Traffic Impact and Access Study

Planned Residential Development
11 Cross Street
Methuen, MA

November 10, 2025

Prepared for:
City of Methuen

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1 Executive Summary

Fuss & O'Neill has prepared this study to assess the traffic impact and to evaluate the access requirements of a proposed Planned Residential Development (PRD) on Cross Street, north of Pelham Street in Methuen, MA. This report has been specifically prepared under the proposed Cross Street Planned Residential Development District (CSPRDD) zoning.

This report identifies existing traffic operating parameters on key roadways and intersections within the study area, evaluates the anticipated traffic volume increases as a result of the proposed PRD, analyzes the PRD's traffic-related impacts, determines the PRD's access/egress requirements and identifies appropriate mitigating measures designed to minimize the traffic-related impacts created by the PRD. The following provides a brief summary of the PRD and the study's findings.

PROJECT DESCRIPTION

The site consists of a single parcel of land consisting of approximately 5.32 acres located on Cross Street in Methuen, Massachusetts. There is currently a single, vacant residential building on the site.

To the south of the property, along Cross Street, there exist commercial uses. Directly to the west of the property, across Cross Street, is parking for an automobile dealership. The site of the PRD is bordered to the north by residential homes and wooded areas. East of the site is the Interstate 93 (I-93) interchange with Route 213.

The current development proposal consists of construction of three (3) buildings with 65 residential apartment units per building (maximum under proposed zoning). The apartments will include:

- At least 30% one-bedroom units
- At least 30% two-bedroom units
- At least 10% three-bedroom units

One of the buildings (Building 2, closest to the neighboring five story hotel) will have parking underneath for 50 vehicles, which will make it (5) stories tall while the other two buildings will be four (4) stories tall. A total of 251 parking spaces will be provided for the site.

Figure 1 shows the site location in relation to the surrounding area.

STUDY METHODOLOGY

This study has been prepared in three stages. The first stage involved an assessment of existing conditions within the study area and included an inventory of roadway geometrics, pedestrian

and bicycle facilities and public transportation services. Existing traffic counts were performed at the study area intersections.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the proposed PRD were assessed along with future traffic demands due to expected traffic growth independent of the proposed PRD. In accordance with Massachusetts Department of Transportation (MassDOT) and Executive Office of Environmental Affairs (EEA) guidelines, the year 2032 was selected as the basis for modeling future transportation impacts of the proposed PRD to reflect a seven-year planning horizon.

Figure 1
Site Location Map

The third stage of the study presents and evaluates measures to address traffic issues, if any, and necessary improvements to accommodate the PRD.

STUDY AREA

Roadway geometry and traffic control information was collected for the following intersections:

- Pelham Street, Ranger Plaza Driveway and the I-93 northbound on/off ramps,
- Pelham Street and Baldwin Street,
- Pelham Street, Cross Street and the I-93 southbound on/off ramps,
- Pelham Street, Danton Drive and Aegean Drive
- Cross Street and existing site driveway, and

- Cross Street and Hampshire Street.

EXISTING CONDITIONS

Evaluation of existing conditions within the study area includes a description of roadway geometrics, traffic constraints, land uses at the intersections, and quantification of traffic volumes.

Existing Traffic Volumes

To establish base traffic conditions within the study area, manual turning movement and vehicle classification counts were obtained in May 2024 and July 2025. Peak-period turning movement counts were conducted during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:30 PM) periods. Daily traffic counts were conducted on Cross Street for a two (2) day weekday period using automatic traffic recorders (ATR).

The traffic-volume data gathered as part of this study was collected during the months of May 2024 and July 2025. Data from the MassDOT was reviewed to determine the monthly variations of the traffic volumes. Seasonal adjustment factors compiled by MassDOT were reviewed. Based on the MassDOT data, May volumes represent higher than average month conditions, and the July volumes are approximately 6% higher than average month volumes. Therefore, the May and July count data was used to represent average month conditions.

Pelham Street was recorded to carry approximately 20,250 vehicles per day (vpd) west of the I-93 northbound ramps on a weekday. During the weekday morning peak hour, approximately 1,505 vehicles per hour (vph) were recorded, and during the weekday evening peak hour, approximately 1,432 vph were recorded.

Cross Street was recorded to carry approximately 8,600 vpd north of Pelham Street on a weekday. During the weekday morning peak hour, approximately 612 vph were recorded, and during the weekday evening peak hour, approximately 682 vph were recorded.

Based on a review of the existing conditions analysis, it was determined that the capacity analysis model results for the weekday morning peak hour did not represent actual observed conditions. Actual vehicle queues in the eastbound direction on Pelham Street at Cross Street extended a fair distance to the west, almost to Aegean Drive. A review of the video taken when the counts were collected showed that the volume of traffic being processed was less than the actual demand for eastbound traffic flow. Therefore, eastbound Pelham Street traffic flows were adjusted upward to be representative of actual vehicular demand by 300 vehicles per hour during the weekday morning peak hour. This increase was carried through out the Pelham Street corridor for the weekday morning peak hour.

Vehicle Speeds

Existing speed data for Cross Street was also collected using the ATRs. The average speed of vehicles travelling northbound or southbound on Cross Street was found to be 37 and 38 mph, respectively. The 85th percentile speed was found to be 42 mph for northbound vehicles and 43 for southbound vehicles. The 85th percentile speed is the speed at which sight distances are evaluated.

Motor Vehicle Crash Data

Motor vehicle crash data for the study area intersections were obtained from the MassDOT Impact Portal for 2017 through 2021. The motor vehicle crash data was reviewed to determine crash trends in the study area. Seventy-eight (78) crashes were reported at the study area intersections. Of the seventy-eight (78) crashes, twenty-two (22) crashes were reported at the intersection of Pelham Street, Ranger Plaza Driveway and I-93 northbound ramps, fourteen (14) were reported at the intersection of Pelham Street and Baldwin Street, twenty-five (25) crashes were reported at the intersection of Pelham Street, Cross Street and the I-93 southbound ramps, eight (8) crashes were reported at the intersection of Cross Street and Hampshire Street. No fatalities were reported during the five-year interval. No crashes were reported at the intersection of Cross Street and site driveway.

Public Transportation

Public transportation services are provided within the study area by the Merrimack Valley Transit (MeVa). The MeVa operates bus service to the study area by Bus Route 10 – Village Mall via Broadway. This route runs from the Village Mall on Route 28 to the McGovern Transportation Center. Within the study area, the route traverses the eastern portion of Pelham Street with a designated stop at the Pelham Street Park & Ride. This is the closest designated stop to the site, approximately ½ mile. Bus Route 10 bus service is provided Monday through Friday from 5:15 AM to 10:00 PM, Saturday from 6:45 AM to 6:45 PM and Sunday from 9:00 AM to 6:00 PM.

Planned Roadway Improvements

Officials for MassDOT and the City of Methuen were contacted regarding roadway improvements planned for the study area intersections. No improvements are currently planned in the vicinity of the site or at the study area intersections.

PROBABLE IMPACTS OF THE PROPOSED PRD

No-Build Traffic Volumes

The Central Transportation Planning Staff (CTPS) Department was queried requesting municipal growth rates for the City of Methuen. An email was received from CTPS providing the Compound Average Annual Growth Rate (CAGR) from 2019 to 2050 for the City of Methuen. Based on the data, a one (1) percent rate was used.

The City of Methuen was contacted to identify specific planned developments. Based on these discussions, there was one (1) project that was identified that could impact traffic volumes in the study area. This project is:

- Danton Drive (60,200 sf warehouse)

No traffic study was prepared for the project. Traffic expected to be generated by the project was obtained from the ITE Trip Generation Manual.

Build Traffic Volumes

The current development proposal under the CSPRDD zoning consists of construction of one hundred and ninety-five (195) dwelling units in three (3) buildings. Site generated traffic for the proposed PRD was based on trip-generation data published by the ITE in the *Trip Generation* manual[1]. The trip generation data for Land Use Code (LUC) 221 – Multifamily Housing (Mid-Rise) was reviewed.

On a typical weekday, the PRD is expected to generate a total of 870 vehicle trips (435 vehicles entering and 435 vehicles exiting). During the weekday morning peak hour, a total of 74 vehicle trips (17 vehicles entering and 57 vehicles exiting) would be expected. During the weekday evening peak hour, a total of 73 vehicle trips (47 vehicles entering and 26 vehicles exiting) would be expected.

TRAFFIC OPERATIONS ANALYSIS

To assess the impacts of the proposed PRD on the roadway network, traffic operations analyses were performed at the study area intersections under 2025 Existing, 2032 No-Build and 2032 Build conditions. These analyses indicate that the proposed PRD will not result in a significant impact on traffic operations at the study area intersections over No-Build conditions.

The Pelham Street intersection with the Ranger Plaza Driveway and the I-93 northbound ramps is projected to operate at level of service (LOS) F under future No-Build weekday morning peak hour conditions and at LOS E during the weekday evening peak hour (without the project). The addition of site generated traffic does not change the level of service and there is a very small increase in the overall intersection volume to capacity (v/c) ratio.

The Pelham Street intersection with the Cross Street and the I-93 southbound ramps is projected to operate at LOS C under future No-Build weekday morning and weekday evening peak hour (without the PRD). The addition of site generated traffic has a very small impact on the overall intersection volume to capacity (v/c) ratio.

The capacity analyses performed for the site driveway intersection with Cross Street indicates that overall, the critical movements at the intersection, shared left and right-turns out of the

[1] *Trip Generation,* Twelfth Edition; Institute of Transportation Engineers; Washington, DC; 2025.

site will operate at acceptable levels of service, with minor delays for the critical movements.

RECOMMENDATIONS

The final phase of the analysis process is to identify the mitigation measures necessary to minimize the impact of the proposed PRD on the transportation system. The proponent has made a commitment to implement the mitigation measures listed below.

Proposed Site Driveway

The proposed site driveway should consist of one entering and one exiting lane for a total minimum driveway width of twenty-four (24) feet. The driveway approach should be placed under STOP sign control with a Stop bar on the exiting lane. To maintain sight distances for the measured 85th percentile speeds, it is recommended that a sight triangle be established along the site frontage on Cross Street, in both directions from a point fifteen (15) feet back of the mainline travelled way and extending to each of the corners of the site along Cross Street. Within this triangle, any existing vegetation should be cut-back, and any plantings and site signage should be designed to be low to not impede sight distances.

Off-Site Mitigation

If the CSRDD is adopted, and as part of the approval, the Applicant will enter into a Memorandum of Agreement with the City of Methuen to implement the following measures, which based on the analysis results, indicates that the queuing on Pelham Street eastbound at Cross Street during the morning peak hour will be reduced:

Pelham Street intersections with the Ranger Plaza Driveway/I-93 Northbound Ramps and with Cross Street/I-93 Southbound Ramps

Overall, the existing equipment at the intersections are in good condition and appear to have been recently upgraded. The two State Owned intersections at the Interstate 93 Ramps have adequate capacity within the existing Controller Cabinets to replace the existing loop detection with video detection. Pavement conditions along Pelham Street are variable with signs of rutting due to heavy use and starting and stopping. Pedestrian signal equipment is variable and significantly dated at the two Interstate 93 Ramp intersections. Field review found the traffic signal controllers at the two ramps were programmed for coordination in accordance with record plans obtained from the cabinets.

Fuss & O'Neill recommends the following upgrades for consideration:

- Pelham Street at Cross Street and I-93 Southbound Ramps
  - Replace the existing loop detection with 360° Video Detection.
  - Re-evaluate coordination plans.
  - Replace the pedestrian signal heads and pushbuttons for the Cross Street crossing.

- Replace the five-section eastbound signal head and backplates (with retroreflective borders) on the southeastern corner.
- Timing pattern to run coordinated with the signal at the I-93 northbound ramps
- Restripe the Pelham Street eastbound approach to provide an exclusive left-turn lane and two through lanes permitting right turns

- Pelham Street at Ranger Plaza Driveway and I-93 Northbound Ramps
  - Replace the existing loop detection with 360° Video Detection.
  - Re-evaluate coordination plans.
  - Replace the pedestrian signal heads and pushbuttons for the Ranger Plaza crossing.
  - Replace the three-section westbound signal head and backplates (with retroreflective borders) on the northwestern corner.
  - Replace the visor for the green indication of the eastbound signal head on the southeastern corner.
  - Timing pattern to run coordinated with the signal at the I-93 southbound ramps

Pelham Street, Aegean Drive and Danton Drive

Fuss & O'Neill recommends the following signal upgrades:

- Pelham Street at Aegean Drive and Danton Drive
  - Replace the pushbuttons at the southwest and northwest corners to establish ADA compliance.
  - Re-evaluate detection zones and time of day plans.

Transportation Demand Management

Regularly scheduled public transportation services are not currently available to the site of the Proposed PRD or along Pelham Street. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following Transportation Demand Management (TDM) measures will be implemented as a part of the PRD:

- An on-site transportation coordinator (TC) will be assigned to coordinate the traffic reduction program for the PRD,
- The TC will work with the City of Methuen, MassDOT and the MVRPC to develop the elements of the traffic reduction program for the PRD,
- The TC will disseminate public transit schedules to tenants of the building (MeVa Bus schedules),
- The TC will electronically disseminate a newsletter identifying carpooling opportunities and available TDM measures and incentives,
- The TC, in association with available ride matching services (such as Ride Match (https://massridematch.org/)) to establish potential carpooling and van pooling programs,

- Sidewalks and pedestrian areas will be provided within the PRD,
- Designating one parking space for low-emission vehicles closer to building entrances to promote the use of clean fuel vehicles,
- Explore potential accommodations for a car sharing service (e.g., Zip Car), and
- The PRD will include provision of safe, secure, weather-protected bicycle racks and/or storage lockers. Signs will be provided at appropriate locations within the PRD directing bicyclists to the bicycle storage facilities.

