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Traffic Impact and Access Study

**Proposed Warehouse
306 Maple Street
Bellingham, Massachusetts**

Prepared for:

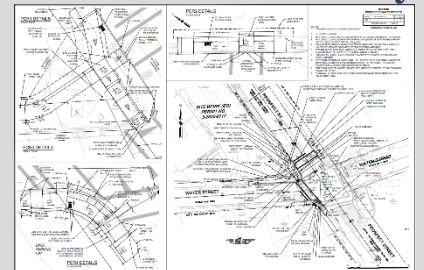
**AIS CRE Development
Framingham, MA 01701**

August 31, 2023

Quality



Accuracy



Integrity



Traffic Impact and Access Study

To: Mr. Andrew Sacher
AIS CRE Development
1991 Worcester Road, Suite 200
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Reg: Proposed Warehouse
306 Maple Street
Bellingham, Massachusetts

From: Shaun P. Kelly, Sr. Project Manager

Date: August 31, 2023
Project #: 23032

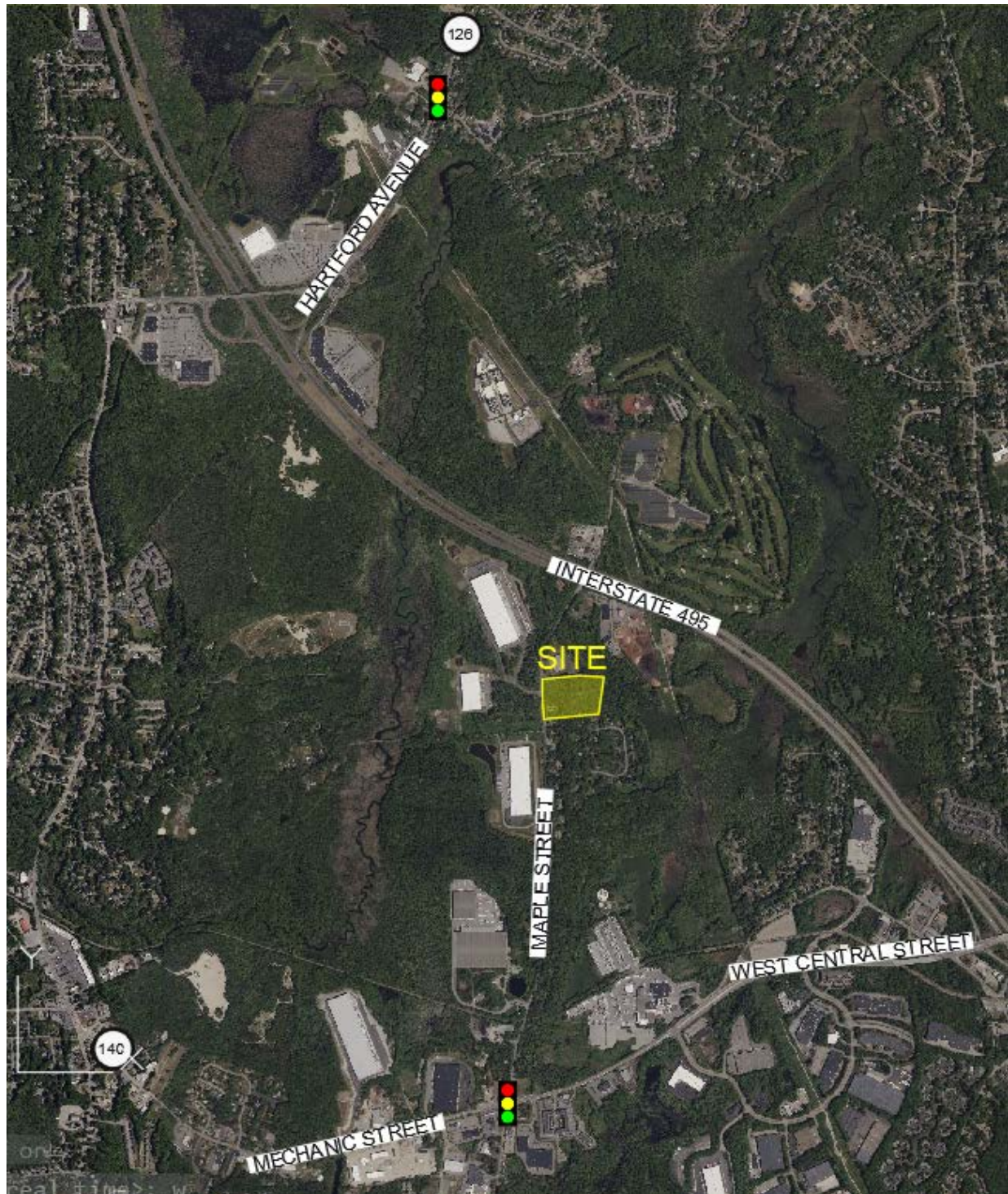
INTRODUCTION

Chappell Engineering Associates, LLC (CEA) has conducted this Traffic Impact and Access Study for a proposed warehouse to be constructed at 306 Maple Street in Bellingham, Massachusetts. As proposed, the project entails the construction of an approximate 59,400± square foot (sf) warehouse building. The facility will provide a total of 119 parking spaces, including five handicap accessible parking spaces. Twelve loading docks will be provided to the rear of the building. Access to the project will be provided via a new driveway onto the eastern side of Maple Street. The driveway is proposed to be located opposite the existing driveway that serves the 351-353 Maple Street property. The project site is generally bounded by Maple Street to the west, and by private properties to the east, north, and south. The site location is shown on Figure 1.

This report has been prepared to assess the safety of the proposed site driveway, estimate the increase in traffic as a result of the project, evaluate the impacts of that traffic on the adjacent streets and nearby intersections, and provide recommendations to ensure safe and efficient access to the project site. As this report demonstrates, following the clearing of existing vegetation along the site frontage associated with the site development, adequate sightlines can be provided at the proposed site driveway location to allow for safe operation. It is recommended that any proposed landscaping or signs in the vicinity of the driveway be kept low to the ground or outside the sight triangles so as not to impede the available sight distances.

The proposed development is expected to generate minimal increases in area traffic, amounting to approximately ten to eleven peak hour trips, the majority of which will be automobile, not truck trips. This level of traffic, once distributed onto the adjacent roadways, results in increases to traffic of approximately 1 vehicle every five to six minutes during peak hours of roadway traffic.

Figure 1
Site Location Map



As this study shows, development of the site is not expected to result in a notable impact to traffic operations within the study area. All intersections are expected to operate comparably between future No-Build and Build conditions, with very minimal increases to vehicle delays expected. The proposed site driveway is projected to operate at acceptable levels of service, with only minimal delays and minimal queue lengths, and will be designed to physically restrict exiting right-turn truck movements to the north.

The site abuts Maple Street, which is under local Town of Bellington jurisdiction, and therefore a Highway Access Permit from the Massachusetts Department of Transportation (MassDOT) will not be required. This study was prepared in conformance with MassDOT guidelines for the preparation of traffic impact assessments. The project is not expected to meet or exceed any transportation thresholds requiring that an Environmental Notification Form (ENF) be submitted to the Massachusetts Environmental Policy Act (MEPA) office. Recommendations are made in this report with regard to the use and design of the site driveway, including pavement markings, signage, and geometric design.

EXISTING CONDITIONS

Study Area

Evaluation of the traffic impacts associated with the proposed site development requires an evaluation of existing and projected traffic volumes, the volume of traffic expected to be generated by the project, and the impact that this traffic will have on the adjacent roadway network. In preparing this study, the following intersections were analyzed and evaluated:

- Maple Street at Mechanic Street/West Central Street (Route 140)
- Maple Street at Hartford Avenue (Route 126)
- Maple Street at 351-353 Maple Street driveway/site driveway (proposed)

The project is expected to have a minimal effect on traffic operations beyond this study area. The study area intersections and roadways are described in detail below.

Maple Street is classified as rural major collector roadway under Town of Bellingham jurisdiction that traverses the study area in a general north-south orientation. Maple Street provides a single lane of travel in each direction, separated by a painted double-yellow centerline. Sidewalk is provided along the eastern side of the corridor in the vicinity of the project. The posted speed limit on Maple Street, in the vicinity of the proposed site access is 35 miles per hour (mph). Sidewalk is provided along the eastern side of the corridor in the vicinity of the project site. Land use along the corridor within the study area is primarily a mix of industrial and residential uses.

Mechanic Street/West Central Street (Route 140) is classified as a rural minor arterial roadway under the jurisdiction of MassDOT. Within the study area, Mechanic Street/West Central Street is a two-lane street roadway that traverses the study area in a general east-west orientation in the vicinity of the site, with eastbound and westbound traffic separated by a double-yellow centerline. Approximate 1- to 2-foot wide paved shoulders are provided along both sides of the corridor. Sidewalks are provided along the northern side of the corridor, west of Maple Street, and along both sides of the corridor, east of Maple Street. The posted speed limit is 35 mph within the vicinity of the site. Land use within the study area is generally a mix of commercial, industrial, and residential properties.

Hartford Avenue (Route 126) is classified as a rural minor arterial roadway that traverses the study area in a general north-south orientation. Within the study area Hartford Avenue is under Town of Bellingham jurisdiction, and under MassDOT jurisdiction further south, in the vicinity of its interchange with Interstate 495 (I-495). Sidewalk is provided along the western side of the corridor within the study area. Land use in the vicinity of this intersection is primarily a mix of residential and commercial properties.

Maple Street meets Mechanic Street and West Central Street from the north and south to form a four-way signalized intersection. The Mechanic Street eastbound and West Central Street westbound approaches to this intersection provide an exclusive left-turn lane, a through lane and a channelized right-turn lane. The Maple Street northbound and southbound approaches provide an exclusive left-turn lane, a through lane and an exclusive right-turn lane. Sidewalk is provided continuously along the northern side of Mechanic Street, along both sides of West Central Street, and along both sides of Maple Street, north of Mechanic Street. Painted crosswalks are provided across all four intersection approaches at this location. Bicycle accommodations are provided on all four intersection approaches. The traffic signal at this location operates under a five-phase signal sequence, with protected and permitted left-turn phasing provided for all four intersection approaches, and a pedestrian phase available via push-button activation. Land use in the vicinity of this intersection consists primarily of commercial, industrial, and residential uses.

Maple Street meets Hartford Avenue from the east to form a three-way signalized intersection. The Maple Street westbound approach to this intersection provides a single general purpose travel lane. The Hartford Avenue northbound approach provides a single general purpose travel lane. The Hartford Avenue southbound approach provides an exclusive left-turn lane and a through lane. Sidewalk is provided along the western side of Hartford Avenue at this location, with a crosswalk provided across the southbound Hartford Avenue approach. The traffic signal at this location operates under a four-phase signal sequence, with protected and permitted phasing for southbound left-turns on Hartford Avenue, and a pedestrian phase provided via push-button activation. Land use in the vicinity of this intersection consists of a mix of residential and commercial properties.

Maple Street meets the 351-353 Maple Street driveway from the west to form a three-way unsignalized intersection that operates under stop control. Maple Street provides an exclusive left-turn lane and a through lane in the northbound direction, and a single general purpose travel lane in the southbound direction. The 351-353 Maple Street driveway provides a single general purpose

travel lane that operates under stop sign control. Signage is provided on the driveway approach indicating exiting left-turns are prohibited for trucks, with a raised median island in Maple Street provided to further restrict these movements. Sidewalk is provided along the eastern side of Maple Street at this location. Land use in the vicinity of this intersection consists primarily of a mix of industrial and residential properties.

Traffic Volumes

Existing traffic conditions were developed by conducting automatic traffic recorder (ATR) counts on Maple Street, adjacent to the site, over a 48-hour period to identify traffic patterns over an extended period. Additionally, manual turning movement counts (TMCs) and vehicle classification counts were conducted during the weekday AM (7:00 to 9:00 AM) and weekday PM (4:00 to 6:00 PM) peak periods. Specifically, TMCs were conducted at the following locations that are expected to accommodate the majority of project-related traffic:

- Maple Street at Mechanic Street and West Central Street
- Maple Street at Hartford Avenue
- Maple Street at 351-353 Maple Street driveway

As documented in this report, these time periods represent the critical periods for analysis as the adjacent streets incur the highest volume of traffic. All traffic counts were collected in May 2023 and are provided in the Appendix.

To determine if the count data needed to be adjusted to represent annual average month conditions consistent with MassDOT guidelines for traffic impact assessment, historical traffic volume data were obtained from MassDOT's Seasonal Weekday Adjustment Factor file. This document provides a monthly adjustment factor based on the roadway classification of the study roadways. Both Mechanic Street/West Central Street and Hartford Avenue are classified as urban principal arterials (U3), with Maple Street classified as an urban minor arterial (U4). The U3 and U4 roadway classifications have adjustment factors of 0.93 and 0.88, respectively, for the month of May, meaning May volumes are typically 7 and 12 percent higher than average annual conditions. To provide a conservative assessment, the collected traffic volumes were not adjusted. The MassDOT Seasonal Adjustment Factor file is provided in the Appendix.

The MassDOT *Traffic and Safety Engineering 25% Design Submission Guidelines* were updated on May 31, 2022. These new directives note that traffic volume data collected after March 1, 2022, are no longer subject to any adjustments to represent pre-pandemic traffic volume conditions, except in areas where land use is predominantly office. Therefore, since the traffic volume data were collected in May 2023 and land use in the area is predominantly residential and industrial, COVID adjustments do not need to be applied to the data. Table 1 summarizes the 2023 Existing traffic volumes on the study area roadways, and the 2023 Existing weekday AM and PM peak hour traffic flow networks are provided on Figure 2.

Figure 2
2023 Existing
Peak Hour Traffic Volumes

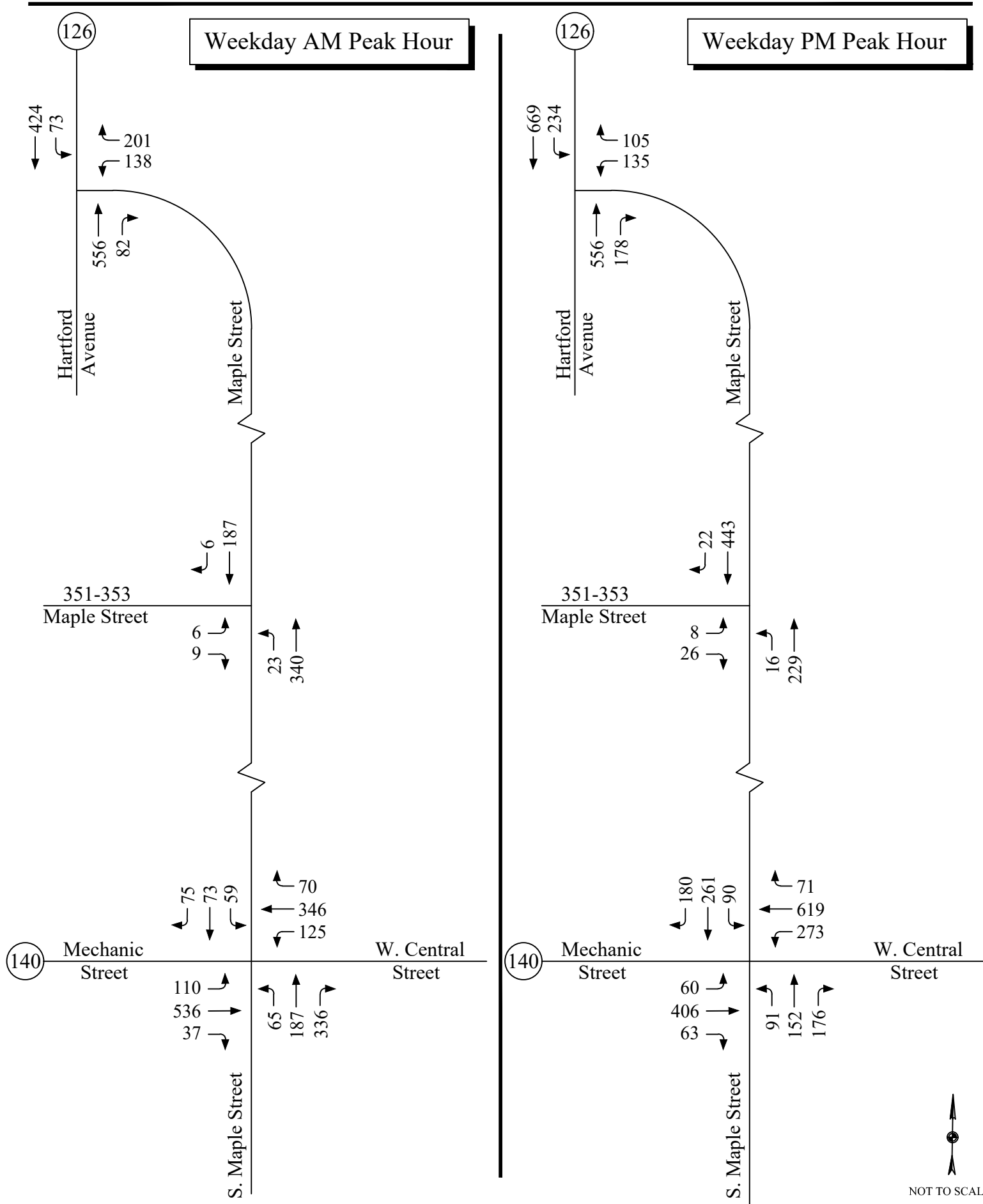


Table 1
Existing Traffic Volume Summary

Location	Daily Volume ^a	Peak Hour Volume ^b	K-Factor ^c	Directional Distribution ^d
Maple Street:				
Weekday	7,482	AM: 559 PM: 714	7.5% 9.5%	65% NB 67% SB

^a In vehicles per day.

^b In vehicles per hour.

^c Percentage of daily traffic occurring during the peak hour.

^d NB = northbound, SB = southbound.

As summarized in Table 1, Maple Street, in the vicinity of the project site currently accommodates 7,482 vehicles per day (vpd), including 559 vehicles per hour (vph) during the weekday AM peak hour and 714 vph during the weekday PM peak hour. Traffic is oriented 65 percent northbound during the weekday AM peak hour and 67 percent southbound during the weekday PM peak hour.

Motor Vehicle Crash Analysis

Crash data for the study area intersections were obtained from MassDOT for the period between 2015 and 2019, the most recent five-year period available for reporting purposes at the time this report was prepared, excluding 2020 data which were impacted by lower traffic volumes during the COVID-19 pandemic. A summary of the MassDOT crash data is provided in Table 2. In addition to the summary, crash occurrence should also be compared to the volume of traffic through a particular intersection to determine any significance. Accordingly, the crash rate was calculated for the study area intersections and compared with the statewide and district-wide (District 3) averages. An intersection crash rate is a measure of the frequency of accidents compared to the volume of traffic through an intersection and is presented in crashes per million entering vehicles (crash/mev). For signalized and unsignalized intersections, the statewide average crash rate is 0.78 crash /mev and 0.57 acc/mev, respectively. The District 3 crash rates are 0.89 crash /mev and 0.61 crash /mev, respectively. A comparison of the calculated crash rate to the statewide and district-wide averages can be used to establish the significance of crash occurrence and whether or not potential safety problems exist. The crash rate worksheets are provided in the Appendix.

Table 2
Crash Summary

Location	Number of Crashes			Severity ^a			Crash Type ^b						% During Wet/Icy Conditions
	Total	Avg./Year	Crash Rate ^c	PD	PI	F	CM	RE	HO	SV	SS	Ped	
Maple Street at Mechanic Street/ West Central Street	25	5.0	0.53	18	7	0	3	16	2	1	3	0	28%
Maple Street at Hartford Avenue	9	1.8	0.25	9	0	0	0	8	0	1	0	0	22%
Maple Street at 351 Maple St. Driveway	0	0.0	0.00	0	0	0	0	0	0	0	0	0	0%

Source: MassDOT Traffic Operations Safety Management System – 2015 through 2019 data.

^a PD = property damage only; PI = personal injury; F = fatality.

^b CM = cross movement/angle; RE = rear end; HO = head on; SV = single vehicle; SS = sideswipe; Ped = pedestrian.

^c Measured in crashes per million entering vehicles.

As presented in Table 2, the intersection of Maple Street with Mechanic Street and West Central Street experienced a total of 25 motor vehicle crashes over the five-year review period, averaging approximately 5.0 crashes per year. The calculated crash rate of 0.53 crashes/mev falls below both the district-wide and statewide average crash rates. Of the 25 reported collisions, 18 resulted in property damage only, with 7 resulting in personal injury. No fatalities were reported over the five-year review period. The majority of crashes (16 out of 25) involved rear-end collisions. Approximately one quarter of the reported collisions occurred on a wet or icy pavement surface. It is noted that this location is not listed as a MassDOT Highway Safety Improvement Program (HSIP) high crash location cluster.

The intersection of Maple Street with Hartford Avenue experienced a total of 9 motor vehicle crashes over the five-year review period, averaging approximately 1.8 crashes per year. The calculated crash rate of 0.25 crashes/mev falls well below both the district-wide and statewide average crash rates. All of the reported collisions resulted in property damage only, no personal injuries or fatalities reported. The majority of crashes (8 out of 9) involved rear-end collisions. Approximately one quarter of the reported collisions occurred on a wet or icy pavement surface. It is noted that this location is not listed as a MassDOT Highway Safety Improvement Program (HSIP) high crash location cluster.

The 351 Maple Street driveway intersection reported no motor vehicle collisions over the five year review period.

Vehicle Speeds

Speed measurements were conducted along Maple Street over an extended forty-eight hour period in conjunction with the ATR counts conducted along the corridor. The results of the speed measurements are summarized in Table 3.

Table 3
Observed Travel Speeds ^a

<u>Location/Direction</u>	<u>Posted Speed Limit</u>	<u>Average Speed</u>	<u>85th Percentile Speed ^b</u>
Maple Street, adjacent to the site			
Northbound	35	36	41
Southbound	35	39	44

^a In miles per hour (mph).

^b Speed at, or below which 85 percent of all observed vehicles travel.

As shown in Table 3, the average travel speed along Maple Street, in the vicinity of the site exceeds the posted speed limit of 35 miles per hour (mph), with observed average speeds of 36 mph traveling northbound and 39 mph traveling southbound. The 85th percentile speed, which is utilized for roadway design and the determination of required sight distances, was calculated to be 41 mph in the northbound direction and 44 mph in the southbound direction. As such, the higher 85th percentile travel speed was utilized for analysis purposes, as described below.

Sight Distance

To identify potential safety concerns associated with site access and egress, sight distances have been evaluated at the proposed site driveway intersection with Maple Street to determine if the available sight distances for vehicles exiting the site meet or exceed the minimum distances required for approaching vehicles to safely stop. The available sight distances were compared with minimum requirements, as established by the American Association of State Highway and Transportation Officials (AASHTO).¹ AASHTO is the national standard by which vehicle sight distance is calculated, measured, and reported. The MassDOT and the Executive Office of Energy and Environmental Affairs (EEA) require the use of AASHTO sight distance standards when preparing traffic impact assessments and studies, as stated in their guidelines for traffic impact assessments.

¹A *Policy on Geometric Design of Highways and Streets, 7th Edition*; American Association of State Highway and Transportation Officials (AASHTO); 2018.

Sight distance is the length of roadway ahead that is visible to the driver. Stopping Sight Distance (SSD) is the minimum distance required for a vehicle traveling at a certain speed to safely stop before reaching a stationary object in its path. The values are based on a driver perception and reaction time of 2.5 seconds and a braking distance calculated for wet, level pavements. When the roadway is either on an upgrade or downgrade, grade correction factors are applied. Stopping sight distance is measured from an eye height of 3.5 feet to an object height of 2 feet above street level, equivalent to the taillight height of a passenger car. The SSD is measured along the centerline of the traveled way of the major road.

Intersection sight distance (ISD) is provided on minor street approaches to allow the drivers of stopped vehicles a sufficient view of the major roadway to decide when to enter the major roadway. By definition, ISD is the minimum distance required for a motorist exiting a minor street to turn onto the major street, without being overtaken by an approaching vehicle reducing its speed from the design speed to 70 percent of the design speed. ISD is measured from an eye height of 3.5 feet to an object height of 3.5 feet above street level. The use of an object height equal to the driver eye height makes intersection sight distances reciprocal (i.e., if one driver can see another vehicle, then the driver of that vehicle can also see the first vehicle). When the minor street is on an upgrade that exceeds 3 percent, grade correction factors are applied.

SSD is generally more important as it represents the minimum distance required for safe stopping while ISD is based only upon acceptable speed reductions to the approaching traffic stream. However, the ISD must be equal to or greater than the minimum required SSD in order to provide safe operations at the intersection. In accordance with the AASHTO manual, *“If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, this may require a major-road vehicle to stop or slow to accommodate the maneuver by a minor-road vehicle. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road.”* Accordingly, ISD should be at least equal to the distance required to allow a driver approaching the minor road to safely stop.

The available intersection sight distances at the proposed site driveway intersection with Maple Street were measured and compared to minimum requirements as established by AASHTO based on the posted speed limit as this is higher than the observed speeds and are shown in Table 4. It is noted that under existing conditions, overgrown vegetation exists along the east side of Maple Street, within the project’s property limits.

Table 4
Sight Distance Summary

Location/Direction	Sight Distance (feet)		
	Measured ^a	Minimum Required (SSD) ^b	Desirable (ISD) ^c
Maple Street at Site Drive			
North of intersection	450+	350	390
South of intersection	550+	320	335

^a Distances provided assume removal of existing vegetation along the site's Maple Street frontage in conjunction with the site development.

^b Values based on AASHTO SSD requirements for the 85th percentile travel speed of 41 mph northbound and 44 mph southbound.

^c Values based on AASHTO ISD requirements for posted speed limit of 35 mph on Maple Street.

The site will provide a single driveway onto the eastern side of Maple Street opposite the location of the current site driveway to the 351-353 Maple Street property. As shown in Table 4, the available sight distances will exceed both the minimum SSD requirements as well as the desirable ISD in both directions, assuming the clearing of existing vegetation along the east side of Maple Street along the property frontage. Accordingly, safe operation of the proposed site driveway can be expected. To ensure the above sight lines are maintained, it is recommended that any proposed landscaping or signs in the vicinity of the site driveway be kept low (maximum 2 feet in height from street level), or set back outside the sight triangles (as defined by AASHTO) so as not to impede the available sight distances.

