

EI-25360



Re: Request for Traffic Study

Robert Jones

to:

Danielle.Gosselin@stb.dot.gov

09/09/2016 09:07 AM

Cc:

"rklempner@verizon.net", "Diller, Elizabeth (Elizabeth.Diller@icfi.com)", "Sullivan, Neil"

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From: Robert Jones <RJones1259@netransrail.com>

To: "Danielle.Gosselin@stb.dot.gov" <Danielle.Gosselin@stb.dot.gov>

Cc: "rklempner@verizon.net" <rklempner@verizon.net>, "Diller, Elizabeth (Elizabeth.Diller@icfi.com)" <Elizabeth.Diller@icfi.com>, "Sullivan, Neil" <Neil.Sullivan@icfi.com>

1 Attachment



TIAS 072216 D.pdf

Good morning Danielle,

Attached you will find the requested Traffic Impact and Analysis Study. Please let me know if you require any addition information. Thanks in advance.

NEW ENGLAND TRANSRAIL, LLC.

Rob Jones

973.930.8041

From: Danielle.Gosselin@stb.dot.gov <Danielle.Gosselin@stb.dot.gov>

Sent: Thursday, September 8, 2016 3:28:54 PM

To: Robert Jones

Cc: rklempner@verizon.net; Diller, Elizabeth (Elizabeth.Diller@icfi.com); Sullivan, Neil

Subject: Request for Traffic Study

Hi Rob,

In response #5 to our first information request, NET references a Traffic Impact and Analysis Study of the project site dated July 22, 2016 conducted by Bayside Engineering. Would it be possible for you to send me a copy of this study? Please let me know.

Thanks,
Danielle

Danielle Gosselin
Attorney Advisor
Office of Environmental Analysis
Surface Transportation Board
Tel: (202) 245-0300

TRAFFIC IMPACT AND ACCESS STUDY



PROPOSED REDEVELOPMENT 51 EAMES STREET WILMINGTON, MA

PREPARED FOR:

NEW ENGLAND TRANSRAIL, LLC

JULY 22, 2016

PREPARED BY:



**600 UNICORN PARK DRIVE
WOBURN, MA 01801**

TRAFFIC IMPACT AND ACCESS STUDY

PROPOSED REDEVELOPMENT

51 Eames Street
Wilmington, Massachusetts

Prepared for:

New England Transrail, LLC

July 22, 2016

Prepared by:

Bayside Engineering
600 Unicorn Park Drive
Woburn, MA 01801

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SECTION 1: EXECUTIVE SUMMARY

Bayside Engineering has prepared this study to assess the traffic impact and to evaluate the access requirements of the proposed industrial development to be located at 51 Eames Street in Wilmington, Massachusetts.

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

PROJECT DESCRIPTION

The development is to be located along the south side of Eames Street west of the intersection with Woburn Street in Wilmington, Massachusetts. Currently, the site consists of a vacant warehouse and a vacant office building with associated off-street parking. Access is currently provided to the site by way of a driveway to Eames Street.

New England Transrail, LLC proposes to construct a railroad transportation facility that transloads (rail to truck) a broad array of products, including, palletized and bagged products through a cross-dock warehouse, bulk liquids from tank cars and granular materials from hopper cars. The transload facility will employ approximately 35 to 50 new employees. Employee shifts and site operations are scheduled each day for 5:00 AM to 1:00 PM, from 1:00 PM to 9:00 PM and from 9 p.m. to 5 a.m. The facility will be serviced by locomotives delivering inbound cargo primarily in box cars, tanker cars and hopper cars to the site and subsequently by trucks carrying materials and products away from the site to regional and local destinations. Box car cargo will be either direct loaded into trucks for continued transport to final destinations or staged or re-packaged within a cross-dock facility for subsequent truck pick-up. Bulk liquids cargo will be either directly loaded into tanker trucks or held within a throughput tank until truck pick-up and delivery to final destinations. Granular materials will be loaded directly into trucks or held in throughput tanks and bulk storage until truck pick-up and delivery.

Figure 1 shows the site location in relation to the surrounding area. Figure 2 shows the Conceptual Site Layout.



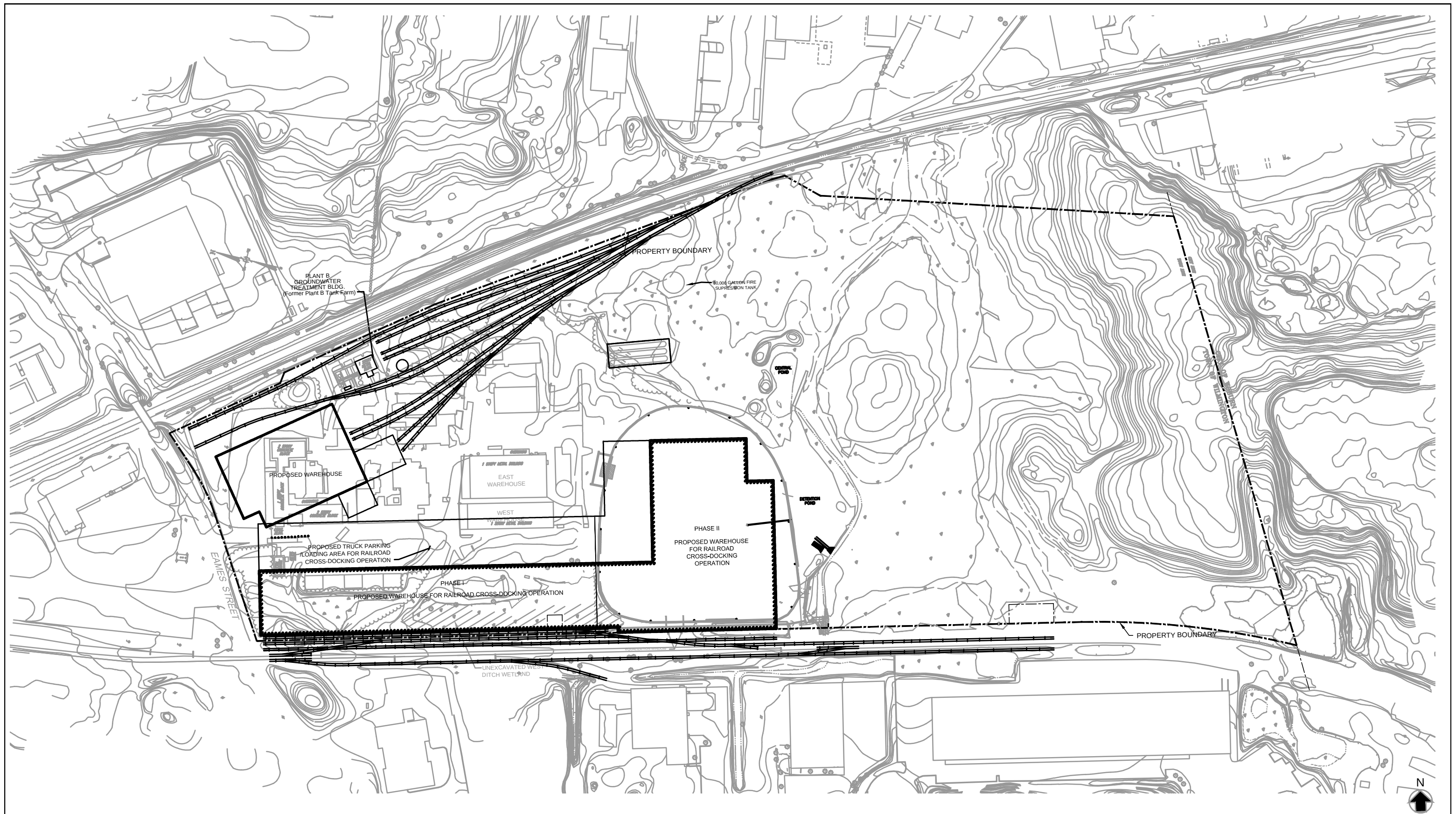
Figure 1
Site Location Map

STUDY METHODOLOGY

This study has been prepared in three stages. The first stage involved an assessment of existing conditions within the study area and included an inventory of roadway geometrics, pedestrian and bicycle facilities and public transportation services. Existing traffic counts were performed at the study area intersections.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the project were assessed along with future traffic demands due to expected traffic growth independent of the proposed project. In accordance with Massachusetts Department of Transportation (MassDOT) guidelines, the year 2022 was selected as the basis for modeling future transportation impacts of the proposed development to reflect the opening year conditions and a seven-year planning horizon.

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



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Proposed Redevelopment
 51 Eames Street
 WILMINGTON, MA

Figure 2
 Conceptual Site Plan



SCALE: 1" = 200'

STUDY AREA

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

- Main Street and Eames Street
- Woburn Street, Eames Street, and Ox Bow Drive
- Woburn Street and Industrial Way
- Woburn Street at Presidential Way
- Lowell Street and Woburn Street
- Lowell Street and West Street

EXISTING CONDITIONS

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

Existing Traffic Volumes

To establish base traffic conditions within the study area, manual turning movement and vehicle classification counts were obtained in June 2015. Peak-period turning movement counts were conducted during the weekday morning period (7:00 to 9:00 AM) and the weekday evening peak period (3:00 to 6:00 PM). Daily traffic counts were conducted on Eames Street for a two day period using automatic traffic recorders (ATR).

The traffic-volume data gathered as part of this study was collected during the month of June 2015. Data from the MassDOT was reviewed to determine the monthly variations of the traffic volumes. Based upon available data, June volumes are significantly higher than average month conditions. To be conservative, no downward adjustment has been made.