Conclusion

The proposed PRD is to be located at 11 Cross Street. On a typical weekday at full build out, the PRD is expected to generate a total of 870 vehicle trips (435 vehicles entering and 435 vehicles exiting) under the CSPRDD zoning (maximum of 195 dwelling units). During the weekday morning peak hour, a total of 76 vehicle trips (17 vehicles entering and 59 vehicles exiting) would be expected. During the weekday evening peak hour, a total of 78 vehicle trips (48 vehicles entering and 30 vehicles exiting) would be expected.

Capacity analyses were performed for each of the study area intersections for 2024 Existing, 2032 No-Build and 2032 Build conditions. Based on the analyses performed, there is no significant change in level of service from No-Build to Build conditions at the study area intersections.

Review of the proposed PRD and access plan shows that in relation to roadway capacity, traffic safety, and traffic impacts upon the surrounding roadway network, the proposed PRD will meet safety standards and have a minimal impact on existing traffic conditions. With the proposed access, in conjunction with the mitigation measures described above and maintaining sight distances from Cross Street (clear sight lines along frontage), safe and efficient access can be provided to the clienteles of the proposed PRD and to the motoring public in the area.

2 Existing Traffic Conditions

The evaluation of the proposed PRD's transportation impacts requires a complete understanding of the existing transportation system within the study area. Existing conditions include roadway geometrics, traffic control, daily and peak hour traffic flows, public transportation, and vehicular crash data. Each of these are discussed below.

2.1 Study Area

Based on a review of the anticipated trip generation and trip distribution for the proposed development, a local study area was established. The study area includes the following intersections:

- Pelham Street, Ranger Plaza Driveway and the I-93 northbound on/off ramps,
- Pelham Street and Baldwin Street,
- Pelham Street, Cross Street and the I-93 southbound on/off ramps,
- Pelham Street, Danton Drive and Aegean Drive
- Cross Street and existing site driveway, and
- Cross Street and Hampshire Street.

2.2 Field Survey

A comprehensive field inventory of the proposed site was conducted in May 2024. The inventory included collection of existing roadway geometrics, traffic volumes, and safety data for the existing study area intersections and site access driveway locations. Traffic volumes were measured by means of automatic traffic recorder (ATR) counts and substantiated by manual turning movement counts (TMCs) conducted at the study area intersections.

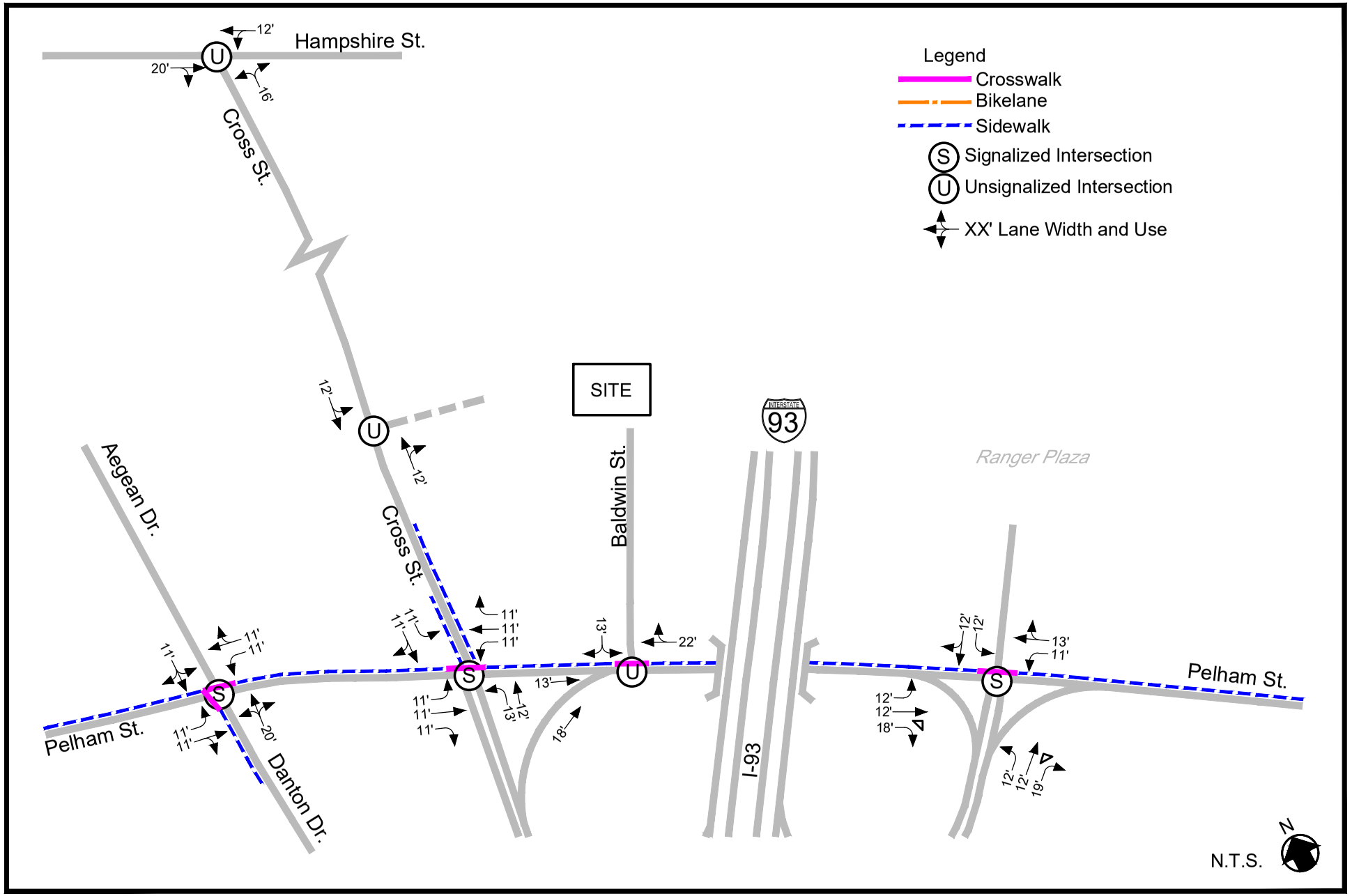
2.3 Geometrics

Primary study area roadways are described below. Figure 2 presents a summary of existing lane uses and traffic control.

Roadways

Pelham Street

Pelham Street is under the jurisdiction of the City of Methuen, except for in the vicinity of the Interstate 93 (I-93) ramps, where it is under the jurisdiction of the Massachusetts Department of Transportation (MassDOT). Pelham Street is functionally classified as an Urban Minor Arterial. Pelham Street generally provides one travel lane per direction connecting Hampshire Road to the west with Osgood Street to the east. Travel lanes are separated by a double yellow centerline, with marked shoulders provided. The posted speed limit in the vicinity of Cross Street is 35 mph. Illumination is provided by luminaries mounted on poles. The pavement is in fair condition. There are sidewalks on the north side of Pelham Street within the study area. Land use along Pelham Street consists primarily of commercial uses.



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VERT.:	
DATUM:	
HORZ.:	-
VERT.:	-

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Proposed Residential

Existing Lane Use, Travel Lane Width and Pedestrian Facilities

Methuen MA

PROJ. No.: 20240957

Figure 2

Cross Street

Cross Street is under the jurisdiction of the City of Methuen and is functionally classified as an Urban Major Collector. Cross Street runs in a general north/south direction from Pelham Street northerly to Hampshire Road. In the vicinity of the site, Cross Street provides one travel lane per direction. Travel lanes are separated by a double yellow centerline, with marked shoulders provided. In the vicinity of the site, the posted speed limit is 35 miles per hour (mph). Illumination is provided by luminaries mounted on poles. The roadway pavement is generally in good condition. There is a sidewalk along the east side of Cross Street from Pelham Street northerly to the PRD site. There are no bicycle facilities on Cross Street. Land use along Cross Street consists of a mix of residential and commercial properties.

Baldwin Street

Baldwin Street is under the jurisdiction of the City of Methuen and is functionally classified as Local Street. Baldwin Street provides one travel lane per direction and is approximately 550 feet in length connecting Pelham Street with several commercial properties to the north. There is no posted speed limit on Baldwin Street. The pavement is in fair condition. There are no sidewalks on Baldwin Street. Land use along Baldwin Street consists of commercial properties.

Intersections

Pelham Street, Ranger Plaza Driveway and I-93 Northbound Ramps

This signalized intersection is under the jurisdiction of the MassDOT. Pelham Street forms the east and west legs, the Ranger Plaza driveway forms the north leg and the I-93 northbound on and off ramps form the south leg. The Pelham Street eastbound approach consists of an exclusive left-turn lane, a through lane and a channelized right-turn lane. The Pelham Street westbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. The Ranger Plaza driveway southbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. The I-93 northbound off ramp approach consists of an exclusive left-turn lane, a through lane and a channelized right-turn lane. The Pelham Street exclusive left-turn lanes generally provide 150 feet (ft) of storage for queued vehicles. A sidewalk is provided along the north side of Pelham Street. Crosswalks exist across the Ranger Plaza driveway approach to the intersection. The intersection is controlled by a three-phase traffic signal with pedestrian activation. Land use at the intersection consists of the I-93 interchange and various commercial uses.

Pelham Street and Baldwin Street

This unsignalized intersection is under the jurisdiction of the MassDOT. Pelham Street forms the east and west legs and Baldwin Street forms the north leg. The Pelham Street eastbound and westbound approaches each consist of single through lanes permitting left- or right-turn movements. The Baldwin Sreet approach consists of a single lane permitting left or right-turn movements. Sidewalks are present on the north side of Pelham Street. The Baldwin Street

operates under STOP-sign control. A crosswalk exists across the Baldwin Street approach. Land use at the intersection consists of commercial uses and the I-93 interchange.

Pelham Street, Cross Street and I-93 Southbound Ramps

This signalized intersection is under the jurisdiction of the MassDOT. Pelham Street forms the east and west legs, Cross Street forms the north leg and the I-93 southbound on and off ramps form the south leg. The Pelham Street eastbound approach consists of an exclusive left-turn lane, a through lane and an exclusive right-turn lane. The Pelham Street westbound approach consists of an exclusive left-turn lane, a through lane and an exclusive right-turn lane. The Cross Street southbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. The I-93 southbound off ramp approach consists of an exclusive left-turn lane, a through lane and a channelized right-turn lane. The Pelham Street exclusive left-turn lanes generally provide 160 ft of storage for queued vehicles. A sidewalk is provided along the north side of Pelham Street and both sides of Cross Street at the intersection. Crosswalks exist across the Cross Street approach to the intersection. The intersection is controlled by a three-phase traffic signal with pedestrian activation. Land use at the intersection consists of the I-93 interchange, wooded land and various commercial uses.

Pelham Street, Aegean Drive and Danton Drive

This signalized intersection is under the jurisdiction of the City of Methuen. Pelham Street forms the east and west legs, Aegean Drive forms the north leg and Danton Drive forms the south leg. The Pelham Street eastbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. The Pelham Street westbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. The Aegean Drive southbound approach consists of a single lane permitting all movements. The Danton Drive approach consists of a wide single lane permitting all movements. The Pelham Street exclusive left-turn lanes generally provide 110 ft) of storage (eastbound) and 250 ft of storage (westbound) for queued vehicles. A sidewalk is provided along the north side of Pelham Street and the west side of Danton Drive at the intersection. Crosswalks exist across the Aegean Drive and Pelham Street eastbound approach to the intersection. The intersection is controlled by a two-phase traffic signal with pedestrian activation. Land use at the intersection consists of the commercial uses, wooded land and a residential property.

Cross Street and Existing Site Driveway

This unsignalized intersection is under the jurisdiction of the City of Methuen. Cross Street forms the north and south legs and the existing driveway forms the east leg. The Cross Street northbound and southbound approaches each consist of single through lanes permitting left- or right-turn movements. The driveway approach, current;ly gated closed, consists of a single lane permitting left or right-turn movements. The driveway operates under STOP control. Land use at the intersection consists of commercial uses.

Cross Street and Hampshire Street

This unsignalized intersection is under the jurisdiction of the City of Methuen. Cross Street forms the west and south legs and Hampshire Street forms the east leg. All approaches consist of single lanes permitting left- or right-turn movements. A raised island separates flow entering/exiting Cross Street at Hampshire Street. The Cross Street northbound approach operates under STOP-sign control. Land use at the intersection consists of residential properties.

2.4 Traffic Volumes

Existing Traffic Volumes

To establish base traffic conditions within the study area, manual turning movement and vehicle classification counts were obtained in May 2024. Peak-period turning movement counts were conducted during the weekday morning peak period (7:00 to 9:00 AM) and weekday evening period (4:00 to 6:30 PM) on Thursday February 27, 2025, at the following intersections:

- Pelham Street, Ranger Plaza Driveway and the I-93 northbound on/off ramps,
- Pelham Street and Baldwin Street,
- Pelham Street, Cross Street and the I-93 southbound on/off ramps,
- Cross Street and existing site driveway, and
- Cross Street and Hampshire Street.

