

---

# TRAFFIC IMPACT STUDY

for

**Hudson Logistics Center  
Hudson, New Hampshire**

*Prepared for:*

**Hillwood Enterprises, L.P.**



*Prepared By:*

**Langan Engineering & Environmental Services, Inc.  
888 Bolyston Street, Suite 510  
Boston, MA 02199**

\_\_\_\_\_  
**Luke Mauro, PTOE**

\_\_\_\_\_  
**John D. Plante, P.E.  
New Hampshire Licensed Professional Engineer No. 14072**

**Revised September 2020  
April 2020  
151010101**

# **LANGAN**

**TABLE OF CONTENTS**

	<b><u>Page No.</u></b>
<b>EXECUTIVE SUMMARY</b> .....	<b>1</b>
<b>1.0 INTRODUCTION</b> .....	<b>1</b>
<b>2.0 SITE ACCESS AND STUDY LOCATIONS</b> .....	<b>1</b>
Site Access .....	<b>1</b>
Study Locations .....	<b>2</b>
<b>3.0 EXISTING CONDITIONS</b> .....	<b>2</b>
Area Roadway Network .....	<b>2</b>
Study Intersections.....	<b>4</b>
<b>4.0 INTERSECTION CAPACITY ANALYSIS MEASURES</b> .....	<b>7</b>
Level of Service Criteria.....	<b>8</b>
<b>5.0 METHODOLOGY AND ANALYSIS</b> .....	<b>9</b>
<b>5.1 Step One: Determine the existing peak-hour traffic volumes and evaluate traffic operating conditions for the study intersections.</b> .....	<b>9</b>
Existing Peak-Hour Traffic Volumes .....	<b>9</b>
Seasonal Adjustments.....	<b>10</b>
2019 Existing Traffic Operating Conditions .....	<b>10</b>
<b>5.2 Step Two: Project the existing peak-hour traffic volumes (Step One) to create 2022 and 2032 No-Build peak-hour traffic volumes (Including approved or pending developments in the area) and evaluate traffic operating conditions for the study intersections.</b> .....	<b>10</b>
No-Build Peak-Hour Traffic Volumes.....	<b>10</b>
2022 and 2032 No-Build Traffic Operating Conditions .....	<b>11</b>
<b>5.3 Step Three: Determine the traffic volumes to be generated by the proposed development. Distribute and assign these site traffic volumes throughout the study area roadway network.</b> .....	<b>12</b>
Project Overview and Site Access Points.....	<b>12</b>
Facilities Operations and Land-use Description .....	<b>13</b>
Trip Generation .....	<b>14</b>
Peak-Hour Period .....	<b>16</b>
Multi-Occupancy Vehicle Credit .....	<b>17</b>
Peak-Hour Trip Distribution .....	<b>18</b>
Peak-Hour Trip Assignment .....	<b>19</b>
Truck Trip Generation, Distribution, & Assignment.....	<b>19</b>
Saturday Peak Period .....	<b>20</b>
<b>5.4 Step Four: Combine the No-Build traffic volumes (Step Two) with the assigned proposed traffic (Step Three) to establish 2022 and 2032 Build traffic volumes. Determine traffic operating conditions and identify mitigation of potential impacts.</b> .....	<b>20</b>
Build Traffic Volumes .....	<b>20</b>
Build Traffic Operating Conditions .....	<b>20</b>
Queuing Evaluation .....	<b>21</b>
Analysis Results .....	<b>38</b>

	<b>Recommended Improvements Summary .....</b>	<b>48</b>
	<b>Recommended Base Improvements.....</b>	<b>48</b>
	<b>Potential Future Improvements.....</b>	<b>50</b>
<b>5.5</b>	<b>Step Five: Investigate the safety conditions within the area roadway network. ....</b>	<b>52</b>
	<b>Accidents.....</b>	<b>52</b>
<b>6.0</b>	<b>SUMMARY AND CONCLUSIONS .....</b>	<b>54</b>

**TABLES**

<b>Table 1</b>	<b>ITE LUC 155 – Fulfillment Center (Non-Sort) – Lot A And Lot B Anticipated Trip Generation By Building Area</b>
<b>Table 2</b>	<b>ITE LUC 155 – Fulfillment Center (Non-Sort) – Lot A And Lot B Anticipated Trip Generation By Employees</b>
<b>Table 3</b>	<b>ITE LUC 150 &amp; 155 – Warehouse &amp; Fulfillment Center (Non-Sort) – Lot C Anticipated Trip Generation</b>
<b>Table 4</b>	<b>Hudson Logistic Center – Adjusted Anticipated Trip Generation</b>
<b>Table 5</b>	<b>Hudson Logistic Center – Adjusted Anticipated Trip Generation</b>
<b>Table 6</b>	<b>Opening Year Base Capacity Analysis Summary – Weekday A.M. Peak-Hour</b>
<b>Table 7</b>	<b>Opening Year Base Capacity Analysis Summary – Weekday P.M. Peak-Hour</b>
<b>Table 8</b>	<b>Horizon Year Base Capacity Analysis Summary – Weekday A.M. Peak-Hour</b>
<b>Table 9</b>	<b>Horizon Year Base Capacity Analysis Summary – Weekday P.M. Peak-Hour</b>
<b>Table 10</b>	<b>Base &amp; Roundabout Improvements Capacity Analysis Summary Comparison For Lowell Road/River Road (Route 3A) &amp; Dracut Road/Steele Road</b>
<b>Table 11</b>	<b>Base &amp; Future Improvements Capacity Analysis Summary Comparison For Lowell Road (Route 3A) &amp; Flagstone Drive/Wason Road</b>
<b>Table 12</b>	<b>Crash Data – Crash Severity (2014 – 2018)</b>
<b>Table 13</b>	<b>Crash Data – Manner of Crash (2014 – 2018)</b>
<b>Table 14</b>	<b>Crash Data – Conditions (2014 – 2018)</b>

**FIGURES**

<b>Figure 1</b>	<b>Location Map</b>
<b>Figure 2</b>	<b>Study Area Intersections</b>
<b>Figure 3</b>	<b>2019 Existing Peak-Hour Traffic Volumes</b>
<b>Figure 4</b>	<b>2022 No-Build Peak-Hour Traffic Volumes</b>
<b>Figure 4A</b>	<b>2022 Ambient Growth Peak-Hour Traffic Volumes</b>
<b>Figure 4B</b>	<b>Cumberland Farms Peak-Hour Traffic Volumes</b>
<b>Figure 5</b>	<b>2032 No-Build Peak-Hour Traffic Volumes</b>
<b>Figure 5A</b>	<b>2032 Ambient Growth Peak-Hour Traffic Volumes</b>

<b>Figure 6</b>	<b>Trip Distribution</b>
<b>Figure 7</b>	<b>Trip Assignment</b>
<b>Figure 7A</b>	<b>Truck Trip Assignment</b>
<b>Figure 8</b>	<b>2022 Build Peak-Hour Traffic Volumes</b>
<b>Figure 9</b>	<b>2032 Build Peak-Hour Traffic Volumes</b>

## **APPENDICES**

<b>Appendix A</b>	<b>Overall Site Plan &amp; Conceptual Improvement Plans</b>
<b>Appendix B</b>	<b>Traffic Count Data, Seasonal Adjustment Worksheets, and Journey to Work Data</b>
<b>Appendix C</b>	<b>Tenant Provided Trip Generation Information NHDOT Intra-Department Communication letters, &amp; ITE Trip Generation Worksheets</b>
<b>Appendix D</b>	<b>Capacity Analysis – 2019 Existing Traffic Conditions</b>
<b>Appendix E</b>	<b>Capacity Analysis – 2022 No-Build Traffic Conditions</b>
<b>Appendix F</b>	<b>Capacity Analysis – 2032 No-Build Traffic Conditions</b>
<b>Appendix G</b>	<b>Capacity Analysis – 2022 Build Traffic Conditions</b>
<b>Appendix H</b>	<b>Capacity Analysis – 2032 Build Traffic Conditions</b>
<b>Appendix I</b>	<b>Capacity Analysis – 2022 Base Build with Improvements Traffic Conditions</b>
<b>Appendix J</b>	<b>Capacity Analysis – 2032 Base Build with Improvements Traffic Conditions</b>
<b>Appendix K</b>	<b>Capacity Analysis – 2022 Future Build with Improvements Traffic Conditions</b>
<b>Appendix L</b>	<b>Capacity Analysis – 2032 Future Build with Improvements Traffic Conditions</b>



## **EXECUTIVE SUMMARY**

Langan has prepared this traffic impact study to identify the operating conditions of the existing roadway network, the potential impacts of the proposed Hudson Logistics Center (HLC) redevelopment at 43 Steele Road in Hudson, New Hampshire (See Figure 1 for the Location Map), improvements to address existing conditions, and to mitigate the impacts of the proposed development.

The project site is approximately 377 acres, which is currently the Green Meadows Golf Course.

The proposed development includes the subdivision of the property into three lots accessed by a proposed public roadway. Three e-commerce fulfillment center warehouse buildings along with associated parking, landscaping, utility improvements and stormwater systems are proposed to be constructed. The proposed roadway (Green Meadow Drive) will connect to Lowell Road at the current location of the Mercury Systems driveway, opposite the intersection of Rena Avenue. The project also proposes to extend Wal-Mart Boulevard (a private way) into the proposed development. Wal-Mart Boulevard forms a four-way signalized intersection on Lowell Road, opposite the westbound approach of Wal-Mart Boulevard. (See Site Plan in Appendix A).

The proposed development includes three fulfillment center warehouses. The warehouses will be part of the e-commerce supply chain. The Institute of Transportation Engineers (ITE) classifies the function of these buildings as high-cube fulfillment center warehouses. These buildings are a specific sub-category of fulfillment center in the e-commerce supply chain: non-sort fulfillment center warehouses.

The development's building construction schedule is anticipated to be phased based on individual tenant schedules; however, although not likely, for this study we will presume that the entire development will be open in 2022. This study includes a build year analysis for 2022 and a 10-year horizon build-out for 2032, in accordance with New Hampshire Department of Transportation guidelines.

### **The New Hampshire Department of Transportation has approved the trip generation, trip distribution and assignment presented in this report.**

Turning-movement and vehicle-classification counts were conducted in October 2019 at nine intersections and used as a basis for this evaluation. The proposed project's trip generation is based on ITE Land Use Code 155 High-Cube Fulfillment Center Warehouse (Non-Sort) and tenant specific data were used to evaluate the peak-hour 2022 opening year and the 2032 horizon year traffic operating conditions. The tenant of the warehouses on Lot A and B is known, as is the specific trip generations volumes for the proposed facilities. For the purpose of this study, we are utilizing the larger of the two trip generation methods, resulting in an over estimation of the trip generation for the proposed project.

A review of the analysis shows that the majority of the development traffic impacts are in the vicinity of the southern Lowell Road (Route 3A) corridor, generally at the intersections of Lowell Road from the intersection with Sagamore Bridge Road south to the new Green Meadow Drive. We propose a number of base improvements to both improve existing operating conditions and to mitigate the project related traffic impacts. These improvements would be constructed by the developer and completed prior to the opening of the development.

Based on our analyses, the following base improvements are recommended to improve existing operating conditions and mitigate the potential traffic impacts associated with the proposed development:

- Installation of new adaptive traffic signal controllers at the following intersections under the existing town control system. Adaptive signal control will allow timing optimization on-the-fly, through video detection, that will allow for seasonal and time-of-day variations in traffic. The industry standard capacity analysis software is unable to calculate this adaptive signal control and capture the efficiency this system provides. We have optimized and coordinated the signal timings in the capacity analyses at the intersections noted below to try to capture the benefits of these improvements; however, we expect the intersections to operate better than indicated in the analysis. We recommend that these signals be incorporated into the town of Hudson system. Note that the intersection of Lowell Road & Wason Road/Flagstone Road is already incorporated into the town's control system.
  - Lowell Road (Route 3A) & Wason Road/Flagstone Drive
  - Lowell Road (Route 3A) & Sagamore Bridge Road
  - Lowell Road (Route 3A) & Wal-Mart Boulevard
  - Lowell Road (Route 3A) & Green Meadow Drive/Rena Avenue
  - Lowell Road (Route 3A)/River Road/Dracut Road/Steele Road (depending on option selected)
- Signal timing optimization at the following intersections
  - Lowell Road (Route 3A) & Executive Drive during the future 2032 weekday morning peak period
  - Lowell Road (Route 3A) & Fox Hollow Drive
- At the intersection of Lowell Road/River Road/Dracut Road/Steele Road we recommend two potential improvement options:
  - Option One: Convert the existing signalized intersection of Lowell Road/River Road & Dracut Road/Steele Road to a dual-lane roundabout with an inscribed diameter of 175 feet.
    - Provide a single lane approach for Steele Road
    - Provide two lane approaches for each of other the roadways
    - Utilize existing land owned by the state of New Hampshire at the southwest corner of the intersection for the construction of the roundabout

- Option Two: Restripe one of the southbound through lanes to a second exclusive left-turn lane onto Dracut Road and widen on Dracut Road south of the intersection to accept a second receiving lane which would transition back down to a single lane with a lane drop
- Construction of the following geometric improvements at the intersection of Lowell Road and Rena Avenue/Mercury Systems driveway
  - Convert the Mercury Systems driveway into a new roadway, Green Meadow Drive, intersecting with Rena Avenue at the existing traffic signal
  - Provide two left-turn lanes and a shared thru/right-turn lane on the eastbound approach
  - Convert the existing southbound shared through/right-turn lane to a through lane
  - Construct a southbound exclusive right turn lane extending to the intersection of Walmart Boulevard
  - Adjust the existing median island north of the intersection to allow for turning movements from Green Meadow Drive
- Construction of the following geometric improvements at the intersection of Lowell Road and Walmart Boulevard
  - Convert the existing southbound exclusive right turn lane to a through lane and restripe for an additional receiving lane on the south side of the intersection to extend down to the intersection of Lowell Road and Rena Avenue
  - Construct a southbound exclusive right turn lane with approximately 400 feet of storage
  - Convert the existing northbound exclusive right turn lane to a shared through/right-turn lane and restripe/widen on the north side of the intersection to receive the additional through lane.
- Construct a third northbound left turn lane at the intersection of Lowell Road and Sagamore Bridge Road
- Widen/restripe to provide three northbound travel lanes from Rena Avenue to Walmart Boulevard. The left-most northbound travel lane will feed the proposed triple left-turn lanes on Lowell Road northbound at Sagamore Bridge Road.
- Construction of the following geometric improvements at the intersection of Lowell Road and Wason Road/Flagstone Road
  - Addition of a second northbound right turn lane
  - Geometric improvements on Wason Road eastbound east of Lowell Road
    - Construct an additional receiving lane on Wason Road eastbound to accept the two right-turning lanes from Lowell Road northbound
    - Remove exclusive left turn lanes into the Goodwill shopping center and the Market Basket shopping center to accommodate the additional travel lane
    - Provide a lane drop approximately 850 feet east of Lowell Road to meet existing Wason Road eastbound geometry

- Restriping at the intersection of Lowell Road and Fox Hollow Drive of the northbound right-turn-only lane to a shared thru/right-turn lane. Two northbound thru receiving lanes currently exist.

Due to the need for private property to accomplish further improvements at the intersection of Lowell Road and Wason Road/Flagstone Drive, the developer proposes to fund future improvements, if the town or state chooses to proceed with these improvements that will further improve operations at this intersection:

- Widen the northbound approach to provide an exclusive left-turn lane, three through lanes and two exclusive right-turn lanes
- Widen the eastbound approach to provide a shared left-turn/through lane and two exclusive right-turn lanes
- Widen to provide an additional northbound receiving lane on the north side of the intersection that becomes an exclusive right-turn lane into the Market Basket plaza
- Install variable lane usage signing/controls for the northbound approach to allow for two exclusive left-turn lanes, two through lanes and two exclusive right-turn lanes during the weekday morning commuter peak to account for the high volume of left-turning traffic onto Flagstone Drive

Upon implementation of the recommended base improvements, the traffic impact of the proposed development is mitigated and existing operating conditions will be improved as compared to current conditions. It is our professional opinion that these base improvement mitigate the traffic impacts of the proposed development.

## **1.0 INTRODUCTION**

Langan has prepared this traffic impact study to identify the operating conditions of the existing roadway network, the potential impacts of the proposed Hudson Logistics Center (HLC) development at 43 Steele Road in Hudson, New Hampshire (See Figure 1 for the Location Map), improvements to address existing conditions, and to mitigate the impacts of the proposed development.

The site is bordered by residential properties to the south, the Merrimack River to the west, and Sagamore Bridge Road to the north. Commercial and industrial uses, with frontage along Lowell Road (Route 3A), border the site to the east.

The project site is approximately 377 acres, which is currently the Green Meadows Golf Course. The proposed development includes the subdivision of the site into three lots accessed by a proposed public roadway. Three e-commerce fulfillment warehouse buildings along with associated parking, landscaping, utility improvements and stormwater systems are proposed to be constructed. The proposed new roadway will connect to Lowell Road at the current location of the Mercury Systems driveway, via an existing easement, opposite the intersection of Rena Avenue. The Mercury Systems parking facilities will tie into the new roadway called Green Meadow Drive. The project also proposes a roadway connection to Wal-Mart Boulevard (a private way). Wal-Mart Boulevard forms a four-way signalized intersection on Lowell Road, with the westbound approach of Wal-Mart Boulevard. (See Site Plan in Appendix A).

The development's building construction schedule is anticipated to be phased based on individual tenant schedules; however, although not likely, for this study we will presume that the entire development will be open in 2022. This study provides an analysis of the traffic conditions for the 2022 build-year and also a 10-year horizon build-out for 2032, in accordance with New Hampshire Department of Transportation guidelines.

## **2.0 SITE ACCESS AND STUDY LOCATIONS**

### Site Access

The project site is currently accessed by a driveway connecting to Steele Road, a residential public way. This access to the property will be abandoned and two new site access points are proposed. A proposed roadway (Green Meadow Drive) will connect to Lowell Road at the current location of the Mercury Systems driveway, opposite the signal at Rena Avenue. The Mercury Systems parking facilities will tie into the new roadway. The second site drive is proposed to connect to Wal-Mart Boulevard, a private road, and access Lowell Road (Route 3A) at its signalized intersection with the Wal-Mart Boulevard westbound approach. Provisions for these access locations were provided for in previous land-use transactions and approvals.

### Study Locations

Nine key intersections were evaluated in this study (See Figure 2 for the Study Intersections Map).

- Lowell Road (Route 3A) and Pelham Road
- Lowell Road (Route 3A) and Fox Hollow Drive/Nottingham Square Drive
- Lowell Road (Route 3A) and Executive Drive
- Lowell Road (Route 3A) and Hampshire Drive/Oblate Drive
- Lowell Road (Route 3A) and Flagstone Drive/Wason Road
- Lowell Road (Route 3A) and Sagamore Bridge Road
- Lowell Road (Route 3A) and Wal-Mart Boulevard
- Lowell Road (Route 3A) and Rena Avenue/Green Meadow Drive
- Lowell Road/River Road (Route 3A) and Dracut Road/Steele Road

Additionally, Sagamore Bridge Road was evaluated for weaving movements. This analysis is provided under a separate cover.

This study will evaluate traffic impacts of the development's peak-hours on these intersections and the area roadway network.

## **3.0 EXISTING CONDITIONS**

### Area Roadway Network

*Lowell Road (Route 3A)* is a north-south principal arterial-other under state jurisdiction. Lowell Road (Route 3A) from the north of Executive Drive is a two lane road with a posted speed limit of 30 MPH. Lowell Road (Route 3A) has a lane width is 12 feet, a 4-foot shoulder, and has a two way left turn lane with an 11-foot width. South of Executive Drive, Lowell Road (Route 3A) is a four lane road with a speed limit of 30 MPH. The speed limit increases to 35 MPH south of the Wal-Mart Boulevard. The lane width is 12 feet with a shoulder of varying widths. A 5-foot median begins at the Flagstone Drive intersection and ends at the Dracut/Steele Road intersection

*Pelham Road* is a two lane east-west local road under local jurisdiction with a posted speed limit of 30 MPH. Pelham Road provides two 11-foot wide travel lanes in each direction and a 4-foot wide shoulder in each direction.

*Fox Hollow Drive* is a two lane east-west private road with a posted speed limit of 10 MPH. Fox Hollow Drive provides two 12-foot wide travel lanes in each direction with no shoulder. There is an 8-foot wide median separating the entry and exit lanes at the Lowell Road (Route 3A) intersection.

*Nottingham Square Driveway* is a two lane east-west private with no posted speed. Nottingham Square Driveway provides a 14-foot wide travel lane in the west direction and a 17-foot wide travel lane in the east direction. There is a 6-foot wide concrete median that at the intersection with Lowell Road (Route 3A) and no shoulder.

*Executive Drive* is a two lane east-west local road under local jurisdiction with no posted speed limit. Executive Drive, east of Lowell Road (Route 3A), has an 11-foot wide travel lane with no shoulders. West of Lowell Road (Route 3A) the travel lane is 18 feet wide with no shoulder.

*Hampshire Drive* is a two lane east-west local road under local jurisdiction with a posted speed limit of 30 MPH. Both directions of Hampshire Drive have a travel lane width of 14-feet at the intersection with Lowell Road (Route 3A). The width expands to 18-feet travel lane about 400 feet west of the intersection. There is no should in either direction of Hampshire Drive.

*Oblate Drive* is a two lane east-west lane private road with a posted speed limit of 10 MPH. Oblate Drive has a 12-foot wide travel lane and 5-foot wide shoulder in both directions. There is a 5-foot wide median starting at the Lowell Road (Route 3A) intersection that continues for about 100 feet. After the 100 feet, a fence separating the lanes continues for the length of the roadway.

*Flagstone Drive* is a two lane east-west local road under local jurisdiction with a posted speed limit of 30 MPH. Flagstone Drive has a travel lane width of 18 feet and no shoulder in both directions.

*Wason Road* is a two lane east-west major collector road under local jurisdiction with a posted speed limit of 30 MPH. Wason Road has a travel lane width of 11 feet with a 2 foot shoulder in both directions. There is a 4-foot wide median starting at the Lowell Road (Route 3A) intersection. The median continues for about 170 feet along Wason Road at a width of 4 feet and another 110 feet with a width of 2 feet.

*Sagamore Bridge Road* is a six lane east-west divided principal arterial – other road under state jurisdiction with a posted speed limit of 50 MPH. Sagamore Bridge Road has lane widths of 12 feet and shoulder widths of 11 feet. There is a median width of at least 40 feet and about 300 feet at the Lowell Road (Route 3A) intersection. Sagamore Bridge Road connects the FE Everett Turnpike (Route 3) and Daniel Webster Highway on the westerly side of the Merrimac River to the east side of the river and Lowell Road (Route 3A).

*Wal-Mart Boulevard (East)* is a two lane east-west private driveway with no posted speed limit, with an average travel lane width of 12 feet with no shoulder in both directions. The westbound lane, at the intersection of Lowell Road (Route 3A), has a travel lane width of

30 feet with no shoulder. There is an 8 foot wide median that extends 200 feet from the Lowell Road (Route 3A) intersection along Wal-Mart Boulevard.

*Wal-Mart Boulevard (West)* is a two lane east-west private roadway with no posted speed limit, with a travel lane width of 15 feet that narrows to 12 feet in both directions. There is no shoulder for the driveway and there is a 7 foot wide median that extends 225 feet from the Lowell Road (Route 3A) intersection.

*Rena Avenue* is a two lane east-west local road under local jurisdiction with a posted speed limit of 25 MPH. Rena Avenue has a travel lane width of 12 feet with no shoulder in both directions.

*Mercury System's Driveway (Green Meadow Drive)* is a two lane east-west private driveway a posted speed limit of 15 MPH. Mercury System's Driveway has a travel lane width of 13 feet with no shoulder in both directions.

*Steele Road* is a two lane east-west local road under local jurisdiction with a posted speed limit of 30 MPH. Steele Road has a travel lane width of 11 feet with no shoulder in both directions.

*Dracut Road* is a two lane northwest-southeast major collector road under local jurisdiction with a posted speed limit of 35 MPH. Dracut Road has a travel lane width of 11 feet in both directions. The northwest travel lane has a shoulder width of 3 feet. The southeast travel lane has a shoulder width of 4 feet.

*River Road (Route 3A)* is a two lane north-south minor arterial road that is a continuation of Lowell Road (Route 3A).

### Study Intersections

*Lowell Road (Route 3A) and Pelham Road is a signalized "T" intersection with the following geometry:*

- Lowell Road (Route 3A) Southbound – one thru lane with approximately 1,310 feet of storage and one left-turn lane with approximately 150 feet of storage.
- Pelham Road Westbound – one right-turn lane with approximately 75 feet of storage and one left-turn lane with approximately 510 feet of storage.
- Lowell Road (Route 3A) Northbound – one shared right-turn/thru lane with approximately 550 feet of storage.

*Lowell Road (Route 3A) and Fox Hollow Drive/Nottingham Square Driveway is a signalized four way intersection with the following geometry:*



- Lowell Road (Route 3A) Southbound – one shared right-turn/thru lane with approximately 550 feet of storage and one left-turn lane with approximately 125 feet of storage.
- Nottingham Square Driveway – one right-turn lane with approximately 100 feet of storage and one left-turn/thru lane with approximately 260 feet of storage.
- Lowell Road (Route 3A) Northbound – one right-turn lane with approximately 325 feet of storage, one thru lane with approximately 1,410 feet of storage, and one left-turn lane with approximately 210 feet of storage.
- Fox Hollow Drive – one right-turn lane with approximately 50 feet of storage and one left-turn/thru lane with approximately 600 feet of storage.

*Lowell Road (Route 3A) and Executive Drive is a signalized four way intersection with the following geometry:*

- Lowell Road (Route 3A) Southbound – one right-turn/thru lane with approximately 1,170 feet of storage, one thru lane with approximately 1,170 feet of storage, and one left-turn lane with approximately 150 feet of storage.
- Executive Drive Westbound – one right-turn lane with approximately 80 feet of storage and one left-turn/thru lane with approximately 580 feet of storage.
- Lowell Road (Route 3A) Northbound – one right-turn/thru lane with approximately 1,790 feet of storage, one thru lane with approximately 1,790 feet of storage, and one left-turn lane with approximately 350 feet of storage.
- Executive Drive Eastbound – one right-turn lane with approximately 225 feet of storage and one left-turn/thru lane with approximately 490 feet of storage.

*Lowell Road (Route 3A) and Hampshire Drive/Oblate Drive is a signalized four way intersection with the following geometry:*

- Lowell Road (Route 3A) Southbound – right-turn/thru lane with approximately 1,790 feet of storage, one thru lane with approximately 1,790 feet of storage, and one left-turn lane with approximately 225 feet of storage.
- Oblate Drive – one right-turn lane with approximately 100 feet of storage and one left-turn/thru lane with approximately 380 feet of storage.
- Lowell Road (Route 3A) Northbound – one right-turn/thru lane with approximately 1,520 feet of storage, one thru lane with approximately 1,520 feet of storage, and one left-turn lane with approximately 225 feet of storage.
- Hampshire Drive – one right-turn lane with approximately 100 feet of storage and one left-turn/thru lane with approximately 500 feet of storage.

*Lowell Road (Route 3A) and Flagstone Drive/Wason Road is a signalized four way intersection with the following geometry:*

- Lowell Road (Route 3A) Southbound – one right-turn/thru lane with approximately 1,520 feet of storage, one thru lane with approximately 1,520 feet of storage, and one left-turn lane with approximately 175 feet of storage.
- Wason Road – one right-turn lane with approximately 75 feet of storage, one left-turn/thru lane with approximately 590 feet of storage, and one left-turn lane with approximately 200 feet of storage.
- Lowell Road (Route 3A) Northbound – one right-turn lane with approximately 275 feet of storage, two thru lanes with approximately 1,000 feet of storage, and one left-turn lane with approximately 575 feet of storage.
- Flagstone Drive – one right-turn lane with approximately 250 feet of storage and one left-turn/thru lane with approximately 810 feet of storage.

*Lowell Road (Route 3A) and Sagamore Bridge Road is a signalized “T” intersection with the following geometry:*

- Lowell Road (Route 3A) Southbound – two thru lanes with approximately 1,000 feet of storage and a channelized free-right-turn lane that diverges from the thru lanes approximately 330 feet from the intersection with minimal storage upstream prior to the exit ramp.
- Lowell Road (Route 3A) Northbound – two thru lanes with approximately 1,200 feet of storage and two left-turn lanes with approximately 525 feet of storage.
- Sagamore Bridge Road Eastbound – two left-turn lanes and a channelized free-right-turn lane.

*Lowell Road (Route 3A) and Wal-Mart Boulevard is a signalized four way intersection with the following geometry:*

- Lowell Road (Route 3A) Southbound – one right-turn lane with approximately 1,200 feet of storage that extends to the eastbound right-turn lane from Sagamore Bridge Road, two thru lanes with approximately 1,200 feet of storage, and two left-turn lanes with approximately 350 feet of storage.
- Wal-Mart Boulevard (East) – one right-turn lane with approximately 200 feet of storage, one thru lane with approximately 450 feet of storage, and two left-turn lanes with approximately 150 feet of storage.
- Lowell Road (Route 3A) Northbound – one right-turn lane with approximately 175 feet of storage, two thru lanes with approximately 980 feet of storage, and two left-turn lanes with approximately 350 feet of storage.

- Wal-Mart Boulevard (West) – one right-turn lane with approximately 175 feet of storage, one thru lane with approximately 400 feet of storage, and two left-turn lanes with approximately 175 feet of storage.

*Lowell Road (Route 3A) and Rena Avenue/Green Meadow Drive is a signalized four way intersection with the following geometry:*

- Lowell Road (Route 3A) Southbound – one right-turn/thru lane with approximately 980 feet of storage, one thru lane with approximately 980 feet of storage, and one left-turn lane with approximately 350 feet of storage.
- Rena Avenue – one right-turn/thru/left-turn lane with approximately 560 feet of storage.
- Lowell Road (Route 3A) Northbound – one right-turn/thru lane with approximately 1,730 feet of storage, one thru lane with approximately 1,730 feet of storage, and one left-turn lane with approximately 300 feet of storage.
- Green Meadow Drive – one right-turn lane with approximately 50 feet of storage and one left-turn/thru lane with approximately 510 feet of storage.

*Lowell Road/River Road (Route 3A) and Dracut Road/Steele Road is a signalized four way intersection with the following geometry:*

- Lowell Road (Route 3A) Southbound – one right-turn/thru lane with approximately 1,730 feet of storage, one thru lane with approximately 1,730 feet of storage and one left-turn lane with approximately 775 feet of storage.
- Dracut Road – one right-turn lane to Lowell Road (Route 3A) with approximately 800 feet of storage and one left-turn lane to Steele Road and River Road with approximately 100 feet of storage.
- River Road (Route 3A) – one right-turn/thru lane with approximately 760 feet of storage, one thru lane with approximately 760 feet of storage, and one left-turn lane with approximately 200 feet of storage.
- Steele Road – one right-turn lane to Dracut Road and River Road with approximately 50 feet of storage and one left-turn lane with approximately 590 feet of storage.

#### **4.0 INTERSECTION CAPACITY ANALYSIS MEASURES**

Langan conducted capacity analyses for the existing, no-build and build traffic conditions to assess quality of traffic flow. No-build and build scenarios were evaluated for the “opening year (OY)” and “horizon year (OY+10)” time periods in accordance with New Hampshire Department of Transportation guidelines. Capacity analyses provide an indication of the adequacy of the road and intersections to serve traffic demands.

### Level of Service Criteria

Level of Service (LOS) is the term used to denote the different operating conditions that occur at an intersection under various traffic volume demands. LOS is a qualitative measure that considers a number of factors including road geometry, speed and travel delay. LOS provides an index to the operational qualities of an intersection. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. The LOS designation is reported differently for signalized intersections and unsignalized intersections.

For signalized intersections, the analysis considers the operation of all traffic entering the intersection. For unsignalized intersections, however, the analysis considers the operation of all movements that are in conflict with other movements, such as mainline left turns and traffic exiting the side street. An overall LOS is given for signalized intersections. For unsignalized intersections, LOS is given for each specific approach.

The LOS for freeway weaving segments and for merge/diverge ramp junctions is determined by density. Density is expressed as passenger cars per mile per lane (pc/mi/ln).

The evaluation criteria used to analyze the study area intersections and roadway segments are based on the Highway Capacity Manual (HCM) 6th Edition, published by the Transportation Research Board (TRB). SYNCHRO 10 capacity analysis software was used to facilitate computer calculation for the capacity analyses at each intersection. There are a number of signalized intersections within the study area that operate under Non-NEMA or atypical phasing. These intersections cannot be analyzed utilizing the HCM 6th Edition or HCM 2010 Edition methodologies; therefore the Synchro Percentile Delay methodology was utilized. For consistency throughout the capacity analysis, all of the signalized intersections were analyzed utilizing the Percentile Delay methodology. McTrans HCS 7 capacity analysis software was used to facilitate computer calculation for the analyses of the weaving segments and merge/diverge ramp junctions.

The HCM 6<sup>th</sup> Edition defines level of service for signalized intersections as follows:

<u>Level of Service</u>	<u>Control Delay per Vehicle (sec/veh)</u>
A	≤10
B	>10 – 20
C	>20 – 35
D	>35 – 55
E	>55 – 80
F	>80

The HCM defines level of service for unsignalized intersections as follows:

<u>Level of Service</u>	<u>Control Delay per Vehicle (sec/veh)</u>
A	≤10
B	>10 – 15
C	>15 – 25
D	>25 – 35
E	>35 – 50
F	> 50

## 5.0 METHODOLOGY AND ANALYSIS

To assess the potential traffic impact of the proposed development, Langan employed a five-step methodology outlined in the following list and described in detail in subsequent sections 5.1 through 5.5:

Step One: Determine the existing peak-hour traffic volumes and evaluate traffic operating conditions for the study intersections.

Step Two: Project the existing peak-hour traffic volumes (Step One) to create 2022 and 2032 No-Build peak-hour traffic volumes (Including approved or pending developments in the area) and evaluate traffic operating conditions for the study intersections.

Step Three: Determine the traffic volumes to be generated by the proposed development. Distribute and assign these site traffic volumes throughout the study area roadway network.

Step Four: Combine the No-Build traffic volumes (Step Two) with the assigned proposed traffic (Step Three) to establish 2022 and 2032 Build traffic volumes. Determine traffic operating conditions and identify mitigation of potential impacts.

Step Five: Investigate the safety conditions within the area roadway network.

### 5.1 Step One: Determine the existing peak-hour traffic volumes and evaluate traffic operating conditions for the study intersections.

#### Existing Peak-Hour Traffic Volumes

Turning-movement counts (TMC's) and vehicle classification counts were conducted in October 2019 to determine the existing peak-hour traffic volumes. The TMC's and vehicle classification counts were conducted on a weekday during the morning (6:00 a.m. to 9:00

a.m.) and evening (4:00 p.m. to 7:00 p.m.) peak periods of the development. During these study periods, the peak hours of the adjacent roadway network generally occurred from 7:15 to 8:15 a.m. and 4:30 to 5:30 p.m.

### Seasonal Adjustments

A review of the 2019 data indicates that at count station 62315281 on Everett Turnpike, October experienced the highest average ADT and therefore is representative of peak-month conditions. To determine the potential need to adjust peak-hour count data based on seasonal traffic fluctuations, the latest peak-hour and average daily traffic volumes were reviewed at NHDOT count station 229022, located in Hudson on Sagamore Bridge Road east of the Nashua town line to establish peak-month conditions. Based on a review of the NHDOT data, the October 2016 data was utilized and no adjustment factor was applied to the weekday morning peak-hour; however, an adjustment factor of 1.007 was applied to the average weekday evening peak-hour. Figure 3 illustrates these existing peak-hour traffic volumes for the area roadway network. Traffic volume and seasonal adjustment data is provided in Appendix B.

### 2019 Existing Traffic Operating Conditions

The traffic operating conditions for the study area intersections were analyzed during the roadway peak-hour periods using the 2019 existing traffic volumes. Figure 3 illustrates the 2019 existing peak-hour traffic volumes. A summary of the traffic operating conditions is provided in Tables 6 through 9. Detailed reports can be found in Appendix D.

## **5.2 Step Two: Project the existing peak-hour traffic volumes (Step One) to create 2022 and 2032 No-Build peak-hour traffic volumes (Including approved or pending developments in the area) and evaluate traffic operating conditions for the study intersections.**

### No-Build Peak-Hour Traffic Volumes

Background traffic growth was estimated based on historical data available from NHDOT in the vicinity of the project. A review of the NHDOT data indicates that traffic volumes in Hudson have fluctuated over the last several years, but generally remained constant or increased. A review of the Nashua Regional Planning Commission's (NRPC) Hudson Boulevard Traffic Analysis, dated June 22, 2018, indicates the 2040 No-Build assignment model forecasts a 15% increase in traffic volumes from 2017, or an increase of approximately 0.65% per year. In an effort to be conservative, a reasonable growth rate of 1% annually was applied to the existing traffic volumes to develop the 2022 and 2032 background ambient growth peak-hour traffic volumes shown in Figure 4A and Figure 5A. **This growth rate has been approved for use by the NHDOT Bureau of Traffic.**

In addition to applying this growth rate, we also considered approved or pending projects and developments in the area that may add substantial traffic volume to the study area intersections. Based on discussions with NHDOT and the town of Hudson, the following area projects were included in the 2022 and 2032 No-Build volumes:

- *Flagstone Crossing (225 Lowell Road)* – The project includes the construction of a mixed-use development consisting of a bank, retail, and restaurant users. This development is currently under construction. This analysis includes the site-generated trips associated with the formerly approved Cumberland Farms project because the trip generation associated with the Flagstone Crossing was not provided to Langan at the time of the initial analysis. A review of the Flagstone Crossing Trip Generation & Site Access Letter, prepared by GPI and dated 9/30/2019, indicates that the trip generation for Flagstone Crossing is about 100 trips less than the former proposed Cumberland Farms, for both the weekday morning and evening peak-hours. It appears that these 100 trips are almost all pass-by trips, so the net change in “new” trips is not substantial. Considering the new trip generation for both developments is similar, the background trips associated with the Cumberland Farms development shown on Figure 4B was used.
- *Southbound Road Widening on Lowell Road @ Flagstone Road* – The development project noted above also includes provisions to convey land to the town of Hudson to allow for a road widening project on Lowell Road. The project has been approved and the town anticipates construction to begin in the fall of 2020. The road widening is proposed at the intersections of Lowell Road and Flagstone Road/Wason Road and Sagamore Bridge Road for the southbound approaches. At the intersection of Lowell Road and Flagstone Road/Wason Road, an additional southbound through lane will be added. At the intersection of Lowell Road and Sagamore Bridge Road, an additional southbound right-turn lane will be added to access the freeway and transition back to one lane prior to merging with the main line.

The above noted projects and developments have been included as part of the no-build analysis. We are unaware of any other substantial developments that have been submitted or are under construction that should be accounted for in the no-build conditions of the study area.

#### 2022 and 2032 No-Build Traffic Operating Conditions

The traffic operating conditions for the study area intersections were analyzed during the peak-hour periods using the 2022 no-build traffic volumes illustrated in Figure 4 and the 2032 no-build traffic volumes illustrated in Figure 5. A summary of the traffic operating

conditions is provided in Tables 6 through 9. Detailed reports can be found in Appendix E and Appendix F.

Based on discussions with NHDOT and town staff, and supported by the traffic volume data, the Lowell Road (Route 3A) corridor experiences daily peak-hour traffic congestion under existing conditions. In general, the Lowell Road corridor experiences heavy commuter related traffic volumes in the morning peak-hour and in the evening peak-hour. Langan evaluated the existing and no-build traffic operations to determine areas of capacity deficiencies without the proposed HLC development.

A review of the existing and no-build capacity analyses indicate some intersections experience unsatisfactory overall levels-of-service (LOS), unsatisfactory individual movement LOS, and extended queue lengths. There are a number of overall intersections and lane groups that already experience extensive delays that equate to LOS E or F in both the existing and no-build conditions, before the Hudson Logistics Center is constructed. There are also a number of intersections that experience extensive queuing along the mainline approaches and several locations where the existing turn-lane storage appears inadequate to accommodate the existing queues. Later in this report, we have recommended some mitigation measures to address both the existing conditions and full build-out traffic impacts within the study area.

### **5.3 Step Three: Determine the traffic volumes to be generated by the proposed development. Distribute and assign these site traffic volumes throughout the study area roadway network.**

#### Project Overview and Site Access Points

The Hudson Logistics Center includes the construction of the following facilities:

- Lot A – Fulfillment Center Warehouse - ±1.08M square-foot building footprint, ±100 loading docks, ±404 trailer parking stalls, ±1,008 car parking stalls, 683 employees
- Lot B – Fulfillment Center Warehouse - ±1.00M square-foot building footprint, ±135 loading docks, ±250 trailer parking stalls, ±417 car parking stalls, 346 employees
- Lot C – Fulfillment Center Warehouse - ±522,000 square-foot building footprint, ±130 loading docks, ±188 trailer parking stalls, ±420 car parking stalls.

Associated site improvements, including utilities, stormwater drainage upgrades, and landscaping are also proposed as part of the development. A proposed roadway, Green Meadow Drive, will connect to Lowell Road at the current location of the Mercury Systems driveway, opposite the intersection of Rena Avenue. The Mercury Systems parking facilities will tie into the new roadway. The project also proposes a driveway



connection to Wal-Mart Boulevard. Wal-Mart Boulevard forms a four-way signalized intersection on Lowell Road. (See Site Plan in Appendix A).

### Facilities Operations and Land-use Description

Both Lots A and B are proposed to be the same tenant – Amazon, however, the two facilities have different functions in the e-commerce supply chain. The tenant develops specific programming for each of their facilities, including the anticipated number of employees, shift and delivery schedules for the facility.

Lot A – The e-commerce facility on Lot A will receive bulk products brought in by tractor trailer truck, from non-affiliated vendors; called the inbound side. This product is of a scale that can be handled by employees, but are larger than can be completely automated and packaged with additional items. Employees breakdown the bulk product and separate it for storage and shipping; called the outbound side, by tenant tractor trailer trucks to the next facility in supply chain. The scale of the products requires more storage area, thus impacting the size of the facility. The inbound and outbound trucks are spread fairly evenly throughout the day.

The facility has a day shift that generally starts around 7:00 to 7:30 a.m. and generally ends around 5:30 to 6:00 p.m., and a night shift that generally starts around 6:00 to 6:30 p.m. and generally ends around 4:30 to 5:00 a.m. There are groups of employees on both shifts that carry out various tasks and functions and may report to the facilities and leave the facilities outside of these general shift times; therefore not 100% of day shift and night shift employees all begin and end their shifts at the same times and there is some volume of traffic in and out the facilities throughout the day.

Lot B – This e-commerce facility receives tractor trailer deliveries of bulk product from manufacturers and vendors of extra-large products, such as appliances and furniture, which require mechanical means, such as forklifts, to maneuver the product for storage within the building and eventual delivery to customers, via box trucks. The outgoing box trucks operate during the day shift, departing the facility prior to both the morning generator and roadway peak hours and return prior to the evening peak hour. The size and type of product results in a larger facility to store and process the product and in less trips than that you will see with the smaller, multi-product e-commerce last-mile facility.

The employee shifts operate in the same manner as those of the Lot A facility, with staggered arrivals and departures of the day and night shifts. This facility has numerous onsite amenities for the employees.

The ITE land use that the Amazon facilities are most closely associated with is High-Cube Fulfillment Center Warehouse (155) Non-Sort. Both buildings on Lot A and B are part of the e-commerce supply chain as non-sort fulfillment centers, as they handle inbound bulk

products from manufacturer or vendors and separated for the next step in the tenant’s supply chain. These products are larger and not combined with other consumer products and transported to the next step in the supply chain.

Lot C – For developing impacts for the proposed development, the current assumption is that the Lot C facility land use would be a general warehouse (LUC 150) or non-sort fulfillment center warehouse (LUC 155).

Trip Generation

Lot A and Lot B – From the ITE 10th Edition Supplement, LUC 155 provides trip generation data for two independent variables: gross-floor-area (GFA) and employees (See Appendix C for excerpts of the relevant ITE Trip Generation Manual 10<sup>th</sup> Edition). Table 1 provides the trip generation for the facilities on Lot A and Lot B associated with both variables, various peak-hour periods and the average daily trips (ADT). The table also indicates the number of studies used in the development of the data.

TABLE 1 ITE LUC 155 – FULFILLMENT CENTER (NON-SORT) – LOT A AND LOT B ANTICIPATED TRIP GENERATION BY BUILDING AREA												
LOCATION	LAND USE CODE	PEAK HOUR SCENARIO	Independent Variable		AM Peak-Hour			PM Peak-Hour			ADT	No. of Studies
			Amount	Unit	IN	OUT	TOTAL	IN	OUT	TOTAL		
Lot A	Fulfillment Ctr N-S LUC 155	Adjacent Street Traffic	1,079,700	GFA	113	27	140	67	106	173	1986	22/22/22
Lot A	Fulfillment Ctr N-S LUC 155	Generator	1,079,700	GFA	119	119	238	146	146	292	1986	1/1/22
Lot A	Fulfillment Ctr N-S LUC 155	Adjacent Street Traffic	683	Employees	72	17	89	43	66	109	1892	7/7/7
Lot B	Fulfillment Ctr N-S LUC 155	Adjacent Street Traffic	1,001,700	GFA	122	28	150	62	98	160	1830	22/22/22
Lot B	Fulfillment Ctr N-S LUC 155	Generator	1,001,700	GFA	110	110	220	135	135	270	1830	1/1/22
Lot B	Fulfillment Ctr N-S LUC 155	Adjacent Street Traffic	346	Employees	36	9	45	21	34	55	1121	7/7/7

A review of this table indicates that the adjacent street peak-hour data, with gross-floor-area (GFA) as the independent variable, is based on twenty-two studies and the data for employees as the independent variable, is based on seven studies; the generator peak-hour data is based on only one study. The ITE Trip Generation Manual cautions against using data from limited studies. The adjacent street peak-hour appears to be the appropriate scenario to utilize, instead of the generator peak-hour. The independent variable of gross-floor-area provides peak-hour trip generation that is appropriate to utilize, versus the trip generation volumes based on employees, which are low and do not appear to represent appropriate volumes, as compared to the tenant’s trip generation predictions. All the ITE LUC 155 scenarios overestimate the ADT volumes compared to the tenant anticipated volumes.

Although two of the known tenant buildings in the HLC fall within the LUC 155 Non-Sort definition, facilities within this category can vary as to specific operations. The trip

generation for the specific facilities on Lot A and B were provided by the tenant, based on the number of employees and trucks anticipated for the facilities. Table 2 provides the anticipated trip generation for Lot A and B, based on the tenant provided data. These volumes represent the anticipated 100% trip generation with no credits taken for multi-occupancy vehicles (mass transit, carpooling and ridesharing).

LOCATION	LAND USE CODE	PEAK HOUR SCENARIO	Independent Variable		AM Peak-Hour			PM Peak-Hour			ADT	No. of Studies
			Amount	Unit	IN	OUT	TOTAL	IN	OUT	TOTAL		
Lot A	Fulfillment Ctr N-S LUC 155	Generator	683	Employees	184	54	238	187	197	384	1631	Tenant
Lot B	Fulfillment Ctr N-S LUC 155	Generator	346	Employees	90	24	104	94	99	193	821	Tenant

A comparison of the ITE trip generation data for the adjacent street peak hours, based on GFA, and the tenant proposed trip generation indicates that for the Lot A facility, the tenant volumes are higher than ITE. For the Lot B facility the ITE adjacent street peak-hour volumes, based on GFA, are higher in the morning peak-hour and lower in the evening peak-hour, than the tenant provided volumes. For Lot A the ITE generator peak-hour volumes, based on GFA, are the same (with a different enter/exit distribution) during the morning peak-hour and lower in the evening peak-hour, than the tenant provided volumes. For Lot B, the ITE generator peak-hour volumes are higher than the tenant provided volumes for both peak periods. The tenant provided volumes for the facilities on Lot A & B, are both higher than the ITE adjacent street peak-hour volumes based on number of employees. A review of the ADT volumes indicate that the ITE volumes are greater than the tenant volumes and do not seem to reflect the actual programming of the facilities. These differences are not unusual as the ITE data is a collection of multiple facility types within the non-sort, fulfillment center warehouse land use and the tenant data is based on very specific facility programs.

A review of the ITE data and the tenant data for Lot A indicates that the tenant data estimates higher trip generation volumes for use in the analysis of the traffic related impacts of the Hudson Logistics Center. To provide a conservative, or overestimation, approach to the trip generation, we would propose to utilize the tenant provided volumes for Lot A and the ITE Generator volumes for Lot B. Although the ITE Generator volumes are based on only one study, they provide a higher volume than the tenant’s anticipated volumes.

Lot C – Lot C is currently a spec building, as no tenant has been identified for the building. It is anticipated that the facility will be either a warehouse (LUC 150) or a non-sort fulfillment center warehouse (LUC 155). Table 3 below indicates the trip generation of Lot C for both LUCs 150 and 155. As the number of employees for that potential facility is not known, the employee independent variable is not applicable.

LOCATION	LAND USE CODE	PEAK HOUR SCENARIO	Independent Variable		AM Peak-Hour			PM Peak-Hour			ADT	No. of Studies
			Amount	Unit	IN	OUT	TOTAL	IN	OUT	TOTAL		
Lot C	Warehouse LUC 150	Adjacent Street Traffic	522,000	GFA	68	20	88	24	66	90	870	37/47/29
Lot C	Warehouse LUC 150	Generator	522,000	GFA	57	30	87	24	77	101	870	23/25/29
Lot C	Fulfillment Ctr N-S LUC 155	Adjacent Street Traffic	522,000	GFA	63	15	78	33	51	84	870	22/22/22
Lot C	Fulfillment Ctr N-S LUC 155	Generator	522,000	GFA	58	57	115	71	70	141	870	1/1/22

Based on Table 3 above, it is recommended that for the Lot C facility, the land use and peak-hour period, used to evaluate traffic impacts of the HLC development, should be a Non-Sort Fulfillment Center Warehouse (LUC 155) and the generator peak period. Even though the generator data is only based on one study, it will provide a conservative approach to the traffic volumes associated with Lot C.

The trip generation approach outlined above should provide an overestimation of the projected traffic from the Hudson Logistics Center, resulting in a conservative analysis, or an overestimation, of the project traffic impacts. Table 4 depicts the unadjusted trip generation volumes used in the analysis to determine the potential impact of the HLC.

LOCATION	LAND USE CODE	PEAK HOUR SCENARIO	Independent Variable		AM Peak-Hour			PM Peak-Hour			ADT	No. of Studies
			Amount	Unit	IN	OUT	TOTAL	IN	OUT	TOTAL		
Lot A	Fulfillment Ctr N-S LUC 155	Generator	Tenant		184	54	238	187	197	384	1631	Tenant
Lot B	Fulfillment Ctr N-S LUC 155	Generator	1,001,700	GFA	110	110	220	135	135	270	1830	1/1/22
Lot C	Fulfillment Ctr N-S LUC 155	Generator	522,000	GFA	58	57	115	71	70	141	870	1/1/22
<b>UNADJUSTED TOTAL</b>					<b>352</b>	<b>221</b>	<b>571</b>	<b>393</b>	<b>402</b>	<b>795</b>	<b>4331</b>	

It should be pointed out that the ADT for Lot B is significantly higher than the tenant specific trip generation; over 1000 vehicle-per-day greater. The ITE LUC overestimates the trip generation of this specific facility.

**This trip generation methodology has been approved by NHDOT Bureau of Traffic, see Intra-Department Communication, dated June 18, 2020 located in Appendix C.**

Peak-Hour Period

This traffic impact analysis will utilize the peak hour of the land-uses and the peak hour of the adjacent roadways, as determined during data collection. The peak hours of the

roadway network were observed to be between 7:15 and 8:15 in the morning and between 4:30 and 5:30 in the evening. The anticipated generator peak hours of the facilities on Lots A and B occur between 6:30 and 7:30 in the morning and between 5:30 and 6:30 in the evening. The peak hours of these users and the area roadway network DO NOT occur simultaneously; however, this study will utilize the peak hours of the generators combined with the peak hours of the roadway network, providing a conservative analysis, or an overestimation, of the potential traffic impact of the development.

#### Multi-Occupancy Vehicle Credit

Amazon has experienced an increasing trend of employees utilizing multi-occupancy vehicles. The tenant's employees have been utilizing self-created carpooling, pool ridesharing (Uber, Lyft) and mass transit. The empirical data of the tenant's Massachusetts facility (See Appendix C) indicates as much as 25% of the employee vehicle trips are multi-occupancy. The developer has discussed with the Nashua Transit System about providing mass transit (bus or shuttle) service to HLC and the area businesses. They have indicated that they would be interested in providing this service and it has been planned for in the past, but there was no mechanism to do so. The developer and tenant will continue those discussion with the intent to provide mass transit service to HLC. For these types of land uses, ITE estimates an average vehicle occupancy of 1.3 persons per vehicle, with a range of 1.2 – 1.8 person per vehicle. A 1.3 person per vehicle translates to a 23% reduction in trip generation. This information can be found in Table B.3 of the ITE Trip Generation Handbook, 3rd Edition (See Appendix C).

Utilizing ITE trip generation guidance and the empirical experience of the tenant, it is suggested to utilize a credit to 5% of the trips, to the HLC, will be multi-occupancy vehicles.

**This multi-occupancy vehicle credit has been approved by NHDOT Bureau of Traffic, see Intra-Department Communication, dated June 18, 2020 located in Appendix C.**

Table 5 below represents the trip generation volumes recommended to be used in the traffic impact study.

**These volumes have been approved for use by the NHDOT Bureau of Traffic see Intra-Department Communication, dated June 18, 2020 located in Appendix C.**

**TABLE 5  
HUDSON LOGISTIC CENTER –ADJUSTED ANTICIPATED TRIP GENERATION**

LOCATION	LAND USE CODE	PEAK HOUR SCENARIO	Independent Variable		AM Peak-Hour			PM Peak-Hour			ADT	No. of Studies
			Amount	Unit	IN	OUT	TOTAL	IN	OUT	TOTAL		
Lot A	Fulfillment Ctr N-S	Generator	Tenant		184	54	238	187	197	384	1631	Tenant
Lot B	Fulfillment Ctr N-S LUC 155	Generator	1,001,700	GFA	110	110	220	135	135	270	1830	1/1/22
Lot C	Fulfillment Ctr N-S LUC 155	Generator	522,000	GFA	58	57	115	71	70	141	870	1/1/22
<b>UNADJUSTED TOTAL</b>					<b>352</b>	<b>221</b>	<b>573</b>	<b>393</b>	<b>402</b>	<b>795</b>	<b>4331</b>	
M-O Credit (5%)					-18	-11	-29	-20	-20	-40	-217	
<b>TOTAL</b>					<b>334</b>	<b>210</b>	<b>544</b>	<b>373</b>	<b>382</b>	<b>755</b>	<b>4114</b>	

Peak-Hour Trip Distribution

The site-generated traffic peak-hour volumes were distributed to and from the site onto the roadway network as a percent distribution and is illustrated on Figure 6. The distribution is based on a number of factors, including existing traffic, anticipated travel patterns of employees, truck routes, and journey to work data obtained for the town of Hudson. Journey to work data was primarily utilized to determine the distributions and was conducted by searching for the zip codes of people that work in Hudson. The tenant expects the workforce to be similar in composition to that of people that currently work in Hudson, meaning that the mixture of people that live in Hudson and the surrounding areas that currently work in Hudson will be similar to the workforce for the tenant. Once a weighted list of the zip codes of people that work in Hudson was generated, those zip codes were used to estimate the best route to and from the study area. This methodology matches up with the tenant’s expectation for their workforce demographic. The results were tabulated in the Journey to Work worksheet provided in Appendix B.

Once within the roadway network, the trips were routed to the site based on existing traffic patterns by combining and separating the distribution percentages from each approach and intersection. Based on the Journey to Work data available, approximately 15% of site-generated traffic will be accessing the site via the Lowell Road corridor north of Sagamore Bridge Road. We expect employees living locally in northern Hudson to be driving both on Lowell Road and on local roads to enter and exit the site. We routed 15% of site-generated trips as through movements on Lowell Road from the intersection with Wason Road to Pelham Road, although we expect a portion of these trips to enter or exit the corridor throughout this segment to navigate to or from their destination. Due to existing peak demands on the Lowell Road corridor, the expected re-routing of these local-road-routed site-generated trips would decrease the development’s expected impact on the Lowell Road corridor. In an effort to be conservative, the entire 15% of site-generated trips was routed through the analyzed Lowell Road corridor to provide an overestimation of the development impacts.

**This trip distribution has been approved for use by the NHDOT Bureau of Traffic see Intra-Department Communication, dated September 1, 2020 located in Appendix C.**

### Peak-Hour Trip Assignment

Figure 7 illustrates the assignment of the peak-hour site-generated trips, indicated in Table 5, into the area roadway network.

### Truck Trip Generation, Distribution, & Assignment

The tenant expects truck trips to be limited to and from the site driveways via Sagamore Bridge Road and limited truck traffic on local roads. Truck routing, to and from Sagamore Bridge Road from the two site driveways, was accounted for by adjusting the heavy vehicle percentages in the Synchro model.

See attached for truck trip assignment figure, Figure 7A. Based on the ITE Trip Generation Manual 10<sup>th</sup> Edition Supplement, the HLC is anticipated to generate 52 trucks in the morning peak-hour and 26 trips in the evening peak-hour (see Appendix C for excerpts from ITE Trip Generation Manual 10<sup>th</sup> Edition Supplement). This is calculated on a total of approximately 2.6M square-feet of High-Cube Fulfillment Center Warehouse – Non-Sort and an average truck trip generation rate of 0.02 trips per 1,000 square-feet during the morning peak-hour and 0.01 trips per 1,000 square-feet during the evening peak-hour. For comparison, utilizing the tenant specific truck volumes for Lots A & B and ITE data for Lot C, results in a trip generation of 26 total truck trips during the morning peak-hour and 13 total truck trips during the evening peak-hour. Utilizing ITE truck data for all three buildings results in twice the amount of peak-hour truck trips when compared to utilizing tenant specific data for Lots A & B; therefore, the numbers shown on the attached truck trip assignment figure should be considered conservative, or an overestimation of the truck trip generation.

It is anticipated that almost 100 percent of the tractor trailer truck traffic to and from the site will be arriving from and departing to Route 3 (Everett Turnpike) via the Lowell Road/Sagamore Bridge Road intersection, as this is the fastest and most efficient connection to HLC. Efficiency is a critical element of the e-commerce industry and the tenant of Lots A & B, so the proximity to the highway for the trucks is purposeful. The tractor trailer truck will generally come and go regionally, thus via the interstate system. Additionally, the vast majority of the trucks servicing the HLC will not be accessing the site during the roadway peak hours, so the efficiency of the highway access is even more prevalent. Considering there is no more efficient connection, further to the north or south on Route 3A, to freeway facilities in proximity to the site, we do not anticipate that many tractor trailers will utilize Route 3A to access the site.

### Saturday Peak Period

Both the Lot A and Lot B facilities will have similar operations on weekdays and Saturdays. The spreadsheets in Appendix C indicate that both facilities do not have a significant midday peak-hour. ITE data indicates that the Saturday peak-hour for a 522,000 square-foot warehousing use is expected to only generate 25 total vehicle trips. The impacts on a Saturday would be less than the weekday peak hours, therefore, we suggest that a separate analysis period on Saturday is not necessary.

## **5.4 Step Four: Combine the No-Build traffic volumes (Step Two) with the assigned proposed traffic (Step Three) to establish 2022 and 2032 Build traffic volumes. Determine traffic operating conditions and identify mitigation of potential impacts.**

### Build Traffic Volumes

To evaluate the impacts of the development, the proposed trip assignment volumes (Figure 7), as distributed on the roadway network, are combined with the 2022 no-build traffic volumes (Figure 4) and the 2032 no-build traffic volumes (Figure 5). Figure 8 and Figure 9 illustrate the 2022 build traffic volumes and the 2032 build traffic volumes in the roadway network during the peak-hour periods.

### Build Traffic Operating Conditions

The resulting traffic volumes illustrated in Figure 8 and Figure 9 were evaluated to determine the effective operating conditions of the study area intersections without any proposed improvements. Tables 6 through 9 compare the traffic operating conditions for the study area intersections during the peak-hour periods. Results shown under the build with base improvements column reflect the base recommended improvements outlined in detail later in this report and include the two-lane roundabout alternative at the intersection of Lowell Road/River Road (Route 3A) & Dracut Road/Steele Road. Appendix G and Appendix H provide detailed reports for the 2022 and 2032 build conditions.

As recommended by NHDOT, we also evaluated a potential alternate improvement at the intersection of Lowell Road/River Road at Dracut Road/Steele Road, which includes the conversion of one of the southbound through lanes to a second exclusive left-turn lane onto Dracut Road and widening on Dracut Road to accept a second receiving lane which would transition back down to a single lane with a lane drop. Table 10 compares the traffic operating conditions for the 2022 and 2032 no-build, two-lane roundabout improvement and the alternative improvement recommended by NHDOT outlined above.

Table 11 compares the traffic operating conditions for the 2022 and 2032 no-build, build with base improvements and build with potential future improvements at the intersection of Lowell Road at Flagstone Drive/Wason Road. A detailed description of the base and potential future improvement at this intersection is provided later in this report. Appendix



K and Appendix L provide detailed reports for the 2022 Future Build with Improvements and 2032 Future Build with Improvements conditions.

### Queuing Evaluation

As part of the traffic operating conditions, we evaluated the resulting vehicular queuing for all conditions to assess the impacts at study intersections. In evaluating queuing length, the industry standard is to utilize the 50<sup>th</sup> and the 95<sup>th</sup> percentile queue lengths developed by the analysis. The 50<sup>th</sup> percentile queue represents the average or typical vehicular queue that can be expected during the peak-hour. The 95<sup>th</sup> percentile queue length represents the queuing experience during the highest peak periods, which accounts for 5% of the analysis period. Queues are calculated in feet, and approximately 25 feet of queue is equal to a single vehicle. Tables 6 through 10 provide the expected 50<sup>th</sup> and 95<sup>th</sup> percentile queue lengths for the analyzed periods.

**TABLE 6  
OPENING YEAR CAPACITY ANALYSIS SUMMARY – WEEKDAY A.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	2019 EXISTING CONDITIONS					2022 NO-BUILD CONDITIONS					2022 BUILD CONDITIONS					2022 BUILD WITH BASE IMPROVEMENTS CONDITIONS							
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		
							50th%	95th%				50th%	95th%				50th%	95th%						50th%	95th%	
River Road (Route 3A)/ Lowell Road (Route 3A) & Dracut Road & Steele Road	ACTUATED-COORDINATED/ ROUNDABOUT	Overall		B	20	0.83			B	19.6	0.84			B	16.4	0.83			Overall		A	7.7				
		EB-L	±590'	D	40	0.03	2'	9'	D	40	0.03	2'	9'	D	40	0.03	2'	9'	EB-LTR	±590'	A	7.7	0.01		0'	
		EB-RR	50'	A	0	0.01	0'	0'	A	0	0.01	0'	0'	A	0	0.01	0'	0'								
		NB-L	200'	A	0	0	0'	0'	A	0	0	0'	0'	A	0	0	0'	0'	NB-LT	±760'	A	6.5	0.20		25'	
		NB-TTR	±760'	C	30.6	0.34	71'	113'	C	32.8	0.39	84'	119'	D	37.6	0.53	96'	123'	NB-TR	±760'	A	6.1	0.20		25'	
		SB-L	775'	D	40.9	0.76	302'	364'	D	37.3	0.74	293'	382'	C	23.6	0.68	149'	427'	SB-LT	>1000'	A	6.4	0.39		50'	
		SB-TTR	±1730'	A	3.6	0.21	110'	2'	A	3.4	0.22	114'	2'	A	0.7	0.22	2'	5'	SB-TR	>1000'	A	6.5	0.42		50'	
		NWB-LL	100'	D	36	0	1'	5'	D	36	0	1'	5'	D	36	0	1'	5'	WB-LTR	>1000'	A	9.6	0.48		75'	
		NWB-R	>1000'	B	14.8	0.83	184'	227'	B	15.2	0.84	168'	319'	B	14.2	0.83	138'	455'	WB-R	150'	A	9.5	0.51		75'	
Lowell Road (Route 3A) & Green Meadow Drive/ Rena Avenue	ACTUATED-COORDINATED	Overall		A	7.7	0.43			A	7.6	0.44			B	18.5	0.83			Overall		B	12.4	0.55			
		EB-LT	±510'	D	38	0.03	2'	11'	D	38	0.03	2'	11'	E	66.1	0.83	112'	208'	EB-LL		D	38.2	0.51	46'	72'	
		EB-R	50'	A	0	0.02	0'	0'	A	0	0.02	0'	0'	A	0.6	0.1	0'	0'	EB-TR	±510'	A	0.3	0.07	0'	0'	
		WB-LTR	±560'	B	17.2	0.24	1'	28'	B	17.1	0.24	1'	28'	B	13.2	0.17	1'	26'	WB-LTR	±560'	C	20.5	0.3	1'	30'	
		NB-L	300'	D	40.9	0.13	9'	16'	D	40.5	0.13	9'	15'	D	42.1	0.3	29'	37'	NB-L	300'	D	41.3	0.3	27'	57'	
		NB-TTR	±1730'	A	3.8	0.43	98'	185'	A	3.8	0.44	106'	193'	B	10.1	0.59	140'	250'	NB-TTR	±1730'	A	9.7	0.55	202'	314'	
		SB-L	350'	C	25	0.06	4'	10'	C	24.4	0.06	4'	10'	C	29.9	0.06	4'	7'	SB-L	350'	D	37.6	0.06	4'	10'	
		SB-TTR	±980'	B	11.3	0.37	237'	169'	B	11	0.39	230'	182'	B	19.6	0.67	147'	261'	SB-TT	±980'	B	12.1	0.48	98'	131'	
Lowell Road (Route 3A) & Wal-Mart Boulevard	ACTUATED-COORDINATED	Overall		B	16.4	0.6			B	16.5	0.62			B	19.6	0.79			Overall		B	15	0.54			
		EB-LL	175'	D	39.5	0.31	29'	54'	D	39.5	0.31	29'	54'	D	40.6	0.4	39'	67'	EB-LL	175'	D	45.6	0.5	40'	70'	
		EB-T	±400'	C	34.2	0.01	2'	12'	C	34.2	0.01	2'	12'	C	34	0.01	2'	12'	EB-T	±400'	D	36.2	0.01	2'	12'	
		EB-R	175'	A	0.8	0.15	0'	0'	A	0.8	0.15	0'	0'	A	0.8	0.15	0'	0'	EB-R	175'	A	1.8	0.11	0'	9'	
		WB-LL	150'	D	38.7	0.06	4'	14'	D	38.7	0.06	4'	14'	D	38.7	0.06	4'	14'	WB-LL	150'	D	38.7	0.06	4'	14'	
		WB-T	±450'	D	38.8	0.04	3'	15'	D	38.8	0.04	3'	15'	D	38.8	0.04	3'	15'	WB-T	±450'	D	38.4	0.04	3'	14'	
		WB-R	200'	A	2.4	0.28	0'	0'	A	2.4	0.28	0'	0'	A	2.4	0.28	0'	0'	WB-R	200'	A	3.9	0.19	0'	19'	
		NB-LL	350'	D	42.8	0.23	18'	44'	D	42.5	0.23	17'	44'	D	48.1	0.27	26'	45'	NB-LL	350'	D	44.9	0.28	28'	50'	
		NB-TT	±980'	B	13.7	0.6	244'	83'	B	13.8	0.62	250'	85'	B	18.2	0.79	323'	509'	NB-TTTR	±980'	B	13.2	0.54	142'	137'	
		NB-R	175'	A	0.1	0.03	0'	0'	A	0.1	0.03	0'	0'	A	0.1	0.03	0'	0'								
		SB-LL	350'	D	48.8	0.27	25'	46'	D	48.9	0.27	25'	46'	D	48.3	0.27	25'	38'	SB-LL	350'	D	47.2	0.28	25'	35'	
		SB-TT	>1000'	B	15.3	0.48	243'	325'	B	15.5	0.5	255'	339'	B	19.4	0.67	326'	424'	SB-TTT	±1190'	B	11.9	0.45	112'	240'	
SB-R	725'	A	0.3	0.07	1'	1'	A	0.3	0.07	1'	1'	A	1.3	0.2	0'	6'	SB-R	400'	A	0.5	0.16	0'	1'			
Lowell Road (Route 3A) & Sagamore Bridge Road	ACTUATED-COORDINATED	Overall		C	26.7	1.01			C	21.7	1.02			D	39.5	1.25			Overall		B	15.3	0.83			
		EB-LL	>1000'	D	37	0.84	246'	376'	D	38.4	0.86	266'	416'	D	41.3	0.89	277'	416'	EB-LL	>1000'	C	33.7	0.82	259'	334'	
		EB-R	>1000'	A	1.2	0.52	0'	0'	A	1.2	0.54	0'	0'	A	2.5	0.7	0'	0'	EB-R	>1000'	A	2.5	0.7	0'	0'	
		NB-LL	525'	D	43.1	0.95	214'	407'	E	60.2	1.02	313'	425'	F	146.2	1.25	414'	538'	NB-LLL	525'	C	25.7	0.83	221'	231'	
		NB-TT	±1190'	A	2.8	0.18	8'	4'	A	2.9	0.19	7'	4'	A	2.2	0.21	3'	4'	NB-TT	±1190'	A	4.4	0.22	16'	12'	
		SB-TT	±1000'	D	37.9	0.58	97'	133'	D	37.8	0.59	102'	138'	D	37.8	0.63	115'	158'	SB-TT	±1000'	C	33.6	0.77	118'	132'	
SB-R	200'	C	27.8	1.01	11'	267'	A	1	0.6	0'	0'	A	1	0.6	0'	0'	SB-RR	200'	A	3.9	0.6	93'	98'			

**TABLE 6  
OPENING YEAR CAPACITY ANALYSIS SUMMARY – WEEKDAY A.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	2019 EXISTING CONDITIONS					2022 NO-BUILD CONDITIONS					2022 BUILD CONDITIONS					2022 BUILD WITH BASE IMPROVEMENTS CONDITIONS						
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)
							50th%	95th%				50th%	95th%				50th%	95th%						50th%	95th%
Lowell Road (Route 3A) & Flagstone Drive/ Wason Road	ACTUATED-COORDINATED	Overall		D	47.4	0.86			D	54.4	1.04			E	55.7	1.07			Overall		D	47.3	0.97		
		EB-LT	±810'	F	85	0.33	32'	67'	F	87.4	0.66	111'	184'	F	89.9	0.66	114'	187'	EB-LT	±810'	F	112.3	0.94	66'	147'
		EB-R	250'	D	45.8	0.55	168'	247'	D	48	0.66	257'	386'	D	50.2	0.68	268'	394'	EB-R	250'	C	22.1	0.6	111'	168'
		WB-L	200'	E	69.9	0.81	342'	490'	E	71.2	0.83	336'	540'	E	73.5	0.83	347'	550'	WB-L	200'	E	72.8	0.95	205'	382'
		WB-LT	±590'	E	69.3	0.8	342'	490'	E	71.5	0.83	342'	546'	E	73.7	0.84	353'	556'	WB-LT	±590'	E	73.2	0.95	208'	386'
		WB-R	75'	A	0.2	0.06	0'	0'	A	0.2	0.06	0'	0'	A	0.2	0.06	0'	0'	WB-R	75'	A	0.2	0.06	0'	0'
		NB-L	575'	F	80.7	0.78	249'	463'	F	121.9	1.04	349'	691'	F	130.4	1.07	368'	707'	NB-L	575'	F	81.3	0.95	198'	319'
		NB-TT	±1000'	C	25.7	0.44	282'	408'	C	32.3	0.5	308'	445'	C	32.6	0.52	330'	467'	NB-TT	±1000'	B	19.3	0.55	125'	198'
		NB-R	275'	A	0.7	0.15	0'	17'	A	1	0.16	0'	22'	A	1	0.16	0'	22'	NB-RR	275'	A	0.1	0.1	0'	0'
		SB-L	175'	F	83.7	0.22	17'	48'	F	84.4	0.22	16'	48'	F	86.6	0.22	17'	49'	SB-L	175'	D	44.9	0.18	9'	29'
SB-TTR	±1520'	D	51.2	0.86	559'	705'	D	50.3	0.76	390'	485'	D	50.6	0.76	420'	512'	SB-TTTR	300'	D	53	0.97	259'	336'		
Lowell Road (Route 3A) & Hampshire Drive/ Oblate Drive	ACTUATED-UNCOORDINATED	Overall		B	12.6	0.64			B	12.8	0.66			B	13	0.67									
		EB-LT	±500'	D	42.4	0.05	3'	22'	D	43.4	0.06	3'	22'	D	44.1	0.06	4'	22'							
		EB-R	100'	A	0.3	0.05	0'	0'	A	0.4	0.05	0'	0'	A	0.4	0.05	0'	0'							
		WB-LT	±380'	D	44.6	0.03	2'	16'	D	45.6	0.04	2'	16'	D	46.4	0.04	2'	16'							
		WB-R	100'	A	0	0.02	0'	0'	A	0	0.02	0'	0'	A	0.2	0.02	0'	0'							
		NB-L	225'	D	44.7	0.51	39'	168'	D	46.1	0.53	43'	174'	D	47.4	0.54	46'	174'							
		NB-TTR	±1520'	A	5	0.26	0'	180'	A	5	0.28	0'	193'	A	5	0.29	0'	203'							
		SB-L	225'	D	47	0.02	1'	8'	D	47.5	0.02	1'	8'	D	48.5	0.02	1'	8'							
SB-TTR	±1790'	B	13.8	0.64	114'	378'	B	14.2	0.66	128'	405'	B	14.4	0.67	141'	433'									
Lowell Road (Route 3A) & Executive Drive	ACTUATED-UNCOORDINATED	Overall		C	28.3	0.85			C	29.6	0.91			C	30.3	0.93									
		EB-LT	±490'	D	44.5	0.4	22'	56'	D	49	0.44	23'	59'	D	52.3	0.47	24'	59'							
		EB-R	225'	A	3.3	0.03	0'	4'	A	3.3	0.03	0'	4'	A	3.3	0.03	0'	4'							
		WB-LT	±580'	E	63.5	0.84	109'	227'	E	68.4	0.86	115'	238'	E	72.7	0.88	120'	239'							
		WB-R	80'	B	13.4	0.33	11'	51'	B	14	0.34	12'	52'	B	14.3	0.34	12'	52'							
		NB-L	350'	E	75	0.85	94'	254'	F	87	0.91	101'	277'	F	94.3	0.93	105'	278'							
		NB-TTR	±1790'	B	12.6	0.3	78'	108'	B	12.5	0.31	85'	117'	B	12.5	0.32	92'	126'							
		SB-L	150'	E	55.7	0.64	61'	157'	E	59.3	0.66	64'	167'	E	61.9	0.67	66'	167'							
SB-TTR	±1170'	C	20.7	0.76	275'	347'	C	20.8	0.77	296'	375'	C	21	0.78	318'	402'									
Lowell Road (Route 3A) & Fox Hollow Drive/ Nottingham Square Driveway	ACTUATED-COORDINATED	Overall		C	26.6	0.81			C	30.5	0.84			C	34.4	0.88			Overall		C	33.6	0.88		
		EB-LT	±600'	F	100.2	0.3	17'	40'	F	100.2	0.3	17'	40'	F	100.2	0.3	17'	40'	EB-LT	±600'	F	100.2	0.3	17'	40'
		EB-R	50'	B	12.4	0.42	0'	3'	B	12.4	0.42	0'	3'	B	12.4	0.42	0'	3'	EB-R	50'	B	12.4	0.42	0'	3'
		WB-LT	±260'	F	90.2	0.16	9'	27'	F	90.2	0.16	9'	27'	F	90.2	0.16	9'	27'	WB-LT	±260'	F	90.2	0.16	9'	27'
		WB-R	100'	A	0.5	0.06	0'	0'	A	0.5	0.06	0'	0'	A	0.5	0.06	0'	0'	WB-R	100'	A	0.5	0.06	0'	0'
		NB-L	210'	F	89	0.08	5'	20'	F	89	0.08	5'	20'	F	89	0.08	5'	20'	NB-L	210'	F	89	0.08	5'	20'
		NB-T	±1410'	A	7.7	0.38	129'	431'	A	8	0.41	143'	475'	A	8.4	0.43	156'	517'	NB-T	±1410'	A	5.8	0.23	65'	517'
		NB-R	325'	A	0	0	0'	0'	A	0	0	0'	0'	A	0	0	0'	0'	NB-TR	325'	A	0	0	0'	0'
		SB-L	125'	F	95.9	0.28	20'	50'	F	95.9	0.28	20'	50'	F	95.9	0.28	20'	50'	SB-L	125'	F	95.9	0.28	20'	50'
SB-TR	±550'	C	33.3	0.81	334'	1917'	D	39.4	0.84	390'	2059'	D	45.4	0.88	449'	2186'	SB-TR	±550'	D	45.4	0.88	449'	2186'		

**TABLE 6  
OPENING YEAR CAPACITY ANALYSIS SUMMARY – WEEKDAY A.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	2019 EXISTING CONDITIONS					2022 NO-BUILD CONDITIONS					2022 BUILD CONDITIONS					2022 BUILD WITH BASE IMPROVEMENTS CONDITIONS						
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	
							50th%	95th%				50th%	95th%				50th%	95th%						50th%	95th%
Lowell Road (Route 3A) & Pelham Road	ACTUATED-COORDINATED	Overall		D	53.2	1.36			E	55.5	1.4			D	55	1.4									
		WB-L	±510'	F	250.3	1.36	419'	599'	F	265.8	1.4	439'	620'	F	265.8	1.4	439'	620'							
		WB-R	75'	E	56.6	0.5	59'	122'	E	57.8	0.51	62'	125'	E	57.8	0.51	62'	125'							
		NB-TR	±550'	B	16	0.42	217'	523'	B	17	0.45	238'	572'	B	18.1	0.47	258'	619'							
		SB-L	150'	F	204.4	1.03	86'	205'	F	211	1.06	91'	210'	F	211	1.06	91'	210'							
		SB-T	±1310'	B	15.5	0.71	436'	1285'	B	16.5	0.74	488'	1449'	B	17.8	0.78	548'	1690'							

**TABLE 7  
OPENING YEAR CAPACITY ANALYSIS SUMMARY – WEEKDAY P.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	2019 EXISTING CONDITIONS					2022 NO-BUILD CONDITIONS					2022 BUILD CONDITIONS					2022 BUILD WITH BASE IMPROVEMENTS CONDITIONS							
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		
							50th%	95th%				50th%	95th%				50th%	95th%						50th%	95th%	
River Road (Route 3A)/ Lowell Road (Route 3A) & Dracut Road & Steele Road	ACTUATED-COORDINATED/ ROUNDABOUT	Overall		E	63.2	1.22			E	70.2	1.26			E	77.5	1.32			Overall		B	12.9	0.74			
		EB-L	±590'	E	61	0.37	33'	62'	E	61.1	0.38	34'	63'	E	61.1	0.38	34'	63'	EB-LTR	±590'	B	10.5	0.12		0'	
		EB-RR	50'	A	0.2	0.02	0'	0'	A	0.2	0.02	0'	0'	A	0.2	0.02	0'	0'								
		NB-L	200'	D	55	0.01	1'	7'	D	55	0.01	1'	7'	D	55	0.01	1'	7'	NB-LT	±760'	C	19.5	0.59		100'	
		NB-TTR	±760'	E	55.4	0.82	238'	307'	E	56.5	0.84	250'	321'	E	57.5	0.85	256'	334'	NB-TR	±760'	C	17.6	0.59		100'	
		SB-L	775'	F	132.6	1.22	920'	1166'	F	151.5	1.26	961'	1216'	F	171.7	1.32	997'	1296'	SB-LT	>1000'	B	13.5	0.74		175'	
		SB-TTR	±1730'	A	4.1	0.17	10'	58'	A	4.1	0.18	18'	65'	A	1.2	0.19	2'	44'	SB-TR	>1000'	A	5.4	0.33		25'	
		NWB-LL	100'	D	51	0.02	3'	15'	D	51	0.03	3'	15'	D	51	0.03	3'	15'	WB-LTR	>1000'	B	12.1	0.48		75'	
		NWB-R	>1000'	B	12.9	0.66	131'	283'	B	14.3	0.68	144'	316'	B	16.4	0.72	175'	377'	WB-R	150'	B	11.4	0.49		75'	
Lowell Road (Route 3A) & Green Meadow Drive/ Rena Avenue	ACTUATED-COORDINATED	Overall		A	6.7	0.48			A	7	0.5			C	29	1.19			Overall		B	15.3	0.73			
		EB-LT	±510'	E	61.9	0.47	45'	80'	E	61.9	0.47	45'	80'	F	155.9	1.19	302'	438'	EB-LL		E	56.4	0.73	128'	147'	
		EB-R	50'	A	0.8	0.09	0'	0'	A	0.8	0.09	0'	0'	A	5.2	0.16	0'	18'	EB-TR	±510'	A	0.5	0.12	0'	0'	
		WB-LTR	±560'	A	0.9	0.09	0'	0'	A	0.9	0.1	0'	0'	A	0.5	0.08	0'	0'	WB-LTR	±560'	A	0.9	0.1	0'	0'	
		NB-L	300'	E	59.5	0.02	0'	2'	E	63	0.02	0'	1'	E	66	0.3	30'	38'	NB-L	300'	E	57.5	0.3	28'	63'	
		NB-TTR	±1730'	A	6.6	0.48	148'	226'	A	7	0.5	160'	236'	B	15.7	0.62	498'	600'	NB-TTR	±1730'	B	14.4	0.57	283'	471'	
		SB-L	350'	D	47	0.21	20'	36'	D	47	0.22	20'	36'	E	57.3	0.22	22'	30'	SB-L	350'	E	68	0.22	22'	45'	
		SB-TTR	±980'	A	3.6	0.45	80'	150'	A	3.9	0.47	76'	168'	B	14.8	0.78	137'	280'	SB-TT	±980'	A	7.8	0.58	87'	115'	
Lowell Road (Route 3A) & Wal-Mart Boulevard	ACTUATED-COORDINATED	Overall		C	28.1	0.79			C	28.5	0.82			D	43.5	1.06			Overall		C	28.3	0.89			
		EB-LL	175'	D	54.8	0.61	107'	144'	D	54.8	0.61	107'	144'	E	58.2	0.76	155'	205'	EB-LL	175'	E	73.3	0.89	161'	239'	
		EB-T	±400'	D	43	0.06	10'	29'	D	42.9	0.06	10'	29'	D	40.9	0.05	10'	29'	EB-T	±400'	D	45.2	0.05	10'	30'	
		EB-R	175'	A	9.6	0.38	0'	44'	A	9.6	0.38	0'	44'	A	9.7	0.38	0'	53'	EB-R	175'	A	9.1	0.3	7'	56'	
		WB-LL	150'	E	55.1	0.36	39'	63'	E	55.1	0.36	39'	63'	E	55.1	0.36	39'	63'	WB-LL	150'	E	58.1	0.4	39'	65'	
		WB-T	±450'	D	51	0.14	17'	41'	D	50.9	0.14	17'	41'	D	50.4	0.14	17'	41'	WB-T	±450'	D	53.6	0.15	17'	42'	
		WB-R	200'	C	24.8	0.77	28'	101'	C	25	0.78	28'	102'	C	30.7	0.8	44'	123'	WB-R	200'	C	25	0.56	99'	175'	
		NB-LL	350'	E	70.5	0.37	44'	75'	E	70.5	0.37	45'	76'	E	58.8	0.41	47'	72'	NB-LL	350'	E	66.4	0.68	48'	88'	
		NB-TT	±980'	C	22.4	0.79	278'	643'	C	23.7	0.82	289'	670'	E	63.5	1.06	708'	836'	NB-TTTR	±980'	C	22.9	0.67	246'	250'	
		NB-R	175'	A	0.6	0.11	4'	0'	A	0.5	0.11	3'	0'	A	1	0.11	0'	5'								
		SB-LL	350'	E	61.9	0.67	135'	156'	E	61.9	0.67	135'	157'	E	58.3	0.67	124'	134'	SB-LL	350'	E	75.2	0.88	139'	154'	
		SB-TT	>1000'	C	20.6	0.63	382'	511'	C	21.1	0.66	401'	532'	C	29.4	0.86	557'	727'	SB-TTT	±1190'	B	13.5	0.52	165'	217'	
SB-R	725'	A	1.3	0.24	0'	22'	A	1.5	0.24	0'	21'	A	3.2	0.38	0'	37'	SB-R	400'	A	0.2	0.27	0'	0'			
Lowell Road (Route 3A) & Sagamore Bridge Road	ACTUATED-COORDINATED	Overall		D	44.8	1.17			D	50.3	1.2			F	82.4	1.53			Overall		D	40.3	1.06			
		EB-LL	>1000'	E	76	1.05	665'	804'	F	92.6	1.1	717'	854'	F	101.6	1.12	717'	854'	EB-LL	>1000'	E	78.5	1.06	678'	815'	
		EB-R	>1000'	A	2.5	0.71	0'	0'	A	2.8	0.73	0'	0'	A	9.3	0.9	0'	5'	EB-R	>1000'	A	9.3	0.9	0'	5'	
		NB-LL	525'	F	114.5	1.17	531'	644'	F	128.6	1.2	560'	673'	F	268.1	1.53	792'	785'	NB-LLL	525'	E	73.4	1.05	433'	523'	
		NB-TT	±1190'	A	9	0.35	146'	113'	A	9.1	0.36	147'	120'	A	7.7	0.39	110'	95'	NB-TT	±1190'	B	15	0.4	221'	225'	
		SB-TT	±1000'	D	54.6	0.75	184'	240'	E	55.4	0.77	192'	250'	E	58.6	0.83	221'	284'	SB-TT	±1000'	E	63.8	0.94	245'	342'	
SB-R	200'	A	5.2	0.83	0'	0'	A	0.6	0.49	0'	0'	A	0.6	0.49	0'	0'	SB-RR	200'	A	1.8	0.49	58'	39'			

**TABLE 7  
OPENING YEAR CAPACITY ANALYSIS SUMMARY – WEEKDAY P.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	2019 EXISTING CONDITIONS				2022 NO-BUILD CONDITIONS				2022 BUILD CONDITIONS				2022 BUILD WITH BASE IMPROVEMENTS CONDITIONS									
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)
							50th%	95th%				50th%	95th%				50th%	95th%						50th%	95th%
Lowell Road (Route 3A) & Flagstone Drive/ Wason Road	ACTUATED-COORDINATED	Overall		D	42.6	0.85			D	50.6	0.94			D	52.1	0.96			Overall		C	34.6	0.83		
		EB-LT	±810'	F	81.7	0.59	90'	165'	F	90.4	0.78	187'	276'	F	92.7	0.8	190'	276'	EB-LT	±810'	E	75.6	0.79	136'	188'
		EB-R	250'	E	57.2	0.85	351'	556'	E	70.5	0.94	521'	696'	E	74.4	0.96	540'	703'	EB-R	250'	D	40.4	0.83	317'	364'
		WB-L	200'	E	57.2	0.61	207'	368'	D	53.6	0.56	227'	358'	D	53.8	0.56	231'	358'	WB-L	200'	E	69.2	0.82	198'	344'
		WB-LT	±590'	E	56.9	0.6	206'	366'	D	53.4	0.56	227'	358'	D	53.7	0.55	231'	358'	WB-LT	±590'	E	68.5	0.82	198'	343'
		WB-R	75'	A	0.2	0.05	0'	0'	A	0.2	0.05	0'	0'	A	0.2	0.05	0'	0'	WB-R	75'	A	0.2	0.06	0'	0'
		NB-L	575'	E	61.1	0.26	66'	153'	E	68.4	0.48	144'	239'	E	69.2	0.49	146'	239'	NB-L	575'	E	58.2	0.4	116'	134'
		NB-TT	±1000'	D	39.3	0.71	416'	648'	D	51	0.82	557'	663'	D	53.7	0.86	603'	715'	NB-TT	±1000'	C	28.8	0.71	251'	253'
		NB-R	275'	B	17.2	0.84	423'	809'	C	26.4	0.89	643'	992'	C	26	0.88	641'	992'	NB-RR	275'	A	2.3	0.5	15'	25'
		SB-L	175'	F	85.7	0.57	72'	156'	F	90.4	0.59	85'	151'	F	91.8	0.6	87'	151'	SB-L	175'	E	77.7	0.65	63'	123'
SB-TTR	±1520'	D	51.8	0.81	406'	576'	D	52.3	0.69	339'	379'	D	53.5	0.72	368'	408'	SB-TTTR	±430'	D	41.6	0.69	264'	318'		
Lowell Road (Route 3A) & Hampshire Drive/ Oblate Drive	ACTUATED-UNCOORDINATED	Overall		B	13.6	0.58			B	13.7	0.59			B	13.7	0.61									
		EB-LT	±500'	D	37.4	0.3	9'	43'	D	39.3	0.32	10'	46'	D	41.6	0.33	10'	48'							
		EB-R	100'	A	5.2	0.25	0'	24'	A	5.4	0.26	0'	25'	A	5.6	0.26	0'	26'							
		WB-LT	±380'	C	33	0.07	4'	22'	C	34.2	0.07	4'	23'	D	35.6	0.07	4'	24'							
		WB-R	100'	A	0	0.02	0'	0'	A	0	0.02	0'	0'	A	0	0.02	0'	0'							
		NB-L	225'	C	35	0.11	5'	30'	D	36.1	0.11	5'	30'	D	37.7	0.12	5'	31'							
		NB-TTR	±1520'	B	11.4	0.53	83'	293'	B	11.4	0.55	90'	310'	B	11.3	0.56	99'	332'							
		SB-L	225'	D	35.2	0.04	2'	15'	D	36.6	0.04	2'	15'	D	38	0.05	2'	16'							
SB-TTR	±1790'	B	15.9	0.58	104'	226'	B	15.9	0.59	112'	238'	B	15.8	0.61	124'	258'									
Lowell Road (Route 3A) & Executive Drive	ACTUATED-UNCOORDINATED	Overall		B	19	0.68			B	19.4	0.71			B	19.6	0.73									
		EB-LT	±490'	C	33.9	0.68	94'	226'	D	36.5	0.71	99'	246'	D	39.1	0.73	106'	258'							
		EB-R	225'	A	3.4	0.1	0'	19'	A	3.5	0.11	0'	20'	A	3.8	0.11	0'	21'							
		WB-LT	±580'	C	21.9	0.12	9'	31'	C	22.8	0.12	9'	32'	C	24.3	0.13	10'	33'							
		WB-R	80'	A	0.3	0.07	0'	0'	A	0.3	0.07	0'	0'	A	0.4	0.07	0'	0'							
		NB-L	350'	C	34.8	0.3	19'	58'	D	35.6	0.32	20'	61'	D	37.2	0.32	21'	63'							
		NB-TTR	±1790'	B	14.7	0.59	126'	249'	B	14.7	0.6	133'	262'	B	14.6	0.62	145'	282'							
		SB-L	150'	C	34	0.12	6'	28'	C	34.8	0.13	6'	28'	D	36.3	0.13	7'	29'							
SB-TTR	±1170'	C	20.4	0.61	126'	186'	C	20.4	0.61	134'	196'	C	20.3	0.63	148'	215'									
Lowell Road (Route 3A) & Fox Hollow Drive/ Nottingham Square Driveway	ACTUATED-COORDINATED	Overall		C	22.8	0.79			C	23.6	0.82			C	25	0.86			Overall		B	17.4	0.68		
		EB-LT	±600'	F	90.1	0.22	16'	40'	F	90.1	0.22	16'	40'	F	90.1	0.22	16'	40'	EB-LT	±600'	F	90.1	0.22	16'	40'
		EB-R	50'	A	2.8	0.2	0'	0'	A	2.8	0.2	0'	0'	A	2.8	0.2	0'	0'	EB-R	50'	A	2.8	0.2	0'	0'
		WB-LT	±260'	F	117.7	0.59	46'	81'	F	117.7	0.59	46'	81'	F	117.7	0.59	46'	81'	WB-LT	±260'	F	117.7	0.59	46'	81'
		WB-R	100'	B	16.3	0.25	0'	36'	B	16.3	0.25	0'	36'	B	16.3	0.25	0'	36'	WB-R	100'	B	16.3	0.25	0'	36'
		NB-L	210'	F	103.9	0.42	32'	70'	F	103.9	0.42	32'	70'	F	103.9	0.42	32'	70'	NB-L	210'	F	103.9	0.42	32'	70'
		NB-T	±1410'	B	19.7	0.79	627'	1657'	C	21.3	0.82	701'	1772'	C	23.8	0.86	806'	1911'	NB-T	±1410'	A	9.6	0.46	217'	519'
		NB-R	325'	A	0	0.01	0'	0'	A	0	0.01	0'	0'	A	0	0.01	0'	0'	NB-TR	325'	A	0	0	0'	0'
		SB-L	125'	F	119.5	0.68	71'	134'	F	119.5	0.68	71'	134'	F	119.5	0.68	71'	134'	SB-L	125'	F	119.5	0.68	71'	134'
SB-TR	±550'	B	11.5	0.45	204'	606'	B	12.1	0.47	219'	652'	B	13.2	0.51	250'	741'	SB-TR	±550'	B	13.2	0.51	250'	741'		



**TABLE 7  
OPENING YEAR CAPACITY ANALYSIS SUMMARY – WEEKDAY P.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	2019 EXISTING CONDITIONS					2022 NO-BUILD CONDITIONS					2022 BUILD CONDITIONS					2022 BUILD WITH BASE IMPROVEMENTS CONDITIONS						
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	
							50th%	95th%				50th%	95th%				50th%	95th%						50th%	95th%
Lowell Road (Route 3A) & Pelham Road	ACTUATED-COORDINATED	Overall		E	69.5	1.82			E	72.7	1.88			E	72.4	1.88									
		WB-L	±510'	F	113.5	0.72	118'	178'	F	114.7	0.73	123'	184'	F	114.7	0.73	123'	184'							
		WB-R	75'	C	21.8	0.63	6'	80'	C	24.5	0.65	13'	91'	C	24.5	0.65	13'	91'							
		NB-TR	±550'	E	69	0.81	701'	1887'	E	72.4	0.85	790'	2011'	E	74.5	0.89	904'	2163'							
		SB-L	150'	F	463.5	1.82	224'	369'	F	487.8	1.88	235'	384'	F	487.8	1.88	235'	384'							
		SB-T	±1310'	A	8.2	0.45	156'	585'	A	8.6	0.48	172'	631'	A	9.2	0.5	197'	722'							

**TABLE 8  
HORIZON YEAR CAPACITY ANALYSIS SUMMARY – WEEKDAY A.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	2019 EXISTING CONDITIONS					2032 NO-BUILD CONDITIONS					2032 BUILD CONDITIONS					2032 BUILD WITH BASE IMPROVEMENTS CONDITIONS							
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		
							50th%	95th%				50th%	95th%				50th%	95th%						50th%	95th%	
River Road (Route 3A)/ Lowell Road (Route 3A) & Dracut Road & Steele Road	ACTUATED-COORDINATED/ ROUNDABOUT	Overall		B	20	0.83			B	18.9	0.86			B	18.3	0.89			Overall		A	8.7	0.68			
		EB-L	±590'	D	40	0.03	2'	9'	D	40	0.03	2'	9'	D	40	0.03	2'	9'	EB-LTR	±590'	A	8.5	0.01		0'	
		EB-RR	50'	A	0	0.01	0'	0'	A	0	0.01	0'	0'	A	0	0.01	0'	0'								
		NB-L	200'	A	0	0	0'	0'	A	0	0	0'	0'	A	0	0	0'	0'	NB-LT	±760'	A	7.2	0.23		25'	
		NB-TTR	±760'	C	30.6	0.34	71'	113'	D	43.2	0.68	102'	131'	D	43.8	0.7	106'	135'	NB-TR	±760'	A	6.7	0.23		25'	
		SB-L	775'	D	40.9	0.76	302'	364'	C	26.8	0.67	251'	455'	C	20.1	0.7	152'	495'	SB-LT	>1000'	A	6.9	0.43		50'	
		SB-TTR	±1730'	A	3.6	0.21	110'	2'	A	2.5	0.24	104'	2'	A	0.6	0.24	2'	5'	SB-TR	>1000'	A	7	0.46		50'	
		NWB-LL	100'	D	36	0	1'	5'	D	36	0	1'	5'	D	36	0	1'	5'	WB-LTR	>1000'	B	11.2	0.55		75'	
		NWB-R	>1000'	B	14.8	0.83	184'	227'	B	16	0.86	182'	726'	B	18.8	0.89	215'	774'	WB-R	150'	B	11.1	0.57		100'	
Lowell Road (Route 3A) & Green Meadow Drive/ Rena Avenue	ACTUATED-COORDINATED	Overall		A	7.7	0.43			A	7.2	0.49			B	19	0.86			Overall		B	12.8	0.6			
		EB-LT	±510'	D	38	0.03	2'	11'	D	38	0.03	2'	10'	E	70.4	0.86	112'	208'	EB-LL		D	43.2	0.59	53'	76'	
		EB-R	50'	A	0	0.02	0'	0'	A	0	0.02	0'	0'	A	0.6	0.1	0'	0'	EB-TR	±510'	A	0.4	0.08	0'	0'	
		WB-LTR	±560'	B	17.2	0.24	1'	28'	B	17	0.26	1'	29'	B	13	0.18	1'	27'	WB-LTR	±560'	B	13.1	0.18	1'	27'	
		NB-L	300'	D	40.9	0.13	9'	16'	D	40.7	0.13	10'	12'	D	41	0.3	29'	32'	NB-L	300'	D	41.3	0.3	27'	57'	
		NB-TTR	±1730'	A	3.8	0.43	98'	185'	A	4.2	0.49	137'	234'	B	10.4	0.65	177'	278'	NB-TTR	±1730'	B	10.1	0.6	180'	368'	
		SB-L	350'	C	25	0.06	4'	10'	C	25.9	0.06	4'	10'	C	30.5	0.06	5'	7'	SB-L	350'	D	36.8	0.06	5'	10'	
		SB-TTR	±980'	B	11.3	0.37	237'	169'	A	9.6	0.42	196'	220'	C	20.5	0.72	183'	298'	SB-TT	±980'	B	12.6	0.53	77'	170'	
Lowell Road (Route 3A) & Wal-Mart Boulevard	ACTUATED-COORDINATED	Overall		B	16.4	0.6			B	17.4	0.68			C	21.4	0.86			Overall		B	15.8	0.58			
		EB-LL	175'	D	39.5	0.31	29'	54'	D	39.5	0.31	29'	54'	D	40.6	0.4	39'	67'	EB-LL	175'	D	45.6	0.5	40'	70'	
		EB-T	±400'	C	34.2	0.01	2'	12'	C	34.2	0.01	2'	12'	C	34	0.01	2'	12'	EB-T	±400'	D	36.5	0.02	2'	12'	
		EB-R	175'	A	0.8	0.15	0'	0'	A	0.8	0.15	0'	0'	A	0.8	0.15	0'	0'	EB-R	175'	A	0.9	0.17	0'	0'	
		WB-LL	150'	D	38.7	0.06	4'	14'	D	38.7	0.06	4'	14'	D	38.7	0.06	4'	14'	WB-LL	150'	D	38.7	0.06	4'	14'	
		WB-T	±450'	D	38.8	0.04	3'	15'	D	38.8	0.04	3'	15'	D	38.8	0.04	3'	15'	WB-T	±450'	D	38.8	0.04	3'	15'	
		WB-R	200'	A	2.4	0.28	0'	0'	A	2.4	0.28	0'	0'	A	2.4	0.28	0'	0'	WB-R	200'	A	2.4	0.28	0'	0'	
		NB-LL	350'	D	42.8	0.23	18'	44'	D	44.6	0.23	14'	44'	D	47.3	0.27	26'	41'	NB-LL	350'	D	44.9	0.27	27'	46'	
		NB-TT	±980'	B	13.7	0.6	244'	83'	B	15.4	0.68	277'	312'	C	21.4	0.86	365'	591'	NB-TTTR	±980'	B	13.9	0.58	246'	167'	
		NB-R	175'	A	0.1	0.03	0'	0'	A	0	0.03	0'	0'	A	0	0.03	0'	0'								
		SB-LL	350'	D	48.8	0.27	25'	46'	D	48.9	0.27	25'	43'	D	48.1	0.27	25'	35'	SB-LL	350'	D	48.7	0.29	25'	34'	
		SB-TT	>1000'	B	15.3	0.48	243'	325'	B	16.4	0.55	290'	381'	C	20.8	0.73	366'	503'	SB-TTT	±1190'	B	13.5	0.49	215'	278'	
SB-R	725'	A	0.3	0.07	1'	1'	A	0.3	0.07	0'	0'	A	1.2	0.2	0'	4'	SB-R	400'	A	0.8	0.2	0'	0'			
Lowell Road (Route 3A) & Sagamore Bridge Road	ACTUATED-COORDINATED	Overall		C	26.7	1.01			D	35.9	1.2			E	55.5	1.42			Overall		B	19.9	0.97			
		EB-LL	>1000'	D	37	0.84	246'	376'	D	45.1	0.93	315'	482'	D	50.9	0.96	323'	482'	EB-LL	>1000'	D	51.3	0.97	320'	457'	
		EB-R	>1000'	A	1.2	0.52	0'	0'	A	1.5	0.59	0'	0'	A	3.4	0.76	0'	0'	EB-R	>1000'	A	3.4	0.76	0'	0'	
		NB-LL	525'	D	43.1	0.95	214'	407'	F	129.6	1.2	378'	491'	F	218.8	1.42	476'	601'	NB-LLL	525'	C	26	0.86	78'	240'	
		NB-TT	±1190'	A	2.8	0.18	8'	4'	A	2.8	0.22	3'	4'	A	2.3	0.23	3'	4'	NB-TT	±1190'	A	4.4	0.23	11'	16'	
		SB-TT	±1000'	D	37.9	0.58	97'	133'	D	37.7	0.62	110'	152'	D	38.2	0.66	125'	173'	SB-TT	±1000'	D	49.3	0.79	124'	133'	
SB-R	200'	C	27.8	1.01	11'	267'	A	1.2	0.66	0'	0'	A	1.2	0.66	0'	0'	SB-RR	200'	A	4.6	0.66	261'	269'			



**TABLE 8  
HORIZON YEAR CAPACITY ANALYSIS SUMMARY – WEEKDAY A.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	2019 EXISTING CONDITIONS					2032 NO-BUILD CONDITIONS					2032 BUILD CONDITIONS					2032 BUILD WITH BASE IMPROVEMENTS CONDITIONS						
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)
							50th%	95th%				50th%	95th%				50th%	95th%						50th%	95th%
Lowell Road (Route 3A) & Flagstone Drive/ Wason Road	ACTUATED-COORDINATED	Overall		D	47.4	0.86			E	63.7	1.23			E	64.9	1.25			Overall		E	55.3	1.25		
		EB-LT	±810'	F	85	0.33	32'	67'	F	95.6	0.7	130'	192'	F	97.4	0.7	134'	192'	EB-LT	±810'	F	120.4	0.98	69'	152'
		EB-R	250'	D	45.8	0.55	168'	247'	E	58.1	0.76	336'	433'	E	59.9	0.77	349'	433'	EB-R	250'	C	28	0.7	134'	197'
		WB-L	200'	E	69.9	0.81	342'	490'	E	79.4	0.88	418'	655'	F	81.4	0.88	432'	655'	WB-L	200'	F	82.8	1	229'	422'
		WB-LT	±590'	E	69.3	0.8	342'	490'	E	79.4	0.88	424'	660'	F	81.3	0.88	437'	660'	WB-LT	±590'	F	82.5	1	231'	425'
		WB-R	75'	A	0.2	0.06	0'	0'	A	0.2	0.07	0'	0'	A	0.2	0.07	0'	0'	WB-R	75'	A	0.2	0.06	0'	0'
		NB-L	575'	F	80.7	0.78	249'	463'	F	184.1	1.23	488'	777'	F	193.7	1.25	510'	777'	NB-L	575'	F	155.6	1.25	236'	293'
		NB-TT	±1000'	C	25.7	0.44	282'	408'	D	35.1	0.55	396'	507'	D	35.4	0.57	422'	532'	NB-TT	±1000'	B	16.3	0.62	241'	295'
		NB-R	275'	A	0.7	0.15	0'	17'	A	1	0.17	0'	23'	A	1	0.17	0'	23'	NB-RR	275'	A	3.8	0.11	20'	26'
		SB-L	175'	F	83.7	0.22	17'	48'	F	90.4	0.27	22'	55'	F	91.8	0.27	23'	55'	SB-L	175'	D	45.8	0.21	11'	33'
SB-TTR	±1520'	D	51.2	0.86	559'	705'	D	53.1	0.79	488'	547'	D	53.8	0.8	523'	578'	SB-TTTR	±410'	D	53.2	0.98	285'	367'		
Lowell Road (Route 3A) & Hampshire Drive/ Oblate Drive	ACTUATED-UNCOORDINATED	Overall		B	12.6	0.64			B	13.8	0.71			B	14.1	0.73									
		EB-LT	±500'	D	42.4	0.05	3'	22'	D	44.6	0.07	4'	23'	D	45	0.07	5'	23'							
		EB-R	100'	A	0.3	0.05	0'	0'	A	0.4	0.06	0'	0'	A	0.4	0.06	0'	0'							
		WB-LT	±380'	D	44.6	0.03	2'	16'	D	46.8	0.04	2'	16'	D	47	0.04	3'	16'							
		WB-R	100'	A	0	0.02	0'	0'	A	0.2	0.02	0'	0'	A	0.2	0.02	0'	0'							
		NB-L	225'	D	44.7	0.51	39'	168'	D	49.1	0.58	56'	201'	D	50.7	0.6	61'	201'							
		NB-TTR	±1520'	A	5	0.26	0'	180'	A	5.1	0.3	0'	217'	A	5.2	0.32	0'	228'							
		SB-L	225'	D	47	0.02	1'	8'	D	49	0.02	1'	8'	D	49	0.02	1'	8'							
SB-TTR	±1790'	B	13.8	0.64	114'	378'	B	15.5	0.71	160'	475'	B	15.9	0.73	172'	506'									
Lowell Road (Route 3A) & Executive Drive	ACTUATED-UNCOORDINATED	Overall		C	28.3	0.85			C	34.2	1.08			D	35	1.11			Overall		C	33.3	0.96		
		EB-LT	±490'	D	44.5	0.4	22'	56'	D	52.8	0.48	29'	65'	E	55.3	0.5	30'	65'	EB-LT	±490'	E	61.9	0.54	32'	67'
		EB-R	225'	A	3.3	0.03	0'	4'	A	3.6	0.03	0'	5'	A	3.5	0.03	0'	5'	EB-R	225'	A	3.7	0.03	0'	5'
		WB-LT	±580'	E	63.5	0.84	109'	227'	E	76.5	0.89	127'	226'	F	80.4	0.91	133'	226'	WB-LT	±580'	F	83.6	0.91	140'	252'
		WB-R	80'	B	13.4	0.33	11'	51'	B	14.4	0.34	13'	51'	B	14.6	0.35	13'	51'	WB-R	80'	B	15.8	0.35	16'	55'
		NB-L	350'	E	75	0.85	94'	254'	F	132.9	1.08	139'	318'	F	141.1	1.11	148'	318'	NB-L	350'	F	100.4	0.96	132'	296'
		NB-TTR	±1790'	B	12.6	0.3	78'	108'	B	12.4	0.32	94'	135'	B	12.5	0.33	102'	145'	NB-TTR	±1790'	B	12	0.32	102'	135'
		SB-L	150'	E	55.7	0.64	61'	157'	E	66.2	0.7	70'	171'	E	68.3	0.71	73'	171'	SB-L	150'	E	72.7	0.74	76'	172'
SB-TTR	±1170'	C	20.7	0.76	275'	347'	C	21.9	0.8	350'	464'	C	22.4	0.82	375'	497'	SB-TTR	±1170'	C	23.7	0.83	394'	488'		
Lowell Road (Route 3A) & Fox Hollow Drive/ Nottingham Square Driveway	ACTUATED-COORDINATED	Overall		C	26.6	0.81			D	42	0.93			D	46.4	0.96			Overall		D	45.5	0.96		
		EB-LT	±600'	F	100.2	0.3	17'	40'	F	100.2	0.3	17'	40'	F	100.2	0.3	17'	40'	EB-LT	±600'	F	100.2	0.3	17'	40'
		EB-R	50'	B	12.4	0.42	0'	3'	B	12.4	0.42	0'	3'	B	12.4	0.42	0'	3'	EB-R	50'	B	12.4	0.42	0'	3'
		WB-LT	±260'	F	90.2	0.16	9'	27'	F	90.2	0.16	9'	27'	F	90.2	0.16	9'	27'	WB-LT	±260'	F	90.2	0.16	9'	27'
		WB-R	100'	A	0.5	0.06	0'	0'	A	0.5	0.06	0'	0'	A	0.5	0.06	0'	0'	WB-R	100'	A	0.5	0.06	0'	0'
		NB-L	210'	F	89	0.08	5'	20'	F	89	0.08	5'	20'	F	89	0.08	5'	20'	NB-L	210'	F	89	0.08	5'	20'
		NB-T	±1410'	A	7.7	0.38	129'	431'	A	8.6	0.45	166'	548'	A	9	0.47	180'	595'	NB-T	±1410'	A	5.9	0.25	73'	227'
		NB-R	325'	A	0	0	0'	0'	A	0	0	0'	0'	A	0	0	0'	0'	NB-TR	325'	A	0	0	0'	0'
SB-L	125'	F	95.9	0.28	20'	50'	F	95.9	0.28	20'	50'	F	95.9	0.28	20'	50'	SB-L	125'	F	95.9	0.28	20'	50'		
SB-TR	±550'	C	33.3	0.81	334'	1917'	E	56.6	0.93	582'	2389'	E	63.5	0.96	695'	2516'	SB-TR	±550'	E	63.5	0.96	695'	2516'		

**TABLE 8  
HORIZON YEAR CAPACITY ANALYSIS SUMMARY – WEEKDAY A.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	2019 EXISTING CONDITIONS					2032 NO-BUILD CONDITIONS					2032 BUILD CONDITIONS					2032 BUILD WITH BASE IMPROVEMENTS CONDITIONS						
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	
							50th%	95th%				50th%	95th%				50th%	95th%						50th%	95th%
Lowell Road (Route 3A) & Pelham Road	ACTUATED-COORDINATED	Overall		D	53.2	1.36			E	65.7	1.55			E	65.5	1.55									
		WB-L	±510'	F	250.3	1.36	419'	599'	F	320.3	1.55	509'	695'	F	320.3	1.55	509'	695'							
		WB-R	75'	E	56.6	0.5	59'	122'	E	63.3	0.56	73'	143'	E	63.3	0.56	73'	143'							
		NB-TR	±550'	B	16	0.42	217'	523'	B	19.1	0.49	276'	661'	C	20.7	0.52	300'	715'							
		SB-L	150'	F	204.4	1.03	86'	205'	F	238.7	1.17	109'	233'	F	238.7	1.17	109'	233'							
		SB-T	±1310'	B	15.5	0.71	436'	1285'	B	19.6	0.82	632'	1850'	C	21.6	0.86	716'	1982'							

**TABLE 9  
HORIZON YEAR CAPACITY ANALYSIS SUMMARY – WEEKDAY P.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	2019 EXISTING CONDITIONS					2032 NO-BUILD CONDITIONS					2032 BUILD CONDITIONS					2032 BUILD WITH BASE IMPROVEMENTS CONDITIONS							
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		
							50th%	95th%				50th%	95th%				50th%	95th%						50th%	95th%	
River Road (Route 3A)/ Lowell Road (Route 3A) & Dracut Road & Steele Road	ACTUATED-COORDINATED/ ROUNDABOUT	Overall		E	63.2	1.22			F	93.6	1.41			F	101.9	1.46			Overall		C	16.8	0.81			
		EB-L	±590'	E	61	0.37	33'	62'	E	61.5	0.4	38'	68'	E	61.5	0.4	38'	68'	EB-LTR	±590'	B	12.3	0.15		25'	
		EB-RR	50'	A	0.2	0.02	0'	0'	A	0.2	0.02	0'	0'	A	0.2	0.02	0'	0'								
		NB-L	200'	D	55	0.01	1'	7'	D	55	0.01	1'	7'	D	55	0.01	1'	7'	NB-LT	±760'	D	28.4	0.72		150'	
		NB-TTR	±760'	E	55.4	0.82	238'	307'	E	62.6	0.91	282'	390'	E	64.1	0.92	288'	402'	NB-TR	±760'	D	25.2	0.71		150'	
		SB-L	775'	F	132.6	1.22	920'	1166'	F	211.8	1.41	1088'	1394'	F	234	1.46	1169'	1470'	SB-LT	>1000'	C	17.2	0.81		250'	
		SB-TTR	±1730'	A	4.1	0.17	10'	58'	A	4.3	0.2	36'	86'	A	1.3	0.21	2'	48'	SB-TR	>1000'	A	5.8	0.36		50'	
		NWB-LL	100'	D	51	0.02	3'	15'	D	51.2	0.03	4'	17'	D	51.2	0.03	4'	17'	WB-LTR	>1000'	C	15.1	0.57		100'	
		NWB-R	>1000'	B	12.9	0.66	131'	283'	B	19.5	0.77	222'	315'	C	22.4	0.81	270'	446'	WB-R	150'	B	14.2	0.58		100'	
Lowell Road (Route 3A) & Green Meadow Drive/ Rena Avenue	ACTUATED-COORDINATED	Overall		A	6.7	0.48			A	7.9	0.55			C	30.1	1.19			Overall		B	16.5	0.74			
		EB-LT	±510'	E	61.9	0.47	45'	80'	E	61.9	0.47	45'	80'	F	155.9	1.19	303'	438'	EB-LL		E	57.4	0.74	122'	158'	
		EB-R	50'	A	0.8	0.09	0'	0'	A	0.8	0.09	0'	0'	A	5.2	0.16	0'	18'	EB-TR	±510'	A	0.5	0.12	0'	0'	
		WB-LTR	±560'	A	0.9	0.09	0'	0'	A	0.8	0.1	0'	0'	A	0.4	0.07	0'	0'	WB-LTR	±560'	A	0.4	0.07	0'	0'	
		NB-L	300'	E	59.5	0.02	0'	2'	E	63.5	0.02	1'	1'	E	64.5	0.3	30'	34'	NB-L	300'	E	57.5	0.3	28'	63'	
		NB-TTR	±1730'	A	6.6	0.48	148'	226'	A	8.1	0.55	197'	628'	B	17.5	0.69	565'	688'	NB-TTR	±1730'	B	16.7	0.65	407'	533'	
		SB-L	350'	D	47	0.21	20'	36'	D	48.7	0.23	22'	38'	E	56.8	0.23	23'	29'	SB-L	350'	E	67.2	0.23	23'	45'	
		SB-TTR	±980'	A	3.6	0.45	80'	150'	A	4.8	0.52	97'	204'	B	17.9	0.85	201'	356'	SB-TT	±980'	A	9.1	0.66	103'	123'	
Lowell Road (Route 3A) & Wal-Mart Boulevard	ACTUATED-COORDINATED	Overall		C	28.1	0.79			C	30.6	0.91			E	56.8	1.15			Overall		C	27.9	0.89			
		EB-LL	175'	D	54.8	0.61	107'	144'	D	54.8	0.61	107'	144'	E	58.2	0.76	155'	205'	EB-LL	175'	E	73.3	0.89	161'	239'	
		EB-T	±400'	D	43	0.06	10'	29'	D	42.9	0.06	10'	29'	D	40.9	0.05	10'	29'	EB-T	±400'	D	45.4	0.06	10'	30'	
		EB-R	175'	A	9.6	0.38	0'	44'	A	9.6	0.38	0'	44'	A	9.7	0.38	0'	53'	EB-R	175'	A	5.4	0.38	0'	23'	
		WB-LL	150'	E	55.1	0.36	39'	63'	E	55.1	0.36	39'	63'	E	55.1	0.36	39'	63'	WB-LL	150'	E	58.1	0.4	39'	65'	
		WB-T	±450'	D	51	0.14	17'	41'	D	50.9	0.14	17'	41'	D	50.4	0.14	17'	41'	WB-T	±450'	D	54.2	0.16	17'	42'	
		WB-R	200'	C	24.8	0.77	28'	101'	C	25.3	0.78	29'	103'	C	30.7	0.8	44'	123'	WB-R	200'	C	29.1	0.81	29'	125'	
		NB-LL	350'	E	70.5	0.37	44'	75'	E	67.7	0.37	45'	75'	E	57.9	0.41	48'	67'	NB-LL	350'	E	64.4	0.62	49'	86'	
		NB-TT	±980'	C	22.4	0.79	278'	643'	C	29.7	0.91	325'	787'	F	100.7	1.15	821'	954'	NB-TTTR	±980'	C	21.8	0.73	199'	261'	
		NB-R	175'	A	0.6	0.11	4'	0'	A	0.7	0.11	0'	5'	A	1.8	0.11	0'	6'								
		SB-LL	350'	E	61.9	0.67	135'	156'	E	61.3	0.67	135'	145'	E	57.6	0.67	125'	122'	SB-LL	350'	E	65.6	0.84	130'	131'	
		SB-TT	>1000'	C	20.6	0.63	382'	511'	C	22.6	0.72	461'	602'	C	32.2	0.93	627'	756'	SB-TTT	±1190'	B	16.8	0.57	345'	349'	
SB-R	725'	A	1.3	0.24	0'	22'	A	2	0.24	0'	17'	A	3.9	0.39	8'	32'	SB-R	400'	A	0.3	0.33	0'	0'			
Lowell Road (Route 3A) & Sagamore Bridge Road	ACTUATED-COORDINATED	Overall		D	44.8	1.17			E	72.6	1.33			F	106.8	1.66			Overall		E	57.3	1.26			
		EB-LL	>1000'	E	76	1.05	665'	804'	F	145.4	1.23	850'	987'	F	153.4	1.25	850'	987'	EB-LL	>1000'	F	154.9	1.26	850'	987'	
		EB-R	>1000'	A	2.5	0.71	0'	0'	A	4.2	0.81	0'	0'	C	20.6	0.98	0'	216'	EB-R	>1000'	C	20.6	0.98	0'	216'	
		NB-LL	525'	F	114.5	1.17	531'	644'	F	180.9	1.33	660'	753'	F	322.5	1.66	890'	807'	NB-LLL	525'	E	63.7	1.04	451'	549'	
		NB-TT	±1190'	A	9	0.35	146'	113'	A	9.4	0.39	155'	126'	A	7.7	0.42	128'	100'	NB-TT	±1190'	A	7.7	0.42	130'	165'	
		SB-TT	±1000'	D	54.6	0.75	184'	240'	E	58.3	0.82	216'	277'	E	63.9	0.89	245'	337'	SB-TT	±1000'	E	72.5	1.02	251'	358'	
SB-R	200'	A	5.2	0.83	0'	0'	A	0.8	0.54	0'	0'	A	0.8	0.54	0'	0'	SB-RR	200'	A	2	0.54	72'	46'			

