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Planners & Engineers

PRINCIPALS
Robert J. Michaud, P.E.
Daniel J. Mills, P.E., PTOE

# M E M O R A N D U M

**DATE:** April 15, 2024

**TO:** Sean Szekely
Szecon Development, Inc.
142 Haggett's Pond Road
Andover, MA 01810

**FROM:** Daniel J. Mills, P.E., PTOE – Principal
Daniel A. Dumais, P.E. – Senior Project Manager

**RE:** **Proposed Residential Development**
164 Essex Street – Melrose, MA

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MDM Transportation Consultants, Inc. (MDM) has prepared this traffic impact memorandum (TIM) for the proposed residential development to be located at 164 Essex Street in Melrose, Massachusetts. The location of the site relative to adjacent roadways is shown in **Figure 1**. This TIA provides a summary of the baseline traffic conditions at the Site and adjacent roadways/ intersections, evaluates existing and projected trip generation, quantifies incremental traffic impacts of the Site development on area roadways, and evaluates safety-related conditions at key study locations that provide access to the Site.

Key findings of the traffic memorandum are as follows:

- *Baseline Traffic Volumes*. The weekday daily traffic volume on Essex Street (urban collector) carries approximately 3,220 vehicles per day (vpd) on a weekday. Peak hour traffic flow on Essex Street ranges from approximately 252 to 359 vehicles per hour (vph) representing 8 to 11 percent of daily traffic flow. Vehicle flow patterns are oriented in the southbound direction during both the morning and evening peak hours.

- *Observed Travel Speeds.* The regulatory posted speed limit along Essex Street in the immediate site vicinity is 25 mph. A survey of travel speeds using a radar recorder during a weekday indicates 85$^{th}$ percentile speeds of 29 mph northbound and 29 mph southbound.

- *Alternative Transportation Modes*. A review of census data for the study area indicates alternative transportation (transit, walk, bike, and work from home) use of 48% for residents of the immediate study area (Census tract 3364.02); therefore, utilizing the 'Dense, Multi-Use Urban Close to Transit' classification when estimating proposed residential trip activity is valid and justified.

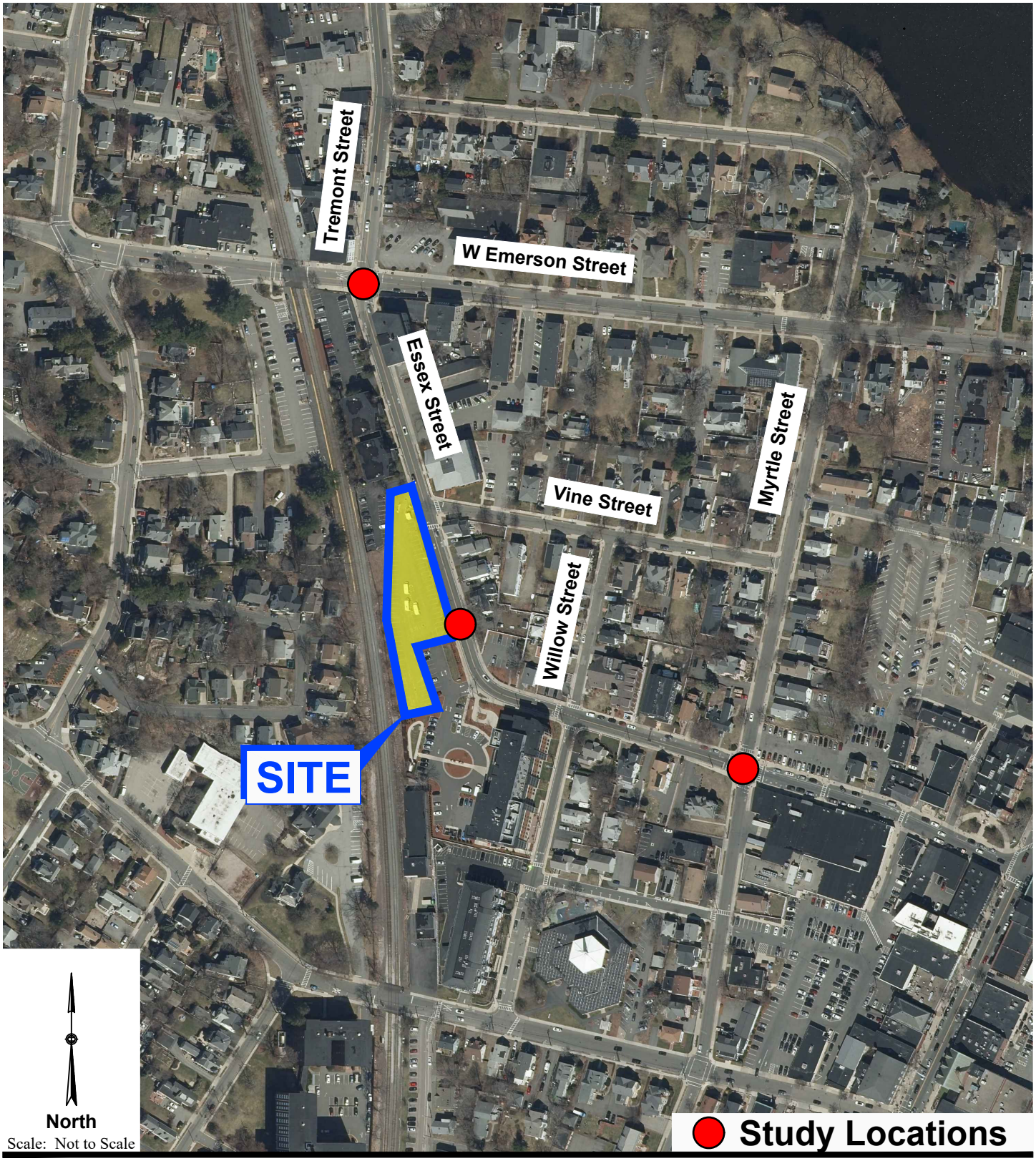


**Figure 1**

**Site Location**

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- *Nominal Trip Generation.* Based on industry-standard trip rates and methodology published by the Institute of Transportation Engineers (ITE), the proposed development is estimated to generate approximately 19 trips during the weekday morning peak hour, 19 trips during the weekday evening peak hour, and 152 vehicle trips on a weekday.

- *Adequate Roadway Capacity.* The incremental traffic associated with the proposed development is not expected to materially impact operating conditions at the study intersections. MDM finds that Essex Road and roadways within the site vicinity can accommodate the traffic increases of the project with no need for off-site mitigation actions.

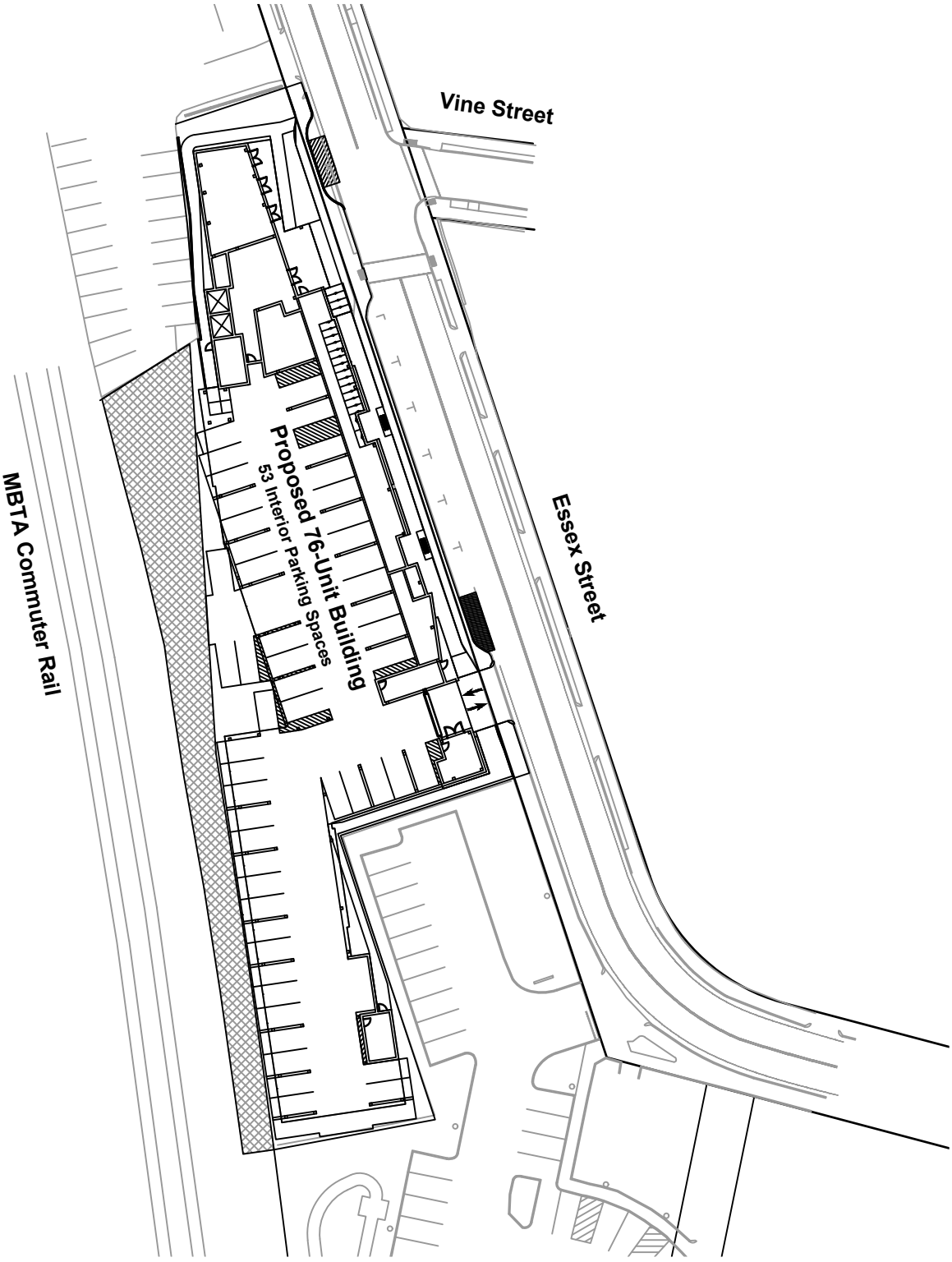
- *Delivery and Rideshare.* Periodic loading and service functions for the proposed development will be conducted similar to other properties along Essex Street. Short-term parking will likely take place curbside as on-street parking is permitted on the westerly (site) side of Essex Street.

In summary, MDM finds that incremental traffic associated with the proposed development is not expected to materially degrade operating conditions at the study intersections. Implementation of access/egress improvements, pedestrian and bicycle accommodations and a TDM program as outlined under the *Recommendations and Conclusions* section will establish a framework of minimizing Site traffic impacts by encouraging non-motorized travel modes and pedestrian accommodation that is compatible with other projects in the area.

**PROJECT DESCRIPTION**

The existing Site consists of a 74-space supplemental/satellite parking lot currently used by the nearby Melrose Hospital on approximately 0.74± acres along the western side of Essex Street in Melrose, MA. Site access/egress is currently provided via one gated driveway along Essex Street just north of Vine Street.

Under the proposed site programming, the existing parking lot at 164 Essex Street will be developed into a 76-unit midrise residential building with first floor garage parking. Additional short-term public street parking spaces will remain along the western side of Essex Street in the site vicinity for delivery/visitor use. On-site parking for the development will be comprised of 53± garage spaces below the building with access/egress along Essex Street in the southern portion of the Site. A preliminary site plan prepared by Williams & Sparages is presented in **Figure 2**.




**North**

Scale: Not to Scale

**Source: Williams & Sparages**

**Figure 2**

**Preliminary Site Layout**

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## EXISTING TRAFFIC & SAFETY CHARACTERISTICS

An overview of existing roadway conditions, traffic volumes, and safety characteristics is provided below.

*Essex Street*

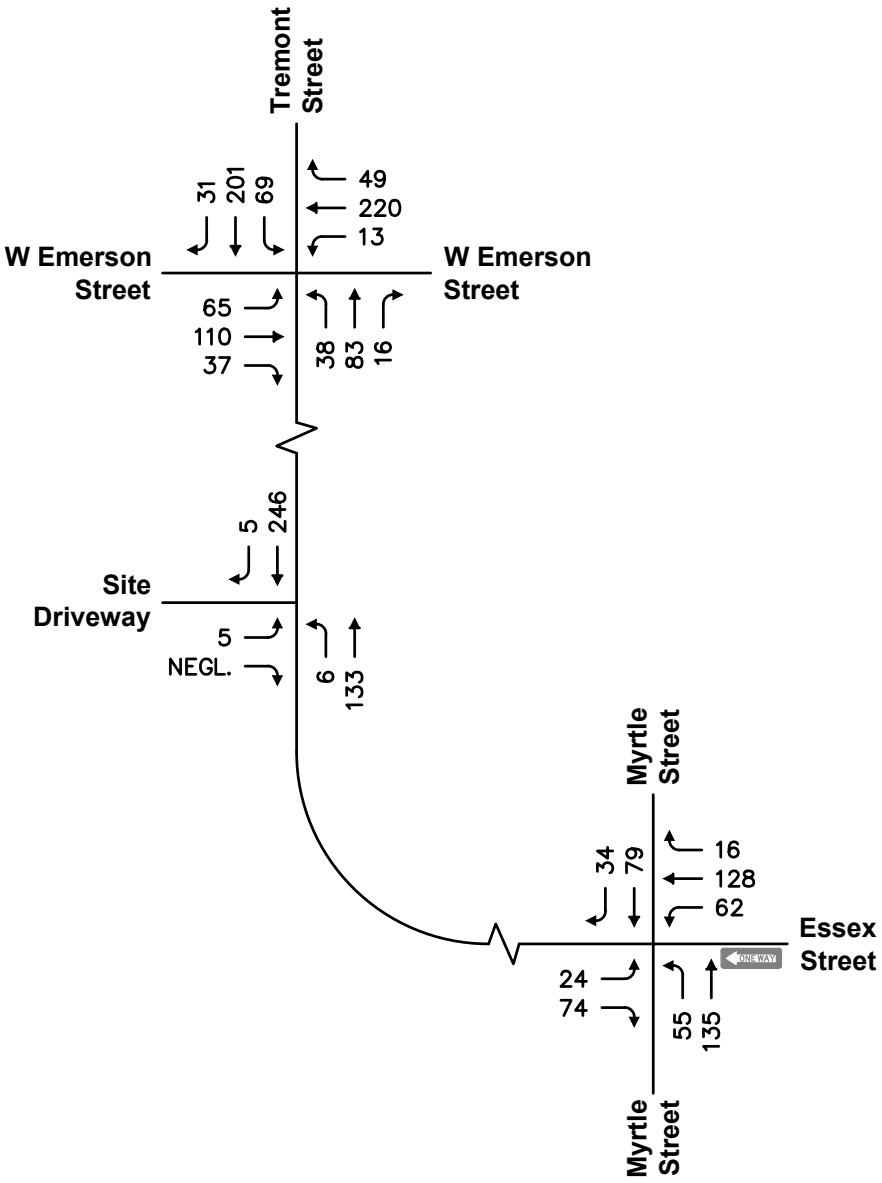
Essex Street is classified by the Massachusetts Department of Transportation (MassDOT) as an urban collector roadway under City jurisdiction. Essex Street is a north-south roadway providing a connection between W Emerson Street to the north and Main Street to the southeast. Within the immediate project area, the roadway provides a single 11± foot wide travel lane with 2-foot marked shoulders in each direction separated by a double yellow centerline. Sidewalks are provided along both sides of the roadway and sharrow bicycle markings are provided through the study area. The posted (regulatory) speed limit on Essex Street is 25 mph in the study area. Land uses along Essex Street include residential uses, commercial land uses, and a surface parking lot (Site).

### Baseline Traffic Data

Traffic-volume data used in this study were obtained in February 2024. Automatic traffic recorder counts (ATRs) were conducted along Essex Street while turning movement counts (TMCs) were conducted at the existing study intersections. Traffic data was collected during the weekday morning (7:00 to 8:00 AM) and weekday evening (4:00 to 6:00 PM) peak commuter periods. A review of MassDOT permanent count station data for the area indicated that February represents below average traffic month conditions; therefore, a 3-percent seasonal adjustment was applied to the data to represent average conditions. The Baseline weekday morning and weekday evening peak hour traffic volumes for the study intersections are shown in **Figure 3** and **Figure 4**. Traffic count data and MassDOT permanent count station data are provided in the **Attachments**.

### Daily Traffic Counts

Daily traffic volumes were obtained along Essex Street to the south of Vine Street in February 2024. Review of MassDOT permanent count station data indicates that February is a slightly-below average month in terms of traffic. The daily traffic volume data for Essex Street is summarized in **Table 1** with adjustments to reflect average conditions.




**NOTES:**
**NEGL. = Negligible**

**Figure 3**

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**2024 Baseline Conditions**
**Weekday Morning Peak Hour Volumes**

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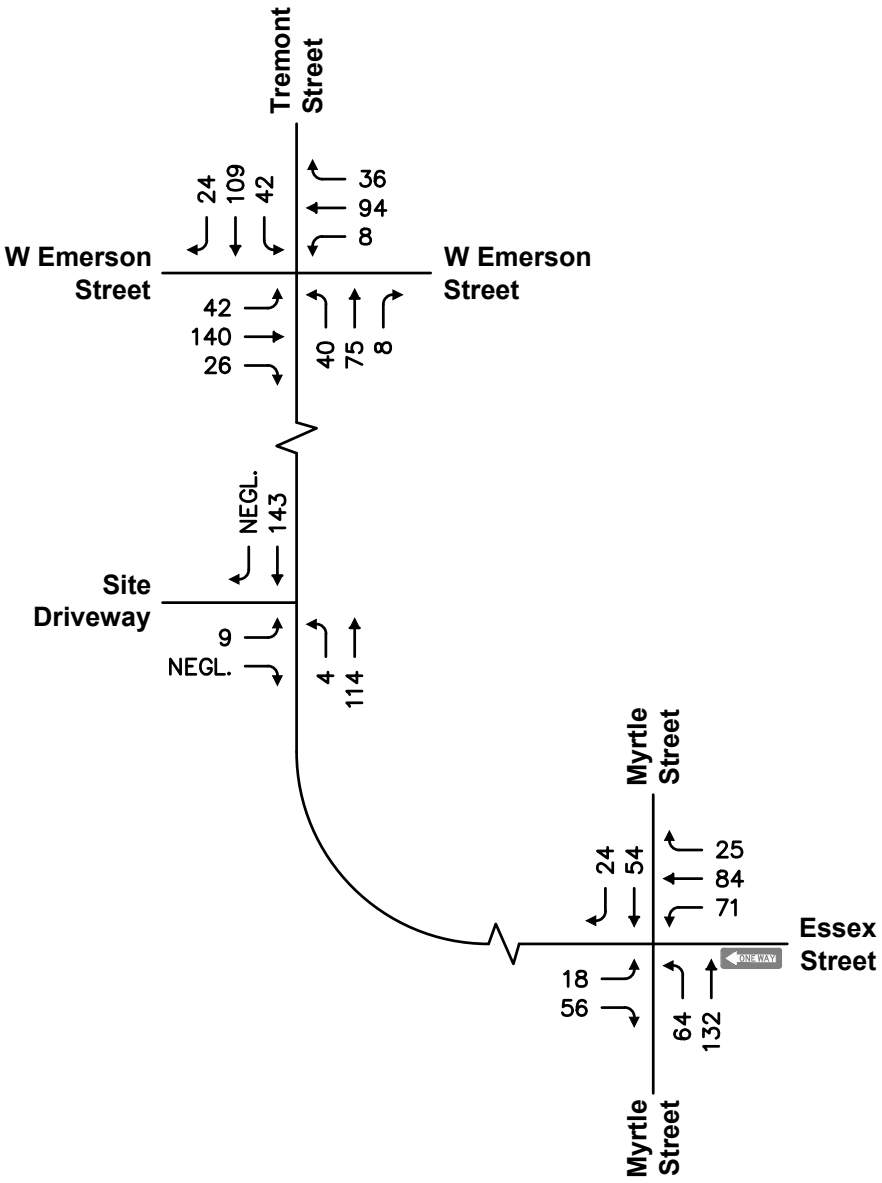


**North**
Scale: Not to Scale

**NOTES:**
**NEGL. = Negligible**

**Figure 4**

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**2024 Baseline Conditions**
**Weekday Evening Peak Hour Volumes**

Date: February 2024
Dwg No. 1344 MR01.dwg

**TABLE 1**
**ROADWAY TRAFFIC-VOLUME SUMMARY – ESSEX STREET**

| Time Period | Daily Volume (vpd)[1] | Percent Daily Traffic[2] | Peak Hour Volume (vph)[3] | Peak Flow Direction[4] | Peak Hour Directional Volume (vph) |
|---|---|---|---|---|---|
| Weekday Morning Peak Hour | 3,220 | 11% | 359 | 64% SB | 229 |
| Weekday Evening Peak Hour | 3,220 | 8% | 252 | 56% SB | 142 |

[1]Two-way daily traffic expressed in vehicles per day with 3% seasonal adjustment.
[2]The percent of daily traffic that occurs during the peak hour.
[3]Two-way peak-hour volume expressed in vehicles per hour.
[4]NB = Northbound, SB = Southbound.

As summarized in **Table 1**, Essex Street carries approximately 3,220 vehicles per day (vpd) on a weekday. Peak hour traffic flow on Essex Street ranges from approximately 252 to 359 vehicles per hour (vph) representing 8 to 11 percent of daily traffic flow. Vehicle flow patterns are oriented in the southbound direction during both the morning and evening peak hours.

*Measured Travel Speeds*

Vehicle speeds were obtained for Essex Street using a radar recorder device to the south of Vine Street. **Table 2** presents a summary of the travel speed data collected for Essex Street in the immediate site vicinity. Collected speed data are provided in the **Attachments**.

**TABLE 2**
**SPEED STUDY RESULTS – ESSEX STREET (south of Vine Street)**

| Travel Direction | Regulatory Speed Limit[1] | Travel Speed | |
|---|---|---|---|
| | | Mean[2] | 85th Percentile[3] |
| Northbound | 25 | 26 | 29 |
| Southbound | 25 | 25 | 29 |

[1]Regulatory speed limit in mph per Melrose opt-in to MGL c.90 §17C.
[2]Arithmetic mean in mph
[3]The speed at or below which 85 percent of the vehicles are traveling in mph

As summarized in **Table 2**, the mean (average) travel speed on Essex Street was observed to be 26 mph for the northbound direction and 25 mph in the southbound direction while the 85th percentile travel speed was observed to be 29 mph in both the northbound and southbound directions.

**Alternative Transportation Facilities**

The project is proximate to an extensive sidewalk system, sharrow on-street bicycle markings and multiple public transit routes (commuter rail and bus). The Massachusetts Bay Transit Authority (MBTA) operates the following commuter rail and bus routes in the immediate study area that could be used as an alternative mode of travel to/from the Site. Specific route and schedule information are provided in the **Attachments**.

- *Commuter Rail:* The Haverhill branch of the Commuter Rail Line runs from Haverhill to North Station with a stop in the immediate area at Melrose/Cedar Park which is located less than 500 feet from the Site (less than a 5-minute walk). Service generally runs Monday through Sunday from 5:30 a.m. to 12:00 a.m. Headways are approximately 45 minutes on weekdays and 2 hours on weekends.

- *MBTA Route 137:* Bus Route 137 runs from Reading Depot to Malden Center. The route passes near the Project site along Main Street, with a stop near the Main Street and Essex Street intersection approximately ¼ mile from the Site. The service provides a connection to the Haverhill Commuter Line and Orange line subway service as well as additional area bus routes (97, 99, 101, 104, 105, 106, 108, 131, 132, 411, 430). Service generally runs Monday to Friday from 5:00 a.m. to 11:00 p.m., Saturday 6:00 a.m. to 9:45 p.m., and Sunday 8:00 a.m. to 7:00 p.m.

- *MBTA Route 131:* Bus Route 131 runs from Melrose Highlands to Malden Center. The route passes near the Project site along Main Street, with an outbound stop near the Main Street and Essex Street intersection approximately ¼ mile from the Site. The inbound stop closest to the Site is near the Main Street and Grove Street intersection approximately ½ mile from the Site. The service provides a connection to the Haverhill Commuter Line and Orange line subway service as well as additional area bus routes (97, 99, 101, 104, 105, 106, 108, 132, 137, 411, 430). Service generally runs during weekday commuter hours Monday to Friday from 6:00 a.m. to 9:30 a.m., and from 3:30 p.m. to 8:00 p.m.

*US Census Travel Mode Statistics*

MDM has reviewed US Census Tract data for the 164 Essex Street vicinity (Census tract 3364.02) to identify transit and auto use statistics that are applicable to the study area. The US Census Journey-to-Work data for residents of the neighborhood is summarized in **Table 5** with supporting documentation in the **Attachments**.

**TABLE 5**
**AREA TRAVEL MODE STATISTICS**[1]

| Travel Mode | Percent |
|---|---|
| Single Occupant Vehicle (SOV) | 47% |
| Auto (Carpool) | 5% |
| Public Transportation | 24% |
| Bike/Walk/Other | 5% |
| Work from Home | 18% |
| **Total** | **100%** |

[1] Includes data from Census tract 3364.02 Middlesex County, Massachusetts

As summarized in **Table 5**, non-auto travel modes account for approximately 48 percent of trips made to/from the Essex Street neighborhood, of which public transportation is the largest share (24 percent) followed by work from home (18 percent), and bike/walk/other (5 percent) and carpooling also account for 5 percent of trips made.

## Crash History

In order to identify crash trends and safety characteristics for study area intersections, crash data were obtained from MassDOT for the City of Melrose for the five-year period covering 2019-2023 (the most recent full year of data currently available from MassDOT). A summary of the crash data with crash rates for the study intersections with reported crashes is provided in **Table 6** with detailed data provided in the **Attachments.**

Crash rates were calculated for the study intersections as reported in **Table 6**. These rates quantify the number of crashes per million entering vehicles. MassDOT has determined the official District 4 (which includes the City of Melrose) crash rate to be 0.57 for unsignalized intersections. This rate represents MassDOT's "average" crash experience for District 4 communities and serves as a basis for comparing reported crash rates for the study intersections. Where calculated crash rates notably exceed the district average, some form of safety countermeasures may be warranted. A review of Highway Safety Improvement Project (HSIP) locations within the study vicinity was also conducted.

**TABLE 6**
**INTERSECTION CRASH SUMMARY[1]**
**2019 THROUGH 2023**

| Data Category | Essex Street at West Emerson Street | Essex Street at Myrtle Street |
|---|---|---|
| Intersection Type | Unsignalized | Unsignalized |
| Crash Rate | **1.00**[2] | **0.32**[2] |
| MassDOT Avg[3] | 0.57 | 0.57 |
| *Year:* | | |
| 2019 | 1 | 2 |
| 2020 | 5 | 0 |
| 2021 | 5 | 0 |
| 2022 | 2 | 2 |
| 2023 | 2 | 0 |
| **Total** | **15** | **4** |
| *Type:* | | |
| Angle | 11 | 4 |
| Rear-End | 0 | 0 |
| Head-On | 2 | 0 |
| Sideswipe | 2 | 0 |
| Single Vehicle | 0 | 0 |
| Other/Unknown | 0 | 0 |
| *Severity:* | | |
| P. Damage Only | 12 | 4 |
| Personal Injury | 3 | 0 |
| Fatality | 0 | 0 |
| *Conditions:* | | |
| Dry | 13 | 2 |
| Wet | 1 | 2 |
| Ice/Snow | 1 | 0 |
| *Time:* | | |
| 7:00 to 9:00 AM | 1 | 0 |
| 4:00 to 6:00 PM | 2 | 1 |
| Rest of Day | 12 | 3 |

[1] Source: MassDOT Crash Database
[2]Crashes per million entering vehicles
[3]MassDOT Average Crash Rate for roadway classification or District 4 Average Crash Rate

As summarized in **Table 6:**

- *West Emerson Street at Essex Street.* Fifteen (15) crashes were reported at the West Emerson Street/Essex Street intersection, resulting in a crash rate of 1.00. The majority of reported crashes at the intersection included angle/side swipe-type (87%) and the remaining two crashes were head-on collisions. Twenty percent (20%) of the crashes occurred during the normal peak traffic periods and eighty percent (80%) of the crashes resulted in property damage only. The City recently implemented intersection improvements in April 2023 to increase intersection safety which included conversion of the intersection to an all-way "STOP" control.

- *Essex Street at Myrtle Street.* Four (4) crashes were reported for the Essex Street/Myrtle Street intersection, resulting in a crash rate of 0.40. All of the reported crashes at the intersection included angle type collisions which one vehicle generally failed to yield at the all-way "STOP' control. Seventy five percent (75%) of the crashes occurred outside the peak commuter periods and all the crashes resulted in property damage only.

In summary, the West Emerson Street at Essex Street intersection experienced a crash rate that was above the MassDOT District 4 average, the Essex Street at Myrtle Street intersection experienced a crash rate that was below the average, and neither of the intersections are listed by MassDOT as HSIP crash locations. No fatalities or pedestrian related crashes were reported during the study period. To enhance safety, the City recently implemented intersection improvements in April 2023 to increase intersection safety which included conversion of the intersection to an all-way "STOP". A review of the crash data indicates only one (1) crash has been reported at the intersection since April 2023, indicating thus far that the improvement has enhanced safety. Therefore, no immediate safety countermeasures are warranted based on the crash history along Essex Street at the study intersections given the recent improvements implemented by the City.

## PROJECTED FUTURE TRAFFIC CONDITIONS

Evaluation of the proposed development impacts requires the establishment of a future baseline analysis condition. This section estimates future roadway and traffic conditions with and without the proposed development. For planning purposes, a seven-year planning horizon (year 2031) was selected consistent with standard industry practice and EEA/MassDOT traffic study guidelines.

To determine the impact of site-generated traffic volumes on the roadway network under future conditions, baseline traffic volumes in the study area were projected to a future year condition. Traffic volumes on the roadway network at that time, in the absence of the development (that is, the No-Build condition), includes existing traffic, new traffic due to general background traffic growth, and traffic related to specific developments by others that are currently under review at the local and/or state level. Consideration of these factors resulted in the development of No-Build traffic volumes. Anticipated site-generated traffic volumes were then superimposed upon these No-Build traffic-flow networks to develop future Build conditions.

The following sections provide an overview of the future traffic volumes.

### Background Growth

Background traffic includes demand generated by other planned developments in the area as well as demand increases caused by external factors. External factors are general increases in traffic not attributable to a specific development and are determined using historical data.

Nearby permanent count station data published by MassDOT indicates a flat or declining annual growth rate. However, for planning purposes, a 0.5 percent annual growth rate is used. This correlated to an approximate 3.6 percent increase over a 7-year horizon. This growth rate is higher than historic rates, and, as such, is also expected to account for any small fluctuation in hourly traffic as may occur from time to time in the study area and small background developments or vacancies in the area. MassDOT permanent count station data and background growth calculations are provided in the **Attachments.**

The following developments are currently approved by the City and are located proximate to the study area near Essex Street:

- *14 Chipman Avenue*: This approved mixed-use development will include approximately 40 residential units and 900± square feet of commercial space. The project will also redevelop the existing VFW Lodge on the site. Trips associated with the project were developed and assigned based on the Traffic Impact Study prepared for the project by Howard Stein Hudson in July 2021. Site-specific peak hour trip tracings through the study area are included in the **Attachments**.

- *681-697 Main Street*: This approved mixed-use development will include approximately 18 residential units and 4,300± square feet of retail space. Trips associated with the project were developed and assigned based on the Traffic Impact Study prepared for the project by Howard Stein Hudson in October 2022. Site-specific peak hour trip tracings through the study area are included in the **Attachments**.

- *521-529 Franklin Street*: This approved mixed-use redevelopment will include approximately 36 residential units located above an existing retail building (T'AHPAS 529) on the site. Trips associated with the project were developed and assigned based on the Traffic Impact and Access Study prepared for the project by Bayside Engineering in September 2023. Site-specific peak hour trip tracings through the study area are included in the **Attachments**.

- *31-39 Wyoming Avenue*: This approved mixed-use development will include approximately 19 residential units and 1,155± square feet of commercial space. Trips associated with the project were developed and assigned based on the Technical Memorandum prepared for the project by Howard Stein Hudson in February 2020. Site-specific peak hour trip tracings through the study area are included in the **Attachments**.

- *14-24 Tremont Street*: This approved residential development will include approximately 78 residential units. Trips associated with the project were developed and assigned based on the Traffic Impact Study prepared for the project by VHB in March 2023. Site-specific peak hour trip tracings through the study area are included in the **Attachments**.

- *453-463 Franklin Street*: This approved mixed-use redevelopment will include approximately 21 residential units and 2,081± square feet of commercial space. The project will replace an existing retail building (Franklin Market) on the site. Trips associated with the project were developed based on the Traffic Assessment prepared for the project by Bayside Engineering in February 2022 and assigned to the roadway network based on the distribution patterns used in the 521-529 Franklin Street traffic study. Site-specific peak hour trip tracings through the study area are included in the **Attachments**.

- *12-16 Essex Street*: This approved mixed-use redevelopment will include approximately 24 residential units and 1,600± square feet of commercial space. The project will replace approximately 6,000± square feet of commercial space on the site. Trips associated with the project were developed based on the Transportation Management Plan prepared for the project by Carroll Essex, LLC in March 2020 and assigned to the roadway network based on the distribution patterns calculated for this traffic memorandum. Site-specific peak hour trip tracings through the study area are included in the **Attachments**.