The intersection of Pelham Street with Aegean Drive and Danton Drive was added after the initial scope was determined for the traffic study and manual turning movement counts for this intersection were obtained in July 2025 for the weekday morning peak period (7:00 to 9:00 AM) and weekday evening period (4:00 to 6:30 PM).

Daily traffic counts were conducted on Cross Street, north of the existing site driveway for a two-day period using automatic traffic recorders (ATR) on Tuesday May 21, 2024 and Wednesday May 22, 2025.

Analysis of the peak-period traffic counts indicated that the weekday morning commuter peak hour generally occurs between 7:45 and 8:45 AM and the weekday evening commuter peak hour generally occurs between 4:00 and 5:00 PM. The traffic count worksheets are provided in the Appendix.

Based on a review of the existing conditions analysis, it was determined that the capacity analysis model results for the weekday morning peak hour did not represent actual observed conditions. Actual vehicle queues in the eastbound direction on Pelham Street at Cross Street extended a fair distance to the west, almost to Aegean Drive. A review of the video taken when the counts were collected showed that the volume of traffic being processed was less than the actual demand for eastbound traffic flow. Therefore, eastbound Pelham Street traffic flows were adjusted upward to be representative of actual vehicular demand by 300 vehicles

per hour during the weekday morning peak hour. This increase was carried through out the Pelham Street corridor for the weekday morning peak hour.

Seasonal Adjustment

The traffic-volume data gathered as part of this study was collected during the months of May 2024 and July 2025. Data from the MassDOT was reviewed to determine the monthly variations of the traffic volumes. Seasonal adjustment factors compiled by MassDOT were reviewed. Based on the MassDOT data, May volumes represent higher than average month conditions, and the July volumes are approximately 6% higher than average month volumes. Therefore, the May and July count data was used to represent average month conditions.

The 2024 existing weekday daily and peak-hour traffic volumes are summarized in Table 1. Figures 3 and 4 show the baseline 2024 Existing weekday morning and weekday evening peak hour traffic volumes, respectively. The seasonal worksheets are provided in the Appendix.

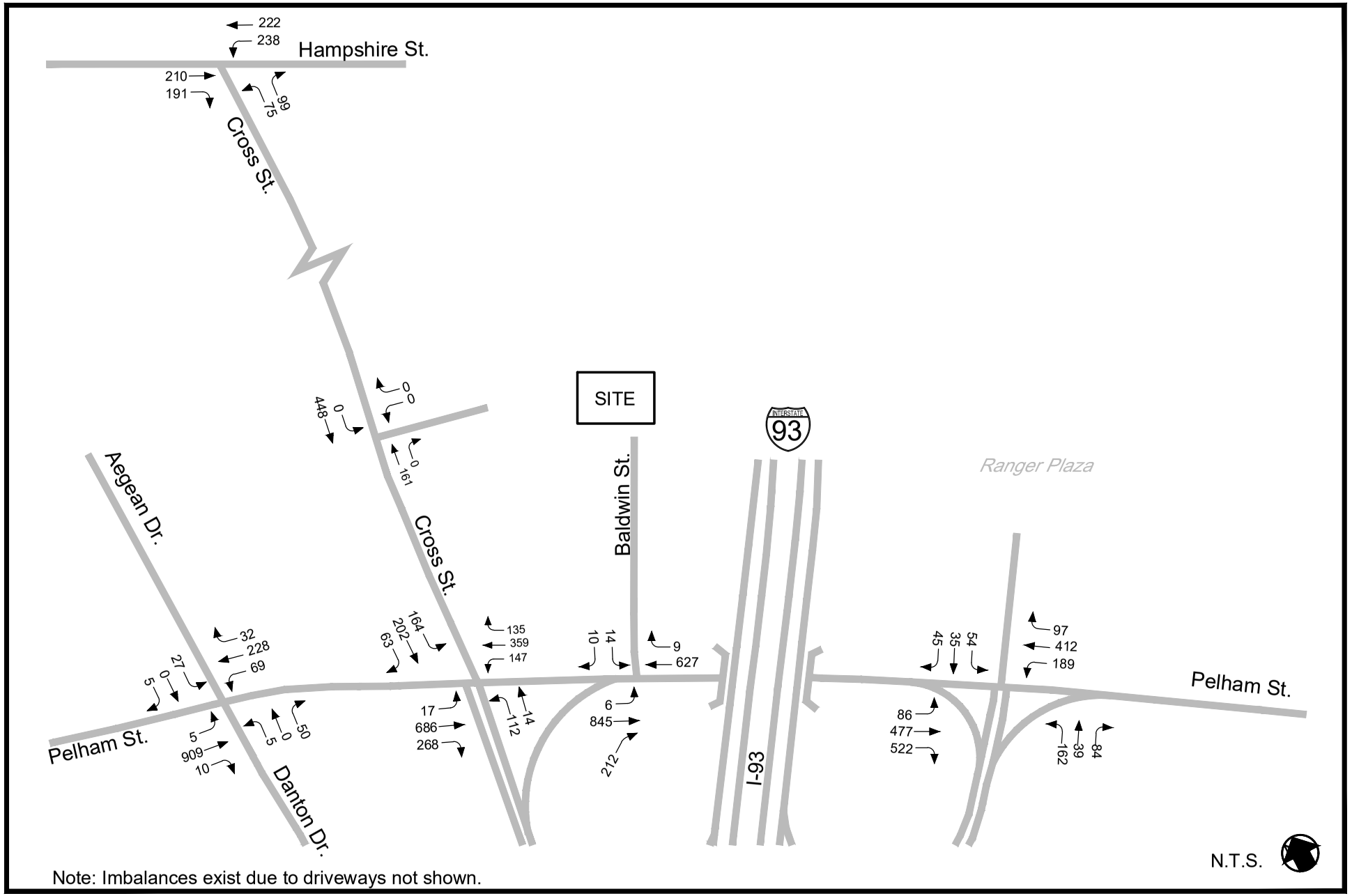
TABLE 1
EXISTING WEEKDAY TRAFFIC-VOLUME SUMMARY[a]

Location	Weekday Traffic Volume[b]	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
		Traffic Volume[c]	K Factor[d]	Directional Distribution[e]	Traffic Volume	K Factor	Directional Distribution
Cross Street, north of Existing Site Driveway	20,250	1,505	7.4	58.8% EB	1,432	7.1	41.1% WB
Pelham Street, west of I-93 Northbound Ramps	8,600	612	7.1	73.2% SB	682	7.9	56.6% NB

[a]Two-way traffic volume
[b]Daily traffic expressed in vehicles per day.
[c]Expressed in vehicles per hour.
[d]Percent of daily traffic volumes which occurs during the peak hour.
[e]Percent of peak-hour volume in the predominant direction of travel.
NB = northbound; SB = southbound; EB = eastbound; WB = westbound.

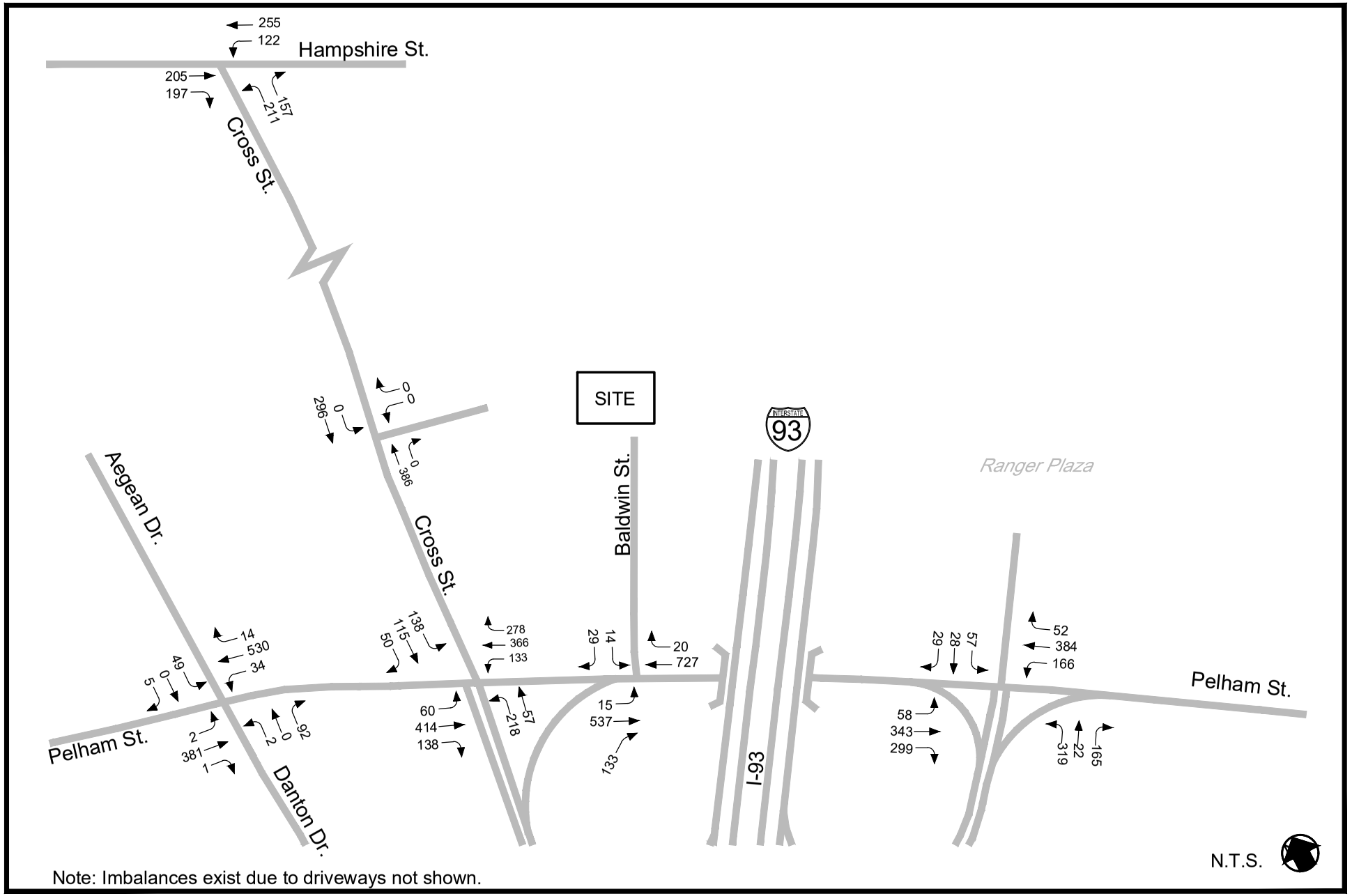
Pelham Street was recorded to carry approximately 20,250 vehicles per day (vpd) west of the I-93 northbound ramps on a weekday. During the weekday morning peak hour, approximately 1,505 vehicles per hour (vph) were recorded, and during the weekday evening peak hour, approximately 1,432 vph were recorded.

Cross Street was recorded to carry approximately 8,600 vpd north of Pelham Street on a weekday. During the weekday morning peak hour, approximately 612 vph were recorded, and during the weekday evening peak hour, approximately 682 vph were recorded.



Note: Imbalances exist due to driveways not shown.

SCALE: HORZ.: NOT TO SCALE VERT.: DATUM: HORZ.: - VERT.: -	FUSS & O'NEILL 600 UNICORN PARK DR, SUITE 17 WOBURN, MA 01801 781.932.3201 www.fando.com	Proposed Residential 2024 Existing Weekday Evening Peak Hour Traffic Volumes Methuen MA	PROJ. No.: 20240957 Figure 3



Note: Imbalances exist due to driveways not shown.

SCALE: HORZ.: NOT TO SCALE VERT.: DATUM: HORZ.: - VERT.: -	FUSS & O'NEILL 600 UNICORN PARK DR, SUITE 17 WOBURN, MA 01801 781.932.3201 www.fando.com	Proposed Residential 2024 Existing Weekday Evening Peak Hour Traffic Volumes Methuen MA	PROJ. No.: 20240957 Figure 4

2.5 Vehicle Speeds

Existing speed data for Cross Street was also collected using the ATRs. The posted speed limit on Pelham Street is 35 miles per hour (mph) and 35 mph on Cross Street in the site vicinity. The speed data is summarized in Table 3.

As shown in Table 2, the average speed of vehicles travelling northbound or southbound on Cross Street was found to be 37 and 38 mph, respectively. The 85th percentile speed was found to be 42 mph for northbound vehicles and 43 for southbound vehicles.

The 85th percentile speed is the speed at which sight distances are evaluated.

TABLE 2
OBSERVED VEHICLE SPEEDS

Direction	Posted Speed Limit (mph)	Average Observed Speed[a] (mph)	85th Percentile Speed (mph)
Cross Street Northbound	35	37	42
Cross Street Southbound	35	38	43

[a]Based on speed data compiled on February 27 through March 1, 2025.

