

Transportation Impact Assessment

Proposed Multifamily Residential Development
55 West Union Street (Route 135)
Ashland, Massachusetts

Prepared for:

55 West Union LLC
Ashland, Massachusetts

June 2025

Prepared by:

 **Vanasse &
Associates inc**
Transportation Engineers & Planners

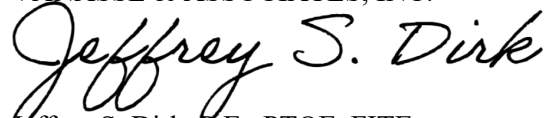
35 New England Business Center Drive
Suite 140
Andover, MA 01810

Dear Reviewer:

This letter shall certify that this *Transportation Impact Assessment* has been prepared under my direct supervision and responsible charge. I am a Registered Professional Engineer (P.E.) in the Commonwealth of Massachusetts (Massachusetts P.E. No. 38871, Civil) and hold Certification as a Professional Traffic Operations Engineer (PTOE) from the Transportation Professional Certification Board, Inc. (TPCB), an independent affiliate of the Institute of Transportation Engineers (ITE) (PTOE Certificate No. 993). I am also a Fellow of the Institute of Transportation Engineers (FITE).

Sincerely,

VANASSE & ASSOCIATES, INC.



Jeffrey S. Dirk, P.E., PTOE, FITE
Managing Partner

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EXECUTIVE SUMMARY

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a multifamily residential development to be located at 55 West Union Street (Route 135) in Ashland, Massachusetts (hereafter referred to as the “Project”). This assessment was prepared in consultation with the Massachusetts Department of Transportation (MassDOT) and the Town of Ashland, and was performed in accordance with MassDOT’s *Transportation Impact Assessment (TIA) Guidelines* and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports.

Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the Institute of Transportation Engineers (ITE)¹ and with adjustment to account for the use of alternative modes of transportation to SOVs, the Project is expected to generate approximately 478 automobile trips on an average weekday (two-way, 24 hour volume), with 42 transit trips and 10 pedestrian/bicycle trips. During the weekday morning peak-hour, the Project is expected to generate 35 automobile trips, three (3) transit trips and one (1) pedestrian/bicycle trip. During the weekday evening peak-hour, the Project is expected to generate 41 automobile trips, three (3) transit trips and two (2) pedestrian/bicycle trips;
2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build condition), with majority of movements at the study area intersections expected to continue to operate at a level-of-service (LOS) of D or better with the addition of Project-related traffic, where an LOS of “D” or better is defined as “acceptable” traffic operations. Project-related impacts were generally defined as an increase in overall average motorist delay of up to 3.5 seconds and in vehicle queuing of up to one (1) vehicle;
3. All movements exiting the Project-site driveways to Memorial Drive are predicted to operate at LOS B or better during the peak hours with negligible vehicle queuing. All movements along Memorial Drive approaching the Project site driveways are predicted to operate at LOS A, also with negligible vehicle queuing. Actual operating conditions at the

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

intersection of the east Project site driveway with Memorial Drive will be directly related to vehicle queuing on the Memorial Drive approach to Route 135;

4. No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study area intersections; and
5. Lines of sight to and from the Project site driveways exceed the recommended minimum distances to function in a safe manner based on the appropriate approach speed.

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

RECOMMENDATIONS

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

Project Access

Access to the Project site will be provided by way of two (2) full-access driveways that will intersect the south side of Memorial Drive approximately 300 feet and 650 feet west of Route 135, respectively. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation:

- The Project site driveways should be a minimum of 24 feet in width and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle.
- Where perpendicular parking is proposed, the drive aisle behind the parking should be a minimum of 23-feet wide.
- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided.
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices (MUTCD)*.²
- Marked crosswalks with Americans with Disabilities Act (ADA)-compliant wheelchair ramps should be provided for crossing the Project site driveways, or the driveways should be designed so that the sidewalk is flush across the driveways (i.e., “pan-type” driveway).
- Sidewalks should be provided to link the residential building to the multi-use path along Memorial Drive.

²*Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

- Signs and landscaping to be installed as a part of the Project within the intersection sight triangle areas of the Project site driveways should be designed and maintained so as not to restrict lines of sight.
- Snow accumulations (windrows) within the sight triangle areas of the Project site driveway will be promptly removed where such accumulations would impede sight lines.

Off-Site

Route 135 Corridor

Independent of the Project, left-turn/through movements from the Memorial Drive approach to the Route 135/Memorial Drive/Voyagers Lane intersection are predicted to operate at or over capacity during both peak hours due to: i) the volume of conflicting traffic on Route 135 during the peak hours; ii) traffic volumes associated with the Ashland Massachusetts Bay Transportation Authority (MBTA) Commuter Rail Station which is accessed from Memorial Drive; and iii) the continued build-out of properties along Memorial Drive. The Project was shown to result in a relatively limited impact at the study area intersections along the Route 135 corridor that was quantified as an increase in average motorist delay of up to 3.5 seconds and an increase in vehicle queuing of up to one (1) vehicle. That being said, one or more movements at the signalized study area intersections along Route 135 were identified to operate at or over capacity (i.e., LOS “E” or “F”).

In an effort to off-set the predicted impact of the Project and improve overall intersection operations, the Project proponent will design and implement an optimal traffic signal timing and phasing plan for the following intersections:

- Route 135 at Memorial Drive and Voyagers Lane; and
- Route 135 at Summer Street

The traffic signal timing improvements will be designed and implemented according to the following schedule: i) prior to achieving 50 percent occupancy of the number of residential units that are associated with the Project (58 units); and ii) after achieving 80 percent occupancy of the Project (93 units). With implementation of an optimal traffic signal timing and phasing plan, overall operations for the subject intersections will be improved over 2032 Build conditions such that no movement will operate with a volume-to-capacity ratio above 1.00 with a general reduction on overall average motorist delay.

Transportation Demand Management

Regularly scheduled public transportation services are provided within the Town of Ashland by the MetroWest Regional Transit Authority (MWRTA) and the MBTA. To the northwest of the Project site at the end of Memorial Drive, the MBTA provides Commuter Rail service to South Station in Boston on the Framingham/Worcester Line from Ashland Station. The MWRTA provides fixed-route bus service within the study area along Route 135 and Memorial Drive between the Blandin Hub in Framingham and the Price Chopper Supermarket in Hopkinton by way of the Route 5 bus route, which includes a stop at the Ashland Commuter Rail station and at the Ashland Middle School. The closest regular stop to the Project site for the Route 5 bus is located at the Ashland Middle School, approximately 0.3 miles (an approximate 7-minute walk) to the south of the Project site; however, MWRTA buses also operate in a “flag-stop” mode, where a rider can request a stop anywhere along the service route by signaling to the driver. As such, a resident of the Project can request a stop along Memorial Drive at the Project site.

In addition, the Town of Ashland provides Senior Center Van Rides to eligible Ashland residents who require transportation to/from Senior Center programs or medical appointments. Mass Health Transportation (MART) is also available to recipients of Medicaid in the area.

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

- A transportation coordinator will be designated for the Project, who may have other duties and responsibilities, to coordinate the elements of the TDM program;
- The transportation coordinator will facilitate a rideshare matching program for residents to encourage carpooling;
- A “welcome packet” will be provided to new residents detailing available public transportation services, bicycle and walking alternatives, and other commuting options;
- Information regarding public transportation services, maps, schedules, and fare information will be posted in a central location and/or otherwise made available to residents;
- New residents of the Project that sign a 12-month lease will be offered a transit pass subsidy for the first month of tenancy limited to \$50 per unit.
- A pick-up/drop-off area has been provided at the front of the building for use by carshare and delivery service providers, as well as Amazon, UPS and FedEx;
- A minimum of 20% of the parking spaces will include accommodations for the installation of electric vehicle (EV) charging stations for use by residents and guests;
- Secure bicycle parking will be provided within the Project site to include interior, weather protected bicycle parking and an exterior bicycle rack; and
- Parking will be unbundled from the lease for each residential unit in order to encourage lower automobile ownership.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed construction of a multifamily residential development to be located at 55 West Union Street (Route 135) in Ashland, Massachusetts (hereafter referred to as the “Project”). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing traffic conditions and future traffic conditions, both with and without the Project, along Memorial Drive and Route 135, and at major intersections located along these roadways through which Project-related traffic will travel.

PROJECT DESCRIPTION

As proposed, the Project will entail the construction of a 116-unit multifamily residential development to be located at 55 West Union Street (Route 135) in Ashland, Massachusetts. The Project site encompasses approximately 4.9± acres of land that is bounded by Memorial Drive to the north; the Ashland Middle School, a residential and commercial property, and areas of open and wooded space to the south and west; and Route 135 and a residential property to the east. The Project site is currently undeveloped and contains areas of open and wooded space. Figure 1 depicts the Project site in relation to the existing roadway network.

Access to the Project site will be provided by way of two (2) full-access driveways that will intersect the south side of Memorial Drive approximately 300 feet and 650 feet west of Route 135, respectively. Off-street parking will be provided within the Project site for 184 vehicles, or a parking ratio of 1.58 parking spaces per unit, to accommodate residents and guests. This parking ratio is within the range of observed parking demands for a multifamily residential development located in a similar setting documented by the Institute of Transportation Engineers (ITE).³

³*Parking Generation*, 6th Edition; Institute of Transportation Engineers; Washington D.C.; October 2023. The observed peak-parking demand ratio for a multifamily (mid-rise) residential development was observed to range from 0.39 to 1.75 spaces per residential unit, with an average observed peak-parking demand of 1.23 parking spaces per unit and an 85th percentile peak-parking demand of 1.45 parking spaces per unit.



ASHLAND

SITE

135



Figure 1

Site Location Map



STUDY METHODOLOGY

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

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

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A seven-year time horizon was selected for analyses consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any, identified in stage two of the study.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in April and May 2025. The field investigation consisted of an inventory of existing roadway geometrics; pedestrian and bicycle facilities; public transportation services; traffic volumes; and operating characteristics; as well as posted speed limits and land use information within the study area. The study area that was assessed for the Project consisted of Route 135 and Memorial Drive, and the following specific intersections through which Project-related traffic will travel: Route 135 at Memorial Drive and Voyagers Lane; and Route 135 at Summer Street

The following describes the study area roadways and intersections.

ROADWAYS

West Union Street/Union Street (Route 135)

- Two lane urban principal arterial roadway under Town jurisdiction defined as Union Street east of Summer Street and West Union Street to the west;
- Traverses the study area in a general northeast-southwest direction;
- Provides two 11- to 12-foot-wide travel lanes that are separated by a double-yellow centerline with 1-foot-wide marked shoulders in the vicinity of the Project site and additional travel lanes provided at major intersections;
- The posted speed limit is 35 miles per hour (mph) in the vicinity of the Project site;
- A sidewalk is provided along both sides of the roadway northeast of Honey Dew Donuts and along the northwest side of the roadway to the southwest;
- Illumination is provided by way of street lights mounted on wood poles;
- Land use within the study area consists of the Project site; residential and commercial properties; the Ashland Middle School; and areas of open and wooded space.

Memorial Drive

- Two lane local roadway under Town jurisdiction;
- Traverses a general northwest-southeast direction between Route 135 and the Massachusetts Bay Transportation Authority (MBTA) Ashland Commuter Rail station;

- Provides two 10- to 16-foot-wide travel lanes that are separated by a double-yellow centerline with 1-foot-wide marked shoulders and additional travel lanes at the intersection with Route 135;
- The posted speed limit along the roadway is 30 mph;
- A 10-foot-wide multi-use path is provided along the southwest side of the roadway;
- Illumination is provided by way of street lights mounted on steel poles;
- Land use along the roadway consists of the Project site; residential properties; a Dunkin’ restaurant; a solar field; the Ashland MBTA Commuter Rail station; and areas of open and wooded space.

INTERSECTIONS

Table 1 and Figure 2 summarize existing lane use, traffic control, and pedestrian and bicycle accommodations at the study area intersections as observed in April 2025.






**Table 1
STUDY AREA INTERSECTION DESCRIPTION**

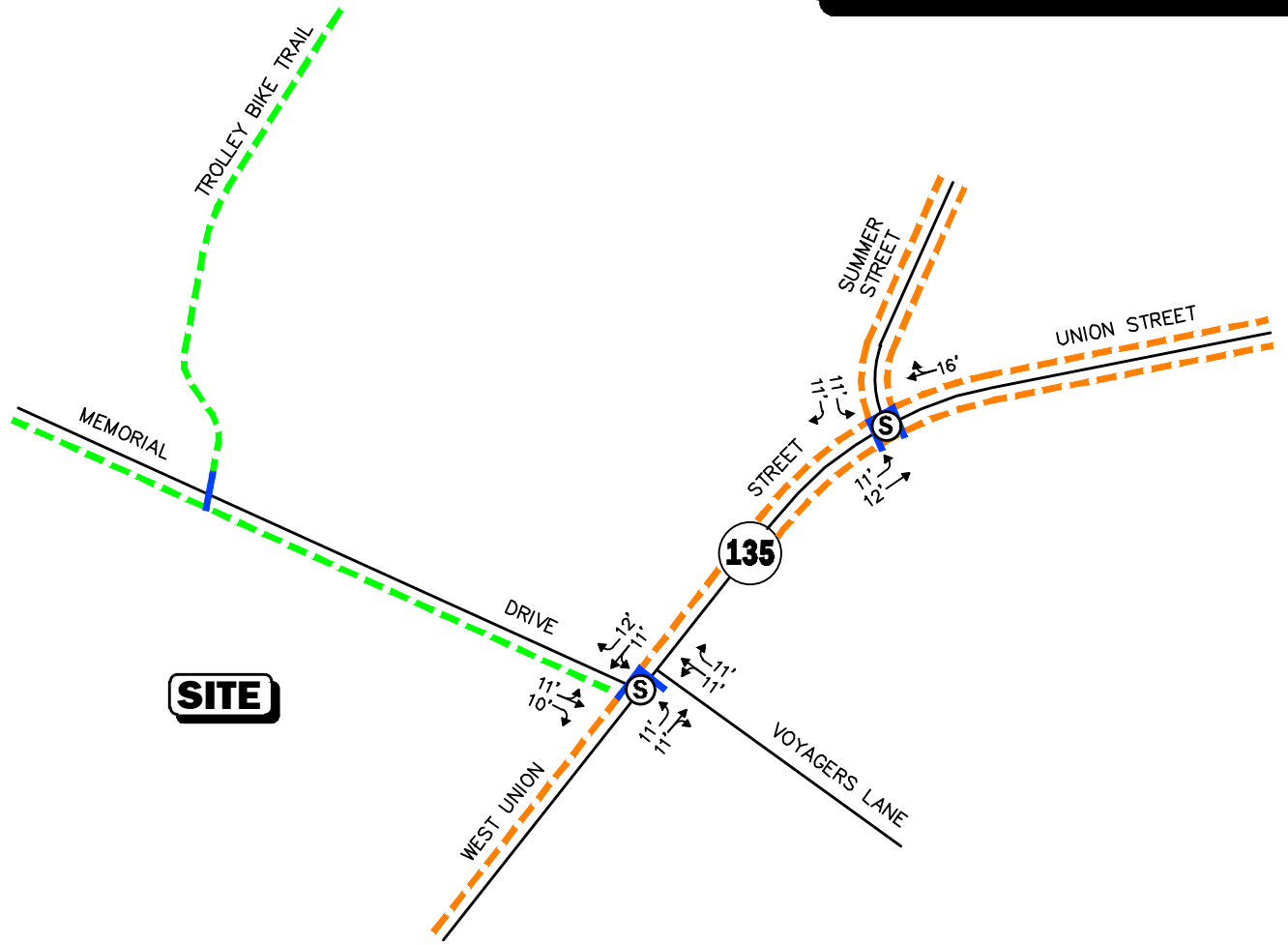
Intersection	Traffic Control Type^a	No. of Travel Lanes Provided	Shoulder Provided? (Yes/No/Width)	Pedestrian Accommodations? (Yes/No/Description)	Bicycle Accommodations? (Yes/No/Description)
Rte. 135/ Memorial Dr./ Voyagers Ln.	TS	1 left-turn/through lane and 1 right-turn lane on Memorial Dr., Voyagers Ln. and Rte. 135 southwestbound approaches; 1 left-turn lane 1 through/right-turn lane on Rte. 135 northeastbound approach; Voyagers Ln. and Memorial Dr. are off-set by approximately 50 ft	Yes; 1 foot along Rte. 135 and Memorial Dr.	Yes; a sidewalk is provided along the northwest side of Rte. 135 and a multi-use path is provided along the southwest side of Memorial Dr.; marked crosswalks provided for crossing Memorial Dr. approach and Rte. 135 between Memorial Dr. and Voyagers Ln.; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; a multi-use path is provided along the southwest side of Memorial Dr.
Rte. 135/ Summer St.	TS	1 left-turn lane and 1 through travel lane on Rte. 135 northeastbound approach; 1 general purpose travel lane on Rte. 135 southwestbound approach; separate left and right-turn lanes on Summer St. approach	Yes; 1 foot on all legs	Yes; sidewalks are provided along both sides of the intersecting roadways; marked crosswalks provided for crossing all legs of the intersection; pedestrian traffic signal equipment and phasing (exclusive) provided	Yes; shared traveled way along Rte. 135 ^b and bicycle lanes along Summer St. north of Cherry St.

^aTS = traffic signal control; S = STOP-sign control.

^bCombined shoulder and travel lane width equal to or exceed 14 feet.

Legend:

-  Signalized Intersection
-  Sidewalk
-  Multi-Use Path
-  Crosswalk
-  Lane Use and Travel Lane Width



 Not To Scale



Figure 2
Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities

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EXISTING TRAFFIC VOLUMES

In order to determine existing traffic-volume demands and flow patterns within the study area, automatic traffic recorder (ATR) counts, turning movement counts (TMCs), and vehicle classification counts were completed in May 2025. The ATR counts were conducted on May 7th and 8th, 2025 (Wednesday and Thursday, respectively) on Memorial Drive in the vicinity of the Project site in order to record weekday traffic conditions over an extended period, with peak-period TMCs performed at the study intersections during the weekday morning (7:00 to 9:00 AM) and evening (2:00 to 6:00 PM) peak-periods on Tuesday, May 7, 2025. These time periods were selected for analysis purposes as they are representative of the peak traffic-volume hours for both the Project, the adjacent roadway network and student drop-off/pick-up periods for the Ashland Middle School.

Traffic-Volume Adjustments

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, MassDOT weekday seasonal factors for Urban Group 3 (principal arterial roadways, the functional classification of Route 135) and a review of traffic-volume from nearby MassDOT Continuous Counts stations (Station No.’s 307 and AET09) were reviewed.⁴ Based on a review of this data, it was determined that traffic volumes for the month of May are between 3.7 and 7.5 percent *above* average-month conditions. In order to provide a conservative (high) assessment of traffic volumes within the study area, no adjustment was made to the May traffic volumes.

Based on updated guidance from MassDOT,⁵ adjustments to account for the impact on traffic volume and trip patterns resulting from the COVID-19 pandemic for traffic counts taken on or after March 1, 2022 are only recommended in areas where the predominant land use is office properties. As the predominant land use within the study area consists of residential, commercial and institutional uses, a pandemic-related adjustment was not required.

The 2025 Existing traffic volumes are summarized in Table 2, with the weekday morning and evening peak-hour traffic volumes graphically depicted on Figure 3. Note that the peak-hour traffic volumes that are presented in Table 2 were obtained from the aforementioned figure.

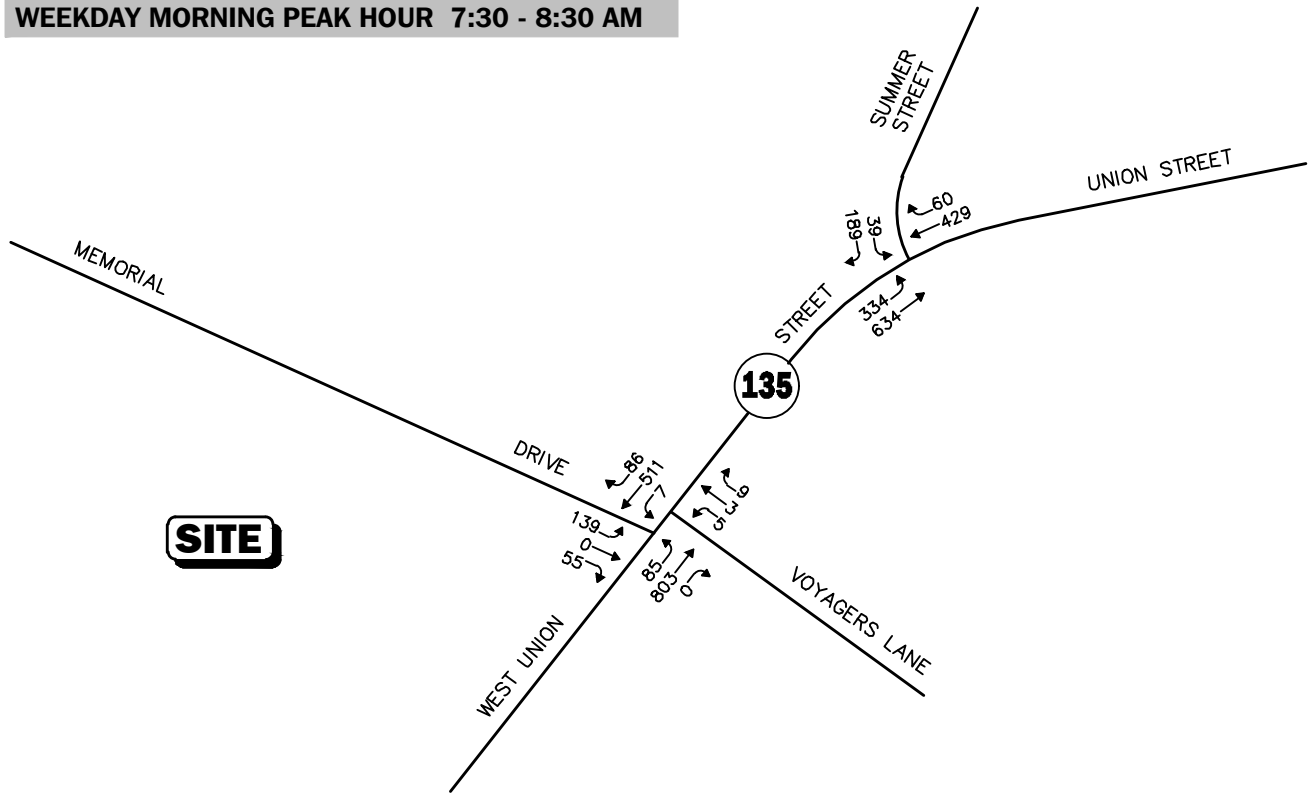
Table 2
2025 EXISTING TRAFFIC VOLUMES

Location/Peak Hour	AWT ^a	VPH ^b	K Factor ^c	Directional Distribution ^d
<i>Memorial Drive, northwest of Route 135:</i>	2,595	--	--	--
Weekday Morning (7:30 – 8:30 AM)	--	368	14.2	52.7% SEB
Weekday Evening (5:00 – 6:00 PM)	--	295	11.4	54.2% SEB

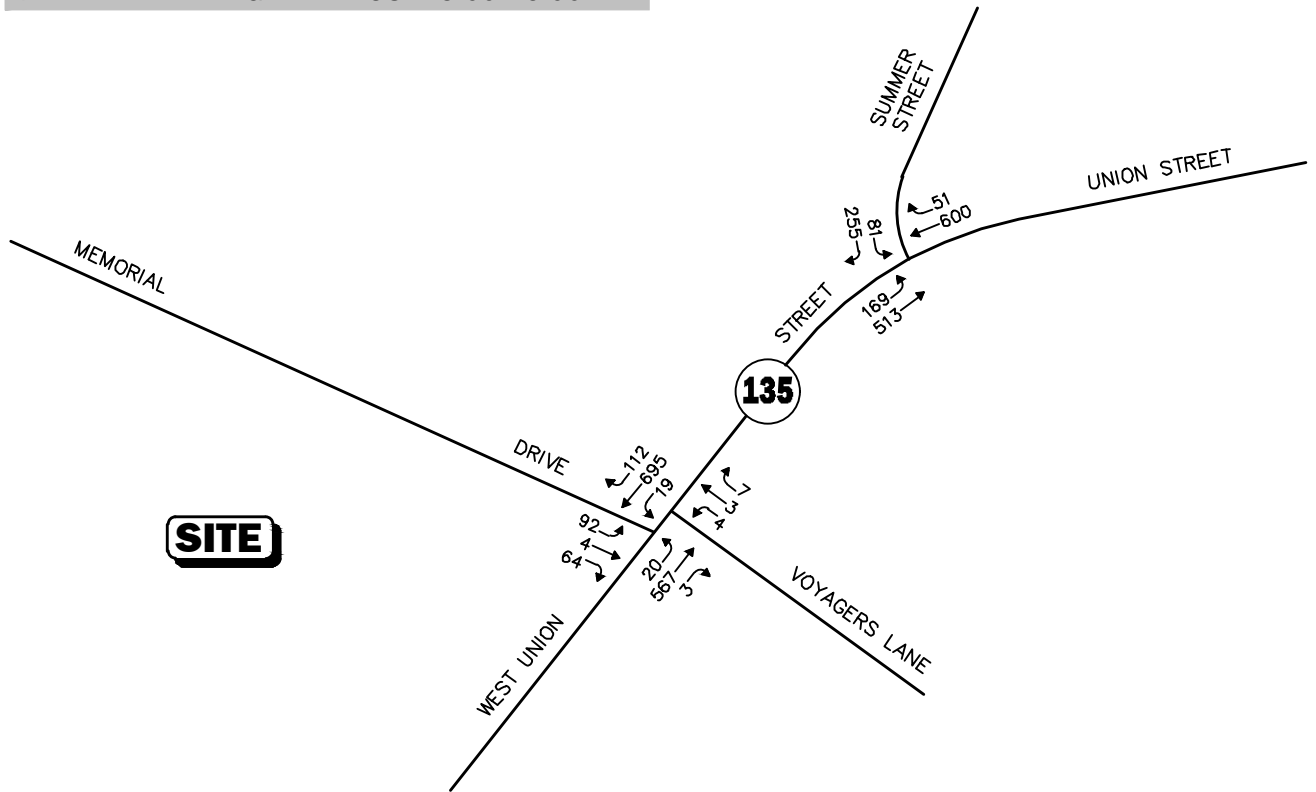
^aAverage weekday traffic in vehicles per day.
^bVehicles per hour.
^cPercent of daily traffic occurring during the peak hour.
^dPercent traveling in peak direction.
 SEB = southeastbound.

⁴MassDOT statewide Traffic Data Collection; 2024 Weekday Seasonal Factors, Group U3.
⁵25% *Design Submission Guidelines*; MassDOT Highway Division, Traffic and Safety Engineering; Revised May 31, 2022.

WEEKDAY MORNING PEAK HOUR 7:30 - 8:30 AM



WEEKDAY EVENING PEAK HOUR 5:00 - 6:00 PM



Not To Scale Figure 3



2025 Existing Peak-Hour Traffic Volumes

As can be seen in Table 2, Memorial Drive in the vicinity of the Project site was found to accommodate approximately 2,595 vehicles on an average weekday (two-way, 24-hour volume), with approximately 368 vehicles per hour (vph) during the weekday morning and 295 vph during the weekday evening peak-hour.

PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in April 2025. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study area intersections, as well as the location of existing and planned future bicycle facilities.

Pedestrian Facilities

As shown on Figure 2, sidewalks are provided along one or both sides of Route 135 within the study area; a multi-use path is provided along the southwest side of Memorial Drive; and marked crosswalks provided for crossing one or more legs of the study area intersections, where pedestrian signal equipment and phasing are provided as a part of the traffic signal systems.

Bicycle Facilities

Within the study area, a multi-use path is provided along the southwest side of Memorial Drive that connects Route 135 to the Ashland MBTA Commuter Rail station and to the Trolley Bike Trail via a crosswalk across Memorial Drive approximately 1,000 feet northwest of Route 135. The Trolley Bike Trail traverses a general north-south alignment for 0.6 miles between Megunko Road and Memorial Drive, and is the planned beginning of the Upper Charles Trail, a potential future multi-use path that is anticipated to connect specific locations within Ashland (i.e., the Ashland MBTA Commuter Rail station, Ashland High School, Ashland State Park, and downtown Ashland) to existing and expanded trail sections in Hopkinton and Sherborn.

PUBLIC TRANSPORTATION

Regularly scheduled public transportation services are provided within the Town of Ashland by the MetroWest Regional Transit Authority (MWRTA) and the MBTA. To the northwest of the Project site at the end of Memorial Drive, the MBTA provides Commuter Rail service to South Station in Boston on the Framingham/Worcester Line from Ashland Station. The MWRTA provides fixed-route bus service within the study area along Route 135 and Memorial Drive between the Blandin Hub in Framingham and the Price Chopper Supermarket in Hopkinton by way of the Route 5 bus route, which includes a stop at the Ashland Commuter Rail station and at the Ashland Middle School. The closest regular stop to the Project site for the Route 5 bus is located at the Ashland Middle School, approximately 0.3 miles (an approximate 7-minute walk) to the south of the Project site; however, MWRTA buses also operate in a “flag-stop” mode, where a rider can request a stop anywhere along the service route by signaling to the driver. As such, a resident of the Project can request a stop along Memorial Drive at the Project site. In addition, the Town of Ashland provides Senior Center Van Rides to eligible Ashland residents who require transportation to/from Senior Center programs or medical appointments. Mass Health Transportation (MART) is also available to recipients of Medicaid in the area.

The public transportation schedules and fare information are attached in the Appendix.

SPOT SPEED MEASUREMENTS

Vehicle travel speed measurements were performed on Memorial Drive in the vicinity of the Project site in conjunction with the ATR counts. Table 3 summarizes the vehicle travel speed measurements.

Table 3
VEHICLE TRAVEL SPEED MEASUREMENTS

	Memorial Drive	
	Northwestbound	Southeastbound
Mean Travel Speed (mph)	33	34
85 th Percentile Speed (mph)	36	37
Posted Speed Limit (mph)	30	30

mph = miles per hour.

As can be seen in Table 3, the mean vehicle travel speed along Memorial Drive in the vicinity of the Project site was found to be 33 mph in the northwestbound direction and 34 mph southeastbound. The measured 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below, was found to be 36 mph in the northwestbound direction and 37 mph southbound, which is 6 to 7 mph *above* the posted speed limit in the vicinity of the Project site (30 mph).

MOTOR VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2017 through 2021, inclusive) in order to examine motor vehicle crash trends occurring within the study area. The data is summarized by intersection, type, severity, roadway and weather conditions, and day of occurrence, and is presented in Table 4.

As can be seen in Table 4, the study area intersections were found to have experienced an average of 1.60 or fewer reported motor vehicle crashes per year over the five-year review period and were found to have motor vehicle crash rates *below* the MassDOT statewide and District average crash rates for similar intersections for the MassDOT Highway Division District in which the intersections are located (District 3). The majority of the reported crashes occurred on a weekday; under clear weather conditions; during daylight; and involved rear-end type collisions that resulted in property damage only.

A review of the MassDOT statewide High Crash Location List indicated that there are no Highway Safety Improvement Program (HSIP) eligible high crash locations within the study area. In addition, no fatal motor vehicle crashes were reported to have occurred at the study area intersections over the five-year review period. To the east of the Route 135/Summer Street intersection, a motor vehicle crash that resulted in a fatality occurred on October 15th, 2020 at approximately 5:07 PM that involved an angle-type collision between a motorist exiting the CVS parking lot and a moped that was traveling along Route 135. The detailed MassDOT Crash Rate Worksheet, High Crash Location mapping and motor vehicle crash back-up are provided in the Appendix.

Table 4
MOTOR VEHICLE CRASH DATA SUMMARY^a

	Rte. 135/ Memorial Dr./ Voyagers Ln.	Rte. 135/ Summer St.	Memorial Dr./ Project Site Driveways
Traffic Control Type: ^b	S	S	U
<i>Year:</i>			
2017	1	1	0
2018	3	1	0
2019	1	2	0
2020	2	1	0
<u>2021</u>	<u>1</u>	<u>0</u>	<u>0</u>
Total	8	5	0
Average	1.60	1.00	0.00
Rate ^c	0.25	0.14	0.00
MassDOT Crash Rate: ^d	0.78/0.89	0.78/0.89	0.57/0.61
Significant? ^e	No	No	No
<i>Type:</i>			
Angle	1	1	0
Rear-End	5	2	0
Head-On	1	0	0
Sideswipe	0	1	0
Single-Vehicle	1	1	0
Pedestrian/Bicycle	0	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	8	5	0
<i>Day of Week:</i>			
Monday through Friday	6	2	0
Saturday	1	3	0
<u>Sunday</u>	<u>1</u>	<u>0</u>	<u>0</u>
Total	8	5	0
<i>Conditions:</i>			
Clear	6	3	0
Cloudy	0	0	0
Rain	2	1	0
Snow/Ice	0	1	0
<u>Not Reported</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	8	5	0
<i>Lighting:</i>			
Daylight	7	2	0
Dawn/Dusk	0	1	0
Dark (Road Lit)	1	1	0
<u>Dark (Road Unlit)</u>	<u>0</u>	<u>1</u>	<u>0</u>
Total	8	5	0
<i>Severity:</i>			
Property Damage Only	6	5	0
Personal Injury	2	0	0
Fatality	0	0	0
<u>Not Reported</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	8	5	0

^aSource: MassDOT Safety Management/Traffic Operations Unit records, 2017 through 2021.

^bTraffic Control Type: S = signalized; U = unsignalized.

^cCrash rate per million vehicles entering the intersection.

^dStatewide/District crash rates

^eThe intersection crash rate is significant if it is found to exceed the MassDOT crash rate for the MassDOT Highway Division District in which the Project is located (District 3).

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2032, which reflects a seven-year planning horizon consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. Independent of the Project, traffic volumes on the roadway network in the year 2032 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2032 No-Build traffic volumes reflect 2032 Build traffic-volume conditions with the Project.

FUTURE TRAFFIC GROWTH

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

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

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

Specific Development by Others

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

- ***Proposed Mixed-Use Development, 9-49 Homer Avenue, Ashland, Massachusetts.*** This project entails the construction of 29 apartment units and 8,550± square feet (sf) of commercial space to be located at 9-49 Homer Avenue to the northeast of the Project site. Traffic volumes associated with this project were obtained from the traffic memorandum prepared for the development⁶ and were included in the future-year condition traffic volumes.

⁶ *Memorandum*, Proposed Mixed-Use Development, Homer Avenue, Ashland, MA; MDM; December 2023.

- ***Proposed Mixed-Use Development, 10-60 Main Street, Ashland, Massachusetts.*** This project entails the redevelopment of the 10-60 Main Street properties to the north of the Project site to accommodate 250 multifamily residential units and 15,000± sf of restaurant/retail space. Traffic volumes associated with this project were obtained from the traffic study prepared for the development⁷ and were included in the future-year condition traffic volumes.
- ***Proposed Multifamily Residential Development, 61 Waverly Street, Ashland, Massachusetts.*** This project entails the construction of a 226-unit multifamily residential development to be located at 61 Waverly Street to the northeast of the Project site. Traffic volumes associated with this project were obtained from the traffic study prepared for the development⁸ and were included in the future-year condition traffic volumes.
- ***Proposed Mixed-Use Development, 100 Chestnut Avenue, Ashland, Massachusetts.*** This project entails the construction of a mixed-use development that is currently proposed to contain 174 multifamily residential units and approximately 10,500± sf of commercial and/or retail space. Traffic volumes associated with this project were obtained from the traffic study prepared for the development⁹ and were included in the future-year condition traffic volumes.
- ***Proposed Duplex Building, 167-169 Pleasant Street, Ashland, Massachusetts.*** This project entails the demolition of an existing single-family home and the construction of a duplex home to be located at 167-169 Pleasant Street to the north of the Project site. Traffic volumes associated with this development within the study area of this assessment are expected to be relatively minor and would be reflected in the general background traffic growth rate (discussion follows).
- ***Proposed Recreational Field, 240-260 Pleasant Street, Ashland, Massachusetts.*** This project entails the construction of a recreational youth soccer field, a tot-lot playground area and supporting parking located at 240-260 Pleasant Street to the north of the Project site. Traffic volumes associated with this development within the study area of this assessment are expected to be relatively minor and would be reflected in the general background traffic growth rate.
- ***Proposed Multifamily Housing Development, 501 Pond Street (Route 126), Ashland, Massachusetts.*** This project entails the construction of a 120-unit multifamily residential development to be located at 501 Pond Street (Route 126) to the southeast of the Project site. Based on a review of the traffic study prepared for the development,¹⁰ traffic volumes associated with this development within the study area of this assessment are expected to be relatively minor and would be reflected in the general background traffic growth rate.
- ***Proposed Age-Restricted Residential Development, Arbella at Ashland, Memorial Drive, Ashland, Massachusetts.*** This project entails the construction of a 180-unit, age-restricted, multifamily residential development to be located off of Memorial Drive and generally south of the Cirrus Apartments to the west of the Project site. Traffic volumes associated

⁷*Transportation Impact Assessment, Proposed Mixed-Use Development, 10-60 Main Street; VAI; August 2024.*

⁸*Traffic Impact Assessment, Residential Development – 61 Waverly Street; Langan; February 2025.*

⁹*Supplemental Analysis Memorandum, 100 Chestnut Street; MDM; March 24, 2022.*

¹⁰*Traffic Impact Assessment, Proposed Multi-Family Housing Development, 501 Pond Street; MDM; October 25, 2021.*

with this project were obtained from the traffic study prepared for the development¹¹ and were included in the future-year condition traffic volumes.

- ***Proposed Ashland Dog Park, Memorial Drive, Ashland, Massachusetts.*** This project entails the construction of dog park on 1.47± acres of land located off of Memorial Drive to the northwest of the Project site and west of the Trolley Bike Trail. Traffic volumes associated with this development were estimated using trip-generation statistics published by the Institute of Transportation Engineers (ITE),¹² and were assigned to the future-year conditions traffic volumes based on a review of existing travel patterns where no other information was available.
- ***Regional YMCA, Memorial Drive, Ashland, Massachusetts.*** This project entails the construction of a regional YMCA to be located off of Memorial Drive west of the Dunkin' restaurant to the immediate north of the Project site. At the time of publication of this assessment, information pertaining to the size and scope of the project has not been filed with the Town of Ashland. As such, traffic volumes associated with this development were not incorporated into the future-year condition traffic volumes. When this project is advanced, the accompanying transportation analysis will include trips that are associated with the Project.

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

General Background Traffic Growth

Traffic-volume data compiled by MassDOT from permanent count stations located in the Ashland area were reviewed in order to determine general traffic growth trends in the area. This data indicates that traffic volumes have fluctuated over the 10-year period between 2009 and 2019, with an average traffic growth rate of 0.14 percent. In order to provide conservative (high) traffic volumes from which to assess the impact of the Project; a slightly higher 1.0 percent per year compounded annual background traffic growth rate was used to account for future traffic growth and presently unforeseen development within the study area.

Roadway Improvement Projects

MassDOT and the Town of Ashland were contacted in order to determine if there were any planned future roadway improvement projects expected to be complete by 2032 within the study area. Based on these discussions, no roadway improvement projects aside from routine maintenance activities were identified to be planned within the study area at this time.

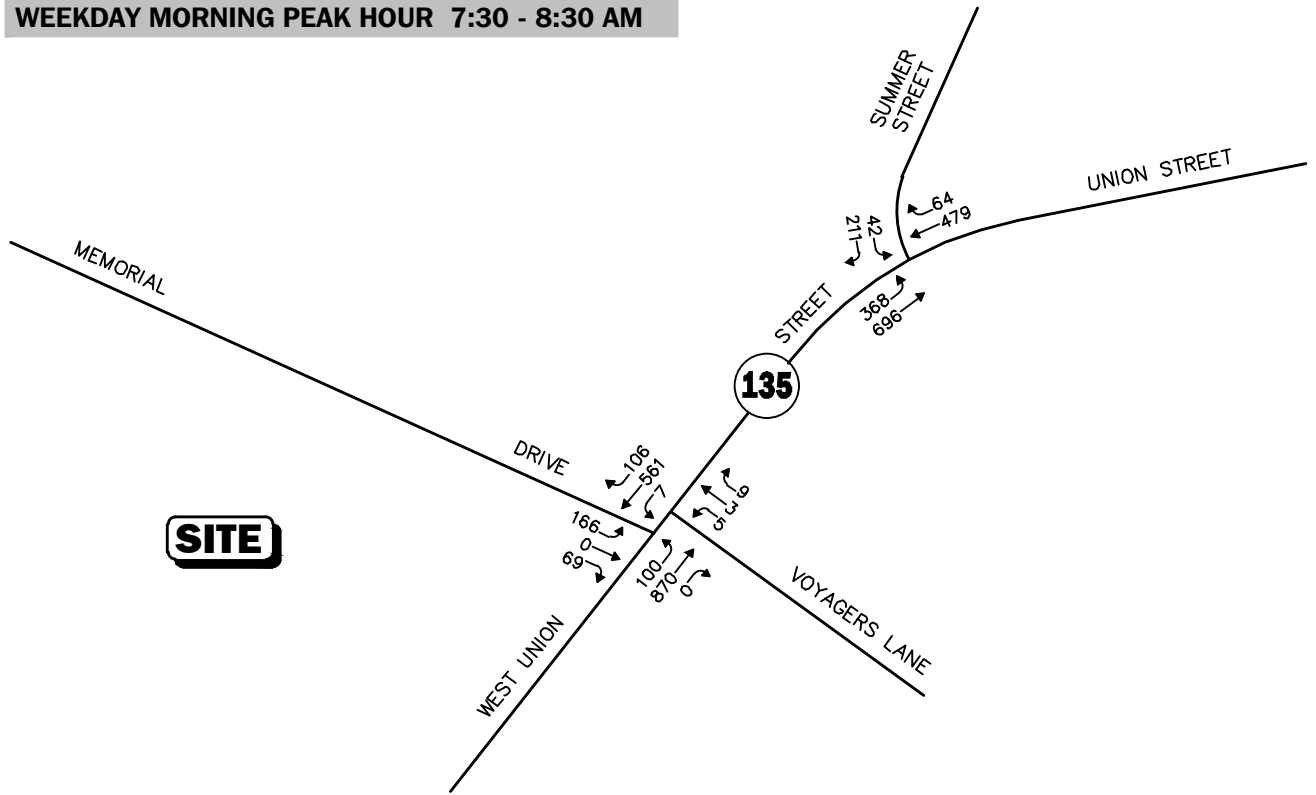
No-Build Traffic Volumes

The 2032 No-Build condition peak-hour traffic-volumes were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2025 Existing peak-hour traffic volumes and then adding the peak-hour traffic associated with the identified specific development projects by others. The resulting 2032 No-Build weekday morning and evening peak-hour traffic volumes are shown on Figure 4.

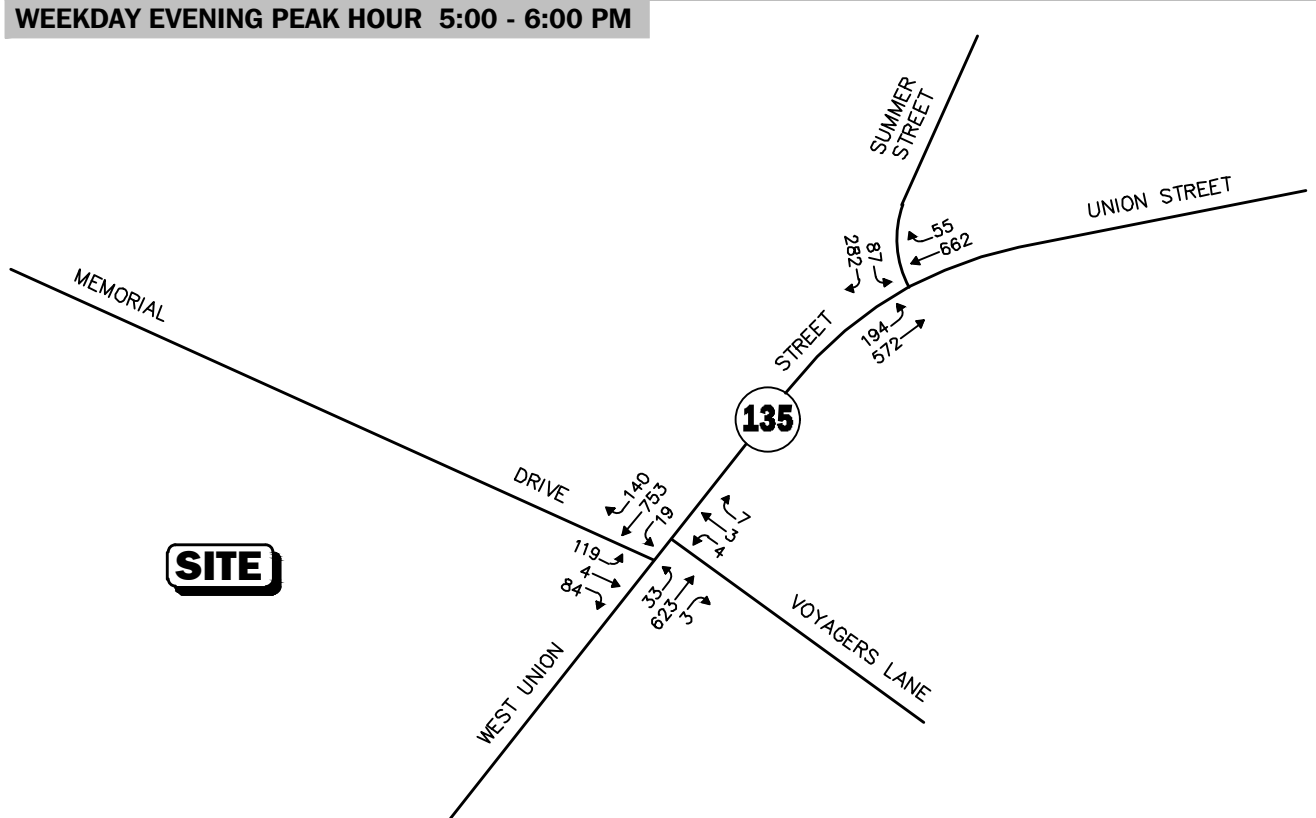
¹¹*Traffic Memorandum, Arbella at Ashland – Age-Restricted Residential Development, Memorial Drive; MDM; March 11, 2021.*

¹²Institute of Transportation Engineers, op. cit. 1.

WEEKDAY MORNING PEAK HOUR 7:30 - 8:30 AM



WEEKDAY EVENING PEAK HOUR 5:00 - 6:00 PM



Not To Scale Figure 4



2032 No-Build Peak-Hour Traffic Volumes

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PROJECT-GENERATED TRAFFIC

Design year (2032 Build) traffic volumes for the study area roadways were determined by estimating Project-generated traffic volumes and assigning those volumes on the study roadways. The following sections describe the methodology used to develop the anticipated traffic characteristics of the Project.

As proposed, the Project will entail the construction of a 116-unit multifamily residential development. In order to develop the traffic characteristics of the Project, trip-generation statistics published by the ITE¹³ for a similar land use as that proposed was reviewed. ITE Land Use Code (LUC) 221, *Multifamily Housing (Mid-Rise)*, was used to develop the base trip-generation characteristics of the Project.

Transit Use

Given the ability of public transportation services in the vicinity of the Project site (MWRTA bus service with connections to the MBTA Commuter Rail) and the interconnected network of multi-use paths and sidewalks, it is expected that a portion of the residents of the Project will use public transportation services, walk, or bicycle, thereby reducing the volume of single-occupant vehicle (SOV) trips that may be associated with the Project. In order to determine the proportion of residents of the Project that may use transit, walk, or bicycle as their primary mode of transportation, travel mode data obtained from the 2015 through 2019 American Community Service (ACS) for the Census Tract that contains that Project site (Census Tract 3851) was reviewed. Based on the ACS data, the following commuting modes were identified for workers aged 16 or older who reside within the Town.

- Single-Occupant Vehicle: 83.8%
- Car/Vanpool/Taxi: 2.7%
- Public Transportation: 8.2%
- Walk/Bike/Other: 1.3%
- Worked at Home: 4.0%

According to the ACS, approximately 16 percent of workers that reside in the Census Tract reported they used an alternative mode of transportation to SOV to travel to/from work, with approximately 2.7 percent participating in car or vanpool, 8.2 percent using public transportation (transit), 1.3 percent walking/bicycling or using other modes of transportation and 4.0 percent reporting that they work from home. In order to account for the use of alternative modes of transportation to SOVs by residents of the Project, the base ITE trip-generation calculations for the Project were first converted to person trips using a vehicle occupancy ratio (VOR) of 1.01 persons per vehicle, which was obtained from the ACS and is representative of the average VOR for Census Tract 3851, and were then disseminated to the modes of transportation that are accessible at the Project: public transportation (transit), pedestrian/bicycle and automobile.

In order to provide conservative (high) traffic volumes from which to assess the potential impact of the Project, it was assumed that 90 percent of the trips generated by the residential component of the Project would consist of automobile trips (vs. 84 percent from ACS), with 8.0 percent of trips assumed to be made using transit and 2.0 percent consisting of pedestrian/bicycle trips. Table 5 summarizes the anticipated traffic characteristics of the Project using the above methodology.

¹³Institute of Transportation Engineers, op. cit. 1.

Table 5
TRIP GENERATION SUMMARY

Time Period/Direction	Vehicle Trips	Person Trips			Project Total	
	(A) Proposed Multifamily Residential Development (116 Units) ^a	(B = A*1.01) Total Person Trips ^b	(C) Automobile Trips (90%)	(D) Transit Trips (8%)	(E) Pedestrian/ Bicycle Trips (2%)	(F = C÷1.01) Total Automobile Trips ^c
<i>Average Weekday Daily:</i>						
Entering	264	267	241	21	5	239
<u>Exiting</u>	<u>264</u>	<u>267</u>	<u>241</u>	<u>21</u>	<u>5</u>	<u>239</u>
Total	528	534	482	42	10	478
<i>Weekday Morning Peak-Hour:</i>						
Entering	9	9	8	1	0	8
<u>Exiting</u>	<u>30</u>	<u>30</u>	<u>27</u>	<u>2</u>	<u>1</u>	<u>27</u>
Total	39	39	35	3	1	35
<i>Weekday Evening Peak-Hour:</i>						
Entering	28	28	25	2	1	25
<u>Exiting</u>	<u>18</u>	<u>18</u>	<u>16</u>	<u>1</u>	<u>1</u>	<u>16</u>
Total	46	46	41	3	2	41

^aBased on ITE LUC 221, *Multifamily Housing (Mid-Rise)*.

^bITE vehicle trips x 1.01 persons per vehicle.

^cAutomobile person trips divided by 1.01.

Project-Generated Traffic-Volume Summary

As can be seen in Table 5, the Project is expected to generate 478 vehicle trips, 42 transit trips and 10 pedestrian/bicycle trips on an average weekday (two-way, 24-hour volumes). During the weekday morning peak-hour, the Project is expected to generate 35 vehicle trips (8 vehicles entering and 27 exiting), three (3) transit trips and one (1) pedestrian/bicycle trip. During the weekday evening peak-hour, the Project is expected to generate 41 vehicle trips (25 vehicles entering and 16 exiting), three (3) transit trips and two (2) pedestrian/bicycle trips.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of generated trips to and from the Project site was determined based on a review of Journey-to-Work data obtained from the U.S. Census for the Town of Ashland and then refined based on existing traffic patterns within the study area and the distribution prepared for nearby developments. The general trip distribution for the Project is graphically depicted on Figure 5. Traffic volumes expected to be generated by the Project were assigned onto the study area roadway network during the weekday morning and evening peak hours as shown on Figure 6.

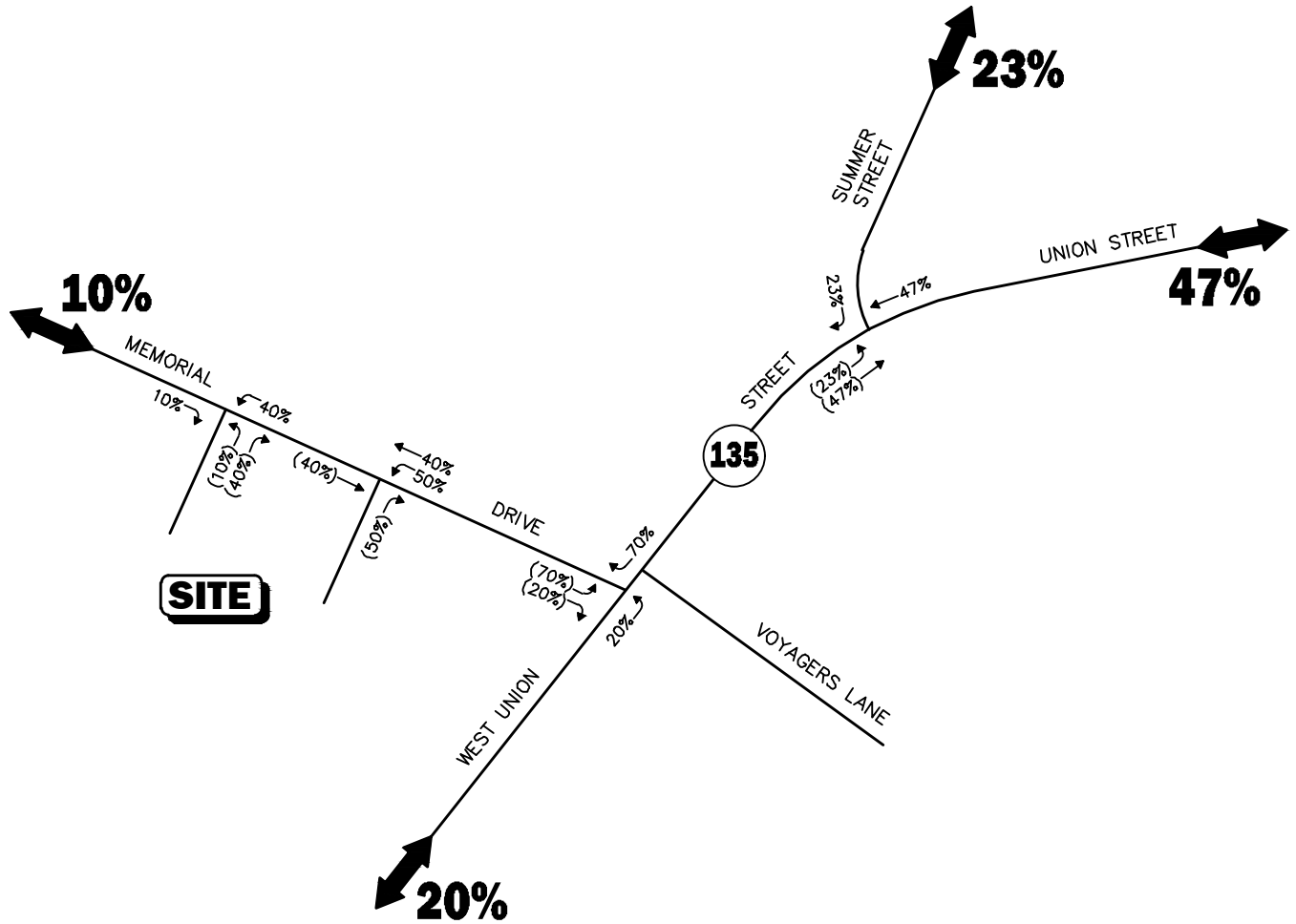
FUTURE TRAFFIC VOLUMES – BUILD CONDITION

The 2032 Build condition traffic volumes were developed by adding the additional traffic expected to be generated by the Project to the 2032 No-Build condition traffic volumes. The resulting 2032 Build weekday morning and evening peak-hour traffic volumes are graphically depicted on Figure 7.

A summary of peak-hour projected traffic-volume changes outside of the study area that is the subject of this assessment is shown in Table 6. These changes are a result of the construction of the Project.

