Town of Stow
PLANNING DEPARTMENT
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Stow, Massachusetts 01775-1122
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planning@stow-ma.gov

Addendum #1

DATE: June 8, 2022

TO: Prospective Bidders and Others

FROM: Jesse Steadman – Stow Town Planner

SUBJECT: Addendum #1 – Town of Stow Hudson Road/Route 117 Intersection Improvements

This addendum provides responses to bidder questions received by the Planning Department and noted during the June 1, 2022 Pre-Proposal Conference.

Pre-Proposal Conference Attendance List:

Kien Ho	Beta Group
Dennis Flynn	Beta Group
Gregory Lucas	Environmental Partners
Wing Wong	Green International
Matthew Soltys	Nitsch Engineering

Question #1
Can the Town clarify when the existing survey for Great Road was completed and whether any other survey plans may be available?

Response #1
The Town of Stow is including two additional survey plans for a 2011 sidewalk design, which includes portions of the project area attached to this Addendum #1. Full size PDF formats will be uploaded to the Bid and Proposal page on the Town's website at https://www.stow-ma.gov/home/pages/bids-and-proposals.

Question #2
Can the Town provide further clarification on the anticipated schedule for the design services?

Response #2
The Town of Stow is submitting a MassWorks Application for construction funding for the intersection improvements. If successful, the grant award would be noticed in the fall of 2022, with expected construction start in the 2023 construction season.

The Town therefore anticipates that design will commence in July 2022, and conclude by the end of the calendar year to provide an opportunity for bidding the project in the event of a successful grant award.

Question #3
Does the Town have access to the traffic study prepared for the proposed Hudson Road development?

Response #3
The Town is making available a *Transportation Impact Assessment*, authored by Vanasse and Associates, Inc. for Athens Street, LLC, in regard to the proposed Active Adult Residential Community off Athens Lane in Stow. The Assessment can be found as Attachment #2 to this Addendum. Additionally, a PDF format will be uploaded to the Bid and Proposal page on the Town's website at https://www.stow-ma.gov/home/pages/bids-and-proposals.

Question #4
Via Email from Kien Ho, Beta Group: What is the anticipated design and construction administration budget allocated for this project?

Response #4
The Town has estimated approximately $90,000.00 for design and approximately $20,000 for construction administration.

Attachment #1

MEMORANDUM

TO: Mr. Bruce Wheeler
Athens Street LLC
148 Park Street
North Reading, MA 01864

FROM: Mr. Jeffrey S. Dirk, P.E., PTOE, FITE
Managing Partner
Vanasse & Associates, Inc.
35 New England Business Center Drive
Suite 140
Andover, MA 01810-1066
(978) 269-6830
jdirk@rdva.com
Professional Engineer in CT, MA, ME, NH, RI and VA

DATE: April 19, 2022

RE: 9026

SUBJECT: Transportation Impact Assessment
Proposed Active Adult Residential Community – Athens Street
Stow, Massachusetts

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a residential community to be located off of Athens Street in Stow, Massachusetts, that will be designed and marketed toward active adults (hereafter referred to as the "Project"). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing traffic conditions and future traffic conditions, both with and without the Project along Hudson Road and at the intersections of Great Road (Route 117) at Hudson Road, Hudson Road at Athens Street, and Hudson Road at Edson Street. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the Institute of Transportation Engineers (ITE)[1] for a housing community marketed towards, but not restricted to, seniors, the Project is expected to generate approximately 1,034 vehicle trips on an average weekday (two-way, 24-hour volume), with 84 vehicle trips expected during the weekday morning peak-hour and 105 vehicle trips expected during the weekday evening peak-hour;

2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build condition); however, it was noted that the Hudson Road northbound approach to Route 117 is predicted to operate over capacity (defined as level-of-service (LOS) "F") during both the weekday morning and evening peak hours independent of the Project, with Project-related impacts on this approach defined as a general increase in average motorist delay that resulted in an increase in vehicle queuing of up to seven (7) vehicles;

[1] *Trip Generation,* 11th Edition; Institute of Transportation Engineers; Washington, DC; 2021.

3. All movements at the Hudson Road/Athens Street intersection (the access to the Project site) are predicted to operate at LOS C or better with the addition of Project-related traffic where a LOS of "D" or better is defined as "acceptable" traffic operations;

4. Independent of the Project, the Route 117/Hudson Road intersection was found to have a motor vehicle crash rate that is above the Massachusetts Department of Transportation (MassDOT) statewide and District 3 average crash rates for an unsignalized intersection. As such, specific recommendations have been provided to advance safety related improvements at this intersection; and

5. Lines of sight at the Hudson Road/Athens Street intersection were found to exceed the recommended minimum distance for the intersection to operate in a safe and efficient manner based on the appropriate approach speed.

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

The following details our assessment of the Project.

PROJECT DESCRIPTION

The Project will entail the construction of a 141±-unit residential community to be located off Athens Street in Stow, Massachusetts. The residential community will include both single-family homes and cottage style units that will be designed and marketed toward active adults, and will be advanced on several parcels of land. The north portion will contain 50 single-family homes and the south portion will contain 70 single-family homes and 21 single-floor cottage-style units. The Project site encompasses approximately 120± acres of land bound by the Bose Corporation Stow Campus, residential properties, and areas of open and wooded space to the north; a commercial property and areas of open and wooded space to the south; and residential properties and areas of open and wooded space to the east and west. The Project site currently contains several vacant buildings and associated appurtenances that will be removed to accommodate the Project. Access to the Project site will be provided by way of Athens Street, which will be improved (widened) and paved.

Imagery ©2021 Google

On-site parking will be provided for approximately 310 vehicles, or a parking ratio of 2.2 parking spaces per unit, which is consistent with the parking requirements for residential dwellings with consideration of visitor parking as specified by Section 7.3.3.3, *Schedule of Minimum Parking: Residential*, of the Town of Stow Zoning Bylaws.[2]

STUDY METHODOLOGY

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

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

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A seven-year time horizon from the date of publication of this assessment was selected for analyses consistent with MassDOT guidelines. The analysis conducted in stage two identifies existing or projected future capacity, safety, and access issues, as these areas relate to the transportation infrastructure.

The third stage of the study presents and evaluates measures to address deficiencies in the transportation infrastructure, if any, identified in stage two of the study.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in June and July 2021. This inventory included the collection of traffic-volume data and vehicle travel speed measurements, as well as a review of existing pedestrian and bicycle accommodations, public transportation services, and motor vehicle crash data. The following summarizes existing conditions within the study area.

Roadways

Hudson Road

Hudson Road is a two-lane, urban collector roadway that is under town jurisdiction and traverses the study area in a north-south direction. In the vicinity of the Project site, Hudson Road provides two 11-foot-wide lanes that are separated by a double-yellow centerline with 2 to 3-foot wide marked shoulders. The posted speed limit in the vicinity of the Project site is 40 miles per hour (mph), with prevailing travel speeds measured in July 2021 found to be 44 mph in both directions.[3] Sidewalks and illumination are not provided in the vicinity of the Project site. Land use along Hudson Road within the study area consists of the Project site and residential and commercial properties.

[2]Two spaces per dwelling unit is required for residential dwellings containing less than five bedrooms plus one parking space for each additional bedroom and sufficient off-street parking for visitors.

[3]The prevailing travel speed is also known as the 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below during the observation period.

Athens Street

Athens Street is a 10± foot wide, unimproved gravel roadway that traverses a general east-west direction for a distance of approximately 2,265 linear feet (lf) west of Hudson Road and provides access to several vacant buildings that are situated within the Project site. Athens Street will be widened and paved to accommodate access to the Project.

Intersections

Table 1 and Figure 1 summarize existing lane use, traffic control, and pedestrian and bicycle accommodations at the study area intersections as observed in July 2021.

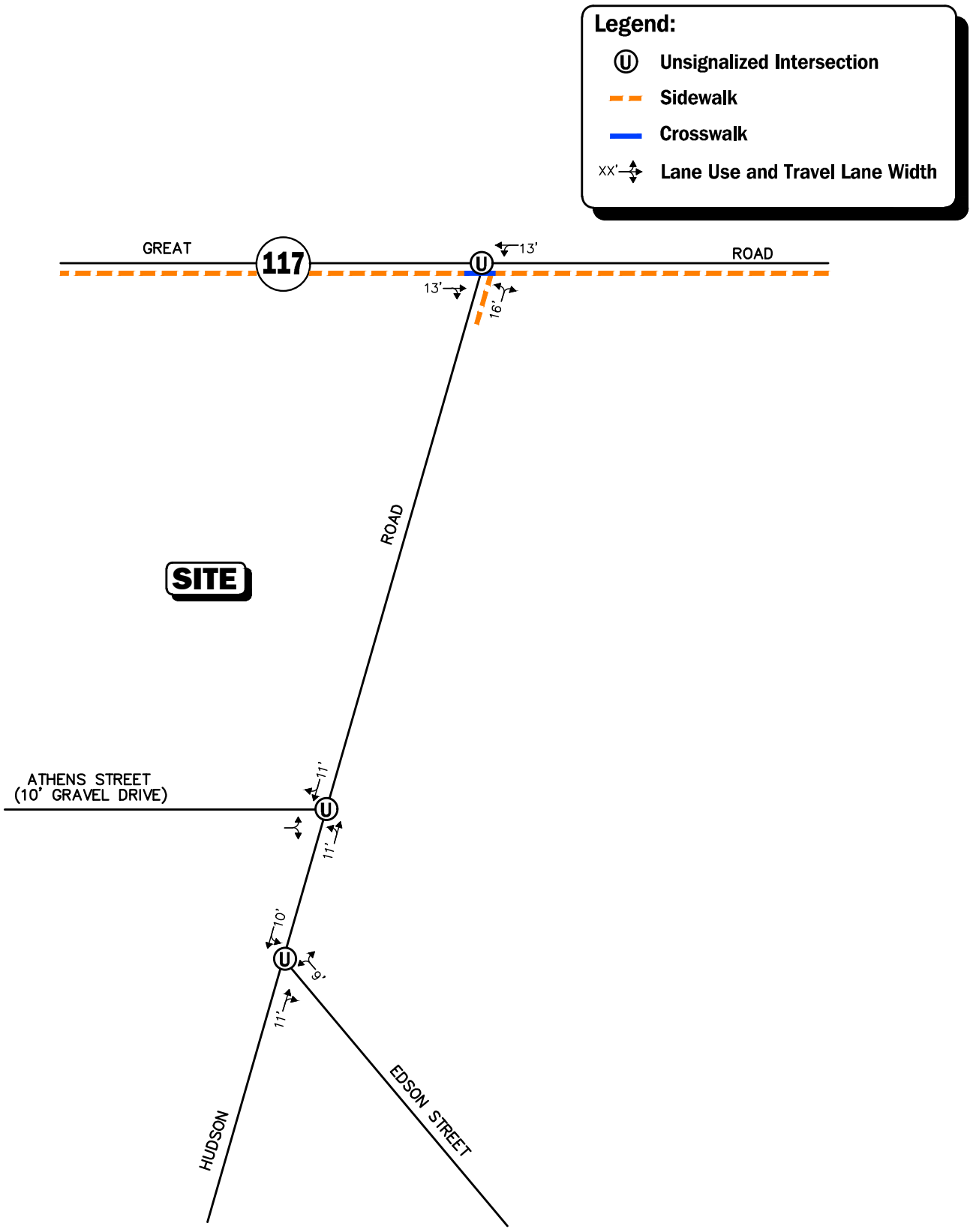
Table 1
STUDY AREA INTERSECTION DESCRIPTION

Intersection	Traffic Control Type[a]	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
Rte. 117/ Hudson Rd.	S	1 general-purpose travel lane on all approaches	Yes; 1 to 2-feet on Rte. 117; 2 to 5-feet on Hudson Rd.	Yes; sidewalks along the south side of Rte. 117 and for approximately 165 feet along the east side of Hudson Rd.; crosswalk provided across Hudson Rd.	No
Hudson Rd./ Athens St.	S	1 general-purpose travel lane on all approaches; Athens St. is an unimproved gravel roadway	Yes; 2 to 3-feet Hudson Rd	No	No
Hudson Rd./ Edson St.	S	1 general-purpose travel lane on all approaches	Yes; 2 to 4-feet on Hudson Rd.	No	No

[a]S = STOP-sign control.

Existing Traffic Volumes

In order to determine existing traffic-volume demands and flow patterns within the study area, automatic traffic recorder (ATR) counts, turning movement counts (TMCs), and vehicle classification counts were completed in June 2021. The ATR counts were conducted on Hudson Road, north of Athens Street, on June 23rd and 24th, 2021 (Wednesday through Thursday, inclusive) in order to record weekday traffic conditions over an extended period, with weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak-period TMCs performed at the intersections of Route 117 at Hudson Road and Hudson Road at Edson Street on June 23rd, 2021 (Wednesday). These time periods were selected for analysis purposes as they are representative of the peak-traffic-volume hours for both the Project and the adjacent roadway network.



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 1

Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Accommodations

Vanasse & Associates inc

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, traffic-volume data from MassDOT Continuous Count Stations No. 403 and 4172 located on Route 2 in Concord and Acton, respectively, were reviewed. Based on a review of this data, Count Station No. 403 reported that traffic volumes for the month of June are approximately 6.9 percent *above* average-month conditions, with Count Station No. 4172 reporting that June traffic volumes are approximately 4.8 percent *above* average-month conditions. Additionally, MassDOT weekday seasonal factors for Urban Group 3 (principal arterial, the functional classification of Route 117) and Group 4-7 (minor arterial, collectors, and local roads and streets, the functional classification of the remaining study area roadways) were reviewed.[4] Based on a review of this data, it was determined that traffic volumes for the month of June are between 9 percent and 14 percent *above* average-month conditions. As such, no adjustments to the raw traffic count data were made as the data is representative of traffic-volume conditions that are higher than those under the average-month conditions.

In order to account for the impact on traffic volumes and trip patterns resulting from the COVID-19 pandemic, traffic volume data collected at MassDOT Continuous Count Station No. 403 in June 2019 were compared to June 2021 traffic volumes that were collected at the same location. Based on this pre- and post-COVID-19 traffic-volume comparison, the traffic-volume data that was collected as part of this assessment was found to be approximately 10.5 percent *below* the traffic-volume conditions that existed prior to the COVID-19 pandemic. As stated previously, Count Station No. 403 reported that June traffic volumes are approximately 6.9 percent *above* average month conditions. As such, the June traffic volumes were adjusted upward by the difference between the COVID adjustment (10.5 percent) and the seasonal adjustment (6.9 percent) in order to be representative of traffic volume conditions that existed prior to the COVID-19 pandemic.

After applying the COVID adjustment, Hudson Road in the vicinity of the Project site was found to accommodate approximately 4,965 vehicles per day (vpd) on an average weekday (two-way, 24-hour volume), with approximately 348 vehicles per hour (vph) during the weekday morning peak hour (7:00 to 8:00 AM) and approximately 488 vph during the weekday evening peak hour (4:30 to 5:30 PM).[5] The 2021 Existing weekday morning and evening peak-hour traffic volumes are graphically depicted on Figures 2 and 3.

Pedestrian and Bicycle Facilities

As shown on Figure 1, a sidewalk is provided along the south side of Route 117 within the study area and along the east side of Hudson Road for a distance of approximately 165 feet south of Route 117, with a marked crosswalk provided for crossing Hudson Road. Formal bicycle facilities were not identified within the immediate study area, and Route 117 and Hudson Road do not provide sufficient width on a continuous basis to accommodate bicycle travel in a shared traveled-way configuration (i.e., bicyclists and motor vehicles sharing the traveled way).[6]

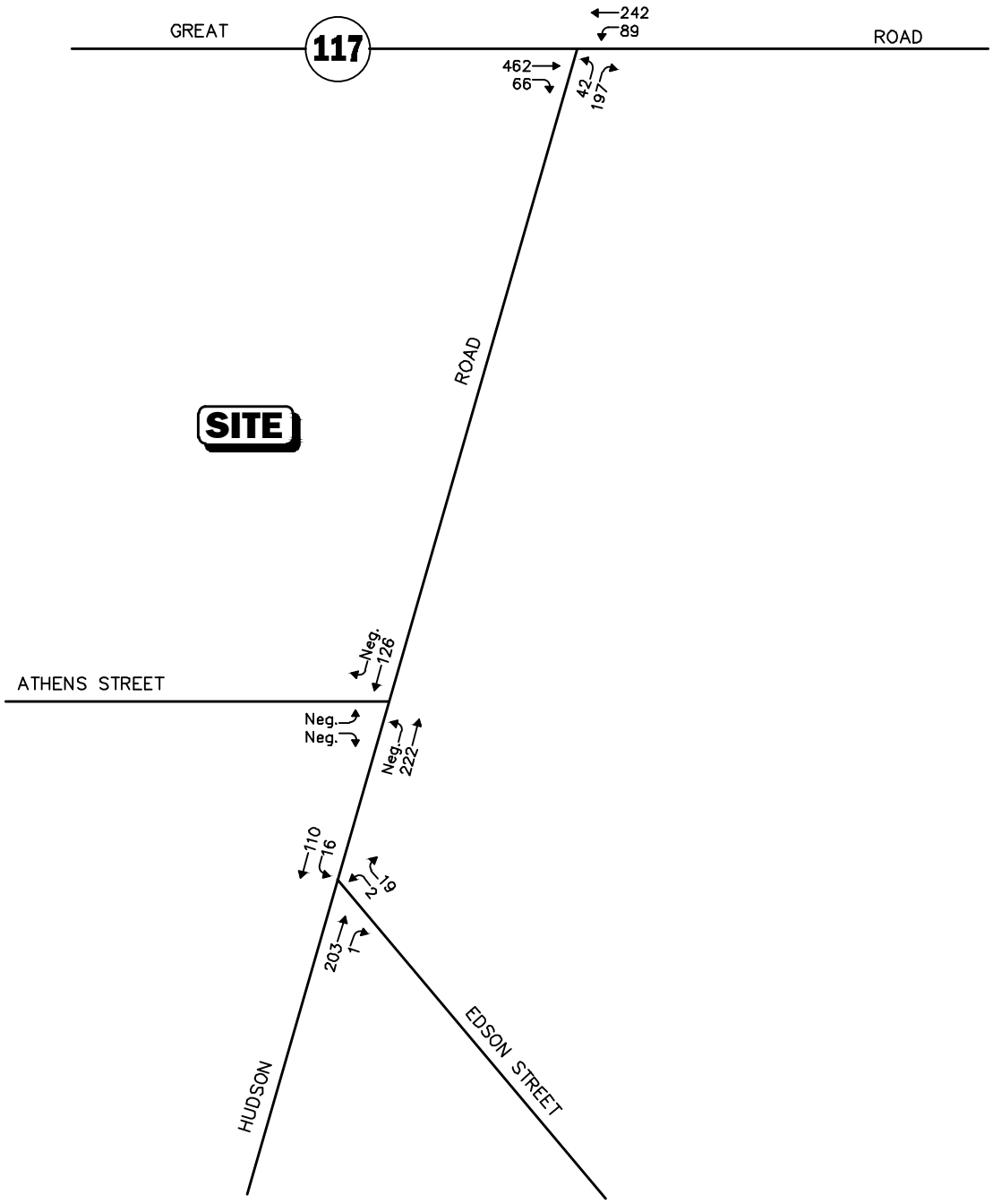
The Town completed a Complete Streets Prioritization Plan in 2018[7] that included specific recommendations for the addition of a shared-use path or sidewalk along both Hudson Road and Route 117 within the study area and the installation of bicycle lanes or shared-use accommodations.

[4]MassDOT statewide Traffic Data Collection; 2019 Weekday Seasonal Factors, Groups U3 and U4-7.

[5]The peak-hour traffic volumes were obtained from Figures 2 and 3.

[6]A minimum combined travel lane and paved shoulder width of 14 feet is required to support bicycle travel in a shared traveled-way condition.

[7]*Complete Streets Prioritization Plan*, Stow, Massachusetts; Howard Stein Hudson; April 2018.



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 2

2021 Existing
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc

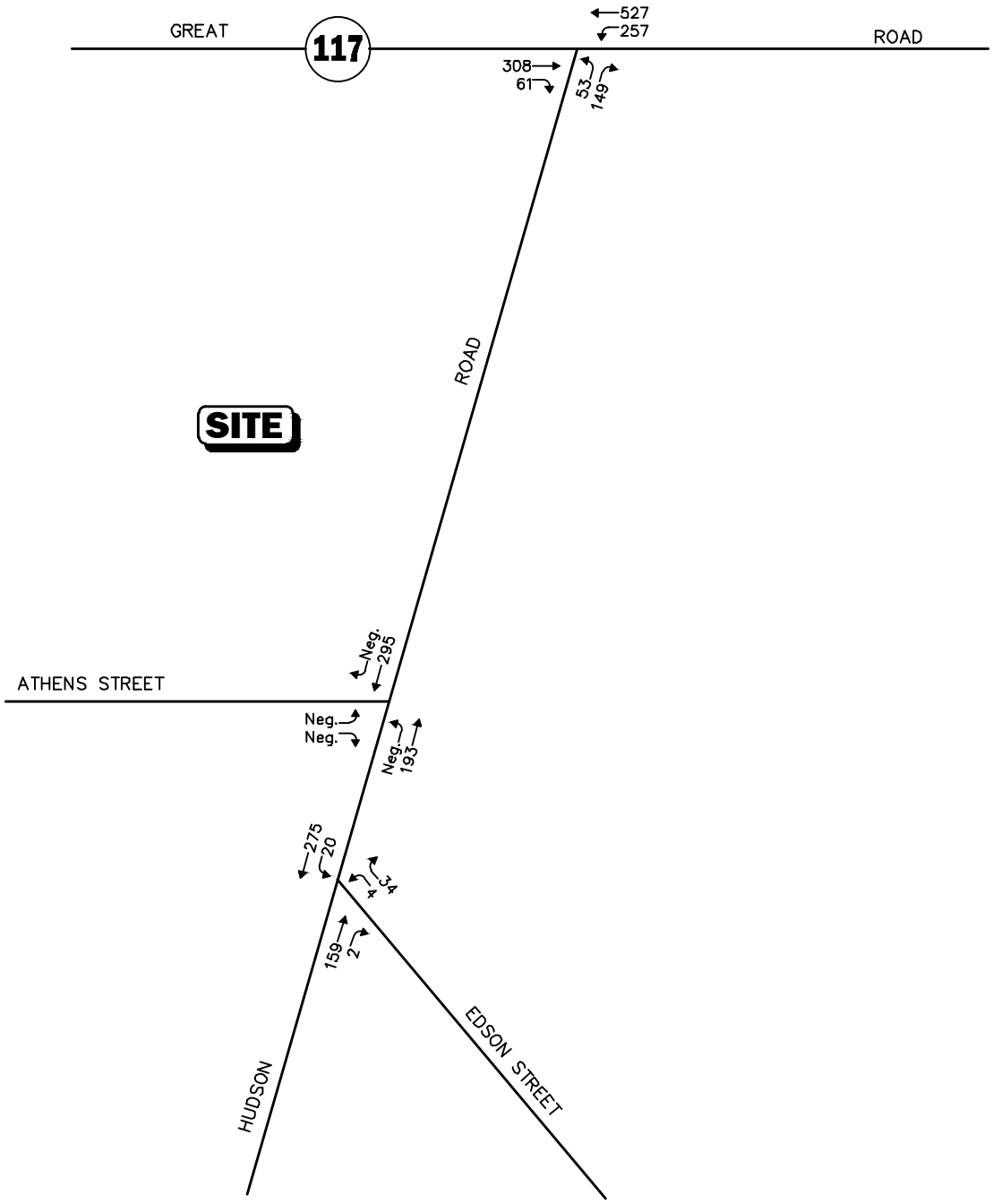


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Figure 3

2021 Existing
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

Public Transportation

Regularly scheduled public transportation services are not currently provided within the study area. To the northeast of the Project site, the Massachusetts Bay Transit Authority (MBTA) provides commuter rail service to South Station in Boston on the Fitchburg Line by way of South Acton Station, which is located at 4 Central Street in Acton (approximately 5 miles from the Project site). The Stow Council on Aging (COA) provides on-demand rides for resident senior citizens for weekly shopping trips and rides to and from medical appointments in Stow and the surrounding area.

Motor Vehicle Crash Data

Motor vehicle crash information for the study area intersections was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2015 through 2019, inclusive) to examine motor vehicle crash trends occurring within the study area. The data is summarized by intersection, type, severity, roadway and weather conditions, and day of occurrence, and is presented in Table 2.

Based on a review of this data, no (0) motor vehicle crashes were reported to have occurred at the Hudson Road/Athens Street or Hudson Road/Edson Road intersections over the five-year review period. The Route 117/Hudson Road intersection experienced 40 total crashes over the five-year period, or an average of 8.0 crashes per year. The majority of the reported crashes occurred on a weekday; during daylight; under clear weather conditions; and involved rear-end or angle-type collisions that resulted in property damage only. The intersection was found to have a motor vehicle crash rate that is *above* both the MassDOT statewide and District average crash rates for an unsignalized intersection for the MassDOT Highway Division District in which the intersection is located in (District 3).

A review of the MassDOT statewide High Crash Location List indicated that there are no locations within Town of Stow that are included on MassDOT's Highway Safety Improvement Program (HSIP) listing as high crash locations. In addition, no fatal motor vehicle crashes were reported to have occurred at the study area intersections over the five-year review period.

The detailed MassDOT Crash Rate Worksheets and High Crash Location mapping are attached.

Table 2
MOTOR VEHICLE CRASH DATA SUMMARY[a]

	Route 117/ Hudson Road	Hudson Road/ Athens Street	Hudson Road/ Edson Road
Traffic Control Type[b]	U	U	U
Year:			
2015	7	0	0
2016	12	0	0
2017	6	0	0
2018	6	0	0
2019	9	0	0
Total	40	0	0
Average	8.0	0	0
Crash Rate[c]	1.46	0	0
MassDOT Crash Rate:[d]	0.57/0.61	0.57/0.61	0.57/0.61
Significant?[e]	Yes	No	No
Type:			
Angle	14	0	0
Head-On	2	0	0
Rear-End	17	0	0
Rear-to-Rear	2	0	0
Sideswipe	4	0	0
Fixed Object	1	0	0
Pedestrian/Bicycle	0	0	0
Unknown/Other	0	0	0
Total	40	0	0
Conditions:			
Clear	28	0	0
Cloudy	6	0	0
Rain	5	0	0
Snow/Ice	1	0	0
Not Reported/Other	0	0	0
Total	40	0	0
Lighting:			
Daylight	35	0	0
Dawn/Dusk	1	0	0
Dark (Road Lit)	3	0	0
Dark (Road Unlit)	1	0	0
Total	40	0	0
Day of Week:			
Monday-Friday	30	0	0
Saturday	5	0	0
Sunday	5	0	0
Total	40	0	0
Severity:			
Property Damage Only	31	0	0
Non-fatal Injury	8	0	0
Not Reported	1	0	0
Total	40	0	0

[a]Source: MassDOT Safety Management/Traffic Operations Unit records, 2015 through 2019.
[b]Traffic Control Type: U = unsignalized.
[c]Crash rate per million vehicles entering the intersection.
[d]Statewide/District crash rate.
[e]The intersection crash rate is significant if it is found to exceed the MassDOT crash rate for the MassDOT Highway Division District in which the Project is located (District 3).

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2029, which reflects a seven-year planning horizon from the date of publication of this assessment, consistent with MassDOT guidelines. Independent of the Project, traffic volumes on the roadway network in the year 2029 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2029 No-Build traffic volumes reflect 2029 Build traffic-volume conditions with the Project.

Future Traffic Growth

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

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

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

Specific Development by Others

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

- ***Pennie Lane Residential Development, Walcott Street, Stow, Massachusetts.*** This project entails the construction of five (5) single-family homes to be located off of Walcott Street and south of the Project site. Traffic volumes associated with this project within study area of this assessment are expected to be relatively minor and would be reflected in the general background growth rate.

- ***Joanne Drive Residential Development, Sudbury Road, Stow, Massachusetts.*** This project entails the construction of seven (7) single-family homes to be located off of Sudbury Road and east of the Project site. Traffic volumes associated with this project within the study area of this assessment are expected to be relatively minor and would be reflected in the general background growth rate.

- ***Stow Acres Redevelopment, Randall Road, Stow, Massachusetts.*** This project entails the redevelopment of a portion of the Stow Acres Country Club that is located off Randall Road and south of the Project site into approximately 25 age-restricted apartments, approximately 40 two or three-bedroom rentable cottages and approximately 124 detached single-family homes. Traffic volumes associated with this project were added to the 2029 No-Build and 2029 Build condition traffic volumes.

- ***Masters Academy at Former Bose Site, Great Road, Stow, Massachusetts.*** This project entails the redevelopment of the former Bose Stow campus into an academic and sports focused private

school for grades 6-12. The redevelopment of the approximately 82± acre site will include substantial renovations to the existing building, the construction of a new ice rink, the addition of workforce housing, and installation of outdoor athletics fields. At this time, a formal application for the project has not been submitted to the Town and, as such, this project and any necessary roadway improvements that would be required to support the project have not been included in the future condition traffic volumes. It is likely that the additional traffic that will be associated with the project will necessitate major improvements at the Route 117/Hudson Road intersection that may include the installation of a traffic control signal or the reconstruction of the intersection as a modern roundabout.

No other developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general background traffic growth rate.

General Background Traffic Growth

Traffic-volume data compiled by MassDOT from permanent count stations located in the area were reviewed in order to determine general traffic growth trends in the area. This data indicates that annual traffic volumes have fluctuated between decreases of 1.0 percent and increases of 0.67 percent, with the average growth rate found to be approximately 0.35 percent per year. In order to provide a prudent planning condition for the Project, a higher 1.0 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

Roadway Improvement Projects

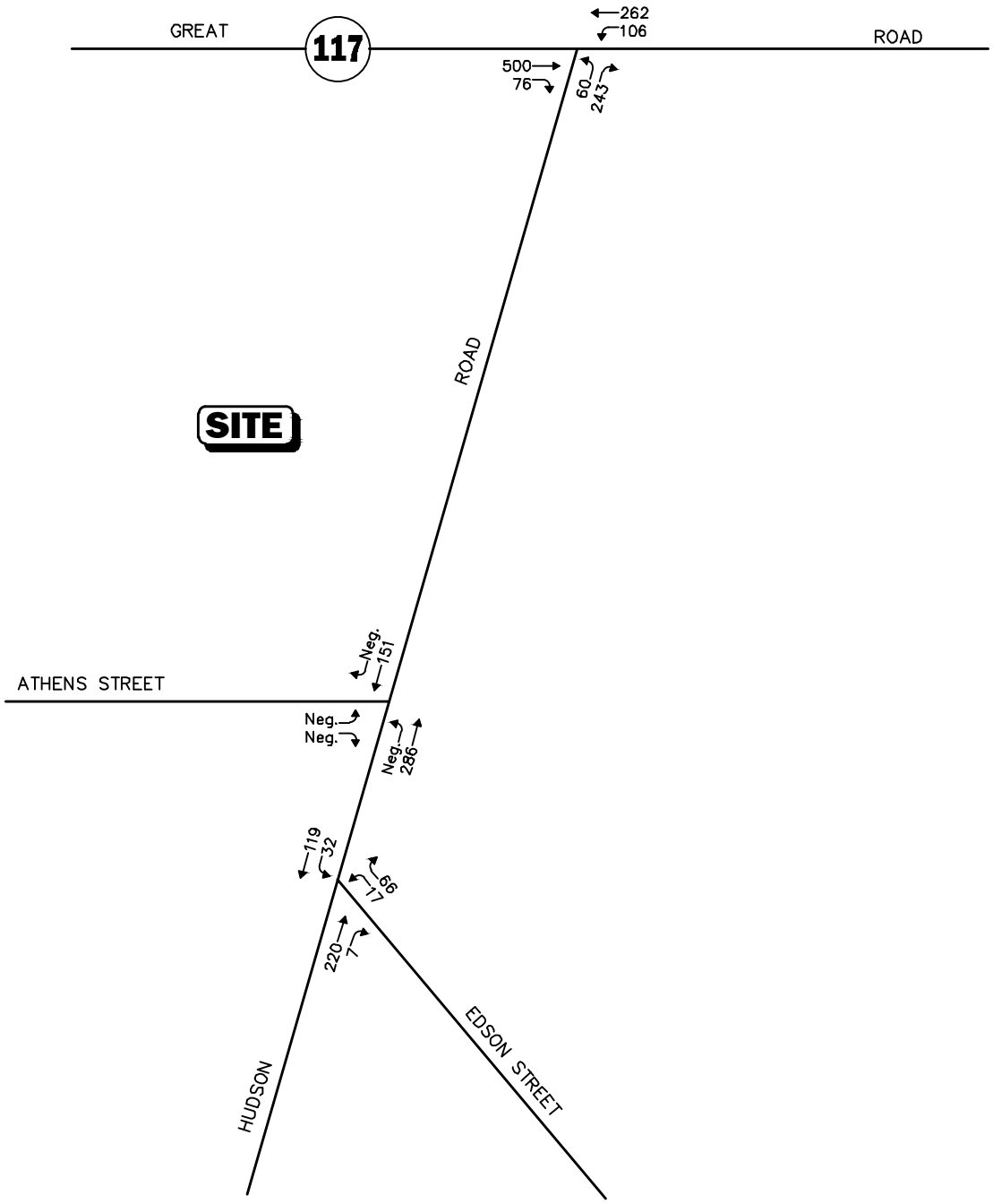
The Town of Stow and MassDOT were contacted in order to determine if there were any planned future roadway improvement projects expected to be complete by 2029 within the study area. Based on these discussions, no roadway improvement projects aside from routine maintenance activities were identified to be planned within the study area at this time.

As identified previously, the Town of Stow has completed a Complete Streets Prioritization Plan[8] that identified a number of pedestrian, bicycle, traffic calming and safety improvements for roadways and intersections within the Town. Within the study area, the identified improvements include the construction of a shared-use path or sidewalks along Hudson Road and Route 117, the addition of bicycle accommodations and pedestrian and bicycle safety improvements at the Route 117/Hudson Road intersection. The improvements within the study area are not currently funded at this time.

No-Build Traffic Volumes

The 2029 No-Build condition peak-hour traffic volumes were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2021 Existing peak-hour traffic volumes and then adding the peak-hour traffic volumes associated with the identified specific development project by others. The resulting 2029 No-Build weekday morning and evening peak-hour traffic volumes are shown on Figures 4 and 5.

[8]Ibid.



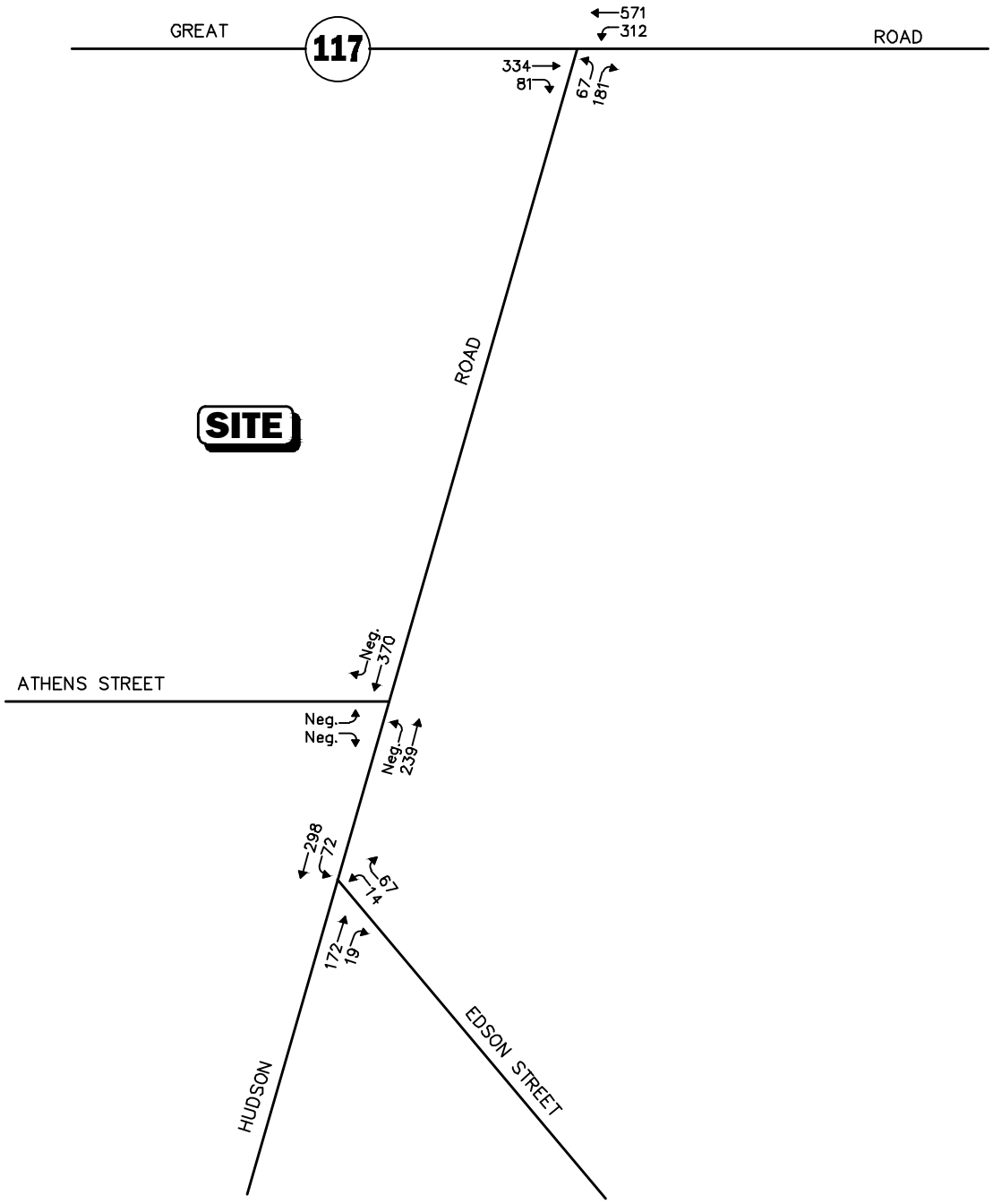
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 4

Vanasse & Associates inc

2029 No-Build
Weekday Morning
Peak-Hour Traffic Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 5

2029 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

Project-Generated Traffic

Design year (2029 Build) traffic volumes for the study area roadways were determined by estimating Project-generated traffic volumes and assigning those volumes on the study roadways. The following sections describe the methodology used to develop the anticipated traffic characteristics of the Project.

As proposed, the Project will entail the construction of a residential community that will include approximately 141± detached single-family homes and cottages that will be marketed towards active adults. Although the Zoning Overlay District no longer requires an age-restriction on residential developments located within the Overlay District, the Project will continue to be marketed toward active adults. In order to account for the possibility that a portion of the proposed units may be occupied by households that have children and working family members, it was assumed that 50 percent of the residential units (70 units) would be traditional single-family homes and the remaining 50 percent (71 units) would be senior housing units. Trip-generation statistics published by the ITE[9] for Land Use Codes (LUCs) 210, *Single-Family Detached Housing*, and 251, *Senior Adult Housing - Single-Family*, were used to establish the traffic characteristics of the Project, the results of which are summarized in Table 3.

Table 3
TRIP-GENERATION SUMMARY

	Vehicle Trips		
Time Period/Direction	(A) Single-Family Housing (70 Dwellings)[a]	(B) Senior Housing (71 Dwellings)[b]	(C=A+B) Total Trips (141 Dwellings)
Average Weekday Daily:			
Entering	364	153	517
Exiting	364	153	517
Total	728	306	1,034
Weekday Morning Peak Hour:			
Entering	14	10	24
Exiting	40	20	60
Total	54	30	84
Weekday Evening Peak Hour:			
Entering	45	21	66
Exiting	26	13	39
Total	71	34	105

[a]Based on ITE LUC 210, *Single-Family Detached Housing*.
[b]Based on ITE LUC 251, *Senior Adult Housing – Single-Family.*

[9]Ibid 1.

