44	2	89	
02:30	0	57	0	43	0	100	
02:45	0	1 48	186	0 1 35	141	0 2 83	327
03:00	0	56	0	30	0	86	
03:15	0	64	0	38	0	102	
03:30	0	85	0	32	0	117	
03:45	0	0 66	271	0 0 34	134	0 0 100	405
04:00	1	77	3	42	4	119	
04:15	0	95	3	31	3	126	
04:30	0	115	7	31	7	146	
04:45	2	3 73	360	3 16 52	156	5 19 125	516
05:00	0	126	5	53	5	179	
05:15	3	133	10	40	13	173	
05:30	5	108	22	58	27	166	
05:45	10	18 105	472	36 73 45	196	46 91 150	668
06:00	10	97	46	39	56	136	
06:15	15	57	59	45	74	102	
06:30	24	76	58	41	82	117	
06:45	23	72 46	276	80 243 27	152	103 315 73	428
07:00	22	49	77	25	99	74	
07:15	24	41	99	23	123	64	
07:30	32	40	120	13	152	53	
07:45	32	110 21	151	121 417 17	78	153 527 38	229
08:00	28	33	113	23	141	56	
08:15	41	36	94	13	135	49	
08:30	32	18	78	20	110	38	
08:45	30	131 23	110	66 351 10	66	96 482 33	176
09:00	41	18	52	13	93	31	
09:15	21	17	52	9	73	26	
09:30	34	21	37	9	71	30	
09:45	17	113 14	70	37 178 11	42	54 291 25	112
10:00	24	11	31	8	55	19	
10:15	20	9	33	6	53	15	
10:30	29	5	33	8	62	13	
10:45	22	95 7	32	34 131 5	27	56 226 12	59
11:00	15	5	29	7	44	12	
11:15	25	6	25	3	50	9	
11:30	30	7	38	4	68	11	
11:45	27	97 6	24	33 125 2	16	60 222 8	40
Total	655	2225	1545	1239	2200	3464	
Percent	29.8%	64.2%	70.2%	35.8%			
Day Total		2880		2784		5664	
Peak Vol.	08:15 144	- 472	- 453	07:15 203	- 581	- 668	- - -
P.H.F.	0.878	0.887	0.936	0.875	0.949	0.933	

Chestnut Street  
north of Eliot Street  
City, State: Ashland, MA  
Client: VHB/E. Chen



PRECISION  
D A T A  
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503  
Office: 508.481.3999 Fax: 508.545.1234  
Email: datarequests@pdillc.com

154499 A Volume  
Site Code: TBD  
Date Start: 09-Jun-15

Start Time	SB		NB		Combin ed		10-Jun-15 Wed
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	
12:00	4	41	4	25	8	66	
12:15	10	24	1	31	11	55	
12:30	4	24	0	27	4	51	
12:45	0	18	35	124	1	70	242
01:00	5	27	0	29	5	56	
01:15	0	32	1	30	1	62	
01:30	0	27	0	32	0	59	
01:45	1	6	29	115	0	62	239
02:00	0	31	1	38	1	69	
02:15	0	46	0	35	0	81	
02:30	0	60	2	43	2	103	
02:45	1	1	65	202	0	98	351
03:00	0	59	2	36	2	95	
03:15	0	67	0	34	0	101	
03:30	1	75	0	50	1	125	
03:45	0	1	82	283	2	114	435
04:00	1	86	2	35	3	121	
04:15	2	86	5	48	7	134	
04:30	1	90	4	26	5	116	
04:45	2	6	94	356	4	127	498
05:00	2	124	5	53	7	177	
05:15	4	137	10	44	14	181	
05:30	7	107	22	58	29	165	
05:45	13	26	100	468	34	152	675
06:00	15	86	36	32	51	118	
06:15	10	76	56	41	66	117	
06:30	25	72	66	38	91	110	
06:45	21	71	48	282	81	81	426
07:00	25	48	91	38	116	86	
07:15	32	69	103	34	135	103	
07:30	26	37	113	31	139	68	
07:45	32	115	41	195	119	62	319
08:00	27	37	111	19	138	56	
08:15	45	34	87	19	132	53	
08:30	30	33	86	16	116	49	
08:45	38	140	30	134	68	47	205
09:00	26	23	58	18	84	41	
09:15	29	14	47	11	76	25	
09:30	24	17	38	20	62	37	
09:45	23	102	17	71	29	24	127
10:00	26	14	40	18	66	32	
10:15	23	13	31	11	54	24	
10:30	22	10	27	7	49	17	
10:45	37	108	7	44	36	9	82
11:00	31	14	24	4	55	18	
11:15	19	15	43	3	62	18	
11:30	29	7	29	4	58	11	
11:45	30	109	2	38	43	2	49
Total	703	2312	1562	1336	2265	3648	
Percent	31.0%	63.4%	69.0%	36.6%			
Day Total		3015		2898		5913	
Peak Vol.	08:00	-	05:00	-	07:15	-	05:00
P.H.F.	140	-	468	-	446	-	207
	0.778	-	0.854	-	0.937	-	0.892