Legend:

- XX Entering Trips
- (XX) Exiting Trips



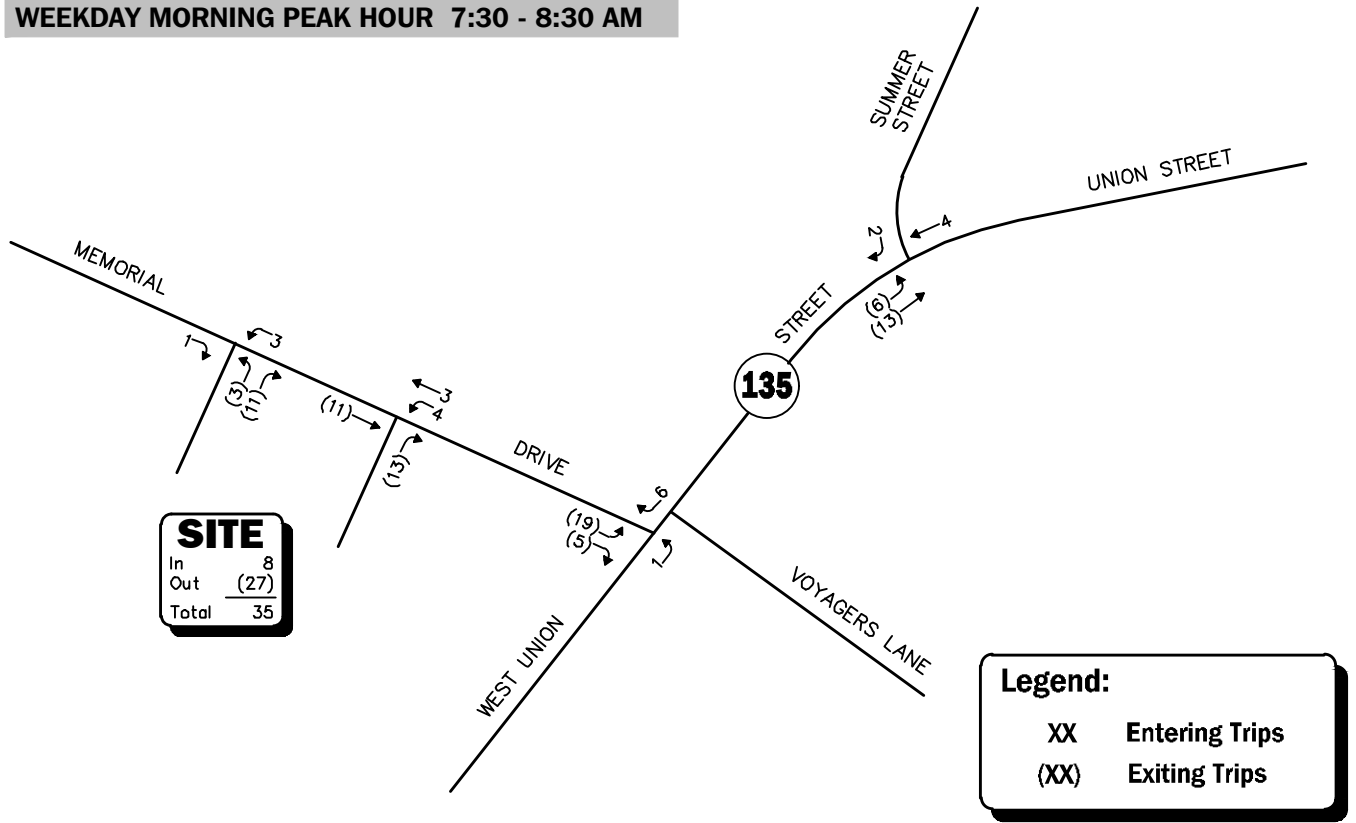
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Figure 5

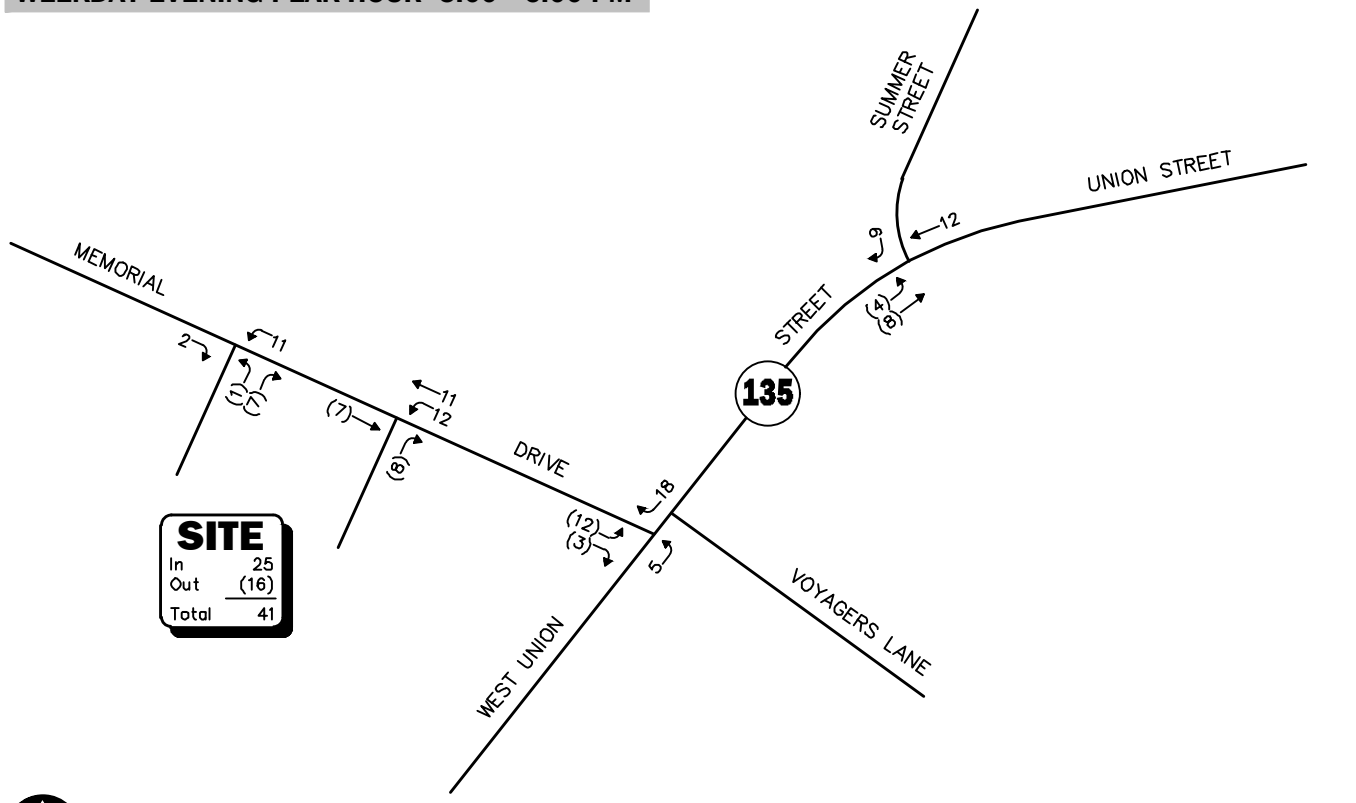
Trip Distribution Map



WEEKDAY MORNING PEAK HOUR 7:30 - 8:30 AM



WEEKDAY EVENING PEAK HOUR 5:00 - 6:00 PM



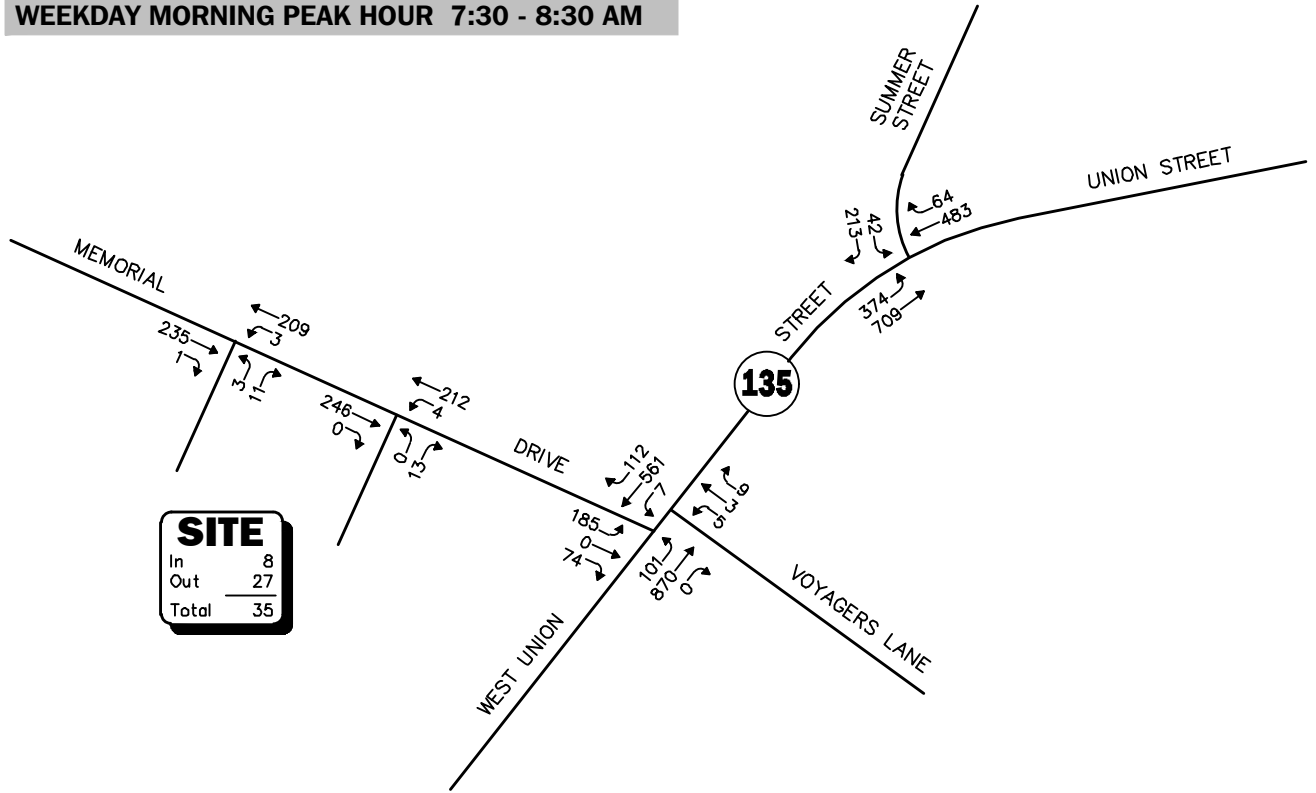
Not To Scale **Figure 6**



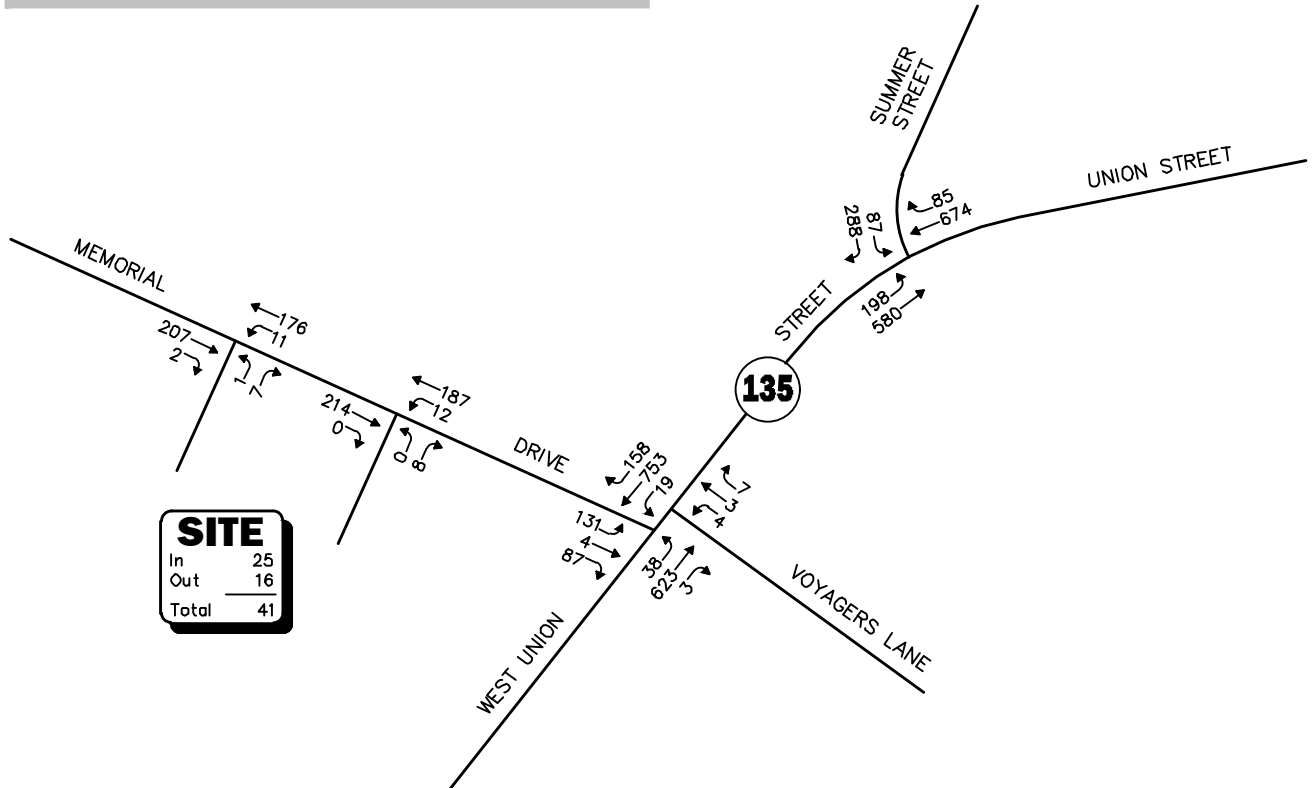
Project-Generated Peak-Hour Traffic Volumes

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WEEKDAY MORNING PEAK HOUR 7:30 - 8:30 AM



WEEKDAY EVENING PEAK HOUR 5:00 - 6:00 PM



Not To Scale Figure 7



2032 Build
Peak-Hour Traffic Volumes

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Table 6
PEAK-HOUR TRAFFIC-VOLUME INCREASES

Location/Peak-Hour	2025 Existing	2032 No-Build	2032 Build	Traffic- Volume Increase Over No-Build	Percent Increase Over No-Build
<i>Route 135, northeast of Summer Street</i>					
Weekday Morning	1,162	1,281	1,298	17	1.3
Weekday Evening	1,245	1,376	1,396	20	1.5
<i>Route 135, southwest of Memorial Drive</i>					
Weekday Morning	1,459	1,605	1,611	6	0.4
Weekday Evening	1,353	1,500	1,508	8	0.5
<i>Summer Street, north of Route 135</i>					
Weekday Morning	622	685	693	8	1.2
Weekday Evening	556	618	628	10	1.6
<i>Memorial Drive, northwest of the Project Site</i>					
Weekday Morning	368	444	448	4	0.9
Weekday Evening	295	383	386	3	0.8

As shown in Table 6, Project-related traffic-volume changes outside of the study area relative to 2032 No-Build conditions are anticipated to range from increases of 0.4 to 1.6 percent during the peak periods, with vehicle increases shown to range from 3 to 20 vehicles. ***When dispersed over the peak-hour, such increases would not be expected to result in a significant impact (increase) on motorist delays or vehicle queuing outside of the immediate study area that is the subject of this assessment.***

TRAFFIC OPERATIONS ANALYSIS

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

METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.¹⁴ The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with level-of-service (LOS) A representing the best operating conditions and LOS F representing congested or constrained operating conditions.

Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

¹⁴The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2016.

Signalized Intersections

The six levels of service for signalized intersections may be described as follows:

- *LOS A* describes operations with very 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.

Levels of service for signalized intersections are calculated using the operational analysis methodology of the 2000 *Highway Capacity Manual*¹⁵ and implemented as a part of the Synchro® 12 software. This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. Level-of-service 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 7 summarizes the relationship between level of service and control delay. The tabulated control delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to entire intersections.

Table 7
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS^a

Level of Service	Control (Signal) Delay Per Vehicle (Seconds)
A	≤10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	>80.0

^aSource: *Highway Capacity Manual*, Transportation Research Board; Washington, DC; 2000; page 16-2.

¹⁵*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2000.

Unsignalized Intersections

The six levels of service 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 levels of service of unsignalized intersections are determined by application of a procedure described in the *Highway Capacity Manual 7th Edition*.¹⁶ Level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the *Highway Capacity Manual 7th Edition*. Table 8 summarizes the relationship between level of service and average control delay for two-way stop controlled and all-way stop controlled intersections.

Table 8
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS^a

Level-Of-Service by Volume-to-Capacity Ratio		Average Control Delay (Seconds Per Vehicle)
$v/c \leq 1.0$	$v/c > 1.0$	
A	F	≤10.0
B	F	10.1 to 15.0
C	F	15.1 to 25.0
D	F	25.1 to 35.0
E	F	35.1 to 50.0
F	F	>50.0

^aSource: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2023.

¹⁶*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2023.

Vehicle Queue Analysis

Vehicle queue analyses are a direct measurement of an intersection's ability to process vehicles under various traffic control and volume scenarios and lane use arrangements. The vehicle queue analysis was performed using the Synchro® intersection capacity analysis software. The Synchro® vehicle queue analysis methodology is a simulation-based model which reports the number of vehicles that experience a delay of six seconds or more at an intersection. For signalized intersections, Synchro® reports both the average (50th percentile) and the 95th percentile vehicle queue. For unsignalized intersections, Synchro® reports the 95th percentile vehicle queue. Vehicle queue lengths are a function of the capacity of the movement under study and the volume of traffic being processed by the intersection during the analysis period. The 95th percentile vehicle queue is the vehicle queue length that will be exceeded only 5 percent of the time, or approximately 3 minutes out of 60 minutes during the peak one hour of the day (during the remaining 57 minutes, the vehicle queue length will be less than the 95th percentile queue length).

ANALYSIS RESULTS

Level-of-service and vehicle queue analyses were conducted for 2025 Existing, 2032 No-Build and 2032 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized in Tables 9 and 10, with the detailed analysis results presented in the Appendix.

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

Signalized Intersections (Table 9)

Route 135 at Memorial Drive and Voyagers Lane

The addition of Project-related traffic to this intersection was shown to result in an increase in overall average motorist delay of 3.5 seconds during the weekday evening peak-hour that resulted in a corresponding change in level-of-service from LOS C to LOS D and a general increase in vehicle queuing of up to one (1) vehicle. Focusing on specific movements, the addition of Project-related traffic to left-turn/through movements from the Memorial Drive approach during the weekday morning peak-hour caused a change in level-of-service from LOS E to LOS F (26.2 second increase in average motorist delay). Independent of the Project, left-turn/through movements from the Memorial Drive approach are predicted to operate at or over capacity (i.e., LOS “E” or “F”, respectively) under No-Build conditions due to the continued build-out of the parcels located along Memorial Drive.

Route 135 at Summer Street

No change in overall level-of-service was shown to occur over No-Build conditions, with Project-related impacts generally defined as a predicted increase in overall average motorist delay of less than 1.0 seconds that resulted in an increase in vehicle queuing of up to one (1) vehicle. Focusing on specific movements, the addition of Project-related traffic to left-turn movements from the Route 135 northeastbound approach during the weekday morning peak-hour caused a change in level-of-service from LOS D to LOS E (4.3 second increase in average motorist delay).

Unsignalized Intersections (Table 10)

Memorial Drive at the East Project Site Driveway

All movements exiting the east Project site driveway to Memorial Drive are predicted to operate at LOS A during the weekday morning peak-hour and at LOS B during the weekday evening peak-hour with negligible vehicle queuing. All movements along Memorial Drive approaching the east Project site driveway are predicted to operate at LOS A, also with negligible vehicle queuing. Actual operating conditions at the east Project site driveway will be directly related to vehicle queuing on the Memorial Drive approach at the Route 135/Memorial Drive/Voyagers Lane intersection during the peak periods.

Memorial Drive at the West Project Site Driveway

All movements exiting the west Project site driveway to Memorial Drive are predicted to operate at LOS B during both the weekday morning and evening peak hours with negligible vehicle queuing. All movements along Memorial Drive approaching the east Project site driveway are predicted to operate at LOS A, also with negligible vehicle queuing.

Table 9
SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak-Hour/Movement	2025 Existing				2032 No-Build				2032 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d 50 th /95 th	V/C	Delay	LOS	Queue 50 th /95 th	V/C	Delay	LOS	Queue 50 th /95 th
Route 135 at Memorial Drive and Voyagers Lane												
<i>Weekday Morning:</i>												
Memorial Drive SEB LT/TH	0.80	54.1	D	3/9	0.94	79.6	E	4/11	1.04	105.8	F	4/12
Memorial Drive SEB RT	0.05	32.1	C	0/0	0.06	31.4	C	0/0	0.06	31.3	C	0/0
Voyagers Lane NWB LT/TH	0.18	38.0	D	1/1	0.18	37.2	D	1/1	0.18	37.0	D	1/1
Voyagers Lane NWB RT	0.01	36.8	D	0/0	0.01	36.1	D	0/0	0.01	35.9	D	0/0
Route 135 NEB LT	0.25	10.1	B	1/3	0.34	11.6	B	1/3	0.35	11.6	B	1/3
Route 135 NEB TH/RT	0.80	17.4	B	11/34	0.88	22.9	C	13/38	0.88	23.0	C	13/38
Route 135 SWB LT/TH	0.69	19.5	B	8/23	0.78	23.0	C	9/26	0.78	23.3	C	9/26
Route 135 SWB RT	0.06	11.9	B	0/0	0.07	12.1	B	0/0	0.08	12.1	B	0/0
Overall	--	21.7	C	--	--	27.9	C	--	--	31.3	C	--
<i>Weekday Evening:</i>												
Memorial Drive SEB LT/TH	0.77	46.4	D	2/5	0.97	81.9	F	3/6	1.07	108.8	F	3/7
Memorial Drive SEB RT	0.08	29.1	C	0/0	0.11	28.8	C	0/0	0.11	28.9	C	0/0
Voyagers Lane NWB LT/TH	0.14	35.9	D	0/1	0.14	35.6	D	0/1	0.14	35.6	D	0/1
Voyagers Lane NWB RT	0.01	34.9	C	0/0	0.01	34.6	C	0/0	0.01	34.6	C	0/0
Route 135 NEB LT	0.12	12.8	B	0/1	0.20	15.1	B	0/1	0.24	15.3	B	0/2
Route 135 NEB TH/RT	0.57	10.9	B	3/19	0.63	12.0	B	4/22	0.63	12.0	B	4/22
Route 135 SWB LT/TH	0.89	28.8	C	5/34	0.97	42.5	D	5/37	0.97	42.5	D	5/37
Route 135 SWB RT	0.07	10.7	B	0/0	0.09	10.9	B	0/1	0.10	11.0	B	0/1
Overall	--	23.3	C	--	--	33.2	C	--	--	36.7	D	--
Route 135 at Summer Street												
<i>Weekday Morning:</i>												
Summer Street SB LT	0.25	27.9	C	1/2	0.28	29.6	C	1/3	0.28	29.7	C	1/3
Summer Street SB RT	0.18	14.3	B	0/1	0.20	15.8	B	0/1	0.20	15.9	B	0/1
Route 135 NEB LT	0.80	34.2	C	5/19	0.93	54.3	D	6/21	0.95	58.6	E	7/21
Route 135 NEB TH	0.56	6.4	A	4/16	0.60	6.8	A	4/19	0.61	7.0	A	4/19
Route 135 SWB TH/RT	0.77	24.8	C	7/17	0.80	25.6	C	8/19	0.80	25.6	C	8/19
Overall	--	18.6	B	--	--	23.1	C	--	--	23.9	C	--
<i>Weekday Evening:</i>												
Summer Street SB LT	0.42	33.0	C	2/4	0.49	36.8	D	2/5	0.49	36.9	D	2/5
Summer Street SB RT	0.19	20.7	C	0/2	0.21	23.2	C	0/2	0.21	23.2	C	0/2
Route 135 NEB LT	0.57	32.3	C	3/7	0.68	38.9	D	4/8	0.68	38.9	D	4/9
Route 135 NEB TH	0.44	6.7	A	3/11	0.47	6.7	A	3/13	0.48	6.7	A	3/13
Route 135 SWB TH/RT	0.81	25.0	C	10/26	0.84	26.4	C	12/30	0.86	27.7	C	12/31
Overall	--	20.1	C	--	--	21.9	C	--	--	22.4	C	--

^aVolume-to-capacity ratio.

^bControl (signal) delay per vehicle in seconds.

^cLevel of service.

^dQueue length in vehicles.

SB = southbound; NEB = northeastbound; NWB = northwestbound; SEB = southeastbound; SWB = southwestbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Table 10
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Unsignalized Intersection/Peak-Hour/Movement	2025 Existing				2032 No-Build				2032 Build			
	Demand ^a	Delay ^b	LOS ^c	Queue ^d 95 th	Demand	Delay	LOS	Queue 95 th	Demand	Delay	LOS	Queue 95 th
Memorial Drive at the East Project Site Driveway												
<i>Weekday Morning:</i>												
Project Site Driveway NB LT/RT	--	--	--	--	--	--	--	--	31	9.9	A	0
Memorial Drive NEB LT/TH	--	--	--	--	--	--	--	--	246	0.0	A	0
Memorial Drive SWB TH/RT	--	--	--	--	--	--	--	--	216	0.2	A	0
<i>Weekday Evening:</i>												
Project Site Driveway NB LT/RT	--	--	--	--	--	--	--	--	8	10.7	B	0
Memorial Drive NEB LT/TH	--	--	--	--	--	--	--	--	214	0.0	A	0
Memorial Drive SWB TH/RT	--	--	--	--	--	--	--	--	199	0.5	A	0
Memorial Drive at the West Project Site Driveway												
<i>Weekday Morning:</i>												
Project Site Driveway NB LT/RT	--	--	--	--	--	--	--	--	14	10.4	B	0
Memorial Drive NEB LT/TH	--	--	--	--	--	--	--	--	236	0.0	A	0
Memorial Drive SWB TH/RT	--	--	--	--	--	--	--	--	212	0.1	A	0
<i>Weekday Evening:</i>												
Project Site Driveway NB LT/RT	--	--	--	--	--	--	--	--	8	10.9	B	0
Memorial Drive NEB LT/TH	--	--	--	--	--	--	--	--	209	0.0	A	0
Memorial Drive SWB TH/RT	--	--	--	--	--	--	--	--	187	0.5	A	0

^aDemand in vehicles per hour.

^bAverage control delay per vehicle (in seconds).

^cLevel of service.

^dQueue length in vehicles.

NB = northbound; NEB = northeastbound; SWB = southwestbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at the proposed intersections of the Project site driveways with Memorial Drive in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)¹⁷ requirements. Stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. In accordance with AASHTO standards, if the measured ISD is at least equal to the required SSD value for the appropriate design speed, the intersection can operate in a safe manner. Table 11 presents the measured SSD and ISD at the subject intersections.

¹⁷*A Policy on Geometric Design of Highway and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.

Table 11
SIGHT DISTANCE MEASUREMENTS^a

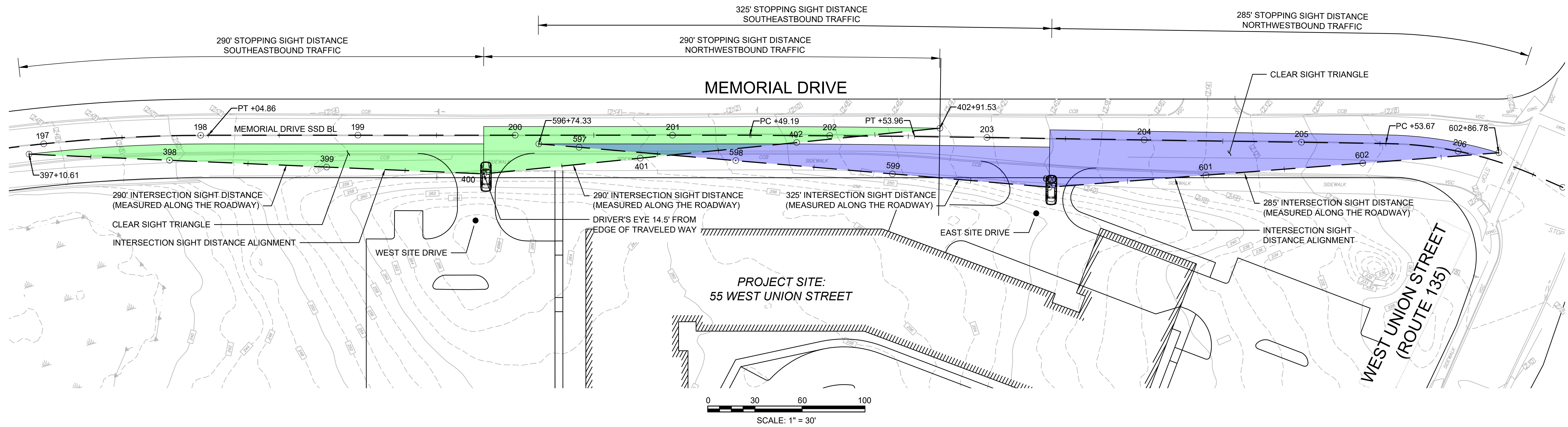
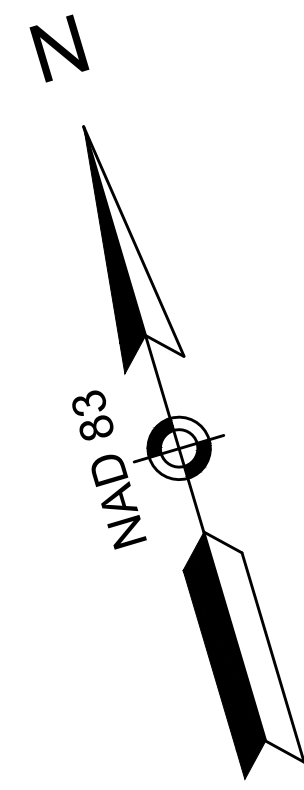
Intersection/Sight Distance Measurement	Feet		
	Required Minimum (SSD)	Desirable (ISD) ^b	Measured
Memorial Drive at the East Project Site Driveway			
<i>Stopping Sight Distance:</i>			
Memorial Drive approaching from the northwest	325	--	350
Memorial Drive approaching from the southeast	285	--	319 ^c
<i>Intersection Sight Distance:</i>			
Looking to the northwest from the Project Driveway	325	385	378
Looking to the southeast from the Project Driveway	285	445	319 ^c
Memorial Drive at the West Project Site Driveway			
<i>Stopping Sight Distance:</i>			
Memorial Drive approaching from the northwest	290	--	324
Memorial Drive approaching from the southeast	290	--	305
<i>Intersection Sight Distance:</i>			
Looking to the northwest from the Project Driveway	290	385	434
Looking to the southeast from the Project Driveway	290	445	500+

^aRecommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018; and based on an approach speed of 40 mph along Memorial Drive. Stopping sight distance values are adjusted to account for the average grade of Memorial Drive approaching the driveways as identified on Figure 8.

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

^cClear line of sight is provided to/from Route 135.

As can be seen in Table 11, the available lines of sight at the locations of the proposed Project site driveways along Memorial Drive were found to meet or exceed the recommended minimum sight distance to function in a safe (SSD) manner based on a 40 mph approach speed along Memorial Drive, which is above both the measured 85th percentile vehicle travel speeds measured along the roadway (36/37 mph) and the posted speed limit in the vicinity of the Project site (30 mph). Figure 8 depicts the sight lines at the Project site driveway intersections using the above methodology.



SSD & ISD CALCULATIONS
PROVIDED ON SHEETS 2 & 3 RESPECTIVELY

FIGURE 8
MEMORIAL DRIVE AT THE PROJECT SITE DRIVEWAYS
SIGHT TRIANGLE PLAN

PROJECT:
PROPOSED MULTIFAMILY RESIDENTIAL DEVELOPMENT
ASHLAND, MASSACHUSETTS

PROPOSER:
55 WEST UNION LLC
ASHLAND, MASSACHUSETTS

NO.	REVISIONS	DATE

Vanasse & Associates inc
Transportation Engineers & Planners
35 New England Business Center Drive - Suite 140 - Andover, MA 01810
www.rdma.com 978-474-8800

DESIGNED BY: IJS DATE: 6/27/25
DRAWN BY: IJS SCALE: 1" = 30'
CHECKED BY: JPC SHEET 1 OF 3

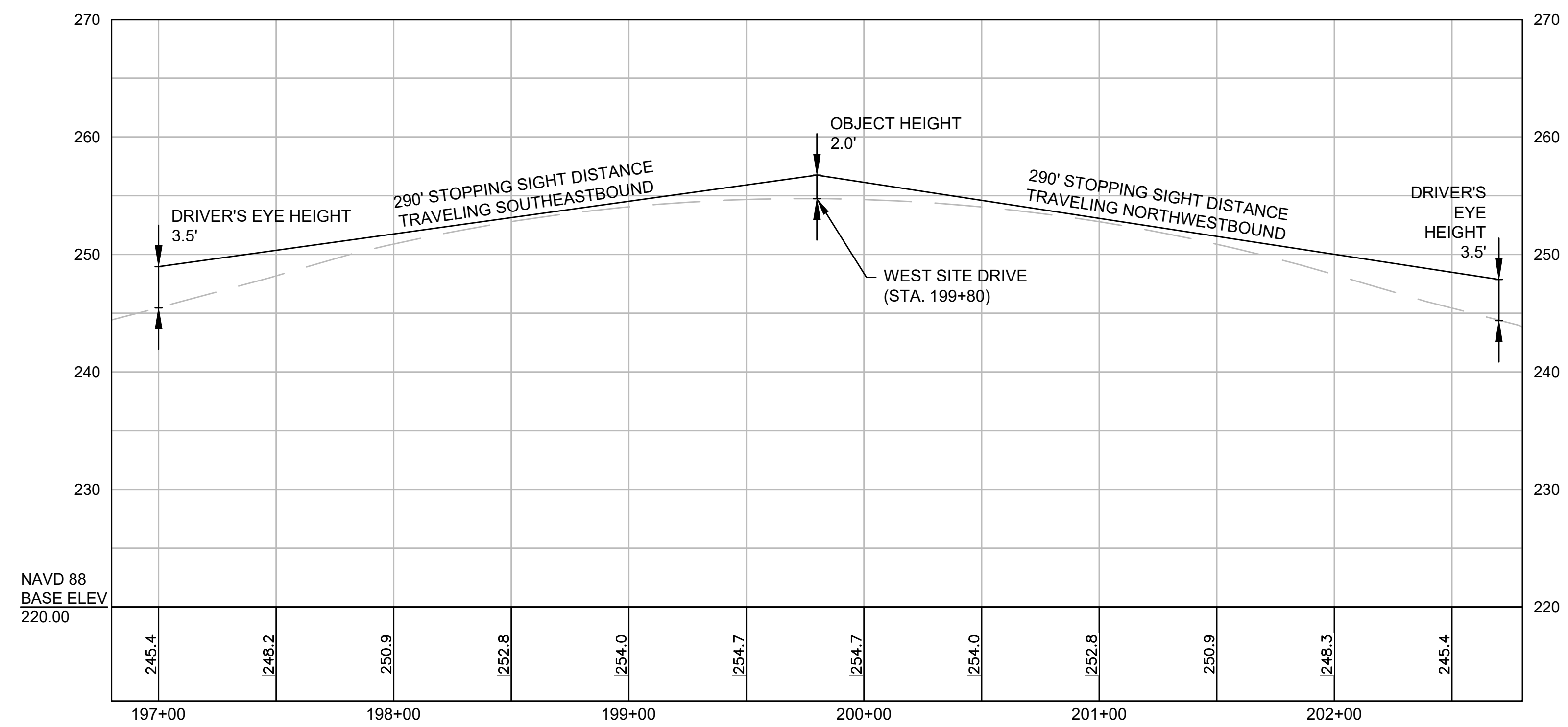
- NOTES:
1. THIS PLAN IS FOR REVIEW PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION.
 2. BASE PLAN INFORMATION OBTAINED FROM CONNORSTONE ENGINEERING.
 3. NO OBJECTS SHALL BE PLACED WITHIN THE SIGHT TRIANGLE AREAS THAT WOULD EXCEED 3.5 FEET IN HEIGHT.
 4. SNOW ACCUMULATIONS (WINDROWS) THAT EXCEED 2.5 FEET IN HEIGHT WILL BE PROMPTLY REMOVED.

R:\10321\HWY\10321SDv2.dwg 6/27/2025 12:02 PM EDT

WEST SITE DRIVE - SOUTHEASTBOUND STOPPING SIGHT DISTANCE

MEMORIAL DRIVE:
 POSTED SPEED = 30 MPH
 85% SPEED (V_{major}) = 37 MPH
 DESIGN SPEED = 40 MPH
 AVERAGE GRADE = +3.2%

STOPPING SIGHT DISTANCE
 TRAVELING SOUTHEASTBOUND:
 REQUIRED MINIMUM SSD = 290'



**WEST SITE DRIVE
STOPPING SIGHT DISTANCE PROFILE**

WEST SITE DRIVE - NORTHWESTBOUND STOPPING SIGHT DISTANCE

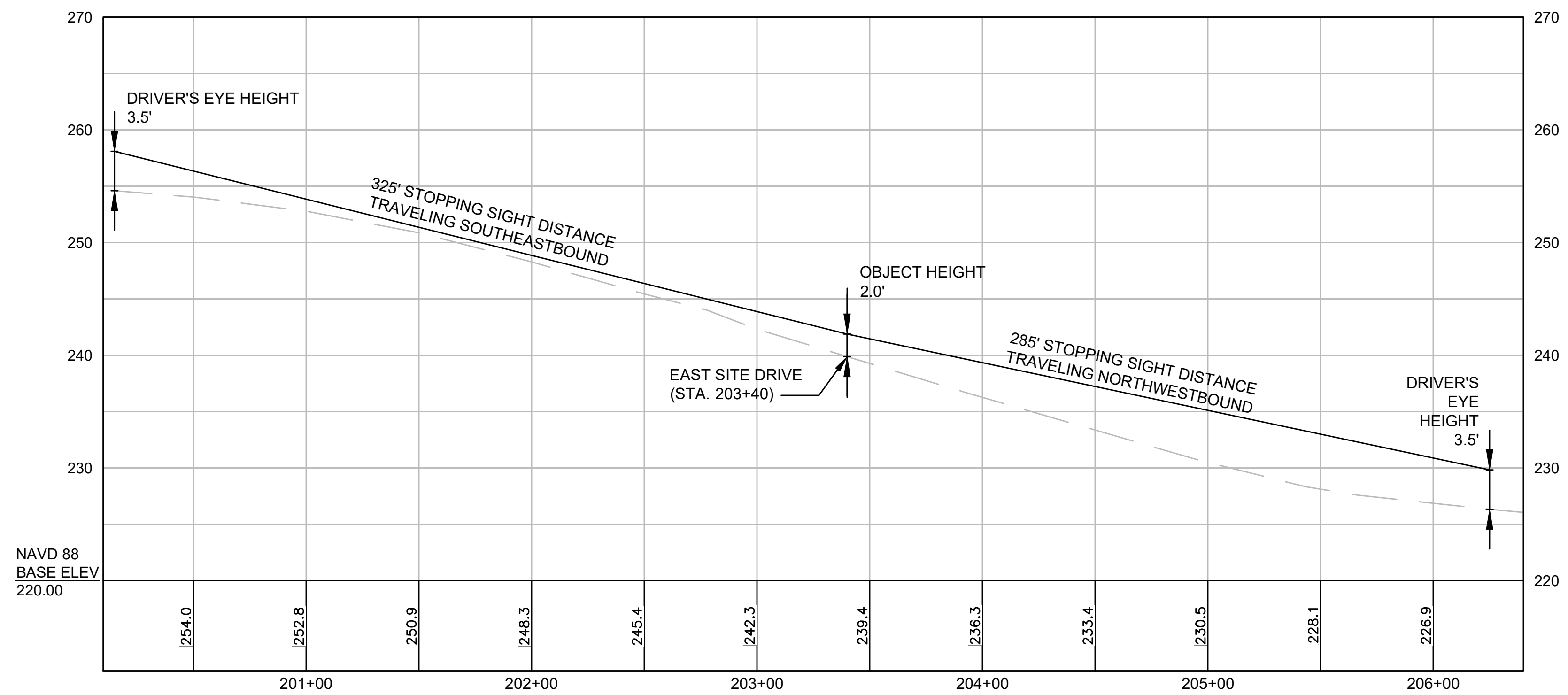
MEMORIAL DRIVE:
 POSTED SPEED = 30 MPH
 85% SPEED (V_{major}) = 36 MPH
 DESIGN SPEED = 40 MPH
 AVERAGE GRADE = +3.5%

STOPPING SIGHT DISTANCE
 TRAVELING NORTHWESTBOUND:
 REQUIRED MINIMUM SSD = 290'

EAST SITE DRIVE - SOUTHEASTBOUND STOPPING SIGHT DISTANCE

MEMORIAL DRIVE:
 POSTED SPEED = 30 MPH
 85% SPEED (V_{major}) = 37 MPH
 DESIGN SPEED = 40 MPH
 AVERAGE GRADE = -4.6%

STOPPING SIGHT DISTANCE
 TRAVELING SOUTHEASTBOUND:
 REQUIRED MINIMUM SSD = 325'

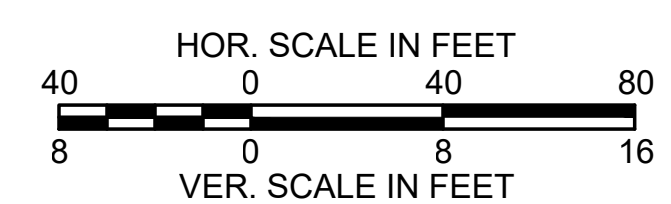


**EAST SITE DRIVE
STOPPING SIGHT DISTANCE PROFILE**

EAST SITE DRIVE - NORTHWESTBOUND STOPPING SIGHT DISTANCE

MEMORIAL DRIVE:
 POSTED SPEED = 30 MPH
 85% SPEED (V_{major}) = 36 MPH
 DESIGN SPEED = 40 MPH
 AVERAGE GRADE = +4.7%

STOPPING SIGHT DISTANCE
 TRAVELING NORTHWESTBOUND:
 REQUIRED MINIMUM SSD = 285'



**FIGURE 8
MEMORIAL DRIVE AT THE PROJECT SITE DRIVEWAYS
STOPPING SIGHT DISTANCE PROFILES**

PROJECT:
**PROPOSED MULTIFAMILY RESIDENTIAL DEVELOPMENT
 ASHLAND, MASSACHUSETTS**

PROPONENT:
**55 WEST UNION LLC
 ASHLAND, MASSACHUSETTS**

NO.	REVISIONS	DATE

Vanasse & Associates inc
 Transportation Engineers & Planners
 35 New England Business Center Drive - Suite 140 - Andover, MA 01810
 www.rdva.com 978-474-8800

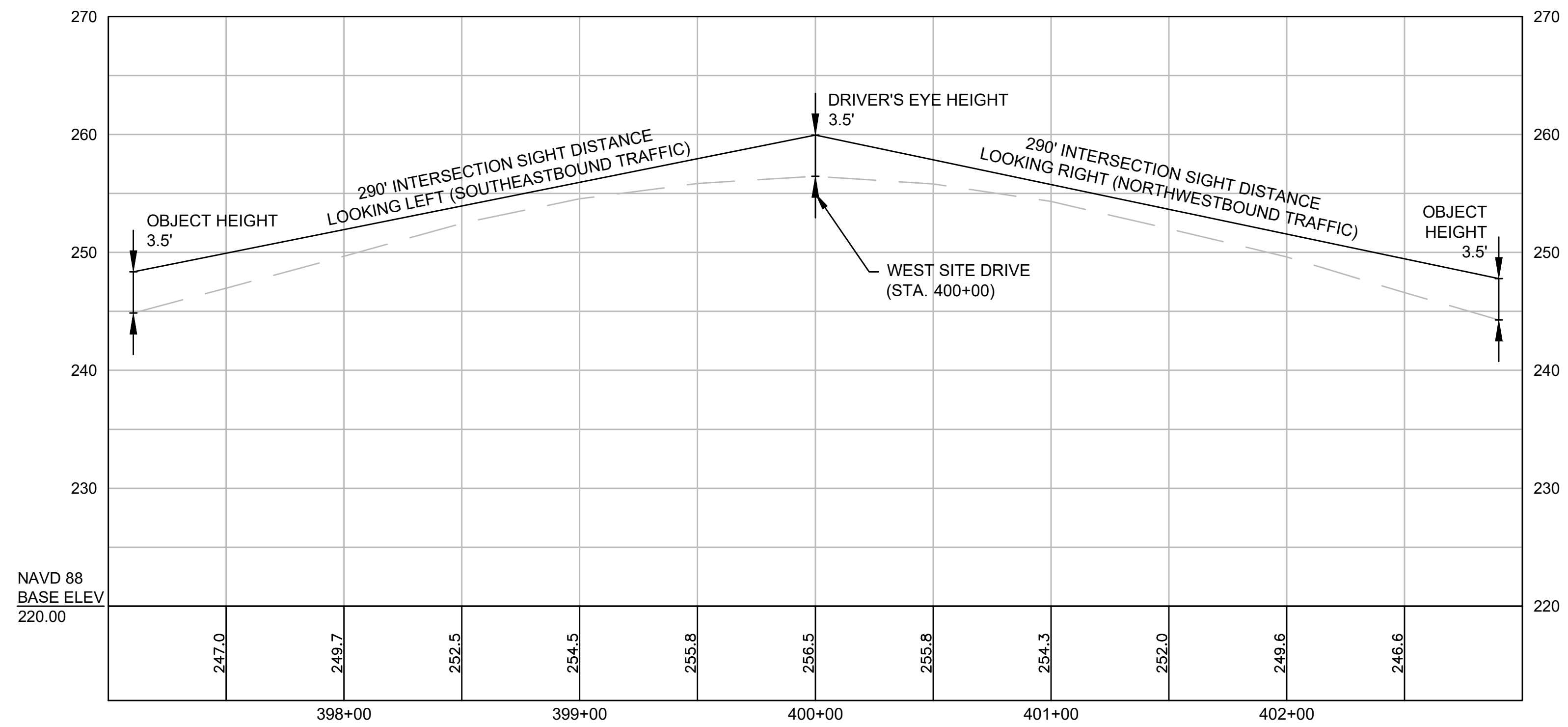
DESIGNED BY: IJS	DATE: 6/27/25
DRAWN BY: IJS	SCALE: AS NOTED
CHECKED BY: JPC	SHEET 2 OF 3

WEST SITE DRIVE - SOUTHEASTBOUND INTERSECTION SIGHT DISTANCE

MEMORIAL DRIVE:
 POSTED SPEED = 30 MPH
 85% SPEED (V_{major}) = 37 MPH
 DESIGN SPEED = 40 MPH

INTERSECTION SIGHT DISTANCE
 LOOKING LEFT (NORTHWEST):
 REQUIRED MINIMUM ISD = SSD *

* SEE SHEET 2



**WEST SITE DRIVE
 INTERSECTION SIGHT DISTANCE PROFILE**

WEST SITE DRIVE - NORTHWESTBOUND INTERSECTION SIGHT DISTANCE

MEMORIAL DRIVE:
 POSTED SPEED = 30 MPH
 85% SPEED (V_{major}) = 36 MPH
 DESIGN SPEED = 40 MPH

INTERSECTION SIGHT DISTANCE
 LOOKING RIGHT (SOUTHEAST):
 REQUIRED MINIMUM ISD = SSD *

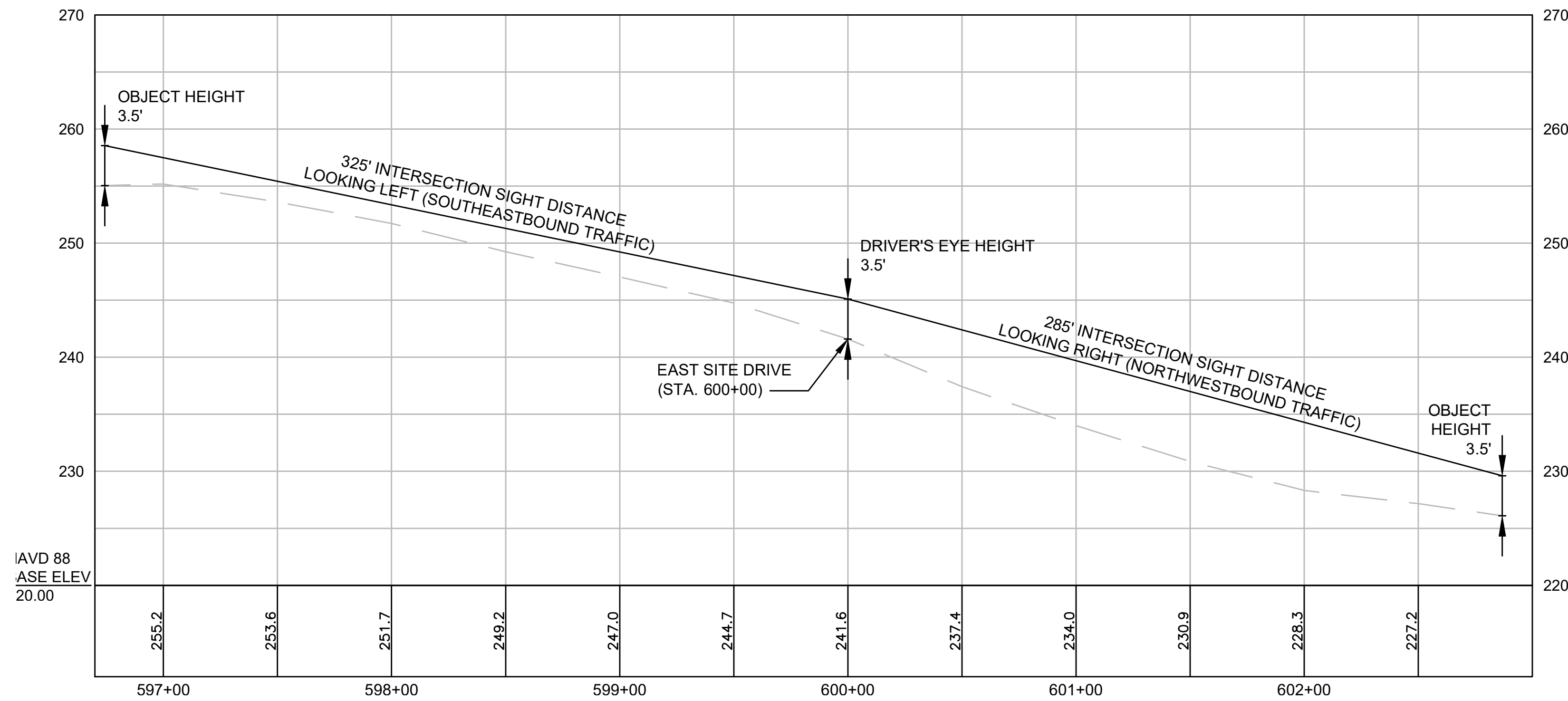
* SEE SHEET 2

EAST SITE DRIVE - SOUTHEASTBOUND INTERSECTION SIGHT DISTANCE

MEMORIAL DRIVE:
 POSTED SPEED = 30 MPH
 85% SPEED (V_{major}) = 37 MPH
 DESIGN SPEED = 40 MPH

INTERSECTION SIGHT DISTANCE
 LOOKING LEFT (NORTHWEST):
 REQUIRED MINIMUM ISD = SSD *

* SEE SHEET 2



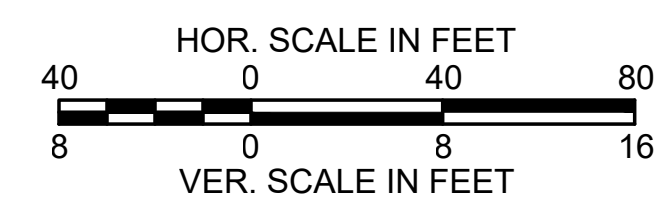
**EAST SITE DRIVE
 INTERSECTION SIGHT DISTANCE PROFILE**

EAST SITE DRIVE - NORTHWESTBOUND INTERSECTION SIGHT DISTANCE

MEMORIAL DRIVE:
 POSTED SPEED = 30 MPH
 85% SPEED (V_{major}) = 36 MPH
 DESIGN SPEED = 40 MPH

INTERSECTION SIGHT DISTANCE
 LOOKING RIGHT (SOUTHEAST):
 REQUIRED MINIMUM ISD = SSD *

* SEE SHEET 2



**FIGURE 8
 MEMORIAL DRIVE AT THE PROJECT SITE DRIVEWAYS
 INTERSECTION SIGHT DISTANCE PROFILES**

PROJECT:
**PROPOSED MULTIFAMILY RESIDENTIAL DEVELOPMENT
 ASHLAND, MASSACHUSETTS**

PROPOSER:
**55 WEST UNION LLC
 ASHLAND, MASSACHUSETTS**

NO.	REVISIONS	DATE

Vanasse & Associates inc
 Transportation Engineers & Planners
35 New England Business Center Drive - Suite 140 - Andover, MA 01810
 www.rdva.com 978-474-8800

DESIGNED BY: IJS	DATE: 6/27/25
DRAWN BY: IJS	SCALE: AS NOTED
CHECKED BY: JPC	SHEET 3 OF 3

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

VAI has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the proposed construction of a multifamily residential development to be located at 55 West Union Street (Route 135) in Ashland, Massachusetts. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the ITE¹⁸ and with adjustment to account for the use of alternative modes of transportation to SOVs, the Project is expected to generate approximately 478 automobile trips on an average weekday (two-way, 24 hour volume), with 42 transit trips and 10 pedestrian/bicycle trips. During the weekday morning peak-hour, the Project is expected to generate 35 automobile trips, three (3) transit trips and one (1) pedestrian/bicycle trip. During the weekday evening peak-hour, the Project is expected to generate 41 automobile trips, three (3) transit trips and two (2) pedestrian/bicycle trips;
2. The Project will not result in a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build condition), with majority of movements at the study area intersections expected to continue to operate at a LOS of D or better with the addition of Project-related traffic, where an LOS of “D” or better is defined as “acceptable” traffic operations. Project-related impacts were generally defined as an increase in overall average motorist delay of up to 3.5 seconds and in vehicle queuing of up to one (1) vehicle;
3. All movements exiting the Project-site driveways to Memorial Drive are predicted to operate at LOS B or better during the peak hours with negligible vehicle queuing. All movements along Memorial Drive approaching the Project site driveways are predicted to operate at LOS A, also with negligible vehicle queuing. Actual operating conditions at the intersection of the east Project site driveway with Memorial Drive will be directly related to vehicle queuing on the Memorial Drive approach to Route 135;

¹⁸Institute of Transportation Engineers, op. cit. 1.

4. No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study area intersections; and
5. Lines of sight to and from the Project site driveways exceed the recommended minimum distances to function in a safe manner based on the appropriate approach speed.

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

RECOMMENDATIONS

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

Project Access

Access to the Project site will be provided by way of two (2) full-access driveways that will intersect the south side of Memorial Drive approximately 300 feet and 650 feet west of Route 135, respectively. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation:

- The Project site driveways should be a minimum of 24 feet in width and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle.
- Where perpendicular parking is proposed, the drive aisle behind the parking should be a minimum of 23-feet wide.
- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided.
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices (MUTCD)*.¹⁹
- Marked crosswalks with Americans with Disabilities Act (ADA)-compliant wheelchair ramps should be provided for crossing the Project site driveways, or the driveways should be designed so that the sidewalk is flush across the driveways (i.e., “pan-type” driveway).
- Sidewalks should be provided to link the residential building to the multi-use path along Memorial Drive.
- Signs and landscaping to be installed as a part of the Project within the intersection sight triangle areas of the Project site driveways should be designed and maintained so as not to restrict lines of sight.

¹⁹Federal Highway Administration, op. cit. 3.

- Snow accumulations (windrows) within the sight triangle areas of the Project site driveway will be promptly removed where such accumulations would impede sight lines.

Off-Site

Route 135 Corridor

Independent of the Project, left-turn/through movements from the Memorial Drive approach to the Route 135/Memorial Drive/Voyagers Lane intersection are predicted to operate at or over capacity during both peak hours due to: i) the volume of conflicting traffic on Route 135 during the peak hours; ii) traffic volumes associated with the Ashland Massachusetts Bay Transportation Authority (MBTA) Commuter Rail Station which is accessed from Memorial Drive; and iii) the continued build-out of properties along Memorial Drive. The Project was shown to result in a relatively limited impact at the study area intersections along the Route 135 corridor that was quantified as an increase in average motorist delay of up to 3.5 seconds and an increase in vehicle queuing of up to one (1) vehicle. That being said, one or more movements at the signalized study area intersections along Route 135 were identified to operate at or over capacity (i.e., LOS “E” or “F”).

In an effort to off-set the predicted impact of the Project and improve overall intersection operations, the Project proponent will design and implement an optimal traffic signal timing and phasing plan for the following intersections:

- Route 135 at Memorial Drive and Voyagers Lane; and
- Route 135 at Summer Street

The traffic signal timing improvements will be designed and implemented according to the following schedule: i) prior to achieving 50 percent occupancy of the number of residential units that are associated with the Project (58 units); and ii) after achieving 80 percent occupancy of the Project (93 units). As can be seen in Table 12, with implementation of an optimal traffic signal timing and phasing plan, overall operations for the subject intersections will be improved over 2032 Build conditions such that no movement will operate with a volume-to-capacity ratio above 1.00 with a general reduction on overall average motorist delay.

Transportation Demand Management

Regularly scheduled public transportation services are provided within the Town of Ashland by the MetroWest Regional Transit Authority (MWRTA) and the MBTA. To the northwest of the Project site at the end of Memorial Drive, the MBTA provides Commuter Rail service to South Station in Boston on the Framingham/Worcester Line from Ashland Station. The MWRTA provides fixed-route bus service within the study area along Route 135 and Memorial Drive between the Blandin Hub in Framingham and the Price Chopper Supermarket in Hopkinton by way of the Route 5 bus route, which includes a stop at the Ashland Commuter Rail station and at the Ashland Middle School. The closest regular stop to the Project site for the Route 5 bus is located at the Ashland Middle School, approximately 0.3 miles (an approximate 7-minute walk) to the south of the Project site; however, MWRTA buses also operate in a “flag-stop” mode, where a rider can request a stop anywhere along the service route by signaling to the driver. As such, a resident of the Project can request a stop along Memorial Drive at the Project site.

In addition, the Town of Ashland provides Senior Center Van Rides to eligible Ashland residents who require transportation to/from Senior Center programs or medical appointments. Mass Health Transportation (MART) is also available to recipients of Medicaid in the area.