Traffic associated with these seven (7) developments has been included in addition to a general background growth rate of 0.5 percent annually to represent a conservative development scenario with an effective growth rate of 0.8 to 1.3% per year at the two gateway intersections which is well above the declining growth rate (-0.6% per year) based on MassDOT data. Associated trip generation information for background projects has been provided in the **Attachments**.

## 2031 No-Build Traffic Volume Networks

In summary, to account for future traffic growth in the study area future No-Build traffic volumes are developed by increasing the Baseline (2024) volumes by approximately 3.6 percent (0.5 percent annually over 7 years) and adding trips associated with nearby background projects. The resulting 2031 No-Build traffic volumes are displayed in **Figure 5** and **Figure 6**.

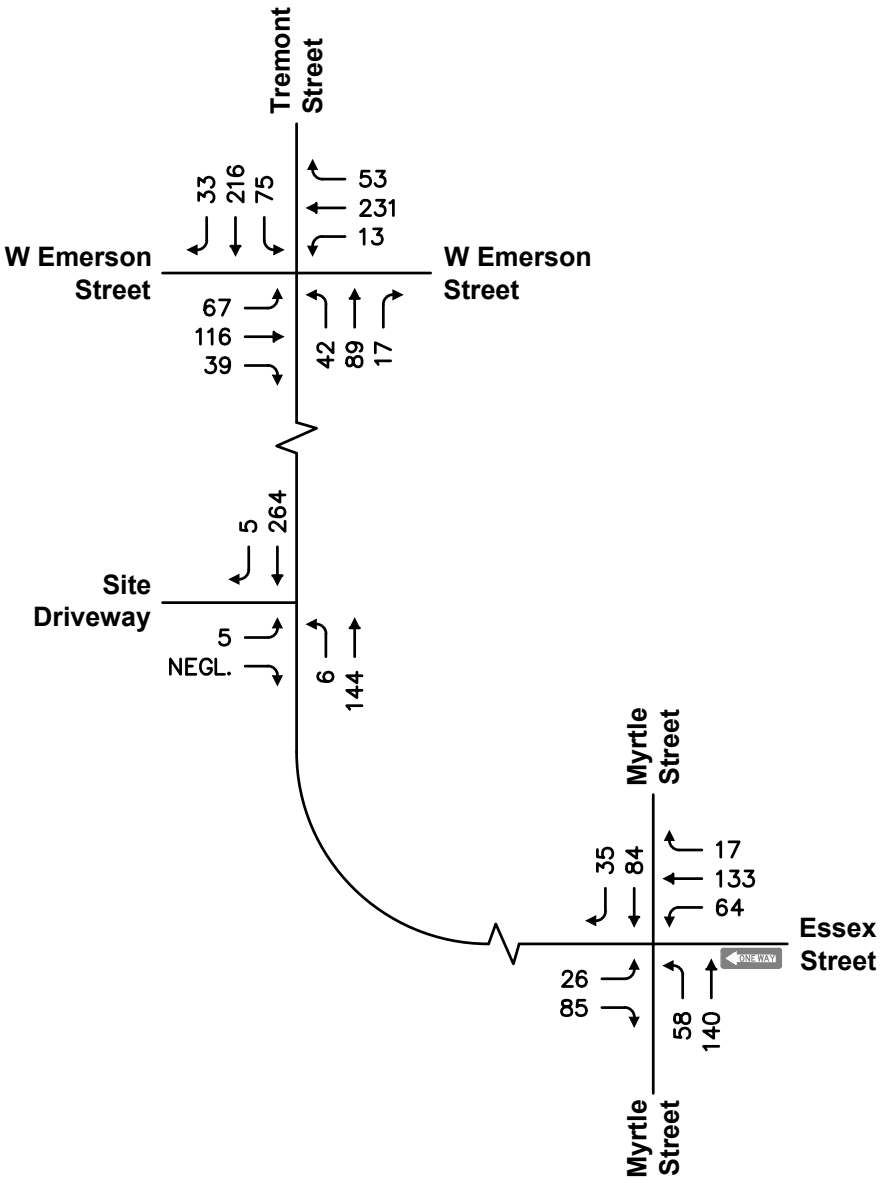
## Trip Generation

The trip generation estimates for the proposed Site development are provided for the weekday morning and weekday evening, which correspond to the critical analysis periods for the proposed use and adjacent street traffic flow. New traffic generated by the project was estimated using trip rates published in ITE's *Trip Generation* for the Land Use Code (LUC) based on trip rates for Multifamily Housing – Mid-Rise (LUC 221) Dense Multi-Use Urban Close to Transit. **Table 7** presents the trip-generation estimates for the proposed development based on ITE methodology applied to 76 residential units at 164 Essex Street.

**TABLE 7**
**TRIP-GENERATION SUMMARY**

| Peak Hour/Direction | Multi-Family (76 Units)[1] |
|---|---|
| *Weekday Morning Peak Hour:* | |
| Entering | 3 |
| Exiting | 16 |
| Total | 19 |
| *Weekday Evening Peak Hour:* | |
| Entering | 14 |
| Exiting | 5 |
| Total | 19 |
| *Weekday Daily (24-Hour):* | 152 |

Source: ITE *Trip Generation*, 11th Edition; 2021.
[2]ITE LUC 221 – Multifamily Housing – Mid-Rise (Dense, Multi-Use Urban Close to Transit) applied to 76 units.




North

Scale: Not to Scale

**NOTES:**
**NEGL. = Negligible**

**Figure 5**

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## 2031 No-Build Conditions
## Weekday Morning Peak Hour Volumes

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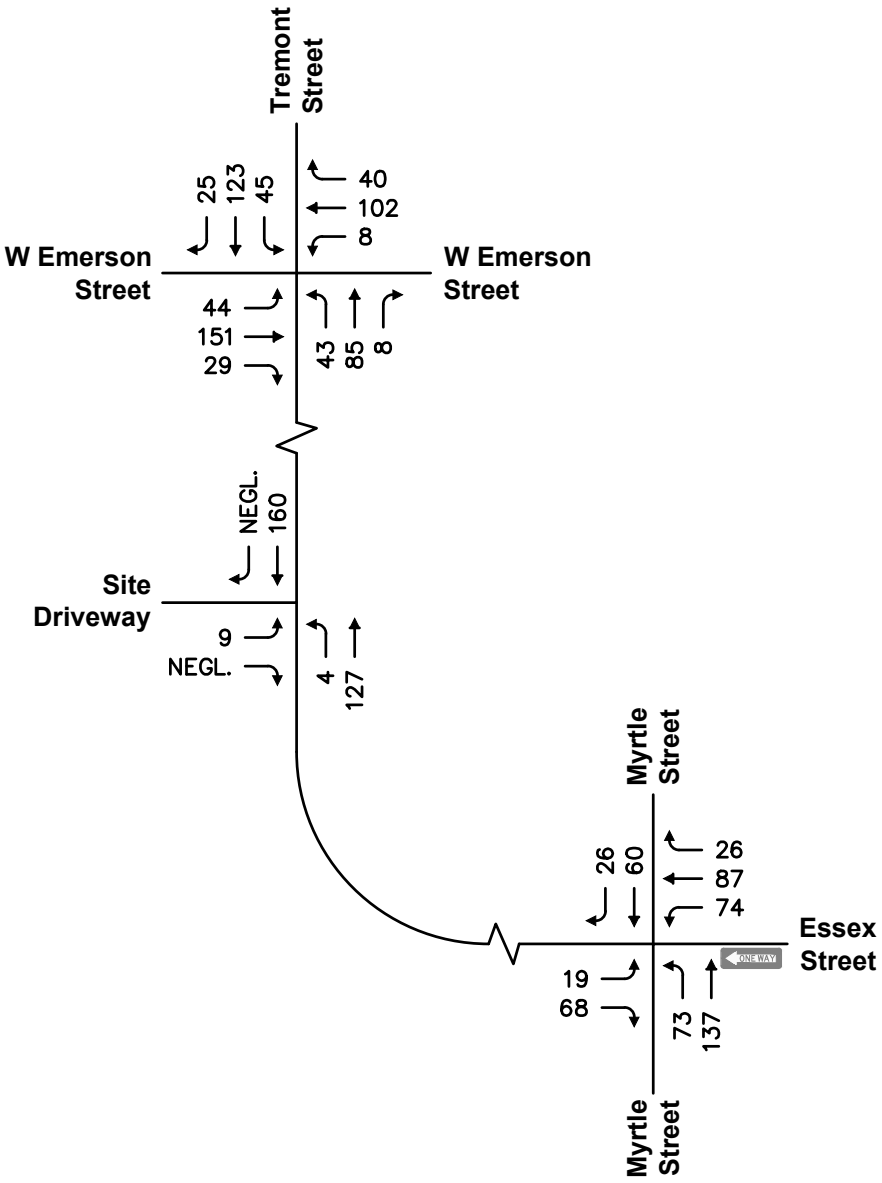


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**NOTES:**
**NEGL. = Negligible**

**Figure 6**

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## 2031 No-Build Conditions
## Weekday Evening Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg

As summarized in **Table 7**, based on industry-standard trip rates, the proposed development is estimated to generate approximately 19 trips during the weekday morning peak hour (3 entering and 16 exiting), 19 trips during the weekday evening peak hour (14 entering and 5 exiting), and 152 vehicle trips on a weekday. As previously indicated, a review of census data for the study area indicates alternative transportation (transit, walk, bike, and work from home) use of 48% for residents of the immediate study area (Census tract 3364.02); therefore, utilizing the 'Dense, Multi-Use Urban Close to Transit' classification when estimating proposed residential trip activity is valid and justified.

Note that the site is actively used for off-street parking at trip rates comparable to the proposed residential use.

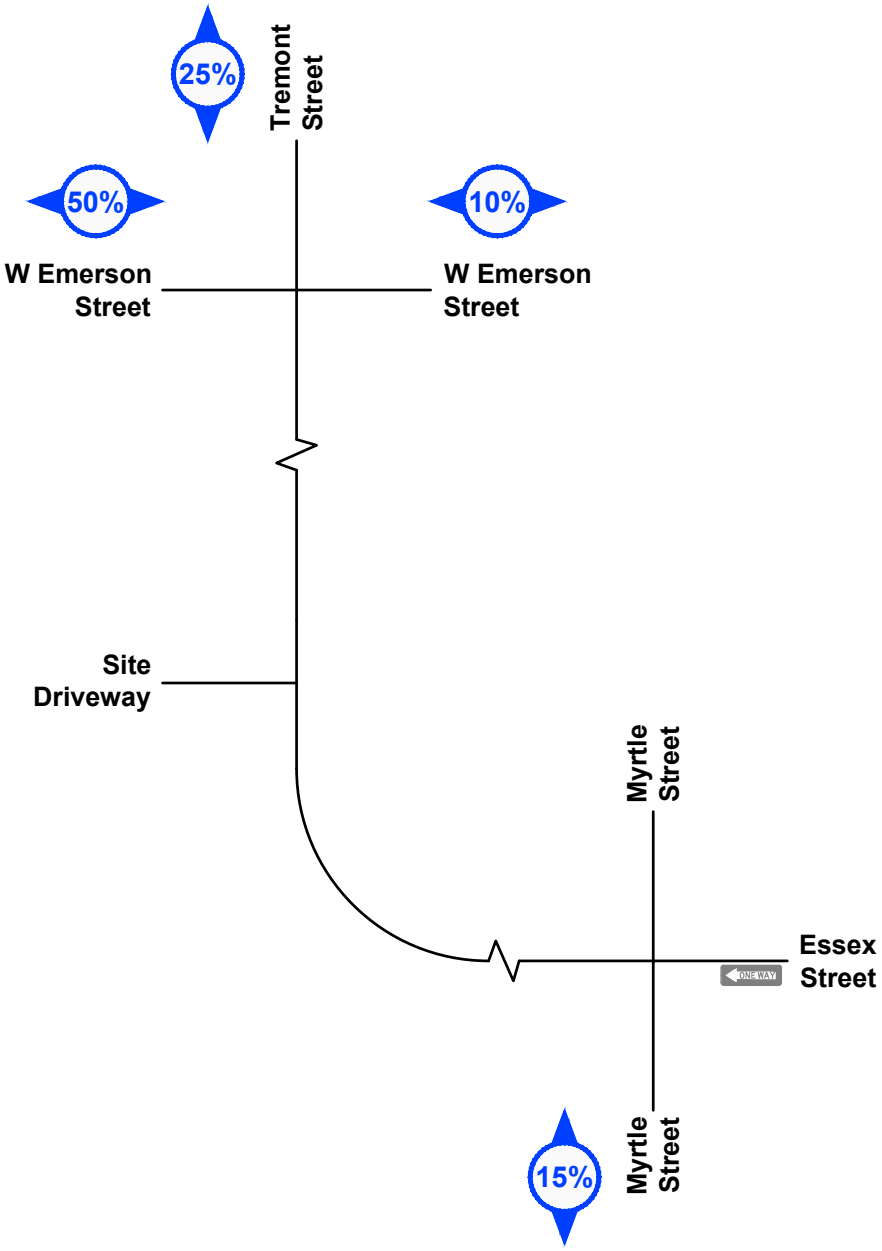
**Trip Distribution**

The directional distribution of development-generated trips on the roadway network is a function of a number of variables including local area populations and the efficiency of the roadways leading to/from the Site. For planning purposes, journey to work census data served as the primary basis for determining the trip distribution pattern for the proposed residents. The distribution of the site generated trips is displayed in **Figure 7**. Trip distribution calculations are provided in the **Attachments**.

Site trips for the proposed development are assigned to the roadway network using the ITE trip-generation estimates shown in **Table 7** and the distribution patterns described above. Site trips at each intersection approach for the weekday morning and weekday evening peak hours are quantified in **Figure 8** and **Figure 9**, respectively.

**2031 Build Traffic Conditions**

2031 Build condition traffic volumes are derived by adding incremental traffic increases for the proposed development of the Site to the 2031 No-Build conditions. **Figure 10** and **Figure 11** present the 2031 Build condition traffic-volume networks for the weekday morning and weekday evening peak hours.




North
Scale: Not to Scale

**NOTES:**
**NEGL. = Negligible**

**Figure 7**

**Trip Distribution**

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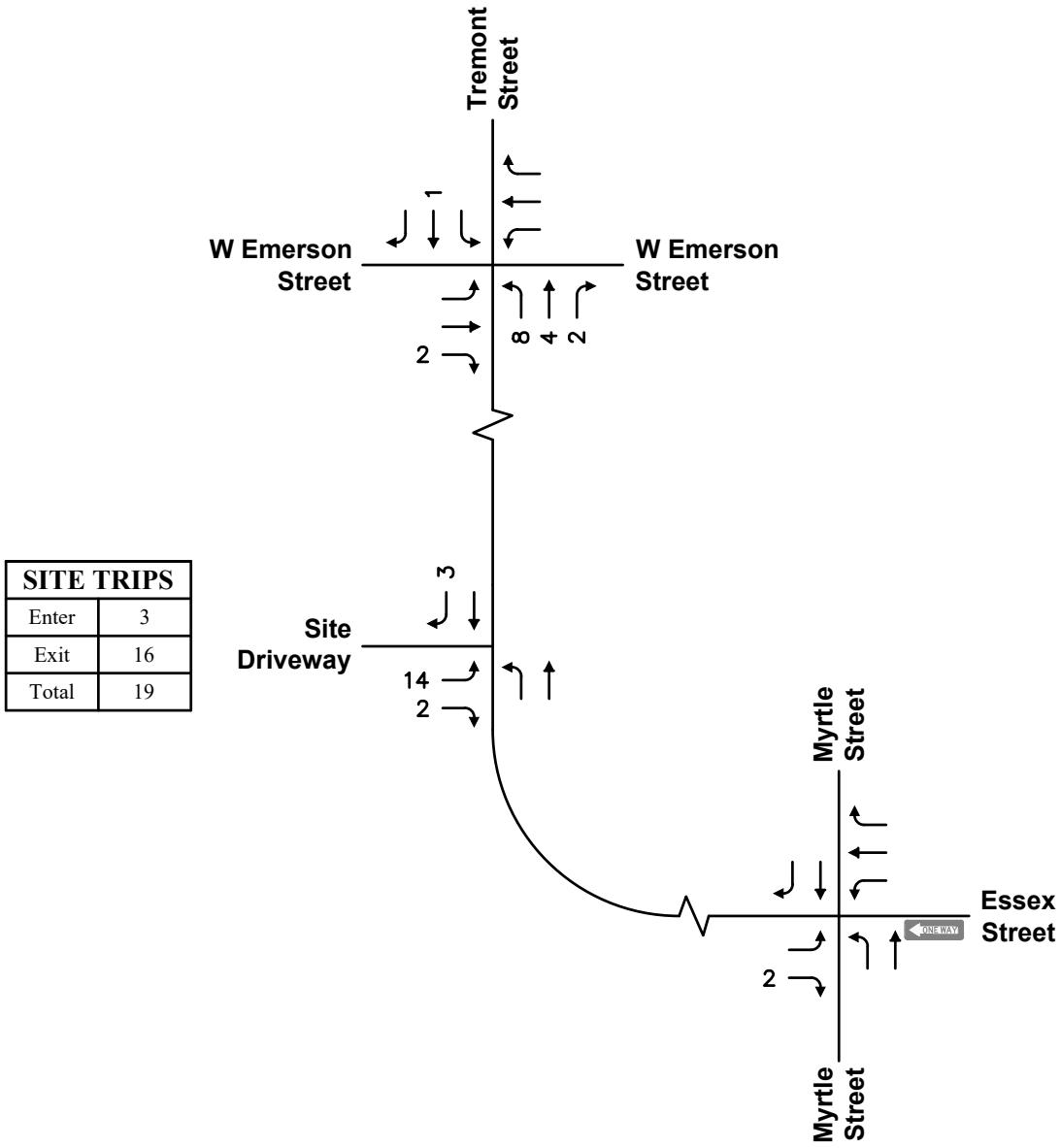


| SITE TRIPS | |
|---|---|
| Enter | 3 |
| Exit | 16 |
| Total | 19 |

North

Scale: Not to Scale

**NOTES:**
**NEGL. = Negligible**

**Figure 8**

**Site-Generated Trips**
**Weekday Morning Peak Hour**

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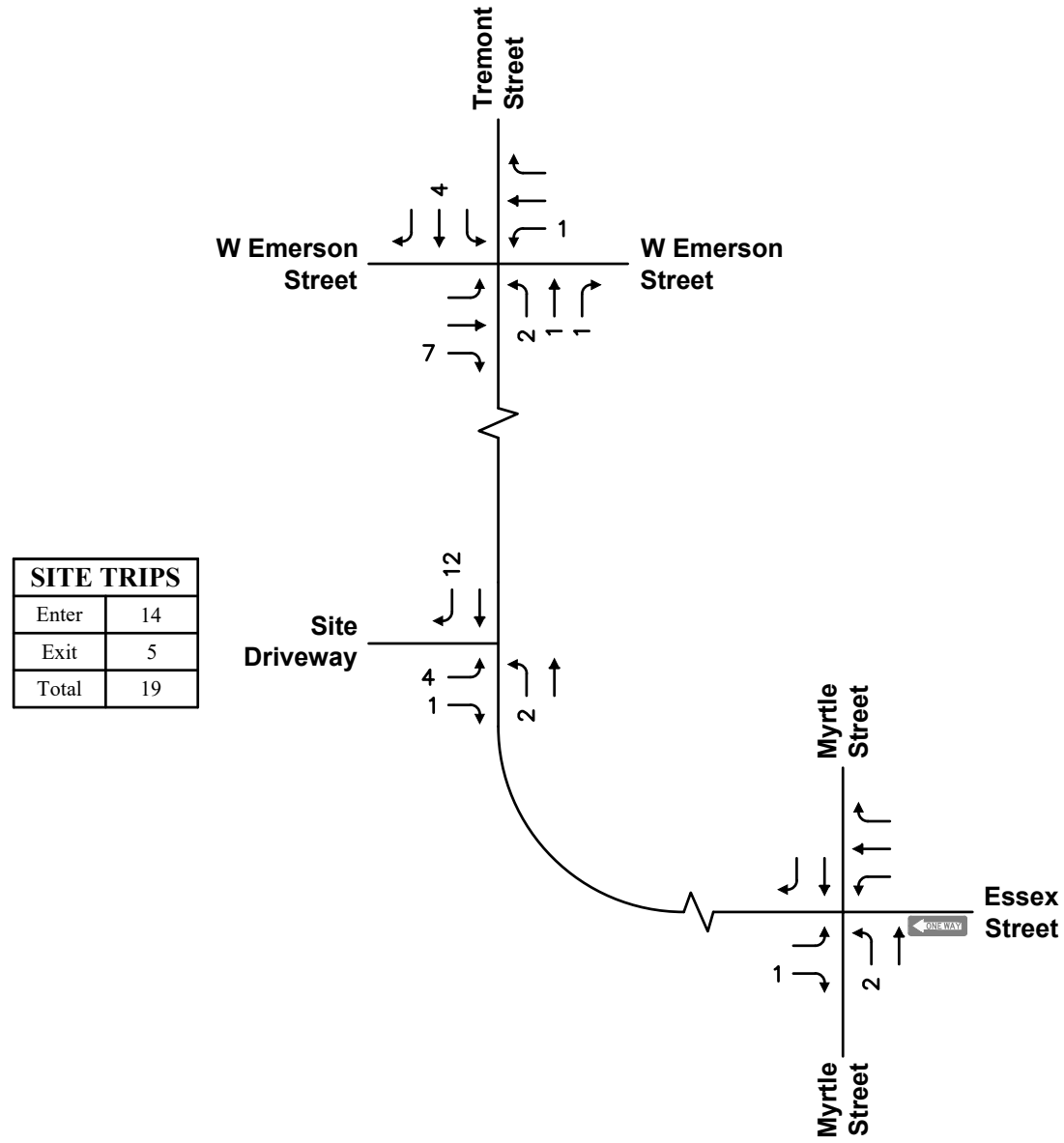


| SITE TRIPS | |
|---|---|
| Enter | 14 |
| Exit | 5 |
| Total | 19 |

**NOTES:**
**NEGL. = Negligible**

**Figure 9**

**Site-Generated Trips**
**Weekday Evening Peak Hour**

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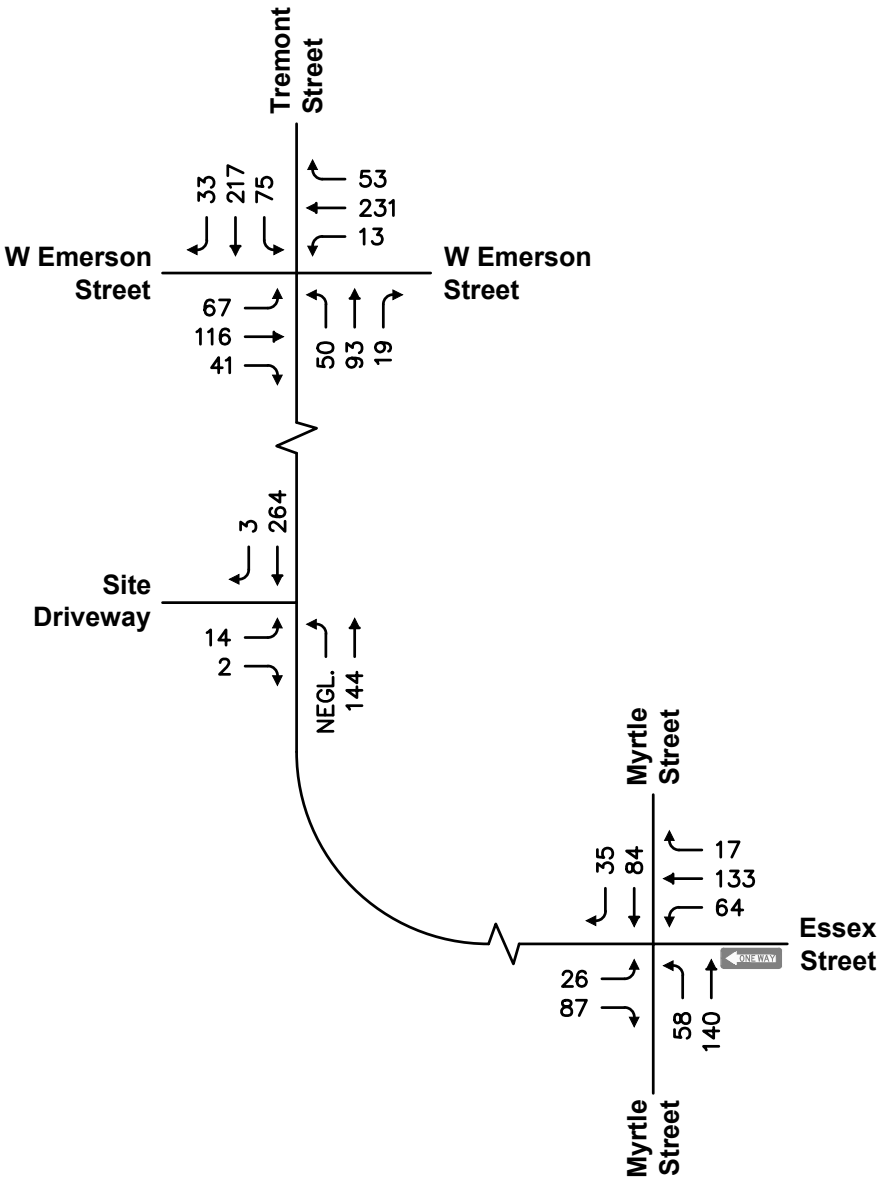


North

Scale: Not to Scale

**NOTES:**
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**Figure 10**

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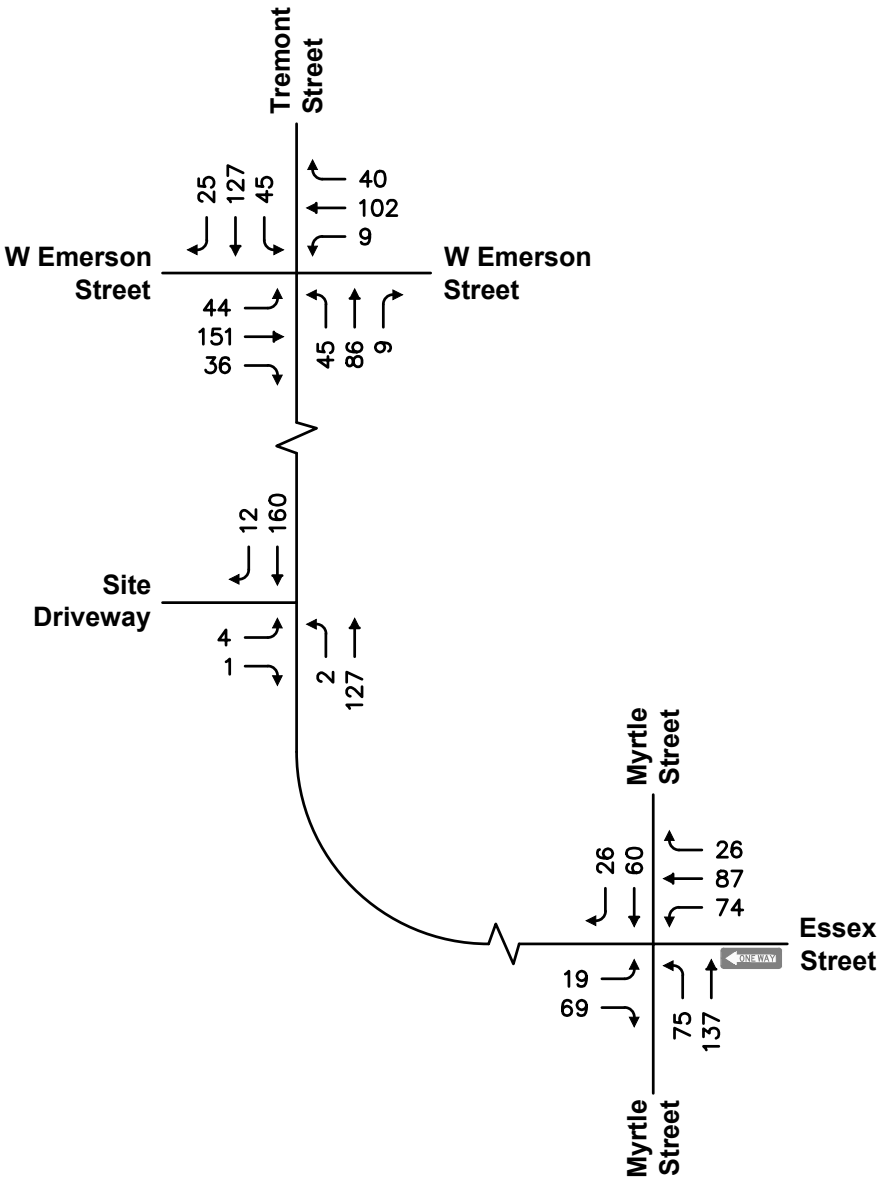
## 2031 Build Conditions
## Weekday Morning Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg




North

Scale: Not to Scale

**NOTES:**
**NEGL. = Negligible**

**Figure 11**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

## 2031 Build Conditions
## Weekday Evening Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg

## OPERATIONS ANALYSIS

This section provides an overview of operational analysis methodology as well as an assessment of driveway operations under existing (Baseline), and projected 2031 No-Build and Build conditions.

### Analysis Methodology

Capacity analyses, conducted in accordance with EEA/MassDOT guidelines, provide an index of how well the roadway facilities serve the traffic demands placed upon them. The operational results provide the basis for recommended access and roadway improvements in the following section if required.

Capacity analysis of intersections is developed using the Synchro® computer software, which implements the methods of the Highway Capacity Manual 6th Edition (HCM6). The resulting analysis presents a level-of-service (LOS) designation for individual intersection movements. The LOS is a letter designation that provides a qualitative measure of operating conditions based on several factors including roadway geometry, speeds, ambient traffic volumes, traffic controls, and driver characteristics. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of year. A range of six levels of service are defined on the basis of average delay, ranging from LOS A (the least delay) to LOS F (delays greater than 50 seconds for unsignalized movements). The specific control delays and associated LOS designations are presented in the **Attachments**.

### Analysis Results

Level-of-Service (LOS) analyses were conducted for the Baseline, No-Build and Build conditions for the study intersection. The results of the intersection capacity analyses are summarized below in **Table 8** and **Table 9**. Detailed analysis results are presented in the **Attachments**.

## TABLE 8
## INTERSECTION CAPACITY ANALYSIS RESULTS
## WEEKDAY MORNING PEAK HOUR

| | | 2024 Baseline | | | 2031 No-Build | | | 2031 Build | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Period | Approach | v/c[1] | Delay[2] | LOS[3] | v/c | Delay | LOS | v/c | Delay | LOS |
| *West Emerson at* | Eastbound | 0.55 | 18 | C | 0.61 | 22 | C | 0.64 | 24 | C |
| *Essex Street/* | Westbound | 0.70 | 24 | C | 0.78 | 31 | D | 0.81 | 35 | D |
| *Tremont Street* | Northbound | 0.38 | 15 | B | 0.44 | 17 | C | 0.49 | 19 | C |
| | Southbound | 0.76 | 29 | D | 0.86 | 40 | E | 0.88 | 47 | E |
| *Essex Street at* | Eastbound | 0.18 | 9 | A | 0.20 | 9 | A | 0.21 | 9 | A |
| *Myrtle Street* | Westbound | 0.39 | 12 | B | 0.42 | 12 | B | 0.42 | 12 | B |
| | Northbound | 0.36 | 11 | B | 0.38 | 12 | B | 0.38 | 12 | B |
| | Southbound | 0.21 | 9 | A | 0.23 | 9 | A | 0.23 | 9 | A |
| *Site Driveway at* | Northbound | 0.01 | <5 | A | 0.01 | <5 | A | 0.00 | <5 | A |
| *Essex Street* | Southbound | 0.00 | <5 | A | 0.00 | <5 | A | 0.00 | <5 | A |
| | EB Exit | 0.01 | 12 | B | 0.01 | 12 | B | 0.04 | 12 | B |

[1]Volume-to-capacity ratio
[2]Average control delay per vehicle (in seconds)
[3]Level of service
[4]n/a = not applicable

## TABLE 9
## INTERSECTION CAPACITY ANALYSIS RESULTS
## WEEKDAY EVENING PEAK HOUR

| | | 2024 Baseline | | | 2031 No-Build | | | 2031 Build | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Period | Approach | v/c[1] | Delay[2] | LOS[3] | v/c | Delay | LOS | v/c | Delay | LOS |
| *West Emerson at* | Eastbound | 0.33 | 11 | B | 0.37 | 11 | B | 0.38 | 12 | B |
| *Essex Street/* | Westbound | 0.22 | 9 | A | 0.25 | 9 | A | 0.25 | 9 | A |
| *Tremont Street* | Northbound | 0.21 | 9 | A | 0.24 | 10 | B | 0.24 | 10 | B |
| | Southbound | 0.28 | 10 | B | 0.32 | 11 | B | 0.33 | 11 | B |
| *Essex Street at* | Eastbound | 0.10 | 8 | A | 0.12 | 8 | A | 0.12 | 8 | A |
| *Myrtle Street* | Westbound | 0.26 | 9 | A | 0.27 | 9 | A | 0.27 | 9 | A |
| | Northbound | 0.28 | 9 | A | 0.30 | 9 | A | 0.31 | 9 | A |
| | Southbound | 0.11 | 8 | A | 0.12 | 8 | A | 0.12 | 8 | A |
| *Site Driveway at* | Northbound | 0.00 | <5 | A | 0.00 | <5 | A | 0.00 | <5 | A |
| *Essex Street* | Southbound | 0.00 | <5 | A | 0.00 | <5 | A | 0.00 | <5 | A |
| | EB Exit | 0.02 | 10 | B | 0.02 | 11 | B | 0.01 | 10 | B |

[1]Volume-to-capacity ratio
[2]Average control delay per vehicle (in seconds)
[3]Level of service
[4]n/a = not applicable

As summarized in **Table 8** and **Table 9**:

- *West Emerson Street at Essex Street/Tremont Street.* Under No-Build conditions, the Essex Street approach to West Emerson Street will operate with moderately long delay (LOS E) during the weekday morning peak hour and with minimal delay (LOS B) during the weekday evening peak hour. Occasional delays, especially during the weekday morning peak hour were observed to occur due to nearby MBTA commuter train crossings on West Emerson Street which result in occasional traffic backups through the Essex Street intersection. Under Build conditions the project will result in a nominal increase in traffic through the intersection with no material change in delay or operations compared to No-Build conditions.

