

TRAFFIC-IMPACT AND ACCESS STUDY

**357 MAIN STREET
TEWKSBURY, MASSACHUSETTS**

September 5, 2025

Prepared for LandPlex, LLC

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TEPP LLC

TRANSPORTATION ENGINEERING, PLANNING, AND POLICY

93 Stiles Road, Suite 201, Salem, New Hampshire 03079 USA
800 Turnpike Street, Suite 300, North Andover, Massachusetts 01845 USA
Phone (603) 212-9133 and Fax (603) 226-4108
Email tepp@teppllc.com and Web www.teppllc.com

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SUMMARY

PROJECT DESCRIPTION

LandPlex, LLC TEPP LLC to prepare this traffic-impact and access study (TIAS) regarding the proposed redevelopment at 357 Main Street in the Town of Tewksbury, Massachusetts.

The redevelopment:

- replaces previous land uses with senior-adult-multi-family housing, 90 dwelling units
- has one proposed unsignalized driveway along the west side of Main Street opposite and north of Old Main Street connector near Vic’s Waffle House

STUDY APPROACH

The TIAS study area consists of the following intersections:

- Main Street/Astle Street/Pike Street/Veranda Street/Old Main Street south (hereinafter Main Street/Astle Street intersection)
- Main Street/Old Main Street north
- Main Street/proposed driveway

This TIAS analyzes traffic operations for the following time periods:

- weekday AM-street-peak hour
- weekday PM-street-peak hour

The TIAS analyzed traffic operations under the following conditions:

- 2025 existing
- 2032 no build (with background-traffic growth)
- 2032 build (with background-traffic growth and the proposed redevelopment)

Differences in traffic operations between the no-build and build conditions approximate traffic impacts of the proposed redevelopment.

TRIP GENERATION

Site trips due to the proposed redevelopment are:

- weekday daily, 292 (total of in and out)
- weekday AM-street-peak hour, 18 (6 in and 12 out)
- weekday PM-street-peak hour, 23 (13 in and 12 out)

CAPACITY ANALYSIS

TEPP LLC conducted capacity analysis as relevant:

- for study-area intersections
- under 2025 existing, 2032 no-build, and 2032 build conditions, as described above
- for the weekday AM-street-peak hour and weekday PM-street-peak hour
- to calculate levels of service (LOS), delays, volume-to-capacity ratios (V/C), and/or queues

Without or with the project, the:

- Main Street/Astle Street intersection shows overall low-to-moderate peak-hour delays, with higher delays on some approaches
- Main Street/Old Main Street north intersection shows low-to-moderate peak-hour delays
- Main Street/proposed driveway intersection shows low-to-moderate peak-hour delays

The project does not show a significant impact on overall area traffic operations.

INTRODUCTION

PROJECT DESCRIPTION

LandPlex, LLC TEPP LLC to prepare this TIAS regarding the proposed redevelopment at 357 Main Street in the Town of Tewksbury, Massachusetts. Figure 1 shows the site location and the project plan is in Appendix A.

The redevelopment:

- replaces previous land uses with senior-adult-multi-family housing, 90 dwelling units
- has one proposed unsignalized driveway along the west side of Main Street opposite and north of Old Main Street connector near Vic's Waffle House

STUDY APPROACH

Figure 2 shows the TIAS study area. The study area consists of the following intersections:

- Main Street/Astle Street
- Main Street/Old Main Street north
- Main Street/proposed driveway

This TIAS analyzes traffic operations for the following time periods:

- weekday AM-street-peak hour
- weekday PM-street-peak hour

The TIAS analyzed traffic operations under the following conditions:

- 2025 existing
- 2032 no build (with background-traffic growth)
- 2032 build (with background-traffic growth and the proposed redevelopment)

Differences in traffic operations between the no-build and build conditions approximate traffic impacts of the proposed redevelopment.

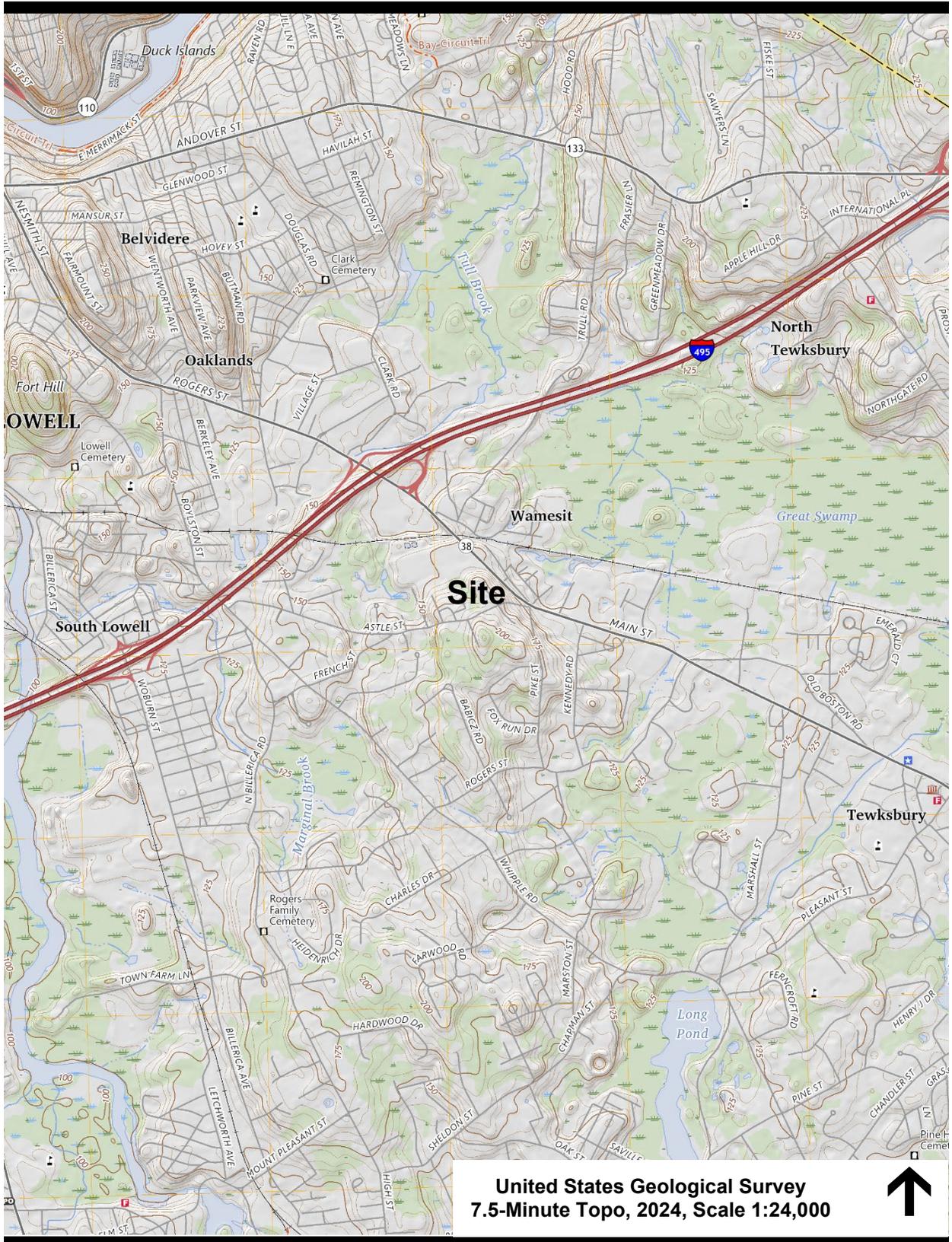


Figure 1. Site location.

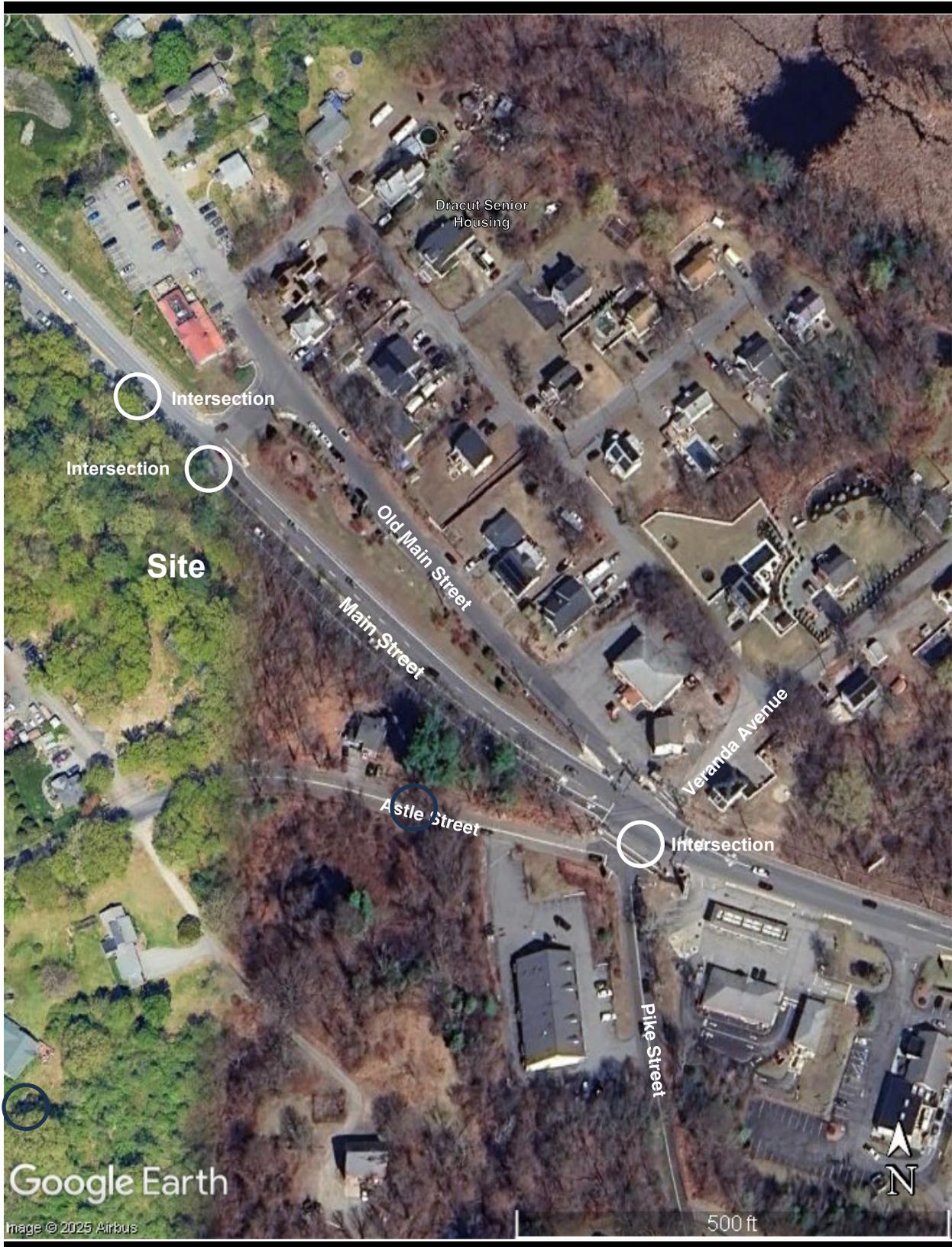


Figure 2. Study area.

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EXISTING CONDITIONS

INTRODUCTION

Existing conditions include:

- physical conditions of the transportation network, roads, and intersections
- traffic volumes
- other relevant information

PHYSICAL CONDITIONS

INTRODUCTION

Figures 1 and 2 show the transportation network, which includes Main Street (Massachusetts Route 38 or MA 38).

Figure 2 shows the following existing intersections:

- Main Street/Astle Street
- Main Street/Old Main Street north

MAIN STREET

Main Street in the study area:

- is overall roughly north-south
- is an arterial highway
- to/from the north, connects with the City of Lowell, Massachusetts
- to/from the south, connects with the Town of Wilmington, Massachusetts
- has a horizontal alignment with minor curvature
- has minor grades
- generally has a two-to-four undivided divided cross-section
- has asphaltic cement concrete (ACC) pavement in overall fair-to-good condition
- has a posted speed limit of 40 miles per hour (mph) northbound and 35 mph southbound
- has sidewalk on both sides

- has utility poles along or near the east side, some with luminaires
- has nearby mixed land uses, including commercial, residential, and a park
- is under the jurisdiction of Commonwealth of Massachusetts

MAIN STREET/ASTLE STREET INTERSECTION

The intersection:

- has a six-legged configuration
- has Main Street as the major north-south street
- has Astle Street as the minor northwest leg
- has Pike Street as the minor west leg
- has Veranda Avenue as the minor east leg
- has Old Main Street south as the minor northeast leg
- on the Main Street northbound approach, has two general-purpose lanes
- on the Main Street southbound approach, has one left-turn lane and one through-movement and right-turn lane
- on the Astle Street, Pike Street, and Veranda Avenue approaches, has one general-purpose lane
- for the Old Main Street leg, has a one-lane departure with no approach
- shows marked crosswalks on all legs except for the Main Street north leg with completion of ongoing construction
- is under traffic-signal control, with protected-permitted left turns on the Main Street southbound approach, with Astle Street having a phase, and with Pike Street and Veranda Avenue sharing a phase
- has an exclusive pedestrian phase with push-button actuation
- prohibits right turns on red from the Main Street southbound approach, the Pike Street approach, and the Veranda Avenue approach
- is illuminated
- has nearby mixed land uses, including commercial, residential, and a park
- is under the jurisdiction of the Commonwealth of Massachusetts

MAIN STREET/OLD MAIN STREET NORTH INTERSECTION

The intersection:

- has a three-legged configuration
- has Main Street as the major north-south street
- has Old Main Street as the minor east leg
- on Main Street, has approaches with two general-purpose lanes
- on Old Main Street, has a one-lane approach
- on the Old Main Street approach, has STOP-sign control
- is illuminated
- has nearby mixed land uses, including commercial, residential, and a park
- is under the jurisdiction of the Commonwealth of Massachusetts

TRAFFIC VOLUMES

TRAFFIC COUNTS

TEPP LLC obtained turning movement counts (TMCs):

- from 7:00 to 9:00 AM and from 3:00 to 6:00 PM on Thursday, June 25, 2025
- at the Main Street/Astle Street intersection
- at the Main Street/Old Main Street north intersection

The traffic-count data are in Appendix B.

MONTHLY VARIATION

As shown in Appendix C, the Massachusetts Department of Transportation (MassDOT) reported average-month volumes as 91 percent of June volumes.¹ Conservatively, TEPP LLC did not reduce the TMCs.

RESULTS

Table 1 and Figure 3 show 2025 existing traffic volumes.

Main Street showed about:

¹ MassDOT, Statewide Traffic Data Collection, 2024 Weekday Seasonal Factors, Factor Group U3.

Table 1. 2025 existing traffic volumes.

Location	Weekday AM-Street-Peak Hour		Weekday PM-Street-Peak Hour	
	Volume (vph)	Direction (%)	Volume (vph)	Direction (%)
Main Street North of Site	1,344	50 Southbound	1,736	60 Northbound

- 1,344 vehicles during the weekday AM-street-peak hour, 50-percent southbound and 50-percent northbound
- 1,736 vehicles during the weekday PM-street-peak hour, 60-percent northbound and 40-percent southbound

VEHICLE SPEEDS

TEPP LLC obtained vehicle speeds using an automatic traffic recorder (ATR):

- on Main Street northbound from Thursday, July 10, 2025, through Saturday, July 12, 2025
- on Main Street southbound from Thursday, July 24, 2025, through Saturday, July 26, 2025

Appendix D has the speed data. Table 2 is a summary.

Table 2 indicates that on Main Street northbound the:

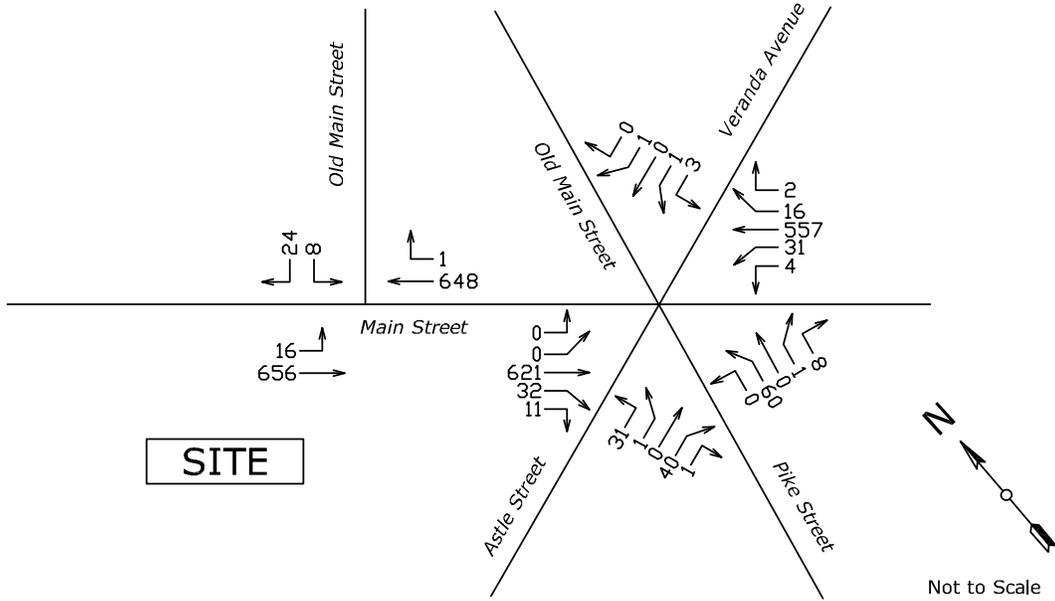
- speed limit was 40 mph
- the mean speed² was 31 mph and the 85th-percentile speed³ was 33 mph

Table 2 indicates that on Main Street southbound the:

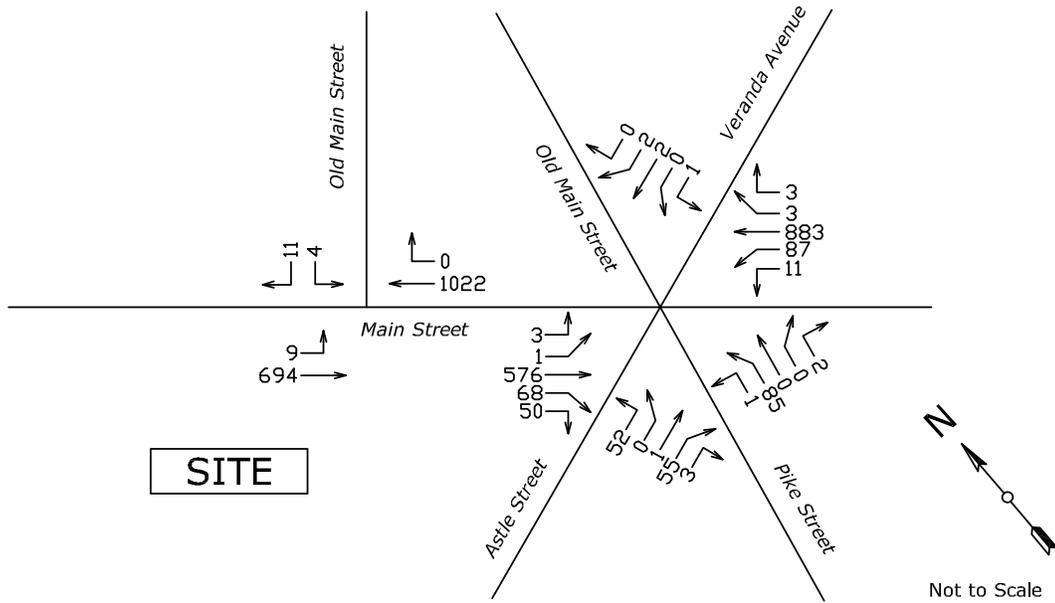
- speed limit was 35 mph
- the mean speed was 38 mph and the 85th-percentile speed was 41 mph

² Mean speed is the average speed.

³ 85th percentile speed is the speed at which or below 85 percent of vehicles travel.



Weekday AM-Street-Peak-Hour



Weekday PM-Street-Peak Hour

Figure 3. 2025 existing traffic volumes.

Table 2. Vehicle speeds.

Location and Direction	Speed Limit (mph)	Observed Speeds (mph) ^a		
		Mean ^b	Pace ^c	85 th Percentile ^d
Main Street North of Site				
Northbound	40	31	26-35	33
Southbound	35	38	34-43	41

^a Northbound ATR from Thursday, July 10, 2025, through Saturday, July 12, 2025. Southbound ATR from Thursday, July 24, 2025, through Saturday, July 26, 2025.

^b Mean speed is the average speed.

^c Pace is the 10-mph speed range with the greatest number of observed speeds.

^d 85th percentile speed is the speed at which or below 85 percent of vehicles travel.

SIGHT DISTANCES

The American Association of State Highway and Transportation Officials (AASHTO) has established authoritative policy for sight distances at unsignalized intersections in terms of:

- fundamental stopping sight distance (SSD)
- desirable intersection sight distance (ISD)⁴

Fundamental SSD:⁵

- provides for safety
- enables a driver, on the major road, to perceive and react accordingly to a vehicle entering the major road from a minor road
- is conservative because it encompasses a wide range of brake-reaction times and deceleration rates

Desirable ISD:⁶

- is ordinarily greater than fundamental SSD
- may enhance traffic operations
- is not required for safety

⁴ AASHTO, *A Policy on Geometric Design of Highways and Streets*, 7th Edition (Washington, DC, 2018), pages 9-35 to 9-36.

⁵ AASHTO, pages 3-2 to 3-6.

⁶ AASHTO, pages 9-35 to 9-59.

Table 3 shows adequate available fundamental SSD at the at the Main Street/proposed driveway intersection. Desirable ISD is also available.

CRASH HISTORY

TEPP LLC obtained crash data from MassDOT for:

- 2017 through 2021, the most recent available and finalized 5 years
- the Main Street/Astle Street intersection
- the Main Street/Old Main Street north intersection

Table 4 is a summary of crash history. MassDOT crash-rate worksheets are in Appendix E.

The Main Street/Astle Street intersection showed:

- an observed crash rate greater than MassDOT averages
- angle collisions as the most common type
- 81 percent of reported crash severities as property-damage only
- 24 percent of reported crash severities with non-fatal injuries
- no reported fatality

The Main Street/Old Main Street north intersection showed:

- an observed crash rate less than MassDOT averages
- rear-end collisions as the most common type
- 50 percent of reported crash severities as property-damage only
- 50 percent of reported crash severities with non-fatal injuries
- no reported fatality

PEDESTRIANS, BICYCLES, AND TRANSIT

PEDESTRIANS

Counts showed low pedestrian volumes.

Main Street has sidewalks on both sides.

The proposed driveway includes a sidewalk along the north side.

Table 3. Sight distances.

Intersection and Movement ^a	Control	View To/From	Sight Distance (ft) ^b	Speeds (mph)			
				Limit	85 ^{thc}	SSD ^d	ISD ^e
Main Street/Proposed Driveway							
Main Street NB L	---	Main Street North	1,000+	35	41	60+	60+
Proposed Driveway EB L	STOP	Main Street North	1,000+	35	41	60+	60+
Proposed Driveway EB L	STOP	Main Street South	900+	40	33	60+	60+
Proposed Driveway EB R	STOP	Main Street North	900+	35	41	60+	60+

^a NB = northbound. EB = eastbound. L = left turn. R = right turn.

^b Sight distance that will be available.

^c ATR from Thursday, June 26, 2025, through Saturday, June 28, 2025.

^d Fundamental SSD is the design speed that available sight distance will provide. AASHTO, pages 3-2 to 3-6.

^e Optional ISD is the design speed that available sight distance will provide. AASHTO, pages 9-35 to 9-59.

Table 4. Crash history.