- A transportation coordinator will be designated for the Project, who may have other duties and responsibilities, to coordinate the elements of the TDM program;
- The transportation coordinator will facilitate a rideshare matching program for residents to encourage carpooling;
- A “welcome packet” will be provided to new residents detailing available public transportation services, bicycle and walking alternatives, and other commuting options;
- Information regarding public transportation services, maps, schedules, and fare information will be posted in a central location and/or otherwise made available to residents;
- New residents of the Project that sign a 12-month lease will be offered a transit pass subsidy for the first month of tenancy limited to \$50 per unit.
- A pick-up/drop-off area has been provided at the front of the building for use by carshare and delivery service providers, as well as Amazon, UPS and FedEx;
- A minimum of 20% of the parking spaces will include accommodations for the installation of electric vehicle (EV) charging stations for use by residents and guests;
- Secure bicycle parking will be provided within the Project site to include interior, weather protected bicycle parking and an exterior bicycle rack; and
- Parking will be unbundled from the lease for each residential unit in order to encourage lower automobile ownership.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

Table 12
MITIGATED SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak-Hour/Movement	2032 No-Build				2032 Build				2032 Build Mitigated			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d 50 th /95 th	V/C	Delay	LOS	Queue 50 th /95 th	V/C	Delay	LOS	Queue 50 th /95 th
Route 135 at Memorial Drive and Voyagers Lane												
<i>Weekday Morning:</i>												
Memorial Drive SEB LT/TH	0.94	79.6	E	4/11	1.04	105.8	F	4/12	0.94	75.1	E	4/11
Memorial Drive SEB RT	0.06	31.4	C	0/0	0.06	31.3	C	0/0	0.06	30.4	C	0/0
Voyagers Lane NWB LT/TH	0.18	37.2	D	1/1	0.18	37.0	D	1/1	0.18	37.1	D	1/1
Voyagers Lane NWB RT	0.01	36.1	D	0/0	0.01	35.9	D	0/0	0.01	35.9	D	0/0
Route 135 NEB LT	0.34	11.6	B	1/3	0.35	11.6	B	1/3	0.36	12.3	B	1/3
Route 135 NEB TH/RT	0.88	22.9	C	13/38	0.88	23.0	C	13/38	0.90	26.0	C	13/39
Route 135 SWB LT/TH	0.78	23.0	C	9/26	0.78	23.3	C	9/26	0.85	29.0	C	10/27
Route 135 SWB RT	0.07	12.1	B	0/0	0.08	12.1	B	0/0	0.08	12.7	B	0/0
Overall	--	27.9	C	--	--	31.3	C	--	--	31.0	C	--
<i>Weekday Evening:</i>												
Memorial Drive SEB LT/TH	0.97	81.9	F	3/6	1.07	108.8	F	3/7	0.97	82.0	F	4/7
Memorial Drive SEB RT	0.11	28.8	C	0/0	0.11	28.9	C	0/0	0.11	30.1	C	0/0
Voyagers Lane NWB LT/TH	0.14	35.6	D	0/1	0.14	35.6	D	0/1	0.15	38.6	D	0/1
Voyagers Lane NWB RT	0.01	34.6	C	0/0	0.01	34.6	C	0/0	0.01	37.5	D	0/0
Route 135 NEB LT	0.20	15.1	B	0/1	0.24	15.3	B	0/2	0.22	16.2	B	0/2
Route 135 NEB TH/RT	0.63	12.0	B	4/22	0.63	12.0	B	4/22	0.63	12.5	B	4/22
Route 135 SWB LT/TH	0.97	42.5	D	5/37	0.97	42.5	D	5/37	0.97	45.3	D	11/38
Route 135 SWB RT	0.09	10.9	B	0/1	0.10	11.0	B	0/1	0.10	11.9	B	0/2
Overall	--	33.2	C	--	--	36.7	D	--	--	34.9	C	--
Route 135 at Summer Street												
<i>Weekday Morning:</i>												
Summer Street SB LT	0.28	29.6	C	1/3	0.28	29.7	C	1/3	0.35	31.2	C	1/2
Summer Street SB RT	0.20	15.8	B	0/1	0.20	15.9	B	0/1	0.20	16.0	B	0/1
Route 135 NEB LT	0.93	54.3	D	6/21	0.95	58.6	E	7/21	0.90	45.6	D	3/18
Route 135 NEB TH	0.60	6.8	A	4/19	0.61	7.0	A	4/19	0.60	6.1	A	4/17
Route 135 SWB TH/RT	0.80	25.6	C	8/19	0.80	25.6	C	8/19	0.80	25.1	C	8/21
Overall	--	23.1	C	--	--	23.9	C	--	--	21.1	C	--
<i>Weekday Evening:</i>												
Summer Street SB LT	0.49	36.8	D	2/5	0.49	36.9	D	2/5	0.66	41.9	D	2/6
Summer Street SB RT	0.21	23.2	C	0/2	0.21	23.2	C	0/2	0.21	22.1	C	0/2
Route 135 NEB LT	0.68	38.9	D	4/8	0.68	38.9	D	4/9	0.73	38.1	D	3/10
Route 135 NEB TH	0.47	6.7	A	3/13	0.48	6.7	A	3/13	0.48	5.8	A	2/11
Route 135 SWB TH/RT	0.84	26.4	C	12/30	0.86	27.7	C	12/31	0.85	24.1	C	9/26
Overall	--	21.9	C	--	--	22.4	C	--	--	20.7	C	--

^aVolume-to-capacity ratio.

^bControl (signal) delay per vehicle in seconds.

^cLevel of service.

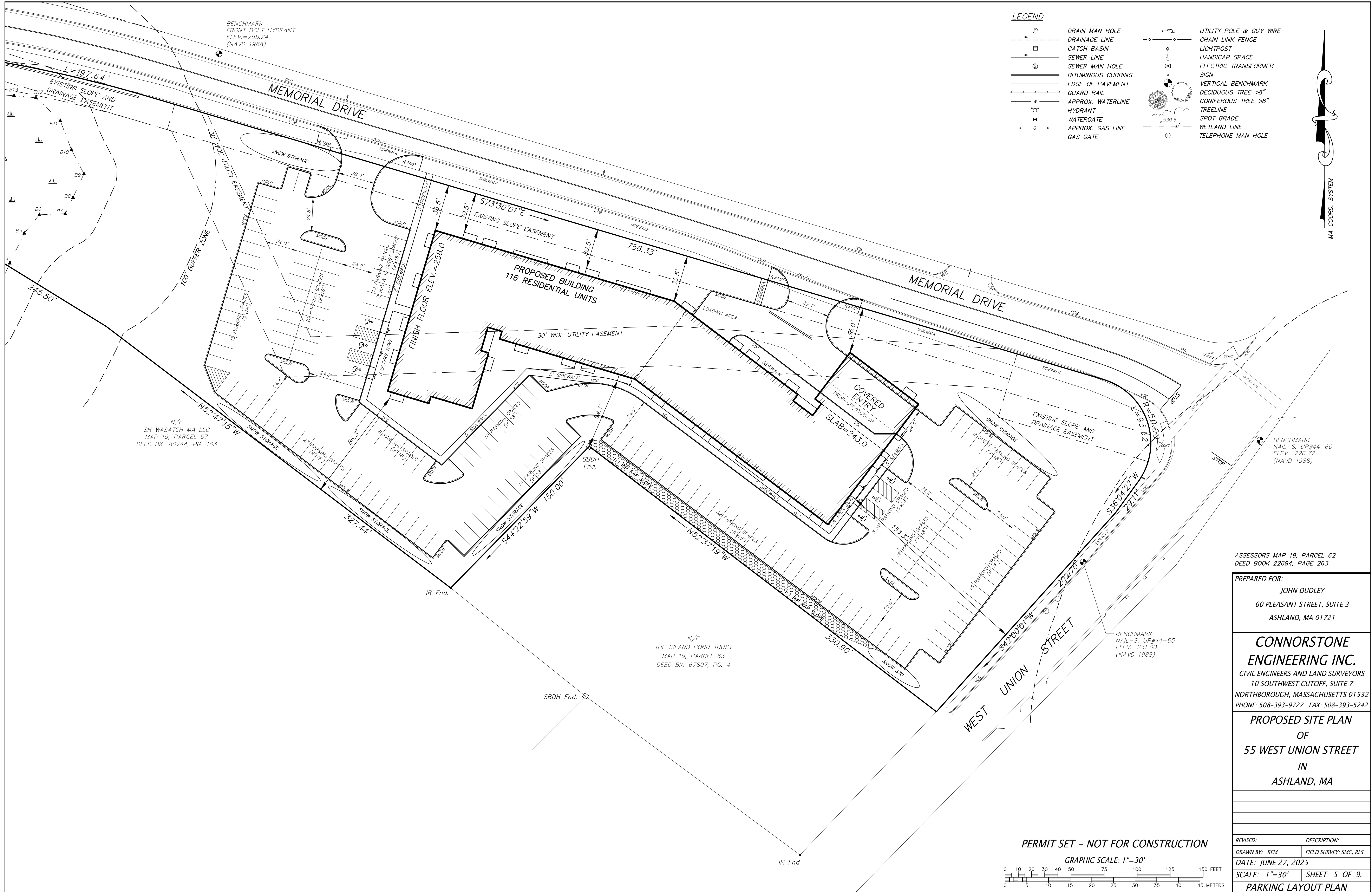
^dQueue length in vehicles.

SB = southbound; NEB = northeastbound; NWB = northwestbound; SEB = southeastbound; SWB = southwestbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

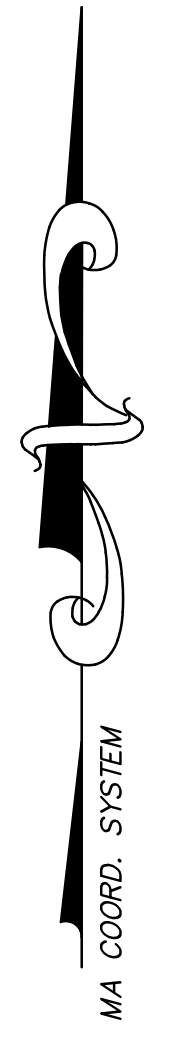
APPENDIX

PROJECT SITE PLAN
AUTOMATIC TRAFFIC RECORDER COUNT DATA
TURNING MOVEMENT COUNT DATA
SEASONAL ADJUSTMENT DATA
PUBLIC TRANSPORTATION SCHEDULES
VEHICLE TRAVEL SPEED DATA
MASSDOT CRASH DATA
MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAP
GENERAL BACKGROUND TRAFFIC GROWTH
BACKGROUND DEVELOPMENT TRAFFIC-VOLUME NETWORKS
TRIP-GENERATION CALCULATIONS
CENSUS TRACT DATA
TRIP DISTRIBUTION DATA
CAPACITY ANALYSIS WORKSHEETS

PROJECT SITE PLAN



- LEGEND**
- DRAIN MAN HOLE
 - DRAINAGE LINE
 - ▣ CATCH BASIN
 - SEWER LINE
 - S SEWER MAN HOLE
 - BITUMINOUS CURBING
 - EDGE OF PAVEMENT
 - GUARD RAIL
 - W APPROX. WATERLINE
 - H HYDRANT
 - WATERGATE
 - G APPROX. GAS LINE
 - GAS GATE
 - UTILITY POLE & GUY WIRE
 - CHAIN LINK FENCE
 - LIGHTPOST
 - HANDICAP SPACE
 - ELECTRIC TRANSFORMER SIGN
 - VERTICAL BENCHMARK
 - DECIDUOUS TREE >8"
 - CONIFEROUS TREE >8"
 - TREELINE
 - SPOT GRADE
 - WETLAND LINE
 - TELEPHONE MAN HOLE



BENCHMARK
FRONT BOLT HYDRANT
ELEV.=255.24
(NAVD 1988)

N/F
SH WASATCH MA LLC
MAP 19, PARCEL 67
DEED BK. 80744, PG. 163

N/F
THE ISLAND POND TRUST
MAP 19, PARCEL 63
DEED BK. 67807, PG. 4

BENCHMARK
NAIL-S, UP#44-60
ELEV.=226.72
(NAVD 1988)

BENCHMARK
NAIL-S, UP#44-65
ELEV.=231.00
(NAVD 1988)

ASSESSORS MAP 19, PARCEL 62
DEED BOOK 22694, PAGE 263

PREPARED FOR:
JOHN DUDLEY
60 PLEASANT STREET, SUITE 3
ASHLAND, MA 01721

**CONNORSTONE
ENGINEERING INC.**
CIVIL ENGINEERS AND LAND SURVEYORS
10 SOUTHWEST CUTOFF, SUITE 7
NORTHBOROUGH, MASSACHUSETTS 01532
PHONE: 508-393-9727 FAX: 508-393-5242

**PROPOSED SITE PLAN
OF
55 WEST UNION STREET
IN
ASHLAND, MA**

REVISED:	DESCRIPTION:
DRAWN BY: REM	FIELD SURVEY: SMC, RLS
DATE: JUNE 27, 2025	
SCALE: 1"=30' SHEET 5 OF 9.	
PARKING LAYOUT PLAN	



AUTOMATIC TRAFFIC RECORDER COUNT DATA

Accurate Counts
978-664-2565

Lo a o : M mora Dr
Lo a o : W o W U o Sr
C Sa : A a d MA

S Cod : 1032101

5 7 2025		EB		Ho rTo a		WB		Ho rTo a		Com dTo a			
Tm	Mor	A r oo	Mor	A r oo	Mor	A r oo	Mor	A r oo	Mor	A r oo			
12:00		0		11		2		7					
12:15		0		8		2		19					
12:30		0		12		0		12					
12:45		1		10	1	41		0	10	4	48	5	89
1:00		0		7		2		7					
1:15		0		12		0		11					
1:30		0		6		0		13					
1:45		0		20	0	45		1	16	3	47	3	92
2:00		1		13		0		15					
2:15		0		19		0		14					
2:30		0		17		1		14					
2:45		0		12	1	61		0	18	1	61	2	122
3:00		0		9		0		24					
3:15		0		18		0		25					
3:30		1		24		1		16					
3:45		0		24	1	75		0	28	1	93	2	168
4:00		0		17		0		18					
4:15		2		9		1		23					
4:30		0		10		5		33					
4:45		3		64	5	100		0	32	6	106	11	206
5:00		3		29		0		34					
5:15		7		19		9		28					
5:30		6		20		2		30					
5:45		10		81	26	149		2	37	13	129	39	278
6:00		8		23		34		35					
6:15		15		83		0		27					
6:30		25		15		6		27					
6:45		30		16	78	137		74	18	114	107	192	244
7:00		32		29		7		20					
7:15		31		17		47		16					
7:30		55		17		65		30					
7:45		25		11	143	74		12	20	131	86	274	160
8:00		30		5		10		20					
8:15		38		9		24		26					
8:30		36		9		37		19					
8:45		23		9	127	32		10	19	81	84	208	116
9:00		17		6		15		14					
9:15		9		7		10		15					
9:30		18		9		6		12					
9:45		15		1	59	23		3	10	34	51	93	74
10:00		18		7		10		8					
10:15		12		2		10		7					
10:30		18		4		15		6					
10:45		8		3	56	16		7	10	42	31	98	47
11:00		9		6		10		1					
11:15		18		4		17		3					
11:30		16		1		7		1					
11:45		16		1	59	12		10	2	44	7	103	19
To a		556		765				474	850			1030	1615
P r		42.1%		57.9%				35.8%	64.2%			38.9%	61.1%

Accurate Counts
978-664-2565

Lo a o : M mora Dr
Lo a o : W o W U o Sr
C Sa : A a d MA

S Cod : 1032101

5 8 2025		EB		Ho r To a		WB		Ho r To a		Com d To a	
Tm	Mor	A	r oo	Mor	A r o	Mor	A r oo	Mor	A r oo	Mor	A r oo
12:00		0	12			2	16				
12:15		0	17			3	11				
12:30		1	12			3	7				
12:45		0	14	1	55	2	10	10	44	11	99
1:00		0	8			1	11				
1:15		0	12			1	16				
1:30		0	9			1	9				
1:45		1	14	1	43	0	11	3	47	4	90
2:00		0	10			0	16				
2:15		1	19			1	14				
2:30		0	10			0	16				
2:45		0	18	1	57	0	12	1	58	2	115
3:00		0	18			0	21				
3:15		0	17			0	28				
3:30		2	29			2	17				
3:45		2	19	4	83	0	25	2	91	6	174
4:00		1	17			0	22				
4:15		0	10			1	29				
4:30		0	10			4	18				
4:45		3	16	4	53	0	29	5	98	9	151
5:00		4	80			2	23				
5:15		9	18			8	20				
5:30		3	38			2	23				
5:45		9	43	25	179	4	34	16	100	41	279
6:00		17	13			29	33				
6:15		13	61			2	27				
6:30		25	12			2	24				
6:45		36	22	91	108	73	31	106	115	197	223
7:00		43	43			7	28				
7:15		39	18			44	28				
7:30		42	12			62	27				
7:45		20	15	144	88	8	14	121	97	265	185
8:00		37	10			8	17				
8:15		31	8			19	22				
8:30		26	17			26	14				
8:45		19	8	113	43	8	24	61	77	174	120
9:00		15	2			17	13				
9:15		15	3			11	14				
9:30		19	3			9	7				
9:45		12	1	61	9	12	13	49	47	110	56
10:00		12	5			9	6				
10:15		11	3			13	4				
10:30		10	3			2	9				
10:45		8	2	41	13	13	5	37	24	78	37
11:00		10	4			14	6				
11:15		17	3			17	3				
11:30		10	2			6	4				
11:45		8	1	45	10	6	4	43	17	88	27
To a		531	741			454	815			985	1556
P r		41.7%	58.3%			35.8%	64.2%			38.8%	61.2%
Gr a d To a		1087	1506			928	1665			2015	3171
P r		41.9%	58.1%			35.8%	64.2%			38.9%	61.1%

ADT

ADT: 2 593

AADT: 2 593

Accurate Counts
978-664-2565

Lo a o : M mora Dr
Lo a o : W o W U o Sr
C Sa : A a d MA

S Cod : 1032101

5 5 2025	Mo da		T da		W d da		T r da		Fr da		Sa rda		S da		W A ra	
Tm	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	*	*	*	*	1	4	1	10	*	*	*	*	*	*	1	7
1:00	*	*	*	*	0	3	1	3	*	*	*	*	*	*	0	3
2:00	*	*	*	*	1	1	1	1	*	*	*	*	*	*	1	1
3:00	*	*	*	*	1	1	4	2	*	*	*	*	*	*	2	2
4:00	*	*	*	*	5	6	4	5	*	*	*	*	*	*	4	6
5:00	*	*	*	*	26	13	25	16	*	*	*	*	*	*	26	14
6:00	*	*	*	*	78	114	91	106	*	*	*	*	*	*	84	110
7:00	*	*	*	*	143	131	144	121	*	*	*	*	*	*	144	126
8:00	*	*	*	*	127	81	113	61	*	*	*	*	*	*	120	71
9:00	*	*	*	*	59	34	61	49	*	*	*	*	*	*	60	42
10:00	*	*	*	*	56	42	41	37	*	*	*	*	*	*	48	40
11:00	*	*	*	*	59	44	45	43	*	*	*	*	*	*	52	44
12:00 PM	*	*	*	*	41	48	55	44	*	*	*	*	*	*	48	46
1:00	*	*	*	*	45	47	43	47	*	*	*	*	*	*	44	47
2:00	*	*	*	*	61	61	57	58	*	*	*	*	*	*	59	60
3:00	*	*	*	*	75	93	83	91	*	*	*	*	*	*	79	92
4:00	*	*	*	*	100	106	53	98	*	*	*	*	*	*	76	102
5:00	*	*	*	*	149	129	179	100	*	*	*	*	*	*	164	114
6:00	*	*	*	*	137	107	108	115	*	*	*	*	*	*	122	111
7:00	*	*	*	*	74	86	88	97	*	*	*	*	*	*	81	92
8:00	*	*	*	*	32	84	43	77	*	*	*	*	*	*	38	80
9:00	*	*	*	*	23	51	9	47	*	*	*	*	*	*	16	49
10:00	*	*	*	*	16	31	13	24	*	*	*	*	*	*	14	28
11:00	*	*	*	*	12	7	10	17	*	*	*	*	*	*	11	12
To a	0	0	0	0	1321	1324	1272	1269	0	0	0	0	0	0	1294	1299
Da	0		0		2645		2541		0		0		0		2593	
AM P a					7:00	7:00	7:00	7:00							7:00	7:00
Vo m					143	131	144	121							144	126
PM P a					5:00	5:00	5:00	6:00							5:00	5:00
Vo m					149	129	179	115							164	114
Com To a	0		0		2645		2541		0		0		0		2593	
ADT	ADT: 2 593		AADT: 2 593													

TURNING MOVEMENT COUNT DATA

Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	West Union St From North			Voyagers Ln From East			West Union St From South			Memorial Dr From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	78	12	2	0	2	7	167	0	34	1	15	318
07:15 AM	0	113	26	3	0	3	31	185	1	37	1	11	411
07:30 AM	1	125	31	2	3	5	41	194	0	43	0	17	462
07:45 AM	3	141	19	0	0	1	7	175	0	26	0	13	385
Total	4	457	88	7	3	11	86	721	1	140	2	56	1576
08:00 AM	2	145	14	2	0	2	16	214	0	32	0	13	440
08:15 AM	1	100	22	1	0	1	21	220	0	38	0	12	416
08:30 AM	1	94	25	0	2	2	29	171	0	38	0	11	373
08:45 AM	2	84	12	0	2	2	8	170	0	34	1	8	323
Total	6	423	73	3	4	7	74	775	0	142	1	44	1552
Grand Total	10	880	161	10	7	18	160	1496	1	282	3	100	3128
Apprch %	1	83.7	15.3	28.6	20	51.4	9.7	90.3	0.1	73.2	0.8	26	
Total %	0.3	28.1	5.1	0.3	0.2	0.6	5.1	47.8	0	9	0.1	3.2	
Cars	10	836	158	10	7	18	160	1448	1	281	3	97	3029
% Cars	100	95	98.1	100	100	100	100	96.8	100	99.6	100	97	96.8
Trucks	0	44	3	0	0	0	0	48	0	1	0	3	99
% Trucks	0	5	1.9	0	0	0	0	3.2	0	0.4	0	3	3.2

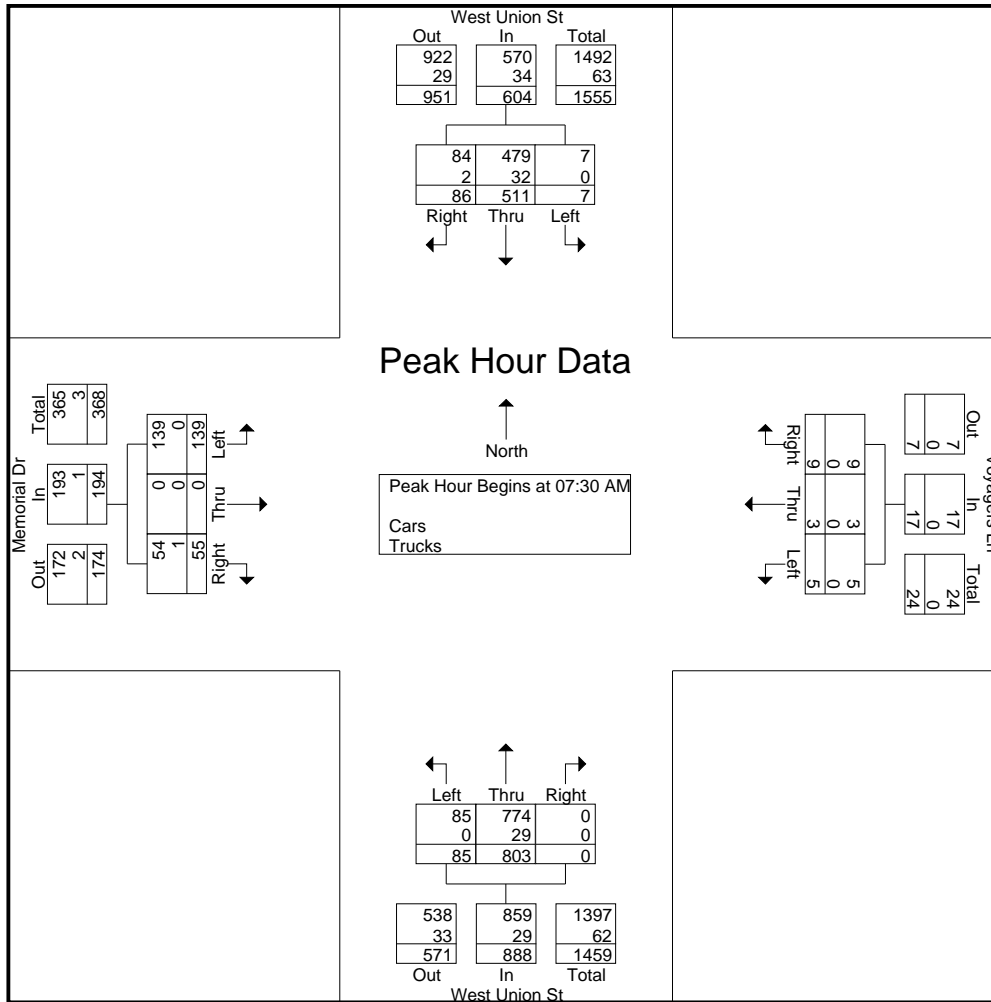
Start Time	West Union St From North				Voyagers Ln From East				West Union St From South				Memorial Dr From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	1	125	31	157	2	3	5	10	41	194	0	235	43	0	17	60	462
07:45 AM	3	141	19	163	0	0	1	1	7	175	0	182	26	0	13	39	385
08:00 AM	2	145	14	161	2	0	2	4	16	214	0	230	32	0	13	45	440
08:15 AM	1	100	22	123	1	0	1	2	21	220	0	241	38	0	12	50	416
Total Volume	7	511	86	604	5	3	9	17	85	803	0	888	139	0	55	194	1703
% App. Total	1.2	84.6	14.2		29.4	17.6	52.9		9.6	90.4	0		71.6	0	28.4		
PHF	.583	.881	.694	.926	.625	.250	.450	.425	.518	.913	.000	.921	.808	.000	.809	.808	.922
Cars	7	479	84	570	5	3	9	17	85	774	0	859	139	0	54	193	1639
% Cars	100	93.7	97.7	94.4	100	100	100	100	100	96.4	0	96.7	100	0	98.2	99.5	96.2
Trucks	0	32	2	34	0	0	0	0	0	29	0	29	0	0	1	1	64
% Trucks	0	6.3	2.3	5.6	0	0	0	0	0	3.6	0	3.3	0	0	1.8	0.5	3.8

Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 2



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

Peak Hour for Each Approach Begins at:

	07:15 AM				07:00 AM				07:30 AM				07:00 AM			
+0 mins.	0	113	26	139	2	0	2	4	41	194	0	235	34	1	15	50
+15 mins.	1	125	31	157	3	0	3	6	7	175	0	182	37	1	11	49
+30 mins.	3	141	19	163	2	3	5	10	16	214	0	230	43	0	17	60
+45 mins.	2	145	14	161	0	0	1	1	21	220	0	241	26	0	13	39
Total Volume	6	524	90	620	7	3	11	21	85	803	0	888	140	2	56	198
% App. Total	1	84.5	14.5		33.3	14.3	52.4		9.6	90.4	0		70.7	1	28.3	
PHF	.500	.903	.726	.951	.583	.250	.550	.525	.518	.913	.000	.921	.814	.500	.824	.825
Cars	6	496	89	591	7	3	11	21	85	774	0	859	140	2	54	196
% Cars	100	94.7	98.9	95.3	100	100	100	100	100	96.4	0	96.7	100	100	96.4	99
Trucks	0	28	1	29	0	0	0	0	0	29	0	29	0	0	2	2
% Trucks	0	5.3	1.1	4.7	0	0	0	0	0	3.6	0	3.3	0	0	3.6	1

Accurate Counts

978-664-2565

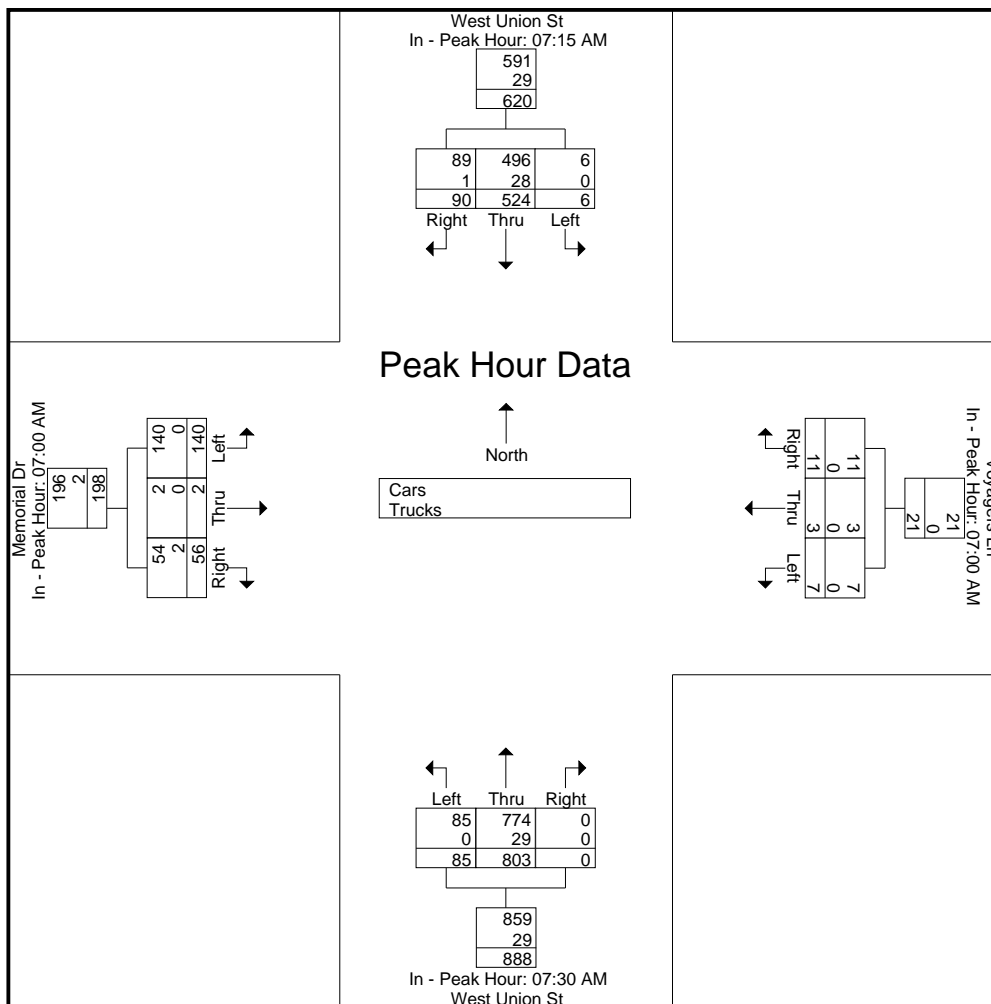
File Name : 10321001

Site Code : 10321001

Start Date : 5/7/2025

Page No : 3

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 4

Groups Printed- Cars

Start Time	West Union St From North			Voyagers Ln From East			West Union St From South			Memorial Dr From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	74	12	2	0	2	7	162	0	34	1	14	308
07:15 AM	0	110	26	3	0	3	31	180	1	37	1	11	403
07:30 AM	1	121	30	2	3	5	41	191	0	43	0	16	453
07:45 AM	3	134	19	0	0	1	7	169	0	26	0	13	372
Total	4	439	87	7	3	11	86	702	1	140	2	54	1536
08:00 AM	2	131	14	2	0	2	16	199	0	32	0	13	411
08:15 AM	1	93	21	1	0	1	21	215	0	38	0	12	403
08:30 AM	1	90	24	0	2	2	29	166	0	38	0	10	362
08:45 AM	2	83	12	0	2	2	8	166	0	33	1	8	317
Total	6	397	71	3	4	7	74	746	0	141	1	43	1493
Grand Total	10	836	158	10	7	18	160	1448	1	281	3	97	3029
Apprch %	1	83.3	15.7	28.6	20	51.4	9.9	90	0.1	73.8	0.8	25.5	
Total %	0.3	27.6	5.2	0.3	0.2	0.6	5.3	47.8	0	9.3	0.1	3.2	

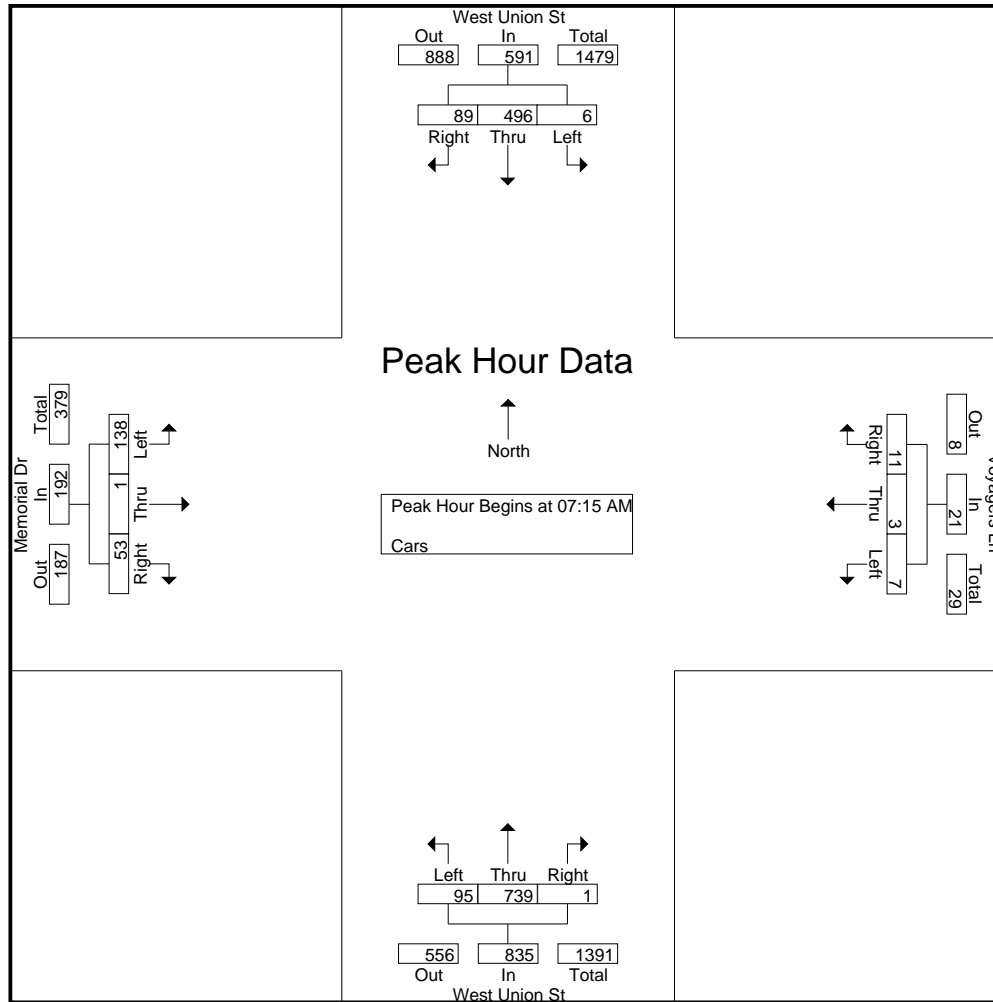
Start Time	West Union St From North				Voyagers Ln From East				West Union St From South				Memorial Dr From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	110	26	136	3	0	3	6	31	180	1	212	37	1	11	49	403
07:30 AM	1	121	30	152	2	3	5	10	41	191	0	232	43	0	16	59	453
07:45 AM	3	134	19	156	0	0	1	1	7	169	0	176	26	0	13	39	372
08:00 AM	2	131	14	147	2	0	2	4	16	199	0	215	32	0	13	45	411
Total Volume	6	496	89	591	7	3	11	21	95	739	1	835	138	1	53	192	1639
% App. Total	1	83.9	15.1		33.3	14.3	52.4		11.4	88.5	0.1		71.9	0.5	27.6		
PHF	.500	.925	.742	.947	.583	.250	.550	.525	.579	.928	.250	.900	.802	.250	.828	.814	.905

Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 5



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

Peak Hour for Each Approach Begins at:

	07:15 AM				07:00 AM				07:30 AM				07:00 AM			
+0 mins.	0	110	26	136	2	0	2	4	41	191	0	232	34	1	14	49
+15 mins.	1	121	30	152	3	0	3	6	7	169	0	176	37	1	11	49
+30 mins.	3	134	19	156	2	3	5	10	16	199	0	215	43	0	16	59
+45 mins.	2	131	14	147	0	0	1	1	21	215	0	236	26	0	13	39
Total Volume	6	496	89	591	7	3	11	21	85	774	0	859	140	2	54	196
% App. Total	1	83.9	15.1		33.3	14.3	52.4		9.9	90.1	0		71.4	1	27.6	
PHF	.500	.925	.742	.947	.583	.250	.550	.525	.518	.900	.000	.910	.814	.500	.844	.831

Accurate Counts

978-664-2565

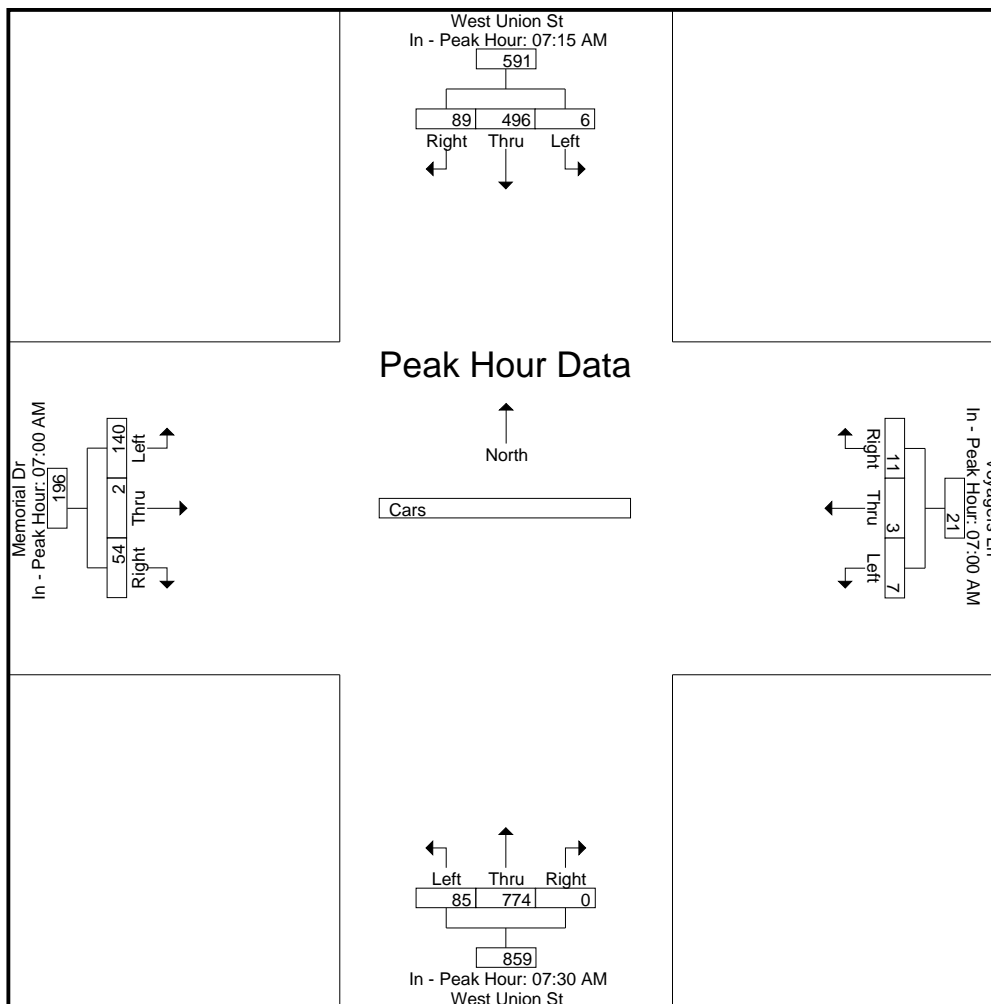
File Name : 10321001

Site Code : 10321001

Start Date : 5/7/2025

Page No : 6

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 7

Groups Printed- Trucks

Start Time	West Union St From North			Voyagers Ln From East			West Union St From South			Memorial Dr From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	4	0	0	0	0	0	5	0	0	0	1	10
07:15 AM	0	3	0	0	0	0	0	5	0	0	0	0	8
07:30 AM	0	4	1	0	0	0	0	3	0	0	0	1	9
07:45 AM	0	7	0	0	0	0	0	6	0	0	0	0	13
Total	0	18	1	0	0	0	0	19	0	0	0	2	40
08:00 AM	0	14	0	0	0	0	0	15	0	0	0	0	29
08:15 AM	0	7	1	0	0	0	0	5	0	0	0	0	13
08:30 AM	0	4	1	0	0	0	0	5	0	0	0	1	11
08:45 AM	0	1	0	0	0	0	0	4	0	1	0	0	6
Total	0	26	2	0	0	0	0	29	0	1	0	1	59
Grand Total	0	44	3	0	0	0	0	48	0	1	0	3	99
Apprch %	0	93.6	6.4	0	0	0	0	100	0	25	0	75	
Total %	0	44.4	3	0	0	0	0	48.5	0	1	0	3	

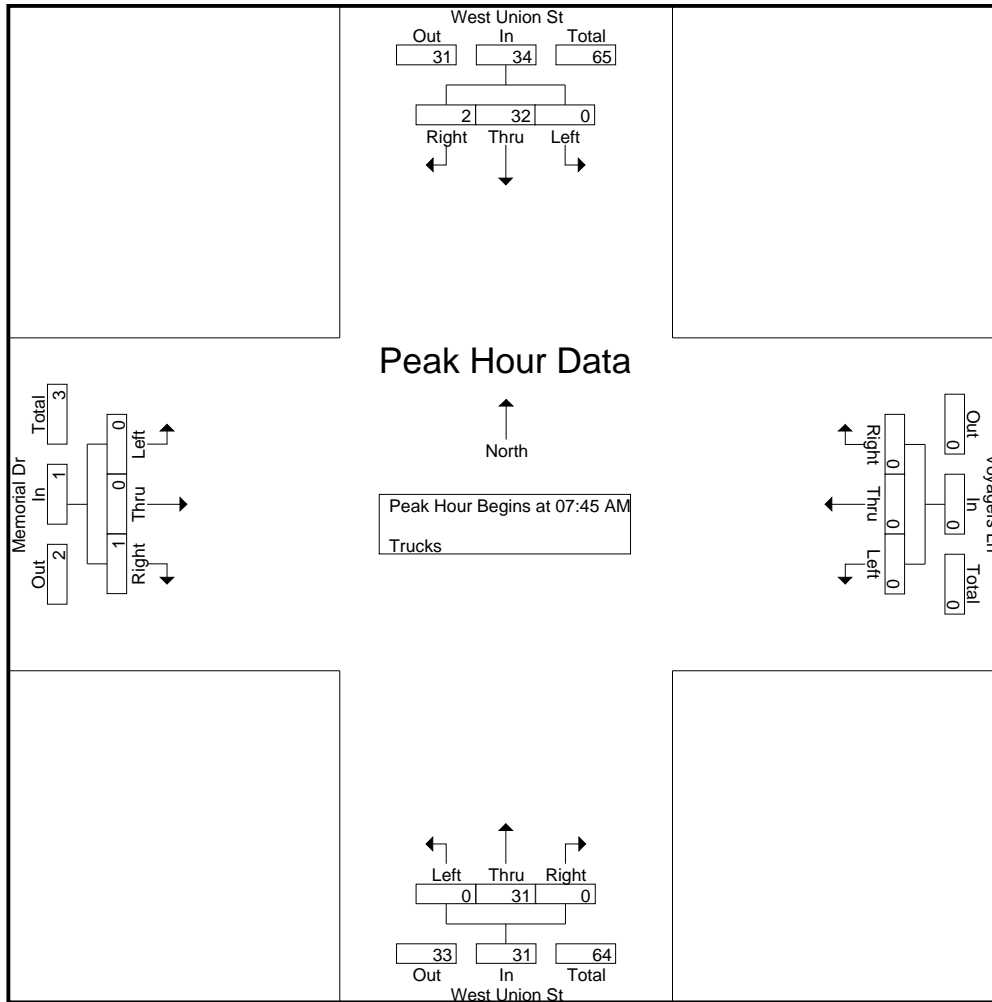
Start Time	West Union St From North				Voyagers Ln From East				West Union St From South				Memorial Dr From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	7	0	7	0	0	0	0	0	6	0	6	0	0	0	0	13
08:00 AM	0	14	0	14	0	0	0	0	0	15	0	15	0	0	0	0	29
08:15 AM	0	7	1	8	0	0	0	0	0	5	0	5	0	0	0	0	13
08:30 AM	0	4	1	5	0	0	0	0	0	5	0	5	0	0	1	1	11
Total Volume	0	32	2	34	0	0	0	0	0	31	0	31	0	0	1	1	66
% App. Total	0	94.1	5.9		0	0	0		0	100	0		0	0	100		
PHF	.000	.571	.500	.607	.000	.000	.000	.000	.000	.517	.000	.517	.000	.000	.250	.250	.569

Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 8



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

Peak Hour for Each Approach Begins at:

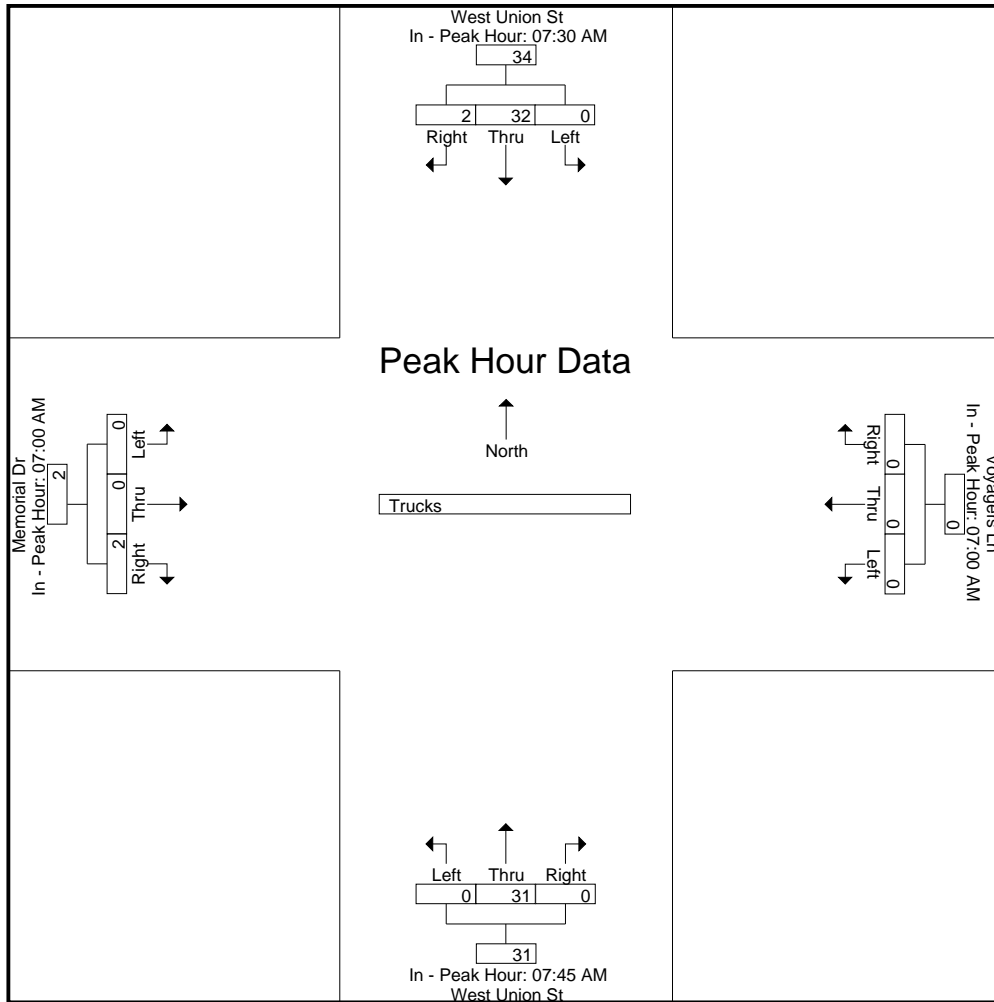
	07:30 AM				07:00 AM				07:45 AM				07:00 AM			
+0 mins.	0	4	1	5	0	0	0	0	0	6	0	6	0	0	1	1
+15 mins.	0	7	0	7	0	0	0	0	0	15	0	15	0	0	0	0
+30 mins.	0	14	0	14	0	0	0	0	0	5	0	5	0	0	1	1
+45 mins.	0	7	1	8	0	0	0	0	0	5	0	5	0	0	0	0
Total Volume	0	32	2	34	0	0	0	0	0	31	0	31	0	0	2	2
% App. Total	0	94.1	5.9		0	0	0		0	100	0		0	0	100	
PHF	.000	.571	.500	.607	.000	.000	.000	.000	.000	.517	.000	.517	.000	.000	.500	.500

Accurate Counts

978-664-2565

N/S Street : West Union Street
E/W Street : Voyagers Ln / Memorial Dr
City/State : Ashland, MA
Weather : Cloudy

File Name : 10321001
Site Code : 10321001
Start Date : 5/7/2025
Page No : 9



Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 10

Groups Printed- Bikes Peds

Start Time	West Union St From North				Voyagers Ln From East				West Union St From South				Memorial Dr From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	3	0	3
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	3	0	3
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	4	0	4
Grand Total	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	5	7	0	7
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

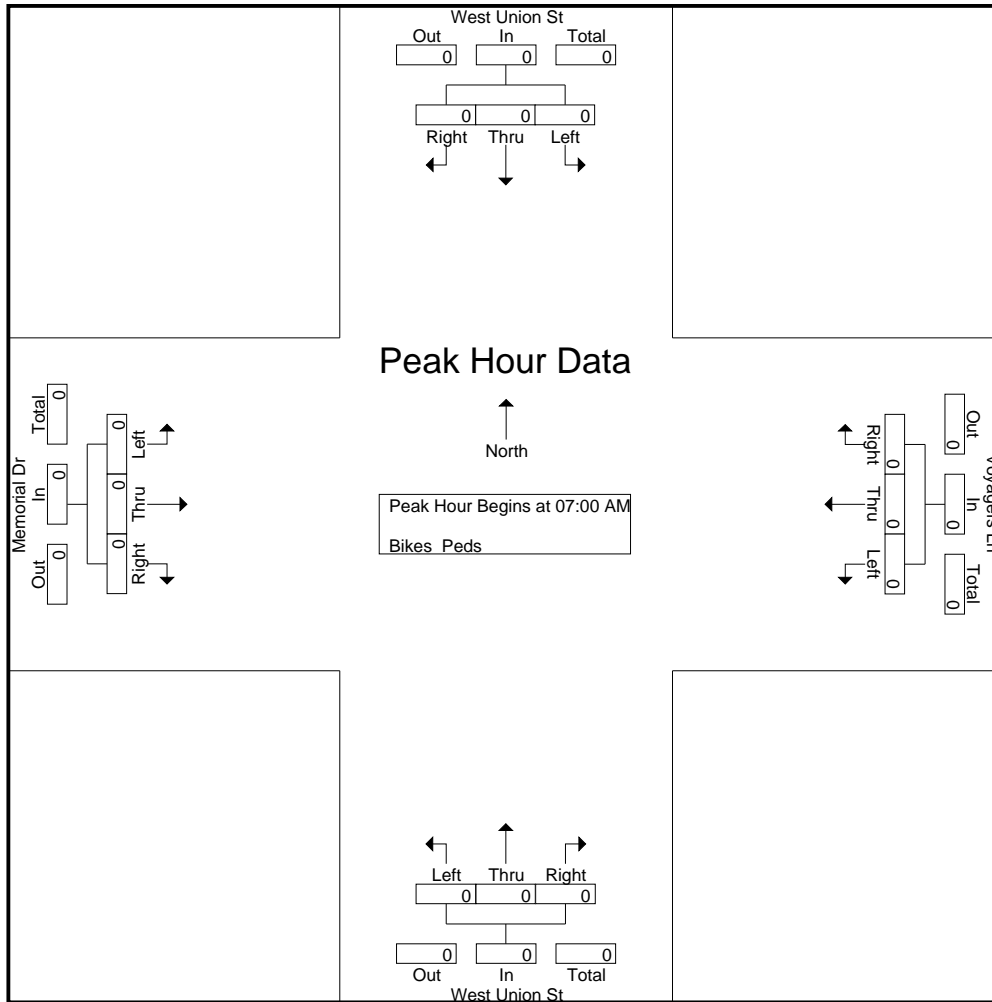
Start Time	West Union St From North				Voyagers Ln From East				West Union St From South				Memorial Dr From West				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 07:00 AM																		
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0			
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 11



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

Peak Hour for Each Approach Begins at:

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

Accurate Counts

978-664-2565

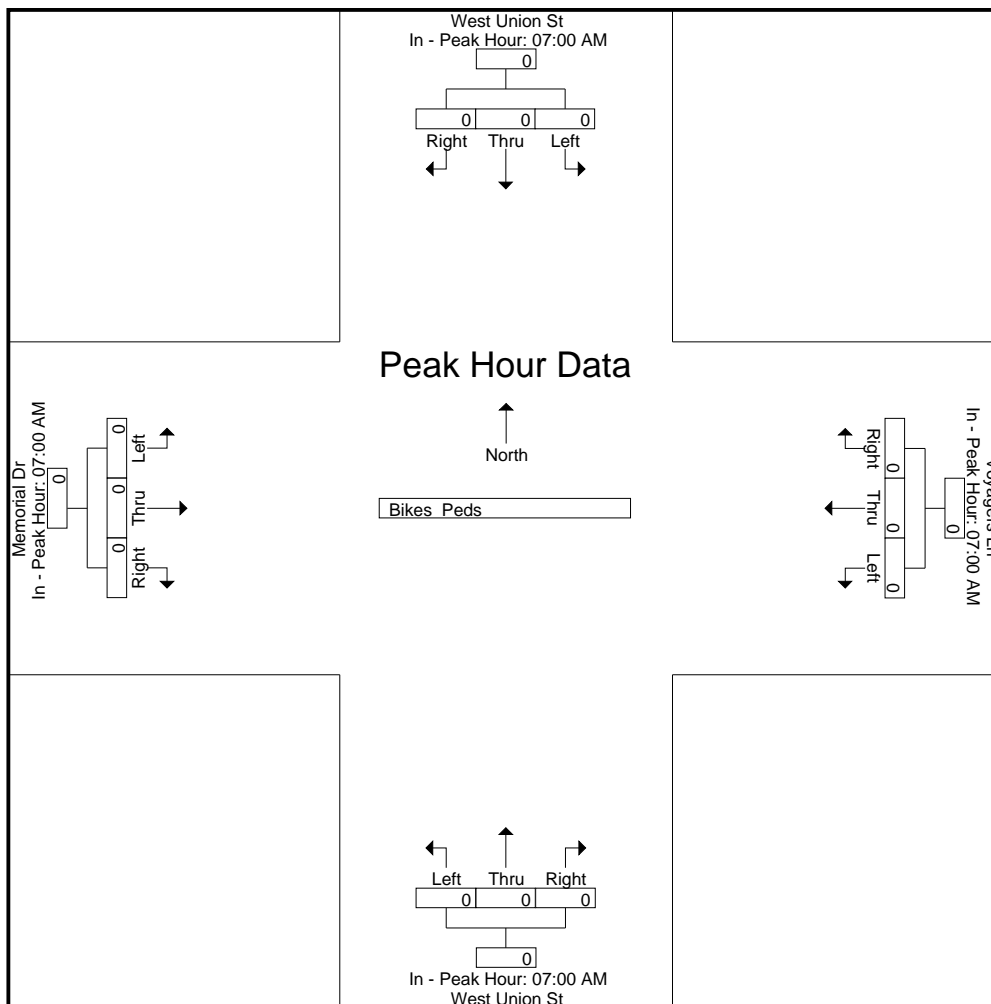
File Name : 10321001

Site Code : 10321001

Start Date : 5/7/2025

Page No : 12

N/S Street : West Union Street
E/W Street : Voyagers Ln / Memorial Dr
City/State : Ashland, MA
Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	West Union St From North			Voyagers Ln From East			West Union St From South			Memorial Dr From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
02:00 PM	1	108	16	0	0	3	4	120	0	15	1	5	273
02:15 PM	0	153	19	1	0	2	2	98	1	15	1	5	297
02:30 PM	2	153	14	0	0	1	7	91	1	20	0	5	294
02:45 PM	0	135	13	1	1	3	10	171	1	12	0	3	350
Total	3	549	62	2	1	9	23	480	3	62	2	18	1214
03:00 PM	3	151	22	1	0	3	6	158	0	11	0	1	356
03:15 PM	4	171	28	0	0	1	7	115	0	19	1	8	354
03:30 PM	3	165	16	2	0	2	6	109	0	20	0	9	332
03:45 PM	4	157	25	1	0	2	11	176	2	14	0	13	405
Total	14	644	91	4	0	8	30	558	2	64	1	31	1447
04:00 PM	9	180	15	0	0	2	8	145	3	15	0	8	385
04:15 PM	5	172	28	0	0	3	5	133	1	9	0	12	368
04:30 PM	6	175	27	0	0	5	11	127	2	12	0	5	370
04:45 PM	6	199	26	1	0	3	5	149	1	20	0	15	425
Total	26	726	96	1	0	13	29	554	7	56	0	40	1548
05:00 PM	7	161	33	0	0	3	2	128	0	36	1	18	389
05:15 PM	5	183	23	2	1	1	4	159	0	11	0	4	393
05:30 PM	6	188	26	1	2	3	3	129	2	10	0	6	376
05:45 PM	1	163	30	1	0	0	11	151	1	35	3	41	437
Total	19	695	112	4	3	7	20	567	3	92	4	69	1595
Grand Total	62	2614	361	11	4	37	102	2159	15	274	7	158	5804
Apprch %	2	86.1	11.9	21.2	7.7	71.2	4.5	94.9	0.7	62.4	1.6	36	
Total %	1.1	45	6.2	0.2	0.1	0.6	1.8	37.2	0.3	4.7	0.1	2.7	
Cars	62	2559	359	11	4	37	101	2094	14	273	7	156	5677
% Cars	100	97.9	99.4	100	100	100	99	97	93.3	99.6	100	98.7	97.8
Trucks	0	55	2	0	0	0	1	65	1	1	0	2	127
% Trucks	0	2.1	0.6	0	0	0	1	3	6.7	0.4	0	1.3	2.2

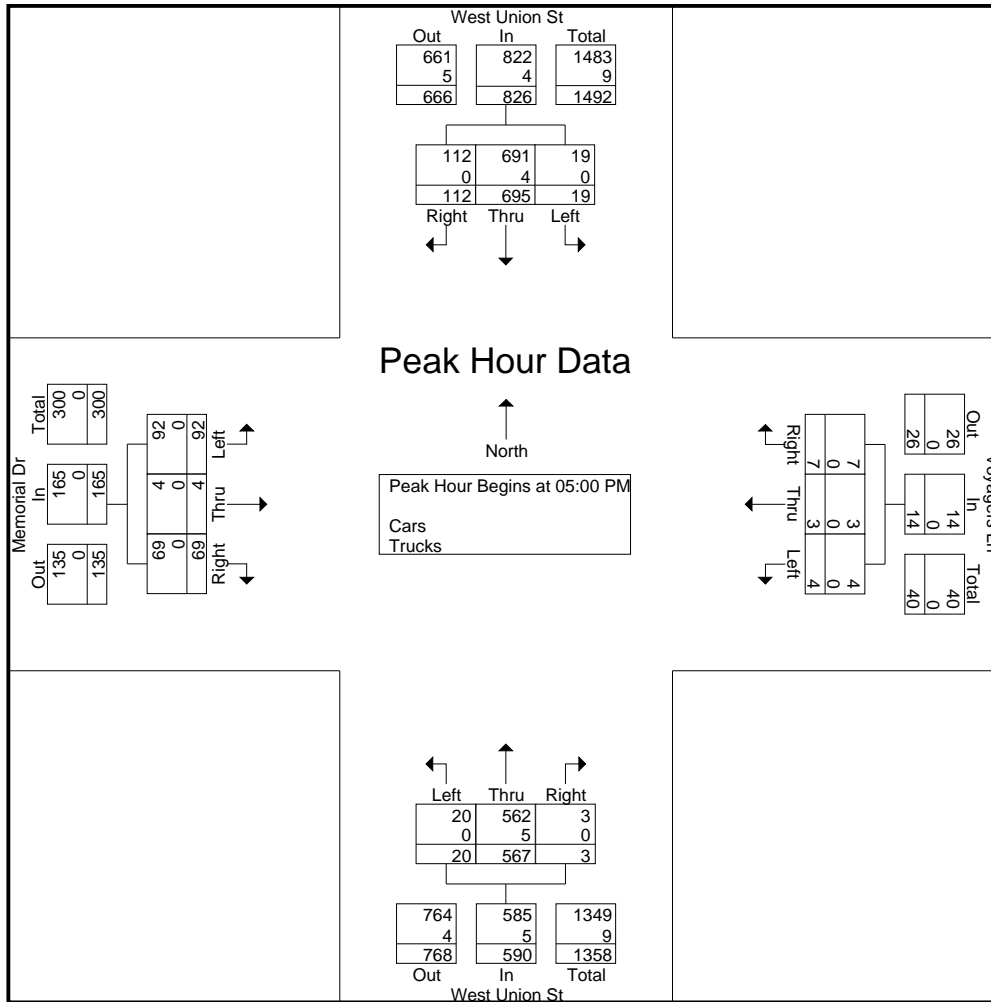
Start Time	West Union St From North				Voyagers Ln From East				West Union St From South				Memorial Dr From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	7	161	33	201	0	0	3	3	2	128	0	130	36	1	18	55	389
05:15 PM	5	183	23	211	2	1	1	4	4	159	0	163	11	0	4	15	393
05:30 PM	6	188	26	220	1	2	3	6	3	129	2	134	10	0	6	16	376
05:45 PM	1	163	30	194	1	0	0	1	11	151	1	163	35	3	41	79	437
Total Volume	19	695	112	826	4	3	7	14	20	567	3	590	92	4	69	165	1595
% App. Total	2.3	84.1	13.6		28.6	21.4	50		3.4	96.1	0.5		55.8	2.4	41.8		
PHF	.679	.924	.848	.939	.500	.375	.583	.583	.455	.892	.375	.905	.639	.333	.421	.522	.912
Cars	19	691	112	822	4	3	7	14	20	562	3	585	92	4	69	165	1586
% Cars	100	99.4	100	99.5	100	100	100	100	100	99.1	100	99.2	100	100	100	100	99.4
Trucks	0	4	0	4	0	0	0	0	0	5	0	5	0	0	0	0	9
% Trucks	0	0.6	0	0.5	0	0	0	0	0	0.9	0	0.8	0	0	0	0	0.6

Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 2



Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				03:45 PM				05:00 PM			
+0 mins.	6	199	26	231	1	0	3	4	11	176	2	189	36	1	18	55
+15 mins.	7	161	33	201	0	0	3	3	8	145	3	156	11	0	4	15
+30 mins.	5	183	23	211	2	1	1	4	5	133	1	139	10	0	6	16
+45 mins.	6	188	26	220	1	2	3	6	11	127	2	140	35	3	41	79
Total Volume	24	731	108	863	4	3	10	17	35	581	8	624	92	4	69	165
% App. Total	2.8	84.7	12.5		23.5	17.6	58.8		5.6	93.1	1.3		55.8	2.4	41.8	
PHF	.857	.918	.818	.934	.500	.375	.833	.708	.795	.825	.667	.825	.639	.333	.421	.522
Cars	24	728	108	860	4	3	10	17	35	566	7	608	92	4	69	165
% Cars	100	99.6	100	99.7	100	100	100	100	100	97.4	87.5	97.4	100	100	100	100
Trucks	0	3	0	3	0	0	0	0	0	15	1	16	0	0	0	0
% Trucks	0	0.4	0	0.3	0	0	0	0	0	2.6	12.5	2.6	0	0	0	0

Accurate Counts

978-664-2565

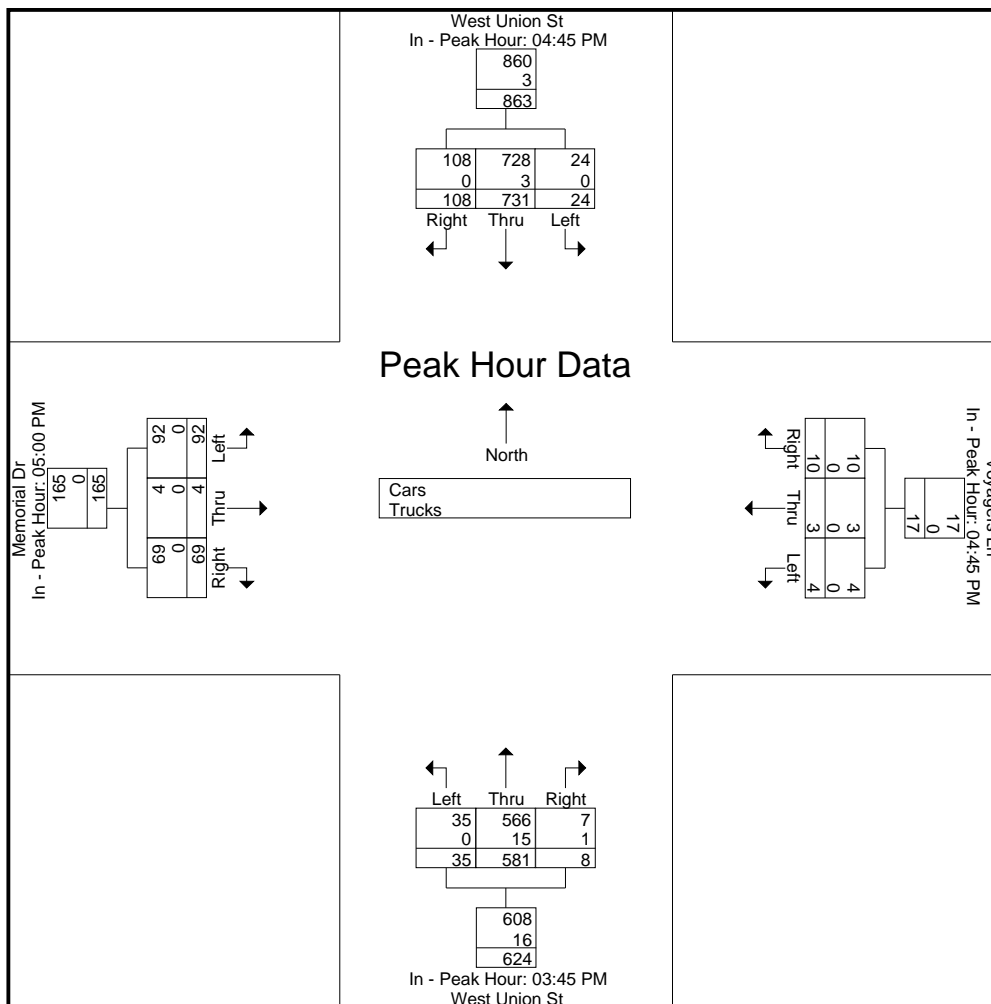
File Name : 10321001

Site Code : 10321001

Start Date : 5/7/2025

Page No : 3

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 4

Groups Printed- Cars

Start Time	West Union St From North			Voyagers Ln From East			West Union St From South			Memorial Dr From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
02:00 PM	1	105	16	0	0	3	4	117	0	15	1	5	267
02:15 PM	0	142	18	1	0	2	2	95	1	15	1	4	281
02:30 PM	2	143	14	0	0	1	7	83	1	20	0	5	276
02:45 PM	0	120	13	1	1	3	10	158	1	12	0	3	322
Total	3	510	61	2	1	9	23	453	3	62	2	17	1146
03:00 PM	3	151	22	1	0	3	6	149	0	11	0	1	347
03:15 PM	4	168	28	0	0	1	6	110	0	18	1	8	344
03:30 PM	3	162	16	2	0	2	6	107	0	20	0	9	327
03:45 PM	4	156	24	1	0	2	11	170	2	14	0	12	396
Total	14	637	90	4	0	8	29	536	2	63	1	30	1414
04:00 PM	9	176	15	0	0	2	8	141	2	15	0	8	376
04:15 PM	5	172	28	0	0	3	5	129	1	9	0	12	364
04:30 PM	6	174	27	0	0	5	11	126	2	12	0	5	368
04:45 PM	6	199	26	1	0	3	5	147	1	20	0	15	423
Total	26	721	96	1	0	13	29	543	6	56	0	40	1531
05:00 PM	7	160	33	0	0	3	2	128	0	36	1	18	388
05:15 PM	5	182	23	2	1	1	4	158	0	11	0	4	391
05:30 PM	6	187	26	1	2	3	3	127	2	10	0	6	373
05:45 PM	1	162	30	1	0	0	11	149	1	35	3	41	434
Total	19	691	112	4	3	7	20	562	3	92	4	69	1586
Grand Total	62	2559	359	11	4	37	101	2094	14	273	7	156	5677
Apprch %	2.1	85.9	12	21.2	7.7	71.2	4.6	94.8	0.6	62.6	1.6	35.8	
Total %	1.1	45.1	6.3	0.2	0.1	0.7	1.8	36.9	0.2	4.8	0.1	2.7	

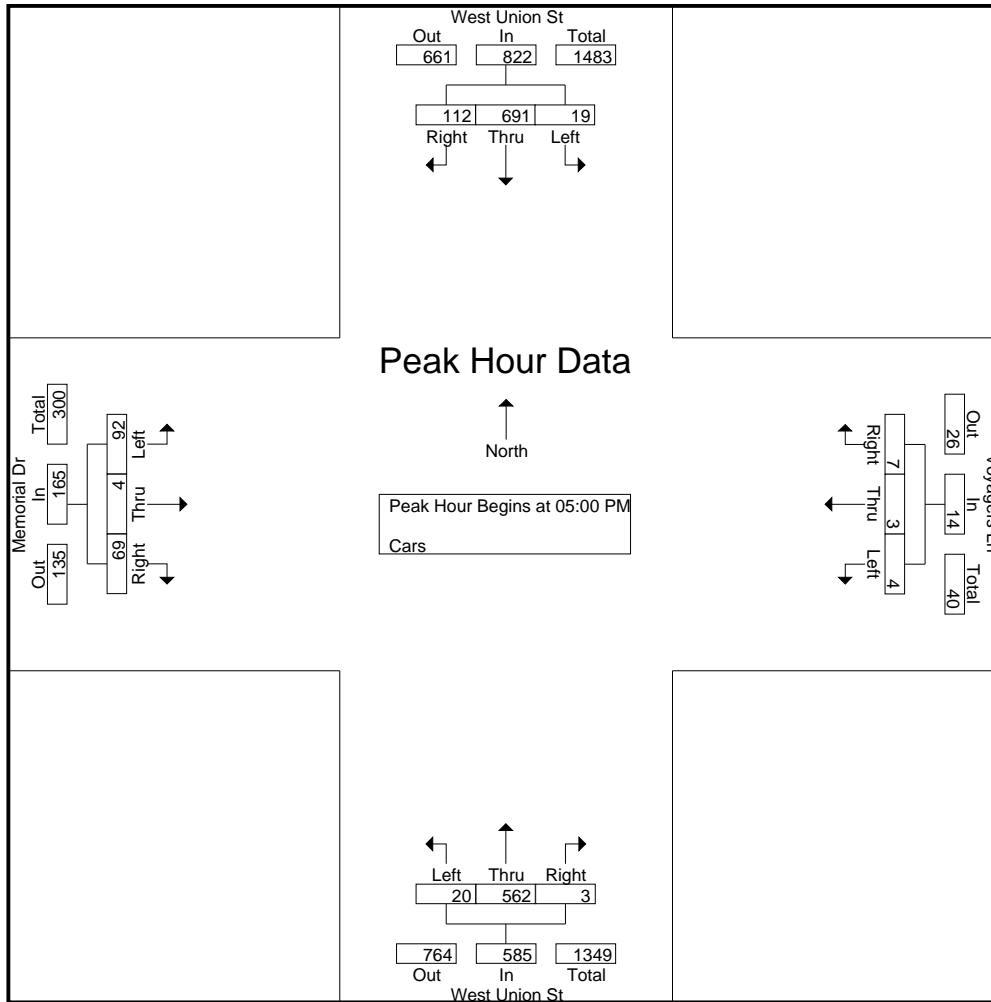
Start Time	West Union St From North				Voyagers Ln From East				West Union St From South				Memorial Dr From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	7	160	33	200	0	0	3	3	2	128	0	130	36	1	18	55	388
05:15 PM	5	182	23	210	2	1	1	4	4	158	0	162	11	0	4	15	391
05:30 PM	6	187	26	219	1	2	3	6	3	127	2	132	10	0	6	16	373
05:45 PM	1	162	30	193	1	0	0	1	11	149	1	161	35	3	41	79	434
Total Volume	19	691	112	822	4	3	7	14	20	562	3	585	92	4	69	165	1586
% App. Total	2.3	84.1	13.6		28.6	21.4	50		3.4	96.1	0.5		55.8	2.4	41.8		
PHF	.679	.924	.848	.938	.500	.375	.583	.583	.455	.889	.375	.903	.639	.333	.421	.522	.914

Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 5



Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				03:45 PM				05:00 PM			
+0 mins.	6	199	26	231	1	0	3	4	11	170	2	183	36	1	18	55
+15 mins.	7	160	33	200	0	0	3	3	8	141	2	151	11	0	4	15
+30 mins.	5	182	23	210	2	1	1	4	5	129	1	135	10	0	6	16
+45 mins.	6	187	26	219	1	2	3	6	11	126	2	139	35	3	41	79
Total Volume	24	728	108	860	4	3	10	17	35	566	7	608	92	4	69	165
% App. Total	2.8	84.7	12.6		23.5	17.6	58.8		5.8	93.1	1.2		55.8	2.4	41.8	
PHF	.857	.915	.818	.931	.500	.375	.833	.708	.795	.832	.875	.831	.639	.333	.421	.522

Accurate Counts

978-664-2565

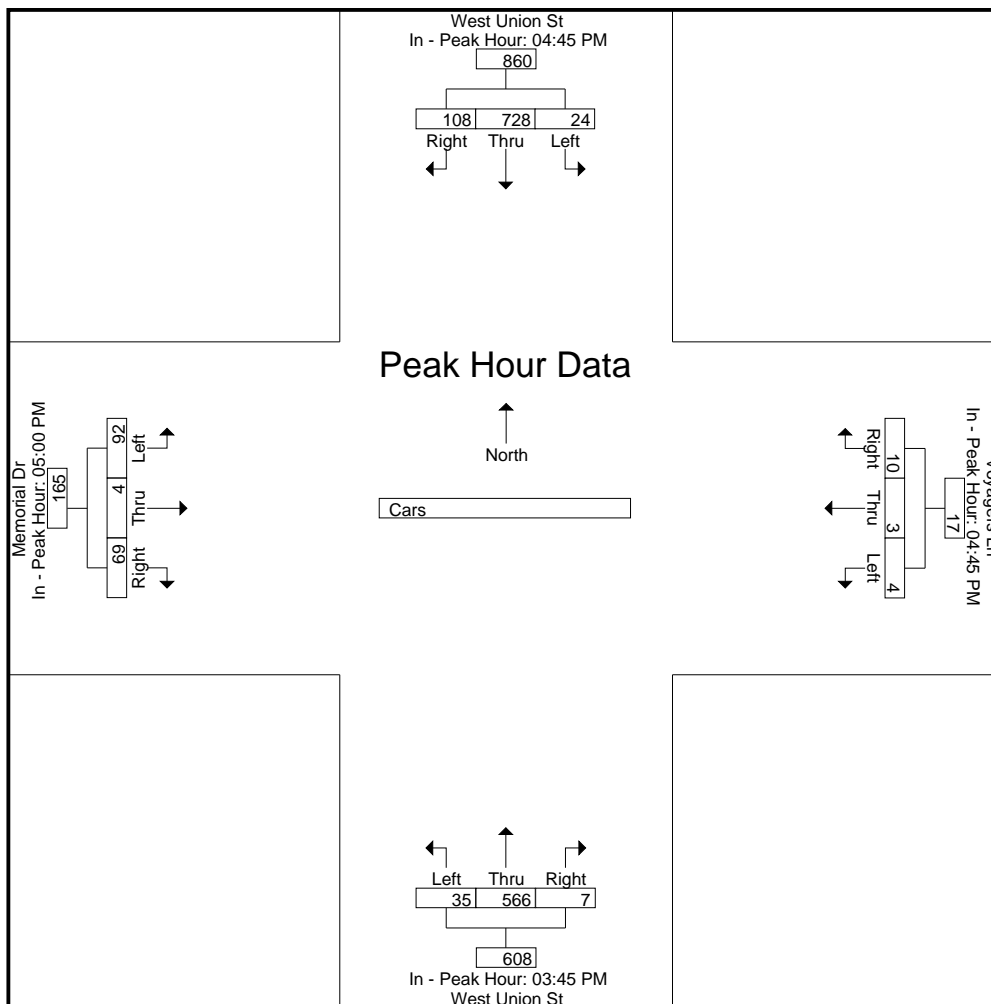
File Name : 10321001

Site Code : 10321001

Start Date : 5/7/2025

Page No : 6

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 7

Groups Printed- Trucks

Start Time	West Union St From North			Voyagers Ln From East			West Union St From South			Memorial Dr From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
02:00 PM	0	3	0	0	0	0	0	3	0	0	0	0	6
02:15 PM	0	11	1	0	0	0	0	3	0	0	0	1	16
02:30 PM	0	10	0	0	0	0	0	8	0	0	0	0	18
02:45 PM	0	15	0	0	0	0	0	13	0	0	0	0	28
Total	0	39	1	0	0	0	0	27	0	0	0	1	68
03:00 PM	0	0	0	0	0	0	0	9	0	0	0	0	9
03:15 PM	0	3	0	0	0	0	1	5	0	1	0	0	10
03:30 PM	0	3	0	0	0	0	0	2	0	0	0	0	5
03:45 PM	0	1	1	0	0	0	0	6	0	0	0	1	9
Total	0	7	1	0	0	0	1	22	0	1	0	1	33
04:00 PM	0	4	0	0	0	0	0	4	1	0	0	0	9
04:15 PM	0	0	0	0	0	0	0	4	0	0	0	0	4
04:30 PM	0	1	0	0	0	0	0	1	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	2	0	0	0	0	2
Total	0	5	0	0	0	0	0	11	1	0	0	0	17
05:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	1	0	0	0	0	0	1	0	0	0	0	2
05:30 PM	0	1	0	0	0	0	0	2	0	0	0	0	3
05:45 PM	0	1	0	0	0	0	0	2	0	0	0	0	3
Total	0	4	0	0	0	0	0	5	0	0	0	0	9
Grand Total	0	55	2	0	0	0	1	65	1	1	0	2	127
Apprch %	0	96.5	3.5	0	0	0	1.5	97	1.5	33.3	0	66.7	
Total %	0	43.3	1.6	0	0	0	0.8	51.2	0.8	0.8	0	1.6	

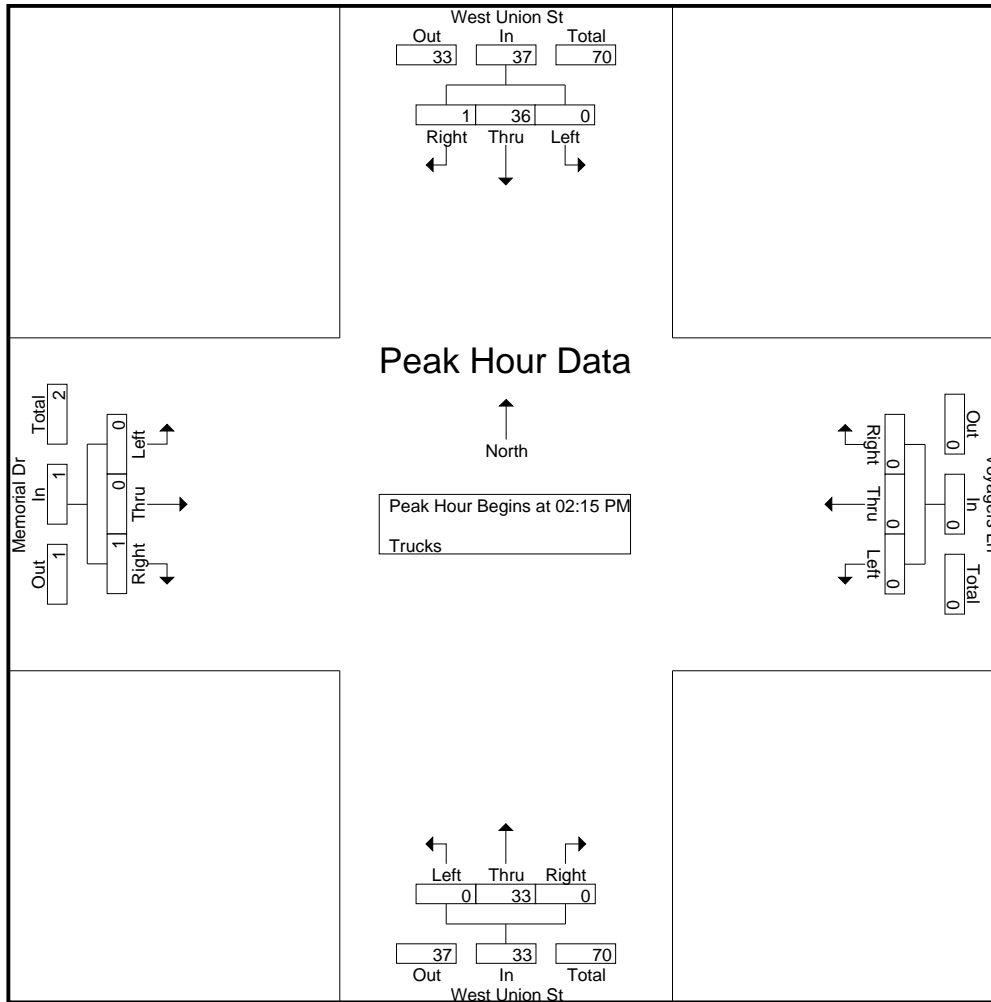
Start Time	West Union St From North				Voyagers Ln From East				West Union St From South				Memorial Dr From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:15 PM																	
02:15 PM	0	11	1	12	0	0	0	0	0	3	0	3	0	0	1	1	16
02:30 PM	0	10	0	10	0	0	0	0	0	8	0	8	0	0	0	0	18
02:45 PM	0	15	0	15	0	0	0	0	0	13	0	13	0	0	0	0	28
03:00 PM	0	0	0	0	0	0	0	0	0	9	0	9	0	0	0	0	9
Total Volume	0	36	1	37	0	0	0	0	0	33	0	33	0	0	1	1	71
% App. Total	0	97.3	2.7		0	0	0		0	100	0		0	0	100		
PHF	.000	.600	.250	.617	.000	.000	.000	.000	.000	.635	.000	.635	.000	.000	.250	.250	.634

Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 8



Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	02:00 PM				02:00 PM				02:30 PM				03:00 PM			
+0 mins.	0	3	0	3	0	0	0	0	0	8	0	8	0	0	0	0
+15 mins.	0	11	1	12	0	0	0	0	0	13	0	13	1	0	0	1
+30 mins.	0	10	0	10	0	0	0	0	0	9	0	9	0	0	0	0
+45 mins.	0	15	0	15	0	0	0	0	1	5	0	6	0	0	0	1
Total Volume	0	39	1	40	0	0	0	0	1	35	0	36	1	0	1	2
% App. Total	0	97.5	2.5		0	0	0		2.8	97.2	0		50	0	50	
PHF	.000	.650	.250	.667	.000	.000	.000	.000	.250	.673	.000	.692	.250	.000	.250	.500

Accurate Counts

978-664-2565

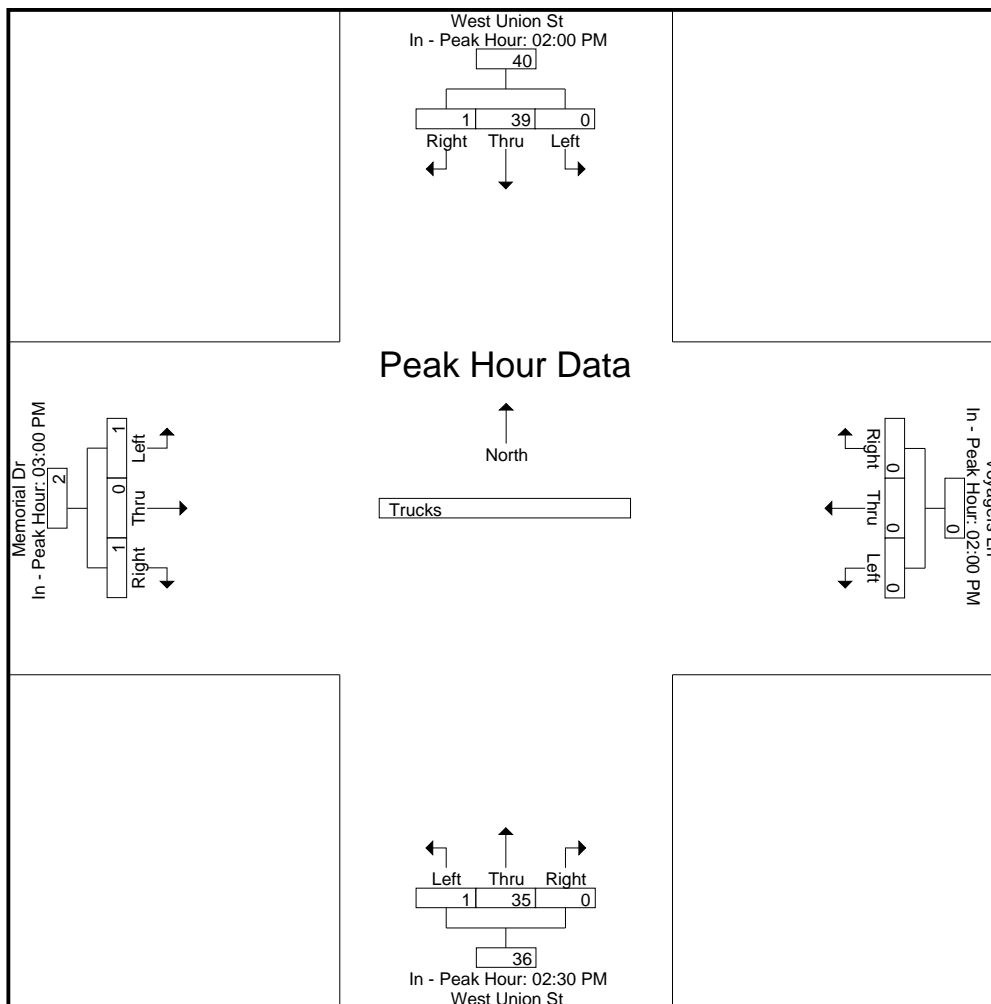
File Name : 10321001

Site Code : 10321001

Start Date : 5/7/2025

Page No : 9

N/S Street : West Union Street
E/W Street : Voyagers Ln / Memorial Dr
City/State : Ashland, MA
Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 10

Groups Printed- Bikes Peds

Start Time	West Union St From North				Voyagers Ln From East				West Union St From South				Memorial Dr From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	21	23	0	23
Total	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	22	24	0	24
03:00 PM	0	2	0	3	0	0	0	0	0	1	0	0	0	0	0	42	45	3	48
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	5
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	4
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	5
Total	0	2	0	3	0	0	0	0	0	1	0	0	0	0	0	56	59	3	62
04:00 PM	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	4	5	2	7
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	5
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
04:45 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	2	3
Total	0	2	1	1	0	0	0	0	0	1	0	0	0	0	0	11	12	4	16
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	1	4	0	0	0	0	0	1	0	0	0	0	0	4	8	2	10
05:45 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	1	5	0	0	0	0	0	1	0	0	0	0	0	5	10	2	12
Grand Total	0	4	2	10	0	0	0	0	0	3	0	1	0	0	0	94	105	9	114
Apprch %	0	66.7	33.3		0	0	0		0	100	0		0	0	0				
Total %	0	44.4	22.2		0	0	0		0	33.3	0		0	0	0		92.1	7.9	

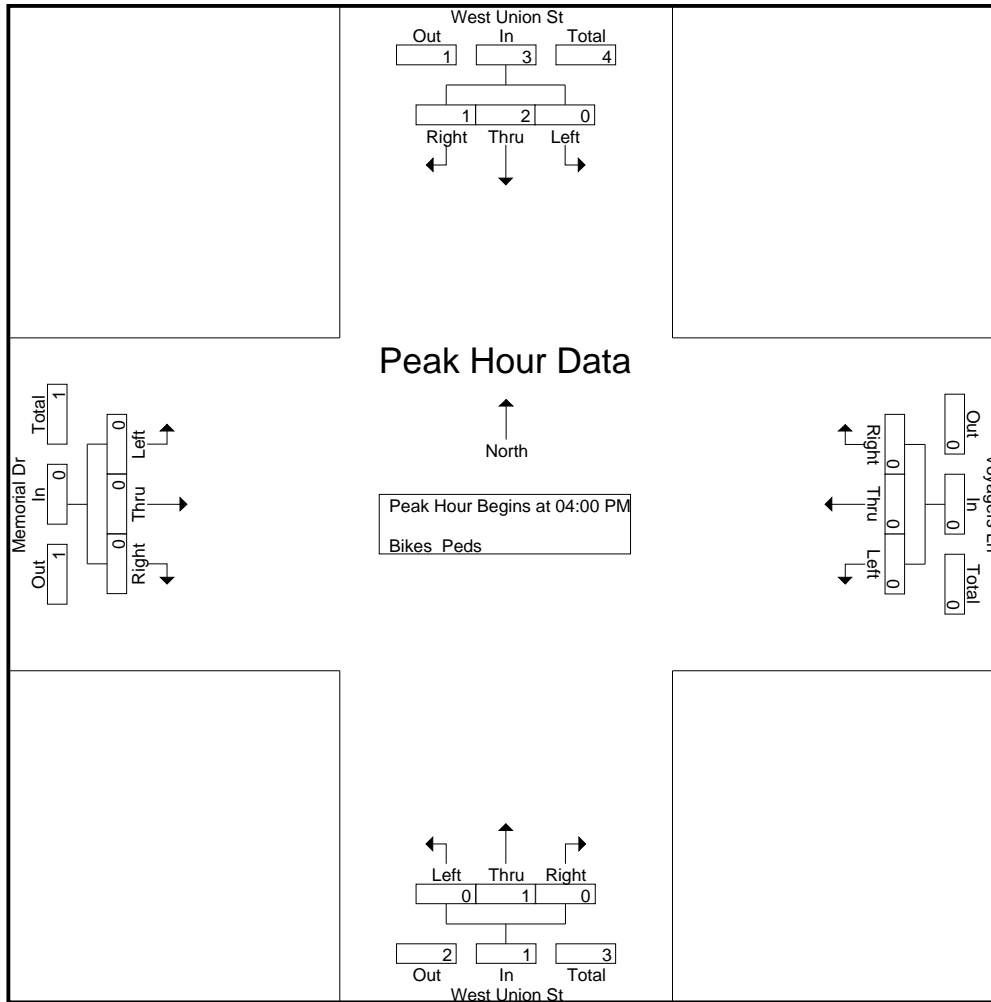
Start Time	West Union St From North				Voyagers Ln From East				West Union St From South				Memorial Dr From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
Total Volume	0	2	1	3	0	0	0	0	0	1	0	1	0	0	0	0	4
% App. Total	0	66.7	33.3		0	0	0		0	100	0		0	0	0		
PHF	.000	.500	.250	.375	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.500

Accurate Counts

978-664-2565

N/S Street : West Union Street
 E/W Street : Voyagers Ln / Memorial Dr
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321001
 Site Code : 10321001
 Start Date : 5/7/2025
 Page No : 11



Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				02:00 PM				04:45 PM				02:00 PM			
+0 mins.	0	1	1	2	0	0	0	0	0	1	0	1	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0
Total Volume	0	2	1	3	0	0	0	0	0	2	0	2	0	0	0	0
% App. Total	0	66.7	33.3		0	0	0	0	0	100	0		0	0	0	
PHF	.000	.500	.250	.375	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000

Accurate Counts

978-664-2565

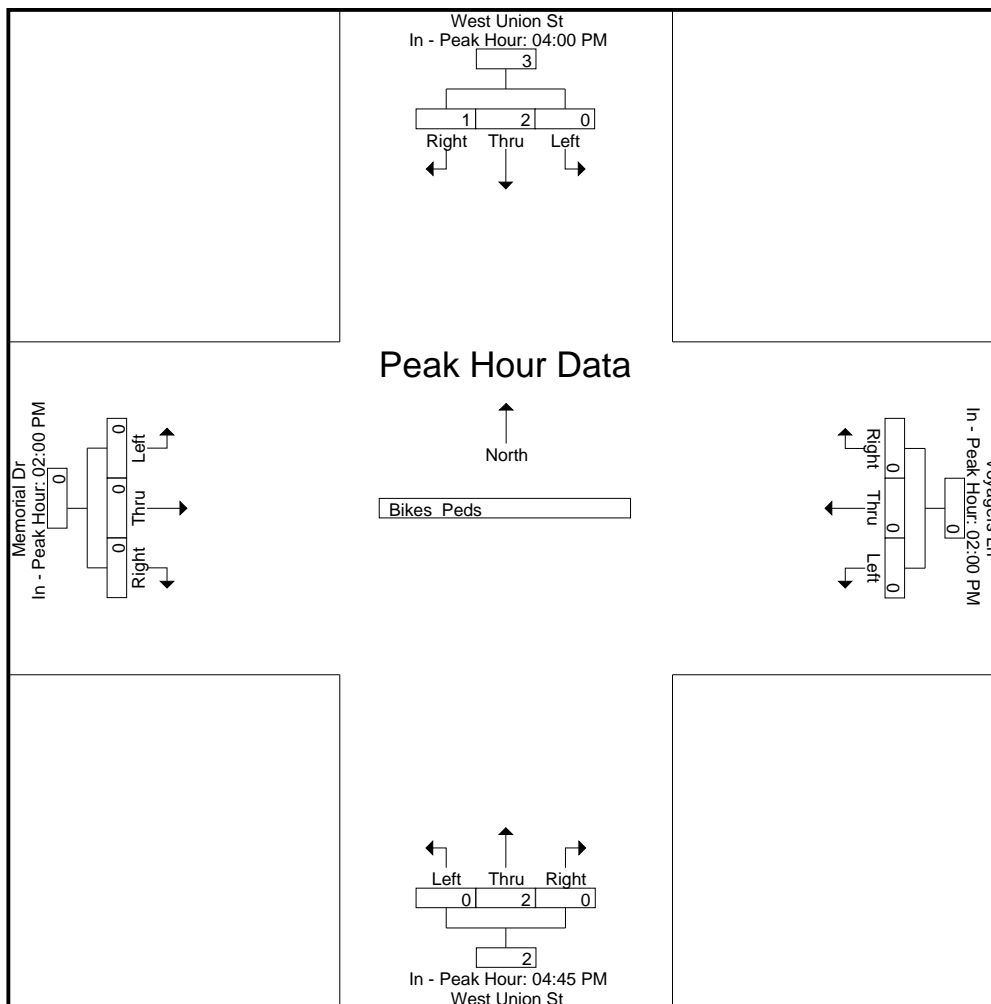
File Name : 10321001

Site Code : 10321001

Start Date : 5/7/2025

Page No : 12

N/S Street : West Union Street
E/W Street : Voyagers Ln / Memorial Dr
City/State : Ashland, MA
Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Union St / West Union St
 E/W Street : Summer Street
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321002
 Site Code : 10321002
 Start Date : 5/7/2025
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Union St From North		West Union St From South			Summer St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right		
07:00 AM	66	12	54	154	2	27	315	
07:15 AM	92	11	97	154	7	48	409	
07:30 AM	100	13	78	162	8	41	402	
07:45 AM	111	15	69	144	13	69	421	
Total	369	51	298	614	30	185	1547	
08:00 AM	120	20	97	154	6	44	441	
08:15 AM	98	12	90	174	12	35	421	
08:30 AM	85	12	59	163	11	42	372	
08:45 AM	70	14	58	150	11	39	342	
Total	373	58	304	641	40	160	1576	
Grand Total	742	109	602	1255	70	345	3123	
Apprch %	87.2	12.8	32.4	67.6	16.9	83.1		
Total %	23.8	3.5	19.3	40.2	2.2	11		
Cars	704	109	590	1217	69	333	3022	
% Cars	94.9	100	98	97	98.6	96.5	96.8	
Trucks	38	0	12	38	1	12	101	
% Trucks	5.1	0	2	3	1.4	3.5	3.2	

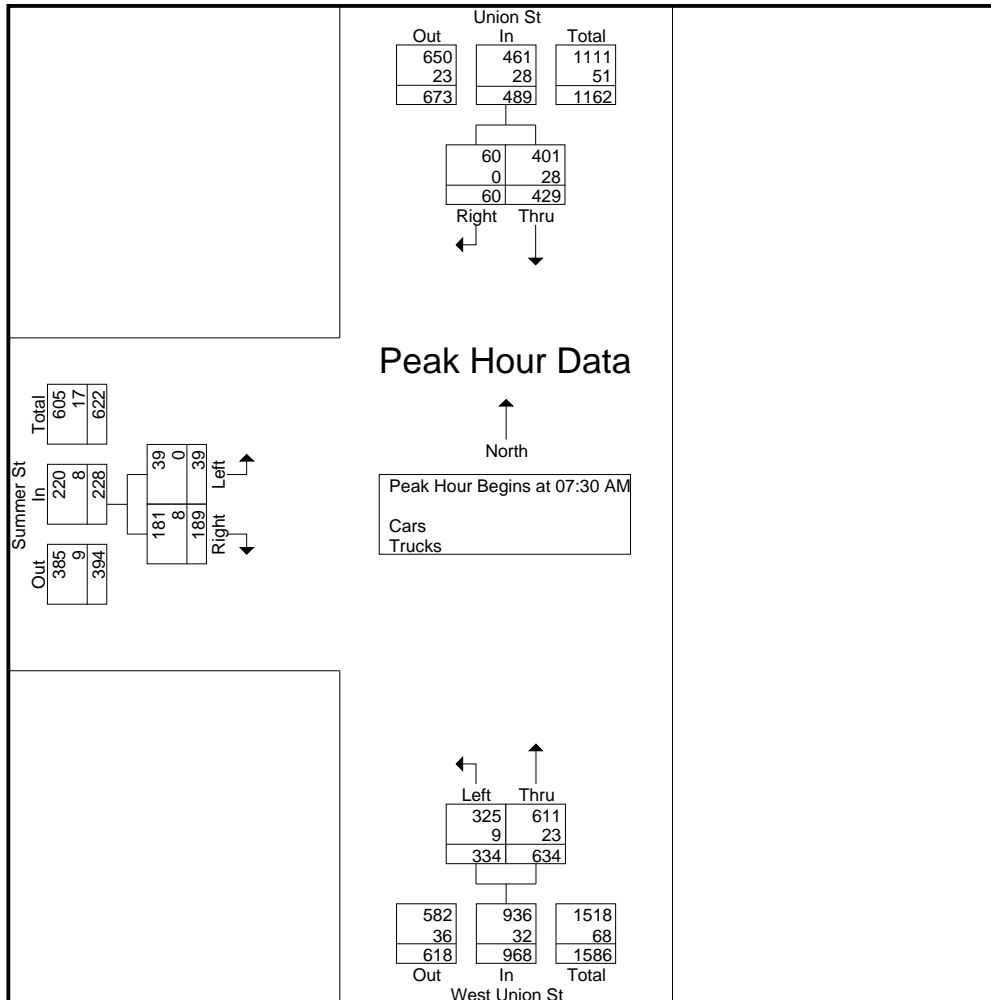
Start Time	Union St From North			West Union St From South			Summer St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	100	13	113	78	162	240	8	41	49	402
07:45 AM	111	15	126	69	144	213	13	69	82	421
08:00 AM	120	20	140	97	154	251	6	44	50	441
08:15 AM	98	12	110	90	174	264	12	35	47	421
Total Volume	429	60	489	334	634	968	39	189	228	1685
% App. Total	87.7	12.3		34.5	65.5		17.1	82.9		
PHF	.894	.750	.873	.861	.911	.917	.750	.685	.695	.955
Cars	401	60	461	325	611	936	39	181	220	1617
% Cars	93.5	100	94.3	97.3	96.4	96.7	100	95.8	96.5	96.0
Trucks	28	0	28	9	23	32	0	8	8	68
% Trucks	6.5	0	5.7	2.7	3.6	3.3	0	4.2	3.5	4.0

Accurate Counts

978-664-2565

N/S Street : Union St / West Union St
 E/W Street : Summer Street
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321002
 Site Code : 10321002
 Start Date : 5/7/2025
 Page No : 2



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

Peak Hour for Each Approach Begins at:

	07:30 AM			07:30 AM			07:15 AM		
+0 mins.	100	13	113	78	162	240	7	48	55
+15 mins.	111	15	126	69	144	213	8	41	49
+30 mins.	120	20	140	97	154	251	13	69	82
+45 mins.	98	12	110	90	174	264	6	44	50
Total Volume	429	60	489	334	634	968	34	202	236
% App. Total	87.7	12.3		34.5	65.5		14.4	85.6	
PHF	.894	.750	.873	.861	.911	.917	.654	.732	.720
Cars	401	60	461	325	611	936	34	193	227
% Cars	93.5	100	94.3	97.3	96.4	96.7	100	95.5	96.2
Trucks	28	0	28	9	23	32	0	9	9
% Trucks	6.5	0	5.7	2.7	3.6	3.3	0	4.5	3.8

Accurate Counts

978-664-2565

File Name : 10321002

Site Code : 10321002

Start Date : 5/7/2025

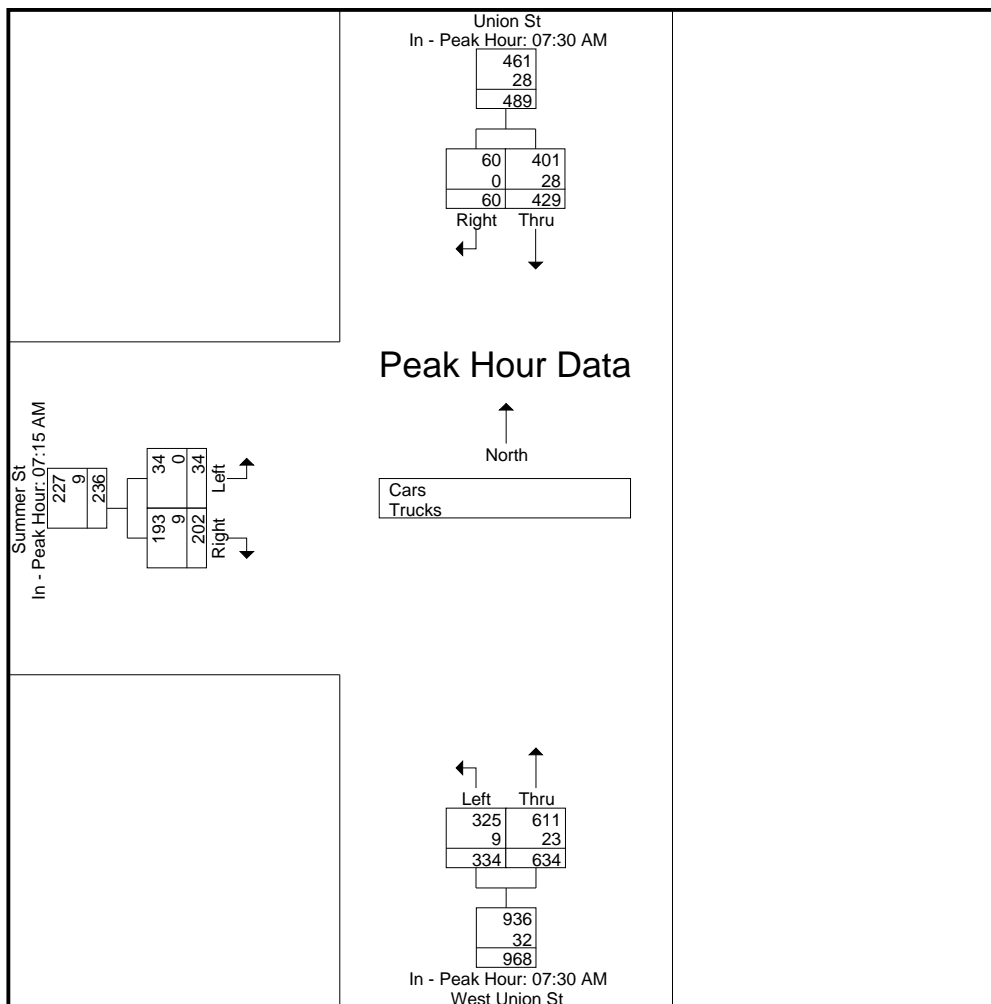
Page No : 3

N/S Street : Union St / West Union St

E/W Street : Summer Street

City/State : Ashland, MA

Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Union St / West Union St
 E/W Street : Summer Street
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321002
 Site Code : 10321002
 Start Date : 5/7/2025
 Page No : 4

Groups Printed- Cars

Start Time	Union St From North		West Union St From South		Summer St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
07:00 AM	62	12	52	151	1	27	305
07:15 AM	91	11	97	150	7	46	402
07:30 AM	96	13	78	159	8	36	390
07:45 AM	106	15	67	138	13	67	406
Total	355	51	294	598	29	176	1503
08:00 AM	106	20	93	144	6	44	413
08:15 AM	93	12	87	170	12	34	408
08:30 AM	81	12	59	158	11	40	361
08:45 AM	69	14	57	147	11	39	337
Total	349	58	296	619	40	157	1519
Grand Total	704	109	590	1217	69	333	3022
Apprch %	86.6	13.4	32.7	67.3	17.2	82.8	
Total %	23.3	3.6	19.5	40.3	2.3	11	

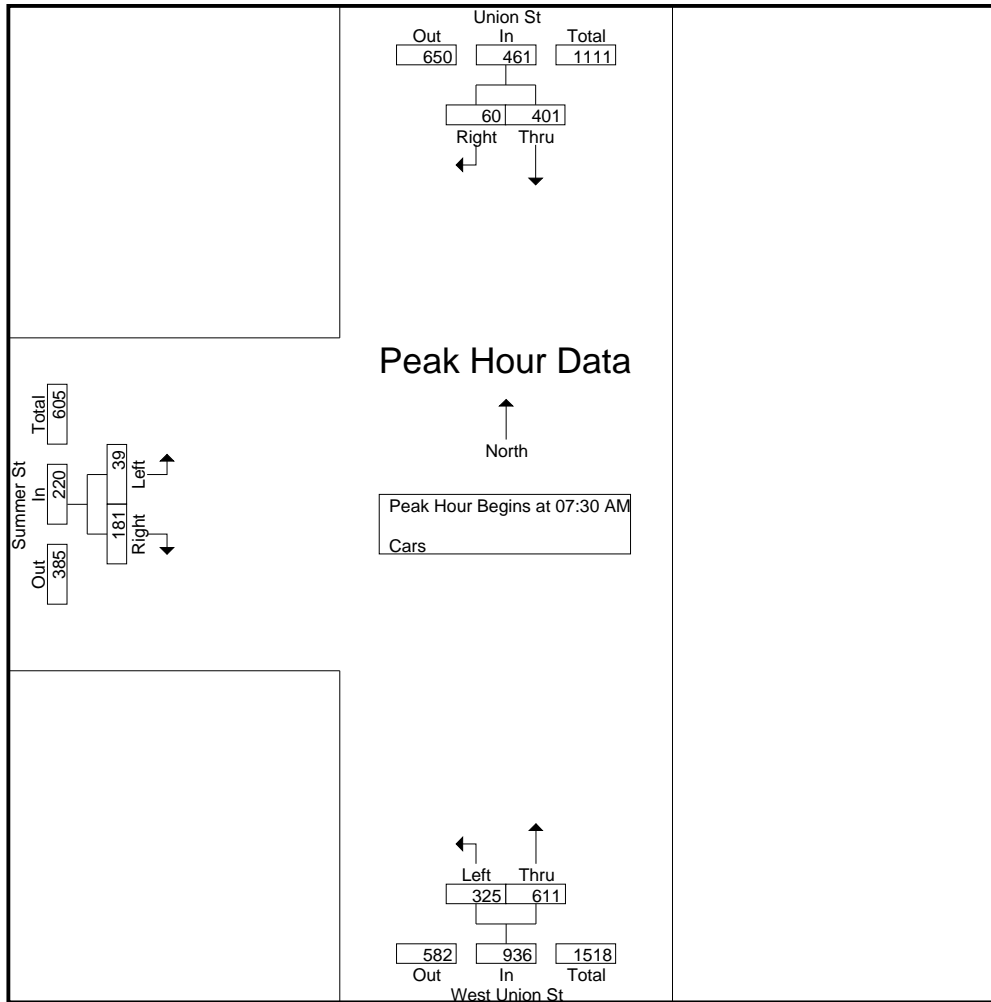
Start Time	Union St From North			West Union St From South			Summer St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	96	13	109	78	159	237	8	36	44	390
07:45 AM	106	15	121	67	138	205	13	67	80	406
08:00 AM	106	20	126	93	144	237	6	44	50	413
08:15 AM	93	12	105	87	170	257	12	34	46	408
Total Volume	401	60	461	325	611	936	39	181	220	1617
% App. Total	87	13		34.7	65.3		17.7	82.3		
PHF	.946	.750	.915	.874	.899	.911	.750	.675	.688	.979

Accurate Counts

978-664-2565

N/S Street : Union St / West Union St
 E/W Street : Summer Street
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321002
 Site Code : 10321002
 Start Date : 5/7/2025
 Page No : 5



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

Peak Hour for Each Approach Begins at:

	07:30 AM			07:30 AM			07:15 AM		
+0 mins.	96	13	109	78	159	237	7	46	53
+15 mins.	106	15	121	67	138	205	8	36	44
+30 mins.	106	20	126	93	144	237	13	67	80
+45 mins.	93	12	105	87	170	257	6	44	50
Total Volume	401	60	461	325	611	936	34	193	227
% App. Total	87	13		34.7	65.3		15	85	
PHF	.946	.750	.915	.874	.899	.911	.654	.720	.709

Accurate Counts

978-664-2565

File Name : 10321002

Site Code : 10321002

Start Date : 5/7/2025

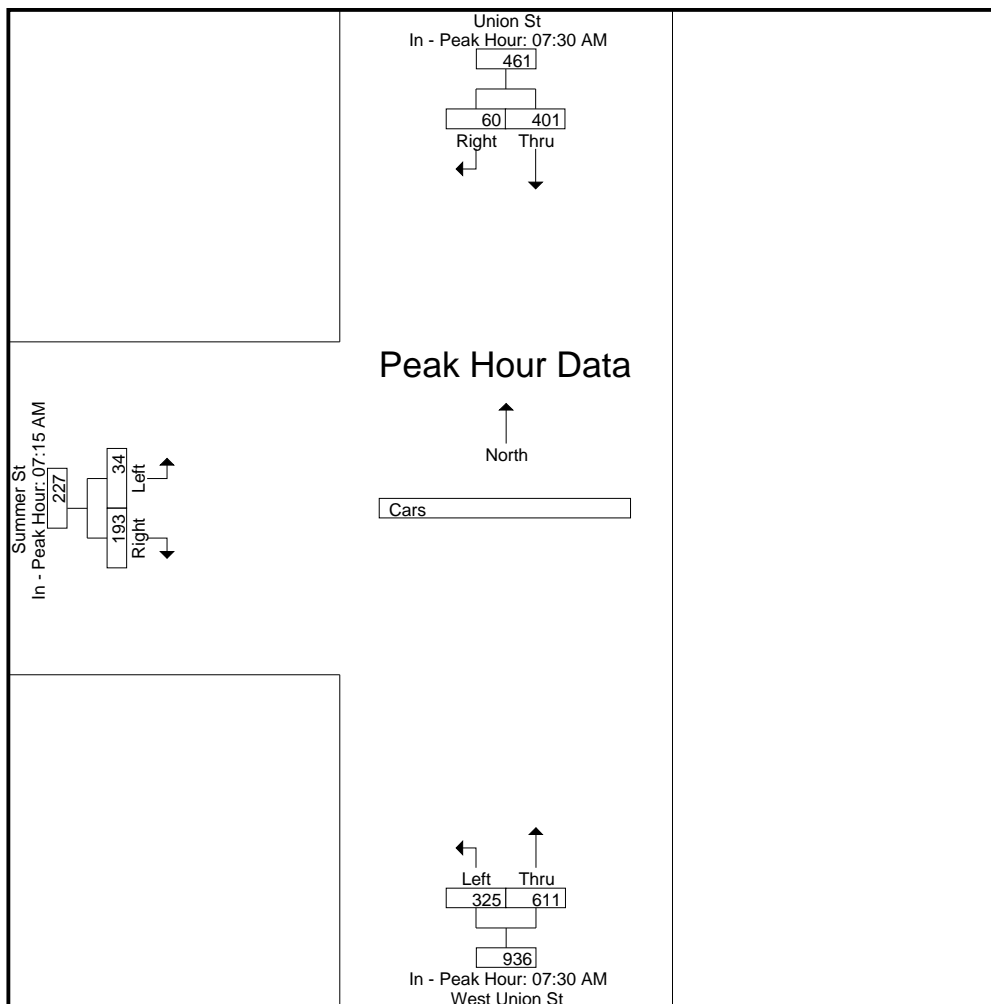
Page No : 6

N/S Street : Union St / West Union St

E/W Street : Summer Street

City/State : Ashland, MA

Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Union St / West Union St

E/W Street : Summer Street

City/State : Ashland, MA

Weather : Cloudy

File Name : 10321002

Site Code : 10321002

Start Date : 5/7/2025

Page No : 7

Groups Printed- Trucks

Start Time	Union St From North		West Union St From South		Summer St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
07:00 AM	4	0	2	3	1	0	10
07:15 AM	1	0	0	4	0	2	7
07:30 AM	4	0	0	3	0	5	12
07:45 AM	5	0	2	6	0	2	15
Total	14	0	4	16	1	9	44
08:00 AM	14	0	4	10	0	0	28
08:15 AM	5	0	3	4	0	1	13
08:30 AM	4	0	0	5	0	2	11
08:45 AM	1	0	1	3	0	0	5
Total	24	0	8	22	0	3	57
Grand Total	38	0	12	38	1	12	101
Apprch %	100	0	24	76	7.7	92.3	
Total %	37.6	0	11.9	37.6	1	11.9	

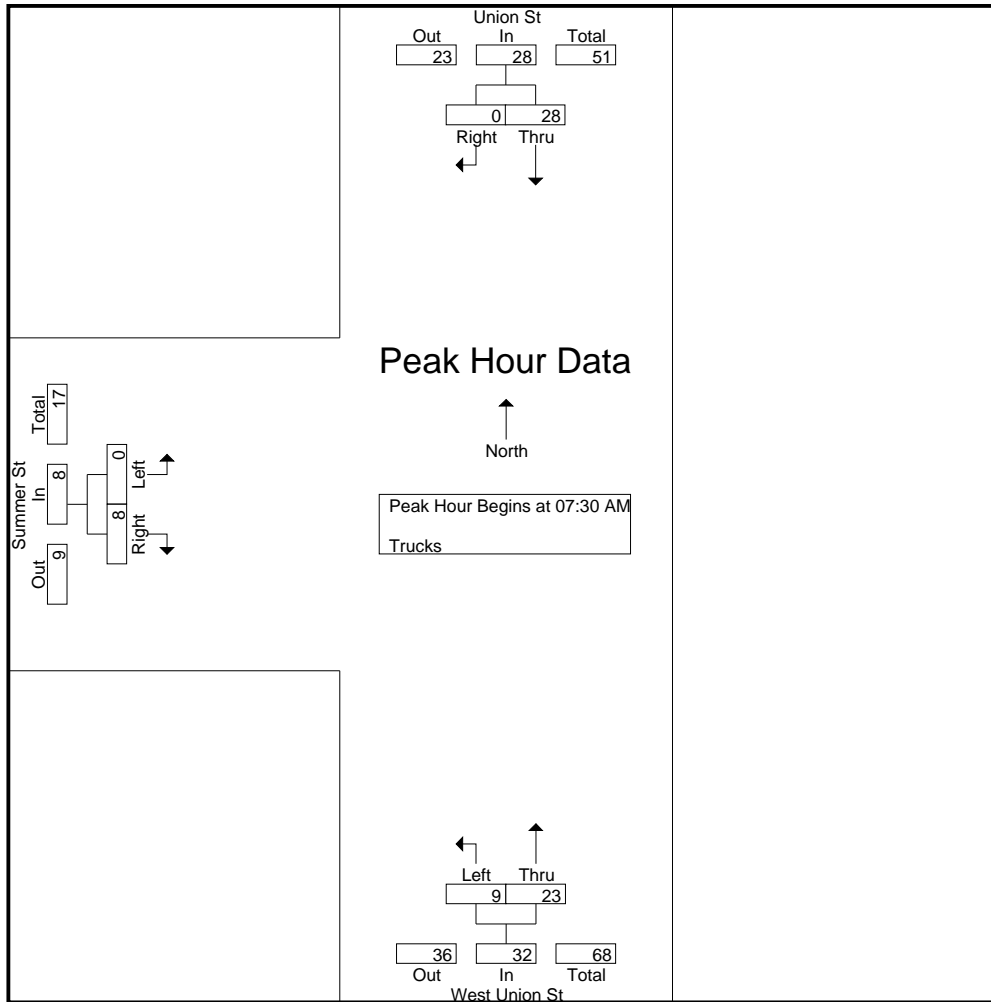
Start Time	Union St From North			West Union St From South			Summer St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	4	0	4	0	3	3	0	5	5	12
07:45 AM	5	0	5	2	6	8	0	2	2	15
08:00 AM	14	0	14	4	10	14	0	0	0	28
08:15 AM	5	0	5	3	4	7	0	1	1	13
Total Volume	28	0	28	9	23	32	0	8	8	68
% App. Total	100	0		28.1	71.9		0	100		
PHF	.500	.000	.500	.563	.575	.571	.000	.400	.400	.607

Accurate Counts

978-664-2565

N/S Street : Union St / West Union St
 E/W Street : Summer Street
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321002
 Site Code : 10321002
 Start Date : 5/7/2025
 Page No : 8



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

Peak Hour for Each Approach Begins at:

	07:30 AM			07:45 AM			07:00 AM		
+0 mins.	4	0	4	2	6	8	1	0	1
+15 mins.	5	0	5	4	10	14	0	2	2
+30 mins.	14	0	14	3	4	7	0	5	5
+45 mins.	5	0	5	0	5	5	0	2	2
Total Volume	28	0	28	9	25	34	1	9	10
% App. Total	100	0		26.5	73.5		10	90	
PHF	.500	.000	.500	.563	.625	.607	.250	.450	.500

