TEC, Inc.
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TECHNICAL MEMORANDUM

TO: JLB Realty, LLC
Attn: Mark Seck
2310 Washington Street, 3rd Floor
Newton, Massachusetts 02462

DATE: October 31, 2025

FROM: Samuel W. Gregorio, PE, PTOE, RSP_1, Senior Engineer
Rana Eslamifard, Transportation Designer

PROJECT #: T1757

RE: Proposed 1 & 2 Federal Street Redevelopment– Billerica, Massachusetts
Traffic Impact & Parking Assessment

INTRODUCTION

TEC, Inc. (TEC) has been retained by the JLB Realty, LLC (the "Applicant") to prepare a Traffic Impact and Parking Assessment (TIPA) associated with a proposed redevelopment of both the #1 Federal Street (Map 77 | Block 0 | Lot 162) and #2 Federal Street (Map 68 | Block 4 | Map 8) parcels (the "Project") in Billerica, Massachusetts. Both parcels are located in the Industrial (I) Zoning District, as well as within the new Massachusetts Bay Transportation Authority (MBTA) Communities Multi-family Overlay District (MCMOD) – Federal Street Subdistrict (Subdistrict C).

The Project location directly abuts State Highway Layout (SHLO) along the US Route 3 Northbound (NB) Ramp and therefore would typically be subject to an Indirect Permit to Access State Highway from the Massachusetts Department of Transportation (MassDOT). The Applicant has preliminarily coordinated with the MassDOT – District 4 and has been informed that the Project does not require the issuance of a State Permit to Access State Highway for the subject redevelopment project.

Change in Site Building Program

The existing site currently consists of a two-story ±60,000 square foot (SF) office building with ±195 off-street parking spaces at #1 Federal Street and a two-story ±98,000 SF office building with ±316 off-street parking spaces at #2 Federal Street. Overall, the two parcels consist of ±158,000 SF of office space with ±511 off-street parking spaces. The #1 Federal Street property is accessed via two (2) full access/egress driveway along the southerly side of Federal Street with cross-access capabilities from the easterly driveway to the adjacent office parcel (#3 Federal Street). The #2 Federal Street property is accessed via two (2) full access/egress driveway along the northerly side of Federal Street with cross-access capabilities from the easterly driveway to the adjacent office parcel (#4 Federal Street).

The Project seeks to raze the existing building structures and fully redevelop each property to include a total of up to 255 multifamily residential units with associated tenant amenity space and 442 off-street parking spaces. Specifically, a three-story residential building with 81 residential units and 143 off-street parking spaces at #1 Federal Street and a three-story building with 174 residential units and 299 off-street parking spaces at #2 Federal Street.

The Project will also reconfigure the pavement and open space area within the site to provide newly reconstructed driveways, including two (2) full-access driveways for #1 Federal Street along the south side of Federal Street with access to neighboring properties eliminated; and two (2) full-access driveways for #2 Federal Street along the north side of Federal Street with cross-access and shared parking capabilities between the adjacent parcels along Federal Street.

Methodology

TEC has evaluated the traffic operations and safety characteristics of the study intersection under base year and future year conditions consistent with the *Transportation Impact Assessment (TIA) Guidelines* issued by MassDOT[1], the Town of Billerica Zoning Bylaw, and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports. The future year examines traffic operations under a 7-year planning horizon (2032) for traffic volume projections, which includes an evaluation of the future year conditions with and without recommended improvements. The findings and recommendations for the improvements are based on the detailed traffic analyses included in this report.

EXISTING CONDITIONS

The study area was selected to contain the major roadways and intersections providing local access to the Project site. This includes an evaluation of intersection(s) in which the site-generated trips increase the peak hour traffic volume by more than 5 percent and/or by more than 100 *new* vehicles per hour per MassDOT's *TIA Guidelines* (Section 3.I.C). The following intersections were included in the study area:

1. Concord Road / Middlesex Turnpike
2. Concord Road / Federal Street / Brightview Concord River Driveway

The study area intersections are shown graphically in Figure 1.

Geometry

A field inventory of existing traffic conditions at the study area intersection was conducted by TEC staff in July 2025 to obtain information related to intersection geometry, operating characteristics, and lane usage. A description of the existing roadway and intersection inventory is provided below.

Roadway – Concord Road

Concord Road is a southwest-northeast urban minor arterial roadway under the jurisdiction of the Town of Billerica except for the segment between the US Route 3 northbound and southbound ramp terminals. For the purpose of this memorandum, the cardinal direction of Concord Road is defined as north-south. The roadway provides a local connection between Route 4 to the south in Bedford and Route 3A / Billerica Center to the north. For a majority of the corridor, Concord Road consists of a single travel lane in each direction which expands up to six-lanes. Pedestrian accommodation is provided along the corridor and alternates sides of the roadway with the study

[1] *Transportation Impact Assessment (TIA) Guidelines*; Massachusetts Department of Transportation; March 13, 2014.

area. There is no formal bicycle accommodation provided along the Concord Road corridor; however, combined shoulder and travel lanes provide shared traveled-way configuration to accommodate biking. Land uses along Concord Road are a mix of commercial, industrial, and residential. The posted speed limit along the corridor in the vicinity of the study area is 35 miles per hour (mph).

Intersection – Concord Road / Federal Street / Brightview Concord River Driveway

Federal Street and the Brightview Concord River Driveway intersect Concord Road to form a four-legged unsignalized intersection. The Federal Street westbound and the Brightview Concord River Driveway eastbound approaches are under stop-control; however, no stop sign is provided for the Brightview Concord River Driveway. Both the Concord Road northbound and southbound approaches are free flowing. The Federal Street westbound approach provides two unmarked lanes typically utilized as an exclusive left-turn lane and an exclusive right-turn lane (negligible cross traffic to the Brightview Concord River Driveway) with directional flow separated by a raised landscaped median. The Brightview Concord River Driveway eastbound approach consists of a single general-purpose travel lane with directional flow separated by a marked centerline. Both the Concord Road northbound and southbound approaches each consist of two general-purpose travel lanes with directional flow separated by a marked centerline. A sidewalk is provided along the southerly side of Federal Street and Brightview Concord River Driveway, and along the westerly side of Concord Road. There is no crosswalk provided across the Brightview Concord River Driveway eastbound approach; however, pedestrian curb ramps are present. There is no formal bicycle accommodation at the intersection.

Intersection – Concord Road / Middlesex Turnpike

Middlesex Turnpike intersects Concord Road to form a four-legged signalized intersection. The Middlesex Turnpike eastbound approach consists of an exclusive left-turn lane and a shared through / right-turn lane which is, and has been, barricaded since the discontinuation of the Middlesex Turnpike section between Concord Road and the Concord River. Traffic signals facing this approach are not operational and the intersection effectively operates as a three-legged intersection. The Middlesex Turnpike westbound approach consists of an exclusive left-turn lane and a general-purpose travel lane with directional flow separated by a marked centerline. The Concord Road northbound and southbound approaches each consist of an exclusive left-turn lane, a through lane, and a shared though / right-turn lane with directional flow separated by a marked centerline. A sidewalk is provided along the southerly side of Middlesex Turnpike east of the intersection, along the westerly side of the Concord Road south of Middlesex Turnpike, and along the easterly side of the Concord Road north of Middlesex Turnpike. Crosswalks are present across all approaches at the intersection. Pedestrian curb ramps are provided at the ends of each crosswalk; all of which appear to still be in compliance with Americans with Disabilities Act (ADA) / Architectural Access Board (AAB) standards. There is no formal bicycle accommodation at the intersection.

1" = 250'

1 & 2 Federal Street Redevelopment - Billerica, MA

Traffic Impact and Parking Assessment

Study Area Intersections:

1. Concord Road / Middlesex Turnpike
2. Concord Road / Federal Street / Brightview Concord River Driveway

Figure 1

Locus Map

TEC
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Existing Public Transportation

Lowell Regional Transit Authority

Public transportation services within the study area are provided by the Lowell Regional Transit Authority (LRTA), including fixed-route bus service along Concord Road and the Middlesex Turnpike via Route 14 (Burlington Mall/Lahey Clinic).

- *LRTA Bus Route 14* - Route 14 connects the Lahey Clinic in Burlington with the Kennedy Transportation Center in Lowell, offering transfer opportunities to other LRTA routes and the MBTA Commuter Rail system. An outbound bus stop (Bus Stop #313) is located along Middlesex Turnpike just south of Concord Road, approximately a three-minute walk from the redevelopment site when accounting for the future Yankee Doodle Bike Path which runs along the northerly edge of the site. Additionally, LRTA buses operate in a flag stop mode, allowing passengers to request pick-up or drop-off at any safe location along the route by signaling to the driver. LRTA also offers Road Runner ADA paratransit services for individuals with disabilities who are unable to use the fixed-route bus system. A schedule outline for the bus route is provided below:
    - Monday to Friday: Inbound 7:00 AM to 7:00 PM & Outbound 6:00 AM to 6:00 PM | Headways – 60 minutes
    - Saturday: Inbound 8:00 AM to 6:00 PM & Outbound 7:00 AM to 5:00 PM | Headways – 60 minutes

LRTA Route 14 schedule information is provided in Attachment A.

Existing Traffic Volumes

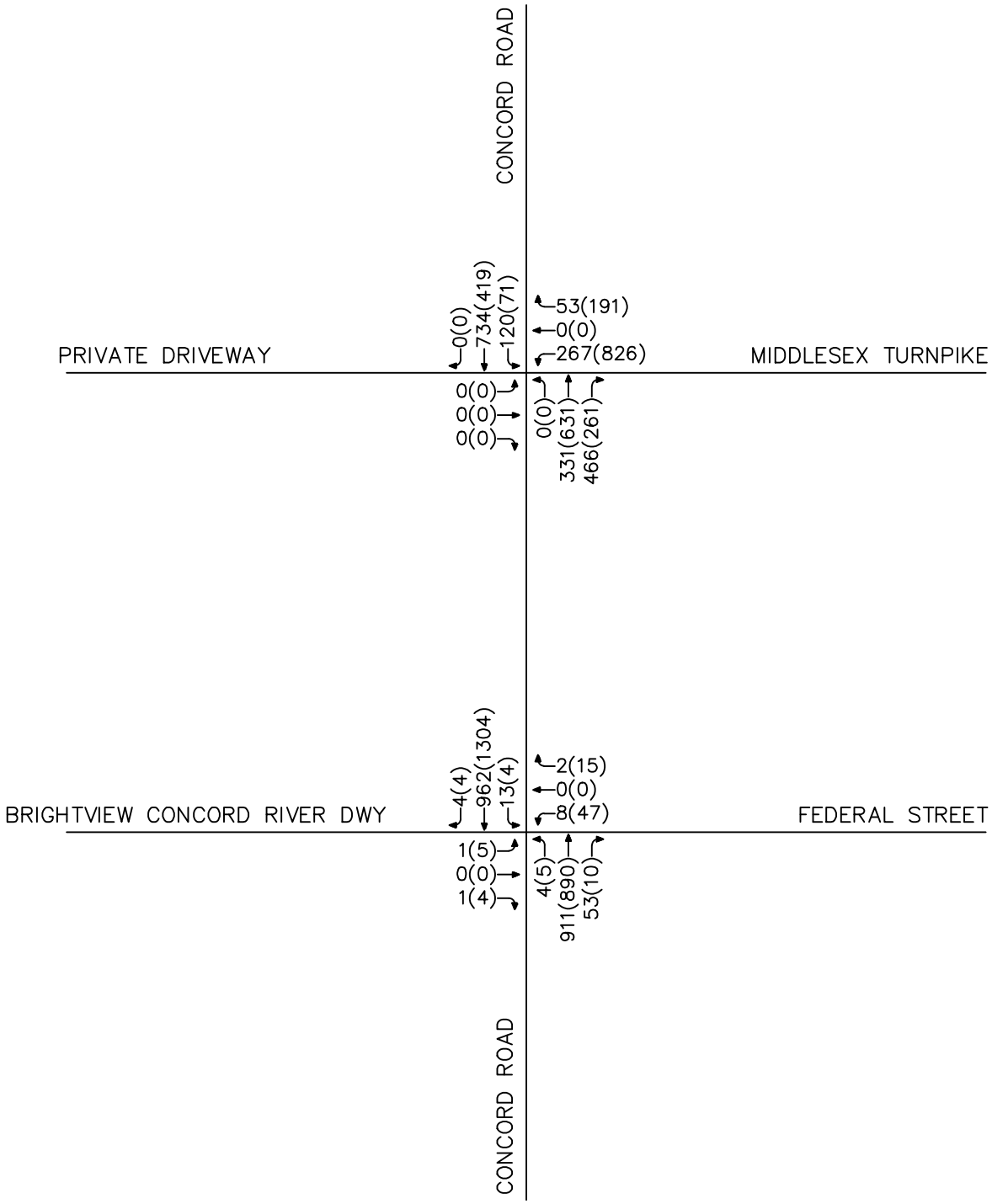
Traffic volume data was obtained from Turning Movement Counts (TMCs) at study area intersections and supplemented with Automatic Traffic Recorder (ATR) counts conducted along Concord Road near Federal Street. The details of the data collection effort are described below.

Turning Movement Counts

To establish existing traffic-volume conditions within the study area, manual TMCs were conducted at the study area intersections during a typical weekday (7:00 AM – 7:00 PM) on Wednesday, July 23, 2025. Area schools were not in regular session during the period of traffic counts; however, TEC does not expect school activities to have a major impact on traffic pattern within the study area. TEC reviewed seasonal adjustment factors per MassDOT guidance to apply to the traffic volumes. In the absence of published 2025 seasonal data, MassDOT's 2024 data indicates that July typically represents an above-average traffic month. Therefore, no seasonal adjustment factor was applied, providing a conservative analysis condition.

A detailed summary of the TMCs, partitioned into 15-minute intervals, is provided within Attachment B. The resulting 2025 Existing Conditions weekday morning and weekday evening peak hour traffic volume network is illustrated in Figure 2.

Not to Scale



XXX(XXX) = WEEKDAY MORNING PEAK HOUR(WEEKDAY EVENING PEAK HOUR)

Figure 2

2025 Existing Year Conditions Weekday Morning and Weekday Evening Peak Hour Traffic Volumes

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Automatic Traffic Recorder Counts

An ATR was conducted for a continuous 48-hour mid-week period on Concord Road, north of Federal Street, and along Middlesex Turnpike, east of Concord Road, from Wednesday, July 23, 2025, through Thursday, July 24, 2025, concurrently with the TMCs. The ATRs were obtained to gather additional daily traffic volume data, vehicle speeds, and vehicle classification with a summary of the weekday ATR traffic data is presented in Table 1. A detailed summary of the ATR data, partitioned into 15-minute intervals, is provided within Attachment C.

Table 1 – Existing Weekday Traffic Volume Summary

Location	Weekday Traffic Volume[a]	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
		Traffic Volume[b]	K Factor[c]	Directional Distribution[d]	Traffic Volume	K Factor	Directional Distribution
Concord Road, north of Federal Street	14,856	979	6.6%	51.7% SB	1,312	8.8%	59.0% NB
Middlesex Turnpike, east of Concord Road	7,422	586	7.9%	64.7% EB	1,017	13.7%	75.4% WB

[a] Daily traffic expressed in vehicles per day.
[b] Hourly traffic expressed in vehicles per hour.
[c] Percent of daily traffic volumes which occur during the peak hour.
[d] Percent of peak hour volume in the predominant direction of travel.

Concord Road carries approximately 14,860 vehicles per day (vpd) on an average weekday. Directional distribution along the roadway is nearly even during the weekday morning peak hour and more prominent in the northbound direction during the weekday evening hour. The average and 85th percentile speeds along Concord Road were measured at 37 mph and 41 mph, respectively, in the northbound direction. The average and 85th percentile speeds along Concord Road were measured at 33 mph and 38 mph, respectively, in the southbound direction. The average speeds are generally consistent with the posted 35 mph speed limit with the 85th percentile speed higher than the posted speed.

Middlesex Turnpike carries approximately 7,420 vpd on an average weekday. Directional distribution along the roadway is more prominent in the eastbound direction during the weekday morning peak hour and in the westbound direction during the weekday evening peak hour which is generally consistent with commuter flows towards/from US Route 3. The average and 85th percentile speeds along Middlesex Turnpike were measured at 29 mph and 32 mph, respectively, in the eastbound direction. The average and 85th percentile speeds along Middlesex Turnpike were measured at 26 mph and 32 mph, respectively, in the westbound direction. Both the average and 85th percentile speeds appear to be below the posted 35 mph speed limit; however, this may be somewhat the result of proximity to the signalized intersection with Concord Road.

Existing Safety Conditions

A comprehensive traffic safety analysis was conducted within the study area. The traffic safety analysis included an evaluation of the compilation and examination of sight distances, intersection crash data, and a general safety review with consideration given to items on the MassDOT Safety Review Prompt List. Details of each step in the traffic safety analysis are described in the following section.

Sight Distance Evaluation

TEC visited the site and measured the available sight lines along Concord Road to/from Federal Street in July 2025. The available sight lines were compared to minimum requirements established by the American Association of State Highway and Transportation Officials (AASHTO)[2].

Sight distance represents the length of roadway that is visible to a driver traveling within the roadway. Two types of sight distance are typically evaluated for driveways and intersections: stopping sight distance (SSD) and intersection sight distance (ISD). SSD is the minimum distance required for a driver traveling along a roadway to perceive an object in the roadway and stop safely in advance of the object when traveling on a wet pavement surface. SSD is measured from an eye height of 3.5 feet to an object height of 2 feet above the ground, which is equivalent to a driver viewing the taillight of a vehicle ahead. SSD is measured along the centerline of the travel lane approaching a driveway or intersection.

ISD represents the length of the roadway visible to a driver waiting to exit a driveway or minor street. Minimum ISD requirements are based on the distance required for a driver to exit a minor street onto a major street without requiring an approaching vehicle to reduce its speed from the design speed to less than 70% of the design speed. ISD is measured from an eye height of 3.5 feet to an object height of 3.5 feet and is measured from a distance 14.5 feet beyond the edge of the travel-way of the major roadway to represent a driver waiting to exit a driveway or minor roadway.

SSD is typically considered the critical sight distance, as it represents the minimum distance required for safe stopping, while ISD represents an acceptable speed reduction for approaching vehicles. The ISD, however, must be at least equal to the minimum required SSD in order to prevent a driver from entering the roadway when an approaching vehicle is too close to safely stop. The guidance provided by AASHTO states:

> *"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."*

Sight distances as typically reported utilize the 85th percentile speed, which were collected in July 2025, to account for the roadway operating speed. Tables 2 and 3 provide a summary of the available sight distances from Federal Street at the intersection of Concord Road / Federal Street / Brightview Concord River Driveway.

[2] *A Policy on Geometric Design of Highways and Streets (the "Green Book")*; American Association of State Highway and Transportation Officials; Washington DC; 2018

Table 2 – Existing Stopping Sight Distance Measurements

Approach / Direction	Operating Speed	AASHTO Recommended Minimum	Measured Stopping Sight Distance
Concord Road at Federal Street			
Concord Road Northbound	41 MPH	305 FT	500+ FT
Concord Road Southbound	38 MPH	280 FT	500+ FT

[a] Actual measured 85th percentile operating speed along Concord Road

As shown in Table 2, the SSD along both Concord Road northbound and southbound exceeds AASHTO minimum recommendations for safe operations under ideal conditions.

Table 3 – Existing Intersection Sight Distance Measurements

Approach / Direction	Operating Speed [(a)]	AASHTO Desired Minimum	AASHTO Recommended Minimum	Measured Intersection Sight Distance
Federal Street at Concord Road:				
Federal Street looking left [South]	41 MPH	455 FT	305 FT	500+ FT
Federal Street looking right [North]	38 MPH	420 FT	280 FT	500+ FT

[a] Actual measured 85th percentile operating speed along Concord Road

Similar to the SSD, the ISD sight lines looking left towards Concord Road northbound and looking right towards southbound exceed AASHTO minimum recommendations for safe operations under ideal conditions. Seasonal vegetation along the easterly side of Concord Road, north of Federal Street, may reduce the sight line for vehicles travelling along Federal Street and should be maintained. This area of vegetation, although not currently an obstruction, is within the Town Right-of-Way (ROW) and/or within the site frontage of #2 Federal Street.

Crash History Analysis

Crash reports at the study intersections were compiled and analyzed from MassDOT's Interactive Mapping Portal for Analysis and Crash Tracking (IMPACT) system for the most recent five full years (2019 – 2023) of crash data including the most recent three years of complete data (2019 – 2021). A summary of the vehicle crash data and intersection crash rates is provided in Table 4. Detailed descriptions of the crash data are provided in Attachment D.

Crash Rates

In addition to examining the number of crashes at the study area intersections, an intersection crash rate was calculated to compare the occurrence of crashes to the volume of traffic passing through the study area intersection. The crash rate per million entering vehicles (MEV) was calculated using the evening peak hour volumes from the TMCs and K-factor factors (relation of peak hour traffic to daily traffic) in Table 1. The crash rate at the intersections was compared to the statewide and district-wide averages published by MassDOT in June 2018 to determine the significance of the crash occurrence. The statewide and District 4 average for signalized intersections is 0.78 and 0.75 crashes per MEV, respectively, with the statewide and District average for unsignalized intersections both as 0.57 crashes per MEV.

Table 4 – Crash Data Summary

Parameter		Concord Road / Middlesex Turnpike	Concord Road / Federal Street
Crash Year	2019	7	0
	2020	4	0
	2021	6	1
	2022	2	2
	2023	3	1
	TOTAL	***22***	***4***
Average Annual Crashes		*4.4*	*0.8*
Crash Rate		*0.44*	*0.08*
Manner of Collision	Angle	4	2
	Rear-end	11	2
	Sideswipe	2	0
	Single Vehicle	0	0
	Ped / Bike	0	0
	Head-On	4	0
	Other / Not Reported	1	0
	TOTAL	***22***	***4***
Road Surface Conditions	Dry	17	3
	Wet	4	1
	Not Reported	1	0
	TOTAL	***22***	***4***
Injury Status (Crash Severity)	Property Damage	17	1
	Non-Fatal Injury	5	3
	Not Reported	0	0
	TOTAL	***22***	***4***
Day of Week	Monday-Friday	17	4
	Saturday-Sunday	5	0
	TOTAL	***22***	***4***
Time of Day	6:00AM-9:00AM	4	0
	9:00AM-12:00PM	1	0
	12:00PM-3:00PM	5	1
	3:00PM-6:00PM	4	1
	6:00PM-9:00PM	6	1
	9:00PM-6:00AM	2	1
	TOTAL	***22***	***4***

Crash Data Summary

Concord Road / Middlesex Turnpike

The intersection of Concord Road / Middlesex Turnpike experienced a total of twenty-two (22) crashes, or an average of 4.4 crashes per year, over the five-year period. A total of five (5) crashes resulted in injuries, while the majority of crashes resulted in property damage only. The intersection has a crash rate of 0.44 per MEV, which is below the statewide and districtwide

averages for signalized intersections. Half of the crashes (11 of 22) at this location were rear-end crashes. The IMPACT database provides information as to the vehicle approach direction; however, the skewed off-compass nature of the roadways does not allow for the specific decipher of travel direction on a crash report on a crash report basis. There were an additional four (4) angle crashes, two (2) sideswipe crashes, and four (4) head-on crashes. Four (4) crashes occurred both during the morning and evening peak periods while six (6) crashes occurred shortly after the evening peak period.

Concord Road / Federal Street / Brightview Concord River Driveway

The intersection of Concord Road / Federal Street / Brightview Concord River Driveway experienced a total of four (4) crashes, or an average of 0.8 crashes per year, over the five-year period. The intersection has a crash rate of 0.08 per MEV, which is well below the statewide and districtwide averages for unsignalized intersections. Half of the crashes (2 of 4) at this location were angled crashes, and the remaining two (2) crashes were reported as rear-end crashes. Most (3 of 4) of the crashes occurred during periods of dry pavement. All (4 of 4) of the crashes occurred on a weekday, where two (2) crashes occurred during the evening period between 3:00 PM and 6:00 PM.

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2032, which reflects a 7-year planning horizon in accordance with MassDOT standards for TIAs. The traffic conditions for the year 2032 under No-Build conditions were developed to document the operating conditions independent of the proposed Project, including all existing traffic, new traffic from background growth, and traffic from other specific developments in the site area. Anticipated site-generated traffic volumes for the proposed Project were superimposed upon the No-Build traffic networks to reflect the Build conditions with the proposed project.

Background Growth

Traffic growth is a function of the expected land development in the immediate area and the surrounding region. Several methods can be used to estimate this growth. A procedure frequently employed estimates an ambient growth rate for the area roadways and applies that percentage to all mainline and side street traffic volumes. The drawback to such a procedure is that some turning volumes may grow at either a higher or a lower rate at particular intersections.

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

To provide a conservative analysis framework, both procedures were used.

General Ambient Growth

To determine future traffic growth projections, TEC utilized the Northern Middlesex Council of Governments (NMCOG), Northen Middlesex Regional Traffic Volume Report published in 2022

evaluating growth rate data at over 200 locations throughout the region between 2012-2022 documenting traffic growth rates for the region's communities is important in the determination of impacts from transportation improvements or new developments on the existing system. The data indicates that in 2022 the highest annual growth in traffic volume occurred in Billerica. This represents an approximate 0.85 percent increase in traffic per year. The NMCOG annual growth data is provided in Attachment E.

Specific Development by Others

TEC coordinated with the Town of Billerica Planning and Community Development Department to identify any nearby private / public development properties in the vicinity of the study area that are either in the planning process or were recently approved but not yet occupied. The following developments were identified to potentially generate new traffic in the vicinity of the study area:

- *#161 Concord Road, Proposed Lab/cGMP Building* – This project entails the construction of a ±203,000 SF laboratory/cGMP building. Primary access to the Project site will be provided by the discontinued Middlesex Turnpike spur at Concord Road with secondary access to be provided by way of a new right-in/right-out driveway that will intersect the west side of Concord Road. Traffic projections related to this project were obtained from the *Transportation Impact Assessment* (TIA) prepared by Vanasse & Associates, Inc. (VAI)[3] in May 2022.
- *#195 Concord Road, Veteran's Educational Facility* – The project entails construction of an education/residence building to be located at #195 Concord Road. The project will include twenty-three (23) units with other resident amenities within the existing Brightview Concord River senior housing complex. Access to the site will be maintained through the existing driveway along Concord Road opposite Federal Street. It is not anticipated that the project will significantly increase traffic volumes in the area and therefore has been assumed to be part of the documented background growth rate.
- *#300 Concord Road, Proposed Lab* - The Concord Road Corporate Center currently consists of three (3) office buildings located at #296, #298, and #300 Concord Road, totaling approximately ±353,708 SF of office space. The proposed project includes the construction of a two-story, ±151,700 SF laboratory building on a portion of the existing parking lot. A *Traffic Assessment*[4] conducted for the proposed lab project indicates approximately 48 percent (±169,780 SF) of the office space within the Corporate Center is vacant which results in the generation of fewer trips within the study area compared to full occupancy of the office buildings. This is redocumented in a supplemental Traffic Assessment completed by McMahon and Associates in January 2023. With the anticipated reduction in traffic, TEC did not consider this reduction in occupancy in its evaluation of traffic within the study area.

Specific site trip generation information for the above-mentioned developments by others is provided in Attachment F.

[3] *Transportation Impact Assessment; Proposed Lab/cGMP Building, 0 & 161 Concord Road, Billerica MA*; prepared by Vanasse and Associates, Inc.; Andover, MA; dated May 2022.
[4] *Traffic Assessment – 300 Concord Road – Proposed Lab*; prepared by McMahon and Associates; Boston, MA; dated May 14, 2021.

Roadway Infrastructure Projects

The Town of Billerica Planning and Community Development Department identified the following public infrastructure projects in the vicinity of the study area:

- *Yankee Doodle Bike Path* – The Town of Billerica's proposed Yankee Doodle Bike Path will be constructed along the northern edge of the Project site. The construction of Phase 1 of the bikeway will connect the Town of Billerica regionally from the center of town to the Minuteman Bikeway in Bedford, via the Narrow-Gauge Bikeway. The completion of this section would provide an alternative mode transportation corridor from Billerica to Arlington, with connections to many other surrounding communities. The addition of this approximately 4-mile bike path to the community will provide a handicapped accessible link between educational, recreational and conservation areas in the southern portion of the Town. As of August 09, 2025, his project has been advertised for construction bids.

The public infrastructure projects are not anticipated to alter the traffic volume characteristics within the study area.

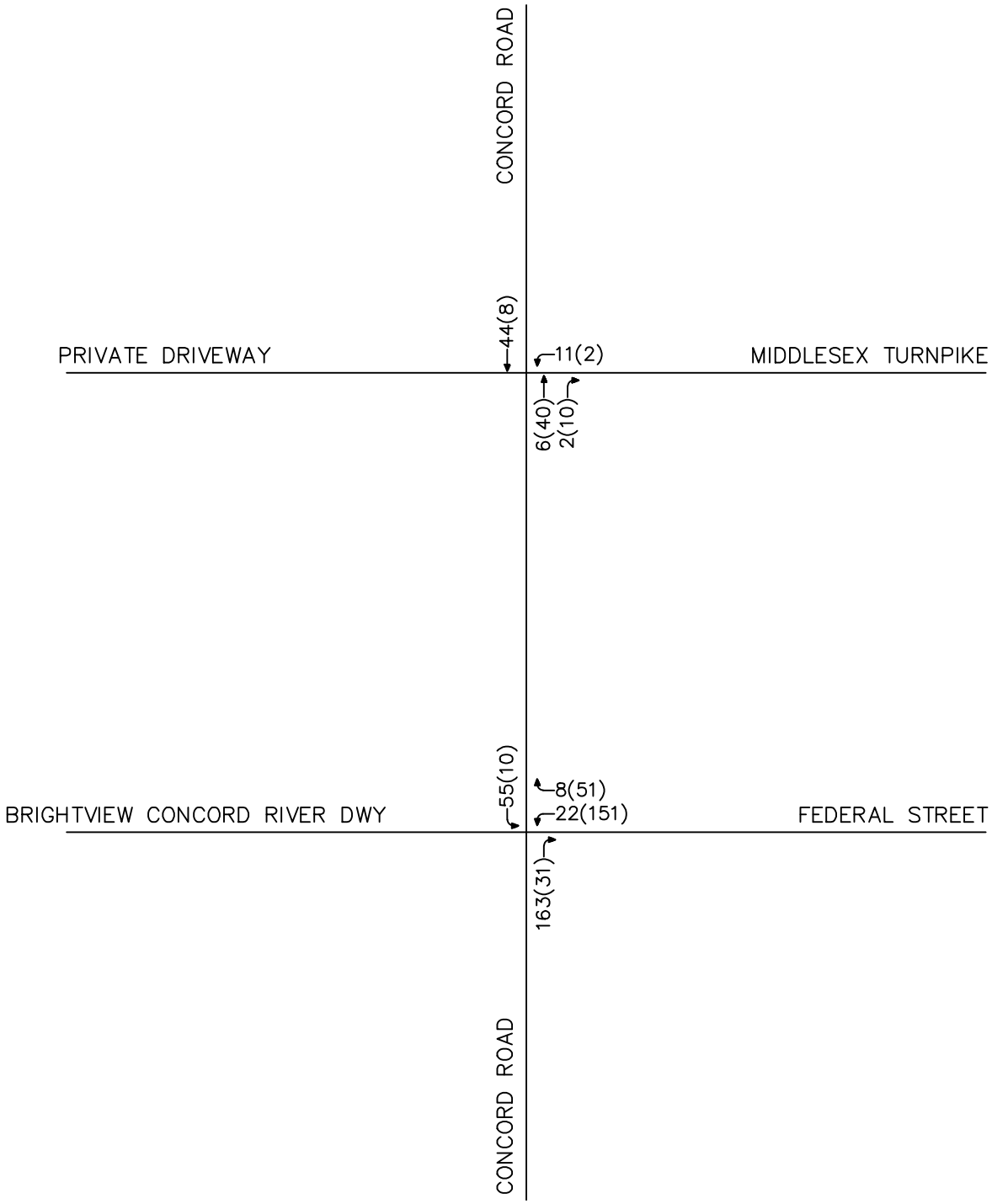
Reoccupancy of Existing Office Space

The existing site currently consists of a two-story ±60,000 SF office building at #1 Federal Street and a two-story ±98,000 SF office building at #2 Federal Street. These office buildings became fully vacant on June 30, 2025. It is reasonable to anticipate that these two (2) buildings could be fully reoccupied at a future date. As such, a projection of the fully occupied site has been included in the No-Build scenario. To determine the future operation of the site driveways and adjacent roadway system with the full reoccupation of the building, traffic volumes were projected for a general office building use which would be a typical traffic generator for the site under the current building footprints and internal layouts. TEC estimated the number of vehicle trips to be generated by the office building using the industry standard trip rates published in the Institute of Transportation Engineers (ITE) publication *Trip Generation, 11th Edition* for LUC 710 – General Office Building. Detailed trip generation calculation worksheets related to the full reoccupancy are provided in Attachment G. The resulting Site Reoccupancy weekday morning and weekday evening peak hour traffic volume networks are illustrated in Figure 3.

<u>No-Build Traffic Volumes</u>

The 2032 No-Build weekday morning and weekday evening peak hour traffic volume networks were developed by applying the 0.85% per year compounded annual background traffic growth rate to the 2025 Existing Conditions peak hour traffic volumes over the 7-year design horizon and adding traffic generated by the nearby proposed developments and the full reoccupancy of the existing office buildings on-site. The resulting 2032 No-Build weekday morning and weekday evening peak hour traffic volume networks are illustrated in Figure 4.

Not to Scale



XXX(XXX) = WEEKDAY MORNING PEAK HOUR(WEEKDAY EVENING PEAK HOUR)

Figure 3

Trip Generation
Existing Office (158,000 SF)

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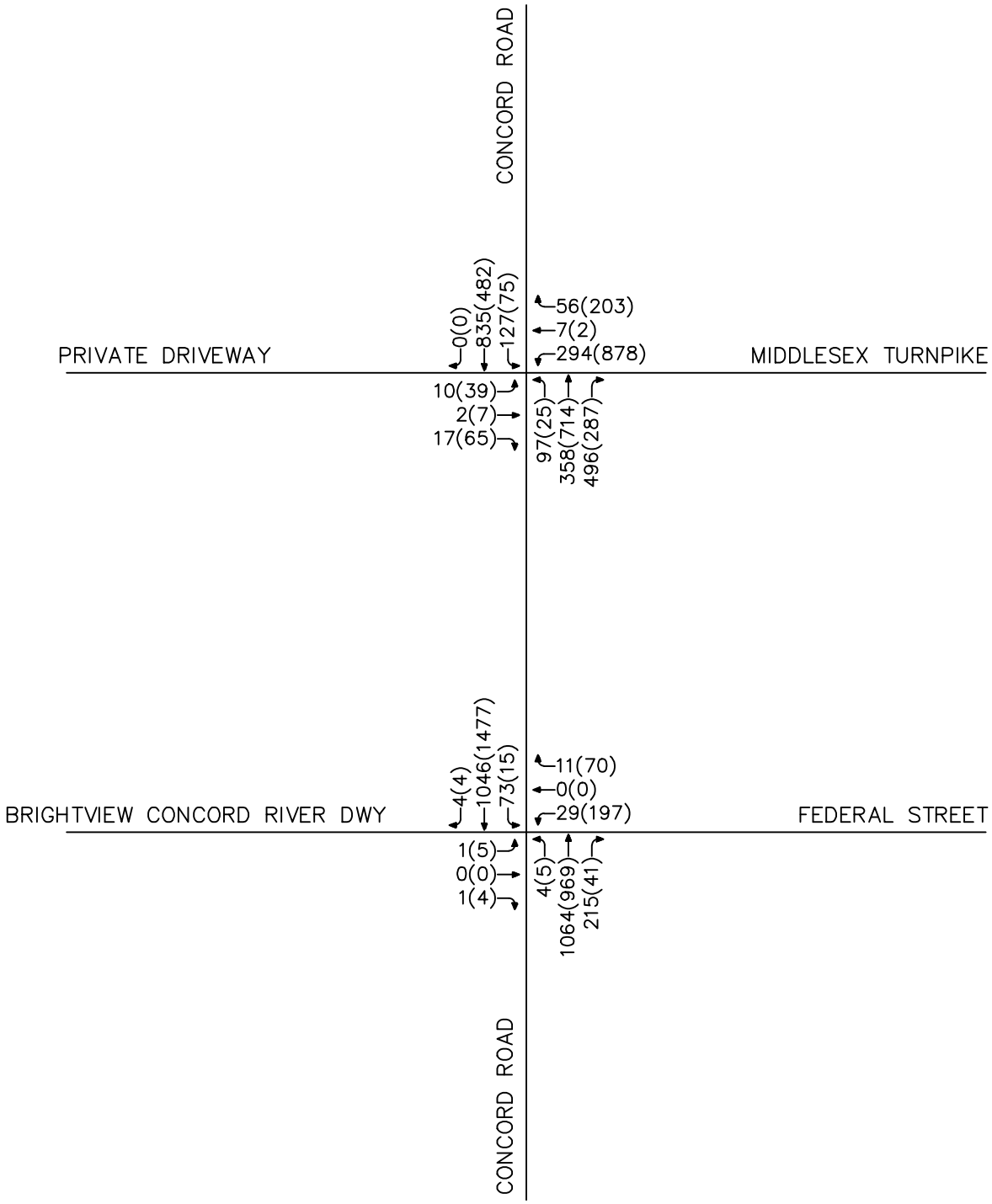

XXX(XXX) = WEEKDAY MORNING PEAK HOUR(WEEKDAY EVENING PEAK HOUR)

Figure 4

2032 No-Build Conditions Weekday Morning and Weekday Evening Peak Hour Traffic Volumes

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Site Generated Traffic

The Project seeks to fully redevelop each property to include a total of up to 255 multifamily residential units with associated tenant amenity space. Specifically, a three-story residential building with 81 residential units at #1 Federal Street and a three-story building with 174 residential units at #2 Federal Street. TEC estimated the site-generated traffic based on industry standard trip rates published in the ITE publication, *Trip Generation, 11th Edition* for LUC 220 – Multifamily Housing (Low-Rise). No credit will be taken in the TIPA for the Project's close proximity to public transportation (LRTA Bus Route 14) and walkable/bikeable destinations (Yankee Doodle Bike Path) resulting in a conservative trip generation projection for the Project. Table 5 provides a summary of the resulting site trip generation characteristics, a comparison to the full reoccupancy of the existing office use, and calculation of the net increase in site generated traffic. The detailed trip generation calculation worksheets are provided in Attachment H.

Table 5 – Trip Generation Summary

Time Period	Proposed Multifamily Housing (LUC 220) [a]	Existing General Office (LUC 710) [b]	Net Difference
Weekday Daily			
IN	**855**	864	**+9**
OUT	**855**	864	**+9**
TOTAL	**1,710**	1,728	**+18**
Weekday Morning			
IN	**24**	218	**-194**
OUT	**78**	30	**+48**
TOTAL	**102**	248	**-146**
Weekday Evening			
IN	**82**	41	**+41**
OUT	**48**	202	**-154**
TOTAL	**130**	243	**-113**

[a] ITE LUC 220-Multifamily Housing (Low-Rise) – 255 Units (Fitted Curve)
[b] ITE LUC 710- General Office – 185,000 SF (Fitted Curve)

As shown in Table 5, the Project is anticipated to generate 1,710 vehicle trips during the average weekday, with 102 vehicle trips (24 entering and 78 exiting) during the weekday morning peak hour and 130 new vehicle trips (82 entering and 48 exiting) during the weekday evening peak hour. In comparison to existing office use, the proposed Project is anticipated to generate a negligible 18 new vehicle trips during the average weekday, with 146 fewer vehicle trips during the weekday morning peak hour and 113 fewer vehicle trips during the weekday evening peak hour.

Trip Distribution

The distribution of the site-generated traffic volumes was based on gravity models using 2022 U.S. Census Bureau Origin-Destination Employment Statistics "On the Map" data for the Town of Billerica. The journey-to-work distribution models the commutes of residents from Billerica to the top twenty-five (25) workplace communities, which represent approximately 67% of the total Billerica working residents. Communities contributing less than 0.7% have been deemed to not

change the distribution of traffic calculations significantly. The resulting primary trip distributions are shown in Table 6. Trip distribution gravity model information is provided in Attachment I. The resulting site-generated traffic volume network is presented in Figure 5.

Table 6 – Trip Distribution Summary

Direction	Entering/Exiting
Concord Road to/from North	15%
Middlesex Turnpike to/from East	15%
Concord Street to/from South	70%
Total	**100%**

2032 Build Traffic Volumes

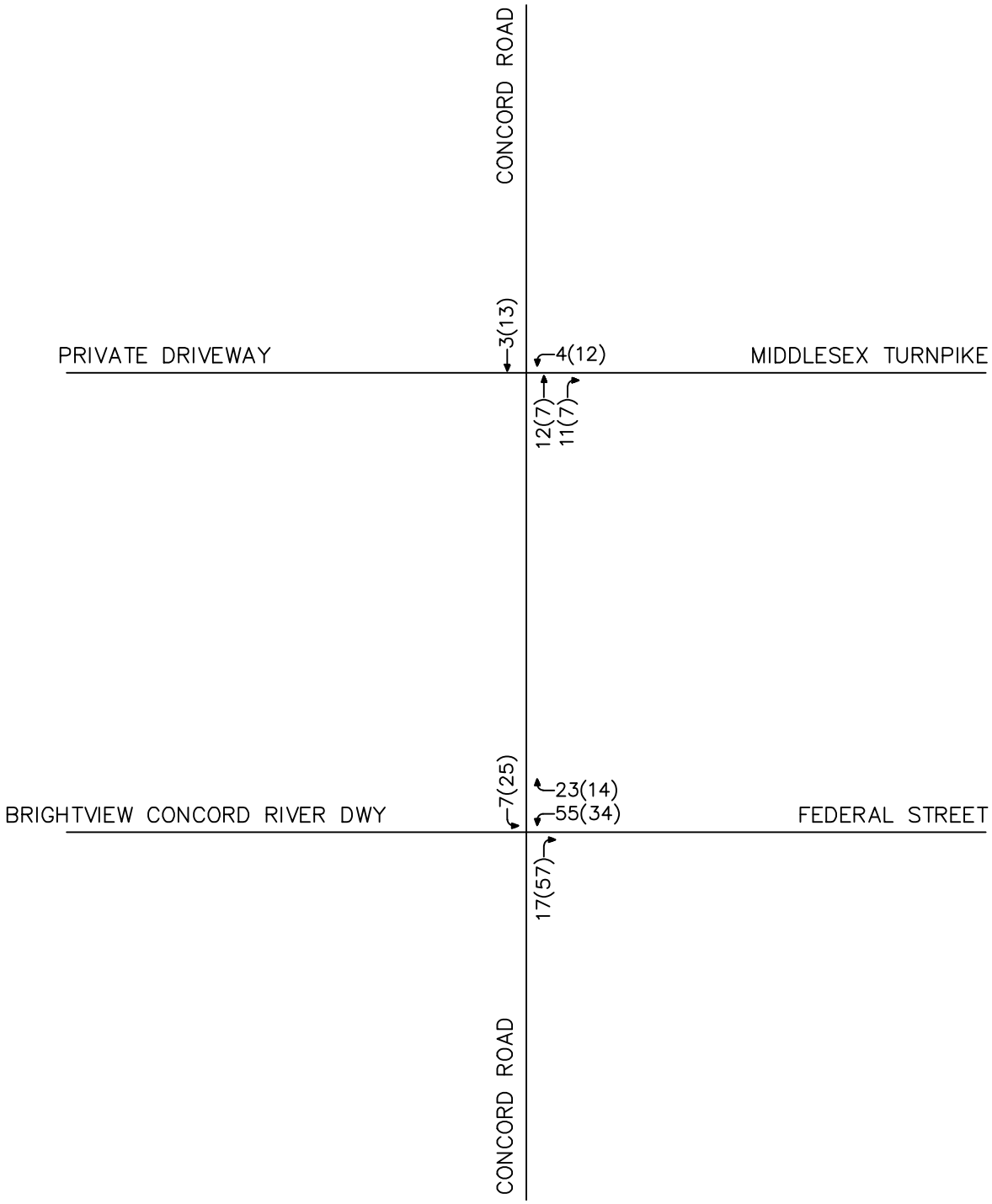
The 2032 Build Condition traffic-volume networks consist of the 2032 No-Build traffic-volumes with the addition of the site-generated traffic for the proposed development. The resulting 2032 Build weekday morning and weekday evening peak hour traffic volume networks are presented in Figure 6. A summary of peak hour projected traffic volume changes outside of the study area that is the subject of this assessment is shown in Table 7.

Table 7 – Peak Hour Traffic Volume Increases

Location/Peak Hour	2032 No-Build	2032 Build	Traffic Volume Difference Over No-Build	Percent Increase Over No-Build
Middlesex Tpk, east of Concord Rd				
Weekday Morning	982	984	+2	0.2%
Weekday Evening	1,452	1,459	+7	0.5%
Concord Rd, north of Middlesex Tpk				
Weekday Morning	1,386	1,346	-40	- 2.9%
Weekday Evening	1,513	1,480	-33	- 2.2%
Concord Rd, south of Federal St				
Weekday Morning	2,359	2,251	-108	- 4.6%
Weekday Evening	2,693	2,607	-86	- 3.2%

As shown in Table 7, site generated traffic volume increases along Middlesex Turnpike are anticipated to be less than 0.5% during any given peak hour. A reduction in traffic volumes is expected along Concord Road up to 2.9% north of Middlesex Turnpike and up to 4.6% south of Federal Street. Overall, the Project will generate less traffic compared to the existing office use during the peak commuter periods, and the additional traffic expected on Middlesex Turnpike as a result of the Project is anticipated to be negligible.

Not to Scale



XXX(XXX) = WEEKDAY MORNING PEAK HOUR(WEEKDAY EVENING PEAK HOUR)

Figure 5

Trip Generation
Proposed Residential Development

TEC, Inc.
282 Merrimack Street
Lawrence, MA 01843
978-794-1792
www.TheEngineeringCorp.com

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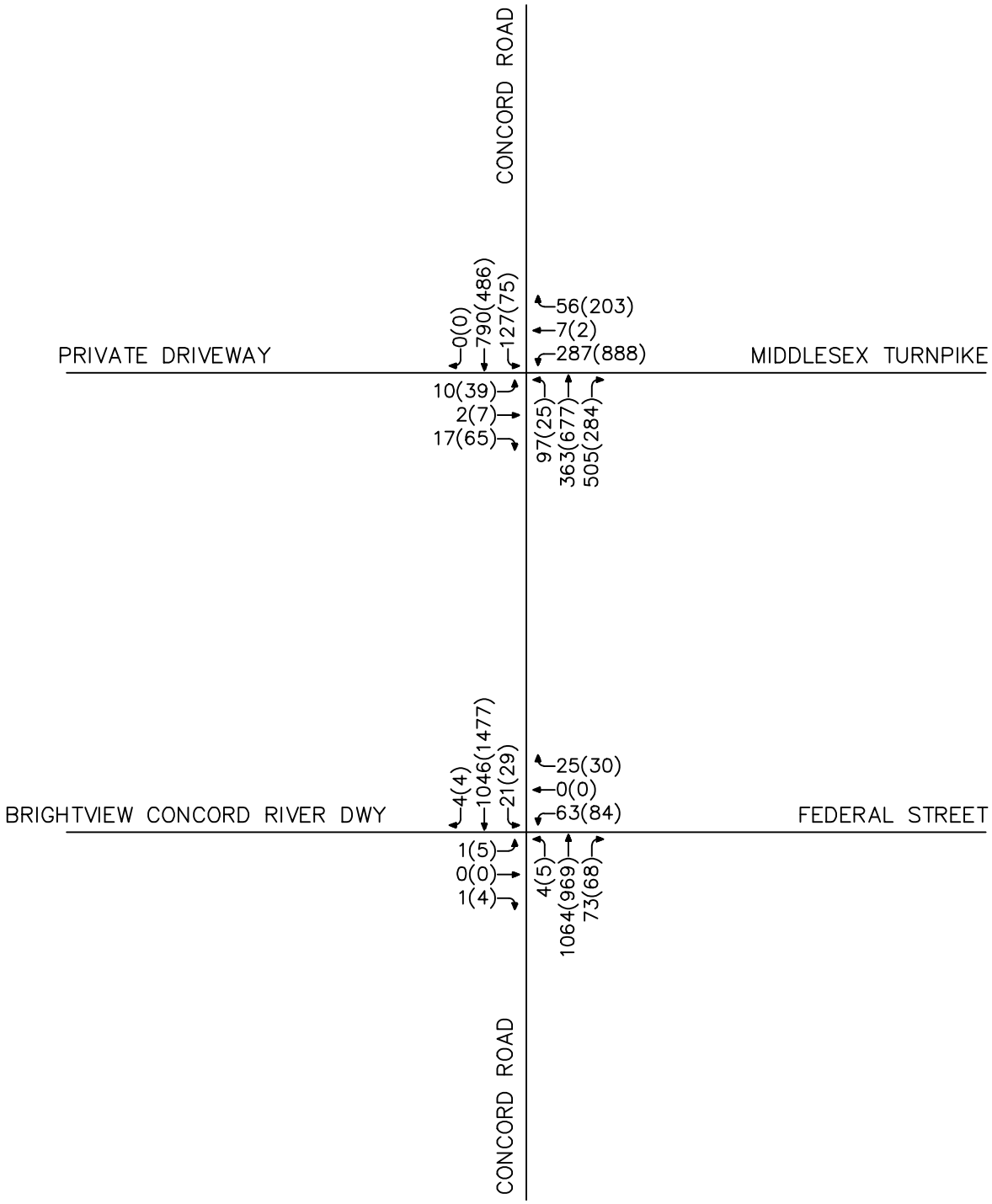
Not to Scale



XXX(XXX) = WEEKDAY MORNING PEAK HOUR(WEEKDAY EVENING PEAK HOUR)

Figure 6

2032 Build Conditions
Weekday Morning and Weekday Evening
Peak Hour Traffic Volumes

TEC, Inc.
282 Merrimack Street
Lawrence, MA 01843
978-794-1792
www.TheEngineeringCorp.com

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TRAFFIC CONTROL WARRANTS

Signal Warrant Analysis

A traffic signal warrant analysis was conducted for the intersection of Concord Road / Federal Street using traffic volumes from the July 2025 TMCs. No seasonal adjustment factor was applied to the traffic volumes as July traffic volumes are typically higher than the average. The *Manual on Uniform Traffic Control Devices* (MUTCD) contains eight warrants for evaluating justifications for the installation of a traffic signal. In accordance with MassDOT guidelines, Warrant 1 must be satisfied at minimum before a new traffic signal installation is considered. As part of this study, only Warrant 1 (Eight-Hour Vehicular Volume) and Warrant 2 (Four-Hour Vehicular Volume) were evaluated, as the remaining MUTCD warrants were not applicable and/or reasonably approaching the corresponding warranting thresholds.

Site generated trip projections were superimposed on the July 2025 traffic volumes to depict a condition following building occupancy. The hour-by-hour distribution of these trips was assessed based on time-of-day distribution data published in the ITE publication *Trip Generation, 11th Edition* for LUC 220 – Multifamily Housing (Low-Rise).

Warrant Adjustments

Right-Turn Side-Street Traffic Volumes – Right-turns are a prominent movement for the Federal Street westbound approach. Most of the right-turns would normally be expected to exit out of the minor-street (Federal Street) with minimal conflict because an exclusive right-turn lane exists, sight lines are generally clear, and sufficient gaps are expected in traffic from the upstream traffic signals along Concord Road near the US Route 3 ramps. For this approach geometry, the *MUTCD* states:

> *"The study should consider the effects of the right-turning vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turning traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants listed in Paragraph 2 of this Section." (MUTCD - Sect 4C.01 ¶8)*

For these traffic signal warrants, a full 100% reduction was applied to the right-turning movements along Federal Street based on the potential for insignificant vehicle conflict for right-turning vehicles. Even if 50% of the right-turning traffic is included in the analysis, the warrants are still not satisfied.

Warrant Results

Based on the existing traffic volumes and the addition of the projected site-generated trips, the intersection of Concord Road / Federal Street / Brightview Concord River Driveway does not meet the MUTCD's traffic signal warranting criteria for Warrant 1 or Warrant 2. The traffic signal warrant analysis worksheets are provided in Attachment J.

TRAFFIC IMPACT ANALYSIS

Measuring existing and future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity and vehicle queue analyses were conducted under Existing, No-Build, and Build traffic volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection.

Methodology

Synchro Methodology for Signalized Intersections

The signalized intersection capacity and queue analysis was conducted using methodology from the *Highway Capacity Manual (HCM) 2000* methodology due to the restrictions posed on signalized intersection analysis using *HCM 7th Edition*. This includes the inability of *HCM 7th Edition* and Synchro software to correctly analyze both an exclusive pedestrian phase and atypical lane movement geometrics (left turns from both an exclusive lane and an adjacent general-purpose travel lane) which are present at the study area signalized intersection.

MassDOT has recognized significant errors and deficiencies in the *HCM 7th Edition* methodology and traffic impact software such as Synchro 12 when attempting to analyze traffic signals. Based on conversations with the MassDOT – Highway Division's Traffic Section, alternate methodologies to analyze capacity, delays, and queues can be conducted as long as the models are properly calibrated.

Levels of Service

A primary result of a capacity analysis is the assignment of level-of-service under various traffic-flow conditions[5]. The concept of level-of-service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. Six levels of service are defined for each type of facility. They are given letter designations from A to F, with level-of-service (LOS) A representing the best operating conditions and LOS F representing the worst. Although Synchro software does not fully adhere to methodologies posed in the *HCM 7th Edition*, the LOS scale A-F was utilized to present a representation of traffic operations intersection by intersection within the network. Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

Queue Length Analysis

Vehicle queue analyses are a direct measurement of an intersection's ability to process vehicles under various traffic control and volume scenarios and lane use arrangements. The vehicle queue analysis was performed using the Synchro simulation software which is also based upon the methodology and procedures presented in the *HCM 7th Edition*. Synchro reports both the 50th

[5] The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual 7th Edition*; Transportation Research Board; Washington, DC; 2022.

(average) and 95th percentile vehicle queues for unsignalized and signalized intersections, which are based on the number of vehicles that experience a delay of six seconds or more at an intersection and is a function of the traffic signal timing; vehicle arrival patterns during the analysis period; and the saturation flow rate. The 50th percentile or average vehicle queue is the average number of vehicles that are projected to be delayed by six seconds or more at the intersection under study during the analysis period. The 95th percentile vehicle queue is the vehicle queue length that will exceed only 5% of the time; or approximately three minutes out of sixty minutes during the peak one hour of the day. During the remaining fifty-seven minutes, the vehicle queue length will be less than the 95th percentile queue length.

Parameters for Traffic Impact Analysis

Signalized Intersections

LOS for signalized intersections is calculated using the operational analysis methodology of the *HCM 2000*. This method assesses the effects of signal type, timing, phasing, progression; vehicle mix; and geometrics on delay. LOS designations are based on the criterion of control or signal delay per vehicle. Control or signal delay can be related to driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay and final acceleration delay. Table 8 summarizes the relationship between LOS and control delay. The tabulated control delay criterion may be applied in assigning LOS designations to individual lane groups, to individual intersection approaches, or to entire intersections.

Table 8 – Level of Service Criteria for Signalized Intersections[(a)]

Level of Service V/C ≤ 1.00	Average Control Delay (s/veh)	Description
A	≤10.0	LOS A describes operations with exceptionally low control delay; most vehicles do not stop at all.
B	10.1 to 20.0	LOS B describes operations with relatively low control delay. However, more vehicles stop than LOS A.
C	20.1 to 35.0	LOS C describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	35.1 to 55.0	LOS D describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable, whereby motorists are not able to get through the signal on one cycle.
E	55.1 to 80.0	LOS E describes operations with high control delay values. Individual cycle failures are frequent occurrences.
F	>80.0	LOS F describes operations with high control delay values that often occur with over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

[a] Source: *Highway Capacity Manual 2000*; Transportation Research Board; Washington D.C.; 2000

Unsignalized Intersections

The levels of service of two-way stop-controlled unsignalized intersections are determined by application of a procedure described in the *HCM 7th Edition*. The level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and stop signs. Control delay includes the effects of initial deceleration delay approaching a stop sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the *HCM 7th Edition*. Table 9 summarizes the relationship between level of service and average control delay for unsignalized intersections.

Table 9 – Level of Service Criteria for Unsignalized Intersections[(a)]

Level of Service V/C ≤ 1.00	Level of Service V/C > 1.00	Average Control Delay (s/veh)	Description
A	F	≤10.0	LOS A describes operations with exceptionally low control delay; most vehicles do not stop at all.
B	F	10.1 to 20.0	LOS B describes operations with relatively low control delay. However, more vehicles stop than LOS A.
C	F	20.1 to 35.0	LOS C describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	F	35.1 to 55.0	LOS D describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable, whereby motorists are not able to get through the signal on one cycle.
E	F	55.1 to 80.0	LOS E describes operations with high control delay values. Individual cycle failures are frequent occurrences.
F	F	>80.0	LOS F describes operations with high control delay values that often occur with over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

[a] Source: *Highway Capacity Manual 6th Edition*; Transportation Research Board; Washington D.C.; 2022

Intersection Capacity and Queue Analysis Results

The capacity and queue analysis worksheets are provided in Attachment K. The results of the capacity and queue analysis are described in Table 10.

Concord Road at Middlesex Turnpike

Under both 2032 No-Build and Build Condition, the Middlesex Turnpike westbound movements and the Concord Road left-turn movements are anticipated to operate at a degraded level of service (LOS F) during the weekday evening peak hour. Independent of the Project, the Middlesex Turnpike westbound movements are also anticipated to operate with volume-to-capacity (v/c) ratios above 1.00 during the weekday evening peak hour. This condition is consistent with the Build Condition reported in the TIA for the 161 Concord Road project which introduces new traffic volumes along the discontinued Middlesex Turnpike eastbound approach and provides modifications to the traffic signal timings and phasing. Although the conditions at this location remain degraded, the Project is anticipated to decrease overall traffic volumes and reduce the

delay per vehicle and v/c ratios. All movements at the intersection are expected to operate at acceptable levels of service (LOS D or better) during the weekday morning peak hour with v/c ratios well below 1.00 indicating that the intersection is expected to accommodate the existing and proposed demand.

Note that traffic signal timings and phasing modifications that are anticipated as part of the 161 Concord Road project will result in optimized operational conditions over existing conditions.

Concord Road at Federal Street / Brightview Concord River Driveway

The Federal Street westbound left-turn movement is anticipated to operate at a degraded level of service (LOS F) during both the weekday morning and evening peak hours under both No-Build and Build Conditions. It should be noted that the Project is expected to reduce overall traffic volumes as a result of the proposed change in use from office to residential, whereas the Build condition improves over No-Build Conditions. The description of vehicle delay in Table 10 for the Federal Street westbound left-turn movement is well overstated as the analysis software and HCM does not take into account the upstream traffic signals in each direction which will create gaps in traffic to allow for a more reasonable flow from the Federal Street stop control. The anticipated 2032 Build Condition traffic volumes exiting left from the Federal Street westbound approach (movement of degraded operations) are only 63 vehicles and 84 vehicles for the weekday morning and weekday evening peak hours, respectively. This equates to between 1 to 1.5 vehicles per minute on average approaching the stop control which represents a nominal amount of traffic for a typical side-street approach along a mainline roadway.