	Intersection	
	Main Street/Astle Street	Main Street/Old Main Street North
Crashes by Year ^a		
2017	16	0
2018	13	0
2019	8	1
2020	6	1
<u>2021</u>	<u>4</u>	<u>0</u>
Total	47	2
Average Per Year	9.60	0.40
Crash Rates		
This Location	1.22	0.06
MassDOT District 4 Average ^b	0.73	0.57
MassDOT State Average ^b	0.78	0.57
Crashes by Severity ^a		
Fatal Injury	0	0
Non-Fatal Injury	9	1
Property-Damage Only	38	1
Crashes by Type ^a		
Angle	15	0
Front-to-Rear	1	0
Head-On	2	0
Rear-End	12	2
Rear-to-Side	1	0
Sideswipe—Opposite Direction	3	0
Sideswipe—Same Direction	7	0
Single-Vehicle	6	0
Crashes by Road Surface ^a		
Dry	36	2
Wet	7	0
Snow	3	0
Not Reported	1	0

^a MassDOT IMPACT crash data obtained July 7, 2025.

^b From <https://www.mass.gov/info-details/intersection-and-roadway-crash-rate-data-for-analysis#intersection-crash-rates>, accessed August 28, 2025. MEV = 1,000,000 entering vehicles.

Table 4. Crash history, continued.

	Intersection	
	Main Street/Astle Street	Main Street/Old Main Street North
Crashes by Weather Condition ^a		
Clear	38	2
Cloudy	2	0
Rain	3	0
Fog, Smog, Smoke	3	0
Crashes by Light Condition ^a		
Daylight	30	2
Dusk	2	0
Dark—Lighted Road	10	0
Dark—Unlighted Road	4	0
Other	1	0

^a MassDOT IMPACT crash data obtained July 7, 2025.

The Main Street/Astle Street intersection shows:

- marked crosswalks across all legs except for the Main Street north leg
- an exclusive pedestrian signal phase

The Main Street/Old Main Street north intersection has a marked crosswalk across the Old Main Street leg.

The Main Street/proposed driveway intersection shows a marked crosswalk across the proposed driveway leg.

BICYCLES

Counts showed low bicycle volumes. Bicycles and other vehicles may share travel lanes with motor vehicles as applicable.

TRANSIT

Transit information is in Appendix F.

Lowell Regional Transit Authority (LRTA) operates bus route 12, Tewksbury via Route 38/Wilmington train station. The route includes:

- Kenedy Center in the City of Lowell, which includes other LRTA bus routes and Massachusetts Bay Transportation Authority (MBTA) commuter rail
- Rogers Street in the City of Lowell
- Main Street in the Town of Tewksbury
- stops on Main Street opposite the Waffle House and at Veranda Avenue
- the MBTA commuter-rail station in the Town of Wilmington, Massachusetts

FUTURE CONDITIONS

INTRODUCTION

Future conditions include:

- road modifications independent of the proposed redevelopment
- future no-build traffic volumes, with background-traffic growth and without the proposed redevelopment
- future build traffic volumes, with background-traffic growth and with the proposed redevelopment

ROAD MODIFICATIONS

MassDOT project 608774:

- is under construction
- is providing an adaptive traffic-signal-control system at seven locations along Massachusetts Route 38 (Rogers Street and Main Street) in the City of Lowell and the Town of Tewksbury
- includes the Main Street/Astle Street intersection

BACKGROUND-TRAFFIC GROWTH

Background-traffic growth:

- is independent of the proposed project
- may relate to area or regional changes in land development
- may relate to area or regional changes in population, economic development, and travel patterns
- may consider a general traffic-growth rate or specific land developments in the immediate area

Background-traffic growth for this TIAS reflects a 1.36-percent annual traffic-growth rate that yields about 9.9-percent growth from 2025 to 2032. This rate is based on MassDOT count station 4111, Tewksbury, Main Street south of Interstate Route 495, as Appendix G shows.

NO-BUILD TRAFFIC VOLUMES

TEPP LLC applied the background-traffic growth described above to 2025 existing traffic volumes. Figure 4 shows resulting 2032 no-build traffic volumes.

TRIP GENERATION

The Institute of Transportation Engineers (ITE) compiles and publishes trip-generation information for a variety of land uses in *Trip Generation Manual*.⁷ This authoritative guide for estimating site traffic includes land use 252, senior-adult-multi-family housing based on dwelling units.⁸

Table 5 shows calculated weekday trip generation for current site-redevelopment proposal as:

- daily, 292 (total of in and out)
- AM-street-peak hour, 18 (6 in and 12 out)
- PM-street-peak hour, 23 (13 in and 10 out)

TRIP DISTRIBUTION AND NETWORK ASSIGNMENT

Trip distribution and network assignment of vehicle trips to and from the site may consider such factors as:

- trip distribution and network assignment for the existing site
- area or regional travel patterns
- area or regional population distribution
- area or regional land development
- desirability of alternative site access or egress routes

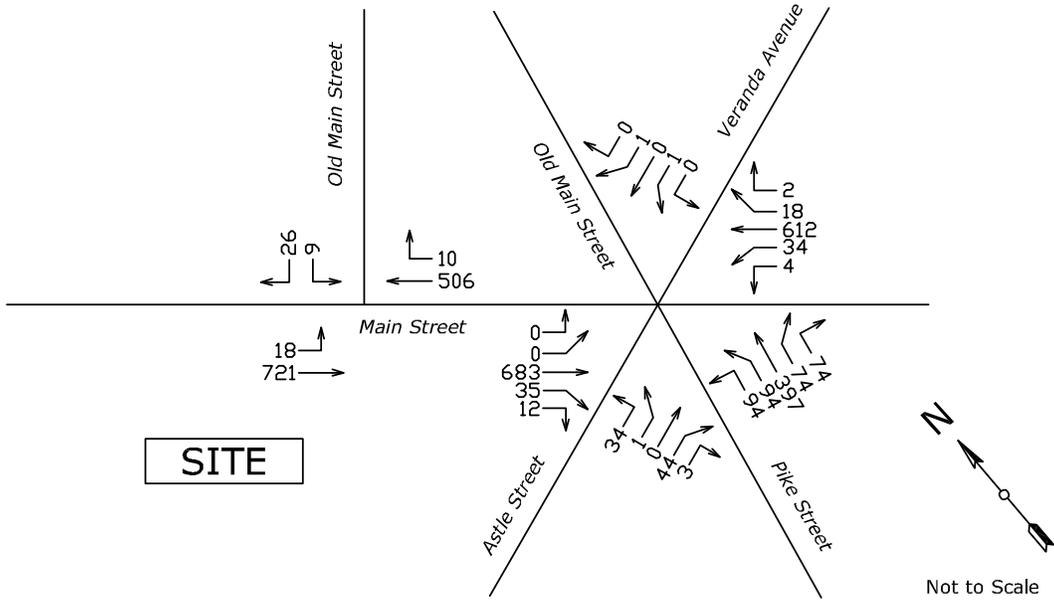
Table 6 shows approximate trip distribution and network assignment based on Appendix H. Figure 5 shows site trips due to the project.

BUILD TRAFFIC VOLUMES

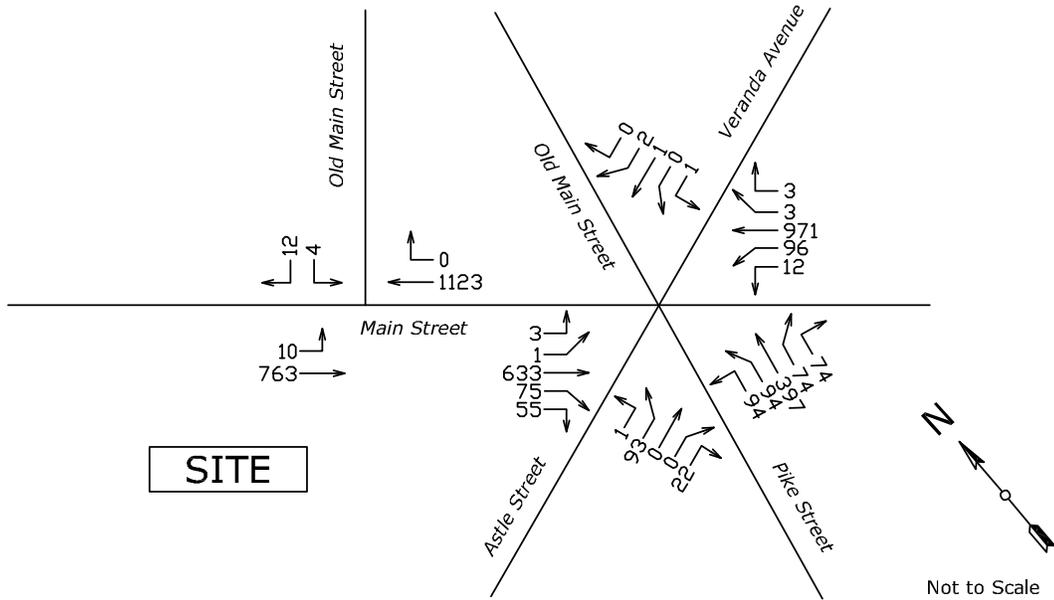
TEPP LLC superimposed changes in site traffic volumes on the no-build traffic volumes to estimate build traffic volumes. Figure 6 shows the resulting 2032 build traffic volumes.

⁷ ITE, *Trip Generation Manual*, 11th edition (Washington DC, 2021).

⁸ ITE, *Trip Generation Manual*, volume 3, pages 414 to 425.



Weekday AM-Street-Peak-Hour



Weekday PM-Street-Peak Hour

Figure 4. 2032 no-build traffic volumes.

Table 5. Trip generation.

Weekday Vehicle-Trips ^a						
Daily	AM-Street-Peak Hour			PM-Street-Peak Hour		
	Total	In	Out	Total	In	Out
292	18	6	12	23	13	10

^a Based on ITE, *Trip Generation Manual*, 11th edition. Land use 252, senior-adult-multi-family housing. 90 dwelling units.

Table 6. Trip distribution and network assignment.

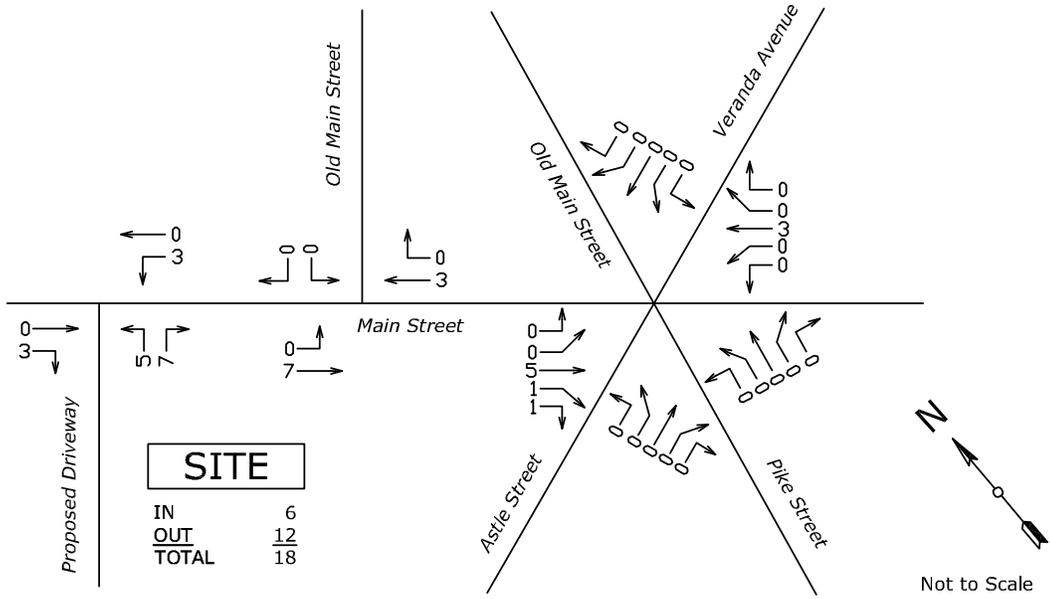
Road and Direction	Percent
Main Street to/from North	45
Main Street to/from South	45
Astle Street to/from West	5
<u>Pike Street to/from South</u>	<u>5</u>
Total	100

TRAFFIC-VOLUME CHANGES

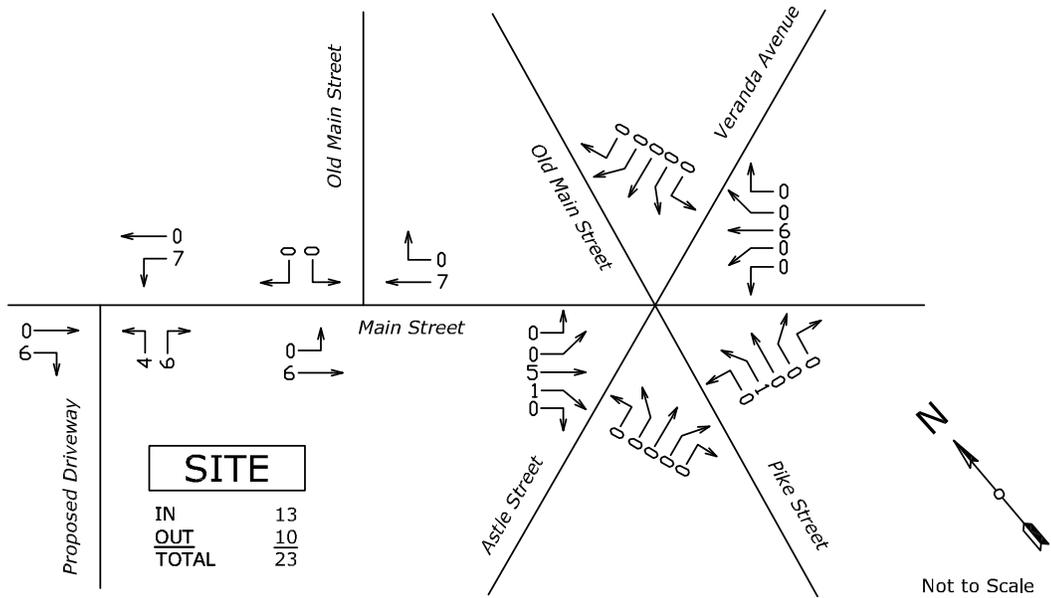
Table 7 presents calculated traffic-volume changes due to the proposed project for the:

- weekday AM-street-peak hour
- weekday PM-street-peak hour

The tabulated increases on Main Street are 8 to 13 vph (0.5 to 0.7 percent).

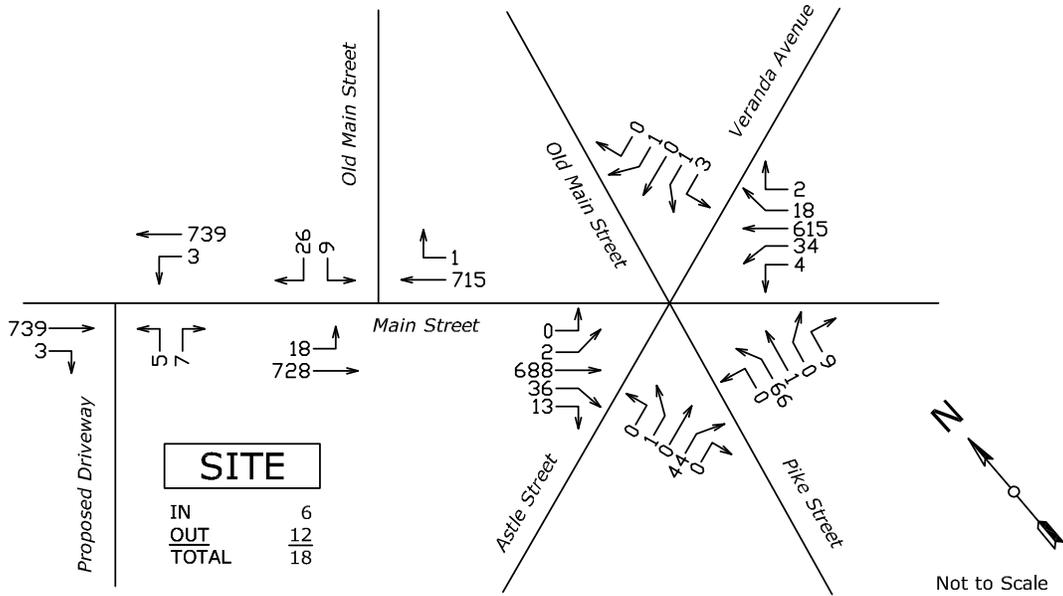


Weekday AM-Street-Peak-Hour

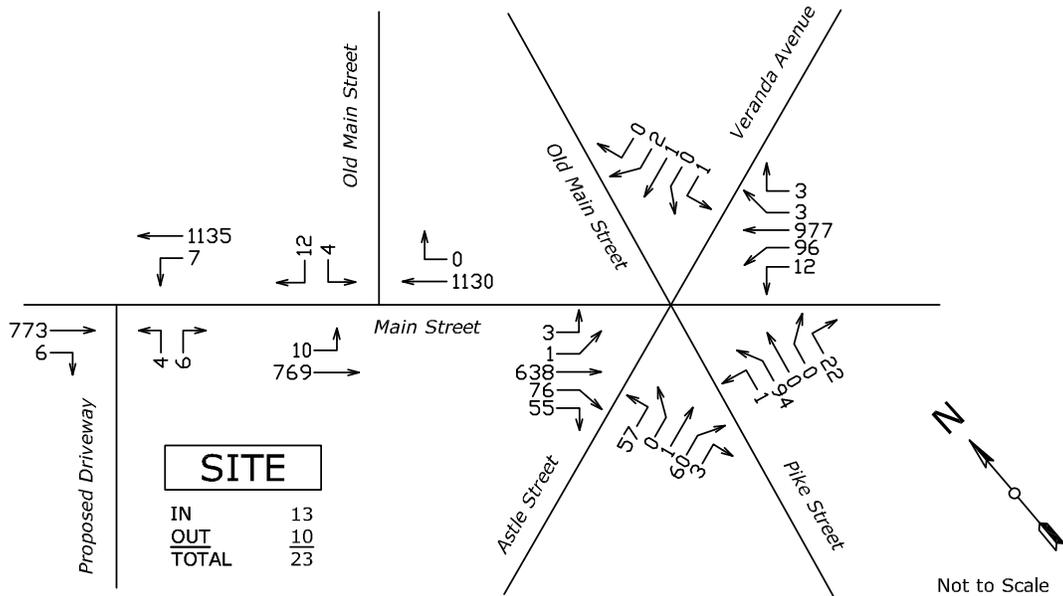


Weekday PM-Street-Peak Hour

Figure 5. Site trips.



Weekday AM-Street-Peak-Hour



Weekday PM-Street-Peak Hour

Figure 6. 2032 build traffic volumes.

Table 7. Traffic-volume changes.

Location and Time Period	Traffic Volumes ^a			Change	Percent Change
	2025 Existing	2032 No-Build	2032 Build		
Main Street South of Astle Street					
Weekday AM-Street-Peak Hour	1,282	1,409	1,417	8	0.6
Weekday PM-Street-Peak Hour	1,639	1,802	1,813	11	0.6
Main Street South of Proposed Driveway					
Weekday AM-Street-Peak Hour	1,344	1,477	1,497	8	0.5
Weekday PM-Street-Peak Hour	1,736	1,908	1,921	13	0.7
Main Street North of Proposed Driveway					
Weekday AM-Street-Peak Hour	1,344	1,477	1,485	8	0.5
Weekday PM-Street-Peak Hour	1,738	1,908	1,918	10	0.5

^a Two-way-total volumes in vph.

CAPACITY ANALYSIS

INTRODUCTION

This TIAS has quantified existing, future-no-build and future-build traffic volumes. Capacity analysis indicates quality of traffic operations. Comparing build conditions to no-build conditions indicates impacts of the proposed alterations on quality of traffic operations.

METHODS

Capacity analysis:

- indicates the quality of traffic operations for transportation facilities
- used methods of the Transportation Research Board (TRB)⁹
- used Synchro 11 software.

Method inputs include:

- intersection geometry
- traffic control, such as YIELD sign, two-way STOP sign, all-way STOP sign, roundabout, or signal (including phasing, timing, and progression)
- traffic volumes
- vehicle composition, such as passenger cars and trucks

Method outputs include:

- LOS based on delays in Table 8
- V/C ratios
- vehicle queues

The six LOS are designated A to F. LOS A represents the best or highest operating conditions. LOS F is the lowest but does not necessarily connote failure.

⁹ TRB, *Highway Capacity Manual 2000* (Washington DC 2000), *Highway Capacity Manual 2010* (Washington DC, 2010), and *Highway Capacity Manual*, 6th Edition (Washington DC, 2016).

Table 8. Level-of-service measures for intersections.

Level of Service	Control Delay (seconds/vehicle)	
	Unsignalized Intersections ^a	Signalized Intersections
A	≤10.0	≤10.0
B	>10.0 and ≤15.0	>10.0 and ≤20.0
C	>15.0 and ≤25.0	>20.0 and ≤35.0
D	>25.0 and ≤35.0	>35.0 and ≤55.0
E	>35.0 and ≤50.0	>55.0 and ≤80.0
F	>50	>80

From TRB, *Highway Capacity Manual 2010* (Washington DC, 2010).

^a For YIELD sign, two-way STOP sign, or all-way STOP sign, control delay defines LOS. For roundabout approaches and overall intersection, control delay defines LOS. For roundabout lanes with V/C ratio ≤1.0, control delay defines LOS. For roundabout lanes with V/C ratio > 1.0, LOS is F regardless of control delay.

LOS is a function of traffic volumes and traffic control. Because these volumes can vary, LOS of a transportation facility can differ by time of day, day of the week, or month. For example, a transportation facility with a low LOS during peak hours may have a high LOS during other hours.

The methods are all approximate. In particular, the method for two-way STOP-sign control can be conservative, with observed delays and queuing shorter than those calculated.

RESULTS

Table 9 shows computed LOS, delays, V/C ratios, and/or queues at study-area intersections under the following conditions:

- 2025 existing
- 2032 no build
- 2032 build

The analysis was for the following time periods:

- weekday AM-street-peak hour
- weekday PM-street-peak hour

Reports that give detail and explanation are in Appendix I.

Table 9. Capacity-analysis summary.

Location, Time Period, and Lane Group ^a	2025 Existing				2032 No Build				2032 Build			
	LOS ^b	Delay ^c	V/C ^d	Queue ^e	LOS	Delay	V/C	Queue	LOS	Delay	V/C	Queue
Main Street/Astle Street Signalized Intersection—Weekday AM-Street-Peak Hour												
Pike Street Eastbound LTR	E	69.5	0.73	52/92	E	74.2	0.78	52/118	E	74.2	0.78	52/118
Veranda Avenue Westbound LTR	D	42.7	0.09	6/11	D	43.0	0.04	3/14	D	43.0	0.04	3/14
Main Street Northbound LTR	A	6.5	0.34	94/120	A	5.7	0.36	87/115	A	5.8	0.37	88/116
Main Street Southbound L	---	---	0.00	0/0	---	---	0.00	0/0	---	---	0.00	0/0
Main Street Southbound TR	B	17.1	0.66	309/449	B	17.8	0.72	356/523	B	18.0	0.73	362/532
Astle Street Southeastbound LTR	D	49.1	0.51	35/60	E	58.8	0.60	31/74	E	58.8	0.60	31/74
Overall	B	16.4	0.64	---	B	16.6	0.70	---	B	16.7	0.71	---
Main Street/Astle Street Signalized Intersection—Weekday PM-Street-Peak Hour												
Pike Street Eastbound LTR	E	58.0	0.74	81/128	E	62.2	0.77	78/168	E	59.8	0.75	78/165
Veranda Avenue Westbound LTR	D	38.7	0.04	5/10	D	39.4	0.02	2/13	D	39.1	0.02	2/13
Main Street North Bound LTR	B	12.5	0.71	168/214	B	15.1	0.81	184/232	B	16.1	0.82	189/238
Main Street South Bound L	A	9.7	0.01	1/6	A	9.3	0.02	1/6	A	9.4	0.02	1/6
Main Street South Bound TR	C	22.4	0.77	388/540	C	23.2	0.80	410/601	C	24.0	0.81	420/632
Astle Street Southeastbound LTR	D	45.7	0.05	0/0	D	45.6	0.04	0/0	D	45.6	0.04	0/0
Overall	C	20.6	0.73	---	C	21.8	0.79	---	C	22.5	0.79	---
Main Street/Old Main Street North Unsignalized Intersection—Weekday AM-Street-Peak Hour												
Main Street Southbound L	A	9.3	0.020	0.1	A	9.5	0.024	0.1	A	9.5	0.024	0.1
Old Main Street Westbound LR	B	0.4	0.106	0.4	C	16.1	0.105	0.3	C	16.2	0.106	0.4
Main Street/Old Main Street North Unsignalized Intersection—Weekday PM-Street-Peak Hour												
Main Street Southbound L	B	10.6	0.015	0.0	B	11.3	0.019	0.1	B	11.4	0.019	0.1
Old Main Street Westbound LR	C	19.3	0.060	0.2	C	22.9	0.079	0.3	C	23.0	0.080	0.3
Main Street/Proposed Driveway Intersection—Weekday AM-Street-Peak Hour												
Main Street Southbound L	---	---	---	---	---	---	---	---	A	9.5	0.004	0.0
Proposed Driveway Eastbound LR	---	---	---	---	---	---	---	---	C	17.8	0.044	0.1
Main Street/Proposed Driveway Intersection—Weekday AM-Street-Peak Hour												
Main Street Southbound L	---	---	---	---	---	---	---	---	A	9.6	0.010	0.0
Proposed Driveway Eastbound LR	---	---	---	---	---	---	---	---	C	22.3	0.050	0.2

^a L = left turn, T = through movement, R = right turn.