# **INTERSECTION CAPACITY ANALYSES**

## Existing Condition

**Intersection**

Int Delay, s/veh 2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	90	5	455	240	5	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	92	92	91	91
Heavy Vehicles, %	4	4	2	2	9	9
Mvmt Flow	105	6	495	261	5	121

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	757	625	0 0 755 0
Stage 1	625	-	- - - -
Stage 2	132	-	- - - -
Critical Hdwy	6.44	6.24	- - 4.19 -
Critical Hdwy Stg 1	5.44	-	- - - -
Critical Hdwy Stg 2	5.44	-	- - - -
Follow-up Hdwy	3.536	3.336	- - 2.281 -
Pot Cap-1 Maneuver	373	481	- - 825 -
Stage 1	530	-	- - - -
Stage 2	889	-	- - - -
Platoon blocked, %			- - - -
Mov Cap-1 Maneuver	371	481	- - 825 -
Mov Cap-2 Maneuver	371	-	- - - -
Stage 1	530	-	- - - -
Stage 2	884	-	- - - -

Approach	WB	NB	SB
HCM Control Delay, s	18.5	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	376	825	-
HCM Lane V/C Ratio	-	-	0.294	0.007	-
HCM Control Delay (s)	-	-	18.5	9.4	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0	-

**Intersection**

Int Delay, s/veh 0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	0	0	460	0	0	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	500	0	0	125

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	625	500	0
Stage 1	500	-	-
Stage 2	125	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	449	571	1064
Stage 1	609	-	-
Stage 2	901	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	449	571	1064
Mov Cap-2 Maneuver	449	-	-
Stage 1	609	-	-
Stage 2	901	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1064	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	0	0	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	-

**Intersection**

Int Delay, s/veh 11.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	240	20	175	115	10	460
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	91	91	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	267	22	192	126	11	529

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	807	255	0
Stage 1	255	-	-
Stage 2	552	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	351	784	1241
Stage 1	788	-	-
Stage 2	577	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	346	784	1241
Mov Cap-2 Maneuver	346	-	-
Stage 1	788	-	-
Stage 2	569	-	-

Approach	WB	NB	SB
HCM Control Delay, s	44.6	0	0.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	362	1241
HCM Lane V/C Ratio	-	-	0.798	0.009
HCM Control Delay (s)	-	-	44.6	7.9
HCM Lane LOS	-	-	E	A
HCM 95th %tile Q(veh)	-	-	6.8	0

HCM 2010 TWSC  
 2: Chestnut Street & Proposed Driveway

6/21/2015

**Intersection**

Int Delay, s/veh 0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	0	0	195	0	0	470
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	212	0	0	511

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	723	212	0
Stage 1	212	-	-
Stage 2	511	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	393	828	1358
Stage 1	823	-	-
Stage 2	602	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	393	828	1358
Mov Cap-2 Maneuver	393	-	-
Stage 1	823	-	-
Stage 2	602	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1358	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	0	0	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	-

## **No-Build Condition**

**Intersection**

Int Delay, s/veh 2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	95	5	470	250	5	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	92	92	91	91
Heavy Vehicles, %	4	4	2	2	9	9
Mvmt Flow	110	6	511	272	5	126

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	784	647	0 0 783 0
Stage 1	647	-	- - - -
Stage 2	137	-	- - - -
Critical Hdwy	6.44	6.24	- - 4.19 -
Critical Hdwy Stg 1	5.44	-	- - - -
Critical Hdwy Stg 2	5.44	-	- - - -
Follow-up Hdwy	3.536	3.336	- - 2.281 -
Pot Cap-1 Maneuver	359	467	- - 805 -
Stage 1	517	-	- - - -
Stage 2	885	-	- - - -
Platoon blocked, %			- - - -
Mov Cap-1 Maneuver	356	467	- - 805 -
Mov Cap-2 Maneuver	356	-	- - - -
Stage 1	517	-	- - - -
Stage 2	879	-	- - - -

Approach	WB	NB	SB
HCM Control Delay, s	19.7	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	360	805	-
HCM Lane V/C Ratio	-	-	0.323	0.007	-
HCM Control Delay (s)	-	-	19.7	9.5	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.4	0	-



**Intersection**

Int Delay, s/veh 0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	0	0	475	0	0	120
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	516	0	0	130

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	646	516	0
Stage 1	516	-	-
Stage 2	130	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	436	559	1050
Stage 1	599	-	-
Stage 2	896	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	436	559	1050
Mov Cap-2 Maneuver	436	-	-
Stage 1	599	-	-
Stage 2	896	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1050	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	0	0	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	-