FUTURE CONDITIONS

Traffic Growth

Future traffic conditions were projected to the year 2030, representing a 7-year design horizon consistent with MassDOT requirements for traffic impact analysis and functional design reports for highway improvement projects. To project traffic conditions within this design horizon, two components of traffic growth were included. First, an annual average traffic growth rate was determined to account for general socio-economic growth and smaller development projects (i.e. residential subdivisions) that may impact traffic in the site vicinity. Based on MassDOT Transportation Data Management System information, the closest traffic count station to the site (Station 6375) is located on Maple Street, north of Interstate 495 (I-495). This counting station shows that traffic in the area has exhibited little growth over the past several years, with volumes typically showing a slight decrease in traffic since volumes were collected prior to the COVID-19

pandemic. Therefore, based on the reviewed data, a conservative one-percent per year growth rate was used to expand the 2023 Existing volumes to 2030 (7-year growth) conditions. This growth rate is consistent with the growth rate utilized for other recent area traffic studies. The MassDOT historical traffic data are provided in the Appendix.

Second, any planned or approved specific developments in the area that would generate a significant volume of traffic on study area roadways within the next seven years were included. Based on discussions with the Town of Bellingham, the following developments were identified and incorporated into the analysis of future traffic conditions.

- ***Warehouse Expansion - 353 Maple Street, Bellingham, MA*** – this project entails an approximate 58,600 sf expansion to an existing warehouse building located at 353 Maple Street. Additional traffic associated with this project, which would also utilize the proposed four-way intersection at Maple Street that serves the proposed project, were incorporated into the analysis of future traffic conditions.
- ***Proposed Warehouse – 206 Mechanic Street, Bellingham, MA*** – this project entails the construction of a new 124,200± sf warehouse at the intersection of Maple Street with Mechanic Street. Additional traffic associated with this project, as well as proposed roadway geometric improvements to Maple Street, as discussed in subsequent sections of this report, were incorporated into the analysis of future traffic operations.
- ***Proposed Residential Development – Mechanic Street, Bellingham, MA*** – this project entails the construction of 115 single-family homes and 54 townhouses off Mechanic Street. Additional traffic associated with this project has been incorporated into the analysis of future traffic operations.
- ***Proposed Curtis Apartments Residential Development – 209 Mechanic Street, Bellingham, MA*** – this project entails the construction of 250 apartments off Mechanic Street. Additional traffic associated with this project has been incorporated into the analysis of future traffic operations. It is noted that a portion of these units were built and occupied at the time of the data collection, however no reduction to the trip generation was applied to provide a conservative assessment of future traffic conditions.
- ***Proposed Warehouse –Mechanic Street, Bellingham, MA*** – this project entails the construction of a new 345,000± sf warehouse off Mechanic Street. Additional traffic associated with this project was incorporated into the analysis of future traffic operations.
- ***Proposed Warehouse – 205-245 Hartford Avenue, Bellingham, MA*** – this project entails the construction of a new 700,000± sf parcel hub warehouse off Hartford Avenue. Additional traffic associated with this project was incorporated into the analysis of future traffic operations.

Proposed Roadway Improvements

The Town of Bellingham and MassDOT were contacted to identify whether there are any planned roadway improvement projects within the study area. Based on these discussions, in conjunction with the 206 Mechanic Street warehouse project, roadway geometric enhancements are proposed at the intersection of Maple Street with Mechanic Street and West Central Street. These improvements include the extension of the existing southbound exclusive right-turn lane on Maple Street to provide in excess of 200 feet of storage. Currently the exclusive right-turn lane is very short and regularly blocked by the adjacent through traffic during peak hours. Future year traffic analyses reflect the implementation of these improvements.

The Boston Region Metropolitan Planning Organization (MPO) conducted a safety and operations study² for the intersection of Hartford Avenue with Maple Street in August 2018, in order to identify potential roadway geometric and traffic signal modifications to improve operations and safety at this location. Three alternatives were identified, which ranged from increasing curb radii and shifting stop lines, to shifting the alignment of Hartford Avenue, to providing an additional turning lane on Maple Street, in conjunction with the other enhancements. The MPO ultimately recommended the third alternative, with additional turning lanes on Maple Street and other improvements on Hartford Avenue. Currently there are no plans to implement these enhancements, and as such they have not been incorporated into the analysis of future traffic conditions.

Lastly, based on discussions with MassDOT, it is anticipated that a future bridge project will entail the replacement of the existing Maple Street bridge over I-495. The timing of this project is not currently identified.

No-Build Conditions

The 2030 No-Build conditions were accordingly developed by applying a compounded 1.0 percent annual growth rate (7.2 percent over seven years) to the existing traffic on the adjacent streets, as well as traffic associated with the aforementioned background development projects and implementation of the improvements to the Maple Street and Mechanic Street intersection. The 2030 No-Build weekday AM and weekday PM peak-hour traffic volumes are shown on Figure 3.

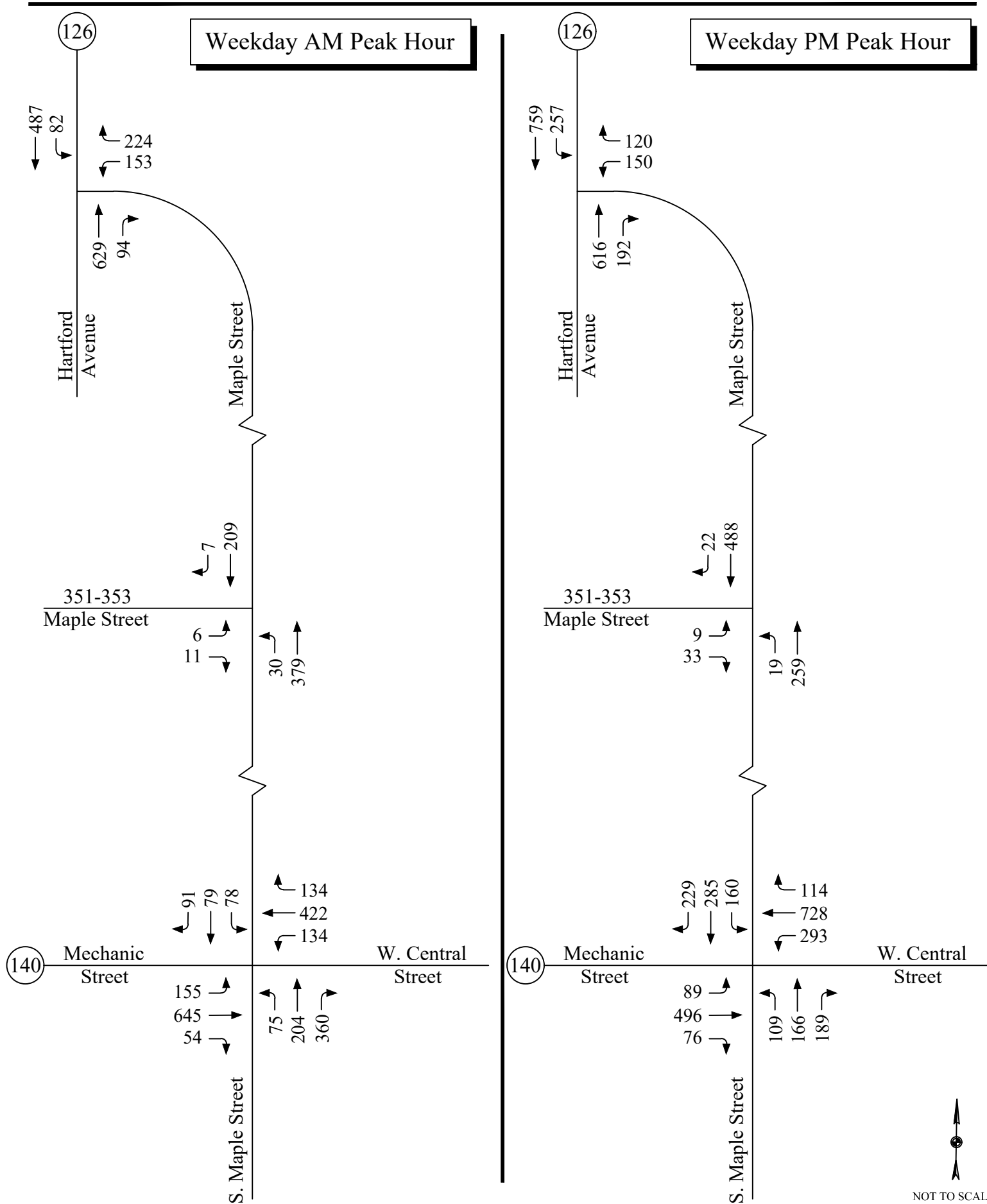
Trip Generation

The traffic to be generated by the proposed development was estimated using the 11th Edition of the ITE *Trip Generation Manual*³. Land Use Code (LUC) 150 – *Warehousing*, trip generation rates were applied to the proposed 59,400± facility. Due to the limited size of the facility, use of

² *Redesign of Hartford Avenue and Maple Street Intersection*, Boston Region Metropolitan Planning Organization; August 27, 2018.

³ *Trip Generation Manual, 11th Edition*; Institute of Transportation Engineers; Washington, DC; 2021.

Figure 3
2030 No Build
Peak Hour Traffic Volumes



ITE trip rates for higher traffic generating warehouses such as sort facilities, ‘last mile’ distribution facilities, or parcel hub distribution warehouses is not appropriate for this project. Table 5 summarizes the expected volume of traffic to be generated by the facility when fully operational, including both automobile trips and truck trips.

Table 5
Trip Generation Summary

Time Period	Automobile Trips ^a	Truck Trips ^a	Total Trips ^a
Weekday Daily	96	36	132
Weekday AM Peak Hour			
Enter	7	1	8
<u>Exit</u>	<u>2</u>	<u>0</u>	<u>2</u>
Total	9	1	10
Weekday PM Peak Hour			
Enter	2	1	3
<u>Exit</u>	<u>7</u>	<u>1</u>	<u>8</u>
Total	9	2	11

^a ITE Land Use Code 150 - Warehousing trip generation data applied to 59,400 sf.

As shown in Table 5, the proposed warehouse is expected to generate 132 total vehicle trips (66 entering and 66 exiting) on a typical weekday, including 36 truck trips (18 entering and 18 exiting). During the weekday AM peak hour the project is expected to generate 10 vehicle trips (8 entering and 2 exiting), including 1 truck trip (1 entering and 0 exiting). During the weekday PM peak hour the project is expected to generate 11 vehicle trips (3 entering and 8 exiting), including 2 truck trips (1 entering and 1 exiting).

Trip Distribution

The distribution of site-generated traffic was determined based on a review of existing traffic patterns within the study area and the anticipated arrival and departure patterns for both commuter and truck traffic. In general, it is expected that 60 percent of employee site-generated traffic will be oriented to and West Central Street, east of Maple Street towards the I-495 interchange; 25 percent to and from Mechanic Street, west of Maple Street; 10 percent to and from Maple Street, north of the site; and 5 percent to and from Maple Street, south of Mechanic Street. The great majority of truck traffic is expected to arrive and depart via the I-495 interchange, via West Central Street, with all peak hour truck trips assumed to arrive and depart via this route. These trip distribution patterns are consistent with the trip distribution patterns utilized for other recent area warehouse traffic assessments.

As described in the *Site Access, Parking and On-Site Circulation* section of this report, it is recommended that proposed site driveway be designed to physically restrict exiting right-turn truck movements from the site, as well as provision of on-site signage to alert truck drivers of this restriction. The site-generated volumes have been assigned accordingly.

Build Conditions

Based on the traffic generation and distribution estimates for this project, the traffic volumes generated by the proposed project were assigned to the roadway network as shown on Figure 4 and were added to the 2030 No-Build traffic volumes to develop the 2030 Build traffic volumes. The 2030 Build weekday AM and weekday PM peak hour traffic volume networks are graphically depicted on Figure 5.

Traffic Increases

Based on the above traffic generation and distribution patterns, the greatest increase in traffic is expected on Maple Street, between the site driveway and Mechanic Street, with increases in the range of 9 to 10 peak hour vehicles. These increases represent, on average, approximately 1 vehicle trip every 5 to 6 minutes. In comparison to No-Build conditions, site-generated traffic results in increases to overall traffic volumes at off-site locations of approximately 0.4 percent or less during peak hours. Smaller increases in traffic are expected during all other hours of the day.

MEPA/MassDOT Thresholds

Maple Street, adjacent to the site, is under Town of Bellingham jurisdiction and the site does not abut any state highway. Accordingly, a Highway Access Permit will not be required from MassDOT for the project. Since no state permits are required for the project, review and approval through the Massachusetts Environmental Policy Act (MEPA) office is also not required.

Site Access

Access to the site is proposed via a new driveway onto Maple Street, opposite the existing driveway for the 351-353 Maple Street driveway. The driveway will provide a single entering and exiting lane of travel, separated by a raised median island. It is recommended that the site driveway approach be placed under stop-sign (MUTCD R1-1) control with a painted stop line provided.

The proposed site access driveway should be designed to accommodate entering truck movements via Maple Street from the south and restrict exiting truck movements to Maple Street to the north. Specifically, it is recommended that a 50-foot radius be provided on the driveway's entrance radius to facilitate entering truck movements from the south. The exit driveway should be designed to

Figure 4
Site Generated Traffic
Peak Hour Traffic Volumes

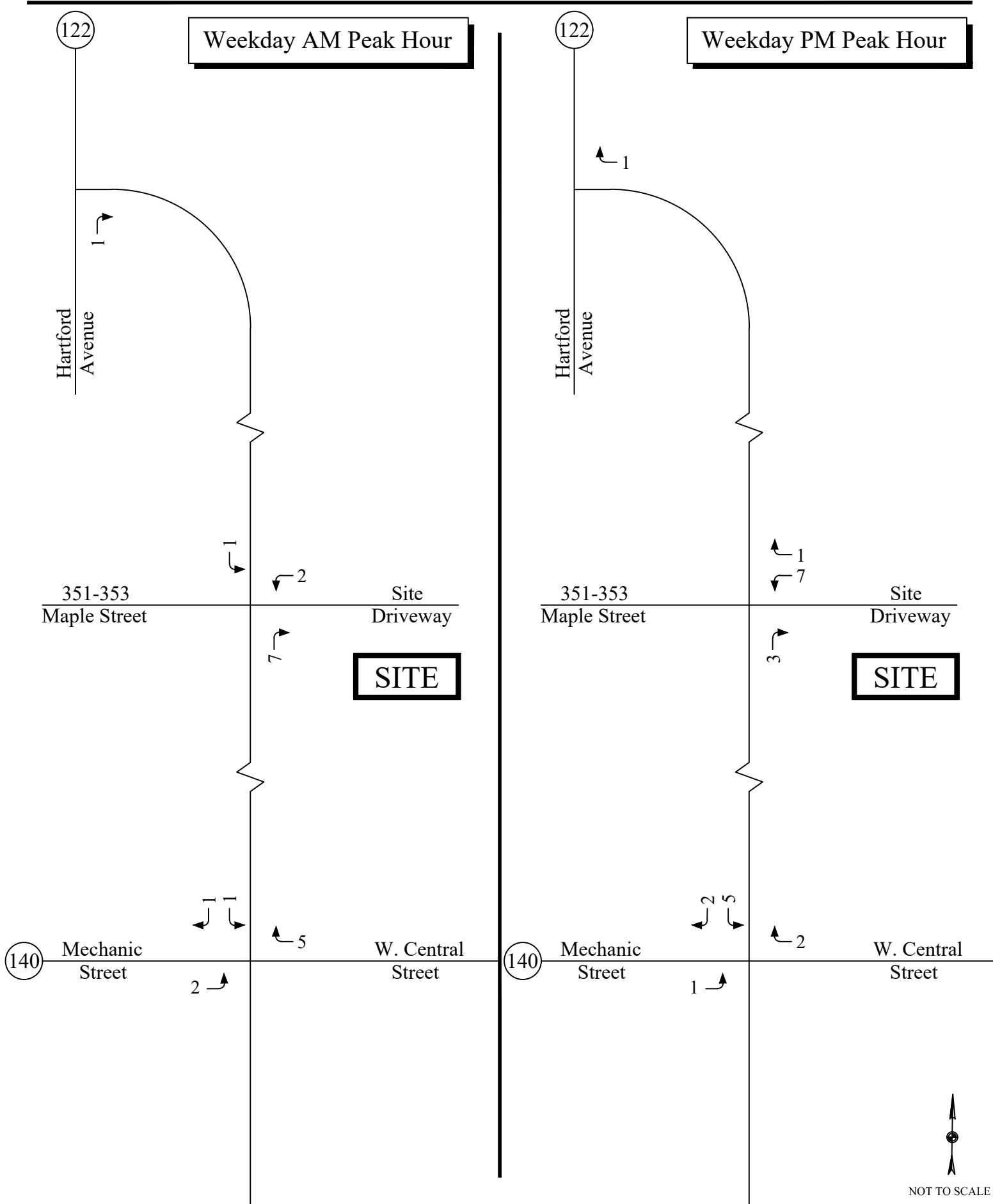
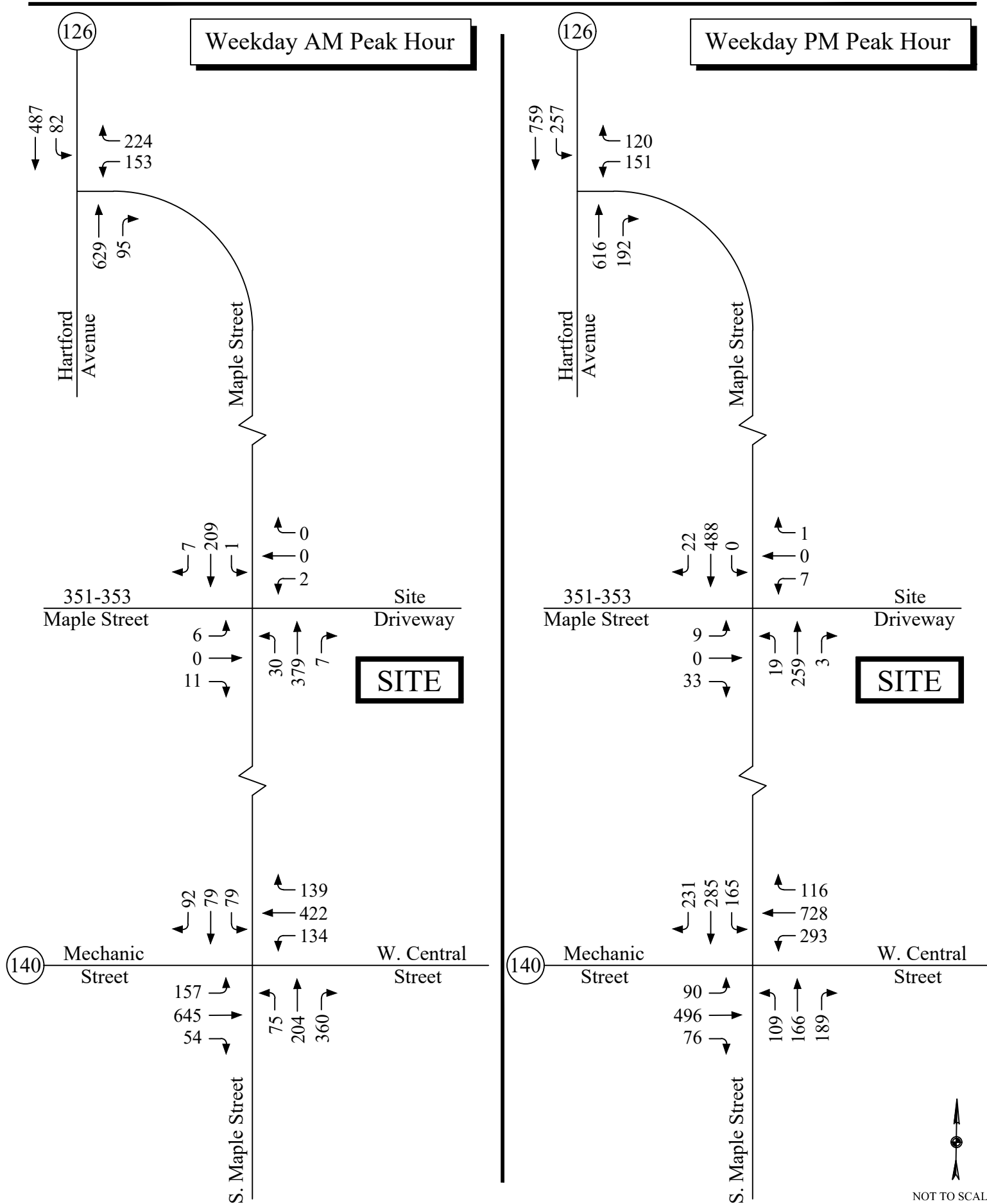


Figure 5
2030 Build
Peak Hour Traffic Volumes



provide only a 10-foot radius, with a scored concrete median constructed on the driveway approach to Maple Street to separate entering and exiting traffic flows. These measures, coupled with the existing raised island within Maple Street, opposite the northbound left-turn lane on Maple Street, will physically prohibit trucks from turning right from the site driveway and require that all exiting trucks turn left. In conjunction with these measures, signage is also recommended on site altering truck drivers of this restriction.

CAPACITY ANALYSIS

Level-of-service (LOS) analyses were conducted at the study area intersection and site driveway under existing and projected volume conditions to determine the effect that the additional site-generated traffic will have on traffic operations. The capacity analysis methodology is based on the concepts and procedures in the *Highway Capacity Manual*⁴ (HCM) and is described in the Appendix. For signalized intersections, the maximum back of queue during an average signal cycle and a 95th percentile signal cycle was calculated for each lane group during the peak periods studied. The back of queue is the length of a backup of vehicles from the stop line of a signalized intersection to the last car in the queue that is required to stop, regardless of the signal indication. The length of this queue depends on a number of factors including signal timing, vehicle arrival patterns, and the saturation flow rate. For unsignalized intersections, the 95th percentile queue represents the length of queue of the critical minor-street movement that is not expected to be exceeded 95 percent of the time during the analysis period (typically one hour). The queue length is a function of the capacity of the movement and the movement's degree of saturation. The capacity and queue analysis results are summarized in Table 6 for the signalized study intersection, and in Table 7 for the site driveway unsignalized intersections. All analysis worksheets are provided in the Appendix.

⁴ *Highway Capacity Manual 2010*; Transportation Research Board; Washington, DC; 2010.

Table 6
Signalized Intersection Level-of-Service Analysis Summary

Location/Peak Hour/Movement	2023 Existing				2030 No-Build				2030 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Maple Street at Mechanic Street and West Central												
<i>Weekday AM Peak Hour</i>												
EB Left	0.33	18.7	B	41/78	0.48	20.7	C	65/107	0.49	20.9	C	66/108
EB Through	0.79	31.5	C	283/429	0.86	35.9	D	404/571	0.86	35.9	D	404/571
EB Right	0.06	0.2	A	0/0	0.08	0.6	A	0/4	0.08	0.6	A	0/4
WB Left	0.35	24.0	C	52/89	0.40	27.4	C	55/93	0.40	27.4	C	55/93
WB Through	0.52	22.9	C	174/256	0.60	24.2	C	221/318	0.60	24.2	C	221/318
WB Right	0.12	1.4	A	0/11	0.21	3.3	A	0/32	0.22	3.3	A	0/33
NB Left	0.21	26.0	C	27/76	0.22	30.4	C	40/86	0.22	30.4	C	40/86
NB Through	0.46	37.3	D	102/219	0.56	44.7	D	138/238	0.56	44.7	D	138/238
NB Right	0.50	6.7	A	20/99	0.58	13.2	B	65/167	0.58	13.2	B	65/167
SB Left	0.23	26.6	C	25/70	0.35	33.4	C	42/89	0.36	33.6	C	42/90
SB Through	0.39	28.6	C	60/148	0.20	38.6	D	49/101	0.21	38.6	D	49/101
SB Right	--	--	--	--	0.23	1.3	A	0/0	0.24	1.3	A	0/0
Overall	--	23.1	C	--	--	25.8	C	--	--	25.7	C	--
<i>Weekday PM Peak Hour</i>												
EB Left	0.23	20.0	B	27/49	0.33	21.0	C	41/65	0.33	21.0	C	42/65
EB Through	0.71	30.5	C	243/309	0.76	32.7	C	310/376	0.76	32.7	C	310/376
EB Right	0.11	1.5	A	0/7	0.12	1.8	A	0/14	0.12	1.8	A	0/14
WB Left	0.50	25.3	C	103/166	0.58	30.0	C	115/179	0.58	30.0	C	116/179
WB Through	0.76	28.3	C	313/470	0.87	36.1	D	418/662	0.87	36.2	D	418/662
WB Right	0.09	0.7	A	0/5	0.14	2.9	A	0/26	0.15	3.0	A	0/27
NB Left	0.46	32.7	C	45/94	0.52	37.0	D	60/109	0.52	37.0	D	60/109
NB Through	0.44	38.5	D	93/171	0.49	42.7	D	110/183	0.50	42.8	D	110/183
NB Right	0.27	3.1	A	0/31	0.28	3.5	A	0/39	0.28	3.5	A	0/39
SB Left	0.28	27.8	C	40/92	0.54	36.2	D	90/151	0.56	37.0	C	93/156
SB Through	1.16	131.0	F	344/626	0.72	50.2	D	202/368	0.72	50.	D	203/368
SB Right	--	--	--	--	0.48	8.7	A	0/69	0.48	8.7	A	0/70
Overall	--	43.8	D	--	--	29.8	C	--	--	29.8	C	--

^a Volume-to-capacity ratio

^b Average control delay in seconds per vehicle

^c Level of service

^d Average/95th percentile queue in feet, assuming 25 feet per vehicle

Table 6 (continued)
Signalized Intersection Level-of-Service Analysis Summary

Location/Peak Hour/Movement	2023 Existing				2030 No-Build				2030 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Maple Street at Hartford Avenue												
<i>Weekday AM Peak Hour</i>												
WB All	0.74	29.1	C	123/214	0.78	31.5	C	146/249	0.78	31.5	C	146/249
NB All	0.71	22.8	C	253/575	0.84	30.4	C	340/700	0.84	30.5	C	341/701
SB Left	0.21	7.9	A	12/36	0.29	9.6	A	15/40	0.29	9.7	A	15/40
SB	0.39	8.8	A	89/201	0.46	10.3	B	121/242	0.46	10.3	B	121/242
Overall	--	19.5	B	--	--	23.8	C	--	--	23.9	C	--
<i>Weekday PM Peak Hour</i>												
WB All	0.66	29.2	C	101/163	0.67	29.5	C	106/184	0.67	29.6	C	106/184
NB All	0.87	34.1	C	307/700	0.99	53.3	D	387/812	0.99	53.6	D	387/814
SB Left	0.66	22.2	C	63/153	0.69	23.9	C	72/169	0.69	23.9	C	72/169
SB	0.59	10.0	B	159/347	0.66	11.8	B	196/432	0.66	11.8	B	196/434
Overall	--	23.2	C	--	--	31.4	C	--	--	31.5	C	--

^a Volume-to-capacity ratio

^b Average control delay in seconds per vehicle

^c Level of service

^d Average/95th percentile queue in feet, assuming 25 feet per vehicle

As shown in Table 6, the intersection of Maple Street with Mechanic Street and West Central Street currently operates at an overall LOS C during the weekday AM peak hour and at an overall LOS D during the weekday PM peak hour. Under future 2030 No-Build conditions, following the implementation of roadway improvements by others, this location is projected to operate at an overall LOS C during both peak periods. Under future 2030 Build conditions, this location is projected to continue to operate at an overall LOS C, with negligible increases in delay as compared to 2030 No-Build conditions.