^b LOS = level of service.

^c Delay = average delay in seconds per vehicle.

^d V/C = volume/capacity ratio.

^e For signalized intersections, 50th-percentile queue in ft/95th-percentile queue in ft. For unsignalized intersections, 95th-percentile queue in vehicles.

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In summary, without or with the project, the:

- Main Street/Astle Street intersection shows overall low-to-moderate peak-hour delays, with higher delays on some approaches
- Main Street/Old Main Street north intersection shows low-to-moderate peak-hour delays
- Main Street/proposed driveway intersection shows low-to-moderate peak-hour delays

The project does not show a significant impact on overall area traffic operations.

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CONCLUSION

PROJECT DESCRIPTION

This TIAS regards the proposed redevelopment at 357 Main Street in the Town of Tewksbury, Massachusetts. The redevelopment:

- replaces previous land uses with senior-adult-multi-family housing, 90 dwelling units
- has one proposed unsignalized driveway along the west side of Main Street opposite and north of Old Main Street connector near Vic's Waffle House

TRIP GENERATION

Site trips due to the proposed redevelopment are:

- weekday daily, 292 (total of in and out)
- weekday AM-street-peak hour, 18 (6 in and 12 out)
- weekday PM-street-peak hour, 23 (13 in and 12 out)

CAPACITY ANALYSIS

Without or with the project, the:

- Main Street/Astle Street intersection shows overall low-to-moderate peak-hour delays, with higher delays on some approaches
- Main Street/Old Main Street north intersection shows low-to-moderate peak-hour delays
- Main Street/proposed driveway intersection shows low-to-moderate peak-hour delays

The project does not show a significant impact on overall area traffic operations.

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APPENDIX

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Appendix A: Project Plan

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ASSESSORS
 MAP 22, LOT 9 (#41 ASTLE STREET)
 MAP 22, LOT 11 (#15 ASTLE STREET)

PROPERTY OWNER
 BLJB HOLDINGS, LLC
 70 JOHN E. SMITH DRIVE
 TEWKSBURY, MASSACHUSETTS

DEED REFERENCE
 MIDDLESEX NORTH REGISTRY OF DEEDS
 BOOK 32462, PAGE 83
 BOOK 32736, PAGE 167 (MA DOT "STREET ACCESS PERMIT")

PLAN REFERENCES
 MIDDLESEX NORTH REGISTRY OF DEEDS
 PLAN BOOK 245, PLAN 120

NOTES
 1. EXISTING CONDITIONS AND BOUNDARY LOCATION SHOWN HEREON FROM AN INSTRUMENT SURVEY IN JANUARY OF 2018. TOPOGRAPHY SHOWN HEREON REFERS TO APPROXIMATE NAVD83 DATUM, TRANSFERRED FROM GPS BENCHMARK UTILIZING MAINE TECHNICAL SOURCE BASE STATION.
 2. NO PORTION OF THE PREMISES SHOWN HEREON IS LOCATED WITHIN A FLOOD HAZARD AREA AS SHOWN ON DEPARTMENT H.U.D. FEDERAL INSURANCE ADMINISTRATION MAPS, PER COMMUNITY PANEL FM25017C0257F, EFFECT. DATE 7/7/14.
 3. NO UTILITIES ARE SHOWN. CALL DIG-SAFE AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION OR CONSTRUCTION.

BUILDING HEIGHT CALCULATIONS
 PER TOWN OF TEWKSBURY ZONING DEFINITIONS, BUILDING HEIGHT IS DEFINED AS THE VERTICAL DISTANCE FROM THE GRADE PLANE TO THE HIGHEST POINT OF THE ROOF, NOT INCLUDING SPIRES, CUPOLAS, ANTENNAE, OR SIMILAR PARTS OF STRUCTURES WHICH DO NOT ENCLOSE POTENTIALLY HABITABLE FLOOR SPACE.
 FOR 'BUILDING 1':
 BASED ON THE PROPOSED GRADING, GRADE PLANE (GP)=168.1. SINCE THE ROOF ELEVATION=221.5 (NOT INCLUDING TOPMOST KNEE WALLS WHICH DO NOT ENCLOSE POTENTIALLY HABITABLE FLOOR SPACE),
 BUILDING HEIGHT = 221.5 - 168.1 = 53.4'.
 FOR 'BUILDING 2':
 BASED ON THE PROPOSED GRADING, GRADE PLANE (GP)=175.9. SINCE THE ROOF ELEVATION=228.5 (NOT INCLUDING TOPMOST KNEE WALLS WHICH DO NOT ENCLOSE POTENTIALLY HABITABLE FLOOR SPACE),
 BUILDING HEIGHT = 228.5 - 175.9 = 52.6'.
 FOR 'BUILDING 3':
 BASED ON THE PROPOSED GRADING, GRADE PLANE (GP)=176.2. SINCE THE ROOF ELEVATION=229.5 (NOT INCLUDING TOPMOST KNEE WALLS WHICH DO NOT ENCLOSE POTENTIALLY HABITABLE FLOOR SPACE),
 BUILDING HEIGHT = 229.5 - 176.2 = 53.3'.

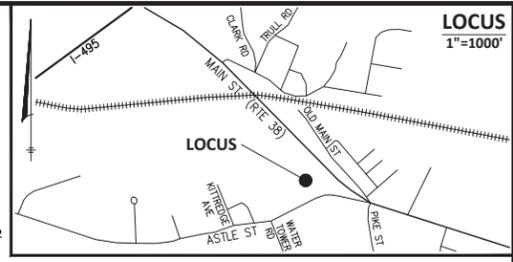
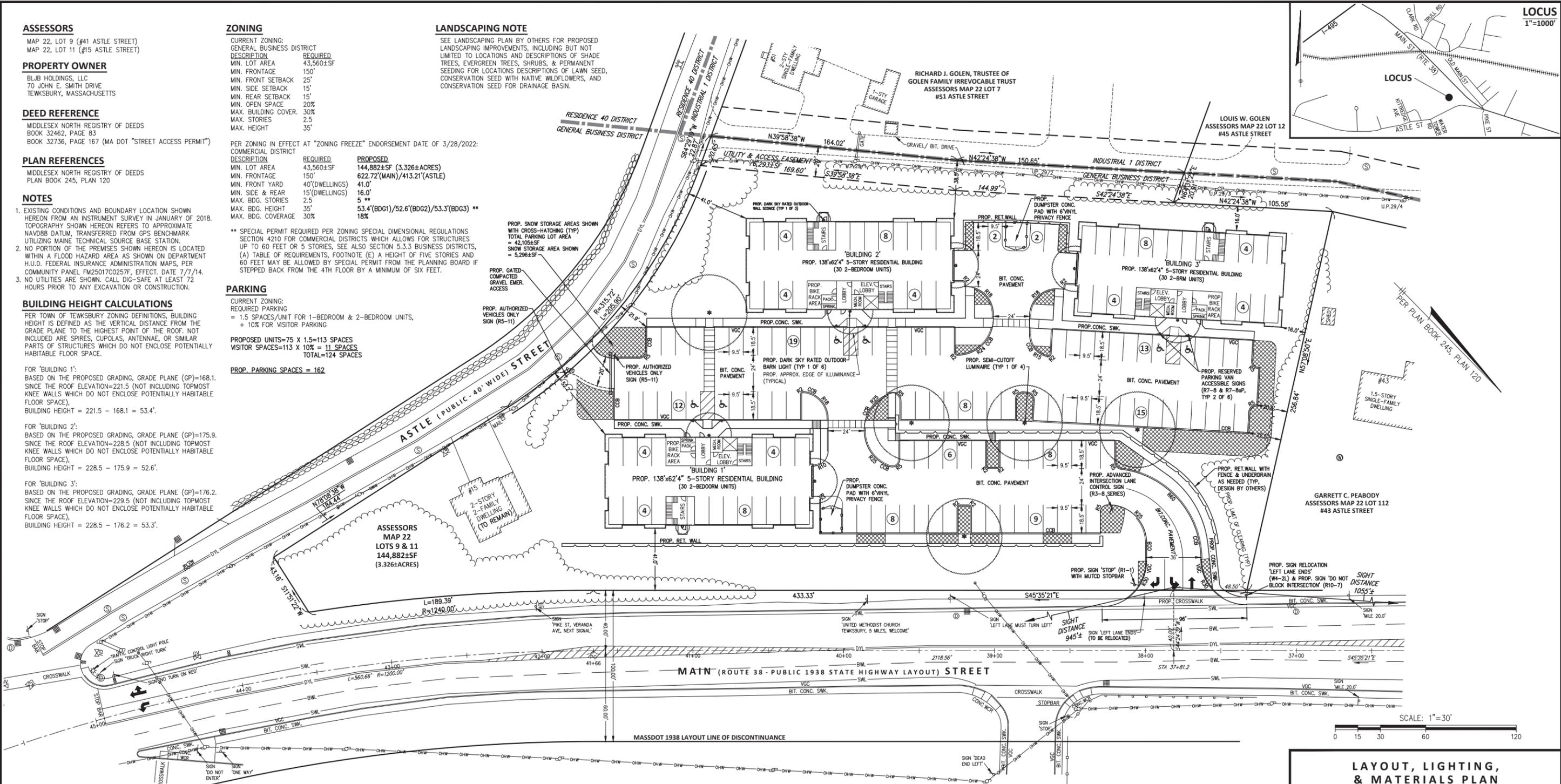
ZONING
 CURRENT ZONING: GENERAL BUSINESS DISTRICT
 DESCRIPTION REQUIRED
 MIN. LOT AREA 43,560±SF
 MIN. FRONTAGE 150'
 MIN. FRONT SETBACK 25'
 MIN. SIDE SETBACK 15'
 MIN. REAR SETBACK 15'
 MIN. OPEN SPACE 20%
 MAX. BUILDING COVER. 30%
 MAX. STORIES 2.5
 MAX. HEIGHT 35'

PER ZONING IN EFFECT AT "ZONING FREEZE" ENDORSEMENT DATE OF 3/28/2022:
 COMMERCIAL DISTRICT
 DESCRIPTION REQUIRED PROPOSED
 MIN. LOT AREA 144,882±SF (3.326±ACRES)
 MIN. FRONTAGE 622.72'(MAIN)/413.21'(ASTLE)
 MIN. FRONT YARD 41.0'
 MIN. SIDE & REAR 15'(DWELLINGS) 16.0'
 MAX. BDG. STORIES 5 **
 MAX. BDG. HEIGHT 53.4'(BDG1)/52.6'(BDG2)/53.3'(BDG3) **
 MAX. BDG. COVERAGE 18%

** SPECIAL PERMIT REQUIRED PER ZONING SPECIAL DIMENSIONAL REGULATIONS SECTION 4210 FOR COMMERCIAL DISTRICTS WHICH ALLOWS FOR STRUCTURES UP TO 60 FEET OR 5 STORIES, SEE ALSO SECTION 5.3.3 BUSINESS DISTRICTS, (A) TABLE OF REQUIREMENTS, FOOTNOTE (E) A HEIGHT OF FIVE STORIES AND 60 FEET MAY BE ALLOWED BY SPECIAL PERMIT FROM THE PLANNING BOARD IF STEPPED BACK FROM THE 4TH FLOOR BY A MINIMUM OF SIX FEET.

PARKING
 CURRENT ZONING: REQUIRED PARKING = 1.5 SPACES/UNIT FOR 1-BEDROOM & 2-BEDROOM UNITS, + 10% FOR VISITOR PARKING
 PROPOSED UNITS=75 X 1.5=113 SPACES
 VISITOR SPACES=113 X 10% = 11 SPACES
 TOTAL=124 SPACES
 PROP. PARKING SPACES = 162

LANDSCAPING NOTE
 SEE LANDSCAPING PLAN BY OTHERS FOR PROPOSED LANDSCAPING IMPROVEMENTS, INCLUDING BUT NOT LIMITED TO LOCATIONS AND DESCRIPTIONS OF SHADE TREES, EVERGREEN TREES, SHRUBS, & PERMANENT SEEDING FOR LOCATIONS DESCRIPTIONS OF LAWN SEED, CONSERVATION SEED WITH NATIVE WILDFLOWERS, AND CONSERVATION SEED FOR DRAINAGE BASIN.



LEGEND
 STONEMAN
 ZONING SETBACK LINE
 EASEMENT LINE
 TRAFFIC CONTROL LIGHT POLE
 SEWER MANHOLE
 DRAIN MANHOLE
 CATCH BASIN
 HYDRANT
 WATER GATE VALVE
 GAS GATE VALVE
 UTILITY POLE
 SIGN
 OVERHEAD WIRE LINE

ABBREVIATIONS
 BIT. BITUMINOUS
 BWL BROKEN WHITE LINE
 CB CATCH BASIN
 CCB CAPE COD BERM
 CONC. CONCRETE
 DMH DRAIN MANHOLE
 DYL DOUBLE YELLOW LINE
 ELEV. ELEVATION
 ESHWT ESTIMATED SEASONAL HIGH WATER TABLE
 FES FLARED END SECTION
 INV. INVERT
 R24 24' RADIUS (TYP)
 RET.WALL RETAINING WALL
 SF SQUARE FEET
 SIS SUBSURFACE INFIL. SYSTEM
 SMH SEWER MANHOLE
 SOS SEDIMENT & OIL SEPARATOR
 SWK SIDEWALK
 SWL SOLID WHITE LINE
 UP UTILITY POLE
 WCR WHEEL CHAIR RAMP

LIGHTING
 LIGHTING SYMBOL KEY:
 DARK SKY RATED OUTDOOR BARN LIGHT (HINKLEY 12070BK OR APPROVED EQUAL)
 SEMI-CUTOFF LUMINAIRE (ANTIQUE STREET LAMPS DS7-W OR APPROVED EQUAL)
 DARK SKY RATED OUTDOOR WALL SCONCE (BALTHUS WS-W28516 OR APPROVED EQUAL)

SIGNAGE SUMMARY TABLE
 ALL PROPOSED SIGNAGE SHOWN HEREON IS TO COMPLY WITH TOWN OF TEWKSBURY, MASSDOT, AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) STANDARDS.
 M.U.T.C.D. SIGN DESIGNATION: R1-1 R3-8 SERIES W4-2L R10-7 R5-11 R7-8 WITH R7-8aP
 M.U.T.C.D. SIGN NAME: STOP ADVANCE INTERSECTION CONTROL, LEFT LANE ONLY LEFT, RIGHT LANE ONLY RIGHT DO NOT BLOCK INTERSECTION AUTHORIZED VEHICLES ONLY ACCESSIBLE PARKING WITH VAN ACCESSIBLE
 NUMBER OF PROP. SIGNS: 1 1 1 1 2 6 EACH
 SIGN IMAGE: STOP ONLY ONLY ?! DO NOT BLOCK INTERSECTION AUTHORIZED VEHICLES ONLY RESERVED PARKING VAN ACCESSIBLE

LAYOUT, LIGHTING, & MATERIALS PLAN

357 MAIN STREET
 TEWKSBURY, MASSACHUSETTS

PLAN PREPARED FOR:
 BLJB HOLDINGS, LLC
 70 JOHN E. SMITH DRIVE
 TEWKSBURY, MASSACHUSETTS

PLAN PREPARED BY:

 CIVIL ENGINEERING & SURVEYING
 10 GEORGE STREET, UNIT 208
 LOWELL, MASSACHUSETTS 01852
 978-201-9390 - LANDPLEX.COM

SHEET: 3 OF 8 SCALE: 1"=30' FEBRUARY 5, 2025

NO.	REVISION DESCRIPTION	DATE
2	PER SUBCONSULTANT REVIEW	8/1/2025
1	PER SUBCONSULTANT REVIEW	4/25/2025
NO.	REVISION DESCRIPTION	DATE

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Appendix B: Traffic Counts

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Accurate Counts

978-664-2565

N/S Street : Main Street
 E/W Street : Veranda Ave / Pike St
 City/State : Tewksbury, MA
 Weather : Clear

File Name : 14050001
 Site Code : 14050001
 Start Date : 6/25/2025
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Main St From North					Old Main Street From Northeast					Veranda Ave From East					Main St From South					Pike St From West					Astle St From Northwest					Int. Total
	Hard Left	Left	Thru	Right	Hard Right	Hard Left	Bear Left	Bear Right	Right	Hard Right	Left	Thru	Bear Right	Right	Hard Right	Left	Bear Left	Thru	Bear Right	Right	Hard Left	Left	Bear Left	Thru	Right	Hard Left	Left	Bear Left	Bear Right	Hard Right	
07:00 AM	0	2	160	14	8	0	0	0	0	0	0	1	0	0	0	2	8	120	2	0	0	13	0	0	6	2	1	0	7	1	347
07:15 AM	0	0	156	9	4	0	0	0	0	0	0	0	0	0	0	1	14	138	1	0	0	12	0	0	7	6	0	0	13	0	361
07:30 AM	0	0	143	7	2	0	0	0	0	0	2	0	0	0	0	0	13	127	3	0	0	10	4	0	0	1	0	0	13	0	325
07:45 AM	0	0	159	8	3	0	0	0	0	0	0	0	0	0	0	0	8	133	2	0	0	11	0	0	3	6	0	0	13	0	346
Total	0	2	618	38	17	0	0	0	0	0	2	1	0	0	0	3	43	518	8	0	0	46	4	0	16	15	1	0	46	1	1379
08:00 AM	0	0	161	7	4	0	0	0	0	0	0	0	0	0	0	1	13	149	4	1	0	16	0	0	1	9	1	0	5	0	372
08:15 AM	0	0	154	8	1	0	0	0	0	0	1	1	0	1	0	1	6	114	4	0	0	19	1	0	1	7	0	0	6	0	325
08:30 AM	0	0	143	9	3	0	0	0	0	0	2	0	0	0	0	2	4	161	6	1	0	14	0	0	3	9	0	0	16	0	373
08:45 AM	1	0	142	13	4	0	0	0	0	0	1	0	0	0	0	3	7	125	2	0	0	19	0	0	6	7	0	0	16	0	346
Total	1	0	600	37	12	0	0	0	0	0	4	1	0	1	0	7	30	549	16	2	0	68	1	0	11	32	1	0	43	0	1416
Grand Total	1	2	1218	75	29	0	0	0	0	0	6	2	0	1	0	10	73	1067	24	2	0	114	5	0	27	47	2	0	89	1	2795
Apprch %	0.1	0.2	91.9	5.7	2.2	0	0	0	0	0	66.7	22.2	0	11.1	0	0.9	6.2	90.7	2	0.2	0	78.1	3.4	0	18.5	33.8	1.4	0	64	0.7	
Total %	0	0.1	43.6	2.7	1	0	0	0	0	0	0.2	0.1	0	0	0	0.4	2.6	38.2	0.9	0.1	0	4.1	0.2	0	1	1.7	0.1	0	3.2	0	
Cars	1	2	1154	75	29	0	0	0	0	0	6	2	0	1	0	10	68	1007	21	2	0	114	5	0	27	47	2	0	88	1	2662
% Cars	100	100	94.7	100	100	0	0	0	0	0	100	100	0	100	0	100	93.2	94.4	87.5	100	0	100	100	0	100	100	100	0	98.9	100	95.2
Trucks	0	0	64	0	0	0	0	0	0	0	0	0	0	0	0	0	5	60	3	0	0	0	0	0	0	0	0	0	1	0	133
% Trucks	0	0	5.3	0	0	0	0	0	0	0	0	0	0	0	0	0	6.8	5.6	12.5	0	0	0	0	0	0	0	0	0	1.1	0	4.8

Start Time	Main St From North					Old Main Street From Northeast					Veranda Ave From East					Main St From South					Pike St From West					Astle St From Northwest					Int. Total							
	Hard Left	Left	Thru	Right	Hard Right	Hard Left	Bear Left	Bear Right	Right	Hard Right	Left	Thru	Bear Right	Right	Hard Right	Left	Bear Left	Thru	Bear Right	Right	Hard Left	Left	Bear Left	Thru	Right	Hard Left	Left	Bear Left	Bear Right	Hard Right								
07:45 AM	0	0	159	8	3	170	0	0	0	0	0	0	0	0	0	0	0	0	0	8	133	2	0	143	0	11	0	0	3	14	6	0	0	13	0	19	346	
08:00 AM	0	0	161	7	4	172	0	0	0	0	0	0	0	0	0	0	0	0	0	1	13	149	4	1	168	0	16	0	0	1	17	9	1	0	5	0	15	372
08:15 AM	0	0	154	8	1	163	0	0	0	0	0	0	1	1	0	1	0	3	1	6	114	4	0	125	0	19	1	0	1	21	7	0	0	6	0	13	325	
08:30 AM	0	0	143	9	3	155	0	0	0	0	0	0	2	0	0	0	0	2	2	4	161	6	1	174	0	14	0	0	3	17	9	0	0	16	0	25	373	
Total Volume	0	0	617	32	11	660	0	0	0	0	0	0	3	1	0	1	0	5	4	31	557	16	2	610	0	60	1	0	8	69	31	1	0	40	0	72	1416	
% App. Total	0	0	93.5	4.8	1.7	0	0	0	0	0	60	20	0	20	0	0.7	5.1	91.3	2.6	0.3	0	87	1.4	0	11.6	43.1	1.4	0	55.6	0								
PHF	.000	.000	.958	.889	.698	.959	.000	.000	.000	.000	.000	.000	.375	.250	.000	.250	.000	.417	.500	.596	.865	.667	.500	.876	.000	.789	.250	.000	.667	.821	.861	.250	.000	.625	.000	.720	.949	
Cars	0	0	583	32	11	626	0	0	0	0	0	0	3	1	0	1	0	5	4	30	521	15	2	572	0	60	1	0	8	69	31	1	0	40	0	72	1344	
% Cars	0	0	94.5	100	100	94.8	0	0	0	0	0	0	100	100	0	100	0	100	100	96.8	93.5	93.8	100	93.8	0	100	100	0	100	100	100	100	0	100	0	100	94.9	
Trucks	0	0	34	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	1	36	1	0	38	0	0	0	0	0	0	0	0	0	0	0	0	72	
% Trucks	0	0	5.5	0	0	5.2	0	0	0	0	0	0	0	0	0	0	0	0	0	3.2	6.5	6.3	0	6.2	0	0	0	0	0	0	0	0	0	0	0	0	5.1	