2.6 Motor Vehicle Crash Data

Motor vehicle crash data for the study area intersections were obtained from the MassDOT Impact Portal for 2017 through 2021. The motor vehicle crash data was reviewed to determine crash trends in the study area. Seventy-eight (78) crashes were reported at the study area intersections. Of the seventy-eight (78) crashes, twenty-two (22) crashes were reported at the intersection of Pelham Street, Ranger Plaza Driveway and I-93 northbound ramps, fourteen (14) were reported at the intersection of Pelham Street and Baldwin Street, twenty-five (25) crashes were reported at the intersection of Pelham Street, Cross Street and the I-93 southbound ramps, eight (8) crashes were reported at the intersection of Cross Street and Hampshire Street. No fatalities were reported during the five-year interval. No crashes were reported at the intersection of Cross Street and site driveway. The crash data is summarized in Table 3 and included in the Appendix.

TABLE 3
MOTOR VEHICLE CRASH DATA SUMMARY[a]

Scenario	Location: Pelham Street, Ranger Plaza Driveway and I-93 Northbound Ramps	Pelham Street and Baldwin Street	Pelham Street, Cross Street and I-93 Southbound Ramps	Pelham Street, Aegean Drive and Danton Drive	Cross Street and Hampshire Road	Cross Street and Site Driveway
Year[b]:						
2017	8	3	9	2	3	0
2018	7	5	9	3	3	0
2019	4	3	4	1	1	0
2020	3	1	2	1	1	0
2021	0	2	1	2	0	0
Total	22	14	25	9	8	0
Average[b]	4.4	2.8	5.0	1.8	1.6	0.0
Crash Rate[c]	0.50	0.41	0.55	0.31	0.35	0.00
Significant[d]	No	No	No	No	No	No
Type:						
Angle	15	10	10	1	2	0
Rear-End	2	2	10	7	4	0
Head-On	3	0	0	0	0	0
Sideswipe	1	1	3	0	0	0
Pedestrian	0	0	0	0	0	0
Bicycle	0	0	0	0	0	0
Single Vehicle Crash	1	0	2	1	2	0
Unknown	0	1	0	0	0	0
Total	22	14	25	9	8	0
Time of Day:						
Morning (7 to 9 AM)	2	0	2	0	0	0
Evening (4 to 6 PM)	0	5	3	3	3	0
Remainder of Day	20	9	20	6	5	0
Total	2	14	25	9	8	0
Pavement Conditions:						
Dry	17	10	21	8	4	0
Wet	0	4	3	1	3	0
Snow/Ice/Slush	0	0	0	0	1	0
Unknown	0	0	1	0	0	0
Total	0	14	25	9	8	0
Severity:						
Property Damage	15	12	20	6	6	0
Personal Injury	7	2	5	3	2	0
Fatal Accident	0	0	0	0	0	0
Unknown	0	0	0	0	0	0
Total	22	14	25	9	8	0

[a]Source: MassDOT Crash Portal.
[b]Average crashes over analysis period.
[c]Crash rate per million entering vehicles (mev).
[d]District 4 signalized intersections are significant if rate >0.73 crashes per million vehicles and unsignalized intersections are significant if rate >0.57 crashes per million vehicles.

2.7 Public Transportation

Public transportation services are provided within the study area by the Merrimack Valley Transit (MeVa). The MeVa operates bus service to the study area by Bus Route 10 – Village Mall via Broadway. This route runs from the Village Mall on Route 28 to the McGovern Transportation Center. Within the study area, the route traverses the eastern portion of Pelham Street with a designated stop at the Pelham Street Park & Ride. This is the closest designated stop to the site, approximately ½ mile. Bus Route 10 bus service is provided Monday through Friday from 5:15 AM to 10:00 PM, Saturday from 6:45 AM to 6:45 PM and Sunday from 9:00 AM to 6:00 PM. The MeVa schedule information is included in the Appendix.

2.8 Planned Roadway Improvements

Officials for MassDOT and the City of Methuen were contacted regarding roadway improvements planned for the study area intersections. No improvements are currently planned in the vicinity of the site or at the study area intersections.

3 2032 No-Build and Build Traffic Conditions

To determine the impact of site-generated traffic volumes on the roadway network under future conditions, baseline traffic volumes in the study area were projected to the year 2032. Traffic volumes on the roadway network at that time, in the absence of the proposed PRD, would include existing traffic, new traffic due to general background traffic growth, and traffic related to specific developments by others expected to be completed by 2032. Consideration of these factors resulted in the development of 2032 No-Build traffic volumes. Anticipated site-generated traffic volumes were then superimposed upon these No-Build traffic flow networks to develop 2032 Build conditions.

3.1 No-Build Traffic Volumes

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

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

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

Background Traffic Growth

The Central Transportation Planning Staff (CTPS) Department was queried requesting municipal growth rates for the City of Methuen. An email was received from CTPS providing the following Compound Average Annual Growth Rate (CAGR) from 2019 to 2050 for the City of Methuen, which is presented in Table 4.

TABLE 4
COMPOUND AVERAGE ANNUAL GROWTH RATE (CAGR) FROM BOSTON REGION MPO (CTPS) FOR 2019 TO 2050

Roadway Type	Methuen CAGR
Highway	0.175%
Major Arterial	0.2.64%
Minor Arterial and Collector	0.322%
All Facilities (including Local Roads)	0.230%

Source: Central Transportation Planning Department, 2019 to 2050.

The future 2032 baseline traffic volumes were projected using a 1.0% growth rate.

Specific Development by Others

Traffic volumes generated by the specific local developments by others were included in the 2032 No-Build condition. The City of Methuen was contacted to identify specific planned developments. Based on these discussions, there was one (1) project that was identified that could impact traffic volumes in the study area. This project is:

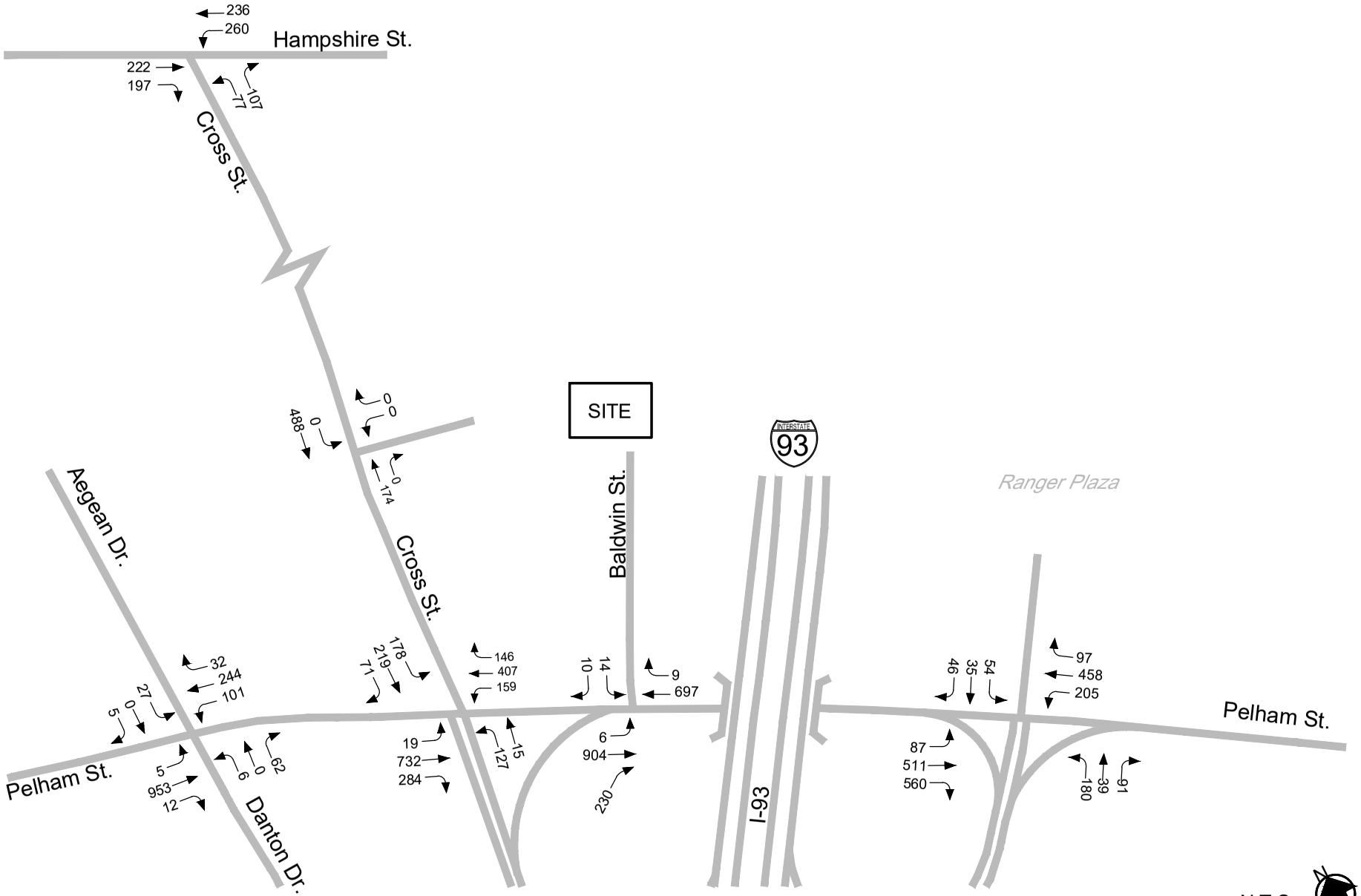
- Danton Drive (60, 200 sf warehouse)

No traffic study was prepared for the project. Traffic expected to be generated by the project was obtained from the ITE Trip Generation Manual.

The background project traffic generation worksheets are included in the Appendix for the project.

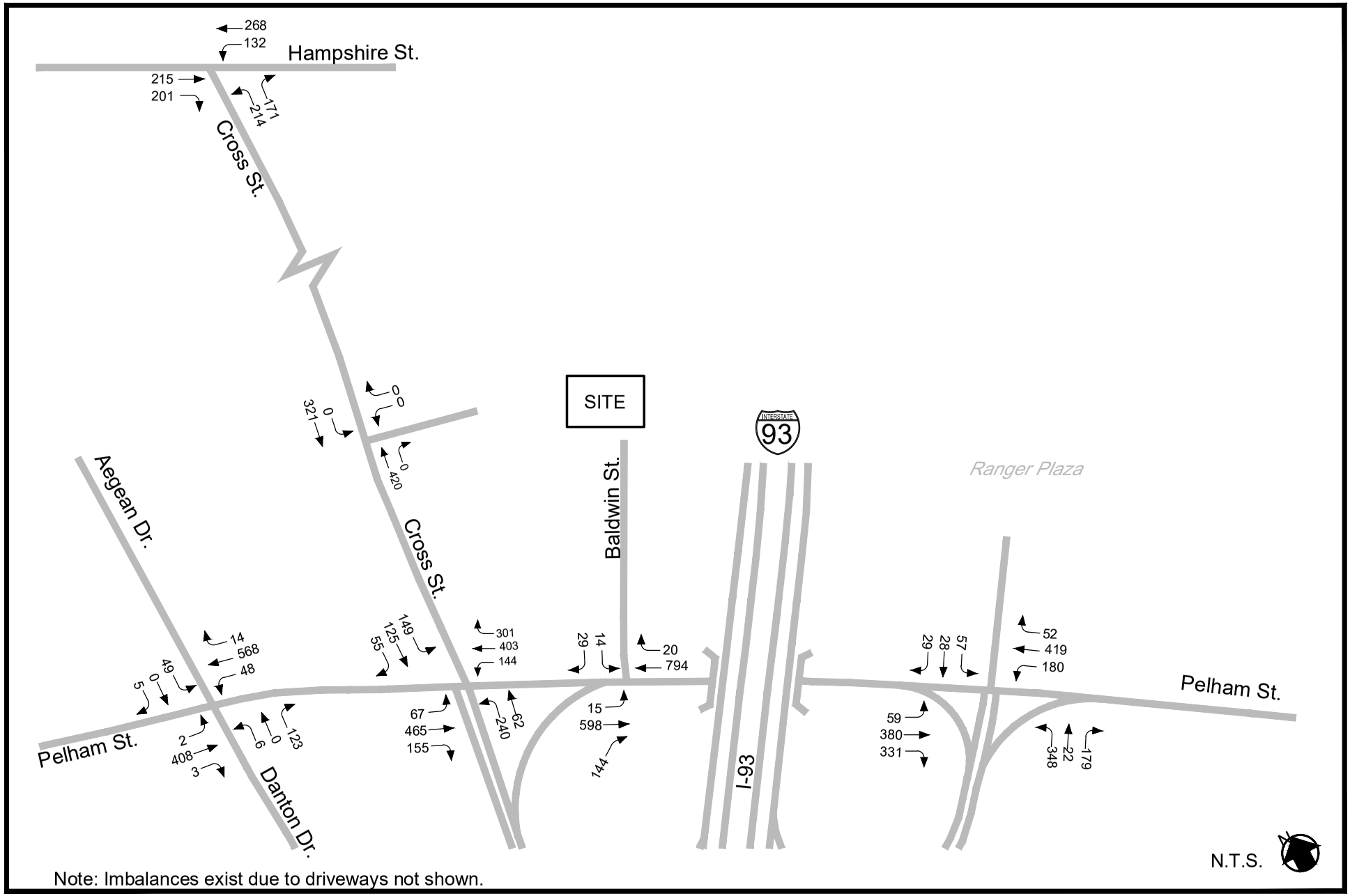
No-Build Condition Traffic Volumes

The 2032 No-Build weekday morning and evening peak-hour traffic volumes were developed by applying a compounded 1.0 percent annual growth rate to the 2025 Existing peak-hour traffic volumes and adding traffic from any identified background developments. Figures 5 and 6 show the projected 2032 No-Build peak hour traffic volumes for the weekday morning and weekday evening peak-hours, respectively.