The intersection of Maple Street with Hartford Avenue currently operates at an overall LOS B during the weekday AM peak hour and an overall LOS C during the weekday PM peak hour. Under 2030 No-Build conditions, this location is projected to operate at LOS C during both peak periods. Under 2030 Build conditions, this location is projected to continue to operate at an overall LOS C, with negligible increases in delay as compared to 2030 No-Build conditions.

Table 7
Unsignalized Intersection Level-of-Service Analysis Summary

Location/Peak Hour/Movement	2023 Existing				2030 No-Build				2030 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Maple Street at 351-353 Maple Street Drive/ Site Drive												
<i>Weekday AM Peak Hour</i>												
EB All	0.03	11.8	B	0	0.04	12.2	B	0	0.04	12.7	B	0
WB All	--	--	--	--	--	--	--	--	0.01	18.1	C	0
NB Left	0.02	7.8	A	0	0.03	7.9	A	0	0.03	7.9	A	0
NB	0.00	0.0	A	0	0.00	0.0	A	0	0.00	0.0	A	0
SB All	0.00	0.0	A	0	0.00	0.0	A	0	0.00	0.0	A	0
<i>Weekday PM Peak Hour</i>												
EB All	0.08	12.4	B	0	0.10	13.2	B	0	0.11	13.7	B	0
WB All	--	--	--	--	--	--	--	--	0.03	18.8	C	0
NB Left	0.02	8.4	A	0	0.02	8.6	A	0	0.02	8.6	A	0
NB	0.00	0.0	A	0	0.00	0.0	A	0	0.00	0.0	A	0
SB All	0.00	0.0	A	0	0.00	0.0	A	0	0.00	0.0	A	0

^a Volume-to-capacity ratio

^b Average control delay in seconds per vehicle

^c Level of service

^d 95th percentile queue in feet, assuming 25 feet per vehicle

As shown in in Table 7, mainline traffic operations along Maple Street, at its intersection with the 351-353 Maple Street driveway, currently operate at LOS A and are projected to continue to operate at LOS A under future 2030 No-Build and Build conditions. Under future Build conditions, traffic volumes exiting the site are projected to operate at an acceptable LOS C during both peak periods, with minimal queuing amounting to less than 1 vehicle on average.

CONCLUSIONS AND RECOMMENDATIONS

Existing and future conditions at the study area intersections have been described and analyzed with respect to traffic operations and the impact of the proposed site development. Conclusions of this effort and recommendations are presented below.

- The project entails the construction of an approximate 59,400± sf warehouse facility at 306 Maple Street in Bellingham.
- Access to the site is proposed via a new driveway onto the eastern side of Maple Street opposite the existing driveway for the 351-353 Maple Street property.

- This traffic study focuses on the impacts of the project at the intersections of Maple Street with Mechanic Street/West Central Street, Maple Street with Hartford Avenue, and the proposed site access opposite the 351-353 Maple Street driveway.
- No safety deficiencies were identified within the study area, with all locations exhibiting crash rates below MassDOT average crash rates, and no collisions reported at the proposed site area over the five-year review period.
- Future traffic conditions were projected to the year 2030 consistent with MassDOT requirements for traffic impact analysis. These traffic projections were made by accounting for the anticipated growth in area traffic, including a number of area background developments.
- Following the removal of overgrown vegetation along the site frontage in conjunction with the site development, minimum required and desirable sight distances are exceeded at the site driveway intersection with Maple Street, thereby allowing safe operation.
- It is recommended that any proposed landscaping, fencing or signs in the vicinity of the driveways be kept low (maximum 2 feet in height from street level), or set back sufficiently so as not to impede the available sight distances.
- The proposed warehouse is expected to generate 132 total vehicle trips (66 entering and 66 exiting) on a typical weekday, including 36 truck trips (18 entering and 18 exiting). During the weekday AM peak hour the project is expected to generate 10 vehicle trips (8 entering and 2 exiting), including 1 truck trip (1 entering and 0 exiting). During the weekday PM peak hour the project is expected to generate 11 vehicle trips (3 entering and 8 exiting), including 2 truck trips (1 entering and 1 exiting).
- The greatest increase in traffic will be experienced on the segment of Maple Street, between the site driveway and Mechanic Street, and will amount to approximately 1 additional vehicle trips every 5 to 6 minutes.
- Traffic operations analyses indicate the above increases in traffic along study area roadways do not result in notable impacts at the study area intersections. All intersections are expected to operate at acceptable overall levels of service under future No-Build and Build conditions, with project-related traffic resulting in negligible increases to overall delays.
- Queue lengths on the site driveway are projected to extend less than one vehicle on average, which can be accommodated on site without impacting on site circulation.
- The site abuts Maple Street, which is under local Town of Bellingham jurisdiction, and therefore a Highway Access Permit from MassDOT will not be required for the project. Since no state permits are required for the project, review and approval through the MEPA office is also not required.

- Access to the site is proposed via a new driveway onto Maple Street, opposite the existing driveway for the 351-353 Maple Street driveway. The driveway will provide a single entering and exiting lane of travel, separated by a scored concrete median island. It is recommended that the site driveway approach be placed under stop-sign (MUTCD R1-1) control with a painted stop line provided.
- The proposed site access driveway should be designed to accommodate entering truck movements from the south and restrict exiting truck movements to Maple Street to the north. Specifically, it is recommended that a 50-foot radius be provided on the driveway's entrance to facilitate entering truck movements from the south. The exit driveway should be designed to provide only a 10-foot radius, with a scored concrete median constructed on the driveway approach to Maple Street. These measures, coupled with the existing raised island within Maple Street, opposite the northbound left-turn lane on Maple Street, will physically prohibit trucks from turning right from the site driveway.

With implementation of these measures, safe access to the project will be provided, and the project is expected to result in minimal impact to area traffic operations.

APPENDIX

Traffic Count Data

Traffic Count Adjustment Data

Crash Rate and Trip Generation Worksheets

Capacity Analysis Methodology and Worksheets

Traffic Count Data

306 Maple Street
north of High Street
City, State: Bellingham, MA
Client: Chappell Engineering/ P. Bradley
Site Code: 23032



PDI File #: 239351 ATR-A (Volume-Speed)

Count Date:
Wednesday, May 3, 2023

NB						SB						Combined					
Start Time:	15 min	60 min	15 min	60 min		Start Time:	15 min	60 min	15 min	60 min		Start Time:	15 min	60 min	15 min	60 min	
12:00 AM	4		12:00 PM	74		12:00 AM	9		12:00 PM	40		12:00 AM	13		12:00 PM	114	
12:15 AM	8		12:15 PM	55		12:15 AM	4		12:15 PM	45		12:15 AM	12		12:15 PM	100	
12:30 AM	5		12:30 PM	51		12:30 AM	18		12:30 PM	38		12:30 AM	23		12:30 PM	89	
12:45 AM	2	19	12:45 PM	33	213	12:45 AM	20	51	12:45 PM	62	185	12:45 AM	22	70	12:45 PM	95	398
1:00 AM	3		1:00 PM	42		1:00 AM	22		1:00 PM	42		1:00 AM	25		1:00 PM	84	
1:15 AM	6		1:15 PM	31		1:15 AM	6		1:15 PM	35		1:15 AM	12		1:15 PM	66	
1:30 AM	1		1:30 PM	51		1:30 AM	4		1:30 PM	37		1:30 AM	5		1:30 PM	88	
1:45 AM	5	15	1:45 PM	48	172	1:45 AM	2	34	1:45 PM	49	163	1:45 AM	7	49	1:45 PM	97	335
2:00 AM	1		2:00 PM	60		2:00 AM	1		2:00 PM	50		2:00 AM	2		2:00 PM	110	
2:15 AM	2		2:15 PM	59		2:15 AM	2		2:15 PM	63		2:15 AM	4		2:15 PM	122	
2:30 AM	1		2:30 PM	52		2:30 AM	3		2:30 PM	64		2:30 AM	4		2:30 PM	116	
2:45 AM	1	5	2:45 PM	48	219	2:45 AM	1	7	2:45 PM	66	243	2:45 AM	2	12	2:45 PM	114	462
3:00 AM	8		3:00 PM	68		3:00 AM	4		3:00 PM	55		3:00 AM	12		3:00 PM	123	
3:15 AM	6		3:15 PM	97		3:15 AM	3		3:15 PM	71		3:15 AM	9		3:15 PM	168	
3:30 AM	4		3:30 PM	84		3:30 AM	5		3:30 PM	56		3:30 AM	9		3:30 PM	140	
3:45 AM	4	22	3:45 PM	112	361	3:45 AM	6	18	3:45 PM	51	233	3:45 AM	10	40	3:45 PM	163	594
4:00 AM	6		4:00 PM	87		4:00 AM	9		4:00 PM	56		4:00 AM	15		4:00 PM	143	
4:15 AM	4		4:15 PM	114		4:15 AM	11		4:15 PM	49		4:15 AM	15		4:15 PM	163	
4:30 AM	4		4:30 PM	100		4:30 AM	12		4:30 PM	51		4:30 AM	16		4:30 PM	151	
4:45 AM	1	15	4:45 PM	106	407	4:45 AM	10	42	4:45 PM	63	219	4:45 AM	11	57	4:45 PM	169	626
5:00 AM	14		5:00 PM	105		5:00 AM	19		5:00 PM	69		5:00 AM	33		5:00 PM	174	
5:15 AM	11		5:15 PM	97		5:15 AM	30		5:15 PM	61		5:15 AM	41		5:15 PM	158	
5:30 AM	9		5:30 PM	87		5:30 AM	48		5:30 PM	52		5:30 AM	57		5:30 PM	139	
5:45 AM	13	47	5:45 PM	93	382	5:45 AM	45	142	5:45 PM	50	232	5:45 AM	58	189	5:45 PM	143	614
6:00 AM	9		6:00 PM	72		6:00 AM	56		6:00 PM	57		6:00 AM	65		6:00 PM	129	
6:15 AM	23		6:15 PM	88		6:15 AM	89		6:15 PM	38		6:15 AM	112		6:15 PM	126	
6:30 AM	26		6:30 PM	69		6:30 AM	88		6:30 PM	42		6:30 AM	114		6:30 PM	111	
6:45 AM	37	95	6:45 PM	74	303	6:45 AM	80	313	6:45 PM	54	191	6:45 AM	117	408	6:45 PM	128	494
7:00 AM	44		7:00 PM	47		7:00 AM	73		7:00 PM	46		7:00 AM	117		7:00 PM	93	
7:15 AM	52		7:15 PM	67		7:15 AM	97		7:15 PM	28		7:15 AM	149		7:15 PM	95	
7:30 AM	42		7:30 PM	57		7:30 AM	88		7:30 PM	30		7:30 AM	130		7:30 PM	87	
7:45 AM	42	180	7:45 PM	52	223	7:45 AM	90	348	7:45 PM	45	149	7:45 AM	132	528	7:45 PM	97	372
8:00 AM	47		8:00 PM	47		8:00 AM	100		8:00 PM	23		8:00 AM	147		8:00 PM	70	
8:15 AM	33		8:15 PM	40		8:15 AM	82		8:15 PM	44		8:15 AM	115		8:15 PM	84	
8:30 AM	43		8:30 PM	53		8:30 AM	85		8:30 PM	28		8:30 AM	128		8:30 PM	81	
8:45 AM	49	172	8:45 PM	36	176	8:45 AM	79	346	8:45 PM	15	110	8:45 AM	128	518	8:45 PM	51	286
9:00 AM	35		9:00 PM	26		9:00 AM	79		9:00 PM	15		9:00 AM	114		9:00 PM	41	
9:15 AM	34		9:15 PM	18		9:15 AM	100		9:15 PM	12		9:15 AM	134		9:15 PM	30	
9:30 AM	46		9:30 PM	8		9:30 AM	73		9:30 PM	10		9:30 AM	119		9:30 PM	18	
9:45 AM	43	158	9:45 PM	15	67	9:45 AM	70	322	9:45 PM	6	43	9:45 AM	113	480	9:45 PM	21	110
10:00 AM	41		10:00 PM	14		10:00 AM	45		10:00 PM	7		10:00 AM	86		10:00 PM	21	
10:15 AM	49		10:15 PM	8		10:15 AM	65		10:15 PM	4		10:15 AM	114		10:15 PM	12	
10:30 AM	33		10:30 PM	10		10:30 AM	65		10:30 PM	5		10:30 AM	98		10:30 PM	15	
10:45 AM	62	185	10:45 PM	11	43	10:45 AM	53	228	10:45 PM	7	23	10:45 AM	115	413	10:45 PM	18	66
11:00 AM	71		11:00 PM	6		11:00 AM	49		11:00 PM	2		11:00 AM	120		11:00 PM	8	
11:15 AM	45		11:15 PM	10		11:15 AM	43		11:15 PM	3		11:15 AM	88		11:15 PM	13	
11:30 AM	60		11:30 PM	4		11:30 AM	47		11:30 PM	9		11:30 AM	107		11:30 PM	13	
11:45 AM	59	235	11:45 PM	6	26	11:45 AM	60	199	11:45 PM	3	17	11:45 AM	119	434	11:45 PM	9	43
Total	1148			2592		Total	2050			1808		Total	3198			4400	
Percent	30.70%			69.30%		Percent	53.14%			46.86%		Percent	42.09%			57.91%	
Day Total				3740		Day Total				3858		Day Total				7598	
Peak Hour	10:45 AM			4:15 PM		Peak Hour	7:15 AM			2:30 PM		Peak Hour	7:15 AM			4:15 PM	
Volume	238			425		Volume	375			256		Volume	558			657	
P.H.F.	0.838			0.932		P.H.F.	0.938			0.901		P.H.F.	0.936			0.944	

306 Maple Street
north of High Street
City, State: Bellingham, MA
Client: Chappell Engineering/ P. Bradley
Site Code: 23032



PDI File #: 239351 ATR-A (Volume-Speed)

Count Date:
Thursday, May 4, 2023

NB						SB						Combined					
Start Time:	15 min	60 min	15 min	60 min		Start Time:	15 min	60 min	15 min	60 min		Start Time:	15 min	60 min	15 min	60 min	
12:00 AM	4		12:00 PM	70		12:00 AM	3		12:00 PM	42		12:00 AM	7		12:00 PM	112	
12:15 AM	2		12:15 PM	53		12:15 AM	12		12:15 PM	57		12:15 AM	14		12:15 PM	110	
12:30 AM	4		12:30 PM	52		12:30 AM	16		12:30 PM	44		12:30 AM	20		12:30 PM	96	
12:45 AM	5	15	12:45 PM	51	226	12:45 AM	19	50	12:45 PM	45	188	12:45 AM	24	65	12:45 PM	96	414
1:00 AM	3		1:00 PM	35		1:00 AM	19		1:00 PM	44		1:00 AM	22		1:00 PM	79	
1:15 AM	6		1:15 PM	53		1:15 AM	12		1:15 PM	38		1:15 AM	18		1:15 PM	91	
1:30 AM	7		1:30 PM	58		1:30 AM	1		1:30 PM	47		1:30 AM	8		1:30 PM	105	
1:45 AM	1	17	1:45 PM	50	196	1:45 AM	5	37	1:45 PM	51	180	1:45 AM	6	54	1:45 PM	101	376
2:00 AM	6		2:00 PM	51		2:00 AM	0		2:00 PM	51		2:00 AM	6		2:00 PM	102	
2:15 AM	2		2:15 PM	54		2:15 AM	4		2:15 PM	51		2:15 AM	6		2:15 PM	105	
2:30 AM	7		2:30 PM	54		2:30 AM	4		2:30 PM	55		2:30 AM	11		2:30 PM	109	
2:45 AM	3	18	2:45 PM	53	212	2:45 AM	2	10	2:45 PM	57	214	2:45 AM	5	28	2:45 PM	110	426
3:00 AM	6		3:00 PM	57		3:00 AM	4		3:00 PM	45		3:00 AM	10		3:00 PM	102	
3:15 AM	2		3:15 PM	89		3:15 AM	4		3:15 PM	51		3:15 AM	6		3:15 PM	140	
3:30 AM	1		3:30 PM	94		3:30 AM	3		3:30 PM	65		3:30 AM	4		3:30 PM	159	
3:45 AM	2	11	3:45 PM	98	338	3:45 AM	8	19	3:45 PM	53	214	3:45 AM	10	30	3:45 PM	151	552
4:00 AM	3		4:00 PM	100		4:00 AM	8		4:00 PM	35		4:00 AM	11		4:00 PM	135	
4:15 AM	2		4:15 PM	91		4:15 AM	9		4:15 PM	49		4:15 AM	11		4:15 PM	140	
4:30 AM	2		4:30 PM	80		4:30 AM	11		4:30 PM	65		4:30 AM	13		4:30 PM	145	
4:45 AM	6	13	4:45 PM	96	367	4:45 AM	9	37	4:45 PM	55	204	4:45 AM	15	50	4:45 PM	151	571
5:00 AM	9		5:00 PM	100		5:00 AM	25		5:00 PM	46		5:00 AM	34		5:00 PM	146	
5:15 AM	10		5:15 PM	102		5:15 AM	31		5:15 PM	52		5:15 AM	41		5:15 PM	154	
5:30 AM	4		5:30 PM	94		5:30 AM	42		5:30 PM	50		5:30 AM	46		5:30 PM	144	
5:45 AM	13	36	5:45 PM	82	378	5:45 AM	38	136	5:45 PM	67	215	5:45 AM	51	172	5:45 PM	149	593
6:00 AM	18		6:00 PM	86		6:00 AM	56		6:00 PM	46		6:00 AM	74		6:00 PM	132	
6:15 AM	23		6:15 PM	74		6:15 AM	89		6:15 PM	44		6:15 AM	112		6:15 PM	118	
6:30 AM	19		6:30 PM	75		6:30 AM	90		6:30 PM	52		6:30 AM	109		6:30 PM	127	
6:45 AM	32	92	6:45 PM	76	311	6:45 AM	83	318	6:45 PM	49	191	6:45 AM	115	410	6:45 PM	125	502
7:00 AM	41		7:00 PM	66		7:00 AM	67		7:00 PM	48		7:00 AM	108		7:00 PM	114	
7:15 AM	46		7:15 PM	61		7:15 AM	73		7:15 PM	48		7:15 AM	119		7:15 PM	109	
7:30 AM	43		7:30 PM	52		7:30 AM	80		7:30 PM	41		7:30 AM	123		7:30 PM	93	
7:45 AM	51	181	7:45 PM	63	242	7:45 AM	86	306	7:45 PM	25	162	7:45 AM	137	487	7:45 PM	88	404
8:00 AM	46		8:00 PM	38		8:00 AM	91		8:00 PM	33		8:00 AM	137		8:00 PM	71	
8:15 AM	46		8:15 PM	43		8:15 AM	71		8:15 PM	40		8:15 AM	117		8:15 PM	83	
8:30 AM	45		8:30 PM	57		8:30 AM	73		8:30 PM	24		8:30 AM	118		8:30 PM	81	
8:45 AM	47	184	8:45 PM	26	164	8:45 AM	86	321	8:45 PM	13	110	8:45 AM	133	505	8:45 PM	39	274
9:00 AM	36		9:00 PM	31		9:00 AM	68		9:00 PM	6		9:00 AM	104		9:00 PM	37	
9:15 AM	32		9:15 PM	19		9:15 AM	88		9:15 PM	14		9:15 AM	120		9:15 PM	33	
9:30 AM	26		9:30 PM	13		9:30 AM	66		9:30 PM	17		9:30 AM	92		9:30 PM	30	
9:45 AM	45	139	9:45 PM	22	85	9:45 AM	67	289	9:45 PM	7	44	9:45 AM	112	428	9:45 PM	29	129
10:00 AM	42		10:00 PM	6		10:00 AM	50		10:00 PM	12		10:00 AM	92		10:00 PM	18	
10:15 AM	40		10:15 PM	13		10:15 AM	47		10:15 PM	11		10:15 AM	87		10:15 PM	24	
10:30 AM	44		10:30 PM	13		10:30 AM	50		10:30 PM	5		10:30 AM	94		10:30 PM	18	
10:45 AM	40	166	10:45 PM	11	43	10:45 AM	54	201	10:45 PM	4	32	10:45 AM	94	367	10:45 PM	15	75
11:00 AM	56		11:00 PM	7		11:00 AM	50		11:00 PM	5		11:00 AM	106		11:00 PM	12	
11:15 AM	63		11:15 PM	11		11:15 AM	38		11:15 PM	6		11:15 AM	101		11:15 PM	17	
11:30 AM	58		11:30 PM	7		11:30 AM	51		11:30 PM	3		11:30 AM	109		11:30 PM	10	
11:45 AM	52	229	11:45 PM	4	29	11:45 AM	41	180	11:45 PM	3	17	11:45 AM	93	409	11:45 PM	7	46
Total	1101			2591		Total	1904			1771		Total	3005			4362	
Percent	29.82%			70.18%		Percent	51.81%			48.19%		Percent	40.79%			59.21%	
Day Total				3692		Day Total				3675		Day Total				7367	
Peak Hour	11:00 AM			4:45 PM		Peak Hour	7:15 AM			2:45 PM		Peak Hour	7:15 AM			4:30 PM	
Volume	229			392		Volume	330			218		Volume	516			596	
P.H.F.	0.909			0.961		P.H.F.	0.907			0.838		P.H.F.	0.942			0.968	

306 Maple Street
north of High Street
City, State: Bellingham, MA
Client: Chappell Engineering/ P. Bradley
Site Code: 23032



PDI File #: 239351 ATR-A (Volume-Speed)

Count Date
Wednesday, May 3, 2023

Speed (60-minute)

NB																
Start Time:	1 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70+	Total	85th %ile	Ave Speed
12:00 AM	0	0	0	3	5	7	3	1	0	0	0	0	0	19	41.3	35.5
1:00 AM	0	0	1	2	6	4	2	0	0	0	0	0	0	15	38.0	33.7
2:00 AM	0	0	1	0	2	1	1	0	0	0	0	0	0	5	39.2	33.2
3:00 AM	0	1	3	4	5	5	2	2	0	0	0	0	0	22	40.7	32.5
4:00 AM	0	0	1	2	6	4	1	1	0	0	0	0	0	15	38.7	33.8
5:00 AM	0	0	3	9	9	14	8	4	0	0	0	0	0	47	41.0	35.2
6:00 AM	0	0	1	2	16	38	30	5	2	0	1	0	0	95	43.0	38.7
7:00 AM	0	0	2	4	20	87	58	9	0	0	0	0	0	180	42.0	38.1
8:00 AM	0	0	5	8	24	75	51	9	0	0	0	0	0	172	42.0	37.3
9:00 AM	0	1	0	19	45	73	17	3	0	0	0	0	0	158	39.0	35.2
10:00 AM	1	0	6	29	51	53	37	7	1	0	0	0	0	185	41.0	35.0
11:00 AM	1	1	7	51	57	78	33	6	1	0	0	0	0	235	40.0	34.1
12:00 PM	0	1	8	24	61	82	28	8	1	0	0	0	0	213	40.0	35.1
1:00 PM	0	1	4	12	33	79	36	7	0	0	0	0	0	172	41.0	36.3
2:00 PM	0	0	2	15	37	95	58	10	2	0	0	0	0	219	42.0	37.4
3:00 PM	0	5	4	30	65	176	73	8	0	0	0	0	0	361	41.0	36.0
4:00 PM	3	2	5	24	85	192	91	5	0	0	0	0	0	407	40.1	36.2
5:00 PM	0	0	10	34	78	161	84	14	0	1	0	0	0	382	41.0	36.1
6:00 PM	0	3	6	27	75	117	68	5	2	0	0	0	0	303	41.0	35.8
7:00 PM	0	2	2	28	57	81	41	11	1	0	0	0	0	223	41.0	35.6
8:00 PM	0	0	2	15	61	79	16	2	1	0	0	0	0	176	39.0	34.9
9:00 PM	0	0	3	7	16	30	10	1	0	0	0	0	0	67	40.0	34.7
10:00 PM	0	0	0	6	14	13	10	0	0	0	0	0	0	43	41.0	35.0
11:00 PM	0	0	3	3	7	7	4	2	0	0	0	0	0	26	42.3	34.5
Total	5	17	79	358	835	1551	762	120	11	1	1	0	0	3740	41.0	35.9
Percent	0.13%	0.45%	2.11%	9.57%	22.33%	41.47%	20.37%	3.21%	0.29%	0.03%	0.03%	0.00%	0.00%			