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

Accurate Counts

978-664-2565

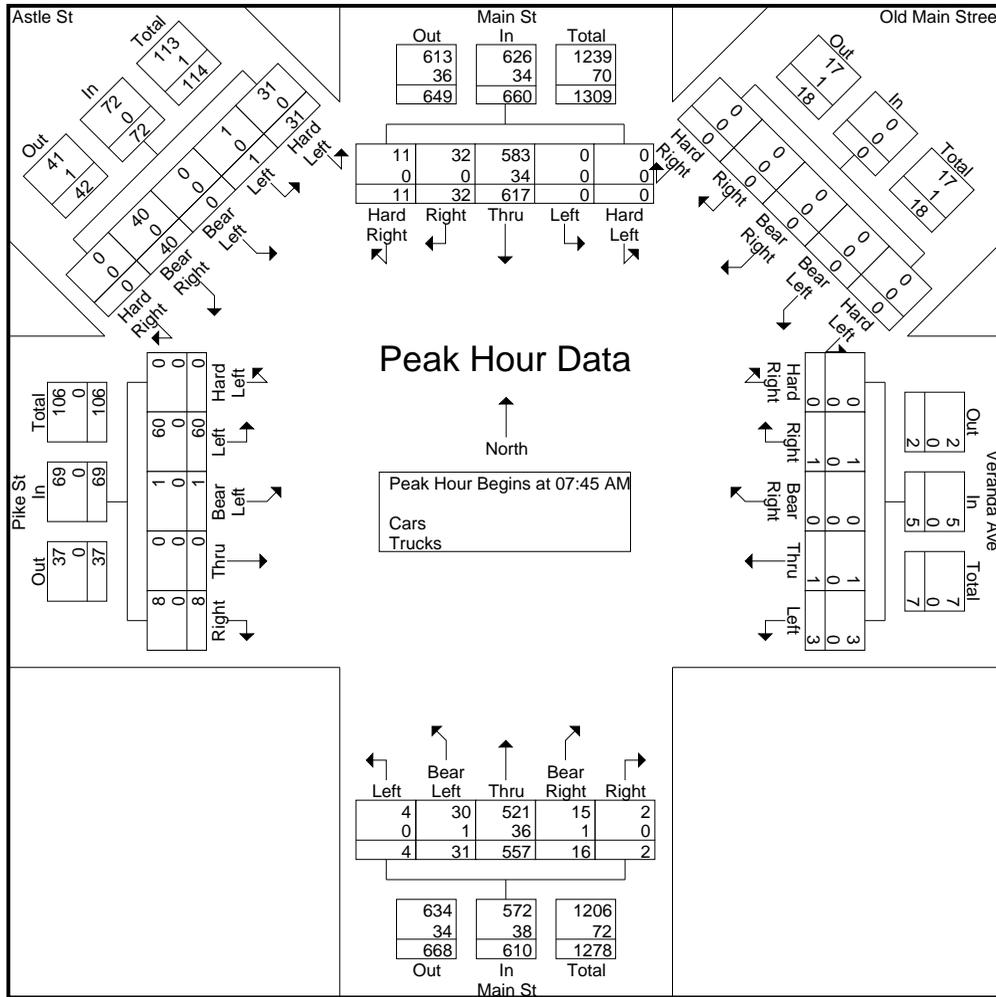
File Name : 14050001

Site Code : 14050001

Start Date : 6/25/2025

Page No : 2

N/S Street : Main Street
 E/W Street : Veranda Ave / Pike St
 City/State : Tewksbury, MA
 Weather : Clear



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

Peak Hour for Each Approach Begins at:

	07:00 AM					08:00 AM					07:45 AM					08:00 AM					08:00 AM															
+0 mins.	0	2	160	14	8	184	0	0	0	0	0	0	0	8	133	2	0	143	0	16	0	0	1	17	9	1	0	5	0	15						
+15 mins.	0	0	156	9	4	169	0	0	0	0	0	0	1	1	0	1	0	3	1	13	149	4	1	168	0	19	1	0	1	21	7	0	0	6	0	13
+30 mins.	0	0	143	7	2	152	0	0	0	0	0	0	2	0	0	0	0	2	1	6	114	4	0	125	0	14	0	0	3	17	9	0	0	16	0	25
+45 mins.	0	0	159	8	3	170	0	0	0	0	0	0	1	0	0	0	0	1	2	4	161	6	1	174	0	19	0	0	6	25	7	0	0	16	0	23
Total Volume	0	2	618	38	17	675	0	0	0	0	0	0	4	1	0	1	0	6	4	31	557	16	2	610	0	68	1	0	11	80	32	1	0	43	0	76
% App. Total	0	0.3	91.6	5.6	2.5		0	0	0	0	0		66.7	16.7	0	16.7	0		0.7	5.1	91.3	2.6	0.3		0	85	1.2	0	13.8		42.1	1.3	0	56.6	0	
PHF	.000	.250	.966	.879	.531	.917	.000	.000	.000	.000	.000	.000	.500	.250	.000	.250	.000	.500	.500	.596	.865	.667	.500	.876	.000	.895	.250	.000	.458	.800	.889	.250	.000	.672	.000	.760
Cars	0	2	58	3	1	642	0	0	0	0	0	0	4	1	0	1	0	6	4	3	52	1	2	572	0	6	1	0	1	80	3	1	0	4	0	75
% Cars	0	10	94.	10	10	95.1	0	0	0	0	0	0	10	10	0	10	0	100	10	96.	93.	93.	10	93.8	0	10	10	0	10	100	10	10	0	97.	0	98.7
Trucks	0	0	3	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	0	38	0	0	0	0	0	0	0	0	0	1	0	1
% Trucks	0	0	5.	0	0	4.9	0	0	0	0	0	0	0	0	0	0	0	0	0	3.	6.	6.	0	6.2	0	0	0	2.	0	1.3						

Accurate Counts
978-664-2565

File Name : 14050001
Site Code : 14050001
Start Date : 6/25/2025
Page No : 10

N/S Street : Main Street
E/W Street : Veranda Ave / Pike St
City/State : Tewksbury, MA
Weather : Clear

Groups Printed- Bikes Peds

Start Time	Main St From North					Old Main Street From Northeast					Veranda Ave From East					Main St From South					Pike St From West					Astle St From Northwest					Exclu. Total	Inclu. Total	Int. Total								
	Har d Left	Thr u	Rig ht	Har d Rig ht	Ped s	Har d Left	Bea r Left	Bea r Rig ht	Rig ht	Har d Rig ht	Ped s	Left	Thr u	Bea r Rig ht	Rig ht	Har d Rig ht	Ped s	Left	Bea r Left	Thr u	Bea r Rig ht	Rig ht	Ped s	Har d Left	Left	Bea r Left	Thr u	Bea r Rig ht	Rig ht	Ped s											
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5	0	5			
07:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2	1	3			
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			
Total	0	0	0	0	1	0	0	0	0	2	0	0	0	0	3	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	1	0	0	7	2	9			
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	2			
08:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Total	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	1	4			
Grand Total	0	0	0	0	1	0	0	0	0	3	0	0	0	0	4	0	0	1	0	0	0	1	0	0	2	0	0	0	1	0	0	0	1	0	0	10	3	13			
Approch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100	0	0	0	0	0	0	100	0											
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33.3	0	0	0	33.3	0	0	0	0	0	0	33.3	0						.76	.23	.9			

Start Time	Main St From North						Old Main Street From Northeast						Veranda Ave From East						Main St From South						Pike St From West						Astle St From Northwest						Int. Total									
	Har d Left	Thr u	Rig ht	Har d Rig ht	App. Total	Har d Left	Bea r Left	Bea r Rig ht	Rig ht	Har d Rig ht	App. Total	Left	Thr u	Bea r Rig ht	Rig ht	Har d Rig ht	App. Total	Left	Bea r Left	Thr u	Bea r Rig ht	Rig ht	App. Total	Har d Left	Left	Bea r Left	Thr u	Bea r Rig ht	Rig ht	App. Total	Har d Left	Left	Bea r Left	Thr u	Bea r Rig ht	Rig ht		App. Total								
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	3	
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100	0	0	0	0	100	0	0	0	0	0	0	100	0											
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.250	.000	.250	.000	.250	.000	.000	.000	.250	.000	.000	.250	.000	.250	.000	.250	.000	.750						

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

Accurate Counts

978-664-2565

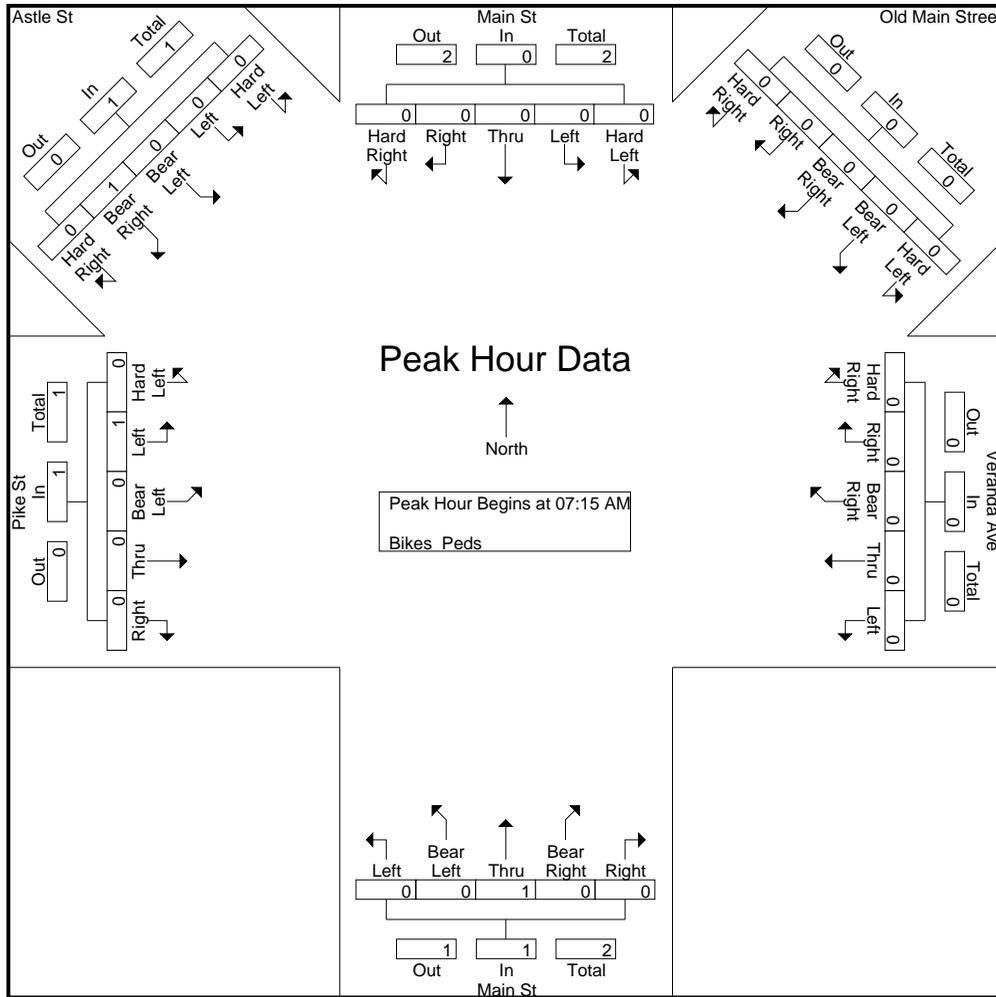
File Name : 14050001

Site Code : 14050001

Start Date : 6/25/2025

Page No : 11

N/S Street : Main Street
 E/W Street : Veranda Ave / Pike St
 City/State : Tewksbury, MA
 Weather : Clear



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						07:15 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	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	1	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	0	0	1	0	0	1	0	1	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100	0	0	0	0	100	0	0	0	0	0	0	0	100	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	.250	.000	.000	.250	.000	.250	.000	.000	.000	.250	.000	.000	.000	.250	.000	.250									

Accurate Counts
978-664-2565

N/S Street : Main Street
E/W Street : Veranda Ave / Pike St
City/State : Tewksbury, MA
Weather : Clear

File Name : 14050001
Site Code : 14050001
Start Date : 6/25/2025
Page No : 1

Groups Printed- Cars - Trucks

Start Time	Main St From North					Old Main Street From Northeast					Veranda Ave From East					Main St From South					Pike St From West					Astle St From Northwest					Int. Total
	Hard Left	Left	Thru	Right	Hard Right	Hard Left	Bear Left	Bear Right	Right	Hard Right	Left	Thru	Bear Right	Right	Hard Right	Left	Bear Left	Thru	Bear Right	Right	Hard Left	Left	Bear Left	Thru	Right	Hard Left	Left	Bear Left	Bear Right	Hard Right	
03:00 PM	0	0	138	14	10	0	0	0	0	0	0	0	0	0	0	1	14	208	3	2	0	17	0	1	8	6	0	0	9	1	432
03:15 PM	0	1	140	13	10	0	0	0	0	0	0	0	0	1	0	1	12	209	1	1	0	23	0	0	7	3	0	0	13	0	435
03:30 PM	2	1	119	14	10	0	0	0	0	0	0	0	0	0	0	3	25	226	1	1	0	26	0	0	7	12	0	1	9	2	459
03:45 PM	1	0	145	12	13	0	0	0	0	0	1	0	1	0	0	1	26	193	2	1	1	15	0	0	5	22	0	0	20	0	459
Total	3	2	542	53	43	0	0	0	0	0	1	0	1	1	0	6	77	836	7	5	1	81	0	1	27	43	0	1	51	3	1785
04:00 PM	0	0	112	15	16	0	0	0	0	0	0	0	0	1	0	5	20	214	0	1	0	22	0	0	4	15	0	0	11	0	436
04:15 PM	0	0	105	27	11	0	0	0	0	0	0	0	0	1	0	2	16	250	0	0	0	22	0	0	4	3	0	0	15	1	457
04:30 PM	1	0	98	12	15	0	0	0	0	0	0	0	0	0	0	0	15	215	1	0	0	14	0	0	1	10	0	0	17	1	400
04:45 PM	0	1	126	6	16	0	0	0	0	1	0	0	1	1	0	3	25	214	1	1	0	13	0	0	4	10	0	0	12	1	436
Total	1	1	441	60	58	0	0	0	0	1	0	0	1	3	0	10	76	893	2	2	0	71	0	0	13	38	0	0	55	3	1729
05:00 PM	0	0	164	15	11	0	0	0	0	0	0	0	0	1	0	4	17	222	1	1	1	6	2	0	2	10	0	0	24	0	481
05:15 PM	0	0	159	13	10	0	0	0	0	0	0	0	0	0	0	5	24	203	0	0	1	20	1	0	5	16	0	0	11	0	468
05:30 PM	0	0	163	10	5	0	0	0	0	0	0	0	0	0	0	1	23	184	2	0	0	13	0	0	4	4	1	0	12	0	422
05:45 PM	0	0	136	15	12	0	0	0	0	0	0	0	0	1	0	3	25	168	1	0	0	18	0	0	3	6	0	0	15	0	403
Total	0	0	622	53	38	0	0	0	0	0	0	0	0	2	0	13	89	777	4	1	2	57	3	0	14	36	1	0	62	0	1774
Grand Total	4	3	1605	166	139	0	0	0	0	1	1	0	2	6	0	29	242	2506	13	8	3	209	3	1	54	117	1	1	168	6	5288
Apprch %	0.2	0.2	83.7	8.7	7.3	0	0	0	0	100	11.1	0	22.2	66.7	0	1	8.6	89.6	0.5	0.3	1.1	77.4	1.1	0.4	20	39.9	0.3	0.3	57.3	2	
Total %	0.1	0.1	30.4	3.1	2.6	0	0	0	0	0	0	0	0	0.1	0	0.5	4.6	47.4	0.2	0.2	0.1	4	0.1	0	1	2.2	0	0	3.2	0.1	
Cars	4	3	1580	165	137	0	0	0	0	1	1	0	2	6	0	26	241	2462	12	8	3	206	3	1	52	117	1	1	163	6	5201
% Cars	100	100	98.4	99.4	98.6	0	0	0	0	100	100	0	100	100	0	89.7	99.6	98.2	92.3	100	100	98.6	100	100	96.3	100	100	100	97	100	98.4
Trucks	0	0	25	1	2	0	0	0	0	0	0	0	0	0	0	3	1	44	1	0	0	3	0	0	2	0	0	0	5	0	87
% Trucks	0	0	1.6	0.6	1.4	0	0	0	0	0	0	0	0	0	0	10.3	0.4	1.8	7.7	0	0	1.4	0	0	3.7	0	0	0	3	0	1.6

Start Time	Main St From North					Old Main Street From Northeast					Veranda Ave From East					Main St From South					Pike St From West					Astle St From Northwest					Int. Total				
	Hard Left	Left	Thru	Right	Hard Right	Hard Left	Bear Left	Bear Right	Right	Hard Right	Left	Thru	Bear Right	Right	Hard Right	Left	Bear Left	Thru	Bear Right	Right	Hard Left	Left	Bear Left	Thru	Right	Hard Left	Left	Bear Left	Bear Right	Hard Right					
03:30 PM	2	1	119	14	10	0	0	0	0	0	0	0	0	0	0	3	25	226	1	1	0	26	0	0	7	12	0	1	9	2	24	459			
03:45 PM	1	0	145	12	13	0	0	0	0	0	1	0	1	0	0	2	26	193	2	1	1	15	0	0	5	22	0	0	20	0	42	459			
04:00 PM	0	0	112	15	16	0	0	0	0	0	0	0	0	1	0	1	20	214	0	1	0	22	0	0	4	15	0	0	11	0	26	436			
04:15 PM	0	0	105	27	11	0	0	0	0	0	0	0	0	1	0	1	16	250	0	0	0	22	0	0	4	3	0	0	15	1	457				
Total Volume	3	1	481	68	50	0	0	0	0	0	1	0	1	2	0	4	11	87	3	3	1	85	0	0	20	32	0	1	55	3	111	1811			
% App. Total	0.5	0.2	79.8	11.3	8.3	0	0	0	0	0	25	0	25	50	0	1.1	8.8	89.5	0.3	0.3	0.9	80.2	0	0	18.9	46.8	0	0.9	49.5	2.7					
PHF	.375	.250	.829	.630	.781	.000	.000	.000	.000	.000	.250	.000	.250	.500	.000	.500	.550	.837	.883	.375	.750	.921	.250	.817	.000	.000	.714	.803	.591	.000	.250	.688	.375	.661	.986
Cars	3	1	474	67	49	0	0	0	0	0	1	0	1	2	0	4	8	87	3	3	1	85	0	0	20	52	0	1	53	3	109	1782			
% Cars	100	100	98.5	98.5	98.0	0	0	0	0	0	100	0	100	100	0	100	72.7	100	98.3	100	100	100	0	0	100	100	0	100	96.4	100	98.2	98.4			
Trucks	0	0	7	1	1	0	0	0	0	0	0	0	0	0	0	0	3	0	15	0	0	0	0	0	0	0	0	0	2	0	2	29			
% Trucks	0	0	1.5	1.5	2.0	0	0	0	0	0	0	0	0	0	0	0	27.3	0	1.7	0	0	0	0	0	0	0	0	0	3.6	0	1.8	1.6			

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 03:30 PM

Accurate Counts

978-664-2565

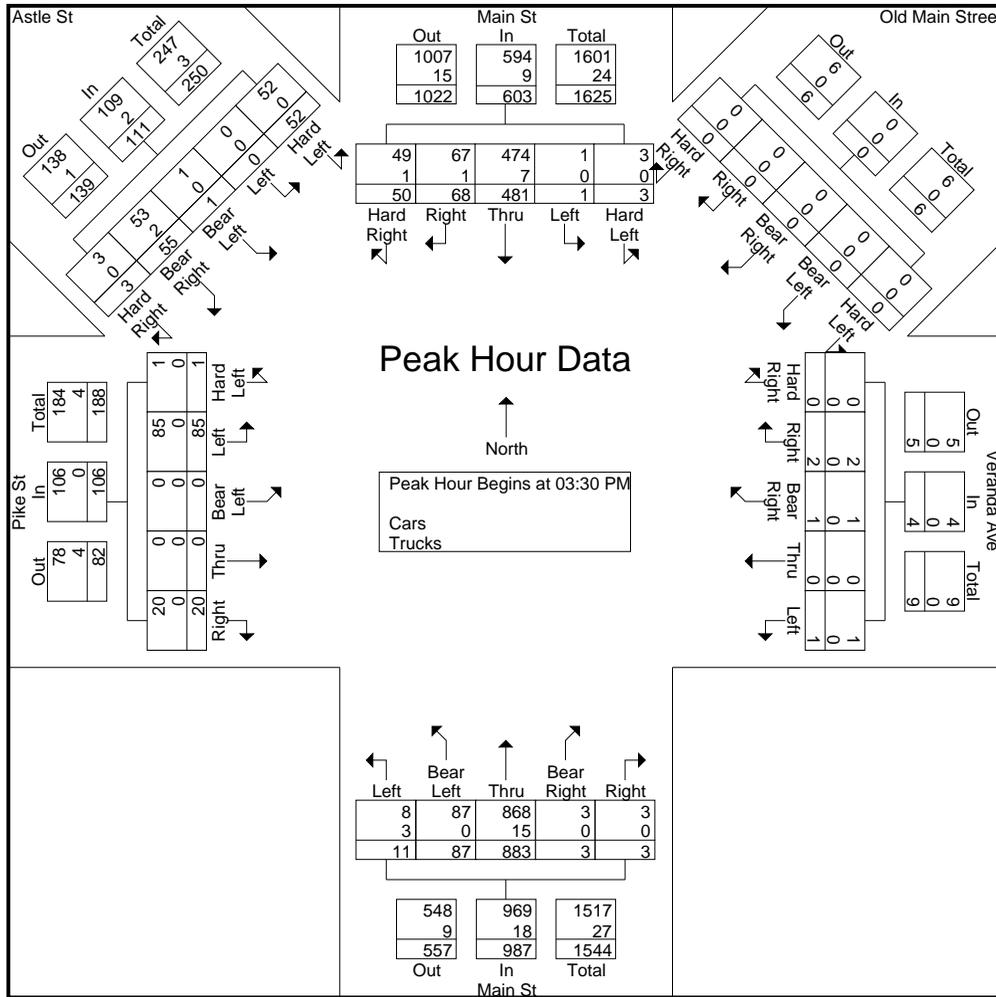
File Name : 14050001

Site Code : 14050001

Start Date : 6/25/2025

Page No : 2

N/S Street : Main Street
 E/W Street : Veranda Ave / Pike St
 City/State : Tewksbury, MA
 Weather : Clear



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	05:00 PM					04:00 PM					03:15 PM					04:15 PM					03:00 PM					03:45 PM										
+0 mins.	0	0	164	15	11	190	0	0	0	0	0	0	0	0	0	1	0	1	2	16	250	0	0	268	0	17	0	1	8	26	22	0	0	20	0	42
+15 mins.	0	0	159	13	10	182	0	0	0	0	0	0	0	0	0	0	0	0	0	15	215	1	0	231	0	23	0	0	7	30	15	0	0	11	0	26
+30 mins.	0	0	163	10	5	178	0	0	0	0	0	0	1	0	1	0	0	2	3	25	214	1	1	244	0	26	0	0	7	33	3	0	0	15	1	19
+45 mins.	0	0	136	15	12	163	0	0	0	0	1	1	0	0	0	1	0	1	4	17	222	1	1	245	1	15	0	0	5	21	10	0	0	17	1	28
Total Volume	0	0	622	53	38	713	0	0	0	0	1	1	1	0	1	2	0	4	9	73	901	3	2	988	1	81	0	1	27	110	50	0	0	63	2	115
% App. Total	0	0	87.2	7.4	5.3	100	0	0	0	0	100	25	0	25	50	0	100	0.9	7.4	91.2	0.3	0.2	100	0.9	73.6	0	0.9	24.5	100	43.5	0	0	54.8	1.7	100	
PHF	.000	.000	.948	.883	.792	.938	.000	.000	.000	.000	.250	.250	.250	.000	.250	.500	.000	.500	.563	.730	.901	.750	.500	.922	.250	.779	.000	.250	.844	.833	.568	.000	.000	.788	.500	.685
Cars	0	0	61	5	3	706	0	0	0	0	1	1	1	0	1	2	0	4	9	7	89	3	2	979	1	8	0	1	2	110	5	0	0	6	0	112
% Cars	0	0	98.	10	10	99	0	0	0	0	10	100	10	0	10	10	0	100	10	10	9	10	10	99.1	10	10	0	10	10	100	10	0	0	95.	10	97.4
Trucks	0	0	7	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	0	0	0	0	3	0	3
% Trucks	0	0	1.	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.9	0	0	0	0	0	0	0	0	0	4.	0	2.6

