

Dear Chief Sullivan & Lte. Anderson,

We, as residents and property owners of Crescent Hill, continue to have serious concerns about traffic, parking, and safety that will result from the proposed 43+ unit 40B development at 44-48 Crescent Hill.

While the developer and architect have worked with the zoning board to reduce the unit count, we fear that the neighborhood will not be able to support the traffic, congestion, and parking demands that would come with adding such a large building to the neighborhood.

The proposal includes a total of 70 parking spaces in a two-level garage with access from Crescent Hill and Crescent Street. We wanted to call out some of our specific concerns:

- 1) While the proposal may include 70 spaces for residents, what about guests, workers, service & delivery vehicles, etc? As you are well aware, parking in the neighborhood is already extremely tight and limited.
- 2) The proposed garage has access from Crescent Hill for 27 vehicles. Crescent Hill is a small dead end street with nowhere to turn around. It is not uncommon for Amazon vans to back out since they do not have anywhere to turn around. It seems unsafe to have access to the parking garage from Crescent Hill. Vehicles that exit the wrong way will be forced to use our driveways to turn around or reverse back down the hill past the exit to the underground parking area.
- 3) Parking is only permitted on one side of Crescent Hill. When vehicles do park on the illegal side of Crescent Hill (side of street with odd numbered homes), there is not space for 2 vehicles to pass. All it takes is one vehicle parked on the wrong side of Crescent Hill or too close to the corner of Crescent Hill and the fire trucks cannot get down the street to access our homes. We are concerned that the additional density of residents would exacerbate this problem, making it far more likely that we will not be able to be reached by emergency vehicles if they are needed.
- 4) The proposed parking garage includes a mix of 18x9 and 18x8.5 parking spaces, some which are packed in very tightly. We wonder if residents will even be able to fit their cars in this tight space and believe that they will take up the limited street parking. This would encourage parking on the illegal side of Crescent Hill and therefore limiting access by emergency vehicles.
- 5) The corner of Crescent Street & Water Street is already a busy intersection and the proposed building will only add to the existing congestion here. The current traffic analysis does not include the traffic at the Crescent/Water street intersection, which during busy times can back well up the street. Again, we are concerned that the density would be problematic for residents on Crescent Hill and unsafe in the event of an emergency.

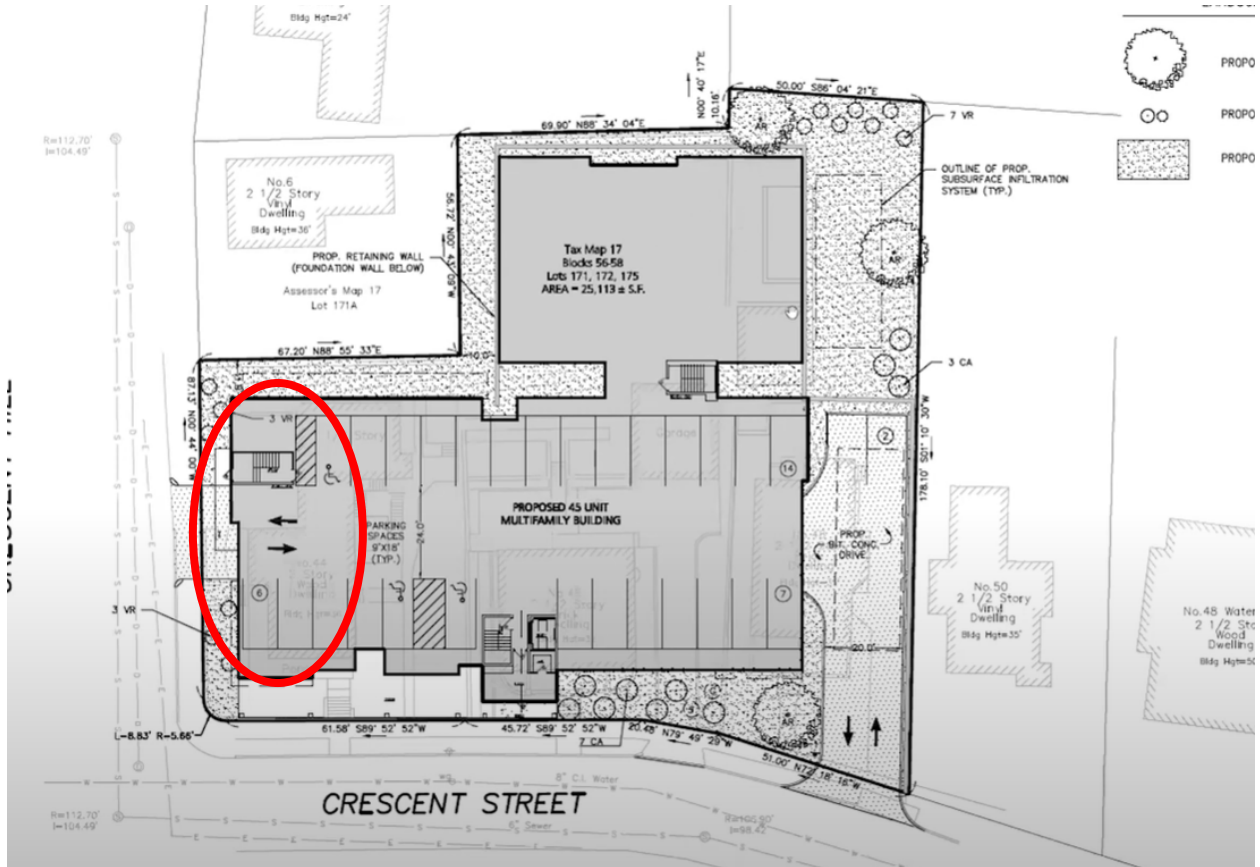
Thank you both for supporting our neighborhood's safety during the proposal process. Below are some screenshots from the more recent presentation as well as some photos from the neighborhood for your reference.

Best regards,

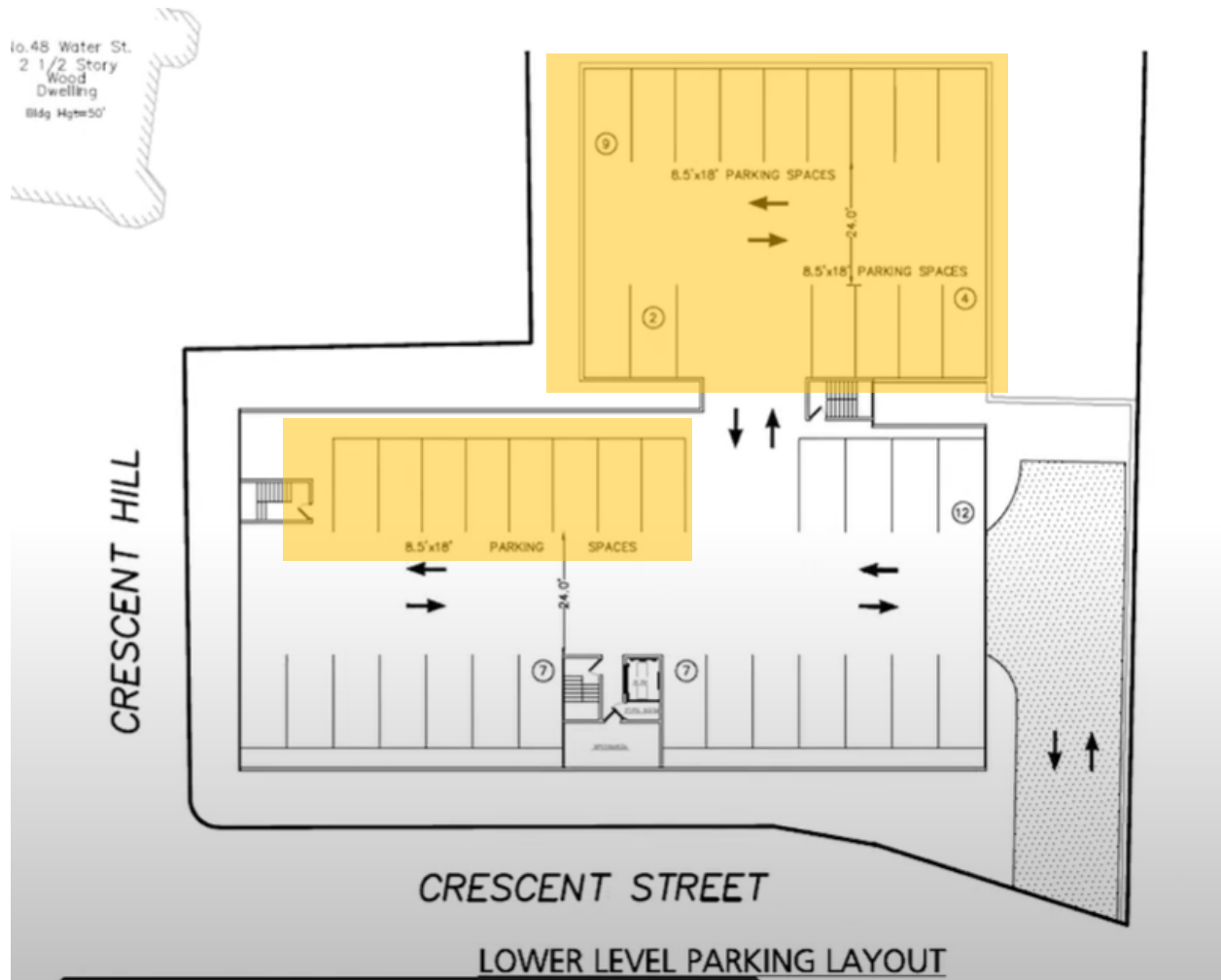
Cullen & Katie Kulaga

9 Crescent Hill

The proposed upper parking level would be accessed from Crescent Hill and includes a total of 27 parking spaces. Crescent Hill is too small to support two way access for 27 vehicles.



The proposed lower level will include 41 spaces and will be accessed from Crescent Street. 21 will only be 8.5 feet wide. These 8.5 foot wide spaces are really crammed into a small space, and we question if/how residents will actually use these spots or if they will instead park on the street (including parking on the illegal side of Crescent Hill and therefore limiting emergency vehicles access)



Here are few photos documenting how tight our current parking situation is (I am sure you are well aware!).

A Crescent Street resident has “claimed” his winter spot:



Even during the spring/summer it happens. There are frequent altercations about parking on the street between neighbors.

Vehicles already park illegally, despite the “no parking” sign. These vehicles frequently remain illegally parked overnight. There simply is not room for the “overflow” parking that we know will come with this huge building



And just a couple days ago we had illegally parked vehicles on both sides of the street. This is already a hazard and will only get worse. These vehicles remained in place for the majority of the day. Both are parked DIRECTLY in front of “No Parking” signs.



Lt. Joseph Anderson

From: Katie Kulaga <katienastoukulaga@gmail.com>
Sent: Friday, April 2, 2021 8:57 AM
To: Lt. Joseph Anderson
Subject: Fwd: Crescent Commons Development - Concerns
Attachments: TAC Letter Crescent Commons_.docx

Dear Chief Sullivan & Lt. Anderson,

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Thank you both for supporting our neighborhood's safety during the proposal process. Attached are some screenshots from the more recent presentation as well as some photos from the neighborhood for your reference.

Best regards,

Cullen & Katie Kulaga

Transportation Impact Statement

Proposed Residential Development
Wakefield, Massachusetts

Prepared for:

Melanson Development Group, Inc.
Woburn, Massachusetts

April 2021

Prepared by:



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

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EXECUTIVE SUMMARY

DESCRIPTION OF PROJECT

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Statement (TIS) to identify traffic impacts associated with the proposed 58-unit residential redevelopment with a 3,750 square foot (sf) ground floor restaurant to be located at 62-76 Foundry Street in Wakefield, Massachusetts (the “Project”). The purpose of this TIS is to review existing and future traffic conditions in the vicinity of the site, determine the traffic impact from the proposed Project at key intersections expected to experience increased traffic levels from the Project, and review the need for improvements to mitigate the Project’s traffic impact.

PROPOSED PROJECT

The existing site at 62-76 Foundry Street includes five existing structures that will all be razed as part of the Project. A new five-story building containing the proposed 3,750 sf restaurant and 58 residential units will be constructed on-site. Parking is to be provided on-site for 92 vehicles. The ground floor under the residential units will provide covered parking for 57 vehicles while the remaining 35 spaces are provided on the uncovered surface lot. The site is located to the west of North Avenue, to the east of Foundry Street, to the north of 128 Plumbing, Heating, Cooling & Electric, and to the south of Maple Street. The Massachusetts Bay Transportation Authority (MBTA) Haverhill Line of the commuter rail system runs parallel to North Avenue adjacent to the site. Site access is proposed to via one full-access driveway onto Foundry Street and a second full-access driveway onto Maple Street.

EXISTING CONDITIONS

A comprehensive field inventory was conducted to collect existing roadway geometrics, traffic volumes, operating characteristics, speed limits, and sight distances, as well as land use information. Traffic volumes were obtained from the Transportation Impact Assessment (TIA) conducted by VAI dated February 15, 2019 for a proposed residential development at the Harvard Mills building at 178 Albion Street.¹ The traffic volumes for the 178 Albion Street study were

¹*Transportation Impact Assessment - Proposed Residential Development -- Harvard Mills Building; Wakefield, Massachusetts; Vanasse and Associates Inc.; February 15, 2019.*

collected in May 2017 and January 2019 prior to COVID-19 and included the intersections expected to receive the traffic impact from the 62-76 Foundry Street project. These traffic volumes were increased to account for the effects of background traffic growth for the period between 2019 and 2021. These intersections are listed below:

- North Avenue at Albion Street
- Albion Street at Foundry Street
- Broadway Street at Foundry Street
- North Avenue at Broadway Street

FUTURE CONDITIONS

Traffic volumes within the study area were projected to 2028, which reflect a seven-year planning horizon consistent with State traffic study guidelines. These conditions incorporate traffic growth due to general background traffic increases as well as development projects currently being proposed/permitted or under construction and expected to generate traffic in the future. This condition is referred to as the No-Build condition.

PROJECT-GENERATED TRAFFIC

The Project is expected to generate 878 vehicle trips on an average weekday (two-way, 24-hour volume), with 24 vehicle trips (8 vehicles entering and 16 exiting) expected during the weekday morning peak hour. During the weekday evening peak hour, the Project is expected to generate 38 vehicle trips (22 vehicle entering and 16 exiting).

The projected vehicle trips were distributed onto area roadways based on existing travel patterns and U.S. Census Journey-to-Work data for Wakefield, Massachusetts. Traffic-volume increases due to the Project were shown to range from 0.3 to 1.3 percent during the peak periods and are expected to be less during other hours of the day.

The Project-generated traffic was added to the No-Build condition to assess future operations of the roadways and intersections in the study area.

TRAFFIC OPERATIONS ANALYSIS

In future conditions, operations are generally preserved with minor but manageable increases to delay on the various approaches and overall intersection operations. The addition of Project-related traffic to the study area roadways and intersections is not anticipated to significantly impact traffic operations within the study area over No-Build conditions.

RECOMMENDATIONS AND CONCLUSIONS

The site driveways onto Foundry Street and Maple Street should be placed under STOP-sign control, with painted STOP bars on the drives at the STOP-sign locations. All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the

*Manual on Uniform Traffic Devices (MUTCD)*² and be shorter than 24 inches or be placed outside of the sight lines for drivers exiting the driveway and those approaching the driveways on Foundry Street and Maple Street. Several Transportation Demand Management (TDM) measures including promotion of public transit services and schedules and consideration of Electric Vehicle (EV) chargers on-site will encourage sustainable transportation associated with the site. Due to the presence of over 300 residential units either above or across the street from the restaurant, many restaurant trips are expected to be pedestrian and not vehicular trips.

The Project is expected to produce a minor increase in traffic volumes in the vicinity of the site with minimal increases in delays to the study area intersections. Based on the above, VAI has concluded that the Project can be safely accommodated with minimal impact on the area road network.

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

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Statement (TIS) in order to identify the traffic impacts associated with the proposed residential redevelopment with a ground floor restaurant to be located at 62-76 Foundry Street in Wakefield, Massachusetts. This report identifies and analyzes existing and future traffic conditions both with and without the Project and reviews access requirements, potential off-site improvements, and safety considerations.

STUDY METHODOLOGY

This study was prepared in accordance with the state guidelines for Transportation Impact Assessments (TIA); and was conducted in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometry, observations of traffic flow, and collection of peak-period traffic counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A seven-year time horizon was selected for these analyses consistent with state guidelines for the preparation of TIAs. The traffic analysis conducted in stage two identifies projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any are necessary, based on the results from stage two of the study.

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions within the study area was conducted in March 2021. The field investigation consisted of an inventory of existing roadway geometrics, as well as posted speed limits, and land use information within the study area. The study area for the Project contains the major roadways which provide access to the Project, as well as the intersections which are expected to accommodate the majority of Project-related traffic. The study area is listed below and graphically depicted on Figure 1.

- North Avenue at Albion Street
- Albion Street at Foundry Street
- Broadway Street at Foundry Street
- North Avenue at Broadway Street

The following describes the study area roadways and intersections which are also shown on Figure 2 which summarizes existing lane use, travel lane widths, and sidewalk and crosswalk locations at the study area intersections.

GEOMETRY

Roadway

Foundry Street

Foundry Street is classified as a local roadway under the jurisdiction of the Town of Wakefield, Massachusetts. Foundry Street is a roadway that runs in a northwest-southeast direction from Albion Street to Broadway Street. Foundry Street has no demarcation for separating direction of travel, but two-way travel is permitted. The land uses along Foundry Street consists of some residential but mostly commercial properties.

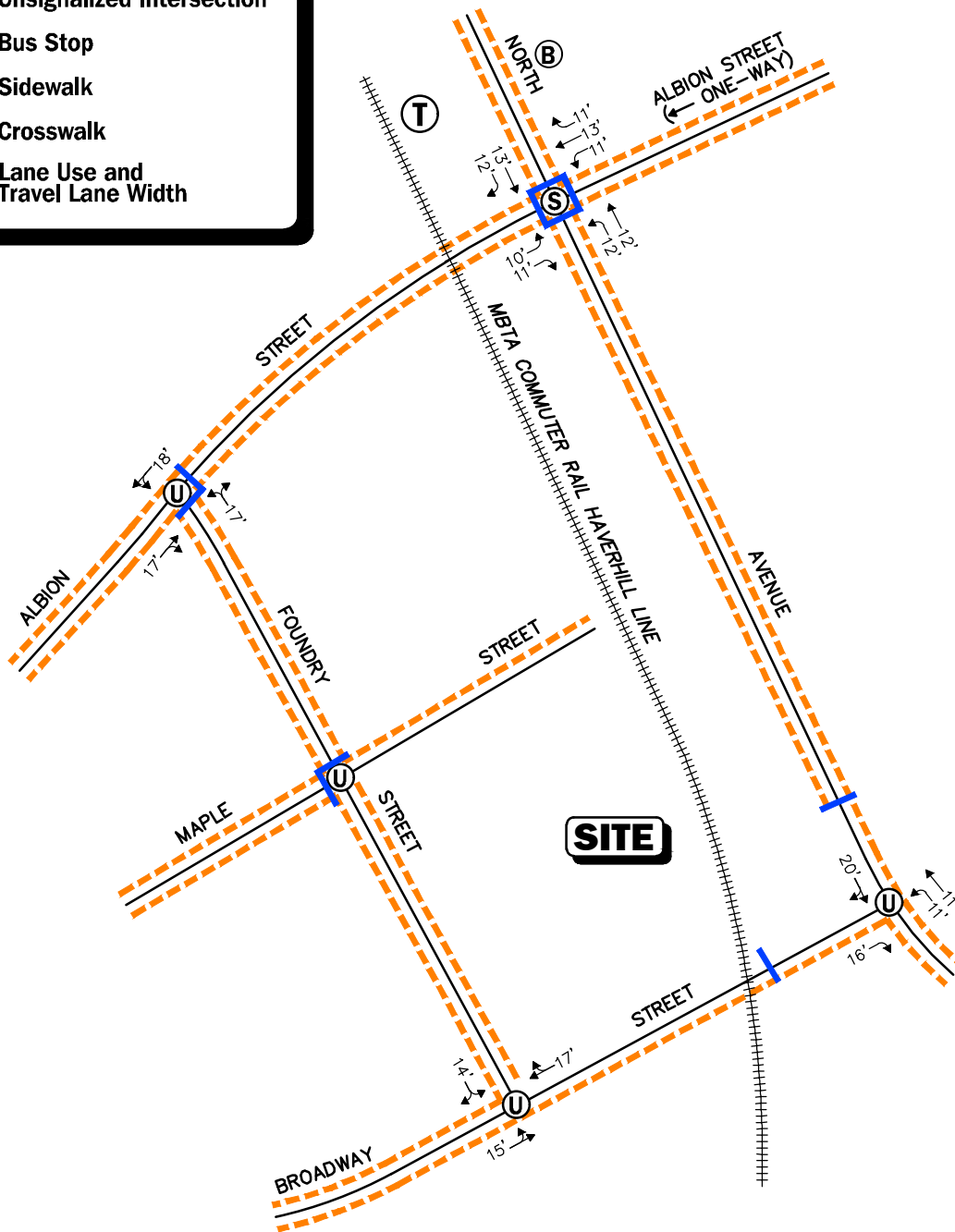


Figure 1
Site Location Map



Legend:

- Ⓢ Signalized Intersection
- Ⓤ Unsignalized Intersection
- Ⓟ Bus Stop
- Sidewalk
- Crosswalk
- xx' ↕ Lane Use and Travel Lane Width



Not to Scale



Figure 2

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

Intersections

North Avenue at Albion Street

North Avenue is intersected by Albion Street from the east and the west to form this four-way intersection under traffic signal control. Direction of travel on North Avenue and Albion Street is separated by a double-yellow centerline. Illumination is provided via streetlights mounted on wooden utility poles and metal poles. Land use in the vicinity of this intersection consists of a church, the train tracks for the Haverhill Line of the Massachusetts Bay Transit Authority (MBTA) commuter rail system, and commercial uses. This intersection is under the jurisdiction of the Town of Wakefield.

Albion Street at Foundry Street

Albion Street is intersected by Foundry Street from the south to form this three-way intersection under STOP-sign control. Direction of travel on Albion Street is separated by a double-yellow centerline. Foundry Street allows two-way travel. Illumination is provided via streetlights mounted on metal poles. Land use in the vicinity of this intersection consists of the site, the existing parking garage on Foundry Street, and a church. This intersection is under the jurisdiction of the Town of Wakefield. Currently, Foundry Street is closed from Albion Street to Maple Street due to construction for the 178 Albion Street development. This is a temporary closure that is expected to be reopened prior to the Project site opening.

Broadway Street at Foundry Street

Broadway Street is intersected by Foundry Street from the north to form this three-way intersection under STOP control. Direction of travel on Broadway Street is separated by a double-yellow centerline. Foundry Street allows two-way travel. Illumination is provided via streetlights mounted on wooden utility poles. Land use in the vicinity of this intersection consists of Crystal Lake and residential and commercial uses. This intersection is under the jurisdiction of the Town of Wakefield. Currently, Broadway Street is closed to through traffic from North Avenue to Foundry Street. Fences are placed on either side of the railroad tracks. This is a temporary closure for installation of new electric transmission conduit as well as gas and water infrastructure. The construction for this was completed in October 2020, but the street must remain closed until reopening approvals have been granted by the Federal Railroad Administration (FRA). It is anticipated that Broadway Street will be reopened prior to the Project site opening.

North Avenue at Broadway Street

North Avenue is intersected by Broadway Street from the west to form this three-way intersection under STOP-sign control. Direction of travel on North Avenue and Broadway Street is separated by a double-yellow centerline. Movement from Broadway Street is restricted to right turns out onto North Avenue. Illumination is provided via streetlights mounted on wooden utility poles. Land use in the vicinity of this intersection consists of commercial uses. This intersection is under the jurisdiction of the Town of Wakefield.

EXISTING TRAFFIC VOLUMES

In order to establish existing traffic-volume demands and flow patterns within the study area, manual turning movement counts (TMCs) were obtained from the TIA conducted by VAI dated February 15, 2019 for a proposed residential development at the Harvard Mills building at 178 Albion Street.³ Counts for that study were completed in May 2017 and January 2019. It should be noted that the counts for the four intersections for the Project study area were completed in May 2017. Manual TMCs were performed from 7:00 to 9:00 AM and from 4:00 to 6:00 PM on a typical weekday at the study area intersections. The May 2017 traffic volumes were grown by 1 percent per year to reflect 2019 traffic-volume conditions. These counts were conducted pre-COVID-19 and therefore do not need to be adjusted for effects of COVID-19.

It should be noted that the area of study for the Project is currently experiencing considerable construction-related traffic detours and activity which reflects a temporary condition not consistent with typical traffic operations. This, in addition to the effects of the COVID-19 pandemic, suggest the use of the previously collected data in favor of new traffic counts of the study area intersections and roadways.

Traffic-Volume Adjustments

The 2019 traffic volumes were grown by 1 percent per year to reflect 2021 traffic-volume conditions. In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, traffic count data from Massachusetts Department of Transportation (MassDOT) permanent count station ID 4158⁴ located on Yankee Division Highway (I-95) north of I-93 were reviewed. May-month volumes are approximately 3 percent higher than average-month volumes for this station. Therefore, the observed volumes were not adjusted downwards in order to provide a conservative analysis.

Baseline traffic volumes on Foundry Street from the 178 Albion Street TIA are summarized in Table 1.

Table 1
BASELINE ROADWAY TRAFFIC-VOLUME SUMMARY

Location	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	Volume (vph) ^a	Predominant Flow	Volume (vph)	Predominant Flow
Foundry Street, north of Broadway Street	206	50% NB	138	65% SB

Source: TMC counts conducted in May 2017 by VAI and adjusted to 2021 Baseline conditions.

^aTwo-way peak-hour volume expressed in vehicles per hour.

NB = northbound; SB = southbound.

³Ibid 1.

⁴MassDOT Transportation Data Management System; Location ID 4158; Located on Yankee Division Highway (I-95) north of I-93, Reading.

As can be seen in Table 1, Foundry Street was found to accommodate 206 vehicles per hour (vph) during the weekday morning peak hour with 50 percent of the traffic traveling northbound. During the weekday evening peak hour, Foundry Street was found to accommodate 138 vph with 65 percent of the traffic traveling southbound. The existing traffic volumes for all the study area intersections are graphically depicted on Figure 3 and Figure 4.

PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was conducted in March 2021. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study intersections, as well as the location of bicycle facilities. Sidewalks are provided along both sides of Albion Street and Foundry Street. Maple Street has sidewalks provided on both sides of the street west of Foundry Street and on the north side of the roadway east of Foundry Street. Broadway Street has sidewalks provided on both sides of the roadway west of Foundry Street. East of Foundry Street a sidewalk is provided on the southern side of the roadway to North Avenue. North Avenue has sidewalks provided on the eastern side of the roadway from north of Albion Street to south of Broadway Street. On the western side of North Avenue, a sidewalk is provided from north of Albion Street to the property of 68 North Avenue and again south of Broadway Street.

The intersection of North Avenue at Albion Street has crosswalks provided across all approaches. The intersection of Albion Street and Foundry Street has crosswalks provide across the northbound and westbound approaches. The intersection of Maple Street and Foundry Street has crosswalks provided across the southbound and eastbound approaches. There is a mid-block crossing on Broadway Street. The crossing is approximately 320 feet west of North Avenue. Another mid-block crossing is on North Avenue approximately 650 feet north of Broadway Street.

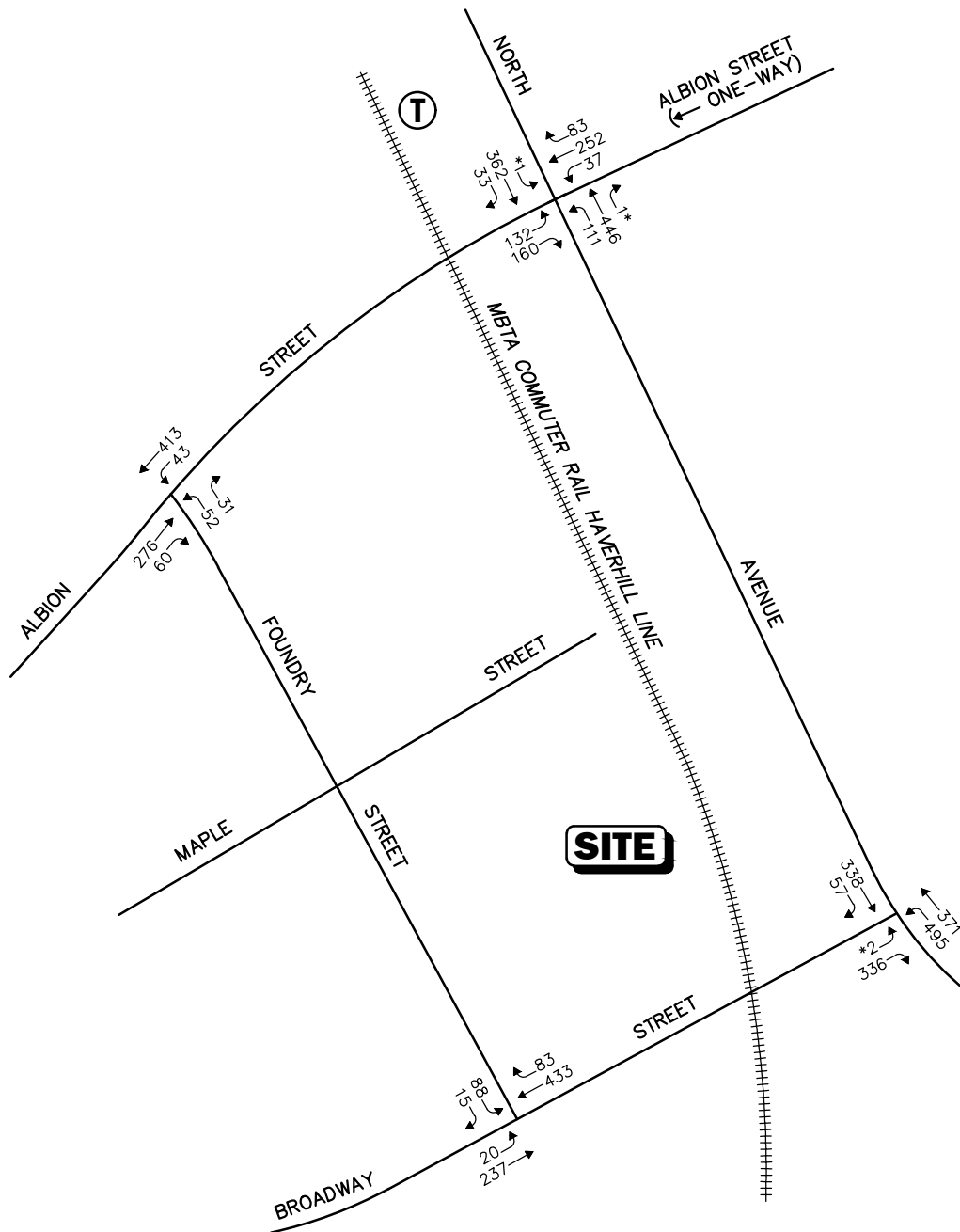
While the streets in the study area do not provide exclusive bicycle facilities, most travel lanes can accommodate bicycles due to widths of between 12 and 17 feet per lane.

PUBLIC TRANSPORTATION

Public transportation services are provided within the study area by the MBTA for fixed-route bus and commuter rail services. Table 2 summarizes the characteristics of these services. Schedules and fare information for the fixed-route bus services are provided in the Appendix.

Table 2
PUBLIC TRANSPORTATION SERVICES

Service	Stop Closest to Site	Distance from Site	Weekday		Saturday		Sunday	
			Hours of Operation	Headway (minutes)	Hours of Operation	Headway (minutes)	Hours of Operation	Headway (minutes)
Bus Route 137: Reading Depot – Malden Center Station	Albion St at North Ave	850 feet North	4:49 AM – 11:00 PM	3-55	6:00 AM – 9:28 PM	40-55	8:00 AM – 5:46 PM	82-100
Commuter Rail: Haverhill Line	Wakefield Station	950 feet North	5:27 AM – 12:04 AM	45-99	On Weekends, no trains operate on the Haverhill Line.			



*Illegal movement.

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

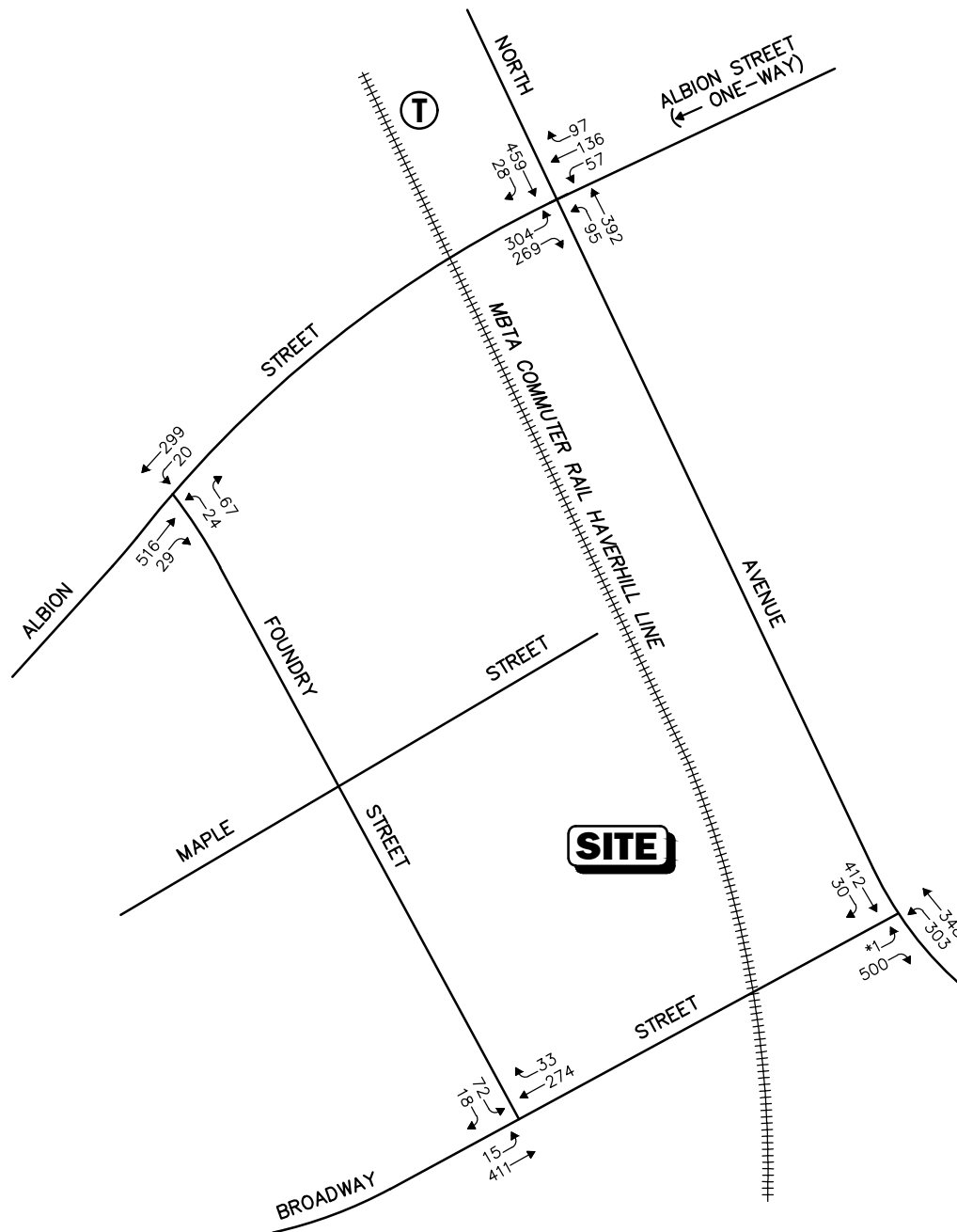


Not to Scale



Figure 3

2021 Baseline
Weekday Morning
Peak-Hour Traffic Volumes



*Illegal movement.

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.



Not to Scale



Figure 4

2021 Baseline
Weekday Evening
Peak-Hour Traffic Volumes

RAILROAD CROSSING

The MBTA commuter rail Haverhill Line stops at the Wakefield station located on the northwest corner of the intersection of North Avenue and Albion Street. The train tracks extend across the Albion Street eastbound approach. When a train is at the Wakefield station, a railroad crossing gate is activated and lowered which blocks traffic on Albion Street. In May 2017, the frequency and duration of when the railroad crossing gate is closed were observed during the weekday morning and weekday evening peak hours. This data was originally collected and presented by BETA Group, Inc. in the *Traffic Assessment*⁵ dated August 10, 2017. The data is summarized in Table 3 below.

Table 3
RAILROAD CROSSING GATE OBSERVATIONS:
ALBION STREET

<u>Time Period</u>	<u>Average Duration of Gate Closure (min:sec)</u>	<u>Frequency (No. of Occurrences)</u>
Weekday Morning:		
7:00 AM to 8:00 AM	2:11	3
8:00 AM to 9:00 AM	2:10	3
Weekday Evening:		
7:00 AM to 8:00 AM	1:25	3
8:00 AM to 9:00 AM	1:25	3

It should be noted that any delay caused by the rail crossings is inherent in the collections of traffic volumes and the delay calculations presented in the analysis section of this report. It should also be noted that the current peak-hour schedule indicates five trains would activate the gate from 7:00 to 9:00 AM and again from 4:00 to 6:00 PM, which is one less than indicated from the 2017 observations.

MOTOR VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Safety Management/Traffic Operations Unit for the most recent five-year period available (2014 through 2018). The data is summarized by location, type, and other characteristics, and indicated that no fatalities were reported over the five-year period reviewed. In addition, crash rates for the intersections were observed to be lower than the MassDOT District 4 crash rates for signalized and unsignalized intersections.

⁵*Traffic Assessment – Proposed Apartment Development Foundry Street, Wakefield, MA*; BETA Group, Inc.; August 10, 2017.

Table 4
MOTOR VEHICLE CRASH DATA SUMMARY

Scenario	North Avenue at Albion Street	Albion Street at Foundry Street	Broadway Street at Foundry Street	North Avenue at Broadway Street
<i>Year:</i>				
2014	4	2	0	2
2015	3	1	0	4
2016	5	1	1	2
2017	1	0	0	1
<u>2018</u>	<u>3</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	16	4	1	9
Average ^a	3.2	0.8	0.2	1.8
Crash Rate ^b	0.44	0.21	0.06	0.28
Significant ^c	No	No	No	No
<i>Type:</i>				
Angle	2	4	0	3
Rear-End	5	0	1	1
Head-On	1	0	0	1
Sideswipe	3	0	0	1
Fixed Object	1	0	0	1
Pedestrian	0	0	0	0
Bicyclist	0	0	0	1
<u>Unknown/Other</u>	<u>4</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	16	4	1	9
<i>Weather Conditions:</i>				
Clear	15	3	1	7
Cloudy/Rain	0	1	0	2
Snow/Ice	0	0	0	0
Fog	0	0	0	0
<u>Unknown/Other</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	16	4	1	9
<i>Lighting Conditions:</i>				
Daylight	12	3	1	6
Dawn/Dusk	0	0	0	0
Dark (lit)	3	1	0	3
Dark (unlit)	0	0	0	0
<u>Unknown/Other</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	16	4	1	9
<i>Pavement Conditions:</i>				
Dry	15	3	1	7
Wet	0	1	0	2
Snow/Ice	0	0	0	0
<u>Unknown/Other</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	16	4	1	9
<i>Severity:</i>				
Property Damage Only	15	3	0	6
Personal Injury	1	1	1	2
Fatality	0	0	0	0
<u>Unknown/Other</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	16	4	1	9

^aAverage number of crashes over five-year period.

^bCrash rate per million entering vehicles (mev).

^cSignificant if crash rate > 0.73 for signalized intersections or > 0.57 for unsignalized intersections (MassDOT District 4 rates).

Source: MassDOT Crash Data, 2014 through 2018.