Accurate Counts

978-664-2565

File Name : 10321002

Site Code : 10321002

Start Date : 5/7/2025

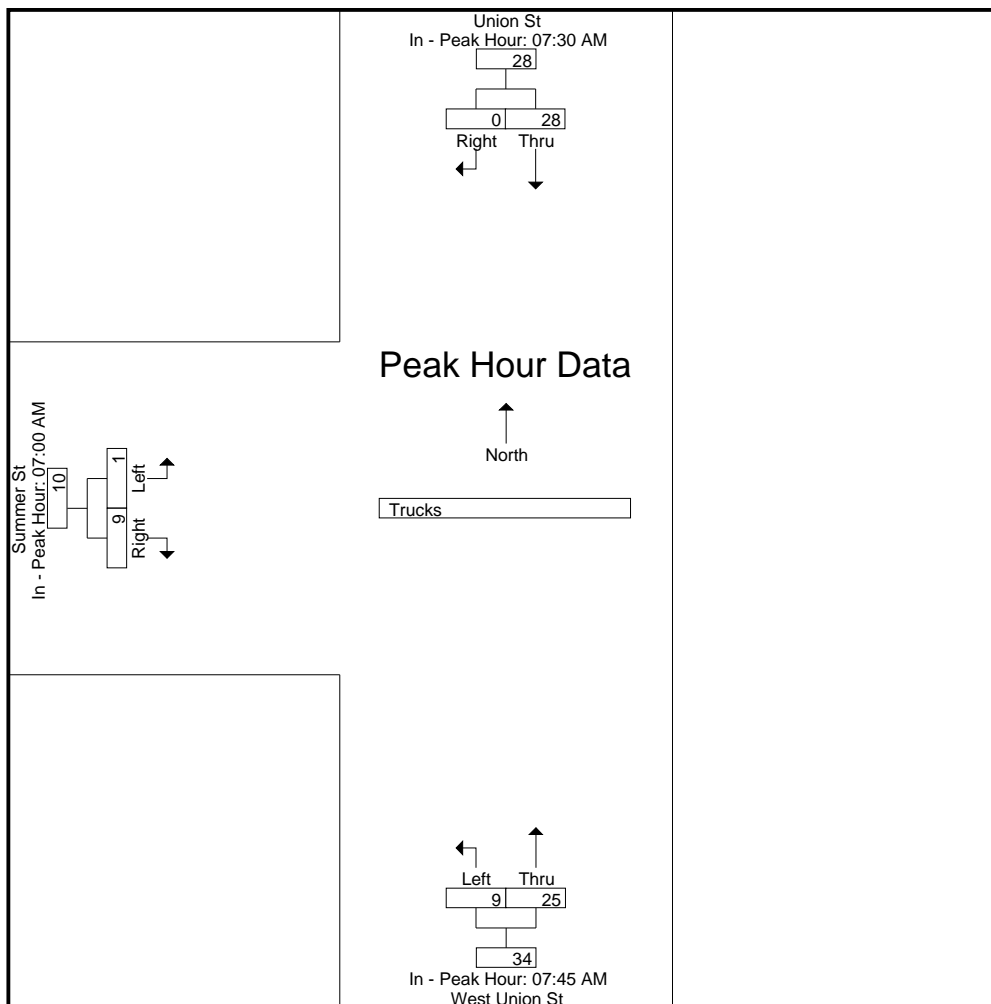
Page No : 9

N/S Street : Union St / West Union St

E/W Street : Summer Street

City/State : Ashland, MA

Weather : Cloudy



Accurate Counts

978-664-2565

File Name : 10321002

Site Code : 10321002

Start Date : 5/7/2025

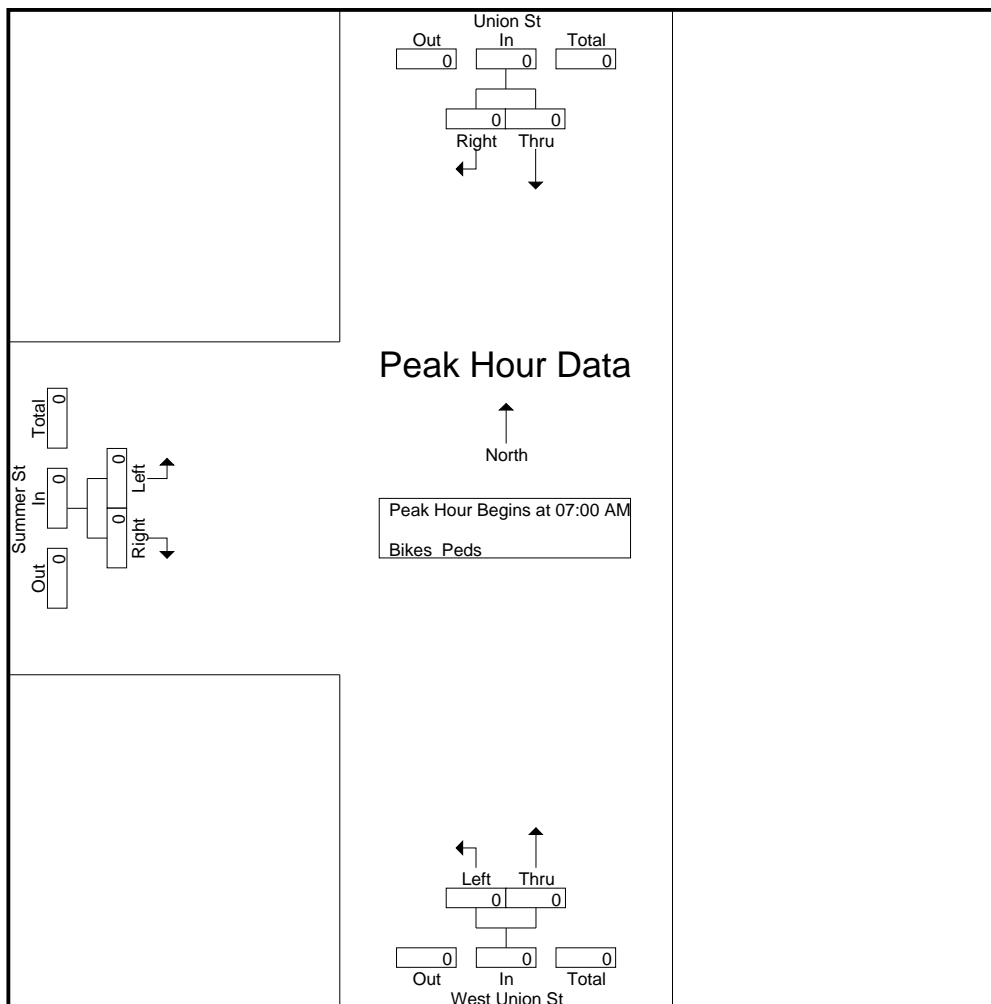
Page No : 11

N/S Street : Union St / West Union St

E/W Street : Summer Street

City/State : Ashland, MA

Weather : Cloudy



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

Peak Hour for Each Approach Begins at:

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

Accurate Counts

978-664-2565

File Name : 10321002

Site Code : 10321002

Start Date : 5/7/2025

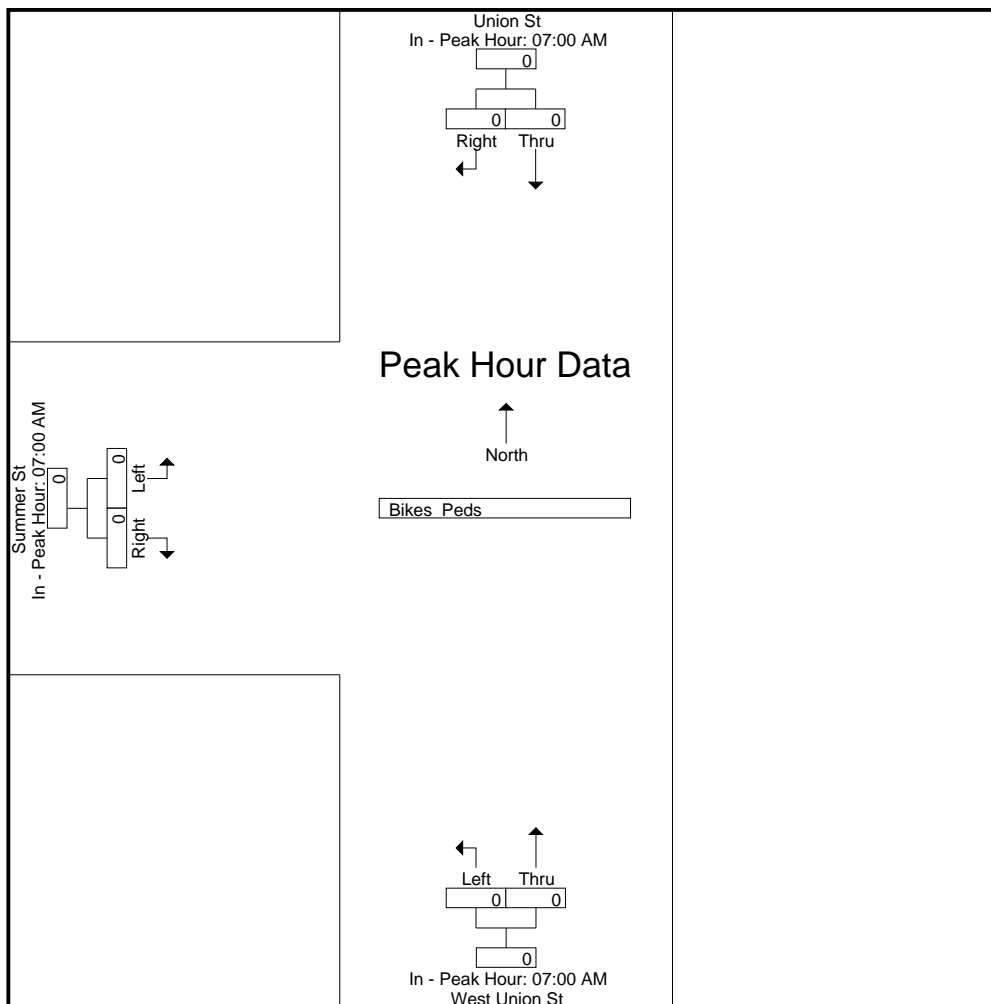
Page No : 12

N/S Street : Union St / West Union St

E/W Street : Summer Street

City/State : Ashland, MA

Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Union St / West Union St
 E/W Street : Summer Street
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321002
 Site Code : 10321002
 Start Date : 5/7/2025
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Union St From North		West Union St From South		Summer St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
02:00 PM	90	11	45	103	7	43	299
02:15 PM	114	13	25	92	6	66	316
02:30 PM	121	10	36	89	14	66	336
02:45 PM	118	10	58	140	10	44	380
Total	443	44	164	424	37	219	1331
03:00 PM	147	16	59	114	10	43	389
03:15 PM	143	13	41	105	6	58	366
03:30 PM	133	17	36	99	17	61	363
03:45 PM	141	12	62	133	6	50	404
Total	564	58	198	451	39	212	1522
04:00 PM	131	10	48	119	22	70	400
04:15 PM	159	15	28	114	10	58	384
04:30 PM	157	16	36	115	18	64	406
04:45 PM	175	12	40	138	22	60	447
Total	622	53	152	486	72	252	1637
05:00 PM	144	9	46	133	30	65	427
05:15 PM	124	14	47	127	11	66	389
05:30 PM	160	12	34	113	15	69	403
05:45 PM	141	11	46	147	15	66	426
Total	569	46	173	520	71	266	1645
Grand Total	2198	201	687	1881	219	949	6135
Apprch %	91.6	8.4	26.8	73.2	18.8	81.2	
Total %	35.8	3.3	11.2	30.7	3.6	15.5	
Cars	2151	199	666	1831	219	929	5995
% Cars	97.9	99	96.9	97.3	100	97.9	97.7
Trucks	47	2	21	50	0	20	140
% Trucks	2.1	1	3.1	2.7	0	2.1	2.3

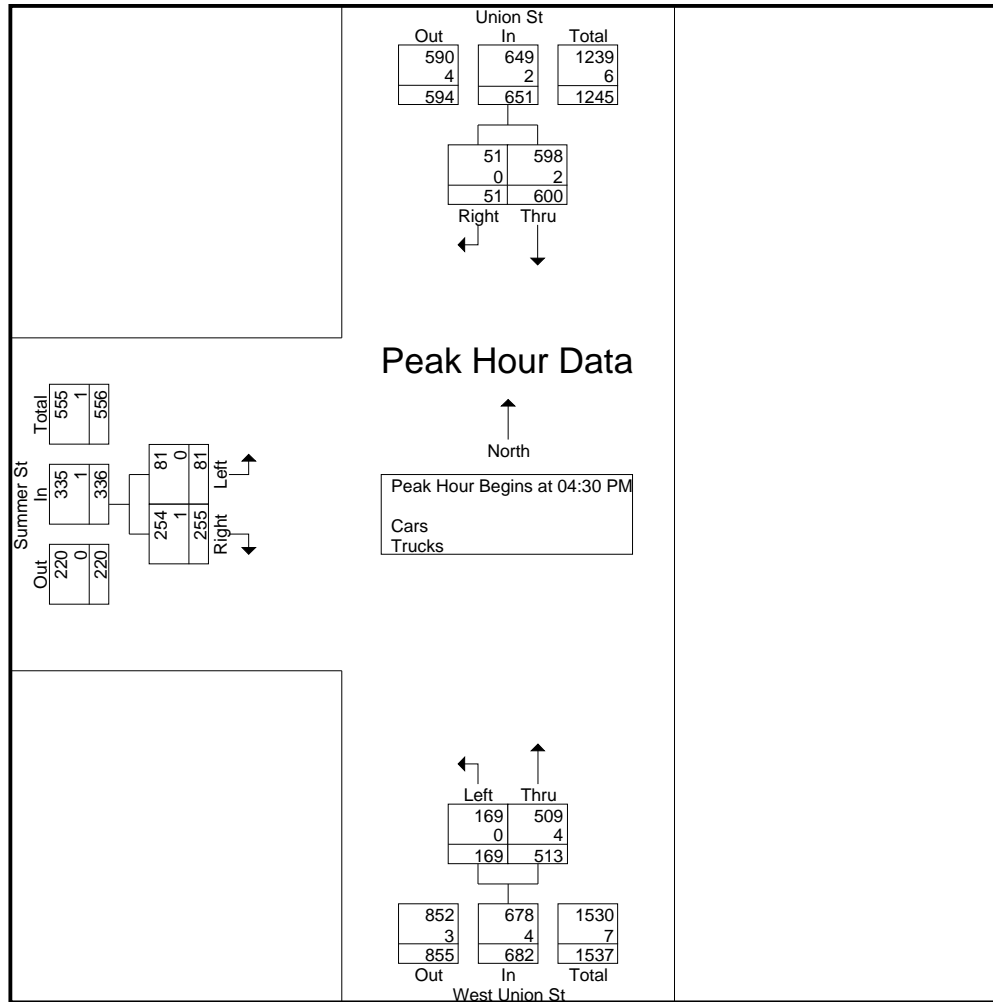
Start Time	Union St From North			West Union St From South			Summer St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	157	16	173	36	115	151	18	64	82	406
04:45 PM	175	12	187	40	138	178	22	60	82	447
05:00 PM	144	9	153	46	133	179	30	65	95	427
05:15 PM	124	14	138	47	127	174	11	66	77	389
Total Volume	600	51	651	169	513	682	81	255	336	1669
% App. Total	92.2	7.8		24.8	75.2		24.1	75.9		
PHF	.857	.797	.870	.899	.929	.953	.675	.966	.884	.933
Cars	598	51	649	169	509	678	81	254	335	1662
% Cars	99.7	100	99.7	100	99.2	99.4	100	99.6	99.7	99.6
Trucks	2	0	2	0	4	4	0	1	1	7
% Trucks	0.3	0	0.3	0	0.8	0.6	0	0.4	0.3	0.4

Accurate Counts

978-664-2565

N/S Street : Union St / West Union St
 E/W Street : Summer Street
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321002
 Site Code : 10321002
 Start Date : 5/7/2025
 Page No : 2



Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:15 PM			05:00 PM			04:45 PM		
+0 mins.	159	15	174	46	133	179	22	60	82
+15 mins.	157	16	173	47	127	174	30	65	95
+30 mins.	175	12	187	34	113	147	11	66	77
+45 mins.	144	9	153	46	147	193	15	69	84
Total Volume	635	52	687	173	520	693	78	260	338
% App. Total	92.4	7.6		25	75		23.1	76.9	
PHF	.907	.813	.918	.920	.884	.898	.650	.942	.889
Cars	634	52	686	172	517	689	78	260	338
% Cars	99.8	100	99.9	99.4	99.4	99.4	100	100	100
Trucks	1	0	1	1	3	4	0	0	0
% Trucks	0.2	0	0.1	0.6	0.6	0.6	0	0	0

Accurate Counts

978-664-2565

File Name : 10321002

Site Code : 10321002

Start Date : 5/7/2025

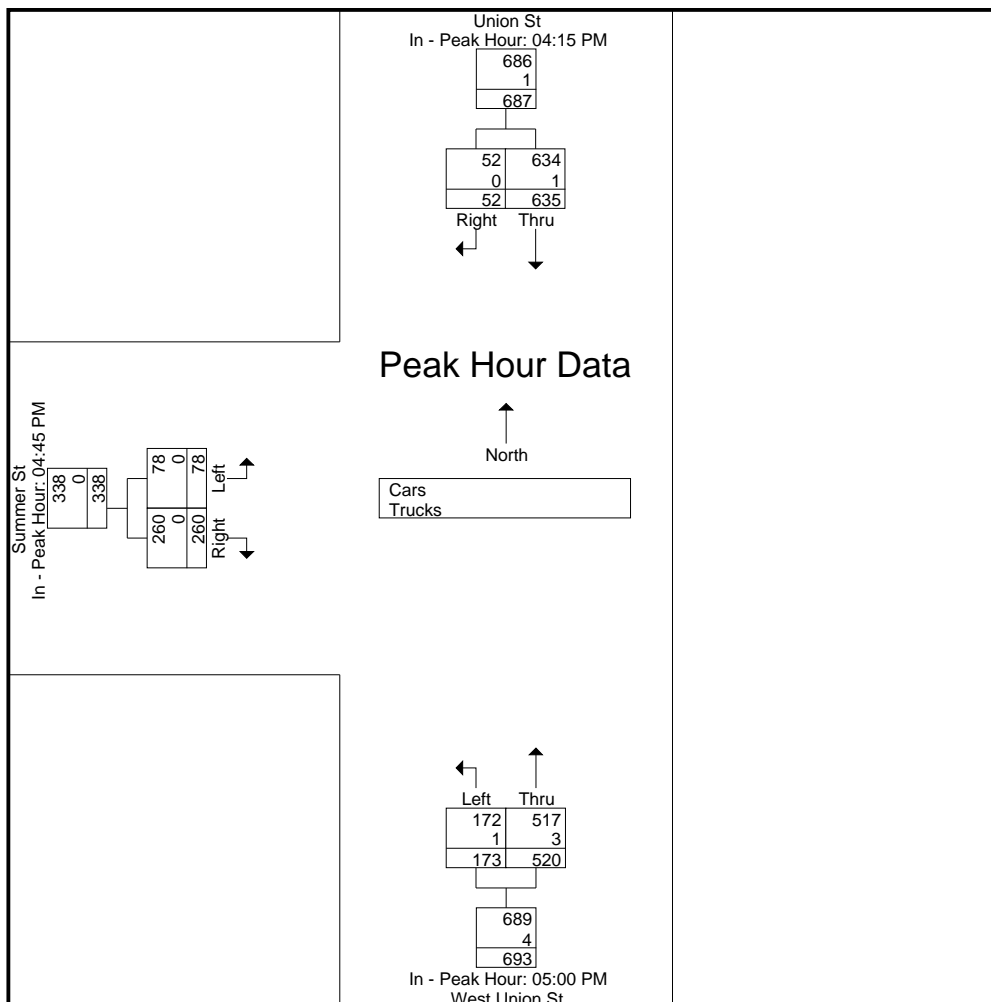
Page No : 3

N/S Street : Union St / West Union St

E/W Street : Summer Street

City/State : Ashland, MA

Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Union St / West Union St
 E/W Street : Summer Street
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321002
 Site Code : 10321002
 Start Date : 5/7/2025
 Page No : 4

Groups Printed- Cars

Start Time	Union St From North		West Union St From South		Summer St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
02:00 PM	88	10	43	101	7	40	289
02:15 PM	104	13	25	90	6	64	302
02:30 PM	115	10	31	81	14	57	308
02:45 PM	104	10	52	131	10	43	350
Total	411	43	151	403	37	204	1249
03:00 PM	147	16	54	111	10	42	380
03:15 PM	141	13	41	99	6	57	357
03:30 PM	131	17	36	97	17	60	358
03:45 PM	139	12	61	128	6	50	396
Total	558	58	192	435	39	209	1491
04:00 PM	127	9	47	116	22	69	390
04:15 PM	159	15	28	110	10	58	380
04:30 PM	157	16	36	114	18	63	404
04:45 PM	175	12	40	136	22	60	445
Total	618	52	151	476	72	250	1619
05:00 PM	143	9	46	133	30	65	426
05:15 PM	123	14	47	126	11	66	387
05:30 PM	158	12	34	112	15	69	400
05:45 PM	140	11	45	146	15	66	423
Total	564	46	172	517	71	266	1636
Grand Total	2151	199	666	1831	219	929	5995
Apprch %	91.5	8.5	26.7	73.3	19.1	80.9	
Total %	35.9	3.3	11.1	30.5	3.7	15.5	

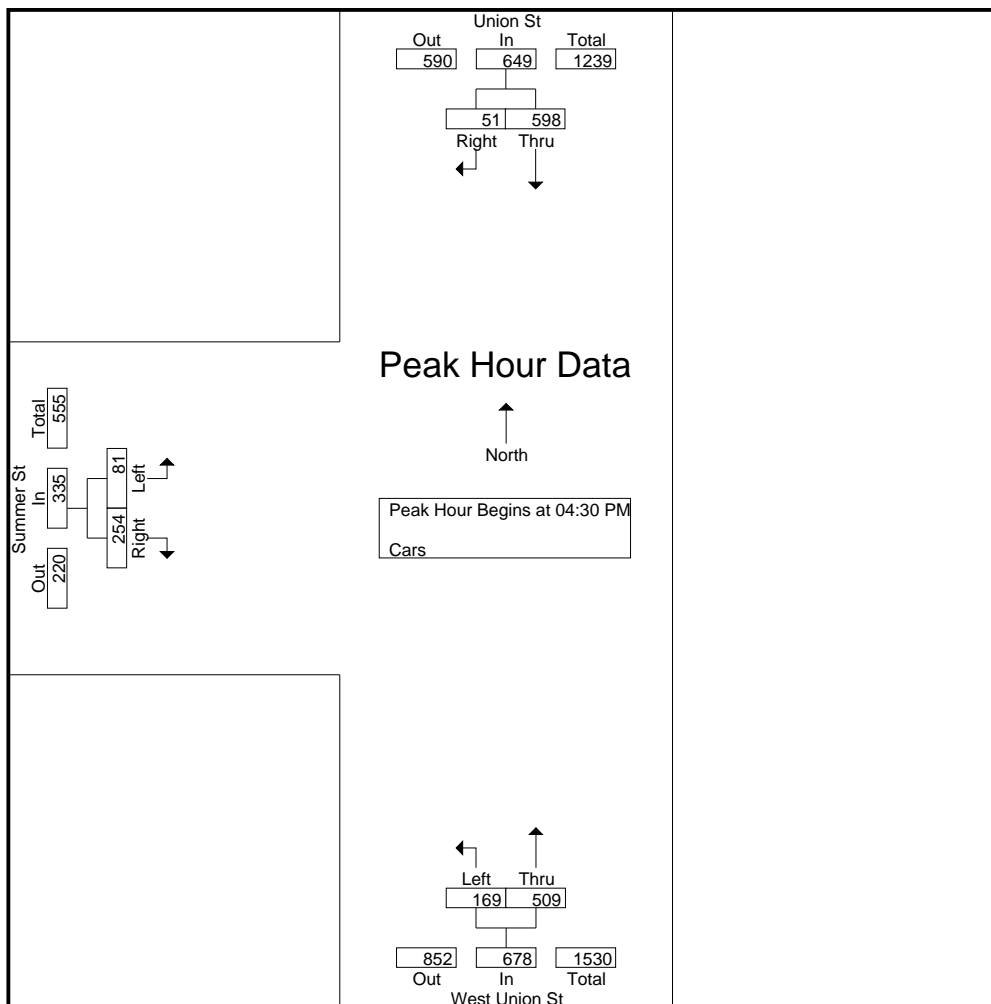
Start Time	Union St From North			West Union St From South			Summer St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	157	16	173	36	114	150	18	63	81	404
04:45 PM	175	12	187	40	136	176	22	60	82	445
05:00 PM	143	9	152	46	133	179	30	65	95	426
05:15 PM	123	14	137	47	126	173	11	66	77	387
Total Volume	598	51	649	169	509	678	81	254	335	1662
% App. Total	92.1	7.9		24.9	75.1		24.2	75.8		
PHF	.854	.797	.868	.899	.936	.947	.675	.962	.882	.934

Accurate Counts

978-664-2565

N/S Street : Union St / West Union St
 E/W Street : Summer Street
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321002
 Site Code : 10321002
 Start Date : 5/7/2025
 Page No : 5



Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:15 PM			05:00 PM			04:45 PM		
+0 mins.	159	15	174	46	133	179	22	60	82
+15 mins.	157	16	173	47	126	173	30	65	95
+30 mins.	175	12	187	34	112	146	11	66	77
+45 mins.	143	9	152	45	146	191	15	69	84
Total Volume	634	52	686	172	517	689	78	260	338
% App. Total	92.4	7.6		25	75		23.1	76.9	
PHF	.906	.813	.917	.915	.885	.902	.650	.942	.889

Accurate Counts

978-664-2565

File Name : 10321002

Site Code : 10321002

Start Date : 5/7/2025

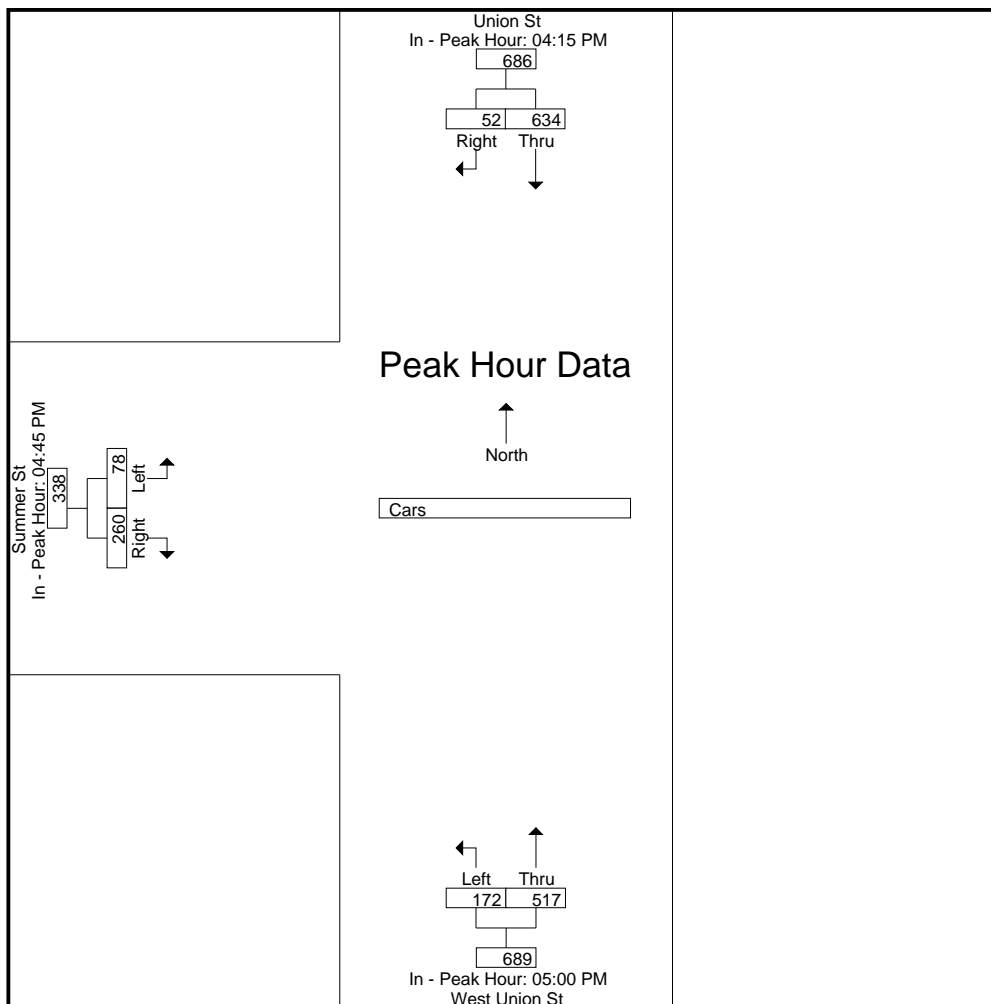
Page No : 6

N/S Street : Union St / West Union St

E/W Street : Summer Street

City/State : Ashland, MA

Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Union St / West Union St
 E/W Street : Summer Street
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321002
 Site Code : 10321002
 Start Date : 5/7/2025
 Page No : 7

Groups Printed- Trucks

Start Time	Union St From North		West Union St From South		Summer St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
02:00 PM	2	1	2	2	0	3	10
02:15 PM	10	0	0	2	0	2	14
02:30 PM	6	0	5	8	0	9	28
02:45 PM	14	0	6	9	0	1	30
Total	32	1	13	21	0	15	82
03:00 PM	0	0	5	3	0	1	9
03:15 PM	2	0	0	6	0	1	9
03:30 PM	2	0	0	2	0	1	5
03:45 PM	2	0	1	5	0	0	8
Total	6	0	6	16	0	3	31
04:00 PM	4	1	1	3	0	1	10
04:15 PM	0	0	0	4	0	0	4
04:30 PM	0	0	0	1	0	1	2
04:45 PM	0	0	0	2	0	0	2
Total	4	1	1	10	0	2	18
05:00 PM	1	0	0	0	0	0	1
05:15 PM	1	0	0	1	0	0	2
05:30 PM	2	0	0	1	0	0	3
05:45 PM	1	0	1	1	0	0	3
Total	5	0	1	3	0	0	9
Grand Total	47	2	21	50	0	20	140
Apprch %	95.9	4.1	29.6	70.4	0	100	
Total %	33.6	1.4	15	35.7	0	14.3	

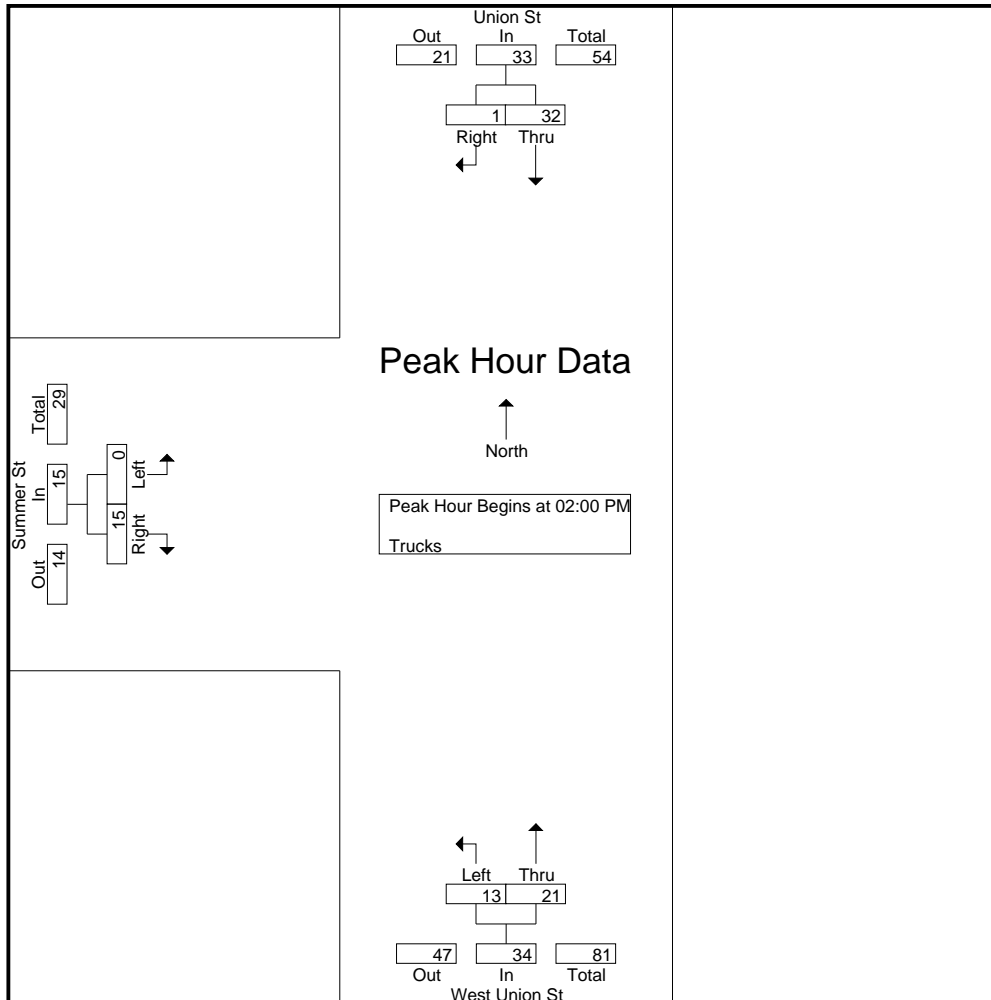
Start Time	Union St From North			West Union St From South			Summer St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 02:00 PM										
02:00 PM	2	1	3	2	2	4	0	3	3	10
02:15 PM	10	0	10	0	2	2	0	2	2	14
02:30 PM	6	0	6	5	8	13	0	9	9	28
02:45 PM	14	0	14	6	9	15	0	1	1	30
Total Volume	32	1	33	13	21	34	0	15	15	82
% App. Total	97	3		38.2	61.8		0	100		
PHF	.571	.250	.589	.542	.583	.567	.000	.417	.417	.683

Accurate Counts

978-664-2565

N/S Street : Union St / West Union St
 E/W Street : Summer Street
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321002
 Site Code : 10321002
 Start Date : 5/7/2025
 Page No : 8



Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	02:00 PM			02:30 PM			02:00 PM		
+0 mins.	2	1	3	5	8	13	0	3	3
+15 mins.	10	0	10	6	9	15	0	2	2
+30 mins.	6	0	6	5	3	8	0	9	9
+45 mins.	14	0	14	0	6	6	0	1	1
Total Volume	32	1	33	16	26	42	0	15	15
% App. Total	97	3		38.1	61.9		0	100	
PHF	.571	.250	.589	.667	.722	.700	.000	.417	.417

Accurate Counts

978-664-2565

File Name : 10321002

Site Code : 10321002

Start Date : 5/7/2025

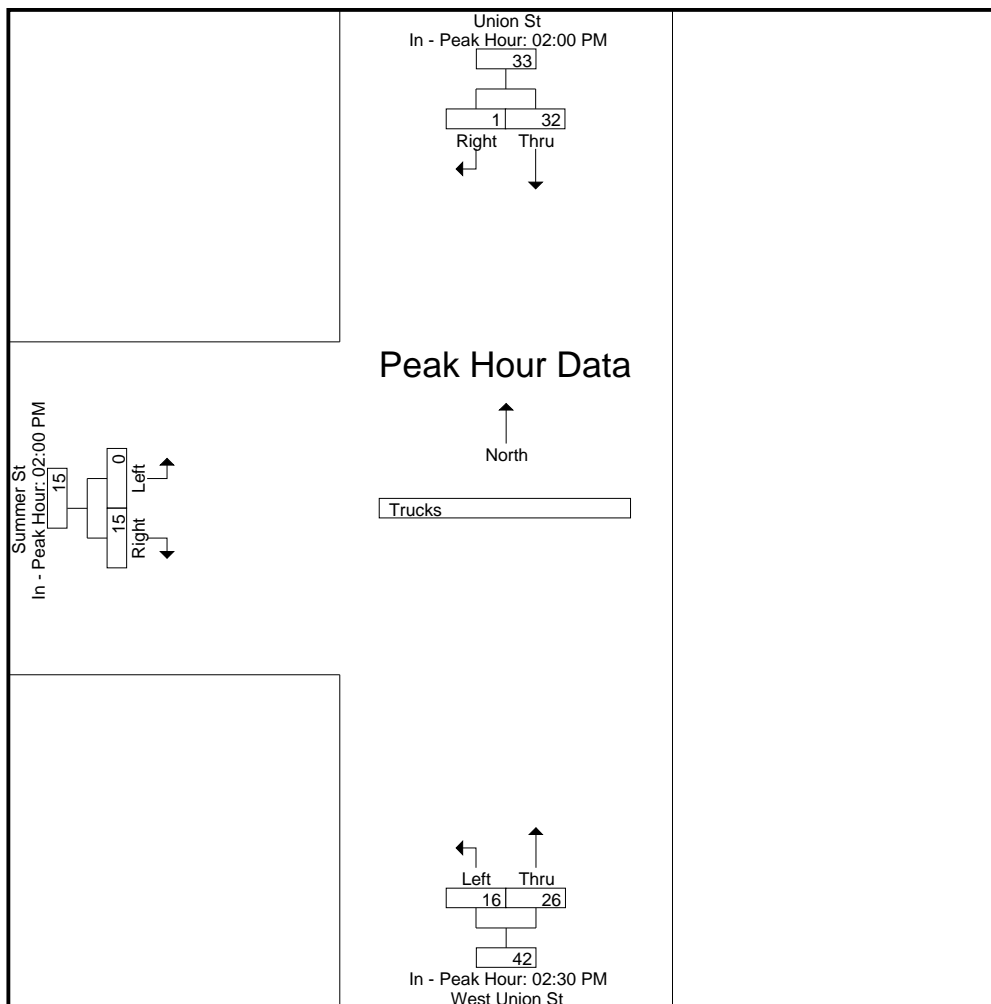
Page No : 9

N/S Street : Union St / West Union St

E/W Street : Summer Street

City/State : Ashland, MA

Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Union St / West Union St

E/W Street : Summer Street

City/State : Ashland, MA

Weather : Cloudy

File Name : 10321002

Site Code : 10321002

Start Date : 5/7/2025

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Groups Printed- Bikes Peds

Start Time	Union St From North			West Union St From South			Summer St From West			Exclu. Total	Inclu. Total	Int. Total
	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds			
02:00 PM	0	0	0	0	0	0	0	0	1	1	0	1
02:15 PM	0	1	0	0	0	0	2	0	0	0	3	3
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	1	1	0	1
Total	0	1	0	0	0	0	2	0	2	2	3	5
03:00 PM	1	0	0	0	1	15	0	1	1	16	3	19
03:15 PM	0	0	1	0	0	1	0	0	1	3	0	3
03:30 PM	0	0	1	0	0	0	0	0	0	1	0	1
03:45 PM	0	0	2	0	0	2	0	0	4	8	0	8
Total	1	0	4	0	1	18	0	1	6	28	3	31
04:00 PM	0	0	2	0	0	0	0	0	0	2	0	2
04:15 PM	0	0	5	0	1	6	0	0	1	12	1	13
04:30 PM	0	0	17	0	0	0	0	0	0	17	0	17
04:45 PM	0	0	0	0	1	0	0	0	0	0	1	1
Total	0	0	24	0	2	6	0	0	1	31	2	33
05:00 PM	0	0	0	0	0	0	0	0	1	1	0	1
05:15 PM	0	0	2	0	0	2	0	0	0	4	0	4
05:30 PM	0	3	0	0	0	0	0	0	0	0	3	3
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	3	2	0	0	2	0	0	1	5	3	8
Grand Total	1	4	30	0	3	26	2	1	10	66	11	77
Apprch %	20	80		0	100		66.7	33.3				
Total %	9.1	36.4		0	27.3		18.2	9.1		85.7	14.3	

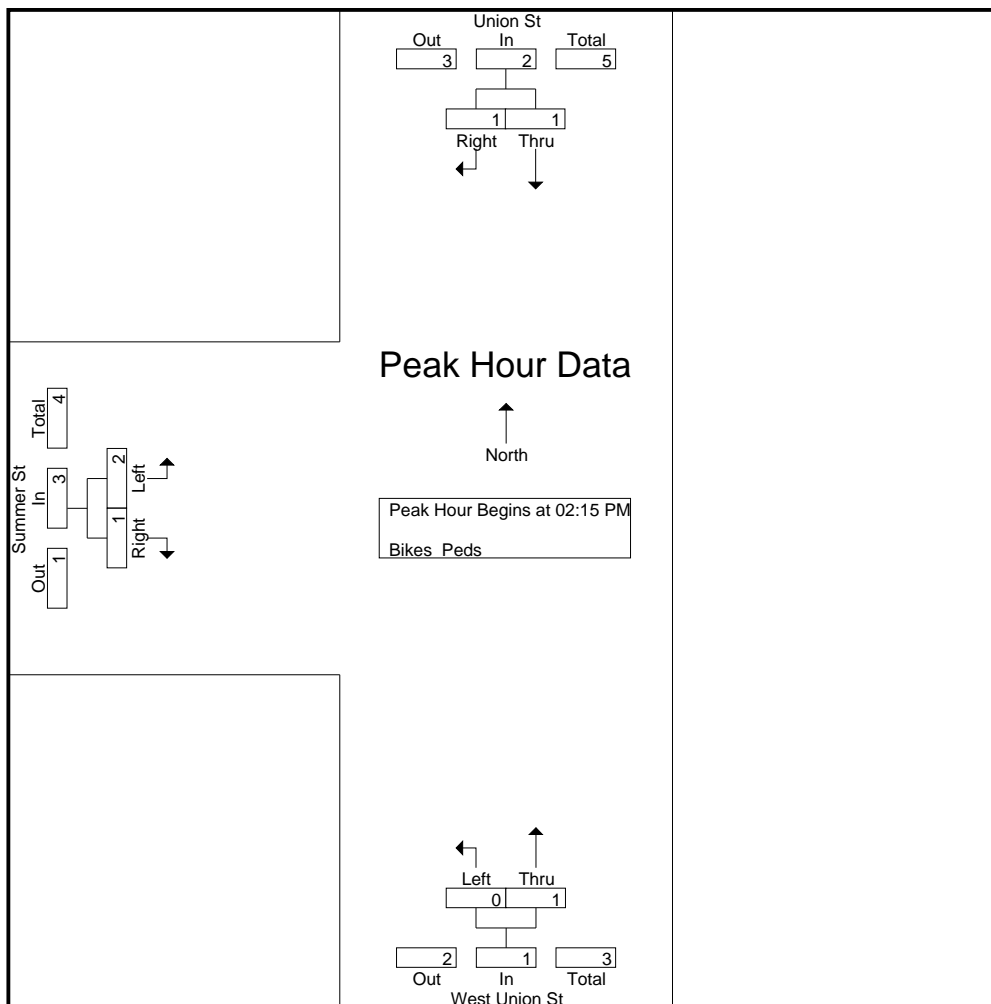
Start Time	Union St From North			West Union St From South			Summer St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 02:15 PM										
02:15 PM	0	1	1	0	0	0	2	0	2	3
02:30 PM	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0
03:00 PM	1	0	1	0	1	1	0	1	1	3
Total Volume	1	1	2	0	1	1	2	1	3	6
% App. Total	50	50		0	100		66.7	33.3		
PHF	.250	.250	.500	.000	.250	.250	.250	.250	.375	.500

Accurate Counts

978-664-2565

N/S Street : Union St / West Union St
 E/W Street : Summer Street
 City/State : Ashland, MA
 Weather : Cloudy

File Name : 10321002
 Site Code : 10321002
 Start Date : 5/7/2025
 Page No : 11



Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:45 PM			04:00 PM			02:15 PM		
+0 mins.	0	0	0	0	0	0	2	0	2
+15 mins.	0	0	0	0	1	1	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	3	3	0	1	1	0	1	1
Total Volume	0	3	3	0	2	2	2	1	3
% App. Total	0	100		0	100		66.7	33.3	
PHF	.000	.250	.250	.000	.500	.500	.250	.250	.375

Accurate Counts

978-664-2565

File Name : 10321002

Site Code : 10321002

Start Date : 5/7/2025

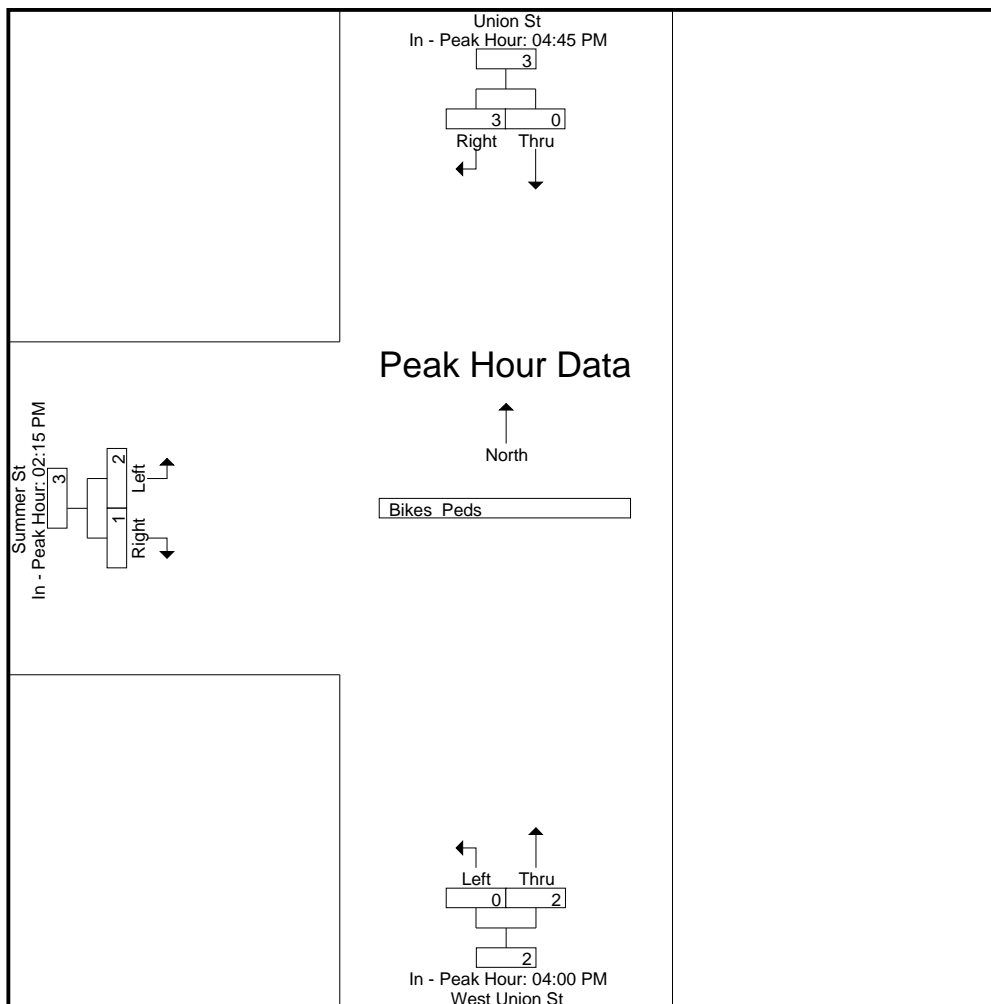
Page No : 12

N/S Street : Union St / West Union St

E/W Street : Summer Street

City/State : Ashland, MA

Weather : Cloudy



SEASONAL ADJUSTMENT DATA

Massachusetts Highway Department
Statewide Traffic Data Collection
2024 Weekday Seasonal Factors

Factor Group	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Axle Factor
R1	1.17	1.12	1.11	1.06	1.00	0.96	0.94	0.92	1.00	0.98	1.06	1.07	0.78
R3	1.10	1.04	1.04	1.02	0.91	0.88	0.88	0.87	0.92	0.92	0.99	1.01	0.98
R4-R7	1.16	1.12	1.08	1.03	0.92	0.89	0.88	0.89	0.92	0.94	1.04	1.10	0.98
U1-Boston	1.07	1.03	0.98	0.97	0.94	0.91	0.94	0.91	0.94	0.94	0.98	1.02	0.94
U1-Essex	1.13	1.09	1.06	1.04	0.95	0.89	0.88	0.87	0.95	0.95	1.03	1.05	0.96
U1-Southeast	1.14	1.10	1.04	0.99	0.93	0.86	0.87	0.85	0.91	0.93	0.99	1.02	0.96
U1-West	1.10	1.02	0.98	0.96	0.95	0.92	0.94	0.91	0.91	0.91	0.96	1.00	0.83
U1-Worcester	1.08	1.03	0.99	0.98	0.94	0.91	0.93	0.91	0.92	0.91	0.95	1.00	0.93
U3	1.06	1.02	0.98	0.96	0.93	0.91	0.95	0.94	0.93	0.93	0.96	1.00	0.98
U4-U7	1.04	1.02	0.96	0.95	0.91	0.90	0.94	0.94	0.93	0.94	0.98	1.02	0.99
UR2	1.08	1.02	0.98	0.97	0.93	0.90	0.93	0.90	0.92	0.92	0.97	1.01	0.98
Rec - East	1.21	1.20	1.09	1.01	0.91	0.81	0.77	0.79	0.91	0.95	1.05	1.13	0.99
Rec - West	1.46	1.38	1.32	1.06	0.94	0.79	0.59	0.69	0.97	0.99	1.18	1.28	0.99

Round off:

0-999 = 10

>1000 = 100

U = Urban

R = Rural

1 - Interstate

2 - Freeway and Expressway

3 - Other Principal Arterial

4 - Minor Arterial

5 - Major Collector

6 - Minor Collector

7 - Local Road and Street

UR2 Group - Combination of Urban Freeways and Expressways and Rural Freeways and Expressways.

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

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

Massachusetts Highway Department

307: Monthly Hourly Volume for May 2024

Location ID:	307	Seasonal Factor Group:	U3
County:	Worcester	Daily Factor Group:	
Functional Class	3	Axle Factor Group:	U3
Location:	TURNPIKE ROAD	Growth Factor Group:	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status	
1	343	223	177	452	627	1,468	2,533	3,365	3,323	3,310	2,884	3,033	3,308	3,131	3,553	3,835	3,877	4,060	3,441	2,662	1,957	1,439	985	744	54,730	Accepted	
2	347	272	166	486	590	1,420	2,580	3,368	3,525	3,147	2,832	3,016	3,181	3,163	3,668	3,855	4,048	4,114	3,653	2,762	1,967	1,462	1,056	721	55,399	Accepted	
3	396	250	233	490	603	1,363	2,355	3,225	3,178	2,876	2,805	3,286	3,454	3,577	3,778	4,119	4,135	4,050	3,536	2,845	2,266	1,691	1,262	984	56,757	Accepted	
4	473	268	236	425	434	627	1,229	1,760	2,248	2,807	3,264	3,695	3,824	3,822	3,742	3,628	3,423	3,279	2,973	2,608	1,915	1,531	1,210	889	50,310	Accepted	
5	528	308	205	391	353	413	758	1,200	1,523	2,080	2,716	3,112	3,473	3,517	3,472	3,264	2,956	2,867	2,545	1,869	1,342	976	758	523	41,149	Accepted	
6	251	164	192	464	612	1,377	2,454	3,322	3,453	2,882	2,648	2,837	3,309	3,196	3,504	3,714	3,815	3,966	3,340	2,384	1,920	1,192	878	633	52,507	Accepted	
7	347	241	165	499	673	1,440	2,690	3,411	3,453	3,245	2,848	3,025	3,222	3,170	3,558	3,861	3,875	4,016	3,358	2,501	2,116	1,337	999	649	54,699	Accepted	
8	383	231	184	496	639	1,411	2,601	3,356	3,413	3,014	2,771	2,883	3,222	3,066	3,489	3,685	3,882	3,861	3,260	2,457	1,820	1,265	989	680	53,058	Accepted	
9	370	225	214	475	637	1,410	2,542	3,263	3,371	3,210	2,877	2,984	3,220	3,373	3,586	3,929	4,035	4,146	3,739	2,733	2,087	1,518	1,002	753	55,719	Accepted	
10	420	253	224	511	606	1,266	2,359	3,094	3,158	3,076	3,005	3,333	3,506	3,590	3,947	4,083	4,152	4,122	3,629	2,923	2,221	1,695	1,278	989	57,440	Accepted	
11	523	339	223	422	412	587	1,201	1,879	2,404	2,785	3,388	3,790	3,887	3,956	4,012	3,822	3,570	3,341	3,121	2,584	2,143	1,443	1,289	1,013	52,134	Accepted	
12	530	295	191	347	315	350	700	1,115	1,505	1,971	2,694	3,016	3,208	3,380	3,362	3,135	2,988	2,980	2,592	2,130	1,603	1,064	744	563	40,778	Accepted	
13	241	176	167	437	600	1,326	2,473	3,197	3,232	2,967	2,714	2,926	3,266	3,131	3,469	3,706	3,860	4,002	3,264	2,539	1,921	1,237	911	594	52,356	Accepted	
14																											
15	348	240	186	426	510	1,377	2,538	3,236	3,528	3,091	2,735	2,981	3,308	3,173	3,352	3,614	3,866	3,964	3,307	2,529	1,971	1,364	937	767	53,348	Accepted	
16	374	215	147	425	572	1,339	2,426	3,167	3,391	3,077	2,716	3,013	3,298	3,118	3,516	3,774	3,934	4,223	3,614	2,729	2,092	1,442	1,072	728	54,402	Accepted	
17	427	278	205	492	594	1,326	2,461	3,042	3,316	2,943	2,954	3,299	3,681	3,531	3,396	4,092	3,968	4,051	3,568	2,804	2,178	1,800	1,466	1,003	56,875	Accepted	
18	517	308	216	402	339	585	1,174	1,708	2,221	2,640	3,212	3,527	3,542	3,596	3,718	3,633	3,253	3,011	2,806	2,276	1,776	1,369	1,114	854	47,797	Accepted	
19	455	271	212	326	326	416	759	1,199	1,534	1,899	2,647	3,094	3,092	3,392	3,543	3,247	3,058	2,878	2,509	1,975	1,538	1,167	727	580	40,844	Accepted	
20	279	170	160	471	601	1,342	2,471	3,151	3,508	2,935	2,781	2,987	3,245	3,202	3,609	3,783	4,057	4,109	3,290	2,614	2,043	1,427	990	650	53,875	Accepted	
21	328	231	178	437	587	1,462	2,619	3,483	3,604	3,135	2,951	3,116	3,317	3,498	3,651	3,868	4,057	4,218	3,558	2,610	2,147	1,489	1,043	766	56,353	Accepted	
22	357	244	181	409	590	1,474	2,574	3,440	3,559	3,288	2,940	3,191	3,332	3,414	3,627	3,763	4,184	4,131	3,479	2,833	2,344	1,735	1,168	737	56,994	Accepted	
23	357	277	192	438	630	1,460	2,511	3,249	3,692	3,330	3,107	3,225	3,246	3,090	3,594	3,979	4,109	4,183	3,519	2,812	2,241	1,613	1,131	843	56,828	Accepted	
24	420	267	191	455	593	1,352	2,369	2,968	3,196	2,994	3,130	3,389	3,627	3,794	4,210	4,154	4,110	3,835	3,394	2,809	2,291	1,729	1,220	909	57,406	Accepted	
25	489	301	211	411	412	561	1,125	1,758	2,149	2,633	3,208	3,400	3,547	3,488	3,477	3,351	3,152	2,957	2,861	2,348	2,078	1,410	1,092	900	47,319	Accepted	
26	483	245	179	357	315	389	692	1,100	1,449	1,817	2,479	2,744	2,959	2,946	2,984	2,802	2,614	2,441	2,369	2,031	1,605	1,275	967	658	37,900	Accepted	
27	354	179	155	372	350	441	836	1,105	1,311	1,684	2,148	2,665	2,815	2,928	3,130	2,922	2,741	2,593	2,291	1,874	1,343	966	686	554	36,443	Accepted	
28	231	152	143	422	590	1,346	2,582	3,359	3,560	3,030	2,890	3,154	3,376	3,266	3,652	3,845	4,007	4,132	3,430	2,568	2,054	1,413	968	722	54,892	Accepted	
29	310	194	169	442	636	1,511	2,662	3,552	3,565	3,156	2,893	3,198	3,339	3,403	3,724	4,018	4,054	4,101	3,662	2,669	2,216	1,649	1,077	683	56,883	Accepted	
30	348	209	181	465	608	1,349	2,273	3,192	3,380	3,173	2,818	3,122	3,377	3,390	3,517	3,724	4,040	4,380	3,585	2,696	2,261	1,654	1,309	911	55,962	Accepted	
31	473	352	216	446	626	1,454	3,005	3,423	3,519	3,229	3,223	3,526	3,778	3,645	3,875	4,046	3,928	4,022	3,678	3,025	2,273	1,857	1,401	1,070	60,090	Accepted	

52,042 May 2024 ADT
50,109 2024 AADT
0.037 3.7% above avg. month

Massachusetts Highway Department

AET09: Monthly Hourly Volume for May 2024

Location ID: AET09
County: Middlesex
Functional Class: 1
Location: MASSACHUSETTS TURNPIKE

Seasonal Factor Group: U1-Boston
Daily Factor Group:
Axle Factor Group: U1-Boston
Growth Factor Group:

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1	1,021	549	457	670	1,371	4,428	6,541	7,058	7,725	7,278	6,090	5,974	6,361	6,732	7,449	7,648	9,076	9,154	7,441	5,233	3,664	3,099	2,707	1,670	119,396	Accepted
2	990	565	484	665	1,480	4,558	6,672	6,909	7,168	6,842	6,285	6,444	6,731	6,947	8,141	8,657	8,601	8,991	7,588	6,089	4,311	3,294	2,580	1,633	122,625	Accepted
3	944	729	614	838	1,342	4,212	6,322	7,181	7,025	6,909	6,811	7,113	6,752	8,008	8,733	8,863	8,611	8,663	7,753	5,947	4,490	3,794	2,791	2,189	126,634	Accepted
4	1,301	828	689	669	886	1,717	2,936	4,406	5,617	6,824	7,880	8,458	8,646	8,344	8,603	8,608	8,513	7,099	7,436	5,852	4,598	3,938	3,359	2,399	119,606	Accepted
5	1,907	910	684	588	594	1,031	1,629	2,653	3,627	5,098	6,745	7,585	8,507	8,333	8,393	8,204	7,483	7,497	6,969	5,953	4,641	3,399	2,514	1,717	106,661	Accepted
6	1,024	610	485	734	1,505	4,525	5,113	6,422	6,685	6,602	6,224	5,893	6,378	6,463	7,927	8,340	8,362	8,393	6,508	4,416	3,408	2,547	1,669	1,428	111,661	Accepted
7	996	557	480	688	1,445	4,522	6,285	6,772	7,664	7,087	6,215	5,929	6,060	6,790	7,955	8,262	8,781	9,087	6,865	5,254	3,569	2,968	2,370	1,554	118,155	Accepted
8	1,051	562	499	745	1,436	4,429	6,334	5,843	7,178	6,297	6,218	6,242	6,330	6,995	7,966	7,913	8,256	8,353	7,333	5,188	3,381	2,935	2,012	1,846	115,342	Accepted
9	1,040	677	618	756	1,431	4,605	6,521	6,676	7,106	6,573	6,555	6,554	7,037	7,616	8,660	8,796	9,056	9,249	7,615	6,159	4,460	3,398	2,792	2,027	125,977	Accepted
10	1,079	766	634	766	1,436	4,169	6,393	7,243	7,125	7,200	7,303	7,632	8,152	8,447	8,435	9,611	9,601	9,216	8,827	6,648	4,794	3,928	3,700	2,641	135,746	Accepted
11	1,485	959	749	674	848	1,615	2,827	4,309	6,009	7,516	8,614	9,132	6,641	8,861	8,866	7,843	7,056	7,461	6,996	6,243	5,078	4,091	3,392	2,565	119,830	Accepted
12	1,562	916	717	541	610	860	1,463	2,535	3,695	5,154	8,185	9,159	8,932	8,659	8,726	9,002	9,384	9,058	8,023	6,841	5,738	4,310	3,170	1,767	119,007	Accepted
13	1,006	656	565	729	1,511	4,491	6,247	6,674	6,457	6,927	6,250	6,101	6,336	5,154	8,023	8,278	8,581	8,445	6,984	4,904	3,440	2,780	2,248	1,521	114,308	Accepted
14	910	607	542	765	1,458	4,742	6,678	6,919	7,176	7,226	6,476	6,361	6,709	7,056	8,058	8,451	9,086	9,089	7,199	5,332	3,649	2,856	2,294	1,857	121,496	Accepted
15	1,012	552	498	704	1,327	4,695	6,496	6,851	7,639	7,188	6,648	6,257	6,363	7,021	8,046	8,467	8,502	9,285	7,749	5,163	3,728	2,996	2,728	1,705	121,620	Accepted
16	936	654	587	708	1,330	4,164	5,511	6,112	6,837	6,877	6,339	6,501	6,614	7,249	7,833	8,863	9,096	9,187	7,577	5,556	4,193	3,443	2,470	2,005	120,642	Accepted
17	1,164	857	653	862	1,483	4,355	6,662	7,026	7,157	7,541	7,320	7,311	7,816	8,521	8,846	9,340	9,470	9,529	8,336	6,377	4,710	3,481	3,477	2,600	134,894	Accepted
18	1,476	942	686	690	956	1,784	3,120	4,514	6,065	7,018	7,887	7,548	8,397	8,442	8,697	8,812	8,698	8,138	7,101	5,597	4,558	3,941	3,429	2,602	121,098	Accepted
19	1,473	928	718	627	682	1,156	2,097	3,284	4,373	5,886	7,320	8,273	8,390	8,579	8,426	8,796	9,015	8,620	7,626	6,399	5,322	4,096	2,717	1,927	116,730	Accepted
20	1,132	787	666	791	1,541	4,360	6,599	7,009	7,191	7,104	7,060	6,541	6,570	6,784	7,912	8,020	8,283	8,520	7,051	5,081	3,741	2,918	1,954	1,345	118,960	Accepted
21	888	580	565	708	1,498	4,743	6,595	6,697	7,590	7,024	6,530	6,148	6,329	6,934	8,094	8,580	8,739	8,807	7,235	5,080	3,646	2,904	1,992	1,648	119,554	Accepted
22	1,197	602	501	734	1,500	4,704	6,209	6,477	7,442	7,404	6,646	6,474	6,603	7,274	8,224	8,542	8,561	8,220	7,099	5,656	4,174	3,241	2,299	1,546	121,029	Accepted
23	1,001	686	557	747	1,499	4,603	6,407	6,792	7,482	6,457	6,902	6,413	6,657	7,043	8,113	7,796	9,206	9,053	7,656	6,208	4,674	3,878	2,535	2,259	124,624	Accepted
24	1,300	824	716	785	1,498	4,108	6,147	6,773	7,170	7,152	7,191	7,783	8,017	8,211	8,801	8,910	9,134	8,447	7,081	5,781	4,810	3,983	3,439	2,863	130,924	Accepted
25	1,712	940	695	715	813	1,607	2,833	4,340	5,589	7,013	7,982	8,301	8,160	8,311	7,782	7,423	7,339	7,019	5,914	5,324	4,571	3,859	2,974	2,297	113,513	Accepted
26	1,371	799	668	541	558	815	1,462	2,232	3,252	4,908	6,917	7,703	8,012	7,709	7,331	6,932	6,471	6,528	6,313	5,808	4,460	3,786	2,957	2,258	99,791	Accepted
27	1,513	823	569	553	670	1,109	1,733	2,403	3,098	4,281	6,227	7,294	7,377	7,326	7,397	7,141	7,003	6,380	5,231	5,155	3,763	2,783	1,984	1,365	93,178	Accepted
28	857	546	478	664	1,395	4,667	6,545	6,738	7,421	6,857	6,391	6,119	6,085	6,629	7,711	7,962	8,317	8,303	7,236	4,984	3,335	2,759	1,989	1,438	115,426	Accepted
29	864	567	517	677	1,411	4,534	6,184	6,292	7,310	6,746	6,286	6,070	6,331	6,821	7,791	8,396	8,464	8,853	7,256	5,419	3,588	2,970	2,222	1,368	116,937	Accepted
30	862	658	543	696	1,374	4,354	5,966	6,106	6,453	6,078	5,661	6,199	6,710	7,126	7,960	8,360	8,849	8,805	7,393	5,548	3,817	3,144	2,664	2,195	117,521	Accepted
31	1,251	750	624	797	1,415	3,535	5,753	6,669	6,904	6,888	6,935	6,773	8,001	8,203	8,704	8,854	8,931	8,881	7,240	5,619	4,466	3,679	3,180	2,333	126,385	Accepted

119,009 May 2024 ADT

113,202 2024 AADT

0.049 4.9% above avg. month

PUBLIC TRANSPORTATION SCHEDULES

Monday to Friday

Table with columns for Zone Station, Train #, AM (502-538), and PM (542-592). Rows include stations from Worcester to South Station. Includes 'Bikes Allowed' icons and departure times.