Accurate Counts
978-664-2565

File Name : 14050001
Site Code : 14050001
Start Date : 6/25/2025
Page No : 10

N/S Street : Main Street
E/W Street : Veranda Ave / Pike St
City/State : Tewksbury, MA
Weather : Clear

Groups Printed- Bikes Peds

Start Time	Main St From North					Old Main Street From Northeast					Veranda Ave From East					Main St From South					Pike St From West					Astle St From Northwest					Exclu. Total	Inclu. Total	Int. Total					
	Har d Left	Thru	Rig ht	Har d Right	Ped s	Har d Left	Bea r Left	Bea r Right	Rig ht	Har d Right	Ped s	Left	Thru	Bea r Right	Rig ht	Har d Right	Ped s	Left	Bea r Left	Thru	Bea r Right	Rig ht	Ped s	Har d Left	Left	Bea r Left	Bea r Right	Har d Right	Ped s									
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	2
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	3	4
04:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	4
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	4	3	7
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6
Grand Total	0	0	1	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	2	1	0	0	1	0	0	0	0	0	0	0	0	11	6	17
Approch %	0	0	50	0	50	0	0	0	0	0	0	0	0	0	0	0	0	66.7	33.3	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0			
Total %	0	0	16.7	0	16.7	0	0	0	0	0	0	0	0	0	0	0	0	33.3	16.7	0	0	16.7	0	0	0	0	0	0	0	0	0	0	0	0	0	64	35	
																																				.7	.3	

Start Time	Main St From North					Old Main Street From Northeast					Veranda Ave From East					Main St From South					Pike St From West					Astle St From Northwest					Exclu. Total	Inclu. Total	Int. Total					
	Har d Left	Thru	Rig ht	Har d Right	App. Total	Har d Left	Bea r Left	Bea r Right	Rig ht	Har d Right	App. Total	Left	Thru	Bea r Right	Rig ht	Har d Right	App. Total	Left	Bea r Left	Thru	Bea r Right	Rig ht	App. Total	Har d Left	Left	Bea r Left	Bea r Right	Har d Right	App. Total									
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																																						
Peak Hour for Entire Intersection Begins at 03:15 PM																																						
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total Volume	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4
% App. Total	0	0	50	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
PHF	.000	.000	.250	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500			

Accurate Counts

978-664-2565

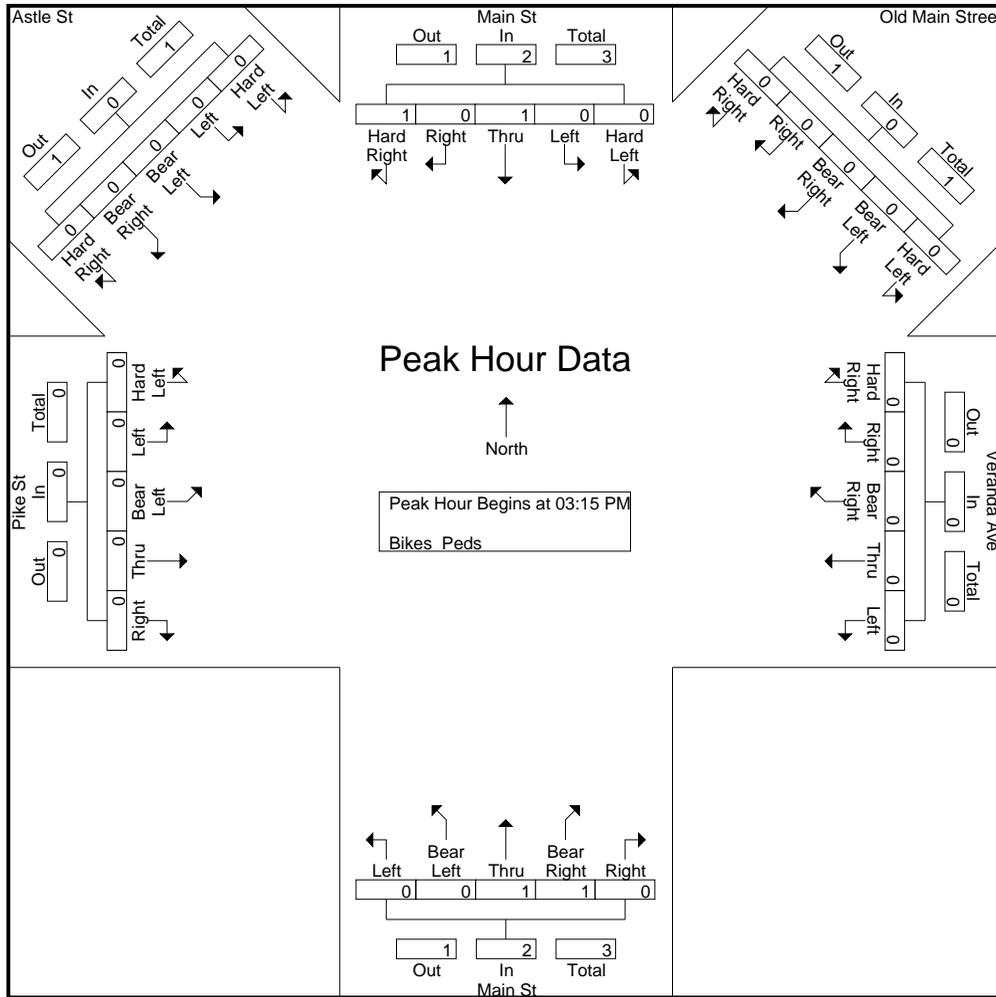
File Name : 14050001

Site Code : 14050001

Start Date : 6/25/2025

Page No : 11

N/S Street : Main Street
 E/W Street : Veranda Ave / Pike St
 City/State : Tewksbury, MA
 Weather : Clear



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	03:15 PM						03:00 PM						03:00 PM						03:45 PM						03:00 PM						03:00 PM					
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0
+15 mins.	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3	0	1	0	0	0	1	0	0	0	0	0	0
% App. Total	0	0	50	0	50		0	0	0	0	0		0	0	0	0	0		0	0	66.7	33.3	0		0	100	0	0	0		0	0	0	0	0	
PHF	.000	.000	.250	.000	.250	.500	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.250	.000	.750	.000	.250	.000	.000	.000	.250	.000	.000	.000	.000	.000	.000	

Accurate Counts

978-664-2565

N/S Street : Main Street
 E/W Street : Old Main Street
 City/State : Tewksbury, MA
 Weather : Clear

File Name : 14050002
 Site Code : 14050002
 Start Date : 6/25/2025
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Main St From North		Old Main St From East		Main St From South		Int. Total
	Left	Thru	Left	Right	Thru	Right	
07:00 AM	4	183	0	2	137	0	326
07:15 AM	3	172	1	5	149	0	330
07:30 AM	2	135	2	6	141	0	286
07:45 AM	3	174	0	7	148	0	332
Total	12	664	3	20	575	0	1274
08:00 AM	0	164	1	3	171	0	339
08:15 AM	7	161	2	9	146	0	325
08:30 AM	6	157	5	5	175	1	349
08:45 AM	7	153	1	2	158	0	321
Total	20	635	9	19	650	1	1334
Grand Total	32	1299	12	39	1225	1	2608
Apprch %	2.4	97.6	23.5	76.5	99.9	0.1	
Total %	1.2	49.8	0.5	1.5	47	0	
Cars	31	1235	12	36	1166	1	2481
% Cars	96.9	95.1	100	92.3	95.2	100	95.1
Trucks	1	64	0	3	59	0	127
% Trucks	3.1	4.9	0	7.7	4.8	0	4.9

Start Time	Main St From North			Old Main St From East			Main St From South			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	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	3	174	177	0	7	7	148	0	148	332
08:00 AM	0	164	164	1	3	4	171	0	171	339
08:15 AM	7	161	168	2	9	11	146	0	146	325
08:30 AM	6	157	163	5	5	10	175	1	176	349
Total Volume	16	656	672	8	24	32	640	1	641	1345
% App. Total	2.4	97.6		25	75		99.8	0.2		
PHF	.571	.943	.949	.400	.667	.727	.914	.250	.911	.963
Cars	15	621	636	8	23	31	605	1	606	1273
% Cars	93.8	94.7	94.6	100	95.8	96.9	94.5	100	94.5	94.6
Trucks	1	35	36	0	1	1	35	0	35	72
% Trucks	6.3	5.3	5.4	0	4.2	3.1	5.5	0	5.5	5.4

Accurate Counts

978-664-2565

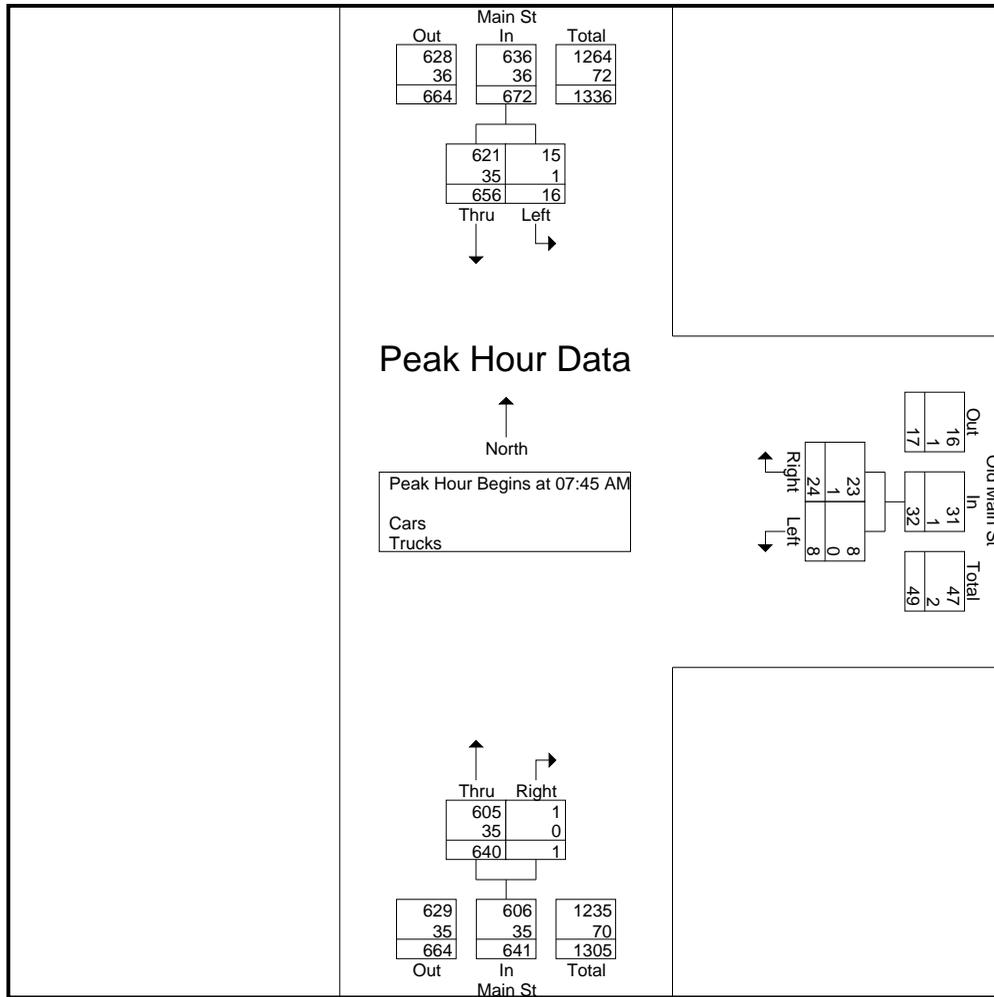
File Name : 14050002

Site Code : 14050002

Start Date : 6/25/2025

Page No : 2

N/S Street : Main Street
 E/W Street : Old Main Street
 City/State : Tewksbury, MA
 Weather : Clear



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			07:45 AM			08:00 AM		
+0 mins.	4	183	187	0	7	7	171	0	171
+15 mins.	3	172	175	1	3	4	146	0	146
+30 mins.	2	135	137	2	9	11	175	1	176
+45 mins.	3	174	177	5	5	10	158	0	158
Total Volume	12	664	676	8	24	32	650	1	651
% App. Total	1.8	98.2		25	75		99.8	0.2	
PHF	.750	.907	.904	.400	.667	.727	.929	.250	.925
Cars	12	631	643	8	23	31	616	1	617
% Cars	100	95	95.1	100	95.8	96.9	94.8	100	94.8
Trucks	0	33	33	0	1	1	34	0	34
% Trucks	0	5	4.9	0	4.2	3.1	5.2	0	5.2

Accurate Counts

978-664-2565

N/S Street : Main Street
 E/W Street : Old Main Street
 City/State : Tewksbury, MA
 Weather : Clear

File Name : 14050002
 Site Code : 14050002
 Start Date : 6/25/2025
 Page No : 10

Groups Printed- Bikes Peds

Start Time	Main St From North			Old Main St From East			Main St From South			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	1	1	0	0	1	1	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	1	0	0	0	1	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	2	1	0	0	2	1	3
Grand Total	0	0	0	0	0	2	1	0	0	2	1	3
Apprch %	0	0		0	0		100	0				
Total %	0	0		0	0		100	0		66.7	33.3	

Start Time	Main St From North			Old Main St From East			Main St From South			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	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	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	1	0	1	1
Total Volume	0	0	0	0	0	0	1	0	1	1
% App. Total	0	0		0	0		100	0		
PHF	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250

Accurate Counts

978-664-2565

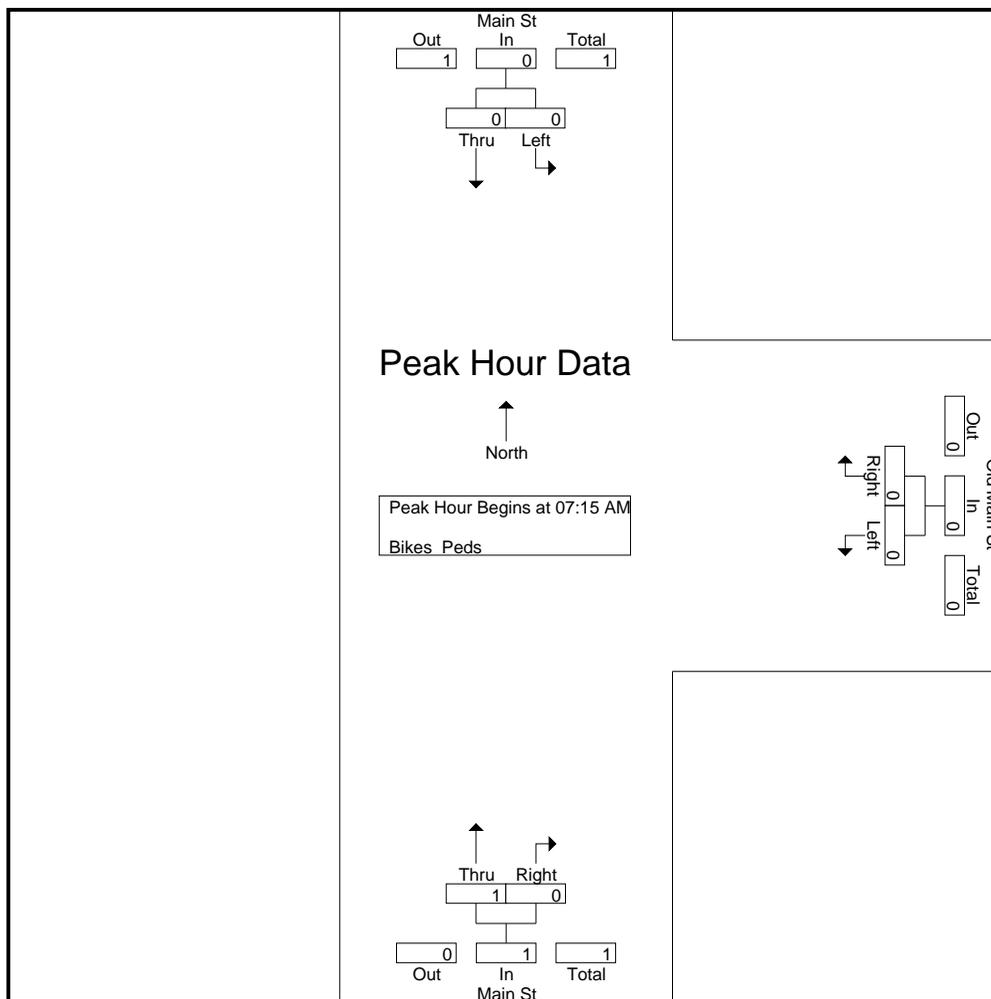
File Name : 14050002

Site Code : 14050002

Start Date : 6/25/2025

Page No : 11

N/S Street : Main Street
 E/W Street : Old Main Street
 City/State : Tewksbury, MA
 Weather : Clear



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

Accurate Counts

978-664-2565

N/S Street : Main Street
 E/W Street : Old Main Street
 City/State : Tewksbury, MA
 Weather : Clear

File Name : 14050002
 Site Code : 14050002
 Start Date : 6/25/2025
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Main St From North		Old Main St From East		Main St From South		Int. Total
	Left	Thru	Left	Right	Thru	Right	
03:00 PM	1	163	0	3	229	1	397
03:15 PM	2	163	1	6	235	0	407
03:30 PM	1	140	3	6	256	1	407
03:45 PM	4	171	2	4	223	0	404
Total	8	637	6	19	943	2	1615
04:00 PM	2	135	1	3	248	0	389
04:15 PM	2	140	0	2	269	0	413
04:30 PM	1	127	0	2	243	0	373
04:45 PM	3	151	0	4	242	0	400
Total	8	553	1	11	1002	0	1575
05:00 PM	3	178	2	2	234	0	419
05:15 PM	2	187	0	4	240	0	433
05:30 PM	1	178	2	1	201	0	383
05:45 PM	3	167	0	2	189	0	361
Total	9	710	4	9	864	0	1596
Grand Total	25	1900	11	39	2809	2	4786
Apprch %	1.3	98.7	22	78	99.9	0.1	
Total %	0.5	39.7	0.2	0.8	58.7	0	
Cars	25	1874	11	38	2763	2	4713
% Cars	100	98.6	100	97.4	98.4	100	98.5
Trucks	0	26	0	1	46	0	73
% Trucks	0	1.4	0	2.6	1.6	0	1.5

Start Time	Main St From North			Old Main St From East			Main St From South			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	3	151	154	0	4	4	242	0	242	400
05:00 PM	3	178	181	2	2	4	234	0	234	419
05:15 PM	2	187	189	0	4	4	240	0	240	433
05:30 PM	1	178	179	2	1	3	201	0	201	383
Total Volume	9	694	703	4	11	15	917	0	917	1635
% App. Total	1.3	98.7		26.7	73.3		100	0		
PHF	.750	.928	.930	.500	.688	.938	.947	.000	.947	.944
Cars	9	691	700	4	11	15	898	0	898	1613
% Cars	100	99.6	99.6	100	100	100	97.9	0	97.9	98.7
Trucks	0	3	3	0	0	0	19	0	19	22
% Trucks	0	0.4	0.4	0	0	0	2.1	0	2.1	1.3

Accurate Counts

978-664-2565

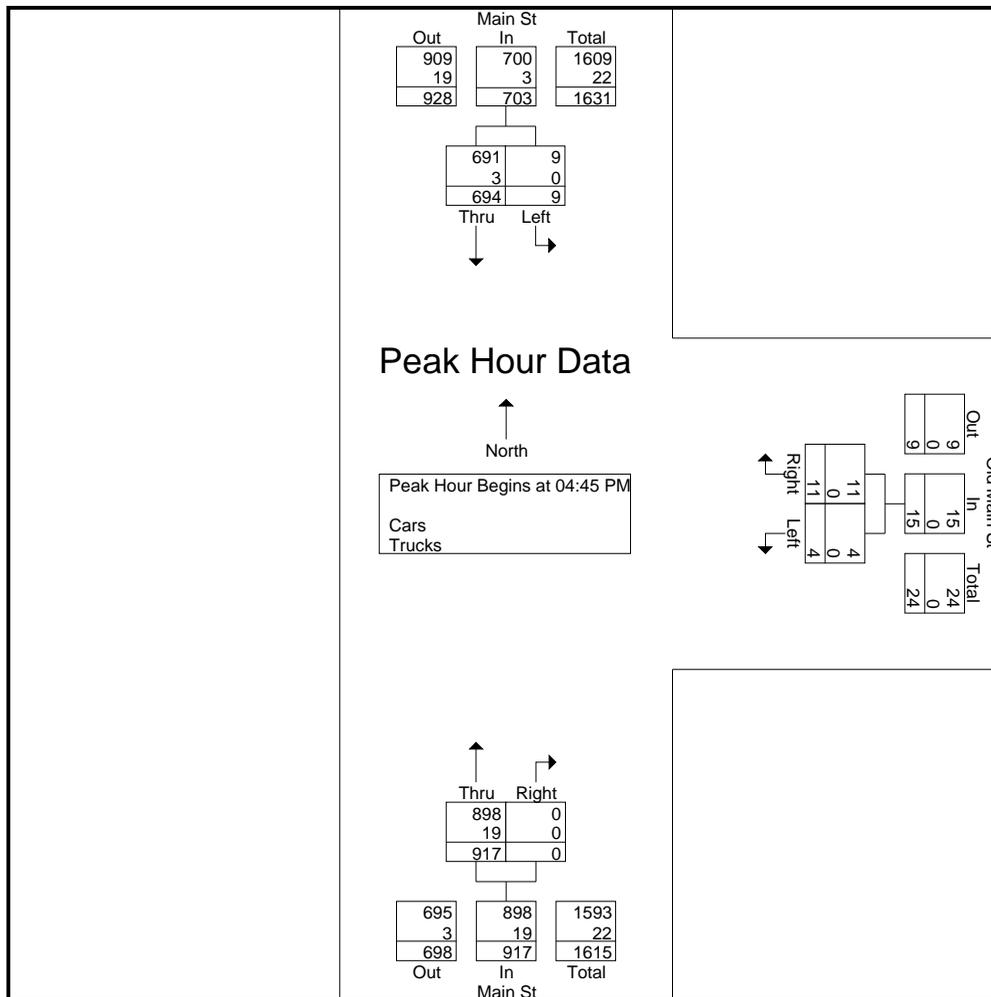
File Name : 14050002

Site Code : 14050002

Start Date : 6/25/2025

Page No : 2

N/S Street : Main Street
 E/W Street : Old Main Street
 City/State : Tewksbury, MA
 Weather : Clear



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

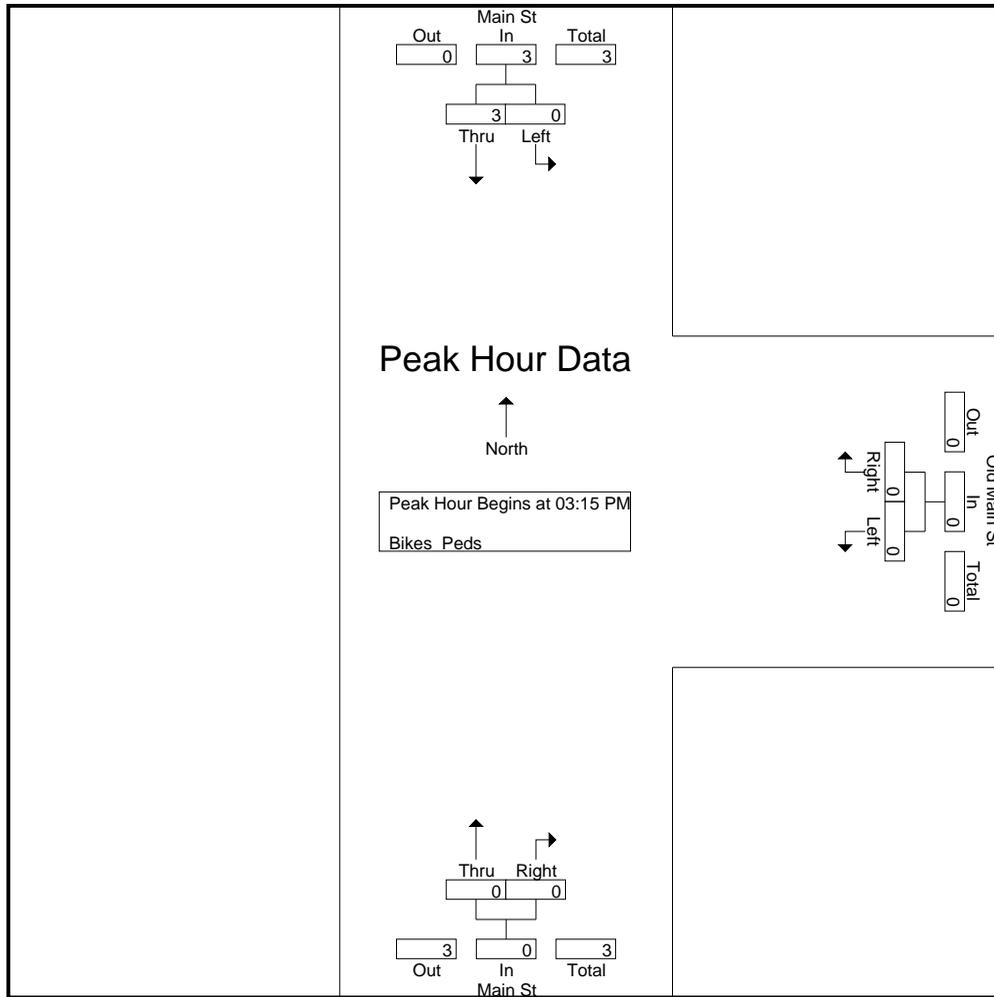
	05:00 PM			03:15 PM			04:00 PM		
+0 mins.	3	178	181	1	6	7	248	0	248
+15 mins.	2	187	189	3	6	9	269	0	269
+30 mins.	1	178	179	2	4	6	243	0	243
+45 mins.	3	167	170	1	3	4	242	0	242
Total Volume	9	710	719	7	19	26	1002	0	1002
% App. Total	1.3	98.7		26.9	73.1		100	0	
PHF	.750	.949	.951	.583	.792	.722	.931	.000	.931
Cars	9	705	714	7	19	26	992	0	992
% Cars	100	99.3	99.3	100	100	100	99	0	99
Trucks	0	5	5	0	0	0	10	0	10
% Trucks	0	0.7	0.7	0	0	0	1	0	1

Accurate Counts

978-664-2565

N/S Street : Main Street
 E/W Street : Old Main Street
 City/State : Tewksbury, MA
 Weather : Clear

File Name : 14050002
 Site Code : 14050002
 Start Date : 6/25/2025
 Page No : 11



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	03:15 PM			03:00 PM			03:00 PM		
+0 mins.	0	0	0	0	0	0	1	0	1
+15 mins.	0	1	1	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	2	2	0	0	0	0	0	0
Total Volume	0	3	3	0	0	0	1	0	1
% App. Total	0	100		0	0		100	0	
PHF	.000	.375	.375	.000	.000	.000	.250	.000	.250

Appendix C: Monthly Traffic-Volume Factors

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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.