As can be seen in Table 4, the intersection of North Avenue at Albion Street experienced a total of 16 accidents over the five-year review period, averaging 3.2 accidents per year. The majority of the accidents were rear-end collisions (5 out of 16), occurred on dry pavement (15 out of 16), during the daylight (12 out of 16), in clear weather (15 out of 16), and caused property damage only (15 out of 16). The intersection of Albion Street at Foundry Street experienced a total of 4 accidents over the five-year review period, averaging 0.8 accidents per year. The majority of the accidents were angle collisions (4 out of 4), occurred on dry pavement (3 out of 4), during the daylight (3 out of 4), in clear weather (3 out of 4), and caused property damage only (3 out of 4). The intersection of Broadway Street at Foundry Street experienced a total of 1 accident over the five-year review period, averaging 0.2 accidents per year. The accident was a rear-end collision, occurred on dry pavement, during the daylight, in clear weather, and caused a personal injury. The intersection of North Avenue at Broadway Street experienced a total of 9 accidents over the five-year review period, averaging 1.8 accidents per year. The majority of the accidents were angle collisions (3 out of 9), occurred on dry pavement (7 out of 9), during the daylight (6 out of 9), in clear weather (7 out of 9), and caused property damage only (6 out of 9).

SIGHT DISTANCE EVALUATION

Sight distances were reviewed at the location of the driveways where it intersects with Foundry Street and Maple Street in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)⁶ standards. Stopping sight distance (SSD) is the minimum distance required for an approaching driver at a height of 3.5 feet to perceive and react accordingly to a stationary object 2 feet tall in its path. The values are based on a perception and reaction time of 2.5 seconds and braking distance required under wet, level pavements. Intersection sight distance (ISD) is based on the time required to perceive, react, and complete desired exiting maneuver from a driveway once the driver decides to execute the maneuver. Values for exiting sight distance represent the time to: 1) turn left or right, in addition to accelerating to the operating speed of the roadway, without causing approaching vehicles to reduce speed by more than 10 miles per hour (mph), and 2) upon turning left, to clear the near half of the intersection without conflicting with the vehicles approaching from the left. When the roadway is either on an upgrade or downgrade, grade correction factors are applied. Table 5 summarizes sight distance measurements at the site driveway location.

⁶*A Policy on Geometric Design of Highway and Streets*, 6th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2011.

Table 5
SIGHT DISTANCE MEASUREMENTS

Location/Sight Distance	Required Distances Based on Prima Facie Speed ^a	Measured Distances (Feet)
<i>Maple Street at Site Driveway</i>		
<i>Stopping Sight Distance:</i>		
Looking east to the driveway	200	81 ^b /497 ^c
<i>Intersection Sight Distance:</i>		
Looking west from the driveway	335	81 ^b /497 ^c
<i>Foundry Street at Site Driveway</i>		
<i>Stopping Sight Distance:</i>		
Looking north to the driveway	200	500+
Looking south to the driveway	200	500 ^d
<i>Intersection Sight Distance:</i>		
Looking north from the driveway	335	500 ^d
Looking south from the driveway	335	500+

^aRecommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*, 6th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2011. “Prima facie” speed limits refer to statutory speed limits identified in Chapter 90, Section 17 of the MGL. In this case, on roads with thickly settled or business districts, the reasonable and proper rate of speed is 30 mph.

^bMeasured from driveway to Foundry Street along Maple Street.

^cMeasured from driveway to Lake Street along Maple Street

^dConstruction on Foundry Street limited our ability to measure, but with the construction completed over 500 feet of sight distance is available.

As shown in Table 5, adequate SSD and ISD are available based on the Prima Facie speed of 30 mph.

FUTURE 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 2028. Traffic volumes on the roadway network at that time, in the absence of the Project (that is, the No-Build condition), would include existing traffic, new traffic due to general background traffic growth, and traffic related to specific development by others expected to be completed by 2028. Inclusion of these factors resulted in the development of 2028 No-Build traffic volumes. Anticipated site-generated traffic volumes were then superimposed upon these No-Build traffic-flow networks to develop the 2028 Build traffic-volume conditions.

FUTURE TRAFFIC GROWTH

Traffic growth on area roadways is a function of the expected land development impacting the study area. Several methods are used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all existing 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.

In addition, we identified the location and type of planned development affecting the study area, estimated the traffic to be generated by that development, and assigned 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 in this TIA.

General Background Growth

Traffic-volume data compiled by MassDOT from permanent count stations and historic traffic counts in the area were reviewed in order to determine general background traffic growth trends. Based on a review of this data and other area traffic studies, it was determined that the traffic volumes are increasing in the area by approximately 0.95 percent per year. To be conservative, a 1.0 percent per year compounded annual background traffic growth rate was used to account for future traffic growth including presently unforeseen development within the study area.

Specific Development by Others

The Town of Wakefield was contacted in order to determine if there are any planned or approved specific development projects within the area that would have an impact on future traffic volumes at the study intersections. Based on these discussions, the following projects were identified for review for possible inclusion in this assessment.

5 Bennett Street – This development entails the construction of 34 residential units with 53 on-site parking spaces to be located at 5 Bennett Street in Wakefield, Massachusetts. This site is currently constructed and occupied but was not when the counts were conducted. Therefore, traffic volumes from the *Traffic Evaluation Letter*⁷ submitted by Tighe & Bond, Inc., December 13, 2016 were added to the future condition networks.

69 Foundry Street – This development entails razing the 7,360 sf industrial use at 69 Foundry Street in Wakefield, Massachusetts and constructing 84 residential units. Access to the site is proposed through two driveways on Foundry Street. Traffic volumes from the *Traffic Assessment*⁸ submitted by BETA Group, Inc., August 10, 2017 were added to the future condition networks.

175 North Avenue – This development consists of razing the 34,300 sf manufacturing use at 175 North Avenue in Wakefield, Massachusetts and constructing 60 residential units and 8,200 sf of retail space. Parking will be provided for 114 vehicles. This site is currently constructed and occupied but was not when the counts were conducted. Therefore, traffic volumes from the *Supplemental Traffic Assessment*⁹ submitted by Tighe & Bond, Inc. April 26, 2016 were added to the future condition networks.

178 Albion Street – The existing site at 178 Albion Street includes one four-story building comprised of an east wing and a west wing connected by a one-story loading dock structure. The west wing contains 114,509 sf of office space and 22,114 sf of research and development space. The east wing contains 125,907 sf of office space. The Project consists of adding three stories to the east wing and constructing 184 apartment units. Parking is to be provided in the existing garage located at 12 Foundry Street, which is located directly across the street from the building and provides approximately 755 parking spaces. The existing site at 7-9 Maple Street consists of a utility building and surface parking for 178 Albion Street. Traffic volumes from the *Transportation Impact Assessment*¹⁰ submitted by VAI, February 15, 2019 were added to the future condition networks.

Planned Roadway Improvements

The Town of Wakefield was contacted in order to determine if there are any planned roadway improvement projects expected to be completed within the study area in the seven-year planning horizon. The Town staff indicated that a number of roadway improvement projects under the Envision Wakefield Downtown program received funding under the MassDOT Complete Streets Program, and accordingly a number of these projects are planned for the area. These projects are

⁷*Traffic Evaluation Letter Proposed Residential Development 5 Bennett Street – Wakefield, Massachusetts*; Tighe & Bond, Inc.; December 13, 2016.

⁸*Traffic Assessment – Proposed Apartment Development Foundry Street, Wakefield, MA*; BETA Group, Inc.; August 10, 2017.

⁹*Supplemental Traffic Assessment – The Residences & Shops at Wakefield Station Wakefield, Massachusetts*; Tighe & Bond, Inc.; April 26, 2016.

¹⁰Ibid 1.

listed below:

1. Broken sidewalk will be repaired on Albion Street.
2. Sharrows will be installed on North Avenue and Albion Street.
3. Curb extensions will be installed on North Avenue from Chestnut Street to Albion Street.
4. Curb extensions or a pedestrian refuge will be implemented at the intersection of Albion Street at Murray Street and Gould Street.
5. Pedestrian timings will be updated to current *Manual on Uniform Traffic Devices* (MUTCD)¹¹ standards at the intersection of North Avenue at Albion Street.
6. Crosswalks and curb extension will be provided along Albion Street from North Avenue to Main Street.
7. A sidewalk will be installed on the west side of North Avenue from the Galvin Middle School to Broadway Street and a crosswalk will be provided at the intersection of North Avenue and Broadway Street.

Currently, only funding for the improvements on Albion Street has been granted through the Complete Streets program. The funding is specifically for replacing sidewalk and curb on Albion Street from North Avenue to Main Street, installing four new curb extensions, and adding bicycle sharrow pavement markings. The curb extensions are to be located at the intersections of North Avenue with Albion Street and Albion Street with Foster Street and at 110 Albion Street and 73 Albion Street.

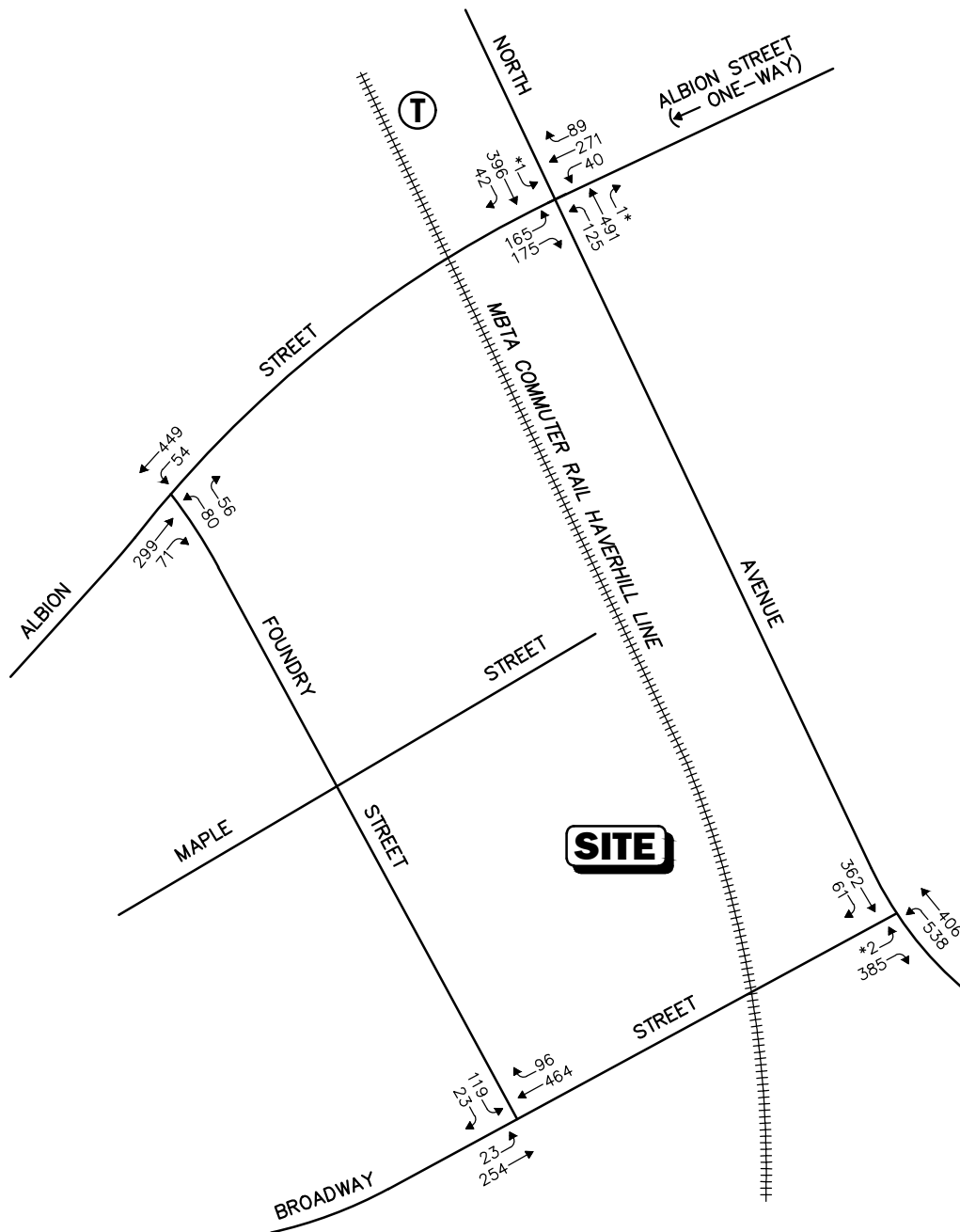
In addition to these public improvement projects, there is also the potential for geometric improvements to the intersection of Albion Street with Murray Street and Gould Street that would be performed as mitigation for the 69 Foundry Street development project.

All of these projects would improve pedestrian and bicycle conditions for those user groups in the areas mentioned. No credit was assumed for these improvements in assessing the impacts of the Project.

NO-BUILD TRAFFIC VOLUMES

The 2028 No-Build peak-hour traffic-volume networks were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2021 Baseline peak-hour traffic volumes and incorporating traffic projections from the identified background developments. The resulting 2028 No-Build weekday morning and weekday evening peak-hour traffic-volume networks are shown on Figure 5 and Figure 6.

¹¹Ibid 2.



*Illegal movement.

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

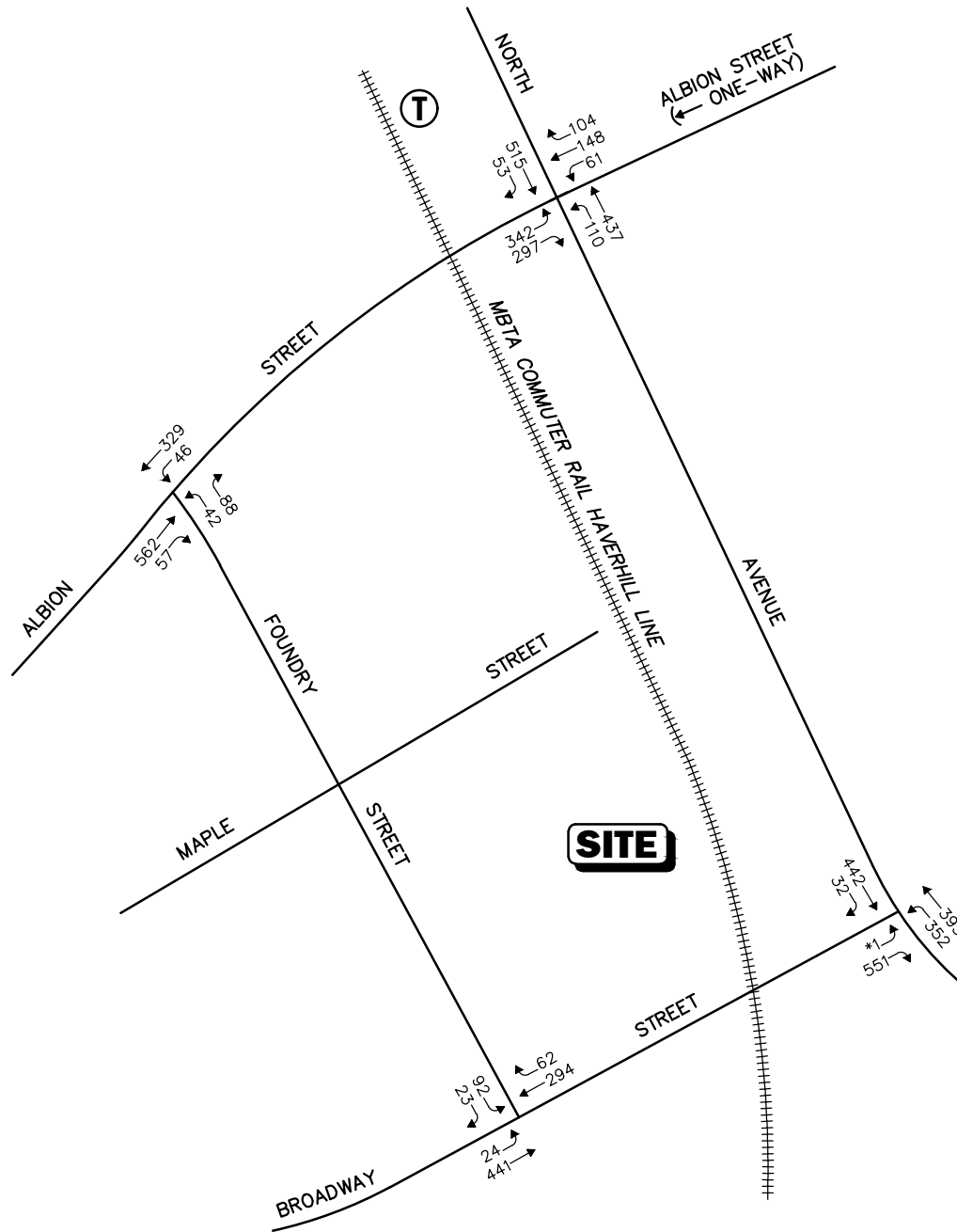


Not to Scale



Figure 5

2028 No-Build
Weekday Morning
Peak-Hour Traffic Volumes



*Illegal movement.

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.



Not to Scale



Figure 6

2028 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

PROJECT-GENERATED TRAFFIC

The Project entails constructing 58 residential units and a 3,750 sf restaurant. In order to develop the traffic characteristics of the proposed Project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)¹² for Land Use Code (LUC) 221, *Multifamily Housing (Mid-Rise)* and LUC 930, *Fast Casual Restaurant* were used in conjunction with mode split data from the Journey-to-Work U.S. Census¹³ for the census tract the Project is located.

Mode Split

Since the Project site is located approximately 950 feet south of the Wakefield station of the Haverhill commuter rail line, it is likely that some residents will commute via public transit. Data from the Journey-to-Work U.S. Census for the census tract the Project is located in were reviewed to determine the mode split characteristics of the immediate area. Table 6 summarizes the mode split obtained from the United States Census Bureau, 2019 American Community Survey 5-year estimates.

Table 6
MODE SPLIT SUMMARY^a

Mode	Percent
Auto	81
Public Transit	9
<u>Other^b</u>	<u>10</u>
TOTAL	100

^aBased on the United States Census Bureau for Census Tract 3352, 2019 American Community Survey 5-year Estimates.

^bIncludes bicycle, walk, and working at home.

As can be seen in Table 6, approximately 9 percent of commuters in this area of Wakefield use public transportation to commute to work. Accordingly, a 9 percent adjustment for public transportation use was employed in trip-generation calculations.

Restaurant Walking Trips Reduction

In addition to the mode split for residential trips, it is anticipated that 50 percent of the restaurant trips will be walking trips. This is due to the site's proximity to the 178 Albion Street and 69 Foundry Street residential developments which total 268 residential units. With the incorporation of the 62-76 Foundry Street development, there will be approximately 326 residential units either above the restaurant or across the street from the restaurant, which indicates a likelihood of a high proportion of walking trips to and from the restaurant. In this context, the 50 percent walking trip reduction is likely a conservative estimate and could in fact be much higher.

¹²*Trip Generation*, 10th Edition; Institute of Transportation Engineers; Washington, DC; 2017.

¹³*2019 American Community Survey 5-Year Estimates*; U.S. Census Bureau; 2021, Census Tract 3352.

Site-Generated Trips by Mode

The mode split data was then applied to the ITE trip-generation projections for LUC 221 *Multifamily Housing (Mid-Rise)* to determine the site-generated trips by mode. As the census mode split data is based on a survey of commuters, the mode split was not applied to the trip-generation projections for LUC 930, *Fast Casual Restaurant*. However, a 50 percent reduction in vehicle trips was taken for the restaurant due to the site's proximity to other residential developments. A summary of the expected Project vehicle trip generation with adjustments for mode split is provided in Table 7.

Table 7
PROJECT TRIP-GENERATION SUMMARY

Time Period/ Directional Distribution	Residential Vehicle Trips	Residential Person Trips				Proposed Residential Vehicle Trips ^f (F=(C+E)/1.04)	Restaurant Trips			Total Proposed Vehicle Trips (J=F+I)
	ITE LUC 221 Trip ^a (A)	Total Residential Trips ^b (B=A*1.04)	Auto Trips ^c (C=B*0.81)	Transit Trips ^d (D=B*0.09)	Bike/Walk/ Other Trips ^e (E=B*0.1)		ITE LUC 930 Trips ^g (G)	Walk Trips ^h (H=G*0.5)	Vehicle Trips (I=G-H)	
Weekday Daily	314	327	265	29	33	287	1,182	591	591	878
<i>Weekday Morning</i>										
<i>Peak Hour:</i>										
Entering	5	5	4	0	1	5	5	2	3	8
Exiting	<u>15</u>	<u>16</u>	<u>13</u>	<u>1</u>	<u>2</u>	<u>14</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>16</u>
Total	20	21	17	1	3	19	8	3	5	24
<i>Weekday Evening</i>										
<i>Peak Hour:</i>										
Entering	16	17	14	2	1	14	16	8	8	22
Exiting	<u>10</u>	<u>10</u>	<u>8</u>	<u>1</u>	<u>1</u>	<u>9</u>	<u>13</u>	<u>6</u>	<u>7</u>	<u>16</u>
Total	26	27	22	3	2	23	29	14	15	38

^aBased on ITE LUC 221, *Multifamily Housing (Mid-Rise)*; 58 units.

^bITE person trips converted to vehicle trips based on rate of 1.04 person trips per vehicle trip for Census Tract 3352.

^cBased on mode split from American Community Survey (ACS) 2019 5-Year Estimates for Census Tract 3352; 86 percent.

^dBased on mode split from ACS 2019 5-Year Estimates for Census Tract 3352; 9 percent.

^eBased on mode split from ACS 2019 5-Year Estimates for Census Tract 3352; 5 percent.

^fITE person trips converted to vehicle trips based on rate of 1.04 person trips per vehicle trip for Census Tract 3352.

^gBased on ITE LUC 930, *Fast Casual Restaurant*; 3,750 sf.

^hReduction in vehicle trips due to sites proximity to 69 Foundry Street and 178 Albion Street residential developments that total an additional 268 residential units. We expect half the restaurant trips to be walking trips from these complexes.

As can be seen in Table 7, the Project is expected to generate 878 vehicle trips on an average weekday (two-way, 24-hour volume), with 24 vehicle trips (8 entering and 16 exiting) expected during the weekday morning peak hour. During the weekday evening peak hour, the Project is expected to generate 38 vehicle trips (22 entering and 16 exiting).

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of the site-generated trips to and from the Project was determined for both weekday morning trips and weekday evening trips. The trip distribution was based on a review of existing travel patterns at the study area intersections and Journey to work data for Wakefield obtained from the United States Census Bureau.¹⁴ The trip distributions for the Project are summarized in Table 8 and graphically depicted on Figure 7. The weekday morning and weekday evening peak-hour traffic volumes expected to be generated by the Project were assigned on the study area roadway network as shown on Figure 8 and Figure 9.

**Table 8
TRIP-DISTRIBUTION SUMMARY**

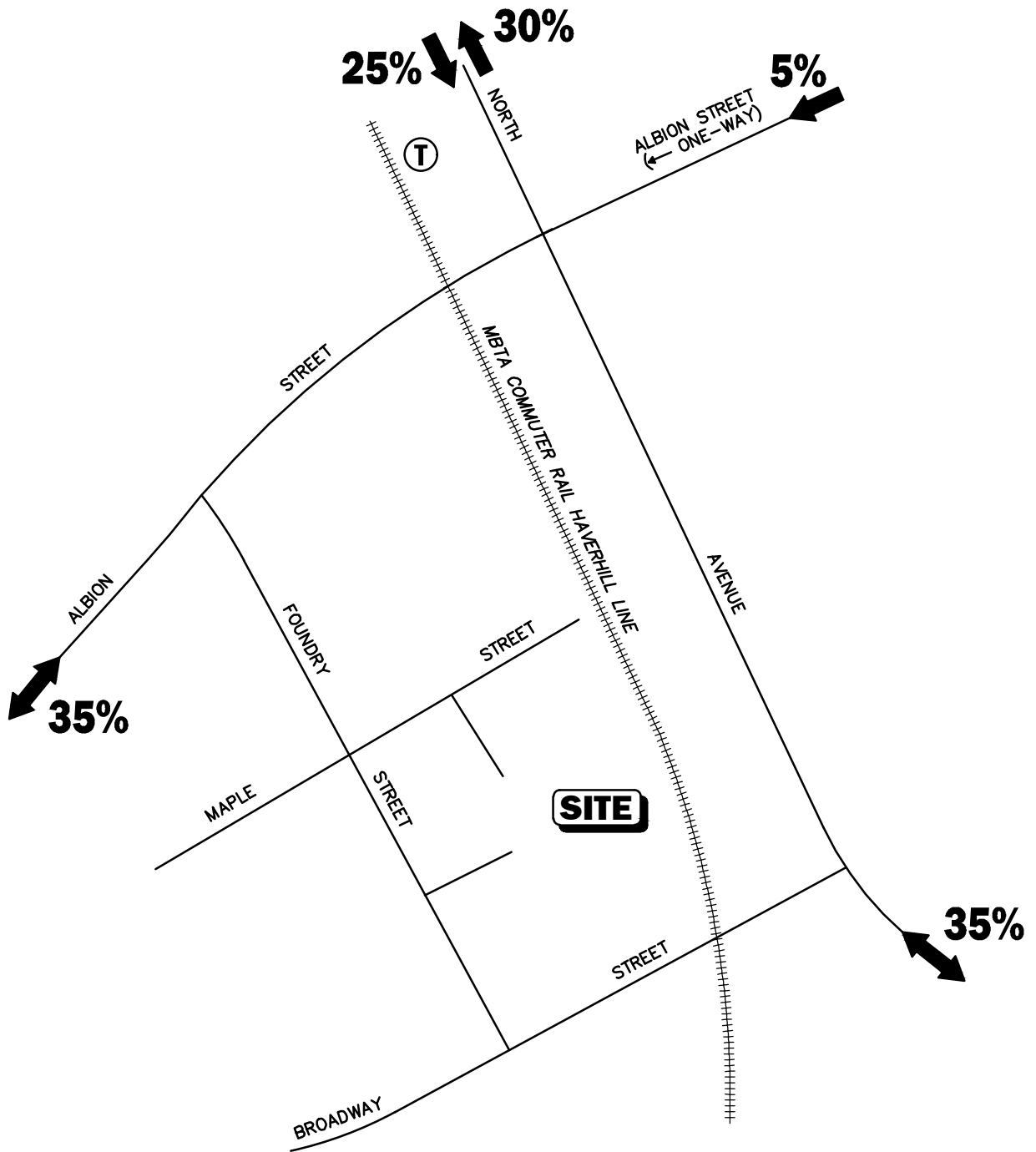
Roadway	Direction (To/From)	Percent (To/From)
North Avenue	North	30/25
North Avenue	South	35/35
Albion Street	East	0/5
Albion Street	West	<u>35/35</u>
TOTAL		100/100

FUTURE TRAFFIC VOLUMES – BUILD CONDITION

The 2028 Build condition networks consist of the 2028 No-Build traffic volumes with the anticipated site-generated traffic added to them. The 2028 Build weekday morning and weekday evening peak-hour traffic-volume networks are graphically depicted on Figure 10 and Figure 11.

A summary of peak-hour projected traffic-volume increases external to the study area that is the subject of this assessment is shown in Table 9. These volumes are based on the expected increases from the Project.

¹⁴2011-2015 5-Year American Community Survey; U.S. Census Bureau; 2021.

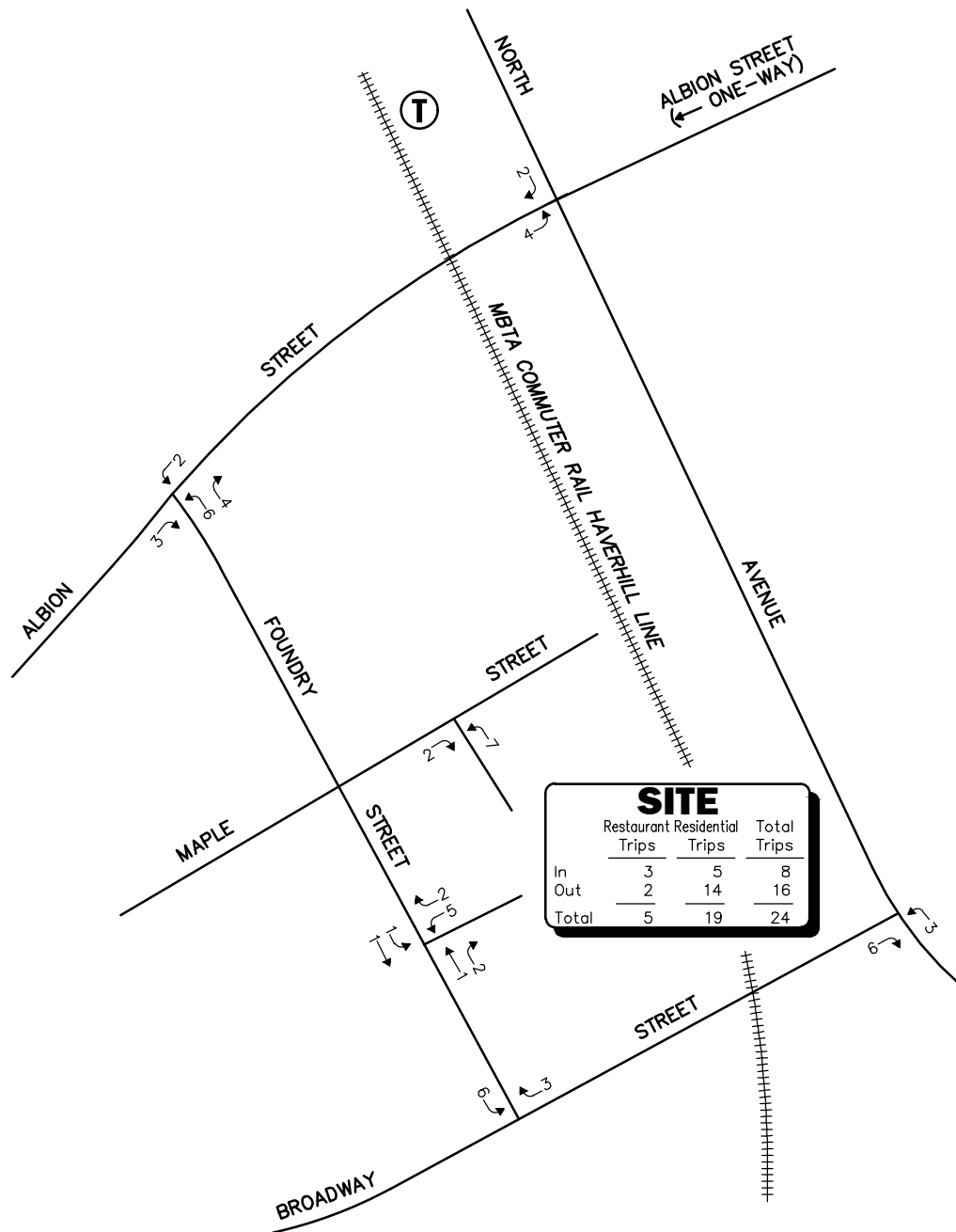


Not to Scale

Figure 7

Trip Distribution Map





Note: Restaurant trips park on-street and not on-site.
 Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

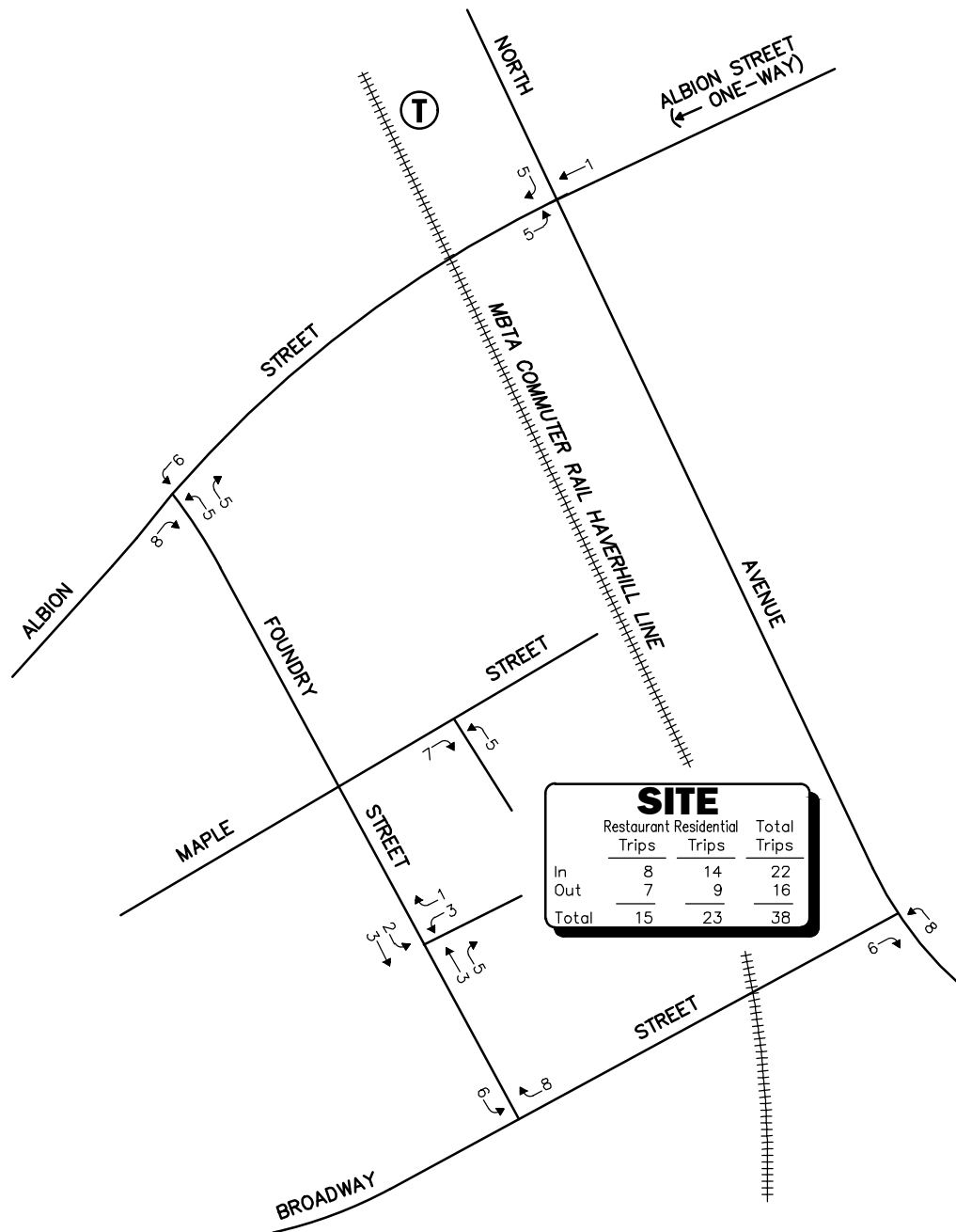


Not to Scale

Figure 8



Site-Generated
 Weekday Morning
 Peak-Hour Traffic Volumes



Note: Restaurant trips park on-street and not on-site.

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

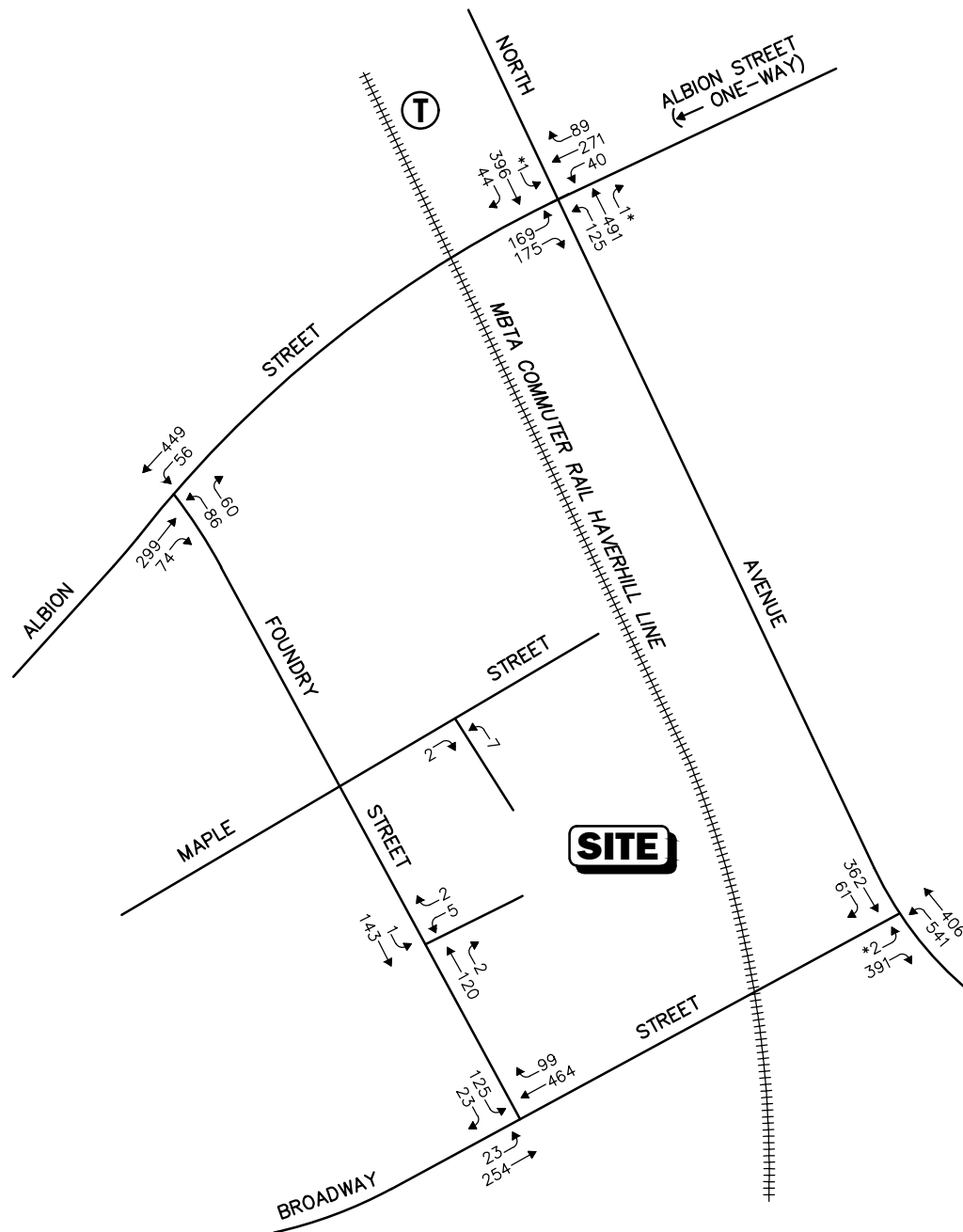


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Figure 9



Site-Generated
Weekday Evening
Peak-Hour Traffic Volumes



*Illegal movement.