- *Essex Street at Myrtle Street.* Under No-Build conditions, the four approaches to this all-way-stop controlled intersection will operate with minimal delay (LOS B or better) during the peak hours. Under Build conditions the intersection will continue to operate with minimal delay with no material change in delay compared to No-Build conditions.

- *Essex Street at Site Driveway.* Under Build conditions, the Site Driveway approach to Essex Street will operate with minimal delay (LOS B or better) and queuing during the peak hours.

In summary, the proposed development is not expected to materially impact study area intersections between future No-Build and Build conditions. Relative traffic increases for the proposed project represents an inconsequential change in area roadway volumes - a level of change that falls well within normal day-to-day fluctuations in traffic entering and exiting the study intersections and is immaterial to traffic operations in the area. Accordingly, no specific roadway improvements at the gateway study intersections are warranted to accommodate the project.

**DELIVERY AND RIDESHARE**

Periodic loading and service functions for the proposed development will be conducted similar to other properties along Essex Street. Short-term parking will likely take place curbside as on-street parking is permitted on the westerly (site) side of Essex Street along the site frontage.

## RECOMMENDATIONS AND CONCLUSIONS

MDM finds Essex Street and roadways within the site vicinity can accommodate the nominal traffic increases of the project. Relative traffic increases for the proposed project represents an inconsequential change in area roadway volumes - a level of change that falls well within normal day-to-day fluctuations in traffic entering and exiting the study area and is immaterial to traffic operations along Essex Street. However, several recommended actions are identified to support the project, ensure that site access meets applicable safety criteria, enhance neighborhood walking/bicycling and access to public transportation opportunities and to reduce dependency on single-occupant auto use. These include (a) access/egress improvements, (b) pedestrian and bicycle accommodations and (c) TDM actions as summarized below.

### Access/Egress Improvements

- *Driveway Design*. The driveway alignment, widths and curb radii have been designed to achieve perpendicular alignment with appropriate width and curb radii between the proposed Site Driveways and Essex Street. The driveway apron has been designed to be constructed with a continuous sidewalk to promote slower travel speeds with a minimum 20-foot separation to the on-street parking per City and MUTCD standards for urban environments. Signs and pavement markings that are compliant with the Manual on Uniform Traffic Control Devices (MUTCD) should be installed on the approach to Essex Street including STOP signs (R1-1) and STOP line pavement markings.

- *Essex Street/Vine Street Intersection*. A STOP sign will be installed on the Vine Street approach to Essex Street if requested by the City of Melrose.

### Pedestrian and Bicycle Accommodations

- *Pedestrian Connections*. The proposed Site Plan has incorporated sidewalks that connect the proposed building and parking area to the existing sidewalk system along Essex Street which provides access to the nearby public transit facilities and commercial uses.

- *Bicycle Amenities*. The proposed Site Plan has incorporated bicycle accommodations within the property including bike storage, including up to 76 bicycle spaces, within the parking garage and bike racks near the building entranceways to encourage and facilitate this mode of transportation to/from the Site.

### Transportation Demand Management (TDM)

TDM programs include a series of measures that are designed to encourage the use of alternative modes of travel to single-occupant vehicles (SOVs) through influencing the choice of travel modes by residents. The benefits that are derived from an effective TDM program include less congestion on the roadway network; improved air quality; reduced parking

demands and the need for construction of new parking spaces; and health benefits through walking and bicycling. A preliminary list of potential TDM program elements may include the following:

- *Transporation Coordinator*
- *Public Transportation Information & Promotion*
- *Electric Vehicle Charging Station*
- *Pedestrian Infrastructure*
- *Secure Covered Bike Parking*
- *Limited/ Unbundled Parking*
- *On-Site Amenities*

**Conclusions**

In summary, MDM finds that incremental traffic associated with the proposed development is not expected to materially impact operating conditions in the study area. Implementation of access/egress improvements, pedestrian and bicycle accommodations and a TDM program as outlined under the *Recommendations and Conclusions* section will establish a framework of minimizing Site traffic impacts by encouraging non-motorized travel modes and pedestrian accommodation that is compatible with other projects in the area.

# ATTACHMENTS

- □ Traffic Volume Data
- □ Seasonal/Yearly Traffic Information
- □ Speed Data
- □ Public Transportation Information
- □ Census Data
- □ Crash Data
- □ Background Growth
- □ Trip Generation
- □ Trip Distribution
- □ Capacity Analysis

- Traffic Volume Data

# MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: W Emerson Street
N/S: Essex Street
Melrose, MA

File Name : 1344_W_Emerson_at_Essex_02-15-2024
Site Code : 1344
Start Date : 2/15/2024
Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks - Bicycles on Road

| | Essex Street From North | | | | | W Emerson Street From East | | | | | Essex Street From South | | | | | W Emerson Street From West | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 5 | 16 | 8 | 0 | 29 | 10 | 20 | 1 | 0 | 31 | 1 | 11 | 4 | 3 | 19 | 0 | 15 | 8 | 0 | 23 | 102 |
| 07:15 AM | 5 | 17 | 12 | 1 | 35 | 13 | 29 | 2 | 0 | 44 | 2 | 18 | 9 | 2 | 31 | 3 | 15 | 5 | 0 | 23 | 133 |
| 07:30 AM | 6 | 21 | 8 | 1 | 36 | 8 | 26 | 0 | 2 | 36 | 2 | 23 | 7 | 5 | 37 | 5 | 17 | 11 | 1 | 34 | 143 |
| 07:45 AM | 6 | 41 | 16 | 2 | 65 | 14 | 47 | 1 | 0 | 62 | 3 | 21 | 13 | 1 | 38 | 9 | 25 | 21 | 3 | 58 | 223 |
| Total | 22 | 95 | 44 | 4 | 165 | 45 | 122 | 4 | 2 | 173 | 8 | 73 | 33 | 11 | 125 | 17 | 72 | 45 | 4 | 138 | 601 |
| 08:00 AM | 11 | 63 | 17 | 7 | 98 | 10 | 76 | 4 | 3 | 93 | 6 | 26 | 11 | 6 | 49 | 10 | 43 | 23 | 3 | 79 | 319 |
| 08:15 AM | 8 | 60 | 20 | 2 | 90 | 10 | 65 | 7 | 3 | 85 | 4 | 16 | 7 | 1 | 28 | 9 | 24 | 10 | 1 | 44 | 247 |
| 08:30 AM | 5 | 33 | 14 | 2 | 54 | 15 | 26 | 1 | 3 | 45 | 3 | 18 | 6 | 3 | 30 | 9 | 15 | 9 | 1 | 34 | 163 |
| 08:45 AM | 7 | 25 | 9 | 1 | 42 | 10 | 22 | 1 | 0 | 33 | 3 | 12 | 6 | 0 | 21 | 4 | 17 | 4 | 0 | 25 | 121 |
| Total | 31 | 181 | 60 | 12 | 284 | 45 | 189 | 13 | 9 | 256 | 16 | 72 | 30 | 10 | 128 | 32 | 99 | 46 | 5 | 182 | 850 |
| 04:00 PM | 6 | 31 | 10 | 8 | 55 | 10 | 26 | 1 | 7 | 44 | 1 | 21 | 17 | 8 | 47 | 7 | 30 | 11 | 2 | 50 | 196 |
| 04:15 PM | 7 | 23 | 13 | 2 | 45 | 8 | 22 | 1 | 5 | 36 | 2 | 13 | 8 | 2 | 25 | 3 | 44 | 8 | 1 | 56 | 162 |
| 04:30 PM | 7 | 23 | 8 | 2 | 40 | 9 | 26 | 4 | 4 | 43 | 3 | 20 | 9 | 4 | 36 | 5 | 27 | 14 | 1 | 47 | 166 |
| 04:45 PM | 5 | 29 | 10 | 3 | 47 | 8 | 17 | 2 | 4 | 31 | 2 | 19 | 5 | 8 | 34 | 10 | 35 | 9 | 2 | 56 | 168 |
| Total | 25 | 106 | 41 | 15 | 187 | 35 | 91 | 8 | 20 | 154 | 8 | 73 | 39 | 22 | 142 | 25 | 136 | 42 | 6 | 209 | 692 |
| 05:00 PM | 5 | 25 | 10 | 5 | 45 | 10 | 30 | 5 | 0 | 45 | 3 | 21 | 9 | 3 | 36 | 4 | 31 | 6 | 2 | 43 | 169 |
| 05:15 PM | 15 | 33 | 14 | 4 | 66 | 8 | 24 | 1 | 7 | 40 | 2 | 21 | 9 | 4 | 36 | 5 | 17 | 11 | 0 | 33 | 175 |
| 05:30 PM | 9 | 27 | 14 | 0 | 50 | 16 | 20 | 1 | 1 | 38 | 2 | 21 | 8 | 5 | 36 | 6 | 30 | 10 | 1 | 47 | 171 |
| 05:45 PM | 8 | 23 | 11 | 1 | 43 | 12 | 13 | 1 | 4 | 30 | 1 | 16 | 9 | 4 | 30 | 4 | 26 | 11 | 3 | 44 | 147 |
| Total | 37 | 108 | 49 | 10 | 204 | 46 | 87 | 8 | 12 | 153 | 8 | 79 | 35 | 16 | 138 | 19 | 104 | 38 | 6 | 167 | 662 |
| Grand Total | 115 | 490 | 194 | 41 | 840 | 171 | 489 | 33 | 43 | 736 | 40 | 297 | 137 | 59 | 533 | 93 | 411 | 171 | 21 | 696 | 2805 |
| Apprch % | 13.7 | 58.3 | 23.1 | 4.9 | | 23.2 | 66.4 | 4.5 | 5.8 | | 7.5 | 55.7 | 25.7 | 11.1 | | 13.4 | 59.1 | 24.6 | 3 | | |
| Total % | 4.1 | 17.5 | 6.9 | 1.5 | 29.9 | 6.1 | 17.4 | 1.2 | 1.5 | 26.2 | 1.4 | 10.6 | 4.9 | 2.1 | 19 | 3.3 | 14.7 | 6.1 | 0.7 | 24.8 | |
| Lights | 106 | 485 | 188 | 41 | 820 | 167 | 486 | 33 | 43 | 729 | 37 | 293 | 134 | 59 | 523 | 91 | 406 | 167 | 21 | 685 | 2757 |
| % Lights | 92.2 | 99 | 96.9 | 100 | 97.6 | 97.7 | 99.4 | 100 | 100 | 99 | 92.5 | 98.7 | 97.8 | 100 | 98.1 | 97.8 | 98.8 | 97.7 | 100 | 98.4 | 98.3 |
| Mediums | 5 | 3 | 6 | 0 | 14 | 3 | 3 | 0 | 0 | 6 | 1 | 3 | 3 | 0 | 7 | 0 | 4 | 3 | 0 | 7 | 34 |
| % Mediums | 4.3 | 0.6 | 3.1 | 0 | 1.7 | 1.8 | 0.6 | 0 | 0 | 0.8 | 2.5 | 1 | 2.2 | 0 | 1.3 | 0 | 1 | 1.8 | 0 | 1 | 1.2 |
| Articulated Trucks | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 3 | 1 | 1 | 0 | 0 | 2 | 6 |
| % Articulated Trucks | 0.9 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 5 | 0.3 | 0 | 0 | 0.6 | 1.1 | 0.2 | 0 | 0 | 0.3 | 0.2 |
| Bicycles on Road | 3 | 2 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 8 |
| % Bicycles on Road | 2.6 | 0.4 | 0 | 0 | 0.6 | 0.6 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 1.1 | 0 | 0.6 | 0 | 0.3 | 0.3 |

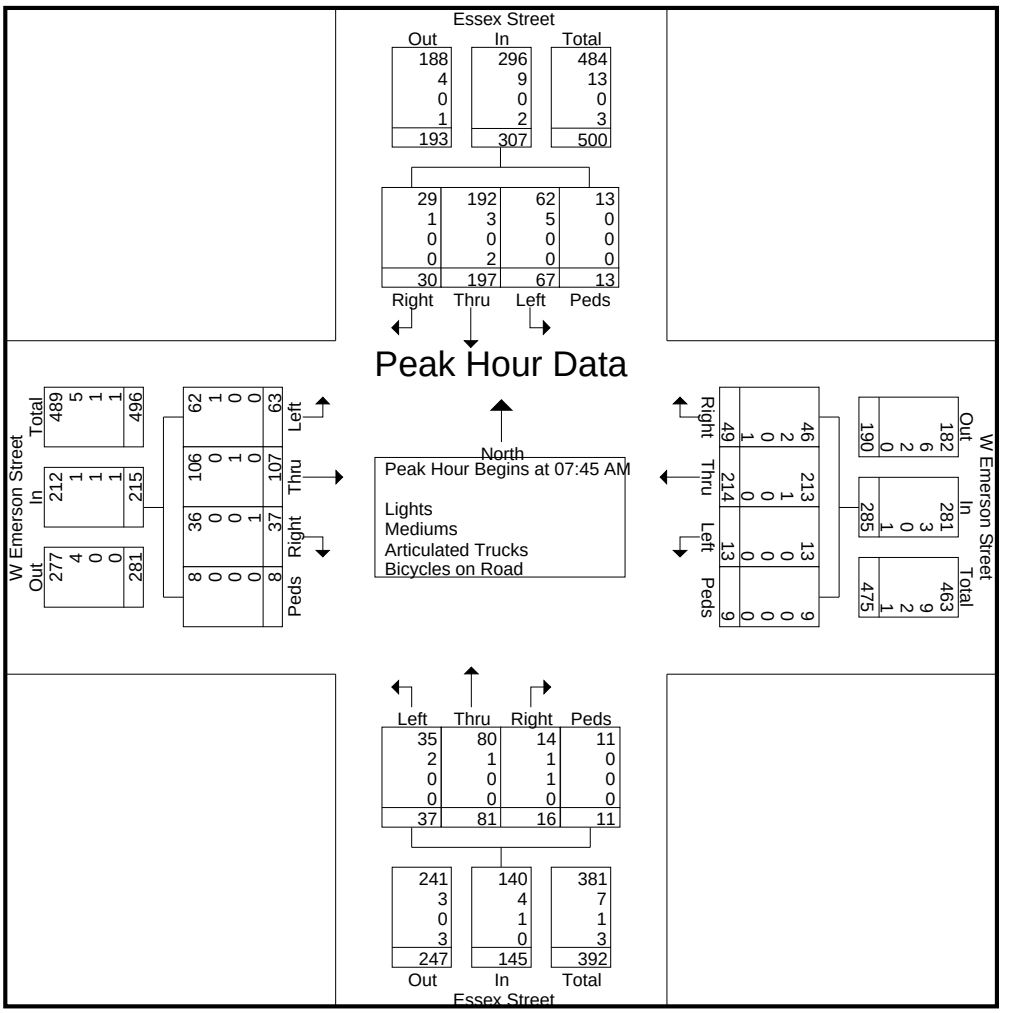
# MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: W Emerson Street
N/S: Essex Street
Melrose, MA

File Name : 1344_W_Emerson_at_Essex_02-15-2024
Site Code : 1344
Start Date : 2/15/2024
Page No : 2

| | Essex Street From North | | | | | W Emerson Street From East | | | | | Essex Street From South | | | | | W Emerson Street From West | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 07:45 AM | 6 | 41 | 16 | 2 | 65 | 14 | 47 | 1 | 0 | 62 | 3 | 21 | **13** | 1 | 38 | 9 | 25 | 21 | **3** | 58 | 223 |
| 08:00 AM | **11** | **63** | 17 | **7** | **98** | 10 | **76** | 4 | **3** | **93** | **6** | **26** | 11 | **6** | **49** | **10** | **43** | **23** | 3 | **79** | **319** |
| 08:15 AM | 8 | 60 | **20** | 2 | 90 | 10 | 65 | **7** | 3 | 85 | 4 | 16 | 7 | 1 | 28 | 9 | 24 | 10 | 1 | 44 | 247 |
| 08:30 AM | 5 | 33 | 14 | 2 | 54 | **15** | 26 | 1 | 3 | 45 | 3 | 18 | 6 | 3 | 30 | 9 | 15 | 9 | 1 | 34 | 163 |
| Total Volume | 30 | 197 | 67 | 13 | 307 | 49 | 214 | 13 | 9 | 285 | 16 | 81 | 37 | 11 | 145 | 37 | 107 | 63 | 8 | 215 | 952 |
| % App. Total | 9.8 | 64.2 | 21.8 | 4.2 | | 17.2 | 75.1 | 4.6 | 3.2 | | 11 | 55.9 | 25.5 | 7.6 | | 17.2 | 49.8 | 29.3 | 3.7 | | |
| PHF | .682 | .782 | .838 | .464 | .783 | .817 | .704 | .464 | .750 | .766 | .667 | .779 | .712 | .458 | .740 | .925 | .622 | .685 | .667 | .680 | .746 |
| Lights | 29 | 192 | 62 | 13 | 296 | 46 | 213 | 13 | 9 | 281 | 14 | 80 | 35 | 11 | 140 | 36 | 106 | 62 | 8 | 212 | 929 |
| % Lights | 96.7 | 97.5 | 92.5 | 100 | 96.4 | 93.9 | 99.5 | 100 | 100 | 98.6 | 87.5 | 98.8 | 94.6 | 100 | 96.6 | 97.3 | 99.1 | 98.4 | 100 | 98.6 | 97.6 |
| Mediums | 1 | 3 | 5 | 0 | 9 | 2 | 1 | 0 | 0 | 3 | 1 | 1 | 2 | 0 | 4 | 0 | 0 | 1 | 0 | 1 | 17 |
| % Mediums | 3.3 | 1.5 | 7.5 | 0 | 2.9 | 4.1 | 0.5 | 0 | 0 | 1.1 | 6.3 | 1.2 | 5.4 | 0 | 2.8 | 0 | 0 | 1.6 | 0 | 0.5 | 1.8 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 |
| % Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.3 | 0 | 0 | 0 | 0.7 | 0 | 0.9 | 0 | 0 | 0.5 | 0.2 |
| Bicycles on Road | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 4 |
| % Bicycles on Road | 0 | 1.0 | 0 | 0 | 0.7 | 2.0 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0 | 2.7 | 0 | 0 | 0 | 0.5 | 0.4 |



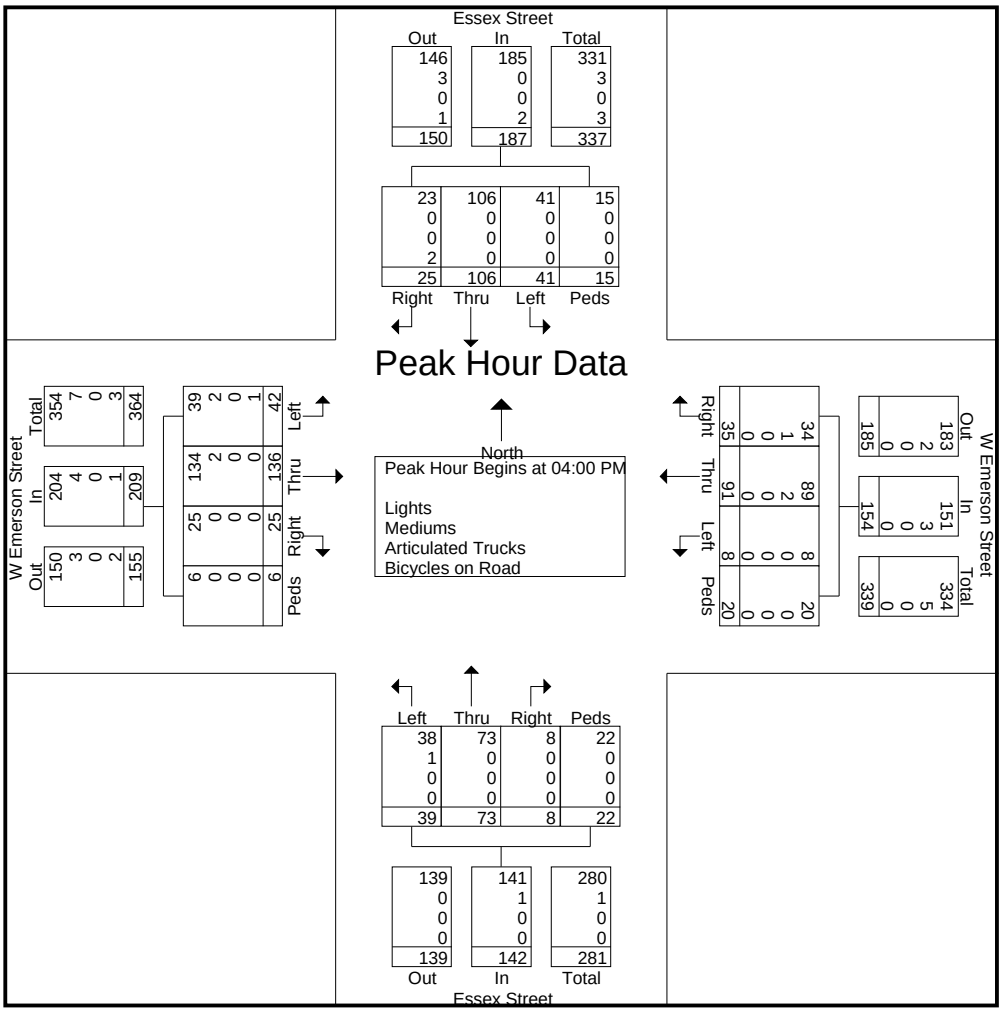
# MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

E/W: W Emerson Street
N/S: Essex Street
Melrose, MA

File Name : 1344_W_Emerson_at_Essex_02-15-2024
Site Code : 1344
Start Date : 2/15/2024
Page No : 3

| | Essex Street From North | | | | | W Emerson Street From East | | | | | Essex Street From South | | | | | W Emerson Street From West | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 04:00 PM | 6 | **31** | 10 | **8** | **55** | **10** | **26** | 1 | **7** | **44** | 1 | **21** | **17** | **8** | **47** | 7 | 30 | 11 | **2** | 50 | **196** |
| 04:15 PM | **7** | 23 | **13** | 2 | 45 | 8 | 22 | 1 | 5 | 36 | 2 | 13 | 8 | 2 | 25 | 3 | **44** | 8 | 1 | **56** | 162 |
| 04:30 PM | 7 | 23 | 8 | 2 | 40 | 9 | 26 | **4** | 4 | 43 | **3** | 20 | 9 | 4 | 36 | 5 | 27 | **14** | 1 | 47 | 166 |
| 04:45 PM | 5 | 29 | 10 | 3 | 47 | 8 | 17 | 2 | 4 | 31 | 2 | 19 | 5 | 8 | 34 | **10** | 35 | 9 | 2 | 56 | 168 |
| Total Volume | 25 | 106 | 41 | 15 | 187 | 35 | 91 | 8 | 20 | 154 | 8 | 73 | 39 | 22 | 142 | 25 | 136 | 42 | 6 | 209 | 692 |
| % App. Total | 13.4 | 56.7 | 21.9 | 8 | | 22.7 | 59.1 | 5.2 | 13 | | 5.6 | 51.4 | 27.5 | 15.5 | | 12 | 65.1 | 20.1 | 2.9 | | |
| PHF | .893 | .855 | .788 | .469 | .850 | .875 | .875 | .500 | .714 | .875 | .667 | .869 | .574 | .688 | .755 | .625 | .773 | .750 | .750 | .933 | .883 |
| Lights | 23 | 106 | 41 | 15 | 185 | 34 | 89 | 8 | 20 | 151 | 8 | 73 | 38 | 22 | 141 | 25 | 134 | 39 | 6 | 204 | 681 |
| % Lights | 92.0 | 100 | 100 | 100 | 98.9 | 97.1 | 97.8 | 100 | 100 | 98.1 | 100 | 100 | 97.4 | 100 | 99.3 | 100 | 98.5 | 92.9 | 100 | 97.6 | 98.4 |
| Mediums | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 2 | 0 | 4 | 8 |
| % Mediums | 0 | 0 | 0 | 0 | 0 | 2.9 | 2.2 | 0 | 0 | 1.9 | 0 | 0 | 2.6 | 0 | 0.7 | 0 | 1.5 | 4.8 | 0 | 1.9 | 1.2 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| % Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bicycles on Road | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| % Bicycles on Road | 8.0 | 0 | 0 | 0 | 1.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.4 | 0 | 0.5 | 0.4 |



MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Myrtle Street
E/W: Essex Street
Melrose, MA

File Name : 1344_Essex_at_Myrtle_02-15-2024
Site Code : 1344
Start Date : 2/15/2024
Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks - Bicycles on Road

| | Myrtle Street From North | | | | Essex Street From East | | | | | Myrtle Street From South | | | | Essex Street From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| 07:00 AM | 2 | 10 | 3 | 15 | 1 | 26 | 4 | 2 | 33 | 12 | 8 | 1 | 21 | 2 | 3 | 2 | 7 | 76 |
| 07:15 AM | 7 | 4 | 2 | 13 | 0 | 19 | 9 | 0 | 28 | 11 | 11 | 0 | 22 | 8 | 1 | 1 | 10 | 73 |
| 07:30 AM | 1 | 15 | 0 | 16 | 2 | 25 | 15 | 0 | 42 | 16 | 13 | 0 | 29 | 10 | 0 | 1 | 11 | 98 |
| 07:45 AM | 2 | 27 | 3 | 32 | 5 | 37 | 13 | 1 | 56 | 33 | 18 | 0 | 51 | 15 | 1 | 1 | 17 | 156 |
| Total | 12 | 56 | 8 | 76 | 8 | 107 | 41 | 3 | 159 | 72 | 50 | 1 | 123 | 35 | 5 | 5 | 45 | 403 |
| 08:00 AM | 12 | 20 | 2 | 34 | 2 | 32 | 21 | 1 | 56 | 58 | 21 | 0 | 79 | 24 | 6 | 2 | 32 | 201 |
| 08:15 AM | 13 | 14 | 1 | 28 | 5 | 34 | 15 | 4 | 58 | 25 | 6 | 1 | 32 | 22 | 6 | 2 | 30 | 148 |
| 08:30 AM | 6 | 16 | 1 | 23 | 4 | 21 | 12 | 0 | 37 | 15 | 8 | 4 | 27 | 11 | 10 | 3 | 24 | 111 |
| 08:45 AM | 4 | 10 | 0 | 14 | 4 | 16 | 9 | 0 | 29 | 10 | 6 | 2 | 18 | 11 | 4 | 1 | 16 | 77 |
| Total | 35 | 60 | 4 | 99 | 15 | 103 | 57 | 5 | 180 | 108 | 41 | 7 | 156 | 68 | 26 | 8 | 102 | 537 |
| 04:00 PM | 3 | 14 | 6 | 23 | 8 | 35 | 17 | 14 | 74 | 22 | 18 | 4 | 44 | 20 | 5 | 0 | 25 | 166 |
| 04:15 PM | 2 | 11 | 3 | 16 | 8 | 15 | 13 | 10 | 46 | 25 | 9 | 6 | 40 | 13 | 4 | 2 | 19 | 121 |
| 04:30 PM | 2 | 15 | 4 | 21 | 4 | 16 | 12 | 10 | 42 | 18 | 15 | 3 | 36 | 12 | 3 | 2 | 17 | 116 |
| 04:45 PM | 9 | 19 | 1 | 29 | 7 | 18 | 12 | 4 | 41 | 26 | 14 | 5 | 45 | 13 | 6 | 1 | 20 | 135 |
| Total | 16 | 59 | 14 | 89 | 27 | 84 | 54 | 38 | 203 | 91 | 56 | 18 | 165 | 58 | 18 | 5 | 81 | 538 |
| 05:00 PM | 4 | 17 | 3 | 24 | 8 | 19 | 14 | 2 | 43 | 41 | 18 | 5 | 64 | 16 | 4 | 1 | 21 | 152 |
| 05:15 PM | 1 | 8 | 4 | 13 | 4 | 23 | 19 | 3 | 49 | 34 | 19 | 3 | 56 | 10 | 2 | 0 | 12 | 130 |
| 05:30 PM | 9 | 8 | 2 | 19 | 5 | 22 | 24 | 3 | 54 | 28 | 11 | 6 | 45 | 15 | 5 | 3 | 23 | 141 |
| 05:45 PM | 3 | 8 | 4 | 15 | 6 | 16 | 13 | 5 | 40 | 20 | 17 | 1 | 38 | 10 | 3 | 0 | 13 | 106 |
| Total | 17 | 41 | 13 | 71 | 23 | 80 | 70 | 13 | 186 | 123 | 65 | 15 | 203 | 51 | 14 | 4 | 69 | 529 |
| Grand Total | 80 | 216 | 39 | 335 | 73 | 374 | 222 | 59 | 728 | 394 | 212 | 41 | 647 | 212 | 63 | 22 | 297 | 2007 |
| Apprch % | 23.9 | 64.5 | 11.6 | | 10 | 51.4 | 30.5 | 8.1 | | 60.9 | 32.8 | 6.3 | | 71.4 | 21.2 | 7.4 | | |
| Total % | 4 | 10.8 | 1.9 | 16.7 | 3.6 | 18.6 | 11.1 | 2.9 | 36.3 | 19.6 | 10.6 | 2 | 32.2 | 10.6 | 3.1 | 1.1 | 14.8 | |
| Lights | 80 | 215 | 39 | 334 | 72 | 364 | 215 | 59 | 710 | 393 | 210 | 41 | 644 | 211 | 63 | 22 | 296 | 1984 |
| % Lights | 100 | 99.5 | 100 | 99.7 | 98.6 | 97.3 | 96.8 | 100 | 97.5 | 99.7 | 99.1 | 100 | 99.5 | 99.5 | 100 | 100 | 99.7 | 98.9 |
| Mediums | 0 | 0 | 0 | 0 | 1 | 7 | 4 | 0 | 12 | 0 | 2 | 0 | 2 | 1 | 0 | 0 | 1 | 15 |
| % Mediums | 0 | 0 | 0 | 0 | 1.4 | 1.9 | 1.8 | 0 | 1.6 | 0 | 0.9 | 0 | 0.3 | 0.5 | 0 | 0 | 0.3 | 0.7 |
| Articulated Trucks | | | | | | | | | | | | | | | | | | |
| % Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 0.8 | 0.9 | 0 | 0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 |
| Bicycles on Road | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| % Bicycles on Road | 0 | 0.5 | 0 | 0.3 | 0 | 0 | 0.5 | 0 | 0.1 | 0.3 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0.1 |

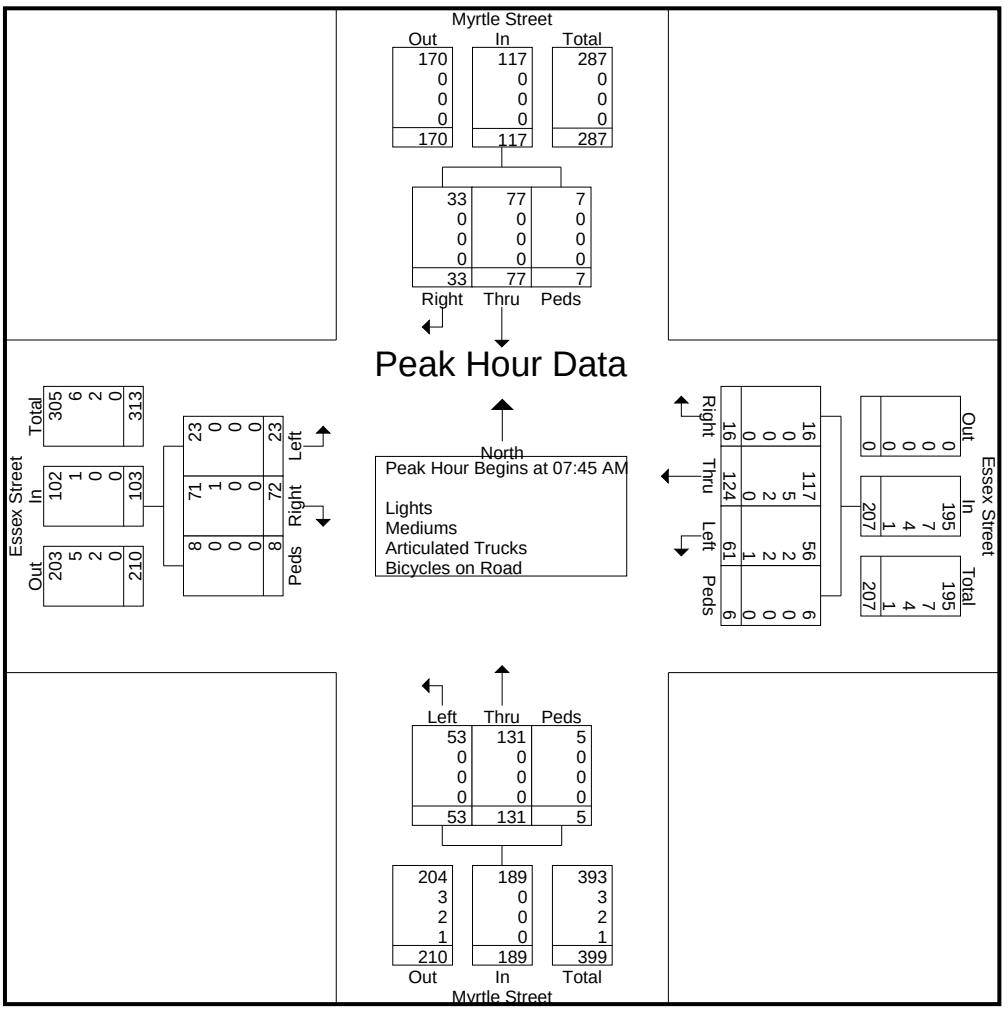
MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Myrtle Street
E/W: Essex Street
Melrose, MA