Eames Street was recorded to carry approximately 7,560 vehicles per day (vpd). During the weekday morning peak hour, approximately 650 vph were recorded on Eames Street and 795 vph were recorded during the weekday evening peak hour.

Motor Vehicle Crash Data

Motor vehicle crash data for the study area intersections and roadways were obtained from MassDOT from 2009 to 2013. The motor vehicle crash data was reviewed to determine crash trends in the study area. A total of fifty-one (51) crashes were reported during the five year interval. Most of the crashes occurred at the two intersections of Lowell Street/West Street and Lowell Street/Woburn Street (21 and 19 crashes, respectively). Of these crashes, 24 were rear-end type collisions and 12 were angle collisions. None of the intersections experienced a significant crash rate. No fatalities

were reported at any of the intersections.

PROBABLE IMPACTS OF THE PROJECT

No-Build Traffic Volumes

To determine the impact of site-generated traffic volumes on the roadway network under future conditions, baseline traffic volumes in the study area were projected to the year 2022. Traffic volumes on the roadway network at that time, in the absence of the proposed project, would include existing traffic, new traffic due to general background traffic growth, and traffic related to specific developments by others expected to be completed by 2022. A one (1.0) percent compounded growth rate was used to develop future No-Build conditions. Three projects were also identified (45 Industrial Way, 90 Eames Street and 203 Lowell Street) and their estimated traffic was included in the No-Build projections.

Build Traffic Volumes

In order to develop the traffic characteristics of the proposed project, available trip-generation statistics published by the Institute of Transportation Engineers (ITE) was researched and projected site operations and employee data were reviewed. The development will consist of the construction of a transload facility which features a Cross Dock Warehouse of up to 240,000 square feet to be built in multiple two (2) stages and also a bulk tank car area which will handle tank cars, flat cars, hopper cars, gondola cars, well cars and spine cars. Intermodal containers will also be transloaded on the property. This study analyzed the peak potential of the site.

The trip generation for the proposed transload facility was determined based on the expected number of employees and expected site operations and truck activities. The ITE *Trip Generation* manual¹ does not contain trip-generation data for this land use. Data provided by New England Transrail, LLC on the proposed usage of the site and expected site operations were used to develop the trip characteristics of the site. The rail transloading facility will employ approximately 35 to 50 new employees. Employee shifts are scheduled 5:00 AM to 1:00 PM a 1:00 PM to 9:00 PM shift and a 9:00PM to 5:00 AM shift. Employee vehicle trips will generally occur outside the commuter peak hours.

Site operations are expected to occur Monday through Friday from 5:00 AM to 6:30 PM, Saturday from 7:00 AM to 5:00 PM, and Sundays from 7:00 AM to 12:00 PM. The vehicles traveling to and from the site will primarily be oriented to Interstate 93 (I-93). Almost all traffic, except that for local deliveries in Wilmington, Woburn and Tewksbury will use Presidential Way to access the site. Deliveries typically occur outside the weekday morning and evening peak hours.

¹*Trip Generation*, Eighth Edition; Institute of Transportation Engineers; Eames, DC; 2009.

The facility will be serviced by rail, with materials going off site by truck. Ten (10) to twenty (20) ton capacity trucks and bulk liquid carriers will enter the site fully empty, take on their load and leave the site loaded.

The temporal distribution of traffic to the site was estimated based on existing traffic flow. It is expected that the proposed project will generate approximately 800 vehicle trips on an average weekday (400 vehicles entering and 400 vehicles exiting). During the weekday morning peak hour, 69 vehicle trips (36 vehicles entering and 33 vehicles exiting) are anticipated. During the weekday evening peak hour, 84 vehicle trips (40 vehicles entering and 44 vehicles exiting) are expected.

TRAFFIC OPERATIONS ANALYSIS

In order to assess the impacts of the proposed project on the roadway network, traffic operations analyses were performed at the study area intersections under 2015 Existing, 2022 No-Build and 2022 Build conditions. These analyses indicate that the proposed project will not result in a significant impact on traffic operations at the study area intersections over No-Build conditions. At the unsignalized intersections, based on existing intersection operations and observations, actual operations are better than the HCS methodology indicates.

Lowell Street and Woburn Street

Under 2015 Existing weekday morning conditions, this signalized intersection currently operates at level of service (LOS) E during the weekday morning peak hour and at LOS E during the weekday evening peak hour. Under future 2022 No-Build conditions, this intersection is projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 Build conditions, with the project, this intersection is projected to continue to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour.

Lowell Street and West Street

Under 2015 Existing weekday morning conditions, this signalized intersection currently operates at LOS C during the weekday morning peak hour and at LOS C during the weekday evening peak hour. Under future 2022 No-Build conditions, this intersection is projected to operate at LOS D during the weekday morning peak hour and at LOS D during the weekday evening peak hour. Under future 2022 Build conditions, with the project, this intersection is projected to operate at LOS D during the weekday morning peak hour and at LOS D during the weekday evening peak hour.

Woburn Street, Eames Street and Oxbow Drive

Under 2015 Existing conditions, during the peak hours, the critical movements (all movements from Eames Street) are modeled to operate at LOS F during the weekday

morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 No-Build conditions, these critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 Build conditions, with the project, the critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour.

Woburn Street and Industrial Way

Under 2015 Existing conditions, during the peak hours, the critical movements (all movements from Industrial Way) are modeled to operate at LOS C during the weekday morning peak hour and at LOS E during the weekday evening peak hour. Under future 2022 No-Build conditions, these critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 Build conditions, with the project, the critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour.

Woburn Street and Presidential Way

Under 2015 Existing conditions, during the peak hours, the critical movements (all movements from Presidential Way) are modeled to operate at LOS C during the weekday morning peak hour and at LOS C during the weekday evening peak hour. Under future 2022 No-Build conditions, these critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 Build conditions, with the project, the critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour.

Eames Street and Site Driveway

Under 2015 Existing conditions, there are no vehicles entering or leaving the site. There are no conflicting turn movements at the site driveway under 2015 Existing conditions or under 2022 No-Build conditions. Under future 2022 Build conditions, with the project, the critical movements are projected to operate at LOS B during the weekday morning and the weekday evening peak hours.

Main Street and Eames Street

Under 2015 Existing conditions, during the peak hours, the critical movements (all movements from Eames Street) are modeled to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 No-Build conditions, these critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 Build conditions, with the project, the critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F

during the weekday evening peak hour.

RECOMMENDATIONS

The final phase of the analysis process is to identify the mitigation measures necessary to minimize the impact of the project on the adjacent transportation system.

Non-Project Related Mitigation

The following intersections have been analyzed without the proposed project and have been determined to require potential modifications and improvements:

- Main Street and Eames Street
- Woburn Street, Eames Street and Oxbow Drive
- Lowell Street and Woburn Street
- Lowell Street and West Street

It should be clearly noted that any improvements to these intersections are precipitated by existing conditions and are not solely due to the project's impacts. Mitigation measures have been identified so that the community and local planning agencies have the tools to identify needed improvements.

Main Street and Eames Street

Under 2015 Existing conditions, during the peak hours, the critical movements (all movements from Eames Street) are modeled to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. These critical movements are projected to continue to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour without the project. Review of existing peak hour operations indicate that a traffic signal would be warranted at this intersection. Installation of a traffic signal would provide the necessary gaps for vehicles to exit the minor street. With this measure, under future 2022 Build conditions, this intersection would operate at LOS C during the weekday morning and evening peak hours.

Woburn Street, Eames Street and Oxbow Drive

Under 2015 Existing conditions, during the peak hours, the critical movements (all movements from Eames Street) are modeled to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. These critical movements are projected to continue to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour without the project. During off-peak hours, traffic operations are expected to be better and less congested. Possible improvements include traffic signalization and intersection geometry

improvements at the southwest corner to facilitate right turns from Eames Street, including providing an exclusive left-turn lane on Eames Street. With these measures, under future 2022 Build conditions, the intersection is projected to operate at LOS C or better during the weekday morning and evening peak hours.

Lowell Street and Woburn Street

Under 2022 No-Build conditions, during the peak hours, this signalized intersection is projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. The Town's consultant, TEC has developed a preliminary mitigation plan for this intersection which includes widening of all approaches to include exclusive left-turn lanes and upgrading the intersection signalization. With these potential improvements, the intersection is projected to operate at LOS C and LOS D or better during the weekday morning and weekday evening peak hours, respectively.

Project Related Mitigation

The following measures have been identified to mitigate the project's impacts and improve intersection operations. The project proponent is committed to working with the Town of Wilmington to implement these measures.

Site Access

The site driveway is recommended to be designed to handle large trucks with appropriate driveway radii (50 foot minimum) and width (24 foot minimum). The driveway should be placed under STOP sign control.

Transportation Demand Management

Transportation Demand Management (TDM) strategies generally work well with office/research and development type facilities. Due to the nature of the proposed project, TDM strategies do not typically work well. In an effort to maximize employee vehicle occupancy and thereby reduce vehicular demand to the site, the project proponent will encourage employees to rideshare. This will be accomplished through the provision of an on-site transportation coordinator to publicize and encourage ride-sharing and provide a ride-matching service. Coordination with MassRides is encouraged.