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

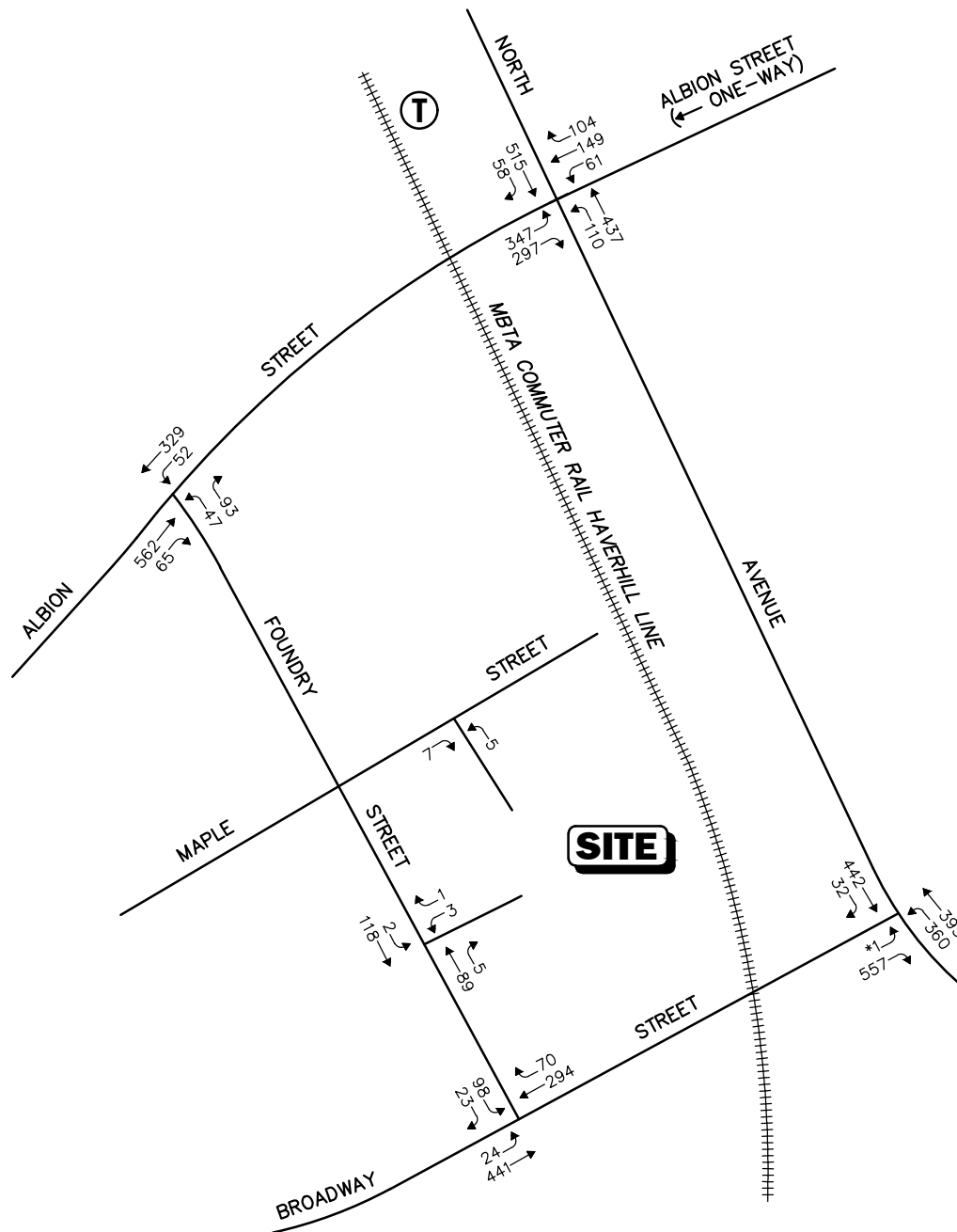


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Figure 10

2028 Build
Weekday Morning
Peak-Hour Traffic Volumes



*Illegal movement.

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.



Not to Scale

Figure 11



2028 Build
Weekday Evening
Peak-Hour Traffic Volumes

Table 9
PEAK-HOUR TRAFFIC-VOLUME INCREASES^a

Location/Peak Hour	2028 No-Build	2028 Build	Traffic-Volume Increase Over No-Build	Percent Increase Over No-Build
<i>North Avenue, north of Albion Street:</i>				
Weekday Morning	1,184	1,190	6	0.5
Weekday Evening	1,451	1,61	10	0.7
<i>Albion Street, east of North Avenue:</i>				
Weekday Morning	402	402	0	0.0
Weekday Evening	313	314	1	0.3
<i>Albion Street, west of Foundry Street:</i>				
Weekday Morning	899	908	9	1.0
Weekday Evening	990	1,003	13	1.3
<i>North Avenue, south of Broadway Street:</i>				
Weekday Morning	1,691	1,700	9	0.5
Weekday Evening	1,740	1,754	14	0.8

^aTwo-way traffic total.

As shown in Table 9, Project-related traffic-volume increases external to the study area relative to 2028 No-Build conditions are anticipated to range from 0.3 to 1.3 percent during the peak periods.

LOADING AND DELIVERIES

Restaurant loading and deliveries are expected to occur on Maple Street outside the restaurant entrance during off-peak time periods. Loading and deliveries for the residential building are expected to occur in the same area. Trash receptacles will be located at the east end of the site.

TRAFFIC OPERATIONS ANALYSIS

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

METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.¹⁵ The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

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

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

¹⁵The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual 6th Edition*; Transportation Research Board; Washington, DC; 2016.

Unsignalized Intersections

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

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The levels of service of unsignalized intersections are determined by application of a procedure described in the *Highway Capacity Manual 6th Edition*.¹⁶ Level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the *Highway Capacity Manual 6th Edition*. Table 10 summarizes the relationship between level of service and average control delay for two-way stop controlled and all-way stop controlled intersections.

**Table 10
LEVEL-OF-SERVICE CRITERIA FOR
UNSIGNALIZED INTERSECTIONS^a**

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

^aSource: *Highway Capacity Manual 6th Edition*; Transportation Research Board; Washington, DC; 2016; page 20-6.

¹⁶*Highway Capacity Manual 6th Edition*; Transportation Research Board; Washington, DC; 2016.

Signalized Intersections

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

- *LOS A* describes operations with very low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than LOS A.
- *LOS C* describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- *LOS D* describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable.
- *LOS E* describes operations with high control delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high control delay values that often occur with oversaturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Levels of service for signalized intersections are calculated using the operational analysis methodology of the *Highway Capacity Manual 6th Edition*. This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. Level-of-service designations are based on the criterion of control or signal delay per vehicle. Control or signal delay is a measure of driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay, and final acceleration delay. Table 11 summarizes the relationship between level of service and control delay. The tabulated control delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to entire intersections.

Table 11
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS^a

Level-of-Service by Volume-to-Capacity Ratio		Average Control Delay (Seconds Per Vehicle)
$v/c \leq 1.0$	$v/c > 1.0$	
A	F	≤ 10.0
B	F	10.1 to 20.0
C	F	20.1 to 35.0
D	F	35.1 to 55.0
E	F	55.1 to 80.0
F	F	> 80.0

^aSource: *Highway Capacity Manual 6th Edition*; Transportation Research Board; Washington, DC; 2016; page 19-16.

ANALYSIS RESULTS

Level-of-service analyses were conducted for 2021 Baseline, 2028 No-Build, and 2028 Build conditions for the study area intersections. The results of the intersection capacity analysis within the study area are described below, with a tabular summary provided in Table 12 and Table 13.

Unsignalized Intersection Analysis Results

Albion Street at Foundry Street

Under 2021 Baseline and 2028 No-Build conditions, the critical movement at this intersection operates at LOS D or better during the weekday morning and weekday evening peak hours. No changes to critical movement level of service occur as a result of the addition of Project volumes under 2028 Build conditions.

Broadway Street at Foundry Street

Under 2021 Baseline and 2028 No-Build conditions, the critical movement at this intersection operates at LOS D or better during the weekday morning and weekday evening peak hours. No changes to critical movement level of service occur as a result of the addition of Project volumes under 2028 Build conditions.

North Avenue at Broadway Street

Under 2021 Baseline conditions, the critical movement at this intersection operates at LOS C during the weekday morning and LOS E during the weekday evening peak hour. Under 2028 No-Build conditions, the critical movement operates at LOS C during the weekday morning peak hour and LOS F during the weekday evening peak hour. Under 2028 Build conditions, the critical movement operates at LOS D during the weekday morning peak hour and at LOS F during the weekday evening peak hour. The increase in vehicle queueing is equivalent to less than 1 vehicle due to the Project.

Maple Street at Site Driveway

Under 2028 Build conditions, the critical movement at this intersection operates at LOS A during the weekday morning and weekday evening peak hours.

Foundry Street at Site Driveway

Under 2028 Build conditions, the critical movement at this intersection operates at LOS A during the weekday morning and weekday evening peak hours.

Signalized Intersection Analysis Results

North Avenue at Albion Street

Under 2021 Baseline and 2028 No-Build conditions this intersection operates at an overall LOS D during the weekday morning peak hour and an overall LOS D during the weekday evening peak hour. No changes to level of service occur as a result of the addition of Project volumes under 2028 Build conditions.

Table 12
UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Unsignalized Intersection Peak Hour/Critical Movement	2021 Baseline				2028 No-Build				2028 Build				
	V/C ^a	Delay ^b	LOS ^c	Queue ^d	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue	
<i>Albion Street at Foundry Street</i>													
<i>Weekday Morning:</i>													
Foundry Street NB LT/RT	0.26	18	C	25	0.48	26	D	63	0.52	27	D	70	
<i>Weekday Evening:</i>													
Foundry Street NB LT/RT	0.22	16	C	20	0.39	21	C	45	0.43	23	C	53	
<i>Broadway Street at Foundry Street</i>													
<i>Weekday Morning:</i>													
Foundry Street SB LT/RT	0.32	20	C	35	0.49	27	D	65	0.51	28	D	70	
<i>Weekday Evening:</i>													
Foundry Street SB LT/RT	0.24	17	C	23	0.35	20	C	38	0.37	21	C	40	
<i>North Avenue at Broadway Street</i>													
<i>Weekday Morning:</i>													
Broadway Street EB RT	0.61	19	C	103	0.73	25	C	153	0.74	26	D	160	
<i>Weekday Evening:</i>													
Broadway Street EB RT	0.89	41	E	265	1.02	70	F	395	1.03	73	F	408	
<i>Maple Street at Site Driveway</i>													
<i>Weekday Morning:</i>													
Site Driveway NB LT									0.01	9	A	0	
<i>Weekday Evening:</i>													
Site Driveway NB LT		Intersection is constructed under 2028 Build Conditions								0.01	9	A	0
<i>Foundry Street at Site Driveway</i>													
<i>Weekday Morning:</i>													
Site Driveway WB LT/RT									0.01	10	A	0	
<i>Weekday Evening:</i>													
Site Driveway WB LT/RT		Intersection is constructed under 2028 Build Conditions								0.01	10	A	0

^aVolume-to-capacity ratio.

^bDelay in seconds per vehicle.

^cLevel of service.

^d95th percentile queue length in feet.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Table 13
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Signalized Intersection/ Peak Hour/Critical Movement	2021 Baseline				2028 No-Build				2028 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d Ave/95 th	V/C	Delay	LOS	Queue Ave/95 th	V/C	Delay	LOS	Queue Ave/95 th
<i>North Avenue at Albion Street</i>												
<i>Weekday Morning:</i>												
Albion Street EB LT	0.59	46	D	76/144	0.66	48	D	100/179	0.66	49	D	103/183
Albion Street EB RT	0.45	10	A	0/55	0.45	9	A	0/57	0.45	9	A	0/57
Albion Street WB LT	0.17	39	D	21/56	0.19	42	D	23/62	0.20	42	D	24/62
Albion Street WB TH	1.06	111	F	171/373	1.18	154	F	212/430	1.19	156	F	213/433
Albion Street WB RT	0.29	6	A	0/25	0.32	8	A	0/31	0.32	8	A	0/31
North Avenue NB LT	0.53	46	D	65/126	0.56	48	D	76/144	0.56	48	D	77/145
North Avenue NB TH	0.50	16	B	165/280	0.56	18	B	202/340	0.56	18	B	203/344
North Avenue SB TH	0.62	31	C	183/326	0.69	36	D	219/413	0.70	36	D	220/418
North Avenue SB RT	0.06	0	A	0/0	0.08	0	A	0/0	0.08	0	A	0/0
Overall	--	38	D	--	--	46	D	--	--	46	D	--
<i>Weekday Evening:</i>												
Albion Street EB LT	0.78	49	D	205/323	0.80	49	D	243/377	0.80	49	D	248/383
Albion Street EB RT	0.48	6	A	0/62	0.49	7	A	9/78	0.49	7	A	11/82
Albion Street WB LT	0.31	50	D	38/92	0.35	54	D	45/100	0.35	54	D	46/100
Albion Street WB TH	0.66	61	E	95/220	0.76	71	E	114/253	0.77	73	E	117/258
Albion Street WB RT	0.37	10	B	0/42	0.41	13	B	0/51	0.41	13	B	0/51
North Avenue NB LT	0.52	54	D	66/133	0.57	57	E	82/152	0.57	58	E	83/152
North Avenue NB TH	0.50	23	C	190/337	0.57	26	C	247/394	0.57	27	C	252/394
North Avenue SB TH	0.86	52	D	311/623	1.02	84	F	434/755	1.03	86	F	443/755
North Avenue SB RT	0.05	0	A	0/0	0.11	0	A	0/0	0.12	0	A	0/0
Overall	--	36	D	--	--	46	D	--	--	47	D	--

^aVolume-to-capacity ratio.

^bDelay in seconds per vehicle.

^cLevel of service.

^dAverage queue length and 95th percentile queue length in feet.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

RECOMMENDATIONS AND CONCLUSIONS

RECOMMENDATIONS

The traffic assessment contained herein indicates that the Project will not have substantial impacts at the study area intersections and Project-related traffic increases are expected to be between 0.3 percent and 1.3 percent during the peak hours depending on location. VAI recommends the following:

Site Recommendations

- The site driveways onto Foundry Street and Maple Street should be placed under STOP-sign control, with painted STOP bars on the drives at the STOP-sign locations.
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the MUTCD and be shorter than 24 inches or be placed outside of the sight lines for drivers exiting the driveway and those approaching the driveways on Foundry Street and Maple Street.
- Snow windows within sight triangle areas of the Project site driveway should be promptly removed where such accumulations would impede sight lines.

TRANSPORTATION DEMAND MANAGEMENT (TDM) PLAN

As is the case with many developments, a major focus of the traffic mitigation plan focuses on the reduction of single-occupant vehicles arriving and departing to and from the site. This is predominantly accomplished by developing a comprehensive TDM strategy. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following TDM measures will be implemented as a part of the Project:

- Information regarding public transportation services, maps, schedules, and fare information will be posted in a central location and/or otherwise made available to residents and employees of the restaurant;
- A “welcome packet” will be provided to residents and restaurant employees detailing available public transportation services, bicycle and walking alternatives, and available com-

muter options;

- Work-at-home workspaces will be provided to support telecommuting by residents of the Project; and
- Consideration should be given to installing accommodations for the charging of electric vehicles by residents of the Project.

CONCLUSIONS

VAI has completed a transportation assessment of the potential impacts on the surrounding transportation infrastructure associated with the proposed 58-unit residential development with a 3,750 sf restaurant to be located at 62-76 Foundry Street in Wakefield, Massachusetts. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project.

The Project is expected to produce a minor increase in traffic volumes in the vicinity of the site with minimal increases in delays to the study area intersections. Based on the above, VAI has concluded that the Project can be safely accommodated with minimal impact on the area road network.

APPENDIX

TRAFFIC COUNT DATA
SEASONAL ADJUSTMENT CALCULATIONS
PUBLIC TRANSPORTATION SCHEDULES
MOTOR VEHICLE CRASH DATA
GROWTH RATE DATA
TRIP GENERATION CALCULATIONS
JOURNEY TO WORK DATA
CAPACITY ANALYSIS



TRAFFIC COUNT DATA



Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640001
Site Code : 55640001
Start Date : 5/23/2017
Page No : 1

Groups Printed- Cars - Trucks

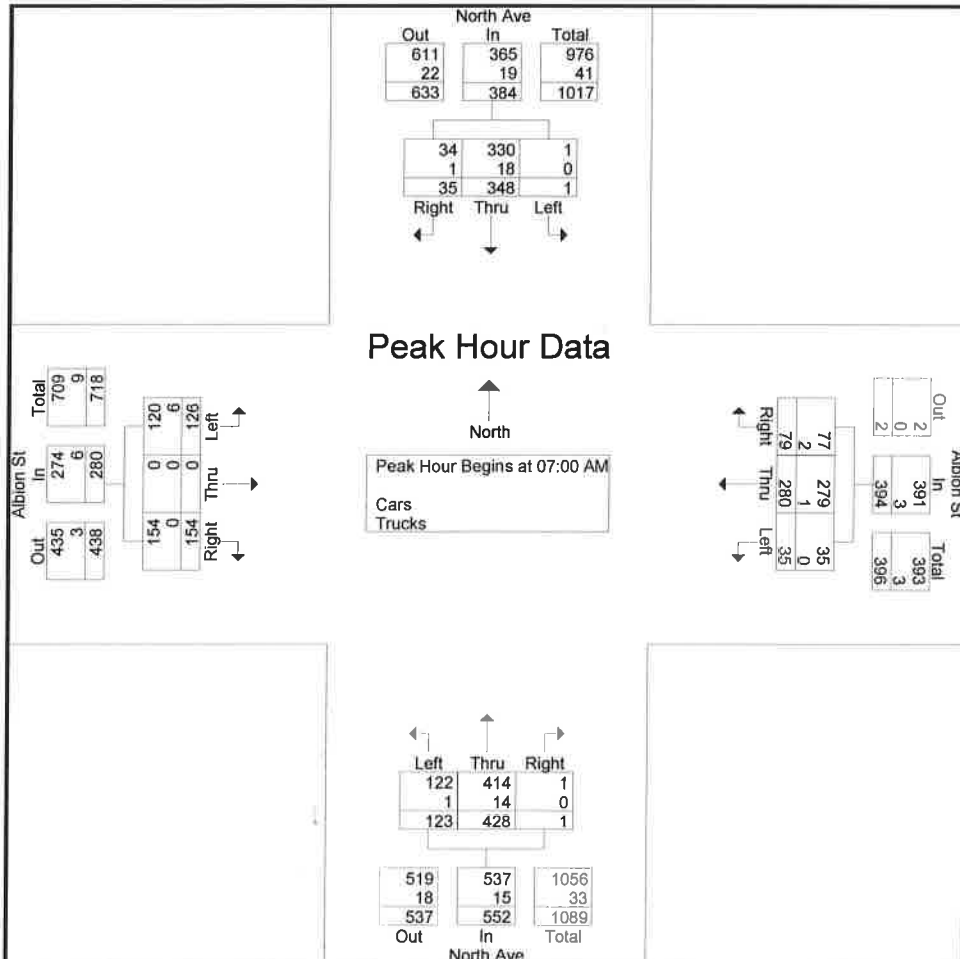
Start Time	North Ave From North			Albion St From East			North Ave From South			Albion St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	94	10	8	44	20	33	101	1	28	0	39	378
07:15 AM	0	87	6	13	69	19	18	96	0	35	0	46	389
07:30 AM	0	94	8	8	68	16	25	108	0	31	0	41	399
07:45 AM	1	73	11	6	99	24	47	123	0	32	0	28	444
Total	1	348	35	35	280	79	123	428	1	126	0	154	1610
08:00 AM	0	76	15	3	64	9	16	92	0	31	0	31	337
08:15 AM	0	66	12	4	62	12	26	97	0	37	0	33	349
08:30 AM	0	63	13	5	61	15	29	109	0	25	0	40	360
08:45 AM	0	69	15	10	56	17	34	121	1	35	0	49	407
Total	0	274	55	22	243	53	105	419	1	128	0	153	1453
Grand Total	1	622	90	57	523	132	228	847	2	254	0	307	3063
Apprch %	0.1	87.2	12.6	8	73.5	18.5	21.2	78.6	0.2	45.3	0	54.7	
Total %	0	20.3	2.9	1.9	17.1	4.3	7.4	27.7	0.1	8.3	0	10	
Cars	1	591	86	56	517	127	224	829	2	245	0	303	2981
% Cars	100	95	95.6	98.2	98.9	96.2	98.2	97.9	100	96.5	0	98.7	97.3
Trucks	0	31	4	1	6	5	4	18	0	9	0	4	82
% Trucks	0	5	4.4	1.8	1.1	3.8	1.8	2.1	0	3.5	0	1.3	2.7

Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640001
Site Code : 55640001
Start Date : 5/23/2017
Page No : 2

Start Time	North Ave From North				Albion St From East				North Ave From South				Albion St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	94	10	104	8	44	20	72	33	101	1	135	28	0	39	67	378
07:15 AM	0	87	6	93	13	69	19	101	18	96	0	114	35	0	46	81	389
07:30 AM	0	94	8	102	8	68	16	92	25	108	0	133	31	0	41	72	399
07:45 AM	1	73	11	85	6	99	24	129	47	123	0	170	32	0	28	60	444
Total Volume	1	348	35	384	35	280	79	394	123	428	1	552	126	0	154	280	1610
% App. Total	0.3	90.6	9.1		8.9	71.1	20.1		22.3	77.5	0.2		45	0	55		
PHF	.250	.926	.795	.923	.673	.707	.823	.764	.654	.870	.250	.812	.900	.000	.837	.864	.907
Cars	1	330	34	365	35	279	77	391	122	414	1	537	120	0	154	274	1567
% Cars	100	94.8	97.1	95.1	100	99.6	97.5	99.2	99.2	96.7	100	97.3	95.2	0	100	97.9	97.3
Trucks	0	18	1	19	0	1	2	3	1	14	0	15	6	0	0	6	43
% Trucks	0	5.2	2.9	4.9	0	0.4	2.5	0.8	0.8	3.3	0	2.7	4.8	0	0	2.1	2.7



Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640001
Site Code : 55640001
Start Date : 5/23/2017
Page No : 7

Groups Printed- Trucks

Start Time	North Ave From North			Albion St From East			North Ave From South			Albion St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	5	1	0	0	0	0	4	0	0	0	0	10
07:15 AM	0	3	0	0	0	1	0	1	0	2	0	0	7
07:30 AM	0	7	0	0	1	0	0	3	0	4	0	0	15
07:45 AM	0	3	0	0	0	1	1	6	0	0	0	0	11
Total	0	18	1	0	1	2	1	14	0	6	0	0	43
08:00 AM	0	4	0	1	0	1	0	1	0	0	0	1	8
08:15 AM	0	5	2	0	1	0	0	2	0	0	0	1	11
08:30 AM	0	2	0	0	3	0	2	0	0	2	0	1	10
08:45 AM	0	2	1	0	1	2	1	1	0	1	0	1	10
Total	0	13	3	1	5	3	3	4	0	3	0	4	39
Grand Total	0	31	4	1	6	5	4	18	0	9	0	4	82
Apprch %	0	88.6	11.4	8.3	50	41.7	18.2	81.8	0	69.2	0	30.8	
Total %	0	37.8	4.9	1.2	7.3	6.1	4.9	22	0	11	0	4.9	

Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640001
Site Code : 55640001
Start Date : 5/23/2017
Page No : 10

Groups Printed- Bikes Peds

Start Time	North Ave From North				Albion St From East				North Ave From South				Albion St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	2	0	0	0	9	0	0	0	0	0	0	1	0	11	1	12
07:15 AM	0	2	0	14	0	0	0	8	0	0	0	6	0	0	0	9	37	2	39
07:30 AM	0	0	0	6	0	0	0	16	0	0	0	29	0	1	0	7	58	1	59
07:45 AM	0	0	0	8	0	0	0	3	0	0	0	2	0	0	0	2	15	0	15
Total	0	2	0	30	0	0	0	36	0	0	0	37	0	1	1	18	121	4	125
08:00 AM	0	1	0	13	0	0	0	3	0	1	0	4	0	0	1	9	29	3	32
08:15 AM	0	0	0	6	0	0	0	5	0	0	0	1	0	0	0	3	15	0	15
08:30 AM	0	1	0	3	0	0	0	3	0	0	0	1	0	0	0	5	12	1	13
08:45 AM	0	0	0	2	0	0	0	3	0	0	0	6	0	0	0	0	11	0	11
Total	0	2	0	24	0	0	0	14	0	1	0	12	0	0	1	17	67	4	71
Grand Total	0	4	0	54	0	0	0	50	0	1	0	49	0	1	2	35	188	8	196
Apprch %	0	100	0		0	0	0		0	100	0		0	33.3	66.7				
Total %	0	50	0		0	0	0		0	12.5	0		0	12.5	25		95.9	4.1	

Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640001
Site Code : 55640001
Start Date : 5/23/2017
Page No : 1

Groups Printed- Cars - Trucks

Start Time	North Ave From North			Albion St From East			North Ave From South			Albion St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	96	6	14	35	31	22	92	0	44	0	60	400
04:15 PM	0	104	9	9	23	25	27	85	0	50	0	64	396
04:30 PM	0	90	13	10	21	31	17	97	0	69	0	50	398
04:45 PM	0	103	8	13	33	23	28	92	0	55	0	47	402
Total	0	393	36	46	112	110	94	366	0	218	0	221	1596
05:00 PM	0	105	3	20	37	30	30	93	0	70	0	57	445
05:15 PM	0	124	10	14	38	23	34	103	0	84	0	62	492
05:30 PM	0	104	8	10	36	19	23	102	0	55	0	55	412
05:45 PM	0	108	8	11	34	21	15	78	0	73	0	76	424
Total	0	441	29	55	145	93	102	376	0	282	0	250	1773
Grand Total	0	834	65	101	257	203	196	742	0	500	0	471	3369
Apprch %	0	92.8	7.2	18	45.8	36.2	20.9	79.1	0	51.5	0	48.5	
Total %	0	24.8	1.9	3	7.6	6	5.8	22	0	14.8	0	14	
Cars	0	823	63	101	255	201	196	735	0	496	0	468	3338
% Cars	0	98.7	96.9	100	99.2	99	100	99.1	0	99.2	0	99.4	99.1
Trucks	0	11	2	0	2	2	0	7	0	4	0	3	31
% Trucks	0	1.3	3.1	0	0.8	1	0	0.9	0	0.8	0	0.6	0.9

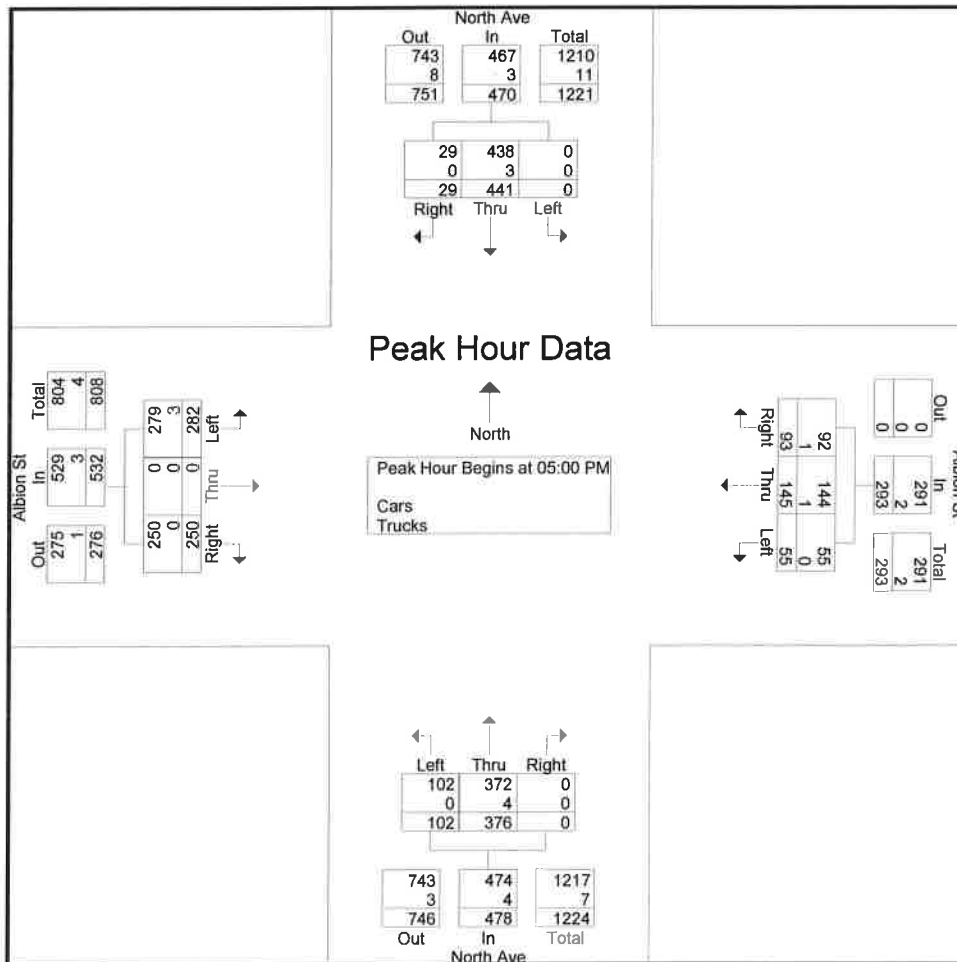
Accurate Counts

978-664-2565

N/S Street : North Avenue
 E/W Street : Albion Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 55640001
 Site Code : 55640001
 Start Date : 5/23/2017
 Page No : 2

Start Time	North Ave From North				Albion St From East				North Ave From South				Albion St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	105	3	108	20	37	30	87	30	93	0	123	70	0	57	127	445
05:15 PM	0	124	10	134	14	38	23	75	34	103	0	137	84	0	62	146	492
05:30 PM	0	104	8	112	10	36	19	65	23	102	0	125	55	0	55	110	412
05:45 PM	0	108	8	116	11	34	21	66	15	78	0	93	73	0	76	149	424
Total Volume	0	441	29	470	55	145	93	293	102	376	0	478	282	0	250	532	1773
% App. Total	0	93.8	6.2		18.8	49.5	31.7		21.3	78.7	0		53	0	47		
PHF	.000	.889	.725	.877	.688	.954	.775	.842	.750	.913	.000	.872	.839	.000	.822	.893	.901
Cars	0	438	29	467	55	144	92	291	102	372	0	474	279	0	250	529	1761
% Cars	0	99.3	100	99.4	100	99.3	98.9	99.3	100	98.9	0	99.2	98.9	0	100	99.4	99.3
Trucks	0	3	0	3	0	1	1	2	0	4	0	4	3	0	0	3	12
% Trucks	0	0.7	0	0.6	0	0.7	1.1	0.7	0	1.1	0	0.8	1.1	0	0	0.6	0.7



Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640001
Site Code : 55640001
Start Date : 5/23/2017
Page No : 7

Groups Printed- Trucks

Start Time	North Ave From North			Albion St From East			North Ave From South			Albion St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	4	0	0	0	0	0	0	0	0	0	0	4
04:15 PM	0	2	1	0	0	0	0	1	0	1	0	1	6
04:30 PM	0	2	0	0	0	1	0	0	0	0	0	1	4
04:45 PM	0	0	1	0	1	0	0	2	0	0	0	1	5
Total	0	8	2	0	1	1	0	3	0	1	0	3	19
05:00 PM	0	0	0	0	0	0	0	2	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	2
05:30 PM	0	2	0	0	1	1	0	0	0	0	0	0	4
05:45 PM	0	1	0	0	0	0	0	2	0	1	0	0	4
Total	0	3	0	0	1	1	0	4	0	3	0	0	12
Grand Total	0	11	2	0	2	2	0	7	0	4	0	3	31
Apprch %	0	84.6	15.4	0	50	50	0	100	0	57.1	0	42.9	
Total %	0	35.5	6.5	0	6.5	6.5	0	22.6	0	12.9	0	9.7	

Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640001
Site Code : 55640001
Start Date : 5/23/2017
Page No : 10

Groups Printed- Bikes Peds

Start Time	North Ave From North				Albion St From East				North Ave From South				Albion St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	2	0	1	0	3	0	0	0	1	0	0	0	0	6	1	7
04:15 PM	0	0	0	1	0	0	0	9	0	0	0	1	0	0	0	3	14	0	14
04:30 PM	0	0	0	2	0	0	0	4	3	0	0	1	0	0	0	2	9	3	12
04:45 PM	0	0	0	7	0	0	0	1	1	3	0	1	0	0	0	0	9	4	13
Total	0	0	0	12	0	1	0	17	4	3	0	4	0	0	0	5	38	8	46
05:00 PM	0	0	0	2	0	0	0	2	0	0	0	1	0	0	0	9	14	0	14
05:15 PM	0	0	0	2	0	0	0	1	0	0	0	1	0	0	4	4	8	4	12
05:30 PM	0	0	0	2	0	0	0	2	0	0	0	3	0	0	0	13	20	0	20
05:45 PM	0	0	0	0	0	0	0	1	0	0	0	3	0	0	2	0	4	2	6
Total	0	0	0	6	0	0	0	6	0	0	0	8	0	0	6	26	46	6	52
Grand Total	0	0	0	18	0	1	0	23	4	3	0	12	0	0	6	31	84	14	98
Apprch %	0	0	0		0	100	0		57.1	42.9	0		0	0	100				
Total %	0	0	0		0	7.1	0		28.6	21.4	0		0	0	42.9		85.7	14.3	

Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640002
Site Code : 55640002
Start Date : 5/23/2017
Page No : 1

Groups Printed- Cars - Trucks

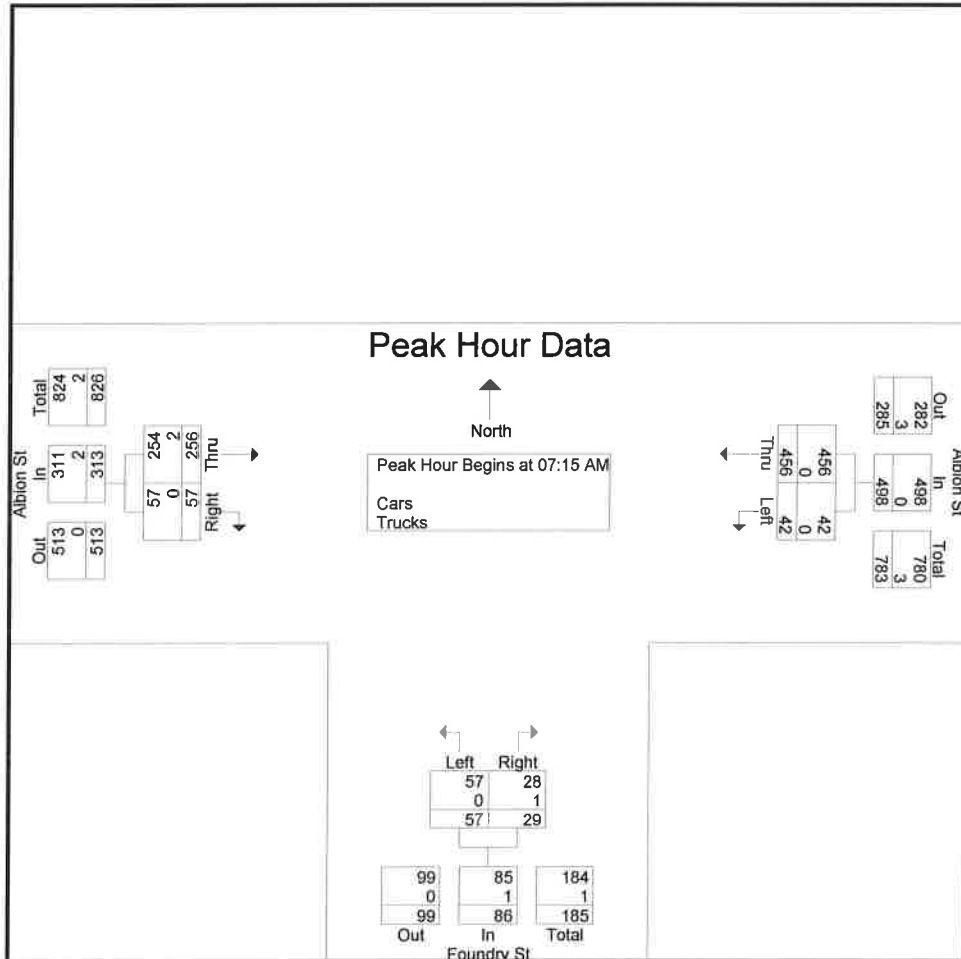
Start Time	Albion St From East		Foundry St From South		Albion St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
07:00 AM	7	88	2	7	71	25	200
07:15 AM	10	102	6	8	72	14	212
07:30 AM	8	103	13	7	68	11	210
07:45 AM	9	150	22	9	57	12	259
Total	34	443	43	31	268	62	881
08:00 AM	15	101	16	5	59	20	216
08:15 AM	14	93	10	5	68	10	200
08:30 AM	20	96	12	10	66	12	216
08:45 AM	20	79	8	11	77	19	214
Total	69	369	46	31	270	61	846
Grand Total	103	812	89	62	538	123	1727
Apprch %	11.3	88.7	58.9	41.1	81.4	18.6	
Total %	6	47	5.2	3.6	31.2	7.1	
Cars	102	810	89	60	536	123	1720
% Cars	99	99.8	100	96.8	99.6	100	99.6
Trucks	1	2	0	2	2	0	7
% Trucks	1	0.2	0	3.2	0.4	0	0.4

Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640002
Site Code : 55640002
Start Date : 5/23/2017
Page No : 2

Start Time	Albion St From East			Foundry St From South			Albion St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	10	102	112	6	8	14	72	14	86	212
07:30 AM	8	103	111	13	7	20	68	11	79	210
07:45 AM	9	150	159	22	9	31	57	12	69	259
08:00 AM	15	101	116	16	5	21	59	20	79	216
Total Volume	42	456	498	57	29	86	256	57	313	897
% App. Total	8.4	91.6		66.3	33.7		81.8	18.2		
PHF	.700	.760	.783	.648	.806	.694	.889	.713	.910	.866
Cars	42	456	498	57	28	85	254	57	311	894
% Cars	100	100	100	100	96.6	98.8	99.2	100	99.4	99.7
Trucks	0	0	0	0	1	1	2	0	2	3
% Trucks	0	0	0	0	3.4	1.2	0.8	0	0.6	0.3



Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640002
Site Code : 55640002
Start Date : 5/23/2017
Page No : 7

Groups Printed- Trucks

Start Time	Albion St From East		Foundry St From South		Albion St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
07:00 AM	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	1	0	1
07:30 AM	0	0	0	1	0	0	1
07:45 AM	0	0	0	0	0	0	0
Total	0	0	0	1	1	0	2
08:00 AM	0	0	0	0	1	0	1
08:15 AM	1	1	0	0	0	0	2
08:30 AM	0	1	0	0	0	0	1
08:45 AM	0	0	0	1	0	0	1
Total	1	2	0	1	1	0	5
Grand Total	1	2	0	2	2	0	7
Approch %	33.3	66.7	0	100	100	0	
Total %	14.3	28.6	0	28.6	28.6	0	

Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640002
Site Code : 55640002
Start Date : 5/23/2017
Page No : 10

Groups Printed- Bikes Peds

Start Time	Albion St From East			Foundry St From South			Albion St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	1	1	0	0	1	1	2
07:15 AM	0	1	1	0	0	3	0	0	0	4	1	5
07:30 AM	0	0	4	0	0	4	1	0	0	8	1	9
07:45 AM	1	0	2	0	0	0	0	0	0	2	1	3
Total	1	1	7	0	0	8	2	0	0	15	4	19
08:00 AM	0	0	3	0	0	2	0	0	2	7	0	7
08:15 AM	0	0	0	0	0	1	0	0	0	1	0	1
08:30 AM	0	0	4	0	0	6	0	0	0	10	0	10
08:45 AM	0	0	3	0	0	3	0	0	0	6	0	6
Total	0	0	10	0	0	12	0	0	2	24	0	24
Grand Total	1	1	17	0	0	20	2	0	2	39	4	43
Apprch %	50	50		0	0		100	0				
Total %	25	25		0	0		50	0		90.7	9.3	

Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640002
Site Code : 55640002
Start Date : 5/23/2017
Page No : 1