File Name : 1344_Essex_at_Myrtle_02-15-2024
Site Code : 1344
Start Date : 2/15/2024
Page No : 2

| | Myrtle Street From North | | | | Essex Street From East | | | | | Myrtle Street From South | | | | Essex Street From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | | | | | | |
| 07:45 AM | 2 | 27 | 3 | 32 | 5 | 37 | 13 | 1 | 56 | 33 | 18 | 0 | 51 | 15 | 1 | 1 | 17 | 156 |
| 08:00 AM | 12 | 20 | 2 | **34** | 2 | 32 | **21** | 1 | 56 | **58** | **21** | 0 | **79** | **24** | 6 | 2 | **32** | **201** |
| **08:15 AM** | **13** | 14 | 1 | 28 | 5 | 34 | 15 | **4** | **58** | **25** | **6** | **1** | **32** | 22 | **6** | **2** | **30** | **148** |
| **08:30 AM** | **6** | **16** | **1** | **23** | **4** | **21** | **12** | **0** | **37** | **15** | **8** | **4** | 27 | 11 | **10** | **3** | 24 | 111 |
| Total Volume | 33 | 77 | 7 | 117 | 16 | 124 | 61 | 6 | 207 | 131 | 53 | 5 | 189 | 72 | 23 | 8 | 103 | 616 |
| % App. Total | 28.2 | 65.8 | 6 | | 7.7 | 59.9 | 29.5 | 2.9 | | 69.3 | 28 | 2.6 | | 69.9 | 22.3 | 7.8 | | |
| PHF | .635 | .713 | .583 | .860 | .800 | .838 | .726 | .375 | .892 | .565 | .631 | .313 | .598 | .750 | .575 | .667 | .805 | .766 |
| Lights | 33 | 77 | 7 | 117 | 16 | 117 | 56 | 6 | 195 | 131 | 53 | 5 | 189 | 71 | 23 | 8 | 102 | 603 |
| % Lights | 100 | 100 | 100 | 100 | 100 | 94.4 | 91.8 | 100 | 94.2 | 100 | 100 | 100 | 100 | 98.6 | 100 | 100 | 99.0 | 97.9 |
| Mediums | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 0 | 7 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 8 |
| % Mediums | 0 | 0 | 0 | 0 | 0 | 4.0 | 3.3 | 0 | 3.4 | 0 | 0 | 0 | 0 | 1.4 | 0 | 0 | 1.0 | 1.3 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| % Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 1.6 | 3.3 | 0 | 1.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 |
| Bicycles on Road | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| % Bicycles on Road | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 |



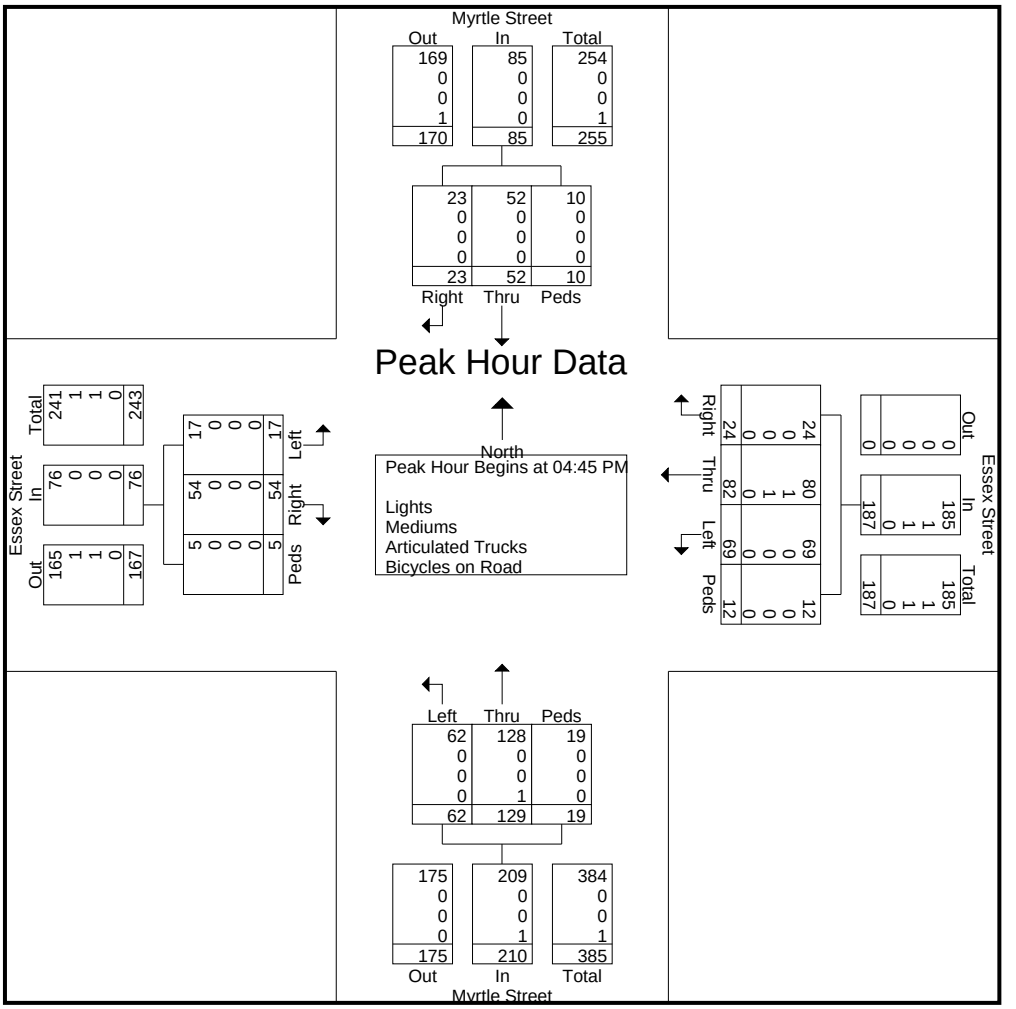
MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Myrtle Street
E/W: Essex Street
Melrose, MA

File Name : 1344_Essex_at_Myrtle_02-15-2024
Site Code : 1344
Start Date : 2/15/2024
Page No : 3

| | Myrtle Street From North | | | | Essex Street From East | | | | | Myrtle Street From South | | | | Essex Street From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | | | | | | |
| 04:45 PM | 9 | 19 | 1 | 29 | 7 | 18 | 12 | 4 | 41 | 26 | 14 | 5 | 45 | 13 | **6** | 1 | 20 | 135 |
| 05:00 PM | 4 | 17 | 3 | 24 | **8** | | | | | **41** | 18 | 5 | **64** | **16** | 4 | 1 | 21 | **152** |
| **05:15 PM** | **1** | **8** | **4** | **13** | **4** | **23** | **19** | **3** | **49** | **34** | **19** | 3 | 56 | 10 | 2 | 0 | 12 | 130 |
| 05:30 PM | 9 | 8 | 2 | 19 | 5 | 22 | **24** | 3 | **54** | | | **6** | 45 | 15 | 5 | **3** | **23** | 141 |
| Total Volume | 23 | 52 | 10 | 85 | 24 | 82 | 69 | 12 | 187 | 129 | 62 | 19 | 210 | 54 | 17 | 5 | 76 | 558 |
| % App. Total | 27.1 | 61.2 | 11.8 | | 12.8 | 43.9 | 36.9 | 6.4 | | 61.4 | 29.5 | 9 | | 71.1 | 22.4 | 6.6 | | |
| PHF | .639 | .684 | .625 | .733 | .750 | .891 | .719 | .750 | .866 | .787 | .816 | .792 | .820 | .844 | .708 | .417 | .826 | .918 |
| Lights | 23 | 52 | 10 | 85 | 24 | 80 | 69 | 12 | 185 | 128 | 62 | 19 | 209 | 54 | 17 | 5 | 76 | 555 |
| % Lights | 100 | 100 | 100 | 100 | 100 | 97.6 | 100 | 100 | 98.9 | 99.2 | 100 | 100 | 99.5 | 100 | 100 | 100 | 100 | 99.5 |
| Mediums | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| % Mediums | 0 | 0 | 0 | 0 | 0 | 1.2 | 0 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 |
| Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| % Articulated Trucks | 0 | 0 | 0 | 0 | 0 | 1.2 | 0 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 |
| Bicycles on Road | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| % Bicycles on Road | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0.2 |



# MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Essex Street
At Proposed Driveway Location
Melrose, MA

Site Code: 1344
Station ID:
1344

| Start Time | 15-Feb-24 Thu | Southbound Morning | Southbound Afternoon | Hour Totals Morning | Hour Totals Afternoon | Northbound Morning | Northbound Afternoon | Hour Totals Morning | Hour Totals Afternoon | Combined Totals Morning | Combined Totals Afternoon |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12:00 | | 2 | 24 | | | 2 | 14 | | | | |
| 12:15 | | 0 | 31 | | | 1 | 17 | | | | |
| 12:30 | | 1 | 24 | | | 2 | 21 | | | | |
| 12:45 | | 0 | 20 | 3 | 99 | 0 | 22 | 5 | 74 | 8 | 173 |
| 01:00 | | 0 | 20 | | | 0 | 25 | | | | |
| 01:15 | | 0 | 28 | | | 1 | 22 | | | | |
| 01:30 | | 0 | 22 | | | 0 | 24 | | | | |
| 01:45 | | 0 | 18 | 0 | 88 | 1 | 19 | 2 | 90 | 2 | 178 |
| 02:00 | | 0 | 23 | | | 1 | 17 | | | | |
| 02:15 | | 0 | 25 | | | 1 | 27 | | | | |
| 02:30 | | 0 | 27 | | | 0 | 31 | | | | |
| 02:45 | | 0 | 29 | 0 | 104 | 1 | 36 | 3 | 111 | 3 | 215 |
| 03:00 | | 1 | 65 | | | 0 | 28 | | | | |
| 03:15 | | 0 | 48 | | | 0 | 31 | | | | |
| 03:30 | | 1 | 40 | | | 1 | 31 | | | | |
| 03:45 | | 1 | 49 | 3 | 202 | 0 | 26 | 1 | 116 | 4 | 318 |
| 04:00 | | 0 | 36 | | | 0 | 33 | | | | |
| 04:15 | | 1 | 38 | | | 0 | 34 | | | | |
| 04:30 | | 0 | 22 | | | 1 | 21 | | | | |
| 04:45 | | 0 | 29 | 1 | 125 | 1 | 25 | 2 | 113 | 3 | 238 |
| 05:00 | | 2 | 35 | | | 1 | 23 | | | | |
| 05:15 | | 1 | 33 | | | 1 | 33 | | | | |
| 05:30 | | 3 | 40 | | | 4 | 26 | | | | |
| 05:45 | | 3 | 30 | 9 | 138 | 5 | 25 | 11 | 107 | 20 | 245 |
| 06:00 | | 11 | 26 | | | 4 | 25 | | | | |
| 06:15 | | 7 | 29 | | | 5 | 15 | | | | |
| 06:30 | | 6 | 18 | | | 12 | 33 | | | | |
| 06:45 | | 12 | 17 | 36 | 90 | 12 | 15 | 33 | 88 | 69 | 178 |
| 07:00 | | 7 | 11 | | | 23 | 13 | | | | |
| 07:15 | | 19 | 22 | | | 20 | 32 | | | | |
| 07:30 | | 24 | 21 | | | 22 | 20 | | | | |
| 07:45 | | 27 | 19 | 77 | 73 | 24 | 19 | 89 | 84 | 166 | 157 |
| 08:00 | | 53 | 11 | | | 42 | 12 | | | | |
| 08:15 | | 68 | 19 | | | 36 | 14 | | | | |
| 08:30 | | 59 | 12 | | | 25 | 13 | | | | |
| 08:45 | | 42 | 8 | 222 | 50 | 23 | 15 | 126 | 54 | 348 | 104 |
| 09:00 | | 30 | 4 | | | 19 | 17 | | | | |
| 09:15 | | 23 | 13 | | | 21 | 16 | | | | |
| 09:30 | | 30 | 6 | | | 21 | 8 | | | | |
| 09:45 | | 27 | 8 | 110 | 31 | 33 | 5 | 94 | 46 | 204 | 77 |
| 10:00 | | 30 | 5 | | | 12 | 4 | | | | |
| 10:15 | | 24 | 2 | | | 25 | 3 | | | | |
| 10:30 | | 19 | 4 | | | 9 | 6 | | | | |
| 10:45 | | 14 | 6 | 87 | 17 | 21 | 7 | 67 | 20 | 154 | 37 |
| 11:00 | | 24 | 2 | | | 21 | 6 | | | | |
| 11:15 | | 24 | 6 | | | 30 | 5 | | | | |
| 11:30 | | 22 | 2 | | | 19 | 8 | | | | |
| 11:45 | | 27 | 2 | 97 | 12 | 21 | 4 | 91 | 23 | 188 | 35 |
| Total | | 645 | 1029 | | | 524 | 926 | | | 1169 | 1955 |
| Percent | | 38.5% | 61.5% | | | 36.1% | 63.9% | | | 37.4% | 62.6% |
| Total | | 645 | 1029 | | | 524 | 926 | | | 1169 | 1955 |
| Percent | | 38.5% | 61.5% | | | 36.1% | 63.9% | | | 37.4% | 62.6% |
| Combined Total | | 1674 | | | | 1450 | | | | 3124 | |

□ Seasonal/Yearly Traffic Information

## *SECTION I - CONTINUOUS COUNTING STATION MONTHLY AVERAGE DAILY TRAFFIC*

**STATION 82 - MEDFORD - RTE.I-93 - AT STONEHAM T.L.**

| YR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | YEAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 166,776 | 173,151 | 169,856 | 183,506 | 183,814 | 186,585 | 178,914 | 184,755 | 177,251 | 185,581 | 176,346 | 169,840 | 178,031 |
| | 6% | 2% | 5% | -2% | -1% | -1% | 2% | 1% | 2% | 0% | -1% | -1% | 1% |
| 13 | 176,123 | 176,529 | 178,822 | 179,899 | 182,423 | 184,088 | 181,645 | 186,580 | 181,395 | 185,616 | 174,950 | 167,373 | 179,620 |
| | -5% | -12% | -4% | 1% | 0% | 2% | 0% | -1% | 1% | -1% | 1% | 4% | -1% |
| 14 | 167,123 | 155,673 | 171,195 | 182,293 | 182,202 | 186,889 | 180,874 | 184,974 | 183,100 | 183,447 | 176,109 | 174,591 | 177,373 |
| | 7% | 16% | 7% | 3% | 3% | 3% | 1% | 2% | 1% | 1% | 2% | 3% | 4% |
| 16 | 179,483 | 180,934 | 183,881 | 187,293 | 187,993 | 191,742 | 182,856 | 188,287 | 184,571 | 184,857 | 179,188 | 179,359 | 184,204 |
| | -1% | -1% | 0% | 1% | 2% | 2% | 6% | 5% | 6% | 6% | 5% | -7% | 2% |
| 19 | 177,043 | 179,523 | 184,449 | 190,020 | 191,295 | 194,944 | 194,551 | 198,442 | 195,236 | 195,619 | 187,620 | 166,485 | 187,936 |
| | 5% | 5% | -35% | -54% | -40% | -24% | -18% | -17% | -16% | -17% | -19% | -15% | -21% |
| 20 | 186,338 | 188,892 | 120,781 | 87,570 | 115,568 | 148,283 | 159,081 | 164,504 | 163,178 | 163,093 | 151,611 | 142,149 | 149,254 |
| | -23% | -22% | 38% | 92% | 51% | 23% | 10% | 10% | 9% | 11% | 19% | 25% | 15% |
| 21 | 143,813 | 147,093 | 166,910 | 167,961 | 174,103 | 182,889 | 174,424 | 180,193 | 177,413 | 181,074 | 180,976 | 177,565 | 171,201 |
| Seasonal Adjustment Factor | 1.03 | 1.03 | 1.05 | 1.09 | 1.02 | 0.96 | 0.98 | 0.95 | 0.97 | 0.96 | 1.00 | 1.04 | |
| (to average month) | | | | | | | | | | | | **Growth** | **-0.6%** |
| | | | | | | | | | | | | **Yearly Growth Factor Used** | **0.5%** |

*ITALICS* = ESTIMATED DATA

MADT

- □ Speed Data

# MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Essex Street
At Proposed Site Driveway Location
Melrose, MA

Site Code: 1344
Station ID:
1344

Southbound

| Start Time | 1 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 75 | 76 999 | Total | 85th Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/14/24 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 01:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 02:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 03:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 04:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 05:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 06:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 07:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 08:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 09:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 10:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 11:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 12 PM | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 13:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 14:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 15:00 | 1 | 2 | 47 | 94 | 21 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 167 | 29 |
| 16:00 | 1 | 9 | 51 | 69 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150 | 29 |
| 17:00 | 1 | 6 | 74 | 72 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 157 | 28 |
| 18:00 | 1 | 4 | 50 | 55 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 120 | 29 |
| 19:00 | 0 | 5 | 33 | 41 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 29 |
| 20:00 | 0 | 2 | 22 | 29 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 29 |
| 21:00 | 0 | 1 | 12 | 10 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 32 |
| 22:00 | 0 | 0 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 29 |
| 23:00 | 0 | 1 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 35 |

# MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Essex Street
At Proposed Site Driveway Location
Melrose, MA

Site Code: 1344
Station ID:
1344

Southbound

| Start Time | 1 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 75 | 76 999 | Total | 85th Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/15/24 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 37 |
| 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * |
| 02:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * |
| 03:00 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 32 |
| 04:00 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 24 |
| 05:00 | 1 | 0 | 2 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 29 |
| 06:00 | 0 | 2 | 10 | 18 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 30 |
| 07:00 | 0 | 2 | 15 | 42 | 16 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 77 | 32 |
| 08:00 | 0 | 7 | 79 | 109 | 26 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 222 | 29 |
| 09:00 | 1 | 4 | 49 | 41 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 110 | 29 |
| 10:00 | 0 | 3 | 31 | 40 | 11 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 87 | 29 |
| 11:00 | 2 | 8 | 43 | 34 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 97 | 29 |
| 12 PM | 0 | 9 | 38 | 40 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 99 | 29 |
| 13:00 | 1 | 10 | 29 | 40 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 88 | 29 |
| 14:00 | 0 | 8 | 42 | 46 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 104 | 29 |
| 15:00 | 2 | 12 | 94 | 78 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 202 | 29 |
| 16:00 | 0 | 4 | 55 | 60 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 125 | 28 |
| 17:00 | 0 | 6 | 64 | 65 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 138 | 28 |
| 18:00 | 2 | 6 | 35 | 40 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 90 | 29 |
| 19:00 | 0 | 3 | 38 | 28 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 73 | 28 |
| 20:00 | 0 | 2 | 19 | 23 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 29 |
| 21:00 | 0 | 3 | 12 | 12 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 29 |
| 22:00 | 0 | 1 | 9 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 29 |
| 23:00 | 0 | 1 | 6 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 28 |

**MDM Transportation Consultants, Inc.**
28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Essex Street
At Proposed Site Driveway Location
Melrose, MA

Site Code: 1344
Station ID:
1344

Southbound

| Start Time | 1 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 75 | 76 999 | Total | 85th Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/16/24 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 26 |
| 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * |
| 02:00 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 33 |
| 03:00 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 34 |
| 04:00 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 27 |
| 05:00 | 1 | 1 | 7 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 27 |
| 06:00 | 0 | 3 | 10 | 15 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 29 |
| 07:00 | 0 | 4 | 21 | 33 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 66 | 29 |
| 08:00 | 1 | 7 | 45 | 99 | 17 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 172 | 29 |
| 09:00 | 1 | 7 | 21 | 30 | 10 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 74 | 31 |
| 10:00 | 0 | 5 | 46 | 43 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 107 | 29 |
| 11:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 12 PM | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 13:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 14:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 15:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 16:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 17:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 18:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 19:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 20:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 21:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 22:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 23:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |

| | | |
|---|---|---|
| | 15th Percentile : | 21 MPH |
| | 50th Percentile : | 25 MPH |
| | 85th Percentile : | 29 MPH |
| | 95th Percentile : | 32 MPH |
| Statistics | 10 MPH Pace Speed : | 21-30 MPH |
| | Number in Pace : | 2456 |
| | Percent in Pace : | 83.7% |
| | Number of Vehicles > 25 MPH : | 1650 |
| | Percent of Vehicles > 25 MPH : | 56.2% |
| | Mean Speed(Average) : | 26 MPH |

**MDM Transportation Consultants, Inc.**
28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Essex Street
At Proposed Site Driveway Location
Melrose, MA

Site Code: 1344
Station ID:
1344

Northbound

| Start Time | 1 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 75 | 76 999 | Total | 85th Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/14/24 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 01:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 02:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 03:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 04:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 05:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 06:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 07:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 08:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 09:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 10:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 11:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 12 PM | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 13:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 14:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 15:00 | 0 | 1 | 36 | 65 | 19 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 123 | 30 |
| 16:00 | 2 | 2 | 39 | 48 | 20 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 112 | 31 |
| 17:00 | 1 | 6 | 54 | 68 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 147 | 29 |
| 18:00 | 2 | 8 | 49 | 49 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 118 | 29 |
| 19:00 | 0 | 6 | 38 | 28 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 79 | 29 |
| 20:00 | 1 | 3 | 16 | 34 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68 | 31 |
| 21:00 | 0 | 0 | 11 | 24 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 29 |
| 22:00 | 0 | 0 | 4 | 9 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 29 |
| 23:00 | 0 | 1 | 2 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 33 |

**MDM Transportation Consultants, Inc.**
28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Essex Street
At Proposed Site Driveway Location
Melrose, MA

Site Code: 1344
Station ID:
1344

Northbound

| Start Time | 1 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 75 | 76 999 | Total | 85th Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/15/24 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 33 |
| 01:00 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 29 |
| 02:00 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 28 |
| 03:00 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 29 |
| 04:00 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 34 |
| 05:00 | 0 | 0 | 5 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 29 |
| 06:00 | 1 | 3 | 9 | 12 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 32 |
| 07:00 | 2 | 2 | 18 | 46 | 15 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 89 | 32 |
| 08:00 | 4 | 4 | 38 | 64 | 15 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 126 | 29 |
| 09:00 | 2 | 3 | 24 | 48 | 15 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 94 | 30 |
| 10:00 | 1 | 7 | 28 | 28 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 67 | 28 |
| 11:00 | 0 | 10 | 27 | 36 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 91 | 31 |
| 12 PM | 3 | 4 | 23 | 31 | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 74 | 30 |
| 13:00 | 3 | 5 | 33 | 42 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 90 | 29 |
| 14:00 | 2 | 3 | 35 | 62 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 111 | 29 |
| 15:00 | 0 | 4 | 32 | 71 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 116 | 29 |
| 16:00 | 1 | 6 | 42 | 51 | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 113 | 29 |
| 17:00 | 1 | 6 | 35 | 49 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 107 | 29 |
| 18:00 | 1 | 6 | 30 | 43 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 88 | 29 |
| 19:00 | 1 | 5 | 26 | 44 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 29 |
| 20:00 | 0 | 3 | 22 | 22 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 29 |
| 21:00 | 0 | 4 | 15 | 20 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 | 30 |
| 22:00 | 1 | 2 | 5 | 8 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 31 |
| 23:00 | 0 | 2 | 12 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 28 |

**MDM Transportation Consultants, Inc.**
28 Lord Road, Suite 280
Marlborough, MA, 01752

N/S: Essex Street
At Proposed Site Driveway Location
Melrose, MA

Site Code: 1344
Station ID:
1344

Northbound

| Start Time | 1 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 75 | 76 999 | Total | 85th Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 02/16/24 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 32 |
| 01:00 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 27 |
| 02:00 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 28 |
| 03:00 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 28 |
| 04:00 | 0 | 0 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 30 |
| 05:00 | 0 | 2 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 29 |
| 06:00 | 0 | 0 | 8 | 15 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 31 |
| 07:00 | 0 | 3 | 33 | 38 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 86 | 29 |
| 08:00 | 2 | 5 | 41 | 72 | 23 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 144 | 30 |
| 09:00 | 1 | 7 | 33 | 38 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 90 | 29 |
| 10:00 | 0 | 5 | 18 | 32 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 66 | 30 |
| 11:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 12 PM | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 13:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 14:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 15:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 16:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 17:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 18:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 19:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 20:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 21:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 22:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 23:00 | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |

| | | |
|---|---|---|
| | 15th Percentile : | 21 MPH |
| | 50th Percentile : | 26 MPH |
| | 85th Percentile : | 29 MPH |
| | 95th Percentile : | 33 MPH |
| Statistics | 10 MPH Pace Speed : | 21-30 MPH |
| | Number in Pace : | 2088 |
| | Percent in Pace : | 80.1% |
| | Number of Vehicles > 25 MPH : | 1592 |
| | Percent of Vehicles > 25 MPH : | 61.0% |
| | Mean Speed(Average) : | 26 MPH |

□ Public Transportation Information

# HAVERHILL LINE — FALL/WINTER SCHEDULE

Effective November 6, 2023

**Monday to Friday**

## Inbound to Boston

| ZONE | STATION | TRAIN # | AM | | | | | | | | | | | PM | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bikes Allowed | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Haverhill | ♿ | ---- | 5:27 | 6:12 | - | 7:25 | - | 8:27 | - | 9:57 | - | 11:27 | - | 12:57 | - | 2:27 | - | 3:57 | 5:20 | - | - | 6:57 | 9:15 |
| 7 | Bradford | ♿ | ---- | 5:29 | 6:14 | - | 7:27 | - | 8:29 | - | f 9:59 | - | f 11:29 | - | f 12:59 | - | f 2:29 | - | f 3:59 | f 5:22 | - | - | f 6:59 | 9:17 |
| 6 | Lawrence | ♿ | 4:51 | 5:36 | 6:21 | - | 7:34 | - | 8:36 | - | 10:06 | - | 11:36 | - | 1:06 | - | 2:36 | - | 4:06 | 5:29 | - | - | 7:06 | 9:24 |
| 5 | Andover | ♿ | 4:58 | 5:43 | 6:28 | - | 7:41 | - | 8:43 | - | f 10:13 | - | f 11:43 | - | f 1:13 | - | f 2:43 | - | f 4:13 | f 5:36 | - | - | f 7:13 | 9:31 |
| 4 | Ballardvale | ♿ | 5:03 | 5:48 | 6:33 | - | 7:46 | - | 8:48 | - | f 10:18 | - | f 11:48 | - | f 1:18 | - | f 2:48 | - | f 4:18 | f 5:41 | - | - | f 7:18 | 9:36 |
| 3 | North Wilmington | | 5:11 | 5:56 | 6:41 | - | - | - | 8:56 | - | f 10:26 | - | f 11:56 | - | f 1:26 | - | f 2:56 | - | f 4:26 | - | - | - | f 7:26 | 9:43 |
| 2 | Reading | ♿ | 5:18 | 6:03 | 6:48 | 7:33 | - | 8:18 | 9:03 | 9:48 | 10:33 | 11:18 | 12:03 | 12:48 | 1:33 | 2:18 | 3:03 | 3:48 | 4:33 | - | 6:03 | 6:48 | 7:33 | 9:50 |
| 2 | Wakefield | | 5:24 | 6:09 | 6:54 | 7:39 | - | 8:24 | 9:09 | 9:54 | 10:39 | 11:24 | 12:09 | 12:54 | 1:39 | 2:24 | 3:09 | 3:54 | 4:39 | - | f 6:09 | f 6:54 | f 7:39 | 9:56 |
| 2 | Greenwood | | 5:27 | 6:12 | 6:57 | 7:42 | - | 8:27 | 9:12 | f 9:57 | f 10:42 | f 11:27 | f 12:12 | f 12:57 | f 1:42 | f 2:27 | f 3:12 | f 3:57 | f 4:42 | - | f 6:12 | f 6:57 | f 7:42 | 9:59 |
| 1 | Melrose Highlands | ♿ | 5:29 | 6:14 | 6:59 | 7:44 | - | 8:29 | 9:14 | 9:59 | 10:44 | 11:29 | 12:14 | 12:59 | 1:44 | 2:29 | 3:14 | 3:59 | 4:44 | - | f 6:14 | f 6:59 | f 7:44 | 10:01 |
| 1 | Melrose/Cedar Park | | 5:31 | 6:16 | 7:01 | 7:46 | - | 8:31 | 9:16 | f 10:01 | f 10:46 | f 11:31 | f 12:16 | f 1:01 | f 1:46 | f 2:31 | f 3:16 | f 4:01 | f 4:46 | - | f 6:16 | f 7:01 | f 7:46 | 10:03 |
| 1 | Wyoming Hill | | 5:33 | 6:18 | 7:03 | 7:48 | - | 8:33 | 9:18 | f 10:03 | f 10:48 | f 11:33 | f 12:18 | f 1:03 | f 1:48 | f 2:33 | f 3:18 | f 4:03 | f 4:48 | - | f 6:18 | f 7:03 | f 7:48 | 10:05 |
| 1A | Oak Grove | ♿ | 5:35 | 6:20 | 7:05 | 7:50 | - | 8:35 | 9:20 | f 10:05 | f 10:50 | f 11:35 | f 12:20 | f 1:05 | f 1:50 | f 2:35 | f 3:20 | f 4:05 | f 4:50 | - | f 6:20 | f 7:05 | f 7:50 | 10:07 |
| 1A | Malden Center | ♿ | L 5:38 | L 6:23 | L 7:08 | L 7:53 | - | L 8:38 | L 9:23 | L 10:08 | L 10:53 | L 11:38 | L 12:23 | L 1:08 | L 1:53 | L 2:38 | L 3:23 | L 4:08 | L 4:53 | - | L 6:23 | L 7:08 | L 7:53 | L 10:10 |
| 1A | North Station | ♿ | 5:54 | 6:41 | 7:26 | 8:10 | 8:25 | 8:55 | 9:40 | 10:24 | 11:09 | 11:54 | 12:39 | 1:24 | 2:09 | 2:54 | 3:39 | 4:24 | 5:09 | 6:19 | 6:39 | 7:24 | 8:09 | 10:26 |

**Monday to Friday**

## Outbound from Boston

| ZONE | STATION | TRAIN # | AM | | | | | | | | | PM | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bikes Allowed | | | | | | | | | | | | | | | | | | | | | | |
| 1A | North Station | ♿ | 5:55 | 6:40 | 7:25 | 8:10 | 8:55 | 9:40 | 10:25 | 11:10 | 11:55 | 12:40 | 1:25 | 2:10 | 2:55 | 3:40 | 4:25 | 5:10 | 5:35 | 5:55 | 6:40 | 7:30 | 9:40 | 11:40 |
| 1A | Malden Center | ♿ | f 6:06 | f 6:51 | f 7:36 | f 8:21 | f 9:06 | f 9:51 | f 10:36 | f 11:21 | f 12:06 | f 12:51 | f 1:36 | f 2:21 | f 3:06 | 3:51 | 4:36 | 5:21 | - | 6:06 | 6:51 | f 7:41 | f 9:51 | 11:51 |
| 1A | Oak Grove | ♿ | f 6:08 | f 6:53 | f 7:38 | f 8:23 | f 9:08 | f 9:53 | f 10:38 | f 11:23 | f 12:08 | f 12:53 | f 1:38 | f 2:23 | f 3:08 | 3:53 | 4:38 | 5:23 | - | 6:08 | 6:53 | f 7:43 | f 9:53 | 11:53 |
| 1 | Wyoming Hill | | f 6:10 | f 6:55 | f 7:40 | f 8:25 | f 9:10 | f 9:55 | f 10:40 | f 11:25 | f 12:10 | f 12:55 | f 1:40 | f 2:25 | f 3:10 | 3:55 | 4:40 | 5:25 | - | 6:10 | 6:55 | f 7:45 | f 9:55 | 11:55 |
| 1 | Melrose/Cedar Park | | f 6:12 | f 6:57 | f 7:42 | f 8:27 | f 9:12 | f 9:57 | f 10:42 | f 11:27 | f 12:12 | f 12:57 | f 1:42 | f 2:27 | f 3:12 | 3:57 | 4:42 | 5:27 | - | 6:12 | 6:57 | f 7:47 | f 9:57 | 11:57 |
| 1 | Melrose Highlands | ♿ | f 6:15 | f 7:00 | f 7:45 | f 8:30 | f 9:15 | 10:00 | 10:45 | 11:30 | 12:15 | 1:00 | 1:45 | 2:30 | 3:15 | 4:00 | 4:45 | 5:30 | - | 6:15 | 7:00 | 7:50 | f 10:00 | 12:00 |
| 2 | Greenwood | | f 6:18 | f 7:03 | f 7:48 | f 8:33 | f 9:18 | f 10:03 | f 10:48 | f 11:33 | f 12:18 | f 1:03 | f 1:48 | f 2:33 | f 3:18 | 4:03 | 4:48 | 5:33 | - | 6:18 | 7:03 | f 7:53 | f 10:03 | 12:03 |
| 2 | Wakefield | | f 6:22 | f 7:07 | f 7:52 | f 8:37 | f 9:22 | 10:07 | 10:52 | 11:37 | 12:22 | 1:07 | 1:52 | 2:37 | 3:22 | 4:07 | 4:52 | 5:37 | - | 6:22 | 7:07 | 7:57 | f 10:07 | 12:07 |
| 2 | Reading | ♿ | 6:28 | 7:16 | 8:01 | 8:43 | 9:31 | 10:13 | 11:01 | 11:43 | 12:31 | 1:13 | 2:01 | 2:43 | 3:31 | 4:13 | 4:58 | 5:46 | - | 6:31 | 7:13 | 8:03 | 10:13 | 12:13 |
| 3 | North Wilmington | | f 6:34 | - | - | f 8:49 | - | f 10:19 | - | f 11:49 | - | f 1:19 | - | f 2:49 | - | 4:19 | 5:05 | - | - | - | 7:19 | f 8:09 | f 10:19 | 12:19 |
| 4 | Ballardvale | ♿ | f 6:42 | - | - | f 8:57 | - | f 10:27 | - | f 11:57 | - | f 1:27 | - | f 2:57 | - | 4:27 | 5:13 | - | 6:07 | - | 7:27 | 8:17 | f 10:26 | 12:26 |
| 5 | Andover | ♿ | f 6:47 | - | - | f 9:02 | - | f 10:32 | - | f 12:02 | - | f 1:32 | - | f 3:02 | - | 4:32 | 5:18 | - | 6:12 | - | 7:32 | 8:22 | f 10:31 | 12:31 |
| 6 | Lawrence | ♿ | 6:54 | - | - | 9:09 | - | 10:39 | - | 12:09 | - | 1:39 | - | 3:09 | - | 4:39 | 5:25 | - | 6:19 | - | 7:39 | 8:29 | 10:38 | 12:38 |
| 7 | Bradford | ♿ | f 7:02 | - | - | f 9:17 | - | L 10:49 | - | L 12:19 | - | L 1:49 | - | L 3:19 | - | L 4:50 | L 5:37 | - | L 6:31 | - | L 7:50 | L 8:39 | f 10:46 | 12:46 |
| 7 | Haverhill | ♿ | 7:10 | - | - | 9:25 | - | 10:55 | - | 12:25 | - | 1:55 | - | 3:25 | - | 4:57 | 5:44 | - | 6:38 | - | 7:57 | 8:45 | 10:54 | 12:54 |