In addition, several TDM strategies can be employed:

- Variable shift schedules (to not impact peak hour traffic flow) are already proposed based on the projected shift scheduling.
- Direct deposit of payroll checks
- Provide a subsidized program for employees who will use the Regional Transportation Center (to the immediate south in Woburn).

SUMMARY

Review of the proposed project and the access plan shows that in relation to roadway capacity, traffic safety, and traffic impacts upon the surrounding roadway network, the proposed project will meet safety standards and have a minimal impact on existing traffic conditions. With the proposed access, and maintaining sight distances from the driveway (clear sight lines along frontage), safe and efficient access can be provided to the clientele of the proposed project and to the motoring public in the area.

DRAFT

SECTION 2: EXISTING TRAFFIC CONDITIONS

STUDY AREA

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

- Main Street and Eames Street
- Woburn Street, Eames Street, and Ox Bow Drive
- Woburn Street and Industrial Way
- Woburn Street at Presidential Way
- Lowell Street and Woburn Street
- Lowell Street and West Street

FIELD SURVEY

A comprehensive field inventory of the proposed site was conducted in June 2015. The inventory included collection of existing roadway geometrics, traffic volumes, and safety data for the existing study area intersections and site access driveway locations. Traffic volumes were measured by means of automatic traffic recorder (ATR) counts and substantiated by manual turning movement counts (TMCs) conducted at the study area intersections.

GEOMETRICS

Primary study area roadways are described below.

Roadways

Lowell Street (Route 129)

Lowell Street is generally a two-lane east-west Urban Principal Arterial. The roadway is maintained by the Town of Wilmington from Main Street (Route 38) to West Street and maintained by MassDOT from West Street to the Reading Town Line. Throughout the Town of Wilmington, Lowell Street is designated as State Route 129 and is part of the National Highway System (NHS). Lowell Street provides a regional connection between Wilmington to the west, and Reading and Wakefield to the east. Between Main Street and the Reading Town Line, the posted speed limit along Lowell Street varies from 25 miles per hour (MPH) to 45 MPH. Cement concrete sidewalks are present along both sides of Lowell Street between Main Street and a point approximately 650-feet west of Woburn Street. Directional flow along Main Street is separated by a marked centerline.

Main Street (Route 38)

Main Street is generally a two-lane north-south urban principal arterial roadway maintained by MassDOT. Throughout the Town of Wilmington, Main Street is signed as State Route 38 (as well as State Route 129 between Lowell Street and Shawsheen Avenue). Main Street is also part of the NHS. Route 38 provides a regional connection between Lowell and Tewksbury to the north, and Woburn and Medford to the south. South of Lowell Street, the posted speed limit along Main Street varies from 30 MPH to 45 MPH. Sidewalks are generally not present along either side of Main Street. Directional flow along Main Street is separated by a marked centerline with sections of permitted two-way and one-way passing zones.

Woburn Street

Woburn Street, south of Lowell Street, is generally a two-lane north-south Urban Minor Arterial maintained by the Town of Wilmington. The roadway provides local connections between Concord Street to the north and Presidential Way to the south. South of Lowell Street, the posted speed limit along Woburn Street varies from 20 MPH to 35 MPH. An asphalt sidewalk is present along the west side of Woburn Street between Lowell Street and Eames Street. Directional flow along Woburn Street is separated by a marked centerline. There is currently an informal truck restriction along Woburn Street between Eames Street and Lowell Street.

Eames Street

Eames Street is a two-lane east-west Local Street maintained by the Town of Wilmington. The roadway connects Main Street to the west with Woburn Street to the

east. Within the study area, Eames Street provides one travel lane in each direction separated by a marked center line. Land use along Eames Street is primarily commercial. Sidewalks are not present along either side of Eames Street in the site vicinity.

Intersections

Lowell Street and Woburn Street

Woburn Street intersects Lowell Street from the north and south to form this four-legged, pre-timed signalized intersection. All four intersection approaches consist of a single general purpose travel lane with directional flow separated by a marked centerline. Sidewalks are present along the westerly side of Woburn Street and the northerly side of Lowell Street, east of Woburn Street. Crosswalks are provided across Lowell Street east of the intersection and across Woburn Street south of the intersection. Land uses on the corners of the intersection include a small retail center, a residence, a vacant lot, and a commercial building.

Lowell Street and West Street

West Street intersects Lowell Street from the north and south to form this four-legged, fully-actuated signalized intersection. The Lowell Street eastbound approach consists of a single general purpose travel lane, but widens at the intersection to provide storage for a single right-turning vehicle within a flared section marked with a right-turn arrow. The Lowell Street westbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. Directional flow along Lowell Street is separated by a marked centerline. The West Street northbound approach consists of a shared left-turn/through lane and an exclusive right-turn lane. The West Street southbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. Directional flow along West Street is separated by a marked centerline. Sidewalks are present along both sides of Lowell Street west of the intersection and along the westerly side of West Street south of the intersection. A crosswalk is provided across Lowell Street west of the intersection. Land uses on the corners of the intersection include a gas station, a daycare, a ticket sales booth, and a vacant, wooded lot.

Woburn Street, Eames Street and Oxbow Drive

Eames Street intersects Woburn Street from the west and Oxbow Drive intersects from the east to form this four-legged, unsignalized intersection. The Eames Street eastbound and Ox Bow Drive westbound approaches are under STOP-sign control. All four intersections approaches consist of single general purpose travel lanes with directional flow separated by a marked centerline. The Woburn Street southbound approach widens to nearly 55 feet at the intersection, providing sufficient space for through vehicles to bypass turning vehicles. There are no sidewalks or crosswalks located at the intersection. Land uses on the corners of the intersection consist primarily of residential homes.

Woburn Street and Industrial Way

Industrial Way intersects Woburn Street from the east to form this three-legged unsignalized intersection. The Industrial Way westbound approach is under STOP-sign control. All three intersection approaches consist of single general purpose travel lanes with directional flow separated by marked centerlines. However, the approaches are sufficiently wide to allow through and right turning vehicles to bypass left-turning vehicles. Land use in the vicinity of this intersection primarily consists of commercial/industrial properties.

Woburn Street and Presidential Way

Presidential Way intersects Woburn Street from the east to form this three-legged unsignalized intersection. The Woburn Street northbound approach consists of wide roadway, accommodating two travel lanes. The Woburn Street southbound approach consists of a single general purpose travel lane. Directional travel along Woburn Street is separated by a double-yellow centerline, north of the intersection. The Industrial Way westbound approach consists of a general purpose travel lane, under STOP-sign control. The posted speed limit on Presidential Way is 35 miles per hour (mph). Land use in the vicinity of this intersection primarily consists of commercial/industrial properties.

Main Street and Eames Street

Eames Street intersects Main Street from the east to form this three-legged, unsignalized intersection. The Eames Street westbound approach is under STOP-sign control. All three intersection approaches consist of a single general purpose travel lane with directional flow separated by a marked centerline. There are no sidewalks or crosswalks provided at the intersection. Land use in the vicinity of this intersection consists of residential and commercial properties.

TRAFFIC VOLUMES

Existing Traffic Volumes

To establish base traffic conditions within the study area, manual turning movement and vehicle classification counts were obtained in June 2015. Peak-period turning movement counts were conducted on June 10, 2015 during the weekday morning and evening peak periods (7:00 to 9:00 AM and 3:00 to 6:00 PM) at the following intersections:

- Main Street and Eames Street
- Woburn Street, Eames Street, and Ox Bow Drive
- Woburn Street and Industrial Way
- Woburn Street at Presidential Way
- Lowell Street and Woburn Street
- Lowell Street and West Street

Daily traffic counts were conducted on Eames Street for a two day period on June 10 and June 11, 2015 using automatic traffic recorders (ATR).

Analysis of the peak-period traffic counts indicated that the weekday morning commuter peak hour generally occurs between 7:30 AM and 8:30 AM and the weekday evening commuter peak hour generally occurs between 5:00 PM and 6:00 PM. The traffic count worksheets are provided in the Appendix.

Seasonal Adjustment

The traffic-volume data gathered as part of this study was collected during the month of June 2015. Data from the MassDOT was reviewed to determine the monthly variations of the traffic volumes. The traffic data showed June volumes to be slightly higher than average month conditions. Therefore, to be conservative, the June traffic volumes were not adjusted and were used to represent average month conditions. The 2015 existing weekday peak-hour and daily traffic volumes for average-month conditions are summarized below in Table 1. The 2015 Existing Weekday Morning and Weekday Evening Peak Hour traffic flow networks are shown graphically on Figures 2 and 3, respectively. The seasonal worksheets are provided in the Appendix.

TABLE 1
EXISTING WEEKDAY TRAFFIC-VOLUME SUMMARY^a

Location	Daily Traffic Volume ^b	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
		Traffic Volume ^c	K Factor ^d	Directional Distribution ^e	Traffic Volume	K Factor	Directional Distribution
Eames Street	7,560	650	8.6	52.3% WB	795	10.5	52.2% EB

^aTwo-way traffic volume.

^bDaily traffic expressed in vehicles per day.

^cExpressed in vehicles per hour.

^dPercent of daily traffic volumes which occurs during the peak hour.

^ePercent of peak-hour volume in the predominant direction of travel.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound.

Eames Street was recorded to carry approximately 7,560 vehicles per day (vpd). During the weekday morning peak hour, approximately 650 vehicles per hour (vph) were recorded on Eames Street and during the weekday evening peak hour, 795 vph were recorded.