Groups Printed- Cars - Trucks

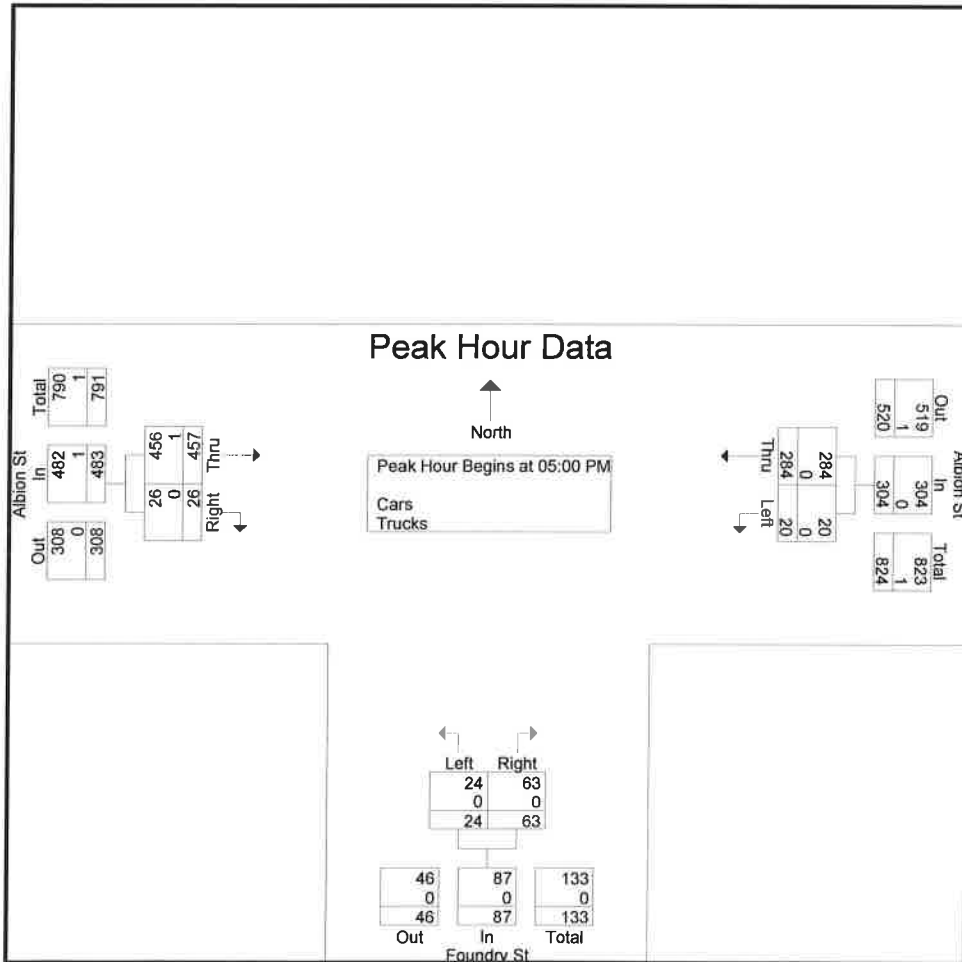
Start Time	Albion St From East		Foundry St From South		Albion St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
04:00 PM	10	61	8	16	95	7	197
04:15 PM	6	58	5	10	89	4	172
04:30 PM	2	49	6	12	108	12	189
04:45 PM	5	61	6	18	108	5	203
Total	23	229	25	56	400	28	761
05:00 PM	6	70	7	20	101	6	210
05:15 PM	2	94	4	15	116	2	233
05:30 PM	5	63	7	10	120	12	217
05:45 PM	7	57	6	18	120	6	214
Total	20	284	24	63	457	26	874
Grand Total	43	513	49	119	857	54	1635
Apprch %	7.7	92.3	29.2	70.8	94.1	5.9	
Total %	2.6	31.4	3	7.3	52.4	3.3	
Cars	42	513	49	119	854	54	1631
% Cars	97.7	100	100	100	99.6	100	99.8
Trucks	1	0	0	0	3	0	4
% Trucks	2.3	0	0	0	0.4	0	0.2

Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640002
Site Code : 55640002
Start Date : 5/23/2017
Page No : 2

Start Time	Albion St From East			Foundry St From South			Albion St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	6	70	76	7	20	27	101	6	107	210
05:15 PM	2	94	96	4	15	19	116	2	118	233
05:30 PM	5	63	68	7	10	17	120	12	132	217
05:45 PM	7	57	64	6	18	24	120	6	126	214
Total Volume	20	284	304	24	63	87	457	26	483	874
% App. Total	6.6	93.4		27.6	72.4		94.6	5.4		
PHF	.714	.755	.792	.857	.788	.806	.952	.542	.915	.938
Cars	20	284	304	24	63	87	456	26	482	873
% Cars	100	100	100	100	100	100	99.8	100	99.8	99.9
Trucks	0	0	0	0	0	0	1	0	1	1
% Trucks	0	0	0	0	0	0	0.2	0	0.2	0.1



Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640002
Site Code : 55640002
Start Date : 5/23/2017
Page No : 7

Groups Printed- Trucks

Start Time	Albion St From East		Foundry St From South		Albion St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
04:00 PM	1	0	0	0	0	0	1
04:15 PM	0	0	0	0	2	0	2
04:30 PM	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0
Total	1	0	0	0	2	0	3
05:00 PM	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	1	0	1
05:30 PM	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	1
Grand Total	1	0	0	0	3	0	4
Apprch %	100	0	0	0	100	0	
Total %	25	0	0	0	75	0	

Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Albion Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640002
Site Code : 55640002
Start Date : 5/23/2017
Page No : 10

Groups Printed- Bikes Peds

Start Time	Albion St From East			Foundry St From South			Albion St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	2	0	0	2	4	0	4
04:15 PM	0	0	1	0	0	1	0	0	0	2	0	2
04:30 PM	0	0	1	0	0	3	0	0	0	4	0	4
04:45 PM	0	0	5	0	0	3	0	0	0	8	0	8
Total	0	0	7	0	0	9	0	0	2	18	0	18
05:00 PM	3	0	1	0	0	2	0	0	0	3	3	6
05:15 PM	0	0	4	0	5	7	0	0	0	11	5	16
05:30 PM	0	0	8	0	0	8	0	0	0	16	0	16
05:45 PM	0	0	0	0	0	1	2	0	0	1	2	3
Total	3	0	13	0	5	18	2	0	0	31	10	41
Grand Total	3	0	20	0	5	27	2	0	2	49	10	59
Apprch %	100	0		0	100		100	0				
Total %	30	0		0	50		20	0		83.1	16.9	

Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640003
Site Code : 55640003
Start Date : 5/23/2017
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Groups Printed- Cars - Trucks

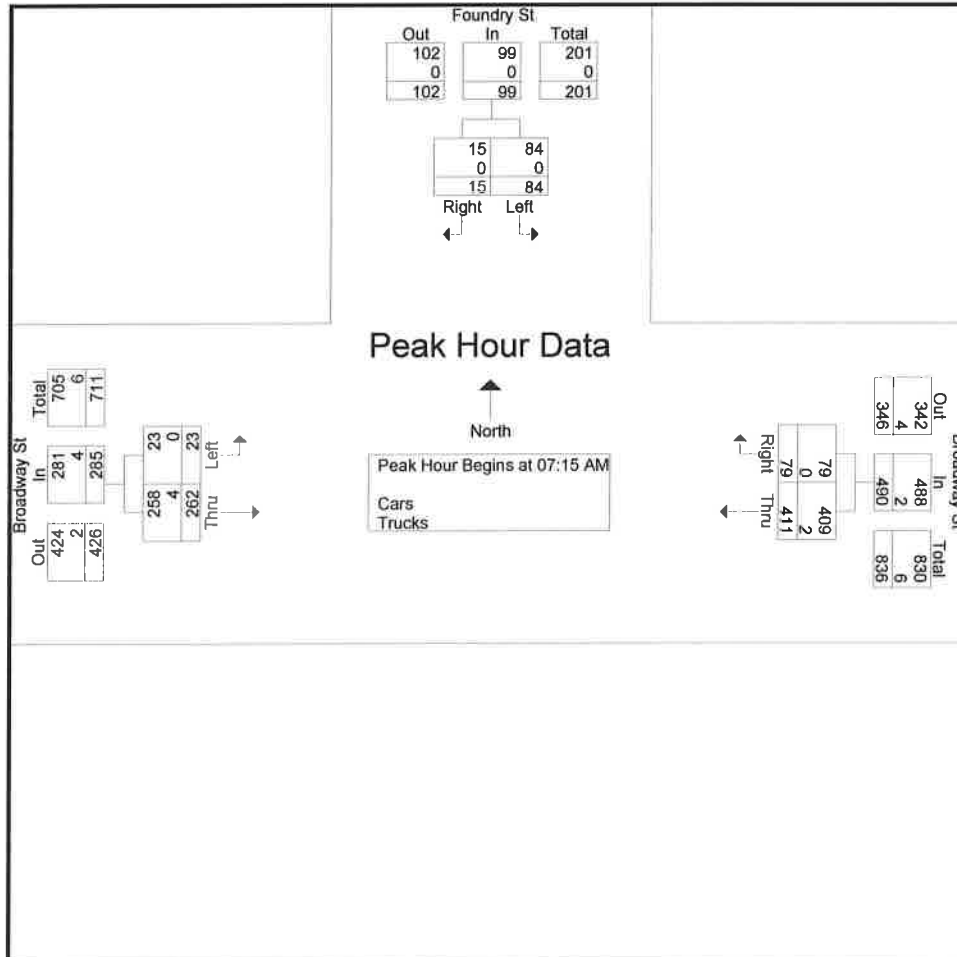
Start Time	Foundry St From North		Broadway St From East		Broadway St From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
07:00 AM	26	3	63	9	3	66	170
07:15 AM	20	3	70	9	3	91	196
07:30 AM	13	4	132	25	9	59	242
07:45 AM	15	2	104	28	4	48	201
Total	74	12	369	71	19	264	809
08:00 AM	36	6	105	17	7	64	235
08:15 AM	10	1	88	17	0	55	171
08:30 AM	11	1	88	21	6	62	189
08:45 AM	12	2	60	17	8	48	147
Total	69	10	341	72	21	229	742
Grand Total	143	22	710	143	40	493	1551
Apprch %	86.7	13.3	83.2	16.8	7.5	92.5	
Total %	9.2	1.4	45.8	9.2	2.6	31.8	
Cars	143	22	707	142	40	486	1540
% Cars	100	100	99.6	99.3	100	98.6	99.3
Trucks	0	0	3	1	0	7	11
% Trucks	0	0	0.4	0.7	0	1.4	0.7

Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640003
Site Code : 55640003
Start Date : 5/23/2017
Page No : 2

Start Time	Foundry St From North			Broadway St From East			Broadway St From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	20	3	23	70	9	79	3	91	94	196
07:30 AM	13	4	17	132	25	157	9	59	68	242
07:45 AM	15	2	17	104	28	132	4	48	52	201
08:00 AM	36	6	42	105	17	122	7	64	71	235
Total Volume	84	15	99	411	79	490	23	262	285	874
% App. Total	84.8	15.2		83.9	16.1		8.1	91.9		
PHF	.583	.625	.589	.778	.705	.780	.639	.720	.758	.903
Cars	84	15	99	409	79	488	23	258	281	868
% Cars	100	100	100	99.5	100	99.6	100	98.5	98.6	99.3
Trucks	0	0	0	2	0	2	0	4	4	6
% Trucks	0	0	0	0.5	0	0.4	0	1.5	1.4	0.7



Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640003
Site Code : 55640003
Start Date : 5/23/2017
Page No : 7

Groups Printed- Trucks

Start Time	Foundry St From North		Broadway St From East		Broadway St From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
07:00 AM	0	0	1	0	0	1	2
07:15 AM	0	0	0	0	0	4	4
07:30 AM	0	0	0	0	0	0	0
07:45 AM	0	0	1	0	0	0	1
Total	0	0	2	0	0	5	7
08:00 AM	0	0	1	0	0	0	1
08:15 AM	0	0	0	0	0	1	1
08:30 AM	0	0	0	0	0	1	1
08:45 AM	0	0	0	1	0	0	1
Total	0	0	1	1	0	2	4
Grand Total	0	0	3	1	0	7	11
Apprch %	0	0	75	25	0	100	
Total %	0	0	27.3	9.1	0	63.6	

Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640003
Site Code : 55640003
Start Date : 5/23/2017
Page No : 10

Groups Printed- Bikes Peds

Start Time	Foundry St From North			Broadway St From East			Broadway St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds			
07:00 AM	0	0	1	0	0	0	0	1	0	1	1	2
07:15 AM	0	0	2	0	0	0	0	0	0	2	0	2
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	1	0	0	0	0	0	0	0	0	1	1
Total	0	1	3	0	0	0	0	1	0	3	2	5
08:00 AM	0	0	1	0	0	0	0	0	0	1	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	0	0	0	0	1	0	1
Grand Total	0	1	4	0	0	0	0	1	0	4	2	6
Apprch %	0	100		0	0		0	100				
Total %	0	50		0	0		0	50		66.7	33.3	

Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640003
Site Code : 55640003
Start Date : 5/23/2017
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Groups Printed- Cars - Trucks

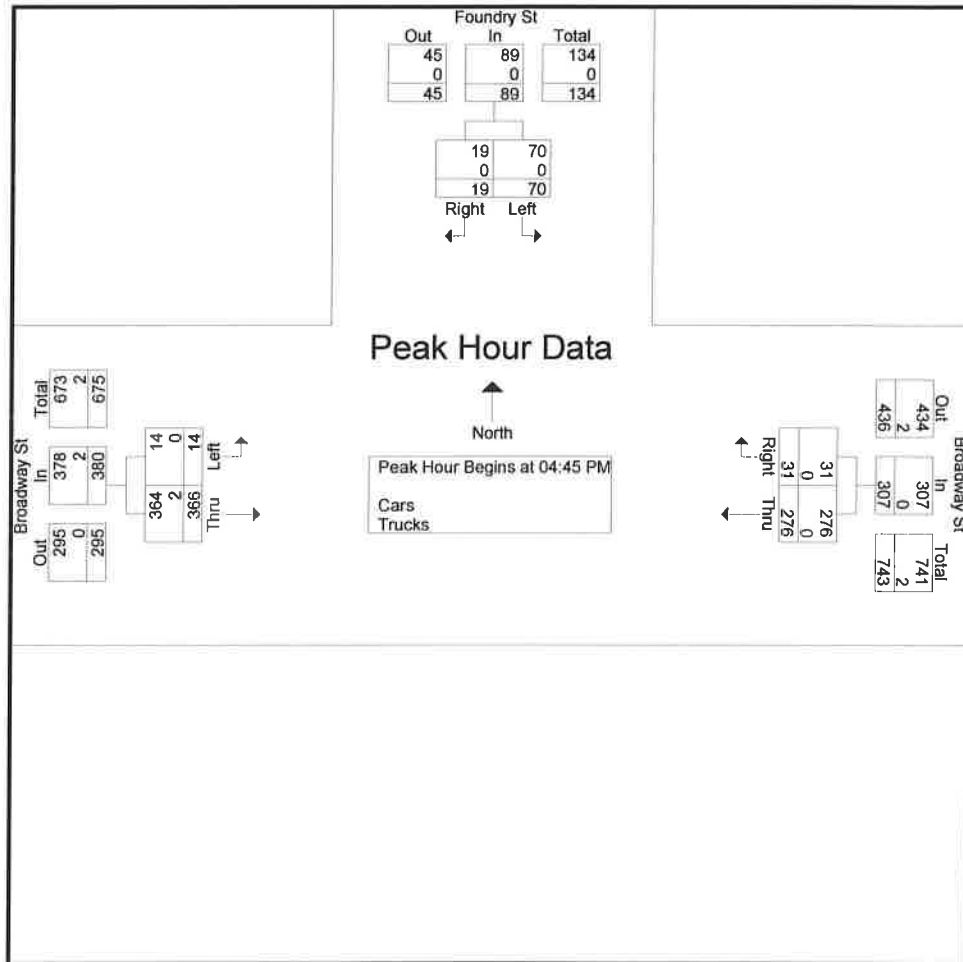
Start Time	Foundry St From North		Broadway St From East		Broadway St From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
04:00 PM	15	4	49	10	2	67	147
04:15 PM	15	9	62	12	6	71	175
04:30 PM	14	2	73	6	4	89	188
04:45 PM	10	4	74	13	3	82	186
Total	54	19	258	41	15	309	696
05:00 PM	31	9	69	5	2	84	200
05:15 PM	15	3	60	8	3	94	183
05:30 PM	14	3	73	5	6	106	207
05:45 PM	13	0	46	10	3	103	175
Total	73	15	248	28	14	387	765
Grand Total	127	34	506	69	29	696	1461
Apprch %	78.9	21.1	88	12	4	96	
Total %	8.7	2.3	34.6	4.7	2	47.6	
Cars	127	34	505	69	29	694	1458
% Cars	100	100	99.8	100	100	99.7	99.8
Trucks	0	0	1	0	0	2	3
% Trucks	0	0	0.2	0	0	0.3	0.2

Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640003
Site Code : 55640003
Start Date : 5/23/2017
Page No : 2

Start Time	Foundry St From North			Broadway St From East			Broadway St From West			Int. Total
	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	10	4	14	74	13	87	3	82	85	186
05:00 PM	31	9	40	69	5	74	2	84	86	200
05:15 PM	15	3	18	60	8	68	3	94	97	183
05:30 PM	14	3	17	73	5	78	6	106	112	207
Total Volume	70	19	89	276	31	307	14	366	380	776
% App. Total	78.7	21.3		89.9	10.1		3.7	96.3		
PHF	.565	.528	.556	.932	.596	.882	.583	.863	.848	.937
Cars	70	19	89	276	31	307	14	364	378	774
% Cars	100	100	100	100	100	100	100	99.5	99.5	99.7
Trucks	0	0	0	0	0	0	0	2	2	2
% Trucks	0	0	0	0	0	0	0	0.5	0.5	0.3



Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640003
Site Code : 55640003
Start Date : 5/23/2017
Page No : 7

Groups Printed- Trucks

Start Time	Foundry St From North		Broadway St From East		Broadway St From West		Int. Total
	Left	Right	Thru	Right	Left	Thru	
04:00 PM	0	0	0	0	0	0	0
04:15 PM	0	0	1	0	0	0	1
04:30 PM	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0
Total	0	0	1	0	0	0	1
05:00 PM	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	1	1
05:30 PM	0	0	0	0	0	1	1
05:45 PM	0	0	0	0	0	0	0
Total	0	0	0	0	0	2	2
Grand Total	0	0	1	0	0	2	3
Approch %	0	0	100	0	0	100	
Total %	0	0	33.3	0	0	66.7	

Accurate Counts
978-664-2565

N/S Street : Foundry Street
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640003
Site Code : 55640003
Start Date : 5/23/2017
Page No : 10

Groups Printed- Bikes Peds

Start Time	Foundry St From North			Broadway St From East			Broadway St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	1	0	0	1	0	0	0	2	0	2
04:30 PM	0	0	2	0	0	0	0	0	0	2	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	3	0	0	1	0	0	0	4	0	4
05:00 PM	0	0	0	1	0	0	0	0	0	0	1	1
05:15 PM	0	0	2	0	0	0	0	0	0	2	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	2	1	0	0	0	0	0	2	1	3
Grand Total	0	0	5	1	0	1	0	0	0	6	1	7
Apprch %	0	0		100	0		0	0				
Total %	0	0		100	0		0	0		85.7	14.3	

Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640004
Site Code : 55640004
Start Date : 5/23/2017
Page No : 1

Groups Printed- Cars - Trucks

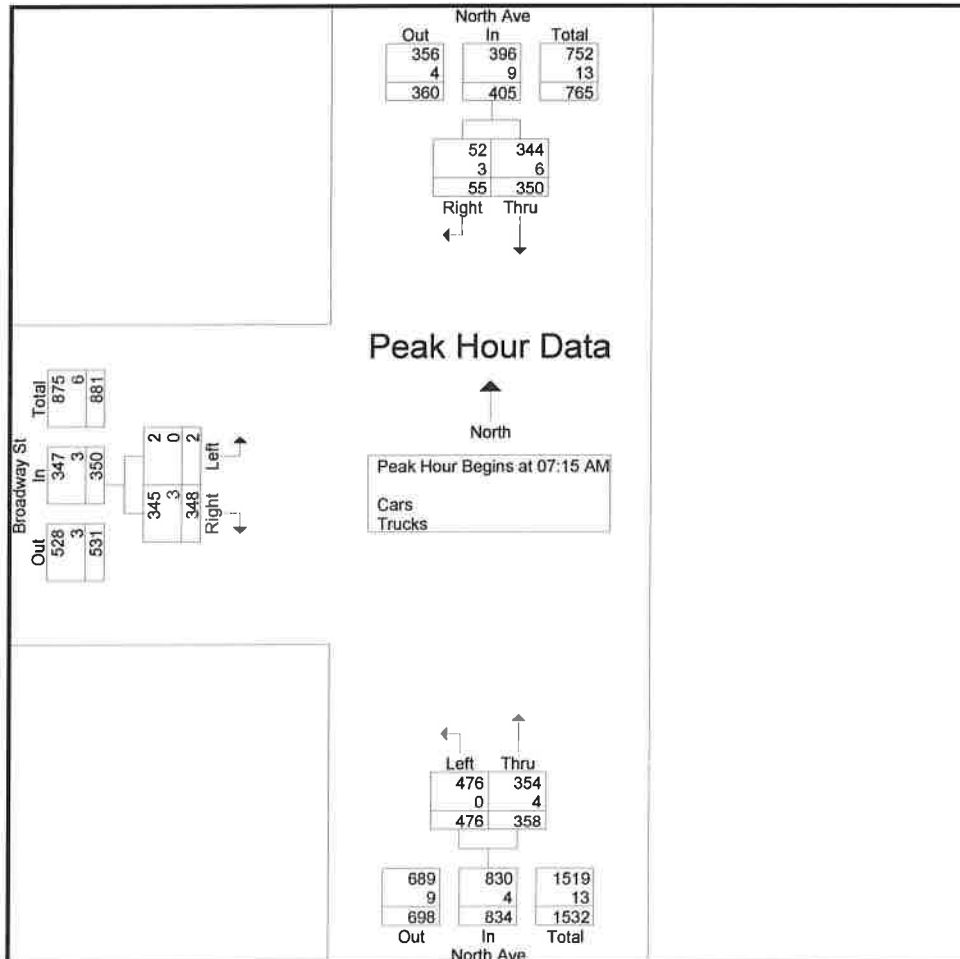
Start Time	North Ave From North		North Ave From South		Broadway St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
07:00 AM	90	1	73	87	1	90	342
07:15 AM	88	9	86	113	2	98	396
07:30 AM	112	21	149	88	0	89	459
07:45 AM	86	17	124	79	0	61	367
Total	376	48	432	367	3	338	1564
08:00 AM	64	8	117	78	0	100	367
08:15 AM	68	10	104	94	0	78	354
08:30 AM	73	4	127	105	2	75	386
08:45 AM	64	8	94	102	0	61	329
Total	269	30	442	379	2	314	1436
Grand Total	645	78	874	746	5	652	3000
Apprch %	89.2	10.8	54	46	0.8	99.2	
Total %	21.5	2.6	29.1	24.9	0.2	21.7	
Cars	634	75	872	740	5	646	2972
% Cars	98.3	96.2	99.8	99.2	100	99.1	99.1
Trucks	11	3	2	6	0	6	28
% Trucks	1.7	3.8	0.2	0.8	0	0.9	0.9

Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640004
Site Code : 55640004
Start Date : 5/23/2017
Page No : 2

Start Time	North Ave From North			North Ave From South			Broadway St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	88	9	97	86	113	199	2	98	100	396
07:30 AM	112	21	133	149	88	237	0	89	89	459
07:45 AM	86	17	103	124	79	203	0	61	61	367
08:00 AM	64	8	72	117	78	195	0	100	100	367
Total Volume	350	55	405	476	358	834	2	348	350	1589
% App. Total	86.4	13.6		57.1	42.9		0.6	99.4		
PHF	.781	.655	.761	.799	.792	.880	.250	.870	.875	.865
Cars	344	52	396	476	354	830	2	345	347	1573
% Cars	98.3	94.5	97.8	100	98.9	99.5	100	99.1	99.1	99.0
Trucks	6	3	9	0	4	4	0	3	3	16
% Trucks	1.7	5.5	2.2	0	1.1	0.5	0	0.9	0.9	1.0



Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640004
Site Code : 55640004
Start Date : 5/23/2017
Page No : 7

Groups Printed- Trucks

Start Time	North Ave From North		North Ave From South		Broadway St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
07:00 AM	2	0	0	0	0	1	3
07:15 AM	2	0	0	2	0	2	6
07:30 AM	2	0	0	0	0	1	3
07:45 AM	1	2	0	2	0	0	5
Total	7	2	0	4	0	4	17
08:00 AM	1	1	0	0	0	0	2
08:15 AM	0	0	1	2	0	1	4
08:30 AM	2	0	0	0	0	0	2
08:45 AM	1	0	1	0	0	1	3
Total	4	1	2	2	0	2	11
Grand Total	11	3	2	6	0	6	28
Approch %	78.6	21.4	25	75	0	100	
Total %	39.3	10.7	7.1	21.4	0	21.4	

Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640004
Site Code : 55640004
Start Date : 5/23/2017
Page No : 10

Groups Printed- Bikes Peds

Start Time	North Ave From North			North Ave From South			Broadway St From West			Exclu. Total	Inclu. Total	Int. Total
	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds			
07:00 AM	1	0	0	0	0	0	0	1	0	0	2	2
07:15 AM	1	1	0	0	0	0	0	0	0	0	2	2
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	1	0	0	0	0	0	1	0	0	4	4
08:00 AM	1	0	0	0	0	0	1	0	0	0	2	2
08:15 AM	0	0	1	0	0	1	0	0	0	2	0	2
08:30 AM	1	0	0	0	0	0	0	0	0	0	1	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	0	1	0	0	1	1	0	0	2	3	5
Grand Total	4	1	1	0	0	1	1	1	0	2	7	9
Apprch %	80	20		0	0		50	50				
Total %	57.1	14.3		0	0		14.3	14.3		22.2	77.8	

Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640004
Site Code : 55640004
Start Date : 5/23/2017
Page No : 1

Groups Printed- Cars - Trucks

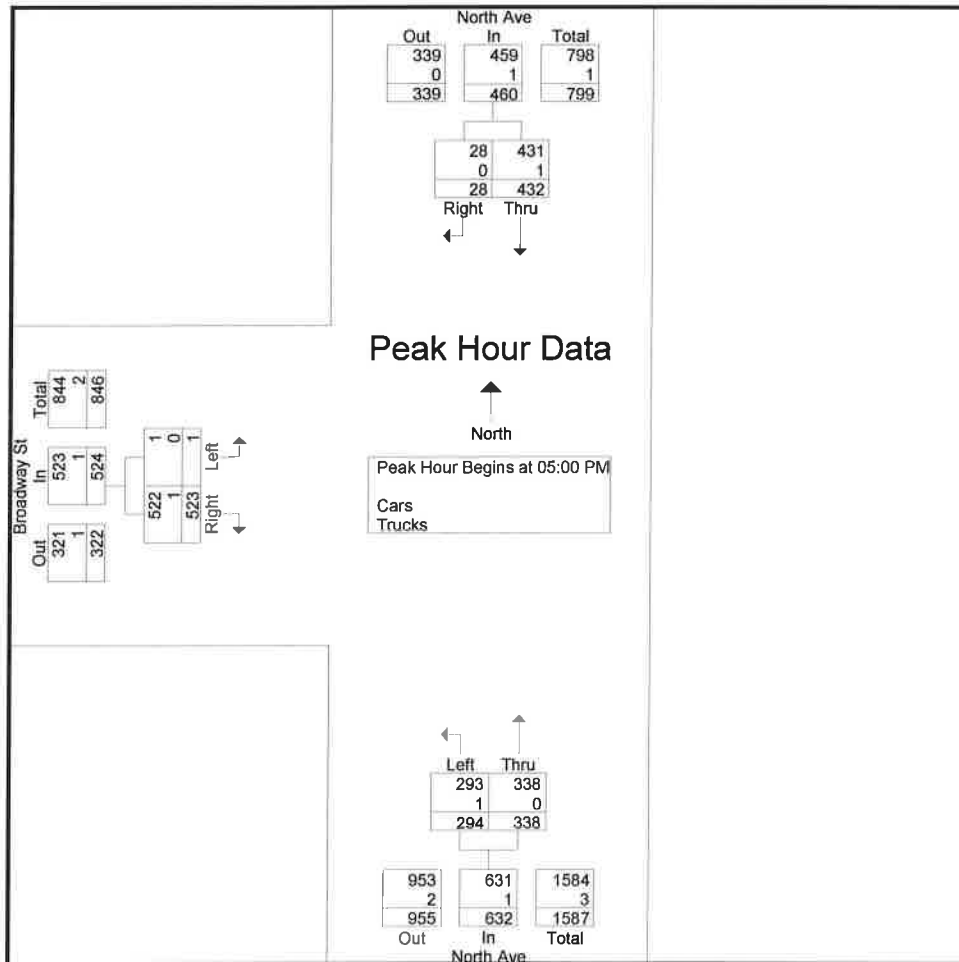
Start Time	North Ave From North		North Ave From South		Broadway St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
04:00 PM	100	9	72	89	0	94	364
04:15 PM	91	6	79	79	2	92	349
04:30 PM	86	4	93	91	0	126	400
04:45 PM	107	7	80	84	0	82	360
Total	384	26	324	343	2	394	1473
05:00 PM	112	6	80	77	0	130	405
05:15 PM	118	13	81	93	0	129	434
05:30 PM	100	7	84	88	0	121	400
05:45 PM	102	2	49	80	1	143	377
Total	432	28	294	338	1	523	1616
Grand Total	816	54	618	681	3	917	3089
Apprch %	93.8	6.2	47.6	52.4	0.3	99.7	
Total %	26.4	1.7	20	22	0.1	29.7	
Cars	813	53	617	680	3	916	3082
% Cars	99.6	98.1	99.8	99.9	100	99.9	99.8
Trucks	3	1	1	1	0	1	7
% Trucks	0.4	1.9	0.2	0.1	0	0.1	0.2

Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640004
Site Code : 55640004
Start Date : 5/23/2017
Page No : 2

Start Time	North Ave From North			North Ave From South			Broadway St From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	112	6	118	80	77	157	0	130	130	405
05:15 PM	118	13	131	81	93	174	0	129	129	434
05:30 PM	100	7	107	84	88	172	0	121	121	400
05:45 PM	102	2	104	49	80	129	1	143	144	377
Total Volume	432	28	460	294	338	632	1	523	524	1616
% App. Total	93.9	6.1		46.5	53.5		0.2	99.8		
PHF	.915	.538	.878	.875	.909	.908	.250	.914	.910	.931
Cars	431	28	459	293	338	631	1	522	523	1613
% Cars	99.8	100	99.8	99.7	100	99.8	100	99.8	99.8	99.8
Trucks	1	0	1	1	0	1	0	1	1	3
% Trucks	0.2	0	0.2	0.3	0	0.2	0	0.2	0.2	0.2



Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640004
Site Code : 55640004
Start Date : 5/23/2017
Page No : 7

Groups Printed- Trucks

Start Time	North Ave From North		North Ave From South		Broadway St From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
04:00 PM	1	0	0	0	0	0	1
04:15 PM	0	1	0	0	0	0	1
04:30 PM	1	0	0	0	0	0	1
04:45 PM	0	0	0	1	0	0	1
Total	2	1	0	1	0	0	4
05:00 PM	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	1	1
05:45 PM	1	0	1	0	0	0	2
Total	1	0	1	0	0	1	3
Grand Total	3	1	1	1	0	1	7
Apprch %	75	25	50	50	0	100	
Total %	42.9	14.3	14.3	14.3	0	14.3	

Accurate Counts
978-664-2565

N/S Street : North Avenue
E/W Street : Broadway Street
City/State : Wakefield, MA
Weather : Clear

File Name : 55640004
Site Code : 55640004
Start Date : 5/23/2017
Page No : 10

Groups Printed- Bikes Peds

Start Time	North Ave From North			North Ave From South			Broadway St From West			Exclu. Total	Inclu. Total	Int. Total
	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	1	0	2	0	0	1	0	1	3	4
Total	0	0	1	0	2	0	0	1	0	1	3	4
05:00 PM	0	0	0	0	0	0	0	0	1	1	0	1
05:15 PM	1	0	0	0	0	0	0	0	0	0	1	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	1	1	1	2
Grand Total	1	0	1	0	2	0	0	1	1	2	4	6
Apprch %	100	0		0	100		0	100				
Total %	25	0		0	50		0	25		33.3	66.7	

SEASONAL ADJUSTMENT CALCULATIONS



Massachusetts Highway Department

4158: Monthly Hourly Volume for 2017

Location ID:	4158	Seasonal Factor Group:	U1
County:	Middlesex	Daily Factor Group:	
Functional Class	1 - Interstate	Axle Factor Group:	U1
Location:	Yankee Division Highway (I-95) North of I-93	Growth Factor Group:	U1

	Monthly Volume	Variation from Avg Month
2017 January	150825.7619	0.96
2017 February	144646.76	0.92
2017 March	154821.6207	0.99
2017 April	156107.75	1.00
2017 May	161028.5	1.03
2017 June	164318.4138	1.05
2017 July	160308.7	1.02
2017 August	164098.9655	1.05
2017 September	157883.6786	1.01
2017 October	159225.7	1.02
2017 November	155225.6207	0.99
2017 December	149044.44	0.95
Average	156461.3259	1.00

PUBLIC TRANSPORTATION SCHEDULES



Effective Mar 14, 2021

**Route/
Schedule
Change**

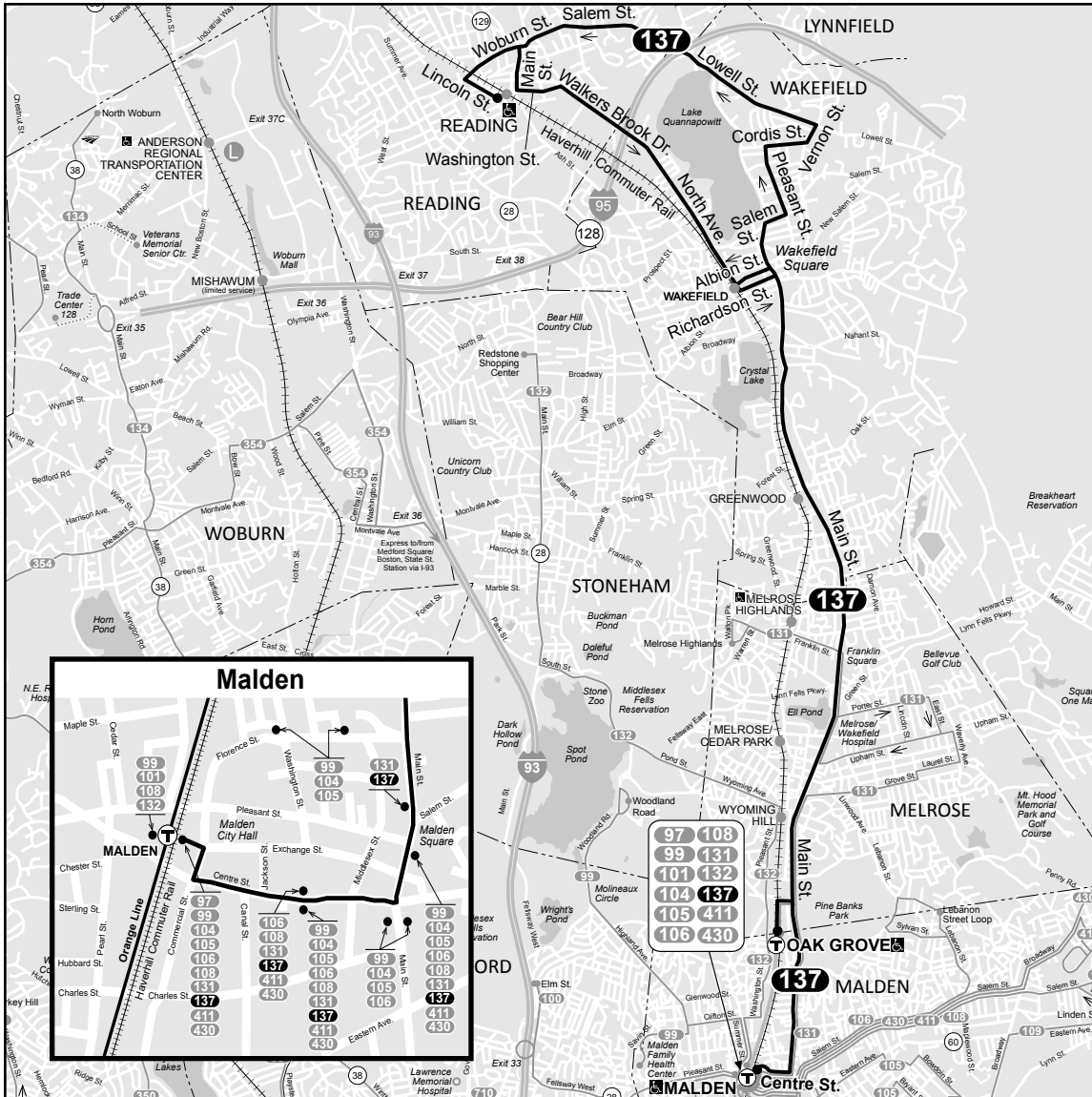
137

Reading Depot - Malden Center Sta



mbta.com
617-222-3200
617-222-5146 (TTY)

Lost & Found
617-222-5607



Information in this timetable is subject to change without notice. Traffic conditions and weather can affect running time.