Project-Generated Traffic-Volume Summary

As can be seen in Table 3, the Project is expected to generate approximately 1,034 vehicle trips on an average weekday (two-way, 24-hour volume, or 517 vehicles entering and 517 exiting), with 84 vehicle trips (24 vehicles entering and 60 exiting) expected during the weekday morning peak-hour and 105 vehicle trips (66 vehicles entering and 39 exiting) expected during the weekday evening peak-hour.

Trip Distribution and Assignment

The directional distribution of generated trips to and from the Project site was determined based on a review of U.S. Census Journey-to-Work data for the Town of Stow and then refined based on a review of existing traffic patterns within the study area. The general trip distribution for the Project is graphically depicted on Figure 6, with the additional traffic that is expected to be generated by the Project assigned on the study area roadway network as shown on Figures 7 and 8.

Build Traffic Volumes

The 2029 Build condition traffic volumes consist of the 2029 No-Build traffic volumes with the addition of the traffic expected to be generated by the Project. The 2029 Build weekday morning and evening peak-hour traffic volumes are graphically depicted on Figures 9 and 10.

TRAFFIC OPERATIONS ANALYSIS

In order to assess the potential impact of the Project on the roadway network, a detailed traffic operations analysis (motorist delays, vehicle queuing, and level-of-service) was performed for the study intersections. Capacity analyses provide an indication of how well transportation facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study.

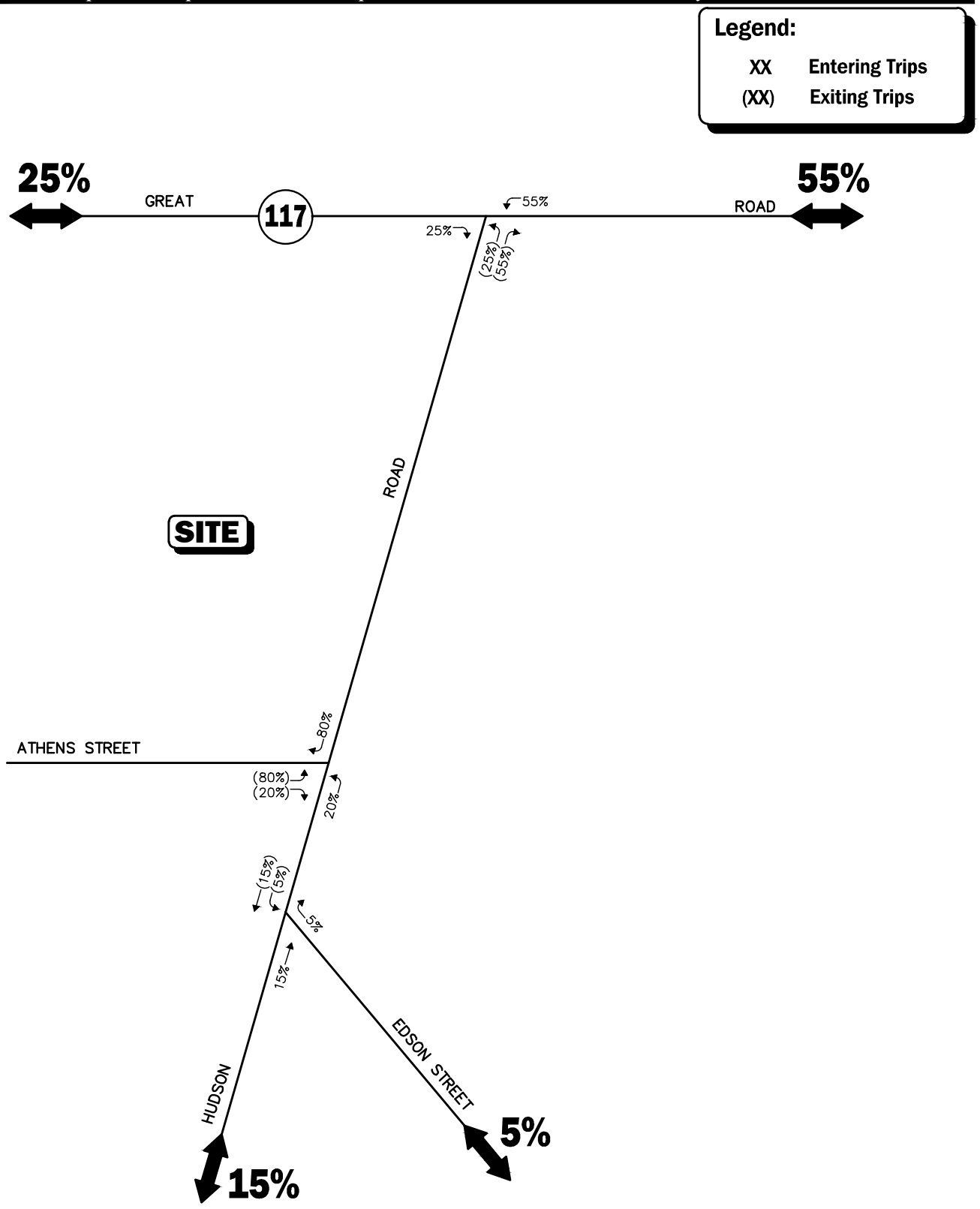
In brief, six levels of service are defined for each type of facility. They are given letter designations ranging from A to F, with LOS "A" representing the best operating conditions and LOS "F" representing congested or constrained operations. An LOS of "E" is representative of a transportation facility that is operating at its design capacity with an LOS of "D" generally defined as the limit of "acceptable" traffic operations. Since the level-of-service of a traffic facility is a function of the 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 the year. The Synchro® intersection capacity analysis software, which is based on the analysis methodologies and procedures presented in the 2010 *Highway Capacity Manual* (HCM)[10] for unsignalized intersections, was used to complete the level-of-service and vehicle queue analyses.

Analysis Results

Level-of-service and vehicle queue analysis were conducted for 2021 Existing, 2029 No-Build and 2029 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized in Table 4, with the detailed analysis results attached.

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

[10] *Highway Capacity Manual*, Transportation Research Board; Washington, DC; 2010.

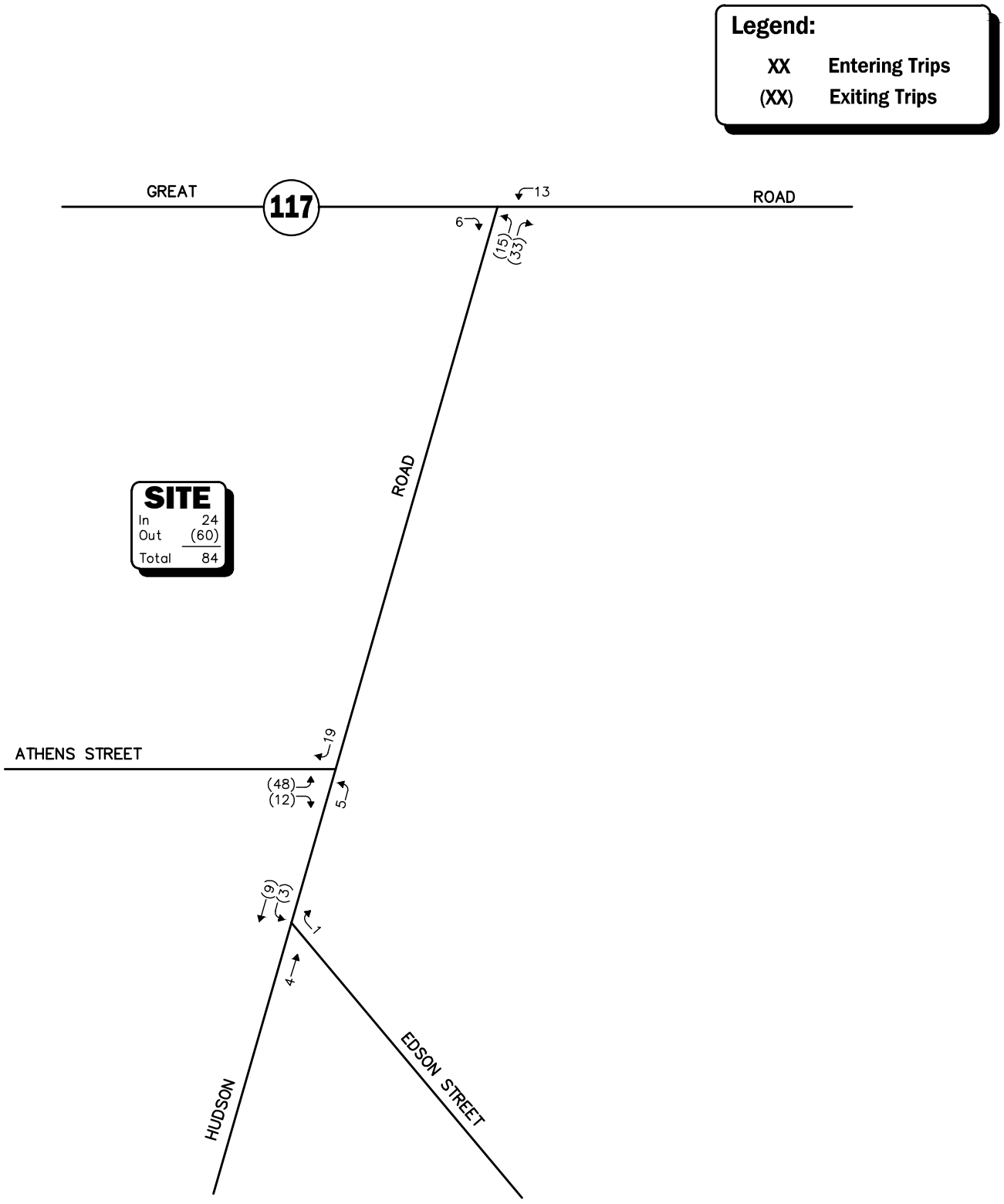


Not To Scale

Figure 6

Trip Distribution Map

Vanasse & Associates inc

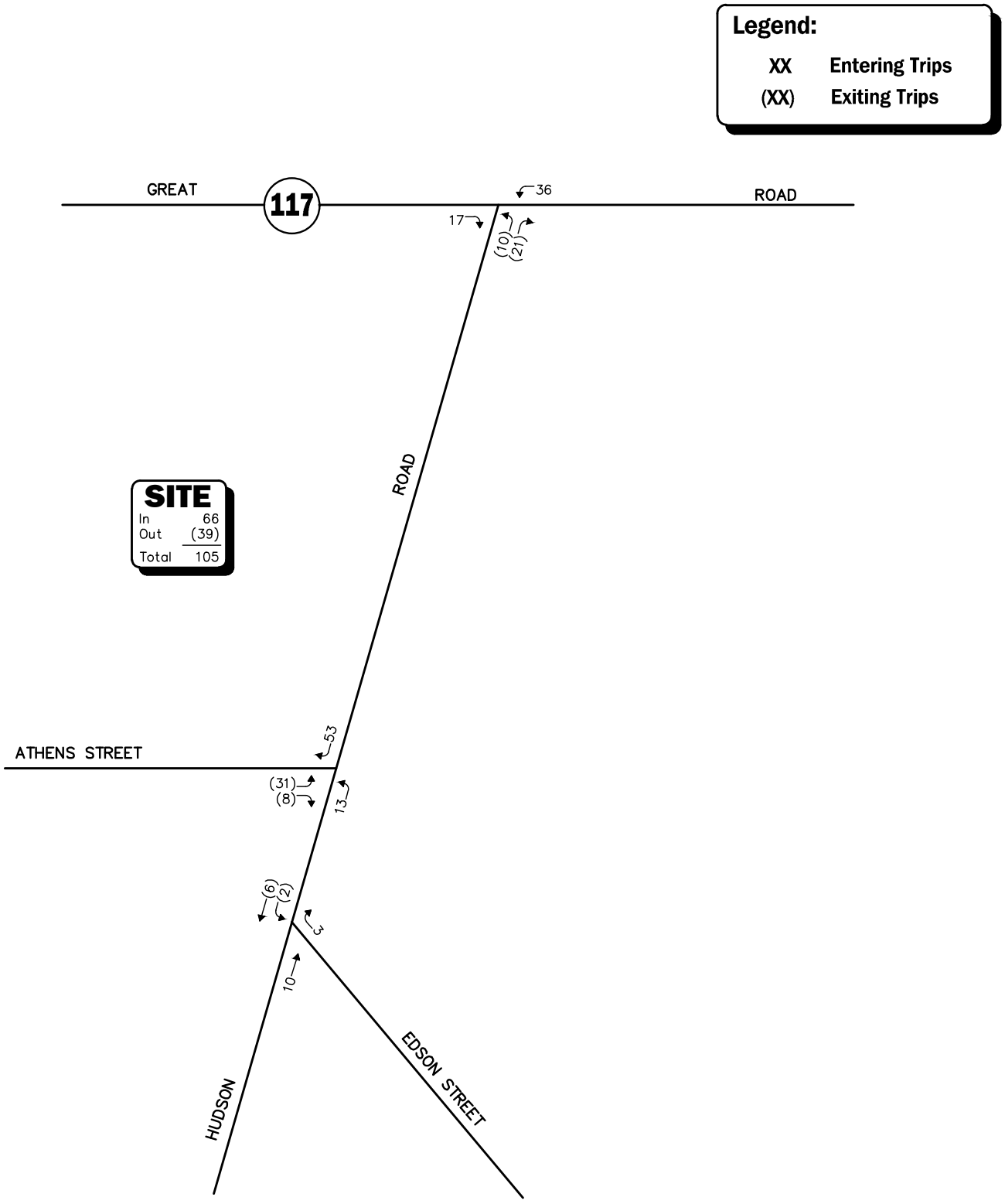


Not To Scale

Figure 7

Project-Generated Weekday Morning Peak-Hour Traffic Volumes

Vanasse & Associates inc

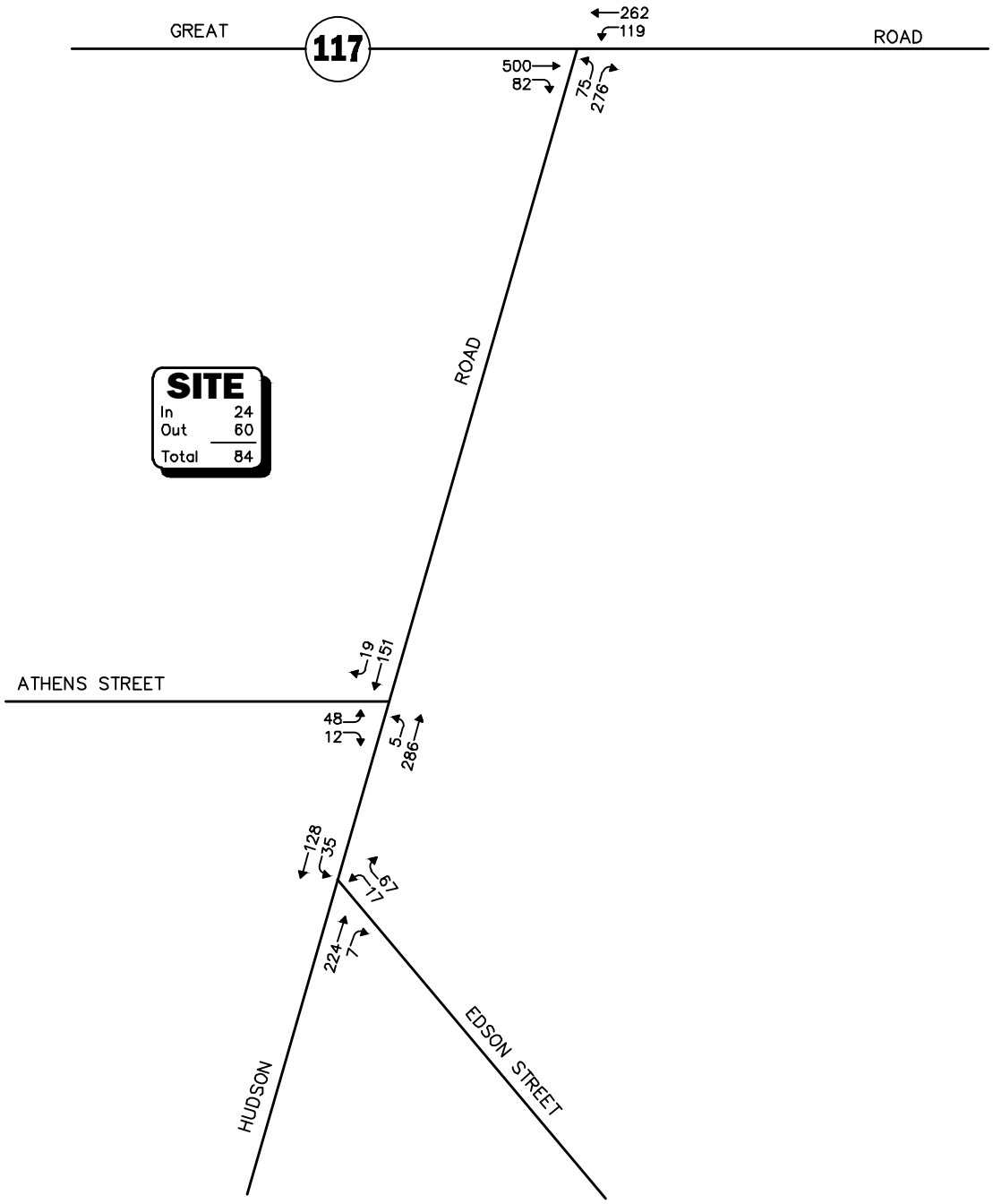


Not To Scale

Figure 8

Project-Generated Weekday Evening Peak-Hour Traffic Volumes

Vanasse & Associates inc



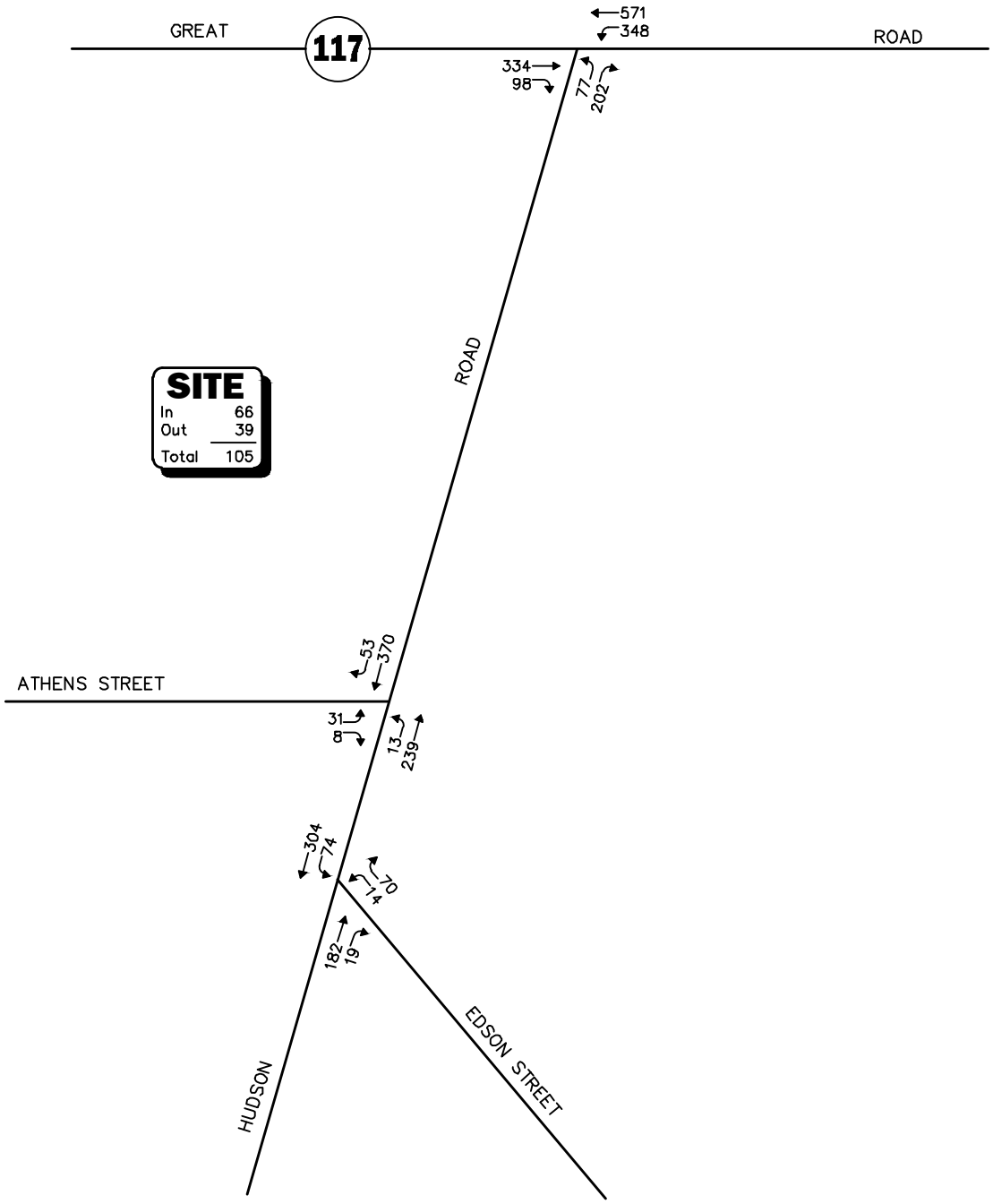
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 9

2029 Build
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 10

2029 Build
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

Route 117 at Hudson Road

The addition of Project-related traffic was shown to result in a general increase in average motorist delay during both the weekday morning and evening peak hours that resulted in continued LOS F operating conditions (no change over No-Build conditions) during the peak hours, with vehicle queues shown to increase by up to seven (7) vehicles. Independent of the Project, it was noted that the Hudson Road approach is currently operating over its design capacity (i.e., LOS F) during the weekday evening peak-hour, with conditions expected to further degrade in the future under No-Build conditions such that the Hudson Road approach is predicted to operate over capacity during both peak-hours, again, independent of the Project. All movements along Route 117 were shown to operate at LOS A during the peak hours with vehicle queues of up to two (2) vehicles.

Hudson Road at Athens Street

All movements at the Athens Street/Hudson Road intersection were shown to operate at LOS C or better during the peak hours with vehicle queues of up to one (1) vehicle.

Hudson Road at Edson Street

No change in level-of-service or vehicle queuing is predicted to occur for any movement over No-Build conditions, with all movements continuing to operate at LOS B or better and Project-related impacts defined as an increase in average motorist delay of less than 1.0 seconds.

Table 4
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

	2021 Existing				2029 No-Build				2029 Build			
Unsignalized Intersection/Peak Hour/Movement	Demand[a]	Delay[b]	LOS[c]	Queue[d] 95th	Demand	Delay	LOS	Queue 95th	Demand	Delay	LOS	Queue 95th
Route 117 at Hudson Road												
Weekday Morning:												
Route 117 EB: TH/RT	528	0.0	A	0	576	0.0	A	0	582	0.0	A	0
Route 117 WB: LT/TH	331	2.5	A	1	368	2.7	A	1	381	3.0	A	1
Hudson Road NB: LT/RT	239	26.3	D	4	302	>50.0	F	9	351	>50.0	F	14
Weekday Evening:												
Route 117 EB: TH/RT	369	0.0	A	0	415	0.0	A	0	432	0.0	A	0
Route 117 WB: LT/TH	784	2.9	A	1	883	3.4	A	1	919	3.7	A	2
Hudson Road NB: LT/RT	202	>50.0	F	7	248	>50.0	F	17	279	>50.0	F	24
Hudson Road at Athens Street												
Weekday Morning:												
Athens Street EB: LT/RT	0	0.0	A	0	0	0.0	A	0	60	12.1	B	1
Hudson Road NB: LT/TH	222	0.0	A	0	286	0.0	A	0	291	0.1	A	0
Hudson Road SB: TH/RT	126	0.0	A	0	151	0.0	A	0	170	0.0	A	0
Weekday Evening:												
Athens Street EB: LT/RT	0	0.0	A	0	0	0.0	A	0	39	15.9	C	1
Hudson Road NB: LT/TH	193	0.0	A	0	239	0.0	A	0	252	0.4	A	0
Hudson Road SB: TH/RT	295	0.0	A	0	370	0.0	A	0	423	0.0	A	0
Hudson Road at Edson Street												
Weekday Morning:												
Edson Street WB: LT/RT	21	9.7	A	0	83	10.8	B	1	84	10.9	B	1
Hudson Road NB: TH/RT	204	0.0	A	0	227	0.0	A	0	231	0.0	A	0
Hudson Road SB: LT/TH	126	1.0	A	0	151	1.7	A	0	163	1.7	A	0
Weekday Evening:												
Edson Street WB: LT/RT	38	10.1	B	0	81	11.7	B	1	84	11.9	B	1
Hudson Road NB: TH/RT	161	0.0	A	0	191	0.0	A	0	201	0.0	A	0
Hudson Road SB: LT/TH	295	0.5	A	0	370	1.5	A	0	378	1.6	A	0

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

SIGHT DISTANCE ASSESSMENT

Sight distance measurements were performed at the Hudson Road/Athens Street intersection in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)[11] requirements. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an oncoming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. In accordance with AASHTO standards, if the measured ISD is at least equal to the required SSD value for the appropriate design speed, the intersection can operate in a safe manner. Table 5 presents the measured SSD and ISD at the subject intersection.

Table 5
SIGHT DISTANCE MEASUREMENTS[a]

	Feet		
Intersection/Sight Distance Measurement	Required Minimum (SSD)	Desirable (ISD)[b]	Measured
Hudson Road at Athens Street			
Stopping Sight Distance:			
Hudson Road approaching from the north	360	--	500+
Hudson Road approaching from the south	360	--	500+
Intersection Sight Distance:			
Looking to the north from Athens Street	360	430	500+
Looking to the south from Athens Street	360	500	500+

[a]Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets,* 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018; and based on a 45 mph approach speed on Hudson Road.

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

As can be seen in Table 5 the available lines of sight at the Hudson Road/Athens Street intersection were found exceed the recommended minimum sight distance to function in a safe (SSD) and efficient (ISD) manner based on a 45 mph approach speed along Hudson Road, which is 5 mph above the posted speed limit in the vicinity of the Project site (40 mph) and is slightly above the measured 85th percentile vehicle travel speed (44 mph).

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

SUMMARY

VAI has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the proposed construction of a residential community to be located of off Athens Street in Stow, Massachusetts, that will be designed and marketed toward active adults. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the ITE[12] for a housing community marketed towards, but not restricted to, seniors, the Project is expected to generate approximately 1,034 vehicle trips on an average weekday (two-way, 24-hour volume), with 84 vehicle trips expected during the weekday morning peak-hour and 105 vehicle trips expected during the weekday evening peak-hour;

2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build condition); however, it was noted that the Hudson Road northbound approach to Route 117 is predicted to operate over capacity (defined as LOS "F") during both the weekday morning and evening peak hours independent of the Project, with Project-related impacts on this approach defined as a general increase in average motorist delay that resulted in an increase in vehicle queuing of up to seven (7) vehicles;

3. All movements at the Hudson Road/Athens Street intersection (the access to the Project site) are predicted to operate at LOS C or better with the addition of Project-related traffic where a LOS of "D" or better is defined as "acceptable" traffic operations;

4. Independent of the Project, the Route 117/Hudson Road intersection was found to have a motor vehicle crash rate that is above the Massachusetts Department of Transportation (MassDOT) statewide and District 3 average crash rates for an unsignalized intersection. As such, specific recommendations have been provided to advance safety related improvements at this intersection; and

5. Lines of sight at the Hudson Road/Athens Street intersection were found to exceed the recommended minimum distance for the intersection to operate in a safe and efficient manner based on the appropriate approach speed.

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

RECOMMENDATIONS

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

[12]Ibid 1.

Project Access

Access to the Project site will be provided by way of Athens Street, which will be improved (widened) and paved, and thereafter by an interconnected network of roadways to be constructed within the Project site. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation, many of which are reflected on the Site Plans:

- The Project site roadway (Athens Street) and internal circulating roads should be a minimum of 22 feet in width and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle. To the extent that a reduced roadway is used (i.e., less than 22 feet), on-street parking should be prohibited along at least one side of the roadway.

- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided. STOP-signs and marked STOP-lines should also be provided at major intersections located within the Project site.

- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).[13]

- A sidewalk should be provided along at least one side of Athens Street and the internal roadway network that should extend to Hudson Road.

- Driveways to the residential units should be a minimum of 21 feet long measured between the garage door and the far edge of the sidewalk (edge closest to the residence) where a sidewalk is provided, and 23 feet measured between the garage door and the edge of the traveled-way in locations without a sidewalk.

- Signs and landscaping to be installed as a part of the Project within the intersection sight triangle areas of Athens Street and at intersections internal to the Project site should be designed and maintained so as not to restrict lines of sight.

- Snow accumulations (windrows) within sight triangle areas should be promptly removed where such accumulations would impede sight lines.

Off-Site

Hudson Road Corridor

The Town of Stow has completed a Complete Streets Prioritization Plan[14] that identified a number of pedestrian, bicycle, traffic calming and safety improvements for roadways and intersections within the Town, including along Hudson Road and Route 117 within the study area. These improvements include the construction of a shared-use path or sidewalks along Hudson Road and Route 117, the addition of bicycle accommodations and pedestrian and bicycle safety improvements at the Route 117/Hudson Road intersection. In order to assist the Town in advancing the pedestrian and bicycle improvements along Hudson Road, the Project proponent will make a financial contribution to the Town for the design and construction of the identified pedestrian and bicycle improvements along Hudson Road. At a baseline level, the contribution will be proportionate to the incremental increase in traffic on an average weekday that the Project represents over No-Build conditions along Hudson Road (i.e., a "fair-share" cost contribution).

[13] *Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.
[14] Ibid.

Route 117 at Hudson Road

Independent of the Project, all movements from Hudson Road at the Route 117/Hudson Road intersection are currently or are predicted to operate over capacity (i.e., LOS "F") during both the weekday morning and evening peak hours. Absent improvement, motorist delays are expected to further increase in the future, again, independent of the Project. In addition and also independent of the Project, the Route 117/ Hudson Road intersection was identified to have a motor vehicle crash history that warrants further review and advancement of specific improvements to enhance safety. In an effort to identify both safety and capacity improvements at this intersection, the Project proponent has contracted with Toole Design Group to complete a Road Safety Audit (RSA) at the intersection. The RSA will be performed during the Project approval phase in order to provide the Town and the Planning Board with the benefit of the RSA to facilitate discussions with the Project proponent concerning the advancement of the suggested improvements that will be an outcome of the RSA.

Hudson Road at Edson Street

Independent of the Project, it is recommended that a STOP-sign and marked STOP-line be installed on the Edson Street approach to Hudson Road in order to regulate the assignment of the vehicular right-of-way at the intersection and to define the desired stopping point for vehicles on the Edson Street approach. These improvements will be implemented in conjunction with the Project, subject to receipt of all necessary rights, permits and approvals.

Hudson Road at Walcott Street and Randall Road

At the request of the Planning Board, a review of lines of sight and intersection geometry was completed for the Hudson Road intersections with Walcott Street and Randall Road. Walcott Street and Randall Road intersect Hudson Road from the west and east respectively, and are separated by a distance of approximately 85 feet. In an effort to improve sight lines and enhance safety, the Project proponent will undertake the following improvements, subject to receipt of all necessary rights, permits and approvals:

1. Replace the STOP-signs and marked STOP-lines on the Walcott Street and Randall Road approaches to include high visibility, thermoplastic pavement markings and the addition or red reflective tape to the sign posts;
2. Selectively trim/remove vegetation located within the sight triangle areas for motorists exiting from Walcott Street and Randall Road; and
3. Install "Intersection Ahead" warning signs (graphic symbol) on Hudson Road north of Randall Road and south of Walcott Street with supplemental street name plaques.

<u>Transportation Demand Management</u>

Regularly scheduled public transportation services are not currently provided within the study area. To the northeast of the Project site, the MBTA provides commuter rail service to South Station in Boston on the Fitchburg Line by way of South Acton Station, which is located at 4 Central Street in Acton (approximately 5 miles from the Project site). The Stow Council on Aging (COA) provides on-demand rides for resident senior citizens for weekly shopping trips and rides to and from medical appointments in Stow and the surrounding area.

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

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

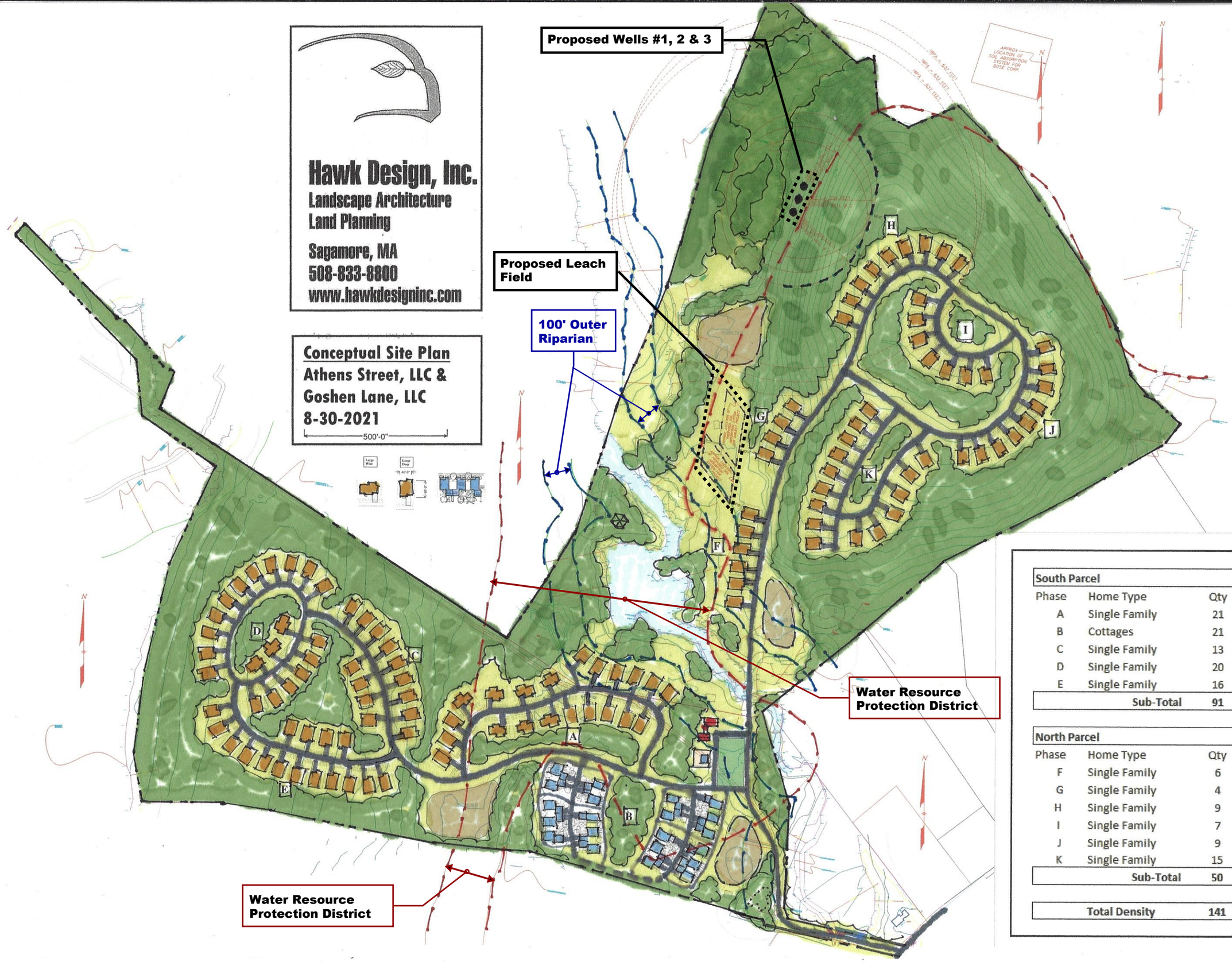
With the implementation of the above recommendations, safe and efficient access can be provided to the Project site and the Project can be accommodated within the confines of the existing transportation infrastructure.

cc: File

ATTACHMENTS

PROJECT SITE PLAN
AUTOMATIC TRAFFIC RECORDER COUNT DATA
TURNING MOVEMENT COUNT DATA
SEASONAL ADJUSTMENT DATA
COVID-19 ADJUSTMENT DATA
VEHICLE TRAVEL SPEED DATA
MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAPPING
GENERAL BACKGROUND TRAFFIC GROWTH
BACKGROUND DEVELOPMENT TRAFFIC-VOLUMES NETWORKS
TRIP-GENERATION CALCULATIONS
JOURNEY TO WORK TRIP DISTRIBUTION
CAPACITY ANALYSIS WORKSHEETS

PROJECT SITE PLAN



South Parcel		
Phase	Home Type	Qty
A	Single Family	21
B	Cottages	21
C	Single Family	13
D	Single Family	20
E	Single Family	16
	Sub-Total	91

North Parcel		
Phase	Home Type	Qty
F	Single Family	6
G	Single Family	4
H	Single Family	9
I	Single Family	7
J	Single Family	9
K	Single Family	15
	Sub-Total	50

Total Density	141

AUTOMATIC TRAFFIC RECORDER COUNT DATA

Accurate Counts

978-664-2565

Location : Hudson Road 90260001
Location : North of Athens Street
City/State: Stow, MA

6/23/2021	SB,		Hour Totals		NB,		Hour Totals		Combined Totals	
Time	Morning	Afternoon	Morning	Afternon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	2	48			1	45				
12:15	1	40			0	38				
12:30	2	52			0	32				
12:45	1	32	6	172	0	36	1	151	7	323
1:00	1	46			0	43				
1:15	0	49			0	32				
1:30	0	41			0	36				
1:45	0	40	1	176	0	32	0	143	1	319
2:00	0	40			1	38				
2:15	0	40			1	30				
2:30	0	34			0	42				
2:45	0	51	0	165	1	46	3	156	3	321
3:00	0	51			0	39				
3:15	0	63			0	38				
3:30	0	51			0	39				
3:45	1	57	1	222	1	49	1	165	2	387
4:00	0	61			0	49				
4:15	3	67			5	40				
4:30	0	75			2	37				
4:45	3	56	6	259	4	47	11	173	17	432
5:00	4	73			5	58				
5:15	8	82			9	47				
5:30	9	51			20	49				
5:45	22	58	43	264	19	38	53	192	96	456
6:00	16	54			24	29				
6:15	11	56			27	37				
6:30	19	41			42	35				
6:45	15	42	61	193	40	27	133	128	194	321
7:00	28	41			51	26				
7:15	25	30			63	24				
7:30	36	33			59	25				
7:45	32	25	121	129	52	28	225	103	346	232
8:00	19	27			48	19				
8:15	32	22			46	18				
8:30	38	19			59	26				
8:45	38	17	127	85	39	29	192	92	319	177
9:00	31	19			34	24				
9:15	41	9			39	15				
9:30	28	13			27	12				
9:45	30	5	130	46	33	15	133	66	263	112
10:00	36	8			31	12				
10:15	25	7			28	10				
10:30	39	5			33	2				
10:45	31	5	131	25	41	4	133	28	264	53
11:00	31	4			47	4				
11:15	49	3			41	4				
11:30	38	3			43	2				
11:45	60	1	178	11	28	3	159	13	337	24
Total	805	1747			1044	1410			1849	3157
Percent	31.5%	68.5%			42.5%	57.5%			36.9%	63.1%

Accurate Counts

978-664-2565

Location : Hudson Road 90260001
Location : North of Athens Street
City/State: Stow, MA