Note: Imbalances exist due to driveways not shown.

SCALE: HORZ.: NOT TO SCALE VERT.: DATUM: HORZ.: - VERT.: -	FUSS & O'NEILL 600 UNICORN PARK DR, SUITE 17 WOBURN, MA 01801 781.932.3201 www.fando.com	Proposed Residential 2032 No-Build Weekday Morning Peak Hour Traffic Volumes Methuen MA	PROJ. No.: 20240957 Figure 5



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3.2 Build Traffic Volumes

PRD Description

The current development proposal under CSPRDD zoning consists of construction of 195 dwelling units. The apartments will include:

- At least 30% one-bedroom units
- At least 30% two-bedroom units
- At least 10% three-bedroom units

A total of 251 parking spaces will be provided for the site.

Traffic Generation

Site generated traffic for the PRD was based on trip-generation data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation* manual[2]. The trip generation data for Land Use Code (LUC) 221 – Multifamily Housing (Mid-Rise) was reviewed. The expected trip generation for the PRD is summarized in Table 5 and the trip generation worksheets are included in the Appendix.

TABLE 5
TRIP-GENERATION SUMMARY

	Proposed PRD Trips[a]
Weekday Daily	870
Weekday Morning Peak Hour:	
Entering	17
Exiting	57
Total	74
Weekday Evening Peak Hour:	
Entering	47
Exiting	26
Total	73

[a]Based on ITE LUC 221 – Multifamily Housing (Mid-Rise); 195 dwelling units.

[2]Ibid.

On a typical weekday, the PRD is expected to generate a total of 870 vehicle trips (435 vehicles entering and 435 vehicles exiting). During the weekday morning peak hour, a total of 74 vehicle trips (17 vehicles entering and 57 vehicles exiting) would be expected. During the weekday evening peak hour, a total of 73 vehicle trips (47 vehicles entering and 26 vehicles exiting) would be expected.

Trip Distribution

The directional distribution of the vehicular traffic approaching and departing the site is a function of population densities, the location of employment, existing travel patterns, similar uses, and the efficiency of the existing roadway system. For purposes of this analysis, a gravity model was developed based on places of work for existing Methuen residents. Table 6 summarizes the expected trip distribution for the PRD.

TABLE 6
PROPOSED TRIP DISTRIBUTION

Route	Direction	Percent of Trips
Cross Street	North	5
Pelham Street	East	17
Pelham Street	West	3
I-93	North	25
I-93	South	50
TOTAL		100

Future Traffic Volumes - Build Condition

The site-generated traffic was distributed within the study area according to the percentages summarized in Table 6. The site generated volumes for the PRD are shown on Figures 7 and 8 for the respective weekday morning and weekday evening peak hours. The site generated traffic volumes for the PRD were then superimposed onto the 2032 No-Build traffic flow network and are shown on Figures 9 and 10 for the weekday morning and weekday evening peak hours, respectively. These volumes were used as the basis for all analysis as well as to identify potential mitigation measures to ameliorate the PRD's impacts.

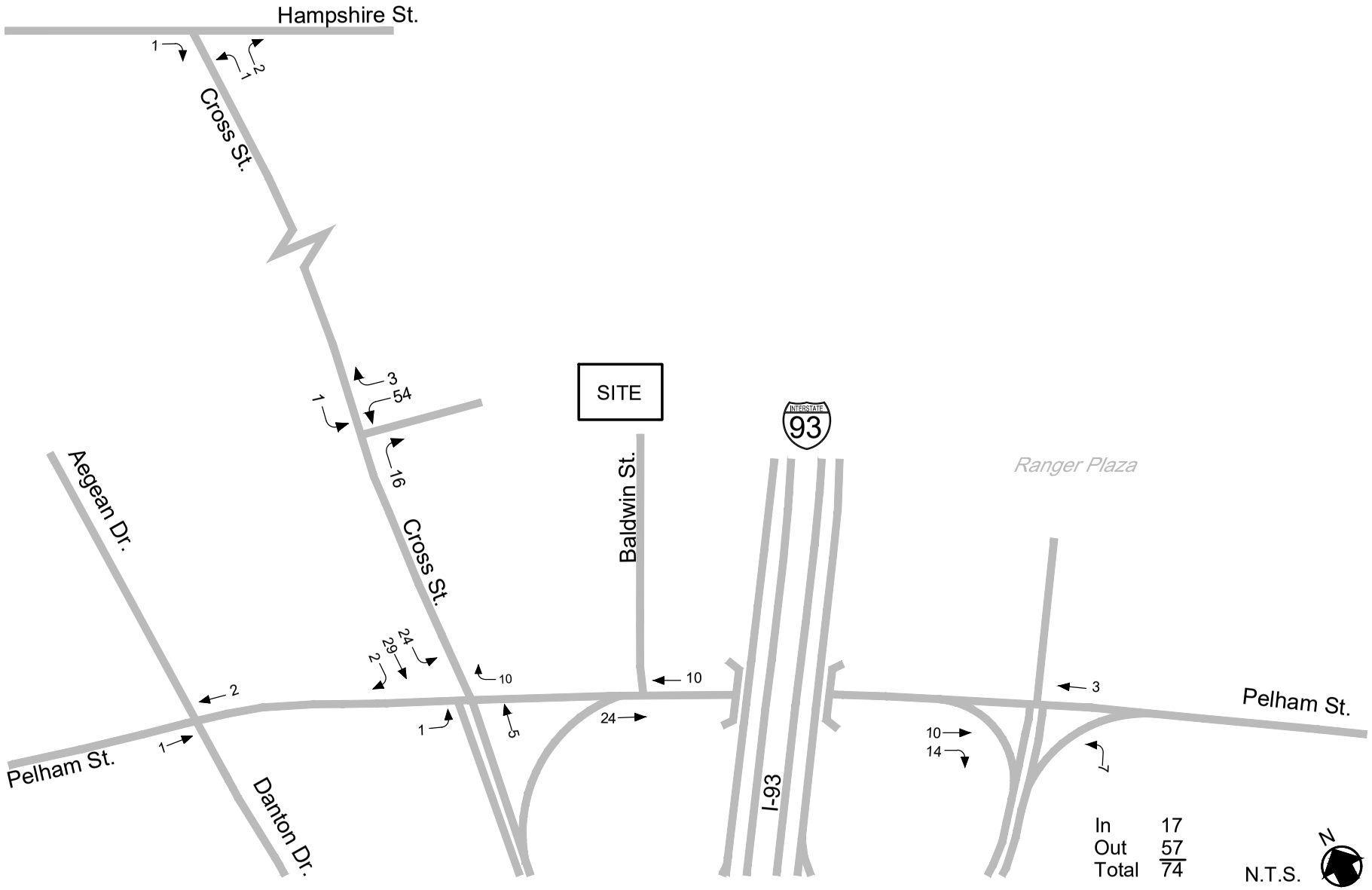
A summary of peak-hour projected traffic-volume changes in the site vicinity is shown in Table 7. These volumes are based on the expected increases from the site traffic generation.

TABLE 7
TRAFFIC-VOLUME INCREASES[a]

Location/Peak Hour	2032 No-Build	2032 Build	Volume Increase over No-Build	Percent Increase over No-Build
Cross Street, north of Site Driveway				
Weekday Morning	662	666	4	0.6
Weekday Evening	741	744	3	0.4
Pelham Street, east of Ranger Plaza Driveway				
Weekday Morning	1,466	1,479	13	0.9
Weekday Evening	1,268	1,278	10	0.8
Pelham Street, west of Aegean Drive				
Weekday Morning	1,225	1,228	3	0.2
Weekday Evening	992	994	2	0.2
I-93 Northbound Ramps, south of Pelham Street				
Weekday Morning	1,160	1,181	21	1.8
Weekday Evening	1,088	1,118	30	2.8
I-93 Southbound Ramps, south of Pelham Street				
Weekday Morning	1,034	1,068	34	3.3
Weekday Evening	870	897	27	3.1

[a]All volumes are vehicles per hour, total of both directions.

As shown in Table 8, PRD-related increases are in the range of two (2) to thirty-four (34) bi-directional vehicles during the peak hours. This is approximately equivalent to one additional vehicle every two (2) minutes or less per direction on average during the peak hours.



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HORZ.: NOT TO SCALE	600 UNICORN PARK DR, SUITE 17	Site Generated	Figure 7
VERT.:	WOBURN, MA 01801	Weekday Morning	
DATUM:	781.932.3201	Peak Hour Traffic Volumes	
HORZ.: -	www.fando.com	Methuen MA	
VERT.: -			