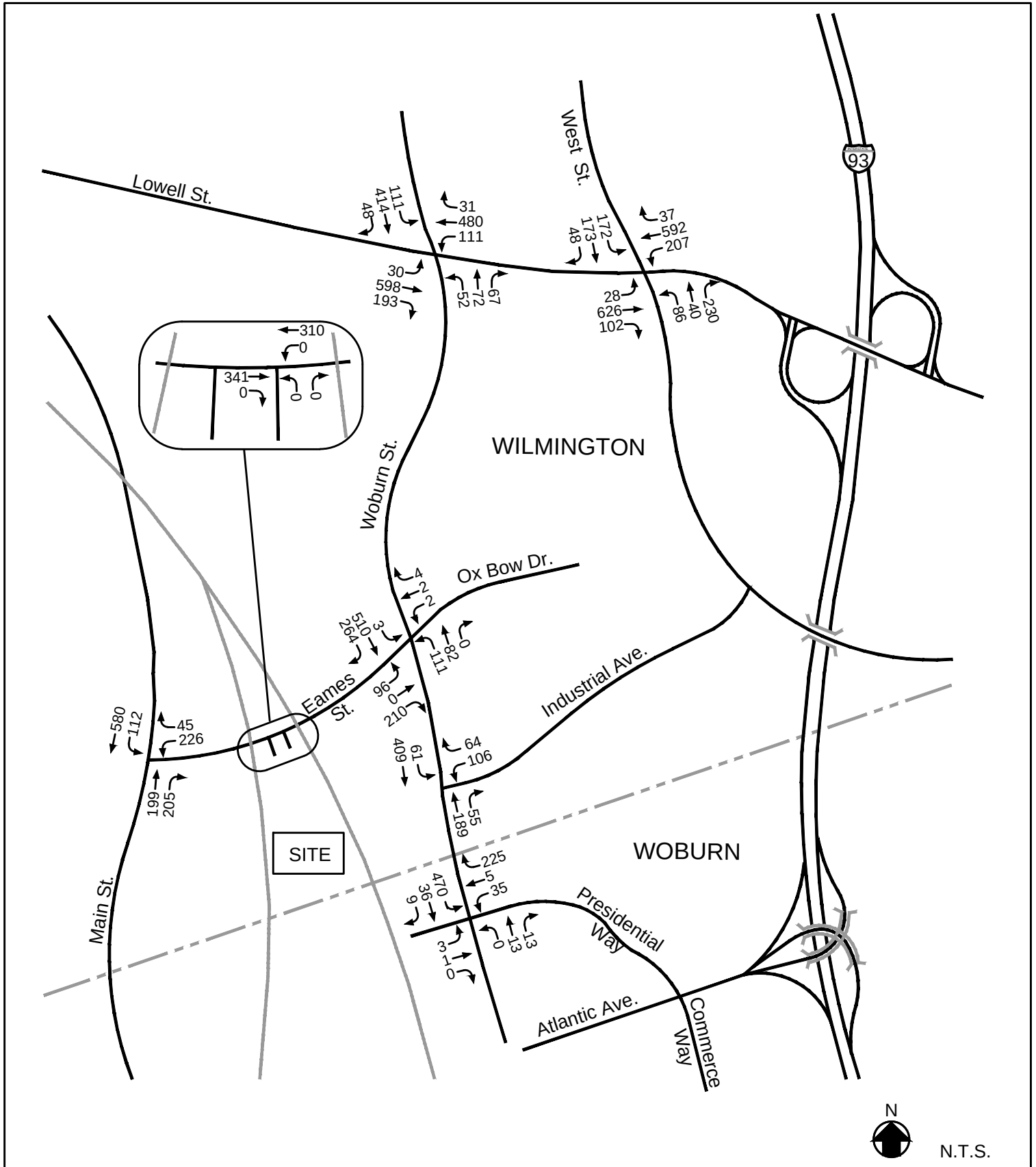
MOTOR VEHICLE CRASH DATA

Motor vehicle crash data for the study area intersections and roadways were obtained from MassDOT for 2009 through 2013. The motor vehicle crash data was reviewed to determine crash trends in the study area. A total of fifty-one (51) crashes were reported during the five year interval. The crash data is included in the Appendix. The crash data is summarized in Table 2.

Most of the crashes occurred at the two signalized intersections of Lowell Street at Woburn Street (19) and Lowell Street at West Street (21). Of these 40 crashes, 24 were rear-end type collisions and 12 were angle collisions. No fatalities were reported during the five-year analysis period.

In order to quantify and establish the significance of accidents at an intersection, the number of accidents must relate or be compared to the traffic volumes entering the intersection. A procedure used by MassDOT for this purpose is the calculation of an intersection accident (crash) rate, which is a measure of the frequency of accidents, compared to the intersection traffic volumes. The accident rate is based on accidents per million entering vehicles (A/MEV). MassDOT releases official Statewide and District rates that can be used as an effective tool to compare safety hazards at a specific intersection. The official Statewide and District 4 rates for the most recent calendar year for an unsignalized intersection are 0.60 and 0.58 A/MEV, respectively. Accident rates higher than these averages at an unsignalized intersection could indicate a potential safety issue.

The accident (crash) rate for all study intersection was calculated using the crash data from 2009 through 2013. The intersection crash rates range from a low of 0.11 A/MEV at Main Street and Eames Street to a high of 0.48 A/MEV at Lowell Street and Woburn Street. These are significantly lower than both the Statewide and District 4 average crash rates for an unsignalized intersection, an indication there are no significant safety issue.