**Weekend**

## Inbound to Boston

| ZONE | STATION | | AM | | | PM | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | SATURDAY TRAIN # | 1200 | 1202 | 1204 | 1206 | 1208 | 1210 | 1212 | 1214 |
| | | SUNDAY TRAIN # | 2200 | 2202 | 2204 | 2206 | 2208 | 2210 | 2212 | 2214 |
| | Bikes Allowed | | | | | | | | | |
| 7 | Haverhill | ♿ | 5:35 | 8:35 | 10:50 | 12:50 | 2:50 | 4:50 | 6:50 | 9:50 |
| 7 | Bradford | ♿ | 5:37 | 8:37 | 10:52 | 12:52 | 2:52 | 4:52 | 6:52 | 9:52 |
| 6 | Lawrence | ♿ | 5:44 | 8:44 | 10:59 | 12:59 | 2:59 | 4:59 | 6:59 | 9:59 |
| 5 | Andover | ♿ | f 5:51 | f 8:51 | f 11:06 | f 1:06 | f 3:06 | f 5:06 | f 7:06 | 10:06 |
| 4 | Ballardvale | ♿ | f 5:56 | f 8:56 | f 11:11 | f 1:11 | f 3:11 | f 5:11 | f 7:11 | 10:11 |
| 3 | North Wilmington | | f 6:03 | f 9:03 | f 11:18 | f 1:18 | f 3:18 | f 5:18 | f 7:18 | 10:18 |
| 2 | Reading | ♿ | 6:10 | 9:10 | 11:25 | 1:25 | 3:25 | 5:25 | 7:25 | 10:25 |
| 2 | Wakefield | | 6:16 | 9:16 | 11:31 | 1:31 | 3:31 | 5:31 | 7:31 | 10:31 |
| 2 | Greenwood | | f 6:19 | f 9:19 | f 11:34 | f 1:34 | f 3:34 | f 5:34 | f 7:34 | 10:34 |
| 1 | Melrose Highlands | ♿ | 6:21 | 9:21 | 11:36 | 1:36 | 3:36 | 5:36 | 7:36 | 10:36 |
| 1 | Melrose/Cedar Park | | f 6:23 | f 9:23 | f 11:38 | f 1:38 | f 3:38 | f 5:38 | f 7:38 | 10:38 |
| 1 | Wyoming Hill | | f 6:25 | f 9:25 | f 11:40 | f 1:40 | f 3:40 | f 5:40 | f 7:40 | 10:40 |
| 1A | Oak Grove | ♿ | f 6:27 | f 9:27 | f 11:43 | f 1:43 | f 3:42 | f 5:42 | f 7:42 | 10:42 |
| 1A | Malden Center | ♿ | L 6:30 | L 9:30 | L 11:45 | L 1:45 | L 3:45 | L 5:45 | L 7:45 | L 10:45 |
| 1A | North Station | ♿ | 6:45 | 9:45 | 12:00 | 2:00 | 4:00 | 6:00 | 8:00 | 11:00 |

**Weekend**

## Outbound from Boston

| ZONE | STATION | | AM | | | PM | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | SATURDAY TRAIN # | 1201 | 1203 | 1205 | 1207 | 1209 | 1211 | 1213 | 1215 |
| | | SUNDAY TRAIN # | 2201 | 2203 | 2205 | 2207 | 2209 | 2211 | 2213 | 2215 |
| | Bikes Allowed | | | | | | | | | |
| 1A | North Station | ♿ | 7:00 | 9:00 | 11:15 | 1:15 | 3:15 | 5:15 | 8:15 | 11:30 |
| 1A | Malden Center | ♿ | f 7:11 | f 9:11 | f 11:26 | f 1:26 | f 3:26 | f 5:26 | f 8:26 | 11:41 |
| 1A | Oak Grove | ♿ | f 7:13 | f 9:13 | f 11:28 | f 1:28 | f 3:28 | f 5:28 | f 8:28 | 11:43 |
| 1 | Wyoming Hill | | f 7:15 | f 9:15 | f 11:30 | f 1:30 | f 3:30 | f 5:30 | f 8:30 | 11:45 |
| 1 | Melrose/Cedar Park | | f 7:17 | f 9:17 | f 11:32 | f 1:32 | f 3:32 | f 5:32 | f 8:32 | 11:47 |
| 1 | Melrose Highlands | ♿ | 7:20 | 9:20 | 11:35 | 1:35 | 3:35 | 5:35 | 8:35 | 11:50 |
| 2 | Greenwood | | f 7:23 | f 9:23 | f 11:38 | f 1:38 | f 3:38 | f 5:38 | f 8:38 | 11:53 |
| 2 | Wakefield | | 7:27 | 9:27 | 11:42 | 1:42 | 3:42 | 5:42 | 8:42 | 11:57 |
| 2 | Reading | ♿ | 7:33 | 9:33 | 11:48 | 1:48 | 3:48 | 5:48 | 8:48 | 12:03 |
| 3 | North Wilmington | | f 7:39 | f 9:39 | f 11:54 | f 1:54 | f 3:54 | f 5:54 | f 8:54 | 12:09 |
| 4 | Ballardvale | ♿ | f 7:46 | f 9:46 | f 12:01 | f 2:01 | f 4:01 | f 6:01 | f 9:01 | 12:16 |
| 5 | Andover | ♿ | f 7:51 | f 9:51 | f 12:06 | f 2:06 | f 4:06 | f 6:06 | f 9:06 | 12:21 |
| 6 | Lawrence | ♿ | 7:58 | 9:58 | 12:13 | 2:13 | 4:13 | 6:13 | 9:13 | 12:28 |
| 7 | Bradford | ♿ | f 8:06 | f 10:06 | f 12:21 | f 2:21 | f 4:21 | f 6:21 | f 9:21 | 12:36 |
| 7 | Haverhill | ♿ | 8:14 | 10:14 | 12:29 | 2:29 | 4:29 | 6:29 | 9:29 | 12:44 |

**Schedules may change in the event of severe weather**

During weather events, these symbols will communicate service level and impact on passengers. Service level for the following day will be announced mid afternoon the prior day.

**REGULAR SERVICE**
Trains will operate on a normal schedule

**STORM SERVICE**
Trains will operate on a reduced schedule. It will be available on MBTA.com and in Boston stations.

**NO SERVICE**
No passenger service on Commuter Rail.

**Times in purple with "f" indicate a flag stop:** Passengers must tell the conductor that they wish to leave. Passengers waiting to board must be visible on the platform for the train to stop.

**Times in blue with "L" indicate an early departure:** The train may leave ahead of schedule at these stops.

**Bikes:** Bicycles are allowed on trains with the bicycle symbol shown below the train number.

**High level platform and bridge plate available.** Visit **mbta.com/accessibility** for more information.

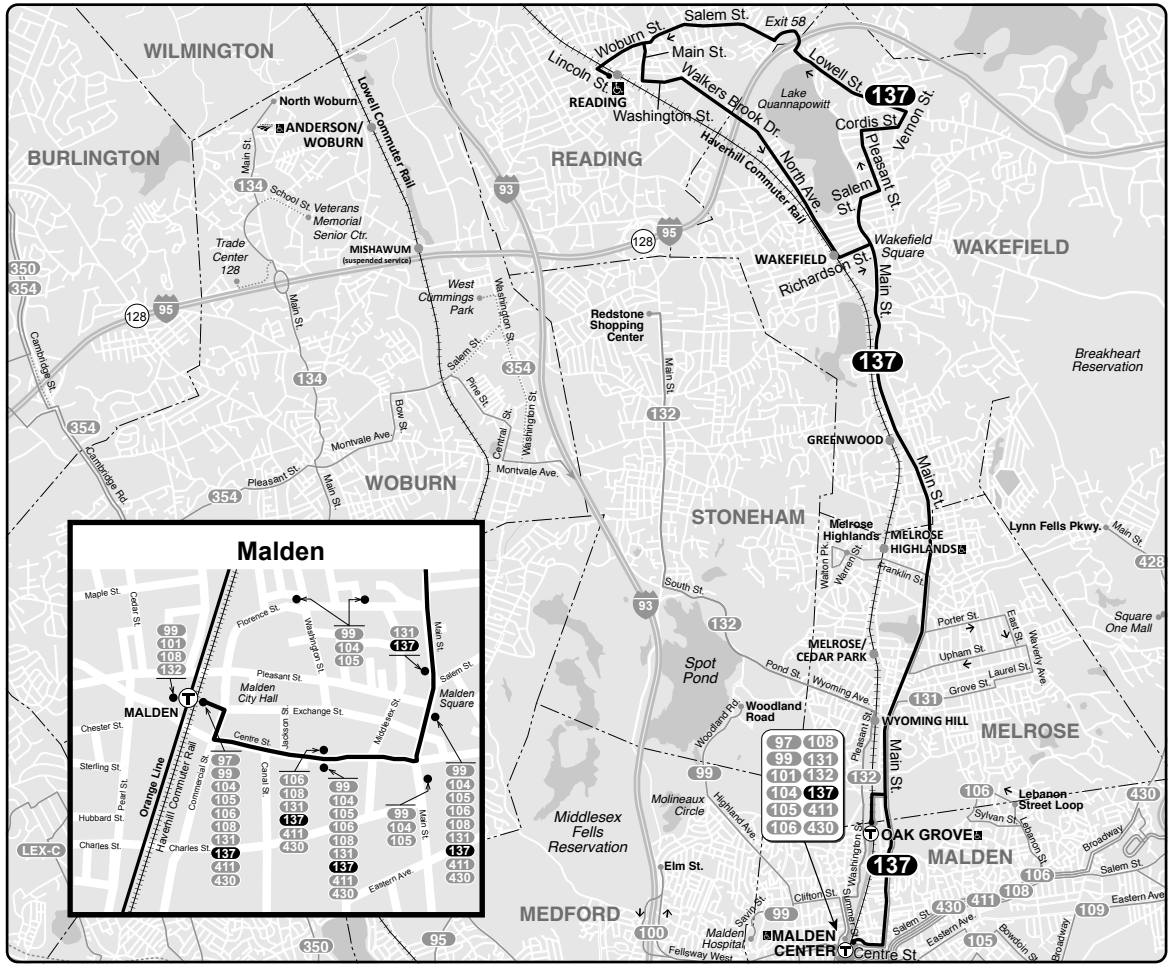
**Keep in Mind:**
**This schedule will be effective from November 6, 2023 and will replace the schedule of October 2, 2023.**

**Holiday Service**

On Thursday, November 23rd, 2023 (Thanksgiving Day), Friday, November 24th, 2023 (day after Thanksgiving), Monday, December 25th, 2023 (Christmas Day), Monday, January 1st, 2024 (New Year's Day), and on Monday, February 19th, 2024 (President's Day) all lines will operate on a weekend schedule.

On Monday, January 15th, 2024 (Martin Luther King Jr. Day), and on Monday, April 15th, 2024 (Patriots' Day), all lines will operate on a regular weekday schedule.

For all holiday schedules, please check MBTA.com/holidays or call 617-222-3200.




- Transfer to bus/subway available on CharlieCard—good for 2 hours, pay fare difference.
- Children 11 & under ride free.

All MBTA buses are accessible to people with disabilities.

| | CharlieCard | Cash on board | Reduced fare |
|---|---|---|---|
| **Local Bus** | **$1.70** | **$1.70** | **$0.85** |
| **Bus + Subway** | **$2.40** | **$4.10** | **$1.10** |

Complete fare/pass rules and free/reduced fare eligibility:
**mbta.com/fares** or call **617-222-3200**

Effective **December 17, 2023** Replaces August 2023

# 137 Reading Depot – Malden Ctr Sta

**Schedule Change**
Weekday, Saturday and Sunday

## Connections

**ORANGE LINE**

**HAVERHILL LINE**

Information **617-222-3200**
Lost and Found **617-222-2229**
TTY **617-222-5146**

Realtime arrival information, maps, and more
**mbta.com**

A126-3-22.1

## Weekday 137

| Inbound | | | | Outbound | | | |
|---|---|---|---|---|---|---|---|
| Reading Depot | Wakefield Square | Oak Grove Station | Malden Center Station | Malden Center Station | Oak Grove Station | Wakefield Square | Reading Depot |
| 5:32 | 5:41 | 5:57 | 6:10 | 4:50 | 4:57 | 5:10 | 5:27 |
| 6:10 | 6:22 | 6:40 | 6:53 | 5:25 | 5:32 | 5:45 | 6:02 |
| 6:50 | 7:02 | 7:26 | - | 6:25 | 6:33 | 6:51 | 7:09 |
| 7:15 | 7:28 | 7:52 | - | 7:05 | 7:15 | 7:36 | 7:55 |
| 7:35 | 7:48 | 8:12 | - | - | 7:43 | 8:01 | 8:19 |
| 8:00 | 8:13 | 8:37 | - | - | 8:08 | 8:26 | 8:44 |
| 8:25 | 8:38 | 8:59 | 9:12 | - | 8:35 | 8:53 | 9:10 |
| 8:50 | 9:03 | 9:24 | 9:37 | - | 9:00 | 9:18 | 9:34 |
| 9:15 | 9:28 | 9:49 | 10:02 | 9:25 | 9:34 | 9:54 | 10:09 |
| 9:40 | 9:53 | 10:14 | 10:27 | 10:05 | 10:14 | 10:34 | 10:49 |
| 10:15 | 10:28 | 10:49 | 11:02 | 10:45 | 10:54 | 11:14 | 11:29 |
| 10:55 | 11:08 | 11:29 | 11:42 | 11:25 | 11:34 | 11:54 | **12:10** |
| 11:35 | 11:48 | **12:10** | **12:24** | **12:07** | **12:17** | **12:38** | **12:54** |
| **12:15** | **12:28** | **12:48** | **1:02** | **12:47** | **12:57** | **1:18** | **1:34** |
| **1:00** | **1:13** | **1:33** | **1:47** | **1:27** | **1:37** | **1:58** | **2:15** |
| **1:40** | **1:53** | **2:15** | **2:29** | **2:07** | **2:19** | **2:41** | **2:58** |
| **2:20** | **2:34** | **2:57** | **3:11** | **2:47** | **2:59** | **3:21** | **3:38** |
| S **-** | **2:50** | **3:09** | **3:22** | **3:27** | **3:39** | **4:01** | **4:18** |
| **3:05** | **3:19** | **3:42** | **3:56** | **-** | **4:15** | **4:39** | **4:55** |
| **3:45** | **3:59** | **4:21** | **-** | **-** | **4:45** | **5:09** | **5:25** |
| **4:25** | **4:39** | **5:01** | **-** | **-** | **5:15** | **5:39** | **5:55** |
| **5:00** | **5:14** | **5:36** | **-** | **-** | **5:50** | **6:13** | **6:28** |
| **5:30** | **5:44** | **6:06** | **-** | **-** | **6:20** | **6:41** | **6:56** |
| **6:00** | **6:12** | **6:30** | **-** | **-** | **6:45** | **7:06** | **7:16** |
| **6:35** | **6:47** | **7:05** | **-** | **-** | **7:20** | **7:41** | **7:51** |
| **7:02** | **7:12** | **7:28** | **-** | **8:10** | **8:20** | **8:37** | **8:52** |
| **7:21** | **7:31** | **7:47** | **-** | **9:00** | **9:09** | **9:25** | **9:40** |
| **7:57** | **8:07** | **8:23** | **8:35** | **9:50** | **9:59** | **10:15** | **10:30** |
| **8:57** | **9:07** | **9:23** | **9:35** | | | | |
| **9:45** | **9:55** | **10:11** | **10:23** | | | | |
| **10:35** | **10:45** | **11:01** | **11:13** | | | | |

## Saturday 137

| Inbound | | | | Outbound | | | |
|---|---|---|---|---|---|---|---|
| Reading Depot | Wakefield Square | Oak Grove Station | Malden Center Station | Malden Center Station | Oak Grove Station | Wakefield Square | Reading Depot |
| 6:00 | 6:09 | 6:24 | 6:36 | 6:00 | 6:08 | 6:25 | 6:39 |
| 6:45 | 6:54 | 7:09 | 7:21 | 6:50 | 6:58 | 7:15 | 7:29 |
| 7:35 | 7:44 | 7:59 | 8:12 | 7:40 | 7:48 | 8:05 | 8:19 |
| 8:25 | 8:35 | 8:51 | 9:04 | 8:35 | 8:43 | 9:00 | 9:15 |
| 9:20 | 9:31 | 9:49 | 10:02 | 9:30 | 9:40 | 9:59 | 10:14 |
| 10:20 | 10:31 | 10:49 | 11:02 | 10:25 | 10:35 | 10:54 | 11:12 |
| 11:15 | 11:28 | 11:47 | **12:00** | 11:20 | 11:31 | 11:54 | **12:11** |
| **12:15** | **12:28** | **12:47** | **1:00** | **12:20** | **12:31** | **12:52** | **1:08** |
| **1:15** | **1:28** | **1:47** | **2:00** | **1:20** | **1:31** | **1:52** | **2:08** |
| **2:15** | **2:28** | **2:47** | **3:00** | **2:20** | **2:31** | **2:52** | **3:08** |
| **3:15** | **3:27** | **3:47** | **3:59** | **3:20** | **3:31** | **3:52** | **4:09** |
| **4:15** | **4:27** | **4:47** | **4:59** | **4:20** | **4:30** | **4:48** | **5:05** |
| **5:10** | **5:21** | **5:40** | **5:52** | **5:10** | **5:20** | **5:38** | **5:55** |
| **6:00** | **6:11** | **6:30** | **6:42** | **6:00** | **6:10** | **6:28** | **6:45** |
| **6:50** | **7:01** | **7:17** | **7:29** | **7:00** | **7:10** | **7:28** | **7:45** |
| **7:50** | **8:00** | **8:16** | **8:28** | **8:00** | **8:10** | **8:28** | **8:45** |
| **8:50** | **9:00** | **9:16** | **9:28** | **9:00** | **9:10** | **9:28** | **9:45** |

## Sunday 137

| Inbound | | | | Outbound | | | |
|---|---|---|---|---|---|---|---|
| Reading Depot | Wakefield Square | Oak Grove Station | Malden Center Station | Malden Center Station | Oak Grove Station | Wakefield Square | Reading Depot |
| 8:05 | 8:15 | 8:31 | 8:44 | 8:45 | 8:53 | 9:12 | 9:27 |
| 9:35 | 9:46 | 10:04 | 10:17 | 10:15 | 10:25 | 10:44 | 10:59 |
| 11:05 | 11:18 | 11:37 | 11:50 | 11:45 | 11:56 | **12:16** | **12:32** |
| **12:40** | **12:53** | **1:12** | **1:25** | **1:15** | **1:26** | **1:47** | **2:03** |
| **2:10** | **2:23** | **2:42** | **2:55** | **2:45** | **2:56** | **3:17** | **3:33** |
| **3:40** | **3:52** | **4:12** | **4:24** | **4:15** | **4:25** | **4:43** | **5:00** |
| **5:10** | **5:21** | **5:40** | **5:52** | **5:45** | **5:55** | **6:13** | **6:30** |
| **6:40** | **6:51** | **7:08** | **7:20** | | | | |

S only runs on school days

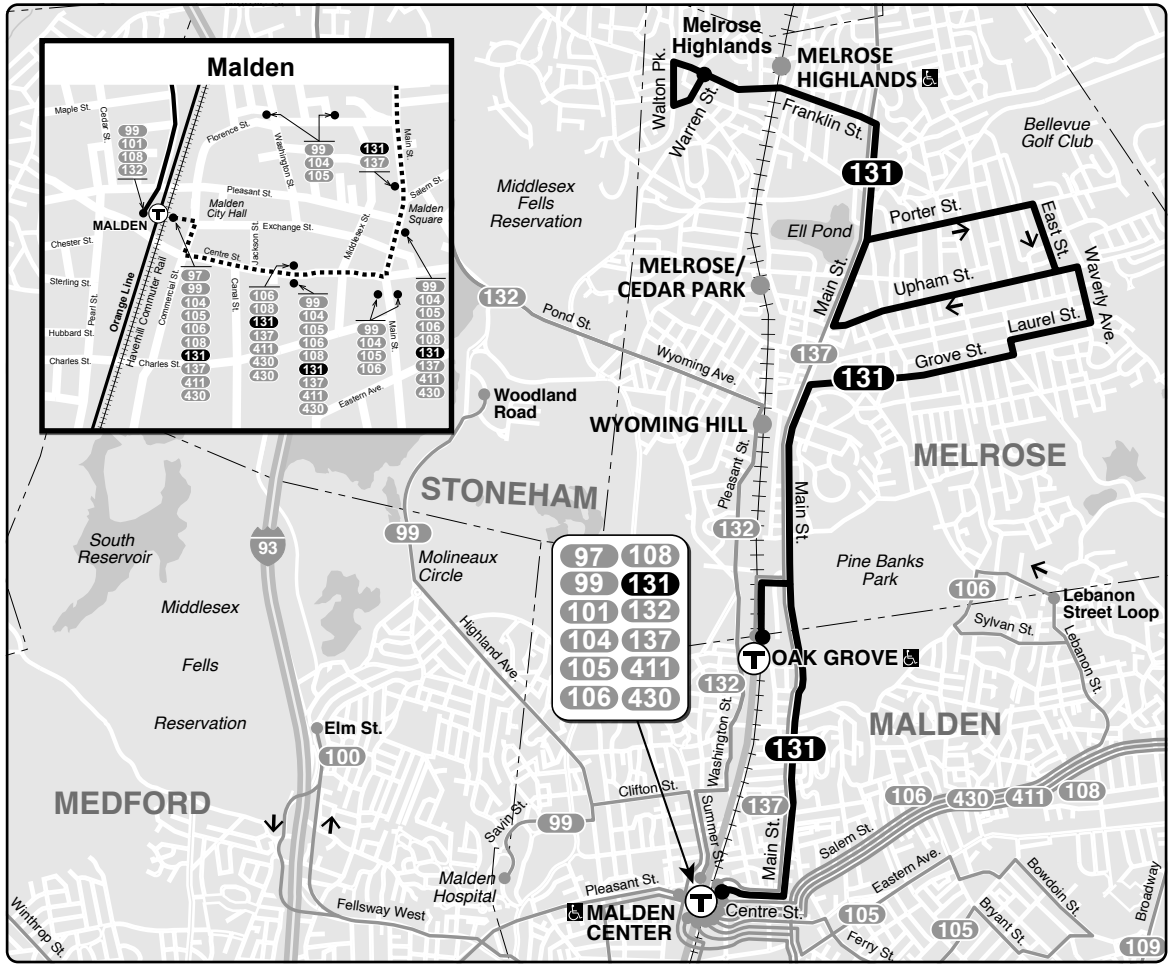
PM times are **bold**

Information in this timetable is subject to change without notice. Traffic and weather may affect running times.

Always check bus destination signs before boarding. Some buses may only serve a part, or skip portions of this route.

**Holidays**

- SUN New Year's Day
- SAT MLK Jr. Day
- SAT Presidents Day
- SAT Patriots' Day
- SUN Memorial Day
- SUN Independence Day
- SUN Labor Day
- SAT Columbus/Indigenous Peoples Day
- SUN Thanksgiving
- SUN Christmas Day
- SUN New Year's Eve




Effective **December 17, 2023** Replaces August 2023

# 131 Melrose Hlnds – Malden Ctr Sta

**Schedule Change**
Weekday

## Connections

ORANGE LINE

HAVERHILL LINE

- Transfer to bus/subway available on CharlieCard—good for 2 hours, pay fare difference.
- Children 11 & under ride free.

All MBTA buses are accessible to people with disabilities.

| | CharlieCard | Cash on board | Reduced fare |
|---|---|---|---|
| **Local Bus** | **$1.70** | **$1.70** | **$0.85** |
| **Bus + Subway** | **$2.40** | **$4.10** | **$1.10** |

Complete fare/pass rules and free/reduced fare eligibility:
**mbta.com/fares** or call **617-222-3200**

Information **617-222-3200**
Lost and Found **617-222-2229**
TTY **617-222-5146**

Realtime arrival information, maps, and more
**mbta.com**

A126-3-22.1

## Weekday 131

Inbound

| Warren St & Melrose St | Upham St & East St | Oak Grove Station | Malden Center Station |
|---|---|---|---|
| 6:15 | 6:23 | 6:35 | 6:50 |
| 6:55 | 7:03 | 7:15 | 7:30 |
| 7:30 | 7:38 | 7:50 | 8:03 |
| 8:10 | 8:18 | 8:30 | 8:41 |
| 8:55 | 9:02 | 9:12 | 9:22 |
| **4:12** | **4:20** | **4:31** | **4:44** |
| **4:53** | **5:01** | **5:13** | **5:28** |
| **5:33** | **5:41** | **5:53** | **6:06** |
| **6:15** | **6:22** | **6:32** | **6:44** |
| **6:50** | **6:57** | **7:07** | **7:19** |

Outbound

| Malden Center Station | Oak Grove Station | Upham St & East St | Warren St & Melrose St |
|---|---|---|---|
| 6:55 | 7:04 | 7:13 | 7:25 |
| 7:35 | 7:44 | 7:53 | 8:05 |
| 8:15 | 8:24 | 8:33 | 8:47 |
| **3:30** | **3:41** | **3:51** | **4:07** |
| **4:10** | **4:23** | **4:34** | **4:49** |
| **4:50** | **5:03** | **5:14** | **5:29** |
| **5:33** | **5:46** | **5:57** | **6:11** |
| **6:10** | **6:22** | **6:32** | **6:46** |
| **6:50** | **7:02** | **7:12** | **7:25** |
| **7:25** | **7:35** | **7:45** | **7:58** |

PM times are **bold**

Information in this timetable is subject to change without notice. Traffic and weather may affect running times.

Always check bus destination signs before boarding. Some buses may only serve a part, or skip portions of this route.

**Holidays**

- SUN New Year's Day
- SAT MLK Jr. Day
- SAT Presidents Day
- SAT Patriots' Day
- SUN Memorial Day
- SUN Independence Day
- SUN Labor Day
- SAT Columbus/Indigenous Peoples Day
- SUN Thanksgiving
- SUN Christmas Day
- SUN New Year's Eve

- Census Data

# Means of Transportation to Work by Vehicles Available

United States® Census Bureau

**Note: The table shown may have been modified by user selections. Some information may be missing.**

| | |
|---|---|
| **DATA NOTES** | |
| TABLE ID: | B08141 |
| SURVEY/PROGRAM: | American Community Survey |
| VINTAGE: | 2022 |
| DATASET: | ACSDT5Y2022 |
| PRODUCT: | ACS 5-Year Estimates Detailed Tables |
| UNIVERSE: | Workers 16 years and over in households |
| MLA: | U.S. Census Bureau. "Means of Transportation to Work by Vehicles Available." American Community Survey, ACS 5-Year Estimates Detailed Tables, Table B08141, 2022, https://data.census.gov/table/ACSDT5Y2022.B08141?g=1400000US25017336402. Accessed on January 30, 2024. |
| FTP URL: | None |
| API URL: | https://api.census.gov/data/2022/acs/acs5 |
| **USER SELECTIONS** | |
| GEOS | Census Tract 3364.02; Middlesex County; Massachusetts |
| **EXCLUDED COLUMNS** | None |
| **APPLIED FILTERS** | None |
| **APPLIED SORTS** | None |
| **PIVOT & GROUPING** | |
| PIVOT COLUMNS | None |
| PIVOT MODE | Off |
| ROW GROUPS | None |
| VALUE COLUMNS | None |
| **WEB ADDRESS** | https://data.census.gov/table/ACSDT5Y2022.B08141?g=1400000US25017336402 |
| **TABLE NOTES** | |
| | Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, the decennial census is the official source of population totals for April 1st of each decennial year. In between censuses, the Census Bureau's Population Estimates Program produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties. |
| | Information about the American Community Survey (ACS) can be found on the ACS website. Supporting documentation including code lists, subject definitions, data accuracy, and statistical testing, and a full list of ACS tables and table shells (without estimates) can be found on the Technical Documentation section of the ACS website.<br><br>Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section. |
| | Source: U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates |
| | Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables. |
| | Workers include members of the Armed Forces and civilians who were at work last week. |
| | Several means of transportation to work categories were updated in 2019. For more information, see: Change to Means of Transportation. |
| | The 2018-2022 American Community Survey (ACS) data generally reflect the March 2020 Office of Management and Budget (OMB) delineations of metropolitan and micropolitan statistical areas. In certain instances, the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB delineation lists due to differences in the effective dates of the geographic entities. |
| | Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on 2020 Census data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization. |
| | Explanation of Symbols:- The estimate could not be computed because there were an insufficient number of sample observations. For a ratio of medians estimate, one or both of the median estimates falls in the lowest interval or highest interval of an open-ended distribution. For a 5-year median estimate, the margin of error associated with a median was larger than the median itself.N The estimate or margin of error cannot be displayed because there were an insufficient number of sample cases in the selected geographic area. (X) The estimate or margin of error is not applicable or not available.median- The median falls in the lowest interval of an open-ended distribution (for example "2,500-")median+ The median falls in the highest interval of an open-ended distribution (for example "250,000+").** The margin of error could not be computed because there were an insufficient number of sample observations.*** The margin of error could not be computed because the median falls in the lowest interval or highest interval of an open-ended distribution.***** A margin of error is not appropriate because the corresponding estimate is controlled to an independent population or housing estimate. Effectively, the corresponding estimate has no sampling error and the margin of error may be treated as zero. |
| **COLUMN NOTES** | None |

| | Census Tract 3364.02; Middlesex County; Massachusetts | | | |
|---|---|---|---|---|
| **Label** | **Estimate** | **Margin of Error** | | |
| Total: | 2,680 | ±424 | | 2680 |
| No vehicle available | 211 | ±119 | Car, truck, or van - drove alone: | 47% |
| 1 vehicle available | 898 | ±194 | Car, truck, or van - carpooled: | 5% |
| 2 vehicles available | 882 | ±241 | Public transportation (excluding taxicab): | 24% |
| 3 or more vehicles available | 689 | ±465 | Walked: | 1% |
| Car, truck, or van - drove alone: | 1,268 | ±224 | Taxicab, motorcycle, bicycle, or other means: | 4% |
| No vehicle available | 84 | ±88 | Worked from home: | 18% |
| 1 vehicle available | 418 | ±120 | | |
| 2 vehicles available | 387 | ±154 | | |
| 3 or more vehicles available | 379 | ±226 | | |
| Car, truck, or van - carpooled: | 124 | ±109 | | |
| No vehicle available | 0 | ±19 | | |
| 1 vehicle available | 29 | ±45 | | |
| 2 vehicles available | 27 | ±42 | | |
| 3 or more vehicles available | 68 | ±79 | | |
| Public transportation (excluding taxicab): | 652 | ±173 | | |
| No vehicle available | 96 | ±86 | | |
| 1 vehicle available | 164 | ±101 | | |
| 2 vehicles available | 353 | ±129 | | |
| 3 or more vehicles available | 39 | ±53 | | |
| Walked: | 31 | ±38 | | |
| No vehicle available | 16 | ±27 | | |
| 1 vehicle available | 0 | ±19 | | |
| 2 vehicles available | 15 | ±26 | | |
| 3 or more vehicles available | 0 | ±19 | | |
| Taxicab, motorcycle, bicycle, or other means: | 114 | ±98 | | |
| No vehicle available | 15 | ±25 | | |
| 1 vehicle available | 74 | ±93 | | |
| 2 vehicles available | 25 | ±25 | | |
| 3 or more vehicles available | 0 | ±19 | | |
| Worked from home: | 491 | ±249 | | |
| No vehicle available | 0 | ±19 | | |
| 1 vehicle available | 213 | ±92 | | |
| 2 vehicles available | 75 | ±75 | | |
| 3 or more vehicles available | 203 | ±251 | | |