6/24/2021	SB,		Hour Totals		NB,		Hour Totals		Combined Totals	
Time	Morning	Afternoon	Morning	Afternon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	3	37			1	29				
12:15	3	38			1	39				
12:30	1	41			1	26				
12:45	1	34	8	150	1	34	4	128	12	278
1:00	0	32			1	24				
1:15	1	49			1	29				
1:30	0	37			0	32				
1:45	0	35	1	153	0	31	2	116	3	269
2:00	0	36			0	33				
2:15	0	29			2	32				
2:30	0	53			0	38				
2:45	0	49	0	167	2	35	4	138	4	305
3:00	1	39			0	28				
3:15	0	35			0	33				
3:30	0	52			2	41				
3:45	2	58	3	184	1	45	3	147	6	331
4:00	1	58			1	51				
4:15	2	61			2	41				
4:30	2	64			5	31				
4:45	1	58	6	241	0	41	8	164	14	405
5:00	5	67			8	43				
5:15	5	58			8	38				
5:30	4	66			10	38				
5:45	15	60	29	251	13	34	39	153	68	404
6:00	12	45			22	38				
6:15	17	45			22	43				
6:30	19	42			34	26				
6:45	15	30	63	162	48	30	126	137	189	299
7:00	20	31			40	28				
7:15	24	32			43	27				
7:30	28	26			61	24				
7:45	34	33	106	122	41	27	185	106	291	228
8:00	33	22			46	26				
8:15	33	26			45	28				
8:30	29	25			51	18				
8:45	37	19	132	92	44	21	186	93	318	185
9:00	22	15			39	15				
9:15	23	15			30	8				
9:30	37	14			35	14				
9:45	31	12	113	56	39	7	143	44	256	100
10:00	35	9			29	15				
10:15	35	9			23	7				
10:30	29	8			27	9				
10:45	24	3	123	29	29	4	108	35	231	64
11:00	40	7			34	4				
11:15	35	11			36	1				
11:30	34	3			33	8				
11:45	31	2	140	23	35	5	138	18	278	41
Total	724	1630			946	1279			1670	2909
Percent	30.8%	69.2%			42.5%	57.5%			36.5%	63.5%
Grand Total	1529	3377			1990	2689			3519	6066
Percent	31.2%	68.8%			42.5%	57.5%			36.7%	63.3%
ADT		ADT: 4,792		AADT: 4,792						

Accurate Counts

978-664-2565

Location : Hudson Road 90260001
Location : North of Athens Street
City/State: Stow, MA

6/21/2021	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Week Average	
Time	SB,	NB,	SB,	NB,	SB,	NB,	SB,	NB,	SB,	NB,	SB,	NB,	SB,	NB,	SB,	NB,
12:00 AM	*	*	*	*	6	1	8	4	*	*	*	*	*	*	7	2
1:00	*	*	*	*	1	0	1	2	*	*	*	*	*	*	1	1
2:00	*	*	*	*	0	3	0	4	*	*	*	*	*	*	0	4
3:00	*	*	*	*	1	1	3	3	*	*	*	*	*	*	2	2
4:00	*	*	*	*	6	11	6	8	*	*	*	*	*	*	6	10
5:00	*	*	*	*	43	53	29	39	*	*	*	*	*	*	36	46
6:00	*	*	*	*	61	133	63	126	*	*	*	*	*	*	62	130
7:00	*	*	*	*	121	225	106	185	*	*	*	*	*	*	114	205
8:00	*	*	*	*	127	192	132	186	*	*	*	*	*	*	130	189
9:00	*	*	*	*	130	133	113	143	*	*	*	*	*	*	122	138
10:00	*	*	*	*	131	133	123	108	*	*	*	*	*	*	127	120
11:00	*	*	*	*	178	159	140	138	*	*	*	*	*	*	159	148
12:00 PM	*	*	*	*	172	151	150	128	*	*	*	*	*	*	161	140
1:00	*	*	*	*	176	143	153	116	*	*	*	*	*	*	164	130
2:00	*	*	*	*	165	156	167	138	*	*	*	*	*	*	166	147
3:00	*	*	*	*	222	165	184	147	*	*	*	*	*	*	203	156
4:00	*	*	*	*	259	173	241	164	*	*	*	*	*	*	250	168
5:00	*	*	*	*	264	192	251	153	*	*	*	*	*	*	258	172
6:00	*	*	*	*	193	128	162	137	*	*	*	*	*	*	178	132
7:00	*	*	*	*	129	103	122	106	*	*	*	*	*	*	126	104
8:00	*	*	*	*	85	92	92	93	*	*	*	*	*	*	88	92
9:00	*	*	*	*	46	66	56	44	*	*	*	*	*	*	51	55
10:00	*	*	*	*	25	28	29	35	*	*	*	*	*	*	27	32
11:00	*	*	*	*	11	13	23	18	*	*	*	*	*	*	17	16
Total	0	0	0	0	2552	2454	2354	2225	0	0	0	0	0	0	2455	2339
Day	0		0		5006		4579		0		0		0		4794	
AM Peak					11:00	7:00	11:00	8:00							11:00	7:00
Volume					178	225	140	186							159	205
PM Peak					5:00	5:00	5:00	4:00							5:00	5:00
Volume					264	192	251	164							258	172
Comb Total	0		0		5006		4579		0		0		0		4794	
ADT	ADT: 4,792		AADT: 4,792													

TURNING MOVEMENT COUNT DATA

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 1

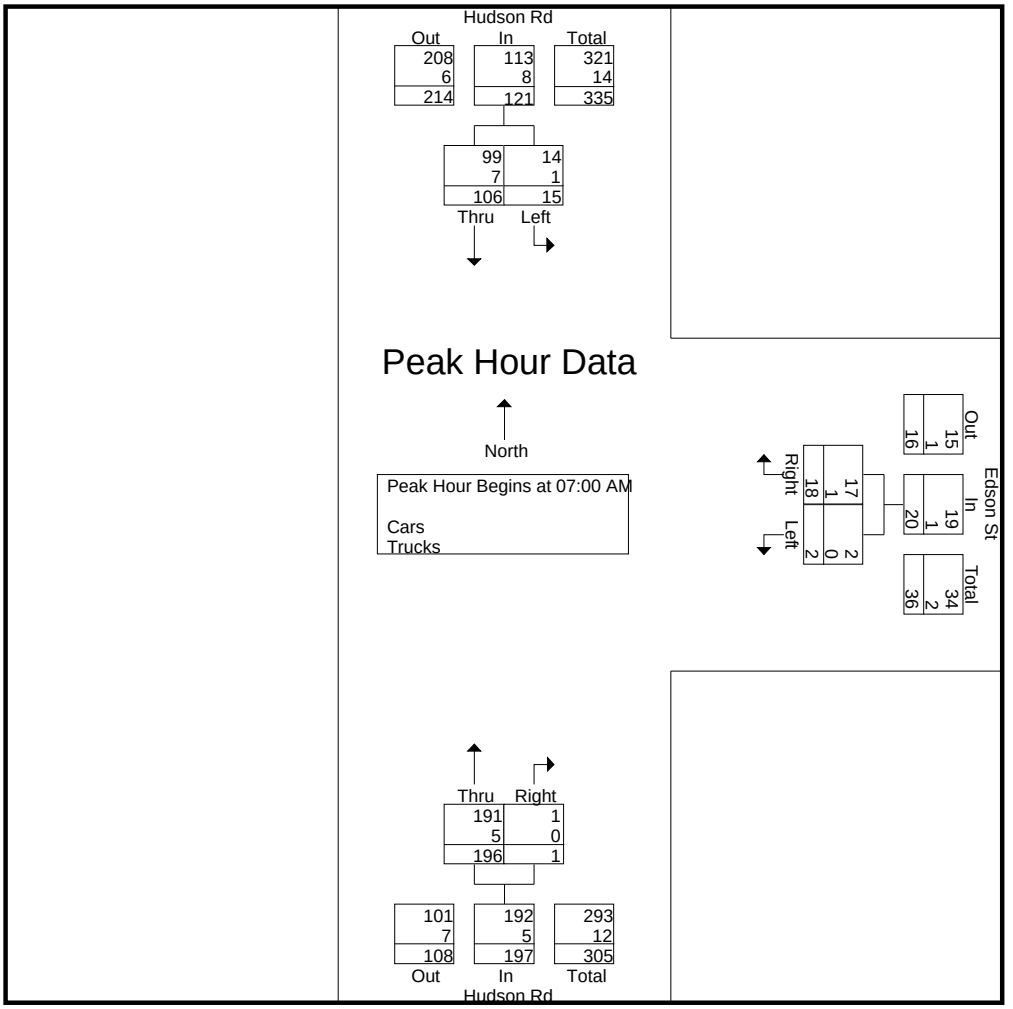
Groups Printed- Cars - Trucks

	Hudson Rd From North		Edson St From East		Hudson Rd From South		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	7	18	0	1	49	0	75
07:15 AM	1	26	2	5	50	0	84
07:30 AM	4	31	0	6	50	1	92
07:45 AM	3	31	0	6	47	0	87
Total	15	106	2	18	196	1	338
08:00 AM	4	14	0	2	44	0	64
08:15 AM	1	32	0	3	44	1	81
08:30 AM	3	34	0	8	48	0	93
08:45 AM	7	32	0	4	33	0	76
Total	15	112	0	17	169	1	314
Grand Total	30	218	2	35	365	2	652
Apprch %	12.1	87.9	5.4	94.6	99.5	0.5	
Total %	4.6	33.4	0.3	5.4	56	0.3	
Cars	29	207	2	34	353	2	627
% Cars	96.7	95	100	97.1	96.7	100	96.2
Trucks	1	11	0	1	12	0	25
% Trucks	3.3	5	0	2.9	3.3	0	3.8

	Hudson Rd From North			Edson St From East			Hudson Rd From South			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. 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	**7**	18	25	0	1	1	49	0	49	75
07:15 AM	1	26	27	**2**	5	**7**	**50**	0	50	84
07:30 AM	4	**31**	**35**	0	**6**	6	50	**1**	**51**	**92**
07:45 AM	3	31	34	0	6	6	47	0	47	87
Total Volume	15	106	121	2	18	20	196	1	197	338
% App. Total	12.4	87.6		10	90		99.5	0.5		
PHF	.536	.855	.864	.250	.750	.714	.980	.250	.966	.918
Cars	14	99	113	2	17	19	191	1	192	324
% Cars	93.3	93.4	93.4	100	94.4	95.0	97.4	100	97.5	95.9
Trucks	1	7	8	0	1	1	5	0	5	14
% Trucks	6.7	6.6	6.6	0	5.6	5.0	2.6	0	2.5	4.1

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

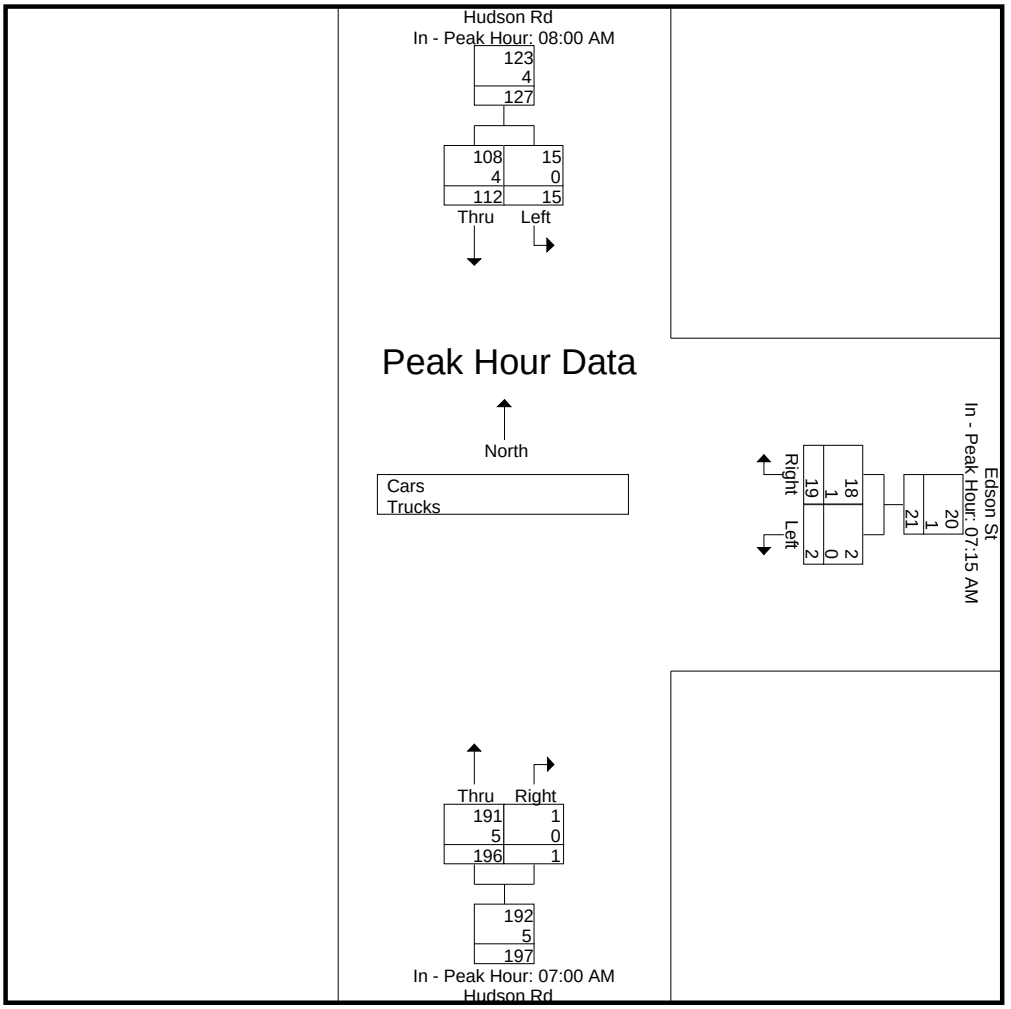
	08:00 AM			07:15 AM			07:00 AM		
+0 mins.	4	14	18	**2**	5	**7**	49	0	49
+15 mins.	1	32	33	0	**6**	6	**50**	0	50
+30 mins.	3	**34**	37	0	6	6	50	**1**	**51**
+45 mins.	**7**	32	**39**	0	2	2	47	0	47
Total Volume	15	112	127	2	19	21	196	1	197
% App. Total	11.8	88.2		9.5	90.5		99.5	0.5	
PHF	.536	.824	.814	.250	.792	.750	.980	.250	.966
Cars	15	108	123	2	18	20	191	1	192
% Cars	100	96.4	96.9	100	94.7	95.2	97.4	100	97.5
Trucks	0	4	4	0	1	1	5	0	5
% Trucks	0	3.6	3.1	0	5.3	4.8	2.6	0	2.5

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 4

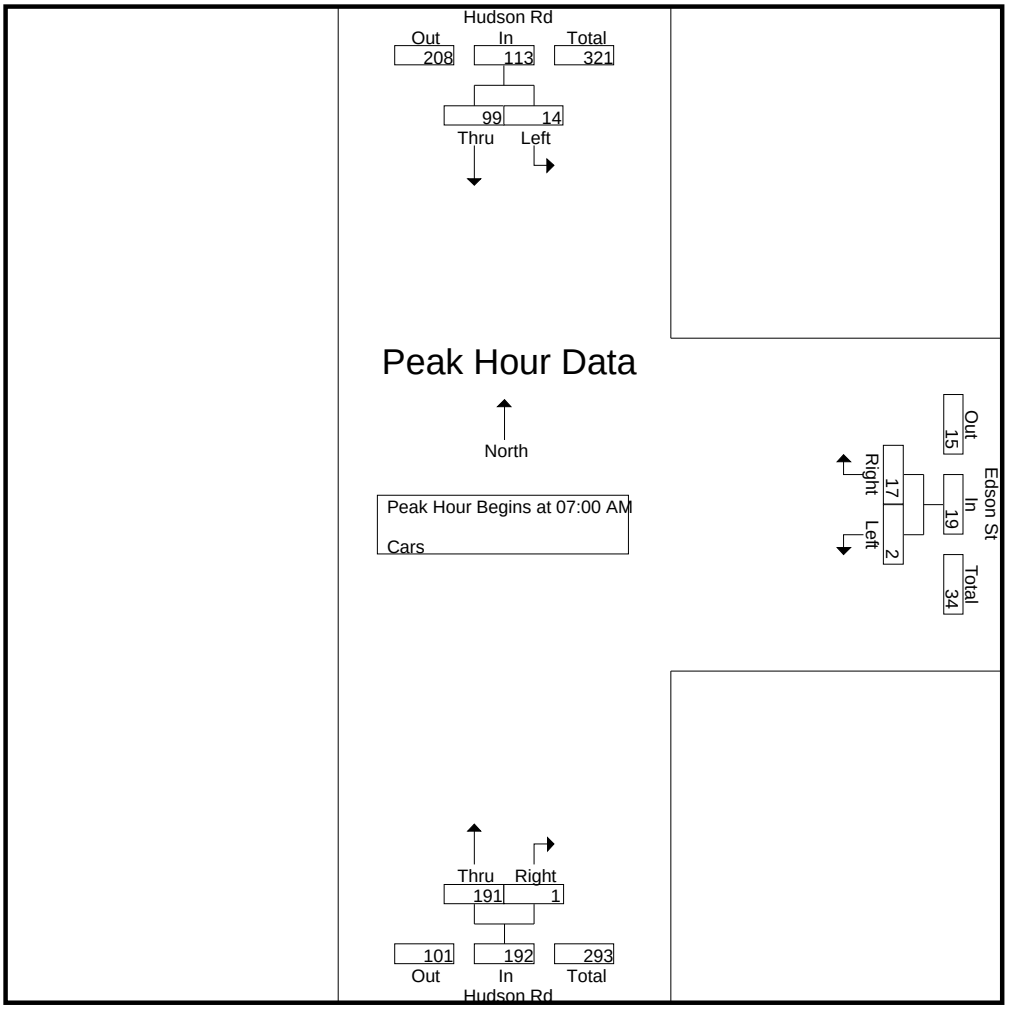
Groups Printed- Cars

	Hudson Rd From North		Edson St From East		Hudson Rd From South		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	7	15	0	1	48	0	71
07:15 AM	1	24	2	4	47	0	78
07:30 AM	4	30	0	6	49	1	90
07:45 AM	2	30	0	6	47	0	85
Total	14	99	2	17	191	1	324
08:00 AM	4	11	0	2	44	0	61
08:15 AM	1	31	0	3	41	1	77
08:30 AM	3	34	0	8	44	0	89
08:45 AM	7	32	0	4	33	0	76
Total	15	108	0	17	162	1	303
Grand Total	29	207	2	34	353	2	627
Apprch %	12.3	87.7	5.6	94.4	99.4	0.6	
Total %	4.6	33	0.3	5.4	56.3	0.3	

	Hudson Rd From North			Edson St From East			Hudson Rd From South			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. 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	**7**	15	22	0	1	1	48	0	48	71
07:15 AM	1	24	25	**2**	4	**6**	47	0	47	78
07:30 AM	4	**30**	**34**	0	**6**	6	**49**	**1**	**50**	**90**
07:45 AM	2	30	32	0	6	6	47	0	47	85
Total Volume	14	99	113	2	17	19	191	1	192	324
% App. Total	12.4	87.6		10.5	89.5		99.5	0.5		
PHF	.500	.825	.831	.250	.708	.792	.974	.250	.960	.900

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 5



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

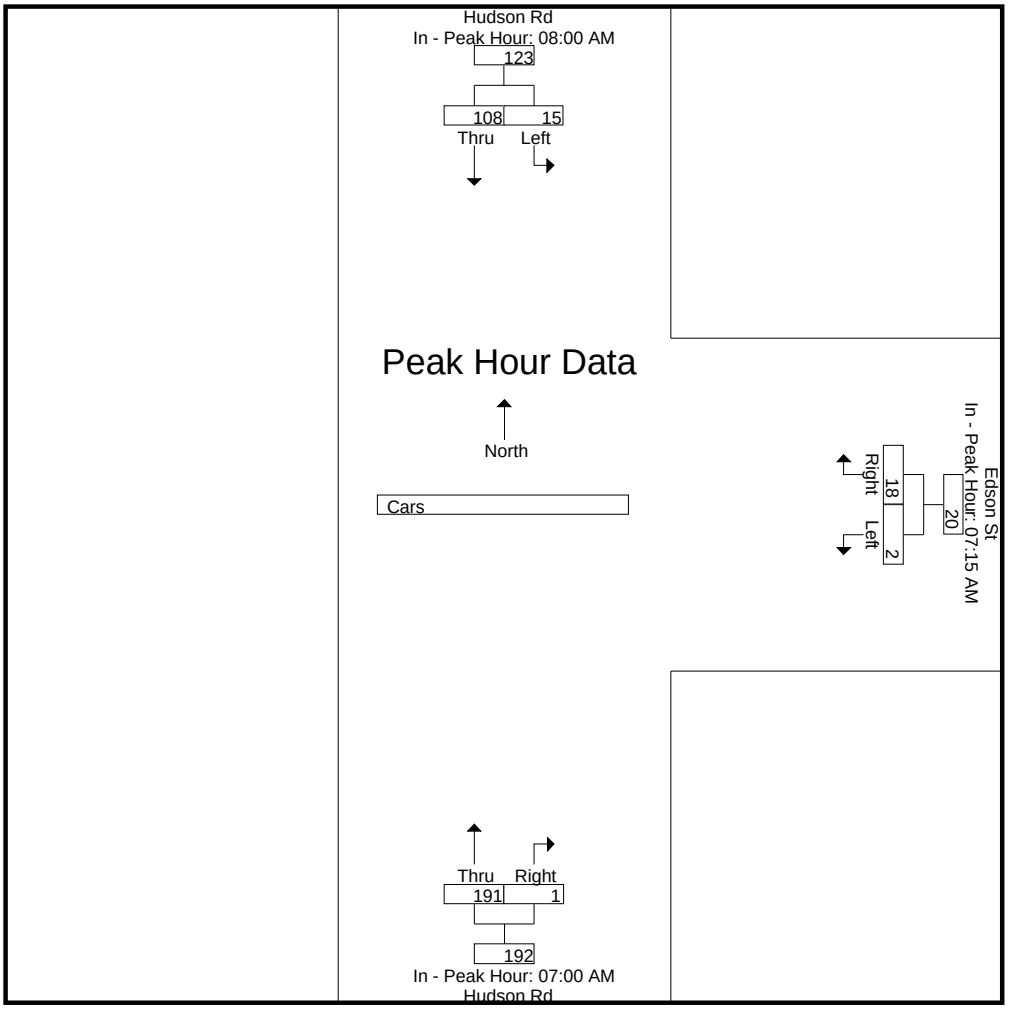
	08:00 AM			07:15 AM			07:00 AM		
+0 mins.	4	11	15	**2**	4	**6**	48	0	48
+15 mins.	1	31	32	0	**6**	6	47	0	47
+30 mins.	3	**34**	37	0	6	6	**49**	**1**	**50**
+45 mins.	**7**	32	**39**	0	2	2	47	0	47
Total Volume	15	108	123	2	18	20	191	1	192
% App. Total	12.2	87.8		10	90		99.5	0.5	
PHF	.536	.794	.788	.250	.750	.833	.974	.250	.960

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021

Groups Printed- Trucks

	Hudson Rd From North		Edson St From East		Hudson Rd From South		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	0	3	0	0	1	0	4
07:15 AM	0	2	0	1	3	0	6
07:30 AM	0	1	0	0	1	0	2
07:45 AM	1	1	0	0	0	0	2
Total	1	7	0	1	5	0	14
08:00 AM	0	3	0	0	0	0	3
08:15 AM	0	1	0	0	3	0	4
08:30 AM	0	0	0	0	4	0	4
08:45 AM	0	0	0	0	0	0	0
Total	0	4	0	0	7	0	11
Grand Total	1	11	0	1	12	0	25
Apprch %	8.3	91.7	0	100	100	0	
Total %	4	44	0	4	48	0	

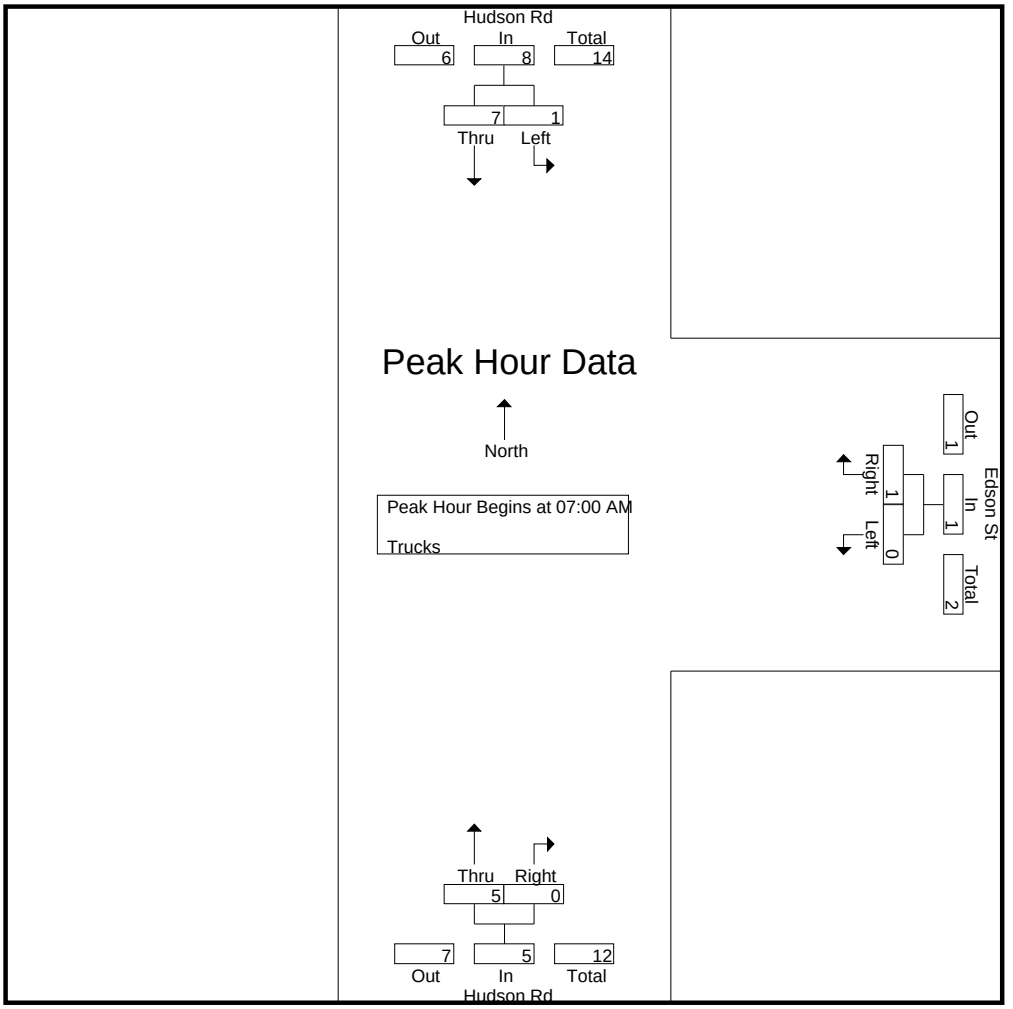
	Hudson Rd From North			Edson St From East			Hudson Rd From South			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	**3**	**3**	0	0	0	1	0	1	4
07:15 AM	0	2	2	0	**1**	**1**	**3**	0	**3**	**6**
07:30 AM	0	1	1	0	0	0	1	0	1	2
07:45 AM	**1**	1	2	0	0	0	0	0	0	2
Total Volume	1	7	8	0	1	1	5	0	5	14
% App. Total	12.5	87.5		0	100		100	0		
PHF	.250	.583	.667	.000	.250	.250	.417	.000	.417	.583

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 8



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

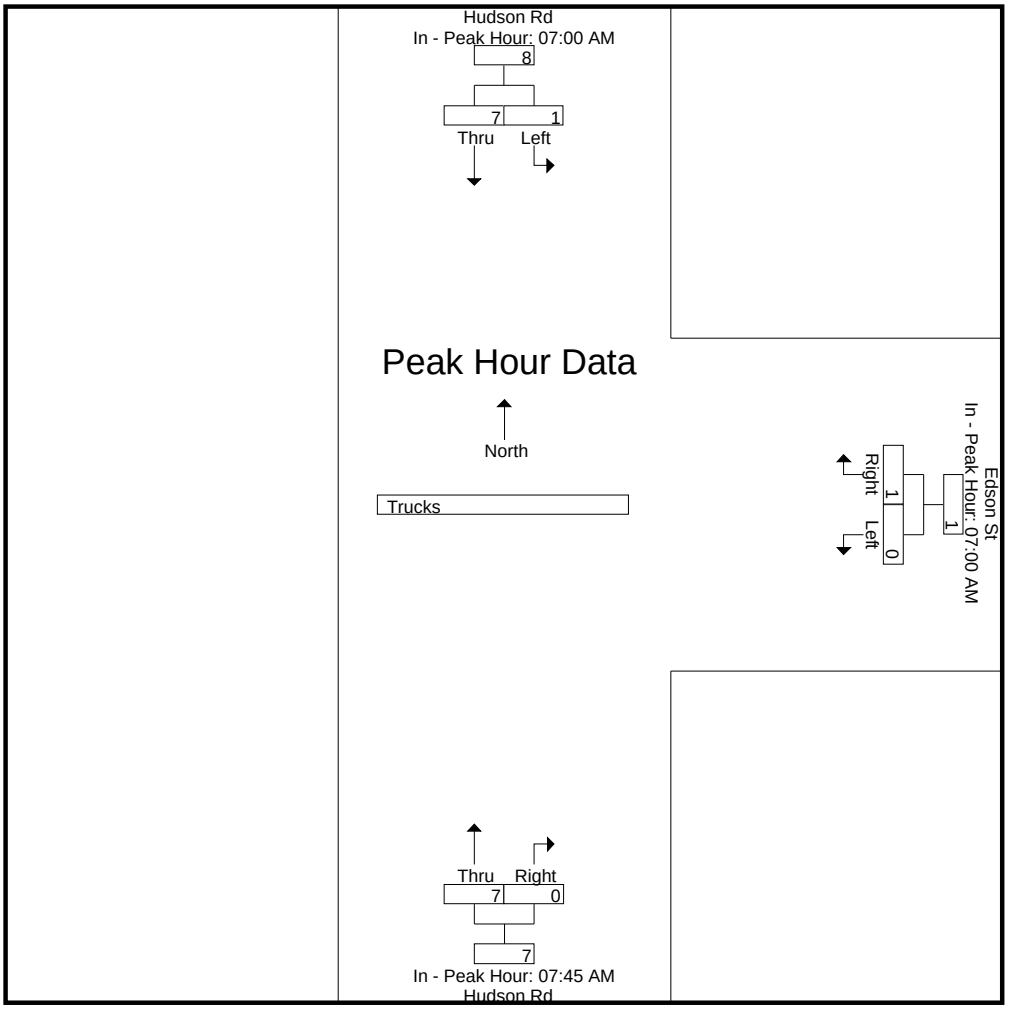
Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:45 AM		
+0 mins.	0	**3**	**3**	0	0	0	0	0	0
+15 mins.	0	2	2	0	**1**	**1**	0	0	0
+30 mins.	0	1	1	0	0	0	3	0	3
+45 mins.	**1**	1	2	0	0	0	**4**	0	**4**
Total Volume	1	7	8	0	1	1	7	0	7
% App. Total	12.5	87.5		0	100		100	0	
PHF	.250	.583	.667	.000	.250	.250	.438	.000	.438

Accurate Counts
978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021

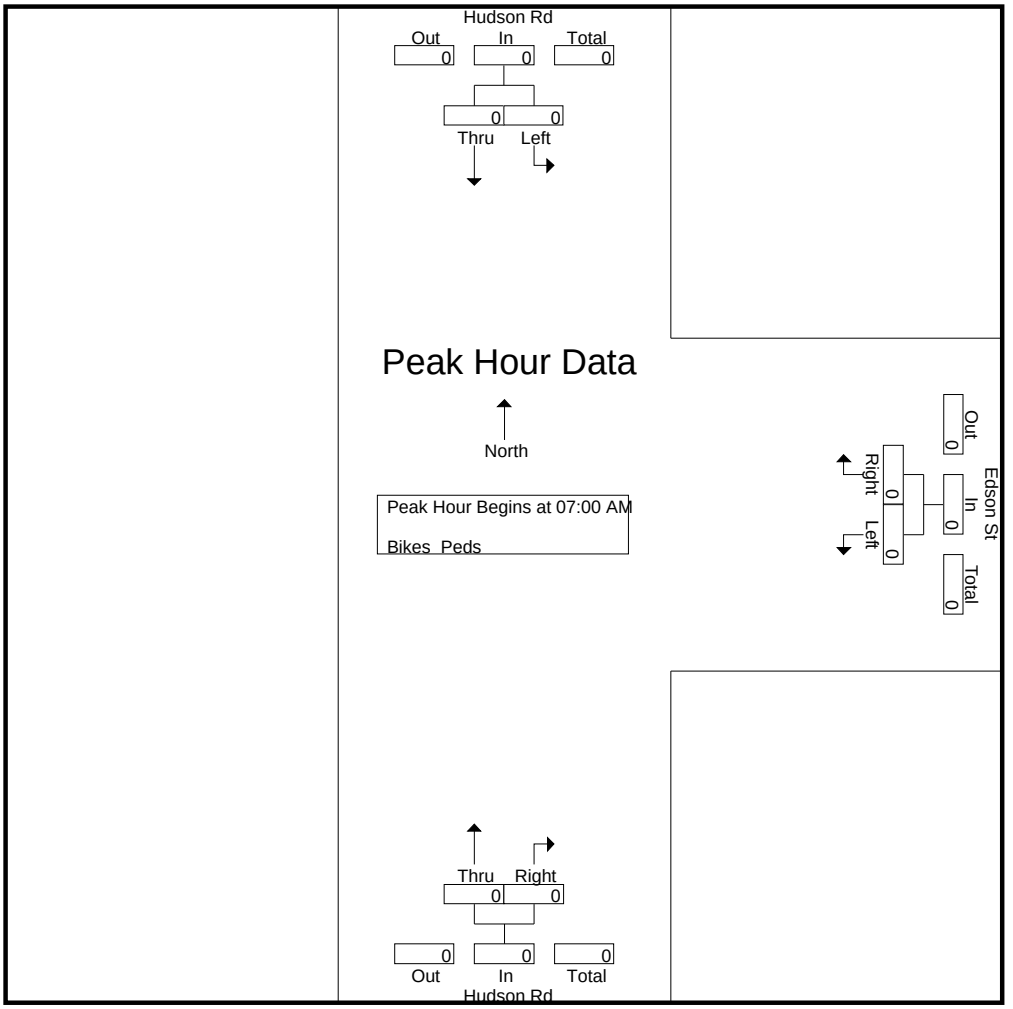
Groups Printed- Bikes Peds

	Hudson Rd From North			Edson St From East			Hudson Rd From South					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	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
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	1	0	0	0	1	0	1
Total	0	0	0	0	0	1	0	0	0	1	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	1	1	0	1
08:30 AM	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
Total	0	0	0	0	0	0	0	0	1	1	0	1
Grand Total	0	0	0	0	0	1	0	0	1	2	0	2
Apprch %	0	0		0	0		0	0				
Total %										100	0	

	Hudson Rd From North			Edson St From East			Hudson Rd From South			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. 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
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 11



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

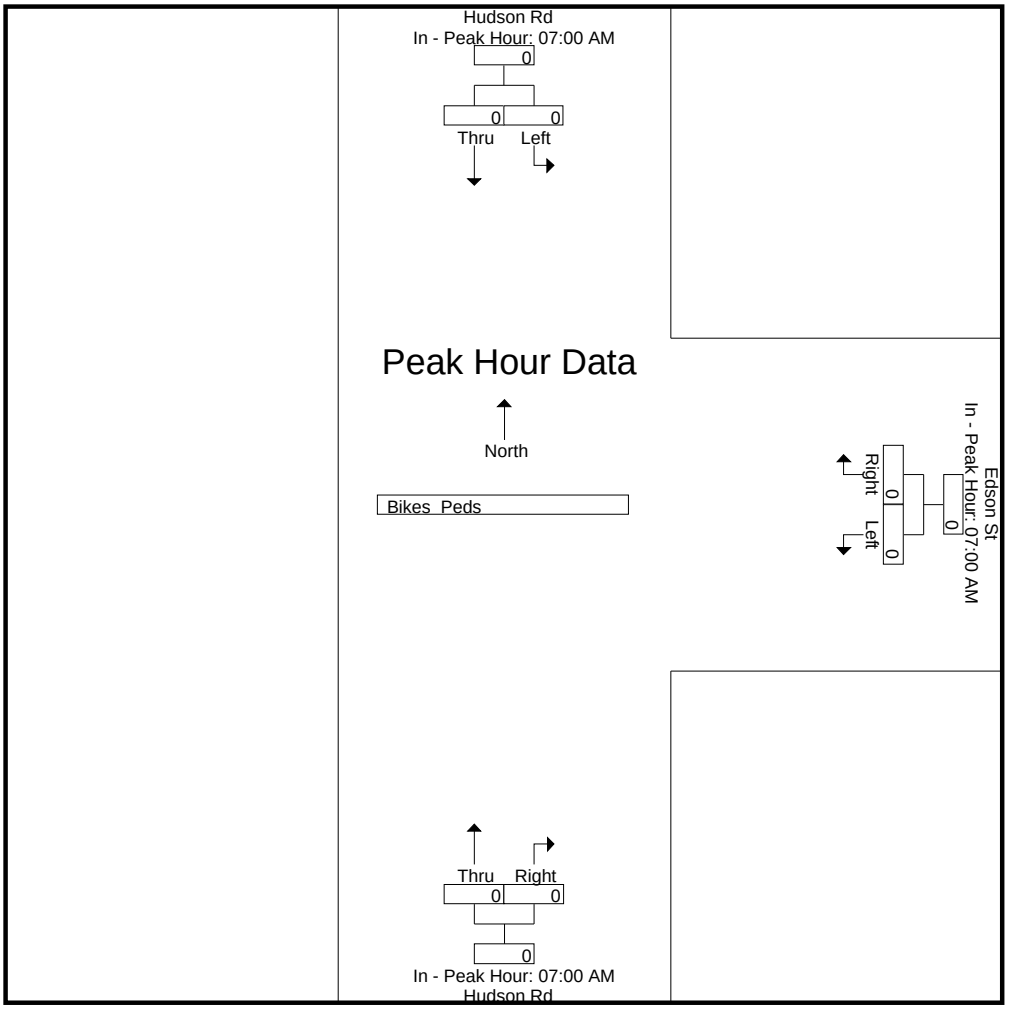
	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021

Groups Printed- Cars - Trucks

	Hudson Rd From North		Edson St From East		Hudson Rd From South		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	4	61	1	3	48	1	118
04:15 PM	4	59	1	2	34	4	104
04:30 PM	3	75	1	5	28	2	114
04:45 PM	4	48	2	11	37	0	102
Total	15	243	5	21	147	7	438
05:00 PM	5	63	1	10	50	0	129
05:15 PM	7	79	0	7	38	0	131
05:30 PM	4	48	0	4	43	0	99
05:45 PM	3	56	5	4	31	1	100
Total	19	246	6	25	162	1	459
Grand Total	34	489	11	46	309	8	897
Apprch %	6.5	93.5	19.3	80.7	97.5	2.5	
Total %	3.8	54.5	1.2	5.1	34.4	0.9	
Cars	34	488	11	44	307	8	892
% Cars	100	99.8	100	95.7	99.4	100	99.4
Trucks	0	1	0	2	2	0	5
% Trucks	0	0.2	0	4.3	0.6	0	0.6