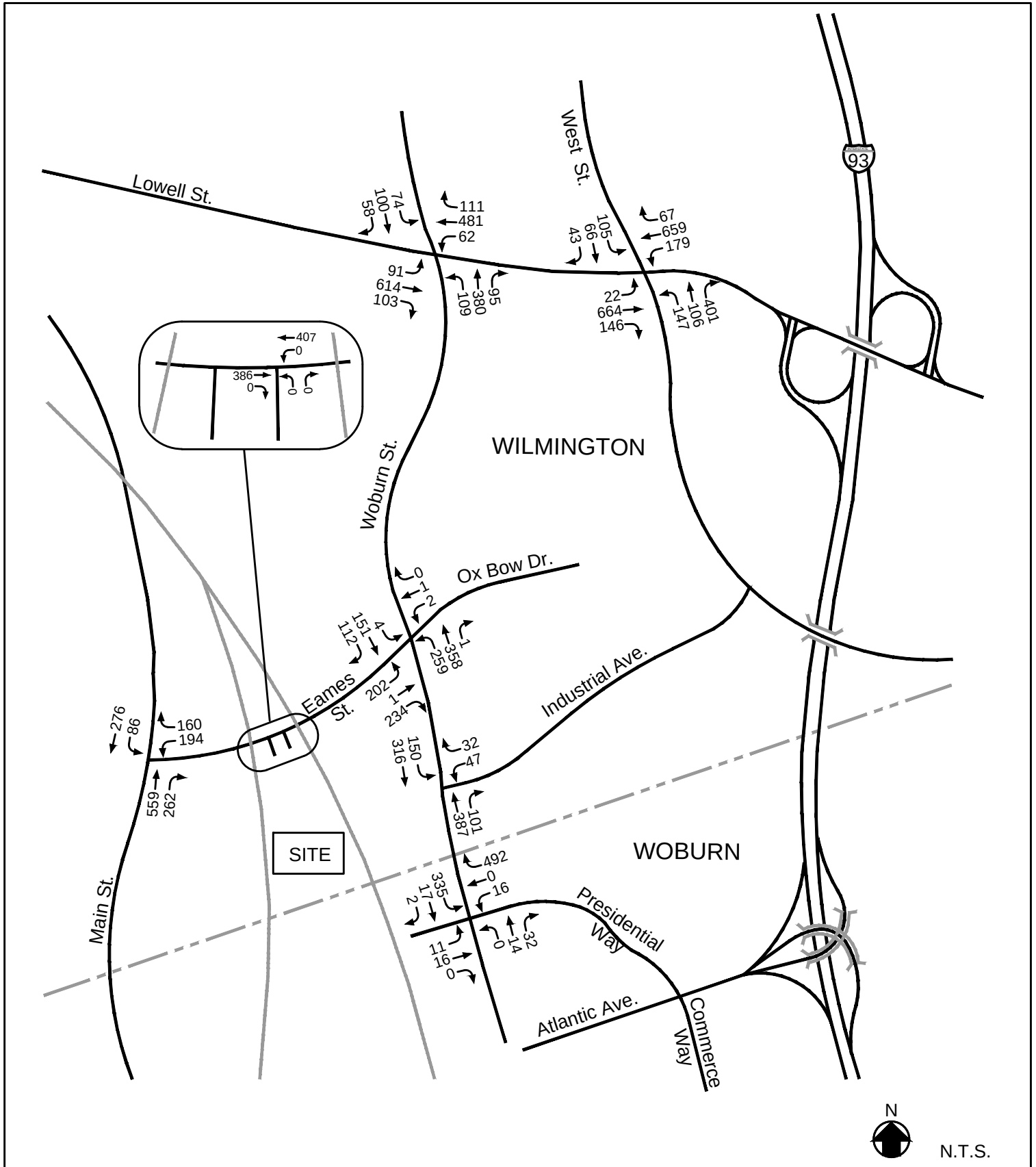


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Figure 3

2015 Existing
Weekday Morning
Peak Hour Traffic Volumes



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Figure 4

2015 Existing
Weekday Evening
Peak Hour Traffic Volumes

TABLE 2
MOTOR VEHICLE CRASH DATA SUMMARY^a

Scenario	Location					
	Lowell Street/ Woburn Street	Lowell Street/ West Street	Woburn Street/ Eames Street/ Oxbow Drive	Woburn Street/ Industrial Way	Woburn Street/ Presidential Way	Main Street/ Eames Street
<i>Year^b:</i>						
2009	4	5	1	2	0	0
2010	2	3	0	1	0	0
2011	4	3	2	0	0	3
2012	5	5	0	2	0	0
2013	<u>3</u>	<u>5</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	19	21	3	5	0	3
Average ^b	3.8	4.2	0.6	1.0	0.0	0.60
Crash Rate ^c	0.48	0.46	0.13	0.28	0.00	0.11
Significant ^d	No	No	No	No	No	No
<i>Type:</i>						
Angle	12	12	2	1	0	2
Rear-End	5	7	1	3	0	1
Sideswipe	0	0	0	0	0	0
Pedestrian	2	2	0	0	0	0
Bicycle	0	0	0	0	0	0
Single Vehicle Crash	0	0	0	0	0	0
<u>Unknown</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>
Total	19	21	3	5	0	3
<i>Time of Day:</i>						
Morning (7:00 to 9:00 AM)	2	5	1	1	0	0
Evening (4:00 to 6:00 PM)	2	4	2	0	0	1
<u>Remainder of Day</u>	<u>15</u>	<u>12</u>	<u>0</u>	<u>4</u>	<u>0</u>	<u>2</u>
Total	19	21	3	5	0	3
<i>Pavement Conditions:</i>						
Dry	17	15	3	5	0	2
Wet	2	2	0	0	0	1
Snow/Ice/Slush	0	4	0	0	0	0
<u>Unknown</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	19	21	3	5	0	3
<i>Severity:</i>						
Property Damage Only	16	18	2	4	0	2
Personal Injury	3	3	1	1	0	1
Fatal Accident	0	0	0	0	0	0
<u>Unknown</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	19	21	3	5	0	3

^aSource: Wilmington Police Department.

^bAverage crashes over analysis period.

^cCrash rate per million entering vehicles (mev).

^dSignalized intersections are significant if rate >0.77 crashes per million vehicles, and unsignalized intersections are significant if rate >0.58 crashes per million vehicles.

PUBLIC TRANSPORTATION

Both the Lowell Regional Transit Authority (LRTA) and the Massachusetts Bay Transit Authority (MBTA) were reviewed to determine any public transportation services within the study area. Currently, neither agency provides any transit service to this section of Wilmington.

PLANNED ROADWAY IMPROVEMENTS

Officials for the Town of Wilmington were contacted regarding roadway improvements planned for the study area intersections. No improvements are currently planned.

SECTION 3:

FUTURE NO-BUILD AND BUILD TRAFFIC CONDITIONS

To determine the impact of site-generated traffic volumes on the roadway network under future conditions, baseline traffic volumes in the study area were projected to the year 2022. Traffic volumes on the roadway network at that time, in the absence of the proposed project, would include existing traffic, new traffic due to general background traffic growth, and traffic related to specific developments by others expected to be completed by 2022. Consideration of these factors resulted in the development of 2022 No-Build traffic volumes. Anticipated site-generated traffic volumes were then superimposed upon these No-Build traffic flow networks to develop the 2022 Build conditions.

FUTURE 2022 NO-BUILD TRAFFIC VOLUMES

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

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

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

Background Traffic Growth

Traffic-volume data compiled by MassDOT from permanent count stations and historic traffic counts in the area were reviewed in order to determine traffic growth trends. Based on a review of this data, it was determined that traffic volumes within the study area have shown little growth or in some cases have generally decreased over the past several years. However, to provide a conservative growth estimate, a one (1.0) percent per year compounded annual background traffic growth rate was used to account for potential future traffic growth external to the study area and presently unforeseen development. The MassDOT data is contained in the Appendix.

Specific Development by Others

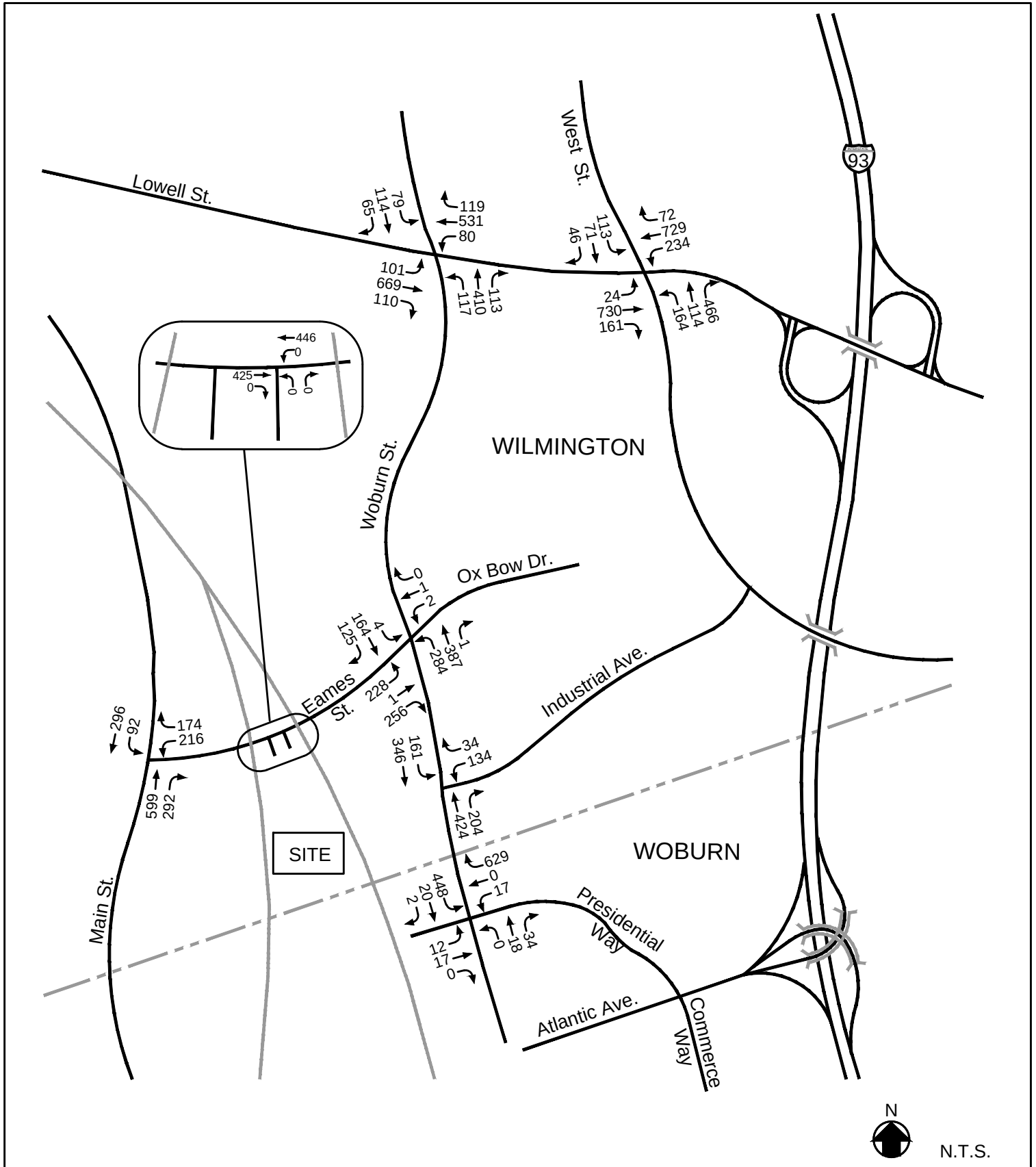
Traffic volumes generated by the specific local developments by others were included in the 2022 No-Build condition. The Town of Wilmington was contacted to identify specific planned developments. Based on these discussions, there are three projects that will impact future volumes. These include the proposed FedEx Ground distribution center at 45 Industrial Way, the Proposed Concrete Facility at 90 Eames Street and Proposed Mixed-Use Development at 203 Lowell Street. The traffic volume projections from these proposed, nearby developments were obtained from the traffic data submitted as part of each project's application and are included in the Appendix.

No-Build Condition Traffic Volumes

The 2022 No-Build weekday morning and weekday evening peak hour traffic volumes were developed by applying a compounded one (1) percent annual growth rate to the 2015 Existing peak hour traffic volumes and adding the generated traffic from the identified background project. The projected 2022 No-Build Weekday Morning and Weekday Evening Peak Hour Traffic Volumes used in the analysis of the No-Build conditions are shown in Figures 4 and 5.



2022 No-Build Weekday Morning Peak Hour Traffic Volumes



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Figure 6

2022 No-Build
Weekday Evening
Peak Hour Traffic Volumes

FUTURE BUILD CONDITIONS

Project Description

New England Transrail, LLC proposes to construct a railroad transportation facility that transloads (rail to truck) a broad array of products, including, palletized and bagged products through a cross-dock warehouse, bulk liquids from tank cars and granular materials from hopper cars. The transload facility will employ approximately 35 to 50 new employees. Employee shifts and site operations are scheduled each day for 5:00 AM to 1:00 PM, from 1:00 PM to 9:00 PM and from 9:00 PM to 5:00 AM. The facility will be serviced by locomotives delivering inbound cargo primarily in box cars, tanker cars and hopper cars to the site and subsequently by trucks carrying materials and products away from the site to regional and local destinations. Box car cargo will be either direct loaded into trucks for continued transport to final destinations or staged or re-packaged within a cross-dock facility for subsequent truck pick-up. Bulk liquids cargo will be either directly loaded into tanker trucks or held within a throughput tank until truck pick-up and delivery to final destinations. Granular materials will be loaded directly into trucks or held in throughput tanks and bulk storage until truck pick-up and delivery.