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Appendix D: Vehicle Speeds

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Accurate Counts
978-664-2565

Site Code: 14050001

Location : Main Street NB
Location : North of Old Main Street
City/State: Tewksbury, MA
Direction: NB,

7/10/2025 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	2	2	9	13	19	9	4	1	0	0	0	0	0	59
1:00	1	9	5	5	8	4	3	0	0	0	0	0	0	35
2:00	1	0	5	6	2	2	0	0	0	0	0	0	0	16
3:00	0	2	5	3	4	2	0	0	1	0	0	0	0	17
4:00	1	1	2	9	2	2	3	2	0	0	0	0	0	22
5:00	0	0	9	23	27	23	15	5	1	1	0	0	0	104
6:00	0	7	25	46	66	41	20	5	2	0	0	0	0	212
7:00	0	6	37	123	108	81	49	10	1	0	0	0	0	415
8:00	2	13	58	123	142	118	29	6	1	0	0	0	0	492
9:00	1	15	58	93	139	95	28	8	2	1	0	0	0	440
10:00	2	18	54	168	120	58	29	10	1	0	0	0	0	460
11:00	1	23	95	125	180	77	25	14	3	0	0	0	0	543
12:00 PM	2	36	100	199	176	93	30	9	2	0	0	0	0	647
1:00	3	37	95	204	194	107	36	11	2	0	0	0	0	689
2:00	0	28	118	205	175	94	37	8	2	0	0	0	0	667
3:00	5	46	122	232	239	137	37	5	1	0	0	0	0	824
4:00	5	28	102	235	217	116	42	6	3	0	0	0	0	754
5:00	8	34	100	177	191	105	31	7	6	0	0	0	0	659
6:00	1	22	82	192	212	95	40	5	1	0	0	0	0	650
7:00	0	18	75	164	168	123	48	12	0	0	0	0	0	608
8:00	1	20	48	144	139	67	27	6	0	1	0	0	0	453
9:00	2	9	64	102	103	39	12	1	1	0	0	0	0	333
10:00	3	8	32	43	43	29	11	3	0	0	0	0	0	172
11:00	2	5	20	45	41	24	6	1	1	0	0	0	0	145
Total	43	387	1320	2679	2715	1541	562	135	31	3	0	0	0	9416
Percentile				15th	50th	85th	95th							
Speed				21	27	33	36							
Mean Speed (Average)				31.2										
10 MPH Pace Speed				26-35										
Number in Pace				5394										
Percent in Pace				57.0%										
Number > 30 MPH				4987										
Percent > 30 MPH				53.0%										

Accurate Counts
978-664-2565

Site Code: 14050001

Location : Main Street NB
Location : North of Old Main Street
City/State: Tewksbury, MA
Direction: NB,

7/11/2025 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	2	6	10	11	23	10	7	2	0	0	0	0	0	71
1:00	0	0	5	5	5	3	0	1	0	0	0	0	0	19
2:00	0	1	0	6	6	4	0	0	0	0	0	0	0	17
3:00	0	1	3	5	3	6	1	1	0	0	0	0	0	20
4:00	0	2	4	8	8	2	6	1	0	0	0	0	0	31
5:00	0	3	17	36	38	27	17	2	1	0	0	0	0	141
6:00	0	6	33	77	68	56	17	7	4	0	0	0	0	268
7:00	4	10	67	133	137	91	36	10	2	0	0	0	0	490
8:00	0	11	58	161	166	97	36	13	1	1	0	0	0	544
9:00	0	22	93	197	196	89	34	6	2	0	0	0	0	639
10:00	0	24	71	181	154	89	31	3	0	0	0	0	0	553
11:00	4	27	69	144	167	82	32	5	0	0	0	0	0	530
12:00 PM	7	31	83	178	139	82	23	6	0	0	0	0	0	549
1:00	1	27	106	179	145	86	25	0	0	0	0	0	0	569
2:00	9	27	93	189	181	103	13	1	3	0	0	0	0	619
3:00	4	37	122	206	194	121	28	4	0	0	0	0	0	716
4:00	2	27	101	187	182	82	22	5	0	0	0	0	0	608
5:00	2	12	63	183	155	87	35	4	2	0	0	0	0	543
6:00	2	12	74	158	165	79	23	6	3	0	0	0	0	522
7:00	0	10	43	118	126	77	33	4	1	0	0	0	0	412
8:00	0	3	40	128	118	64	27	5	0	0	0	0	0	385
9:00	0	14	62	106	95	38	15	5	2	0	1	0	0	338
10:00	1	13	40	85	55	32	8	5	0	0	0	0	0	239
11:00	0	12	42	83	51	34	12	4	1	1	0	1	0	241
Total	38	338	1299	2764	2577	1441	481	100	22	2	1	1	0	9064

Percentile	15th
Speed	22
Mean Speed (Average)	30.9
10 MPH Pace Speed	26-35
Number in Pace	5341
Percent in Pace	59.0%
Number > 30 MPH	4625
Percent > 30 MPH	51.0%

Accurate Counts
978-664-2565

Location : Main Street NB
Location : North of Old Main Street
City/State: Tewksbury, MA
Direction: NB,

Site Code: 14050001

7/12/2025 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	2	10	17	21	23	14	2	1	1	0	0	0	0	91
1:00	0	8	6	5	8	2	3	1	0	0	0	0	0	33
2:00	1	0	5	3	3	3	3	0	0	0	0	0	0	18
3:00	0	0	3	5	6	4	0	1	0	0	0	0	0	19
4:00	1	0	4	12	7	3	1	0	0	0	0	0	0	28
5:00	0	1	5	17	7	9	5	1	0	0	0	0	0	45
6:00	0	2	24	55	42	34	8	2	0	1	0	0	0	168
7:00	1	10	34	72	90	75	18	9	2	2	1	0	0	314
8:00	1	14	42	95	102	68	11	2	0	0	0	0	0	335
9:00	1	19	46	154	155	71	28	3	3	0	0	0	0	480
10:00	4	25	95	152	188	85	31	3	0	0	0	0	0	583
11:00	4	23	64	200	195	105	34	5	1	0	1	0	0	632
12:00 PM	1	24	86	182	159	106	25	4	0	0	0	0	0	587
1:00	3	15	85	169	177	90	19	3	0	0	0	0	0	561
2:00	0	9	57	162	160	94	33	5	1	0	0	0	0	521
3:00	1	11	71	175	169	93	41	3	0	0	0	0	0	564
4:00	2	11	56	168	155	82	31	10	3	0	0	0	0	518
5:00	0	10	60	183	130	95	34	5	0	0	0	0	0	517
6:00	0	4	43	119	141	83	31	8	3	0	0	0	0	432
7:00	0	9	26	122	113	62	27	9	0	0	0	0	0	368
8:00	0	11	48	87	81	55	16	6	0	0	0	0	0	304
9:00	2	10	57	81	72	41	16	3	2	0	0	0	0	284
10:00	0	17	42	66	52	18	5	2	0	0	0	0	0	202
11:00	1	4	28	46	45	33	11	2	1	0	0	0	0	171
Total	25	247	1004	2351	2280	1325	433	88	17	3	2	0	0	7775
			Percentile	15th	50th	85th	95th							
			Speed	23	27	33	37							
			Mean Speed (Average)	31.3										
			10 MPH Pace Speed	26-35										
			Number in Pace	4422										
			Percent in Pace	60.0%										
			Number > 30 MPH	4148										
			Percent > 30 MPH	53.4%										
Grand Total	106	972	3623	7794	7572	4307	1476	323	70	8	3	1	0	26255
Stats			Percentile	15th	50th	85th	95th							
			Speed	22	27	33	36							
			Mean Speed (Average)	31.1										
			10 MPH Pace Speed	26-35										
			Number in Pace	15275										
			Percent in Pace	59.0%										
			Number > 30 MPH	13760										
			Percent > 30 MPH	52.4%										

Accurate Counts
978-664-2565

Location : Main Street SB
Location : North of Old Main Street
City/State: Tewksbury, MA
Direction: SB,

Site Code: 1405002A

7/24/2025 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	0	0	6	13	19	5	1	0	0	0	0	44
1:00	0	0	0	0	2	23	6	4	0	0	0	0	0	35
2:00	0	0	0	0	3	6	4	5	0	1	0	0	0	19
3:00	0	0	0	2	4	9	12	3	2	0	0	0	0	32
4:00	0	1	0	0	8	23	23	9	2	2	0	0	0	68
5:00	0	0	0	2	17	104	110	45	16	0	0	0	1	295
6:00	1	0	18	19	92	219	214	78	15	2	0	0	0	658
7:00	0	1	1	43	131	232	189	55	7	0	0	0	0	659
8:00	2	4	13	64	154	209	191	55	11	0	1	0	0	704
9:00	0	0	13	41	197	246	174	16	1	0	0	0	0	688
10:00	9	8	15	59	203	239	170	30	15	0	8	0	0	756
11:00	3	11	31	112	206	257	161	26	3	1	0	0	0	811
12:00 PM	2	3	35	84	316	275	95	23	2	1	0	0	0	836
1:00	11	5	29	122	194	234	136	27	0	0	0	0	0	758
2:00	0	7	20	76	190	313	130	38	3	3	0	0	0	780
3:00	5	2	9	58	180	297	100	23	1	0	0	0	0	675
4:00	0	0	5	45	157	245	182	15	9	1	0	1	0	660
5:00	0	0	9	41	194	278	163	29	6	0	0	0	0	720
6:00	0	0	14	51	132	265	231	30	1	0	0	0	0	724
7:00	0	3	14	42	130	257	149	18	4	0	0	0	0	617
8:00	0	0	4	27	126	176	125	12	1	0	0	0	0	471
9:00	0	4	4	13	68	113	80	13	10	3	0	1	0	309
10:00	0	0	2	18	40	81	65	32	4	3	0	0	0	245
11:00	1	0	0	7	11	45	40	16	4	0	0	0	0	124
Total	34	49	236	926	2761	4159	2769	607	118	17	9	2	1	11688
			Percentile	15th	50th	85th	95th							
			Speed	29	35	41	44							
			Mean Speed (Average)	37.5										
			10 MPH Pace Speed	34-43										
			Number in Pace	6948										
			Percent in Pace	59.0%										
			Number > 35 MPH	7682										
			Percent > 35 MPH	65.7%										

Accurate Counts
978-664-2565

Site Code: 1405002A

Location : Main Street SB
Location : North of Old Main Street
City/State: Tewksbury, MA
Direction: SB,

7/25/2025 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	0	2	7	19	19	4	1	0	0	0	0	52
1:00	0	0	1	0	4	9	16	6	0	0	0	0	0	36
2:00	0	0	0	1	3	6	5	1	3	0	0	0	0	19
3:00	0	0	0	1	7	14	11	3	3	1	0	0	0	40
4:00	0	0	1	5	16	23	19	5	2	2	0	0	0	73
5:00	0	1	0	1	19	69	92	55	5	4	1	0	0	247
6:00	0	0	19	19	69	199	192	58	11	2	2	0	0	571
7:00	0	0	13	47	103	225	155	67	6	0	0	0	0	616
8:00	0	2	8	62	125	303	185	55	3	5	0	0	0	748
9:00	0	1	7	34	148	255	164	45	8	1	1	0	0	664
10:00	0	1	5	71	181	293	150	26	2	0	0	0	0	729
11:00	1	2	16	49	150	233	176	33	1	0	1	0	0	662
12:00 PM	0	0	15	97	283	276	116	48	4	0	0	0	0	839
1:00	6	28	26	92	228	271	151	28	2	0	0	0	0	832
2:00	1	2	9	51	158	308	164	20	3	2	0	0	0	718
3:00	1	1	12	37	177	253	169	36	4	3	0	0	0	693
4:00	0	0	1	44	201	261	169	46	2	1	0	0	0	725
5:00	0	1	4	20	157	272	172	54	8	0	0	0	0	688
6:00	0	0	0	23	154	240	207	20	10	2	0	0	0	656
7:00	0	1	0	16	113	197	138	38	5	0	0	0	0	508
8:00	0	0	1	15	99	164	85	13	2	0	0	0	0	379
9:00	0	2	6	16	74	142	63	20	5	1	0	0	0	329
10:00	0	1	2	10	51	114	72	32	3	2	2	0	0	289
11:00	0	1	1	0	20	53	49	23	5	1	0	0	0	153
Total	9	44	147	713	2547	4199	2739	736	98	27	7	0	0	11266

Percentile	15th
Speed	31
Mean Speed (Average)	38.0
10 MPH Pace Speed	36-45
Number in Pace	6938
Percent in Pace	62.0%
Number > 35 MPH	7806
Percent > 35 MPH	69.3%

Accurate Counts
978-664-2565

Site Code: 1405002A

Location : Main Street SB
Location : North of Old Main Street
City/State: Tewksbury, MA
Direction: SB,

7/26/2025 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	1	5	13	20	29	9	0	0	0	0	0	77
1:00	0	0	0	3	8	10	12	7	3	0	0	0	0	43
2:00	0	0	1	0	4	16	15	4	2	0	0	0	0	42
3:00	0	0	0	0	8	9	6	3	2	0	0	0	0	28
4:00	0	0	0	0	3	10	8	5	1	0	0	0	0	27
5:00	0	1	0	1	6	31	45	21	2	0	0	0	0	107
6:00	0	0	0	6	24	85	117	48	7	2	1	0	0	290
7:00	1	0	4	14	53	121	100	44	4	0	0	0	0	341
8:00	0	0	6	50	116	243	126	30	3	0	0	0	0	574
9:00	0	2	8	51	194	270	140	24	3	0	0	0	0	692
10:00	1	4	28	71	189	336	126	19	11	1	0	0	0	786
11:00	2	4	14	86	233	272	110	19	8	1	0	0	0	749
12:00 PM	8	5	39	76	228	344	93	25	10	0	0	0	0	828
1:00	0	0	19	48	214	259	175	18	2	2	1	0	0	738
2:00	0	0	2	32	188	267	192	48	10	0	0	0	0	739
3:00	3	1	5	38	205	273	145	29	4	0	1	0	0	704
4:00	3	1	9	55	133	286	106	54	2	0	1	0	0	650
5:00	0	1	6	27	116	212	165	36	7	0	0	0	0	570
6:00	0	0	1	30	104	223	145	30	2	0	0	0	0	535
7:00	0	1	1	14	112	198	132	25	3	2	0	0	2	490
8:00	0	0	4	13	103	151	75	16	2	1	2	0	0	367
9:00	0	0	2	14	88	144	93	17	1	0	0	0	0	359
10:00	0	0	0	16	60	75	79	17	3	0	0	0	0	250
11:00	0	1	1	4	26	49	51	19	2	1	0	0	0	154
Total	18	21	151	654	2428	3904	2285	567	94	10	6	0	2	10140
				Percentile	15th	50th	85th	95th						
				Speed	31	35	41	44						
				Mean Speed (Average)	37.7									
				10 MPH Pace Speed	31-40									
				Number in Pace	6122									
				Percent in Pace	63.0%									
				Number > 35 MPH	6868									
				Percent > 35 MPH	67.7%									
Grand Total	61	114	534	2293	7736	12262	7793	1910	310	54	22	2	3	33094
Stats					Percentile	15th	50th	85th	95th					
				Speed	30	35	41	44						
				Mean Speed (Average)	37.7									
				10 MPH Pace Speed	34-43									
				Number in Pace	20015									
				Percent in Pace	61.0%									
				Number > 35 MPH	22356									
				Percent > 35 MPH	67.6%									

Appendix E: Crash-Rate Worksheets

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Appendix F: Transit

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RIDER POLICY FOR FARE FREE PROGRAM

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



LRTA ROAD RUNNER OFFICE

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

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

1) IN PERSON AT LRTA ROAD RUNNER OFFICE

- First time applicants for the IAP ID, or applicants with expired TAP ID Cards need to fill out an application.

Applications are available at the LRTA Road Runner Office or online at LRTA.com

- The LRTA will process your application within 14 days of receipt.
- Once approved, you will need to bring a photo ID.

2) APPLY ONLINE AT MBTA.COM

3) MAIL YOUR APPLICATION TO THE LRTA ROAD RUNNER OFFICE

113 THORNDIKE STREET
LOWELL, MA 01852

For More Detailed Info visit LRTA.com

BLIND ACCESS CHARLIECARD

These cards are issued by the MBTA.

For more information visit

www.mbta.com/fares/reduced/blind-access-charliecard

THE LOWELL REGIONAL TRANSIT AUTHORITY

Announces

A Temporary Fare Free Pilot Program Commencing

December 1, 2024

And Continues Through September 30, 2025

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

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

TO CATCH A BUS...

1

USE A DESIGNATED LRTA BUS STOP

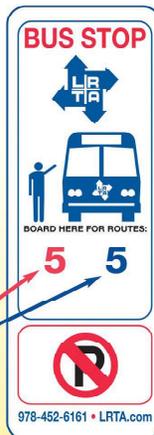
The bus will pick you up and take you to your destination. Please raise your hand to alert driver.

Outbound
Inbound

2

WAVE YOUR HAND ALONG ANY LRTA BUS ROUTE

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



BUS SCHEDULES

EFFECTIVE DECEMBER 1, 2024



BUS INFORMATION
978-452-6161
WWW.LRTA.COM

Service updates and changes will be posted on LRTA.com

DOWNTOWN SHUTTLE



The LRTA offers a Shuttle between

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

Monday - Friday:

5:45 am - 7:00 pm Every 30 minutes

First Shuttle departs Downtown Lowell at 6:00 AM
Last Shuttle departs Downtown Lowell at 7:00 PM

Saturday

7:15 am - 7:00 pm Every 30 minutes

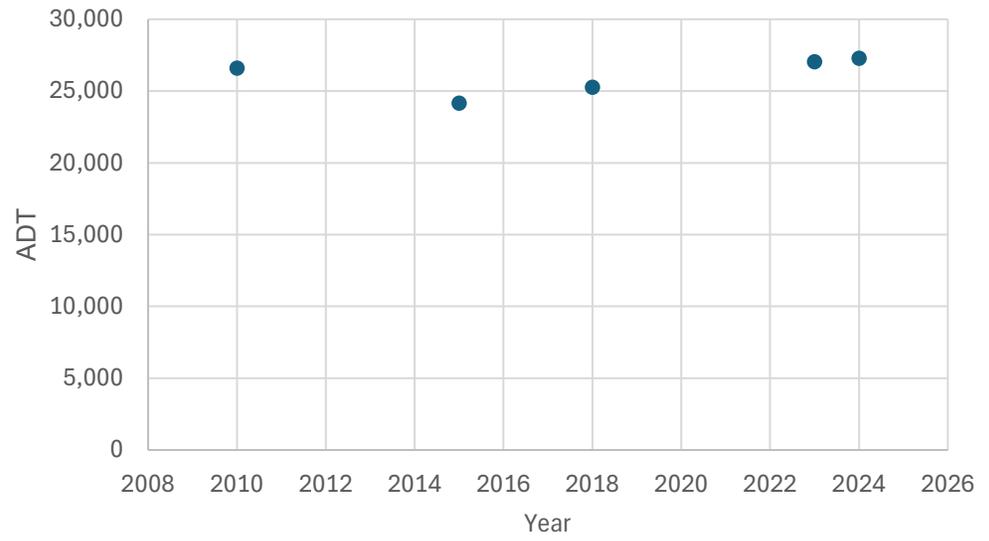
First Shuttle departs Downtown Lowell at 7:30 AM
Last Shuttle departs Downtown Lowell at 7:00 PM

Appendix G: Traffic Growth

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MassDOT Count Station 4111, Tewksbury, Main Street South of Interstate Route 495

Year	AADT (veh)	CAGR to 2024
2010	26,593	0.18%
2011		
2012		
2013		
2014		
2015	24,170	1.36%
2016		
2017		
2018	25,271	1.29%
2019		
2020		
2021		
2022		
2023	27,032	0.94%
2024	27,287	



ADT = annual average daily traffic.

CAGR = compound annual growth rate.