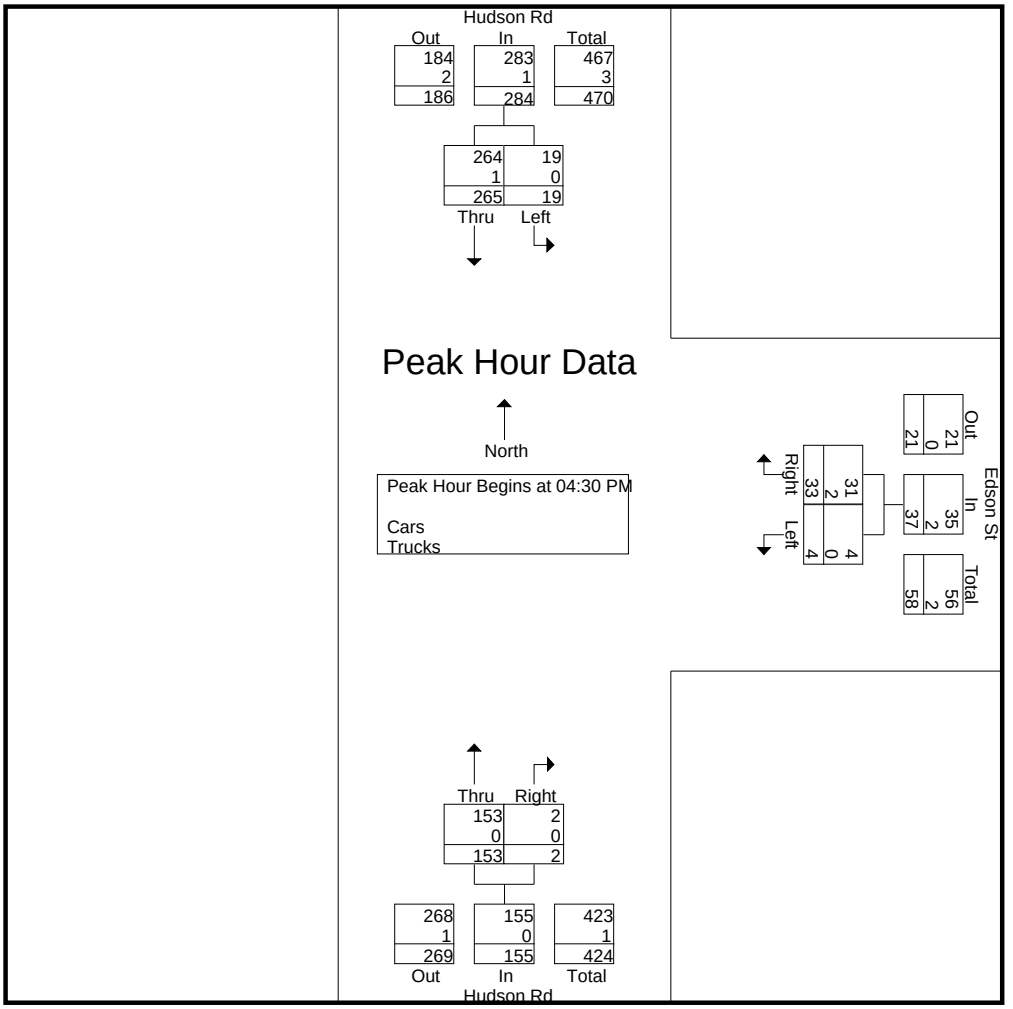
	Hudson Rd From North			Edson St From East			Hudson Rd From South			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	3	75	78	1	5	6	28	**2**	30	114
04:45 PM	4	48	52	**2**	**11**	**13**	37	0	37	102
05:00 PM	5	63	68	1	10	11	**50**	0	**50**	129
05:15 PM	**7**	**79**	**86**	0	7	7	38	0	38	**131**
Total Volume	19	265	284	4	33	37	153	2	155	476
% App. Total	6.7	93.3		10.8	89.2		98.7	1.3		
PHF	.679	.839	.826	.500	.750	.712	.765	.250	.775	.908
Cars	19	264	283	4	31	35	153	2	155	473
% Cars	100	99.6	99.6	100	93.9	94.6	100	100	100	99.4
Trucks	0	1	1	0	2	2	0	0	0	3
% Trucks	0	0.4	0.4	0	6.1	5.4	0	0	0	0.6

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

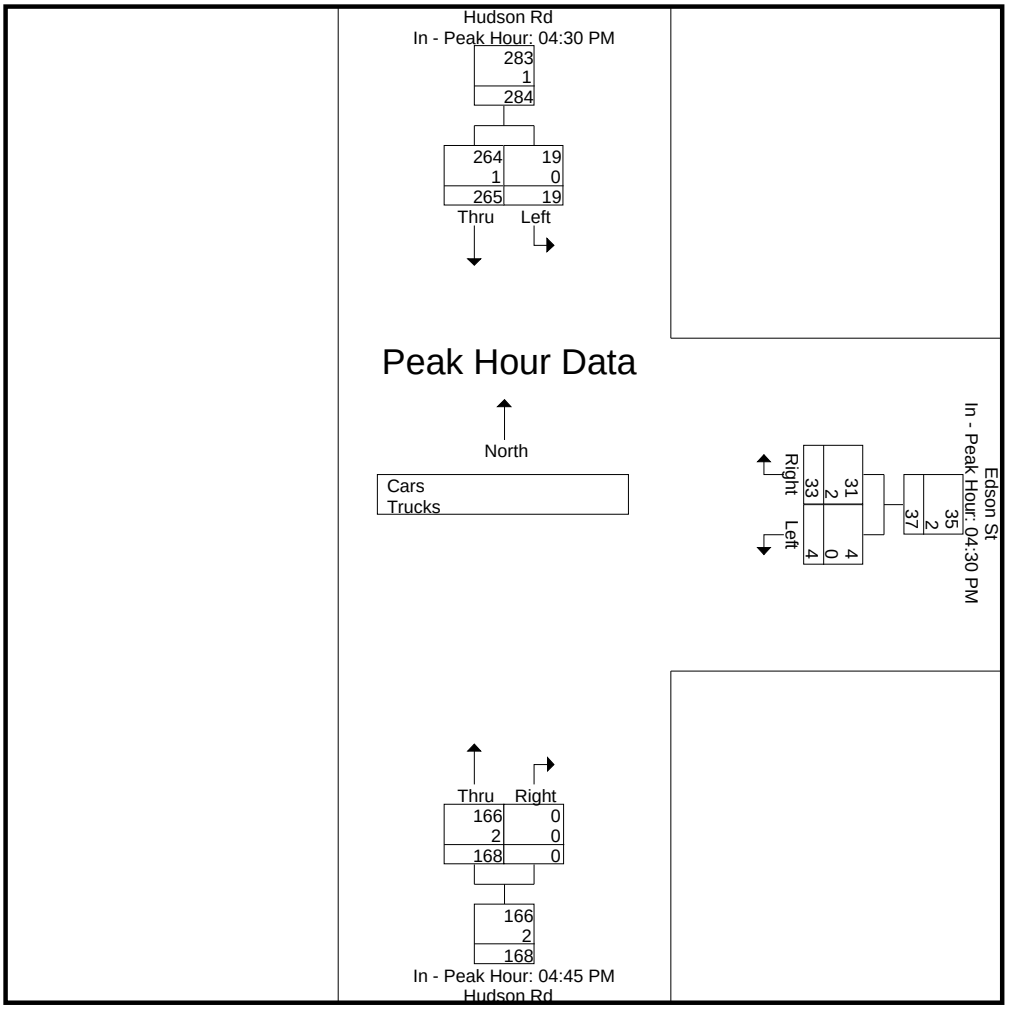
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:45 PM		
+0 mins.	3	75	78	1	5	6	37	0	37
+15 mins.	4	48	52	**2**	**11**	**13**	**50**	0	**50**
+30 mins.	5	63	68	1	10	11	38	0	38
+45 mins.	**7**	**79**	**86**	0	7	7	43	0	43
Total Volume	19	265	284	4	33	37	168	0	168
% App. Total	6.7	93.3		10.8	89.2		100	0	
PHF	.679	.839	.826	.500	.750	.712	.840	.000	.840
Cars	19	264	283	4	31	35	166	0	166
% Cars	100	99.6	99.6	100	93.9	94.6	98.8	0	98.8
Trucks	0	1	1	0	2	2	2	0	2
% Trucks	0	0.4	0.4	0	6.1	5.4	1.2	0	1.2

Accurate Counts
978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 4

Groups Printed- Cars

	Hudson Rd From North		Edson St From East		Hudson Rd From South		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	4	61	1	3	48	1	118
04:15 PM	4	59	1	2	34	4	104
04:30 PM	3	75	1	5	28	2	114
04:45 PM	4	48	2	10	37	0	101
Total	15	243	5	20	147	7	437
05:00 PM	5	63	1	9	50	0	128
05:15 PM	7	78	0	7	38	0	130
05:30 PM	4	48	0	4	41	0	97
05:45 PM	3	56	5	4	31	1	100
Total	19	245	6	24	160	1	455
Grand Total	34	488	11	44	307	8	892
Apprch %	6.5	93.5	20	80	97.5	2.5	
Total %	3.8	54.7	1.2	4.9	34.4	0.9	

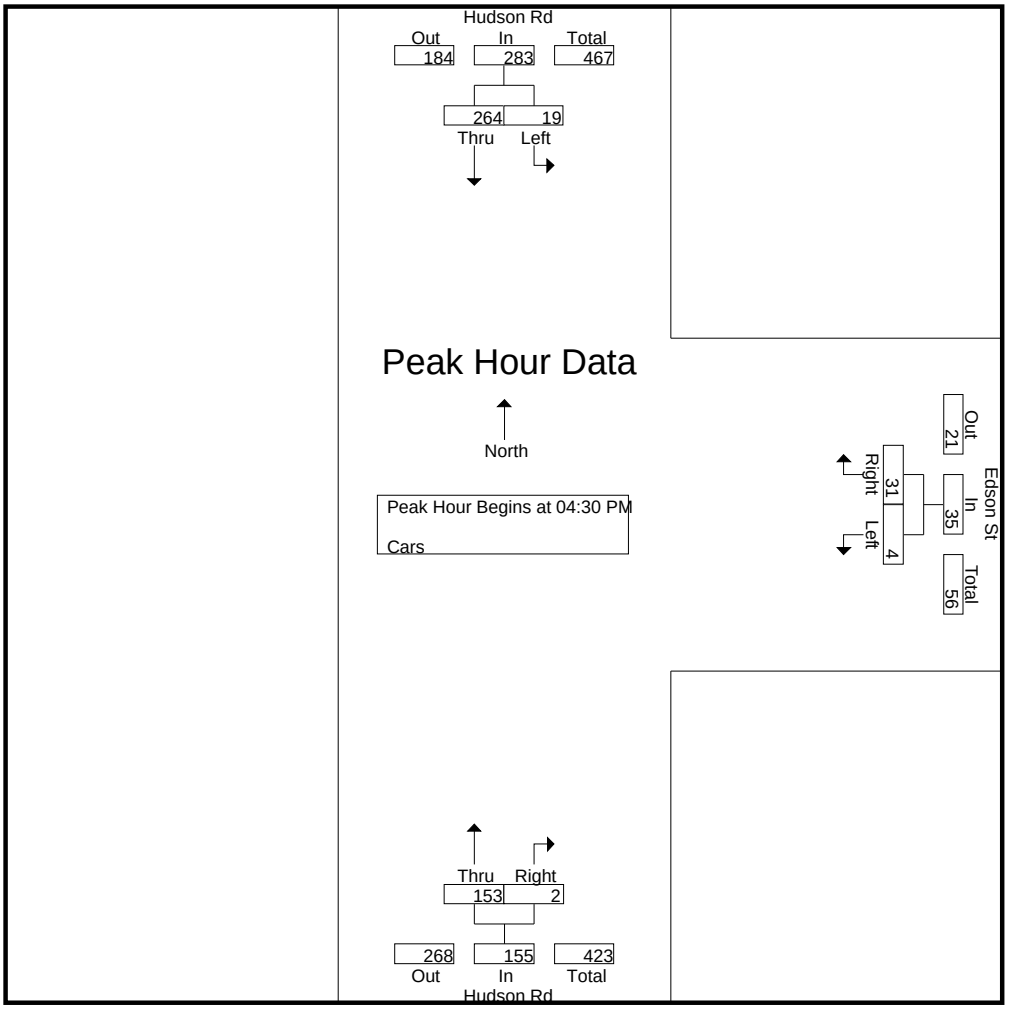
	Hudson Rd From North			Edson St From East			Hudson Rd From South			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	3	75	78	1	5	6	28	**2**	30	114
04:45 PM	4	48	52	**2**	**10**	**12**	37	0	37	101
05:00 PM	5	63	68	1	9	10	**50**	0	**50**	128
05:15 PM	**7**	**78**	**85**	0	7	7	38	0	38	**130**
Total Volume	19	264	283	4	31	35	153	2	155	473
% App. Total	6.7	93.3		11.4	88.6		98.7	1.3		
PHF	.679	.846	.832	.500	.775	.729	.765	.250	.775	.910

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 5



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

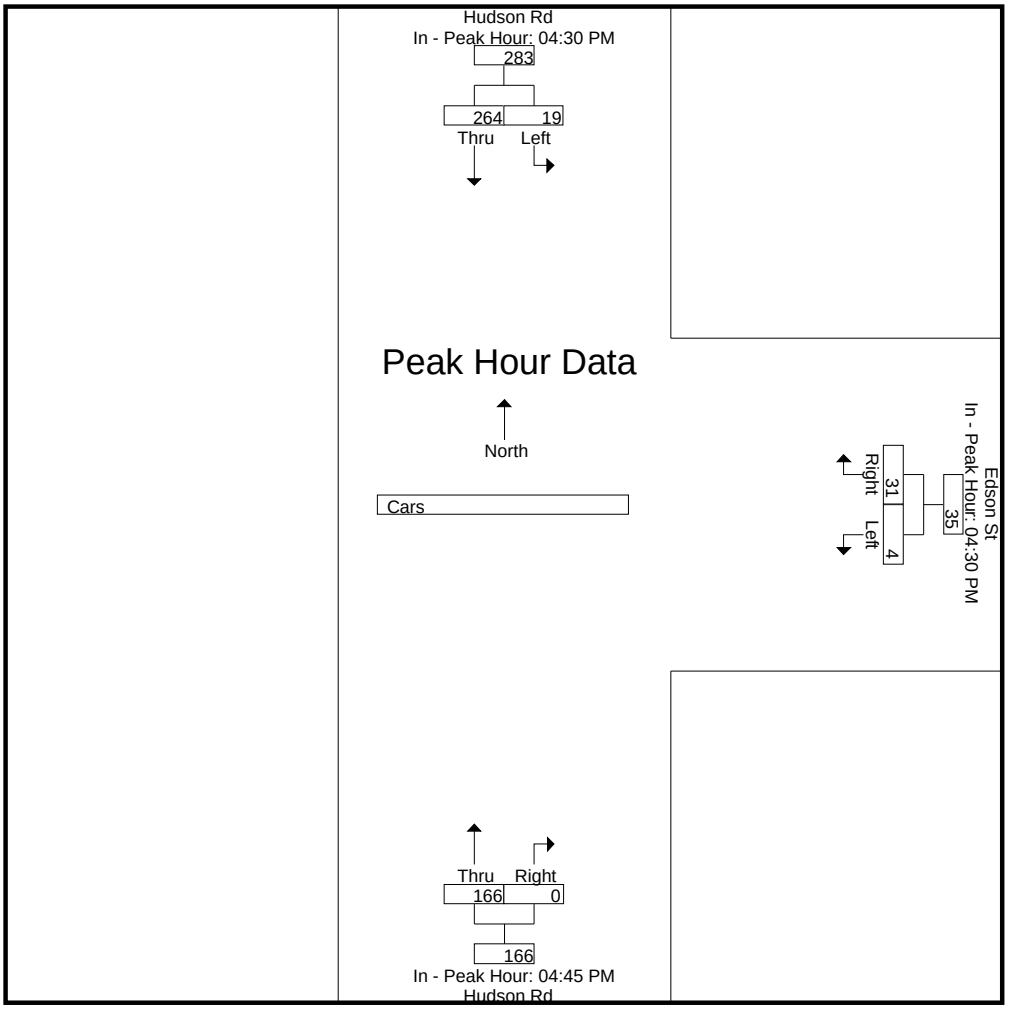
	04:30 PM			04:30 PM			04:45 PM		
+0 mins.	3	75	78	1	5	6	37	0	37
+15 mins.	4	48	52	**2**	**10**	**12**	**50**	0	**50**
+30 mins.	5	63	68	1	9	10	38	0	38
+45 mins.	**7**	**78**	**85**	0	7	7	41	0	41
Total Volume	19	264	283	4	31	35	166	0	166
% App. Total	6.7	93.3		11.4	88.6		100	0	
PHF	.679	.846	.832	.500	.775	.729	.830	.000	.830

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021

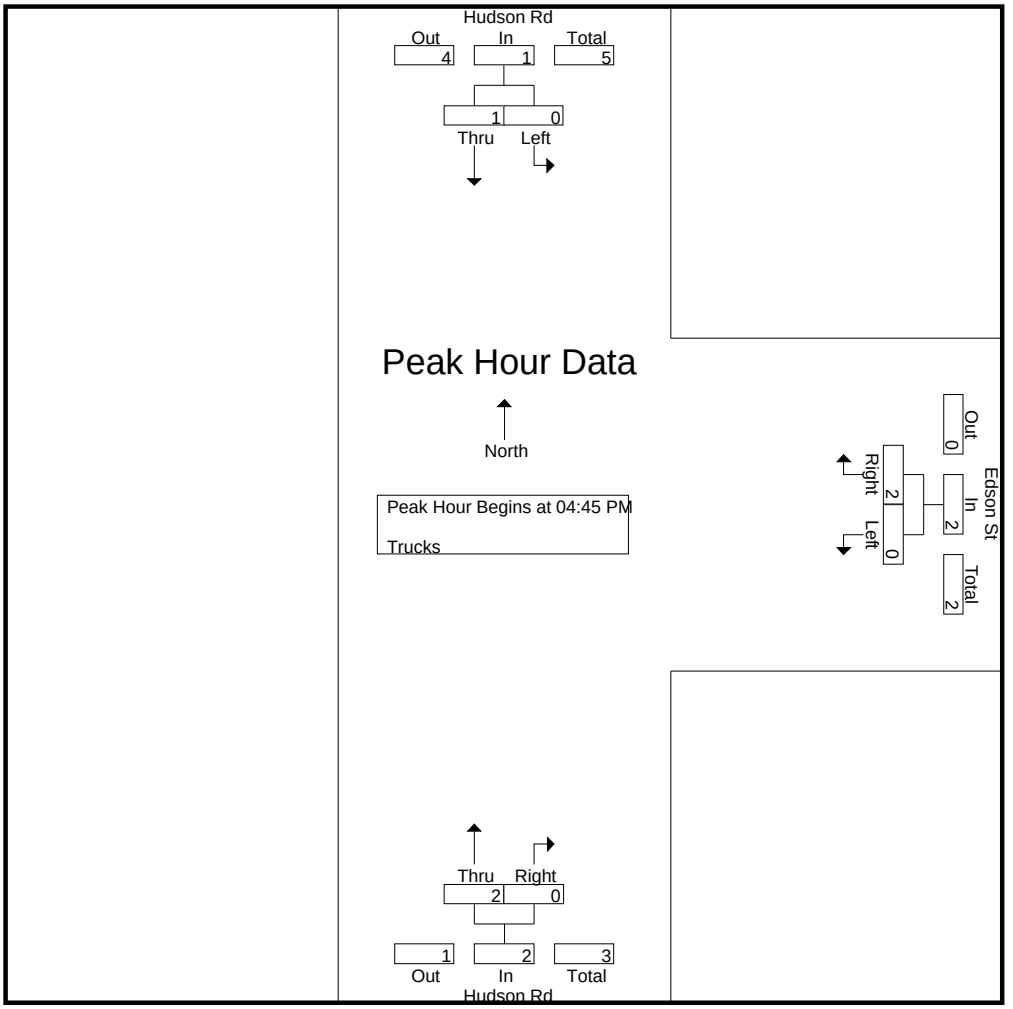
Groups Printed- Trucks

	Hudson Rd From North		Edson St From East		Hudson Rd From South		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0
04:45 PM	0	0	0	1	0	0	1
Total	0	0	0	1	0	0	1
05:00 PM	0	0	0	1	0	0	1
05:15 PM	0	1	0	0	0	0	1
05:30 PM	0	0	0	0	2	0	2
05:45 PM	0	0	0	0	0	0	0
Total	0	1	0	1	2	0	4
Grand Total	0	1	0	2	2	0	5
Apprch %	0	100	0	100	100	0	
Total %	0	20	0	40	40	0	

	Hudson Rd From North			Edson St From East			Hudson Rd From South			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	0	0	0	0	**1**	**1**	0	0	0	1
05:00 PM	0	0	0	0	1	1	0	0	0	1
05:15 PM	0	**1**	**1**	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	**2**	0	**2**	**2**
Total Volume	0	1	1	0	2	2	2	0	2	5
% App. Total	0	100		0	100		100	0		
PHF	.000	.250	.250	.000	.500	.500	.250	.000	.250	.625

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 8



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

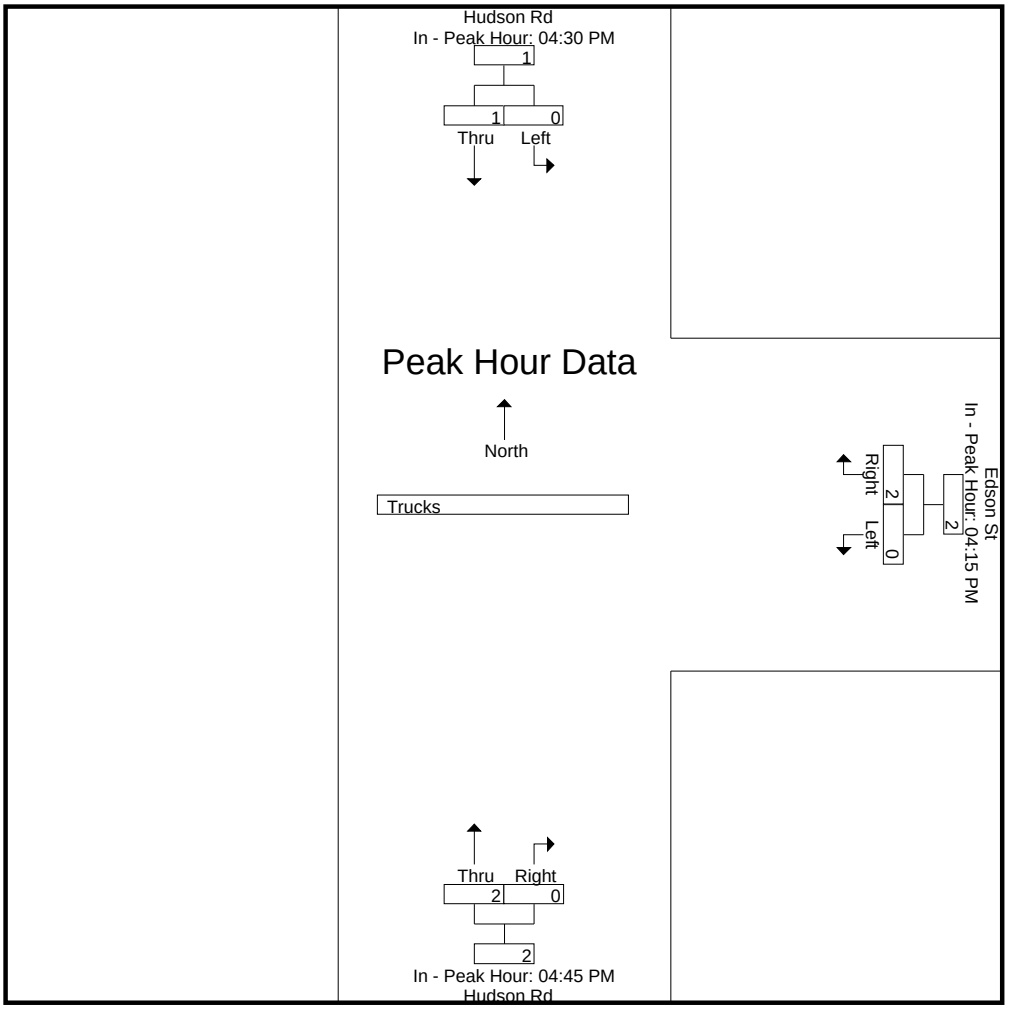
	04:30 PM			04:15 PM			04:45 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	**1**	**1**	0	0	0
+45 mins.	0	**1**	**1**	0	1	1	**2**	0	**2**
Total Volume	0	1	1	0	2	2	2	0	2
% App. Total	0	100		0	100		100	0	
PHF	.000	.250	.250	.000	.500	.500	.250	.000	.250

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021

Groups Printed- Bikes Peds

	Hudson Rd From North			Edson St From East			Hudson Rd From South					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	1	0	0	0	2	0	0	0	2	1	3
04:30 PM	1	0	0	0	0	0	0	0	0	0	1	1
04:45 PM	0	3	0	0	0	0	0	0	0	0	3	3
Total	1	4	0	0	0	2	0	0	0	2	5	7
05:00 PM	0	0	0	0	0	0	2	0	0	0	2	2
05:15 PM	0	0	0	0	0	0	2	0	0	0	2	2
05:30 PM	0	0	0	0	0	2	0	0	0	2	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	2	4	0	0	2	4	6
Grand Total	1	4	0	0	0	4	4	0	0	4	9	13
Apprch %	20	80		0	0		100	0				
Total %	11.1	44.4		0	0		44.4	0		30.8	69.2	

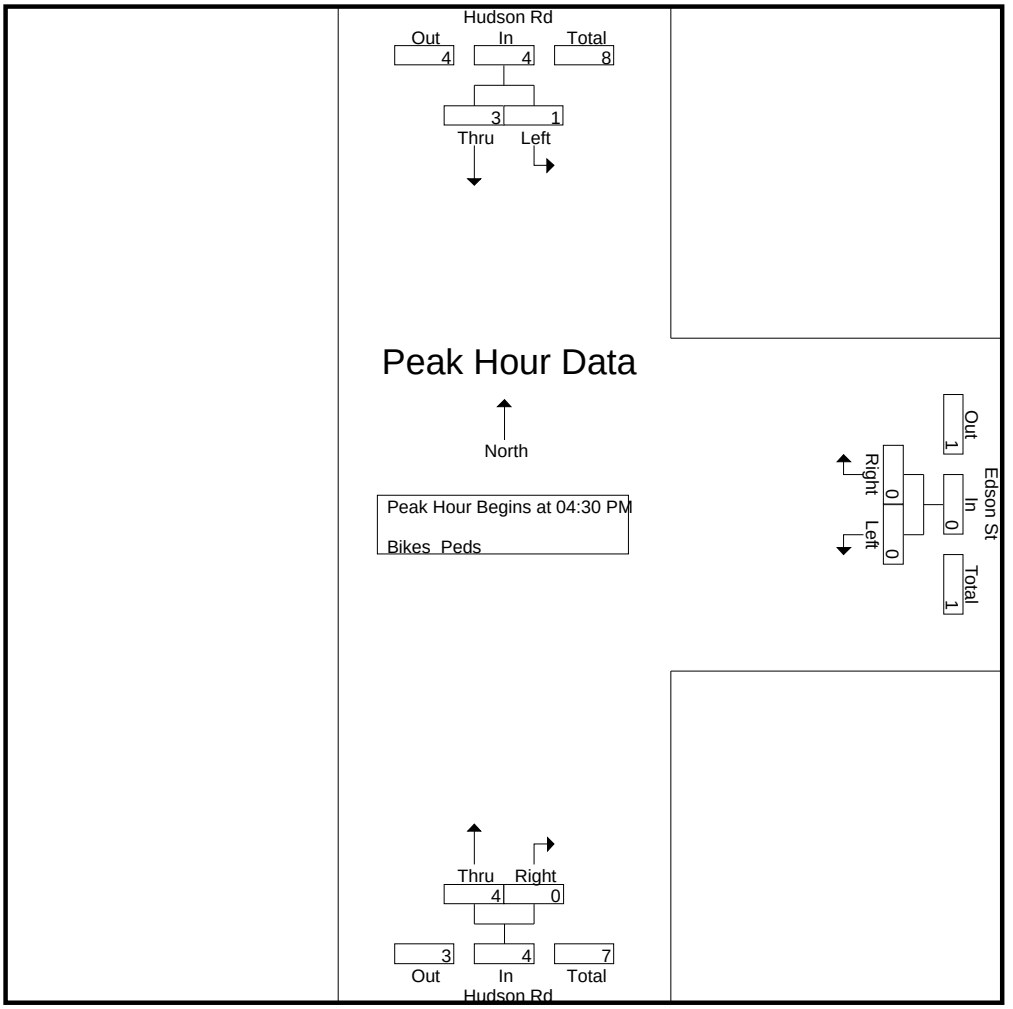
	Hudson Rd From North			Edson St From East			Hudson Rd From South			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	**1**	0	1	0	0	0	0	0	0	1
04:45 PM	0	**3**	**3**	0	0	0	0	0	0	**3**
05:00 PM	0	0	0	0	0	0	**2**	0	**2**	2
05:15 PM	0	0	0	0	0	0	2	0	2	2
Total Volume	1	3	4	0	0	0	4	0	4	8
% App. Total	25	75		0	0		100	0		
PHF	.250	.250	.333	.000	.000	.000	.500	.000	.500	.667

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 11



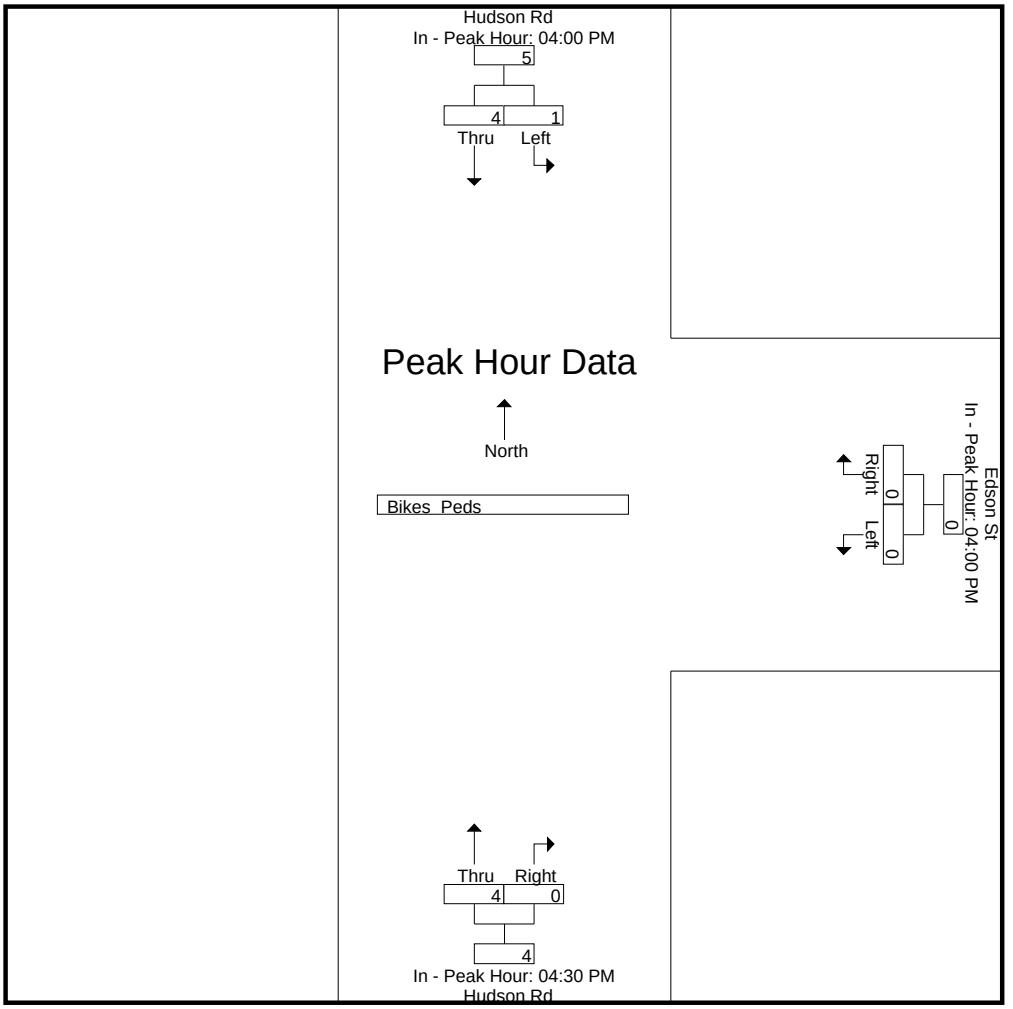
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			04:30 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	1	1	0	0	0	0	0	0
+30 mins.	**1**	0	1	0	0	0	**2**	0	**2**
+45 mins.	0	**3**	**3**	0	0	0	2	0	2
Total Volume	1	4	5	0	0	0	4	0	4
% App. Total	20	80		0	0		100	0	
PHF	.250	.333	.417	.000	.000	.000	.500	.000	.500

Accurate Counts
978-664-2565

N/S Street : Hudson Road
E/W Street : Edson Street
City/State : Stow, MA
Weather : Clear

File Name : 90260001
Site Code : 90260001
Start Date : 6/23/2021
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 1

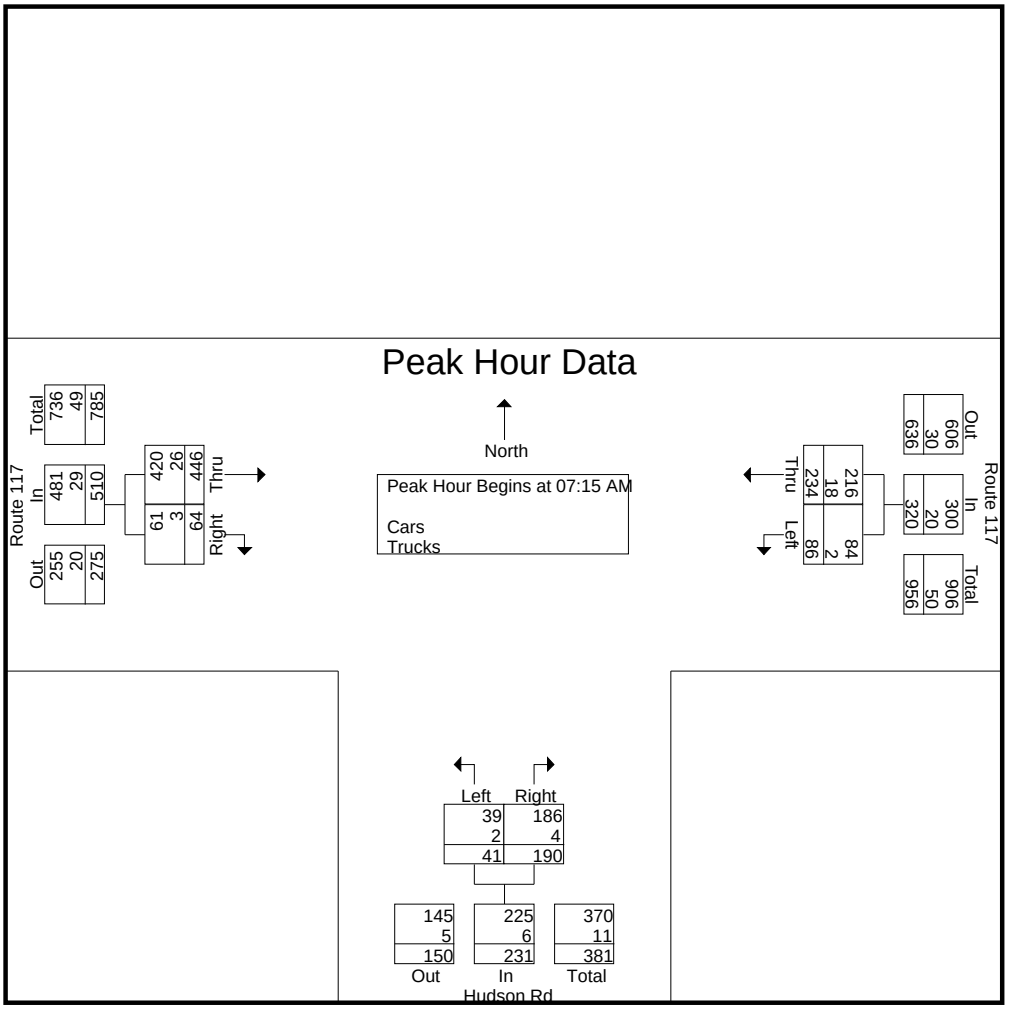
Groups Printed- Cars - Trucks

	Route 117 From East		Hudson Rd From South		Route 117 From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	20	46	11	35	92	17	221
07:15 AM	20	56	10	53	108	14	261
07:30 AM	26	58	13	43	106	15	261
07:45 AM	23	66	11	48	128	19	295
Total	89	226	45	179	434	65	1038
08:00 AM	17	54	7	46	104	16	244
08:15 AM	27	46	6	45	107	12	243
08:30 AM	35	78	14	36	85	8	256
08:45 AM	27	65	13	35	76	14	230
Total	106	243	40	162	372	50	973
Grand Total	195	469	85	341	806	115	2011
Apprch %	29.4	70.6	20	80	87.5	12.5	
Total %	9.7	23.3	4.2	17	40.1	5.7	
Cars	190	433	78	332	763	107	1903
% Cars	97.4	92.3	91.8	97.4	94.7	93	94.6
Trucks	5	36	7	9	43	8	108
% Trucks	2.6	7.7	8.2	2.6	5.3	7	5.4

	Route 117 From East			Hudson Rd From South			Route 117 From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. 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	20	56	76	10	**53**	**63**	108	14	122	261
07:30 AM	**26**	58	84	**13**	43	56	106	15	121	261
07:45 AM	23	**66**	**89**	11	48	59	**128**	**19**	**147**	**295**
08:00 AM	17	54	71	7	46	53	104	16	120	244
Total Volume	86	234	320	41	190	231	446	64	510	1061
% App. Total	26.9	73.1		17.7	82.3		87.5	12.5		
PHF	.827	.886	.899	.788	.896	.917	.871	.842	.867	.899
Cars	84	216	300	39	186	225	420	61	481	1006
% Cars	97.7	92.3	93.8	95.1	97.9	97.4	94.2	95.3	94.3	94.8
Trucks	2	18	20	2	4	6	26	3	29	55
% Trucks	2.3	7.7	6.3	4.9	2.1	2.6	5.8	4.7	5.7	5.2