Monday to Friday

Table with columns for Zone Station, Train #, AM (503-537), and PM (541-593). Rows include stations from South Station to Worcester. Includes 'Bikes Allowed' icons and departure times.

Weekend

Table with columns for Zone Station, Train #, AM (5508-5594), and PM (5546-5594). Rows include stations from Worcester to South Station. Includes 'Bikes Allowed' icons and departure times.

Weekend

Table with columns for Zone Station, Train #, AM (5503-5533), and PM (5541-5591). Rows include stations from South Station to Worcester. Includes 'Bikes Allowed' icons and departure times.

Keep in Mind:

This schedule will be effective from March 24, 2025 and will replace the schedule of January 6, 2025

HOLIDAY SERVICE: The following holidays will operate on a WEEKEND Schedule:

- MEMORIAL DAY - Monday, May 26, 2025
INDEPENDENCE DAY - Friday, July 4, 2025
LABOR DAY - Monday, September 1, 2025

WEEKDAY SERVICE: The following holidays will operate on a WEEKDAY schedule:

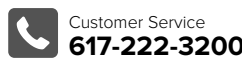
- PATRIOTS' DAY - Monday, April 21, 2025
JUNETEENTH - Thursday, June 19, 2025
COLUMBUS DAY - Monday, October 13, 2025

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

Times in blue indicate an early departure (L stop): 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 platforms and bridge plates are available. Visit mbta.com/accessibility for more information.



Fare Information

	Cash	CatchCard	Monthly Pass
Adult:	\$1.50	\$1.25	\$20.00
Senior (65+) / Disabled*:	\$0.75	\$0.70	\$10.00
Student with valid student ID:	\$1.00	N/A	N/A
Children under 6 (with adult):	Free		
Active Duty men & women in uniform:	Free		

*To receive Reduced Fare, please present:

- a photo ID with birth date listed, **OR**
 - MBTA Access Card or Medicare Card
- Children under 12 years old may not ride unaccompanied.
Catch Cards can be obtained from drivers on the bus, or at the MWRTA Blandin Hub.

Transfers / Connections

Transfer slips are available on all MWRTA buses and are good for one transfer going in the same direction within the MWRTA bus system only. One transfer per paid fare is issued upon request, and must be presented to the next driver within 90 minutes.

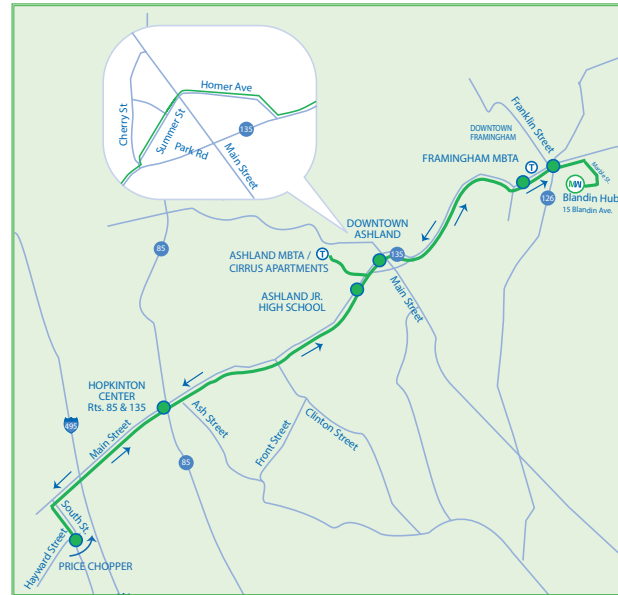
Holidays

No Service: New Year's Day, Patriots's Day, Memorial Day, Independence Day, Thanksgiving Day, Christmas Day

Reduced Service: MLK Day, Presidents Day, Juneteenth, Columbus Day, Veterans Day, Black Friday

Service will end around 7:30 PM on Christmas and New Years Eve.

See the full Holiday Policy at www.mwrta.com/holidays.



MWRTA Customer Service:

(508) 935-2222

Blandin Hub: 15 Blandin Ave.

Framingham, MA 01702

www.mwrta.com



Follow Us: @mwrta



Download the MWRTA
CATCH App on Apple
& Google Play stores!



Scan QR code with
your phone to go
to the MWRTA
website.

		AM						PM					
OUTBOUND	Blandin Hub	5:30	6:45	8:00	9:20	10:37	11:55	1:15	2:22	3:30	4:45	6:08	7:14
	Framingham MBTA Station	5:34	6:49	8:05	9:25	10:42	12:00	1:20	2:26	3:35	4:50	6:13	7:18
	Homer Ave. / Main St.	5:39	6:56	8:16	9:32	10:49	12:07	1:26	2:32	3:43	4:58	6:20	7:24
	Ashland Middle School	5:42	7:00	8:20	9:36	10:53	12:11	1:29	2:36	3:47	5:02	6:24	7:27
	Route 85 / Route 135	5:49	7:07	8:27	9:43	11:00	12:18	1:36	2:43	3:54	5:10	6:31	7:33
	Price Chopper	5:56	7:14	8:34	9:50	11:07	12:25	1:43	2:50	4:01	5:20	6:38	7:38
	South St. / Hayward St.	6:00	7:17	8:37	9:54	11:11	12:30	1:46	2:53	4:05	5:26	6:41	7:41
INBOUND	Hopkinton Center	6:05	7:23	8:43	10:00	11:17	12:36	1:52	2:59	4:12	5:33	6:47	7:46
	Ashland MBTA Station	6:15	7:33	8:53	10:10	11:27	12:46	2:02	3:09	4:22	5:43	6:57	7:54
	Cirrus Apartments*	6:17	7:34	8:54	10:12	11:29	12:48	2:03	3:11	4:24	5:44	6:58	7:55
	Homer Ave. / Main St.	6:21	7:38	8:58	10:16	11:33	12:52	2:07	3:15	4:28	5:48	7:02	7:59
	Framingham MBTA Station	6:28	7:45	9:04	10:22	11:40	12:58	2:13	3:21	4:36	5:58	7:07	8:05
	Blandin Hub	6:33	7:50	9:09	10:27	11:45	1:04	2:18	3:25	4:40	6:03	7:11	8:10

Route 5 Connections:

- Routes 4S, 6: Framingham MBTA Station
 - Routes 4N, 4S, 6, 10, 11: Blandin Hub
- Riders can also connect to the Framingham/Natick Night Catch Connect service at the Framingham MBTA or Blandin Hub.

Additional Information:

- Please wait for the bus 10 minutes in advance of scheduled times to ensure not missing the bus.
- For Vehicle Tracking: www.mwrta.com, or download the MWRTA Catch App.
- MWRTA uses the Flag Down system, allowing busses to stop anywhere along the route where it is safe to do so. Riders can hail the bus by waving.
- * Stop may not be serviced due to snow and ice.
- *Cirrus Apartments will be serviced from the MBTA Access Road

Fare Information

	Cash	CatchCard	Monthly Pass
Adult:	\$1.50	\$1.25	\$20.00
Senior (65+) / Disabled*:	\$0.75	\$0.70	\$10.00
Student with valid student ID:	\$1.00	N/A	N/A
Children under 6 (with adult):	Free		
Active Duty men & women in uniform:	Free		

*To receive Reduced Fare, please present:

- a photo ID with birth date listed, **OR**
 - MBTA Access Card or Medicare Card
- Children under 12 years old may not ride unaccompanied.
Catch Cards can be obtained from drivers on the bus, or at the MWRTA Blandin Hub.

Transfers / Connections

Transfer slips are available on all MWRTA buses and are good for one transfer going in the same direction within the MWRTA bus system only. One transfer per paid fare is issued upon request, and must be presented to the next driver within 90 minutes.

Holidays

No Service: New Year's Day, Patriots's Day, Memorial Day, Independence Day, Thanksgiving Day, Christmas Day

Reduced Service: MLK Day, Presidents Day, Juneteenth, Columbus Day, Veterans Day, Black Friday

Service will end around 7:30 PM on Christmas and New Years Eve.

See the full Holiday Policy at www.mwrta.com/holidays.



MWRTA Customer Service:

(508) 935-2222

Blandin Hub: 15 Blandin Ave.
Framingham, MA 01702

www.mwrta.com



Follow Us: @mwrta



Download the MWRTA
CATCH App on Apple
& Google Play stores!



Scan QR code with
your phone to go
to the MWRTA
website.

		AM			PM			
OUTBOUND	Blandin Hub	8:30	9:47	11:04	12:22	1:41	2:54	4:07
	Framingham MBTA Station	8:35	9:52	11:09	12:27	1:46	2:58	4:12
	Homer Ave. / Main St.	8:43	9:59	11:16	12:34	1:52	3:04	4:19
	Ashland Middle School	8:47	10:03	11:20	12:38	1:55	3:08	4:23
	Route 85 / Route 135	8:54	10:10	11:27	12:45	2:02	3:15	4:30
	Price Chopper	9:01	10:17	11:34	12:52	2:09	3:22	4:37
	South St. / Hayward St.	9:04	10:21	11:38	12:57	2:12	3:25	4:41
INBOUND	Hopkinton Center	9:10	10:27	11:44	1:03	2:18	3:31	4:48
	Ashland MBTA Station	9:20	10:37	11:54	1:13	2:28	3:41	4:58
	Cirrus Apartments*	9:21	10:39	11:56	1:15	2:29	3:43	5:00
	Homer Ave. / Main St.	9:25	10:43	12:00	1:19	2:33	3:47	5:04
	Framingham MBTA Station	9:31	10:49	12:07	1:25	2:39	3:53	5:11
	Blandin Hub	9:36	10:54	12:12	1:31	2:44	3:57	5:15

Route 5 Connections:

- Route 4S: Framingham MBTA
- Routes 4S, 11: Blandin Hub

Riders can also connect to the Framingham/Natick Weekend Connect service at the Blandin Hub or Framingham MBTA.

Additional Information:

- Please wait for the bus 10 minutes in advance of scheduled times to ensure not missing the bus.
- For Vehicle Tracking: www.mwrta.com, or download the MWRTA Catch App.
- MWRTA uses the Flag Down system, allowing busses to stop anywhere along the route where it is safe to do so. Riders can hail the bus by waving.
- *Cirrus Apartments are serviced from the MBTA Access Road.

VEHICLE TRAVEL SPEED DATA

Accurate Counts
978-664-2565

S Cod : 1032101

Lo a o : M mora Dr
Lo a o : W o W U o Sr
C Sa : A a d MA
Dr o : EB

5 7 2025	0 - 15	15 -	20 -	25 -	30 -	35 -	40 -	45 -	50 -	55 -	60 -	65 -	70	To a
T m	MPH	20 MPH	25 MPH	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH	55 MPH	60 MPH	65 MPH	70 MPH	MPH	
12:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	1
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1
3:00	0	0	0	1	0	0	0	0	0	0	0	0	0	1
4:00	0	1	0	1	1	1	1	0	0	0	0	0	0	5
5:00	0	0	3	2	9	8	4	0	0	0	0	0	0	26
6:00	0	0	0	7	32	29	7	2	1	0	0	0	0	78
7:00	0	0	0	15	77	45	6	0	0	0	0	0	0	143
8:00	0	0	0	17	43	49	14	2	2	0	0	0	0	127
9:00	0	0	0	5	28	20	6	0	0	0	0	0	0	59
10:00	0	0	0	8	25	17	6	0	0	0	0	0	0	56
11:00	0	0	1	6	27	20	4	0	1	0	0	0	0	59
12:00 PM	0	0	0	3	16	19	3	0	0	0	0	0	0	41
1:00	0	0	0	6	16	19	3	1	0	0	0	0	0	45
2:00	0	0	0	8	27	21	5	0	0	0	0	0	0	61
3:00	0	0	3	10	35	18	7	1	1	0	0	0	0	75
4:00	0	0	0	21	45	27	5	2	0	0	0	0	0	100
5:00	2	1	1	30	79	29	7	0	0	0	0	0	0	149
6:00	0	1	2	39	60	27	4	3	1	0	0	0	0	137
7:00	0	0	0	13	25	27	7	1	1	0	0	0	0	74
8:00	0	0	0	10	14	7	1	0	0	0	0	0	0	32
9:00	0	0	0	3	12	6	2	0	0	0	0	0	0	23
10:00	0	0	1	3	3	4	4	1	0	0	0	0	0	16
11:00	0	0	0	3	4	4	0	0	0	1	0	0	0	12
To a	2	3	11	211	580	397	96	13	7	1	0	0	0	1321

P r 15 50 85 95
 S d 29 33 38 41
 M a S d(A ra) 34.5
 10 MPH Pa S d 31-40
 N m r Pa 977
 P r Pa 74.0%
 N m r 30 MPH 1094
 P r 30 MPH 82.8%

Accurate Counts
978-664-2565

S Cod : 1032101

Lo a o : M mora Dr
Lo a o : W o W U o Sr
C Sa : A a d MA
Dr o : EB

5 8 2025	0 - 15	15 -	20 -	25 -	30 -	35 -	40 -	45 -	50 -	55 -	60 -	65 -	70	To a
T m	MPH	20 MPH	25 MPH	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH	55 MPH	60 MPH	65 MPH	70 MPH	MPH	
12:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	1
1:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1
3:00	0	0	0	1	1	2	0	0	0	0	0	0	0	4
4:00	0	0	0	0	2	2	0	0	0	0	0	0	0	4
5:00	0	0	1	1	9	11	3	0	0	0	0	0	0	25
6:00	0	0	0	13	41	29	5	3	0	0	0	0	0	91
7:00	0	0	2	15	69	50	7	1	0	0	0	0	0	144
8:00	0	0	0	19	44	40	8	1	0	1	0	0	0	113
9:00	1	0	0	11	23	21	4	0	1	0	0	0	0	61
10:00	0	0	1	8	16	13	1	2	0	0	0	0	0	41
11:00	0	0	0	13	15	14	3	0	0	0	0	0	0	45
12:00 PM	0	0	2	13	22	15	2	1	0	0	0	0	0	55
1:00	0	0	0	8	19	13	3	0	0	0	0	0	0	43
2:00	0	0	1	11	27	15	3	0	0	0	0	0	0	57
3:00	0	0	4	20	26	29	3	1	0	0	0	0	0	83
4:00	1	0	4	7	28	12	1	0	0	0	0	0	0	53
5:00	0	0	7	37	91	39	3	2	0	0	0	0	0	179
6:00	0	0	1	26	46	31	4	0	0	0	0	0	0	108
7:00	0	0	1	18	39	25	4	1	0	0	0	0	0	88
8:00	2	0	0	13	15	12	1	0	0	0	0	0	0	43
9:00	0	0	1	5	1	1	0	1	0	0	0	0	0	9
10:00	0	0	0	2	5	3	3	0	0	0	0	0	0	13
11:00	0	0	1	1	5	1	2	0	0	0	0	0	0	10
To a	4	0	26	242	547	378	60	13	1	1	0	0	0	1272

Pr 15 50 85 95
S d 28 33 37 39
M a S d(A ra) 33.9
10 MPH Pa S d 31-40
N m r Pa 911
Pr Pa 73.0%
N m r 30 MPH 1000
Pr 30 MPH 78.6%

Grad To a	6	3	37	453	1127	775	156	26	8	2	0	0	0	2593
S a				Pr 15	50	85	95							
				S d 29	33	37	40							
				M a S d(A ra) 34.2										
				10 MPH Pa S d 31-40										
				N m r Pa 1896										
				Pr Pa 73.0%										
				N m r 30 MPH 2094										
				Pr 30 MPH 80.8%										

Accurate Counts
978-664-2565

S Cod : 1032101

Lo a o : M mora Dr
Lo a o : W o W U o Sr
C Sa : A a d MA
Dr o : WB

5 7 2025	0 - 15	15 -	20 -	25 -	30 -	35 -	40 -	45 -	50 -	55 -	60 -	65 -	70	To a
T m	MPH	20 MPH	25 MPH	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH	55 MPH	60 MPH	65 MPH	70 MPH	MPH	
12:00 AM	0	0	0	2	0	2	0	0	0	0	0	0	0	4
1:00	0	0	0	2	0	1	0	0	0	0	0	0	0	3
2:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1
3:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4:00	0	0	0	0	2	4	0	0	0	0	0	0	0	6
5:00	0	0	0	3	7	1	0	2	0	0	0	0	0	13
6:00	0	0	2	31	53	23	4	0	1	0	0	0	0	114
7:00	0	0	5	24	63	28	9	1	1	0	0	0	0	131
8:00	0	0	5	23	35	14	3	0	1	0	0	0	0	81
9:00	0	0	0	10	9	11	3	0	1	0	0	0	0	34
10:00	0	1	0	11	19	11	0	0	0	0	0	0	0	42
11:00	0	0	1	7	23	8	4	1	0	0	0	0	0	44
12:00 PM	0	0	2	9	26	8	2	0	1	0	0	0	0	48
1:00	0	0	0	8	20	16	2	1	0	0	0	0	0	47
2:00	0	0	0	19	28	12	2	0	0	0	0	0	0	61
3:00	0	0	4	17	33	31	6	2	0	0	0	0	0	93
4:00	0	0	1	21	56	23	4	1	0	0	0	0	0	106
5:00	0	0	2	41	54	26	4	1	1	0	0	0	0	129
6:00	0	0	3	23	55	22	3	1	0	0	0	0	0	107
7:00	0	0	3	13	44	19	5	0	1	0	0	0	1	86
8:00	0	0	5	27	38	11	1	2	0	0	0	0	0	84
9:00	0	0	2	14	24	9	2	0	0	0	0	0	0	51
10:00	0	0	0	8	17	6	0	0	0	0	0	0	0	31
11:00	0	0	0	0	5	2	0	0	0	0	0	0	0	7
To a	0	1	35	313	613	288	54	12	7	0	0	0	1	1324

P r 15 50 85 95
 S d 28 31 36 39
 M a S d(A ra) 33.2
 10 MPH Pa S d 28-37
 N m r Pa 943
 P r Pa 71.0%
 N m r 30 MPH 975
 P r 30 MPH 73.6%

Accurate Counts
978-664-2565

S Cod : 1032101

Lo a o : M mora Dr
Lo a o : W o W U o Sr
C Sa : A a d MA
Dr o : WB

5 8 2025 T m	0 - 15 MPH	15 - 20 MPH	20 - 25 MPH	25 - 30 MPH	30 - 35 MPH	35 - 40 MPH	40 - 45 MPH	45 - 50 MPH	50 - 55 MPH	55 - 60 MPH	60 - 65 MPH	65 - 70 MPH	70 MPH	To a
12:00 AM	0	1	0	3	3	2	1	0	0	0	0	0	0	10
1:00	0	0	0	0	2	1	0	0	0	0	0	0	0	3
2:00	0	0	0	0	0	0	0	0	0	1	0	0	0	1
3:00	0	0	0	0	2	0	0	0	0	0	0	0	0	2
4:00	0	0	0	0	1	2	2	0	0	0	0	0	0	5
5:00	0	0	1	3	8	2	1	0	1	0	0	0	0	16
6:00	0	0	5	27	53	15	6	0	0	0	0	0	0	106
7:00	0	0	1	27	53	35	4	1	0	0	0	0	0	121
8:00	0	0	2	18	27	14	0	0	0	0	0	0	0	61
9:00	0	1	3	11	19	13	2	0	0	0	0	0	0	49
10:00	0	0	0	13	12	7	5	0	0	0	0	0	0	37
11:00	0	0	0	12	20	10	1	0	0	0	0	0	0	43
12:00 PM	0	0	1	12	22	8	1	0	0	0	0	0	0	44
1:00	0	0	3	9	28	6	1	0	0	0	0	0	0	47
2:00	0	0	0	9	29	19	1	0	0	0	0	0	0	58
3:00	0	1	2	25	40	19	4	0	0	0	0	0	0	91
4:00	0	2	3	19	46	21	6	0	0	1	0	0	0	98
5:00	0	0	2	21	51	18	5	3	0	0	0	0	0	100
6:00	0	0	1	28	49	28	9	0	0	0	0	0	0	115
7:00	0	0	4	28	37	17	11	0	0	0	0	0	0	97
8:00	0	0	1	25	33	15	3	0	0	0	0	0	0	77
9:00	0	0	0	18	18	10	1	0	0	0	0	0	0	47
10:00	0	0	1	7	11	4	1	0	0	0	0	0	0	24
11:00	0	0	0	6	7	0	2	2	0	0	0	0	0	17
To a	0	5	30	321	571	266	67	6	1	2	0	0	0	1269

Pr 15 50 85 95
S d 28 31 36 39
M a S d(A ra) 33.1
10 MPH Pa S d 27-36
N m r Pa 865
Pr Pa 70.0%
N m r 30 MPH 913
Pr 30 MPH 71.9%

Gr a d To a	0	6	65	634	1184	554	121	18	8	2	0	0	1	2593
S a				Pr 15	50	85	95							
				S d 28	31	36	39							
				M a S d(A ra) 33.2										
				10 MPH Pa S d 28-37										
				N m r Pa 1824										
				Pr Pa 71.0%										
				N m r 30 MPH 1888										
				Pr 30 MPH 72.8%										

Accurate Counts
978-664-2565

S Cod : 1032101

Lo a o : M mora Dr
Lo a o : W o W U o Sr
C Sa : A a d MA
Dr o : Com d

5 7 2025	0 - 15	15 -	20 -	25 -	30 -	35 -	40 -	45 -	50 -	55 -	60 -	65 -	70	To a
T m	MPH	20 MPH	25 MPH	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH	55 MPH	60 MPH	65 MPH	70 MPH	MPH	
12:00 AM	0	0	0	2	1	2	0	0	0	0	0	0	0	5
1:00	0	0	0	2	0	1	0	0	0	0	0	0	0	3
2:00	0	0	0	0	2	0	0	0	0	0	0	0	0	2
3:00	0	0	0	1	1	0	0	0	0	0	0	0	0	2
4:00	0	1	0	1	3	5	1	0	0	0	0	0	0	11
5:00	0	0	3	5	16	9	4	2	0	0	0	0	0	39
6:00	0	0	2	38	85	52	11	2	2	0	0	0	0	192
7:00	0	0	5	39	140	73	15	1	1	0	0	0	0	274
8:00	0	0	5	40	78	63	17	2	3	0	0	0	0	208
9:00	0	0	0	15	37	31	9	0	1	0	0	0	0	93
10:00	0	1	0	19	44	28	6	0	0	0	0	0	0	98
11:00	0	0	2	13	50	28	8	1	1	0	0	0	0	103
12:00 PM	0	0	2	12	42	27	5	0	1	0	0	0	0	89
1:00	0	0	0	14	36	35	5	2	0	0	0	0	0	92
2:00	0	0	0	27	55	33	7	0	0	0	0	0	0	122
3:00	0	0	7	27	68	49	13	3	1	0	0	0	0	168
4:00	0	0	1	42	101	50	9	3	0	0	0	0	0	206
5:00	2	1	3	71	133	55	11	1	1	0	0	0	0	278
6:00	0	1	5	62	115	49	7	4	1	0	0	0	0	244
7:00	0	0	3	26	69	46	12	1	2	0	0	0	1	160
8:00	0	0	5	37	52	18	2	2	0	0	0	0	0	116
9:00	0	0	2	17	36	15	4	0	0	0	0	0	0	74
10:00	0	0	1	11	20	10	4	1	0	0	0	0	0	47
11:00	0	0	0	3	9	6	0	0	0	1	0	0	0	19
To a	2	4	46	524	1193	685	150	25	14	1	0	0	1	2645

P r 15 50 85 95
 S d 28 33 37 40
 M a S d(A ra) 33.9
 10 MPH Pa S d 31-40
 N m r Pa 1878
 P r Pa 71.0%
 N m r 30 MPH 2069
 P r 30 MPH 78.2%

Accurate Counts
978-664-2565

S Cod : 1032101

Lo a o : M mora Dr
Lo a o : W o W U o Sr
C Sa : A a d MA
Dr o : Com d

5 8 2025	0 - 15	15 -	20 -	25 -	30 -	35 -	40 -	45 -	50 -	55 -	60 -	65 -	70	To a
T m	MPH	20 MPH	25 MPH	30 MPH	35 MPH	40 MPH	45 MPH	50 MPH	55 MPH	60 MPH	65 MPH	70 MPH	MPH	To a
12:00 AM	0	1	0	3	4	2	1	0	0	0	0	0	0	11
1:00	0	0	0	0	3	1	0	0	0	0	0	0	0	4
2:00	0	0	0	0	1	0	0	0	0	1	0	0	0	2
3:00	0	0	0	1	3	2	0	0	0	0	0	0	0	6
4:00	0	0	0	0	3	4	2	0	0	0	0	0	0	9
5:00	0	0	2	4	17	13	4	0	1	0	0	0	0	41
6:00	0	0	5	40	94	44	11	3	0	0	0	0	0	197
7:00	0	0	3	42	122	85	11	2	0	0	0	0	0	265
8:00	0	0	2	37	71	54	8	1	0	1	0	0	0	174
9:00	1	1	3	22	42	34	6	0	1	0	0	0	0	110
10:00	0	0	1	21	28	20	6	2	0	0	0	0	0	78
11:00	0	0	0	25	35	24	4	0	0	0	0	0	0	88
12:00 PM	0	0	3	25	44	23	3	1	0	0	0	0	0	99
1:00	0	0	3	17	47	19	4	0	0	0	0	0	0	90
2:00	0	0	1	20	56	34	4	0	0	0	0	0	0	115
3:00	0	1	6	45	66	48	7	1	0	0	0	0	0	174
4:00	1	2	7	26	74	33	7	0	0	1	0	0	0	151
5:00	0	0	9	58	142	57	8	5	0	0	0	0	0	279
6:00	0	0	2	54	95	59	13	0	0	0	0	0	0	223
7:00	0	0	5	46	76	42	15	1	0	0	0	0	0	185
8:00	2	0	1	38	48	27	4	0	0	0	0	0	0	120
9:00	0	0	1	23	19	11	1	1	0	0	0	0	0	56
10:00	0	0	1	9	16	7	4	0	0	0	0	0	0	37
11:00	0	0	1	7	12	1	4	2	0	0	0	0	0	27
To a	4	5	56	563	1118	644	127	19	2	3	0	0	0	2541

Pr 15 50 85 95
S d 28 32 36 39
M a S d(A ra) 33.5
10 MPH Pa S d 30-39
N m r Pa 1734
Pr Pa 70.0%
N m r 30 MPH 1913
Pr 30 MPH 75.3%

Grad To a	6	9	102	1087	2311	1329	277	44	16	4	0	0	1	5186
S a				Pr 15	50	85	95							
				S d 28	32	37	40							
				M a S d(A ra) 33.7										
				10 MPH Pa S d 30-39										
				N m r Pa 3638										
				Pr Pa 71.0%										
				N m r 30 MPH 3982										
				Pr 30 MPH 76.8%										

MASSDOT CRASH DATA

Route 135 at Memorial Drive and Voyagers Lane MassDOT Crash Data

Crash Number	City Town Name	Crash Date	Date	Crash Severity	Crash Time	Crash Year	Driver Contributing Circumstances (All Drivers)	First Harmful Event	Light Conditions	Manner of Collision
4478524	ASHLAND	12/27/2017	Wed	Property damage only (none injured)	11:20 AM	2017	D1: (No improper driving) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Rear-end
4612134	ASHLAND	07/20/2018	Fri	Property damage only (none injured)	7:03 AM	2018	D1: (No improper driving) / D2: (Inattention)	Collision with motor vehicle in traffic	Daylight	Rear-end
4632223	ASHLAND	10/27/2018	Sat	Non-fatal injury	6:57 PM	2018	D1: (Fatigued/asleep)	Collision with ditch	Dark - lighted roadway	Single vehicle crash
4648708	ASHLAND	12/07/2018	Fri	Property damage only (none injured)	12:32 PM	2018	D1: (No improper driving) / D2: (Failed to yield right of way)	Collision with motor vehicle in traffic	Daylight	Angle
4659849	ASHLAND	01/24/2019	Thu	Property damage only (none injured)	4:40 PM	2019	D1: (No improper driving) / D2: (No improper driving) / D3: (Followed too closely)	Collision with motor vehicle in traffic	Daylight	Rear-end
4868640	ASHLAND	07/06/2020	Mon	Property damage only (none injured)	6:01 PM	2020	D1: (No improper driving)	Collision with other movable object	Daylight	Head-on
4892860	ASHLAND	07/31/2020	Fri	Property damage only (none injured)	5:12 PM	2020	D1: (No improper driving) / D2: (Inattention),(Followed too closely)	Collision with motor vehicle in traffic	Daylight	Rear-end
4980606	ASHLAND	03/21/2021	Sun	Non-fatal injury	3:09 PM	2021	D1: (No improper driving) / D2: (No improper driving)	Collision with motor vehicle in traffic	Daylight	Rear-end

Route 135 at Memorial Drive and Voyagers Lane MassDOT Crash Data

Crash Number	City Town Name	Crash Date	Road Surface Condition	Roadway Junction Type	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway
4478524	ASHLAND	12/27/2017	Dry	Four-way intersection	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear		W UNION ST / VOYAGERS LN
4612134	ASHLAND	07/20/2018	Dry	Four-way intersection	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1: E / V2: E	Clear		W UNION ST / VOYAGERS LN
4632223	ASHLAND	10/27/2018	Wet	Not at junction	V1: Travelling straight ahead	V1: E	Rain		W UNION ST / VOYAGERS LN
4648708	ASHLAND	12/07/2018	Dry	Four-way intersection	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: S	Clear	55	W UNION ST
4659849	ASHLAND	01/24/2019	Wet	Not at junction	V1: Turning left / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic	V1: E / V2: E / V3: E	Rain		W UNION ST / VOYAGERS LN
4868640	ASHLAND	07/06/2020	Dry	Four-way intersection	V1: Travelling straight ahead	V1: W	Clear/Other		WEST UNION STREET Rte SR135 E
4892860	ASHLAND	07/31/2020	Dry	Four-way intersection	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear		W UNION ST / VOYAGERS LN
4980606	ASHLAND	03/21/2021	Dry	Not at junction	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear	55	W UNION ST

Route 135 at Summer Street MassDOT Crash Data

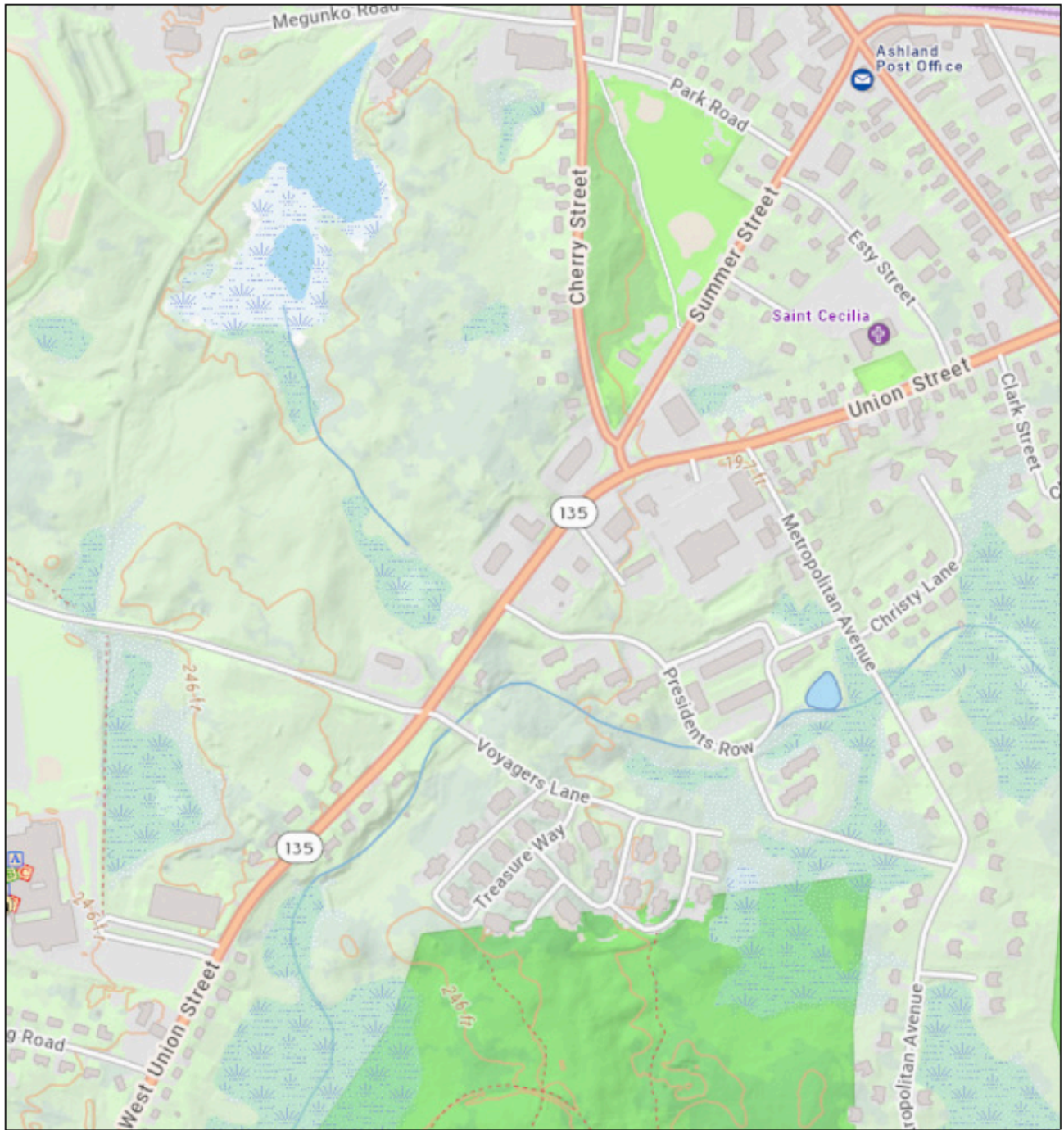
Crash Number	City Town Name	Crash Date	Date	Crash Severity	Crash Time	Crash Year	First Harmful Event	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)
4326832	ASHLAND	01/25/2017	Wed	Property damage only (none injured)	12:36 PM	2017	Collision with motor vehicle in traffic	Daylight	Angle	Dry	V1: Backing / V2: Travelling straight ahead
4632224	ASHLAND	10/27/2018	Sat	Property damage only (none injured)	7:10 PM	2018	Collision with motor vehicle in traffic	Dark - roadway not lighted	Rear-end	Wet	V1: Backing / V2: Slowing or stopped in traffic
4680765	ASHLAND	02/23/2019	Sat	Property damage only (none injured)	4:21 PM	2019	Collision with motor vehicle in traffic	Daylight	Front to Rear	Dry	V1: Slowing or stopped in traffic
4804211	ASHLAND	12/03/2019	Tue	Property damage only (none injured)	5:25 AM	2019	Collision with motor vehicle in traffic	Dawn	Sideswipe, same direction	Snow	V1: Travelling straight ahead / V2: Travelling straight ahead
4868635	ASHLAND	07/04/2020	Sat	Property damage only (none injured)	9:51 PM	2020	Collision with curb	Dark - lighted roadway	Single vehicle crash	Dry	V1: Travelling straight ahead

Route 135 at Summer Street MassDOT Crash Data

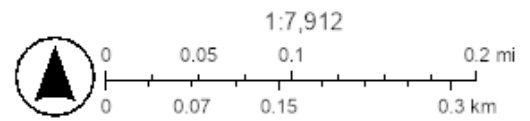
Crash Number	City Town Name	Crash Date	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Street Number	Roadway
4326832	ASHLAND	01/25/2017	V1: N / V2: W	Clear/Other	1	W UNION ST
4632224	ASHLAND	10/27/2018	V1: N / V2: S	Rain	1	W UNION ST
4680765	ASHLAND	02/23/2019	V1: S	Clear		SUMMER STREET / UNION STREET Rte SR135 / WEST UNION STREET Rte SR135
4804211	ASHLAND	12/03/2019	V1: E / V2: E	Snow/Blowing sand, snow		WEST UNION STREET Rte SR135 E / SUMMER STREET
4868635	ASHLAND	07/04/2020	V1: S	Clear	1	W UNION ST

MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAP

ArcGIS Web Map



May 20, 2025



MassGIS

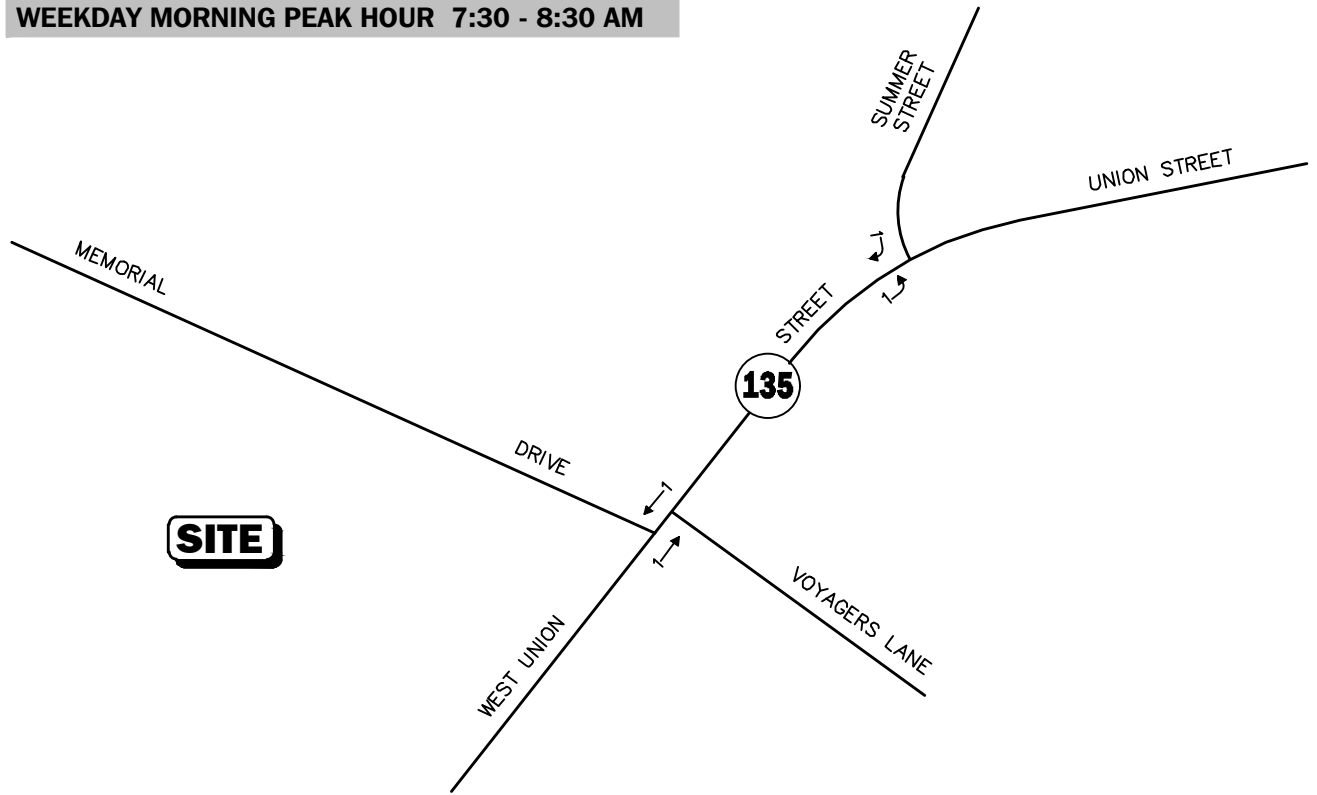
GENERAL BACKGROUND TRAFFIC GROWTH

General Background Traffic Growth - Daily Traffic Volumes

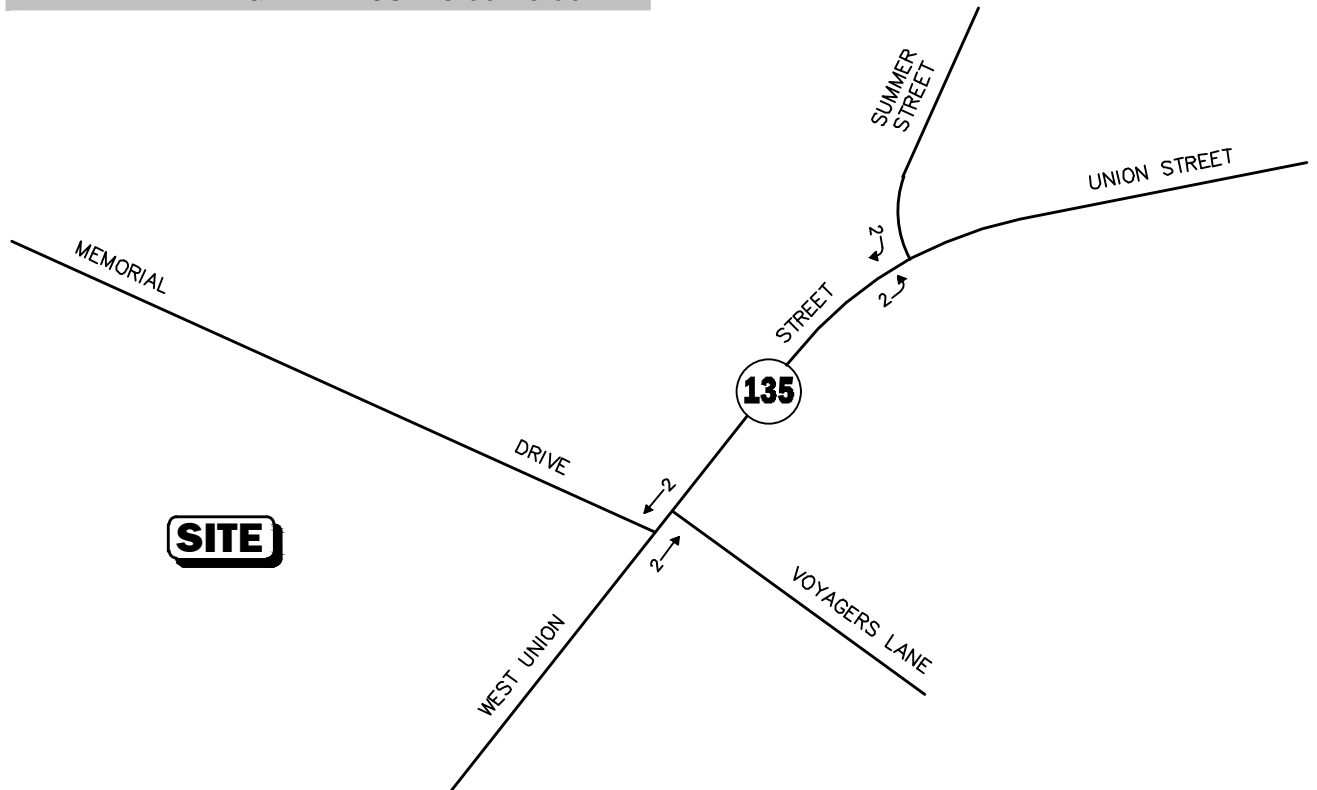
CITY/TOWN	ROUTE/STREET	LOCATION	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Annual Growth
Southborough	Boston Road	at Valley Road	14,900	14,810	15,350	16,363	16,683	17,200	16,228	17,234	17,527	16,420	16,354	1.02%
Framingham	Fountain Street	at Winter Street	11,022	9,900	10,089	9,986	11,828	12,195	12,475	13,248	13,473	13,513	10,443	0.00%
Framingham	Union Avenue	at Mount Wayte Avenue	17,973	15,500	15,797	15,273	17,009	17,536	17,939	14,980	15,235	15,281	15,220	-1.33%
Ashland	Chestnut Street	at Union Street	6,157	6,700	6,832	6,836	6,723	6,931	7,090	7,158	7,280	7,302	6,956	1.28%
Framingham	Waverly Street	at Route 126 (Concord Street)	15,578	14,400			15,267	16,107	16,284	14,393	14,551	14,755	15,007	-1.20%
Southborough	Massachusetts Turnpike	at Cordaville									100,312	100,999	102,416	1.04%
														0.14%