MOTOR VEHICLE CRASH DATA



MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021 Baseline

MHD USE ONLY

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

Source #

~ INTERSECTION DATA ~

MAJOR STREET : North Avenue

ST #

MINOR STREET(S) : Albion Street

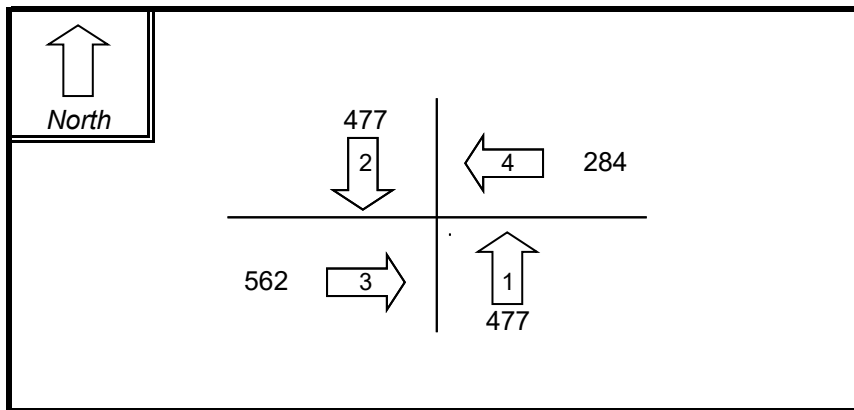
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	477	477	562	284		1,800

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73
Accident Rate for District 4 unsignalized intersections = 0.57

MassDOT Crash Report for North Avenue at Albion Street in Wakefield MA 2014-2018

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Vehicle Sequence of Events (All Vehicles)	Street Number	Roadway
03/27/2014	Property damage only (none injured)	1:34 PM	2	D1: (No improper driving) / D2: (Unknown)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: N / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	221	NORTH AVE
06/02/2014	Property damage only (none injured)	11:22 AM	2	D1: (No improper driving) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Changing lanes / V2: Travelling straight ahead	V1: S / V2: S	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	225	NORTH AVE
07/28/2014	Property damage only (none injured)	4:25 PM	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Head-on	Dry	V1: Turning left / V2: Travelling straight ahead	V1: S / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic),(Collision with utility pole)		NORTH AVE / ALBION ST
08/20/2014	Property damage only (none injured)	5:43 PM	2	D1: (No improper driving) / D2: (Operating vehicle in erratic, reckless, careless, negligent or aggressive manner)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Overtaking/passing	V1: N / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Cross median or centerline),(Collision with motor vehicle in traffic)		NORTH AVE / ALBION ST
06/18/2015	Property damage only (none injured)	12:11 PM	3	D1: (No improper driving) / D2: (Inattention) / D3: (Inattention)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead / V3: Travelling straight ahead	V1: S / V2: S / V3: S	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic)		NORTH AVE / ALBION ST
08/08/2015	Property damage only (none injured)	10:37 AM	4	D1: (Unknown)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Parked / V3: Parked / V4: Parked	V1: S / V2: S / V3: S / V4: S	Clear	V1:(Equipment failure) V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic) V4:(Collision with motor vehicle in traffic)	225	NORTH AVENUE
09/22/2015	Property damage only (none injured)	4:20 PM	2	D1: (No improper driving) / D2: (Followed too closely)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		NORTH AVE / ALBION ST
04/14/2016	Property damage only (none injured)	9:51 AM	1	D1: (No improper driving)	Daylight	Single vehicle crash	Dry	V1: Turning right	V1: W	Clear	V1:(Collision with other movable object)		ALBION ST / NORTH AVE
07/20/2016	Property damage only (none injured)	8:49 AM	1	D1: (No improper driving)	Unknown	Rear-to-rear	Unknown	V1: Parked	V1: N	Unknown	V1:(Collision with parked motor vehicle)	225	NORTH AVE
07/22/2016	Property damage only (none injured)	1:21 PM	2	D1: (Failure to keep in proper lane or running off road) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Overtaking/passing / V2: Turning right	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		NORTH AVE / ALBION ST
09/02/2016	Property damage only (none injured)	9:50 PM	1	D1: (Inattention)	Dark - lighted roadway	Single vehicle crash	Dry	V1: Turning right	V1: W	Clear	V1:(Collision with other movable object)		ALBION STREET / NORTH AVENUE
11/17/2016	Property damage only (none injured)	9:25 AM	1	D1: (No improper driving)	Daylight	Angle	Dry	V1: Parked	V1: N	Clear	V1:(Collision with motor vehicle in traffic)	225	NORTH AVE
12/15/2017	Property damage only (none injured)	6:01 AM	1	D1: (Disregarded traffic signs, signals, road markings)	Dark - lighted roadway	Single vehicle crash	Dry	V1: Turning right	V1: W	Clear	V1:(Collision with other movable object)		NORTH AVE / ALBION ST
09/14/2018	Property damage only (none injured)	7:09 AM	2	D1: (Failure to keep in proper lane or running off road) / D2: (No improper driving)	Daylight	Sideswipe, same direction	Dry	V1: Overtaking/passing / V2: Entering traffic lane	V1: N / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	225	NORTH AVE
12/10/2018	Property damage only (none injured)	4:41 PM	2	D1: (No improper driving) / D2: (Followed too closely)	Dark - lighted roadway	Rear-end	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: S / V2: S	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		NORTH AVE / ALBION ST
12/27/2018	Non-fatal injury	9:29 AM	1	D1: (Unknown)	Daylight	Single vehicle crash	Dry	V1: Travelling straight ahead	V1: W	Clear	V1:(Collision with other fixed object(wall, building, tunnel, etc.))	225	NORTH AVE

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021 Baseline

MHD USE ONLY

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Albion Street

ST #

MINOR STREET(S) : Foundry Street

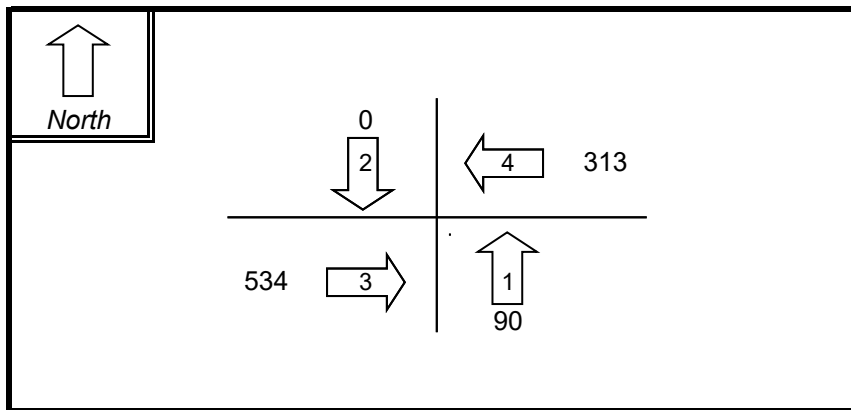
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	90		534	313		937

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73
Accident Rate for District 4 unsignalized intersections = 0.57

MassDOT Crash Report for Albion Street at Foundry Street in Wakefield MA 2014-2018

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Vehicle Sequence of Events (All Vehicles)	Street Number	Roadway
05/08/2014	Property damage only (none injured)	9:57 AM	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Turning right / V2: Travelling straight ahead	V1: N / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		ALBION STREET / FOUNDRY STREET
12/03/2014	Non-fatal injury	5:31 PM	2	D1: (Unknown) / D2: (Unknown)	Dark - lighted roadway	Angle	Wet	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: N	Rain	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		ALBION ST / FOUNDRY ST
10/29/2015	Property damage only (none injured)	3:29 PM	2	D1: (No improper driving) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Turning left	V1: E / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		ALBION ST / FOUNDRY ST
01/27/2016	Property damage only (none injured)	2:58 PM	2	D1: (Unknown) / D2: (Failed to yield right of way)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		ALBION STREET / FOUNDRY STREET

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021 Baseline

MHD USE ONLY

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Broadway Street

ST #

MINOR STREET(S) : Foundry Street

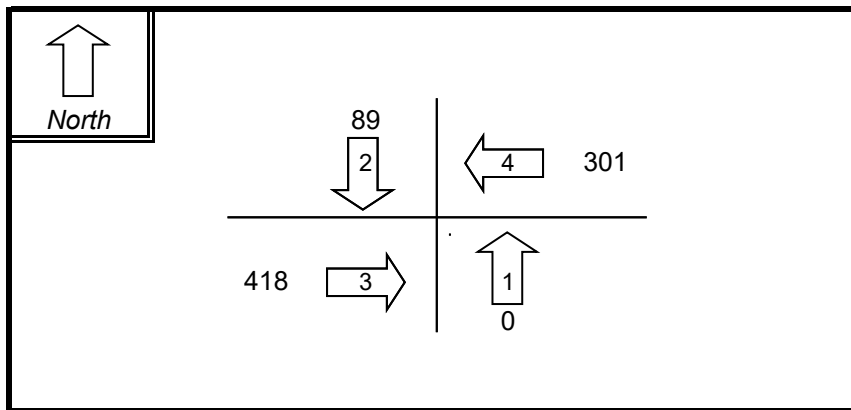
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :		89	418	301		808

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73
Accident Rate for District 4 unsignalized intersections = 0.57

MassDOT Crash Report for Broadway Street at Foundry Street in Wakefield MA 2014-2018

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Vehicle Sequence of Events (All Vehicles)	Street Number	Roadway
10/31/2018	Non-fatal injury	5:22 PM	4	D1: (Distracted) / D2: (No improper driving) / D3: (No improper driving) / D4: (No improper driving)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic / V3: Slowing or stopped in traffic / V4: Slowing or stopped in traffic	V1: E / V2: E / V3: E / V4: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic) V4:(Collision with motor vehicle in traffic)		BROADWAY / FOUNDRY ST

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021 Baseline

MHD USE ONLY

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

Source #

~ INTERSECTION DATA ~

MAJOR STREET : North Avenue

ST #

MINOR STREET(S) : Broadway Street

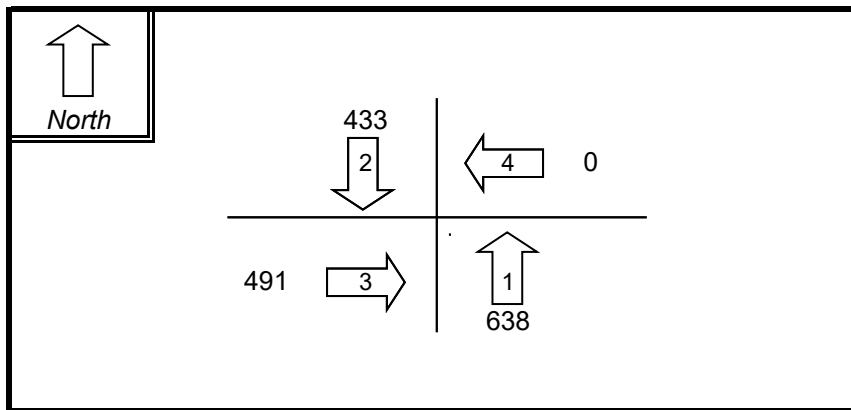
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	638	433	491			1,562

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73
Accident Rate for District 4 unsignalized intersections = 0.57

MassDOT Crash Report for North Avenue at Broadway Street in Wakefield MA 2014-2018

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Vehicle Sequence of Events (All Vehicles)	Street Number	Roadway
01/11/2014	Property damage only (none injured)	3:04 PM	1	D1: (No improper driving)	Daylight	Sideswipe, opposite direction	Wet	V1: Parked	V1: E	Cloudy/Rain	V1:(Collision with motor vehicle in traffic)	10	BROADWAY
08/28/2014	Non-fatal injury	5:57 PM	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Daylight	Head-on	Dry	V1: Travelling straight ahead / V2: Turning left	V1: E / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		BROADWAY / NORTH AVE
06/13/2015	Not Reported	2:10 PM	2		Daylight	Rear-end	Dry	V1: Parked / V2: Other	V1: E / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with parked motor vehicle)	10	BROADWAY
08/15/2015	Property damage only (none injured)	11:31 PM	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Dark - lighted roadway	Angle	Wet	V1: Entering traffic lane / V2: Travelling straight ahead	V1: E / V2: S	Rain	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		NORTH AVE / BROADWAY
09/17/2015	Property damage only (none injured)	6:50 AM	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Entering traffic lane / V2: Slowing or stopped in traffic	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		NORTH AVE / BROADWAY
12/15/2015	Property damage only (none injured)	10:42 PM	1	D1: (Distracted)	Dark - lighted roadway	Fixed-object	Dry	V1: Travelling straight ahead	V1: E	Clear	V1:(Collision with utility pole)	10	BROADWAY
06/22/2016	Property damage only (none injured)	3:25 PM	1	D1: (No improper driving)	Daylight	Unknown	Dry	V1: Parked	V1: E	Clear	V1:(Collision with parked motor vehicle)	10	BROADWAY
12/25/2016	Property damage only (none injured)	8:16 PM	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Dark - lighted roadway	Angle	Dry	V1: Travelling straight ahead / V2: Turning left	V1: N / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		NORTH AVE / BROADWAY
07/19/2017	Non-fatal injury	7:27 PM	1	D1: (Glare)	Daylight	Bicycle	Dry	V1: Turning left	V1: W	Clear	V1:(Collision with cyclist)		NORTH AVE / BROADWAY

GROWTH RATE DATA



Massachusetts Highway Department

4125: Annual Growth Rate 2007-2017

Location ID:	4125	Seasonal Factor Group:	U3
County:	Middlesex	Daily Factor Group:	
Functional Class	3 Other Principal Arterial	Axle Factor Group:	U3
Location:	Main Street at Melrose City Line	Growth Factor Group:	U3

Year	AADT
2017	13207
2007	12360

A = 2017/2007 1.0685

B = A^(1/10) 1.0067

Average Annual Growth Rate	0.67
---------------------------------------	-------------

Massachusetts Highway Department

4122: Annual Growth Rate 2006-2016

Location ID:	4122	Seasonal Factor Group:	U3
County:	Middlesex	Daily Factor Group:	
Functional Class	3 Other Principal Arterial	Axle Factor Group:	U3
Location:	Lynn Fells Parkway at Saugus Town Line	Growth Factor Group:	U3

Year	AADT
2016	12976
2006	11557

A = 2016/2006 1.1228

B = A^(1/10) 1.0116

Average Annual Growth Rate	1.16
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Massachusetts Highway Department

R12703: Annual Growth Rate 2007-2015

Location ID:	4122	Seasonal Factor Group:	U4-7
County:	Middlesex	Daily Factor Group:	
Functional Class	4 Minor Arterial	Axle Factor Group:	U4-7
Location:	Ramp I95 NB to North Avenue	Growth Factor Group:	U4-7

Year	AADT
2015	7352
2007	6786

A = 2015/2007 1.0834

B = A^(1/8) 1.0101

Average Annual Growth Rate	1.01
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Station	Growth
4125	0.67
4122	1.16
R12703	1.01
Average	0.95
Use	1 Percent

TRIP GENERATION CALCULATIONS



COMMUTING CHARACTERISTICS BY SEX

Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.

	Census Tract 3352, Middlesex County, Massachusetts	
	Total	
Label	Estimate	Margin of Error
▼ Workers 16 years and over	3,518	±37
▼ MEANS OF TRANSPORTATION TO WORK		
▼ Car, truck, or van	80.7%	±6.
Drove alone	75.1%	±7.
▼ Carpooled	5.5%	±3.
In 2-person carpool	4.2%	±3.
In 3-person carpool	1.4%	±2.
In 4-or-more person carpool	0.0%	±1.
Workers per car, truck, or van	1.04	±0.0
Public transportation (excluding taxicab)	9.1%	±4.
Walked	2.4%	±3.
Bicycle	0.3%	±0.
Taxicab, motorcycle, or other means	2.4%	±2.
Worked from home	5.1%	±3.
▼ PLACE OF WORK		
▼ Worked in state of residence	97.6%	±1.
Worked in county of residence	62.1%	±6.
Worked outside county of residence	35.5%	±6.
Worked outside state of residence	2.4%	±1.
▼ Living in a place	100.0%	±1.
Worked in place of residence	20.6%	±6.
Worked outside place of residence	79.4%	±6.
Not living in a place	0.0%	±1.
▼ Living in 12 selected states	100.0%	±1.
Worked in minor civil division of residence	20.6%	±6.
Worked outside minor civil division of residence	79.4%	±6.

Table Notes

COMMUTING CHARACTERISTICS BY SEX

Survey/Program:

American Community Survey

Year:

2019

Estimates:

5-Year

Table ID:

S0801

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates

When information is missing or inconsistent, the Census Bureau logically assigns an acceptable value using the response to a related question or questions. If a logical assignment is not possible, data are filled using a statistical process called allocation, which uses a similar individual or household to provide a donor value. The "Allocated" section is the number of respondents who received an allocated value for a particular subject.

2019 ACS data products include updates to several categories of the existing means of transportation question. For more information, see: [Change to Means of Transportation](#).

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.

The 12 selected states are Connecticut, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin.

Workers include members of the Armed Forces and civilians who were at work last week.

The 2015-2019 American Community Survey (ACS) data generally reflect the September 2018 Office of Management and Budget (OMB) delineations of metropolitan and micropolitan statistical areas. In certain instances, the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB delineation lists due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Explanation of Symbols:

An "**" entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.

An "-" entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution, or the margin of error associated with a median was larger than the median itself.

An "-" following a median estimate means the median falls in the lowest interval of an open-ended distribution.

An "+" following a median estimate means the median falls in the upper interval of an open-ended distribution.

An "***" entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.

An "*****" entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.

An "N" entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.

An "(X)" means that the estimate is not applicable or not available.

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Institute of Transportation Engineers (ITE)
Trip Generation, 10th Edition
Land Use Code (LUC) 221 - Multifamily Housing (Mid-Rise)

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 58

AVERAGE WEEKDAY DAILY

$$T = 5.45 * (X) - 1.75$$

$$T = 5.45 * 58 - (1.75)$$

$$T = 314.35$$

$$T = 314 \text{ vehicle trips}$$

with 50% (157 vpd) entering and 50% (157 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\ln T = 0.98 * \ln(X) - 0.98$$

$$\ln T = 0.98 * \ln 58 - (0.98)$$

$$\ln T = 3.00$$

$$T = 20.07$$

$$T = 20 \text{ vehicle trips}$$

with 26% (5 vph) entering and 74% (15 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\ln T = 0.96 * \ln(X) - 0.63$$

$$\ln T = 0.96 * \ln 58 - (0.63)$$

$$\ln T = 3.27$$

$$T = 26.26$$

$$T = 26 \text{ vehicle trips}$$

with 61% (16 vph) entering and 39% (10 vph) exiting.

Institute of Transportation Engineers (ITE)
Trip Generation, 10 th Edition
Land Use Code (LUC) 930 -Fast Casual Restaurant

Average Vehicle Trips Ends vs: 1000 SF Gross Floor Area

Independent Variable (X): 3.75

Limited sample size - use caution

AVERAGE WEEKDAY DAILY

$$T = 315.17 * (X)$$

$$T = 315.17 * 3.75$$

$$T = 1181.89$$

$$T = 1,182 \text{ vehicle trips}$$

with 50% (591 vpd) entering and 50% (591 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 2.07 * (X)$$

$$T = 2.07 * 3.75$$

$$T = 7.76$$

$$T = 8 \text{ vehicle trips}$$

with 67% (5 vph) entering and 33% (3 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 14.13 * (X)$$

$$T = 14.13 * 3.75$$

$$T = 29.25$$

$$T = 29 \text{ vehicle trips}$$

with 55% (16 vph) entering and 45% (13 vph) exiting.

	Vehicle Trips ITE LUC 221 (A)	Total Residential (B=A*1.04)	Person Trips			Proposed Residential Vehicle Trips (F=(C+E)/1.04)	Proposed Resturant Trips	Proposed Resturant Walking Trips	Proposed Restaurant Vehicle Trips	Total Site Vechile Trips
			Auto Trips (C=B*0.81)	Tranit Trips (D=B*0.09)	Bike/Walk/Other Trips (E=B*0.10)					
Weekday Daily	314	327	265	29	33	287	1,182	591	591	878
AM Peak Hour										
In	5	5	4	0	1	5	5	2	3	8
Out	15	16	13	1	2	14	3	1	2	16
Total	20	21	17	1	3	19	8	3	5	24
PM Peak Hour										
In	16	17	14	2	1	14	16	8	8	22
Out	10	10	8	1	1	9	13	6	7	16
Total	26	27	22	3	2	23	29	14	15	38
Census Tract 3352	1.04	person trips per vehicle trips								
Mode Split from Census Tract 3352										
Auto Trips	81	percent								
Transit Trips	9	percent								
Bike/Walk/Other Trips	10	percent								
Resturant Trip Reduction for Walking Trips	50	perecnt								

JOURNEY TO WORK DATA



Journey to Work: Exiting Traffic					
Town/City/County	Percent	Albion Street West	Albion Street East	North Avenue North	North Avenue South
Andover town	1.55	0.78		0.78	
Beverly city	1.79			0.90	0.90
Danvers town	1.76			1.76	
Lynnfield town	1.09			1.09	
Peabody city	1.54			0.77	0.77
Salem city	1.25			1.25	
Saugus town	1.61				1.61
Bedford town	1.19			1.19	
Burlington town	3.27			3.27	
Cambridge city	4.88				4.88
Everett city	1.22				1.22
Lexington town	1.19	1.19			
Malden city	1.41				1.41
Medford city	1.71	1.71			
Melrose city	2.55				2.55
Newton city	1.36	1.36			
Reading town	4.46			4.46	
Somerville city	1.44	1.44			
Stoneham town	1.47	1.47			
Wakefield town	17.45	2.44		5.76	9.25
Waltham city	2.59	2.59			
Wilmington town	1.74	1.74			
Winchester town	1.18	1.18			
Woburn city	5.83	5.83			
Boston city	19.69	9.85			9.85
Chelsea city	1.14				1.14
Barnstable County	0.16	0.16			
Bristol County	0.11	0.11			
Essex County	3.28			3.28	
Middlesex County	7.65	3.83		3.83	
Norfolk County	1.55	1.03			0.52
Plymouth County	0.13	0.13			
Suffolk County	0.69				0.69
Worcester County	0.04	0.04			
TOTAL	100.00	36.89	0.00	28.33	34.78
USE	100	35	0	30	35

Journey to Work: Entering Traffic					
Town/City/County	Percent	Albion Street West	Albion Street East	North Avenue North	North Avenue South
Andover town	1.55		1.55		
Beverly city	1.79			0.90	0.90
Danvers town	1.76			1.76	
Lynnfield town	1.09			1.09	
Peabody city	1.54		1.54		
Salem city	1.25			1.25	
Saugus town	1.61				1.61
Bedford town	1.19			1.19	
Burlington town	3.27			3.27	
Cambridge city	4.88				4.88
Everett city	1.22				1.22
Lexington town	1.19	1.19			
Malden city	1.41				1.41
Medford city	1.71	1.71			
Melrose city	2.55				2.55
Newton city	1.36	1.36			
Reading town	4.46			4.46	
Somerville city	1.44	1.44			
Stoneham town	1.47	1.47			
Wakefield town	17.45	2.44	2.44	3.32	9.25
Waltham city	2.59	2.59			
Wilmington town	1.74	1.74			
Winchester town	1.18	1.18			
Woburn city	5.83	5.83			
Boston city	19.69	9.85			9.85
Chelsea city	1.14				1.14
Barnstable County	0.16	0.16			
Bristol County	0.11	0.11			
Essex County	3.28			3.28	
Middlesex County	7.65	3.83		3.83	
Norfolk County	1.55	1.03			0.52
Plymouth County	0.13	0.13			
Suffolk County	0.69				0.69
Worcester County	0.04	0.04			
TOTAL	100.00	36.12	5.53	24.34	34.01
USE	100	35	5	25	35

CAPACITY ANALYSIS

2021 Baseline Weekday Morning Peak Hour
2021 Baseline Weekday Evening Peak Hour
2028 No-Build Weekday Morning Peak Hour
2028 No-Build Weekday Evening Peak Hour
2028 Build Weekday Morning Peak Hour
2028 Build Weekday Evening Peak Hour
























2021 Baseline Weekday Morning Peak Hour



Lanes, Volumes, Timings
12: North Avenue & Albion Street

2021 Baseline Weekday Morning Peak Hour

03/29/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	0	160	37	252	83	111	446	0	0	362	33
Future Volume (vph)	132	0	160	37	252	83	111	446	0	0	362	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	11	11	13	11	12	12	12	12	13	12
Storage Length (ft)	0		0	90		90	160		0	0		100
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850						0.850
Fl _t Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Fl _t Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			176			124						124
Link Speed (mph)		30			30			30				30
Link Distance (ft)		119			257			1012				238
Travel Time (s)		2.7			5.8			23.0				5.4
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	5%	0%	0%	0%	1%	3%	1%	3%	0%	0%	5%	3%
Adj. Flow (vph)	145	0	176	41	277	91	122	490	0	0	398	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	145	0	176	41	277	91	122	490	0	0	398	36
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.04	1.04	0.96	1.04	1.00	1.00	1.00	1.00	0.96	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				94
Detector 2 Size(ft)					6			6				6
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Prot	Split	NA	Prot	Prot	NA			NA	Perm

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)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lanes, Volumes, Timings
12: North Avenue & Albion Street

2021 Baseline Weekday Morning Peak Hour
03/29/2021

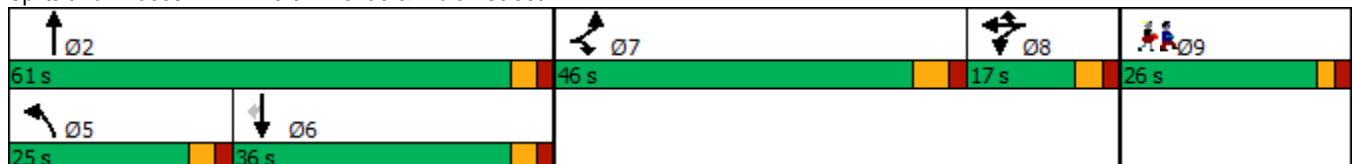


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7		7	8	8	8	5	2			6	
Permitted Phases												6
Detector Phase	7		7	8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	24.0		24.0	17.0	17.0	17.0	10.5	23.5			24.0	24.0
Total Split (s)	46.0		46.0	17.0	17.0	17.0	25.0	61.0			36.0	36.0
Total Split (%)	30.7%		30.7%	11.3%	11.3%	11.3%	16.7%	40.7%			24.0%	24.0%
Maximum Green (s)	40.0		40.0	12.0	12.0	12.0	20.0	56.0			31.0	31.0
Yellow Time (s)	4.0		4.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
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	0.0
Total Lost Time (s)	6.0		6.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead		Lead	Lag	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	Min			Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	13.6		13.6	12.1	12.1	12.1	11.6	47.5			30.9	30.9
Actuated g/C Ratio	0.15		0.15	0.14	0.14	0.14	0.13	0.53			0.35	0.35
v/c Ratio	0.59		0.45	0.17	1.06	0.29	0.53	0.50			0.62	0.06
Control Delay	46.1		9.6	38.9	111.3	6.0	45.6	16.0			30.7	0.2
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	46.1		9.6	38.9	111.3	6.0	45.6	16.0			30.7	0.2
LOS	D		A	D	F	A	D	B			C	A
Approach Delay		26.1			80.6			21.9			28.1	
Approach LOS		C			F			C			C	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	89.3
Natural Cycle:	105
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.06
Intersection Signal Delay:	37.7
Intersection LOS:	D
Intersection Capacity Utilization:	61.6%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 12: North Avenue & Albion Street



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	17%
Maximum Green (s)	22.0
Yellow Time (s)	2.0
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)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues
12: North Avenue & Albion Street

2021 Baseline Weekday Morning Peak Hour
03/29/2021



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	145	176	41	277	91	122	490	398	36
v/c Ratio	0.59	0.45	0.17	1.06	0.29	0.53	0.50	0.62	0.06
Control Delay	46.1	9.6	38.9	111.3	6.0	45.6	16.0	30.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	9.6	38.9	111.3	6.0	45.6	16.0	30.7	0.2
Queue Length 50th (ft)	76	0	21	~171	0	65	165	183	0
Queue Length 95th (ft)	144	55	56	#373	25	126	280	326	0
Internal Link Dist (ft)				177			932	158	
Turn Bay Length (ft)			90		90	160			100
Base Capacity (vph)	722	799	235	262	311	402	1163	653	627
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
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	0.20	0.22	0.17	1.06	0.29	0.30	0.42	0.61	0.06

Intersection Summary

~ 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.

Intersection						
Int Delay, s/veh	2.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	276	60	43	413	52	31
Future Vol, veh/h	276	60	43	413	52	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	1	0	0	0	0	3
Mvmt Flow	317	69	49	475	60	36

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	386	0	925 352
Stage 1	-	-	-	-	352 -
Stage 2	-	-	-	-	573 -
Critical Hdwy	-	-	4.1	-	6.4 6.23
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.327
Pot Cap-1 Maneuver	-	-	1184	-	301 689
Stage 1	-	-	-	-	716 -
Stage 2	-	-	-	-	568 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1184	-	284 689
Mov Cap-2 Maneuver	-	-	-	-	284 -
Stage 1	-	-	-	-	716 -
Stage 2	-	-	-	-	536 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	18.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	364	-	-	1184	-
HCM Lane V/C Ratio	0.262	-	-	0.042	-
HCM Control Delay (s)	18.4	-	-	8.2	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.1	-

Intersection						
Int Delay, s/veh	7.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↑	↘	
Traffic Vol, veh/h	0	336	495	371	338	57
Future Vol, veh/h	0	336	495	371	338	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	1	0	1	2	6
Mvmt Flow	0	386	569	426	389	66

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	422	455	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.21	4.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	0	634	1116	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	634	1116	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.1	6.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1116	-	634	-	-
HCM Lane V/C Ratio	0.51	-	0.609	-	-
HCM Control Delay (s)	11.5	-	19.1	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	3	-	4.1	-	-

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	20	237	433	83	88	15
Future Vol, veh/h	20	237	433	83	88	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	2	1	0	0	0
Mvmt Flow	22	263	481	92	98	17

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	573	0	-	0	834 527
Stage 1	-	-	-	-	527 -
Stage 2	-	-	-	-	307 -
Critical Hdwy	4.1	-	-	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	1010	-	-	-	341 555
Stage 1	-	-	-	-	596 -
Stage 2	-	-	-	-	751 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1010	-	-	-	332 555
Mov Cap-2 Maneuver	-	-	-	-	332 -
Stage 1	-	-	-	-	581 -
Stage 2	-	-	-	-	751 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	20
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1010	-	-	-	353
HCM Lane V/C Ratio	0.022	-	-	-	0.324
HCM Control Delay (s)	8.6	0	-	-	20
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.4






















2021 Baseline Weekday Evening Peak Hour



Lanes, Volumes, Timings
12: North Avenue & Albion Street

2021 Baseline Weekday Evening Peak Hour

03/29/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	304	0	269	57	136	97	95	392	0	0	459	28
Future Volume (vph)	304	0	269	57	136	97	95	392	0	0	459	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	11	11	13	11	12	12	12	12	13	12
Storage Length (ft)	0		0	90		90	160		0	0		100
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850						0.850
Fl _t Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1668	0	1561	1745	1944	1546	1805	1881	0	0	1944	1615
Fl _t Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1668	0	1561	1745	1944	1546	1805	1881	0	0	1944	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			299			124						124
Link Speed (mph)		30			30			30				30
Link Distance (ft)		119			257			1012				238
Travel Time (s)		2.7			5.8			23.0				5.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	0%	0%	0%	1%	1%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	338	0	299	63	151	108	106	436	0	0	510	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	338	0	299	63	151	108	106	436	0	0	510	31
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.04	1.04	0.96	1.04	1.00	1.00	1.00	1.00	0.96	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				94
Detector 2 Size(ft)					6			6				6
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Prot	Split	NA	Prot	Prot	NA			NA	Perm

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)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lanes, Volumes, Timings
12: North Avenue & Albion Street

2021 Baseline Weekday Evening Peak Hour
03/29/2021

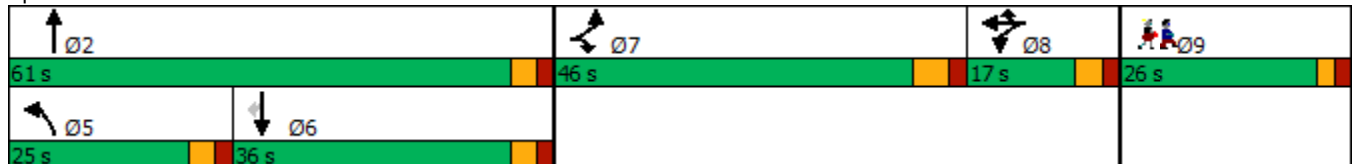


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7		7	8	8	8	5	2			6	
Permitted Phases												6
Detector Phase	7		7	8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	24.0		24.0	17.0	17.0	17.0	10.5	23.5			24.0	24.0
Total Split (s)	46.0		46.0	17.0	17.0	17.0	25.0	61.0			36.0	36.0
Total Split (%)	30.7%		30.7%	11.3%	11.3%	11.3%	16.7%	40.7%			24.0%	24.0%
Maximum Green (s)	40.0		40.0	12.0	12.0	12.0	20.0	56.0			31.0	31.0
Yellow Time (s)	4.0		4.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
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	0.0
Total Lost Time (s)	6.0		6.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead		Lead	Lag	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	Min			Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	26.6		26.6	12.1	12.1	12.1	11.7	48.1			31.3	31.3
Actuated g/C Ratio	0.26		0.26	0.12	0.12	0.12	0.11	0.47			0.30	0.30
v/c Ratio	0.78		0.48	0.31	0.66	0.37	0.52	0.50			0.86	0.05
Control Delay	49.2		6.1	49.9	60.8	10.3	53.9	22.6			51.9	0.2
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	49.2		6.1	49.9	60.8	10.3	53.9	22.6			51.9	0.2
LOS	D		A	D	E	B	D	C			D	A
Approach Delay		29.0			41.7			28.7			49.0	
Approach LOS		C			D			C			D	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	103
Natural Cycle:	125
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	36.2
Intersection LOS:	D
Intersection Capacity Utilization:	69.3%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 12: North Avenue & Albion Street



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	17%
Maximum Green (s)	22.0
Yellow Time (s)	2.0
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)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues
12: North Avenue & Albion Street

2021 Baseline Weekday Evening Peak Hour
03/29/2021



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	338	299	63	151	108	106	436	510	31
v/c Ratio	0.78	0.48	0.31	0.66	0.37	0.52	0.50	0.86	0.05
Control Delay	49.2	6.1	49.9	60.8	10.3	53.9	22.6	51.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	6.1	49.9	60.8	10.3	53.9	22.6	51.9	0.2
Queue Length 50th (ft)	205	0	38	95	0	66	190	311	0
Queue Length 95th (ft)	323	62	92	#220	42	133	337	#623	0
Internal Link Dist (ft)				177			932	158	
Turn Bay Length (ft)			90		90	160			100
Base Capacity (vph)	654	794	205	228	291	354	1033	591	577
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
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	0.52	0.38	0.31	0.66	0.37	0.30	0.42	0.86	0.05

Intersection Summary

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

Intersection						
Int Delay, s/veh	1.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	516	29	20	299	24	67
Future Vol, veh/h	516	29	20	299	24	67
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	549	31	21	318	26	71

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	580	0	925
Stage 1	-	-	-	-	565
Stage 2	-	-	-	-	360
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1004	-	301
Stage 1	-	-	-	-	573
Stage 2	-	-	-	-	710
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1004	-	293
Mov Cap-2 Maneuver	-	-	-	-	293
Stage 1	-	-	-	-	573
Stage 2	-	-	-	-	692

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	15.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	436	-	-	1004	-
HCM Lane V/C Ratio	0.222	-	-	0.021	-
HCM Control Delay (s)	15.6	-	-	8.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

Intersection						
Int Delay, s/veh	14.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↑	↘	
Traffic Vol, veh/h	0	500	303	348	412	30
Future Vol, veh/h	0	500	303	348	412	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	1	1	0	1	0
Mvmt Flow	0	538	326	374	443	32

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	459	475	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.21	4.11	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	0	604	1092	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	604	1092	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	41	4.5	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1092	-	604	-	-
HCM Lane V/C Ratio	0.298	-	0.89	-	-
HCM Control Delay (s)	9.7	-	41	-	-
HCM Lane LOS	A	-	E	-	-
HCM 95th %tile Q(veh)	1.3	-	10.6	-	-

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	15	411	274	33	72	18
Future Vol, veh/h	15	411	274	33	72	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	16	437	291	35	77	19

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	326	0	-	0	778 309
Stage 1	-	-	-	-	309 -
Stage 2	-	-	-	-	469 -
Critical Hdwy	4.1	-	-	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	1245	-	-	-	368 736
Stage 1	-	-	-	-	749 -
Stage 2	-	-	-	-	634 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1245	-	-	-	362 736
Mov Cap-2 Maneuver	-	-	-	-	362 -
Stage 1	-	-	-	-	736 -
Stage 2	-	-	-	-	634 -

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1245	-	-	-	403
HCM Lane V/C Ratio	0.013	-	-	-	0.238
HCM Control Delay (s)	7.9	0	-	-	16.7
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.9






















2028 No-Build Weekday Morning Peak Hour



Lanes, Volumes, Timings
12: North Avenue & Albion Street

2028 No-Build Weekday Morning Peak Hour

03/29/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	0	175	40	271	89	125	491	0	0	396	42
Future Volume (vph)	165	0	175	40	271	89	125	491	0	0	396	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	11	11	13	11	12	12	12	12	13	12
Storage Length (ft)	0		0	90		90	160		0	0		100
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
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					
Satd. Flow (prot)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			192			124						124
Link Speed (mph)		30			30			30				30
Link Distance (ft)		119			257			1012				238
Travel Time (s)		2.7			5.8			23.0				5.4
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	5%	0%	0%	0%	1%	3%	1%	3%	0%	0%	5%	3%
Adj. Flow (vph)	181	0	192	44	298	98	137	540	0	0	435	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	181	0	192	44	298	98	137	540	0	0	435	46
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.04	1.04	0.96	1.04	1.00	1.00	1.00	1.00	0.96	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		Prot	Split	NA	Prot	Prot	NA			NA	Perm

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)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lanes, Volumes, Timings
12: North Avenue & Albion Street

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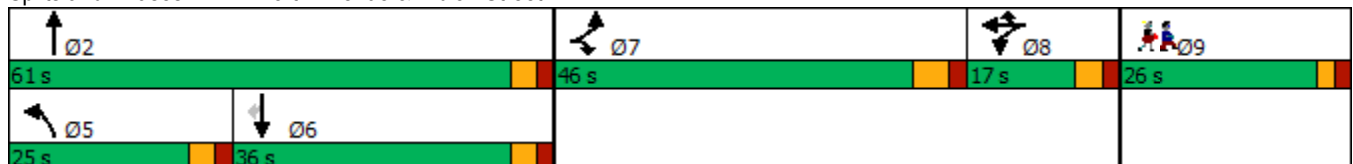


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7		7	8	8	8	5	2			6	
Permitted Phases												6
Detector Phase	7		7	8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	24.0		24.0	17.0	17.0	17.0	10.5	23.5			24.0	24.0
Total Split (s)	46.0		46.0	17.0	17.0	17.0	25.0	61.0			36.0	36.0
Total Split (%)	30.7%		30.7%	11.3%	11.3%	11.3%	16.7%	40.7%			24.0%	24.0%
Maximum Green (s)	40.0		40.0	12.0	12.0	12.0	20.0	56.0			31.0	31.0
Yellow Time (s)	4.0		4.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
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	0.0
Total Lost Time (s)	6.0		6.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead		Lead	Lag	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	Min			Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	16.0		16.0	12.1	12.1	12.1	12.7	48.9			31.2	31.2
Actuated g/C Ratio	0.17		0.17	0.13	0.13	0.13	0.14	0.53			0.34	0.34
v/c Ratio	0.66		0.45	0.19	1.18	0.32	0.56	0.56			0.69	0.08
Control Delay	48.3		8.8	41.5	154.1	7.5	47.7	18.1			35.6	0.2
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	48.3		8.8	41.5	154.1	7.5	47.7	18.1			35.6	0.2
LOS	D		A	D	F	A	D	B			D	A
Approach Delay		27.9			110.2			24.1			32.2	
Approach LOS		C			F			C			C	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	93.1
Natural Cycle:	115
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.18
Intersection Signal Delay:	46.0
Intersection LOS:	D
Intersection Capacity Utilization:	67.0%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 12: North Avenue & Albion Street



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	17%
Maximum Green (s)	22.0
Yellow Time (s)	2.0
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)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues
12: North Avenue & Albion Street

2028 No-Build Weekday Morning Peak Hour
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Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	181	192	44	298	98	137	540	435	46
v/c Ratio	0.66	0.45	0.19	1.18	0.32	0.56	0.56	0.69	0.08
Control Delay	48.3	8.8	41.5	154.1	7.5	47.7	18.1	35.6	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.3	8.8	41.5	154.1	7.5	47.7	18.1	35.6	0.2
Queue Length 50th (ft)	100	0	23	~212	0	76	202	219	0
Queue Length 95th (ft)	179	57	62	#430	31	144	340	#413	0
Internal Link Dist (ft)				177			932	158	
Turn Bay Length (ft)			90		90	160			100
Base Capacity (vph)	693	783	226	252	304	386	1116	626	607
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
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	0.26	0.25	0.19	1.18	0.32	0.35	0.48	0.69	0.08

Intersection Summary

~ 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.