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

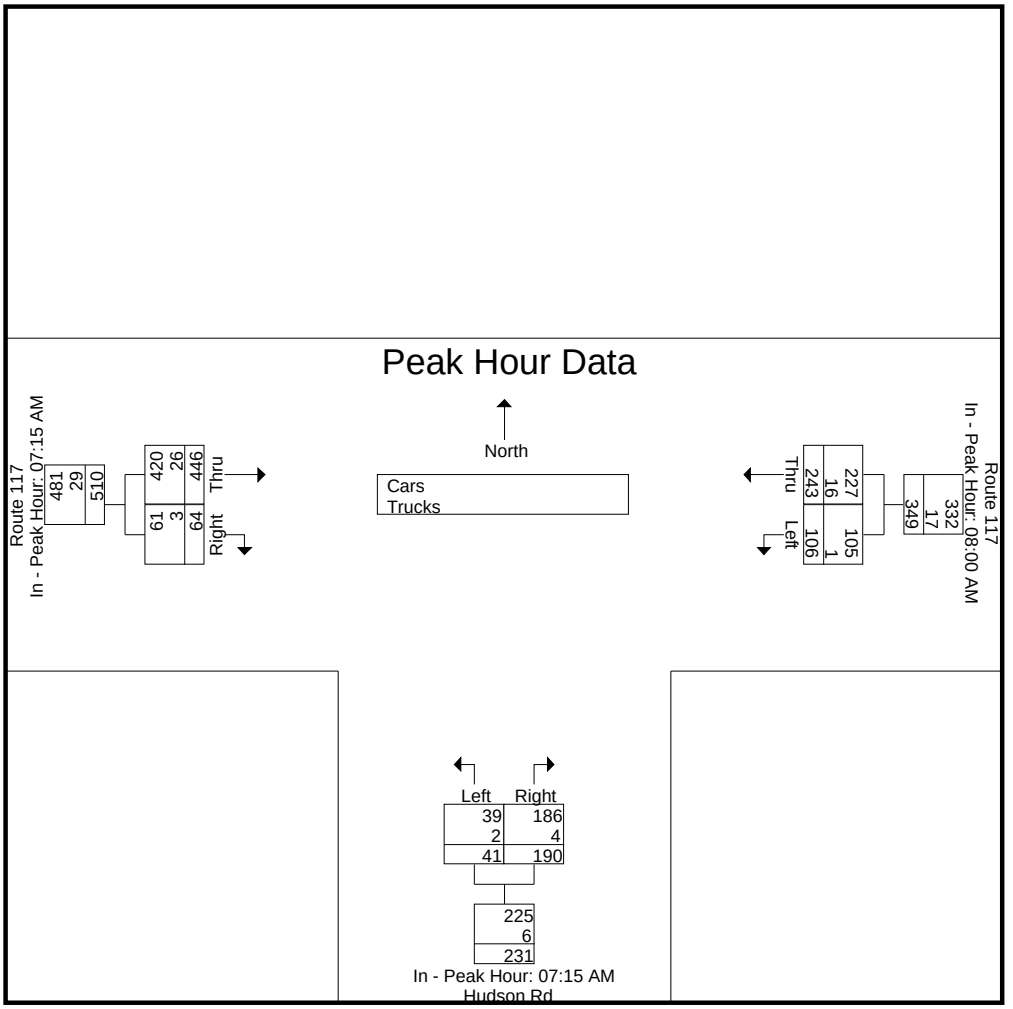
	08:00 AM			07:15 AM			07:15 AM		
+0 mins.	17	54	71	10	**53**	**63**	108	14	122
+15 mins.	27	46	73	**13**	43	56	106	15	121
+30 mins.	**35**	**78**	**113**	11	48	59	**128**	**19**	**147**
+45 mins.	27	65	92	7	46	53	104	16	120
Total Volume	106	243	349	41	190	231	446	64	510
% App. Total	30.4	69.6		17.7	82.3		87.5	12.5	
PHF	.757	.779	.772	.788	.896	.917	.871	.842	.867
Cars	105	227	332	39	186	225	420	61	481
% Cars	99.1	93.4	95.1	95.1	97.9	97.4	94.2	95.3	94.3
Trucks	1	16	17	2	4	6	26	3	29
% Trucks	0.9	6.6	4.9	4.9	2.1	2.6	5.8	4.7	5.7

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 4

Groups Printed- Cars

	Route 117 From East		Hudson Rd From South		Route 117 From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	18	42	9	35	89	15	208
07:15 AM	19	52	9	51	100	14	245
07:30 AM	26	50	12	42	103	15	248
07:45 AM	22	62	11	48	122	19	284
Total	85	206	41	176	414	63	985
08:00 AM	17	52	7	45	95	13	229
08:15 AM	26	44	5	41	102	11	229
08:30 AM	35	70	13	35	81	7	241
08:45 AM	27	61	12	35	71	13	219
Total	105	227	37	156	349	44	918
Grand Total	190	433	78	332	763	107	1903
Apprch %	30.5	69.5	19	81	87.7	12.3	
Total %	10	22.8	4.1	17.4	40.1	5.6	

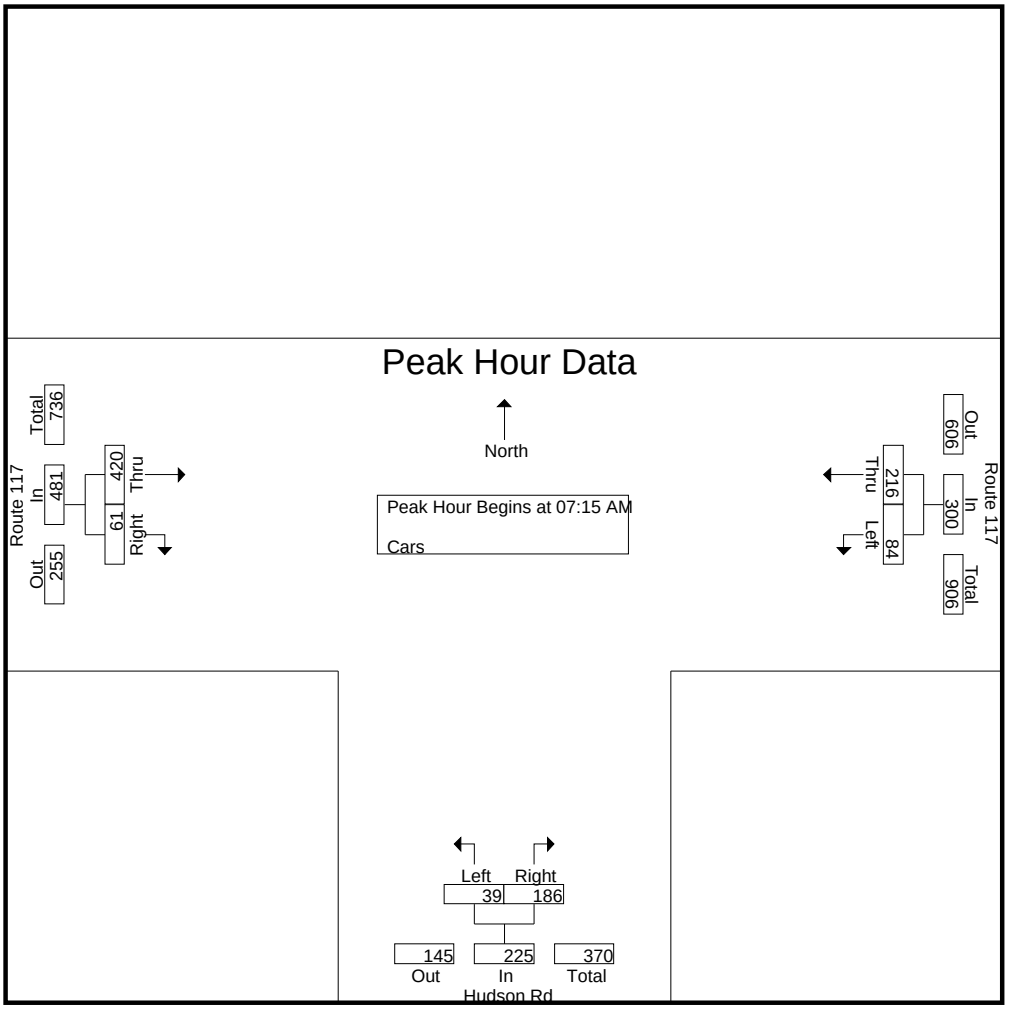
	Route 117 From East			Hudson Rd From South			Route 117 From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	19	52	71	9	**51**	**60**	100	14	114	245
07:30 AM	**26**	50	76	**12**	42	54	103	15	118	248
07:45 AM	22	**62**	**84**	11	48	59	**122**	**19**	**141**	**284**
08:00 AM	17	52	69	7	45	52	95	13	108	229
Total Volume	84	216	300	39	186	225	420	61	481	1006
% App. Total	28	72		17.3	82.7		87.3	12.7		
PHF	.808	.871	.893	.813	.912	.938	.861	.803	.853	.886

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 5



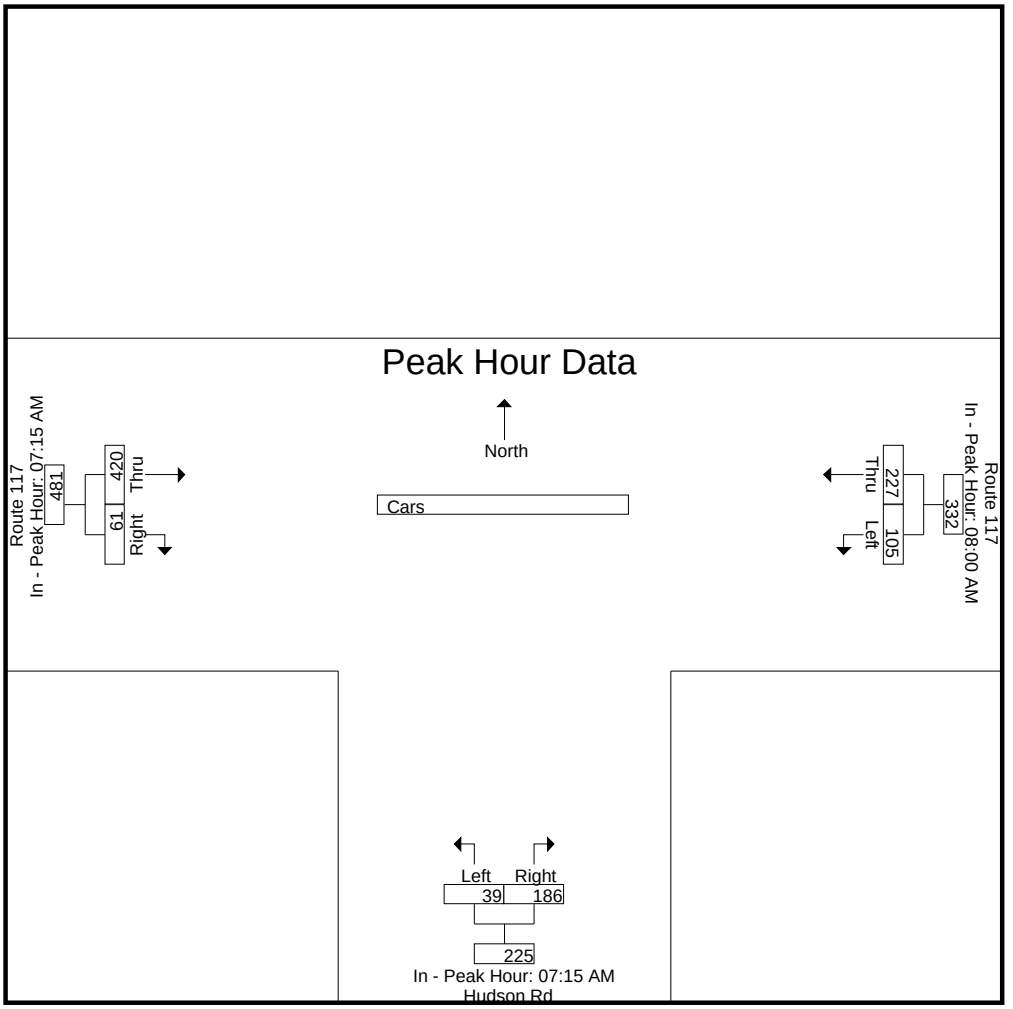
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM			07:15 AM			07:15 AM		
+0 mins.	17	52	69	9	**51**	**60**	100	14	114
+15 mins.	26	44	70	**12**	42	54	103	15	118
+30 mins.	**35**	**70**	**105**	11	48	59	**122**	**19**	**141**
+45 mins.	27	61	88	7	45	52	95	13	108
Total Volume	105	227	332	39	186	225	420	61	481
% App. Total	31.6	68.4		17.3	82.7		87.3	12.7	
PHF	.750	.811	.790	.813	.912	.938	.861	.803	.853

Accurate Counts
978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 7

Groups Printed- Trucks

	Route 117 From East		Hudson Rd From South		Route 117 From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	2	4	2	0	3	2	13
07:15 AM	1	4	1	2	8	0	16
07:30 AM	0	8	1	1	3	0	13
07:45 AM	1	4	0	0	6	0	11
Total	4	20	4	3	20	2	53
08:00 AM	0	2	0	1	9	3	15
08:15 AM	1	2	1	4	5	1	14
08:30 AM	0	8	1	1	4	1	15
08:45 AM	0	4	1	0	5	1	11
Total	1	16	3	6	23	6	55
Grand Total	5	36	7	9	43	8	108
Apprch %	12.2	87.8	43.8	56.2	84.3	15.7	
Total %	4.6	33.3	6.5	8.3	39.8	7.4	

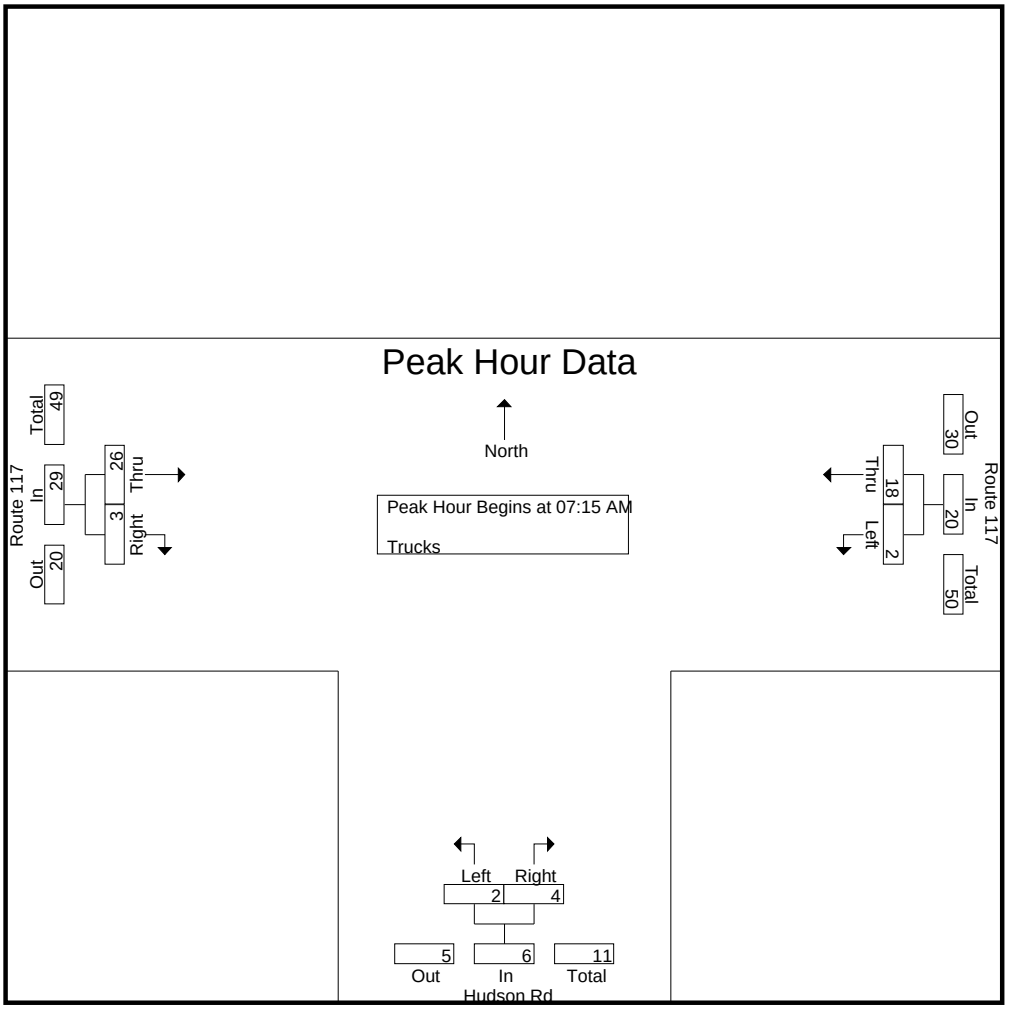
	Route 117 From East			Hudson Rd From South			Route 117 From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	**1**	4	5	**1**	**2**	**3**	8	0	8	**16**
07:30 AM	0	**8**	**8**	1	1	2	3	0	3	13
07:45 AM	1	4	5	0	0	0	6	0	6	11
08:00 AM	0	2	2	0	1	1	**9**	**3**	**12**	15
Total Volume	2	18	20	2	4	6	26	3	29	55
% App. Total	10	90		33.3	66.7		89.7	10.3		
PHF	.500	.563	.625	.500	.500	.500	.722	.250	.604	.859

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 8



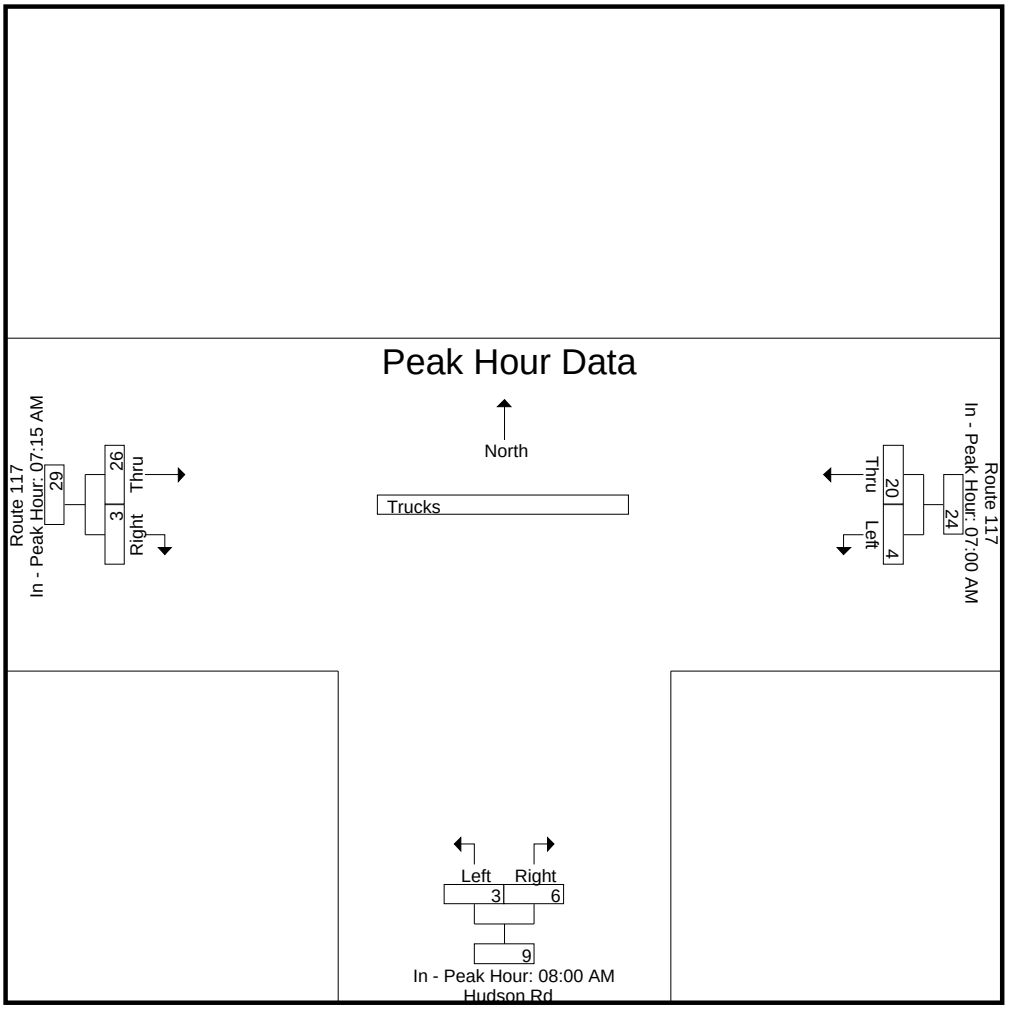
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			08:00 AM			07:15 AM		
+0 mins.	**2**	4	6	0	1	1	8	0	8
+15 mins.	1	4	5	**1**	**4**	**5**	3	0	3
+30 mins.	0	**8**	**8**	1	1	2	6	0	6
+45 mins.	1	4	5	1	0	1	**9**	**3**	**12**
Total Volume	4	20	24	3	6	9	26	3	29
% App. Total	16.7	83.3		33.3	66.7		89.7	10.3	
PHF	.500	.625	.750	.750	.375	.450	.722	.250	.604

Accurate Counts
978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 10

Groups Printed- Bikes Peds

	Route 117 From East			Hudson Rd From South			Route 117 From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	1	1	0	0	2	2
07:15 AM	0	0	0	1	1	0	0	1	0	0	3	3
07:30 AM	0	0	0	0	0	0	0	0	1	1	0	1
07:45 AM	0	0	0	0	0	0	0	0	1	1	0	1
Total	0	0	0	1	1	0	1	2	2	2	5	7
08:00 AM	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
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	2	0	0	0	0	0	0	0	0	2	2
Total	0	2	0	0	0	0	0	0	0	0	2	2
Grand Total	0	2	0	1	1	0	1	2	2	2	7	9
Apprch %	0	100		50	50		33.3	66.7				
Total %	0	28.6		14.3	14.3		14.3	28.6		22.2	77.8	

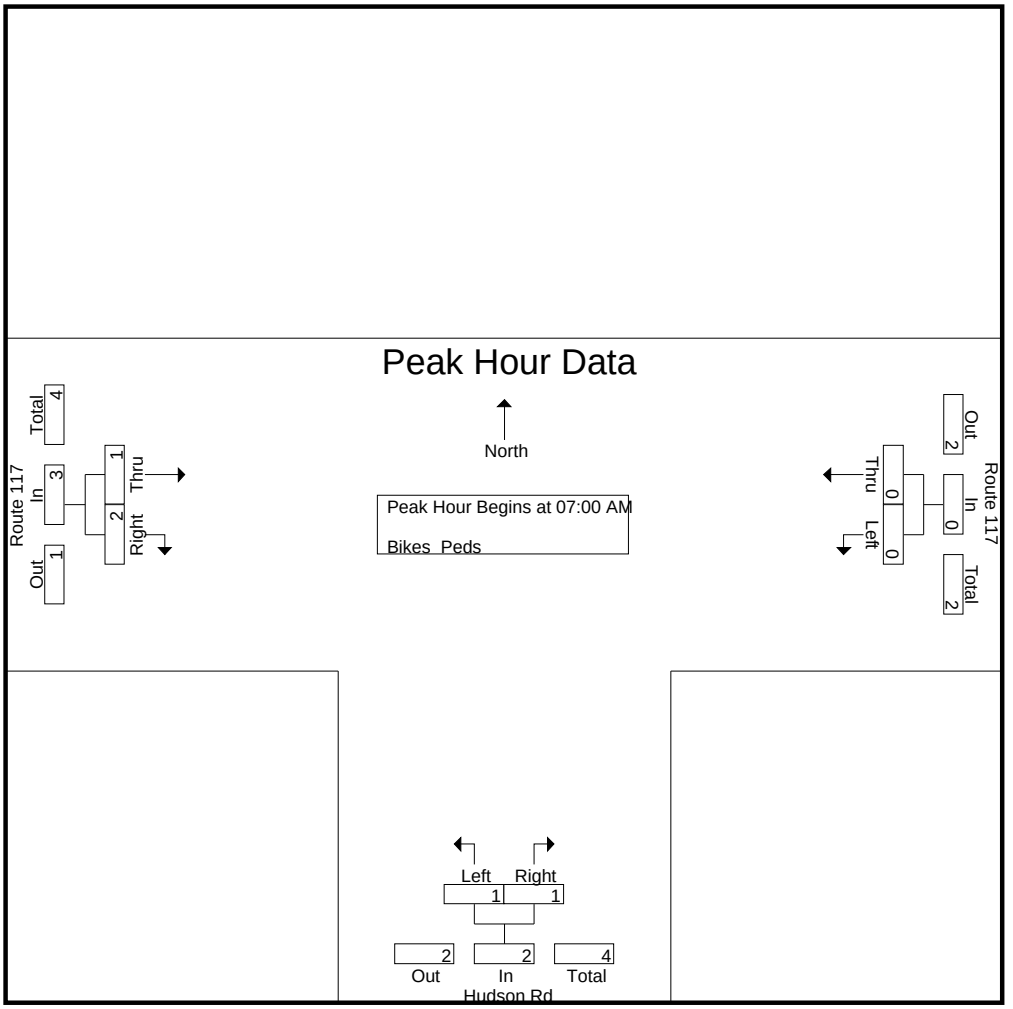
	Route 117 From East			Hudson Rd From South			Route 117 From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	**1**	**1**	**2**	2
07:15 AM	0	0	0	**1**	**1**	**2**	0	1	1	**3**
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	1	1	2	1	2	3	5
% App. Total	0	0		50	50		33.3	66.7		
PHF	.000	.000	.000	.250	.250	.250	.250	.500	.375	.417

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 11



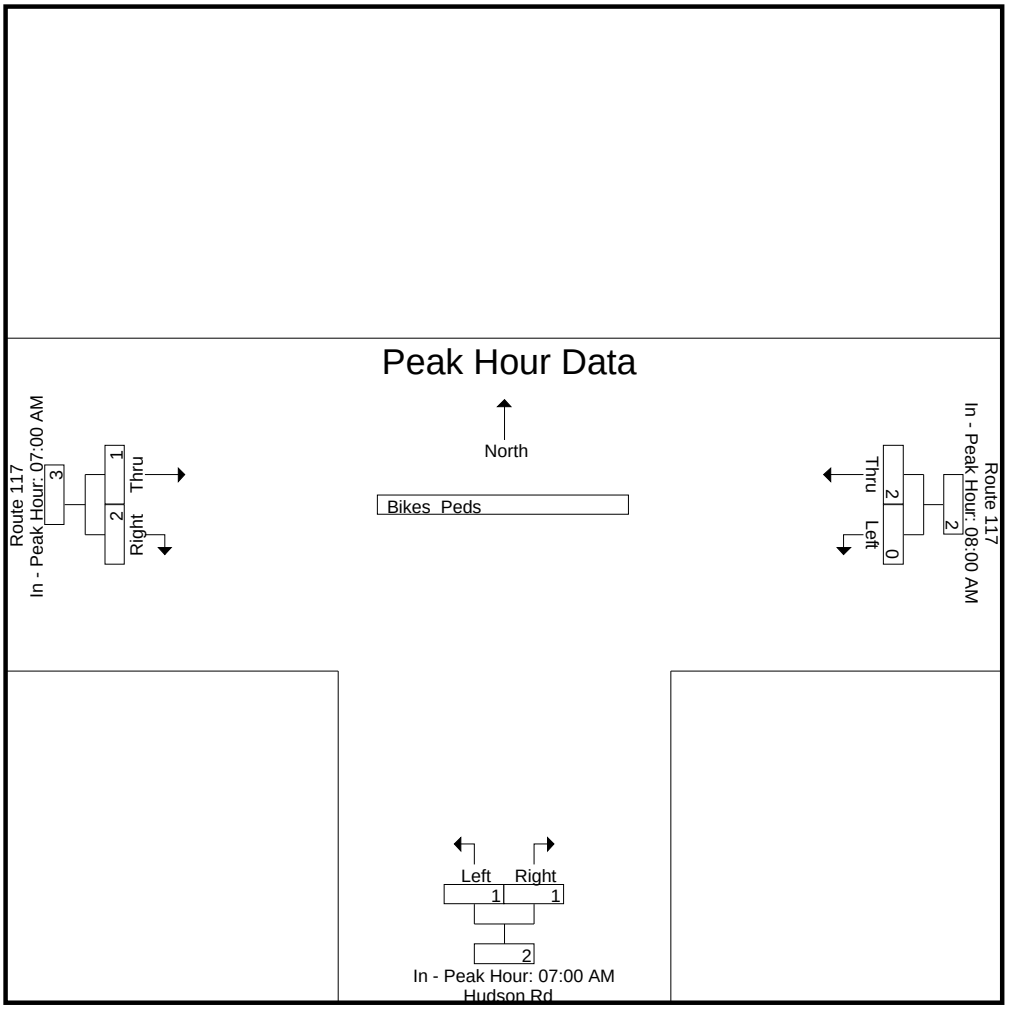
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	0	0	0	0	0	**1**	**1**	**2**
+15 mins.	0	0	0	**1**	**1**	**2**	0	1	1
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	**2**	**2**	0	0	0	0	0	0
Total Volume	0	2	2	1	1	2	1	2	3
% App. Total	0	100		50	50		33.3	66.7	
PHF	.000	.250	.250	.250	.250	.250	.250	.500	.375

Accurate Counts
978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 12



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 1

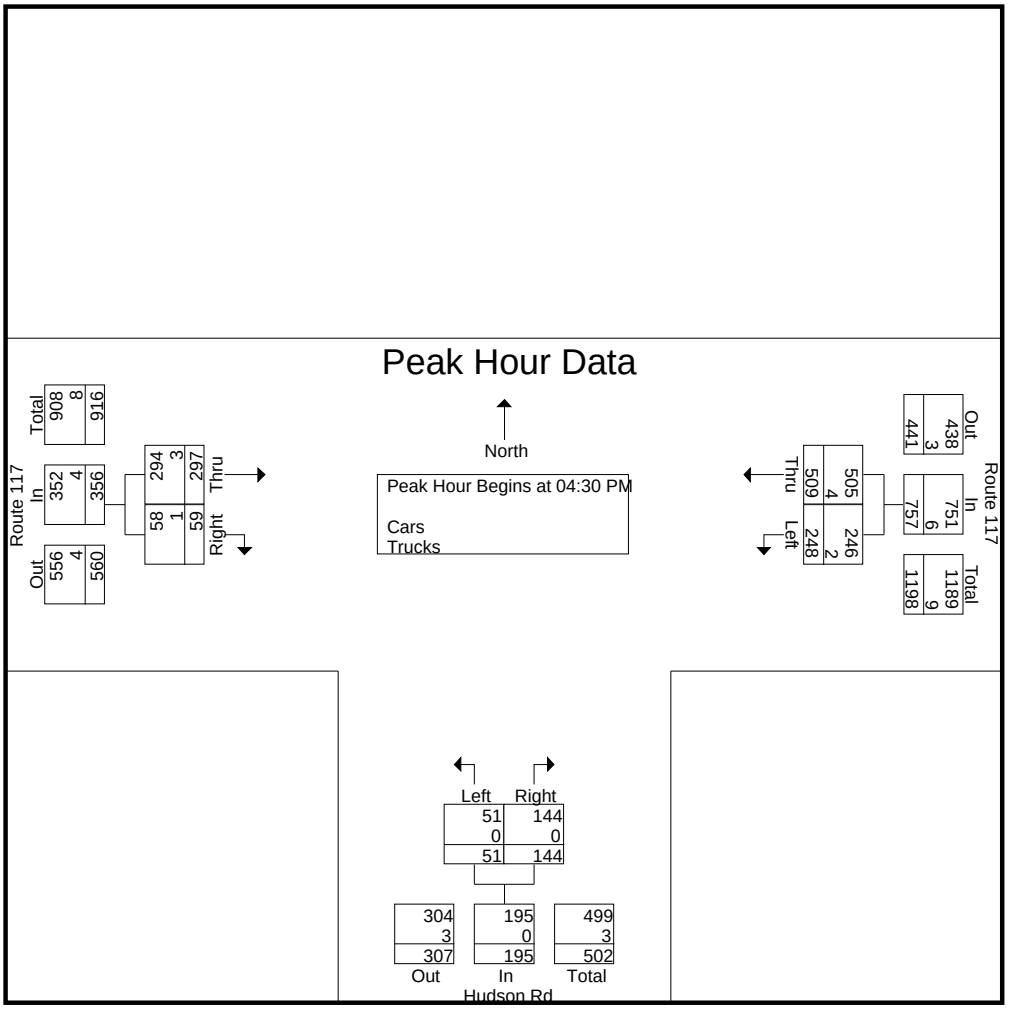
Groups Printed- Cars - Trucks

	Route 117 From East		Hudson Rd From South		Route 117 From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	50	138	16	44	57	10	315
04:15 PM	56	134	10	30	58	16	304
04:30 PM	64	122	7	33	82	13	321
04:45 PM	52	131	15	33	77	10	318
Total	222	525	48	140	274	49	1258
05:00 PM	63	132	16	37	63	20	331
05:15 PM	69	124	13	41	75	16	338
05:30 PM	39	124	20	35	73	8	299
05:45 PM	49	110	9	21	69	17	275
Total	220	490	58	134	280	61	1243
Grand Total	442	1015	106	274	554	110	2501
Apprch %	30.3	69.7	27.9	72.1	83.4	16.6	
Total %	17.7	40.6	4.2	11	22.2	4.4	
Cars	440	1002	104	274	549	109	2478
% Cars	99.5	98.7	98.1	100	99.1	99.1	99.1
Trucks	2	13	2	0	5	1	23
% Trucks	0.5	1.3	1.9	0	0.9	0.9	0.9

	Route 117 From East			Hudson Rd From South			Route 117 From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	64	122	186	7	33	40	**82**	13	**95**	321
04:45 PM	52	131	183	15	33	48	77	10	87	318
05:00 PM	63	**132**	**195**	**16**	37	53	63	**20**	83	331
05:15 PM	**69**	124	193	13	**41**	**54**	75	16	91	**338**
Total Volume	248	509	757	51	144	195	297	59	356	1308
% App. Total	32.8	67.2		26.2	73.8		83.4	16.6		
PHF	.899	.964	.971	.797	.878	.903	.905	.738	.937	.967
Cars	246	505	751	51	144	195	294	58	352	1298
% Cars	99.2	99.2	99.2	100	100	100	99.0	98.3	98.9	99.2
Trucks	2	4	6	0	0	0	3	1	4	10
% Trucks	0.8	0.8	0.8	0	0	0	1.0	1.7	1.1	0.8

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

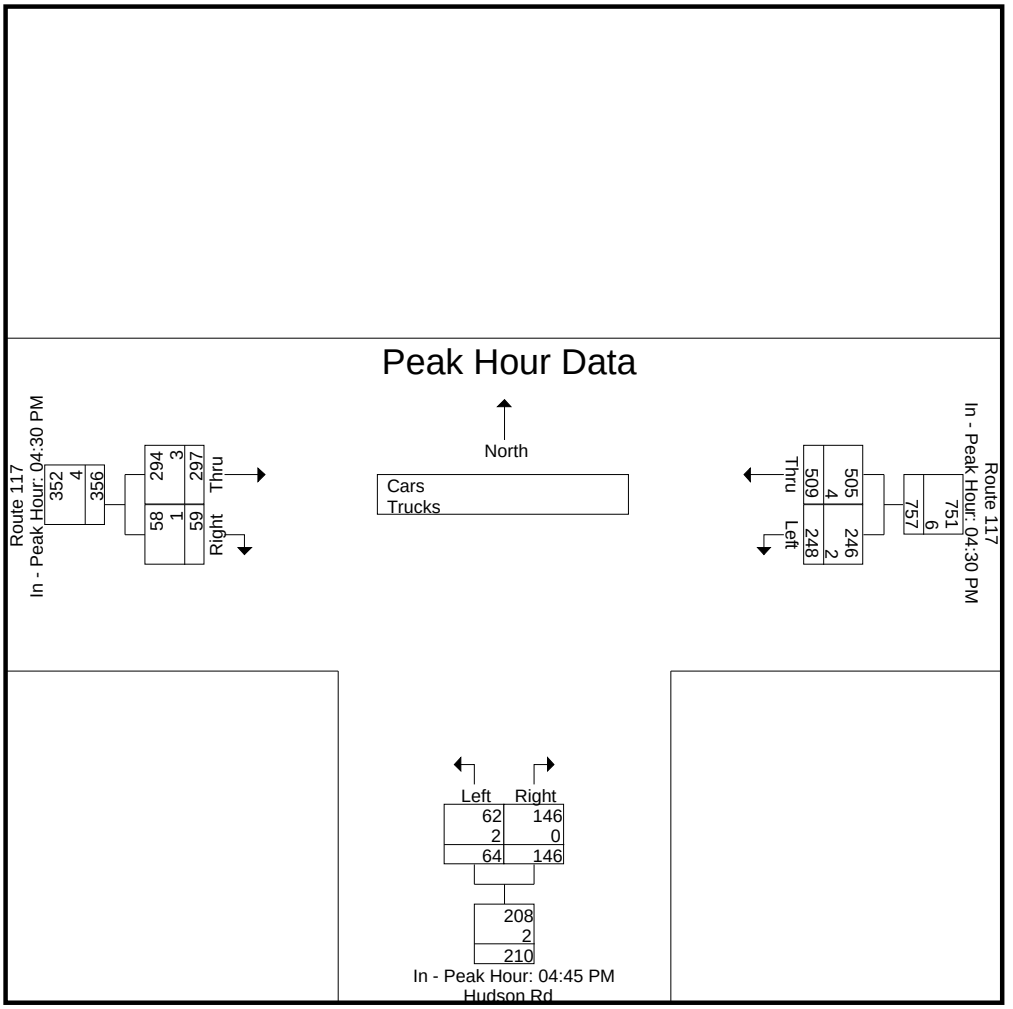
	04:30 PM			04:45 PM			04:30 PM		
+0 mins.	64	122	186	15	33	48	**82**	13	**95**
+15 mins.	52	131	183	16	37	53	77	10	87
+30 mins.	63	**132**	**195**	13	**41**	54	63	**20**	83
+45 mins.	**69**	124	193	**20**	35	**55**	75	16	91
Total Volume	248	509	757	64	146	210	297	59	356
% App. Total	32.8	67.2		30.5	69.5		83.4	16.6	
PHF	.899	.964	.971	.800	.890	.955	.905	.738	.937
Cars	246	505	751	62	146	208	294	58	352
% Cars	99.2	99.2	99.2	96.9	100	99	99	98.3	98.9
Trucks	2	4	6	2	0	2	3	1	4
% Trucks	0.8	0.8	0.8	3.1	0	1	1	1.7	1.1

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 4

Groups Printed- Cars

	Route 117 From East		Hudson Rd From South		Route 117 From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	50	134	16	44	57	10	311
04:15 PM	56	130	10	30	56	16	298
04:30 PM	62	121	7	33	82	13	318
04:45 PM	52	128	15	33	76	10	314
Total	220	513	48	140	271	49	1241
05:00 PM	63	132	16	37	62	20	330
05:15 PM	69	124	13	41	74	15	336
05:30 PM	39	124	18	35	73	8	297
05:45 PM	49	109	9	21	69	17	274
Total	220	489	56	134	278	60	1237
Grand Total	440	1002	104	274	549	109	2478
Apprch %	30.5	69.5	27.5	72.5	83.4	16.6	
Total %	17.8	40.4	4.2	11.1	22.2	4.4	