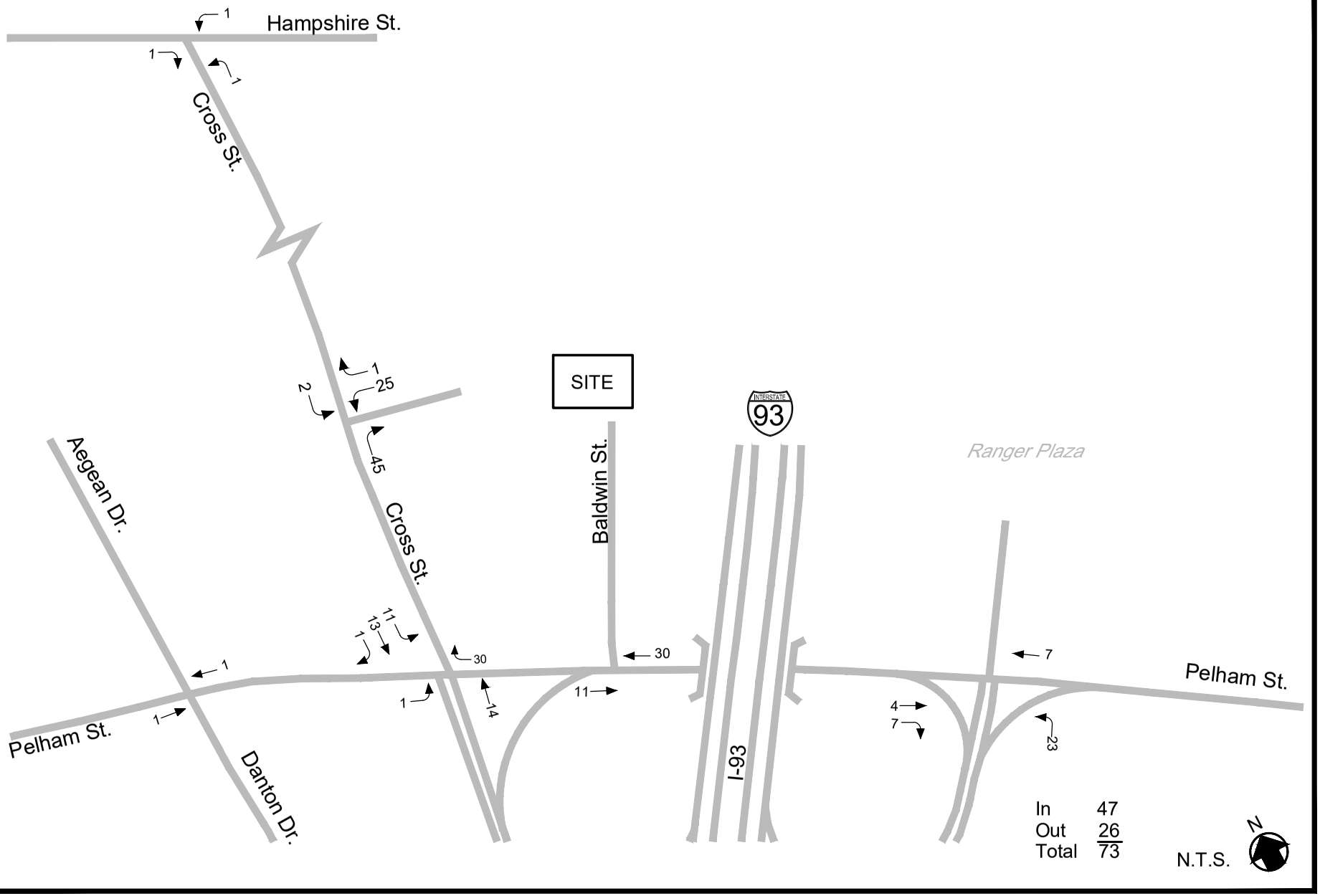

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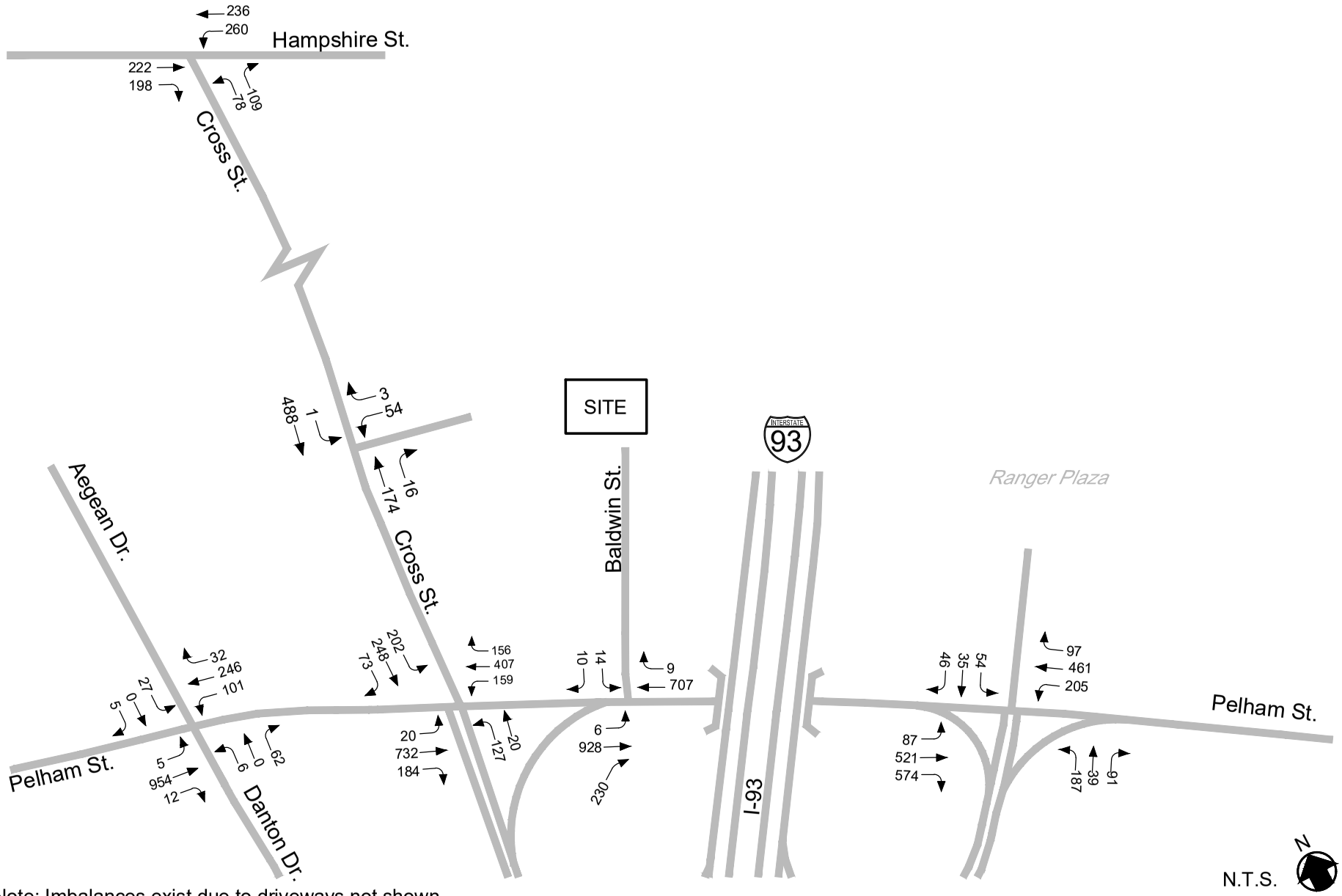
Figure 8



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PC3: DWG TO PDF.PC3 STB/CTB: MADOT-D.STB

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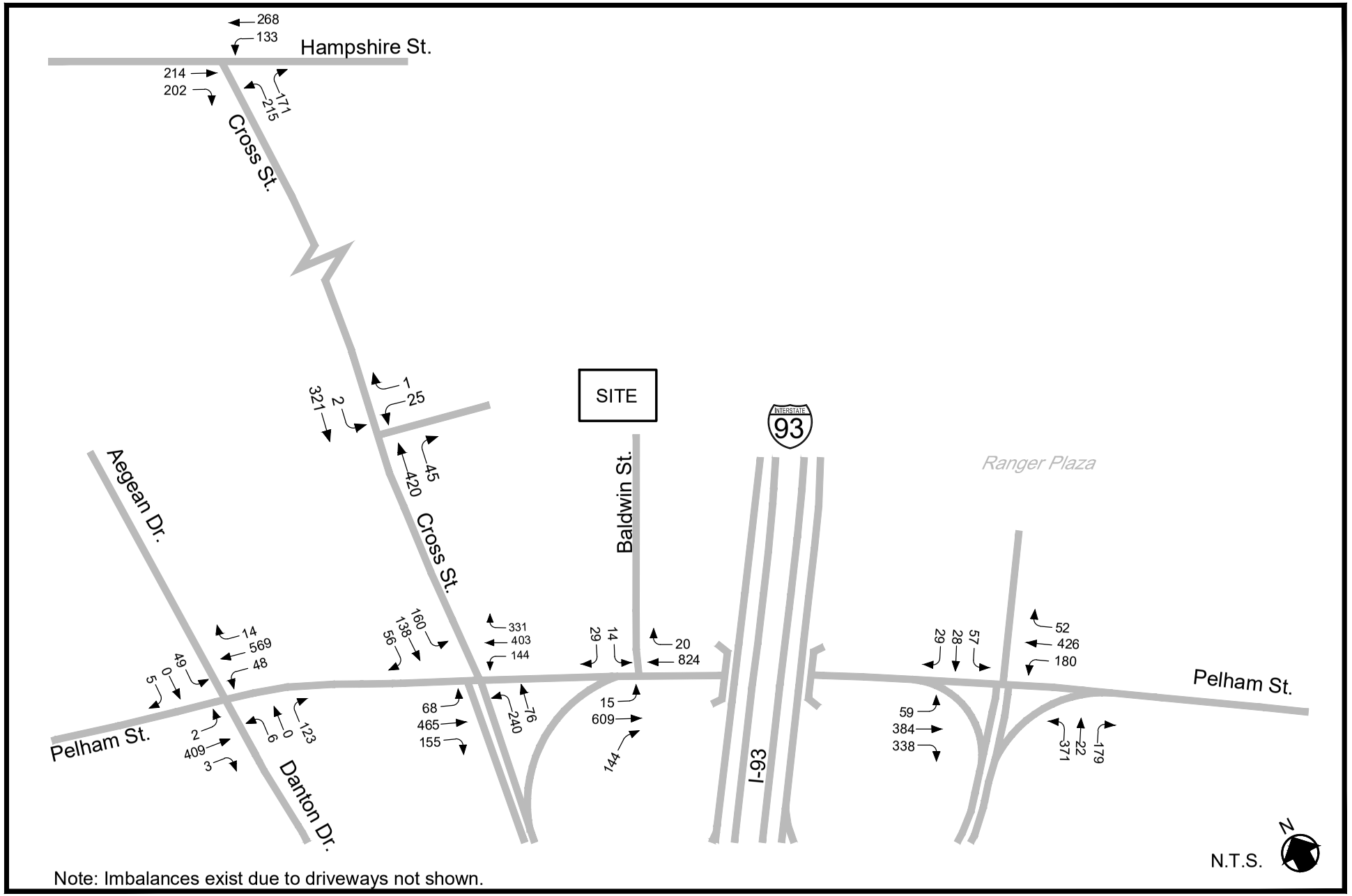
2032 Build
Weekday Morning
Peak Hour Traffic Volumes

Methuen MA

PROJ. No.: 20240957

Figure 9



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SCALE: HORZ.: NOT TO SCALE VERT.: DATUM: HORZ.: - VERT.: -	FUSS & O'NEILL 600 UNICORN PARK DR, SUITE 17 WOBURN, MA 01801 781.932.3201 www.fando.com	Proposed Residential 2032 Build Weekday Evening Peak Hour Traffic Volumes Methuen MA	PROJ. No.: 20240957 Figure 10

4 Analysis

4.1 Methodology

To assess intersection operations, capacity analyses were conducted for Existing, No-Build, and Build traffic-volume conditions. Capacity analyses provide an indication of how well the study area intersections serve existing and projected traffic volumes. Vehicle queue analyses provide a secondary measure of the operational characteristics of an intersection or section of roadway under study in terms of lane use and demand.

Levels of Service

Level-of-service (LOS) is a quantitative measure used to describe the operation of an intersection or roadway segment. The Level-of-Service definition is described by the quality of traffic flow and is primarily defined in terms of traffic delays. The primary result of capacity analyses[3] is the assignment of a level-of-service to traffic intersections or roadway segments under various traffic-flow conditions. Six levels of service are defined for traffic intersections and roadway segments. Levels-of-service criteria range from LOS A to LOS F. LOS A represents very good operating conditions while LOS F represents very poor operating conditions.

Signalized Intersections

Levels of service for signalized intersections are calculated using the methodology and procedures described in the 7th Edition *Highway Capacity Manual*[4] *(HCM7)*. The methodology assesses the intersection based on type of signal operation, signal timing and phasing, progression, vehicle mix, and intersection geometrics. Level-of-service designations are based on the delay per vehicle. Table 8 summarizes the relationship between Level-of-Service and delay for signalized intersections. The calculated delay values result in levels-of-service designations which are applied to individual lane groups, to individual intersection approaches, and to the entire intersection. In the HCM7 methodology, the critical lane group volume to capacity ratio is reported.

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

[4]*Highway Capacity Manual 7th Edition*; Transportation Research Board; Washington, DC; 2022.

TABLE 8
LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS[a]

Delay per Vehicle (Seconds)	Defined Level-of-Service $v/c^b < 1.0$	Defined Level-of-Service $v/c^b > 1.0$
≤10.0	A	F
10.1 to 20.0	B	F
20.1 to 35.0	C	F
35.1 to 55.0	D	F
55.1 to 80.0	E	F
>80.0	F	F

[a]*Highway Capacity Manual 7th Edition*; Transportation Research Board; Washington, DC; 2022; page 19-16.
[b]Volume to capacity ratio.

Unsignalized Intersections

The level-of-service (LOS) for an unsignalized intersection is determined by the methodology and procedures described in the HCM7. The level-of-service for unsignalized intersections is measured in terms of average delay for the critical movements (typically side street turning movements or mainline turning movements). The delay for the critical movements is a function of the available capacity for the movement and the degree of saturation of the lane group containing the critical movement. The delay calculation includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. The definitions for level-of-service at unsignalized intersections are also provided in the *Highway Capacity Manual 7th Edition*. Table 9 summarizes the relationship between level- of-service and average control delay for the critical movements at unsignalized intersections.

TABLE 9
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[a]

Average Delay (seconds per vehicle)	Defined Level-of-Service v/c[b] < 1.0	Defined Level-of-Service v/c > 1.0
≤ 10.0	A	F
10.1 to 15.0	B	F
15.1 to 25.0	C	F
25.1 to 35.0	D	F
35.1 to 50.0	E	F
>50.0	F	F

[a]*Highway Capacity Manual 7th Edition*; Transportation Research Board; Broad, DC; page 20-6
[b]Volume to capacity ratio.

The analytical methodologies used for the analysis of unsignalized intersections use conservative analysis parameters, such as high critical gaps. The critical gap is defined as the minimum time between successive main line vehicles for a side street vehicle to execute the appropriate turning maneuver. Actual field observations indicate that drivers at the study area intersections accept smaller gaps in traffic than those used in the analysis procedures and therefore experience less delay than calculated by the HCM methodology. **The analysis results from the HCM model overstate the actual delays experienced in the field.** It should be noted that the unsignalized intersections along heavily trafficked roadways operate at constrained levels and the resulting calculated results of the unsignalized intersection analyses should be considered highly conservative.

4.2 Capacity Analysis Results

Level-of-service analyses were conducted for both average and peak month conditions for 2025 Existing, 2032 No-Build and 2032 Build conditions for the intersections within the study area. The results of the signalized capacity analyses are summarized in Tables 10, 11 and 12 and the unsignalized capacity analyses are summarized in Table 13. Detailed analysis sheets are presented in the Appendix.