**TABLE 9  
HORIZON YEAR CAPACITY ANALYSIS SUMMARY – WEEKDAY P.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	2019 EXISTING CONDITIONS				2032 NO-BUILD CONDITIONS				2032 BUILD CONDITIONS				2032 BUILD WITH BASE IMPROVEMENTS CONDITIONS									
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)	LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	QUEUES (ft)
							50th%	95th%				50th%	95th%				50th%	95th%						50th%	95th%
Lowell Road (Route 3A) & Flagstone Drive/ Wason Road	ACTUATED-COORDINATED	Overall		D	42.6	0.85			E	67.9	1.13			E	68.7	1.13			Overall		C	35	0.9		
		EB-LT	±810'	F	81.7	0.59	90'	165'	F	105.9	0.86	216'	302'	F	107.3	0.87	216'	306'	EB-LT	±810'	F	92.1	0.9	148'	232'
		EB-R	250'	E	57.2	0.85	351'	556'	F	125.3	1.13	749'	825'	F	128.6	1.13	749'	835'	EB-R	250'	D	48.1	0.9	373'	439'
		WB-L	200'	E	57.2	0.61	207'	368'	E	56.3	0.57	283'	400'	E	57.4	0.58	283'	402'	WB-L	200'	E	73.5	0.87	221'	382'
		WB-LT	±590'	E	56.9	0.6	206'	366'	E	56.1	0.56	281'	395'	E	57.1	0.57	281'	400'	WB-LT	±590'	E	72.3	0.86	220'	378'
		WB-R	75'	A	0.2	0.05	0'	0'	A	0.2	0.05	0'	0'	A	0.2	0.05	0'	0'	WB-R	75'	A	0.3	0.07	0'	0'
		NB-L	575'	E	61.1	0.26	66'	153'	E	76.7	0.57	167'	253'	E	77.6	0.58	167'	255'	NB-L	575'	E	57.8	0.4	111'	117'
		NB-TT	±1000'	D	39.3	0.71	416'	648'	E	60.1	0.9	654'	763'	E	63.0	0.93	705'	823'	NB-TT	±1000'	B	19.5	0.81	200'	161'
		NB-R	275'	B	17.2	0.84	423'	809'	E	55.5	0.97	993'	1506'	D	53.8	0.97	993'	1512'	NB-RR	275'	A	0.6	0.57	5'	1'
		SB-L	175'	F	85.7	0.57	72'	156'	F	100.1	0.67	102'	165'	F	101.3	0.68	102'	166'	SB-L	175'	F	93.6	0.77	71'	155'
SB-TTR	±1520'	D	51.8	0.81	406'	576'	E	55.3	0.71	384'	425'	E	55.8	0.73	414'	455'	SB-TTTR	±410'	D	45.4	0.79	300'	346'		
Lowell Road (Route 3A) & Hampshire Drive/ Oblate Drive	ACTUATED-UNCOORDINATED	Overall		B	13.6	0.58			B	14.5	0.61			B	14.5	0.62									
		EB-LT	±500'	D	37.4	0.3	9'	43'	D	46.2	0.37	11'	51'	D	49	0.38	12'	55'							
		EB-R	100'	A	5.2	0.25	0'	24'	A	5.9	0.29	0'	28'	A	6.2	0.3	0'	29'							
		WB-LT	±380'	C	33	0.07	4'	22'	D	38.3	0.08	5'	26'	D	40.3	0.08	5'	27'							
		WB-R	100'	A	0	0.02	0'	0'	A	0.2	0.02	0'	0'	A	0.2	0.02	0'	0'							
		NB-L	225'	C	35	0.11	5'	30'	D	40.6	0.13	6'	35'	D	42.6	0.14	6'	36'							
		NB-TTR	±1520'	B	11.4	0.53	83'	293'	B	12.9	0.6	108'	358'	B	12.8	0.61	118'	381'							
		SB-L	225'	D	35.2	0.04	2'	15'	D	40.8	0.05	2'	18'	D	42.8	0.06	2'	18'							
SB-TTR	±1790'	B	15.9	0.58	104'	226'	B	15.5	0.61	131'	272'	B	15.4	0.62	145'	293'									
Lowell Road (Route 3A) & Executive Drive	ACTUATED-UNCOORDINATED	Overall		B	19	0.68			C	20.8	0.82			C	21.2	0.85									
		EB-LT	±490'	C	33.9	0.68	94'	226'	D	46.9	0.82	122'	301'	D	51.9	0.85	129'	322'							
		EB-R	225'	A	3.4	0.1	0'	19'	A	3.8	0.12	0'	22'	A	4.1	0.13	0'	24'							
		WB-LT	±580'	C	21.9	0.12	9'	31'	C	25	0.13	10'	34'	C	26.8	0.14	10'	36'							
		WB-R	80'	A	0.3	0.07	0'	0'	A	0.4	0.07	0'	0'	A	0.4	0.07	0'	0'							
		NB-L	350'	C	34.8	0.3	19'	58'	D	38.4	0.35	24'	68'	D	40.3	0.36	25'	71'							
		NB-TTR	±1790'	B	14.7	0.59	126'	249'	B	14.8	0.63	153'	296'	B	14.6	0.64	165'	318'							
		SB-L	150'	C	34	0.12	6'	28'	D	37	0.13	7'	29'	D	38.7	0.13	7'	31'							
SB-TTR	±1170'	C	20.4	0.61	126'	186'	C	20.3	0.63	154'	220'	C	20.1	0.64	170'	238'									
Lowell Road (Route 3A) & Fox Hollow Drive/ Nottingham Square Driveway	ACTUATED-COORDINATED	Overall		C	22.8	0.79			C	27.2	0.91			C	30.4	0.95			Overall		B	17.8	0.68		
		EB-LT	±600'	F	90.1	0.22	16'	40'	F	90	0.22	16'	40'	F	90.1	0.22	16'	40'	EB-LT	±600'	F	90.1	0.22	16'	40'
		EB-R	50'	A	2.8	0.2	0'	0'	A	2.8	0.2	0'	0'	A	2.8	0.2	0'	0'	EB-R	50'	A	2.8	0.2	0'	0'
		WB-LT	±260'	F	117.7	0.59	46'	81'	F	118.9	0.6	46'	81'	F	117.7	0.59	46'	81'	WB-LT	±260'	F	117.7	0.59	46'	81'
		WB-R	100'	B	16.3	0.25	0'	36'	B	16.3	0.24	0'	36'	B	16.3	0.25	0'	36'	WB-R	100'	B	16.3	0.25	0'	36'
		NB-L	210'	F	103.9	0.42	32'	70'	F	103.9	0.42	32'	70'	F	103.9	0.42	32'	70'	NB-L	210'	F	103.9	0.42	32'	70'
		NB-T	±1410'	B	19.7	0.79	627'	1657'	C	27.8	0.91	954'	2065'	C	33.1	0.95	1114'	2202'	NB-T	±1410'	B	10.3	0.5	252'	600'
		NB-R	325'	A	0	0.01	0'	0'	A	0	0.01	0'	0'	A	0	0.01	0'	0'	NB-TR	325'	A	0	0	0'	0'
		SB-L	125'	F	119.5	0.68	71'	134'	F	119.5	0.68	71'	134'	F	119.5	0.68	71'	134'	SB-L	125'	F	119.5	0.68	71'	134'
SB-TR	±550'	B	11.5	0.45	204'	606'	B	13.5	0.52	259'	766'	B	14.9	0.56	294'	870'	SB-TR	±550'	B	14.9	0.56	294'	870'		

**TABLE 9  
HORIZON YEAR CAPACITY ANALYSIS SUMMARY – WEEKDAY P.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	LANE USE	STORAGE LENGTH (ft)	2019 EXISTING CONDITIONS					2032 NO-BUILD CONDITIONS					2032 BUILD CONDITIONS					2032 BUILD WITH BASE IMPROVEMENTS CONDITIONS						
				LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	
							50th%	95th%				50th%	95th%				50th%	95th%						50th%	95th%
Lowell Road (Route 3A) & Pelham Road	ACTUATED-COORDINATED	Overall		E	69.5	1.82			F	81.1	2.08			F	81.3	2.08									
		WB-L	±510'	F	113.5	0.72	118'	178'	F	115.2	0.76	135'	197'	F	115.2	0.76	135'	197'							
		WB-R	75'	C	21.8	0.63	6'	80'	C	30.4	0.7	30'	118'	C	30.4	0.7	30'	118'							
		NB-TR	±550'	E	69	0.81	701'	1887'	E	78.8	0.94	1104'	2345'	F	82	0.98	1286'	2494'							
		SB-L	150'	F	463.5	1.82	224'	369'	F	568.2	2.08	268'	423'	F	568.2	2.08	268'	423'							
		SB-T	±1310'	A	8.2	0.45	156'	585'	A	9.6	0.53	213'	745'	B	10.5	0.57	244'	851'							



**TABLE 10  
BASE & ROUNDABOUT IMPROVEMENTS CAPACITY ANALYSIS SUMMARY COMPARISON FOR LOWELL ROAD/RIVER ROAD (ROUTE 3A) & DRACUT ROAD/STEELE ROAD**

**2022 CAPACITY ANALYSIS SUMMARY – WEEKDAY A.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	NO-BUILD CONDITIONS							ROUNDABOUT BUILD CONDITIONS							NHDOT SUGGESTED BUILD CONDITIONS						
		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	
							50th%	95th%						50th%	95th%						50th%	95th%
River Road (Route 3A)/ Lowell Road (Route 3A) & Dracut Road & Steele Road	ACTUATED-COORDINATED	<b>Overall</b>		<b>B</b>	<b>19.6</b>	<b>0.84</b>			<b>Overall</b>		<b>A</b>	<b>7.7</b>				<b>Overall</b>		<b>B</b>	<b>17.3</b>	<b>0.86</b>		
		EB-L	±590'	D	40	0.03	2'	9'	EB-LTR	±590'	A	7.7	0.01		0'	EB-L	±590'	D	40	0.03	2'	9'
		EB-RR	50'	A	0	0.01	0'	0'								EB-RR	50'	A	0	0.01	0'	0'
		NB-L	200'	A	0	0	0'	0'	NB-LT	±760'	A	6.5	0.20		25'	NB-L	200'	A	0	0	0'	0'
		NB-TTR	±760'	C	32.8	0.39	84'	119'	NB-TR	±760'	A	6.1	0.20		25'	NB-TTR	±760'	C	34.1	0.41	88'	127'
		SB-L	775'	D	37.3	0.74	293'	382'	SB-LT	>1000'	A	6.4	0.39		50'	SB-LL	775'	C	24.4	0.38	110'	101'
		SB-TTR	±1730'	A	3.4	0.22	114'	2'	SB-TR	>1000'	A	6.5	0.42		50'	SB-TR	±1730'	A	3.8	0.41	3'	7'
		NWB-LL	100'	D	36	0	1'	5'	WB-	>1000'	A	9.6	0.48		75'	NWB-LL	100'	D	37	0.01	1'	5'
		NWB-R	>1000'	B	15.2	0.84	168'	319'	WB-R	150'	A	9.5	0.51		75'	NWB-R		B	15.3	0.86	161'	287'

**2022 CAPACITY ANALYSIS SUMMARY – WEEKDAY P.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	NO-BUILD CONDITIONS							ROUNDABOUT BUILD CONDITIONS							NHDOT SUGGESTED BUILD CONDITIONS						
		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	
							50th%	95th%						50th%	95th%						50th%	95th%
River Road (Route 3A)/ Lowell Road (Route 3A) & Dracut Road & Steele Road	ACTUATED-COORDINATED	<b>Overall</b>		<b>E</b>	<b>70.2</b>	<b>1.26</b>			<b>Overall</b>		<b>B</b>	<b>12.9</b>	<b>0.74</b>			<b>Overall</b>		<b>C</b>	<b>23.2</b>	<b>0.79</b>		
		EB-L	±810'	E	61.1	0.38	34'	63'	EB-LTR	±590'	B	10.5	0.12		0'	EB-L	±590'	E	61.1	0.38	34'	63'
		EB-RR	250'	A	0.2	0.02	0'	0'								EB-RR	50'	A	0.2	0.02	0'	0'
		NB-L	200'	D	55	0.01	1'	7'	NB-LT	±760'	C	19.5	0.59		100'	NB-L	200'	D	55	0.01	1'	7'
		NB-TTR	±590'	E	56.5	0.84	250'	321'	NB-TR	±760'	C	17.6	0.59		100'	NB-TTR	±760'	D	44.2	0.66	243'	334'
		SB-L	75'	F	151.5	1.26	961'	1216'	SB-LT	>1000'	B	13.5	0.74		175'	SB-LL	775'	B	19.2	0.79	121'	61'
		SB-TTR	575'	A	4.1	0.18	18'	65'	SB-TR	>1000'	A	5.4	0.33		25'	SB-TR	±1730'	A	3.1	0.35	59'	178'
		NWB-LL	±1000'	D	51	0.03	3'	15'	WB-	>1000'	B	12.1	0.48		75'	NWB-LL	100'	D	52	0.03	3'	15'
		NWB-R	275'	B	14.3	0.68	144'	316'	WB-R	150'	B	11.4	0.49		75'	NWB-R		B	19.9	0.78	197'	371'

**2032 CAPACITY ANALYSIS SUMMARY – WEEKDAY A.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	NO-BUILD CONDITIONS							ROUNDABOUT BUILD CONDITIONS							NHDOT SUGGESTED BUILD CONDITIONS						
		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	
							50th%	95th%						50th%	95th%						50th%	95th%
River Road (Route 3A)/ Lowell Road (Route 3A) & Dracut Road & Steele Road	ACTUATED-COORDINATED	<b>Overall</b>		<b>B</b>	<b>18.9</b>	<b>0.86</b>			<b>Overall</b>		<b>A</b>	<b>8.7</b>	<b>0.68</b>			<b>Overall</b>		<b>B</b>	<b>18.3</b>	<b>0.89</b>		
		EB-L	±810'	D	40	0.03	2'	9'	EB-LTR	±590'	A	8.5	0.01		0'	EB-L	±590'	D	40	0.03	2'	9'
		EB-RR	250'	A	0	0.01	0'	0'								EB-RR	50'	A	0	0.01	0'	0'
		NB-L	200'	A	0	0	0'	0'	NB-LT	±760'	A	7.2	0.23		25'	NB-L	200'	A	0	0	0'	0'
		NB-TTR	±590'	D	43.2	0.68	102'	131'	NB-TR	±760'	A	6.7	0.23		25'	NB-TTR	±760'	D	43.8	0.7	106'	135'
		SB-L	75'	C	26.8	0.67	251'	455'	SB-LT	>1000'	A	6.9	0.43		50'	SB-LL	775'	B	17.2	0.36	89'	102'
		SB-TTR	575'	A	2.5	0.24	104'	2'	SB-TR	>1000'	A	7	0.46		50'	SB-TR	±1730'	A	3.4	0.46	3'	8'
		NWB-LL	±1000'	D	36	0	1'	5'	WB-	>1000'	B	11.2	0.55		75'	NWB-LL	100'	D	36	0	1'	5'
		NWB-R	275'	B	16	0.86	182'	726'	WB-R	150'	B	11.1	0.57		100'	NWB-R		B	18.8	0.89	215'	774'

**TABLE 10  
BASE & ROUNDABOUT IMPROVEMENTS CAPACITY ANALYSIS SUMMARY COMPARISON FOR LOWELL ROAD/RIVER ROAD (ROUTE 3A) & DRACUT ROAD/STEELE ROAD**

**2032 CAPACITY ANALYSIS SUMMARY – WEEKDAY P.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	NO-BUILD CONDITIONS							ROUNDABOUT BUILD CONDITIONS							NHDOT SUGGESTED BUILD CONDITIONS						
		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	
							50th%	95th%						50th%	95th%						50th%	95th%
River Road (Route 3A)/ Lowell Road (Route 3A) & Dracut Road & Steele Road	<b>ACTUATED-COORDINATED</b>	<b>Overall</b>		<b>F</b>	<b>93.6</b>	<b>1.41</b>			<b>Overall</b>		<b>C</b>	<b>16.8</b>	<b>0.81</b>			<b>Overall</b>		<b>C</b>	<b>25.8</b>	<b>0.79</b>		
		EB-L	±810'	E	61.5	0.4	38'	68'	EB-LTR	±590'	B	12.3	0.15		25'	EB-L	±590'	E	61.5	0.4	38'	68'
		EB-RR	250'	A	0.2	0.02	0'	0'								EB-RR	50'	A	0.2	0.02	0'	0'
		NB-L	200'	D	55	0.01	1'	7'	NB-LT	±760'	D	28.4	0.72		150'	NB-L	200'	D	55	0.01	1'	7'
		NB-TTR	±590'	E	62.6	0.91	282'	390'	NB-TR	±760'	D	25.2	0.71		150'	NB-TTR	±760'	D	51	0.79	284'	478'
		SB-L	75'	F	211.8	1.41	1088'	1394'	SB-LT	>1000'	C	17.2	0.81		250'	SB-LL	775'	C	25.7	0.77	134'	128'
		SB-TTR	575'	A	4.3	0.2	36'	86'	SB-TR	>1000'	A	5.8	0.36		50'	SB-TR	±1730'	A	1.9	0.38	4'	8'
		NWB-LL	±1000'	D	51.2	0.03	4'	17'	WB-LTR	>1000'	C	15.1	0.57		100'	NWB-LL	100'	D	54.6	0.05	4'	17'
		NWB-R	275'	B	19.5	0.77	222'	315'	WB-R	150'	B	14.2	0.58		100'	NWB-R		B	16	0.79	183'	342'

**TABLE 11  
BASE & FUTURE IMPROVMENTS CAPACITY ANALYSIS SUMMARY COMPARISON FOR LOWELL ROAD (ROUTE 3A) & FLAGSTONE DRIVE/WASON ROAD**

**2022 CAPACITY ANALYSIS SUMMARY – WEEKDAY A.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	2022 NO-BUILD CONDITIONS							2022 BUILD WITH BASE IMPROVEMENTS CONDITIONS							2022 FUTURE BUILD WITH IMPROVEMENTS CONDITIONS						
		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	
							50th%	95th%						50th%	95th%						50th%	95th%
Lowell Road (Route 3A) & Flagstone Drive/Wason Road	ACTUATED-COORDINATED	<b>Overall</b>		<b>D</b>	<b>54.4</b>	<b>1.04</b>			<b>Overall</b>		<b>D</b>	<b>47.3</b>	<b>0.97</b>			<b>Overall</b>		<b>D</b>	<b>38.3</b>	<b>0.9</b>		
		EB-LT	±810'	F	87.4	0.66	111'	184'	EB-LT	±810'	F	112.3	0.94	66'	147'	EB-LT	±810'	E	66.8	0.73	65'	122'
		EB-R	250'	D	48	0.66	257'	386'	EB-R	250'	C	22.1	0.6	111'	168'	EB-RR	250'	B	18.2	0.39	59'	83'
		WB-L	200'	E	71.2	0.83	336'	540'	WB-L	200'	E	72.8	0.95	205'	382'	WB-L	200'	E	61.1	0.9	198'	358'
		WB-LT	±590'	E	71.5	0.83	342'	546'	WB-LT	±590'	E	73.2	0.95	208'	386'	WB-LT	±590'	E	61.5	0.9	202'	363'
		WB-R	75'	A	0.2	0.06	0'	0'	WB-R	75'	A	0.2	0.06	0'	0'	WB-R	75'	A	0.2	0.06	0'	0'
		NB-L	575'	F	121.9	1.04	349'	691'	NB-L	575'	F	81.3	0.95	198'	319'	NB-LL	575'	D	54	0.67	101'	134'
		NB-TT	±1000'	C	32.3	0.5	308'	445'	NB-TT	±1000'	B	19.3	0.55	125'	198'	NB-TT	±1000'	C	21.3	0.59	130'	198'
		NB-R	275'	A	1	0.16	0'	22'	NB-RR	275'	A	0.1	0.1	0'	0'	NB-RR	275'	A	0.1	0.1	0'	0'
		SB-L	175'	F	84.4	0.22	16'	48'	SB-L	175'	D	44.9	0.18	9'	29'	SB-L	175'	D	44.9	0.18	9'	29'
SB-TTTR	±1520'	D	50.3	0.76	390'	485'	SB-TTTR	300'	D	53	0.97	259'	336'	SB-TTTR	±430'	D	43	0.9	259'	350'		

**2022 CAPACITY ANALYSIS SUMMARY – WEEKDAY P.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	2022 NO-BUILD CONDITIONS							2022 BUILD WITH BASE IMPROVEMENTS CONDITIONS							2022 FUTURE BUILD WITH IMPROVEMENTS CONDITIONS						
		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	
							50th%	95th%						50th%	95th%						50th%	95th%
Lowell Road (Route 3A) & Flagstone Drive/Wason Road	ACTUATED-COORDINATED	<b>Overall</b>		<b>D</b>	<b>50.6</b>	<b>0.94</b>			<b>Overall</b>		<b>C</b>	<b>34.6</b>	<b>0.83</b>			<b>Overall</b>		<b>C</b>	<b>30.8</b>	<b>0.79</b>		
		EB-LT	±810'	F	90.4	0.78	187'	276'	EB-LT	±810'	E	75.6	0.79	136'	188'	EB-LT	±810'	E	75.6	0.79	136'	188'
		EB-R	250'	E	70.5	0.94	521'	696'	EB-R	250'	D	40.4	0.83	317'	364'	EB-RR	250'	C	32.8	0.61	171'	181'
		WB-L	200'	D	53.6	0.56	227'	358'	WB-L	200'	E	69.2	0.82	198'	344'	WB-L	200'	D	53.4	0.69	184'	281'
		WB-LT	±590'	D	53.4	0.56	227'	358'	WB-LT	±590'	E	68.5	0.82	198'	343'	WB-LT	±590'	D	53	0.69	184'	280'
		WB-R	75'	A	0.2	0.05	0'	0'	WB-R	75'	A	0.2	0.06	0'	0'	WB-R	75'	A	0.2	0.06	0'	0'
		NB-L	575'	E	68.4	0.48	144'	239'	NB-L	575'	E	58.2	0.4	116'	134'	NB-L	575'	E	71.1	0.66	120'	138'
		NB-TT	±1000'	D	51	0.82	557'	663'	NB-TT	±1000'	C	28.8	0.71	251'	253'	NB-TT	±1000'	C	27.4	0.54	175'	176'
		NB-R	275'	C	26.4	0.89	643'	992'	NB-RR	275'	A	2.3	0.5	15'	25'	NB-RR	275'	A	0.8	0.5	0'	0'
		SB-L	175'	F	90.4	0.59	85'	151'	SB-L	175'	E	77.7	0.65	63'	123'	SB-L	175'	E	77.7	0.65	63'	123'
SB-TTTR	±1520'	D	52.3	0.69	339'	379'	SB-TTTR	±430'	D	41.6	0.69	264'	318'	SB-TTTR	±430'	D	36.7	0.59	252'	319'		

**2032 CAPACITY ANALYSIS SUMMARY – WEEKDAY A.M. PEAK-HOUR**

INTERSECTION	CONTROL TYPE	2032 NO-BUILD CONDITIONS							2032 BUILD WITH BASE IMPROVEMENTS CONDITIONS							2032 FUTURE BUILD WITH IMPROVEMENTS CONDITIONS						
		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	
							50th%	95th%						50th%	95th%						50th%	95th%
Lowell Road (Route 3A) & Flagstone Drive/Wason Road	ACTUATED-COORDINATED	<b>Overall</b>		<b>E</b>	<b>63.7</b>	<b>1.23</b>			<b>Overall</b>		<b>E</b>	<b>55.3</b>	<b>1.25</b>			<b>Overall</b>		<b>D</b>	<b>42.1</b>	<b>0.97</b>		
		EB-LT	±810'	F	95.6	0.7	130'	192'	EB-LT	±810'	F	120.4	0.98	69'	152'	EB-LT	±810'	E	60.2	0.68	66'	115'
		EB-R	250'	E	58.1	0.76	336'	433'	EB-R	250'	C	28	0.7	134'	197'	EB-RR	250'	C	20.5	0.44	68'	96'
		WB-L	200'	E	79.4	0.88	418'	655'	WB-L	200'	F	82.8	1	229'	422'	WB-L	200'	E	70	0.95	225'	410'
		WB-LT	±590'	E	79.4	0.88	424'	660'	WB-LT	±590'	F	82.5	1	231'	425'	WB-LT	±590'	E	69.9	0.95	228'	413'
		WB-R	75'	A	0.2	0.07	0'	0'	WB-R	75'	A	0.2	0.06	0'	0'	WB-R	75'	A	0.2	0.07	0'	0'
		NB-L	575'	F	184.1	1.23	488'	777'	NB-L	575'	F	155.6	1.25	236'	293'	NB-LL	575'	D	45.7	0.88	84'	105'
		NB-TT	±1000'	D	35.1	0.55	396'	507'	NB-TT	±1000'	B	16.3	0.62	241'	295'	NB-TT	±1000'	C	21.2	0.7	270'	311'
		NB-R	275'	A	1	0.17	0'	23'	NB-RR	275'	A	3.8	0.11	20'	26'	NB-RR	275'	A	5.7	0.11	26'	34'
		SB-L	175'	F	90.4	0.27	22'	55'	SB-L	175'	D	45.8	0.21	11'	33'	SB-L	175'	D	43.8	0.18	11'	33'
SB-TTTR	±1520'	D	53.1	0.79	488'	547'	SB-TTTR	±410'	D	53.2	0.98	285'	367'	SB-TTTR	±410'	D	51.2	0.97	285'	367'		



**TABLE 11  
BASE & FUTURE IMPROVMENTS CAPACITY ANALYSIS SUMMARY COMPARISON FOR LOWELL ROAD (ROUTE 3A) & FLAGSTONE DRIVE/WASON ROAD**

**2032 CAPACITY ANALYSIS SUMMARY – WEEKDAY P.M. PEAK-HOUR**

		2032 NO-BUILD CONDITIONS						2032 BUILD WITH BASE IMPROVEMENTS CONDITIONS						2032 FUTURE BUILD WITH IMPROVEMENTS CONDITIONS								
		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)		LANE USE	STORAGE LENGTH (ft)	LOS	DELAY (sec)	V/C RATIO	QUEUES (ft)	
							50th%	95th%						50th%	95th%						50th%	95th%
Lowell Road (Route 3A) & Flagstone Drive/ Wason Road	<b>ACTUATED-COORDINATED</b>	<b>Overall</b>		<b>E</b>	<b>67.9</b>	<b>1.13</b>			<b>Overall</b>		<b>C</b>	<b>35</b>	<b>0.9</b>			<b>Overall</b>		<b>C</b>	<b>31.9</b>	<b>0.76</b>		
		EB-LT	±810'	F	105.9	0.86	216'	302'	EB-LT	±810'	F	92.1	0.9	148'	232'	EB-LT	±810'	E	69.6	0.76	143'	193'
		EB-R	250'	F	125.3	1.13	749'	825'	EB-R	250'	D	48.1	0.9	373'	439'	EB-RR	250'	C	32.4	0.63	191'	193'
		WB-L	200'	E	56.3	0.57	283'	400'	WB-L	200'	E	73.5	0.87	221'	382'	WB-L	200'	D	54.6	0.73	206'	310'
		WB-LT	±590'	E	56.1	0.56	281'	395'	WB-LT	±590'	E	72.3	0.86	220'	378'	WB-LT	±590'	D	54.1	0.72	205'	309'
		WB-R	75'	A	0.2	0.05	0'	0'	WB-R	75'	A	0.3	0.07	0'	0'	WB-R	75'	A	0.2	0.06	0'	0'
		NB-L	575'	E	76.7	0.57	167'	253'	NB-L	575'	E	57.8	0.4	111'	117'	NB-L	575'	E	70.6	0.67	128'	129'
		NB-TT	±1000'	E	60.1	0.9	654'	763'	NB-TT	±1000'	B	19.5	0.81	200'	161'	NB-TTT	±1000'	C	30	0.69	211'	206'
		NB-R	275'	E	55.5	0.97	993'	1506'	NB-RR	275'	A	0.6	0.57	5'	1'	NB-RR	275'	A	0.4	0.57	0'	0'
		SB-L	175'	F	100.1	0.67	102'	165'	SB-L	175'	F	93.6	0.77	71'	155'	SB-L	175'	E	69.2	0.6	69'	121'
		SB-TTR	±1520'	E	55.3	0.71	384'	425'	SB-TTTR	±410'	D	45.4	0.79	300'	346'	SB-TTTR	±410'	D	41.7	0.71	290'	411'

## Analysis Results

The analysis of the study intersections reveals that most of the signalized intersections analyzed on Lowell Road north of Sagamore Bridge Road will generally maintain overall acceptable or no-build operating conditions for the 2022 and 2032 build scenario. Individual movements and lane groups may change slightly in level of service, delay, and queue length; however, overall levels of service at these signalized intersections analyzed remain unchanged or acceptable, with nominal impacts to intersection delays. This is likely because there is not a significant amount of development related traffic (around 100 peak-hour trips or less) expected to travel on Lowell Road north of the intersection with Sagamore Bridge Road. The analyses show that any capacity deficiencies or queuing issues at the intersections north of Sagamore Bridge Road are existing/no-build issues and are not greatly impacted by the development's anticipated traffic; however we have provided some recommendations to help improve traffic operating conditions at several of these intersections.

As the project impacts are generally limited to the southern Lowell Road corridor, the results of the capacity analysis have been explored in detail for this area. Below, the operating condition analysis results for the intersections on Lowell Road south of and including the intersection with Sagamore Bridge Road are described:

### Lowell Road/River Road/Steele Road/Dracut Road

2022 No-Build to Build Conditions – Overall this intersection operates acceptably in the morning peak period and unsatisfactorily in the evening peak period under no-build and build conditions. For the 2022 analysis, overall the intersection maintains LOS B in the morning peak period and maintains LOS E in the evening peak period.

In the 2022 morning peak-hour, the northwestbound traffic from Dracut Road to Lowell Road maintains LOS B and exiting traffic from Steele Road maintains LOS D from no-build to build. The 95<sup>th</sup> percentile queues from Dracut Road increase by approximately 5.5 car lengths and Steele Road queues do not increase. The southbound left turning traffic from Lowell Road onto Dracut Road improves from LOS D to LOS C and northbound through traffic changes from LOS C to LOS D. The 95<sup>th</sup> percentile queues on the southbound left turn movement increase by less than two car lengths and northbound through queues increase by less than a car length (See Table 6, page 22).

In the 2022 evening peak-hour, the northwestbound traffic from Dracut Road to Lowell Road maintains LOS B and exiting traffic from Steele Road maintains LOS E from no-build to build. The 95<sup>th</sup> percentile queues on the northwestbound approach increase by less than two car lengths and at the eastbound Steele Road approach queues remain the same. The southbound left turn movement maintains LOS F and the northbound through

movement maintains LOS E from no-build to build. The 95<sup>th</sup> percentile queues at the southbound left turn movement increase by approximately three car lengths and the northbound through movement queues increase by less than a car length (See Table 7, page 25).

2022 Build with Improvements Conditions – As described earlier in the report, we looked at two potential mitigation options at this location: (1) a dual-lane roundabout and (2) the conversion of one of the southbound through lanes to a second exclusive left-turn lane onto Dracut Road and widening on Dracut Road to accept a second receiving lane which would transition back down to a single lane with a lane drop. As shown in Table 10, both potential improvements greatly improve operating conditions at this intersection. The developer will discuss which one is the preferred option with NHDOT.

Roundabout (Option 1): With the recommended base improvements of converting to a dual-lane roundabout, the morning peak period improves to overall LOS A and improves to overall LOS B in the evening peak period.

During the 2022 morning peak-hour, the northwestbound movement improves from LOS B to LOS A and Steele Road improves from LOS D to LOS A. The 95<sup>th</sup> percentile queues from Dracut Road decrease by approximately 10 car lengths from no-build to build with improvements. The southbound left turn movement also improves from LOS D to LOS A and the northbound through traffic improves from LOS C to LOS A. The 95<sup>th</sup> percentile queues on the southbound left turn movement decrease by approximately 13 car lengths and northbound through queues decrease by about four car lengths from no-build to build with improvements conditions (See Table 6, page 22).

During the 2022 evening peak-hour, the northwest right-turn movement from Dracut maintains LOS B and the eastbound movement from Steele Road improves from LOS E to LOS B. The 95<sup>th</sup> percentile queues on the northwestbound approach decrease by approximately 10 car lengths and Steele Road queues decrease by about three car lengths from no-build to build with improvements conditions. The southbound left turn movement improves from LOS F to LOS B and the northbound through movement improves from LOS E to LOS C. The 95<sup>th</sup> percentile queues at the southbound left turn movement decrease by approximately 42 car lengths and the northbound through queues decrease by about nine car lengths from no-build to build with improvements conditions (See Table 7, page 25).

Lane Reassignment (Option 2): With the recommended base improvements of reassigning one of the southbound through lanes to a second left-turn lane, the

morning peak period remains overall LOS B and improves to overall LOS C in the evening peak period.

During the 2022 morning peak-hour the 95<sup>th</sup> percentile queues from Dracut Road decrease by about two car lengths from no-build to build with improvements. The southbound left turn movement improves from LOS D to LOS C and the 95<sup>th</sup> percentile queues on the southbound left turn movement decrease by approximately 11 car lengths from no-build to build with improvements conditions (See Table 10, pages 34-35).

During the 2022 evening peak-hour, the southbound left turn movement improves from LOS F to LOS B and the northbound through movement improves from LOS E to LOS D. The 95<sup>th</sup> percentile queues at the southbound left turn movement decrease by approximately 46 car lengths and the northbound through queue increases by about one car length from no-build to build with improvements conditions (See Table 10, pages 34-35).

2032 No-Build to Build Conditions – For the 2032 analysis, overall the intersection maintains LOS B in the morning peak period and maintains LOS F in the evening peak period.

In the 2032 morning peak-hour, the northwestbound traffic from Dracut Road to Lowell Road maintains LOS B and exiting traffic from Steele Road maintains LOS D from no-build to build. The 95<sup>th</sup> percentile queues from Dracut Road increase by less than two car lengths and Steele Road queues do not increase. The southbound left turning traffic from Lowell Road onto Dracut Road maintains LOS C and northbound through traffic operates maintains LOS D. The 95<sup>th</sup> percentile queues on the southbound left turn movement increase by less than two car lengths and northbound through queues increase by less than a car length (See Table 8, page 28).

In the 2032 evening peak-hour, the northwestbound traffic from Dracut Road to Lowell Road changes from LOS B to LOS C and exiting traffic from Steele Road maintains LOS E from no-build to build. The 95<sup>th</sup> percentile queues on the northwestbound approach increase by approximately five car lengths and at the eastbound Steele Road approach queues remain the same. The southbound left turn movement maintains LOS F and the northbound through movement maintains LOS E from no-build to build. The 95<sup>th</sup> percentile queues at the southbound left turn movement increase by approximately three car lengths and the northbound through movement queues increase by less than a car length (See Table 9, page 31).

### 2032 Build with Improvements Conditions

Roundabout (Option 1): With the recommended base improvements of converting to a dual-lane roundabout, the morning peak period the overall intersection improves from LOS B to LOS A and improves from LOS F to LOS C in the evening peak period.

During the 2032 morning peak-hour, the northwest right turn movement from Dracut Road maintains LOS B and Steele Road improves from LOS D to LOS A. The 95<sup>th</sup> percentile queues decrease by approximately 25 car lengths for the northwest right movement and remain approximately the same for Steele Road from no-build to build with improvements conditions. The southbound left movement improves from LOS C to LOS A and the northbound through movement improves from LOS D to LOS A from no-build to build with improvements. The 95<sup>th</sup> percentile queues decrease by approximately 16 car lengths for the southbound left turn movement and the northbound through movement decreases by approximately four car lengths from no-build to build with improvements (See Table 8, page 28).

During the 2032 evening peak-hour, the northwest right turn movement from Dracut Road maintains LOS B and Steele Road improves from LOS E to LOS B. The 95<sup>th</sup> percentile queues for the northwest right movement decrease by about nine car lengths and Steele Road queues decrease by approximately two car lengths from no-build to build with improvements. The southbound left turn movement improves LOS F to LOS C and the northbound through movement improves from LOS E to LOS D from no-build to build with improvements. The 95<sup>th</sup> percentile queues decrease by approximately 46 car lengths for the southbound left turn movement and decrease by less than 10 car lengths for the northbound through movement from no-build to build with improvements conditions (See Table 9, page 31).

Lane Reassignment (Option 2): With the recommended base improvements of reassigning one of the southbound through lanes to a second left-turn lane, the morning peak period remains overall LOS B and improves to overall LOS C in the evening peak period.

During the 2032 morning peak-hour, The 95<sup>th</sup> percentile queues from Dracut Road increase by about two car lengths from no-build to build with improvements. The southbound left turn movement improves from LOS C to LOS B and the 95<sup>th</sup> percentile queues on the southbound left turn movement decrease by approximately 14 car lengths from no-build to build with improvements conditions (See Table 10, pages 34-35).

During the 2032 evening peak-hour, the southbound left turn movement improves from LOS F to LOS C and the northbound through movement improves from LOS E to LOS D. The 95<sup>th</sup> percentile queues at the southbound left turn movement decrease by approximately 51 car lengths and the northbound through queue increases by about four cars length from no-build to build with improvements conditions (See Table 10, pages 34-35).

### Lowell Road & Green Meadow Drive/Rena Avenue

2022 No-Build to Build Conditions – Overall, the intersection operates acceptably in the morning and afternoon peak periods. For the 2022 analysis, overall the intersection changes from LOS A to LOS B in the morning peak period and from LOS A to LOS C in the evening peak period.

In the 2022 morning peak-hour, Green Meadow Drive/Hudson Logistics Center Driveway changes from LOS D to LOS E and Rena Avenue maintains LOS B from no-build to build. The 95<sup>th</sup> percentile queues for the Green Meadow Drive approach increase by seven car lengths and Rena Avenue queues decrease slightly. The northbound left turn movement maintains LOS D and the 95<sup>th</sup> percentile queues increase by less than a car length. The northbound through movement changes from LOS A to LOS B and the southbound through movement maintains LOS B. The 95<sup>th</sup> percentile queues for the northbound through movement increase by approximately two car lengths and the southbound queues increase by approximately three car lengths (See Table 6, page 22).

In the 2022 evening peak-hour, the Green Meadow Drive/Hudson Logistics Center Driveway approach changes from LOS E to LOS F and Rena Avenue maintains LOS A from no-build to build. The 95<sup>th</sup> percentile queues for the Green Meadow Drive approach increase by approximately 14 car lengths, due to the connection to the development, and Rena Avenue queues remain at zero. The northbound left turn movement maintains LOS E and 95<sup>th</sup> percentile queues increase by one car length. The northbound and southbound through movements each change from LOS A to LOS B. The 95<sup>th</sup> percentile queues for the northbound through movement increase by approximately 14.5 car lengths and the southbound queues increase by less than five car lengths. The southbound left turn movement changes from LOS D to LOS E and the 95<sup>th</sup> percentile queues decrease slightly (See Table 7, page 25).

2022 Build with Improvements Conditions – With the recommended base improvements, the morning peak period and evening peak period both operate at overall LOS B. Intersections with overall LOS B are generally considered acceptable and although the overall intersection LOS for both time periods change from LOS A to LOS B with the proposed improvements, this intersection represents the primary access location for the proposed development where the greatest change to traffic volumes is expected.

During the 2022 morning peak-hour, Green Meadow Drive maintains LOS D and Rena Avenue changes from LOS B to LOS C. The 95<sup>th</sup> percentile queues at Green Meadow Drive increase by less than three car lengths and Rena Avenue queues increase negligibly from no-build to build with improvements conditions. The northbound left turn movement also maintains LOS D and the 95<sup>th</sup> percentile queues increase by less than two car lengths from no-build to build with improvements conditions. The northbound through movement maintains LOS A and the southbound through movement maintains LOS B. The 95<sup>th</sup> percentile queues for the northbound through movement increase by less than five car lengths and southbound through queues decrease by approximately two car lengths from no-build to build with improvements conditions (See Table 6, page 22).

During the 2022 evening peak-hour, the Green Meadow Drive approach maintains LOS E and Rena Avenue maintains LOS A. The 95<sup>th</sup> percentile queues increase by less than three car lengths from the Green Meadow Drive approach and Rena Avenue queues remain nominal. The northbound left turn movement maintains LOS E and the 95<sup>th</sup> percentile queues increase by less than two car lengths from no-build to build with improvements. The northbound through movement changes from LOS A to LOS B and the southbound through movement maintains LOS A. The 95<sup>th</sup> percentile queues for the northbound through movement increase by less than ten car lengths and the southbound queues decrease by approximately two car lengths from no-build to build with improvements conditions (See Table 7, page 25).

2032 No-Build to Build Conditions – For the 2032 analysis, overall the intersection changes from LOS A to LOS B in the morning peak period and from LOS A to LOS C in the evening peak period.

In the 2032 morning peak-hour, Green Meadow Drive changes from LOS D to LOS E and Rena Avenue maintains LOS B from no-build to build. The 95<sup>th</sup> percentile queues for the Green Meadow Drive approach increase by eight cars and Rena Avenue queues remain the same. The northbound left turn movement maintains LOS D and the 95<sup>th</sup> percentile queues increase by one car. The northbound through movement changes from LOS A to LOS B and the southbound through movement changes from LOS A to LOS C. The 95<sup>th</sup> percentile queues for the northbound through movement increase by less than two cars and the southbound queues increase by approximately three cars (See Table 8, page 28).

In the 2032 evening peak-hour, the Green Meadow Drive approach changes from LOS E to LOS F and Rena Avenue maintains LOS A from no-build to build. The 95<sup>th</sup> percentile queues for the Green Meadow Drive approach increase by approximately 14 car lengths and Rena Avenue queues remain the same. The northbound left turn movement maintains LOS E and 95<sup>th</sup> percentile queues increase by approximately one car length. The northbound and southbound through movements each change from LOS A to LOS B. The 95<sup>th</sup> percentile queues for the northbound through movement increase by less

than three car lengths and the southbound queues increase by approximately six car lengths. The southbound left turn movement changes from LOS D to LOS E and the 95<sup>th</sup> percentile queues decrease slightly (See Table 9, page 31).

2032 Build with Improvements Conditions – With the recommended base improvements, both the morning and evening peak periods both operate at overall LOS B. Intersections with overall LOS B are generally considered acceptable and although the overall intersection LOS for both time periods change from LOS A to LOS B with the proposed improvements, this intersection represents the primary access location for the proposed development where the greatest change to traffic volumes is expected.

In the 2032 morning peak-hour, Green Meadow Drive maintains LOS D and Rena Avenue maintains LOS B. The 95<sup>th</sup> percentile queues at Green Meadow Drive increase by less than three car lengths and Rena Avenue queues decrease negligibly from no-build to build with improvements. The northbound left turn movement maintains LOS D and the 95<sup>th</sup> percentile queues increase by less than two car lengths. The northbound through movement changes from LOS A to LOS B and the southbound through movement changes from LOS A to LOS B. The 95<sup>th</sup> percentile queues for the northbound through movement increase by approximately five car lengths and the southbound through queues decrease by two car lengths from no-build to build with improvements (See Table 8, page 28).

In the 2032 evening peak-hour, Green Meadow Drive maintains LOS E and Rena Avenue maintains LOS A. The 95<sup>th</sup> percentile queues at Green Meadow Drive increase by approximately three car lengths and remain at zero for Rena Avenue. The northbound left turn movement maintains LOS E and the 95<sup>th</sup> percentile queues increase by less than three car lengths. The northbound through movement changes from LOS A to LOS B and southbound through movement maintains LOS A from no-build to build with improvements. The 95<sup>th</sup> percentile queues for the northbound through decrease by less than four car lengths and the southbound through queues decrease by approximately three car lengths (See Table 9, page 31).

#### Lowell Road & Wal-Mart Boulevard

2022 No-Build to Build Conditions – Overall, the intersection operates acceptably in the morning and afternoon peak periods for the 2022 analysis year. For the 2022 analysis, overall the intersection maintains LOS B in the morning peak period and changes from LOS C to LOS D in the evening peak period.

In the 2022 morning peak-hour, the eastbound left turn movement maintains LOS D from no-build to build and the 95<sup>th</sup> percentile queues increase by less than one car. The northbound through movement maintains LOS B and the southbound through movement maintains LOS B. The northbound through queues increase by approximately 17 cars and



the southbound through queues increase by approximately three cars (See Table 6, page 22).

In the 2022 evening peak-hour, the eastbound left turn movement changes from LOS D to LOS E from no-build to build and the 95<sup>th</sup> percentile queues increase by approximately two cars. The northbound through movement changes from LOS C to LOS E and the southbound through movement maintains LOS C. The northbound through queues increase by approximately seven cars and the southbound through queues increase by approximately eight cars (See Table 7, page 25).

2022 Build with Improvements Conditions – With the recommended base improvements, the overall intersection maintains LOS B in the morning peak period and maintains LOS C in the evening peak period.

In the 2022 morning peak-hour, the eastbound left turn movement maintains LOS D and the 95<sup>th</sup> percentile queues increase by less than one car length. The northbound through and southbound through movements each maintain LOS B from no-build to build with improvements. The 95<sup>th</sup> percentile queues for the northbound through movement increase by approximately two car lengths and the southbound through queues decrease by approximately four car lengths from no-build to build with improvements (See Table 6, page 22).

In the 2022 evening peak-hour, the eastbound left turn changes from LOS D to LOS E and the 95<sup>th</sup> percentile queues increase by approximately four car lengths. The northbound through movement maintains LOS C and the southbound through movement improves from LOS C to LOS B. The 95<sup>th</sup> percentile queues for the northbound through movement decrease by approximately 17 car lengths and southbound through queues decrease by approximately 13 car lengths from no-build to build with improvements (See Table 7, page 25).

2032 No-Build to Build Conditions – For the 2032 analysis, overall the intersection changes from LOS B to LOS C in the morning peak period and changes from LOS C to LOS E in the evening peak period.

In the 2032 morning peak-hour, the eastbound left turn movement maintains LOS D from no-build to build and the 95<sup>th</sup> percentile queues increase by less than one car. The northbound through and southbound through movements each changes from LOS B to LOS C from no-build to build. The northbound through queues increase by approximately 11 cars and the southbound through queues approximately five cars (See Table 8, page 28).

In the 2032 evening peak-hour, the eastbound left turn movement changes from LOS D to LOS E from no-build to build and the 95<sup>th</sup> percentile queues increase by approximately

2 cars. The northbound through movement changes from LOS C to LOS F and the southbound through movement maintains LOS C. The northbound through queues increase by approximately seven cars and the southbound through queues increase by approximately six cars (See Table 9, page 31).

2032 Build with Improvements Conditions – With the recommended base improvements, the overall intersection maintains LOS B in the morning peak period and maintains LOS C in the evening peak period.

In the 2032 morning peak-hour, the eastbound left turn maintains LOS D and the 95<sup>th</sup> percentile queues increase by approximately one car length. The northbound through movement maintains LOS B and the southbound through movement maintains LOS B. The 95<sup>th</sup> percentile queues for the northbound through movement decrease by approximately six car lengths and southbound through queues decrease by approximately four car lengths from no-build to build with improvements (See Table 8, page 28).

In the 2032 evening peak-hour, the eastbound left turn changes from LOS D to LOS E and the 95<sup>th</sup> percentile queues increase by approximately four car lengths. The northbound through movement maintains LOS C and the southbound through movement improves from LOS C to LOS B. The 95<sup>th</sup> percentile queues for the northbound through movement decrease by approximately 21 car lengths and southbound through queues decrease by approximately 10 car lengths from no-build to build with improvements (See Table 9, page 31).

#### Lowell Road & Sagamore Bridge Road

2022 No-Build to Build Conditions – Overall, the intersection operates at or over capacity under existing, no-build, and build conditions. For the 2022 analysis, overall the intersection changes from LOS C to LOS D in the morning peak period and changes from LOS D to LOS F in the evening peak period.

In the 2022 morning peak-hour, the eastbound left turn movement maintains LOS D from no-build to build and the 95<sup>th</sup> percentile queues remain the same. The northbound left turn movement changes from LOS E to LOS F and the 95<sup>th</sup> percentile queues increase by approximately four cars. The southbound through movement maintains LOS D and the 95<sup>th</sup> percentile queues increase by less than one car (See Table 6, page 22).

In the 2022 evening peak-hour, the eastbound left turn movement maintains LOS F from no-build to build and the 95<sup>th</sup> percentile queues remain the same. The northbound left turn movement maintains LOS F and the 95<sup>th</sup> percentile queues increase by approximately four cars. The southbound through movement maintains LOS E and the 95<sup>th</sup> percentile queues increase by approximately one car (See Table 7, page 25).

2022 Build with Improvements Conditions – With the recommended base improvements, overall the intersection improves from LOS C to LOS B in the morning peak period and in the evening peak period maintains LOS D.

In the 2022 morning peak-hour, the eastbound left turn movement improves from LOS D to LOS C and the 95<sup>th</sup> percentile queues decrease by approximately three car lengths. The northbound left turn movement improves from LOS E to LOS C and the 95<sup>th</sup> percentile queues decrease by approximately eight car lengths from no-build to build with improvements conditions. The southbound through movement also improves from LOS D to LOS C and the 95<sup>th</sup> percentile queues decrease negligibly (See Table 6, page 22).

In the 2022 evening peak-hour, the eastbound left turn movement improves from LOS F to LOS E and the 95<sup>th</sup> percentile queues decrease by less than two car lengths. The northbound left turn movement improves from LOS F to LOS E and the 95<sup>th</sup> percentile queues decrease by six car lengths from no-build to build with improvements conditions. The southbound through movement maintains LOS E and 95<sup>th</sup> percentile queues increase by less than four car lengths (See Table 7, page 25).

2023 No-Build to Build Conditions – For the 2032 analysis, overall the intersection changes from LOS D to LOS E in the morning peak period and changes from LOS E to LOS F in the evening peak period.

In the 2032 morning peak-hour, the eastbound left turn movement maintains LOS D from no-build to build and the 95<sup>th</sup> percentile queues remain the same. The northbound left turn movement maintains LOS F and the 95<sup>th</sup> percentile queues increase by approximately four cars. The southbound through movement maintains LOS D and the 95<sup>th</sup> percentile queues increase by approximately one car (See Table 8, page 28).

In the 2032 evening peak-hour, the eastbound left turn movement maintains LOS F from no-build to build and the 95<sup>th</sup> percentile queues remain the same. The northbound left turn movement maintains LOS F and the 95<sup>th</sup> percentile queues increase by approximately two cars. The southbound through movement maintains LOS E and the 95<sup>th</sup> percentile queues increase by approximately two cars (See Table 9, page 31).

2032 Build with Improvements Conditions – With the recommended base improvements, overall the intersection improves from LOS D to LOS B in the morning peak period and in the evening peak period maintains LOS E.

In the 2032 morning peak-hour, the eastbound left turn movement maintains LOS D and the 95<sup>th</sup> percentile queues decrease by one car length. The northbound left turn movement improves from LOS F to LOS C and the 95<sup>th</sup> percentile queues decrease by approximately 10 car lengths from no-build to build with improvements conditions. The

southbound through movement also maintains from LOS D and the 95<sup>th</sup> percentile queues decrease by approximately one car length (See Table 8, page 28).

In the 2032 evening peak-hour, the eastbound left turn movement maintains LOS F and the 95<sup>th</sup> percentile queues remain the same from no-build to build with improvements. The northbound left turn movement improves from LOS F to LOS E and the 95<sup>th</sup> percentile queues decrease by approximately eight car lengths from no-build to build with improvements conditions. The southbound through movement also maintains LOS E and the 95<sup>th</sup> percentile queues increase by approximately three car lengths (See Table 9, page 31).

### Recommended Improvements Summary

A review of the analysis shows that the majority of the development traffic impacts are in the vicinity of the southern Lowell Road (Route 3A) corridor, generally at the intersections of Lowell Road from the intersection with Sagamore Bridge Road south to the new Green Meadow Drive. We propose a number of base improvements to both improve existing operating conditions and to mitigate the project related traffic impacts. These improvements would be constructed by the developer and completed prior to the opening of the development.

We anticipate that approximately 15% of the total site-generated traffic will enter from and exit to the Lowell Road (Route 3A) corridor north of Sagamore Bridge Road. Some of these intersections perform unsatisfactorily in the no-build scenarios and do not typically degrade further in the build scenarios (2022 and 2032). The base improvements listed below at the intersections north of Flagstone Drive/Wason Road are limited to signal timing optimization and minor re-striping within existing pavement widths where feasible. However, the town of Hudson and NHDOT should continue to explore further options to further improve existing and no-build traffic operations.

### Recommended Base Improvements

Based on our analyses, the following base improvements are recommended to improve existing operating conditions and mitigate the potential traffic impacts associated with the proposed development:

- Installation of new adaptive traffic signal controllers at the following intersections under the existing town control system. Adaptive signal control will allow timing optimization on-the-fly, through video detection, that will allow for seasonal and time-of-day variations in traffic. The industry standard capacity analysis software is unable to calculate this adaptive signal control and capture the efficiency this system provides. We have optimized and coordinated the signal timings in the capacity analyses at the intersections noted below to try to capture the benefits

of these improvements; however, we expect the intersections to operate better than indicated in the analysis. We recommend that these signals be incorporated into the town of Hudson system. Note that the intersection of Lowell Road & Wason Road/Flagstone Road is already incorporated into the town's control system.

- Lowell Road (Route 3A) & Wason Road/Flagstone Drive
- Lowell Road (Route 3A) & Sagamore Bridge Road
- Lowell Road (Route 3A) & Wal-Mart Boulevard
- Lowell Road (Route 3A) & Green Meadow Drive/Rena Avenue
- Lowell Road (Route 3A)/River Road/Dracut Road/Steele Road (depending on the option selected)
- Signal timing optimization at the following intersections
  - Lowell Road (Route 3A) & Executive Drive during the future 2032 weekday morning peak period
  - Lowell Road (Route 3A) & Fox Hollow Drive
- At Lowell Road/River Road/Dracut Road/Steele Road intersection we recommend two potential improvement options:
  - Option One: Convert the existing signalized intersection of Lowell Road/River Road & Dracut Road/Steele Road to a dual-lane roundabout with an inscribed diameter of 175 feet.
    - Provide a single lane approach for Steele Road
    - Provide two lane approaches for each of other the roadways
    - Utilize existing land owned by the state of New Hampshire at the southwest corner of the intersection for the construction of the roundabout
  - Option Two: Restripe one of the southbound through lanes to a second exclusive left-turn lane onto Dracut Road and widen on Dracut Road south of the intersection to accept a second receiving lane which would transition back down to a single lane with a lane drop
- Construction of the following geometric improvements at the intersection of Lowell Road and Rena Avenue/Mercury Systems driveway
  - Convert the Mercury Systems driveway into a new public roadway, Green Meadow Drive, intersecting with Rena Avenue at the existing traffic signal
  - Provide two left-turn lanes and a shared thru/right-turn lane on the eastbound approach
  - Convert the existing southbound shared through/right-turn lane to a through lane
  - Construct a southbound exclusive right turn lane extending to the intersection of Walmart Boulevard
  - Adjust the existing median island north of the intersection to allow for turning movements from Green Meadow Drive

- Construction of the following geometric improvements at the intersection of Lowell Road and Walmart Boulevard
  - Convert the existing southbound exclusive right turn lane to a through lane and restripe for an additional receiving lane on the south side of the intersection to extend down to the intersection of Lowell Road and Rena Avenue
  - Construct a southbound exclusive right turn lane with approximately 400 feet of storage
  - Convert the existing northbound exclusive right turn lane to a shared through/right-turn lane and restripe/widen on the north side of the intersection to receive the additional through lane.
- Construct a third northbound left turn lane at the intersection of Lowell Road and Sagamore Bridge Road
- Widen/restripe to provide three northbound travel lanes from Rena Avenue to Walmart Boulevard. The left-most northbound travel lane will feed the proposed triple left-turn lanes on Lowell Road northbound at Sagamore Bridge Road.
- Construction of the following geometric improvements at the intersection of Lowell Road and Wason Road/Flagstone Road
  - Addition of a second northbound right turn lane
  - Geometric improvements on Wason Road eastbound east of Lowell Road
    - Construct an additional receiving lane on Wason Road eastbound to accept the two right-turning lanes from Lowell Road northbound
    - Remove exclusive left turn lanes into the Goodwill shopping center and the Market Basket shopping center to accommodate the additional travel lane
    - Provide a lane drop approximately 850 feet east of Lowell Road to meet existing Wason Road eastbound geometry
- Restriping at the intersection of Lowell Road and Fox Hollow Drive of the northbound right-turn-only lane to a shared thru/right-turn lane. Two northbound thru receiving lanes currently exist.

Tables 6 through 10 compare the capacity analysis for the 2022 and 2032 build conditions based on the recommended improvements outlined above. Appendix I and Appendix J provide detailed reports for the 2022 Build with Base Improvements and 2032 Build with Base Improvements conditions. Conceptual improvement plans depicting the above-referenced improvements are provided in Appendix A.

#### Potential Future Improvements

In addition to the base improvements noted above, we have identified additional potential future improvements at the intersection of Lowell Road and Flagstone Drive/Wason Road that would further improve traffic operating conditions at this location. These

improvements would require right-of-way acquisitions from private property owners, which would need to be pursued by the town of Hudson. The developer has committed to fund the improvements, if the town or state pursues this improvement. In addition to the base improvements, these potential future improvements include the following:

- Widen the northbound approach to provide an exclusive left-turn lane, three through lanes and two exclusive right-turn lanes
- Widen the eastbound approach to provide a shared left-turn/through lane and two exclusive right-turn lanes
- Widen to provide an additional northbound receiving lane on the north side of the intersection that becomes an exclusive right-turn lane into the Market Basket plaza
- Install variable lane usage signing/controls for the northbound approach to allow for two exclusive left-turn lanes, two through lanes and two exclusive right-turn lanes during the weekday morning commuter peak to account for the high volume of left-turning traffic onto Flagstone Drive

Table 11 (See pages 36-37) compares the traffic operating conditions at Lowell Road and Flagstone Drive/Wason Road for the 2022 and 2032 no-build, build with base improvements and build with potential future improvements outlined above. Appendix K and Appendix L provide detailed reports for the 2022 Future Build with Improvements and 2032 Future Build with Improvements conditions. Appendix A provides a conceptual improvement plan for the items listed above.

Variable Lane Use Signing – The variable lane use signing and controls discussed as a potential future improvement are proposed due to the existing commuter distribution patterns of traffic volumes at the intersection of Lowell Road and Flagstone Drive/Wason Road. In the morning peak period, a high volume of vehicles travelling northbound on Lowell Road turn left onto Flagstone Drive, assumed to be employees travelling to work in the industrial uses off of Flagstone Drive. All other times of the day, a small number of vehicles are turning left from the northbound approach to the intersection, instead continuing northbound or turning right onto Wason Road. The variable lane use signing would be designed to provide the following lane arrangements for the northbound approach:

- Morning peak period:
  - Two left-turn lanes
  - Two through lanes
  - Two right-turn lanes
- All other times of the day:
  - Single left-turn lane
  - Three through lanes
  - Two right-turn lanes

Existing traffic patterns would benefit from this configuration of variable lane use signage, which would provide extra capacity for northbound left-turning vehicles in the morning peak period and an additional travel through lane all other times of the day.

The variable lane use signage and controls would be provided mid-block using overhead illuminated blank-out signs (see the first image below) with the lane uses described above illuminated during the appropriate time of day. This arrangement would be coordinated with the traffic signal controller cabinet based on time of day programming and provide motorists with advance warning of the correct lane to use at all times of the day. Additional post-mounted aluminum signage would also be provided at the stop bar on either side of the approach to inform motorists of the lane changes and what time of the day that movements are permitted (see the second image below).



Source: Google Street View, accessed August 2020

## 5.5 Step Five: Investigate the safety conditions within the area roadway network.

### Accidents

The most recent five years of accident data were requested via the Town of Hudson Police Department in order to conduct an accident analysis for the study area intersections. Table 12 through Table 14 provide details of the accident history.

Accidents included rear-ends, sideswipe (same direction), head-on collisions, angle collisions, pedestrian collisions, and single vehicle crashes, which are behaviors typical at signalized intersections. One fatality was reported at the Lowell Road at Wason Road/Flagstone Drive intersection in a head-on collision. Only 31 (19%) of the reported accidents resulted in injuries. The majority of accidents occurred during dry weather conditions (86%) and during daylight hours (93%).



<b>TABLE 12 CRASH DATA – CRASH SEVERITY (2014 – 2018)</b>					
<b>INTERSECTION</b>	<b>NUMBER OF ACCIDENTS</b>		<b>SEVERITY</b>		
	<b>Total</b>	<b>Average Per Year</b>	<b>Property Damage Only</b>	<b>Personal Injury</b>	<b>Fatality</b>
Lowell Road @Pelham Road	13	2.6	12 (92%)	1 (8%)	0 (0%)
Lowell Road @ Fox Hollow Drive	11	2.2	7 (64%)	4 (36%)	0 (0%)
Lowell Road @ Executive Drive	7	1.4	5 (71%)	2 (29%)	0 (0%)
Lowell Road @ Hampshire Drive/Oblate Drive	4	0.8	3 (75%)	1 (25%)	0 (0%)
Lowell Road @ Wason Road/Flagstone Drive	38	7.6	29 (76%)	8 (21%)	1 (3%)
Lowell Road @ Sagamore Bridge	46	9.2	39 (85%)	7 (15%)	0 (0%)
Lowell Road @ Wal-Mart Boulevard	30	6.0	25 (83%)	5 (17%)	0 (0%)
Lowell Road @ Rena Street	2	0.4	2 (100%)	0 (0%)	0 (0%)
Lowell Road @ River Road	1	0.2	1 (100%)	0 (0%)	0 (0%)
Lowell Road @ Dracut Road	12	2.4	9 (75%)	3 (25%)	0 (0%)

Source: Hudson New Hampshire Police Department (2014 – 2018)

<b>TABLE 13 CRASH DATA – MANNER OF CRASH (2014 – 2018)</b>							
<b>INTERSECTION</b>	<b>MANNER OF CRASH</b>						
	<b>Angle</b>	<b>Rear End</b>	<b>Head On</b>	<b>Sideswipe</b>	<b>Fixed Object</b>	<b>Pedestrian</b>	<b>Not Reported</b>
Lowell Road @ Pelham Road	5 (38%)	4 (31%)	2 (15%)	0 (0%)	0 (0%)	1 (8%)	1 (8%)
Lowell Road @ Fox Hollow Drive	3 (27%)	6 (55%)	1 (9%)	0 (0%)	0 (0%)	1 (9%)	0 (0%)
Lowell Road @ Executive Drive	2 (29%)	5 (71%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowell Road @ Hampshire Drive/Oblate Drive	0 (0%)	3 (75%)	0 (0%)	1 (25%)	0 (0%)	0 (0%)	0 (0%)
Lowell Road @ Wason Road/Flagstone Drive	8 (21%)	24 (63%)	2 (5%)	4 (11%)	0 (0%)	0 (0%)	0 (0%)
Lowell Road @ Sagamore Bridge	3 (7%)	34 (74%)	3 (7%)	6 (13%)	0 (0%)	0 (0%)	0 (0%)
Lowell Road @ Wal-Mart Boulevard	13 (43%)	10 (33%)	6 (20%)	1 (3%)	0 (0%)	0 (0%)	0 (0%)
Lowell Road @ Rena Street	0 (0%)	2 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowell Road @ River Road	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Lowell Road @ Dracut Road	0 (0%)	9 (75%)	2 (17%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)

Source: Hudson New Hampshire Police Department (2014 – 2018)

<b>TABLE 14 CRASH DATA – CONDITIONS (2014 – 2018)</b>				
<b>INTERSECTION</b>	<b>CONDITIONS</b>			
	<b>Clear (Dry)</b>	<b>Rain/ Snow</b>	<b>Day</b>	<b>Night</b>
Lowell Road @Pelham Road	12 (92%)	1 (8%)	12 (92%)	1 (8%)
Lowell Road @ Fox Hollow Drive	11 (100%)	0 (0%)	11 (100%)	0 (0%)
Lowell Road @ Executive Drive	4 (57%)	3 (43%)	5 (71%)	2 (29%)
Lowell Road @ Hampshire Drive/Oblate Drive	4 (100%)	0 (0%)	4 (100%)	0 (0%)
Lowell Road @ Wason Road/Flagstone Drive	34 (89%)	4 (11%)	37 (97%)	1 (3%)
Lowell Road @ Sagamore Bridge	39 (85%)	7 (15%)	44 (96%)	2 (4%)
Lowell Road @ Wal-Mart Boulevard	27 (90%)	3 (10%)	26 (87%)	4 (13%)
Lowell Road @ Rena Street	2 (100%)	0 (0%)	2 (100%)	0 (0%)
Lowell Road @ River Road	1 (100%)	0 (0%)	1 (100%)	0 (0%)
Lowell Road @ Dracut Road	7 (58%)	5 (42%)	10 (83%)	2 (17%)

Source: Hudson New Hampshire Police Department (2014 – 2018)

## 6.0 SUMMARY AND CONCLUSIONS

This evaluation identifies the potential traffic impacts generated by the proposed Hudson Logistics Center project on the surrounding area road network. We performed a capacity analysis for the 2019 existing; 2022 and 2032 no-build; and 2022 and 2032 build scenarios for nine intersections. Our evaluation indicates that, with the following recommended improvements, the intersections analyzed will maintain acceptable or improve on the no-build traffic operating conditions.

Our recommended improvements have been separated into two groups: (1) base improvements that will be implemented immediately to improve existing operating conditions and mitigate the potential traffic impacts directly associated with the proposed development and (2) future improvements that require right-of-way acquisitions from private property owners, which would need to be pursued by the town of Hudson, further improve traffic operating conditions at the intersection of Lowell Road & Wason Road/Flagstone Drive. The town of Hudson and NHDOT should continue to explore further options to further improve existing and no-build traffic operations.

The proposed improvements will improve traffic operating conditions of the area roadway network, not only for the worst-case peak-hour conditions, but will also significantly improve off-peak-hour operations.

Recommended base improvements include the following items:

- Installation of new adaptive traffic signal controllers at the following intersections under the existing town control system. Adaptive signal control will allow timing optimization on-the-fly, through video detection, that will allow for seasonal and time-of-day variations in traffic. The industry standard capacity analysis software is unable to calculate this adaptive signal control and capture the efficiency this system provides. We have optimized and coordinated the signal timings in the capacity analyses at the intersections noted below to try to capture the benefits of these improvements; however, we expect the intersections to operate better than indicated in the analysis. Note that the intersection of Lowell Road & Wason Road/Flagstone Road is already incorporated into the town's control system.
  - Lowell Road (Route 3A) & Wason Road/Flagstone Drive
  - Lowell Road (Route 3A) & Sagamore Bridge Road
  - Lowell Road (Route 3A) & Wal-Mart Boulevard
  - Lowell Road (Route 3A) & Green Meadow Drive/Rena Avenue
  - Lowell Road (Route 3A)/River Road/Dracut Road/Steele Road (depending on option selected)
- Signal timing optimization at the following intersections
  - Lowell Road (Route 3A) & Executive Drive during the 2032 weekday morning peak period
  - Lowell Road (Route 3A) & Fox Hollow Drive
- At Lowell Road/River Road/Dracut Road/Steele Road intersection we recommend two potential improvement options:
  - Option One: Convert the existing signalized intersection of Lowell Road/River Road & Dracut Road/Steele Road to a dual-lane roundabout with an inscribed diameter of 175 feet.
    - Provide a single lane approach for Steele Road
    - Provide two lane approaches for each of other the roadways
    - Utilize existing land owned by the state of New Hampshire at the southwest corner of the intersection for the construction of the roundabout
  - Option Two: Restripe one of the southbound through lanes to a second exclusive left-turn lane onto Dracut Road and widen on Dracut Road south of the intersection to accept a second receiving lane which would transition back down to a single lane with a lane drop
- Construction of the following geometric improvements at the intersection of Lowell Road and Rena Avenue/Mercury Systems driveway
  - Convert the Mercury Systems driveway into a new public roadway, Green Meadow Drive, intersecting with Rena Avenue at the existing traffic signal
  - Provide two left-turn lanes and a shared thru/right-turn lane on the eastbound approach
  - Convert the existing southbound shared through/right-turn lane to a through lane

- Construct a southbound exclusive right turn lane extending to the intersection of Walmart Boulevard
- Adjust the existing median island north of the intersection to allow for turning movements from Green Meadow Drive
- Construction of the following geometric improvements at the intersection of Lowell Road and Walmart Boulevard
  - Convert the existing southbound exclusive right turn lane to a through lane and restripe for an additional receiving lane on the south side of the intersection to extend down to the intersection of Lowell Road and Rena Avenue
  - Construct a southbound exclusive right turn lane with approximately 400 feet of storage
  - Convert the existing northbound exclusive right turn lane to a shared through/right-turn lane and restripe/widen on the north side of the intersection to receive the additional through lane.
- Construct a third northbound left turn lane at the intersection of Lowell Road and Sagamore Bridge Road
- Widen/restripe to provide three northbound travel lanes from Rena Avenue to Walmart Boulevard. The left-most northbound travel lane will feed the proposed triple left-turn lanes on Lowell Road northbound at Sagamore Bridge Road.
- Construction of the following geometric improvements at the intersection of Lowell Road and Wason Road/Flagstone Road
  - Addition of a second northbound right turn lane
  - Geometric improvements on Wason Road eastbound east of Lowell Road
    - Construct an additional receiving lane on Wason Road eastbound to accept the two right-turning lanes from Lowell Road northbound
    - Remove exclusive left turn lanes into the Goodwill shopping center and the Market Basket shopping center to accommodate the additional travel lane
    - Provide a lane drop approximately 850 feet east of Lowell Road to meet existing Wason Road eastbound geometry
- Restriping at the intersection of Lowell Road and Fox Hollow Drive of the northbound right-turn-only lane to a shared thru/right-turn lane. Two northbound thru receiving lanes currently exist.

Due to the need for private property to accomplish further improvements at the intersection of Lowell Road and Wason Road/Flagstone Drive, the developer proposes to fund future improvements, if the town or state chooses to proceed with these improvements that will further improve operations at this intersection:

- Widen the northbound approach to provide an exclusive left-turn lane, three through lanes and two exclusive right-turn lanes

- Widen the eastbound approach to provide a shared left-turn/through lane and two exclusive right-turn lanes
- Widen to provide an additional northbound receiving lane on the north side of the intersection that becomes an exclusive right-turn lane into the Market Basket plaza
- Install variable lane usage signing/controls for the northbound approach to allow for two exclusive left-turn lanes, two through lanes and two exclusive right-turn lanes during the weekday morning commuter peak to account for the high volume of left-turning traffic onto Flagstone Drive

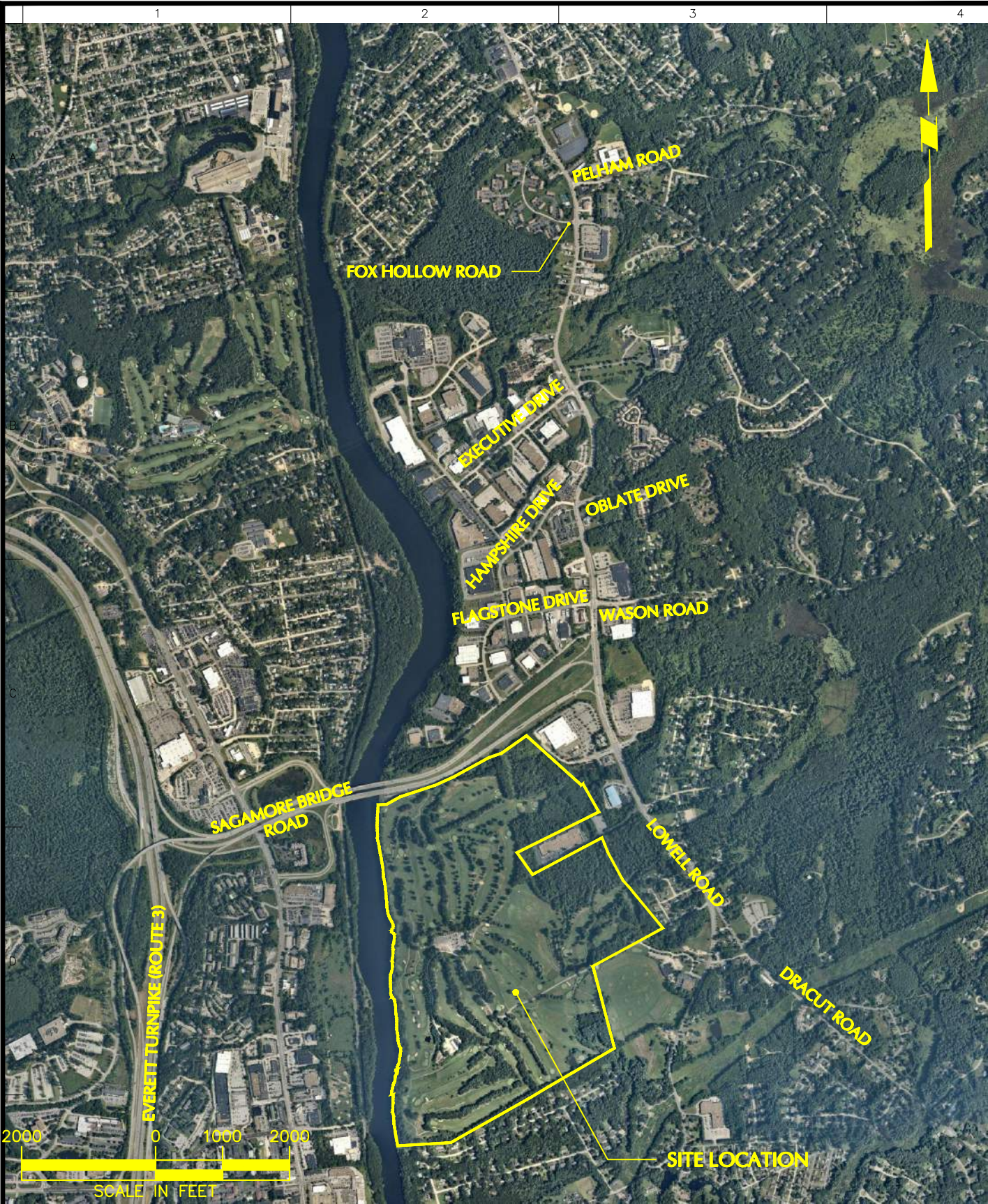
Upon implementation of the recommended base improvements, the traffic impact of the proposed development is mitigated and existing operating conditions will be improved as compared to current conditions. It is our professional opinion that these base improvement mitigate the traffic impacts of the proposed development.

\\langan.com\data\BOS\data1\151010101\Project Data\Discipline\Traffic\Reports\Traffic Impact Assessment\151010101 - Hudson Logistics Center - Traffic Impact Study NHDOT - September 2020.docx

## **Figures**

Figure 1	Location Map
Figure 2	Study Area Intersections
Figure 3	2019 Existing Peak-Hour Traffic Volumes
Figure 4	2022 No-Build Peak-Hour Traffic Volumes
Figure 4A	2022 Ambient Growth Peak-Hour Traffic Volumes
Figure 4B	Cumberland Farms Peak-Hour Traffic Volumes
Figure 5	2032 No-Build Peak-Hour Traffic Volumes
Figure 5A	2032 Ambient Growth Peak-Hour Traffic Volumes
Figure 6	Trip Distribution
Figure 7	Trip Assignment
Figure 7A	Truck Trip Assignment
Figure 8	2022 Build Peak-Hour Traffic Volumes
Figure 9	2032 Build Peak-Hour Traffic Volumes





**LANGAN**  
Langan Engineering and  
Environmental Services, Inc.

www.langan.com

Project  
**HUDSON LOGISTICS  
CENTER**

HUDSON  
HILLSBOROUGH COUNTY NEW HAMPSHIRE

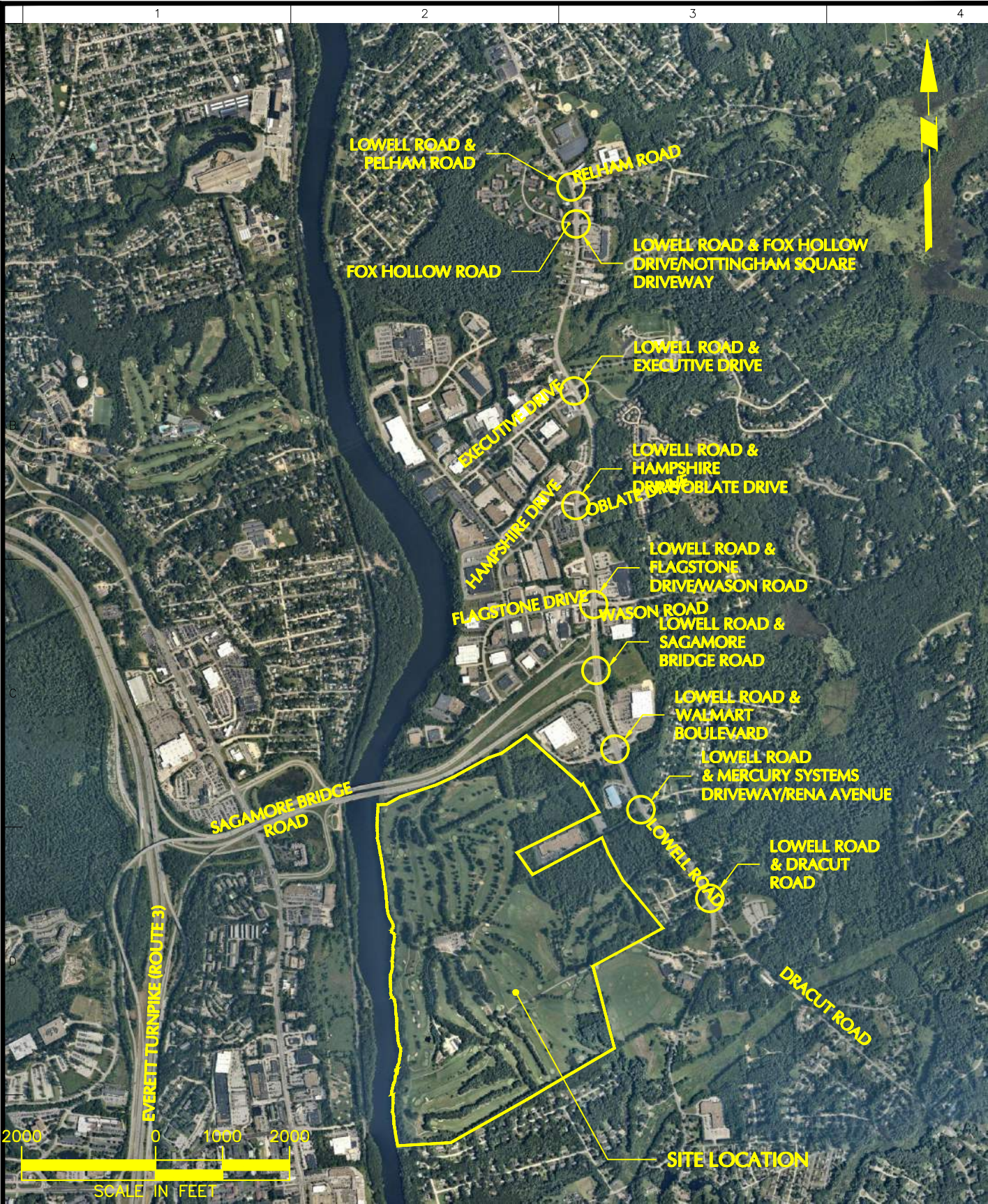
Drawing Title  
**LOCATION MAP**

Project No.  
**151010101**  
Date  
**03/04/2020**  
Drawn By  
**CJM**  
Checked By  
**LAM**

Drawing No.  
**FIG. 1**

Sheet 1 of 15





**LANGAN**  
Langan Engineering and  
Environmental Services, Inc.

www.langan.com

Project  
**HUDSON LOGISTICS  
CENTER**

HUDSON  
HILLSBOROUGH COUNTY NEW HAMPSHIRE

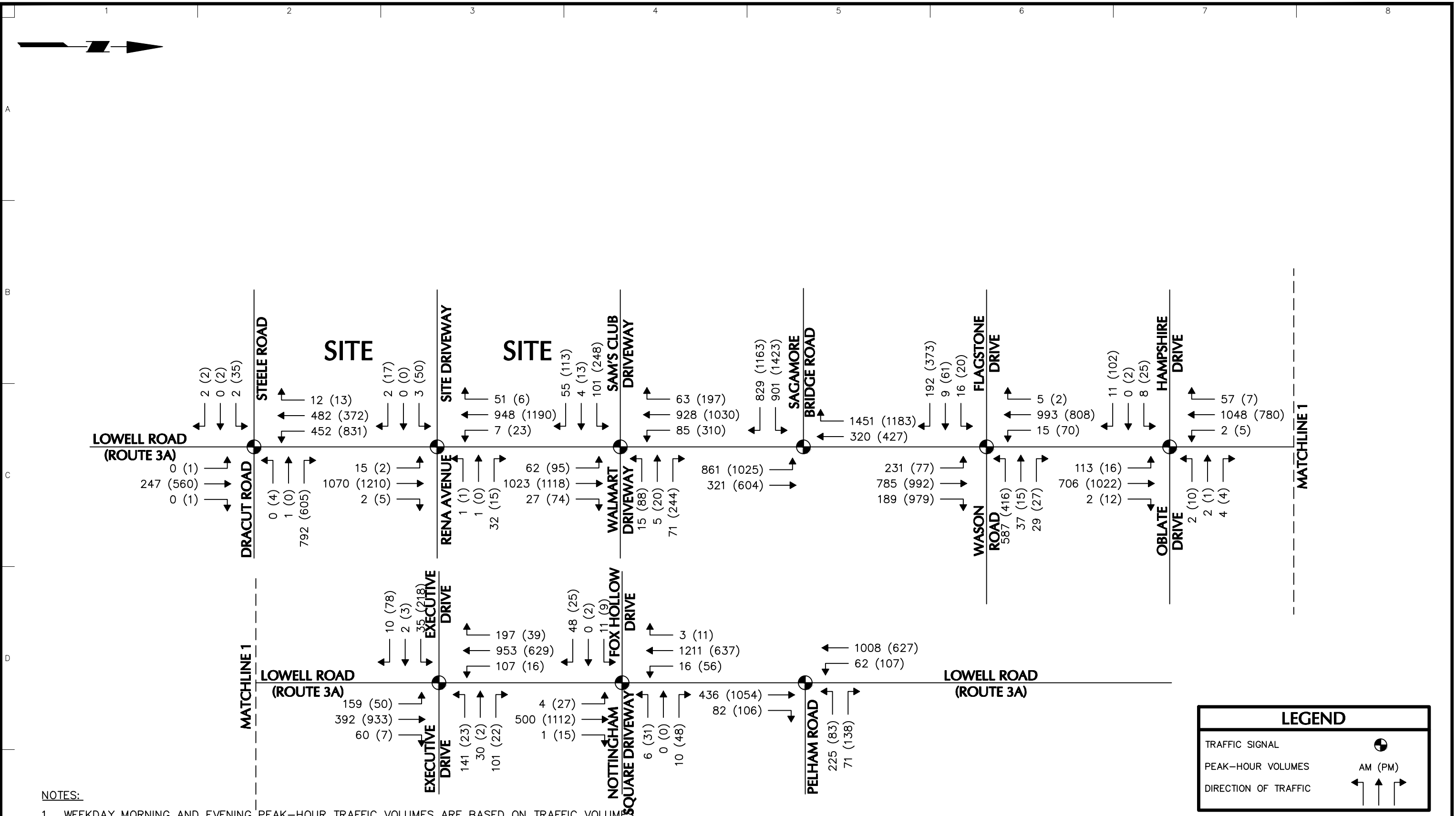
Drawing Title  
**STUDY  
INTERSECTIONS MAP**

Project No.  
**151010101**  
Date  
**03/04/2020**  
Drawn By  
**CJM**  
Checked By  
**LAM**

Drawing No.  
**FIG. 2**

Sheet 2 of 15

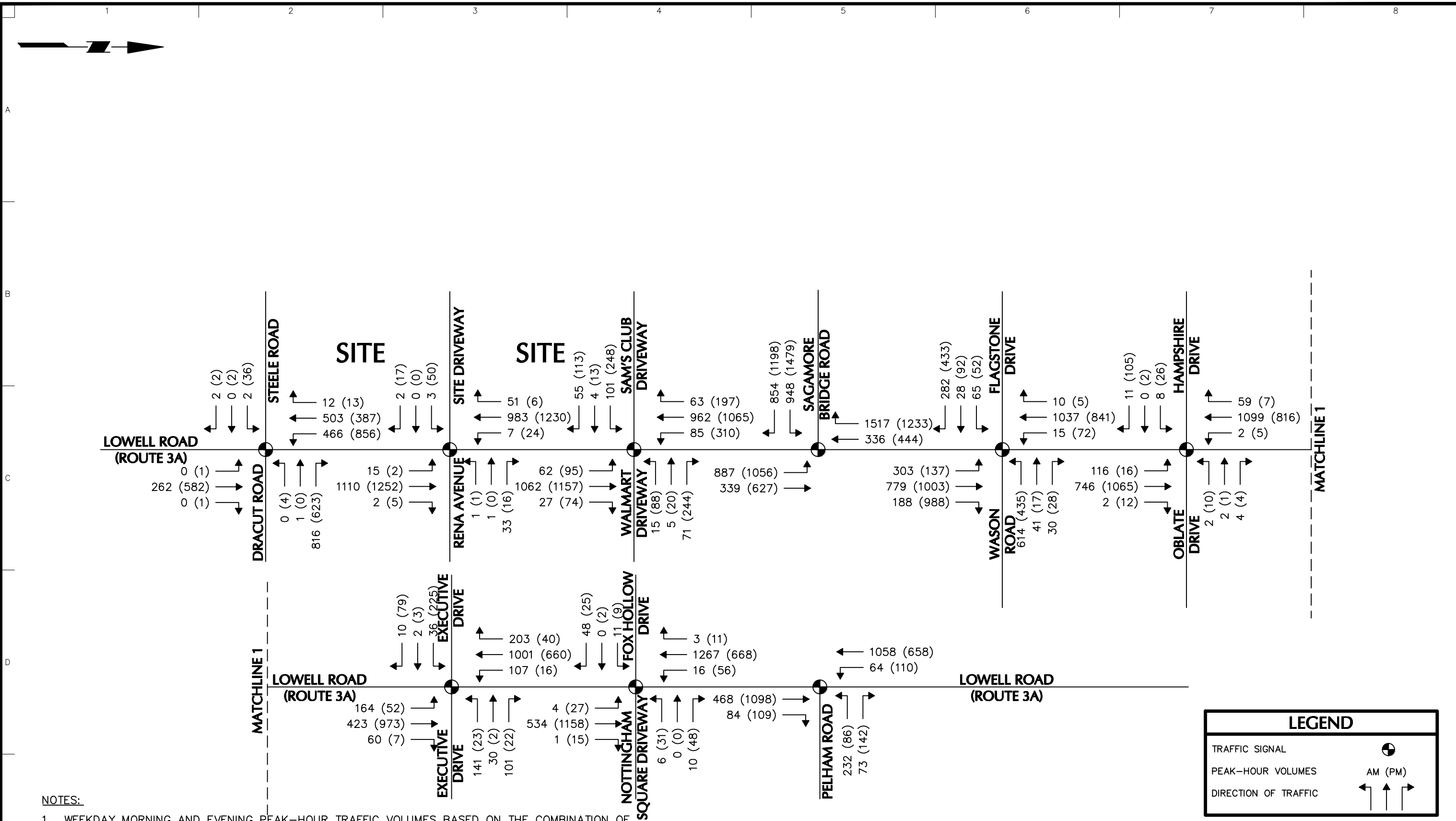




- NOTES:**
1. WEEKDAY MORNING AND EVENING PEAK-HOUR TRAFFIC VOLUMES ARE BASED ON TRAFFIC VOLUMES OBSERVED ON 10/08/2019 BY ACCURATE COUNTS.
  2. MORNING PEAK-HOUR: 7:15 A.M. - 8:15 A.M.
  3. EVENING PEAK-HOUR: 4:30 P.M. - 5:30 P.M.

LEGEND	
TRAFFIC SIGNAL	
PEAK-HOUR VOLUMES	AM (PM)
DIRECTION OF TRAFFIC	

 Langan Engineering and Environmental Services, Inc. www.langan.com	Project <b>HUDSON LOGISTICS CENTER</b> HUDSON HILLSBOROUGH COUNTY NEW HAMPSHIRE	Drawing Title <b>2019 EXISTING PEAK-HOUR TRAFFIC VOLUMES</b>	Project No. <b>151010101</b>	Drawing No. <b>FIG. 3</b>
	Date <b>03/04/2020</b>	Drawn By <b>CJM</b>	Checked By <b>LAM</b>	Sheet <b>3</b> of <b>17</b>

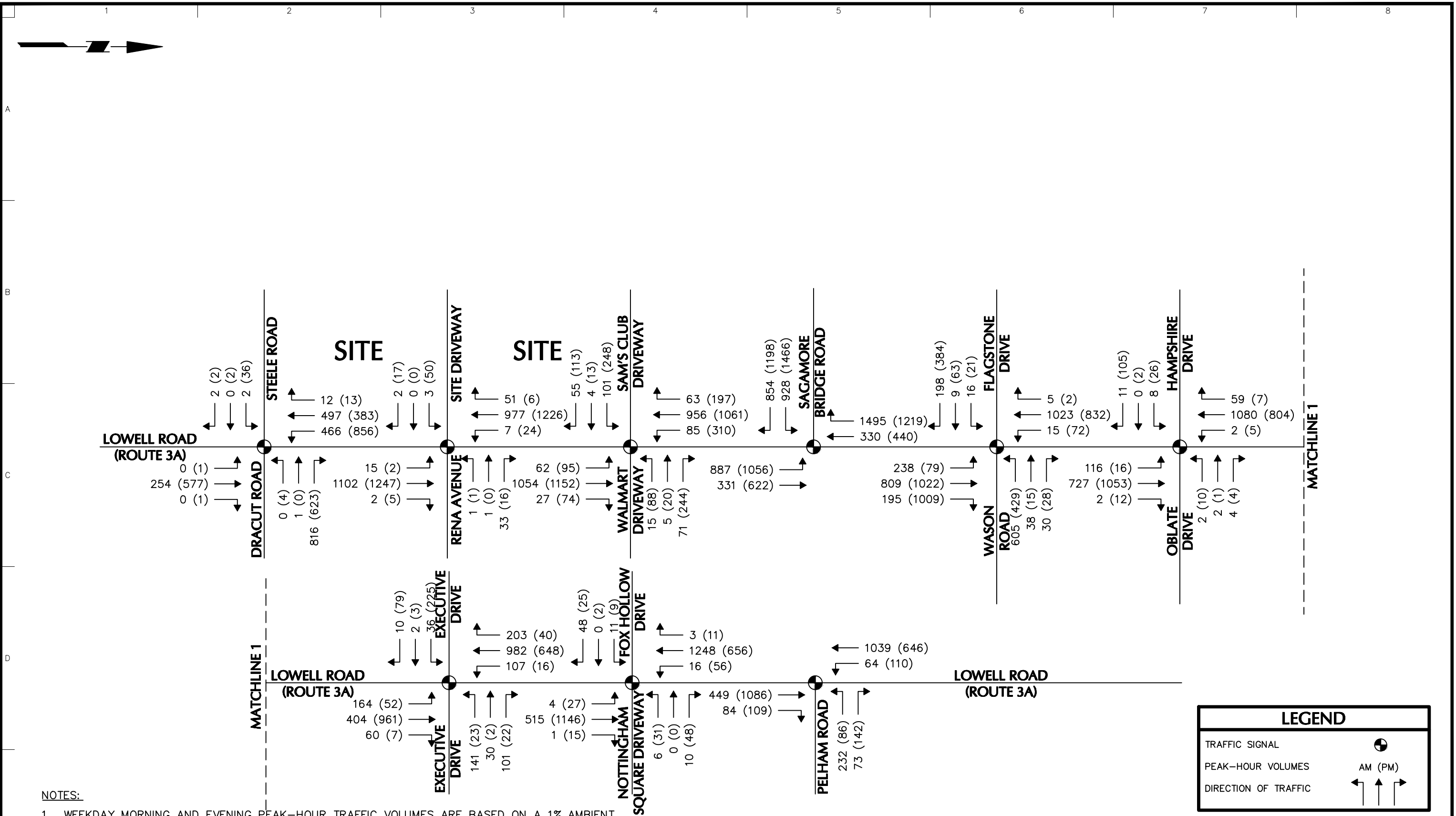


**NOTES:**

1. WEEKDAY MORNING AND EVENING PEAK-HOUR TRAFFIC VOLUMES BASED ON THE COMBINATION OF VOLUMES FROM FIGURE 4A AND FIGURE 4B OF THIS REPORT.
2. MORNING PEAK-HOUR: 7:15 A.M. - 8:15 A.M.
3. EVENING PEAK-HOUR: 4:30 P.M. - 5:30 P.M.

LEGEND	
TRAFFIC SIGNAL	
PEAK-HOUR VOLUMES	AM (PM)
DIRECTION OF TRAFFIC	

 Langan Engineering and Environmental Services, Inc. www.langan.com	Project <b>HUDSON LOGISTICS CENTER</b> HUDSON HILLSBOROUGH COUNTY NEW HAMPSHIRE	Drawing Title <b>2022 COMBINED NO-BUILD PEAK-HOUR TRAFFIC VOLUMES</b>	Project No. 151010101	Drawing No. <b>FIG. 4</b>
			Date 03/04/2020	
			Drawn By CJM	Sheet 4 of 17
			Checked By LAM	

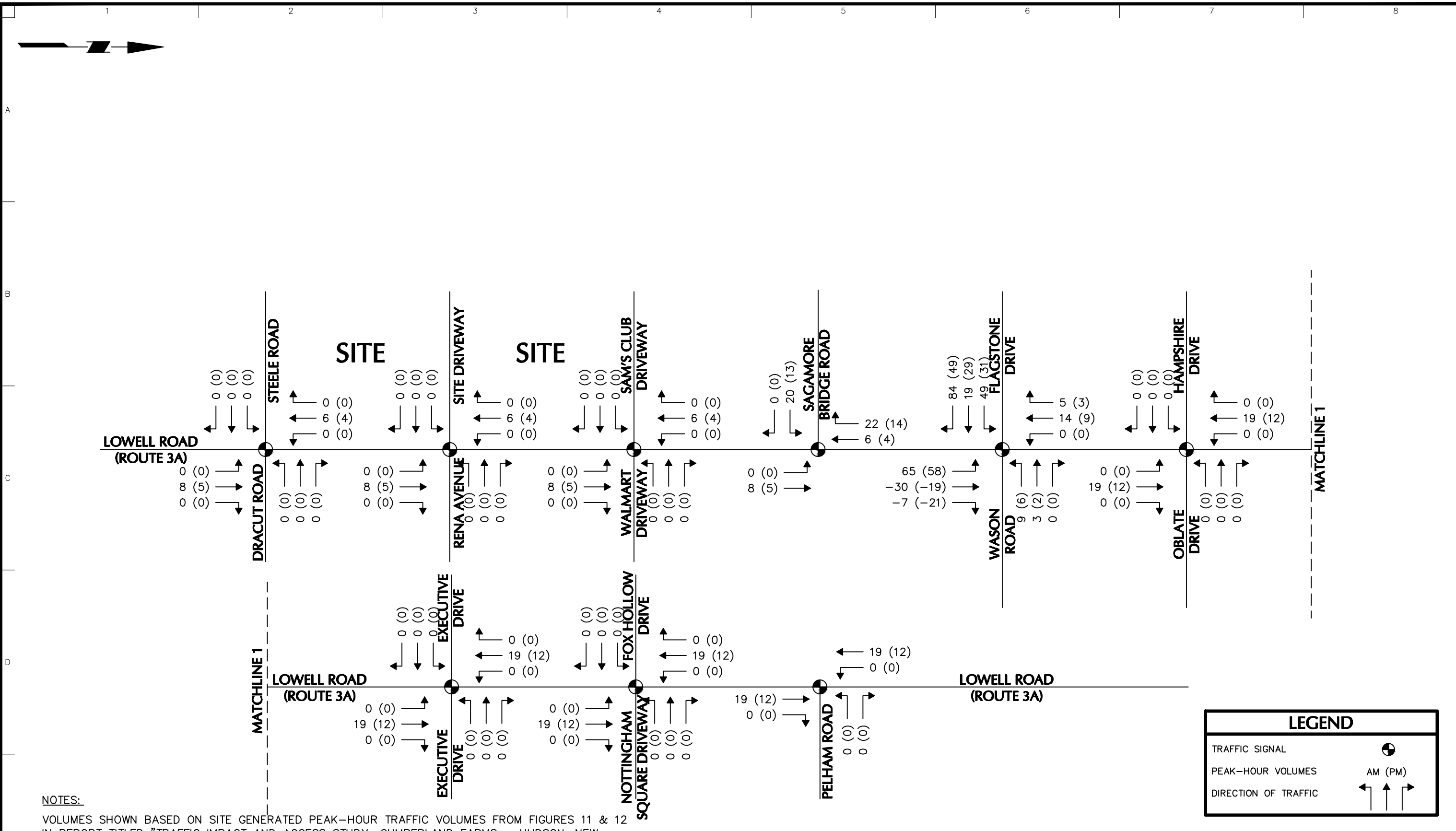


**NOTES:**

1. WEEKDAY MORNING AND EVENING PEAK-HOUR TRAFFIC VOLUMES ARE BASED ON A 1% AMBIENT GROWTH RATE APPLIED TO THE TRAFFIC VOLUMES SHOWN IN FIGURE 3 OF THIS REPORT.
2. MORNING PEAK-HOUR: 7:15 A.M. - 8:15 A.M.
3. EVENING PEAK-HOUR: 4:30 P.M. - 5:30 P.M.

LEGEND	
TRAFFIC SIGNAL	
PEAK-HOUR VOLUMES	AM (PM)
DIRECTION OF TRAFFIC	

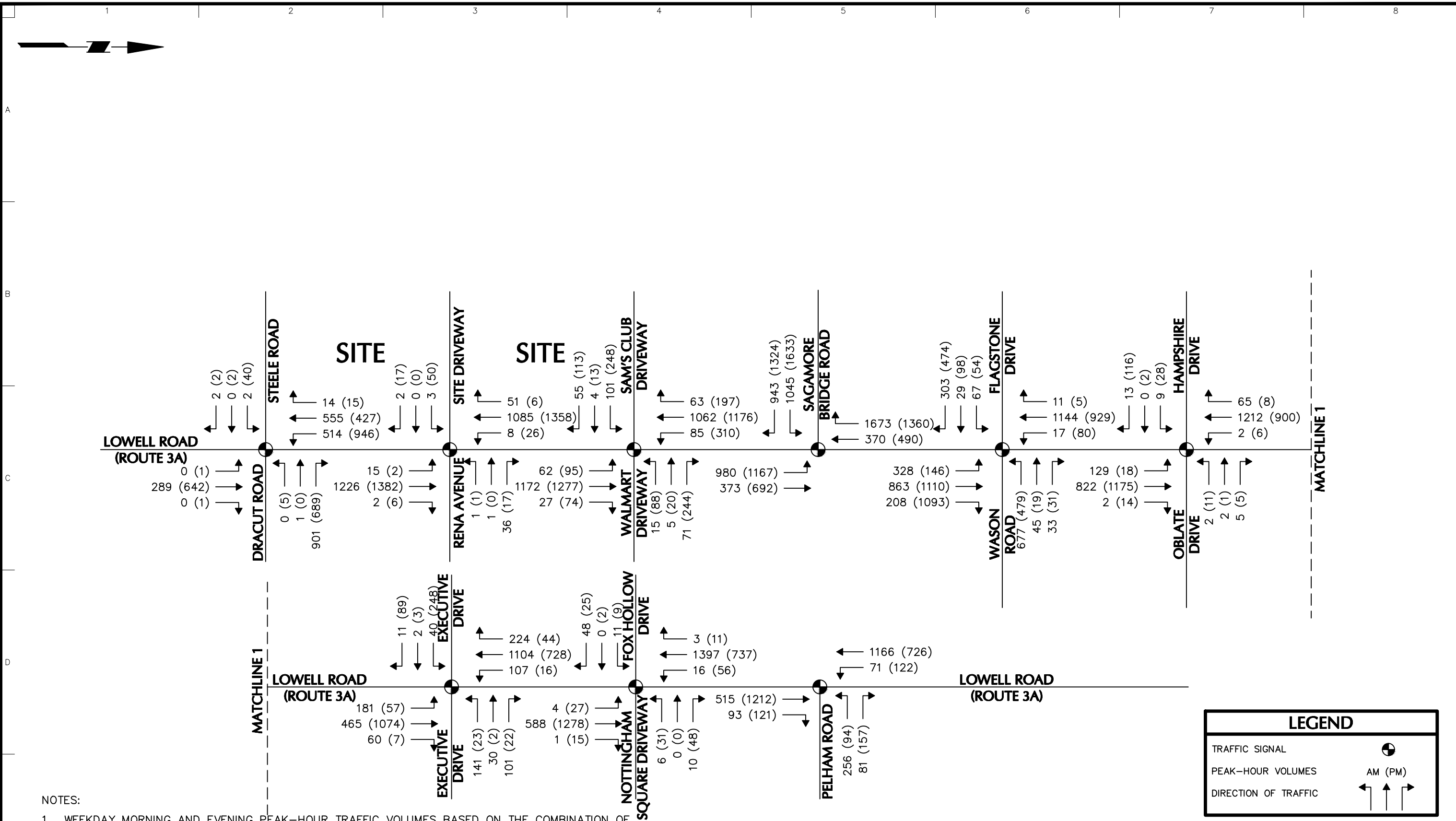
<p>LANGAN Langan Engineering and Environmental Services, Inc. www.langan.com</p>	<p>Project <b>HUDSON LOGISTICS CENTER</b> HUDSON HILLSBOROUGH COUNTY NEW HAMPSHIRE</p>	<p>Drawing Title <b>2022 AMBIENT GROWTH PEAK-HOUR TRAFFIC VOLUMES</b></p>	<p>Project No. <b>151010101</b></p>	<p>Drawing No. <b>FIG. 4A</b></p>
			<p>Date <b>06/08/2020</b></p>	
			<p>Drawn By <b>BTW</b></p>	<p>Sheet <b>5</b> of <b>17</b></p>
			<p>Checked By <b>CJM</b></p>	



**NOTES:**  
 VOLUMES SHOWN BASED ON SITE GENERATED PEAK-HOUR TRAFFIC VOLUMES FROM FIGURES 11 & 12 IN REPORT TITLED "TRAFFIC IMPACT AND ACCESS STUDY: CUMBERLAND FARMS - HUDSON, NEW HAMPSHIRE" BY GPI DATED OCTOBER 2018.

LEGEND	
TRAFFIC SIGNAL	
PEAK-HOUR VOLUMES	AM (PM)
DIRECTION OF TRAFFIC	

 Langan Engineering and Environmental Services, Inc. www.langan.com	Project <b>HUDSON LOGISTICS CENTER</b> HUDSON HILLSBOROUGH COUNTY NEW HAMPSHIRE	Drawing Title <b>FLAGSTONE CROSSING PEAK-HOUR TRAFFIC VOLUMES</b>	Project No. <b>151010101</b>	Drawing No. <b>FIG. 4B</b>
	Date <b>06/08/2020</b>	Drawn By <b>BTW</b>	Checked By <b>CJM</b>	Sheet <b>6</b> of <b>18</b>

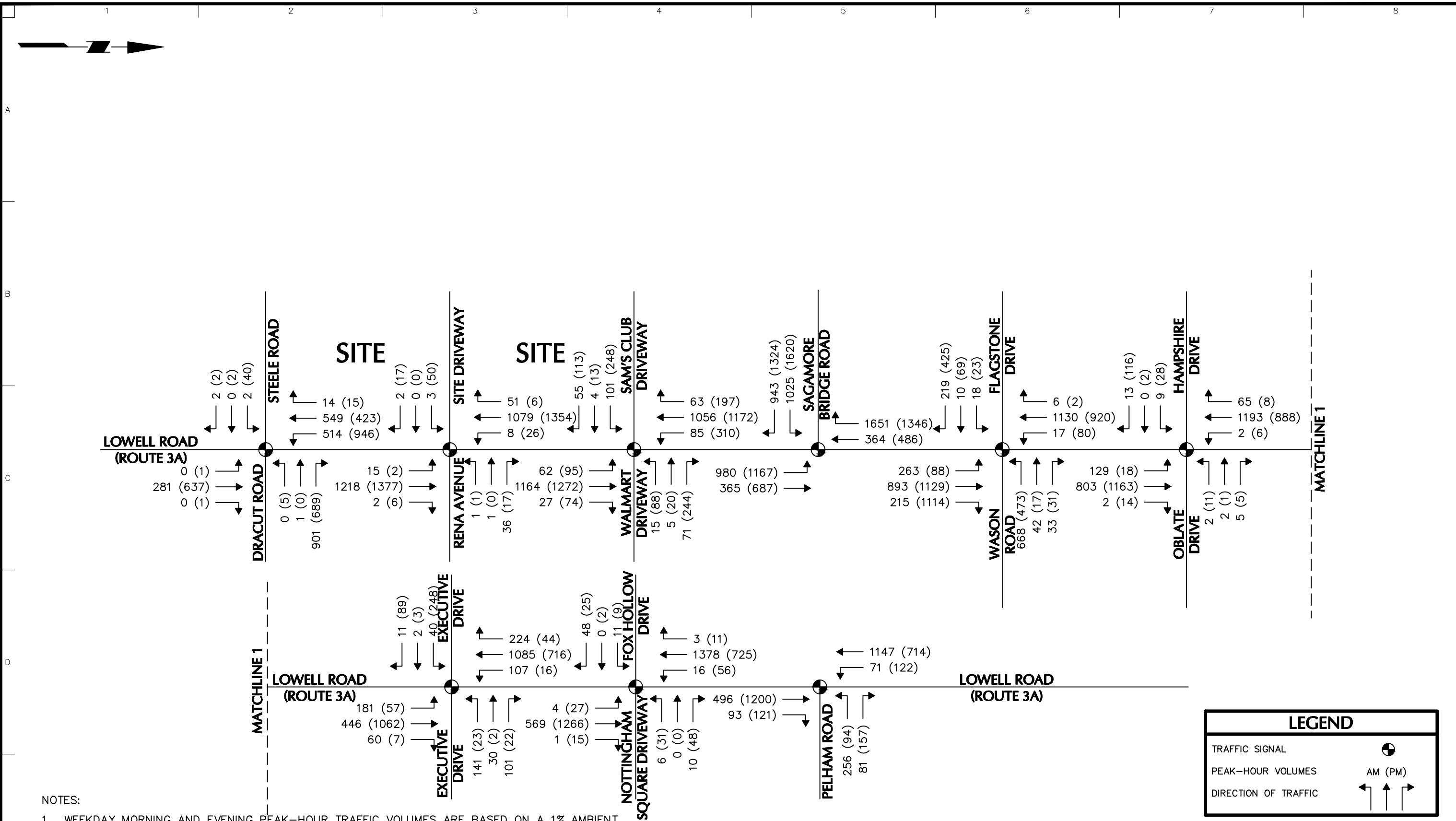


**NOTES:**

1. WEEKDAY MORNING AND EVENING PEAK-HOUR TRAFFIC VOLUMES BASED ON THE COMBINATION OF VOLUMES FROM FIGURE 5A AND FIGURE 4B OF THIS REPORT.
2. MORNING PEAK-HOUR: 7:15 A.M. - 8:15 A.M.
3. EVENING PEAK-HOUR: 4:30 P.M. - 5:30 P.M.

LEGEND	
TRAFFIC SIGNAL	
PEAK-HOUR VOLUMES	AM (PM)
DIRECTION OF TRAFFIC	

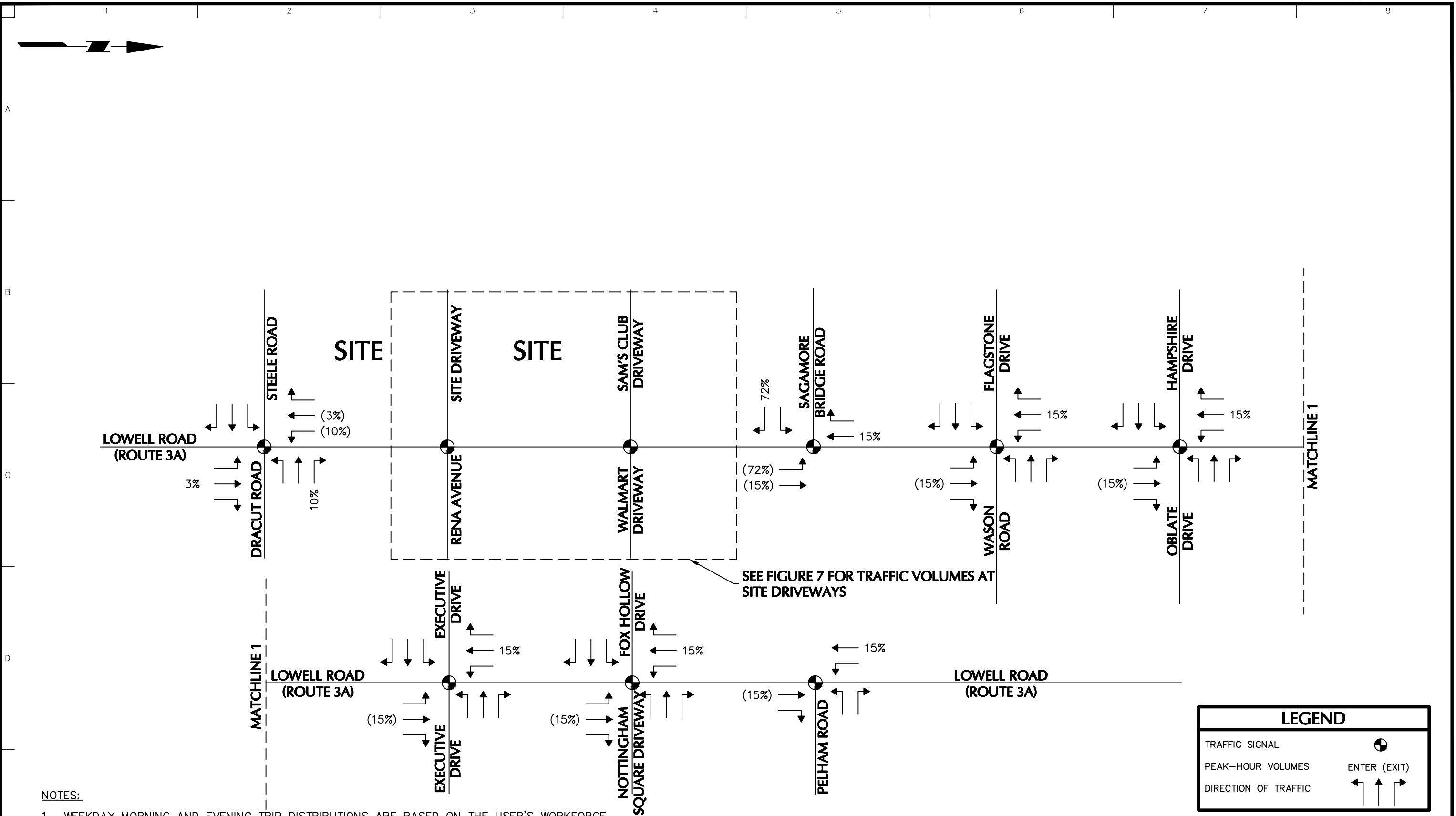
 Langan Engineering and Environmental Services, Inc. www.langan.com	Project	HUDSON LOGISTICS CENTER	Drawing Title	2032 NO-BUILD PEAK-HOUR TRAFFIC VOLUMES	Project No.	151010101	Drawing No.	FIG. 5
		HUDSON HILLSBOROUGH COUNTY NEW HAMPSHIRE			Date	03/04/2020	Sheet 7 of 17	
					Drawn By	CJM		
					Checked By	LAM		



- NOTES:
1. WEEKDAY MORNING AND EVENING PEAK-HOUR TRAFFIC VOLUMES ARE BASED ON A 1% AMBIENT GROWTH RATE APPLIED TO THE TRAFFIC VOLUMES SHOWN IN FIGURE 3 OF THIS REPORT.
  2. MORNING PEAK-HOUR: 7:15 A.M. - 8:15 A.M.
  3. EVENING PEAK-HOUR: 4:30 P.M. - 5:30 P.M.