- □ Crash Data

# INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Melrose | COUNT DATE : Feb-24

DISTRICT : 4 | UNSIGNALIZED : X | SIGNALIZED :

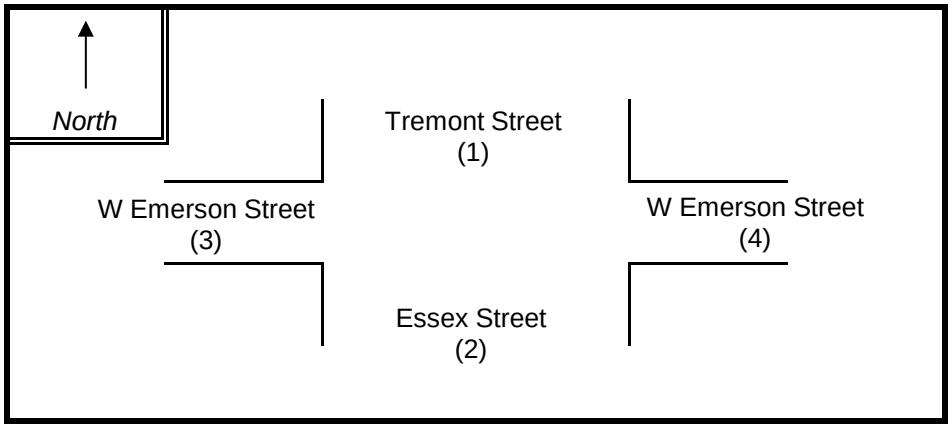
**~ INTERSECTION DATA ~**

MAJOR STREET : W Emerson Street

MINOR STREET(S) : Essex Street

Tremont Street

**INTERSECTION DIAGRAM (Label Approaches)**




**PEAK HOUR VOLUMES**

| APPROACH : | 1 | 2 | 3 | 4 | 5 | Total Peak Hourly Approach Volume |
|---|---|---|---|---|---|---|
| DIRECTION : | N | S | E | W | | |
| PEAK HOURLY VOLUMES (AM/PM) : | 175 | 123 | 208 | 138 | | 644 |

" K " FACTOR : **0.078** | INTERSECTION ADT ( **V** ) = TOTAL DAILY APPROACH VOLUME : **8,256**

TOTAL # OF CRASHES : 15 | # OF YEARS : 5 | AVERAGE # OF CRASHES PER YEAR ( **A** ) : **3.00**

**CRASH RATE CALCULATION :** **1.00**

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

Comments : MassDOT District 4 Avg: Signalized = 0.73; Unsignalized = 0.57

Project Title & Date: 1344 Melrose - February 2024

W Emerson Street at Essex Street

| Crash Number | Crash Date | Crash Severity | Crash Time | Number of Vehicles | Light Conditions | Manner of Collision | Road Surface Condition | Total Fatalities | Total Non-Fatal Injuries | Vehicle Actions Prior to Crash (All Vehicles) | Vehicle Configuration (All Vehicles) | Vehicle Travel Directions (All Vehicles) | Weather Conditions | Most Harmful Event (All Vehicles) | X | Y | Roadway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4654445 | 01/14/2019 | Property damage only (none injured) | 4:49 PM | 2 | Daylight | Sideswipe, same direction | Dry | 0 | 0 | V1: Turning right / V2: Parked | V1:(Passenger car) / V2:(Passenger car) | V1: W / V2: Not Reported | Clear | V1:(Collision with parked motor vehicle) / V2:(Collision with motor vehicle in traffic) | 235403.9161 | 912156.4447 | WEST EMERSON ST |
| 4817308 | 01/30/2020 | Property damage only (none injured) | 12:23 PM | 2 | Daylight | Angle | Dry | 0 | 0 | V1: Travelling straight ahead / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Passenger car) | V1: E / V2: S | Clear/Unknown | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235412.3438 | 912155.7501 | TREMONT ST / WEST EMERSON ST |
| 4826455 | 03/05/2020 | Property damage only (none injured) | 10:39 AM | 2 | Daylight | Angle | Dry | 0 | 0 | V1: Travelling straight ahead / V2: Turning left | V1:(Passenger car) / V2:(Passenger car) | V1: E / V2: S | Clear | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235412.3438 | 912155.7501 | WEST EMERSON ST / TREMONT ST |
| 4925929 | 06/16/2020 | Non-fatal injury | 11:32 AM | 2 | Daylight | Angle | Dry | 0 | 1 | V1: Travelling straight ahead / V2: Backing | V1:(Passenger car) / V2:(Light truck(van, mini-van, pickup, sport utility)) | V1: E / V2: N | Clear | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235442.9183 | 912153.6515 | WEST EMERSON ST |
| 4926244 | 12/18/2020 | Property damage only (none injured) | 6:19 PM | 2 | Dark - lighted roadway | Angle | Snow | 0 | 0 | V1: Turning left / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Passenger car) | V1: S / V2: E | Clear | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235412.3438 | 912155.7501 | WEST EMERSON ST / TREMONT ST |
| 4926268 | 04/19/2020 | Property damage only (none injured) | 7:31 PM | 2 | Dark - lighted roadway | Angle | Dry | 0 | 0 | V1: Travelling straight ahead / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Passenger car) | V1: E / V2: N | Cloudy | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235412.3438 | 912155.7501 | ESSEX ST / WEST EMERSON ST |
| 4926305 | 01/22/2021 | Property damage only (none injured) | 12:38 PM | 2 | Daylight | Sideswipe, same direction | Dry | 0 | 0 | V1: Travelling straight ahead / V2: Parked | V1:(Passenger car) / V2:(Passenger car) | V1: W / V2: Not Reported | Clear | V1:(Collision with parked motor vehicle) / V2:(Collision with parked motor vehicle) | 235401.079 | 912156.6786 | WEST EMERSON ST |
| 4938864 | 03/04/2021 | Property damage only (none injured) | 12:10 PM | 2 | Daylight | Angle | Dry | 0 | 0 | V1: Travelling straight ahead / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Passenger car) | V1: E / V2: S | Clear | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235412.3438 | 912155.7501 | WEST EMERSON ST / ESSEX ST |
| 4982099 | 06/22/2021 | Non-fatal injury | 2:03 PM | 2 | Daylight | Angle | Dry | 0 | 1 | V1: Entering traffic lane / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Passenger car) | V1: S / V2: E | Cloudy | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235412.3438 | 912155.7501 | WEST EMERSON ST / TREMONT ST |
| 5004749 | 09/01/2021 | Property damage only (none injured) | 4:12 PM | 2 | Daylight | Front to Front | Dry | 0 | 0 | V1: Travelling straight ahead / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Passenger car) | V1: E / V2: S | Cloudy | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235412.3438 | 912155.7501 | WEST EMERSON ST / TREMONT ST |
| 5016390 | 09/29/2021 | Property damage only (none injured) | 8:30 AM | 2 | Daylight | Angle | Dry | 0 | 0 | V1: Travelling straight ahead / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Passenger car) | V1: N / V2: E | Clear | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235412.3438 | 912155.7501 | WEST EMERSON ST |
| 5132754 | 07/19/2022 | Property damage only (none injured) | 12:59 PM | 2 | Daylight | Angle | Dry | 0 | 0 | V1: Travelling straight ahead / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Other) | V1: S / V2: W | Clear | V1:(Collision with motor vehicle in traffic) / V1:(Unknown) | 235412.3438 | 912155.7501 | TREMONT ST / WEST EMERSON ST |
| 5184702 | 12/01/2022 | Non-fatal injury | 11:03 AM | 2 | Daylight | Angle | Dry | 0 | 1 | V1: Travelling straight ahead / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Passenger car) | V1: E / V2: S | Clear | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235412.3438 | 912155.7501 | WEST EMERSON ST / TREMONT ST |
| 5228189 | 02/21/2023 | Property damage only (none injured) | 8:31 PM | 2 | Dark - lighted roadway | Head-on | Wet | 0 | 0 | V1: Entering traffic lane / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Other) | V1: N / V2: E | Cloudy/Rain | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235412.3438 | 912155.7501 | TREMONT ST Rte / WEST EMERSON ST Rte |
| 5308771 | 10/12/2023 | Property damage only (none injured) | 2:53 PM | 2 | Daylight | Angle | Dry | 0 | 0 | V1: Travelling straight ahead / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Passenger car) | V1: N / V2: E | Clear | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235412.3438 | 912155.7501 | ESSEX ST Rte / WEST EMERSON ST Rte |

# INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Melrose | COUNT DATE : Feb-24

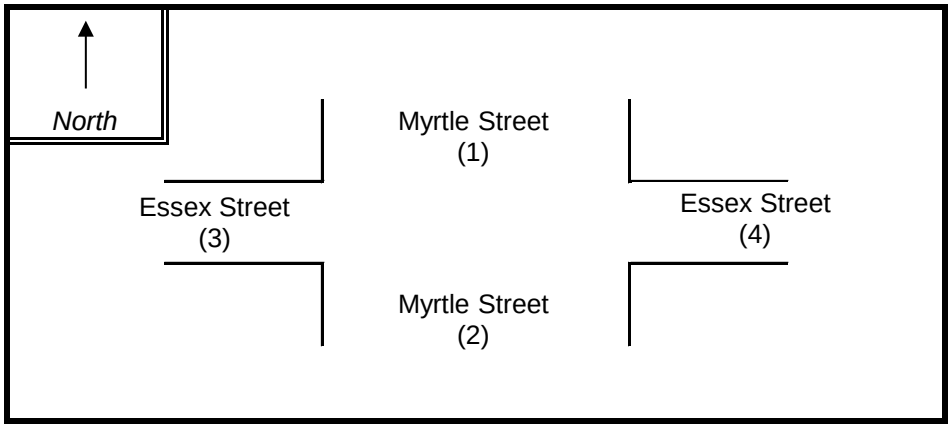
DISTRICT : 4 | UNSIGNALIZED : X | SIGNALIZED :

**~ INTERSECTION DATA ~**

MAJOR STREET : Essex Street

MINOR STREET(S) : Myrtle Street

**INTERSECTION DIAGRAM (Label Approaches)**




**PEAK HOUR VOLUMES**

| APPROACH : | 1 | 2 | 3 | 4 | 5 | Total Peak Hourly Approach Volume |
|---|---|---|---|---|---|---|
| DIRECTION : | N | S | E | W | | |
| PEAK HOURLY VOLUMES (AM/PM) : | 78 | 196 | 74 | 180 | | 528 |

" K " FACTOR : **0.078**

INTERSECTION ADT ( **V** ) = TOTAL DAILY APPROACH VOLUME : **6,769**

TOTAL # OF CRASHES : 4

# OF YEARS : 5

AVERAGE # OF CRASHES PER YEAR ( **A** ) : **0.80**

**CRASH RATE CALCULATION :** **0.32**

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

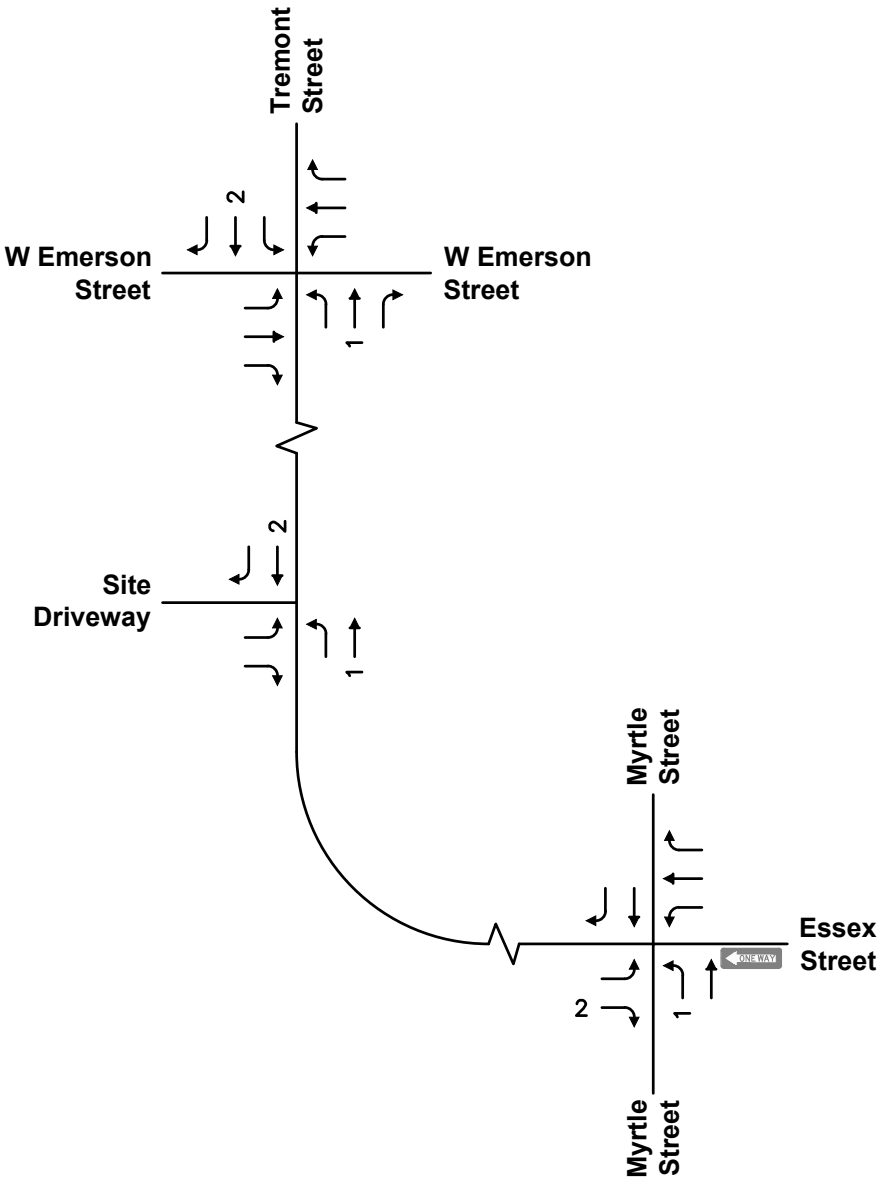
Comments : MassDOT District 4 Avg: Signalized = 0.73; Unsignalized = 0.57

Project Title & Date: 1344 Melrose - February 2024

Myrtle Street at Essex Street

| Crash Number | Crash Date | Crash Severity | Crash Time | Max Injury Severity Reported | Number of Vehicles | Light Conditions | Manner of Collision | Road Surface Condition | Total Fatalities | Total Non-Fatal Injuries | Vehicle Actions Prior to Crash (All Vehicles) | Vehicle Configuration (All Vehicles) | Vehicle Travel Directions (All Vehicles) | Weather Conditions | Most Harmful Event (All Vehicles) | X | Y | Roadway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4773639 | 11/05/2019 | Property damage only (none injured) | 2:13 PM | No Apparent Injury (O) | 2 | Daylight | Single vehicle crash | Wet | 0 | 0 | V2: Travelling straight ahead / V1: Travelling straight ahead | V2:(Passenger car) / V1:(Truck/trailer) | V2: S / V1: W | Cloudy/Rain | V2:(Collision with motor vehicle in traffic) / V1:(Collision with motor vehicle in traffic) | 235644.7657 | 911879.3751 | ESSEX ST Rte 73 / MYRTLE ST |
| 4791032 | 12/15/2019 | Property damage only (none injured) | 5:47 PM | No Apparent Injury (O) | 2 | Dark - lighted roadway | Angle | Dry | 0 | 0 | V1: Travelling straight ahead / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Passenger car) | V1: W / V2: N | Clear/Severe crosswinds | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235644.7657 | 911879.3751 | MYRTLE ST / ESSEX ST |
| 5098676 | 02/08/2022 | Property damage only (none injured) | 10:59 AM | No Apparent Injury (O) | 2 | Daylight | Angle | Dry | 0 | 0 | V1: Turning left / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Passenger car) | V1: W / V2: N | Clear | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235644.7657 | 911879.3751 | ESSEX ST / MYRTLE ST |
| 5189642 | 12/12/2022 | Property damage only (none injured) | 10:09 AM | No Apparent Injury (O) | 2 | Daylight | Angle | Wet | 0 | 0 | V1: Travelling straight ahead / V2: Travelling straight ahead | V1:(Passenger car) / V2:(Passenger car) | V1: S / V2: W | Clear | V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic) | 235644.7657 | 911879.3751 | ESSEX ST / MYRTLE ST |

□ Background Growth




North
Scale: Not to Scale

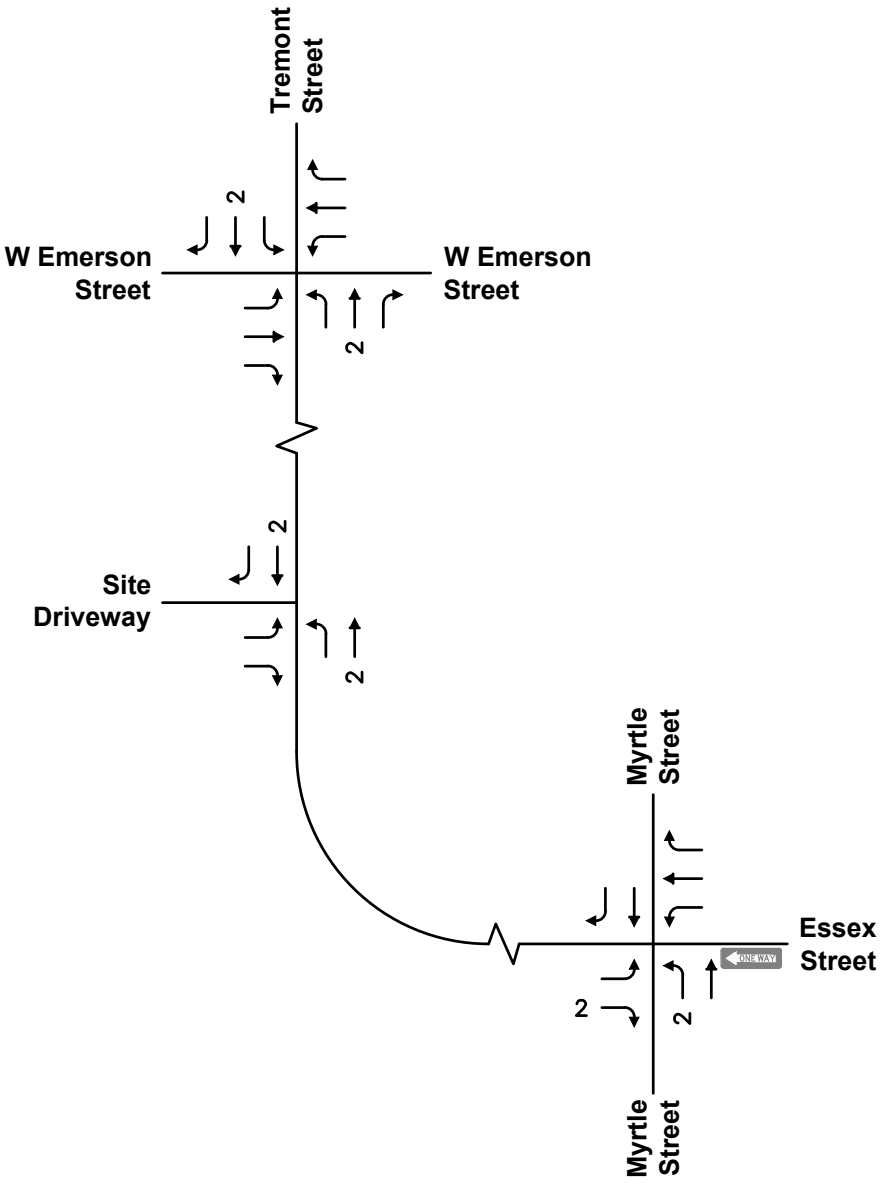
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

## 14 Chipman Avenue
## Weekday Morning Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg




North
Scale: Not to Scale

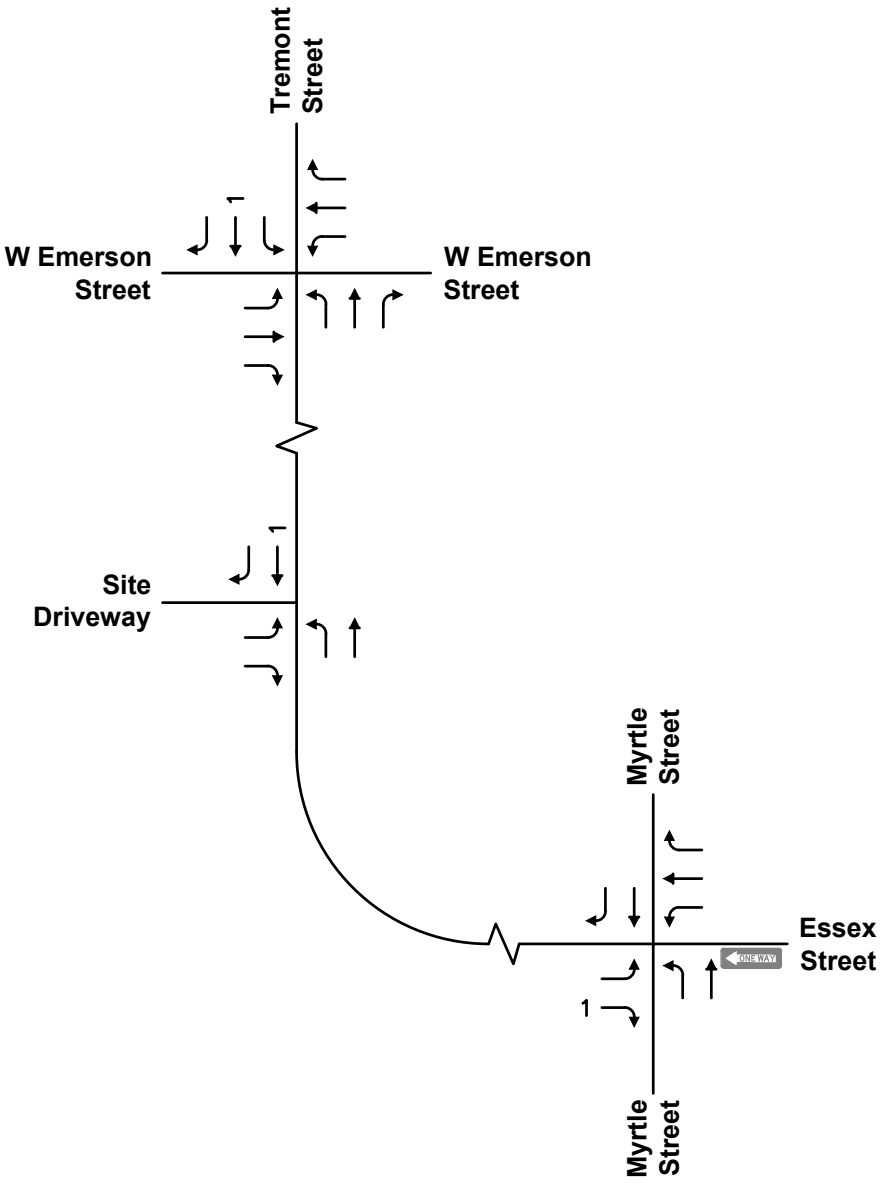
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

## 14 Chipman Avenue
## Weekday Evening Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg




North

Scale: Not to Scale

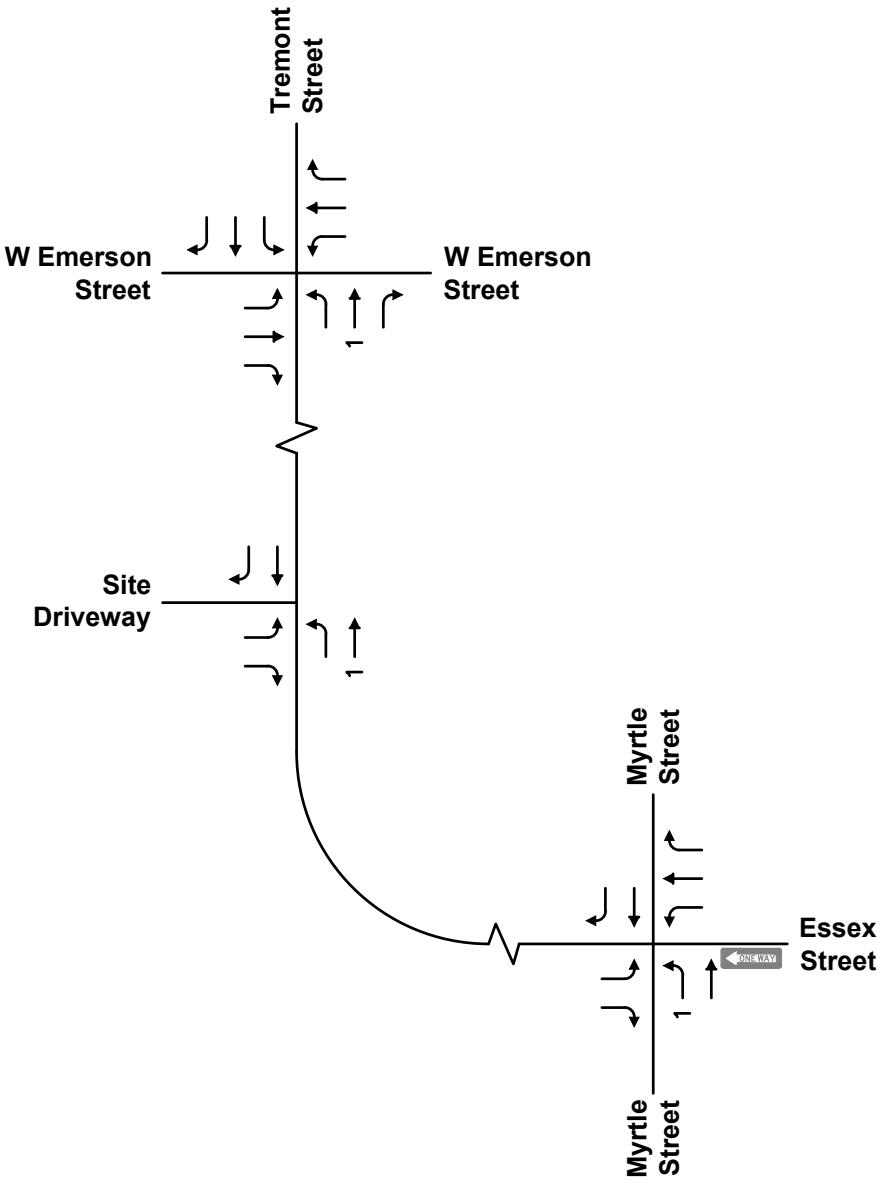
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

**521-529 Franklin Street**
**Weekday Morning Peak Hour Volumes**

Date: February 2024
Dwg No. 1344 MR01.dwg




North

Scale: Not to Scale

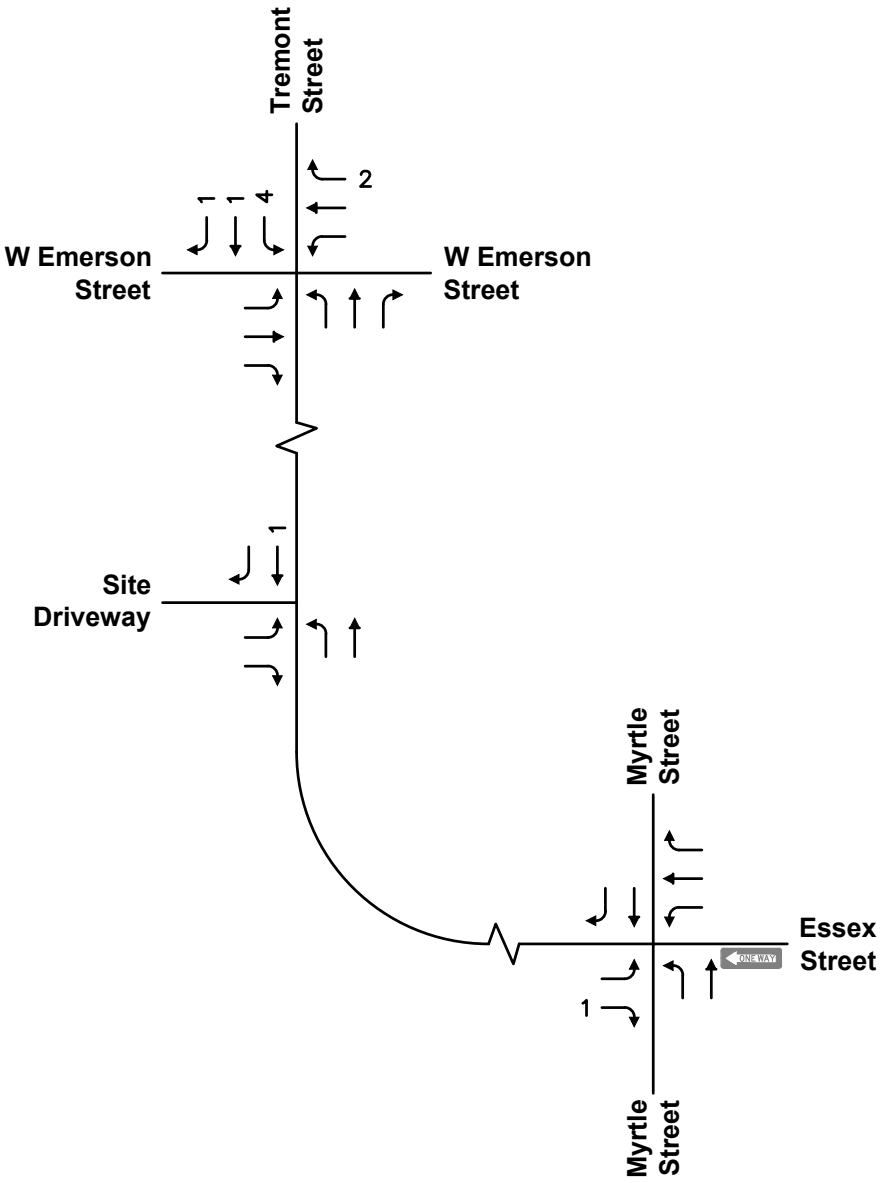
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

## 521-529 Franklin Street
## Weekday Evening Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg




North

Scale: Not to Scale

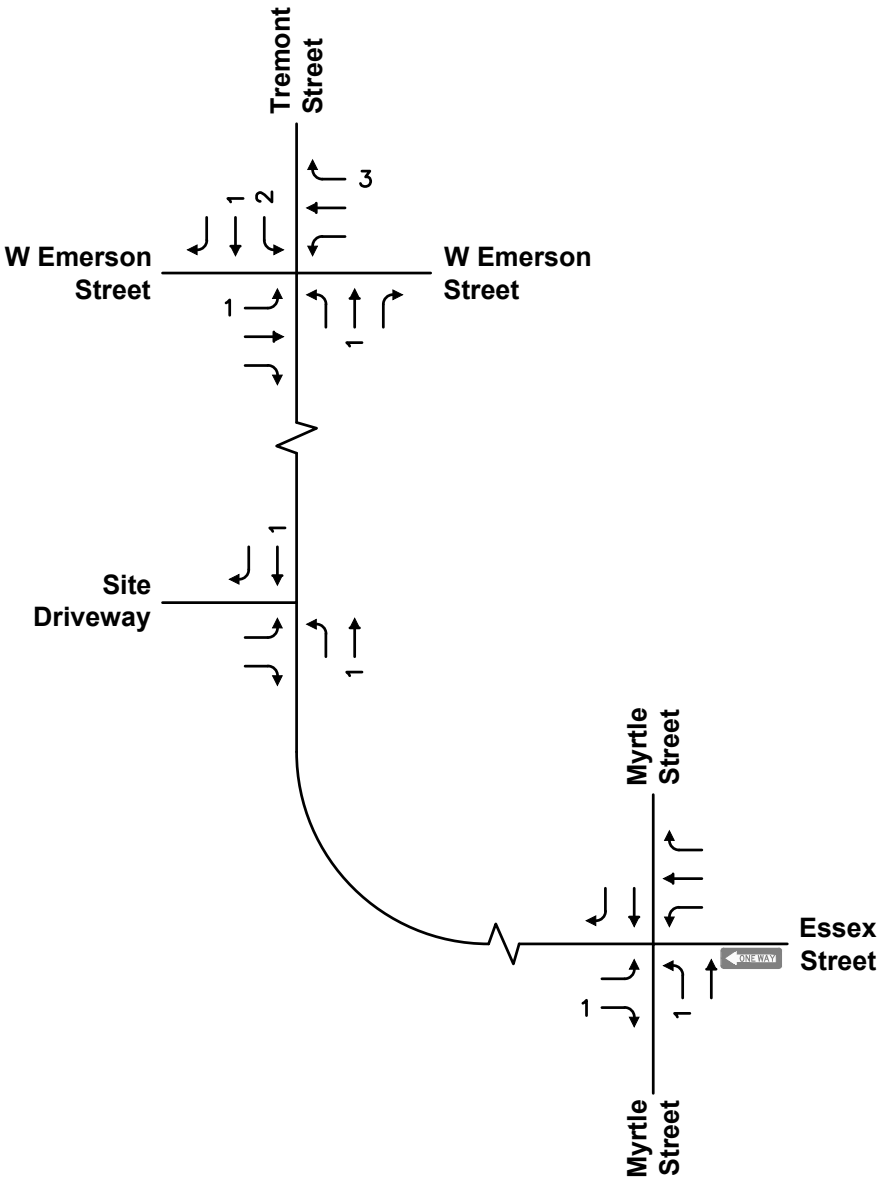
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