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Appendix H: Trip Distribution

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Trip-Distribution Analysis

Location	2025 Existing Weekday Street-Peak-Hour Volumes					Trip Distribution (%)
	Vehicles		Percent			
	AM	PM	AM	PM	Average	
Main Street S of Astle Street	1,282	1,639	44	43	43	45
Main Street N of Site	1,313	1,736	45	45	45	45
Astle Street NW of Main Street	114	250	4	6	5	5
Pike Street SW of Main Street	106	188	4	5	4	5
Veranda Avenue SE of Main Street	7	9	0	0	0	0
Old Main Street S NE of Main Street	18	6	1	0	0	0
Old Main Street E of Main Street	49	24	2	1	1	0
Total	2,889	3,852	100	100	100	1

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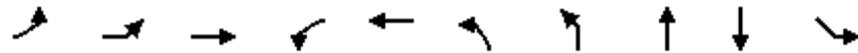
Appendix I: Synchro Reports

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Timings

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025

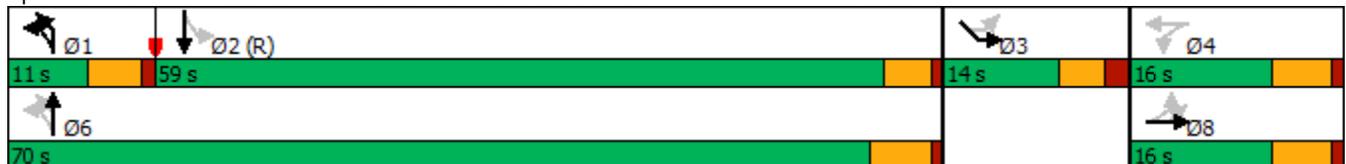


Lane Group	EBL2	EBL	EBT	WBL	WBT	NBL2	NBL	NBT	SBT	SEL
Lane Configurations			↔		↔			↔	↑	↔
Traffic Volume (vph)	60	1	0	3	1	4	31	557	621	0
Future Volume (vph)	60	1	0	3	1	4	31	557	621	0
Turn Type	Perm	Perm	NA	custom	NA	pm+pt	pm+pt	NA	NA	Prot
Protected Phases			8			1	1	6	2	3
Permitted Phases	8	8		4	4	6	6			
Detector Phase	8	8	8	4	4	1	1	6	2	3
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	10.0	5.0	6.0
Minimum Split (s)	11.5	11.5	11.5	11.5	11.5	11.0	11.0	15.5	15.5	11.5
Total Split (s)	16.0	16.0	16.0	16.0	16.0	11.0	11.0	70.0	59.0	14.0
Total Split (%)	16.0%	16.0%	16.0%	16.0%	16.0%	11.0%	11.0%	70.0%	59.0%	14.0%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
Lost Time Adjust (s)			0.0		0.0			0.0	0.0	0.0
Total Lost Time (s)			5.5		5.5			5.5	4.5	5.5
Lead/Lag						Lead	Lead		Lag	
Lead-Lag Optimize?						Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	Min	Min	Min	C-Min	None
Act Effct Green (s)			9.5		9.4			71.0	61.0	7.8
Actuated g/C Ratio			0.10		0.09			0.71	0.61	0.08
v/c Ratio			0.63		0.08			0.33	0.63	0.44
Control Delay			64.4		41.8			7.3	18.3	54.3
Queue Delay			0.0		0.0			0.0	0.0	0.0
Total Delay			64.4		41.8			7.3	18.3	54.3
LOS			E		D			A	B	D
Approach Delay			64.4		41.8			7.3	18.3	54.3
Approach LOS			E		D			A	B	D

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 17.4
 Intersection LOS: B
 Intersection Capacity Utilization 66.5%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street



Queues

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Lane Group	EBT	WBT	NBT	SBT	SEL
Lane Group Flow (vph)	84	11	693	691	57
v/c Ratio	0.63	0.08	0.33	0.63	0.44
Control Delay	64.4	41.8	7.3	18.3	54.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	64.4	41.8	7.3	18.3	54.3
Queue Length 50th (ft)	52	6	94	309	35
Queue Length 95th (ft)	92	11	120	449	60
Internal Link Dist (ft)	269	168	98	438	447
Turn Bay Length (ft)					
Base Capacity (vph)	148	160	2078	1092	144
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	0.57	0.07	0.33	0.63	0.40

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	NBR2
Lane Configurations			↔			↔				↕		
Traffic Volume (vph)	60	1	0	8	3	1	1	4	31	557	16	2
Future Volume (vph)	60	1	0	8	3	1	1	4	31	557	16	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-3%			3%				0%		
Total Lost time (s)			5.5			5.5				5.5		
Lane Util. Factor			1.00			1.00				0.95		
Frt			0.98			0.98				1.00		
Flt Protected			0.96			0.97				1.00		
Satd. Flow (prot)			1817			1769				3381		
Flt Permitted			0.74			0.84				0.85		
Satd. Flow (perm)			1411			1528				2889		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.42	0.42	0.42	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	73	1	0	10	7	2	2	5	35	633	18	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	84	0	0	11	0	0	0	693	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	6%	6%	6%	6%	6%
Turn Type	Perm	Perm	NA		custom	NA		pm+pt	pm+pt	NA		
Protected Phases			8					1	1	6		
Permitted Phases	8	8			4	4		6	6			
Actuated Green, G (s)			8.2			8.2				68.7		
Effective Green, g (s)			8.2			8.2				68.7		
Actuated g/C Ratio			0.08			0.08				0.69		
Clearance Time (s)			5.5			5.5				5.5		
Vehicle Extension (s)			3.0			3.0				3.0		
Lane Grp Cap (vph)			115			125				2014		
v/s Ratio Prot										c0.02		
v/s Ratio Perm			c0.06			0.01				0.22		
v/c Ratio			0.73			0.09				0.34		
Uniform Delay, d1			44.8			42.4				6.4		
Progression Factor			1.00			1.00				1.00		
Incremental Delay, d2			21.0			0.3				0.1		
Delay (s)			65.9			42.7				6.5		
Level of Service			E			D				A		
Approach Delay (s)			65.9			42.7				6.5		
Approach LOS			E			D				A		

Intersection Summary

HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Movement	SBL	SBT	SBR	SBR2	SEL2	SEL	SER
Lane Configurations	↘	↗				↘	
Traffic Volume (vph)	0	621	32	11	1	0	40
Future Volume (vph)	0	621	32	11	1	0	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%				-6%	
Total Lost time (s)		4.5				5.5	
Lane Util. Factor		1.00				1.00	
Frt		0.99				0.87	
Flt Protected		1.00				1.00	
Satd. Flow (prot)		1792				1696	
Flt Permitted		1.00				1.00	
Satd. Flow (perm)		1792				1696	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.72	0.72	0.72
Adj. Flow (vph)	0	647	33	11	1	0	56
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	691	0	0	0	57	0
Heavy Vehicles (%)	5%	5%	5%	5%	0%	0%	0%
Turn Type	Perm	NA			Perm	Prot	
Protected Phases		2				3	
Permitted Phases	2				3		
Actuated Green, G (s)		58.7				6.6	
Effective Green, g (s)		58.7				6.6	
Actuated g/C Ratio		0.59				0.07	
Clearance Time (s)		4.5				5.5	
Vehicle Extension (s)		3.0				3.0	
Lane Grp Cap (vph)		1051				111	
v/s Ratio Prot		0.39					
v/s Ratio Perm						0.03	
v/c Ratio		0.66				0.51	
Uniform Delay, d1		13.9				45.1	
Progression Factor		1.00				1.00	
Incremental Delay, d2		3.2				4.0	
Delay (s)		17.1				49.1	
Level of Service		B				D	
Approach Delay (s)		17.1				49.1	
Approach LOS		B				D	
Intersection Summary							

HCM 6th TWSC
2: Main Street & Old Main Street

09/05/2025

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	24	648	1	16	656
Future Vol, veh/h	8	24	648	1	16	656
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	73	73	91	91	95	95
Heavy Vehicles, %	3	2	6	6	5	5
Mvmt Flow	11	33	712	1	17	691

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1093	357	0	0	713
Stage 1	713	-	-	-	-
Stage 2	380	-	-	-	-
Critical Hdwy	6.86	6.94	-	-	4.2
Critical Hdwy Stg 1	5.86	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-
Follow-up Hdwy	3.53	3.32	-	-	2.25
Pot Cap-1 Maneuver	207	639	-	-	863
Stage 1	444	-	-	-	-
Stage 2	658	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	200	639	-	-	863
Mov Cap-2 Maneuver	200	-	-	-	-
Stage 1	444	-	-	-	-
Stage 2	637	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.7	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	413	863
HCM Lane V/C Ratio	-	-	0.106	0.02
HCM Control Delay (s)	-	-	14.7	9.3
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1

Timings

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025

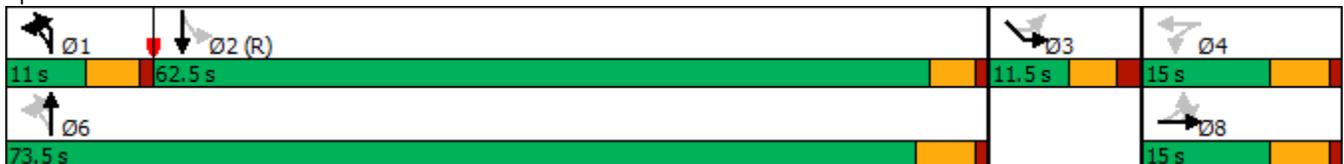


Lane Group	EBL2	EBL	EBT	WBL	WBT	NBL2	NBL	NBT	SBT	SEL
Lane Configurations										
Traffic Volume (vph)	66	1	0	3	1	4	34	612	683	0
Future Volume (vph)	66	1	0	3	1	4	34	612	683	0
Turn Type	Perm	Perm	NA	custom	NA	pm+pt	pm+pt	NA	NA	Prot
Protected Phases			8			1	1	6	2	3
Permitted Phases	8	8		4	4	6	6			
Detector Phase	8	8	8	4	4	1	1	6	2	3
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	10.0	5.0	6.0
Minimum Split (s)	11.5	11.5	11.5	11.5	11.5	11.0	11.0	15.5	15.5	11.5
Total Split (s)	15.0	15.0	15.0	15.0	15.0	11.0	11.0	73.5	62.5	11.5
Total Split (%)	15.0%	15.0%	15.0%	15.0%	15.0%	11.0%	11.0%	73.5%	62.5%	11.5%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
Lost Time Adjust (s)			0.0		0.0			0.0	0.0	0.0
Total Lost Time (s)			5.5		5.5			5.5	4.5	5.5
Lead/Lag						Lead	Lead		Lag	
Lead-Lag Optimize?						Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	Min	Min	Min	C-Min	None
Act Effct Green (s)			8.9		8.8			73.3	63.3	6.0
Actuated g/C Ratio			0.09		0.09			0.73	0.63	0.06
v/c Ratio			0.66		0.04			0.35	0.70	0.49
Control Delay			68.7		41.8			6.3	18.6	62.0
Queue Delay			0.0		0.0			0.0	0.0	0.0
Total Delay			68.7		41.8			6.3	18.6	62.0
LOS			E		D			A	B	E
Approach Delay			68.7		41.8			6.3	18.6	62.0
Approach LOS			E		D			A	B	E

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 17.1
 Intersection LOS: B
 Intersection Capacity Utilization 70.9%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street



Queues

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Lane Group	EBT	WBT	NBT	SBT	SEL
Lane Group Flow (vph)	83	5	728	793	49
v/c Ratio	0.66	0.04	0.35	0.70	0.49
Control Delay	68.7	41.8	6.3	18.6	62.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	68.7	41.8	6.3	18.6	62.0
Queue Length 50th (ft)	52	3	87	356	31
Queue Length 95th (ft)	#118	14	115	523	#74
Internal Link Dist (ft)	269	168	98	438	447
Turn Bay Length (ft)					
Base Capacity (vph)	134	148	2065	1133	101
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	0.62	0.03	0.35	0.70	0.49

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	NBR2
Lane Configurations			↔			↔				↕		
Traffic Volume (vph)	66	1	0	9	3	1	1	4	34	612	18	2
Future Volume (vph)	66	1	0	9	3	1	1	4	34	612	18	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-3%			3%				0%		
Total Lost time (s)			5.5			5.5				5.5		
Lane Util. Factor			1.00			1.00				0.95		
Frt			0.98			0.97				1.00		
Flt Protected			0.96			0.97				1.00		
Satd. Flow (prot)			1817			1768				3381		
Flt Permitted			0.75			0.86				0.82		
Satd. Flow (perm)			1420			1561				2772		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	1	0	10	3	1	1	4	37	665	20	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	83	0	0	5	0	0	0	728	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	6%	6%	6%	6%	6%
Turn Type	Perm	Perm	NA		custom	NA		pm+pt	pm+pt	NA		
Protected Phases			8					1	1	6		
Permitted Phases	8	8			4	4		6	6			
Actuated Green, G (s)			7.6			7.6				71.1		
Effective Green, g (s)			7.6			7.6				71.1		
Actuated g/C Ratio			0.08			0.08				0.71		
Clearance Time (s)			5.5			5.5				5.5		
Vehicle Extension (s)			3.0			3.0				3.0		
Lane Grp Cap (vph)			107			118				2007		
v/s Ratio Prot										c0.02		
v/s Ratio Perm			c0.06			0.00				0.24		
v/c Ratio			0.78			0.04				0.36		
Uniform Delay, d1			45.4			42.8				5.6		
Progression Factor			1.00			1.00				1.00		
Incremental Delay, d2			28.9			0.1				0.1		
Delay (s)			74.2			43.0				5.7		
Level of Service			E			D				A		
Approach Delay (s)			74.2			43.0				5.7		
Approach LOS			E			D				A		

Intersection Summary

HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Movement	SBL	SBT	SBR	SBR2	SEL2	SEL	SER
Lane Configurations	↘	↗				↘	
Traffic Volume (vph)	0	683	35	12	1	0	44
Future Volume (vph)	0	683	35	12	1	0	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%				-6%	
Total Lost time (s)		4.5				5.5	
Lane Util. Factor		1.00				1.00	
Frt		0.99				0.87	
Flt Protected		1.00				1.00	
Satd. Flow (prot)		1792				1696	
Flt Permitted		1.00				1.00	
Satd. Flow (perm)		1792				1696	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	742	38	13	1	0	48
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	793	0	0	0	49	0
Heavy Vehicles (%)	5%	5%	5%	5%	0%	0%	0%
Turn Type	Perm	NA			Perm	Prot	
Protected Phases		2				3	
Permitted Phases	2				3		
Actuated Green, G (s)		61.1				4.8	
Effective Green, g (s)		61.1				4.8	
Actuated g/C Ratio		0.61				0.05	
Clearance Time (s)		4.5				5.5	
Vehicle Extension (s)		3.0				3.0	
Lane Grp Cap (vph)		1094				81	
v/s Ratio Prot		0.44					
v/s Ratio Perm						0.03	
v/c Ratio		0.72				0.60	
Uniform Delay, d1		13.6				46.7	
Progression Factor		1.00				1.00	
Incremental Delay, d2		4.2				12.1	
Delay (s)		17.8				58.8	
Level of Service		B				E	
Approach Delay (s)		17.8				58.8	
Approach LOS		B				E	
Intersection Summary							

HCM 6th TWSC
2: Main Street & Old Main Street

09/05/2025

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	26	712	1	18	721
Future Vol, veh/h	9	26	712	1	18	721
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	2	6	6	5	5
Mvmt Flow	10	28	774	1	20	784

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1207	388	0	0	775
Stage 1	775	-	-	-	-
Stage 2	432	-	-	-	-
Critical Hdwy	6.86	6.94	-	-	4.2
Critical Hdwy Stg 1	5.86	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-
Follow-up Hdwy	3.53	3.32	-	-	2.25
Pot Cap-1 Maneuver	174	611	-	-	817
Stage 1	412	-	-	-	-
Stage 2	619	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	167	611	-	-	817
Mov Cap-2 Maneuver	167	-	-	-	-
Stage 1	412	-	-	-	-
Stage 2	592	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.1	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	363	817
HCM Lane V/C Ratio	-	-	0.105	0.024
HCM Control Delay (s)	-	-	16.1	9.5
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.3	0.1

Timings

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025

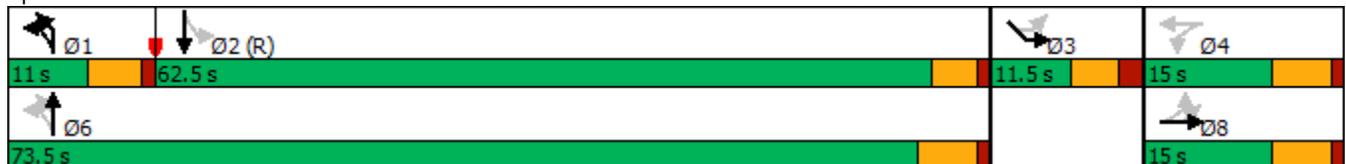


Lane Group	EBL2	EBL	EBT	WBL	WBT	NBL2	NBL	NBT	SBT	SEL
Lane Configurations			↔		↔			↔↔	↑	↔↔
Traffic Volume (vph)	66	1	0	3	1	4	34	615	688	0
Future Volume (vph)	66	1	0	3	1	4	34	615	688	0
Turn Type	Perm	Perm	NA	custom	NA	pm+pt	pm+pt	NA	NA	Prot
Protected Phases			8			1	1	6	2	3
Permitted Phases	8	8		4	4	6	6			
Detector Phase	8	8	8	4	4	1	1	6	2	3
Switch Phase										
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	10.0	5.0	6.0
Minimum Split (s)	11.5	11.5	11.5	11.5	11.5	11.0	11.0	15.5	15.5	11.5
Total Split (s)	15.0	15.0	15.0	15.0	15.0	11.0	11.0	73.5	62.5	11.5
Total Split (%)	15.0%	15.0%	15.0%	15.0%	15.0%	11.0%	11.0%	73.5%	62.5%	11.5%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
Lost Time Adjust (s)			0.0		0.0			0.0	0.0	0.0
Total Lost Time (s)			5.5		5.5			5.5	4.5	5.5
Lead/Lag						Lead	Lead		Lag	
Lead-Lag Optimize?						Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	Min	Min	Min	C-Min	None
Act Effct Green (s)			8.9		8.8			73.3	63.3	6.0
Actuated g/C Ratio			0.09		0.09			0.73	0.63	0.06
v/c Ratio			0.66		0.04			0.36	0.71	0.49
Control Delay			68.7		41.8			6.3	18.9	62.0
Queue Delay			0.0		0.0			0.0	0.0	0.0
Total Delay			68.7		41.8			6.3	18.9	62.0
LOS			E		D			A	B	E
Approach Delay			68.7		41.8			6.3	18.9	62.0
Approach LOS			E		D			A	B	E

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 17.2
 Intersection LOS: B
 Intersection Capacity Utilization 71.0%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street



Queues

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Lane Group	EBT	WBT	NBT	SBT	SEL
Lane Group Flow (vph)	83	5	731	801	49
v/c Ratio	0.66	0.04	0.36	0.71	0.49
Control Delay	68.7	41.8	6.3	18.9	62.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	68.7	41.8	6.3	18.9	62.0
Queue Length 50th (ft)	52	3	88	362	31
Queue Length 95th (ft)	#118	14	116	532	#74
Internal Link Dist (ft)	269	168	98	438	447
Turn Bay Length (ft)					
Base Capacity (vph)	134	148	2055	1133	101
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	0.62	0.03	0.36	0.71	0.49

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	NBR2
Lane Configurations			↔			↔				↕		
Traffic Volume (vph)	66	1	0	9	3	1	1	4	34	615	18	2
Future Volume (vph)	66	1	0	9	3	1	1	4	34	615	18	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-3%			3%				0%		
Total Lost time (s)			5.5			5.5				5.5		
Lane Util. Factor			1.00			1.00				0.95		
Flt			0.98			0.97				1.00		
Flt Protected			0.96			0.97				1.00		
Satd. Flow (prot)			1817			1768				3381		
Flt Permitted			0.75			0.86				0.81		
Satd. Flow (perm)			1420			1561				2759		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	1	0	10	3	1	1	4	37	668	20	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	83	0	0	5	0	0	0	731	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	6%	6%	6%	6%	6%
Turn Type	Perm	Perm	NA		custom	NA		pm+pt	pm+pt	NA		
Protected Phases			8					1	1	6		
Permitted Phases	8	8			4	4		6	6			
Actuated Green, G (s)			7.6			7.6				71.1		
Effective Green, g (s)			7.6			7.6				71.1		
Actuated g/C Ratio			0.08			0.08				0.71		
Clearance Time (s)			5.5			5.5				5.5		
Vehicle Extension (s)			3.0			3.0				3.0		
Lane Grp Cap (vph)			107			118				1998		
v/s Ratio Prot										c0.02		
v/s Ratio Perm			c0.06			0.00				0.24		
v/c Ratio			0.78			0.04				0.37		
Uniform Delay, d1			45.4			42.8				5.6		
Progression Factor			1.00			1.00				1.00		
Incremental Delay, d2			28.9			0.1				0.1		
Delay (s)			74.2			43.0				5.8		
Level of Service			E			D				A		
Approach Delay (s)			74.2			43.0				5.8		
Approach LOS			E			D				A		

Intersection Summary

HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Movement	SBL	SBT	SBR	SBR2	SEL2	SEL	SER
Lane Configurations							
Traffic Volume (vph)	0	688	36	13	1	0	44
Future Volume (vph)	0	688	36	13	1	0	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%				-6%	
Total Lost time (s)		4.5				5.5	
Lane Util. Factor		1.00				1.00	
Frt		0.99				0.87	
Flt Protected		1.00				1.00	
Satd. Flow (prot)		1792				1696	
Flt Permitted		1.00				1.00	
Satd. Flow (perm)		1792				1696	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	748	39	14	1	0	48
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	801	0	0	0	49	0
Heavy Vehicles (%)	5%	5%	5%	5%	0%	0%	0%
Turn Type	Perm	NA			Perm	Prot	
Protected Phases		2				3	
Permitted Phases	2				3		
Actuated Green, G (s)		61.1				4.8	
Effective Green, g (s)		61.1				4.8	
Actuated g/C Ratio		0.61				0.05	
Clearance Time (s)		4.5				5.5	
Vehicle Extension (s)		3.0				3.0	
Lane Grp Cap (vph)		1094				81	
v/s Ratio Prot		0.45					
v/s Ratio Perm						0.03	
v/c Ratio		0.73				0.60	
Uniform Delay, d1		13.7				46.7	
Progression Factor		1.00				1.00	
Incremental Delay, d2		4.3				12.1	
Delay (s)		18.0				58.8	
Level of Service		B				E	
Approach Delay (s)		18.0				58.8	
Approach LOS		B				E	
Intersection Summary							

HCM 6th TWSC
2: Main Street & Old Main Street

09/05/2025

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	26	715	1	18	728
Future Vol, veh/h	9	26	715	1	18	728
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	2	6	6	5	5
Mvmt Flow	10	28	777	1	20	791

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1214	389	0	0	778
Stage 1	778	-	-	-	-
Stage 2	436	-	-	-	-
Critical Hdwy	6.86	6.94	-	-	4.2
Critical Hdwy Stg 1	5.86	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-
Follow-up Hdwy	3.53	3.32	-	-	2.25
Pot Cap-1 Maneuver	173	610	-	-	815
Stage 1	411	-	-	-	-
Stage 2	616	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	165	610	-	-	815
Mov Cap-2 Maneuver	165	-	-	-	-
Stage 1	411	-	-	-	-
Stage 2	589	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.2	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	360	815
HCM Lane V/C Ratio	-	-	0.106	0.024
HCM Control Delay (s)	-	-	16.2	9.5
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1

HCM 6th TWSC
 3: Main Street & Proposed Driveway

09/05/2025

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	5	7	3	739	739	3
Future Vol, veh/h	5	7	3	739	739	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	5	5	6	6
Mvmt Flow	5	8	3	803	803	3

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1213	403	806	0	-	0
Stage 1	805	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.2	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.25	-	-	-
Pot Cap-1 Maneuver	174	597	795	-	-	-
Stage 1	400	-	-	-	-	-
Stage 2	640	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	173	597	795	-	-	-
Mov Cap-2 Maneuver	173	-	-	-	-	-
Stage 1	397	-	-	-	-	-
Stage 2	640	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	795	-	295	-	-
HCM Lane V/C Ratio	0.004	-	0.044	-	-
HCM Control Delay (s)	9.5	0	17.8	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Timings