BACKGROUND DEVELOPMENT TRAFFIC-VOLUME NETWORKS

WEEKDAY MORNING PEAK HOUR 7:30 - 8:30 AM



WEEKDAY EVENING PEAK HOUR 5:00 - 6:00 PM



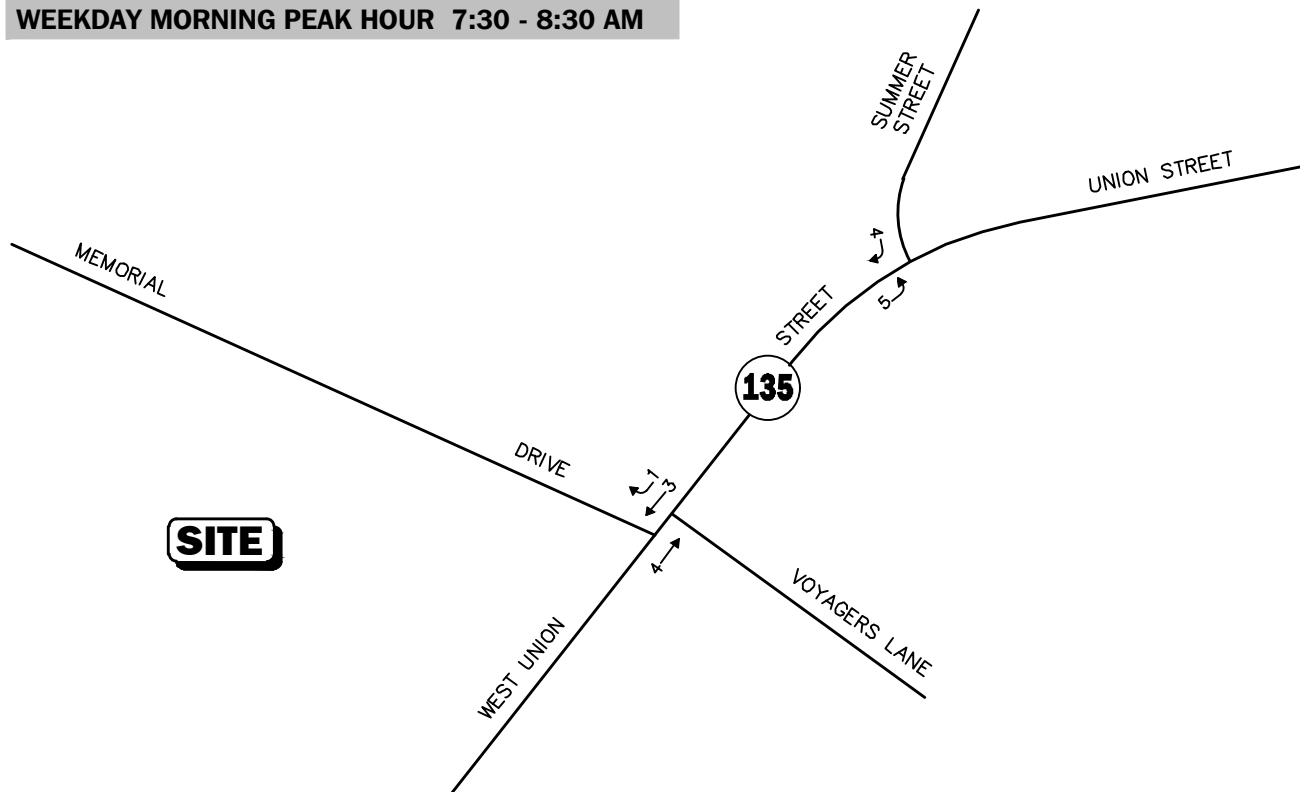
Not To Scale

Figure A-1

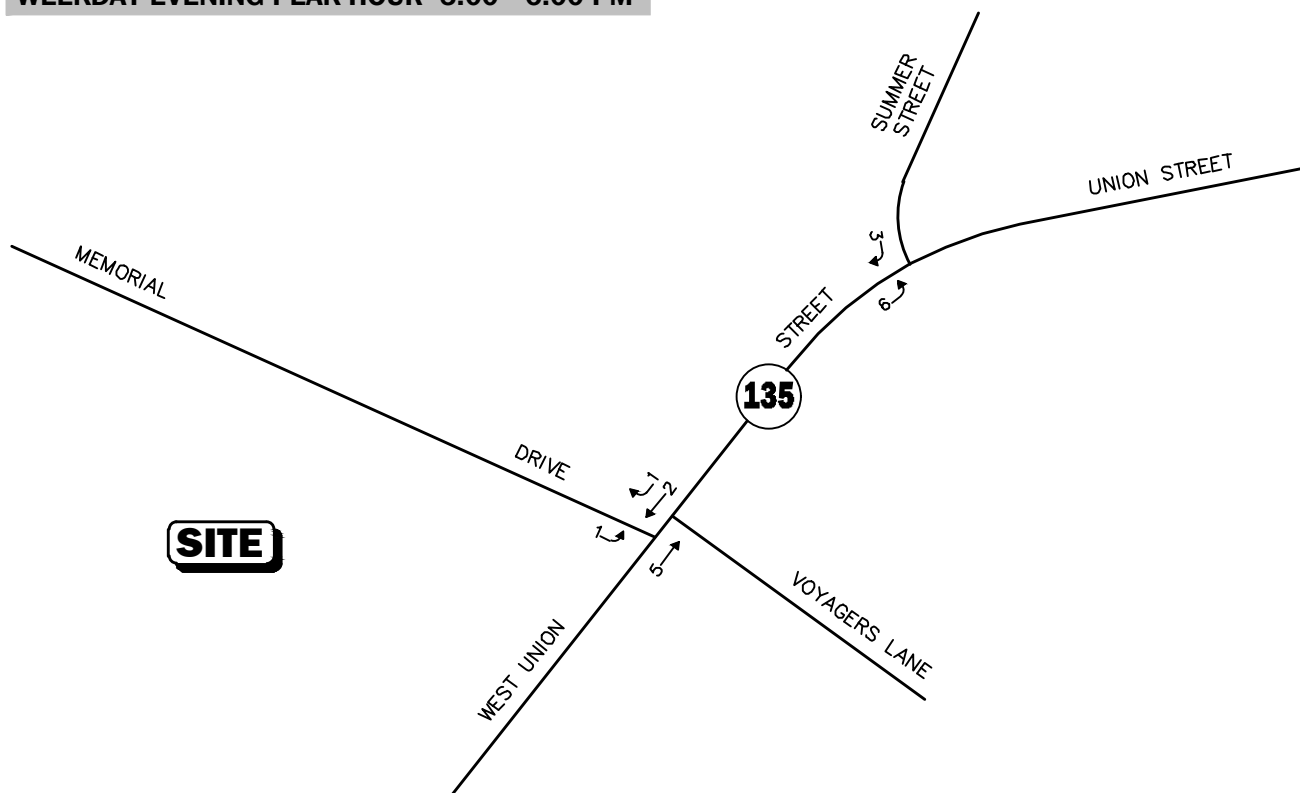


Proposed Mixed-Use Development
9-49 Homer Avenue
Peak-Hour Traffic Volumes

WEEKDAY MORNING PEAK HOUR 7:30 - 8:30 AM



WEEKDAY EVENING PEAK HOUR 5:00 - 6:00 PM



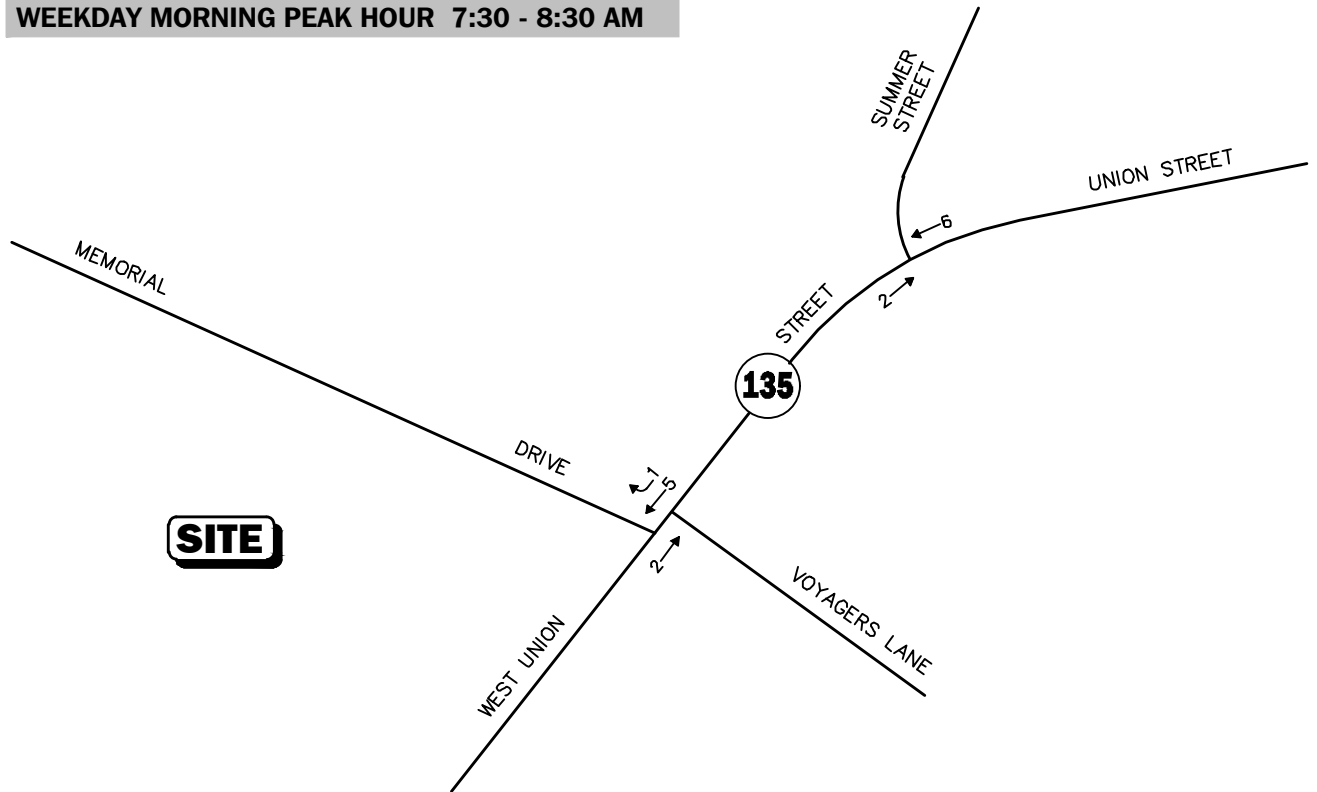
Not To Scale

Figure A-2

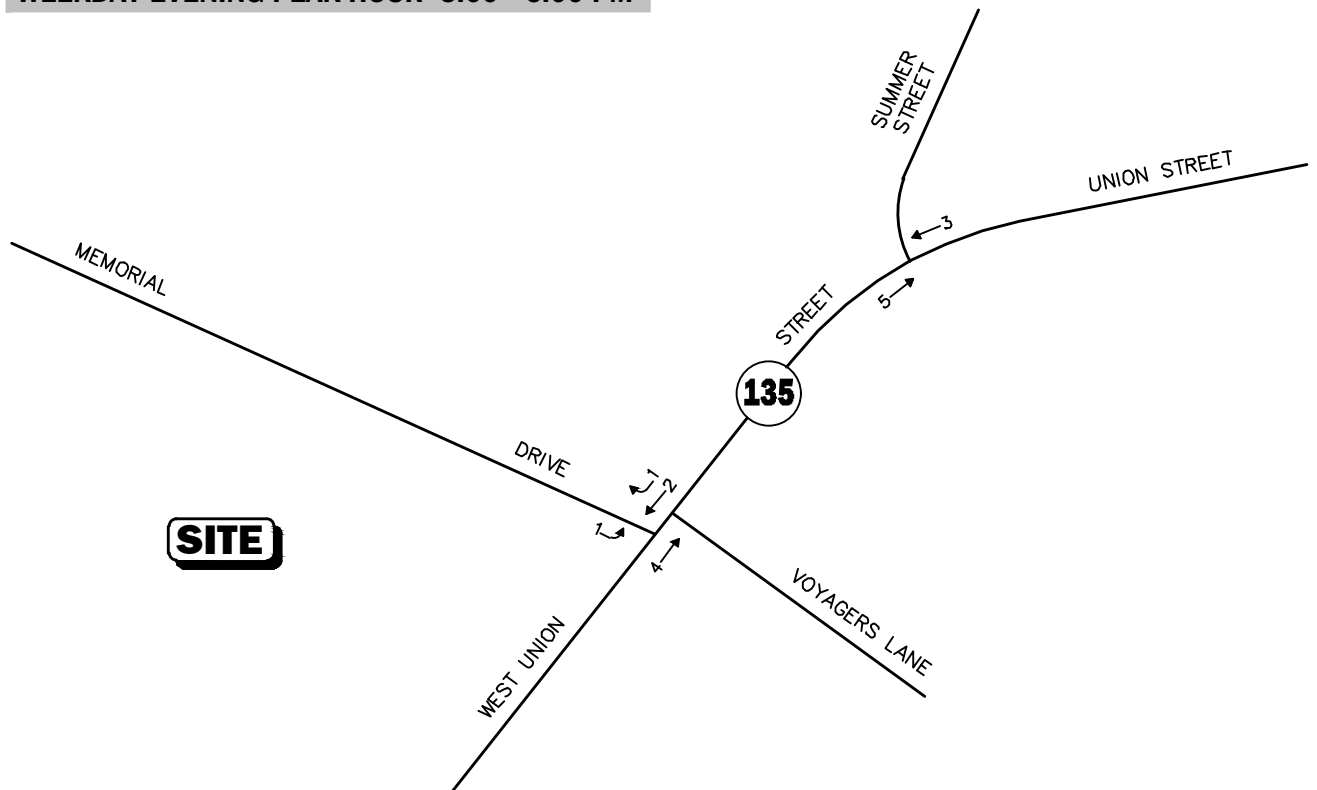


Proposed Mixed-Use Development
10-60 Main Street
Peak-Hour Traffic Volumes

WEEKDAY MORNING PEAK HOUR 7:30 - 8:30 AM



WEEKDAY EVENING PEAK HOUR 5:00 - 6:00 PM



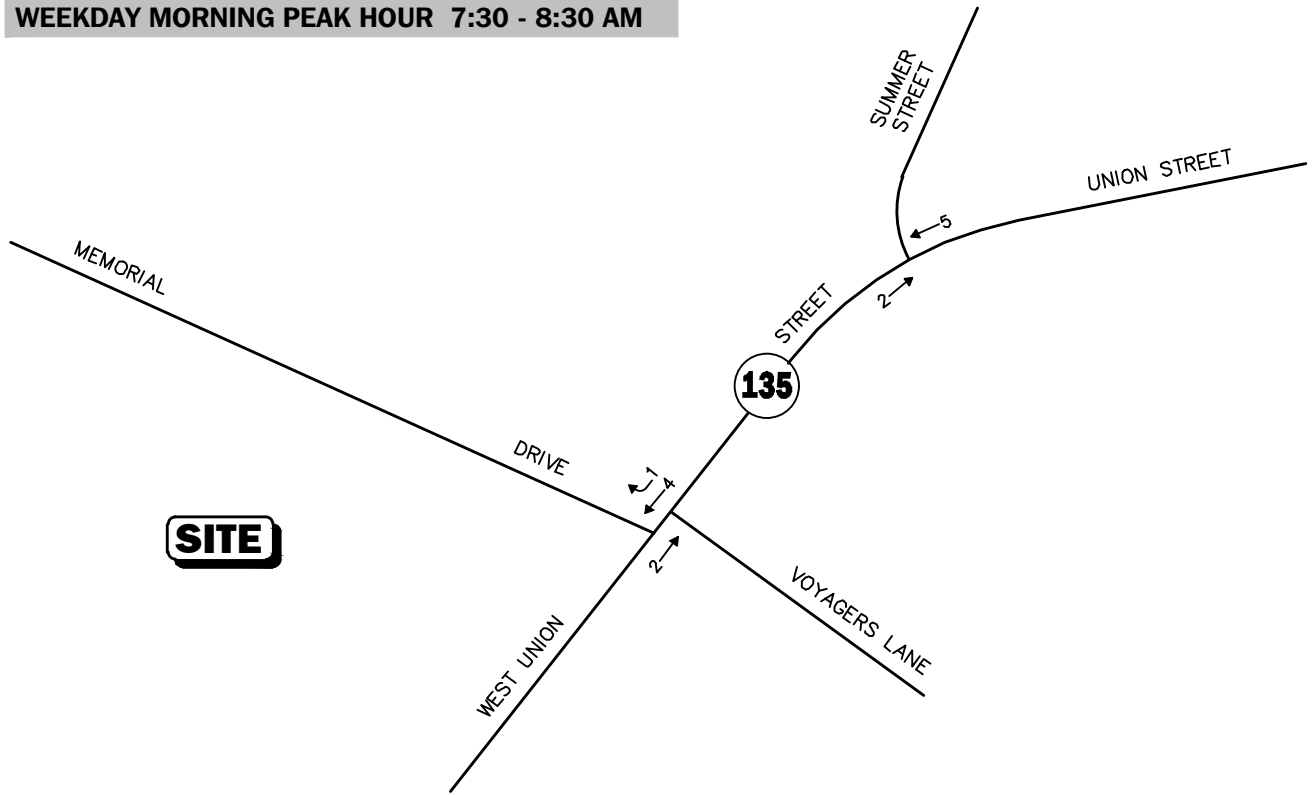
Not To Scale



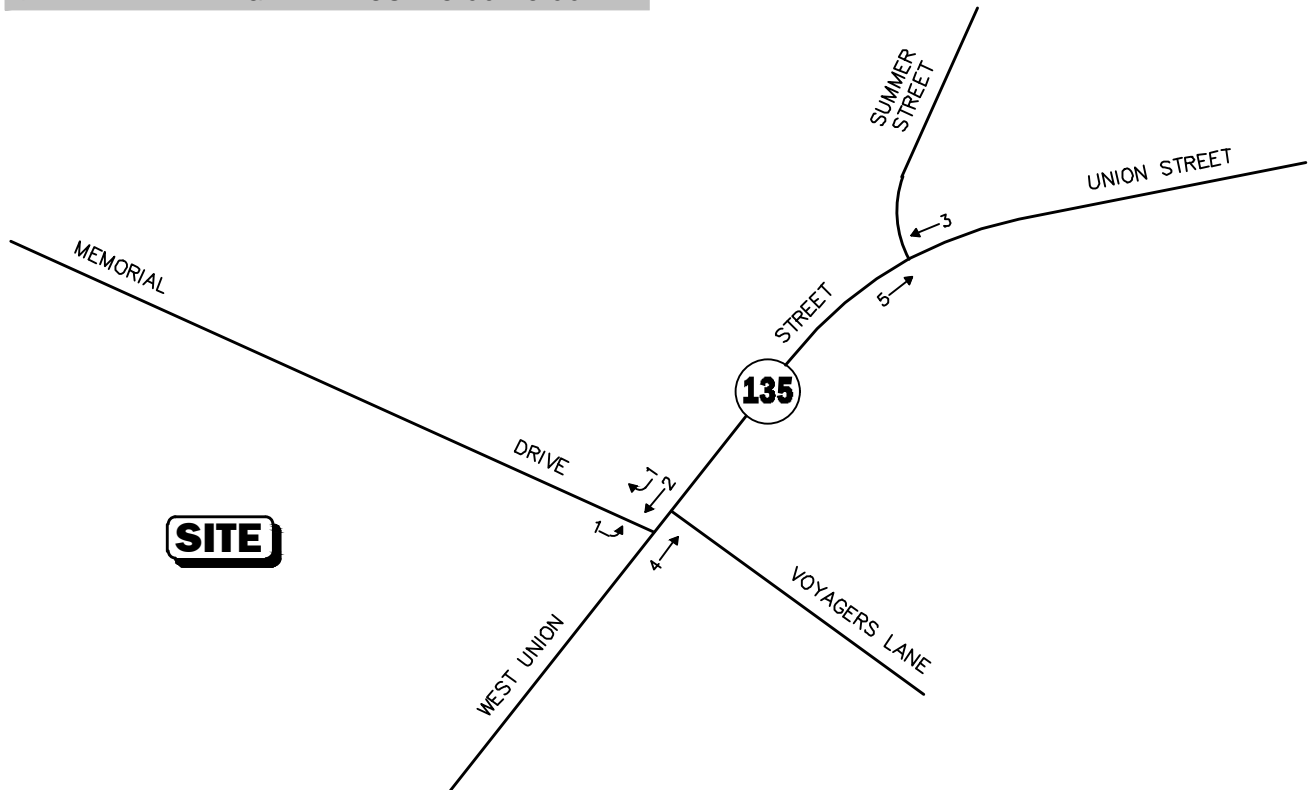
Figure A-3

Proposed Residential Development
61 Waverly Street
Peak-Hour Traffic Volumes

WEEKDAY MORNING PEAK HOUR 7:30 - 8:30 AM



WEEKDAY EVENING PEAK HOUR 5:00 - 6:00 PM



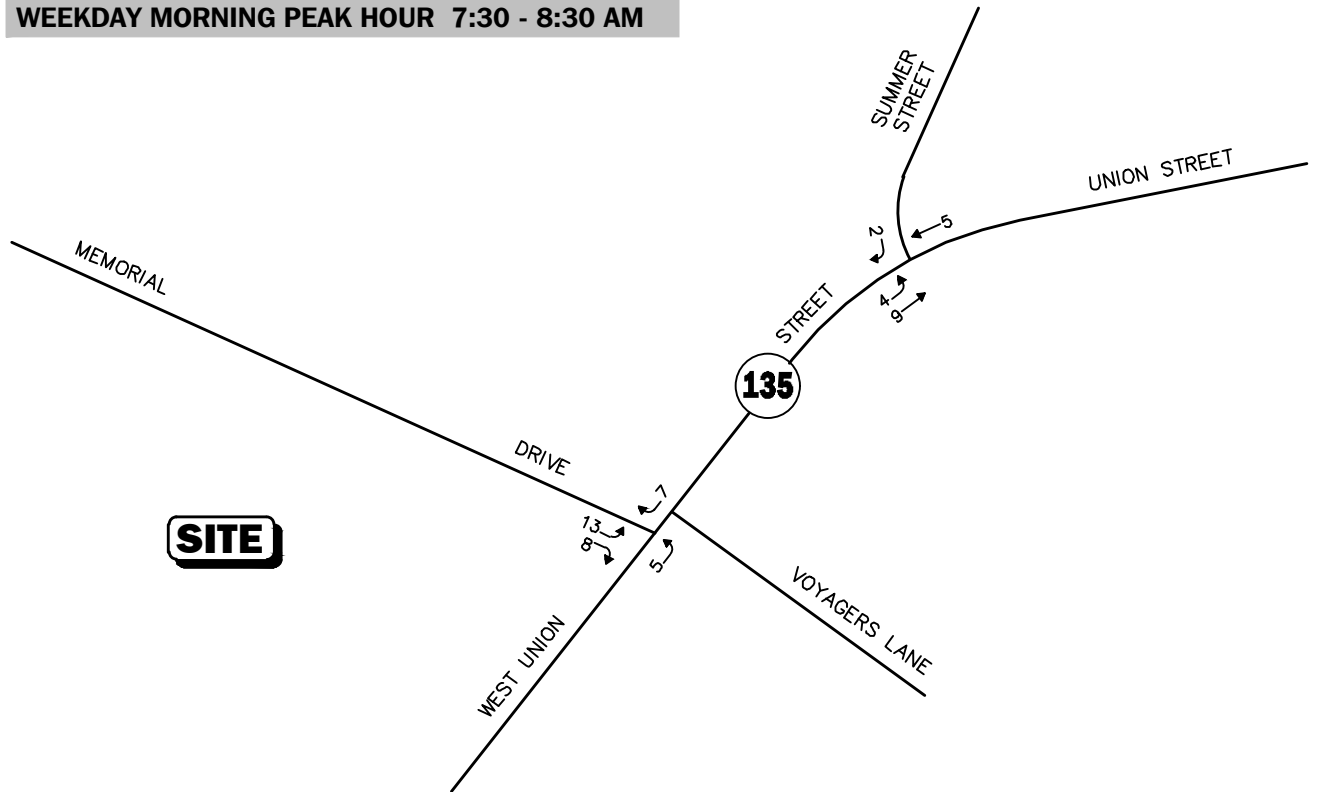
 Not To Scale

Figure A-4

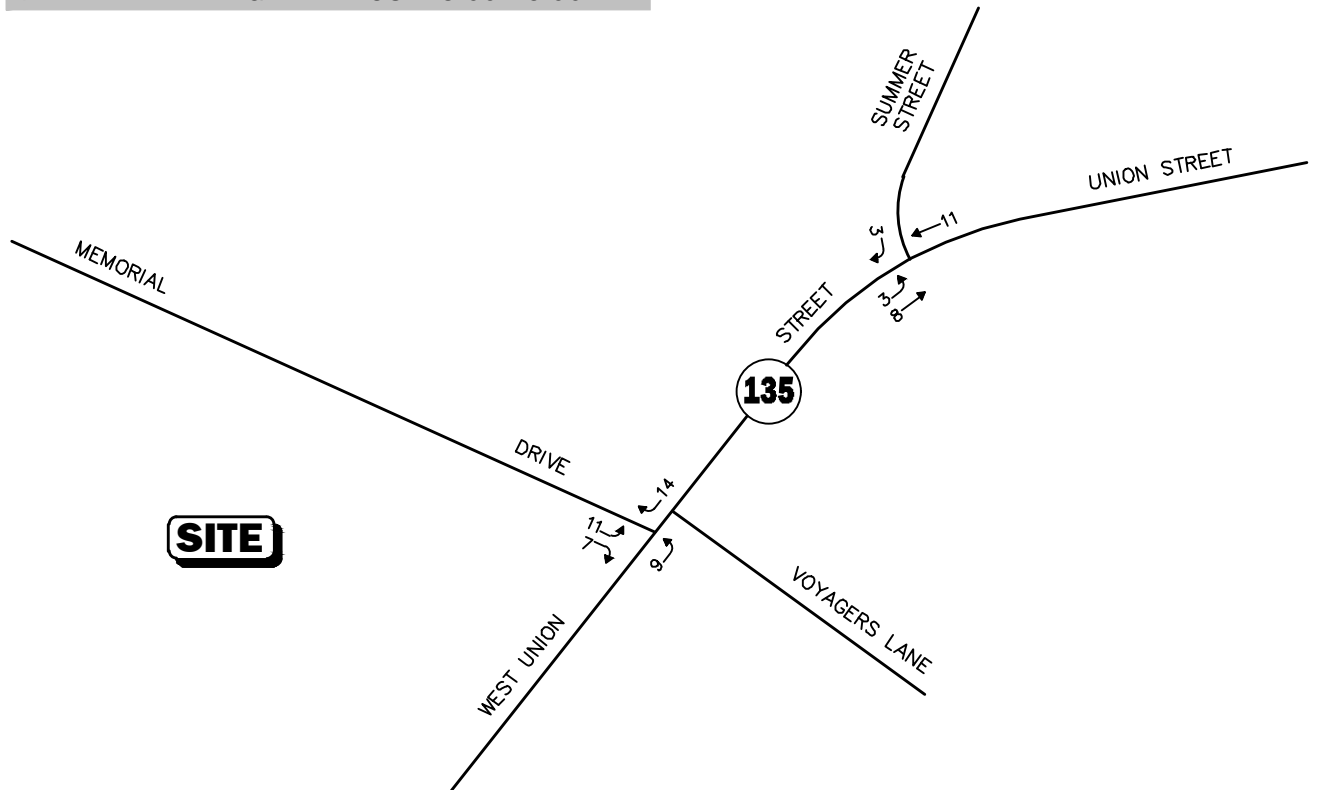


Proposed Mixed-Use Development
100 Chestnut Street
Peak-Hour Traffic Volumes

WEEKDAY MORNING PEAK HOUR 7:30 - 8:30 AM



WEEKDAY EVENING PEAK HOUR 5:00 - 6:00 PM



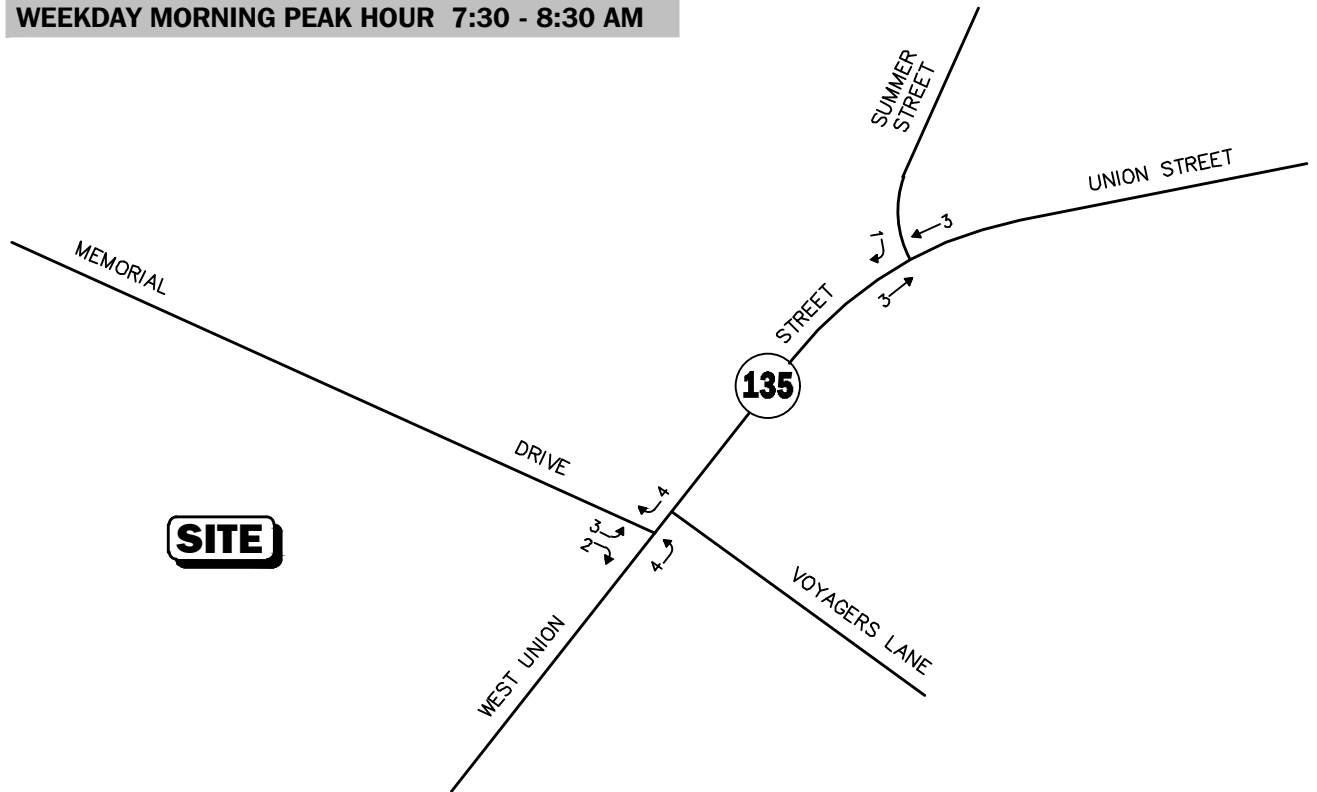
Not To Scale



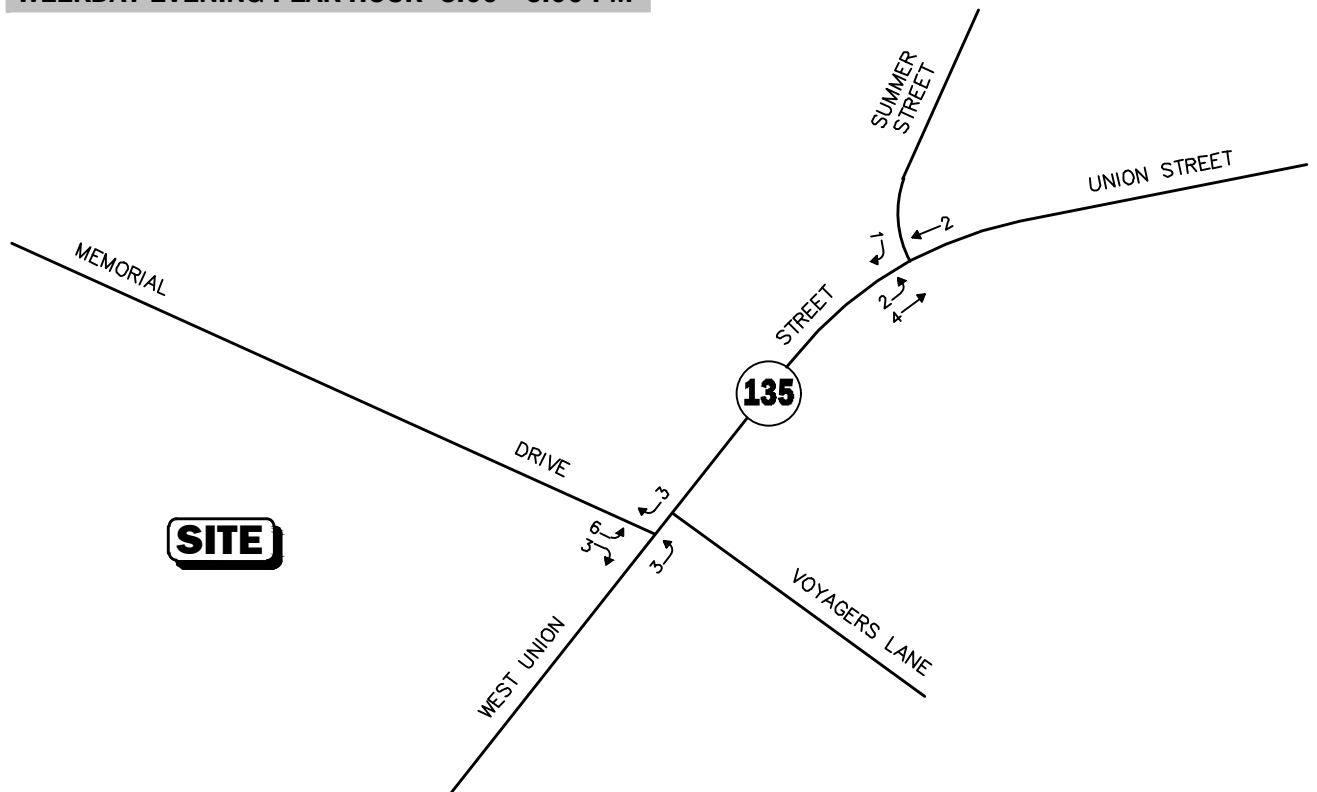
Figure A-5

Proposed Residential Development
Arbella
Peak-Hour Traffic Volumes

WEEKDAY MORNING PEAK HOUR 7:30 - 8:30 AM



WEEKDAY EVENING PEAK HOUR 5:00 - 6:00 PM



Not To Scale

Figure A-6

Proposed Ashland Dog Park
Memorial Drive
Peak-Hour Traffic Volumes



TRIP-GENERATION CALCULATIONS

Graph Look Up



ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

TGM Desk Reference

TGM Appendices

Support Documents

Add Users

Comments

Query Filter

DATA SOURCE:

Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:

221

LAND USE GROUP:

(200-299) Residential

LAND USE :

221 - Multifamily Housing (Mid-Rise)

LAND USE SUBCATEGORY:

Not Close to Rail Transit

SETTING/LOCATION:

General Urban/Suburban

INDEPENDENT VARIABLE (IV):

Dwelling Units

TIME PERIOD:

Weekday

TRIP TYPE:

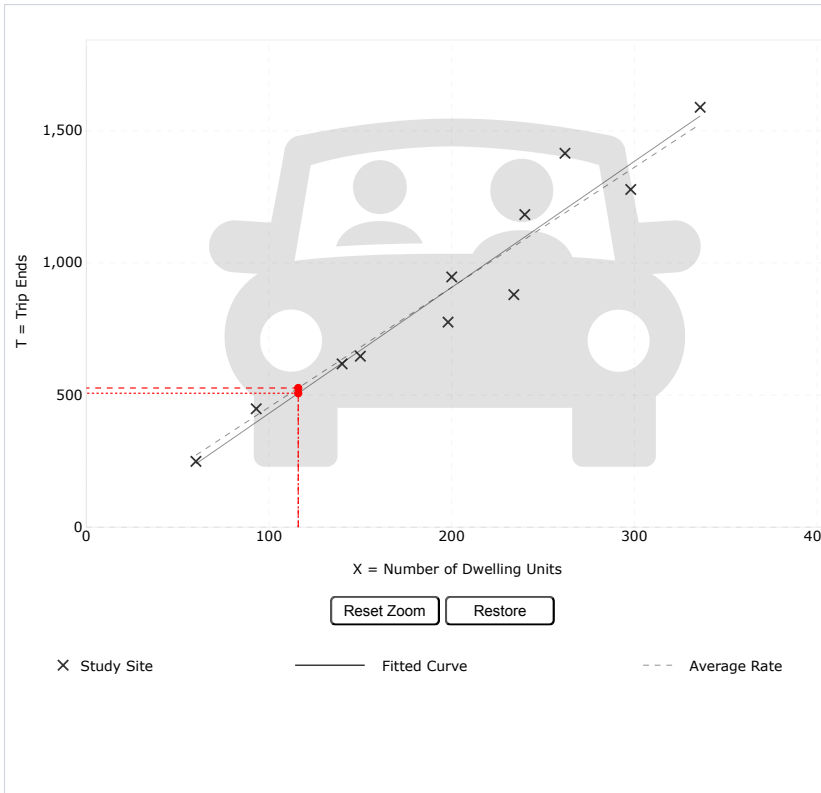
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

116

Calculate

Data Plot and Equation



DATA STATISTICS

Land Use:
Multifamily Housing (Mid-Rise) - Not Close to Rail Transit (221) [Click for Description and Data Plots](#)

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
11

Avg. Num. of Dwelling Units:
201

Average Rate:
4.54

Range of Rates:
3.76 - 5.40

Standard Deviation:
0.51

Fitted Curve Equation:
 $T = 4.77(X) - 46.46$

R²:
0.93

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 527 (Total), 263 (Entry), 264 (Exit)
Fitted Curve: 507 (Total), 253 (Entry), 254 (Exit)

Add-ons to do more

Try OTISS Pro

Graph Look Up



ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

TGM Desk Reference

TGM Appendices

Support Documents

Add Users

Comments

Query Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
221

LAND USE GROUP:
(200-299) Residential

LAND USE:
221 - Multifamily Housing (Mid-Rise)

LAND USE SUBCATEGORY:
Not Close to Rail Transit

SETTING/LOCATION:
General Urban/Suburban

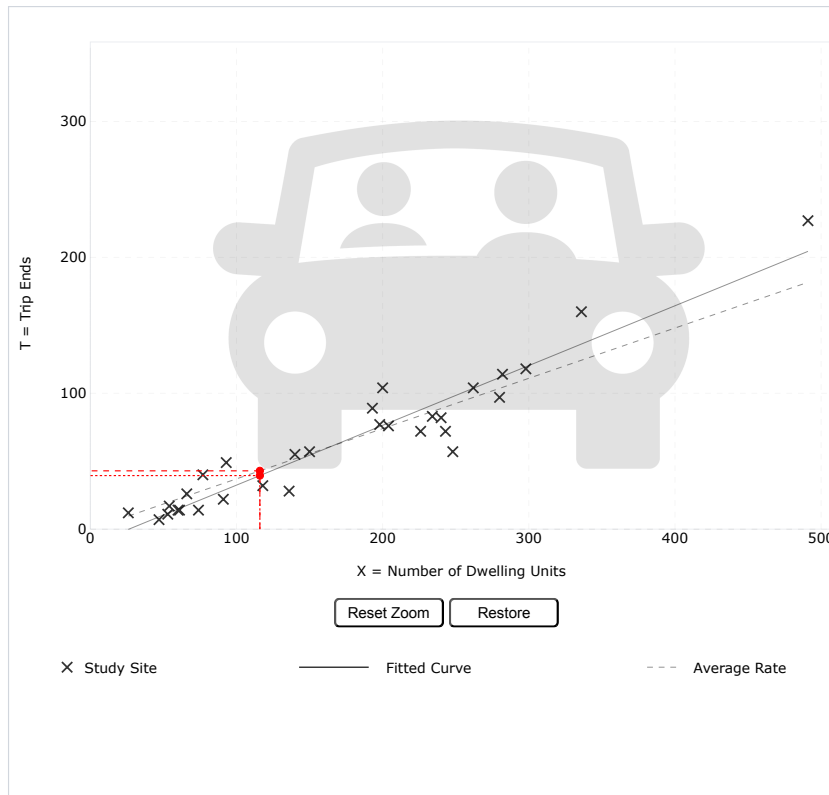
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
116

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Mid-Rise) - Not Close to Rail Transit (221) [Click for Description and Data Plots](#)

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
30

Avg. Num. of Dwelling Units:
173

Average Rate:
0.37

Range of Rates:
0.15 - 0.53

Standard Deviation:
0.09

Fitted Curve Equation:
 $T = 0.44(X) - 11.61$

R²:
0.91

Directional Distribution:
23% entering, 77% exiting

Calculated Trip Ends:
Average Rate: 43 (Total), 10 (Entry), 33 (Exit)
Fitted Curve: 39 (Total), 9 (Entry), 30 (Exit)

Add-ons to do more

Try OTISS Pro

Graph Look Up



ITETripGen Web-based App

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- How to Use ITETripGen
- TGM Desk Reference
- TGM Appendices
- Support Documents
- Add Users
- Comments

Query Filter

DATA SOURCE:
Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:
221

LAND USE GROUP:
(200-299) Residential

LAND USE:
221 - Multifamily Housing (Mid-Rise)

LAND USE SUBCATEGORY:
Not Close to Rail Transit

SETTING/LOCATION:
General Urban/Suburban

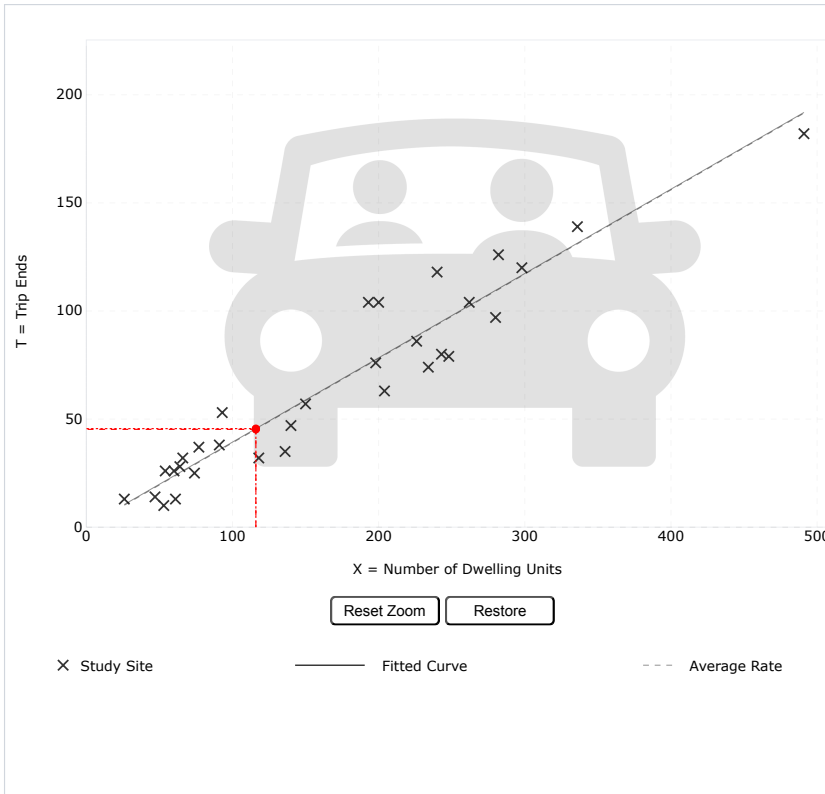
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
116

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
 Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
 Multifamily Housing (Mid-Rise) - Not Close to Rail Transit (221) [Click for Description and Data Plots](#)

Independent Variable:
 Dwelling Units

Time Period:
 Weekday
 Peak Hour of Adjacent Street Traffic
 One Hour Between 4 and 6 p.m.

Setting/Location:
 General Urban/Suburban

Trip Type:
 Vehicle

Number of Studies:
 31

Avg. Num. of Dwelling Units:
 169

Average Rate:
 0.39

Range of Rates:
 0.19 - 0.57

Standard Deviation:
 0.08

Fitted Curve Equation:
 $T = 0.39(X) + 0.34$

R²:
 0.91

Directional Distribution:
 61% entering, 39% exiting

Calculated Trip Ends:
 Average Rate: 45 (Total), 28 (Entry), 17 (Exit)
 Fitted Curve: 46 (Total), 28 (Entry), 18 (Exit)

Add-ons to do more

Try OTISS Pro



CENSUS TRACT DATA

Table: ACSST5Y2019.S0801

	Census Tract 3851, Middlesex County, Massachusetts
	Total
Label	Estimate
Workers 16 years and over	4,223
MEANS OF TRANSPORTATION TO WORK	
Car, truck, or van	86.1%
Drove alone	83.7%
Carpooled	2.4%
In 2-person carpool	2.4%
In 3-person carpool	0.0%
In 4-or-more person carpool	0.0%
Workers per car, truck, or van	1.01
Public transportation (excluding taxicab)	8.2%
Walked	1.3%
Bicycle	0.0%
Taxicab, motorcycle, or other means	0.3%
Worked from home	4.0%

SOVs: 83.8%
 Carpool/Taxi: 2.7%
 Public Transit: 8.2%
 Walk: 1.3%
 Bike: 0.0%
 WFH: 4.0%

TRIP DISTRIBUTION DATA

Proposed Residential Development, 55 West Union Street
Ashland, MA

Residence	Workplace	Number	Memorial Drive (West)		Route 135 (East)		Route 135 (South)		Summer Street (North)	
Ashland, MA	Boston city (Suffolk, MA)	1,266	40%	506	30%	380		0	30%	380
Ashland, MA	Framingham city (Middlesex, MA)	956		0	100%	956		0		0
Ashland, MA	Ashland town (Middlesex, MA)	687		0	30%	206	30%	206	40%	275
Ashland, MA	Natick town (Middlesex, MA)	466		0	100%	466		0		0
Ashland, MA	Waltham city (Middlesex, MA)	384		0	60%	230		0	40%	154
Ashland, MA	Cambridge city (Middlesex, MA)	374	40%	150	30%	112		0	30%	112
Ashland, MA	Marlborough city (Middlesex, MA)	306		0		0	80%	245	20%	61
Ashland, MA	Newton city (Middlesex, MA)	286	20%	57	40%	114		0	40%	114
Ashland, MA	Worcester city (Worcester, MA)	283		0		0	80%	226	20%	57
Ashland, MA	Westborough town (Worcester, MA)	224		0		0	100%	224		0
Ashland, MA	Wellesley town (Norfolk, MA)	200		0	60%	120		0	40%	80
Ashland, MA	Hopkinton town (Middlesex, MA)	171		0		0	100%	171		0
Ashland, MA	Needham town (Norfolk, MA)	153		0	100%	153		0		0
Ashland, MA	Milford town (Worcester, MA)	136		0		0	100%	136		0
Ashland, MA	Holliston town (Middlesex, MA)	126		0	50%	63	50%	63		0
Ashland, MA	Southborough town (Worcester, MA)	112		0		0		0	100%	112
Ashland, MA	Burlington town (Middlesex, MA)	103		0	60%	62		0	40%	41
Ashland, MA	Sudbury town (Middlesex, MA)	80		0	100%	80		0		0
Ashland, MA	Norwood town (Norfolk, MA)	76		0	100%	76		0		0
Ashland, MA	Quincy city (Norfolk, MA)	71		0	60%	43		0	40%	28
Ashland, MA	Woburn city (Middlesex, MA)	68		0	60%	41		0	40%	27
Ashland, MA	Franklin Town city (Norfolk, MA)	63		0		0	100%	63		0
Ashland, MA	Northborough town (Worcester, MA)	62		0		0	50%	31	50%	31
Ashland, MA	Walpole town (Norfolk, MA)	61		0	100%	61		0		0
Ashland, MA	Hudson town (Middlesex, MA)	58		0		0	50%	29	50%	29
Ashland, MA	Canton town (Norfolk, MA)	56		0	60%	34		0	40%	22
Ashland, MA	Concord town (Middlesex, MA)	56		0	60%	34		0	40%	22
Ashland, MA	Dedham town (Norfolk, MA)	52		0	60%	31		0	40%	21
Ashland, MA	Shrewsbury town (Worcester, MA)	52		0		0	50%	26	50%	26
Ashland, MA	Somerville city (Middlesex, MA)	52		0	60%	31		0	40%	21
Ashland, MA	Westwood town (Norfolk, MA)	51		0	100%	51		0		0
Ashland, MA	Lexington town (Middlesex, MA)	50		0	60%	30		0	40%	20
		7,141		713		3,374		1,420		1,634
				10.0%		47.2%		19.9%		22.9%
		<u>SAY</u>		10%		47%		20%		23%

CAPACITY ANALYSIS WORKSHEETS

2025 Existing
2032 No-Build
2032 Build
2032 Build Mitigated

2025 Existing

2025 Existing Weekday Morning
1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↖	↗	↖	↖	↗		↕	↗
Traffic Volume (vph)	139	0	55	5	3	9	85	803	0	7	511	86
Future Volume (vph)	139	0	55	5	3	9	85	803	0	7	511	86
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850						0.850
Fl _t Protected		0.950			0.969		0.950				0.999	
Satd. Flow (prot)	0	1745	1478	0	1780	1561	1745	1827	0	0	1732	1583
Fl _t Permitted		0.950			0.969		0.249				0.987	
Satd. Flow (perm)	0	1745	1478	0	1780	1561	457	1827	0	0	1712	1583
Satd. Flow (RTOR)			196			196						196
Adj. Flow (vph)	172	0	68	12	7	21	92	873	0	8	549	92
Lane Group Flow (vph)	0	172	68	0	19	21	92	873	0	0	557	92
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Detector Phase	4	4	4	8	8	8	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		16.0	16.0	16.0
Total Split (s)	14.0	14.0	14.0	11.0	11.0	11.0	11.0	49.0		38.0	38.0	38.0
Total Split (%)	14.0%	14.0%	14.0%	11.0%	11.0%	11.0%	11.0%	49.0%		38.0%	38.0%	38.0%
Maximum Green (s)	8.0	8.0	8.0	5.0	5.0	5.0	5.0	43.0		32.0	32.0	32.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min		Min	Min	Min
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.74	0.19		0.11	0.07	0.23	0.76			0.64	0.10
Control Delay (s/veh)		55.3	1.1		38.8	0.3	10.9	20.2			23.2	0.2
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0
Total Delay (s/veh)		55.3	1.1		38.8	0.3	10.9	20.2			23.2	0.2
Queue Length 50th (ft)		77	0		8	0	16	268			195	0
Queue Length 95th (ft)		#209	0		17	0	63	#851			#560	0
Internal Link Dist (ft)		443			385			386			1045	
Turn Bay Length (ft)			220			210	175					45
Base Capacity (vph)		232	367		166	323	406	1145			873	903
Starvation Cap Reductn		0	0		0	0	0	0			0	0
Spillback Cap Reductn		0	0		0	0	0	0			0	0
Storage Cap Reductn		0	0		0	0	0	0			0	0
Reduced v/c Ratio		0.74	0.19		0.11	0.07	0.23	0.76			0.64	0.10

Intersection Summary

Cycle Length: 100

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	26%
Maximum Green (s)	23.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	9.0
Flash Don't Walk (s)	14.0
Pedestrian Calls (#/hr)	6
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

2025 Existing Weekday Morning
 1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025

Actuated Cycle Length: 76.7

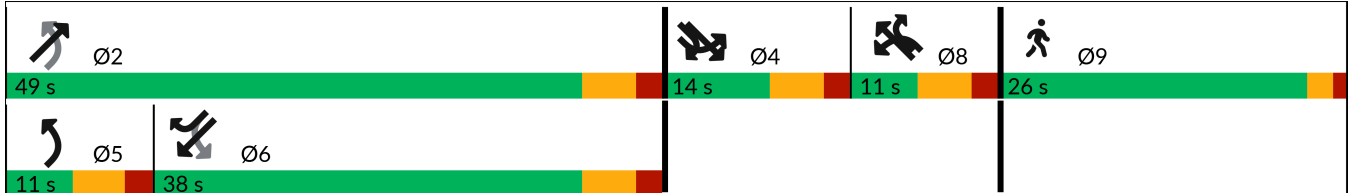
Natural Cycle: 110

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 135 & Voyagers Lane/Memorial Drive



2025 Existing Weekday Morning
1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↕	↗	↖	↖			↕	↗
Traffic Volume (vph)	139	0	55	5	3	9	85	803	0	7	511	86
Future Volume (vph)	139	0	55	5	3	9	85	803	0	7	511	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	10	11	11	11	11	12	12	11	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.97	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1745	1478		1780	1561	1745	1827			1733	1583
Flt Permitted		0.95	1.00		0.97	1.00	0.25	1.00			0.99	1.00
Satd. Flow (perm)		1745	1478		1780	1561	457	1827			1712	1583
Peak-hour factor, PHF	0.81	0.81	0.81	0.43	0.43	0.43	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	172	0	68	12	7	21	92	873	0	8	549	92
RTOR Reduction (vph)	0	0	60	0	0	20	0	0	0	0	0	49
Lane Group Flow (vph)	0	172	8	0	19	1	92	873	0	0	557	43
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	4%	0%	0%	6%	2%
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Actuated Green, G (s)		8.2	8.2		2.8	2.8	47.2	47.2			37.1	37.1
Effective Green, g (s)		10.2	10.2		4.8	4.8	49.2	49.2			39.1	39.1
Actuated g/C Ratio		0.12	0.12		0.06	0.06	0.59	0.59			0.47	0.47
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		215	182		103	90	366	1086			809	748
v/s Ratio Prot		c0.10	0.01		c0.01	0.00	0.02	c0.48				0.03
v/s Ratio Perm							0.13				0.33	
v/c Ratio		0.80	0.05		0.18	0.01	0.25	0.80			0.69	0.06
Uniform Delay, d1		35.3	32.0		37.1	36.7	9.8	13.0			17.0	11.8
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		18.8	0.1		0.9	0.1	0.4	4.4			2.5	0.0
Delay (s)		54.1	32.1		38.0	36.8	10.1	17.4			19.5	11.9
Level of Service		D	C		D	D	B	B			B	B
Approach Delay (s/veh)		47.8			37.3			16.7			18.4	
Approach LOS		D			D			B			B	

Intersection Summary

HCM 2000 Control Delay (s/veh)	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	82.7	Sum of lost time (s)	23.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2025 Existing Weekday Morning
2: Route 135 & Summer Street

05/30/2025



Lane Group	SBL	SBR	NEL	NET	SWT	SWR	Ø9
Lane Configurations							
Traffic Volume (vph)	39	189	334	634	429	60	
Future Volume (vph)	39	189	334	634	429	60	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.983		
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1745	1501	1752	1827	1994	0	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1745	1501	1752	1827	1994	0	
Satd. Flow (RTOR)		270			8		
Adj. Flow (vph)	56	270	363	689	493	69	
Lane Group Flow (vph)	56	270	363	689	562	0	
Turn Type	Prot	pt+ov	Prot	NA	NA		
Protected Phases	4	4 5	5	2	6		9
Permitted Phases							
Detector Phase	4	4 5	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	10.0	10.0		5.0
Minimum Split (s)	10.0		10.0	15.0	15.0		22.0
Total Split (s)	15.0		21.0	63.0	42.0		22.0
Total Split (%)	15.0%		21.0%	63.0%	42.0%		22%
Maximum Green (s)	10.0		16.0	58.0	37.0		19.0
Yellow Time (s)	4.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		None	Min	Min		None
Walk Time (s)							7.0
Flash Don't Walk (s)							12.0
Pedestrian Calls (#/hr)							6
v/c Ratio	0.25	0.33	0.78	0.54	0.76		
Control Delay (s/veh)	34.3	3.1	40.7	8.6	26.6		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay (s/veh)	34.3	3.1	40.7	8.6	26.6		
Queue Length 50th (ft)	19	0	122	82	169		
Queue Length 95th (ft)	55	9	#463	389	408		
Internal Link Dist (ft)	581			1045	897		
Turn Bay Length (ft)	40		170				
Base Capacity (vph)	300	807	466	1618	1190		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.19	0.33	0.78	0.43	0.47		

Intersection Summary

Cycle Length: 100

2025 Existing Weekday Morning
 2: Route 135 & Summer Street

05/30/2025

Actuated Cycle Length: 67.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Route 135 & Summer Street





Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	39	189	334	634	429	60
Future Volume (vph)	39	189	334	634	429	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	16	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1745	1501	1752	1827	1995	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1745	1501	1752	1827	1995	
Peak-hour factor, PHF	0.70	0.70	0.92	0.92	0.87	0.87
Adj. Flow (vph)	56	270	363	689	493	69
RTOR Reduction (vph)	0	166	0	0	5	0
Lane Group Flow (vph)	56	104	363	689	557	0
Heavy Vehicles (%)	0%	4%	3%	4%	7%	0%
Turn Type	Prot	pt+ov	Prot	NA	NA	
Protected Phases	4	4 5	5	2	6	
Permitted Phases						
Actuated Green, G (s)	7.8	24.7	16.9	46.0	24.1	
Effective Green, g (s)	8.8	26.7	17.9	47.0	25.1	
Actuated g/C Ratio	0.13	0.38	0.26	0.68	0.36	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	221	577	451	1237	721	
v/s Ratio Prot	c0.03	0.07	c0.21	0.38	c0.28	
v/s Ratio Perm						
v/c Ratio	0.25	0.18	0.80	0.56	0.77	
Uniform Delay, d1	27.3	14.1	24.1	5.8	19.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.2	10.0	0.5	5.1	
Delay (s)	27.9	14.3	34.2	6.4	24.8	
Level of Service	C	B	C	A	C	
Approach Delay (s/veh)	16.6			15.9	24.8	
Approach LOS	B			B	C	

Intersection Summary

HCM 2000 Control Delay (s/veh)	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	69.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2025 Existing Weekday Evening
1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↕	↗	↖	↖			↕	↗
Traffic Volume (vph)	92	4	64	4	3	7	20	567	3	19	695	112
Future Volume (vph)	92	4	64	4	3	7	20	567	3	19	695	112
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr't			0.850			0.850		0.999				0.850
Flt Protected		0.954			0.972		0.950				0.999	
Satd. Flow (prot)	0	1752	1507	0	1785	1561	1745	1879	0	0	1817	1615
Flt Permitted		0.954			0.972		0.110				0.978	
Satd. Flow (perm)	0	1752	1507	0	1785	1561	202	1879	0	0	1779	1615
Satd. Flow (RTOR)			196			196						196
Adj. Flow (vph)	177	8	123	7	5	12	22	623	3	20	739	119
Lane Group Flow (vph)	0	185	123	0	12	12	22	626	0	0	759	119
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Detector Phase	4	4	4	8	8	8	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		16.0	16.0	16.0
Total Split (s)	14.0	14.0	14.0	11.0	11.0	11.0	11.0	49.0		38.0	38.0	38.0
Total Split (%)	14.0%	14.0%	14.0%	11.0%	11.0%	11.0%	11.0%	49.0%		38.0%	38.0%	38.0%
Maximum Green (s)	8.0	8.0	8.0	5.0	5.0	5.0	5.0	43.0		32.0	32.0	32.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min		Min	Min	Min
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.66	0.30		0.06	0.03	0.07	0.55			0.77	0.12
Control Delay (s/veh)		44.5	2.8		36.4	0.1	10.5	13.4			24.6	0.5
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0
Total Delay (s/veh)		44.5	2.8		36.4	0.1	10.5	13.4			24.6	0.5
Queue Length 50th (ft)		52	0		3	0	2	78			110	0
Queue Length 95th (ft)		107	0		17	0	22	460			#835	3
Internal Link Dist (ft)		443			385			386			1045	
Turn Bay Length (ft)			220			210	175					45
Base Capacity (vph)		280	406		199	348	295	1354			989	985
Starvation Cap Reductn		0	0		0	0	0	0			0	0
Spillback Cap Reductn		0	0		0	0	0	0			0	0
Storage Cap Reductn		0	0		0	0	0	0			0	0
Reduced v/c Ratio		0.66	0.30		0.06	0.03	0.07	0.46			0.77	0.12

Intersection Summary

Cycle Length: 100

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	26%
Maximum Green (s)	23.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	9.0
Flash Don't Walk (s)	14.0
Pedestrian Calls (#/hr)	10
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

2025 Existing Weekday Evening
 1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025

Actuated Cycle Length: 66.7

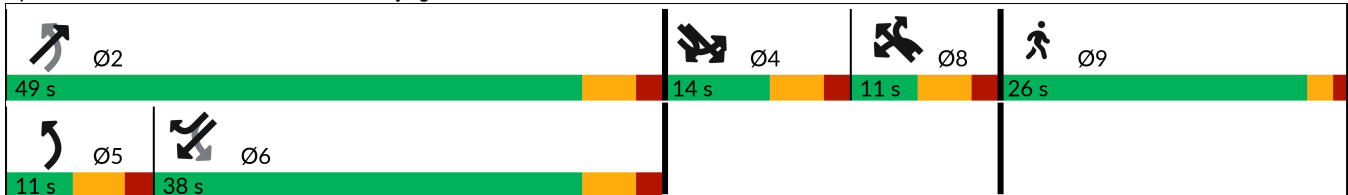
Natural Cycle: 110

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 135 & Voyagers Lane/Memorial Drive



2025 Existing Weekday Evening
1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↕	↗	↖	↖			↕	↗
Traffic Volume (vph)	92	4	64	4	3	7	20	567	3	19	695	112
Future Volume (vph)	92	4	64	4	3	7	20	567	3	19	695	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	10	11	11	11	11	12	12	11	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.97	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1753	1507		1785	1561	1745	1880			1817	1615
Flt Permitted		0.95	1.00		0.97	1.00	0.11	1.00			0.98	1.00
Satd. Flow (perm)		1753	1507		1785	1561	203	1880			1779	1615
Peak-hour factor, PHF	0.52	0.52	0.52	0.58	0.58	0.58	0.91	0.91	0.91	0.94	0.94	0.94
Adj. Flow (vph)	177	8	123	7	5	12	22	623	3	20	739	119
RTOR Reduction (vph)	0	0	106	0	0	11	0	0	0	0	0	62
Lane Group Flow (vph)	0	185	17	0	12	1	22	626	0	0	759	57
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Actuated Green, G (s)		8.5	8.5		1.6	1.6	42.6	42.6			35.0	35.0
Effective Green, g (s)		10.5	10.5		3.6	3.6	44.6	44.6			37.0	37.0
Actuated g/C Ratio		0.14	0.14		0.05	0.05	0.58	0.58			0.48	0.48
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		239	206		83	73	190	1091			857	778
v/s Ratio Prot		c0.11	0.01		c0.01	0.00	0.01	c0.33				0.04
v/s Ratio Perm							0.06				c0.43	
v/c Ratio		0.77	0.08		0.14	0.01	0.12	0.57			0.89	0.07
Uniform Delay, d1		32.0	28.9		35.1	34.9	12.5	10.1			18.0	10.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		14.4	0.2		0.8	0.0	0.3	0.7			10.9	0.0
Delay (s)		46.4	29.1		35.9	34.9	12.8	10.9			28.8	10.7
Level of Service		D	C		D	C	B	B			C	B
Approach Delay (s/veh)		39.5			35.4			10.9			26.4	
Approach LOS		D			D			B			C	

Intersection Summary

HCM 2000 Control Delay (s/veh)	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	76.8	Sum of lost time (s)	23.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

2025 Existing Weekday Evening
2: Route 135 & Summer Street

05/30/2025



Lane Group	SBL	SBR	NEL	NET	SWT	SWR	Ø9
Lane Configurations							
Traffic Volume (vph)	81	255	169	513	600	51	
Future Volume (vph)	81	255	169	513	600	51	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fr't		0.850			0.989		
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1745	1546	1805	1881	2110	0	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1745	1546	1805	1881	2110	0	
Satd. Flow (RTOR)		290			5		
Adj. Flow (vph)	92	290	178	540	690	59	
Lane Group Flow (vph)	92	290	178	540	749	0	
Turn Type	Prot	pt+ov	Prot	NA	NA		
Protected Phases	4	4 5	5	2	6		9
Permitted Phases							
Detector Phase	4	4 5	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	10.0	10.0		5.0
Minimum Split (s)	10.0		10.0	15.0	15.0		22.0
Total Split (s)	15.0		21.0	63.0	42.0		22.0
Total Split (%)	15.0%		21.0%	63.0%	42.0%		22%
Maximum Green (s)	10.0		16.0	58.0	37.0		19.0
Yellow Time (s)	4.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		None	Min	Min		None
Walk Time (s)							7.0
Flash Don't Walk (s)							12.0
Pedestrian Calls (#/hr)							22
v/c Ratio	0.41	0.40	0.56	0.43	0.81		
Control Delay (s/veh)	43.1	3.7	40.5	9.2	30.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay (s/veh)	43.1	3.7	40.5	9.2	30.2		
Queue Length 50th (ft)	38	0	72	65	238		
Queue Length 95th (ft)	105	34	176	266	#647		
Internal Link Dist (ft)	581			1045	897		
Turn Bay Length (ft)	40		170				
Base Capacity (vph)	266	777	425	1479	1114		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.35	0.37	0.42	0.37	0.67		

Intersection Summary

Cycle Length: 100

2025 Existing Weekday Evening
 2: Route 135 & Summer Street

05/30/2025

Actuated Cycle Length: 77.2

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Route 135 & Summer Street



2025 Existing Weekday Evening
2: Route 135 & Summer Street

05/30/2025



Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	81	255	169	513	600	51
Future Volume (vph)	81	255	169	513	600	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	16	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1745	1546	1805	1881	2111	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1745	1546	1805	1881	2111	
Peak-hour factor, PHF	0.88	0.88	0.95	0.95	0.87	0.87
Adj. Flow (vph)	92	290	178	540	690	59
RTOR Reduction (vph)	0	203	0	0	3	0
Lane Group Flow (vph)	92	87	178	540	746	0
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%
Turn Type	Prot	pt+ov	Prot	NA	NA	
Protected Phases	4	4 5	5	2	6	
Permitted Phases						
Actuated Green, G (s)	8.9	21.5	12.6	50.8	33.2	
Effective Green, g (s)	9.9	23.5	13.6	51.8	34.2	
Actuated g/C Ratio	0.13	0.30	0.17	0.66	0.44	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	219	462	312	1239	918	
v/s Ratio Prot	c0.05	0.06	c0.10	0.29	c0.35	
v/s Ratio Perm						
v/c Ratio	0.42	0.19	0.57	0.44	0.81	
Uniform Delay, d1	31.7	20.5	29.8	6.4	19.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	0.2	2.5	0.2	5.6	
Delay (s)	33.0	20.7	32.3	6.7	25.0	
Level of Service	C	C	C	A	C	
Approach Delay (s/veh)	23.6			13.0	25.0	
Approach LOS	C			B	C	

Intersection Summary

HCM 2000 Control Delay (s/veh)	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	78.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2032 No-Build