## 14-24 Tremont Street
## Weekday Morning Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg




North

Scale: Not to Scale

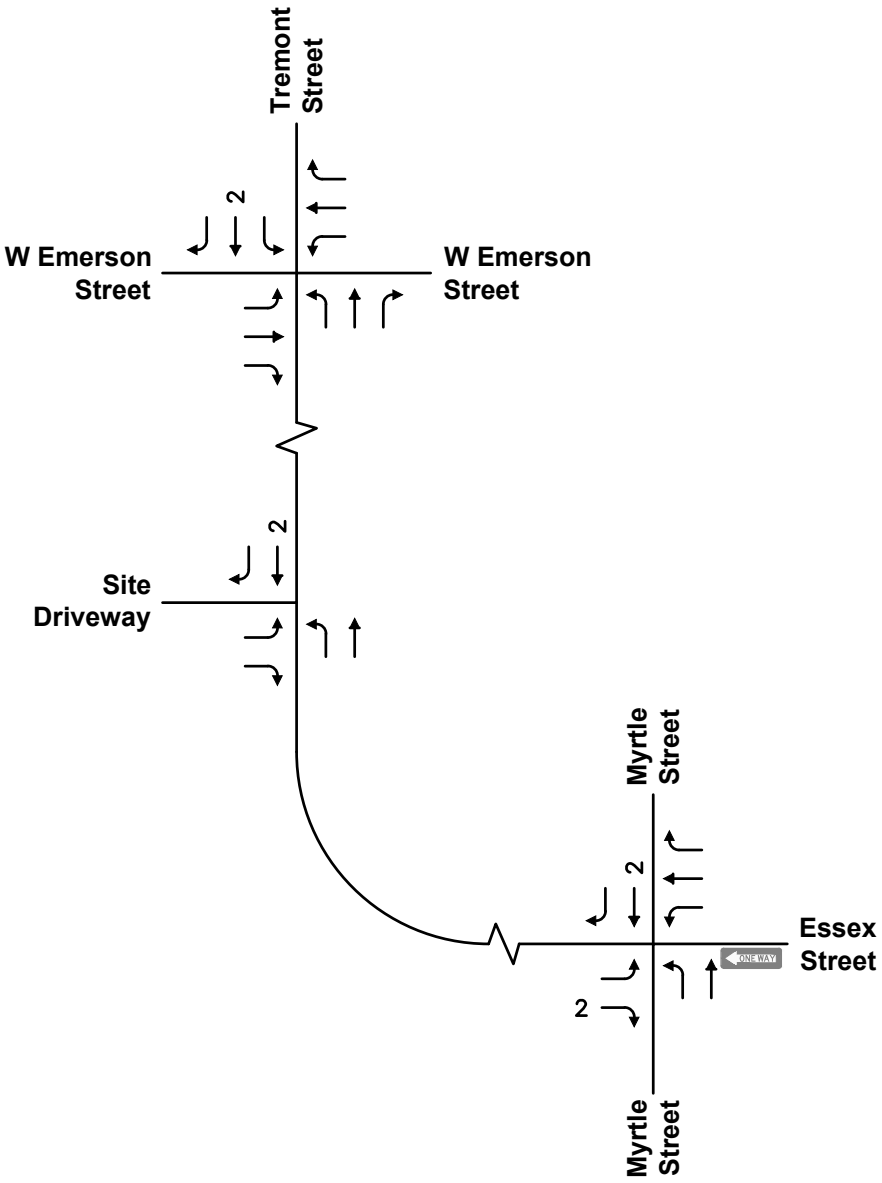
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

## 14-24 Tremont Street
## Weekday Evening Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg




North

Scale: Not to Scale

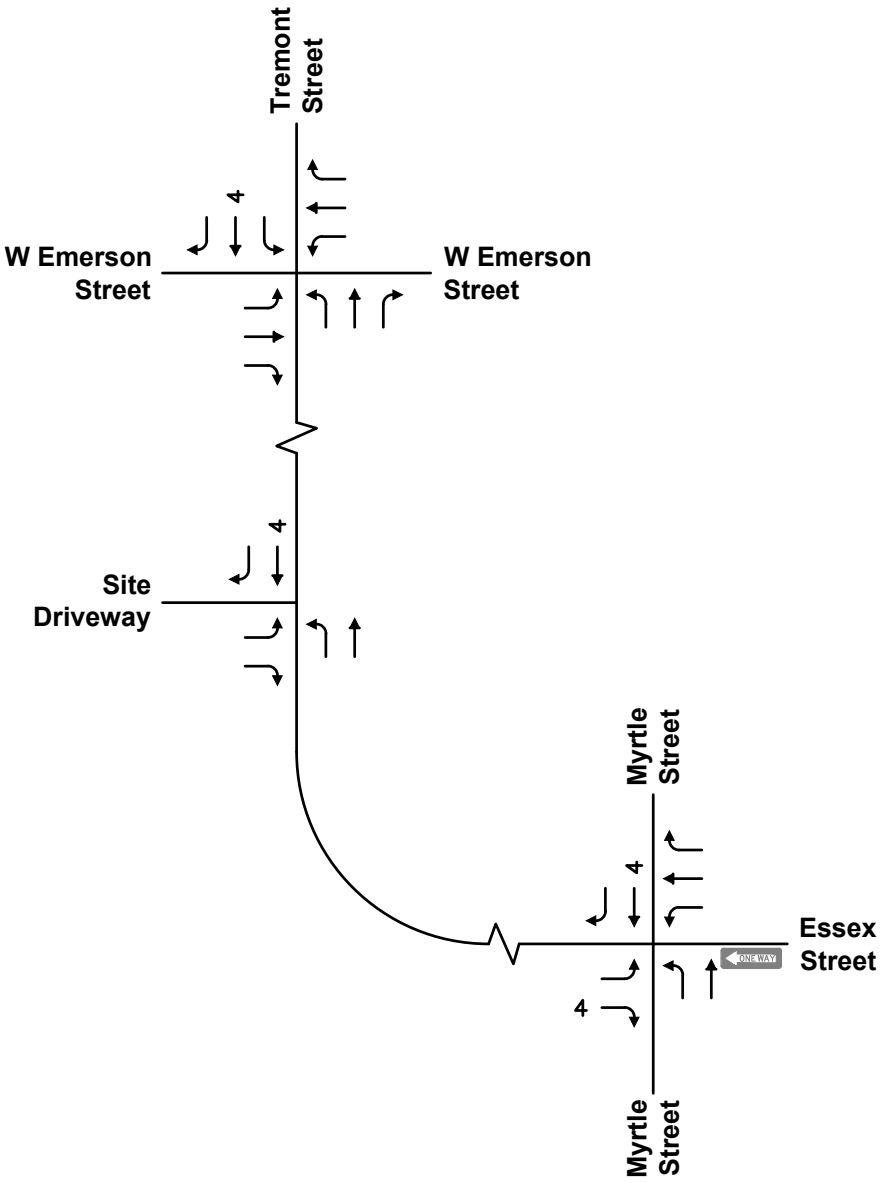
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

## 31-39 West Wyoming Avenue
## Weekday Morning Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg




North

Scale: Not to Scale

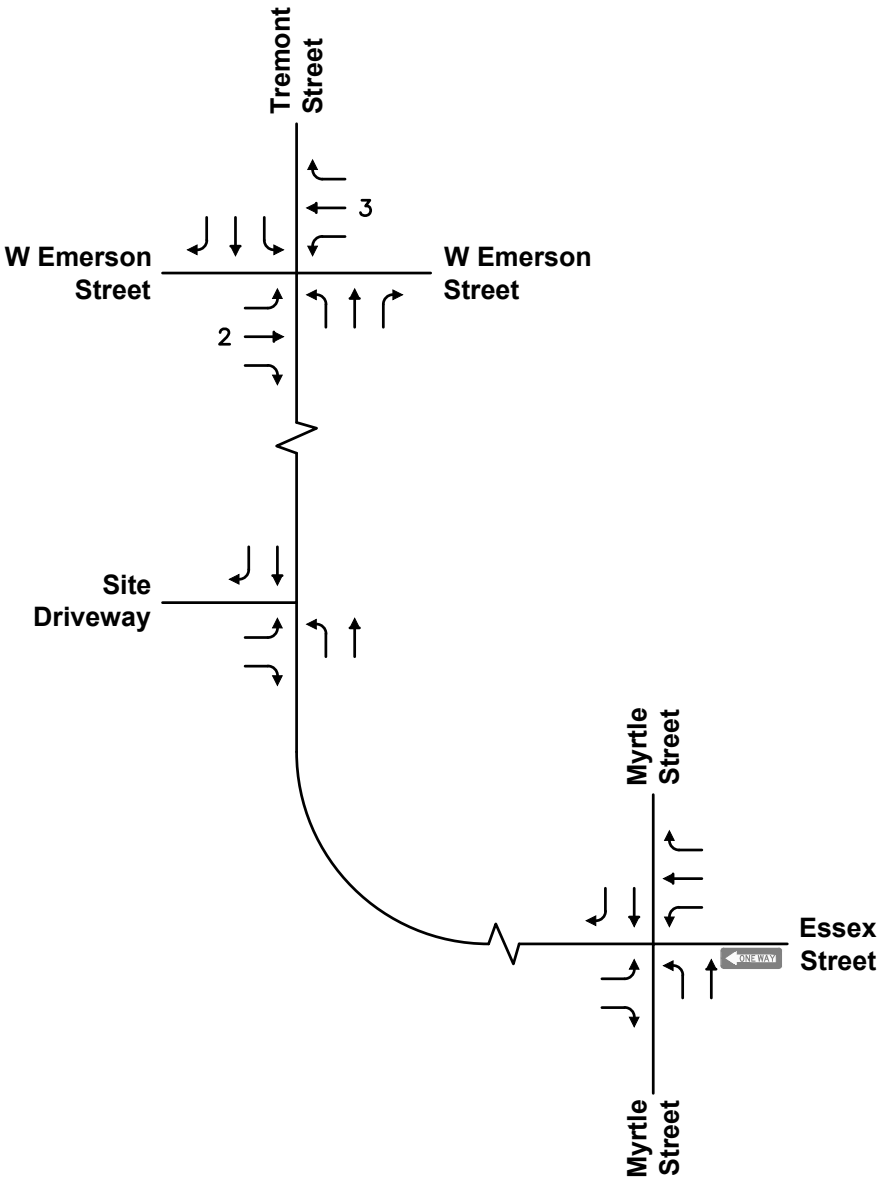
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

## 31-39 West Wyoming Avenue
## Weekday Evening Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg




North
Scale: Not to Scale

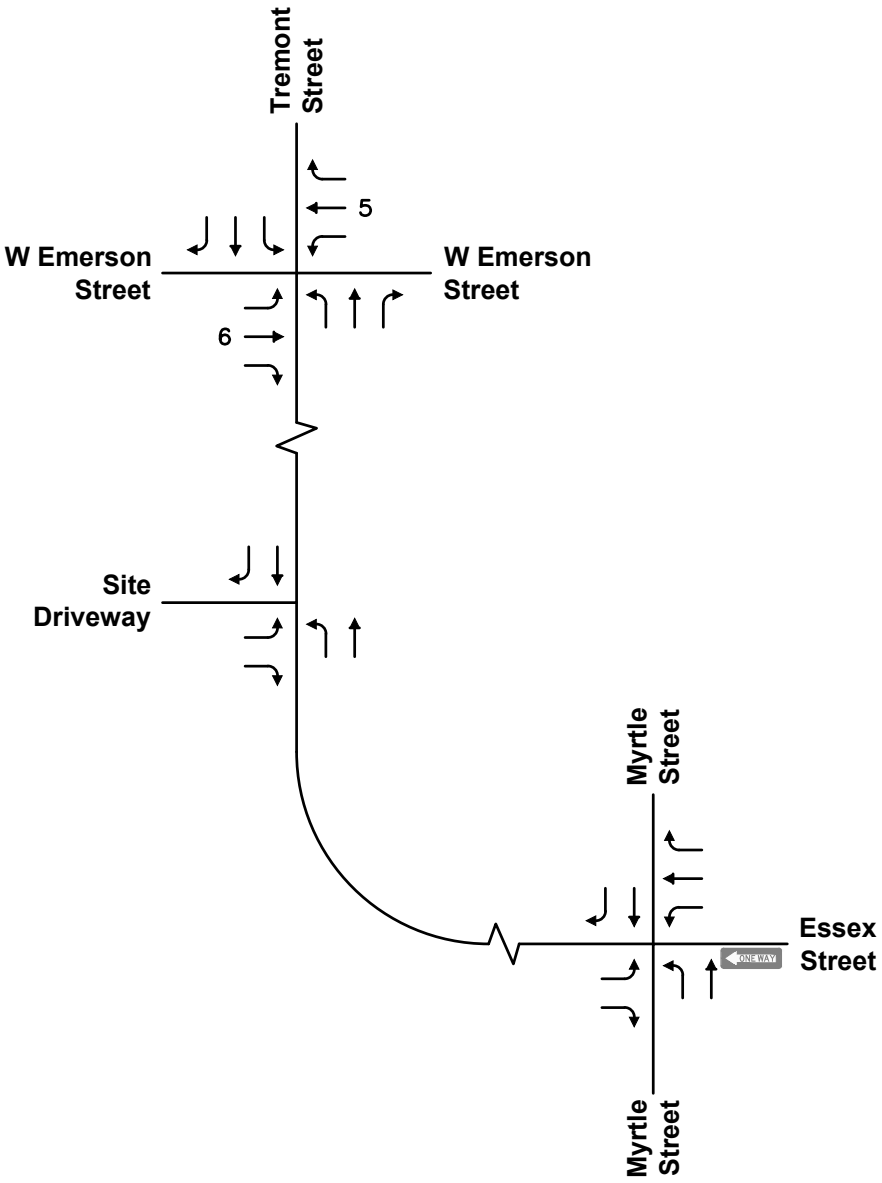
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

## 681-697 Main Street
## Weekday Morning Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg




North

Scale: Not to Scale

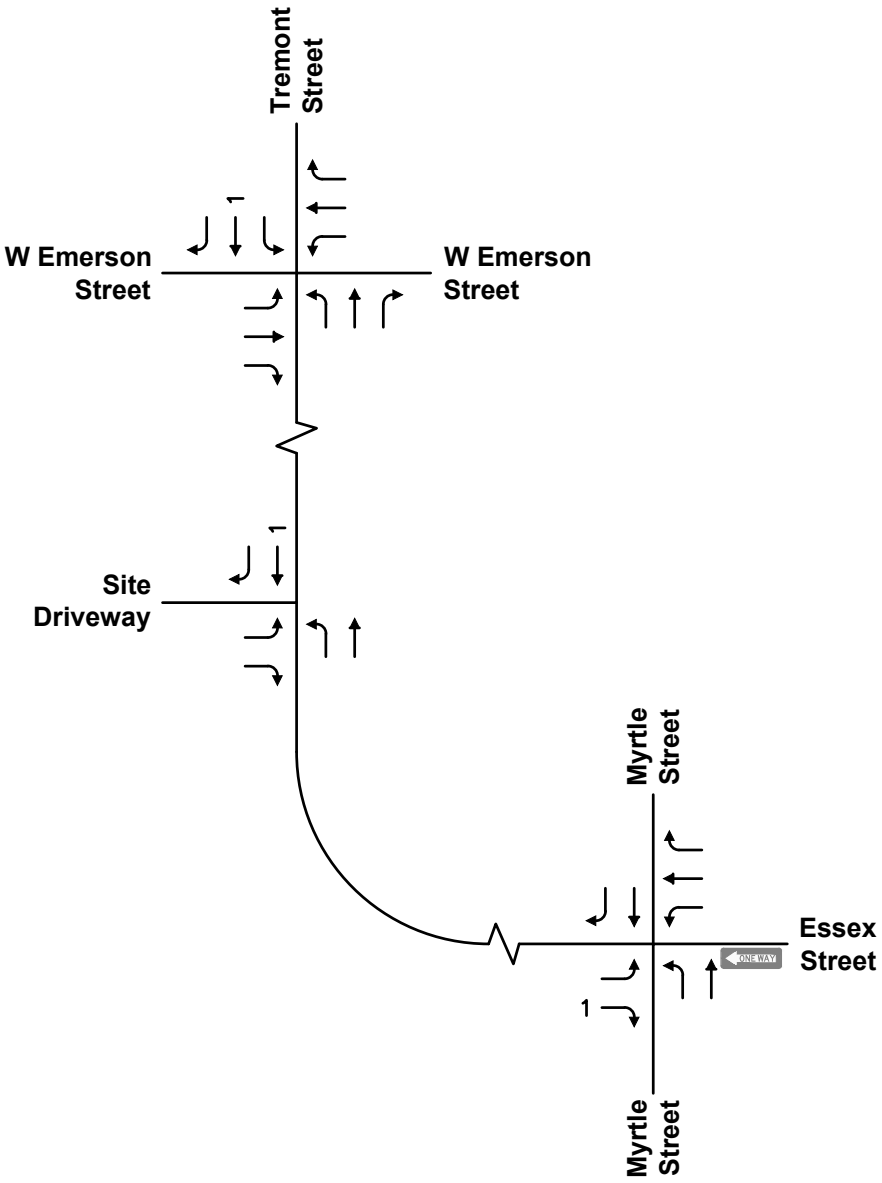
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

## 681-697 Main Street
## Weekday Evening Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg




North

Scale: Not to Scale

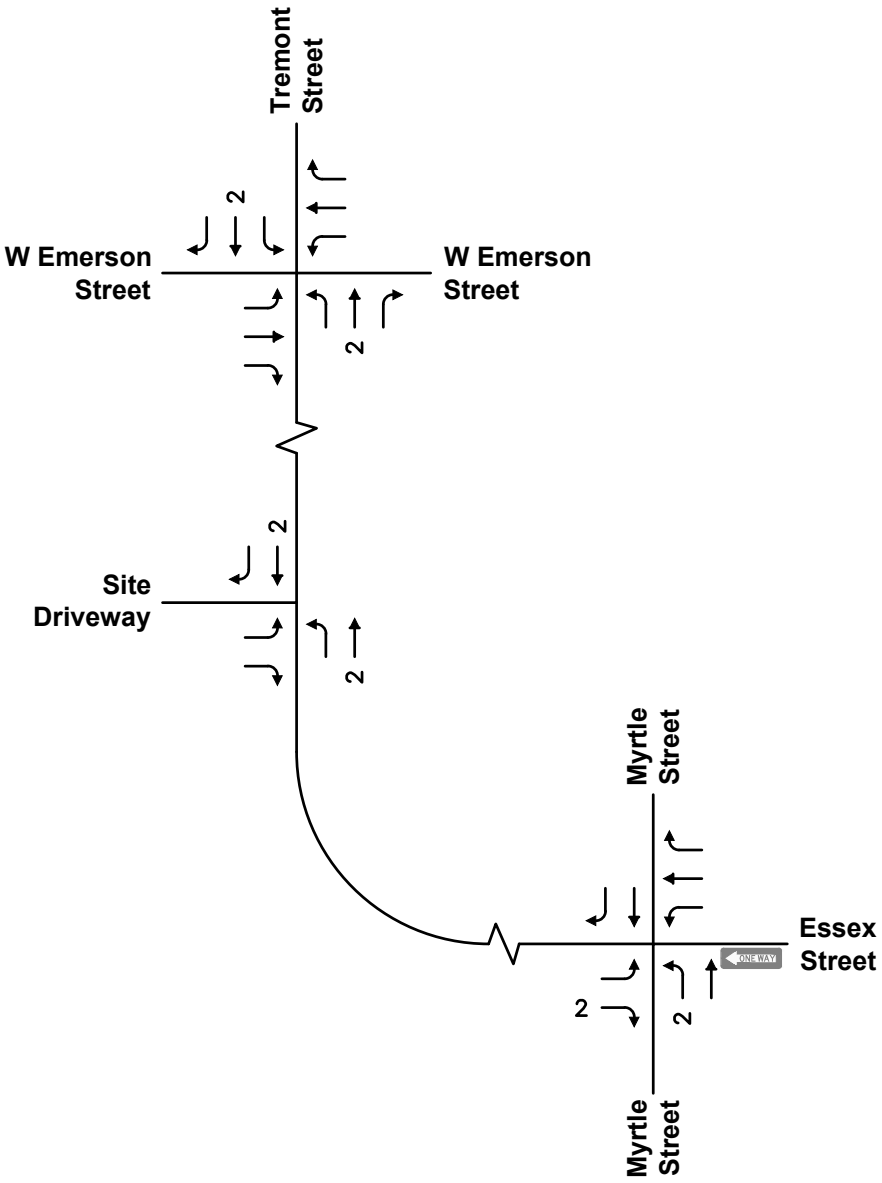
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

**453-463 Franklin Street**
**Weekday Morning Peak Hour Volumes**

Date: February 2024
Dwg No. 1344 MR01.dwg




North
Scale: Not to Scale

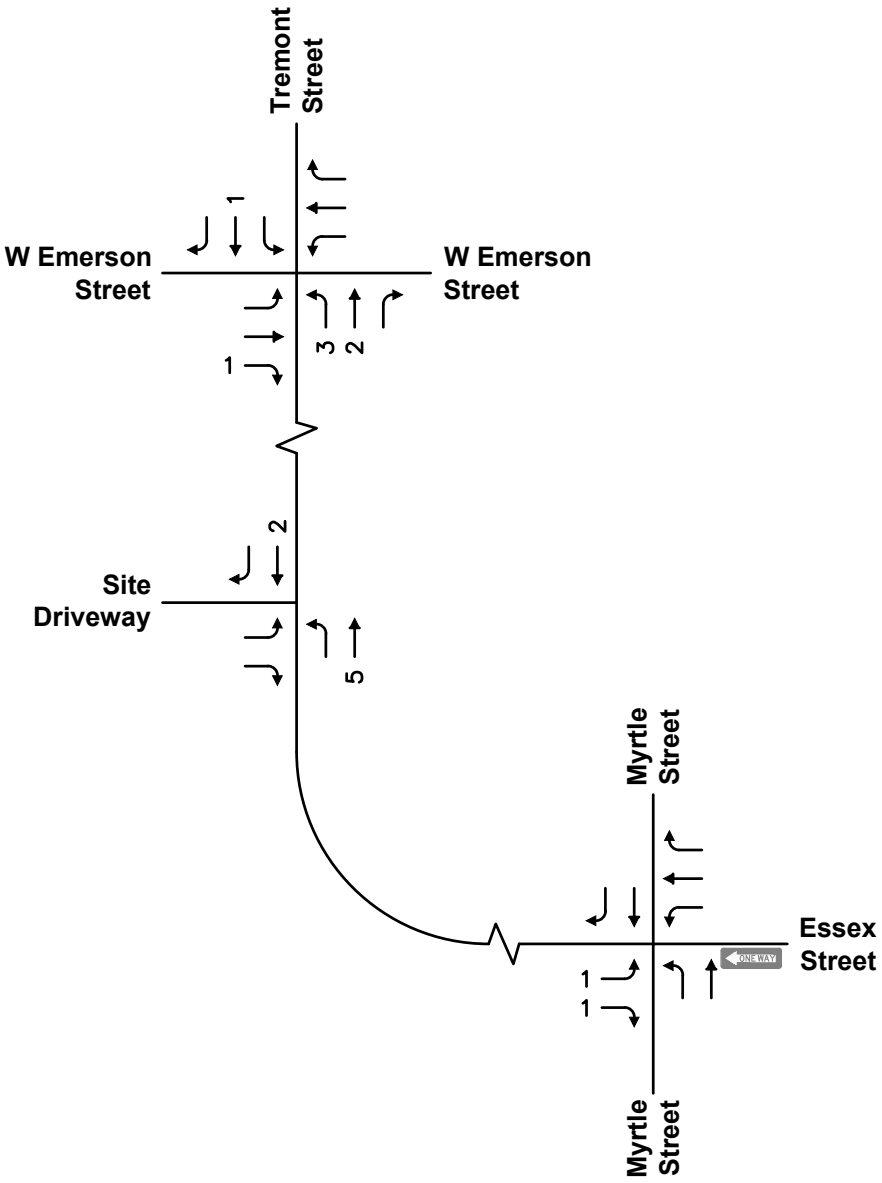
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

**453-463 Franklin Street**
**Weekday Evening Peak Hour Volumes**

Date: February 2024
Dwg No. 1344 MR01.dwg




North
Scale: Not to Scale

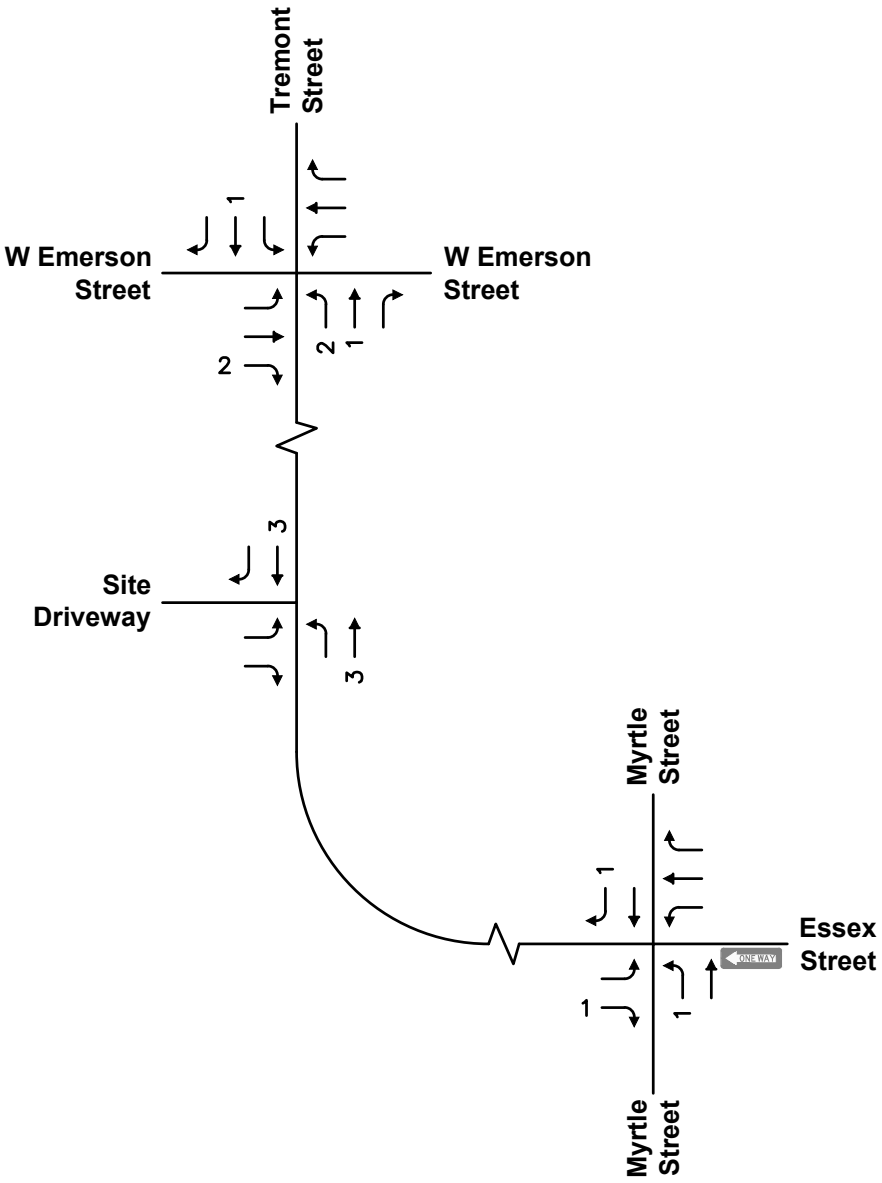
**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

## 12-16 Essex Street
## Weekday Morning Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg




North

Scale: Not to Scale

**NOTES:**
**NEGL. = Negligible**

**Attachment**

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

## 12-16 Essex Street
## Weekday Evening Peak Hour Volumes

Date: February 2024
Dwg No. 1344 MR01.dwg

- Trip Generation

**Institute of Transportation Engineers (ITE) 11th Edition**
**Land Use Code (LUC) 221 - Multifamily Housing (Mid-Rise)**
**Dense Multi-Use Urban - Close to Rail Transit**

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 76

**AVERAGE WEEKDAY DAILY**

T = 2.01 * X
T = 2.01 * 76
T = 152.76
T = 152 vehicle trips
with 50% ( **76** vpd) entering and 50% ( **76** vpd) exiting.

**WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC**

T = 0.25 * X
T = 0.25 * 76
T = 19.00
T = 19 vehicle trips
with 15% ( **3** vph) entering and 85% ( **16** vph) exiting.

**WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC**

T = 0.25 * X
T = 0.25 * 76
T = 19.00
T = 19 vehicle trips
with 74% ( **14** vph) entering and 26% ( **5** vph) exiting.

**SATURDAY DAILY**

Proportional Estimate Method:

LUC 221 Saturday Daily 4.57 x LUC 221 Weekday Daily 2.01 = 2.02
LUC 221 Weekday Daily 4.54

T = 2.02*(X)
T = 2.02* 76
T = 153.52
T = 154 vehicle trips
with 50% ( 77 vpd) entering and 50% ( 77 vpd) exiting.

**SATURDAY MIDDAY PEAK HOUR OF GENERATOR**

Proportional Estimate Method:

LUC 221 Saturday Midday 0.39 x LUC 221 Weekday Daily 2.01 = 0.17
LUC 221 Weekday Daily 4.54

T = 0.39*(X)
T = 0.39* 76
T = 29.64
T = 30 vehicle trips
with 51% ( 15 vpd) entering and 49% ( 15 vpd) exiting.