TABLE 10
SIGNALIZED LEVEL-OF-SERVICE SUMMARY PELHAM STREET, RANGER PLAZA DRIVEWAY AND I-93 NORTHBOUND RAMPS

	2024 Existing				2032 No-Build				2032 Build			
Peak Hour/Lane Group	V/C[a]	Delay[b]	LOS[c]	Queue[d]	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Weekday Morning												
Eastbound Lt	0.25	9.6	A	13/20	0.29	10.4	B	12/20	0.29	10.5	B	12/19
Eastbound Th/Rt	1.42	206.8	F	682/717	1.57	272.5	F	748/770	1.61	290.7	F	775/770
Westbound Lt	0.71	21.5	C	42/133	0.74	23.5	C	47/151	0.74	23.4	C	46/150
Westbound Th/Rt	0.66	18.6	B	195/403	0.72	21.1	C	216/452	0.73	21.4	C	218/455
Northbound Lt	0.67	34.5	C	75/150	0.73	37.3	D	85/175	0.75	39.2	D	89/184
Northbound Th/Rt	0.22	28.8	C	17/63	0.19	26.6	C	17/65	0.19	26.5	C	17/65
Southbound Lt	0.37	31.1	C	33/53	0.36	32.4	C	25/57	0.36	32.4	C	25/57
Southbound Th/Rt	0.31	31.3	C	21/43	0.23	30.6	C	16/54	0.23	30.6	C	16/54
Overall	**1.06**	**105.3**	**F**	--	**1.12**	**137.1**	**F**	--	**1.15**	**146.6**	**F**	--
Weekday Evening												
Eastbound Lt	0.22	11.6	B	11/26	0.22	12.6	B	10/22	0.23	12.7	B	10/22
Eastbound Th/Rt	1.14	94.0	F	399/613	1.19	111.6	F	415/672	1.20	118.5	F	424/682
Westbound Lt	0.62	18.0	B	43/98	0.65	18.7	B	46/106	0.65	18.7	B	46/106
Westbound Th/Rt	0.67	23.5	C	183/377	0.68	22.5	C	196/401	0.69	22.9	C	201/409
Northbound Lt	0.86	43.9	D	154/293	0.97	52.3	D	172/329	0.98	66.3	E	187/358
Northbound Th/Rt	0.17	24.4	C	9/59	0.18	23.7	C	9/61	0.18	23.7	C	9/61
Southbound Lt	0.39	31.7	C	32/58	0.39	32.9	C	27/61	0.39	32.9	C	27/61
Southbound Th/Rt	0.22	31.0	C	16/40	0.20	31.6	C	13/45	0.20	31.6	C	13/45
Overall	**0.89**	**50.5**	**D**	--	**0.97**	**57.9**	**E**	--	**0.97**	**62.9**	**E**	--

[a]Maximum volume-to-capacity ratio.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]Average Queue (ft)/95th %tile Queue (ft)
Lt = Left; Th = Through; Rt = Right.

Pelham Street, Ranger Plaza Driveway and I-93 Northbound Ramps

Under 2025 Existing conditions, this signalized intersection is projected to operate at LOS F during the weekday morning peak hour and at LOS D during the weekday evening peak hour. Under future 2032 No-Build conditions, the intersection is projected to operate at LOS F during the weekday morning peak hour and at LOS E during the weekday evening peak hour. Under future 2032 Build conditions, with the PRD, the intersection is projected to operate at LOS F during the weekday morning peak hour and at LOS E during the weekday evening peak hour.

TABLE 11
SIGNALIZED LEVEL-OF-SERVICE SUMMARY PELHAM STREET, CROSS STREET AND I-93 SOUTHBOUND RAMPS

	2024 Existing				2032 No-Build				2032 Build			
Peak Hour/Lane Group	V/C[a]	Delay[b]	LOS[c]	Queue[d]	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Weekday Morning												
Eastbound Lt	0.26	35.2	D	8/27	0.21	33.7	C	9/28	0.22	33.7	C	10/29
Eastbound Th	1.08	81.9	F	402/605	1.17	115.4	F	443/651	1.18	119.1	F	443/651
Eastbound Rt	0.29	16.5	B	22/74	0.32	17.3	B	27/83	0.32	17.5	B	27/83
Westbound Lt	0.75	39.9	D	63/135	0.79	42.4	D	67/131	0.79	42.9	D	67/139
Westbound Th	0.50	10.0	A	82/216	0.58	12.3	B	92/228	0.59	12.0	B	90/233
Westbound Rt	0.11	6.9	A	6/21	0.12	8.6	A	6/21	0.13	9.0	A	6/24
Northbound Lt	0.43	19.9	B	46/73	0.46	19.6	B	44/83	0.46	19.7	B	44/83
Northbound Th/Rt	0.20	18.0	B	6/35	0.18	17.5	B	5/53	0.19	17.5	B	7/56
Southbound Lt	1.07	118.4	F	103/207	0.92	68.5	E	101/223	1.04	101.8	F	129/257
Southbound Th/Rt	1.00	81.8	F	143/275	0.88	51.0	D	146/304	0.97	69.1	E	187/346
Overall	**0.92**	**49.8**	**D**	--	**0.94**	**52.9**	**D**	--	**0.98**	**58.5**	**E**	--
Weekday Evening												
Eastbound Lt	0.52	34.9	C	28/64	0.47	33.2	C	31/70	0.48	33.3	C	32/71
Eastbound Th	0.73	29.4	C	172/278	0.81	33.9	C	203/359	0.82	34.6	C	203/359
Eastbound Rt	0.10	17.3	B	0/11	0.11	17.3	B	0/19	0.11	17.4	B	0/19
Westbound Lt	0.74	42.1	D	59/144	0.81	49.0	D	66/132	0.83	51.5	D	66/125
Westbound Th	0.60	14.3	B	121/177	0.69	17.5	B	135/187	0.70	17.8	B	139/179
Westbound Rt	0.20	14.7	B	26/37	0.22	15.4	B	27/36	0.24	15.7	B	29/35
Northbound Lt	0.58	18.9	B	79/132	0.62	20.3	C	85/143	0.63	20.3	C	85/143
Northbound Th/Rt	0.20	15.7	B	19/58	0.20	15.8	B	19/63	0.23	15.8	B	27/73
Southbound Lt	0.72	38.2	D	65/145	0.75	40.6	D	70/156	0.80	45.5	D	76/174
Southbound Th/Rt	0.50	27.5	C	64/124	0.53	27.7	C	69/132	0.56	28.2	C	77/143
Overall	**0.69**	**23.0**	**C**	--	**0.77**	**25.3**	**C**	--	**0.78**	**26.0**	**C**	--

[a]Maximum volume-to-capacity ratio.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]Average Queue (ft)/95th %tile Queue (ft)
Lt = Left; Th = Through; Rt = Right.

Pelham Street, Cross Street and I-93 Southbound Ramps

Under 2024 Existing conditions, this signalized intersection is projected to operate at LOS D during the weekday morning peak hour and at LOS C during the weekday evening peak hour. It is noted that currently there are long queues on the Pelham Street eastbound approach, which corresponds with the modeled LOS F for the eastbound Pelham Street through movements. Under future 2032 No-Build conditions, the intersection is projected to operate at LOS D during the weekday morning peak hour and at LOS C during the weekday evening peak hour. Under future 2032 Build conditions, with the PRD, the intersection is projected to operate at LOS E during the weekday morning peak hour and at LOS C during the weekday evening peak hour. The Pelham Street eastbound approach is projected to operate at LOS F during the weekday morning peak hour under No-Build and Build conditions.

TABLE 12
SIGNALIZED LEVEL-OF-SERVICE SUMMARY PELHAM STREET, AEGEAN DRIVE AND DANTON DRIVE

	2025 Existing				2032 No-Build				2032 Build			
Peak Hour/Lane Group	V/C[a]	Delay[b]	LOS[c]	Queue[d]	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Weekday Morning												
Eastbound Lt	0.01	7.3	A	1/10	0.01	7.5	A	1/10	0.01	7.5	A	1/10
Eastbound Th/Rt	0.95	33.2	C	361/1179	1.00	46.1	D	410/1300	1.00	46.4	D	410/1301
Westbound Lt	0.43	17.9	B	7/56	0.56	21.3	C	10/90	0.56	21.3	C	10/90
Westbound Th/Rt	0.25	4.6	A	32/157	0.25	4.5	A	32/163	0.25	4.5	A	32/164
Northbound Lt/Th/Rt	0.60	40.7	D	32/71	0.58	40.2	D	30/94	0.58	40.2	D	30/94
Southbound Lt/Th/Rt	0.39	34.4	C	22/43	0.22	33.1	C	14/50	0.22	33.1	C	14/50
Overall	**0.81**	**27.1**	**C**	--	**0.85**	**35.8**	**D**	--	**0.85**	**35.9**	**D**	--
Weekday Morning												
Eastbound Lt	0.01	8.0	A	0/6	0.01	9.9	A	0/6	0.01	9.9	A	0/6
Eastbound Th/Rt	0.46	10.3	B	44/292	0.54	13.3	B	89/325	0.54	13.2	B	89/325
Westbound Lt	0.11	6.4	A	3/27	0.16	7.8	A	5/36	0.16	7.8	A	5/36
Westbound Th/Rt	0.58	8.2	A	74/383	0.63	10.2	B	88/428	0.63	10.2	B	88/428
Northbound Lt/Th/Rt	0.48	21.6	C	21/98	0.44	21.4	C	32/143	0.45	21.5	C	32/145
Southbound Lt/Th/Rt	0.35	20.7	C	12/63	0.20	19.7	B	12/69	0.20	19.8	B	13/69
Overall	**0.57**	**11.0**	**B**	--	**0.59**	**12.8**	**B**	--	**0.59**	**12.8**	**B**	--

[a]Maximum volume-to-capacity ratio.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]Average Queue (ft)/95th %tile Queue (ft)
Lt = Left; Th = Through; Rt = Right.

Pelham Street, Aegean Drive and Danton Drive

Under 2024 Existing conditions, this signalized intersection is projected to operate at LOS C during the weekday morning peak hour and at LOS B during the weekday evening peak hour. Under future 2032 No-Build conditions, the intersection is projected to operate at LOS D during the weekday morning peak hour and at LOS B during the weekday evening peak hour. Under future 2032 Build conditions, with the PRD, the intersection is projected to operate at LOS D during the weekday morning peak hour and at LOS B during the weekday evening peak hour.

TABLE 13
UNSIGNALIZED LEVEL-OF-SERVICE ANALYSIS SUMMARY

Critical Movement/ Peak Hour	2025 Existing					2032 No-Build					2032 Build				
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Queue[e]	Demand	V/C	Delay	LOS	Queue	Demand	V/C	Delay	LOS	Queue
Cross Street and Hampshire Street															
All movements from Cross Street (NB):															
Weekday Morning	174	0.61	33.6	D	95	184	0.73	46.0	E	128	187	0.75	48.6	E	135
Weekday Evening	368	1.07	100.1	F	350	385	1.18	139.0	F	428	386	1.19	144.2	F	438
Cross Street and Site Driveway															
All movements from driveway (SB):															
Weekday Morning	--	--	--	--	--	--	--	--	--	--	57	0.16	15.6	C	12.5
Weekday Evening	--	--	--	--	--	--	--	--	--	--	26	0.07	15.9	C	5
Pelham Street and Baldwin Street															
All movements from Cross Street (SB):															
Weekday Morning	24	0.12	24.6	C	10	24	0.15	29.1	D	12.5	24	0.16	39.8	E	17.5
Weekday Evening	43	0.19	22.5	C	17.5	43	0.22	26.3	D	20.0	43	0.23	27.8	D	22.5

[a]Demand of critical movements in vehicles per hour.
[b]Volume-to-capacity ratio.
[c]Delay in seconds per vehicle.
[d]Level of service.
[e]95th percentile queue in feet.
[f]Calculated delay and v/c not representative of actual conditions when v/c exceeds 1.0.

Cross Street and Hampshire Street

Under 2024 Existing conditions, the critical movements (all movements from Cross Street northbound) are projected to operate at LOS D during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2032 No-Build conditions, these critical movements are projected to operate at LOS E during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2032 Build conditions, with the PRD, these critical movements are projected to continue to operate at LOS E during the weekday morning peak hour and at LOS F during the weekday evening peak hour.

Cross Street and Site Driveway

Under future 2032 Build conditions, with the PRD, the critical movements (left and right turns out of the driveway)are projected to operate at LOS C during the weekday morning peak hour and LOS C during the weekday evening peak hour. The projected v/c ratio will be below 1.00 during each peak hour, indicating there will be capacity to accommodate the anticipated traffic volumes.

Cross Street and Baldwin Street

Under 2025 Existing conditions, the critical movements (all movements from Baldwin Street) are projected to operate at LOS C during the weekday morning peak hour and at LOS C during the weekday evening peak hour. Under future 2032 No-Build conditions, these critical movements are projected to operate at LOS D during the weekday morning peak hour and at LOS D during the weekday evening peak hour. Under future 2032 Build conditions, with the PRD, these critical movements are projected to operate at LOS E during the weekday morning peak hour and at LOS D during the weekday evening peak hour.

4.3 Sight Distance Assessment

Sight distance measurements were performed at the proposed site driveway intersection with Cross Street in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO) standards. Stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. Intersection sight distance (ISD) or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway, to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. Table 14 presents the measured SSD and ISD at the intersection of the site driveway with Cross Street. The sight distance calculations are included in the Appendix.

TABLE 14
SIGHT DISTANCE SUMMARY

	Required Minimum (Feet)[a]	Measured (Feet)
Cross Street and Site Driveway		
Stopping Sight Distance:		
Cross Street approaching from the North	325	325
Cross Street approaching from the South	335	350

[a]Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*; American Association of State Highway and Transportation Officials (AASHTO); 2018 and based on 85th percentile speed for Cross Street.

As can be seen in Table 14, the SSD measurements performed at the site driveway intersections indicate that the intersections SSD will generally meet or exceed the recommended minimum requirements based on an 85th percentile speed. In accordance with the AASHTO manual, *"If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, this may require a major-road vehicle to stop or slow to accommodate the maneuver by a minor-road vehicle. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road."* Accordingly, the ISD should be at least equal to the SSD, which would allow a driver approaching the minor road to safely stop. It is recommended that any proposed landscaping be less than three (3) feet in height and maintained for sightlines. It is also recommended that no plantings occur within ten (10) feet of the Cross Street travelled ways to maintain sight lines and that the vegetation within the layout be maintained at a height that will not impact sight distances.