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025

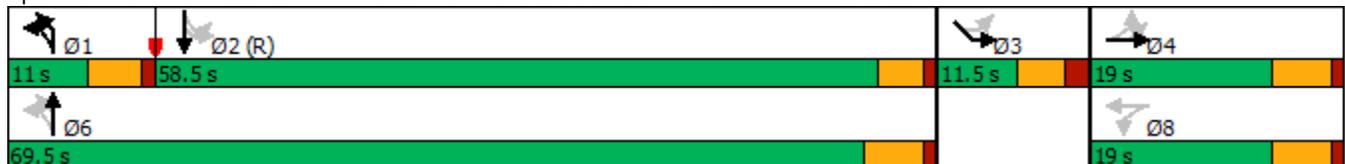


Lane Group	EBL2	EBT	WBL	WBT	NBL2	NBL	NBT	SBL2	SBL	SBT	SEL
Lane Configurations		↕		↕			↕		↕	↕	↕
Traffic Volume (vph)	85	0	1	0	11	87	883	3	1	576	1
Future Volume (vph)	85	0	1	0	11	87	883	3	1	576	1
Turn Type	Perm	NA	custom	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	Prot
Protected Phases		4			1	1	6			2	3
Permitted Phases	4		8	8	6	6		2	2		
Detector Phase	4	4	8	8	1	1	6	2	2	2	3
Switch Phase											
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	10.0	5.0	5.0	5.0	6.0
Minimum Split (s)	11.5	11.5	11.5	11.5	11.0	11.0	15.5	15.5	15.5	15.5	11.5
Total Split (s)	19.0	19.0	19.0	19.0	11.0	11.0	69.5	58.5	58.5	58.5	11.5
Total Split (%)	19.0%	19.0%	19.0%	19.0%	11.0%	11.0%	69.5%	58.5%	58.5%	58.5%	11.5%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.0	4.0	4.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
Lost Time Adjust (s)		0.0		0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)		5.5		5.5			5.5		4.5	4.5	5.5
Lead/Lag					Lead	Lead		Lag	Lag	Lag	
Lead-Lag Optimize?					Yes	Yes		Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	Min	C-Min	C-Min	C-Min	None
Act Effct Green (s)		12.3		12.3			67.5		57.5	57.5	6.0
Actuated g/C Ratio		0.12		0.12			0.68		0.58	0.58	0.06
v/c Ratio		0.74		0.04			0.71		0.01	0.76	0.39
Control Delay		67.4		38.2			13.3		11.0	23.4	6.9
Queue Delay		0.0		0.0			0.0		0.0	0.0	0.0
Total Delay		67.4		38.2			13.3		11.0	23.4	6.9
LOS		E		D			B		B	C	A
Approach Delay		67.4		38.3			13.3			23.3	6.9
Approach LOS		E		D			B			C	A

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 20.3
 Intersection LOS: C
 Intersection Capacity Utilization 100.0%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street



Queues

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Lane Group	EBT	WBT	NBT	SBL	SBT	SEL
Lane Group Flow (vph)	131	8	1073	4	789	90
v/c Ratio	0.74	0.04	0.71	0.01	0.76	0.39
Control Delay	67.4	38.2	13.3	11.0	23.4	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.4	38.2	13.3	11.0	23.4	6.9
Queue Length 50th (ft)	81	5	168	1	388	0
Queue Length 95th (ft)	#128	10	214	6	540	0
Internal Link Dist (ft)	269	168	98		438	447
Turn Bay Length (ft)				150		
Base Capacity (vph)	193	213	1507	285	1043	233
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.04	0.71	0.01	0.76	0.39

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Movement	EBL2	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	NBR2
Lane Configurations		↕			↕					↕		
Traffic Volume (vph)	85	0	20	1	0	1	2	11	87	883	3	3
Future Volume (vph)	85	0	20	1	0	1	2	11	87	883	3	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			3%					0%		
Total Lost time (s)		5.5			5.5					5.5		
Lane Util. Factor		1.00			1.00					0.95		
Frt		0.97			0.90					1.00		
Flt Protected		0.96			0.99					1.00		
Satd. Flow (prot)		1806			1661					3519		
Flt Permitted		0.76			0.94					0.60		
Satd. Flow (perm)		1431			1585					2123		
Peak-hour factor, PHF	0.80	0.80	0.80	0.50	0.50	0.50	0.50	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	106	0	25	2	0	2	4	12	95	960	3	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	131	0	0	8	0	0	0	0	1073	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%
Parking (#/hr)												0
Turn Type	Perm	NA		custom	NA			pm+pt	pm+pt	NA		
Protected Phases		4						1	1	6		
Permitted Phases	4			8	8			6	6			
Actuated Green, G (s)		12.3			12.3					66.4		
Effective Green, g (s)		12.3			12.3					66.4		
Actuated g/C Ratio		0.12			0.12					0.66		
Clearance Time (s)		5.5			5.5					5.5		
Vehicle Extension (s)		3.0			3.0					3.0		
Lane Grp Cap (vph)		176			194					1493		
v/s Ratio Prot										c0.04		
v/s Ratio Perm		c0.09			0.01					0.43		
v/c Ratio		0.74			0.04					0.72		
Uniform Delay, d1		42.3			38.7					10.8		
Progression Factor		1.00			1.00					1.00		
Incremental Delay, d2		15.6			0.1					1.7		
Delay (s)		58.0			38.7					12.5		
Level of Service		E			D					B		
Approach Delay (s)		58.0			38.7					12.5		
Approach LOS		E			D					B		
Intersection Summary												
HCM 2000 Control Delay			20.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.5			
Intersection Capacity Utilization			100.0%			ICU Level of Service				G		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Movement	SBL2	SBL	SBT	SBR	SBR2	SEL	SER	SER2
Lane Configurations								
Traffic Volume (vph)	3	1	576	68	50	1	55	3
Future Volume (vph)	3	1	576	68	50	1	55	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%			-6%		
Total Lost time (s)		4.5	4.5			5.5		
Lane Util. Factor		1.00	1.00			1.00		
Frt		1.00	0.97			0.87		
Flt Protected		0.95	1.00			1.00		
Satd. Flow (prot)		1770	1815			1664		
Flt Permitted		0.27	1.00			1.00		
Satd. Flow (perm)		496	1815			1664		
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.66	0.66	0.66
Adj. Flow (vph)	3	1	655	77	57	2	83	5
RTOR Reduction (vph)	0	0	0	0	0	86	0	0
Lane Group Flow (vph)	0	4	789	0	0	4	0	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)								
Turn Type	Perm	Perm	NA			Prot		
Protected Phases			2			3		
Permitted Phases	2	2						
Actuated Green, G (s)		56.4	56.4			4.8		
Effective Green, g (s)		56.4	56.4			4.8		
Actuated g/C Ratio		0.56	0.56			0.05		
Clearance Time (s)		4.5	4.5			5.5		
Vehicle Extension (s)		3.0	3.0			3.0		
Lane Grp Cap (vph)		279	1023			79		
v/s Ratio Prot			c0.43			c0.00		
v/s Ratio Perm		0.01						
v/c Ratio		0.01	0.77			0.05		
Uniform Delay, d1		9.6	16.8			45.4		
Progression Factor		1.00	1.00			1.00		
Incremental Delay, d2		0.1	5.6			0.3		
Delay (s)		9.7	22.4			45.7		
Level of Service		A	C			D		
Approach Delay (s)			22.4			45.7		
Approach LOS			C			D		
Intersection Summary								

HCM 6th TWSC
2: Main Street & Old Main Street

09/05/2025

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	11	1022	0	9	694
Future Vol, veh/h	4	11	1022	0	9	694
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	94	94	95	95	93	93
Heavy Vehicles, %	0	0	2	2	0	0
Mvmt Flow	4	12	1076	0	10	746

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1469	538	0	0	1076
Stage 1	1076	-	-	-	-
Stage 2	393	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	121	493	-	-	656
Stage 1	293	-	-	-	-
Stage 2	657	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	118	493	-	-	656
Mov Cap-2 Maneuver	118	-	-	-	-
Stage 1	293	-	-	-	-
Stage 2	640	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.3	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	267	656
HCM Lane V/C Ratio	-	-	0.06	0.015
HCM Control Delay (s)	-	-	19.3	10.6
HCM Lane LOS	-	-	C	B
HCM 95th %tile Q(veh)	-	-	0.2	0

Timings

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025

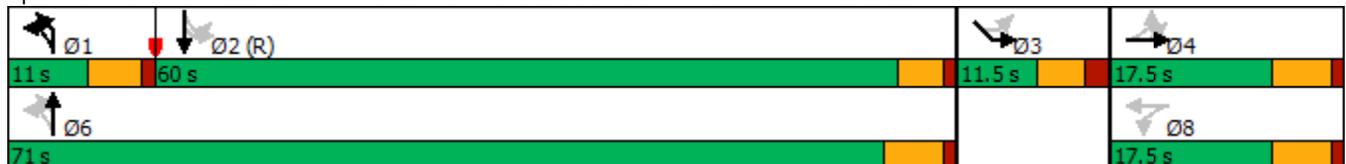


Lane Group	EBL2	EBT	WBL	WBT	NBL2	NBL	NBT	SBL2	SBL	SBT	SEL
Lane Configurations		↕		↕			↕		↕	↕	↕
Traffic Volume (vph)	93	0	1	0	12	96	971	3	1	633	1
Future Volume (vph)	93	0	1	0	12	96	971	3	1	633	1
Turn Type	Perm	NA	custom	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	Prot
Protected Phases		4			1	1	6			2	3
Permitted Phases	4		8	8	6	6		2	2		
Detector Phase	4	4	8	8	1	1	6	2	2	2	3
Switch Phase											
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	10.0	5.0	5.0	5.0	6.0
Minimum Split (s)	11.5	11.5	11.5	11.5	11.0	11.0	15.5	15.5	15.5	15.5	11.5
Total Split (s)	17.5	17.5	17.5	17.5	11.0	11.0	71.0	60.0	60.0	60.0	11.5
Total Split (%)	17.5%	17.5%	17.5%	17.5%	11.0%	11.0%	71.0%	60.0%	60.0%	60.0%	11.5%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.0	4.0	4.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
Lost Time Adjust (s)		0.0		0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)		5.5		5.5			5.5		4.5	4.5	5.5
Lead/Lag					Lead	Lead		Lag	Lag	Lag	
Lead-Lag Optimize?					Yes	Yes		Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	Min	C-Min	C-Min	C-Min	None
Act Effct Green (s)		11.4		11.4			68.4		58.4	58.4	6.0
Actuated g/C Ratio		0.11		0.11			0.68		0.58	0.58	0.06
v/c Ratio		0.77		0.02			0.80		0.02	0.78	0.30
Control Delay		72.8		39.2			16.0		10.2	23.9	3.2
Queue Delay		0.0		0.0			0.0		0.0	0.0	0.0
Total Delay		72.8		39.2			16.0		10.2	23.9	3.2
LOS		E		D			B		B	C	A
Approach Delay		72.8		39.3			16.0			23.8	3.2
Approach LOS		E		D			B			C	A

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 21.8	Intersection LOS: C
Intersection Capacity Utilization 107.0%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street



Queues

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Lane Group	EBT	WBT	NBT	SBL	SBT	SEL
Lane Group Flow (vph)	125	4	1178	4	830	69
v/c Ratio	0.77	0.02	0.80	0.02	0.78	0.30
Control Delay	72.8	39.2	16.0	10.2	23.9	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.8	39.2	16.0	10.2	23.9	3.2
Queue Length 50th (ft)	78	2	184	1	410	0
Queue Length 95th (ft)	#168	13	232	6	601	0
Internal Link Dist (ft)	269	168	98		438	447
Turn Bay Length (ft)				150		
Base Capacity (vph)	172	191	1473	257	1059	233
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.02	0.80	0.02	0.78	0.30

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Movement	EBL2	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	NBR2
Lane Configurations		↕			↕					↕		
Traffic Volume (vph)	93	0	22	1	0	1	2	12	96	971	3	3
Future Volume (vph)	93	0	22	1	0	1	2	12	96	971	3	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			3%					0%		
Total Lost time (s)		5.5			5.5					5.5		
Lane Util. Factor		1.00			1.00					0.95		
Frt		0.97			0.90					1.00		
Flt Protected		0.96			0.99					1.00		
Satd. Flow (prot)		1806			1661					3519		
Flt Permitted		0.76			0.95					0.58		
Satd. Flow (perm)		1436			1591					2034		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	0	24	1	0	1	2	13	104	1055	3	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	125	0	0	4	0	0	0	0	1178	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	custom	NA				pm+pt	pm+pt	NA		
Protected Phases		4						1	1	6		
Permitted Phases	4		8	8				6	6			
Actuated Green, G (s)		11.4			11.4					67.3		
Effective Green, g (s)		11.4			11.4					67.3		
Actuated g/C Ratio		0.11			0.11					0.67		
Clearance Time (s)		5.5			5.5					5.5		
Vehicle Extension (s)		3.0			3.0					3.0		
Lane Grp Cap (vph)		163			181					1457		
v/s Ratio Prot										c0.05		
v/s Ratio Perm		c0.09			0.00					c0.50		
v/c Ratio		0.77			0.02					0.81		
Uniform Delay, d1		43.0			39.3					11.7		
Progression Factor		1.00			1.00					1.00		
Incremental Delay, d2		19.2			0.0					3.4		
Delay (s)		62.2			39.4					15.1		
Level of Service		E			D					B		
Approach Delay (s)		62.2			39.4					15.1		
Approach LOS		E			D					B		

Intersection Summary

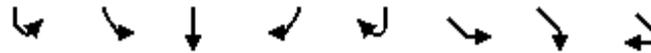
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	107.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Movement	SBL2	SBL	SBT	SBR	SBR2	SEL	SER	SER2
Lane Configurations								
Traffic Volume (vph)	3	1	633	75	55	1	60	3
Future Volume (vph)	3	1	633	75	55	1	60	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%			-6%		
Total Lost time (s)		4.5	4.5			5.5		
Lane Util. Factor		1.00	1.00			1.00		
Frt		1.00	0.97			0.87		
Flt Protected		0.95	1.00			1.00		
Satd. Flow (prot)		1770	1815			1662		
Flt Permitted		0.24	1.00			1.00		
Satd. Flow (perm)		442	1815			1662		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	1	688	82	60	1	65	3
RTOR Reduction (vph)	0	0	0	0	0	66	0	0
Lane Group Flow (vph)	0	4	830	0	0	3	0	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	Perm	NA			Prot		
Protected Phases			2			3		
Permitted Phases	2	2						
Actuated Green, G (s)		57.3	57.3			4.8		
Effective Green, g (s)		57.3	57.3			4.8		
Actuated g/C Ratio		0.57	0.57			0.05		
Clearance Time (s)		4.5	4.5			5.5		
Vehicle Extension (s)		3.0	3.0			3.0		
Lane Grp Cap (vph)		253	1039			79		
v/s Ratio Prot			0.46			c0.00		
v/s Ratio Perm		0.01						
v/c Ratio		0.02	0.80			0.04		
Uniform Delay, d1		9.2	16.8			45.4		
Progression Factor		1.00	1.00			1.00		
Incremental Delay, d2		0.1	6.4			0.2		
Delay (s)		9.3	23.2			45.6		
Level of Service		A	C			D		
Approach Delay (s)			23.2			45.6		
Approach LOS			C			D		
Intersection Summary								

HCM 6th TWSC
 2: Main Street & Old Main Street

09/05/2025

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	12	1123	0	10	763
Future Vol, veh/h	4	12	1123	0	10	763
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	2	0	0
Mvmt Flow	4	13	1221	0	11	829

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1658	611	0	0	1221	0
Stage 1	1221	-	-	-	-	-
Stage 2	437	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	90	442	-	-	578	-
Stage 1	246	-	-	-	-	-
Stage 2	624	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	87	442	-	-	578	-
Mov Cap-2 Maneuver	87	-	-	-	-	-
Stage 1	246	-	-	-	-	-
Stage 2	602	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	22.9	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	219	578
HCM Lane V/C Ratio	-	-	0.079	0.019
HCM Control Delay (s)	-	-	22.9	11.3
HCM Lane LOS	-	-	C	B
HCM 95th %tile Q(veh)	-	-	0.3	0.1

Timings

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025

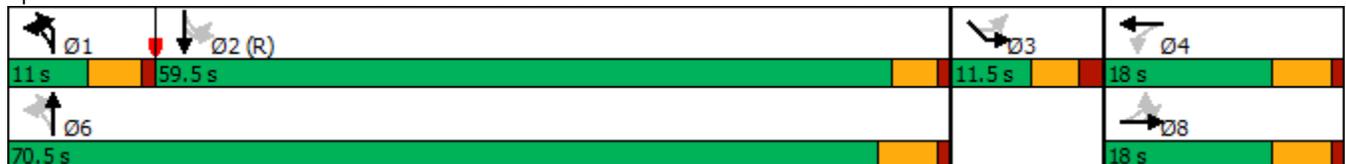


Lane Group	EBL2	EBT	WBL	WBT	NBL2	NBL	NBT	SBL2	SBL	SBT	SEL
Lane Configurations		↔		↔			↔↔		↖	↗	↘
Traffic Volume (vph)	94	0	1	0	12	96	977	3	1	638	1
Future Volume (vph)	94	0	1	0	12	96	977	3	1	638	1
Turn Type	Perm	NA	Perm	NA	pm+pt	pm+pt	NA	Perm	Perm	NA	Prot
Protected Phases		8		4	1	1	6			2	3
Permitted Phases	8		4		6	6		2	2		
Detector Phase	8	8	4	4	1	1	6	2	2	2	3
Switch Phase											
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	10.0	5.0	5.0	5.0	6.0
Minimum Split (s)	11.5	11.5	11.5	11.5	11.0	11.0	15.5	15.5	15.5	15.5	11.5
Total Split (s)	18.0	18.0	18.0	18.0	11.0	11.0	70.5	59.5	59.5	59.5	11.5
Total Split (%)	18.0%	18.0%	18.0%	18.0%	11.0%	11.0%	70.5%	59.5%	59.5%	59.5%	11.5%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.0	4.0	4.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
Lost Time Adjust (s)		0.0		0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)		5.5		5.5			5.5		4.5	4.5	5.5
Lead/Lag					Lead	Lead		Lag	Lag	Lag	
Lead-Lag Optimize?					Yes	Yes		Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	Min	C-Min	C-Min	C-Min	None
Act Effct Green (s)		11.7		11.7			68.1		58.1	58.1	6.0
Actuated g/C Ratio		0.12		0.12			0.68		0.58	0.58	0.06
v/c Ratio		0.75		0.02			0.81		0.02	0.79	0.30
Control Delay		70.2		38.8			17.1		10.5	24.7	3.2
Queue Delay		0.0		0.0			0.0		0.0	0.0	0.0
Total Delay		70.2		38.8			17.1		10.5	24.7	3.2
LOS		E		D			B		B	C	A
Approach Delay		70.2		38.8			17.1			24.7	3.2
Approach LOS		E		D			B			C	A

Intersection Summary

Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 22.6	Intersection LOS: C
Intersection Capacity Utilization 107.6%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street



Queues

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Lane Group	EBT	WBT	NBT	SBL	SBT	SEL
Lane Group Flow (vph)	126	4	1185	4	836	69
v/c Ratio	0.75	0.02	0.81	0.02	0.79	0.30
Control Delay	70.2	38.8	17.1	10.5	24.7	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.2	38.8	17.1	10.5	24.7	3.2
Queue Length 50th (ft)	78	2	189	1	420	0
Queue Length 95th (ft)	#165	13	238	6	#632	0
Internal Link Dist (ft)	269	168	98		438	447
Turn Bay Length (ft)				150		
Base Capacity (vph)	179	198	1455	253	1054	233
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.02	0.81	0.02	0.79	0.30

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Movement	EBL2	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	NBR2
Lane Configurations		↕			↕					↕		
Traffic Volume (vph)	94	0	22	1	0	1	2	12	96	977	3	3
Future Volume (vph)	94	0	22	1	0	1	2	12	96	977	3	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			3%					0%		
Total Lost time (s)		5.5			5.5					5.5		
Lane Util. Factor		1.00			1.00					0.95		
Frt		0.97			0.90					1.00		
Flt Protected		0.96			0.99					1.00		
Satd. Flow (prot)		1806			1661					3519		
Flt Permitted		0.76			0.94					0.57		
Satd. Flow (perm)		1436			1588					2016		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	0	24	1	0	1	2	13	104	1062	3	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	126	0	0	4	0	0	0	0	1185	0	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA			pm+pt	pm+pt	NA		
Protected Phases		8			4			1	1	6		
Permitted Phases	8			4				6	6			
Actuated Green, G (s)		11.7			11.7					67.0		
Effective Green, g (s)		11.7			11.7					67.0		
Actuated g/C Ratio		0.12			0.12					0.67		
Clearance Time (s)		5.5			5.5					5.5		
Vehicle Extension (s)		3.0			3.0					3.0		
Lane Grp Cap (vph)		168			185					1440		
v/s Ratio Prot										c0.05		
v/s Ratio Perm		c0.09			0.00					c0.50		
v/c Ratio		0.75			0.02					0.82		
Uniform Delay, d1		42.7			39.1					12.1		
Progression Factor		1.00			1.00					1.00		
Incremental Delay, d2		17.0			0.0					3.9		
Delay (s)		59.8			39.1					16.1		
Level of Service		E			D					B		
Approach Delay (s)		59.8			39.1					16.1		
Approach LOS		E			D					B		

Intersection Summary

HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	107.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

1: Main Street & Pike Street/Veranda Avenue & Astle Street & Old Main Street

09/05/2025



Movement	SBL2	SBL	SBT	SBR	SBR2	SEL	SER	SER2
Lane Configurations								
Traffic Volume (vph)	3	1	638	76	55	1	60	3
Future Volume (vph)	3	1	638	76	55	1	60	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%			-6%		
Total Lost time (s)		4.5	4.5			5.5		
Lane Util. Factor		1.00	1.00			1.00		
Frt		1.00	0.97			0.87		
Flt Protected		0.95	1.00			1.00		
Satd. Flow (prot)		1770	1815			1662		
Flt Permitted		0.23	1.00			1.00		
Satd. Flow (perm)		436	1815			1662		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	1	693	83	60	1	65	3
RTOR Reduction (vph)	0	0	0	0	0	66	0	0
Lane Group Flow (vph)	0	4	836	0	0	3	0	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	Perm	NA			Prot		
Protected Phases			2			3		
Permitted Phases	2	2						
Actuated Green, G (s)		57.0	57.0			4.8		
Effective Green, g (s)		57.0	57.0			4.8		
Actuated g/C Ratio		0.57	0.57			0.05		
Clearance Time (s)		4.5	4.5			5.5		
Vehicle Extension (s)		3.0	3.0			3.0		
Lane Grp Cap (vph)		248	1034			79		
v/s Ratio Prot			0.46			c0.00		
v/s Ratio Perm		0.01						
v/c Ratio		0.02	0.81			0.04		
Uniform Delay, d1		9.3	17.1			45.4		
Progression Factor		1.00	1.00			1.00		
Incremental Delay, d2		0.1	6.8			0.2		
Delay (s)		9.4	24.0			45.6		
Level of Service		A	C			D		
Approach Delay (s)			23.9			45.6		
Approach LOS			C			D		
Intersection Summary								

HCM 6th TWSC
2: Main Street & Old Main Street

09/05/2025

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	12	1130	0	10	769
Future Vol, veh/h	4	12	1130	0	10	769
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	2	0	0
Mvmt Flow	4	13	1228	0	11	836

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1668	614	0	0	1228
Stage 1	1228	-	-	-	-
Stage 2	440	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	89	440	-	-	575
Stage 1	244	-	-	-	-
Stage 2	622	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	86	440	-	-	575
Mov Cap-2 Maneuver	86	-	-	-	-
Stage 1	244	-	-	-	-
Stage 2	600	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	217	575
HCM Lane V/C Ratio	-	-	0.08	0.019
HCM Control Delay (s)	-	-	23	11.4
HCM Lane LOS	-	-	C	B
HCM 95th %tile Q(veh)	-	-	0.3	0.1

HCM 6th TWSC
 3: Main Street & Proposed Driveway

09/05/2025

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	4	6	7	1135	773	6
Future Vol, veh/h	4	6	7	1135	773	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	0	0
Mvmt Flow	4	7	8	1234	840	7

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1477	424	847	0	-	0
Stage 1	844	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	117	579	786	-	-	-
Stage 1	382	-	-	-	-	-
Stage 2	491	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	113	579	786	-	-	-
Mov Cap-2 Maneuver	113	-	-	-	-	-
Stage 1	370	-	-	-	-	-
Stage 2	491	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.3	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	786	-	219	-	-
HCM Lane V/C Ratio	0.01	-	0.05	-	-
HCM Control Delay (s)	9.6	0.2	22.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-