- Trip Distribution

**Journey-to-Work Distribution**

US Census Journey-to-Work Data

| Residence Town Name | Workplace Town Name | All Workers | % of Total Rounded |
|---|---|---|---|
| Melrose city | Boston city | 4,480 | 29.7% |
| Melrose city | Melrose city | 2,289 | 15.2% |
| Melrose city | Cambridge city | 1,171 | 7.8% |
| Melrose city | Burlington town | 450 | 3.0% |
| Melrose city | Malden city | 445 | 3.0% |
| Melrose city | Medford city | 359 | 2.4% |
| Melrose city | Stoneham town | 311 | 2.1% |
| Melrose city | Waltham city | 302 | 2.0% |
| Melrose city | Wakefield town | 299 | 2.0% |
| Melrose city | Everett city | 275 | 1.8% |
| Melrose city | Newton city | 275 | 1.8% |
| Melrose city | Woburn city | 274 | 1.8% |
| Melrose city | Saugus town | 269 | 1.8% |
| Melrose city | Reading town | 260 | 1.7% |
| Melrose city | Lynn city | 250 | 1.7% |
| Melrose city | Bedford town | 199 | 1.3% |
| Melrose city | Wilmington town | 194 | 1.3% |
| Melrose city | Somerville city | 190 | 1.3% |
| Melrose city | Revere city | 150 | 1.0% |
| Melrose city | Andover town | 144 | 1.0% |
| Melrose city | Framingham town | 137 | 0.9% |
| Melrose city | Salem city | 131 | 0.9% |
| Melrose city | Danvers town | 124 | 0.8% |
| Melrose city | Peabody city | 123 | 0.8% |
| Melrose city | Marlborough city | 123 | 0.8% |
| Melrose city | Billerica town | 103 | 0.7% |
| Melrose city | Beverly city | 83 | 0.6% |
| Melrose city | Winchester town | 83 | 0.6% |
| Melrose city | Chelmsford town | 80 | 0.5% |
| Melrose city | Watertown Town city | 79 | 0.5% |
| Melrose city | Chelsea city | 77 | 0.5% |
| Melrose city | Brookline town | 76 | 0.5% |
| Melrose city | Lexington town | 75 | 0.5% |
| | Sub-Total | **13,880** | **92%** |
| | Other | 1,204 | 8% |
| | **Total** | **15,084** | **100%** |

| | To/From Routes | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Tremont Street (To/From North) | | Myrtle Street (To/From South) | | W Emerson Street (To/From East) | | W Emerson Street (To/From West) | | |
| Workplace | | | | | | | | | Total |
| Boston city | 10% | 3.0% | 10% | 3.0% | 10% | 3.0% | 70% | 20.8% | 29.7% |
| Melrose city | 10% | 1.5% | 30% | 4.6% | 30% | 4.6% | 30% | 4.6% | 15.2% |
| Cambridge city | 10% | 0.8% | 10% | 0.8% | | 0.0% | 80% | 6.2% | 7.8% |
| Burlington town | 50% | 1.5% | | 0.0% | | 0.0% | 50% | 1.5% | 3.0% |
| Malden city | | 0.0% | 100% | 3.0% | | 0.0% | | 0.0% | 3.0% |
| Medford city | 10% | 0.2% | 10% | 0.2% | | 0.0% | 80% | 1.9% | 2.4% |
| Stoneham town | 50% | 1.0% | | 0.0% | | 0.0% | 50% | 1.0% | 2.1% |
| Waltham city | 50% | 1.0% | | 0.0% | | 0.0% | 50% | 1.0% | 2.0% |
| Wakefield town | 70% | 1.4% | | 0.0% | 10% | 0.2% | 20% | 0.4% | 2.0% |
| Everett city | | 0.0% | 100% | 1.8% | | 0.0% | | 0.0% | 1.8% |
| Newton city | 50% | 0.9% | | 0.0% | | 0.0% | 50% | 0.9% | 1.8% |
| Woburn city | 50% | 0.9% | | 0.0% | | 0.0% | 50% | 0.9% | 1.8% |
| Saugus town | 25% | 0.4% | | 0.0% | 75% | 1.3% | | 0.0% | 1.8% |
| Reading town | 100% | 1.7% | | 0.0% | | 0.0% | | 0.0% | 1.7% |
| Lynn city | 25% | 0.4% | | 0.0% | 75% | 1.2% | | 0.0% | 1.7% |
| Bedford town | 50% | 0.7% | | 0.0% | | 0.0% | 50% | 0.7% | 1.3% |
| Wilmington town | 50% | 0.6% | | 0.0% | | 0.0% | 50% | 0.6% | 1.3% |
| Somerville city | | 0.0% | | 0.0% | | 0.0% | 100% | 1.3% | 1.3% |
| Revere city | | 0.0% | 50% | 0.5% | 50% | 0.5% | | 0.0% | 1.0% |
| Andover town | 50% | 0.5% | | 0.0% | | 0.0% | 50% | 0.5% | 1.0% |
| Framingham town | 50% | 0.5% | | 0.0% | | 0.0% | 50% | 0.5% | 0.9% |
| Salem city | 100% | 0.9% | | 0.0% | | 0.0% | | 0.0% | 0.9% |
| Danvers town | 100% | 0.8% | | 0.0% | | 0.0% | | 0.0% | 0.8% |
| Peabody city | 100% | 0.8% | | 0.0% | | 0.0% | | 0.0% | 0.8% |
| Marlborough city | 50% | 0.4% | | 0.0% | | 0.0% | 50% | 0.4% | 0.8% |
| Billerica town | 50% | 0.3% | | 0.0% | | 0.0% | 50% | 0.3% | 0.7% |
| Beverly city | 100% | 0.6% | | 0.0% | | 0.0% | | 0.0% | 0.6% |
| Winchester town | 50% | 0.3% | | 0.0% | | 0.0% | 50% | 0.3% | 0.6% |
| Chelmsford town | 50% | 0.3% | | 0.0% | | 0.0% | 50% | 0.3% | 0.5% |
| Watertown Town city | 50% | 0.3% | | 0.0% | | 0.0% | 50% | 0.3% | 0.5% |
| Chelsea city | | 0.0% | 50% | 0.3% | 50% | 0.3% | | 0.0% | 0.5% |
| Brookline town | 50% | 0.3% | | 0.0% | | 0.0% | 50% | 0.3% | 0.5% |
| Lexington town | 50% | 0.2% | | 0.0% | | 0.0% | 50% | 0.2% | 0.5% |
| Sub-Total | | 22.2% | | 14.1% | | 11.1% | | 44.7% | 92.0% |
| Other | | 1.9% | | 1.2% | | 1.0% | | 3.9% | 8.0% |
| **Total** | | 24.1% | | 15.3% | | 12.0% | | 48.6% | 100.0% |
| SAY | | 25% | | 15% | | 10% | | 50% | 100% |

□ Capacity Analysis

# *LEVEL OF SERVICE METHODOLOGY*

Capacity analysis of intersections is developed using the Synchro® computer software, which implements the methods of the Highway Capacity Manual 6th Edition (HCM). The resulting analysis presents a level-of-service (LOS) designation for individual intersection movements and (for signalized intersections) for the entire intersection. The LOS is a letter designation that provides a qualitative measure of operating conditions based on several factors including roadway geometry, speeds, ambient traffic volumes, traffic controls, and driver characteristics. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of year. A range of six levels of service are defined on the basis of average delay, ranging from LOS A (the least delay) to LOS F (delays greater than 50 seconds for unsignalized movements, and greater than 80 seconds for signalized movements).

## *Signalized Intersection Performance Measures*

The six LOS designations for signalized intersections may be described as follows:

- *LOS A* describes operations with low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than LOS A.
- *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.
- *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.
- *LOS E* describes operations with high control delay values. Individual cycle failures are frequent occurrences.
- *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.

The LOS for signalized intersections are calculated using the operational analysis methodology of the *Highway Capacity Manual 6th Edition*.[1] This method assesses the effects of signal type, timing, phasing, and 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 is a measure of 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 A1** 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 A1**
**LEVEL-OF-SERVICE CRITERIA**
**FOR SIGNALIZED INTERSECTIONS**[1]

| Control (Signal) Delay per Vehicle (seconds per vehicle) | Level of Service | |
|---|---|---|
| | v/c ≤ 1 | v/c > 1 |
| ≤10.0 | A | F |
| 10.1 to 20.0 | B | F |
| 20.1 to 35.0 | C | F |
| 35.1 to 55.0 | D | F |
| 55.1 to 80.0 | E | F |
| >80.0 | F | F |

[1]Source: *Highway Capacity Manual 6th Edition*, Transportation Research Board; Washington, DC; 2016.

[1]*Highway Capacity Manual* 6th Edition; Transportation Research Board; Washington, DC; 2016.

## *Unsignalized Intersection Performance Measures*

The six LOS designations for unsignalized intersections may be described as follows:

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The LOS designations of unsignalized intersections are determined by application of a procedure described in the *Highway Capacity Manual 6th Edition.*[2] LOS 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 LOS at unsignalized intersections are also given in the *Highway Capacity Manual 6th Edition*. **Table A2** summarizes the relationship between LOS and average control delay.

**Table A2**
**LEVEL-OF-SERVICE CRITERIA FOR**
**UNSIGNALIZED INTERSECTIONS**[1]

| Average Control Delay (seconds per vehicle) | Level of Service | |
|---|---|---|
| | v/c ≤ 1 | v/c > 1 |
| ≤ 10.0 | A | F |
| 10.1 to 15.0 | B | F |
| 15.1 to 25.0 | C | F |
| 25.1 to 35.0 | D | F |
| 35.1 to 50.0 | E | F |
| >50.0 | F | F |

[1]Source: *Highway Capacity Manual 6th Edition*, Transportation Research Board; Washington, DC; 2016.

[2] ibid

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 22.7 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 65 | 110 | 37 | 13 | 220 | 49 | 38 | 83 | 16 | 69 | 201 | 31 |
| Future Vol, veh/h | 65 | 110 | 37 | 13 | 220 | 49 | 38 | 83 | 16 | 69 | 201 | 31 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 2 | 1 | 0 | 0 | 1 | 4 | 5 | 1 | 6 | 8 | 2 | 3 |
| Mvmt Flow | 87 | 147 | 49 | 17 | 293 | 65 | 51 | 111 | 21 | 92 | 268 | 41 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 18.2 | 23.8 | 14.9 | 28.5 |
| HCM LOS | C | C | B | D |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 28% | 31% | 5% | 23% |
| Vol Thru, % | 61% | 52% | 78% | 67% |
| Vol Right, % | 12% | 17% | 17% | 10% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 137 | 212 | 282 | 301 |
| LT Vol | 38 | 65 | 13 | 69 |
| Through Vol | 83 | 110 | 220 | 201 |
| RT Vol | 16 | 37 | 49 | 31 |
| Lane Flow Rate | 183 | 283 | 376 | 401 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.376 | 0.548 | 0.698 | 0.762 |
| Departure Headway (Hd) | 7.404 | 6.975 | 6.684 | 6.831 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 484 | 514 | 541 | 530 |
| Service Time | 5.479 | 5.042 | 4.714 | 4.857 |
| HCM Lane V/C Ratio | 0.378 | 0.551 | 0.695 | 0.757 |
| HCM Control Delay | 14.9 | 18.2 | 23.8 | 28.5 |
| HCM Lane LOS | B | C | C | D |
| HCM 95th-tile Q | 1.7 | 3.3 | 5.5 | 6.7 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.7 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 24 | 0 | 74 | 62 | 128 | 16 | 55 | 135 | 0 | 0 | 79 | 34 |
| Future Vol, veh/h | 24 | 0 | 74 | 62 | 128 | 16 | 55 | 135 | 0 | 0 | 79 | 34 |
| Peak Hour Factor | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 |
| Heavy Vehicles, % | 0 | 0 | 1 | 7 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 31 | 0 | 96 | 81 | 166 | 21 | 71 | 175 | 0 | 0 | 103 | 44 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 9.1 | 11.7 | 11.2 | 9.6 |
| HCM LOS | A | B | B | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 29% | 24% | 30% | 0% |
| Vol Thru, % | 71% | 0% | 62% | 70% |
| Vol Right, % | 0% | 76% | 8% | 30% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 190 | 98 | 206 | 113 |
| LT Vol | 55 | 24 | 62 | 0 |
| Through Vol | 135 | 0 | 128 | 79 |
| RT Vol | 0 | 74 | 16 | 34 |
| Lane Flow Rate | 247 | 127 | 268 | 147 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.359 | 0.176 | 0.392 | 0.21 |
| Departure Headway (Hd) | 5.237 | 4.974 | 5.275 | 5.162 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 688 | 722 | 682 | 696 |
| Service Time | 3.265 | 3.005 | 3.3 | 3.194 |
| HCM Lane V/C Ratio | 0.359 | 0.176 | 0.393 | 0.211 |
| HCM Control Delay | 11.2 | 9.1 | 11.7 | 9.6 |
| HCM Lane LOS | B | A | B | A |
| HCM 95th-tile Q | 1.6 | 0.6 | 1.9 | 0.8 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.3 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 5 | 0 | 6 | 133 | 246 | 5 |
| Future Vol, veh/h | 5 | 0 | 6 | 133 | 246 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 2 | 0 |
| Mvmt Flow | 6 | 0 | 8 | 168 | 311 | 6 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 498 | 314 | 317 | 0 | - | 0 |
| Stage 1 | 314 | - | - | - | - | - |
| Stage 2 | 184 | - | - | - | - | - |
| Critical Hdwy | 6.4 | 6.2 | 4.1 | - | - | - |
| Critical Hdwy Stg 1 | 5.4 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - |
| Follow-up Hdwy | 3.5 | 3.3 | 2.2 | - | - | - |
| Pot Cap-1 Maneuver | 535 | 731 | 1255 | - | - | - |
| Stage 1 | 745 | - | - | - | - | - |
| Stage 2 | 852 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 531 | 731 | 1255 | - | - | - |
| Mov Cap-2 Maneuver | 531 | - | - | - | - | - |
| Stage 1 | 740 | - | - | - | - | - |
| Stage 2 | 852 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 11.9 | 0.3 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1255 | - | 531 | - | - |
| HCM Lane V/C Ratio | 0.006 | - | 0.012 | - | - |
| HCM Control Delay (s) | 7.9 | 0 | 11.9 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 29.9 |
| Intersection LOS | D |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 67 | 116 | 39 | 13 | 231 | 53 | 42 | 89 | 17 | 75 | 216 | 33 |
| Future Vol, veh/h | 67 | 116 | 39 | 13 | 231 | 53 | 42 | 89 | 17 | 75 | 216 | 33 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 2 | 1 | 0 | 0 | 1 | 4 | 5 | 1 | 6 | 8 | 2 | 3 |
| Mvmt Flow | 89 | 155 | 52 | 17 | 308 | 71 | 56 | 119 | 23 | 100 | 288 | 44 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 22.1 | 30.9 | 17.1 | 40.3 |
| HCM LOS | C | D | C | E |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 28% | 30% | 4% | 23% |
| Vol Thru, % | 60% | 52% | 78% | 67% |
| Vol Right, % | 11% | 18% | 18% | 10% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 148 | 222 | 297 | 324 |
| LT Vol | 42 | 67 | 13 | 75 |
| Through Vol | 89 | 116 | 231 | 216 |
| RT Vol | 17 | 39 | 53 | 33 |
| Lane Flow Rate | 197 | 296 | 396 | 432 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.438 | 0.62 | 0.777 | 0.859 |
| Departure Headway (Hd) | 7.997 | 7.538 | 7.172 | 7.264 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 452 | 482 | 507 | 501 |
| Service Time | 6.016 | 5.538 | 5.172 | 5.264 |
| HCM Lane V/C Ratio | 0.436 | 0.614 | 0.781 | 0.862 |
| HCM Control Delay | 17.1 | 22.1 | 30.9 | 40.3 |
| HCM Lane LOS | C | C | D | E |
| HCM 95th-tile Q | 2.2 | 4.1 | 7 | 9 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 11.1 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Traffic Vol, veh/h | 26 | 0 | 85 | 64 | 133 | 17 | 58 | 140 | 0 | 0 | 84 | 35 |
| Future Vol, veh/h | 26 | 0 | 85 | 64 | 133 | 17 | 58 | 140 | 0 | 0 | 84 | 35 |
| Peak Hour Factor | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 |
| Heavy Vehicles, % | 0 | 0 | 1 | 7 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 34 | 0 | 110 | 83 | 173 | 22 | 75 | 182 | 0 | 0 | 109 | 45 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 9.4 | 12.2 | 11.7 | 9.9 |
| HCM LOS | A | B | B | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 29% | 23% | 30% | 0% |
| Vol Thru, % | 71% | 0% | 62% | 71% |
| Vol Right, % | 0% | 77% | 8% | 29% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 198 | 111 | 214 | 119 |
| LT Vol | 58 | 26 | 64 | 0 |
| Through Vol | 140 | 0 | 133 | 84 |
| RT Vol | 0 | 85 | 17 | 35 |
| Lane Flow Rate | 257 | 144 | 278 | 155 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.382 | 0.203 | 0.415 | 0.227 |
| Departure Headway (Hd) | 5.343 | 5.063 | 5.371 | 5.283 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 674 | 708 | 670 | 678 |
| Service Time | 3.381 | 3.105 | 3.406 | 3.326 |
| HCM Lane V/C Ratio | 0.381 | 0.203 | 0.415 | 0.229 |
| HCM Control Delay | 11.7 | 9.4 | 12.2 | 9.9 |
| HCM Lane LOS | B | A | B | A |
| HCM 95th-tile Q | 1.8 | 0.8 | 2 | 0.9 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.3 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 5 | 0 | 6 | 144 | 264 | 5 |
| Future Vol, veh/h | 5 | 0 | 6 | 144 | 264 | 5 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 2 | 0 |
| Mvmt Flow | 6 | 0 | 8 | 182 | 334 | 6 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 535 | 337 | 340 | 0 | - | 0 |
| Stage 1 | 337 | - | - | - | - | - |
| Stage 2 | 198 | - | - | - | - | - |
| Critical Hdwy | 6.4 | 6.2 | 4.1 | - | - | - |
| Critical Hdwy Stg 1 | 5.4 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - |
| Follow-up Hdwy | 3.5 | 3.3 | 2.2 | - | - | - |
| Pot Cap-1 Maneuver | 510 | 710 | 1230 | - | - | - |
| Stage 1 | 728 | - | - | - | - | - |
| Stage 2 | 840 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 506 | 710 | 1230 | - | - | - |
| Mov Cap-2 Maneuver | 506 | - | - | - | - | - |
| Stage 1 | 723 | - | - | - | - | - |
| Stage 2 | 840 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 12.2 | 0.3 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1230 | - | 506 | - | - |
| HCM Lane V/C Ratio | 0.006 | - | 0.013 | - | - |
| HCM Control Delay (s) | 7.9 | 0 | 12.2 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 33.5 |
| Intersection LOS | D |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 67 | 116 | 41 | 13 | 231 | 53 | 50 | 93 | 19 | 75 | 217 | 33 |
| Future Vol, veh/h | 67 | 116 | 41 | 13 | 231 | 53 | 50 | 93 | 19 | 75 | 217 | 33 |
| Peak Hour Factor | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| Heavy Vehicles, % | 2 | 1 | 0 | 0 | 1 | 4 | 5 | 1 | 6 | 8 | 2 | 3 |
| Mvmt Flow | 89 | 155 | 55 | 17 | 308 | 71 | 67 | 124 | 25 | 100 | 289 | 44 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 23.6 | 34.9 | 18.8 | 46.5 |
| HCM LOS | C | D | C | E |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 31% | 30% | 4% | 23% |
| Vol Thru, % | 57% | 52% | 78% | 67% |
| Vol Right, % | 12% | 18% | 18% | 10% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 162 | 224 | 297 | 325 |
| LT Vol | 50 | 67 | 13 | 75 |
| Through Vol | 93 | 116 | 231 | 217 |
| RT Vol | 19 | 41 | 53 | 33 |
| Lane Flow Rate | 216 | 299 | 396 | 433 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.488 | 0.64 | 0.81 | 0.895 |
| Departure Headway (Hd) | 8.133 | 7.717 | 7.362 | 7.438 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 441 | 466 | 491 | 490 |
| Service Time | 6.219 | 5.795 | 5.394 | 5.466 |
| HCM Lane V/C Ratio | 0.49 | 0.642 | 0.807 | 0.884 |
| HCM Control Delay | 18.8 | 23.6 | 34.9 | 46.5 |
| HCM Lane LOS | C | C | D | E |
| HCM 95th-tile Q | 2.6 | 4.4 | 7.7 | 9.9 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 11.1 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 26 | 0 | 87 | 64 | 133 | 17 | 58 | 140 | 0 | 0 | 84 | 35 |
| Future Vol, veh/h | 26 | 0 | 87 | 64 | 133 | 17 | 58 | 140 | 0 | 0 | 84 | 35 |
| Peak Hour Factor | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 | 0.77 |
| Heavy Vehicles, % | 0 | 0 | 1 | 7 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 34 | 0 | 113 | 83 | 173 | 22 | 75 | 182 | 0 | 0 | 109 | 45 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 9.4 | 12.2 | 11.7 | 9.9 |
| HCM LOS | A | B | B | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 29% | 23% | 30% | 0% |
| Vol Thru, % | 71% | 0% | 62% | 71% |
| Vol Right, % | 0% | 77% | 8% | 29% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 198 | 113 | 214 | 119 |
| LT Vol | 58 | 26 | 64 | 0 |
| Through Vol | 140 | 0 | 133 | 84 |
| RT Vol | 0 | 87 | 17 | 35 |
| Lane Flow Rate | 257 | 147 | 278 | 155 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.382 | 0.206 | 0.415 | 0.227 |
| Departure Headway (Hd) | 5.353 | 5.063 | 5.377 | 5.294 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 671 | 707 | 670 | 677 |
| Service Time | 3.387 | 3.102 | 3.41 | 3.332 |
| HCM Lane V/C Ratio | 0.383 | 0.208 | 0.415 | 0.229 |
| HCM Control Delay | 11.7 | 9.4 | 12.2 | 9.9 |
| HCM Lane LOS | B | A | B | A |
| HCM 95th-tile Q | 1.8 | 0.8 | 2 | 0.9 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.4 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 14 | 2 | 0 | 144 | 264 | 3 |
| Future Vol, veh/h | 14 | 2 | 0 | 144 | 264 | 3 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 2 | 0 |
| Mvmt Flow | 18 | 3 | 0 | 182 | 334 | 4 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 518 | 336 | 338 | 0 | - | 0 |
| Stage 1 | 336 | - | - | - | - | - |
| Stage 2 | 182 | - | - | - | - | - |
| Critical Hdwy | 6.4 | 6.2 | 4.1 | - | - | - |
| Critical Hdwy Stg 1 | 5.4 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - |
| Follow-up Hdwy | 3.5 | 3.3 | 2.2 | - | - | - |
| Pot Cap-1 Maneuver | 521 | 711 | 1232 | - | - | - |
| Stage 1 | 728 | - | - | - | - | - |
| Stage 2 | 854 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 521 | 711 | 1232 | - | - | - |
| Mov Cap-2 Maneuver | 521 | - | - | - | - | - |
| Stage 1 | 728 | - | - | - | - | - |
| Stage 2 | 854 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 11.9 | 0 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1232 | - | 539 | - | - |
| HCM Lane V/C Ratio | - | - | 0.038 | - | - |
| HCM Control Delay (s) | 0 | - | 11.9 | - | - |
| HCM Lane LOS | A | - | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.1 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 42 | 140 | 26 | 8 | 94 | 36 | 40 | 75 | 8 | 42 | 109 | 24 |
| Future Vol, veh/h | 42 | 140 | 26 | 8 | 94 | 36 | 40 | 75 | 8 | 42 | 109 | 24 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 5 | 2 | 0 | 0 | 2 | 3 | 3 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 48 | 159 | 30 | 9 | 107 | 41 | 45 | 85 | 9 | 48 | 124 | 27 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 10.5 | 9.4 | 9.6 | 10.1 |
| HCM LOS | B | A | A | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 33% | 20% | 6% | 24% |
| Vol Thru, % | 61% | 67% | 68% | 62% |
| Vol Right, % | 7% | 12% | 26% | 14% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 123 | 208 | 138 | 175 |
| LT Vol | 40 | 42 | 8 | 42 |
| Through Vol | 75 | 140 | 94 | 109 |
| RT Vol | 8 | 26 | 36 | 24 |
| Lane Flow Rate | 140 | 236 | 157 | 199 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.202 | 0.328 | 0.214 | 0.277 |
| Departure Headway (Hd) | 5.209 | 5 | 4.919 | 5.019 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 681 | 711 | 720 | 708 |
| Service Time | 3.307 | 3.086 | 3.013 | 3.109 |
| HCM Lane V/C Ratio | 0.206 | 0.332 | 0.218 | 0.281 |
| HCM Control Delay | 9.6 | 10.5 | 9.4 | 10.1 |
| HCM Lane LOS | A | B | A | B |
| HCM 95th-tile Q | 0.8 | 1.4 | 0.8 | 1.1 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9.1 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 18 | 0 | 56 | 71 | 84 | 25 | 64 | 132 | 0 | 0 | 54 | 24 |
| Future Vol, veh/h | 18 | 0 | 56 | 71 | 84 | 25 | 64 | 132 | 0 | 0 | 54 | 24 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 20 | 0 | 61 | 77 | 91 | 27 | 70 | 143 | 0 | 0 | 59 | 26 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 8 | 9.4 | 9.6 | 8.2 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 33% | 24% | 39% | 0% |
| Vol Thru, % | 67% | 0% | 47% | 69% |
| Vol Right, % | 0% | 76% | 14% | 31% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 196 | 74 | 180 | 78 |
| LT Vol | 64 | 18 | 71 | 0 |
| Through Vol | 132 | 0 | 84 | 54 |
| RT Vol | 0 | 56 | 25 | 24 |
| Lane Flow Rate | 213 | 80 | 196 | 85 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.279 | 0.099 | 0.255 | 0.109 |
| Departure Headway (Hd) | 4.712 | 4.445 | 4.697 | 4.624 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 761 | 803 | 763 | 772 |
| Service Time | 2.752 | 2.493 | 2.737 | 2.672 |
| HCM Lane V/C Ratio | 0.28 | 0.1 | 0.257 | 0.11 |
| HCM Control Delay | 9.6 | 8 | 9.4 | 8.2 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 1.1 | 0.3 | 1 | 0.4 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.5 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 9 | 0 | 4 | 114 | 143 | 0 |
| Future Vol, veh/h | 9 | 0 | 4 | 114 | 143 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 87 | 87 | 87 | 87 | 87 | 87 |
| Heavy Vehicles, % | 0 | 0 | 0 | 1 | 0 | 0 |
| Mvmt Flow | 10 | 0 | 5 | 131 | 164 | 0 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 305 | 164 | 164 | 0 | - | 0 |
| Stage 1 | 164 | - | - | - | - | - |
| Stage 2 | 141 | - | - | - | - | - |
| Critical Hdwy | 6.4 | 6.2 | 4.1 | - | - | - |
| Critical Hdwy Stg 1 | 5.4 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - |
| Follow-up Hdwy | 3.5 | 3.3 | 2.2 | - | - | - |
| Pot Cap-1 Maneuver | 691 | 886 | 1427 | - | - | - |
| Stage 1 | 870 | - | - | - | - | - |
| Stage 2 | 891 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 688 | 886 | 1427 | - | - | - |
| Mov Cap-2 Maneuver | 688 | - | - | - | - | - |
| Stage 1 | 867 | - | - | - | - | - |
| Stage 2 | 891 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 10.3 | 0.3 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1427 | - | 688 | - | - |
| HCM Lane V/C Ratio | 0.003 | - | 0.015 | - | - |
| HCM Control Delay (s) | 7.5 | 0 | 10.3 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.7 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Traffic Vol, veh/h | 44 | 151 | 29 | 8 | 102 | 40 | 43 | 85 | 8 | 45 | 123 | 25 |
| Future Vol, veh/h | 44 | 151 | 29 | 8 | 102 | 40 | 43 | 85 | 8 | 45 | 123 | 25 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 5 | 2 | 0 | 0 | 2 | 3 | 3 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 50 | 172 | 33 | 9 | 116 | 45 | 49 | 97 | 9 | 51 | 140 | 28 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 11.3 | 9.9 | 10.2 | 10.8 |
| HCM LOS | B | A | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 32% | 20% | 5% | 23% |
| Vol Thru, % | 62% | 67% | 68% | 64% |
| Vol Right, % | 6% | 13% | 27% | 13% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 136 | 224 | 150 | 193 |
| LT Vol | 43 | 44 | 8 | 45 |
| Through Vol | 85 | 151 | 102 | 123 |
| RT Vol | 8 | 29 | 40 | 25 |
| Lane Flow Rate | 155 | 255 | 170 | 219 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.235 | 0.37 | 0.245 | 0.32 |
| Departure Headway (Hd) | 5.467 | 5.232 | 5.173 | 5.256 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 657 | 687 | 694 | 684 |
| Service Time | 3.503 | 3.264 | 3.209 | 3.29 |
| HCM Lane V/C Ratio | 0.236 | 0.371 | 0.245 | 0.32 |
| HCM Control Delay | 10.2 | 11.3 | 9.9 | 10.8 |
| HCM Lane LOS | B | B | A | B |
| HCM 95th-tile Q | 0.9 | 1.7 | 1 | 1.4 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9.3 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Traffic Vol, veh/h | 19 | 0 | 68 | 74 | 87 | 26 | 73 | 137 | 0 | 0 | 60 | 26 |
| Future Vol, veh/h | 19 | 0 | 68 | 74 | 87 | 26 | 73 | 137 | 0 | 0 | 60 | 26 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 21 | 0 | 74 | 80 | 95 | 28 | 79 | 149 | 0 | 0 | 65 | 28 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 8.2 | 9.6 | 9.9 | 8.4 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 35% | 22% | 40% | 0% |
| Vol Thru, % | 65% | 0% | 47% | 70% |
| Vol Right, % | 0% | 78% | 14% | 30% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 210 | 87 | 187 | 86 |
| LT Vol | 73 | 19 | 74 | 0 |
| Through Vol | 137 | 0 | 87 | 60 |
| RT Vol | 0 | 68 | 26 | 26 |
| Lane Flow Rate | 228 | 95 | 203 | 93 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.303 | 0.118 | 0.27 | 0.122 |
| Departure Headway (Hd) | 4.785 | 4.506 | 4.779 | 4.709 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 749 | 791 | 748 | 756 |
| Service Time | 2.835 | 2.562 | 2.827 | 2.768 |
| HCM Lane V/C Ratio | 0.304 | 0.12 | 0.271 | 0.123 |
| HCM Control Delay | 9.9 | 8.2 | 9.6 | 8.4 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 1.3 | 0.4 | 1.1 | 0.4 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.4 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 9 | 0 | 4 | 127 | 160 | 0 |
| Future Vol, veh/h | 9 | 0 | 4 | 127 | 160 | 0 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 87 | 87 | 87 | 87 | 87 | 87 |
| Heavy Vehicles, % | 0 | 0 | 0 | 1 | 0 | 0 |
| Mvmt Flow | 10 | 0 | 5 | 146 | 184 | 0 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 340 | 184 | 184 | 0 | - | 0 |
| Stage 1 | 184 | - | - | - | - | - |
| Stage 2 | 156 | - | - | - | - | - |
| Critical Hdwy | 6.4 | 6.2 | 4.1 | - | - | - |
| Critical Hdwy Stg 1 | 5.4 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - |
| Follow-up Hdwy | 3.5 | 3.3 | 2.2 | - | - | - |
| Pot Cap-1 Maneuver | 660 | 864 | 1403 | - | - | - |
| Stage 1 | 852 | - | - | - | - | - |
| Stage 2 | 877 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 657 | 864 | 1403 | - | - | - |
| Mov Cap-2 Maneuver | 657 | - | - | - | - | - |
| Stage 1 | 849 | - | - | - | - | - |
| Stage 2 | 877 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 10.6 | 0.2 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1403 | - | 657 | - | - |
| HCM Lane V/C Ratio | 0.003 | - | 0.016 | - | - |
| HCM Control Delay (s) | 7.6 | 0 | 10.6 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0 | - | - |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.8 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 44 | 151 | 36 | 9 | 102 | 40 | 45 | 86 | 9 | 45 | 127 | 25 |
| Future Vol, veh/h | 44 | 151 | 36 | 9 | 102 | 40 | 45 | 86 | 9 | 45 | 127 | 25 |
| Peak Hour Factor | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Heavy Vehicles, % | 5 | 2 | 0 | 0 | 2 | 3 | 3 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 50 | 172 | 41 | 10 | 116 | 45 | 51 | 98 | 10 | 51 | 144 | 28 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 11.5 | 10 | 10.3 | 10.9 |
| HCM LOS | B | A | B | B |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 32% | 19% | 6% | 23% |
| Vol Thru, % | 61% | 65% | 68% | 64% |
| Vol Right, % | 6% | 16% | 26% | 13% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 140 | 231 | 151 | 197 |
| LT Vol | 45 | 44 | 9 | 45 |
| Through Vol | 86 | 151 | 102 | 127 |
| RT Vol | 9 | 36 | 40 | 25 |
| Lane Flow Rate | 159 | 262 | 172 | 224 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.243 | 0.383 | 0.249 | 0.33 |
| Departure Headway (Hd) | 5.509 | 5.254 | 5.227 | 5.301 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 651 | 685 | 686 | 678 |
| Service Time | 3.547 | 3.286 | 3.263 | 3.334 |
| HCM Lane V/C Ratio | 0.244 | 0.382 | 0.251 | 0.33 |
| HCM Control Delay | 10.3 | 11.5 | 10 | 10.9 |
| HCM Lane LOS | B | B | A | B |
| HCM 95th-tile Q | 0.9 | 1.8 | 1 | 1.4 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9.4 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 19 | 0 | 69 | 74 | 87 | 26 | 75 | 137 | 0 | 0 | 60 | 26 |
| Future Vol, veh/h | 19 | 0 | 69 | 74 | 87 | 26 | 75 | 137 | 0 | 0 | 60 | 26 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 21 | 0 | 75 | 80 | 95 | 28 | 82 | 149 | 0 | 0 | 65 | 28 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 8.2 | 9.6 | 10 | 8.4 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 35% | 22% | 40% | 0% |
| Vol Thru, % | 65% | 0% | 47% | 70% |
| Vol Right, % | 0% | 78% | 14% | 30% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 212 | 88 | 187 | 86 |
| LT Vol | 75 | 19 | 74 | 0 |
| Through Vol | 137 | 0 | 87 | 60 |
| RT Vol | 0 | 69 | 26 | 26 |
| Lane Flow Rate | 230 | 96 | 203 | 93 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.307 | 0.12 | 0.27 | 0.122 |
| Departure Headway (Hd) | 4.79 | 4.51 | 4.787 | 4.716 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 747 | 789 | 748 | 755 |
| Service Time | 2.839 | 2.568 | 2.837 | 2.776 |
| HCM Lane V/C Ratio | 0.308 | 0.122 | 0.271 | 0.123 |
| HCM Control Delay | 10 | 8.2 | 9.6 | 8.4 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 1.3 | 0.4 | 1.1 | 0.4 |

| Intersection | |
|---|---|
| Int Delay, s/veh | 0.2 |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Vol, veh/h | 4 | 1 | 2 | 127 | 160 | 12 |
| Future Vol, veh/h | 4 | 1 | 2 | 127 | 160 | 12 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | - | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 87 | 87 | 87 | 87 | 87 | 87 |
| Heavy Vehicles, % | 0 | 0 | 0 | 1 | 0 | 0 |
| Mvmt Flow | 5 | 1 | 2 | 146 | 184 | 14 |

| Major/Minor | Minor2 | | Major1 | | Major2 | |
|---|---|---|---|---|---|---|
| Conflicting Flow All | 341 | 191 | 198 | 0 | - | 0 |
| Stage 1 | 191 | - | - | - | - | - |
| Stage 2 | 150 | - | - | - | - | - |
| Critical Hdwy | 6.4 | 6.2 | 4.1 | - | - | - |
| Critical Hdwy Stg 1 | 5.4 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.4 | - | - | - | - | - |
| Follow-up Hdwy | 3.5 | 3.3 | 2.2 | - | - | - |
| Pot Cap-1 Maneuver | 659 | 856 | 1387 | - | - | - |
| Stage 1 | 846 | - | - | - | - | - |
| Stage 2 | 883 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 658 | 856 | 1387 | - | - | - |
| Mov Cap-2 Maneuver | 658 | - | - | - | - | - |
| Stage 1 | 844 | - | - | - | - | - |
| Stage 2 | 883 | - | - | - | - | - |

| Approach | EB | NB | SB |
|---|---|---|---|
| HCM Control Delay, s | 10.3 | 0.1 | 0 |
| HCM LOS | B | | |

| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR |
|---|---|---|---|---|---|
| Capacity (veh/h) | 1387 | - | 690 | - | - |
| HCM Lane V/C Ratio | 0.002 | - | 0.008 | - | - |
| HCM Control Delay (s) | 7.6 | 0 | 10.3 | - | - |
| HCM Lane LOS | A | A | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0 | - | - |