Table 10 – Intersection Capacity and Queue Analysis Summary

	2025 Existing Condition				2032 No Build Condition				2032 Build Condition			
Intersection / Lane Group	**V/C[a]**	**Delay[b]**	**LOS[c]**	**Queue[d]**	**V/C**	**Delay**	**LOS**	**Queue**	**V/C**	**Delay**	**LOS**	**Queue**
Concord Road / Middlesex Turnpike												
Weekday AM Peak Period												
Middlesex Turnpike EBL	-	-	-	-	0.31	38.1	D	<25/<25	0.29	37.2	D	<25/<25
Middlesex Turnpike EBTR	-	-	-	-	0.13	36.4	D	<25/<25	0.13	36.3	D	<25/<25
Middlesex Turnpike WBL	0.53	24.4	C	64/168	0.88	57.6	E	67/288	0.84	51.6	D	62/281
Middlesex Turnpike WBLTR	0.26	21.8	C	<25/87	0.79	44.6	D	56/260	0.77	42.3	D	52/254
Concord Road NBL	-	-	-	-	0.80	56.9	E	37/170	0.78	54.2	D	35/170
Concord Road NBTR	0.66	19.4	B	105/172	0.86	31.9	C	94/384	0.82	27.6	C	96/394
Concord Road SBL	0.46	25.1	A	49/113	0.51	27.9	C	42/129	0.62	32.7	C	40/129
Concord Road SBTR	0.39	9.2	A	81/108	0.75	22.0	C	116/395	0.71	21.4	C	107/362
Overall Intersection	**0.62**	**15.6**	**B**	**-**	**0.74**	**32.2**	**C**	**-**	**0.73**	**30.0**	**C**	**-**
Weekday PM Peak Period												
Middlesex Turnpike EBL	-	-	-	-	0.14	46.5	D	<25/64	0.14	45.2	D	<25/64
Middlesex Turnpike EBTR	-	-	-	-	0.13	59.8	E	<25/81	0.13	58.3	E	<25/81
Middlesex Turnpike WBL	1.57	296.6	F	345/663	1.17	142.3	F	558/1056	1.16	136.0	F	545/1,071
Middlesex Turnpike WBLTR	1.30	155.7	F	249/541	1.14	129.3	F	509/990	1.12	119.7	F	492/1,001
Concord Road NBL	-	-	-	-	0.69	106.1	F	<25/65	0.71	104.7	F	<25/65
Concord Road NBTR	0.70	18.9	B	155/231	0.85	45.2	D	384/638	0.85	45.4	D	361/574
Concord Road SBL	0.34	27.2	C	29/75	0.87	115.8	F	65/200	0.85	106.3	F	63/200
Concord Road SBTR	0.21	6.0	A	38/55	0.38	28.9	C	154/261	0.39	29.5	C	155/263
Overall Intersection	**0.93**	**111.0**	**F**	**-**	**0.90**	**80.6**	**F**	**-**	**0.89**	**78.2**	**E**	**-**

[a] Volume-to-capacity ratio
[b] Delay expressed in seconds per vehicle (average)
[c] Level of service
[d] 95th Percentile Queue

Table 10 – Intersection Capacity and Queue Analysis Summary (Continued)

	2025 Existing Condition				2032 No Build Condition				2032 Build Condition			
Intersection / Lane Group	**V/C[a]**	**Delay[b]**	**LOS[c]**	**Queue[d]**	**V/C**	**Delay**	**LOS**	**Queue**	**V/C**	**Delay**	**LOS**	**Queue**
Concord Road / Federal Street / Brightview Driveway												
Weekday AM Peak Period												
Brightview Driveway EB	0.03	36.9	E	<25	0.07	76.1	F	<25	0.05	53.5	F	<25
Federal Street WBL*	0.19	92.6	F	<25	>2.0	946.0	F	123	>2.0	934.8	F	220
Federal Street WBTR	0.01	12.1	B	<25	0.03	14.5	B	<25	0.07	13.7	B	<25
Concord Road NB	0.01	10.6	B	<25	0.01	11.1	B	<25	0.01	11.1	B	<25
Concord Road SB	0.02	10.4	B	<25	0.16	13.5	B	<25	0.04	11.5	A	<25
Weekday PM Peak Period												
Brightview Driveway EB	0.28	91.0	F	25	0.55	229.1	F	45	0.54	224.1	F	38
Federal Street WBL*	1.23	332.0	F	143	>2.0	>999	F	800	>2.0	>999	F	343
Federal Street WBTR	0.04	12.4	B	<25	0.20	14.7	B	<25	0.09	13.7	B	<25
Concord Road NB	0.01	13.0	B	<25	0.01	14.5	B	<25	0.01	14.5	B	<25
Concord Road SB	0.01	10.8	B	<25	0.03	11.6	B	<25	0.06	12.0	B	<25

[a] Volume-to-capacity ratio
[b] Delay expressed in seconds per vehicle (average)
[c] Level of service
[d] 95th Percentile Queue

*Note: The description of vehicle delay in Table 10 for the Federal Street westbound left-turn movement is well overstated as the analysis software and HCM does not take into account the upstream traffic signals in each direction which will create gaps in traffic to allow for a more reasonable flow from the Federal Street stop control approach:

PARKING DEMAND

The Project seeks to provide 442 off-street parking spaces. Specifically, 143 off-street parking spaces at #1 Federal Street and 299 off-street parking spaces #2 Federal Street. TEC assessed the projected parking demand for the land use to confirm the adequacy of the parking supply provided. The following section details the review of parking supply and anticipated demand.

ITE Parking Demand Analysis

TEC assessed the future parking demands from the project with a review of the 85th percentile peak parking demand rates established in the industry standard ITE publication *Parking Generation, 6th Edition*. The analysis assumes the 85th percentile peak parking demand rates associated with the following land uses:

LUC 217 - Multifamily Housing 1 Bedrooms (Low-Rise) – 136 Units (includes studios)

LUC 220 - Multifamily Housing 2+ Bedrooms (Low-Rise) – 119 Units

The site is anticipated to include 136 one-bedroom units, 109 two-bedroom units, and 10 three-bedroom units for a total of 384 bedrooms. Table 11 provides a summary of the resulting 85th percentile peak parking demand estimates. Detailed parking generation worksheets are provided in Attachment L.

Table 11 – ITE Parking Demand Summary

Day	Land Use Description	Peak Parking Demand Rate	Bedroom Count	Parking Demand
Weekday	Multifamily Housing 1 BR (Low-Rise)	1.27 per Unit / Bedroom	136	173
Weekday	Multifamily Housing 2+ BR (Low-Rise)	0.86 per Bedroom	248	214
		TOTALS	**384**	**387**

No Saturday data used.

The Project is expected to generate a demand for approximately 387 parking spaces for the proposed 255 residential units (384 bedrooms). As the site offers 442 off-street parking spaces, the parking supply is expected to meet the 85th percentile peak parking demand.

Town of Billerica Zoning Bylaw – MCMOD (Federal Street Subdistrict)

Under the Town of Billerica Zoning Bylaw Section 5.E.12(F)(1) for the new MCMOD Federal Street Subdistrict, number of off-street parking spaces required are 1.5 spaces per unit for one-bedroom / studio units and 2.0 spaces per unit for two-bedrooms or more units. Table 12 provides a summary of the proposed parking supply in relation to the Zoning Bylaw.

Table 12 – Billerica MCMOD Zoning – Off-Street Parking Requirements

Land Use Description	Peak Parking Demand Rate	Unit Count	Parking Required
MCMOD-C: Multifamily Housing 1 BR	1.5 per Unit	136	204
MCMOD-C: Multifamily Housing 2+ BR	2.0 per Unit	119	238
	TOTALS	**255**	**442**

The Applicant meets the zoning parking requirements of 442 off-street parking spaces. In addition, based on the ITE projections for peak parking demand, the Applicant is confident that the proposed parking supply is adequate to accommodate the demand expected on the site.

CONCLUSIONS AND RECOMMENDATIONS

Summary of Traffic Impact & Parking Assessment

TEC has examined the potential traffic impacts associated with the proposed redevelopment of 1 & 2 Federal Street in Billerica, Massachusetts. The following is a summary of the results and conclusions of this effort:

- Through discussions with MassDOT District 4, the Project does not require a Permit to Access State Highway.
- The existing site currently consists of two (2) building structures including a two-story ±60,000 SF office building at #1 Federal Street and a two-story ±98,000 SF office building at #2 Federal Street. The buildings will be razed as part of the project.
- The Project will fully redevelop each property to include a total of up to 255 multifamily residential units with associated amenity space and 442 off-street parking spaces. Specifically, a three-story residential building with 81 residential units and 143 off-street parking spaces at #1 Federal Street and a three-story building with 174 residential units and 299 off-street parking spaces at #2 Federal Street.
- The Project will also reconfigure the pavement and open space area within the site to provide newly reconstructed driveways, including two (2) full-access driveways for #1 Federal Street along the south side of Federal Street with access to neighboring properties eliminated; and two (2) full-access driveways for #2 Federal Street along the north side of Federal Street.
- The SSD and ISD along Concord Road at its intersection with Federal Street exceeds AASHTO minimum recommendations for safe operations. Seasonal vegetation along the easterly side of Concord Road, north of Federal Street, may reduce the sight line for vehicles travelling along Concord Road and should be maintained.
- The proposed Project is anticipated to generate 1,710 vehicle trips during the average weekday, with 102 vehicle trips (24 entering and 78 exiting) during the weekday morning peak hour and 130 new vehicle trips (82 entering and 48 exiting) during the weekday evening peak hour.

- In comparison to existing office space use which could be reoccupied in full, the proposed Project is anticipated to generate 18 new vehicle trips during the average weekday, with 146 fewer vehicle trips during the weekday morning peak hour and 113 fewer vehicle trips during the weekday evening peak hour.
- Overall, the Project is anticipated to decrease the overall traffic volumes at the study area intersections as a result of the proposed change in use from office to residential.
- Independent of the Project, the Middlesex Turnpike westbound movements are also anticipated to operate with volume-to-capacity (v/c) ratios above 1.00 during the weekday evening peak hour. This condition is consistent with the Build Condition reported in the TIA for the 161 Concord Road project which introduces new traffic volumes along the discontinued Middlesex Turnpike eastbound approach and provides modifications to the traffic signal timings and phasing. Although the conditions at this location remain degraded, the Project is anticipated to decrease overall traffic volumes and reduce the delay per vehicle and v/c ratios. All movements at the intersection are expected to operate at acceptable levels of service (LOS D or better) during the weekday morning peak hour with v/c ratios well below 1.00 indicating that the intersection is expected to accommodate the existing and proposed demand.
- The Federal Street westbound left-turn movement is anticipated to operate at a degraded level of service (LOS F) during both the weekday morning and evening peak hours under No-Build and Build Conditions. It is important to note that the description of vehicle delay in Table 10 for the Federal Street westbound left-turn movement is well overstated as the analysis software and HCM does not take into account the upstream traffic signals in each direction which will create gaps in traffic to allow for a more reasonable flow from Federal Street's stop control.

Applicants' Off-Site Mitigation Commitments

The Applicant will commit to the following transportation improvement measures in the vicinity of the site:

- The Applicant will provide clearing / trimming of seasonal vegetation, including future maintenance as necessary, along the easterly side of Concord Road along the site's frontage to maintenance sight lines to/from Federal Street. The Applicant will keep and maintain new plantings / landscaping along the site frontage for Concord Road and Federal Street, near the site driveways, to a maximum height of 3.5-feet within the sight triangles.
- The Applicant will provide a permanent easement along the northerly edge of the property for the establishment of the proposed Yankee Doodle Bike Path.
- The Applicant will provide direct internal sidewalk network connection to the proposed Yankee Doodle Bike Path passing through the northerly portion of the property at #2 Federal Street. Note that this will facilitate nearby access to the dedicated LRTA bus stop that exists along Middlesex Turnpike to the north of the site.

- The Applicant will reapply pavement markings and install appropriate lane configuration traffic signage along the Federal Street westbound approach to Concord Road to denote the shared left-turn / through lane and exclusive right-turn lane.
- The Applicant will reapply a new stop line and install a new stop sign (R1-1) along the Federal Street westbound approach to Concord Road. The Applicant will also add the necessary stop line and stop signs to each Site Driveway approaching Federal Street.

The above-mentioned improvements represent a considerable financial investment from the Applicant, through both design and construction, to improve traffic operational and safety conditions adjacent to the site.

Transportation Demand Management Measures

The Applicant has a commitment to research and provide a dynamic Transportation Demand Management (TDM) program to reduce SOV trips to/from the site. Currently, the Applicant is committed to providing the following TDM measures:

Bicycle and Pedestrian Measures

- On-Site Pedestrian Accommodations – The Applicant will provide internal pedestrian connections within each parcel and between the two (2) parcels of the redevelopment. The Applicant will also provide direct connection to the Yankee Doodle Bike Path within the site.
- Bicycle Racks – The Applicant will provide 255 secure, weather-protected, long-term bicycle parking for residents at designated locations within the proposed project area.

Public Transportation Measures

- Maps / Schedules - Public transportation schedules with transit maps for LRTA Bus Route 14, the MBTA Commuter Rail (connection from LRTA Bus Route 14), as well as for all nearby routes will be provided to each resident upon move-in and will be posted within each floor of the residential buildings. Schedules and maps will also be provided in the lobby and near doorways in all other on-site buildings.

Other Measures

- Marketing of Transportation Options and Benefits - A welcome packet for all tenants will be distributed at move-in which includes information for all transportation related benefits, promotions, and local transportation options; including location of LRTA stops, transit schedules, maps of the Yankee Doodle Bike Path, and any other emerging new mobility locations.
- In-Unit Laundry Services - The Applicant will provide in-unit laundry that allows for the reduction of trips to/from the site of nearby laundromats.

- Site Amenities – The site includes several on-site amenities, such as a work from home office space area, a fitness center, storage, a pool, and open space. This location will assist in reducing vehicular demand and increase multi-use trips, which include parking capacity sized to meet minimum local requirements without providing excessive parking.

With implementation of the proposed improvements and the minimal daily increase / significant reduction of commuter peak period traffic volumes from the redevelopment of 1& 2 Federal Street properties, the Project will safely and efficiently be accommodated within the study area corridors and intersections. The level of impact on traffic operations and safety does not warrant any additional project-specific mitigation beyond the commitments outlined in this TIPA.

Attachment A - Public Transportation Data

RIDER POLICY FOR FARE FREE PROGRAM

1. You must have a destination when boarding the bus. Riding the bus without a destination will create bus overcrowding.
2. You may be asked to disembark at the end of the line.
3. You are only allowed to bring on the bus what you can carry in one trip.

LRTA ROAD RUNNER OFFICE

(978-459-0152)
113 THORNDIKE STREET, LOWELL, MA 01852
(LOCATED NEXT TO THE KENNEDY CENTER)
Monday - Friday: 9 AM to Noon
Issues CharlieCards for Persons with Disabilities/TAP.

THREE WAYS TO GET YOUR CHARLIECARD FOR PERSONS WITH DISABILITIES/TAP

1) **IN PERSON AT LRTA ROAD RUNNER OFFICE**
   - First time applicants for the TAP ID, or applicants with expired TAP ID Cards need to fill out an application.
     Applications are available at the LRTA Road Runner Office or online at LRTA.com
   - The LRTA will process your application within 14 days of receipt.
   - Once approved, you will need to bring a photo ID.

2) **APPLY ONLINE AT MBTA.COM**

3) **MAIL YOUR APPLICATION TO THE LRTA ROAD RUNNER OFFICE**
   113 THORNDIKE STREET
   LOWELL, MA 01852

For More Detailed Info visit LRTA.com

BLIND ACCESS CHARLIECARD

These cards are issued by the MBTA.

For more information visit
www.mbta.com/fares/reduced/blind-access-charliecard

THE LOWELL REGIONAL TRANSIT AUTHORITY

Announces

A Temporary Fare Free Pilot Program Commencing

December 1, 2024

And Continues Through September 30, 2025

(Fares may resume 10/1/2025
Subject to State Funding)

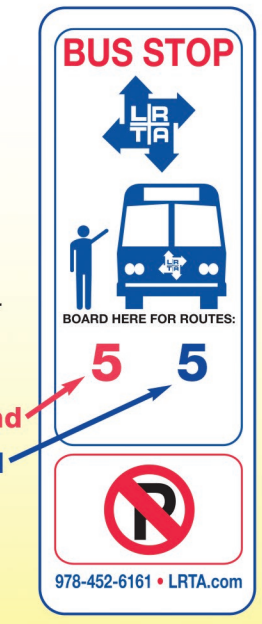
The LRTA wants to Thank Governor Maura Healey and Lieutenant Governor Kim Driscoll, as well as the Massachusetts State Legislature for funding this Fare Free Transportation Pilot Program that will greatly benefit our communities.

TO CATCH A BUS...

1

USE A DESIGNATED LRTA BUS STOP

The bus will pick you up and take you to your destination. Please raise your hand to alert driver.



2

WAVE YOUR HAND ALONG ANY LRTA BUS ROUTE

Simply wave your hand in order to alert the driver to stop. You need to be at a safe location on the same side of the street as the bus. We encourage you to be at a bus stop.

Lowell Regional Transit Authority

BUS SCHEDULES

EFFECTIVE DECEMBER 1, 2024

BUS INFORMATION
978-452-6161
WWW.LRTA.COM
Service updates and changes will be posted on LRTA.com

DOWNTOWN SHUTTLE

The LRTA offers a Shuttle between

DOWNTOWN LOWELL
(JOHN & MERRIMACK STREETS)
&
ROBERT B. KENNEDY BUS TRANSFER CENTER

Monday - Friday:
5:45 am - 7:00 pm Every 30 minutes
First Shuttle departs Downtown Lowell at 6:00 AM
Last Shuttle departs Downtown Lowell at 7:00 PM

Saturday
7:15 am - 7:00 pm Every 30 minutes
First Shuttle departs Downtown Lowell at 7:30 AM
Last Shuttle departs Downtown Lowell at 7:00 PM

LRTA MONDAY THROUGH FRIDAY SCHEDULE

OUTBOUND LEAVING KENNEDY CENTER

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	20
CHRISTIAN HILL	BELVIDERE	SOUTH LOWELL	HIGHLANDS VIA STEVENS	WESTFORD STREET/ DRUM HILL	BROADWAY/ UMASS SOUTH	PAWTUCKETVILLE/ UMASS NORTH	CENTRALVILLE	LOWELL CIRCULATOR	DRACUT/ TYNGSBORO	IRS/ RAYTHEON VIA RTE. 133	TEWKSBURY VIA RTE. 38	BILLERICA VIA EDSON	BURLINGTON MALL/ LAHEY CLINIC	CHELMSFORD/ WESTFORD VIA RTES. 129/110	CHELMSFORD VIA CHELMSFORD STREET	NORTH CHELMSFORD VIA MIDDLESEX	DOWNTOWN SHUTTLE	WARREN ST/ KENNEDY CENTER
PASSENGER BOARDING LOCATIONS AT KENNEDY CENTER																		
B2	A1	B2	A2	C2	C1	A2	A3	B1	B3	B1	B3	B4	B4	A4	A4	A1	SH	A3
AM 5:55 M 6:40 7:40 8:40 9:40 10:40 11:40	AM 6:15 6:45 7:15 7:45 8:15 8:45 9:15 9:45 10:15 10:45 11:15 11:45	AM 6:00 7:00 8:00 9:00 10:00 11:00	AM 6:10 6:35 7:15 7:40 8:10 8:40 9:40 10:40 11:40	AM 5:50 BR 6:05 6:30 7:00 7:30 8:00 8:30 9:00 9:30 10:00 10:30 11:00 11:30	AM 6:00 7:00 8:00 9:00 10:00 11:00	AM 5:50 6:25 6:55 7:25 7:50 8:25 8:50 9:25 9:55 10:25 10:55 11:25 11:55	AM 6:15 6:45 7:15 8:15 9:20 10:20 11:20	AM 6:50 7:50 8:50 9:50 10:50 11:50	AM 6:35 7:35 8:40 9:40 10:40 11:40	AM 6:00 7:00	AM 6:00 7:00 8:00 9:00 10:00 11:00	AM 6:30 7:30 8:20 9:20 10:20 11:20	AM 6:00 7:00 8:00 9:00 10:00 11:00	AM 6:45 8:15 9:45 11:15	AM 6:15 C 6:40 C 7:10 8:30 10:00 11:30	AM 6:20 7:25 8:30 9:25 10:25 11:25	AM 5:45 SHUTTLE SERVICE EVERY 30 MINUTES FROM KENNEDY CENTER TO DOWNTOWN	AM 7:30 SERVICE EVERY 20 MINUTES FROM KENNEDY CENTER
PM 12:40 1:40 2:40 3:40 4:40 5:45 7:00	PM 12:15 12:45 1:15 1:45 2:15 2:40 SPE1 2:40 SPE2 2:45 3:15 3:45 4:15 4:45 5:15 5:45 6:20 6:50	PM 12:00 1:00 2:00 2:40 SPE 3:15 3:50 4:15 5:00 5:30 6:35	PM 12:40 1:40 2:35 2:40 SP 2:40 SP 3:15 3:35 4:00 4:40 5:00 5:50 6:30	PM 12:00 12:30 1:00 1:30 2:00 2:30 2:40 SPE3 2:40 SPE4 3:00 3:40 4:10 4:40 5:10 5:40 6:10 R 6:50 R 7:20 R	PM 12:00 1:00 2:00 3:00 4:00 5:00 6:00	PM 12:25 12:55 1:25 1:55 2:25 2:40 SP5 2:40 SP6 2:55 3:20 3:55 4:25 4:55 5:25 5:55 6:25 6:55	PM 12:20 1:20 2:25 3:25 4:15 4:40 5:20 5:50 6:35 7:10	PM 12:50 1:50 2:50 3:50 4:50 5:50 6:50	PM 12:40 1:40 2:40 3:40 4:30 5:50	PM 3:00 4:00	PM 12:00 1:00 2:00 3:00 4:10 5:10 6:10	PM 12:20 1:20 2:20 2:40 SPE 3:10 4:40 5:30 6:35	PM 12:00 1:00 2:00 3:00 4:00 5:00 6:00	PM 12:45 2:15 3:45 5:15 6:15	PM 1:00 2:30 2:40 SPE 3:20 4:00 4:50 5:30 7:00	PM 12:25 1:25 2:25 2:40 SPE 3:30 4:00 4:30 5:35 6:40	PM LAST SHUTTLE DEPARTS FROM KENNEDY CENTER 6:45 PM	PM NO SERVICE

INBOUND TO KENNEDY CENTER

DEPARTING FROM:	SCOLA'S RESTAURANT DRACUT	WHITE DOVE	N. BILLERICA TRAIN STATION	VA CLINIC	WALMART DRUM HILL PLAZA	UMASS SOUTH PARKING LOT	GREATER LOWELL TECH.	HANNAFORD SUPERMARKET DRACUT	FOX HALL	AYOTTES MARKET	IRS FACILITY	WILMINGTON TRAIN STATION	LACASCIA'S BAKERY BURLINGTON	LAHEY CLINIC BURLINGTON	OLD IBM 550 KING STREET	WALMART DRUM HILL PLAZA	CHELMSFORD SENIOR CENTER	MERRIMACK & JOHN STREET	50 WARREN STREET LOWELL
	AM 6:00 7:05 8:05 9:05 10:05 11:05	AM 6:50 7:05 S 7:20 7:50 8:20 8:50 9:20 9:50 10:20 10:50 11:20 11:50	AM 6:20 7:20 D 8:20 9:20 10:20 11:20	AM 6:30 6:55 7:05 S 7:15 S 7:35 8:00 8:30 9:00 10:00 11:00	AM 6:00 6:25 6:50 7:05 SBE 7:20 SBE 7:20 7:50 8:20 8:50 9:20 9:50 10:20 10:50 11:20 11:50	AM 6:20 7:20 8:20 9:20 10:20 11:20	AM 6:25 7:00 7:00 S 7:05 S 7:30 8:00 8:25 9:00 9:25 10:00 10:30 11:00 11:30	AM 6:40 7:05 7:40 8:40 9:40 10:40 11:40	AM 7:10 8:10 9:10 10:10 11:10	AM 7:20 8:20 9:25 10:35 11:20	AM 6:30 7:30	AM 7:00 8:00 9:00 10:00 11:00	AM 7:10 7:10 SE 8:10 9:00 10:00 11:00	AM 7:00 8:00 9:00 10:00 11:00	AM 7:30 9:00 10:30	AM 6:00 C 6:25 C 6:50 C 7:05 SE 7:50 9:15 10:45	AM 7:00 S 8:00 9:05 10:00 11:00	AM 6:00 SHUTTLE SERVICE EVERY 30 MINUTES	AM 7:50 SERVICE EVERY 20 MINUTES FROM 50 WARREN STREET (DOWNTOWN)
	PM 12:05 1:05 2:05 3:10 4:10 5:10 6:15 7:20	PM 12:20 12:50 1:20 1:50 2:20 2:50 3:20 3:50 4:20 4:50 5:20 5:50 6:20 6:50 7:20	PM 12:20 1:20 2:20 3:40 4:20 4:45 5:30 6:10 7:00	PM 12:00 1:00 2:00 3:00 3:35 3:55 4:20 5:00 5:30 6:15 6:50	PM 12:20 12:50 1:20 1:50 2:20 2:50 3:20 4:00 4:30 5:00 5:30 6:00 6:35 7:10 7:40	PM 12:20 1:20 2:20 3:20 4:20 5:20 6:20	PM 12:00 12:30 1:00 1:30 2:00 2:30 3:10 3:40 4:05 4:40 5:10 5:40 6:10 6:40 7:05 7:40	PM 12:40 1:40 2:50 3:50 4:40 5:05 5:45 6:15 6:50 7:30	PM 12:10 1:10 2:10 3:10 4:10 5:10 6:10 7:10	PM 12:25 1:25 2:25 3:25 4:25 5:20 6:30	PM 3:30 4:30	PM 12:00 1:00 2:00 3:00 4:00 5:10 6:10 7:10	PM 12:00 1:00 2:00 3:00 3:50 5:20 6:10 7:15	PM 12:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00	PM 12:00 1:30 3:00 4:30 6:00 7:00	PM 12:15 1:45 3:15 4:05 T 4:45 5:35 6:15 7:40	PM 12:00 1:00 IW 2:00 3:00 I 4:05 I 4:35 5:05 6:10 7:15	PM LAST SHUTTLE DEPARTS FROM DOWNTOWN 7:00 PM	PM NO SERVICE

1 Starts at Andover St/Ends at River Rd
2 Starts at High St/Ends at Wentworth Ave
3 Starts at Stevens St/Ends at Technology Dr
4 Starts at Chelmsford St & Westford St/Ends at Stevens St
5 Starts at Woodward Ave/Ends at G Lowell Vokes
6 Starts at University Ave/Ends at McAvenue School
B Starts at Princeton Blvd & Baldwin St
C Starts/Terminates at the Radisson (Does Not Service Meadow Brook Center)
D Drop Students at Washington Savings Bank
E Starts/Terminates at Lowell Line
I Service on Innovation Academy School Days Only
M Departs from Market Basket
P On School Days Leaves from Paige & Kirk
R No Service to Research Place
S Supplemental Service on School Days Only (Does Not Service Kennedy Center)
T Does not Service Target on Plain St
W Service Wednesday School Days Only

LRTA SATURDAY SCHEDULE

OUTBOUND LEAVING KENNEDY CENTER

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	20
PASSENGER BOARDING LOCATIONS AT KENNEDY CENTER																		
B2	A1	B1	A2	C2	C1	A2	A3	B1	B3		B3	B4	B4	C2	A4	A1	SH	
AM 8:00 9:00 10:00 11:00	AM 7:45 8:45 9:45 10:45 11:45	AM 8:00 9:00 10:00 11:00	AM 8:20 9:20 10:20 11:20	AM 7:45 R 8:45 R 9:45 R 10:45 R 11:45 R	AM 8:00 9:00 10:00 11:00	AM 7:45 8:45 9:45 10:45 11:45	AM 8:00 9:00 10:00 11:00	AM 7:45 8:45 9:45 10:45 11:45	AM 8:30 9:30 10:30 11:30	AM NO SERVICE	AM 7:00 8:00 9:00 10:00 11:00	AM 7:30 8:30 9:30 10:30 11:30	AM 7:00 8:00 9:00 10:00 11:00	AM 6:45 8:00 9:30 11:00	AM 8:00 9:00 10:00 11:00	AM 8:00 9:00 10:00 11:00	AM 7:15 SERVICE EVERY 30 MINS	AM NO SERVICE
PM 12:00 1:00 2:00 3:00 4:00 5:00	PM 12:45 1:45 2:45 3:45 4:45 5:45	PM 12:00 1:00 2:00 3:00 4:00 5:00	PM 12:20 1:20 2:20 3:20 4:20 5:20	PM 12:45 R 1:45 R 2:45 R 3:45 R 4:45 R 5:55 R	PM 12:00 1:00 2:00 3:00 4:00 5:00	PM 12:45 1:45 2:45 3:45 4:45 5:50	PM 12:00 1:00 2:00 3:00 4:00 5:00	PM 12:45 1:45 2:45 3:45 4:45 5:45	PM 12:30 1:30 2:30 3:30 4:30 5:30	PM NO SERVICE	PM 12:00 1:00 2:00 3:00 4:00 5:00	PM 12:30 1:30 2:30 3:30 4:30	PM 12:00 1:00 2:00 3:00 4:00 5:00	PM 12:30 2:00 3:30 5:00	PM 12:00 1:00 2:00 3:00 4:00 5:00	PM 12:00 1:00 2:00 3:00 4:00 5:00	PM LAST SHUTTLE DEPARTS FROM KENNEDY CENTER 6:45 PM	PM NO SERVICE

INBOUND TO KENNEDY CENTER

DEPARTING FROM:	SCOLA'S RESTAURANT DRACUT	WHITE DOVE	N. BILLERICA TRAIN STATION	VA CLINIC	WALMART DRUM HILL PLAZA	UMASS SOUTH PARKING LOT	GREATER LOWELL TECH.	HANNAFORD SUPERMARKET DRACUT	FOX HALL	AYOTTES MARKET	IRS FACILITY	WILMINGTON TRAIN STATION	LACASCIA'S BAKERY BURLINGTON	LAHEY CLINIC BURLINGTON	OLD IBM 550 KING STREET	WALMART DRUM HILL PLAZA	CHELMSFORD SENIOR CENTER	MERRIMACK & JOHN ST	50 WARREN STREET LOWELL
	AM 8:20 9:20 10:20 11:20	AM 8:20 9:20 10:20 11:20	AM 8:20 9:20 10:20 11:20	AM 8:40 9:40 10:40 11:40	AM 8:05 9:05 10:05 11:05	AM 8:15 9:15 10:15 11:15	AM 8:20 9:20 10:20 11:20	AM 8:25 9:25 10:25 11:25	AM 8:05 9:05 10:05 11:05	AM 9:15 10:15 11:15	AM NO SERVICE	AM 8:00 9:00 10:00 11:00	AM 8:10 9:10 10:10 11:10	AM 8:00 9:00 10:00 11:00	AM 7:30 8:45 10:15 11:45	AM 8:45 9:45 10:45 11:45	AM 8:40 9:40 10:40 11:40	AM SERVICE EVERY 30 MINS	AM NO SERVICE
	PM 12:20 1:20 2:20 3:20 4:20 5:20	PM 12:20 1:20 2:20 3:20 4:20 5:20 6:20	PM 12:20 1:20 2:20 3:20 4:20 5:20	PM 12:40 1:40 2:40 3:40 4:40 5:40	PM 12:05 1:05 2:05 3:05 4:05 5:05 6:15	PM 12:15 1:15 2:15 3:15 4:15 5:15	PM 12:20 1:20 2:20 3:20 4:20 5:20 6:25	PM 12:25 1:25 2:25 3:25 4:25 5:25	PM 12:05 1:05 2:05 3:05 4:05 5:05 6:05	PM 12:15 1:15 2:15 3:15 4:15 5:15 6:15	PM NO SERVICE	PM 12:00 1:00 2:00 3:00 4:00 5:00 6:00	PM 12:10 1:10 2:10 3:10 4:10 5:10	PM 12:00 1:00 2:00 3:00 4:00 5:00 6:00	PM 1:15 2:45 4:15 5:45	PM 12:45 1:45 2:45 3:45 4:45 5:45	PM 12:40 1:40 2:40 3:40 4:40 5:40	PM LAST SHUTTLE DEPARTS FROM DOWNTOWN 7:00 PM	PM NO SERVICE

Attachment B – Turning Movement Counts (TMCs)

National Data & Surveying Services

Intersection Turning Movement Count

Location: Federal St/Brightview Concord River Assisted Living Access Dwy & Concord Rd
City: Billerica
Control: 1-Way Stop(NB)

Project ID: 25-430106-002
Date: 7/23/2025

Data - Total

NS/EW Streets:	Federal St/Brightview Concord River Assisted Living Access Dwy				Federal St/Brightview Concord River Assisted Living Access Dwy				Concord Rd				Concord Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	1	0	0	0	0	0	0	120	3	0	1	146	1	0	272
6:15 AM	1	1	0	0	0	0	0	0	1	82	0	0	2	172	1	0	260
6:30 AM	0	0	0	0	0	0	0	0	0	114	4	0	3	218	2	0	341
6:45 AM	2	0	1	0	0	0	2	0	1	135	4	0	0	214	3	0	362
7:00 AM	1	0	0	0	0	0	3	0	2	153	4	0	2	210	2	0	377
7:15 AM	2	0	0	0	1	0	2	0	1	155	6	0	3	229	1	0	400
7:30 AM	2	0	0	0	0	0	0	0	2	192	9	0	5	272	0	0	482
7:45 AM	1	0	2	0	0	0	0	0	0	245	15	0	1	223	0	0	487
8:00 AM	2	0	0	0	0	0	1	0	1	248	10	0	4	240	1	0	507
8:15 AM	3	0	0	0	1	0	0	0	1	226	19	0	3	227	3	0	483
8:30 AM	4	0	0	0	2	0	0	0	3	211	11	1	3	188	1	0	424
8:45 AM	1	0	1	0	0	0	3	0	7	240	15	0	6	193	0	0	466
9:00 AM	2	0	0	0	0	0	1	0	1	180	18	0	3	188	0	0	393
9:15 AM	2	0	4	0	0	0	0	0	1	182	12	0	1	159	3	0	364
9:30 AM	4	0	1	0	0	1	1	0	3	145	9	0	1	183	0	0	348
9:45 AM	0	0	0	0	0	0	1	0	2	138	3	0	2	178	4	0	328
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	27	1	10	0	4	1	14	0	26	2766	142	1	40	3240	22	0	6294
APPROACH %'s :	71.05%	2.63%	26.32%	0.00%	21.05%	5.26%	73.68%	0.00%	0.89%	94.24%	4.84%	0.03%	1.21%	98.12%	0.67%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	8	0	2	0	1	0	1	0	4	911	53	0	13	962	4	0	1959
PEAK HR FACTOR :	0.667	0.000	0.250	0.000	0.250	0.000	0.250	0.000	0.500	0.918	0.697	0.000	0.650	0.884	0.333	0.000	0.966
	0.833				0.500				0.931				0.884				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
10:00 AM	2	0	3	0	1	0	2	0	2	110	4	0	1	132	1	0	258
10:15 AM	1	0	2	0	1	0	0	0	1	111	4	0	4	127	0	0	251
10:30 AM	1	0	4	0	0	1	0	0	2	148	7	0	3	143	1	0	310
10:45 AM	7	0	4	0	1	0	3	0	2	148	6	0	2	116	4	0	293
11:00 AM	2	0	0	0	0	0	1	0	1	138	1	0	1	121	2	0	267
11:15 AM	3	0	1	0	0	0	4	0	0	130	2	0	1	140	2	0	283
11:30 AM	2	0	2	0	2	0	3	0	3	176	2	0	0	152	3	0	345
11:45 AM	4	0	3	0	2	0	3	0	3	206	1	0	0	149	1	0	372
12:00 PM	1	0	7	0	3	0	3	0	2	169	5	0	2	167	2	0	361
12:15 PM	5	0	1	0	1	0	2	0	0	164	4	0	6	157	0	0	340
12:30 PM	6	0	4	0	0	0	3	0	2	173	2	0	1	172	1	0	364
12:45 PM	4	1	3	0	1	0	0	0	3	166	4	0	3	147	1	0	333
1:00 PM	10	0	1	0	0	0	1	0	6	155	3	0	0	157	0	0	333
1:15 PM	9	0	2	0	2	0	2	0	1	160	1	0	2	168	1	0	348
1:30 PM	4	0	0	0	2	0	2	0	0	207	3	0	0	163	2	0	383
1:45 PM	2	0	1	0	0	0	2	0	4	166	1	1	0	143	0	0	320
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	63	1	38	0	16	1	31	0	32	2527	50	1	26	2354	21	0	5161
APPROACH %'s :	61.76%	0.98%	37.25%	0.00%	33.33%	2.08%	64.58%	0.00%	1.23%	96.82%	1.92%	0.04%	1.08%	98.04%	0.87%	0.00%	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	16	0	15	0	6	0	11	0	7	712	12	0	9	645	4	0	1437
PEAK HR FACTOR :	0.667	0.000	0.536	0.000	0.500	0.000	0.917	0.000	0.583	0.864	0.600	0.000	0.375	0.938	0.500	0.000	0.966
	0.775				0.708				0.870				0.945				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	1	0	2	0	4	0	3	0	0	162	1	0	2	192	0	0	367
2:15 PM	5	0	2	0	2	0	3	0	2	177	0	0	2	210	3	0	406
2:30 PM	9	0	2	0	2	0	2	0	0	190	3	0	1	286	3	0	498
2:45 PM	2	0	2	0	0	0	2	0	0	165	4	0	3	183	2	0	363
3:00 PM	5	0	3	0	4	0	5	0	1	190	2	0	1	221	6	0	438
3:15 PM	3	0	3	0	2	0	7	0	3	181	1	0	3	245	1	0	449
3:30 PM	6	0	3	0	2	0	1	0	1	223	3	0	0	274	1	0	514
3:45 PM	2	0	1	0	0	0	1	0	1	215	0	0	0	242	1	0	463
4:00 PM	6	0	3	0	0	0	3	0	2	236	3	0	0	270	1	0	524
4:15 PM	13	0	3	0	0	0	2	0	1	237	1	0	1	274	0	0	532
4:30 PM	12	0	2	0	2	0	0	0	2	240	6	0	0	296	1	0	561
4:45 PM	10	0	2	0	1	0	0	0	2	215	0	0	0	313	1	0	544
5:00 PM	9	0	6	0	1	0	1	0	0	200	3	0	3	326	1	0	550
5:15 PM	16	0	5	0	1	0	3	0	1	235	1	0	1	369	1	1	634
5:30 PM	9	0	2	0	0	0	1	0	0	202	0	0	0	311	0	0	525
5:45 PM	12	0	5	0	0	0	0	0	0	189	0	0	2	310	0	0	518
6:00 PM	8	0	2	0	0	0	2	0	0	187	1	0	0	208	2	0	410
6:15 PM	5	0	2	0	2	0	2	0	1	176	0	1	0	174	0	0	363
6:30 PM	1	0	0	0	0	0	0	0	1	162	2	0	0	144	1	0	311
6:45 PM	3	0	1	0	0	0	2	0	1	162	1	0	0	142	0	0	312
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	137	0	51	0	23	0	40	0	19	3944	32	1	19	4990	25	1	9282
APPROACH %'s :	72.87%	0.00%	27.13%	0.00%	36.51%	0.00%	63.49%	0.00%	0.48%	98.70%	0.80%	0.03%	0.38%	99.11%	0.50%	0.02%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	47	0	15	0	5	0	4	0	5	890	10	0	4	1304	4	1	2289
PEAK HR FACTOR :	0.734	0.000	0.625	0.000	0.625	0.000	0.333	0.000	0.625	0.927	0.417	0.000	0.333	0.883	1.000	0.250	0.903
	0.738				0.563				0.912				0.882				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Federal St/Brightview Concord River Assisted Living Access Dwy & Concord Rd
City: Billerica
Control: 1-Way Stop(NB)

Project ID: 25-430106-002
Date: 7/23/2025

Data - Cars

NS/EW Streets: Federal St/Brightview Concord River Assisted Living Access Dwy | Federal St/Brightview Concord River Assisted Living Access Dwy | Concord Rd | Concord Rd

AM

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	113	3	0	0	138	1	0	255
6:15 AM	1	1	0	0	0	0	0	0	1	80	0	0	2	161	1	0	247
6:30 AM	0	0	0	0	0	0	0	0	0	113	3	0	2	209	2	0	329
6:45 AM	1	0	0	0	0	0	2	0	1	134	4	0	0	207	3	0	352
7:00 AM	1	0	0	0	0	0	3	0	2	149	3	0	2	200	2	0	362
7:15 AM	1	0	0	0	1	0	2	0	1	145	6	0	3	222	1	0	382
7:30 AM	1	0	0	0	0	0	0	0	2	187	9	0	5	263	0	0	467
7:45 AM	1	0	2	0	0	0	0	0	0	238	15	0	1	210	0	0	467
8:00 AM	2	0	0	0	0	0	1	0	1	239	10	0	4	235	1	0	493
8:15 AM	3	0	0	0	1	0	0	0	1	222	19	0	3	217	2	0	468
8:30 AM	4	0	0	0	1	0	0	0	3	205	11	1	3	183	1	0	412
8:45 AM	1	0	1	0	0	0	3	0	7	228	15	0	6	185	0	0	446
9:00 AM	2	0	0	0	0	0	1	0	1	175	18	0	3	181	0	0	381
9:15 AM	2	0	4	0	0	0	0	0	1	170	11	0	1	143	2	0	334
9:30 AM	3	0	1	0	0	0	1	0	2	135	9	0	1	174	0	0	326
9:45 AM	0	0	0	0	0	0	1	0	2	132	3	0	1	168	4	0	311
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	23	1	8	0	3	0	14	0	25	2665	139	1	37	3096	20	0	6032
APPROACH %'s :	71.88%	3.13%	25.00%	0.00%	17.65%	0.00%	82.35%	0.00%	0.88%	94.17%	4.91%	0.04%	1.17%	98.19%	0.63%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	7	0	2	0	1	0	1	0	4	886	53	0	13	925	3	0	1895
PEAK HR FACTOR :	0.583	0.000	0.250	0.000	0.250	0.000	0.250	0.000	0.500	0.927	0.697	0.000	0.650	0.879	0.375	0.000	0.961
	0.750				0.500				0.932				0.878				

NOON

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
10:00 AM	2	0	2	0	0	0	2	0	2	101	4	0	0	116	1	0	230
10:15 AM	1	0	2	0	1	0	0	0	1	103	4	0	4	120	0	0	236
10:30 AM	1	0	3	0	0	0	0	0	2	133	6	0	2	132	0	0	279
10:45 AM	5	0	3	0	1	0	3	0	2	139	6	0	2	113	4	0	278
11:00 AM	2	0	0	0	0	0	1	0	1	130	1	0	1	113	2	0	251
11:15 AM	3	0	1	0	0	0	4	0	0	121	2	0	1	128	2	0	262
11:30 AM	1	0	2	0	2	0	3	0	3	168	2	0	0	144	3	0	328
11:45 AM	4	0	3	0	2	0	3	0	3	197	1	0	0	140	1	0	354
12:00 PM	1	0	7	0	3	0	3	0	2	158	5	0	2	161	2	0	344
12:15 PM	5	0	1	0	1	0	2	0	0	157	4	0	6	146	0	0	322
12:30 PM	6	0	4	0	0	0	3	0	2	164	2	0	1	163	1	0	346
12:45 PM	4	1	3	0	1	0	0	0	3	157	4	0	3	137	1	0	314
1:00 PM	10	0	1	0	0	0	1	0	6	144	3	0	0	147	0	0	312
1:15 PM	9	0	2	0	2	0	2	0	1	151	1	0	2	159	1	0	330
1:30 PM	4	0	0	0	2	0	2	0	0	198	3	0	0	154	2	0	365
1:45 PM	2	0	1	0	0	0	2	0	4	153	1	1	0	136	0	0	300
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	60	1	35	0	15	0	31	0	32	2374	49	1	24	2209	20	0	4851
APPROACH %'s :	62.50%	1.04%	36.46%	0.00%	32.61%	0.00%	67.39%	0.00%	1.30%	96.66%	2.00%	0.04%	1.07%	98.05%	0.89%	0.00%	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	16	0	15	0	6	0	11	0	7	676	12	0	9	610	4	0	1366
PEAK HR FACTOR :	0.667	0.000	0.536	0.000	0.500	0.000	0.917	0.000	0.583	0.858	0.600	0.000	0.375	0.936	0.500	0.000	0.965
	0.775				0.708				0.864				0.944				

PM

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	1	0	2	0	4	0	3	0	0	150	1	0	2	182	0	0	345
2:15 PM	5	0	2	0	2	0	3	0	2	164	0	0	1	206	3	0	388
2:30 PM	9	0	1	0	2	0	2	0	0	181	3	0	1	278	3	0	480
2:45 PM	2	0	2	0	0	0	2	0	0	160	4	0	2	181	2	0	355
3:00 PM	5	0	3	0	4	0	5	0	1	181	2	0	1	219	6	0	427
3:15 PM	2	0	2	0	2	0	7	0	3	175	0	0	1	237	1	0	430
3:30 PM	6	0	2	0	2	0	1	0	1	219	3	0	0	270	1	0	505
3:45 PM	2	0	1	0	0	0	1	0	1	199	0	0	0	236	1	0	441
4:00 PM	6	0	3	0	0	0	3	0	2	227	3	0	0	263	0	0	507
4:15 PM	13	0	2	0	0	0	1	0	1	231	1	0	1	272	0	0	522
4:30 PM	12	0	2	0	2	0	0	0	2	233	5	0	0	293	1	0	550
4:45 PM	9	0	2	0	1	0	0	0	2	211	0	0	0	307	1	0	533
5:00 PM	8	0	5	0	1	0	1	0	0	196	2	0	2	319	1	0	535
5:15 PM	16	0	5	0	1	0	3	0	1	233	1	0	1	365	1	0	627
5:30 PM	9	0	2	0	0	0	1	0	0	198	0	0	0	307	0	0	517
5:45 PM	12	0	5	0	0	0	0	0	0	187	0	0	2	307	0	0	513
6:00 PM	8	0	2	0	0	0	2	0	0	184	0	0	0	208	2	0	406
6:15 PM	5	0	1	0	2	0	2	0	1	174	0	1	0	172	0	0	358
6:30 PM	1	0	0	0	0	0	0	0	1	160	1	0	0	143	1	0	307
6:45 PM	3	0	1	0	0	0	2	0	1	162	1	0	0	141	0	0	311
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	134	0	45	0	23	0	39	0	19	3825	27	1	14	4906	24	0	9057
APPROACH %'s :	74.86%	0.00%	25.14%	0.00%	37.10%	0.00%	62.90%	0.00%	0.49%	98.79%	0.70%	0.03%	0.28%	99.23%	0.49%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	45	0	14	0	5	0	4	0	5	873	8	0	3	1284	4	0	2245
PEAK HR FACTOR :	0.703	0.000	0.700	0.000	0.625	0.000	0.333	0.000	0.625	0.937	0.400	0.000	0.375	0.879	1.000	0.000	0.895
	0.702				0.563				0.923				0.879				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Federal St/Brightview Concord River Assisted Living Access Dwy & Concord Rd
City: Billerica
Control: 1-Way Stop(NB)

Project ID: 25-430106-002
Date: 7/23/2025

Data - Buses

NS/EW Streets:	Federal St/Brightview Concord River Assisted Living Access Dwy				Federal St/Brightview Concord River Assisted Living Access Dwy				Concord Rd				Concord Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
8:15 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
9:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
9:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3
9:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	8	0	0	0	15	0	0	23
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	6
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.375	0.000	0.000	0.750
									0.375				0.375				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
11:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
1:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
1:45 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	7	0	0	0	7	0	0	14
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.500
									0.250				0.250				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	3
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	6
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
5:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	2	0	0	0	0	0	0	10	1	0	1	5	0	1	20
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%					0.00%	90.91%	9.09%	0.00%	14.29%	71.43%	0.00%	14.29%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	0	1	0	0	0	0	0	0	2	0	0	1	0	0	1	5
PEAK HR FACTOR :	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.250	0.000	0.000	0.250	0.625
			0.250							0.500				0.500			

National Data & Surveying Services

Intersection Turning Movement Count

Location: Federal St/Brightview Concord River Assisted Living Access Dwy & Concord Rd
City: Billerica
Control: 1-Way Stop(NB)

Project ID: 25-430106-002
Date: 7/23/2025

Data - Duals

NS/EW Streets: Federal St/Brightview Concord River Assisted Living Access Dwy | Federal St/Brightview Concord River Assisted Living Access Dwy | Concord Rd | Concord Rd

AM

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	1	0	0	0	0	0	0	7	0	0	1	7	0	0	16
6:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	8	0	0	9
6:30 AM	0	0	0	0	0	0	0	0	0	1	1	0	1	8	0	0	11
6:45 AM	1	0	1	0	0	0	0	0	0	1	0	0	0	7	0	0	10
7:00 AM	0	0	0	0	0	0	0	0	0	1	1	0	0	8	0	0	10
7:15 AM	1	0	0	0	0	0	0	0	0	8	0	0	0	6	0	0	15
7:30 AM	1	0	0	0	0	0	0	0	0	4	0	0	0	8	0	0	13
7:45 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	10	0	0	15
8:00 AM	0	0	0	0	0	0	0	0	0	8	0	0	0	2	0	0	10
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	9	1	0	10
8:30 AM	0	0	0	0	1	0	0	0	0	4	0	0	0	3	0	0	8
8:45 AM	0	0	0	0	0	0	0	0	0	10	0	0	0	6	0	0	16
9:00 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	7	0	0	11
9:15 AM	0	0	0	0	0	0	0	0	0	8	1	0	0	14	1	0	24
9:30 AM	1	0	0	0	0	1	0	0	1	7	0	0	0	6	0	0	16
9:45 AM	0	0	0	0	0	0	0	0	0	5	0	0	1	3	0	0	9
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	0	2	0	1	1	0	0	1	74	3	0	3	112	2	0	203
APPROACH %'s :	66.67%	0.00%	33.33%	0.00%	50.00%	50.00%	0.00%	0.00%	1.28%	94.87%	3.85%	0.00%	2.56%	95.73%	1.71%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	1	0	0	0	0	0	0	0	0	17	0	0	0	29	1	0	48
PEAK HR FACTOR :	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.531	0.000	0.000	0.000	0.725	0.250	0.000	0.800
	0.250								0.531				0.750				

NOON

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
10:00 AM	0	0	1	0	1	0	0	0	0	8	0	0	1	14	0	0	25
10:15 AM	0	0	0	0	0	0	0	0	0	8	0	0	0	6	0	0	14
10:30 AM	0	0	1	0	0	1	0	0	0	13	1	0	1	8	1	0	26
10:45 AM	2	0	1	0	0	0	0	0	0	7	0	0	0	3	0	0	13
11:00 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	7	0	0	11
11:15 AM	0	0	0	0	0	0	0	0	0	7	0	0	0	10	0	0	17
11:30 AM	1	0	0	0	0	0	0	0	0	8	0	0	0	4	0	0	13
11:45 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	9	0	0	15
12:00 PM	0	0	0	0	0	0	0	0	0	8	0	0	0	6	0	0	14
12:15 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	7	0	0	12
12:30 PM	0	0	0	0	0	0	0	0	0	7	0	0	0	6	0	0	13
12:45 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	7	0	0	13
1:00 PM	0	0	0	0	0	0	0	0	0	9	0	0	0	5	0	0	14
1:15 PM	0	0	0	0	0	0	0	0	0	7	0	0	0	7	0	0	14
1:30 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	9	0	0	15
1:45 PM	0	0	0	0	0	0	0	0	0	8	0	0	0	5	0	0	13
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	3	0	3	0	1	1	0	0	0	117	1	0	2	113	1	0	242
APPROACH %'s :	50.00%	0.00%	50.00%	0.00%	50.00%	50.00%	0.00%	0.00%	0.00%	99.15%	0.85%	0.00%	1.72%	97.41%	0.86%	0.00%	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	26	0	0	0	28	0	0	54
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.813	0.000	0.000	0.000	0.778	0.000	0.000	0.900
									0.813				0.778				

PM

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	0	0	0	0	0	0	0	0	0	9	0	0	0	6	0	0	15
2:15 PM	0	0	0	0	0	0	0	0	0	11	0	0	1	3	0	0	15
2:30 PM	0	0	1	0	0	0	0	0	0	5	0	0	0	7	0	0	13
2:45 PM	0	0	0	0	0	0	0	0	0	5	0	0	1	2	0	0	8
3:00 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	2	0	0	7
3:15 PM	1	0	0	0	0	0	0	0	0	6	0	0	2	5	0	0	14
3:30 PM	0	0	1	0	0	0	0	0	0	3	0	0	0	4	0	0	8
3:45 PM	0	0	0	0	0	0	0	0	0	7	0	0	0	5	0	0	12
4:00 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	4	1	0	11
4:15 PM	0	0	1	0	0	0	1	0	0	6	0	0	0	2	0	0	10
4:30 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	3	0	0	9
4:45 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0	0	7
5:00 PM	1	0	0	0	0	0	0	0	0	4	1	0	0	5	0	0	11
5:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	5
5:30 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	2	0	0	6
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3
6:00 PM	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
6:15 PM	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	3
6:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	0	4	0	0	0	1	0	0	85	2	0	4	63	1	0	162
APPROACH %'s :	33.33%	0.00%	66.67%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	97.70%	2.30%	0.00%	5.88%	92.65%	1.47%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	1	0	0	0	0	0	0	0	0	14	1	0	0	16	0	0	32
PEAK HR FACTOR :	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.583	0.250	0.000	0.000	0.800	0.000	0.000	0.727
	0.250								0.625				0.800				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Federal St/Brightview Concord River Assisted Living Access Dwy & Concord Rd
City: Billerica
Control: 1-Way Stop(NB)

Project ID: 25-430106-002
Date: 7/23/2025

Data - TTST

NS/EW Streets:	Federal St/Brightview Concord River Assisted Living Access Dwy				Federal St/Brightview Concord River Assisted Living Access Dwy				Concord Rd				Concord Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	5
7:15 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
7:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
7:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3
8:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
8:15 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
8:30 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
9:30 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	4
9:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	19	0	0	0	17	0	0	36
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0	0	10
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.625	0.000	0.000	0.000	0.625	0.000	0.000	0.833
									0.625				0.625				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
10:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
10:30 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	5
10:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
11:00 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	0	5
11:15 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	4
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
11:45 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
12:00 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
12:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	0	6
12:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	4
12:45 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	4
1:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	5	0	0	6
1:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	4
1:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
1:45 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	4
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	29	0	0	0	25	0	0	54
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	9	0	0	0	6	0	0	15
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.750	0.000	0.000	0.000	0.375	0.000	0.000	0.625
									0.750				0.375				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	5
2:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
2:30 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	4
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
3:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
3:45 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	4
4:00 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	5
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
4:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
6:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:30 PM	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	0	0	0	0	0	0	0	0	24	2	0	0	16	0	0	43
APPROACH %'s :	100.00%	0.00%	0.00%	0.00%					0.00%	92.31%	7.69%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	1	0	0	0	0	0	0	0	0	1	1	0	0	4	0	0	7
PEAK HR FACTOR :	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.250	0.000	0.000	0.500	0.000	0.000	0.583
		0.250							0.250				0.500				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Federal St/Brightview Concord River Assisted Living Access Dwy & Concord Rd
City: Billerica
Control: 1-Way Stop(NB)

Project ID: 25-430106-002
Date: 7/23/2025

Data - Bikes

NS/EW Streets:	Federal St/Brightview Concord River Assisted Living Access Dwy				Federal St/Brightview Concord River Assisted Living Access Dwy				Concord Rd				Concord Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	2	0	0	1	4	0	0	7
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	20.00%	80.00%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.500
									0.250				0.250				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0	0	7
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.375
									0.250				0.250				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	2	0	0	0	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	0	6
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.250
									0.250								

National Data & Surveying Services

Intersection Turning Movement Count

Location: Federal St/Brightview Concord River Assisted Living Access Dwy & Co **Project ID:** 25-430106-002
City: Billerica **Date:** 7/23/2025

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Federal St/Brightview Concord River Assisted		Federal St/Brightview Concord River Assisted		Concord Rd		Concord Rd		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	1	0	0	0	0	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	1	0	0	0	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	1	0	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	1	1
8:45 AM	0	0	0	0	0	0	1	0	1
9:00 AM	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0
9:30 AM	0	1	0	0	1	0	0	0	2
9:45 AM	1	0	0	0	0	0	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	3	2	0	0	1	0	1	1	8
APPROACH %'s :	60.00%	40.00%			100.00%	0.00%	50.00%	50.00%	
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	1	0	0	0	0	0	0	0	1
PEAK HR FACTOR :	0.250								0.250
	0.250								

NOON	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
10:00 AM	0	0	2	0	0	0	0	0	2
10:15 AM	1	1	0	0	0	0	0	0	2
10:30 AM	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0
1:15 PM	1	0	0	0	0	0	0	0	1
1:30 PM	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	2	1	2	0	0	0	0	0	5
APPROACH %'s :	66.67%	33.33%	100.00%	0.00%					
PEAK HR :	11:45 AM - 12:45 PM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
2:00 PM	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	1	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	1	0	0	0	0	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	2	0	0	0	0	0	0	2
APPROACH %'s :	0.00%	100.00%							
PEAK HR :	04:30 PM - 05:30 PM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

Prepared by National Data & Surveying Services

Federal St/Brightview Concord River Assisted Living Access Dwy & Concord Rd

Peak Hour Turning Movement Count

ID: 25-430106-002
City: Billerica

Day: Wednesday
Date: 7/23/2025

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	6:00 AM - 10:00 AM
11:45 AM - 12:45 PM	10:00 AM - 02:00 PM
04:30 PM - 05:30 PM	2:00 PM - 07:00 PM

SOUTHBOUND — Federal St/Brightview Concord River Assisted Living Access Dwy

AM	1	0	1	0	8	AM
NOON	11	0	6	0	11	NOON
PM	4	0	5	0	9	PM
	0	1	0	0		

EASTBOUND — Concord Rd

AM	NOON	PM		
971	672	1355	⇦	
0	0	0	↶	0
4	7	5	↱	0
911	712	890	→	2
53	12	10	↳	0
AM	NOON	PM		

WESTBOUND — Concord Rd

PM	NOON	AM		
4	4	4	↰	0
1304	645	962	←	2
4	9	13	↲	0
1	0	0	↺	0
911	733	914	⇨	
PM	NOON	AM		

CONTROL

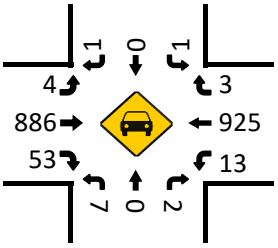
1-Way Stop(NB)