Intersection						
Int Delay, s/veh	3.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	299	71	54	449	80	56
Future Vol, veh/h	299	71	54	449	80	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	1	0	0	0	0	3
Mvmt Flow	344	82	62	516	92	64

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	426	0	1025 385
Stage 1	-	-	-	-	385 -
Stage 2	-	-	-	-	640 -
Critical Hdwy	-	-	4.1	-	6.4 6.23
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.327
Pot Cap-1 Maneuver	-	-	1144	-	263 660
Stage 1	-	-	-	-	692 -
Stage 2	-	-	-	-	529 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1144	-	243 660
Mov Cap-2 Maneuver	-	-	-	-	243 -
Stage 1	-	-	-	-	692 -
Stage 2	-	-	-	-	489 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	25.6
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	328	-	-	1144	-
HCM Lane V/C Ratio	0.477	-	-	0.054	-
HCM Control Delay (s)	25.6	-	-	8.3	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	2.5	-	-	0.2	-

Intersection						
Int Delay, s/veh	9.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↑	↘	
Traffic Vol, veh/h	0	385	538	406	362	61
Future Vol, veh/h	0	385	538	406	362	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	1	0	1	2	6
Mvmt Flow	0	443	618	467	416	70

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	451	486	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.21	4.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	0	610	1087	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	610	1087	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.9	7.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1087	-	610	-	-
HCM Lane V/C Ratio	0.569	-	0.725	-	-
HCM Control Delay (s)	12.6	-	24.9	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	3.7	-	6.1	-	-

Intersection						
Int Delay, s/veh	4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	23	254	464	96	119	23
Future Vol, veh/h	23	254	464	96	119	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	2	1	0	0	0
Mvmt Flow	26	282	516	107	132	26

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	623	0	-	0	904 570
Stage 1	-	-	-	-	570 -
Stage 2	-	-	-	-	334 -
Critical Hdwy	4.1	-	-	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	968	-	-	-	310 525
Stage 1	-	-	-	-	570 -
Stage 2	-	-	-	-	730 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	968	-	-	-	300 525
Mov Cap-2 Maneuver	-	-	-	-	300 -
Stage 1	-	-	-	-	552 -
Stage 2	-	-	-	-	730 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	26.5
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	968	-	-	-	322
HCM Lane V/C Ratio	0.026	-	-	-	0.49
HCM Control Delay (s)	8.8	0	-	-	26.5
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	2.6






















2028 No-Build Weekday Evening Peak Hour



Lanes, Volumes, Timings
12: North Avenue & Albion Street

2028 No-Build Weekday Evening Peak Hour

03/29/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	342	0	297	61	148	104	110	437	0	0	515	53
Future Volume (vph)	342	0	297	61	148	104	110	437	0	0	515	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	11	11	13	11	12	12	12	12	13	12
Storage Length (ft)	0		0	90		90	160		0	0		100
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
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					
Satd. Flow (prot)	1668	0	1561	1745	1944	1546	1805	1881	0	0	1944	1615
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1668	0	1561	1745	1944	1546	1805	1881	0	0	1944	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			313			124						124
Link Speed (mph)		30			30			30				30
Link Distance (ft)		119			257			1012				238
Travel Time (s)		2.7			5.8			23.0				5.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	0%	0%	0%	1%	1%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	380	0	330	68	164	116	122	486	0	0	572	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	380	0	330	68	164	116	122	486	0	0	572	59
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.04	1.04	0.96	1.04	1.00	1.00	1.00	1.00	0.96	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		Prot	Split	NA	Prot	Prot	NA			NA	Perm

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)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lanes, Volumes, Timings
12: North Avenue & Albion Street

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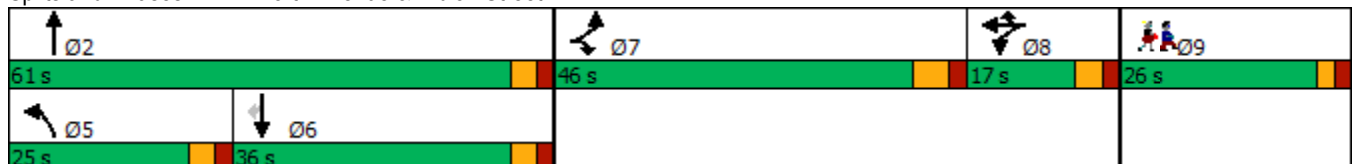


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7		7	8	8	8	5	2			6	
Permitted Phases												6
Detector Phase	7		7	8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	24.0		24.0	17.0	17.0	17.0	10.5	23.5			24.0	24.0
Total Split (s)	46.0		46.0	17.0	17.0	17.0	25.0	61.0			36.0	36.0
Total Split (%)	30.7%		30.7%	11.3%	11.3%	11.3%	16.7%	40.7%			24.0%	24.0%
Maximum Green (s)	40.0		40.0	12.0	12.0	12.0	20.0	56.0			31.0	31.0
Yellow Time (s)	4.0		4.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
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	0.0
Total Lost Time (s)	6.0		6.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead		Lead	Lag	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	Min			Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	31.0		31.0	12.1	12.1	12.1	12.9	49.3			31.3	31.3
Actuated g/C Ratio	0.29		0.29	0.11	0.11	0.11	0.12	0.45			0.29	0.29
v/c Ratio	0.80		0.49	0.35	0.76	0.41	0.57	0.57			1.02	0.11
Control Delay	49.3		6.8	53.7	71.4	12.5	57.3	26.1			83.7	0.4
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	49.3		6.8	53.7	71.4	12.5	57.3	26.1			83.7	0.4
LOS	D		A	D	E	B	E	C			F	A
Approach Delay		29.6			48.3			32.3			75.9	
Approach LOS		C			D			C			E	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	108.6
Natural Cycle:	145
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.02
Intersection Signal Delay:	45.9
Intersection LOS:	D
Intersection Capacity Utilization:	75.8%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 12: North Avenue & Albion Street



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	17%
Maximum Green (s)	22.0
Yellow Time (s)	2.0
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)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues
12: North Avenue & Albion Street

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Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	380	330	68	164	116	122	486	572	59
v/c Ratio	0.80	0.49	0.35	0.76	0.41	0.57	0.57	1.02	0.11
Control Delay	49.3	6.8	53.7	71.4	12.5	57.3	26.1	83.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.3	6.8	53.7	71.4	12.5	57.3	26.1	83.7	0.4
Queue Length 50th (ft)	243	9	45	114	0	82	247	~434	0
Queue Length 95th (ft)	377	78	100	#253	51	152	394	#755	0
Internal Link Dist (ft)				177			932	158	
Turn Bay Length (ft)			90		90	160			100
Base Capacity (vph)	620	777	194	217	282	335	979	560	553
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
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	0.61	0.42	0.35	0.76	0.41	0.36	0.50	1.02	0.11

Intersection Summary

~ 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.

Intersection						
Int Delay, s/veh	2.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Vol, veh/h	562	57	46	329	42	88
Future Vol, veh/h	562	57	46	329	42	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	598	61	49	350	45	94

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	659	0	1077
Stage 1	-	-	-	-	629
Stage 2	-	-	-	-	448
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	939	-	245
Stage 1	-	-	-	-	535
Stage 2	-	-	-	-	648
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	939	-	229
Mov Cap-2 Maneuver	-	-	-	-	229
Stage 1	-	-	-	-	535
Stage 2	-	-	-	-	606

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	21.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	357	-	-	939	-
HCM Lane V/C Ratio	0.387	-	-	0.052	-
HCM Control Delay (s)	21.3	-	-	9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.8	-	-	0.2	-

Intersection						
Int Delay, s/veh	23.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↑	↗	
Traffic Vol, veh/h	0	551	352	395	442	32
Future Vol, veh/h	0	551	352	395	442	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	1	1	0	1	0
Mvmt Flow	0	592	378	425	475	34

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	492	509	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.21	4.11	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	0 ~ 579	1061	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	- ~ 579	1061	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	70.2	4.8	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1061	-	579	-	-
HCM Lane V/C Ratio	0.357	-	1.023	-	-
HCM Control Delay (s)	10.3	-	70.2	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	1.6	-	15.8	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	2.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	24	441	294	62	92	23
Future Vol, veh/h	24	441	294	62	92	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	26	469	313	66	98	24

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	379	0	-	0	867 346
Stage 1	-	-	-	-	346 -
Stage 2	-	-	-	-	521 -
Critical Hdwy	4.1	-	-	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	1191	-	-	-	326 702
Stage 1	-	-	-	-	721 -
Stage 2	-	-	-	-	600 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1191	-	-	-	316 702
Mov Cap-2 Maneuver	-	-	-	-	316 -
Stage 1	-	-	-	-	699 -
Stage 2	-	-	-	-	600 -

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	20.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1191	-	-	-	355
HCM Lane V/C Ratio	0.021	-	-	-	0.345
HCM Control Delay (s)	8.1	0	-	-	20.4
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.5

2028 Build Weekday Morning Peak Hour



Lanes, Volumes, Timings
12: North Avenue & Albion Street

2028 Build Weekday Morning Peak Hour
03/29/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	0	175	40	271	89	125	491	0	0	396	44
Future Volume (vph)	169	0	175	40	271	89	125	491	0	0	396	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	11	11	13	11	12	12	12	12	13	12
Storage Length (ft)	0		0	90		90	160		0	0		100
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
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					
Satd. Flow (prot)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1604	0	1561	1745	1944	1516	1787	1845	0	0	1870	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			192			124						124
Link Speed (mph)		30			30			30				30
Link Distance (ft)		119			257			1012				238
Travel Time (s)		2.7			5.8			23.0				5.4
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	5%	0%	0%	0%	1%	3%	1%	3%	0%	0%	5%	3%
Adj. Flow (vph)	186	0	192	44	298	98	137	540	0	0	435	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	0	192	44	298	98	137	540	0	0	435	48
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.04	1.04	0.96	1.04	1.00	1.00	1.00	1.00	0.96	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94				94
Detector 2 Size(ft)					6			6				6
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Prot	Split	NA	Prot	Prot	NA			NA	Perm

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)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lanes, Volumes, Timings
12: North Avenue & Albion Street

2028 Build Weekday Morning Peak Hour
03/29/2021

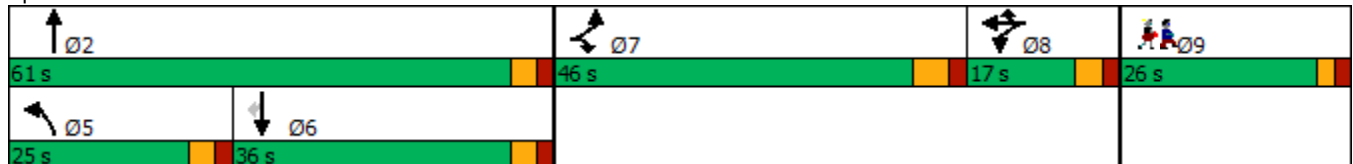


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7		7	8	8	8	5	2			6	
Permitted Phases												6
Detector Phase	7		7	8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	24.0		24.0	17.0	17.0	17.0	10.5	23.5			24.0	24.0
Total Split (s)	46.0		46.0	17.0	17.0	17.0	25.0	61.0			36.0	36.0
Total Split (%)	30.7%		30.7%	11.3%	11.3%	11.3%	16.7%	40.7%			24.0%	24.0%
Maximum Green (s)	40.0		40.0	12.0	12.0	12.0	20.0	56.0			31.0	31.0
Yellow Time (s)	4.0		4.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
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	0.0
Total Lost Time (s)	6.0		6.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead		Lead	Lag	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	Min			Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	16.3		16.3	12.1	12.1	12.1	12.8	49.0			31.2	31.2
Actuated g/C Ratio	0.17		0.17	0.13	0.13	0.13	0.14	0.52			0.33	0.33
v/c Ratio	0.66		0.45	0.20	1.19	0.32	0.56	0.56			0.70	0.08
Control Delay	48.6		8.7	41.8	155.6	7.6	47.9	18.3			35.9	0.2
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	48.6		8.7	41.8	155.6	7.6	47.9	18.3			35.9	0.2
LOS	D		A	D	F	A	D	B			D	A
Approach Delay		28.3			111.3			24.3			32.4	
Approach LOS		C			F			C			C	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	93.5
Natural Cycle:	115
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.19
Intersection Signal Delay:	46.4
Intersection LOS:	D
Intersection Capacity Utilization:	67.2%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 12: North Avenue & Albion Street



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	17%
Maximum Green (s)	22.0
Yellow Time (s)	2.0
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)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues
12: North Avenue & Albion Street

2028 Build Weekday Morning Peak Hour
03/29/2021



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	186	192	44	298	98	137	540	435	48
v/c Ratio	0.66	0.45	0.20	1.19	0.32	0.56	0.56	0.70	0.08
Control Delay	48.6	8.7	41.8	155.6	7.6	47.9	18.3	35.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.6	8.7	41.8	155.6	7.6	47.9	18.3	35.9	0.2
Queue Length 50th (ft)	103	0	24	~213	0	77	203	220	0
Queue Length 95th (ft)	183	57	62	#433	31	145	344	#418	0
Internal Link Dist (ft)				177			932	158	
Turn Bay Length (ft)			90		90	160			100
Base Capacity (vph)	690	781	225	251	303	384	1112	624	605
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
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	0.27	0.25	0.20	1.19	0.32	0.36	0.49	0.70	0.08

Intersection Summary

~ 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.

Intersection						
Int Delay, s/veh	4.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	299	74	56	449	86	60
Future Vol, veh/h	299	74	56	449	86	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	1	0	0	0	0	3
Mvmt Flow	344	85	64	516	99	69

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	429	0	1031 387
Stage 1	-	-	-	-	387 -
Stage 2	-	-	-	-	644 -
Critical Hdwy	-	-	4.1	-	6.4 6.23
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.327
Pot Cap-1 Maneuver	-	-	1141	-	261 659
Stage 1	-	-	-	-	691 -
Stage 2	-	-	-	-	527 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1141	-	240 659
Mov Cap-2 Maneuver	-	-	-	-	240 -
Stage 1	-	-	-	-	691 -
Stage 2	-	-	-	-	485 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	27.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	325	-	-	1141	-
HCM Lane V/C Ratio	0.516	-	-	0.056	-
HCM Control Delay (s)	27.3	-	-	8.3	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	2.8	-	-	0.2	-

Intersection						
Int Delay, s/veh	6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	2	0	0	7	0
Future Vol, veh/h	0	2	0	0	7	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	2	0	0	8	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	2	0	2
Stage 1	-	-	-	-	1
Stage 2	-	-	-	-	1
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1634	-	1026
Stage 1	-	-	-	-	1028
Stage 2	-	-	-	-	1028
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1634	-	1026
Mov Cap-2 Maneuver	-	-	-	-	1026
Stage 1	-	-	-	-	1028
Stage 2	-	-	-	-	1028

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1026	-	-	1634	-
HCM Lane V/C Ratio	0.007	-	-	-	-
HCM Control Delay (s)	8.5	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	2	120	2	1	143
Future Vol, veh/h	5	2	120	2	1	143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	5	2	130	2	1	155

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	288	131	0	0	132
Stage 1	131	-	-	-	-
Stage 2	157	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	707	924	-	-	1466
Stage 1	900	-	-	-	-
Stage 2	876	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	706	924	-	-	1466
Mov Cap-2 Maneuver	706	-	-	-	-
Stage 1	900	-	-	-	-
Stage 2	875	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	757	1466
HCM Lane V/C Ratio	-	-	0.01	0.001
HCM Control Delay (s)	-	-	9.8	7.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	9.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↑	↘	
Traffic Vol, veh/h	0	391	541	406	362	61
Future Vol, veh/h	0	391	541	406	362	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	1	0	1	2	6
Mvmt Flow	0	449	622	467	416	70

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	451	486	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.21	4.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	0	610	1087	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	610	1087	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.6	7.2	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1087	-	610	-	-
HCM Lane V/C Ratio	0.572	-	0.737	-	-
HCM Control Delay (s)	12.6	-	25.6	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	3.8	-	6.4	-	-

Intersection						
Int Delay, s/veh	4.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	23	254	464	99	125	23
Future Vol, veh/h	23	254	464	99	125	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	2	1	0	0	0
Mvmt Flow	26	282	516	110	139	26

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	626	0	-	0	905 571
Stage 1	-	-	-	-	571 -
Stage 2	-	-	-	-	334 -
Critical Hdwy	4.1	-	-	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	965	-	-	-	309 524
Stage 1	-	-	-	-	569 -
Stage 2	-	-	-	-	730 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	965	-	-	-	299 524
Mov Cap-2 Maneuver	-	-	-	-	299 -
Stage 1	-	-	-	-	551 -
Stage 2	-	-	-	-	730 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	27.6
HCM LOS			D






















Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	965	-	-	-	320
HCM Lane V/C Ratio	0.026	-	-	-	0.514
HCM Control Delay (s)	8.8	0	-	-	27.6
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	2.8

2028 Build Weekday Evening Peak Hour



Lanes, Volumes, Timings
12: North Avenue & Albion Street

2028 Build Weekday Evening Peak Hour
03/29/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	347	0	297	61	149	104	110	437	0	0	515	58
Future Volume (vph)	347	0	297	61	149	104	110	437	0	0	515	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	11	11	13	11	12	12	12	12	13	12
Storage Length (ft)	0		0	90		90	160		0	0		100
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
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					
Satd. Flow (prot)	1668	0	1561	1745	1944	1546	1805	1881	0	0	1944	1615
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1668	0	1561	1745	1944	1546	1805	1881	0	0	1944	1615
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			308			124						124
Link Speed (mph)		30			30			30				30
Link Distance (ft)		119			257			1012				238
Travel Time (s)		2.7			5.8			23.0				5.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	0%	0%	0%	1%	1%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	386	0	330	68	166	116	122	486	0	0	572	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	386	0	330	68	166	116	122	486	0	0	572	64
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.09	1.00	1.04	1.04	0.96	1.04	1.00	1.00	1.00	1.00	0.96	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		Prot	Split	NA	Prot	Prot	NA			NA	Perm

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)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lanes, Volumes, Timings
12: North Avenue & Albion Street

2028 Build Weekday Evening Peak Hour
03/29/2021

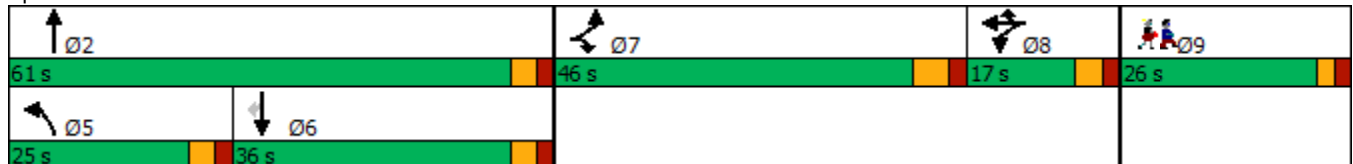


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases	7		7	8	8	8	5	2			6	
Permitted Phases												6
Detector Phase	7		7	8	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	24.0		24.0	17.0	17.0	17.0	10.5	23.5			24.0	24.0
Total Split (s)	46.0		46.0	17.0	17.0	17.0	25.0	61.0			36.0	36.0
Total Split (%)	30.7%		30.7%	11.3%	11.3%	11.3%	16.7%	40.7%			24.0%	24.0%
Maximum Green (s)	40.0		40.0	12.0	12.0	12.0	20.0	56.0			31.0	31.0
Yellow Time (s)	4.0		4.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
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	0.0
Total Lost Time (s)	6.0		6.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead		Lead	Lag	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	Min			Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	31.8		31.8	12.1	12.1	12.1	13.0	49.3			31.3	31.3
Actuated g/C Ratio	0.29		0.29	0.11	0.11	0.11	0.12	0.45			0.29	0.29
v/c Ratio	0.80		0.49	0.35	0.77	0.41	0.57	0.57			1.03	0.12
Control Delay	49.0		7.1	54.1	73.2	12.5	57.7	26.5			86.0	0.4
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	49.0		7.1	54.1	73.2	12.5	57.7	26.5			86.0	0.4
LOS	D		A	D	E	B	E	C			F	A
Approach Delay		29.7			49.4			32.8			77.4	
Approach LOS		C			D			C			E	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	109.3
Natural Cycle:	145
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.03
Intersection Signal Delay:	46.6
Intersection LOS:	D
Intersection Capacity Utilization:	76.1%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 12: North Avenue & Albion Street



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	17%
Maximum Green (s)	22.0
Yellow Time (s)	2.0
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)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Queues
12: North Avenue & Albion Street

2028 Build Weekday Evening Peak Hour
03/29/2021



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	386	330	68	166	116	122	486	572	64
v/c Ratio	0.80	0.49	0.35	0.77	0.41	0.57	0.57	1.03	0.12
Control Delay	49.0	7.1	54.1	73.2	12.5	57.7	26.5	86.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	7.1	54.1	73.2	12.5	57.7	26.5	86.0	0.4
Queue Length 50th (ft)	248	11	46	117	0	83	252	~443	0
Queue Length 95th (ft)	383	82	100	#258	51	152	394	#755	0
Internal Link Dist (ft)				177			932	158	
Turn Bay Length (ft)			90		90	160			100
Base Capacity (vph)	615	770	193	215	281	333	972	556	550
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
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	0.63	0.43	0.35	0.77	0.41	0.37	0.50	1.03	0.12

Intersection Summary

~ 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.

Intersection						
Int Delay, s/veh	3.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	562	65	52	329	47	93
Future Vol, veh/h	562	65	52	329	47	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	598	69	55	350	50	99

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	667	0	1093
Stage 1	-	-	-	-	633
Stage 2	-	-	-	-	460
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	932	-	239
Stage 1	-	-	-	-	533
Stage 2	-	-	-	-	640
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	932	-	222
Mov Cap-2 Maneuver	-	-	-	-	222
Stage 1	-	-	-	-	533
Stage 2	-	-	-	-	593

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	23
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	346	-	-	932	-
HCM Lane V/C Ratio	0.43	-	-	0.059	-
HCM Control Delay (s)	23	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.1	-	-	0.2	-

Intersection						
Int Delay, s/veh	3.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	7	0	0	5	0
Future Vol, veh/h	0	7	0	0	5	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	8	0	0	5	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	8	0	5
Stage 1	-	-	-	-	4
Stage 2	-	-	-	-	1
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1625	-	1022
Stage 1	-	-	-	-	1024
Stage 2	-	-	-	-	1028
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1625	-	1022
Mov Cap-2 Maneuver	-	-	-	-	1022
Stage 1	-	-	-	-	1024
Stage 2	-	-	-	-	1028

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1022	-	-	1625	-
HCM Lane V/C Ratio	0.005	-	-	-	-
HCM Control Delay (s)	8.5	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	3	1	89	5	2	118
Future Vol, veh/h	3	1	89	5	2	118
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	3	1	97	5	2	128

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	232	100	0	0	102	0
Stage 1	100	-	-	-	-	-
Stage 2	132	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	761	961	-	-	1503	-
Stage 1	929	-	-	-	-	-
Stage 2	899	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	760	961	-	-	1503	-
Mov Cap-2 Maneuver	760	-	-	-	-	-
Stage 1	929	-	-	-	-	-
Stage 2	898	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	802	1503
HCM Lane V/C Ratio	-	-	0.005	0.001
HCM Control Delay (s)	-	-	9.5	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	24.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↑	↗	
Traffic Vol, veh/h	0	557	360	395	442	32
Future Vol, veh/h	0	557	360	395	442	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	1	1	0	1	0
Mvmt Flow	0	599	387	425	475	34

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	492	509	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.21	4.11	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	0 ~	579	1061	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	- ~	579	1061	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	73.3	4.9	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1061	-	579	-	-
HCM Lane V/C Ratio	0.365	-	1.034	-	-
HCM Control Delay (s)	10.3	-	73.3	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	1.7	-	16.3	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	2.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	24	441	294	70	98	23
Future Vol, veh/h	24	441	294	70	98	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	26	469	313	74	104	24

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	387	0	-	0	871 350
Stage 1	-	-	-	-	350 -
Stage 2	-	-	-	-	521 -
Critical Hdwy	4.1	-	-	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.2	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	1183	-	-	-	324 698
Stage 1	-	-	-	-	718 -
Stage 2	-	-	-	-	600 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1183	-	-	-	314 698
Mov Cap-2 Maneuver	-	-	-	-	314 -
Stage 1	-	-	-	-	696 -
Stage 2	-	-	-	-	600 -

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	21.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1183	-	-	-	351
HCM Lane V/C Ratio	0.022	-	-	-	0.367
HCM Control Delay (s)	8.1	0	-	-	21.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.6

200 - 400 QUANNAPOWITT PARKWAY

SITE DEVELOPMENT PLANS

16 March 2021

Wakefield, MA

CLIENT:
 CABOT, CABOT & FORBES
 185 DARTMOUTH STREET, SUITE 402
 BOSTON, MA 02116
 (617) 603-4000

SITE ENGINEERS:
 ALLEN & MAJOR ASSOCIATES, INC.
 100 COMMERCE WAY
 WOBURN, MA 01888-01188
 (781) 935-6889

LAND SURVEYORS:
 MERRILL
 427 COLUMBIA ROAD
 HANOVER, MA 02339
 (781) 826-9200

LANDSCAPE ARCHITECTS:
 COPLEY WOLFF DESIGN GROUP
 10 POST OFFICE SQUARE, SUITE 1315
 BOST, MA 02109
 (617) 654-9000

ARCHITECT:
 CUBE 3
 370 MERRIMACK STREET, SUITE 337
 LAWRENCE, MA 01843
 (978) 989-9900

TRAFFIC ENGINEERS:
 VANASSE & ASSOCIATES, INC.
 35 NEW ENGLAND BUSINESS CENTER DRIVE, SUITE 140
 ANDOVER, MA 01810
 (978) 474-8800



PROJECT SITE

Drawing List	
Sheet Number	Sheet Name
A-000	Cover Sheet
A-003	Unit Mix and Project Metrics
A-080	Site Plan
A-101	Buildings 1 and 2 First Floor Plan
A-102	Buildings 1 and 2 Second Floor Plan
A-103	Buildings 1 and 2 Third Floor Plan
A-104	Buildings 1 and 2 Roof Plan
A-111	Building 3 First Floor Plan
A-112	Building 3 Second Floor Plan
A-113	Building 3 Third Floor Plan
A-114	Building 3 Fourth Floor Plan
A-115	Building 3 Roof Plan
A-200	Conceptual Exterior Elevations
A-201	Conceptual Exterior Renders
A-300	Conceptual Building Sections



RENDERED VIEW OF BUILDING 1 RESIDENCES WITH CAFE ALONG NEW PROPOSED LAKE PATH.

NOTE: APPLICATION REVISION

200 - 400
 QUANNAPOWITT
 PARKWAY
 Wakefield, MA

CABOT, CABOT &
 FORBES

185 Dartmouth St.,
 Boston, MA 02110

SITE
 DEVELOPMENT
 PLANS
 NOT FOR
 CONSTRUCTION

drawing by: AA
 drawing checked by: BC
 drawing scale:
 drawing date: 16 March 2021
 project number: 19234.00

No.	Description	Date
1	B3 Height Reduction	03-31-2021



Cover
 Sheet

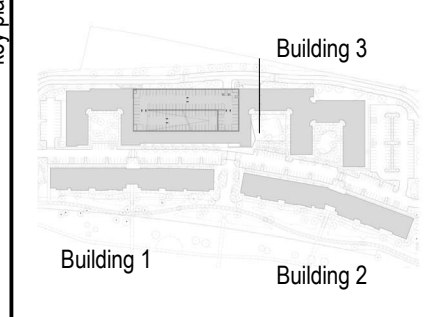
A-000

200 - 400
 QUANNAPOWITT
 PARKWAY
 Wakefield, MA

CABOT, CABOT &
 FORBES

185 Dartmouth St.,
 Boston, MA 02110

**SITE
 DEVELOPMENT
 PLANS**
 NOT FOR
 CONSTRUCTION



drawing by: AA
 drawing checked by: BC
 drawing scale: 1/32" = 1'-0"
 drawing date: 16 March 2021
 project number: 19234.00

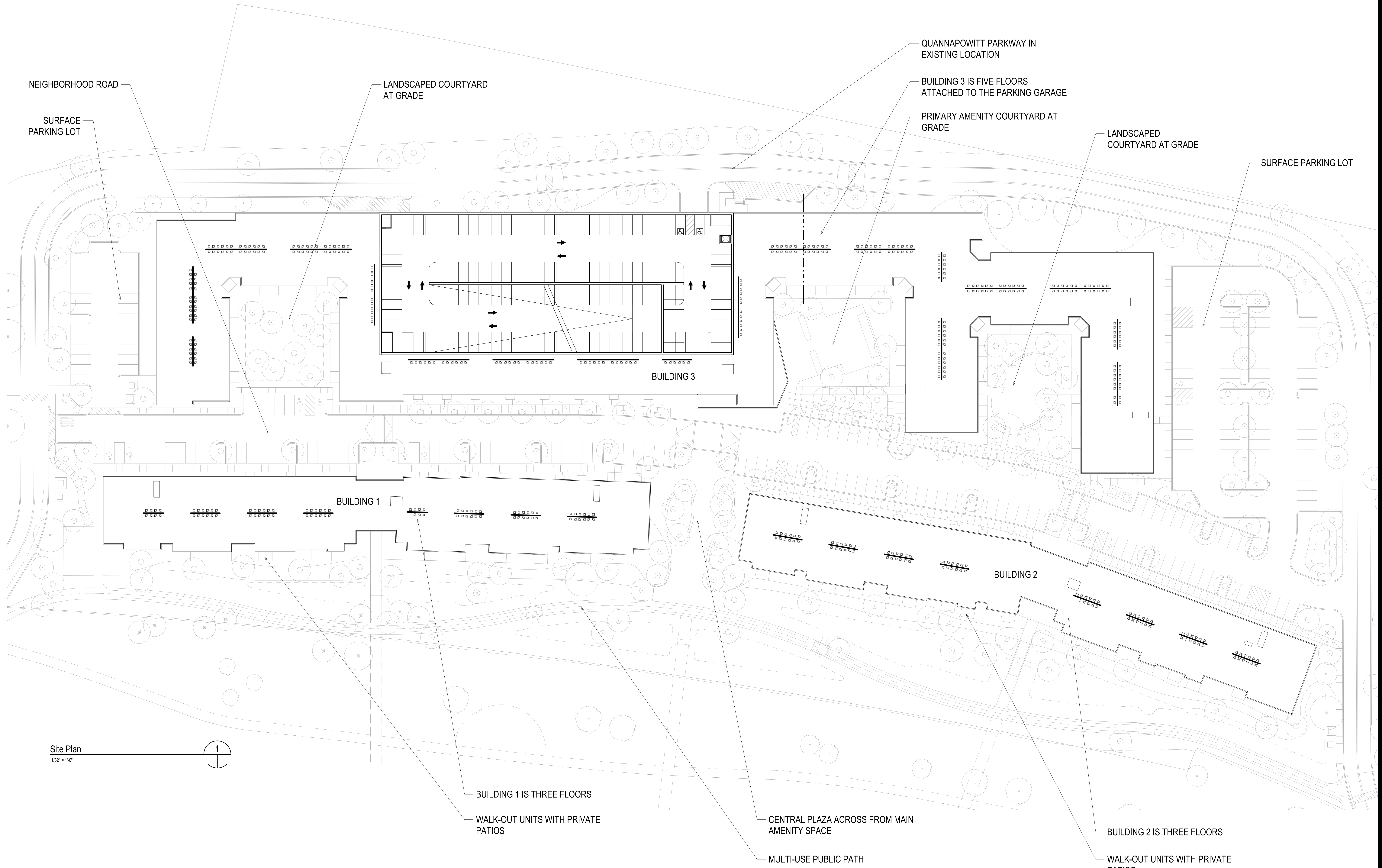
drawing revisions:

No.	Description	Date
1	B3 Height Reduction	03-31-2021



Site Plan

A-080



NEIGHBORHOOD ROAD

SURFACE
 PARKING LOT

LANDSCAPED COURTYARD
 AT GRADE

QUANNAPOWITT PARKWAY IN
 EXISTING LOCATION

BUILDING 3 IS FIVE FLOORS
 ATTACHED TO THE PARKING GARAGE

PRIMARY AMENITY COURTYARD AT
 GRADE

LANDSCAPED
 COURTYARD AT GRADE

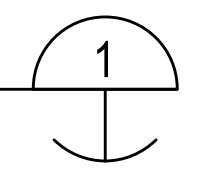
SURFACE PARKING LOT

BUILDING 3

BUILDING 1

BUILDING 2

Site Plan
 1/32" = 1'-0"



BUILDING 1 IS THREE FLOORS

WALK-OUT UNITS WITH PRIVATE
 PATIOS

CENTRAL PLAZA ACROSS FROM MAIN
 AMENITY SPACE

MULTI-USE PUBLIC PATH

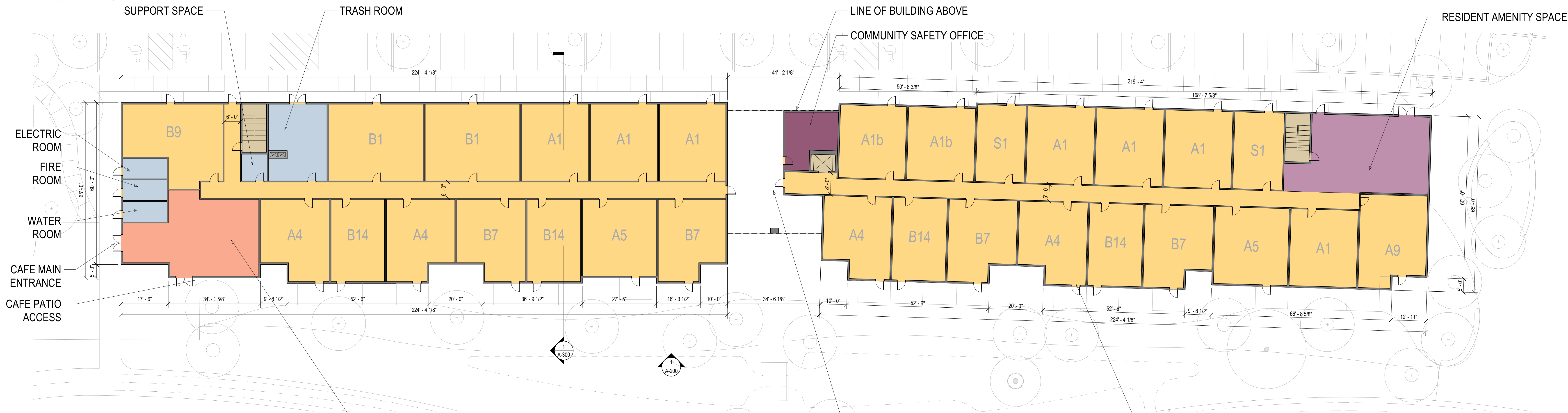
BUILDING 2 IS THREE FLOORS

WALK-OUT UNITS WITH PRIVATE
 PATIOS

NOTE: APPLICATION REVISION



NOTE: CONCEPTUAL FLOOR PLANS. FUTURE PLANS TO INCLUDE BALCONIES, WINDOWS, AND EXTERIOR DOOR LOCATIONS.

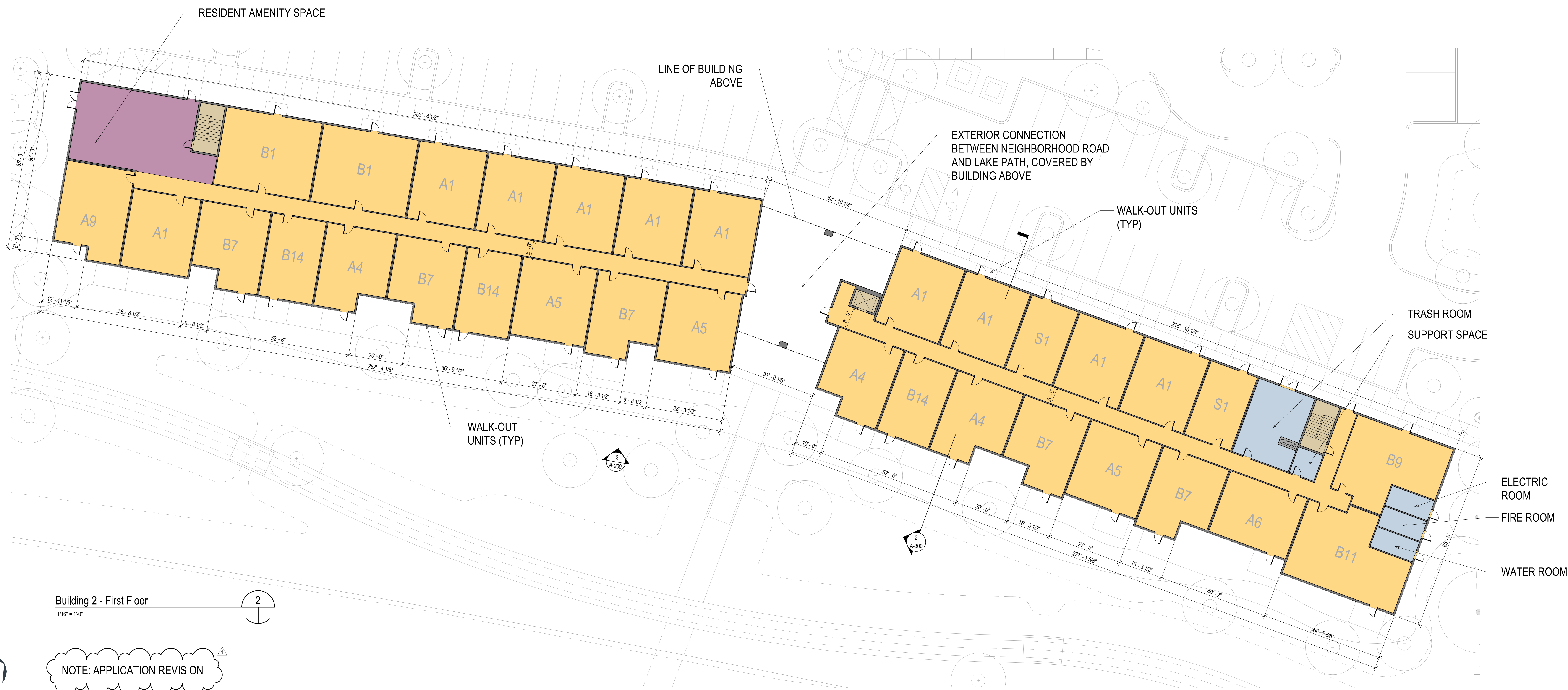


Building 1 - First Floor
 1/16" = 1'-0"

RESTAURANT / CAFE SHOWN SUBJECT TO SPECIAL USE PERMIT; ABSENT THE ISSUANCE, AREA TO BE USED AS RESIDENT AMENITY SPACE

EXTERIOR CONNECTION BETWEEN NEIGHBORHOOD ROAD AND LAKE PATH, COVERED BY BUILDING ABOVE

WALK-OUT UNITS (TYP)



Building 2 - First Floor
 1/16" = 1'-0"

NOTE: APPLICATION REVISION

EXTERIOR CONNECTION BETWEEN NEIGHBORHOOD ROAD AND LAKE PATH, COVERED BY BUILDING ABOVE

WALK-OUT UNITS (TYP)

TRASH ROOM
 SUPPORT SPACE

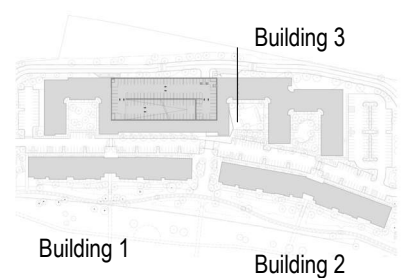
ELECTRIC ROOM
 FIRE ROOM
 WATER ROOM

200 - 400
 QUANNAPOWITT
 PARKWAY
 Wakefield, MA

CABOT, CABOT &
 FORBES

185 Dartmouth St.
 Boston, MA 02110

SITE
 DEVELOPMENT
 PLANS
 NOT FOR
 CONSTRUCTION



drawing by: AA
 drawing checked by: BC
 drawing scale: 1/16" = 1'-0"
 drawing date: 16 March 2021
 project number: 19234.00

drawing revisions:		
No.	Description	Date
1	B3 Height Reduction	03-31-2021



Buildings 1
 and 2 First
 Floor Plan

A-101

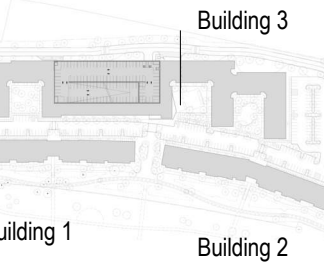
NOTE: CONCEPTUAL FLOOR PLANS. FUTURE PLANS TO INCLUDE BALCONIES, WINDOWS, AND EXTERIOR DOOR LOCATIONS.