Site Traffic Generation

In order to develop the traffic characteristics of the proposed project, available trip-generation statistics published by ITE was researched. ITE does not contain trip-generation data for this land use. Trip generation for the proposed transload facility was determined based on the expected number of employees and expected site operations and truck activities. Data provided by New England Transrail, LLC on the proposed usage of the site and expected operations were used to develop the trip characteristics of the site. The transload facility will employ approximately 35 to 50 new employees. Employee shifts and site operations are scheduled each day for 5:00 AM to 1:00 PM, from 1:00 PM to 9:00 PM and from 9:00 PM to 5:00 AM. The employee vehicle trips will generally occur outside the commuter peak hours.

Almost all traffic, except that for local deliveries in Wilmington, Woburn, and Tewksbury will use Presidential Way to access the site. Truck deliveries typically will occur outside the weekday morning and evening peak hours. The expected estimated site generation is summarized in Table 3.

TABLE 3
DAILY TRIP GENERATION ESTIMATES

	Estimated Payload Per Truck (Tons/Gals.)	Estimated Daily (Max.) No. of Trucks
Tractor Trailer(s) [Outbound] (40' to 53' tractors w/trailers)	20 Tons	137
Straight Box Truck(s) [Outbound] (30' Straight Bed Trucks to 40' Tractor Trailers)	10 Tons	137
Bulk Liquids Tanker Truck(s) [Outbound] (28' to 53' tractor w/trailer)	3000 - 9500 Gallons	70
Miscellaneous [Inbound & Outbound]	10 - 20 Tons	15
Supply/Deliveries		6
Employee Vehicles		<u>35</u>
	TOTAL	400

The estimated daily number of delivery vehicles and employee vehicles is a total of 400 vehicles. Therefore, the expected daily traffic generation is estimated as 800 vehicle trip ends per day (400 vehicles entering and 400 vehicles exiting).

Using the employee shift data, expected delivery arrival data, the temporal flow of traffic within the study area, trips for the facility were determined, as shown in Table 4.

TABLE 4
PROPOSED TRIP-GENERATION SUMMARY

	Transload Facility ^a
Average Weekday Daily Traffic	800
<i>Weekday Morning Peak Hour:</i>	
Entering	36
<u>Exiting</u>	<u>33</u>
Total	69
<i>Weekday Evening Peak Hour:</i>	
Entering	40
<u>Exiting</u>	<u>44</u>
Total	84

^aBased on projected employee and truck delivery levels.

The detailed trip generation calculations are provided in the Appendix.

As shown in Table 4, the proposed project is expected to generate 800 vehicle trips (400 vehicles entering and 400 vehicles exiting). During the weekday morning peak hour, 69 vehicle trips (36 vehicles entering and 33 vehicles exiting) are expected. During the weekday evening peak hour, 84 vehicle trips (40 vehicles entering and 44 vehicles exiting) are expected.

Trip Distribution

The directional distribution of the vehicular traffic approaching and departing the site is a function of population densities, the location of employment, existing travel patterns, similar uses, and the efficiency of the existing roadway system. Existing traffic flows and trip assignments from the traffic studies for 321 Eames Street and 333 East Street were reviewed to determine the expected trip distribution pattern. Table 5 summarizes the expected trip distribution.

TABLE 5
PROPOSED TRIP DISTRIBUTION

Roadway	Direction	Percent of Trips
Main Street	North/South	1
Presidential Way	South	99
TOTAL		100

Future Traffic Volumes - Build Condition

The site-generated traffic was distributed within the study area according to the percentages summarized in Table 5. The site generated volumes were superimposed onto the 2022 No-Build traffic volumes to represent the 2022 Build traffic-volume conditions. The anticipated 2022 Build weekday morning and weekday evening traffic volumes are graphically presented in Figures 6 and 7. These volumes were used as the basis for all analysis as well as to identify potential mitigation measures to ameliorate the project's impacts.

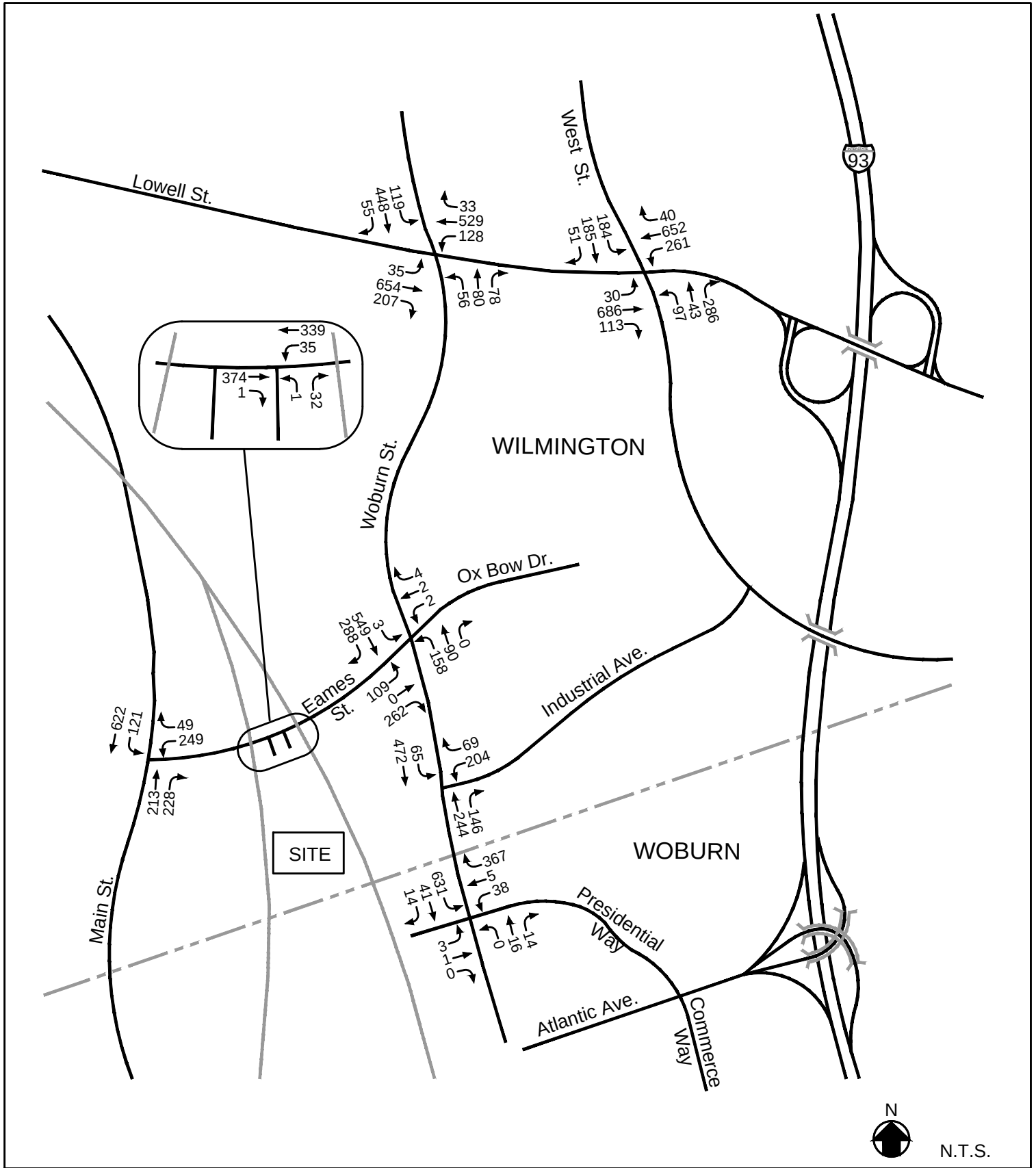
A summary of 2022 peak-hour projected traffic-volume changes in the site vicinity are shown in Table 6. These volumes are based on the expected increases from the site traffic generation.

TABLE 6
TRAFFIC-VOLUME INCREASES^a

Location/Peak Hour	2022 No-Build	2022 Build	Volume (%) Increase over No-Build
<i>Main Street, north of Eames Street</i>			
Weekday Morning	1003	1005	2 (0.2)
Weekday Evening	1161	1163	2 (0.2)
<i>Lowell Street, east of West Street</i>			
Weekday Morning	2109	2109	0 (0.0)
Weekday Evening	2344	2344	0 (0.0)
<i>Presidential Way, east of Woburn Street</i>			
Weekday Morning	989	1056	67 (6.8)
Weekday Evening	1145	1227	82 (7.2)

^aAll volumes are vehicles per hour, total of both directions.

As shown in Table 6, project-related increases are in the range of 67 and 82 bi-directional vehicles during the peak hours. This is approximately equivalent to one additional vehicle every 1.5 minutes or less per direction on average during the peak hours.