AM Peak	10:00 AM	3:00 AM	11:00 AM	11:00 AM	11:00 AM	7:00 AM	7:00 AM	7:00 AM	6:00 AM		6:00 AM			11:00 AM
Volume	1	1	7	51	57	87	58	9	2	0	1	0	0	235
PM Peak	4:00 PM	3:00 PM	5:00 PM	5:00 PM	4:00 PM	4:00 PM	4:00 PM	5:00 PM	2:00 PM	5:00 PM				4:00 PM
Volume	3	5	10	34	85	192	91	14	2	1	0	0	0	407

15th Percentile:	30.0 MPH	Average Speed:	35.9 MPH	Posted Speed Limit:	35 MPH
50th Percentile:	37.0 MPH	10 MPH Pace:	32 to 41 MPH	Number of Vehicles > 35 MPH:	2200
85th Percentile:	41.0 MPH	Number in Pace:	2615	Percent of Vehicles > 35 MPH:	58.8%
95th Percentile:	44.0 MPH	Percent in Pace:	69.9%		

306 Maple Street
north of High Street
City, State: Bellingham, MA
Client: Chappell Engineering/ P. Bradley
Site Code: 23032



PDI File #: 239351 ATR-A (Volume-Speed)

Count Date
Wednesday, May 3, 2023

Speed (60-minute)

SB																
Start Time:	1 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70+	Total	85th %ile	Ave Speed
12:00 AM	0	1	1	1	13	17	17	1	0	0	0	0	0	51	41.0	36.5
1:00 AM	0	0	0	2	2	10	11	5	2	2	0	0	0	34	47.1	40.8
2:00 AM	0	0	0	1	1	3	1	0	0	1	0	0	0	7	42.4	37.3
3:00 AM	0	1	2	2	1	7	4	1	0	0	0	0	0	18	42.9	34.9
4:00 AM	0	1	1	1	5	6	15	9	4	0	0	0	0	42	48.0	40.9
5:00 AM	0	0	4	10	7	31	65	23	2	0	0	0	0	142	45.9	39.8
6:00 AM	0	0	6	15	7	84	152	45	4	0	0	0	0	313	45.0	40.3
7:00 AM	0	1	11	19	17	126	146	24	4	0	0	0	0	348	43.0	38.5
8:00 AM	0	0	13	10	26	98	168	30	1	0	0	0	0	346	44.0	39.2
9:00 AM	0	1	17	11	24	112	119	31	6	1	0	0	0	322	44.0	38.7
10:00 AM	0	0	4	4	18	87	95	18	1	0	1	0	0	228	43.0	39.3
11:00 AM	0	3	11	3	12	72	76	21	1	0	0	0	0	199	44.0	38.4
12:00 PM	0	0	6	5	20	72	70	12	0	0	0	0	0	185	43.0	38.5
1:00 PM	0	0	2	10	10	59	65	15	1	1	0	0	0	163	43.0	38.9
2:00 PM	0	0	10	9	18	86	88	29	3	0	0	0	0	243	44.0	39.0
3:00 PM	0	1	8	15	16	78	92	21	2	0	0	0	0	233	43.2	38.5
4:00 PM	0	1	12	17	21	59	82	25	2	0	0	0	0	219	44.0	38.0
5:00 PM	0	0	7	23	20	70	93	18	1	0	0	0	0	232	43.4	38.2
6:00 PM	0	0	8	11	16	66	68	22	0	0	0	0	0	191	44.0	38.3
7:00 PM	0	1	5	16	30	46	44	6	0	1	0	0	0	149	42.0	36.3
8:00 PM	0	0	2	5	29	46	20	6	2	0	0	0	0	110	42.0	36.8
9:00 PM	0	0	2	3	10	14	8	5	0	0	1	0	0	43	44.0	37.3
10:00 PM	0	0	0	1	8	9	4	1	0	0	0	0	0	23	40.0	36.7
11:00 PM	0	0	1	0	0	12	3	1	0	0	0	0	0	17	40.6	37.5
Total	0	11	133	194	331	1270	1506	369	36	6	2	0	0	3858	44.0	38.6
Percent	0.00%	0.29%	3.45%	5.03%	8.58%	32.92%	39.04%	9.56%	0.93%	0.16%	0.05%	0.00%	0.00%			

AM Peak
Volume 11:00 AM 9:00 AM 7:00 AM 8:00 AM 7:00 AM 8:00 AM 6:00 AM 9:00 AM 1:00 AM 10:00 AM 7:00 AM
0 3 17 19 26 126 168 45 6 2 1 0 0 348

PM Peak
Volume 3:00 PM 4:00 PM 5:00 PM 7:00 PM 2:00 PM 5:00 PM 2:00 PM 2:00 PM 1:00 PM 9:00 PM 2:00 PM
0 1 12 23 30 86 93 29 3 1 1 0 0 243

15th Percentile:	34.0 MPH	Average Speed:	38.6 MPH	Posted Speed Limit:	35 MPH
50th Percentile:	39.0 MPH	10 MPH Pace:	35 to 44 MPH	Number of Vehicles > 35 MPH:	3025
85th Percentile:	44.0 MPH	Number in Pace:	2776	Percent of Vehicles > 35 MPH:	78.4%
95th Percentile:	47.0 MPH	Percent in Pace:	72.0%		

306 Maple Street
north of High Street
City, State: Bellingham, MA
Client: Chappell Engineering/ P. Bradley
Site Code: 23032



PDI File #: 239351 ATR-A (Volume-Speed)

Count Date
Wednesday, May 3, 2023

Speed (60-minute)																
Combined NB and SB																
Start Time:	1 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70+	Total	85th %ile	Ave Speed
12:00 AM	0	1	1	4	18	24	20	2	0	0	0	0	0	70	41.0	36.3
1:00 AM	0	0	1	4	8	14	13	5	2	2	0	0	0	49	45.0	38.7
2:00 AM	0	0	1	1	3	4	2	0	0	1	0	0	0	12	41.0	35.6
3:00 AM	0	2	5	6	6	12	6	3	0	0	0	0	0	40	42.0	33.6
4:00 AM	0	1	2	3	11	10	16	10	4	0	0	0	0	57	48.0	39.0
5:00 AM	0	0	7	19	16	45	73	27	2	0	0	0	0	189	44.8	38.7
6:00 AM	0	0	7	17	23	122	182	50	6	0	1	0	0	408	44.0	39.9
7:00 AM	0	1	13	23	37	213	204	33	4	0	0	0	0	528	43.0	38.4
8:00 AM	0	0	18	18	50	173	219	39	1	0	0	0	0	518	43.0	38.5
9:00 AM	0	2	17	30	69	185	136	34	6	1	0	0	0	480	43.0	37.5
10:00 AM	1	0	10	33	69	140	132	25	2	0	1	0	0	413	43.0	37.4
11:00 AM	1	4	18	54	69	150	109	27	2	0	0	0	0	434	43.0	36.1
12:00 PM	0	1	14	29	81	154	98	20	1	0	0	0	0	398	42.0	36.7
1:00 PM	0	1	6	22	43	138	101	22	1	1	0	0	0	335	42.0	37.6
2:00 PM	0	0	12	24	55	181	146	39	5	0	0	0	0	462	43.0	38.2
3:00 PM	0	6	12	45	81	254	165	29	2	0	0	0	0	594	42.0	37.0
4:00 PM	3	3	17	41	106	251	173	30	2	0	0	0	0	626	42.0	36.8
5:00 PM	0	0	17	57	98	231	177	32	1	1	0	0	0	614	42.0	36.9
6:00 PM	0	3	14	38	91	183	136	27	2	0	0	0	0	494	42.0	36.8
7:00 PM	0	3	7	44	87	127	85	17	1	1	0	0	0	372	42.0	35.9
8:00 PM	0	0	4	20	90	125	36	8	3	0	0	0	0	286	40.0	35.6
9:00 PM	0	0	5	10	26	44	18	6	0	0	1	0	0	110	42.0	35.7
10:00 PM	0	0	0	7	22	22	14	1	0	0	0	0	0	66	41.0	35.6
11:00 PM	0	0	4	3	7	19	7	3	0	0	0	0	0	43	41.7	35.7
Total	5	28	212	552	1166	2821	2268	489	47	7	3	0	0	7598	43.0	37.3
Percent	0.07%	0.37%	2.79%	7.27%	15.35%	37.13%	29.85%	6.44%	0.62%	0.09%	0.04%	0.00%	0.00%			

AM Peak	10:00 AM	11:00 AM	8:00 AM	11:00 AM	9:00 AM	7:00 AM	8:00 AM	6:00 AM	6:00 AM	1:00 AM	6:00 AM			7:00 AM
Volume	1	4	18	54	69	213	219	50	6	2	1	0	0	528
PM Peak	4:00 PM	3:00 PM	4:00 PM	5:00 PM	4:00 PM	3:00 PM	5:00 PM	2:00 PM	2:00 PM	1:00 PM	9:00 PM			4:00 PM
Volume	3	6	17	57	106	254	177	39	5	1	1	0	0	626

15th Percentile:	32.0 MPH	Average Speed:	37.3 MPH	Posted Speed Limit:	35 MPH
50th Percentile:	38.0 MPH	10 MPH Pace:	34 to 43 MPH	Number of Vehicles > 35 MPH:	5225
85th Percentile:	43.0 MPH	Number in Pace:	5175	Percent of Vehicles > 35 MPH:	68.8%
95th Percentile:	45.0 MPH	Percent in Pace:	68.1%		

306 Maple Street
north of High Street
City, State: Bellingham, MA
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Site Code: 23032



PDI File #: 239351 ATR-A (Volume-Speed)

Count Date
Thursday, May 4, 2023

Speed (60-minute)

NB																
Start Time:	1 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70+	Total	85th %ile	Ave Speed
12:00 AM	0	0	0	2	4	5	3	1	0	0	0	0	0	15	40.0	35.4
1:00 AM	0	0	1	2	4	3	5	1	1	0	0	0	0	17	42.2	36.5
2:00 AM	0	1	3	0	5	6	2	1	0	0	0	0	0	18	39.5	32.9
3:00 AM	0	0	1	2	0	4	3	1	0	0	0	0	0	11	42.0	36.0
4:00 AM	0	0	3	1	4	3	2	0	0	0	0	0	0	13	38.6	32.2
5:00 AM	0	0	1	3	4	14	7	6	1	0	0	0	0	36	45.0	38.4
6:00 AM	0	2	4	13	11	36	23	3	0	0	0	0	0	92	41.0	35.5
7:00 AM	0	1	4	10	28	88	46	3	1	0	0	0	0	181	41.0	36.5
8:00 AM	0	1	8	8	34	92	31	10	0	0	0	0	0	184	40.6	36.2
9:00 AM	1	0	1	12	30	57	33	5	0	0	0	0	0	139	41.0	36.2
10:00 AM	0	0	10	22	30	66	29	8	0	0	0	0	1	166	41.3	35.6
11:00 AM	0	0	16	38	51	87	30	6	1	0	0	0	0	229	40.0	34.2
12:00 PM	0	1	2	23	44	102	49	5	0	0	0	0	0	226	40.3	35.9
1:00 PM	0	1	4	19	53	65	42	11	1	0	0	0	0	196	41.0	36.0
2:00 PM	1	0	2	10	32	88	66	10	3	0	0	0	0	212	42.0	37.5
3:00 PM	0	1	8	25	101	138	56	8	1	0	0	0	0	338	40.0	35.5
4:00 PM	0	0	3	25	63	178	93	4	1	0	0	0	0	367	41.0	36.8
5:00 PM	2	2	5	33	78	175	75	7	1	0	0	0	0	378	40.0	35.9
6:00 PM	0	3	10	25	77	132	59	4	1	0	0	0	0	311	40.0	35.3
7:00 PM	0	1	5	17	47	115	47	9	1	0	0	0	0	242	41.0	36.5
8:00 PM	0	0	0	15	58	68	19	4	0	0	0	0	0	164	39.0	35.1
9:00 PM	0	1	7	4	19	35	17	1	0	0	0	0	1	85	40.4	35.6
10:00 PM	0	0	0	5	13	12	11	2	0	0	0	0	0	43	42.7	36.2
11:00 PM	0	1	1	2	5	9	8	2	1	0	0	0	0	29	42.0	36.8
Total	4	16	99	316	795	1578	756	112	14	0	0	0	2	3692	41.0	35.9
Percent	0.11%	0.43%	2.68%	8.56%	21.53%	42.74%	20.48%	3.03%	0.38%	0.00%	0.00%	0.00%	0.05%			

AM Peak	9:00 AM	6:00 AM	11:00 AM	11:00 AM	11:00 AM	8:00 AM	7:00 AM	8:00 AM	1:00 AM					10:00 AM	11:00 AM
Volume	1	2	16	38	51	92	46	10	1	0	0	0	1	229	

PM Peak	5:00 PM	6:00 PM	6:00 PM	5:00 PM	3:00 PM	4:00 PM	4:00 PM	1:00 PM	2:00 PM					9:00 PM	5:00 PM
Volume	2	3	10	33	101	178	93	11	3	0	0	0	1	378	

15th Percentile:	31.0 MPH	Average Speed:	35.9 MPH	Posted Speed Limit:	35 MPH
50th Percentile:	37.0 MPH	10 MPH Pace:	32 to 41 MPH	Number of Vehicles > 35 MPH:	2203
85th Percentile:	41.0 MPH	Number in Pace:	2639	Percent of Vehicles > 35 MPH:	59.7%
95th Percentile:	43.0 MPH	Percent in Pace:	71.5%		

306 Maple Street
north of High Street
City, State: Bellingham, MA
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Site Code: 23032



PDI File #: 239351 ATR-A (Volume-Speed)

Count Date
Thursday, May 4, 2023

Speed (60-minute)

SB																
Start Time:	1 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70+	Total	85th %ile	Ave Speed
12:00 AM	0	0	4	1	6	20	14	4	1	0	0	0	0	50	41.7	37.3
1:00 AM	0	0	3	2	4	13	7	5	2	1	0	0	0	37	46.6	38.0
2:00 AM	0	0	0	0	2	5	1	2	0	0	0	0	0	10	44.9	39.1
3:00 AM	0	3	1	0	3	5	5	0	1	1	0	0	0	19	43.3	36.1
4:00 AM	0	0	1	1	2	6	14	11	2	0	0	0	0	37	46.0	41.7
5:00 AM	0	0	4	7	9	36	53	21	3	2	0	0	1	136	46.0	40.1
6:00 AM	0	1	12	16	15	97	150	26	1	0	0	0	0	318	43.0	38.9
7:00 AM	0	1	12	17	27	113	122	12	1	1	0	0	0	306	42.0	37.8
8:00 AM	0	2	12	14	33	137	105	16	2	0	0	0	0	321	42.0	37.7
9:00 AM	0	2	16	16	16	138	80	20	0	1	0	0	0	289	42.0	37.3
10:00 AM	0	0	7	8	19	71	84	7	5	0	0	0	0	201	43.0	38.6
11:00 AM	0	0	4	8	16	90	47	13	2	0	0	0	0	180	42.2	38.2
12:00 PM	0	0	5	6	24	68	73	10	2	0	0	0	0	188	43.0	38.4
1:00 PM	0	2	5	6	6	93	57	11	0	0	0	0	0	180	43.0	38.4
2:00 PM	0	0	6	14	14	65	87	27	1	0	0	0	0	214	44.0	39.0
3:00 PM	0	2	9	17	12	78	81	14	1	0	0	0	0	214	42.1	37.8
4:00 PM	0	0	10	14	15	73	72	17	3	0	0	0	0	204	44.0	38.2
5:00 PM	0	1	9	15	26	69	78	14	3	0	0	0	0	215	43.9	37.8
6:00 PM	0	0	8	23	37	60	42	20	1	0	0	0	0	191	44.0	36.6
7:00 PM	0	2	5	13	34	42	49	14	3	0	0	0	0	162	43.0	37.1
8:00 PM	0	0	4	9	26	41	25	5	0	0	0	0	0	110	42.0	36.0
9:00 PM	0	0	3	2	2	22	11	4	0	0	0	0	0	44	43.0	37.6
10:00 PM	0	0	0	1	4	13	11	2	1	0	0	0	0	32	43.0	38.4
11:00 PM	0	0	0	3	3	6	4	1	0	0	0	0	0	17	43.6	36.4
Total	0	16	140	213	355	1361	1272	276	35	6	0	0	1	3675	43.0	38.0
Percent	0.00%	0.44%	3.81%	5.80%	9.66%	37.03%	34.61%	7.51%	0.95%	0.16%	0.00%	0.00%	0.03%			

AM Peak
Volume 3:00 AM 9:00 AM 7:00 AM 8:00 AM 9:00 AM 6:00 AM 6:00 AM 10:00 AM 5:00 AM 5:00 AM 8:00 AM
 0 3 16 17 33 138 150 26 5 2 0 0 1 321

PM Peak
Volume 1:00 PM 4:00 PM 6:00 PM 6:00 PM 1:00 PM 2:00 PM 2:00 PM 4:00 PM 5:00 PM
 0 2 10 23 37 93 87 27 3 0 0 0 0 215

15th Percentile:	33.0 MPH	Average Speed:	38.0 MPH	Posted Speed Limit:	35 MPH
50th Percentile:	39.0 MPH	10 MPH Pace:	35 to 44 MPH	Number of Vehicles > 35 MPH:	2791
85th Percentile:	43.0 MPH	Number in Pace:	2633	Percent of Vehicles > 35 MPH:	75.9%
95th Percentile:	46.0 MPH	Percent in Pace:	71.6%		

306 Maple Street
north of High Street
City, State: Bellingham, MA
Client: Chappell Engineering/ P. Bradley
Site Code: 23032



PDI File #: 239351 ATR-A (Volume-Speed)

Count Date
Thursday, May 4, 2023

Speed (60-minute)																
Combined NB and SB																
Start Time:	1 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70+	Total	85th %ile	Ave Speed
12:00 AM	0	0	4	3	10	25	17	5	1	0	0	0	0	65	41.0	36.9
1:00 AM	0	0	4	4	8	16	12	6	3	1	0	0	0	54	46.1	37.5
2:00 AM	0	1	3	0	7	11	3	3	0	0	0	0	0	28	41.0	35.1
3:00 AM	0	3	2	2	3	9	8	1	1	1	0	0	0	30	43.7	36.0
4:00 AM	0	0	4	2	6	9	16	11	2	0	0	0	0	50	46.0	39.2
5:00 AM	0	0	5	10	13	50	60	27	4	2	0	0	1	172	46.0	39.7
6:00 AM	0	3	16	29	26	133	173	29	1	0	0	0	0	410	43.0	38.1
7:00 AM	0	2	16	27	55	201	168	15	2	1	0	0	0	487	42.0	37.3
8:00 AM	0	3	20	22	67	229	136	26	2	0	0	0	0	505	42.0	37.1
9:00 AM	1	2	17	28	46	195	113	25	0	1	0	0	0	428	42.0	36.9
10:00 AM	0	0	17	30	49	137	113	15	5	0	0	0	1	367	42.1	37.2
11:00 AM	0	0	20	46	67	177	77	19	3	0	0	0	0	409	41.0	36.0
12:00 PM	0	1	7	29	68	170	122	15	2	0	0	0	0	414	42.0	37.0
1:00 PM	0	3	9	25	59	158	99	22	1	0	0	0	0	376	42.0	37.2
2:00 PM	1	0	8	24	46	153	153	37	4	0	0	0	0	426	43.0	38.3
3:00 PM	0	3	17	42	113	216	137	22	2	0	0	0	0	552	42.0	36.4
4:00 PM	0	0	13	39	78	251	165	21	4	0	0	0	0	571	42.0	37.3
5:00 PM	2	3	14	48	104	244	153	21	4	0	0	0	0	593	41.0	36.6
6:00 PM	0	3	18	48	114	192	101	24	2	0	0	0	0	502	41.0	35.8
7:00 PM	0	3	10	30	81	157	96	23	4	0	0	0	0	404	42.0	36.7
8:00 PM	0	0	4	24	84	109	44	9	0	0	0	0	0	274	40.0	35.5
9:00 PM	0	1	10	6	21	57	28	5	0	0	0	0	1	129	41.0	36.3
10:00 PM	0	0	0	6	17	25	22	4	1	0	0	0	0	75	43.0	37.2
11:00 PM	0	1	1	5	8	15	12	3	1	0	0	0	0	46	43.3	36.6
Total	4	32	239	529	1150	2939	2028	388	49	6	0	0	3	7367	42.0	37.0
Percent	0.05%	0.43%	3.24%	7.18%	15.61%	39.89%	27.53%	5.27%	0.67%	0.08%	0.00%	0.00%	0.04%			

AM Peak	9:00 AM	3:00 AM	8:00 AM	11:00 AM	8:00 AM	8:00 AM	6:00 AM	6:00 AM	10:00 AM	5:00 AM				5:00 AM	8:00 AM
Volume	1	3	20	46	67	229	173	29	5	2	0	0	1	505	
PM Peak	5:00 PM	1:00 PM	6:00 PM	5:00 PM	6:00 PM	4:00 PM	4:00 PM	2:00 PM	2:00 PM					9:00 PM	5:00 PM
Volume	2	3	18	48	114	251	165	37	4	0	0	0	1	593	

15th Percentile:	31.0 MPH	Average Speed:	37.0 MPH	Posted Speed Limit:	35 MPH
50th Percentile:	38.0 MPH	10 MPH Pace:	34 to 43 MPH	Number of Vehicles > 35 MPH:	4994
85th Percentile:	42.0 MPH	Number in Pace:	5057	Percent of Vehicles > 35 MPH:	67.8%
95th Percentile:	45.0 MPH	Percent in Pace:	68.6%		

Ron Müller & Associates

Traffic Engineering and Consulting Services

File Name : 23032 Maple St at 351-353 Maple St Drwy AM

Site Code : 23032

E-W Street: 351-353 Maple St Drwy

Start Date : 5/4/2023

N-S Street: Maple Street

Page No : 1

Groups Printed- Cars - Trucks

	Maple Street From North				Maple Street From South				351-353 Maple Street Driveway From West				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
07:00 AM	36	1	1	38	3	67	0	70	1	7	0	8	116
07:15 AM	44	0	0	44	6	80	0	86	1	4	0	5	135
07:30 AM	44	0	0	44	6	81	0	87	4	1	0	5	136
07:45 AM	51	4	0	55	7	87	0	94	1	1	0	2	151
Total	175	5	1	181	22	315	0	337	7	13	0	20	538
08:00 AM	48	2	0	50	4	92	0	96	0	3	0	3	149
08:15 AM	44	2	0	46	3	76	0	79	0	5	0	5	130
08:30 AM	44	1	0	45	9	73	0	82	4	3	0	7	134
08:45 AM	44	5	0	49	13	77	0	90	7	6	0	13	152
Total	180	10	0	190	29	318	0	347	11	17	0	28	565
Grand Total	355	15	1	371	51	633	0	684	18	30	0	48	1103
Apprch %	95.7	4	0.3		7.5	92.5	0		37.5	62.5	0		
Total %	32.2	1.4	0.1	33.6	4.6	57.4	0	62	1.6	2.7	0	4.4	
Cars	312	13	1	326	47	585	0	632	17	19	0	36	994
% Cars	87.9	86.7	100	87.9	92.2	92.4	0	92.4	94.4	63.3	0	75	90.1
Trucks	43	2	0	45	4	48	0	52	1	11	0	12	109
% Trucks	12.1	13.3	0	12.1	7.8	7.6	0	7.6	5.6	36.7	0	25	9.9

Ron Müller & Associates

Traffic Engineering and Consulting Services

File Name : 23032 Maple St at 351-353 Maple St Drwy AM

Site Code : 23032

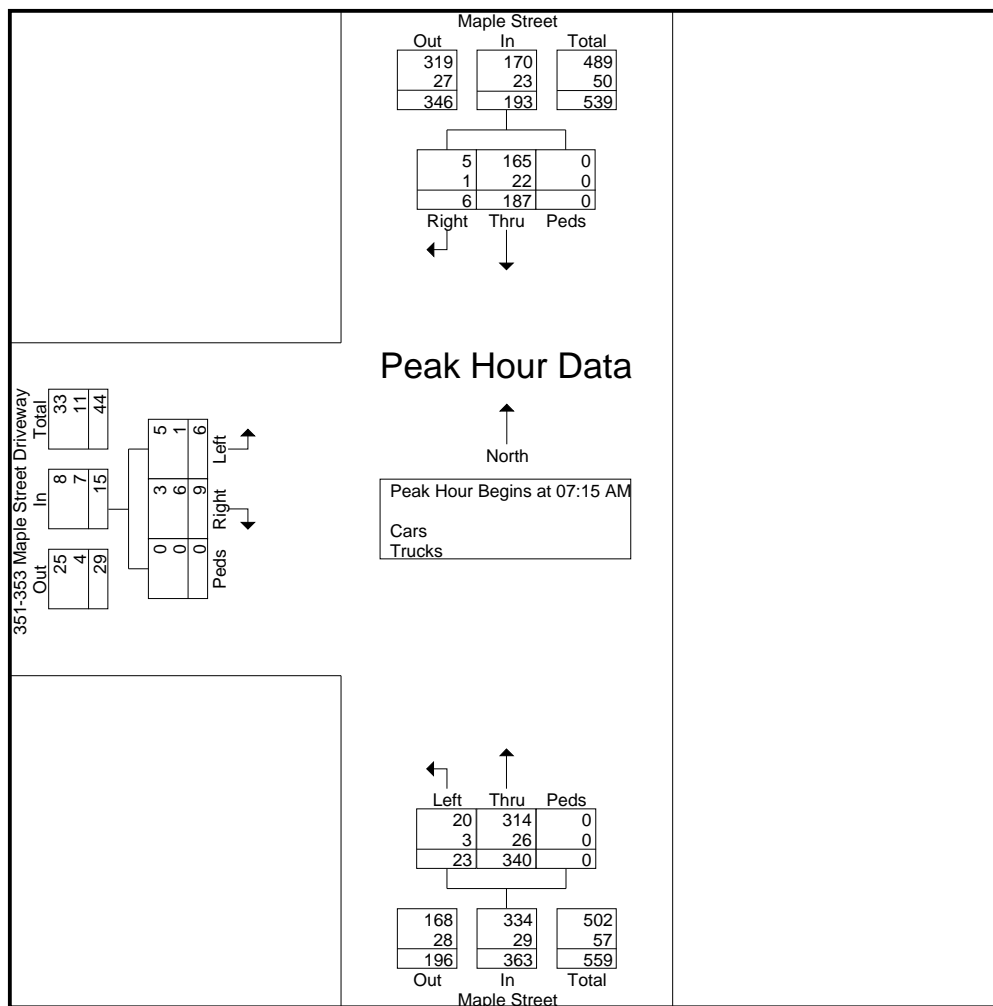
Start Date : 5/4/2023

Page No : 2

E-W Street:351-353 MapleStDrwy

N-S Street:Maple Street

	Maple Street From North				Maple Street From South				351-353 Maple Street Driveway From West				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	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	44	0	0	44	6	80	0	86	1	4	0	5	135
07:30 AM	44	0	0	44	6	81	0	87	4	1	0	5	136
07:45 AM	51	4	0	55	7	87	0	94	1	1	0	2	151
08:00 AM	48	2	0	50	4	92	0	96	0	3	0	3	149
Total Volume	187	6	0	193	23	340	0	363	6	9	0	15	571
% App. Total	96.9	3.1	0		6.3	93.7	0		40	60	0		
PHF	.917	.375	.000	.877	.821	.924	.000	.945	.375	.563	.000	.750	.945
Cars	165	5	0	170	20	314	0	334	5	3	0	8	512
% Cars	88.2	83.3	0	88.1	87.0	92.4	0	92.0	83.3	33.3	0	53.3	89.7
Trucks	22	1	0	23	3	26	0	29	1	6	0	7	59
% Trucks	11.8	16.7	0	11.9	13.0	7.6	0	8.0	16.7	66.7	0	46.7	10.3