**Intersection**

Int Delay, s/veh 13.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	250	20	180	120	10	475
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	91	91	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	278	22	198	132	11	546

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	833	264	0
Stage 1	264	-	-
Stage 2	569	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	339	775	1229
Stage 1	780	-	-
Stage 2	566	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	335	775	1229
Mov Cap-2 Maneuver	335	-	-
Stage 1	780	-	-
Stage 2	559	-	-

Approach	WB	NB	SB
HCM Control Delay, s	53.9	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	350	1229	-
HCM Lane V/C Ratio	-	-	0.857	0.009	-
HCM Control Delay (s)	-	-	53.9	8	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	7.9	0	-

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**Intersection**

Int Delay, s/veh 0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	0	0	200	0	0	485
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	217	0	0	527

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	744	217	0
Stage 1	217	-	-
Stage 2	527	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	382	823	1353
Stage 1	819	-	-
Stage 2	592	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	382	823	1353
Mov Cap-2 Maneuver	382	-	-
Stage 1	819	-	-
Stage 2	592	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1353	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	0	0	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	-

## **Build Condition**

**Intersection**

Int Delay, s/veh 2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	95	5	475	250	5	125
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	92	92	91	91
Heavy Vehicles, %	4	4	2	2	9	9
Mvmt Flow	110	6	516	272	5	137

Major/Minor	Minor1	Minor2	Major1	Major2	Major3	Major4
Conflicting Flow All	800	652	0	0	788	0
Stage 1	652	-	-	-	-	-
Stage 2	148	-	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	4.19	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	2.281	-
Pot Cap-1 Maneuver	351	464	-	-	801	-
Stage 1	515	-	-	-	-	-
Stage 2	875	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	349	464	-	-	801	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	515	-	-	-	-	-
Stage 2	869	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.1	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	353	801	-
HCM Lane V/C Ratio	-	-	0.329	0.007	-
HCM Control Delay (s)	-	-	20.1	9.5	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.4	0	-

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**Intersection**

Int Delay, s/veh 0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	10	20	475	5	10	120
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	22	516	5	11	130

Major/Minor	Minor1	Minor2	Major1	Major2	Major3	Major4
Conflicting Flow All	671	519	0	0	522	0
Stage 1	519	-	-	-	-	-
Stage 2	152	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	422	557	-	-	1044	-
Stage 1	597	-	-	-	-	-
Stage 2	876	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	417	557	-	-	1044	-
Mov Cap-2 Maneuver	417	-	-	-	-	-
Stage 1	597	-	-	-	-	-
Stage 2	866	-	-	-	-	-

Approach	WB	WB	NB	SB
HCM Control Delay, s	12.7		0	0.7
HCM LOS	B			

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	501	1044	-
HCM Lane V/C Ratio	-	-	0.065	0.01	-
HCM Control Delay (s)	-	-	12.7	8.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

**Intersection**

Int Delay, s/veh 14.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	250	20	185	120	10	480
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	91	91	87	87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	278	22	203	132	11	552

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	844	269	0 0 335 0
Stage 1	269	-	- - - -
Stage 2	575	-	- - - -
Critical Hdwy	6.42	6.22	- - 4.12 -
Critical Hdwy Stg 1	5.42	-	- - - -
Critical Hdwy Stg 2	5.42	-	- - - -
Follow-up Hdwy	3.518	3.318	- - 2.218 -
Pot Cap-1 Maneuver	334	770	- - 1224 -
Stage 1	776	-	- - - -
Stage 2	563	-	- - - -
Platoon blocked, %			- - - -
Mov Cap-1 Maneuver	330	770	- - 1224 -
Mov Cap-2 Maneuver	330	-	- - - -
Stage 1	776	-	- - - -
Stage 2	556	-	- - - -

Approach	WB	NB	SB
HCM Control Delay, s	56.4	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	345	1224	-
HCM Lane V/C Ratio	-	-	0.87	0.009	-
HCM Control Delay (s)	-	-	56.4	8	0
HCM Lane LOS	-	-	F	A	A
HCM 95th %tile Q(veh)	-	-	8.2	0	-

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**Intersection**

Int Delay, s/veh 0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	5	10	200	5	20	485
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	11	217	5	22	527

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	791	220	0
Stage 1	220	-	-
Stage 2	571	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	358	820	1346
Stage 1	817	-	-
Stage 2	565	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	350	820	1346
Mov Cap-2 Maneuver	350	-	-
Stage 1	817	-	-
Stage 2	552	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	566	1346
HCM Lane V/C Ratio	-	-	0.029	0.016
HCM Control Delay (s)	-	-	11.5	7.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0