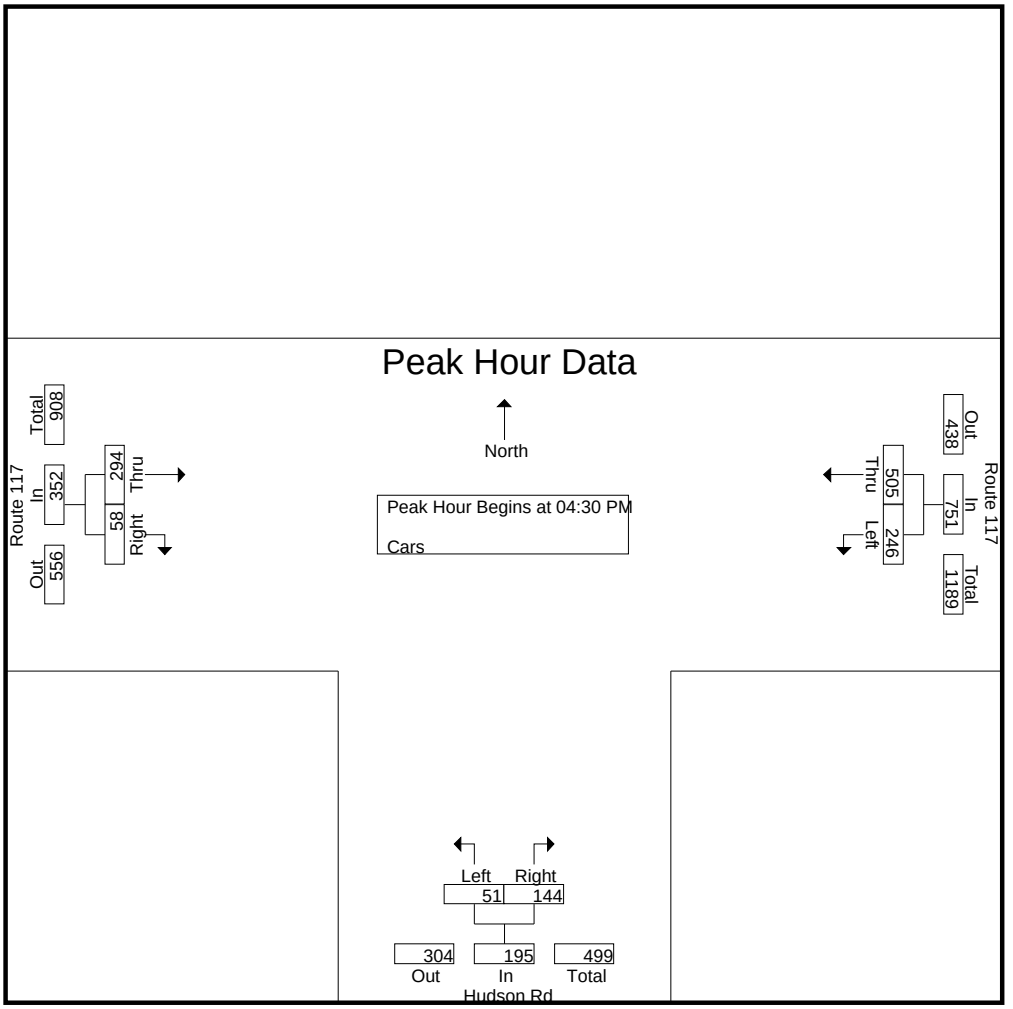
	Route 117 From East			Hudson Rd From South			Route 117 From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	62	121	183	7	33	40	**82**	13	**95**	318
04:45 PM	52	128	180	15	33	48	76	10	86	314
05:00 PM	63	**132**	**195**	**16**	37	53	62	**20**	82	330
05:15 PM	**69**	124	193	13	**41**	**54**	74	15	89	**336**
Total Volume	246	505	751	51	144	195	294	58	352	1298
% App. Total	32.8	67.2		26.2	73.8		83.5	16.5		
PHF	.891	.956	.963	.797	.878	.903	.896	.725	.926	.966

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 5



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

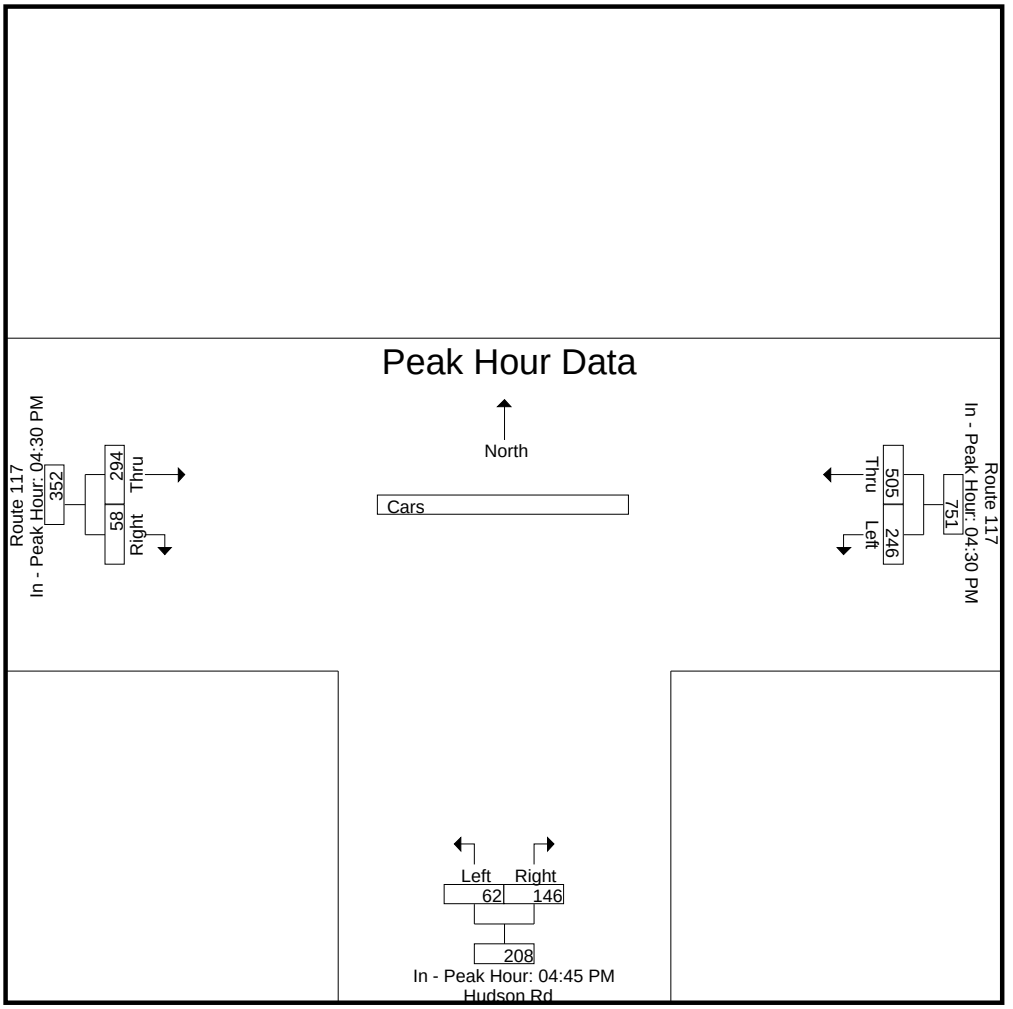
	04:30 PM			04:45 PM			04:30 PM		
+0 mins.	62	121	183	15	33	48	**82**	13	**95**
+15 mins.	52	128	180	16	37	53	76	10	86
+30 mins.	63	**132**	**195**	13	**41**	**54**	62	**20**	82
+45 mins.	**69**	124	193	**18**	35	53	74	15	89
Total Volume	246	505	751	62	146	208	294	58	352
% App. Total	32.8	67.2		29.8	70.2		83.5	16.5	
PHF	.891	.956	.963	.861	.890	.963	.896	.725	.926

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 6



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 7

Groups Printed- Trucks

	Route 117 From East		Hudson Rd From South		Route 117 From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	0	4	0	0	0	0	4
04:15 PM	0	4	0	0	2	0	6
04:30 PM	2	1	0	0	0	0	3
04:45 PM	0	3	0	0	1	0	4
Total	2	12	0	0	3	0	17
05:00 PM	0	0	0	0	1	0	1
05:15 PM	0	0	0	0	1	1	2
05:30 PM	0	0	2	0	0	0	2
05:45 PM	0	1	0	0	0	0	1
Total	0	1	2	0	2	1	6
Grand Total	2	13	2	0	5	1	23
Apprch %	13.3	86.7	100	0	83.3	16.7	
Total %	8.7	56.5	8.7	0	21.7	4.3	

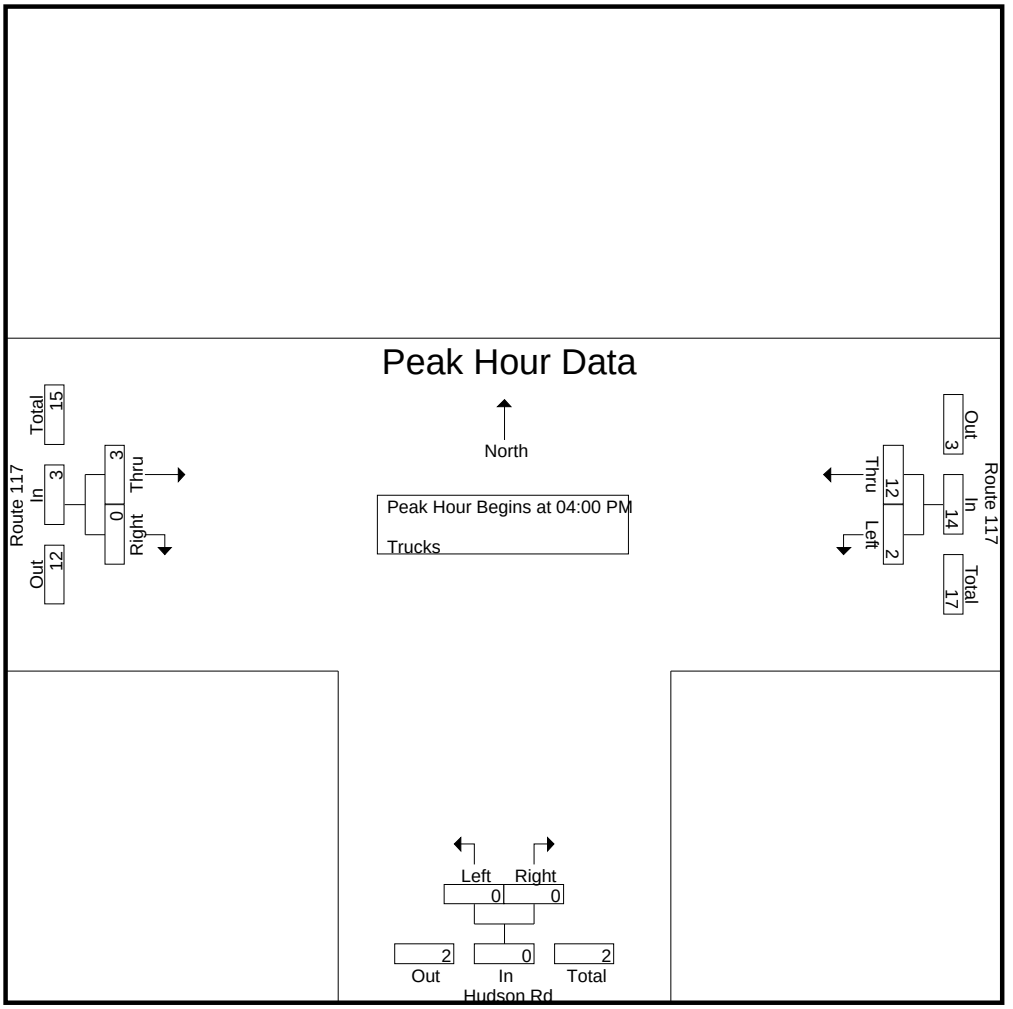
	Route 117 From East			Hudson Rd From South			Route 117 From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	**4**	**4**	0	0	0	0	0	0	4
04:15 PM	0	4	4	0	0	0	**2**	0	**2**	**6**
04:30 PM	**2**	1	3	0	0	0	0	0	0	3
04:45 PM	0	3	3	0	0	0	1	0	1	4
Total Volume	2	12	14	0	0	0	3	0	3	17
% App. Total	14.3	85.7		0	0		100	0		
PHF	.250	.750	.875	.000	.000	.000	.375	.000	.375	.708

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 8



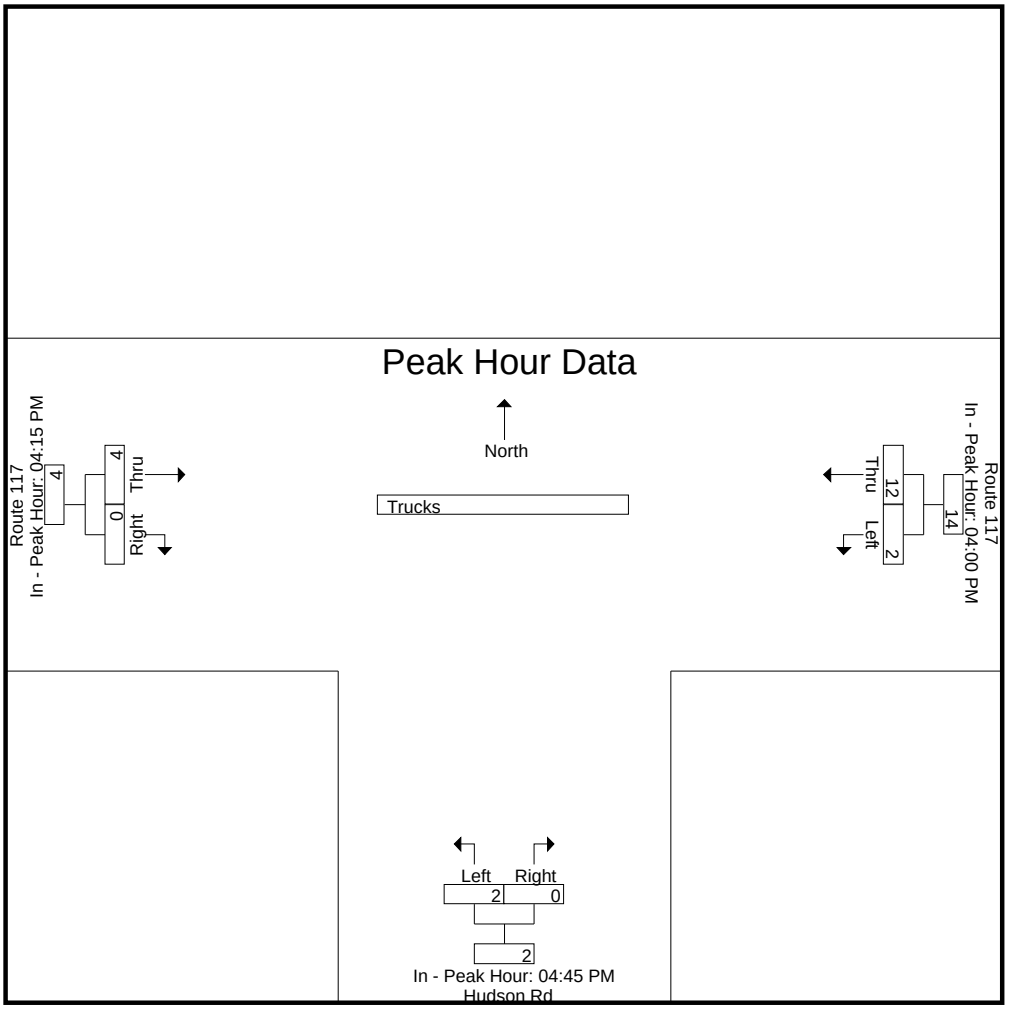
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			04:45 PM			04:15 PM		
+0 mins.	0	**4**	**4**	0	0	0	**2**	0	**2**
+15 mins.	0	4	4	0	0	0	0	0	0
+30 mins.	**2**	1	3	0	0	0	1	0	1
+45 mins.	0	3	3	**2**	0	**2**	1	0	1
Total Volume	2	12	14	2	0	2	4	0	4
% App. Total	14.3	85.7		100	0		100	0	
PHF	.250	.750	.875	.250	.000	.250	.500	.000	.500

Accurate Counts
978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 9



Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 10

Groups Printed- Bikes Peds

	Route 117 From East			Hudson Rd From South			Route 117 From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	2	1	1	0	2	2	4
04:30 PM	0	0	0	0	0	0	0	1	0	0	1	1
04:45 PM	0	0	4	0	0	0	3	2	0	4	5	9
Total	0	0	4	0	0	2	4	4	0	6	8	14
05:00 PM	0	0	0	1	1	0	0	0	0	0	2	2
05:15 PM	0	1	0	0	0	0	0	0	0	0	1	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	1	0	1	1	0	0	1	0	0	4	4
Grand Total	0	1	4	1	1	2	4	5	0	6	12	18
Apprch %	0	100		50	50		44.4	55.6				
Total %	0	8.3		8.3	8.3		33.3	41.7		33.3	66.7	

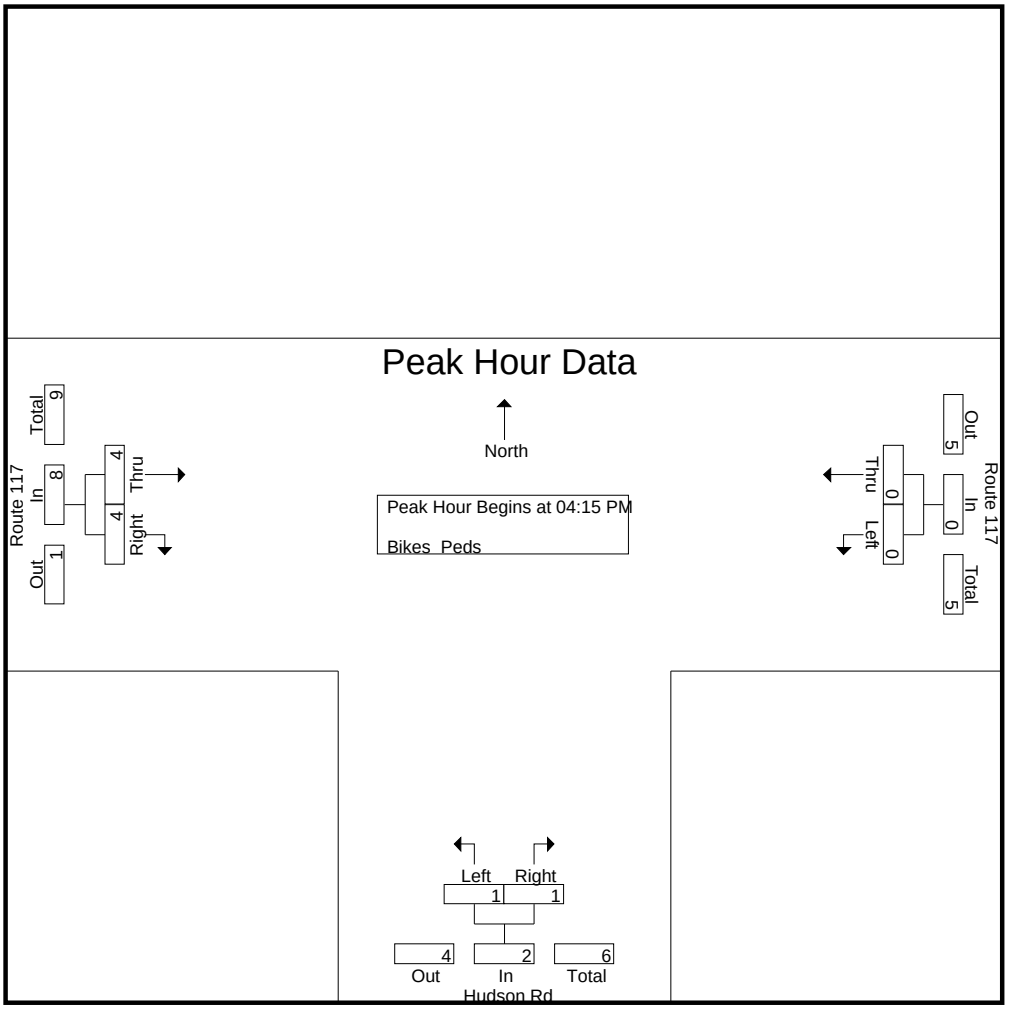
	Route 117 From East			Hudson Rd From South			Route 117 From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	0	0	0	0	0	0	1	1	2	2
04:30 PM	0	0	0	0	0	0	0	1	1	1
04:45 PM	0	0	0	0	0	0	**3**	**2**	**5**	**5**
05:00 PM	0	0	0	**1**	**1**	**2**	0	0	0	2
Total Volume	0	0	0	1	1	2	4	4	8	10
% App. Total	0	0		50	50		50	50		
PHF	.000	.000	.000	.250	.250	.250	.333	.500	.400	.500

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 11



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

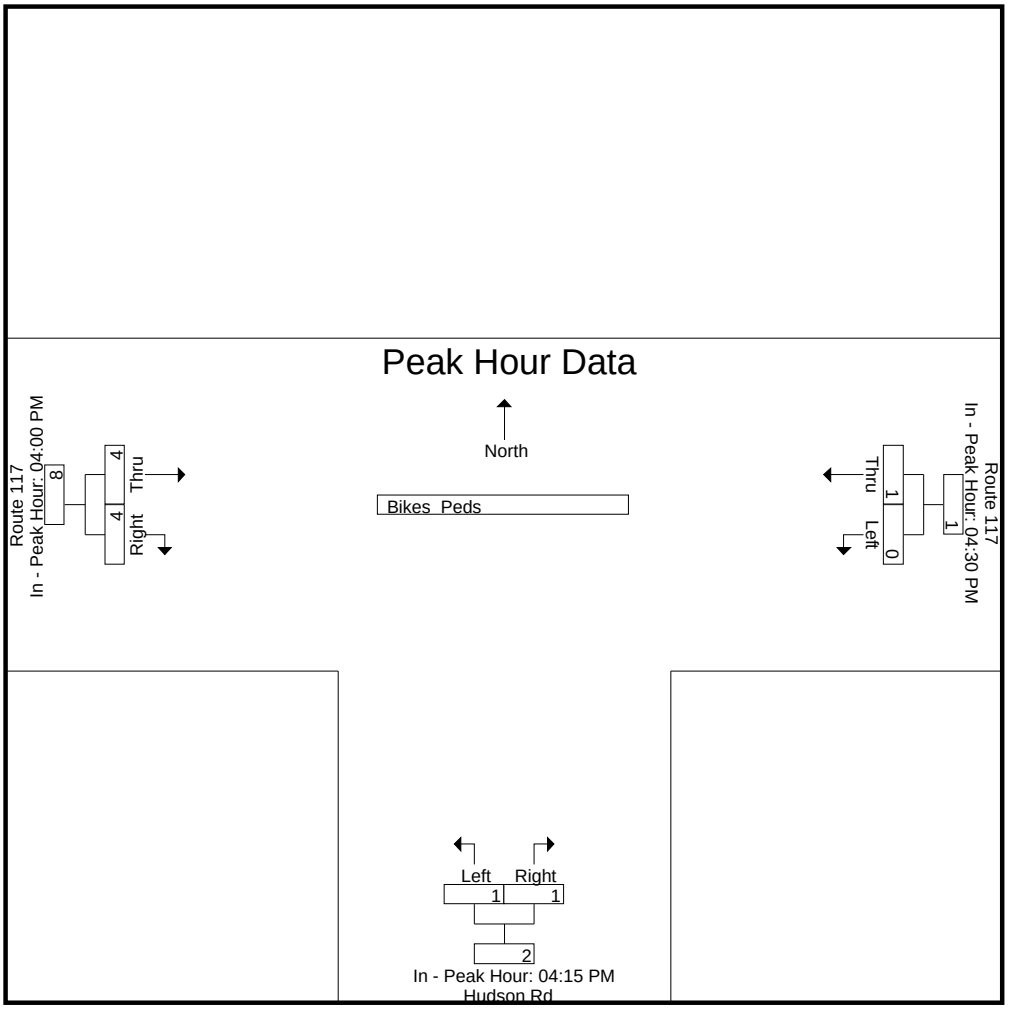
	04:30 PM			04:15 PM			04:00 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	1	1	2
+30 mins.	0	0	0	0	0	0	0	1	1
+45 mins.	0	**1**	**1**	**1**	**1**	**2**	**3**	**2**	**5**
Total Volume	0	1	1	1	1	2	4	4	8
% App. Total	0	100		50	50		50	50	
PHF	.000	.250	.250	.250	.250	.250	.333	.500	.400

Accurate Counts

978-664-2565

N/S Street : Hudson Road
E/W Street : Route 117
City/State : Stow, MA
Weather : Clear

File Name : 90260002
Site Code : 90260002
Start Date : 6/23/2021
Page No : 12



SEASONAL ADJUSTMENT DATA

Massachusetts Highway Department

403: Monthly Hourly Volume for June 2018

Location ID:	**403**	**Seasonal Factor Group:**	**U3**
County:	**Middlesex**	**Daily Factor Group:**	
Functional Class	**3**	**Axle Factor Group:**	**U3**
Location:	**ELM STREET**	**Growth Factor Group:**	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1	395	193	150	187	481	2114	2990	3397	3295	3314	2982	2994	3212	3317	3415	3170	3246	3342	3157	2330	1811	1537	1263	942	53234	Accepted
2	473	246	182	136	254	668	1317	1709	2166	2555	2984	3002	3113	3344	3408	3257	3271	2826	2381	2179	1699	1610	1400	898	45078	Accepted
3	472	250	183	132	165	358	824	1230	1842	2257	2616	2935	3084	3060	3202	3294	3110	2783	2461	2175	1715	1305	801	488	40742	Accepted
4	263	130	104	130	507	2121	2942	3291	3272	3105	2727	2661	2715	2690	3163	3082	2981	3046	3230	2391	1484	1186	774	503	48498	Accepted
5	242	138	140	147	456	2269	3035	3367	3472	3335	2940	2926	2953	2941	3303	3184	2976	3170	3024	2431	1683	1364	949	695	51140	Accepted
6	256	154	108	147	493	2201	2995	3369	3509	3346	3000	2952	2940	3073	3337	3351	3294	3388	3165	2368	1863	1447	1116	817	52689	Accepted
7	349	169	117	150	486	2208	3023	3354	3421	3334	3042	3138	3053	3248	3567	3391	3368	3366	3147	2591	1888	1519	1143	864	53936	Accepted
8	356	208	149	167	462	1994	2965	3408	3331	3299	2884	3109	3173	3309	3290	3218	3512	3554	3203	2242	1802	1467	1299	978	53379	Accepted
9	488	286	170	161	246	594	1227	1921	2404	2736	2988	3258	3259	3469	3299	3285	2901	2851	2573	2184	1943	1625	1264	980	46112	Accepted
10	548	296	163	131	166	363	757	1319	1675	2148	2649	3046	3243	3114	3093	3194	2946	2902	2744	2059	1636	1228	817	496	40733	Accepted
11	266	154	114	170	512	2172	2958	3334	3380	3320	2864	2659	2826	2777	3400	3268	3117	3042	3256	2333	1700	1238	828	542	50230	Accepted
12	241	122	109	163	509	2189	2935	3376	3436	3272	3065	2950	3017	2963	3298	3291	3399	3368	3214	2565	1770	1458	986	635	52331	Accepted
13	300	134	109	158	493	2182	2956	3293	3446	3219	2934	2911	2980	2939	3381	3304	3279	3361	3172	2520	1828	1445	1035	665	52044	Accepted
14	339	179	127	164	479	2205	2896	3289	3426	3253	3095	3093	3109	3107	3342	3253	3276	3207	3183	2587	1871	1475	1040	745	52740	Accepted
15	351	210	144	182	469	1938	2948	3230	3262	3150	2914	3012	3027	3376	3447	3518	3614	3440	3215	2350	1639	1312	1194	1045	52987	Accepted
16	615	240	160	141	252	559	1115	1796	2199	2505	2719	3145	3327	3194	3118	3057	2835	2773	2479	1928	1710	1458	1233	1016	43574	Accepted
17	541	254	165	139	176	334	773	1065	1483	1988	2380	2769	3006	3152	2926	2887	2818	2845	2610	2306	1989	1422	902	442	39372	Accepted
18	281	147	104	148	515	2143	2943	3267	3340	3087	2740	2941	2729	2946	3170	3027	3216	3297	2900	2344	1581	1195	766	569	49396	Accepted
19	371	154	102	158	478	2229	2912	3314	3348	3323	2996	3022	3435	3794	3555	3338	3189	3242	3116	2561	1899	1384	974	653	53547	Accepted
20	291	148	111	175	519	2186	2955	3257	3335	3252	3183	2986	2978	2840	3372	3235	3234	3408	3187	2417	1906	1551	1034	647	52207	Accepted
21	362	180	128	172	520	2257	2876	3390	3346	3263	3240	2986	2965	3163	3429	3284	3483	3340	3263	2507	2005	1532	1147	788	53626	Accepted
22	480	199	139	163	493	2086	2918	3354	3100	3107	3015	2735	3214	3353	3508	3483	3428	3571	3210	2266	1756	1365	1166	1008	53117	Accepted
23	635	264	165	171	237	581	1169	1689	1986	2360	2684	2981	2961	2952	3054	3023	2830	2662	2301	1835	1490	1167	1076	920	41193	Accepted
24	516	219	153	152	202	328	819	1105	1465	1815	2396	2742	2703	2743	2746	2914	2754	2616	2301	1820	1418	1076	744	437	36184	Accepted
25	229	169	102	168	551	1775	2963	3327	3200	3205	2893	2694	2958	2981	3258	3352	3464	3346	3200	2340	1638	1190	821	543	50367	Accepted
26	277	148	114	168	538	2230	2905	3339	3385	3221	3117	2670	3192	3042	3382	3387	3404	3567	3249	2516	1855	1351	1065	838	52960	Accepted
27	389	214	114	176	546	2241	2935	3430	3409	3187	3237	3021	3021	3150	3426	3361	3345	3453	3197	2403	1910	1458	1055	720	53398	Accepted
28	507	175	150	186	509	2142	2883	3309	3138	3054	2936	2941	3122	3134	3397	3338	3549	3343	3083	2457	1612	1407	1081	929	52382	Accepted
29	360	206	170	189	494	1960	2820	3330	3252	3176	3159	3353	3353	3684	3448	3569	3278	3479	2991	2176	1655	1362	1059	796	53319	Accepted
30	505	227	199	161	270	599	1080	1693	1971	2392	2615	2889	2995	2979	2708	2629	2549	2272	2100	1768	1504	1251	1153	796	39305	Accepted
																									48994	June ADT
																									45632	2018 AADT
																									0.068621	6.9% above

Massachusetts Highway Department

4172: Monthly Hourly Volume for June 2018

Location ID:	**4172**	**Seasonal Factor Group:**	**U2**
County:	**Middlesex**	**Daily Factor Group:**	
Functional Class	**2**	**Axle Factor Group:**	**U2**
Location:	**ROUTE 2**	**Growth Factor Group:**	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1	302	155	122	164	404	1196	2095	2668	2681	2445	2373	2377	2543	2825	3369	3567	3903	3861	3203	1945	1500	1211	1029	772	46710	Accepted
2	378	216	138	109	247	524	1164	1508	1825	2197	2374	2557	2618	2862	3030	2886	2801	2446	2057	1808	1394	1325	1227	711	38402	Accepted
3	362	189	130	120	261	1422	2333	2611	2584	2422	2229	2501	2499	2754	2729	2820	2742	2503	2022	1786	1433	1049	700	420	40621	Accepted
4																										
5	209	133	91	138	503	2478	3698	4065	3650	2968	2275	2188	2307	2433	2939	3551	3814	4016	3275	2041	1345	1075	762	579	50533	Accepted
6	200	127	111	142	528	2427	3639	4089	3677	2968	2393	2333	2402	2505	3006	3627	4080	4048	3343	1965	1505	1126	880	670	51791	Accepted
7	275	142	101	145	447	2211	3537	3934	3492	2827	2471	2317	2364	2675	3201	3656	4151	4290	3299	2205	1604	1271	913	724	52252	Accepted
8	328	200	112	176	378	1230	2165	2660	2682	2581	2390	2449	2575	2853	3370	3748	4094	3995	3053	1912	1422	1236	1019	802	47430	Accepted
9	416	231	159	150	219	538	1092	1710	2054	2222	2651	2959	2925	3097	2869	2789	2461	2468	2134	1684	1543	1314	1021	831	39537	Accepted
10	430	225	132	114	266	1542	2348	2634	2546	2398	2262	2615	2821	2708	2644	2760	2518	2508	2300	1694	1323	1000	705	406	40899	Accepted
11	250	117	86	156	496	2449	3642	4039	3713	2994	2301	2032	2104	2295	2940	3502	3706	3840	3302	1909	1398	974	691	487	49423	Accepted
12	220	113	94	155	531	2452	3611	4057	3719	2867	2340	2264	2277	2372	2932	3633	3986	4091	3296	2194	1448	1144	803	537	51136	Accepted
13	247	125	112	145	500	2332	3643	4060	3602	2888	2441	2304	2350	2449	2948	3652	3904	4073	3311	2091	1386	1189	832	522	51106	Accepted
14	278	160	113	142	493	2164	3482	3592	3437	2774	2464	2339	2383	2474	3031	3639	4046	3920	3334	2118	1551	1194	860	621	50609	Accepted
15	303	186	110	154	382	1174	2037	2387	2673	2387	2301	2382	2498	2867	3344	3870	4189	3859	3082	1930	1458	1117	973	799	46462	Accepted
16	493	191	127	140	220	450	975	1500	1926	2207	2394	2662	2910	2753	2673	2604	2533	2406	2069	1544	1302	1175	1045	829	37128	Accepted
17	459	227	132	121	271	1451	2245	2334	2294	2265	2026	2412	2719	2733	2445	2497	2386	2379	2263	1954	1603	1184	780	385	39565	Accepted
18	232	151	89	158	504	2372	3664	3722	3696	2798	2117	2153	2088	2276	2946	3396	3870	3930	2808	1663	1104	865	641	480	47723	Accepted
19	298	145	94	151	535	2420	3568	3866	3648	2826	2374	2122	2472	2935	3270	3637	3836	3979	3265	2126	1501	1115	793	553	51529	Accepted
20	245	134	94	160	553	2409	3628	4047	3578	2962	2430	2386	2431	2387	3085	3539	3831	4048	3281	2038	1580	1192	790	558	51386	Accepted
21	295	157	100	168	483	2194	3493	3816	3397	2771	2547	2347	2443	2585	3076	3723	4168	3986	3166	2105	1579	1209	912	645	51365	Accepted
22	388	185	125	137	386	1192	2081	2477	2517	2403	2518	2465	2611	2983	3390	3919	3977	3942	2996	2020	1476	1095	935	789	47007	Accepted
23	536	222	158	144	199	461	1059	1496	1759	2081	2250	2483	2515	2633	2626	2644	2505	2318	2028	1562	1185	1028	952	776	35620	Accepted
24																										
25	198	129	85	169	532	2329	3467	3985	3492	2889	2279	2220	2201	2449	2839	3510	3856	3902	3114	1974	1366	951	675	496	49107	Accepted
26	239	134	99	161	562	2430	3581	3940	3615	2905	2476	2116	2425	2454	3026	3504	4045	4118	3277	2034	1491	1090	868	715	51305	Accepted
27	335	175	89	156	520	2296	3431	3695	3429	2801	2653	2366	2395	2614	3198	3560	4017	4048	3244	2001	1503	1126	863	578	51093	Accepted
28	402	174	117	184	502	2131	3233	3541	3303	2906	2570	2379	2499	2594	3039	3588	3864	3859	3011	1989	1382	1089	851	732	49939	Accepted
29	309	172	152	161	410	1161	1835	2468	2566	2368	2580	2746	2813	3165	3292	3997	3660	3678	2881	1898	1431	1099	878	686	46406	Accepted
30	421	225	165	131	218	479	1015	1537	1676	2121	2268	2634	2727	2652	2361	2318	2176	1998	1770	1410	1176	1034	1008	641	34161	Accepted

June Average	**46437.32**	
2018 AADT	**44307**	
Seasonal Adjustment	**1.048081**	Above Seasonal Average by 4.81%

Massachusetts Highway Department
Statewide Traffic Data Collection
2019 Weekday Seasonal Factors

Factor Group	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Axle Factor
R1	1.22	1.14	1.12	1.06	1.00	0.96	0.87	0.85	0.96	0.99	1.04	1.12	0.85
R2	0.95	0.96	0.98	0.97	0.97	0.93	0.97	0.94	0.96	0.90	0.92	0.93	0.96
R3	1.15	1.06	1.07	1.00	0.89	0.88	0.89	0.89	0.95	0.92	1.02	1.01	0.97
R4-R7	1.09	1.09	1.11	1.02	0.96	0.92	0.89	0.89	0.99	0.98	1.09	1.13	0.98
U1-Boston	1.03	1.01	0.98	0.94	0.94	0.92	0.95	0.93	0.94	0.94	0.97	1.04	0.96
U1-Essex	1.09	1.06	1.03	0.99	0.94	0.90	0.88	0.86	0.93	0.94	0.99	1.06	0.93
U1-Southeast	1.06	1.05	1.01	0.97	0.95	0.93	0.93	0.90	0.94	0.94	0.98	1.04	0.98
U1-West	1.19	1.14	1.09	0.95	0.92	0.89	0.89	0.86	0.91	0.95	0.97	1.07	0.84
U1-Worcester	1.02	1.04	0.97	0.94	0.93	0.91	0.95	0.91	0.93	0.92	0.95	1.10	0.88
U2	1.01	1.00	0.94	0.93	0.91	0.89	0.93	0.90	0.90	0.91	0.94	1.02	0.99
U3	1.06	1.03	0.98	0.94	0.93	0.91	0.95	0.91	0.92	0.93	0.97	1.00	0.98
U4-U7	1.01	1.00	0.95	0.92	0.88	0.86	0.92	0.91	0.92	0.94	0.99	1.04	0.99
Rec - East	1.04	1.16	1.12	0.98	0.92	0.88	0.77	0.81	0.94	1.02	1.08	1.12	0.99
Rec - West	1.30	1.23	1.32	1.18	0.95	0.82	0.70	0.69	0.97	0.96	1.16	1.15	0.98

Round off:
0-999 = 10
>1000 = 100

U = Urban
R = Rural

1 - Interstate
2 - Freeway and Expressway
3 - Other Principal Arterial
4 - Minor Arterial
5 - Major Collector
6 - Minor Collector
7 - Local Road and Street

Recreational - East Group - Cape Cod (all towns) including the town of Plymouth south of Route 3A (stations 7014,7079,7080,7090,7091,7092,7093,7094,7095,7096,7097,7108 and 7178), Martha's Vineyard and Nantucket.

Recreational - West Group - Continuous Stations 2 and 189 including stations 1066,1067,1083,1084,1085,1086,1087,1088,1089,1090,1091,1092,1093,1094,1095,1096,1097,1098,1099,1100,1101,1102,1103,1104,1105,1106,1107,1108,1113,1114,1116,2196,2197 and 2198.