Ron Müller & Associates

Traffic Engineering and Consulting Services

File Name : 23032 Maple St at 351-353 Maple St Drwy PM

Site Code : 23032

E-W Street:351-353MapleStDrwy

Start Date : 5/4/2023

N-S Street:Maple St

Page No : 1

Groups Printed- Cars - Trucks

	Maple Street From North				Maple Street From South				351-353 Maple Street Driveway From West				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
04:00 PM	99	2	0	101	2	37	0	39	11	13	0	24	164
04:15 PM	105	7	0	112	3	48	0	51	2	3	0	5	168
04:30 PM	85	5	0	90	1	74	0	75	5	4	0	9	174
04:45 PM	114	3	0	117	3	63	0	66	3	6	0	9	192
Total	403	17	0	420	9	222	0	231	21	26	0	47	698
05:00 PM	112	6	0	118	1	58	0	59	3	7	0	10	187
05:15 PM	110	4	0	114	5	53	0	58	0	5	0	5	177
05:30 PM	107	9	0	116	7	55	0	62	2	8	0	10	188
05:45 PM	79	15	0	94	10	52	0	62	5	13	0	18	174
Total	408	34	0	442	23	218	0	241	10	33	0	43	726
Grand Total	811	51	0	862	32	440	0	472	31	59	0	90	1424
Apprch %	94.1	5.9	0		6.8	93.2	0		34.4	65.6	0		
Total %	57	3.6	0	60.5	2.2	30.9	0	33.1	2.2	4.1	0	6.3	
Cars	805	51	0	856	31	433	0	464	29	57	0	86	1406
% Cars	99.3	100	0	99.3	96.9	98.4	0	98.3	93.5	96.6	0	95.6	98.7
Trucks	6	0	0	6	1	7	0	8	2	2	0	4	18
% Trucks	0.7	0	0	0.7	3.1	1.6	0	1.7	6.5	3.4	0	4.4	1.3

Ron Müller & Associates

Traffic Engineering and Consulting Services

File Name : 23032 Maple St at 351-353 Maple St Drwy PM

Site Code : 23032

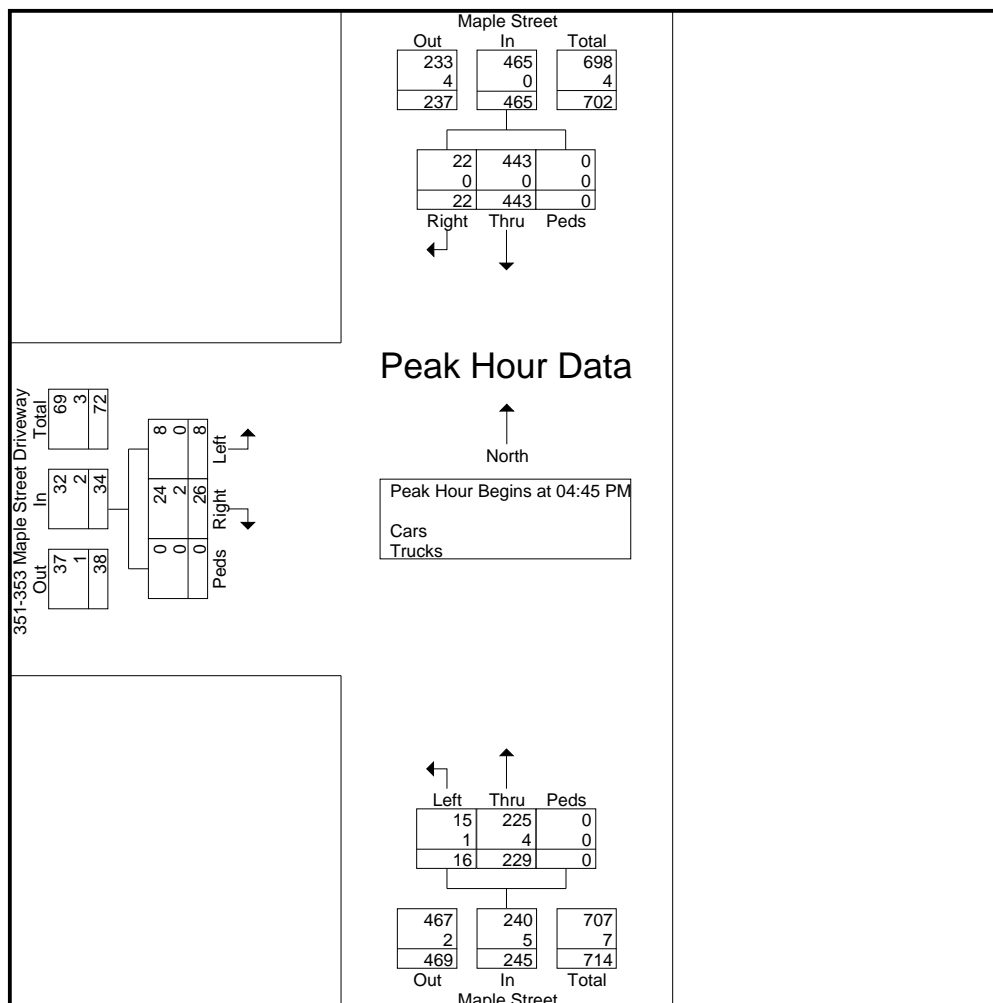
Start Date : 5/4/2023

Page No : 2

E-W Street:351-353MapleStDrwy

N-S Street:Maple St

	Maple Street From North				Maple Street From South				351-353 Maple Street Driveway From West				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	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	114	3	0	117	3	63	0	66	3	6	0	9	192
05:00 PM	112	6	0	118	1	58	0	59	3	7	0	10	187
05:15 PM	110	4	0	114	5	53	0	58	0	5	0	5	177
05:30 PM	107	9	0	116	7	55	0	62	2	8	0	10	188
Total Volume	443	22	0	465	16	229	0	245	8	26	0	34	744
% App. Total	95.3	4.7	0		6.5	93.5	0		23.5	76.5	0		
PHF	.971	.611	.000	.985	.571	.909	.000	.928	.667	.813	.000	.850	.969
Cars	443	22	0	465	15	225	0	240	8	24	0	32	737
% Cars	100	100	0	100	93.8	98.3	0	98.0	100	92.3	0	94.1	99.1
Trucks	0	0	0	0	1	4	0	5	0	2	0	2	7
% Trucks	0	0	0	0	6.3	1.7	0	2.0	0	7.7	0	5.9	0.9



Ron Müller & Associates

Traffic Engineering and Consulting Services

E-W Street:Maple St
N-S Street:RTE 122

File Name : 23032 RTE 122 Hartford Ave at Maple St AM
Site Code : 23032
Start Date : 5/3/2023
Page No : 1

Groups Printed- Cars - Trucks

	RTE 122 Hartford Avenue From North				Maple Street From East				RTE 122 Hartford Avenue From South				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	22	83	0	105	30	36	0	66	152	12	0	164	335
07:15 AM	26	101	0	127	32	45	0	77	143	10	0	153	357
07:30 AM	14	117	0	131	38	41	0	79	150	22	0	172	382
07:45 AM	21	103	0	124	39	51	0	90	147	23	0	170	384
Total	83	404	0	487	139	173	0	312	592	67	0	659	1458
08:00 AM	19	94	0	113	30	50	0	80	131	17	0	148	341
08:15 AM	19	110	0	129	31	59	0	90	128	20	0	148	367
08:30 AM	18	113	0	131	39	41	0	80	123	12	0	135	346
08:45 AM	35	103	0	138	34	61	0	95	127	13	0	140	373
Total	91	420	0	511	134	211	0	345	509	62	0	571	1427
Grand Total	174	824	0	998	273	384	0	657	1101	129	0	1230	2885
Apprch %	17.4	82.6	0		41.6	58.4	0		89.5	10.5	0		
Total %	6	28.6	0	34.6	9.5	13.3	0	22.8	38.2	4.5	0	42.6	
Cars	157	750	0	907	253	344	0	597	1002	120	0	1122	2626
% Cars	90.2	91	0	90.9	92.7	89.6	0	90.9	91	93	0	91.2	91
Trucks	17	74	0	91	20	40	0	60	99	9	0	108	259
% Trucks	9.8	9	0	9.1	7.3	10.4	0	9.1	9	7	0	8.8	9

Ron Müller & Associates

Traffic Engineering and Consulting Services

File Name : 23032 RTE 122 Hartford Ave at Maple St AM

Site Code : 23032

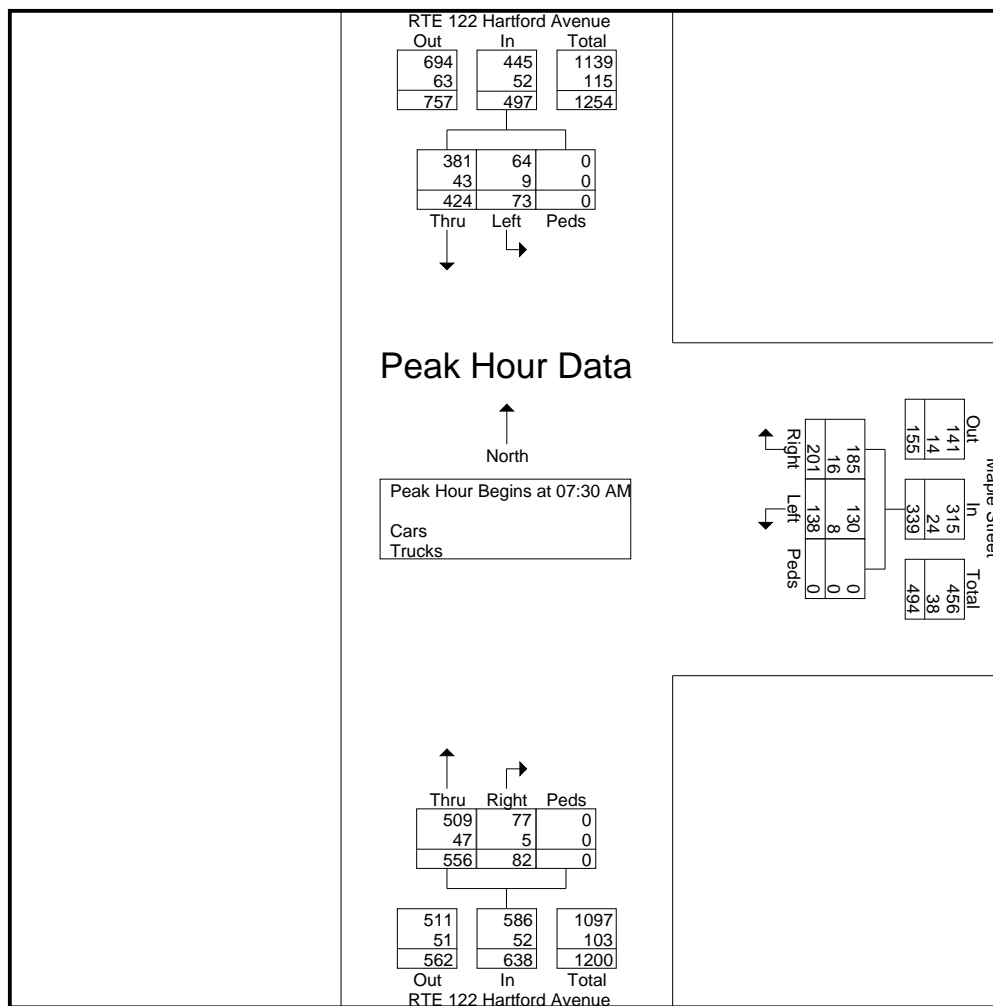
Start Date : 5/3/2023

Page No : 2

E-W Street:Maple St

N-S Street:RTE 122

	RTE 122 Hartford Avenue From North				Maple Street From East				RTE 122 Hartford Avenue From South				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	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 07:30 AM													
07:30 AM	14	117	0	131	38	41	0	79	150	22	0	172	382
07:45 AM	21	103	0	124	39	51	0	90	147	23	0	170	384
08:00 AM	19	94	0	113	30	50	0	80	131	17	0	148	341
08:15 AM	19	110	0	129	31	59	0	90	128	20	0	148	367
Total Volume	73	424	0	497	138	201	0	339	556	82	0	638	1474
% App. Total	14.7	85.3	0		40.7	59.3	0		87.1	12.9	0		
PHF	.869	.906	.000	.948	.885	.852	.000	.942	.927	.891	.000	.927	.960
Cars	64	381	0	445	130	185	0	315	509	77	0	586	1346
% Cars	87.7	89.9	0	89.5	94.2	92.0	0	92.9	91.5	93.9	0	91.8	91.3
Trucks	9	43	0	52	8	16	0	24	47	5	0	52	128
% Trucks	12.3	10.1	0	10.5	5.8	8.0	0	7.1	8.5	6.1	0	8.2	8.7



Ron Müller & Associates

Traffic Engineering and Consulting Services

E-W Street:Maple St
N-S Street:RTE 122

File Name : 23032 RTE 122 Hartford Ave at Maple St PM
Site Code : 23032
Start Date : 5/11/2023
Page No : 1

Groups Printed- Cars - Trucks

	Hartford Avenue/RTE 122 From North				Maple Street From East				Hartford Avenue/RTE 122 From South				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	50	202	0	252	32	35	0	67	145	44	1	190	509
04:15 PM	64	149	0	213	32	27	0	59	157	37	0	194	466
04:30 PM	57	155	0	212	44	26	0	70	120	42	2	164	446
04:45 PM	63	163	0	226	25	17	1	43	134	50	0	184	453
Total	234	669	0	903	133	105	1	239	556	173	3	732	1874
05:00 PM	53	148	1	202	36	25	0	61	146	44	1	191	454
05:15 PM	76	165	2	243	46	32	2	80	132	25	0	157	480
05:30 PM	50	187	0	237	32	23	0	55	135	32	2	169	461
05:45 PM	53	170	0	223	27	24	0	51	147	35	0	182	456
Total	232	670	3	905	141	104	2	247	560	136	3	699	1851
Grand Total	466	1339	3	1808	274	209	3	486	1116	309	6	1431	3725
Apprch %	25.8	74.1	0.2		56.4	43	0.6		78	21.6	0.4		
Total %	12.5	35.9	0.1	48.5	7.4	5.6	0.1	13	30	8.3	0.2	38.4	
Cars	446	1300	3	1749	268	203	3	474	1089	303	6	1398	3621
% Cars	95.7	97.1	100	96.7	97.8	97.1	100	97.5	97.6	98.1	100	97.7	97.2
Trucks	20	39	0	59	6	6	0	12	27	6	0	33	104
% Trucks	4.3	2.9	0	3.3	2.2	2.9	0	2.5	2.4	1.9	0	2.3	2.8

Ron Müller & Associates

Traffic Engineering and Consulting Services

File Name : 23032 RTE 122 Hartford Ave at Maple St PM

Site Code : 23032

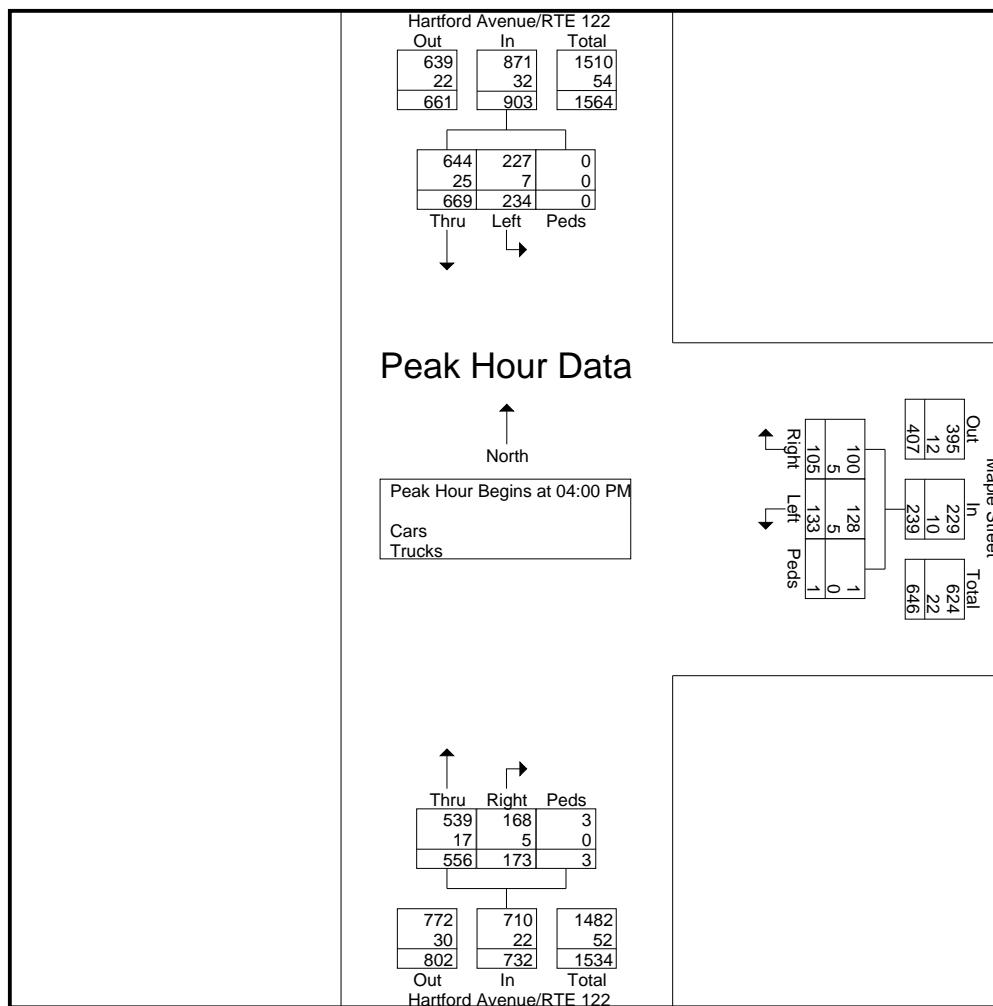
Start Date : 5/11/2023

Page No : 2

E-W Street:Maple St

N-S Street:RTE 122

	Hartford Avenue/RTE 122 From North				Maple Street From East				Hartford Avenue/RTE 122 From South				
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	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	50	202	0	252	32	35	0	67	145	44	1	190	509
04:15 PM	64	149	0	213	32	27	0	59	157	37	0	194	466
04:30 PM	57	155	0	212	44	26	0	70	120	42	2	164	446
04:45 PM	63	163	0	226	25	17	1	43	134	50	0	184	453
Total Volume	234	669	0	903	133	105	1	239	556	173	3	732	1874
% App. Total	25.9	74.1	0		55.6	43.9	0.4		76	23.6	0.4		
PHF	.914	.828	.000	.896	.756	.750	.250	.854	.885	.865	.375	.943	.920
Cars	227	644	0	871	128	100	1	229	539	168	3	710	1810
% Cars	97.0	96.3	0	96.5	96.2	95.2	100	95.8	96.9	97.1	100	97.0	96.6
Trucks	7	25	0	32	5	5	0	10	17	5	0	22	64
% Trucks	3.0	3.7	0	3.5	3.8	4.8	0	4.2	3.1	2.9	0	3.0	3.4



Ron Müller & Associates

Traffic Engineering and Consulting Services

File Name : 23032 RTE 140 Mechanic St at Maple St AM

Site Code : 23032

E-W Street: RTE 140

Start Date : 5/2/2023

N-S Street: Maple St-South Maple St

Page No : 1

Groups Printed- Cars - Trucks

	Maple Street From North					West Central Street (RTE 140) From East					South Maple Street From South					Mechanic Street (RTE 140) From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	11	13	17	0	41	30	100	21	0	151	13	46	104	0	163	29	134	5	0	168	523
07:15 AM	18	18	21	0	57	40	79	17	0	136	10	58	77	0	145	25	136	9	0	170	508
07:30 AM	15	16	19	0	50	33	83	15	0	131	20	29	72	0	121	28	141	13	1	183	485
07:45 AM	15	26	18	0	59	22	84	17	0	123	22	54	83	0	159	28	125	10	0	163	504
Total	59	73	75	0	207	125	346	70	0	541	65	187	336	0	588	110	536	37	1	684	2020
08:00 AM	20	30	14	0	64	28	73	20	0	121	13	51	68	0	132	30	153	6	0	189	506
08:15 AM	13	19	12	0	44	29	81	19	0	129	19	36	71	0	126	30	115	7	0	152	451
08:30 AM	19	16	8	0	43	21	77	14	0	112	14	40	46	0	100	40	136	16	0	192	447
08:45 AM	10	17	16	0	43	31	73	18	0	122	13	53	43	1	110	30	109	9	1	149	424
Total	62	82	50	0	194	109	304	71	0	484	59	180	228	1	468	130	513	38	1	682	1828
Grand Total	121	155	125	0	401	234	650	141	0	1025	124	367	564	1	1056	240	1049	75	2	1366	3848
Apprch %	30.2	38.7	31.2	0		22.8	63.4	13.8	0		11.7	34.8	53.4	0.1		17.6	76.8	5.5	0.1		
Total %	3.1	4	3.2	0	10.4	6.1	16.9	3.7	0	26.6	3.2	9.5	14.7	0	27.4	6.2	27.3	1.9	0.1	35.5	
Cars	93	150	106	0	349	222	605	122	0	949	115	348	520	1	984	210	968	65	2	1245	3527
% Cars	76.9	96.8	84.8	0	87	94.9	93.1	86.5	0	92.6	92.7	94.8	92.2	100	93.2	87.5	92.3	86.7	100	91.1	91.7
Trucks	28	5	19	0	52	12	45	19	0	76	9	19	44	0	72	30	81	10	0	121	321
% Trucks	23.1	3.2	15.2	0	13	5.1	6.9	13.5	0	7.4	7.3	5.2	7.8	0	6.8	12.5	7.7	13.3	0	8.9	8.3

Ron Müller & Associates

Traffic Engineering and Consulting Services

File Name : 23032 RTE 140 Mechanic St at Maple St AM

Site Code : 23032

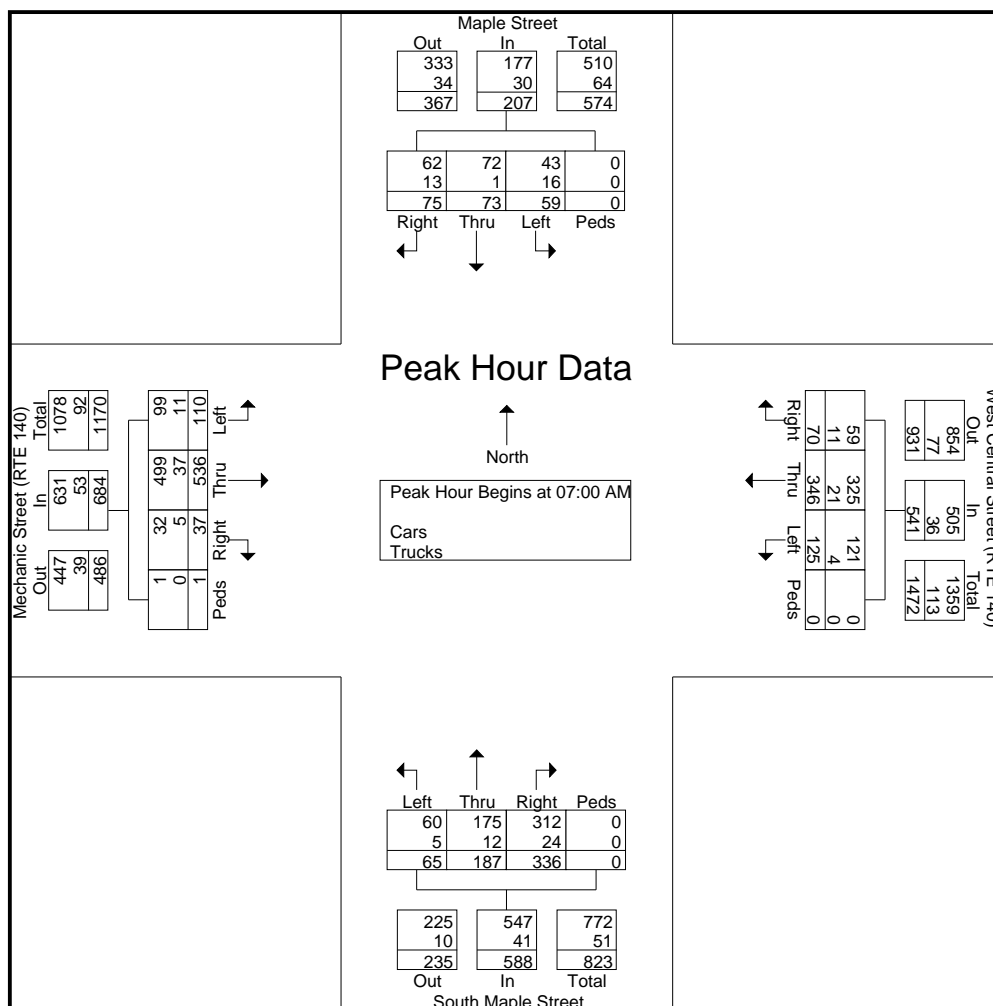
Start Date : 5/2/2023

Page No : 2

E-W Street: RTE 140

N-S Street: Maple St-South Maple St

	Maple Street From North					West Central Street (RTE 140) From East					South Maple Street From South					Mechanic Street (RTE 140) From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	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	11	13	17	0	41	30	100	21	0	151	13	46	104	0	163	29	134	5	0	168	523
07:15 AM	18	18	21	0	57	40	79	17	0	136	10	58	77	0	145	25	136	9	0	170	508
07:30 AM	15	16	19	0	50	33	83	15	0	131	20	29	72	0	121	28	141	13	1	183	485
07:45 AM	15	26	18	0	59	22	84	17	0	123	22	54	83	0	159	28	125	10	0	163	504
Total Volume	59	73	75	0	207	125	346	70	0	541	65	187	336	0	588	110	536	37	1	684	2020
% App. Total	28.5	35.3	36.2	0		23.1	64	12.9	0		11.1	31.8	57.1	0		16.1	78.4	5.4	0.1		
PHF	.819	.702	.893	.000	.877	.781	.865	.833	.000	.896	.739	.806	.808	.000	.902	.948	.950	.712	.250	.934	.966
Cars	43	72	62	0	177	121	325	59	0	505	60	175	312	0	547	99	499	32	1	631	1860
% Cars	72.9	98.6	82.7	0	85.5	96.8	93.9	84.3	0	93.3	92.3	93.6	92.9	0	93.0	90.0	93.1	86.5	100	92.3	92.1
Trucks	16	1	13	0	30	4	21	11	0	36	5	12	24	0	41	11	37	5	0	53	160
% Trucks	27.1	1.4	17.3	0	14.5	3.2	6.1	15.7	0	6.7	7.7	6.4	7.1	0	7.0	10.0	6.9	13.5	0	7.7	7.9