	AM	NOON	PM
TEV	1959	1437	2289
PHF	0.97	0.97	0.90

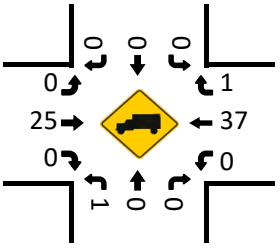
NORTHBOUND — Federal St/Brightview Concord River Assisted Living Access Dwy

PM	14	0	47	0	15	PM
NOON	21	0	16	0	15	NOON
AM	66	0	8	0	2	AM
		0	0	2	0	

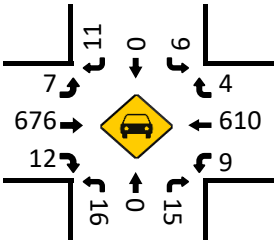
Cars (AM)



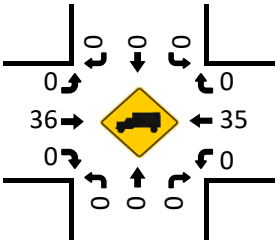
Total Trucks (AM)



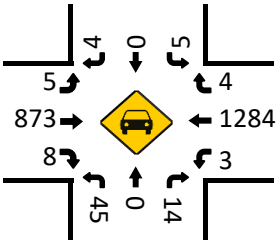
Cars (NOON)



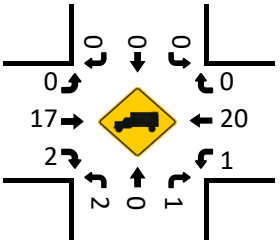
Total Trucks (NOON)



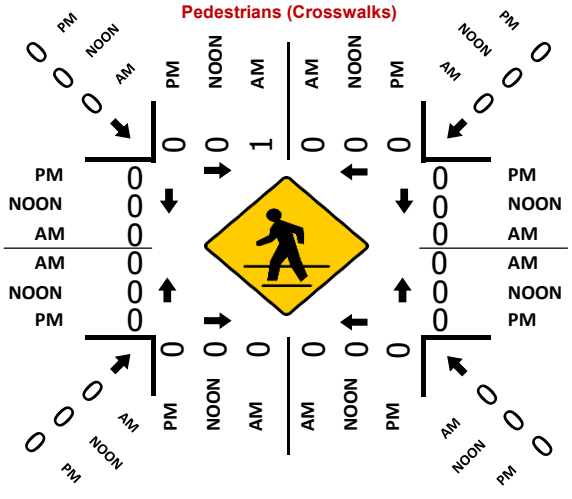
Cars (PM)



Total Trucks (PM)



Pedestrians (Crosswalks)


PM
NOON
AM
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Project ID: 25-430106-002
Location: Federal St/Brightview Concord River Assisted Living Access Dwy & Concord Rd
City: Billerica

Day: Wednesday
Date: 7/23/2025

Groups Printed - Cars, PU, Vans - Heavy Trucks

	Brightview Concord River Assisted Living A Northbound						Brightview Concord River Assisted Living A Southbound						Concord Rd Eastbound						Concord Rd Westbound						
Start Time	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Int. Total
6:00 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	120	3	0	0	123	1	146	1	0	0	148	272
6:15 AM	1	1	0	0	0	2	0	0	0	0	0	0	1	82	0	0	0	83	2	172	1	0	0	175	260
6:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	114	4	0	0	118	3	218	2	0	0	223	341
6:45 AM	2	0	1	0	0	3	0	0	2	0	0	2	1	135	4	0	0	140	0	214	3	0	0	217	362
Total	3	1	2	0	0	6	0	0	2	0	1	2	2	451	11	0	0	464	6	750	7	0	0	763	1235
7:00 AM	1	0	0	0	0	1	0	0	3	0	1	3	2	153	4	0	0	159	2	210	2	0	0	214	377
7:15 AM	2	0	0	0	0	2	1	0	2	0	0	3	1	155	6	0	0	162	3	229	1	0	0	233	400
7:30 AM	2	0	0	0	0	2	0	0	0	0	1	0	2	192	9	0	0	203	5	272	0	0	0	277	482
7:45 AM	1	0	2	0	0	3	0	0	0	0	0	0	0	245	15	0	0	260	1	223	0	0	0	224	487
Total	6	0	2	0	0	8	1	0	5	0	2	6	5	745	34	0	0	784	11	934	3	0	0	948	1746
8:00 AM	2	0	0	0	0	2	0	0	1	0	0	1	1	248	10	0	0	259	4	240	1	0	0	245	507
8:15 AM	3	0	0	0	0	3	1	0	0	0	0	1	1	226	19	0	0	246	3	227	3	0	0	233	483
8:30 AM	4	0	0	0	0	4	2	0	0	0	0	2	3	211	11	1	1	226	3	188	1	0	0	192	424
8:45 AM	1	0	1	0	0	2	0	0	3	0	0	3	7	240	15	0	1	262	6	193	0	0	0	199	466
Total	10	0	1	0	0	11	3	0	4	0	0	7	12	925	55	1	2	993	16	848	5	0	0	869	1880
9:00 AM	2	0	0	0	0	2	0	0	1	0	0	1	1	180	18	0	0	199	3	188	0	0	0	191	393
9:15 AM	2	0	4	0	0	6	0	0	0	0	0	0	1	182	12	0	0	195	1	159	3	0	0	163	364
9:30 AM	4	0	1	0	0	5	0	1	1	0	1	2	3	145	9	0	0	157	1	183	0	0	1	184	348
9:45 AM	0	0	0	0	0	0	0	0	1	0	1	1	2	138	3	0	0	143	2	178	4	0	0	184	328
Total	8	0	5	0	0	13	0	1	3	0	2	4	7	645	42	0	0	694	7	708	7	0	1	722	1433
BREAK																									
10:00 AM	2	0	3	0	2	5	1	0	2	0	0	3	2	110	4	0	0	116	1	132	1	0	0	134	258
10:15 AM	1	0	2	0	0	3	1	0	0	0	2	1	1	111	4	0	0	116	4	127	0	0	0	131	251
10:30 AM	1	0	4	0	0	5	0	1	0	0	0	1	2	148	7	0	0	157	3	143	1	0	0	147	310
10:45 AM	7	0	4	0	0	11	1	0	3	0	0	4	2	148	6	0	0	156	2	116	4	0	0	122	293
Total	11	0	13	0	2	24	3	1	5	0	2	9	7	517	21	0	0	545	10	518	6	0	0	534	1112
11:00 AM	2	0	0	0	0	2	0	0	1	0	0	1	1	138	1	0	0	140	1	121	2	0	0	124	267
11:15 AM	3	0	1	0	0	4	0	0	4	0	0	4	0	130	2	0	0	132	1	140	2	0	0	143	283
11:30 AM	2	0	2	0	0	4	2	0	3	0	0	5	3	176	2	0	0	181	0	152	3	0	0	155	345
11:45 AM	4	0	3	0	0	7	2	0	3	0	0	5	3	206	1	0	0	210	0	149	1	0	0	150	372
Total	11	0	6	0	0	17	4	0	11	0	0	15	7	650	6	0	0	663	2	562	8	0	0	572	1267
12:00 PM	1	0	7	0	0	8	3	0	3	0	0	6	2	169	5	0	0	176	2	167	2	0	0	171	361
12:15 PM	5	0	1	0	0	6	1	0	2	0	0	3	0	164	4	0	0	168	6	157	0	0	0	163	340
12:30 PM	6	0	4	0	0	10	0	0	3	0	0	3	2	173	2	0	0	177	1	172	1	0	0	174	364
12:45 PM	4	1	3	0	0	8	1	0	0	0	0	1	3	166	4	0	0	173	3	147	1	0	0	151	333
Total	16	1	15	0	0	32	5	0	8	0	0	13	7	672	15	0	0	694	12	643	4	0	0	659	1398
1:00 PM	10	0	1	0	0	11	0	0	1	0	0	1	6	155	3	0	0	164	0	157	0	0	0	157	333
1:15 PM	9	0	2	0	0	11	2	0	2	0	1	4	1	160	1	0	0	162	2	168	1	0	0	171	348
1:30 PM	4	0	0	0	0	4	2	0	2	0	0	4	0	207	3	0	0	210	0	163	2	0	0	165	383
1:45 PM	2	0	1	0	0	3	0	0	2	0	0	2	4	166	1	1	0	172	0	143	0	0	0	143	320
Total	25	0	4	0	0	29	4	0	7	0	1	11	11	688	8	1	0	708	2	631	3	0	0	636	1384
BREAK																									
2:00 PM	1	0	2	0	0	3	4	0	3	0	0	7	0	162	1	0	0	163	2	192	0	0	0	194	367
2:15 PM	5	0	2	0	0	7	2	0	3	0	0	5	2	177	0	0	0	179	2	210	3	0	0	215	406
2:30 PM	9	0	2	0	0	11	2	0	2	0	0	4	0	190	3	0	0	193	1	286	3	0	0	290	498
2:45 PM	2	0	2	0	0	4	0	0	2	0	0	2	0	165	4	0	0	169	3	183	2	0	0	188	363
Total	17	0	8	0	0	25	8	0	10	0	0	18	2	694	8	0	0	704	8	871	8	0	0	887	1634
3:00 PM	5	0	3	0	0	8	4	0	5	0	0	9	1	190	2	0	0	193	1	221	6	0	0	228	438
3:15 PM	3	0	3	0	0	6	2	0	7	0	0	9	3	181	1	0	0	185	3	245	1	0	0	249	449
3:30 PM	6	0	3	0	0	9	2	0	1	0	0	3	1	223	3	0	0	227	0	274	1	0	0	275	514
3:45 PM	2	0	1	0	0	3	0	0	1	0	0	1	1	215	0	0	0	216	0	242	1	0	0	243	463
Total	16	0	10	0	0	26	8	0	14	0	0	22	6	809	6	0	0	821	4	982	9	0	0	995	1864
4:00 PM	6	0	3	0	0	9	0	0	3	0	0	3	2	236	3	0	0	241	0	270	1	0	0	271	524
4:15 PM	13	0	3	0	0	16	0	0	2	0	0	2	1	237	1	0	0	239	1	274	0	0	0	275	532
4:30 PM	12	0	2	0	0	14	2	0	0	0	0	2	2	240	6	0	0	248	0	296	1	0	0	297	561
4:45 PM	10	0	2	0	0	12	1	0	0	0	0	1	2	215	0	0	0	217	0	313	1	0	0	314	544
Total	41	0	10	0	0	51	3	0	5	0	0	8	7	928	10	0	0	945	1	1153	3	0	0	1157	2161
5:00 PM	9	0	6	0	0	15	1	0	1	0	0	2	0	200	3	0	0	203	3	326	1	0	0	330	550
5:15 PM	16	0	5	0	0	21	1	0	3	0	0	4	1	235	1	0	0	237	1	369	1	1	0	372	634
5:30 PM	9	0	2	0	0	11	0	0	1	0	1	1	0	202	0	0	0	202	0	311	0	0	0	311	525
5:45 PM	12	0	5	0	0	17	0	0	0	0	0	0	0	189	0	0	0	189	2	310	0	0	0	312	518
Total	46	0	18	0	0	64	2	0	5	0	1	7	1	826	4	0	0	831	6	1316	2	1	0	1325	2227
6:00 PM	8	0	2	0	0	10	0	0	2	0	0	2	0	187	1	0	0	188	0	208	2	0	0	210	410
6:15 PM	5	0	2	0	0	7	2	0	2	0	0	4	1	176	0	1	0	178	0	174	0	0	0	174	363
6:30 PM	1	0	0	0	0	1	0	0	0	0	0	0	1	162	2	0	0	165	0	144	1	0	0	145	311
6:45 PM	3	0	1	0	0	4	0	0	2	0	1	2	1	162	1	0	0	164	0	142	0	0	0	142	312
Total	17	0	5	0	0	22	2	0	6	0	1	8	3	687	4	1	0	695	0	668	3	0	0	671	1396
Grand Total	227	2	99	0	2	328	43	2	85	0	10	130	77	9237	224	3	2	9541	85	10584	68	1	1	10738	20737
Apprch %	69.2	0.6	30.2	0.0	0.6		33.1	1.5	65.4	0.0	7.7		0.8	96.8	2.3	0.0	0.0		0.8	98.6	0.6	0.0	0.0		
Total %	1.1	0.0	0.5	0.0	0.0	1.6	0.2	0.0	0.4	0.0	0.0	0.6	0.4	44.5	1.1	0.0	0.0	46.0	0.4	51.0	0.3	0.0	0.0	51.8	
Cars, PU, Vans	217	2	88	0		307	41	0	84	0		125	76	8864	215	3		9158	75	10211	64	0		10350	19940
% Cars, PU, Vans	95.6	100.0	88.9	0.0		93.6	95.3	0.0	98.8	0.0		96.2	98.7	96.0	96.0	100.0		96.0	88.2	96.5	94.1	0.0		96.4	96.2
Buses	0	0	2	0		2	0	0	0	0		0	0	25	1	0		26	1	27	0	1		29	57
%Buses	0.0	0.0	2.0	0.0		0.6	0.0	0.0	0.0	0.0		0.0	0.0	0.3	0.4	0.0		0.3	1.2	0.3	0.0	100.0		0.3	0.3
Duals	9	0	9	0		18	2	2	1	0		5	1	276	6	0		283	9	288	4	0		301	607
%Duals	4.0	0.0	9.1	0.0		5.5	4.7	100.0	1.2	0.0		3.8	1.3	3.0	2.7	0.0		3.0	10.6	2.7	5.9	0.0		2.8	2.9
TTST	1	0	0	0		1	0	0	0	0		0	0	72	2	0		74	0	58	0	0		58	133
%TTST	0.4	0.0	0.0	0.0		0.3	0.0	0.0	0.0	0.0		0.0	0.0	0.8	0.9	0.0		0.8	0.0	0.5	0.0	0.0		0.5	0.6

Project ID: 25-430106-002
Location: Federal St/Brightview Concord River Assisted Livi
City: Billerica

PEAK HOURS

Day: Wednesday
Date: 7/23/2025

AM

	htview Concord River Assisted Livi Northbound					ightview Concord River Assisted Livi Southbound					Concord Rd Eastbound					Concord Rd Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 06:00 AM - 10:00 AM																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
7:30 AM	2	0	0	0	2	0	0	0	0	0	2	192	9	0	203	5	272	0	0	277	482
7:45 AM	1	0	2	0	3	0	0	0	0	0	0	245	15	0	260	1	223	0	0	224	487
8:00 AM	2	0	0	0	2	0	0	1	0	1	1	248	10	0	259	4	240	1	0	245	507
8:15 AM	3	0	0	0	3	1	0	0	0	1	1	226	19	0	246	3	227	3	0	233	483
Total Volume	8	0	2	0	10	1	0	1	0	2	4	911	53	0	968	13	962	4	0	979	1959
% App. Total	80.0	0.0	20.0	0.0	100	50.0	0.0	50.0	0.0	100	0.4	94.1	5.5	0.0	100	1.3	98.3	0.4	0.0	100	
PHF					0.833					0.500					0.931					0.884	0.966
Cars, PU, Vans	7	0	2	0	9	1	0	1	0	2	4	886	53	0	943	13	925	3	0	941	1895
% Cars, PU, Vans	87.5	0.0	100.0	0.0	90.0	100.0	0.0	100.0	0.0	100.0	100.0	97.3	100.0	0.0	97.4	100.0	96.2	75.0	0.0	96.1	96.7
Buses	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	3	0	0	3	6
%Buses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.3	0.3
Duals	1	0	0	0	1	0	0	0	0	0	0	17	0	0	17	0	29	1	0	30	48
%Duals	12.5	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	1.8	0.0	3.0	25.0	0.0	3.1	2.5
TTST	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	5	0	0	5	10
%TTST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.5	0.0	0.0	0.5	0.5

NOON

	htview Concord River Assisted Livi Northbound					ightview Concord River Assisted Livi Southbound					Concord Rd Eastbound					Concord Rd Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 10:00 AM - 02:00 PM																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	4	0	3	0	7	2	0	3	0	5	3	206	1	0	210	0	149	1	0	150	372
12:00 PM	1	0	7	0	8	3	0	3	0	6	2	169	5	0	176	2	167	2	0	171	361
12:15 PM	5	0	1	0	6	1	0	2	0	3	0	164	4	0	168	6	157	0	0	163	340
12:30 PM	6	0	4	0	10	0	0	3	0	3	2	173	2	0	177	1	172	1	0	174	364
Total Volume	16	0	15	0	31	6	0	11	0	17	7	712	12	0	731	9	645	4	0	658	1437
% App. Total	51.6	0.0	48.4	0.0	100	35.3	0.0	64.7	0.0	100	1.0	97.4	1.6	0.0	100	1.4	98.0	0.6	0.0	100	
PHF					0.775					0.708					0.870					0.945	0.966
Cars, PU, Vans	16	0	15	0	31	6	0	11	0	17	7	676	12	0	695	9	610	4	0	623	1366
% Cars, PU, Vans	100.0	0.0	100.0	0.0	100.0	100.0	0.0	100.0	0.0	100.0	100.0	94.9	100.0	0.0	95.1	100.0	94.6	100.0	0.0	94.7	95.1
Buses	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
%Buses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.2	0.1
Duals	0	0	0	0	0	0	0	0	0	0	0	26	0	0	26	0	28	0	0	28	54
%Duals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	3.6	0.0	4.3	0.0	0.0	4.3	3.8
TTST	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	0	6	0	0	6	15
%TTST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.2	0.0	0.9	0.0	0.0	0.9	1.0

PM

	htview Concord River Assisted Livi Northbound					ightview Concord River Assisted Livi Southbound					Concord Rd Eastbound					Concord Rd Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 02:00 PM - 07:00 PM																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
4:30 PM	12	0	2	0	14	2	0	0	0	2	2	240	6	0	248	0	296	1	0	297	561
4:45 PM	10	0	2	0	12	1	0	0	0	1	2	215	0	0	217	0	313	1	0	314	544
5:00 PM	9	0	6	0	15	1	0	1	0	2	0	200	3	0	203	3	326	1	0	330	550
5:15 PM	16	0	5	0	21	1	0	3	0	4	1	235	1	0	237	1	369	1	1	372	634
Total Volume	47	0	15	0	62	5	0	4	0	9	5	890	10	0	905	4	1304	4	1	1313	2289
% App. Total	75.8	0.0	24.2	0.0	100	55.6	0.0	44.4	0.0	100	0.6	98.3	1.1	0.0	100	0.3	99.3	0.3	0.1	100	
PHF					0.738					0.563					0.912					0.882	0.903
Cars, PU, Vans	45	0	14	0	59	5	0	4	0	9	5	873	8	0	886	3	1284	4	0	1291	2245
% Cars, PU, Vans	95.7	0.0	93.3	0.0	95.2	100.0	0.0	100.0	0.0	100.0	100.0	98.1	80.0	0.0	97.9	75.0	98.5	100.0	0.0	98.3	98.1
Buses	0	0	1	0	1	0	0	0	0	0	0	2	0	0	2	1	0	0	1	2	5
%Buses	0.0	0.0	6.7	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	25.0	0.0	0.0	100.0	0.2	0.2
Duals	1	0	0	0	1	0	0	0	0	0	0	14	1	0	15	0	16	0	0	16	32
%Duals	2.1	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	1.6	10.0	0.0	1.7	0.0	1.2	0.0	0.0	1.2	1.4
TTST	1	0	0	0	1	0	0	0	0	0	0	1	1	0	2	0	4	0	0	4	7
%TTST	2.1	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1	10.0	0.0	0.2	0.0	0.3	0.0	0.0	0.3	0.3

National Data & Surveying Services

Intersection Turning Movement Count

Location: Middlesex Turnpike & Concord Rd
City: Billerica
Control: Signalized

Project ID: 25-430106-001
Date: 7/23/2025

Data - Total

NS/EW Streets:	Middlesex Turnpike				Middlesex Turnpike				Concord Rd				Concord Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	27	0	9	0	0	0	0	0	0	35	66	0	19	114	0	0	270
6:15 AM	29	0	6	0	0	0	0	0	0	37	43	0	37	146	0	0	298
6:30 AM	51	0	2	0	0	0	0	0	0	42	75	0	44	155	0	0	369
6:45 AM	51	0	3	0	0	0	0	0	0	45	74	0	46	169	0	0	388
7:00 AM	44	0	7	0	0	0	0	0	0	49	99	0	36	169	0	0	404
7:15 AM	50	0	7	0	0	0	0	0	0	58	87	0	37	182	0	0	421
7:30 AM	76	0	5	0	0	0	0	0	0	74	89	0	33	211	0	0	488
7:45 AM	61	0	15	0	0	0	0	0	0	88	124	0	39	158	0	0	485
8:00 AM	64	0	18	0	0	0	0	0	0	85	120	0	19	190	0	0	496
8:15 AM	66	0	15	0	0	0	0	0	0	84	133	0	29	175	0	0	502
8:30 AM	45	0	12	0	0	0	0	0	0	100	90	0	26	148	0	0	421
8:45 AM	58	0	8	0	0	0	0	0	0	111	102	0	17	140	0	0	436
9:00 AM	45	0	14	0	0	0	0	0	0	82	85	0	19	153	0	0	398
9:15 AM	42	0	20	0	0	0	0	0	0	88	83	0	19	115	0	0	367
9:30 AM	54	0	14	0	0	0	0	0	0	81	54	0	23	135	0	0	361
9:45 AM	43	0	12	0	0	0	0	0	0	78	51	0	11	142	0	0	337
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	806	0	167	0	0	0	0	0	0	1137	1375	0	454	2502	0	0	6441
APPROACH %'s :	82.84%	0.00%	17.16%	0.00%					0.00%	45.26%	54.74%	0.00%	15.36%	84.64%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	267	0	53	0	0	0	0	0	0	331	466	0	120	734	0	0	1971
PEAK HR FACTOR :	0.878	0.000	0.736	0.000	0.000	0.000	0.000	0.000	0.000	0.940	0.876	0.000	0.769	0.870	0.000	0.000	0.982
	0.976								0.918				0.875				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
10:00 AM	32	0	12	0	0	0	0	0	0	67	41	0	11	97	0	0	260
10:15 AM	34	0	13	0	0	0	0	0	0	71	40	0	17	96	0	0	271
10:30 AM	43	0	11	0	0	0	0	0	0	101	48	0	14	106	0	0	323
10:45 AM	38	0	24	0	0	0	0	0	0	107	44	0	20	79	0	0	312
11:00 AM	33	0	20	0	0	0	0	0	0	89	47	0	22	84	0	0	295
11:15 AM	40	0	25	0	0	0	0	0	0	89	44	0	14	102	0	0	314
11:30 AM	46	0	14	0	0	0	0	0	0	114	46	0	22	107	0	0	349
11:45 AM	48	0	21	0	0	0	0	0	0	155	67	0	14	91	0	0	396
12:00 PM	67	0	25	0	0	0	0	0	0	127	57	0	25	95	0	0	396
12:15 PM	64	0	21	0	0	0	0	0	0	117	57	0	20	99	0	0	378
12:30 PM	61	0	24	0	0	0	0	0	0	96	78	0	20	123	0	0	402
12:45 PM	51	0	18	0	0	0	0	0	0	112	44	0	20	99	0	0	344
1:00 PM	57	0	24	0	0	0	0	0	0	106	48	0	18	91	0	0	344
1:15 PM	60	0	23	0	0	0	0	0	0	104	52	1	22	105	0	0	367
1:30 PM	64	0	23	0	0	0	0	0	0	130	65	0	18	105	0	0	405
1:45 PM	55	0	18	0	0	0	0	0	0	102	54	0	21	77	0	0	327
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	793	0	316	0	0	0	0	0	0	1687	832	1	298	1556	0	0	5483
APPROACH %'s :	71.51%	0.00%	28.49%	0.00%					0.00%	66.94%	33.02%	0.04%	16.07%	83.93%	0.00%	0.00%	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	240	0	91	0	0	0	0	0	0	495	259	0	79	408	0	0	1572
PEAK HR FACTOR :	0.896	0.000	0.910	0.000	0.000	0.000	0.000	0.000	0.000	0.798	0.830	0.000	0.790	0.829	0.000	0.000	0.978
	0.899								0.849				0.851				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	104	0	24	0	0	0	0	0	0	105	52	1	9	74	0	0	369
2:15 PM	101	0	25	0	0	0	0	0	0	147	44	0	9	98	0	0	424
2:30 PM	143	0	29	0	0	0	0	0	0	143	52	0	10	112	0	0	489
2:45 PM	81	0	36	0	0	0	0	0	0	140	35	0	11	92	0	0	395
3:00 PM	136	0	33	0	0	0	0	0	0	137	52	0	19	92	0	0	469
3:15 PM	120	0	34	0	0	0	0	0	0	146	48	0	22	109	0	0	479
3:30 PM	186	0	44	0	0	0	0	0	0	163	62	0	16	87	0	0	558
3:45 PM	160	0	47	0	0	0	0	0	0	185	41	0	9	67	0	0	509
4:00 PM	154	0	50	0	0	0	0	0	0	171	53	0	11	93	0	0	532
4:15 PM	134	0	50	0	0	0	0	0	0	200	52	0	29	127	0	0	592
4:30 PM	164	0	50	0	0	0	0	0	0	190	54	0	22	100	0	0	580
4:45 PM	196	0	42	0	0	0	0	0	0	144	75	0	18	98	0	0	573
5:00 PM	216	0	38	0	0	0	0	0	0	140	62	0	19	114	0	0	589
5:15 PM	216	0	60	0	0	0	0	0	0	175	64	0	19	115	0	0	649
5:30 PM	198	0	51	0	0	0	0	0	0	172	60	0	15	92	0	0	588
5:45 PM	202	0	49	0	0	0	0	0	0	124	50	0	19	101	0	0	545
6:00 PM	104	0	37	0	0	0	0	0	0	157	47	0	16	92	0	0	453
6:15 PM	82	0	36	0	0	0	0	0	0	136	40	0	13	92	0	0	399
6:30 PM	57	0	24	0	0	0	0	0	0	130	30	0	20	80	0	0	341
6:45 PM	48	0	25	0	0	0	0	0	0	127	32	0	10	88	0	0	330
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2802	0	784	0	0	0	0	0	0	3032	1005	1	316	1923	0	0	9863
APPROACH %'s :	78.14%	0.00%	21.86%	0.00%					0.00%	75.09%	24.89%	0.02%	14.11%	85.89%	0.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	826	0	191	0	0	0	0	0	0	631	261	0	71	419	0	0	2399
PEAK HR FACTOR :	0.956	0.000	0.796	0.000	0.000	0.000	0.000	0.000	0.000	0.901	0.870	0.000	0.934	0.911	0.000	0.000	0.924
	0.921								0.933				0.914				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Middlesex Turnpike & Concord Rd
City: Billerica
Control: Signalized

Project ID: 25-430106-001
Date: 7/23/2025

Data - Cars

NS/EW Streets:	Middlesex Turnpike				Middlesex Turnpike				Concord Rd				Concord Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	26	0	9	0	0	0	0	0	0	28	64	0	19	107	0	0	253
6:15 AM	27	0	6	0	0	0	0	0	0	35	43	0	36	139	0	0	286
6:30 AM	49	0	2	0	0	0	0	0	0	41	75	0	43	147	0	0	357
6:45 AM	49	0	3	0	0	0	0	0	0	43	74	0	45	164	0	0	378
7:00 AM	41	0	6	0	0	0	0	0	0	48	98	0	36	162	0	0	391
7:15 AM	47	0	6	0	0	0	0	0	0	51	83	0	34	178	0	0	399
7:30 AM	73	0	5	0	0	0	0	0	0	71	89	0	32	204	0	0	474
7:45 AM	58	0	15	0	0	0	0	0	0	86	119	0	37	151	0	0	466
8:00 AM	59	0	17	0	0	0	0	0	0	81	117	0	19	189	0	0	482
8:15 AM	61	0	13	0	0	0	0	0	0	80	132	0	28	170	0	0	484
8:30 AM	44	0	10	0	0	0	0	0	0	97	87	0	25	143	0	0	406
8:45 AM	54	0	7	0	0	0	0	0	0	102	99	0	17	137	0	0	416
9:00 AM	44	0	12	0	0	0	0	0	0	80	83	0	17	147	0	0	383
9:15 AM	37	0	17	0	0	0	0	0	0	84	77	0	17	105	0	0	337
9:30 AM	53	0	12	0	0	0	0	0	0	75	51	0	23	128	0	0	342
9:45 AM	40	0	12	0	0	0	0	0	0	76	47	0	11	132	0	0	318
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	762	0	152	0	0	0	0	0	0	1078	1338	0	439	2403	0	0	6172
APPROACH %'s :	83.37%	0.00%	16.63%	0.00%					0.00%	44.62%	55.38%	0.00%	15.45%	84.55%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	251	0	50	0	0	0	0	0	0	318	457	0	116	714	0	0	1906
PEAK HR FACTOR :	0.860	0.000	0.735	0.000	0.000	0.000	0.000	0.000	0.000	0.924	0.866	0.000	0.784	0.875	0.000	0.000	0.985
	0.965								0.914				0.879				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
10:00 AM	27	0	11	0	0	0	0	0	0	58	37	0	11	87	0	0	231
10:15 AM	33	0	11	0	0	0	0	0	0	68	37	0	14	89	0	0	252
10:30 AM	40	0	11	0	0	0	0	0	0	90	43	0	13	97	0	0	294
10:45 AM	36	0	23	0	0	0	0	0	0	99	41	0	18	78	0	0	295
11:00 AM	32	0	18	0	0	0	0	0	0	85	44	0	22	78	0	0	279
11:15 AM	37	0	21	0	0	0	0	0	0	85	40	0	13	93	0	0	289
11:30 AM	43	0	14	0	0	0	0	0	0	108	43	0	22	100	0	0	330
11:45 AM	45	0	20	0	0	0	0	0	0	150	64	0	14	88	0	0	381
12:00 PM	64	0	24	0	0	0	0	0	0	120	53	0	24	91	0	0	376
12:15 PM	60	0	20	0	0	0	0	0	0	112	56	0	19	93	0	0	360
12:30 PM	59	0	24	0	0	0	0	0	0	92	75	0	18	117	0	0	385
12:45 PM	46	0	18	0	0	0	0	0	0	107	40	0	19	94	0	0	324
1:00 PM	55	0	23	0	0	0	0	0	0	97	47	0	16	83	0	0	321
1:15 PM	53	0	21	0	0	0	0	0	0	99	48	1	21	103	0	0	346
1:30 PM	62	0	22	0	0	0	0	0	0	127	59	0	16	97	0	0	383
1:45 PM	51	0	18	0	0	0	0	0	0	94	50	0	20	76	0	0	309
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	743	0	299	0	0	0	0	0	0	1591	777	1	280	1464	0	0	5155
APPROACH %'s :	71.31%	0.00%	28.69%	0.00%					0.00%	67.16%	32.80%	0.04%	16.06%	83.94%	0.00%	0.00%	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	228	0	88	0	0	0	0	0	0	474	248	0	75	389	0	0	1502
PEAK HR FACTOR :	0.891	0.000	0.917	0.000	0.000	0.000	0.000	0.000	0.000	0.790	0.827	0.000	0.781	0.831	0.000	0.000	0.975
	0.898								0.843				0.859				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	100	0	24	0	0	0	0	0	0	99	48	1	8	69	0	0	349
2:15 PM	96	0	21	0	0	0	0	0	0	134	42	0	7	97	0	0	397
2:30 PM	140	0	29	0	0	0	0	0	0	136	49	0	9	109	0	0	472
2:45 PM	79	0	36	0	0	0	0	0	0	138	33	0	11	90	0	0	387
3:00 PM	135	0	32	0	0	0	0	0	0	130	49	0	19	90	0	0	455
3:15 PM	116	0	33	0	0	0	0	0	0	141	46	0	21	105	0	0	462
3:30 PM	184	0	44	0	0	0	0	0	0	160	58	0	15	85	0	0	546
3:45 PM	154	0	45	0	0	0	0	0	0	176	34	0	9	67	0	0	485
4:00 PM	149	0	49	0	0	0	0	0	0	164	51	0	10	90	0	0	513
4:15 PM	133	0	48	0	0	0	0	0	0	196	49	0	28	126	0	0	580
4:30 PM	160	0	49	0	0	0	0	0	0	185	51	0	21	98	0	0	564
4:45 PM	192	0	41	0	0	0	0	0	0	143	73	0	17	96	0	0	562
5:00 PM	210	0	38	0	0	0	0	0	0	135	61	0	19	113	0	0	576
5:15 PM	214	0	58	0	0	0	0	0	0	173	64	0	18	113	0	0	640
5:30 PM	196	0	51	0	0	0	0	0	0	170	59	0	15	91	0	0	582
5:45 PM	200	0	48	0	0	0	0	0	0	123	49	0	19	101	0	0	540
6:00 PM	104	0	37	0	0	0	0	0	0	156	46	0	16	92	0	0	451
6:15 PM	81	0	34	0	0	0	0	0	0	132	40	0	12	91	0	0	390
6:30 PM	57	0	24	0	0	0	0	0	0	129	29	0	20	79	0	0	338
6:45 PM	48	0	25	0	0	0	0	0	0	127	32	0	10	87	0	0	329
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2748	0	766	0	0	0	0	0	0	2947	963	1	304	1889	0	0	9618
APPROACH %'s :	78.20%	0.00%	21.80%	0.00%					0.00%	75.35%	24.62%	0.03%	13.86%	86.14%	0.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	812	0	188	0	0	0	0	0	0	621	257	0	69	413	0	0	2360
PEAK HR FACTOR :	0.949	0.000	0.810	0.000	0.000	0.000	0.000	0.000	0.000	0.897	0.880	0.000	0.908	0.914	0.000	0.000	0.922
	0.919								0.926				0.913				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Middlesex Turnpike & Concord Rd
City: Billerica
Control: Signalized

Project ID: 25-430106-001
Date: 7/23/2025

Data - Buses

NS/EW Streets:	Middlesex Turnpike				Middlesex Turnpike				Concord Rd				Concord Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
8:00 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:15 AM	0	0	1	0	0	0	0	0	0	2	0	0	1	0	0	0	4
8:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2
8:45 AM	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	3
9:00 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
9:15 AM	0	0	1	0	0	0	0	0	0	0	2	0	1	2	0	0	6
9:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2
9:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	7
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	5	0	7	0	0	0	0	0	0	3	5	0	4	10	0	0	34
APPROACH %'s :	41.67%	0.00%	58.33%	0.00%					0.00%	37.50%	62.50%	0.00%	28.57%	71.43%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	3	0	1	0	0	0	0	0	0	2	1	0	1	0	0	0	8
PEAK HR FACTOR :	0.375	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.250	0.000	0.250	0.000	0.000	0.000	0.500
	0.500								0.375				0.250				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	3
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2
11:30 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3
11:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
12:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
1:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
1:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	3
1:45 PM	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	3
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	3	0	4	0	0	0	0	0	0	3	4	0	5	4	0	0	23
APPROACH %'s :	42.86%	0.00%	57.14%	0.00%					0.00%	42.86%	57.14%	0.00%	55.56%	44.44%	0.00%	0.00%	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	0	4
PEAK HR FACTOR :	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.250	0.250	0.000	0.000	0.500
	0.250								0.250				0.500				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
2:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2
2:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	3
3:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
3:45 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	6
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
5:00 PM	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
5:15 PM	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	3
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
6:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	3
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	0	5	0	0	0	0	0	0	8	4	0	5	2	0	0	28
APPROACH %'s :	44.44%	0.00%	55.56%	0.00%					0.00%	66.67%	33.33%	0.00%	71.43%	28.57%	0.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	1	0	1	0	0	0	0	0	0	2	1	0	1	0	0	0	6
PEAK HR FACTOR :	0.250	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.250	0.000	0.250	0.000	0.000	0.000	0.500
	0.500								0.750				0.250				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Middlesex Turnpike & Concord Rd
City: Billerica
Control: Signalized

Project ID: 25-430106-001
Date: 7/23/2025

Data - Duals

NS/EW Streets:	Middlesex Turnpike				Middlesex Turnpike				Concord Rd				Concord Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	1	0	0	0	0	0	0	0	0	7	2	0	0	6	0	0	16
6:15 AM	1	0	0	0	0	0	0	0	0	1	0	0	0	6	0	0	8
6:30 AM	2	0	0	0	0	0	0	0	0	1	0	0	1	7	0	0	11
6:45 AM	2	0	0	0	0	0	0	0	0	2	0	0	1	5	0	0	10
7:00 AM	3	0	1	0	0	0	0	0	0	0	0	0	0	6	0	0	10
7:15 AM	2	0	0	0	0	0	0	0	0	6	3	0	1	4	0	0	16
7:30 AM	2	0	0	0	0	0	0	0	0	2	0	0	1	7	0	0	12
7:45 AM	1	0	0	0	0	0	0	0	0	2	3	0	2	6	0	0	14
8:00 AM	2	0	1	0	0	0	0	0	0	3	3	0	0	1	0	0	10
8:15 AM	5	0	1	0	0	0	0	0	0	0	1	0	0	4	0	0	11
8:30 AM	1	0	1	0	0	0	0	0	0	3	1	0	1	3	0	0	10
8:45 AM	3	0	0	0	0	0	0	0	0	8	2	0	0	2	0	0	15
9:00 AM	1	0	0	0	0	0	0	0	0	2	2	0	2	6	0	0	13
9:15 AM	5	0	1	0	0	0	0	0	0	4	2	0	1	8	0	0	21
9:30 AM	0	0	0	0	0	0	0	0	0	4	1	0	0	5	0	0	10
9:45 AM	1	0	0	0	0	0	0	0	0	1	4	0	0	4	0	0	10
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	32	0	5	0	0	0	0	0	0	46	24	0	10	80	0	0	197
APPROACH %'s :	86.49%	0.00%	13.51%	0.00%					0.00%	65.71%	34.29%	0.00%	11.11%	88.89%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	10	0	2	0	0	0	0	0	0	7	7	0	3	18	0	0	47
PEAK HR FACTOR :	0.500	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.583	0.583	0.000	0.375	0.643	0.000	0.000	0.839
	0.500								0.583				0.656				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
10:00 AM	5	0	1	0	0	0	0	0	0	9	3	0	0	9	0	0	27
10:15 AM	1	0	0	0	0	0	0	0	0	3	3	0	1	6	0	0	14
10:30 AM	2	0	0	0	0	0	0	0	0	9	5	0	1	7	0	0	24
10:45 AM	2	0	1	0	0	0	0	0	0	6	3	0	2	1	0	0	15
11:00 AM	1	0	2	0	0	0	0	0	0	2	1	0	0	5	0	0	11
11:15 AM	2	0	3	0	0	0	0	0	0	2	4	0	0	8	0	0	19
11:30 AM	2	0	0	0	0	0	0	0	0	6	3	0	0	4	0	0	15
11:45 AM	3	0	1	0	0	0	0	0	0	4	2	0	0	3	0	0	13
12:00 PM	2	0	0	0	0	0	0	0	0	5	3	0	0	4	0	0	14
12:15 PM	2	0	0	0	0	0	0	0	0	4	1	0	0	5	0	0	12
12:30 PM	2	0	0	0	0	0	0	0	0	3	2	0	2	4	0	0	13
12:45 PM	4	0	0	0	0	0	0	0	0	2	4	0	1	3	0	0	14
1:00 PM	1	0	0	0	0	0	0	0	0	7	1	0	1	5	0	0	15
1:15 PM	6	0	1	0	0	0	0	0	0	4	3	0	1	1	0	0	16
1:30 PM	1	0	1	0	0	0	0	0	0	3	3	0	1	8	0	0	17
1:45 PM	3	0	0	0	0	0	0	0	0	5	2	0	1	1	0	0	12
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	39	0	10	0	0	0	0	0	0	74	43	0	11	74	0	0	251
APPROACH %'s :	79.59%	0.00%	20.41%	0.00%					0.00%	63.25%	36.75%	0.00%	12.94%	87.06%	0.00%	0.00%	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	9	0	1	0	0	0	0	0	0	16	8	0	2	16	0	0	52
PEAK HR FACTOR :	0.750	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.800	0.667	0.000	0.250	0.800	0.000	0.000	0.929
	0.625								0.750				0.750				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	2	0	0	0	0	0	0	0	0	5	3	0	1	4	0	0	15
2:15 PM	3	0	2	0	0	0	0	0	0	11	1	0	1	1	0	0	19
2:30 PM	3	0	0	0	0	0	0	0	0	4	2	0	0	3	0	0	12
2:45 PM	2	0	0	0	0	0	0	0	0	2	2	0	0	2	0	0	8
3:00 PM	1	0	1	0	0	0	0	0	0	4	2	0	0	2	0	0	10
3:15 PM	2	0	0	0	0	0	0	0	0	5	2	0	0	3	0	0	12
3:30 PM	2	0	0	0	0	0	0	0	0	2	3	0	0	2	0	0	9
3:45 PM	5	0	2	0	0	0	0	0	0	3	4	0	0	0	0	0	14
4:00 PM	4	0	1	0	0	0	0	0	0	6	0	0	1	1	0	0	13
4:15 PM	1	0	1	0	0	0	0	0	0	4	3	0	0	1	0	0	10
4:30 PM	3	0	1	0	0	0	0	0	0	5	2	0	1	2	0	0	14
4:45 PM	3	0	1	0	0	0	0	0	0	1	1	0	0	2	0	0	8
5:00 PM	3	0	0	0	0	0	0	0	0	4	1	0	0	1	0	0	9
5:15 PM	2	0	1	0	0	0	0	0	0	1	0	0	0	2	0	0	6
5:30 PM	0	0	0	0	0	0	0	0	0	2	1	0	0	1	0	0	4
5:45 PM	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
6:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:15 PM	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3
6:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	38	0	10	0	0	0	0	0	0	63	28	0	4	29	0	0	172
APPROACH %'s :	79.17%	0.00%	20.83%	0.00%					0.00%	69.23%	30.77%	0.00%	12.12%	87.88%	0.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	8	0	2	0	0	0	0	0	0	8	3	0	0	6	0	0	27
PEAK HR FACTOR :	0.667	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.750	0.000	0.000	0.750	0.000	0.000	0.750
	0.625								0.550				0.750				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Middlesex Turnpike & Concord Rd
City: Billerica
Control: Signalized

Project ID: 25-430106-001
Date: 7/23/2025

Data - TTST

NS/EW Streets:	Middlesex Turnpike				Middlesex Turnpike				Concord Rd				Concord Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	3
7:15 AM	1	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	4
7:30 AM	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
7:45 AM	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	3
8:00 AM	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
8:15 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
8:30 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	3
8:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	3
9:30 AM	1	0	2	0	0	0	0	0	0	2	1	0	0	1	0	0	7
9:45 AM	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	7	0	3	0	0	0	0	0	0	10	8	0	1	9	0	0	38
APPROACH %'s :	70.00%	0.00%	30.00%	0.00%					0.00%	55.56%	44.44%	0.00%	10.00%	90.00%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	3	0	0	0	0	0	0	0	0	4	1	0	0	2	0	0	10
PEAK HR FACTOR :	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.250	0.000	0.000	0.500	0.000	0.000	0.833
	0.750								0.625				0.500				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
10:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2
10:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2
10:30 AM	1	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	5
10:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
11:00 AM	0	0	0	0	0	0	0	0	0	2	2	0	0	1	0	0	5
11:15 AM	1	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	4
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
11:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
12:00 PM	1	0	1	0	0	0	0	0	0	2	1	0	1	0	0	0	6
12:15 PM	2	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	4
12:30 PM	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	3
12:45 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	4
1:00 PM	1	0	1	0	0	0	0	0	0	1	0	0	1	3	0	0	7
1:15 PM	1	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	4
1:30 PM	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
1:45 PM	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	8	0	3	0	0	0	0	0	0	19	8	0	2	14	0	0	54
APPROACH %'s :	72.73%	0.00%	27.27%	0.00%					0.00%	70.37%	29.63%	0.00%	12.50%	87.50%	0.00%	0.00%	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	3	0	1	0	0	0	0	0	0	5	2	0	1	2	0	0	14
PEAK HR FACTOR :	0.375	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.625	0.500	0.000	0.250	0.500	0.000	0.000	0.583
	0.500								0.583				0.750				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	3
2:15 PM	2	0	1	0	0	0	0	0	0	2	1	0	0	0	0	0	6
2:30 PM	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	4
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	4
3:15 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
3:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2
3:45 PM	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	4
4:00 PM	1	0	0	0	0	0	0	0	0	1	2	0	0	1	0	0	5
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
4:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
5:00 PM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:45 PM	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	3
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	3
6:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	12	0	3	0	0	0	0	0	0	14	10	0	3	3	0	0	45
APPROACH %'s :	80.00%	0.00%	20.00%	0.00%					0.00%	58.33%	41.67%	0.00%	50.00%	50.00%	0.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6
PEAK HR FACTOR :	0.625	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.750
	0.625												0.250				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Middlesex Turnpike & Concord Rd
City: Billerica
Control: Signalized

Project ID: 25-430106-001
Date: 7/23/2025

Data - Bikes

NS/EW Streets:	Middlesex Turnpike				Middlesex Turnpike				Concord Rd				Concord Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	5
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.375
									0.250				0.250				

NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	7
APPROACH %'s :	100.00%	0.00%	0.00%	0.00%					0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.375
									0.250				0.250				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1.3	0.3	0.3	0	1	1	0	0	1	1.5	0.5	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	2	0	0	1	1	0	0	4
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	50.00%	50.00%	0.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services

Intersection Turning Movement Count

Location: Middlesex Turnpike & Concord Rd
City: Billerica

Project ID: 25-430106-001
Date: 7/23/2025

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Middlesex Turnpike		Middlesex Turnpike		Concord Rd		Concord Rd		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	1	0	0	0	0	0	1
6:30 AM	0	1	0	0	0	0	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	1	0	0	0	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	1	0	0	1	0	0	0	0	2
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	2	0	0	0	0	2
9:15 AM	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	1	0	0	0	0	1
9:45 AM	1	0	0	0	0	1	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	3	1	1	4	0	1	0	0	10
APPROACH %'s :	75.00%	25.00%	20.00%	80.00%	0.00%	100.00%			
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	1	0	0	1	0	0	0	0	2
PEAK HR FACTOR :	0.250			0.250					0.250
	0.250		0.250						

NOON	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
10:00 AM	0	1	0	0	1	0	0	0	2
10:15 AM	1	0	0	0	0	1	0	0	2
10:30 AM	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0
11:30 AM	1	0	0	0	0	1	0	0	2
11:45 AM	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0
12:15 PM	0	2	0	0	0	0	0	1	3
12:30 PM	0	0	0	1	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0
1:30 PM	1	0	0	0	0	1	0	0	2
1:45 PM	0	1	0	0	1	0	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	3	4	0	1	2	3	0	1	14
APPROACH %'s :	42.86%	57.14%	0.00%	100.00%	40.00%	60.00%	0.00%	100.00%	
PEAK HR :	11:45 AM - 12:45 PM								TOTAL
PEAK HR VOL :	0	2	0	1	0	0	0	1	4
PEAK HR FACTOR :		0.250		0.250				0.250	0.333
	0.250		0.250				0.250		

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
2:00 PM	0	0	0	0	0	0	0	1	1
2:15 PM	0	0	1	2	0	0	0	0	3
2:30 PM	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	1	0	0	0	0	1
3:15 PM	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	1	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	1	0	0	1	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	1	0	0	1	0	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	2	2	3	2	0	0	1	10
APPROACH %'s :	0.00%	100.00%	40.00%	60.00%	100.00%	0.00%	0.00%	100.00%	
PEAK HR :	04:45 PM - 05:45 PM								TOTAL
PEAK HR VOL :	0	1	1	0	1	0	0	0	3
PEAK HR FACTOR :		0.250	0.250		0.250				0.375
	0.250		0.250		0.250				

Prepared by National Data & Surveying Services

Middlesex Turnpike & Concord Rd

Peak Hour Turning Movement Count

ID: 25-430106-001
City: Billerica

Day: Wednesday
Date: 7/23/2025

PEAK HOURS	
AM	07:30 AM - 08:30 AM
NOON	11:45 AM - 12:45 PM
PM	04:45 PM - 05:45 PM

COUNT PERIODS	
AM	6:00 AM - 10:00 AM
NOON	10:00 AM - 02:00 PM
PM	2:00 PM - 07:00 PM

SOUTHBOUND (Middlesex Turnpike)

AM	0	0	0	0	0	AM
NOON	0	0	0	0	0	NOON
PM	0	0	0	0	0	PM

EASTBOUND (Concord Rd)

AM	NOON	PM		
1001	648	1245	⇦	
0	0	0	↶	0
0	0	0	↱	1
331	495	631	→	1.5
466	259	261	↴	0.5

WESTBOUND (Concord Rd)

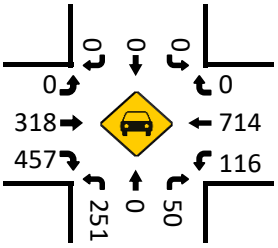
PM	NOON	AM		
0	0	0	↰	0
419	408	734	←	2
71	79	120	↰	1
0	0	0	↶	0
822	586	384	⇨	

NORTHBOUND (Middlesex Turnpike)

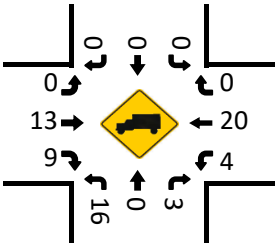
PM	332	0	826	0	191	PM
NOON	338	0	240	0	91	NOON
AM	586	0	267	0	53	AM
		0	1.3	0.3	0.3	

CONTROL			
Signalized			
TEV	1971	1572	2399
	AM	NOON	PM
PHF	0.98	0.98	0.92

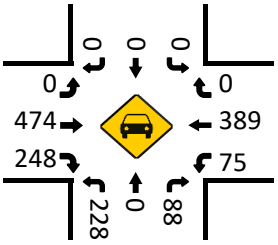
Cars (AM)



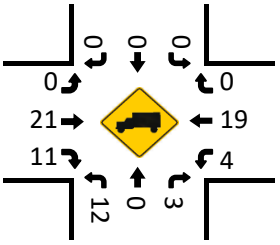
Total Trucks (AM)



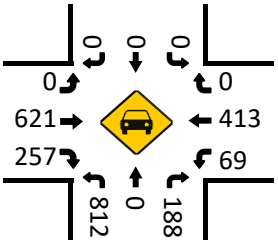
Cars (NOON)



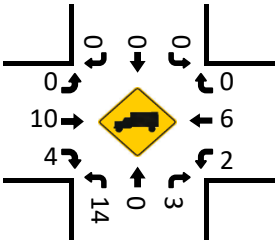
Total Trucks (NOON)



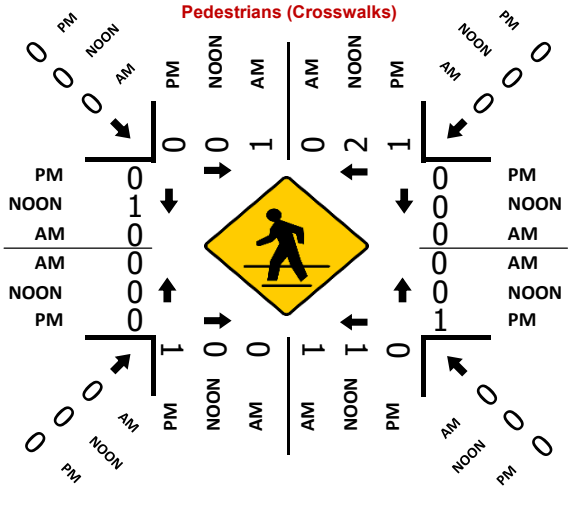
Cars (PM)



Total Trucks (PM)



Pedestrians (Crosswalks)


PM
NOON
AM
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Project ID: 25-430106-001
Location: Middlesex Turnpike & Concord Rd
City: Billerica

Day: Wednesday
Date: 7/23/2025

Groups Printed - Cars, PU, Vans - Heavy Trucks

	Middlesex Turnpike Northbound						Middlesex Turnpike Southbound						Concord Rd Eastbound						Concord Rd Westbound						
Start Time	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Int. Total
6:00 AM	27	0	9	0	0	36	0	0	0	0	0	0	0	35	66	0	0	101	19	114	0	0	0	133	270
6:15 AM	29	0	6	0	1	35	0	0	0	0	0	0	0	37	43	0	0	80	37	146	0	0	0	183	298
6:30 AM	51	0	2	0	0	53	0	0	0	0	1	0	0	42	75	0	0	117	44	155	0	0	0	199	369
6:45 AM	51	0	3	0	0	54	0	0	0	0	0	0	0	45	74	0	0	119	46	169	0	0	0	215	388
Total	158	0	20	0	1	178	0	0	0	0	1	0	0	159	258	0	0	417	146	584	0	0	0	730	1325
7:00 AM	44	0	7	0	0	51	0	0	0	0	1	0	0	49	99	0	0	148	36	169	0	0	0	205	404
7:15 AM	50	0	7	0	0	57	0	0	0	0	0	0	0	58	87	0	0	145	37	182	0	0	0	219	421
7:30 AM	76	0	5	0	1	81	0	0	0	0	1	0	0	74	89	0	0	163	33	211	0	0	0	244	488
7:45 AM	61	0	15	0	0	76	0	0	0	0	0	0	0	88	124	0	0	212	39	158	0	0	0	197	485
Total	231	0	34	0	1	265	0	0	0	0	2	0	0	269	399	0	0	668	145	720	0	0	0	865	1798
8:00 AM	64	0	18	0	0	82	0	0	0	0	0	0	0	85	120	0	0	205	19	190	0	0	0	209	496
8:15 AM	66	0	15	0	0	81	0	0	0	0	0	0	0	84	133	0	0	217	29	175	0	0	0	204	502
8:30 AM	45	0	12	0	0	57	0	0	0	0	0	0	0	100	90	0	0	190	26	148	0	0	0	174	421
8:45 AM	58	0	8	0	0	66	0	0	0	0	0	0	0	111	102	0	0	213	17	140	0	0	0	157	436
Total	233	0	53	0	0	286	0	0	0	0	0	0	0	380	445	0	0	825	91	653	0	0	0	744	1855
9:00 AM	45	0	14	0	2	59	0	0	0	0	0	0	0	82	85	0	0	167	19	153	0	0	0	172	398
9:15 AM	42	0	20	0	0	62	0	0	0	0	0	0	0	88	83	0	0	171	19	115	0	0	0	134	367
9:30 AM	54	0	14	0	1	68	0	0	0	0	0	0	0	81	54	0	0	135	23	135	0	0	0	158	361
9:45 AM	43	0	12	0	0	55	0	0	0	0	1	0	0	78	51	0	0	129	11	142	0	0	1	153	337
Total	184	0	60	0	3	244	0	0	0	0	1	0	0	329	273	0	0	602	72	545	0	0	1	617	1463
BREAK																									
10:00 AM	32	0	12	0	0	44	0	0	0	0	1	0	0	67	41	0	0	108	11	97	0	0	1	108	260
10:15 AM	34	0	13	0	0	47	0	0	0	0	1	0	0	71	40	0	0	111	17	96	0	0	1	113	271
10:30 AM	43	0	11	0	0	54	0	0	0	0	0	0	0	101	48	0	0	149	14	106	0	0	0	120	323
10:45 AM	38	0	24	0	0	62	0	0	0	0	0	0	0	107	44	0	0	151	20	79	0	0	0	99	312
Total	147	0	60	0	0	207	0	0	0	0	2	0	0	346	173	0	0	519	62	378	0	0	2	440	1166
11:00 AM	33	0	20	0	0	53	0	0	0	0	0	0	0	89	47	0	0	136	22	84	0	0	0	106	295
11:15 AM	40	0	25	0	0	65	0	0	0	0	0	0	0	89	44	0	0	133	14	102	0	0	0	116	314
11:30 AM	46	0	14	0	0	60	0	0	0	0	1	0	0	114	46	0	0	160	22	107	0	0	1	129	349
11:45 AM	48	0	21	0	0	69	0	0	0	0	0	0	0	155	67	0	0	222	14	91	0	0	0	105	396
Total	167	0	80	0	0	247	0	0	0	0	1	0	0	447	204	0	0	651	72	384	0	0	1	456	1354
12:00 PM	67	0	25	0	0	92	0	0	0	0	0	0	0	127	57	0	0	184	25	95	0	0	0	120	396
12:15 PM	64	0	21	0	0	85	0	0	0	0	2	0	0	117	57	0	1	174	20	99	0	0	0	119	378
12:30 PM	61	0	24	0	1	85	0	0	0	0	0	0	0	96	78	0	0	174	20	123	0	0	0	143	402
12:45 PM	51	0	18	0	0	69	0	0	0	0	0	0	0	112	44	0	0	156	20	99	0	0	0	119	344
Total	243	0	88	0	1	331	0	0	0	0	2	0	0	452	236	0	1	688	85	416	0	0	0	501	1520
1:00 PM	57	0	24	0	0	81	0	0	0	0	0	0	0	106	48	0	0	154	18	91	0	0	0	109	344
1:15 PM	60	0	23	0	0	83	0	0	0	0	0	0	0	104	52	1	0	157	22	105	0	0	0	127	367
1:30 PM	64	0	23	0	0	87	0	0	0	0	1	0	0	130	65	0	0	195	18	105	0	0	1	123	405
1:45 PM	55	0	18	0	0	73	0	0	0	0	1	0	0	102	54	0	0	156	21	77	0	0	1	98	327
Total	236	0	88	0	0	324	0	0	0	0	2	0	0	442	219	1	0	662	79	378	0	0	2	457	1443
BREAK																									
2:00 PM	104	0	24	0	0	128	0	0	0	0	0	0	0	105	52	1	1	158	9	74	0	0	0	83	369
2:15 PM	101	0	25	0	3	126	0	0	0	0	0	0	0	147	44	0	0	191	9	98	0	0	0	107	424
2:30 PM	143	0	29	0	0	172	0	0	0	0	0	0	0	143	52	0	0	195	10	112	0	0	0	122	489
2:45 PM	81	0	36	0	0	117	0	0	0	0	0	0	0	140	35	0	0	175	11	92	0	0	0	103	395
Total	429	0	114	0	3	543	0	0	0	0	0	0	0	535	183	1	1	719	39	376	0	0	0	415	1677
3:00 PM	136	0	33	0	1	169	0	0	0	0	0	0	0	137	52	0	0	189	19	92	0	0	0	111	469
3:15 PM	120	0	34	0	0	154	0	0	0	0	0	0	0	146	48	0	0	194	22	109	0	0	0	131	479
3:30 PM	186	0	44	0	0	230	0	0	0	0	0	0	0	163	62	0	0	225	16	87	0	0	0	103	558
3:45 PM	160	0	47	0	0	207	0	0	0	0	0	0	0	185	41	0	0	226	9	67	0	0	0	76	509
Total	602	0	158	0	1	760	0	0	0	0	0	0	0	631	203	0	0	834	66	355	0	0	0	421	2015
4:00 PM	154	0	50	0	0	204	0	0	0	0	0	0	0	171	53	0	0	224	11	93	0	0	0	104	532
4:15 PM	134	0	50	0	0	184	0	0	0	0	0	0	0	200	52	0	0	252	29	127	0	0	0	156	592
4:30 PM	164	0	50	0	0	214	0	0	0	0	0	0	0	190	54	0	0	244	22	100	0	0	0	122	580
4:45 PM	196	0	42	0	0	238	0	0	0	0	0	0	0	144	75	0	0	219	18	98	0	0	0	116	573
Total	648	0	192	0	0	840	0	0	0	0	0	0	0	705	234	0	0	939	80	418	0	0	0	498	2277
5:00 PM	216	0	38	0	1	254	0	0	0	0	0	0	0	140	62	0	0	202	19	114	0	0	0	133	589
5:15 PM	216	0	60	0	0	276	0	0	0	0	0	0	0	175	64	0	0	239	19	115	0	0	0	134	649
5:30 PM	198	0	51	0	0	249	0	0	0	0	1	0	0	172	60	0	0	232	15	92	0	0	1	107	588
5:45 PM	202	0	49	0	0	251	0	0	0	0	0	0	0	124	50	0	0	174	19	101	0	0	0	120	545
Total	832	0	198	0	1	1030	0	0	0	0	1	0	0	611	236	0	0	847	72	422	0	0	1	494	2371
6:00 PM	104	0	37	0	0	141	0	0	0	0	0	0	0	157	47	0	0	204	16	92	0	0	0	108	453
6:15 PM	82	0	36	0	0	118	0	0	0	0	0	0	0	136	40	0	0	176	13	92	0	0	0	105	399
6:30 PM	57	0	24	0	0	81	0	0	0	0	0	0	0	130	30	0	0	160	20	80	0	0	0	100	341
6:45 PM	48	0	25	0	0	73	0	0	0	0	1	0	0	127	32	0	0	159	10	88	0	0	1	98	330
Total	291	0	122	0	0	413	0	0	0	0	1	0	0	550	149	0	0	699	59	352	0	0	1	411	1523
Grand Total	4401	0	1267	0	11	5668	0	0	0	0	13	0	0	5856	3212	2	2	9070	1068	5981	0	0	8	7049	21787
Apprch %	77.6	0.0	22.4	0.0	0.2		0.0	0.0	0.0	0.0	0.0		0.0	64.6	35.4	0.0	0.0		15.2	84.8	0.0	0.0	0.1		
Total %	20.2	0.0	5.8	0.0	0.1	26.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	26.9	14.7	0.0	0.0	41.6	4.9	27.5	0.0	0.0	0.0	32.4	
Cars, PU, Vans	4253	0	1217	0		5470	0	0	0	0		0	0	5616	3078	2		8696	1023	5756	0	0		6779	20945
% Cars, PU, Vans	96.6	0.0	96.1	0.0		96.5	0.0	0.0	0.0	0.0		0.0	0.0	95.9	95.8	100.0		95.9	95.8	96.2	0.0	0.0		96.2	96.1
Buses	12	0	16	0		28	0	0	0	0		0	0	14	13	0		27	14	16	0	0		30	85
%Buses	0.3	0.0	1.3	0.0		0.5	0.0	0.0	0.0	0.0		0.0	0.0	0.2	0.4	0.0		0.3	1.3	0.3	0.0	0.0		0.4	0.4
Duals	109	0	25	0		134	0	0	0	0		0	0	183	95	0		278	25	183	0	0		208	620
%Duals	2.5	0.0	2.0	0.0		2.4	0.0	0.0	0.0	0.0		0.0	0.0	3.1	3.0	0.0		3.1	2.3	3.1	0.0	0.0		3.0	2.8
TTST	27	0	9	0		36	0	0	0	0		0	0	43	26	0		69	6	26	0	0		32	137
%TTST	0.6	0.0	0.7	0.0		0.6	0.0	0.0	0.0	0.0		0.0	0.0	0.7	0.8	0.0		0.8	0.6	0.4	0.0	0.0		0.5	0.6