LEGEND	
TRAFFIC SIGNAL	
PEAK-HOUR VOLUMES	AM (PM)
DIRECTION OF TRAFFIC	

 Langan Engineering and Environmental Services, Inc.	Project <b>HUDSON LOGISTICS CENTER</b>	Drawing Title <b>2032 AMBIENT GROWTH PEAK-HOUR TRAFFIC VOLUMES</b>	Project No. 151010101	Drawing No. <b>FIG. 5A</b>
			Date 03/04/2020	
www.langan.com	HUDSON HILLSBOROUGH COUNTY NEW HAMPSHIRE	Checked By BTW	Sheet 8 of 17	

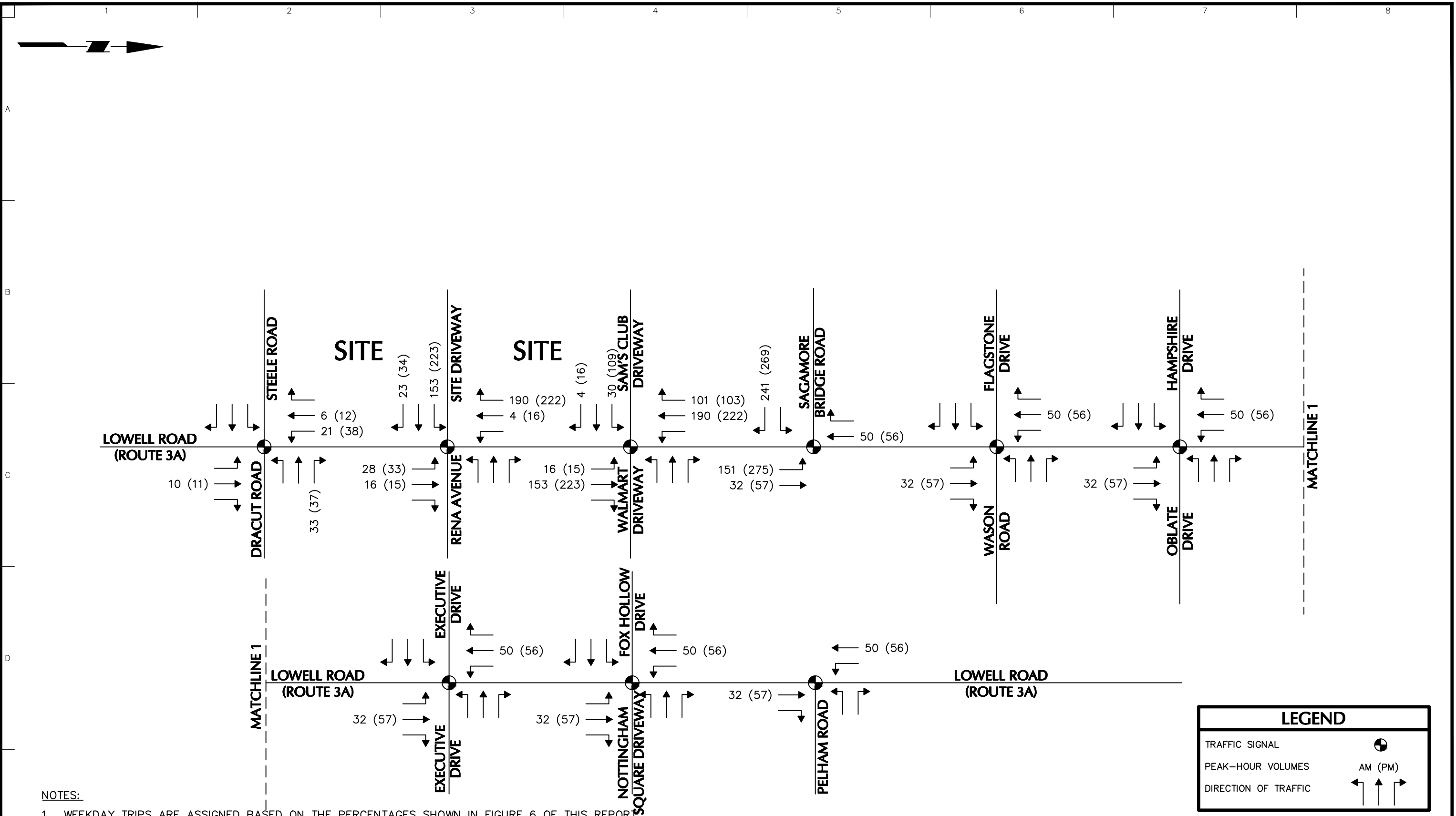


SEE FIGURE 7 FOR TRAFFIC VOLUMES AT SITE DRIVEWAYS

LEGEND	
TRAFFIC SIGNAL	
PEAK-HOUR VOLUMES	ENTER (EXIT)
DIRECTION OF TRAFFIC	

**NOTES:**  
 1. WEEKDAY MORNING AND EVENING TRIP DISTRIBUTIONS ARE BASED ON THE USER'S WORKFORCE, EXISTING TRAFFIC PATTERNS, ANTICIPATED TRUCK ROUTES, AND JOURNEY TO WORK DATA.

 Langan Engineering and Environmental Services, Inc. www.langan.com	Project <b>HUDSON LOGISTICS CENTER</b> HUDSON HILLSBOROUGH COUNTY NEW HAMPSHIRE	Drawing Title <b>TRIP DISTRIBUTION</b>	Project No. <b>151010101</b>	Drawing No. <b>FIG. 6</b>
	Date <b>03/04/2020</b>	Drawn By <b>CJM</b>	Checked By <b>LAM</b>	Sheet <b>9</b> of <b>17</b>



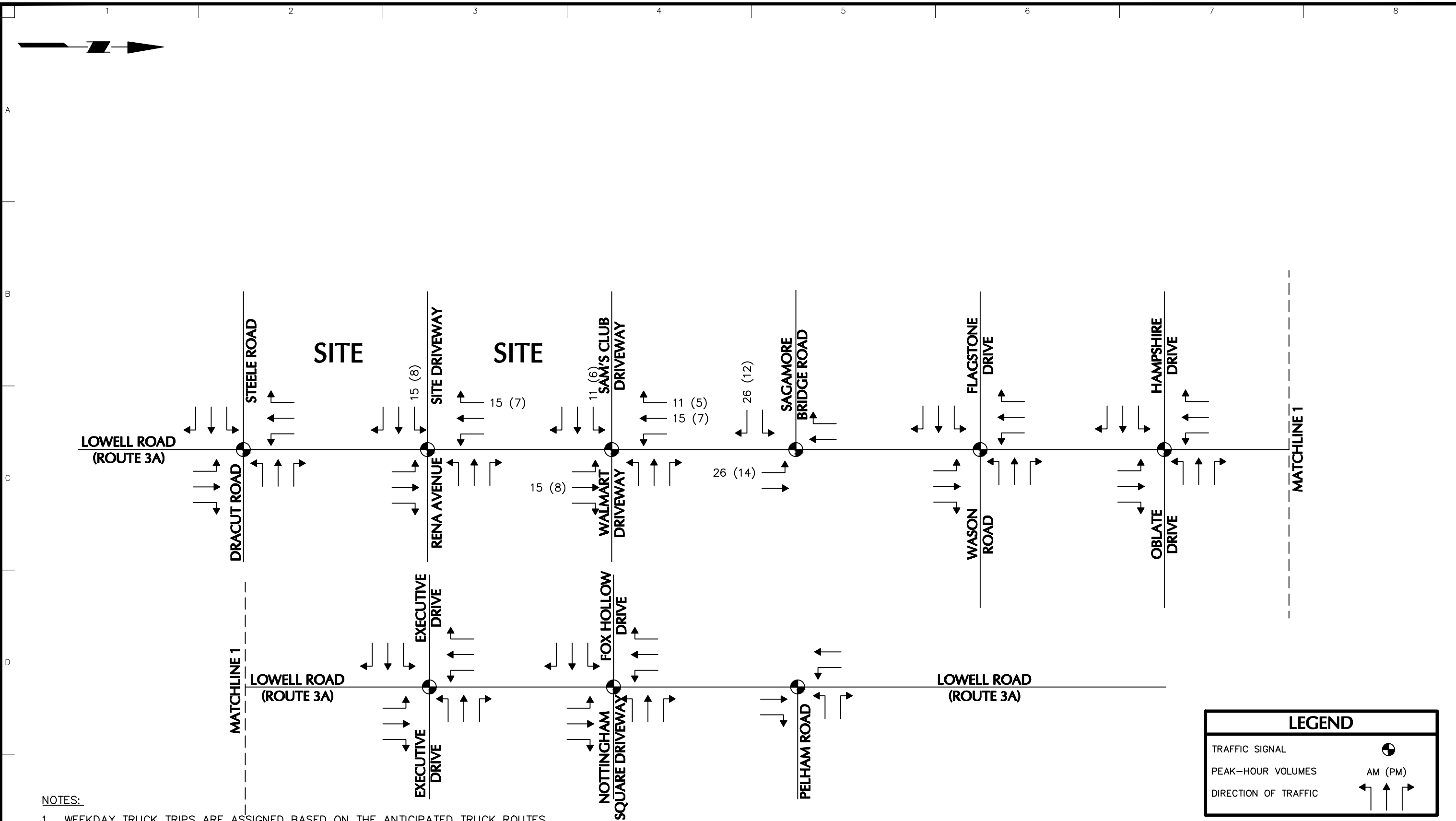
**NOTES:**

1. WEEKDAY TRIPS ARE ASSIGNED BASED ON THE PERCENTAGES SHOWN IN FIGURE 6 OF THIS REPORT AND THE TRIP GENERATION TABLE IN THIS REPORT.
2. MORNING PEAK-HOUR: 7:15 A.M. - 8:15 A.M.
3. EVENING PEAK-HOUR: 4:30 P.M. - 5:30 P.M.

LEGEND	
TRAFFIC SIGNAL	
PEAK-HOUR VOLUMES	AM (PM)
DIRECTION OF TRAFFIC	

 Langan Engineering and Environmental Services, Inc. www.langan.com	Project <b>HUDSON LOGISTICS CENTER</b> HUDSON HILLSBOROUGH COUNTY NEW HAMPSHIRE	Drawing Title <b>TRIP ASSIGNMENT</b>	Project No. <b>151010101</b>	Drawing No. <b>FIG. 7</b>
	Date <b>03/04/2020</b>	Drawn By <b>CJM</b>	Checked By <b>LAM</b>	Sheet <b>10</b> of <b>17</b>



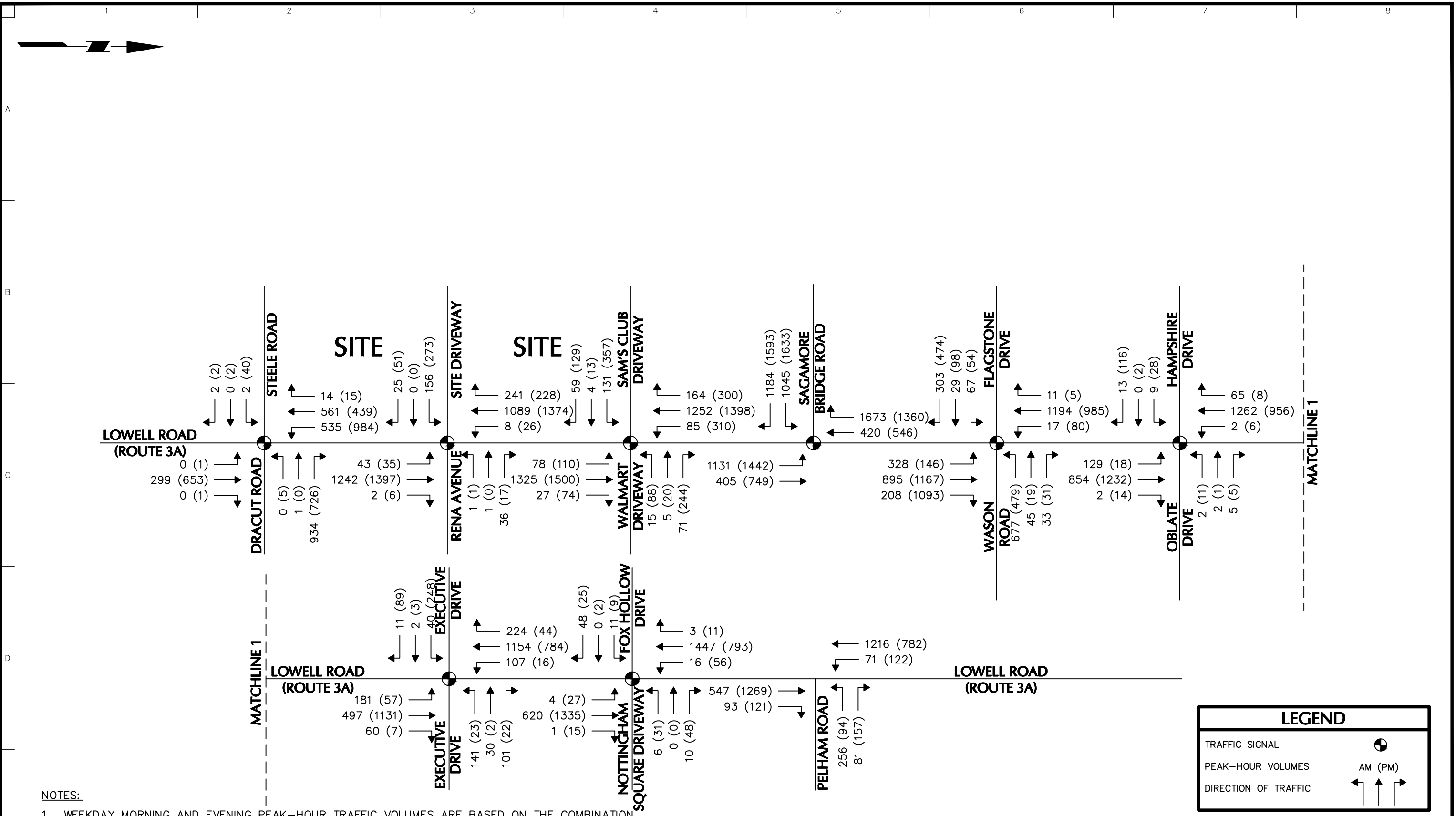


- NOTES:**
1. WEEKDAY TRUCK TRIPS ARE ASSIGNED BASED ON THE ANTICIPATED TRUCK ROUTES.
  2. WEEKDAY TRUCK TRIP VOLUMES ARE CALCULATED USING ITE 10TH EDITION TRIP GENERATION MANUAL SUPPLEMENT LAND USE CODE 155 (NON-SORT) BASED ON BUILDING GROSS FLOOR AREA.
  3. MORNING PEAK-HOUR: 7:15 A.M. - 8:15 A.M.
  4. EVENING PEAK-HOUR: 4:30 P.M. - 5:30 P.M.

LEGEND	
TRAFFIC SIGNAL	
PEAK-HOUR VOLUMES	AM (PM)
DIRECTION OF TRAFFIC	

 Langan Engineering and Environmental Services, Inc. www.langan.com	Project	HUDSON LOGISTICS CENTER	Drawing Title	Project No.	Drawing No.
		HUDSON HILLSBOROUGH COUNTY NEW HAMPSHIRE	PEAK-HOUR TRUCK TRIP ASSIGNMENT	151010101	FIG. 7A
				Date	08/12/2020
				Drawn By	BDB
				Checked By	CJM
					Sheet 0 of 18



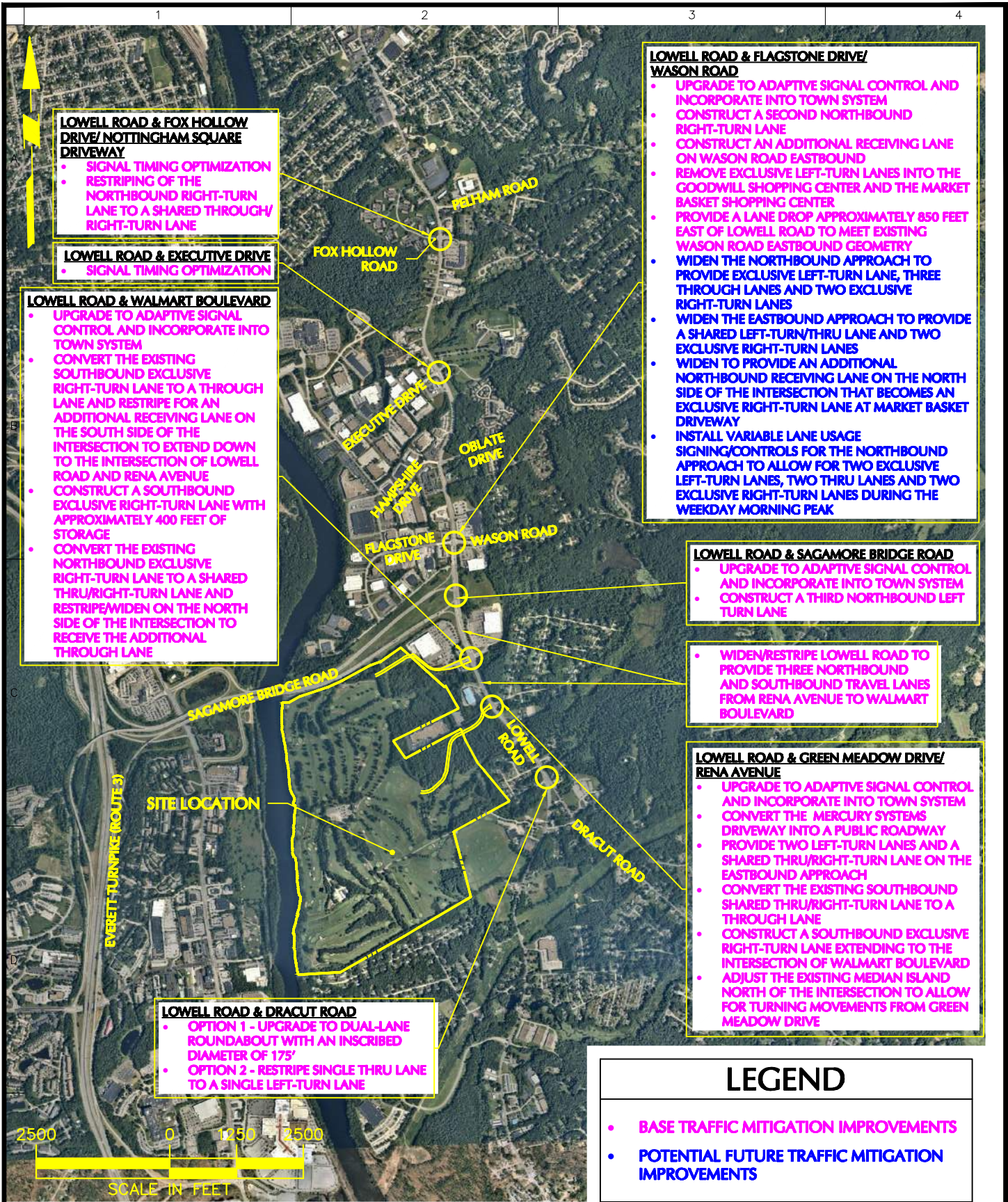


- NOTES:**
1. WEEKDAY MORNING AND EVENING PEAK-HOUR TRAFFIC VOLUMES ARE BASED ON THE COMBINATION OF TRAFFIC VOLUMES FROM FIGURE 5 AND FIGURE 7 OF THIS REPORT.
  2. MORNING PEAK-HOUR: 7:15 A.M. - 8:15 A.M.
  3. EVENING PEAK-HOUR: 4:30 P.M. - 5:30 P.M.

<p>LANGAN Langan Engineering and Environmental Services, Inc. www.langan.com</p>	Project	HUDSON LOGISTICS CENTER	Drawing Title	2032 BUILD PEAK-HOUR TRAFFIC VOLUMES	Project No.	151010101	Drawing No.	FIG. 9
		HUDSON HILLSBOROUGH COUNTY NEW HAMPSHIRE			Date	03/04/2020		
					Drawn By	CJM		
					Checked By	LAM		Sheet 12 of 17

## **Appendix A**

### **Overall Site Plan & Conceptual Improvements Plans**



**LOWELL ROAD & FOX HOLLOW DRIVE/ NOTTINGHAM SQUARE DRIVEWAY**

- SIGNAL TIMING OPTIMIZATION
- RESTRIPING OF THE NORTHBOUND RIGHT-TURN LANE TO A SHARED THROUGH/ RIGHT-TURN LANE

**LOWELL ROAD & EXECUTIVE DRIVE**

- SIGNAL TIMING OPTIMIZATION

**LOWELL ROAD & WALMART BOULEVARD**

- UPGRADE TO ADAPTIVE SIGNAL CONTROL AND INCORPORATE INTO TOWN SYSTEM
- CONVERT THE EXISTING SOUTHBOUND EXCLUSIVE RIGHT-TURN LANE TO A THROUGH LANE AND RESTRIPE FOR AN ADDITIONAL RECEIVING LANE ON THE SOUTH SIDE OF THE INTERSECTION TO EXTEND DOWN TO THE INTERSECTION OF LOWELL ROAD AND RENA AVENUE
- CONSTRUCT A SOUTHBOUND EXCLUSIVE RIGHT-TURN LANE WITH APPROXIMATELY 400 FEET OF STORAGE
- CONVERT THE EXISTING NORTHBOUND EXCLUSIVE RIGHT-TURN LANE TO A SHARED THRU/RIGHT-TURN LANE AND RESTRIPE/WIDEN ON THE NORTH SIDE OF THE INTERSECTION TO RECEIVE THE ADDITIONAL THROUGH LANE

**LOWELL ROAD & FLAGSTONE DRIVE/ WASON ROAD**

- UPGRADE TO ADAPTIVE SIGNAL CONTROL AND INCORPORATE INTO TOWN SYSTEM
- CONSTRUCT A SECOND NORTHBOUND RIGHT-TURN LANE
- CONSTRUCT AN ADDITIONAL RECEIVING LANE ON WASON ROAD EASTBOUND
- REMOVE EXCLUSIVE LEFT-TURN LANES INTO THE GOODWILL SHOPPING CENTER AND THE MARKET BASKET SHOPPING CENTER
- PROVIDE A LANE DROP APPROXIMATELY 850 FEET EAST OF LOWELL ROAD TO MEET EXISTING WASON ROAD EASTBOUND GEOMETRY
- WIDEN THE NORTHBOUND APPROACH TO PROVIDE EXCLUSIVE LEFT-TURN LANE, THREE THROUGH LANES AND TWO EXCLUSIVE RIGHT-TURN LANES
- WIDEN THE EASTBOUND APPROACH TO PROVIDE A SHARED LEFT-TURN/THRU LANE AND TWO EXCLUSIVE RIGHT-TURN LANES
- WIDEN TO PROVIDE AN ADDITIONAL NORTHBOUND RECEIVING LANE ON THE NORTH SIDE OF THE INTERSECTION THAT BECOMES AN EXCLUSIVE RIGHT-TURN LANE AT MARKET BASKET DRIVEWAY
- INSTALL VARIABLE LANE USAGE SIGNING/CONTROLS FOR THE NORTHBOUND APPROACH TO ALLOW FOR TWO EXCLUSIVE LEFT-TURN LANES, TWO THRU LANES AND TWO EXCLUSIVE RIGHT-TURN LANES DURING THE WEEKDAY MORNING PEAK

**LOWELL ROAD & SAGAMORE BRIDGE ROAD**

- UPGRADE TO ADAPTIVE SIGNAL CONTROL AND INCORPORATE INTO TOWN SYSTEM
- CONSTRUCT A THIRD NORTHBOUND LEFT TURN LANE

- WIDEN/RESTRIPE LOWELL ROAD TO PROVIDE THREE NORTHBOUND AND SOUTHBOUND TRAVEL LANES FROM RENA AVENUE TO WALMART BOULEVARD

**LOWELL ROAD & GREEN MEADOW DRIVE/ RENA AVENUE**

- UPGRADE TO ADAPTIVE SIGNAL CONTROL AND INCORPORATE INTO TOWN SYSTEM
- CONVERT THE MERCURY SYSTEMS DRIVEWAY INTO A PUBLIC ROADWAY
- PROVIDE TWO LEFT-TURN LANES AND A SHARED THRU/RIGHT-TURN LANE ON THE EASTBOUND APPROACH
- CONVERT THE EXISTING SOUTHBOUND SHARED THRU/RIGHT-TURN LANE TO A THROUGH LANE
- CONSTRUCT A SOUTHBOUND EXCLUSIVE RIGHT-TURN LANE EXTENDING TO THE INTERSECTION OF WALMART BOULEVARD
- ADJUST THE EXISTING MEDIAN ISLAND NORTH OF THE INTERSECTION TO ALLOW FOR TURNING MOVEMENTS FROM GREEN MEADOW DRIVE

**LOWELL ROAD & DRACUT ROAD**

- OPTION 1 - UPGRADE TO DUAL-LANE ROUNDABOUT WITH AN INSCRIBED DIAMETER OF 175'
- OPTION 2 - RESTRIPE SINGLE THRU LANE TO A SINGLE LEFT-TURN LANE

**LEGEND**

- BASE TRAFFIC MITIGATION IMPROVEMENTS
- POTENTIAL FUTURE TRAFFIC MITIGATION IMPROVEMENTS

**LANGAN**  
Langan Engineering and Environmental Services, Inc.  
www.langan.com

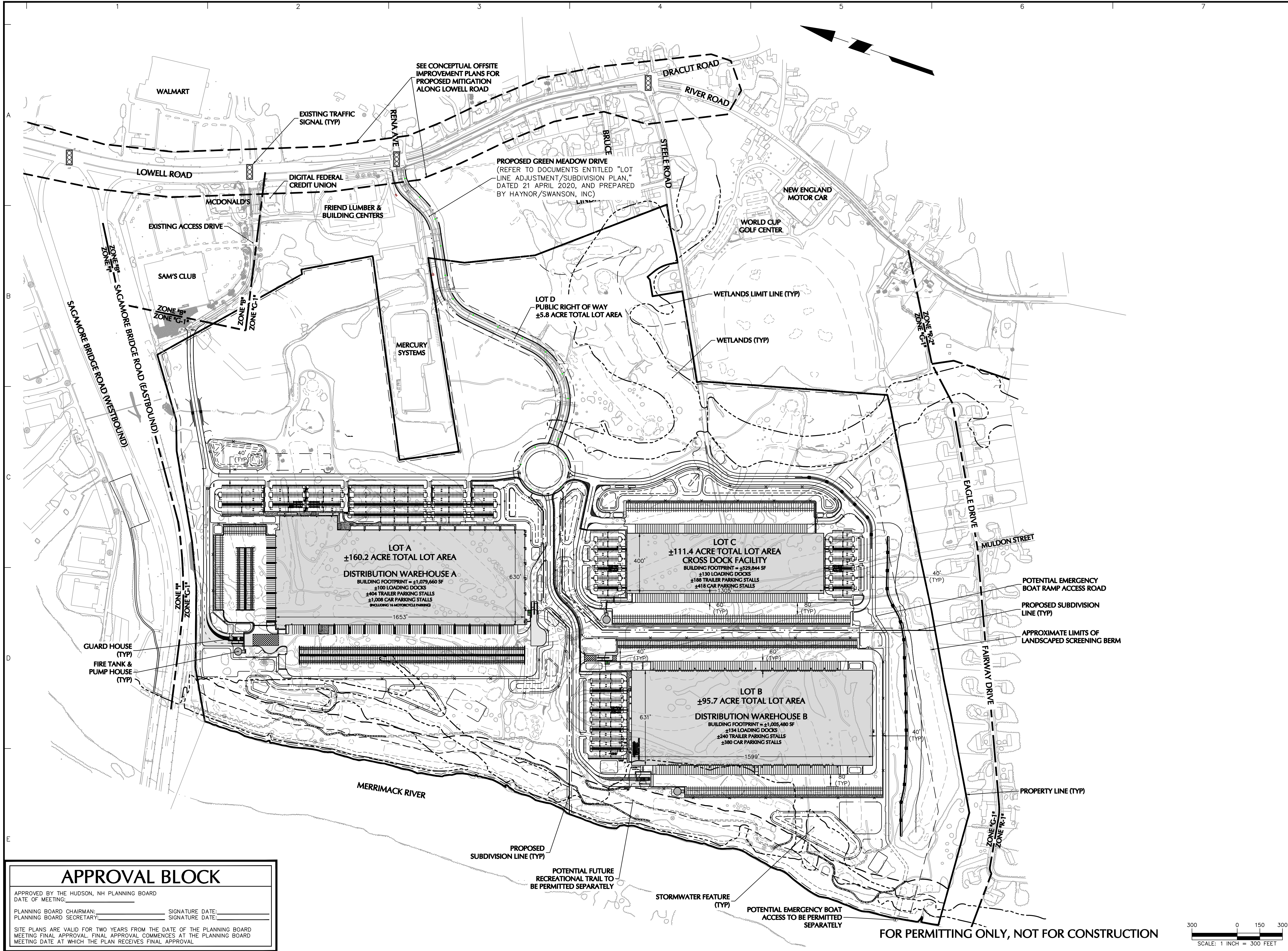
Project  
**HUDSON LOGISTICS CENTER**  
HUDSON  
HILLSBOROUGH COUNTY, NEW HAMPSHIRE

Drawing Title  
**TRAFFIC MITIGATION MEASURES**

Project No.  
151010101  
Date  
03/04/2020  
Drawn By  
CJM  
Checked By  
LAM

Figure  
**IMP-1**  
Sheet 1 of 17





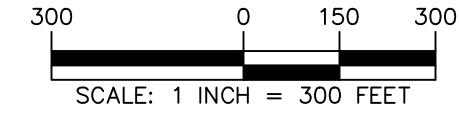
**APPROVAL BLOCK**

APPROVED BY THE HUDSON, NH PLANNING BOARD  
 DATE OF MEETING: \_\_\_\_\_

PLANNING BOARD CHAIRMAN: \_\_\_\_\_ SIGNATURE DATE: \_\_\_\_\_  
 PLANNING BOARD SECRETARY: \_\_\_\_\_ SIGNATURE DATE: \_\_\_\_\_

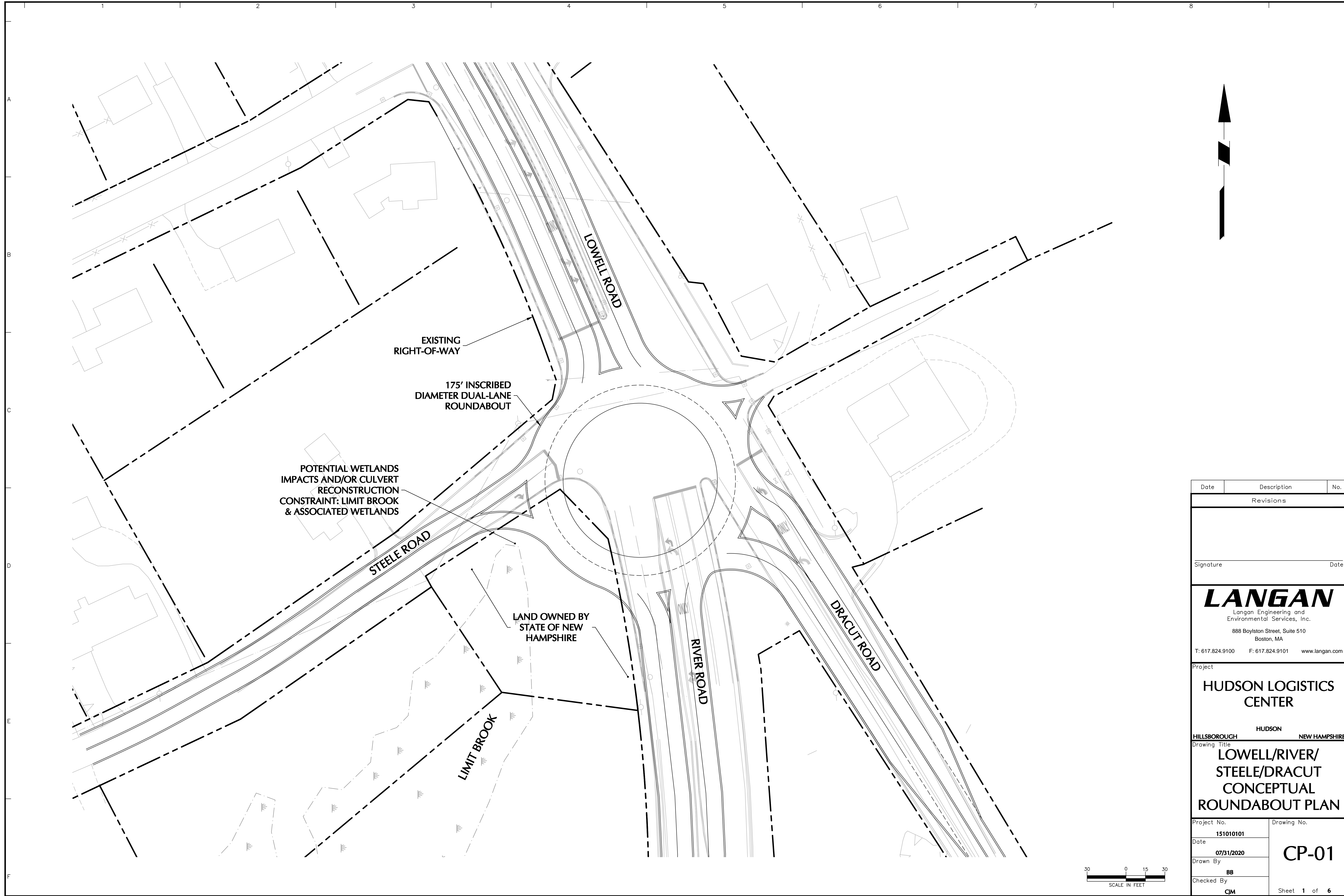
SITE PLANS ARE VALID FOR TWO YEARS FROM THE DATE OF THE PLANNING BOARD MEETING FINAL APPROVAL. FINAL APPROVAL COMMENCES AT THE PLANNING BOARD MEETING DATE AT WHICH THE PLAN RECEIVES FINAL APPROVAL.

Date	Description	No.
Revisions		
Signature		Date
<b>LANGAN</b>		
Langan Engineering and Environmental Services, Inc. 888 Boylston Street, Ste 510 Boston, MA 02199 T: 617.824.9100 F: 617.824.9101 www.langan.com		
Project		
<b>HUDSON LOGISTICS CENTER</b>		
MAP No. 239, LOT No. 1 HUDSON HILLSBOROUGH COUNTY NEW HAMPSHIRE		
Drawing Title		
<b>OVERALL TRAFFIC SITE PLAN</b>		
Project No.	Drawing No.	
151010101	<b>KS101</b>	
Date	Drawn By	
06-26-2020	CLR	
Checked By	Sheet 1 of 0	
NLK		

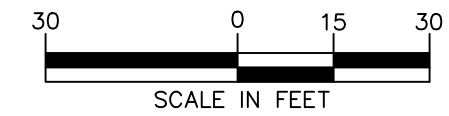


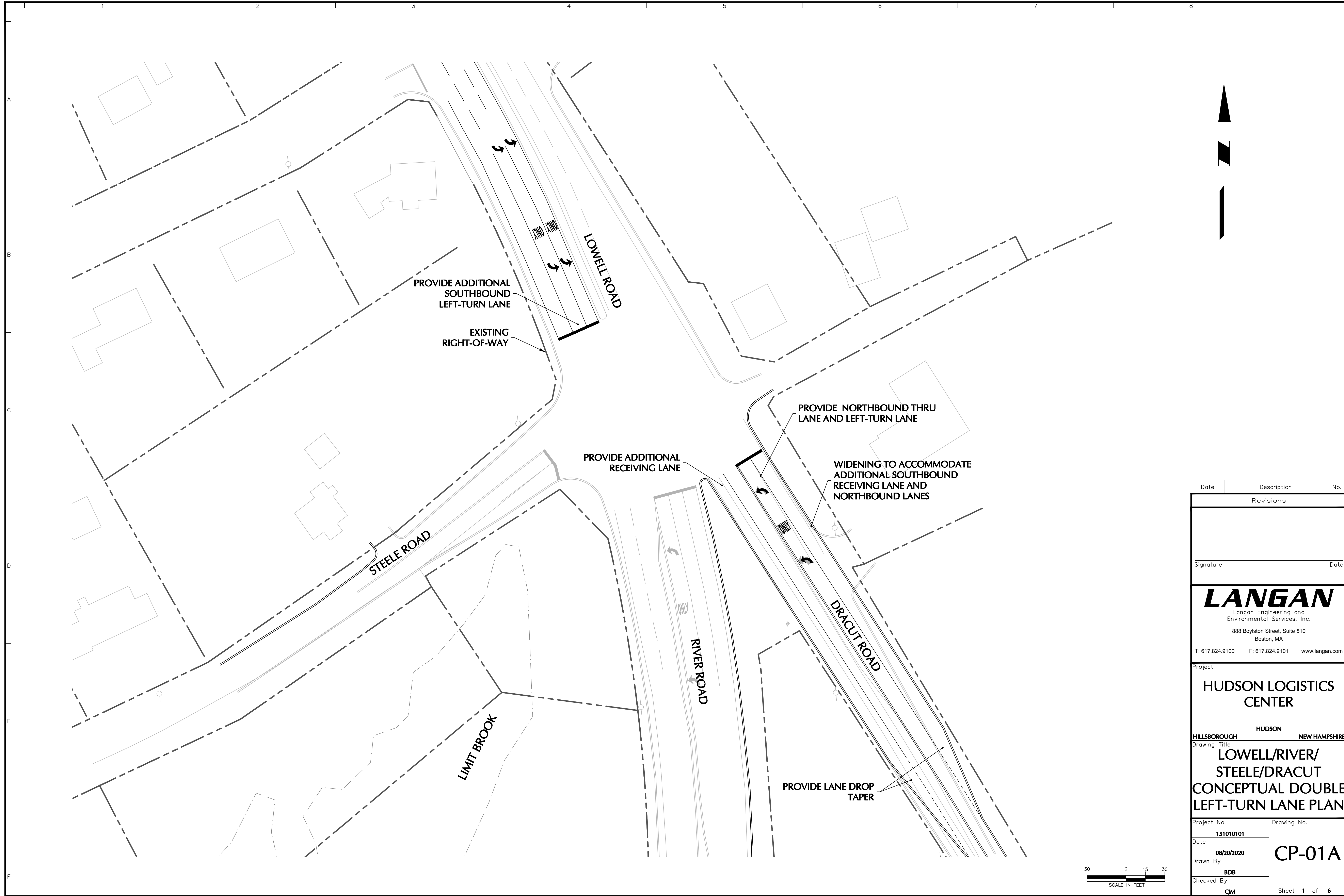
FOR PERMITTING ONLY, NOT FOR CONSTRUCTION





Date	Description	No.
Revisions		
Signature		Date
<b>LANGAN</b> Langan Engineering and Environmental Services, Inc. 888 Boylston Street, Suite 510 Boston, MA T: 617.824.9100 F: 617.824.9101 www.langan.com		
Project		
<b>HUDSON LOGISTICS CENTER</b> HUDSON HILLSBOROUGH NEW HAMPSHIRE		
Drawing Title		
<b>LOWELL/RIVER/STEELE/DRACUT CONCEPTUAL ROUNDABOUT PLAN</b>		
Project No.	Drawing No.	
151010101	<b>CP-01</b>	
Date		
07/31/2020		
Drawn By		
BB	Sheet 1 of 6	
Checked By	CJM	





Date	Description	No.
------	-------------	-----

Revisions		

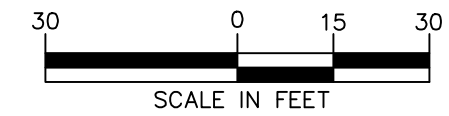
Signature \_\_\_\_\_ Date \_\_\_\_\_

**LANGAN**  
 Langan Engineering and Environmental Services, Inc.  
 888 Boylston Street, Suite 510  
 Boston, MA  
 T: 617.824.9100 F: 617.824.9101 www.langan.com

Project  
**HUDSON LOGISTICS CENTER**  
 HUDSON  
 HILLSBOROUGH NEW HAMPSHIRE

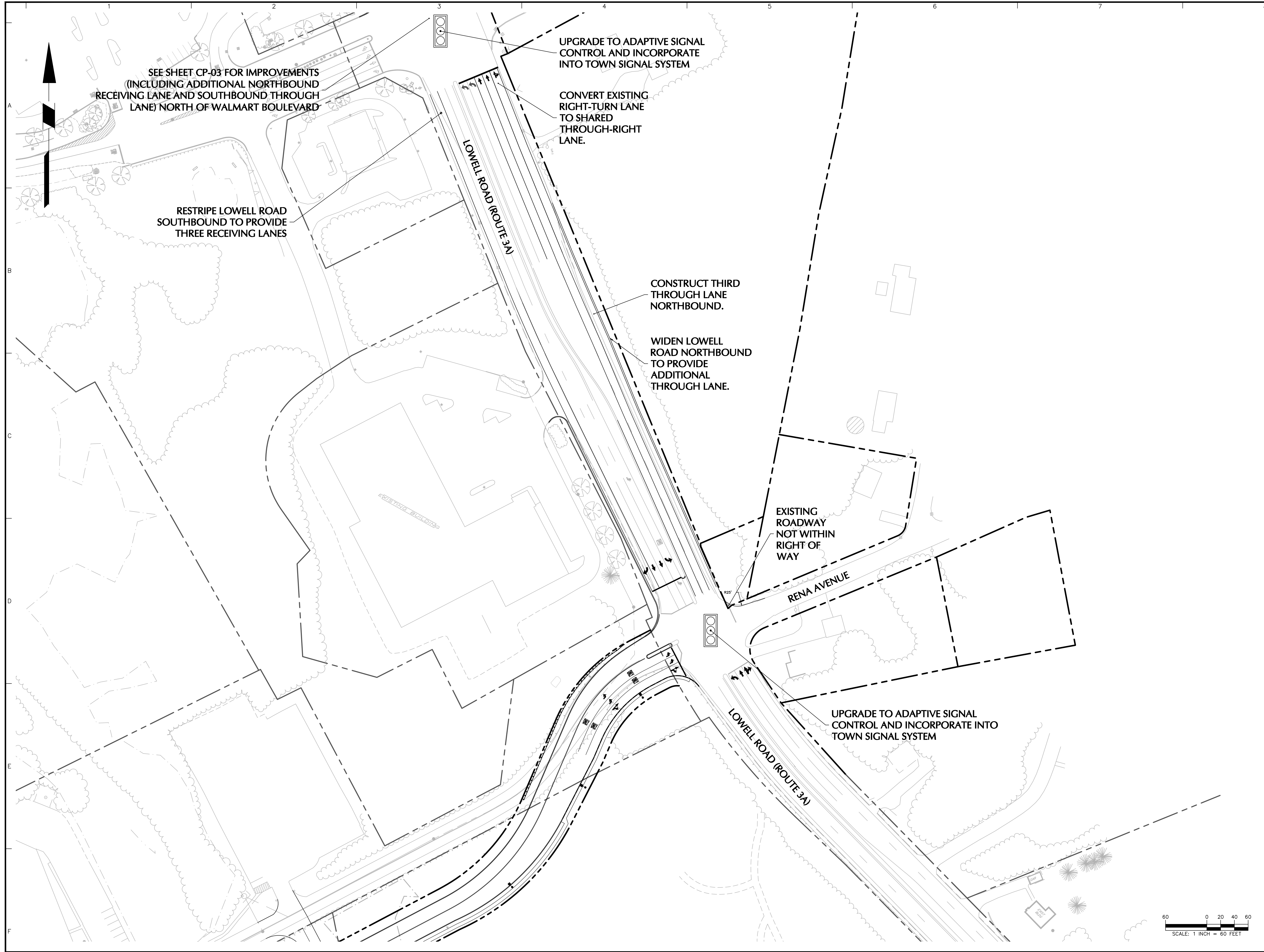
Drawing Title  
**LOWELL/RIVER/STEELE/DRACUT CONCEPTUAL DOUBLE LEFT-TURN LANE PLAN**

Project No. <b>151010101</b>	Drawing No. <b>CP-01A</b>
Date <b>08/20/2020</b>	<b>1 of 6</b>
Drawn By <b>BDB</b>	
Checked By <b>CJM</b>	



Project No. 151010101  
© 2018 Langan





Date	Description	No.
------	-------------	-----

Revisions		

Signature \_\_\_\_\_ Date \_\_\_\_\_

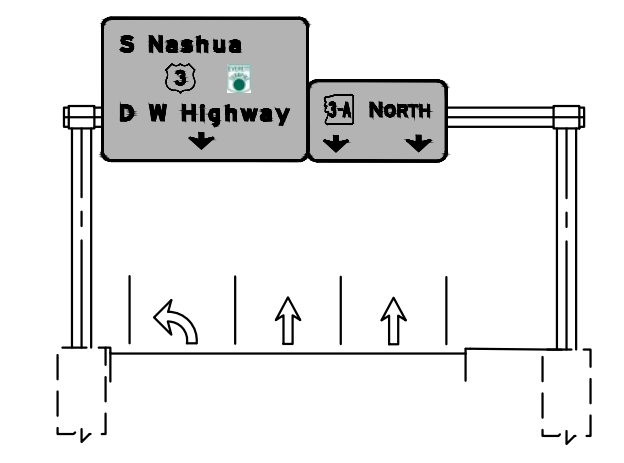
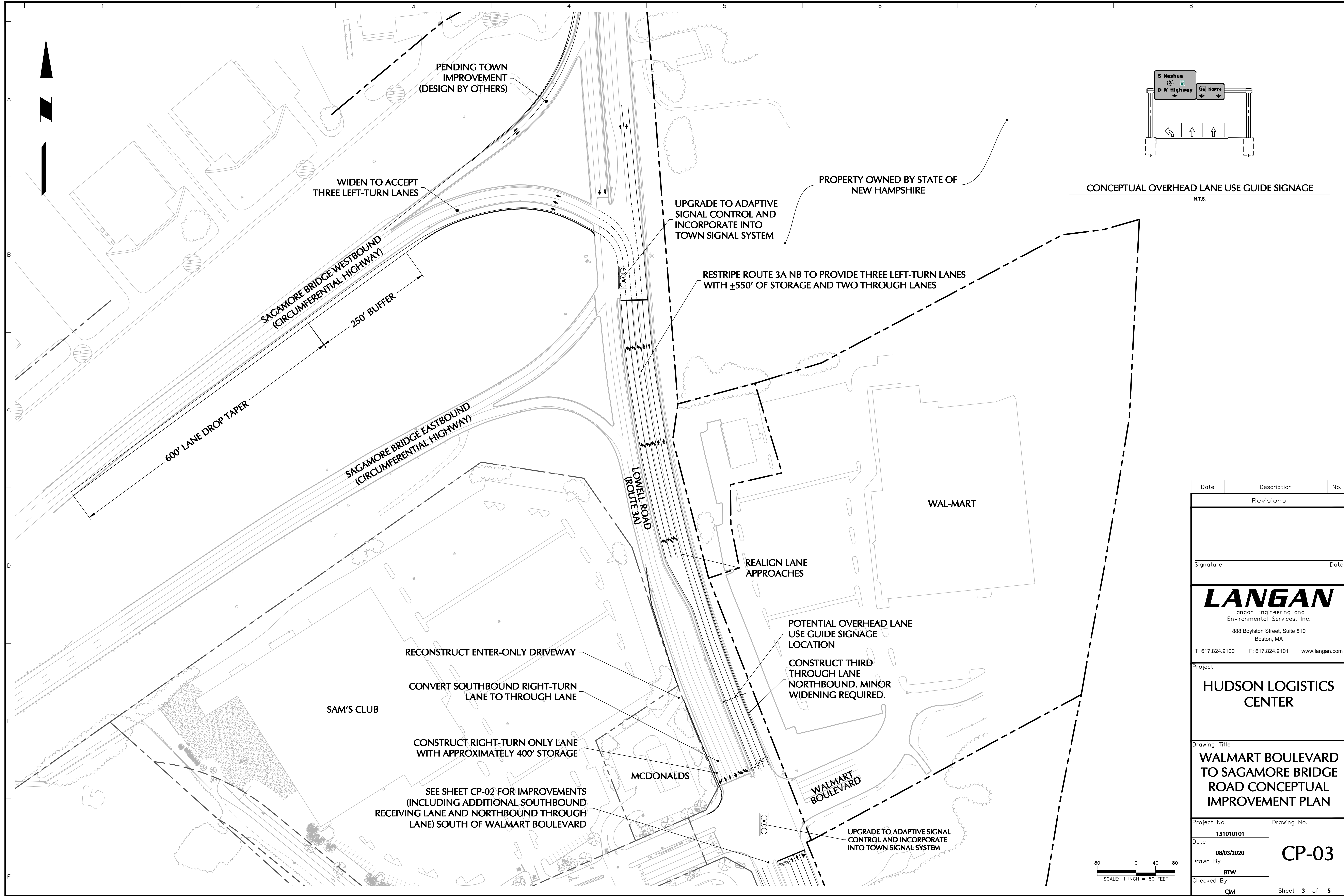
**LANGAN**  
 Langan Engineering and Environmental Services, Inc.  
 888 Boylston Street, Suite 510  
 Boston, MA  
 T: 617.824.9100 F: 617.824.9101 www.langan.com

Project  
**HUDSON LOGISTICS CENTER**

Drawn  
**RENA AVENUE TO WALMART BOULEVARD CONCEPTUAL IMPROVEMENTS PLAN**

Project No. 151010101	Drawing No. CP-02
Date 08/03/2020	
Drawn By BTW	
Checked By CJM	





CONCEPTUAL OVERHEAD LANE USE GUIDE SIGNAGE  
N.T.S.

Date	Description	No.
------	-------------	-----

Revisions

Signature \_\_\_\_\_ Date \_\_\_\_\_

**LANGAN**  
 Langan Engineering and Environmental Services, Inc.  
 888 Boylston Street, Suite 510  
 Boston, MA  
 T: 617.824.9100 F: 617.824.9101 www.langan.com

Project  
**HUDSON LOGISTICS CENTER**

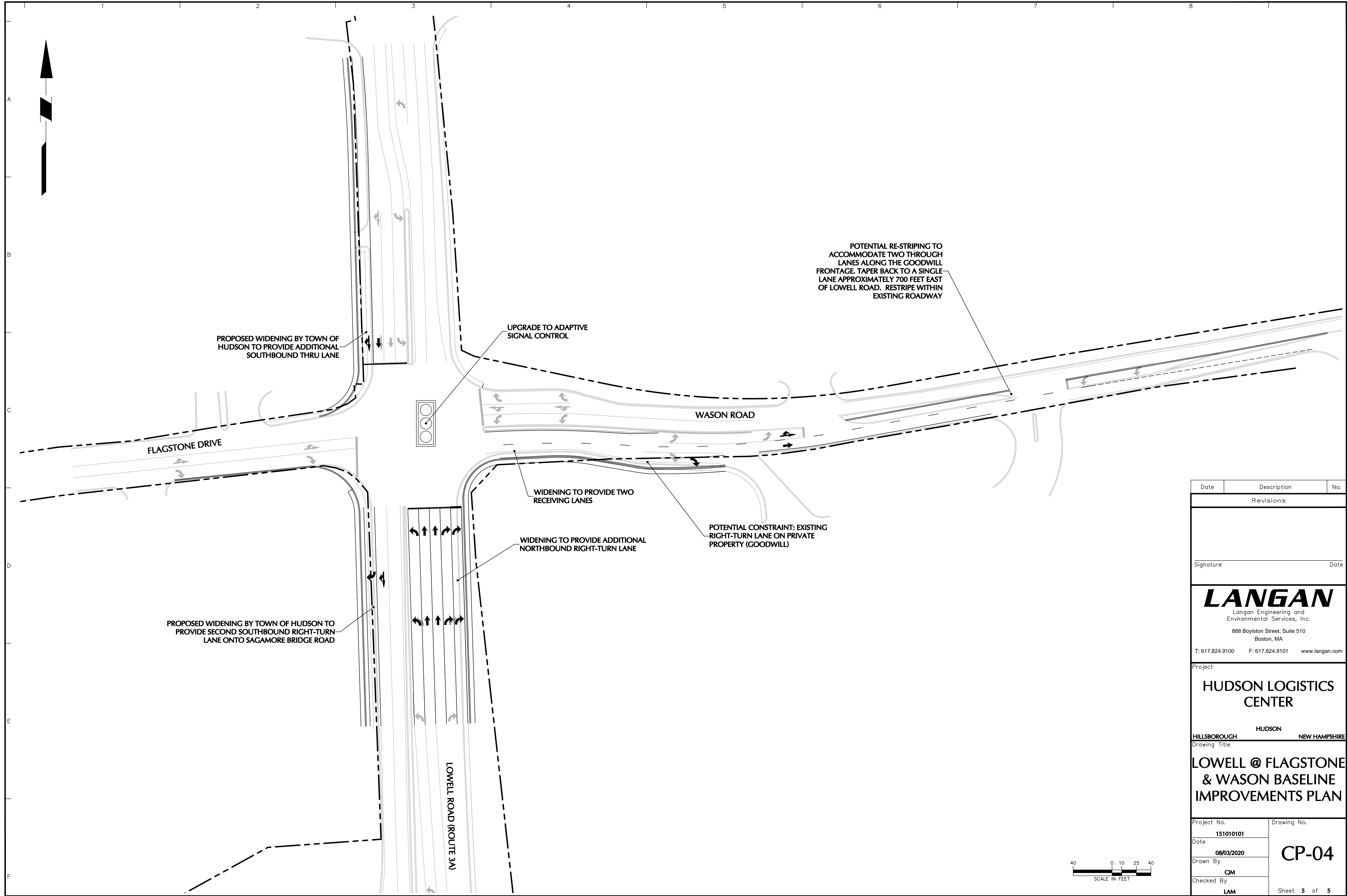
Drawing Title  
**WALMART BOULEVARD TO SAGAMORE BRIDGE ROAD CONCEPTUAL IMPROVEMENT PLAN**

Project No. 151010101	Drawing No. CP-03
Date 08/03/2020	
Drawn By BTW	
Checked By CJM	
Sheet 3 of 5	



Project No. 151010101 © 2019 Langan





Date	Description	No.
------	-------------	-----

Revisions		

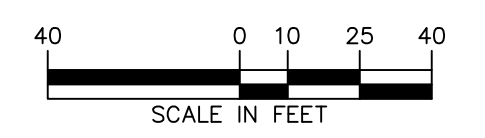
Signature \_\_\_\_\_ Date \_\_\_\_\_

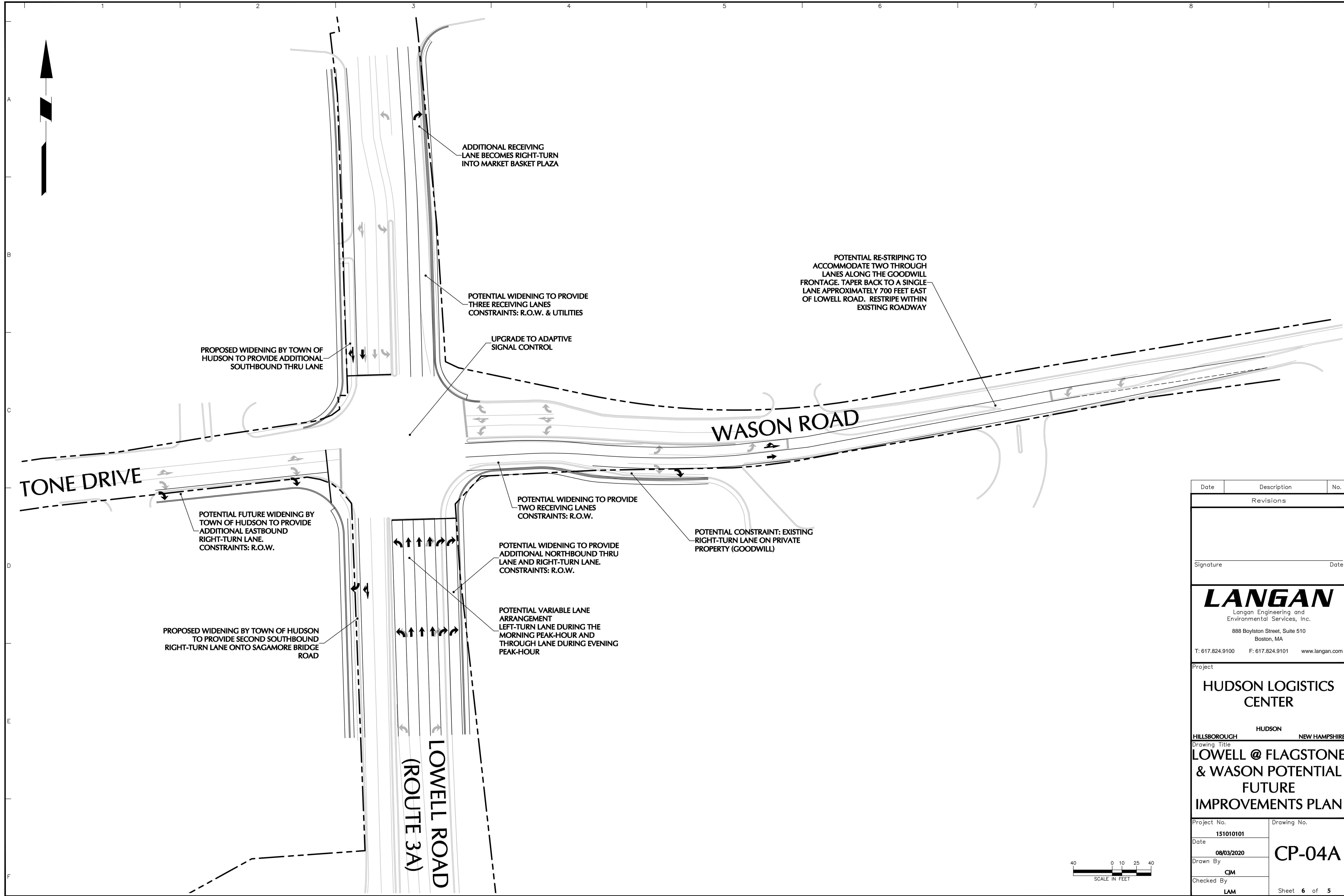
**LANGAN**  
 Langan Engineering and Environmental Services, Inc.  
 888 Boylston Street, Suite 510  
 Boston, MA  
 T: 617.824.9100 F: 617.824.9101 www.langan.com

Project  
**HUDSON LOGISTICS CENTER**  
 HUDSON  
 HILLSBOROUGH NEW HAMPSHIRE

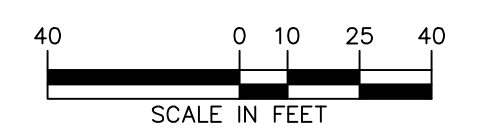
Drawing Title  
**LOWELL @ FLAGSTONE & WASON BASELINE IMPROVEMENTS PLAN**

Project No. <b>151010101</b>	Drawing No. <b>CP-04</b>
Date <b>08/03/2020</b>	Sheet <b>5</b> of <b>5</b>
Drawn By <b>CJM</b>	
Checked By <b>LAM</b>	

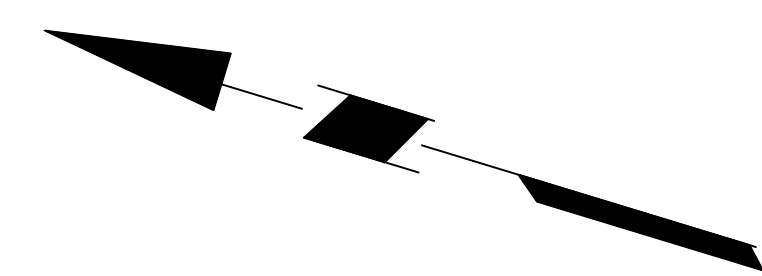




Date	Description	No.
Revisions		
Signature		Date
 Langan Engineering and Environmental Services, Inc. 888 Boylston Street, Suite 510 Boston, MA T: 617.824.9100 F: 617.824.9101 www.langan.com		
Project		
<b>HUDSON LOGISTICS CENTER</b> HUDSON <small>HILLSBOROUGH NEW HAMPSHIRE</small>		
Drawing Title		
<b>LOWELL @ FLAGSTONE &amp; WASON POTENTIAL FUTURE IMPROVEMENTS PLAN</b>		
Project No.	Drawing No.	
151010101	<b>CP-04A</b>	
Date		
08/03/2020		
Drawn By		
CJM	Checked By	
LAM	Sheet 6 of 5	



Project No. 151010101



95TH PERCENTILE QUEUE LENGTHS	
<span style="color: magenta;">—</span>	2022 NO-BUILD WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
<span style="color: cyan;">—</span>	2022 NO-BUILD WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
<span style="color: orange;">—</span>	2022 BUILD WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
<span style="color: blue;">—</span>	2022 BUILD WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
<span style="color: green;">—</span>	2022 BUILD W/ IMP. WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
<span style="color: black;">—</span>	2022 BUILD W/ IMP. WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH

Date	Description	No.
Revisions		

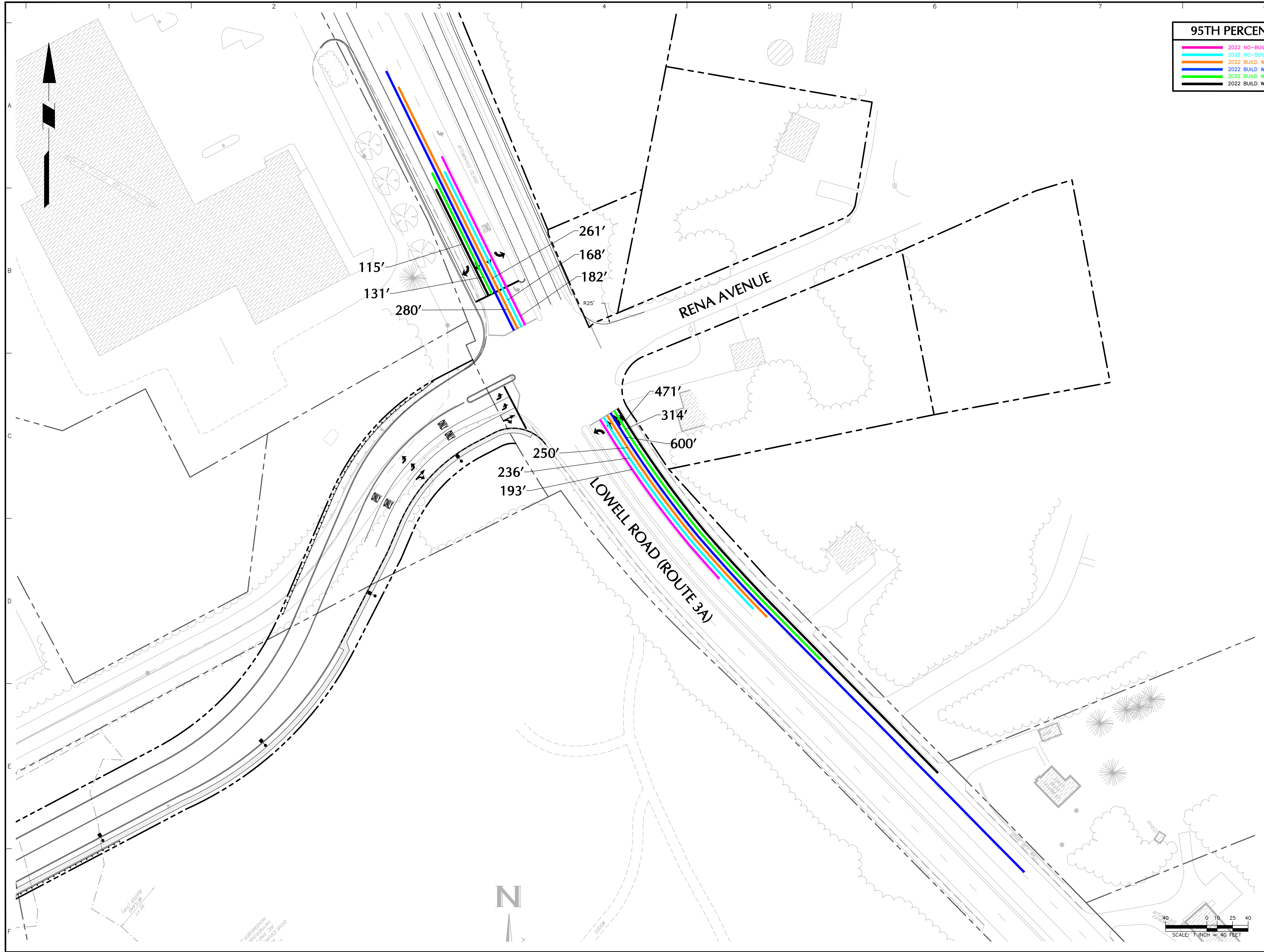
**LANGAN**  
 Langan Engineering and  
 Environmental Services, Inc.  
 888 Boylston Street, Suite 510  
 Boston, MA  
 T: 617.824.9100 F: 617.824.9101 www.langan.com

Project  
**HUDSON LOGISTICS CENTER**  
 HUDSON  
 HILLSBOROUGH NEW HAMPSHIRE

Drawing Title  
**2022 95TH PERCENTILE QUEUES - LOWELL/RIVER/ DRACUT/STEELE**

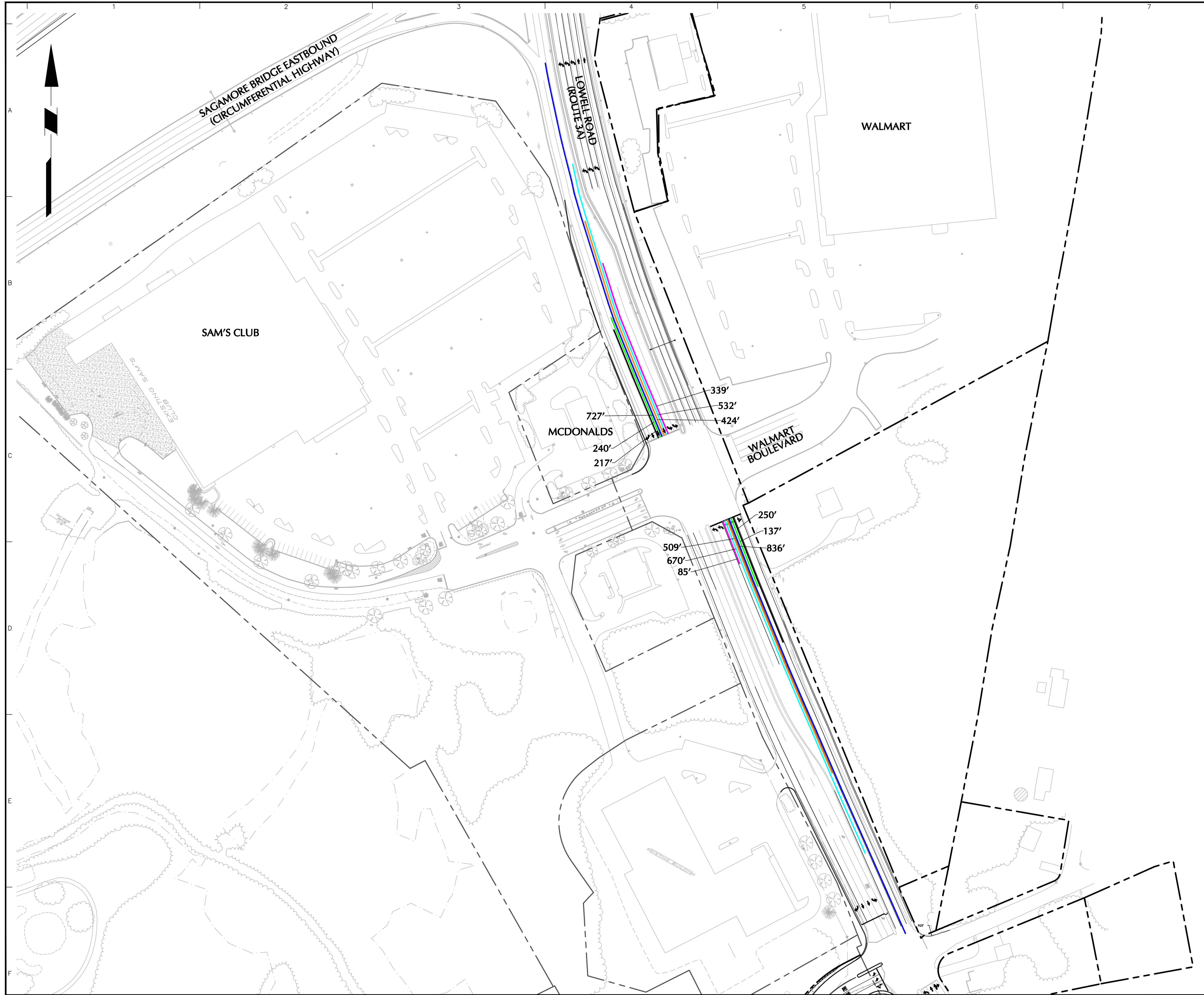
Project No. <b>151010101</b>	<b>Q-01</b>
Date <b>09/02/2020</b>	
Drawn By <b>BDB</b>	
Checked By <b>CJM</b>	
Sheet 1 of 11	





Date	Description	No.
Revisions		
Signature		Date
<b>LANGAN</b> Langan Engineering and Environmental Services, Inc. 888 Boylston Street, Suite 510 Boston, MA T: 617.824.9100 F: 617.824.9101 www.langan.com		
Project		
<b>HUDSON LOGISTICS CENTER</b>		
Drawing Title		
<b>2022 95TH PERCENTILE QUEUES - LOWELL RD &amp; RENA AVE</b>		
Project No.		Drawing No.
151010101		<b>Q-02</b>
Date		
09/01/2020		
Drawn By		
BTW		Sheet 2 of 11
Checked By		
CJM		





95TH PERCENTILE QUEUE LENGTHS	
[Pink line]	2022 NO-BUILD WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
[Cyan line]	2022 NO-BUILD WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
[Orange line]	2022 BUILD WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
[Blue line]	2022 BUILD WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
[Green line]	2022 BUILD W/ IMP. WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
[Black line]	2022 BUILD W/ IMP. WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH

Date	Description	No.
Revisions		

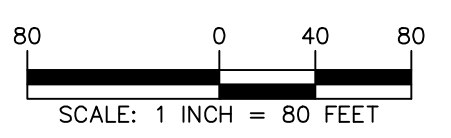
Signature \_\_\_\_\_ Date \_\_\_\_\_

**LANGAN**  
 Langan Engineering and  
 Environmental Services, Inc.  
 888 Boylston Street, Suite 510  
 Boston, MA  
 T: 617.824.9100 F: 617.824.9101 www.langan.com

Project  
**HUDSON LOGISTICS  
 CENTER**

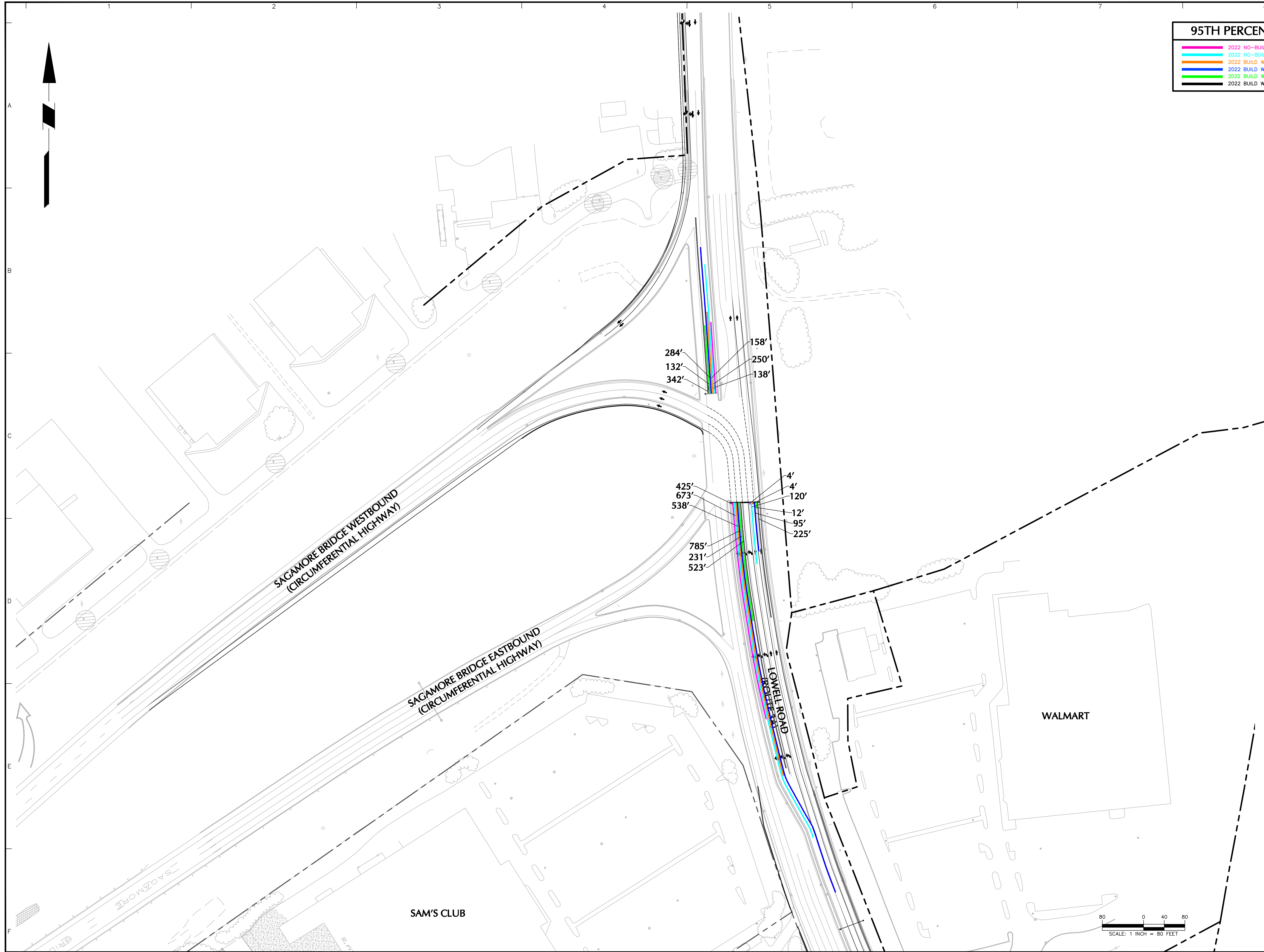
Drawing Title  
**2022 95TH PERCENTILE  
 QUEUES - LOWELL RD  
 & WALMART BLVD**

Project No. <b>151010101</b>	Drawing No. <b>Q-03</b>
Date <b>09/01/2020</b>	
Drawn By <b>BTW</b>	
Checked By <b>CJM</b>	



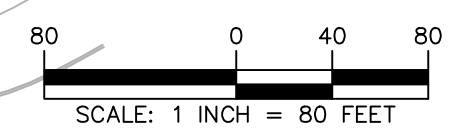
Project No. 151010101 Langan



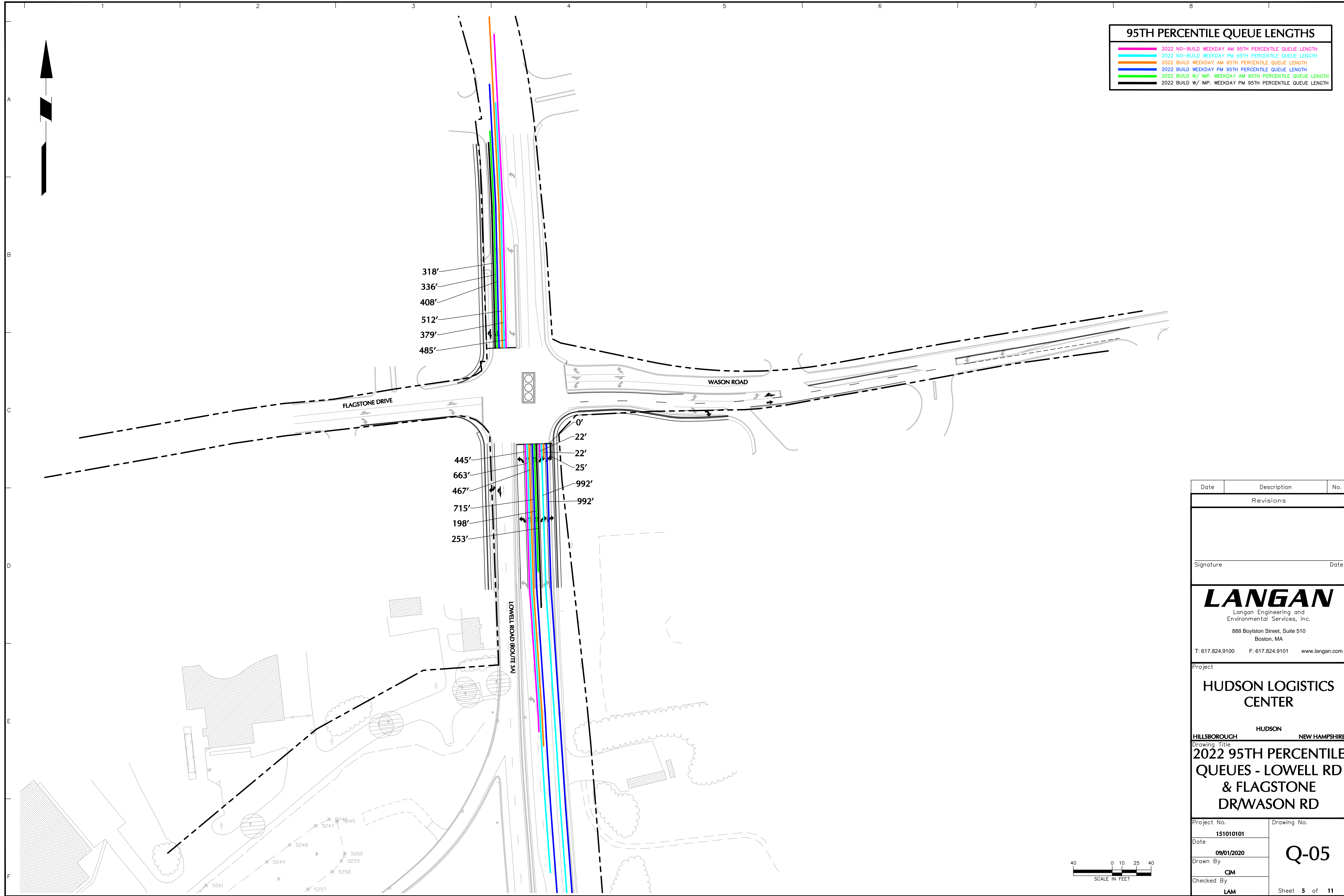


95TH PERCENTILE QUEUE LENGTHS	
[Pink line]	2022 NO-BUILD WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
[Cyan line]	2022 NO-BUILD WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
[Orange line]	2022 BUILD WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
[Blue line]	2022 BUILD WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
[Green line]	2022 BUILD W/ IMP. WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
[Black line]	2022 BUILD W/ IMP. WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH

Date	Description	No.
Revisions		
Signature		Date
<b>LANGAN</b> Langan Engineering and Environmental Services, Inc. 888 Boylston Street, Suite 510 Boston, MA T: 617.824.9100 F: 617.824.9101 www.langan.com		
Project		
<b>HUDSON LOGISTICS CENTER</b>		
Drawing Title		
<b>2022 95TH PERCENTILE QUEUES - LOWELL RD &amp; SAGAMORE BRIDGE RD</b>		
Project No.	Drawing No.	
151010101	Q-04	
Date		
09/01/2020		
Drawn By		
BTW		
Checked By		
CJM		
Sheet		4 of 11

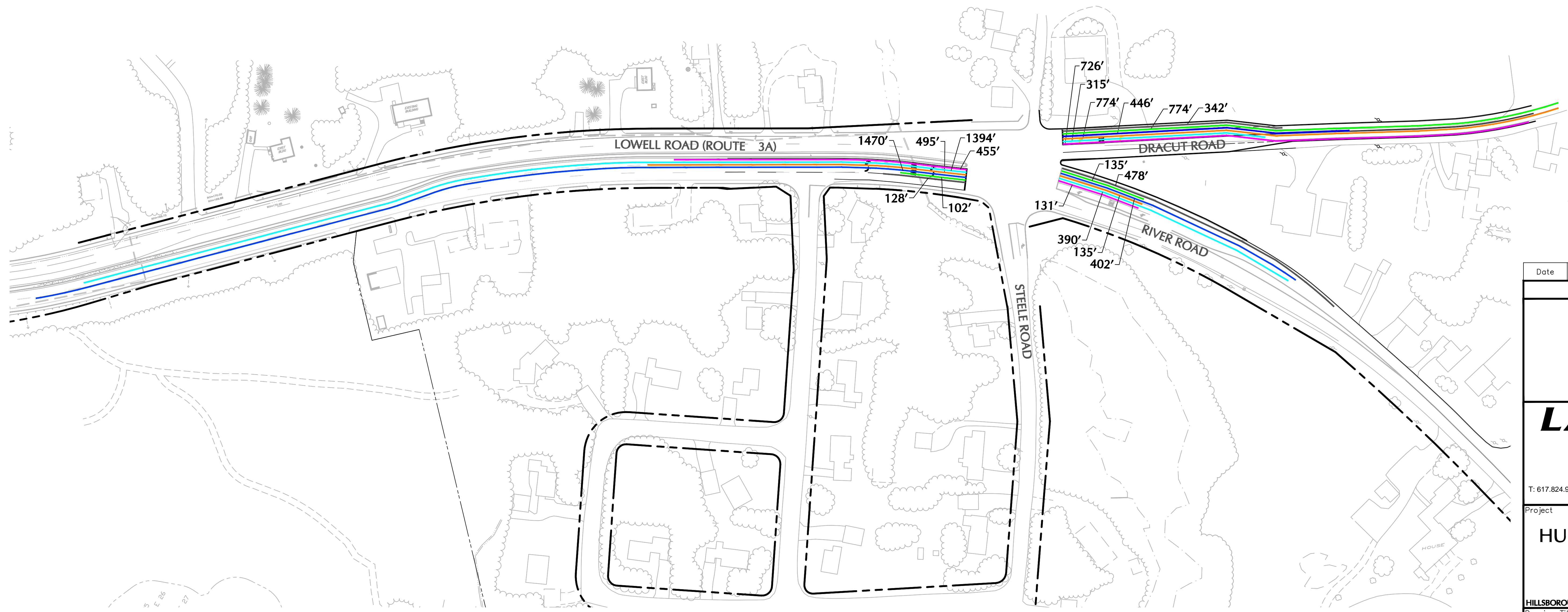
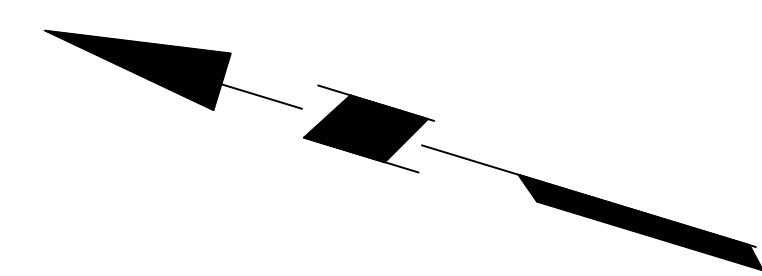






Date	Description	No.
Revisions		
Signature		Date
<b>LANGAN</b> Langan Engineering and Environmental Services, Inc. 888 Boylston Street, Suite 510 Boston, MA T: 617.824.9100 F: 617.824.9101 www.langan.com		
Project		
<b>HUDSON LOGISTICS CENTER</b> HUDSON HILLSBOROUGH NEW HAMPSHIRE		
Drawing Title		
<b>2022 95TH PERCENTILE QUEUES - LOWELL RD &amp; FLAGSTONE DR/WASON RD</b>		
Project No.	Drawing No.	
151010101	Q-05	
Date	09/01/2020	
Drawn By	CJM	
Checked By	LAM	
Sheet 5 of 11		© 2019 Langan





95TH PERCENTILE QUEUE LENGTHS	
<span style="color: magenta;">—</span>	2032 NO-BUILD WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
<span style="color: cyan;">—</span>	2032 NO-BUILD WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
<span style="color: orange;">—</span>	2032 BUILD WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
<span style="color: blue;">—</span>	2032 BUILD WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
<span style="color: green;">—</span>	2032 BUILD W/ IMP. WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
<span style="color: black;">—</span>	2032 BUILD W/ IMP. WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH

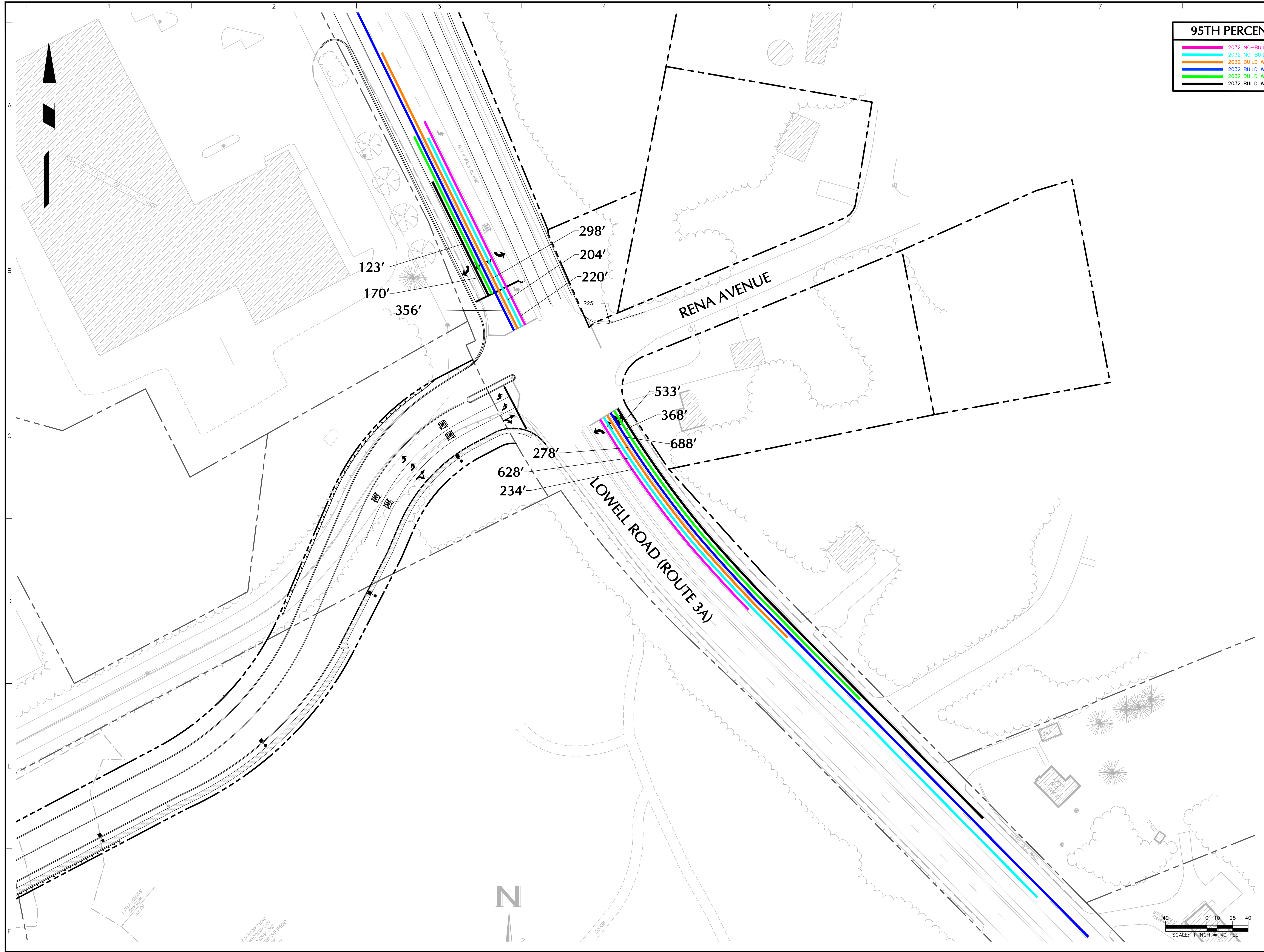
Date	Description	No.
Revisions		

**LANGAN**  
 Langan Engineering and  
 Environmental Services, Inc.  
 888 Boylston Street, Suite 510  
 Boston, MA  
 T: 617.824.9100 F: 617.824.9101 www.langan.com

Project  
**HUDSON LOGISTICS CENTER**  
 HUDSON  
 HILLSBOROUGH NEW HAMPSHIRE  
 Drawing Title  
**2032 95TH PERCENTILE QUEUES - LOWELL/RIVER/ DRACUT/STEELE**

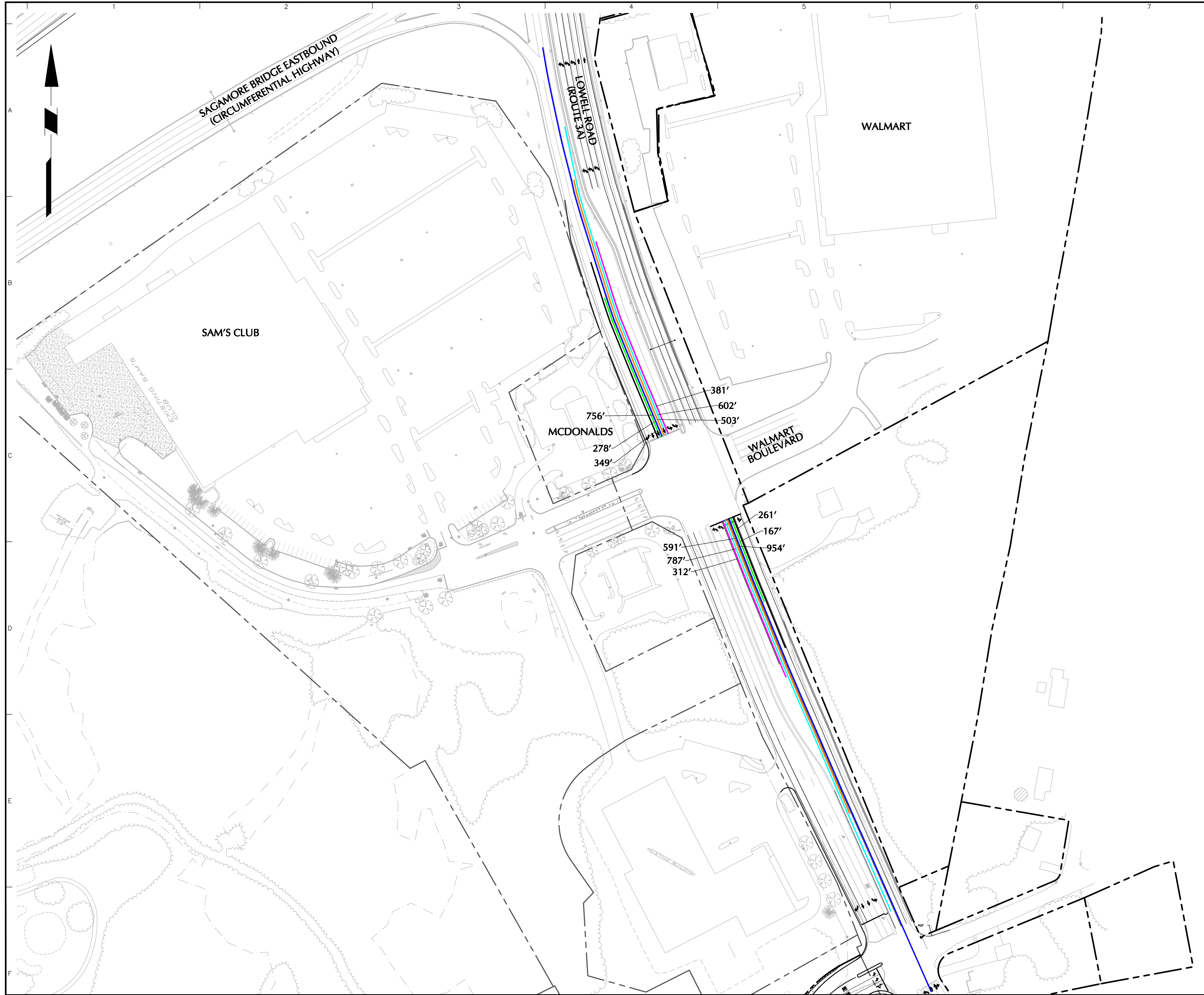
Project No. <b>151010101</b>	<b>Q-06</b>
Date <b>08/31/2020</b>	
Drawn By <b>BDB</b>	
Checked By <b>CJM</b>	
Sheet <b>6</b> of <b>11</b>	





Date	Description	No.
Revisions		
Signature		Date
<b>LANGAN</b> Langan Engineering and Environmental Services, Inc. 888 Boylston Street, Suite 510 Boston, MA T: 617.824.9100 F: 617.824.9101 www.langan.com		
Project		
<b>HUDSON LOGISTICS CENTER</b>		
Drawing Title		
<b>2032 95TH PRECENTILE QUEUES - LOWELL RD &amp; RENA AVE</b>		
Project No.		Drawing No.
151010101		<b>Q-07</b>
Date		
09/01/2020		
Drawn By		
BTW		Sheet 7 of 11
Checked By		
CJM		





95TH PERCENTILE QUEUE LENGTHS	
[Pink line]	2032 NO-BUILD WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
[Cyan line]	2032 NO-BUILD WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
[Orange line]	2032 BUILD WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
[Blue line]	2032 BUILD WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
[Green line]	2032 BUILD W/ IMP. WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
[Black line]	2032 BUILD W/ IMP. WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH

Date	Description	No.
Revisions		

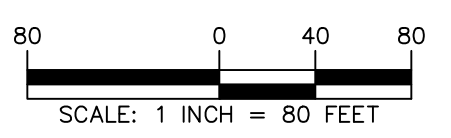
Signature \_\_\_\_\_ Date \_\_\_\_\_

**LANGAN**  
 Langan Engineering and  
 Environmental Services, Inc.  
 888 Boylston Street, Suite 510  
 Boston, MA  
 T: 617.824.9100 F: 617.824.9101 www.langan.com

Project  
**HUDSON LOGISTICS CENTER**

Drawing Title  
**2032 95TH PERCENTILE QUEUES - LOWELL RD & WALMART BLVD**

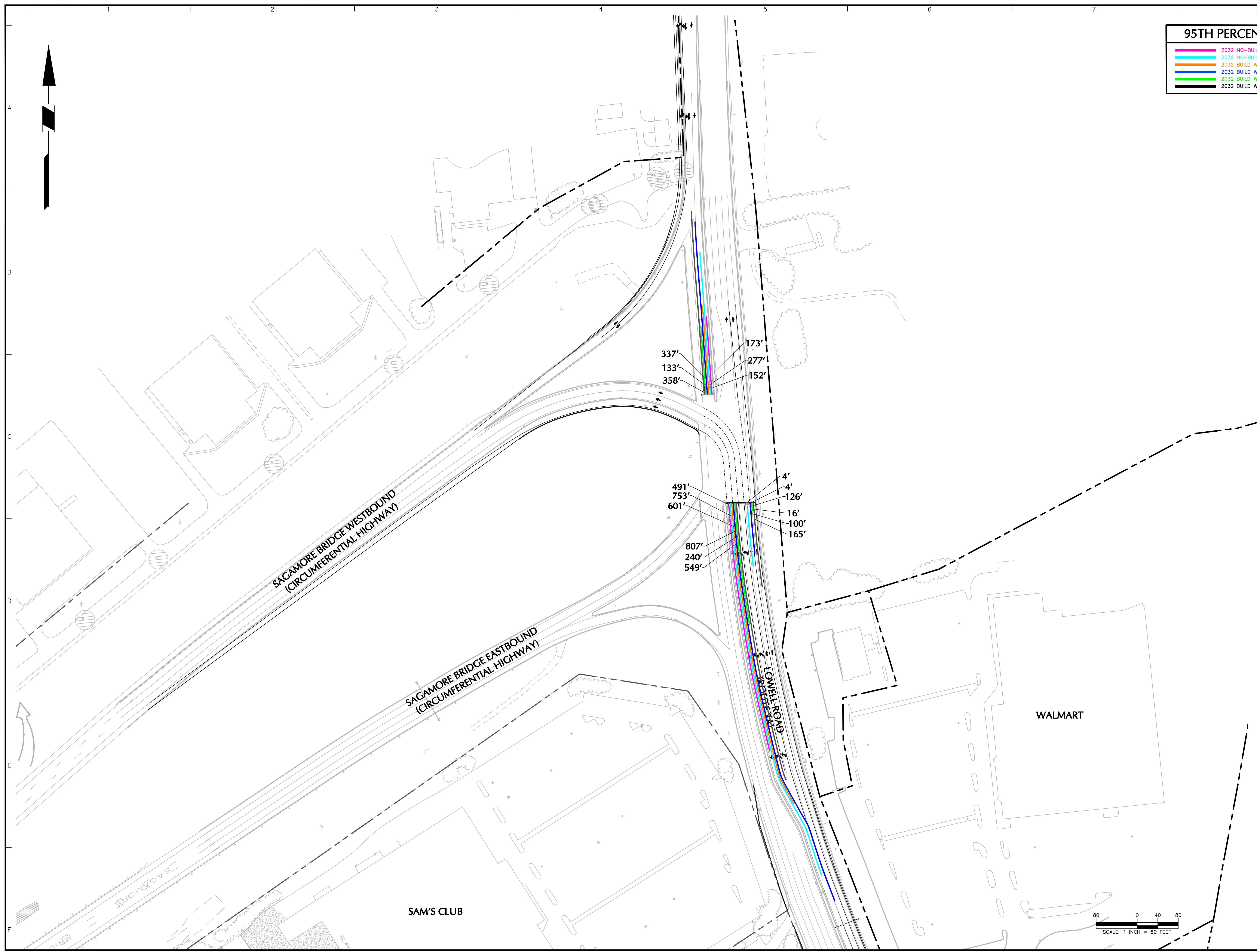
Project No. <b>151010101</b>	Drawing No. <b>Q-08</b>
Date <b>09/01/2020</b>	
Drawn By <b>BTW</b>	
Checked By <b>CJM</b>	



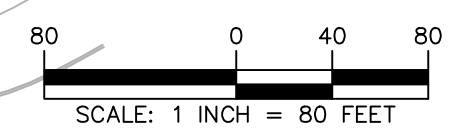
Project No. 151010101 LANGAN © 2019 Langan



95TH PERCENTILE QUEUE LENGTHS	
<span style="color: magenta;">—</span>	2032 NO-BUILD WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
<span style="color: cyan;">—</span>	2032 NO-BUILD WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
<span style="color: orange;">—</span>	2032 BUILD WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
<span style="color: blue;">—</span>	2032 BUILD WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
<span style="color: green;">—</span>	2032 BUILD W/ IMP. WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
<span style="color: black;">—</span>	2032 BUILD W/ IMP. WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH

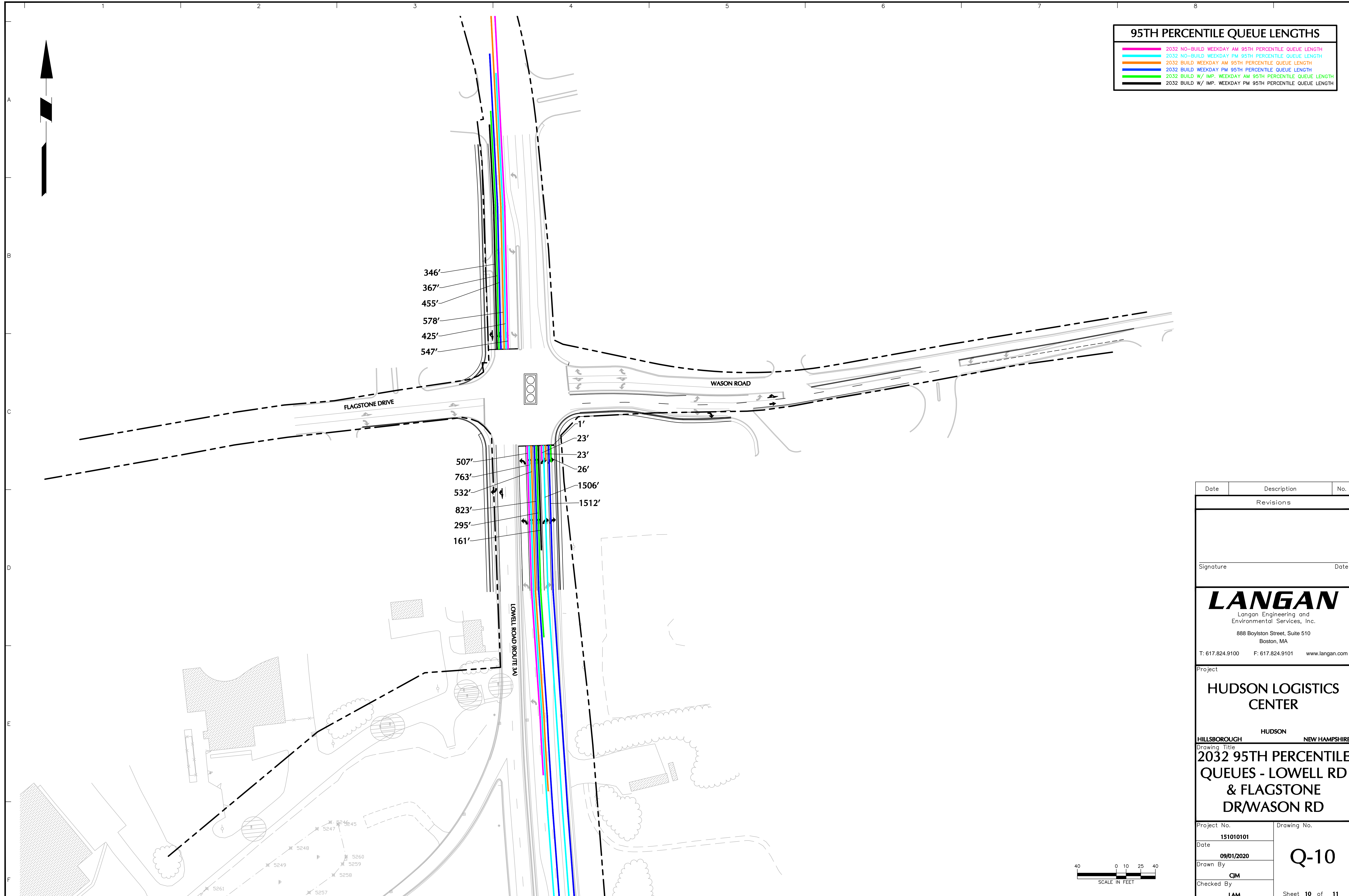


Date	Description	No.
Revisions		
Signature		Date
<b>LANGAN</b> Langan Engineering and Environmental Services, Inc. 888 Boylston Street, Suite 510 Boston, MA T: 617.824.9100 F: 617.824.9101 www.langan.com		
Project		
<b>HUDSON LOGISTICS CENTER</b>		
Drawing Title		
<b>2032 95TH PERCENTILE QUEUES - LOWELL RD &amp; SAGAMORE BRIDGE RD</b>		
Project No.	Drawing No.	
151010101	<b>Q-09</b>	
Date		
09/01/2020		
Drawn By		
BTW	Sheet 9 of 11	
Checked By	CJM	



Project No. 151010101



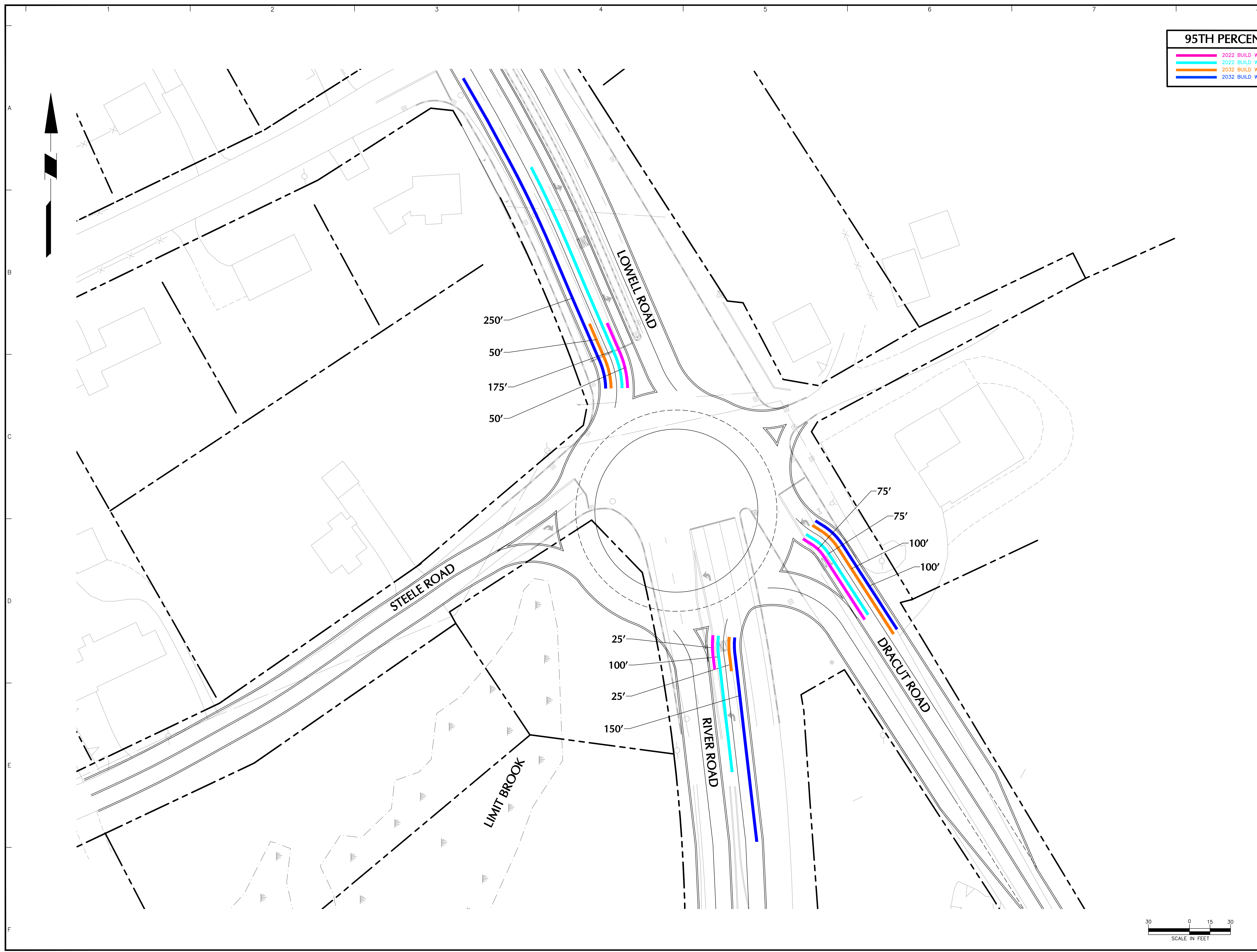


Date	Description	No.
Revisions		
Signature		Date
 Langan Engineering and Environmental Services, Inc. 888 Boylston Street, Suite 510 Boston, MA T: 617.824.9100 F: 617.824.9101 www.langan.com		
Project		
<b>HUDSON LOGISTICS CENTER</b> HUDSON HILLSBOROUGH NEW HAMPSHIRE		
Drawing Title		
<b>2032 95TH PERCENTILE QUEUES - LOWELL RD &amp; FLAGSTONE DR/WASON RD</b>		
Project No.	Drawing No.	
151010101	<b>Q-10</b>	
Date		
09/01/2020		
Drawn By	Checked By	
CJM	LAM	
Sheet 10 of 11		© 2019 Langan



**95TH PERCENTILE QUEUE LENGTHS**

- 2022 BUILD W/ IMP. WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
- 2022 BUILD W/ IMP. WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH
- 2032 BUILD W/ IMP. WEEKDAY AM 95TH PERCENTILE QUEUE LENGTH
- 2032 BUILD W/ IMP. WEEKDAY PM 95TH PERCENTILE QUEUE LENGTH



Date	Description	No.
------	-------------	-----

Revisions

Date	Description	No.