Ron Müller & Associates

Traffic Engineering and Consulting Services

File Name : 23032 RTE 140 Mechanic St at Maple St PM

Site Code : 23032

E-W Street:Rte 140

Start Date : 5/16/2023

N-S Street:Maple St - South Maple St

Page No : 1

Groups Printed- Cars - Trucks

	Maple Street From North					West Central Street (RTE 140) From East					South Maple Street From South					Mechanic Street (RTE 140) From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	20	57	37	0	114	77	144	22	0	243	30	24	43	0	97	17	97	13	0	127	581
04:15 PM	19	76	37	0	132	66	159	15	0	240	19	28	49	0	96	15	128	14	0	157	625
04:30 PM	23	62	54	0	139	84	146	17	0	247	25	45	40	0	110	15	81	15	1	112	608
04:45 PM	19	50	48	0	117	69	161	16	0	246	22	31	37	0	90	23	99	16	0	138	591
Total	81	245	176	0	502	296	610	70	0	976	96	128	169	0	393	70	405	58	1	534	2405
05:00 PM	29	73	41	0	143	54	153	23	0	230	25	48	50	0	123	7	98	18	0	123	619
05:15 PM	17	66	35	0	118	79	183	22	0	284	12	20	29	0	61	18	91	12	0	121	584
05:30 PM	21	58	42	0	121	59	161	21	0	241	11	45	39	0	95	12	59	9	0	80	537
05:45 PM	24	37	47	0	108	55	166	17	0	238	11	20	17	0	48	13	92	17	0	122	516
Total	91	234	165	0	490	247	663	83	0	993	59	133	135	0	327	50	340	56	0	446	2256
Grand Total	172	479	341	0	992	543	1273	153	0	1969	155	261	304	0	720	120	745	114	1	980	4661
Apprch %	17.3	48.3	34.4	0		27.6	64.7	7.8	0		21.5	36.2	42.2	0		12.2	76	11.6	0.1		
Total %	3.7	10.3	7.3	0	21.3	11.6	27.3	3.3	0	42.2	3.3	5.6	6.5	0	15.4	2.6	16	2.4	0	21	
Cars	165	471	332	0	968	537	1243	145	0	1925	150	254	300	0	704	118	722	113	1	954	4551
% Cars	95.9	98.3	97.4	0	97.6	98.9	97.6	94.8	0	97.8	96.8	97.3	98.7	0	97.8	98.3	96.9	99.1	100	97.3	97.6
Trucks	7	8	9	0	24	6	30	8	0	44	5	7	4	0	16	2	23	1	0	26	110
% Trucks	4.1	1.7	2.6	0	2.4	1.1	2.4	5.2	0	2.2	3.2	2.7	1.3	0	2.2	1.7	3.1	0.9	0	2.7	2.4

Ron Müller & Associates

Traffic Engineering and Consulting Services

File Name : 23032 RTE 140 Mechanic St at Maple St PM

Site Code : 23032

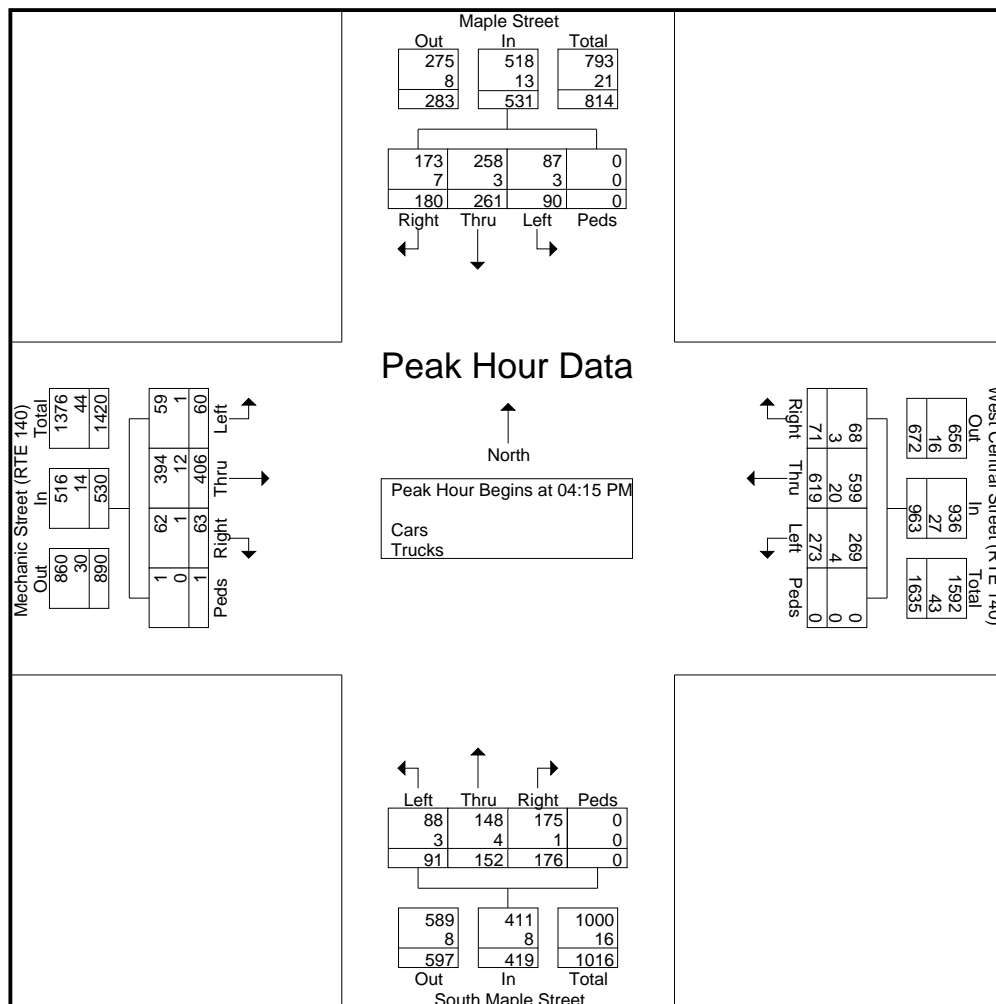
Start Date : 5/16/2023

E-W Street:Rte 140

N-S Street:Maple St - South Maple St

Page No : 2

	Maple Street From North					West Central Street (RTE 140) From East					South Maple Street From South					Mechanic Street (RTE 140) From West					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	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	19	76	37	0	132	66	159	15	0	240	19	28	49	0	96	15	128	14	0	157	625
04:30 PM	23	62	54	0	139	84	146	17	0	247	25	45	40	0	110	15	81	15	1	112	608
04:45 PM	19	50	48	0	117	69	161	16	0	246	22	31	37	0	90	23	99	16	0	138	591
05:00 PM	29	73	41	0	143	54	153	23	0	230	25	48	50	0	123	7	98	18	0	123	619
Total Volume	90	261	180	0	531	273	619	71	0	963	91	152	176	0	419	60	406	63	1	530	2443
% App. Total	16.9	49.2	33.9	0		28.3	64.3	7.4	0		21.7	36.3	42	0		11.3	76.6	11.9	0.2		
PHF	.776	.859	.833	.000	.928	.813	.961	.772	.000	.975	.910	.792	.880	.000	.852	.652	.793	.875	.250	.844	.977
Cars	87	258	173	0	518	269	599	68	0	936	88	148	175	0	411	59	394	62	1	516	2381
% Cars	96.7	98.9	96.1	0	97.6	98.5	96.8	95.8	0	97.2	96.7	97.4	99.4	0	98.1	98.3	97.0	98.4	100	97.4	97.5
Trucks	3	3	7	0	13	4	20	3	0	27	3	4	1	0	8	1	12	1	0	14	62
% Trucks	3.3	1.1	3.9	0	2.4	1.5	3.2	4.2	0	2.8	3.3	2.6	0.6	0	1.9	1.7	3.0	1.6	0	2.6	2.5



Traffic Count Adjustment Data

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.

Crash Rate and Trip Generation Worksheets

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : BELLINGHAM COUNT DATE : May-23

DISTRICT : 3 UNSIGNALIZED : ☐ SIGNALIZED : ☒

~ INTERSECTION DATA ~

MAJOR STREET : MECHANIC STREET/WEST CENTRAL STREET

MINOR STREET(S) : MAPLE STREET

**INTERSECTION
DIAGRAM**
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (PM) :	529	963	419	531		2,442

" K " FACTOR : 0.095 APPROACH VOLUME : 25,705

TOTAL # OF CRASHES : 25 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (A) : 5.00

CRASH RATE CALCULATION :

0.53

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

Source : MassDOT Crash Portal

Project Title & Date : Proposed Warehouse - 306 Maple Street, Bellingham, MA

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : BELLINGHAM COUNT DATE : May-23

DISTRICT : 3 UNSIGNALIZED : ☐ SIGNALIZED : ☒

~ INTERSECTION DATA ~

MAJOR STREET : HARTFORD AVENUE

MINOR STREET(S) : MAPLE STREET

**INTERSECTION
DIAGRAM**
(Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (PM) :		240	734	903		1,877

" K " FACTOR : 0.095 APPROACH VOLUME : 19,758

TOTAL # OF CRASHES : 9 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (A) : 1.80

CRASH RATE CALCULATION :

0.25

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

Source : MassDOT Crash Portal

Project Title & Date : Proposed Warehouse - 306 Maple Street, Bellingham, MA

HARTFORD AVENUE AT MAPLE STREET

Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Number of Vehicles	Light Conditions	Manner of Collision	Road Surface Condition	Weather Conditions
4030834	BELLINGHAM	04/06/2015	Property damage only (none injured)	7:48 AM	3	Daylight	Rear-end	Dry	Clear
4155506	BELLINGHAM	11/05/2015	Property damage only (none injured)	5:08 PM	2	Dark - lighted roadway	Rear-end	Dry	Clear
4174057	BELLINGHAM	01/01/2016	Property damage only (none injured)	12:19 PM	2	Daylight	Rear-end	Dry	Cloudy/Clear
4293365	BELLINGHAM	11/28/2016	Property damage only (none injured)	2:46 PM	2	Daylight	Rear-end	Dry	Clear
4302185	BELLINGHAM	12/06/2016	Property damage only (none injured)	9:00 AM	2	Daylight	Rear-end	Ice	Clear
4579735	BELLINGHAM	01/12/2018	Property damage only (none injured)	8:24 AM	2	Daylight	Rear-end	Dry	Clear
4580184	BELLINGHAM	04/13/2018	Property damage only (none injured)	7:24 AM	1	Daylight	Single vehicle crash	Dry	Clear
4672852	BELLINGHAM	02/18/2019	Property damage only (none injured)	4:45 AM	2	Dark - lighted roadway	Rear-end	Snow	Snow
4756319	BELLINGHAM	09/06/2019	Property damage only (none injured)	7:02 AM	2	Daylight	Rear-end	Dry	Clear

MAPLE STREET AT MECHANIC STREET AND WEST CENTRAL STREET

Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Number of Vehicles	Light Conditions	Manner of Collision	Road Surface Condition	Weather Conditions
4025429	BELLINGHAM	03/08/2015	Non-fatal injury	6:06 PM	2	Daylight	Angle	Dry	Clear
4057083	BELLINGHAM	06/29/2015	Non-fatal injury	6:00 PM	3	Daylight	Rear-end	Dry	Clear
4154063	BELLINGHAM	10/27/2015	Property damage only (none injured)	10:15 AM	3	Daylight	Rear-end	Dry	Clear
4174044	BELLINGHAM	02/28/2016	Non-fatal injury	2:45 PM	2	Daylight	Rear-end	Dry	Clear
4174121	BELLINGHAM	02/15/2016	Property damage only (none injured)	5:12 PM	2	Dark - lighted roadway	Rear-end	Wet	Snow
4174124	BELLINGHAM	02/16/2016	Non-fatal injury	10:57 AM	2	Daylight	Angle	Wet	Cloudy
4200040	BELLINGHAM	05/11/2016	Property damage only (none injured)	4:28 PM	2	Daylight	Rear-end	Dry	Clear/Other
4200816	BELLINGHAM	03/17/2016	Property damage only (none injured)	3:55 PM	2	Daylight	Rear-end	Dry	Clear/Cloudy
4200861	BELLINGHAM	03/21/2016	Property damage only (none injured)	7:12 AM	2	Daylight	Rear-end	Ice	Snow/Cloudy
4278688	BELLINGHAM	10/16/2016	Property damage only (none injured)	5:35 PM	2	Daylight	Rear-end	Dry	Clear
4315435	BELLINGHAM	01/09/2017	Property damage only (none injured)	6:45 PM	2	Dark - lighted roadway	Sideswipe, opposite direction	Wet	Clear
4343888	BELLINGHAM	03/01/2017	Non-fatal injury	7:06 PM	2	Dark - lighted roadway	Rear-end	Dry	Clear
4363117	BELLINGHAM	03/31/2017	Property damage only (none injured)	8:35 AM	2	Daylight	Rear-end	Wet	Rain
4428676	BELLINGHAM	08/23/2017	Non-fatal injury	8:43 PM	2	Dark - lighted roadway	Head-on	Dry	Clear
4428877	BELLINGHAM	08/01/2017	Property damage only (none injured)	7:17 AM	2	Daylight	Sideswipe, same direction	Dry	Clear
4428893	BELLINGHAM	08/25/2017	Property damage only (none injured)	6:55 AM	2	Daylight	Rear-end	Dry	Clear
4455292	BELLINGHAM	10/10/2017	Property damage only (none injured)	8:32 PM	3	Dark - lighted roadway	Angle	Dry	Clear/Cloudy
4578692	BELLINGHAM	12/12/2017	Property damage only (none injured)	5:37 PM	2	Dark - roadway not lighted	Rear-end	Wet	Rain/Cloudy
4580805	BELLINGHAM	07/29/2018	Property damage only (none injured)	6:28 PM	2	Daylight	Rear-end	Dry	Clear
4608828	BELLINGHAM	10/02/2018	Property damage only (none injured)	9:56 AM	1	Daylight	Single vehicle crash	Wet	Cloudy/Rain
4614360	BELLINGHAM	10/09/2018	Non-fatal injury	7:37 PM	2	Dark - lighted roadway	Head-on	Dry	Clear
4702757	BELLINGHAM	04/29/2019	Property damage only (none injured)	8:50 AM	2	Daylight	Sideswipe, same direction	Dry	Clear
4729604	BELLINGHAM	07/12/2019	Property damage only (none injured)	3:54 PM	2	Daylight	Rear-end	Dry	Clear
4745837	BELLINGHAM	08/14/2019	Property damage only (none injured)	4:33 PM	2	Daylight	Rear-end	Dry	Clear
4756169	BELLINGHAM	09/21/2019	Property damage only (none injured)	8:03 PM	2	Dark - lighted roadway	Rear-end	Dry	Clear

Warehousing (150)

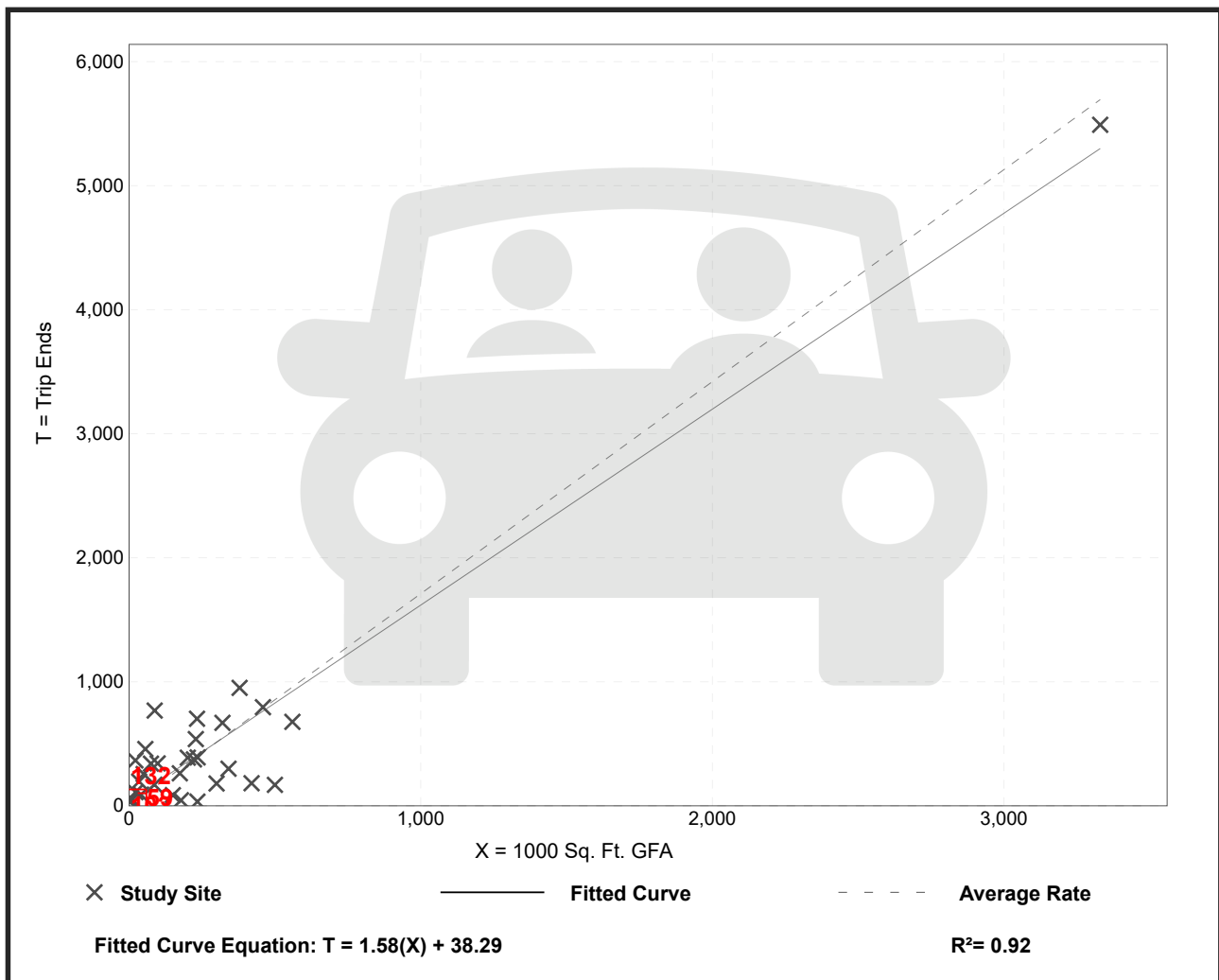
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 31
Avg. 1000 Sq. Ft. GFA: 292
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.71	0.15 - 16.93	1.48

Data Plot and Equation



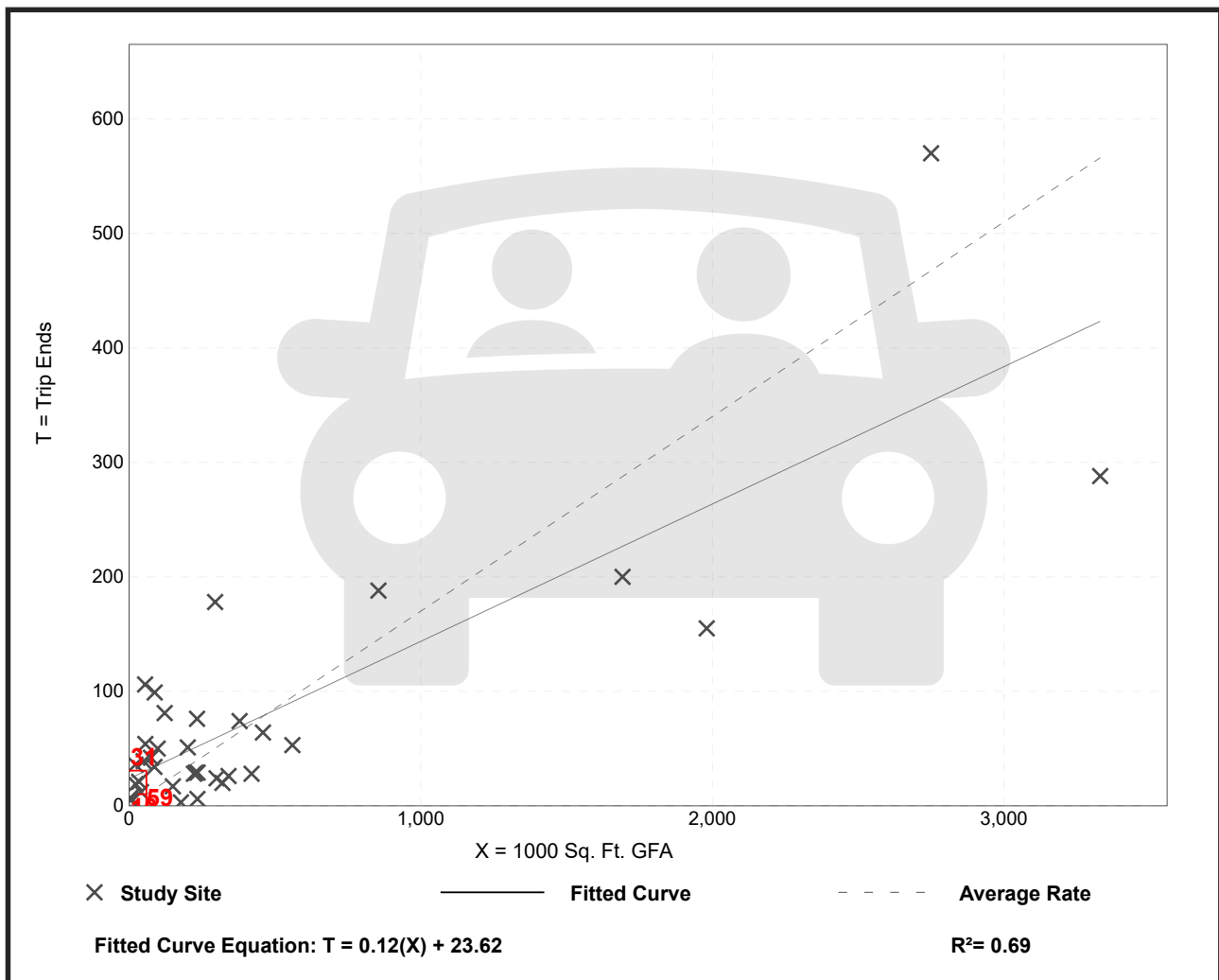
Warehousing (150)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 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: 36
 Avg. 1000 Sq. Ft. GFA: 448
 Directional Distribution: 77% entering, 23% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.17	0.02 - 1.93	0.19