Project ID: 25-430106-001
Location: Middlesex Turnpike & Concord Rd
City: Billerica

PEAK HOURS

Day: Wednesday
Date: 7/23/2025

AM

	Middlesex Turnpike Northbound					Middlesex Turnpike Southbound					Concord Rd Eastbound					Concord Rd Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 06:00 AM - 10:00 AM																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
7:30 AM	76	0	5	0	81	0	0	0	0	0	0	74	89	0	163	33	211	0	0	244	488
7:45 AM	61	0	15	0	76	0	0	0	0	0	0	88	124	0	212	39	158	0	0	197	485
8:00 AM	64	0	18	0	82	0	0	0	0	0	0	85	120	0	205	19	190	0	0	209	496
8:15 AM	66	0	15	0	81	0	0	0	0	0	0	84	133	0	217	29	175	0	0	204	502
Total Volume	267	0	53	0	320	0	0	0	0	0	0	331	466	0	797	120	734	0	0	854	1971
% App. Total	83.4	0.0	16.6	0.0	100	0.0	0.0	0.0	0.0	0	0.0	41.5	58.5	0.0	100	14.1	85.9	0.0	0.0	100	
PHF					0.976										0.918					0.875	0.982
Cars, PU, Vans	251	0	50	0	301	0	0	0	0	0	0	318	457	0	775	116	714	0	0	830	1906
% Cars, PU, Vans	94.0	0.0	94.3	0.0	94.1	0.0	0.0	0.0	0.0	0.0	0.0	96.1	98.1	0.0	97.2	96.7	97.3	0.0	0.0	97.2	96.7
Buses	3	0	1	0	4	0	0	0	0	0	0	2	1	0	3	1	0	0	0	1	8
%Buses	1.1	0.0	1.9	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.0	0.4	0.8	0.0	0.0	0.0	0.1	0.4
Duals	10	0	2	0	12	0	0	0	0	0	0	7	7	0	14	3	18	0	0	21	47
%Duals	3.7	0.0	3.8	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	2.1	1.5	0.0	1.8	2.5	2.5	0.0	0.0	2.5	2.4
TTST	3	0	0	0	3	0	0	0	0	0	0	4	1	0	5	0	2	0	0	2	10
%TTST	1.1	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.2	0.0	0.6	0.0	0.3	0.0	0.0	0.2	0.5

NOON

	Middlesex Turnpike Northbound					Middlesex Turnpike Southbound					Concord Rd Eastbound					Concord Rd Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 10:00 AM - 02:00 PM																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	48	0	21	0	69	0	0	0	0	0	0	155	67	0	222	14	91	0	0	105	396
12:00 PM	67	0	25	0	92	0	0	0	0	0	0	127	57	0	184	25	95	0	0	120	396
12:15 PM	64	0	21	0	85	0	0	0	0	0	0	117	57	0	174	20	99	0	0	119	378
12:30 PM	61	0	24	0	85	0	0	0	0	0	0	96	78	0	174	20	123	0	0	143	402
Total Volume	240	0	91	0	331	0	0	0	0	0	0	495	259	0	754	79	408	0	0	487	1572
% App. Total	72.5	0.0	27.5	0.0	100	0.0	0.0	0.0	0.0	0	0.0	65.6	34.4	0.0	100	16.2	83.8	0.0	0.0	100	
PHF					0.899										0.849					0.851	0.978
Cars, PU, Vans	228	0	88	0	316	0	0	0	0	0	0	474	248	0	722	75	389	0	0	464	1502
% Cars, PU, Vans	95.0	0.0	96.7	0.0	95.5	0.0	0.0	0.0	0.0	0.0	0.0	95.8	95.8	0.0	95.8	94.9	95.3	0.0	0.0	95.3	95.5
Buses	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	1	1	0	0	2	4
%Buses	0.0	0.0	1.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	1.3	0.2	0.0	0.0	0.4	0.3
Duals	9	0	1	0	10	0	0	0	0	0	0	16	8	0	24	2	16	0	0	18	52
%Duals	3.8	0.0	1.1	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	3.1	0.0	3.2	2.5	3.9	0.0	0.0	3.7	3.3
TTST	3	0	1	0	4	0	0	0	0	0	0	5	2	0	7	1	2	0	0	3	14
%TTST	1.3	0.0	1.1	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8	0.0	0.9	1.3	0.5	0.0	0.0	0.6	0.9

PM

	Middlesex Turnpike Northbound					Middlesex Turnpike Southbound					Concord Rd Eastbound					Concord Rd Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 02:00 PM - 07:00 PM																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
4:45 PM	196	0	42	0	238	0	0	0	0	0	0	144	75	0	219	18	98	0	0	116	573
5:00 PM	216	0	38	0	254	0	0	0	0	0	0	140	62	0	202	19	114	0	0	133	589
5:15 PM	216	0	60	0	276	0	0	0	0	0	0	175	64	0	239	19	115	0	0	134	649
5:30 PM	198	0	51	0	249	0	0	0	0	0	0	172	60	0	232	15	92	0	0	107	588
Total Volume	826	0	191	0	1017	0	0	0	0	0	0	631	261	0	892	71	419	0	0	490	2399
% App. Total	81.2	0.0	18.8	0.0	100	0.0	0.0	0.0	0.0	0	0.0	70.7	29.3	0.0	100	14.5	85.5	0.0	0.0	100	
PHF					0.921										0.933					0.914	0.924
Cars, PU, Vans	812	0	188	0	1000	0	0	0	0	0	0	621	257	0	878	69	413	0	0	482	2360
% Cars, PU, Vans	98.3	0.0	98.4	0.0	98.3	0.0	0.0	0.0	0.0	0.0	0.0	98.4	98.5	0.0	98.4	97.2	98.6	0.0	0.0	98.4	98.4
Buses	1	0	1	0	2	0	0	0	0	0	0	2	1	0	3	1	0	0	0	1	6
%Buses	0.1	0.0	0.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.3	1.4	0.0	0.0	0.0	0.2	0.3
Duals	8	0	2	0	10	0	0	0	0	0	0	8	3	0	11	0	6	0	0	6	27
%Duals	1.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.1	0.0	1.2	0.0	1.4	0.0	0.0	1.2	1.1
TTST	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	6
%TTST	0.6	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.2	0.3

Attachment C – Automatic Traffic Recorder (ATR) Counts

Prepared by National Data & Surveying Services

SPEED

Concord Rd E/O Federal St/Bright View Concord River Assisted Living Access Dwy

Day: Wednesday
Date: 7/23/2025

City: Billerica
Project #: MA25_430107_001

HOURLY BREAKDOWN

Time	EASTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	0	11	29	26	5	2	0	0	0	0	0	73
1:00	0	0	0	6	13	11	5	2	0	0	0	0	0	37
2:00	0	0	0	3	11	10	5	1	0	0	0	0	0	30
3:00	0	0	2	2	10	8	1	2	0	0	0	0	0	25
4:00	0	1	4	4	29	36	12	8	2	0	0	0	0	96
5:00	0	0	0	13	134	174	87	24	5	0	0	0	0	437
6:00	0	0	0	8	109	227	83	22	3	1	0	0	0	453
7:00	0	0	1	36	252	342	97	17	3	0	0	0	0	748
8:00	7	2	6	72	400	344	71	19	7	1	0	0	0	929
9:00	0	0	0	32	231	304	73	8	2	0	0	0	0	650
10:00	0	0	1	28	186	242	64	12	0	0	0	0	0	533
11:00	0	0	1	18	205	314	105	13	4	0	0	0	0	660
12:00	0	0	2	38	213	304	116	17	2	0	0	0	0	692
13:00	0	0	1	12	195	348	120	18	1	1	0	0	0	696
14:00	2	1	9	31	188	304	143	26	6	0	0	0	0	710
15:00	1	2	10	60	253	360	115	23	3	0	0	0	0	827
16:00	1	3	6	59	322	385	145	18	1	1	0	0	0	941
17:00	0	2	5	60	295	352	121	9	3	0	0	0	0	847
18:00	0	0	2	18	184	304	157	23	6	0	0	0	0	694
19:00	0	0	2	30	147	255	82	13	4	0	0	0	0	533
20:00	0	0	1	28	199	151	38	5	0	0	0	0	0	422
21:00	3	0	2	43	156	114	35	5	0	0	0	0	0	358
22:00	0	0	0	26	72	75	22	4	1	0	0	0	0	200
23:00	0	0	1	26	76	56	15	5	0	0	0	0	0	179
Totals	14	11	56	664	3,909	5,046	1,717	296	53	4	0	0	0	11,770
% of Totals	0%	0%	0%	6%	33%	43%	15%	3%	0%	0%				100%

Time	WESTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	5	8	19	10	1	0	0	0	0	0	0	43
1:00	0	1	1	8	13	1	1	0	0	0	0	0	0	25
2:00	0	0	0	5	8	5	2	0	0	0	0	0	0	20
3:00	0	0	0	7	8	9	4	1	0	0	0	0	0	29
4:00	0	0	0	25	43	31	12	1	2	0	0	0	0	114
5:00	0	1	3	28	142	141	34	7	1	0	0	0	0	357
6:00	0	1	9	103	337	251	51	9	2	0	0	0	0	763
7:00	0	3	14	136	475	264	49	5	1	1	0	0	0	948
8:00	0	0	9	150	447	227	29	6	0	1	0	0	0	869
9:00	0	0	7	118	346	211	37	3	0	0	0	0	0	722
10:00	0	0	2	79	259	157	34	2	1	0	0	0	0	534
11:00	0	1	8	87	274	169	26	7	0	0	0	0	0	572
12:00	0	2	12	112	321	168	38	5	1	0	0	0	0	659
13:00	0	1	7	97	308	185	32	6	0	0	0	0	0	636
14:00	2	6	46	210	393	178	47	4	0	1	0	0	0	887
15:00	0	5	63	286	413	186	32	9	1	0	0	0	0	995
16:00	7	9	97	291	468	236	39	8	1	0	0	0	0	1156
17:00	89	87	187	373	410	141	32	6	0	1	0	0	0	1326
18:00	0	0	16	121	337	149	39	7	2	0	0	0	0	671
19:00	0	0	14	149	211	77	7	1	0	0	0	0	0	459
20:00	0	3	34	157	157	22	2	0	0	0	0	0	0	375
21:00	0	1	28	142	91	23	4	0	0	0	0	0	0	289
22:00	0	0	24	88	64	11	1	0	0	0	0	0	0	188
23:00	0	1	19	53	32	10	0	0	1	0	0	0	0	116
Totals	98	122	605	2,833	5,576	2,862	553	87	13	4	0	0	0	12,753
% of Totals	1%	1%	5%	22%	44%	22%	4%	1%	0%	0%				100%

Time	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	5	19	48	36	6	2	0	0	0	0	0	116
1:00	0	1	1	14	26	12	6	2	0	0	0	0	0	62
2:00	0	0	0	8	19	15	7	1	0	0	0	0	0	50
3:00	0	0	2	9	18	17	5	3	0	0	0	0	0	54
4:00	0	1	4	29	72	67	24	9	4	0	0	0	0	210
5:00	0	1	3	41	276	315	121	31	6	0	0	0	0	794
6:00	0	1	9	111	446	478	134	31	5	1	0	0	0	1216
7:00	0	3	15	172	727	606	146	22	4	1	0	0	0	1696
8:00	7	2	15	222	847	571	100	25	7	2	0	0	0	1798
9:00	0	0	7	150	577	515	110	11	2	0	0	0	0	1372
10:00	0	0	3	107	445	399	98	14	1	0	0	0	0	1067
11:00	0	1	9	105	479	483	131	20	4	0	0	0	0	1232
12:00	0	2	14	150	534	472	154	22	3	0	0	0	0	1351
13:00	0	1	8	109	503	533	152	24	1	1	0	0	0	1332
14:00	4	7	55	241	581	482	190	30	6	1	0	0	0	1597
15:00	1	7	73	346	666	546	147	32	4	0	0	0	0	1822
16:00	8	12	103	350	790	621	184	26	2	1	0	0	0	2097
17:00	89	89	192	433	705	493	153	15	3	1	0	0	0	2173
18:00	0	0	18	139	521	453	196	30	8	0	0	0	0	1365
19:00	0	0	16	179	358	332	89	14	4	0	0	0	0	992
20:00	0	3	35	185	356	173	40	5	0	0	0	0	0	797
21:00	3	1	30	185	247	137	39	5	0	0	0	0	0	647
22:00	0	0	24	114	136	86	23	4	1	0	0	0	0	388
23:00	0	1	20	79	108	66	15	5	1	0	0	0	0	295
Totals	112	133	661	3,497	9,485	7,908	2,270	383	66	8	0	0	0	24,523
% of Totals	0%	1%	3%	14%	39%	32%	9%	2%	0%	0%				100%

STATISTICS

	EASTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
00:00 - 12:00	7	3	15	233	1609	2038	608	130	26	2	0	0	0	4671
%	0%	0%	0%	2%	14%	17%	5%	1%	0%	0%	0%	0%	0%	40%
Peak Hour	7:30	7:30	8:00	7:45	8:00	7:45	11:45	5:15	8:00	5:15	0:00	0:00	0:00	7:45
Peak Volume	7	2	6	81	400	368	135	34	7	1	0	0	0	935
12:00 - 24:00	7	8	41	431	2300	3008	1109	166	27	2	0	0	0	7099
%	0%	0%	0%	4%	20%	26%	9%	1%	0%	0%	0%	0%	0%	60%
Peak Hour	21:00	15:45	14:15	16:30	16:30	15:30	17:30	14:15	17:30	13:00	12:00	12:00	12:00	16:00
Peak Volume	3	4	11	88	372	410	185	29	8	1	0	0	0	941
07:00 - 09:00	7	2	7	108	652	686	168	36	10	1	0	0	0	1677
%	0%	0%	0%	1%	6%	6%	1%	0%	0%	0%	0%	0%	0%	14%
Peak Hour	7:30	7:30	8:00	7:45	8:00	7:45	7:30	7:30	8:00	7:45	7:00	7:00	7:00	7:45
Peak Volume	7	2	6	81	400	368	98	22	7	1	0	0	0	935
16:00 - 18:00	1	5	11	119	617	737	266	27	4	1	0	0	0	1788
%	0%	0%	0%	1%	5%	6%	2%	0%	0%	0%	0%	0%	0%	15%
Peak Hour	16:00	16:30	16:30	16:30	16:30	16:00	16:00	16:00	17:00	16:00	16:00	16:00	16:00	16:00
Peak Volume	1	4	9	88	372	385	145	18	3	1	0	0	0	941

	WESTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
00:00 - 12:00	0	7	58	754	2371	1476	280	41	7	2	0	0	0	4996
%	0%	0%	0%	6%	20%	13%	2%	0%	0%	0%	0%	0%	0%	42%
Peak Hour	0:00	6:45	6:15	6:45	7:30	7:15	6:30	5:45	3:45	6:15	0:00	0:00	0:00	7:15
Peak Volume	0	3	16	159	516	268	53	11	2	1	0	0	0	979
12:00 - 24:00	98	115	547	2079	3205	1386	273	46	6	2	0	0	0	7757
%	1%	1%	5%	18%	27%	12%	2%	0%	0%	0%	0%	0%	0%	66%
Peak Hour	16:30	17:00	17:00	17:00	16:00	16:00	14:00	14:45	15:30	14:00	12:00	12:00	12:00	16:45
Peak Volume	91	87	187	373	468	236	47	10	2	1	0	0	0	1327
07:00 - 09:00	0	3	23	286	922	491	78	11	1	2	0	0	0	1817
%	0%	0%	0%	2%	8%	4%	1%	0%	0%	0%	0%	0%	0%	15%
Peak Hour	7:00	7:00	7:00	8:00	7:30	7:15	7:15	7:15	7:00	7:00	7:00	7:00	7:00	7:15
Peak Volume	0	3	14	150	516	268	51	7	1	1	0	0	0	979
16:00 - 18:00	96	96	284	664	878	377	71	14	1	1	0	0	0	2482
%	1%	1%	2%	6%	7%	3%	1%	0%	0%	0%	0%	0%	0%	21%
Peak Hour	16:30	17:00	17:00	17:00	16:00	16:00	16:00	16:15	16:00	16:45	16:00	16:00	16:00	16:45
Peak Volume	91	87	187	373	468	236	39	10	1	1	0	0	0	1327

	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
00:00 - 12:00	7	10	73	987	3980	3514	888	171	33	4	0	0	0	9667
%	0%	0%	1%	8%	34%	30%	8%	1%	0%	0%	0%	0%	0%	82%
Peak Hour	7:30	7:30	8:15	8:00	7:30	7:15	11:45	5:15	6:30	8:00	0:00	0:00	0:00	7:30
Peak Volume	7	4	19	222	880	616	172	44	8	2	0	0	0	1893
12:00 - 24:00	105	123	588	2510	5505	4394	1382	212	33	4	0	0	0	14856
%	1%	1%	5%	21%	47%	37%	12%	2%	0%	0%	0%	0%	0%	126%
Peak Hour	16:30	17:00	17:00	16:30	16:30	15:45	17:30	14:15	17:30	13:00	12:00	12:00	12:00	16:30
Peak Volume	92	89	192	434	799	630	223	35	9	1	0	0	0	2224
07:00 - 09:00	7	5	30	394	1574	1177	246	47	11	3	0	0	0	3494
%	0%	0%	0%	3%	13%	10%	2%	0%	0%	0%	0%	0%	0%	30%
Peak Hour	7:30	7:30	7:00	8:00	7:30	7:15	7:15	7:30	7:15	8:00	7:00	7:00	7:00	7:30
Peak Volume	7	4	15	222	880	616	148	29	7	2	0	0	0	1893
16:00 - 18:00	97	101	295	783	1495	1114	337	41	5	2	0	0	0	4270
%	1%	1%	3%	7%	13%	9%	3%	0%	0%	0%	0%	0%	0%	36%
Peak Hour	16:30	17:00	17:00	16:30	16:30	16:00	16:00	16:00	17:00	16:00	16:00	16:00	16:00	16:30
Peak Volume	92	89	192	434	799	621	184	26	3	1	0	0	0	2224

Direction	Percentiles 15th	50th	Average	85th	95th	ADT
EASTBOUND	33	37	37	41	44	11770
WESTBOUND	28	33	33	38	41	12753
TOTALS	30	35	35	40	43	24523

Direction	Pace 10mph Pace	# in Pace	% in Pace	Number of Vehicles >= 55 MPH	% of Vehicles >= 55 MPH
EASTBOUND	32 - 41 mph	9102	78%	11	0%
WESTBOUND	29 - 38 mph	9201	73%	4	0%
TOTALS	30 - 39 mph	17374	71%	15	0%

Prepared by National Data & Surveying Services

SPEED

Concord Rd E/O Federal St/Bright View Concord River Assisted Living Access Dwy

Day: Wednesday

Date: 7/23/2025

City: Billerica

Project #: MA25_430107_001

15-MINUTE BREAKDOWN

Time	EASTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	0	5	7	9	2	0	0	0	0	0	0	23
0:15	0	0	0	1	8	7	0	1	0	0	0	0	0	17
0:30	0	0	0	2	6	8	3	1	0	0	0	0	0	20
0:45	0	0	0	3	8	2	0	0	0	0	0	0	0	13
1:00	0	0	0	1	6	3	1	0	0	0	0	0	0	11
1:15	0	0	0	0	1	3	0	1	0	0	0	0	0	5
1:30	0	0	0	0	3	2	3	1	0	0	0	0	0	9
1:45	0	0	0	5	3	3	1	0	0	0	0	0	0	12
2:00	0	0	0	2	1	5	4	0	0	0	0	0	0	12
2:15	0	0	0	0	4	1	0	0	0	0	0	0	0	5
2:30	0	0	0	1	3	0	0	0	0	0	0	0	0	4
2:45	0	0	0	0	3	4	1	1	0	0	0	0	0	9
3:00	0	0	0	0	4	2	0	1	0	0	0	0	0	7
3:15	0	0	2	1	1	2	0	1	0	0	0	0	0	7
3:30	0	0	0	1	3	1	1	0	0	0	0	0	0	6
3:45	0	0	0	0	2	3	0	0	0	0	0	0	0	5
4:00	0	0	0	0	2	2	0	2	0	0	0	0	0	6
4:15	0	0	2	0	4	5	1	0	0	0	0	0	0	12
4:30	0	1	2	3	12	11	2	0	0	0	0	0	0	31
4:45	0	0	0	1	11	18	9	6	2	0	0	0	0	47
5:00	0	0	0	1	27	18	7	2	0	0	0	0	0	55
5:15	0	0	0	0	12	45	14	8	1	0	0	0	0	80
5:30	0	0	0	6	41	47	30	5	1	0	0	0	0	130
5:45	0	0	0	6	54	64	36	9	3	0	0	0	0	172
6:00	0	0	0	0	14	73	21	12	0	1	0	0	0	121
6:15	0	0	0	1	20	45	14	2	0	0	0	0	0	82
6:30	0	0	0	1	24	56	25	7	1	0	0	0	0	114
6:45	0	0	0	6	51	53	23	1	2	0	0	0	0	136
7:00	0	0	0	6	49	75	18	4	1	0	0	0	0	153
7:15	0	0	0	2	46	79	25	2	2	0	0	0	0	156
7:30	0	0	0	7	73	72	33	7	0	0	0	0	0	192
7:45	0	0	1	21	84	116	21	4	0	0	0	0	0	247
8:00	0	0	0	18	123	81	18	4	4	0	0	0	0	248
8:15	7	2	4	23	84	73	26	7	1	0	0	0	0	227
8:30	0	0	0	19	75	98	14	6	0	1	0	0	0	213
8:45	0	0	2	12	118	92	13	2	2	0	0	0	0	241
9:00	0	0	0	7	51	100	20	0	2	0	0	0	0	180
9:15	0	0	0	13	84	67	20	2	0	0	0	0	0	186
9:30	0	0	0	9	47	70	15	5	0	0	0	0	0	146
9:45	0	0	0	3	49	67	18	1	0	0	0	0	0	138
10:00	0	0	0	4	30	60	16	4	0	0	0	0	0	114
10:15	0	0	1	4	30	57	16	6	0	0	0	0	0	114
10:30	0	0	0	12	59	67	13	1	0	0	0	0	0	152
10:45	0	0	0	8	67	58	19	1	0	0	0	0	0	153
11:00	0	0	0	4	60	60	13	0	1	0	0	0	0	138
11:15	0	0	0	3	30	62	30	5	1	0	0	0	0	131
11:30	0	0	1	8	55	91	22	2	1	0	0	0	0	180
11:45	0	0	0	3	60	101	40	6	1	0	0	0	0	211

Time	WESTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	1	1	6	2	0	0	0	0	0	0	0	10
0:15	0	0	1	2	6	5	1	0	0	0	0	0	0	15
0:30	0	0	3	4	4	0	0	0	0	0	0	0	0	11
0:45	0	0	0	1	3	3	0	0	0	0	0	0	0	7
1:00	0	0	0	0	1	1	0	0	0	0	0	0	0	2
1:15	0	0	0	2	0	0	0	0	0	0	0	0	0	2
1:30	0	0	0	3	5	0	1	0	0	0	0	0	0	9
1:45	0	1	1	3	7	0	0	0	0	0	0	0	0	12
2:00	0	0	0	0	3	2	0	0	0	0	0	0	0	5
2:15	0	0	0	2	2	0	1	0	0	0	0	0	0	5
2:30	0	0	0	3	3	1	1	0	0	0	0	0	0	8
2:45	0	0	0	0	0	2	0	0	0	0	0	0	0	2
3:00	0	0	0	3	1	1	1	0	0	0	0	0	0	6
3:15	0	0	0	1	2	5	0	1	0	0	0	0	0	9
3:30	0	0	0	2	4	2	3	0	0	0	0	0	0	11
3:45	0	0	0	1	1	1	0	0	0	0	0	0	0	3
4:00	0	0	0	3	5	2	2	0	1	0	0	0	0	13
4:15	0	0	0	2	9	7	4	1	0	0	0	0	0	23
4:30	0	0	0	10	11	4	2	0	1	0	0	0	0	28
4:45	0	0	0	10	18	18	4	0	0	0	0	0	0	50
5:00	0	1	1	4	22	19	7	1	0	0	0	0	0	55
5:15	0	0	0	3	21	29	9	2	0	0	0	0	0	64
5:30	0	0	0	13	47	43	7	2	0	0	0	0	0	112
5:45	0	0	2	8	52	50	11	2	1	0	0	0	0	126
6:00	0	0	0	11	66	57	10	4	0	0	0	0	0	148
6:15	0	0	5	24	66	65	13	2	0	0	0	0	0	175
6:30	0	0	3	28	95	77	16	3	1	0	0	0	0	223
6:45	0	1	1	40	110	52	12	0	1	0	0	0	0	217
7:00	0	1	7	37	96	62	10	0	0	1	0	0	0	214
7:15	0	0	5	35	111	65	15	2	0	0	0	0	0	233
7:30	0	1	2	47	139	74	12	2	0	0	0	0	0	277
7:45	0	1	0	17	129	63	12	1	1	0	0	0	0	224
8:00	0	0	0	46	119	66	12	2	0	0	0	0	0	245
8:15	0	0	5	38	129	54	5	2	0	0	0	0	0	233
8:30	0	0	1	24	95	63	8	1	0	0	0	0	0	192
8:45	0	0	3	42	104	44	4	1	0	1	0	0	0	199
9:00	0	0	4	30	88	60	7	2	0	0	0	0	0	191
9:15	0	0	0	30	89	37	7	0	0	0	0	0	0	163
9:30	0	0	1	23	81	63	16	0	0	0	0	0	0	184
9:45	0	0	2	35	88	51	7	1	0	0	0	0	0	184
10:00	0	0	0	28	58	39	9	0	0	0	0	0	0	134
10:15	0	0	1	21	57	41	10	1	0	0	0	0	0	131
10:30	0	0	0	15	84	40	7	1	0	0	0	0	0	147
10:45	0	0	1	15	60	37	8	0	1	0	0	0	0	122
11:00	0	1	1	19	57	39	7	0	0	0	0	0	0	124
11:15	0	0	4	11	71	50	4	3	0	0	0	0	0	143
11:30	0	0	1	27	78	40	6	3	0	0	0	0	0	155
11:45	0	0	2	30	68	40	9	1	0	0	0	0	0	150

Time	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	1	6	13	11	2	0	0	0	0	0	0	33
0:15	0	0	1	3	14	12	1	1	0	0	0	0	0	32
0:30	0	0	3	6	10	8	3	1	0	0	0	0	0	31
0:45	0	0	0	4	11	5	0	0	0	0	0	0	0	20
1:00	0	0	0	1	7	4	1	0	0	0	0	0	0	13
1:15	0	0	0	2	1	3	0	1	0	0	0	0	0	7
1:30	0	0	0	3	8	2	4	1	0	0	0	0	0	18
1:45	0	1	1	8	10	3	1	0	0	0	0	0	0	24
2:00	0	0	0	2	4	7	4	0	0	0	0	0	0	17
2:15	0	0	0	2	6	1	1	0	0	0	0	0	0	10
2:30	0	0	0	4	6	1	1	0	0	0	0	0	0	12
2:45	0	0	0	0	3	6	1	1	0	0	0	0	0	11
3:00	0	0	0	3	5	3	1	1	0	0	0	0	0	13
3:15	0	0	2	2	3	7	0	2	0	0	0	0	0	16
3:30	0	0	0	3	7	3	4	0	0	0	0	0	0	17
3:45	0	0	0	1	3	4	0	0	0	0	0	0	0	8
4:00	0	0	0	3	7	4	2	2	1	0	0	0	0	19
4:15	0	0	2	2	13	12	5	1	0	0	0	0	0	35
4:30	0	1	2	13	23	15	4	0	1	0	0	0	0	59
4:45	0	0	0	11	29	36	13	6	2	0	0	0	0	97
5:00	0	1	1	5	49	37	14	3	0	0	0	0	0	110
5:15	0	0	0	3	33	74	23	10	1	0	0	0	0	144
5:30	0	0	0	19	88	90	37	7	1	0	0	0	0	242
5:45	0	0	2	14	106	114	47	11	4	0	0	0	0	298
6:00	0	0	0	11	80	130	31	16	0	1	0	0	0	269
6:15	0	0	5	25	86	110	27	4	0	0	0	0	0	257
6:30	0	0	3	29	119	133	41	10	2	0	0	0	0	337
6:45	0	1	1	46	161	105	35	1	3	0	0	0	0	353
7:00	0	1	7	43	145	137	28	4	1	1	0	0	0	367
7:15	0	0	5	37	157	144	40	4	2	0	0	0	0	389
7:30	0	1	2	54	212	146	45	9	0	0	0	0	0	469
7:45	0	1	1	38	213	179	33	5	1	0	0	0	0	471
8:00	0	0	0	64	242	147	30	6	4	0	0	0	0	493
8:15	7	2	9	61	213	127	31	9	1	0	0	0	0	460
8:30	0	0	1	43	170	161	22	7	0	1	0	0	0	405
8:45	0	0	5	54	222	136	17	3	2	1	0	0	0	440
9:00	0	0	4	37	139	160	27	2	2	0	0	0	0	371
9:15	0	0	0	43	173	104	27	2	0	0	0	0	0	349
9:30	0	0	1	32	128	133	31	5	0	0	0	0	0	330
9:45	0	0	2	38	137	118	25	2	0	0	0	0	0	322
10:00	0	0	0	32	88	99	25	4	0	0	0	0	0	248
10:15	0	0	2	25	87	98	26	7	0	0	0	0	0	245
10:30	0	0	0	27	143	107	20	2	0	0	0	0	0	299
10:45	0	0	1	23	127	95	27	1	1	0	0	0	0	275
11:00	0	1	1	23	117	99	20	0	1	0	0	0	0	262
11:15	0	0	4	14	101	112	34	8	1	0	0	0	0	274
11:30	0	0	2	35	133	131	28	5	1	0	0	0	0	335
11:45	0	0	2	33	128	141	49	7	1	0	0	0	0	361

Prepared by National Data & Surveying Services

SPEED

Concord Rd E/O Federal St/Bright View Concord River Assisted Living Access Dwy

Day: Wednesday

City: Billerica

Date: 7/23/2025

Project #: MA25_430107_001

15-MINUTE BREAKDOWN

Time	EASTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
12:00	0	0	0	15	56	86	21	0	1	0	0	0	0	179
12:15	0	0	0	3	54	67	37	5	0	0	0	0	0	166
12:30	0	0	1	10	35	86	37	8	0	0	0	0	0	177
12:45	0	0	1	10	68	65	21	4	1	0	0	0	0	170
13:00	0	0	0	3	42	70	35	5	1	0	0	0	0	156
13:15	0	0	0	2	57	80	21	4	0	0	0	0	0	164
13:30	0	0	1	5	50	110	36	7	0	0	0	0	0	209
13:45	0	0	0	2	46	88	28	2	0	1	0	0	0	167
14:00	0	0	0	4	49	77	29	5	4	0	0	0	0	168
14:15	0	0	1	2	49	70	51	8	0	0	0	0	0	181
14:30	2	1	8	18	53	83	22	6	1	0	0	0	0	194
14:45	0	0	0	7	37	74	41	7	1	0	0	0	0	167
15:00	0	0	2	14	55	82	36	8	0	0	0	0	0	197
15:15	0	0	1	12	74	75	21	3	0	0	0	0	0	186
15:30	1	1	3	15	71	99	31	6	1	0	0	0	0	228
15:45	0	1	4	19	53	104	27	6	2	0	0	0	0	216
16:00	0	0	1	10	85	93	45	5	0	0	0	0	0	239
16:15	0	1	1	10	69	114	39	5	1	0	0	0	0	240
16:30	1	2	4	23	89	91	28	5	0	1	0	0	0	244
16:45	0	0	0	16	79	87	33	3	0	0	0	0	0	218
17:00	0	0	2	23	86	70	23	3	0	0	0	0	0	207
17:15	0	2	3	26	118	79	13	1	0	0	0	0	0	242
17:30	0	0	0	1	43	106	48	4	2	0	0	0	0	204
17:45	0	0	0	10	48	97	37	1	1	0	0	0	0	194
18:00	0	0	0	0	27	84	63	13	2	0	0	0	0	189
18:15	0	0	1	9	58	70	37	2	3	0	0	0	0	180
18:30	0	0	1	8	49	69	28	6	1	0	0	0	0	162
18:45	0	0	0	1	50	81	29	2	0	0	0	0	0	163
19:00	0	0	0	5	50	70	24	1	2	0	0	0	0	152
19:15	0	0	2	21	36	62	17	4	1	0	0	0	0	143
19:30	0	0	0	3	35	62	21	6	1	0	0	0	0	128
19:45	0	0	0	1	26	61	20	2	0	0	0	0	0	110
20:00	0	0	0	3	45	51	14	2	0	0	0	0	0	115
20:15	0	0	0	3	40	44	13	2	0	0	0	0	0	102
20:30	0	0	1	11	49	29	6	0	0	0	0	0	0	96
20:45	0	0	0	11	65	27	5	1	0	0	0	0	0	109
21:00	2	0	1	15	44	26	7	0	0	0	0	0	0	95
21:15	0	0	1	12	50	34	10	3	0	0	0	0	0	110
21:30	0	0	0	13	32	27	7	0	0	0	0	0	0	79
21:45	1	0	0	3	30	27	11	2	0	0	0	0	0	74
22:00	0	0	0	13	19	18	5	1	0	0	0	0	0	56
22:15	0	0	0	3	15	25	3	1	0	0	0	0	0	47
22:30	0	0	0	4	18	19	10	2	0	0	0	0	0	53
22:45	0	0	0	6	20	13	4	0	1	0	0	0	0	44
23:00	0	0	1	7	22	13	4	2	0	0	0	0	0	49
23:15	0	0	0	9	23	25	6	3	0	0	0	0	0	66
23:30	0	0	0	8	14	9	1	0	0	0	0	0	0	32
23:45	0	0	0	2	17	9	4	0	0	0	0	0	0	32
Totals	14	11	56	664	3,909	5,046	1,717	296	53	4	0	0	0	11,770
% of Totals	0%	0%	0%	6%	33%	43%	15%	3%	0%	0%	0%	0%	0%	100%

Time	WESTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
12:00	0	2	0	35	84	39	9	2	0	0	0	0	0	171
12:15	0	0	4	32	83	34	9	1	0	0	0	0	0	163
12:30	0	0	2	22	81	57	10	1	1	0	0	0	0	174
12:45	0	0	6	23	73	38	10	1	0	0	0	0	0	151
13:00	0	1	3	15	79	45	12	2	0	0	0	0	0	157
13:15	0	0	1	36	81	46	5	2	0	0	0	0	0	171
13:30	0	0	0	29	73	54	7	2	0	0	0	0	0	165
13:45	0	0	3	17	75	40	8	0	0	0	0	0	0	143
14:00	0	0	10	46	83	43	12	0	0	0	0	0	0	194
14:15	0	0	1	40	107	52	13	2	0	0	0	0	0	215
14:30	2	6	35	96	113	32	6	0	0	0	0	0	0	290
14:45	0	0	0	28	90	51	16	2	0	1	0	0	0	188
15:00	0	1	7	66	94	50	8	2	0	0	0	0	0	228
15:15	0	0	5	63	127	45	8	1	0	0	0	0	0	249
15:30	0	2	28	87	99	43	10	5	1	0	0	0	0	275
15:45	0	2	23	70	93	48	6	1	0	0	0	0	0	243
16:00	4	2	27	50	103	77	7	1	0	0	0	0	0	271
16:15	0	1	10	74	121	51	14	3	1	0	0	0	0	275
16:30	0	0	32	83	121	52	7	2	0	0	0	0	0	297
16:45	3	6	28	84	123	56	11	2	0	0	0	0	0	313
17:00	81	48	51	67	54	22	5	3	0	0	0	0	0	331
17:15	7	24	62	112	129	32	6	0	0	0	0	0	0	372
17:30	0	6	30	76	119	60	16	3	0	1	0	0	0	311
17:45	1	9	44	118	108	27	5	0	0	0	0	0	0	312
18:00	0	0	6	36	110	44	9	4	1	0	0	0	0	210
18:15	0	0	4	38	87	36	8	1	0	0	0	0	0	174
18:30	0	0	3	23	70	39	9	1	0	0	0	0	0	145
18:45	0	0	3	24	70	30	13	1	1	0	0	0	0	142
19:00	0	0	1	28	60	24	4	1	0	0	0	0	0	118
19:15	0	0	7	35	52	25	1	0	0	0	0	0	0	120
19:30	0	0	2	56	53	13	0	0	0	0	0	0	0	124
19:45	0	0	4	30	46	15	2	0	0	0	0	0	0	97
20:00	0	0	9	45	49	10	1	0	0	0	0	0	0	114
20:15	0	0	9	43	50	2	0	0	0	0	0	0	0	104
20:30	0	2	9	34	31	5	0	0	0	0	0	0	0	81
20:45	0	1	7	35	27	5	1	0	0	0	0	0	0	76
21:00	0	0	8	54	25	8	2	0	0	0	0	0	0	97
21:15	0	1	10	42	20	6	0	0	0	0	0	0	0	79
21:30	0	0	5	29	23	5	0	0	0	0	0	0	0	62
21:45	0	0	5	17	23	4	2	0	0	0	0	0	0	51
22:00	0	0	11	31	15	3	0	0	0	0	0	0	0	60
22:15	0	0	1	19	19	4	0	0	0	0	0	0	0	43
22:30	0	0	10	26	13	2	0	0	0	0	0	0	0	51
22:45	0	0	2	12	17	2	1	0	0	0	0	0	0	34
23:00	0	0	5	15	4	1	0	0	0	0	0	0	0	25
23:15	0	0	5	7	8	1	0	0	0	0	0	0	0	21
23:30	0	0	4	22	11	3	0	0	1	0	0	0	0	41
23:45	0	1	5	9	9	5	0	0	0	0	0	0	0	29
Totals	98	122	605	2,833	5,576	2,862	553	87	13	4	0	0	0	12,753
% of Totals	1%	1%	5%	22%	44%	22%	4%	1%	0%	0%	0%	0%	0%	100%

Time	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
12:00	0	2	0	50	140	125	30	2	1	0	0	0	0	350
12:15	0	0	4	35	137	101	46	6	0	0	0	0	0	329
12:30	0	0	3	32	116	143	47	9	1	0	0	0	0	351
12:45	0	0	7	33	141	103	31	5	1	0	0	0	0	321
13:00	0	1	3	18	121	115	47	7	1	0	0	0	0	313
13:15	0	0	1	38	138	126	26	6	0	0	0	0	0	335
13:30	0	0	1	34	123	164	43	9	0	0	0	0	0	374
13:45	0	0	3	19	121	128	36	2	0	1	0	0	0	310
14:00	0	0	10	50	132	120	41	5	4	0	0	0	0	362
14:15	0	0	2	42	156	122	64	10	0	0	0	0	0	396
14:30	4	7	43	114	166	115	28	6	1	0	0	0	0	484
14:45	0	0	0	35	127	125	57	9	1	1	0	0	0	355
15:00	0	1	9	80	149	132	44	10	0	0	0	0	0	425
15:15	0	0	6	75	201	120	29	4	0	0	0	0	0	435
15:30	1	3	31	102	170	142	41	11	2	0	0	0	0	503
15:45	0	3	27	89	146	152	33	7	2	0	0	0	0	459
16:00	4	2	28	60	188	170	52	6	0	0	0	0	0	510
16:15	0	2	11	84	190	165	53	8	2	0	0	0	0	515
16:30	1	2	36	106	210	143	35	7	0	1	0	0	0	541
16:45	3	6	28	100	202	143	44	5	0	0	0	0	0	531
17:00	81	48	53	90	140	92	28	6	0	0	0	0	0	538
17:15	7	26	65	138	247	111	19	1	0	0	0	0	0	614
17:30	0	6	30	77	162	166	64	7	2	1	0	0	0	515
17:45	1	9	44	128	156	124	42	1	1	0	0	0	0	506
18:00	0	0	6	36	137	128	72	17	3	0	0	0	0	399
18:15	0	0	5	47	145	106	45	3	3	0	0	0	0	354
18:30	0	0	4	31	119	108	37	7	1	0	0	0	0	307
18:45	0	0	3	25	120	111	42	3	1	0	0	0	0	305
19:00	0	0	1	33	110	94	28	2	2	0	0	0	0	270
19:15	0	0	9	56	88	87	18	4	1	0	0	0	0	263
19:30	0	0	2	59	88	75	21	6	1	0	0	0	0	252
19:45	0	0	4	31	72	76	22	2	0	0	0	0	0	207
20:00	0	0	9	48	94	61	15	2	0	0	0	0	0	229
20:15	0	0	9	46	90	46	13	2	0	0	0	0	0	206
20:30	0	2	10	45	80	34	6	0	0	0	0	0	0	177
20:45	0	1	7	46	92	32	6	1	0	0	0	0	0	185
21:00	2	0	9	69	69	34	9	0	0	0	0	0	0	192
21:15	0	1	11	54	70	40	10	3	0	0	0	0	0	189
21:30	0	0	5	42	55	32	7	0	0	0	0	0	0	141
21:45	1	0	5	20	53	31	13	2	0	0	0	0	0	125
22:00	0	0	11	44	34	21	5	1	0	0	0	0	0	116
22:15	0	0	1	22	34	29	3	1	0	0	0	0	0	90
22:30	0	0	10	30	31	21	10	2	0	0	0	0	0	104
22:45	0	0	2	18	37	15	5	0	1	0	0	0	0	78
23:00	0	0	6	22	26	14	4	2	0	0	0	0	0	74
23:15	0	0	5	16	31	26	6	3	0	0	0	0	0	87
23:30	0	0	4	30	25	12	1	0	1	0	0	0	0	73
23:45	0	1	5	11	26	14	4	0	0	0	0	0	0	61
Totals	112	133	661	3,497	9,485	7,908	2,270	383	66	8	0	0	0	24,523
% of Totals	0%	1%	3%	14%	39%	32%	9%	2%	0%	0%	0%	0%	0%	100%

Prepared by National Data & Surveying Services

VOLUME

Concord Rd E/O Federal St/Bright View Concord River Assisted Living Access Dwy

Day: Wednesday
Date: 7/23/2025

City: Billerica
Project #: MA25_430107_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	11,770	12,753	24,523

DAILY TOTALS

15-Minutes Interval

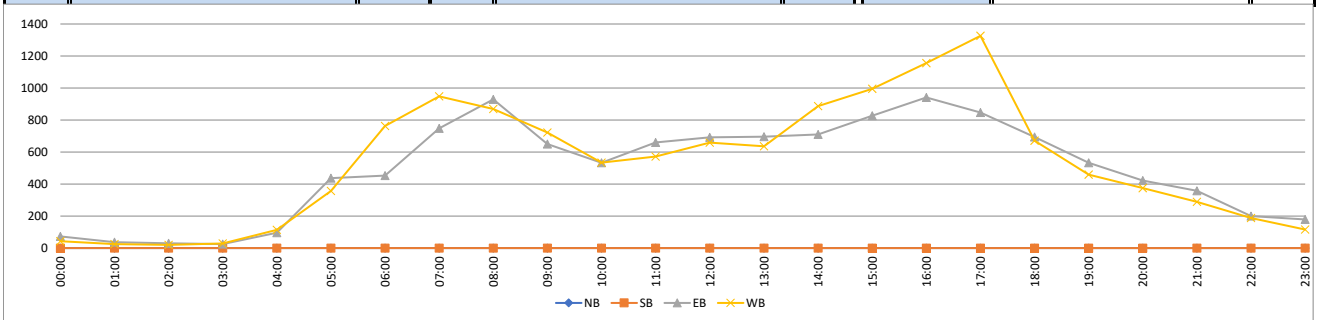
TIME	NB	SB	EB	WB	TOTAL	TIME	NB	SB	EB	WB	TOTAL
0:00			23	10	33	12:00			179	171	350
0:15			17	15	32	12:15			166	163	329
0:30			20	11	31	12:30			177	174	351
0:45			13	7	20	12:45			170	151	321
1:00			11	2	13	13:00			156	157	313
1:15			5	2	7	13:15			164	171	335
1:30			9	9	18	13:30			209	165	374
1:45			12	12	24	13:45			167	143	310
2:00			12	5	17	14:00			168	194	362
2:15			5	5	10	14:15			181	215	396
2:30			4	8	12	14:30			194	290	484
2:45			9	2	11	14:45			167	188	355
3:00			7	6	13	15:00			197	228	425
3:15			7	9	16	15:15			186	249	435
3:30			6	11	17	15:30			228	275	503
3:45			5	3	8	15:45			216	243	459
4:00			6	13	19	16:00			239	271	510
4:15			12	23	35	16:15			240	275	515
4:30			31	28	59	16:30			244	297	541
4:45			47	50	97	16:45			218	313	531
5:00			55	55	110	17:00			207	331	538
5:15			80	64	144	17:15			242	372	614
5:30			130	112	242	17:30			204	311	515
5:45			172	126	298	17:45			194	312	506
6:00			121	148	269	18:00			189	210	399
6:15			82	175	257	18:15			180	174	354
6:30			114	223	337	18:30			162	145	307
6:45			136	217	353	18:45			163	142	305
7:00			153	214	367	19:00			152	118	270
7:15			156	233	389	19:15			143	120	263
7:30			192	277	469	19:30			128	124	252
7:45			247	224	471	19:45			110	97	207
8:00			248	245	493	20:00			115	114	229
8:15			227	233	460	20:15			102	104	206
8:30			213	192	405	20:30			96	81	177
8:45			241	199	440	20:45			109	76	185
9:00			180	191	371	21:00			95	97	192
9:15			186	163	349	21:15			110	79	189
9:30			146	184	330	21:30			79	62	141
9:45			138	184	322	21:45			74	51	125
10:00			114	134	248	22:00			56	60	116
10:15			114	131	245	22:15			47	43	90
10:30			152	147	299	22:30			53	51	104
10:45			153	122	275	22:45			44	34	78
11:00			138	124	262	23:00			49	25	74
11:15			131	143	274	23:15			66	21	87
11:30			180	155	335	23:30			32	41	73
11:45			211	150	361	23:45			32	29	61
TOTALS	0	0	4671	4996	9667	TOTALS	0	0	7099	7757	14856
SPLIT %	0%	0%	48%	52%	39%	SPLIT %	0%	0%	48%	52%	61%

Hourly Intervals

TIME		NB	SB	EB	WB	TOTAL
00:00	01:00			73	43	116
01:00	02:00			37	25	62
02:00	03:00			30	20	50
03:00	04:00			25	29	54
04:00	05:00			96	114	210
05:00	06:00			437	357	794
06:00	07:00			453	763	1216
07:00	08:00			748	948	1696
08:00	09:00			929	869	1798
09:00	10:00			650	722	1372
10:00	11:00			533	534	1067
11:00	12:00			660	572	1232
12:00	13:00			692	659	1351
13:00	14:00			696	636	1332
14:00	15:00			710	887	1597
15:00	16:00			827	995	1822
16:00	17:00			941	1156	2097
17:00	18:00			847	1326	2173
18:00	19:00			694	671	1365
19:00	20:00			533	459	992
20:00	21:00			422	375	797
21:00	22:00			358	289	647
22:00	23:00			200	188	388
23:00	00:00			179	116	295

STATISTICS

	NB	SB	EB	WB	TOTAL
Peak Period	00:00	to	12:00		
Volume			4671	4996	9667
Peak Hour			7:45	7:15	7:30
Peak Volume			935	979	1893
Peak Hour Factor			0.943	0.884	0.960
Peak Period	12:00	to	00:00		
Volume			7099	7757	14856
Peak Hour			16:00	16:45	16:30
Peak Volume			941	1327	2224
Peak Hour Factor			0.964	0.892	0.906
Peak Period	07:00	to	09:00		
Volume			1677	1817	3494
Peak Hour			7:45	7:15	7:30
Peak Volume			935	979	1893
Peak Hour Factor			0.943	0.884	0.960
Peak Period	16:00	to	18:00		
Volume			1788	2482	4270
Peak Hour			16:00	16:45	16:30
Peak Volume			941	1327	2224
Peak Hour Factor			0.964	0.892	0.906



Prepared by National Data & Surveying Services

SPEED

Concord Rd E/O Federal St/Bright View Concord River Assisted Living Access Dwy

Day: Thursday
Date: 7/24/2025

City: Billerica
Project #: MA25_430107_001

HOURLY BREAKDOWN

Time	EASTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	1	8	27	26	10	2	0	0	0	0	0	74
1:00	0	0	0	6	11	12	3	1	1	0	0	0	0	34
2:00	1	0	0	1	9	14	9	2	0	0	0	0	0	36
3:00	0	0	0	3	6	5	5	4	2	0	0	0	0	25
4:00	0	0	0	5	9	35	24	15	4	0	0	0	0	92
5:00	0	0	2	18	121	198	68	20	4	0	0	0	0	431
6:00	0	0	0	31	147	171	62	13	0	1	0	0	0	425
7:00	3	2	13	47	243	317	87	24	3	1	0	0	0	740
8:00	0	0	0	39	280	421	153	31	2	3	0	0	0	929
9:00	0	0	2	53	246	296	110	18	2	1	0	0	0	728
10:00	0	0	6	35	212	232	79	14	3	0	0	0	0	581
11:00	1	0	5	42	212	240	82	9	1	0	0	0	0	592
12:00	0	0	1	23	219	284	99	25	3	0	0	0	0	654
13:00	0	1	6	108	265	233	73	11	0	0	0	0	0	697
14:00	0	0	5	91	360	262	45	10	0	0	0	0	0	773
15:00	0	1	13	97	361	281	52	4	0	0	0	0	0	809
16:00	0	0	10	143	369	252	48	7	1	0	0	0	0	830
17:00	0	0	7	108	372	291	107	11	0	0	0	0	0	896
18:00	0	0	22	120	275	212	53	14	2	0	0	0	0	698
19:00	0	2	6	69	235	161	49	4	0	0	0	0	0	526
20:00	0	0	0	21	146	172	59	8	1	0	0	0	0	407
21:00	0	0	1	16	141	137	34	6	0	0	0	0	0	335
22:00	0	0	2	26	92	80	19	6	0	0	0	0	0	225
23:00	0	0	2	28	82	55	11	1	1	0	0	0	0	180
Totals	5	6	104	1,138	4,440	4,387	1,341	260	30	6	0	0	0	11,717
% of Totals	0%	0%	1%	10%	38%	37%	11%	2%	0%	0%				100%

Time	WESTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	0	5	17	23	6	2	0	0	0	0	0	53
1:00	0	1	0	1	10	7	3	1	0	0	0	0	0	23
2:00	0	0	0	0	8	4	3	2	0	0	0	0	0	17
3:00	0	0	1	3	7	13	6	1	0	0	0	0	0	31
4:00	0	0	0	1	23	32	31	8	1	0	0	0	0	96
5:00	0	0	1	35	119	118	63	14	2	0	0	0	0	352
6:00	0	2	13	162	375	154	29	3	1	0	0	0	0	739
7:00	3	6	27	180	423	261	49	10	0	0	0	0	0	959
8:00	0	0	6	106	385	267	61	6	0	0	0	0	0	831
9:00	0	0	10	126	288	168	38	5	0	0	0	0	0	635
10:00	0	0	11	118	239	163	34	3	0	0	0	0	0	568
11:00	3	3	17	115	262	179	30	6	1	0	0	0	0	616
12:00	0	0	4	125	278	176	54	6	1	0	0	0	0	644
13:00	0	2	28	200	244	108	20	2	0	1	0	0	0	605
14:00	0	2	24	256	432	183	15	2	2	0	0	0	0	916
15:00	0	3	49	337	484	129	12	1	0	0	0	0	0	1015
16:00	0	2	60	415	579	186	22	5	0	0	0	0	0	1269
17:00	0	0	42	313	484	206	35	9	0	0	0	0	0	1089
18:00	0	5	40	207	232	102	11	2	0	0	0	0	0	599
19:00	0	6	19	181	202	65	12	4	2	0	0	0	0	491
20:00	0	0	6	72	190	84	16	2	0	0	0	0	0	370
21:00	0	0	1	54	122	56	11	4	0	0	0	0	0	248
22:00	0	0	3	70	78	23	3	1	0	0	0	0	0	178
23:00	0	0	8	38	53	24	4	0	0	0	0	0	0	127
Totals	6	32	370	3,120	5,534	2,731	568	99	10	1	0	0	0	12,471
% of Totals	0%	0%	3%	25%	44%	22%	5%	1%	0%	0%				100%

Time	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	1	13	44	49	16	4	0	0	0	0	0	127
1:00	0	1	0	7	21	19	6	2	1	0	0	0	0	57
2:00	1	0	0	1	17	18	12	4	0	0	0	0	0	53
3:00	0	0	1	6	13	18	11	5	2	0	0	0	0	56
4:00	0	0	0	6	32	67	55	23	5	0	0	0	0	188
5:00	0	0	3	53	240	316	131	34	6	0	0	0	0	783
6:00	0	2	13	193	522	325	91	16	1	1	0	0	0	1164
7:00	6	8	40	227	666	578	136	34	3	1	0	0	0	1699
8:00	0	0	6	145	665	688	214	37	2	3	0	0	0	1760
9:00	0	0	12	179	534	464	148	23	2	1	0	0	0	1363
10:00	0	0	17	153	451	395	113	17	3	0	0	0	0	1149
11:00	4	3	22	157	474	419	112	15	2	0	0	0	0	1208
12:00	0	0	5	148	497	460	153	31	4	0	0	0	0	1298
13:00	0	3	34	308	509	341	93	13	0	1	0	0	0	1302
14:00	0	2	29	347	792	445	60	12	2	0	0	0	0	1689
15:00	0	4	62	434	845	410	64	5	0	0	0	0	0	1824
16:00	0	2	70	558	948	438	70	12	1	0	0	0	0	2099
17:00	0	0	49	421	856	497	142	20	0	0	0	0	0	1985
18:00	0	5	62	327	507	314	64	16	2	0	0	0	0	1297
19:00	0	8	25	250	437	226	61	8	2	0	0	0	0	1017
20:00	0	0	6	93	336	256	75	10	1	0	0	0	0	777
21:00	0	0	2	70	263	193	45	10	0	0	0	0	0	583
22:00	0	0	5	96	170	103	22	7	0	0	0	0	0	403
23:00	0	0	10	66	135	79	15	1	1	0	0	0	0	307
Totals	11	38	474	4,258	9,974	7,118	1,909	359	40	7	0	0	0	24,188
% of Totals	0%	0%	2%	18%	41%	29%	8%	1%	0%	0%				100%

STATISTICS

	EASTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
00:00 - 12:00	5	2	29	288	1523	1967	692	153	22	6	0	0	0	4687
%	0%	0%	0%	2%	13%	17%	6%	1%	0%	0%	0%	0%	0%	40%
Peak Hour	6:15	6:15	7:00	9:00	7:45	7:45	8:00	7:45	4:00	7:30	0:00	0:00	0:00	7:45
Peak Volume	3	2	13	53	286	433	153	31	4	4	0	0	0	942
12:00 - 24:00	0	4	75	850	2917	2420	649	107	8	0	0	0	0	7030
%	0%	0%	1%	7%	25%	21%	6%	1%	0%	0%	0%	0%	0%	60%
Peak Hour	12:00	18:45	18:00	16:00	14:30	15:15	17:00	12:00	12:00	12:00	12:00	12:00	12:00	17:00
Peak Volume	0	2	22	143	388	297	107	25	3	0	0	0	0	896
07:00 - 09:00	3	2	13	86	523	738	240	55	5	4	0	0	0	1669
%	0%	0%	0%	1%	4%	6%	2%	0%	0%	0%	0%	0%	0%	14%
Peak Hour	7:00	7:00	7:00	7:00	7:45	7:45	8:00	7:45	7:15	7:30	7:00	7:00	7:00	7:45
Peak Volume	3	2	13	47	286	433	153	31	4	4	0	0	0	942
16:00 - 18:00	0	0	17	251	741	543	155	18	1	0	0	0	0	1726
%	0%	0%	0%	2%	6%	5%	1%	0%	0%	0%	0%	0%	0%	15%
Peak Hour	16:00	16:00	16:15	16:00	17:00	17:00	17:00	17:00	16:00	16:00	16:00	16:00	16:00	17:00
Peak Volume	0	0	11	143	372	291	107	11	1	0	0	0	0	896

	WESTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
00:00 - 12:00	6	12	86	852	2156	1389	353	61	5	0	0	0	0	4920
%	0%	0%	1%	7%	18%	12%	3%	1%	0%	0%	0%	0%	0%	42%
Peak Hour	6:15	6:15	6:45	6:30	7:15	7:30	7:45	4:45	4:30	0:00	0:00	0:00	0:00	7:15
Peak Volume	3	7	30	198	447	293	75	19	3	0	0	0	0	966
12:00 - 24:00	0	20	284	2268	3378	1342	215	38	5	1	0	0	0	7551
%	0%	0%	2%	19%	29%	11%	2%	0%	0%	0%	0%	0%	0%	64%
Peak Hour	12:00	18:45	16:00	16:15	16:00	17:00	12:00	16:30	13:30	12:15	12:00	12:00	12:00	16:00
Peak Volume	0	8	60	418	579	206	54	12	2	1	0	0	0	1269
07:00 - 09:00	3	6	33	286	808	528	110	16	0	0	0	0	0	1790
%	0%	0%	0%	2%	7%	5%	1%	0%	0%	0%	0%	0%	0%	15%
Peak Hour	7:00	7:00	7:00	7:00	7:15	7:30	7:45	7:15	7:00	7:00	7:00	7:00	7:00	7:15
Peak Volume	3	6	27	180	447	293	75	11	0	0	0	0	0	966
16:00 - 18:00	0	2	102	728	1063	392	57	14	0	0	0	0	0	2358
%	0%	0%	1%	6%	9%	3%	0%	0%	0%	0%	0%	0%	0%	20%
Peak Hour	16:00	16:00	16:00	16:15	16:00	17:00	16:30	16:30	16:00	16:00	16:00	16:00	16:00	16:00
Peak Volume	0	2	60	418	579	206	38	12	0	0	0	0	0	1269

	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
00:00 - 12:00	11	14	115	1140	3679	3356	1045	214	27	6	0	0	0	9607
%	0%	0%	1%	10%	31%	29%	9%	2%	0%	0%	0%	0%	0%	82%
Peak Hour	6:15	6:15	6:45	6:30	7:15	7:45	7:45	4:45	4:30	7:30	0:00	0:00	0:00	7:45
Peak Volume	6	9	40	242	727	722	224	48	7	4	0	0	0	1849
12:00 - 24:00	0	24	359	3118	6295	3762	864	145	13	1	0	0	0	14581
%	0%	0%	3%	27%	54%	32%	7%	1%	0%	0%	0%	0%	0%	124%
Peak Hour	12:00	18:45	15:45	16:00	16:00	17:00	12:00	12:00	12:00	12:15	12:00	12:00	12:00	16:15
Peak Volume	0	10	71	558	948	497	153	31	4	1	0	0	0	2122
07:00 - 09:00	6	8	46	372	1331	1266	350	71	5	4	0	0	0	3459
%	0%	0%	0%	3%	11%	11%	3%	1%	0%	0%	0%	0%	0%	30%
Peak Hour	7:00	7:00	7:00	7:00	7:15	7:45	7:45	7:45	7:15	7:30	7:00	7:00	7:00	7:45
Peak Volume	6	8	40	227	727	722	224	39	4	4	0	0	0	1849
16:00 - 18:00	0	2	119	979	1804	935	212	32	1	0	0	0	0	4084
%	0%	0%	1%	8%	15%	8%	2%	0%	0%	0%	0%	0%	0%	35%
Peak Hour	16:00	16:00	16:15	16:00	16:00	17:00	17:00	16:30	16:00	16:00	16:00	16:00	16:00	16:15
Peak Volume	0	2	71	558	948	497	142	21	1	0	0	0	0	2122

Direction	Percentiles 15th	50th	Average	85th	95th	ADT
EASTBOUND	31	35	35	40	43	11717
WESTBOUND	31	35	35	40	43	12471
TOTALS	31	35	35	40	43	24188

Direction	Pace 10mph Pace	# in Pace	% in Pace	Number of Vehicles >= 55 MPH	% of Vehicles >= 55 MPH
EASTBOUND	31 - 40 mph	8744	74%	6	0%
WESTBOUND	31 - 40 mph	9242	75%	8	0%
TOTALS	31 - 40 mph	17986	74%	14	0%

Prepared by National Data & Surveying Services

SPEED

Concord Rd E/O Federal St/Bright View Concord River Assisted Living Access Dwy

Day: Thursday

Date: 7/24/2025

City: Billerica

Project #: MA25_430107_001

15-MINUTE BREAKDOWN

Time	EASTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	0	4	5	10	2	1	0	0	0	0	0	22
0:15	0	0	0	0	13	7	4	1	0	0	0	0	0	25
0:30	0	0	1	2	3	4	4	0	0	0	0	0	0	14
0:45	0	0	0	2	6	5	0	0	0	0	0	0	0	13
1:00	0	0	0	2	7	4	2	1	1	0	0	0	0	17
1:15	0	0	0	1	1	2	0	0	0	0	0	0	0	4
1:30	0	0	0	1	3	3	0	0	0	0	0	0	0	7
1:45	0	0	0	2	0	3	1	0	0	0	0	0	0	6
2:00	1	0	0	1	1	2	2	0	0	0	0	0	0	7
2:15	0	0	0	0	5	6	2	0	0	0	0	0	0	13
2:30	0	0	0	0	2	3	2	2	0	0	0	0	0	9
2:45	0	0	0	0	1	3	3	0	0	0	0	0	0	7
3:00	0	0	0	1	1	4	2	2	1	0	0	0	0	11
3:15	0	0	0	0	1	0	1	1	1	0	0	0	0	4
3:30	0	0	0	0	3	1	1	1	0	0	0	0	0	6
3:45	0	0	0	2	1	0	1	0	0	0	0	0	0	4
4:00	0	0	0	4	0	5	0	0	0	0	0	0	0	9
4:15	0	0	0	0	3	4	1	0	0	0	0	0	0	8
4:30	0	0	0	0	4	8	11	4	3	0	0	0	0	30
4:45	0	0	0	1	2	18	12	11	1	0	0	0	0	45
5:00	0	0	1	8	10	21	9	1	0	0	0	0	0	50
5:15	0	0	0	2	11	29	18	5	0	0	0	0	0	65
5:30	0	0	0	2	34	59	22	12	3	0	0	0	0	132
5:45	0	0	1	6	66	89	19	2	1	0	0	0	0	184
6:00	0	0	0	4	44	42	18	3	0	0	0	0	0	111
6:15	0	0	0	8	32	44	15	2	0	0	0	0	0	101
6:30	0	0	0	7	28	27	10	1	0	0	0	0	0	73
6:45	0	0	0	12	43	58	19	7	0	1	0	0	0	140
7:00	3	2	8	15	43	66	12	6	0	0	0	0	0	155
7:15	0	0	1	10	65	63	14	8	0	0	0	0	0	161
7:30	0	0	1	15	49	76	25	4	1	1	0	0	0	172
7:45	0	0	3	7	86	112	36	6	2	0	0	0	0	252
8:00	0	0	0	3	80	116	36	7	1	0	0	0	0	243
8:15	0	0	0	11	53	95	38	12	0	3	0	0	0	212
8:30	0	0	0	12	67	110	39	6	1	0	0	0	0	235
8:45	0	0	0	13	80	100	40	6	0	0	0	0	0	239
9:00	0	0	0	6	69	105	30	6	1	0	0	0	0	217
9:15	0	0	0	9	51	67	36	10	1	0	0	0	0	174
9:30	0	0	1	17	58	55	19	2	0	1	0	0	0	153
9:45	0	0	1	21	68	69	25	0	0	0	0	0	0	184
10:00	0	0	2	6	37	72	31	3	1	0	0	0	0	152
10:15	0	0	1	8	65	40	15	3	0	0	0	0	0	132
10:30	0	0	1	8	55	61	18	6	1	0	0	0	0	150
10:45	0	0	2	13	55	59	15	2	1	0	0	0	0	147
11:00	0	0	0	3	33	43	28	3	0	0	0	0	0	110
11:15	0	0	0	4	54	60	17	2	1	0	0	0	0	138
11:30	1	0	5	27	60	53	12	1	0	0	0	0	0	159
11:45	0	0	0	8	65	84	25	3	0	0	0	0	0	185

Time	WESTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	0	0	5	8	0	1	0	0	0	0	0	14
0:15	0	0	0	0	0	2	4	0	0	0	0	0	0	6
0:30	0	0	0	2	6	8	2	1	0	0	0	0	0	19
0:45	0	0	0	3	6	5	0	0	0	0	0	0	0	14
1:00	0	0	0	0	2	3	1	0	0	0	0	0	0	6
1:15	0	1	0	0	5	2	0	0	0	0	0	0	0	8
1:30	0	0	0	1	2	0	1	0	0	0	0	0	0	4
1:45	0	0	0	0	1	2	1	1	0	0	0	0	0	5
2:00	0	0	0	0	3	0	0	0	0	0	0	0	0	3
2:15	0	0	0	0	2	1	0	0	0	0	0	0	0	3
2:30	0	0	0	0	2	2	2	1	0	0	0	0	0	7
2:45	0	0	0	0	1	1	1	1	0	0	0	0	0	4
3:00	0	0	0	0	0	1	0	1	0	0	0	0	0	2
3:15	0	0	0	1	2	1	2	0	0	0	0	0	0	6
3:30	0	0	1	1	3	4	2	0	0	0	0	0	0	11
3:45	0	0	0	1	2	7	2	0	0	0	0	0	0	12
4:00	0	0	0	0	7	1	2	0	0	0	0	0	0	10
4:15	0	0	0	0	2	8	11	1	0	0	0	0	0	22
4:30	0	0	0	1	9	9	5	1	0	0	0	0	0	25
4:45	0	0	0	0	5	14	13	6	1	0	0	0	0	39
5:00	0	0	0	6	19	16	10	1	0	0	0	0	0	52
5:15	0	0	0	2	7	27	25	8	2	0	0	0	0	71
5:30	0	0	1	8	29	44	20	4	0	0	0	0	0	106
5:45	0	0	0	19	64	31	8	1	0	0	0	0	0	123
6:00	0	1	0	20	90	31	8	0	0	0	0	0	0	150
6:15	0	0	5	52	83	35	7	2	1	0	0	0	0	185
6:30	0	0	3	47	113	32	3	1	0	0	0	0	0	199
6:45	0	1	5	43	89	56	11	0	0	0	0	0	0	205
7:00	3	6	9	43	85	53	8	0	0	0	0	0	0	207
7:15	0	0	9	65	109	53	6	3	0	0	0	0	0	245
7:30	0	0	7	38	115	69	15	4	0	0	0	0	0	248
7:45	0	0	2	34	114	86	20	3	0	0	0	0	0	259
8:00	0	0	0	25	109	61	18	1	0	0	0	0	0	214
8:15	0	0	0	39	105	77	16	1	0	0	0	0	0	238
8:30	0	0	2	20	85	65	21	3	0	0	0	0	0	196
8:45	0	0	4	22	86	64	6	1	0	0	0	0	0	183
9:00	0	0	2	28	77	60	8	0	0	0	0	0	0	175
9:15	0	0	2	26	66	49	14	2	0	0	0	0	0	159
9:30	0	0	2	40	73	35	5	1	0	0	0	0	0	156
9:45	0	0	4	32	72	24	11	2	0	0	0	0	0	145
10:00	0	0	1	12	64	61	17	0	0	0	0	0	0	155
10:15	0	0	0	25	71	45	9	1	0	0	0	0	0	151
10:30	0	0	4	26	47	37	2	2	0	0	0	0	0	118
10:45	0	0	6	55	57	20	6	0	0	0	0	0	0	144
11:00	0	0	1	23	52	44	12	1	0	0	0	0	0	133
11:15	0	0	0	25	51	52	9	2	0	0	0	0	0	139
11:30	3	13	13	37	83	28	3	0	0	0	0	0	0	170
11:45	0	0	3	30	76	55	6	3	1	0	0	0	0	174

Time	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	0	4	10	18	2	2	0	0	0	0	0	36
0:15	0	0	0	0	13	9	8	1	0	0	0	0	0	31
0:30	0	0	1	4	9	12	6	1	0	0	0	0	0	33
0:45	0	0	0	5	12	10	0	0	0	0	0	0	0	27
1:00	0	0	0	2	9	7	3	1	1	0	0	0	0	23
1:15	0	1	0	1	6	4	0	0	0	0	0	0	0	12
1:30	0	0	0	2	5	3	1	0	0	0	0	0	0	11
1:45	0	0	0	2	1	5	2	1	0	0	0	0	0	11
2:00	1	0	0	1	4	2	2	0	0	0	0	0	0	10
2:15	0	0	0	0	7	7	2	0	0	0	0	0	0	16
2:30	0	0	0	0	4	5	4	3	0	0	0	0	0	16
2:45	0	0	0	0	2	4	4	1	0	0	0	0	0	11
3:00	0	0	0	1	1	5	2	3	1	0	0	0	0	13
3:15	0	0	0	1	3	1	3	1	1	0	0	0	0	10
3:30	0	0	1	1	6	5	3	1	0	0	0	0	0	17
3:45	0	0	0	3	3	7	3	0	0	0	0	0	0	16
4:00	0	0	0	4	7	6	2	0	0	0	0	0	0	19
4:15	0	0	0	0	5	12	12	1	0	0	0	0	0	30
4:30	0	0	0	1	13	17	16	5	3	0	0	0	0	55
4:45	0	0	0	1	7	32	25	17	2	0	0	0	0	84
5:00	0	0	1	14	29	37	19	2	0	0	0	0	0	102
5:15	0	0	0	4	18	56	43	13	2	0	0	0	0	136
5:30	0	0	1	10	63	103	42	16	3	0	0	0	0	238
5:45	0	0	1	25	130	120	27	3	1	0	0	0	0	307
6:00	0	1	0	24	134	73	26	3	0	0	0	0	0	261
6:15	0	0	5	60	115	79	22	4	1	0	0	0	0	286
6:30	0	0	3	54	141	59	13	2	0	0	0	0	0	272
6:45	0	1	5	55	132	114	30	7	0	1	0	0	0	345
7:00	6	8	17	58	128	119	20	6	0	0	0	0	0	362
7:15	0	0	10	75	174	116	20	11	0	0	0	0	0	406
7:30	0	0	8	53	164	145	40	8	1	1	0	0	0	420
7:45	0	0	5	41	200	198	56	9	2	0	0	0	0	511
8:00	0	0	0	28	189	177	54	8	1	0	0	0	0	457
8:15	0	0	0	50	158	172	54	13	0	3	0	0	0	450
8:30	0	0	2	32	152	175	60	9	1	0	0	0	0	431
8:45	0	0	4	35	166	164	46	7	0	0	0	0	0	422
9:00	0	0	2	34	146	165	38	6	1	0	0	0	0	392
9:15	0	0	2	35	117	116	50	12	1	0	0	0	0	333
9:30	0	0	3	57	131	90	24	3	0	1	0	0	0	309
9:45	0	0	5	53	140	93	36	2	0	0	0	0	0	329
10:00	0	0	3	18	101	133	48	3	1	0	0	0	0	307
10:15	0	0	1	33	136	85	24	4	0	0	0	0	0	283
10:30	0	0	5	34	102	98	20	8	1	0	0	0	0	268
10:45	0	0	8	68	112	79	21	2	1	0	0	0	0	291
11:00	0	0	1	26	85	87	40	4	0	0	0	0	0	243
11:15	0	0	0	29	105	112	26	4	1	0	0	0	0	277
11:30	4	3	18	64	143	81	15	1	0	0	0	0	0	329
11:45	0	0	3	38	141	139	31	6	1	0	0	0	0	359

Prepared by National Data & Surveying Services

SPEED

Concord Rd E/O Federal St/Bright View Concord River Assisted Living Access Dwy

Day: Thursday

Date: 7/24/2025

City: Billerica

Project #: MA25_430107_001

15-MINUTE BREAKDOWN

Time	EASTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
12:00	0	0	0	3	41	55	37	12	1	0	0	0	0	**149**
12:15	0	0	0	10	58	89	15	4	1	0	0	0	0	**177**
12:30	0	0	0	4	55	63	26	5	1	0	0	0	0	**154**
12:45	0	0	1	6	65	77	21	4	0	0	0	0	0	**174**
13:00	0	1	0	22	63	51	11	3	0	0	0	0	0	**151**
13:15	0	0	0	31	74	56	10	1	0	0	0	0	0	**172**
13:30	0	0	5	41	76	46	18	3	0	0	0	0	0	**189**
13:45	0	0	1	14	52	80	34	4	0	0	0	0	0	**185**
14:00	0	0	1	14	82	63	15	4	0	0	0	0	0	**179**
14:15	0	0	2	25	98	52	9	2	0	0	0	0	0	**188**
14:30	0	0	2	31	103	63	9	1	0	0	0	0	0	**209**
14:45	0	0	0	21	77	84	12	3	0	0	0	0	0	**197**
15:00	0	0	1	19	96	61	10	0	0	0	0	0	0	**187**
15:15	0	1	4	21	112	79	11	2	0	0	0	0	0	**230**
15:30	0	0	3	37	68	60	16	2	0	0	0	0	0	**186**
15:45	0	0	5	20	85	81	15	0	0	0	0	0	0	**206**
16:00	0	0	1	23	97	77	15	3	0	0	0	0	0	**216**
16:15	0	0	2	46	99	71	13	1	1	0	0	0	0	**233**
16:30	0	0	4	35	89	52	10	2	0	0	0	0	0	**192**
16:45	0	0	3	39	84	52	10	1	0	0	0	0	0	**189**
17:00	0	0	2	19	86	88	39	5	0	0	0	0	0	**239**
17:15	0	0	0	30	95	77	22	1	0	0	0	0	0	**225**
17:30	0	0	1	34	104	60	29	2	0	0	0	0	0	**230**
17:45	0	0	4	25	87	66	17	3	0	0	0	0	0	**202**
18:00	0	0	6	31	66	57	16	6	1	0	0	0	0	**183**
18:15	0	0	4	26	65	64	17	3	1	0	0	0	0	**180**
18:30	0	0	2	27	79	49	7	1	0	0	0	0	0	**165**
18:45	0	0	10	36	65	42	13	4	0	0	0	0	0	**170**
19:00	0	0	0	19	58	45	14	1	0	0	0	0	0	**137**
19:15	0	0	5	18	68	46	13	1	0	0	0	0	0	**151**
19:30	0	2	1	12	48	35	16	2	0	0	0	0	0	**116**
19:45	0	0	0	20	61	35	6	0	0	0	0	0	0	**122**
20:00	0	0	0	8	35	43	10	0	1	0	0	0	0	**97**
20:15	0	0	0	3	56	44	10	4	0	0	0	0	0	**117**
20:30	0	0	0	0	20	37	23	3	0	0	0	0	0	**83**
20:45	0	0	0	10	35	48	16	1	0	0	0	0	0	**110**
21:00	0	0	1	5	37	29	8	0	0	0	0	0	0	**80**
21:15	0	0	0	5	45	40	12	2	0	0	0	0	0	**104**
21:30	0	0	0	1	31	34	8	2	0	0	0	0	0	**76**
21:45	0	0	0	5	28	34	6	2	0	0	0	0	0	**75**
22:00	0	0	1	13	23	14	3	1	0	0	0	0	0	**55**
22:15	0	0	0	5	29	25	8	3	0	0	0	0	0	**70**
22:30	0	0	1	4	18	16	4	2	0	0	0	0	0	**45**
22:45	0	0	0	4	22	25	4	0	0	0	0	0	0	**55**
23:00	0	0	0	5	21	23	4	1	1	0	0	0	0	**55**
23:15	0	0	1	14	21	13	2	0	0	0	0	0	0	**51**
23:30	0	0	1	7	21	13	2	0	0	0	0	0	0	**44**
23:45	0	0	0	2	19	6	3	0	0	0	0	0	0	**30**
Totals	**5**	**6**	**104**	**1,138**	**4,440**	**4,387**	**1,341**	**260**	**30**	**6**	**0**	**0**	**0**	**11,717**
% of Totals	0%	0%	1%	10%	38%	37%	11%	2%	0%	0%	0%	0%	0%	**100%**

Time	WESTBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
12:00	0	0	1	16	73	69	29	3	1	0	0	0	0	**192**
12:15	0	0	0	44	84	38	5	2	0	0	0	0	0	**173**
12:30	0	0	2	31	60	33	11	0	0	0	0	0	0	**137**
12:45	0	0	1	34	61	36	9	1	0	0	0	0	0	**142**
13:00	0	2	5	55	53	18	5	1	0	1	0	0	0	**140**
13:15	0	0	10	48	53	17	1	0	0	0	0	0	0	**129**
13:30	0	0	12	63	62	28	7	0	0	0	0	0	0	**172**
13:45	0	0	1	34	76	45	7	1	0	0	0	0	0	**164**
14:00	0	0	1	59	89	51	5	0	1	0	0	0	0	**206**
14:15	0	0	4	65	97	30	3	1	1	0	0	0	0	**201**
14:30	0	2	12	78	136	46	4	0	0	0	0	0	0	**278**
14:45	0	0	7	54	110	56	3	1	0	0	0	0	0	**231**
15:00	0	0	17	83	89	25	0	1	0	0	0	0	0	**215**
15:15	0	1	5	74	122	45	2	0	0	0	0	0	0	**249**
15:30	0	0	16	86	144	31	6	0	0	0	0	0	0	**283**
15:45	0	2	11	94	129	28	4	0	0	0	0	0	0	**268**
16:00	0	0	10	66	153	66	4	0	0	0	0	0	0	**299**
16:15	0	2	20	103	150	44	3	1	0	0	0	0	0	**323**
16:30	0	0	18	116	129	42	10	1	0	0	0	0	0	**316**
16:45	0	0	12	130	147	34	5	3	0	0	0	0	0	**331**
17:00	0	0	10	69	131	72	13	4	0	0	0	0	0	**299**
17:15	0	0	17	95	134	45	10	4	0	0	0	0	0	**305**
17:30	0	0	9	89	118	48	4	0	0	0	0	0	0	**268**
17:45	0	0	6	60	101	41	8	1	0	0	0	0	0	**217**
18:00	0	0	14	59	76	32	6	1	0	0	0	0	0	**188**
18:15	0	3	5	46	67	32	2	0	0	0	0	0	0	**155**
18:30	0	0	5	64	46	14	0	0	0	0	0	0	0	**129**
18:45	0	2	16	38	43	24	3	1	0	0	0	0	0	**127**
19:00	0	0	2	51	58	28	3	2	0	0	0	0	0	**144**
19:15	0	1	7	44	58	15	3	0	2	0	0	0	0	**130**
19:30	0	5	5	34	44	16	5	2	0	0	0	0	0	**111**
19:45	0	0	5	52	42	6	1	0	0	0	0	0	0	**106**
20:00	0	0	1	18	51	18	1	0	0	0	0	0	0	**89**
20:15	0	0	1	21	58	21	3	1	0	0	0	0	0	**105**
20:30	0	0	0	9	55	30	9	0	0	0	0	0	0	**103**
20:45	0	0	4	24	26	15	3	1	0	0	0	0	0	**73**
21:00	0	0	0	18	40	14	3	3	0	0	0	0	0	**78**
21:15	0	0	0	14	33	17	3	0	0	0	0	0	0	**67**
21:30	0	0	1	13	24	12	3	1	0	0	0	0	0	**54**
21:45	0	0	0	9	25	13	2	0	0	0	0	0	0	**49**
22:00	0	0	2	21	20	4	0	0	0	0	0	0	0	**47**
22:15	0	0	0	15	12	8	0	0	0	0	0	0	0	**35**
22:30	0	0	0	23	31	8	1	1	0	0	0	0	0	**64**
22:45	0	0	1	11	15	3	2	0	0	0	0	0	0	**32**
23:00	0	0	5	11	14	4	0	0	0	0	0	0	0	**34**
23:15	0	0	2	10	6	1	0	0	0	0	0	0	0	**19**
23:30	0	0	1	16	19	12	1	0	0	0	0	0	0	**49**
23:45	0	0	0	1	14	7	3	0	0	0	0	0	0	**25**
Totals	**6**	**32**	**370**	**3,120**	**5,534**	**2,731**	**568**	**99**	**10**	**1**	**0**	**0**	**0**	**12,471**
% of Totals	0%	0%	3%	25%	44%	22%	5%	1%	0%	0%	0%	0%	0%	**100%**

Time	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
12:00	0	0	1	19	114	124	66	15	2	0	0	0	0	**341**
12:15	0	0	0	54	142	127	20	6	1	0	0	0	0	**350**
12:30	0	0	2	35	115	96	37	5	1	0	0	0	0	**291**
12:45	0	0	2	40	126	113	30	5	0	0	0	0	0	**316**
13:00	0	3	5	77	116	69	16	4	0	1	0	0	0	**291**
13:15	0	0	10	79	127	73	11	1	0	0	0	0	0	**301**
13:30	0	0	17	104	138	74	25	3	0	0	0	0	0	**361**
13:45	0	0	2	48	128	125	41	5	0	0	0	0	0	**349**
14:00	0	0	2	73	171	114	20	4	1	0	0	0	0	**385**
14:15	0	0	6	90	195	82	12	3	1	0	0	0	0	**389**
14:30	0	2	14	109	239	109	13	1	0	0	0	0	0	**487**
14:45	0	0	7	75	187	140	15	4	0	0	0	0	0	**428**
15:00	0	0	18	102	185	86	10	1	0	0	0	0	0	**402**
15:15	0	2	9	95	234	124	13	2	0	0	0	0	0	**479**
15:30	0	0	19	123	212	91	22	2	0	0	0	0	0	**469**
15:45	0	2	16	114	214	109	19	0	0	0	0	0	0	**474**
16:00	0	0	11	89	250	143	19	3	0	0	0	0	0	**515**
16:15	0	2	22	149	249	115	16	2	1	0	0	0	0	**556**
16:30	0	0	22	151	218	94	20	3	0	0	0	0	0	**508**
16:45	0	0	15	169	231	86	15	4	0	0	0	0	0	**520**
17:00	0	0	12	88	217	160	52	9	0	0	0	0	0	**538**
17:15	0	0	17	125	229	122	32	5	0	0	0	0	0	**530**
17:30	0	0	10	123	222	108	33	2	0	0	0	0	0	**498**
17:45	0	0	10	85	188	107	25	4	0	0	0	0	0	**419**
18:00	0	0	20	90	142	89	22	7	1	0	0	0	0	**371**
18:15	0	3	9	72	132	96	19	3	1	0	0	0	0	**335**
18:30	0	0	7	91	125	63	7	1	0	0	0	0	0	**294**
18:45	0	2	26	74	108	66	16	5	0	0	0	0	0	**297**
19:00	0	0	2	70	116	73	17	3	0	0	0	0	0	**281**
19:15	0	1	12	62	126	61	16	1	2	0	0	0	0	**281**
19:30	0	7	6	46	92	51	21	4	0	0	0	0	0	**227**
19:45	0	0	5	72	103	41	7	0	0	0	0	0	0	**228**
20:00	0	0	1	26	86	61	11	0	1	0	0	0	0	**186**
20:15	0	0	1	24	114	65	13	5	0	0	0	0	0	**222**
20:30	0	0	0	9	75	67	32	3	0	0	0	0	0	**186**
20:45	0	0	4	34	61	63	19	2	0	0	0	0	0	**183**
21:00	0	0	1	23	77	43	11	3	0	0	0	0	0	**158**
21:15	0	0	0	19	78	57	15	2	0	0	0	0	0	**171**
21:30	0	0	1	14	55	46	11	3	0	0	0	0	0	**130**
21:45	0	0	0	14	53	47	8	2	0	0	0	0	0	**124**
22:00	0	0	3	34	43	18	3	1	0	0	0	0	0	**102**
22:15	0	0	0	20	41	33	8	3	0	0	0	0	0	**105**
22:30	0	0	1	27	49	24	5	3	0	0	0	0	0	**109**
22:45	0	0	1	15	37	28	6	0	0	0	0	0	0	**87**
23:00	0	0	5	16	35	27	4	1	1	0	0	0	0	**89**
23:15	0	0	3	24	27	14	2	0	0	0	0	0	0	**70**
23:30	0	0	2	23	40	25	3	0	0	0	0	0	0	**93**
23:45	0	0	0	3	33	13	6	0	0	0	0	0	0	**55**
Totals	**11**	**38**	**474**	**4,258**	**9,974**	**7,118**	**1,909**	**359**	**40**	**7**	**0**	**0**	**0**	**24,188**
% of Totals	0%	0%	2%	18%	41%	29%	8%	1%	0%	0%	0%	0%	0%	**100%**

Prepared by National Data & Surveying Services

VOLUME

Concord Rd E/O Federal St/Bright View Concord River Assisted Living Access Dwy

Day: Thursday
Date: 7/24/2025

City: Billerica
Project #: MA25_430107_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	11,717	12,475	24,192

DAILY TOTALS

15-Minutes Interval

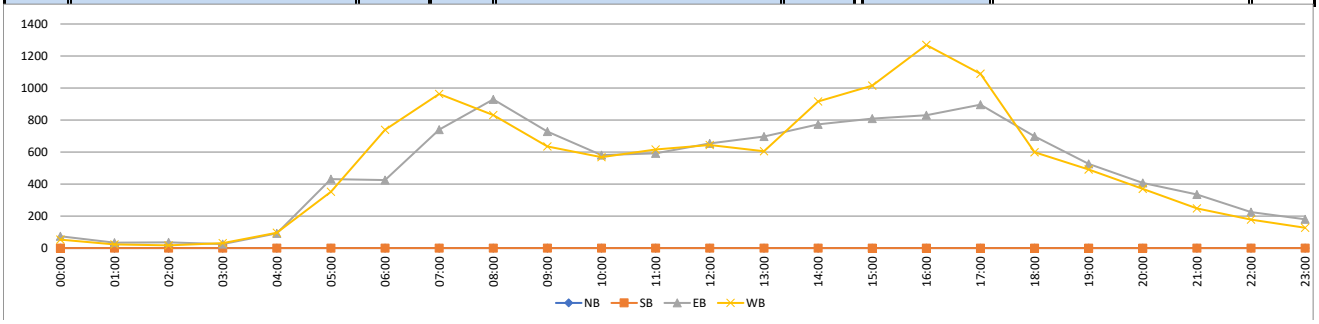
TIME	NB	SB	EB	WB	TOTAL	TIME	NB	SB	EB	WB	TOTAL
0:00			22	14	36	12:00			149	192	341
0:15			25	6	31	12:15			177	173	350
0:30			14	19	33	12:30			154	137	291
0:45			13	14	27	12:45			174	142	316
1:00			17	6	23	13:00			151	140	291
1:15			4	8	12	13:15			172	129	301
1:30			7	4	11	13:30			189	172	361
1:45			6	5	11	13:45			185	164	349
2:00			7	3	10	14:00			179	206	385
2:15			13	3	16	14:15			188	201	389
2:30			9	7	16	14:30			209	278	487
2:45			7	4	11	14:45			197	231	428
3:00			11	2	13	15:00			187	215	402
3:15			4	6	10	15:15			230	249	479
3:30			6	11	17	15:30			186	283	469
3:45			4	12	16	15:45			206	268	474
4:00			9	10	19	16:00			216	299	515
4:15			8	22	30	16:15			233	323	556
4:30			30	25	55	16:30			192	316	508
4:45			45	39	84	16:45			189	331	520
5:00			50	52	102	17:00			239	299	538
5:15			65	71	136	17:15			225	305	530
5:30			132	106	238	17:30			230	268	498
5:45			184	123	307	17:45			202	217	419
6:00			111	150	261	18:00			183	188	371
6:15			101	185	286	18:15			180	155	335
6:30			73	199	272	18:30			165	129	294
6:45			140	205	345	18:45			170	127	297
7:00			155	211	366	19:00			137	144	281
7:15			161	245	406	19:15			151	130	281
7:30			172	248	420	19:30			116	111	227
7:45			252	259	511	19:45			122	106	228
8:00			243	214	457	20:00			97	89	186
8:15			212	238	450	20:15			117	105	222
8:30			235	196	431	20:30			83	103	186
8:45			239	183	422	20:45			110	73	183
9:00			217	175	392	21:00			80	78	158
9:15			174	159	333	21:15			104	67	171
9:30			153	156	309	21:30			76	54	130
9:45			184	145	329	21:45			75	49	124
10:00			152	155	307	22:00			55	47	102
10:15			132	151	283	22:15			70	35	105
10:30			150	118	268	22:30			45	64	109
10:45			147	144	291	22:45			55	32	87
11:00			110	133	243	23:00			55	34	89
11:15			138	139	277	23:15			51	19	70
11:30			159	170	329	23:30			44	49	93
11:45			185	174	359	23:45			30	25	55
TOTALS	0	0	4687	4924	9611	TOTALS	0	0	7030	7551	14581
SPLIT %	0%	0%	49%	51%	40%	SPLIT %	0%	0%	48%	52%	60%

Hourly Intervals

TIME		NB	SB	EB	WB	TOTAL
00:00	01:00			74	53	127
01:00	02:00			34	23	57
02:00	03:00			36	17	53
03:00	04:00			25	31	56
04:00	05:00			92	96	188
05:00	06:00			431	352	783
06:00	07:00			425	739	1164
07:00	08:00			740	963	1703
08:00	09:00			929	831	1760
09:00	10:00			728	635	1363
10:00	11:00			581	568	1149
11:00	12:00			592	616	1208
12:00	13:00			654	644	1298
13:00	14:00			697	605	1302
14:00	15:00			773	916	1689
15:00	16:00			809	1015	1824
16:00	17:00			830	1269	2099
17:00	18:00			896	1089	1985
18:00	19:00			698	599	1297
19:00	20:00			526	491	1017
20:00	21:00			407	370	777
21:00	22:00			335	248	583
22:00	23:00			225	178	403
23:00	00:00			180	127	307

STATISTICS

	NB	SB	EB	WB	TOTAL
Peak Period	00:00	to	12:00		
Volume			4687	4924	9611
Peak Hour			7:45	7:15	7:45
Peak Volume			942	966	1849
Peak Hour Factor			0.935	0.932	0.905
Peak Period	12:00	to	00:00		
Volume			7030	7551	14581
Peak Hour			17:00	16:00	16:15
Peak Volume			896	1269	2122
Peak Hour Factor			0.937	0.958	0.954
Peak Period	07:00	to	09:00		
Volume			1669	1794	3463
Peak Hour			7:45	7:15	7:45
Peak Volume			942	966	1849
Peak Hour Factor			0.935	0.932	0.905
Peak Period	16:00	to	18:00		
Volume			1726	2358	4084
Peak Hour			17:00	16:00	16:15
Peak Volume			896	1269	2122
Peak Hour Factor			0.937	0.958	0.954



Prepared by National Data & Surveying Services

SPEED

Middlesex Turnpike S/O Concord Rd

Day: Wednesday

Date: 7/23/2025

City: Billerica

Project #: MA25_430107_002

HOURLY BREAKDOWN

Time	NORTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	2	3	8	11	1	0	0	0	0	0	0	0	25
1:00	0	0	1	6	9	1	0	0	0	0	0	0	0	17
2:00	0	0	0	6	1	0	0	0	0	0	0	0	0	7
3:00	1	0	1	5	2	2	0	0	0	0	0	0	0	11
4:00	0	0	0	12	12	4	1	0	0	0	0	0	0	29
5:00	1	0	9	27	39	11	1	0	0	0	0	0	0	88
6:00	1	0	9	83	69	15	1	0	0	0	0	0	0	178
7:00	0	5	20	113	108	19	0	0	0	0	0	0	0	265
8:00	1	2	51	126	92	12	2	0	0	0	0	0	0	286
9:00	7	11	33	112	68	11	2	0	0	0	0	0	0	244
10:00	1	3	20	87	81	14	0	1	0	0	0	0	0	207
11:00	1	1	22	109	103	8	3	0	0	0	0	0	0	247
12:00	3	9	48	140	112	19	0	0	0	0	0	0	0	331
13:00	6	4	38	176	88	12	0	0	0	0	0	0	0	324
14:00	13	56	185	217	65	6	1	0	0	0	0	0	0	543
15:00	52	129	288	229	57	5	0	0	0	0	0	0	0	760
16:00	57	117	337	282	44	3	0	0	0	0	0	0	0	840
17:00	239	410	302	68	9	2	0	0	0	0	0	0	0	1030
18:00	4	35	165	157	43	9	0	0	0	0	0	0	0	413
19:00	2	1	32	100	65	8	1	0	0	0	0	0	0	209
20:00	0	4	15	111	44	5	1	0	0	0	0	0	0	180
21:00	0	1	18	57	39	3	1	0	0	0	0	0	0	119
22:00	0	0	11	35	25	5	0	0	0	0	0	0	0	76
23:00	1	1	9	43	27	6	0	0	0	0	0	0	0	87
Totals	390	791	1,617	2,309	1,213	181	14	1	0	0	0	0	0	6,516
% of Totals	6%	12%	25%	35%	19%	3%	0%	0%						100%

Time	SOUTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	4	8	8	0	1	0	0	0	0	0	0	21
1:00	1	0	1	4	3	1	0	0	0	0	0	0	0	10
2:00	0	1	4	6	3	1	0	0	0	0	0	0	0	15
3:00	0	0	2	9	2	2	0	0	0	0	0	0	0	15
4:00	1	1	5	15	40	6	0	0	0	0	0	0	0	68
5:00	2	2	23	154	117	28	2	0	0	0	0	0	0	328
6:00	1	0	16	220	138	27	1	1	0	0	0	0	0	404
7:00	2	18	120	259	137	7	1	0	0	0	0	0	0	544
8:00	2	8	108	298	109	11	0	0	0	0	0	0	0	536
9:00	1	11	58	189	78	8	0	0	0	0	0	0	0	345
10:00	0	0	31	120	81	3	0	0	0	0	0	0	0	235
11:00	2	3	31	153	75	12	0	0	0	0	0	0	0	276
12:00	4	8	39	162	98	10	0	0	0	0	0	0	0	321
13:00	2	5	50	135	92	12	2	0	0	0	0	0	0	298
14:00	1	2	31	122	55	10	1	0	0	0	0	0	0	222
15:00	1	6	41	123	87	9	2	0	0	0	0	0	0	269
16:00	7	4	63	148	85	6	1	0	0	0	0	0	0	314
17:00	6	7	84	160	44	7	0	0	0	0	0	0	0	308
18:00	5	7	36	116	39	5	0	0	0	0	0	0	0	208
19:00	2	2	13	80	68	12	1	0	1	0	0	0	0	179
20:00	0	2	12	68	50	2	1	0	0	0	0	0	0	135
21:00	2	5	10	65	30	3	0	0	0	0	0	0	0	115
22:00	0	0	11	33	26	4	0	0	0	0	0	0	0	74
23:00	0	0	7	31	24	5	0	0	0	0	0	0	0	67
Totals	42	92	800	2,678	1,489	191	13	1	1	0	0	0	0	5,307
% of Totals	1%	2%	15%	50%	28%	4%	0%	0%	0%					100%

Time	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	2	7	16	19	1	1	0	0	0	0	0	0	46
1:00	1	0	2	10	12	2	0	0	0	0	0	0	0	27
2:00	0	1	4	12	4	1	0	0	0	0	0	0	0	22
3:00	1	0	3	14	4	4	0	0	0	0	0	0	0	26
4:00	1	1	5	27	52	10	1	0	0	0	0	0	0	97
5:00	3	2	32	181	156	39	3	0	0	0	0	0	0	416
6:00	2	0	25	303	207	42	2	1	0	0	0	0	0	582
7:00	2	23	140	372	245	26	1	0	0	0	0	0	0	809
8:00	3	10	159	424	201	23	2	0	0	0	0	0	0	822
9:00	8	22	91	301	146	19	2	0	0	0	0	0	0	589
10:00	1	3	51	207	162	17	0	1	0	0	0	0	0	442
11:00	3	4	53	262	178	20	3	0	0	0	0	0	0	523
12:00	7	17	87	302	210	29	0	0	0	0	0	0	0	652
13:00	8	9	88	311	180	24	2	0	0	0	0	0	0	622
14:00	14	58	216	339	120	16	2	0	0	0	0	0	0	765
15:00	53	135	329	352	144	14	2	0	0	0	0	0	0	1029
16:00	64	121	400	430	129	9	1	0	0	0	0	0	0	1154
17:00	245	417	386	228	53	9	0	0	0	0	0	0	0	1338
18:00	9	42	201	273	82	14	0	0	0	0	0	0	0	621
19:00	4	3	45	180	133	20	2	0	1	0	0	0	0	388
20:00	0	6	27	179	94	7	2	0	0	0	0	0	0	315
21:00	2	6	28	122	69	6	1	0	0	0	0	0	0	234
22:00	0	0	22	68	51	9	0	0	0	0	0	0	0	150
23:00	1	1	16	74	51	11	0	0	0	0	0	0	0	154
Totals	432	883	2,417	4,987	2,702	372	27	2	1	0	0	0	0	11,823
% of Totals	4%	7%	20%	42%	23%	3%	0%	0%	0%					100%

STATISTICS

	NORTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
00:00 - 12:00	13	24	169	694	595	98	10	1	0	0	0	0	0	1604
%	0%	0%	3%	11%	9%	2%	0%	0%	0%	0%	0%	0%	0%	25%
Peak Hour	9:00	9:00	8:00	7:30	11:45	7:00	8:15	9:15	0:00	0:00	0:00	0:00	0:00	11:45
Peak Volume	7	11	51	140	123	19	3	1	0	0	0	0	0	331
12:00 - 24:00	377	767	1448	1615	618	83	4	0	0	0	0	0	0	4912
%	6%	12%	22%	25%	9%	1%	0%	0%	0%	0%	0%	0%	0%	75%
Peak Hour	17:00	17:00	16:15	16:00	12:00	12:00	20:15	12:00	12:00	12:00	12:00	12:00	12:00	17:00
Peak Volume	239	410	356	282	112	19	2	0	0	0	0	0	0	1030
07:00 - 09:00	1	7	71	239	200	31	2	0	0	0	0	0	0	551
%	0%	0%	1%	4%	3%	0%	0%	0%	0%	0%	0%	0%	0%	8%
Peak Hour	7:30	7:00	8:00	7:30	7:30	7:00	7:45	7:00	7:00	7:00	7:00	7:00	7:00	7:30
Peak Volume	1	5	51	140	116	19	2	0	0	0	0	0	0	320
16:00 - 18:00	296	527	639	350	53	5	0	0	0	0	0	0	0	1870
%	5%	8%	10%	5%	1%	0%	0%	0%	0%	0%	0%	0%	0%	29%
Peak Hour	17:00	17:00	16:15	16:00	16:00	16:00	16:00	16:00	16:00	16:00	16:00	16:00	16:00	17:00
Peak Volume	239	410	356	282	44	3	0	0	0	0	0	0	0	1030

	SOUTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
00:00 - 12:00	12	44	403	1435	791	106	5	1	0	0	0	0	0	2797
%	0%	1%	6%	22%	12%	2%	0%	0%	0%	0%	0%	0%	0%	43%
Peak Hour	7:45	7:45	7:45	7:30	5:45	5:15	5:00	5:30	0:00	0:00	0:00	0:00	0:00	7:30
Peak Volume	4	21	142	306	159	35	2	1	0	0	0	0	0	586
12:00 - 24:00	30	48	397	1243	698	85	8	0	1	0	0	0	0	2510
%	0%	1%	6%	19%	11%	1%	0%	0%	0%	0%	0%	0%	0%	39%
Peak Hour	16:30	17:15	17:00	16:45	12:15	14:30	12:15	12:00	19:00	12:00	12:00	12:00	12:00	16:30
Peak Volume	10	10	84	169	102	15	2	0	1	0	0	0	0	333
07:00 - 09:00	4	26	228	557	246	18	1	0	0	0	0	0	0	1080
%	0%	0%	3%	9%	4%	0%	0%	0%	0%	0%	0%	0%	0%	17%
Peak Hour	7:45	7:45	7:45	7:30	7:00	8:00	7:00	7:00	7:00	7:00	7:00	7:00	7:00	7:30
Peak Volume	4	21	142	306	137	11	1	0	0	0	0	0	0	586
16:00 - 18:00	13	11	147	308	129	13	1	0	0	0	0	0	0	622
%	0%	0%	2%	5%	2%	0%	0%	0%	0%	0%	0%	0%	0%	10%
Peak Hour	16:30	16:30	17:00	16:45	16:15	17:00	16:00	16:00	16:00	16:00	16:00	16:00	16:00	16:30
Peak Volume	10	9	84	169	87	7	1	0	0	0	0	0	0	333

	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
00:00 - 12:00	25	68	572	2129	1386	204	15	2	0	0	0	0	0	4401
%	0%	1%	9%	33%	21%	3%	0%	0%	0%	0%	0%	0%	0%	68%
Peak Hour	9:00	7:45	7:45	7:30	6:45	5:15	5:15	5:30	0:00	0:00	0:00	0:00	0:00	7:30
Peak Volume	8	25	192	446	245	50	4	1	0	0	0	0	0	906
12:00 - 24:00	407	815	1845	2858	1316	168	12	0	1	0	0	0	0	7422
%	6%	13%	28%	44%	20%	3%	0%	0%	0%	0%	0%	0%	0%	114%
Peak Hour	17:00	17:00	16:45	16:00	12:00	12:00	14:15	12:00	19:00	12:00	12:00	12:00	12:00	16:45
Peak Volume	245	417	429	430	210	29	3	0	1	0	0	0	0	1349
07:00 - 09:00	5	33	299	796	446	49	3	0	0	0	0	0	0	1631
%	0%	1%	5%	12%	7%	1%	0%	0%	0%	0%	0%	0%	0%	25%
Peak Hour	7:45	7:45	7:45	7:30	7:00	7:00	7:45	7:00	7:00	7:00	7:00	7:00	7:00	7:30
Peak Volume	5	25	192	446	245	26	2	0	0	0	0	0	0	906
16:00 - 18:00	309	538	786	658	182	18	1	0	0	0	0	0	0	2492
%	5%	8%	12%	10%	3%	0%	0%	0%	0%	0%	0%	0%	0%	38%
Peak Hour	17:00	17:00	16:45	16:00	16:00	16:00	16:00	16:00	16:00	16:00	16:00	16:00	16:00	16:45
Peak Volume	245	417	429	430	129	9	1	0	0	0	0	0	0	1349

Direction	Percentiles 15th	50th	Average	85th	95th	ADT
NORTHBOUND	20	26	26	32	34	6516
SOUTHBOUND	25	29	29	32	35	5307
TOTALS	22	28	27	32	35	11823

Direction	Pace 10mph Pace	# in Pace	% in Pace	Number of Vehicles >= 55 MPH	% of Vehicles >= 55 MPH
NORTHBOUND	23 - 32 mph	4139	64%	0	0%
SOUTHBOUND	24 - 33 mph	4409	83%	1	0%
TOTALS	24 - 33 mph	8471	72%	1	0%

Prepared by National Data & Surveying Services

SPEED

Middlesex Turnpike S/O Concord Rd

Day: Wednesday

Date: 7/23/2025

City: Billerica

Project #: MA25_430107_002

15-MINUTE BREAKDOWN

Time	NORTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	0	4	4	0	0	0	0	0	0	0	0	**8**
0:15	0	1	1	0	3	0	0	0	0	0	0	0	0	**5**
0:30	0	1	2	3	0	1	0	0	0	0	0	0	0	**7**
0:45	0	0	0	1	4	0	0	0	0	0	0	0	0	**5**
1:00	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
1:15	0	0	0	0	2	0	0	0	0	0	0	0	0	**2**
1:30	0	0	0	4	2	0	0	0	0	0	0	0	0	**6**
1:45	0	0	1	1	5	1	0	0	0	0	0	0	0	**8**
2:00	0	0	0	2	1	0	0	0	0	0	0	0	0	**3**
2:15	0	0	0	2	0	0	0	0	0	0	0	0	0	**2**
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:45	0	0	0	2	0	0	0	0	0	0	0	0	0	**2**
3:00	1	0	1	0	0	0	0	0	0	0	0	0	0	**2**
3:15	0	0	0	2	1	1	0	0	0	0	0	0	0	**4**
3:30	0	0	0	3	1	1	0	0	0	0	0	0	0	**5**
3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
4:15	0	0	0	2	2	0	1	0	0	0	0	0	0	**5**
4:30	0	0	0	4	3	1	0	0	0	0	0	0	0	**8**
4:45	0	0	0	5	7	3	0	0	0	0	0	0	0	**15**
5:00	1	0	4	9	9	2	0	0	0	0	0	0	0	**25**
5:15	0	0	0	5	7	3	0	0	0	0	0	0	0	**15**
5:30	0	0	3	6	10	3	0	0	0	0	0	0	0	**22**
5:45	0	0	2	7	13	3	1	0	0	0	0	0	0	**26**
6:00	0	0	2	12	15	6	1	0	0	0	0	0	0	**36**
6:15	0	0	1	14	17	3	0	0	0	0	0	0	0	**35**
6:30	1	0	2	26	19	5	0	0	0	0	0	0	0	**53**
6:45	0	0	4	31	18	1	0	0	0	0	0	0	0	**54**
7:00	0	3	6	16	24	2	0	0	0	0	0	0	0	**51**
7:15	0	0	7	25	17	8	0	0	0	0	0	0	0	**57**
7:30	0	0	2	33	40	6	0	0	0	0	0	0	0	**81**
7:45	0	2	5	39	27	3	0	0	0	0	0	0	0	**76**
8:00	0	1	15	39	26	1	0	0	0	0	0	0	0	**82**
8:15	1	1	22	29	23	4	1	0	0	0	0	0	0	**81**
8:30	0	0	8	28	16	4	1	0	0	0	0	0	0	**57**
8:45	0	0	6	30	27	3	0	0	0	0	0	0	0	**66**
9:00	0	3	6	32	12	5	1	0	0	0	0	0	0	**59**
9:15	0	1	11	23	22	4	1	0	0	0	0	0	0	**62**
9:30	1	0	9	33	23	2	0	0	0	0	0	0	0	**68**
9:45	6	7	7	24	11	0	0	0	0	0	0	0	0	**55**
10:00	0	0	2	22	16	3	0	1	0	0	0	0	0	**44**
10:15	0	2	0	21	23	1	0	0	0	0	0	0	0	**47**
10:30	1	1	7	11	26	8	0	0	0	0	0	0	0	**54**
10:45	0	0	11	33	16	2	0	0	0	0	0	0	0	**62**
11:00	0	1	10	26	15	1	0	0	0	0	0	0	0	**53**
11:15	1	0	4	30	28	2	0	0	0	0	0	0	0	**65**
11:30	0	0	3	29	23	3	2	0	0	0	0	0	0	**60**
11:45	0	0	5	24	37	2	1	0	0	0	0	0	0	**69**

Time	SOUTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	3	1	5	0	1	0	0	0	0	0	0	**10**
0:15	0	0	1	5	2	0	0	0	0	0	0	0	0	**8**
0:30	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
0:45	0	0	0	2	0	0	0	0	0	0	0	0	0	**2**
1:00	0	0	0	2	0	0	0	0	0	0	0	0	0	**2**
1:15	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
1:30	0	0	0	1	1	0	0	0	0	0	0	0	0	**2**
1:45	1	0	1	1	1	1	0	0	0	0	0	0	0	**5**
2:00	0	0	1	2	2	0	0	0	0	0	0	0	0	**5**
2:15	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:30	0	0	1	0	0	1	0	0	0	0	0	0	0	**2**
2:45	0	1	2	4	1	0	0	0	0	0	0	0	0	**8**
3:00	0	0	0	2	1	1	0	0	0	0	0	0	0	**4**
3:15	0	0	2	2	0	1	0	0	0	0	0	0	0	**5**
3:30	0	0	0	1	1	0	0	0	0	0	0	0	0	**2**
3:45	0	0	0	4	0	0	0	0	0	0	0	0	0	**4**
4:00	1	1	0	0	2	1	0	0	0	0	0	0	0	**5**
4:15	0	0	0	3	6	1	0	0	0	0	0	0	0	**10**
4:30	0	0	0	6	12	1	0	0	0	0	0	0	0	**19**
4:45	0	0	5	6	20	3	0	0	0	0	0	0	0	**34**
5:00	0	2	4	13	9	2	0	0	0	0	0	0	0	**30**
5:15	0	0	2	14	17	14	1	0	0	0	0	0	0	**48**
5:30	2	0	4	58	34	5	0	0	0	0	0	0	0	**103**
5:45	0	0	13	69	57	7	1	0	0	0	0	0	0	**147**
6:00	0	0	0	43	33	9	0	0	0	0	0	0	0	**85**
6:15	1	0	0	37	33	7	1	1	0	0	0	0	0	**80**
6:30	0	0	8	69	36	6	0	0	0	0	0	0	0	**119**
6:45	0	0	8	71	36	5	0	0	0	0	0	0	0	**120**
7:00	0	1	17	83	34	0	0	0	0	0	0	0	0	**135**
7:15	0	4	19	51	44	5	1	0	0	0	0	0	0	**124**
7:30	0	0	32	56	32	2	0	0	0	0	0	0	0	**122**
7:45	2	13	52	69	27	0	0	0	0	0	0	0	0	**163**
8:00	1	0	29	82	26	1	0	0	0	0	0	0	0	**139**
8:15	0	7	28	99	26	2	0	0	0	0	0	0	0	**162**
8:30	1	1	33	56	20	5	0	0	0	0	0	0	0	**116**
8:45	0	0	18	61	37	3	0	0	0	0	0	0	0	**119**
9:00	0	1	22	42	36	3	0	0	0	0	0	0	0	**104**
9:15	1	3	11	69	17	1	0	0	0	0	0	0	0	**102**
9:30	0	1	13	49	13	1	0	0	0	0	0	0	0	**77**
9:45	0	6	12	29	12	3	0	0	0	0	0	0	0	**62**
10:00	0	0	5	24	21	2	0	0	0	0	0	0	0	**52**
10:15	0	0	2	34	21	0	0	0	0	0	0	0	0	**57**
10:30	0	0	11	28	22	1	0	0	0	0	0	0	0	**62**
10:45	0	0	13	34	17	0	0	0	0	0	0	0	0	**64**
11:00	0	3	14	37	11	4	0	0	0	0	0	0	0	**69**
11:15	1	0	2	33	18	4	0	0	0	0	0	0	0	**58**
11:30	1	0	11	46	10	0	0	0	0	0	0	0	0	**68**
11:45	0	0	4	37	36	4	0	0	0	0	0	0	0	**81**

Time	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	3	5	9	0	1	0	0	0	0	0	0	**18**
0:15	0	1	2	5	5	0	0	0	0	0	0	0	0	**13**
0:30	0	1	2	3	1	1	0	0	0	0	0	0	0	**8**
0:45	0	0	0	3	4	0	0	0	0	0	0	0	0	**7**
1:00	0	0	0	3	0	0	0	0	0	0	0	0	0	**3**
1:15	0	0	0	0	3	0	0	0	0	0	0	0	0	**3**
1:30	0	0	0	5	3	0	0	0	0	0	0	0	0	**8**
1:45	1	0	2	2	6	2	0	0	0	0	0	0	0	**13**
2:00	0	0	1	4	3	0	0	0	0	0	0	0	0	**8**
2:15	0	0	0	2	0	0	0	0	0	0	0	0	0	**2**
2:30	0	0	1	0	0	1	0	0	0	0	0	0	0	**2**
2:45	0	1	2	6	1	0	0	0	0	0	0	0	0	**10**
3:00	1	0	1	2	1	1	0	0	0	0	0	0	0	**6**
3:15	0	0	2	4	1	2	0	0	0	0	0	0	0	**9**
3:30	0	0	0	4	2	1	0	0	0	0	0	0	0	**7**
3:45	0	0	0	4	0	0	0	0	0	0	0	0	0	**4**
4:00	1	1	0	1	2	1	0	0	0	0	0	0	0	**6**
4:15	0	0	0	5	8	1	1	0	0	0	0	0	0	**15**
4:30	0	0	0	10	15	2	0	0	0	0	0	0	0	**27**
4:45	0	0	5	11	27	6	0	0	0	0	0	0	0	**49**
5:00	1	2	8	22	18	4	0	0	0	0	0	0	0	**55**
5:15	0	0	2	19	24	17	1	0	0	0	0	0	0	**63**
5:30	2	0	7	64	44	8	0	0	0	0	0	0	0	**125**
5:45	0	0	15	76	70	10	2	0	0	0	0	0	0	**173**
6:00	0	0	2	55	48	15	1	0	0	0	0	0	0	**121**
6:15	1	0	1	51	50	10	1	1	0	0	0	0	0	**115**
6:30	1	0	10	95	55	11	0	0	0	0	0	0	0	**172**
6:45	0	0	12	102	54	6	0	0	0	0	0	0	0	**174**
7:00	0	4	23	99	58	2	0	0	0	0	0	0	0	**186**
7:15	0	4	26	76	61	13	1	0	0	0	0	0	0	**181**
7:30	0	0	34	89	72	8	0	0	0	0	0	0	0	**203**
7:45	2	15	57	108	54	3	0	0	0	0	0	0	0	**239**
8:00	1	1	44	121	52	2	0	0	0	0	0	0	0	**221**
8:15	1	8	50	128	49	6	1	0	0	0	0	0	0	**243**
8:30	1	1	41	84	36	9	1	0	0	0	0	0	0	**173**
8:45	0	0	24	91	64	6	0	0	0	0	0	0	0	**185**
9:00	0	4	28	74	48	8	1	0	0	0	0	0	0	**163**
9:15	1	4	22	92	39	5	1	0	0	0	0	0	0	**164**
9:30	1	1	22	82	36	3	0	0	0	0	0	0	0	**145**
9:45	6	13	19	53	23	3	0	0	0	0	0	0	0	**117**
10:00	0	0	7	46	37	5	0	1	0	0	0	0	0	**96**
10:15	0	2	2	55	44	1	0	0	0	0	0	0	0	**104**
10:30	1	1	18	39	48	9	0	0	0	0	0	0	0	**116**
10:45	0	0	24	67	33	2	0	0	0	0	0	0	0	**126**
11:00	0	4	24	63	26	5	0	0	0	0	0	0	0	**122**
11:15	2	0	6	63	46	6	0	0	0	0	0	0	0	**123**
11:30	1	0	14	75	33	3	2	0	0	0	0	0	0	**128**
11:45	0	0	9	61	73	6	1	0	0	0	0	0	0	**150**