5 Recommendations and Conclusion

5.1 Recommendations

To assess the impacts of the proposed PRD on the roadway network, traffic operations analyses were performed at the study area intersections under 2025 Existing, 2032 No-Build and 2032 Build conditions. These analyses indicate that the proposed PRD will not result in a significant impact on traffic operations at the study area intersections over No-Build conditions.

The Pelham Street intersection with the Ranger Plaza Driveway and the I-93 northbound ramps is projected to operate at level of service (LOS) F under future No-Build weekday morning peak hour conditions and at LOS E during the weekday evening peak hour (without the PRD). The addition of site generated traffic does not change the level of service and there is a very small increase in the overall intersection volume to capacity (v/c) ratio.

The Pelham Street intersection with the Cross Street and the I-93 southbound ramps is projected to operate at LOS C under future No-Build weekday morning and weekday evening peak hour (without the PRD). It is noted that currently there are long queues on the Pelham Street eastbound approach. The mitigation identified below has been designed to reduce these queues. The addition of site generated traffic has a very small impact on the overall intersection volume to capacity (v/c) ratio.

The capacity analyses performed for the site driveway intersection with Cross Street indicates that overall, the critical movements at the intersection, shared left and right-turns out of the site will operate at acceptable levels of service, with minor delays for the critical movements.

Proposed Site Driveway

The proposed site driveway should consist of one entering and one exiting lane for a total minimum driveway width of twenty-four (24) feet. The driveway approach should be placed under STOP sign control with a Stop bar on the exiting lane. To maintain sight distances for the measured 85th percentile speeds, it is recommended that a sight triangle be established along the site frontage on Cross Street, in both directions from a point fifteen (15) feet back of the mainline travelled way and extending to each of the corners of the site along Cross Street. Within this triangle, any existing vegetation should be cut-back, and any plantings and site signage should be designed to be low to not impede sight distances.

Off-Site Mitigation

If the CSRDD is adopted, and as part of the approval, the Applicant will enter into a Memorandum of Agreement with the City of Methuen to implement the following measures, which based on the analysis results, indicates that the queuing on Pelham Street eastbound at Cross Street during the morning peak hour will be reduced, shown conceptually on Figure 11:

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
####	####	####	####	####
####	####	####	####	####
####	####	####	####	####
####	####	####	####	####
####	####	####	####	####
####	####	####	####	####
####	####	####	####	####
####	####	####	####	####
####	####	####	####	####
####	####	####	####	####

SCALE:
HORZ.:
VERT.:
DATUM:
HORZ.:
VERT.:

FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NH 03101
603.668.8223
www.fando.com

Proposd Residential

Conceptual Improvement plan

Methuen MA

PROJ. No.: 20240957

Figure 11

Pelham Street intersections with the Ranger Plaza Driveway/I-93 Northbound Ramps and with Cross Street/I-93 Southbound Ramps

Overall, the existing equipment at the intersections are in good condition and appear to have been recently upgraded. The two State Owned intersections at the Interstate 93 Ramps have adequate capacity within the existing Controller Cabinets to replace the existing loop detection with video detection. Pavement conditions along Pelham Street are variable with signs of rutting due to heavy use and starting and stopping. Pedestrian signal equipment is variable and significantly dated at the two Interstate 93 Ramp intersections. Field review found the traffic signal controllers at the two ramps were programmed for coordination in accordance with record plans obtained from the cabinets.

Fuss & O'Neill recommends the following upgrades for consideration:

- Pelham Street at Cross Street and I-93 Southbound Ramps
  - Replace the existing loop detection with 360° Video Detection.
  - Re-evaluate coordination plans.
  - Replace the pedestrian signal heads and pushbuttons for the Cross Street crossing.
  - Replace the five-section eastbound signal head and backplates (with retroreflective borders) on the southeastern corner.
  - Timing pattern to run coordinated with the signal at the I-93 northbound ramps
  - Restripe the Pelham Street eastbound approach to provide an exclusive left-turn lane and two through lanes permitting right turns

- Pelham Street at Ranger Plaza Driveway and I-93 Northbound Ramps
  - Replace the existing loop detection with 360° Video Detection.
  - Re-evaluate coordination plans.
  - Replace the pedestrian signal heads and pushbuttons for the Ranger Plaza crossing.
  - Replace the three-section westbound signal head and backplates (with retroreflective borders) on the northwestern corner.
  - Replace the visor for the green indication of the eastbound signal head on the southeastern corner.
  - Timing pattern to run coordinated with the signal at the I-93 southbound ramps

Pelham Street, Aegean Drive and Danton Drive

Fuss & O'Neill recommends the following signal upgrades:

- Pelham Street at Aegean Drive and Danton Drive
  - Replace the pushbuttons at the southwest and northwest corners to establish ADA compliance.
  - Re-evaluate detection zones and time of day plans.

Tables 15 and 16 summarize the future Build and Build with mitigation results for the Pelham Street intersections at the I-93 northbound and southbound ramps.

TABLE 15
LEVEL-OF-SERVICE SUMMARY PELHAM STREET, RANGER PLAZA DRIVEWAY AND I-93 NORTHBOUND RAMPS WITH MITIGATION

	2032 No-Build				2032 Build				2032 Build with Mitigation			
Peak Hour/Lane Group	V/C[a]	Delay[b]	LOS[c]	Queue[d]	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Weekday Morning												
Eastbound Lt	0.29	10.4	B	12/20	0.29	10.5	B	12/19	0.18	4.7	A	9/14
Eastbound Th/Rt	1.57	272.5	F	748/770	1.61	290.7	F	775/770	1.09	64.3	E	851/1100
Westbound Lt	0.74	23.5	C	47/151	0.74	23.4	C	46/150	0.95	80.0	E	100/249
Westbound Th/Rt	0.72	21.1	C	216/452	0.73	21.4	C	218/455	0.50	8.4	A	160/238
Northbound Lt	0.73	37.3	D	85/175	0.75	39.2	D	89/184	1.02	110.1	F	123/206
Northbound Th/Rt	0.19	26.6	C	17/65	0.19	26.5	C	17/65	0.51	47.1	D	32/124
Southbound Lt	0.36	32.4	C	25/57	0.36	32.4	C	25/57	0.30	39.8	D	32/69
Southbound Th/Rt	0.23	30.6	C	16/54	0.23	30.6	C	16/54	0.42	46.5	D	24/74
Overall	**1.12**	**137.1**	**F**	--	**1.15**	**146.6**	**F**	--	**1.07**	**51.9**	**D**	--
Weekday Evening												
Eastbound Lt	0.22	12.6	B	10/22	0.23	12.7	B	10/22	0.18	7.7	A	9/18
Eastbound Th/Rt	1.19	111.6	F	415/672	1.20	118.5	F	424/682	0.98	39.1	C	360/586
Westbound Lt	0.65	18.7	B	46/106	0.65	18.7	B	46/106	0.78	28.6	C	41/151
Westbound Th/Rt	0.68	22.5	C	196/401	0.69	22.9	C	201/409	0.61	18.3	B	180/287
Northbound Lt	0.97	52.3	D	172/329	0.98	66.3	E	187/358	0.91	47.0	D	159/314
Northbound Th/Rt	0.18	23.7	C	9/61	0.18	23.7	C	9/61	0.18	24.9	C	9/66
Southbound Lt	0.39	32.9	C	27/61	0.39	32.9	C	27/61	0.38	32.8	C	20/45
Southbound Th/Rt	0.20	31.6	C	13/45	0.20	31.6	C	13/45	0.32	34.5	C	13/49
Overall	**0.97**	**57.9**	**E**	--	**0.97**	**62.9**	**E**	--	**0.96**	**32.4**	**C**	--

[a]Maximum volume-to-capacity ratio.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]Average Queue (ft)/95th %tile Queue (ft)
Lt = Left; Th = Through; Rt = Right.

TABLE 16
LEVEL-OF-SERVICE SUMMARY PELHAM STREET, CROSS STREET AND I-93 SOUTHBOUND RAMPS WITH MITIGATION

	2032 No-Build				2032 Build				2032 Build with Mitigation			
Peak Hour/Lane Group	V/C[a]	Delay[b]	LOS[c]	Queue[d]	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Weekday Morning												
Eastbound Lt	0.21	33.7	C	9/28	0.22	33.7	C	10/29	0.32	47.4	D	12/38
Eastbound Th	1.17	115.4	F	443/651	1.18	119.1	F	443/651	0.83	32.3	C	314/409
Eastbound Rt	0.32	17.3	B	27/83	0.32	17.5	B	27/83	-	-	-	-
Westbound Lt	0.79	42.4	D	67/131	0.79	42.9	D	67/139	0.77	55.1	E	111/178
Westbound Th	0.58	12.3	B	92/228	0.59	12.0	B	90/233	0.53	21.7	C	176/258
Westbound Rt	0.12	8.6	A	6/21	0.13	9.0	A	6/24	0.13	30.1	C	13/34
Northbound Lt	0.46	19.6	B	44/83	0.46	19.7	B	44/83	0.53	26.3	C	58/102
Northbound Th/Rt	0.18	17.5	B	5/53	0.19	17.5	B	7/56	0.19	22.8	C	9/63
Southbound Lt	0.92	68.5	E	101/223	1.04	101.8	F	129/257	0.88	62.8	E	132/289
Southbound Th/Rt	0.88	51.0	D	146/304	0.97	69.1	E	187/346	0.83	48.2	D	199/335
Overall	**0.94**	**52.9**	**D**	--	**0.98**	**58.5**	**D**	--	**0.79**	**35.1**	**D**	--
Weekday Evening												
Eastbound Lt	0.47	33.2	C	31/70	0.48	33.3	C	32/71	0.48	33.2	C	32/71
Eastbound Th	0.81	33.9	C	203/359	0.82	34.6	C	203/359	0.57	22.7	C	126/170
Eastbound Rt	0.11	17.3	B	0/19	0.11	17.4	B	0/19	-	-	-	-
Westbound Lt	0.81	49.0	D	66/132	0.83	51.5	D	66/125	0.63	33.5	C	75/108
Westbound Th	0.69	17.5	B	135/187	0.70	17.8	B	139/179	0.65	20.3	C	156/194
Westbound Rt	0.22	15.4	B	27/36	0.24	15.7	B	29/35	0.24	21.7	C	20/35
Northbound Lt	0.62	20.3	C	85/143	0.63	20.3	C	85/143	0.57	18.8	B	75/139
Northbound Th/Rt	0.20	15.8	B	19/63	0.23	15.8	B	27/73	0.23	16.0	B	26/77
Southbound Lt	0.75	40.6	D	70/156	0.80	45.5	D	76/174	0.79	44.7	D	76/174
Southbound Th/Rt	0.53	27.7	C	69/132	0.56	28.2	C	77/143	0.56	28.0	C	77/143
Overall	**0.77**	**25.3**	**C**	--	**0.78**	**26.0**	**C**	--	**0.68**	**24.0**	**C**	--

[a]Maximum volume-to-capacity ratio.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]Average Queue (ft)/95th %tile Queue (ft)
Lt = Left; Th = Through; Rt = Right.

Transportation Demand Management

Regularly scheduled public transportation services are not currently available to the PRD site or along Pelham Street. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following Transportation Demand Management (TDM) measures will be implemented as a part of the PRD:

- An on-site transportation coordinator (TC) will be assigned to coordinate the traffic reduction program for the PRD,
- The TC will work with the City of Methuen, MassDOT and the MVRPC to develop the elements of the traffic reduction program for the PRD,
- The TC will disseminate public transit schedules to tenants of the building (MeVa

Bus schedules),

- The TC will electronically disseminate a newsletter identifying carpooling opportunities and available TDM measures and incentives,
- The TC, in association with available ride matching services (such as Ride Match (https://massridematch.org/)) to establish potential carpooling and van pooling programs,
- Sidewalks and pedestrian areas will be provided within the PRD,
- Designating one parking space for low-emission vehicles closer to building entrances to promote the use of clean fuel vehicles,
- Explore potential accommodations for a car sharing service (e.g., Zip Car), and
- The PRD will include provision of safe, secure, weather-protected bicycle racks and/or storage lockers. Signs will be provided at appropriate locations within the PRD directing bicyclists to the bicycle storage facilities.

5.2 Conclusion

The proposed PRD is to be located at 11 Cross Street. On a typical weekday at full build out, the PRD is expected to generate a total of 870 vehicle trips (435 vehicles entering and 435 vehicles exiting) under the CSPRDD zoning (maximum of 195 dwelling units). During the weekday morning peak hour, a total of 74 vehicle trips (17 vehicles entering and 57 vehicles exiting) would be expected. During the weekday evening peak hour, a total of 73 vehicle trips (47 vehicles entering and 26 vehicles exiting) would be expected.

Capacity analyses were performed for each of the study area intersections for 2024 Existing, 2032 No-Build and 2032 Build conditions. Based on the analyses performed, there is no significant change in level of service from No-Build to Build conditions at the study area intersections.

Review of the proposed development and access plan shows that in relation to roadway capacity, traffic safety, and traffic impacts upon the surrounding roadway network, the proposed PRD will meet safety standards and have a minimal impact on existing traffic conditions. With the proposed access, in conjunction with the mitigation measures described above and maintaining sight distances from Cross Street (clear sight lines along frontage), safe and efficient access can be provided to the clienteles of the proposed facility and to the motoring public in the area.