Signature \_\_\_\_\_ Date \_\_\_\_\_

**LANGAN**

Langan Engineering and Environmental Services, Inc.  
888 Boylston Street, Suite 510  
Boston, MA

T: 617.824.9100 F: 617.824.9101 www.langan.com

Project

**HUDSON LOGISTICS CENTER**

HUDSON  
HILLSBOROUGH NEW HAMPSHIRE

Drawing Title

**95TH PERCENTILE QUEUES - LOWELL RD & DRACUT RD/RIVER RD ROUNDABOUT**

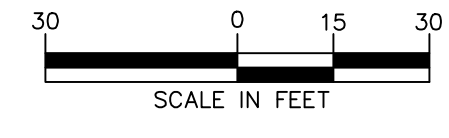
Project No. 151010101 Drawing No. Q-11

Date 09/01/2020

Drawn By BB

Checked By CJM

Sheet 11 of 11



## **Appendix B**

### **Traffic Count Data, Journey to Work Worksheet & Seasonal Adjustment Worksheet**



## Home Destination Report - Where Workers Live Who are Employed in the Selection Area By ZIP Codes (ZCTA)

### Total Primary Jobs

	2017	
	Count	Share
Total Primary Jobs	9,972	100.0%

Jobs Counts by ZIP Codes (ZCTA) Where Workers Live - Primary Jobs				Route 3A		U.S. Route 3		Daniel Webster Highway		Dracut Road	Total
				North	South	North	South	North	South	South	
		2017									
		Count	Share								
03051	Hudson, NH	1,568	15.7%	9.2%	3.0%					3.5%	15.7%
03060	Nashua, NH	651	6.5%			3.5%		3.0%			6.5%
03054	Merrimack, NH	447	4.5%			3.5%		1.0%			4.5%
03062	Nashua, NH	446	4.5%			4.5%					4.5%
03053	Londonderry, NH	341	3.4%	3.4%							3.4%
03038	Londonderry, NH	319	3.2%	2.7%					0.5%		3.2%
03063	Nashua, NH	294	2.9%			2.9%					2.9%
03064	Nashua, NH	279	2.8%			1.8%		1.0%			2.8%
03052	Litchfield, NH	258	2.6%	1.6%		1.0%					2.6%
03103	Manchester, NH	202	2.0%			2.0%					2.0%
03055	Milford, NH	196	2.0%			2.0%					2.0%
03104	Manchester, NH	192	1.9%			1.9%					1.9%
03079	Salem, NH	183	1.8%				0.8%		1.0%		1.8%
03102	Manchester, NH	179	1.8%			1.8%					1.8%
03076	Pelham, NH	175	1.8%						1.8%		1.8%
01851	Lowell, NH	144	1.4%				1.4%				1.4%
03110	Bedford, NH	140	1.4%			1.4%					1.4%
03087	Windham, NH	132	1.3%						1.3%		1.3%
01826	Dracut, MA	126	1.3%						1.3%		1.3%
03031	Amherst, NH	101	1.0%			1.0%					1.0%
01852	Lowell, MA	94	0.9%				0.9%				0.9%
01844	Methuen, NH	91	0.9%				0.5%		0.4%		0.9%
01879	Tyngsborough, MA	89	0.9%					0.9%			0.9%
03301	Concord, NH	88	0.9%			0.9%					0.9%
03049	Hollis, NH	84	0.8%			0.8%					0.8%
03045	Goffstown, NH	79	0.8%			0.8%					0.8%
01854	Lowell, MA	67	0.7%				0.7%				0.7%
03109	Manchester, NH	65	0.7%			0.7%					0.7%
03077	Raymond, NH	64	0.6%			0.6%					0.6%
01886	Westford, MA	61	0.6%				0.6%				0.6%
01841	Lawrence, MA	58	0.6%				0.6%				0.6%
03036	Chester, NH	51	0.5%			0.5%					0.5%
01824	South Chelmsford, MA	46	0.5%				0.5%				0.5%
03033	Brookline, NH	45	0.5%			0.5%					0.5%
03275	Allenstown, NH	45	0.5%			0.5%					0.5%
03820	Dover, NH	45	0.5%			0.5%					0.5%
03106	Hooksett, NH	42	0.4%			0.4%					0.4%
03281	Weare, NH	42	0.4%			0.4%					0.4%
01850	Lowell, MA	41	0.4%						0.4%		0.4%
03873	Sandown, NH	40	0.4%						0.4%		0.4%
01463	Pepperell, MA	39	0.4%			0.4%					0.4%
03841	Hampstead, NH	38	0.4%	0.2%					0.2%		0.4%
03032	Auburn, NH	37	0.4%			0.4%					0.4%
03070	New Boston, NH	34	0.3%			0.3%					0.3%
03811	Atkinson, NH	34	0.3%						0.3%		0.3%
01845	North Andover, MA	33	0.3%				0.3%				0.3%
03819	Danville, NH	33	0.3%						0.3%		0.3%
03071	New Ipswich, NH	32	0.3%			0.3%					0.3%
01830	Haverhill, MA	31	0.3%				0.3%				0.3%
03244	Hillsboro, NH	31	0.3%			0.3%					0.3%
Subtotal		7,952	79.7%	17.1%	3.0%	35.6%	6.7%	5.0%	0.9%	11.5%	79.7%
All Other Locations		2,020	20.3%			12.3%	7.0%	0.5%	0.5%		20.3%
<b>TOTALS</b>				<b>17.1%</b>	<b>3.0%</b>	<b>47.8%</b>	<b>13.7%</b>	<b>5.5%</b>	<b>1.4%</b>	<b>11.5%</b>	<b>100.0%</b>
<b>USE</b>				<b>15.0%</b>	<b>3.0%</b>	<b>50.0%</b>	<b>15.0%</b>	<b>5.0%</b>	<b>2.0%</b>	<b>10.0%</b>	<b>100.0%</b>

**2015 Monthly Count Data - Station 229022 (Hudson - Sagamore Bridge Road  
east of Nashua Town Line)**

<b>Weekday Peak Hour Data</b>				
<b>Month</b>	<b>Volume</b>		<b>Peak Month Seas. Adj. Factors</b>	
	<b>Weekday AM</b>	<b>Weekday PM</b>	<b>Weekday AM</b>	<b>Weekday PM</b>
January	2,985	3,763	1.221	1.174
February	2,918	3,743	1.249	1.180
March	3,556	4,188	1.025	1.055
April	3,512	4,260	1.038	1.037
May	3,551	4,322	1.027	1.022
June	3,472	4,417	1.050	1.000
July	3,138	4,180	1.162	1.057
August	3,192	4,241	1.142	1.041
September	3,617	4,241	1.008	1.041
October	3,646	4,385	1.000	1.007
November	3,433	4,203	1.062	1.051
December	3,194	4,164	1.142	1.061
<b>Average</b>	<b>3,351</b>	<b>4,176</b>		

Oct. Weekday A.M. Peak-Hour Seasonal Adjustment Factor =  $3,646/3,646 = 1.000$

Oct. Weekday P.M. Peak-Hour Seasonal Adjustment Factor =  $4,417/4,385 = 1.007$

<b>Average Daily Data</b>		
<b>Month</b>	<b>Volume</b>	<b>Avg Month Seas. Adj. Factors</b>
	<b>Weekday</b>	<b>Weekday</b>
January	40,218	1.154
February	40,879	1.135
March	45,240	1.026
April	46,980	0.988
May	48,764	0.952
June	49,349	0.940
July	47,654	0.974
August	47,968	0.968
September	47,379	0.980
October	48,228	0.962
November	46,780	0.992
December	47,509	0.977
<b>Average</b>	<b>46,412</b>	

Oct. Weekday Daily Seasonal Adjustment Factor =  $46,412/48,228 = 0.962$

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC  
 IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

2/22/2016

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF JANUARY 2015

02 229022 HUDSON- CIRCUMFERENCE RD EAST OF NASHUA TL (SAGAMORE BRIDGE) (EB-WB) (01229101-01229102)

M O N  
D A T E  
D A Y

			12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
1	4	1	179	167	114	113	105	228	280	434	568	922	1357	1871	2172	2310	2461	2296	2154	1826	1370	1043	733	499	331	203	23736
1	11	1	237	149	105	81	89	190	337	549	897	1444	2199	2604	2983	2971	2828	2595	2432	1974	1595	1032	816	509	329	227	29172
1	18	1	269	179	110	84	83	170	328	526	944	1594	2260	2706	2942	2625	2437	2116	1880	1630	1130	595	479	444	752	318	26601
1	25	1	153	122	103	89	96	203	315	551	896	1580	2246	2918	3311	3201	3224	3031	2774	2411	1710	1250	796	555	381	251	32167
1	5	2	107	65	91	150	383	1322	2339	3451	2764	1855	1915	2213	2433	2401	2950	3604	3851	4112	2650	1647	1109	813	440	317	42982
1	12	2	104	61	77	144	374	1308	2284	3406	2755	1765	1810	1901	2187	2243	2722	3495	3658	3957	2667	1505	1080	776	458	282	41019
1	19	2	139	117	74	136	276	1064	1736	2684	2331	1897	2185	2725	2946	2950	3318	3578	3719	3613	2316	1538	1046	792	471	265	41916
1	26	2	102	50	76	169	372	1377	2366	3610	3101	2374	2430	2560	2808	2785	3350	4233	4363	3851	2172	1257	627	397	258	142	44830
1	6	3	145	88	94	144	350	1339	2247	3586	2739	1875	1861	2071	2070	2146	2579	3311	3854	4052	2717	1650	1176	873	494	275	41736
1	13	3	171	97	115	176	387	1323	2326	3598	2780	1921	1899	2092	2407	2417	2834	3618	3921	4139	2717	1643	1193	933	542	303	43552
1	20	3	137	85	89	151	361	1397	2372	3600	2856	1993	1944	2180	2380	2403	2849	3521	3871	4183	2606	1623	1226	820	462	264	43373
1	27	3	83	67	60	99	85	96	121	123	109	81	102	113	120	136	222	194	160	182	160	141	137	125	137	64	2917
1	7	4	148	87	117	138	336	1303	2268	3502	2825	1926	1859	2188	2271	2426	2884	3456	3898	4100	2772	1726	1174	947	484	296	43131
1	14	4	154	89	99	142	347	1300	2335	3576	2807	1944	1951	2150	2349	2318	2810	3608	3979	3900	2648	1722	1297	971	541	319	43356
1	21	4	149	104	98	137	336	1338	2325	3522	2836	2006	1969	2036	2451	2384	2756	3585	3991	3993	2627	1711	1244	993	495	336	43422
1	28	4	55	62	66	103	218	764	1315	1831	1697	1554	1478	1604	1866	2012	2524	2750	3045	3250	2079	1391	991	851	481	303	32290
1	1	5	533	364	168	91	63	127	226	330	514	843	1194	1809	2200	2313	2465	2433	2123	1795	1640	1205	798	634	441	259	24568
1	8	5	157	92	95	143	337	1218	2040	3124	2667	2145	1897	1988	2248	2427	2881	3559	3995	4100	2695	1656	1271	997	565	283	42580
1	15	5	152	96	103	149	338	1350	2290	3597	2746	1907	1910	2033	2413	2359	2928	3698	3766	4044	2825	1723	1311	962	579	305	43584
1	22	5	143	88	103	139	359	1317	2316	3525	2680	1996	1920	2230	2480	2458	2885	3719	3898	4151	2790	1757	1259	894	579	321	44007
1	29	5	181	109	119	185	407	1300	2220	3378	2902	2062	1997	2279	2349	2516	2997	3562	3841	4257	2894	1946	1382	994	644	352	44873
1	2	6	113	80	84	124	200	670	1210	1794	1954	2089	2473	2897	3356	3425	3640	3809	3667	3379	2538	1786	1402	1098	689	507	42984
1	9	6	152	115	88	140	348	1318	2096	3124	2304	1621	1397	1790	2166	2363	3172	3699	4025	4024	2734	1911	1412	1138	754	494	42385
1	16	6	184	132	105	161	314	1087	2057	3099	2597	2071	2169	2546	2785	2874	3286	3668	3933	3920	2810	1985	1471	1186	701	470	45611
1	23	6	157	127	115	142	342	1226	2280	3387	2774	2198	2175	2575	2845	2871	3488	3988	4307	4235	3170	2250	1590	1179	780	534	48735
1	30	6	186	164	150	186	373	1149	2034	3011	2577	1828	1776	1948	2178	2352	2739	3247	3617	3550	2627	1740	1338	1076	646	459	40951
1	3	7	260	142	106	112	150	272	537	924	1376	2024	2628	3198	3495	3497	3172	3101	2808	2253	1689	1201	882	730	479	306	35342
1	10	7	250	155	105	117	173	379	548	974	1542	2082	2724	3383	3627	3542	3425	3301	2749	2004	1525	1042	1385	1119	767	492	37410
1	17	7	242	174	107	123	156	405	614	993	1586	2046	2728	3168	3452	3419	3513	3332	3154	2849	2204	1609	1211	1133	763	518	39499
1	24	7	271	157	146	127	173	358	624	876	967	1142	1020	1105	1164	1187	1289	1233	1254	1189	1019	783	696	608	442	331	18161
1	31	7	240	132	123	128	186	395	603	917	1418	1978	2549	3146	3343	3290	3335	3290	3120	2790	2230	1626	1151	988	688	440	38106

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
02	229022	2015	January	31	27919	40218	33704	37581	1164996		
02	229022	2014	January	31	28268	40215	34135	37889	1174564		-0.81%

PEAK HOUR VOLUMES:

AVERAGE AM:

AVERAGE MIDDAY:

AVERAGE PM:

SUNDAY	1385	2886	2738	AM - 6 AM TO 10 AM
WEEKDAY	2985	2400	3763	MIDDAY - 10 AM TO 2 PM
SATURDAY	1854	3021	2947	PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC  
 IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

2/22/2016

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF FEBRUARY 2015

02 229022 HUDSON- CIRCUMFERENCE RD EAST OF NASHUA TL (SAGAMORE BRIDGE) (EB-WB) (01229101-01229102)

M O N  
D A T E  
D A Y

			12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
2	1	1	257	182	106	86	92	202	309	595	971	1657	2260	2765	3011	2882	2810	2583	2505	2119	1143	534	437	369	1084	661	29620
2	8	1	276	174	122	95	86	246	293	487	615	977	1204	1431	1702	1709	1693	1718	1605	1222	970	682	449	348	272	136	18512
2	15	1	140	103	78	91	79	123	163	172	177	270	418	555	763	890	1020	1247	1217	1207	1076	796	526	400	275	198	11984
2	22	1	191	154	113	116	112	223	318	503	719	1106	1549	2014	2431	2557	2542	2457	2299	2087	1749	1154	750	559	393	234	26330
2	2	2	247	89	86	143	254	726	996	1280	1060	638	620	692	833	883	1135	1296	1097	883	574	415	304	250	226	152	14879
2	9	2	80	65	82	126	248	661	1121	1316	1137	758	769	785	947	1025	1272	1598	1548	1411	1016	759	585	443	298	203	18253
2	16	2	117	66	83	149	269	945	1447	2306	1897	1842	2166	2536	2769	2797	3107	3454	3364	3308	2250	1455	1153	872	496	278	39126
2	23	2	121	49	71	144	405	1252	2240	2964	2511	1956	1993	2138	2358	2437	2741	3428	3834	3891	2554	1644	1123	841	513	349	41557
2	3	3	129	95	109	191	397	1179	1790	2556	2544	2213	1981	1955	2306	2361	2798	3410	3713	3882	2700	1661	1186	892	580	296	40924
2	10	3	99	95	111	183	395	1215	1875	2581	2473	2078	1848	1942	2137	2248	2712	3321	3649	3873	2675	1692	1172	909	502	293	40078
2	17	3	154	98	85	174	393	1345	2276	3407	2734	1954	1788	2014	2269	2214	2840	3465	3932	4112	2780	1652	1301	947	547	324	42805
2	24	3	164	105	101	141	397	1287	2228	3181	2529	1897	1927	2119	2318	2366	2656	3296	3714	3955	2683	1704	1180	932	524	272	41676
2	4	4	187	136	125	130	399	1338	2392	3521	2888	2036	1923	2024	2421	2433	2996	3565	3965	4308	2844	1872	1294	1006	542	327	44672
2	11	4	147	100	98	154	350	1314	2363	3520	2979	2011	2028	2272	2385	3268	2932	3623	3974	4173	2855	1935	1456	1009	583	360	45889
2	18	4	161	101	96	137	392	1323	2326	3470	2801	2017	1987	2236	2442	2380	2956	3659	4022	4067	2768	1703	1352	1100	570	316	44382
2	25	4	147	110	103	174	396	1299	2302	3161	2465	1957	2070	2375	2554	2558	2855	3469	3913	4019	2814	1788	1288	996	616	355	43784
2	5	5	207	138	128	188	418	1254	2078	2878	2447	1733	1521	1621	1803	1997	2565	3318	3617	4031	2956	1737	1321	974	509	301	39740
2	12	5	212	142	147	187	390	1329	2341	3511	2805	2080	2011	2172	2427	2307	2891	3506	3468	3702	2764	1823	1263	995	634	338	43445
2	19	5	192	146	134	190	435	1310	2150	3030	2819	2125	1955	2079	2378	2324	2924	3508	3876	3897	2814	1775	1401	1013	574	303	43352
2	26	5	171	113	102	155	404	1294	2329	3114	2558	2007	2009	2312	2561	2484	2877	3487	3992	4002	2858	1855	1368	1005	581	302	43940
2	6	6	157	105	111	181	346	1247	2307	3521	2756	2169	2179	2516	2742	2814	3391	3940	4164	4205	3151	2273	1653	1236	799	506	48469
2	13	6	228	143	131	171	401	1186	2116	3015	2768	2118	2224	2601	2763	2816	3410	4001	4123	4190	3169	2291	1701	1313	845	515	48239
2	20	6	150	108	117	180	381	1207	2252	3307	2692	2066	2162	2534	2733	2722	3495	3889	4326	4087	2965	2047	1457	1176	784	513	47350
2	27	6	145	128	115	141	333	1083	2003	2718	2375	2042	2328	2616	2894	2840	3250	3741	3872	3799	2792	2019	1432	1128	747	478	45019
2	7	7	273	161	120	131	192	422	722	1154	1724	2404	3103	3460	3703	3565	3438	3395	2978	2813	2156	1605	1175	1015	726	520	40955
2	14	7	279	153	131	132	162	383	685	1189	1824	2548	3097	3416	3562	3372	3105	2853	2199	1733	1058	800	570	491	360	242	34344
2	21	7	268	151	126	125	181	421	649	1087	1562	2349	2789	3199	3276	3135	3187	3119	2476	2171	1604	1035	827	833	523	305	35398
2	28	7	238	164	115	118	175	382	675	1090	1530	2177	2736	3275	3383	3381	3382	3327	2969	2876	2310	1742	1320	1120	765	481	39731

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
02	229022	2015	February	28	21612	40879	37607	37659	1054453		
02	229022	2014	February	28	28987	39517	37058	37661	1054511		-0.01%

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	1002	2042	2079
WEEKDAY	2918	2385	3743
SATURDAY	2370	3481	3278

AM - 6 AM TO 10 AM  
 MIDDAY - 10 AM TO 2 PM  
 PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC  
 IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

2/22/2016

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF MARCH 2015

02 229022 HUDSON- CIRCUMFERENCE RD EAST OF NASHUA TL (SAGAMORE BRIDGE) (EB-WB) (01229101-01229102)

M O N  
D A T E  
D A Y

			12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
3	1	1	277	179	123	104	74	170	328	556	953	1613	2226	2728	2995	3005	2749	2611	2498	2046	1471	979	674	469	348	197	29373
3	8	1	279	179	69	68	103	199	316	515	785	1398	1966	2576	2809	2816	2855	2881	2695	2273	1895	1323	890	665	366	171	30092
3	15	1	277	197	114	88	87	180	304	506	821	1440	2067	2549	2989	2990	2908	2632	2430	1983	1520	1215	757	509	335	207	29105
3	22	1	222	179	101	99	103	191	347	565	961	1639	2291	2798	3259	3209	3166	2921	2634	2331	1896	1319	884	549	355	176	32195
3	29	1	246	175	117	90	91	215	348	614	1025	1788	2319	2907	3393	3396	3092	3094	2761	2470	1845	1395	926	580	367	266	33520
3	2	2	137	80	121	199	432	1331	2325	3392	2658	1827	1817	2052	2251	2316	2738	3535	3810	4023	2634	1594	1121	772	459	265	41889
3	9	2	103	71	68	154	374	1286	2346	3523	2669	1861	1900	2072	2317	2435	2946	3607	3931	4177	2727	1737	1285	859	488	297	43233
3	16	2	98	54	94	145	378	1283	2371	3465	2756	1857	1876	2159	2350	2466	3092	3616	4159	4128	2939	1830	1243	879	476	316	44030
3	23	2	100	63	76	162	435	1303	2464	3514	2789	1988	1986	2151	2368	2429	2992	3824	4115	4068	2728	1724	1229	809	441	298	44056
3	30	2	101	58	80	157	403	1400	2389	3661	2773	1998	1957	2144	2316	2390	2902	3579	4086	4097	2775	1792	1216	859	507	286	43926
3	3	3	127	97	99	137	399	1380	2491	3730	2731	2078	1927	2191	2468	2424	2906	3666	4089	4113	2656	1689	1101	805	464	310	44078
3	10	3	138	99	105	150	389	1299	2393	3552	2810	2008	1953	2191	2356	2445	3024	3552	4193	4158	2780	1738	1350	934	546	306	44469
3	17	3	158	90	100	156	400	1330	2416	3587	2687	1924	1976	2135	2314	2457	2957	3648	3900	4075	2537	1687	1324	836	484	303	43481
3	24	3	125	84	97	143	421	1355	2498	3661	2681	2015	2062	2190	2317	2426	3141	3704	4079	4218	2689	1850	1269	879	503	259	44666
3	31	3	140	88	94	159	412	1409	2525	3805	2797	2114	2058	2334	2421	2473	3189	3814	4121	4381	2852	1865	1337	944	562	316	46210
3	4	4	161	127	138	167	439	1320	2384	3555	2667	1798	1842	2054	2206	2410	2859	3537	4086	4129	2841	1861	1344	904	576	290	43695
3	11	4	136	83	110	135	409	1333	2431	3557	2868	1912	1996	2254	2516	2679	3174	3830	4086	4253	2928	1967	1428	1005	546	319	45955
3	18	4	162	143	90	157	398	1329	2558	3526	2836	1999	1935	2221	2334	2367	2959	3743	4008	4043	2838	1814	1401	989	557	315	44722
3	25	4	129	115	93	145	400	1373	2466	3636	2924	2003	2099	2290	2553	2547	3042	3689	4298	4234	2847	1807	1412	997	517	303	45919
3	5	5	136	105	115	140	416	1377	2473	3633	2769	1980	2052	2224	2387	2447	3029	3614	4079	4293	2715	1780	1335	953	574	308	44934
3	12	5	181	94	109	157	379	1344	2350	3727	2739	2015	1947	2203	2461	2582	3027	3776	4117	4222	2881	2074	1449	1070	583	347	45834
3	19	5	155	98	90	136	385	1363	2481	3602	2768	2164	2014	2237	2467	2541	3060	3761	4183	4412	2871	1979	1572	1043	621	291	46294
3	26	5	142	94	113	150	407	1377	2452	3670	2818	2047	2059	2291	2548	2658	3128	3653	4167	4132	2851	1805	1366	953	552	303	45736
3	6	6	151	110	90	142	414	1282	2415	3521	2772	2120	2182	2500	2796	2946	3596	4012	4200	4075	3031	2047	1557	1207	765	446	48377
3	13	6	177	118	115	142	365	1140	2180	3114	2625	2144	2247	2627	2822	2881	3458	3843	4141	4120	3152	2177	1670	1287	806	503	47854
3	20	6	140	119	108	130	367	1279	2328	3486	2760	2116	2212	2614	2780	2879	3491	4136	4240	4106	2927	1981	1416	1142	750	465	47972
3	27	6	185	121	118	160	387	1218	2228	3310	2672	2153	2255	2545	2793	2828	3503	3899	4198	4074	2992	2091	1614	1231	843	523	47941
3	7	7	260	164	88	136	171	402	662	1173	1717	2302	2909	3410	3537	3414	3433	3305	3052	2850	2331	1768	1284	1090	768	461	40687
3	14	7	265	164	126	116	166	354	590	1076	1538	1989	2605	3015	3172	3242	3104	3137	2723	2632	2112	1662	1226	1045	710	451	37220
3	21	7	246	166	91	127	175	393	602	999	1359	1739	2131	2663	3018	3231	3328	3251	3121	2961	2354	1775	1396	1128	855	511	37620
3	28	7	255	163	133	123	167	379	664	1127	1587	2116	2574	2969	3063	3135	3070	3018	2855	2806	2178	1637	1338	1040	764	458	37619

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
02	229022	2015	March	31	30857	45240	38286	42023	1302702	3.04%	
02	229022	2014	March	31	30240	43485	39977	40783	1264263		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	1576	3093	2960
WEEKDAY	3556	2549	4188
SATURDAY	2036	3286	3242

AM - 6 AM TO 10 AM  
 MIDDAY - 10 AM TO 2 PM  
 PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC  
 IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

2/22/2016

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF APRIL 2015

02 229022 HUDSON- CIRCUMFERENCE RD EAST OF NASHUA TL (SAGAMORE BRIDGE) (EB-WB) (01229101-01229102)

M O N  
D A T E  
D A Y

			12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
4	5	1	258	161	121	81	55	103	254	513	722	1332	1770	2253	2709	2241	1855	1781	1970	1964	1930	1470	878	573	342	208	25544
4	12	1	263	181	110	92	95	195	411	738	1249	1827	2553	2983	3182	3245	2968	2912	2725	2387	1913	1559	934	608	375	212	33717
4	19	1	241	148	120	97	83	201	467	806	1220	2094	2802	3042	3324	3314	3136	3017	2658	2519	1947	1534	998	616	355	226	34965
4	26	1	267	174	122	75	93	227	459	799	1212	1842	2463	2880	3169	2951	2792	2800	2542	2284	1683	1334	811	618	346	216	32159
4	6	2	95	46	82	168	433	1386	2489	3619	2831	2074	2021	2345	2561	2500	3123	3828	4089	4260	2876	1907	1348	818	497	301	45697
4	13	2	111	81	94	146	423	1397	2519	3618	2818	2092	2150	2309	2543	2522	3147	3790	4095	4079	2817	1796	1264	838	477	281	45407
4	20	2	109	64	84	136	396	1171	2372	3386	2698	2164	2202	2523	2636	2602	3018	3733	3919	3853	2504	1611	1156	773	461	274	43845
4	27	2	110	77	90	164	399	1369	2404	3100	2518	2089	2052	2406	2572	2567	2922	3560	4013	3953	2763	1923	1269	883	465	282	43950
4	7	3	143	96	105	154	428	1409	2487	3756	2826	1983	2049	2230	2353	2318	2993	3716	4165	4281	2810	1735	1309	888	508	267	45009
4	14	3	135	98	99	154	439	1407	2531	3666	2784	2087	1996	2231	2484	2490	3197	3740	4104	4208	2845	1968	1372	954	531	315	45835
4	21	3	130	103	110	160	434	1383	2453	3641	2746	2174	2084	2374	2516	2601	3068	3863	4244	4290	2893	1939	1420	978	572	284	46460
4	28	3	140	80	113	158	396	1377	2487	3240	2548	2151	2120	2441	2626	2594	2987	3744	4141	4125	2892	1969	1443	943	577	291	45583
4	1	4	157	104	99	147	420	1442	2561	3741	2922	2115	2084	2300	2529	2662	3087	3854	4242	4402	3136	2014	1457	998	539	309	47321
4	8	4	143	85	113	145	428	1409	2575	3747	2755	2147	2024	2456	2488	2458	3109	3677	4052	4054	2779	1811	1250	865	520	286	45376
4	15	4	124	101	111	135	432	1459	2624	3729	2897	2135	2141	2376	2679	2649	3288	3843	4260	4341	3026	2075	1475	978	565	301	47744
4	22	4	136	99	94	146	428	1484	2566	3554	2943	2191	2182	2485	2707	2608	3343	3945	4344	4121	3031	2032	1489	978	551	291	47748
4	29	4	154	111	99	161	401	1394	2503	3230	2730	2122	2097	2531	2515	2669	3020	3619	3979	3940	3036	2006	1485	1032	577	280	45691
4	2	5	153	113	122	144	431	1404	2459	3719	2798	2202	2093	2415	2556	2676	3254	3905	4467	4512	3370	2181	1610	1206	632	354	48776
4	9	5	138	113	105	153	432	1352	2468	3610	2706	1998	2009	2183	2400	2394	3160	3713	4142	4234	2823	1940	1415	996	530	381	45395
4	16	5	143	112	115	169	410	1440	2598	3762	2874	2180	2188	2519	2645	2642	3291	3997	4393	4476	3156	2218	1523	1124	619	294	48888
4	23	5	136	111	104	178	400	1434	2569	3665	2814	2176	2183	2432	2720	2677	3252	3937	4295	4517	2987	2063	1488	1057	557	313	48065
4	30	5	149	103	88	163	432	1392	2352	3265	2645	2264	2187	2530	2664	2690	3223	3737	4178	4257	2983	2111	1518	1101	630	317	46979
4	3	6	203	130	115	144	374	1231	2169	3164	2684	2448	2552	2958	3363	3305	3881	4399	4430	4098	3052	2221	1763	1317	787	529	51317
4	10	6	169	98	118	163	391	1161	2224	3206	2684	2119	2304	2684	2878	2851	3423	3945	4098	4014	3011	2127	1683	1246	799	469	47865
4	17	6	183	127	115	176	443	1359	2435	3615	2855	2322	2423	2665	3036	2968	3771	4303	4478	4292	3146	2333	1764	1259	787	460	51315
4	24	6	151	128	115	165	380	1229	2255	3235	2680	2270	2367	2704	2989	2905	3638	4143	4385	4298	3100	2207	1584	1151	701	511	49291
4	4	7	277	192	107	138	172	368	669	1118	1778	2538	3250	3588	3785	3712	3620	3655	3201	3037	2609	2026	1561	1154	883	509	43947
4	11	7	253	172	122	102	173	402	726	1327	1858	2346	3049	3503	3566	3604	3465	3424	3149	2968	2413	1979	1371	1081	800	498	42351
4	18	7	247	135	119	122	171	383	799	1360	2025	2698	3304	3512	3628	3457	3387	3341	3089	3046	2331	1845	1524	1158	785	459	42925
4	25	7	248	168	128	117	208	409	841	1396	1856	2411	3025	3241	3369	3322	3388	3205	3117	2905	2283	1828	1395	1098	763	408	41129

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
02	229022	2015	April	30	31596	46980	42588	44343	1330294	2.79%	
02	229022	2014	April	30	30774	45766	41068	43141	1294230		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	1774	3112	2718
WEEKDAY	3512	2681	4260
SATURDAY	2498	3596	3474

AM - 6 AM TO 10 AM  
 MIDDAY - 10 AM TO 2 PM  
 PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC  
 IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

2/22/2016

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF MAY 2015

02 229022 HUDSON- CIRCUMFERENCE RD EAST OF NASHUA TL (SAGAMORE BRIDGE) (EB-WB) (01229101-01229102)

M O N  
D A T E  
D A Y

			12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
5	3	1	303	371	142	102	109	258	447	824	1268	1849	2591	3019	3088	3186	3036	2814	2537	2268	1913	1423	1010	632	367	217	33774
5	10	1	237	181	98	108	84	255	447	875	1390	2076	2817	3058	3265	3111	2935	2747	2559	2337	2170	1613	1211	711	481	210	34976
5	17	1	275	187	114	95	109	274	501	901	1349	2132	2931	3134	3541	3218	3064	2848	2740	2474	1994	1559	1176	685	460	256	36017
5	24	1	231	154	104	77	96	237	438	795	1199	1823	2342	2595	2873	2790	2537	2285	2202	2078	1776	1508	1090	808	559	355	30952
5	31	1	282	241	134	94	114	235	412	809	1198	1828	2508	2822	3191	3239	2890	2752	2608	2245	1766	1271	812	650	392	236	32729
5	4	2	119	71	99	170	441	1457	2614	3668	2920	2156	2219	2430	2623	2569	3141	3988	4145	4337	2967	2143	1462	928	544	307	47518
5	11	2	110	66	103	162	454	1457	2608	3614	2858	2232	2167	2448	2599	2516	3205	3840	4281	4383	3051	2157	1429	887	522	287	47436
5	18	2	121	82	92	164	447	1512	2529	3596	2880	2126	2132	2383	2640	2601	3247	4019	4237	4365	2959	2287	1529	904	576	293	47721
5	25	2	186	124	70	65	115	240	458	731	1224	1847	2410	2982	2808	2889	2684	2570	2251	2074	1717	1454	1049	711	422	192	31273
5	5	3	132	102	99	148	438	1518	2607	3768	2887	2199	2139	2366	2595	2642	3233	3927	4269	4413	2981	2126	1522	936	570	311	47928
5	12	3	153	100	97	177	449	1498	2569	3798	2888	2211	2227	2416	2650	2573	3321	3818	4273	4355	3044	2275	1596	986	539	313	48326
5	19	3	139	96	111	167	446	1528	2598	3714	2897	2129	2185	2434	2641	2542	3259	3859	4235	4443	3121	2059	1653	1041	577	324	48198
5	26	3	112	65	94	152	438	1518	2591	3781	2965	2262	2231	2479	2616	2640	3205	3964	4123	4327	2894	2217	1641	993	526	292	48126
5	6	4	147	111	96	154	436	1494	2684	3694	2925	2259	2141	2447	2686	2625	3229	3947	4385	4457	3197	2361	1675	1075	568	336	49129
5	13	4	178	114	81	172	438	1583	2684	3716	2895	2212	2168	2416	2719	2719	3244	3952	4359	4407	3116	2268	1616	1060	611	311	49039
5	20	4	148	115	112	165	438	1647	2726	3775	2930	2178	2218	2512	2672	2733	3429	3978	4226	4371	3209	2258	1736	1183	612	313	49684
5	27	4	130	109	99	158	461	1569	2742	3685	3019	2211	2314	2528	2614	2712	3266	4132	4476	4376	3142	2282	1769	1133	572	316	49815
5	7	5	141	122	104	149	442	1498	2629	3797	2948	2264	2259	2546	2659	2747	3476	4138	4518	4581	3289	2474	1834	1196	653	316	50780
5	14	5	143	122	115	147	447	1533	2757	3684	2884	2178	2343	2528	2809	2776	3318	4099	4318	4323	3192	2442	1805	1157	611	338	50069
5	21	5	162	109	115	155	484	1537	2637	3719	2948	2242	2338	2635	2760	2870	3420	4135	4372	4415	3263	2351	1734	1182	648	383	50614
5	28	5	153	101	111	163	483	1599	2728	3794	3009	2273	2297	2600	2675	2817	3356	3998	4448	4270	3020	2246	1788	1154	655	322	50060
5	1	6	208	163	127	158	391	1325	2258	3063	2548	2395	2588	2839	3181	3110	3584	4175	4329	3974	2961	2237	1634	1213	737	505	49703
5	8	6	182	136	116	175	395	1336	2366	3322	2867	2463	2543	2941	3098	3106	3646	4106	4420	4294	3345	2522	1954	1421	868	492	52114
5	15	6	175	123	103	161	446	1454	2589	3597	2916	2427	2526	2891	3054	3024	3711	4294	4476	4220	3177	2521	1884	1404	897	513	52583
5	22	6	223	151	145	153	399	1195	2226	3246	2713	2487	2650	3123	3332	3326	3961	4255	4068	3733	2768	2235	1744	1277	806	492	50708
5	29	6	179	133	116	156	466	1515	2651	3697	3020	2468	2606	2912	3021	3201	3846	4137	4490	4224	3330	2391	1914	1376	844	520	53213
5	2	7	245	179	132	109	182	428	751	1364	1871	2397	2984	3297	3369	3339	3318	3240	3099	2885	2458	1840	1629	1209	745	445	41515
5	9	7	255	159	95	125	171	446	821	1394	2012	2575	3007	3390	3618	3626	3712	3579	3313	3105	2704	2248	1780	1280	931	596	44942
5	16	7	245	185	133	132	186	429	868	1330	1883	2518	2959	3224	3504	3369	3254	3313	3209	2952	2591	1952	1536	1227	901	540	42440
5	23	7	232	164	113	122	153	358	779	1224	1836	2449	2995	3208	3325	3265	3180	2993	2852	2683	2190	1799	1468	1150	708	401	39647
5	30	7	232	150	149	143	183	477	850	1335	2007	2638	3071	3190	3324	3218	3075	3091	2814	2760	2271	1850	1512	1209	791	490	40830

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
02	229022	2015	May	31	33690	48764	41875	45221	1401859	3.50%	
02	229022	2014	May	31	32420	46464	40521	43693	1354497		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	1942	3221	2892
WEEKDAY	3551	2828	4322
SATURDAY	2515	3430	3323

AM - 6 AM TO 10 AM  
 MIDDAY - 10 AM TO 2 PM  
 PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC  
 IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

2/22/2016

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF JUNE 2015

02 229022 HUDSON- CIRCUMFERENCE RD EAST OF NASHUA TL (SAGAMORE BRIDGE) (EB-WB) (01229101-01229102)

M O N  
D A T E  
D A Y

			12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
6	7	1	290	184	125	76	114	262	515	833	1289	1981	2629	3003	3222	3102	2946	2954	2799	2371	2014	1604	1170	735	448	215	34881
6	14	1	304	189	123	68	114	289	585	1069	1283	2102	2597	3027	3091	2984	2858	2665	2514	2310	1966	1614	1258	744	450	284	34488
6	21	1	270	160	107	88	112	215	371	590	944	1531	2044	2628	3051	2974	2930	2780	2751	2396	2127	1692	1200	775	455	264	32455
6	28	1	286	190	115	89	118	221	363	574	831	1494	2148	2564	2854	2853	2926	2777	2495	2204	1795	1290	980	641	453	263	30524
6	1	2	117	72	104	157	469	1499	2538	3549	2764	2022	1984	2318	2585	2634	3137	3864	4066	4224	2810	1909	1271	925	496	302	45816
6	8	2	99	85	97	165	465	1533	2716	3474	2935	2154	2151	2446	2503	2601	3097	3974	4384	4323	2881	2029	1448	970	495	275	47300
6	15	2	137	82	86	168	446	1490	2423	3213	2760	2112	2060	2427	2642	2570	3087	3716	4089	4216	2925	1954	1332	938	519	329	45721
6	22	2	118	78	112	177	484	1515	2598	3361	2709	2215	2354	2526	2671	2715	3051	3803	4416	4235	2951	2161	1646	1074	569	320	47859
6	29	2	105	79	104	160	468	1452	2434	3221	2685	2167	2197	2590	2806	2877	3079	3856	4229	4272	3100	2101	1574	1109	660	352	47677
6	2	3	121	117	105	156	433	1504	2611	3696	2854	2113	2133	2301	2464	2626	3314	3891	4286	4250	2866	1901	1426	992	550	312	47022
6	9	3	169	107	118	155	487	1576	2758	3702	2945	2136	2172	2418	2567	2697	3161	4007	4372	4459	2983	2045	1568	1031	574	326	48533
6	16	3	133	105	91	153	484	1596	2648	3524	2825	2182	2089	2472	2712	2611	3089	3985	4348	4444	2953	2132	1543	1053	613	339	48124
6	23	3	147	111	123	167	505	1552	2641	3396	2844	2082	2276	2640	2461	2524	2928	3717	4253	4184	2888	2004	1562	1018	559	338	46920
6	30	3	173	106	110	166	481	1564	2545	3310	2819	2291	2285	2579	2738	2728	3254	3851	4324	4295	2976	2190	1689	1141	630	374	48619
6	3	4	137	104	106	146	475	1551	2827	3833	3007	2190	2211	2599	2653	2623	3438	4168	4510	4507	3096	2339	1786	1196	589	355	50446
6	10	4	176	125	113	159	471	1608	2756	3833	2930	2259	2271	2647	2733	2745	3325	3944	4603	4572	3132	2322	1796	1173	609	355	50657
6	17	4	148	131	107	149	507	1582	2821	3410	2884	2224	2315	2537	2685	2823	3239	3887	4509	4564	3187	2304	1847	1199	637	304	50000
6	24	4	177	127	123	179	495	1596	2653	3376	2897	2305	2360	2698	2840	2670	3161	3915	4434	4408	2972	2308	1780	1256	671	443	49844
6	4	5	168	108	97	169	478	1588	2752	3816	2918	2269	2307	2422	2771	2741	3369	4214	4562	4606	3186	2377	1800	1240	690	363	51011
6	11	5	195	100	97	164	484	1571	2758	3737	2961	2308	2371	2490	2744	2773	3437	4114	4626	4530	3162	2417	1935	1220	700	357	51251
6	18	5	174	121	109	159	462	1589	2628	3466	2949	2240	2241	2535	2888	2843	3500	4024	4428	4462	3175	2331	1825	1313	731	391	50584
6	25	5	192	128	107	168	483	1519	2681	3353	2901	2335	2445	2636	2854	2772	3158	3966	4360	4494	3201	2243	1853	1242	664	383	50138
6	5	6	189	138	122	160	452	1375	2471	3479	2882	2530	2735	2932	3122	3121	3755	4168	4375	4086	3168	2346	1890	1418	816	547	52277
6	12	6	157	162	110	156	496	1494	2512	3573	2821	2537	2665	3061	3156	3213	3720	4132	4515	4122	3079	2358	1928	1382	886	594	52829
6	19	6	178	141	128	162	429	1300	2404	2952	2786	2450	2649	3051	3285	3241	3764	4138	4356	3996	3107	2294	1968	1393	814	559	51545
6	26	6	211	144	130	161	444	1448	2393	3114	2712	2385	2491	2907	3215	3273	3758	4127	4342	4230	3025	2286	1845	1417	883	564	51505
6	6	7	277	166	117	122	211	460	903	1365	1910	2460	2965	3287	3465	3255	3178	3279	3041	2851	2300	1993	1591	1361	891	494	41942
6	13	7	285	156	119	122	217	434	826	1429	1951	2580	3185	3387	3554	3360	3214	3098	2944	2730	2209	1918	1602	1305	843	499	41967
6	20	7	220	156	131	134	207	482	859	1407	2041	2654	3087	3464	3501	3284	3253	3173	2883	2838	2334	1879	1528	1200	875	528	42118
6	27	7	234	181	125	130	236	476	836	1291	1837	2493	2945	3188	3456	3256	3131	3022	2740	2633	2228	1742	1433	1182	750	477	40022

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
02	229022	2015	June	30	33087	49349	41512	46136	1384075	3.90%	
02	229022	2014	June	30	32585	48030	40134	44403	1332093		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	1777	3054	2917
WEEKDAY	3472	2824	4417
SATURDAY	2547	3494	3219

AM - 6 AM TO 10 AM  
 MIDDAY - 10 AM TO 2 PM  
 PM - 2 PM TO 8 PM



STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC  
 IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

2/22/2016

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF JULY 2015

02 229022 HUDSON- CIRCUMFERENCE RD EAST OF NASHUA TL (SAGAMORE BRIDGE) (EB-WB) (01229101-01229102)

M O N  
D A T E  
D A Y

			12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
7	5	1	289	150	96	70	93	238	376	614	933	1533	2012	2541	2685	2622	2380	2348	2241	1929	1791	1343	1128	787	517	250	28966
7	12	1	295	207	122	83	114	260	472	809	1133	1853	2323	2784	2815	2668	2565	2567	2377	2058	1861	1584	1208	782	474	277	31691
7	19	1	256	193	132	85	131	250	505	837	1195	1787	2182	2771	2854	2647	2494	2463	2353	2049	2015	1630	1187	750	459	249	31474
7	26	1	277	209	140	89	117	222	491	684	1029	1658	2233	2637	3093	2988	2997	2758	2639	2308	1841	1455	1056	748	470	269	32408
7	6	2	139	105	111	168	392	1205	2058	2595	2501	2036	2215	2509	2680	2574	2908	3410	3862	3615	2617	1958	1506	987	592	299	43042
7	13	2	160	108	108	166	455	1476	2458	3118	2811	2203	2158	2581	2649	2659	3022	3796	4092	4181	2861	2099	1541	1050	615	316	46683
7	20	2	129	105	114	148	501	1439	2437	3192	2781	2178	2171	2525	2604	2553	2987	3667	4205	4101	2846	2092	1613	1034	565	334	46321
7	27	2	143	88	99	166	494	1489	2493	3237	2738	2152	2230	2567	2676	2805	3160	3694	3903	4069	2784	1972	1553	978	513	322	46325
7	7	3	160	94	122	164	460	1442	2388	3202	2748	2209	2198	2508	2757	2705	2961	3627	4084	4104	2824	2018	1581	1006	602	306	46270
7	14	3	164	131	127	166	470	1493	2531	3354	2851	2248	2182	2474	2712	2596	3104	2698	2654	4095	2829	2224	1666	1156	583	368	44876
7	21	3	163	113	134	164	470	1466	2536	3422	2769	2172	2153	2567	2687	2494	3051	3804	4183	4274	2935	2173	1658	1068	601	369	47426
7	28	3	148	107	137	168	482	1530	2548	3397	2808	2255	2198	2523	2737	2571	3015	3924	4249	4215	2897	2173	1667	1108	635	359	47851
7	1	4	160	119	106	154	475	1411	2568	3093	2623	2106	2189	2525	2850	2836	3260	4031	4341	4358	3280	2246	1626	1190	585	357	48489
7	8	4	162	117	129	124	471	1481	2458	3159	2559	2118	2210	2585	2759	2788	3167	3880	4172	4222	2918	2236	1695	1171	621	346	47548
7	15	4	145	136	131	159	466	1520	2506	3400	2834	2196	2306	2606	2695	2789	3274	3909	4379	4426	3110	2356	1720	1165	577	312	49117
7	22	4	162	134	122	134	477	1570	2442	3381	2844	2338	2223	2490	2711	2692	3152	3760	4268	4249	3104	2215	1712	1169	623	349	48321
7	29	4	143	127	121	158	464	1542	2493	3289	2821	2243	2293	2516	2758	2609	2991	3796	4264	4280	2938	2169	1760	1216	640	339	47970
7	2	5	212	141	114	174	449	1404	2364	3002	2802	2437	2603	2958	3228	3358	3779	4203	4234	3911	3022	2367	1994	1251	773	431	51211
7	9	5	197	118	118	150	454	1448	2460	3163	2731	2220	2265	2524	2821	2825	3194	3844	4350	4406	3169	2337	1761	1126	611	375	48667
7	16	5	122	131	111	164	457	1489	2507	3321	2839	2285	2374	2492	2778	2753	3302	3993	4375	4351	3249	2379	1836	1352	702	392	49754
7	23	5	182	129	131	175	470	1513	2500	3416	2848	2204	2302	2676	2802	2700	3231	3935	4383	4393	3101	2303	1757	1129	730	410	49420
7	30	5	187	115	130	172	483	1501	2484	3250	2792	2270	2262	2613	2753	2834	3260	3773	4304	4045	3023	2140	1600	1158	613	356	48118
7	3	6	266	160	117	138	239	516	968	1431	1912	2472	2929	3428	3543	3262	3355	3149	2991	2663	2281	1908	1556	1123	808	411	41626
7	10	6	183	118	127	156	428	1382	2221	2984	2777	2339	2568	2929	3143	3101	3648	3994	4280	3948	2997	2265	1797	1341	794	449	49969
7	17	6	210	167	124	160	417	1226	2156	2776	2609	2493	2424	2898	3148	3069	3533	3865	3991	3706	3020	2259	1724	1206	807	481	48469
7	24	6	201	150	139	169	461	1380	2284	3083	2736	2271	2439	2889	3075	3097	3669	3981	4203	3852	3009	2266	1760	1286	799	512	49711
7	31	6	182	144	139	148	424	1265	2159	2861	2693	2504	2497	2957	3207	3027	3451	3894	3996	3778	2905	2157	1886	1343	762	480	48859
7	4	7	216	158	114	90	94	219	467	733	1081	1445	1810	2286	2465	2280	2143	1946	1577	1558	1361	1294	1008	821	948	487	26601
7	11	7	271	184	140	110	200	468	803	1299	1809	2442	2934	3185	3216	3120	2923	2821	2690	2481	2188	1829	1585	1257	733	529	39217
7	18	7	263	160	122	126	214	409	689	1180	1609	2136	2739	3064	3245	3233	3135	3002	2905	2593	2138	1789	1506	1134	760	503	38654
7	25	7	243	185	183	132	204	464	831	1292	1779	2323	2826	3268	3182	3290	3145	2907	2817	2625	2168	1866	1506	1177	819	466	39698

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
02	229022	2015	July	31	31135	47654	36042	44024	1364752	3.30%	
02	229022	2014	July	31	30352	45864	36220	42618	1321170		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	1708	2862	2610
WEEKDAY	3138	2881	4180
SATURDAY	2086	3054	2836

AM - 6 AM TO 10 AM  
 MIDDAY - 10 AM TO 2 PM  
 PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC  
 IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

2/22/2016

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF AUGUST 2015

02 229022 HUDSON- CIRCUMFERENCE RD EAST OF NASHUA TL (SAGAMORE BRIDGE) (EB-WB) (01229101-01229102)

M O N	D A T E	D A Y	12 AM 1 AM 2 AM 3 AM 4 AM 5 AM 6 AM 7 AM 8 AM 9 AM 10 AM 11 AM 12 PM 1 PM 2 PM 3 PM 4 PM 5 PM 6 PM 7 PM 8 PM 9 PM 10 PM 11 PM																								Total
			12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	
8	2	1	295	215	107	92	111	255	499	776	1168	1853	2307	2708	2901	2836	2663	2603	2492	2157	1943	1539	1176	754	457	266	32173
8	9	1	273	167	117	86	109	247	434	798	1109	1755	2273	2704	2996	2911	2933	2658	2460	2279	1847	1510	1172	702	460	267	32267
8	16	1	264	175	122	110	125	244	450	844	1179	1816	2356	2750	2916	2790	2651	2532	2399	2241	1815	1535	1132	805	520	259	32030
8	23	1	303	200	145	80	123	250	445	719	1077	1675	2270	2795	2936	3087	3204	2915	2544	2297	1894	1431	963	631	430	232	32646
8	30	1	272	210	137	112	123	269	465	813	1216	1834	2404	2984	3079	3094	2978	2759	2593	2338	2072	1558	1027	673	436	263	33709
8	3	2	154	102	119	160	448	1437	2450	3151	2727	2166	2241	2478	2693	2698	2974	3733	4077	4176	2773	2088	1539	1003	514	276	46177
8	10	2	151	88	121	177	453	1431	2489	3023	2672	2092	2099	2540	2744	2673	3002	3749	4101	4074	2780	2166	1567	965	566	303	46026
8	17	2	140	71	117	170	470	1417	2414	3152	2664	2128	2159	2499	2626	2664	2993	3734	4104	4116	2788	2049	1486	919	529	310	45719
8	24	2	117	81	117	179	506	1380	2511	3108	2478	2146	2168	2545	2860	2854	3215	3831	4260	4284	2941	2045	1472	965	586	306	46955
8	31	2	107	78	104	173	511	1386	2588	3350	2588	2181	2390	2661	2835	2756	3328	3840	4242	4360	3089	2233	1500	901	542	311	48054
8	4	3	130	118	104	185	453	1548	2570	3213	2683	2198	2193	2539	2811	2644	2887	3582	4056	4135	2985	2126	1600	986	630	291	46667
8	11	3	161	100	120	177	463	1468	2481	3307	2641	2155	2101	2263	2463	2420	2925	3759	4104	4085	2871	1976	1423	974	604	313	45354
8	18	3	139	126	113	180	513	1496	2530	3309	2666	2188	2225	2548	2841	2669	3132	3751	4158	4198	2939	2172	1547	1064	532	320	47356
8	25	3	152	131	121	167	502	1485	2564	3383	2733	2185	2236	2454	2782	2823	3199	3832	4271	4310	3080	2196	1432	1025	572	308	47943
8	5	4	188	107	121	184	469	1471	2598	3324	2704	2253	2277	2621	2935	2689	3265	3937	4354	4472	3090	2308	1774	1168	624	341	49274
8	12	4	115	130	124	163	477	1476	2511	3348	2759	2255	2377	2581	2842	2765	3224	3794	4434	4284	3061	2299	1752	1091	603	349	48814
8	19	4	198	132	112	165	506	1498	2531	3184	2748	2166	2318	2683	2710	2682	3174	3841	4030	4271	3085	2269	1696	1149	606	356	48110
8	26	4	147	116	128	161	498	1476	2573	3385	2662	2268	2326	2494	2734	2675	3301	3830	4341	4311	3117	2385	1682	1110	603	337	48660
8	6	5	155	110	150	148	429	1494	2553	3351	2714	2281	2435	2589	2772	2849	3218	3957	4348	4287	3136	2329	1792	1114	655	369	49235
8	13	5	189	137	136	180	493	1467	2502	3188	2664	2248	2292	2579	2692	2772	3160	3897	4321	4262	3226	2275	1687	1195	715	418	48695
8	20	5	157	132	139	179	456	1464	2509	3245	2726	2251	2380	2633	2736	2661	3137	3812	4233	4344	3069	2414	1835	1120	662	342	48636
8	27	5	166	116	103	182	476	1457	2592	3404	2834	2373	2403	2689	2842	2792	3351	4002	4398	4314	3032	2358	1705	1161	628	373	49751
8	7	6	199	138	119	169	454	1322	2386	3003	2653	2342	2529	2866	3088	3184	3590	4038	4255	3941	2949	2239	1733	1188	793	542	49720
8	14	6	215	157	139	146	448	1245	2153	2703	2594	2339	2511	2910	3052	3198	3493	3681	3939	3824	2905	2298	1696	1244	782	473	48145
8	21	6	212	157	124	164	462	1333	2237	3027	2577	2217	2451	2855	3140	3206	3612	4072	4101	3801	2978	2171	1727	1205	743	502	49074
8	28	6	173	129	122	201	454	1174	2179	2868	2550	2357	2540	2977	3172	3129	3627	4056	4059	3874	2900	2235	1730	1169	806	485	48966
8	1	7	259	183	146	122	197	490	734	1263	1760	2329	2782	3119	3103	2945	2925	2625	2705	2477	2130	1765	1537	1125	725	460	37906
8	8	7	263	177	123	122	211	462	778	1143	1726	2344	2760	3138	3238	3019	3006	2877	2634	2423	2095	1750	1410	1124	671	459	37953
8	15	7	265	144	131	136	208	448	764	1301	1792	2329	2716	3037	3238	3025	3016	2941	2688	2452	1989	1692	1312	1178	737	476	38015
8	22	7	238	151	135	105	217	466	714	1119	1687	2252	2740	3204	3452	3305	3267	3080	2792	2563	2246	1798	1338	1093	739	533	39234
8	29	7	293	204	148	112	232	448	807	1288	1874	2361	2868	3226	3218	3181	3136	3047	2839	2580	2256	1930	1431	1130	727	469	39805

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
02	229022	2015	August	31	32565	47968	38583	43970	1363069	3.35%	
02	229022	2014	August	31	31112	46606	36923	42545	1318906		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:	
SUNDAY	1787	2999	2886	AM - 6 AM TO 10 AM
WEEKDAY	3192	2853	4241	MIDDAY - 10 AM TO 2 PM
SATURDAY	2323	3255	3070	PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC  
 IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

2/22/2016

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF SEPTEMBER 2015

02 229022 HUDSON- CIRCUMFERENCE RD EAST OF NASHUA TL (SAGAMORE BRIDGE) (EB-WB) (01229101-01229102)

M O N  
D A T E  
D A Y

			12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
9	6	1	247	155	105	72	82	240	440	696	1057	1769	2204	2565	2769	2644	2475	2377	2138	1976	1686	1465	1050	751	513	343	29819
9	13	1	281	181	121	87	153	225	478	761	1168	1859	2570	2905	3196	3129	2922	2732	2489	2132	1673	1368	811	545	348	184	32318
9	20	1	266	166	133	90	108	250	501	827	1223	2068	2555	3190	3141	2660	2436	2356	2397	2383	1908	1316	855	558	386	191	31964
9	27	1	303	180	127	90	99	259	489	875	1303	1927	2626	3046	3145	2622	2531	2482	2594	2197	1912	1404	836	545	386	192	32170
9	7	2	179	87	86	97	112	240	489	753	1196	1747	2332	2758	2935	2754	2638	2460	2328	2042	1764	1449	987	614	360	203	30610
9	14	2	108	65	106	165	531	1488	2759	3663	2848	2070	2069	2416	2505	2668	3294	3840	4301	4215	2865	1987	1261	783	465	250	46722
9	21	2	99	67	110	162	514	1511	2636	3702	2728	1958	2069	2399	2455	2646	3151	3834	4322	4214	2844	1807	1162	830	458	253	45931
9	28	2	116	73	106	152	522	1555	2753	3785	2712	2027	2195	2345	2623	2646	3260	3923	4345	4212	2784	1667	1184	764	476	268	46493
9	1	3	139	106	118	172	519	1500	2711	3755	2942	2308	2337	2697	2664	2647	3110	3923	4290	4251	3033	2169	1399	944	530	294	48558
9	8	3	85	58	116	149	512	1450	2789	3760	2910	2262	2290	2377	2451	2646	3190	3875	4153	4003	2823	1952	1396	856	508	287	46898
9	15	3	114	107	123	163	516	1540	2875	3962	2776	2117	2048	2430	2510	2716	3123	4017	4325	4319	3026	2114	1447	895	494	278	48035
9	22	3	135	111	111	153	573	1578	2857	3847	2859	2085	2110	2334	2554	2547	3214	3927	4323	4302	2868	1788	1253	889	521	276	47215
9	29	3	137	93	112	159	536	1628	2861	3798	2822	2137	2179	2361	2447	2599	3167	3956	4308	4250	2804	1781	1225	873	522	284	47039
9	2	4	154	127	113	179	499	1547	2816	3835	2861	2157	2175	2559	2633	2723	3278	3984	4307	4246	3092	2218	1565	1002	576	302	48948
9	9	4	143	124	114	188	533	1571	2922	3896	2841	2128	2130	2350	2562	2590	3437	3859	4254	4366	3064	2157	1494	958	539	265	48485
9	16	4	142	114	111	148	510	1576	2904	3758	2845	2093	2039	2305	2574	2575	3246	4074	4413	4393	2965	2273	1458	942	569	295	48322
9	23	4	125	116	120	148	540	1615	2795	3718	2894	2009	2151	2373	2637	2744	3194	4063	4384	4222	2999	2002	1383	940	499	278	47949
9	30	4	123	136	123	161	492	1602	2683	3537	2722	1870	1844	2189	2303	2411	3121	3839	4161	4178	2975	1758	1374	913	543	292	45350
9	3	5	134	108	103	177	495	1494	2782	3822	2860	2382	2350	2575	2777	2799	3457	4046	4396	4335	3092	2179	1446	1012	639	354	49814
9	10	5	138	107	116	187	537	1500	2827	3826	2806	2135	2230	2386	2735	2781	3256	4011	4225	4018	2867	1937	1234	868	505	399	47631
9	17	5	156	125	122	177	523	1572	2817	3817	2820	2200	2145	2391	2639	2601	3296	4038	4571	4306	3133	2103	1533	991	617	296	48989
9	24	5	155	114	115	167	546	1594	2819	3898	2938	2259	2192	2427	2566	2726	3339	3955	4400	4290	3201	2148	1527	1047	584	353	49360
9	4	6	201	128	111	170	476	1260	2310	2982	2644	2397	2629	3045	3311	3527	3931	4172	4047	3555	2814	2110	1519	1134	727	455	49655
9	11	6	215	165	148	182	476	1231	2382	3324	2822	2203	2363	2727	3026	3020	3662	4227	4209	4091	3134	2251	1615	1335	739	485	50032
9	18	6	182	117	121	160	496	1479	2633	3617	2723	2422	2370	2890	2819	2900	3653	4091	4312	4059	3109	2234	1612	1212	747	417	50375
9	25	6	123	132	119	178	512	1355	2448	3517	2786	2309	2454	2715	2897	3078	3675	4057	4346	3918	3059	2146	1633	1158	785	530	49930
9	5	7	238	147	141	138	150	363	726	1153	1658	2288	2711	3093	3057	2966	2951	2798	2658	2305	2049	1780	1278	1047	705	380	36780
9	12	7	229	153	126	142	205	483	833	1351	1819	2420	2921	3235	3394	3119	3154	3100	3013	2796	2298	1841	1291	1026	677	483	40109
9	19	7	218	158	133	135	217	430	914	1268	2039	2462	2967	3303	3205	3392	3114	3189	2954	2767	2304	1819	1323	1095	689	474	40569
9	26	7	277	175	142	126	196	444	824	1329	2036	2505	2887	3379	3428	3345	3374	3215	3041	2908	2318	1668	1377	1090	705	491	41280

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
02	229022	2015	September	30	31568	47379	39684	44245	1327350	2.57%	
02	229022	2014	September	30	30956	46123	38902	43138	1294145		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	1906	3075	2607
WEEKDAY	3617	2756	4241
SATURDAY	2419	3327	3167

AM - 6 AM TO 10 AM  
 MIDDAY - 10 AM TO 2 PM  
 PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC  
 IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

2/22/2016

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF OCTOBER 2015

02 229022 HUDSON- CIRCUMFERENCE RD EAST OF NASHUA TL (SAGAMORE BRIDGE) (EB-WB) (01229101-01229102)

M	O	N	D	A	T	E	D	A	Y	12 AM 1 AM 2 AM 3 AM 4 AM 5 AM 6 AM 7 AM 8 AM 9 AM 10 AM 11 AM 12 PM 1 PM 2 PM 3 PM 4 PM 5 PM 6 PM 7 PM 8 PM 9 PM 10 PM 11 PM Total																							
										12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
10	4	1	269	164	118	86	110	245	460	859	1294	1945	2415	2908	3047	3121	3109	2856	2838	2279	1789	1294	870	506	373	198	33153						
10	11	1	257	166	129	68	103	241	453	855	1267	1885	2493	2815	3039	2841	2860	2773	2226	1820	1603	1482	1018	604	482	270	31750						
10	18	1	317	209	136	81	104	223	421	772	1271	2063	2877	3392	3687	3391	3157	2876	2556	2240	1660	1266	696	487	386	215	34483						
10	25	1	314	235	126	86	127	241	430	773	1206	1868	2494	2998	3217	2611	2396	2784	2598	2528	1920	1285	839	579	371	223	32249						
10	5	2	111	60	95	163	499	1545	2685	3725	2811	2072	2075	2325	2482	2603	3189	4002	4296	4105	2862	1770	1145	773	458	262	46113						
10	12	2	140	85	109	108	344	1038	1920	2556	2259	2136	2505	2845	3052	3011	3282	3747	3900	3583	2521	1620	1120	778	428	259	43346						
10	19	2	130	90	108	145	489	1482	2652	3615	2787	2045	2037	2385	2629	2564	3093	3849	4291	4013	2758	1697	1191	760	447	252	45509						
10	26	2	88	73	105	143	506	1517	2643	3643	2793	2148	2106	2420	2564	2538	3151	3975	4355	4162	2810	1757	1161	812	450	284	46204						
10	6	3	139	105	119	144	546	1581	2803	3810	2793	2218	2121	2363	2530	2729	3296	3953	4198	4307	2983	1945	1365	896	515	327	47786						
10	13	3	121	105	110	168	511	1584	2827	3779	2843	2122	2125	2343	2464	2570	3272	3827	4302	4164	2675	1802	1274	825	535	269	46617						
10	20	3	110	108	120	154	521	1651	2687	3867	2758	2117	2073	2349	2527	2564	3226	3923	4367	4222	2860	1805	1322	879	538	262	47010						
10	27	3	144	113	111	154	534	1618	2717	3763	2816	2224	2130	2431	2612	2629	3324	3909	4476	4165	2822	1766	1309	913	505	312	47497						
10	7	4	132	103	124	159	521	1580	2780	3752	2946	2164	2141	2504	2622	2710	3196	3911	4498	4350	3045	1928	1387	956	519	303	48331						
10	14	4	119	108	129	180	526	1610	2827	3771	2974	2070	2155	2458	2667	2674	3217	3909	4341	4301	2894	1810	1311	938	526	323	47838						
10	21	4	140	118	129	152	496	1622	2804	3737	2915	2074	2164	2365	2613	2697	3183	3919	4334	4202	2779	1844	1394	1028	548	292	47549						
10	28	4	127	115	128	163	533	1577	2774	3793	2937	2167	2163	2401	2653	2596	3274	3947	4377	3948	2713	1811	1296	904	527	270	47194						
10	1	5	132	145	118	153	538	1609	2844	3849	2816	2265	2233	2423	2705	2820	3440	4120	4521	4593	3098	2018	1398	989	588	306	49721						
10	8	5	124	129	129	146	524	1609	2769	3809	2857	2182	2269	2475	2606	2830	3382	4107	4420	4267	3023	2065	1421	994	605	324	49066						
10	15	5	132	107	128	160	552	1593	2708	3790	2911	2207	2260	2400	2672	2817	3444	4077	4591	4466	3107	1974	1499	994	613	314	49516						
10	22	5	152	132	115	163	514	1630	2725	3806	2824	2219	2218	2400	2490	2783	3305	4023	4453	4280	2852	2026	1371	1028	626	317	48452						
10	29	5	119	119	134	159	523	1668	2715	3769	2812	2239	2282	2460	2743	2875	3476	4170	4510	4544	3185	2130	1421	948	519	402	49922						
10	2	6	173	134	132	172	497	1517	2576	3519	2860	2313	2492	2725	2939	3048	3758	4161	4519	4089	2913	2086	1550	1177	720	497	50567						
10	9	6	172	133	122	168	498	1292	2384	3282	2735	2258	2486	2754	2974	3134	3616	3843	3987	3729	2924	1938	1522	1172	736	429	48288						
10	16	6	165	107	127	161	495	1560	2567	3539	2841	2378	2383	2715	2958	3056	3905	4261	4587	4103	3209	2084	1588	1300	775	510	51374						
10	23	6	172	128	143	158	492	1364	2438	3368	2707	2341	2410	2836	3037	3130	3724	4114	4282	4063	3045	2096	1604	1176	871	508	50207						
10	30	6	212	170	169	154	512	1437	2513	3666	2823	2411	2519	2908	3191	3224	3944	4368	4643	4330	3162	2267	1631	1341	796	525	52916						
10	3	7	238	132	133	123	217	440	694	1225	1857	2438	2943	3298	3525	3617	3450	3239	3086	2881	2332	1822	1311	1060	731	473	41265						
10	10	7	245	152	157	126	201	434	751	1348	1929	2581	3001	3393	3474	3266	3337	3201	3040	2790	2383	1607	1205	1066	736	492	40915						
10	17	7	226	175	152	126	223	467	757	1315	1906	2464	3001	3423	3374	3627	3407	3378	3068	2893	2158	1629	1308	1047	729	513	41366						
10	24	7	241	170	135	133	214	460	780	1305	1915	2465	2958	3453	3455	3510	3391	3402	3199	2957	2268	1775	1310	1108	743	563	41910						
10	31	7	281	157	141	119	222	452	747	1204	1837	2415	3101	3473	3568	3537	3433	3420	3095	2474	1474	1425	1338	1018	680	490	40101						

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
02	229022	2015	October	31	32909	48228	41111	45104	1398215	2.33%	
02	229022	2014	October	31	31978	46898	39951	44076	1366359		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	1940	3266	2978
WEEKDAY	3646	2809	4385
SATURDAY	2473	3559	3406

AM - 6 AM TO 10 AM  
 MIDDAY - 10 AM TO 2 PM  
 PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC  
 IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

2/22/2016

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF NOVEMBER 2015

02 229022 HUDSON- CIRCUMFERENCE RD EAST OF NASHUA TL (SAGAMORE BRIDGE) (EB-WB) (01229101-01229102)

M	O	N	D	A	T	E	D	A	Y																									Total
										12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	
11	1	1					319	180	223	71	120	249	465	859	1416	2007	2713	3081	3309	3035	2929	2836	2509	2063	1506	1119	697	494	305	176	32681			
11	8	1					272	168	132	82	103	267	501	879	1386	2286	2814	2952	3248	2691	2486	2311	2580	2080	1577	1250	771	519	380	174	31909			
11	15	1					314	235	114	92	93	198	397	752	1092	1794	2523	2883	3099	3012	3033	3010	2359	1775	1529	972	1118	629	392	232	31647			
11	22	1					297	218	124	89	86	244	384	706	1083	1701	2515	2870	3161	3215	3145	2930	2730	2126	1759	1304	848	607	440	217	32799			
11	29	1					295	198	130	89	95	192	372	586	1011	1661	2431	2933	3168	3145	3082	2885	2685	2130	1729	1298	773	515	377	207	31987			
11	2	2					92	76	96	138	562	1686	2838	3816	2794	2102	2158	2262	2473	2589	3083	3943	4240	3969	2450	1570	1077	766	473	274	45527			
11	9	2					104	72	111	144	537	1554	2870	3682	2801	2161	2225	2288	2546	2499	3033	3681	4172	4358	2833	1815	1267	860	595	342	46550			
11	16	2					99	78	91	139	361	1392	2402	3641	3054	2248	2041	2317	2541	2544	3028	3768	4166	4345	2843	1737	1223	937	555	340	45890			
11	23	2					159	105	111	131	379	1399	2416	3613	3102	2330	2239	2520	2730	2641	3195	3897	4159	4309	2968	1928	1274	867	563	295	47330			
11	30	2					183	80	89	148	348	1323	2365	3595	3032	2328	2166	2404	2655	2634	3304	3901	4195	4328	2974	1880	1335	924	581	315	47087			
11	3	3					117	120	125	153	585	1662	2863	3915	2678	2170	2222	2521	2643	2653	3321	3915	4272	3792	2696	1635	1212	877	545	288	46980			
11	10	3					175	120	134	147	350	1460	2537	3904	3061	2278	2099	2271	2597	2406	3037	3868	4085	4291	2839	2058	1461	1000	656	380	47214			
11	17	3					175	84	138	141	379	1445	2465	3699	3074	2245	2094	2277	2576	2550	3098	3776	4086	4443	3007	1953	1441	947	612	351	47056			
11	24	3					228	138	146	203	358	1329	2368	3624	3076	2409	2427	2443	2892	2868	3362	3941	4351	4559	3068	2166	1546	1208	718	378	49806			
11	4	4					129	127	121	148	527	1645	2918	3793	2793	2150	2106	2418	2540	2633	3244	4004	4435	4092	2643	1723	1267	915	449	246	47066			
11	11	4					188	120	151	142	321	1165	2043	2931	2583	2270	2402	2794	3082	3113	3153	3732	3979	4026	2893	1817	1400	978	640	356	46279			
11	18	4					152	104	144	150	348	1427	2505	3748	3048	2226	2172	2408	2639	2653	3163	3830	4209	4380	2960	1971	1452	1085	661	384	47819			
11	25	4					191	116	138	164	350	1238	2106	2954	2785	2519	2637	2949	3425	3662	3889	4222	4014	3559	2560	1990	1564	1166	747	496	49441			
11	5	5					120	118	110	173	578	1650	2865	3914	2881	2222	2191	2546	2608	2754	3372	4043	4504	4054	2703	1848	1380	945	588	366	48533			
11	12	5					151	117	131	141	375	1388	2492	3801	3067	2264	2066	2322	2642	2783	3206	3761	4059	4288	2976	1909	1335	1053	675	420	47422			
11	19	5					186	116	133	137	373	1402	2482	3749	3127	2362	2127	2463	2559	2651	3251	4011	4230	4368	3038	2038	1526	1136	673	439	48577			
11	26	5					307	193	140	80	89	137	266	462	666	968	1281	1918	2444	1836	1223	1130	1748	2096	2332	2292	2095	1583	1257	995	27538			
11	6	6					151	138	148	154	512	1390	2530	3452	2825	2505	2496	2803	2888	3167	3693	4131	4370	4039	2796	1928	1529	1149	760	462	50016			
11	13	6					196	118	129	151	382	1304	2337	3576	3107	2467	2381	2784	3058	3060	3729	4211	4414	4305	3035	2057	1522	1268	844	547	50982			
11	20	6					180	136	155	163	380	1186	2182	3331	3011	2438	2526	2853	2998	3024	3591	4160	4386	4314	3094	2189	1631	1390	854	567	50739			
11	27	6					685	531	347	294	381	651	1040	1647	2064	2384	2825	3191	3388	3290	3343	3384	3381	3029	2406	1936	1544	1258	960	559	44518			
11	7	7					217	172	149	118	237	498	895	1404	2123	2630	3086	3485	3437	3252	3266	3311	3231	2843	2128	1593	1260	1138	742	529	41744			
11	14	7					255	175	150	149	188	454	765	1340	1897	2576	3153	3436	3610	3533	3466	3436	3251	2991	2337	1754	1290	1121	822	545	42694			
11	21	7					271	191	164	144	212	447	771	1229	1870	2502	3096	3358	3539	3454	3497	3582	3294	3042	2300	1772	1329	1232	854	560	42710			
11	28	7					295	169	132	100	161	259	579	954	1423	2114	2643	2983	3221	3286	3091	3113	3000	2683	2090	1620	1324	1097	878	580	37795			

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
02	229022	2015	November	30	32205	46780	41236	43611	1308336	4.36%	
02	229022	2014	November	30	30690	44976	40151	41790	1253712		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	1890	3208	2954
WEEKDAY	3433	2815	4203
SATURDAY	2456	3480	3368

AM - 6 AM TO 10 AM  
 MIDDAY - 10 AM TO 2 PM  
 PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC  
 IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

2/22/2016

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF DECEMBER 2015

02 229022 HUDSON- CIRCUMFERENCE RD EAST OF NASHUA TL (SAGAMORE BRIDGE) (EB-WB) (01229101-01229102)

M O N	D A T E	D A Y	12 AM 1 AM 2 AM 3 AM 4 AM 5 AM 6 AM 7 AM 8 AM 9 AM 10 AM 11 AM 12 PM 1 PM 2 PM 3 PM 4 PM 5 PM 6 PM 7 PM 8 PM 9 PM 10 PM 11 PM																								Total
			12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	
12	6	1	365	172	153	91	84	208	368	709	1141	1893	2651	3070	3375	3241	3135	3000	2777	2034	1597	1340	1005	708	447	264	33828
12	13	1	394	257	150	134	85	196	416	660	1131	1884	2546	3092	3300	3166	3116	3003	2982	2431	1904	1403	953	638	468	341	34650
12	20	1	490	212	166	94	98	211	409	807	1366	2012	2765	3227	3545	3025	2786	2598	2858	2463	2112	1644	1181	830	602	383	35884
12	27	1	300	192	114	79	105	174	342	522	829	1497	2211	2671	3103	2538	2391	2240	2430	2249	1786	1239	940	683	532	261	29428
12	7	2	113	87	83	133	353	1377	2381	3683	3088	2242	2304	2545	2783	2726	3250	3933	4282	4342	3117	1866	1408	982	593	376	48047
12	14	2	146	74	96	140	359	1313	2383	3611	3129	2456	2334	2563	2832	2866	3216	3915	4005	4265	2968	2057	1452	1053	653	412	48298
12	21	2	164	92	107	125	382	1343	2254	3455	3095	2680	2757	2983	3274	3266	3717	4334	4505	4615	3359	2318	1828	1266	867	516	53302
12	28	2	179	89	103	121	325	1079	1775	2432	2456	2351	2617	2992	3207	3280	3588	4121	4196	4047	2795	1927	1418	1113	686	394	47291
12	1	3	158	98	146	140	378	1401	2408	3781	3045	2278	2217	2352	2627	2572	3093	3794	4166	4202	3023	1840	1322	1008	609	343	47001
12	8	3	139	78	122	148	384	1337	2455	3777	3110	2311	2234	2454	2612	2619	3188	3962	4159	4406	3093	2054	1465	1042	638	358	48145
12	15	3	161	98	146	130	398	1417	2461	3851	3129	2438	2357	2510	2748	2826	3307	4020	4360	4602	3293	2064	1555	1059	679	420	50029
12	22	3	229	163	140	151	378	1338	2335	3491	3210	2604	2692	2951	3157	3149	3617	4308	4399	4571	3403	2509	1954	1429	963	578	53719
12	29	3	204	149	129	215	452	953	1380	1808	1614	1267	1115	1216	1402	1582	1908	2306	2577	2465	1677	1180	950	792	528	340	28209
12	2	4	169	130	133	143	393	1403	2364	3581	3006	2300	2152	2327	2554	2497	2966	3765	4034	4220	3049	2078	1437	1143	666	361	46871
12	9	4	165	110	136	149	377	1382	2434	3700	3199	2328	2287	2508	2689	2811	3195	3986	4236	4438	3160	2017	1648	1185	670	363	49173
12	16	4	182	129	149	146	361	1401	2467	3705	3176	2396	2365	2608	2772	2901	3410	4232	4488	4649	3341	2264	1759	1235	754	423	51313
12	23	4	276	153	125	155	373	1279	2228	3107	3103	2817	2995	3294	3547	3576	4044	4717	4721	4249	3328	2489	2071	1688	1103	717	56155
12	30	4	179	105	118	152	318	1092	1707	2257	2322	2154	2310	2699	2986	3062	3393	3847	3777	3762	2714	1867	1441	1170	710	366	44508
12	3	5	187	109	128	155	356	1357	2491	3716	3075	2377	2268	2479	2718	2792	3242	4026	4343	4487	3259	2045	1656	1138	691	378	49473
12	10	5	152	117	128	154	402	1409	2392	3778	3081	2397	2323	2557	2809	2804	3392	4057	4329	4503	3118	2326	1667	1161	783	436	50275
12	17	5	197	118	127	155	356	1429	2460	3719	3219	2437	2466	2710	2887	2948	3441	4106	4236	4371	3279	2286	1752	1308	918	514	51439
12	24	5	1322	179	146	154	292	735	1329	1929	2414	2819	3294	3657	4055	3703	3758	3491	3073	2939	2061	1364	1353	1397	1260	747	47471
12	31	5	220	127	123	140	260	863	1508	1995	2160	2228	2677	3152	3614	3773	3945	4251	3515	2821	2110	1491	919	728	534	341	43495
12	4	6	203	135	118	161	344	1150	2213	3286	2888	2496	2478	2730	3033	3254	3757	4201	4356	4192	3198	2237	1709	1364	972	582	51057
12	11	6	175	154	109	149	366	1285	2296	3547	3043	2562	2582	2899	3188	3134	3824	4341	4466	4411	3249	2292	1816	1471	1043	743	53145
12	18	6	225	173	172	137	342	1158	2156	3277	3042	2703	2771	3258	3430	3453	4057	4474	4459	4198	3287	2483	1879	1574	1240	746	54694
12	25	6	325	188	81	52	40	72	160	263	491	764	1042	1547	1921	1630	1447	1363	1442	1367	1295	1169	1111	886	605	342	19603
12	5	7	280	187	148	151	176	389	700	1252	1796	2907	3115	3409	3630	3782	3574	3442	3380	3052	2446	1945	1532	1235	971	637	44136
12	12	7	307	180	122	125	170	377	753	1265	1924	2592	3252	3609	3658	3610	3629	3558	3388	3012	2496	1900	1448	1320	1112	706	44513
12	19	7	354	223	145	129	183	420	770	1333	2008	2565	3272	3649	3773	3817	3776	3608	3380	3195	2616	2045	1707	1494	1158	797	46417
12	26	7	170	85	72	84	114	249	471	843	1312	2015	2593	3107	3322	3292	3313	3182	3027	2687	2058	1691	1322	1103	738	455	37305

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
02	229022	2015	December	31	33448	47509	43093	45125	1398874	3.08%	
02	229022	2014	December	31	32209	46210	41364	43778	1357130		

PEAK HOUR VOLUMES:

AVERAGE AM:

AVERAGE MIDDAY:

AVERAGE PM:

SUNDAY	1822	3331	2885	AM - 6 AM TO 10 AM
WEEKDAY	3194	2961	4164	MIDDAY - 10 AM TO 2 PM
SATURDAY	2520	3645	3573	PM - 2 PM TO 8 PM

## **Appendix C**

# **Tenant Provided Trip Generation Information, NHDOT Intra- Department Communication letters, & ITE 10<sup>th</sup> Edition Supplement Information**

## Hudson Logistics Center - Lot A Trip Generation Spreadsheet

### Headcount

Warehouse Employee Count	
Headcount - Day Shift	370
Headcount - Night Shift	313

### Shift Structure

	Start	End		
Day Shift Inbound	7:00:00 AM	5:30:00 PM	Inbound Are Employees Working Receiving Side of Operation	Adjustment below accounts for mass transit and carpool users.
Day Shift Outbound	7:30:00 AM	6:00:00 PM	Outbound Are Employees Working Shipping Side of Operation	
Night Shift Inbound	6:00:00 PM	4:30:00 AM		
Night Shift Outbound	6:30:00 PM	5:00:00 AM		
				Net Cars Factor 100%

### Traffic Schedule

#### Unadjusted Cars

	In	Out	Total
00:00	2	4	6
01:00	1	6	7
02:00	1	6	7
03:00	4	7	11
04:00	21	42	63
05:00	23	84	107
06:00	19	20	39
06:15	30	10	40
<b>06:30</b>	<b>32</b>	<b>6</b>	<b>38</b>
<b>06:45</b>	<b>43</b>	<b>6</b>	<b>49</b>
<b>07:00</b>	<b>47</b>	<b>20</b>	<b>67</b>
<b>07:15</b>	<b>55</b>	<b>15</b>	<b>70</b>
07:30	11	6	17
07:45	5	2	7
08:00	15	9	24
09:00	29	18	47
10:00	13	13	26
11:00	9	14	23
12:00	15	22	37
13:00	9	16	25
14:00	4	11	15
15:00	7	23	30
16:00	12	21	33
17:00	8	6	14
17:15	16	8	24
<b>17:30</b>	<b>29</b>	<b>44</b>	<b>73</b>
<b>17:45</b>	<b>45</b>	<b>19</b>	<b>64</b>
<b>18:00</b>	<b>54</b>	<b>98</b>	<b>152</b>
<b>18:15</b>	<b>56</b>	<b>33</b>	<b>89</b>
18:30	12	14	26
18:45	3	6	9
19:00	13	15	28
20:00	12	16	28
21:00	12	16	28
22:00	8	14	22
23:00	12	12	24
	687	682	1,369

#### Trucks

	In	Out	Total
00:00	8	8	16
01:00	7	7	14
02:00	7	7	14
03:00	9	9	18
04:00	8	8	16
05:00	10	10	20
06:00	2	2	4
06:15	2	2	4
<b>06:30</b>	<b>2</b>	<b>2</b>	<b>4</b>
<b>06:45</b>	<b>2</b>	<b>2</b>	<b>4</b>
<b>07:00</b>	<b>2</b>	<b>2</b>	<b>4</b>
<b>07:15</b>	<b>1</b>	<b>1</b>	<b>2</b>
07:30	1	1	2
07:45	1	1	2
08:00	5	5	10
09:00	6	6	12
10:00	5	5	10
11:00	5	5	10
12:00	6	6	12
13:00	5	5	10
14:00	4	4	8
15:00	4	4	8
16:00	3	3	6
17:00	1	1	2
17:15	1	1	2
<b>17:30</b>	<b>1</b>	<b>1</b>	<b>2</b>
<b>17:45</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>18:00</b>	<b>1</b>	<b>1</b>	<b>2</b>
<b>18:15</b>	<b>1</b>	<b>1</b>	<b>2</b>
18:30	1	1	2
18:45	0	0	0
19:00	4	4	8
20:00	2	2	4
21:00	3	3	6
22:00	4	4	8
23:00	7	7	14
	131	131	262

#### Unadjusted Total Vehicles

	In	Out	Total
00:00	10	12	22
01:00	8	13	21
02:00	8	13	21
03:00	13	16	29
04:00	29	50	79
05:00	33	94	127
06:00	21	22	43
06:15	32	12	44
<b>06:30</b>	<b>34</b>	<b>8</b>	<b>42</b>
<b>06:45</b>	<b>45</b>	<b>8</b>	<b>53</b>
<b>07:00</b>	<b>49</b>	<b>22</b>	<b>71</b>
<b>07:15</b>	<b>56</b>	<b>16</b>	<b>72</b>
07:30	12	7	19
07:45	6	3	9
08:00	20	14	34
09:00	35	24	59
10:00	18	18	36
11:00	14	19	33
12:00	21	28	49
13:00	14	21	35
14:00	8	15	23
15:00	11	27	38
16:00	15	24	39
17:00	9	7	16
17:15	17	9	26
<b>17:30</b>	<b>30</b>	<b>45</b>	<b>75</b>
<b>17:45</b>	<b>45</b>	<b>19</b>	<b>64</b>
<b>18:00</b>	<b>55</b>	<b>99</b>	<b>154</b>
<b>18:15</b>	<b>57</b>	<b>34</b>	<b>91</b>
18:30	13	15	28
18:45	3	6	9
19:00	17	19	36
20:00	14	18	32
21:00	15	19	34
22:00	12	18	30
23:00	19	19	38
	818	813	1,631

Morning Peak Hour Of Generator 6:30 AM -7:30 AM		
<u>Enter</u>	<u>Exit</u>	<u>Total</u>
184	54	238

Evening Peak Hour Of Generator 5:30 PM -6:30 PM		
<u>Enter</u>	<u>Exit</u>	<u>Total</u>
187	197	384



## Hudson Logistics Center - Lot B Trip Generation Spreadsheet

### Headcount

Warehouse Employee Count		Box Truck Delivery Drivers	
Headcount - Day Shift	172	Headcount - Day Shift	40
Headcount Night Shift	172	Headcount - Night Shift	None

### Shift Structure

Warehouse Employees			Box Truck Drivers		
	Start	End		Start	End
Day Shift Inbound	7:00:00 AM	5:30:00 PM	Inbound Are Employees Working Receiving Side of Operation	Day Shift	5:30:00 AM
Day Shift Outbound	7:30:00 AM	6:00:00 PM	Outbound Are Employees Working Shipping Side of Operation	Night Shift	None
Night Shift Inbound	6:00:00 PM	4:30:00 AM			
Night Shift Outbound	6:30:00 PM	5:00:00 AM			

### Traffic Schedule

Unadjusted Car Trips				Tractor-Trailers				Box Trucks				Unadjusted Total Vehicles							
		In	Out	Total			In	Out	Total			In	Out	Total					
00:00	1	2	3	00:00	1	1	2	00:00	0	0	0	00:00	2	3	5				
01:00	1	3	4	01:00	1	1	2	01:00	0	0	0	01:00	2	4	6				
02:00	1	3	4	02:00	1	1	2	02:00	0	0	0	02:00	2	4	6				
03:00	2	4	6	03:00	1	1	2	03:00	0	0	0	03:00	3	5	8				
04:00	10	21	31	04:00	1	1	2	04:00	0	0	0	04:00	11	22	33				
05:00	52	42	94	05:00	1	1	2	05:00	0	40	40	05:00	53	43	96				
06:00	10	10	20	06:00	1	1	2	06:00	0	0	0	06:00	11	11	22				
06:15	15	5	20	06:15	0	0	0	06:15	0	0	0	06:15	15	5	20				
06:30	16	3	19	06:30	0	0	0	06:30	0	0	0	06:30	16	3	19	Morning Peak Hour Of Generator			
06:45	22	3	25	06:45	0	0	0	06:45	0	0	0	06:45	22	3	25	6:30 AM -7:30 AM			
07:00	23	10	33	07:00	1	1	2	07:00	0	0	0	07:00	24	11	35	<u>Enter</u>	<u>Exit</u>	<u>Total</u>	
07:15	28	7	35	07:15	0	0	0	07:15	0	0	0	07:15	28	7	35	90	24	114	
07:30	5	3	8	07:30	0	0	0	07:30	0	0	0	07:30	5	3	8				
07:45	3	1	4	07:45	0	0	0	07:45	0	0	0	07:45	3	1	4				
08:00	8	4	12	08:00	1	1	2	08:00	0	0	0	08:00	9	5	14				
09:00	15	9	24	09:00	1	1	2	09:00	0	0	0	09:00	16	10	26				
10:00	7	7	14	10:00	1	1	2	10:00	0	0	0	10:00	8	8	16				
11:00	4	7	11	11:00	1	1	2	11:00	0	0	0	11:00	5	8	13				
12:00	8	11	19	12:00	1	1	2	12:00	0	0	0	12:00	9	12	21				
13:00	4	8	12	13:00	1	1	2	13:00	0	0	0	13:00	5	9	14				
14:00	2	45	47	14:00	1	1	2	14:00	40	0	40	14:00	3	46	49				
15:00	3	12	15	15:00	1	1	2	15:00	0	0	0	15:00	4	13	17				
16:00	6	11	17	16:00	1	1	2	16:00	0	0	0	16:00	7	12	19				
17:00	4	3	7	17:00	1	1	2	17:00	0	0	0	17:00	5	4	9				
17:15	8	4	12	17:15	1	1	2	17:15	0	0	0	17:15	9	5	14				
17:30	15	22	37	17:30	0	0	0	17:30	0	0	0	17:30	15	22	37	Evening Peak Hour Of Generator			
17:45	23	10	33	17:45	0	0	0	17:45	0	0	0	17:45	23	10	33	5:30 PM -6:30 PM			
18:00	27	49	76	18:00	1	1	2	18:00	0	0	0	18:00	28	50	78	<u>Enter</u>	<u>Exit</u>	<u>Total</u>	
18:15	28	17	45	18:15	0	0	0	18:15	0	0	0	18:15	28	17	45	94	99	193	
18:30	6	7	13	18:30	0	0	0	18:30	0	0	0	18:30	6	7	13				
18:45	2	3	5	18:45	0	0	0	18:45	0	0	0	18:45	2	3	5				
19:00	7	8	15	19:00	1	1	2	19:00	0	0	0	19:00	8	9	17				
20:00	6	8	14	20:00	1	1	2	20:00	0	0	0	20:00	7	9	16				
21:00	6	8	14	21:00	1	1	2	21:00	0	0	0	21:00	7	9	16				
22:00	4	7	11	22:00	1	1	2	22:00	0	0	0	22:00	5	8	13				
23:00	6	6	12	23:00	1	1	2	23:00	0	0	0	23:00	7	7	14				
		388	383	771			25	25	50			40	40	80			413	408	821

**STATE OF NEW HAMPSHIRE**  
**INTRA-DEPARTMENT COMMUNICATION**

NBS

**DATE:** June 18, 2020

**FROM:** Nick Sanders, P.E.  
 Traffic Research Engineer

**AT (OFFICE):**  
 Department of Transportation  
 Bureau of Traffic

**SUBJECT:** Preliminary Traffic Assessment -  
 Trip Generation

**TO:** Brian Desfosses, P.E  
 NHDOT District 5

Name of Facility	<u>Hudson Logistic Center</u>
Location	<u>NH 3A (Lowell Rd) Hudson, NH</u>
Consultant	<u>LANGAN</u>
Report Date(s)	<u>June 2, 2020</u>
Received by Traffic	<u>June 2, 2020 (pdf)</u>

NHDOT Bureau of Traffic Research Section has completed its review of the above referenced trip generation memorandum and offer the following comments:

- Given that the requested tenant data from additional similar facilities is not available, we are in agreement with LANGAN's recommended approach to use the most conservative trip generation estimates for each individual Building Lot (A, B, and C), either calculated from the updated ITE rates (as done so for B and C) or using the tenant (single site) anticipated volumes (as done so for A).

Location	Land Use Code	Peak Hour Scenario	Independent Variable		AM Peak-Hour			PM Peak-Hour		
			Amount	Unit	IN	OUT	TOTAL	IN	OUT	TOTAL
Lot A	Fulfillment Center - Non-Sort	Generator	Tenant		184	54	238	187	197	384
Lot B	Fulfillment Ctr N-S LUC 155	Generator	1,001,700	GFA	110	110	220	135	135	270
Lot C	Fulfillment Ctr N-S LUC 155	Generator	522,000	GFA	58	57	115	71	70	141
<b>UNADJUSTED TOTAL</b>					<b>352</b>	<b>221</b>	<b>573</b>	<b>393</b>	<b>402</b>	<b>795</b>
<b>M-O CREDIT (5%)</b>					<b>-18</b>	<b>-11</b>	<b>-29</b>	<b>-20</b>	<b>-20</b>	<b>-40</b>
<b>TOTAL</b>					<b>334</b>	<b>210</b>	<b>544</b>	<b>373</b>	<b>382</b>	<b>755</b>

- Since the trip generation at two of the three buildings (B and C) are now being estimated with ITE rates, which already account for possible ridesharing and/or public transit, we are in agreement that reducing the multi-occupancy rate from 15 percent to 5 percent is appropriate with the understanding that the developer will be pursuing bus service at the site.

3. LANGAN should still respond to the previous comments from the NHDOT Bureau of Traffic memorandum dated May 21, 2020.
4. LANGAN should provide an updated site generated traffic volume network such that the previously discussed study area (as shown in Figure 7 from the April 29, 2020 memorandum) can be formally agreed upon.

cc: W. Cass, Assistant Commissioner & Chief Engineer  
W. Lambert, Bureau of Traffic;  
J. Butler, Bureau of Highway Design;  
N. Spaulding, Bureau of Turnpikes  
M. O'Donnell, Bureau of Traffic;  
E. Bell, Bureau of Traffic;  
W. O'Donnell, District 5; and File

**STATE OF NEW HAMPSHIRE**  
**INTRA-DEPARTMENT COMMUNICATION**

NBS

**DATE:** September 1, 2020

**FROM:** Nick Sanders, P.E.  
Traffic Research Engineer

**AT (OFFICE):**  
Department of Transportation  
Bureau of Traffic

**SUBJECT:** Hudson Logistic Center  
Response to Comments

**TO:** Brian Desfosses, P.E.  
NHDOT District 5

Name of Facility	<u>Hudson Logistic Center</u>
Location	<u>NH 3A (Lowell Rd) Hudson, NH</u>
Consultant	<u>LANGAN</u>
Report Date(s)	<u>August 19, 2020</u>
Received by Traffic	<u>August</u>

The Bureau of Traffic Research Section has completed our review of the response to comments memorandum prepared by LANGAN dated August 19, 2020. This review pertains only to the methodology and adequacy of the projected traffic volumes, and does not imply approval of the proposal. You (District) and/or Highway Design will be reviewing the mitigation, site access plans and other elements of the Driveway rules pursuant to this TIS.

Overall, the traffic volumes and methodology contained in the June 2020 TIS and response to previous comment documents (June 30, 2020 & August 19, 2020) are acceptable and may be used for design purposes. However, the following comments on LANGAN's August 19, 2020 memorandum should be noted and responded to as needed (number 3):

1. The supporting traffic data (Turning Movement Counts) has been provided for the NH 3A corridor and the traffic volume networks in the June 2020 TIS are acceptable. ***No further response is required.***
2. It is understood that the Circumferential Highway operational analysis and VISSIM model (from NH 3A to FEET) will be submitted under separate cover. ***No further response is required.***
3. Trip generation: We are in agreement with the trip generation estimates provided in the TIS (based on currently available data from the tenant and ITE) and agree that some amount of vacant/available parking spaces is appropriate for circulation and efficiencies. However, the gap, particularly for Lot A between the 683 employees and 1,008 parking spaces leaves a surplus of over 30 percent vacant spaces (assuming that all employees are on site at once which is not expected even during the afternoon/evening shift overlap period) and goes well beyond what seems appropriate for parking efficiencies and circulation alone.

It is understood that the ecommerce industry (similar to retail) experiences a higher demand during the holiday season creating the need for additional staffing and parking. Although NHDOT does not typically require an evaluation of impacts during the holiday season for a retail type uses, we would like to understand how much larger the expected holiday trip generation is and for what duration. As such, **LANGAN should provide a holiday trip generation estimate for the proposed facility and identify the extent of this peak season.** Understanding the holiday trip generation (volume and duration) in conjunction with lower adjacent street (Circ. Highway & NH 3A) traffic volumes in December will help determine what, if any, supplemental or sensitivity holiday season analyses are appropriate.

4. Trip Distribution: Although modest shifts in local traffic assigned in Hudson (raised previously) could reasonably result in 20 percent of the site generated traffic being assigned on NH 3A to/from the north, it is recognized that developing a trip distribution is a subjective exercise and that a difference of 5 percent does not represent a substantial amount of additional traffic. The proposed trip distribution is based on an acceptable methodology and yields a reasonable assignment of site generated traffic. **No further response is required.**
5. Seasonal adjustments utilized for this TIS are acceptable and considered to represent pre-pandemic peak month (summer) conditions. **No further response is required.**
6. Figures depicting the expected distribution of the truck traffic have been provided and the increased truck percentages in the analyses have been verified. **No further response is required.**

cc: W. Cass, Assistant Commissioner & Chief Engineer  
W. Lambert, Bureau of Traffic;  
J. Butler, Bureau of Highway Design;  
N. Spaulding, Bureau of Turnpikes  
M. O'Donnell, Bureau of Traffic;  
E. Bell, Bureau of Traffic; and File

# Land Use: 150 Warehousing

## Description

A warehouse is primarily devoted to the storage of materials, but it may also include office and maintenance areas. High-cube transload and short-term storage warehouse (Land Use 154), high-cube fulfillment center warehouse (Land Use 155), high-cube parcel hub warehouse (Land Use 156), and high-cube cold storage warehouse (Land Use 157) are related uses.

## Additional Data

Time-of-day distribution data for this land use are presented in Appendix A. For the 13 general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 11:30 a.m. and 12:30 p.m. and 3:00 and 4:00 p.m., respectively.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Connecticut, Minnesota, New Jersey, New York, Ohio, Oregon, Pennsylvania, and Texas.

## Source Numbers

184, 331, 406, 411, 443, 579, 583, 596, 598, 611, 619, 642, 752, 869, 875, 876, 914, 940



# Warehousing (150)

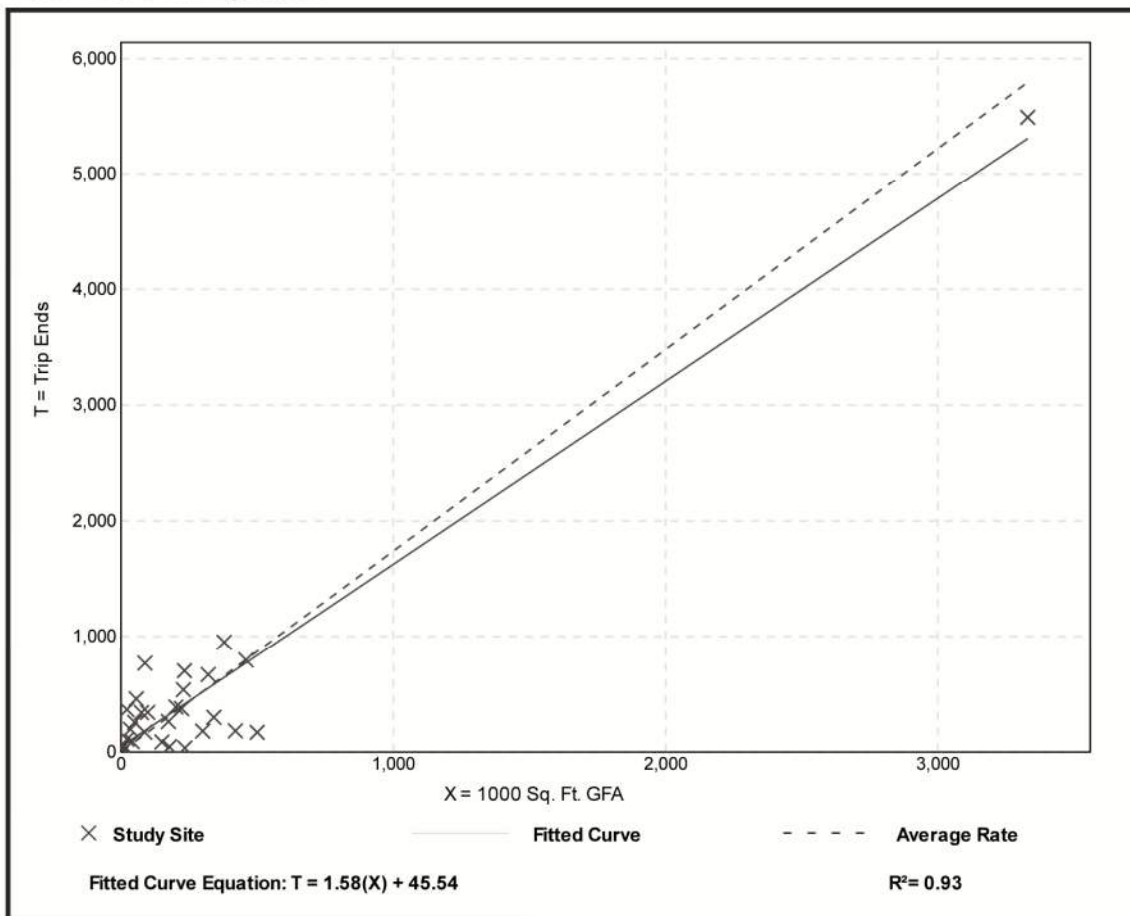
**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 29  
 1000 Sq. Ft. GFA: 285  
 Directional Distribution: 50% entering, 50% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.74	0.15 - 16.93	1.55

### Data Plot and Equation



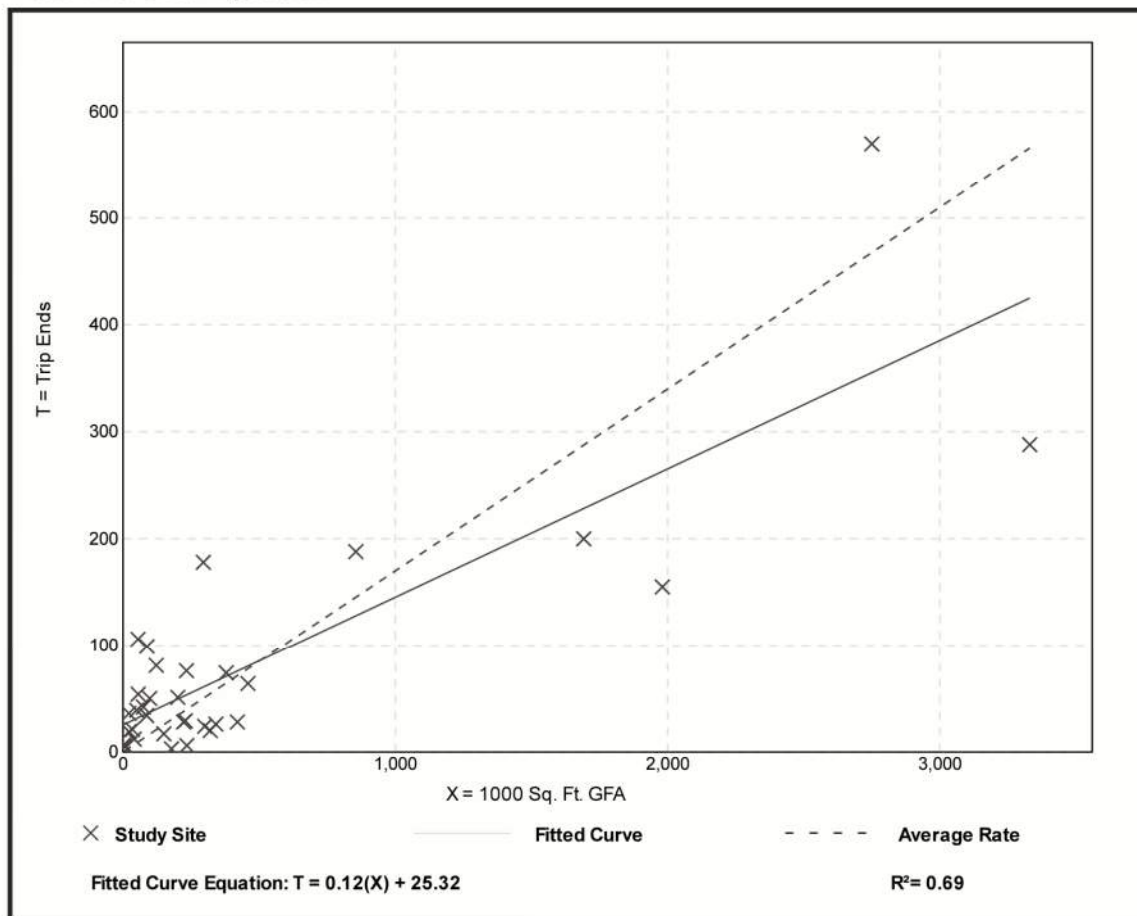
## Warehousing (150)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 34  
 1000 Sq. Ft. GFA: 451  
 Directional Distribution: 77% entering, 23% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.17	0.02 - 1.93	0.20

### Data Plot and Equation





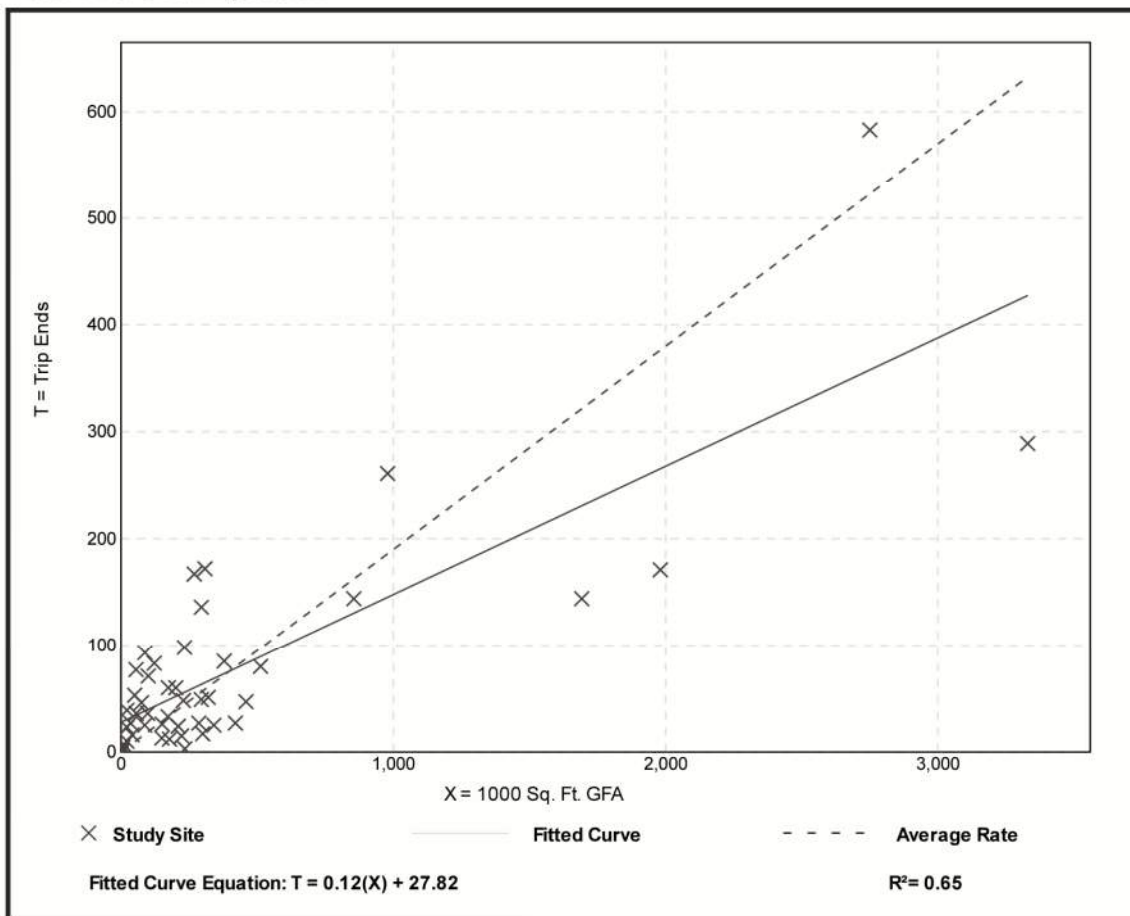
# Warehousing (150)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 47  
 1000 Sq. Ft. GFA: 400  
 Directional Distribution: 27% entering, 73% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.19	0.01 - 1.80	0.18

### Data Plot and Equation



# Warehousing (150)

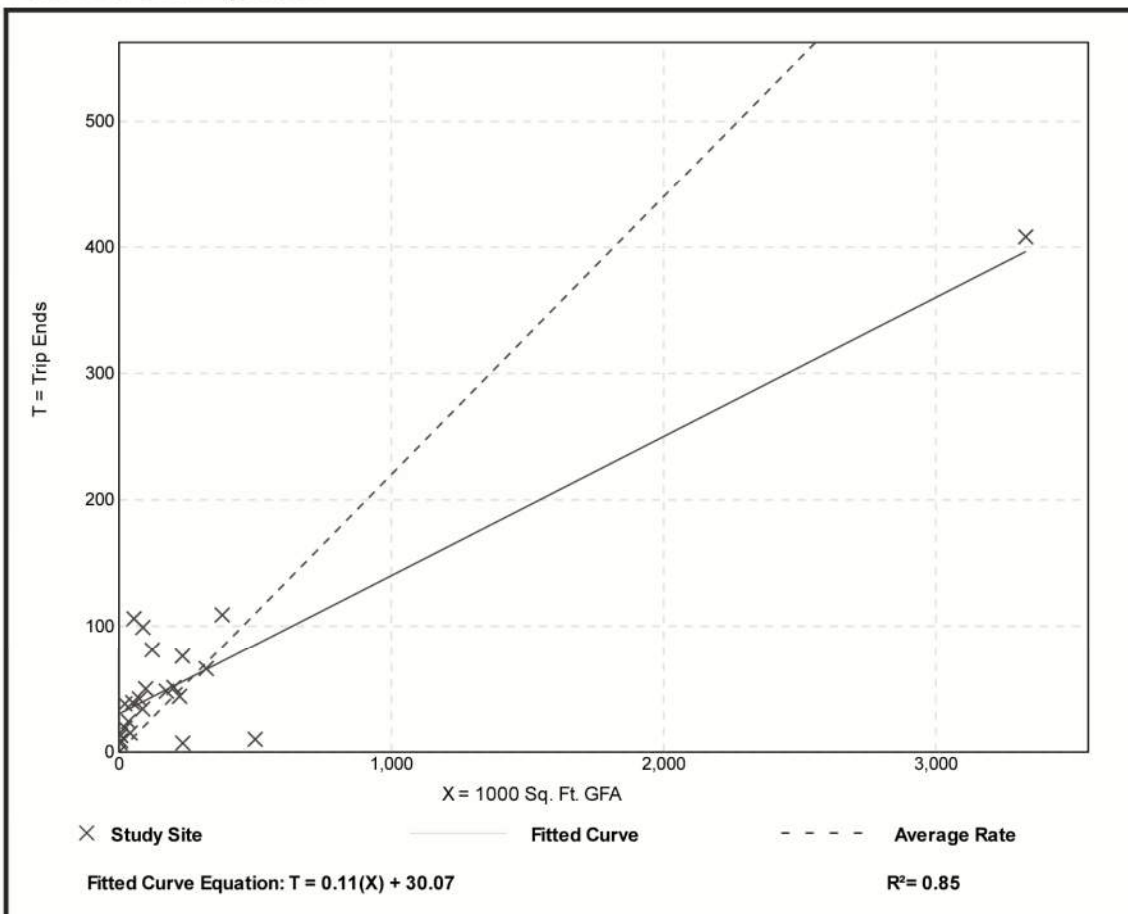
**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**AM Peak Hour of Generator**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 23  
 1000 Sq. Ft. GFA: 274  
 Directional Distribution: 65% entering, 35% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.22	0.02 - 2.08	0.28

### Data Plot and Equation



## Warehousing (150)

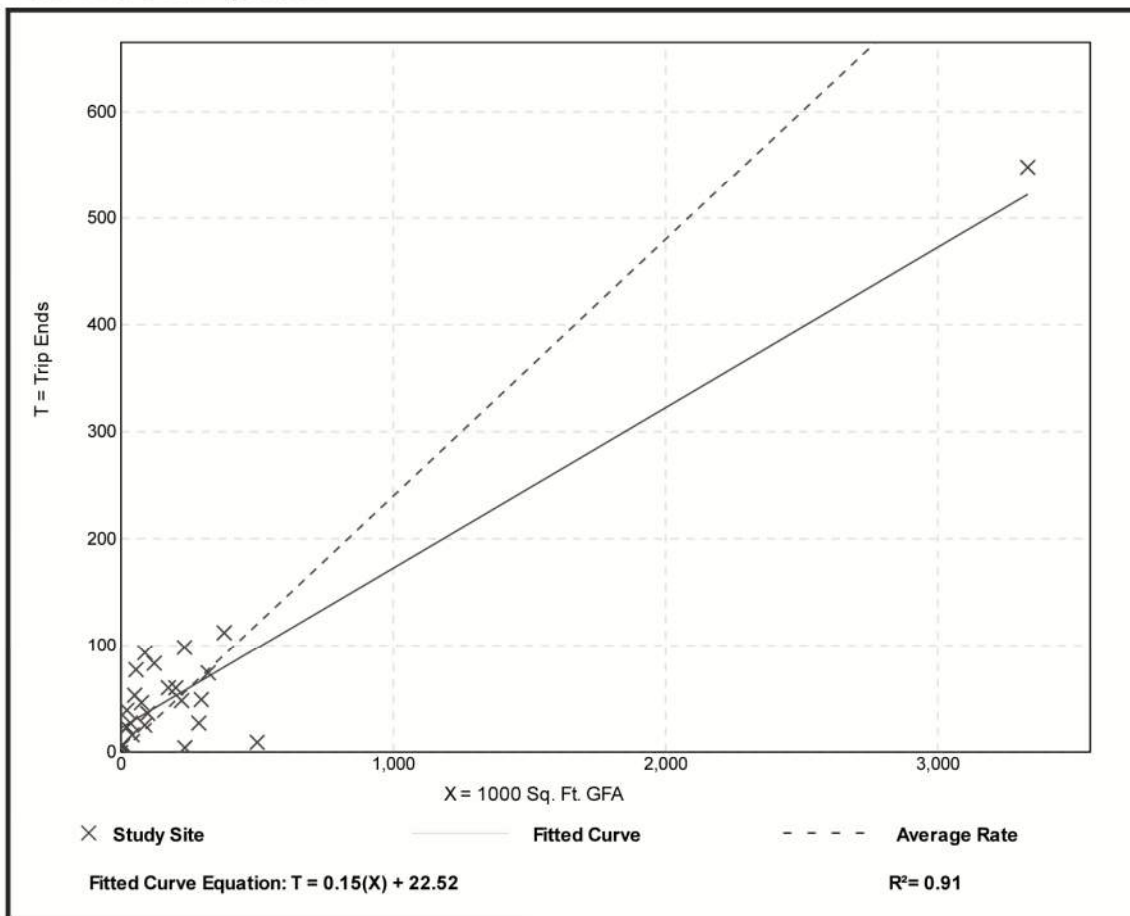
**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**PM Peak Hour of Generator**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 25  
 1000 Sq. Ft. GFA: 275  
 Directional Distribution: 24% entering, 76% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.24	0.02 - 1.80	0.24

### Data Plot and Equation



# Warehousing (150)

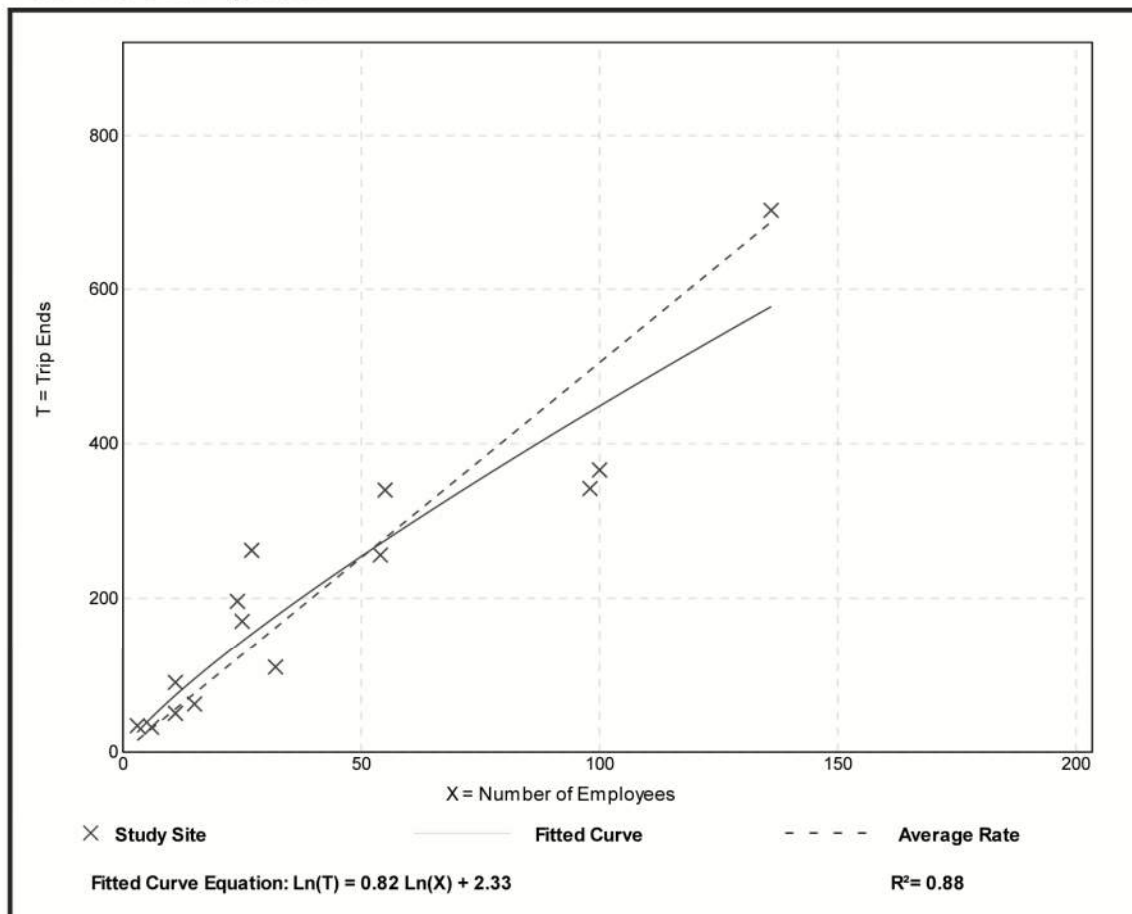
**Vehicle Trip Ends vs: Employees**  
**On a: Weekday**

**Setting/Location: General Urban/Suburban**  
Number of Studies: 14  
Avg. Num. of Employees: 43  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
5.05	3.44 - 11.33	1.77

## Data Plot and Equation



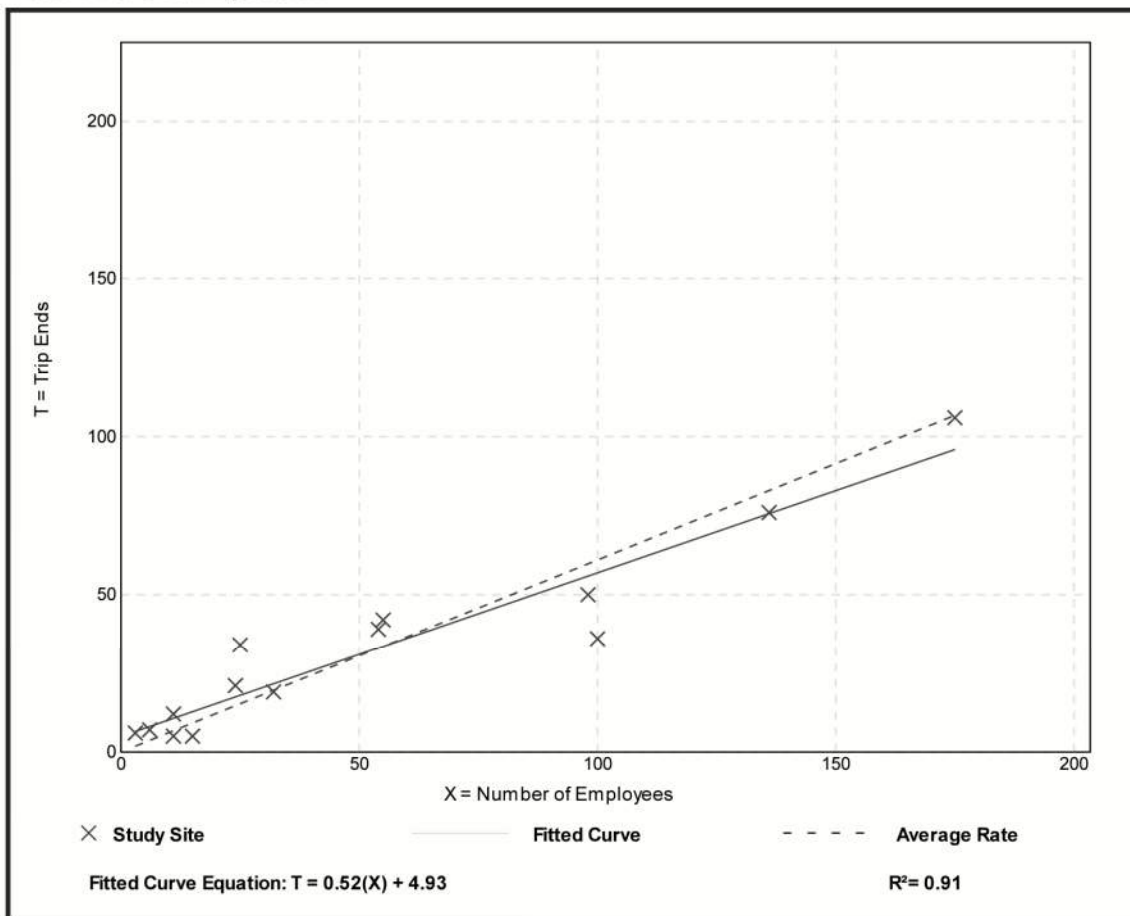
# Warehousing (150)

**Vehicle Trip Ends vs: Employees**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 14  
 Avg. Num. of Employees: 53  
 Directional Distribution: 72% entering, 28% exiting

## Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.61	0.33 - 2.00	0.23

## Data Plot and Equation



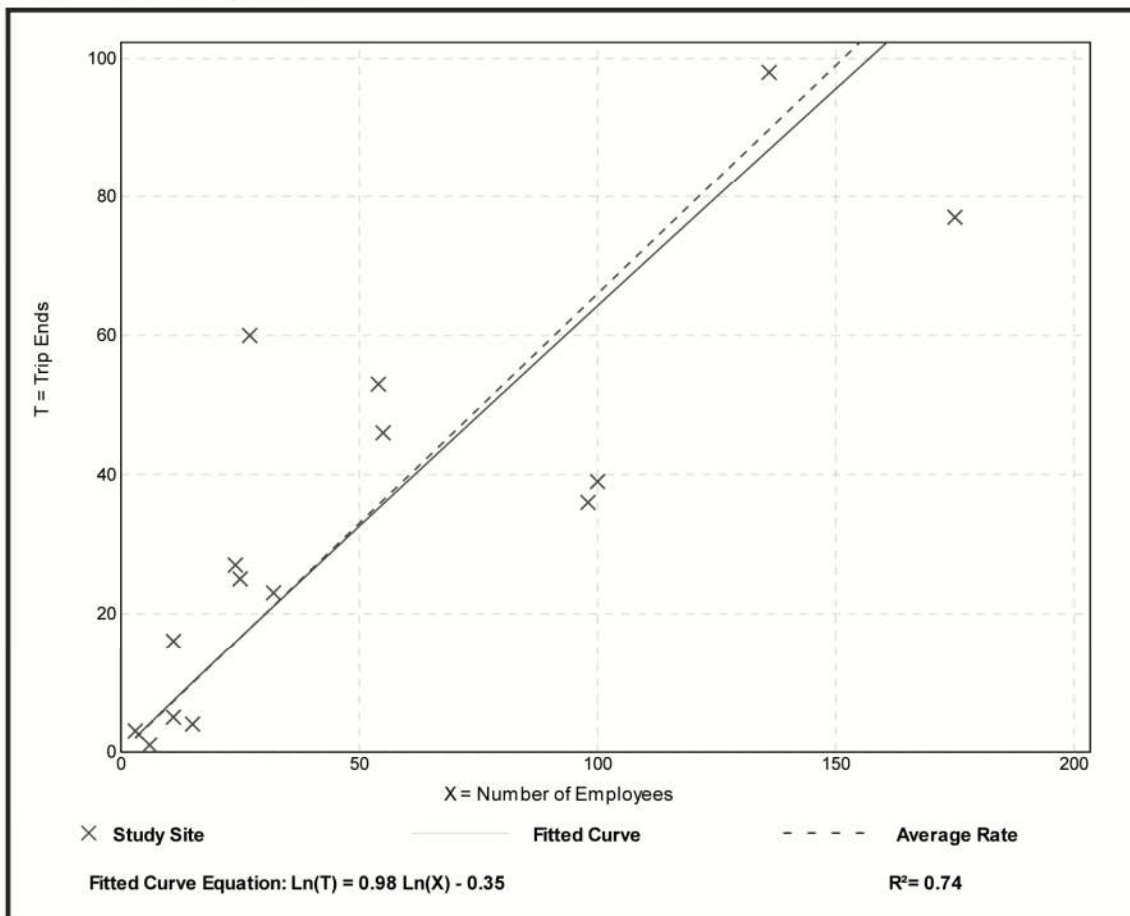
# Warehousing (150)

**Vehicle Trip Ends vs: Employees**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 15  
 Avg. Num. of Employees: 51  
 Directional Distribution: 36% entering, 65% exiting

## Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.66	0.17 - 2.22	0.40

## Data Plot and Equation



# Warehousing (150)

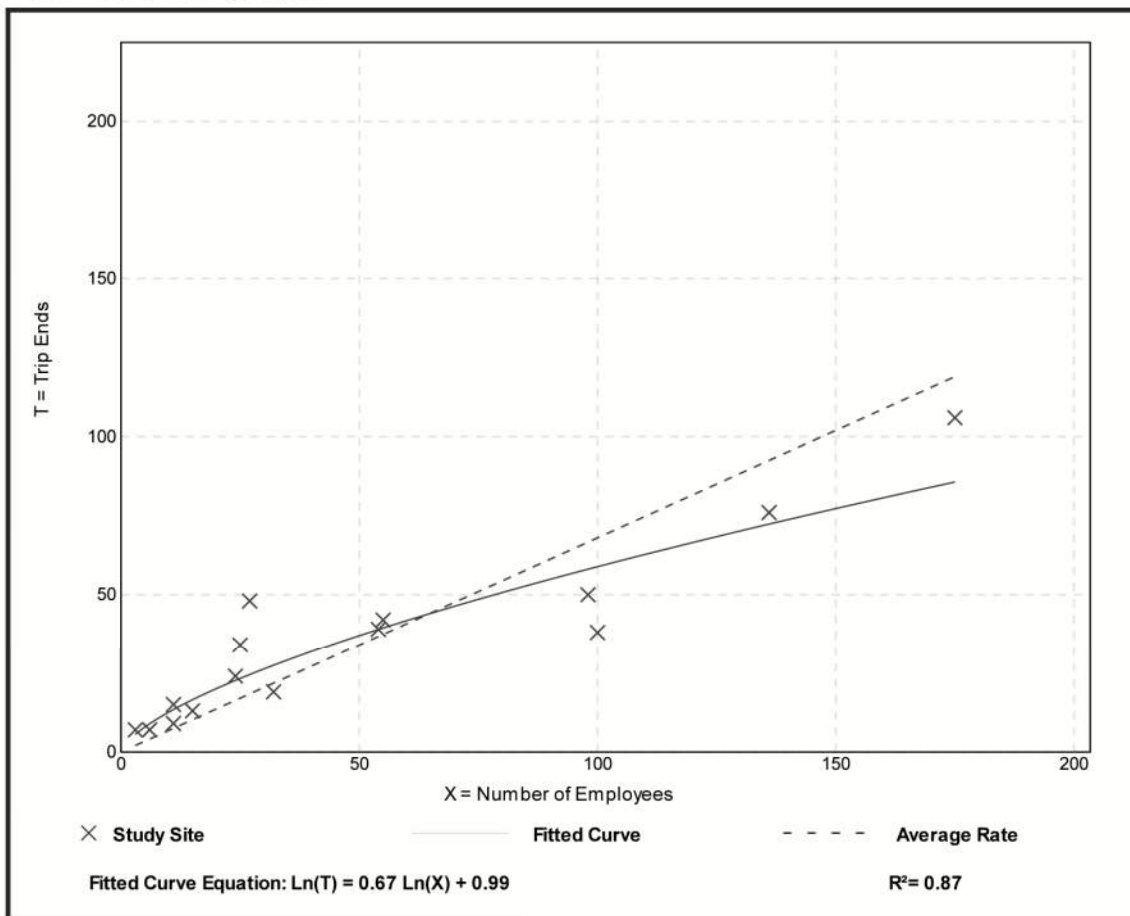
**Vehicle Trip Ends vs: Employees**  
**On a: Weekday,**  
**AM Peak Hour of Generator**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 15  
 Avg. Num. of Employees: 51  
 Directional Distribution: 53% entering, 47% exiting

## Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.68	0.38 - 2.33	0.33

## Data Plot and Equation



# Warehousing (150)

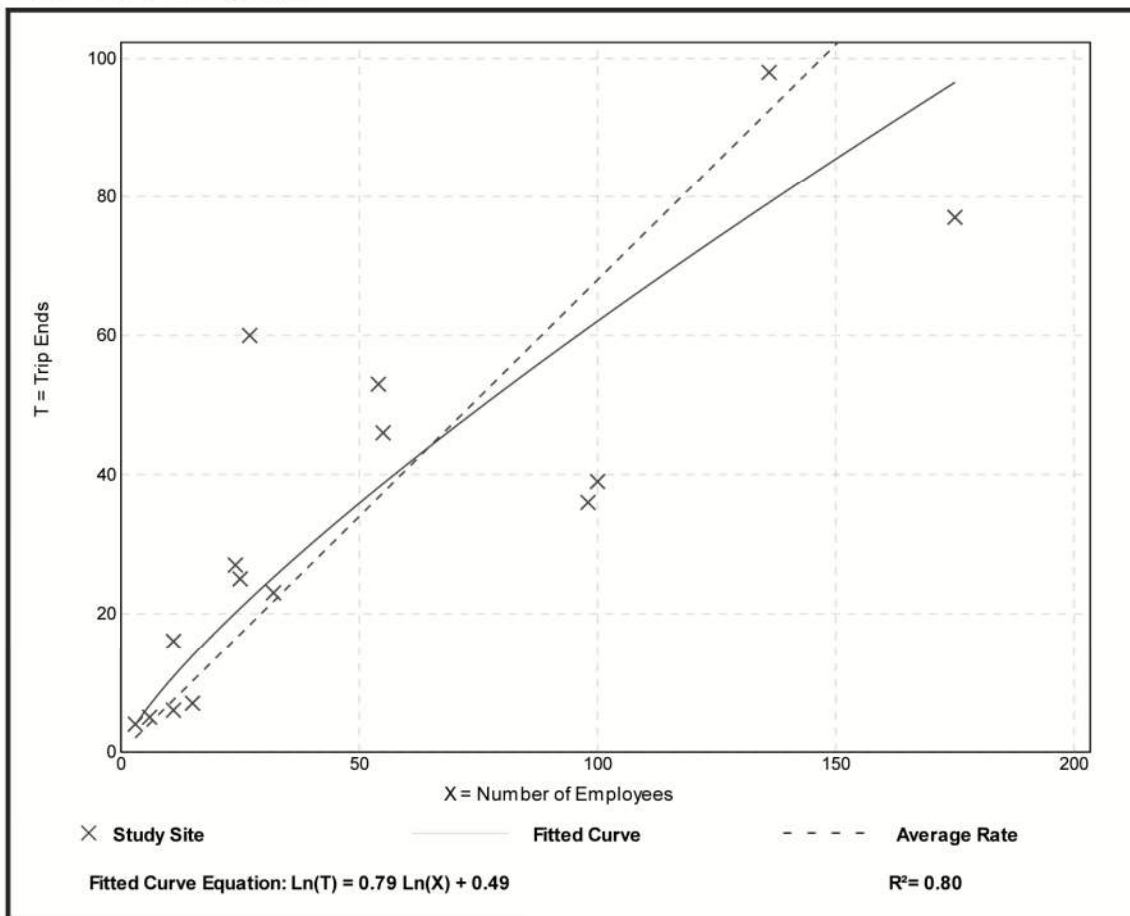
**Vehicle Trip Ends vs: Employees**  
**On a: Weekday,**  
**PM Peak Hour of Generator**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 15  
 Avg. Num. of Employees: 51  
 Directional Distribution: 28% entering, 72% exiting

## Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.68	0.37 - 2.22	0.40

## Data Plot and Equation





## **Land Use: 155**

### **High-Cube Fulfillment Center Warehouse**

#### **Description**

A high-cube warehouse (HCW) is a building that typically has at least 200,000 gross square feet of floor area, has a ceiling height of 24 feet or more, and is used primarily for the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. A typical HCW has a high level of on-site automation and logistics management. The automation and logistics enable highly-efficient processing of goods through the HCW. High-cube fulfillment center warehouses include warehouses characterized by a significant storage function and direct distribution of ecommerce product to end users. These facilities typically handle smaller packages and quantities than other types of HCWs and often contain multiple mezzanine levels. Warehousing (Land Use 150), high-cube transload and short-term storage warehouse (Land Use 154), high-cube parcel hub warehouse (Land Use 156), and high-cube cold storage warehouse (Land Use 157) are related land uses.