Prepared by National Data & Surveying Services

SPEED

Middlesex Turnpike S/O Concord Rd

Day: Wednesday

Date: 7/23/2025

City: Billerica

Project #: MA25_430107_002

15-MINUTE BREAKDOWN

Time	NORTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
12:00	0	3	11	43	29	6	0	0	0	0	0	0	0	92
12:15	1	3	11	33	32	5	0	0	0	0	0	0	0	85
12:30	1	3	15	37	25	4	0	0	0	0	0	0	0	85
12:45	1	0	11	27	26	4	0	0	0	0	0	0	0	69
13:00	3	2	12	40	22	2	0	0	0	0	0	0	0	81
13:15	0	0	6	46	29	2	0	0	0	0	0	0	0	83
13:30	0	1	6	55	20	5	0	0	0	0	0	0	0	87
13:45	3	1	14	35	17	3	0	0	0	0	0	0	0	73
14:00	2	8	45	57	14	2	0	0	0	0	0	0	0	128
14:15	1	11	46	54	12	1	1	0	0	0	0	0	0	126
14:30	7	29	61	61	13	1	0	0	0	0	0	0	0	172
14:45	3	8	33	45	26	2	0	0	0	0	0	0	0	117
15:00	9	32	53	66	9	0	0	0	0	0	0	0	0	169
15:15	1	13	67	53	19	1	0	0	0	0	0	0	0	154
15:30	24	61	100	42	3	0	0	0	0	0	0	0	0	230
15:45	18	23	68	68	26	4	0	0	0	0	0	0	0	207
16:00	22	30	68	74	10	0	0	0	0	0	0	0	0	204
16:15	17	31	69	58	9	0	0	0	0	0	0	0	0	184
16:30	10	32	109	53	10	0	0	0	0	0	0	0	0	214
16:45	8	24	91	97	15	3	0	0	0	0	0	0	0	238
17:00	51	85	87	28	3	0	0	0	0	0	0	0	0	254
17:15	88	114	65	8	1	0	0	0	0	0	0	0	0	276
17:30	32	99	108	10	0	0	0	0	0	0	0	0	0	249
17:45	68	112	42	22	5	2	0	0	0	0	0	0	0	251
18:00	0	19	66	47	6	3	0	0	0	0	0	0	0	141
18:15	1	6	53	39	17	2	0	0	0	0	0	0	0	118
18:30	0	4	29	41	5	2	0	0	0	0	0	0	0	81
18:45	3	6	17	30	15	2	0	0	0	0	0	0	0	73
19:00	2	0	8	16	14	1	1	0	0	0	0	0	0	42
19:15	0	1	10	36	16	1	0	0	0	0	0	0	0	64
19:30	0	0	9	23	13	1	0	0	0	0	0	0	0	46
19:45	0	0	5	25	22	5	0	0	0	0	0	0	0	57
20:00	0	0	2	37	20	4	0	0	0	0	0	0	0	63
20:15	0	0	4	34	10	1	1	0	0	0	0	0	0	50
20:30	0	0	2	21	7	0	0	0	0	0	0	0	0	30
20:45	0	4	7	19	7	0	0	0	0	0	0	0	0	37
21:00	0	0	7	12	11	2	1	0	0	0	0	0	0	33
21:15	0	0	6	18	10	0	0	0	0	0	0	0	0	34
21:30	0	1	4	14	7	0	0	0	0	0	0	0	0	26
21:45	0	0	1	13	11	1	0	0	0	0	0	0	0	26
22:00	0	0	5	8	7	2	0	0	0	0	0	0	0	22
22:15	0	0	3	6	5	1	0	0	0	0	0	0	0	15
22:30	0	0	2	11	6	1	0	0	0	0	0	0	0	20
22:45	0	0	1	10	7	1	0	0	0	0	0	0	0	19
23:00	0	0	3	11	1	0	0	0	0	0	0	0	0	15
23:15	0	1	3	6	5	2	0	0	0	0	0	0	0	17
23:30	0	0	1	21	15	3	0	0	0	0	0	0	0	40
23:45	1	0	2	5	6	1	0	0	0	0	0	0	0	15
Totals	390	791	1,617	2,309	1,213	181	14	1	0	0	0	0	0	6,516
% of Totals	6%	12%	25%	35%	19%	3%	0%	0%	0%	0%	0%	0%	0%	100%

Time	SOUTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
12:00	0	3	15	43	19	2	0	0	0	0	0	0	0	82
12:15	0	0	5	36	30	6	0	0	0	0	0	0	0	77
12:30	3	2	5	55	32	1	0	0	0	0	0	0	0	98
12:45	1	3	14	28	17	1	0	0	0	0	0	0	0	64
13:00	0	0	6	30	23	5	2	0	0	0	0	0	0	66
13:15	1	3	13	26	27	4	0	0	0	0	0	0	0	74
13:30	1	1	19	39	20	3	0	0	0	0	0	0	0	83
13:45	0	1	12	40	22	0	0	0	0	0	0	0	0	75
14:00	0	0	13	30	17	1	0	0	0	0	0	0	0	61
14:15	0	2	7	29	14	1	0	0	0	0	0	0	0	53
14:30	0	0	5	36	15	5	1	0	0	0	0	0	0	62
14:45	1	0	6	27	9	3	0	0	0	0	0	0	0	46
15:00	0	1	8	31	28	2	1	0	0	0	0	0	0	71
15:15	0	0	7	37	21	5	0	0	0	0	0	0	0	70
15:30	1	4	21	35	16	0	1	0	0	0	0	0	0	78
15:45	0	1	5	20	22	2	0	0	0	0	0	0	0	50
16:00	1	0	14	31	15	3	0	0	0	0	0	0	0	64
16:15	1	1	14	37	26	1	1	0	0	0	0	0	0	81
16:30	1	1	20	36	17	1	0	0	0	0	0	0	0	76
16:45	4	2	15	44	27	1	0	0	0	0	0	0	0	93
17:00	1	0	21	41	17	1	0	0	0	0	0	0	0	81
17:15	4	6	17	45	10	1	0	0	0	0	0	0	0	83
17:30	0	0	25	39	9	2	0	0	0	0	0	0	0	75
17:45	1	1	21	35	8	3	0	0	0	0	0	0	0	69
18:00	3	3	14	30	12	1	0	0	0	0	0	0	0	63
18:15	0	0	13	34	6	0	0	0	0	0	0	0	0	53
18:30	2	4	6	30	6	2	0	0	0	0	0	0	0	50
18:45	0	0	3	22	15	2	0	0	0	0	0	0	0	42
19:00	0	2	8	27	15	3	0	0	0	0	0	0	0	55
19:15	1	0	1	25	20	1	1	0	0	0	0	0	0	49
19:30	0	0	4	16	17	2	0	0	0	0	0	0	0	39
19:45	1	0	0	12	16	6	0	0	1	0	0	0	0	36
20:00	0	0	6	24	12	1	0	0	0	0	0	0	0	43
20:15	0	0	1	12	12	1	0	0	0	0	0	0	0	26
20:30	0	1	2	10	14	0	1	0	0	0	0	0	0	28
20:45	0	1	3	22	12	0	0	0	0	0	0	0	0	38
21:00	0	1	3	11	9	0	0	0	0	0	0	0	0	24
21:15	1	3	3	27	7	0	0	0	0	0	0	0	0	41
21:30	1	0	4	10	7	1	0	0	0	0	0	0	0	23
21:45	0	1	0	17	7	2	0	0	0	0	0	0	0	27
22:00	0	0	4	14	7	1	0	0	0	0	0	0	0	26
22:15	0	0	1	8	7	1	0	0	0	0	0	0	0	17
22:30	0	0	1	9	6	1	0	0	0	0	0	0	0	17
22:45	0	0	5	2	6	1	0	0	0	0	0	0	0	14
23:00	0	0	2	13	5	0	0	0	0	0	0	0	0	20
23:15	0	0	2	11	13	4	0	0	0	0	0	0	0	30
23:30	0	0	2	4	3	0	0	0	0	0	0	0	0	9
23:45	0	0	1	3	3	1	0	0	0	0	0	0	0	8
Totals	42	92	800	2,678	1,489	191	13	1	1	0	0	0	0	5,307
% of Totals	1%	2%	15%	50%	28%	4%	0%	0%	0%	0%	0%	0%	0%	100%

Time	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
12:00	0	6	26	86	48	8	0	0	0	0	0	0	0	174
12:15	1	3	16	69	62	11	0	0	0	0	0	0	0	162
12:30	4	5	20	92	57	5	0	0	0	0	0	0	0	183
12:45	2	3	25	55	43	5	0	0	0	0	0	0	0	133
13:00	3	2	18	70	45	7	2	0	0	0	0	0	0	147
13:15	1	3	19	72	56	6	0	0	0	0	0	0	0	157
13:30	1	2	25	94	40	8	0	0	0	0	0	0	0	170
13:45	3	2	26	75	39	3	0	0	0	0	0	0	0	148
14:00	2	8	58	87	31	3	0	0	0	0	0	0	0	189
14:15	1	13	53	83	26	2	1	0	0	0	0	0	0	179
14:30	7	29	66	97	28	6	1	0	0	0	0	0	0	234
14:45	4	8	39	72	35	5	0	0	0	0	0	0	0	163
15:00	9	33	61	97	37	2	1	0	0	0	0	0	0	240
15:15	1	13	74	90	40	6	0	0	0	0	0	0	0	224
15:30	25	65	121	77	19	0	1	0	0	0	0	0	0	308
15:45	18	24	73	88	48	6	0	0	0	0	0	0	0	257
16:00	23	30	82	105	25	3	0	0	0	0	0	0	0	268
16:15	18	32	83	95	35	1	1	0	0	0	0	0	0	265
16:30	11	33	129	89	27	1	0	0	0	0	0	0	0	290
16:45	12	26	106	141	42	4	0	0	0	0	0	0	0	331
17:00	52	85	108	69	20	1	0	0	0	0	0	0	0	335
17:15	92	120	82	53	11	1	0	0	0	0	0	0	0	359
17:30	32	99	133	49	9	2	0	0	0	0	0	0	0	324
17:45	69	113	63	57	13	5	0	0	0	0	0	0	0	320
18:00	3	22	80	77	18	4	0	0	0	0	0	0	0	204
18:15	1	6	66	73	23	2	0	0	0	0	0	0	0	171
18:30	2	8	35	71	11	4	0	0	0	0	0	0	0	131
18:45	3	6	20	52	30	4	0	0	0	0	0	0	0	115
19:00	2	2	16	43	29	4	1	0	0	0	0	0	0	97
19:15	1	1	11	61	36	2	1	0	0	0	0	0	0	113
19:30	0	0	13	39	30	3	0	0	0	0	0	0	0	85
19:45	1	0	5	37	38	11	0	0	1	0	0	0	0	93
20:00	0	0	8	61	32	5	0	0	0	0	0	0	0	106
20:15	0	0	5	46	22	2	1	0	0	0	0	0	0	76
20:30	0	1	4	31	21	0	1	0	0	0	0	0	0	58
20:45	0	5	10	41	19	0	0	0	0	0	0	0	0	75
21:00	0	1	10	23	20	2	1	0	0	0	0	0	0	57
21:15	1	3	9	45	17	0	0	0	0	0	0	0	0	75
21:30	1	1	8	24	14	1	0	0	0	0	0	0	0	49
21:45	0	1	1	30	18	3	0	0	0	0	0	0	0	53
22:00	0	0	9	22	14	3	0	0	0	0	0	0	0	48
22:15	0	0	4	14	12	2	0	0	0	0	0	0	0	32
22:30	0	0	3	20	12	2	0	0	0	0	0	0	0	37
22:45	0	0	6	12	13	2	0	0	0	0	0	0	0	33
23:00	0	0	5	24	6	0	0	0	0	0	0	0	0	35
23:15	0	1	5	17	18	6	0	0	0	0	0	0	0	47
23:30	0	0	3	25	18	3	0	0	0	0	0	0	0	49
23:45	1	0	3	8	9	2	0	0	0	0	0	0	0	23
Totals	432	883	2,417	4,987	2,702	372	27	2	1	0	0	0	0	11,823
% of Totals	4%	7%	20%	42%	23%	3%	0%	0%	0%	0%	0%	0%	0%	100%

Prepared by National Data & Surveying Services

VOLUME

Middlesex Turnpike S/O Concord Rd

Day: Wednesday
Date: 7/23/2025

City: Billerica
Project #: MA25_430107_002

DAILY TOTALS	NB	SB	EB	WB	Total
	6,516	5,307	0	0	11,823

DAILY TOTALS

15-Minutes Interval

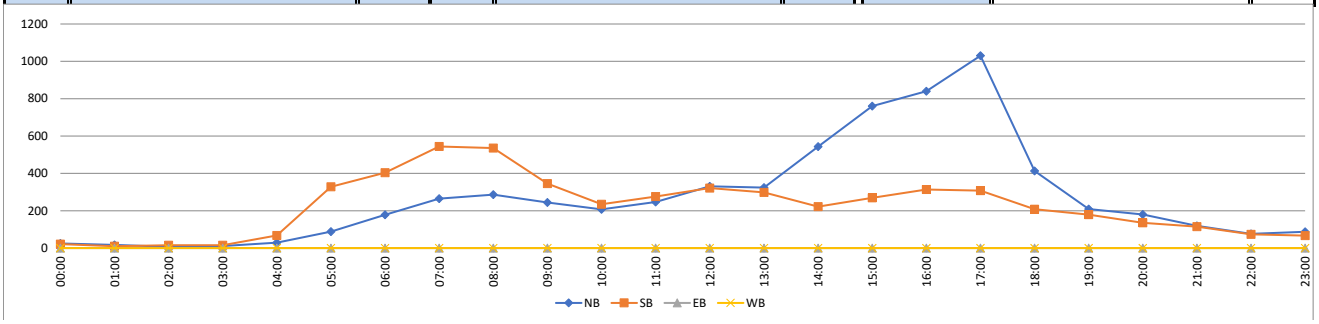
TIME	NB	SB	EB	WB	TOTAL	TIME	NB	SB	EB	WB	TOTAL
0:00	8	10			18	12:00	92	82			174
0:15	5	8			13	12:15	85	77			162
0:30	7	1			8	12:30	85	98			183
0:45	5	2			7	12:45	69	64			133
1:00	1	2			3	13:00	81	66			147
1:15	2	1			3	13:15	83	74			157
1:30	6	2			8	13:30	87	83			170
1:45	8	5			13	13:45	73	75			148
2:00	3	5			8	14:00	128	61			189
2:15	2	0			2	14:15	126	53			179
2:30	0	2			2	14:30	172	62			234
2:45	2	8			10	14:45	117	46			163
3:00	2	4			6	15:00	169	71			240
3:15	4	5			9	15:15	154	70			224
3:30	5	2			7	15:30	230	78			308
3:45	0	4			4	15:45	207	50			257
4:00	1	5			6	16:00	204	64			268
4:15	5	10			15	16:15	184	81			265
4:30	8	19			27	16:30	214	76			290
4:45	15	34			49	16:45	238	93			331
5:00	25	30			55	17:00	254	81			335
5:15	15	48			63	17:15	276	83			359
5:30	22	103			125	17:30	249	75			324
5:45	26	147			173	17:45	251	69			320
6:00	36	85			121	18:00	141	63			204
6:15	35	80			115	18:15	118	53			171
6:30	53	119			172	18:30	81	50			131
6:45	54	120			174	18:45	73	42			115
7:00	51	135			186	19:00	42	55			97
7:15	57	124			181	19:15	64	49			113
7:30	81	122			203	19:30	46	39			85
7:45	76	163			239	19:45	57	36			93
8:00	82	139			221	20:00	63	43			106
8:15	81	162			243	20:15	50	26			76
8:30	57	116			173	20:30	30	28			58
8:45	66	119			185	20:45	37	38			75
9:00	59	104			163	21:00	33	24			57
9:15	62	102			164	21:15	34	41			75
9:30	68	77			145	21:30	26	23			49
9:45	55	62			117	21:45	26	27			53
10:00	44	52			96	22:00	22	26			48
10:15	47	57			104	22:15	15	17			32
10:30	54	62			116	22:30	20	17			37
10:45	62	64			126	22:45	19	14			33
11:00	53	69			122	23:00	15	20			35
11:15	65	58			123	23:15	17	30			47
11:30	60	68			128	23:30	40	9			49
11:45	69	81			150	23:45	15	8			23
TOTALS	1604	2797	0	0	4401	TOTALS	4912	2510	0	0	7422
SPLIT %	36%	64%	0%	0%	37%	SPLIT %	66%	34%	0%	0%	63%

Hourly Intervals

TIME		NB	SB	EB	WB	TOTAL
00:00	01:00	25	21			46
01:00	02:00	17	10			27
02:00	03:00	7	15			22
03:00	04:00	11	15			26
04:00	05:00	29	68			97
05:00	06:00	88	328			416
06:00	07:00	178	404			582
07:00	08:00	265	544			809
08:00	09:00	286	536			822
09:00	10:00	244	345			589
10:00	11:00	207	235			442
11:00	12:00	247	276			523
12:00	13:00	331	321			652
13:00	14:00	324	298			622
14:00	15:00	543	222			765
15:00	16:00	760	269			1029
16:00	17:00	840	314			1154
17:00	18:00	1030	308			1338
18:00	19:00	413	208			621
19:00	20:00	209	179			388
20:00	21:00	180	135			315
21:00	22:00	119	115			234
22:00	23:00	76	74			150
23:00	00:00	87	67			154

STATISTICS

	NB	SB	EB	WB	TOTAL
Peak Period	00:00	to	12:00		
Volume	1604	2797			4401
Peak Hour	7:30	7:30			7:30
Peak Volume	320	586			906
Peak Hour Factor	0.976	0.899			0.932
Peak Period	12:00	to	00:00		
Volume	4912	2510			7422
Peak Hour	17:00	16:30			16:45
Peak Volume	1030	333			1349
Peak Hour Factor	0.933	0.895			0.939
Peak Period	07:00	to	09:00		
Volume	551	1080			1631
Peak Hour	7:30	7:30			7:30
Peak Volume	320	586			906
Peak Hour Factor	0.976	0.899			0.932
Peak Period	16:00	to	18:00		
Volume	1870	622			2492
Peak Hour	17:00	16:30			16:45
Peak Volume	1030	333			1349
Peak Hour Factor	0.933	0.895			0.939



Prepared by National Data & Surveying Services

SPEED

Middlesex Turnpike S/O Concord Rd

Day: Thursday

Date: 7/24/2025

City: Billerica

Project #: MA25_430107_002

HOURLY BREAKDOWN

Time	NORTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	1	6	13	7	3	1	0	0	0	0	0	0	31
1:00	0	1	0	6	6	1	0	0	0	0	0	0	0	14
2:00	0	0	1	3	1	1	0	0	0	0	0	0	0	6
3:00	0	0	0	2	3	5	0	0	0	0	0	0	0	10
4:00	0	0	5	12	13	3	0	0	0	0	0	0	0	33
5:00	1	0	4	29	29	10	3	0	0	0	0	0	0	76
6:00	2	3	12	62	78	9	1	0	0	0	0	0	0	167
7:00	3	14	99	86	54	6	1	0	0	0	0	0	0	263
8:00	3	4	78	123	53	1	1	0	0	0	0	0	0	263
9:00	5	8	53	128	44	7	3	0	0	0	0	0	0	248
10:00	3	5	46	111	60	5	0	0	0	0	0	0	0	230
11:00	2	6	33	118	83	8	2	0	0	0	0	0	0	252
12:00	2	5	32	165	95	8	0	0	0	0	0	0	0	307
13:00	3	7	32	151	95	10	1	1	0	0	0	0	0	300
14:00	32	61	139	212	91	4	1	1	0	0	0	0	0	541
15:00	41	45	218	349	79	6	0	0	0	0	0	0	0	738
16:00	70	87	272	362	116	9	0	0	0	0	0	0	0	916
17:00	19	59	217	377	118	5	0	0	0	0	0	0	0	795
18:00	2	3	31	180	109	13	2	0	0	0	0	0	0	340
19:00	0	2	29	140	79	9	3	1	0	0	0	0	0	263
20:00	0	1	28	84	46	5	1	0	0	0	0	0	0	165
21:00	0	1	22	57	34	9	0	0	0	0	0	0	0	123
22:00	0	0	13	36	21	5	0	0	0	0	0	0	0	75
23:00	0	1	10	52	24	9	1	0	0	0	0	0	0	97
Totals	188	314	1,380	2,858	1,338	151	21	3	0	0	0	0	0	6,253
% of Totals	3%	5%	22%	46%	21%	2%	0%	0%						100%

Time	SOUTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	7	13	3	1	0	0	0	0	0	0	0	24
1:00	0	0	1	8	2	2	0	0	0	0	0	0	0	13
2:00	1	0	1	6	4	6	0	0	0	0	0	0	0	18
3:00	0	0	1	4	7	0	1	0	0	0	0	0	0	13
4:00	0	0	2	17	33	13	4	0	0	0	0	0	0	69
5:00	1	2	24	105	155	20	4	3	0	0	0	0	0	314
6:00	2	4	24	162	175	35	1	0	0	0	0	0	0	403
7:00	90	120	61	154	91	10	0	0	0	0	0	0	0	526
8:00	95	98	132	201	52	0	0	0	0	0	0	0	0	578
9:00	7	3	33	211	102	8	0	0	0	0	0	0	0	364
10:00	1	4	25	116	88	6	0	0	0	0	0	0	0	240
11:00	1	1	25	123	96	16	1	0	0	0	0	0	0	263
12:00	1	6	30	98	128	11	0	0	0	0	0	0	0	274
13:00	4	4	40	123	105	9	1	0	0	0	0	0	0	286
14:00	0	1	42	145	92	9	1	0	0	0	0	0	0	290
15:00	3	5	24	123	117	11	0	0	0	0	0	0	0	283
16:00	1	0	17	116	110	12	0	1	0	0	0	0	0	257
17:00	0	3	24	136	128	9	2	0	0	0	0	0	0	302
18:00	0	3	24	105	92	19	1	0	0	0	0	0	0	244
19:00	0	0	10	59	86	11	3	0	2	0	0	0	0	171
20:00	5	1	14	75	47	9	2	0	0	0	0	0	0	153
21:00	2	0	9	48	34	5	1	0	0	0	0	0	0	99
22:00	2	0	8	33	32	2	0	0	0	0	0	0	0	77
23:00	2	0	9	32	28	8	1	0	0	1	0	0	0	81
Totals	218	255	587	2,213	1,807	232	23	4	2	1	0	0	0	5,342
% of Totals	4%	5%	11%	41%	34%	4%	0%	0%	0%	0%				100%

Time	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	1	13	26	10	4	1	0	0	0	0	0	0	55
1:00	0	1	1	14	8	3	0	0	0	0	0	0	0	27
2:00	1	0	2	9	5	7	0	0	0	0	0	0	0	24
3:00	0	0	1	6	10	5	1	0	0	0	0	0	0	23
4:00	0	0	7	29	46	16	4	0	0	0	0	0	0	102
5:00	2	2	28	134	184	30	7	3	0	0	0	0	0	390
6:00	4	7	36	224	253	44	2	0	0	0	0	0	0	570
7:00	93	134	160	240	145	16	1	0	0	0	0	0	0	789
8:00	98	102	210	324	105	1	1	0	0	0	0	0	0	841
9:00	12	11	86	339	146	15	3	0	0	0	0	0	0	612
10:00	4	9	71	227	148	11	0	0	0	0	0	0	0	470
11:00	3	7	58	241	179	24	3	0	0	0	0	0	0	515
12:00	3	11	62	263	223	19	0	0	0	0	0	0	0	581
13:00	7	11	72	274	200	19	2	1	0	0	0	0	0	586
14:00	32	62	181	357	183	13	2	1	0	0	0	0	0	831
15:00	44	50	242	472	196	17	0	0	0	0	0	0	0	1021
16:00	71	87	289	478	226	21	0	1	0	0	0	0	0	1173
17:00	19	62	241	513	246	14	2	0	0	0	0	0	0	1097
18:00	2	6	55	285	201	32	3	0	0	0	0	0	0	584
19:00	0	2	39	199	165	20	6	1	2	0	0	0	0	434
20:00	5	2	42	159	93	14	3	0	0	0	0	0	0	318
21:00	2	1	31	105	68	14	1	0	0	0	0	0	0	222
22:00	2	0	21	69	53	7	0	0	0	0	0	0	0	152
23:00	2	1	19	84	52	17	2	0	0	1	0	0	0	178
Totals	406	569	1,967	5,071	3,145	383	44	7	2	1	0	0	0	11,595
% of Totals	4%	5%	17%	44%	27%	3%	0%	0%	0%	0%				100%

STATISTICS

	NORTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
00:00 - 12:00	19	42	337	693	431	59	12	0	0	0	0	0	0	1593
%	0%	1%	5%	11%	7%	1%	0%	0%	0%	0%	0%	0%	0%	25%
Peak Hour	7:30	7:00	7:30	11:30	11:45	4:45	4:30	0:00	0:00	0:00	0:00	0:00	0:00	11:30
Peak Volume	5	14	137	158	91	11	3	0	0	0	0	0	0	298
12:00 - 24:00	169	272	1043	2165	907	92	9	3	0	0	0	0	0	4660
%	3%	4%	17%	35%	15%	1%	0%	0%	0%	0%	0%	0%	0%	75%
Peak Hour	15:45	16:00	15:30	16:30	16:15	18:30	18:30	13:00	12:00	12:00	12:00	12:00	12:00	16:15
Peak Volume	76	87	275	413	134	14	3	1	0	0	0	0	0	923
07:00 - 09:00	6	18	177	209	107	7	2	0	0	0	0	0	0	526
%	0%	0%	3%	3%	2%	0%	0%	0%	0%	0%	0%	0%	0%	8%
Peak Hour	7:30	7:00	7:30	8:00	7:00	7:00	7:00	7:00	7:00	7:00	7:00	7:00	7:00	7:30
Peak Volume	5	14	137	123	54	6	1	0	0	0	0	0	0	291
16:00 - 18:00	89	146	489	739	234	14	0	0	0	0	0	0	0	1711
%	1%	2%	8%	12%	4%	0%	0%	0%	0%	0%	0%	0%	0%	27%
Peak Hour	16:00	16:00	16:00	16:30	16:15	16:00	16:00	16:00	16:00	16:00	16:00	16:00	16:00	16:15
Peak Volume	70	87	272	413	134	9	0	0	0	0	0	0	0	923

	SOUTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
00:00 - 12:00	198	232	336	1120	808	117	11	3	0	0	0	0	0	2825
%	3%	4%	5%	18%	13%	2%	0%	0%	0%	0%	0%	0%	0%	45%
Peak Hour	7:30	7:30	7:45	8:30	5:30	5:45	4:45	5:00	0:00	0:00	0:00	0:00	0:00	7:45
Peak Volume	184	205	137	267	201	44	5	3	0	0	0	0	0	599
12:00 - 24:00	20	23	251	1093	999	115	12	1	2	1	0	0	0	2517
%	0%	0%	4%	17%	16%	2%	0%	0%	0%	0%	0%	0%	0%	40%
Peak Hour	20:15	12:00	14:15	14:15	12:00	18:15	19:30	15:45	19:00	22:15	12:00	12:00	12:00	14:30
Peak Volume	6	6	48	147	128	20	5	1	2	1	0	0	0	309
07:00 - 09:00	185	218	193	355	143	10	0	0	0	0	0	0	0	1104
%	3%	3%	3%	6%	2%	0%	0%	0%	0%	0%	0%	0%	0%	18%
Peak Hour	7:30	7:30	7:45	8:00	7:00	7:00	7:00	7:00	7:00	7:00	7:00	7:00	7:00	7:45
Peak Volume	184	205	137	201	91	10	0	0	0	0	0	0	0	599
16:00 - 18:00	1	3	41	252	238	21	2	1	0	0	0	0	0	559
%	0%	0%	1%	4%	4%	0%	0%	0%	0%	0%	0%	0%	0%	9%
Peak Hour	16:00	17:00	16:15	17:00	17:00	16:15	17:00	16:00	16:00	16:00	16:00	16:00	16:00	17:00
Peak Volume	1	3	24	136	128	13	2	1	0	0	0	0	0	302

	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
00:00 - 12:00	217	274	673	1813	1239	176	23	3	0	0	0	0	0	4418
%	3%	4%	11%	29%	20%	3%	0%	0%	0%	0%	0%	0%	0%	71%
Peak Hour	7:30	7:30	7:30	8:30	5:45	5:45	4:45	5:00	0:00	0:00	0:00	0:00	0:00	7:45
Peak Volume	189	219	246	390	270	52	8	3	0	0	0	0	0	867
12:00 - 24:00	189	295	1294	3258	1906	207	21	4	2	1	0	0	0	7177
%	3%	5%	21%	52%	30%	3%	0%	0%	0%	0%	0%	0%	0%	115%
Peak Hour	15:45	16:15	16:45	16:30	16:30	18:15	19:30	13:00	19:00	22:15	12:00	12:00	12:00	16:30
Peak Volume	78	88	295	540	247	33	7	1	2	1	0	0	0	1207
07:00 - 09:00	191	236	370	564	250	17	2	0	0	0	0	0	0	1630
%	3%	4%	6%	9%	4%	0%	0%	0%	0%	0%	0%	0%	0%	26%
Peak Hour	7:30	7:30	7:30	8:00	7:00	7:00	7:00	7:00	7:00	7:00	7:00	7:00	7:00	7:45
Peak Volume	189	219	246	324	145	16	1	0	0	0	0	0	0	867
16:00 - 18:00	90	149	530	991	472	35	2	1	0	0	0	0	0	2270
%	1%	2%	8%	16%	8%	1%	0%	0%	0%	0%	0%	0%	0%	36%
Peak Hour	16:00	16:15	16:45	16:30	16:30	16:00	17:00	16:00	16:00	16:00	16:00	16:00	16:00	16:30
Peak Volume	71	88	295	540	247	21	2	1	0	0	0	0	0	1207

Direction	Percentiles 15th	50th	Average	85th	95th	ADT
NORTHBOUND	23	28	27	32	34	6253
SOUTHBOUND	24	29	28	33	35	5342
TOTALS	23	28	28	33	35	11595

Direction	Pace 10mph Pace	# in Pace	% in Pace	Number of Vehicles >= 55 MPH	% of Vehicles >= 55 MPH
NORTHBOUND	23 - 32 mph	4593	74%	0	0%
SOUTHBOUND	26 - 35 mph	4003	75%	1	0%
TOTALS	25 - 34 mph	8462	73%	1	0%

Prepared by National Data & Surveying Services

SPEED

Middlesex Turnpike S/O Concord Rd

Day: Thursday

Date: 7/24/2025

City: Billerica

Project #: MA25_430107_002

15-MINUTE BREAKDOWN

Time	NORTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	1	4	3	1	0	0	0	0	0	0	0	9
0:15	0	0	1	1	0	0	1	0	0	0	0	0	0	3
0:30	0	1	3	3	2	1	0	0	0	0	0	0	0	10
0:45	0	0	1	5	2	1	0	0	0	0	0	0	0	9
1:00	0	0	0	1	3	0	0	0	0	0	0	0	0	4
1:15	0	1	0	2	0	1	0	0	0	0	0	0	0	4
1:30	0	0	0	1	2	0	0	0	0	0	0	0	0	3
1:45	0	0	0	2	1	0	0	0	0	0	0	0	0	3
2:00	0	0	0	1	1	1	0	0	0	0	0	0	0	3
2:15	0	0	0	1	0	0	0	0	0	0	0	0	0	1
2:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45	0	0	1	1	0	0	0	0	0	0	0	0	0	2
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15	0	0	0	0	0	1	0	0	0	0	0	0	0	1
3:30	0	0	0	1	3	3	0	0	0	0	0	0	0	7
3:45	0	0	0	1	0	1	0	0	0	0	0	0	0	2
4:00	0	0	0	0	2	0	0	0	0	0	0	0	0	2
4:15	0	0	3	2	0	0	0	0	0	0	0	0	0	5
4:30	0	0	0	4	3	1	0	0	0	0	0	0	0	8
4:45	0	0	2	6	8	2	0	0	0	0	0	0	0	18
5:00	0	0	0	4	3	5	1	0	0	0	0	0	0	13
5:15	0	0	4	8	8	1	2	0	0	0	0	0	0	23
5:30	0	0	0	6	9	3	0	0	0	0	0	0	0	18
5:45	1	0	0	11	9	1	0	0	0	0	0	0	0	22
6:00	0	1	3	10	21	2	0	0	0	0	0	0	0	37
6:15	1	0	4	21	20	4	0	0	0	0	0	0	0	50
6:30	1	0	0	19	21	1	1	0	0	0	0	0	0	43
6:45	0	2	5	12	16	2	0	0	0	0	0	0	0	37
7:00	0	3	13	24	21	2	0	0	0	0	0	0	0	63
7:15	0	1	4	15	25	4	1	0	0	0	0	0	0	50
7:30	3	1	41	32	5	0	0	0	0	0	0	0	0	82
7:45	0	9	41	15	3	0	0	0	0	0	0	0	0	68
8:00	1	3	38	24	2	0	0	0	0	0	0	0	0	68
8:15	1	1	17	41	13	0	0	0	0	0	0	0	0	73
8:30	0	0	6	26	25	1	1	0	0	0	0	0	0	59
8:45	1	0	17	32	13	0	0	0	0	0	0	0	0	63
9:00	2	1	10	30	15	2	1	0	0	0	0	0	0	61
9:15	2	6	13	35	7	0	0	0	0	0	0	0	0	63
9:30	0	0	13	36	11	3	0	0	0	0	0	0	0	63
9:45	1	1	17	27	11	2	2	0	0	0	0	0	0	61
10:00	1	1	8	30	20	3	0	0	0	0	0	0	0	63
10:15	0	1	14	26	10	0	0	0	0	0	0	0	0	51
10:30	1	3	9	26	15	1	0	0	0	0	0	0	0	55
10:45	1	0	15	29	15	1	0	0	0	0	0	0	0	61
11:00	0	0	3	22	21	1	0	0	0	0	0	0	0	47
11:15	0	3	8	30	25	0	1	0	0	0	0	0	0	67
11:30	1	2	18	31	19	4	0	0	0	0	0	0	0	75
11:45	1	1	4	35	18	3	1	0	0	0	0	0	0	63

Time	SOUTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	2	5	0	0	0	0	0	0	0	0	0	7
0:15	0	0	2	7	2	1	0	0	0	0	0	0	0	12
0:30	0	0	3	1	1	0	0	0	0	0	0	0	0	5
0:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00	0	0	0	3	0	1	0	0	0	0	0	0	0	4
1:15	0	0	0	1	1	0	0	0	0	0	0	0	0	2
1:30	0	0	0	1	1	1	0	0	0	0	0	0	0	3
1:45	0	0	1	3	0	0	0	0	0	0	0	0	0	4
2:00	1	0	0	0	0	0	0	0	0	0	0	0	0	1
2:15	0	0	1	2	1	2	0	0	0	0	0	0	0	6
2:30	0	0	0	2	2	1	0	0	0	0	0	0	0	5
2:45	0	0	0	2	1	3	0	0	0	0	0	0	0	6
3:00	0	0	0	1	5	0	1	0	0	0	0	0	0	7
3:15	0	0	1	1	2	0	0	0	0	0	0	0	0	4
3:30	0	0	0	1	0	0	0	0	0	0	0	0	0	1
3:45	0	0	0	1	0	0	0	0	0	0	0	0	0	1
4:00	0	0	2	1	4	2	0	0	0	0	0	0	0	9
4:15	0	0	0	2	4	1	1	0	0	0	0	0	0	8
4:30	0	0	0	7	7	1	0	0	0	0	0	0	0	15
4:45	0	0	0	7	18	9	3	0	0	0	0	0	0	37
5:00	0	0	2	10	15	1	0	0	0	0	0	0	0	28
5:15	1	0	4	9	25	5	1	2	0	0	0	0	0	47
5:30	0	0	6	37	49	3	1	0	0	0	0	0	0	96
5:45	0	2	12	49	66	11	2	1	0	0	0	0	0	143
6:00	0	1	0	25	44	13	1	0	0	0	0	0	0	84
6:15	0	0	3	43	42	10	0	0	0	0	0	0	0	98
6:30	1	0	3	23	47	10	0	0	0	0	0	0	0	84
6:45	1	3	18	71	42	2	0	0	0	0	0	0	0	137
7:00	1	0	6	84	36	5	0	0	0	0	0	0	0	132
7:15	0	0	9	56	44	5	0	0	0	0	0	0	0	114
7:30	44	40	17	11	9	0	0	0	0	0	0	0	0	121
7:45	45	80	29	3	2	0	0	0	0	0	0	0	0	159
8:00	64	55	29	3	0	0	0	0	0	0	0	0	0	151
8:15	31	30	34	42	6	0	0	0	0	0	0	0	0	143
8:30	0	5	45	77	19	0	0	0	0	0	0	0	0	146
8:45	0	8	24	79	27	0	0	0	0	0	0	0	0	138
9:00	0	0	9	62	37	4	0	0	0	0	0	0	0	112
9:15	0	0	14	49	23	1	0	0	0	0	0	0	0	87
9:30	3	0	4	41	23	1	0	0	0	0	0	0	0	72
9:45	4	3	6	59	19	2	0	0	0	0	0	0	0	93
10:00	1	1	3	26	25	0	0	0	0	0	0	0	0	56
10:15	0	1	7	24	23	1	0	0	0	0	0	0	0	56
10:30	0	2	8	36	22	3	0	0	0	0	0	0	0	71
10:45	0	0	7	30	18	2	0	0	0	0	0	0	0	57
11:00	0	0	4	22	23	6	1	0	0	0	0	0	0	56
11:15	0	0	5	31	20	2	0	0	0	0	0	0	0	58
11:30	1	1	11	33	23	2	0	0	0	0	0	0	0	71
11:45	0	0	5	37	30	6	0	0	0	0	0	0	0	78

Time	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
0:00	0	0	3	9	3	1	0	0	0	0	0	0	0	16
0:15	0	0	3	8	2	1	1	0	0	0	0	0	0	15
0:30	0	1	6	4	3	1	0	0	0	0	0	0	0	15
0:45	0	0	1	5	2	1	0	0	0	0	0	0	0	9
1:00	0	0	0	4	3	1	0	0	0	0	0	0	0	8
1:15	0	1	0	3	1	1	0	0	0	0	0	0	0	6
1:30	0	0	0	2	3	1	0	0	0	0	0	0	0	6
1:45	0	0	1	5	1	0	0	0	0	0	0	0	0	7
2:00	1	0	0	1	1	1	0	0	0	0	0	0	0	4
2:15	0	0	1	3	1	2	0	0	0	0	0	0	0	7
2:30	0	0	0	2	2	1	0	0	0	0	0	0	0	5
2:45	0	0	1	3	1	3	0	0	0	0	0	0	0	8
3:00	0	0	0	1	5	0	1	0	0	0	0	0	0	7
3:15	0	0	1	1	2	1	0	0	0	0	0	0	0	5
3:30	0	0	0	2	3	3	0	0	0	0	0	0	0	8
3:45	0	0	0	2	0	1	0	0	0	0	0	0	0	3
4:00	0	0	2	1	6	2	0	0	0	0	0	0	0	11
4:15	0	0	3	4	4	1	1	0	0	0	0	0	0	13
4:30	0	0	0	11	10	2	0	0	0	0	0	0	0	23
4:45	0	0	2	13	26	11	3	0	0	0	0	0	0	55
5:00	0	0	2	14	18	6	1	0	0	0	0	0	0	41
5:15	1	0	8	17	33	6	3	2	0	0	0	0	0	70
5:30	0	0	6	43	58	6	1	0	0	0	0	0	0	114
5:45	1	2	12	60	75	12	2	1	0	0	0	0	0	165
6:00	0	2	3	35	65	15	1	0	0	0	0	0	0	121
6:15	1	0	7	64	62	14	0	0	0	0	0	0	0	148
6:30	2	0	3	42	68	11	1	0	0	0	0	0	0	127
6:45	1	5	23	83	58	4	0	0	0	0	0	0	0	174
7:00	1	3	19	108	57	7	0	0	0	0	0	0	0	195
7:15	0	1	13	71	69	9	1	0	0	0	0	0	0	164
7:30	47	41	58	43	14	0	0	0	0	0	0	0	0	203
7:45	45	89	70	18	5	0	0	0	0	0	0	0	0	227
8:00	65	58	67	27	2	0	0	0	0	0	0	0	0	219
8:15	32	31	51	83	19	0	0	0	0	0	0	0	0	216
8:30	0	5	51	103	44	1	1	0	0	0	0	0	0	205
8:45	1	8	41	111	40	0	0	0	0	0	0	0	0	201
9:00	2	1	19	92	52	6	1	0	0	0	0	0	0	173
9:15	2	6	27	84	30	1	0	0	0	0	0	0	0	150
9:30	3	0	17	77	34	4	0	0	0	0	0	0	0	135
9:45	5	4	23	86	30	4	2	0	0	0	0	0	0	154
10:00	2	2	11	56	45	3	0	0	0	0	0	0	0	119
10:15	0	2	21	50	33	1	0	0	0	0	0	0	0	107
10:30	1	5	17	62	37	4	0	0	0	0	0	0	0	126
10:45	1	0	22	59	33	3	0	0	0	0	0	0	0	118
11:00	0	0	7	44	44	7	1	0	0	0	0	0	0	103
11:15	0	3	13	61	45	2	1	0	0	0	0	0	0	125
11:30	2	3	29	64	42	6	0	0	0	0	0	0	0	146
11:45	1	1	9	72	48	9	1	0	0	0	0	0	0	141

Prepared by National Data & Surveying Services

SPEED

Middlesex Turnpike S/O Concord Rd

Day: Thursday

Date: 7/24/2025

City: Billerica

Project #: MA25_430107_002

15-MINUTE BREAKDOWN

Time	NORTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
12:00	0	3	6	46	17	0	0	0	0	0	0	0	0	72
12:15	0	1	11	46	29	1	0	0	0	0	0	0	0	88
12:30	1	1	6	30	27	4	0	0	0	0	0	0	0	69
12:45	1	0	9	43	22	3	0	0	0	0	0	0	0	78
13:00	2	4	8	37	17	2	0	0	0	0	0	0	0	70
13:15	0	0	6	35	22	3	1	0	0	0	0	0	0	67
13:30	0	2	8	52	20	2	0	0	0	0	0	0	0	84
13:45	1	1	10	27	36	3	0	1	0	0	0	0	0	79
14:00	9	20	39	46	10	0	0	0	0	0	0	0	0	124
14:15	0	2	26	50	27	2	1	0	0	0	0	0	0	108
14:30	23	25	42	50	29	2	0	0	0	0	0	0	0	171
14:45	0	14	32	66	25	0	0	1	0	0	0	0	0	138
15:00	1	2	33	98	17	2	0	0	0	0	0	0	0	153
15:15	8	15	48	69	27	1	0	0	0	0	0	0	0	168
15:30	11	14	81	100	23	1	0	0	0	0	0	0	0	230
15:45	21	14	56	82	12	2	0	0	0	0	0	0	0	187
16:00	25	26	68	85	20	4	0	0	0	0	0	0	0	228
16:15	15	27	70	71	31	2	0	0	0	0	0	0	0	216
16:30	15	14	56	113	36	1	0	0	0	0	0	0	0	235
16:45	15	20	78	93	29	2	0	0	0	0	0	0	0	237
17:00	9	25	66	96	38	1	0	0	0	0	0	0	0	235
17:15	2	12	64	111	22	1	0	0	0	0	0	0	0	212
17:30	8	19	64	89	25	2	0	0	0	0	0	0	0	207
17:45	0	3	23	81	33	1	0	0	0	0	0	0	0	141
18:00	2	1	11	67	32	1	1	0	0	0	0	0	0	115
18:15	0	0	11	56	24	2	0	0	0	0	0	0	0	93
18:30	0	2	3	31	32	3	1	0	0	0	0	0	0	72
18:45	0	0	6	26	21	7	0	0	0	0	0	0	0	60
19:00	0	2	8	36	23	1	1	1	0	0	0	0	0	72
19:15	0	0	12	37	20	3	1	0	0	0	0	0	0	73
19:30	0	0	3	31	18	2	1	0	0	0	0	0	0	55
19:45	0	0	6	36	18	3	0	0	0	0	0	0	0	63
20:00	0	1	6	17	10	2	1	0	0	0	0	0	0	37
20:15	0	0	8	19	17	1	0	0	0	0	0	0	0	45
20:30	0	0	11	24	9	1	0	0	0	0	0	0	0	45
20:45	0	0	3	24	10	1	0	0	0	0	0	0	0	38
21:00	0	1	8	16	7	2	0	0	0	0	0	0	0	34
21:15	0	0	3	24	11	2	0	0	0	0	0	0	0	40
21:30	0	0	4	10	5	3	0	0	0	0	0	0	0	22
21:45	0	0	7	7	11	2	0	0	0	0	0	0	0	27
22:00	0	0	6	7	3	0	0	0	0	0	0	0	0	16
22:15	0	0	4	9	4	3	0	0	0	0	0	0	0	20
22:30	0	0	0	12	10	1	0	0	0	0	0	0	0	23
22:45	0	0	3	8	4	1	0	0	0	0	0	0	0	16
23:00	0	0	1	13	5	1	1	0	0	0	0	0	0	21
23:15	0	1	2	9	3	1	0	0	0	0	0	0	0	16
23:30	0	0	2	21	12	6	0	0	0	0	0	0	0	41
23:45	0	0	5	9	4	1	0	0	0	0	0	0	0	19
Totals	188	314	1,380	2,858	1,338	151	21	3	0	0	0	0	0	6,253
% of Totals	3%	5%	22%	46%	21%	2%	0%	0%	0%	0%	0%	0%	0%	100%

Time	SOUTHBOUND 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
12:00	0	1	5	22	32	4	0	0	0	0	0	0	0	64
12:15	1	2	12	19	41	2	0	0	0	0	0	0	0	77
12:30	0	1	8	21	29	2	0	0	0	0	0	0	0	61
12:45	0	2	5	36	26	3	0	0	0	0	0	0	0	72
13:00	1	0	6	19	27	2	0	0	0	0	0	0	0	55
13:15	2	0	6	35	24	1	0	0	0	0	0	0	0	68
13:30	1	1	24	40	27	0	1	0	0	0	0	0	0	94
13:45	0	3	4	29	27	6	0	0	0	0	0	0	0	69
14:00	0	0	8	39	18	2	0	0	0	0	0	0	0	67
14:15	0	1	10	26	32	2	0	0	0	0	0	0	0	71
14:30	0	0	13	51	17	5	0	0	0	0	0	0	0	86
14:45	0	0	11	29	25	0	1	0	0	0	0	0	0	66
15:00	0	0	14	41	26	2	0	0	0	0	0	0	0	83
15:15	1	4	3	26	36	4	0	0	0	0	0	0	0	74
15:30	1	1	5	28	28	1	0	0	0	0	0	0	0	64
15:45	1	0	2	28	27	4	0	0	0	0	0	0	0	62
16:00	0	0	3	28	29	3	0	0	0	0	0	0	0	63
16:15	1	0	4	26	25	1	0	0	0	0	0	0	0	57
16:30	0	0	3	33	36	4	0	1	0	0	0	0	0	77
16:45	0	0	7	29	20	4	0	0	0	0	0	0	0	60
17:00	0	2	10	32	28	4	0	0	0	0	0	0	0	76
17:15	0	0	3	33	38	1	0	0	0	0	0	0	0	75
17:30	0	0	3	34	32	2	1	0	0	0	0	0	0	72
17:45	0	1	8	37	30	2	1	0	0	0	0	0	0	79
18:00	0	1	12	36	25	3	0	0	0	0	0	0	0	77
18:15	0	1	7	28	21	3	0	0	0	0	0	0	0	60
18:30	0	0	3	22	25	6	1	0	0	0	0	0	0	57
18:45	0	1	2	19	21	7	0	0	0	0	0	0	0	50
19:00	0	0	1	12	15	4	0	0	0	0	0	0	0	32
19:15	0	0	4	20	28	1	0	0	0	0	0	0	0	53
19:30	0	0	3	11	23	4	1	0	1	0	0	0	0	43
19:45	0	0	2	16	20	2	2	0	1	0	0	0	0	43
20:00	0	1	1	16	17	3	0	0	0	0	0	0	0	38
20:15	2	0	3	18	12	5	2	0	0	0	0	0	0	42
20:30	3	0	4	20	7	0	0	0	0	0	0	0	0	34
20:45	0	0	6	21	11	1	0	0	0	0	0	0	0	39
21:00	1	0	0	17	12	0	0	0	0	0	0	0	0	30
21:15	0	0	4	19	6	1	0	0	0	0	0	0	0	30
21:30	0	0	3	6	10	3	0	0	0	0	0	0	0	22
21:45	1	0	2	6	6	1	1	0	0	0	0	0	0	17
22:00	1	0	3	6	5	0	0	0	0	0	0	0	0	15
22:15	1	0	2	10	11	0	0	0	0	0	0	0	0	24
22:30	0	0	2	9	7	1	0	0	0	0	0	0	0	19
22:45	0	0	1	8	9	1	0	0	0	0	0	0	0	19
23:00	0	0	2	15	12	7	0	0	0	1	0	0	0	37
23:15	1	0	4	13	10	0	0	0	0	0	0	0	0	28
23:30	1	0	2	2	2	0	1	0	0	0	0	0	0	8
23:45	0	0	1	2	4	1	0	0	0	0	0	0	0	8
Totals	218	255	587	2,213	1,807	232	23	4	2	1	0	0	0	5,342
% of Totals	4%	5%	11%	41%	34%	4%	0%	0%	0%	0%	0%	0%	0%	100%

Time	TOTALS 5-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-99	Total
12:00	0	4	11	68	49	4	0	0	0	0	0	0	0	136
12:15	1	3	23	65	70	3	0	0	0	0	0	0	0	165
12:30	1	2	14	51	56	6	0	0	0	0	0	0	0	130
12:45	1	2	14	79	48	6	0	0	0	0	0	0	0	150
13:00	3	4	14	56	44	4	0	0	0	0	0	0	0	125
13:15	2	0	12	70	46	4	1	0	0	0	0	0	0	135
13:30	1	3	32	92	47	2	1	0	0	0	0	0	0	178
13:45	1	4	14	56	63	9	0	1	0	0	0	0	0	148
14:00	9	20	47	85	28	2	0	0	0	0	0	0	0	191
14:15	0	3	36	76	59	4	1	0	0	0	0	0	0	179
14:30	23	25	55	101	46	7	0	0	0	0	0	0	0	257
14:45	0	14	43	95	50	0	1	1	0	0	0	0	0	204
15:00	1	2	47	139	43	4	0	0	0	0	0	0	0	236
15:15	9	19	51	95	63	5	0	0	0	0	0	0	0	242
15:30	12	15	86	128	51	2	0	0	0	0	0	0	0	294
15:45	22	14	58	110	39	6	0	0	0	0	0	0	0	249
16:00	25	26	71	113	49	7	0	0	0	0	0	0	0	291
16:15	16	27	74	97	56	3	0	0	0	0	0	0	0	273
16:30	15	14	59	146	72	5	0	1	0	0	0	0	0	312
16:45	15	20	85	122	49	6	0	0	0	0	0	0	0	297
17:00	9	27	76	128	66	5	0	0	0	0	0	0	0	311
17:15	2	12	67	144	60	2	0	0	0	0	0	0	0	287
17:30	8	19	67	123	57	4	1	0	0	0	0	0	0	279
17:45	0	4	31	118	63	3	1	0	0	0	0	0	0	220
18:00	2	2	23	103	57	4	1	0	0	0	0	0	0	192
18:15	0	1	18	84	45	5	0	0	0	0	0	0	0	153
18:30	0	2	6	53	57	9	2	0	0	0	0	0	0	129
18:45	0	1	8	45	42	14	0	0	0	0	0	0	0	110
19:00	0	2	9	48	38	5	1	1	0	0	0	0	0	104
19:15	0	0	16	57	48	4	1	0	0	0	0	0	0	126
19:30	0	0	6	42	41	6	2	0	1	0	0	0	0	98
19:45	0	0	8	52	38	5	2	0	1	0	0	0	0	106
20:00	0	2	7	33	27	5	1	0	0	0	0	0	0	75
20:15	2	0	11	37	29	6	2	0	0	0	0	0	0	87
20:30	3	0	15	44	16	1	0	0	0	0	0	0	0	79
20:45	0	0	9	45	21	2	0	0	0	0	0	0	0	77
21:00	1	1	8	33	19	2	0	0	0	0	0	0	0	64
21:15	0	0	7	43	17	3	0	0	0	0	0	0	0	70
21:30	0	0	7	16	15	6	0	0	0	0	0	0	0	44
21:45	1	0	9	13	17	3	1	0	0	0	0	0	0	44
22:00	1	0	9	13	8	0	0	0	0	0	0	0	0	31
22:15	1	0	6	19	15	3	0	0	0	0	0	0	0	44
22:30	0	0	2	21	17	2	0	0	0	0	0	0	0	42
22:45	0	0	4	16	13	2	0	0	0	0	0	0	0	35
23:00	0	0	3	28	17	8	1	0	0	1	0	0	0	58
23:15	1	1	6	22	13	1	0	0	0	0	0	0	0	44
23:30	1	0	4	23	14	6	1	0	0	0	0	0	0	49
23:45	0	0	6	11	8	2	0	0	0	0	0	0	0	27
Totals	406	569	1,967	5,071	3,145	383	44	7	2	1	0	0	0	11,595
% of Totals	4%	5%	17%	44%	27%	3%	0%	0%	0%	0%	0%	0%	0%	100%

Prepared by National Data & Surveying Services

VOLUME

Middlesex Turnpike S/O Concord Rd

Day: Thursday
Date: 7/24/2025

City: Billerica
Project #: MA25_430107_002

DAILY TOTALS	NB	SB	EB	WB	Total
	6,253	5,342	0	0	11,595

15-Minutes Interval

TIME	NB	SB	EB	WB	TOTAL	TIME	NB	SB	EB	WB	TOTAL
0:00	9	7			16	12:00	72	64			136
0:15	3	12			15	12:15	88	77			165
0:30	10	5			15	12:30	69	61			130
0:45	9	0			9	12:45	78	72			150
1:00	4	4			8	13:00	70	55			125
1:15	4	2			6	13:15	67	68			135
1:30	3	3			6	13:30	84	94			178
1:45	3	4			7	13:45	79	69			148
2:00	3	1			4	14:00	124	67			191
2:15	1	6			7	14:15	108	71			179
2:30	0	5			5	14:30	171	86			257
2:45	2	6			8	14:45	138	66			204
3:00	0	7			7	15:00	153	83			236
3:15	1	4			5	15:15	168	74			242
3:30	7	1			8	15:30	230	64			294
3:45	2	1			3	15:45	187	62			249
4:00	2	9			11	16:00	228	63			291
4:15	5	8			13	16:15	216	57			273
4:30	8	15			23	16:30	235	77			312
4:45	18	37			55	16:45	237	60			297
5:00	13	28			41	17:00	235	76			311
5:15	23	47			70	17:15	212	75			287
5:30	18	96			114	17:30	207	72			279
5:45	22	143			165	17:45	141	79			220
6:00	37	84			121	18:00	115	77			192
6:15	50	98			148	18:15	93	60			153
6:30	43	84			127	18:30	72	57			129
6:45	37	137			174	18:45	60	50			110
7:00	63	132			195	19:00	72	32			104
7:15	50	114			164	19:15	73	53			126
7:30	82	121			203	19:30	55	43			98
7:45	68	159			227	19:45	63	43			106
8:00	68	151			219	20:00	37	38			75
8:15	73	143			216	20:15	45	42			87
8:30	59	146			205	20:30	45	34			79
8:45	63	138			201	20:45	38	39			77
9:00	61	112			173	21:00	34	30			64
9:15	63	87			150	21:15	40	30			70
9:30	63	72			135	21:30	22	22			44
9:45	61	93			154	21:45	27	17			44
10:00	63	56			119	22:00	16	15			31
10:15	51	56			107	22:15	20	24			44
10:30	55	71			126	22:30	23	19			42
10:45	61	57			118	22:45	16	19			35
11:00	47	56			103	23:00	21	37			58
11:15	67	58			125	23:15	16	28			44
11:30	75	71			146	23:30	41	8			49
11:45	63	78			141	23:45	19	8			27
TOTALS	1593	2825	0	0	4418	TOTALS	4660	2517	0	0	7177
SPLIT %	36%	64%	0%	0%	38%	SPLIT %	65%	35%	0%	0%	62%

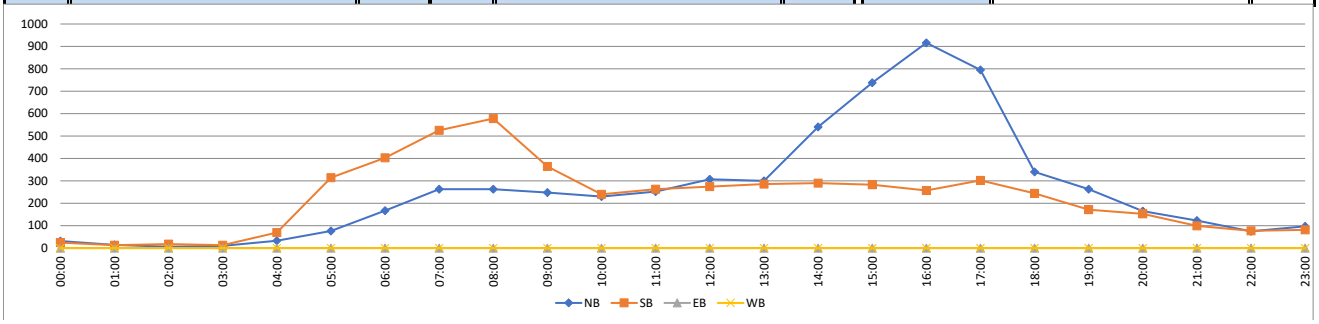
DAILY TOTALS

Hourly Intervals

TIME		NB	SB	EB	WB	TOTAL
00:00	01:00	31	24			55
01:00	02:00	14	13			27
02:00	03:00	6	18			24
03:00	04:00	10	13			23
04:00	05:00	33	69			102
05:00	06:00	76	314			390
06:00	07:00	167	403			570
07:00	08:00	263	526			789
08:00	09:00	263	578			841
09:00	10:00	248	364			612
10:00	11:00	230	240			470
11:00	12:00	252	263			515
12:00	13:00	307	274			581
13:00	14:00	300	286			586
14:00	15:00	541	290			831
15:00	16:00	738	283			1021
16:00	17:00	916	257			1173
17:00	18:00	795	302			1097
18:00	19:00	340	244			584
19:00	20:00	263	171			434
20:00	21:00	165	153			318
21:00	22:00	123	99			222
22:00	23:00	75	77			152
23:00	00:00	97	81			178

STATISTICS

	NB	SB	EB	WB	TOTAL
Peak Period	00:00	to	12:00		
Volume	1593	2825			4418
Peak Hour	7:30	7:45			7:45
Peak Volume	291	599			867
Peak Hour Factor	0.887	0.942			0.955
Peak Period	12:00	to	00:00		
Volume	4660	2517			7177
Peak Hour	16:15	14:30			16:30
Peak Volume	923	309			1207
Peak Hour Factor	0.974	0.898			0.967
Peak Period	07:00	to	09:00		
Volume	526	1104			1630
Peak Hour	7:30	7:45			7:45
Peak Volume	291	599			867
Peak Hour Factor	0.887	0.942			0.955
Peak Period	16:00	to	18:00		
Volume	1711	559			2270
Peak Hour	16:15	17:00			16:30
Peak Volume	923	302			1207
Peak Hour Factor	0.974	0.956			0.967