Data Plot and Equation



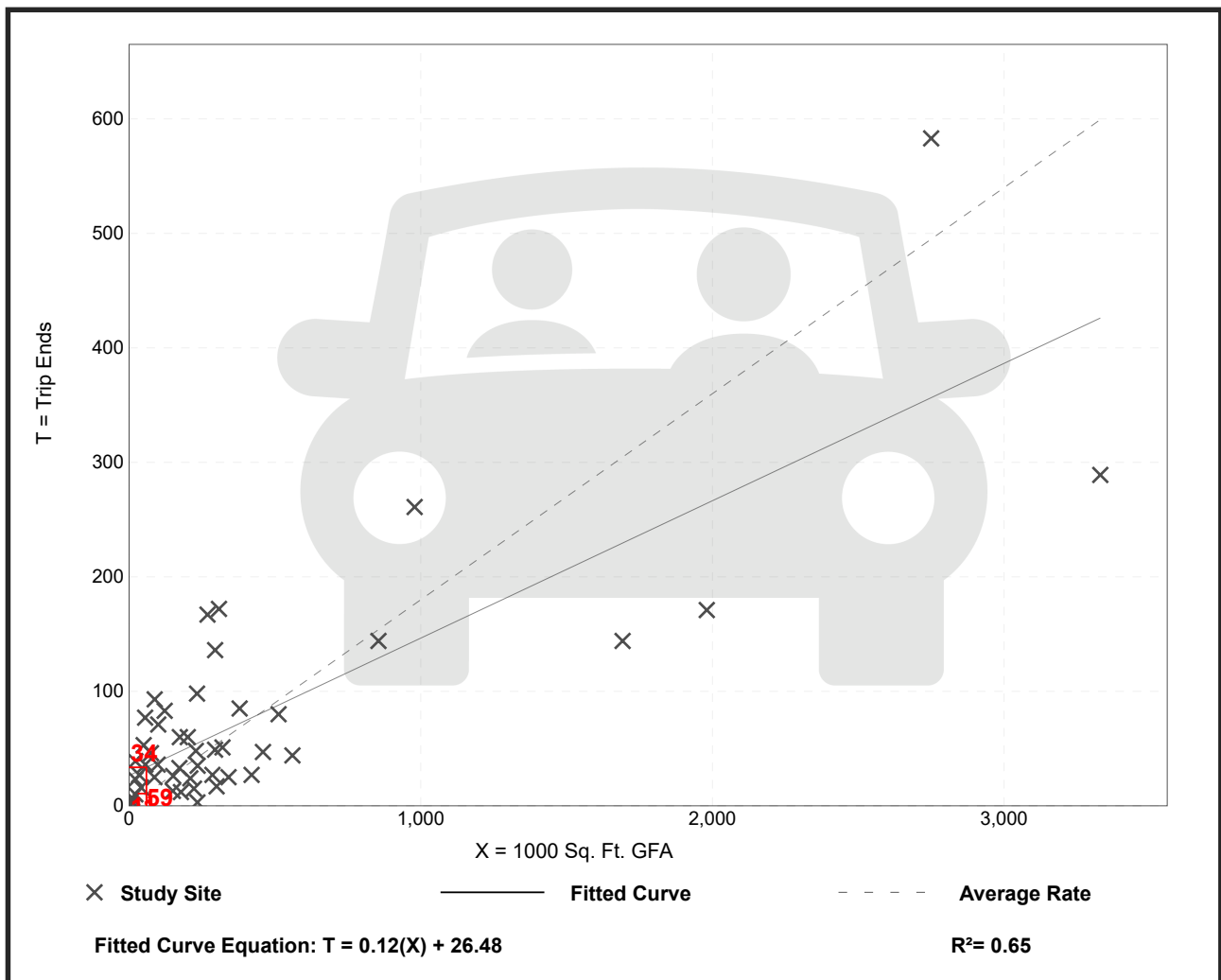
Warehousing (150)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 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: 49
 Avg. 1000 Sq. Ft. GFA: 400
 Directional Distribution: 28% entering, 72% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.18	0.01 - 1.80	0.18

Data Plot and Equation



























Capacity Analysis Methodology and Worksheets

Lanes, Volumes, Timings

3: Maple Street & Mechanic Street/W. Central Street













2023 AM BUILD

08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	536	37	125	346	70	65	187	336	59	73	75
Future Volume (vph)	110	536	37	125	346	70	65	187	336	59	73	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	11	12	11	11	11	13	11	11
Storage Length (ft)	150		0	250		275	0		0	260		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr't			0.850			0.850			0.850		0.924	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1586	1776	1417	1752	1733	1392	1616	1733	1459	1469	1556	0
Flt Permitted	0.276			0.322			0.526			0.451		
Satd. Flow (perm)	461	1776	1417	594	1733	1392	895	1733	1459	697	1556	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105			115			300		40	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1205			1102			2149			1938	
Travel Time (s)		27.4			25.0			48.8			44.0	
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.88	0.88	0.88
Heavy Vehicles (%)	10%	7%	14%	3%	6%	16%	8%	6%	7%	27%	1%	17%
Adj. Flow (vph)	118	576	40	139	384	78	72	208	373	67	83	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	576	40	139	384	78	72	208	373	67	168	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			13			13	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.00	1.00	1.04	1.00	1.04	1.04	1.04	0.96	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	

Lanes, Volumes, Timings
3: Maple Street & Mechanic Street/W. Central Street

2023 AM BUILD
08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	8.0	5.0	5.0	8.0	
Minimum Split (s)	12.0	26.0	26.0	12.0	24.0	24.0	9.5	23.0	12.0	9.5	23.0	
Total Split (s)	17.0	61.0	61.0	17.0	61.0	61.0	11.0	25.0	17.0	11.0	25.0	
Total Split (%)	14.9%	53.5%	53.5%	14.9%	53.5%	53.5%	9.6%	21.9%	14.9%	9.6%	21.9%	
Maximum Green (s)	10.0	55.0	55.0	12.0	55.0	55.0	8.0	20.0	12.0	8.0	20.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	4.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	
Lost Time Adjust (s)	-4.0	-2.0	-2.0	-2.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	
Act Effect Green (s)	37.7	36.6	36.6	39.2	38.2	38.2	28.8	23.0	34.7	28.8	23.0	
Actuated g/C Ratio	0.42	0.41	0.41	0.44	0.43	0.43	0.32	0.26	0.39	0.32	0.26	
v/c Ratio	0.33	0.79	0.06	0.35	0.52	0.12	0.21	0.46	0.50	0.23	0.39	
Control Delay	18.7	31.5	0.2	24.0	22.9	1.4	26.0	37.3	6.7	26.6	28.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	18.7	31.5	0.2	24.0	22.9	1.4	26.0	37.3	6.7	26.6	28.6	
LOS	B	C	A	C	C	A	C	D	A	C	C	
Approach Delay		27.7			20.4			18.5			28.0	
Approach LOS		C			C			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 114

Actuated Cycle Length: 89

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 23.1









Intersection LOS: C

Intersection Capacity Utilization 63.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Maple Street & Mechanic Street/W. Central Street












 Ø1	 Ø2	 Ø4	 Ø3
11 s	25 s	61 s	17 s
 Ø5	 Ø6	 Ø7	 Ø8
11 s	25 s	17 s	61 s






Queues

2023 AM BUILD

3: Maple Street & Mechanic Street/W. Central Street

08/31/2023

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	118	576	40	139	384	78	72	208	373	67	168
v/c Ratio	0.33	0.79	0.06	0.35	0.52	0.12	0.21	0.46	0.50	0.23	0.39
Control Delay	18.7	31.5	0.2	24.0	22.9	1.4	26.0	37.3	6.7	26.6	28.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	31.5	0.2	24.0	22.9	1.4	26.0	37.3	6.7	26.6	28.6
Queue Length 50th (ft)	41	283	0	52	174	0	27	102	20	25	60
Queue Length 95th (ft)	78	429	0	89	256	11	76	219	99	70	148
Internal Link Dist (ft)	1125			1022			2069			1858	
Turn Bay Length (ft)	150			250			275			260	
Base Capacity (vph)	380	1190	984	478	1162	971	359	448	777	300	432
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.48	0.04	0.29	0.33	0.08	0.20	0.46	0.48	0.22	0.39
Intersection Summary											

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	9	23	340	187	6
Future Vol, veh/h	6	9	23	340	187	6
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	17	67	13	8	12	17
Mvmt Flow	7	10	25	370	203	7






Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	627	207	210	0	-	0
Stage 1	207	-	-	-	-	-
Stage 2	420	-	-	-	-	-
Critical Hdwy	6.57	6.87	4.23	-	-	-
Critical Hdwy Stg 1	5.57	-	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-	-
Follow-up Hdwy	3.653	3.903	2.317	-	-	-
Pot Cap-1 Maneuver	424	694	1298	-	-	-
Stage 1	793	-	-	-	-	-
Stage 2	632	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	416	694	1298	-	-	-
Mov Cap-2 Maneuver	416	-	-	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	632	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.8	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1298	-	548	-	-
HCM Lane V/C Ratio	0.019	-	0.03	-	-
HCM Control Delay (s)	7.8	-	11.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Lanes, Volumes, Timings
9: Hartford Avenue & Maple Street






2023 AM BUILD
08/31/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	138	201	556	82	73	424
Future Volume (vph)	138	201	556	82	73	424
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	13	13	12	12
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.920		0.983			
Flt Protected	0.980				0.950	
Satd. Flow (prot)	1598	0	1777	0	1612	1727
Flt Permitted	0.980				0.198	
Satd. Flow (perm)	1598	0	1777	0	336	1727
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	90		9			
Link Speed (mph)	30		30			30
Link Distance (ft)	1491		1071			836
Travel Time (s)	33.9		24.3			19.0
Peak Hour Factor	0.94	0.94	0.93	0.93	0.95	0.95
Heavy Vehicles (%)	6%	8%	9%	6%	12%	10%
Adj. Flow (vph)	147	214	598	88	77	446
Shared Lane Traffic (%)						
Lane Group Flow (vph)	361	0	686	0	77	446
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.96	0.96	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (ft)	20		100		20	100
Trailing Detector (ft)	0		0		0	0
Detector 1 Position(ft)	0		0		0	0
Detector 1 Size(ft)	20		6		20	6
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA

Lanes, Volumes, Timings

9: Hartford Avenue & Maple Street

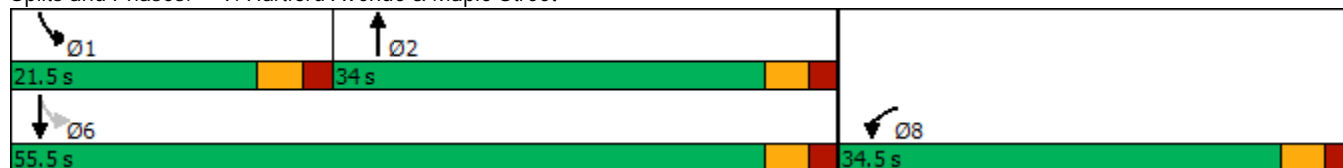
2023 AM BUILD
08/31/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	8		2		1	6
Permitted Phases					6	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	5.0		5.0		5.0	5.0
Minimum Split (s)	23.0		23.0		10.0	23.0
Total Split (s)	34.5		34.0		21.5	55.5
Total Split (%)	38.3%		37.8%		23.9%	61.7%
Maximum Green (s)	29.5		29.0		16.5	50.5
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0		-2.0	-2.0
Total Lost Time (s)	3.0		3.0		3.0	3.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		Max		None	Max
Act Effct Green (s)	21.3		43.2		52.9	52.9
Actuated g/C Ratio	0.27		0.54		0.66	0.66
v/c Ratio	0.74		0.71		0.21	0.39
Control Delay	29.1		22.8		7.9	8.8
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	29.1		22.8		7.9	8.8
LOS	C		C		A	A
Approach Delay	29.1		22.8			8.6
Approach LOS	C		C			A

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 80.2
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 19.5
Intersection LOS: B
Intersection Capacity Utilization 68.4%
ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 9: Hartford Avenue & Maple Street





Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	361	686	77	446
v/c Ratio	0.74	0.71	0.21	0.39
Control Delay	29.1	22.8	7.9	8.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	29.1	22.8	7.9	8.8
Queue Length 50th (ft)	123	253	12	89
Queue Length 95th (ft)	214	#575	36	201
Internal Link Dist (ft)	1411	991		756
Turn Bay Length (ft)			125	
Base Capacity (vph)	686	960	517	1138
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.53	0.71	0.15	0.39

Intersection Summary

























95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

3: Maple Street & Mechanic Street/W. Central Street

2023 PM EXISTING

08/31/2023













												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	406	63	273	619	71	91	152	176	90	261	180
Future Volume (vph)	60	406	63	273	619	71	91	152	176	90	261	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	11	12	11	11	11	13	11	11
Storage Length (ft)	150		0	250		275	0		0	260		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.939	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1711	1845	1583	1787	1783	1553	1694	1783	1546	1811	1687	0
Flt Permitted	0.166			0.407			0.222			0.479		
Satd. Flow (perm)	299	1845	1583	766	1783	1553	396	1783	1546	913	1687	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			114			125			207		29	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1205			1102			2149			1938	
Travel Time (s)		27.4			25.0			48.8			44.0	
Peak Hour Factor	0.84	0.84	0.84	0.98	0.98	0.98	0.85	0.85	0.85	0.93	0.93	0.93
Heavy Vehicles (%)	2%	3%	2%	1%	3%	4%	3%	3%	1%	3%	1%	4%
Adj. Flow (vph)	71	483	75	279	632	72	107	179	207	97	281	194
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	483	75	279	632	72	107	179	207	97	475	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			13			13	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.00	1.00	1.04	1.00	1.04	1.04	1.04	0.96	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	

Lanes, Volumes, Timings

3: Maple Street & Mechanic Street/W. Central Street

2023 PM EXISTING

08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8		8	2		2	6		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	8.0	5.0	5.0	8.0	
Minimum Split (s)	12.0	26.0	26.0	12.0	24.0	24.0	9.5	23.0	12.0	9.5	23.0	
Total Split (s)	17.0	55.0	55.0	17.0	55.0	55.0	11.0	22.0	17.0	11.0	22.0	
Total Split (%)	16.2%	52.4%	52.4%	16.2%	52.4%	52.4%	10.5%	21.0%	16.2%	10.5%	21.0%	
Maximum Green (s)	10.0	49.0	49.0	12.0	49.0	49.0	8.0	17.0	12.0	8.0	17.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	4.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	
Lost Time Adjust (s)	-4.0	-2.0	-2.0	-2.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	
Act Effect Green (s)	33.4	32.4	32.4	41.7	40.7	40.7	26.0	20.1	37.6	25.9	20.1	
Actuated g/C Ratio	0.38	0.37	0.37	0.48	0.46	0.46	0.30	0.23	0.43	0.30	0.23	
v/c Ratio	0.23	0.71	0.11	0.50	0.76	0.09	0.46	0.44	0.27	0.28	1.16	
Control Delay	20.0	30.5	1.5	25.3	28.3	0.7	32.7	38.5	3.1	27.8	131.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.0	30.5	1.5	25.3	28.3	0.7	32.7	38.5	3.1	27.8	131.0	
LOS	B	C	A	C	C	A	C	D	A	C	F	
Approach Delay		25.9			25.4			22.4			113.5	
Approach LOS		C			C			C			F	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 87.6

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.16

Intersection Signal Delay: 43.8









Intersection LOS: D












Intersection Capacity Utilization 79.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: Maple Street & Mechanic Street/W. Central Street

 Ø1	 Ø2	 Ø4	 Ø3
11 s	22 s	55 s	17 s
 Ø5	 Ø6	 Ø7	 Ø8
11 s	22 s	17 s	55 s

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	71	483	75	279	632	72	107	179	207	97	475
v/c Ratio	0.23	0.71	0.11	0.50	0.76	0.09	0.46	0.44	0.27	0.28	1.16
Control Delay	20.0	30.5	1.5	25.3	28.3	0.7	32.7	38.5	3.1	27.8	131.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	30.5	1.5	25.3	28.3	0.7	32.7	38.5	3.1	27.8	131.0
Queue Length 50th (ft)	27	243	0	103	313	0	45	93	0	40	~344
Queue Length 95th (ft)	49	309	7	166	470	5	94	171	31	92	#626
Internal Link Dist (ft)	1125			1022			2069			1858	
Turn Bay Length (ft)	150			250			275			260	
Base Capacity (vph)	352	1160	1038	599	1122	1023	242	409	781	357	408
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.42	0.07	0.47	0.56	0.07	0.44	0.44	0.27	0.27	1.16






Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.






Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	26	16	229	443	22
Future Vol, veh/h	8	26	16	229	443	22
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	93	93	99	99
Heavy Vehicles, %	0	8	6	2	0	0
Mvmt Flow	9	31	17	246	447	22
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	738	458	469	0	-	0
Stage 1	458	-	-	-	-	-
Stage 2	280	-	-	-	-	-
Critical Hdwy	6.4	6.28	4.16	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.372	2.254	-	-	-
Pot Cap-1 Maneuver	388	591	1072	-	-	-
Stage 1	641	-	-	-	-	-
Stage 2	772	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	382	591	1072	-	-	-
Mov Cap-2 Maneuver	382	-	-	-	-	-
Stage 1	631	-	-	-	-	-
Stage 2	772	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.4	0.5		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1072	-	524	-	-	
HCM Lane V/C Ratio	0.016	-	0.076	-	-	
HCM Control Delay (s)	8.4	-	12.4	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

Lanes, Volumes, Timings
9: Hartford Avenue & Maple Street

2023 PM EXISTING






08/31/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	135	105	556	173	234	669
Future Volume (vph)	135	105	556	173	234	669
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	13	13	12	12
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.941		0.968			
Flt Protected	0.973				0.950	
Satd. Flow (prot)	1666	0	1845	0	1752	1827
Flt Permitted	0.973				0.101	
Satd. Flow (perm)	1666	0	1845	0	186	1827
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	48		19			
Link Speed (mph)	30		30			30
Link Distance (ft)	1491		1071			836
Travel Time (s)	33.9		24.3			19.0
Peak Hour Factor	0.85	0.85	0.94	0.94	0.90	0.90
Heavy Vehicles (%)	4%	5%	3%	3%	3%	4%
Adj. Flow (vph)	159	124	591	184	260	743
Shared Lane Traffic (%)						
Lane Group Flow (vph)	283	0	775	0	260	743
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.96	0.96	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (ft)	20		100		20	100
Trailing Detector (ft)	0		0		0	0
Detector 1 Position(ft)	0		0		0	0
Detector 1 Size(ft)	20		6		20	6
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA

Lanes, Volumes, Timings
9: Hartford Avenue & Maple Street

2023 PM EXISTING

08/31/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	8		2		1	6
Permitted Phases					6	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	5.0		5.0		5.0	5.0
Minimum Split (s)	23.0		23.0		10.0	23.0
Total Split (s)	34.5		34.0		21.5	55.5
Total Split (%)	38.3%		37.8%		23.9%	61.7%
Maximum Green (s)	29.5		29.0		16.5	50.5
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0		-2.0	-2.0
Total Lost Time (s)	3.0		3.0		3.0	3.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		Max		None	Max
Act Effct Green (s)	18.3		36.6		52.7	52.7
Actuated g/C Ratio	0.24		0.48		0.68	0.68
v/c Ratio	0.66		0.87		0.66	0.59
Control Delay	29.2		34.1		22.2	10.0
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	29.2		34.1		22.2	10.0
LOS	C		C		C	B
Approach Delay	29.2		34.1			13.2
Approach LOS	C		C			B

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 77

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 23.2

Intersection LOS: C

Intersection Capacity Utilization 76.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 9: Hartford Avenue & Maple Street



Queues

2023 PM EXISTING

9: Hartford Avenue & Maple Street

08/31/2023



Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	283	775	260	743
v/c Ratio	0.66	0.87	0.66	0.59
Control Delay	29.2	34.1	22.2	10.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	29.2	34.1	22.2	10.0
Queue Length 50th (ft)	101	307	63	159
Queue Length 95th (ft)	163	#700	153	347
Internal Link Dist (ft)	1411	991		756
Turn Bay Length (ft)			125	
Base Capacity (vph)	712	886	505	1250
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.40	0.87	0.51	0.59

Intersection Summary

























95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

3: Maple Street & Mechanic Street/W. Central Street

2030 AM NO-BUILD













08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	645	54	134	422	134	75	204	360	78	79	91
Future Volume (vph)	155	645	54	134	422	134	75	204	360	78	79	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	11	12	11	11	11	13	11	11
Storage Length (ft)	150		0	250		275	0		0	260		230
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1586	1776	1417	1752	1733	1392	1616	1733	1459	1469	1818	1334
Flt Permitted	0.232			0.237			0.673			0.389		
Satd. Flow (perm)	387	1776	1417	437	1733	1392	1145	1733	1459	601	1818	1334
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105			146			226			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1205			1102			2149			1938	
Travel Time (s)		27.4			25.0			48.8			44.0	
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	7%	14%	3%	6%	16%	8%	6%	7%	27%	1%	17%
Adj. Flow (vph)	167	694	58	146	459	146	82	222	391	85	86	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	167	694	58	146	459	146	82	222	391	85	86	99
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			13			13	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.00	1.00	1.04	1.00	1.04	1.04	1.04	0.96	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	Perm

Lanes, Volumes, Timings
3: Maple Street & Mechanic Street/W. Central Street

2030 AM NO-BUILD

08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	8.0	5.0	5.0	8.0	8.0
Minimum Split (s)	12.0	26.0	26.0	12.0	24.0	24.0	9.5	23.0	12.0	9.5	23.0	23.0
Total Split (s)	17.0	61.0	61.0	17.0	61.0	61.0	11.0	25.0	17.0	11.0	25.0	25.0
Total Split (%)	14.9%	53.5%	53.5%	14.9%	53.5%	53.5%	9.6%	21.9%	14.9%	9.6%	21.9%	21.9%
Maximum Green (s)	10.0	55.0	55.0	12.0	55.0	55.0	8.0	20.0	12.0	8.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	4.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-2.0	-2.0	-2.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	0.0
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	Max
Act Effect Green (s)	46.4	45.4	45.4	45.0	44.0	44.0	28.8	22.9	36.3	28.9	23.0	20.9
Actuated g/C Ratio	0.47	0.46	0.46	0.45	0.44	0.44	0.29	0.23	0.37	0.29	0.23	0.21
v/c Ratio	0.48	0.86	0.08	0.40	0.60	0.21	0.22	0.56	0.58	0.35	0.20	0.23
Control Delay	20.7	35.9	0.6	27.4	24.2	3.3	30.4	44.7	13.2	33.4	38.6	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.7	35.9	0.6	27.4	24.2	3.3	30.4	44.7	13.2	33.4	38.6	1.3
LOS	C	D	A	C	C	A	C	D	B	C	D	A
Approach Delay		30.9			20.8			25.3			23.3	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 114

Actuated Cycle Length: 99.4

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 25.8









Intersection LOS: C

Intersection Capacity Utilization 70.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Maple Street & Mechanic Street/W. Central Street













 Ø1	 Ø2	 Ø4	 Ø3
11 s	25 s	61 s	17 s
 Ø5	 Ø6	 Ø7	 Ø8
11 s	25 s	17 s	61 s






Queues

2030 AM NO-BUILD

3: Maple Street & Mechanic Street/W. Central Street

08/31/2023











												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	167	694	58	146	459	146	82	222	391	85	86	99
v/c Ratio	0.48	0.86	0.08	0.40	0.60	0.21	0.22	0.56	0.58	0.35	0.20	0.23
Control Delay	20.7	35.9	0.6	27.4	24.2	3.3	30.4	44.7	13.2	33.4	38.6	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.7	35.9	0.6	27.4	24.2	3.3	30.4	44.7	13.2	33.4	38.6	1.3
Queue Length 50th (ft)	65	404	0	55	221	0	40	138	65	42	49	0
Queue Length 95th (ft)	107	571	4	93	318	32	86	238	167	89	101	0
Internal Link Dist (ft)	1125			1022			2069			1858		
Turn Bay Length (ft)	150			250			275			260		
Base Capacity (vph)	356	1061	889	399	1035	890	371	399	681	247	420	424
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.65	0.07	0.37	0.44	0.16	0.22	0.56	0.57	0.34	0.20	0.23
Intersection Summary												

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	11	30	379	209	7
Future Vol, veh/h	6	11	30	379	209	7
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	17	67	13	8	12	17
Mvmt Flow	7	12	33	412	227	8
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	709	231	235	0	-	0
Stage 1	231	-	-	-	-	-
Stage 2	478	-	-	-	-	-
Critical Hdwy	6.57	6.87	4.23	-	-	-
Critical Hdwy Stg 1	5.57	-	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-	-
Follow-up Hdwy	3.653	3.903	2.317	-	-	-
Pot Cap-1 Maneuver	379	671	1270	-	-	-
Stage 1	773	-	-	-	-	-
Stage 2	594	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	369	671	1270	-	-	-
Mov Cap-2 Maneuver	369	-	-	-	-	-
Stage 1	753	-	-	-	-	-
Stage 2	594	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.2	0.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1270	-	521	-	-	
HCM Lane V/C Ratio	0.026	-	0.035	-	-	
HCM Control Delay (s)	7.9	-	12.2	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-	

Lanes, Volumes, Timings
9: Hartford Avenue & Maple Street






2030 AM NO-BUILD

08/31/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	153	224	629	94	82	487
Future Volume (vph)	153	224	629	94	82	487
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	13	13	12	12
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.920		0.982			
Flt Protected	0.980				0.950	
Satd. Flow (prot)	1598	0	1775	0	1612	1727
Flt Permitted	0.980				0.123	
Satd. Flow (perm)	1598	0	1775	0	209	1727
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	90		9			
Link Speed (mph)	30		30			30
Link Distance (ft)	1491		1071			836
Travel Time (s)	33.9		24.3			19.0
Peak Hour Factor	0.94	0.94	0.93	0.93	0.95	0.95
Heavy Vehicles (%)	6%	8%	9%	6%	12%	10%
Adj. Flow (vph)	163	238	676	101	86	513
Shared Lane Traffic (%)						
Lane Group Flow (vph)	401	0	777	0	86	513
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.96	0.96	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (ft)	20		100		20	100
Trailing Detector (ft)	0		0		0	0
Detector 1 Position(ft)	0		0		0	0
Detector 1 Size(ft)	20		6		20	6
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA

Lanes, Volumes, Timings
9: Hartford Avenue & Maple Street

2030 AM NO-BUILD
08/31/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	8		2		1	6
Permitted Phases					6	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	5.0		5.0		5.0	5.0
Minimum Split (s)	23.0		23.0		10.0	23.0
Total Split (s)	34.5		34.0		21.5	55.5
Total Split (%)	38.3%		37.8%		23.9%	61.7%
Maximum Green (s)	29.5		29.0		16.5	50.5
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0		-2.0	-2.0
Total Lost Time (s)	3.0		3.0		3.0	3.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		Max		None	Max
Act Effct Green (s)	23.3		42.8		52.8	52.8
Actuated g/C Ratio	0.28		0.52		0.64	0.64
v/c Ratio	0.78		0.84		0.29	0.46
Control Delay	31.5		30.4		9.6	10.3
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	31.5		30.4		9.6	10.3
LOS	C		C		A	B
Approach Delay	31.5		30.4			10.2
Approach LOS	C		C			B