2032 No-Build Weekday Morning
 1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↖	↗	↖	↖	↖		↖	↗
Traffic Volume (vph)	166	0	69	5	3	9	100	870	0	7	561	106
Future Volume (vph)	166	0	69	5	3	9	100	870	0	7	561	106
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850						0.850
Fl _t Protected		0.950			0.969		0.950				0.999	
Satd. Flow (prot)	0	1745	1478	0	1780	1561	1745	1827	0	0	1732	1583
Fl _t Permitted		0.950			0.969		0.202				0.977	
Satd. Flow (perm)	0	1745	1478	0	1780	1561	371	1827	0	0	1694	1583
Satd. Flow (RTOR)			196			196						196
Adj. Flow (vph)	205	0	85	12	7	21	109	946	0	8	603	114
Lane Group Flow (vph)	0	205	85	0	19	21	109	946	0	0	611	114
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Detector Phase	4	4	4	8	8	8	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		16.0	16.0	16.0
Total Split (s)	14.0	14.0	14.0	11.0	11.0	11.0	11.0	49.0		38.0	38.0	38.0
Total Split (%)	14.0%	14.0%	14.0%	11.0%	11.0%	11.0%	11.0%	49.0%		38.0%	38.0%	38.0%
Maximum Green (s)	8.0	8.0	8.0	5.0	5.0	5.0	5.0	43.0		32.0	32.0	32.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min		Min	Min	Min
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.86	0.23		0.11	0.06	0.30	0.83			0.72	0.13
Control Delay (s/veh)		68.3	1.4		38.8	0.3	11.7	23.6			25.7	0.3
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0
Total Delay (s/veh)		68.3	1.4		38.8	0.3	11.7	23.6			25.7	0.3
Queue Length 50th (ft)		94	0		8	0	19	314			226	0
Queue Length 95th (ft)		#257	0		17	0	73	#952			#643	0
Internal Link Dist (ft)		443			385			386			1045	
Turn Bay Length (ft)			220			210	175					45
Base Capacity (vph)		238	371		170	326	361	1133			853	894
Starvation Cap Reductn		0	0		0	0	0	0			0	0
Spillback Cap Reductn		0	0		0	0	0	0			0	0
Storage Cap Reductn		0	0		0	0	0	0			0	0
Reduced v/c Ratio		0.86	0.23		0.11	0.06	0.30	0.83			0.72	0.13

Intersection Summary

Cycle Length: 100

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	26%
Maximum Green (s)	23.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	9.0
Flash Don't Walk (s)	14.0
Pedestrian Calls (#/hr)	6
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

2032 No-Build Weekday Morning
 1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025

Actuated Cycle Length: 75.1

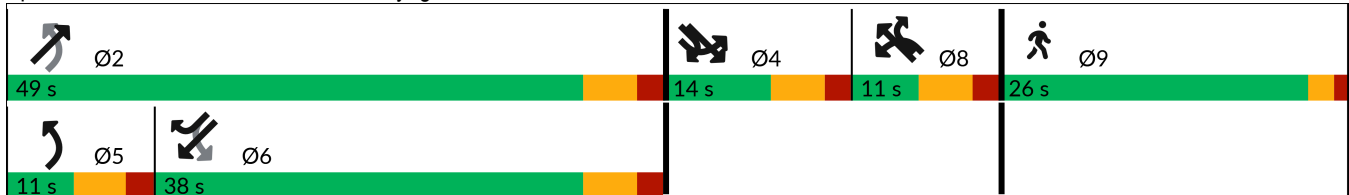
Natural Cycle: 130

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 135 & Voyagers Lane/Memorial Drive



2032 No-Build Weekday Morning
 1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↕	↗	↖	↖			↕	↗
Traffic Volume (vph)	166	0	69	5	3	9	100	870	0	7	561	106
Future Volume (vph)	166	0	69	5	3	9	100	870	0	7	561	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	10	11	11	11	11	12	12	11	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.97	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1745	1478		1780	1561	1745	1827			1733	1583
Flt Permitted		0.95	1.00		0.97	1.00	0.20	1.00			0.98	1.00
Satd. Flow (perm)		1745	1478		1780	1561	370	1827			1694	1583
Peak-hour factor, PHF	0.81	0.81	0.81	0.43	0.43	0.43	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	205	0	85	12	7	21	109	946	0	8	603	114
RTOR Reduction (vph)	0	0	74	0	0	20	0	0	0	0	0	61
Lane Group Flow (vph)	0	205	11	0	19	1	109	946	0	0	611	53
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	4%	0%	0%	6%	2%
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Actuated Green, G (s)		8.2	8.2		2.8	2.8	45.8	45.8			35.8	35.8
Effective Green, g (s)		10.2	10.2		4.8	4.8	47.8	47.8			37.8	37.8
Actuated g/C Ratio		0.13	0.13		0.06	0.06	0.59	0.59			0.46	0.46
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		218	185		105	92	319	1074			787	736
v/s Ratio Prot		c0.12	0.01		c0.01	0.00	0.03	c0.52				0.03
v/s Ratio Perm							0.18				0.36	
v/c Ratio		0.94	0.06		0.18	0.01	0.34	0.88			0.78	0.07
Uniform Delay, d1		35.2	31.3		36.4	36.0	10.9	14.3			18.2	12.0
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		44.4	0.1		0.8	0.1	0.6	8.6			4.8	0.0
Delay (s)		79.6	31.4		37.2	36.1	11.6	22.9			23.0	12.1
Level of Service		E	C		D	D	B	C			C	B
Approach Delay (s/veh)		65.5			36.6			21.8			21.3	
Approach LOS		E			D			C			C	

Intersection Summary

HCM 2000 Control Delay (s/veh)	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	81.3	Sum of lost time (s)	23.0
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

2032 No-Build Weekday Morning
2: Route 135 & Summer Street

05/30/2025



Lane Group	SBL	SBR	NEL	NET	SWT	SWR	Ø9
Lane Configurations							
Traffic Volume (vph)	42	211	368	696	479	64	
Future Volume (vph)	42	211	368	696	479	64	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.984		
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1745	1501	1752	1827	1996	0	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1745	1501	1752	1827	1996	0	
Satd. Flow (RTOR)		301			8		
Adj. Flow (vph)	60	301	400	757	551	74	
Lane Group Flow (vph)	60	301	400	757	625	0	
Turn Type	Prot	pt+ov	Prot	NA	NA		
Protected Phases	4	4 5	5	2	6		9
Permitted Phases							
Detector Phase	4	4 5	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	10.0	10.0		5.0
Minimum Split (s)	10.0		10.0	15.0	15.0		22.0
Total Split (s)	15.0		21.0	63.0	42.0		22.0
Total Split (%)	15.0%		21.0%	63.0%	42.0%		22%
Maximum Green (s)	10.0		16.0	58.0	37.0		19.0
Yellow Time (s)	4.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		None	Min	Min		None
Walk Time (s)							7.0
Flash Don't Walk (s)							12.0
Pedestrian Calls (#/hr)							6
v/c Ratio	0.27	0.37	0.90	0.58	0.79		
Control Delay (s/veh)	35.8	3.3	55.6	9.3	27.7		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay (s/veh)	35.8	3.3	55.6	9.3	27.7		
Queue Length 50th (ft)	22	0	153	99	200		
Queue Length 95th (ft)	58	8	#518	457	471		
Internal Link Dist (ft)	581			1045	897		
Turn Bay Length (ft)	40		170				
Base Capacity (vph)	285	799	443	1567	1133		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.21	0.38	0.90	0.48	0.55		

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 70.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Route 135 & Summer Street



2032 No-Build Weekday Morning
2: Route 135 & Summer Street

05/30/2025



Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	42	211	368	696	479	64
Future Volume (vph)	42	211	368	696	479	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	16	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1745	1501	1752	1827	1996	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1745	1501	1752	1827	1996	
Peak-hour factor, PHF	0.70	0.70	0.92	0.92	0.87	0.87
Adj. Flow (vph)	60	301	400	757	551	74
RTOR Reduction (vph)	0	190	0	0	5	0
Lane Group Flow (vph)	60	111	400	757	620	0
Heavy Vehicles (%)	0%	4%	3%	4%	7%	0%
Turn Type	Prot	pt+ov	Prot	NA	NA	
Protected Phases	4	4 5	5	2	6	
Permitted Phases						
Actuated Green, G (s)	7.9	24.6	16.7	48.8	27.1	
Effective Green, g (s)	8.9	26.6	17.7	49.8	28.1	
Actuated g/C Ratio	0.12	0.37	0.24	0.69	0.39	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	214	551	428	1256	774	
v/s Ratio Prot	c0.03	0.07	c0.23	0.41	c0.31	
v/s Ratio Perm						
v/c Ratio	0.28	0.20	0.93	0.60	0.80	
Uniform Delay, d1	28.8	15.6	26.8	6.0	19.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.2	27.6	0.8	6.0	
Delay (s)	29.6	15.8	54.3	6.8	25.6	
Level of Service	C	B	D	A	C	
Approach Delay (s/veh)	18.1			23.3	25.6	
Approach LOS	B			C	C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2032 No-Build Weekday Evening
 1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↕	↗	↖	↖			↕	↗
Traffic Volume (vph)	119	4	84	4	3	7	33	623	3	19	753	140
Future Volume (vph)	119	4	84	4	3	7	33	623	3	19	753	140
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850		0.999				0.850
Fl _t Protected		0.954			0.972		0.950				0.999	
Satd. Flow (prot)	0	1752	1507	0	1785	1561	1745	1879	0	0	1817	1615
Fl _t Permitted		0.954			0.972		0.099				0.978	
Satd. Flow (perm)	0	1752	1507	0	1785	1561	182	1879	0	0	1779	1615
Satd. Flow (RTOR)			196			196						196
Adj. Flow (vph)	229	8	162	7	5	12	36	685	3	20	801	149
Lane Group Flow (vph)	0	237	162	0	12	12	36	688	0	0	821	149
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Detector Phase	4	4	4	8	8	8	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		16.0	16.0	16.0
Total Split (s)	14.0	14.0	14.0	11.0	11.0	11.0	11.0	49.0		38.0	38.0	38.0
Total Split (%)	14.0%	14.0%	14.0%	11.0%	11.0%	11.0%	11.0%	49.0%		38.0%	38.0%	38.0%
Maximum Green (s)	8.0	8.0	8.0	5.0	5.0	5.0	5.0	43.0		32.0	32.0	32.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min		Min	Min	Min
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.83	0.40		0.06	0.03	0.13	0.61			0.84	0.15
Control Delay (s/veh)		58.6	6.9		36.4	0.1	10.5	14.7			28.3	1.8
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0
Total Delay (s/veh)		58.6	6.9		36.4	0.1	10.5	14.7			28.3	1.8
Queue Length 50th (ft)		69	0		3	0	3	91			127	0
Queue Length 95th (ft)		#153	0		17	0	31	#539			#923	20
Internal Link Dist (ft)		443			385			386			1045	
Turn Bay Length (ft)			220			210	175					45
Base Capacity (vph)		284	409		202	351	287	1373			982	979
Starvation Cap Reductn		0	0		0	0	0	0			0	0
Spillback Cap Reductn		0	0		0	0	0	0			0	0
Storage Cap Reductn		0	0		0	0	0	0			0	0
Reduced v/c Ratio		0.83	0.40		0.06	0.03	0.13	0.50			0.84	0.15

Intersection Summary

Cycle Length: 100

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	26%
Maximum Green (s)	23.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	9.0
Flash Don't Walk (s)	14.0
Pedestrian Calls (#/hr)	10
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Actuated Cycle Length: 66

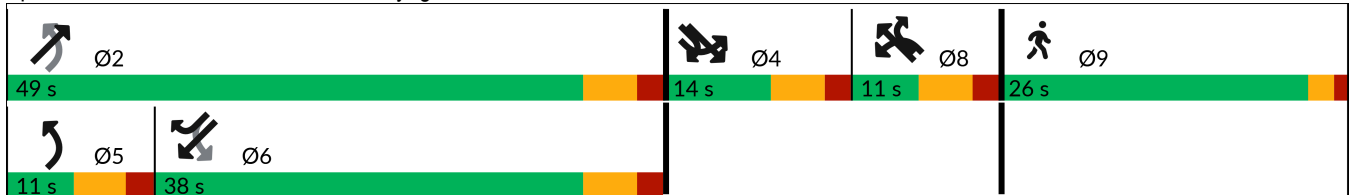
Natural Cycle: 130

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 135 & Voyagers Lane/Memorial Drive



2032 No-Build Weekday Evening
1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↕	↗	↖	↖			↕	↗
Traffic Volume (vph)	119	4	84	4	3	7	33	623	3	19	753	140
Future Volume (vph)	119	4	84	4	3	7	33	623	3	19	753	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	10	11	11	11	11	12	12	11	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.97	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1752	1507		1785	1561	1745	1880			1817	1615
Flt Permitted		0.95	1.00		0.97	1.00	0.10	1.00			0.98	1.00
Satd. Flow (perm)		1752	1507		1785	1561	182	1880			1779	1615
Peak-hour factor, PHF	0.52	0.52	0.52	0.58	0.58	0.58	0.91	0.91	0.91	0.94	0.94	0.94
Adj. Flow (vph)	229	8	162	7	5	12	36	685	3	20	801	149
RTOR Reduction (vph)	0	0	139	0	0	11	0	0	0	0	0	78
Lane Group Flow (vph)	0	237	23	0	12	1	36	688	0	0	821	71
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Actuated Green, G (s)		8.6	8.6		1.6	1.6	41.9	41.9			34.3	34.3
Effective Green, g (s)		10.6	10.6		3.6	3.6	43.9	43.9			36.3	36.3
Actuated g/C Ratio		0.14	0.14		0.05	0.05	0.58	0.58			0.48	0.48
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		244	209		84	73	178	1084			848	770
v/s Ratio Prot		c0.14	0.01		c0.01	0.00	0.01	c0.37				0.04
v/s Ratio Perm							0.11				c0.46	
v/c Ratio		0.97	0.11		0.14	0.01	0.20	0.63			0.97	0.09
Uniform Delay, d1		32.6	28.6		34.8	34.5	14.5	10.7			19.3	10.9
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		49.3	0.2		0.8	0.0	0.6	1.2			23.1	0.1
Delay (s)		81.9	28.8		35.6	34.6	15.1	12.0			42.5	10.9
Level of Service		F	C		D	C	B	B			D	B
Approach Delay (s/veh)		60.4			35.1			12.1			37.6	
Approach LOS		E			D			B			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			33.2									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			76.1								23.0	Sum of lost time (s)
Intersection Capacity Utilization			75.0%									ICU Level of Service D
Analysis Period (min)			15									

c Critical Lane Group

2032 No-Build Weekday Evening
2: Route 135 & Summer Street

05/30/2025



Lane Group	SBL	SBR	NEL	NET	SWT	SWR	Ø9
Lane Configurations							
Traffic Volume (vph)	87	282	194	572	662	55	
Future Volume (vph)	87	282	194	572	662	55	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.990		
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1745	1546	1805	1881	2112	0	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1745	1546	1805	1881	2112	0	
Satd. Flow (RTOR)		320			5		
Adj. Flow (vph)	99	320	204	602	761	63	
Lane Group Flow (vph)	99	320	204	602	824	0	
Turn Type	Prot	pt+ov	Prot	NA	NA		
Protected Phases	4	4 5	5	2	6		9
Permitted Phases							
Detector Phase	4	4 5	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	10.0	10.0		5.0
Minimum Split (s)	10.0		10.0	15.0	15.0		22.0
Total Split (s)	15.0		21.0	63.0	42.0		22.0
Total Split (%)	15.0%		21.0%	63.0%	42.0%		22%
Maximum Green (s)	10.0		16.0	58.0	37.0		19.0
Yellow Time (s)	4.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		None	Min	Min		None
Walk Time (s)							7.0
Flash Don't Walk (s)							12.0
Pedestrian Calls (#/hr)							22
v/c Ratio	0.48	0.45	0.66	0.46	0.83		
Control Delay (s/veh)	45.9	3.9	45.4	9.5	31.5		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay (s/veh)	45.9	3.9	45.4	9.5	31.5		
Queue Length 50th (ft)	43	0	87	78	294		
Queue Length 95th (ft)	111	35	#204	310	#749		
Internal Link Dist (ft)	581			1045	897		
Turn Bay Length (ft)	40		170				
Base Capacity (vph)	237	745	380	1376	998		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.42	0.43	0.54	0.44	0.83		

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 82.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Route 135 & Summer Street





Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	87	282	194	572	662	55
Future Volume (vph)	87	282	194	572	662	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	16	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1745	1546	1805	1881	2112	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1745	1546	1805	1881	2112	
Peak-hour factor, PHF	0.88	0.88	0.95	0.95	0.87	0.87
Adj. Flow (vph)	99	320	204	602	761	63
RTOR Reduction (vph)	0	229	0	0	3	0
Lane Group Flow (vph)	99	91	204	602	821	0
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%
Turn Type	Prot	pt+ov	Prot	NA	NA	
Protected Phases	4	4 5	5	2	6	
Permitted Phases						
Actuated Green, G (s)	8.9	22.1	13.2	56.4	38.2	
Effective Green, g (s)	9.9	24.1	14.2	57.4	39.2	
Actuated g/C Ratio	0.12	0.28	0.17	0.68	0.46	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	204	440	302	1276	978	
v/s Ratio Prot	c0.06	0.06	c0.11	0.32	c0.39	
v/s Ratio Perm						
v/c Ratio	0.49	0.21	0.68	0.47	0.84	
Uniform Delay, d1	35.0	23.0	33.0	6.4	19.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	0.2	5.9	0.3	6.4	
Delay (s)	36.8	23.2	38.9	6.7	26.4	
Level of Service	D	C	D	A	C	
Approach Delay (s/veh)	26.4			14.9	26.4	
Approach LOS	C			B	C	

Intersection Summary

HCM 2000 Control Delay (s/veh)	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	84.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2032 Build

2032 Build Weekday Morning
 1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↕	↗	↖	↖			↕	↗
Traffic Volume (vph)	185	0	74	5	3	9	101	870	0	7	561	112
Future Volume (vph)	185	0	74	5	3	9	101	870	0	7	561	112
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850						0.850
Fl _t Protected		0.950			0.969		0.950				0.999	
Satd. Flow (prot)	0	1745	1478	0	1780	1561	1745	1827	0	0	1732	1583
Fl _t Permitted		0.950			0.969		0.200				0.974	
Satd. Flow (perm)	0	1745	1478	0	1780	1561	367	1827	0	0	1689	1583
Satd. Flow (RTOR)			196			196						196
Adj. Flow (vph)	228	0	91	12	7	21	110	946	0	8	603	120
Lane Group Flow (vph)	0	228	91	0	19	21	110	946	0	0	611	120
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Detector Phase	4	4	4	8	8	8	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		16.0	16.0	16.0
Total Split (s)	14.0	14.0	14.0	11.0	11.0	11.0	11.0	49.0		38.0	38.0	38.0
Total Split (%)	14.0%	14.0%	14.0%	11.0%	11.0%	11.0%	11.0%	49.0%		38.0%	38.0%	38.0%
Maximum Green (s)	8.0	8.0	8.0	5.0	5.0	5.0	5.0	43.0		32.0	32.0	32.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min		Min	Min	Min
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.95	0.24		0.11	0.06	0.31	0.84			0.72	0.13
Control Delay (s/veh)		85.0	1.6		38.8	0.3	11.8	23.7			25.9	0.6
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0
Total Delay (s/veh)		85.0	1.6		38.8	0.3	11.8	23.7			25.9	0.6
Queue Length 50th (ft)		106	0		8	0	19	314			226	0
Queue Length 95th (ft)		#290	0		17	0	74	#952			#644	4
Internal Link Dist (ft)		443			385			386			1045	
Turn Bay Length (ft)			220			210	175					45
Base Capacity (vph)		239	372		171	327	359	1131			849	893
Starvation Cap Reductn		0	0		0	0	0	0			0	0
Spillback Cap Reductn		0	0		0	0	0	0			0	0
Storage Cap Reductn		0	0		0	0	0	0			0	0
Reduced v/c Ratio		0.95	0.24		0.11	0.06	0.31	0.84			0.72	0.13

Intersection Summary

Cycle Length: 100

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	26%
Maximum Green (s)	23.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	9.0
Flash Don't Walk (s)	14.0
Pedestrian Calls (#/hr)	6
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Actuated Cycle Length: 74.8

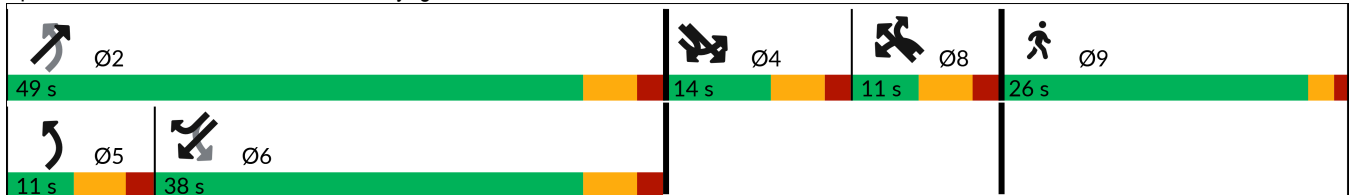
Natural Cycle: 130

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 135 & Voyagers Lane/Memorial Drive



2032 Build Weekday Morning
 1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↕	↗	↖	↖			↕	↗
Traffic Volume (vph)	185	0	74	5	3	9	101	870	0	7	561	112
Future Volume (vph)	185	0	74	5	3	9	101	870	0	7	561	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	10	11	11	11	11	12	12	11	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.97	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1745	1478		1780	1561	1745	1827			1733	1583
Flt Permitted		0.95	1.00		0.97	1.00	0.20	1.00			0.97	1.00
Satd. Flow (perm)		1745	1478		1780	1561	368	1827			1690	1583
Peak-hour factor, PHF	0.81	0.81	0.81	0.43	0.43	0.43	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	228	0	91	12	7	21	110	946	0	8	603	120
RTOR Reduction (vph)	0	0	80	0	0	20	0	0	0	0	0	64
Lane Group Flow (vph)	0	228	11	0	19	1	110	946	0	0	611	56
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	4%	0%	0%	6%	2%
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Actuated Green, G (s)		8.2	8.2		2.8	2.8	45.5	45.5			35.5	35.5
Effective Green, g (s)		10.2	10.2		4.8	4.8	47.5	47.5			37.5	37.5
Actuated g/C Ratio		0.13	0.13		0.06	0.06	0.59	0.59			0.46	0.46
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		220	186		105	92	318	1072			783	733
v/s Ratio Prot		c0.13	0.01		c0.01	0.00	0.03	c0.52				0.04
v/s Ratio Perm							0.18				0.36	
v/c Ratio		1.04	0.06		0.18	0.01	0.35	0.88			0.78	0.08
Uniform Delay, d1		35.4	31.1		36.2	35.8	10.9	14.3			18.2	12.1
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		70.5	0.1		0.8	0.1	0.7	8.7			5.1	0.0
Delay (s)		105.8	31.3		37.0	35.9	11.6	23.0			23.3	12.1
Level of Service		F	C		D	D	B	C			C	B
Approach Delay (s/veh)		84.6			36.4			21.9			21.5	
Approach LOS		F			D			C			C	

Intersection Summary

HCM 2000 Control Delay (s/veh)	31.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	80.9	Sum of lost time (s)	23.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

2032 Build Weekday Morning
2: Route 135 & Summer Street

05/30/2025



Lane Group	SBL	SBR	NEL	NET	SWT	SWR	Ø9
Lane Configurations							
Traffic Volume (vph)	42	213	374	709	483	64	
Future Volume (vph)	42	213	374	709	483	64	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.984		
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1745	1501	1752	1827	1996	0	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1745	1501	1752	1827	1996	0	
Satd. Flow (RTOR)		304			8		
Adj. Flow (vph)	60	304	407	771	555	74	
Lane Group Flow (vph)	60	304	407	771	629	0	
Turn Type	Prot	pt+ov	Prot	NA	NA		
Protected Phases	4	4 5	5	2	6		9
Permitted Phases							
Detector Phase	4	4 5	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	10.0	10.0		5.0
Minimum Split (s)	10.0		10.0	15.0	15.0		22.0
Total Split (s)	15.0		21.0	63.0	42.0		22.0
Total Split (%)	15.0%		21.0%	63.0%	42.0%		22%
Maximum Green (s)	10.0		16.0	58.0	37.0		19.0
Yellow Time (s)	4.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		None	Min	Min		None
Walk Time (s)							7.0
Flash Don't Walk (s)							12.0
Pedestrian Calls (#/hr)							6
v/c Ratio	0.27	0.37	0.92	0.59	0.79		
Control Delay (s/veh)	35.9	3.3	58.7	9.5	27.8		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay (s/veh)	35.9	3.3	58.7	9.5	27.8		
Queue Length 50th (ft)	22	0	157	103	201		
Queue Length 95th (ft)	58	8	#528	472	475		
Internal Link Dist (ft)	581			1045	897		
Turn Bay Length (ft)	40		170				
Base Capacity (vph)	284	799	442	1563	1129		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.21	0.38	0.92	0.49	0.56		

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 70.4

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Route 135 & Summer Street





Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	42	213	374	709	483	64
Future Volume (vph)	42	213	374	709	483	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	16	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1745	1501	1752	1827	1996	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1745	1501	1752	1827	1996	
Peak-hour factor, PHF	0.70	0.70	0.92	0.92	0.87	0.87
Adj. Flow (vph)	60	304	407	771	555	74
RTOR Reduction (vph)	0	193	0	0	5	0
Lane Group Flow (vph)	60	111	407	771	624	0
Heavy Vehicles (%)	0%	4%	3%	4%	7%	0%
Turn Type	Prot	pt+ov	Prot	NA	NA	
Protected Phases	4	4 5	5	2	6	
Permitted Phases						
Actuated Green, G (s)	7.9	24.6	16.7	49.0	27.3	
Effective Green, g (s)	8.9	26.6	17.7	50.0	28.3	
Actuated g/C Ratio	0.12	0.37	0.24	0.69	0.39	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	213	549	427	1258	778	
v/s Ratio Prot	c0.03	0.07	c0.23	0.42	c0.31	
v/s Ratio Perm						
v/c Ratio	0.28	0.20	0.95	0.61	0.80	
Uniform Delay, d1	28.9	15.7	27.0	6.1	19.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.2	31.6	0.9	6.0	
Delay (s)	29.7	15.9	58.6	7.0	25.6	
Level of Service	C	B	E	A	C	
Approach Delay (s/veh)	18.2			24.8	25.6	
Approach LOS	B			C	C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	72.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.3					
Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations	W		T			T
Traffic Vol, veh/h	0	13	246	0	4	212
Future Vol, veh/h	0	13	246	0	4	212
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	81	81	92	92
Heavy Vehicles, %	2	2	1	2	2	2
Mvmt Flow	0	14	304	0	4	230

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	543	304	0	0	304	0
Stage 1	304	-	-	-	-	-
Stage 2	239	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	501	736	-	-	1257	-
Stage 1	749	-	-	-	-	-
Stage 2	801	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	499	736	-	-	1257	-
Mov Cap-2 Maneuver	499	-	-	-	-	-
Stage 1	749	-	-	-	-	-
Stage 2	797	-	-	-	-	-

Approach	NB	SE	NW
HCM Ctrl Dly, s/v	9.99	0	0.15
HCM LOS	A		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	SET	SER
Capacity (veh/h)	736	33	-	-	-
HCM Lane V/C Ratio	0.019	0.003	-	-	-
HCM Ctrl Dly (s/v)	10	7.9	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations	W		T			T
Traffic Vol, veh/h	3	11	235	1	3	209
Future Vol, veh/h	3	11	235	1	3	209
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	81	81	92	92
Heavy Vehicles, %	2	2	1	2	2	2
Mvmt Flow	3	12	290	1	3	227

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	524	291	0	0	291	0
Stage 1	291	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	513	748	-	-	1270	-
Stage 1	759	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	512	748	-	-	1270	-
Mov Cap-2 Maneuver	512	-	-	-	-	-
Stage 1	759	-	-	-	-	-
Stage 2	803	-	-	-	-	-

Approach	NB	SE	NW
HCM Ctrl Dly, s/v	10.41	0	0.11
HCM LOS	B		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	SET	SER
Capacity (veh/h)	681	25	-	-	-
HCM Lane V/C Ratio	0.022	0.003	-	-	-
HCM Ctrl Dly (s/v)	10.4	7.8	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

2032 Build Weekday Evening
 1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↕	↗	↖	↖			↕	↗
Traffic Volume (vph)	131	4	87	4	3	7	38	623	3	19	753	158
Future Volume (vph)	131	4	87	4	3	7	38	623	3	19	753	158
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850		0.999				0.850
Fl _t Protected		0.954			0.972		0.950				0.999	
Satd. Flow (prot)	0	1752	1507	0	1785	1561	1745	1879	0	0	1817	1615
Fl _t Permitted		0.954			0.972		0.099				0.978	
Satd. Flow (perm)	0	1752	1507	0	1785	1561	182	1879	0	0	1779	1615
Satd. Flow (RTOR)			196			196						196
Adj. Flow (vph)	252	8	167	7	5	12	42	685	3	20	801	168
Lane Group Flow (vph)	0	260	167	0	12	12	42	688	0	0	821	168
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Detector Phase	4	4	4	8	8	8	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		16.0	16.0	16.0
Total Split (s)	14.0	14.0	14.0	11.0	11.0	11.0	11.0	49.0		38.0	38.0	38.0
Total Split (%)	14.0%	14.0%	14.0%	11.0%	11.0%	11.0%	11.0%	49.0%		38.0%	38.0%	38.0%
Maximum Green (s)	8.0	8.0	8.0	5.0	5.0	5.0	5.0	43.0		32.0	32.0	32.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min		Min	Min	Min
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.92	0.41		0.06	0.03	0.15	0.61			0.84	0.17
Control Delay (s/veh)		70.5	7.4		36.4	0.1	10.6	14.7			28.3	2.7
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0
Total Delay (s/veh)		70.5	7.4		36.4	0.1	10.6	14.7			28.3	2.7
Queue Length 50th (ft)		77	0		3	0	4	91			127	0
Queue Length 95th (ft)		#174	0		17	0	34	#539			#923	31
Internal Link Dist (ft)		443			385			386			1045	
Turn Bay Length (ft)			220			210	175					45
Base Capacity (vph)		284	409		202	351	287	1373			982	979
Starvation Cap Reductn		0	0		0	0	0	0			0	0
Spillback Cap Reductn		0	0		0	0	0	0			0	0
Storage Cap Reductn		0	0		0	0	0	0			0	0
Reduced v/c Ratio		0.92	0.41		0.06	0.03	0.15	0.50			0.84	0.17

Intersection Summary

Cycle Length: 100

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	26%
Maximum Green (s)	23.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	9.0
Flash Don't Walk (s)	14.0
Pedestrian Calls (#/hr)	10
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Actuated Cycle Length: 66

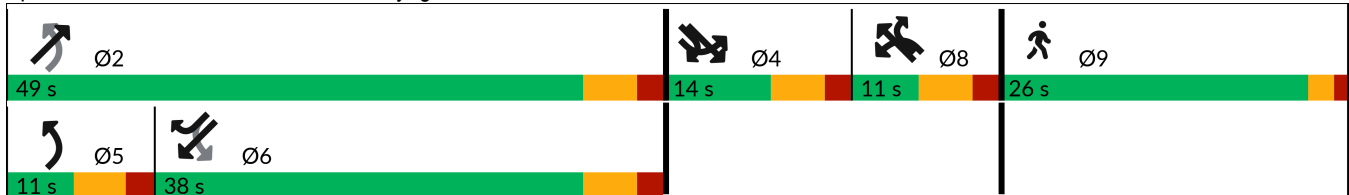
Natural Cycle: 140

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 135 & Voyagers Lane/Memorial Drive



2032 Build Weekday Evening
 1: Route 135 & Voyagers Lane/Memorial Drive

05/30/2025



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↕	↗	↖	↖			↕	↗
Traffic Volume (vph)	131	4	87	4	3	7	38	623	3	19	753	158
Future Volume (vph)	131	4	87	4	3	7	38	623	3	19	753	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	10	11	11	11	11	12	12	11	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.97	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1752	1507		1785	1561	1745	1880			1817	1615
Flt Permitted		0.95	1.00		0.97	1.00	0.10	1.00			0.98	1.00
Satd. Flow (perm)		1752	1507		1785	1561	182	1880			1779	1615
Peak-hour factor, PHF	0.52	0.52	0.52	0.58	0.58	0.58	0.91	0.91	0.91	0.94	0.94	0.94
Adj. Flow (vph)	252	8	167	7	5	12	42	685	3	20	801	168
RTOR Reduction (vph)	0	0	144	0	0	11	0	0	0	0	0	88
Lane Group Flow (vph)	0	260	23	0	12	1	42	688	0	0	821	80
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Actuated Green, G (s)		8.6	8.6		1.6	1.6	41.9	41.9			34.3	34.3
Effective Green, g (s)		10.6	10.6		3.6	3.6	43.9	43.9			36.3	36.3
Actuated g/C Ratio		0.14	0.14		0.05	0.05	0.58	0.58			0.48	0.48
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		244	209		84	73	178	1084			848	770
v/s Ratio Prot		c0.15	0.02		c0.01	0.00	0.01	c0.37				0.05
v/s Ratio Perm							0.12				c0.46	
v/c Ratio		1.07	0.11		0.14	0.01	0.24	0.63			0.97	0.10
Uniform Delay, d1		32.7	28.6		34.8	34.5	14.6	10.7			19.3	11.0
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		76.0	0.2		0.8	0.0	0.7	1.2			23.1	0.1
Delay (s)		108.8	28.9		35.6	34.6	15.3	12.0			42.5	11.0
Level of Service		F	C		D	C	B	B			D	B
Approach Delay (s/veh)		77.5			35.1			12.2			37.1	
Approach LOS		E			D			B			D	

Intersection Summary

HCM 2000 Control Delay (s/veh)	36.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	76.1	Sum of lost time (s)	23.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

2032 Build Weekday Evening
2: Route 135 & Summer Street

05/30/2025



Lane Group	SBL	SBR	NEL	NET	SWT	SWR	Ø9
Lane Configurations							
Traffic Volume (vph)	87	288	198	580	674	55	
Future Volume (vph)	87	288	198	580	674	55	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fr't		0.850			0.990		
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1745	1546	1805	1881	2112	0	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1745	1546	1805	1881	2112	0	
Satd. Flow (RTOR)		327			5		
Adj. Flow (vph)	99	327	208	611	775	63	
Lane Group Flow (vph)	99	327	208	611	838	0	
Turn Type	Prot	pt+ov	Prot	NA	NA		
Protected Phases	4	4 5	5	2	6		9
Permitted Phases							
Detector Phase	4	4 5	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	10.0	10.0		5.0
Minimum Split (s)	10.0		10.0	15.0	15.0		22.0
Total Split (s)	15.0		21.0	63.0	42.0		22.0
Total Split (%)	15.0%		21.0%	63.0%	42.0%		22%
Maximum Green (s)	10.0		16.0	58.0	37.0		19.0
Yellow Time (s)	4.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		None	Min	Min		None
Walk Time (s)							7.0
Flash Don't Walk (s)							12.0
Pedestrian Calls (#/hr)							22
v/c Ratio	0.48	0.45	0.66	0.47	0.84		
Control Delay (s/veh)	46.1	3.9	45.6	9.6	32.6		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay (s/veh)	46.1	3.9	45.6	9.6	32.6		
Queue Length 50th (ft)	43	0	89	80	305		
Queue Length 95th (ft)	111	35	#216	317	#770		
Internal Link Dist (ft)	581			1045	897		
Turn Bay Length (ft)	40		170				
Base Capacity (vph)	237	749	379	1373	995		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.42	0.44	0.55	0.45	0.84		

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 83.1

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Route 135 & Summer Street





Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	87	288	198	580	674	55
Future Volume (vph)	87	288	198	580	674	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	16	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1745	1546	1805	1881	2112	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1745	1546	1805	1881	2112	
Peak-hour factor, PHF	0.88	0.88	0.95	0.95	0.87	0.87
Adj. Flow (vph)	99	327	208	611	775	63
RTOR Reduction (vph)	0	233	0	0	3	0
Lane Group Flow (vph)	99	94	208	611	835	0
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%
Turn Type	Prot	pt+ov	Prot	NA	NA	
Protected Phases	4	4 5	5	2	6	
Permitted Phases						
Actuated Green, G (s)	8.9	22.3	13.4	56.6	38.2	
Effective Green, g (s)	9.9	24.3	14.4	57.6	39.2	
Actuated g/C Ratio	0.12	0.29	0.17	0.68	0.46	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	203	443	306	1277	976	
v/s Ratio Prot	c0.06	0.06	c0.12	0.32	c0.40	
v/s Ratio Perm						
v/c Ratio	0.49	0.21	0.68	0.48	0.86	
Uniform Delay, d1	35.1	23.0	33.0	6.5	20.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	0.2	5.9	0.3	7.5	
Delay (s)	36.9	23.2	38.9	6.7	27.7	
Level of Service	D	C	D	A	C	
Approach Delay (s/veh)	26.4			14.9	27.7	
Approach LOS	C			B	C	

Intersection Summary

HCM 2000 Control Delay (s/veh)	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	84.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.3					
Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations	W		T			T
Traffic Vol, veh/h	0	8	214	0	12	187
Future Vol, veh/h	0	8	214	0	12	187
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	52	52	93	93
Heavy Vehicles, %	2	2	0	2	2	0
Mvmt Flow	0	9	412	0	13	201

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	638	412	0	0	412	0
Stage 1	412	-	-	-	-	-
Stage 2	227	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	441	640	-	-	1147	-
Stage 1	669	-	-	-	-	-
Stage 2	811	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	435	640	-	-	1147	-
Mov Cap-2 Maneuver	435	-	-	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	801	-	-	-	-	-

Approach	NB	SE	NW
HCM Ctrl Dly, s/v	10.7	0	0.49
HCM LOS	B		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	SET	SER
Capacity (veh/h)	640	109	-	-	-
HCM Lane V/C Ratio	0.014	0.011	-	-	-
HCM Ctrl Dly (s/v)	10.7	8.2	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0	0	-	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations	W		T			T
Traffic Vol, veh/h	1	7	207	2	11	176
Future Vol, veh/h	1	7	207	2	11	176
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	52	25	93	93
Heavy Vehicles, %	2	2	0	2	2	0
Mvmt Flow	1	8	398	8	12	189

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	615	402	0	0	406
Stage 1	402	-	-	-	-
Stage 2	213	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	455	648	-	-	1153
Stage 1	676	-	-	-	-
Stage 2	823	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	449	648	-	-	1153
Mov Cap-2 Maneuver	449	-	-	-	-
Stage 1	676	-	-	-	-
Stage 2	813	-	-	-	-

Approach	NB	SE	NW
HCM Ctrl Dly, s/v	10.94	0	0.48
HCM LOS	B		

Minor Lane/Major Mvmt	NBLn1	NWL	NWT	SET	SER
Capacity (veh/h)	614	106	-	-	-
HCM Lane V/C Ratio	0.014	0.01	-	-	-
HCM Ctrl Dly (s/v)	10.9	8.2	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0	0	-	-	-

2032 Build Mitigated

2032 Build Mitigated Weekday Morning
 1: Route 135 & Voyagers Lane/Memorial Drive

06/04/2025



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↕	↗	↖	↖			↕	↗
Traffic Volume (vph)	185	0	74	5	3	9	101	870	0	7	561	112
Future Volume (vph)	185	0	74	5	3	9	101	870	0	7	561	112
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850						0.850
Fl _t Protected		0.950			0.969		0.950				0.999	
Satd. Flow (prot)	0	1745	1478	0	1780	1561	1745	1827	0	0	1732	1583
Fl _t Permitted		0.950			0.969		0.189				0.922	
Satd. Flow (perm)	0	1745	1478	0	1780	1561	347	1827	0	0	1599	1583
Satd. Flow (RTOR)			196			196						196
Adj. Flow (vph)	228	0	91	12	7	21	110	946	0	8	603	120
Lane Group Flow (vph)	0	228	91	0	19	21	110	946	0	0	611	120
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Detector Phase	4	4	4	8	8	8	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		16.0	16.0	16.0
Total Split (s)	15.0	15.0	15.0	11.0	11.0	11.0	11.0	48.0		37.0	37.0	37.0
Total Split (%)	15.0%	15.0%	15.0%	11.0%	11.0%	11.0%	11.0%	48.0%		37.0%	37.0%	37.0%
Maximum Green (s)	9.0	9.0	9.0	5.0	5.0	5.0	5.0	42.0		31.0	31.0	31.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min		Min	Min	Min
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.87	0.23		0.11	0.06	0.32	0.86			0.78	0.14
Control Delay (s/veh)		65.9	1.4		38.8	0.3	12.5	25.6			29.8	0.6
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0
Total Delay (s/veh)		65.9	1.4		38.8	0.3	12.5	25.6			29.8	0.6
Queue Length 50th (ft)		104	0		8	0	20	328			240	0
Queue Length 95th (ft)		#279	0		17	0	75	#965			#675	4
Internal Link Dist (ft)		443			385			386			1045	
Turn Bay Length (ft)			220			210	175					45
Base Capacity (vph)		263	389		171	327	344	1105			781	873
Starvation Cap Reductn		0	0		0	0	0	0			0	0
Spillback Cap Reductn		0	0		0	0	0	0			0	0
Storage Cap Reductn		0	0		0	0	0	0			0	0
Reduced v/c Ratio		0.87	0.23		0.11	0.06	0.32	0.86			0.78	0.14

Intersection Summary

Cycle Length: 100

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	26%
Maximum Green (s)	23.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	9.0
Flash Don't Walk (s)	14.0
Pedestrian Calls (#/hr)	6
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

2032 Build Mitigated Weekday Morning
 1: Route 135 & Voyagers Lane/Memorial Drive

06/04/2025

Actuated Cycle Length: 74.8

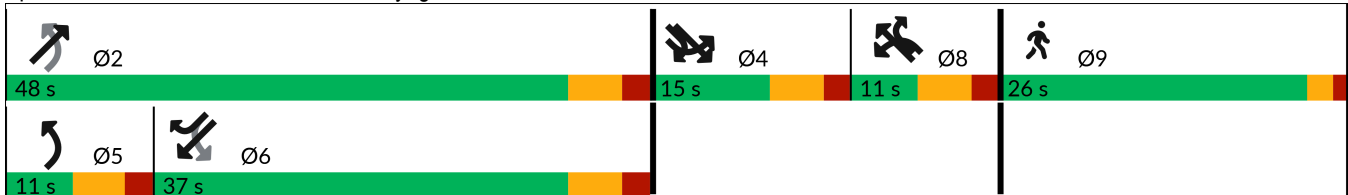
Natural Cycle: 130

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 135 & Voyagers Lane/Memorial Drive



2032 Build Mitigated Weekday Morning
 1: Route 135 & Voyagers Lane/Memorial Drive

06/04/2025



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↕	↗	↖	↖			↕	↗
Traffic Volume (vph)	185	0	74	5	3	9	101	870	0	7	561	112
Future Volume (vph)	185	0	74	5	3	9	101	870	0	7	561	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	10	11	11	11	11	12	12	11	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.97	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1745	1478		1780	1561	1745	1827			1733	1583
Flt Permitted		0.95	1.00		0.97	1.00	0.19	1.00			0.92	1.00
Satd. Flow (perm)		1745	1478		1780	1561	346	1827			1598	1583
Peak-hour factor, PHF	0.81	0.81	0.81	0.43	0.43	0.43	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	228	0	91	12	7	21	110	946	0	8	603	120
RTOR Reduction (vph)	0	0	78	0	0	20	0	0	0	0	0	66
Lane Group Flow (vph)	0	228	13	0	19	1	110	946	0	0	611	54
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	4%	0%	0%	6%	2%
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Actuated Green, G (s)		9.3	9.3		2.8	2.8	44.5	44.5			34.5	34.5
Effective Green, g (s)		11.3	11.3		4.8	4.8	46.5	46.5			36.5	36.5
Actuated g/C Ratio		0.14	0.14		0.06	0.06	0.57	0.57			0.45	0.45
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		243	206		105	92	302	1048			720	713
v/s Ratio Prot		c0.13	0.01		c0.01	0.00	0.03	c0.52				0.03
v/s Ratio Perm							0.18				0.38	
v/c Ratio		0.94	0.06		0.18	0.01	0.36	0.90			0.85	0.08
Uniform Delay, d1		34.5	30.2		36.2	35.9	11.6	15.2			19.8	12.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		40.6	0.1		0.8	0.1	0.7	10.7			9.2	0.0
Delay (s)		75.1	30.4		37.1	35.9	12.3	26.0			29.0	12.7
Level of Service		E	C		D	D	B	C			C	B
Approach Delay (s/veh)		62.4			36.5			24.6			26.3	
Approach LOS		E			D			C			C	

Intersection Summary

HCM 2000 Control Delay (s/veh)	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	81.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

2032 Build Mitigated Weekday Morning
2: Route 135 & Summer Street

06/04/2025



Lane Group	SBL	SBR	NEL	NET	SWT	SWR	Ø9
Lane Configurations							
Traffic Volume (vph)	42	213	374	709	483	64	
Future Volume (vph)	42	213	374	709	483	64	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.984		
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1745	1501	1752	1827	1996	0	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1745	1501	1752	1827	1996	0	
Satd. Flow (RTOR)		304			8		
Adj. Flow (vph)	60	304	407	771	555	74	
Lane Group Flow (vph)	60	304	407	771	629	0	
Turn Type	Prot	pt+ov	Prot	NA	NA		
Protected Phases	4	4 5	5	2	6		9
Permitted Phases							
Detector Phase	4	4 5	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	10.0	10.0		5.0
Minimum Split (s)	10.0		10.0	15.0	15.0		22.0
Total Split (s)	11.0		22.0	57.0	35.0		22.0
Total Split (%)	12.2%		24.4%	63.3%	38.9%		24%
Maximum Green (s)	6.0		17.0	52.0	30.0		19.0
Yellow Time (s)	4.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		None	Min	Min		None
Walk Time (s)							7.0
Flash Don't Walk (s)							12.0
Pedestrian Calls (#/hr)							6
v/c Ratio	0.34	0.38	0.87	0.58	0.78		
Control Delay (s/veh)	38.3	3.2	47.9	8.4	27.5		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay (s/veh)	38.3	3.2	47.9	8.4	27.5		
Queue Length 50th (ft)	23	0	156	84	195		
Queue Length 95th (ft)	56	8	#454	430	#510		
Internal Link Dist (ft)	581			1045	897		
Turn Bay Length (ft)	40		170				
Base Capacity (vph)	181	793	469	1441	925		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.33	0.38	0.87	0.54	0.68		

Intersection Summary

Cycle Length: 90

2032 Build Mitigated Weekday Morning
 2: Route 135 & Summer Street

06/04/2025

Actuated Cycle Length: 68.8

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Route 135 & Summer Street



2032 Build Mitigated Weekday Morning
2: Route 135 & Summer Street

06/04/2025



Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	42	213	374	709	483	64
Future Volume (vph)	42	213	374	709	483	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	16	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1745	1501	1752	1827	1996	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1745	1501	1752	1827	1996	
Peak-hour factor, PHF	0.70	0.70	0.92	0.92	0.87	0.87
Adj. Flow (vph)	60	304	407	771	555	74
RTOR Reduction (vph)	0	195	0	0	5	0
Lane Group Flow (vph)	60	109	407	771	624	0
Heavy Vehicles (%)	0%	4%	3%	4%	7%	0%
Turn Type	Prot	pt+ov	Prot	NA	NA	
Protected Phases	4	4 5	5	2	6	
Permitted Phases						
Actuated Green, G (s)	6.0	23.4	17.4	49.2	26.8	
Effective Green, g (s)	7.0	25.4	18.4	50.2	27.8	
Actuated g/C Ratio	0.10	0.36	0.26	0.71	0.39	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	171	536	453	1289	780	
v/s Ratio Prot	c0.03	0.07	c0.23	0.42	c0.31	
v/s Ratio Perm						
v/c Ratio	0.35	0.20	0.90	0.60	0.80	
Uniform Delay, d1	29.9	15.8	25.4	5.3	19.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.2	20.1	0.8	5.9	
Delay (s)	31.2	16.0	45.6	6.1	25.1	
Level of Service	C	B	D	A	C	
Approach Delay (s/veh)	18.5			19.7	25.1	
Approach LOS	B			B	C	

Intersection Summary

HCM 2000 Control Delay (s/veh)	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	71.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

2032 Build Mitigated Weekday Evening
 1: Route 135 & Voyagers Lane/Memorial Drive

06/04/2025



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↕		↕	↕	↕	↕			↕	↕
Traffic Volume (vph)	131	4	87	4	3	7	38	623	3	19	753	158
Future Volume (vph)	131	4	87	4	3	7	38	623	3	19	753	158
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850		0.999				0.850
Fl _t Protected		0.954			0.972		0.950				0.999	
Satd. Flow (prot)	0	1752	1507	0	1785	1561	1745	1879	0	0	1817	1615
Fl _t Permitted		0.954			0.972		0.093				0.978	
Satd. Flow (perm)	0	1752	1507	0	1785	1561	171	1879	0	0	1779	1615
Satd. Flow (RTOR)			187			187						187
Adj. Flow (vph)	252	8	167	7	5	12	42	685	3	20	801	168
Lane Group Flow (vph)	0	260	167	0	12	12	42	688	0	0	821	168
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Detector Phase	4	4	4	8	8	8	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		16.0	16.0	16.0
Total Split (s)	16.0	16.0	16.0	11.0	11.0	11.0	11.0	52.0		41.0	41.0	41.0
Total Split (%)	15.2%	15.2%	15.2%	10.5%	10.5%	10.5%	10.5%	49.5%		39.0%	39.0%	39.0%
Maximum Green (s)	10.0	10.0	10.0	5.0	5.0	5.0	5.0	46.0		35.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0			4.0	4.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min		Min	Min	Min
Walk Time (s)												
Flash Don't Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.86	0.40		0.07	0.04	0.16	0.60			0.87	0.18
Control Delay (s/veh)		61.9	8.1		40.0	0.1	11.0	14.9			32.0	3.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0			0.0	0.0
Total Delay (s/veh)		61.9	8.1		40.0	0.1	11.0	14.9			32.0	3.1
Queue Length 50th (ft)		106	0		5	0	4	106			265	0
Queue Length 95th (ft)		#163	0		17	0	35	546			#945	35
Internal Link Dist (ft)		443			385			386			1045	
Turn Bay Length (ft)			220			210	175					45
Base Capacity (vph)		302	414		180	325	263	1298			947	947
Starvation Cap Reductn		0	0		0	0	0	0			0	0
Spillback Cap Reductn		0	0		0	0	0	0			0	0
Storage Cap Reductn		0	0		0	0	0	0			0	0
Reduced v/c Ratio		0.86	0.40		0.07	0.04	0.16	0.53			0.87	0.18

Intersection Summary

Cycle Length: 105

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	25%
Maximum Green (s)	23.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	9.0
Flash Don't Walk (s)	14.0
Pedestrian Calls (#/hr)	10
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

2032 Build Mitigated Weekday Evening
 1: Route 135 & Voyagers Lane/Memorial Drive

06/04/2025

Actuated Cycle Length: 73.2

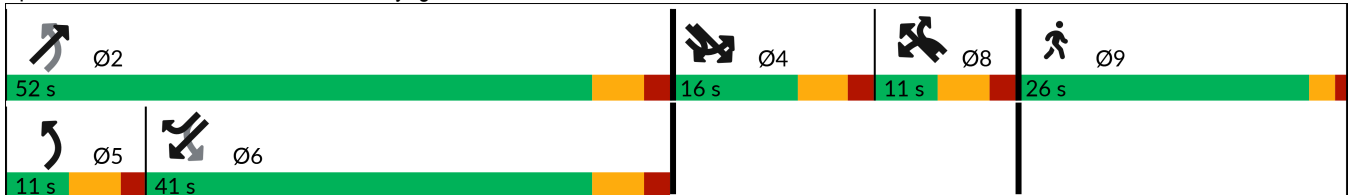
Natural Cycle: 140

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Route 135 & Voyagers Lane/Memorial Drive



2032 Build Mitigated Weekday Evening
 1: Route 135 & Voyagers Lane/Memorial Drive

06/04/2025



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕	↗		↖	↗	↖	↖	↗		↕	↗
Traffic Volume (vph)	131	4	87	4	3	7	38	623	3	19	753	158
Future Volume (vph)	131	4	87	4	3	7	38	623	3	19	753	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	10	11	11	11	11	12	12	11	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.85	
Flt Protected		0.95	1.00		0.97	1.00	0.95	1.00		1.00	1.00	
Satd. Flow (prot)		1752	1507		1785	1561	1745	1880		1817	1615	
Flt Permitted		0.95	1.00		0.97	1.00	0.09	1.00		0.98	1.00	
Satd. Flow (perm)		1752	1507		1785	1561	171	1880		1778	1615	
Peak-hour factor, PHF	0.52	0.52	0.52	0.58	0.58	0.58	0.91	0.91	0.91	0.94	0.94	0.94
Adj. Flow (vph)	252	8	167	7	5	12	42	685	3	20	801	168
RTOR Reduction (vph)	0	0	142	0	0	11	0	0	0	0	0	88
Lane Group Flow (vph)	0	260	25	0	12	1	42	688	0	0	821	80
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA		Perm	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2			6	6
Permitted Phases							2			6		
Actuated Green, G (s)		10.5	10.5		1.6	1.6	45.6	45.6			36.9	36.9
Effective Green, g (s)		12.5	12.5		3.6	3.6	47.6	47.6			38.9	38.9
Actuated g/C Ratio		0.15	0.15		0.04	0.04	0.58	0.58			0.47	0.47
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		267	230		78	68	189	1092			844	767
v/s Ratio Prot		c0.15	0.02		c0.01	0.00	0.01	c0.37				0.05
v/s Ratio Perm							0.12				c0.46	
v/c Ratio		0.97	0.11		0.15	0.01	0.22	0.63			0.97	0.10
Uniform Delay, d1		34.5	29.9		37.7	37.4	15.6	11.3			21.0	11.9
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2		47.5	0.2		0.9	0.0	0.6	1.2			24.3	0.1
Delay (s)		82.0	30.1		38.6	37.5	16.2	12.5			45.3	11.9
Level of Service		F	C		D	D	B	B			D	B
Approach Delay (s/veh)		61.7			38.0			12.7			39.6	
Approach LOS		E			D			B			D	

Intersection Summary		
HCM 2000 Control Delay (s/veh)	34.9	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.92	
Actuated Cycle Length (s)	81.9	Sum of lost time (s) 23.0
Intersection Capacity Utilization	75.7%	ICU Level of Service D
Analysis Period (min)	15	

c Critical Lane Group

2032 Build Mitigated Weekday Evening
2: Route 135 & Summer Street

06/04/2025



Lane Group	SBL	SBR	NEL	NET	SWT	SWR	Ø9
Lane Configurations							
Traffic Volume (vph)	87	288	198	580	674	55	
Future Volume (vph)	87	288	198	580	674	55	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850			0.990		
Flt Protected	0.950		0.950				
Satd. Flow (prot)	1745	1546	1805	1881	2112	0	
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	1745	1546	1805	1881	2112	0	
Satd. Flow (RTOR)		327			6		
Adj. Flow (vph)	99	327	208	611	775	63	
Lane Group Flow (vph)	99	327	208	611	838	0	
Turn Type	Prot	pt+ov	Prot	NA	NA		
Protected Phases	4	4 5	5	2	6		9
Permitted Phases							
Detector Phase	4	4 5	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0		5.0	10.0	10.0		5.0
Minimum Split (s)	10.0		10.0	15.0	15.0		22.0
Total Split (s)	10.0		15.0	58.0	43.0		22.0
Total Split (%)	11.1%		16.7%	64.4%	47.8%		24%
Maximum Green (s)	5.0		10.0	53.0	38.0		19.0
Yellow Time (s)	4.0		4.0	4.0	4.0		2.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0
Lost Time Adjust (s)	-1.0		-1.0	-1.0	-1.0		
Total Lost Time (s)	4.0		4.0	4.0	4.0		
Lead/Lag			Lead		Lag		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0
Recall Mode	None		None	Min	Min		None
Walk Time (s)							7.0
Flash Don't Walk (s)							12.0
Pedestrian Calls (#/hr)							22
v/c Ratio	0.64	0.48	0.71	0.47	0.84		
Control Delay (s/veh)	58.5	4.8	48.9	8.4	27.5		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay (s/veh)	58.5	4.8	48.9	8.4	27.5		
Queue Length 50th (ft)	38	0	76	50	220		
Queue Length 95th (ft)	#144	39	#253	279	#635		
Internal Link Dist (ft)	581			1045	897		
Turn Bay Length (ft)	40		170				
Base Capacity (vph)	154	683	293	1492	1220		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.64	0.48	0.71	0.41	0.69		

Intersection Summary

Cycle Length: 90

2032 Build Mitigated Weekday Evening
 2: Route 135 & Summer Street

06/04/2025

Actuated Cycle Length: 71

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Route 135 & Summer Street



2032 Build Mitigated Weekday Evening
2: Route 135 & Summer Street

06/04/2025



Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	87	288	198	580	674	55
Future Volume (vph)	87	288	198	580	674	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	12	16	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1745	1546	1805	1881	2112	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1745	1546	1805	1881	2112	
Peak-hour factor, PHF	0.88	0.88	0.95	0.95	0.87	0.87
Adj. Flow (vph)	99	327	208	611	775	63
RTOR Reduction (vph)	0	247	0	0	3	0
Lane Group Flow (vph)	99	80	208	611	835	0
Heavy Vehicles (%)	0%	1%	0%	1%	1%	0%
Turn Type	Prot	pt+ov	Prot	NA	NA	
Protected Phases	4	4 5	5	2	6	
Permitted Phases						
Actuated Green, G (s)	5.3	15.8	10.5	48.3	32.8	
Effective Green, g (s)	6.3	17.8	11.5	49.3	33.8	
Actuated g/C Ratio	0.09	0.25	0.16	0.68	0.47	
Clearance Time (s)	5.0		5.0	5.0	5.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	151	379	285	1277	983	
v/s Ratio Prot	c0.06	0.05	c0.12	0.32	c0.40	
v/s Ratio Perm						
v/c Ratio	0.66	0.21	0.73	0.48	0.85	
Uniform Delay, d1	32.1	21.8	29.1	5.5	17.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.8	0.3	9.0	0.3	7.0	
Delay (s)	41.9	22.1	38.1	5.8	24.1	
Level of Service	D	C	D	A	C	
Approach Delay (s/veh)	26.7			14.0	24.1	
Approach LOS	C			B	C	

Intersection Summary

HCM 2000 Control Delay (s/veh)	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	72.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group