Attachment D – Crash History

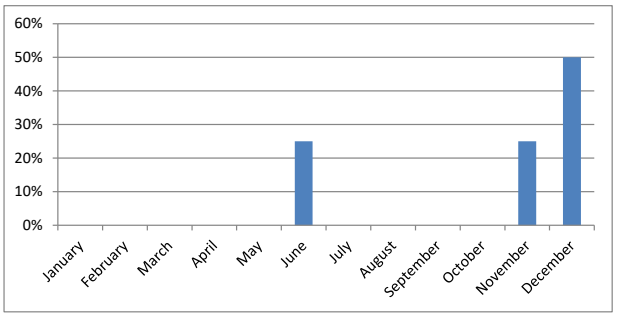
Crash Data Summary Tables
Concord Road @ Federal Street - Billerica, MA
1/1/2019 - 12/31/2023

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4972364	6/14/2021	2:11 PM	Daylight	Rain	Wet	2	N	E			Non-fatal Injury	1	Angled	Failure to Yield Right-of-Way	
2	5171566	11/2/2022	5:38 AM	Dawn	Clear	Dry	3	S	W	W		Property Damage Only	0	Rear-end	Excessive Speed	
3	5194615	12/29/2022	7:14 PM	Dark - Lighted	Clear	Dry	2	N	N			Non-fatal Injury	1	Rear-end	Followed Too Closely	
4	5331501	12/6/2023	4:57 PM	Dark - Lighted	Clear	Dry	2	W	S			Non-fatal Injury	1	Angled	Failure to Yield Right-of-Way	

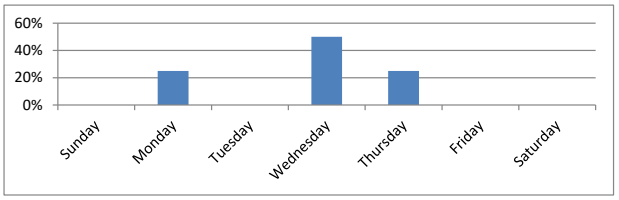
Crash Data Summary Charts
Concord Road @ Federal Street - Billerica, MA
1/1/2019 - 12/31/2023

Concord Road @ Federal Street *4*

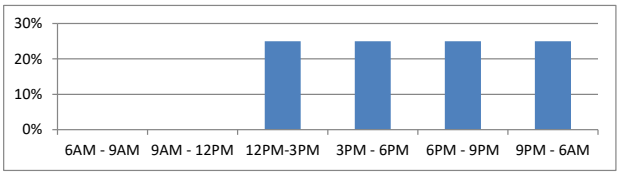
Month	#	%
January	0	0%
February	0	0%
March	0	0%
April	0	0%
May	0	0%
June	1	25%
July	0	0%
August	0	0%
September	0	0%
October	0	0%
November	1	25%
December	2	50%



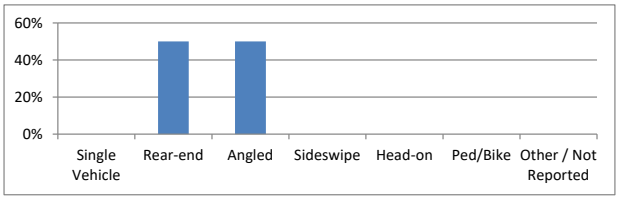
Day of Week	#	%
Sunday	0	0%
Monday	1	25%
Tuesday	0	0%
Wednesday	2	50%
Thursday	1	25%
Friday	0	0%
Saturday	0	0%



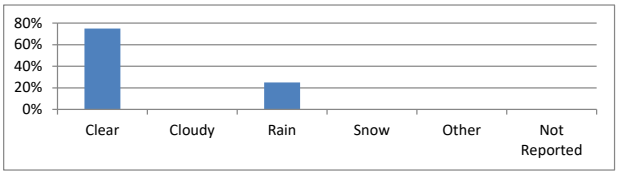
Time of Day	#	%
6AM - 9AM	0	0%
9AM - 12PM	0	0%
12PM-3PM	1	25%
3PM - 6PM	1	25%
6PM - 9PM	1	25%
9PM - 6AM	1	25%



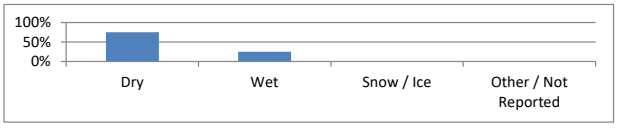
Manner of Collision	#	%
Single Vehicle	0	0%
Rear-end	2	50%
Angled	2	50%
Sideswipe	0	0%
Head-on	0	0%
Ped/Bike	0	0%
Other / Not Reported	0	0%



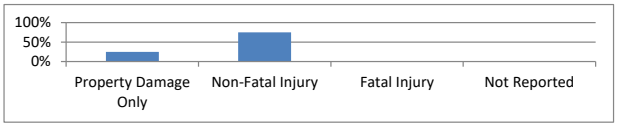
Weather Conditions	#	%
Clear	3	75%
Cloudy	0	0%
Rain	1	25%
Snow	0	0%
Other	0	0%
Not Reported	0	0%



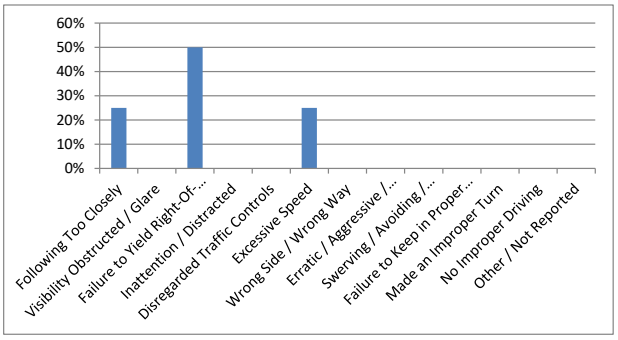
Road Surface	#	%
Dry	3	75%
Wet	1	25%
Snow / Ice	0	0%
Other / Not Reported	0	0%



Crash Severity	#	%
Property Damage Only	1	25%
Non-Fatal Injury	3	75%
Fatal Injury	0	0%
Not Reported	0	0%



Main Contributing Factor from Narrative	#	%
Following Too Closely	1	25%
Visibility Obstructed / Glare	0	0%
Failure to Yield Right-Of-Way	2	50%
Inattention / Distracted	0	0%
Disregarded Traffic Controls	0	0%
Excessive Speed	1	25%
Wrong Side / Wrong Way	0	0%
Erratic / Aggressive / Reckless Driving	0	0%
Swerving / Avoiding / Over-Steering / Over-Correcting	0	0%
Failure to Keep in Proper Lane	0	0%
Made an Improper Turn	0	0%
No Improper Driving	0	0%
Other / Not Reported	0	0%



7/31/2025

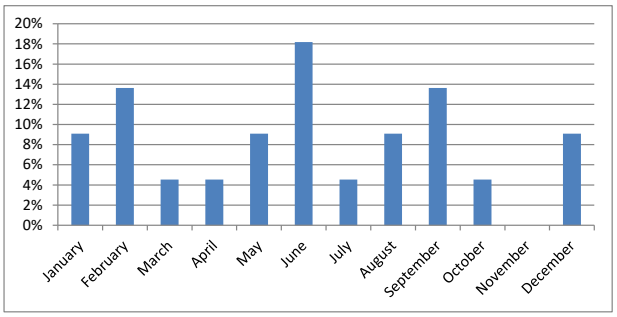
Crash Data Summary Tables
Concord Road @ Middlesex Turnpike - Billerica, MA
1/1/2019 - 12/31/2023

Collision Diagram	Crash Number	Crash Date	Crash Time	Ambient Light	Weather Condition	Road Surface	Number of Vehicles	Vehicle Travel Directions				Crash Severity	Number of NonFatal Injuries	Manner of Collision	Driver Contributing Codes	Detailed Narrative (from Crash Report)
								V1	V2	V3	V4					
1	4665334	2/15/2019	1:29 PM	Daylight	Rain	Wet	2	W	W			Property Damage Only	0	Rear-end	Followed Too Closely	
2	4704369	5/18/2019	2:51 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	0	Rear-end	Excessive Speed	
3	4718928	6/28/2019	8:33 AM	Daylight	Clear	Dry	2	W	W			Property Damage Only	0	Rear-end	Followed Too Closely	
4	4731942	7/30/2019	11:55 PM	Dark - Lighted	Clear	Not Reported	2	W	W			Property Damage Only	0	Rear-end	Inattention / Distracted	
5	4733643	8/6/2019	10:20 AM	Daylight	Not Reported	Dry	2	S	E			Non-fatal Injury	2	Head-on	Failure to Yield Right-of-Way	
6	4752455	9/23/2019	7:55 AM	Daylight	Clear	Dry	2	E	W			Property Damage Only	0	Angled	Failure to Yield Right-of-Way	
7	4765170	10/22/2019	7:07 PM	Dark - Not Lighted	Rain	Wet	2	W	E			Property Damage Only	0	Sideswipe	Disregarded Traffic Controls	
8	4808924	1/25/2020	6:32 PM	Dark - Lighted	Rain	Wet	2	N	W			Property Damage Only	1	Head-on	Disregarded Traffic Controls	
9	4815038	2/8/2020	3:09 AM	Dark - Lighted	Cloudy	Dry	1	E				Non-fatal Injury	1	Not Reported	Failure to Keep in Proper Lane	
10	4828462	3/12/2020	6:33 PM	Daylight	Clear	Dry	2	E	W			Non-fatal Injury	0	Head-on	Not Reported	
11	4856392	6/30/2020	4:02 PM	Daylight	Clear	Dry	2	E	E			Property Damage Only	0	Rear-end	Erratic / Aggressive / Reckless Driving	
12	4935805	2/26/2021	4:26 PM	Daylight	Clear	Dry	2	E	E			Property Damage Only	0	Rear-end	Inattention / Distracted	
13	4948101	4/2/2021	6:54 PM	Daylight	Clear	Dry	2	S	S			Property Damage Only	0	Angled	Made an Improper Turn	
14	4973666	6/16/2021	5:04 PM	Daylight	Clear	Dry	2	N	N			Property Damage Only	1	Rear-end	Not Reported	
15	4998561	8/20/2021	8:38 AM	Daylight	Cloudy	Wet	2	S	E			Non-fatal Injury	0	Angled	Not Reported	
16	5013191	9/25/2021	3:54 PM	Daylight	Clear	Dry	2	W	E			Property Damage Only	0	Angled	Failure to Yield Right-of-Way	
17	5049686	12/22/2021	12:13 PM	Daylight	Rain	Dry	2	E	E			Property Damage Only	0	Rear-end	Inattention / Distracted	
18	5151674	9/15/2022	6:34 AM	Daylight	Clear	Dry	2	S	E			Property Damage Only	0	Sideswipe	No Improper Driving	
19	5185704	12/1/2022	2:04 PM	Daylight	Clear	Dry	2	E	E			Property Damage Only	0	Rear-end	Not Reported	
20	5195555	1/2/2023	7:35 PM	Dark - Lighted	Clear	Dry	2	W	E			Property Damage Only	0	Head-on	Not Reported	
21	5267088	5/31/2023	2:41 PM	Daylight	Clear	Dry	2	E	E			Non-fatal Injury	1	Rear-end	Inattention / Distracted	
22	5291343	6/24/2023	8:39 PM	Dusk	Cloudy	Dry	3	N	N	N		Property Damage Only	0	Rear-end	Inattention / Distracted	

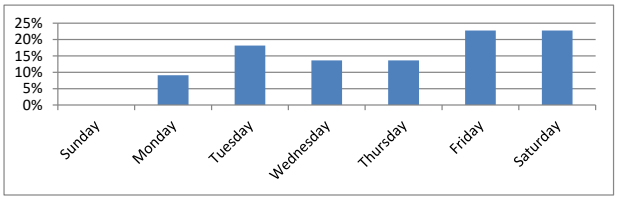
Crash Data Summary Tables
Concord Road @ Middlesex Turnpike - Billerica, MA
1/1/2019 - 12/31/2023

Concord Road @ Middlesex Turnpike *22*

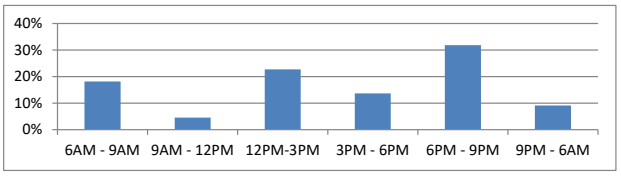
Month	#	%
January	2	9%
February	3	14%
March	1	5%
April	1	5%
May	2	9%
June	4	18%
July	1	5%
August	2	9%
September	3	14%
October	1	5%
November	0	0%
December	2	9%



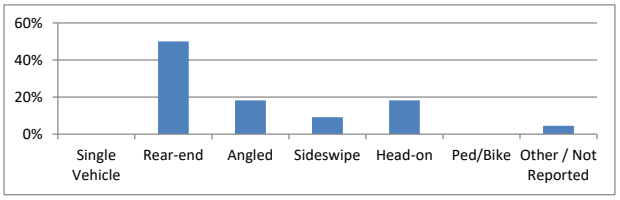
Day of Week	#	%
Sunday	0	0%
Monday	2	9%
Tuesday	4	18%
Wednesday	3	14%
Thursday	3	14%
Friday	5	23%
Saturday	5	23%



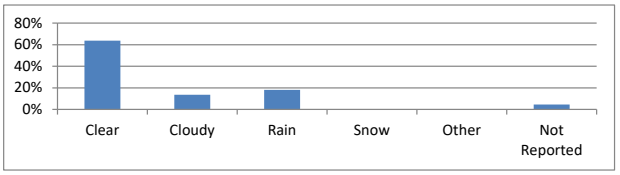
Time of Day	#	%
6AM - 9AM	4	18%
9AM - 12PM	1	5%
12PM-3PM	5	23%
3PM - 6PM	3	14%
6PM - 9PM	7	32%
9PM - 6AM	2	9%



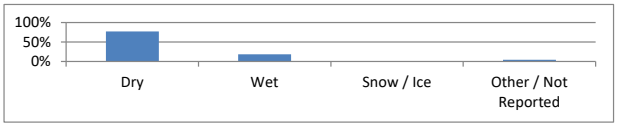
Manner of Collision	#	%
Single Vehicle	0	0%
Rear-end	11	50%
Angled	4	18%
Sideswipe	2	9%
Head-on	4	18%
Ped/Bike	0	0%
Other / Not Reported	1	5%



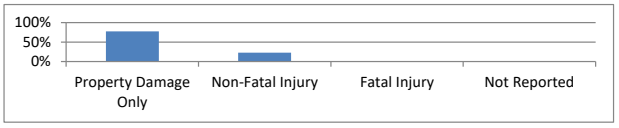
Weather Conditions	#	%
Clear	14	64%
Cloudy	3	14%
Rain	4	18%
Snow	0	0%
Other	0	0%
Not Reported	1	5%



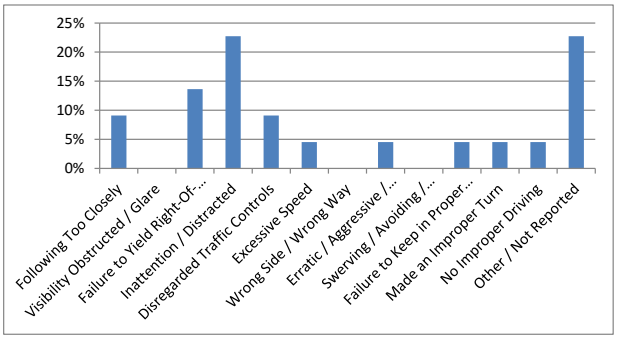
Road Surface	#	%
Dry	17	77%
Wet	4	18%
Snow / Ice	0	0%
Other / Not Reported	1	5%



Crash Severity	#	%
Property Damage Only	17	77%
Non-Fatal Injury	5	23%
Fatal Injury	0	0%
Not Reported	0	0%



Main Contributing Factor from Narrative	#	%
Following Too Closely	2	9%
Visibility Obstructed / Glare	0	0%
Failure to Yield Right-Of-Way	3	14%
Inattention / Distracted	5	23%
Disregarded Traffic Controls	2	9%
Excessive Speed	1	5%
Wrong Side / Wrong Way	0	0%
Erratic / Aggressive / Reckless Driving	1	5%
Swerving / Avoiding / Over-Steering / Over-Correcting	0	0%
Failure to Keep in Proper Lane	1	5%
Made an Improper Turn	1	5%
No Improper Driving	1	5%
Other / Not Reported	5	23%



7/31/2025

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Billerica COUNT DATE : 11/21/2024

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : Y

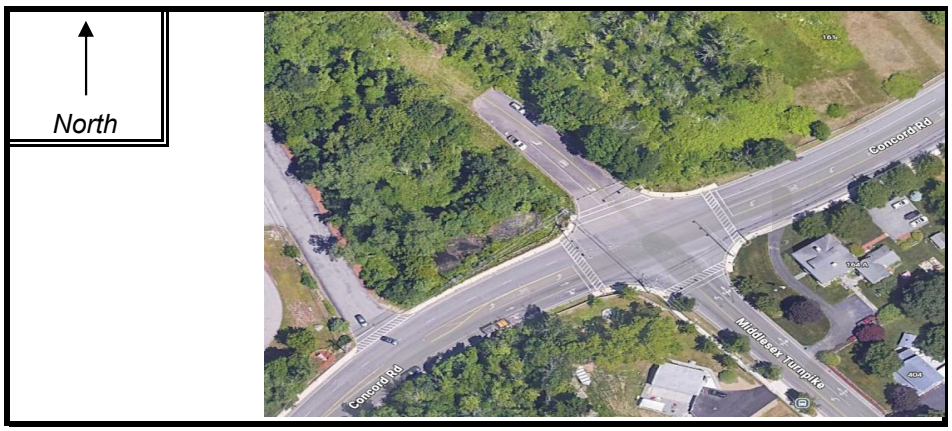
~ INTERSECTION DATA ~

MAJOR STREET : Concord Road

MINOR STREET(S) : Middlesex Turnpike

Private Driveway

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 (AM/**PM**) :	0	1,016	892	487		**2,395**

" K " FACTOR : **0.088** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **27,216**

TOTAL # OF CRASHES : 22 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **4.40**

CRASH RATE CALCULATION : 0.44

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

Comments : K factor based on TIPA Table 1

Project Title & Date: 1 & 2 Federal Street - Billerica, MA

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Billerica COUNT DATE : 7/23/2025

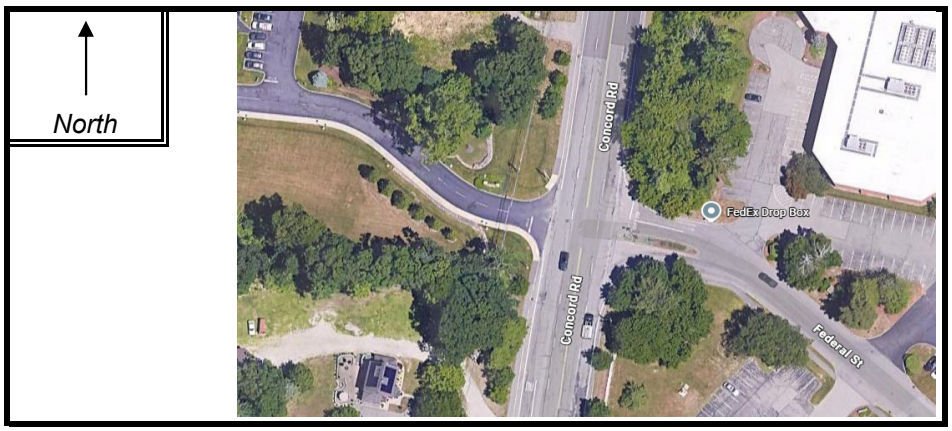
DISTRICT : 4 UNSIGNALIZED : **Y** SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Concord Road

MINOR STREET(S) : Federal 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 (AM/**PM**) :	9	62	905	1,312		**2,288**

" K " FACTOR : **0.088** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **26,000**

TOTAL # OF CRASHES : 4 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **0.80**

CRASH RATE CALCULATION : **0.08**

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

Comments : K factor based on TIPA Table 1

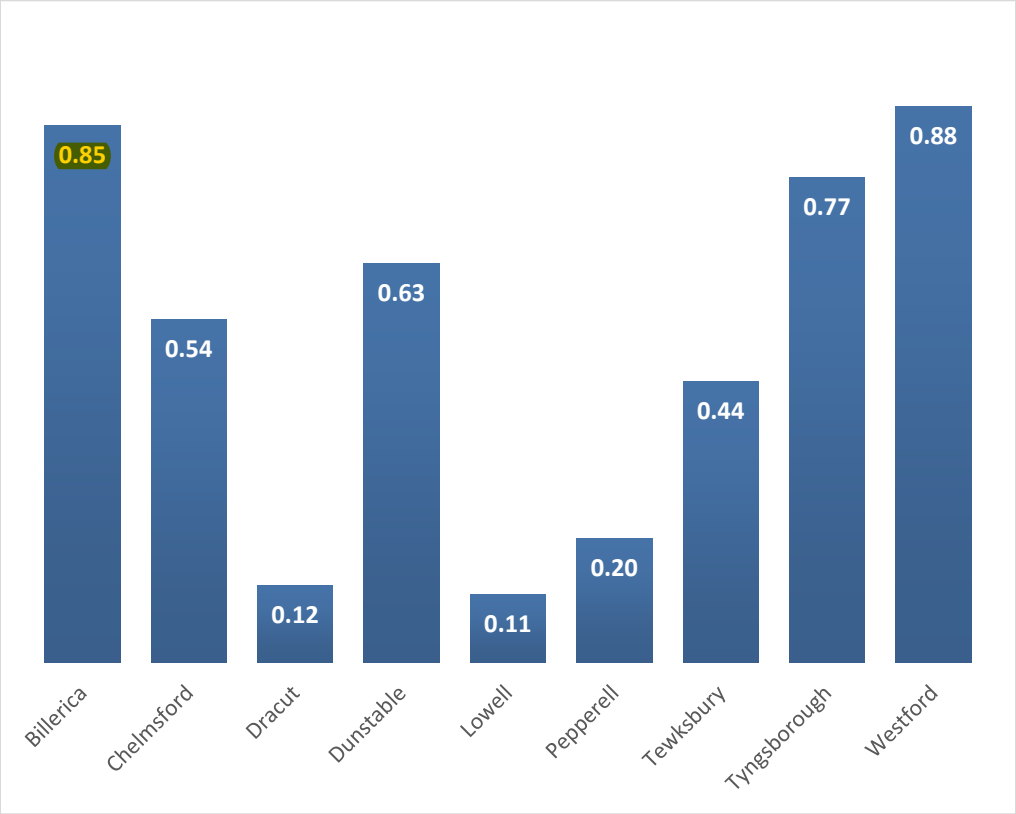
Project Title & Date: 1 & 2 Federal Street - Billerica, MA

Attachment E – Ambient Growth Rate Data

2.3 TRAFFIC GROWTH IN THE NORTHERN MIDDLESEX REGION.

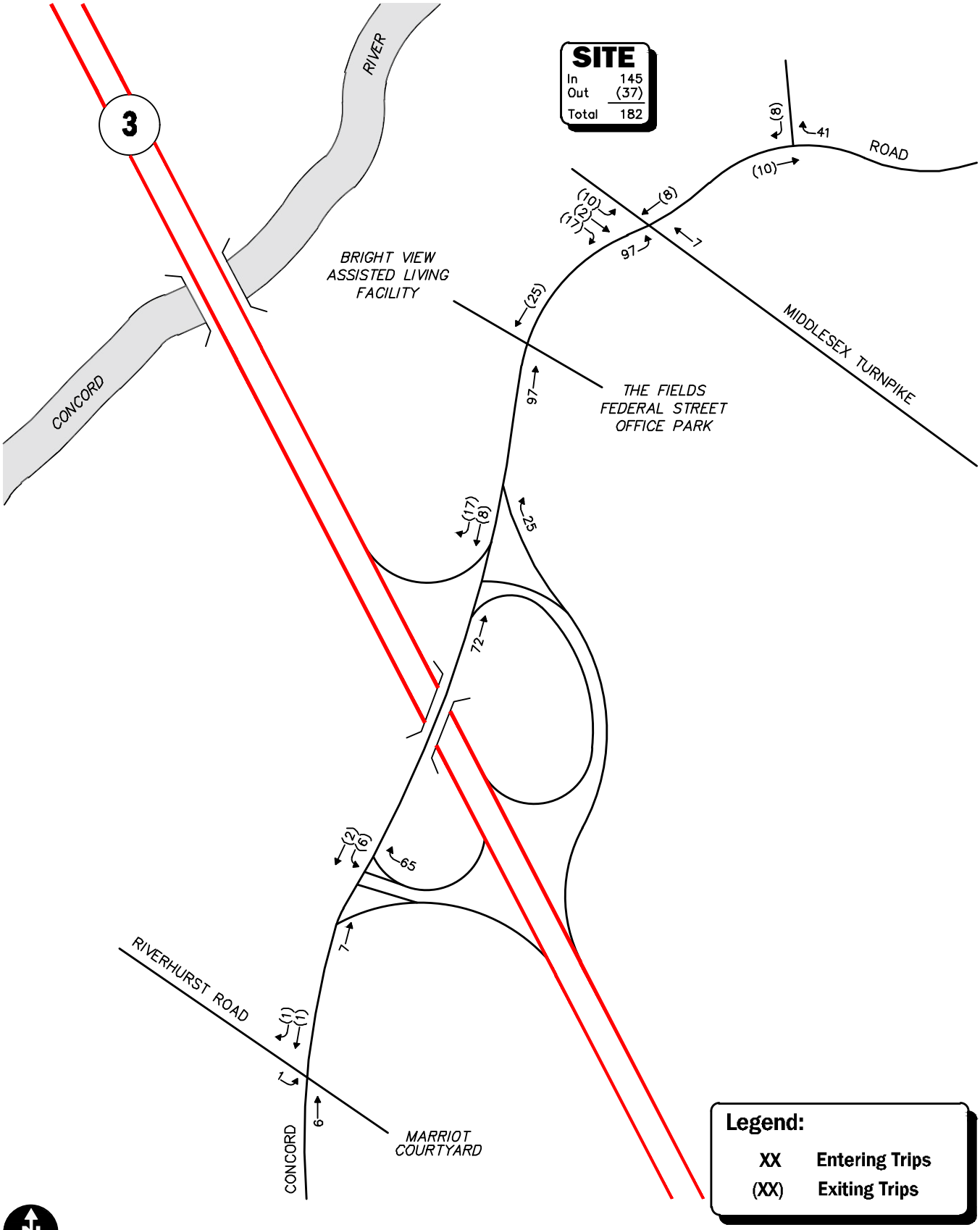
NMCOG's annual traffic counting program has compiled growth rate data at over 200 locations throughout the region since 2012. Documenting traffic growth rates for the region's communities is important in the determination of impacts from transportation improvements or new developments on the existing system. Growth rates are determined from NMCOG's regional traffic counting activities and used widely in traffic impact analyses. Determining accurate traffic growth rates is dependent upon the available data and the accuracy of the data collected. Average annual traffic volume growth rates have been calculated for locations where three or more counts have been performed since 2010. Figure 2-5 shows the average traffic volume growth rates for each community. Historical count data can be provided upon request.

FIGURE 2-5: AVERAGE ANNUAL TRAFFIC GROWTH RATES FOR NORTHERN MIDDLESEX COMMUNITIES 2012 – 2022.



Over the past decade, traffic growth in the region has been relatively constant, with the highest annual growth in traffic volume occurring in Billerica, Westford, and Tyngsborough. In 2022 the highest annual growth in traffic volume occurred in Tewksbury, Chelmsford, and Billerica. The Town of Lowell has the lowest average growth rate in the region with Dracut and Pepperell close behind. The City of Lowell has recently undertaken large-scale improvements to its existing transportation infrastructure such as redesigning the Lord Overpass to be an at-grade multi-modal boulevard, as well as improvements to bridges over the canal system and Merrimack River. In upcoming years, the Rourke Bridge will be replaced, likely having a great impact on regional circulation. Map 2.1 shows traffic growth rates for selected locations throughout the Northern Middlesex region. Traffic growth trends have been compiled for all U.S. and State numbered routes and is reported as part of the regional traffic count database (Tables 2-6 through 2-14).

Attachment F – Specific Developments by Others



Not To Scale

Figure 8

Project-Generated Weekday Morning Peak-Hour Traffic Volumes

Vanasse & Associates inc

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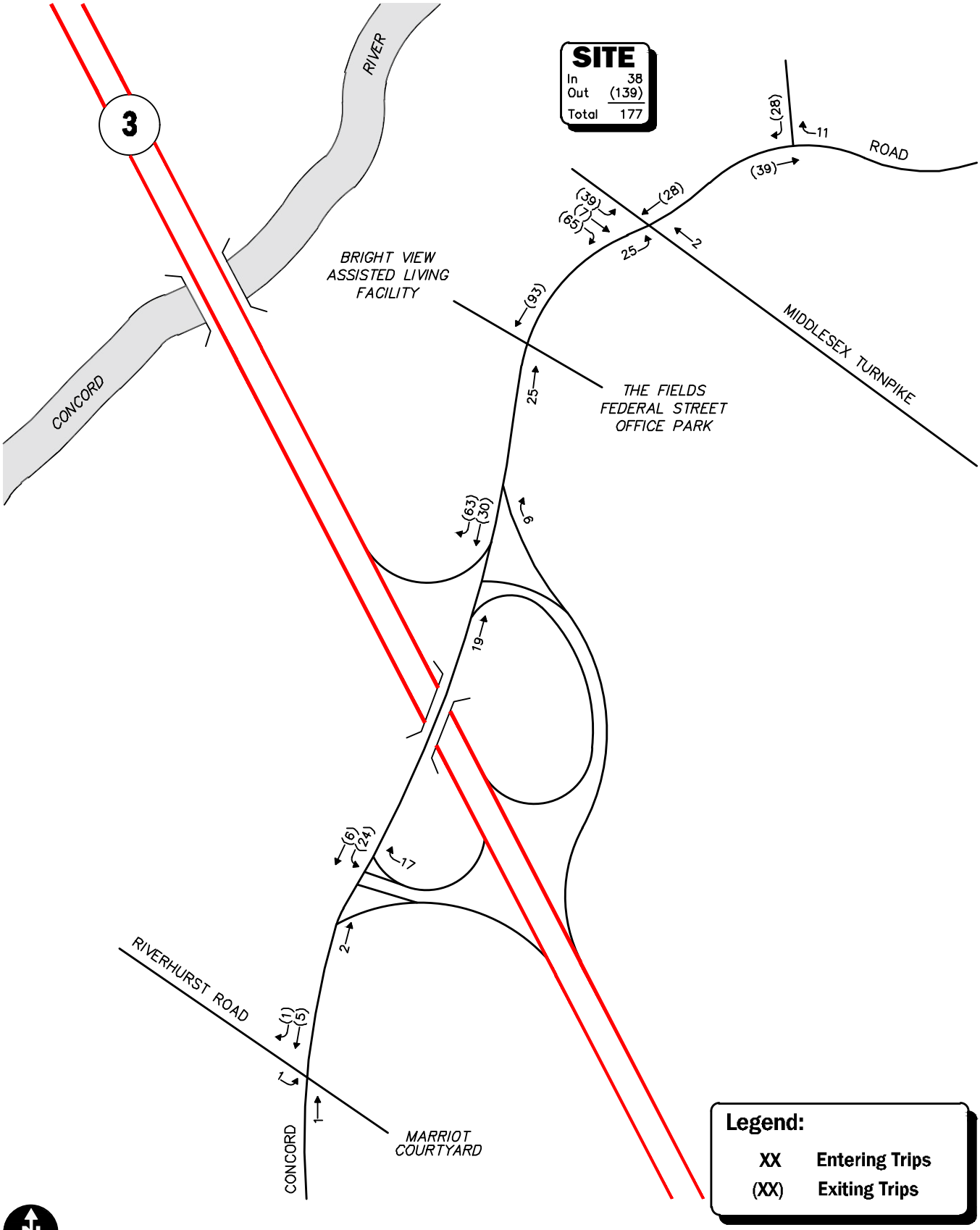

Not To Scale

Figure 9

Project-Generated Weekday Evening Peak-Hour Traffic Volumes

Vanasse & Associates inc

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Attachment G – Reoccupancy of Existing Office Site Trip Generation Data

General Office Building
(710)

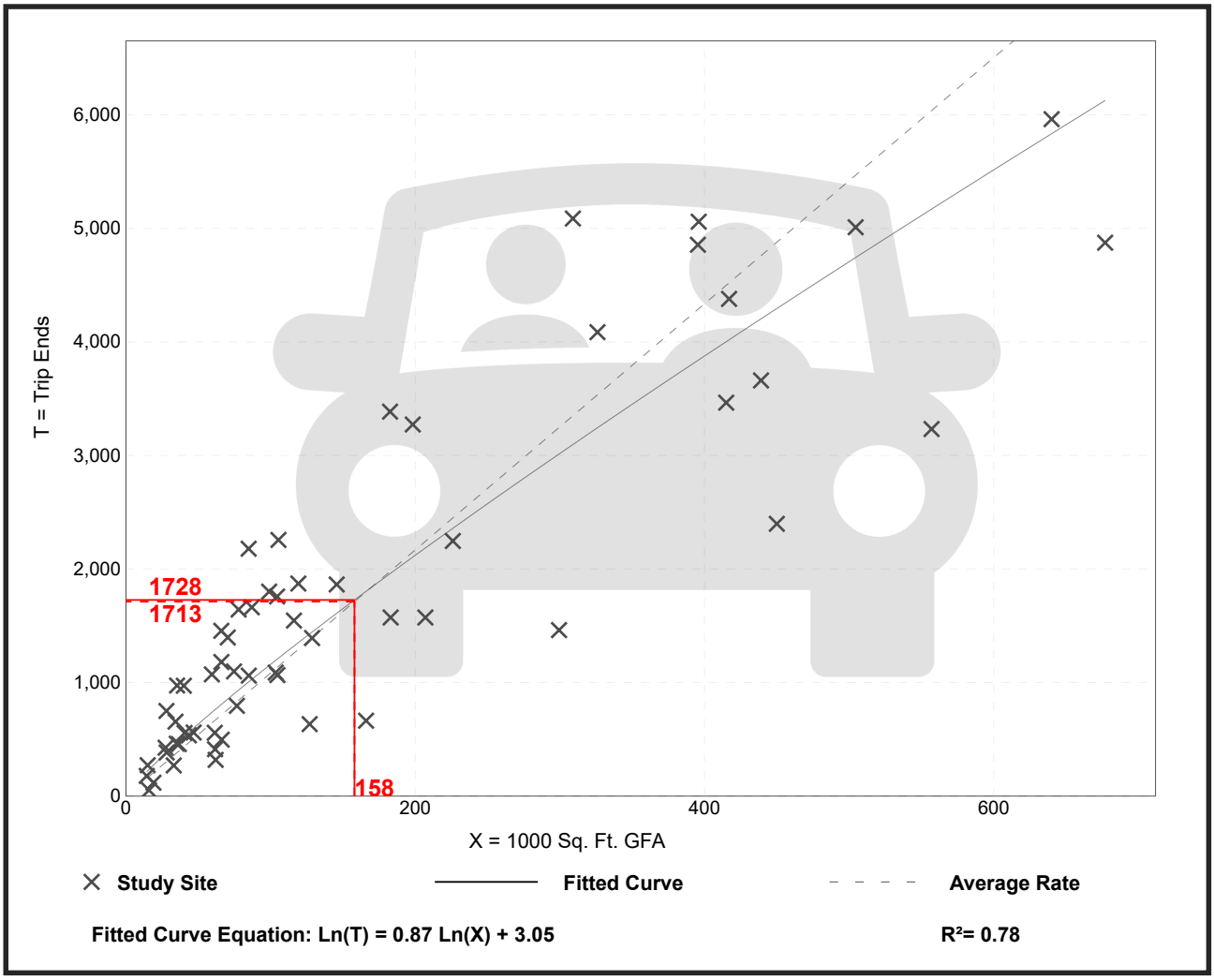
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 59
Avg. 1000 Sq. Ft. GFA: 163
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
10.84	3.27 - 27.56	4.76

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

General Office Building
(710)

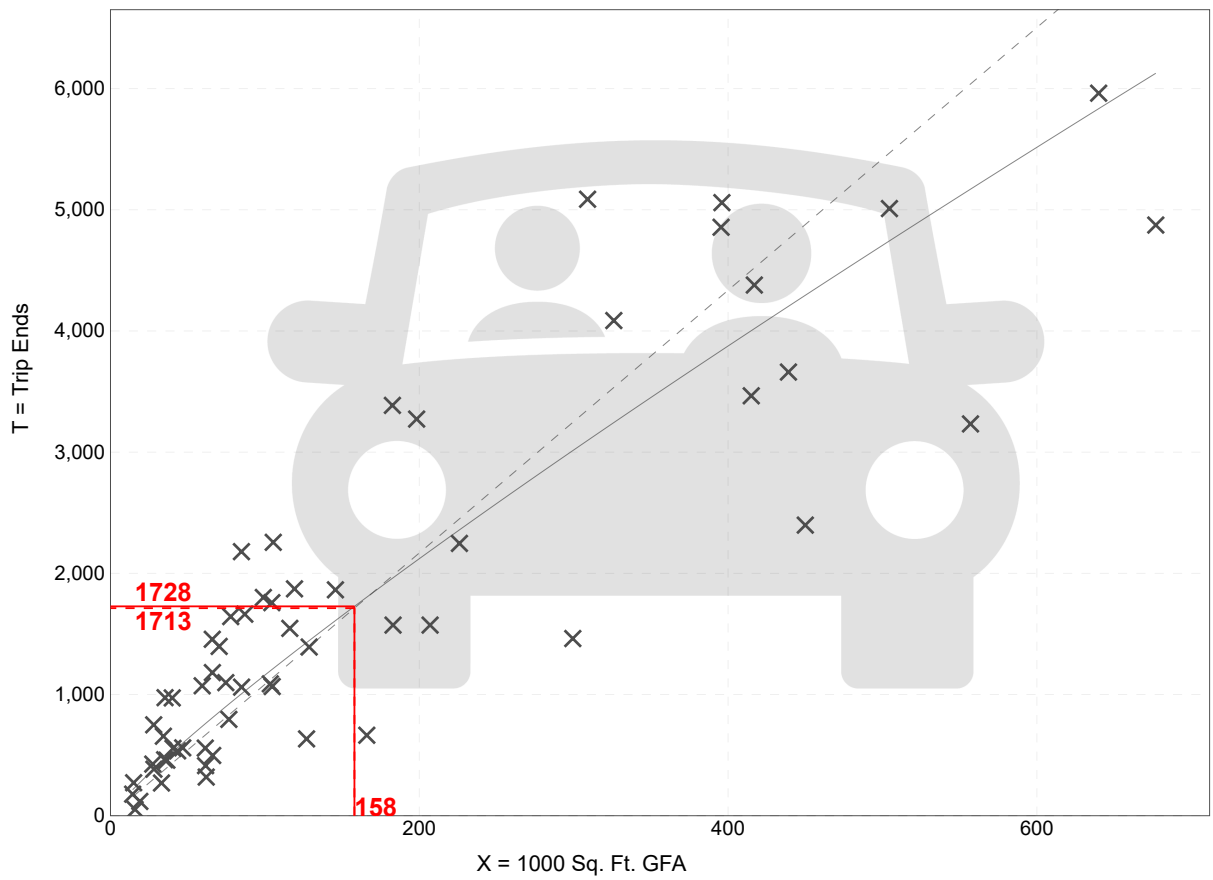
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 59
Avg. 1000 Sq. Ft. GFA: 163
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
10.84	3.27 - 27.56	4.76

Data Plot and Equation



Study Site **Fitted Curve** **Average Rate**

Fitted Curve Equation: Ln(T) = 0.87 Ln(X) + 3.05 **R^2= 0.78**

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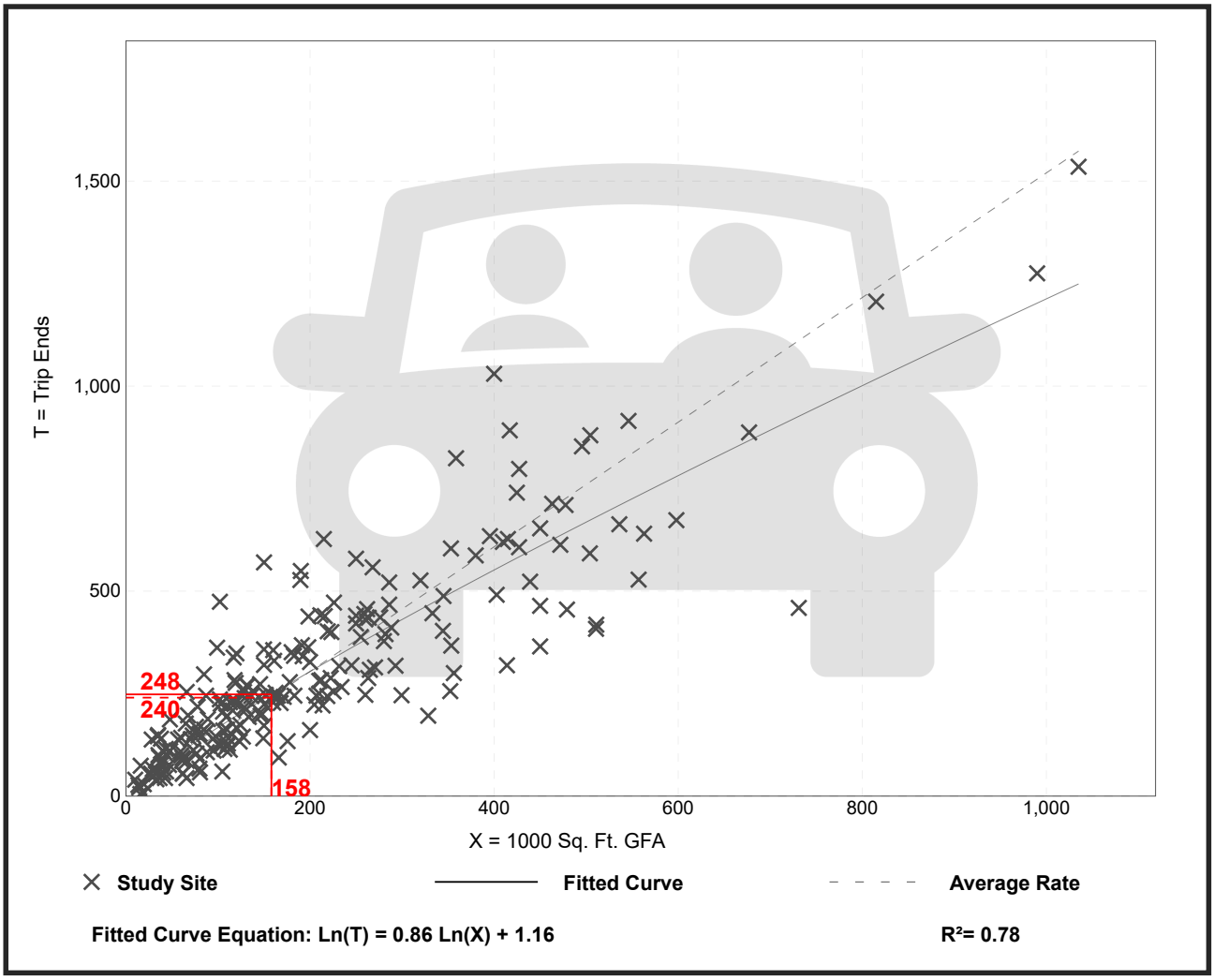
General Office Building
(710)

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:	221
Avg. 1000 Sq. Ft. GFA:	201
Directional Distribution:	88% entering, 12% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.52	0.32 - 4.93	0.58

Data Plot and Equation



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Attachment H – Site Trip Generation Data

Trip Generation Estimate

Project:	T1757 - Mixed Use Development - Haverhill, MA
Date:	October 9, 2025
Analyst:	TEC, Inc.
Source:	Institute of Transportation Engineers - Trip Generation, 11th Edition

ITE Land Use Code (LUC): 220 Multifamily Housing (Low-Rise) Not C

Average Vehicle Trips Ends vs:	Dwelling Units
Independent Variable (X):	255
Curve Method:	Fitted

Average Weekday Daily

T =	6.41	*	(X)	+	75.31						
T =	6.41	*	255	+	75.31						
T =	**1,710**	vehicle trips									
with	50%	entering (	855	vpd) and with		50%	exiting (	855	vpd)		

Weekday Morning Peak Hour

Ln(T) =	0.31	*	(X)	+	22.85						
Ln(T) =	0.31	*	255.00	+	22.85						
T =	**102**	vehicle trips									
with	24%	entering (	24	vpd) and with		76%	exiting (	78	vpd)		

Weekday Evening Peak Hour

Ln(T) =	0.43	*	(X)	+	20.55						
Ln(T) =	0.43	*	255.00	+	20.55						
T =	**130**	vehicle trips									
with	63%	entering (	82	vpd) and with		37%	exiting (	48	vpd)		

Average Saturday Daily

T =	0.00	*	(X)	+	0.00						
T =	0.00	*	6	+	0						
T =	**-**	vehicle trips									
with	50%	entering (	-	vpd) and with		50%	exiting (	-	vpd)		

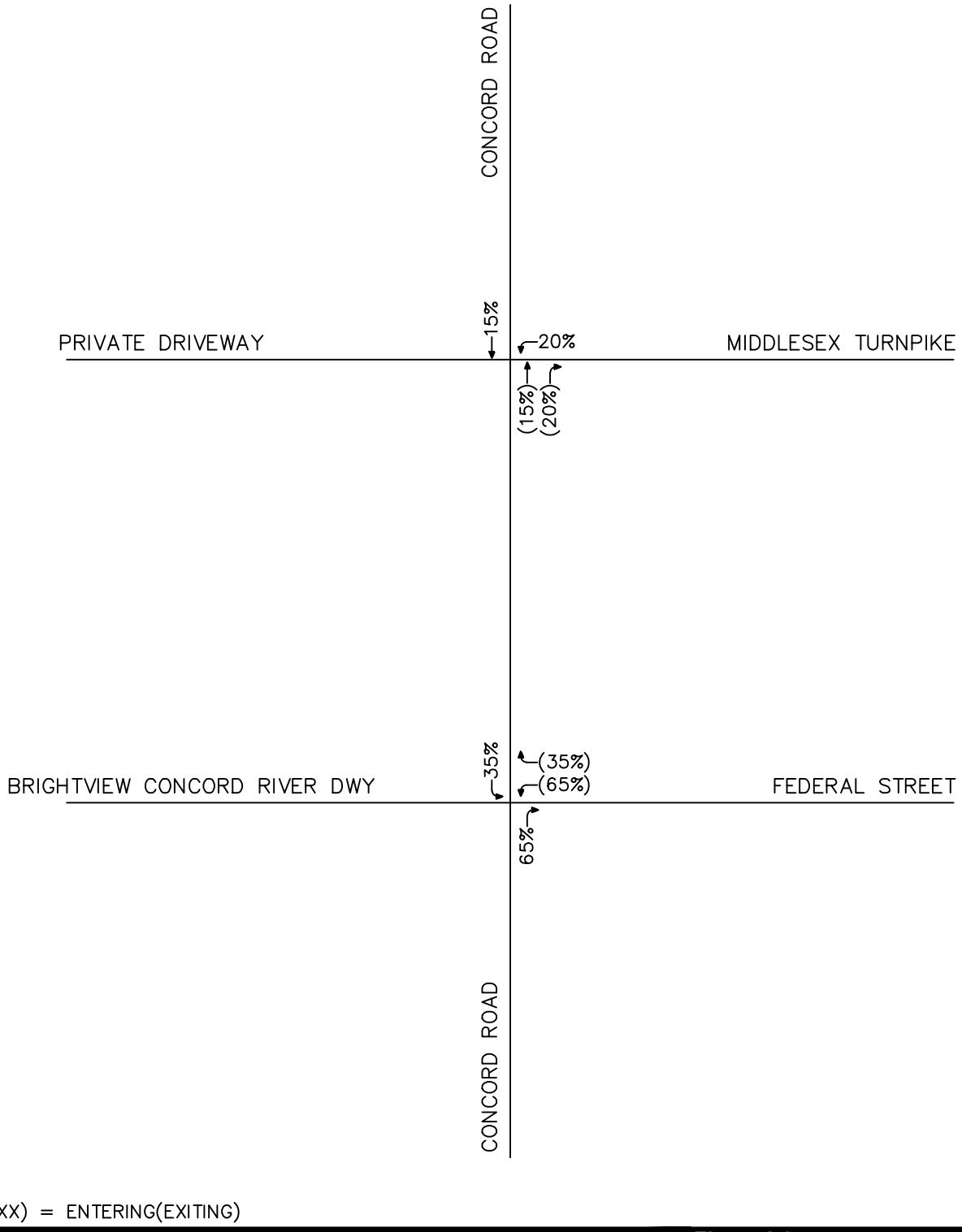
Saturday Midday Peak Hour

T =	0.00	*	(X)	+	0.00						
T =	0.00	*	6	+	0						
T =	**-**	vehicle trips									
with	61%	entering (	-	vpd) and with		39%	exiting (	-	vpd)		

TEC The Engineering Corp

Attachment I – Trip Distribution Data

Not to Scale



XXX(XXX) = ENTERING(EXITING)

Figure I-1

Trip Distribution

TEC, Inc.
282 Merrimack Street
Lawrence, MA 01843
978-794-1792
www.TheEngineeringCorp.com

T:\T1757\CAD\Highway\Graphics\T1757_Traffic Network.dwg 10/30/2025 2:40:09 PM

Trip Distribution - Billerica Residence

Project: T1757 - Traffic Impact Assessment - Billerica, MA
Date: 8/14/2025
Source: US Census Bureau - 2022 OnTheMap Tool - Top 22 Communities
Analyst: TEC / RE

Place of Residence		Place of Work		Commuting Flow			Major Routes Entering/Exiting						Major Route Breakdown Entering/Exiting					
State Name	Minor Civil Division Name	State Name	Minor Civil Division Name	Workers in Commuting Flow	% of total Commuters	% of selected commuters	Concord Road (North)	Middlesex Turnpike (East)	Route 3 (North)	Route 3 (South)	Concord Road (South)	Check	Concord Road (North)	Middlesex Turnpike (East)	Route 3 (North)	Route 3 (South)	Concord Road (South)	Check
Massachusetts	Billerica	Massachusetts	Billerica	2,718	11.9%	17.8%	60%	30%			10%	100%	1,631	815	0	0	272	2,718
Massachusetts	Billerica	Massachusetts	Boston city, MA	2,063	9.0%	13.5%		20%		80%		100%	0	413	0	1,650	0	2,063
Massachusetts	Billerica	Massachusetts	Burlington CDP, MA	1,711	7.5%	11.2%		40%		60%		100%	0	684	0	1,027	0	1,711
Massachusetts	Billerica	Massachusetts	Woburn city, MA	932	4.1%	6.1%		10%		90%		100%	0	93	0	839	0	932
Massachusetts	Billerica	Massachusetts	Waltham city, MA	814	3.6%	5.3%				100%		100%	0	0	0	814	0	814
Massachusetts	Billerica	Massachusetts	Cambridge city, MA	809	3.5%	5.3%				100%		100%	0	0	0	809	0	809
Massachusetts	Billerica	Massachusetts	Lowell city, MA	752	3.3%	4.9%			100%			100%	0	0	752	0	0	752
Massachusetts	Billerica	Massachusetts	Chelmsford town	674	2.9%	4.4%	5%		80%		15%	100%	34	0	539	0	101	674
Massachusetts	Billerica	Massachusetts	Bedford town	653	2.9%	4.3%				5%	95%	100%	0	0	0	33	620	653
Massachusetts	Billerica	Massachusetts	Wilmington CDP, MA	624	2.7%	4.1%	50%	50%				100%	312	312	0	0	0	624
Massachusetts	Billerica	Massachusetts	Lexington CDP, MA	549	2.4%	3.6%				100%		100%	0	0	0	549	0	549
Massachusetts	Billerica	Massachusetts	Pinehurst CDP, MA	319	1.4%	2.1%	80%	10%		10%		100%	255	32	0	32	0	319
Massachusetts	Billerica	Massachusetts	Newton city, MA	284	1.2%	1.9%				100%		100%	0	0	0	284	0	284
Massachusetts	Billerica	Massachusetts	Framingham city,	246	1.1%	1.6%				100%		100%	0	0	0	246	0	246
Massachusetts	Billerica	Massachusetts	Danvers CDP, MA	237	1.0%	1.5%	20%			80%		100%	47	0	0	190	0	237
Massachusetts	Billerica	Massachusetts	Nashua city, NH	205	0.9%	1.3%			100%			100%	0	0	205	0	0	205
Massachusetts	Billerica	Massachusetts	Arlington CDP, MA	204	0.9%	1.3%				100%		100%	0	0	0	204	0	204
Massachusetts	Billerica	Massachusetts	Winchester CDP, MA	204	0.9%	1.3%				100%		100%	0	0	0	204	0	204
Massachusetts	Billerica	Massachusetts	Lawrence city, MA	202	0.9%	1.3%			100%			100%	0	0	202	0	0	202
Massachusetts	Billerica	Massachusetts	Watertown Town	201	0.9%	1.3%				100%		100%	0	0	0	201	0	201
Massachusetts	Billerica	Massachusetts	Marlborough city,	190	0.8%	1.2%			90%	10%		100%	0	0	171	19	0	190
Massachusetts	Billerica	Massachusetts	Worcester city, MA	190	0.8%	1.2%			90%	10%		100%	0	0	171	19	0	190
Massachusetts	Billerica	Massachusetts	Medford city, MA	180	0.8%	1.2%	20%			80%		100%	36	0	0	144	0	180
Massachusetts	Billerica	Massachusetts	Peabody city, MA	180	0.8%	1.2%	10%			90%		100%	18	0	0	162	0	180
Massachusetts	Billerica	Massachusetts	Wakefield CDP, MA	171	0.7%	1.1%				100%		100%	0	0	0	171	0	171
				22,872		**15,312**							2,333	2,349	2,040	7,596	993	15,312
						66.9%							**15.2%**	**15.3%**	**13.3%**	**49.6%**	**6.5%**	**100.0%**
													15%	**15%**	**13%**	**50%**	**7%**	**100%**

Trip Distribution - Billerica Workers

Project: T1757 - Traffic Impact Assessment - Billerica, MA
Date: 8/14/2025
Source: US Census Bureau - 2022 OnTheMap Tool - Top 22 Communities
Analyst: TEC / RE

Place of Residence		Place of Work		Commuting Flow			Major Routes Entering/Exiting						Major Route Breakdown Entering/Exiting					
State Name	Minor Civil Division Name	State Name	Minor Civil Division Name	Workers in Commuting Flow	% of total Commuters	% of selected commuters	Concord Road (North)	Middlesex Turnpike (East)	Route 3 (North)	Route 3 (South)	Concord Road (South)	Check	Concord Road (North)	Middlesex Turnpike (East)	Route 3 (North)	Route 3 (South)	Concord Road (South)	Check
Massachusetts	Billerica town	Massachusetts	Billerica	2,718	10.3%	19.2%	70%	20%			10%	100%	1,903	544	0	0	272	2,718
Massachusetts	Lowell city	Massachusetts	Billerica	2,434	9.2%	17.2%			100%			100%	0	0	2,434	0	0	2,434
Massachusetts	Chelmsford town	Massachusetts	Billerica	841	3.2%	6.0%	5%		80%		15%	100%	42	0	673	0	126	841
Massachusetts	Boston city (Suffolk,	Massachusetts	Billerica	796	3.0%	5.6%				100%		100%	0	0	0	796	0	796
Massachusetts	Nashua city	Massachusetts	Billerica	704	2.7%	5.0%			100%			100%	0	0	704	0	0	704
Massachusetts	Dracut town	Massachusetts	Billerica	639	2.4%	4.5%			100%			100%	0	0	639	0	0	639
Massachusetts	Tewksbury town	Massachusetts	Billerica	628	2.4%	4.4%	100%					100%	628	0	0	0	0	628
Massachusetts	Lawrence city (Essex,	Massachusetts	Billerica	596	2.3%	4.2%			100%			100%	0	0	596	0	0	596
Massachusetts	Methuen Town city	Massachusetts	Billerica	454	1.7%	3.2%			100%			100%	0	0	454	0	0	454
Massachusetts	Haverhill city (Essex,	Massachusetts	Billerica	425	1.6%	3.0%			100%			100%	0	0	425	0	0	425
Massachusetts	Lynn city (Essex, MA)	Massachusetts	Billerica	405	1.5%	2.9%				100%		100%	0	0	0	405	0	405
Massachusetts	Burlington town	Massachusetts	Billerica	377	1.4%	2.7%		25%		75%		100%	0	94	0	283	0	377
Massachusetts	Woburn city	Massachusetts	Billerica	362	1.4%	2.6%		25%		75%		100%	0	91	0	272	0	362
Massachusetts	Westford town	Massachusetts	Billerica	354	1.3%	2.5%			100%			100%	0	0	354	0	0	354
Massachusetts	Wilmington town	Massachusetts	Billerica	349	1.3%	2.5%	100%					100%	349	0	0	0	0	349
Massachusetts	Waltham city	Massachusetts	Billerica	287	1.1%	2.0%				100%		100%	0	0	0	287	0	287
Massachusetts	Peabody city (Essex,	Massachusetts	Billerica	276	1.0%	2.0%	25%			75%		100%	69	0	0	207	0	276
Massachusetts	Andover town	Massachusetts	Billerica	262	1.0%	1.9%	25%		75%			100%	66	0	197	0	0	262
Massachusetts	Tyngsborough town	Massachusetts	Billerica	262	1.0%	1.9%			100%			100%	0	0	262	0	0	262
Massachusetts	Somerville city	Massachusetts	Billerica	256	1.0%	1.8%				100%		100%	0	0	0	256	0	256
Massachusetts	Hudson town	Massachusetts	Billerica	239	0.9%	1.7%			100%			100%	0	0	239	0	0	239
Massachusetts	Medford city	Massachusetts	Billerica	235	0.9%	1.7%				100%		100%	0	0	0	235	0	235
Massachusetts	Worcester city	Massachusetts	Billerica	232	0.9%	1.6%			90%	10%		100%	0	0	209	23	0	232
				26,325		**14,131**							3,056	728	7,185	2,763	398	14,131
						53.7%							**21.6%**	**5.2%**	**50.8%**	**19.6%**	**2.8%**	**100.0%**
													22%	**5%**	**51%**	**19%**	**3%**	**100%**

Attachment J – Traffic Signal Warrant Analysis

Project: Residential
Town: Billerica, MA
TEC #T1757
Analyst: TEC, Inc

Land Use Code	220
Land Use	Multifamily Housing (Low-Rise)
Subcategory	Not Close to Rail transit
Setting	General Urban/Suburban
Time Period	Weekday
# Data Sites	6