200 - 400 QUANNAPOWITT PARKWAY Wakefield, MA

CABOT, CABOT & FORBES

185 Dartmouth St, Boston, MA 02110

SITE DEVELOPMENT PLANS
NOT FOR CONSTRUCTION



drawing by: AA
drawing checked by: BC
drawing scale: 1/16" = 1'-0"
drawing date: 16 March 2021
project number: 19234.00

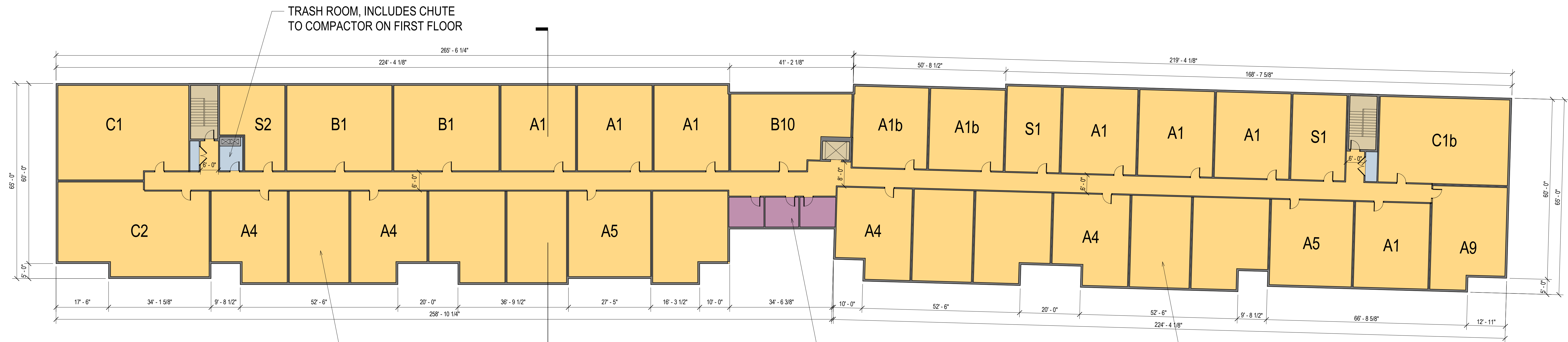
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No.	Description	Date
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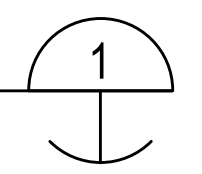


Buildings 1 and 2 Second Floor Plan

A-102



Building 1 - Second Floor
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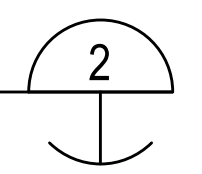
EMPTY UNITS ARE SECOND FLOOR OF UNIT TYPES BELOW, INCLUDES INTERNAL STAIR CONNECTION

PRIVATE CO-WORKING SPACES (RESIDENT AMENITY)

EMPTY UNITS ARE SECOND FLOOR OF UNIT TYPES BELOW, INCLUDES INTERNAL STAIR CONNECTION



Building 2 - Second Floor
1/16" = 1'-0"



EMPTY UNITS ARE SECOND FLOOR OF UNIT TYPES BELOW, INCLUDES INTERNAL STAIR CONNECTION

PRIVATE CO-WORKING SPACES (RESIDENT AMENITY)

TRASH ROOM, INCLUDES CHUTE TO COMPACTOR ON FIRST FLOOR

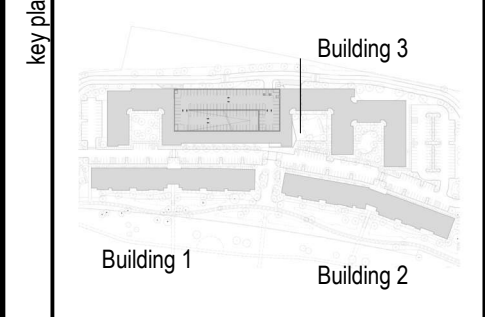
EMPTY UNITS ARE SECOND FLOOR OF UNIT TYPES BELOW, INCLUDES INTERNAL STAIR CONNECTION

NOTE: APPLICATION REVISION

NOTE: CONCEPTUAL FLOOR PLANS. FUTURE PLANS TO INCLUDE BALCONIES, WINDOWS, AND EXTERIOR DOOR LOCATIONS.

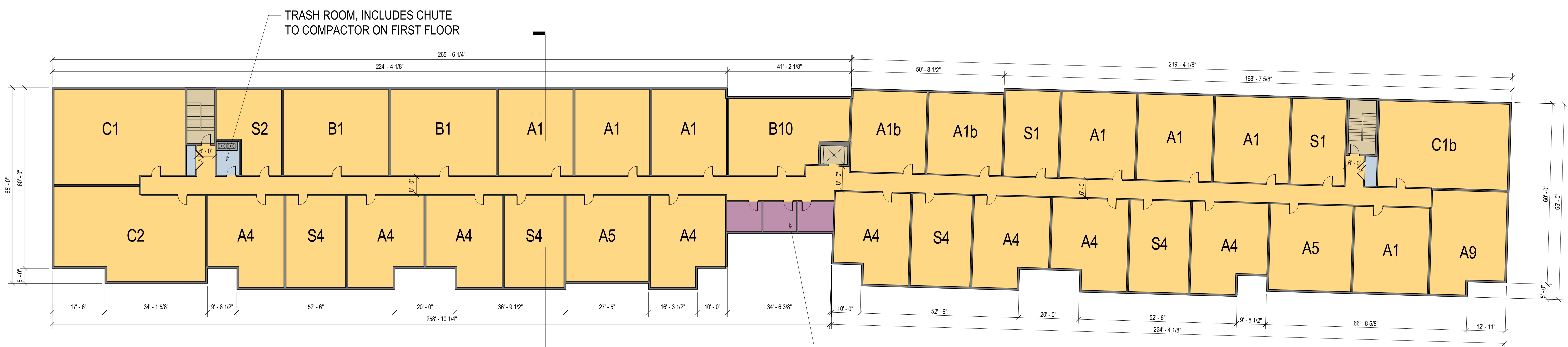
200 - 400 QUANNAPOWITT PARKWAY
 Wakefield, MA
CABOT, CABOT & FORBES
 185 Dartmouth St., Boston, MA 02110

SITE DEVELOPMENT PLANS
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drawing by: AA
 drawing checked by: BC
 drawing scale: 1/16" = 1'-0"
 drawing date: 16 March 2021
 project number: 19234.00

drawing revisions:		
No.	Description	Date
1	B3 Height Reduction	03-31-2021



Building 1 - Third Floor
 1/16" = 1'-0"



PRIVATE CO-WORKING SPACES (RESIDENT AMENITY)



Building 2 - Third Floor
 1/16" = 1'-0"



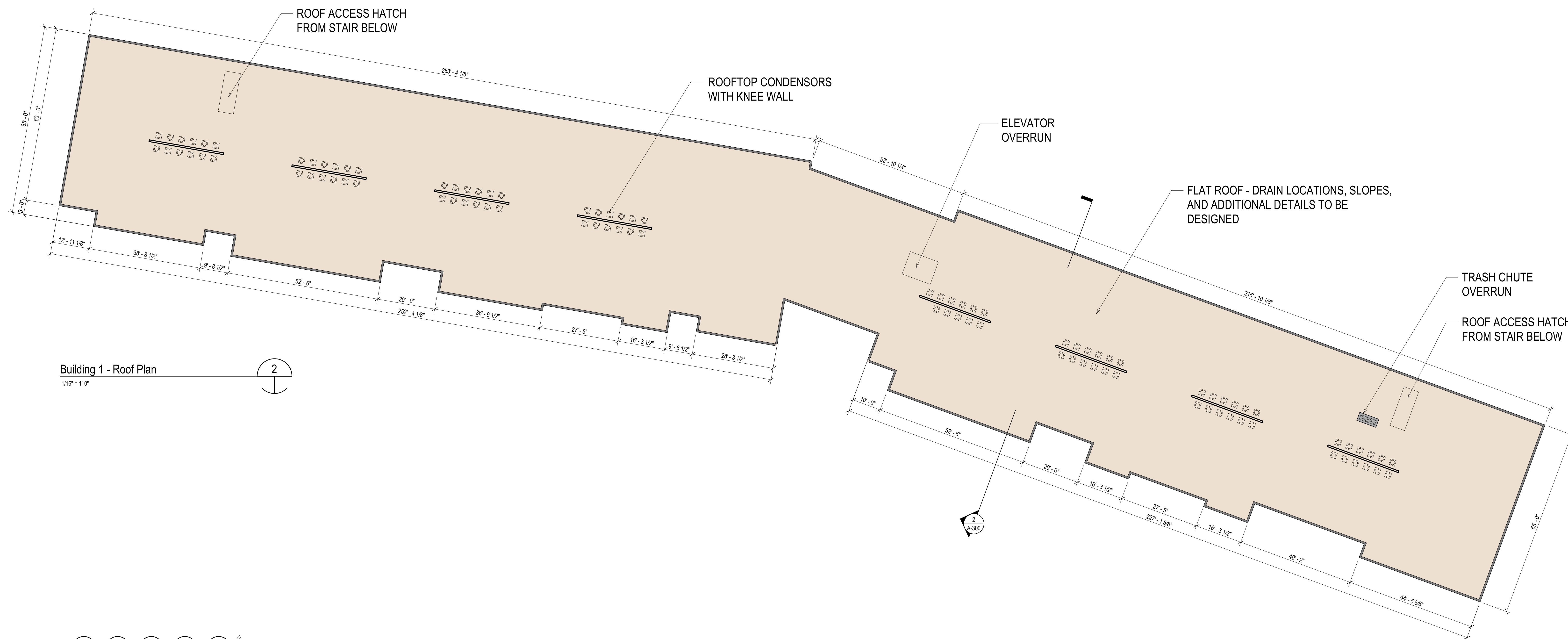
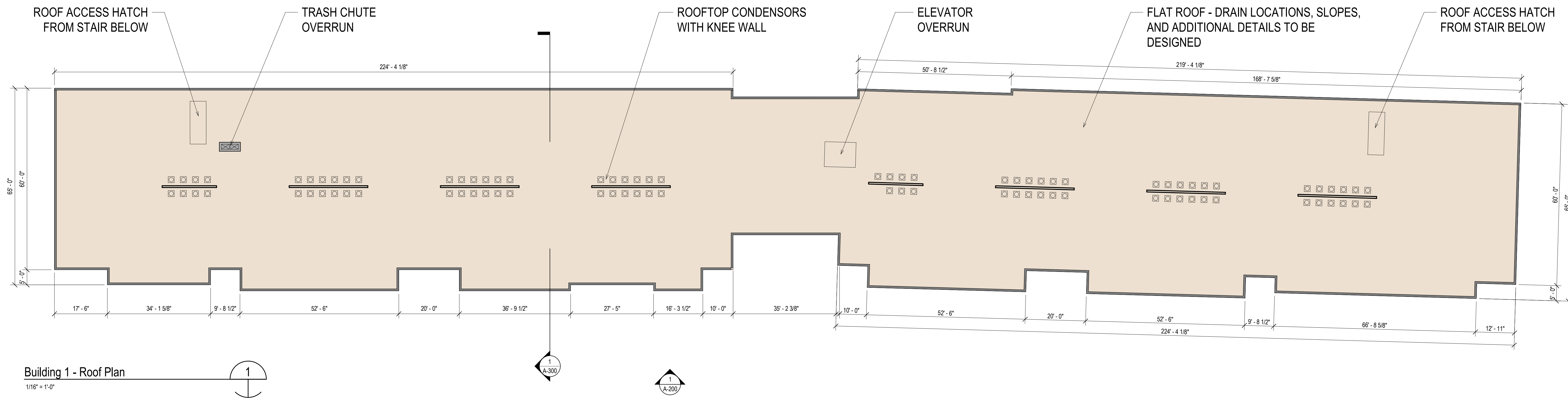
PRIVATE CO-WORKING SPACES (RESIDENT AMENITY)

NOTE: APPLICATION REVISION



Buildings 1 and 2 Third Floor Plan

NOTE: CONCEPTUAL FLOOR PLANS. FUTURE PLANS TO INCLUDE BALCONIES, WINDOWS, AND EXTERIOR DOOR LOCATIONS.

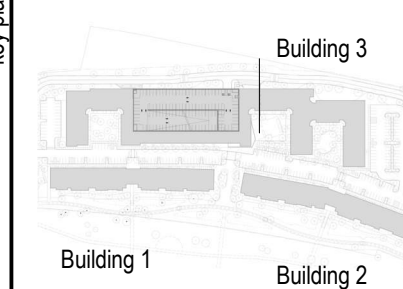


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drawing by: AA
 drawing checked by: BC
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 project number: 19234.00

drawing revisions:

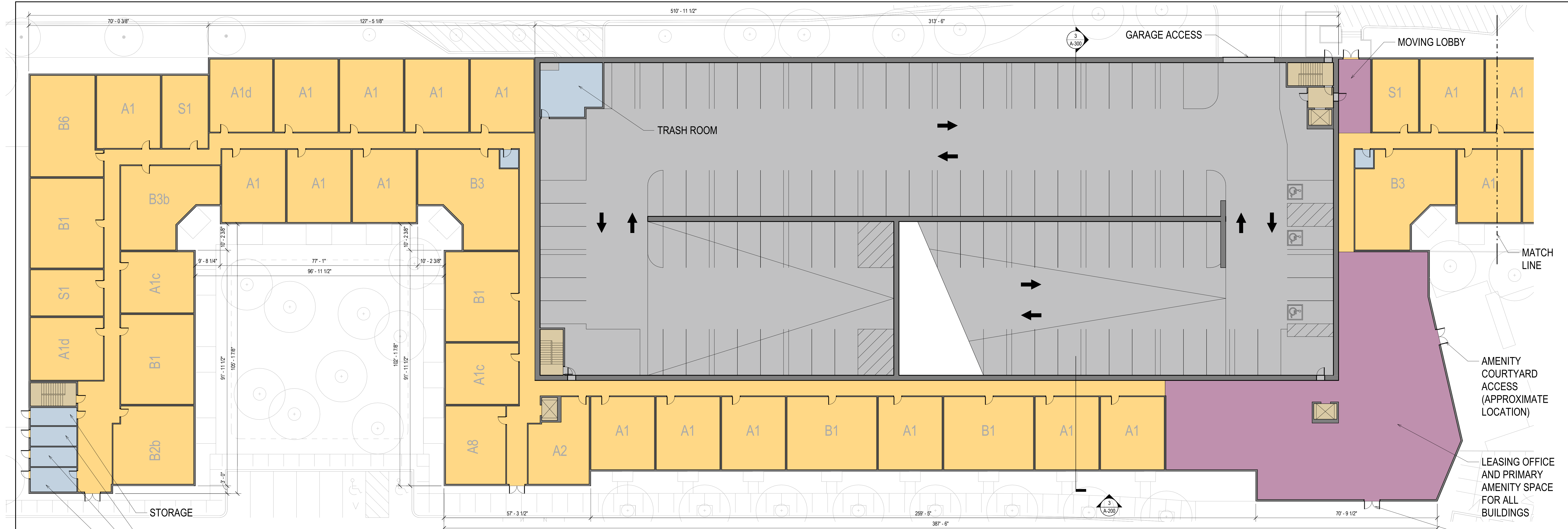
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1	B3 Height Reduction	03-31-2021



Buildings 1
 and 2 Roof
 Plan

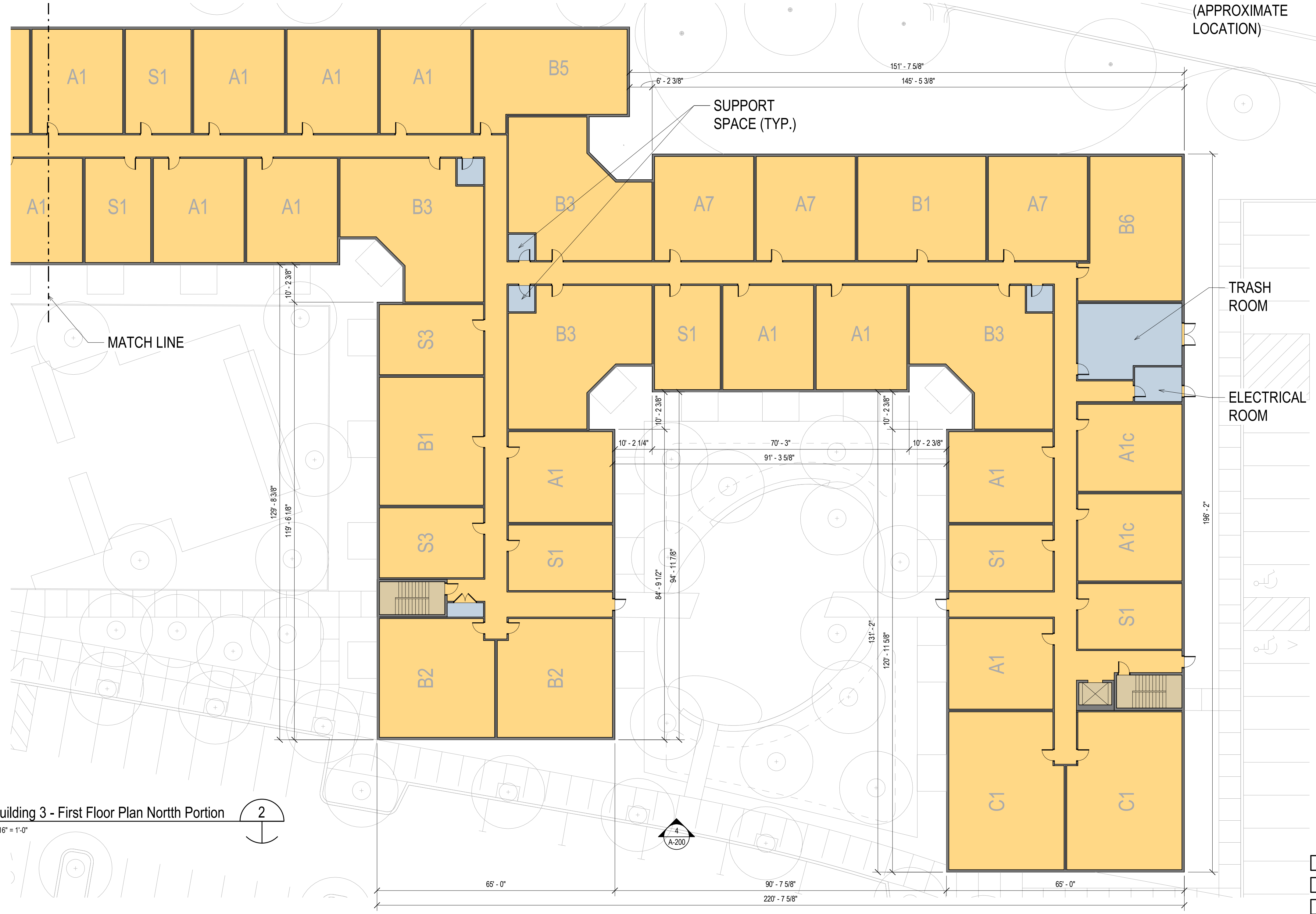
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NOTE: APPLICATION REVISION



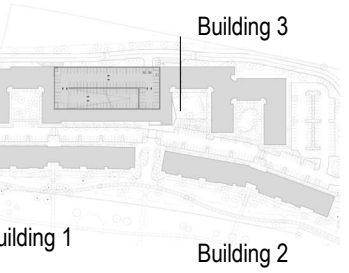
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1/16" = 1'-0"

NOTE: CONCEPTUAL FLOOR PLANS. FUTURE PLANS TO INCLUDE BALCONIES, WINDOWS, AND EXTERIOR DOOR LOCATIONS.



Building 3 - First Floor Plan North Portion
1/16" = 1'-0"

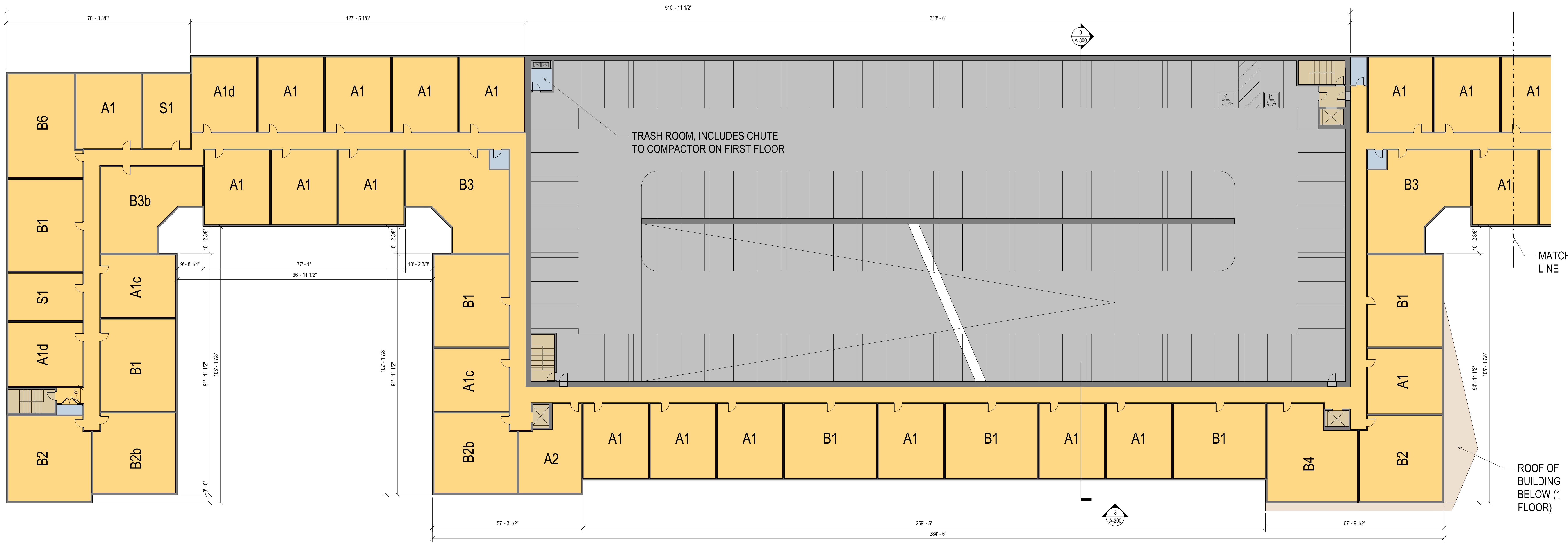
NOTE: APPLICATION REVISION



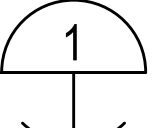
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drawing revisions:

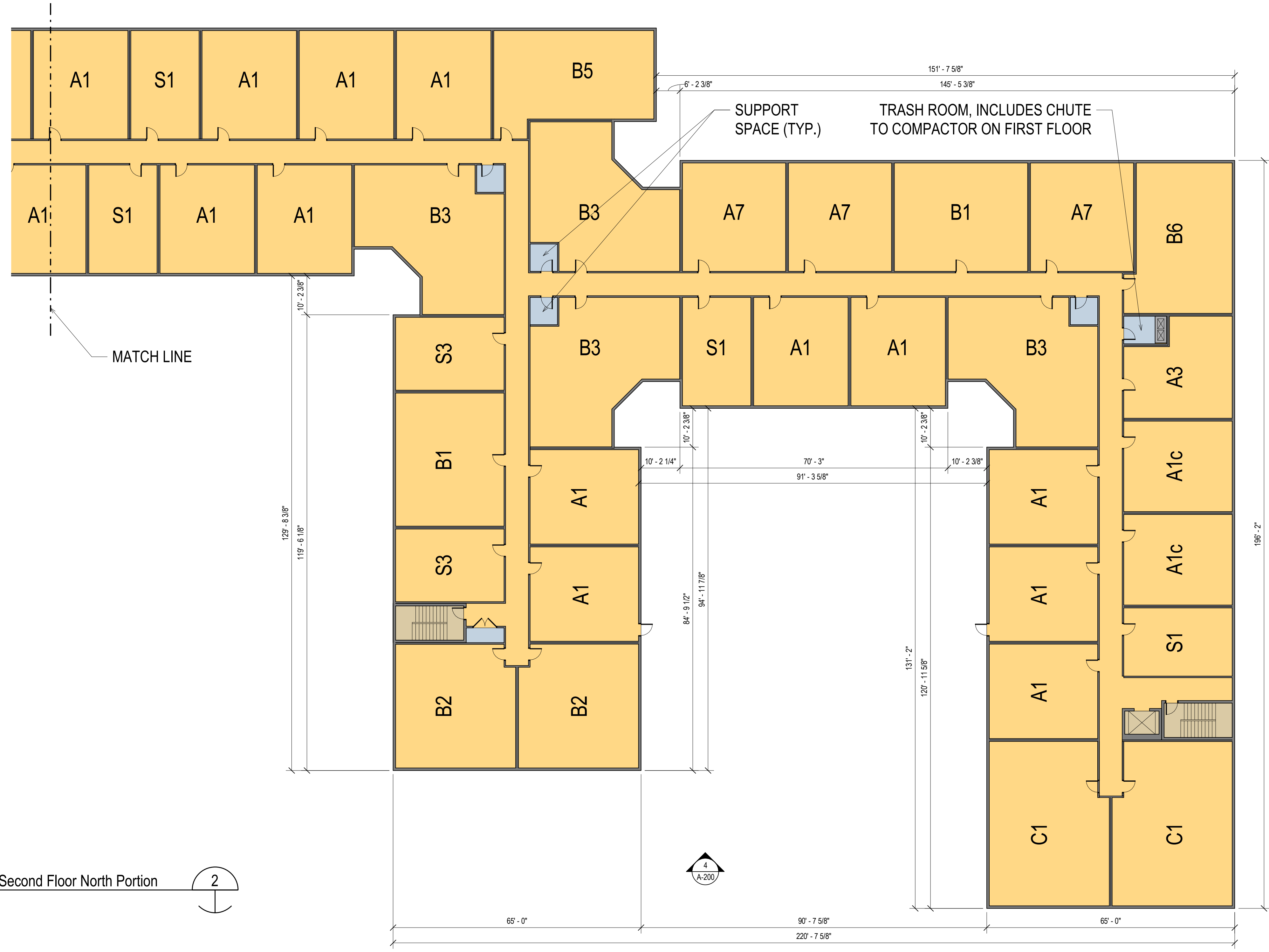
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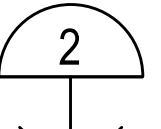
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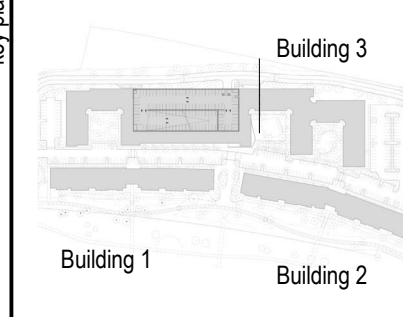
NOTE: CONCEPTUAL FLOOR PLANS. FUTURE PLANS TO INCLUDE BALCONIES, WINDOWS, AND EXTERIOR DOOR LOCATIONS.



Building 3 - Second Floor North Portion
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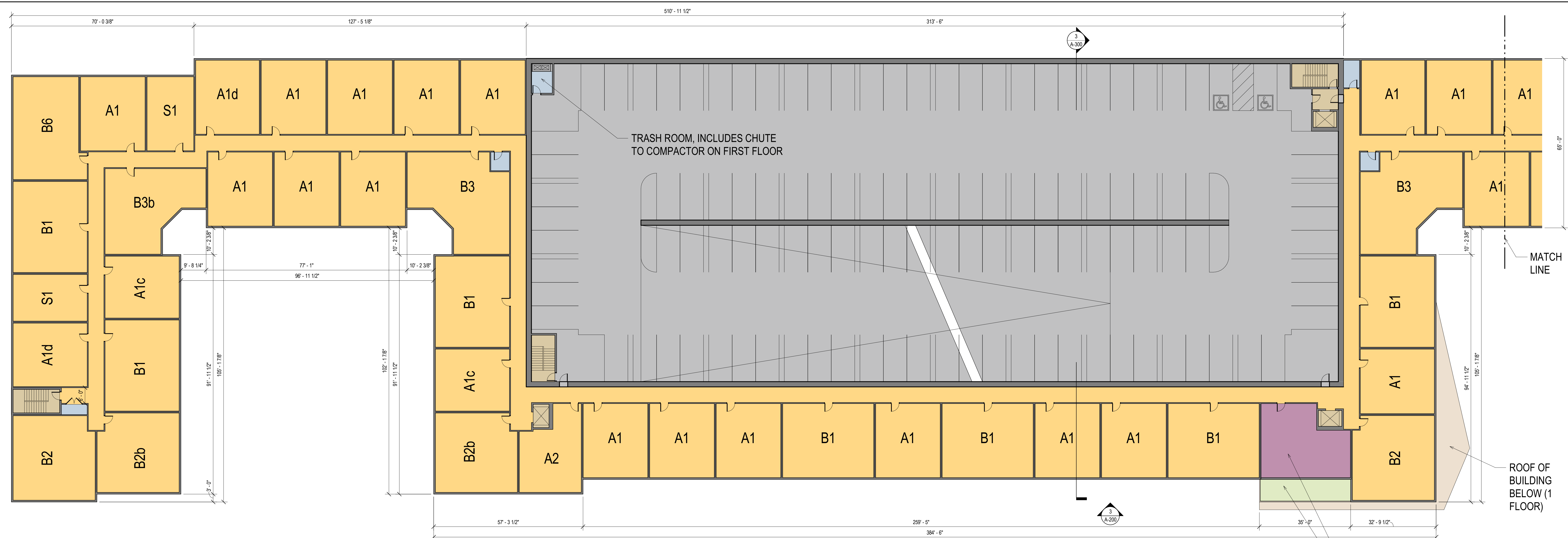
NOTE: APPLICATION REVISION



drawing by: AA
 drawing checked by: BC
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 project number: 19234.00

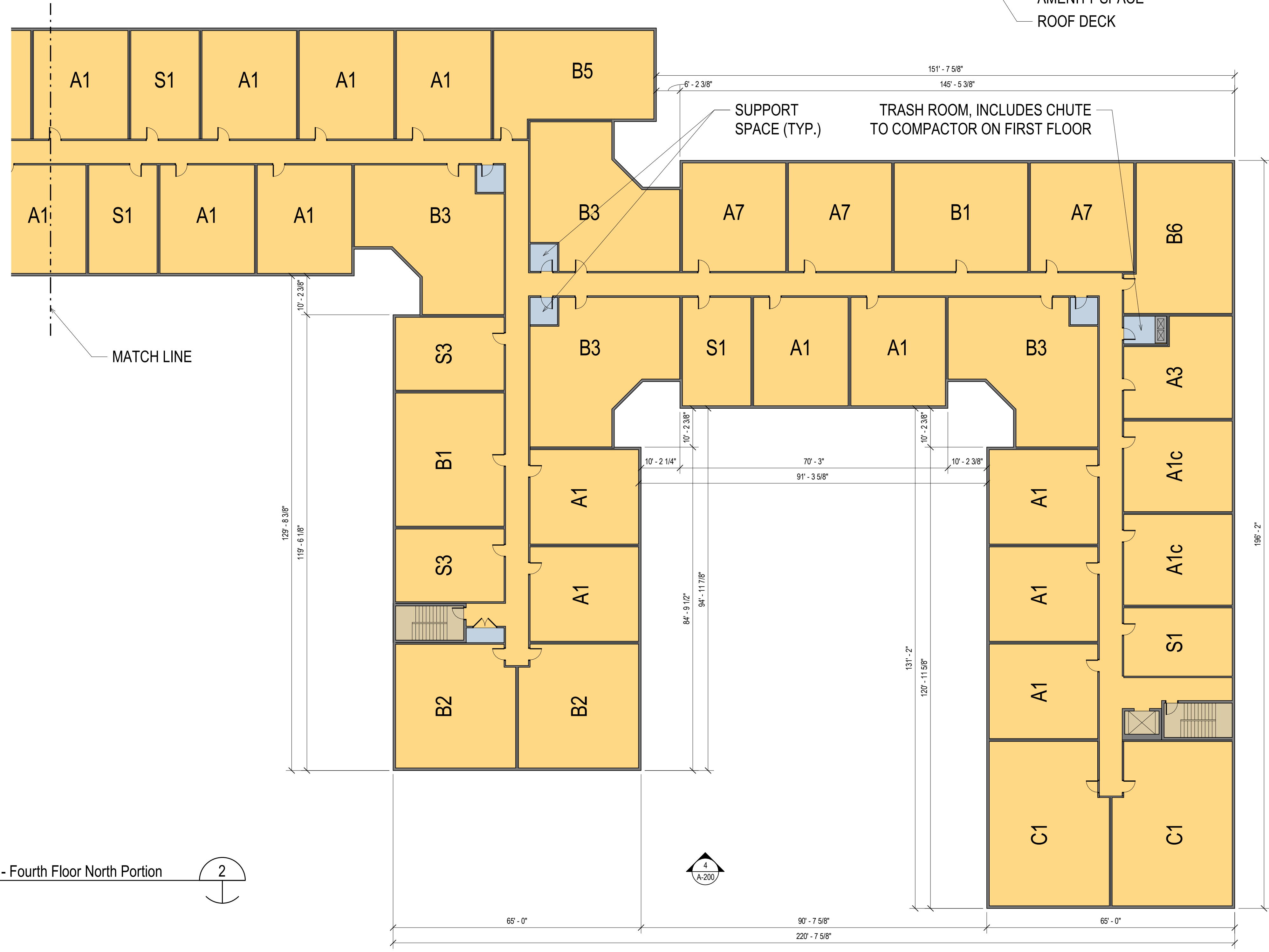
drawing revisions:

No.	Description	Date
1	B3 Height Reduction	03-31-2021



Building 3 - Fourth Floor
 1/16" = 1'-0"

NOTE: CONCEPTUAL FLOOR PLANS. FUTURE PLANS TO INCLUDE BALCONIES, WINDOWS, AND EXTERIOR DOOR LOCATIONS.



Building 3 - Fourth Floor North Portion
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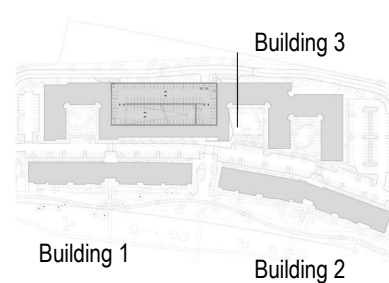
NOTE: APPLICATION REVISION

200 - 400
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PARKWAY
Wakefield, MA

CABOT, CABOT &
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Boston, MA 02110

SITE
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drawing by: AA
drawing checked by: BC
drawing scale: 1/16" = 1'-0"
drawing date: 16 March 2021
project number: 19234.00

drawing revisions:

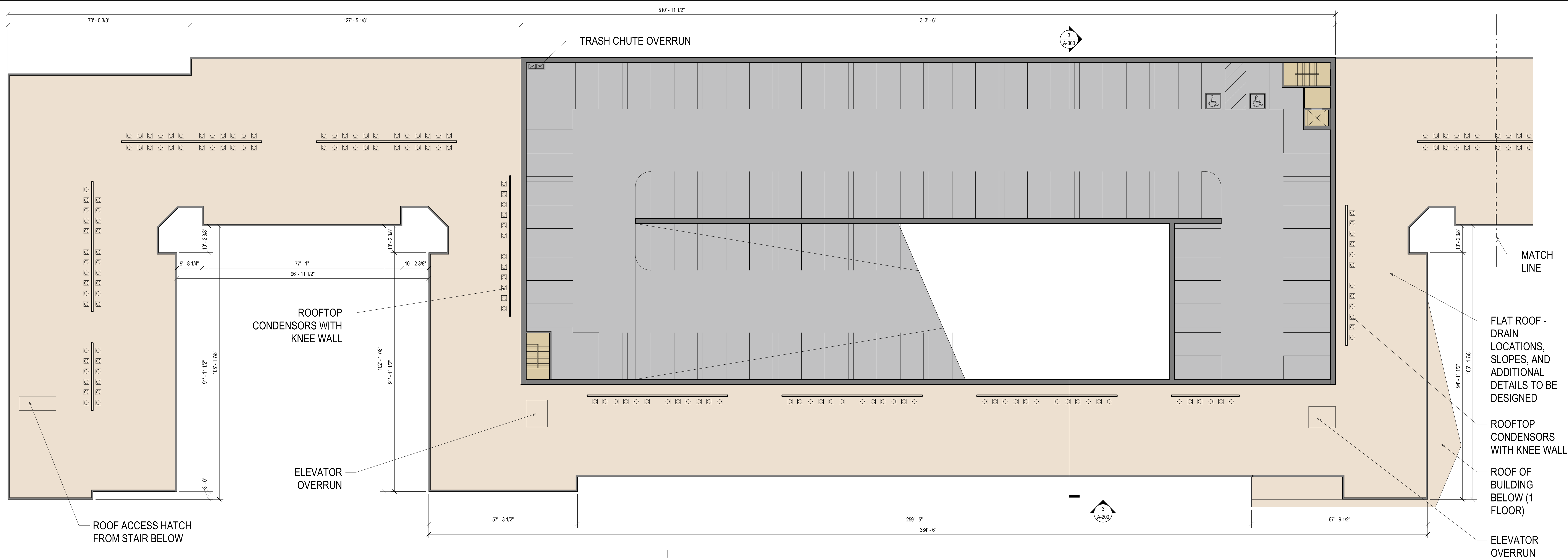
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Building 3
Roof Plan

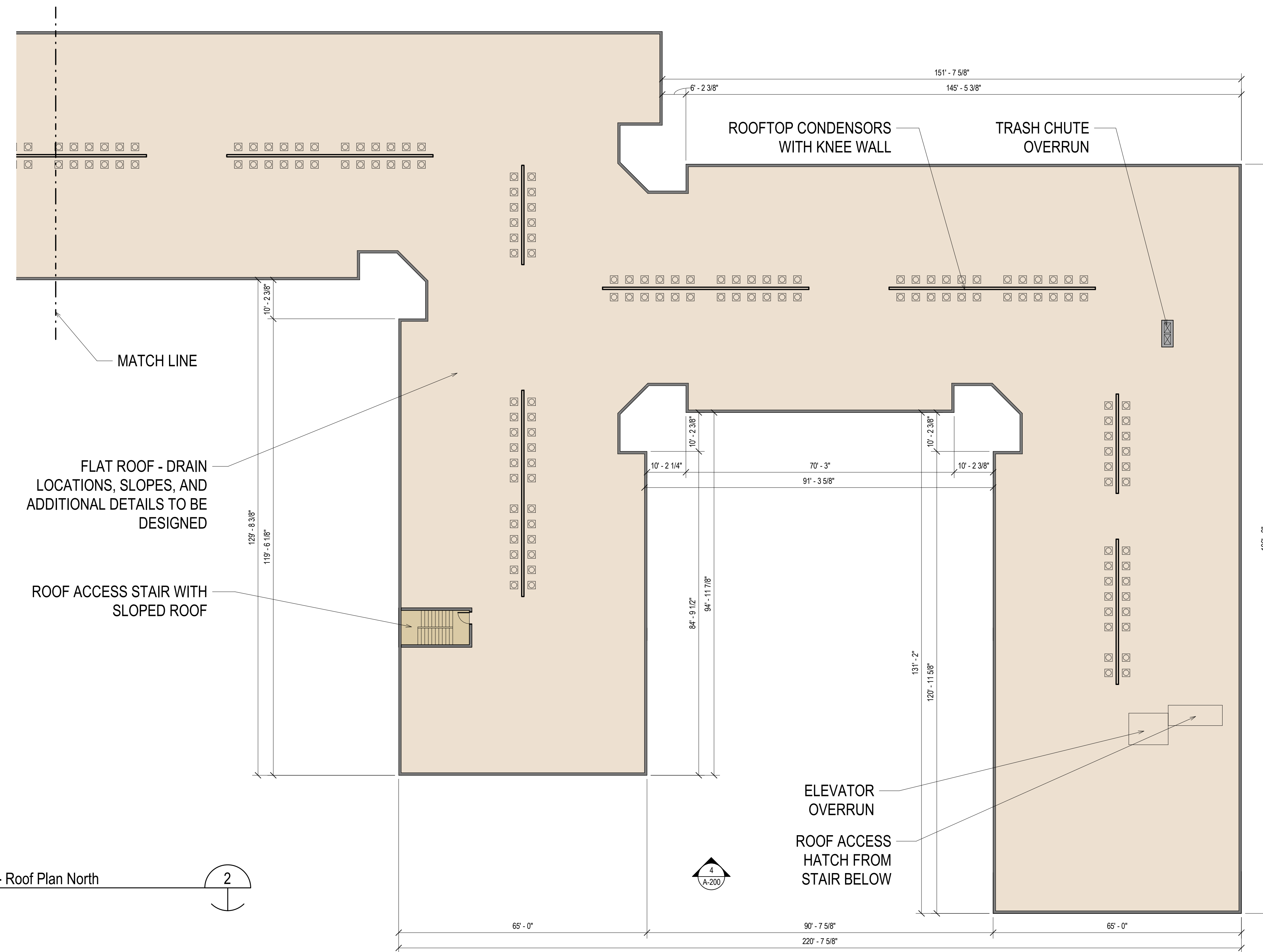
A-115

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R - B3.1 - Roof Plan South
1/16" = 1'-0"

NOTE: CONCEPTUAL FLOOR PLANS. FUTURE PLANS TO INCLUDE
BALCONIES, WINDOWS, AND EXTERIOR DOOR LOCATIONS.