COVID-19 ADJUSTMENT DATA

Massachusetts Highway Department
403: Monthly Hourly Volume for June 2019

Location ID:	**403**	**Seasonal Factor Group:**	**U3**
County:	**Middlesex**	**Daily Factor Group:**	
Functional Class	**3**	**Axle Factor Group:**	**U3**
Location:	**ELM STREET**	**Growth Factor Group:**	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1	525	237	163	150	239	681	1343	1858	2290	2760	2987	3149	3250	3289	3421	3275	3155	2995	2623	2164	1645	1437	1232	951	45819	Accepted
2	514	258	191	126	197	371	815	1280	1582	2130	2499	2853	3096	3106	3177	2919	3044	2749	2538	1995	1575	1148	716	490	39369	Accepted
3	235	137	119	173	572	2387	2938	3565	3454	3393	2996	2827	2918	3082	3327	3258	3337	3380	3141	2532	1678	1203	857	574	52083	Accepted
4	273	163	107	181	588	2441	3056	3420	3606	3463	3277	3047	3107	3159	3435	3283	3288	3294	3154	2681	1877	1463	980	648	53991	Accepted
5	311	155	132	167	526	2400	3089	3511	3520	3436	3227	2992	3125	3275	3588	3346	3403	3403	3217	2613	1959	1559	1057	675	54686	Accepted
6	354	206	133	154	522	2358	2991	3543	3504	3320	3071	3165	3302	3434	3579	3352	3227	3419	3290	2777	1874	1438	1148	826	54987	Accepted
7	484	224	128	186	545	2205	3037	3370	3383	3509	3414	3169	3423	3451	3484	3470	3327	3420	3080	2364	1892	1596	1501	1095	55757	Accepted
8	547	271	177	173	260	725	1254	1841	2301	2806	3060	3437	3337	3393	3363	3247	3033	2960	2720	2240	1864	1613	1413	1076	47111	Accepted
9	520	253	174	143	200	335	930	1362	1835	2341	2887	3129	3382	3438	3194	3158	3064	2991	2902	2243	1807	1257	874	605	43024	Accepted
10	309	158	129	194	610	2382	2970	3408	3237	3249	2853	2803	2801	2985	3385	3176	3159	3240	3252	2437	1680	1391	886	620	51314	Accepted
11	328	142	141	180	537	2286	2910	3244	3336	3318	2880	2780	2941	3055	3279	3206	3206	3288	3100	2649	1924	1372	1040	772	51914	Accepted
12	327	158	123	164	577	2397	3037	3429	3407	3365	3219	2992	3019	3182	3492	3145	3198	3345	3205	2806	1929	1337	961	840	53654	Accepted
13																									**50309.08**	**June Average**
14																										
15																										
16																										
17																										
18																										
19																										
20																										
21																										
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Massachusetts Highway Department

403: Monthly Hourly Volume for June 2021

Location ID:	**403**	**Seasonal Factor Group:**	**U3**
County:	**Middlesex**	**Daily Factor Group:**	
Functional Class	**3**	**Axle Factor Group:**	**U3**
Location:	**ELM STREET**	**Growth Factor Group:**	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1	295	87	75	116	384	1648	2756	3137	2974	2798	2594	2606	2695	2750	3105	3319	3230	3394	2597	1769	1391	881	667	467	45735	Accepted
2	192	116	83	153	401	1638	2745	3145	3062	3008	2522	2654	2765	2918	3377	3487	3388	3340	2638	1860	1473	1109	732	540	47346	Accepted
3	220	128	110	147	405	1631	2769	3175	3053	2746	2654	2604	2752	2880	3378	3315	3282	3460	2668	1940	1423	1040	816	580	47176	Accepted
4	256	149	119	144	389	1538	2665	3028	2952	2743	2775	2697	2885	3035	3368	3358	3528	3635	2782	1985	1547	1184	983	753	48498	Accepted
5	376	227	172	142	244	715	1257	1827	2155	2411	2765	3162	3187	3156	3058	2955	2864	2582	2317	2155	1746	1403	1159	733	42768	Accepted
6	369	215	138	106	184	374	842	1195	1618	2171	2529	2685	2798	2795	2742	2627	2555	2442	2309	1949	1690	1259	856	653	37101	Accepted
7	241	159	92	147	453	1669	2827	3118	2985	2643	2519	2491	2624	2672	3111	3350	3315	3158	2385	1788	1620	1267	955	489	46078	Accepted
8	232	106	72	166	415	1672	2758	3213	3038	2844	2628	2610	2698	2820	3194	3379	3228	3291	2514	1857	1365	1001	772	581	46454	Accepted
9	262	157	84	144	388	1673	2744	2980	3234	2751	2632	2798	2787	2910	3256	3359	3351	3480	2780	1912	1397	1236	872	654	47841	Accepted
10	283	161	133	188	466	1675	2781	3121	3085	2950	2629	2744	2857	2905	3171	3640	3529	3581	3028	1960	1506	1156	838	648	49035	Accepted
11	342	198	142	173	386	1609	2733	2962	3012	2689	2749	2921	3438	3243	3191	3499	3583	3532	2785	1976	1364	1028	901	725	49181	Accepted
12	360	183	109	150	249	594	1162	1406	1820	2209	2641	2927	3062	3234	3200	2962	2598	2594	2237	1962	1546	1392	1064	777	40438	Accepted
13	356	218	140	131	180	378	862	1247	1674	2037	2424	2763	3077	2924	3080	2780	2744	2693	2397	1990	1524	1182	847	484	38132	Accepted
14	211	118	99	138	437	1799	2754	3114	3002	2520	2356	2305	2470	2577	2931	3215	591	2212	2259	1562	1245	849	630	480	39874	Accepted
15	179	129	108	152	428	1731	2740	3145	3069	2724	2554	2453	2627	2796	3060	3343	3262	3497	2523	1757	1383	1027	723	491	45901	Accepted
16	227	137	93	154	435	1758	2782	3067	3053	2727	2602	2790	2824	2877	3249	3282	3402	3380	2923	1848	1473	1167	835	487	47572	Accepted
17	263	138	82	176	450	1672	2739	3046	3115	2859	2668	2686	2884	2792	3157	3323	3398	3464	2907	2027	1643	1177	864	516	48046	Accepted
18	280	141	109	163	409	1461	2520	2763	2752	2692	2913	3105	3189	3184	3562	3483	3613	3637	2625	2062	1537	1191	1044	651	49086	Accepted
19	360	197	120	137	244	665	1085	1586	1941	2321	2644	3072	3111	3386	3429	2996	2714	2690	2344	1923	1708	1382	997	679	41731	Accepted
20	379	178	133	125	170	390	730	1044	1543	1954	2406	2923	3378	3246	2836	2893	2672	2629	2352	2161	1855	1575	902	513	38987	Accepted
21	216	116	107	150	448	1689	2838	3152	3062	2737	2509	2705	2791	2771	2987	3310	3127	3096	2435	1845	1466	1053	713	498	45821	Accepted
22	251	136	105	178	467	1738	2773	3110	3094	2773	2534	2666	2660	2779	3092	3095	3073	3275	2781	1725	1211	883	676	447	45522	Accepted
23	225	121	85	158	447	1706	2814	3091	3082	2874	2663	2782	2859	2909	3117	3340	3429	3677	2759	1870	1570	1180	869	528	48155	Accepted
24	246	132	125	188	430	1682	2629	3087	3030	2997	2819	2818	2820	2951	3228	3484	3446	3452	2838	1940	1584	1197	866	584	48573	Accepted
25	258	134	108	175	405	1519	2420	2802	2859	3081	3386	3914	3974	3654	4238	4656	4710	4805	2893	2124	1607	1544	1515	1314	58095	Accepted
26	807	483	648	223	210	607	1140	1647	1901	2323	2708	3036	3376	3428	3199	2940	2680	2564	2246	1866	1512	1399	1045	862	42850	Accepted
27	462	244	153	114	164	363	831	1211	1439	1953	2495	2919	2760	2869	2944	2826	2680	2614	2184	2164	1667	1357	999	516	37928	Accepted
28	265	160	95	137	457	1689	2735	3031	3046	2704	2503	2621	2772	2748	3044	3311	3226	3230	2399	1809	1461	1147	937	688	46215	Accepted
29	258	125	113	170	427	1803	2789	3303	3142	2977	2728	2657	2921	2916	3146	3290	3000	3357	2670	1997	1592	1307	933	676	48297	Accepted
30	367	175	95	173	419	1738	2823	3159	3094	3047	2635	2761	3004	3074	3183	3429	3217	3247	2557	1756	1439	1049	782	637	47860	Accepted
																									45543.2	**June Average**

2019 Average Count Data – Sta. 403

June ADT: 50,309

2021 Average Count Data – Sta. 403

June ADT: 45,543

COVID Adjustment

$$1 - \frac{50{,}309}{45{,}543} = -10.46$$

10.5% below expected

VEHICLE TRAVEL SPEED DATA

Accurate Counts

978-664-2565

Location : Hudson Road 90260001
Location : North of Athens Street
City/State: Stow, MA
Direction: SB,

6/23/2021 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	0	0	0	2	2	2	0	0	0	0	0	6
1:00	0	0	0	0	0	0	1	0	0	0	0	0	0	1
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	1	0	0	0	0	0	1
4:00	0	1	0	0	0	1	3	1	0	0	0	0	0	6
5:00	0	0	1	1	0	10	18	12	1	0	0	0	0	43
6:00	0	1	0	0	2	18	29	10	1	0	0	0	0	61
7:00	1	0	0	1	6	43	45	23	1	0	1	0	0	121
8:00	0	0	1	0	4	44	59	15	4	0	0	0	0	127
9:00	0	0	2	3	9	58	47	10	1	0	0	0	0	130
10:00	0	0	0	11	19	63	33	4	1	0	0	0	0	131
11:00	2	0	2	2	24	78	62	5	2	0	0	1	0	178
12:00 PM	0	0	0	3	18	76	61	14	0	0	0	0	0	172
1:00	0	0	0	0	10	81	68	15	2	0	0	0	0	176
2:00	1	0	0	0	15	75	63	11	0	0	0	0	0	165
3:00	0	0	0	5	12	89	93	20	2	1	0	0	0	222
4:00	1	0	0	0	28	107	99	23	1	0	0	0	0	259
5:00	0	0	0	3	21	115	103	19	3	0	0	0	0	264
6:00	0	0	0	1	9	92	73	15	2	1	0	0	0	193
7:00	0	0	0	0	12	67	42	8	0	0	0	0	0	129
8:00	0	0	0	2	4	35	31	9	3	1	0	0	0	85
9:00	0	0	1	0	5	21	13	5	0	1	0	0	0	46
10:00	0	0	0	0	4	8	9	3	1	0	0	0	0	25
11:00	0	0	0	0	0	2	6	3	0	0	0	0	0	11
Total	5	2	7	32	202	1085	960	228	25	4	1	1	0	2552

Accurate Counts

978-664-2565

Location : Hudson Road 90260001
Location : North of Athens Street
City/State: Stow, MA
Direction: SB,

6/24/2021 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	0	0	0	5	2	1	0	0	0	0	0	8
1:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	1	0	1	1	0	0	0	0	0	3
4:00	0	0	1	1	0	1	2	0	1	0	0	0	0	6
5:00	0	0	0	0	0	6	20	2	0	1	0	0	0	29
6:00	0	1	0	0	0	22	25	10	4	1	0	0	0	63
7:00	0	0	1	4	17	33	37	12	1	1	0	0	0	106
8:00	1	2	0	4	11	52	44	15	3	0	0	0	0	132
9:00	0	0	0	2	25	46	31	8	1	0	0	0	0	113
10:00	1	0	0	1	19	63	35	4	0	0	0	0	0	123
11:00	0	0	0	0	25	59	50	5	0	1	0	0	0	140
12:00 PM	0	0	0	2	17	79	42	9	1	0	0	0	0	150
1:00	0	0	0	2	6	73	52	18	2	0	0	0	0	153
2:00	0	0	2	0	12	101	46	5	1	0	0	0	0	167
3:00	1	0	0	5	18	69	76	12	3	0	0	0	0	184
4:00	0	0	0	0	9	102	108	21	1	0	0	0	0	241
5:00	0	0	0	4	14	110	104	19	0	0	0	0	0	251
6:00	0	0	0	3	16	65	55	20	2	1	0	0	0	162
7:00	0	1	0	0	19	47	39	15	1	0	0	0	0	122
8:00	1	0	1	1	9	37	38	4	1	0	0	0	0	92
9:00	0	0	0	0	3	17	22	12	2	0	0	0	0	56
10:00	0	0	0	0	5	11	10	3	0	0	0	0	0	29
11:00	0	0	0	0	3	12	5	1	0	2	0	0	0	23
Total	4	4	5	29	230	1010	844	197	24	7	0	0	0	2354
Grand Total	9	6	12	61	432	2095	1804	425	49	11	1	1	0	4906

Stats				
	Percentile	15th	50th	85th	95th
	Speed	35.9	39.7	44	46.5
	Mean Speed (Average)	39.8			
	10 MPH Pace Speed	35-44			
	Number in Pace	3872			
	Percent in Pace	78.9%			
	Number > 45 MPH	487			
	Percent > 45 MPH	9.9%			

Accurate Counts

978-664-2565

Location : Hudson Road 90260001
Location : North of Athens Street
City/State: Stow, MA
Direction: NB,

6/23/2021 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	1
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	2	1	0	0	0	0	0	0	3
3:00	0	0	0	0	0	1	0	0	0	0	0	0	0	1
4:00	0	0	0	1	0	4	2	3	1	0	0	0	0	11
5:00	0	0	0	1	2	9	25	12	3	0	1	0	0	53
6:00	1	1	0	3	15	49	41	22	1	0	0	0	0	133
7:00	0	0	0	2	19	88	97	16	3	0	0	0	0	225
8:00	0	0	2	6	28	82	60	12	2	0	0	0	0	192
9:00	0	0	0	4	11	49	57	11	1	0	0	0	0	133
10:00	0	0	0	6	25	63	34	5	0	0	0	0	0	133
11:00	0	0	0	0	19	80	51	8	1	0	0	0	0	159
12:00 PM	0	1	3	5	23	59	50	10	0	0	0	0	0	151
1:00	0	2	0	2	27	61	44	6	1	0	0	0	0	143
2:00	0	0	0	4	24	77	41	9	1	0	0	0	0	156
3:00	0	0	2	2	16	82	52	7	4	0	0	0	0	165
4:00	0	0	0	3	21	72	65	11	0	1	0	0	0	173
5:00	2	1	3	1	23	80	69	12	1	0	0	0	0	192
6:00	2	3	0	3	15	50	43	9	3	0	0	0	0	128
7:00	0	0	0	2	10	52	35	3	1	0	0	0	0	103
8:00	0	0	0	1	18	39	27	5	2	0	0	0	0	92
9:00	0	0	1	3	12	17	23	6	4	0	0	0	0	66
10:00	0	0	0	0	4	7	12	5	0	0	0	0	0	28
11:00	0	0	0	0	6	3	3	1	0	0	0	0	0	13
Total	5	8	11	49	318	1026	833	173	29	1	1	0	0	2454

Accurate Counts

978-664-2565

Location : Hudson Road 90260001
Location : North of Athens Street
City/State: Stow, MA
Direction: NB,

6/24/2021 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	1	0	0	2	0	1	0	0	0	0	0	4
1:00	0	0	0	0	1	0	0	0	0	0	1	0	0	2
2:00	0	0	0	0	0	3	1	0	0	0	0	0	0	4
3:00	0	0	1	2	0	0	0	0	0	0	0	0	0	3
4:00	0	0	0	0	1	1	1	4	0	0	0	1	0	8
5:00	0	0	0	0	0	8	21	9	1	0	0	0	0	39
6:00	1	0	0	0	11	42	50	21	1	0	0	0	0	126
7:00	0	1	3	6	22	95	48	8	1	1	0	0	0	185
8:00	1	0	0	5	23	77	65	13	2	0	0	0	0	186
9:00	1	2	3	6	31	45	43	9	2	1	0	0	0	143
10:00	1	0	2	0	16	48	33	6	2	0	0	0	0	108
11:00	0	0	0	5	13	61	49	10	0	0	0	0	0	138
12:00 PM	1	1	2	5	21	49	37	11	1	0	0	0	0	128
1:00	0	0	0	4	8	46	50	5	1	1	0	0	1	116
2:00	0	0	1	6	22	64	34	11	0	0	0	0	0	138
3:00	0	1	0	5	16	62	52	10	1	0	0	0	0	147
4:00	0	0	1	10	23	46	66	16	1	0	1	0	0	164
5:00	1	0	1	3	19	65	54	7	2	1	0	0	0	153
6:00	0	0	0	2	20	57	49	7	2	0	0	0	0	137
7:00	0	0	1	6	14	44	25	13	2	0	0	1	0	106
8:00	0	0	0	0	16	47	25	4	1	0	0	0	0	93
9:00	0	0	0	0	13	13	16	1	1	0	0	0	0	44
10:00	0	0	0	2	4	7	15	6	1	0	0	0	0	35
11:00	0	0	0	0	4	4	6	1	2	1	0	0	0	18
Total	6	5	16	67	298	886	740	173	24	5	2	2	1	2225
Grand Total	11	13	27	116	616	1912	1573	346	53	6	3	2	1	4679

Stats	Percentile	15th	50th	85th	95th
	Speed	34.7	39	43.4	46.5
	Mean Speed (Average)	39.1			
	10 MPH Pace Speed	35-44			
	Number in Pace	3466			
	Percent in Pace	74.1%			
	Number > 45 MPH	411			
	Percent > 45 MPH	8.8%			

Accurate Counts

978-664-2565

Location : Hudson Road 90260001
Location : North of Athens Street
City/State: Stow, MA
Direction: Combined

6/23/2021 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	0	0	0	2	3	2	0	0	0	0	0	7
1:00	0	0	0	0	0	0	1	0	0	0	0	0	0	1
2:00	0	0	0	0	0	2	1	0	0	0	0	0	0	3
3:00	0	0	0	0	0	1	0	1	0	0	0	0	0	2
4:00	0	1	0	1	0	5	5	4	1	0	0	0	0	17
5:00	0	0	1	2	2	19	43	24	4	0	1	0	0	96
6:00	1	2	0	3	17	67	70	32	2	0	0	0	0	194
7:00	1	0	0	3	25	131	142	39	4	0	1	0	0	346
8:00	0	0	3	6	32	126	119	27	6	0	0	0	0	319
9:00	0	0	2	7	20	107	104	21	2	0	0	0	0	263
10:00	0	0	0	17	44	126	67	9	1	0	0	0	0	264
11:00	2	0	2	2	43	158	113	13	3	0	0	1	0	337
12:00 PM	0	1	3	8	41	135	111	24	0	0	0	0	0	323
1:00	0	2	0	2	37	142	112	21	3	0	0	0	0	319
2:00	1	0	0	4	39	152	104	20	1	0	0	0	0	321
3:00	0	0	2	7	28	171	145	27	6	1	0	0	0	387
4:00	1	0	0	3	49	179	164	34	1	1	0	0	0	432
5:00	2	1	3	4	44	195	172	31	4	0	0	0	0	456
6:00	2	3	0	4	24	142	116	24	5	1	0	0	0	321
7:00	0	0	0	2	22	119	77	11	1	0	0	0	0	232
8:00	0	0	0	3	22	74	58	14	5	1	0	0	0	177
9:00	0	0	2	3	17	38	36	11	4	1	0	0	0	112
10:00	0	0	0	0	8	15	21	8	1	0	0	0	0	53
11:00	0	0	0	0	6	5	9	4	0	0	0	0	0	24
Total	10	10	18	81	520	2111	1793	401	54	5	2	1	0	5006

Accurate Counts

978-664-2565

Location : Hudson Road 90260001
Location : North of Athens Street
City/State: Stow, MA
Direction: Combined

6/24/2021 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	1	0	0	7	2	2	0	0	0	0	0	12
1:00	0	0	0	0	2	0	0	0	0	0	1	0	0	3
2:00	0	0	0	0	0	3	1	0	0	0	0	0	0	4
3:00	0	0	1	2	1	0	1	1	0	0	0	0	0	6
4:00	0	0	1	1	1	2	3	4	1	0	0	1	0	14
5:00	0	0	0	0	0	14	41	11	1	1	0	0	0	68
6:00	1	1	0	0	11	64	75	31	5	1	0	0	0	189
7:00	0	1	4	10	39	128	85	20	2	2	0	0	0	291
8:00	2	2	0	9	34	129	109	28	5	0	0	0	0	318
9:00	1	2	3	8	56	91	74	17	3	1	0	0	0	256
10:00	2	0	2	1	35	111	68	10	2	0	0	0	0	231
11:00	0	0	0	5	38	120	99	15	0	1	0	0	0	278
12:00 PM	1	1	2	7	38	128	79	20	2	0	0	0	0	278
1:00	0	0	0	6	14	119	102	23	3	1	0	0	1	269
2:00	0	0	3	6	34	165	80	16	1	0	0	0	0	305
3:00	1	1	0	10	34	131	128	22	4	0	0	0	0	331
4:00	0	0	1	10	32	148	174	37	2	0	1	0	0	405
5:00	1	0	1	7	33	175	158	26	2	1	0	0	0	404
6:00	0	0	0	5	36	122	104	27	4	1	0	0	0	299
7:00	0	1	1	6	33	91	64	28	3	0	0	1	0	228
8:00	1	0	1	1	25	84	63	8	2	0	0	0	0	185
9:00	0	0	0	0	16	30	38	13	3	0	0	0	0	100
10:00	0	0	0	2	9	18	25	9	1	0	0	0	0	64
11:00	0	0	0	0	7	16	11	2	2	3	0	0	0	41
Total	10	9	21	96	528	1896	1584	370	48	12	2	2	1	4579
Grand Total	20	19	39	177	1048	4007	3377	771	102	17	4	3	1	9585

Stats	Percentile	15th	50th	85th	95th
	Speed	35.3	39.7	43.4	46.5
	Mean Speed (Average)	39.4			
	10 MPH Pace Speed	35-44			
	Number in Pace	7337			
	Percent in Pace	76.5%			
	Number > 45 MPH	898			
	Percent > 45 MPH	9.4%			

MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAPPING

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Stow | COUNT DATE : Jun - 23

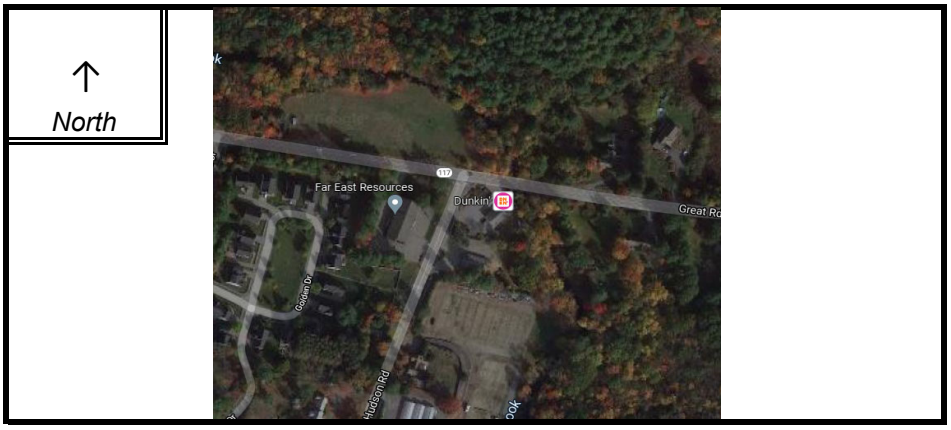
DISTRICT : 3 | UNSIGNALIZED : X | SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Route 117 (Great Road)

MINOR STREET(S) : Hudson Road

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	EB	WB			
PEAK HOURLY VOLUMES (AM/PM) :	202	369	784			1,355

" K " FACTOR : **0.090**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **15,056**

TOTAL # OF CRASHES : 40

OF YEARS : 5

AVERAGE # OF CRASHES PER YEAR (**A**) : **8.00**

CRASH RATE CALCULATION : **1.46**

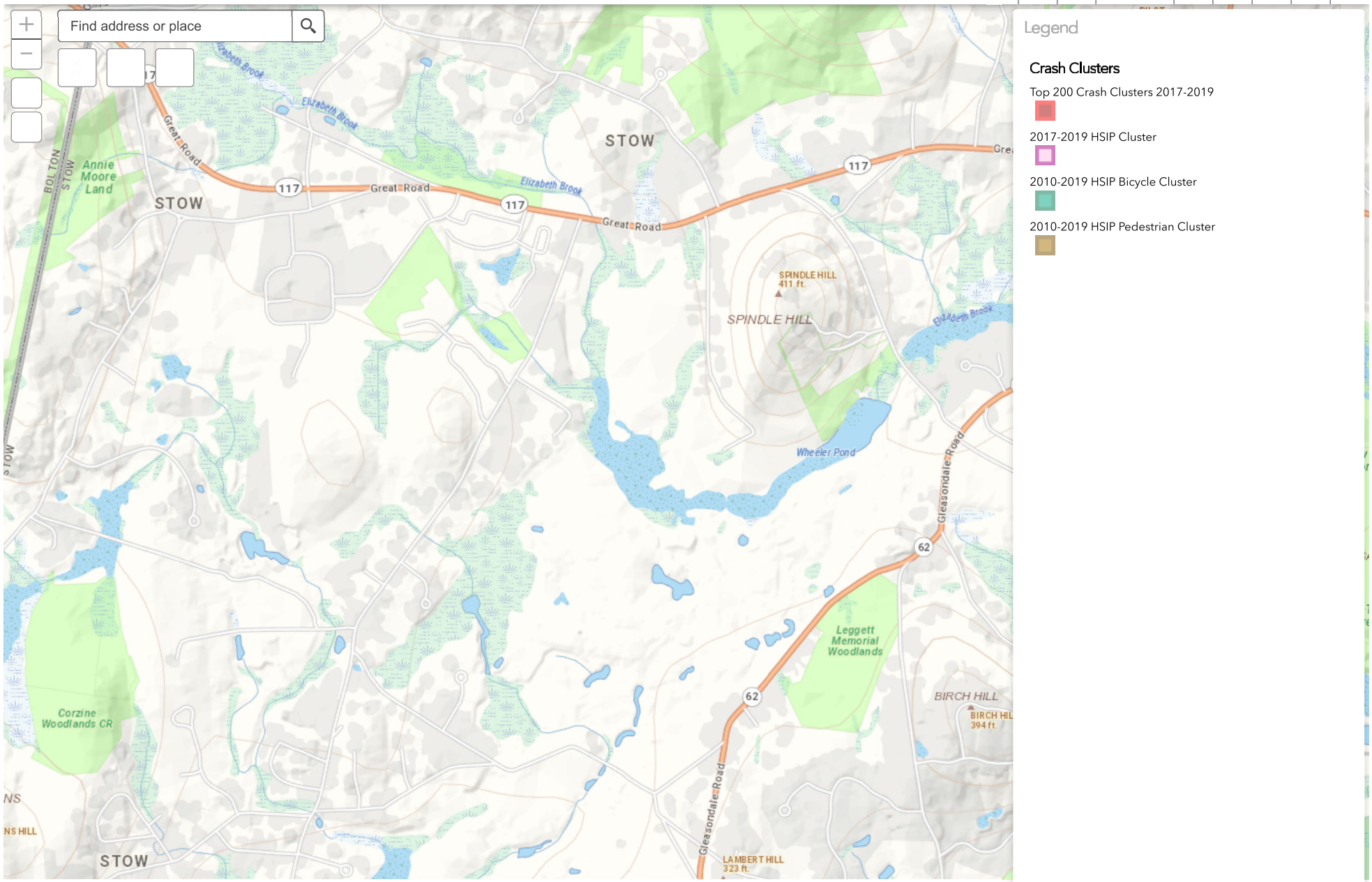
RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Above District Crash Rate

Project Title & Date: Proposed Residential Community

Top Crash Locations

Accessible Version



Legend

Crash Clusters

Top 200 Crash Clusters 2017-2019

2017-2019 HSIP Cluster

2010-2019 HSIP Bicycle Cluster

2010-2019 HSIP Pedestrian Cluster

0.2mi

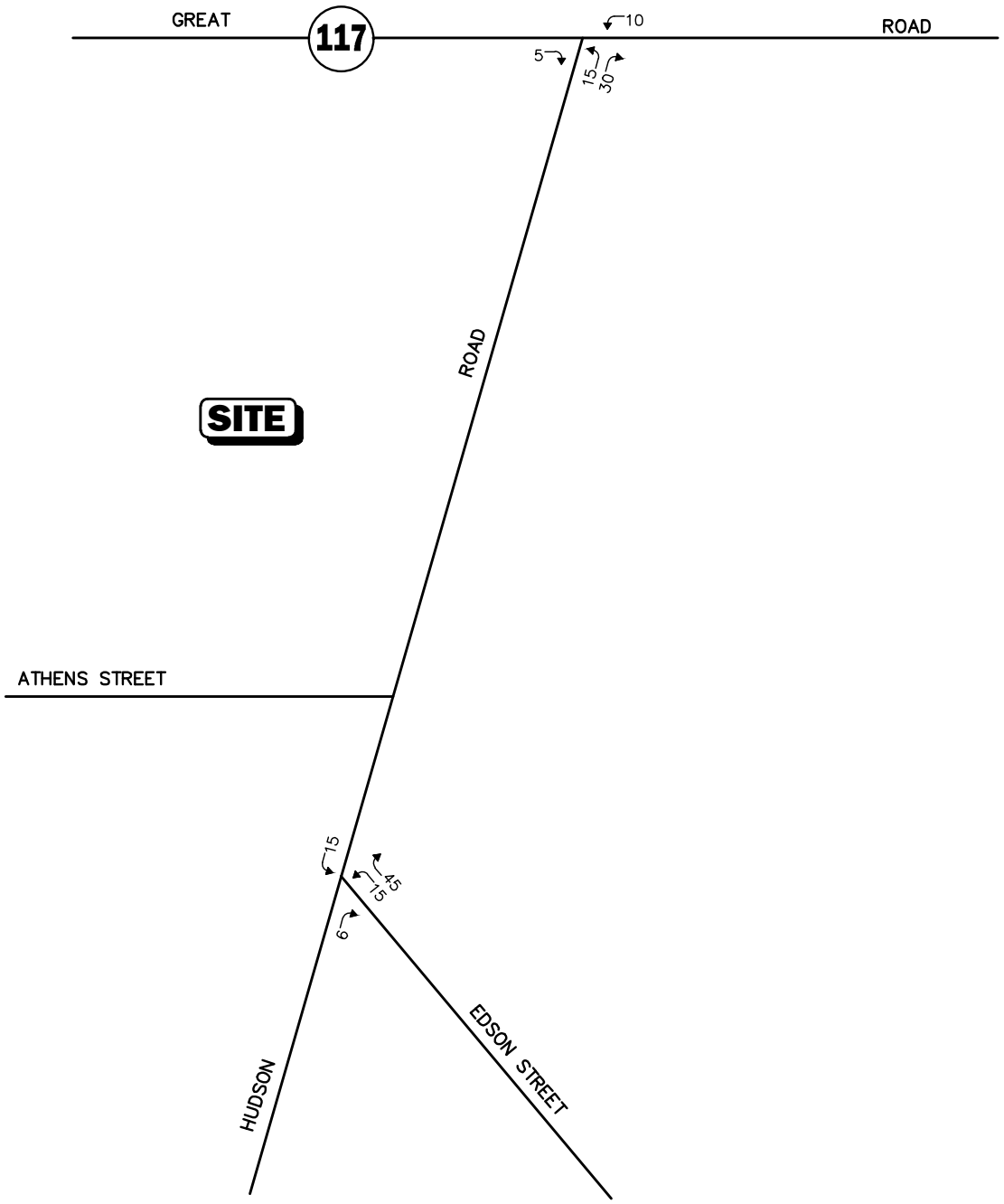
-71.527 42.431 Degrees

GENERAL BACKGROUND TRAFFIC GROWTH

General Background Traffic Growth - Daily Traffic Volumes

CITY/TOWN	ROUTE/STREET	LOCATION	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Annual Growth Rate
Stow	Main Street	west of East End Road	10,000	9,864	10,017				10,698			10,150	10,272	**0.50%**
Stow	Great Road	west of Hudson Road								10,424	10,539	10,687	10,730	**0.67%**
Stow	Great Road	east of Hudson Road								12,479	12,616	12,793	12,844	**0.67%**
Stow	Hudson Road	south of Great Road								4,585	4,663	4,677	4,658	**0.67%**
Stow	Gleasondale Road	east of Rockbottom Road								4,843	4,896	4,965	4,985	**0.67%**
Hudson	Wilkins Street	at Stow town line	4,981	5,035	5,572	5,700	5746	6,062	6,129	6,209	4,088	4,145	4,162	**-1.00%**
Maynard	Great Road	at Stow town line	12,153	12,286	11,986	12,144	12,210	12,882	13,024	13,193	12,243	12,414	12,464	**0.27%**
														0.35%

BACKGROUND DEVELOPMENT TRAFFIC-VOLUMES NETWORKS



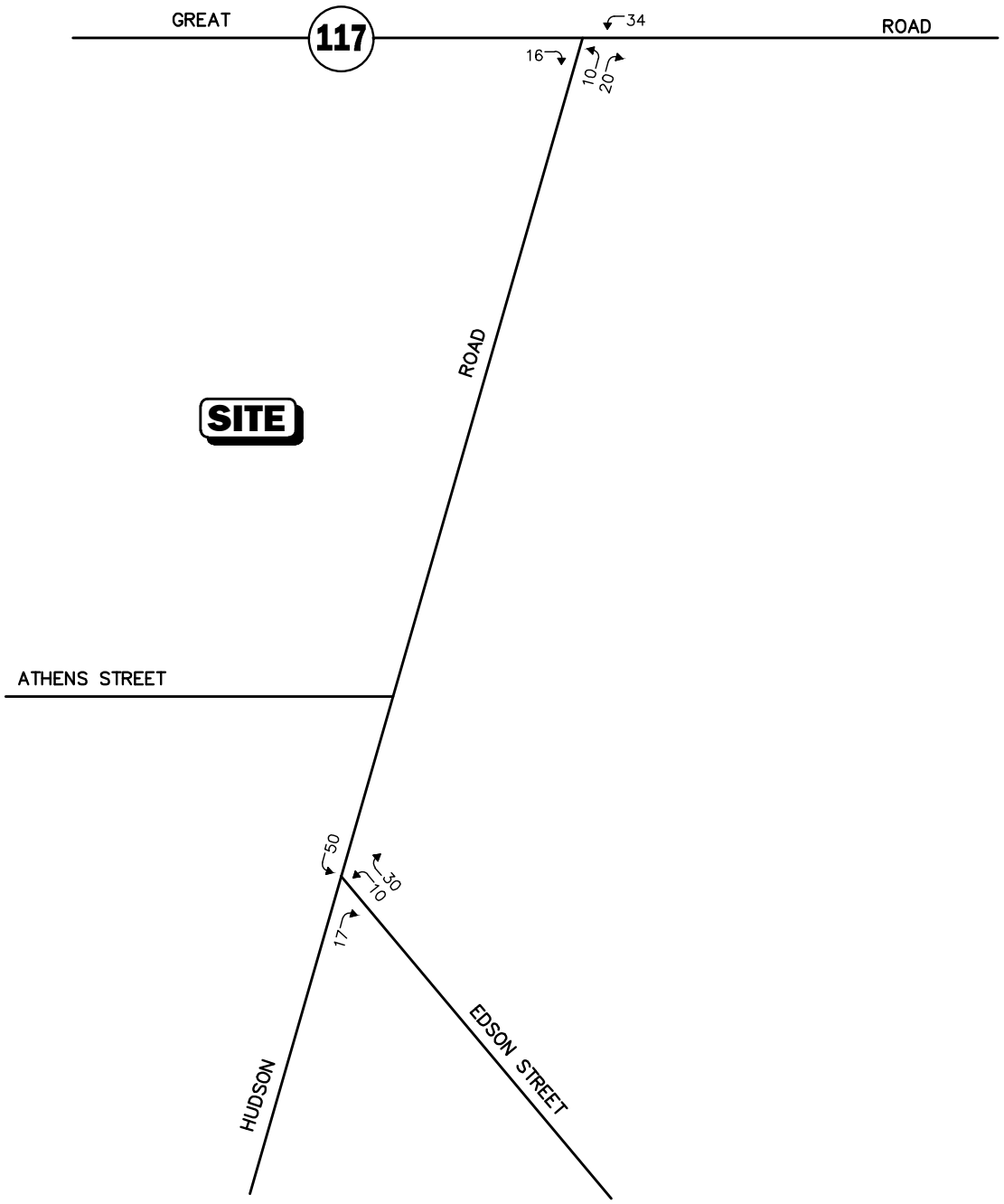
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure A-1

Trip Generation
Proposed Residential Community
(Stow Acres)
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure A-2

Trip Generation
Proposed Residential Community
(Stow Acres)
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

TRIP-GENERATION CALCULATIONS

Single-Family Detached Housing
(210)

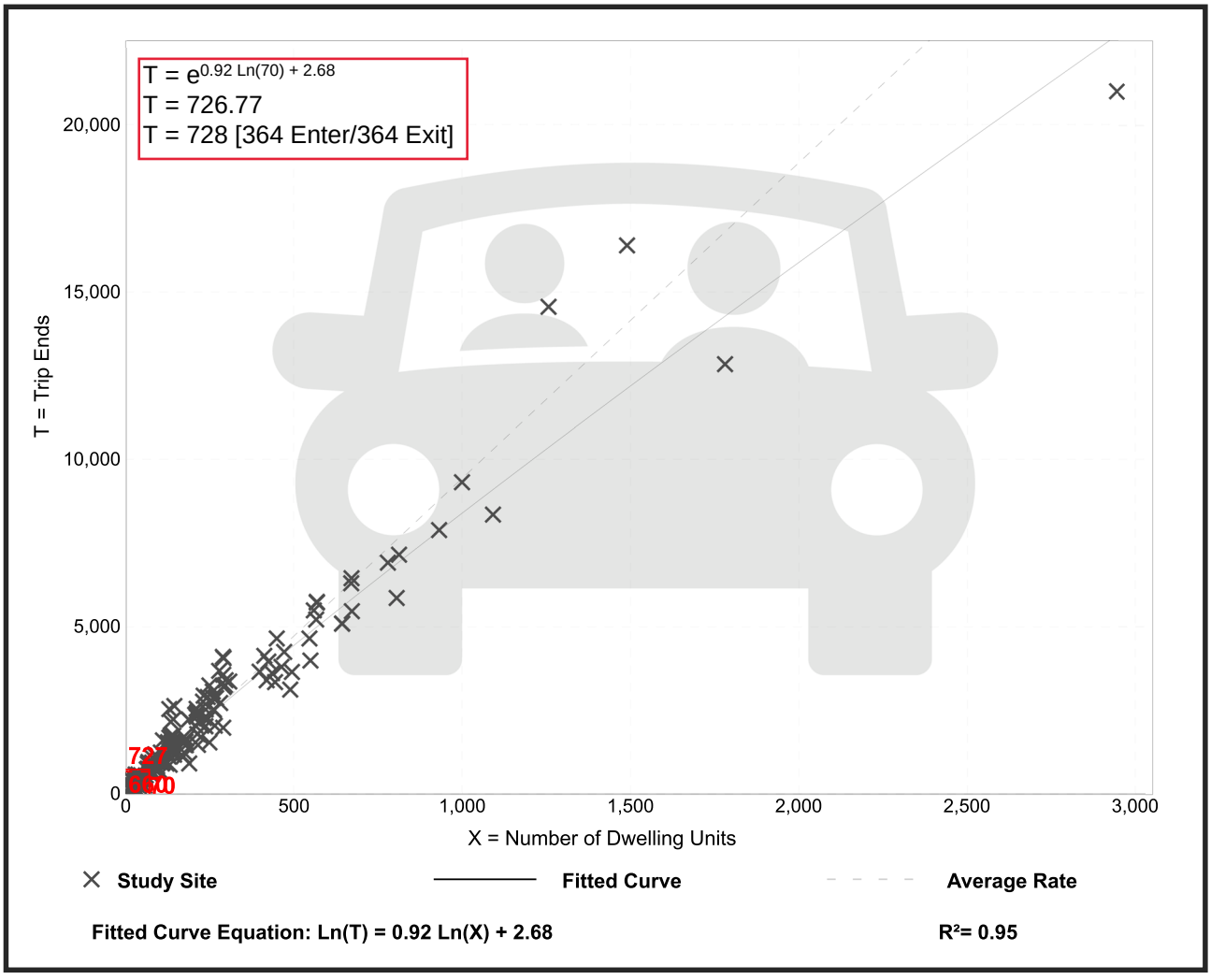
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