	% of 24-Hour Vehicle Trips			Entering	Exiting
Time	Total	Entering	Exiting	855	855
12:00 - 1:00 AM	0.7%	0.9%	0.4%	8	3
1:00 - 2:00 AM	0.4%	0.5%	0.3%	5	3
2:00 - 3:00 AM	0.4%	0.4%	0.4%	3	3
3:00 - 4:00 AM	0.4%	0.4%	0.3%	3	3
4:00 - 5:00 AM	0.9%	0.3%	1.4%	3	12
5:00 - 6:00 AM	1.6%	0.5%	2.6%	4	22
6:00 - 7:00 AM	4.2%	1.4%	6.9%	12	59
7:00 - 8:00 AM	6.5%	2.0%	10.8%	17	92
8:00 - 9:00 AM	5.8%	3.1%	8.5%	27	72
9:00 - 10:00 AM	3.9%	2.9%	4.9%	24	42
10:00 - 11:00 AM	3.6%	2.4%	4.8%	21	41
11:00 - 12:00 PM	4.3%	3.8%	4.7%	33	40
12:00 - 1:00 PM	4.3%	4.5%	4.1%	39	35
1:00 - 2:00 PM	4.2%	4.0%	4.4%	34	38
2:00 - 3:00 PM	5.2%	5.6%	4.9%	48	42
3:00 - 4:00 PM	6.1%	6.9%	5.3%	59	45
4:00 - 5:00 PM	7.9%	10.1%	5.6%	87	48
5:00 - 6:00 PM	9.5%	11.4%	7.6%	98	65
6:00 - 7:00 PM	8.2%	9.7%	6.7%	83	57
7:00 - 8:00 PM	6.4%	8.1%	4.7%	69	40
8:00 - 9:00 PM	5.9%	7.7%	4.2%	66	36
9:00 - 10:00 PM	4.4%	6.0%	2.7%	51	23
10:00 - 11:00 PM	3.5%	4.7%	2.4%	40	20
11:00 - 12:00 AM	1.9%	2.5%	1.4%	21	12
		100.0%	100.0%	855	853

Enter
Exit

Right turns removed from the total side street volume

	Southbound					Eastbound					Northbound					Westbound			
	Concord Road From North					Private Driveway From West					Concord Road From South					Federal Street From East			
Start Time	Left	Thru	Right	Total		Left	Thru	Right	Total		Left	Thru	Right	Total		Left	Thru	Right	Total
Residential	0.3					0	0	0					0.7			0.7		0.3	1
Pass-by						See Table to Right													
Other Uses																			
7:00 - 8:00 AM	5			**5**		0	0	0	**0**				12	**12**		64		28	**64**
8:00 - 9:00 AM	8			**8**		0	0	0	**0**				19	**19**		50		22	**50**
9:00 - 10:00 AM	7			**7**		0	0	0	**0**				17	**17**		29		13	**29**
10:00 - 11:00 AM	6			**6**		0	0	0	**0**				15	**15**		29		12	**29**
11:00 - 12:00 PM	10			**10**		0	0	0	**0**				23	**23**		28		12	**28**
12:00 - 1:00 PM	12			**12**		0	0	0	**0**				27	**27**		25		11	**25**
1:00 - 2:00 PM	10			**10**		0	0	0	**0**				24	**24**		27		11	**27**
2:00 - 3:00 PM	14			**14**		0	0	0	**0**				34	**34**		29		13	**29**
3:00 - 4:00 PM	18			**18**		0	0	0	**0**				41	**41**		32		14	**32**
4:00 - 5:00 PM	26			**26**		0	0	0	**0**				61	**61**		34		14	**34**
5:00 - 6:00 PM	29			**29**		0	0	0	**0**				69	**69**		46		20	**46**
6:00 - 7:00 PM	25			**25**		0	0	0	**0**				58	**58**		40		17	**40**

Evaluation of Traffic Signal Warrants

Project:	T1757 - Proposed Residential Development	*Eval Date:*	Thursday, October 9, 2025
Location:	Concord Road / Federal Street	*Source:*	*MUTCD 2023*
Municipality	Billerica, MA	*Trip Gen:*	*ITE Trip Generation, 11th Edition*
Count Date:	Wednesday, July 23, 2025	*Analyst:*	TEC
Count Time:	7:00 AM - 7:00 PM		

Minor Street Roadway 1:	Private Driveway	Major Street Roadway 1:	Concord Road
Minor Street Roadway 2:	Federal Street	Major Street Roadway 2:	Concord Road
Minor Street Direction 1:	EB	Major Street Direction 1:	NB
Minor Street Direction 2:	WB	Major Street Direction 2:	SB
Minor Street Lanes:	1	Major Street Lanes:	2

Major Street 85th Speed >40 mph OR Isolated Population ≤ 10,000 persons: No

RAW DATA INPUT

VOLUMES

Time	Minor Private Driveway EB	Minor Federal Street WB	Major Concord Road NB	Major Concord Road SB
7-8 AM	1	6	784	948
8-9 AM	3	10	992	869
9-10 AM	1	8	694	722
10-11 AM	4	11	545	534
11-12 PM	4	11	663	572
12-1 PM	5	17	694	659
1-2 PM	4	25	707	636
2-3 PM	8	17	704	887
3-4 PM	8	16	821	995
4-5 PM	3	41	945	1157
5-6 PM	2	46	831	1324
6-7 PM	2	17	694	671

SEASONALLY ADJUSTED DATA

VOLUMES

Time	Minor Private Driveway EB	Minor Federal Street WB	Major Concord Road NB	Major Concord Road SB
7-8 AM	1	6	784	948
8-9 AM	3	10	992	869
9-10 AM	1	8	694	722
10-11 AM	4	11	545	534
11-12 PM	4	11	663	572
12-1 PM	5	17	694	659
1-2 PM	4	25	707	636
2-3 PM	8	17	704	887
3-4 PM	8	16	821	995
4-5 PM	3	41	945	1157
5-6 PM	2	46	831	1324
6-7 PM	2	17	694	671

Seasonal Adjustment: 0.0%

SITE-GENERATED DATA

VOLUMES

Time	Minor Private Driveway EB	Minor 115 WB	Major Concord Road NB	Major Concord Road SB
7-8 AM	0	64	12	5
8-9 AM	0	50	19	8
9-10 AM	0	29	17	7
10-11 AM	0	29	15	6
11-12 PM	0	28	23	10
12-1 PM	0	25	27	12
1-2 PM	0	27	24	10
2-3 PM	0	29	34	14
3-4 PM	0	32	41	18
4-5 PM	0	34	61	26
5-6 PM	0	46	69	29
6-7 PM	0	40	58	25

OPENING YEAR DATA

VOLUMES

Time	Minor Private Driveway EB	Minor Federal Street WB	Major Concord Road NB	Major Concord Road SB
7-8 AM	1	70	796	953
8-9 AM	3	60	1011	877
9-10 AM	1	37	711	729
10-11 AM	4	40	560	540
11-12 PM	4	39	686	582
12-1 PM	5	42	721	671
1-2 PM	4	52	731	646
2-3 PM	8	46	738	901
3-4 PM	8	48	862	1013
4-5 PM	3	75	1006	1183
5-6 PM	2	92	900	1353
6-7 PM	2	57	752	696

Annual Adjustment:	
Opening Year:	2025
Years Until Opening Year:	0

Evaluation of Traffic Signal Warrants - Warrant #1 - 8 Hour Vehicular Traffic Volume

OPENING YEAR DATA

VOLUMES

Time	Minor Private Driveway EB	Minor Federal Street WB	Major Concord Road NB	Major Concord Road SB	Total Major Street Volume
7-8 AM	1	70	796	953	1749
8-9 AM	3	60	1011	877	1888
9-10 AM	1	37	711	729	1440
10-11 AM	4	40	560	540	1100
11-12 PM	4	39	686	582	1268
12-1 PM	5	42	721	671	1392
1-2 PM	4	52	731	646	1377
2-3 PM	8	46	738	901	1639
3-4 PM	8	48	862	1013	1875
4-5 PM	3	75	1006	1183	2189
5-6 PM	2	92	900	1353	2253
6-7 PM	2	57	752	696	1448

One of the Following Conditions Must Be Met for any 8 hours of an average day (Table 4C-1)

Condition A - Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Major Street Volume (VPH) (total of both approaches)				Minor Street Volume (VPH) (critical minor street approach - one direction only)			
Major Street	Minor Street	100% [a]	80% [b]	70% [c]	56% [d]	100% [a]	80% [b]	70% [c]	56% [d]
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Major Street Volume (VPH) (total of both approaches)				Minor Street Volume (VPH) (critical minor street approach - one direction only)			
Major Street	Minor Street	100% [a]	80% [b]	70% [c]	56% [d]	100% [a]	80% [b]	70% [c]	56% [d]
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

[a] Basic Minimum Hourly Volume

[b] Used for Combination of Conditions A and B after adwquate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

[d] May be used for combination of Conditions A and B after adequate trial of remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Individual Option:

Condition A: Minimum Vehicular Volume

100%

Street	Lanes	Minimum Volume	TMC Data 7-8 AM	8-9 AM	9-10 AM	10-11 AM	11-12 PM	12-1 PM	1-2 PM	2-3 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
Major	2	600	1749	1888	1440	1100	1268	1392	1377	1639	1875	2189	2253	1448
Minor	1	150	70	60	37	40	39	42	52	46	48	75	92	57
		Met?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

OR

Condition B: Interruption of Continuous Traffic

100%

Street	Lanes	Minimum Volume	TMC Data 7-8 AM	8-9 AM	9-10 AM	10-11 AM	11-12 PM	12-1 PM	1-2 PM	2-3 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
Major	2	900	1749	1888	1440	1100	1268	1392	1377	1639	1875	2189	2253	1448
Minor	1	75	70	60	37	40	39	42	52	46	48	75	92	57
		Met?	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO

Result:	NO

Combination Option:

Condition A: Minimum Vehicular Volume

80%

Street	Lanes	Minimum Volume	TMC Data 7-8 AM	8-9 AM	9-10 AM	10-11 AM	11-12 PM	12-1 PM	1-2 PM	2-3 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
Major	2	480	1749	1888	1440	1100	1268	1392	1377	1639	1875	2189	2253	1448
Minor	1	120	70	60	37	40	39	42	52	46	48	75	92	57
		Met?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

AND

Condition B: Interruption of Continuous Traffic

80%

Street	Lanes	Minimum Volume	TMC Data 7-8 AM	8-9 AM	9-10 AM	10-11 AM	11-12 PM	12-1 PM	1-2 PM	2-3 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
Major	2	720	1749	1888	1440	1100	1268	1392	1377	1639	1875	2189	2253	1448
Minor	1	60	70	60	37	40	39	42	52	46	48	75	92	57
		Met?	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO

Result:	NO

Evaluation of Traffic Signal Warrants - Warrant #2 - 4 Hour Hour Vehicular Traffic Volume

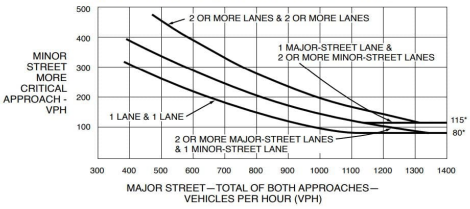
OPENING YEAR DATA

VOLUMES

Time	Minor Private Driveway EB	Minor Federal Street WB	Major Concord Road NB	Major Concord Road SB	Total Major Street Volume
7-8 AM	1	70	796	953	1749
8-9 AM	3	60	1011	877	1888
9-10 AM	1	37	711	729	1440
10-11 AM	4	40	560	540	1100
11-12 PM	4	39	686	582	1268
12-1 PM	5	42	721	671	1392
1-2 PM	4	52	731	646	1377
2-3 PM	8	46	738	901	1639
3-4 PM	8	48	862	1013	1875
4-5 PM	3	75	1006	1183	2189
5-6 PM	2	92	900	1353	2253
6-7 PM	2	57	752	696	1448

Warrant #2 - Must be met for any 4 hours of an average day

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane

Street	Lanes	Minimum Volume	TMC Data 7-8 AM	8-9 AM	9-10 AM	10-11 AM	11-12 PM	12-1 PM	1-2 PM	2-3 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
Major	2	Figure 4C-1	1749	1888	1440	1100	1268	1392	1377	1639	1875	2189	2253	1448
Minor	1	Figure 4C-1	70	60	37	40	39	42	52	46	48	75	92	57
		Met?	No	No	No	No	No	No	No	No	No	No	Yes	No

Result:	NO

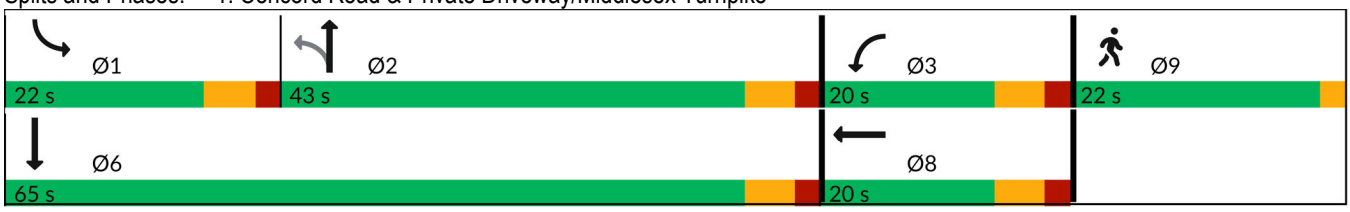
Attachment K – Capacity and Queue Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	267	0	53	0	351	494	127	779	0
Future Volume (vph)	0	0	0	267	0	53	0	351	494	127	779	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		330			2775			1149			1797	
Travel Time (s)		7.5			63.1			22.4			35.0	
Peak Hour Factor	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	6%	0%	6%	0%	4%	2%	2%	2%	2%
Shared Lane Traffic (%)				39%								
Turn Type				Prot	NA		Perm	NA		Prot	NA	
Protected Phases				3	8			2		1	6	
Permitted Phases							2					
Detector Phase				3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)				5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)				11.0	11.0		22.0	22.0		22.0	22.0	
Total Split (s)				20.0	20.0		43.0	43.0		22.0	65.0	
Total Split (%)				18.7%	18.7%		40.2%	40.2%		20.6%	60.7%	
Yellow Time (s)				4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)				2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)				0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)				6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode				None	None		Min	Min		Min	Min	

Intersection Summary

Area Type: Other
Cycle Length: 107
Actuated Cycle Length: 64.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Concord Road & Private Driveway/Middlesex Turnpike



Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	21%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None

Intersection Summary

Lane Group	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	177	171	971	138	847
v/c Ratio	0.54	0.42	0.73	0.46	0.40
Control Delay (s/veh)	32.8	14.5	15.0	31.7	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	32.8	14.5	15.0	31.7	7.0
Queue Length 50th (ft)	64	20	105	49	81
Queue Length 95th (ft)	#168	87	172	113	108
Internal Link Dist (ft)		2695	1069		1717
Turn Bay Length (ft)	150			150	
Base Capacity (vph)	361	408	2038	451	3168
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.49	0.42	0.48	0.31	0.27

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	267	0	53	0	351	494	127	779	0
Future Volume (vph)	0	0	0	267	0	53	0	351	494	127	779	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor				0.95	0.95			0.95		1.00	0.95	
Frt				1.00	0.95			0.91		1.00	1.00	
Flt Protected				0.95	0.97			1.00		0.95	1.00	
Satd. Flow (prot)				1618	1565			3203		1770	3539	
Flt Permitted				0.95	0.97			1.00		0.95	1.00	
Satd. Flow (perm)				1618	1565			3203		1770	3539	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	290	0	58	0	403	568	138	847	0
RTOR Reduction (vph)	0	0	0	0	89	0	0	239	0	0	0	0
Lane Group Flow (vph)	0	0	0	177	82	0	0	732	0	138	847	0
Heavy Vehicles (%)	0%	0%	0%	6%	0%	6%	0%	4%	2%	2%	2%	2%
Turn Type				Prot	NA		Perm	NA		Prot	NA	
Protected Phases				3	8			2		1	6	
Permitted Phases							2					
Actuated Green, G (s)				13.2	13.2			22.1		10.9	39.0	
Effective Green, g (s)				13.2	13.2			22.1		10.9	39.0	
Actuated g/C Ratio				0.21	0.21			0.34		0.17	0.61	
Clearance Time (s)				6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)				3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)				332	321			1102		300	2149	
v/s Ratio Prot				c0.11	0.05			c0.23		0.08	c0.24	
v/s Ratio Perm												
v/c Ratio				0.53	0.26			0.66		0.46	0.39	
Uniform Delay, d1				22.8	21.4			17.9		24.0	6.5	
Progression Factor				1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2				1.6	0.4			1.5		1.1	0.1	
Delay (s)				24.4	21.8			19.4		25.1	6.6	
Level of Service				C	C			B		C	A	
Approach Delay (s/veh)		0.0			23.1			19.4			9.2	
Approach LOS		A			C			B			A	

Intersection Summary

HCM 2000 Control Delay (s/veh)	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	64.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	8	0	2	4	911	53	13	962	4
Future Volume (vph)	1	0	1	8	0	2	4	911	53	13	962	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	11	12	12	12	12	12	12	12	12
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		598			981			1348			1149	
Travel Time (s)		13.6			22.3			26.3			22.4	
Peak Hour Factor	0.50	0.50	0.50	0.83	0.83	0.83	0.93	0.93	0.93	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	33%	0%	0%	0%	3%	0%	0%	4%	50%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

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	1	0	1	8	0	2	4	911	53	13	962	4
Future Vol, veh/h	1	0	1	8	0	2	4	911	53	13	962	4
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	-	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	50	83	83	83	93	93	93	88	88	88
Heavy Vehicles, %	0	0	0	33	0	0	0	3	0	0	4	50
Mvmt Flow	2	0	2	10	0	2	4	980	57	15	1093	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1623	2170	549	1593	2144	518	1098	0	0	1037	0	0
Stage 1	1125	1125	-	1017	1017	-	-	-	-	-	-	-
Stage 2	498	1045	-	576	1127	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	8.16	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	7.16	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	7.16	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.83	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	69	47	485	53	49	508	643	-	-	678	-	-
Stage 1	222	283	-	204	318	-	-	-	-	-	-	-
Stage 2	528	308	-	400	282	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	66	45	485	50	47	508	643	-	-	678	-	-
Mov Cap-2 Maneuver	66	45	-	50	47	-	-	-	-	-	-	-
Stage 1	215	274	-	202	315	-	-	-	-	-	-	-
Stage 2	520	305	-	386	273	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	36.92	76.47	0.14	0.45
HCM LOS	E	F		

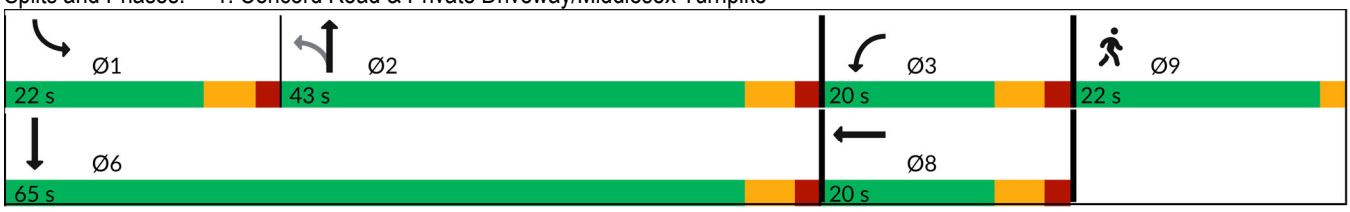
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	14	-	-	117	50	508	48	-	-
HCM Lane V/C Ratio	0.007	-	-	0.034	0.191	0.005	0.022	-	-
HCM Ctrl Dly (s/v)	10.6	0.1	-	36.9	92.6	12.1	10.4	0.3	-
HCM Lane LOS	B	A	-	E	F	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.6	0	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	826	0	191	0	631	261	71	419	0
Future Volume (vph)	0	0	0	826	0	191	0	631	261	71	419	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		330			2775			1149			1797	
Travel Time (s)		7.5			63.1			22.4			35.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	2%	0%	1%	0%	1%	2%	2%	1%	0%
Shared Lane Traffic (%)				37%								
Turn Type				Prot	NA		Perm	NA		Prot	NA	
Protected Phases				3	8			2		1	6	
Permitted Phases							2					
Detector Phase				3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)				5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)				11.0	11.0		22.0	22.0		22.0	22.0	
Total Split (s)				20.0	20.0		43.0	43.0		22.0	65.0	
Total Split (%)				18.7%	18.7%		40.2%	40.2%		20.6%	60.7%	
Yellow Time (s)				4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)				2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)				0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)				6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode				None	None		Min	Min		Min	Min	

Intersection Summary

Area Type: Other
Cycle Length: 107
Actuated Cycle Length: 66.5
Natural Cycle: 140
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Concord Road & Private Driveway/Middlesex Turnpike



Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	21%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None

Intersection Summary

Lane Group	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	566	540	959	78	460
v/c Ratio	1.58	1.24	0.72	0.34	0.21
Control Delay (s/veh)	297.7	150.6	19.5	32.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	297.7	150.6	19.5	32.5	6.0
Queue Length 50th (ft)	~345	~249	155	29	38
Queue Length 95th (ft)	#663	#541	231	75	55
Internal Link Dist (ft)		2695	1069		1717
Turn Bay Length (ft)	150			150	
Base Capacity (vph)	359	435	1954	432	3175
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.58	1.24	0.49	0.18	0.14

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	826	0	191	0	631	261	71	419	0
Future Volume (vph)	0	0	0	826	0	191	0	631	261	71	419	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor				0.95	0.95			0.95		1.00	0.95	
Frt				1.00	0.94			0.96		1.00	1.00	
Flt Protected				0.95	0.97			1.00		0.95	1.00	
Satd. Flow (prot)				1681	1624			3407		1770	3574	
Flt Permitted				0.95	0.97			1.00		0.95	1.00	
Satd. Flow (perm)				1681	1624			3407		1770	3574	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	898	0	208	0	678	281	78	460	0
RTOR Reduction (vph)	0	0	0	0	88	0	0	40	0	0	0	0
Lane Group Flow (vph)	0	0	0	566	452	0	0	919	0	78	460	0
Heavy Vehicles (%)	2%	2%	2%	2%	0%	1%	0%	1%	2%	2%	1%	0%
Turn Type				Prot	NA		Perm	NA		Prot	NA	
Protected Phases				3	8			2		1	6	
Permitted Phases							2					
Actuated Green, G (s)				14.2	14.2			25.5		8.6	40.1	
Effective Green, g (s)				14.2	14.2			25.5		8.6	40.1	
Actuated g/C Ratio				0.21	0.21			0.38		0.13	0.60	
Clearance Time (s)				6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)				3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)				360	347			1310		229	2161	
v/s Ratio Prot				c0.34	0.28			c0.27		c0.04	0.13	
v/s Ratio Perm												
v/c Ratio				1.57	1.30			0.70		0.34	0.21	
Uniform Delay, d1				26.1	26.1			17.2		26.3	5.9	
Progression Factor				1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2				270.6	155.7			1.7		0.9	0.0	
Delay (s)				296.6	181.7			18.9		27.2	6.0	
Level of Service				F	F			B		C	A	
Approach Delay (s/veh)		0.0			240.5			18.9			9.1	
Approach LOS		A			F			B			A	

Intersection Summary

HCM 2000 Control Delay (s/veh)	111.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	4	47	0	15	5	890	10	4	1304	4
Future Volume (vph)	5	0	4	47	0	15	5	890	10	4	1304	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	12	12	12	12	12	12	12	12	12
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		598			981			1348			1149	
Travel Time (s)		13.6			22.3			26.3			22.4	
Peak Hour Factor	0.56	0.56	0.56	0.74	0.74	0.74	0.91	0.91	0.91	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	4%	0%	6%	0%	2%	25%	14%	2%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	4	47	0	15	5	890	10	4	1304	4
Future Vol, veh/h	5	0	4	47	0	15	5	890	10	4	1304	4
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	-	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	56	56	56	74	74	74	91	91	91	88	88	88
Heavy Vehicles, %	0	0	0	4	0	6	0	2	25	14	2	0
Mvmt Flow	9	0	7	64	0	20	5	978	11	5	1482	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1993	2493	743	1745	2490	495	1486	0	0	989	0	0
Stage 1	1493	1493	-	995	995	-	-	-	-	-	-	-
Stage 2	500	1000	-	750	1495	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.58	6.5	7.02	4.1	-	-	4.38	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.58	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.58	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.54	4	3.36	2.2	-	-	2.34	-	-
Pot Cap-1 Maneuver	37	30	362	~ 54	30	510	458	-	-	626	-	-
Stage 1	132	188	-	259	325	-	-	-	-	-	-	-
Stage 2	527	324	-	365	188	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	34	29	362	~ 51	29	510	458	-	-	626	-	-
Mov Cap-2 Maneuver	34	29	-	~ 51	29	-	-	-	-	-	-	-
Stage 1	130	186	-	255	320	-	-	-	-	-	-	-
Stage 2	497	318	-	353	186	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	90.98	254.66	0.28	0.16
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	20	-	-	57	51	510	11	-	-
HCM Lane V/C Ratio	0.012	-	-	0.281	1.235	0.04	0.007	-	-
HCM Ctrl Dly (s/v)	13	0.2	-	91	$ 332	12.4	10.8	0.1	-
HCM Lane LOS	B	A	-	F	F	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	1	5.7	0.1	0	-	-

Notes

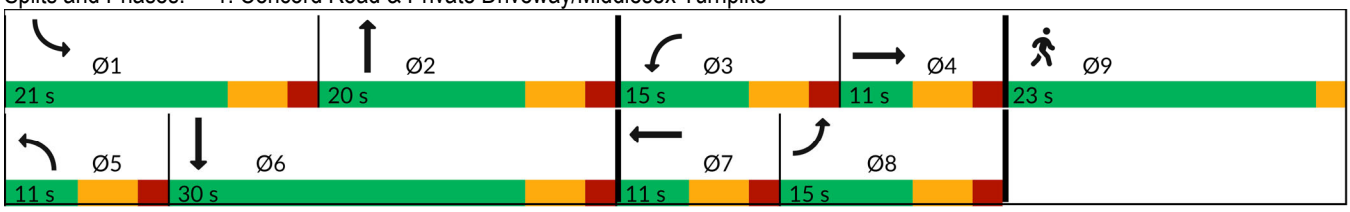
~: Volume exceeds capacity $: Delay exceeds 300s
+: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	2	17	294	7	56	97	358	496	127	835	0
Future Volume (vph)	10	2	17	294	7	56	97	358	496	127	835	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		330			2775			1149			1797	
Travel Time (s)		7.5			63.1			22.4			35.0	
Peak Hour Factor	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	6%	0%	6%	0%	4%	2%	2%	2%	2%
Shared Lane Traffic (%)				38%								
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	8	4		3	7		5	2		1	6	
Permitted Phases												
Detector Phase	8	4		3	7		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	15.0	11.0		15.0	11.0		11.0	20.0		21.0	30.0	
Total Split (%)	16.7%	12.2%		16.7%	12.2%		12.2%	22.2%		23.3%	33.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		Min	Min	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 61.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Concord Road & Private Driveway/Middlesex Turnpike



Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	26%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	10	20	198	191	111	981	138	908
v/c Ratio	0.05	0.13	0.80	0.73	0.72	0.83	0.47	0.68
Control Delay (s/veh)	30.6	19.8	53.7	44.6	59.5	23.5	31.0	21.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	30.6	19.8	53.7	44.6	59.5	23.5	31.0	21.9
Queue Length 50th (ft)	3	1	67	56	37	94	42	116
Queue Length 95th (ft)	21	24	#288	#260	#170	#384	129	#395
Internal Link Dist (ft)		250		2695		1069		1717
Turn Bay Length (ft)	150		150		150		150	
Base Capacity (vph)	278	157	249	260	154	1180	454	1453
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.13	0.80	0.73	0.72	0.83	0.30	0.62

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	2	17	294	7	56	97	358	496	127	835	0
Future Volume (vph)	10	2	17	294	7	56	97	358	496	127	835	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.95		1.00	0.91		1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1644		1618	1575		1805	3204		1770	3539	
Flt Permitted	0.95	1.00		0.95	0.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1644		1618	0		1805	3204		1770	3539	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	10	2	18	320	8	61	111	411	570	138	908	0
RTOR Reduction (vph)	0	18	0	0	18	0	0	240	0	0	0	0
Lane Group Flow (vph)	10	2	0	198	173	0	111	741	0	138	908	0
Heavy Vehicles (%)	0%	0%	0%	6%	0%	6%	0%	4%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	8	4		3	7		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.2	0.7		9.4	9.4		5.2	18.1		10.2	23.1	
Effective Green, g (s)	1.2	0.7		9.4	9.4		5.2	18.1		10.2	23.1	
Actuated g/C Ratio	0.02	0.01		0.14	0.14		0.08	0.27		0.15	0.34	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	32	17		226	220		139	862		268	1216	
v/s Ratio Prot	c0.01	0.00		c0.12	0.11		0.06	c0.23		c0.08	c0.26	
v/s Ratio Perm												
v/c Ratio	0.31	0.13		0.88	0.79		0.80	0.86		0.51	0.75	
Uniform Delay, d1	32.6	32.9		28.3	27.9		30.5	23.3		26.2	19.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.5	3.4		29.3	16.7		26.5	8.5		1.7	2.5	
Delay (s)	38.1	36.4		57.6	44.6		56.9	31.9		27.9	22.0	
Level of Service	D	D		E	D		E	C		C	C	
Approach Delay (s/veh)		36.9			51.2			34.4			22.8	
Approach LOS		D			D			C			C	

Intersection Summary

HCM 2000 Control Delay (s/veh)	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	26.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	29	0	11	4	1064	215	73	1046	4
Future Volume (vph)	1	0	1	29	0	11	4	1064	215	73	1046	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	12	12	12	12	12	12	12	12	12
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		598			981			1348			1149	
Travel Time (s)		13.6			22.3			26.3			22.4	
Peak Hour Factor	0.50	0.50	0.50	0.83	0.83	0.83	0.93	0.93	0.93	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	33%	0%	0%	0%	3%	0%	0%	4%	50%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Intersection

Int Delay, s/veh 14.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	1	29	0	11	4	1064	215	73	1046	4
Future Vol, veh/h	1	0	1	29	0	11	4	1064	215	73	1046	4
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	-	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	50	83	83	83	93	93	93	88	88	88
Heavy Vehicles, %	0	0	0	33	0	0	0	3	0	0	4	50
Mvmt Flow	2	0	2	35	0	13	4	1144	231	83	1189	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1937	2741	597	2029	2627	688	1193	0	0	1375	0	0
Stage 1	1357	1357	-	1268	1268	-	-	-	-	-	-	-
Stage 2	581	1384	-	760	1359	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	8.16	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	7.16	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	7.16	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.83	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	40	20	451	~ 23	24	394	592	-	-	505	-	-
Stage 1	160	219	-	137	242	-	-	-	-	-	-	-
Stage 2	472	213	-	302	219	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	29	15	451	~ 17	18	394	592	-	-	505	-	-
Mov Cap-2 Maneuver	29	15	-	~ 17	18	-	-	-	-	-	-	-
Stage 1	121	165	-	136	239	-	-	-	-	-	-	-
Stage 2	450	210	-	227	165	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	76.08	$ 689.81	0.14	3.59
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	9	-	-	55	17	394	233	-	-
HCM Lane V/C Ratio	0.007	-	-	0.073	2.039	0.034	0.164	-	-
HCM Ctrl Dly (s/v)	11.1	0.1	-	76.1	$ 946	14.5	13.5	2.9	-
HCM Lane LOS	B	A	-	F	F	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	4.9	0.1	0.6	-	-

Notes

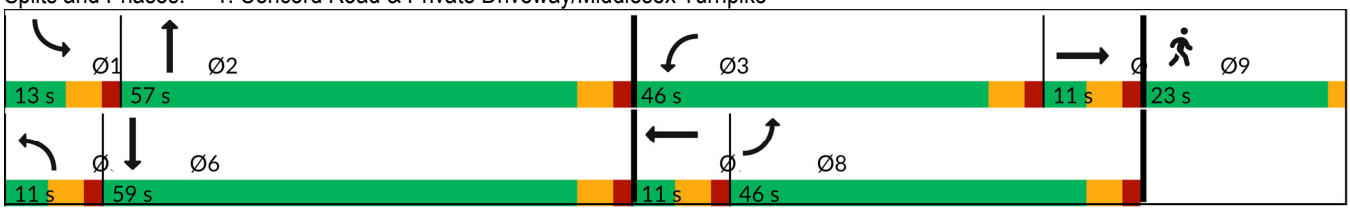
~: Volume exceeds capacity $: Delay exceeds 300s
+: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	7	65	878	2	203	25	714	287	75	482	0
Future Volume (vph)	39	7	65	878	2	203	25	714	287	75	482	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		330			2775			1149			1797	
Travel Time (s)		7.5			63.1			22.4			35.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	2%	0%	1%	0%	1%	2%	2%	1%	0%
Shared Lane Traffic (%)				37%								
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	8	4		3	7		5	2		1	6	
Permitted Phases												
Detector Phase	8	4		3	7		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	46.0	11.0		46.0	11.0		11.0	57.0		13.0	59.0	
Total Split (%)	30.7%	7.3%		30.7%	7.3%		7.3%	38.0%		8.7%	39.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		Min	Min	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 125.6
Natural Cycle: 150
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Concord Road & Private Driveway/Middlesex Turnpike



Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	15%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	42	79	601	576	27	1077	82	530
v/c Ratio	0.12	0.59	1.11	1.08	0.38	0.86	0.83	0.36
Control Delay (s/veh)	38.0	36.1	113.2	100.7	78.3	44.5	112.3	28.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	38.0	36.1	113.2	100.7	78.3	44.5	112.3	28.0
Queue Length 50th (ft)	23	6	~558	~509	21	384	65	154
Queue Length 95th (ft)	64	#81	#1056	#990	#65	#638	#200	261
Internal Link Dist (ft)		250		2695		1069		1717
Turn Bay Length (ft)	150		150		150		150	
Base Capacity (vph)	569	133	541	535	72	1425	99	1534
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.59	1.11	1.08	0.38	0.76	0.83	0.35

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	7	65	878	2	203	25	714	287	75	482	0
Future Volume (vph)	39	7	65	878	2	203	25	714	287	75	482	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.94		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1612		1681	1624		1805	3411		1770	3574	
Flt Permitted	0.95	1.00		0.95	0.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1612		1681	0		1805	3411		1770	3574	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	42	8	71	954	2	221	27	768	309	82	530	0
RTOR Reduction (vph)	0	67	0	0	14	0	0	28	0	0	0	0
Lane Group Flow (vph)	42	12	0	601	562	0	27	1049	0	82	530	0
Heavy Vehicles (%)	2%	2%	2%	2%	0%	1%	0%	1%	2%	2%	1%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	8	4		3	7		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	22.9	7.7		40.4	40.4		2.9	47.6		7.1	51.8	
Effective Green, g (s)	22.9	7.7		40.4	40.4		2.9	47.6		7.1	51.8	
Actuated g/C Ratio	0.17	0.06		0.31	0.31		0.02	0.36		0.05	0.39	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	306	93		513	495		39	1227		94	1399	
v/s Ratio Prot	c0.02	0.01		c0.36	0.35		0.01	c0.31		c0.05	c0.15	
v/s Ratio Perm												
v/c Ratio	0.14	0.13		1.17	1.14		0.69	0.85		0.87	0.38	
Uniform Delay, d1	46.3	59.1		46.0	46.0		64.3	39.2		62.2	28.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.6		96.4	83.3		41.8	6.0		53.6	0.2	
Delay (s)	46.5	59.8		142.3	129.3		106.1	45.2		115.8	28.9	
Level of Service	D	E		F	F		F	D		F	C	
Approach Delay (s/veh)		55.2			135.9			46.7			40.6	
Approach LOS		E			F			D			D	

Intersection Summary

HCM 2000 Control Delay (s/veh)	80.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	132.3	Sum of lost time (s)	26.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	4	197	0	70	5	969	41	15	1477	4
Future Volume (vph)	5	0	4	197	0	70	5	969	41	15	1477	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	12	12	12	12	12	12	12	12	12
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		598			981			1348			1149	
Travel Time (s)		13.6			22.3			26.3			22.4	
Peak Hour Factor	0.56	0.56	0.56	0.74	0.74	0.74	0.91	0.91	0.91	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	4%	0%	6%	0%	2%	25%	14%	2%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Intersection

Int Delay, s/veh 289.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	4	197	0	70	5	969	41	15	1477	4
Future Vol, veh/h	5	0	4	197	0	70	5	969	41	15	1477	4
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	-	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	56	56	56	74	74	74	91	91	91	88	88	88
Heavy Vehicles, %	0	0	0	4	0	6	0	2	25	14	2	0
Mvmt Flow	9	0	7	266	0	95	5	1065	45	17	1678	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2258	2836	841	1972	2815	555	1683	0	0	1110	0	0
Stage 1	1715	1715	-	1098	1098	-	-	-	-	-	-	-
Stage 2	543	1121	-	873	1717	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.58	6.5	7.02	4.1	-	-	4.38	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.58	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.58	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.54	4	3.36	2.2	-	-	2.34	-	-
Pot Cap-1 Maneuver	23	18	312	~ 36	18	465	385	-	-	560	-	-
Stage 1	96	147	-	~ 223	291	-	-	-	-	-	-	-
Stage 2	496	284	-	307	146	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	17	16	312	~ 33	17	465	385	-	-	560	-	-
Mov Cap-2 Maneuver	17	16	-	~ 33	17	-	-	-	-	-	-	-
Stage 1	90	138	-	~ 219	285	-	-	-	-	-	-	-
Stage 2	387	278	-	283	138	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	229.12	$ 2548.52	0.35	0.76
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	17	-	-	29	33	465	36	-	-
HCM Lane V/C Ratio	0.014	-	-	0.551	8.14	0.203	0.03	-	-
HCM Ctrl Dly (s/v)	14.5	0.3	-	229.3	$ 3448.9	14.7	11.6	0.7	-
HCM Lane LOS	B	A	-	F	F	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	1.8	32.3	0.8	0.1	-	-

Notes

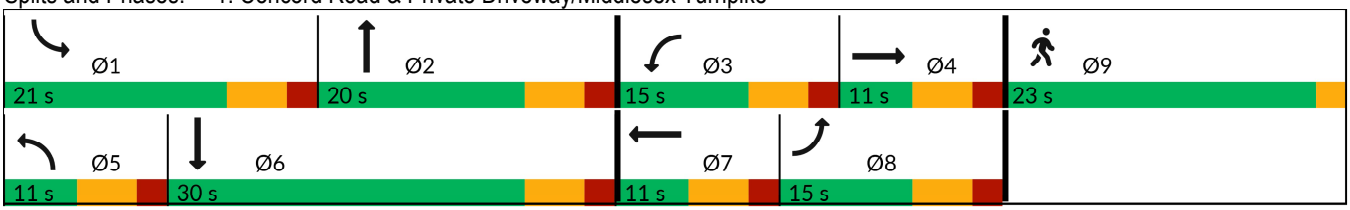
~: Volume exceeds capacity $: Delay exceeds 300s
+: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	2	17	287	7	56	97	363	505	127	790	0
Future Volume (vph)	10	2	17	287	7	56	97	363	505	127	790	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		330			2775			1149			1797	
Travel Time (s)		7.5			63.1			22.4			35.0	
Peak Hour Factor	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	6%	0%	6%	0%	4%	2%	2%	2%	2%
Shared Lane Traffic (%)				38%								
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	8	4		3	7		5	2		1	6	
Permitted Phases												
Detector Phase	8	4		3	7		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	15.0	11.0		15.0	11.0		11.0	20.0		21.0	30.0	
Total Split (%)	16.7%	12.2%		16.7%	12.2%		12.2%	22.2%		23.3%	33.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	

Intersection Summary

Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 59.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 1: Concord Road & Private Driveway/Middlesex Turnpike



Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	26%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	10	20	193	188	111	997	138	859
v/c Ratio	0.05	0.12	0.75	0.70	0.69	0.78	0.46	0.68
Control Delay (s/veh)	30.5	19.8	48.8	41.6	56.2	21.3	30.2	21.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	30.5	19.8	48.8	41.6	56.2	21.3	30.2	21.9
Queue Length 50th (ft)	3	1	62	52	35	96	40	107
Queue Length 95th (ft)	21	24	#281	#254	#170	#394	129	#362
Internal Link Dist (ft)		250		2695		1069		1717
Turn Bay Length (ft)	150		150		150		150	
Base Capacity (vph)	287	162	257	268	160	1277	469	1502
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.12	0.75	0.70	0.69	0.78	0.29	0.57

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	2	17	287	7	56	97	363	505	127	790	0
Future Volume (vph)	10	2	17	287	7	56	97	363	505	127	790	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.95		1.00	0.91		1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1644		1618	1574		1805	3204		1770	3539	
Flt Permitted	0.95	1.00		0.95	0.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	1644		1618	0		1805	3204		1770	3539	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.87	0.87	0.87	0.92	0.92	0.92
Adj. Flow (vph)	10	2	18	312	8	61	111	417	580	138	859	0
RTOR Reduction (vph)	0	18	0	0	18	0	0	234	0	0	0	0
Lane Group Flow (vph)	10	2	0	193	170	0	111	763	0	138	859	0
Heavy Vehicles (%)	0%	0%	0%	6%	0%	6%	0%	4%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	8	4		3	7		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.3	0.7		9.5	9.5		5.3	19.6		8.5	22.8	
Effective Green, g (s)	1.3	0.7		9.5	9.5		5.3	19.6		8.5	22.8	
Actuated g/C Ratio	0.02	0.01		0.14	0.14		0.08	0.29		0.13	0.34	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	34	17		229	222		142	935		224	1202	
v/s Ratio Prot	c0.01	0.00		c0.12	0.11		0.06	c0.24		c0.08	c0.24	
v/s Ratio Perm												
v/c Ratio	0.29	0.13		0.84	0.77		0.78	0.82		0.62	0.71	
Uniform Delay, d1	32.4	32.9		28.1	27.7		30.3	22.1		27.8	19.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	3.4		23.5	14.5		23.8	5.6		5.0	2.0	
Delay (s)	37.2	36.3		51.6	42.3		54.2	27.6		32.7	21.4	
Level of Service	D	D		D	D		D	C		C	C	
Approach Delay (s/veh)		36.6			47.0			30.3			22.9	
Approach LOS		D			D			C			C	

Intersection Summary

HCM 2000 Control Delay (s/veh)	30.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	26.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	63	0	25	4	1064	73	21	1046	4
Future Volume (vph)	1	0	1	63	0	25	4	1064	73	21	1046	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	12	12	12	12	12	12	12	12	12
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		598			981			1348			1149	
Travel Time (s)		13.6			22.3			26.3			22.4	
Peak Hour Factor	0.50	0.50	0.50	0.83	0.83	0.83	0.93	0.93	0.93	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	33%	0%	0%	0%	3%	0%	0%	4%	50%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type: Unsignalized	

Intersection												
Int Delay, s/veh	28.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	1	63	0	25	4	1064	73	21	1046	4
Future Vol, veh/h	1	0	1	63	0	25	4	1064	73	21	1046	4
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	-	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	50	83	83	83	93	93	93	88	88	88
Heavy Vehicles, %	0	0	0	33	0	0	0	3	0	0	4	50
Mvmt Flow	2	0	2	76	0	30	4	1144	78	24	1189	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1819	2470	597	1834	2433	611	1193	0	0	1223	0	0
Stage 1	1239	1239	-	1192	1192	-	-	-	-	-	-	-
Stage 2	581	1231	-	642	1241	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	8.16	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	7.16	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	7.16	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.83	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	50	31	451	~ 33	32	442	592	-	-	577	-	-
Stage 1	189	250	-	155	263	-	-	-	-	-	-	-
Stage 2	472	252	-	362	249	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	43	28	451	~ 31	30	442	592	-	-	577	-	-
Mov Cap-2 Maneuver	43	28	-	~ 31	30	-	-	-	-	-	-	-
Stage 1	177	234	-	153	260	-	-	-	-	-	-	-
Stage 2	435	249	-	338	234	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	53.47	$ 673.11	0.15	0.89
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	12	-	-	78	31	442	70	-	-
HCM Lane V/C Ratio	0.007	-	-	0.051	2.456	0.068	0.041	-	-
HCM Ctrl Dly (s/v)	11.1	0.1	-	53.5	$ 934.8	13.7	11.5	0.7	-
HCM Lane LOS	B	A	-	F	F	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	8.8	0.2	0.1	-	-

Notes

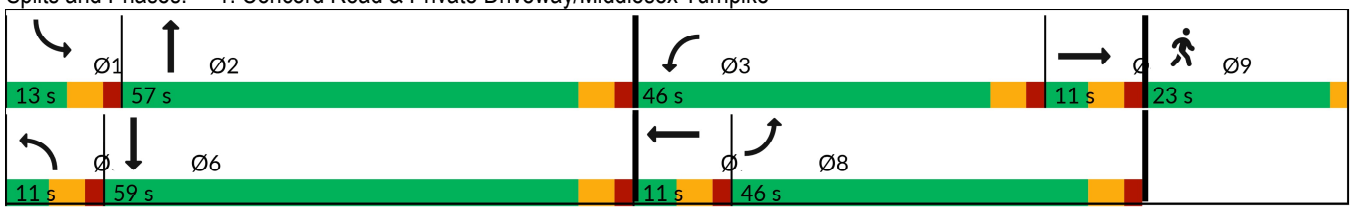
~: Volume exceeds capacity $: Delay exceeds 300s
+: Computation Not Defined *: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	7	65	888	2	203	25	677	284	75	486	0
Future Volume (vph)	39	7	65	888	2	203	25	677	284	75	486	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		330			2775			1149			1797	
Travel Time (s)		7.5			63.1			22.4			35.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	2%	0%	1%	0%	1%	2%	2%	1%	0%
Shared Lane Traffic (%)				37%								
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	8	4		3	7		5	2		1	6	
Permitted Phases												
Detector Phase	8	4		3	7		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Total Split (s)	46.0	11.0		46.0	11.0		11.0	57.0		13.0	59.0	
Total Split (%)	30.7%	7.3%		30.7%	7.3%		7.3%	38.0%		8.7%	39.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	

Intersection Summary

Area Type:	Other
Cycle Length: 150	
Actuated Cycle Length: 123	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 1: Concord Road & Private Driveway/Middlesex Turnpike



Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	23.0
Total Split (s)	23.0
Total Split (%)	15%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	42	79	608	580	27	1033	82	534
v/c Ratio	0.11	0.59	1.10	1.06	0.36	0.86	0.80	0.37
Control Delay (s/veh)	37.1	35.4	107.6	93.7	76.7	44.6	107.2	28.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.1	35.4	107.6	93.7	76.7	44.6	107.2	28.5
Queue Length 50th (ft)	22	6	~545	~492	21	361	63	155
Queue Length 95th (ft)	64	#81	#1071	#1001	#65	574	#200	263
Internal Link Dist (ft)		250		2695		1069		1717
Turn Bay Length (ft)	150		150		150		150	
Base Capacity (vph)	583	134	553	548	74	1457	102	1559
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.59	1.10	1.06	0.36	0.71	0.80	0.34

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	7	65	888	2	203	25	677	284	75	486	0
Future Volume (vph)	39	7	65	888	2	203	25	677	284	75	486	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.94		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1612		1681	1625		1805	3406		1770	3574	
Flt Permitted	0.95	1.00		0.95	0.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1612		1681	0		1805	3406		1770	3574	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.91	0.91	0.91
Adj. Flow (vph)	42	8	71	965	2	221	27	728	305	82	534	0
RTOR Reduction (vph)	0	67	0	0	14	0	0	30	0	0	0	0
Lane Group Flow (vph)	42	12	0	608	566	0	27	1003	0	82	534	0
Heavy Vehicles (%)	2%	2%	2%	2%	0%	1%	0%	1%	2%	2%	1%	0%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	8	4		3	7		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	22.8	7.8		40.5	40.5		2.8	44.8		7.1	49.1	
Effective Green, g (s)	22.8	7.8		40.5	40.5		2.8	44.8		7.1	49.1	
Actuated g/C Ratio	0.18	0.06		0.31	0.31		0.02	0.35		0.05	0.38	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	311	97		525	507		38	1177		96	1354	
v/s Ratio Prot	c0.02	0.01		c0.36	0.35		0.01	c0.29		c0.05	c0.15	
v/s Ratio Perm												
v/c Ratio	0.14	0.13		1.16	1.12		0.71	0.85		0.85	0.39	
Uniform Delay, d1	45.1	57.7		44.6	44.6		63.0	39.3		60.7	29.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.6		90.8	76.1		47.3	6.1		48.1	0.2	
Delay (s)	45.3	58.3		135.4	120.6		110.3	45.5		108.9	29.6	
Level of Service	D	E		F	F		F	D		F	C	
Approach Delay (s/veh)		53.8			128.2			47.1			40.1	
Approach LOS		D			F			D			D	

Intersection Summary

HCM 2000 Control Delay (s/veh)	78.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	129.6	Sum of lost time (s)	26.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	4	84	0	30	5	969	68	29	1477	4
Future Volume (vph)	5	0	4	84	0	30	5	969	68	29	1477	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	12	12	12	12	12	12	12	12	12
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		598			981			1348			1149	
Travel Time (s)		13.6			22.3			26.3			22.4	
Peak Hour Factor	0.56	0.56	0.56	0.74	0.74	0.74	0.91	0.91	0.91	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	4%	0%	6%	0%	2%	25%	14%	2%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection												
Int Delay, s/veh	63.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	4	84	0	30	5	969	68	29	1477	4
Future Vol, veh/h	5	0	4	84	0	30	5	969	68	29	1477	4
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	-	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	56	56	56	74	74	74	91	91	91	88	88	88
Heavy Vehicles, %	0	0	0	4	0	6	0	2	25	14	2	0
Mvmt Flow	9	0	7	114	0	41	5	1065	75	33	1678	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2290	2897	841	2018	2862	570	1683	0	0	1140	0	0
Stage 1	1747	1747	-	1113	1113	-	-	-	-	-	-	-
Stage 2	543	1151	-	905	1749	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.58	6.5	7.02	4.1	-	-	4.38	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.58	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.58	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.54	4	3.36	2.2	-	-	2.34	-	-
Pot Cap-1 Maneuver	22	16	312	~ 33	17	455	385	-	-	544	-	-
Stage 1	91	141	-	219	286	-	-	-	-	-	-	-
Stage 2	496	275	-	294	141	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	17	14	312	~ 28	15	455	385	-	-	544	-	-
Mov Cap-2 Maneuver	17	14	-	~ 28	15	-	-	-	-	-	-	-
Stage 1	81	125	-	214	280	-	-	-	-	-	-	-
Stage 2	443	269	-	254	125	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	224.11	$ 1211.33	0.35	1.52
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	16	-	-	30	28	455	69	-	-
HCM Lane V/C Ratio	0.014	-	-	0.542	4.01	0.089	0.061	-	-
HCM Ctrl Dly (s/v)	14.5	0.3	-	224.3	$ 1639.1	13.7	12	1.3	-
HCM Lane LOS	B	A	-	F	F	B	B	A	-
HCM 95th %tile Q(veh)	0	-	-	1.7	13.7	0.3	0.2	-	-

Notes

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

Attachment L – Parking Generation Data

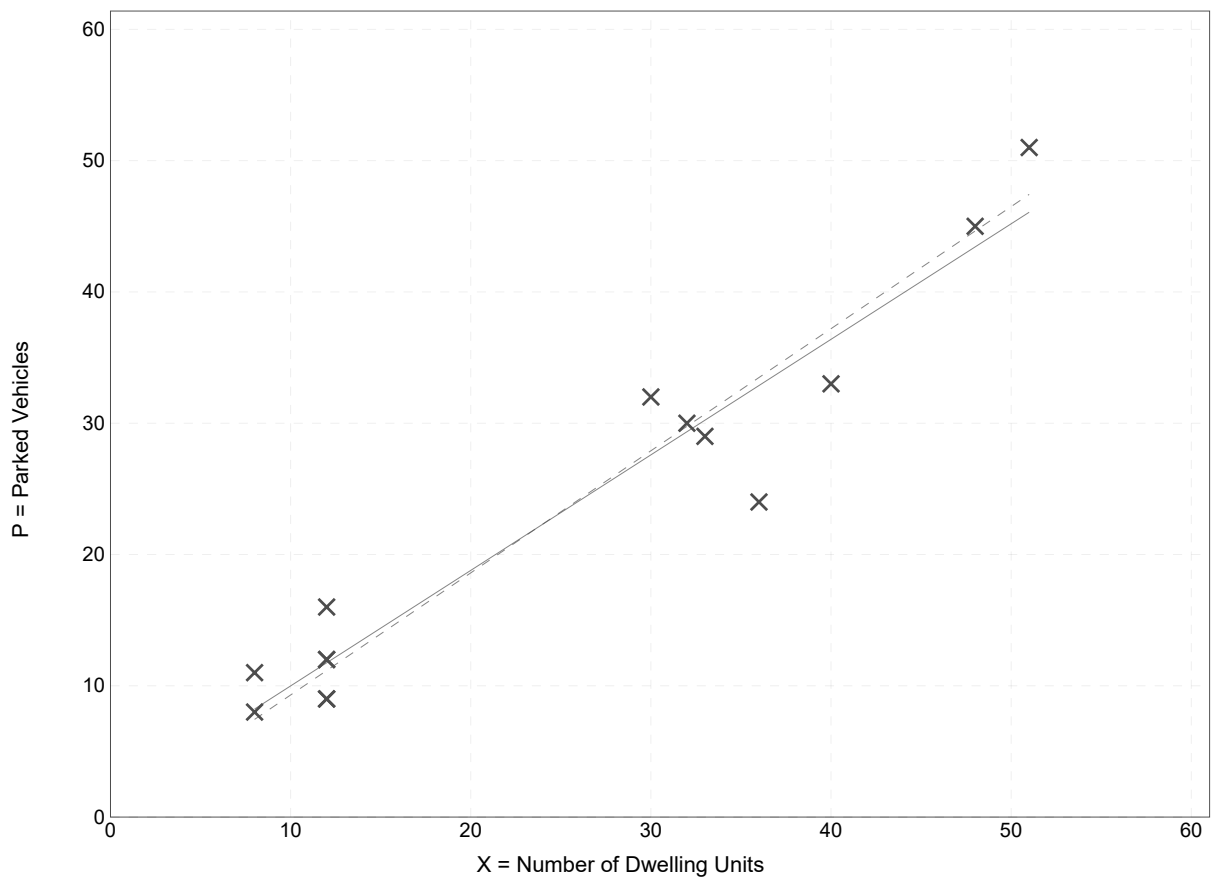
Multifamily Housing - 1 BR (Low-Rise) - Not Close to Rail Transit
(217)

Peak Period Parking Demand vs: **Dwelling Units**
On a: **Weekday (Monday - Friday)**
Setting/Location: **General Urban/Suburban**
Number of Studies: 14
Avg. Num. of Dwelling Units: 25

Peak Period Parking Demand per Dwelling Unit

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.93	0.67 - 1.38	0.88 / 1.27	***	0.16 (17%)

Data Plot and Equation



Fitted Curve Equation: P = 0.88(X) + 1.19 **R^2= 0.93**

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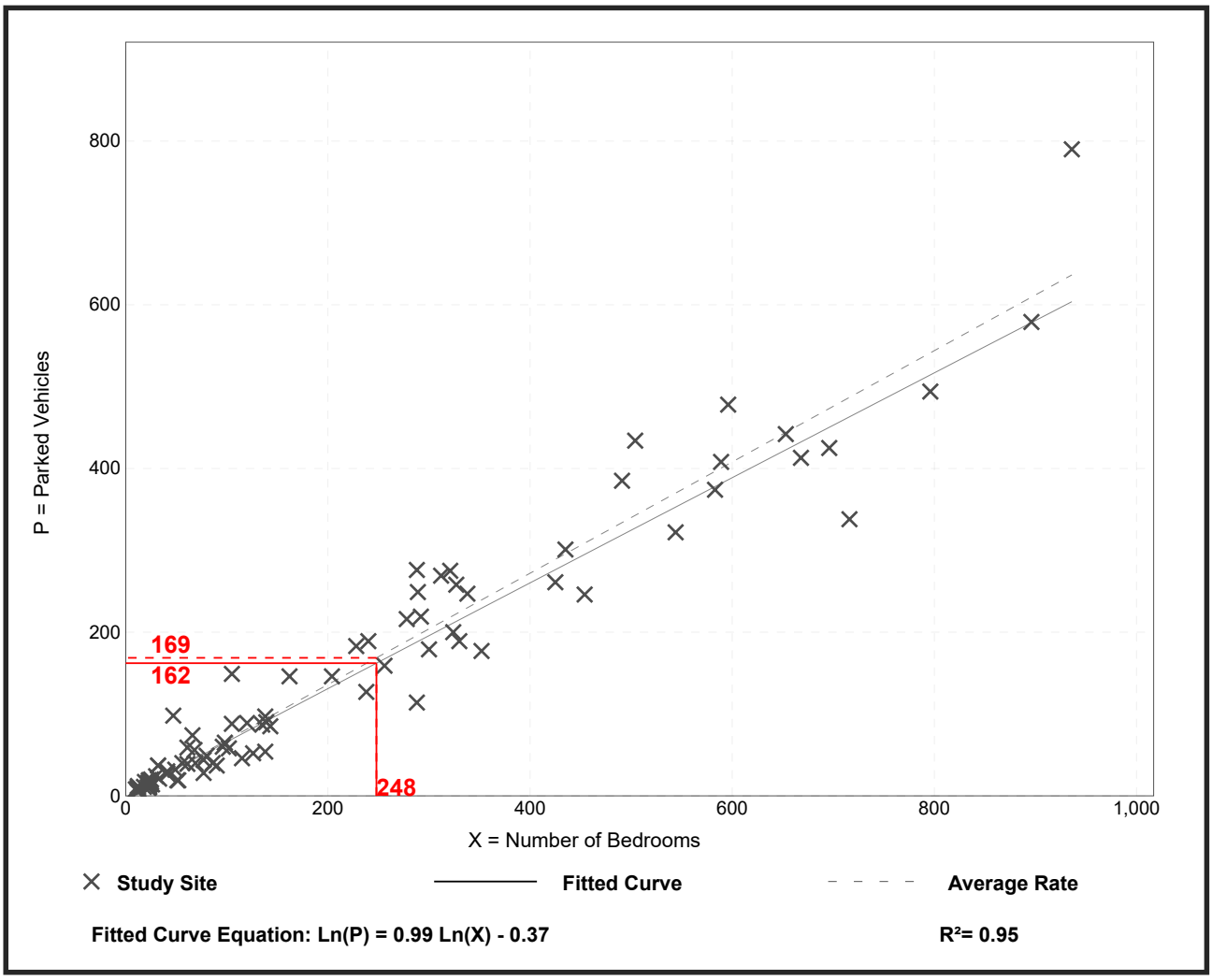
Multifamily Housing - 2+ BR (Low-Rise) - Not Close to Rail Transit (220)

Peak Period Parking Demand vs:	**Bedrooms**
On a:	**Weekday (Monday - Friday)**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	97
Avg. Num. of Bedrooms:	192

Peak Period Parking Demand per Bedroom

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.68	0.36 - 2.09	0.61 / 0.86	0.65 - 0.71	0.16 (24%)

Data Plot and Equation



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