Each fulfillment center in the ITE database has been categorized as either a sort or non-sort facility. A sort facility is a fulfillment center that ships out smaller items, requiring extensive sorting, typically by manual means. A non-sort facility is a fulfillment center that ships large box items that are processed primarily with automation rather than through manual means. Separate sets of data plots are presented for the sort and non-sort fulfillment centers.

#### **Additional Data**

The High-Cube Warehouse/Distribution Center-related land uses underwent specialized consideration through a commissioned study titled "High-Cube Warehouse Vehicle Trip Generation Analysis," published in October 2016. The results of this study have been incorporated into the 10th Edition *Trip Generation Manual* and are posted on the ITE website at <http://library.ite.org/pub/a3e6679a-e3a8-bf38-7f29-2961becdd498>.

The sites were surveyed in the 2000s and the 2010s in California, New Jersey, and Texas.

#### **Source Numbers**

752, 941, 1001, 1002, 1011

# High-Cube Fulfillment Center Warehouse - Non-Sort (155)

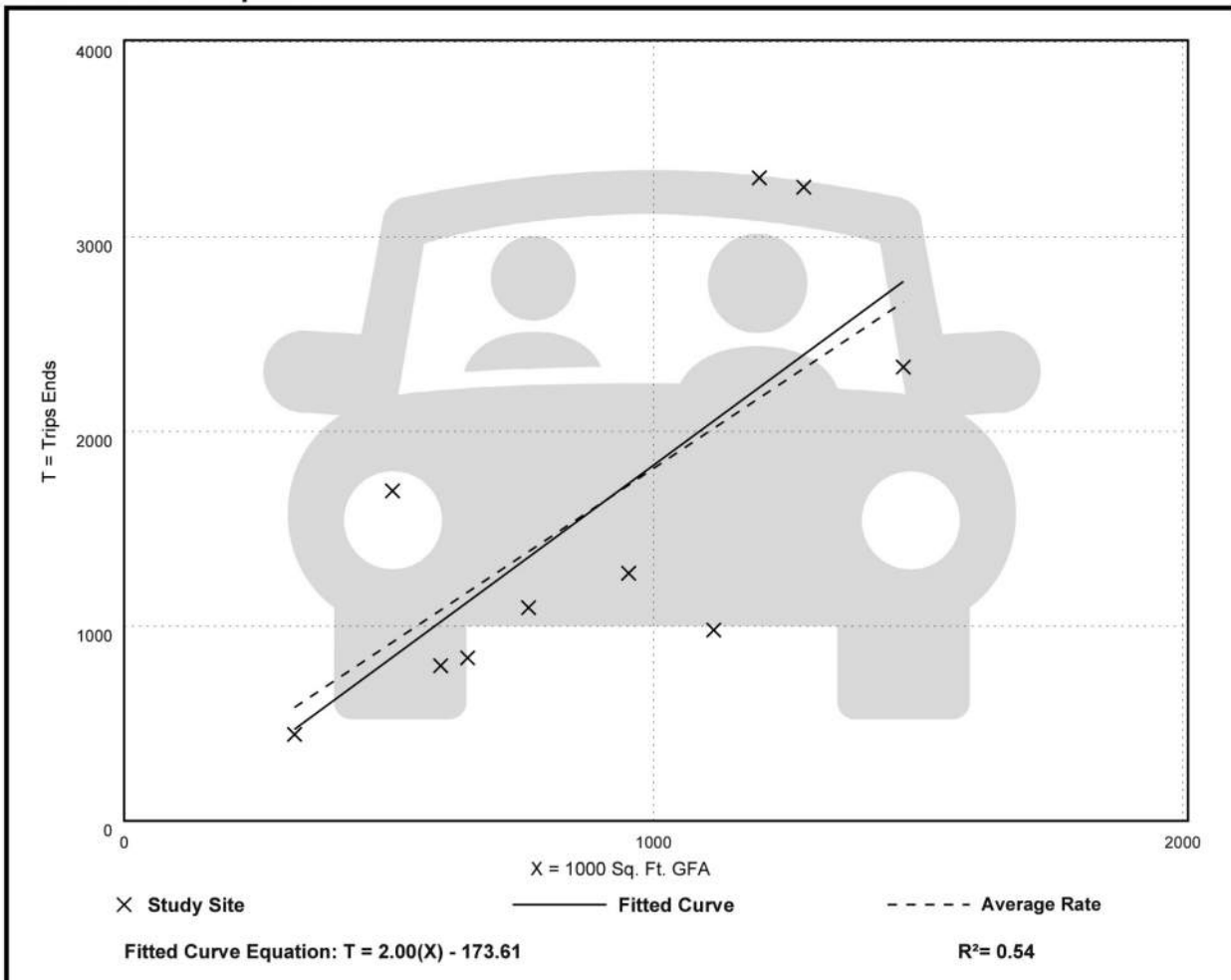
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 10  
Avg. 1000 Sq. Ft. GFA: 886  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.81	0.88 - 3.34	0.76

## Data Plot and Equation



# High-Cube Fulfillment Center Warehouse - Non-Sort (155)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 22

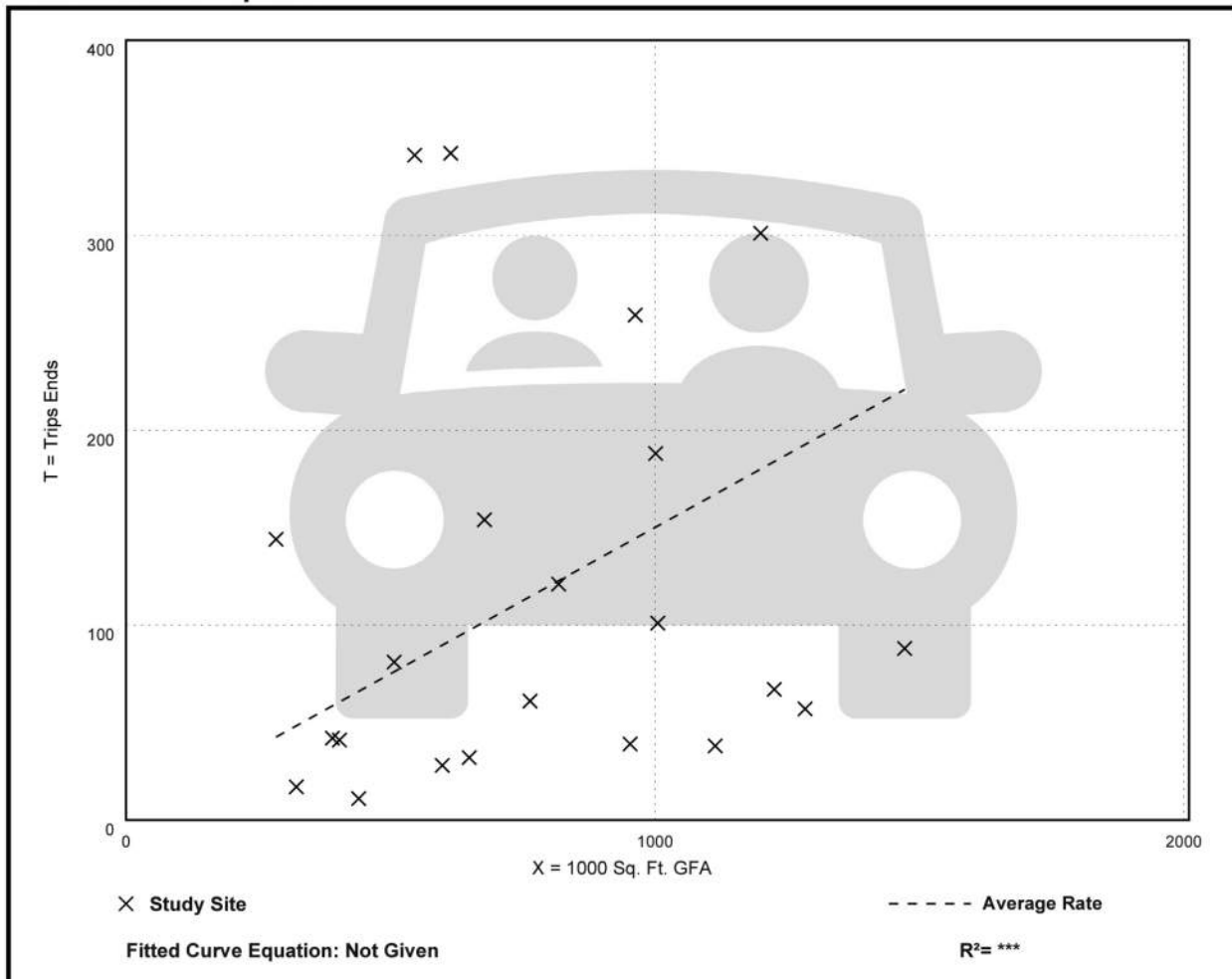
Avg. 1000 Sq. Ft. GFA: 783

Directional Distribution: 81% entering, 19% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.15	0.03 - 0.62	0.15

## Data Plot and Equation



# High-Cube Fulfillment Center Warehouse - Non-Sort (155)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 22

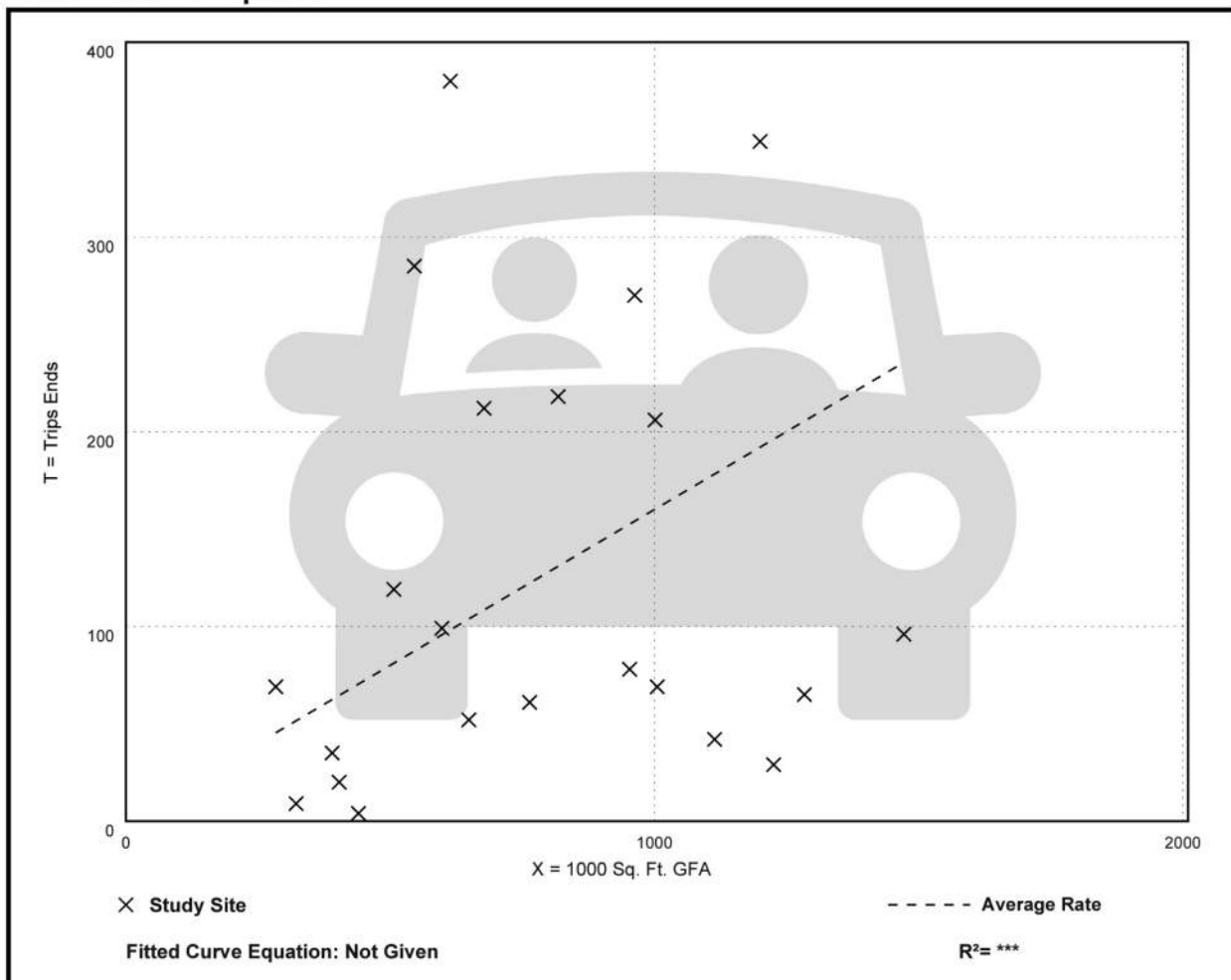
Avg. 1000 Sq. Ft. GFA: 783

Directional Distribution: 39% entering, 61% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.16	0.01 - 0.62	0.15

## Data Plot and Equation



# High-Cube Fulfillment Center Warehouse - Non-Sort (155)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

AM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. 1000 Sq. Ft. GFA: 818

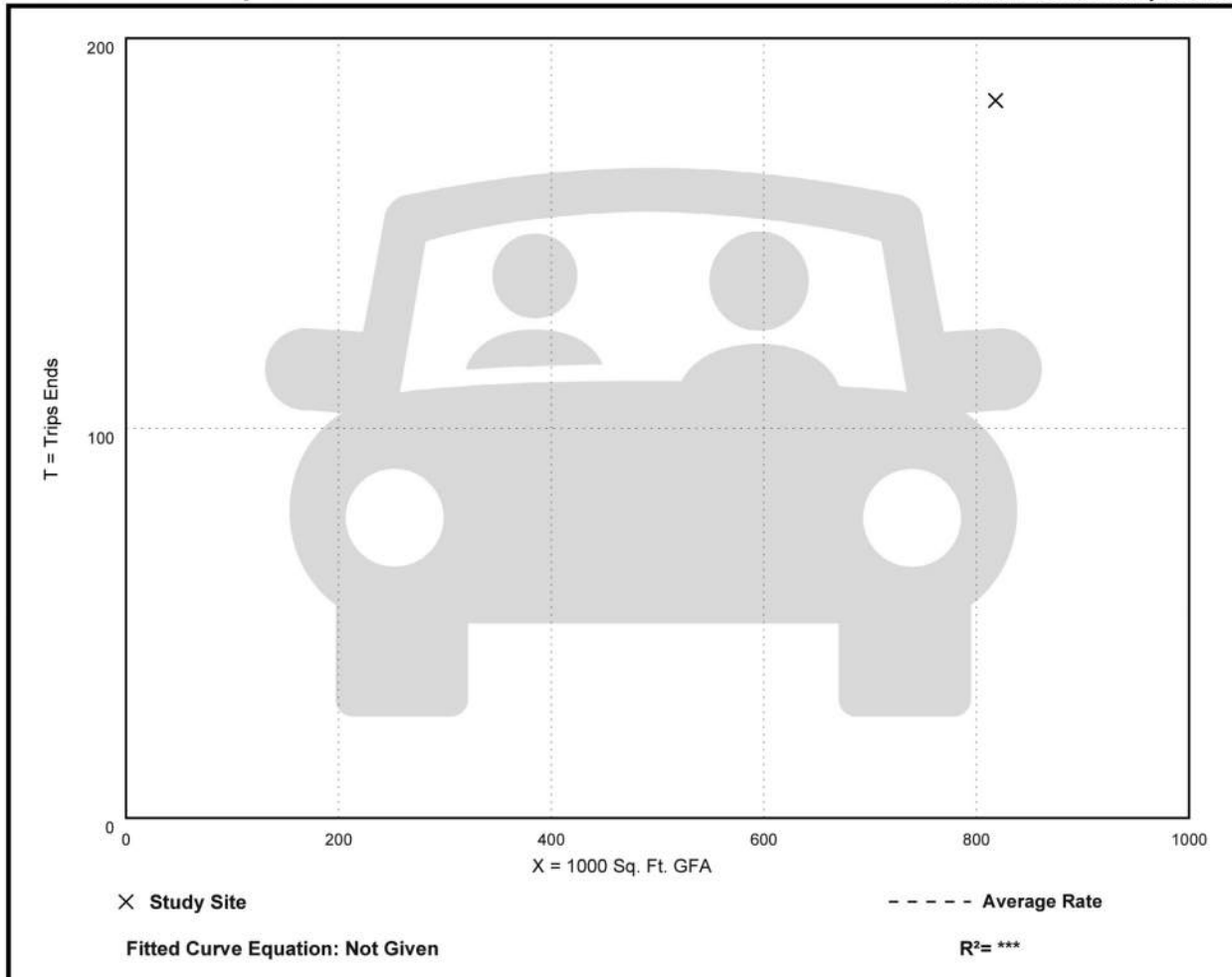
Directional Distribution: Not Available

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.22	0.22 - 0.22	***

## Data Plot and Equation

Caution – Small Sample Size





# High-Cube Fulfillment Center Warehouse - Non-Sort (155)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. 1000 Sq. Ft. GFA: 818

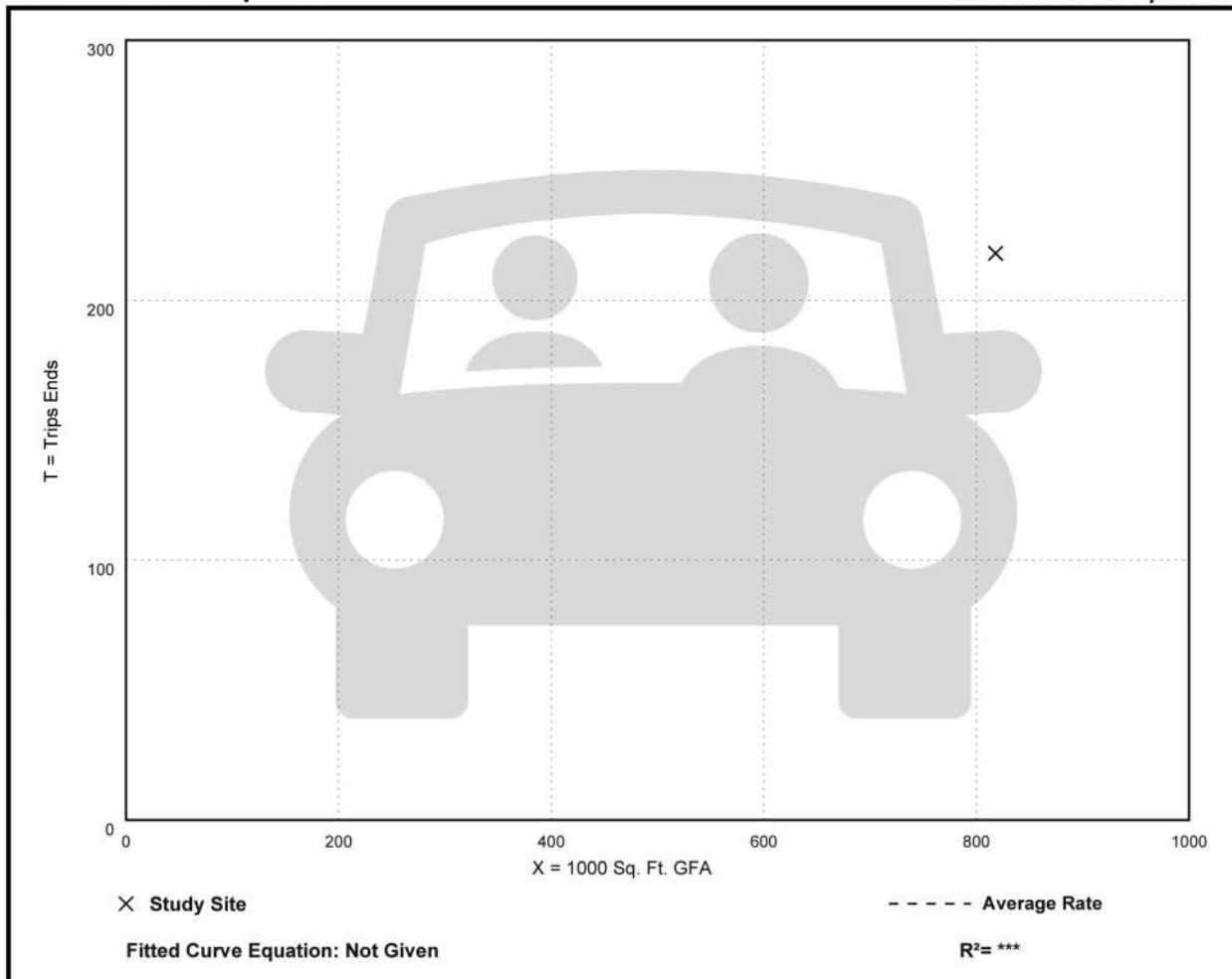
Directional Distribution: Not Available

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.27	0.27 - 0.27	***

## Data Plot and Equation

Caution – Small Sample Size



# High-Cube Fulfillment Center Warehouse - Non-Sort (155)

Vehicle Trip Ends vs: Employees  
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 7

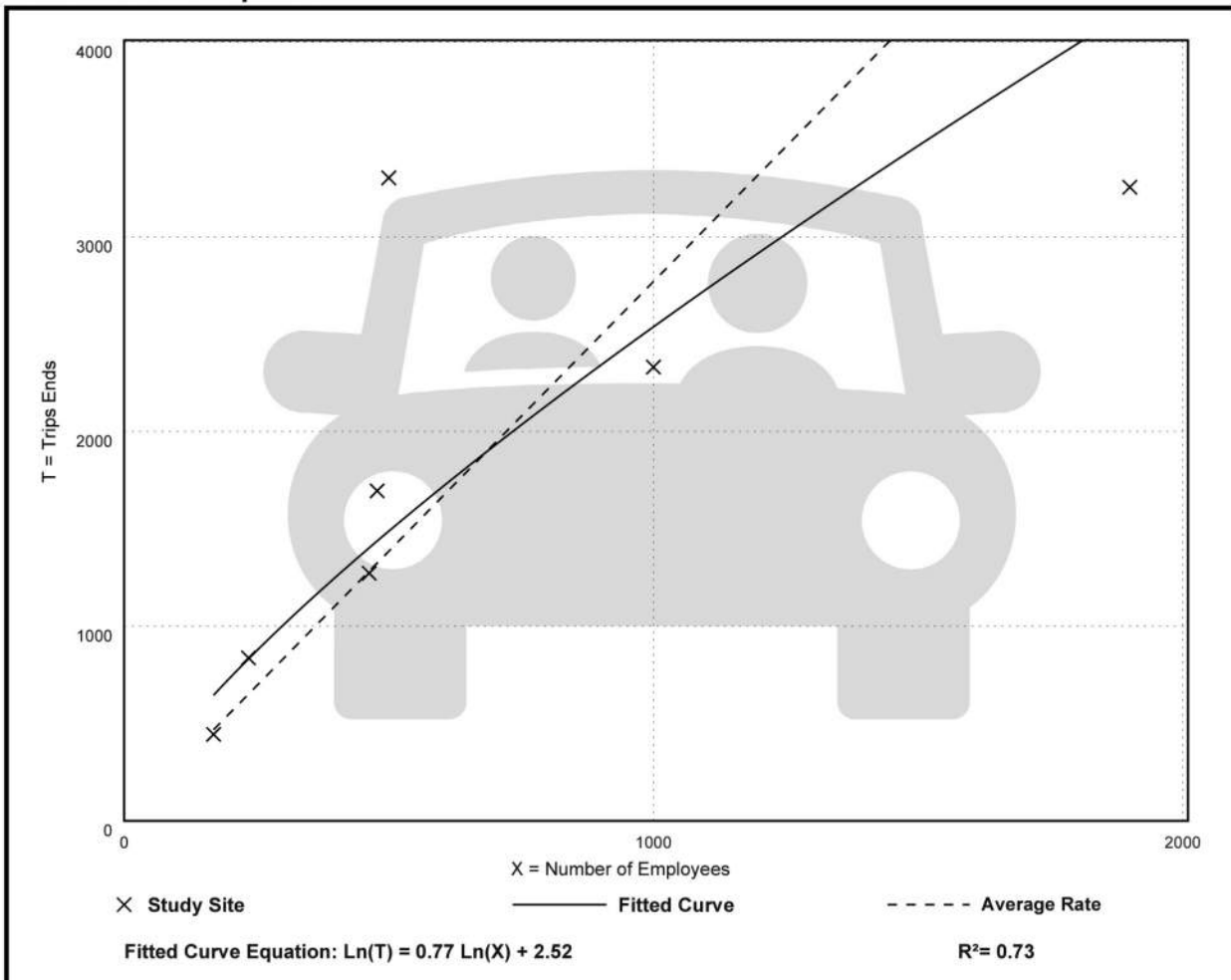
Avg. Num. of Employees: 678

Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
2.77	1.71 - 6.61	1.58

## Data Plot and Equation



# High-Cube Fulfillment Center Warehouse - Non-Sort (155)

## Vehicle Trip Ends vs: Employees

On a: **Weekday,**

**Peak Hour of Adjacent Street Traffic,**

**One Hour Between 7 and 9 a.m.**

**Setting/Location: General Urban/Suburban**

Number of Studies: 7

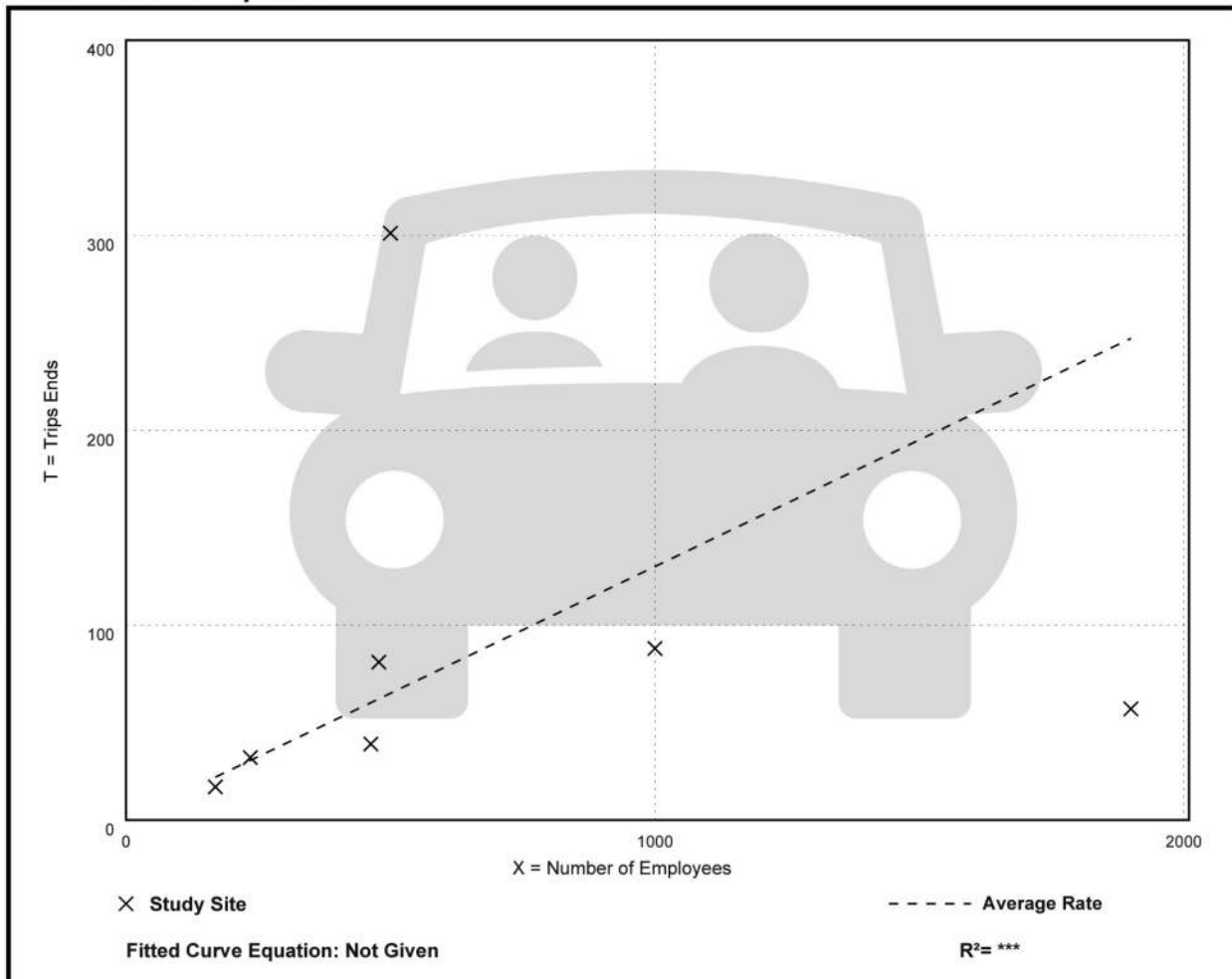
Avg. Num. of Employees: 678

Directional Distribution: 81% entering, 19% exiting

## Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.13	0.03 - 0.60	0.18

## Data Plot and Equation



# High-Cube Fulfillment Center Warehouse - Non-Sort (155)

## Vehicle Trip Ends vs: Employees

On a: **Weekday,**

**Peak Hour of Adjacent Street Traffic,**

**One Hour Between 4 and 6 p.m.**

**Setting/Location: General Urban/Suburban**

Number of Studies: 7

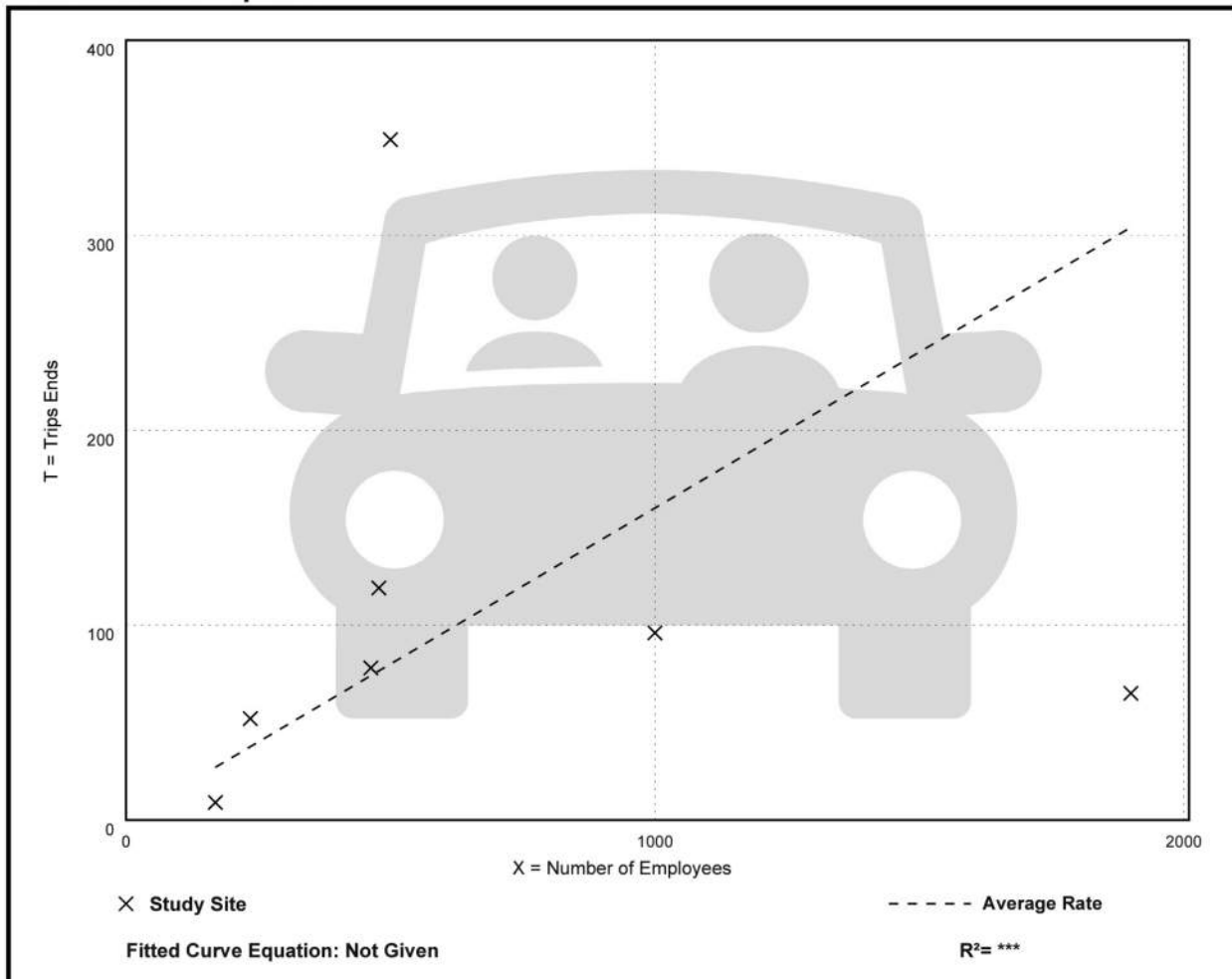
Avg. Num. of Employees: 678

Directional Distribution: 39% entering, 61% exiting

## Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.16	0.03 - 0.70	0.21

## Data Plot and Equation



# High-Cube Fulfillment Center Warehouse - Non-Sort (155)

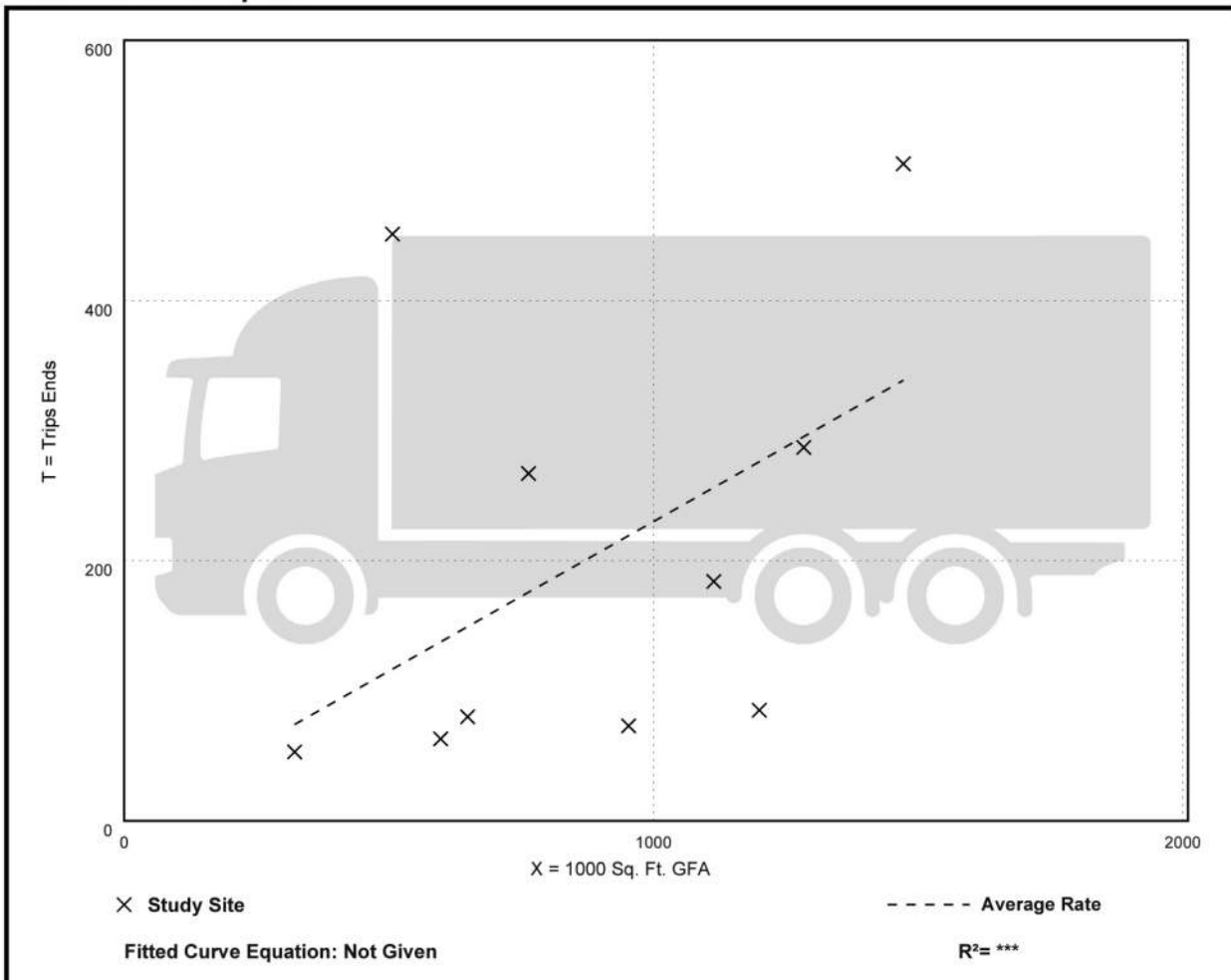
Truck Trip Ends vs: 1000 Sq. Ft. GFA  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 10  
Avg. 1000 Sq. Ft. GFA: 886  
Directional Distribution: 50% entering, 50% exiting

## Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.23	0.07 - 0.89	0.20

## Data Plot and Equation





# High-Cube Fulfillment Center Warehouse - Non-Sort (155)

Truck Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 21

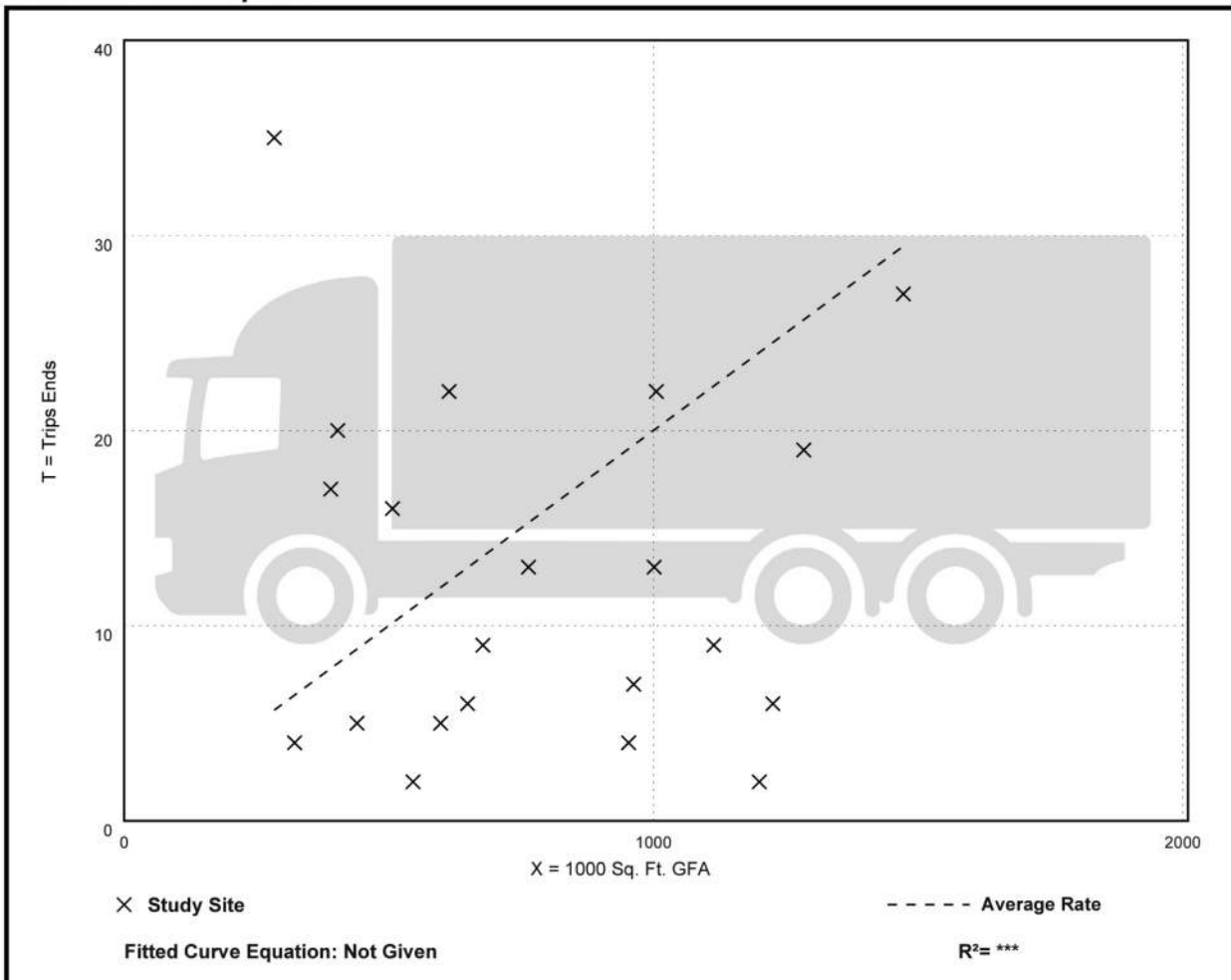
Avg. 1000 Sq. Ft. GFA: 782

Directional Distribution: 50% entering, 50% exiting

## Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.02	0.00 - 0.12	0.02

## Data Plot and Equation



# High-Cube Fulfillment Center Warehouse - Non-Sort (155)

Truck Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 21

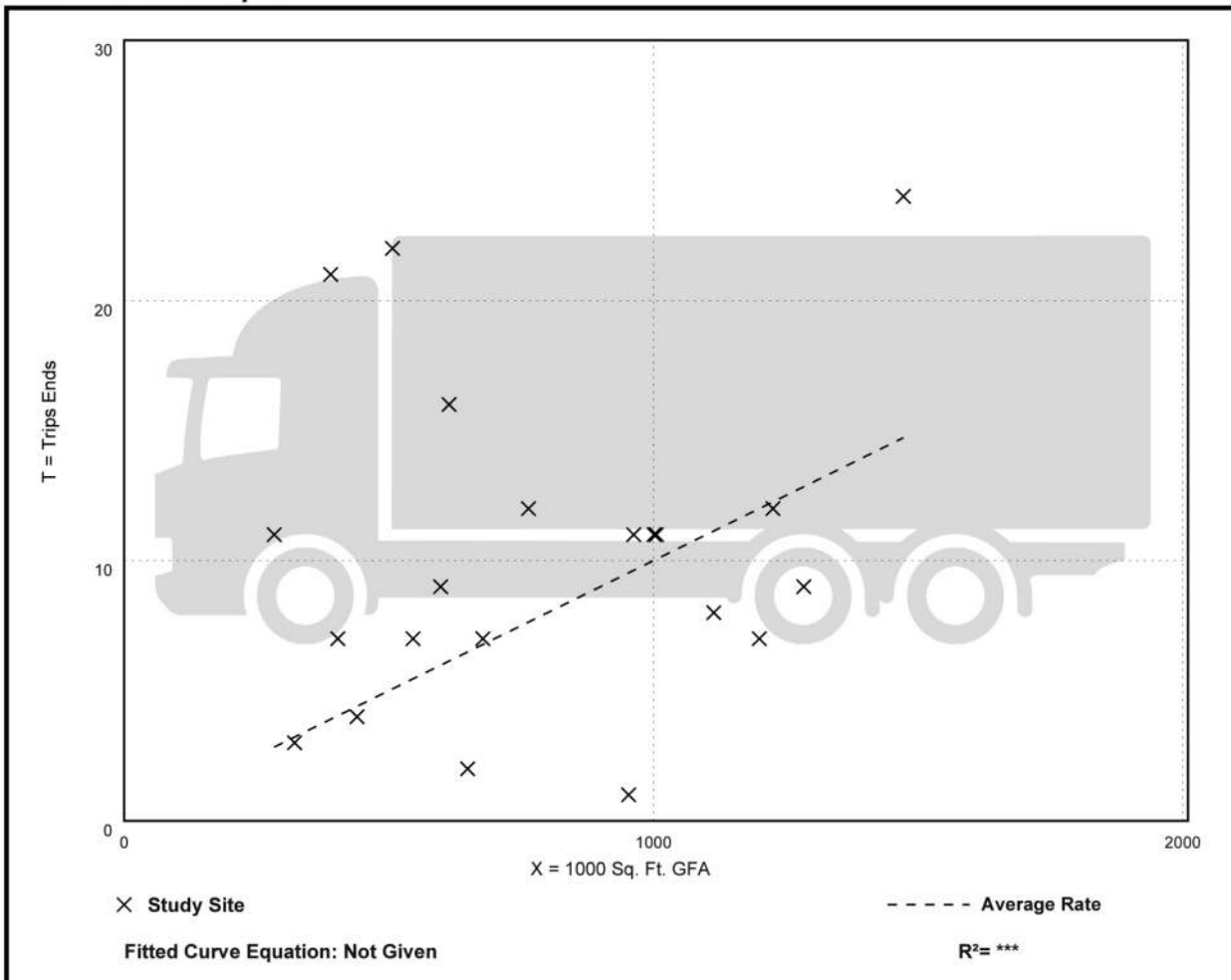
Avg. 1000 Sq. Ft. GFA: 782

Directional Distribution: 46% entering, 54% exiting

## Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.01	0.00 - 0.05	0.01

## Data Plot and Equation



**Table B.3 Baseline Vehicle Occupancy in  
Trip Generation Manual Data Volumes**

Land Use Classification		Time Period	Vehicle Occupancy		
Code	Description		Average	Range	Comment
021	Commercial Airport	Weekday		1.79–2.42	
022	General Aviation Airport	Weekday		1.20–1.70	
030	Intermodal Truck Terminal	Weekday	1.16		avg. of 2 studies
110	General Light Industrial	Not Available	1.3		for all industrial sites
120	General Heavy Industrial	Not Available			
150	Warehousing	Not Available			
130	Industrial Park	Weekday	1.37	1.20–1.80	
140	Manufacturing	Weekday		1.20–1.30	
151	Mini-Warehouse	Weekday		1.20–1.90	
714	Corporate Headquarters Building	Weekday	1.2	1.03–1.74	avg. of 10 studies
715	Single Tenant Office Building	Not Available	1.1	1.03–1.14	avg. of 10 studies
720	Medical Dental Office Building	Not Available	1.37	1.32–1.44	avg. of 6 studies
731	State Motor Vehicles Department	Weekday	1.38	1.30–1.48	
732	United States Post Office	Weekday	1.14		avg. of 4 studies
760	Research and Development Center	Weekday	1.19	1.10–1.33	avg. of 13 studies
812	Building Materials and Lumber Store	Weekday	1.17	1.10–1.21	
815	Free-Standing Discount Store	Weekday	1.32	1.19–1.46	avg. of 2 sites
816	Hardware/Paint Store	Weekday	1.31	1.15–1.39	avg. of all sites
857	Discount Club	Not Available	1.45		limited sample
860	Wholesale Market	Weekday	1.21		avg. for site
890	Furniture Store	Weekday	1.42	1.12–2.00	
920	Copy, Print, and Express Ship Store	AM street pk	1.12		
		PM street pk	1.21		
		Pk. Hour	1.16		
931	Quality Restaurant	Weekday	1.78	1.59–1.98	
932	High-Turnover (Sit-Down) Restaurant	Weekday	1.52	1.39–1.69	

Source: *Trip Generation Manual*, 9th Edition, Institute of Transportation Engineers, Washington, DC, 2012.

## **Appendix D**

### **Capacity Analysis – 2019 Existing Traffic Conditions**

**2019 Existing Weekday A.M.**



1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2019 Existing AM



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	247	0	452	482	12	1	792
Future Volume (vph)	2	0	2	0	247	0	452	482	12	1	792
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0	100	0
Storage Lanes	1	1		1		1	1		0	1	1
Taper Length (ft)	25			100			75			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00
Fr <sub>t</sub>		0.850						0.996			0.850
Fl <sub>t</sub> Protected	0.950						0.950			0.950	
Satd. Flow (prot)	1685	1133	0	1773	3574	0	1652	3561	0	1805	1583
Fl <sub>t</sub> Permitted	0.950						0.950			0.950	
Satd. Flow (perm)	1685	1133	0	1773	3574	0	1652	3561	0	1805	1583
Right Turn on Red			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		554						3			484
Link Speed (mph)	30				35			35		35	
Link Distance (ft)	591				758			1733		622	
Travel Time (s)	13.4				14.8			33.8		12.1	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.92	0.92	0.92	0.86	0.86
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Adj. Flow (vph)	3	0	3	0	309	0	491	524	13	1	921
Shared Lane Traffic (%)											
Lane Group Flow (vph)	3	3	0	0	309	0	491	537	0	1	921
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5
Permitted Phases											
Detector Phase	4	4		1	6		5	2		3	3 5
Switch Phase											
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	
Total Split (s)	16.0	16.0		16.0	20.0		38.0	42.0		16.0	
Total Split (%)	17.8%	17.8%		17.8%	22.2%		42.2%	46.7%		17.8%	
Maximum Green (s)	10.0	10.0		10.0	14.0		32.0	36.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	
Act Effct Green (s)	5.8	5.8			23.0		35.0	64.0		11.5	51.4
Actuated g/C Ratio	0.06	0.06			0.26		0.39	0.71		0.13	0.57
v/c Ratio	0.03	0.01			0.34		0.76	0.21		0.00	0.83
Control Delay	40.0	0.0			30.6		40.9	3.6		36.0	14.8
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0
Total Delay	40.0	0.0			30.6		40.9	3.6		36.0	14.8
LOS	D	A			C		D	A		D	B

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2019 Existing AM

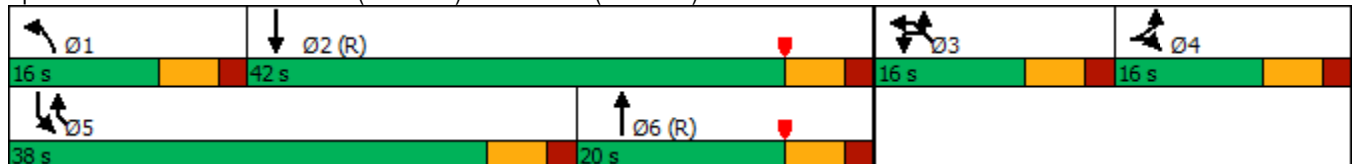


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Approach Delay	20.0				30.6			21.4		14.8	
Approach LOS	B				C			C		B	
Queue Length 50th (ft)	2	0			71		302	110		1	184
Queue Length 95th (ft)	9	0			113		364	2		5	#227
Internal Link Dist (ft)	511				678			1653		542	
Turn Bay Length (ft)		50					775			100	
Base Capacity (vph)	187	618			911		663	2533		231	1124
Starvation Cap Reductn	0	0			0		0	0		0	0
Spillback Cap Reductn	0	0			0		0	0		0	0
Storage Cap Reductn	0	0			0		0	0		0	0
Reduced v/c Ratio	0.02	0.00			0.34		0.74	0.21		0.00	0.82

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	20.0
Intersection LOS:	B
Intersection Capacity Utilization:	65.9%
ICU Level of Service:	C
Analysis Period (min):	15
Description:	NHDOT Int. No.: S-229-04
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.

Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road



2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue  
Lanes, Volumes, Timings

2019 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↗	↕↗		↗	↕↗	
Traffic Volume (vph)	3	0	2	1	1	32	15	1070	2	7	948	51
Future Volume (vph)	3	0	2	1	1	32	15	1070	2	7	948	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.872						0.992	
Flt Protected		0.950			0.999		0.950			0.950		
Satd. Flow (prot)	0	1685	1133	0	1659	0	1685	3538	0	1570	3514	0
Flt Permitted		0.851			0.991		0.950			0.950		
Satd. Flow (perm)	0	1509	1133	0	1646	0	1685	3538	0	1570	3514	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109		38							8
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.80	0.80	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	0%
Adj. Flow (vph)	4	0	3	1	1	38	18	1259	2	7	998	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	3	0	40	0	18	1261	0	7	1052	0
Turn Type	Perm	NA	Prot	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		7	7		3		1	6		5	2	
Permitted Phases	7			3								
Detector Phase	7	7	7	3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0	21.0	21.0	21.0		21.0	51.0		18.0	48.0	
Total Split (%)	23.3%	23.3%	23.3%	23.3%	23.3%		23.3%	56.7%		20.0%	53.3%	
Maximum Green (s)	15.0	15.0	15.0	15.0	15.0		15.0	45.0		12.0	42.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		7.2	7.2		7.3		7.6	75.3		7.0	72.2	
Actuated g/C Ratio		0.08	0.08		0.08		0.08	0.84		0.08	0.80	
v/c Ratio		0.03	0.02		0.24		0.13	0.43		0.06	0.37	
Control Delay		38.0	0.0		17.2		40.9	3.8		25.0	11.3	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		38.0	0.0		17.2		40.9	3.8		25.0	11.3	
LOS		D	A		B		D	A		C	B	

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2019 Existing AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		21.7			17.2			4.3				11.4
Approach LOS		C			B			A				B
Queue Length 50th (ft)		2	0		1		9	98		4		237
Queue Length 95th (ft)		11	0		28		m16	185		m10		169
Internal Link Dist (ft)		430			477			1653				900
Turn Bay Length (ft)			50				300			350		
Base Capacity (vph)		251	279		306		280	2959		209		2822
Starvation Cap Reductn		0	0		0		0	0		0		0
Spillback Cap Reductn		0	0		0		0	0		0		0
Storage Cap Reductn		0	0		0		0	0		0		0
Reduced v/c Ratio		0.02	0.01		0.13		0.06	0.43		0.03		0.37

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 51 (57%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 7.7

Intersection LOS: A

Intersection Capacity Utilization 51.2%

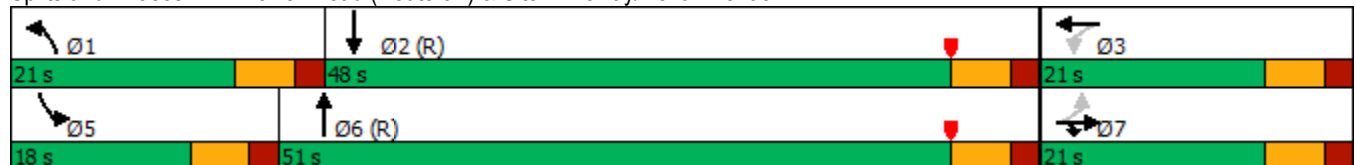
ICU Level of Service A

Analysis Period (min) 15

Description: NHDOT Int. No.: S-229-03

























m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2019 Existing AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	4	55	15	5	71	62	1023	27	85	928	63
Future Volume (vph)	101	4	55	15	5	71	62	1023	27	85	928	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Fr <sub>t</sub>			0.850			0.850			0.850			0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3467	1852	1568	3502	1900	1589	3467	3539	1583	3433	3574	1583
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	1852	1568	3502	1900	1589	3467	3539	1583	3433	3574	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			182			182			182
Link Speed (mph)		30			30			35			30	
Link Distance (ft)		401			449			980			1189	
Travel Time (s)		9.1			10.2			19.1			27.0	
Peak Hour Factor	0.93	0.93	0.93	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	1%	6%	3%	0%	0%	5%	1%	2%	2%	2%	1%	2%
Adj. Flow (vph)	109	4	59	17	6	81	71	1176	31	89	967	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	4	59	17	6	81	71	1176	31	89	967	66
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4	4	3	8	8	1	6	6	5	2	2
Permitted Phases												
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	16.0
Total Split (s)	17.0	16.0	16.0	17.0	16.0	16.0	16.0	41.0	41.0	16.0	41.0	41.0
Total Split (%)	18.9%	17.8%	17.8%	18.9%	17.8%	17.8%	17.8%	45.6%	45.6%	17.8%	45.6%	45.6%
Maximum Green (s)	11.0	10.0	10.0	11.0	10.0	10.0	10.0	35.0	35.0	10.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	9.1	14.0	14.0	7.0	6.9	6.9	8.2	50.2	50.2	8.7	50.6	50.6
Actuated g/C Ratio	0.10	0.16	0.16	0.08	0.08	0.08	0.09	0.56	0.56	0.10	0.56	0.56
v/c Ratio	0.31	0.01	0.15	0.06	0.04	0.28	0.23	0.60	0.03	0.27	0.48	0.07
Control Delay	39.5	34.2	0.8	38.7	38.8	2.4	42.8	13.7	0.1	48.8	15.3	0.3
Queue Delay	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 Delay	39.5	34.2	0.8	38.7	38.8	2.4	42.8	13.7	0.1	48.8	15.3	0.3
LOS	D	C	A	D	D	A	D	B	A	D	B	A



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2019 Existing AM

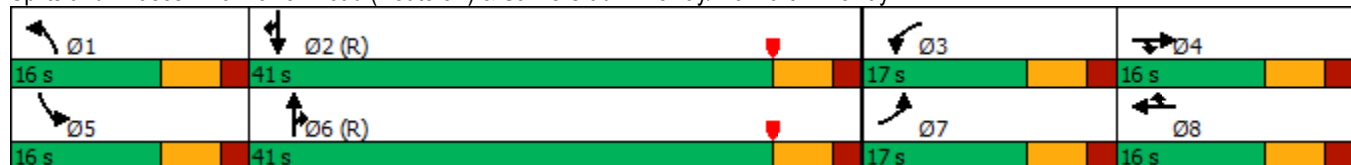


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		26.1			10.4			15.0			17.1	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	29	2	0	4	3	0	18	244	0	25	243	1
Queue Length 95th (ft)	54	12	0	14	15	0	44	83	m0	46	325	m1
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350		175	350		
Base Capacity (vph)	423	302	408	428	211	338	385	1973	963	386	2010	970
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.01	0.14	0.04	0.03	0.24	0.18	0.60	0.03	0.23	0.48	0.07

#### Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 51 (57%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.60  
 Intersection Signal Delay: 16.4  
 Intersection LOS: B  
 Intersection Capacity Utilization 55.9%  
 ICU Level of Service B  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway



#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2019 Existing AM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗	↔↔	↕↕	↕↕	↘
Traffic Volume (vph)	901	829	861	321	320	1451
Future Volume (vph)	901	829	861	321	320	1451
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	3662	1689	3467	3539	3539	1568
Fl <sub>t</sub> Permitted	0.950		0.950			
Satd. Flow (perm)	3662	1689	3467	3539	3539	1568
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		786				730
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.94	0.94	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	1%	2%	2%	3%
Adj. Flow (vph)	959	882	936	349	348	1577
Shared Lane Traffic (%)						
Lane Group Flow (vph)	959	882	936	349	348	1577
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	32.0		31.0	58.0	27.0	
Total Split (%)	35.6%		34.4%	64.4%	30.0%	
Maximum Green (s)	26.0		23.0	51.0	20.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	28.1	90.0	25.6	48.9	15.3	90.0
Actuated g/C Ratio	0.31	1.00	0.28	0.54	0.17	1.00
v/c Ratio	0.84	0.52	0.95	0.18	0.58	1.01
Control Delay	37.0	1.2	43.1	2.8	37.9	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	1.2	43.1	2.8	37.9	27.8
LOS	D	A	D	A	D	C

# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2019 Existing AM

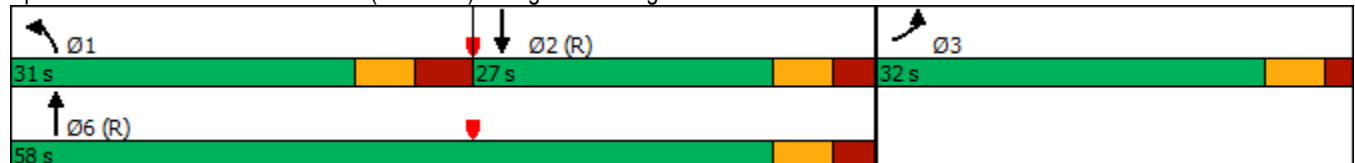


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	19.8			32.1	29.6	
Approach LOS	B			C	C	
Queue Length 50th (ft)	246	0	~214	8	97	~11
Queue Length 95th (ft)	#376	0	#407	4	133	#267
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1149	1689	985	2011	786	1568
Starvation 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	0.83	0.52	0.95	0.17	0.44	1.01

## Intersection Summary
























Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	70 (78%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	26.7
Intersection LOS:	C
Intersection Capacity Utilization:	75.8%
ICU Level of Service:	D
Analysis Period (min):	15
Description:	NHDOT Int. No.: S-229-02
~	Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road



5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road  
Lanes, Volumes, Timings

2019 Existing AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	9	192	587	37	29	231	785	189	15	993	5
Future Volume (vph)	16	9	192	587	37	29	231	785	189	15	993	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		0
Storage Lanes	0		1	1		1	1		1	1		0
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.969		0.950	0.958		0.950			0.950		
Satd. Flow (prot)	0	1841	1583	1641	1657	1501	1787	3539	1583	1752	3535	0
Flt Permitted		0.969		0.950	0.958		0.950			0.950		
Satd. Flow (perm)	0	1841	1583	1641	1657	1501	1787	3539	1583	1752	3535	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			53			89			199			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		805			586			999			1515	
Travel Time (s)		18.3			13.3			22.7			34.4	
Peak Hour Factor	0.81	0.81	0.81	0.94	0.94	0.94	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	1%	0%	4%	1%	2%	2%	3%	2%	6%
Adj. Flow (vph)	20	11	237	624	39	31	243	826	199	17	1141	6
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	31	237	331	332	31	243	826	199	17	1147	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	26.0	26.0	31.0	56.0	56.0	21.0	31.0	71.0	56.0	21.0	71.0	
Total Split (%)	14.1%	14.1%	16.8%	30.4%	30.4%	11.4%	16.8%	38.6%	30.4%	11.4%	38.6%	
Maximum Green (s)	20.0	20.0	25.0	50.0	50.0	15.0	25.0	65.0	50.0	15.0	65.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)		7.7	36.6	37.4	37.4	45.8	25.9	78.9	124.2	6.7	56.5	
Actuated g/C Ratio		0.05	0.25	0.25	0.25	0.31	0.17	0.53	0.83	0.04	0.38	
v/c Ratio		0.33	0.55	0.81	0.80	0.06	0.78	0.44	0.15	0.22	0.86	
Control Delay		85.0	45.8	69.9	69.3	0.2	80.7	25.7	0.7	83.7	51.2	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		85.0	45.8	69.9	69.3	0.2	80.7	25.7	0.7	83.7	51.2	
LOS		F	D	E	E	A	F	C	A	F	D	

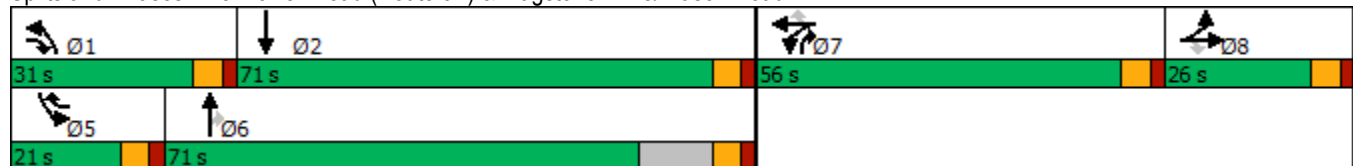
# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2019 Existing AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		50.4			66.5			32.3			51.7	
Approach LOS		D			E			C			D	
Queue Length 50th (ft)		32	168	342	342	0	249	282	0	17	559	
Queue Length 95th (ft)		67	247	490	490	0	#463	408	17	48	705	
Internal Link Dist (ft)		725			506			919			1435	
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		255	428	569	575	606	310	1924	1411	182	1595	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.12	0.55	0.58	0.58	0.05	0.78	0.43	0.14	0.09	0.72	

Intersection Summary	
Area Type:	Other
Cycle Length:	184
Actuated Cycle Length:	149.2
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	47.4
Intersection LOS:	D
Intersection Capacity Utilization:	79.3%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	























## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road





6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2019 Existing AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	0	11	2	2	4	113	706	2	2	1048	57
Future Volume (vph)	8	0	11	2	2	4	113	706	2	2	1048	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	11	12	12
Storage Length (ft)	0		100	0		100	225		0	225		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850					0.992	
Flt Protected		0.950			0.976		0.950			0.950		
Satd. Flow (prot)	0	1719	1455	0	1916	1669	1752	3505	0	1745	3477	0
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	1810	1455	0	1963	1669	1752	3505	0	1745	3477	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			86			86						7
Link Speed (mph)		30			10			30				30
Link Distance (ft)		495			382			1515				1791
Travel Time (s)		11.3			26.0			34.4				40.7
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.90	0.90	0.90	0.83	0.83	0.83
Heavy Vehicles (%)	5%	0%	11%	0%	0%	0%	3%	3%	0%	0%	3%	3%
Adj. Flow (vph)	10	0	14	3	3	5	126	784	2	2	1263	69
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	14	0	6	5	126	786	0	2	1332	0
Turn Type	Perm	NA	pt+ov	Perm	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases		4	4 1		8	8 5	1	6		5	2	
Permitted Phases	4			8								
Detector Phase	4	4	4 1	8	8	8 5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		8.0	21.0		8.0	21.0	
Total Split (s)	16.0	16.0		16.0	16.0		16.0	66.0		16.0	66.0	
Total Split (%)	14.0%	14.0%		14.0%	14.0%		14.0%	57.9%		14.0%	57.9%	
Maximum Green (s)	10.0	10.0		10.0	10.0		12.0	60.0		12.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		7.5	11.0		6.5	9.1	10.4	63.3		5.2	44.5	
Actuated g/C Ratio		0.10	0.15		0.09	0.12	0.14	0.86		0.07	0.60	
v/c Ratio		0.05	0.05		0.03	0.02	0.51	0.26		0.02	0.64	
Control Delay		42.4	0.3		44.6	0.0	44.7	5.0		47.0	13.8	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		42.4	0.3		44.6	0.0	44.7	5.0		47.0	13.8	
LOS		D	A		D	A	D	A		D	B	

6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2019 Existing AM

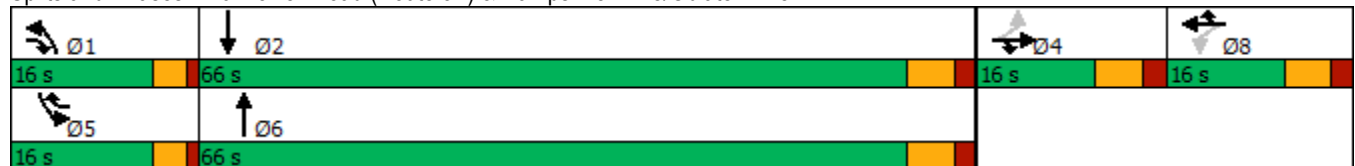


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		17.8			24.3			10.5				13.9
Approach LOS		B			C			B				B
Queue Length 50th (ft)		3	0		2	0	39	0		1		114
Queue Length 95th (ft)		22	0		16	0	#168	180		8		378
Internal Link Dist (ft)		415			302			1435				1711
Turn Bay Length (ft)			100			100	225			225		
Base Capacity (vph)		275	346		299	387	320	3001		319		2877
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.04	0.04		0.02	0.01	0.39	0.26		0.01		0.46

Intersection Summary























Area Type:	Other
Cycle Length:	114
Actuated Cycle Length:	73.9
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	12.6
Intersection LOS:	B
Intersection Capacity Utilization:	57.0%
ICU Level of Service:	B
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive



7: Lowell Road (Route 3A) & Executive Drive  
Lanes, Volumes, Timings

2019 Existing AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	2	10	141	30	101	159	392	60	107	953	197
Future Volume (vph)	35	2	10	141	30	101	159	392	60	107	953	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	15	12	12	13	11	12	12	11	12	12
Storage Length (ft)	0		225	0		80	350		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.980			0.974	
Flt Protected		0.955			0.961		0.950			0.950		
Satd. Flow (prot)	0	1577	1558	0	1811	1620	1711	3406	0	1728	3447	0
Flt Permitted		0.508			0.732		0.950			0.950		
Satd. Flow (perm)	0	839	1558	0	1379	1620	1711	3406	0	1728	3447	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30			101		25			36	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		492			577			1791			1168	
Travel Time (s)		11.2			13.1			40.7			26.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	12%	0%	14%	1%	0%	3%	2%	4%	3%	1%	2%	2%
Adj. Flow (vph)	44	3	13	176	38	126	175	431	66	118	1047	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	13	0	214	126	175	497	0	118	1263	0
Turn Type	Perm	NA	pt+ov	Perm	NA	Prot	Prot	NA		Prot	NA	
Protected Phases		8	8 1		4	4	1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8	8 1	4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		5.0	5.0	5.0	3.0	8.0		3.0	8.0	
Minimum Split (s)	9.0	9.0		11.0	11.0	11.0	9.0	14.0		9.0	14.0	
Total Split (s)	26.0	26.0		23.0	23.0	23.0	16.0	66.0		16.0	66.0	
Total Split (%)	24.1%	24.1%		21.3%	21.3%	21.3%	14.8%	61.1%		14.8%	61.1%	
Maximum Green (s)	20.0	20.0		17.0	17.0	17.0	10.0	60.0		10.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)		12.0	25.5		15.7	15.7	10.2	41.4		9.1	40.3	
Actuated g/C Ratio		0.14	0.30		0.19	0.19	0.12	0.49		0.11	0.48	
v/c Ratio		0.40	0.03		0.84	0.33	0.85	0.30		0.64	0.76	
Control Delay		44.5	3.3		63.5	13.4	75.0	12.6		55.7	20.7	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		44.5	3.3		63.5	13.4	75.0	12.6		55.7	20.7	
LOS		D	A		E	B	E	B		E	C	

# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2019 Existing AM

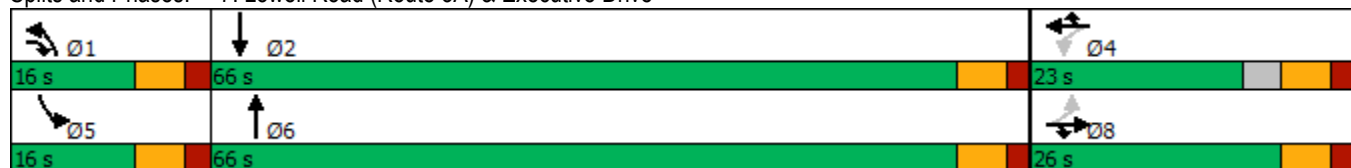


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		35.6			45.0			28.8			23.7	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)		22	0		109	11	94	78		61	275	
Queue Length 95th (ft)		56	4		#227	51	#254	108		#157	347	
Internal Link Dist (ft)		412			497			1711			1088	
Turn Bay Length (ft)			225			80	350			150		
Base Capacity (vph)		202	570		332	466	206	2468		208	2501	
Starvation Cap Reductn		0	0		0	0	0	0		0	0	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.23	0.02		0.64	0.27	0.85	0.20		0.57	0.50	

## Intersection Summary

Area Type:	Other
Cycle Length:	108
Actuated Cycle Length:	84.5
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	28.3
Intersection LOS:	C
Intersection Capacity Utilization:	72.5%
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	






















## Splits and Phases: 7: Lowell Road (Route 3A) & Executive Drive



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2019 Existing AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	48	6	0	10	4	500	1	16	1211	3
Future Volume (vph)	11	0	48	6	0	10	4	500	1	16	1211	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1719	1583	0	1865	1669	1745	1766	1615	1805	1863	0
Flt Permitted		0.752			0.748		0.950			0.950		
Satd. Flow (perm)	0	1361	1583	0	1469	1669	1745	1766	1615	1805	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			55			91			
Link Speed (mph)		10			30			30			30	
Link Distance (ft)		598			262			1405			549	
Travel Time (s)		40.8			6.0			31.9			12.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	5%	0%	2%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Adj. Flow (vph)	14	0	60	8	0	13	4	549	1	17	1275	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	60	0	8	13	4	549	1	17	1278	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA	Prot	Prot	NA	
Protected Phases		8	8		4	5	1	6	6	5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0	116.0	16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%	64.4%	8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0	110.0	10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag						Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		6.3	6.3		6.3	18.3	5.0	147.7	147.7	6.0	153.1	
Actuated g/C Ratio		0.04	0.04		0.04	0.10	0.03	0.82	0.82	0.03	0.85	
v/c Ratio		0.30	0.42		0.16	0.06	0.08	0.38	0.00	0.28	0.81	
Control Delay		100.2	12.4		90.2	0.5	89.0	7.7	0.0	95.9	15.2	



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2019 Existing AM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2019 Existing AM

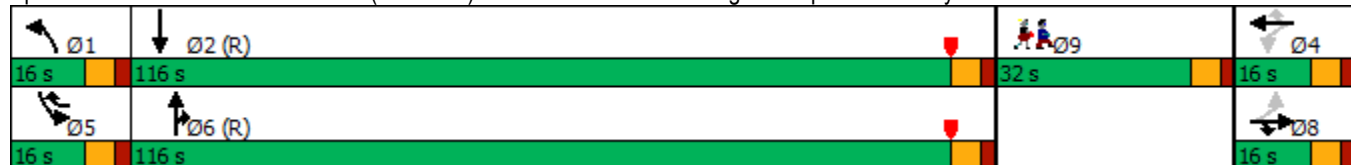


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	18.1	
Total Delay		100.2	12.4		90.2	0.5	89.0	7.7	0.0	95.9	33.3	
LOS		F	B		F	A	F	A	A	F	C	
Approach Delay		29.0			34.7			8.3			34.1	
Approach LOS		C			C			A			C	
Queue Length 50th (ft)		17	0		9	0	5	129	0	20	334	
Queue Length 95th (ft)		40	3		27	0	20	431	0	50	#1917	
Internal Link Dist (ft)		518			182			1325			469	
Turn Bay Length (ft)			50			100	210		325	125		
Base Capacity (vph)		75	173		81	254	96	1449	1341	100	1585	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	333	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.19	0.35		0.10	0.05	0.04	0.38	0.00	0.17	1.02	

### Intersection Summary

Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.81  
 Intersection Signal Delay: 26.6  
 Intersection LOS: C  
 Intersection Capacity Utilization 87.3%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

### Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2019 Existing AM












---

Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

---

9: Lowell Road (Route 3A) & Pelham Road  
Lanes, Volumes, Timings

2019 Existing AM

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Lane Configurations							
Traffic Volume (vph)	225	71	436	82	62	1008	
Future Volume (vph)	225	71	436	82	62	1008	
Ideal Flow (vphpl)	1900	1000	1900	1900	1900	1900	
Lane Width (ft)	12	12	13	13	12	12	
Storage Length (ft)	0	75		0	150		
Storage Lanes	1	1		0	1		
Taper Length (ft)	25				50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850	0.979				
Fl <sub>t</sub> Protected	0.950				0.950		
Satd. Flow (prot)	1787	802	1836	0	1719	1863	
Fl <sub>t</sub> Permitted	0.950				0.950		
Satd. Flow (perm)	1787	802	1836	0	1719	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		29	8				
Link Speed (mph)	20		30			30	
Link Distance (ft)	512		549			1309	
Travel Time (s)	17.5		12.5			29.8	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.96	0.96	
Heavy Vehicles (%)	1%	6%	5%	3%	5%	2%	
Adj. Flow (vph)	256	81	474	89	65	1050	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	256	81	563	0	65	1050	
Turn Type	Prot	pt+ov	NA		Prot	NA	
Protected Phases	4	4 5	6		5	2	9
Permitted Phases							
Detector Phase	4	4 5	6		5	2	
Switch Phase							
Minimum Initial (s)	5.0		10.0		3.0	10.0	5.0
Minimum Split (s)	11.0		16.0		9.0	16.0	35.0
Total Split (s)	26.0		116.0		13.0	116.0	35.0
Total Split (%)	13.7%		61.1%		6.8%	61.1%	18%
Maximum Green (s)	20.0		110.0		7.0	110.0	29.0
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0		6.0		6.0	6.0	
Lead/Lag			Lag		Lead		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	1.5		1.5		1.5	1.5	3.0
Recall Mode	None		C-Min		None	C-Min	None
Walk Time (s)							5.0
Flash Dont Walk (s)							24.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	20.0	33.0	138.0		7.0	151.0	
Actuated g/C Ratio	0.11	0.17	0.73		0.04	0.79	
v/c Ratio	1.36	0.50	0.42		1.03	0.71	
Control Delay	250.3	56.6	13.1		204.4	15.5	

# 9: Lowell Road (Route 3A) & Pelham Road Lanes, Volumes, Timings

2019 Existing AM

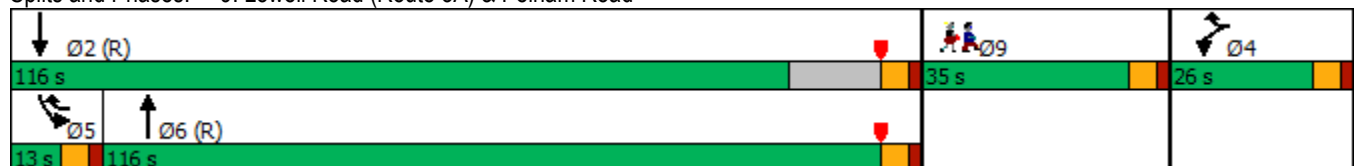


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Queue Delay	0.0	0.0	2.8		0.0	0.0	
Total Delay	250.3	56.6	16.0		204.4	15.5	
LOS	F	E	B		F	B	
Approach Delay	203.7		16.0			26.5	
Approach LOS	F		B			C	
Queue Length 50th (ft)	~419	59	217		~86	436	
Queue Length 95th (ft)	#599	122	523		#205	1285	
Internal Link Dist (ft)	432		469			1229	
Turn Bay Length (ft)		75			150		
Base Capacity (vph)	188	163	1336		63	1480	
Starvation Cap Reductn	0	0	639		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	1.36	0.50	0.81		1.03	0.71	

## Intersection Summary

Area Type: Other  
 Cycle Length: 190  
 Actuated Cycle Length: 190  
 Offset: 30 (16%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.36  
 Intersection Signal Delay: 53.2  
 Intersection LOS: D  
 Intersection Capacity Utilization 75.5%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

## Splits and Phases: 9: Lowell Road (Route 3A) & Pelham Road























**2019 Existing Weekday P.M.**



1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2019 Existing PM

												
Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	35	2	2	1	560	1	831	372	13	4	0	605
Future Volume (vph)	35	2	2	1	560	1	831	372	13	4	0	605
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0		100	0
Storage Lanes	1	1		1		1	1		0		1	1
Taper Length (ft)	25			100			75				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Fr <sub>t</sub>		0.850						0.995				0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1668	1507	0	1685	3610	0	1685	3558	0	0	1805	1615
Fl <sub>t</sub> Permitted	0.950			0.950			0.950				0.950	
Satd. Flow (perm)	1668	1507	0	1685	3610	0	1685	3558	0	0	1805	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191						4				269
Link Speed (mph)	30			35			35				35	
Link Distance (ft)	591			758			1733				622	
Travel Time (s)	13.4			14.8			33.8				12.1	
Peak Hour Factor	0.80	0.80	0.80	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	44	3	3	1	615	1	923	413	14	4	0	665
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	6	0	1	616	0	923	427	0	0	4	665
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3	3.5
Permitted Phases												
Detector Phase	4	4		1	6		5	2		3	3	3.5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	11.0	
Total Split (s)	21.0	21.0		16.0	32.0		51.0	67.0		16.0	16.0	
Total Split (%)	17.5%	17.5%		13.3%	26.7%		42.5%	55.8%		13.3%	13.3%	
Maximum Green (s)	15.0	15.0		10.0	26.0		45.0	61.0		10.0	10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	None	
Act Effct Green (s)	8.6	8.6		5.6	24.9		54.0	82.5			10.8	66.0
Actuated g/C Ratio	0.07	0.07		0.05	0.21		0.45	0.69			0.09	0.55
v/c Ratio	0.37	0.02		0.01	0.82		1.22	0.17			0.02	0.66
Control Delay	61.0	0.2		55.0	55.4		132.6	4.1			51.0	12.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	61.0	0.2		55.0	55.4		132.6	4.1			51.0	12.9
LOS	E	A		D	E		F	A			D	B

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2019 Existing PM

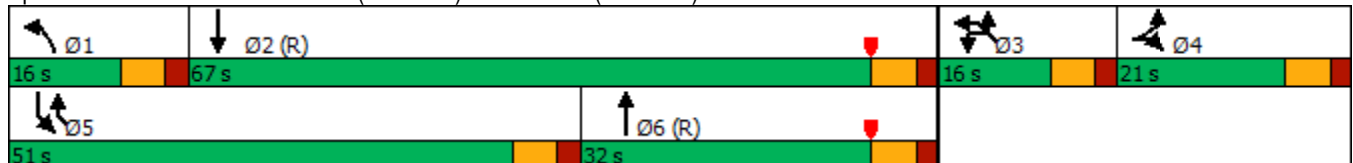


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Approach Delay	53.7			55.4			92.0			13.2		
Approach LOS	D			E			F			B		
Queue Length 50th (ft)	33	0		1	238		~920	10			3	131
Queue Length 95th (ft)	62	0		7	307		#1166	58			15	283
Internal Link Dist (ft)	511			678			1653			542		
Turn Bay Length (ft)	50			200			775			100		
Base Capacity (vph)	208	355		140	782		758	2447			162	1009
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.21	0.02		0.01	0.79		1.22	0.17			0.02	0.66

Intersection Summary






















Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 5 (4%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.22  
 Intersection Signal Delay: 63.2  
 Intersection LOS: E  
 Intersection Capacity Utilization 89.9%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-04  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road



2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue  
Lanes, Volumes, Timings

2019 Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	0	17	1	0	15	2	1210	5	23	1190	6
Future Volume (vph)	50	0	17	1	0	15	2	1210	5	23	1190	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.872			0.999			0.999	
Flt Protected		0.950			0.998		0.950			0.950		
Satd. Flow (prot)	0	1668	1507	0	1709	0	1685	3606	0	1805	3605	0
Flt Permitted		0.744			0.985		0.950			0.950		
Satd. Flow (perm)	0	1306	1507	0	1686	0	1685	3606	0	1805	3605	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82		82							1
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.84	0.84	0.84	0.80	0.80	0.80	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	9%
Adj. Flow (vph)	60	0	20	1	0	19	2	1301	5	26	1322	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	60	20	0	20	0	2	1306	0	26	1329	0
Turn Type	Perm	NA	Prot	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		7	7		3		1	6		5	2	
Permitted Phases	7			3								
Detector Phase	7	7	7	3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	32.0	32.0	32.0	32.0	32.0		27.0	61.0		27.0	61.0	
Total Split (%)	26.7%	26.7%	26.7%	26.7%	26.7%		22.5%	50.8%		22.5%	50.8%	
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		21.0	55.0		21.0	55.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		11.8	11.8		10.0		6.8	90.9		8.3	97.3	
Actuated g/C Ratio		0.10	0.10		0.08		0.06	0.76		0.07	0.81	
v/c Ratio		0.47	0.09		0.09		0.02	0.48		0.21	0.45	
Control Delay		61.9	0.8		0.9		59.5	6.6		47.0	3.6	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		61.9	0.8		0.9		59.5	6.6		47.0	3.6	
LOS		E	A		A		E	A		D	A	

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2019 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		46.6			0.9			6.7				4.4
Approach LOS		D			A			A				A
Queue Length 50th (ft)		45	0		0		0	148		20		80
Queue Length 95th (ft)		80	0		0		m2	226		m36		150
Internal Link Dist (ft)		430			477			1653				900
Turn Bay Length (ft)			50				300			350		
Base Capacity (vph)		282	390		429		294	2730		315		2924
Starvation Cap Reductn		0	0		0		0	0		0		0
Spillback Cap Reductn		0	0		0		0	0		0		0
Storage Cap Reductn		0	0		0		0	0		0		0
Reduced v/c Ratio		0.21	0.05		0.05		0.01	0.48		0.08		0.45

### Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 74 (62%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 6.7

Intersection LOS: A

Intersection Capacity Utilization 56.4%

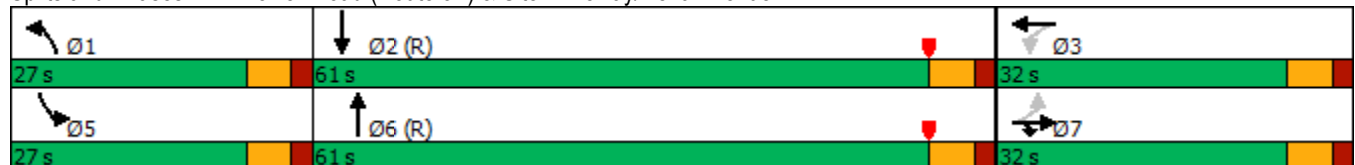
ICU Level of Service B

Analysis Period (min) 15

Description: NHDOT Int. No.: S-229-03

m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2019 Existing PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	248	13	113	88	20	244	95	1118	74	310	1030	197
Future Volume (vph)	248	13	113	88	20	244	95	1118	74	310	1030	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Fr <sub>t</sub>			0.850			0.850			0.850			0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3502	1963	1615	3502	1900	1669	3467	3610	1615	3502	3574	1615
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3502	1963	1615	3502	1900	1669	3467	3610	1615	3502	3574	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			247			136			197
Link Speed (mph)		30			30			35				30
Link Distance (ft)		401			449			980				1189
Travel Time (s)		9.1			10.2			19.1				27.0
Peak Hour Factor	0.88	0.88	0.88	0.86	0.86	0.86	0.89	0.89	0.89	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%
Adj. Flow (vph)	282	15	128	102	23	284	107	1256	83	341	1132	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	282	15	128	102	23	284	107	1256	83	341	1132	216
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4	4	3	8	8	1	6	6	5	2	2
Permitted Phases												
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	16.0
Total Split (s)	26.0	20.0	20.0	26.0	20.0	20.0	21.0	48.0	48.0	26.0	53.0	53.0
Total Split (%)	21.7%	16.7%	16.7%	21.7%	16.7%	16.7%	17.5%	40.0%	40.0%	21.7%	44.2%	44.2%
Maximum Green (s)	20.0	14.0	14.0	20.0	14.0	14.0	15.0	42.0	42.0	20.0	47.0	47.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	15.8	16.1	16.1	9.8	10.1	10.1	10.0	52.7	52.7	17.4	60.0	60.0
Actuated g/C Ratio	0.13	0.13	0.13	0.08	0.08	0.08	0.08	0.44	0.44	0.14	0.50	0.50
v/c Ratio	0.61	0.06	0.38	0.36	0.14	0.77	0.37	0.79	0.11	0.67	0.63	0.24
Control Delay	54.8	43.0	9.6	55.1	51.0	24.8	70.5	22.4	0.6	61.9	20.6	1.3
Queue Delay	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 Delay	54.8	43.0	9.6	55.1	51.0	24.8	70.5	22.4	0.6	61.9	20.6	1.3
LOS	D	D	A	E	D	C	E	C	A	E	C	A

### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2019 Existing PM

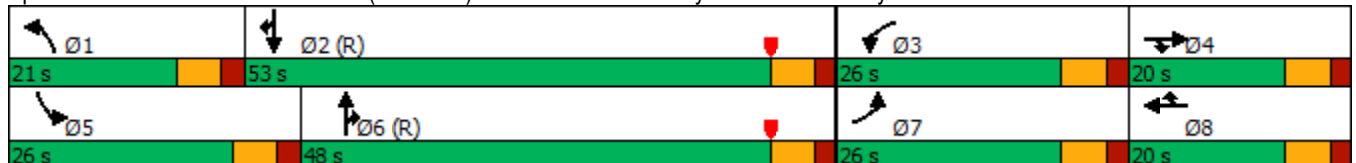


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		40.8			33.8			24.7			26.5	
Approach LOS		D			C			C			C	
Queue Length 50th (ft)	107	10	0	39	17	28	44	278	4	135	382	0
Queue Length 95th (ft)	144	29	44	63	41	101	75	#643	0	156	511	m22
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350		175	350		
Base Capacity (vph)	583	279	346	583	222	413	433	1585	785	583	1788	906
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.05	0.37	0.17	0.10	0.69	0.25	0.79	0.11	0.58	0.63	0.24

#### Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 64 (53%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.79  
 Intersection Signal Delay: 28.1  
 Intersection LOS: C  
 Intersection Capacity Utilization 68.5%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway





#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2019 Existing PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↖	↗	↖↖	↕↕	↕↕	↗
Traffic Volume (vph)	1423	1163	1025	604	427	1183
Future Volume (vph)	1423	1163	1025	604	427	1183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	3698	1706	3502	3610	3610	1599
Fl <sub>t</sub> Permitted	0.950		0.950			
Satd. Flow (perm)	3698	1706	3502	3610	3610	1599
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		523				739
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.96	0.96	0.94	0.94	0.89	0.89
Heavy Vehicles (%)	1%	1%	0%	0%	0%	1%
Adj. Flow (vph)	1482	1211	1090	643	480	1329
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1482	1211	1090	643	480	1329
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	50.0		40.0	67.0	30.0	
Total Split (%)	41.7%		33.3%	55.8%	25.0%	
Maximum Green (s)	44.0		32.0	60.0	23.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	45.7	120.0	32.0	61.3	21.3	120.0
Actuated g/C Ratio	0.38	1.00	0.27	0.51	0.18	1.00
v/c Ratio	1.05	0.71	1.17	0.35	0.75	0.83
Control Delay	76.0	2.5	114.5	9.0	54.6	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.0	2.5	114.5	9.0	54.6	5.2
LOS	E	A	F	A	D	A

# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2019 Existing PM

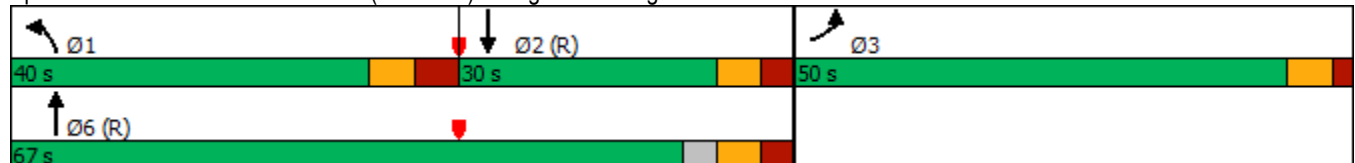


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	43.0			75.4	18.3	
Approach LOS	D			E	B	
Queue Length 50th (ft)	~665	0	~531	146	184	0
Queue Length 95th (ft)	#804	0	#644	113	240	0
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1407	1706	933	1895	691	1599
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	1.05	0.71	1.17	0.34	0.69	0.83

## Intersection Summary
























Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	100 (83%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Natural Cycle:	130
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.17
Intersection Signal Delay:	44.8
Intersection LOS:	D
Intersection Capacity Utilization:	98.3%
ICU Level of Service:	F
Analysis Period (min):	15
Description:	NHDOT Int. No.: S-229-02
~	Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road



5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road  
Lanes, Volumes, Timings

2019 Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	61	373	416	15	27	77	992	979	70	808	2
Future Volume (vph)	20	61	373	416	15	27	77	992	979	70	808	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		0
Storage Lanes	0		1	1		1	1		1	1		0
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850			
Flt Protected		0.988		0.950	0.956		0.950			0.950		
Satd. Flow (prot)	0	1877	1599	1658	1668	1546	1787	3574	1615	1805	3574	0
Flt Permitted		0.988		0.950	0.956		0.950			0.950		
Satd. Flow (perm)	0	1877	1599	1658	1668	1546	1787	3574	1615	1805	3574	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			68			89			384			
Link Speed (mph)		30			30			30				30
Link Distance (ft)		805			586			999				1515
Travel Time (s)		18.3			13.3			22.7				34.4
Peak Hour Factor	0.80	0.80	0.80	0.90	0.90	0.90	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	1%	1%	0%	0%	1%	0%
Adj. Flow (vph)	25	76	466	462	17	30	82	1055	1041	80	918	2
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	101	466	240	239	30	82	1055	1041	80	920	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	26.0	26.0	31.0	56.0	56.0	21.0	31.0	71.0	56.0	21.0	71.0	
Total Split (%)	14.1%	14.1%	16.8%	30.4%	30.4%	11.4%	16.8%	38.6%	30.4%	11.4%	38.6%	
Maximum Green (s)	20.0	20.0	25.0	50.0	50.0	15.0	25.0	65.0	50.0	15.0	65.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)		13.0	44.7	33.9	33.9	45.1	25.4	59.5	99.7	11.2	45.3	
Actuated g/C Ratio		0.09	0.31	0.24	0.24	0.32	0.18	0.42	0.70	0.08	0.32	
v/c Ratio		0.59	0.85	0.61	0.60	0.05	0.26	0.71	0.84	0.57	0.81	
Control Delay		81.7	57.2	57.2	56.9	0.2	61.1	39.3	16.8	85.7	51.8	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	
Total Delay		81.7	57.2	57.2	56.9	0.2	61.1	39.3	17.2	85.7	51.8	
LOS		F	E	E	E	A	E	D	B	F	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2019 Existing PM

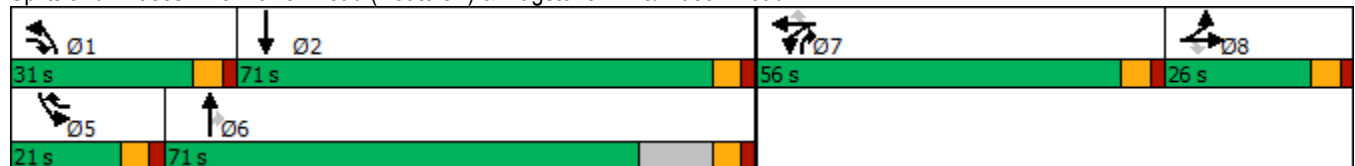


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		61.6			53.7			29.6				54.5
Approach LOS		E			D			C				D
Queue Length 50th (ft)		90	351	207	206	0	66	416	423	72		406
Queue Length 95th (ft)		165	#556	368	366	0	153	648	809	156		576
Internal Link Dist (ft)		725			506			919				1435
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		274	554	604	608	594	325	1955	1400	197		1694
Starvation Cap Reductn		0	0	0	0	0	0	0	85	0		0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0		0
Reduced v/c Ratio		0.37	0.84	0.40	0.39	0.05	0.25	0.54	0.79	0.41		0.54

## Intersection Summary























Area Type:	Other
Cycle Length:	184
Actuated Cycle Length:	142.6
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	42.6
Intersection LOS:	D
Intersection Capacity Utilization	84.1%
ICU Level of Service	E
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2019 Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	2	102	10	1	4	16	1022	12	5	780	7
Future Volume (vph)	25	2	102	10	1	4	16	1022	12	5	780	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	11	12	12
Storage Length (ft)	0		100	0		100	225		0	225		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.998			0.999	
Flt Protected		0.956			0.956		0.950			0.950		
Satd. Flow (prot)	0	1816	1583	0	1877	1669	1736	3568	0	1745	3571	0
Flt Permitted		0.445					0.950			0.950		
Satd. Flow (perm)	0	846	1583	0	1963	1669	1736	3568	0	1745	3571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			128			86		2				1
Link Speed (mph)		30			10			30				30
Link Distance (ft)		495			382			1515				1791
Travel Time (s)		11.3			26.0			34.4				40.7
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	4%	1%	0%	0%	1%	0%
Adj. Flow (vph)	31	3	128	13	1	5	17	1076	13	6	897	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	34	128	0	14	5	17	1089	0	6	905	0
Turn Type	Perm	NA	pt+ov	Perm	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases		4	4 1		8	8 5	1	6		5	2	
Permitted Phases	4			8								
Detector Phase	4	4	4 1	8	8	8 5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		8.0	21.0		8.0	21.0	
Total Split (s)	16.0	16.0		16.0	16.0		16.0	66.0		16.0	66.0	
Total Split (%)	14.0%	14.0%		14.0%	14.0%		14.0%	57.9%		14.0%	57.9%	
Maximum Green (s)	10.0	10.0		10.0	10.0		12.0	60.0		12.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		8.6	16.4		6.6	9.5	5.5	36.0		5.1	27.6	
Actuated g/C Ratio		0.14	0.26		0.10	0.15	0.09	0.57		0.08	0.44	
v/c Ratio		0.30	0.25		0.07	0.02	0.11	0.53		0.04	0.58	
Control Delay		37.4	5.2		33.0	0.0	35.0	11.4		35.2	15.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		37.4	5.2		33.0	0.0	35.0	11.4		35.2	15.9	
LOS		D	A		C	A	C	B		D	B	

6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2019 Existing PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		11.9			24.3			11.7				16.0
Approach LOS		B			C			B				B
Queue Length 50th (ft)		9	0		4	0	5	83		2		104
Queue Length 95th (ft)		43	24		22	0	30	293		15		226
Internal Link Dist (ft)		415			302			1435				1711
Turn Bay Length (ft)			100			100	225			225		
Base Capacity (vph)		142	619		331	432	351	3210		353		3212
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.24	0.21		0.04	0.01	0.05	0.34		0.02		0.28

Intersection Summary

Area Type:	Other
Cycle Length:	114
Actuated Cycle Length:	62.9
Natural Cycle:	55
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.58
Intersection Signal Delay:	13.6
Intersection LOS:	B
Intersection Capacity Utilization:	50.3%
ICU Level of Service:	A
Analysis Period (min):	15























Splits and Phases: 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive





7: Lowell Road (Route 3A) & Executive Drive  
Lanes, Volumes, Timings

2019 Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	218	3	78	23	2	22	50	933	7	16	629	39
Future Volume (vph)	218	3	78	23	2	22	50	933	7	16	629	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	15	12	12	13	11	12	12	11	12	12
Storage Length (ft)	0		225	0		80	350		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.999			0.991	
Flt Protected		0.953			0.957		0.950			0.950		
Satd. Flow (prot)	0	1733	1742	0	1818	1620	1678	3571	0	1646	3536	0
Flt Permitted		0.706			0.680		0.950			0.950		
Satd. Flow (perm)	0	1284	1742	0	1292	1620	1678	3571	0	1646	3536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			98			91		1				9
Link Speed (mph)		30			30			30				30
Link Distance (ft)		492			577			1791				1168
Travel Time (s)		11.2			13.1			40.7				26.5
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.97	0.97	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	2%	0%	0%	3%	4%	1%	0%	6%	1%	4%
Adj. Flow (vph)	273	4	98	29	3	28	52	962	7	17	684	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	277	98	0	32	28	52	969	0	17	726	0
Turn Type	Perm	NA	pt+ov	Perm	NA	Prot	Prot	NA		Prot	NA	
Protected Phases		8	8 1		4	4	1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8	8 1	4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		5.0	5.0	5.0	3.0	8.0		3.0	8.0	
Minimum Split (s)	9.0	9.0		11.0	11.0	11.0	9.0	14.0		9.0	14.0	
Total Split (s)	26.0	26.0		23.0	23.0	23.0	16.0	66.0		16.0	66.0	
Total Split (%)	24.1%	24.1%		21.3%	21.3%	21.3%	14.8%	61.1%		14.8%	61.1%	
Maximum Green (s)	20.0	20.0		17.0	17.0	17.0	10.0	60.0		10.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)		20.6	33.4		13.5	13.5	6.6	29.8		5.4	21.9	
Actuated g/C Ratio		0.32	0.52		0.21	0.21	0.10	0.46		0.08	0.34	
v/c Ratio		0.68	0.10		0.12	0.07	0.30	0.59		0.12	0.61	
Control Delay		33.9	3.4		21.9	0.3	34.8	14.7		34.0	20.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		33.9	3.4		21.9	0.3	34.8	14.7		34.0	20.4	
LOS		C	A		C	A	C	B		C	C	

# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2019 Existing PM

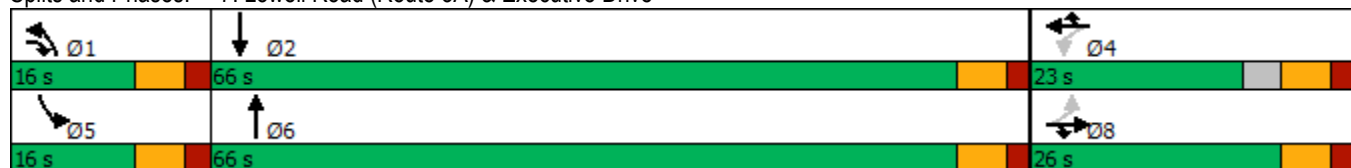


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		25.9			11.8			15.7				20.7
Approach LOS		C			B			B				C
Queue Length 50th (ft)		94	0		9	0	19	126		6		126
Queue Length 95th (ft)		#226	19		31	0	58	249		28		186
Internal Link Dist (ft)		412			497			1711				1088
Turn Bay Length (ft)			225			80	350			150		
Base Capacity (vph)		407	1038		410	576	266	3232		261		3201
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.68	0.09		0.08	0.05	0.20	0.30		0.07		0.23

## Intersection Summary

Area Type:	Other
Cycle Length:	108
Actuated Cycle Length:	64.8
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	19.0
Intersection LOS:	B
Intersection Capacity Utilization:	63.2%
ICU Level of Service:	B
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	























## Splits and Phases: 7: Lowell Road (Route 3A) & Executive Drive



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2019 Existing PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	25	31	0	48	27	1112	15	56	637	11
Future Volume (vph)	9	2	25	31	0	48	27	1112	15	56	637	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.997	
Flt Protected		0.962			0.950		0.950			0.950		
Satd. Flow (prot)	0	1828	1583	0	1865	1669	1745	1818	1615	1805	1876	0
Flt Permitted		0.746			0.748		0.950			0.950		
Satd. Flow (perm)	0	1417	1583	0	1469	1669	1745	1818	1615	1805	1876	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			60			91			1
Link Speed (mph)		10			30			30				30
Link Distance (ft)		598			262			1405				549
Travel Time (s)		40.8			6.0			31.9				12.5
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.99	0.99	0.99	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	11	3	31	39	0	60	27	1123	15	60	678	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	31	0	39	60	27	1123	15	60	690	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA	Prot	Prot	NA	
Protected Phases		8	8		4	5	1	6	6	5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0	116.0	16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%	64.4%	8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0	110.0	10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.1	8.1		8.1	20.7	6.6	140.9	140.9	8.8	146.5	
Actuated g/C Ratio		0.04	0.04		0.04	0.12	0.04	0.78	0.78	0.05	0.81	
v/c Ratio		0.22	0.20		0.59	0.25	0.42	0.79	0.01	0.68	0.45	
Control Delay		90.1	2.8		117.7	16.3	103.9	19.7	0.0	119.5	9.7	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2019 Existing PM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2019 Existing PM

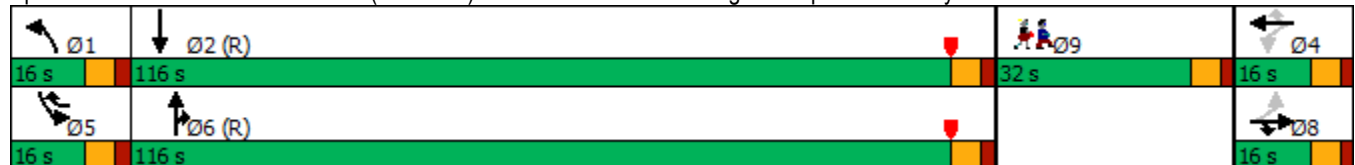


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		1.8
Total Delay		90.1	2.8		117.7	16.3	103.9	19.7	0.0	119.5		11.5
LOS		F	A		F	B	F	B	A	F		B
Approach Delay		29.9			56.2			21.4				20.2
Approach LOS		C			E			C				C
Queue Length 50th (ft)		16	0		46	0	32	627	0	71		204
Queue Length 95th (ft)		40	0		81	36	70	#1657	0	#134		606
Internal Link Dist (ft)		518			182			1325				469
Turn Bay Length (ft)			50			100	210		325	125		
Base Capacity (vph)		78	173		81	255	96	1423	1284	100		1527
Starvation Cap Reductn		0	0		0	0	0	0	0	0		640
Spillback Cap Reductn		0	0		0	0	0	0	0	0		0
Storage Cap Reductn		0	0		0	0	0	0	0	0		0
Reduced v/c Ratio		0.18	0.18		0.48	0.24	0.28	0.79	0.01	0.60		0.78

### Intersection Summary

Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.79  
 Intersection Signal Delay: 22.8  
 Intersection LOS: C  
 Intersection Capacity Utilization 81.9%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

### Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
Lanes, Volumes, Timings

2019 Existing PM

---












Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

---



9: Lowell Road (Route 3A) & Pelham Road  
Lanes, Volumes, Timings

2019 Existing PM

							Ø9
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (vph)	83	138	1054	106	107	627	
Future Volume (vph)	83	138	1054	106	107	627	
Ideal Flow (vphpl)	1900	1000	1900	1900	1900	1900	
Lane Width (ft)	12	12	13	13	12	12	
Storage Length (ft)	0	75		0	150		
Storage Lanes	1	1		0	1		
Taper Length (ft)	25				50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850	0.988				
Fl <sub>t</sub> Protected	0.950				0.950		
Satd. Flow (prot)	1805	850	1922	0	1805	1881	
Fl <sub>t</sub> Permitted	0.950				0.950		
Satd. Flow (perm)	1805	850	1922	0	1805	1881	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		154	5				
Link Speed (mph)	20		30			30	
Link Distance (ft)	512		549			1309	
Travel Time (s)	17.5		12.5			29.8	
Peak Hour Factor	0.87	0.87	0.98	0.98	0.89	0.89	
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	
Adj. Flow (vph)	95	159	1076	108	120	704	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	95	159	1184	0	120	704	
Turn Type	Prot	pt+ov	NA		Prot	NA	
Protected Phases	4	4 5	6		5	2	9
Permitted Phases							
Detector Phase	4	4 5	6		5	2	
Switch Phase							
Minimum Initial (s)	5.0		10.0		3.0	10.0	5.0
Minimum Split (s)	11.0		16.0		9.0	16.0	35.0
Total Split (s)	26.0		116.0		13.0	116.0	35.0
Total Split (%)	13.7%		61.1%		6.8%	61.1%	18%
Maximum Green (s)	20.0		110.0		7.0	110.0	29.0
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0		6.0		6.0	6.0	
Lead/Lag			Lag		Lead		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	1.5		1.5		1.5	1.5	3.0
Recall Mode	None		C-Min		None	C-Min	None
Walk Time (s)							5.0
Flash Dont Walk (s)							24.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	14.0	27.0	144.0		7.0	157.0	
Actuated g/C Ratio	0.07	0.14	0.76		0.04	0.83	
v/c Ratio	0.72	0.63	0.81		1.82	0.45	
Control Delay	113.5	21.8	22.5		463.5	8.2	

9: Lowell Road (Route 3A) & Pelham Road  
Lanes, Volumes, Timings

2019 Existing PM

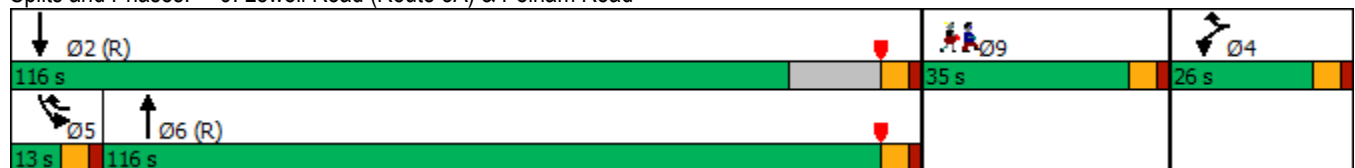


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Queue Delay	0.0	0.0	46.4		0.0	0.0	
Total Delay	113.5	21.8	69.0		463.5	8.2	
LOS	F	C	E		F	A	
Approach Delay	56.1		69.0			74.5	
Approach LOS	E		E			E	
Queue Length 50th (ft)	118	6	701		~224	156	
Queue Length 95th (ft)	178	80	#1887		#369	585	
Internal Link Dist (ft)	432		469			1229	
Turn Bay Length (ft)		75			150		
Base Capacity (vph)	190	251	1458		66	1554	
Starvation Cap Reductn	0	0	377		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.50	0.63	1.10		1.82	0.45	

Intersection Summary

Area Type: Other  
 Cycle Length: 190  
 Actuated Cycle Length: 190  
 Offset: 30 (16%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.82  
 Intersection Signal Delay: 69.5  
 Intersection LOS: E  
 Intersection Capacity Utilization 88.1%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 9: Lowell Road (Route 3A) & Pelham Road



## **Appendix E**

### **Capacity Analysis – 2022 No-Build Traffic Conditions**

**2022 No-Build Weekday A.M.**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2022 No-Build AM



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	262	0	466	503	12	1	816
Future Volume (vph)	2	0	2	0	262	0	466	503	12	1	816
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0	100	0
Storage Lanes	1	1		1		1	1		0	1	1
Taper Length (ft)	25			100			75			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00
Fr <sub>t</sub>		0.850						0.997			0.850
Fl <sub>t</sub> Protected	0.950						0.950			0.950	
Satd. Flow (prot)	1685	1133	0	1773	3574	0	1652	3564	0	1805	1583
Fl <sub>t</sub> Permitted	0.950						0.950			0.950	
Satd. Flow (perm)	1685	1133	0	1773	3574	0	1652	3564	0	1805	1583
Right Turn on Red			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		545						3			477
Link Speed (mph)	30				35			35		35	
Link Distance (ft)	591				758			1733		622	
Travel Time (s)	13.4				14.8			33.8		12.1	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.92	0.92	0.92	0.86	0.86
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Adj. Flow (vph)	3	0	3	0	328	0	507	547	13	1	949
Shared Lane Traffic (%)											
Lane Group Flow (vph)	3	3	0	0	328	0	507	560	0	1	949
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5
Permitted Phases											
Detector Phase	4	4		1	6		5	2		3	3 5
Switch Phase											
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	
Total Split (s)	16.0	16.0		16.0	20.0		38.0	42.0		16.0	
Total Split (%)	17.8%	17.8%		17.8%	22.2%		42.2%	46.7%		17.8%	
Maximum Green (s)	10.0	10.0		10.0	14.0		32.0	36.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	
Act Effct Green (s)	5.8	5.8			21.0		37.3	64.3		11.2	53.3
Actuated g/C Ratio	0.06	0.06			0.23		0.41	0.71		0.12	0.59
v/c Ratio	0.03	0.01			0.39		0.74	0.22		0.00	0.84
Control Delay	40.0	0.0			32.8		37.3	3.4		36.0	15.2
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0
Total Delay	40.0	0.0			32.8		37.3	3.4		36.0	15.2
LOS	D	A			C		D	A		D	B

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2022 No-Build AM

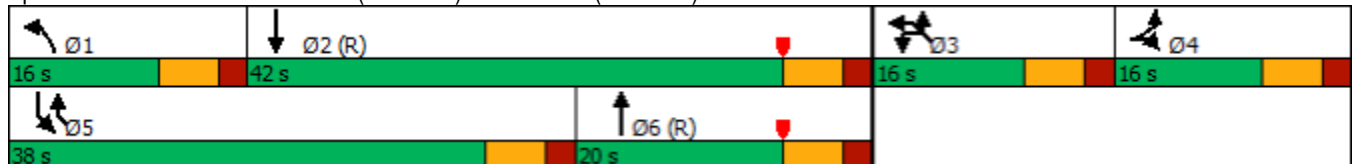


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Approach Delay	20.0			32.8			19.5			15.2	
Approach LOS	B			C			B			B	
Queue Length 50th (ft)	2	0		84			293	114	1 168		
Queue Length 95th (ft)	9	0		119			#382	2	5 #319		
Internal Link Dist (ft)	511			678			1653			542	
Turn Bay Length (ft)	50			775			100				
Base Capacity (vph)	187	610		833			700	2548	224 1142		
Starvation Cap Reductn	0	0		0			0	0	0 0		
Spillback Cap Reductn	0	0		0			0	0	0 0		
Storage Cap Reductn	0	0		0			0	0	0 0		
Reduced v/c Ratio	0.02	0.00		0.39			0.72	0.22	0.00 0.83		

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.84  
 Intersection Signal Delay: 19.6 Intersection LOS: B  
 Intersection Capacity Utilization 67.8% ICU Level of Service C  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-04  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.






















Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road





2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue  
Lanes, Volumes, Timings

2022 No-Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	2	1	1	33	15	1110	2	7	983	51
Future Volume (vph)	3	0	2	1	1	33	15	1110	2	7	983	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.872							0.993
Flt Protected		0.950			0.999		0.950			0.950		
Satd. Flow (prot)	0	1685	1133	0	1659	0	1685	3538	0	1570	3518	0
Flt Permitted		0.851			0.991		0.950			0.950		
Satd. Flow (perm)	0	1509	1133	0	1646	0	1685	3538	0	1570	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109		39							8
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.80	0.80	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	0%
Adj. Flow (vph)	4	0	3	1	1	39	18	1306	2	7	1035	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	3	0	41	0	18	1308	0	7	1089	0
Turn Type	Perm	NA	Prot	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		7	7		3		1	6		5	2	
Permitted Phases	7			3								
Detector Phase	7	7	7	3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0	21.0	21.0	21.0		21.0	51.0		18.0	48.0	
Total Split (%)	23.3%	23.3%	23.3%	23.3%	23.3%		23.3%	56.7%		20.0%	53.3%	
Maximum Green (s)	15.0	15.0	15.0	15.0	15.0		15.0	45.0		12.0	42.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		7.2	7.2		7.3		7.6	75.3		7.0	72.2	
Actuated g/C Ratio		0.08	0.08		0.08		0.08	0.84		0.08	0.80	
v/c Ratio		0.03	0.02		0.24		0.13	0.44		0.06	0.39	
Control Delay		38.0	0.0		17.1		40.5	3.8		24.4	11.0	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		38.0	0.0		17.1		40.5	3.8		24.4	11.0	
LOS		D	A		B		D	A		C	B	

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2022 No-Build AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		21.7			17.1			4.3				11.1
Approach LOS		C			B			A				B
Queue Length 50th (ft)		2	0		1		9	106		4		230
Queue Length 95th (ft)		11	0		28		m15	193		m10		182
Internal Link Dist (ft)		430			477			1653				900
Turn Bay Length (ft)			50				300			350		
Base Capacity (vph)		251	279		306		280	2959		209		2825
Starvation Cap Reductn		0	0		0		0	0		0		0
Spillback Cap Reductn		0	0		0		0	0		0		0
Storage Cap Reductn		0	0		0		0	0		0		0
Reduced v/c Ratio		0.02	0.01		0.13		0.06	0.44		0.03		0.39

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 51 (57%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 7.6

Intersection LOS: A

Intersection Capacity Utilization 52.1%

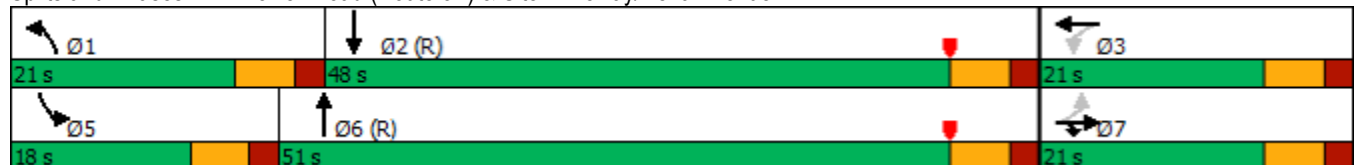
ICU Level of Service A

Analysis Period (min) 15

Description: NHDOT Int. No.: S-229-03






























m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2022 No-Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 			 	 		 	 	
Traffic Volume (vph)	101	4	55	15	5	71	62	1062	27	85	962	63
Future Volume (vph)	101	4	55	15	5	71	62	1062	27	85	962	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Fr <sub>t</sub>			0.850			0.850			0.850			0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3467	1852	1568	3502	1900	1589	3467	3539	1583	3433	3574	1583
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	1852	1568	3502	1900	1589	3467	3539	1583	3433	3574	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			182			182			182
Link Speed (mph)		30			30			35			30	
Link Distance (ft)		401			449			980			1189	
Travel Time (s)		9.1			10.2			19.1			27.0	
Peak Hour Factor	0.93	0.93	0.93	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	1%	6%	3%	0%	0%	5%	1%	2%	2%	2%	1%	2%
Adj. Flow (vph)	109	4	59	17	6	81	71	1221	31	89	1002	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	4	59	17	6	81	71	1221	31	89	1002	66
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4	4	3	8	8	1	6	6	5	2	2
Permitted Phases												
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	16.0
Total Split (s)	17.0	16.0	16.0	17.0	16.0	16.0	16.0	41.0	41.0	16.0	41.0	41.0
Total Split (%)	18.9%	17.8%	17.8%	18.9%	17.8%	17.8%	17.8%	45.6%	45.6%	17.8%	45.6%	45.6%
Maximum Green (s)	11.0	10.0	10.0	11.0	10.0	10.0	10.0	35.0	35.0	10.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	9.1	14.0	14.0	7.0	6.9	6.9	8.2	50.2	50.2	8.7	50.6	50.6
Actuated g/C Ratio	0.10	0.16	0.16	0.08	0.08	0.08	0.09	0.56	0.56	0.10	0.56	0.56
v/c Ratio	0.31	0.01	0.15	0.06	0.04	0.28	0.23	0.62	0.03	0.27	0.50	0.07
Control Delay	39.5	34.2	0.8	38.7	38.8	2.4	42.5	13.8	0.1	48.9	15.5	0.3
Queue Delay	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 Delay	39.5	34.2	0.8	38.7	38.8	2.4	42.5	13.8	0.1	48.9	15.5	0.3
LOS	D	C	A	D	D	A	D	B	A	D	B	A

### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2022 No-Build AM

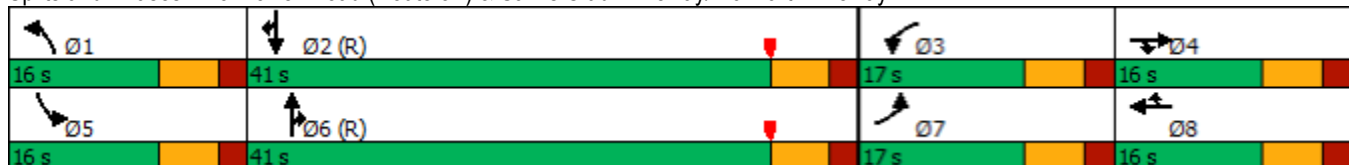


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		26.1			10.4			15.1			17.2	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	29	2	0	4	3	0	17	250	0	25	255	1
Queue Length 95th (ft)	54	12	0	14	15	0	44	85	m0	m46	339	m1
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350		175	350		
Base Capacity (vph)	423	302	408	428	211	338	385	1973	963	386	2010	970
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.01	0.14	0.04	0.03	0.24	0.18	0.62	0.03	0.23	0.50	0.07

#### Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 51 (57%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.62  
 Intersection Signal Delay: 16.5  
 Intersection LOS: B  
 Intersection Capacity Utilization 55.9%  
 ICU Level of Service B  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway



#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2022 No-Build AM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗	↔↔	↕↕	↕↕	↗↗
Traffic Volume (vph)	948	854	887	339	336	1517
Future Volume (vph)	948	854	887	339	336	1517
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	0.88
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	3662	1689	3467	3539	3539	2760
Fl <sub>t</sub> Permitted	0.950		0.950			
Satd. Flow (perm)	3662	1689	3467	3539	3539	2760
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		769				1283
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.94	0.94	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	1%	2%	2%	3%
Adj. Flow (vph)	1009	909	964	368	365	1649
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1009	909	964	368	365	1649
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	32.0		31.0	58.0	27.0	
Total Split (%)	35.6%		34.4%	64.4%	30.0%	
Maximum Green (s)	26.0		23.0	51.0	20.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	28.8	90.0	24.5	48.2	15.7	90.0
Actuated g/C Ratio	0.32	1.00	0.27	0.54	0.17	1.00
v/c Ratio	0.86	0.54	1.02	0.19	0.59	0.60
Control Delay	38.4	1.2	60.2	2.9	37.8	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	1.2	60.2	2.9	37.8	1.0
LOS	D	A	E	A	D	A

# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2022 No-Build AM

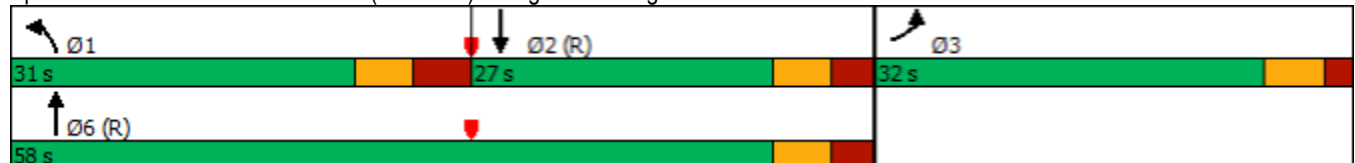


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	20.8			44.4	7.6	
Approach LOS	C			D	A	
Queue Length 50th (ft)	266	0	~313	7	102	0
Queue Length 95th (ft)	#416	0	#425	4	138	0
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1170	1689	944	2005	786	2760
Starvation 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	0.86	0.54	1.02	0.18	0.46	0.60

## Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	70 (78%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.02
Intersection Signal Delay:	21.7
Intersection LOS:	C
Intersection Capacity Utilization:	78.3%
ICU Level of Service:	D
Analysis Period (min):	15
Description:	NHDOT Int. No.: S-229-02
~	Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road




























# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road

## Lanes, Volumes, Timings

2022 No-Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	28	282	614	41	30	303	779	188	15	1037	10
Future Volume (vph)	65	28	282	614	41	30	303	779	188	15	1037	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		1	1		1	1		1	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (prot)	0	1835	1583	1641	1657	1501	1787	3539	1583	1752	5078	0
Flt Permitted		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (perm)	0	1835	1583	1641	1657	1501	1787	3539	1583	1752	5078	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			53			89			198			1
Link Speed (mph)		30			30			30				30
Link Distance (ft)		805			586			999				1515
Travel Time (s)		18.3			13.3			22.7				34.4
Peak Hour Factor	0.81	0.81	0.81	0.94	0.94	0.94	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	1%	0%	4%	1%	2%	2%	3%	2%	6%
Adj. Flow (vph)	80	35	348	653	44	32	319	820	198	17	1192	11
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	115	348	346	351	32	319	820	198	17	1203	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	26.0	26.0	31.0	56.0	56.0	21.0	31.0	71.0	56.0	21.0	71.0	
Total Split (%)	14.1%	14.1%	16.8%	30.4%	30.4%	11.4%	16.8%	38.6%	30.4%	11.4%	38.6%	
Maximum Green (s)	20.0	20.0	25.0	50.0	50.0	15.0	25.0	65.0	50.0	15.0	65.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)		14.3	46.1	38.2	38.2	44.9	25.7	68.8	113.2	6.7	46.9	
Actuated g/C Ratio		0.10	0.31	0.26	0.26	0.30	0.17	0.46	0.76	0.04	0.31	
v/c Ratio		0.66	0.66	0.83	0.83	0.06	1.04	0.50	0.16	0.22	0.76	
Control Delay		87.4	48.0	71.2	71.5	0.2	121.9	32.3	1.0	84.4	50.3	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		87.4	48.0	71.2	71.5	0.2	121.9	32.3	1.0	84.4	50.3	
LOS		F	D	E	E	A	F	C	A	F	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2022 No-Build AM

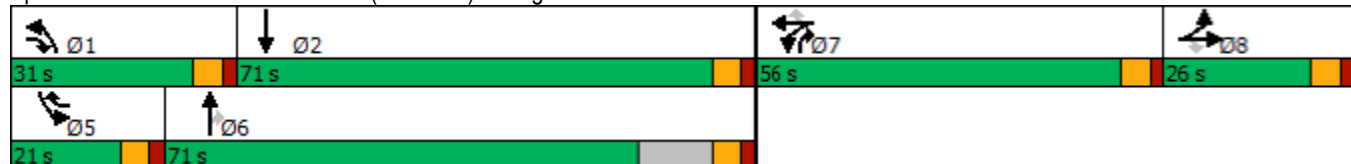


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		57.8			68.2			49.1				50.7
Approach LOS		E			E			D				D
Queue Length 50th (ft)		111	257	336	342	0	~349	308	0	16	390	
Queue Length 95th (ft)		184	386	540	546	0	#691	445	22	48	485	
Internal Link Dist (ft)		725			506			919			1435	
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		251	524	562	567	594	306	1830	1352	180	2263	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.46	0.66	0.62	0.62	0.05	1.04	0.45	0.15	0.09	0.53	

## Intersection Summary























Area Type:	Other
Cycle Length:	184
Actuated Cycle Length:	149.8
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.04
Intersection Signal Delay:	54.4
Intersection LOS:	D
Intersection Capacity Utilization	76.8%
ICU Level of Service	D
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2022 No-Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	0	11	2	2	4	116	746	2	2	1099	59
Future Volume (vph)	8	0	11	2	2	4	116	746	2	2	1099	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	11	12	12
Storage Length (ft)	0		100	0		100	225		0	225		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850						0.992
Flt Protected		0.950			0.976		0.950			0.950		
Satd. Flow (prot)	0	1719	1455	0	1916	1669	1752	3505	0	1745	3477	0
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	1810	1455	0	1963	1669	1752	3505	0	1745	3477	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			86			86						7
Link Speed (mph)		30			10			30				30
Link Distance (ft)		495			382			1515				1791
Travel Time (s)		11.3			26.0			34.4				40.7
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.90	0.90	0.90	0.83	0.83	0.83
Heavy Vehicles (%)	5%	0%	11%	0%	0%	0%	3%	3%	0%	0%	3%	3%
Adj. Flow (vph)	10	0	14	3	3	5	129	829	2	2	1324	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	14	0	6	5	129	831	0	2	1395	0
Turn Type	Perm	NA	pt+ov	Perm	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases		4	4 1		8	8 5	1	6		5	2	
Permitted Phases	4			8								
Detector Phase	4	4	4 1	8	8	8 5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		8.0	21.0		8.0	21.0	
Total Split (s)	16.0	16.0		16.0	16.0		16.0	66.0		16.0	66.0	
Total Split (%)	14.0%	14.0%		14.0%	14.0%		14.0%	57.9%		14.0%	57.9%	
Maximum Green (s)	10.0	10.0		10.0	10.0		12.0	60.0		12.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		7.4	11.2		6.5	9.1	10.7	65.4		5.2	46.5	
Actuated g/C Ratio		0.10	0.15		0.09	0.12	0.14	0.86		0.07	0.61	
v/c Ratio		0.06	0.05		0.04	0.02	0.53	0.28		0.02	0.66	
Control Delay		43.4	0.4		45.6	0.0	46.1	5.0		47.5	14.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		43.4	0.4		45.6	0.0	46.1	5.0		47.5	14.2	
LOS		D	A		D	A	D	A		D	B	

# 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive Lanes, Volumes, Timings

2022 No-Build AM

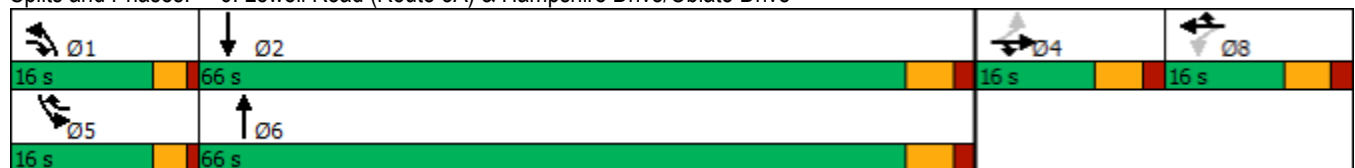


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		18.3			24.9			10.5				14.2
Approach LOS		B			C			B				B
Queue Length 50th (ft)		3	0		2	0	43	0		1		128
Queue Length 95th (ft)		22	0		16	0	#174	193		8		405
Internal Link Dist (ft)		415			302			1435				1711
Turn Bay Length (ft)			100			100	225			225		
Base Capacity (vph)		265	337		287	377	308	2990		307		2843
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.04	0.04		0.02	0.01	0.42	0.28		0.01		0.49

## Intersection Summary























Area Type: Other  
 Cycle Length: 114  
 Actuated Cycle Length: 76.2  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.66  
 Intersection Signal Delay: 12.8  
 Intersection LOS: B  
 Intersection Capacity Utilization 58.7%  
 ICU Level of Service B  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

## Splits and Phases: 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive



# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2022 No-Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	2	10	141	30	101	164	423	60	107	1001	203
Future Volume (vph)	36	2	10	141	30	101	164	423	60	107	1001	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	15	12	12	13	11	12	12	11	12	12
Storage Length (ft)	0		225	0		80	350		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.981			0.975	
Flt Protected		0.955			0.961		0.950			0.950		
Satd. Flow (prot)	0	1577	1558	0	1811	1620	1711	3409	0	1728	3451	0
Flt Permitted		0.485			0.731		0.950			0.950		
Satd. Flow (perm)	0	801	1558	0	1378	1620	1711	3409	0	1728	3451	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30			101		23			35	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		492			577			1791			1168	
Travel Time (s)		11.2			13.1			40.7			26.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	12%	0%	14%	1%	0%	3%	2%	4%	3%	1%	2%	2%
Adj. Flow (vph)	45	3	13	176	38	126	180	465	66	118	1100	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	48	13	0	214	126	180	531	0	118	1323	0
Turn Type	Perm	NA	pt+ov	Perm	NA	Prot	Prot	NA		Prot	NA	
Protected Phases		8	8 1		4	4	1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8	8 1	4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		5.0	5.0	5.0	3.0	8.0		3.0	8.0	
Minimum Split (s)	9.0	9.0		11.0	11.0	11.0	9.0	14.0		9.0	14.0	
Total Split (s)	26.0	26.0		23.0	23.0	23.0	16.0	66.0		16.0	66.0	
Total Split (%)	24.1%	24.1%		21.3%	21.3%	21.3%	14.8%	61.1%		14.8%	61.1%	
Maximum Green (s)	20.0	20.0		17.0	17.0	17.0	10.0	60.0		10.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)		12.1	25.6		15.9	15.9	10.2	44.3		9.1	43.3	
Actuated g/C Ratio		0.14	0.29		0.18	0.18	0.12	0.51		0.10	0.49	
v/c Ratio		0.44	0.03		0.86	0.34	0.91	0.31		0.66	0.77	
Control Delay		49.0	3.3		68.4	14.0	87.0	12.5		59.3	20.8	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		49.0	3.3		68.4	14.0	87.0	12.5		59.3	20.8	
LOS		D	A		E	B	F	B		E	C	

# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2022 No-Build AM

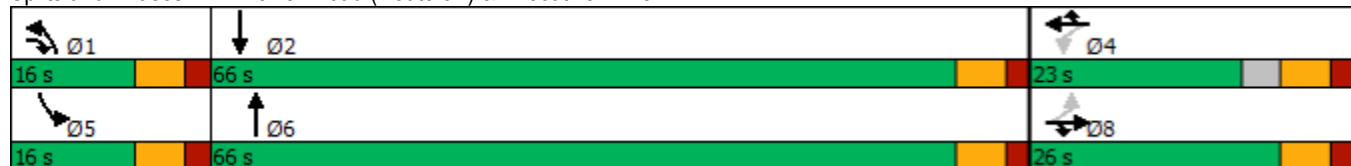


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		39.2			48.2			31.4				23.9
Approach LOS		D			D			C				C
Queue Length 50th (ft)		23	0		115	12	101	85		64		296
Queue Length 95th (ft)		59	4		#238	52	#277	117		#167		375
Internal Link Dist (ft)		412			497			1711				1088
Turn Bay Length (ft)			225			80	350			150		
Base Capacity (vph)		186	552		320	454	198	2385		201		2418
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.26	0.02		0.67	0.28	0.91	0.22		0.59		0.55

## Intersection Summary

Area Type:	Other
Cycle Length:	108
Actuated Cycle Length:	87.7
Natural Cycle:	70
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.91
Intersection Signal Delay:	29.6
Intersection LOS:	C
Intersection Capacity Utilization	74.3%
ICU Level of Service	D
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	






















## Splits and Phases: 7: Lowell Road (Route 3A) & Executive Drive





# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2022 No-Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	48	6	0	10	4	534	1	16	1267	3
Future Volume (vph)	11	0	48	6	0	10	4	534	1	16	1267	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1719	1583	0	1865	1669	1745	1766	1615	1805	1863	0
Flt Permitted		0.752			0.748		0.950			0.950		
Satd. Flow (perm)	0	1361	1583	0	1469	1669	1745	1766	1615	1805	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			55			91			
Link Speed (mph)		10			30			30			30	
Link Distance (ft)		598			262			1405			549	
Travel Time (s)		40.8			6.0			31.9			12.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	5%	0%	2%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Adj. Flow (vph)	14	0	60	8	0	13	4	587	1	17	1334	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	60	0	8	13	4	587	1	17	1337	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA	Prot	Prot	NA	
Protected Phases		8	8		4	5	1	6	6	5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0	116.0	16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%	64.4%	8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0	110.0	10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		6.3	6.3		6.3	18.3	5.0	147.7	147.7	6.0	153.1	
Actuated g/C Ratio		0.04	0.04		0.04	0.10	0.03	0.82	0.82	0.03	0.85	
v/c Ratio		0.30	0.42		0.16	0.06	0.08	0.41	0.00	0.28	0.84	
Control Delay		100.2	12.4		90.2	0.5	89.0	8.0	0.0	95.9	16.8	

8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
Lanes, Volumes, Timings

2022 No-Build AM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2022 No-Build AM

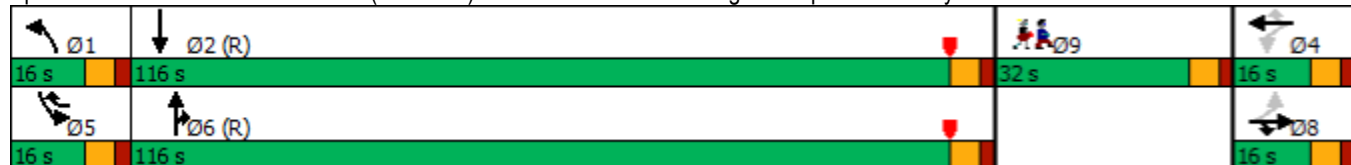


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	22.6	
Total Delay		100.2	12.4		90.2	0.5	89.0	8.0	0.0	95.9	39.4	
LOS		F	B		F	A	F	A	A	F	D	
Approach Delay		29.0			34.7			8.6			40.1	
Approach LOS		C			C			A			D	
Queue Length 50th (ft)		17	0		9	0	5	143	0	20	390	
Queue Length 95th (ft)		40	3		27	0	20	475	0	50	#2059	
Internal Link Dist (ft)		518			182			1325			469	
Turn Bay Length (ft)			50			100	210		325	125		
Base Capacity (vph)		75	173		81	254	96	1449	1341	100	1585	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	295	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.19	0.35		0.10	0.05	0.04	0.41	0.00	0.17	1.04	

### Intersection Summary

Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.84  
 Intersection Signal Delay: 30.5  
 Intersection LOS: C  
 Intersection Capacity Utilization 90.2%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

### Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



## 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2022 No-Build AM












---

Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

---

9: Lowell Road (Route 3A) & Pelham Road  
Lanes, Volumes, Timings

2022 No-Build AM

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Lane Configurations							
Traffic Volume (vph)	232	73	468	84	64	1058	
Future Volume (vph)	232	73	468	84	64	1058	
Ideal Flow (vphpl)	1900	1000	1900	1900	1900	1900	
Lane Width (ft)	12	12	13	13	12	12	
Storage Length (ft)	0	75		0	150		
Storage Lanes	1	1		0	1		
Taper Length (ft)	25				50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850	0.980				
Fl <sub>t</sub> Protected	0.950				0.950		
Satd. Flow (prot)	1787	802	1838	0	1719	1863	
Fl <sub>t</sub> Permitted	0.950				0.950		
Satd. Flow (perm)	1787	802	1838	0	1719	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		29	8				
Link Speed (mph)	20		30			30	
Link Distance (ft)	512		549			1309	
Travel Time (s)	17.5		12.5			29.8	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.96	0.96	
Heavy Vehicles (%)	1%	6%	5%	3%	5%	2%	
Adj. Flow (vph)	264	83	509	91	67	1102	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	264	83	600	0	67	1102	
Turn Type	Prot	pt+ov	NA		Prot	NA	
Protected Phases	4	4 5	6		5	2	9
Permitted Phases							
Detector Phase	4	4 5	6		5	2	
Switch Phase							
Minimum Initial (s)	5.0		10.0		3.0	10.0	5.0
Minimum Split (s)	11.0		16.0		9.0	16.0	35.0
Total Split (s)	26.0		116.0		13.0	116.0	35.0
Total Split (%)	13.7%		61.1%		6.8%	61.1%	18%
Maximum Green (s)	20.0		110.0		7.0	110.0	29.0
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0		6.0		6.0	6.0	
Lead/Lag			Lag		Lead		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	1.5		1.5		1.5	1.5	3.0
Recall Mode	None		C-Min		None	C-Min	None
Walk Time (s)							5.0
Flash Dont Walk (s)							24.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	20.0	33.0	138.0		7.0	151.0	
Actuated g/C Ratio	0.11	0.17	0.73		0.04	0.79	
v/c Ratio	1.40	0.51	0.45		1.06	0.74	
Control Delay	265.8	57.8	13.6		211.0	16.5	

# 9: Lowell Road (Route 3A) & Pelham Road Lanes, Volumes, Timings

2022 No-Build AM

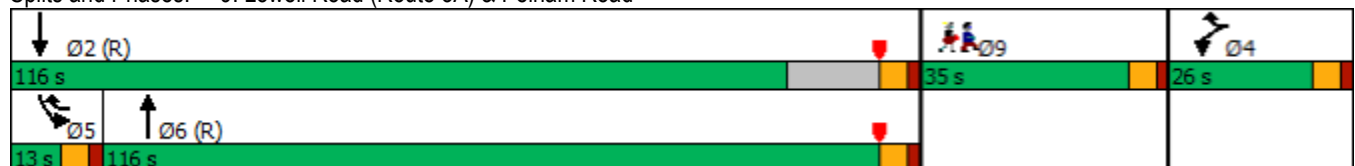


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Queue Delay	0.0	0.0	3.3		0.0	0.0	
Total Delay	265.8	57.8	17.0		211.0	16.5	
LOS	F	E	B		F	B	
Approach Delay	216.0		17.0			27.7	
Approach LOS	F		B			C	
Queue Length 50th (ft)	~439	62	238		~91	488	
Queue Length 95th (ft)	#620	125	572		#210	1449	
Internal Link Dist (ft)	432		469			1229	
Turn Bay Length (ft)		75			150		
Base Capacity (vph)	188	163	1337		63	1480	
Starvation Cap Reductn	0	0	620		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	1.40	0.51	0.84		1.06	0.74	

## Intersection Summary

Area Type: Other  
 Cycle Length: 190  
 Actuated Cycle Length: 190  
 Offset: 30 (16%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.40  
 Intersection Signal Delay: 55.5  
 Intersection LOS: E  
 Intersection Capacity Utilization 78.5%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

## Splits and Phases: 9: Lowell Road (Route 3A) & Pelham Road





**2022 No-Build Weekday P.M.**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings





















2022 No-Build PM

Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	36	2	2	1	582	1	856	387	13	4	0	623
Future Volume (vph)	36	2	2	1	582	1	856	387	13	4	0	623
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0		100	0
Storage Lanes	1	1		1		1	1		0		1	1
Taper Length (ft)	25			100			75				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Fr <sub>t</sub>		0.850						0.995				0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1668	1507	0	1685	3610	0	1685	3557	0	0	1805	1615
Fl <sub>t</sub> Permitted	0.950			0.950			0.950				0.950	
Satd. Flow (perm)	1668	1507	0	1685	3610	0	1685	3557	0	0	1805	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191						4				264
Link Speed (mph)	30			35			35				35	
Link Distance (ft)	591			758			1733				622	
Travel Time (s)	13.4			14.8			33.8				12.1	
Peak Hour Factor	0.80	0.80	0.80	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	45	3	3	1	640	1	951	430	14	4	0	685
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	6	0	1	641	0	951	444	0	0	4	685
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3	3.5
Permitted Phases												
Detector Phase	4	4		1	6		5	2		3	3	3.5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	11.0	
Total Split (s)	21.0	21.0		16.0	32.0		51.0	67.0		16.0	16.0	
Total Split (%)	17.5%	17.5%		13.3%	26.7%		42.5%	55.8%		13.3%	13.3%	
Maximum Green (s)	15.0	15.0		10.0	26.0		45.0	61.0		10.0	10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	None	
Act Effct Green (s)	8.7	8.7		5.6	25.3		53.6	82.6			10.7	65.5
Actuated g/C Ratio	0.07	0.07		0.05	0.21		0.45	0.69			0.09	0.55
v/c Ratio	0.38	0.02		0.01	0.84		1.26	0.18			0.03	0.68
Control Delay	61.1	0.2		55.0	56.5		151.5	4.1			51.0	14.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	61.1	0.2		55.0	56.5		151.5	4.1			51.0	14.3
LOS	E	A		D	E		F	A			D	B



## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2022 No-Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	0	17	1	0	16	2	1252	5	24	1230	6
Future Volume (vph)	50	0	17	1	0	16	2	1252	5	24	1230	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.871			0.999			0.999	
Flt Protected		0.950			0.998		0.950			0.950		
Satd. Flow (prot)	0	1668	1507	0	1707	0	1685	3606	0	1805	3605	0
Flt Permitted		0.744			0.985		0.950			0.950		
Satd. Flow (perm)	0	1306	1507	0	1684	0	1685	3606	0	1805	3605	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82		82							1
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.84	0.84	0.84	0.80	0.80	0.80	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	9%
Adj. Flow (vph)	60	0	20	1	0	20	2	1346	5	27	1367	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	60	20	0	21	0	2	1351	0	27	1374	0
Turn Type	Perm	NA	Prot	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		7	7		3		1	6		5	2	
Permitted Phases	7			3								
Detector Phase	7	7	7	3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	32.0	32.0	32.0	32.0	32.0		27.0	61.0		27.0	61.0	
Total Split (%)	26.7%	26.7%	26.7%	26.7%	26.7%		22.5%	50.8%		22.5%	50.8%	
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		21.0	55.0		21.0	55.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		11.8	11.8		10.0		6.8	90.8		8.3	97.3	
Actuated g/C Ratio		0.10	0.10		0.08		0.06	0.76		0.07	0.81	
v/c Ratio		0.47	0.09		0.10		0.02	0.50		0.22	0.47	
Control Delay		61.9	0.8		0.9		63.0	7.0		47.0	3.9	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		61.9	0.8		0.9		63.0	7.0		47.0	3.9	
LOS		E	A		A		E	A		D	A	

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2022 No-Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		46.6			0.9			7.1				4.7
Approach LOS		D			A			A				A
Queue Length 50th (ft)		45	0		0		0	160		20		76
Queue Length 95th (ft)		80	0		0		m1	236		m36		168
Internal Link Dist (ft)		430			477			1653				900
Turn Bay Length (ft)			50				300			350		
Base Capacity (vph)		282	390		429		294	2728		315		2924
Starvation Cap Reductn		0	0		0		0	0		0		0
Spillback Cap Reductn		0	0		0		0	0		0		0
Storage Cap Reductn		0	0		0		0	0		0		0
Reduced v/c Ratio		0.21	0.05		0.05		0.01	0.50		0.09		0.47

### Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 74 (62%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 7.0

Intersection LOS: A

Intersection Capacity Utilization 57.5%

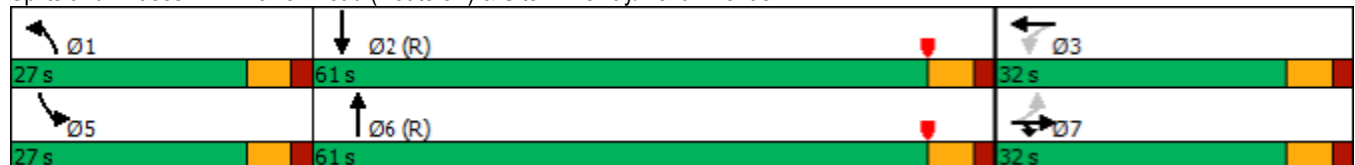
ICU Level of Service B

Analysis Period (min) 15

Description: NHDOT Int. No.: S-229-03































m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2022 No-Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 			 	 		 	 	
Traffic Volume (vph)	248	13	113	88	20	244	95	1157	74	310	1065	197
Future Volume (vph)	248	13	113	88	20	244	95	1157	74	310	1065	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Fr <sub>t</sub>			0.850			0.850			0.850			0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3502	1963	1615	3502	1900	1669	3467	3610	1615	3502	3574	1615
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3502	1963	1615	3502	1900	1669	3467	3610	1615	3502	3574	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			246			136			190
Link Speed (mph)		30			30			35				30
Link Distance (ft)		401			449			980				1189
Travel Time (s)		9.1			10.2			19.1				27.0
Peak Hour Factor	0.88	0.88	0.88	0.86	0.86	0.86	0.89	0.89	0.89	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%
Adj. Flow (vph)	282	15	128	102	23	284	107	1300	83	341	1170	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	282	15	128	102	23	284	107	1300	83	341	1170	216
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4	4	3	8	8	1	6	6	5	2	2
Permitted Phases												
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	16.0
Total Split (s)	26.0	20.0	20.0	26.0	20.0	20.0	21.0	48.0	48.0	26.0	53.0	53.0
Total Split (%)	21.7%	16.7%	16.7%	21.7%	16.7%	16.7%	17.5%	40.0%	40.0%	21.7%	44.2%	44.2%
Maximum Green (s)	20.0	14.0	14.0	20.0	14.0	14.0	15.0	42.0	42.0	20.0	47.0	47.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	15.8	16.1	16.1	9.8	10.2	10.2	10.0	52.7	52.7	17.4	60.0	60.0
Actuated g/C Ratio	0.13	0.13	0.13	0.08	0.08	0.08	0.08	0.44	0.44	0.14	0.50	0.50
v/c Ratio	0.61	0.06	0.38	0.36	0.14	0.78	0.37	0.82	0.11	0.67	0.66	0.24
Control Delay	54.8	42.9	9.6	55.1	50.9	25.0	70.5	23.7	0.5	61.9	21.1	1.5
Queue Delay	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 Delay	54.8	42.9	9.6	55.1	50.9	25.0	70.5	23.7	0.5	61.9	21.1	1.5
LOS	D	D	A	E	D	C	E	C	A	E	C	A



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2022 No-Build PM

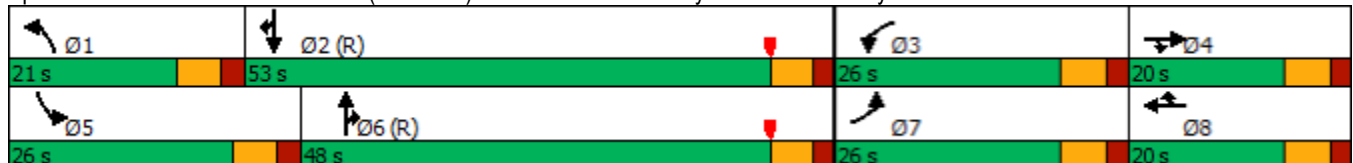


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		40.8			33.9			25.8			26.7	
Approach LOS		D			C			C			C	
Queue Length 50th (ft)	107	10	0	39	17	28	45	289	3	135	401	0
Queue Length 95th (ft)	144	29	44	63	41	102	76	#670	0	157	532	m21
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350		175	350		
Base Capacity (vph)	583	279	346	583	222	413	433	1584	785	583	1786	902
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.05	0.37	0.17	0.10	0.69	0.25	0.82	0.11	0.58	0.66	0.24

#### Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 64 (53%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.82  
 Intersection Signal Delay: 28.5  
 Intersection LOS: C  
 Intersection Capacity Utilization 69.6%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway



#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2022 No-Build PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1479	1198	1056	627	444	1233
Future Volume (vph)	1479	1198	1056	627	444	1233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	0.88
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	3698	1706	3502	3610	3610	2814
Fl <sub>t</sub> Permitted	0.950		0.950			
Satd. Flow (perm)	3698	1706	3502	3610	3610	2814
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		519				1301
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.96	0.96	0.94	0.94	0.89	0.89
Heavy Vehicles (%)	1%	1%	0%	0%	0%	1%
Adj. Flow (vph)	1541	1248	1123	667	499	1385
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1541	1248	1123	667	499	1385
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	50.0		40.0	67.0	30.0	
Total Split (%)	41.7%		33.3%	55.8%	25.0%	
Maximum Green (s)	44.0		32.0	60.0	23.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	45.4	120.0	32.0	61.6	21.6	120.0
Actuated g/C Ratio	0.38	1.00	0.27	0.51	0.18	1.00
v/c Ratio	1.10	0.73	1.20	0.36	0.77	0.49
Control Delay	92.6	2.8	128.6	9.1	55.4	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.6	2.8	128.6	9.1	55.4	0.6
LOS	F	A	F	A	E	A

# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2022 No-Build PM

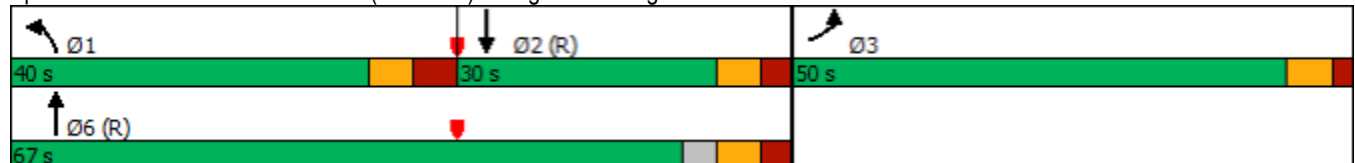


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	52.4			84.1	15.1	
Approach LOS	D			F	B	
Queue Length 50th (ft)	~717	0	~560	147	192	0
Queue Length 95th (ft)	#854	0	#673	120	250	0
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1400	1706	933	1895	691	2814
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	1.10	0.73	1.20	0.35	0.72	0.49

## Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 100 (83%), Referenced to phase 2:SBT and 6:NBT, Start of Green  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.20  
 Intersection Signal Delay: 50.3  
 Intersection LOS: D  
 Intersection Capacity Utilization 101.3%  
 ICU Level of Service G  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-02  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road



# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road

## Lanes, Volumes, Timings

2022 No-Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↕	↗	↖	↕	↗	↖	↕	↗
Traffic Volume (vph)	52	92	433	435	17	28	137	1003	988	72	841	5
Future Volume (vph)	52	92	433	435	17	28	137	1003	988	72	841	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		1	1		1	1		1	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.982		0.950	0.956		0.950			0.950		
Satd. Flow (prot)	0	1866	1599	1658	1668	1546	1787	3574	1615	1805	5131	0
Flt Permitted		0.982		0.950	0.956		0.950			0.950		
Satd. Flow (perm)	0	1866	1599	1658	1668	1546	1787	3574	1615	1805	5131	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			61			89			283			1
Link Speed (mph)		30			30			30				30
Link Distance (ft)		805			586			999				1515
Travel Time (s)		18.3			13.3			22.7				34.4
Peak Hour Factor	0.80	0.80	0.80	0.90	0.90	0.90	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	1%	1%	0%	0%	1%	0%
Adj. Flow (vph)	65	115	541	483	19	31	146	1067	1051	82	956	6
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	180	541	251	251	31	146	1067	1051	82	962	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	26.0	26.0	31.0	56.0	56.0	21.0	31.0	71.0	56.0	21.0	71.0	
Total Split (%)	14.1%	14.1%	16.8%	30.4%	30.4%	11.4%	16.8%	38.6%	30.4%	11.4%	38.6%	
Maximum Green (s)	20.0	20.0	25.0	50.0	50.0	15.0	25.0	65.0	50.0	15.0	65.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)		18.7	50.6	40.9	40.9	52.5	25.7	55.3	102.4	11.6	41.2	
Actuated g/C Ratio		0.12	0.33	0.27	0.27	0.35	0.17	0.37	0.68	0.08	0.27	
v/c Ratio		0.78	0.94	0.56	0.56	0.05	0.48	0.82	0.89	0.59	0.69	
Control Delay		90.4	70.5	53.6	53.4	0.2	68.4	51.0	24.7	90.4	52.3	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	
Total Delay		90.4	70.5	53.6	53.4	0.2	68.4	51.0	26.4	90.4	52.3	
LOS		F	E	D	D	A	E	D	C	F	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2022 No-Build PM

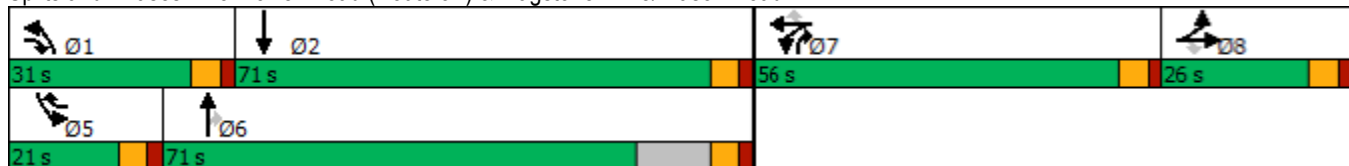


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		75.4			50.4			40.7				55.3
Approach LOS		E			D			D				E
Queue Length 50th (ft)		187	521	227	227	0	144	557	643	85	339	
Queue Length 95th (ft)		#276	#696	358	358	0	239	663	992	151	379	
Internal Link Dist (ft)		725			506			919				1435
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		254	575	564	568	632	304	1825	1277	184	2271	
Starvation Cap Reductn		0	0	0	0	0	0	0	101	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.71	0.94	0.45	0.44	0.05	0.48	0.58	0.89	0.45	0.42	

## Intersection Summary























Area Type:	Other
Cycle Length:	184
Actuated Cycle Length:	151.2
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	50.6
Intersection LOS:	D
Intersection Capacity Utilization:	88.1%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2022 No-Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	2	105	10	1	4	16	1065	12	5	816	7
Future Volume (vph)	26	2	105	10	1	4	16	1065	12	5	816	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	11	12	12
Storage Length (ft)	0		100	0		100	225		0	225		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.998			0.999	
Flt Protected		0.956			0.956		0.950			0.950		
Satd. Flow (prot)	0	1816	1583	0	1877	1669	1736	3568	0	1745	3571	0
Flt Permitted		0.441					0.950			0.950		
Satd. Flow (perm)	0	838	1583	0	1963	1669	1736	3568	0	1745	3571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131			86		1				1
Link Speed (mph)		30			10			30				30
Link Distance (ft)		495			382			1515				1791
Travel Time (s)		11.3			26.0			34.4				40.7
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	4%	1%	0%	0%	1%	0%
Adj. Flow (vph)	33	3	131	13	1	5	17	1121	13	6	938	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	36	131	0	14	5	17	1134	0	6	946	0
Turn Type	Perm	NA	pt+ov	Perm	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases		4	4 1		8	8 5	1	6		5	2	
Permitted Phases	4			8								
Detector Phase	4	4	4 1	8	8	8 5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		8.0	21.0		8.0	21.0	
Total Split (s)	16.0	16.0		16.0	16.0		16.0	66.0		16.0	66.0	
Total Split (%)	14.0%	14.0%		14.0%	14.0%		14.0%	57.9%		14.0%	57.9%	
Maximum Green (s)	10.0	10.0		10.0	10.0		12.0	60.0		12.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		8.7	16.7		6.6	9.6	5.5	37.2		5.1	28.8	
Actuated g/C Ratio		0.14	0.26		0.10	0.15	0.09	0.58		0.08	0.45	
v/c Ratio		0.32	0.26		0.07	0.02	0.11	0.55		0.04	0.59	
Control Delay		39.3	5.4		34.2	0.0	36.1	11.4		36.6	15.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		39.3	5.4		34.2	0.0	36.1	11.4		36.6	15.9	
LOS		D	A		C	A	D	B		D	B	



# 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive Lanes, Volumes, Timings

2022 No-Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		12.7			25.2			11.8				16.1
Approach LOS		B			C			B				B
Queue Length 50th (ft)		10	0		4	0	5	90		2		112
Queue Length 95th (ft)		46	25		23	0	30	310		15		238
Internal Link Dist (ft)		415			302			1435				1711
Turn Bay Length (ft)			100			100	225			225		
Base Capacity (vph)		138	611		325	424	344	3177		346		3179
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.26	0.21		0.04	0.01	0.05	0.36		0.02		0.30























Intersection Summary	
Area Type:	Other
Cycle Length:	114
Actuated Cycle Length:	64.3
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	13.7
Intersection LOS:	B
Intersection Capacity Utilization:	51.5%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive



7: Lowell Road (Route 3A) & Executive Drive  
Lanes, Volumes, Timings

2022 No-Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	3	79	23	2	22	52	973	7	16	660	40
Future Volume (vph)	225	3	79	23	2	22	52	973	7	16	660	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	15	12	12	13	11	12	12	11	12	12
Storage Length (ft)	0		225	0		80	350		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.999			0.992	
Flt Protected		0.953			0.957		0.950			0.950		
Satd. Flow (prot)	0	1733	1742	0	1818	1620	1678	3571	0	1646	3540	0
Flt Permitted		0.706			0.675		0.950			0.950		
Satd. Flow (perm)	0	1284	1742	0	1282	1620	1678	3571	0	1646	3540	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			99			91		1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		492			577			1791			1168	
Travel Time (s)		11.2			13.1			40.7			26.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.97	0.97	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	2%	0%	0%	3%	4%	1%	0%	6%	1%	4%
Adj. Flow (vph)	281	4	99	29	3	28	54	1003	7	17	717	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	285	99	0	32	28	54	1010	0	17	760	0
Turn Type	Perm	NA	pt+ov	Perm	NA	Prot	Prot	NA		Prot	NA	
Protected Phases		8	8 1		4	4	1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8	8 1	4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		5.0	5.0	5.0	3.0	8.0		3.0	8.0	
Minimum Split (s)	9.0	9.0		11.0	11.0	11.0	9.0	14.0		9.0	14.0	
Total Split (s)	26.0	26.0		23.0	23.0	23.0	16.0	66.0		16.0	66.0	
Total Split (%)	24.1%	24.1%		21.3%	21.3%	21.3%	14.8%	61.1%		14.8%	61.1%	
Maximum Green (s)	20.0	20.0		17.0	17.0	17.0	10.0	60.0		10.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)		20.6	33.5		13.5	13.5	6.8	31.2		5.4	23.0	
Actuated g/C Ratio		0.31	0.51		0.20	0.20	0.10	0.47		0.08	0.35	
v/c Ratio		0.71	0.11		0.12	0.07	0.32	0.60		0.13	0.61	
Control Delay		36.5	3.5		22.8	0.3	35.6	14.7		34.8	20.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		36.5	3.5		22.8	0.3	35.6	14.7		34.8	20.4	
LOS		D	A		C	A	D	B		C	C	

# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

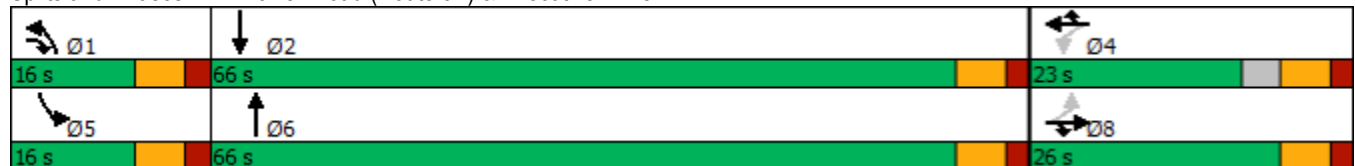
2022 No-Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		28.0			12.3			15.7				20.7
Approach LOS		C			B			B				C
Queue Length 50th (ft)		99	0		9	0	20	133		6		134
Queue Length 95th (ft)		#246	20		32	0	61	262		28		196
Internal Link Dist (ft)		412			497			1711				1088
Turn Bay Length (ft)			225			80	350			150		
Base Capacity (vph)		399	1018		398	566	260	3189		256		3163
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.71	0.10		0.08	0.05	0.21	0.32		0.07		0.24

Intersection Summary	
Area Type:	Other
Cycle Length:	108
Actuated Cycle Length:	66.1
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	19.4
Intersection LOS:	B
Intersection Capacity Utilization:	64.7%
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 7: Lowell Road (Route 3A) & Executive Drive



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2022 No-Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↗	↕	↗	↗	↗	↗
Traffic Volume (vph)	9	2	25	31	0	48	27	1158	15	56	668	11
Future Volume (vph)	9	2	25	31	0	48	27	1158	15	56	668	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.998	
Flt Protected		0.962			0.950		0.950			0.950		
Satd. Flow (prot)	0	1828	1583	0	1865	1669	1745	1818	1615	1805	1878	0
Flt Permitted		0.746			0.748		0.950			0.950		
Satd. Flow (perm)	0	1417	1583	0	1469	1669	1745	1818	1615	1805	1878	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			60			91			1
Link Speed (mph)		10			30			30				30
Link Distance (ft)		598			262			1405				549
Travel Time (s)		40.8			6.0			31.9				12.5
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.99	0.99	0.99	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	11	3	31	39	0	60	27	1170	15	60	711	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	31	0	39	60	27	1170	15	60	723	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA	Prot	Prot	NA	
Protected Phases		8	8		4	5	1	6	6	5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0	116.0	16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%	64.4%	8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0	110.0	10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.1	8.1		8.1	20.7	6.6	140.9	140.9	8.8	146.5	
Actuated g/C Ratio		0.04	0.04		0.04	0.12	0.04	0.78	0.78	0.05	0.81	
v/c Ratio		0.22	0.20		0.59	0.25	0.42	0.82	0.01	0.68	0.47	
Control Delay		90.1	2.8		117.7	16.3	103.9	21.3	0.0	119.5	10.1	

8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
Lanes, Volumes, Timings

2022 No-Build PM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2022 No-Build PM

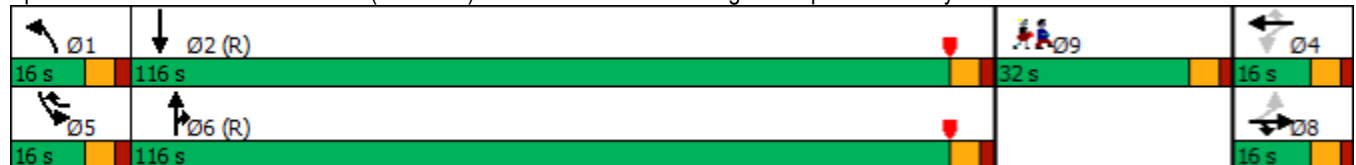


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
Total Delay		90.1	2.8		117.7	16.3	103.9	21.3	0.0	119.5	12.1	
LOS		F	A		F	B	F	C	A	F	B	
Approach Delay		29.9			56.2			22.9				20.3
Approach LOS		C			E			C				C
Queue Length 50th (ft)		16	0		46	0	32	701	0	71	219	
Queue Length 95th (ft)		40	0		81	36	70	#1772	0	#134	652	
Internal Link Dist (ft)		518			182			1325				469
Turn Bay Length (ft)			50			100	210		325	125		
Base Capacity (vph)		78	173		81	255	96	1423	1284	100	1528	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	622	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.18	0.18		0.48	0.24	0.28	0.82	0.01	0.60	0.80	

### Intersection Summary

Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.82  
 Intersection Signal Delay: 23.6  
 Intersection LOS: C  
 Intersection Capacity Utilization 84.3%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

### Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway





# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2022 No-Build PM












---

Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

---

9: Lowell Road (Route 3A) & Pelham Road  
Lanes, Volumes, Timings

2022 No-Build PM

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Lane Configurations							
Traffic Volume (vph)	86	142	1098	109	110	658	
Future Volume (vph)	86	142	1098	109	110	658	
Ideal Flow (vphpl)	1900	1000	1900	1900	1900	1900	
Lane Width (ft)	12	12	13	13	12	12	
Storage Length (ft)	0	75		0	150		
Storage Lanes	1	1		0	1		
Taper Length (ft)	25				50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850	0.988				
Fl <sub>t</sub> Protected	0.950				0.950		
Satd. Flow (prot)	1805	850	1922	0	1805	1881	
Fl <sub>t</sub> Permitted	0.950				0.950		
Satd. Flow (perm)	1805	850	1922	0	1805	1881	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		151	4				
Link Speed (mph)	20		30			30	
Link Distance (ft)	512		549			1309	
Travel Time (s)	17.5		12.5			29.8	
Peak Hour Factor	0.87	0.87	0.98	0.98	0.89	0.89	
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	
Adj. Flow (vph)	99	163	1120	111	124	739	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	99	163	1231	0	124	739	
Turn Type	Prot	pt+ov	NA		Prot	NA	
Protected Phases	4	4 5	6		5	2	9
Permitted Phases							
Detector Phase	4	4 5	6		5	2	
Switch Phase							
Minimum Initial (s)	5.0		10.0		3.0	10.0	5.0
Minimum Split (s)	11.0		16.0		9.0	16.0	35.0
Total Split (s)	26.0		116.0		13.0	116.0	35.0
Total Split (%)	13.7%		61.1%		6.8%	61.1%	18%
Maximum Green (s)	20.0		110.0		7.0	110.0	29.0
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0		6.0		6.0	6.0	
Lead/Lag			Lag		Lead		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	1.5		1.5		1.5	1.5	3.0
Recall Mode	None		C-Min		None	C-Min	None
Walk Time (s)							5.0
Flash Dont Walk (s)							24.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	14.3	27.3	143.7		7.0	156.7	
Actuated g/C Ratio	0.08	0.14	0.76		0.04	0.82	
v/c Ratio	0.73	0.65	0.85		1.88	0.48	
Control Delay	114.7	24.5	24.5		487.8	8.6	

# 9: Lowell Road (Route 3A) & Pelham Road Lanes, Volumes, Timings

2022 No-Build PM



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Queue Delay	0.0	0.0	47.9		0.0	0.0	
Total Delay	114.7	24.5	72.4		487.8	8.6	
LOS	F	C	E		F	A	
Approach Delay	58.6		72.4			77.4	
Approach LOS	E		E			E	
Queue Length 50th (ft)	123	13	790		~235	172	
Queue Length 95th (ft)	184	91	#2011		#384	631	
Internal Link Dist (ft)	432		469			1229	
Turn Bay Length (ft)		75			150		
Base Capacity (vph)	190	249	1455		66	1551	
Starvation Cap Reductn	0	0	350		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.52	0.65	1.11		1.88	0.48	

## Intersection Summary

Area Type: Other

Cycle Length: 190

Actuated Cycle Length: 190

Offset: 30 (16%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.88

Intersection Signal Delay: 72.7

Intersection LOS: E

Intersection Capacity Utilization 91.1%

ICU Level of Service F

Analysis Period (min) 15

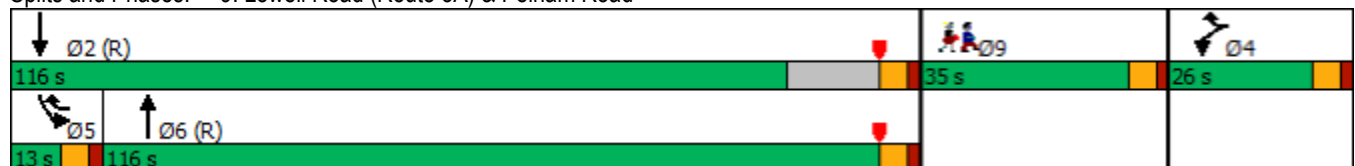
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

## Splits and Phases: 9: Lowell Road (Route 3A) & Pelham Road



## **Appendix F**

### **Capacity Analysis – 2032 No-Build Traffic Conditions**

**2032 No-Build Weekday A.M.**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2032 No-Build AM

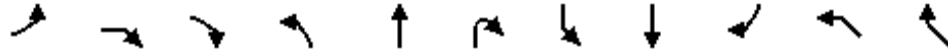


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	289	0	514	555	14	1	901
Future Volume (vph)	2	0	2	0	289	0	514	555	14	1	901
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0	100	0
Storage Lanes	1	1		1		1	1		0	1	1
Taper Length (ft)	25			100			75			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00
Fr <sub>t</sub>		0.850						0.996			0.850
Fl <sub>t</sub> Protected	0.950						0.950			0.950	
Satd. Flow (prot)	1685	1133	0	1773	3574	0	1652	3561	0	1805	1583
Fl <sub>t</sub> Permitted	0.950						0.950			0.950	
Satd. Flow (perm)	1685	1133	0	1773	3574	0	1652	3561	0	1805	1583
Right Turn on Red			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		526						3			467
Link Speed (mph)	30				35			35		35	
Link Distance (ft)	591				758			1733		622	
Travel Time (s)	13.4				14.8			33.8		12.1	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.92	0.92	0.92	0.86	0.86
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Adj. Flow (vph)	3	0	3	0	361	0	559	603	15	1	1048
Shared Lane Traffic (%)											
Lane Group Flow (vph)	3	3	0	0	361	0	559	618	0	1	1048
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5
Permitted Phases											
Detector Phase	4	4		1	6		5	2		3	3 5
Switch Phase											
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	
Total Split (s)	16.0	16.0		16.0	20.0		38.0	42.0		16.0	
Total Split (%)	17.8%	17.8%		17.8%	22.2%		42.2%	46.7%		17.8%	
Maximum Green (s)	10.0	10.0		10.0	14.0		32.0	36.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	
Act Effct Green (s)	5.8	5.8			13.4		45.5	64.9		10.6	60.9
Actuated g/C Ratio	0.06	0.06			0.15		0.51	0.72		0.12	0.68
v/c Ratio	0.03	0.01			0.68		0.67	0.24		0.00	0.86
Control Delay	40.0	0.0			43.2		26.8	2.5		36.0	16.0
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0
Total Delay	40.0	0.0			43.2		26.8	2.5		36.0	16.0
LOS	D	A			D		C	A		D	B



1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2032 No-Build AM

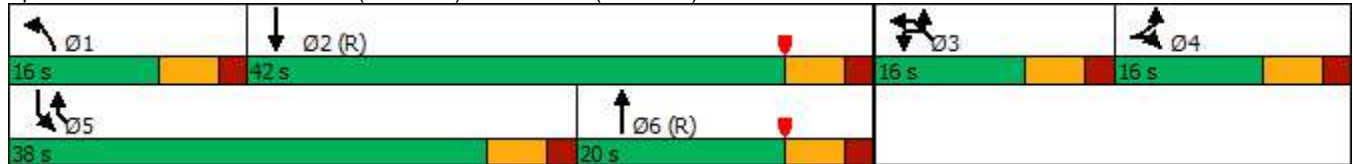


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Approach Delay	20.0				43.2			14.0		16.0	
Approach LOS	B				D			B		B	
Queue Length 50th (ft)	2	0			102		251	104		1	182
Queue Length 95th (ft)	9	0			131		#455	2		5	#726
Internal Link Dist (ft)	511				678			1653		542	
Turn Bay Length (ft)		50					775			100	
Base Capacity (vph)	187	593			555		836	2570		212	1222
Starvation Cap Reductn	0	0			0		0	0		0	0
Spillback Cap Reductn	0	0			0		0	0		0	0
Storage Cap Reductn	0	0			0		0	0		0	0
Reduced v/c Ratio	0.02	0.01			0.65		0.67	0.24		0.00	0.86

Intersection Summary






















Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	18.9
Intersection LOS:	B
Intersection Capacity Utilization:	73.8%
ICU Level of Service:	D
Analysis Period (min):	15
Description:	NHDOT Int. No.: S-229-04
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.

Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road



## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2032 No-Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	2	1	1	36	15	1226	2	8	1085	51
Future Volume (vph)	3	0	2	1	1	36	15	1226	2	8	1085	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.871							0.993
Flt Protected		0.950			0.999		0.950			0.950		
Satd. Flow (prot)	0	1685	1133	0	1657	0	1685	3538	0	1570	3518	0
Flt Permitted		0.851			0.991		0.950			0.950		
Satd. Flow (perm)	0	1509	1133	0	1644	0	1685	3538	0	1570	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109		42							7
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.80	0.80	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	0%
Adj. Flow (vph)	4	0	3	1	1	42	18	1442	2	8	1142	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	4	3	0	44	0	18	1444	0	8	1196	0
Turn Type	Perm	NA	Prot	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		7	7		3		1	6		5	2	
Permitted Phases	7			3								
Detector Phase	7	7	7	3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0	21.0	21.0	21.0		21.0	51.0		18.0	48.0	
Total Split (%)	23.3%	23.3%	23.3%	23.3%	23.3%		23.3%	56.7%		20.0%	53.3%	
Maximum Green (s)	15.0	15.0	15.0	15.0	15.0		15.0	45.0		12.0	42.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		7.3	7.3		7.3		7.6	75.2		7.1	72.2	
Actuated g/C Ratio		0.08	0.08		0.08		0.08	0.84		0.08	0.80	
v/c Ratio		0.03	0.02		0.26		0.13	0.49		0.06	0.42	
Control Delay		38.0	0.0		17.0		40.7	4.2		25.9	9.6	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		38.0	0.0		17.0		40.7	4.2		25.9	9.6	
LOS		D	A		B		D	A		C	A	

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2032 No-Build AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		21.7			17.0			4.7			9.7	
Approach LOS		C			B			A			A	
Queue Length 50th (ft)		2	0		1		10	137		4	196	
Queue Length 95th (ft)		10	0		29		m12	234		m10	220	
Internal Link Dist (ft)		430			477			1653			900	
Turn Bay Length (ft)			50				300			350		
Base Capacity (vph)		251	279		309		280	2957		209	2824	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.02	0.01		0.14		0.06	0.49		0.04	0.42	

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 51 (57%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 7.2

Intersection LOS: A

Intersection Capacity Utilization 54.9%

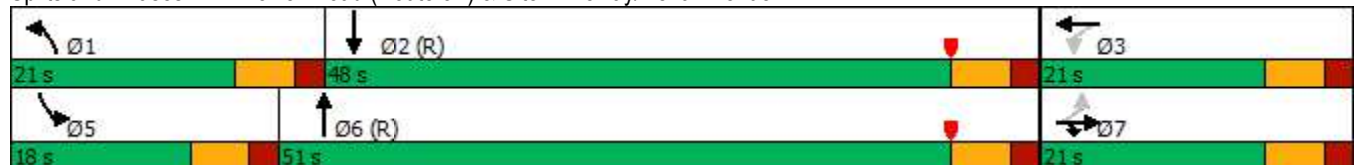
ICU Level of Service A

Analysis Period (min) 15

Description: NHDOT Int. No.: S-229-03































m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2032 No-Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 			 	 		 	 	
Traffic Volume (vph)	101	4	55	15	5	71	62	1172	27	85	1062	63
Future Volume (vph)	101	4	55	15	5	71	62	1172	27	85	1062	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Fr <sub>t</sub>			0.850			0.850			0.850			0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3467	1852	1568	3502	1900	1589	3467	3539	1583	3433	3574	1583
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	1852	1568	3502	1900	1589	3467	3539	1583	3433	3574	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			182			182			182
Link Speed (mph)		30			30			35			30	
Link Distance (ft)		401			449			980			1189	
Travel Time (s)		9.1			10.2			19.1			27.0	
Peak Hour Factor	0.93	0.93	0.93	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	1%	6%	3%	0%	0%	5%	1%	2%	2%	2%	1%	2%
Adj. Flow (vph)	109	4	59	17	6	81	71	1347	31	89	1106	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	4	59	17	6	81	71	1347	31	89	1106	66
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4	4	3	8	8	1	6	6	5	2	2
Permitted Phases												
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	16.0
Total Split (s)	17.0	16.0	16.0	17.0	16.0	16.0	16.0	41.0	41.0	16.0	41.0	41.0
Total Split (%)	18.9%	17.8%	17.8%	18.9%	17.8%	17.8%	17.8%	45.6%	45.6%	17.8%	45.6%	45.6%
Maximum Green (s)	11.0	10.0	10.0	11.0	10.0	10.0	10.0	35.0	35.0	10.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	9.1	14.0	14.0	7.0	6.9	6.9	8.2	50.2	50.2	8.7	50.6	50.6
Actuated g/C Ratio	0.10	0.16	0.16	0.08	0.08	0.08	0.09	0.56	0.56	0.10	0.56	0.56
v/c Ratio	0.31	0.01	0.15	0.06	0.04	0.28	0.23	0.68	0.03	0.27	0.55	0.07
Control Delay	39.5	34.2	0.8	38.7	38.8	2.4	44.6	15.4	0.0	48.9	16.4	0.3
Queue Delay	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 Delay	39.5	34.2	0.8	38.7	38.8	2.4	44.6	15.4	0.0	48.9	16.4	0.3
LOS	D	C	A	D	D	A	D	B	A	D	B	A



#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2032 No-Build AM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗	↔↔	↕↕	↕↕	↗↗
Traffic Volume (vph)	1045	943	980	373	370	1673
Future Volume (vph)	1045	943	980	373	370	1673
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	0.88
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3662	1689	3467	3539	3539	2760
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3662	1689	3467	3539	3539	2760
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		770				1282
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.94	0.94	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	1%	2%	2%	3%
Adj. Flow (vph)	1112	1003	1065	405	402	1818
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1112	1003	1065	405	402	1818
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	32.0		31.0	58.0	27.0	
Total Split (%)	35.6%		34.4%	64.4%	30.0%	
Maximum Green (s)	26.0		23.0	51.0	20.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	29.4	90.0	23.0	47.6	16.6	90.0
Actuated g/C Ratio	0.33	1.00	0.26	0.53	0.18	1.00
v/c Ratio	0.93	0.59	1.20	0.22	0.62	0.66
Control Delay	45.1	1.5	129.6	2.8	37.7	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.1	1.5	129.6	2.8	37.7	1.2
LOS	D	A	F	A	D	A

# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2032 No-Build AM

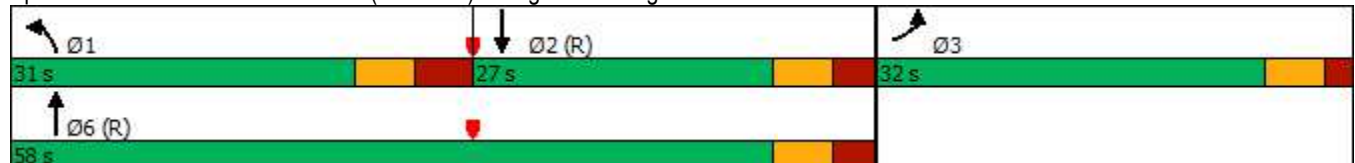


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	24.5			94.7	7.8	
Approach LOS	C			F	A	
Queue Length 50th (ft)	315	0	~378	3	110	0
Queue Length 95th (ft)	#482	0	#491	4	152	0
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1196	1689	886	2005	786	2760
Starvation 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	0.93	0.59	1.20	0.20	0.51	0.66

## Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	70 (78%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.20
Intersection Signal Delay:	35.9
Intersection LOS:	D
Intersection Capacity Utilization:	84.7%
ICU Level of Service:	E
Analysis Period (min):	15
Description:	NHDOT Int. No.: S-229-02
~	Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road





# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road

## Lanes, Volumes, Timings

2032 No-Build AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	29	303	677	45	33	328	863	208	17	1144	11
Future Volume (vph)	67	29	303	677	45	33	328	863	208	17	1144	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		1	1		1	1		1	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (prot)	0	1835	1583	1641	1657	1501	1787	3539	1583	1752	5078	0
Flt Permitted		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (perm)	0	1835	1583	1641	1657	1501	1787	3539	1583	1752	5078	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			53			89			219			1
Link Speed (mph)		30			30			30				30
Link Distance (ft)		805			586			999				1515
Travel Time (s)		18.3			13.3			22.7				34.4
Peak Hour Factor	0.81	0.81	0.81	0.94	0.94	0.94	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	1%	0%	4%	1%	2%	2%	3%	2%	6%
Adj. Flow (vph)	83	36	374	720	48	35	345	908	219	20	1315	13
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	119	374	382	386	35	345	908	219	20	1328	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	26.0	26.0	31.0	56.0	56.0	21.0	31.0	71.0	56.0	21.0	71.0	
Total Split (%)	14.1%	14.1%	16.8%	30.4%	30.4%	11.4%	16.8%	38.6%	30.4%	11.4%	38.6%	
Maximum Green (s)	20.0	20.0	25.0	50.0	50.0	15.0	25.0	65.0	50.0	15.0	65.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)		15.1	46.7	43.0	43.0	50.0	25.5	75.2	124.3	7.0	53.9	
Actuated g/C Ratio		0.09	0.29	0.27	0.27	0.31	0.16	0.46	0.77	0.04	0.33	
v/c Ratio		0.70	0.76	0.88	0.88	0.07	1.23	0.55	0.17	0.27	0.79	
Control Delay		95.6	58.1	79.4	79.4	0.2	184.1	35.1	1.0	90.4	53.1	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		95.6	58.1	79.4	79.4	0.2	184.1	35.1	1.0	90.4	53.1	
LOS		F	E	E	E	A	F	D	A	F	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2032 No-Build AM

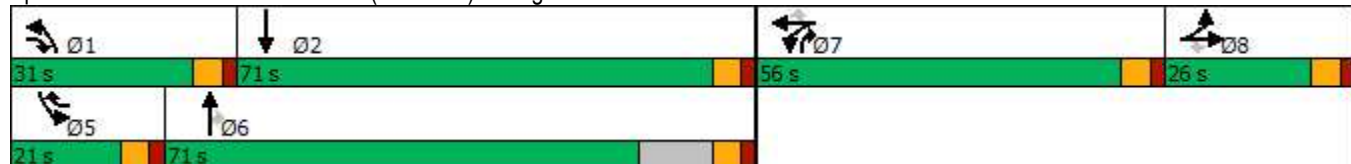


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		67.1			76.0			64.9				53.7
Approach LOS		E			E			E				D
Queue Length 50th (ft)		130	336	418	424	0	~488	396	0	22	488	
Queue Length 95th (ft)		192	433	#655	#660	0	#777	507	23	55	547	
Internal Link Dist (ft)		725			506			919			1435	
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		231	494	516	521	597	281	1706	1332	165	2077	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.52	0.76	0.74	0.74	0.06	1.23	0.53	0.16	0.12	0.64	

## Intersection Summary























Area Type:	Other
Cycle Length:	184
Actuated Cycle Length:	162
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.23
Intersection Signal Delay:	63.7
Intersection LOS:	E
Intersection Capacity Utilization:	82.1%
ICU Level of Service:	E
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2032 No-Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	13	2	2	5	129	822	2	2	1212	65
Future Volume (vph)	9	0	13	2	2	5	129	822	2	2	1212	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	11	12	12
Storage Length (ft)	0		100	0		100	225		0	225		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850						0.992
Flt Protected		0.950			0.976		0.950			0.950		
Satd. Flow (prot)	0	1719	1455	0	1916	1669	1752	3505	0	1745	3477	0
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	1810	1455	0	1963	1669	1752	3505	0	1745	3477	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			86			86						7
Link Speed (mph)		30			10			30				30
Link Distance (ft)		495			382			1515				1791
Travel Time (s)		11.3			26.0			34.4				40.7
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.90	0.90	0.90	0.83	0.83	0.83
Heavy Vehicles (%)	5%	0%	11%	0%	0%	0%	3%	3%	0%	0%	3%	3%
Adj. Flow (vph)	11	0	16	3	3	6	143	913	2	2	1460	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	16	0	6	6	143	915	0	2	1538	0
Turn Type	Perm	NA	pt+ov	Perm	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases		4	4 1		8	8 5	1	6		5	2	
Permitted Phases	4			8								
Detector Phase	4	4	4 1	8	8	8 5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		8.0	21.0		8.0	21.0	
Total Split (s)	16.0	16.0		16.0	16.0		16.0	66.0		16.0	66.0	
Total Split (%)	14.0%	14.0%		14.0%	14.0%		14.0%	57.9%		14.0%	57.9%	
Maximum Green (s)	10.0	10.0		10.0	10.0		12.0	60.0		12.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		7.5	11.9		6.4	9.1	11.4	69.2		5.1	50.0	
Actuated g/C Ratio		0.09	0.15		0.08	0.11	0.14	0.86		0.06	0.62	
v/c Ratio		0.07	0.06		0.04	0.02	0.58	0.30		0.02	0.71	
Control Delay		44.6	0.4		46.8	0.2	49.1	5.1		49.0	15.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		44.6	0.4		46.8	0.2	49.1	5.1		49.0	15.5	
LOS		D	A		D	A	D	A		D	B	

# 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive Lanes, Volumes, Timings

2032 No-Build AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		18.4			23.5			11.1				15.5
Approach LOS		B			C			B				B
Queue Length 50th (ft)		4	0		2	0	56	0		1		160
Queue Length 95th (ft)		23	0		16	0	#201	217		8		475
Internal Link Dist (ft)		415			302			1435				1711
Turn Bay Length (ft)			100			100	225			225		
Base Capacity (vph)		246	322		267	359	286	3014		285		2747
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.04	0.05		0.02	0.02	0.50	0.30		0.01		0.56

## Intersection Summary

Area Type: Other  
 Cycle Length: 114  
 Actuated Cycle Length: 80.5  
 Natural Cycle: 65  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.71  
 Intersection Signal Delay: 13.8  
 Intersection LOS: B  
 Intersection Capacity Utilization 63.2%  
 ICU Level of Service B  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

## Splits and Phases: 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive



# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2032 No-Build AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↗	↕↗		↗	↕↗	
Traffic Volume (vph)	40	2	11	141	30	101	181	465	60	107	1104	224
Future Volume (vph)	40	2	11	141	30	101	181	465	60	107	1104	224
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	15	12	12	13	11	12	12	11	12	12
Storage Length (ft)	0		225	0		80	350		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.983			0.975	
Flt Protected		0.955			0.961		0.950			0.950		
Satd. Flow (prot)	0	1576	1558	0	1811	1620	1711	3416	0	1728	3451	0
Flt Permitted		0.435			0.728		0.950			0.950		
Satd. Flow (perm)	0	718	1558	0	1372	1620	1711	3416	0	1728	3451	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30			101		21			35	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		492			577			1791			1168	
Travel Time (s)		11.2			13.1			40.7			26.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	12%	0%	14%	1%	0%	3%	2%	4%	3%	1%	2%	2%
Adj. Flow (vph)	50	3	14	176	38	126	199	511	66	118	1213	246
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	53	14	0	214	126	199	577	0	118	1459	0
Turn Type	Perm	NA	pt+ov	Perm	NA	Prot	Prot	NA		Prot	NA	
Protected Phases		8	8 1		4	4	1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8	8 1	4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		5.0	5.0	5.0	3.0	8.0		3.0	8.0	
Minimum Split (s)	9.0	9.0		11.0	11.0	11.0	9.0	14.0		9.0	14.0	
Total Split (s)	26.0	26.0		23.0	23.0	23.0	16.0	66.0		16.0	66.0	
Total Split (%)	24.1%	24.1%		21.3%	21.3%	21.3%	14.8%	61.1%		14.8%	61.1%	
Maximum Green (s)	20.0	20.0		17.0	17.0	17.0	10.0	60.0		10.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)		14.6	29.4		16.5	16.5	10.2	50.0		9.2	49.1	
Actuated g/C Ratio		0.16	0.31		0.18	0.18	0.11	0.53		0.10	0.52	
v/c Ratio		0.48	0.03		0.89	0.34	1.08	0.32		0.70	0.80	
Control Delay		52.8	3.6		76.5	14.4	132.9	12.4		66.2	21.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		52.8	3.6		76.5	14.4	132.9	12.4		66.2	21.9	
LOS		D	A		E	B	F	B		E	C	

# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2032 No-Build AM

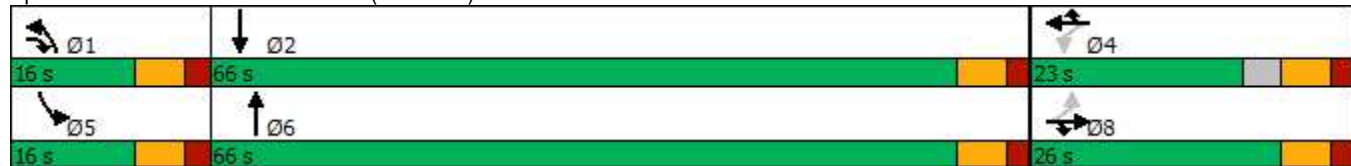


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		42.5			53.5			43.3				25.2
Approach LOS		D			D			D				C
Queue Length 50th (ft)		29	0		127	13	~139	94		70		350
Queue Length 95th (ft)		65	5		#226	51	#318	135		#171		464
Internal Link Dist (ft)		412			497			1711				1088
Turn Bay Length (ft)			225			80	350			150		
Base Capacity (vph)		155	517		296	429	184	2221		186		2248
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.34	0.03		0.72	0.29	1.08	0.26		0.63		0.65

## Intersection Summary

Area Type:	Other
Cycle Length:	108
Actuated Cycle Length:	94.1
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.08
Intersection Signal Delay:	34.2
Intersection LOS:	C
Intersection Capacity Utilization	78.7%
ICU Level of Service	D
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 7: Lowell Road (Route 3A) & Executive Drive



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2032 No-Build AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	48	6	0	10	4	588	1	16	1397	3
Future Volume (vph)	11	0	48	6	0	10	4	588	1	16	1397	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1719	1583	0	1865	1669	1745	1766	1615	1805	1863	0
Flt Permitted		0.752			0.748		0.950			0.950		
Satd. Flow (perm)	0	1361	1583	0	1469	1669	1745	1766	1615	1805	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			55			91			
Link Speed (mph)		10			30			30			30	
Link Distance (ft)		598			262			1405			549	
Travel Time (s)		40.8			6.0			31.9			12.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	5%	0%	2%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Adj. Flow (vph)	14	0	60	8	0	13	4	646	1	17	1471	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	60	0	8	13	4	646	1	17	1474	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA	Prot	Prot	NA	
Protected Phases		8	8		4	5	1	6	6	5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0	116.0	16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%	64.4%	8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0	110.0	10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		6.3	6.3		6.3	18.3	5.0	147.7	147.7	6.0	153.1	
Actuated g/C Ratio		0.04	0.04		0.04	0.10	0.03	0.82	0.82	0.03	0.85	
v/c Ratio		0.30	0.42		0.16	0.06	0.08	0.45	0.00	0.28	0.93	
Control Delay		100.2	12.4		90.2	0.5	89.0	8.6	0.0	95.9	23.5	



8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
 Lanes, Volumes, Timings

2032 No-Build AM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2032 No-Build AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	33.1	
Total Delay		100.2	12.4		90.2	0.5	89.0	8.6	0.0	95.9	56.6	
LOS		F	B		F	A	F	A	A	F	E	
Approach Delay		29.0			34.7			9.1			57.1	
Approach LOS		C			C			A			E	
Queue Length 50th (ft)		17	0		9	0	5	166	0	20	582	
Queue Length 95th (ft)		40	3		27	0	20	548	0	50	#2389	
Internal Link Dist (ft)		518			182			1325			469	
Turn Bay Length (ft)			50			100	210		325	125		
Base Capacity (vph)		75	173		81	254	96	1449	1341	100	1585	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	209	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.19	0.35		0.10	0.05	0.04	0.45	0.00	0.17	1.07	

## Intersection Summary

Area Type: Other

Cycle Length: 180

Actuated Cycle Length: 180

Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 42.0

Intersection LOS: D

Intersection Capacity Utilization 97.0%

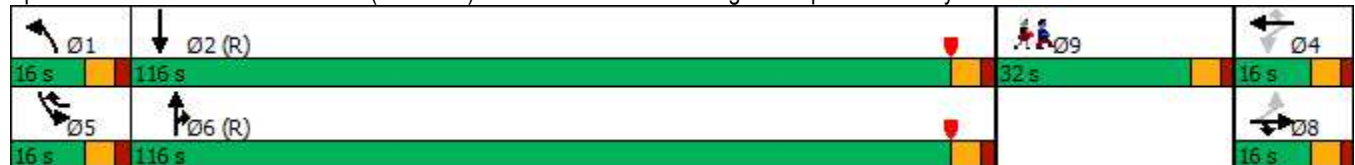
ICU Level of Service F

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

## Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2032 No-Build AM












---

Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

---

9: Lowell Road (Route 3A) & Pelham Road  
Lanes, Volumes, Timings

2032 No-Build AM

							Ø9
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (vph)	256	81	515	93	71	1166	
Future Volume (vph)	256	81	515	93	71	1166	
Ideal Flow (vphpl)	1900	1000	1900	1900	1900	1900	
Lane Width (ft)	12	12	13	13	12	12	
Storage Length (ft)	0	75		0	150		
Storage Lanes	1	1		0	1		
Taper Length (ft)	25				50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850	0.979				
Fl <sub>t</sub> Protected	0.950				0.950		
Satd. Flow (prot)	1787	802	1836	0	1719	1863	
Fl <sub>t</sub> Permitted	0.950				0.950		
Satd. Flow (perm)	1787	802	1836	0	1719	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		29	8				
Link Speed (mph)	20		30			30	
Link Distance (ft)	512		549			1309	
Travel Time (s)	17.5		12.5			29.8	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.96	0.96	
Heavy Vehicles (%)	1%	6%	5%	3%	5%	2%	
Adj. Flow (vph)	291	92	560	101	74	1215	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	291	92	661	0	74	1215	
Turn Type	Prot	pt+ov	NA		Prot	NA	
Protected Phases	4	4 5	6		5	2	9
Permitted Phases							
Detector Phase	4	4 5	6		5	2	
Switch Phase							
Minimum Initial (s)	5.0		10.0		3.0	10.0	5.0
Minimum Split (s)	11.0		16.0		9.0	16.0	35.0
Total Split (s)	26.0		116.0		13.0	116.0	35.0
Total Split (%)	13.7%		61.1%		6.8%	61.1%	18%
Maximum Green (s)	20.0		110.0		7.0	110.0	29.0
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0		6.0		6.0	6.0	
Lead/Lag			Lag		Lead		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	1.5		1.5		1.5	1.5	3.0
Recall Mode	None		C-Min		None	C-Min	None
Walk Time (s)							5.0
Flash Dont Walk (s)							24.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	20.0	33.0	138.0		7.0	151.0	
Actuated g/C Ratio	0.11	0.17	0.73		0.04	0.79	
v/c Ratio	1.55	0.56	0.49		1.17	0.82	
Control Delay	320.3	63.3	14.6		238.7	19.6	

# 9: Lowell Road (Route 3A) & Pelham Road Lanes, Volumes, Timings

2032 No-Build AM

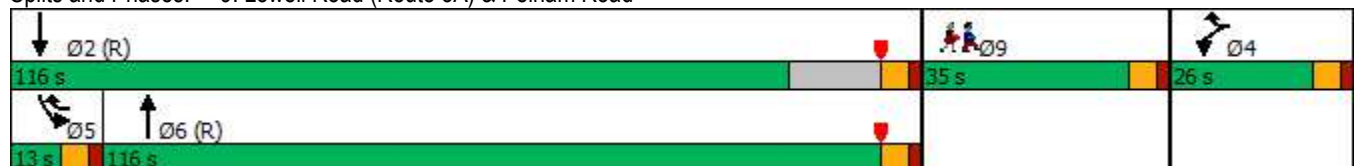


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Queue Delay	0.0	0.0	4.6		0.0	0.0	
Total Delay	320.3	63.3	19.1		238.7	19.6	
LOS	F	E	B		F	B	
Approach Delay	258.6		19.1			32.2	
Approach LOS	F		B			C	
Queue Length 50th (ft)	~509	73	276		~109	632	
Queue Length 95th (ft)	#695	143	661		#233	#1850	
Internal Link Dist (ft)	432		469			1229	
Turn Bay Length (ft)		75			150		
Base Capacity (vph)	188	163	1336		63	1480	
Starvation Cap Reductn	0	0	587		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	1.55	0.56	0.88		1.17	0.82	

## Intersection Summary

Area Type: Other  
 Cycle Length: 190  
 Actuated Cycle Length: 190  
 Offset: 30 (16%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.55  
 Intersection Signal Delay: 65.7  
 Intersection LOS: E  
 Intersection Capacity Utilization 85.6%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

## Splits and Phases: 9: Lowell Road (Route 3A) & Pelham Road



**2032 No-Build Weekday P.M.**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2032 No-Build PM



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	40	2	2	1	642	1	946	427	15	5	0	689
Future Volume (vph)	40	2	2	1	642	1	946	427	15	5	0	689
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0		100	0
Storage Lanes	1	1		1		1	1		0		1	1
Taper Length (ft)	25			100			75				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Fr <sub>t</sub>		0.850						0.995				0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1668	1507	0	1685	3610	0	1685	3558	0	0	1805	1615
Fl <sub>t</sub> Permitted	0.950			0.950			0.950				0.950	
Satd. Flow (perm)	1668	1507	0	1685	3610	0	1685	3558	0	0	1805	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191						4				247
Link Speed (mph)	30			35			35				35	
Link Distance (ft)	591			758			1733				622	
Travel Time (s)	13.4			14.8			33.8				12.1	
Peak Hour Factor	0.80	0.80	0.80	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	50	3	3	1	705	1	1051	474	17	5	0	757
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	6	0	1	706	0	1051	491	0	0	5	757
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3	3.5
Permitted Phases												
Detector Phase	4	4		1	6		5	2		3	3	3.5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	11.0	
Total Split (s)	21.0	21.0		16.0	32.0		51.0	67.0		16.0	16.0	
Total Split (%)	17.5%	17.5%		13.3%	26.7%		42.5%	55.8%		13.3%	13.3%	
Maximum Green (s)	15.0	15.0		10.0	26.0		45.0	61.0		10.0	10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	None	
Act Effct Green (s)	9.0	9.0		5.6	25.8		53.3	82.7			10.2	64.7
Actuated g/C Ratio	0.08	0.08		0.05	0.22		0.44	0.69			0.08	0.54
v/c Ratio	0.40	0.02		0.01	0.91		1.41	0.20			0.03	0.77
Control Delay	61.5	0.2		55.0	62.6		211.8	4.3			51.2	19.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	61.5	0.2		55.0	62.6		211.8	4.3			51.2	19.5
LOS	E	A		D	E		F	A			D	B



1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2032 No-Build PM

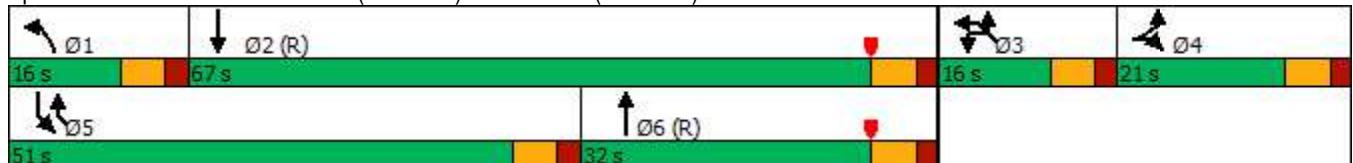


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Approach Delay	54.9				62.6			145.8			19.7	
Approach LOS	D				E			F			B	
Queue Length 50th (ft)	38	0		1	282		~1088	36			4	222
Queue Length 95th (ft)	68	0		7	#390		#1394	86			17	#315
Internal Link Dist (ft)	511				678			1653			542	
Turn Bay Length (ft)		50		200			775				100	
Base Capacity (vph)	208	355		140	782		748	2454			152	984
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.24	0.02		0.01	0.90		1.41	0.20			0.03	0.77

Intersection Summary






















Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 5 (4%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.41  
 Intersection Signal Delay: 93.6  
 Intersection LOS: F  
 Intersection Capacity Utilization 98.5%  
 ICU Level of Service F  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-04  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road



2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue  
Lanes, Volumes, Timings

2032 No-Build PM

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	50	0	17	1	0	17	2	1382	6	26	1358	6	
Future Volume (vph)	50	0	17	1	0	17	2	1382	6	26	1358	6	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12	
Storage Length (ft)	0		50	0		0	300		0	350		0	
Storage Lanes	0		1	0		0	1		0	1		0	
Taper Length (ft)	25			25			75			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	
Frt			0.850		0.871			0.999			0.999		
Flt Protected		0.950			0.998		0.950			0.950			
Satd. Flow (prot)	0	1668	1507	0	1707	0	1685	3606	0	1805	3605	0	
Flt Permitted		0.743			0.986		0.950			0.950			
Satd. Flow (perm)	0	1305	1507	0	1686	0	1685	3606	0	1805	3605	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			82		82								
Link Speed (mph)		15			30			35			35		
Link Distance (ft)		510			557			1733			980		
Travel Time (s)		23.2			12.7			33.8			19.1		
Peak Hour Factor	0.84	0.84	0.84	0.80	0.80	0.80	0.93	0.93	0.93	0.90	0.90	0.90	
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	9%	
Adj. Flow (vph)	60	0	20	1	0	21	2	1486	6	29	1509	7	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	60	20	0	22	0	2	1492	0	29	1516	0	
Turn Type	Perm	NA	Prot	Perm	NA		Prot	NA		Prot	NA		
Protected Phases		7	7		3		1	6		5	2		
Permitted Phases	7			3									
Detector Phase	7	7	7	3	3		1	6		5	2		
Switch Phase													
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	10.0		5.0	10.0		
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	16.0		11.0	16.0		
Total Split (s)	32.0	32.0	32.0	32.0	32.0		27.0	61.0		27.0	61.0		
Total Split (%)	26.7%	26.7%	26.7%	26.7%	26.7%		22.5%	50.8%		22.5%	50.8%		
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		21.0	55.0		21.0	55.0		
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0		
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0		
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0		
Lead/Lag							Lead	Lag		Lead	Lag		
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min		
Act Effct Green (s)		11.8	11.8		11.1		6.8	90.7		8.5	97.3		
Actuated g/C Ratio		0.10	0.10		0.09		0.06	0.76		0.07	0.81		
v/c Ratio		0.47	0.09		0.10		0.02	0.55		0.23	0.52		
Control Delay		61.9	0.8		0.8		63.5	8.1		48.7	4.8		
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0		
Total Delay		61.9	0.8		0.8		63.5	8.1		48.7	4.8		
LOS		E	A		A		E	A		D	A		

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2032 No-Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		46.6			0.8			8.2				5.7
Approach LOS		D			A			A				A
Queue Length 50th (ft)		45	0		0		1	197		22		97
Queue Length 95th (ft)		80	0		0		m1	m628		m38		204
Internal Link Dist (ft)		430			477			1653				900
Turn Bay Length (ft)			50				300			350		
Base Capacity (vph)		282	390		429		294	2725		315		2923
Starvation Cap Reductn		0	0		0		0	0		0		0
Spillback Cap Reductn		0	0		0		0	0		0		0
Storage Cap Reductn		0	0		0		0	0		0		0
Reduced v/c Ratio		0.21	0.05		0.05		0.01	0.55		0.09		0.52

### Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 74 (62%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 7.9

Intersection LOS: A

Intersection Capacity Utilization 61.1%

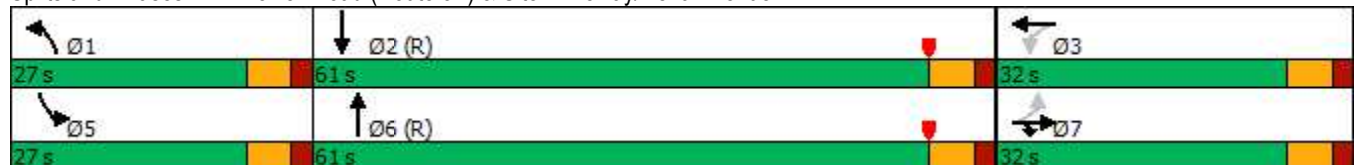
ICU Level of Service B

Analysis Period (min) 15

Description: NHDOT Int. No.: S-229-03






























m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2032 No-Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 			 	 		 	 	
Traffic Volume (vph)	248	13	113	88	20	244	95	1277	74	310	1176	197
Future Volume (vph)	248	13	113	88	20	244	95	1277	74	310	1176	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Fr <sub>t</sub>			0.850			0.850			0.850			0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3502	1963	1615	3502	1900	1669	3467	3610	1615	3502	3574	1615
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3502	1963	1615	3502	1900	1669	3467	3610	1615	3502	3574	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			245			136			172
Link Speed (mph)		30			30			35				30
Link Distance (ft)		401			449			980				1189
Travel Time (s)		9.1			10.2			19.1				27.0
Peak Hour Factor	0.88	0.88	0.88	0.86	0.86	0.86	0.89	0.89	0.89	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%
Adj. Flow (vph)	282	15	128	102	23	284	107	1435	83	341	1292	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	282	15	128	102	23	284	107	1435	83	341	1292	216
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4	4	3	8	8	1	6	6	5	2	2
Permitted Phases												
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	16.0
Total Split (s)	26.0	20.0	20.0	26.0	20.0	20.0	21.0	48.0	48.0	26.0	53.0	53.0
Total Split (%)	21.7%	16.7%	16.7%	21.7%	16.7%	16.7%	17.5%	40.0%	40.0%	21.7%	44.2%	44.2%
Maximum Green (s)	20.0	14.0	14.0	20.0	14.0	14.0	15.0	42.0	42.0	20.0	47.0	47.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	15.8	16.1	16.1	9.8	10.2	10.2	10.0	52.7	52.7	17.4	60.0	60.0
Actuated g/C Ratio	0.13	0.13	0.13	0.08	0.08	0.08	0.08	0.44	0.44	0.14	0.50	0.50
v/c Ratio	0.61	0.06	0.38	0.36	0.14	0.78	0.37	0.91	0.11	0.67	0.72	0.24
Control Delay	54.8	42.9	9.6	55.1	50.9	25.3	67.7	29.7	0.7	61.3	22.6	2.0
Queue Delay	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 Delay	54.8	42.9	9.6	55.1	50.9	25.3	67.7	29.7	0.7	61.3	22.6	2.0
LOS	D	D	A	E	D	C	E	C	A	E	C	A

### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2032 No-Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		40.8			34.1			30.7			27.3	
Approach LOS		D			C			C			C	
Queue Length 50th (ft)	107	10	0	39	17	29	45	325	0	135	461	0
Queue Length 95th (ft)	144	29	44	63	41	103	75	#787	5	m145	602	m17
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350		175	350		
Base Capacity (vph)	583	279	346	583	222	412	433	1584	785	583	1786	893
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.05	0.37	0.17	0.10	0.69	0.25	0.91	0.11	0.58	0.72	0.24

#### Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 64 (53%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.91  
 Intersection Signal Delay: 30.6  
 Intersection LOS: C  
 Intersection Capacity Utilization 72.9%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway



#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2032 No-Build PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1633	1324	1167	692	490	1360
Future Volume (vph)	1633	1324	1167	692	490	1360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	0.88
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	3698	1706	3502	3610	3610	2814
Fl <sub>t</sub> Permitted	0.950		0.950			
Satd. Flow (perm)	3698	1706	3502	3610	3610	2814
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		519				1300
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.96	0.96	0.94	0.94	0.89	0.89
Heavy Vehicles (%)	1%	1%	0%	0%	0%	1%
Adj. Flow (vph)	1701	1379	1241	736	551	1528
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1701	1379	1241	736	551	1528
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	50.0		40.0	67.0	30.0	
Total Split (%)	41.7%		33.3%	55.8%	25.0%	
Maximum Green (s)	44.0		32.0	60.0	23.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	44.8	120.0	32.0	62.2	22.2	120.0
Actuated g/C Ratio	0.37	1.00	0.27	0.52	0.18	1.00
v/c Ratio	1.23	0.81	1.33	0.39	0.82	0.54
Control Delay	145.4	4.2	180.9	9.4	58.3	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	145.4	4.2	180.9	9.4	58.3	0.8
LOS	F	A	F	A	E	A

# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2032 No-Build PM

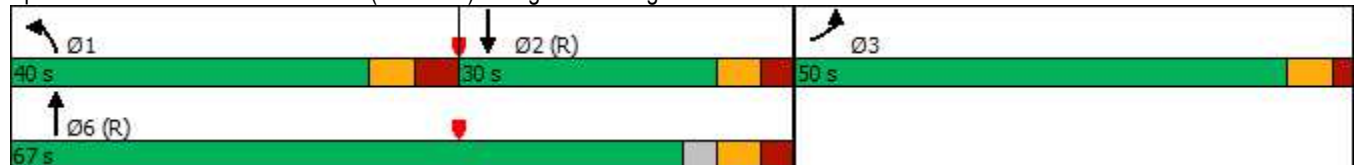


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	82.2			117.0	16.0	
Approach LOS	F			F	B	
Queue Length 50th (ft)	~850	0	~660	155	216	0
Queue Length 95th (ft)	#987	0	m#753	m126	277	0
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1379	1706	933	1895	691	2814
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	1.23	0.81	1.33	0.39	0.80	0.54

## Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 100 (83%), Referenced to phase 2:SBT and 6:NBT, Start of Green  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.33  
 Intersection Signal Delay: 72.6  
 Intersection LOS: E  
 Intersection Capacity Utilization 110.1%  
 ICU Level of Service H  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-02  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road




























# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road

## Lanes, Volumes, Timings

2032 No-Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	98	474	479	19	31	146	1110	1093	80	929	5
Future Volume (vph)	54	98	474	479	19	31	146	1110	1093	80	929	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		1	1		1	1		1	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.983		0.950	0.956		0.950			0.950		
Satd. Flow (prot)	0	1868	1599	1658	1668	1546	1787	3574	1615	1805	5131	0
Flt Permitted		0.983		0.950	0.956		0.950			0.950		
Satd. Flow (perm)	0	1868	1599	1658	1668	1546	1787	3574	1615	1805	5131	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			53			89			252			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		805			586			999			1515	
Travel Time (s)		18.3			13.3			22.7			34.4	
Peak Hour Factor	0.80	0.80	0.80	0.90	0.90	0.90	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	1%	1%	0%	0%	1%	0%
Adj. Flow (vph)	68	123	593	532	21	34	155	1181	1163	91	1056	6
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	191	593	277	276	34	155	1181	1163	91	1062	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	26.0	26.0	31.0	56.0	56.0	21.0	31.0	71.0	56.0	21.0	71.0	
Total Split (%)	14.1%	14.1%	16.8%	30.4%	30.4%	11.4%	16.8%	38.6%	30.4%	11.4%	38.6%	
Maximum Green (s)	20.0	20.0	25.0	50.0	50.0	15.0	25.0	65.0	50.0	15.0	65.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)		19.6	50.8	48.7	48.7	61.1	25.1	60.9	115.6	12.5	48.2	
Actuated g/C Ratio		0.12	0.31	0.29	0.29	0.37	0.15	0.37	0.70	0.08	0.29	
v/c Ratio		0.86	1.13	0.57	0.56	0.05	0.57	0.90	0.97	0.67	0.71	
Control Delay		105.9	125.3	56.3	56.1	0.2	76.7	60.1	38.1	100.1	55.3	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.5	0.0	0.0	
Total Delay		105.9	125.3	56.3	56.1	0.2	76.7	60.1	55.5	100.1	55.3	
LOS		F	F	E	E	A	E	E	E	F	E	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2032 No-Build PM

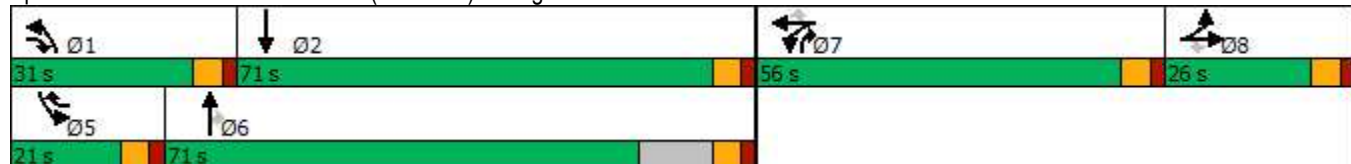


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		120.6			52.9			59.0				58.8
Approach LOS		F			D			E				E
Queue Length 50th (ft)		216	~749	283	281	0	167	654	993	102	384	
Queue Length 95th (ft)		#302	#825	400	395	0	253	763	#1506	165	425	
Internal Link Dist (ft)		725			506			919			1435	
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		226	526	502	505	649	270	1625	1215	163	2022	
Starvation Cap Reductn		0	0	0	0	0	0	0	91	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.85	1.13	0.55	0.55	0.05	0.57	0.73	1.03	0.56	0.53	

## Intersection Summary























Area Type:	Other
Cycle Length:	184
Actuated Cycle Length:	165.8
Natural Cycle:	110
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.13
Intersection Signal Delay:	67.9
Intersection LOS:	E
Intersection Capacity Utilization:	95.3%
ICU Level of Service:	F
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2032 No-Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	2	116	11	1	5	18	1175	14	6	900	8
Future Volume (vph)	28	2	116	11	1	5	18	1175	14	6	900	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	11	12	12
Storage Length (ft)	0		100	0		100	225		0	225		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.998			0.999	
Flt Protected		0.956			0.955		0.950			0.950		
Satd. Flow (prot)	0	1816	1583	0	1875	1669	1736	3568	0	1745	3571	0
Flt Permitted		0.422					0.950			0.950		
Satd. Flow (perm)	0	802	1583	0	1963	1669	1736	3568	0	1745	3571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145			86		2				1
Link Speed (mph)		30			10			30				30
Link Distance (ft)		495			382			1515				1791
Travel Time (s)		11.3			26.0			34.4				40.7
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	4%	1%	0%	0%	1%	0%
Adj. Flow (vph)	35	3	145	14	1	6	19	1237	15	7	1034	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	145	0	15	6	19	1252	0	7	1043	0
Turn Type	Perm	NA	pt+ov	Perm	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases		4	4 1		8	8 5	1	6		5	2	
Permitted Phases	4			8								
Detector Phase	4	4	4 1	8	8	8 5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		8.0	21.0		8.0	21.0	
Total Split (s)	16.0	16.0		16.0	16.0		16.0	66.0		16.0	66.0	
Total Split (%)	14.0%	14.0%		14.0%	14.0%		14.0%	57.9%		14.0%	57.9%	
Maximum Green (s)	10.0	10.0		10.0	10.0		12.0	60.0		12.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		9.1	17.3		6.8	9.7	5.7	40.8		5.2	33.6	
Actuated g/C Ratio		0.13	0.25		0.10	0.14	0.08	0.58		0.07	0.48	
v/c Ratio		0.37	0.29		0.08	0.02	0.13	0.60		0.05	0.61	
Control Delay		46.2	5.9		38.3	0.2	40.6	12.9		40.8	15.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		46.2	5.9		38.3	0.2	40.6	12.9		40.8	15.5	
LOS		D	A		D	A	D	B		D	B	

# 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive Lanes, Volumes, Timings

2032 No-Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		14.3			27.4			13.3				15.6
Approach LOS		B			C			B				B
Queue Length 50th (ft)		11	0		5	0	6	108		2		131
Queue Length 95th (ft)		51	28		26	0	35	358		18		272
Internal Link Dist (ft)		415			302			1435				1711
Turn Bay Length (ft)			100			100	225			225		
Base Capacity (vph)		124	590		304	398	322	3056		324		3059
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.31	0.25		0.05	0.02	0.06	0.41		0.02		0.34

Intersection Summary	
Area Type:	Other
Cycle Length:	114
Actuated Cycle Length:	69.8
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.61
Intersection Signal Delay:	14.5
Intersection LOS:	B
Intersection Capacity Utilization	54.6%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive



# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2032 No-Build PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	248	3	89	23	2	22	57	1074	7	16	728	44
Future Volume (vph)	248	3	89	23	2	22	57	1074	7	16	728	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	15	12	12	13	11	12	12	11	12	12
Storage Length (ft)	0		225	0		80	350		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.999			0.991	
Flt Protected		0.953			0.957		0.950			0.950		
Satd. Flow (prot)	0	1733	1742	0	1818	1620	1678	3571	0	1646	3536	0
Flt Permitted		0.705			0.656		0.950			0.950		
Satd. Flow (perm)	0	1282	1742	0	1246	1620	1678	3571	0	1646	3536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			111			91		1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		492			577			1791			1168	
Travel Time (s)		11.2			13.1			40.7			26.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.97	0.97	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	2%	0%	0%	3%	4%	1%	0%	6%	1%	4%
Adj. Flow (vph)	310	4	111	29	3	28	59	1107	7	17	791	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	314	111	0	32	28	59	1114	0	17	839	0
Turn Type	Perm	NA	pt+ov	Perm	NA	Prot	Prot	NA		Prot	NA	
Protected Phases		8	8 1		4	4	1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8	8 1	4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		5.0	5.0	5.0	3.0	8.0		3.0	8.0	
Minimum Split (s)	9.0	9.0		11.0	11.0	11.0	9.0	14.0		9.0	14.0	
Total Split (s)	26.0	26.0		23.0	23.0	23.0	16.0	66.0		16.0	66.0	
Total Split (%)	24.1%	24.1%		21.3%	21.3%	21.3%	14.8%	61.1%		14.8%	61.1%	
Maximum Green (s)	20.0	20.0		17.0	17.0	17.0	10.0	60.0		10.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)		20.7	33.8		13.5	13.5	7.0	34.1		5.5	25.8	
Actuated g/C Ratio		0.30	0.49		0.20	0.20	0.10	0.49		0.08	0.37	
v/c Ratio		0.82	0.12		0.13	0.07	0.35	0.63		0.13	0.63	
Control Delay		46.9	3.8		25.0	0.4	38.4	14.8		37.0	20.3	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		46.9	3.8		25.0	0.4	38.4	14.8		37.0	20.3	
LOS		D	A		C	A	D	B		D	C	

# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

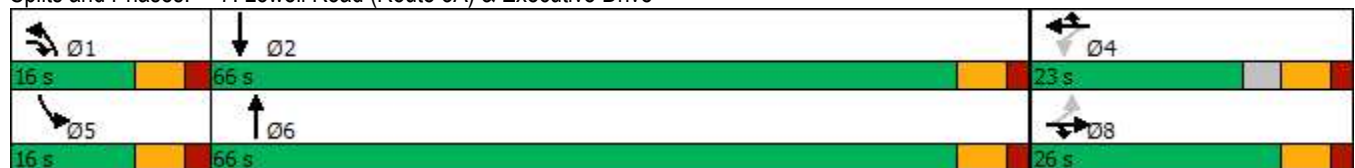
2032 No-Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		35.6			13.5			16.0				20.6
Approach LOS		D			B			B				C
Queue Length 50th (ft)		122	0		10	0	24	153		7		154
Queue Length 95th (ft)		#301	22		34	0	68	296		29		220
Internal Link Dist (ft)		412			497			1711				1088
Turn Bay Length (ft)			225			80	350			150		
Base Capacity (vph)		382	987		371	547	250	3079		245		3050
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.82	0.11		0.09	0.05	0.24	0.36		0.07		0.28

Intersection Summary	
Area Type:	Other
Cycle Length:	108
Actuated Cycle Length:	69.2
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.82
Intersection Signal Delay:	20.8
Intersection LOS:	C
Intersection Capacity Utilization:	68.8%
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

## Splits and Phases: 7: Lowell Road (Route 3A) & Executive Drive



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2032 No-Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↖	↑	↗	↖	↗	
Traffic Volume (vph)	9	2	25	31	0	48	27	1278	15	56	737	11
Future Volume (vph)	9	2	25	31	0	48	27	1278	15	56	737	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					0.98							
Frt			0.850			0.850			0.850		0.998	
Flt Protected		0.962			0.950		0.950			0.950		
Satd. Flow (prot)	0	1828	1583	0	1865	1669	1745	1818	1615	1805	1878	0
Flt Permitted		0.746			0.748		0.950			0.950		
Satd. Flow (perm)	0	1417	1583	0	1445	1669	1745	1818	1615	1805	1878	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			60			91			1
Link Speed (mph)		10			30			30				30
Link Distance (ft)		598			262			1405				549
Travel Time (s)		40.8			6.0			31.9				12.5
Confl. Peds. (#/hr)				3								
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.99	0.99	0.99	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	11	3	31	39	0	60	27	1291	15	60	784	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	31	0	39	60	27	1291	15	60	796	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA	Prot	Prot	NA	
Protected Phases		8	8		4	5	1	6	6	5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0	116.0	16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%	64.4%	8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0	110.0	10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.1	8.1		8.1	20.7	6.6	140.9	140.9	8.8	146.5	
Actuated g/C Ratio		0.04	0.04		0.04	0.12	0.04	0.78	0.78	0.05	0.81	



8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
Lanes, Volumes, Timings

2032 No-Build PM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2032 No-Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.22	0.20		0.60	0.24	0.42	0.91	0.01	0.68	0.52	
Control Delay		90.0	2.8		118.9	16.3	103.9	27.8	0.0	119.5	11.0	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	2.5	
Total Delay		90.0	2.8		118.9	16.3	103.9	27.8	0.0	119.5	13.5	
LOS		F	A		F	B	F	C	A	F	B	
Approach Delay		29.9			56.7			29.0			20.9	
Approach LOS		C			E			C			C	
Queue Length 50th (ft)		16	0		46	0	32	954	0	71	259	
Queue Length 95th (ft)		40	0		81	36	70	#2065	0	#134	766	
Internal Link Dist (ft)		518			182			1325			469	
Turn Bay Length (ft)			50			100	210		325	125		
Base Capacity (vph)		78	173		80	256	96	1423	1283	100	1528	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	580	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.18	0.18		0.49	0.23	0.28	0.91	0.01	0.60	0.84	

### Intersection Summary

Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.91  
 Intersection Signal Delay: 27.2  
 Intersection Capacity Utilization 90.6%  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

### Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2032 No-Build PM












---

Lane Group	Ø9
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

---

9: Lowell Road (Route 3A) & Pelham Road  
Lanes, Volumes, Timings

2032 No-Build PM

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Lane Configurations							
Traffic Volume (vph)	94	157	1212	121	122	726	
Future Volume (vph)	94	157	1212	121	122	726	
Ideal Flow (vphpl)	1900	1000	1900	1900	1900	1900	
Lane Width (ft)	12	12	13	13	12	12	
Storage Length (ft)	0	75		0	150		
Storage Lanes	1	1		0	1		
Taper Length (ft)	25				50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850	0.988				
Fl <sub>t</sub> Protected	0.950				0.950		
Satd. Flow (prot)	1805	850	1922	0	1805	1881	
Fl <sub>t</sub> Permitted	0.950				0.950		
Satd. Flow (perm)	1805	850	1922	0	1805	1881	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		153	4				
Link Speed (mph)	20		30			30	
Link Distance (ft)	512		549			1309	
Travel Time (s)	17.5		12.5			29.8	
Peak Hour Factor	0.87	0.87	0.98	0.98	0.89	0.89	
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	
Adj. Flow (vph)	108	180	1237	123	137	816	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	108	180	1360	0	137	816	
Turn Type	Prot	pt+ov	NA		Prot	NA	
Protected Phases	4	4 5	6		5	2	9
Permitted Phases							
Detector Phase	4	4 5	6		5	2	
Switch Phase							
Minimum Initial (s)	5.0		10.0		3.0	10.0	5.0
Minimum Split (s)	11.0		16.0		9.0	16.0	35.0
Total Split (s)	26.0		116.0		13.0	116.0	35.0
Total Split (%)	13.7%		61.1%		6.8%	61.1%	18%
Maximum Green (s)	20.0		110.0		7.0	110.0	29.0
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0		6.0		6.0	6.0	
Lead/Lag			Lag		Lead		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	1.5		1.5		1.5	1.5	3.0
Recall Mode	None		C-Min		None	C-Min	None
Walk Time (s)							5.0
Flash Dont Walk (s)							24.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	15.1	28.1	142.9		7.0	155.9	
Actuated g/C Ratio	0.08	0.15	0.75		0.04	0.82	
v/c Ratio	0.76	0.70	0.94		2.08	0.53	
Control Delay	115.2	30.4	34.2		568.2	9.6	

# 9: Lowell Road (Route 3A) & Pelham Road Lanes, Volumes, Timings

2032 No-Build PM



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Queue Delay	0.0	0.0	44.6		0.0	0.0	
Total Delay	115.2	30.4	78.8		568.2	9.6	
LOS	F	C	E		F	A	
Approach Delay	62.2		78.8			89.9	
Approach LOS	E		E			F	
Queue Length 50th (ft)	135	30	1104		~268	213	
Queue Length 95th (ft)	197	118	#2345		#423	745	
Internal Link Dist (ft)	432		469			1229	
Turn Bay Length (ft)		75			150		
Base Capacity (vph)	190	252	1446		66	1543	
Starvation Cap Reductn	0	0	276		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.57	0.71	1.16		2.08	0.53	

## Intersection Summary

Area Type: Other

Cycle Length: 190

Actuated Cycle Length: 190

Offset: 30 (16%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 2.08

Intersection Signal Delay: 81.1

Intersection LOS: F

Intersection Capacity Utilization 99.6%

ICU Level of Service F

Analysis Period (min) 15

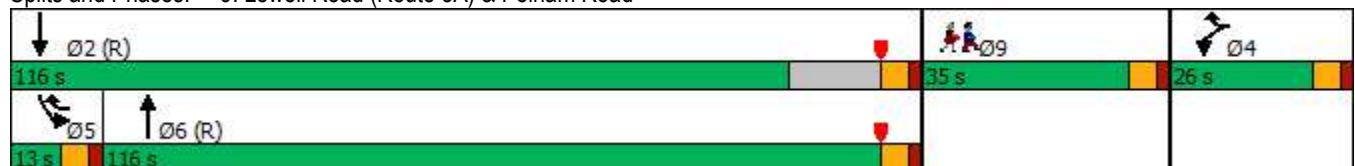
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

## Splits and Phases: 9: Lowell Road (Route 3A) & Pelham Road



## **Appendix G**

### **Capacity Analysis – 2022 Build Traffic Conditions**

**2022 Build Weekday A.M.**



1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2022 Build AM



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	272	0	487	509	12	1	849
Future Volume (vph)	2	0	2	0	272	0	487	509	12	1	849
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0	100	0
Storage Lanes	1	1		1		1	1		0	1	1
Taper Length (ft)	25			100			75			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00
Fr <sub>t</sub>		0.850						0.997			0.850
Fl <sub>t</sub> Protected	0.950						0.950			0.950	
Satd. Flow (prot)	1685	1133	0	1773	3574	0	1652	3564	0	1805	1583
Fl <sub>t</sub> Permitted	0.950						0.950			0.950	
Satd. Flow (perm)	1685	1133	0	1773	3574	0	1652	3564	0	1805	1583
Right Turn on Red			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		543						3			473
Link Speed (mph)	30				35			35			35
Link Distance (ft)	591				758			1733			622
Travel Time (s)	13.4				14.8			33.8			12.1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.92	0.92	0.92	0.86	0.86
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Adj. Flow (vph)	3	0	3	0	340	0	529	553	13	1	987
Shared Lane Traffic (%)											
Lane Group Flow (vph)	3	3	0	0	340	0	529	566	0	1	987
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5
Permitted Phases											
Detector Phase	4	4		1	6		5	2		3	3 5
Switch Phase											
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	
Total Split (s)	16.0	16.0		16.0	20.0		38.0	42.0		16.0	
Total Split (%)	17.8%	17.8%		17.8%	22.2%		42.2%	46.7%		17.8%	
Maximum Green (s)	10.0	10.0		10.0	14.0		32.0	36.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	
Act Effct Green (s)	5.8	5.8			16.3		42.4	64.7		10.8	58.0
Actuated g/C Ratio	0.06	0.06			0.18		0.47	0.72		0.12	0.64
v/c Ratio	0.03	0.01			0.53		0.68	0.22		0.00	0.83
Control Delay	40.0	0.0			37.6		23.6	0.7		36.0	14.2
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0
Total Delay	40.0	0.0			37.6		23.6	0.7		36.0	14.2
LOS	D	A			D		C	A		D	B

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2022 Build AM

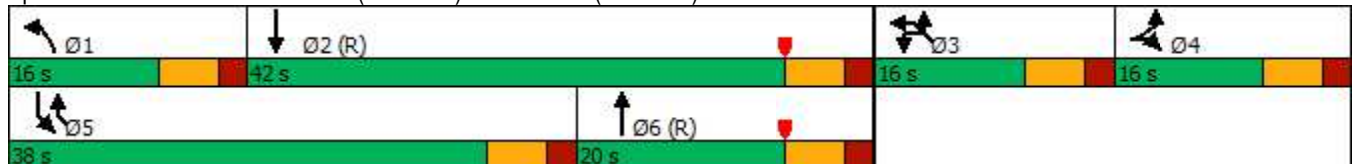


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Approach Delay	20.0				37.6			11.8		14.3	
Approach LOS	B				D			B		B	
Queue Length 50th (ft)	2	0			96		149	2		1	138
Queue Length 95th (ft)	9	0			123		#427	5		5	#455
Internal Link Dist (ft)	511				678			1653		542	
Turn Bay Length (ft)		50					775			100	
Base Capacity (vph)	187	608			646		778	2562		217	1188
Starvation Cap Reductn	0	0			0		0	0		0	0
Spillback Cap Reductn	0	0			0		0	0		0	0
Storage Cap Reductn	0	0			0		0	0		0	0
Reduced v/c Ratio	0.02	0.00			0.53		0.68	0.22		0.00	0.83

Intersection Summary






















Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	16.4
Intersection LOS:	B
Intersection Capacity Utilization:	70.1%
ICU Level of Service:	C
Analysis Period (min):	15
Description:	NHDOT Int. No.: S-229-04
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.

Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road



2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue  
Lanes, Volumes, Timings

2022 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	25	1	1	33	43	1126	2	7	987	241
Future Volume (vph)	156	0	25	1	1	33	43	1126	2	7	987	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.872							0.971
Flt Protected		0.950			0.999		0.950			0.950		
Satd. Flow (prot)	0	1532	1133	0	1659	0	1685	3538	0	1570	3410	0
Flt Permitted		0.730			0.993		0.950			0.950		
Satd. Flow (perm)	0	1177	1133	0	1649	0	1685	3538	0	1570	3410	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109		39							45
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.80	0.80	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95
Heavy Vehicles (%)	10%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	6%
Adj. Flow (vph)	195	0	31	1	1	39	51	1325	2	7	1039	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	195	31	0	41	0	51	1327	0	7	1293	0
Turn Type	Perm	NA	Prot	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		7	7		3		1	6		5	2	
Permitted Phases	7			3								
Detector Phase	7	7	7	3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0	21.0	21.0	21.0		21.0	51.0		18.0	48.0	
Total Split (%)	23.3%	23.3%	23.3%	23.3%	23.3%		23.3%	56.7%		20.0%	53.3%	
Maximum Green (s)	15.0	15.0	15.0	15.0	15.0		15.0	45.0		12.0	42.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		18.0	18.0		11.6		9.1	57.2		7.0	50.1	
Actuated g/C Ratio		0.20	0.20		0.13		0.10	0.64		0.08	0.56	
v/c Ratio		0.83	0.10		0.17		0.30	0.59		0.06	0.67	
Control Delay		66.1	0.6		13.2		42.1	10.1		29.9	19.6	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		66.1	0.6		13.2		42.1	10.1		29.9	19.6	
LOS		E	A		B		D	B		C	B	

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2022 Build AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		57.1			13.2			11.3				19.6
Approach LOS		E			B			B				B
Queue Length 50th (ft)		112	0		1		29	140		4		147
Queue Length 95th (ft)		#208	0		26		m37	250		m7		261
Internal Link Dist (ft)		430			477			1653				900
Turn Bay Length (ft)			50				300			350		
Base Capacity (vph)		235	313		307		280	2247		209		1918
Starvation Cap Reductn		0	0		0		0	0		0		0
Spillback Cap Reductn		0	0		0		0	0		0		0
Storage Cap Reductn		0	0		0		0	0		0		0
Reduced v/c Ratio		0.83	0.10		0.13		0.18	0.59		0.03		0.67

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 51 (57%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 18.5

Intersection LOS: B

Intersection Capacity Utilization 61.0%

ICU Level of Service B

Analysis Period (min) 15

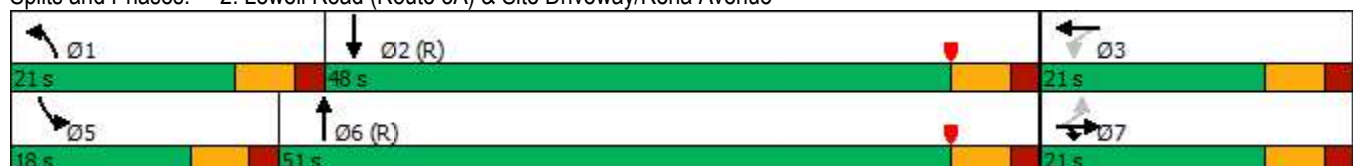
Description: NHDOT Int. No.: S-229-03

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

Queue shown is maximum after two cycles.



























m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2022 Build AM

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	131	4	59	15	5	71	78	1215	27	85	1152	164	
Future Volume (vph)	131	4	59	15	5	71	78	1215	27	85	1152	164	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12	
Storage Length (ft)	175		175	150		200	350		175	350		0	
Storage Lanes	2		1	2		1	2		1	2		1	
Taper Length (ft)	25			75			125			100			
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00	
Fr <sub>t</sub>			0.850			0.850			0.850			0.850	
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	3213	1852	1568	3502	1900	1589	3467	3505	1583	3433	3539	1482	
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950			
Satd. Flow (perm)	3213	1852	1568	3502	1900	1589	3467	3505	1583	3433	3539	1482	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			182			182			182			182	
Link Speed (mph)		30			30			35				30	
Link Distance (ft)		401			449			980				1189	
Travel Time (s)		9.1			10.2			19.1				27.0	
Peak Hour Factor	0.93	0.93	0.93	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96	
Heavy Vehicles (%)	9%	6%	3%	0%	0%	5%	1%	3%	2%	2%	2%	9%	
Adj. Flow (vph)	141	4	63	17	6	81	90	1397	31	89	1200	171	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	141	4	63	17	6	81	90	1397	31	89	1200	171	
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	
Protected Phases	7	4	4	3	8	8	1	6	6	5	2	2	
Permitted Phases													
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2	
Switch Phase													
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	16.0	
Total Split (s)	17.0	16.0	16.0	17.0	16.0	16.0	16.0	41.0	41.0	16.0	41.0	41.0	
Total Split (%)	18.9%	17.8%	17.8%	18.9%	17.8%	17.8%	17.8%	45.6%	45.6%	17.8%	45.6%	45.6%	
Maximum Green (s)	11.0	10.0	10.0	11.0	10.0	10.0	10.0	35.0	35.0	10.0	35.0	35.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	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 Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min	
Act Effct Green (s)	9.8	14.8	14.8	7.0	6.9	6.9	8.7	45.7	45.7	8.7	45.7	45.7	
Actuated g/C Ratio	0.11	0.16	0.16	0.08	0.08	0.08	0.10	0.51	0.51	0.10	0.51	0.51	
v/c Ratio	0.40	0.01	0.15	0.06	0.04	0.28	0.27	0.79	0.03	0.27	0.67	0.20	
Control Delay	40.6	34.0	0.8	38.7	38.8	2.4	48.1	18.2	0.1	48.3	19.4	1.3	
Queue Delay	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 Delay	40.6	34.0	0.8	38.7	38.8	2.4	48.1	18.2	0.1	48.3	19.4	1.3	
LOS	D	C	A	D	D	A	D	B	A	D	B	A	

### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2022 Build AM

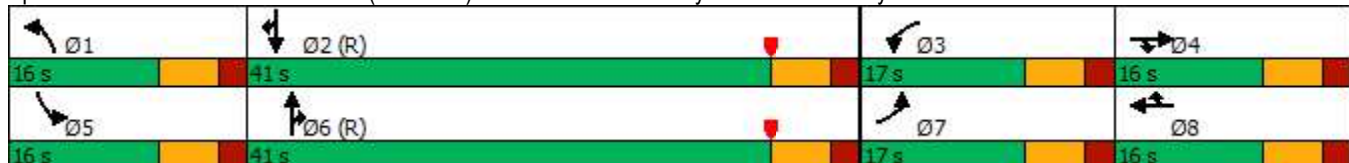


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		28.4			10.4			19.6			19.0	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	39	2	0	4	3	0	26	323	0	25	326	0
Queue Length 95th (ft)	67	12	0	14	15	0	m45	#509	m0	m38	424	m6
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350		175	350		
Base Capacity (vph)	392	314	417	428	211	338	390	1778	892	386	1795	841
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.01	0.15	0.04	0.03	0.24	0.23	0.79	0.03	0.23	0.67	0.20

#### Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 51 (57%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 65  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.79  
 Intersection Signal Delay: 19.6  
 Intersection LOS: B  
 Intersection Capacity Utilization 57.1%  
 ICU Level of Service B  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway



#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2022 Build AM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↖	↖	↖↖	↑↑	↑↑	↖↖
Traffic Volume (vph)	948	1095	1038	371	386	1517
Future Volume (vph)	948	1095	1038	371	386	1517
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	0.88
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	3662	1656	3367	3539	3539	2760
Fl <sub>t</sub> Permitted	0.950		0.950			
Satd. Flow (perm)	3662	1656	3367	3539	3539	2760
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		800				1281
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.94	0.94	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	4%	2%	2%	3%
Adj. Flow (vph)	1009	1165	1128	403	420	1649
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1009	1165	1128	403	420	1649
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	32.0		31.0	58.0	27.0	
Total Split (%)	35.6%		34.4%	64.4%	30.0%	
Maximum Green (s)	26.0		23.0	51.0	20.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	27.9	90.0	24.2	49.1	16.9	90.0
Actuated g/C Ratio	0.31	1.00	0.27	0.55	0.19	1.00
v/c Ratio	0.89	0.70	1.25	0.21	0.63	0.60
Control Delay	41.3	2.5	146.2	2.2	37.8	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	2.5	146.2	2.2	37.8	1.0
LOS	D	A	F	A	D	A



# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2022 Build AM

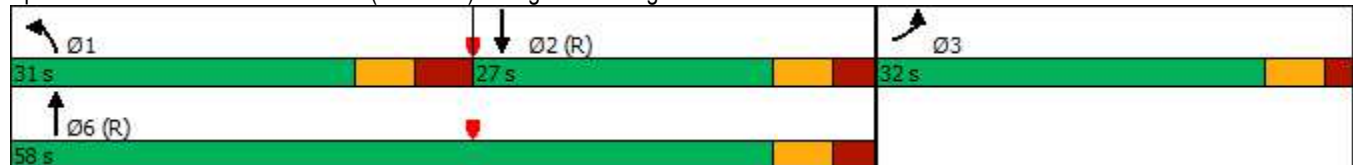


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	20.5			108.3	8.4	
Approach LOS	C			F	A	
Queue Length 50th (ft)	277	0	~414	3	115	0
Queue Length 95th (ft)	#416	0	#538	m4	158	0
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1135	1656	903	2005	786	2760
Starvation 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	0.89	0.70	1.25	0.20	0.53	0.60

## Intersection Summary
























Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 70 (78%), Referenced to phase 2:SBT and 6:NBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.25  
 Intersection Signal Delay: 39.5  
 Intersection LOS: D  
 Intersection Capacity Utilization 84.0%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-02  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road



5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road  
Lanes, Volumes, Timings

2022 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	28	282	614	41	30	303	811	188	15	1087	10
Future Volume (vph)	65	28	282	614	41	30	303	811	188	15	1087	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		1	1		1	1		1	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (prot)	0	1835	1583	1641	1657	1501	1787	3539	1583	1752	5078	0
Flt Permitted		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (perm)	0	1835	1583	1641	1657	1501	1787	3539	1583	1752	5078	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			53			89			198			1
Link Speed (mph)		30			30			30				30
Link Distance (ft)		805			586			999				1515
Travel Time (s)		18.3			13.3			22.7				34.4
Peak Hour Factor	0.81	0.81	0.81	0.94	0.94	0.94	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	1%	0%	4%	1%	2%	2%	3%	2%	6%
Adj. Flow (vph)	80	35	348	653	44	32	319	854	198	17	1249	11
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	115	348	346	351	32	319	854	198	17	1260	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	26.0	26.0	31.0	56.0	56.0	21.0	31.0	71.0	56.0	21.0	71.0	
Total Split (%)	14.1%	14.1%	16.8%	30.4%	30.4%	11.4%	16.8%	38.6%	30.4%	11.4%	38.6%	
Maximum Green (s)	20.0	20.0	25.0	50.0	50.0	15.0	25.0	65.0	50.0	15.0	65.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)		14.5	46.3	38.9	38.9	45.5	25.7	71.7	116.7	6.7	49.8	
Actuated g/C Ratio		0.09	0.30	0.25	0.25	0.30	0.17	0.47	0.76	0.04	0.32	
v/c Ratio		0.66	0.68	0.83	0.84	0.06	1.07	0.52	0.16	0.22	0.76	
Control Delay		89.9	50.2	73.5	73.7	0.2	130.4	32.6	1.0	86.6	50.6	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		89.9	50.2	73.5	73.7	0.2	130.4	32.6	1.0	86.6	50.6	
LOS		F	D	E	E	A	F	C	A	F	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2022 Build AM

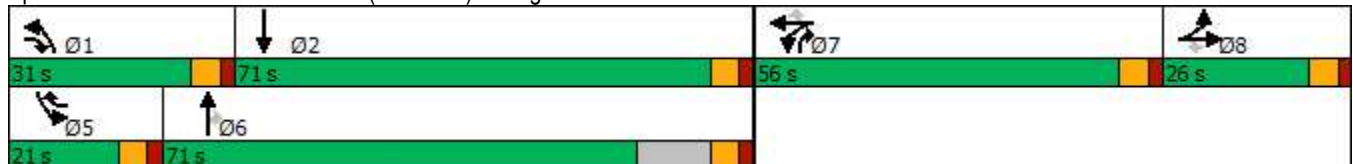


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		60.1			70.4			50.8				51.0
Approach LOS		E			E			D				D
Queue Length 50th (ft)		114	268	347	353	0	~368	330	0	17	420	
Queue Length 95th (ft)		187	394	550	556	0	#707	467	22	49	512	
Internal Link Dist (ft)		725			506			919			1435	
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		245	514	549	554	588	298	1799	1352	175	2210	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.47	0.68	0.63	0.63	0.05	1.07	0.47	0.15	0.10	0.57	

## Intersection Summary























Area Type:	Other
Cycle Length:	184
Actuated Cycle Length:	153.5
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.07
Intersection Signal Delay:	55.7
Intersection LOS:	E
Intersection Capacity Utilization	77.8%
ICU Level of Service	D
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2022 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	0	11	2	2	4	116	778	2	2	1149	59
Future Volume (vph)	8	0	11	2	2	4	116	778	2	2	1149	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	11	12	12
Storage Length (ft)	0		100	0		100	225		0	225		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Fr <sub>t</sub>			0.850			0.850						0.993
Fl <sub>t</sub> Protected		0.950			0.976		0.950			0.950		
Satd. Flow (prot)	0	1719	1455	0	1916	1669	1752	3505	0	1745	3480	0
Fl <sub>t</sub> Permitted							0.950			0.950		
Satd. Flow (perm)	0	1810	1455	0	1963	1669	1752	3505	0	1745	3480	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			86			86						7
Link Speed (mph)		30			10			30				30
Link Distance (ft)		495			382			1515				1791
Travel Time (s)		11.3			26.0			34.4				40.7
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.90	0.90	0.90	0.83	0.83	0.83
Heavy Vehicles (%)	5%	0%	11%	0%	0%	0%	3%	3%	0%	0%	3%	3%
Adj. Flow (vph)	10	0	14	3	3	5	129	864	2	2	1384	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	14	0	6	5	129	866	0	2	1455	0
Turn Type	Perm	NA	pt+ov	Perm	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases		4	4 1		8	8 5	1	6		5	2	
Permitted Phases	4			8								
Detector Phase	4	4	4 1	8	8	8 5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		8.0	21.0		8.0	21.0	
Total Split (s)	16.0	16.0		16.0	16.0		16.0	66.0		16.0	66.0	
Total Split (%)	14.0%	14.0%		14.0%	14.0%		14.0%	57.9%		14.0%	57.9%	
Maximum Green (s)	10.0	10.0		10.0	10.0		12.0	60.0		12.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		7.5	11.3		6.5	9.1	10.8	67.5		5.2	48.6	
Actuated g/C Ratio		0.10	0.14		0.08	0.12	0.14	0.86		0.07	0.62	
v/c Ratio		0.06	0.05		0.04	0.02	0.54	0.29		0.02	0.67	
Control Delay		44.1	0.4		46.4	0.2	47.4	5.0		48.5	14.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		44.1	0.4		46.4	0.2	47.4	5.0		48.5	14.4	
LOS		D	A		D	A	D	A		D	B	

# 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive Lanes, Volumes, Timings

2022 Build AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		18.6			25.4			10.5				14.5
Approach LOS		B			C			B				B
Queue Length 50th (ft)		4	0		2	0	46	0		1		141
Queue Length 95th (ft)		22	0		16	0	#174	203		8		433
Internal Link Dist (ft)		415			302			1435				1711
Turn Bay Length (ft)			100			100	225			225		
Base Capacity (vph)		256	329		277	367	297	2965		296		2800
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.04	0.04		0.02	0.01	0.43	0.29		0.01		0.52

## Intersection Summary























Area Type: Other  
 Cycle Length: 114  
 Actuated Cycle Length: 78.4  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.67  
 Intersection Signal Delay: 13.0  
 Intersection LOS: B  
 Intersection Capacity Utilization 60.0%  
 ICU Level of Service B  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

## Splits and Phases: 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive



# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2022 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	2	10	141	30	101	164	455	60	107	1051	203
Future Volume (vph)	36	2	10	141	30	101	164	455	60	107	1051	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	15	12	12	13	11	12	12	11	12	12
Storage Length (ft)	0		225	0		80	350		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.983			0.976	
Flt Protected		0.955			0.961		0.950			0.950		
Satd. Flow (prot)	0	1577	1558	0	1811	1620	1711	3416	0	1728	3454	0
Flt Permitted		0.469			0.731		0.950			0.950		
Satd. Flow (perm)	0	774	1558	0	1378	1620	1711	3416	0	1728	3454	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30			101		21			33	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		492			577			1791			1168	
Travel Time (s)		11.2			13.1			40.7			26.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	12%	0%	14%	1%	0%	3%	2%	4%	3%	1%	2%	2%
Adj. Flow (vph)	45	3	13	176	38	126	180	500	66	118	1155	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	48	13	0	214	126	180	566	0	118	1378	0
Turn Type	Perm	NA	pt+ov	Perm	NA	Prot	Prot	NA		Prot	NA	
Protected Phases		8	8 1		4	4	1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8	8 1	4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		5.0	5.0	5.0	3.0	8.0		3.0	8.0	
Minimum Split (s)	9.0	9.0		11.0	11.0	11.0	9.0	14.0		9.0	14.0	
Total Split (s)	26.0	26.0		23.0	23.0	23.0	16.0	66.0		16.0	66.0	
Total Split (%)	24.1%	24.1%		21.3%	21.3%	21.3%	14.8%	61.1%		14.8%	61.1%	
Maximum Green (s)	20.0	20.0		17.0	17.0	17.0	10.0	60.0		10.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)		12.1	25.6		16.0	16.0	10.2	46.7		9.2	45.7	
Actuated g/C Ratio		0.13	0.28		0.18	0.18	0.11	0.52		0.10	0.51	
v/c Ratio		0.47	0.03		0.88	0.34	0.93	0.32		0.67	0.78	
Control Delay		52.3	3.3		72.7	14.3	94.3	12.5		61.9	21.0	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		52.3	3.3		72.7	14.3	94.3	12.5		61.9	21.0	
LOS		D	A		E	B	F	B		E	C	

# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2022 Build AM

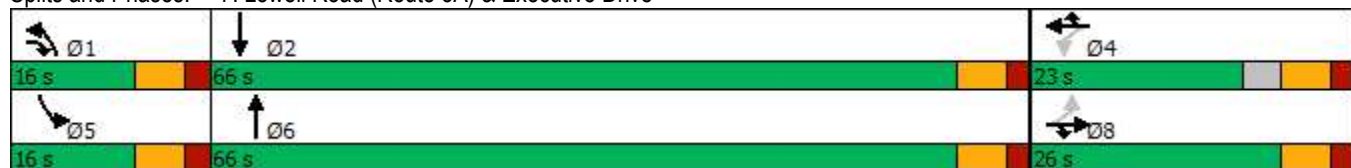


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		41.8			51.1			32.2				24.2
Approach LOS		D			D			C				C
Queue Length 50th (ft)		24	0		120	12	105	92		66		318
Queue Length 95th (ft)		59	4		#239	52	#278	126		#167		402
Internal Link Dist (ft)		412			497			1711				1088
Turn Bay Length (ft)			225			80	350			150		
Base Capacity (vph)		174	537		311	443	193	2319		194		2349
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.28	0.02		0.69	0.28	0.93	0.24		0.61		0.59

## Intersection Summary

Area Type:	Other
Cycle Length:	108
Actuated Cycle Length:	90.2
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	30.3
Intersection LOS:	C
Intersection Capacity Utilization	75.7%
ICU Level of Service	D
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

## Splits and Phases: 7: Lowell Road (Route 3A) & Executive Drive





# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2022 Build AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↗	↕	↗	↗	↗	↗
Traffic Volume (vph)	11	0	48	6	0	10	4	566	1	16	1317	3
Future Volume (vph)	11	0	48	6	0	10	4	566	1	16	1317	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1719	1583	0	1865	1669	1745	1766	1615	1805	1863	0
Flt Permitted		0.752			0.748		0.950			0.950		
Satd. Flow (perm)	0	1361	1583	0	1469	1669	1745	1766	1615	1805	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			55			91			
Link Speed (mph)		10			30			30				30
Link Distance (ft)		598			262			1405				549
Travel Time (s)		40.8			6.0			31.9				12.5
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	5%	0%	2%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Adj. Flow (vph)	14	0	60	8	0	13	4	622	1	17	1386	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	60	0	8	13	4	622	1	17	1389	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA	Prot	Prot	NA	
Protected Phases		8	8		4	5	1	6	6	5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0	116.0	16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%	64.4%	8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0	110.0	10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag						Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		6.3	6.3		6.3	18.3	5.0	147.7	147.7	6.0	153.1	
Actuated g/C Ratio		0.04	0.04		0.04	0.10	0.03	0.82	0.82	0.03	0.85	
v/c Ratio		0.30	0.42		0.16	0.06	0.08	0.43	0.00	0.28	0.88	
Control Delay		100.2	12.4		90.2	0.5	89.0	8.4	0.0	95.9	18.7	

8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
Lanes, Volumes, Timings

2022 Build AM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2022 Build AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	26.8	
Total Delay		100.2	12.4		90.2	0.5	89.0	8.4	0.0	95.9	45.4	
LOS		F	B		F	A	F	A	A	F	D	
Approach Delay		29.0			34.7			8.9			46.0	
Approach LOS		C			C			A			D	
Queue Length 50th (ft)		17	0		9	0	5	156	0	20	449	
Queue Length 95th (ft)		40	3		27	0	20	517	0	50	#2186	
Internal Link Dist (ft)		518			182			1325			469	
Turn Bay Length (ft)			50			100	210		325	125		
Base Capacity (vph)		75	173		81	254	96	1449	1341	100	1585	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	262	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.19	0.35		0.10	0.05	0.04	0.43	0.00	0.17	1.05	

## Intersection Summary

Area Type: Other

Cycle Length: 180

Actuated Cycle Length: 180

Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 34.4

Intersection LOS: C

Intersection Capacity Utilization 92.8%

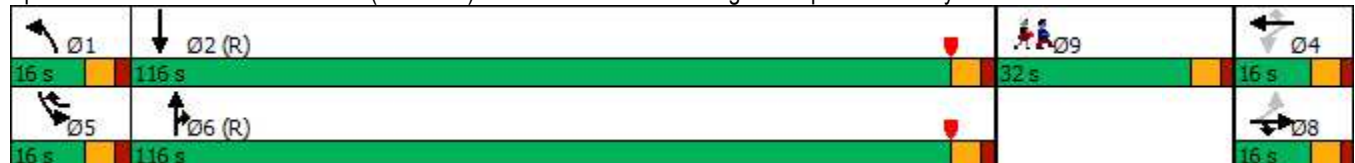
ICU Level of Service F

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

## Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2022 Build AM












---

Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

---

9: Lowell Road (Route 3A) & Pelham Road  
Lanes, Volumes, Timings

2022 Build AM

							Ø9
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (vph)	232	73	500	84	64	1108	
Future Volume (vph)	232	73	500	84	64	1108	
Ideal Flow (vphpl)	1900	1000	1900	1900	1900	1900	
Lane Width (ft)	12	12	13	13	12	12	
Storage Length (ft)	0	75		0	150		
Storage Lanes	1	1		0	1		
Taper Length (ft)	25				50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850	0.981				
Fl <sub>t</sub> Protected	0.950				0.950		
Satd. Flow (prot)	1787	802	1839	0	1719	1863	
Fl <sub>t</sub> Permitted	0.950				0.950		
Satd. Flow (perm)	1787	802	1839	0	1719	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		29	8				
Link Speed (mph)	20		30			30	
Link Distance (ft)	512		549			1309	
Travel Time (s)	17.5		12.5			29.8	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.96	0.96	
Heavy Vehicles (%)	1%	6%	5%	3%	5%	2%	
Adj. Flow (vph)	264	83	543	91	67	1154	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	264	83	634	0	67	1154	
Turn Type	Prot	pt+ov	NA		Prot	NA	
Protected Phases	4	4 5	6		5	2	9
Permitted Phases							
Detector Phase	4	4 5	6		5	2	
Switch Phase							
Minimum Initial (s)	5.0		10.0		3.0	10.0	5.0
Minimum Split (s)	11.0		16.0		9.0	16.0	35.0
Total Split (s)	26.0		116.0		13.0	116.0	35.0
Total Split (%)	13.7%		61.1%		6.8%	61.1%	18%
Maximum Green (s)	20.0		110.0		7.0	110.0	29.0
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0		6.0		6.0	6.0	
Lead/Lag			Lag		Lead		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	1.5		1.5		1.5	1.5	3.0
Recall Mode	None		C-Min		None	C-Min	None
Walk Time (s)							5.0
Flash Dont Walk (s)							24.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	20.0	33.0	138.0		7.0	151.0	
Actuated g/C Ratio	0.11	0.17	0.73		0.04	0.79	
v/c Ratio	1.40	0.51	0.47		1.06	0.78	
Control Delay	265.8	57.8	14.1		211.0	17.8	

# 9: Lowell Road (Route 3A) & Pelham Road Lanes, Volumes, Timings

2022 Build AM

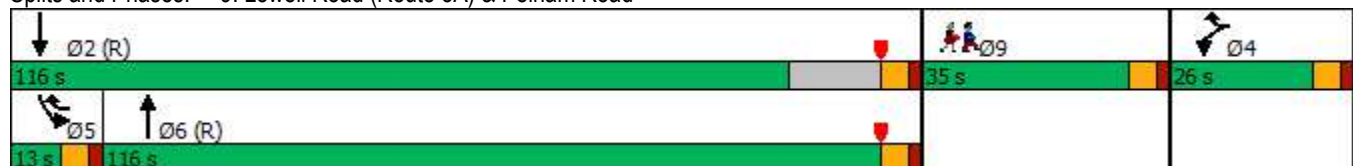


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Queue Delay	0.0	0.0	3.9		0.0	0.0	
Total Delay	265.8	57.8	18.1		211.0	17.8	
LOS	F	E	B		F	B	
Approach Delay	216.0		18.1			28.4	
Approach LOS	F		B			C	
Queue Length 50th (ft)	~439	62	258		~91	548	
Queue Length 95th (ft)	#620	125	619		#210	#1690	
Internal Link Dist (ft)	432		469			1229	
Turn Bay Length (ft)		75			150		
Base Capacity (vph)	188	163	1338		63	1480	
Starvation Cap Reductn	0	0	603		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	1.40	0.51	0.86		1.06	0.78	

## Intersection Summary

Area Type: Other  
 Cycle Length: 190  
 Actuated Cycle Length: 190  
 Offset: 30 (16%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.40  
 Intersection Signal Delay: 55.0  
 Intersection LOS: D  
 Intersection Capacity Utilization 81.2%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

## Splits and Phases: 9: Lowell Road (Route 3A) & Pelham Road



**2022 Build Weekday P.M.**



1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2022 Build PM



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	36	2	2	1	593	1	894	399	13	4	0	660
Future Volume (vph)	36	2	2	1	593	1	894	399	13	4	0	660
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0		100	0
Storage Lanes	1	1		1		1	1		0		1	1
Taper Length (ft)	25			100			75				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Fr <sub>t</sub>		0.850						0.995				0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1668	1507	0	1685	3610	0	1685	3557	0	0	1805	1615
Fl <sub>t</sub> Permitted	0.950			0.950			0.950				0.950	
Satd. Flow (perm)	1668	1507	0	1685	3610	0	1685	3557	0	0	1805	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191						4				263
Link Speed (mph)	30			35			35				35	
Link Distance (ft)	591			758			1733				622	
Travel Time (s)	13.4			14.8			33.8				12.1	
Peak Hour Factor	0.80	0.80	0.80	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	45	3	3	1	652	1	993	443	14	4	0	725
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	6	0	1	653	0	993	457	0	0	4	725
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3	3.5
Permitted Phases												
Detector Phase	4	4		1	6		5	2		3	3	3.5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	11.0	
Total Split (s)	21.0	21.0		16.0	32.0		51.0	67.0		16.0	16.0	
Total Split (%)	17.5%	17.5%		13.3%	26.7%		42.5%	55.8%		13.3%	13.3%	
Maximum Green (s)	15.0	15.0		10.0	26.0		45.0	61.0		10.0	10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	None	
Act Effct Green (s)	8.7	8.7		5.6	25.4		53.6	82.6			10.6	65.4
Actuated g/C Ratio	0.07	0.07		0.05	0.21		0.45	0.69			0.09	0.54
v/c Ratio	0.38	0.02		0.01	0.85		1.32	0.19			0.03	0.72
Control Delay	61.1	0.2		55.0	57.5		171.7	1.2			51.0	16.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	61.1	0.2		55.0	57.5		171.7	1.2			51.0	16.4
LOS	E	A		D	E		F	A			D	B

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2022 Build PM

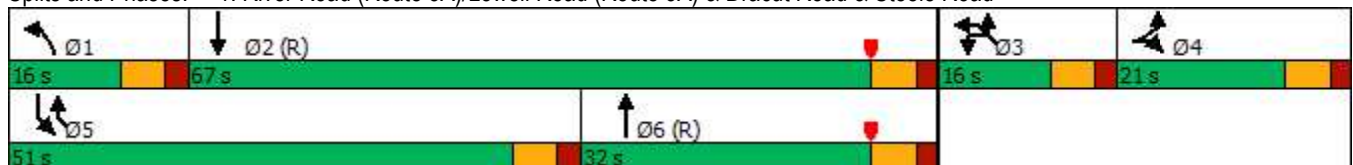


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Approach Delay	53.9				57.5			118.0			16.6	
Approach LOS	D				E			F			B	
Queue Length 50th (ft)	34	0		1	256		~997	2			3	175
Queue Length 95th (ft)	63	0		7	#334		#1296	m44			15	377
Internal Link Dist (ft)	511				678			1653			542	
Turn Bay Length (ft)		50		200			775				100	
Base Capacity (vph)	208	355		140	782		753	2450			159	1000
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.22	0.02		0.01	0.84		1.32	0.19			0.03	0.72

Intersection Summary






















Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 5 (4%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.32  
 Intersection Signal Delay: 77.5  
 Intersection LOS: E  
 Intersection Capacity Utilization 94.3%  
 ICU Level of Service F  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-04  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road



2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue  
Lanes, Volumes, Timings

2022 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	273	0	51	1	0	16	35	1267	5	24	1246	228
Future Volume (vph)	273	0	51	1	0	16	35	1267	5	24	1246	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Fr <sub>t</sub>			0.850		0.871			0.999				0.977
Fl <sub>t</sub> Protected		0.950			0.998		0.950			0.950		
Satd. Flow (prot)	0	1620	1507	0	1707	0	1685	3606	0	1805	3463	0
Fl <sub>t</sub> Permitted		0.744			0.986		0.950			0.950		
Satd. Flow (perm)	0	1269	1507	0	1686	0	1685	3606	0	1805	3463	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82		82							23
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.84	0.84	0.84	0.80	0.80	0.80	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%
Adj. Flow (vph)	325	0	61	1	0	20	38	1362	5	27	1384	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	325	61	0	21	0	38	1367	0	27	1637	0
Turn Type	Perm	NA	Prot	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		7	7		3		1	6		5	2	
Permitted Phases	7			3								
Detector Phase	7	7	7	3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	32.0	32.0	32.0	32.0	32.0		27.0	61.0		27.0	61.0	
Total Split (%)	26.7%	26.7%	26.7%	26.7%	26.7%		22.5%	50.8%		22.5%	50.8%	
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		21.0	55.0		21.0	55.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		26.0	26.0		14.3		9.2	72.8		8.3	72.1	
Actuated g/C Ratio		0.22	0.22		0.12		0.08	0.61		0.07	0.60	
v/c Ratio		1.19	0.16		0.08		0.30	0.62		0.22	0.78	
Control Delay		155.9	5.2		0.5		66.0	15.7		57.3	14.8	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		155.9	5.2		0.5		66.0	15.7		57.3	14.8	
LOS		F	A		A		E	B		E	B	

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2022 Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		132.1			0.5			17.1				15.5
Approach LOS		F			A			B				B
Queue Length 50th (ft)		~302	0		0		30	498		22		137
Queue Length 95th (ft)		#438	18		0		m38	600		m30		280
Internal Link Dist (ft)		430			477			1653				900
Turn Bay Length (ft)			50				300			350		
Base Capacity (vph)		274	390		429		294	2188		315		2089
Starvation Cap Reductn		0	0		0		0	0		0		0
Spillback Cap Reductn		0	0		0		0	0		0		0
Storage Cap Reductn		0	0		0		0	0		0		0
Reduced v/c Ratio		1.19	0.16		0.05		0.13	0.62		0.09		0.78

### Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 74 (62%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 29.0

Intersection LOS: C

Intersection Capacity Utilization 73.5%

ICU Level of Service D

Analysis Period (min) 15

Description: NHDOT Int. No.: S-229-03

~ Volume exceeds capacity, queue is theoretically infinite.

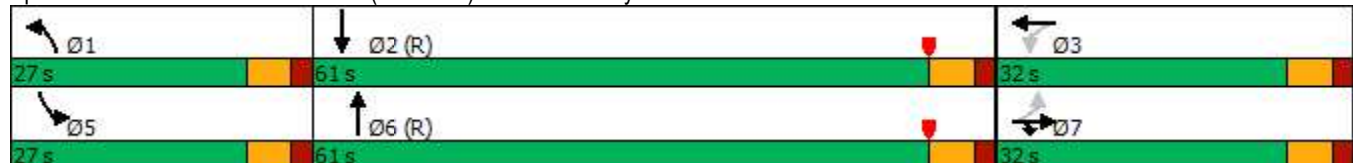
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.































m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2022 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 			 			 	 		 	 	
Traffic Volume (vph)	357	13	129	88	20	244	110	1380	74	310	1287	300
Future Volume (vph)	357	13	129	88	20	244	110	1380	74	310	1287	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Fr <sub>t</sub>			0.850			0.850			0.850			0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1963	1615	3502	1900	1669	3467	3574	1615	3502	3539	1583
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1963	1615	3502	1900	1669	3467	3574	1615	3502	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			147			224			136			241
Link Speed (mph)		30			30			35			30	
Link Distance (ft)		401			449			980			1189	
Travel Time (s)		9.1			10.2			19.1			27.0	
Peak Hour Factor	0.88	0.88	0.88	0.86	0.86	0.86	0.89	0.89	0.89	0.91	0.91	0.91
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	1%	1%	0%	0%	2%	2%
Adj. Flow (vph)	406	15	147	102	23	284	124	1551	83	341	1414	330
Shared Lane Traffic (%)												
Lane Group Flow (vph)	406	15	147	102	23	284	124	1551	83	341	1414	330
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4	4	3	8	8	1	6	6	5	2	2
Permitted Phases												
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	16.0
Total Split (s)	26.0	20.0	20.0	26.0	20.0	20.0	21.0	48.0	48.0	26.0	53.0	53.0
Total Split (%)	21.7%	16.7%	16.7%	21.7%	16.7%	16.7%	17.5%	40.0%	40.0%	21.7%	44.2%	44.2%
Maximum Green (s)	20.0	14.0	14.0	20.0	14.0	14.0	15.0	42.0	42.0	20.0	47.0	47.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	18.7	19.6	19.6	9.8	10.7	10.7	10.6	49.2	49.2	17.4	55.9	55.9
Actuated g/C Ratio	0.16	0.16	0.16	0.08	0.09	0.09	0.09	0.41	0.41	0.14	0.47	0.47
v/c Ratio	0.76	0.05	0.38	0.36	0.14	0.80	0.41	1.06	0.11	0.67	0.86	0.38
Control Delay	58.2	40.9	9.7	55.1	50.4	30.7	58.8	63.5	1.0	58.3	29.4	3.2
Queue Delay	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 Delay	58.2	40.9	9.7	55.1	50.4	30.7	58.8	63.5	1.0	58.3	29.4	3.2
LOS	E	D	A	E	D	C	E	E	A	E	C	A

### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2022 Build PM

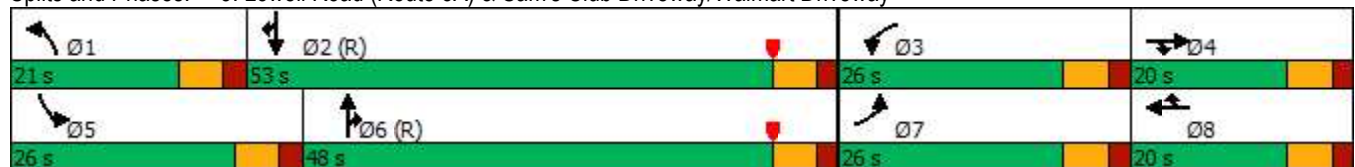


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		45.2			37.9			60.3			30.0	
Approach LOS		D			D			E			C	
Queue Length 50th (ft)	155	10	0	39	17	44	47	~708	0	124	557	0
Queue Length 95th (ft)	205	29	53	63	41	123	m72	m#836	m5	m134	m#727	m37
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350		175	350		
Base Capacity (vph)	572	320	386	583	221	392	433	1464	742	583	1649	866
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.05	0.38	0.17	0.10	0.72	0.29	1.06	0.11	0.58	0.86	0.38

#### Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 64 (53%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.06  
 Intersection Signal Delay: 43.5  
 Intersection LOS: D  
 Intersection Capacity Utilization 78.8%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway



#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2022 Build PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗	↔↔	↕↕	↕↕	↗↗
Traffic Volume (vph)	1479	1467	1331	684	500	1233
Future Volume (vph)	1479	1467	1331	684	500	1233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	0.88
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	3698	1689	3467	3610	3610	2814
Fl <sub>t</sub> Permitted	0.950		0.950			
Satd. Flow (perm)	3698	1689	3467	3610	3610	2814
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		635				1300
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.96	0.96	0.94	0.94	0.89	0.89
Heavy Vehicles (%)	1%	2%	1%	0%	0%	1%
Adj. Flow (vph)	1541	1528	1416	728	562	1385
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1541	1528	1416	728	562	1385
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	50.0		40.0	67.0	30.0	
Total Split (%)	41.7%		33.3%	55.8%	25.0%	
Maximum Green (s)	44.0		32.0	60.0	23.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	44.5	120.0	32.0	62.5	22.5	120.0
Actuated g/C Ratio	0.37	1.00	0.27	0.52	0.19	1.00
v/c Ratio	1.12	0.90	1.53	0.39	0.83	0.49
Control Delay	101.6	9.3	268.1	7.7	58.6	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	101.6	9.3	268.1	7.7	58.6	0.6
LOS	F	A	F	A	E	A



# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2022 Build PM

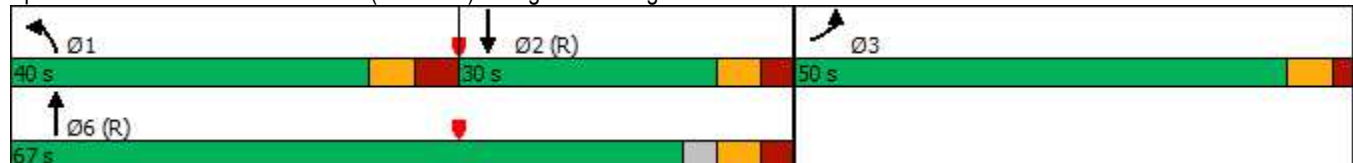


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	55.7			179.7	17.4	
Approach LOS	E			F	B	
Queue Length 50th (ft)	~717	0	~792	110	221	0
Queue Length 95th (ft)	#854	#5	m#785	m95	284	0
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1371	1689	924	1895	691	2814
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	1.12	0.90	1.53	0.38	0.81	0.49

## Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 100 (83%), Referenced to phase 2:SBT and 6:NBT, Start of Green  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.53  
 Intersection Signal Delay: 82.4  
 Intersection LOS: F  
 Intersection Capacity Utilization 110.7%  
 ICU Level of Service H  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-02  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.
























## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road



# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road

## Lanes, Volumes, Timings

2022 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	92	433	435	17	28	137	1060	988	72	897	5
Future Volume (vph)	52	92	433	435	17	28	137	1060	988	72	897	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		1	1		1	1		1	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.982		0.950	0.956		0.950			0.950		
Satd. Flow (prot)	0	1866	1599	1658	1668	1546	1787	3574	1615	1805	5131	0
Flt Permitted		0.982		0.950	0.956		0.950			0.950		
Satd. Flow (perm)	0	1866	1599	1658	1668	1546	1787	3574	1615	1805	5131	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			57			89			283			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		805			586			999			1515	
Travel Time (s)		18.3			13.3			22.7			34.4	
Peak Hour Factor	0.80	0.80	0.80	0.90	0.90	0.90	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	1%	1%	0%	0%	1%	0%
Adj. Flow (vph)	65	115	541	483	19	31	146	1128	1051	82	1019	6
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	180	541	251	251	31	146	1128	1051	82	1025	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	26.0	26.0	31.0	56.0	56.0	21.0	31.0	71.0	56.0	21.0	71.0	
Total Split (%)	14.1%	14.1%	16.8%	30.4%	30.4%	11.4%	16.8%	38.6%	30.4%	11.4%	38.6%	
Maximum Green (s)	20.0	20.0	25.0	50.0	50.0	15.0	25.0	65.0	50.0	15.0	65.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)		18.6	50.5	41.5	41.5	53.1	25.7	56.3	104.0	11.6	42.1	
Actuated g/C Ratio		0.12	0.33	0.27	0.27	0.35	0.17	0.37	0.68	0.08	0.28	
v/c Ratio		0.80	0.96	0.56	0.55	0.05	0.49	0.86	0.88	0.60	0.72	
Control Delay		92.7	74.4	53.8	53.7	0.2	69.2	53.7	24.2	91.8	53.5	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	
Total Delay		92.7	74.4	53.8	53.7	0.2	69.2	53.7	26.0	91.8	53.5	
LOS		F	E	D	D	A	E	D	C	F	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2022 Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		79.0			50.6			42.1				56.3
Approach LOS		E			D			D				E
Queue Length 50th (ft)		190	~540	231	231	0	146	603	641	87		368
Queue Length 95th (ft)		#276	#703	358	358	0	239	715	992	151		408
Internal Link Dist (ft)		725			506			919				1435
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		251	566	559	562	632	301	1807	1277	182		2249
Starvation Cap Reductn		0	0	0	0	0	0	0	105	0		0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0		0
Reduced v/c Ratio		0.72	0.96	0.45	0.45	0.05	0.49	0.62	0.90	0.45		0.46

## Intersection Summary























Area Type:	Other
Cycle Length:	184
Actuated Cycle Length:	152.7
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	52.1
Intersection LOS:	D
Intersection Capacity Utilization	88.1%
ICU Level of Service	E
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2022 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	2	105	10	1	4	16	1122	12	5	872	7
Future Volume (vph)	26	2	105	10	1	4	16	1122	12	5	872	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	11	12	12
Storage Length (ft)	0		100	0		100	225		0	225		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.998			0.999	
Flt Protected		0.956			0.956		0.950			0.950		
Satd. Flow (prot)	0	1816	1583	0	1877	1669	1736	3567	0	1745	3571	0
Flt Permitted		0.436					0.950			0.950		
Satd. Flow (perm)	0	828	1583	0	1963	1669	1736	3567	0	1745	3571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131			86		1			1	
Link Speed (mph)		30			10			30			30	
Link Distance (ft)		495			382			1515			1791	
Travel Time (s)		11.3			26.0			34.4			40.7	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	4%	1%	0%	0%	1%	0%
Adj. Flow (vph)	33	3	131	13	1	5	17	1181	13	6	1002	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	36	131	0	14	5	17	1194	0	6	1010	0
Turn Type	Perm	NA	pt+ov	Perm	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases		4	4 1		8	8 5	1	6		5	2	
Permitted Phases	4			8								
Detector Phase	4	4	4 1	8	8	8 5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		8.0	21.0		8.0	21.0	
Total Split (s)	16.0	16.0		16.0	16.0		16.0	66.0		16.0	66.0	
Total Split (%)	14.0%	14.0%		14.0%	14.0%		14.0%	57.9%		14.0%	57.9%	
Maximum Green (s)	10.0	10.0		10.0	10.0		12.0	60.0		12.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		8.8	16.8		6.7	9.6	5.6	39.7		5.1	31.2	
Actuated g/C Ratio		0.13	0.25		0.10	0.14	0.08	0.59		0.08	0.47	
v/c Ratio		0.33	0.26		0.07	0.02	0.12	0.56		0.05	0.61	
Control Delay		41.6	5.6		35.6	0.0	37.7	11.3		38.0	15.8	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		41.6	5.6		35.6	0.0	37.7	11.3		38.0	15.8	
LOS		D	A		D	A	D	B		D	B	

# 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive Lanes, Volumes, Timings

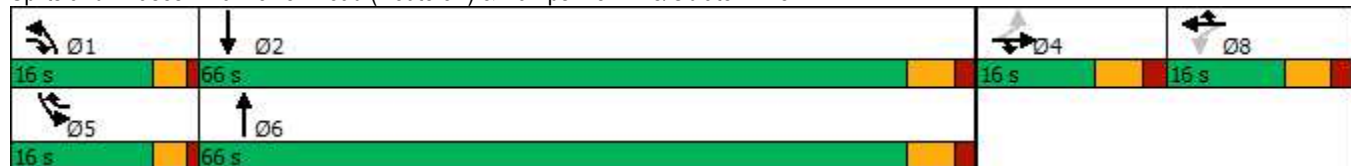
2022 Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		13.4			26.3			11.7				16.0
Approach LOS		B			C			B				B
Queue Length 50th (ft)		10	0		4	0	5	99		2		124
Queue Length 95th (ft)		48	26		24	0	31	332		16		258
Internal Link Dist (ft)		415			302			1435				1711
Turn Bay Length (ft)			100			100	225			225		
Base Capacity (vph)		131	593		312	411	331	3136		333		3140
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.27	0.22		0.04	0.01	0.05	0.38		0.02		0.32























Intersection Summary	
Area Type:	Other
Cycle Length:	114
Actuated Cycle Length:	66.9
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.61
Intersection Signal Delay:	13.7
Intersection LOS:	B
Intersection Capacity Utilization:	53.1%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive



# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2022 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	3	79	23	2	22	52	1030	7	16	716	40
Future Volume (vph)	225	3	79	23	2	22	52	1030	7	16	716	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	15	12	12	13	11	12	12	11	12	12
Storage Length (ft)	0		225	0		80	350		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.999			0.992	
Flt Protected		0.953			0.957		0.950			0.950		
Satd. Flow (prot)	0	1733	1742	0	1818	1620	1678	3571	0	1646	3540	0
Flt Permitted		0.706			0.673		0.950			0.950		
Satd. Flow (perm)	0	1284	1742	0	1279	1620	1678	3571	0	1646	3540	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			99			91		1			8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		492			577			1791			1168	
Travel Time (s)		11.2			13.1			40.7			26.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.97	0.97	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	2%	0%	0%	3%	4%	1%	0%	6%	1%	4%
Adj. Flow (vph)	281	4	99	29	3	28	54	1062	7	17	778	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	285	99	0	32	28	54	1069	0	17	821	0
Turn Type	Perm	NA	pt+ov	Perm	NA	Prot	Prot	NA		Prot	NA	
Protected Phases		8	8 1		4	4	1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8	8 1	4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		5.0	5.0	5.0	3.0	8.0		3.0	8.0	
Minimum Split (s)	9.0	9.0		11.0	11.0	11.0	9.0	14.0		9.0	14.0	
Total Split (s)	26.0	26.0		23.0	23.0	23.0	16.0	66.0		16.0	66.0	
Total Split (%)	24.1%	24.1%		21.3%	21.3%	21.3%	14.8%	61.1%		14.8%	61.1%	
Maximum Green (s)	20.0	20.0		17.0	17.0	17.0	10.0	60.0		10.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)		20.6	33.6		13.4	13.4	6.8	33.2		5.4	25.0	
Actuated g/C Ratio		0.30	0.49		0.20	0.20	0.10	0.49		0.08	0.37	
v/c Ratio		0.73	0.11		0.13	0.07	0.32	0.62		0.13	0.63	
Control Delay		39.1	3.8		24.3	0.4	37.2	14.6		36.3	20.3	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		39.1	3.8		24.3	0.4	37.2	14.6		36.3	20.3	
LOS		D	A		C	A	D	B		D	C	

# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2022 Build PM

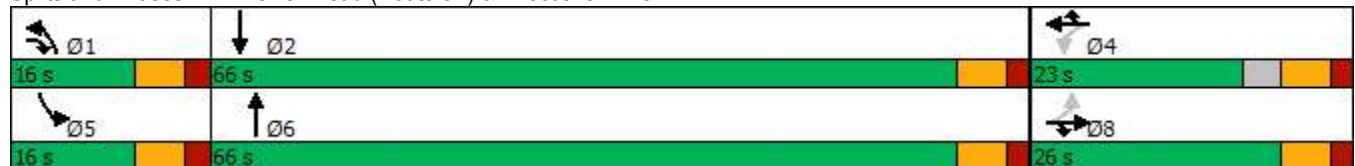


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		30.0			13.1			15.7				20.6
Approach LOS		C			B			B				C
Queue Length 50th (ft)		106	0		10	0	21	145		7		148
Queue Length 95th (ft)		#258	21		33	0	63	282		29		215
Internal Link Dist (ft)		412			497			1711				1088
Turn Bay Length (ft)			225			80	350			150		
Base Capacity (vph)		388	993		386	553	253	3110		248		3084
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.73	0.10		0.08	0.05	0.21	0.34		0.07		0.27

## Intersection Summary

Area Type:	Other
Cycle Length:	108
Actuated Cycle Length:	68.2
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	19.6
Intersection LOS:	B
Intersection Capacity Utilization:	66.3%
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 7: Lowell Road (Route 3A) & Executive Drive



























# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2022 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	25	31	0	48	27	1215	15	56	724	11
Future Volume (vph)	9	2	25	31	0	48	27	1215	15	56	724	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.998	
Flt Protected		0.962			0.950		0.950			0.950		
Satd. Flow (prot)	0	1828	1583	0	1865	1669	1745	1818	1615	1805	1878	0
Flt Permitted		0.746			0.748		0.950			0.950		
Satd. Flow (perm)	0	1417	1583	0	1469	1669	1745	1818	1615	1805	1878	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			60			91			1
Link Speed (mph)		10			30			30				30
Link Distance (ft)		598			262			1405				549
Travel Time (s)		40.8			6.0			31.9				12.5
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.99	0.99	0.99	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	11	3	31	39	0	60	27	1227	15	60	770	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	31	0	39	60	27	1227	15	60	782	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA	Prot	Prot	NA	
Protected Phases		8	8		4	5	1	6	6	5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0	116.0	16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%	64.4%	8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0	110.0	10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.1	8.1		8.1	20.7	6.6	140.9	140.9	8.8	146.5	
Actuated g/C Ratio		0.04	0.04		0.04	0.12	0.04	0.78	0.78	0.05	0.81	
v/c Ratio		0.22	0.20		0.59	0.25	0.42	0.86	0.01	0.68	0.51	
Control Delay		90.1	2.8		117.7	16.3	103.9	23.8	0.0	119.5	10.8	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2022 Build PM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2022 Build PM

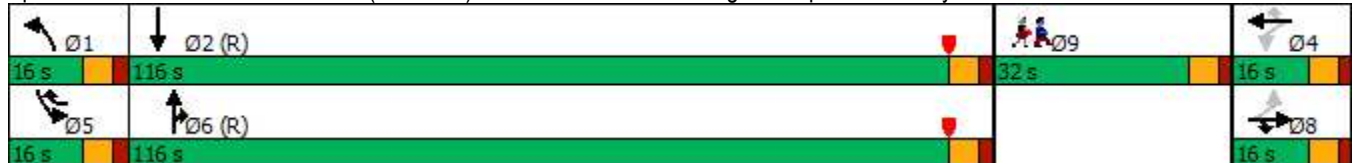


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4
Total Delay		90.1	2.8		117.7	16.3	103.9	23.8	0.0	119.5	13.2	
LOS		F	A		F	B	F	C	A	F	B	
Approach Delay		29.9			56.2			25.2				20.8
Approach LOS		C			E			C				C
Queue Length 50th (ft)		16	0		46	0	32	806	0	71	250	
Queue Length 95th (ft)		40	0		81	36	70	#1911	0	#134	741	
Internal Link Dist (ft)		518			182			1325				469
Turn Bay Length (ft)			50			100	210		325	125		
Base Capacity (vph)		78	173		81	255	96	1423	1284	100	1528	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	588	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.18	0.18		0.48	0.24	0.28	0.86	0.01	0.60	0.83	

### Intersection Summary

Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.86  
 Intersection Signal Delay: 25.0  
 Intersection LOS: C  
 Intersection Capacity Utilization 87.3%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

### Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2022 Build PM

---

Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

---

# 9: Lowell Road (Route 3A) & Pelham Road Lanes, Volumes, Timings

2022 Build PM



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Lane Configurations							
Traffic Volume (vph)	86	142	1155	109	110	714	
Future Volume (vph)	86	142	1155	109	110	714	
Ideal Flow (vphpl)	1900	1000	1900	1900	1900	1900	
Lane Width (ft)	12	12	13	13	12	12	
Storage Length (ft)	0	75		0	150		
Storage Lanes	1	1		0	1		
Taper Length (ft)	25				50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850	0.988				
Fl <sub>t</sub> Protected	0.950				0.950		
Satd. Flow (prot)	1805	850	1922	0	1805	1881	
Fl <sub>t</sub> Permitted	0.950				0.950		
Satd. Flow (perm)	1805	850	1922	0	1805	1881	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		151	4				
Link Speed (mph)	20		30			30	
Link Distance (ft)	512		549			1309	
Travel Time (s)	17.5		12.5			29.8	
Peak Hour Factor	0.87	0.87	0.98	0.98	0.89	0.89	
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	
Adj. Flow (vph)	99	163	1179	111	124	802	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	99	163	1290	0	124	802	
Turn Type	Prot	pt+ov	NA		Prot	NA	
Protected Phases	4	4 5	6		5	2	9
Permitted Phases							
Detector Phase	4	4 5	6		5	2	
Switch Phase							
Minimum Initial (s)	5.0		10.0		3.0	10.0	5.0
Minimum Split (s)	11.0		16.0		9.0	16.0	35.0
Total Split (s)	26.0		116.0		13.0	116.0	35.0
Total Split (%)	13.7%		61.1%		6.8%	61.1%	18%
Maximum Green (s)	20.0		110.0		7.0	110.0	29.0
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0		6.0		6.0	6.0	
Lead/Lag			Lag		Lead		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	1.5		1.5		1.5	1.5	3.0
Recall Mode	None		C-Min		None	C-Min	None
Walk Time (s)							5.0
Flash Dont Walk (s)							24.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	14.3	27.3	143.7		7.0	156.7	
Actuated g/C Ratio	0.08	0.14	0.76		0.04	0.82	
v/c Ratio	0.73	0.65	0.89		1.88	0.52	
Control Delay	114.7	24.5	27.5		487.8	9.2	

# 9: Lowell Road (Route 3A) & Pelham Road Lanes, Volumes, Timings

2022 Build PM

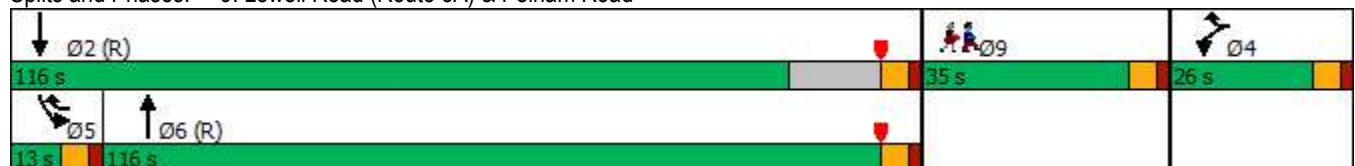


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Queue Delay	0.0	0.0	47.0		0.0	0.0	
Total Delay	114.7	24.5	74.5		487.8	9.2	
LOS	F	C	E		F	A	
Approach Delay	58.6		74.5			73.3	
Approach LOS	E		E			E	
Queue Length 50th (ft)	123	13	904		~235	197	
Queue Length 95th (ft)	184	91	#2163		#384	722	
Internal Link Dist (ft)	432		469			1229	
Turn Bay Length (ft)		75			150		
Base Capacity (vph)	190	249	1455		66	1551	
Starvation Cap Reductn	0	0	317		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.52	0.65	1.13		1.88	0.52	

## Intersection Summary

Area Type: Other  
 Cycle Length: 190  
 Actuated Cycle Length: 190  
 Offset: 30 (16%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.88  
 Intersection Signal Delay: 72.4  
 Intersection LOS: E  
 Intersection Capacity Utilization 94.1%  
 ICU Level of Service F  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

## Splits and Phases: 9: Lowell Road (Route 3A) & Pelham Road



## **Appendix H**

### **Capacity Analysis – 2032 Build Traffic Conditions**



**2032 Build Weekday A.M.**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2032 Build AM



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	299	0	535	561	14	1	934
Future Volume (vph)	2	0	2	0	299	0	535	561	14	1	934
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0	100	0
Storage Lanes	1	1		1		1	1		0	1	1
Taper Length (ft)	25			100			75			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00
Fr <sub>t</sub>		0.850						0.996			0.850
Fl <sub>t</sub> Protected	0.950						0.950			0.950	
Satd. Flow (prot)	1685	1133	0	1773	3574	0	1652	3561	0	1805	1583
Fl <sub>t</sub> Permitted	0.950						0.950			0.950	
Satd. Flow (perm)	1685	1133	0	1773	3574	0	1652	3561	0	1805	1583
Right Turn on Red			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		524						3			464
Link Speed (mph)	30				35			35		35	
Link Distance (ft)	591				758			1733		622	
Travel Time (s)	13.4				14.8			33.8		12.1	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.92	0.92	0.92	0.86	0.86
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Adj. Flow (vph)	3	0	3	0	374	0	582	610	15	1	1086
Shared Lane Traffic (%)											
Lane Group Flow (vph)	3	3	0	0	374	0	582	625	0	1	1086
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5
Permitted Phases											
Detector Phase	4	4		1	6		5	2		3	3 5
Switch Phase											
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	
Total Split (s)	16.0	16.0		16.0	20.0		38.0	42.0		16.0	
Total Split (%)	17.8%	17.8%		17.8%	22.2%		42.2%	46.7%		17.8%	
Maximum Green (s)	10.0	10.0		10.0	14.0		32.0	36.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	
Act Effct Green (s)	5.8	5.8			13.5		45.5	65.1		10.5	60.8
Actuated g/C Ratio	0.06	0.06			0.15		0.51	0.72		0.12	0.68
v/c Ratio	0.03	0.01			0.70		0.70	0.24		0.00	0.89
Control Delay	40.0	0.0			43.8		20.1	0.6		36.0	18.8
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0
Total Delay	40.0	0.0			43.8		20.1	0.6		36.0	18.8
LOS	D	A			D		C	A		D	B

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2032 Build AM

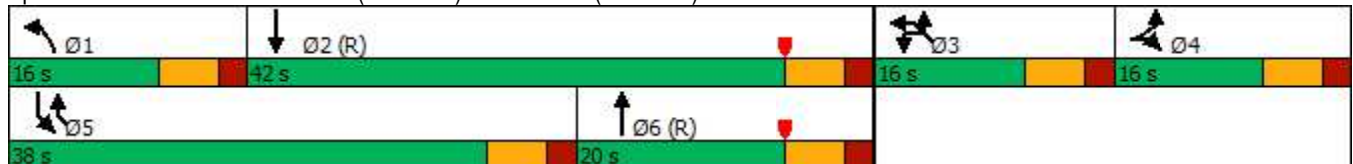


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Approach Delay	20.0				43.8			10.0		18.8	
Approach LOS	B				D			B		B	
Queue Length 50th (ft)	2	0			106		152	2		1	215
Queue Length 95th (ft)	9	0			135		#495	5		5	#774
Internal Link Dist (ft)	511				678			1653		542	
Turn Bay Length (ft)		50					775			100	
Base Capacity (vph)	187	591			555		836	2575		210	1220
Starvation Cap Reductn	0	0			0		0	0		0	0
Spillback Cap Reductn	0	0			0		0	0		0	0
Storage Cap Reductn	0	0			0		0	0		0	0
Reduced v/c Ratio	0.02	0.01			0.67		0.70	0.24		0.00	0.89

Intersection Summary






















Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.89
Intersection Signal Delay:	18.3
Intersection LOS:	B
Intersection Capacity Utilization:	76.1%
ICU Level of Service:	D
Analysis Period (min):	15
Description:	NHDOT Int. No.: S-229-04
#	95th percentile volume exceeds capacity, queue may be longer.
	Queue shown is maximum after two cycles.

Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road



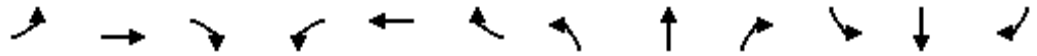
## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2032 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	25	1	1	36	43	1242	2	8	1089	241
Future Volume (vph)	156	0	25	1	1	36	43	1242	2	8	1089	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.871							0.973
Flt Protected		0.950			0.999		0.950			0.950		
Satd. Flow (prot)	0	1532	1133	0	1657	0	1685	3538	0	1570	3419	0
Flt Permitted		0.728			0.993		0.950			0.950		
Satd. Flow (perm)	0	1174	1133	0	1648	0	1685	3538	0	1570	3419	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109		42							39
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.80	0.80	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95
Heavy Vehicles (%)	10%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	6%
Adj. Flow (vph)	195	0	31	1	1	42	51	1461	2	8	1146	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	195	31	0	44	0	51	1463	0	8	1400	0
Turn Type	Perm	NA	Prot	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		7	7		3		1	6		5	2	
Permitted Phases	7			3								
Detector Phase	7	7	7	3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0	21.0	21.0	21.0		21.0	51.0		18.0	48.0	
Total Split (%)	23.3%	23.3%	23.3%	23.3%	23.3%		23.3%	56.7%		20.0%	53.3%	
Maximum Green (s)	15.0	15.0	15.0	15.0	15.0		15.0	45.0		12.0	42.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		17.6	17.6		11.6		9.1	57.6		7.1	50.6	
Actuated g/C Ratio		0.20	0.20		0.13		0.10	0.64		0.08	0.56	
v/c Ratio		0.86	0.10		0.18		0.30	0.65		0.06	0.72	
Control Delay		70.4	0.6		13.0		41.0	10.4		30.5	20.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		70.4	0.6		13.0		41.0	10.4		30.5	20.5	
LOS		E	A		B		D	B		C	C	

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2032 Build AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		60.8			13.0			11.4			20.6	
Approach LOS		E			B			B			C	
Queue Length 50th (ft)		112	0		1		29	177		5	183	
Queue Length 95th (ft)		#208	0		27		m32	278		m7	298	
Internal Link Dist (ft)		430			477			1653			900	
Turn Bay Length (ft)			50				300			350		
Base Capacity (vph)		228	308		309		280	2264		209	1937	
Starvation Cap Reductn		0	0		0		0	0		0	0	
Spillback Cap Reductn		0	0		0		0	0		0	0	
Storage Cap Reductn		0	0		0		0	0		0	0	
Reduced v/c Ratio		0.86	0.10		0.14		0.18	0.65		0.04	0.72	

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 51 (57%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 19.0

Intersection LOS: B

Intersection Capacity Utilization 63.1%

ICU Level of Service B

Analysis Period (min) 15

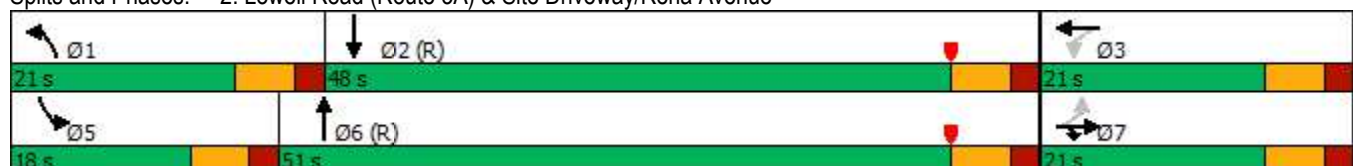
Description: NHDOT Int. No.: S-229-03

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

Queue shown is maximum after two cycles.
































m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2032 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 	 		 	 	 	 	 		
Traffic Volume (vph)	131	4	59	15	5	71	78	1325	27	85	1252	164
Future Volume (vph)	131	4	59	15	5	71	78	1325	27	85	1252	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Fr <sub>t</sub>			0.850			0.850			0.850			0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3213	1852	1568	3502	1900	1589	3467	3505	1583	3433	3539	1482
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3213	1852	1568	3502	1900	1589	3467	3505	1583	3433	3539	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			182			182			182
Link Speed (mph)		30			30			35			30	
Link Distance (ft)		401			449			980			1189	
Travel Time (s)		9.1			10.2			19.1			27.0	
Peak Hour Factor	0.93	0.93	0.93	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	9%	6%	3%	0%	0%	5%	1%	3%	2%	2%	2%	9%
Adj. Flow (vph)	141	4	63	17	6	81	90	1523	31	89	1304	171
Shared Lane Traffic (%)												
Lane Group Flow (vph)	141	4	63	17	6	81	90	1523	31	89	1304	171
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4	4	3	8	8	1	6	6	5	2	2
Permitted Phases												
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	16.0
Total Split (s)	17.0	16.0	16.0	17.0	16.0	16.0	16.0	41.0	41.0	16.0	41.0	41.0
Total Split (%)	18.9%	17.8%	17.8%	18.9%	17.8%	17.8%	17.8%	45.6%	45.6%	17.8%	45.6%	45.6%
Maximum Green (s)	11.0	10.0	10.0	11.0	10.0	10.0	10.0	35.0	35.0	10.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	9.8	14.8	14.8	7.0	6.9	6.9	8.7	45.7	45.7	8.7	45.7	45.7
Actuated g/C Ratio	0.11	0.16	0.16	0.08	0.08	0.08	0.10	0.51	0.51	0.10	0.51	0.51
v/c Ratio	0.40	0.01	0.15	0.06	0.04	0.28	0.27	0.86	0.03	0.27	0.73	0.20
Control Delay	40.6	34.0	0.8	38.7	38.8	2.4	47.3	21.4	0.0	48.1	20.8	1.2
Queue Delay	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 Delay	40.6	34.0	0.8	38.7	38.8	2.4	47.3	21.4	0.0	48.1	20.8	1.2
LOS	D	C	A	D	D	A	D	C	A	D	C	A

### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2032 Build AM

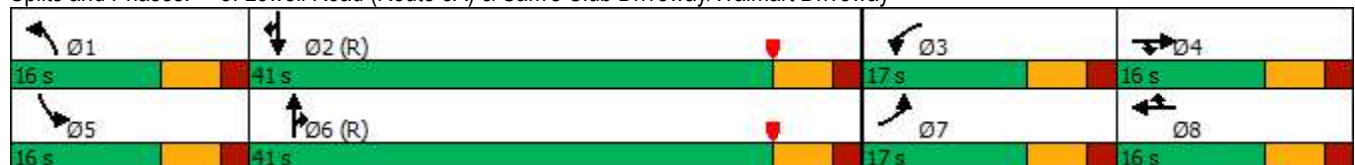


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		28.4			10.4			22.4			20.2	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	39	2	0	4	3	0	26	365	0	25	366	0
Queue Length 95th (ft)	67	12	0	14	15	0	m41	#591	m0	m35	#503	m4
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350		175	350		
Base Capacity (vph)	392	314	417	428	211	338	390	1778	892	386	1795	841
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.01	0.15	0.04	0.03	0.24	0.23	0.86	0.03	0.23	0.73	0.20

#### Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 51 (57%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.86  
 Intersection Signal Delay: 21.4  
 Intersection LOS: C  
 Intersection Capacity Utilization 60.2%  
 ICU Level of Service B  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway





#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2032 Build AM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖	↖↗	↑↑	↑↑	↖↗
Traffic Volume (vph)	1045	1184	1131	405	420	1673
Future Volume (vph)	1045	1184	1131	405	420	1673
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	0.88
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	3662	1656	3400	3539	3539	2760
Fl <sub>t</sub> Permitted	0.950		0.950			
Satd. Flow (perm)	3662	1656	3400	3539	3539	2760
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		795				1281
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.94	0.94	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	3%	2%	2%	3%
Adj. Flow (vph)	1112	1260	1229	440	457	1818
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1112	1260	1229	440	457	1818
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	32.0		31.0	58.0	27.0	
Total Split (%)	35.6%		34.4%	64.4%	30.0%	
Maximum Green (s)	26.0		23.0	51.0	20.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	28.4	90.0	23.0	48.6	17.6	90.0
Actuated g/C Ratio	0.32	1.00	0.26	0.54	0.20	1.00
v/c Ratio	0.96	0.76	1.42	0.23	0.66	0.66
Control Delay	50.9	3.4	218.8	2.3	38.2	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	3.4	218.8	2.3	38.2	1.2
LOS	D	A	F	A	D	A

# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2032 Build AM

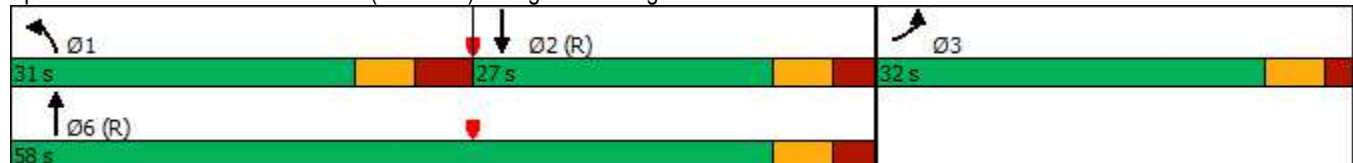


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	25.7			161.7	8.7	
Approach LOS	C			F	A	
Queue Length 50th (ft)	323	0	~476	3	125	0
Queue Length 95th (ft)	#482	0	#601	m4	173	0
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1156	1656	868	2005	786	2760
Starvation 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	0.96	0.76	1.42	0.22	0.58	0.66

## Intersection Summary
























Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 70 (78%), Referenced to phase 2:SBT and 6:NBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.42  
 Intersection Signal Delay: 55.5  
 Intersection LOS: E  
 Intersection Capacity Utilization 90.4%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-02  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road



5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road  
Lanes, Volumes, Timings

2032 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	29	303	677	45	33	328	895	208	17	1194	11
Future Volume (vph)	67	29	303	677	45	33	328	895	208	17	1194	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		1	1		1	1		1	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (prot)	0	1835	1583	1641	1657	1501	1787	3539	1583	1752	5078	0
Flt Permitted		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (perm)	0	1835	1583	1641	1657	1501	1787	3539	1583	1752	5078	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			53			89			219			1
Link Speed (mph)		30			30			30				30
Link Distance (ft)		805			586			999				1515
Travel Time (s)		18.3			13.3			22.7				34.4
Peak Hour Factor	0.81	0.81	0.81	0.94	0.94	0.94	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	1%	0%	4%	1%	2%	2%	3%	2%	6%
Adj. Flow (vph)	83	36	374	720	48	35	345	942	219	20	1372	13
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	119	374	382	386	35	345	942	219	20	1385	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	26.0	26.0	31.0	56.0	56.0	21.0	31.0	71.0	56.0	21.0	71.0	
Total Split (%)	14.1%	14.1%	16.8%	30.4%	30.4%	11.4%	16.8%	38.6%	30.4%	11.4%	38.6%	
Maximum Green (s)	20.0	20.0	25.0	50.0	50.0	15.0	25.0	65.0	50.0	15.0	65.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)		15.3	46.8	43.5	43.5	50.5	25.5	77.5	127.1	7.0	56.2	
Actuated g/C Ratio		0.09	0.28	0.26	0.26	0.31	0.15	0.47	0.77	0.04	0.34	
v/c Ratio		0.70	0.77	0.88	0.88	0.07	1.25	0.57	0.17	0.27	0.80	
Control Delay		97.4	59.9	81.4	81.3	0.2	193.7	35.4	1.0	91.8	53.8	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		97.4	59.9	81.4	81.3	0.2	193.7	35.4	1.0	91.8	53.8	
LOS		F	E	F	F	A	F	D	A	F	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2032 Build AM

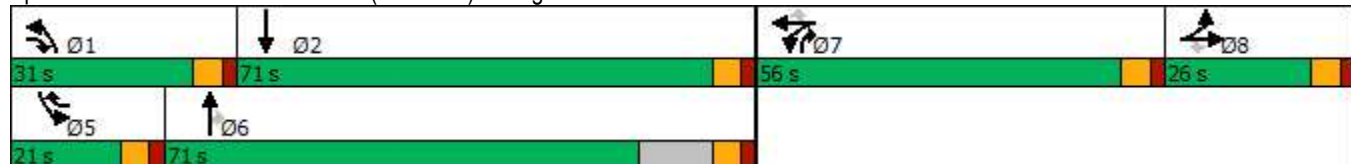


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		69.0			77.8			66.7				54.3
Approach LOS		E			E			E				D
Queue Length 50th (ft)		134	349	432	437	0	~510	422	0	23	523	
Queue Length 95th (ft)		192	433	#655	#660	0	#777	532	23	55	578	
Internal Link Dist (ft)		725			506			919			1435	
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		226	487	506	511	592	275	1698	1331	162	2038	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.53	0.77	0.75	0.76	0.06	1.25	0.55	0.16	0.12	0.68	

## Intersection Summary























Area Type:	Other
Cycle Length:	184
Actuated Cycle Length:	164.9
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.25
Intersection Signal Delay:	64.9
Intersection LOS:	E
Intersection Capacity Utilization:	83.1%
ICU Level of Service:	E
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2032 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	0	13	2	2	5	129	854	2	2	1262	65
Future Volume (vph)	9	0	13	2	2	5	129	854	2	2	1262	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	11	12	12
Storage Length (ft)	0		100	0		100	225		0	225		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850						0.993
Flt Protected		0.950			0.976		0.950			0.950		
Satd. Flow (prot)	0	1719	1455	0	1916	1669	1752	3505	0	1745	3480	0
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	1810	1455	0	1963	1669	1752	3505	0	1745	3480	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			86			86						7
Link Speed (mph)		30			10			30				30
Link Distance (ft)		495			382			1515				1791
Travel Time (s)		11.3			26.0			34.4				40.7
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.90	0.90	0.90	0.83	0.83	0.83
Heavy Vehicles (%)	5%	0%	11%	0%	0%	0%	3%	3%	0%	0%	3%	3%
Adj. Flow (vph)	11	0	16	3	3	6	143	949	2	2	1520	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	16	0	6	6	143	951	0	2	1598	0
Turn Type	Perm	NA	pt+ov	Perm	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases		4	4 1		8	8 5	1	6		5	2	
Permitted Phases	4			8								
Detector Phase	4	4	4 1	8	8	8 5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		8.0	21.0		8.0	21.0	
Total Split (s)	16.0	16.0		16.0	16.0		16.0	66.0		16.0	66.0	
Total Split (%)	14.0%	14.0%		14.0%	14.0%		14.0%	57.9%		14.0%	57.9%	
Maximum Green (s)	10.0	10.0		10.0	10.0		12.0	60.0		12.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		7.4	11.9		6.3	9.0	11.3	71.0		5.0	52.1	
Actuated g/C Ratio		0.09	0.14		0.08	0.11	0.14	0.86		0.06	0.63	
v/c Ratio		0.07	0.06		0.04	0.02	0.60	0.32		0.02	0.73	
Control Delay		45.0	0.4		47.0	0.2	50.7	5.2		49.0	15.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		45.0	0.4		47.0	0.2	50.7	5.2		49.0	15.9	
LOS		D	A		D	A	D	A		D	B	

6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2032 Build AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		18.6			23.6			11.2				15.9
Approach LOS		B			C			B				B
Queue Length 50th (ft)		5	0		3	0	61	0		1		172
Queue Length 95th (ft)		23	0		16	0	#201	228		8		506
Internal Link Dist (ft)		415			302			1435				1711
Turn Bay Length (ft)			100			100	225			225		
Base Capacity (vph)		236	314		256	350	274	3005		273		2708
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.05	0.05		0.02	0.02	0.52	0.32		0.01		0.59

Intersection Summary























Area Type: Other  
 Cycle Length: 114  
 Actuated Cycle Length: 82.6  
 Natural Cycle: 65  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.73  
 Intersection Signal Delay: 14.1  
 Intersection LOS: B  
 Intersection Capacity Utilization 64.6%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive



# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2032 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	2	11	141	30	101	181	497	60	107	1154	224
Future Volume (vph)	40	2	11	141	30	101	181	497	60	107	1154	224
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	15	12	12	13	11	12	12	11	12	12
Storage Length (ft)	0		225	0		80	350		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.984			0.976	
Flt Protected		0.955			0.961		0.950			0.950		
Satd. Flow (prot)	0	1576	1558	0	1811	1620	1711	3419	0	1728	3454	0
Flt Permitted		0.427			0.728		0.950			0.950		
Satd. Flow (perm)	0	705	1558	0	1372	1620	1711	3419	0	1728	3454	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30			101		19			33	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		492			577			1791			1168	
Travel Time (s)		11.2			13.1			40.7			26.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	12%	0%	14%	1%	0%	3%	2%	4%	3%	1%	2%	2%
Adj. Flow (vph)	50	3	14	176	38	126	199	546	66	118	1268	246
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	53	14	0	214	126	199	612	0	118	1514	0
Turn Type	Perm	NA	pt+ov	Perm	NA	Prot	Prot	NA		Prot	NA	
Protected Phases		8	8 1		4	4	1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8	8 1	4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		5.0	5.0	5.0	3.0	8.0		3.0	8.0	
Minimum Split (s)	9.0	9.0		11.0	11.0	11.0	9.0	14.0		9.0	14.0	
Total Split (s)	26.0	26.0		23.0	23.0	23.0	16.0	66.0		16.0	66.0	
Total Split (%)	24.1%	24.1%		21.3%	21.3%	21.3%	14.8%	61.1%		14.8%	61.1%	
Maximum Green (s)	20.0	20.0		17.0	17.0	17.0	10.0	60.0		10.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)		14.6	29.3		16.6	16.6	10.1	51.9		9.3	51.0	
Actuated g/C Ratio		0.15	0.31		0.17	0.17	0.11	0.54		0.10	0.53	
v/c Ratio		0.50	0.03		0.91	0.35	1.11	0.33		0.71	0.82	
Control Delay		55.3	3.5		80.4	14.6	141.1	12.5		68.3	22.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		55.3	3.5		80.4	14.6	141.1	12.5		68.3	22.4	
LOS		E	A		F	B	F	B		E	C	



# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2032 Build AM

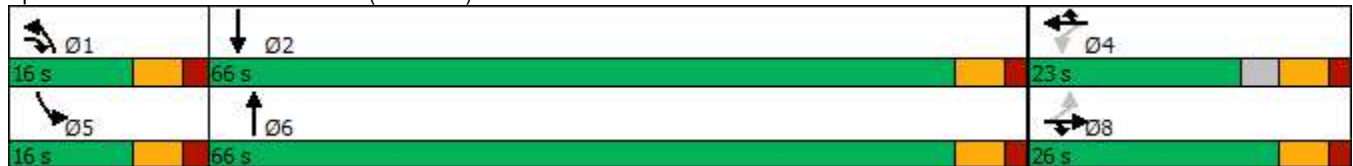


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		44.5			56.0			44.1				25.8
Approach LOS		D			E			D				C
Queue Length 50th (ft)		30	0		133	13	~148	102		73		375
Queue Length 95th (ft)		65	5		#226	51	#318	145		#171		497
Internal Link Dist (ft)		412			497			1711				1088
Turn Bay Length (ft)			225			80	350			150		
Base Capacity (vph)		148	508		290	422	180	2174		182		2202
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.36	0.03		0.74	0.30	1.11	0.28		0.65		0.69

## Intersection Summary

Area Type:	Other
Cycle Length:	108
Actuated Cycle Length:	96
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.11
Intersection Signal Delay:	35.0
Intersection LOS:	D
Intersection Capacity Utilization:	80.1%
ICU Level of Service:	D
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	























## Splits and Phases: 7: Lowell Road (Route 3A) & Executive Drive



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2032 Build AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	48	6	0	10	4	620	1	16	1447	3
Future Volume (vph)	11	0	48	6	0	10	4	620	1	16	1447	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1719	1583	0	1865	1669	1745	1766	1615	1805	1863	0
Flt Permitted		0.752			0.748		0.950			0.950		
Satd. Flow (perm)	0	1361	1583	0	1469	1669	1745	1766	1615	1805	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			55			91			
Link Speed (mph)		10			30			30			30	
Link Distance (ft)		598			262			1405			549	
Travel Time (s)		40.8			6.0			31.9			12.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	5%	0%	2%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Adj. Flow (vph)	14	0	60	8	0	13	4	681	1	17	1523	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	60	0	8	13	4	681	1	17	1526	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA	Prot	Prot	NA	
Protected Phases		8	8		4	5	1	6	6	5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0	116.0	16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%	64.4%	8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0	110.0	10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag						Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		6.3	6.3		6.3	18.3	5.0	147.7	147.7	6.0	153.1	
Actuated g/C Ratio		0.04	0.04		0.04	0.10	0.03	0.82	0.82	0.03	0.85	
v/c Ratio		0.30	0.42		0.16	0.06	0.08	0.47	0.00	0.28	0.96	
Control Delay		100.2	12.4		90.2	0.5	89.0	9.0	0.0	95.9	28.4	

8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
Lanes, Volumes, Timings

2032 Build AM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2032 Build AM

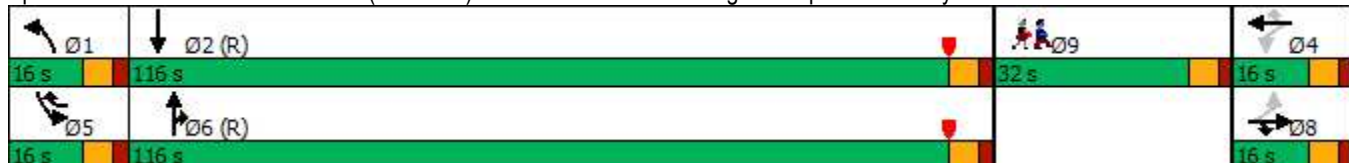


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	35.1	
Total Delay		100.2	12.4		90.2	0.5	89.0	9.0	0.0	95.9	63.5	
LOS		F	B		F	A	F	A	A	F	E	
Approach Delay		29.0			34.7			9.4			63.9	
Approach LOS		C			C			A			E	
Queue Length 50th (ft)		17	0		9	0	5	180	0	20	695	
Queue Length 95th (ft)		40	3		27	0	20	595	0	50	#2516	
Internal Link Dist (ft)		518			182			1325			469	
Turn Bay Length (ft)			50			100	210		325	125		
Base Capacity (vph)		75	173		81	254	96	1449	1341	100	1585	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	175	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.19	0.35		0.10	0.05	0.04	0.47	0.00	0.17	1.08	

### Intersection Summary

Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.96  
 Intersection Signal Delay: 46.4  
 Intersection LOS: D  
 Intersection Capacity Utilization 99.7%  
 ICU Level of Service F  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

### Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2032 Build AM












---

Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

---

9: Lowell Road (Route 3A) & Pelham Road  
Lanes, Volumes, Timings

2032 Build AM

							Ø9
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (vph)	256	81	547	93	71	1216	
Future Volume (vph)	256	81	547	93	71	1216	
Ideal Flow (vphpl)	1900	1000	1900	1900	1900	1900	
Lane Width (ft)	12	12	13	13	12	12	
Storage Length (ft)	0	75		0	150		
Storage Lanes	1	1		0	1		
Taper Length (ft)	25				50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850	0.980				
Fl <sub>t</sub> Protected	0.950				0.950		
Satd. Flow (prot)	1787	802	1838	0	1719	1863	
Fl <sub>t</sub> Permitted	0.950				0.950		
Satd. Flow (perm)	1787	802	1838	0	1719	1863	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		29	8				
Link Speed (mph)	20		30			30	
Link Distance (ft)	512		549			1309	
Travel Time (s)	17.5		12.5			29.8	
Peak Hour Factor	0.88	0.88	0.92	0.92	0.96	0.96	
Heavy Vehicles (%)	1%	6%	5%	3%	5%	2%	
Adj. Flow (vph)	291	92	595	101	74	1267	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	291	92	696	0	74	1267	
Turn Type	Prot	pt+ov	NA		Prot	NA	
Protected Phases	4	4 5	6		5	2	9
Permitted Phases							
Detector Phase	4	4 5	6		5	2	
Switch Phase							
Minimum Initial (s)	5.0		10.0		3.0	10.0	5.0
Minimum Split (s)	11.0		16.0		9.0	16.0	35.0
Total Split (s)	26.0		116.0		13.0	116.0	35.0
Total Split (%)	13.7%		61.1%		6.8%	61.1%	18%
Maximum Green (s)	20.0		110.0		7.0	110.0	29.0
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0		6.0		6.0	6.0	
Lead/Lag			Lag		Lead		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	1.5		1.5		1.5	1.5	3.0
Recall Mode	None		C-Min		None	C-Min	None
Walk Time (s)							5.0
Flash Dont Walk (s)							24.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	20.0	33.0	138.0		7.0	151.0	
Actuated g/C Ratio	0.11	0.17	0.73		0.04	0.79	
v/c Ratio	1.55	0.56	0.52		1.17	0.86	
Control Delay	320.3	63.3	15.1		238.7	21.6	

# 9: Lowell Road (Route 3A) & Pelham Road Lanes, Volumes, Timings

2032 Build AM

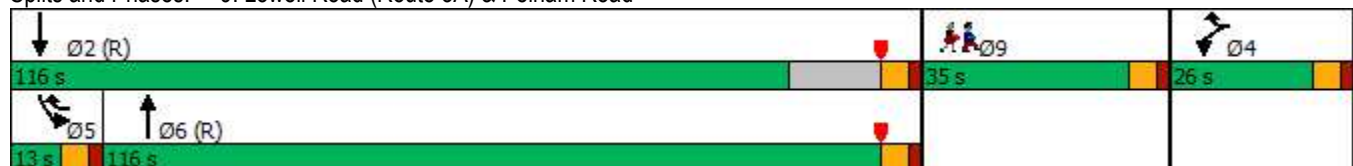


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Queue Delay	0.0	0.0	5.6		0.0	0.0	
Total Delay	320.3	63.3	20.7		238.7	21.6	
LOS	F	E	C		F	C	
Approach Delay	258.6		20.7			33.6	
Approach LOS	F		C			C	
Queue Length 50th (ft)	~509	73	300		~109	716	
Queue Length 95th (ft)	#695	143	715		#233	#1982	
Internal Link Dist (ft)	432		469			1229	
Turn Bay Length (ft)		75			150		
Base Capacity (vph)	188	163	1337		63	1480	
Starvation Cap Reductn	0	0	570		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	1.55	0.56	0.91		1.17	0.86	

## Intersection Summary

Area Type: Other  
 Cycle Length: 190  
 Actuated Cycle Length: 190  
 Offset: 30 (16%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.55  
 Intersection Signal Delay: 65.5  
 Intersection LOS: E  
 Intersection Capacity Utilization 88.2%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

## Splits and Phases: 9: Lowell Road (Route 3A) & Pelham Road





**2032 Build Weekday P.M.**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2032 Build PM



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	40	2	2	1	653	1	984	439	15	5	0	726
Future Volume (vph)	40	2	2	1	653	1	984	439	15	5	0	726
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0		100	0
Storage Lanes	1	1		1		1	1		0		1	1
Taper Length (ft)	25			100			75				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Fr <sub>t</sub>		0.850						0.995				0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1668	1507	0	1685	3610	0	1685	3558	0	0	1805	1615
Fl <sub>t</sub> Permitted	0.950			0.950			0.950				0.950	
Satd. Flow (perm)	1668	1507	0	1685	3610	0	1685	3558	0	0	1805	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191						4				246
Link Speed (mph)	30			35			35				35	
Link Distance (ft)	591			758			1733				622	
Travel Time (s)	13.4			14.8			33.8				12.1	
Peak Hour Factor	0.80	0.80	0.80	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	50	3	3	1	718	1	1093	488	17	5	0	798
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	6	0	1	719	0	1093	505	0	0	5	798
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3	3.5
Permitted Phases												
Detector Phase	4	4		1	6		5	2		3	3	3.5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	11.0	
Total Split (s)	21.0	21.0		16.0	32.0		51.0	67.0		16.0	16.0	
Total Split (%)	17.5%	17.5%		13.3%	26.7%		42.5%	55.8%		13.3%	13.3%	
Maximum Green (s)	15.0	15.0		10.0	26.0		45.0	61.0		10.0	10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	None	
Act Effct Green (s)	9.0	9.0		5.6	26.0		53.3	82.9			10.0	64.5
Actuated g/C Ratio	0.08	0.08		0.05	0.22		0.44	0.69			0.08	0.54
v/c Ratio	0.40	0.02		0.01	0.92		1.46	0.21			0.03	0.81
Control Delay	61.5	0.2		55.0	64.1		234.0	1.3			51.2	22.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	61.5	0.2		55.0	64.1		234.0	1.3			51.2	22.4
LOS	E	A		D	E		F	A			D	C

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road  
Lanes, Volumes, Timings

2032 Build PM

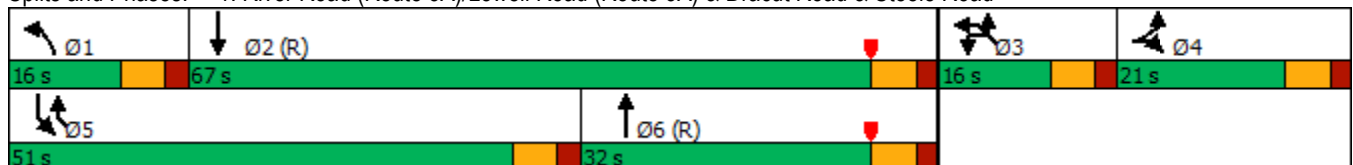


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Approach Delay	54.9				64.1			160.4			22.6	
Approach LOS	D				E			F			C	
Queue Length 50th (ft)	38	0		1	288		~1169	2			4	270
Queue Length 95th (ft)	68	0		7	#402		#1470	m48			17	#446
Internal Link Dist (ft)	511				678			1653			542	
Turn Bay Length (ft)		50		200			775				100	
Base Capacity (vph)	208	355		140	782		748	2458			150	981
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.24	0.02		0.01	0.92		1.46	0.21			0.03	0.81

Intersection Summary






















Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 5 (4%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.46  
 Intersection Signal Delay: 101.9      Intersection LOS: F  
 Intersection Capacity Utilization 100.9%      ICU Level of Service G  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-04  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road



## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2032 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	273	0	51	1	0	17	35	1397	6	26	1374	228
Future Volume (vph)	273	0	51	1	0	17	35	1397	6	26	1374	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.871			0.999				0.979
Flt Protected		0.950			0.998		0.950			0.950		
Satd. Flow (prot)	0	1620	1507	0	1707	0	1685	3606	0	1805	3475	0
Flt Permitted		0.743			0.987		0.950			0.950		
Satd. Flow (perm)	0	1267	1507	0	1688	0	1685	3606	0	1805	3475	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82		82							20
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.84	0.84	0.84	0.80	0.80	0.80	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%
Adj. Flow (vph)	325	0	61	1	0	21	38	1502	6	29	1527	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	325	61	0	22	0	38	1508	0	29	1780	0
Turn Type	Perm	NA	Prot	Perm	NA		Prot	NA		Prot	NA	
Protected Phases		7	7		3		1	6		5	2	
Permitted Phases	7			3								
Detector Phase	7	7	7	3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	32.0	32.0	32.0	32.0	32.0		27.0	61.0		27.0	61.0	
Total Split (%)	26.7%	26.7%	26.7%	26.7%	26.7%		22.5%	50.8%		22.5%	50.8%	
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0		21.0	55.0		21.0	55.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None	None	None	None		None	C-Min		None	C-Min	
Act Effct Green (s)		26.0	26.0		18.2		9.2	72.7		8.5	72.1	
Actuated g/C Ratio		0.22	0.22		0.15		0.08	0.61		0.07	0.60	
v/c Ratio		1.19	0.16		0.07		0.30	0.69		0.23	0.85	
Control Delay		155.9	5.2		0.4		64.5	17.5		56.8	17.9	
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Total Delay		155.9	5.2		0.4		64.5	17.5		56.8	17.9	
LOS		F	A		A		E	B		E	B	

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2032 Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		132.1			0.4			18.7				18.5
Approach LOS		F			A			B				B
Queue Length 50th (ft)		~303	0		0		30	565		23		201
Queue Length 95th (ft)		#438	18		0		m34	m688		m29		m#356
Internal Link Dist (ft)		430			477			1653				900
Turn Bay Length (ft)			50				300			350		
Base Capacity (vph)		274	390		429		294	2185		315		2095
Starvation Cap Reductn		0	0		0		0	0		0		0
Spillback Cap Reductn		0	0		0		0	0		0		0
Storage Cap Reductn		0	0		0		0	0		0		0
Reduced v/c Ratio		1.19	0.16		0.05		0.13	0.69		0.09		0.85

### Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 74 (62%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 30.1

Intersection LOS: C

Intersection Capacity Utilization 77.0%

ICU Level of Service D

Analysis Period (min) 15

Description: NHDOT Int. No.: S-229-03

~ Volume exceeds capacity, queue is theoretically infinite.

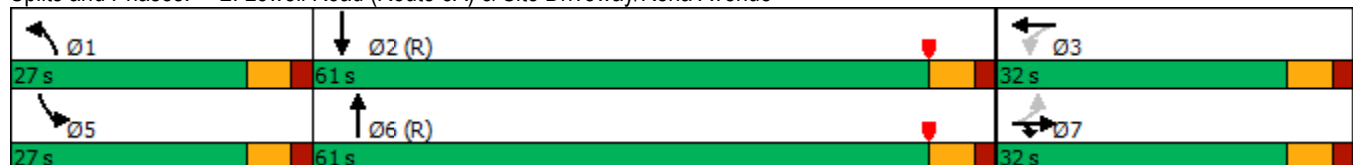
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

























m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2032 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	357	13	129	88	20	244	110	1500	74	310	1398	300
Future Volume (vph)	357	13	129	88	20	244	110	1500	74	310	1398	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Fr <sub>t</sub>			0.850			0.850			0.850			0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1963	1615	3502	1900	1669	3467	3574	1615	3502	3539	1583
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1963	1615	3502	1900	1669	3467	3574	1615	3502	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			147			224			136			222
Link Speed (mph)		30			30			35			30	
Link Distance (ft)		401			449			980			1189	
Travel Time (s)		9.1			10.2			19.1			27.0	
Peak Hour Factor	0.88	0.88	0.88	0.86	0.86	0.86	0.89	0.89	0.89	0.91	0.91	0.91
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	1%	1%	0%	0%	2%	2%
Adj. Flow (vph)	406	15	147	102	23	284	124	1685	83	341	1536	330
Shared Lane Traffic (%)												
Lane Group Flow (vph)	406	15	147	102	23	284	124	1685	83	341	1536	330
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4	4	3	8	8	1	6	6	5	2	2
Permitted Phases												
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	16.0
Total Split (s)	26.0	20.0	20.0	26.0	20.0	20.0	21.0	48.0	48.0	26.0	53.0	53.0
Total Split (%)	21.7%	16.7%	16.7%	21.7%	16.7%	16.7%	17.5%	40.0%	40.0%	21.7%	44.2%	44.2%
Maximum Green (s)	20.0	14.0	14.0	20.0	14.0	14.0	15.0	42.0	42.0	20.0	47.0	47.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	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 Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0	6.0	4.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	18.7	19.6	19.6	9.8	10.7	10.7	10.6	49.2	49.2	17.4	55.9	55.9
Actuated g/C Ratio	0.16	0.16	0.16	0.08	0.09	0.09	0.09	0.41	0.41	0.14	0.47	0.47
v/c Ratio	0.76	0.05	0.38	0.36	0.14	0.80	0.41	1.15	0.11	0.67	0.93	0.39
Control Delay	58.2	40.9	9.7	55.1	50.4	30.7	57.9	100.7	1.8	57.6	32.2	3.9
Queue Delay	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 Delay	58.2	40.9	9.7	55.1	50.4	30.7	57.9	100.7	1.8	57.6	32.2	3.9
LOS	E	D	A	E	D	C	E	F	A	E	C	A

### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2032 Build PM

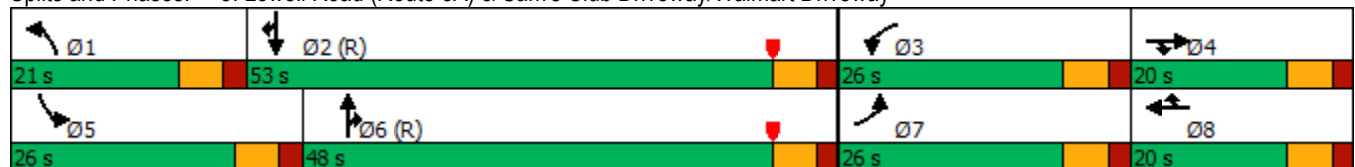


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		45.2			37.9			93.6			31.9	
Approach LOS		D			D			F			C	
Queue Length 50th (ft)	155	10	0	39	17	44	48	~821	0	125	627	8
Queue Length 95th (ft)	205	29	53	63	41	123	m67	m#954	m6	m122	m#756	m32
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350		175	350		
Base Capacity (vph)	572	320	386	583	221	392	433	1464	742	583	1649	856
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.05	0.38	0.17	0.10	0.72	0.29	1.15	0.11	0.58	0.93	0.39

#### Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 64 (53%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.15  
 Intersection Signal Delay: 56.8  
 Intersection LOS: E  
 Intersection Capacity Utilization 82.2%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway





#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2032 Build PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1633	1593	1442	749	546	1360
Future Volume (vph)	1633	1593	1442	749	546	1360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.97	0.95	0.95	0.88
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3698	1689	3467	3610	3610	2814
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3698	1689	3467	3610	3610	2814
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		624				1300
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.96	0.96	0.94	0.94	0.89	0.89
Heavy Vehicles (%)	1%	2%	1%	0%	0%	1%
Adj. Flow (vph)	1701	1659	1534	797	613	1528
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1701	1659	1534	797	613	1528
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	50.0		40.0	67.0	30.0	
Total Split (%)	41.7%		33.3%	55.8%	25.0%	
Maximum Green (s)	44.0		32.0	60.0	23.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	44.1	120.0	32.0	62.9	22.9	120.0
Actuated g/C Ratio	0.37	1.00	0.27	0.52	0.19	1.00
v/c Ratio	1.25	0.98	1.66	0.42	0.89	0.54
Control Delay	153.4	20.6	322.5	7.7	63.9	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	153.4	20.6	322.5	7.7	63.9	0.8
LOS	F	C	F	A	E	A

# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2032 Build PM

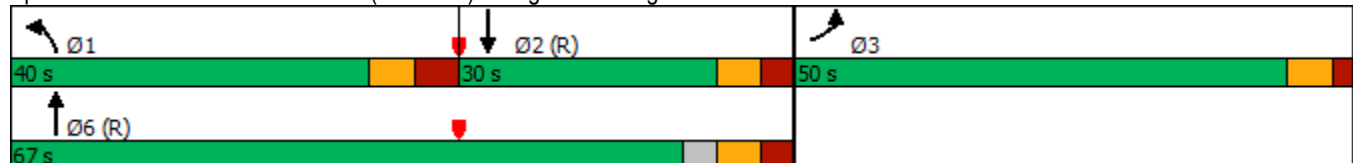


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	87.8			214.9	18.8	
Approach LOS	F			F	B	
Queue Length 50th (ft)	~850	0	~890	128	245	0
Queue Length 95th (ft)	#987	#216	m#807	m100	#337	0
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1359	1689	924	1895	691	2814
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	1.25	0.98	1.66	0.42	0.89	0.54

## Intersection Summary
























Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 100 (83%), Referenced to phase 2:SBT and 6:NBT, Start of Green  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.66  
 Intersection Signal Delay: 106.8  
 Intersection LOS: F  
 Intersection Capacity Utilization 119.5%  
 ICU Level of Service H  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-02  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road



5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road  
Lanes, Volumes, Timings

2032 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	98	474	479	19	31	146	1167	1093	80	985	5
Future Volume (vph)	54	98	474	479	19	31	146	1167	1093	80	985	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		1	1		1	1		1	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.983		0.950	0.956		0.950			0.950		
Satd. Flow (prot)	0	1868	1599	1658	1668	1546	1787	3574	1615	1805	5131	0
Flt Permitted		0.983		0.950	0.956		0.950			0.950		
Satd. Flow (perm)	0	1868	1599	1658	1668	1546	1787	3574	1615	1805	5131	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			53			89			252			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		805			586			999			1515	
Travel Time (s)		18.3			13.3			22.7			34.4	
Peak Hour Factor	0.80	0.80	0.80	0.90	0.90	0.90	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	1%	1%	0%	0%	1%	0%
Adj. Flow (vph)	68	123	593	532	21	34	155	1241	1163	91	1119	6
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	191	593	277	276	34	155	1241	1163	91	1125	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	26.0	26.0	31.0	56.0	56.0	21.0	31.0	71.0	56.0	21.0	71.0	
Total Split (%)	14.1%	14.1%	16.8%	30.4%	30.4%	11.4%	16.8%	38.6%	30.4%	11.4%	38.6%	
Maximum Green (s)	20.0	20.0	25.0	50.0	50.0	15.0	25.0	65.0	50.0	15.0	65.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)		19.7	50.8	48.3	48.3	60.8	25.1	62.6	116.9	12.5	50.0	
Actuated g/C Ratio		0.12	0.30	0.29	0.29	0.36	0.15	0.37	0.70	0.07	0.30	
v/c Ratio		0.87	1.13	0.58	0.57	0.05	0.58	0.93	0.97	0.68	0.73	
Control Delay		107.3	128.6	57.4	57.1	0.2	77.6	63.0	37.5	101.3	55.8	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.3	0.0	0.0	
Total Delay		107.3	128.6	57.4	57.1	0.2	77.6	63.0	53.8	101.3	55.8	
LOS		F	F	E	E	A	E	E	D	F	E	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2032 Build PM

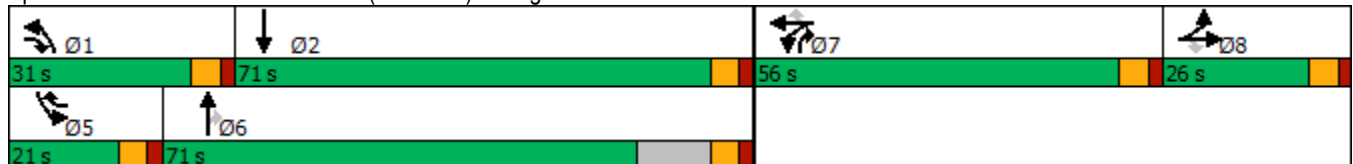


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		123.4			53.9			59.7				59.2
Approach LOS		F			D			E				E
Queue Length 50th (ft)		216	~749	283	281	0	167	705	993	102	414	
Queue Length 95th (ft)		#306	#835	402	400	0	255	#823	#1512	166	455	
Internal Link Dist (ft)		725			506			919			1435	
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		224	523	498	501	641	268	1610	1220	162	2004	
Starvation Cap Reductn		0	0	0	0	0	0	0	91	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.85	1.13	0.56	0.55	0.05	0.58	0.77	1.03	0.56	0.56	

## Intersection Summary























Area Type:	Other
Cycle Length:	184
Actuated Cycle Length:	167.2
Natural Cycle:	110
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.13
Intersection Signal Delay:	68.7
Intersection LOS:	E
Intersection Capacity Utilization:	95.3%
ICU Level of Service:	F
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive  
Lanes, Volumes, Timings

2032 Build PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	2	116	11	1	5	18	1232	14	6	956	8
Future Volume (vph)	28	2	116	11	1	5	18	1232	14	6	956	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	13	13	12	12	12	11	12	12
Storage Length (ft)	0		100	0		100	225		0	225		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.998			0.999	
Flt Protected		0.956			0.955		0.950			0.950		
Satd. Flow (prot)	0	1816	1583	0	1875	1669	1736	3568	0	1745	3571	0
Flt Permitted		0.422					0.950			0.950		
Satd. Flow (perm)	0	802	1583	0	1963	1669	1736	3568	0	1745	3571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145			86		1			1	
Link Speed (mph)		30			10			30			30	
Link Distance (ft)		495			382			1515			1791	
Travel Time (s)		11.3			26.0			34.4			40.7	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	4%	1%	0%	0%	1%	0%
Adj. Flow (vph)	35	3	145	14	1	6	19	1297	15	7	1099	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	145	0	15	6	19	1312	0	7	1108	0
Turn Type	Perm	NA	pt+ov	Perm	NA	pt+ov	Prot	NA		Prot	NA	
Protected Phases		4	4 1		8	8 5	1	6		5	2	
Permitted Phases	4			8								
Detector Phase	4	4	4 1	8	8	8 5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		3.0	3.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	9.0	9.0		9.0	9.0		8.0	21.0		8.0	21.0	
Total Split (s)	16.0	16.0		16.0	16.0		16.0	66.0		16.0	66.0	
Total Split (%)	14.0%	14.0%		14.0%	14.0%		14.0%	57.9%		14.0%	57.9%	
Maximum Green (s)	10.0	10.0		10.0	10.0		12.0	60.0		12.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0		4.0	6.0		4.0	6.0	
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)		9.2	17.5		6.9	9.7	5.8	43.5		5.3	36.2	
Actuated g/C Ratio		0.13	0.24		0.10	0.13	0.08	0.60		0.07	0.50	
v/c Ratio		0.38	0.30		0.08	0.02	0.14	0.61		0.06	0.62	
Control Delay		49.0	6.2		40.3	0.2	42.6	12.8		42.8	15.4	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		49.0	6.2		40.3	0.2	42.6	12.8		42.8	15.4	
LOS		D	A		D	A	D	B		D	B	

# 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive Lanes, Volumes, Timings

2032 Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		15.1			28.9			13.2				15.6
Approach LOS		B			C			B				B
Queue Length 50th (ft)		12	0		5	0	6	118		2		145
Queue Length 95th (ft)		#55	29		27	0	36	381		18		293
Internal Link Dist (ft)		415			302			1435				1711
Turn Bay Length (ft)			100			100	225			225		
Base Capacity (vph)		119	574		292	387	310	3018		312		3021
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.32	0.25		0.05	0.02	0.06	0.43		0.02		0.37

## Intersection Summary

Area Type:	Other
Cycle Length:	114
Actuated Cycle Length:	72.6
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	14.5
Intersection LOS:	B
Intersection Capacity Utilization	56.2%
ICU Level of Service	B
Analysis Period (min)	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

## Splits and Phases: 6: Lowell Road (Route 3A) & Hampshire Drive/Oblate Drive



# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2032 Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↗	↕↗		↗	↕↗	
Traffic Volume (vph)	248	3	89	23	2	22	57	1131	7	16	784	44
Future Volume (vph)	248	3	89	23	2	22	57	1131	7	16	784	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	15	12	12	13	11	12	12	11	12	12
Storage Length (ft)	0		225	0		80	350		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.999			0.992	
Flt Protected		0.953			0.957		0.950			0.950		
Satd. Flow (prot)	0	1733	1742	0	1818	1620	1678	3571	0	1646	3540	0
Flt Permitted		0.705			0.635		0.950			0.950		
Satd. Flow (perm)	0	1282	1742	0	1206	1620	1678	3571	0	1646	3540	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			111			91		1			8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		492			577			1791			1168	
Travel Time (s)		11.2			13.1			40.7			26.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.97	0.97	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	2%	0%	0%	3%	4%	1%	0%	6%	1%	4%
Adj. Flow (vph)	310	4	111	29	3	28	59	1166	7	17	852	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	314	111	0	32	28	59	1173	0	17	900	0
Turn Type	Perm	NA	pt+ov	Perm	NA	Prot	Prot	NA		Prot	NA	
Protected Phases		8	8 1		4	4	1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8	8 1	4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		5.0	5.0	5.0	3.0	8.0		3.0	8.0	
Minimum Split (s)	9.0	9.0		11.0	11.0	11.0	9.0	14.0		9.0	14.0	
Total Split (s)	26.0	26.0		23.0	23.0	23.0	16.0	66.0		16.0	66.0	
Total Split (%)	24.1%	24.1%		21.3%	21.3%	21.3%	14.8%	61.1%		14.8%	61.1%	
Maximum Green (s)	20.0	20.0		17.0	17.0	17.0	10.0	60.0		10.0	60.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)		20.7	33.9		13.5	13.5	7.0	36.7		5.5	28.3	
Actuated g/C Ratio		0.29	0.47		0.19	0.19	0.10	0.51		0.08	0.39	
v/c Ratio		0.85	0.13		0.14	0.07	0.36	0.64		0.13	0.64	
Control Delay		51.9	4.1		26.8	0.4	40.3	14.6		38.7	20.1	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		51.9	4.1		26.8	0.4	40.3	14.6		38.7	20.1	
LOS		D	A		C	A	D	B		D	C	



# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2032 Build PM

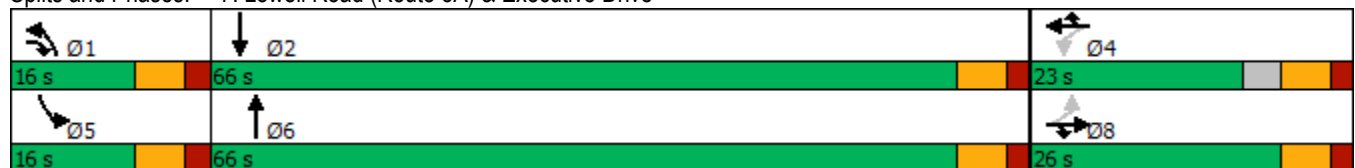


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		39.4			14.4			15.9				20.4
Approach LOS		D			B			B				C
Queue Length 50th (ft)		129	0		10	0	25	165		7		170
Queue Length 95th (ft)		#322	24		36	0	71	318		31		238
Internal Link Dist (ft)		412			497			1711				1088
Turn Bay Length (ft)			225			80	350			150		
Base Capacity (vph)		369	955		346	531	241	2995		237		2970
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.85	0.12		0.09	0.05	0.24	0.39		0.07		0.30

## Intersection Summary

Area Type:	Other
Cycle Length:	108
Actuated Cycle Length:	71.8
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	21.2
Intersection LOS:	C
Intersection Capacity Utilization:	70.4%
ICU Level of Service:	C
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

## Splits and Phases: 7: Lowell Road (Route 3A) & Executive Drive



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2032 Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↗	↕	↗	↗	↗	↗
Traffic Volume (vph)	9	2	25	31	0	48	27	1335	15	56	793	11
Future Volume (vph)	9	2	25	31	0	48	27	1335	15	56	793	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.998	
Flt Protected		0.962			0.950		0.950			0.950		
Satd. Flow (prot)	0	1828	1583	0	1865	1669	1745	1818	1615	1805	1878	0
Flt Permitted		0.746			0.748		0.950			0.950		
Satd. Flow (perm)	0	1417	1583	0	1469	1669	1745	1818	1615	1805	1878	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			60			91			1
Link Speed (mph)		10			30			30				30
Link Distance (ft)		598			262			1405				549
Travel Time (s)		40.8			6.0			31.9				12.5
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.99	0.99	0.99	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	11	3	31	39	0	60	27	1348	15	60	844	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	31	0	39	60	27	1348	15	60	856	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA	Prot	Prot	NA	
Protected Phases		8	8		4	5	1	6	6	5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	16.0	11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0	116.0	16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%	64.4%	8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0	110.0	10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag						Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.1	8.1		8.1	20.7	6.6	140.9	140.9	8.8	146.5	
Actuated g/C Ratio		0.04	0.04		0.04	0.12	0.04	0.78	0.78	0.05	0.81	
v/c Ratio		0.22	0.20		0.59	0.25	0.42	0.95	0.01	0.68	0.56	
Control Delay		90.1	2.8		117.7	16.3	103.9	33.1	0.0	119.5	11.9	

8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
Lanes, Volumes, Timings

2032 Build PM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2032 Build PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1
Total Delay		90.1	2.8		117.7	16.3	103.9	33.1	0.0	119.5	14.9	
LOS		F	A		F	B	F	C	A	F	B	
Approach Delay		29.9			56.2			34.2				21.8
Approach LOS		C			E			C				C
Queue Length 50th (ft)		16	0		46	0	32	1114	0	71	294	
Queue Length 95th (ft)		40	0		81	36	70	#2202	0	#134	870	
Internal Link Dist (ft)		518			182			1325				469
Turn Bay Length (ft)			50			100	210		325	125		
Base Capacity (vph)		78	173		81	255	96	1423	1284	100	1528	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	546	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.18	0.18		0.48	0.24	0.28	0.95	0.01	0.60	0.87	

### Intersection Summary

Area Type: Other

Cycle Length: 180

Actuated Cycle Length: 180

Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 30.4

Intersection LOS: C

Intersection Capacity Utilization 93.6%

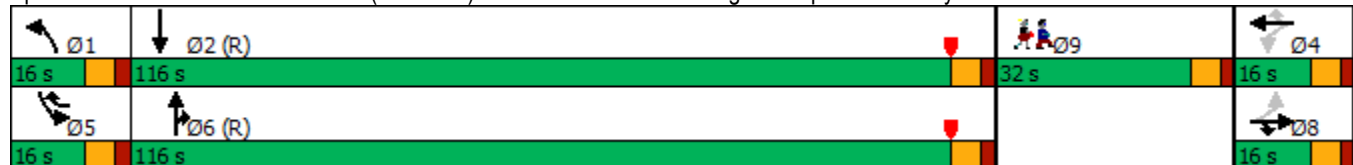
ICU Level of Service F

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

### Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2032 Build PM

---

Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

---

# 9: Lowell Road (Route 3A) & Pelham Road Lanes, Volumes, Timings

2032 Build PM



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Lane Configurations							
Traffic Volume (vph)	94	157	1269	121	122	782	
Future Volume (vph)	94	157	1269	121	122	782	
Ideal Flow (vphpl)	1900	1000	1900	1900	1900	1900	
Lane Width (ft)	12	12	13	13	12	12	
Storage Length (ft)	0	75		0	150		
Storage Lanes	1	1		0	1		
Taper Length (ft)	25				50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>		0.850	0.988				
Fl <sub>t</sub> Protected	0.950				0.950		
Satd. Flow (prot)	1805	850	1922	0	1805	1881	
Fl <sub>t</sub> Permitted	0.950				0.950		
Satd. Flow (perm)	1805	850	1922	0	1805	1881	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		153	4				
Link Speed (mph)	20		30			30	
Link Distance (ft)	512		549			1309	
Travel Time (s)	17.5		12.5			29.8	
Peak Hour Factor	0.87	0.87	0.98	0.98	0.89	0.89	
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	
Adj. Flow (vph)	108	180	1295	123	137	879	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	108	180	1418	0	137	879	
Turn Type	Prot	pt+ov	NA		Prot	NA	
Protected Phases	4	4 5	6		5	2	9
Permitted Phases							
Detector Phase	4	4 5	6		5	2	
Switch Phase							
Minimum Initial (s)	5.0		10.0		3.0	10.0	5.0
Minimum Split (s)	11.0		16.0		9.0	16.0	35.0
Total Split (s)	26.0		116.0		13.0	116.0	35.0
Total Split (%)	13.7%		61.1%		6.8%	61.1%	18%
Maximum Green (s)	20.0		110.0		7.0	110.0	29.0
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0		6.0		6.0	6.0	
Lead/Lag			Lag		Lead		
Lead-Lag Optimize?			Yes		Yes		
Vehicle Extension (s)	1.5		1.5		1.5	1.5	3.0
Recall Mode	None		C-Min		None	C-Min	None
Walk Time (s)							5.0
Flash Dont Walk (s)							24.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	15.1	28.1	142.9		7.0	155.9	
Actuated g/C Ratio	0.08	0.15	0.75		0.04	0.82	
v/c Ratio	0.76	0.70	0.98		2.08	0.57	
Control Delay	115.2	30.4	41.7		568.2	10.5	

# 9: Lowell Road (Route 3A) & Pelham Road Lanes, Volumes, Timings

2032 Build PM

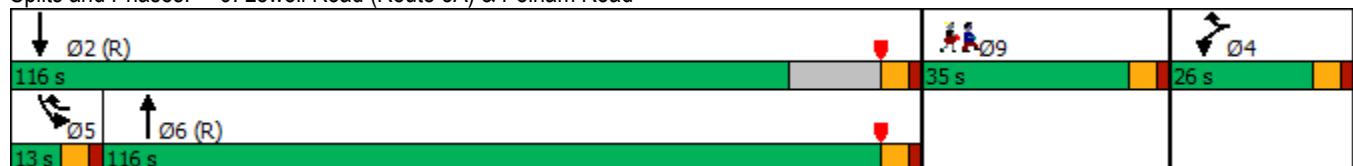


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Queue Delay	0.0	0.0	40.3		0.0	0.0	
Total Delay	115.2	30.4	82.0		568.2	10.5	
LOS	F	C	F		F	B	
Approach Delay	62.2		82.0			85.7	
Approach LOS	E		F			F	
Queue Length 50th (ft)	135	30	1286		~268	244	
Queue Length 95th (ft)	197	118	#2494		#423	851	
Internal Link Dist (ft)	432		469			1229	
Turn Bay Length (ft)		75			150		
Base Capacity (vph)	190	252	1446		66	1543	
Starvation Cap Reductn	0	0	244		0	0	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.57	0.71	1.18		2.08	0.57	

## Intersection Summary

Area Type: Other  
 Cycle Length: 190  
 Actuated Cycle Length: 190  
 Offset: 30 (16%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 2.08  
 Intersection Signal Delay: 81.3  
 Intersection LOS: F  
 Intersection Capacity Utilization 102.6%  
 ICU Level of Service G  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

## Splits and Phases: 9: Lowell Road (Route 3A) & Pelham Road





## **Appendix I**


















# **Capacity Analysis – 2022 Build with Base Improvements Traffic Conditions**

**2022 Build with Base Improvements Weekday A.M.**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Steele Road/Dracut Road

Lanes, Volumes, Timings

2022 Build with Improvements AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	2	0	1	849	0	272	0	487	509	12
Future Volume (vph)	2	0	2	0	1	849	0	272	0	487	509	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	12	12	12	10	12	12	10	12	12
Storage Length (ft)	0		50	100		0	200		300	775		0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	25			25			100			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.932			0.850	0.850						0.998
Flt Protected		0.976										0.976
Satd. Flow (prot)	0	1385	0	0	1504	1504	0	3574	0	0	3465	0
Flt Permitted		0.976										0.976
Satd. Flow (perm)	0	1385	0	0	1504	1504	0	3574	0	0	3465	0
Link Speed (mph)		30			35			35			35	
Link Distance (ft)		591			645			758			1733	
Travel Time (s)		13.4			12.6			14.8			33.8	
Peak Hour Factor	0.80	0.80	0.80	0.86	0.86	0.86	0.80	0.80	0.80	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	33%	0%	0%	2%	0%	1%	0%	2%	1%	0%
Adj. Flow (vph)	3	0	3	0	1	987	0	340	0	529	553	13
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	6	0	0	495	493	0	340	0	0	1095	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	63.7%
ICU Level of Service	B
Analysis Period (min)	15

1: River Road (Route 3A)/Lowell Road (Route 3A) & Steele Road/Dracut Road




























HCM 6th Roundabout

2022 Build with Improvements AM

Intersection							
Intersection Delay, s/veh	7.7						
Intersection LOS	A						
Approach	EB	WB		NB		SB	
Entry Lanes	1	2		2		2	
Conflicting Circle Lanes	2	2		2		2	
Adj Approach Flow, veh/h	6	988		340		1095	
Demand Flow Rate, veh/h	7	1008		343		1112	
Vehicles Circulating, veh/h	1099	346		543		1	
Vehicles Exiting, veh/h	14	540		563		1353	
Ped Vol Crossing Leg, #/h	0	0		0		0	
Ped Cap Adj	1.000	1.000		1.000		1.000	
Approach Delay, s/veh	7.7	9.5		6.3		6.4	
Approach LOS	A	A		A		A	
Lane	Left	Left	Right	Left	Right	Left	Right
Designated Moves	LTR	LTR	R	LT	TR	LT	TR
Assumed Moves	LTR	LTR	R	LT	TR	LT	TR
RT Channelized							
Lane Util	1.000	0.470	0.530	0.469	0.531	0.470	0.530
Follow-Up Headway, s	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	7	474	534	161	182	523	589
Cap Entry Lane, veh/h	558	982	1058	819	895	1349	1419
Entry HV Adj Factor	0.857	0.980	0.981	0.991	0.989	0.984	0.986
Flow Entry, veh/h	6	464	524	160	180	515	581
Cap Entry, veh/h	478	962	1038	812	885	1328	1399
V/C Ratio	0.013	0.483	0.505	0.197	0.203	0.388	0.415
Control Delay, s/veh	7.7	9.6	9.5	6.5	6.1	6.4	6.5
LOS	A	A	A	A	A	A	A
95th %tile Queue, veh	0	3	3	1	1	2	2

2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue  
Lanes, Volumes, Timings

2022 Build with Improvements AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 				 		 	 		 	 	 
Traffic Volume (vph)	156	0	25	1	1	33	43	1126	2	7	987	241
Future Volume (vph)	156	0	25	1	1	33	43	1126	2	7	987	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	2		0	0		0	1		0	1		1
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Fr <sub>t</sub>		0.850			0.872							0.850
Fl <sub>t</sub> Protected	0.950				0.999		0.950			0.950		
Satd. Flow (prot)	2971	1133	0	0	1659	0	1685	3538	0	1570	3539	1524
Fl <sub>t</sub> Permitted	0.529				0.990		0.950			0.950		
Satd. Flow (perm)	1654	1133	0	0	1644	0	1685	3538	0	1570	3539	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		316			39							254
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.80	0.80	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95
Heavy Vehicles (%)	10%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	6%
Adj. Flow (vph)	195	0	31	1	1	39	51	1325	2	7	1039	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	195	31	0	0	41	0	51	1327	0	7	1039	254
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	Prot
Protected Phases	3	7			4		1	6		5	2	2
Permitted Phases	7			4								
Detector Phase	3	7		4	4		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.0	11.0		11.0	11.0		11.0	16.0		11.0	16.0	16.0
Total Split (s)	10.0	21.0		11.0	11.0		22.0	49.0		20.0	47.0	47.0
Total Split (%)	11.1%	23.3%		12.2%	12.2%		24.4%	54.4%		22.2%	52.2%	52.2%
Maximum Green (s)	5.0	15.0		5.0	5.0		16.0	43.0		14.0	41.0	41.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0			6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)	14.6	12.6			5.6		9.1	61.6		7.0	54.5	54.5
Actuated g/C Ratio	0.16	0.14			0.06		0.10	0.68		0.08	0.61	0.61
v/c Ratio	0.51	0.07			0.30		0.30	0.55		0.06	0.48	0.25
Control Delay	38.2	0.3			20.5		41.3	9.7		37.6	12.1	1.5
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	38.2	0.3			20.5		41.3	9.7		37.6	12.1	1.5
LOS	D	A			C		D	A		D	B	A

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2022 Build with Improvements AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		33.0			20.5			10.8			10.2	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	46	0			1		27	202		4	98	0
Queue Length 95th (ft)	72	0			30		57	314		m10	131	12
Internal Link Dist (ft)		430			477			1653			900	
Turn Bay Length (ft)							300			350		
Base Capacity (vph)	384	461			138		299	2422		244	2144	1023
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	0.51	0.07			0.30		0.17	0.55		0.03	0.48	0.25

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 53 (59%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 12.4

Intersection LOS: B

Intersection Capacity Utilization 56.9%

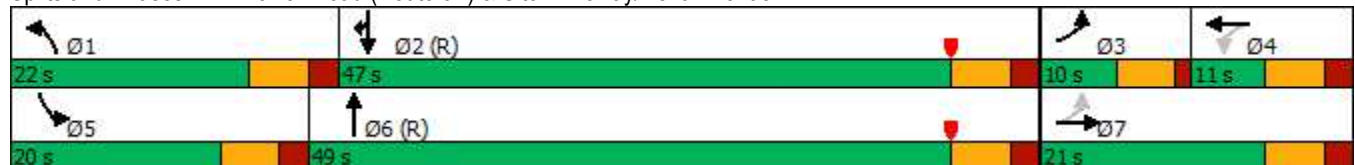
ICU Level of Service B

Analysis Period (min) 15

Description: NHDOT Int. No.: S-229-03

m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2022 Build with Improvements AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	4	59	15	5	71	78	1215	27	85	1152	164
Future Volume (vph)	131	4	59	15	5	71	78	1215	27	85	1152	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		400
Storage Lanes	2		1	2		1	2		0	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91	0.91	0.97	0.91	1.00
Frt			0.850			0.850		0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3213	1852	1568	3502	1900	1589	3467	5022	0	3433	5085	1482
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3213	1852	1568	3502	1900	1589	3467	5022	0	3433	5085	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			109		5				171
Link Speed (mph)		30			30			35				30
Link Distance (ft)		401			449			980				1189
Travel Time (s)		9.1			10.2			19.1				27.0
Peak Hour Factor	0.93	0.93	0.93	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	9%	6%	3%	0%	0%	5%	1%	3%	2%	2%	2%	9%
Adj. Flow (vph)	141	4	63	17	6	81	90	1397	31	89	1200	171
Shared Lane Traffic (%)												
Lane Group Flow (vph)	141	4	63	17	6	81	90	1428	0	89	1200	171
Turn Type	Prot	NA	pt+ov	Prot	NA	pt+ov	Prot	NA		Prot	NA	pt+ov
Protected Phases	7	4	4 1	3	8	8 5	1	6		5	2	2 7
Permitted Phases												
Detector Phase	7	4	4 1	3	8	8 5	1	6		5	2	2 7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	14.0	15.0		14.0	15.0		15.0	46.0		15.0	46.0	
Total Split (%)	15.6%	16.7%		15.6%	16.7%		16.7%	51.1%		16.7%	51.1%	
Maximum Green (s)	8.0	9.0		8.0	9.0		9.0	40.0		9.0	40.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Act Effct Green (s)	7.9	13.1	27.6	7.0	7.1	19.0	8.5	47.6		8.5	47.6	62.7
Actuated g/C Ratio	0.09	0.15	0.31	0.08	0.08	0.21	0.09	0.53		0.09	0.53	0.70
v/c Ratio	0.50	0.01	0.11	0.06	0.04	0.19	0.28	0.54		0.28	0.45	0.16
Control Delay	45.6	36.2	1.8	38.7	38.4	3.9	44.9	13.2		47.2	11.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	45.6	36.2	1.8	38.7	38.4	3.9	44.9	13.2		47.2	11.9	0.5
LOS	D	D	A	D	D	A	D	B		D	B	A



### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2022 Build with Improvements AM

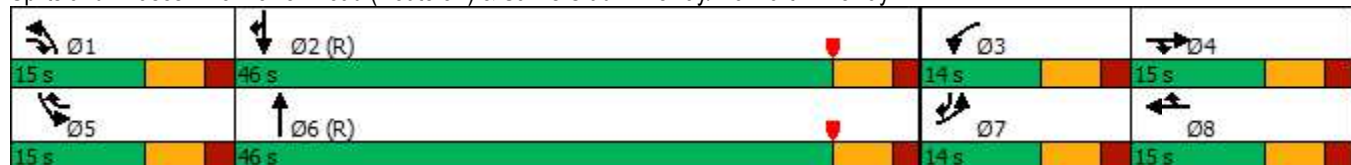


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		32.2			11.6			15.1			12.7	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	40	2	0	4	3	0	28	142		25	112	0
Queue Length 95th (ft)	70	12	9	14	14	19	50	137		m35	240	m1
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350			350		400
Base Capacity (vph)	285	280	517	311	190	379	354	2657		351	2688	1067
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.49	0.01	0.12	0.05	0.03	0.21	0.25	0.54		0.25	0.45	0.16

#### Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 53 (59%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.54  
 Intersection Signal Delay: 15.0  
 Intersection LOS: B  
 Intersection Capacity Utilization 53.6%  
 ICU Level of Service A  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway



#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2022 Build with Improvements AM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗	↔↔↔	↕↕	↕↕	↗↗
Traffic Volume (vph)	948	1095	1038	371	386	1517
Future Volume (vph)	948	1095	1038	371	386	1517
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.94	0.95	0.95	0.88
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	3662	1656	4894	3539	3539	2760
Fl <sub>t</sub> Permitted	0.950		0.950			
Satd. Flow (perm)	3662	1656	4894	3539	3539	2760
Right Turn on Red		No				Yes
Satd. Flow (RTOR)						1227
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.94	0.94	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	4%	2%	2%	3%
Adj. Flow (vph)	1009	1165	1128	403	420	1649
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1009	1165	1128	403	420	1649
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	38.0		33.0	52.0	19.0	
Total Split (%)	42.2%		36.7%	57.8%	21.1%	
Maximum Green (s)	32.0		25.0	45.0	12.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	30.2	90.0	25.0	46.8	13.8	90.0
Actuated g/C Ratio	0.34	1.00	0.28	0.52	0.15	1.00
v/c Ratio	0.82	0.70	0.83	0.22	0.77	0.60
Control Delay	33.7	2.5	25.7	4.4	33.6	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	2.5	25.7	4.4	33.6	3.9
LOS	C	A	C	A	C	A

# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2022 Build with Improvements AM

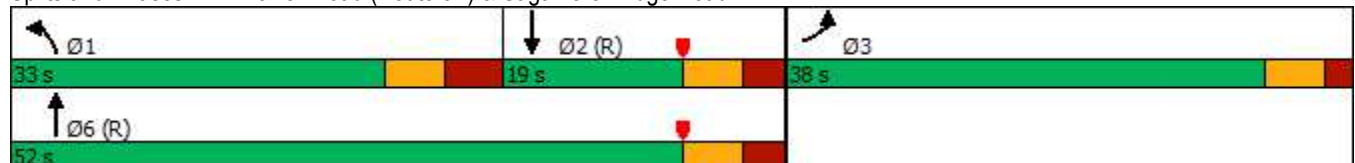


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	17.0			20.1	9.9	
Approach LOS	B			C	A	
Queue Length 50th (ft)	259	0	221	16	118	93
Queue Length 95th (ft)	334	0	231	12	m132	m98
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1302	1656	1377	1841	542	2760
Starvation 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	0.77	0.70	0.82	0.22	0.77	0.60

## Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection
Natural Cycle:	70
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	15.3
Intersection LOS:	B
Intersection Capacity Utilization	74.1%
ICU Level of Service	D
Analysis Period (min)	15
Description:	NHDOT Int. No.: S-229-02
m Volume for 95th percentile queue is metered by upstream signal.	
























## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road



# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road

## Lanes, Volumes, Timings

2022 Build with Improvements AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	28	282	614	41	30	303	811	188	15	1087	10
Future Volume (vph)	65	28	282	614	41	30	303	811	188	15	1087	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		1	1		1	0		2	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.88	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (prot)	0	1835	1583	1641	1657	1501	1787	3539	2787	1752	5078	0
Flt Permitted		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (perm)	0	1835	1583	1641	1657	1501	1787	3539	2787	1752	5078	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			182			198			1
Link Speed (mph)		30			30			30				30
Link Distance (ft)		805			586			999				430
Travel Time (s)		18.3			13.3			22.7				9.8
Peak Hour Factor	0.81	0.81	0.81	0.94	0.94	0.94	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	1%	0%	4%	1%	2%	2%	3%	2%	6%
Adj. Flow (vph)	80	35	348	653	44	32	319	854	198	17	1249	11
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	115	348	346	351	32	319	854	198	17	1260	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	12.0	12.0	23.0	26.0	26.0	11.0	23.0	41.0	26.0	11.0	29.0	
Total Split (%)	13.3%	13.3%	25.6%	28.9%	28.9%	12.2%	25.6%	45.6%	28.9%	12.2%	32.2%	
Maximum Green (s)	6.0	6.0	17.0	20.0	20.0	5.0	17.0	35.0	20.0	5.0	23.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)		6.0	29.0	20.0	20.0	25.0	17.0	39.4	65.4	5.0	23.0	
Actuated g/C Ratio		0.07	0.32	0.22	0.22	0.28	0.19	0.44	0.73	0.06	0.26	
v/c Ratio		0.94	0.60	0.95	0.95	0.06	0.95	0.55	0.10	0.18	0.97	
Control Delay		112.3	22.1	72.8	73.2	0.2	81.3	19.3	0.1	44.9	53.0	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		112.3	22.1	72.8	73.2	0.2	81.3	19.3	0.1	44.9	53.0	
LOS		F	C	E	E	A	F	B	A	D	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2022 Build with Improvements AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		44.5			69.8			30.9				52.9
Approach LOS		D			E			C				D
Queue Length 50th (ft)		66	111	205	208	0	198	125	0	9		259
Queue Length 95th (ft)		#147	168	#382	#386	0	m#319	198	m0	29		#336
Internal Link Dist (ft)		725			506			919				350
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		122	583	364	368	548	337	1549	2079	97		1298
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0		0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0		0
Reduced v/c Ratio		0.94	0.60	0.95	0.95	0.06	0.95	0.55	0.10	0.18		0.97

## Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 48 (53%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.97  
 Intersection Signal Delay: 47.3  
 Intersection LOS: D  
 Intersection Capacity Utilization 77.8%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.






















## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2022 Build with Improvements AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	48	6	0	10	4	566	1	16	1317	3
Future Volume (vph)	11	0	48	6	0	10	4	566	1	16	1317	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850			0.850						
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1719	1583	0	1865	1669	1745	3356	0	1805	1863	0
Flt Permitted		0.752			0.748		0.950			0.950		
Satd. Flow (perm)	0	1361	1583	0	1469	1669	1745	3356	0	1805	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			55						
Link Speed (mph)		10			30			30			30	
Link Distance (ft)		598			262			1405			549	
Travel Time (s)		40.8			6.0			31.9			12.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	5%	0%	2%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Adj. Flow (vph)	14	0	60	8	0	13	4	622	1	17	1386	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	60	0	8	13	4	623	0	17	1389	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases		8	8		4	5	1	6		5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0		16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%		8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0		10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lead	Lag		Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5		1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min		None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		6.3	6.3		6.3	18.3	5.0	147.7		6.0	153.1	
Actuated g/C Ratio		0.04	0.04		0.04	0.10	0.03	0.82		0.03	0.85	
v/c Ratio		0.30	0.42		0.16	0.06	0.08	0.23		0.28	0.88	
Control Delay		100.2	12.4		90.2	0.5	89.0	5.8		95.9	18.7	

8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
 Lanes, Volumes, Timings

2022 Build with Improvements AM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2022 Build with Improvements AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	26.8	
Total Delay		100.2	12.4		90.2	0.5	89.0	5.8		95.9	45.4	
LOS		F	B		F	A	F	A		F	D	
Approach Delay		29.0			34.7			6.3			46.0	
Approach LOS		C			C			A			D	
Queue Length 50th (ft)		17	0		9	0	5	65		20	449	
Queue Length 95th (ft)		40	3		27	0	20	204		50	#2186	
Internal Link Dist (ft)		518			182			1325			469	
Turn Bay Length (ft)			50			100	210			125		
Base Capacity (vph)		75	173		81	254	96	2753		100	1585	
Starvation Cap Reductn		0	0		0	0	0	0		0	262	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.19	0.35		0.10	0.05	0.04	0.23		0.17	1.05	

### Intersection Summary

Area Type: Other

Cycle Length: 180

Actuated Cycle Length: 180

Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 33.6

Intersection LOS: C

Intersection Capacity Utilization 92.8%

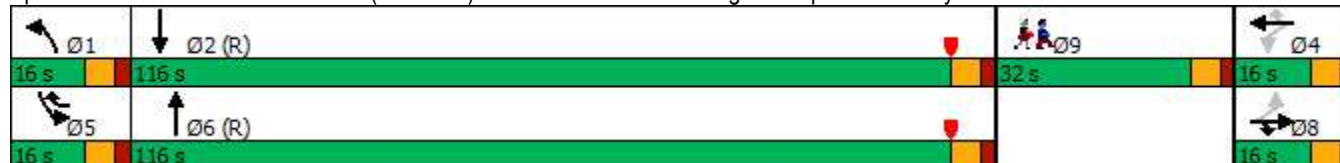
ICU Level of Service F

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

### Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
Lanes, Volumes, Timings

2022 Build with Improvements AM

---

Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	




















---

**2022 Build with Base Improvements Weekday P.M.**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Steele Road/Dracut Road

Lanes, Volumes, Timings

2022 Build with Improvements PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	2	2	4	0	660	1	593	1	894	399	13
Future Volume (vph)	36	2	2	4	0	660	1	593	1	894	399	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	12	12	12	10	12	12	10	12	12
Storage Length (ft)	0		50	100		0	200		300	775		0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	25			25			100			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.992			0.852	0.850						0.999
Flt Protected		0.958			0.999							0.967
Satd. Flow (prot)	0	1671	0	0	1536	1534	0	3610	0	0	3477	0
Flt Permitted		0.958			0.999							0.967
Satd. Flow (perm)	0	1671	0	0	1536	1534	0	3610	0	0	3477	0
Link Speed (mph)		30			35			35			35	
Link Distance (ft)		591			645			758			1733	
Travel Time (s)		13.4			12.6			14.8			33.8	
Peak Hour Factor	0.80	0.80	0.80	0.91	0.91	0.91	0.91	0.91	0.91	0.90	0.90	0.90
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	45	3	3	4	0	725	1	652	1	993	443	14
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	51	0	0	367	362	0	654	0	0	1450	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type: Other

Control Type: Roundabout

Intersection Capacity Utilization 96.5% ICU Level of Service F

Analysis Period (min) 15

1: River Road (Route 3A)/Lowell Road (Route 3A) & Steele Road/Dracut Road




























HCM 6th Roundabout

2022 Build with Improvements PM

Intersection							
Intersection Delay, s/veh	12.9						
Intersection LOS	B						
Approach	EB	WB		NB		SB	
Entry Lanes	1	2		2		2	
Conflicting Circle Lanes	2	2		2		2	
Adj Approach Flow, veh/h	51	729		654		1450	
Demand Flow Rate, veh/h	51	729		654		1454	
Vehicles Circulating, veh/h	1444	698		1041		5	
Vehicles Exiting, veh/h	15	997		454		1422	
Ped Vol Crossing Leg, #/h	0	0		0		0	
Ped Cap Adj	1.000	1.000		1.000		1.000	
Approach Delay, s/veh	10.5	11.7		18.5		11.0	
Approach LOS	B	B		C		B	
Lane	Left	Left	Right	Left	Right	Left	Right
Designated Moves	LTR	LTR	R	LT	TR	LT	TR
Assumed Moves	LTR	LTR	R	LT	TR	L	TR
RT Channelized							
Lane Util	1.000	0.471	0.529	0.469	0.531	0.683	0.317
Follow-Up Headway, s	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	51	343	386	307	347	993	461
Cap Entry Lane, veh/h	416	710	785	518	586	1344	1414
Entry HV Adj Factor	1.000	0.999	1.001	1.001	0.999	1.000	0.990
Flow Entry, veh/h	51	343	386	307	347	993	457
Cap Entry, veh/h	416	710	785	519	585	1344	1401
V/C Ratio	0.123	0.483	0.492	0.593	0.592	0.739	0.326
Control Delay, s/veh	10.5	12.1	11.4	19.5	17.6	13.5	5.4
LOS	B	B	B	C	C	B	A
95th %tile Queue, veh	0	3	3	4	4	7	1

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2022 Build with Improvements PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 				 		 	 		 	 	 
Traffic Volume (vph)	273	0	51	1	0	16	35	1267	5	24	1246	228
Future Volume (vph)	273	0	51	1	0	16	35	1267	5	24	1246	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	2		0	0		0	1		0	1		1
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Fr <sub>t</sub>		0.850			0.871			0.999				0.850
Fl <sub>t</sub> Protected	0.950				0.998		0.950			0.950		
Satd. Flow (prot)	3143	1507	0	0	1707	0	1685	3606	0	1805	3610	1482
Fl <sub>t</sub> Permitted	0.500						0.950			0.950		
Satd. Flow (perm)	1654	1507	0	0	1710	0	1685	3606	0	1805	3610	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		314			136							212
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.84	0.84	0.84	0.80	0.80	0.80	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	9%
Adj. Flow (vph)	325	0	61	1	0	20	38	1362	5	27	1384	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	325	61	0	0	21	0	38	1367	0	27	1384	253
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Prot	NA	Prot
Protected Phases	3	7			4		1	6		5	2	2
Permitted Phases	7			4								
Detector Phase	3	7		4	4		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	16.0		11.0	16.0	16.0
Total Split (s)	21.0	32.0		11.0	11.0		27.0	61.0		27.0	61.0	61.0
Total Split (%)	17.5%	26.7%		9.2%	9.2%		22.5%	50.8%		22.5%	50.8%	50.8%
Maximum Green (s)	15.0	26.0		5.0	5.0		21.0	55.0		21.0	55.0	55.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)	19.2	17.7			5.6		9.2	79.7		8.3	78.9	78.9
Actuated g/C Ratio	0.16	0.15			0.05		0.08	0.66		0.07	0.66	0.66
v/c Ratio	0.73	0.12			0.10		0.30	0.57		0.22	0.58	0.24
Control Delay	56.4	0.5			0.9		57.5	14.4		68.0	7.8	0.7
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	56.4	0.5			0.9		57.5	14.4		68.0	7.8	0.7
LOS	E	A			A		E	B		E	A	A

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2022 Build with Improvements PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		47.6			0.9			15.6			7.7	
Approach LOS		D			A			B			A	
Queue Length 50th (ft)	128	0			0		28	283		22	87	0
Queue Length 95th (ft)	147	0			0		63	471		m45	115	1
Internal Link Dist (ft)		430			477			1653			900	
Turn Bay Length (ft)							300			350		
Base Capacity (vph)	453	572			209		294	2393		315	2374	1047
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	0.72	0.11			0.10		0.13	0.57		0.09	0.58	0.24

### Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 74 (62%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 15.3

Intersection LOS: B

Intersection Capacity Utilization 59.6%

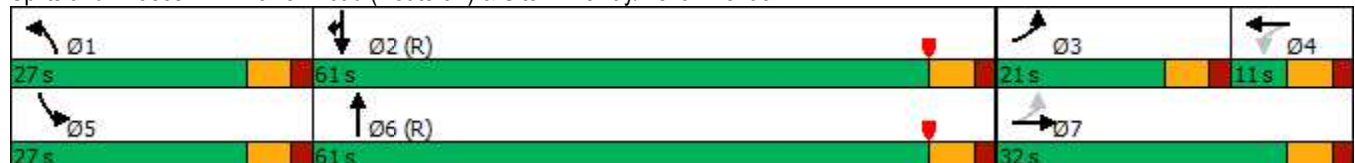
ICU Level of Service B

Analysis Period (min) 15

Description: NHDOT Int. No.: S-229-03

m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue





### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2022 Build with Improvements PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	357	13	129	88	20	244	110	1380	74	310	1287	300
Future Volume (vph)	357	13	129	88	20	244	110	1380	74	310	1287	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		400
Storage Lanes	2		1	2		1	2		0	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91	0.91	0.97	0.91	1.00
Fr <sub>t</sub>			0.850			0.850		0.992				0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1963	1615	3502	1900	1669	3467	5097	0	3502	5085	1583
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1963	1615	3502	1900	1669	3467	5097	0	3502	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			136		9				330
Link Speed (mph)		30			30			35				30
Link Distance (ft)		401			449			980				1189
Travel Time (s)		9.1			10.2			19.1				27.0
Peak Hour Factor	0.88	0.88	0.88	0.86	0.86	0.86	0.89	0.89	0.89	0.91	0.91	0.91
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	1%	1%	0%	0%	2%	2%
Adj. Flow (vph)	406	15	147	102	23	284	124	1551	83	341	1414	330
Shared Lane Traffic (%)												
Lane Group Flow (vph)	406	15	147	102	23	284	124	1634	0	341	1414	330
Turn Type	Prot	NA	pt+ov	Prot	NA	pt+ov	Prot	NA		Prot	NA	pt+ov
Protected Phases	7	4	4 1	3	8	8 5	1	6		5	2	2 7
Permitted Phases												
Detector Phase	7	4	4 1	3	8	8 5	1	6		5	2	2 7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	16.0		11.0	16.0	
Total Split (s)	22.0	23.0		15.0	16.0		12.0	63.0		19.0	70.0	
Total Split (%)	18.3%	19.2%		12.5%	13.3%		10.0%	52.5%		15.8%	58.3%	
Maximum Green (s)	16.0	17.0		9.0	10.0		6.0	57.0		13.0	64.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	6.0		4.0	6.0	
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Act Effct Green (s)	16.0	17.0	29.3	8.7	9.7	29.0	6.3	57.0		13.3	64.0	86.0
Actuated g/C Ratio	0.13	0.14	0.24	0.07	0.08	0.24	0.05	0.48		0.11	0.53	0.72
v/c Ratio	0.89	0.05	0.30	0.40	0.15	0.56	0.68	0.67		0.88	0.52	0.27
Control Delay	73.3	45.2	9.1	58.1	53.6	25.0	66.4	22.9		75.2	13.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	73.3	45.2	9.1	58.1	53.6	25.0	66.4	22.9		75.2	13.5	0.2
LOS	E	D	A	E	D	C	E	C		E	B	A

### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2022 Build with Improvements PM

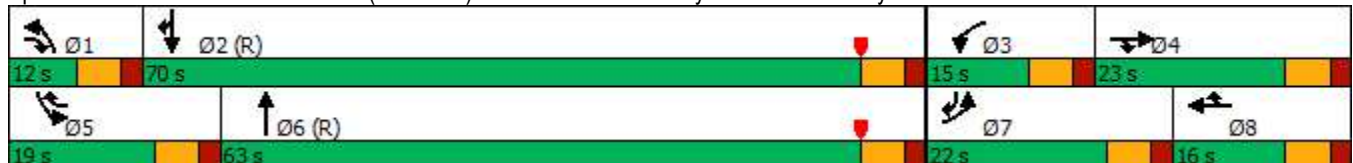


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		55.9			34.9			25.9			21.5	
Approach LOS		E			C			C			C	
Queue Length 50th (ft)	161	10	7	39	17	99	48	246		139	165	0
Queue Length 95th (ft)	#239	30	56	65	42	175	m#88	250		m154	m217	m0
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350			350		400
Base Capacity (vph)	457	278	483	262	158	495	183	2425		389	2712	1227
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.89	0.05	0.30	0.39	0.15	0.57	0.68	0.67		0.88	0.52	0.27

#### Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 64 (53%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.89  
 Intersection Signal Delay: 28.3  
 Intersection LOS: C  
 Intersection Capacity Utilization 69.0%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway



#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2022 Build with Improvements PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗	↔↔↔	↕↕	↕↕	↖↖
Traffic Volume (vph)	1479	1467	1331	684	500	1233
Future Volume (vph)	1479	1467	1331	684	500	1233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.94	0.95	0.95	0.88
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3698	1689	5040	3610	3610	2814
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3698	1689	5040	3610	3610	2814
Right Turn on Red		No				Yes
Satd. Flow (RTOR)						1300
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.96	0.96	0.94	0.94	0.89	0.89
Heavy Vehicles (%)	1%	2%	1%	0%	0%	1%
Adj. Flow (vph)	1541	1528	1416	728	562	1385
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1541	1528	1416	728	562	1385
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	53.0		40.0	67.0	27.0	
Total Split (%)	44.2%		33.3%	55.8%	22.5%	
Maximum Green (s)	47.0		32.0	60.0	20.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	47.0	120.0	32.0	60.0	20.0	120.0
Actuated g/C Ratio	0.39	1.00	0.27	0.50	0.17	1.00
v/c Ratio	1.06	0.90	1.05	0.40	0.94	0.49
Control Delay	78.5	9.3	73.4	15.0	63.8	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.5	9.3	73.4	15.0	63.8	1.8
LOS	E	A	E	B	E	A

# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2022 Build with Improvements PM

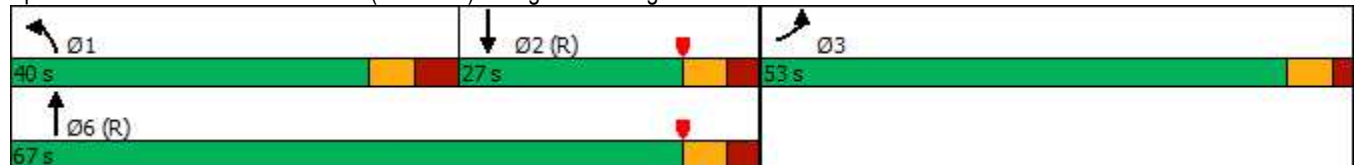


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	44.1			53.5	19.7	
Approach LOS	D			D	B	
Queue Length 50th (ft)	~678	0	~433	221	245	58
Queue Length 95th (ft)	#815	#5	#523	m225	#342	39
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1448	1689	1344	1805	601	2814
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	1.06	0.90	1.05	0.40	0.94	0.49

## Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.06  
 Intersection Signal Delay: 40.3  
 Intersection LOS: D  
 Intersection Capacity Utilization 98.0%  
 ICU Level of Service F  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-02  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road



5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road  
Lanes, Volumes, Timings

2022 Build with Improvements PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	92	433	435	17	28	137	1060	988	72	897	5
Future Volume (vph)	52	92	433	435	17	28	137	1060	988	72	897	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		1	1		1	0		2	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.88	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.982		0.950	0.956		0.950			0.950		
Satd. Flow (prot)	0	1866	1599	1658	1668	1546	1787	3574	2842	1805	5131	0
Flt Permitted		0.982		0.950	0.956		0.950			0.950		
Satd. Flow (perm)	0	1866	1599	1658	1668	1546	1787	3574	2842	1805	5131	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			136			567			1
Link Speed (mph)		30			30			30				30
Link Distance (ft)		805			586			999				427
Travel Time (s)		18.3			13.3			22.7				9.7
Peak Hour Factor	0.80	0.80	0.80	0.90	0.90	0.90	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	1%	1%	0%	0%	1%	0%
Adj. Flow (vph)	65	115	541	483	19	31	146	1128	1051	82	1019	6
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	180	541	251	251	31	146	1128	1051	82	1025	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	22.0	22.0	34.0	28.0	28.0	15.0	34.0	55.0	28.0	15.0	36.0	
Total Split (%)	18.3%	18.3%	28.3%	23.3%	23.3%	12.5%	28.3%	45.8%	23.3%	12.5%	30.0%	
Maximum Green (s)	16.0	16.0	28.0	22.0	22.0	9.0	28.0	49.0	22.0	9.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)		14.6	44.9	22.2	22.2	30.6	24.3	53.3	81.4	8.4	35.0	
Actuated g/C Ratio		0.12	0.37	0.18	0.18	0.26	0.20	0.44	0.68	0.07	0.29	
v/c Ratio		0.79	0.83	0.82	0.82	0.06	0.40	0.71	0.50	0.65	0.69	
Control Delay		75.6	40.4	69.2	68.5	0.2	58.2	28.8	2.3	77.7	41.6	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		75.6	40.4	69.2	68.5	0.2	58.2	28.8	2.3	77.7	41.6	
LOS		E	D	E	E	A	E	C	A	E	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2022 Build with Improvements PM

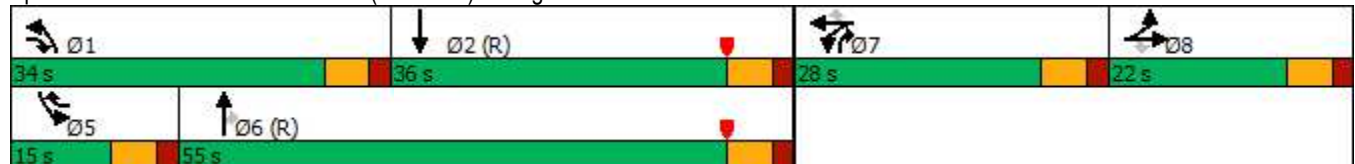


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		49.2			64.8			18.7				44.2
Approach LOS		D			E			B				D
Queue Length 50th (ft)		136	317	198	198	0	116	251	15	63		264
Queue Length 95th (ft)		188	364	#344	#343	0	m134	m253	m25	#123		318
Internal Link Dist (ft)		725			506			919				347
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		248	696	311	313	502	416	1592	2118	135		1495
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0		0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0		0
Reduced v/c Ratio		0.73	0.78	0.81	0.80	0.06	0.35	0.71	0.50	0.61		0.69

## Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 64 (53%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.83  
 Intersection Signal Delay: 34.6  
 Intersection LOS: C  
 Intersection Capacity Utilization 71.7%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.






















## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2022 Build with Improvements PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	25	31	0	48	27	1215	15	56	724	11
Future Volume (vph)	9	2	25	31	0	48	27	1215	15	56	724	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850			0.850		0.998			0.998	
Flt Protected		0.962			0.950		0.950			0.950		
Satd. Flow (prot)	0	1828	1583	0	1865	1669	1745	3449	0	1805	1878	0
Flt Permitted		0.746			0.748		0.950			0.950		
Satd. Flow (perm)	0	1417	1583	0	1469	1669	1745	3449	0	1805	1878	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			60		1			1	
Link Speed (mph)		10			30			30			30	
Link Distance (ft)		598			262			1405			549	
Travel Time (s)		40.8			6.0			31.9			12.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.99	0.99	0.99	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	11	3	31	39	0	60	27	1227	15	60	770	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	31	0	39	60	27	1242	0	60	782	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases		8	8		4	5	1	6		5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0		16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%		8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0		10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lead	Lag		Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5		1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min		None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.1	8.1		8.1	20.7	6.6	140.9		8.8	146.5	
Actuated g/C Ratio		0.04	0.04		0.04	0.12	0.04	0.78		0.05	0.81	
v/c Ratio		0.22	0.20		0.59	0.25	0.42	0.46		0.68	0.51	
Control Delay		90.1	2.8		117.7	16.3	103.9	9.6		119.5	10.8	



8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
 Lanes, Volumes, Timings

2022 Build with Improvements PM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

Lanes, Volumes, Timings

2022 Build with Improvements PM

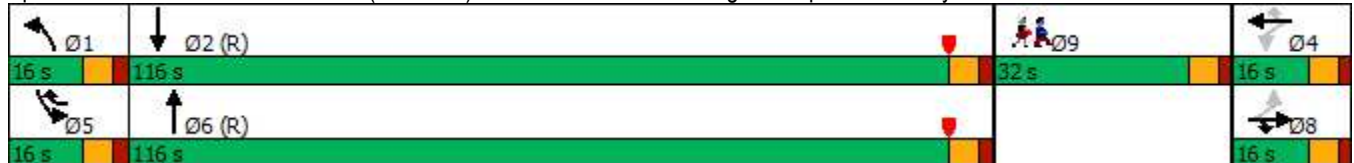


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	2.4	
Total Delay		90.1	2.8		117.7	16.3	103.9	9.6		119.5	13.2	
LOS		F	A		F	B	F	A		F	B	
Approach Delay		29.9			56.2			11.6			20.8	
Approach LOS		C			E			B			C	
Queue Length 50th (ft)		16	0		46	0	32	217		71	250	
Queue Length 95th (ft)		40	0		81	36	70	519		#134	741	
Internal Link Dist (ft)		518			182			1325			469	
Turn Bay Length (ft)			50			100	210			125		
Base Capacity (vph)		78	173		81	255	96	2700		100	1528	
Starvation Cap Reductn		0	0		0	0	0	0		0	588	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.18	0.18		0.48	0.24	0.28	0.46		0.60	0.83	

Intersection Summary

Area Type: Other  
 Cycle Length: 180  
 Actuated Cycle Length: 180  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.68  
 Intersection Signal Delay: 17.4  
 Intersection LOS: B  
 Intersection Capacity Utilization 64.9%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
Lanes, Volumes, Timings

2022 Build with Improvements PM

---

Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

---

**2022 Build with Base Improvements Weekday A.M.  
(NHDOT Alternative @ Lowell/River/Dracut/Steele)**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road

Lanes, Volumes, Timings

2022 Build with Improvements AM



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	272	0	487	509	12	1	849
Future Volume (vph)	2	0	2	0	272	0	487	509	12	1	849
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0	100	0
Storage Lanes	1	0		1		1	2		0	1	1
Taper Length (ft)	25			100			75			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00
Frt		0.850						0.997			0.850
Flt Protected	0.950						0.950			0.950	
Satd. Flow (prot)	1685	1133	0	1773	3574	0	3204	1876	0	1805	1583
Flt Permitted	0.950						0.950			0.950	
Satd. Flow (perm)	1685	1133	0	1773	3574	0	3204	1876	0	1805	1583
Right Turn on Red			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		532						2			524
Link Speed (mph)	30				35			35		35	
Link Distance (ft)	591				758			1733		622	
Travel Time (s)	13.4				14.8			33.8		12.1	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.92	0.92	0.92	0.86	0.86
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Adj. Flow (vph)	3	0	3	0	340	0	529	553	13	1	987
Shared Lane Traffic (%)											
Lane Group Flow (vph)	3	3	0	0	340	0	529	566	0	1	987
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5
Permitted Phases											
Detector Phase	4	4		1	6		5	2		3	3 5
Switch Phase											
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	
Total Split (s)	17.0	17.0		16.0	18.0		40.0	42.0		15.0	
Total Split (%)	18.9%	18.9%		17.8%	20.0%		44.4%	46.7%		16.7%	
Maximum Green (s)	11.0	11.0		10.0	12.0		34.0	36.0		9.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	
Act Effct Green (s)	5.8	5.8			20.8		39.2	66.1		9.5	53.5
Actuated g/C Ratio	0.06	0.06			0.23		0.44	0.73		0.11	0.59
v/c Ratio	0.03	0.01			0.41		0.38	0.41		0.01	0.86
Control Delay	40.0	0.0			34.1		24.4	3.8		37.0	15.3
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0
Total Delay	40.0	0.0			34.1		24.4	3.8		37.0	15.3
LOS	D	A			C		C	A		D	B

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road

Lanes, Volumes, Timings

2022 Build with Improvements AM

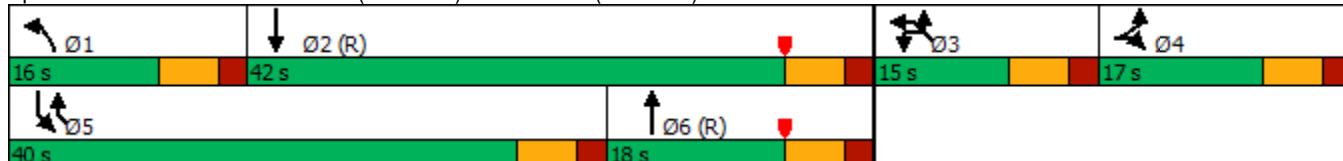


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Approach Delay	20.0				34.1			13.7		15.4	
Approach LOS	B				C			B		B	
Queue Length 50th (ft)	2	0			88		110	3		1	161
Queue Length 95th (ft)	9	0			127		101	7		5	#287
Internal Link Dist (ft)	511				678			1653		542	
Turn Bay Length (ft)		50					775			100	
Base Capacity (vph)	205	605			827		1466	1377		190	1176
Starvation Cap Reductn	0	0			0		0	0		0	0
Spillback Cap Reductn	0	0			0		0	0		0	0
Storage Cap Reductn	0	0			0		0	0		0	0
Reduced v/c Ratio	0.01	0.00			0.41		0.36	0.41		0.01	0.84

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.86  
 Intersection Signal Delay: 17.3  
 Intersection LOS: B  
 Intersection Capacity Utilization 70.1%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road



**2022 Build with Base Improvements Weekday P.M.  
(NHDOT Alternative @ Lowell/River/Dracut/Steele)**



1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road

Lanes, Volumes, Timings

2022 Build with Improvements PM

Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	36	2	2	1	593	1	894	399	13	4	0	660
Future Volume (vph)	36	2	2	1	593	1	894	399	13	4	0	660
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0		100	0
Storage Lanes	1	1		1		1	2		0		1	1
Taper Length (ft)	25			100			75				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850						0.995				0.850
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1668	1507	0	1685	3610	0	3268	1872	0	0	1805	1615
Flt Permitted	0.950			0.950			0.950				0.950	
Satd. Flow (perm)	1668	1507	0	1685	3610	0	3268	1872	0	0	1805	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191						2				281
Link Speed (mph)	30			35			35				35	
Link Distance (ft)	591			758			1733				622	
Travel Time (s)	13.4			14.8			33.8				12.1	
Peak Hour Factor	0.80	0.80	0.80	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	45	3	3	1	652	1	993	443	14	4	0	725
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	6	0	1	653	0	993	457	0	0	4	725
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3	3.5
Permitted Phases												
Detector Phase	4	4		1	6		5	2		3	3	3.5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	11.0	
Total Split (s)	22.0	22.0		16.0	32.0		51.0	67.0		15.0	15.0	
Total Split (%)	18.3%	18.3%		13.3%	26.7%		42.5%	55.8%		12.5%	12.5%	
Maximum Green (s)	16.0	16.0		10.0	26.0		45.0	61.0		9.0	9.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	None	
Act Effct Green (s)	8.7	8.7		5.6	32.8		46.2	82.6			10.6	58.0
Actuated g/C Ratio	0.07	0.07		0.05	0.27		0.38	0.69			0.09	0.48
v/c Ratio	0.38	0.02		0.01	0.66		0.79	0.35			0.03	0.78
Control Delay	61.1	0.2		55.0	44.2		19.2	3.1			52.0	19.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	61.1	0.2		55.0	44.2		19.2	3.1			52.0	19.9
LOS	E	A		D	D		B	A			D	B

# 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road

## Lanes, Volumes, Timings

2022 Build with Improvements PM

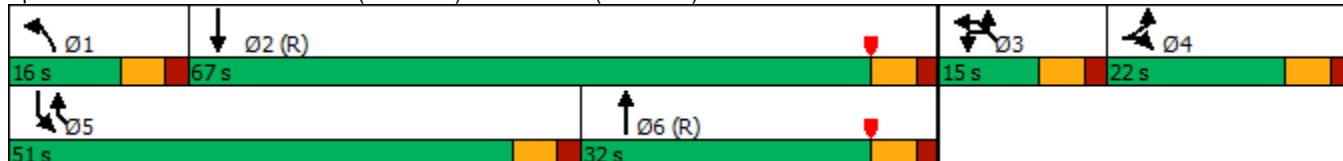


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Approach Delay	53.9			44.2			14.2			20.0		
Approach LOS	D			D			B			C		
Queue Length 50th (ft)	34	0		1	243		121	59			3	197
Queue Length 95th (ft)	63	0		7	#334		61	178			15	371
Internal Link Dist (ft)	511			678			1653			542		
Turn Bay Length (ft)	50			200			775			100		
Base Capacity (vph)	222	366		140	987		1296	1289			160	941
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.20	0.02		0.01	0.66		0.77	0.35			0.03	0.77

### Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 5 (4%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.79  
 Intersection Signal Delay: 23.2  
 Intersection LOS: C  
 Intersection Capacity Utilization 70.3%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

### Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road



## **Appendix J**


















# **Capacity Analysis – 2032 Build with Base Improvements Traffic Conditions**

**2032 Build with Base Improvements Weekday A.M.**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Steele Road/Dracut Road

Lanes, Volumes, Timings

2032 Build with Improvements AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	2	0	1	934	0	299	0	535	561	14
Future Volume (vph)	2	0	2	0	1	934	0	299	0	535	561	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	12	12	12	10	12	12	10	12	12
Storage Length (ft)	0		50	100		0	200		300	775		0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	25			25			100			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.932			0.850	0.850						0.998
Flt Protected		0.976										0.976
Satd. Flow (prot)	0	1385	0	0	1504	1504	0	3574	0	0	3465	0
Flt Permitted		0.976										0.976
Satd. Flow (perm)	0	1385	0	0	1504	1504	0	3574	0	0	3465	0
Link Speed (mph)		30			35			35				35
Link Distance (ft)		591			638			758				1733
Travel Time (s)		13.4			12.4			14.8				33.8
Peak Hour Factor	0.80	0.80	0.80	0.86	0.86	0.86	0.80	0.80	0.80	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	33%	0%	0%	2%	0%	1%	0%	2%	1%	0%
Adj. Flow (vph)	3	0	3	0	1	1086	0	374	0	582	610	15
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	6	0	0	544	543	0	374	0	0	1207	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	69.1%
ICU Level of Service	C
Analysis Period (min)	15

1: River Road (Route 3A)/Lowell Road (Route 3A) & Steele Road/Dracut Road




























HCM 6th Roundabout

2032 Build with Improvements AM

Intersection							
Intersection Delay, s/veh	8.7						
Intersection LOS	A						
Approach	EB	WB		NB		SB	
Entry Lanes	1	2		2		2	
Conflicting Circle Lanes	2	2		2		2	
Adj Approach Flow, veh/h	6	1087		374		1207	
Demand Flow Rate, veh/h	7	1109		378		1225	
Vehicles Circulating, veh/h	1210	381		597		1	
Vehicles Exiting, veh/h	16	594		620		1489	
Ped Vol Crossing Leg, #/h	0	0		0		0	
Ped Cap Adj	1.000	1.000		1.000		1.000	
Approach Delay, s/veh	8.5	11.1		6.9		6.9	
Approach LOS	A	B		A		A	
Lane	Left	Left	Right	Left	Right	Left	Right
Designated Moves	LTR	LTR	R	LT	TR	LT	TR
Assumed Moves	LTR	LTR	R	LT	TR	LT	TR
RT Channelized							
Lane Util	1.000	0.470	0.530	0.471	0.529	0.470	0.530
Follow-Up Headway, s	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	7	521	588	178	200	576	649
Cap Entry Lane, veh/h	508	951	1027	779	855	1349	1419
Entry HV Adj Factor	0.857	0.981	0.980	0.988	0.992	0.985	0.986
Flow Entry, veh/h	6	511	576	176	198	567	640
Cap Entry, veh/h	435	932	1006	770	848	1328	1398
V/C Ratio	0.014	0.548	0.572	0.228	0.234	0.427	0.457
Control Delay, s/veh	8.5	11.2	11.1	7.2	6.7	6.9	7.0
LOS	A	B	B	A	A	A	A
95th %tile Queue, veh	0	3	4	1	1	2	2

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2032 Build with Improvements AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 				 		 	 		 	 	 
Traffic Volume (vph)	156	0	25	1	1	36	43	1242	2	8	1089	241
Future Volume (vph)	156	0	25	1	1	36	43	1242	2	8	1089	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	2		0	0		0	1		0	1		1
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Fr <sub>t</sub>		0.850			0.871							0.850
Fl <sub>t</sub> Protected	0.950				0.999		0.950			0.950		
Satd. Flow (prot)	2971	1133	0	0	1657	0	1685	3538	0	1570	3539	1524
Fl <sub>t</sub> Permitted	0.728				0.995		0.950			0.950		
Satd. Flow (perm)	2277	1133	0	0	1651	0	1685	3538	0	1570	3539	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		273			42							254
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.80	0.80	0.80	0.85	0.85	0.85	0.85	0.85	0.85	0.95	0.95	0.95
Heavy Vehicles (%)	10%	0%	33%	9%	0%	3%	0%	2%	20%	15%	2%	6%
Adj. Flow (vph)	195	0	31	1	1	42	51	1461	2	8	1146	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	195	31	0	0	44	0	51	1463	0	8	1146	254
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Prot
Protected Phases		7			3		1	6		5	2	2
Permitted Phases	7			3								
Detector Phase	7	7		3	3		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	16.0		11.0	16.0	16.0
Total Split (s)	21.0	21.0		21.0	21.0		21.0	51.0		18.0	48.0	48.0
Total Split (%)	23.3%	23.3%		23.3%	23.3%		23.3%	56.7%		20.0%	53.3%	53.3%
Maximum Green (s)	15.0	15.0		15.0	15.0		15.0	45.0		12.0	42.0	42.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)	13.1	13.1			11.4		9.1	62.1		7.1	55.0	55.0
Actuated g/C Ratio	0.15	0.15			0.13		0.10	0.69		0.08	0.61	0.61
v/c Ratio	0.59	0.08			0.18		0.30	0.60		0.06	0.53	0.25
Control Delay	43.2	0.4			13.1		41.3	10.1		36.8	12.6	1.6
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	43.2	0.4			13.1		41.3	10.1		36.8	12.6	1.6
LOS	D	A			B		D	B		D	B	A

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2032 Build with Improvements AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		37.4			13.1			11.1			10.7	
Approach LOS		D			B			B			B	
Queue Length 50th (ft)	53	0			1		27	180		5	77	0
Queue Length 95th (ft)	76	0			27		57	368		m10	170	27
Internal Link Dist (ft)		430			477			1653			900	
Turn Bay Length (ft)							300			350		
Base Capacity (vph)	379	416			310		280	2439		209	2163	1030
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	0.51	0.07			0.14		0.18	0.60		0.04	0.53	0.25

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 51 (57%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 12.8

Intersection LOS: B

Intersection Capacity Utilization 56.9%

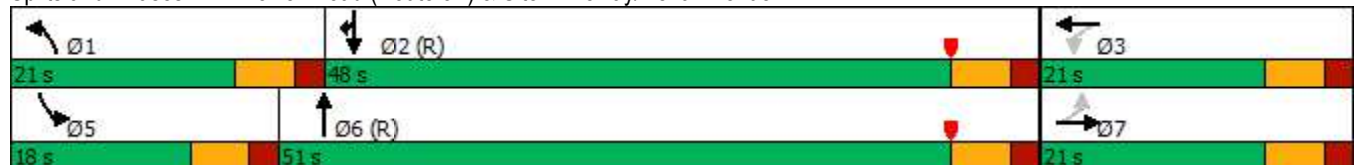
ICU Level of Service B

Analysis Period (min) 15

Description: NHDOT Int. No.: S-229-03

m Volume for 95th percentile queue is metered by upstream signal.































### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue





### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2032 Build with Improvements AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 	 		 	 	  		 		
Traffic Volume (vph)	131	4	59	15	5	71	78	1325	27	85	1252	164
Future Volume (vph)	131	4	59	15	5	71	78	1325	27	85	1252	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		400
Storage Lanes	2		1	2		1	2		0	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91	0.91	0.97	0.91	1.00
Fr <sub>t</sub>			0.850			0.850		0.997				0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3213	1852	1568	3502	1900	1589	3467	5022	0	3433	5085	1482
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3213	1852	1568	3502	1900	1589	3467	5022	0	3433	5085	1482
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			182		4				182
Link Speed (mph)		30			30			35				30
Link Distance (ft)		401			449			980				1189
Travel Time (s)		9.1			10.2			19.1				27.0
Peak Hour Factor	0.93	0.93	0.93	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	9%	6%	3%	0%	0%	5%	1%	3%	2%	2%	2%	9%
Adj. Flow (vph)	141	4	63	17	6	81	90	1523	31	89	1304	171
Shared Lane Traffic (%)												
Lane Group Flow (vph)	141	4	63	17	6	81	90	1554	0	89	1304	171
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA		Prot	NA	Prot
Protected Phases	7	4	4	3	8	8	1	6		5	2	2
Permitted Phases												
Detector Phase	7	4	4	3	8	8	1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		11.0	16.0	16.0
Total Split (s)	14.0	15.0	15.0	14.0	15.0	15.0	16.0	48.0		13.0	45.0	45.0
Total Split (%)	15.6%	16.7%	16.7%	15.6%	16.7%	16.7%	17.8%	53.3%		14.4%	50.0%	50.0%
Maximum Green (s)	8.0	9.0	9.0	8.0	9.0	9.0	10.0	42.0		7.0	39.0	39.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0		4.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min		None	C-Min	C-Min
Act Effct Green (s)	7.9	12.9	12.9	7.0	6.9	6.9	8.7	48.1		8.1	47.5	47.5
Actuated g/C Ratio	0.09	0.14	0.14	0.08	0.08	0.08	0.10	0.53		0.09	0.53	0.53
v/c Ratio	0.50	0.02	0.17	0.06	0.04	0.28	0.27	0.58		0.29	0.49	0.20
Control Delay	45.6	36.5	0.9	38.7	38.8	2.4	44.9	13.9		48.7	13.5	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	45.6	36.5	0.9	38.7	38.8	2.4	44.9	13.9		48.7	13.5	0.8
LOS	D	D	A	D	D	A	D	B		D	B	A

### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2032 Build with Improvements AM

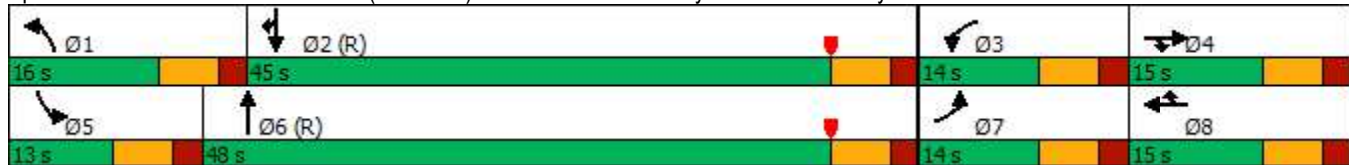


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		31.9			10.4			15.6			14.1	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	40	2	0	4	3	0	27	246		25	215	0
Queue Length 95th (ft)	70	12	0	14	15	0	m46	167		m34	278	m0
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350			350		400
Base Capacity (vph)	285	280	391	311	190	322	390	2685		312	2685	868
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.49	0.01	0.16	0.05	0.03	0.25	0.23	0.58		0.29	0.49	0.20

#### Intersection Summary



















Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 51 (57%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.58  
 Intersection Signal Delay: 15.8 Intersection LOS: B  
 Intersection Capacity Utilization 55.8% ICU Level of Service B  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway



#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2032 Build with Improvements AM

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	 		  	 	 	 
Traffic Volume (vph)	1045	1184	1131	405	420	1673
Future Volume (vph)	1045	1184	1131	405	420	1673
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.94	0.95	0.95	0.88
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3662	1656	4942	3539	3539	2760
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3662	1656	4942	3539	3539	2760
Right Turn on Red		No				Yes
Satd. Flow (RTOR)						1198
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.94	0.94	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	3%	2%	2%	3%
Adj. Flow (vph)	1112	1260	1229	440	457	1818
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1112	1260	1229	440	457	1818
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	34.0		34.0	56.0	22.0	
Total Split (%)	37.8%		37.8%	62.2%	24.4%	
Maximum Green (s)	28.0		26.0	49.0	15.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	28.3	90.0	25.9	48.7	14.8	90.0
Actuated g/C Ratio	0.31	1.00	0.29	0.54	0.16	1.00
v/c Ratio	0.97	0.76	0.86	0.23	0.79	0.66
Control Delay	51.3	3.4	26.0	4.4	49.3	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.3	3.4	26.0	4.4	49.3	4.6
LOS	D	A	C	A	D	A

# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2032 Build with Improvements AM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	25.8			20.3	13.6	
Approach LOS	C			C	B	
Queue Length 50th (ft)	320	0	78	11	124	261
Queue Length 95th (ft)	#457	0	#240	16	m133	m269
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1150	1656	1427	1926	589	2760
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	0.97	0.76	0.86	0.23	0.78	0.66

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 85 (94%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 19.9

Intersection LOS: B

Intersection Capacity Utilization 79.6%

ICU Level of Service D

Analysis Period (min) 15

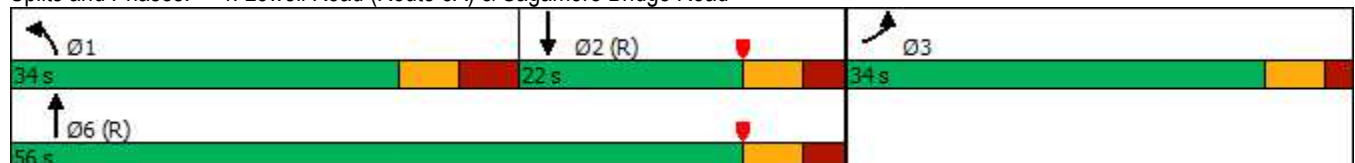
Description: NHDOT Int. No.: S-229-02

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

Queue shown is maximum after two cycles.
























m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road



# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2032 Build with Improvements AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	29	303	677	45	33	328	895	208	17	1194	11
Future Volume (vph)	67	29	303	677	45	33	328	895	208	17	1194	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		1	1		1	1		2	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.88	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (prot)	0	1835	1583	1641	1657	1501	1787	3539	2787	1752	5078	0
Flt Permitted		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (perm)	0	1835	1583	1641	1657	1501	1787	3539	2787	1752	5078	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			182			219			1
Link Speed (mph)		30			30			30				30
Link Distance (ft)		805			586			999				405
Travel Time (s)		18.3			13.3			22.7				9.2
Peak Hour Factor	0.81	0.81	0.81	0.94	0.94	0.94	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	1%	0%	4%	1%	2%	2%	3%	2%	6%
Adj. Flow (vph)	83	36	374	720	48	35	345	942	219	20	1372	13
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	119	374	382	386	35	345	942	219	20	1385	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	12.0	12.0	20.0	27.0	27.0	11.0	20.0	40.0	27.0	11.0	31.0	
Total Split (%)	13.3%	13.3%	22.2%	30.0%	30.0%	12.2%	22.2%	44.4%	30.0%	12.2%	34.4%	
Maximum Green (s)	6.0	6.0	14.0	21.0	21.0	5.0	14.0	34.0	21.0	5.0	25.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)		6.0	26.0	21.0	21.0	26.0	14.0	38.4	65.4	5.0	25.0	
Actuated g/C Ratio		0.07	0.29	0.23	0.23	0.29	0.16	0.43	0.73	0.06	0.28	
v/c Ratio		0.98	0.70	1.00	1.00	0.06	1.25	0.62	0.11	0.21	0.98	
Control Delay		120.4	28.0	82.8	82.5	0.2	155.6	16.3	3.8	45.8	53.2	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		120.4	28.0	82.8	82.5	0.2	155.6	16.3	3.8	45.8	53.2	
LOS		F	C	F	F	A	F	B	A	D	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2032 Build with Improvements AM

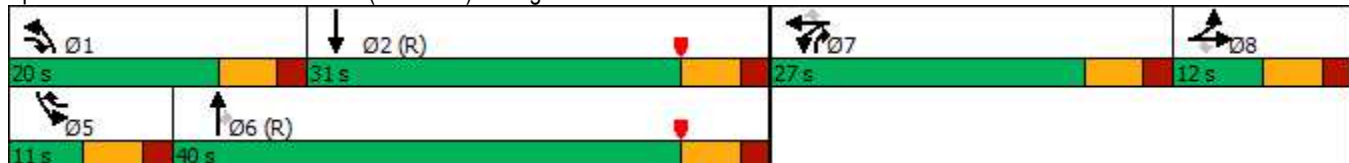


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		50.3			79.0			46.4				53.1
Approach LOS		D			E			D				D
Queue Length 50th (ft)		69	134	229	231	0	~236	241	20	11		285
Queue Length 95th (ft)		#152	197	#422	#425	0	m#293	m295	m26	33		#367
Internal Link Dist (ft)		725			506			919				325
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		122	534	382	386	563	277	1509	2085	97		1411
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0		0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0		0
Reduced v/c Ratio		0.98	0.70	1.00	1.00	0.06	1.25	0.62	0.11	0.21		0.98

## Intersection Summary























Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 80 (89%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.25  
 Intersection Signal Delay: 55.3  
 Intersection LOS: E  
 Intersection Capacity Utilization 83.1%  
 ICU Level of Service E  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2032 Build with Improvements AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	2	11	141	30	101	181	497	60	107	1154	224
Future Volume (vph)	40	2	11	141	30	101	181	497	60	107	1154	224
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	15	12	12	13	11	12	12	11	12	12
Storage Length (ft)	0		225	0		80	350		0	150		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.984			0.976	
Flt Protected		0.955			0.961		0.950			0.950		
Satd. Flow (prot)	0	1576	1558	0	1811	1620	1711	3419	0	1728	3454	0
Flt Permitted		0.416			0.728		0.950			0.950		
Satd. Flow (perm)	0	686	1558	0	1372	1620	1711	3419	0	1728	3454	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30			98		21			34	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		492			577			1791			1168	
Travel Time (s)		11.2			13.1			40.7			26.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	12%	0%	14%	1%	0%	3%	2%	4%	3%	1%	2%	2%
Adj. Flow (vph)	50	3	14	176	38	126	199	546	66	118	1268	246
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	53	14	0	214	126	199	612	0	118	1514	0
Turn Type	Perm	NA	pt+ov	Perm	NA	Prot	Prot	NA		Prot	NA	
Protected Phases		8	8 1		4	4	1	6		5	2	
Permitted Phases	8			4								
Detector Phase	8	8	8 1	4	4	4	1	6		5	2	
Switch Phase												
Minimum Initial (s)	3.0	3.0		5.0	5.0	5.0	3.0	8.0		3.0	8.0	
Minimum Split (s)	9.0	9.0		11.0	11.0	11.0	9.0	14.0		9.0	14.0	
Total Split (s)	23.0	23.0		23.0	23.0	23.0	18.0	69.0		16.0	67.0	
Total Split (%)	21.3%	21.3%		21.3%	21.3%	21.3%	16.7%	63.9%		14.8%	62.0%	
Maximum Green (s)	17.0	17.0		17.0	17.0	17.0	12.0	63.0		10.0	61.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	Min		None	Min	
Act Effct Green (s)		14.3	31.1		17.1	17.1	12.1	55.3		9.3	52.5	
Actuated g/C Ratio		0.14	0.31		0.17	0.17	0.12	0.55		0.09	0.53	
v/c Ratio		0.54	0.03		0.91	0.35	0.96	0.32		0.74	0.83	
Control Delay		61.9	3.7		83.6	15.8	100.4	12.0		72.7	23.7	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		61.9	3.7		83.6	15.8	100.4	12.0		72.7	23.7	
LOS		E	A		F	B	F	B		E	C	

# 7: Lowell Road (Route 3A) & Executive Drive Lanes, Volumes, Timings

2032 Build with Improvements AM

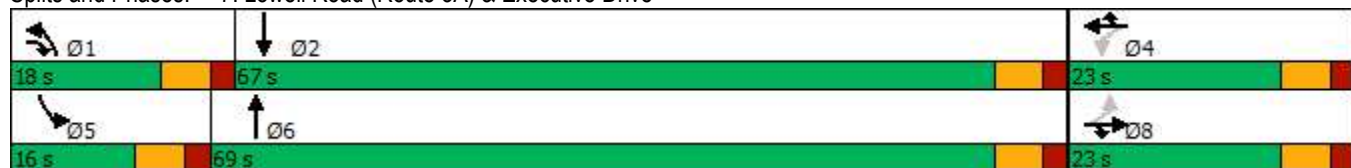


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		49.7			58.5			33.7				27.2
Approach LOS		D			E			C				C
Queue Length 50th (ft)		32	0		140	16	132	102		76		394
Queue Length 95th (ft)		67	5		#252	55	#296	135		#172		488
Internal Link Dist (ft)		412			497			1711				1088
Turn Bay Length (ft)			225			80	350			150		
Base Capacity (vph)		117	569		235	359	207	2181		174		2138
Starvation Cap Reductn		0	0		0	0	0	0		0		0
Spillback Cap Reductn		0	0		0	0	0	0		0		0
Storage Cap Reductn		0	0		0	0	0	0		0		0
Reduced v/c Ratio		0.45	0.02		0.91	0.35	0.96	0.28		0.68		0.71

## Intersection Summary

Area Type:	Other
Cycle Length:	108
Actuated Cycle Length:	99.9
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	33.3
Intersection LOS:	C
Intersection Capacity Utilization:	80.1%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

## Splits and Phases: 7: Lowell Road (Route 3A) & Executive Drive


























# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2032 Build with Improvements AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	48	6	0	10	4	620	1	16	1447	3
Future Volume (vph)	11	0	48	6	0	10	4	620	1	16	1447	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850			0.850						
Flt Protected		0.950			0.950		0.950			0.950		
Satd. Flow (prot)	0	1719	1583	0	1865	1669	1745	3356	0	1805	1863	0
Flt Permitted		0.752			0.748		0.950			0.950		
Satd. Flow (perm)	0	1361	1583	0	1469	1669	1745	3356	0	1805	1863	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			55						
Link Speed (mph)		10			30			30				30
Link Distance (ft)		598			262			1405				549
Travel Time (s)		40.8			6.0			31.9				12.5
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.91	0.91	0.91	0.95	0.95	0.95
Heavy Vehicles (%)	5%	0%	2%	0%	0%	0%	0%	4%	0%	0%	2%	0%
Adj. Flow (vph)	14	0	60	8	0	13	4	681	1	17	1523	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	60	0	8	13	4	682	0	17	1526	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases		8	8		4	5	1	6		5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0		16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%		8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0		10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag						Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5		1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min		None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		6.3	6.3		6.3	18.3	5.0	147.7		6.0	153.1	
Actuated g/C Ratio		0.04	0.04		0.04	0.10	0.03	0.82		0.03	0.85	
v/c Ratio		0.30	0.42		0.16	0.06	0.08	0.25		0.28	0.96	
Control Delay		100.2	12.4		90.2	0.5	89.0	5.9		95.9	28.4	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2032 Build with Improvements AM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2032 Build with Improvements AM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	35.1	
Total Delay		100.2	12.4		90.2	0.5	89.0	5.9		95.9	63.5	
LOS		F	B		F	A	F	A		F	E	
Approach Delay		29.0			34.7			6.4			63.9	
Approach LOS		C			C			A			E	
Queue Length 50th (ft)		17	0		9	0	5	73		20	695	
Queue Length 95th (ft)		40	3		27	0	20	227		50	#2516	
Internal Link Dist (ft)		518			182			1325			469	
Turn Bay Length (ft)			50			100	210			125		
Base Capacity (vph)		75	173		81	254	96	2753		100	1585	
Starvation Cap Reductn		0	0		0	0	0	0		0	175	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.19	0.35		0.10	0.05	0.04	0.25		0.17	1.08	

### Intersection Summary

Area Type: Other

Cycle Length: 180

Actuated Cycle Length: 180

Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 45.5

Intersection LOS: D

Intersection Capacity Utilization 99.7%

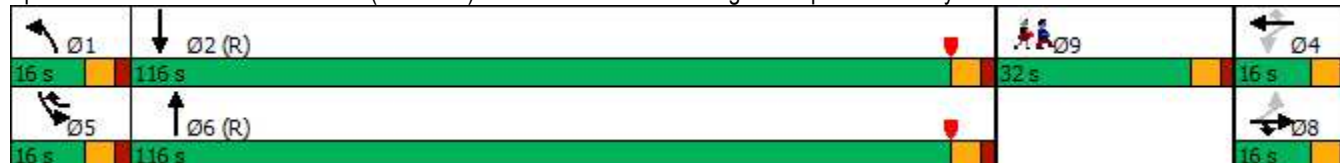
ICU Level of Service F

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

### Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2032 Build with Improvements AM


















Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

**2032 Build with Base Improvements Weekday P.M.**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Steele Road/Dracut Road

Lanes, Volumes, Timings

2032 Build with Improvements PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	2	2	5	0	726	1	653	1	984	439	15
Future Volume (vph)	40	2	2	5	0	726	1	653	1	984	439	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	12	12	12	10	12	12	10	12	12
Storage Length (ft)	0		50	100		0	200		300	775		0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	25			25			100			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.993			0.852	0.850						0.998
Flt Protected		0.957			0.999							0.967
Satd. Flow (prot)	0	1670	0	0	1536	1534	0	3610	0	0	3473	0
Flt Permitted		0.957			0.999							0.967
Satd. Flow (perm)	0	1670	0	0	1536	1534	0	3610	0	0	3473	0
Link Speed (mph)		30			35			35			35	
Link Distance (ft)		591			647			758			1733	
Travel Time (s)		13.4			12.6			14.8			33.8	
Peak Hour Factor	0.80	0.80	0.80	0.91	0.91	0.91	0.91	0.91	0.91	0.90	0.90	0.90
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	50	3	3	5	0	798	1	718	1	1093	488	17
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	56	0	0	404	399	0	720	0	0	1598	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	104.5%
ICU Level of Service	G
Analysis Period (min)	15

1: River Road (Route 3A)/Lowell Road (Route 3A) & Steele Road/Dracut Road





















HCM 6th Roundabout

2032 Build with Improvements PM

Intersection								
Intersection Delay, s/veh	16.8							
Intersection LOS	C							
Approach	EB	WB		NB		SB		
Entry Lanes	1	2		2		2		
Conflicting Circle Lanes	2	2		2		2		
Adj Approach Flow, veh/h	56	803		720		1598		
Demand Flow Rate, veh/h	56	803		720		1603		
Vehicles Circulating, veh/h	1591	769		1146		6		
Vehicles Exiting, veh/h	18	1097		501		1566		
Ped Vol Crossing Leg, #/h	0	0		0		0		
Ped Cap Adj	1.000	1.000		1.000		1.000		
Approach Delay, s/veh	12.3	14.6		26.7		13.6		
Approach LOS	B	B		D		B		
Lane	Left	Left	Right	Left	Right	Left	Right	
Designated Moves	LTR	LTR	R	LT	TR	LT	TR	
Assumed Moves	LTR	LTR	R	LT	TR	L	TR	
RT Channelized								
Lane Util	1.000	0.469	0.531	0.469	0.531	0.682	0.318	
Follow-Up Headway, s	2.535	2.667	2.535	2.667	2.535	2.667	2.535	
Critical Headway, s	4.328	4.645	4.328	4.645	4.328	4.645	4.328	
Entry Flow, veh/h	56	377	426	338	382	1093	510	
Cap Entry Lane, veh/h	367	665	739	470	536	1342	1413	
Entry HV Adj Factor	1.000	1.001	0.999	1.001	0.999	1.000	0.990	
Flow Entry, veh/h	56	377	426	338	382	1093	505	
Cap Entry, veh/h	367	666	738	471	535	1342	1399	
V/C Ratio	0.153	0.567	0.577	0.719	0.713	0.814	0.361	
Control Delay, s/veh	12.3	15.1	14.2	28.4	25.2	17.2	5.8	
LOS	B	C	B	D	D	C	A	
95th %tile Queue, veh	1	4	4	6	6	10	2	

## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2032 Build with Improvements PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	273	0	51	1	0	17	35	1397	6	26	1374	228
Future Volume (vph)	273	0	51	1	0	17	35	1397	6	26	1374	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	13	13	13	10	12	12	12	12	12
Storage Length (ft)	0		50	0		0	300		0	350		0
Storage Lanes	2		0	0		0	1		0	1		1
Taper Length (ft)	25			25			75			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.850			0.871			0.999				0.850
Flt Protected	0.950				0.998		0.950			0.950		
Satd. Flow (prot)	3143	1507	0	0	1707	0	1685	3606	0	1805	3610	1442
Flt Permitted	0.743				0.992		0.950			0.950		
Satd. Flow (perm)	2458	1507	0	0	1696	0	1685	3606	0	1805	3610	1442
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		303			82							198
Link Speed (mph)		15			30			35				35
Link Distance (ft)		510			557			1733				980
Travel Time (s)		23.2			12.7			33.8				19.1
Peak Hour Factor	0.84	0.84	0.84	0.80	0.80	0.80	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%
Adj. Flow (vph)	325	0	61	1	0	21	38	1502	6	29	1527	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	325	61	0	0	22	0	38	1508	0	29	1527	253
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Prot
Protected Phases		7			3		1	6		5	2	2
Permitted Phases	7			3								
Detector Phase	7	7		3	3		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	16.0		11.0	16.0	16.0
Total Split (s)	30.0	30.0		30.0	30.0		27.0	63.0		27.0	63.0	63.0
Total Split (%)	25.0%	25.0%		25.0%	25.0%		22.5%	52.5%		22.5%	52.5%	52.5%
Maximum Green (s)	24.0	24.0		24.0	24.0		21.0	57.0		21.0	57.0	57.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0			6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min
Act Effct Green (s)	21.4	21.4			16.7		9.2	77.3		8.5	76.7	76.7
Actuated g/C Ratio	0.18	0.18			0.14		0.08	0.64		0.07	0.64	0.64
v/c Ratio	0.74	0.12			0.07		0.30	0.65		0.23	0.66	0.25
Control Delay	57.4	0.5			0.4		57.5	16.7		67.2	9.1	0.8
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	57.4	0.5			0.4		57.5	16.7		67.2	9.1	0.8
LOS	E	A			A		E	B		E	A	A



## 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue Lanes, Volumes, Timings

2032 Build with Improvements PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		48.4			0.4			17.7			8.9	
Approach LOS		D			A			B			A	
Queue Length 50th (ft)	122	0			0		28	407		23	103	0
Queue Length 95th (ft)	158	0			0		63	533		m45	123	2
Internal Link Dist (ft)		430			477			1653			900	
Turn Bay Length (ft)							300			350		
Base Capacity (vph)	491	543			404		294	2324		315	2307	993
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	0.66	0.11			0.05		0.13	0.65		0.09	0.66	0.25

### Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 82 (68%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 16.5

Intersection LOS: B

Intersection Capacity Utilization 63.3%

ICU Level of Service B

Analysis Period (min) 15

Description: NHDOT Int. No.: S-229-03































m Volume for 95th percentile queue is metered by upstream signal.

### Splits and Phases: 2: Lowell Road (Route 3A) & Site Driveway/Rena Avenue

Ø1	Ø2 (R)	Ø3
27 s	63 s	30 s
Ø5	Ø6 (R)	Ø7
27 s	63 s	30 s

### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2032 Build with Improvements PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 	 		 	 	  		 		
Traffic Volume (vph)	357	13	129	88	20	244	110	1500	74	310	1398	300
Future Volume (vph)	357	13	129	88	20	244	110	1500	74	310	1398	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	12	13	12	12	12	12	12	12
Storage Length (ft)	175		175	150		200	350		175	350		400
Storage Lanes	2		1	2		1	2		0	2		1
Taper Length (ft)	25			75			125			100		
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	0.97	0.91	0.91	0.97	0.91	1.00
Fr <sub>t</sub>			0.850			0.850		0.993				0.850
Fl <sub>t</sub> Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1963	1615	3502	1900	1669	3467	5102	0	3502	5085	1583
Fl <sub>t</sub> Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	1963	1615	3502	1900	1669	3467	5102	0	3502	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191			245		8				330
Link Speed (mph)		30			30			35				30
Link Distance (ft)		401			449			980				1189
Travel Time (s)		9.1			10.2			19.1				27.0
Peak Hour Factor	0.88	0.88	0.88	0.86	0.86	0.86	0.89	0.89	0.89	0.91	0.91	0.91
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	1%	1%	0%	0%	2%	2%
Adj. Flow (vph)	406	15	147	102	23	284	124	1685	83	341	1536	330
Shared Lane Traffic (%)												
Lane Group Flow (vph)	406	15	147	102	23	284	124	1768	0	341	1536	330
Turn Type	Prot	NA	Prot	Prot	NA	Prot	Prot	NA		Prot	NA	Prot
Protected Phases	7	4	4	3	8	8	1	6		5	2	2
Permitted Phases												
Detector Phase	7	4	4	3	8	8	1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		11.0	16.0	16.0
Total Split (s)	22.0	23.0	23.0	15.0	16.0	16.0	12.0	63.0		19.0	70.0	70.0
Total Split (%)	18.3%	19.2%	19.2%	12.5%	13.3%	13.3%	10.0%	52.5%		15.8%	58.3%	58.3%
Maximum Green (s)	16.0	17.0	17.0	9.0	10.0	10.0	6.0	57.0		13.0	64.0	64.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	6.0		4.0	6.0	6.0
Recall Mode	None	None	None	None	None	None	None	C-Min		None	C-Min	C-Min
Act Effct Green (s)	16.0	16.2	16.2	8.7	8.9	8.9	7.0	57.2		13.9	64.1	64.1
Actuated g/C Ratio	0.13	0.14	0.14	0.07	0.07	0.07	0.06	0.48		0.12	0.53	0.53
v/c Ratio	0.89	0.06	0.38	0.40	0.16	0.81	0.62	0.73		0.84	0.57	0.33
Control Delay	73.3	45.4	5.4	58.1	54.2	29.1	64.4	21.8		65.6	16.8	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	73.3	45.4	5.4	58.1	54.2	29.1	64.4	21.8		65.6	16.8	0.3
LOS	E	D	A	E	D	C	E	C		E	B	A

### 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway Lanes, Volumes, Timings

2032 Build with Improvements PM

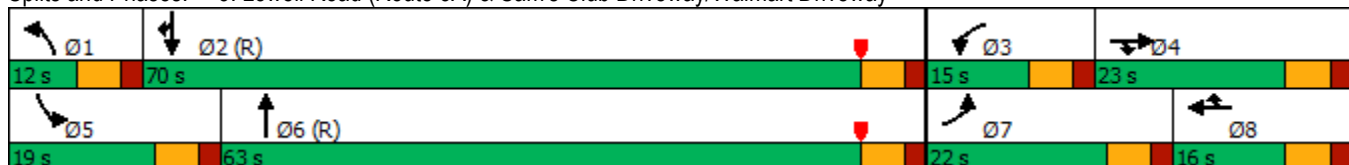


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		55.0			37.8			24.6			21.9	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	161	10	0	39	17	29	49	199		130	345	0
Queue Length 95th (ft)	#239	30	23	65	42	#125	m#86	261		m131	m349	m0
Internal Link Dist (ft)		321			369			900			1109	
Turn Bay Length (ft)	175		175	150		200	350			350		400
Base Capacity (vph)	457	278	392	262	158	363	201	2436		405	2717	999
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.89	0.05	0.38	0.39	0.15	0.78	0.62	0.73		0.84	0.57	0.33

#### Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 74 (62%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.89  
 Intersection Signal Delay: 27.9  
 Intersection LOS: C  
 Intersection Capacity Utilization 71.3%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-06  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Lowell Road (Route 3A) & Sam's Club Driveway/Walmart Driveway



#### 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2032 Build with Improvements PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1633	1593	1442	749	546	1360
Future Volume (vph)	1633	1593	1442	749	546	1360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	12	12	12	12
Storage Length (ft)	0	0	525			200
Storage Lanes	2	1	2			1
Taper Length (ft)	25		100			
Lane Util. Factor	0.97	1.00	0.94	0.95	0.95	0.88
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3698	1689	5040	3610	3610	2814
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3698	1689	5040	3610	3610	2814
Right Turn on Red		No				Yes
Satd. Flow (RTOR)						1242
Link Speed (mph)	35			30	30	
Link Distance (ft)	929			1189	999	
Travel Time (s)	18.1			27.0	22.7	
Peak Hour Factor	0.96	0.96	0.94	0.94	0.89	0.89
Heavy Vehicles (%)	1%	2%	1%	0%	0%	1%
Adj. Flow (vph)	1701	1659	1534	797	613	1528
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1701	1659	1534	797	613	1528
Turn Type	Prot	Free	Prot	NA	NA	Free
Protected Phases	3		1	6	2	
Permitted Phases		Free				Free
Detector Phase	3		1	6	2	
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	10.0	
Minimum Split (s)	16.0		15.0	17.0	17.0	
Total Split (s)	50.0		43.0	70.0	27.0	
Total Split (%)	41.7%		35.8%	58.3%	22.5%	
Maximum Green (s)	44.0		35.0	63.0	20.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		4.0	3.0	3.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		8.0	7.0	7.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	4.0		4.0	4.0	4.0	
Recall Mode	None		None	C-Min	C-Min	
Act Effct Green (s)	44.0	120.0	35.0	63.0	20.0	120.0
Actuated g/C Ratio	0.37	1.00	0.29	0.52	0.17	1.00
v/c Ratio	1.26	0.98	1.04	0.42	1.02	0.54
Control Delay	154.9	20.6	63.7	7.7	72.5	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	154.9	20.6	63.7	7.7	72.5	2.0
LOS	F	C	E	A	E	A

# 4: Lowell Road (Route 3A) & Sagamore Bridge Road Lanes, Volumes, Timings

2032 Build with Improvements PM

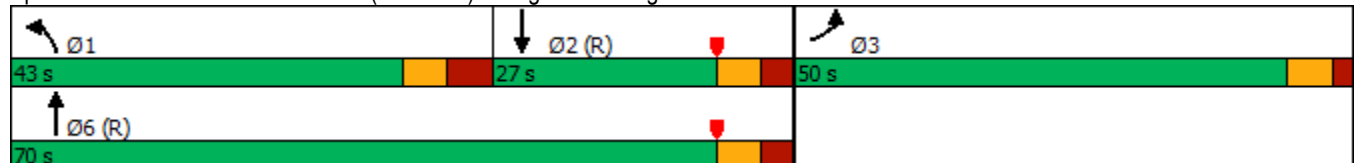


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Approach Delay	88.6			44.5	22.2	
Approach LOS	F			D	C	
Queue Length 50th (ft)	~850	0	~451	130	~251	72
Queue Length 95th (ft)	#987	#216	#549	m165	m#358	46
Internal Link Dist (ft)	849			1109	919	
Turn Bay Length (ft)			525			200
Base Capacity (vph)	1355	1689	1470	1895	601	2814
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	1.26	0.98	1.04	0.42	1.02	0.54

## Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.26  
 Intersection Signal Delay: 57.3  
 Intersection LOS: E  
 Intersection Capacity Utilization 105.8%  
 ICU Level of Service G  
 Analysis Period (min) 15  
 Description: NHDOT Int. No.: S-229-02  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 4: Lowell Road (Route 3A) & Sagamore Bridge Road



# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road

## Lanes, Volumes, Timings

2032 Build with Improvements PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	98	474	479	19	31	146	1167	1093	80	985	5
Future Volume (vph)	54	98	474	479	19	31	146	1167	1093	80	985	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		1	1		1	1		2	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.88	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.983		0.950	0.956		0.950			0.950		
Satd. Flow (prot)	0	1868	1599	1658	1668	1546	1787	3574	2842	1805	5131	0
Flt Permitted		0.983		0.950	0.956		0.950			0.950		
Satd. Flow (perm)	0	1868	1599	1658	1668	1546	1787	3574	2842	1805	5131	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			136			424			1
Link Speed (mph)		30			30			30				30
Link Distance (ft)		805			586			999				414
Travel Time (s)		18.3			13.3			22.7				9.4
Peak Hour Factor	0.80	0.80	0.80	0.90	0.90	0.90	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	1%	1%	0%	0%	1%	0%
Adj. Flow (vph)	68	123	593	532	21	34	155	1241	1163	91	1119	6
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	191	593	277	276	34	155	1241	1163	91	1125	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	20.0	20.0	33.0	29.0	29.0	14.0	33.0	57.0	29.0	14.0	38.0	
Total Split (%)	16.7%	16.7%	27.5%	24.2%	24.2%	11.7%	27.5%	47.5%	24.2%	11.7%	31.7%	
Maximum Green (s)	14.0	14.0	27.0	23.0	23.0	8.0	27.0	51.0	23.0	8.0	32.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)		13.8	45.7	23.2	23.2	31.0	25.9	51.2	80.4	7.9	33.2	
Actuated g/C Ratio		0.12	0.38	0.19	0.19	0.26	0.22	0.43	0.67	0.07	0.28	
v/c Ratio		0.90	0.90	0.87	0.86	0.07	0.40	0.81	0.57	0.77	0.79	
Control Delay		92.1	48.1	73.5	72.3	0.3	57.8	19.5	0.6	93.6	45.4	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		92.1	48.1	73.5	72.3	0.3	57.8	19.5	0.6	93.6	45.4	
LOS		F	D	E	E	A	E	B	A	F	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2032 Build with Improvements PM

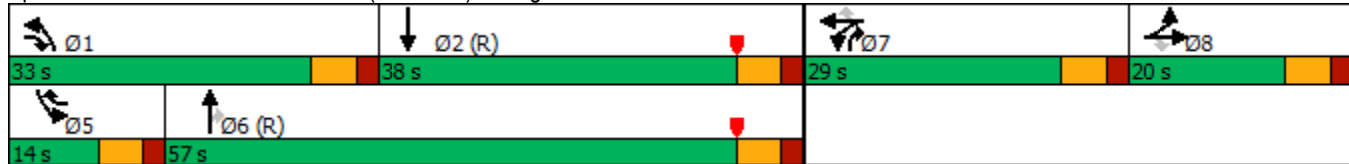


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		58.8			68.7			13.2				49.0
Approach LOS		E			E			B				D
Queue Length 50th (ft)		148	373	221	220	0	111	200	5	71	300	
Queue Length 95th (ft)		#232	439	#382	#378	0	m117	m161	m1	#155	346	
Internal Link Dist (ft)		725			506			919			334	
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		217	673	319	321	502	402	1525	2044	120	1419	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.88	0.88	0.87	0.86	0.07	0.39	0.81	0.57	0.76	0.79	

## Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 74 (62%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.90  
 Intersection Signal Delay: 35.0  
 Intersection LOS: C  
 Intersection Capacity Utilization 77.3%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.























## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2032 Build with Improvements PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	25	31	0	48	27	1335	15	56	793	11
Future Volume (vph)	9	2	25	31	0	48	27	1335	15	56	793	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	14	13	13	11	11	12	12	12	12
Storage Length (ft)	0		50	0		100	210		325	125		0
Storage Lanes	0		1	0		1	1		0	1		0
Taper Length (ft)	25			25			50			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850			0.850		0.998			0.998	
Flt Protected		0.962			0.950		0.950			0.950		
Satd. Flow (prot)	0	1828	1583	0	1865	1669	1745	3449	0	1805	1878	0
Flt Permitted		0.746			0.748		0.950			0.950		
Satd. Flow (perm)	0	1417	1583	0	1469	1669	1745	3449	0	1805	1878	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			91			60		1			1	
Link Speed (mph)		10			30			30			30	
Link Distance (ft)		598			262			1405			549	
Travel Time (s)		40.8			6.0			31.9			12.5	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.99	0.99	0.99	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	11	3	31	39	0	60	27	1348	15	60	844	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	31	0	39	60	27	1363	0	60	856	0
Turn Type	Perm	NA	Prot	Perm	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases		8	8		4	5	1	6		5	2	
Permitted Phases	8			4		4						
Detector Phase	8	8	8	4	4	5	1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0		11.0	16.0	
Total Split (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	116.0		16.0	116.0	
Total Split (%)	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%	64.4%		8.9%	64.4%	
Maximum Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	110.0		10.0	110.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag							Lead	Lead	Lag		Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.5		1.5	1.5	
Recall Mode	None	None	None	None	None	None	None	C-Min		None	C-Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		8.1	8.1		8.1	20.7	6.6	140.9		8.8	146.5	
Actuated g/C Ratio		0.04	0.04		0.04	0.12	0.04	0.78		0.05	0.81	
v/c Ratio		0.22	0.20		0.59	0.25	0.42	0.50		0.68	0.56	
Control Delay		90.1	2.8		117.7	16.3	103.9	10.3		119.5	11.9	



8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway  
 Lanes, Volumes, Timings

2032 Build with Improvements PM

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	32.0
Total Split (s)	32.0
Total Split (%)	18%
Maximum Green (s)	26.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	21.0
Pedestrian Calls (#/hr)	5
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway

## Lanes, Volumes, Timings

2032 Build with Improvements PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	3.1	
Total Delay		90.1	2.8		117.7	16.3	103.9	10.3		119.5	14.9	
LOS		F	A		F	B	F	B		F	B	
Approach Delay		29.9			56.2			12.1			21.8	
Approach LOS		C			E			B			C	
Queue Length 50th (ft)		16	0		46	0	32	252		71	294	
Queue Length 95th (ft)		40	0		81	36	70	600		#134	870	
Internal Link Dist (ft)		518			182			1325			469	
Turn Bay Length (ft)			50			100	210			125		
Base Capacity (vph)		78	173		81	255	96	2700		100	1528	
Starvation Cap Reductn		0	0		0	0	0	0		0	546	
Spillback Cap Reductn		0	0		0	0	0	0		0	0	
Storage Cap Reductn		0	0		0	0	0	0		0	0	
Reduced v/c Ratio		0.18	0.18		0.48	0.24	0.28	0.50		0.60	0.87	

### Intersection Summary

Area Type: Other

Cycle Length: 180

Actuated Cycle Length: 180

Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow, Master Intersection

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 17.8

Intersection LOS: B

Intersection Capacity Utilization 65.7%

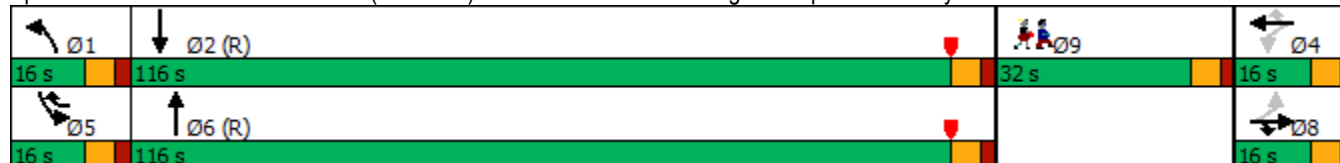
ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

### Splits and Phases: 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway



# 8: Lowell Road (Route 3A) & Fox Hollow Drive/Nottingham Square Driveway Lanes, Volumes, Timings

2032 Build with Improvements PM

Lane Group	Ø9
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

**2032 Build with Base Improvements Weekday A.M.  
(NHDOT Alternative @ Lowell/River/Dracut/Steele)**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road

Lanes, Volumes, Timings

2032 Build with Improvements AM



Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations											
Traffic Volume (vph)	2	0	2	0	299	0	535	561	14	1	934
Future Volume (vph)	2	0	2	0	299	0	535	561	14	1	934
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0	100	0
Storage Lanes	1	0		1		1	2		0	1	1
Taper Length (ft)	25			100			75			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00
Frt		0.850						0.996			0.850
Flt Protected	0.950						0.950			0.950	
Satd. Flow (prot)	1685	1133	0	1773	3574	0	3204	1874	0	1805	1583
Flt Permitted	0.950						0.950			0.950	
Satd. Flow (perm)	1685	1133	0	1773	3574	0	3204	1874	0	1805	1583
Right Turn on Red			Yes			Yes			Yes		Yes
Satd. Flow (RTOR)		524						2			464
Link Speed (mph)	30				35			35		35	
Link Distance (ft)	591				758			1733		622	
Travel Time (s)	13.4				14.8			33.8		12.1	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.92	0.92	0.92	0.86	0.86
Heavy Vehicles (%)	0%	0%	33%	0%	1%	0%	2%	1%	0%	0%	2%
Adj. Flow (vph)	3	0	3	0	374	0	582	610	15	1	1086
Shared Lane Traffic (%)											
Lane Group Flow (vph)	3	3	0	0	374	0	582	625	0	1	1086
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3 5
Permitted Phases											
Detector Phase	4	4		1	6		5	2		3	3 5
Switch Phase											
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	
Total Split (s)	16.0	16.0		16.0	20.0		38.0	42.0		16.0	
Total Split (%)	17.8%	17.8%		17.8%	22.2%		42.2%	46.7%		17.8%	
Maximum Green (s)	10.0	10.0		10.0	14.0		32.0	36.0		10.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	
Act Effct Green (s)	5.8	5.8			13.5		45.5	65.1		10.5	60.8
Actuated g/C Ratio	0.06	0.06			0.15		0.51	0.72		0.12	0.68
v/c Ratio	0.03	0.01			0.70		0.36	0.46		0.00	0.89
Control Delay	40.0	0.0			43.8		17.2	3.4		36.0	18.8
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0
Total Delay	40.0	0.0			43.8		17.2	3.4		36.0	18.8
LOS	D	A			D		B	A		D	B

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road

Lanes, Volumes, Timings

2032 Build with Improvements AM

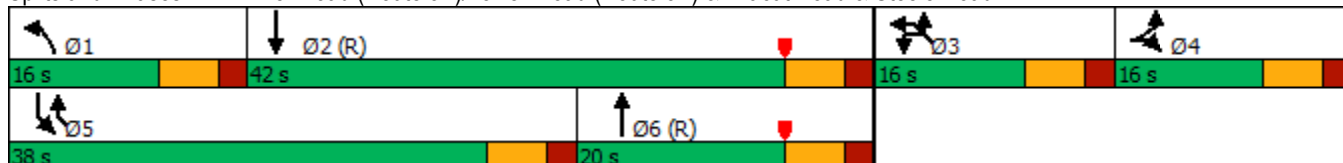


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Approach Delay	20.0				43.8			10.0		18.8	
Approach LOS	B				D			B		B	
Queue Length 50th (ft)	2	0			106		89	3		1	215
Queue Length 95th (ft)	9	0			135		102	8		5	#774
Internal Link Dist (ft)	511				678			1653		542	
Turn Bay Length (ft)		50					775			100	
Base Capacity (vph)	187	591			555		1620	1355		210	1220
Starvation Cap Reductn	0	0			0		0	0		0	0
Spillback Cap Reductn	0	0			0		0	0		0	0
Storage Cap Reductn	0	0			0		0	0		0	0
Reduced v/c Ratio	0.02	0.01			0.67		0.36	0.46		0.00	0.89

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 130  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.89  
 Intersection Signal Delay: 18.3  
 Intersection LOS: B  
 Intersection Capacity Utilization 76.1%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road



**2032 Build with Base Improvements Weekday P.M.  
(NHDOT Alternative @ Lowell/River/Dracut/Steele)**

1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road

Lanes, Volumes, Timings

2032 Build with Improvements PM

Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Lane Configurations												
Traffic Volume (vph)	40	2	2	1	653	1	984	439	15	5	0	726
Future Volume (vph)	40	2	2	1	653	1	984	439	15	5	0	726
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	12	12	10	12	12	12	12	12
Storage Length (ft)	0	50		200		300	775		0		100	0
Storage Lanes	1	1		1		1	2		0		0	1
Taper Length (ft)	25			100			75				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Frt		0.850						0.995				0.850
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	1668	1507	0	1685	3610	0	3268	1872	0	0	1805	1615
Flt Permitted	0.950			0.950			0.950				0.950	
Satd. Flow (perm)	1668	1507	0	1685	3610	0	3268	1872	0	0	1805	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191						2				405
Link Speed (mph)	30			35			35				35	
Link Distance (ft)	591			758			1733				622	
Travel Time (s)	13.4			14.8			33.8				12.1	
Peak Hour Factor	0.80	0.80	0.80	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Adj. Flow (vph)	50	3	3	1	718	1	1093	488	17	5	0	798
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	6	0	1	719	0	1093	505	0	0	5	798
Turn Type	Prot	Prot		Prot	NA		Prot	NA		Prot	Prot	pt+ov
Protected Phases	4	4		1	6		5	2		3	3	3.5
Permitted Phases												
Detector Phase	4	4		1	6		5	2		3	3	3.5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0		8.0	8.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	14.0		14.0	14.0		11.0	11.0	
Total Split (s)	28.0	28.0		16.0	26.0		53.0	63.0		13.0	13.0	
Total Split (%)	23.3%	23.3%		13.3%	21.7%		44.2%	52.5%		10.8%	10.8%	
Maximum Green (s)	22.0	22.0		10.0	20.0		47.0	57.0		7.0	7.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0			6.0	
Lead/Lag	Lag	Lag		Lead	Lag		Lead	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	4.0		4.0	4.0		4.0	4.0	
Recall Mode	None	None		None	C-Min		None	C-Min		None	None	
Act Effct Green (s)	9.0	9.0		5.6	30.4		51.9	85.9			7.0	60.1
Actuated g/C Ratio	0.08	0.08		0.05	0.25		0.43	0.72			0.06	0.50
v/c Ratio	0.40	0.02		0.01	0.79		0.77	0.38			0.05	0.79
Control Delay	61.5	0.2		55.0	51.0		25.7	1.9			54.6	16.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	61.5	0.2		55.0	51.0		25.7	1.9			54.6	16.0
LOS	E	A		D	D		C	A			D	B



1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road

Lanes, Volumes, Timings

2032 Build with Improvements PM

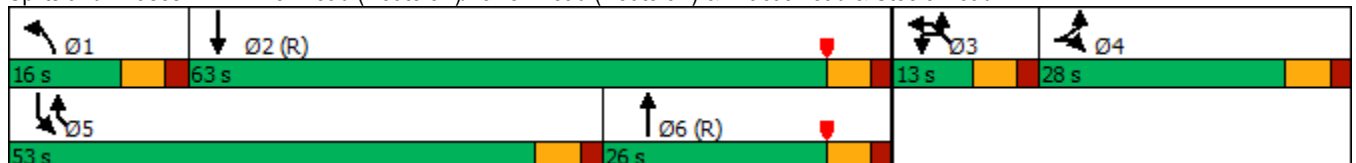


Lane Group	EBL	EBR	EBR2	NBL	NBT	NBR	SBL	SBT	SBR	NWL2	NWL	NWR
Approach Delay	54.9			51.0			18.2			16.2		
Approach LOS	D			D			B			B		
Queue Length 50th (ft)	38	0		1	284		134	4		4	183	
Queue Length 95th (ft)	68	0		7	#478		128	8		17	342	
Internal Link Dist (ft)	511			678			1653			542		
Turn Bay Length (ft)	50			200			775			100		
Base Capacity (vph)	305	432		140	913		1434	1340		105	1018	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.16	0.01		0.01	0.79		0.76	0.38		0.05	0.78	

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 5 (4%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.79  
 Intersection Signal Delay: 25.8 Intersection LOS: C  
 Intersection Capacity Utilization 74.5% ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: River Road (Route 3A)/Lowell Road (Route 3A) & Dracut Road & Steele Road



## **Appendix K**





































# **Capacity Analysis – 2022 Future Build with Improvements Traffic Conditions**

**2022 Future Build with Improvements Weekday A.M.**

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road

## Lanes, Volumes, Timings

2022 Build with Improvements AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			  			 	  	  	  		  	  
Traffic Volume (vph)	65	28	282	614	41	30	303	811	188	15	1087	10
Future Volume (vph)	65	28	282	614	41	30	303	811	188	15	1087	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		2	1		1	0		2	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	0.88	0.95	0.95	1.00	0.97	0.95	0.88	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (prot)	0	1835	2787	1641	1657	1501	3467	3539	2787	1752	5078	0
Flt Permitted		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (perm)	0	1835	2787	1641	1657	1501	3467	3539	2787	1752	5078	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			182			198			1
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		805			586			999			430	
Travel Time (s)		18.3			13.3			22.7			9.8	
Peak Hour Factor	0.81	0.81	0.81	0.94	0.94	0.94	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	1%	0%	4%	1%	2%	2%	3%	2%	6%
Adj. Flow (vph)	80	35	348	653	44	32	319	854	198	17	1249	11
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	115	348	346	351	32	319	854	198	17	1260	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	14.0	14.0	20.0	28.0	28.0	11.0	20.0	37.0	28.0	11.0	28.0	
Total Split (%)	15.6%	15.6%	22.2%	31.1%	31.1%	12.2%	22.2%	41.1%	31.1%	12.2%	31.1%	
Maximum Green (s)	8.0	8.0	14.0	22.0	22.0	5.0	14.0	31.0	22.0	5.0	22.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)		7.8	26.1	21.1	21.1	26.1	12.4	36.5	63.6	5.0	24.8	
Actuated g/C Ratio		0.09	0.29	0.23	0.23	0.29	0.14	0.41	0.71	0.06	0.28	
v/c Ratio		0.73	0.39	0.90	0.90	0.06	0.67	0.59	0.10	0.18	0.90	
Control Delay		66.8	18.2	61.1	61.5	0.2	54.0	21.3	0.1	44.9	43.0	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		66.8	18.2	61.1	61.5	0.2	54.0	21.3	0.1	44.9	43.0	
LOS		E	B	E	E	A	D	C	A	D	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2022 Build with Improvements AM

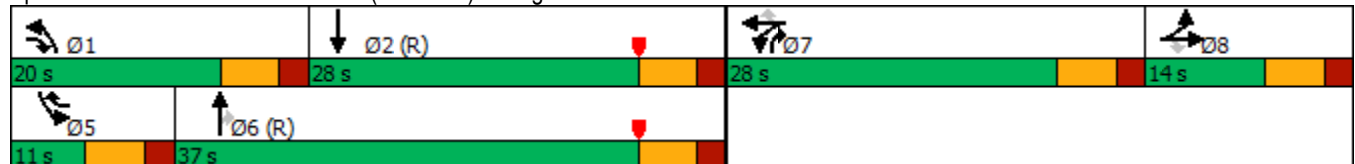


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		30.3			58.6			25.9				43.0
Approach LOS		C			E			C				D
Queue Length 50th (ft)		65	59	198	202	0	101	130	0	9		259
Queue Length 95th (ft)		#122	83	#358	#363	0	m134	198	m0	29		#350
Internal Link Dist (ft)		725			506			919				350
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		163	935	401	405	564	539	1436	2054	97		1398
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0		0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0		0
Reduced v/c Ratio		0.71	0.37	0.86	0.87	0.06	0.59	0.59	0.10	0.18		0.90

## Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 48 (53%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.90  
 Intersection Signal Delay: 38.3  
 Intersection LOS: D  
 Intersection Capacity Utilization 69.6%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road


























**2022 Future Build with Improvements Weekday P.M.**

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road

## Lanes, Volumes, Timings

2022 Build with Improvements PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	92	433	435	17	28	137	1060	988	72	897	5
Future Volume (vph)	52	92	433	435	17	28	137	1060	988	72	897	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		2	1		1	0		2	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	0.88	0.95	0.95	1.00	1.00	0.91	0.88	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.982		0.950	0.956		0.950			0.950		
Satd. Flow (prot)	0	1866	2814	1658	1668	1546	1787	5136	2842	1805	5131	0
Flt Permitted		0.982		0.950	0.956		0.950			0.950		
Satd. Flow (perm)	0	1866	2814	1658	1668	1546	1787	5136	2842	1805	5131	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			136			567			1
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		805			586			999			427	
Travel Time (s)		18.3			13.3			22.7			9.7	
Peak Hour Factor	0.80	0.80	0.80	0.90	0.90	0.90	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	1%	1%	0%	0%	1%	0%
Adj. Flow (vph)	65	115	541	483	19	31	146	1128	1051	82	1019	6
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	180	541	251	251	31	146	1128	1051	82	1025	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	22.0	22.0	34.0	35.0	35.0	15.0	34.0	48.0	35.0	15.0	29.0	
Total Split (%)	18.3%	18.3%	28.3%	29.2%	29.2%	12.5%	28.3%	40.0%	29.2%	12.5%	24.2%	
Maximum Green (s)	16.0	16.0	28.0	29.0	29.0	9.0	28.0	42.0	29.0	9.0	23.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)		14.6	35.4	26.3	26.3	34.7	14.8	49.2	81.4	8.4	40.3	
Actuated g/C Ratio		0.12	0.30	0.22	0.22	0.29	0.12	0.41	0.68	0.07	0.34	
v/c Ratio		0.79	0.61	0.69	0.69	0.06	0.66	0.54	0.50	0.65	0.59	
Control Delay		75.6	32.8	53.4	53.0	0.2	71.1	27.4	0.8	77.7	36.7	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		75.6	32.8	53.4	53.0	0.2	71.1	27.4	0.8	77.7	36.7	
LOS		E	C	D	D	A	E	C	A	E	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2022 Build with Improvements PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		43.5			50.1			18.2				39.7
Approach LOS		D			D			B				D
Queue Length 50th (ft)		136	171	184	184	0	120	175	0	63		252
Queue Length 95th (ft)		188	181	281	280	0	m138	m176	m0	#123		319
Internal Link Dist (ft)		725			506			919				347
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		248	1188	400	403	550	416	2104	2162	135		1723
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.73	0.46	0.63	0.62	0.06	0.35	0.54	0.49	0.61		0.59

## Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 64 (53%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 30.8

Intersection LOS: C

Intersection Capacity Utilization 61.4%

ICU Level of Service B

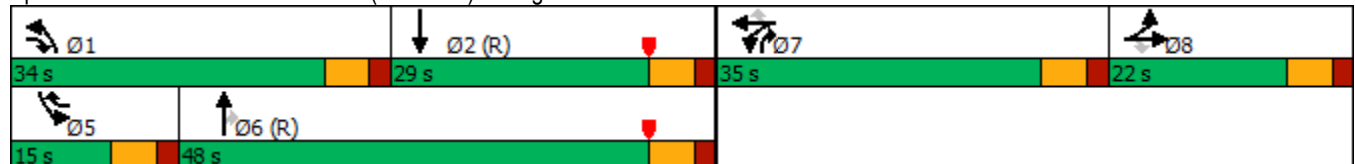
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road





## **Appendix L**

# **Capacity Analysis – 2032 Future Build with Improvements Traffic Conditions**

**2032 Future Build with Improvements Weekday A.M.**

5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road  
Lanes, Volumes, Timings

2032 Build with Improvements AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	29	303	677	45	33	328	895	208	17	1194	11
Future Volume (vph)	67	29	303	677	45	33	328	895	208	17	1194	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		2	1		1	2		2	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	0.88	0.95	0.95	1.00	0.97	0.95	0.88	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (prot)	0	1835	2787	1641	1657	1501	3467	3539	2787	1752	5078	0
Flt Permitted		0.966		0.950	0.958		0.950			0.950		
Satd. Flow (perm)	0	1835	2787	1641	1657	1501	3467	3539	2787	1752	5078	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			109			219			1
Link Speed (mph)		30			30			30				30
Link Distance (ft)		805			586			999				405
Travel Time (s)		18.3			13.3			22.7				9.2
Peak Hour Factor	0.81	0.81	0.81	0.94	0.94	0.94	0.95	0.95	0.95	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	2%	1%	0%	4%	1%	2%	2%	3%	2%	6%
Adj. Flow (vph)	83	36	374	720	48	35	345	942	219	20	1372	13
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	0	119	374	382	386	35	345	942	219	20	1385	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	15.0	15.0	16.0	28.0	28.0	12.0	16.0	35.0	28.0	12.0	31.0	
Total Split (%)	16.7%	16.7%	17.8%	31.1%	31.1%	13.3%	17.8%	38.9%	31.1%	13.3%	34.4%	
Maximum Green (s)	9.0	9.0	10.0	22.0	22.0	6.0	10.0	29.0	22.0	6.0	25.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)		8.5	24.8	22.0	22.0	27.6	10.2	34.3	62.3	5.6	25.2	
Actuated g/C Ratio		0.09	0.28	0.24	0.24	0.31	0.11	0.38	0.69	0.06	0.28	
v/c Ratio		0.68	0.44	0.95	0.95	0.07	0.88	0.70	0.11	0.18	0.97	
Control Delay		60.2	20.5	70.0	69.9	0.2	45.7	21.2	5.7	43.8	51.2	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		60.2	20.5	70.0	69.9	0.2	45.7	21.2	5.7	43.8	51.2	
LOS		E	C	E	E	A	D	C	A	D	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2032 Build with Improvements AM

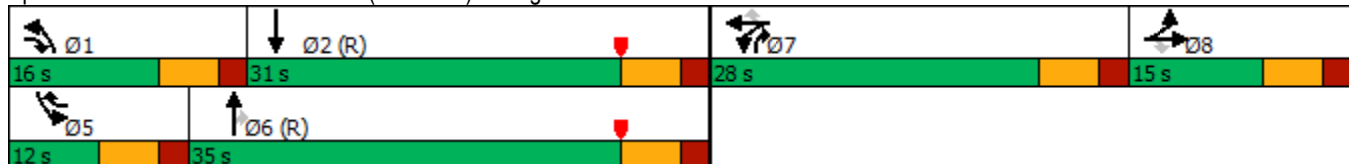


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		30.1			66.9			24.5			51.1	
Approach LOS		C			E			C			D	
Queue Length 50th (ft)		66	68	225	228	0	84	270	26	11	285	
Queue Length 95th (ft)		#115	96	#410	#413	0	m#105	m311	m34	33	#367	
Internal Link Dist (ft)		725			506			919			325	
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		183	845	401	405	542	393	1347	1995	116	1424	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.65	0.44	0.95	0.95	0.06	0.88	0.70	0.11	0.17	0.97	

## Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 80 (89%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.97  
 Intersection Signal Delay: 42.1  
 Intersection LOS: D  
 Intersection Capacity Utilization 74.3%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.
























## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road



**2032 Future Build with Improvements Weekday P.M.**

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2032 Build with Improvements PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	98	474	479	19	31	146	1167	1093	80	985	5
Future Volume (vph)	54	98	474	479	19	31	146	1167	1093	80	985	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		250	200		75	575		275	175		300
Storage Lanes	0		2	1		1	1		2	1		1
Taper Length (ft)	25			50			175			75		
Lane Util. Factor	1.00	1.00	0.88	0.95	0.95	1.00	1.00	0.91	0.88	1.00	0.91	0.91
Frt			0.850			0.850			0.850		0.999	
Flt Protected		0.983		0.950	0.956		0.950			0.950		
Satd. Flow (prot)	0	1868	2814	1658	1668	1546	1787	5136	2842	1805	5131	0
Flt Permitted		0.983		0.950	0.956		0.950			0.950		
Satd. Flow (perm)	0	1868	2814	1658	1668	1546	1787	5136	2842	1805	5131	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			136			658			1
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		805			586			999			414	
Travel Time (s)		18.3			13.3			22.7			9.4	
Peak Hour Factor	0.80	0.80	0.80	0.90	0.90	0.90	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%	1%	1%	0%	0%	1%	0%
Adj. Flow (vph)	68	123	593	532	21	34	155	1241	1163	91	1119	6
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	191	593	277	276	34	155	1241	1163	91	1125	0
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	8	8	1	7	7	5	1	6	7	5	2	
Permitted Phases			8			7			6			
Detector Phase	8	8	1	7	7	5	1	6	7	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	5.0	10.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	16.0	11.0	11.0	16.0	
Total Split (s)	25.0	25.0	32.0	35.0	35.0	18.0	32.0	42.0	35.0	18.0	28.0	
Total Split (%)	20.8%	20.8%	26.7%	29.2%	29.2%	15.0%	26.7%	35.0%	29.2%	15.0%	23.3%	
Maximum Green (s)	19.0	19.0	26.0	29.0	29.0	12.0	26.0	36.0	29.0	12.0	22.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	2.5	2.5	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)		16.1	37.6	27.5	27.5	37.6	15.5	42.3	75.8	10.1	36.8	
Actuated g/C Ratio		0.13	0.31	0.23	0.23	0.31	0.13	0.35	0.63	0.08	0.31	
v/c Ratio		0.76	0.63	0.73	0.72	0.06	0.67	0.69	0.57	0.60	0.71	
Control Delay		69.6	32.4	54.6	54.1	0.2	70.6	30.0	0.4	69.2	41.7	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		69.6	32.4	54.6	54.1	0.2	70.6	30.0	0.4	69.2	41.7	
LOS		E	C	D	D	A	E	C	A	E	D	

# 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road Lanes, Volumes, Timings

2032 Build with Improvements PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		41.5			51.2			19.0				43.8
Approach LOS		D			D			B				D
Queue Length 50th (ft)		143	191	206	205	0	128	211	0	69	290	
Queue Length 95th (ft)		193	193	310	309	0	m129	m206	m0	121	#411	
Internal Link Dist (ft)		725			506			919				334
Turn Bay Length (ft)			250	200		75	575		275	175		
Base Capacity (vph)		295	1176	400	403	600	387	1809	2064	180	1576	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.65	0.50	0.69	0.68	0.06	0.40	0.69	0.56	0.51	0.71	

## Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 65 (54%), Referenced to phase 2:SBT and 6:NBT, Start of Yellow  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.76  
 Intersection Signal Delay: 31.9  
 Intersection LOS: C  
 Intersection Capacity Utilization 65.8%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

## Splits and Phases: 5: Lowell Road (Route 3A) & Flagstone Drive/Wason Road