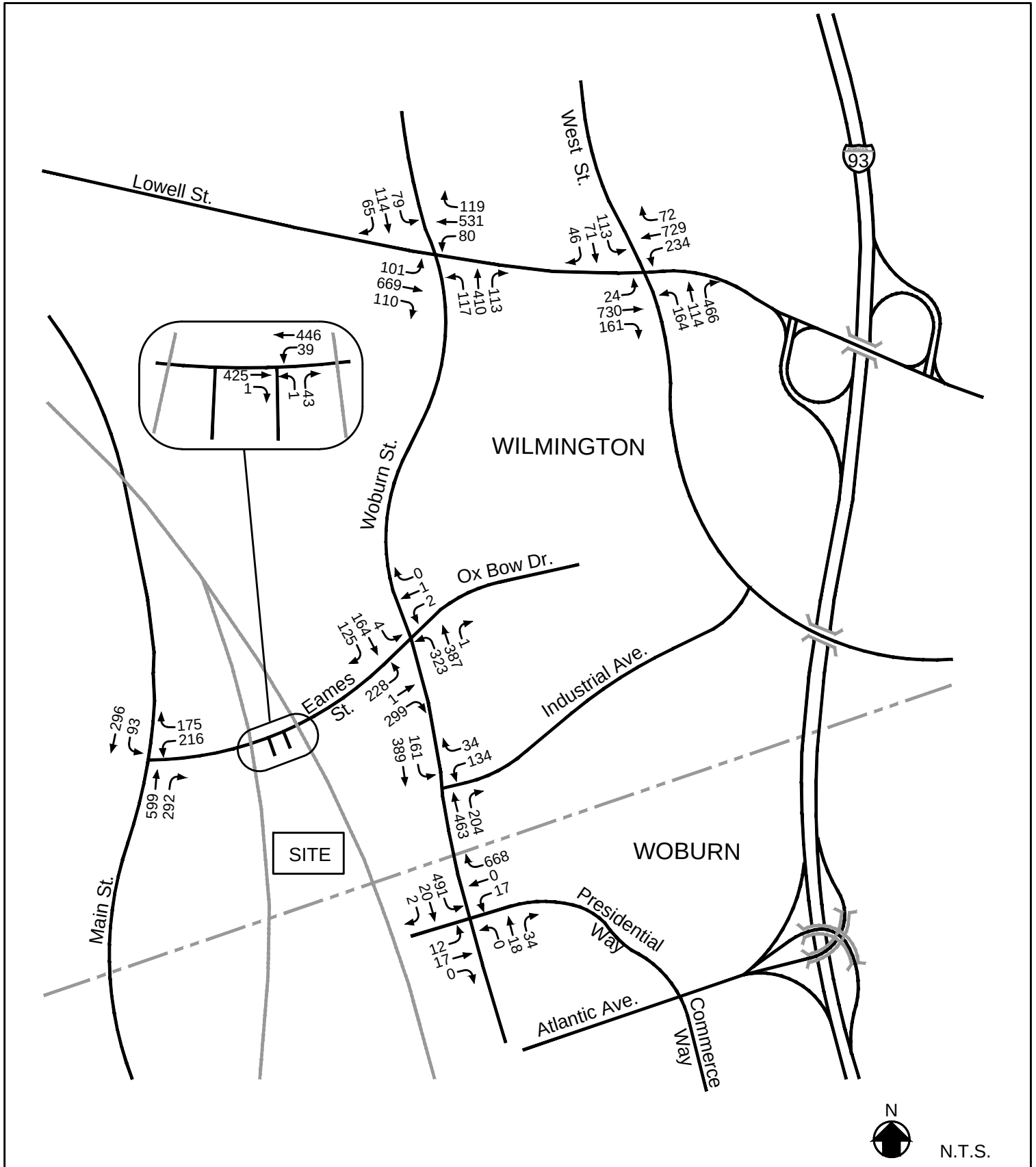


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Figure 7

2022 Build
Weekday Morning
Peak Hour Traffic Volumes



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Proposed Redevelopment
51 Eames Street
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Figure 8

2022 Build
Weekday Evening
Peak Hour Traffic Volumes

SECTION 4: ANALYSIS

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

METHODOLOGY

Levels of Service

Level of service (LOS) is a quantitative measure used to describe the operation of an intersection or roadway segment. The level of service definition is described by the quality of traffic flow and is primarily defined in terms of traffic delays. The primary result of capacity analyses² is the assignment of a level of service to traffic intersections or roadway segments under various traffic-flow conditions. Six levels of service are defined for traffic intersections and roadway segments. Levels of service range from LOS A to LOS F. LOS A represents very good operating conditions and LOS F represents very poor operating conditions.

Signalized Intersections

Levels of service for signalized intersections are calculated using the methodology and procedures described in the 2010 *Highway Capacity Manual*. The methodology assesses the intersection based on type of signal operation, signal timing and phasing, progression, vehicle mix, and intersection geometrics. Level-of-service designations are based on the delay per vehicle. Table 7 summarizes the relationship between level of service and delay. The calculated delay values result in level-of-service designations which are applied to individual lane groups, to individual intersection approaches, and to the entire

²The capacity analysis methodology is based on procedures presented in the *Highway Capacity Manual*; Transportation Research Board; Eames, DC; 2010.

intersection. In the 2010 HCM methodology, the critical lane group volume to capacity ratio is reported.

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

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

^a*Highway Capacity Manual*; Transportation Research Board; Eames, DC; 2010; page 18-6.

^bVolume to capacity ratio.

Unsignalized Intersections

The level of service for an unsignalized intersection is determined by the methodology and procedures described in the 2010 *Highway Capacity Manual*.³ The level of service for unsignalized intersections is measured in terms of average delay for the critical movements (typically side street turning movements or mainline turning movements). The delay for the critical movements is a function of the available capacity for the movement and the degree of saturation of the lane group containing the critical movement. The delay calculation includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. The definitions for level of service at unsignalized intersections are also provided in the 2010 *Highway Capacity Manual*. Table 8 summarizes the relationship between level of service and average control delay for the critical movements at unsignalized intersections.

³*Highway Capacity Manual*; Transportation Research Board; Eames, DC; 2010.

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

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

^aHighway Capacity Manual; Transportation Research Board; Elm, DC; 2010; page 19-2

^bVolume to capacity ratio.

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

CAPACITY ANALYSIS RESULTS

Level-of-service analyses were conducted for 2015 Existing, 2022 No-Build, and 2022 Build conditions for the intersections within the study area. The results of the 2022 signalized analyses are summarized in Table 9 and the unsignalized analyses are summarized in Table 10. Detailed analysis sheets are presented in the Appendix.

TABLE 9
SIGNALIZED LEVEL-OF-SERVICE ANALYSIS SUMMARY

Signalized Intersection/ Peak Hour	2015 Existing			2022 No-Build			2022 Build		
	V/C ^a	Delay ^b	LOS ^c	V/C	Delay	LOS	V/C	Delay	LOS
Lowell Street and Woburn Street									
Weekday Morning									
Eastbound LT/TH/RT	1.05	64.9	E	1.15	>80.0	F	1.15	>80.0	F
Westbound LT/TH/RT	1.14	>80.0	F	1.40	>80.0	F	1.40	>80.0	F
Northbound LT/TH/RT	0.58	22.4	C	0.68	26.8	C	0.68	26.8	C
Southbound LT/TH/RT	1.10	>80.0	F	1.21	>80.0	F	1.21	>80.0	F
OVERALL		78.7	E		>80.0	F		>80.0	F
Weekday Evening									
Eastbound LT/TH/RT	1.17	>80.0	F	1.33	>80.0	F	1.33	>80.0	F
Westbound LT/TH/RT	0.98	48.4	D	1.18	>80.0	F	1.18	>80.0	F
Northbound LT/TH/RT	1.10	>80.0	F	1.22	>80.0	F	1.22	>80.0	F
Southbound LT/TH/RT	0.72	31.5	C	0.84	42.7	D	0.84	42.7	D
OVERALL		79.2	E		>80.0	F		>80.0	F
Lowell Street and West Street									
Weekday Morning									
Eastbound TH/LT	0.92	39.3	D	1.00	55.2	E	1.00	55.2	E
Eastbound RT	0.18	7.5	A	0.20	8.0	A	0.20	8.0	A
Westbound LT	0.70	21.9	C	0.90	49.9	D	0.90	49.9	D
Westbound TH/RT	0.60	11.3	B	0.64	12.1	B	0.64	12.1	B
Northbound TH/LT	0.70	48.2	D	0.93	86.8	F	0.93	86.8	F
Northbound RT	0.52	7.1	A	0.63	10.0	B	0.63	10.0	B
Southbound LT	0.72	45.2	D	0.87	64.6	E	0.87	64.6	E
Southbound TH/RT	0.58	31.3	C	0.65	34.8	C	0.65	34.8	C
OVERALL		25.7	C		36.7	D		36.7	D
Weekday Evening									
Eastbound TH/LT	0.92	39.5	D	1.01	57.6	E	1.01	57.6	E
Eastbound RT	0.23	8.5	A	0.25	9.10	A	0.25	9.10	A
Westbound LT	0.66	19.4	B	0.86	43.0	D	0.86	43.0	D
Westbound TH/RT	0.73	14.5	B	0.78	16.5	B	0.78	16.5	B
Northbound TH/LT	0.90	62.5	E	1.07	>80.0	F	1.07	>80.0	F
Northbound RT	0.78	18.4	B	0.95	40.2	D	0.95	40.2	D
Southbound LT	0.77	64.5	E	1.09	>80.0	F	1.09	>80.0	F
Southbound TH/RT	0.30	20.6	C	0.33	21.5	C	0.33	21.5	C
OVERALL		28.4	C		46.0	D		46.0	D

^aMaximum volume-to-capacity ratio.