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 82.1

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 23.8

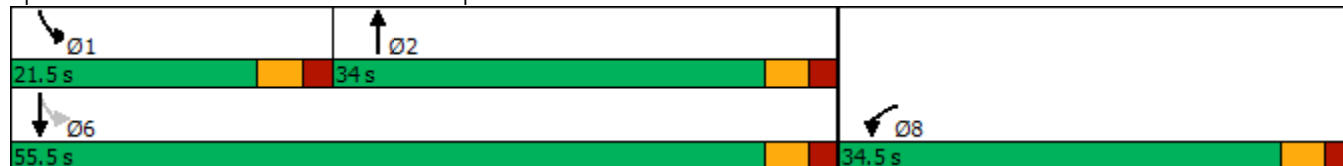
Intersection LOS: C

Intersection Capacity Utilization 75.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 9: Hartford Avenue & Maple Street



Queues

2030 AM NO-BUILD

9: Hartford Avenue & Maple Street

08/31/2023



Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	401	777	86	513
v/c Ratio	0.78	0.84	0.29	0.46
Control Delay	31.5	30.4	9.6	10.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	31.5	30.4	9.6	10.3
Queue Length 50th (ft)	146	340	15	121
Queue Length 95th (ft)	249	#700	40	242
Internal Link Dist (ft)	1411	991		756
Turn Bay Length (ft)			125	
Base Capacity (vph)	672	930	452	1110
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.60	0.84	0.19	0.46

Intersection Summary

























95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

3: Maple Street & Mechanic Street/W. Central Street

2030 PM NO-BUILD













08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	496	76	293	728	114	109	166	189	160	285	229
Future Volume (vph)	89	496	76	293	728	114	109	166	189	160	285	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	11	12	11	11	11	13	11	11
Storage Length (ft)	150		0	250		275	0		0	260		230
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1711	1845	1583	1787	1783	1553	1694	1783	1546	1811	1818	1501
Flt Permitted	0.143			0.323			0.248			0.404		
Satd. Flow (perm)	257	1845	1583	608	1783	1553	442	1783	1546	770	1818	1501
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			114			125			205			246
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1205			1102			2149			1938	
Travel Time (s)		27.4			25.0			48.8			44.0	
Peak Hour Factor	0.92	0.92	0.92	0.98	0.98	0.98	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	2%	3%	2%	1%	3%	4%	3%	3%	1%	3%	1%	4%
Adj. Flow (vph)	97	539	83	299	743	116	118	180	205	172	306	246
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	539	83	299	743	116	118	180	205	172	306	246
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			13			13	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.00	1.00	1.04	1.00	1.04	1.04	1.04	0.96	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	Perm

Lanes, Volumes, Timings
3: Maple Street & Mechanic Street/W. Central Street

2030 PM NO-BUILD

08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	8.0	5.0	5.0	8.0	8.0
Minimum Split (s)	12.0	26.0	26.0	12.0	24.0	24.0	9.5	23.0	12.0	9.5	23.0	23.0
Total Split (s)	17.0	55.0	55.0	17.0	55.0	55.0	11.0	22.0	17.0	11.0	22.0	22.0
Total Split (%)	16.2%	52.4%	52.4%	16.2%	52.4%	52.4%	10.5%	21.0%	16.2%	10.5%	21.0%	21.0%
Maximum Green (s)	10.0	49.0	49.0	12.0	49.0	49.0	8.0	17.0	12.0	8.0	17.0	17.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	4.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-2.0	-2.0	-2.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	0.0
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	Max
Act Effect Green (s)	38.0	37.0	37.0	46.7	45.7	45.7	27.3	19.6	37.3	28.4	22.5	20.4
Actuated g/C Ratio	0.40	0.39	0.39	0.49	0.48	0.48	0.29	0.20	0.39	0.30	0.24	0.21
v/c Ratio	0.33	0.76	0.12	0.58	0.87	0.14	0.52	0.49	0.28	0.54	0.72	0.48
Control Delay	21.0	32.7	1.8	30.0	36.1	2.9	37.0	42.7	3.5	36.2	50.2	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	32.7	1.8	30.0	36.1	2.9	37.0	42.7	3.5	36.2	50.2	8.7
LOS	C	C	A	C	D	A	D	D	A	D	D	A
Approach Delay		27.5			31.2			25.4			32.8	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 95.7

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 29.8









Intersection LOS: C

Intersection Capacity Utilization 77.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: Maple Street & Mechanic Street/W. Central Street













 Ø1	 Ø2	 Ø4	 Ø3
11 s	22 s	55 s	17 s
 Ø5	 Ø6	 Ø7	 Ø8
11 s	22 s	17 s	55 s

Queues

2030 PM NO-BUILD

3: Maple Street & Mechanic Street/W. Central Street





08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	97	539	83	299	743	116	118	180	205	172	306	246
v/c Ratio	0.33	0.76	0.12	0.58	0.87	0.14	0.52	0.49	0.28	0.54	0.72	0.48
Control Delay	21.0	32.7	1.8	30.0	36.1	2.9	37.0	42.7	3.5	36.2	50.2	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	32.7	1.8	30.0	36.1	2.9	37.0	42.7	3.5	36.2	50.2	8.7
Queue Length 50th (ft)	41	310	0	115	418	0	60	110	0	90	202	0
Queue Length 95th (ft)	65	376	14	179	#662	26	109	183	39	151	#368	69
Internal Link Dist (ft)	1125			1022			2069			1858		
Turn Bay Length (ft)	150			250			275			260		
Base Capacity (vph)	321	1012	919	549	978	908	236	364	753	318	426	513
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.53	0.09	0.54	0.76	0.13	0.50	0.49	0.27	0.54	0.72	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.











Queue shown is maximum after two cycles.

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	33	19	259	488	22
Future Vol, veh/h	9	33	19	259	488	22
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	-	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	93	93	99	99
Heavy Vehicles, %	0	8	6	2	0	0
Mvmt Flow	11	39	20	278	493	22
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	822	504	515	0	-	0
Stage 1	504	-	-	-	-	-
Stage 2	318	-	-	-	-	-
Critical Hdwy	6.4	6.28	4.16	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.372	2.254	-	-	-
Pot Cap-1 Maneuver	346	556	1030	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	742	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	339	556	1030	-	-	-
Mov Cap-2 Maneuver	339	-	-	-	-	-
Stage 1	599	-	-	-	-	-
Stage 2	742	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13.2	0.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1030	-	489	-	-	
HCM Lane V/C Ratio	0.02	-	0.101	-	-	
HCM Control Delay (s)	8.6	-	13.2	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-	

Lanes, Volumes, Timings
9: Hartford Avenue & Maple Street






2030 PM NO-BUILD

08/31/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	150	120	616	192	257	759
Future Volume (vph)	150	120	616	192	257	759
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	13	13	12	12
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.940		0.968			
Flt Protected	0.973				0.950	
Satd. Flow (prot)	1664	0	1845	0	1752	1827
Flt Permitted	0.973				0.103	
Satd. Flow (perm)	1664	0	1845	0	190	1827
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	49		19			
Link Speed (mph)	30		30			30
Link Distance (ft)	1491		1071			836
Travel Time (s)	33.9		24.3			19.0
Peak Hour Factor	0.92	0.92	0.94	0.94	0.92	0.92
Heavy Vehicles (%)	4%	5%	3%	3%	3%	4%
Adj. Flow (vph)	163	130	655	204	279	825
Shared Lane Traffic (%)						
Lane Group Flow (vph)	293	0	859	0	279	825
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.96	0.96	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (ft)	20		100		20	100
Trailing Detector (ft)	0		0		0	0
Detector 1 Position(ft)	0		0		0	0
Detector 1 Size(ft)	20		6		20	6
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA

Lanes, Volumes, Timings
9: Hartford Avenue & Maple Street

2030 PM NO-BUILD
08/31/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	8		2		1	6
Permitted Phases					6	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	5.0		5.0		5.0	5.0
Minimum Split (s)	23.0		23.0		10.0	23.0
Total Split (s)	34.5		34.0		21.5	55.5
Total Split (%)	38.3%		37.8%		23.9%	61.7%
Maximum Green (s)	29.5		29.0		16.5	50.5
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0		-2.0	-2.0
Total Lost Time (s)	3.0		3.0		3.0	3.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		Max		None	Max
Act Effct Green (s)	18.8		36.0		52.7	52.7
Actuated g/C Ratio	0.24		0.46		0.68	0.68
v/c Ratio	0.67		0.99		0.69	0.66
Control Delay	29.5		53.3		23.9	11.8
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	29.5		53.3		23.9	11.8
LOS	C		D		C	B
Approach Delay	29.5		53.3			14.9
Approach LOS	C		D			B

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 77.5

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 31.4

Intersection LOS: C

Intersection Capacity Utilization 84.0%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 9: Hartford Avenue & Maple Street



Queues

2030 PM NO-BUILD

9: Hartford Avenue & Maple Street

08/31/2023



Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	293	859	279	825
v/c Ratio	0.67	0.99	0.69	0.66
Control Delay	29.5	53.3	23.9	11.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	29.5	53.3	23.9	11.8
Queue Length 50th (ft)	106	387	72	196
Queue Length 95th (ft)	184	#812	169	432
Internal Link Dist (ft)	1411	991		756
Turn Bay Length (ft)			125	
Base Capacity (vph)	708	867	503	1242
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.41	0.99	0.55	0.66

Intersection Summary

























95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

3: Maple Street & Mechanic Street/W. Central Street













2030 AM BUILD

08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	645	54	134	422	139	75	204	360	79	79	92
Future Volume (vph)	157	645	54	134	422	139	75	204	360	79	79	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	11	12	11	11	11	13	11	11
Storage Length (ft)	150		0	250		275	0		0	260		230
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1586	1776	1417	1752	1733	1392	1616	1733	1459	1469	1818	1334
Flt Permitted	0.232			0.237			0.673			0.389		
Satd. Flow (perm)	387	1776	1417	437	1733	1392	1145	1733	1459	601	1818	1334
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105			151			226			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1205			1102			2149			1938	
Travel Time (s)		27.4			25.0			48.8			44.0	
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	7%	14%	3%	6%	16%	8%	6%	7%	27%	1%	17%
Adj. Flow (vph)	169	694	58	146	459	151	82	222	391	86	86	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	169	694	58	146	459	151	82	222	391	86	86	100
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			13			13	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.00	1.00	1.04	1.00	1.04	1.04	1.04	0.96	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	Perm

Lanes, Volumes, Timings
3: Maple Street & Mechanic Street/W. Central Street

2030 AM BUILD
08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	8.0	5.0	5.0	8.0	8.0
Minimum Split (s)	12.0	26.0	26.0	12.0	24.0	24.0	9.5	23.0	12.0	9.5	23.0	23.0
Total Split (s)	17.0	61.0	61.0	17.0	61.0	61.0	11.0	25.0	17.0	11.0	25.0	25.0
Total Split (%)	14.9%	53.5%	53.5%	14.9%	53.5%	53.5%	9.6%	21.9%	14.9%	9.6%	21.9%	21.9%
Maximum Green (s)	10.0	55.0	55.0	12.0	55.0	55.0	8.0	20.0	12.0	8.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	4.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-2.0	-2.0	-2.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	0.0
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	Max
Act Effect Green (s)	46.4	45.4	45.4	45.1	44.0	44.0	28.8	22.9	36.3	28.9	23.0	20.9
Actuated g/C Ratio	0.47	0.46	0.46	0.45	0.44	0.44	0.29	0.23	0.37	0.29	0.23	0.21
v/c Ratio	0.49	0.86	0.08	0.40	0.60	0.22	0.22	0.56	0.58	0.36	0.21	0.24
Control Delay	20.9	35.9	0.6	27.4	24.2	3.3	30.4	44.7	13.2	33.6	38.6	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	35.9	0.6	27.4	24.2	3.3	30.4	44.7	13.2	33.6	38.6	1.3
LOS	C	D	A	C	C	A	C	D	B	C	D	A
Approach Delay		30.9			20.6			25.3			23.3	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 114

Actuated Cycle Length: 99.4

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 25.7









Intersection LOS: C

Intersection Capacity Utilization 70.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Maple Street & Mechanic Street/W. Central Street













 Ø1	 Ø2	 Ø4	 Ø3
11 s	25 s	61 s	17 s
 Ø5	 Ø6	 Ø7	 Ø8
11 s	25 s	17 s	61 s

Queues

2030 AM BUILD

3: Maple Street & Mechanic Street/W. Central Street











08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	169	694	58	146	459	151	82	222	391	86	86	100
v/c Ratio	0.49	0.86	0.08	0.40	0.60	0.22	0.22	0.56	0.58	0.36	0.21	0.24
Control Delay	20.9	35.9	0.6	27.4	24.2	3.3	30.4	44.7	13.2	33.6	38.6	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	35.9	0.6	27.4	24.2	3.3	30.4	44.7	13.2	33.6	38.6	1.3
Queue Length 50th (ft)	66	404	0	55	221	0	40	138	65	42	49	0
Queue Length 95th (ft)	108	571	4	93	318	33	86	238	167	90	101	0
Internal Link Dist (ft)	1125			1022			2069			1858		
Turn Bay Length (ft)	150				250	275			260			230
Base Capacity (vph)	356	1060	888	399	1034	891	371	399	681	247	419	424
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.65	0.07	0.37	0.44	0.17	0.22	0.56	0.57	0.35	0.21	0.24
Intersection Summary												

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕			↕	
Traffic Vol, veh/h	6	0	11	2	0	0	30	379	7	1	209	7
Future Vol, veh/h	6	0	11	2	0	0	30	379	7	1	209	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	17	2	67	50	0	0	13	8	14	0	12	17
Mvmt Flow	7	0	12	2	0	0	33	412	8	1	227	8
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	715	719	231	721	719	416	235	0	0	420	0	0
Stage 1	233	233	-	482	482	-	-	-	-	-	-	-
Stage 2	482	486	-	239	237	-	-	-	-	-	-	-
Critical Hdwy	7.27	6.52	6.87	7.6	6.5	6.2	4.23	-	-	4.1	-	-
Critical Hdwy Stg 1	6.27	5.52	-	6.6	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.27	5.52	-	6.6	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.653	4.018	3.903	3.95	4	3.3	2.317	-	-	2.2	-	-
Pot Cap-1 Maneuver	327	354	671	288	357	641	1270	-	-	1150	-	-
Stage 1	737	712	-	485	557	-	-	-	-	-	-	-
Stage 2	538	551	-	669	713	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	320	344	671	277	347	641	1270	-	-	1150	-	-
Mov Cap-2 Maneuver	320	344	-	277	347	-	-	-	-	-	-	-
Stage 1	718	711	-	472	543	-	-	-	-	-	-	-
Stage 2	524	537	-	656	712	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	12.7		18.1		0.6		0					
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1270	-	-	484	277	1150	-	-				
HCM Lane V/C Ratio	0.026	-	-	0.038	0.008	0.001	-	-				
HCM Control Delay (s)	7.9	-	-	12.7	18.1	8.1	0	-				
HCM Lane LOS	A	-	-	B	C	A	A	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0	0	-	-				






Lanes, Volumes, Timings
9: Hartford Avenue & Maple Street

2030 AM BUILD
08/31/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	153	224	629	95	82	487
Future Volume (vph)	153	224	629	95	82	487
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	13	13	12	12
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.920		0.982			
Flt Protected	0.980				0.950	
Satd. Flow (prot)	1598	0	1775	0	1612	1727
Flt Permitted	0.980				0.122	
Satd. Flow (perm)	1598	0	1775	0	207	1727
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	90		9			
Link Speed (mph)	30		30			30
Link Distance (ft)	1491		1071			836
Travel Time (s)	33.9		24.3			19.0
Peak Hour Factor	0.94	0.94	0.93	0.93	0.95	0.95
Heavy Vehicles (%)	6%	8%	9%	6%	12%	10%
Adj. Flow (vph)	163	238	676	102	86	513
Shared Lane Traffic (%)						
Lane Group Flow (vph)	401	0	778	0	86	513
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.96	0.96	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (ft)	20		100		20	100
Trailing Detector (ft)	0		0		0	0
Detector 1 Position(ft)	0		0		0	0
Detector 1 Size(ft)	20		6		20	6
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA

Lanes, Volumes, Timings
9: Hartford Avenue & Maple Street

2030 AM BUILD
08/31/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	8		2		1	6
Permitted Phases					6	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	5.0		5.0		5.0	5.0
Minimum Split (s)	23.0		23.0		10.0	23.0
Total Split (s)	34.5		34.0		21.5	55.5
Total Split (%)	38.3%		37.8%		23.9%	61.7%
Maximum Green (s)	29.5		29.0		16.5	50.5
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0		-2.0	-2.0
Total Lost Time (s)	3.0		3.0		3.0	3.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		Max		None	Max
Act Effct Green (s)	23.3		42.8		52.8	52.8
Actuated g/C Ratio	0.28		0.52		0.64	0.64
v/c Ratio	0.78		0.84		0.29	0.46
Control Delay	31.5		30.5		9.7	10.3
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	31.5		30.5		9.7	10.3
LOS	C		C		A	B
Approach Delay	31.5		30.5			10.2
Approach LOS	C		C			B

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 82.1

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 23.9

Intersection LOS: C

Intersection Capacity Utilization 75.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 9: Hartford Avenue & Maple Street



Queues

2030 AM BUILD

9: Hartford Avenue & Maple Street

08/31/2023



Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	401	778	86	513
v/c Ratio	0.78	0.84	0.29	0.46
Control Delay	31.5	30.5	9.7	10.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	31.5	30.5	9.7	10.3
Queue Length 50th (ft)	146	341	15	121
Queue Length 95th (ft)	249	#701	40	242
Internal Link Dist (ft)	1411	991		756
Turn Bay Length (ft)			125	
Base Capacity (vph)	672	930	451	1110
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.60	0.84	0.19	0.46

Intersection Summary

























95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

3: Maple Street & Mechanic Street/W. Central Street













2030 PM BUILD

08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	496	76	293	728	116	109	166	189	165	285	231
Future Volume (vph)	90	496	76	293	728	116	109	166	189	165	285	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	11	12	11	11	11	13	11	11
Storage Length (ft)	150		0	250		275	0		0	260		230
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1711	1845	1583	1787	1783	1553	1694	1783	1546	1811	1818	1501
Flt Permitted	0.143			0.323			0.248			0.400		
Satd. Flow (perm)	257	1845	1583	608	1783	1553	442	1783	1546	762	1818	1501
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			114			125			205			248
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1205			1102			2149			1938	
Travel Time (s)		27.4			25.0			48.8			44.0	
Peak Hour Factor	0.92	0.92	0.92	0.98	0.98	0.98	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	2%	3%	2%	1%	3%	4%	3%	3%	1%	3%	1%	4%
Adj. Flow (vph)	98	539	83	299	743	118	118	180	205	177	306	248
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	539	83	299	743	118	118	180	205	177	306	248
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			13			13	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.00	1.00	1.04	1.00	1.04	1.04	1.04	0.96	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	Perm

Lanes, Volumes, Timings
3: Maple Street & Mechanic Street/W. Central Street

2030 PM BUILD
08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	8.0	5.0	5.0	8.0	8.0
Minimum Split (s)	12.0	26.0	26.0	12.0	24.0	24.0	9.5	23.0	12.0	9.5	23.0	23.0
Total Split (s)	17.0	55.0	55.0	17.0	55.0	55.0	11.0	22.0	17.0	11.0	22.0	22.0
Total Split (%)	16.2%	52.4%	52.4%	16.2%	52.4%	52.4%	10.5%	21.0%	16.2%	10.5%	21.0%	21.0%
Maximum Green (s)	10.0	49.0	49.0	12.0	49.0	49.0	8.0	17.0	12.0	8.0	17.0	17.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	4.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-4.0	-2.0	-2.0	-2.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	0.0
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.0	3.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max	Max
Act Effect Green (s)	38.0	37.0	37.0	46.7	45.6	45.6	27.3	19.5	37.3	28.4	22.5	20.4
Actuated g/C Ratio	0.40	0.39	0.39	0.49	0.48	0.48	0.29	0.20	0.39	0.30	0.24	0.21
v/c Ratio	0.33	0.76	0.12	0.58	0.87	0.15	0.52	0.50	0.28	0.56	0.72	0.48
Control Delay	21.0	32.7	1.8	30.0	36.2	3.0	37.0	42.8	3.5	37.0	50.2	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	32.7	1.8	30.0	36.2	3.0	37.0	42.8	3.5	37.0	50.2	8.7
LOS	C	C	A	C	D	A	D	D	A	D	D	A
Approach Delay		27.5			31.2			25.4			32.9	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 95.7

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 29.8









Intersection LOS: C

Intersection Capacity Utilization 77.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: Maple Street & Mechanic Street/W. Central Street













 Ø1	 Ø2	 Ø4	 Ø3
11 s	22 s	55 s	17 s
 Ø5	 Ø6	 Ø7	 Ø8
11 s	22 s	17 s	55 s

Queues

2030 PM BUILD

3: Maple Street & Mechanic Street/W. Central Street

08/31/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	98	539	83	299	743	118	118	180	205	177	306	248
v/c Ratio	0.33	0.76	0.12	0.58	0.87	0.15	0.52	0.50	0.28	0.56	0.72	0.48
Control Delay	21.0	32.7	1.8	30.0	36.2	3.0	37.0	42.8	3.5	37.0	50.2	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	32.7	1.8	30.0	36.2	3.0	37.0	42.8	3.5	37.0	50.2	8.7
Queue Length 50th (ft)	42	310	0	116	418	0	60	110	0	93	203	0
Queue Length 95th (ft)	65	376	14	179	#662	27	109	183	39	156	#368	70
Internal Link Dist (ft)	1125			1022			2069			1858		
Turn Bay Length (ft)	150			250			275			260		
Base Capacity (vph)	320	1011	919	549	977	907	236	363	753	316	426	515
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.53	0.09	0.54	0.76	0.13	0.50	0.50	0.27	0.56	0.72	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑			↕	
Traffic Vol, veh/h	9	0	33	7	0	1	19	259	3	0	488	22
Future Vol, veh/h	9	0	33	7	0	1	19	259	3	0	488	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	200	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	92	85	92	92	92	93	93	92	92	99	99
Heavy Vehicles, %	0	2	8	14	0	0	6	2	33	2	0	0
Mvmt Flow	11	0	39	8	0	1	20	278	3	0	493	22











Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	824	825	504	844	835	280	515	0	0	281	0	0
Stage 1	504	504	-	320	320	-	-	-	-	-	-	-
Stage 2	320	321	-	524	515	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.28	7.24	6.5	6.2	4.16	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.24	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.24	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.372	3.626	4	3.3	2.254	-	-	2.218	-	-
Pot Cap-1 Maneuver	294	308	556	270	306	764	1030	-	-	1282	-	-
Stage 1	554	541	-	667	656	-	-	-	-	-	-	-
Stage 2	696	652	-	515	538	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	289	302	556	247	300	764	1030	-	-	1282	-	-
Mov Cap-2 Maneuver	289	302	-	247	300	-	-	-	-	-	-	-
Stage 1	543	541	-	654	644	-	-	-	-	-	-	-
Stage 2	682	640	-	479	538	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13.7		18.8		0.6		0	
HCM LOS	B		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1030	-	-	464	270	1282	-
HCM Lane V/C Ratio	0.02	-	-	0.106	0.032	-	-
HCM Control Delay (s)	8.6	-	-	13.7	18.8	0	-
HCM Lane LOS	A	-	-	B	C	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.1	0	-






Lanes, Volumes, Timings
9: Hartford Avenue & Maple Street

2030 PM BUILD
08/31/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	151	120	616	192	257	759
Future Volume (vph)	151	120	616	192	257	759
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	13	13	12	12
Storage Length (ft)	0	0		0	125	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.940		0.968			
Flt Protected	0.973				0.950	
Satd. Flow (prot)	1664	0	1845	0	1752	1827
Flt Permitted	0.973				0.103	
Satd. Flow (perm)	1664	0	1845	0	190	1827
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	49		19			
Link Speed (mph)	30		30			30
Link Distance (ft)	1491		1071			836
Travel Time (s)	33.9		24.3			19.0
Peak Hour Factor	0.92	0.92	0.94	0.94	0.92	0.92
Heavy Vehicles (%)	4%	5%	3%	3%	3%	4%
Adj. Flow (vph)	164	130	655	204	279	825
Shared Lane Traffic (%)						
Lane Group Flow (vph)	294	0	859	0	279	825
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	0.96	0.96	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (ft)	20		100		20	100
Trailing Detector (ft)	0		0		0	0
Detector 1 Position(ft)	0		0		0	0
Detector 1 Size(ft)	20		6		20	6
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA

Lanes, Volumes, Timings
9: Hartford Avenue & Maple Street

2030 PM BUILD
08/31/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	8		2		1	6
Permitted Phases					6	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	5.0		5.0		5.0	5.0
Minimum Split (s)	23.0		23.0		10.0	23.0
Total Split (s)	34.5		34.0		21.5	55.5
Total Split (%)	38.3%		37.8%		23.9%	61.7%
Maximum Green (s)	29.5		29.0		16.5	50.5
Yellow Time (s)	3.0		3.0		3.0	3.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0		-2.0	-2.0
Total Lost Time (s)	3.0		3.0		3.0	3.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		Max		None	Max
Act Effct Green (s)	18.8		36.0		52.8	52.8
Actuated g/C Ratio	0.24		0.46		0.68	0.68
v/c Ratio	0.67		0.99		0.69	0.66
Control Delay	29.6		53.6		23.8	11.8
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	29.6		53.6		23.8	11.8
LOS	C		D		C	B
Approach Delay	29.6		53.6			14.9
Approach LOS	C		D			B

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 77.6

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 31.5

Intersection LOS: C

Intersection Capacity Utilization 84.1%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 9: Hartford Avenue & Maple Street



Queues

2030 PM BUILD

9: Hartford Avenue & Maple Street

08/31/2023



Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	294	859	279	825
v/c Ratio	0.67	0.99	0.69	0.66
Control Delay	29.6	53.6	23.8	11.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	29.6	53.6	23.8	11.8
Queue Length 50th (ft)	106	387	72	196
Queue Length 95th (ft)	184	#814	169	434
Internal Link Dist (ft)	1411	991		756
Turn Bay Length (ft)			125	
Base Capacity (vph)	707	866	503	1242
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.42	0.99	0.55	0.66

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.