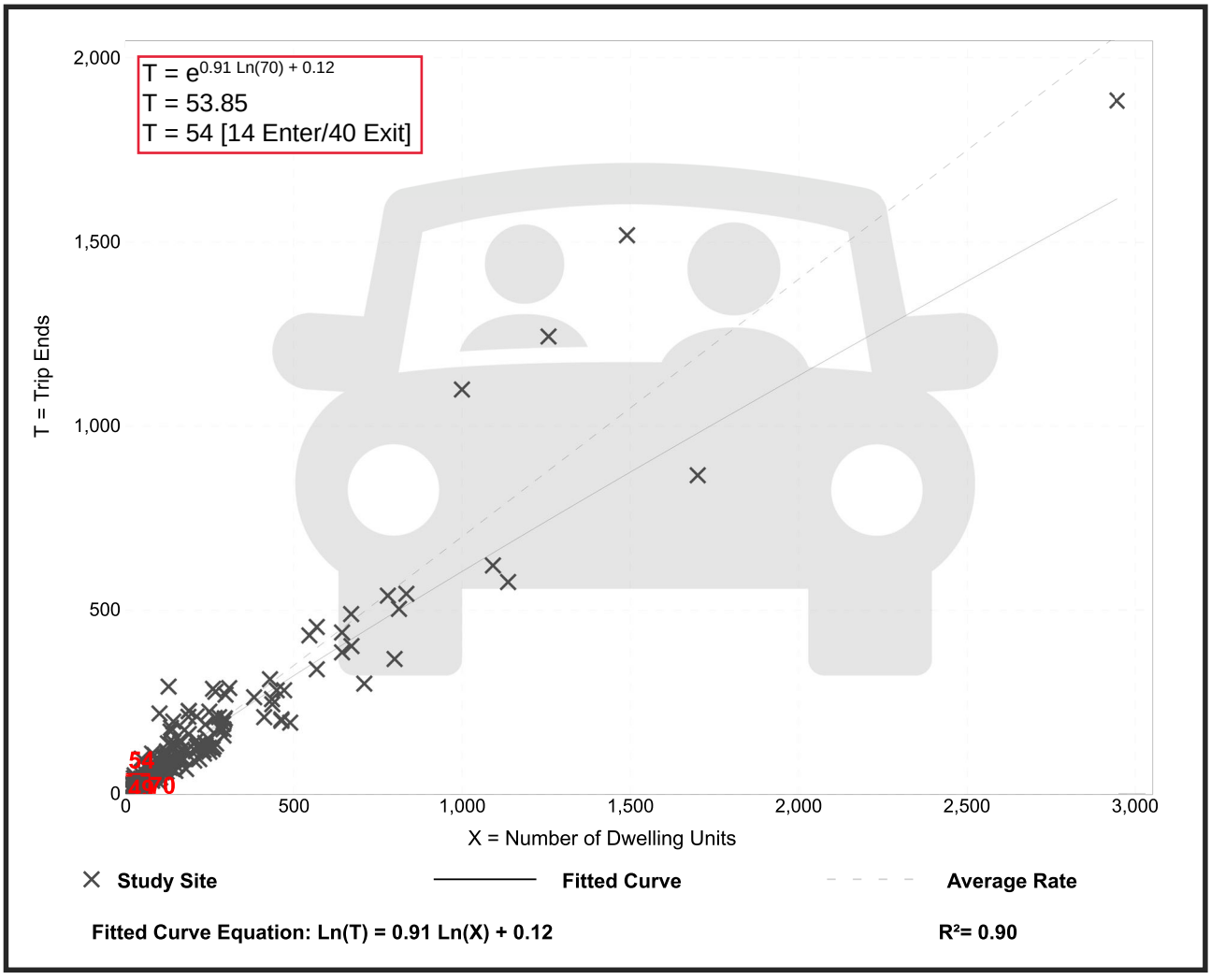
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	192
Avg. Num. of Dwelling Units:	226
Directional Distribution:	26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



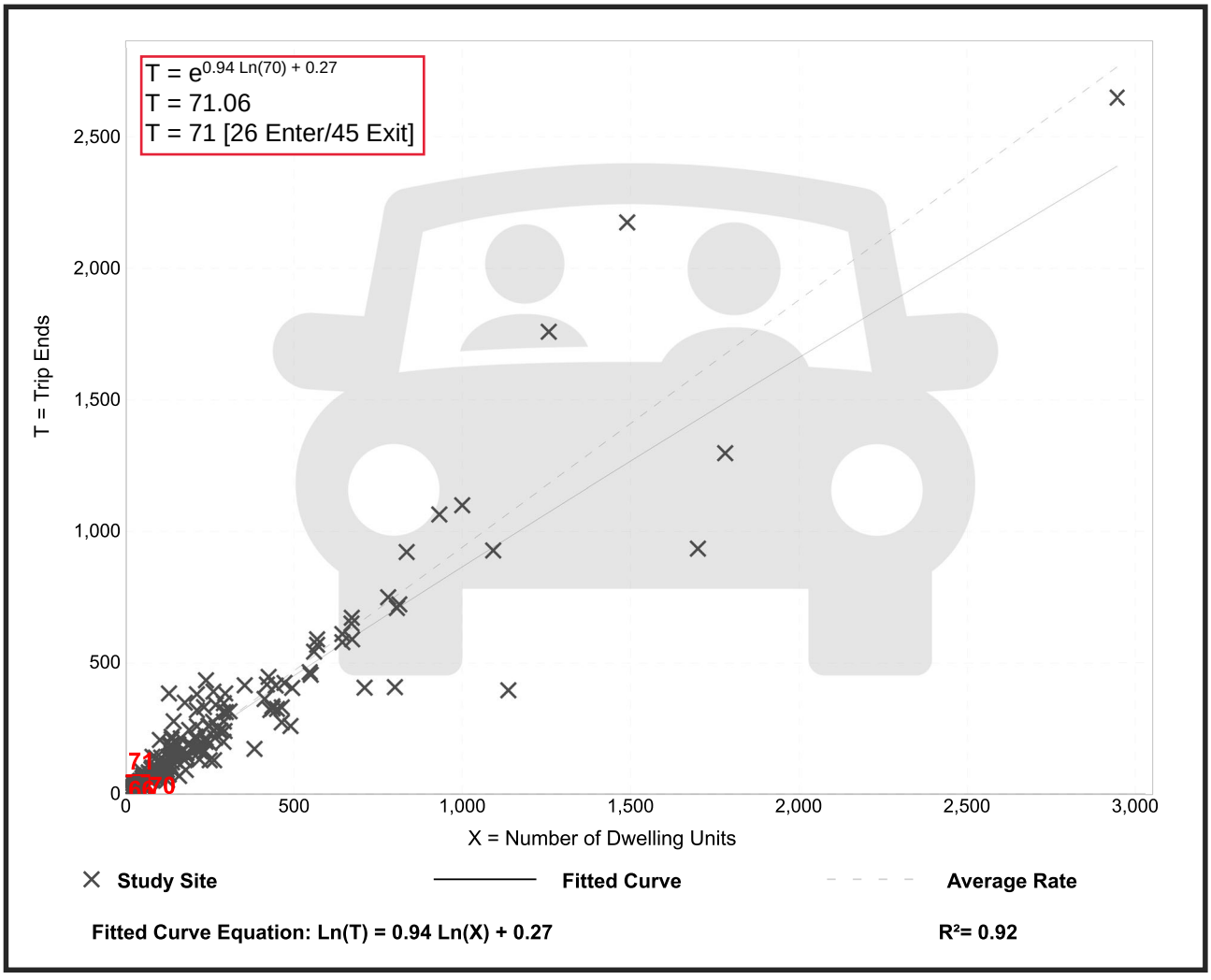
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	208
Avg. Num. of Dwelling Units:	248
Directional Distribution:	63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



Senior Adult Housing - Single-Family
(251)

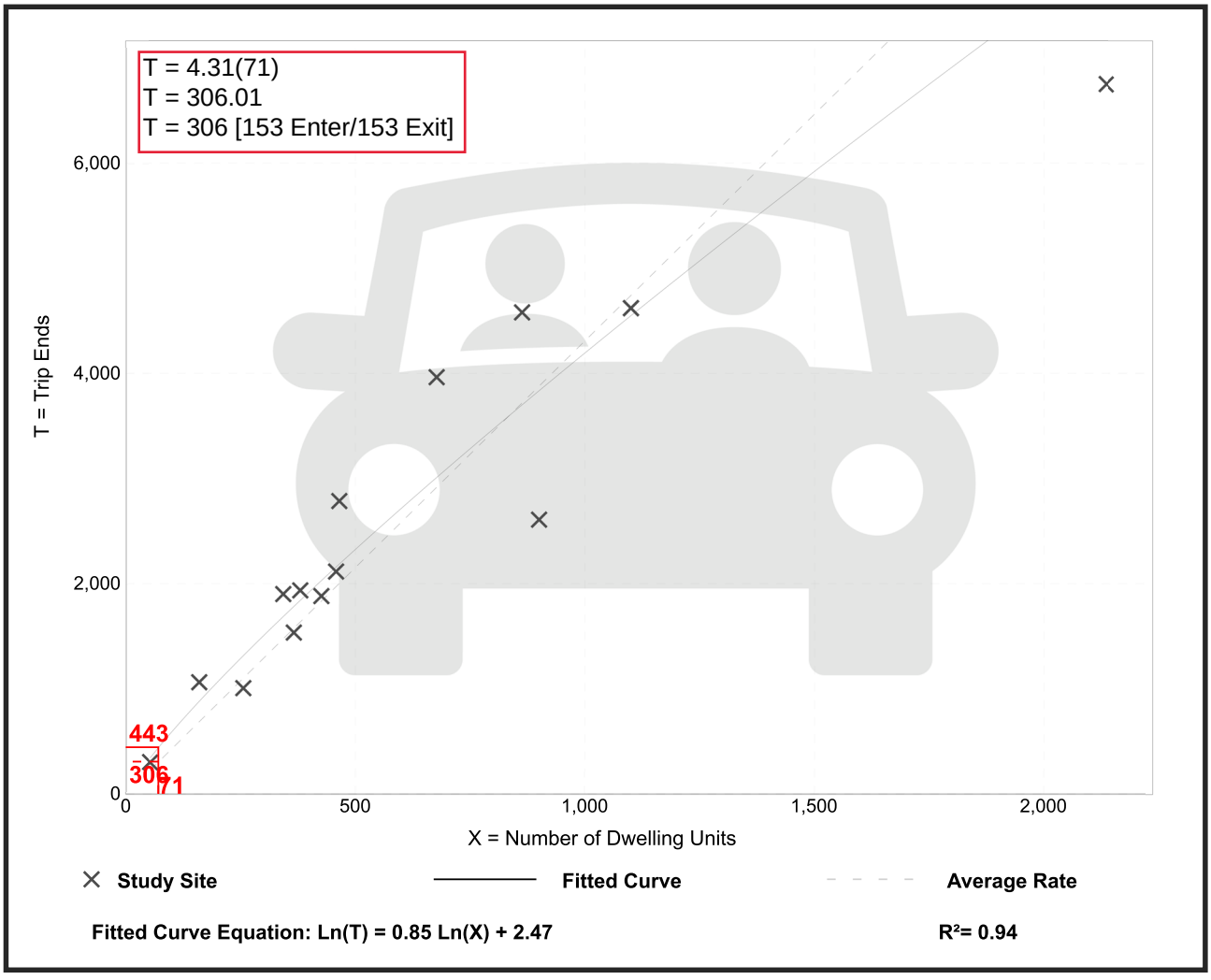
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 15
Avg. Num. of Dwelling Units: 646
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.31	2.90 - 6.66	1.07

Data Plot and Equation



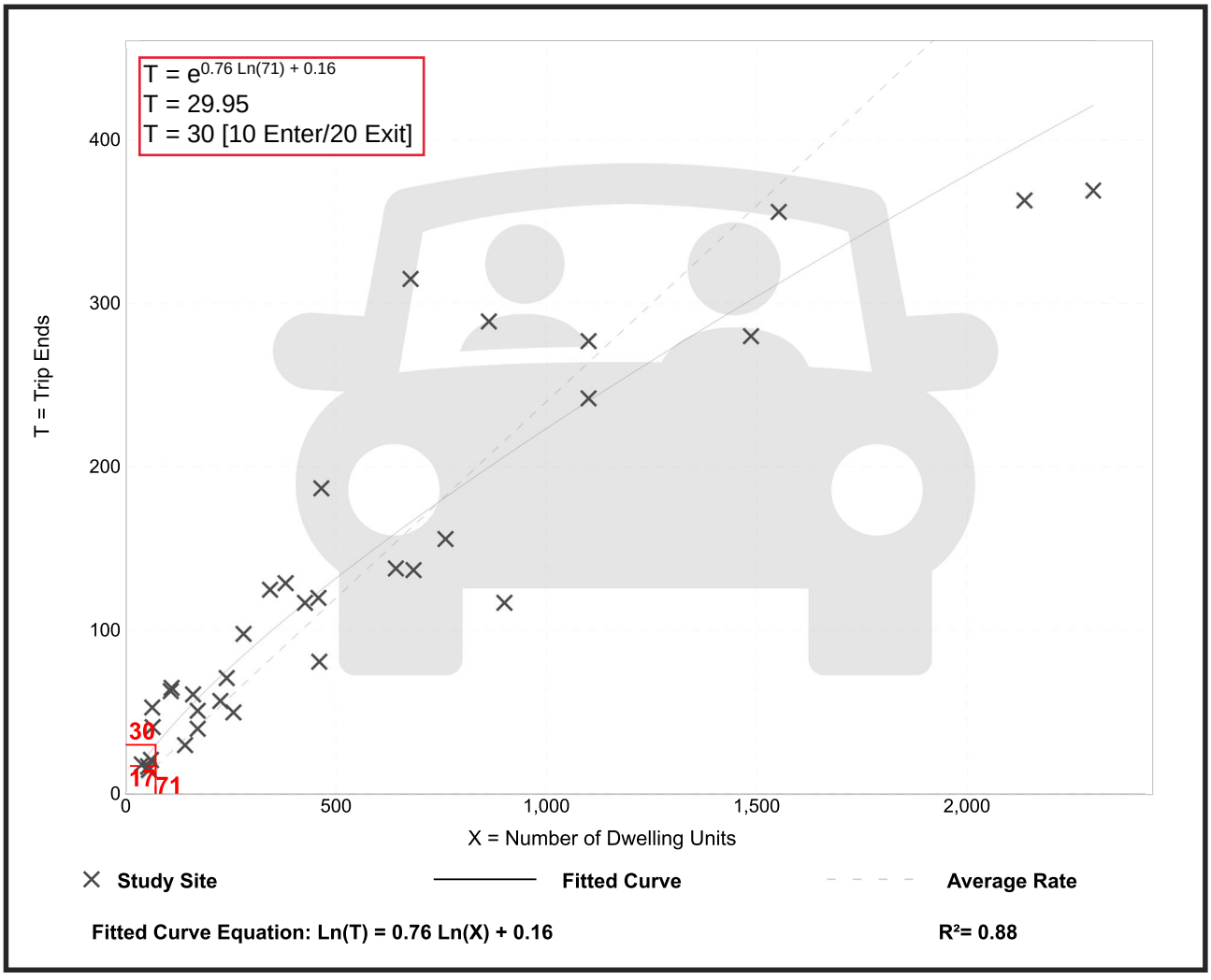
Senior Adult Housing - Single-Family
(251)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	34
Avg. Num. of Dwelling Units:	557
Directional Distribution:	33% entering, 67% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.24	0.13 - 0.84	0.10

Data Plot and Equation



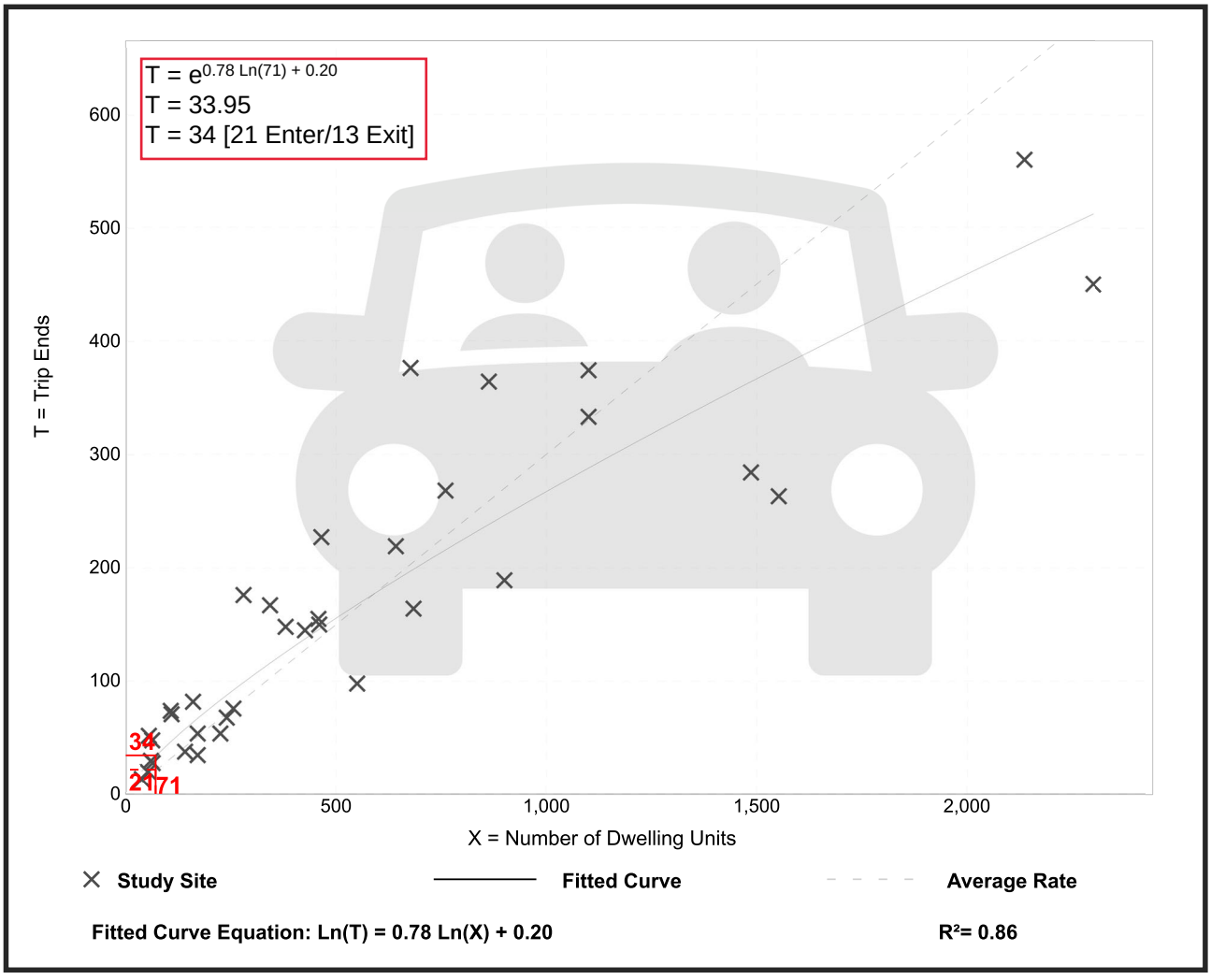
Senior Adult Housing - Single-Family
(251)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	35
Avg. Num. of Dwelling Units:	556
Directional Distribution:	61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.30	0.17 - 0.95	0.12

Data Plot and Equation



JOURNEY TO WORK TRIP DISTRIBUTION

Proposed Residential Development
Athens Street
Stow, Massachusetts

Residence	Workplace	Number	Route 117 (East)		Route 177 (West)		Hudson Road (South)		Edson Street (East)	
Stow town	Stow town	634	60%	380	30%	190		0	10%	63
Stow town	Waltham city	336	100%	336		0		0		0
Stow town	Boston city	254	50%	127	40%	102	10%	25		0
Stow town	Concord town	173	100%	173		0		0		0
Stow town	Lexington town	158	100%	158		0		0		0
Stow town	Marlborough city	145		0		0	100%	145		0
Stow town	Acton town	142	100%	142		0		0		0
Stow town	Worcester city	121		0		0	100%	121		0
Stow town	Maynard town	104	100%	104		0		0		0
Stow town	Burlington town	102	50%	51	50%	51		0		0
Stow town	Framingham town	80		0		0	50%	40	50%	40
Stow town	Littleton town	79	50%	40	50%	40		0		0
Stow town	Cambridge city	69	75%	52		0		0	25%	17
Stow town	Newton city	62	50%	31		0		0	50%	31
Stow town	Hudson town	60		0		0	100%	60		0
Stow town	North Reading town	58	25%	15	75%	44		0		0
Stow town	Hopkinton town	50		0	80%	40	10%	5	10%	5
Stow town	Wellesley town	46	50%	23		0		0	50%	23
Stow town	Westford town	44	25%	11	75%	33		0		0
Stow town	Chelmsford town	39	50%	20	50%	20		0		0
Stow town	Athol town	38		0	100%	38		0		0
Stow town	Boxborough town	34	50%	17	50%	17		0		0
Stow town	Harvard town	34		0	100%	34		0		0
Stow town	Salem town	34		0	100%	34		0		0
Stow town	Arlington town	33	80%	26	20%	7		0		0
Stow town	Lowell city	30		0	100%	30		0		0
Stow town	Stoneham town	30	100%	30		0		0		0
Stow town	Bedford town	29	100%	29		0		0		0
Stow town	Southborough town	28		0		0	100%	28		0
Stow town	Westborough town	26		0		0	100%	26		0
Stow town	Gardner city	21		0	100%	21		0		0
		3,093		1,764		699		450		180
				57.0%		22.6%		14.6%		5.8%
		SAY		**55%**		**25%**		**15%**		**5%**

CAPACITY ANALYSIS WORKSHEETS

Route 117 at Hudson Road
Hudson Road at Athens Street
Hudson Road at Edson Street

Route 117 at Hudson Road

Intersection	
Int Delay, s/veh	6.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	462	66	89	242	42	197
Future Vol, veh/h	462	66	89	242	42	197
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	90	90	92	92
Heavy Vehicles, %	6	5	2	8	5	2
Mvmt Flow	531	76	99	269	46	214

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	607	0	1036	569
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	467	-
Critical Hdwy	-	-	4.12	-	6.45	6.22
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.218	-	3.545	3.318
Pot Cap-1 Maneuver	-	-	971	-	253	522
Stage 1	-	-	-	-	561	-
Stage 2	-	-	-	-	625	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	971	-	223	522
Mov Cap-2 Maneuver	-	-	-	-	223	-
Stage 1	-	-	-	-	561	-
Stage 2	-	-	-	-	550	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.5	26.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	422	-	-	971	-
HCM Lane V/C Ratio	0.616	-	-	0.102	-
HCM Control Delay (s)	26.3	-	-	9.1	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	4	-	-	0.3	-

Intersection	
Int Delay, s/veh	11

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	308	61	257	527	53	149
Future Vol, veh/h	308	61	257	527	53	149
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	97	97	90	90
Heavy Vehicles, %	1	2	1	1	0	0
Mvmt Flow	328	65	265	543	59	166

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	393	0	1434	361
Stage 1	-	-	-	-	361	-
Stage 2	-	-	-	-	1073	-
Critical Hdwy	-	-	4.11	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.209	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1171	-	149	688
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	331	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1171	-	101	688
Mov Cap-2 Maneuver	-	-	-	-	101	-
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	224	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	59.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	272	-	-	1171	-
HCM Lane V/C Ratio	0.825	-	-	0.226	-
HCM Control Delay (s)	59.3	-	-	9	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	6.7	-	-	0.9	-

Intersection	
Int Delay, s/veh	14.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	500	76	106	262	60	243
Future Vol, veh/h	500	76	106	262	60	243
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	90	90	92	92
Heavy Vehicles, %	6	5	2	8	5	2
Mvmt Flow	575	87	118	291	65	264

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	662	0	1146	619
Stage 1	-	-	-	-	619	-
Stage 2	-	-	-	-	527	-
Critical Hdwy	-	-	4.12	-	6.45	6.22
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.218	-	3.545	3.318
Pot Cap-1 Maneuver	-	-	927	-	217	489
Stage 1	-	-	-	-	531	-
Stage 2	-	-	-	-	586	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	927	-	184	489
Mov Cap-2 Maneuver	-	-	-	-	184	-
Stage 1	-	-	-	-	531	-
Stage 2	-	-	-	-	497	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	58.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	368	-	-	927	-
HCM Lane V/C Ratio	0.895	-	-	0.127	-
HCM Control Delay (s)	58.2	-	-	9.4	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	9	-	-	0.4	-

Intersection	
Int Delay, s/veh	48.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	334	81	312	571	67	181
Future Vol, veh/h	334	81	312	571	67	181
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	97	97	90	90
Heavy Vehicles, %	1	2	1	1	0	0
Mvmt Flow	355	86	322	589	74	201

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	441	0	1631	398
Stage 1	-	-	-	-	398	-
Stage 2	-	-	-	-	1233	-
Critical Hdwy	-	-	4.11	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.209	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1124	-	113	656
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	278	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1124	-	~ 65	656
Mov Cap-2 Maneuver	-	-	-	-	~ 65	-
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	160	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.4	275.7
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	190	-	-	1124	-
HCM Lane V/C Ratio	1.45	-	-	0.286	-
HCM Control Delay (s)	275.7	-	-	9.5	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	16.8	-	-	1.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	29.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	500	82	119	262	75	276
Future Vol, veh/h	500	82	119	262	75	276
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	90	90	92	92
Heavy Vehicles, %	6	5	2	8	5	2
Mvmt Flow	575	94	132	291	82	300

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	669	0	1177	622
Stage 1	-	-	-	-	622	-
Stage 2	-	-	-	-	555	-
Critical Hdwy	-	-	4.12	-	6.45	6.22
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.218	-	3.545	3.318
Pot Cap-1 Maneuver	-	-	921	-	208	487
Stage 1	-	-	-	-	530	-
Stage 2	-	-	-	-	569	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	921	-	172	487
Mov Cap-2 Maneuver	-	-	-	-	172	-
Stage 1	-	-	-	-	530	-
Stage 2	-	-	-	-	472	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3	109.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	350	-	-	921	-
HCM Lane V/C Ratio	1.09	-	-	0.144	-
HCM Control Delay (s)	109.4	-	-	9.6	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	14.1	-	-	0.5	-

Intersection	
Int Delay, s/veh	95

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	334	98	348	571	77	202
Future Vol, veh/h	334	98	348	571	77	202
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	97	97	90	90
Heavy Vehicles, %	1	2	1	1	0	0
Mvmt Flow	355	104	359	589	86	224

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	459	0	1714	407
Stage 1	-	-	-	-	407	-
Stage 2	-	-	-	-	1307	-
Critical Hdwy	-	-	4.11	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.209	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1107	-	100	648
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	256	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1107	-	~ 52	648
Mov Cap-2 Maneuver	-	-	-	-	~ 52	-
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	133	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	$ 514.7
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	156	-	-	1107	-
HCM Lane V/C Ratio	1.987	-	-	0.324	-
HCM Control Delay (s)	$ 514.7	-	-	9.8	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	24.1	-	-	1.4	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Hudson Road at Athens Street

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	48	12	5	286	151	19
Future Vol, veh/h	48	12	5	286	151	19
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	95	86	92
Heavy Vehicles, %	2	2	2	3	7	2
Mvmt Flow	52	13	5	301	176	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	498	187	197	0	-	0
Stage 1	187	-	-	-	-	-
Stage 2	311	-	-	-	-	-
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	532	855	1376	-	-	-
Stage 1	845	-	-	-	-	-
Stage 2	743	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	530	855	1376	-	-	-
Mov Cap-2 Maneuver	530	-	-	-	-	-
Stage 1	842	-	-	-	-	-
Stage 2	743	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1376	-	574	-	-
HCM Lane V/C Ratio	0.004	-	0.114	-	-
HCM Control Delay (s)	7.6	0	12.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	8	13	239	370	53
Future Vol, veh/h	31	8	13	239	370	53
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	77	83	92
Heavy Vehicles, %	2	2	2	1	0	2
Mvmt Flow	34	9	14	310	446	58

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	813	475	504	0	-	0
Stage 1	475	-	-	-	-	-
Stage 2	338	-	-	-	-	-
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	348	590	1061	-	-	-
Stage 1	626	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	342	590	1061	-	-	-
Mov Cap-2 Maneuver	342	-	-	-	-	-
Stage 1	616	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.9	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1061	-	374	-	-
HCM Lane V/C Ratio	0.013	-	0.113	-	-
HCM Control Delay (s)	8.4	0	15.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Hudson Road at Edson Street

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	19	203	1	16	110
Future Vol, veh/h	2	19	203	1	16	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	71	71	97	97	86	86
Heavy Vehicles, %	0	6	3	0	7	7
Mvmt Flow	3	27	209	1	19	128

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	376	210	0	0	210	0
Stage 1	210	-	-	-	-	-
Stage 2	166	-	-	-	-	-
Critical Hdwy	6.4	6.26	-	-	4.17	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.354	-	-	2.263	-
Pot Cap-1 Maneuver	629	820	-	-	1331	-
Stage 1	830	-	-	-	-	-
Stage 2	868	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	620	820	-	-	1331	-
Mov Cap-2 Maneuver	620	-	-	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	855	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	796	1331	-
HCM Lane V/C Ratio	-	-	0.037	0.014	-
HCM Control Delay (s)	-	-	9.7	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	34	159	2	20	275
Future Vol, veh/h	4	34	159	2	20	275
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	71	71	78	78	83	83
Heavy Vehicles, %	0	6	0	0	0	0
Mvmt Flow	6	48	204	3	24	331

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	585	206	0	0	207	0
Stage 1	206	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Critical Hdwy	6.4	6.26	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.354	-	-	2.2	-
Pot Cap-1 Maneuver	477	824	-	-	1376	-
Stage 1	833	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	467	824	-	-	1376	-
Mov Cap-2 Maneuver	467	-	-	-	-	-
Stage 1	833	-	-	-	-	-
Stage 2	681	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	763	1376	-
HCM Lane V/C Ratio	-	-	0.07	0.018	-
HCM Control Delay (s)	-	-	10.1	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Intersection	
Int Delay, s/veh	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	66	220	7	32	119
Future Vol, veh/h	17	66	220	7	32	119
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	71	71	97	97	86	86
Heavy Vehicles, %	0	6	3	0	7	7
Mvmt Flow	24	93	227	7	37	138

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	443	231	0	0	234	0
Stage 1	231	-	-	-	-	-
Stage 2	212	-	-	-	-	-
Critical Hdwy	6.4	6.26	-	-	4.17	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.354	-	-	2.263	-
Pot Cap-1 Maneuver	576	798	-	-	1305	-
Stage 1	812	-	-	-	-	-
Stage 2	828	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	558	798	-	-	1305	-
Mov Cap-2 Maneuver	558	-	-	-	-	-
Stage 1	812	-	-	-	-	-
Stage 2	802	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	1.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	733	1305	-
HCM Lane V/C Ratio	-	-	0.159	0.029	-
HCM Control Delay (s)	-	-	10.8	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	67	172	19	72	298
Future Vol, veh/h	14	67	172	19	72	298
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	71	71	78	78	83	83
Heavy Vehicles, %	0	6	0	0	0	0
Mvmt Flow	20	94	221	24	87	359

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	766	233	0	0	245	0
Stage 1	233	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Critical Hdwy	6.4	6.26	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.354	-	-	2.2	-
Pot Cap-1 Maneuver	374	796	-	-	1333	-
Stage 1	810	-	-	-	-	-
Stage 2	593	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	343	796	-	-	1333	-
Mov Cap-2 Maneuver	343	-	-	-	-	-
Stage 1	810	-	-	-	-	-
Stage 2	544	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.7	0	1.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	648	1333	-
HCM Lane V/C Ratio	-	-	0.176	0.065	-
HCM Control Delay (s)	-	-	11.7	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.2	-

Intersection	
Int Delay, s/veh	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	67	224	7	35	128
Future Vol, veh/h	17	67	224	7	35	128
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	71	71	97	97	86	86
Heavy Vehicles, %	0	6	3	0	7	7
Mvmt Flow	24	94	231	7	41	149

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	466	235	0	0	238	0
Stage 1	235	-	-	-	-	-
Stage 2	231	-	-	-	-	-
Critical Hdwy	6.4	6.26	-	-	4.17	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.354	-	-	2.263	-
Pot Cap-1 Maneuver	559	794	-	-	1300	-
Stage 1	809	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	540	794	-	-	1300	-
Mov Cap-2 Maneuver	540	-	-	-	-	-
Stage 1	809	-	-	-	-	-
Stage 2	784	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	1.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	725	1300	-
HCM Lane V/C Ratio	-	-	0.163	0.031	-
HCM Control Delay (s)	-	-	10.9	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

Intersection	
Int Delay, s/veh	2.6

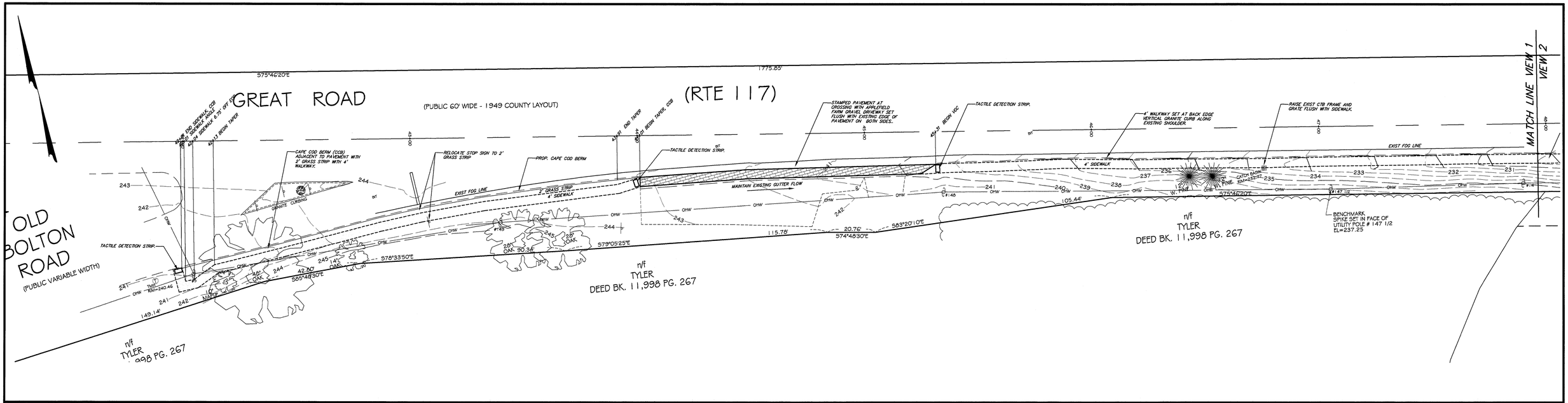
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	70	182	19	74	304
Future Vol, veh/h	14	70	182	19	74	304
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	78	78	83	83
Heavy Vehicles, %	0	6	0	0	0	0
Mvmt Flow	20	99	233	24	89	366

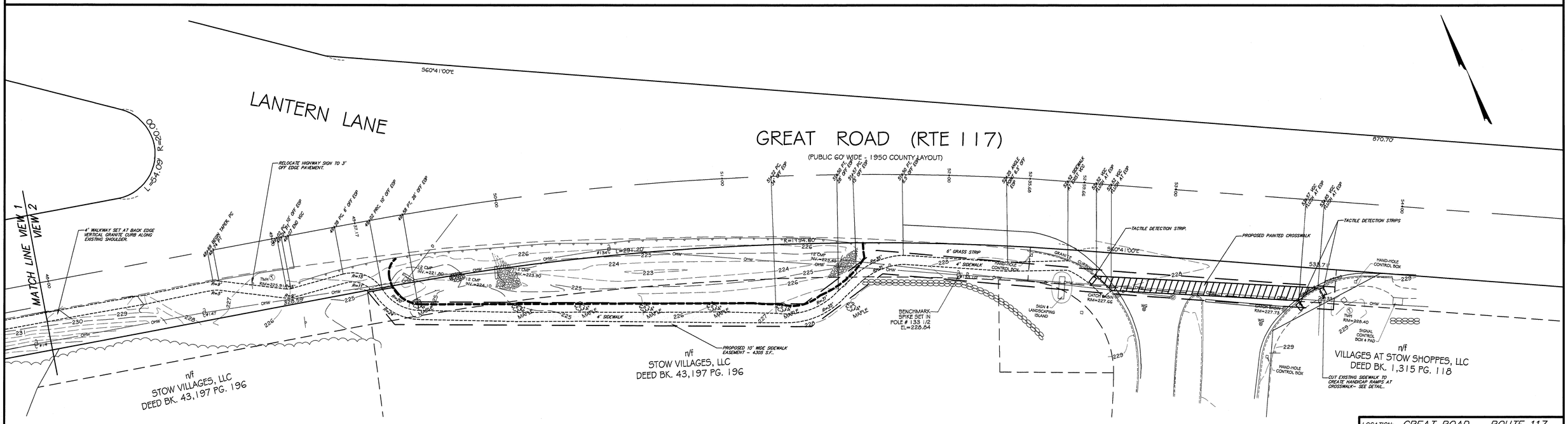
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	789	245	0	0	257	0
Stage 1	245	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Critical Hdwy	6.4	6.26	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.354	-	-	2.2	-
Pot Cap-1 Maneuver	362	784	-	-	1320	-
Stage 1	800	-	-	-	-	-
Stage 2	586	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	331	784	-	-	1320	-
Mov Cap-2 Maneuver	331	-	-	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	536	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.9	0	1.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	638	1320	-
HCM Lane V/C Ratio	-	-	0.185	0.068	-
HCM Control Delay (s)	-	-	11.9	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.2	-

Attachment #2





CONSTRUCTION NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH MADOT "STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, LATEST VERSION, UNLESS OTHERWISE NOTED OR SHOWN ON THE PLANS.
2. PRIOR TO ANY ON-SITE SUBSURFACE EXPLORATIONS, EXCAVATIONS OR DISTURBANCE, DIG SAFE SHALL BE NOTIFIED AS REQUIRED BY LAW. ANTIDOTAL EVIDENCE INDICATES THAT THE GAS MAIN MAY BE RELATIVELY SHALLOW DUE TO PREVIOUS EXCAVATIONS IN THE SHOULERS.
3. SIDEWALKS SHALL NOT HAVE A CROSS-SLOPE IN EXCESS OF (1:50) OR 2% GRADE AND SHALL BEET THE MASSACHUSETTS ARCHITECTURAL ACCESS BOARD CRITERIA IN 521 CMR.
4. THE CONTRACTOR SHALL INCLUDE IN THE BASE BID IMPORTED LOAM AND SEED TO BLEND PROPOSED CONSTRUCTION TO ADJACENT AREAS. LOAM SHALL MEET THE FOLLOWING CRITERIA:
   A. NATURAL MATERIAL FREE FROM HARD CLODS, STIFF CLAY, SOD, NON-ORGANIC MATERIALS AND WEEDS.
   B. IT SHALL BE SCREEN TO A MAXIMUM SIZE OF 1/2" HAVE A pH OF 6.5 TO 7.5 AND CONTAIN BETWEEN 5.5 AND 10.5 % ORGANIC MATTER.
   C. IT SHALL BE OBTAINED FROM AN AREA THAT HAS DEMONSTRATED PLANT GROWTH.
5. THE CONTRACTOR SHALL INCLUDE IN THE BASE BID ALL PROTECTIVE, WARNING, VISUAL AIDS AND SIGNS REQUIRED TO MEET MADOT SINGLE LANE OBSTRUCTION CLOSURE STANDARDS FOR WORK ISN A RIGHT OF WAY. THE CONTRACTOR IS ALSO RESPONSIBLE FOR THE COORDINATION OF, PROVISION OF AND PAYMENT FOR ANY/ALL POLICE DETAILS.
6. UNLESS OTHERWISE SHOWN OR DEPICTED, EXISTING VEGETATION, UTILITY POLES & STRUCTURES, FENCES, WALLS AND OTHER ITEMS DEPICTED ON PLAN ARE TO BE MAINTAINED AND PROTECTED.
7. THE JOINTS OF EXISTING PAVED AREAS ARE TO BE SAW CUT & PATCHED TO MATCH EXISTING DRAINAGE PATTERNS.

GREAT ROAD PEDESTRIAN WALKWAY OLD BOLTON ROAD - BOSE DRIVEWAY AREA

COMMONWEALTH OF MASSACHUSETTS
SUSAN E. CARTER
NO. 41270
REGISTERED PROFESSIONAL ENGINEER
5/31/11

LOCATION: GREAT ROAD – ROUTE 117
TOWN: STOW, MASSACHUSETTS
PREPARED FOR:
TOWN OF STOW
SCALE: 1"=20' DATE: MAY 31, 2011

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