^bDelay in seconds per vehicle.

^cLevel of service.

Lowell Street and Woburn Street

Under 2015 Existing weekday morning conditions, this signalized intersection currently operates at level of service (LOS) E during the weekday morning peak hour and at LOS E during the weekday evening peak hour. Under future 2022 No-Build conditions, this intersection is projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 Build conditions, with the project, this intersection is projected to continue to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. The proposed project is not projected to have any impact at this intersection as almost all truck traffic will be accessing the site from the south.

Lowell Street and West Street

Under 2015 Existing weekday morning conditions, this signalized intersection currently operates at LOS C during the weekday morning peak hour and at LOS C during the weekday evening peak hour. Under future 2022 No-Build conditions, this intersection is projected to operate at LOS D during the weekday morning peak hour and at LOS D during the weekday evening peak hour. Under future 2022 Build conditions, with the project, this intersection is projected to operate at LOS D during the weekday morning peak hour and at LOS D during the weekday evening peak hour. The proposed project is not projected to have any impact at this intersection as almost all truck traffic will be accessing the site from the south.

TABLE 10
2022 UNSIGNALIZED LEVEL-OF-SERVICE ANALYSIS SUMMARY

Critical Movement/ Peak Hour	2015 Existing				2022 No-Build				2022 Build			
	Demand ^a	V/C ^b	Delay ^c	LOS ^d	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Woburn Street, Eames Street and Oxbow Drive												
<i>All movements from Eames Street:</i>												
Weekday Morning	306	1.16	>50.0	F	339	1.47	>50.0	F	371	1.74	>50.0	F
Weekday Evening	437	2.77	>50.0	F	485	3.96	>50.0	F	528	5.00	>50.0	F
Woburn Street and Industrial Way												
<i>All movements from Industrial Way:</i>												
Weekday Morning	170	0.54	24.0	C	273	1.12	>50.0	F	273	1.24	>50.0	F
Weekday Evening	79	0.50	38.7	E	168	1.75	>50.0	F	168	2.07	>50.0	F
Woburn Street and Presidential Way												
<i>All movements from Presidential Way:</i>												
Weekday Morning	265	0.60	23.1	C	375	1.08	>50.0	F	410	1.24	>50.0	F
Weekday Evening	508	0.76	20.2	C	646	1.07	>50.0	F	685	1.21	>50.0	F
Eames Street and Site Driveway												
<i>All movements from Site Driveway:</i>												
Weekday Morning	-	-	-	-	-	-	-	-	33	0.06	11.6	B
Weekday Evening	-	-	-	-	-	-	-	-	44	0.08	11.9	B
Main Street and Eames Street												
<i>All movements from Eames Street:</i>												
Weekday Morning	271	1.87	>50.0	F	297	2.43	>50.0	F	298	2.44	>50.0	F
Weekday Evening	354	1.60	>50.0	F	390	2.02	>50.0	F	391	2.04	>50.0	F

^aDemand of critical movements in vehicles per hour.

^bVolume-to-capacity ratio.

^cDelay in seconds per vehicle.

^dLevel of service.

^eDelay not representative of actual conditions when v/c is greater than 1.00.

Woburn Street, Eames Street and Oxbow Drive

Under 2015 Existing conditions, during the peak hours, the critical movements (all movements from Eames Street) are modeled to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 No-Build conditions, these critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 Build conditions, with the project, the critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Based on existing intersection operations and observations, actual operations are better than the HCS methodology indicates.

Woburn Street and Industrial Way

Under 2015 Existing conditions, during the peak hours, the critical movements (all movements from Industrial Way) are modeled to operate at LOS C during the weekday morning peak hour and at LOS E during the weekday evening peak hour. Under future 2022 No-Build conditions, these critical movements are projected to operate at LOS F

during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 Build conditions, with the project, the critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Based on existing intersection operations and observations, actual operations are better than the HCS methodology indicates.

Woburn Street and Presidential Way

Under 2015 Existing conditions, during the peak hours, the critical movements (all movements from Presidential Way) are modeled to operate at LOS C during the weekday morning peak hour and at LOS C during the weekday evening peak hour. Under future 2022 No-Build conditions, these critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 Build conditions, with the project, the critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Based on existing intersection operations and observations, actual operations are better than the HCS methodology indicates.

Eames Street and Site Driveway

Under 2015 Existing conditions, there are no vehicles entering or leaving the site. There are no conflicting turn movements at the site driveway under 2015 Existing conditions or under 2022 No-Build conditions. Under future 2022 Build conditions, with the project, the critical movements are projected to operate at LOS B during the weekday morning and the weekday evening peak hours.

Main Street and Eames Street

Under 2015 Existing conditions, during the peak hours, the critical movements (all movements from Eames Street) are modeled to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 No-Build conditions, these critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Under future 2022 Build conditions, with the project, the critical movements are projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. Based on existing intersection operations and observations, actual operations are better than the HCS methodology indicates.

SECTION 5: RECOMMENDATIONS AND CONCLUSION

RECOMMENDATIONS

The final phase of the analysis process is to identify the mitigation measures to minimize the impact of the project on the transportation system, if necessary.

Non-Project Related Mitigation

The following intersections have been analyzed without the proposed project and have been determined to require potential modifications and improvements:

- Main Street and Eames Street
- Woburn Street, Eames Street and Oxbow Drive
- Lowell Street and Woburn Street
- Lowell Street and West Street

It should be clearly noted that any improvements to these intersections are precipitated by existing conditions and are not solely due to the project's impacts. Mitigation measures have been identified so that the community and local planning agencies have the tools to identify needed improvements.

Main Street and Eames Street

Under 2015 Existing conditions, during the peak hours, the critical movements (all movements from Eames Street) are modeled to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. These critical movements are projected to continue to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour without the project. Review of existing peak hour operations indicates that a traffic signal would be warranted at this intersection. Installation of a traffic signal would provide the necessary gaps for vehicles to exit the minor street. With this measure, under future 2022 Build conditions, this intersection would operate at LOS C during the weekday morning and evening peak hours.

Woburn Street, Eames Street and Oxbow Drive

Under 2015 Existing conditions, during the peak hours, the critical movements (all movements from Eames Street) are modeled to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. These critical movements are projected to continue to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour without the project. During off-peak hours, traffic operations are expected to be better and less congested. Possible improvements include traffic signalization and intersection geometry improvements at the southwest corner to facilitate right turns from Eames Street, including providing an exclusive left-turn lane on Eames Street. With these measures, under future 2022 Build conditions, the intersection is projected to operate at LOS C or better during the weekday morning and evening peak hours.

Lowell Street and Woburn Street

Under 2022 No-Build conditions, during the peak hours, this signalized intersection is projected to operate at LOS F during the weekday morning peak hour and at LOS F during the weekday evening peak hour. The Town's consultant, TEC has developed a preliminary mitigation plan for this intersection which includes widening of all approaches to include exclusive left-turn lanes and upgrading the intersection signalization. With these potential improvements, the intersection is projected to operate at LOS C and LOS D or better during the weekday morning and weekday evening peak hours, respectively.

Project Related Mitigation

The following measures have been identified to mitigate the project's impacts and improve intersection operations. The project proponent is committed to working with the Town of Wilmington to implement these measures.

Site Access

The site driveway is recommended to be designed to handle large trucks with appropriate driveway radii (50 foot minimum) and width (24 foot minimum). The driveway should be placed under STOP sign control.

Transportation Demand Management

Transportation Demand Management (TDM) strategies generally work well with office/research and development type facilities. Due to the nature of the proposed project, TDM strategies do not typically work well. In an effort to maximize employee vehicle occupancy and thereby reduce vehicular demand to the site, the project proponent will encourage employees to rideshare. This will be accomplished through the provision of an on-site transportation coordinator to publicize and encourage ride-sharing and

provide a ride-matching service. Coordination with MassRides is encouraged.

In addition, several TDM strategies can be employed:

- Variable shift schedules (to not impact peak hour traffic flow) are already proposed based on the projected shift scheduling.
- Direct deposit of payroll checks
- Provide a subsidized program for employees who will use the Regional Transportation Center (to the immediate south in Woburn).

CONCLUSION

The proposed industrial development is expected to generate approximately 800 vehicle trips on an average weekday (400 vehicles entering and 400 vehicles exiting), with approximately 69 vehicle trips (36 vehicles entering and 33 vehicles exiting) during the weekday morning peak hour and 84 vehicle trips (40 vehicles entering and 44 vehicles exiting) during the weekday evening peak hour. Based on a review of the anticipated traffic generation, peak-hour traffic-volume increases in the project vicinity are projected to increase between 67 and 82 bi-directional vehicles during the weekday morning and weekday evening peak hours.

An analysis and comparison of the 2022 No-Build and Build traffic operations indicates that these increases do not result in a significant impact on traffic operations within the study area, including the site driveway intersection with Eames Street. All movements exiting the proposed site driveway under 2022 Build conditions are expected to operate at LOS B during both peak periods.

Review of the proposed project and the access plan shows that in relation to roadway capacity, traffic safety, and traffic impacts upon the surrounding roadway network, the proposed project will meet safety standards and have a minimal impact on existing traffic conditions. With the proposed access, and maintaining sight distances from the driveway (clear sight lines along frontage), safe and efficient access can be provided to the residents of the proposed project and to the motoring public in the area.

APPENDIX