R - B3.2 - Roof Plan North
1/16" = 1'-0"

NOTE: APPLICATION REVISION

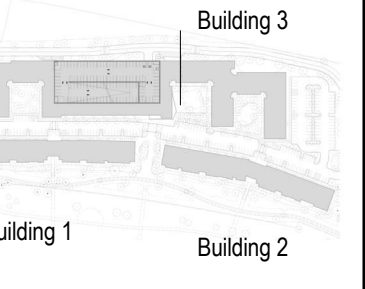
NOTE: TYPICAL ELEVATIONS SHOW OVERALL MATERIAL COMPOSITION AND DESIGN LANGUAGE TO BE CONTINUED AROUND BUILDING PERIMETER. DESIGN IS CONCEPTUAL AND SUBJECT TO CHANGE.

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 Wakefield, MA

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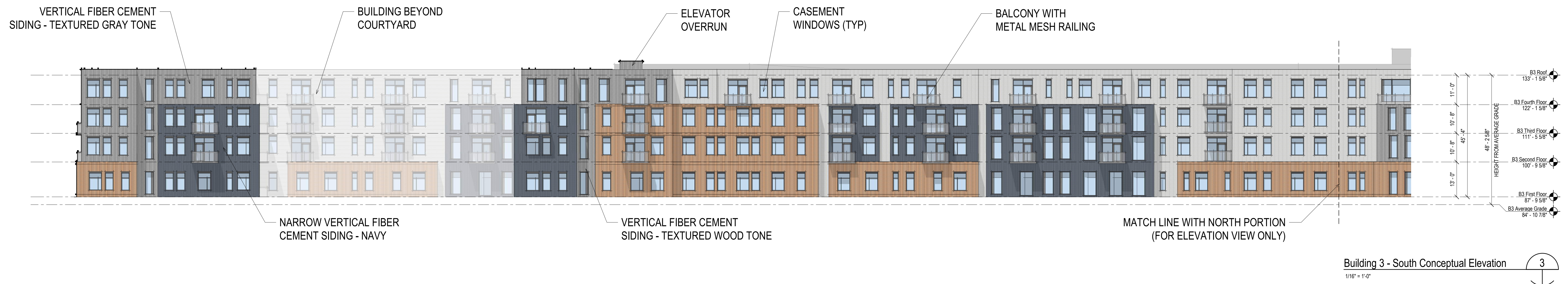
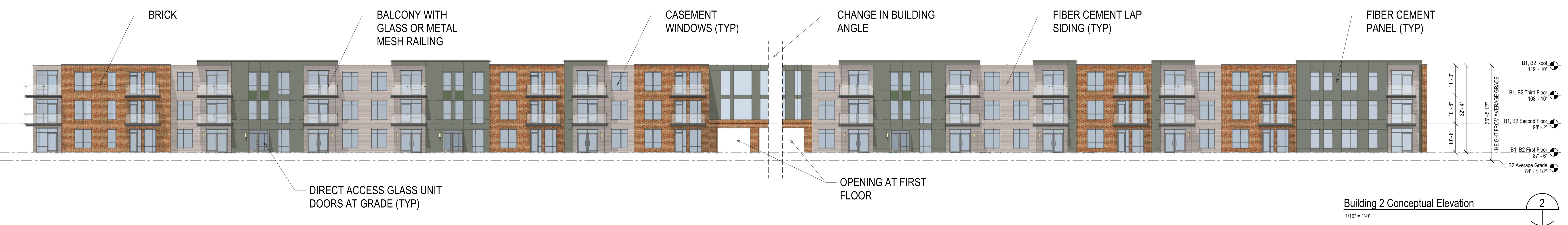
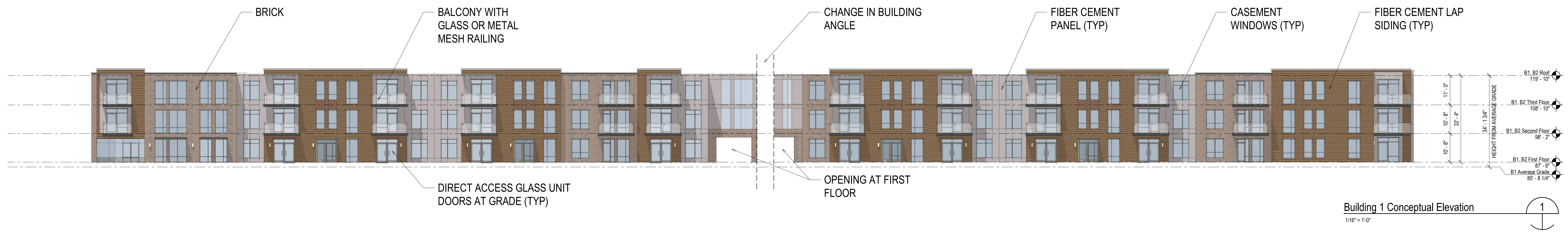
drawing by: AA
 drawing checked by: BC
 drawing scale: 1/16" = 1'-0"
 drawing date: 16 March 2021
 project number: 19234.00

drawing revisions:		
No.	Description	Date
1	B3 Height Reduction	03-31-2021



Conceptual
 Exterior
 Elevations

A-200



MATCH LINE WITH SOUTH PORTION (FOR ELEVATION VIEW ONLY)

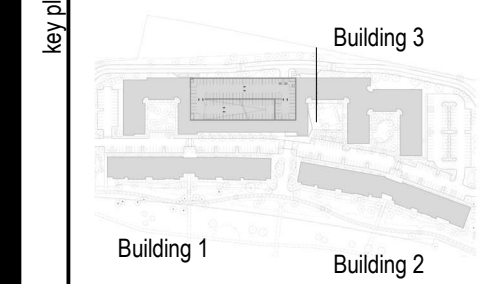
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**200 - 400
 QUANNAPOWITT
 PARKWAY
 Wakefield, MA**

**CABOT, CABOT &
 FORBES**

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 Boston, MA 02110

**SITE
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 PLANS**
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drawing by: AA
 drawing checked by: BC
 drawing scale: N.T.S.
 drawing date: 16 March 2021
 project number: 19234.00

drawing revisions:

No.	Description	Date
1	B3 Height Reduction	03-31-2021



**Conceptual
 Exterior
 Renders**

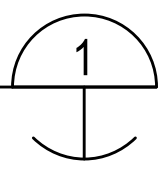
A-201



RENDERED VIEW OF BUILDING 1
 RESIDENCES WITH CAFE ALONG NEW
 PROPOSED LAKE PATH.

NOTE: APPLICATION REVISION

Building 1 Render
 N.T.S.

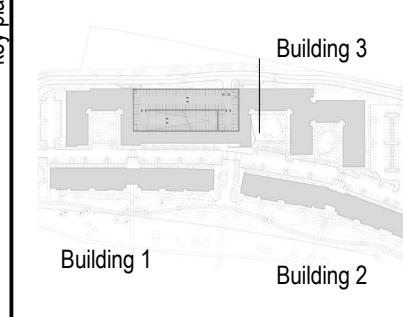


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drawing by: AA
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 project number: 19234.00

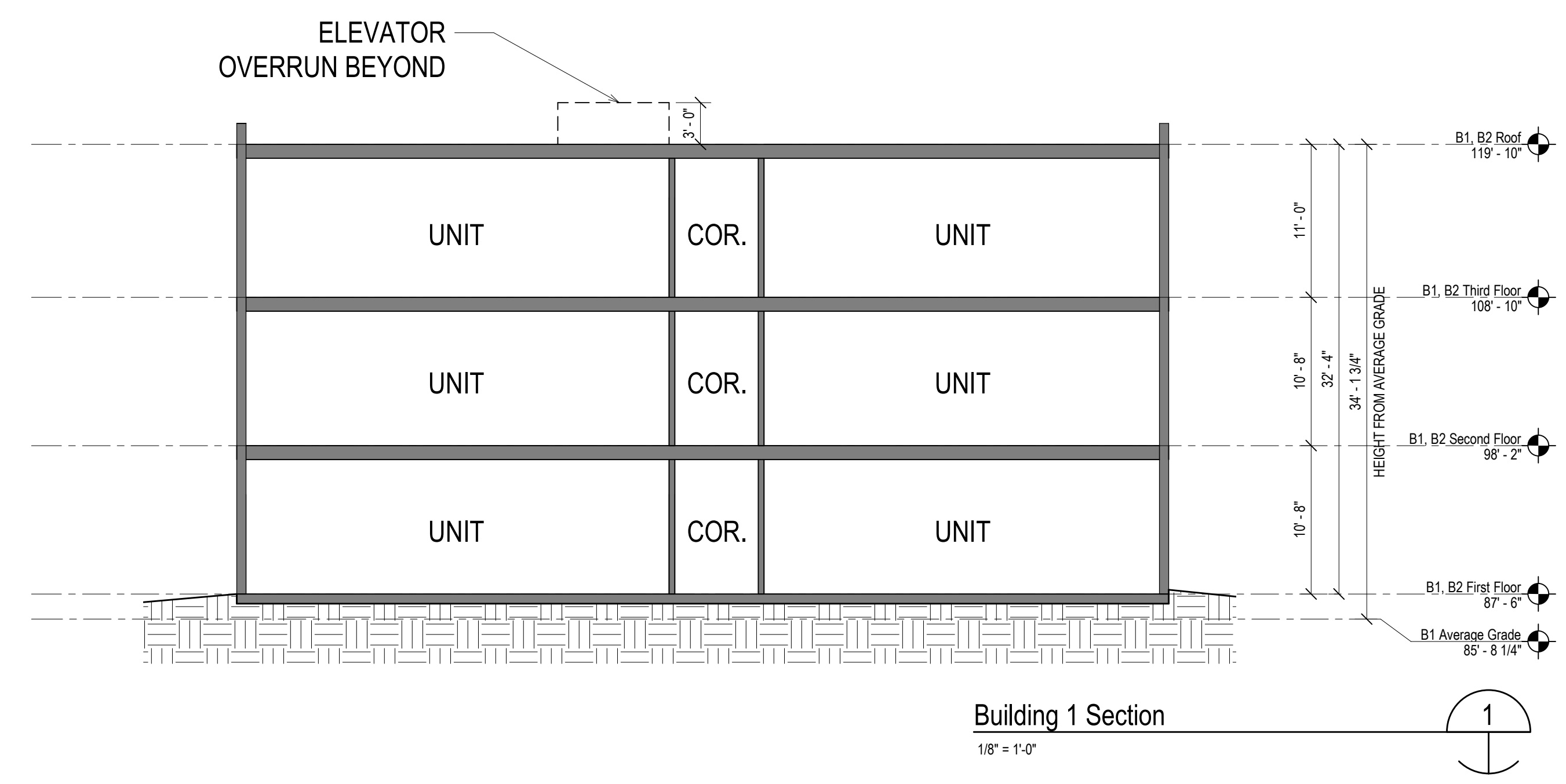
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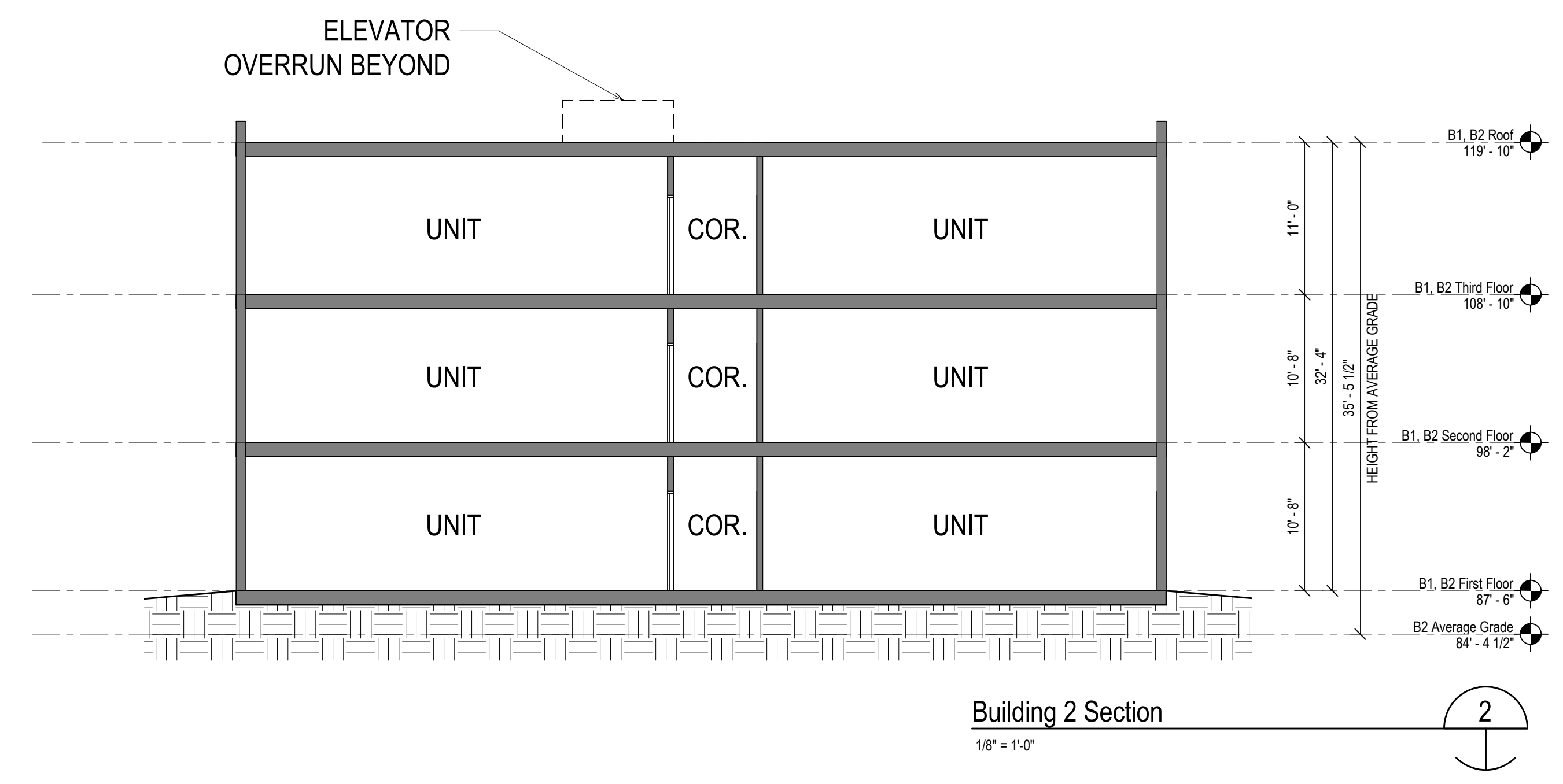


Conceptual
 Building
 Sections

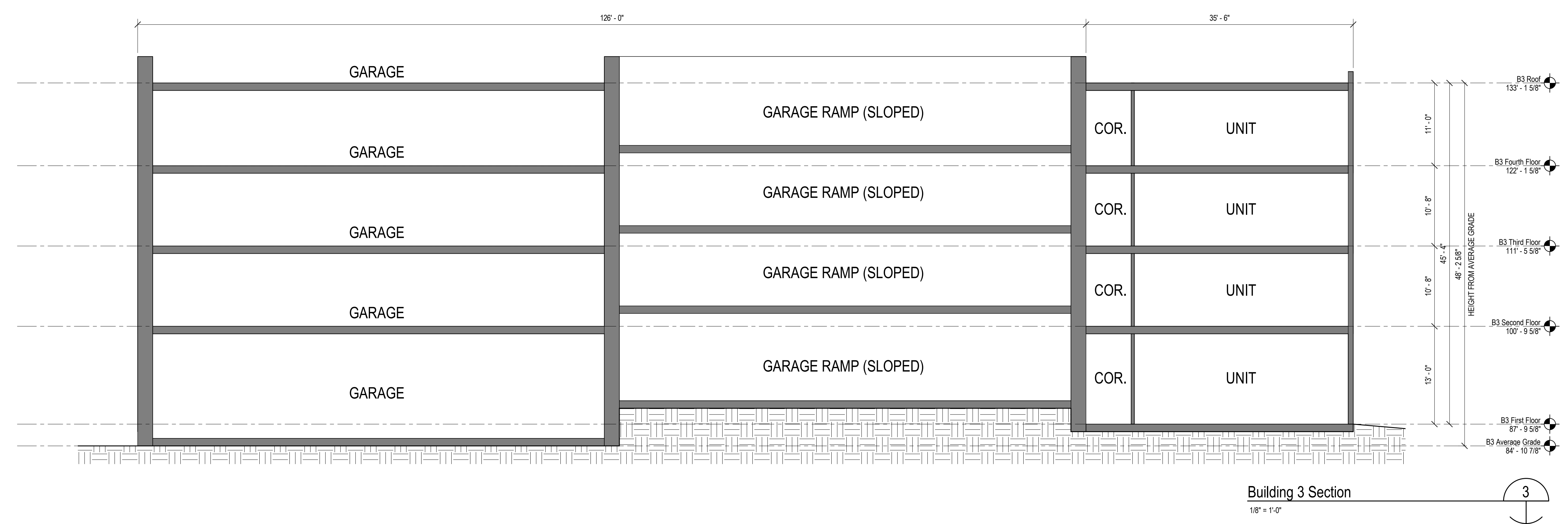
A-300



Building 1 Section
 1/8" = 1'-0" 1



Building 2 Section
 1/8" = 1'-0" 2



Building 3 Section
 1/8" = 1'-0" 3

NOTE: APPLICATION REVISION

Transportation Impact Assessment

Proposed Mixed-Use Development
200 Quannapowitt Parkway
Wakefield, Massachusetts

Prepared for:

Cabot, Cabot & Forbes
Boston, Massachusetts

April 2021

Prepared by:

VANASSE & ASSOCIATES, INC.
35 New England Business Center Drive
Suite 140
Andover, MA 01810

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EXECUTIVE SUMMARY

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment (TIA) in order to evaluate potential traffic impacts associated with the proposed mixed-use development to be located at 200 Quannapowitt Parkway in Wakefield, Massachusetts (hereafter referred to as the “Project”). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing and future traffic conditions, both with and without the Project.

PROJECT DESCRIPTION

The Project site was developed in 1957 with 224,067 square feet (sf) of office space and approximately 612 parking spaces. The development remained unchanged until 2010. In 2010, the existing 224,067 sf office space was modified to include a 28,782 sf data center. In 2019, a proposed change was approved by the Wakefield Board of Appeals to include 82,250 sf of office space, 141,817 sf of research and development (R&D) space, and 8,800 sf of mechanical space for a total of 232,867 sf.

The new program will entail the construction of a mixed-use development to include 485 multi-family residential units and a 1,100 sf restaurant. The Project site is bounded by Interstate 95 (I-95) to the north; Lake Quannapowitt to the south; areas of open and wooded space to the east; and commercial properties to the west. The existing buildings will be razed to accommodate the Project. On-site parking will be provided for approximately 747 vehicles, including 532 covered spaces and 215 surface spaces. Of the 747 parking spaces proposed, 738 spaces will be dedicated for residential use and 9 spaces will be dedicated for commercial use. Access to the Project site is provided by way of the existing roadway that serves the 200 Quannapowitt Parkway property.

EXISTING CONDITIONS

Traffic-volume data for the study area intersections was collected in July 2018 as a part of a prior study conducted by VAI. In order to account for traffic-volume changes over past two years, VAI conducted turning movement counts (TMCs) and vehicle classification counts for a two-hour weekday morning period (7:00 to 9:00 AM) and a two-hour weekday evening period (4:00 to 6:00 PM) on an average weekday at the intersections of Quannapowitt Parkway/Lowell Street and North Avenue at Quannapowitt Parkway in February 2020. Based upon a review of this data the 2018

traffic volumes were increased by 1.0 percent per year to reflect the 2021 base conditions. The adjusted volumes are above the February 2020 traffic volume and represent reasonable design condition. Please note that traffic-volume data for the intersection of Main Street at Lowell Street was collected in September 2020 and then adjusted upward by 10 and 24 percent to reflect the morning and evening peak-hour design conditions.

Quannapowitt Parkway, north of North Avenue was found to accommodate approximately 1,855 vehicles on an average weekday (24-hour, two-way volume), with approximately 280 vehicles per hour (vph) during the weekday morning peak hour and 318 vph during the weekday evening peak hour; and Quannapowitt Parkway south of Lowell Street was found to accommodate approximately 1,655 vehicles on an average weekday (24-hour, two-way volume), with approximately 192 vph during the weekday morning peak hour and 194 vph during the weekday evening peak hour.

A review of the peak-period traffic counts indicate that the weekday morning peak hour generally occurs between 8:00 and 9:00 AM, with the weekday evening peak hour generally occurring between 4:45-5:45 PM.

Vehicle Accident Data

The study intersections experienced an average of approximately 6 or fewer reported motor vehicle crashes per year over the five-year review period, the majority of which occurred on a weekday, under clear weather conditions during daylight, and involved angle or rear-end type collisions that resulted in property damage only. With exception of intersection of Main Street at Lowell Street, all of the study intersections were found to have a motor vehicle crash rate below the Massachusetts Department of Transportation (MassDOT) statewide and district average crash rates for signalized or unsignalized intersections for the MassDOT Highway Division District in which the intersections are located (District 4).

FUTURE CONDITIONS

Traffic volumes within the study area were projected to 2028, which reflects a seven-year planning horizon consistent with state traffic study guidelines. The future condition traffic-volume projections incorporated general background traffic growth as a result of development external to the study area and presently unforeseen projects. The 2028 No-Build traffic volumes reflect the occupied 195,285 sf office space and 28,782 sf data center. The 2028 Build condition traffic volumes were developed by: i) removing the trips generated by the existing buildings (data center and office space) at 200 Quannapowitt Parkway from the 2028 No-Build condition traffic volumes; and ii) adding the traffic expected to be generated by the Project.

Background Traffic Growth

Traffic-volume data compiled by MassDOT from permanent count station located along I-95 was reviewed. This data provides the most recent data and indicates a growth rate of 0.91 percent over the past several years. In order to provide a prudent planning condition for the Project, a slightly higher 1.0 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

Specific Development by Others

The Town of Wakefield was contacted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes along Quannapowitt Parkway and within the Project study area. Based on this discussion, no significant developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general background traffic growth rate.

Planned Roadway Improvements

The Town of Wakefield was consulted in order to determine if there were any planned roadway improvement projects expected to be completed within the study area. Based on these discussions, no improvements are planned beyond general maintenance.

No-Build Traffic Volumes

The 2028 No-Build peak-hour traffic-volume networks were developed by applying the 1.0 percent per year compounded annual background traffic growth rate and addition of the existing buildings (data center and office space) traffic volumes to the 2021 Baseline condition peak-hour traffic volumes.

Site-Generated Traffic Volumes

The proposal entails construction of a mixed-use development that will contain 485 multifamily residential units and an 1,100 sf restaurant. In order to develop the traffic characteristics of the Project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)¹ for similar land uses as those proposed were used. ITE Land Use Codes (LUCs) 221, *Multifamily Housing (Mid-Rise)* and 932, *High Turn-Over (Sit-Down) Restaurant*; were used to establish the base traffic characteristics of the Project. Trip-generation calculations were performed for a typical weekday, as well as the weekday morning and weekday evening peak hours, the critical time periods for Project-related traffic activity. For purposes of this study, the Project is expected to generate approximately 2,766 primary (new) vehicle trips on an average weekday (two-way volume, 24-hour volume), with 186 new vehicle trips (51 vehicles entering and 135 exiting) expected during the weekday morning peak hour, and 224 new vehicle trips (137 vehicles entering and 87 exiting) expected during the weekday evening peak hour.

In comparison to the existing 28,782 sf data center and 195,285 sf office space at the Project site, the proposed Project is expected to generate 706 *additional* new vehicle trips on an average weekday, with 27 *fewer* vehicle trips expected during the weekday morning peak hour, and 6 *additional* vehicle trips expected during the weekday evening peak hour. In comparison to the 2019 approved program for 82,250 sf office space and 141,817 sf R&D space at the Project site, it can be seen in Table 6 that the proposed Project is expected to generate 292 *additional* new vehicle trips on an average weekday, with 91 *fewer* vehicle trips expected during the weekday morning peak hour, and 28 *fewer* vehicle trips expected during the weekday evening peak hour. Therefore, the Project represents a substantial decrease in peak hour site traffic as compared with the most recently approved development program for the site.

¹*Trip Generation*, 10th Edition; Institute of Transportation Engineers; Washington, DC; 2017.

Trip Distribution and Assignment

The directional distribution of site generated trips to and from the Project was determined based on a review of existing traffic patterns at study area intersections and journey to work data for Town of Wakefield obtained from the United States Census Bureau.² Overall, up to 65.0 percent of the Project-related traffic will travel to/from I-95.

TRAFFIC OPERATIONS ANALYSIS

In order to assess the impact of the proposed Project on the roadway network, traffic operations analyses were performed at the study intersections under 2021 Existing, 2028 No-Build, and 2028 Build conditions. The addition of site-related traffic will result in a measurable, but not a significant, impact on overall operations at the study area intersection. It is important to note that the Project change from office space/data center to residential/commercial does not result in a significant overall peak-hour increase in volume.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any conditions identified at off-site locations evaluated in conjunction with this study. The elements of the improvement program include Project access, transportation system improvements, pedestrian improvements, and a Travel Demand Management (TDM) program. These elements provide a comprehensive mitigation program, which not only provides transportation system improvements, but also promotes alternative healthy modes of transportation. The following improvements have been recommended as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

Project Access

Access to the Project site is provided by way of the existing roadway that serves 200 Quannapowitt Parkway property. The following recommendations are offered with respect to Project access, internal circulation, and parking, many of which are already reflected on the Site Plans for the Project:

- The Project site driveways and internal circulating drives will be a minimum of 24 feet in width where two-way traffic is to be conveyed, and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle as defined by the Wakefield Fire Department;
- Vehicles exiting the Project site will be placed under STOP-sign control with a marked STOP-line provided;
- All signs and pavement markings to be installed within the Project site will conform to the

²Table 3 - Residence MCD/County to Workplace MCD/County Commuting Flows for the United States and Puerto Rico
Sorted by Residence Geography: 5-Year ACS, 2011-2015

applicable standards of the *Manual on Uniform Traffic Control Devices (MUTCD)*,³

- Americans with Disabilities Act (ADA)-compliant wheelchair ramps should be provided at all pedestrian crossings internal to the Project site and for crossing the Project site driveways;
- Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas of the Project site driveways will be designed and maintained so as not to restrict lines of sight; and
- Snow windows within the sight triangle areas of the Project site driveways and at intersections within the Project site will be promptly removed where such accumulations would impede sight lines.

QUANNAPOWITT PARKWAY IMPROVEMENTS

The following are recommended in order to upgrade and improve Quannapowitt Parkway conditions in the vicinity of the Project site.

- The existing roadway within the Project will receive a full-depth reconstruction to upgrade the poor pavement conditions;
- Addition of vertical granite curb and new drainage, and replacement of the street lights;
- Restripe the crosswalks on Quannapowitt Parkway at site driveways; and
- Restripe the double-yellow centerline along Quannapowitt Parkway in the vicinity of the Project site.

Quannapowitt Parkway at Lowell Street

In order to improve safety conditions along Quannapowitt Parkway at its intersection with the adjacent parking lot at Lowell Street, the following is recommended to be offered by the Applicant: i) restripe double-yellow centerline along Quannapowitt Parkway ii) provide a crosswalk with pedestrian crossing signs for crossing Quannapowitt Parkway at the adjacent parking lot, iii) provide a STOP-sign control with a marked STOP-line for left-turn/right-turn movements from Quannapowitt Parkway to Lowell Street.

North Avenue at Wolcott Street and Linda Road

This signalized location with a pedestrian crosswalk is currently in need of an upgraded traffic signal. The Project proponent, in coordination with Town officials, is willing to offer a fair share contribution towards the future traffic signal upgrade.

³*Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

TRANSPORTATION DEMAND MANAGEMENT (TDM) PLAN

As is the case with many developments, a major focus of the traffic mitigation plan focuses on the reduction of single-occupant vehicles arriving and departing to and from the site. This is predominantly accomplished by developing a comprehensive TDM strategy. In consultation with the Town, the proponent is committed to supporting a balanced multimodal transportation plan to serve the residents and visitors of the site. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following TDM measures will be implemented as a part of the Project:

- A transportation coordinator will be designated for the Project to coordinate the elements of the TDM program;
- Information regarding public transportation services, maps, schedules, and fare information will be posted in a central location and/or otherwise made available to residents and employees;
- A “welcome packet” will be provided to residents and employees detailing available public transportation services, bicycle and walking alternatives, and available commuter options;
- Pedestrian accommodations will be incorporated into the Project and consist of sidewalks and ADA-compliant wheelchair ramps at all pedestrian crossings internal to the Project site that will link building entrances to the sidewalk infrastructure along Quannapowitt Parkway;
- Secure bicycle parking will be provided within the Project site consisting of both exterior and interior (covered) bicycle parking;
- Work-at-home workspaces will be provided to support telecommuting by residents of the Project; and
- Consideration should be given to installing accommodations for the charging of electric vehicles by residents of the Project.

CONCLUSIONS

The proposed Project will not have a significant impact on overall operations. With the implementation of the above recommendations, safe and efficient access will be provided to the planned development and the proposed development can be constructed with minimal impact to the area as designed.

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment (TIA) in order to evaluate potential traffic impacts associated with the Proposed mixed-use development to be located at 200 Quannapowitt Parkway in Wakefield, Massachusetts (the “Project”). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing and future traffic conditions, both with and without the Project, along Quannapowitt Parkway and at major intersections which Project-related traffic will travel.

PROJECT DESCRIPTION

The Project site was developed in 1957 with 224,067 sf of office space and approximately 612 parking spaces. The development remained unchanged until 2010. In 2010, the existing 224,067 sf office space was modified to include a 28,782 sf data center. In 2019, a proposed change was approved by the Wakefield Planning Board to include 82,250 sf of office space, 141,817 sf of R&D space, and 8,800 sf of mechanical space for a total of 232,867 sf.

The new program will entail the construction of a mixed-use development to include 485 multi-family residential units and an 1,100 sf restaurant. The Project site is bounded by I-95 to the north; Lake Quannapowitt to the south; areas of open and wooded space to the east; and commercial properties to the west. The existing buildings will be razed to accommodate the Project. The location of the Project site, relative to the surrounding roadway network is displayed in Figure 1. On-site parking will be provided for approximately 747 vehicles, including 532 covered spaces and 215 surface spaces. Of the 747 parking spaces proposed, 738 spaces will be dedicated for residential use and 9 spaces will be dedicated for commercial use. Access to the Project site is provided by way of the existing roadway that serves the 200 Quannapowitt Parkway property.

STUDY METHODOLOGY

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

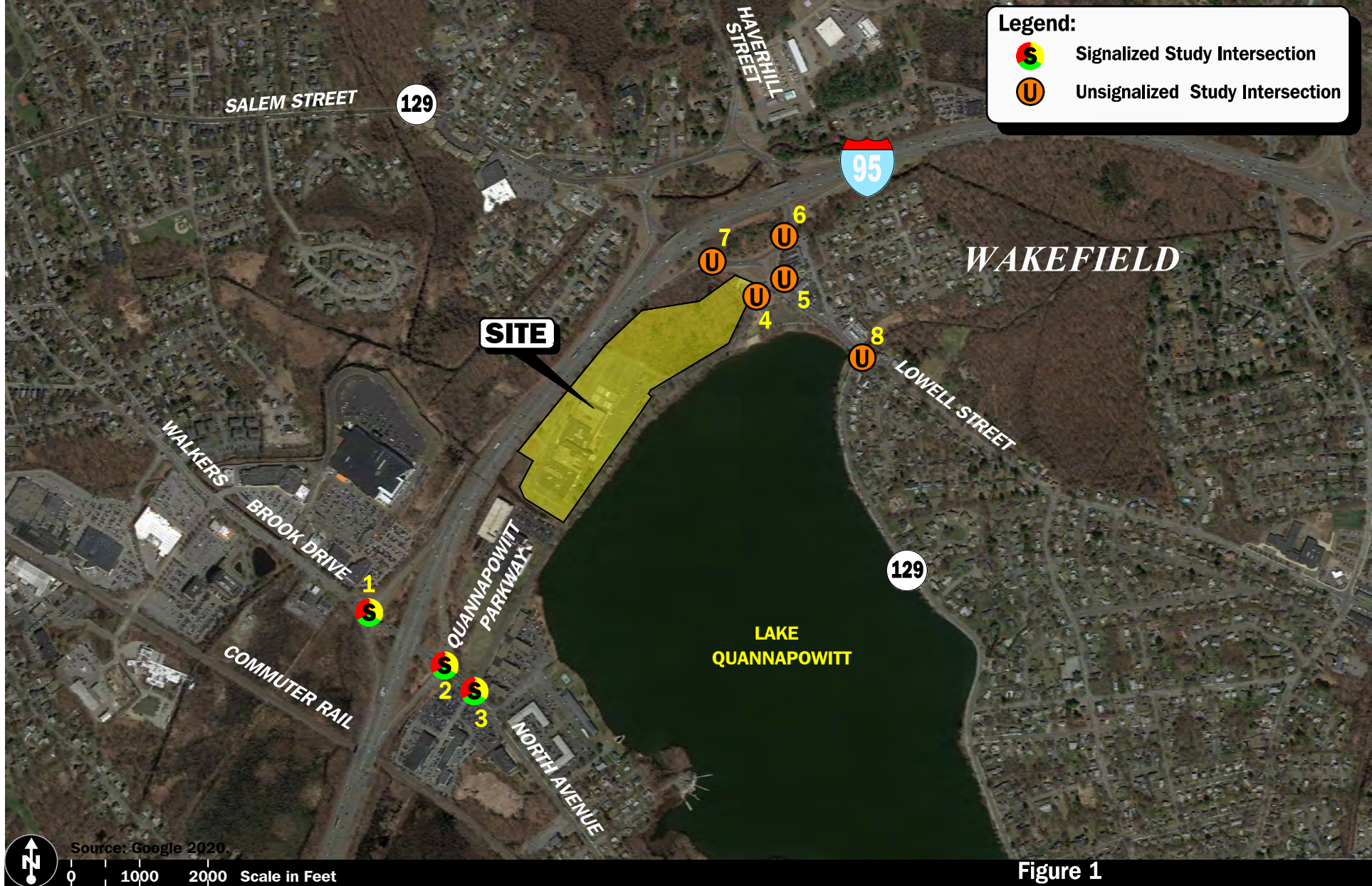


Figure 1

Site Location and Study Area Map

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; pedestrian facilities; observations of traffic flow; review of safety characteristics along area roadways and collection of daily and peak-period traffic counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project.

A seven-year time horizon was selected for analyses consistent with state guidelines for the preparation of TIAs. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues.

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

EXISTING CONDITIONS

A comprehensive field inventory of existing conditions on the study area roadways was conducted in September 2020. The field investigation consisted of an inventory of existing roadway geometrics, pedestrian and bicycle facilities, public transportation services, traffic, pedestrian and bicycle volumes, and operating characteristics, as well as posted speed limits and land use information within the study area. The study area for the Project was selected to contain the major roadways and intersections which Project-related traffic will travel.

- North Avenue at I-95 northbound ramps
- North Avenue at I-95 southbound ramps
- North Avenue at Quannapowitt Parkway/private driveway
- Quannapowitt Parkway at parking lot and channelized right-turn lane to Lowell Street
- Quannapowitt Parkway at Lowell Street
- Rotary at Lowell Street and the I-95 northbound on-ramp
- Rotary at the I-95 northbound off-ramp and Lowell Street
- Lowell Street at Main Street

The following and Figure 2 describe the study area roadway and the intersections.

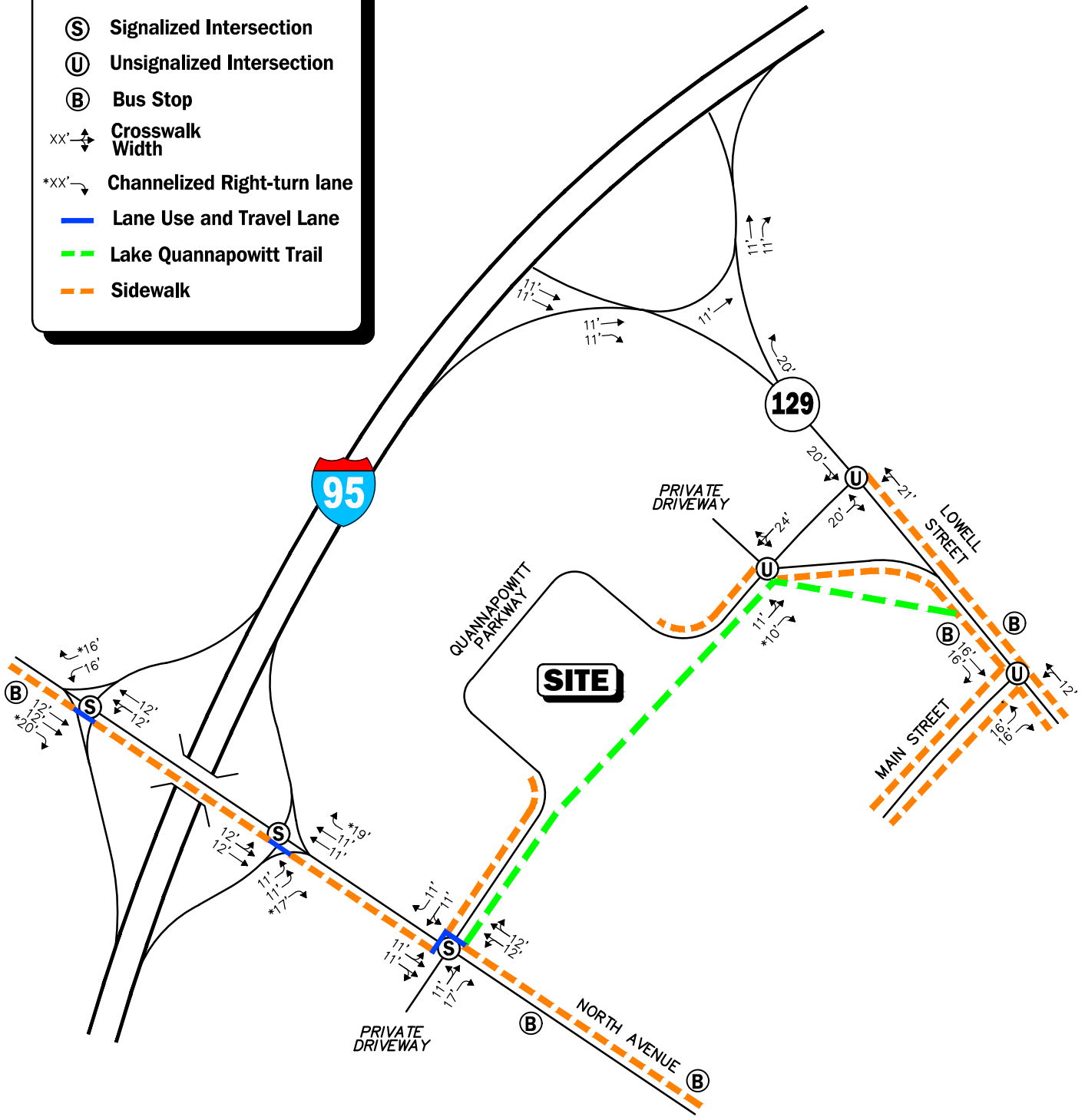
ROADWAY

Quannapowitt Parkway

Quannapowitt Parkway traverses the study area in a general north-south direction. Within the study area, the roadway provides one general-purpose travel lane per direction, with an exclusive right-turn lane at its intersection with North Avenue. A 6-foot wide sidewalk is generally provided along Quannapowitt Parkway with a trail provided along west side of Lake Quannapowitt where it connects to Quannapowitt Parkway and Lowell Street to the north. There is no posted speed limit along Quannapowitt Parkway. Land use along Quannapowitt Parkway, within the study area, consists of commercial uses and areas of open and wooded space.

Legend:

- Ⓢ Signalized Intersection
- Ⓤ Unsignalized Intersection
- Ⓑ Bus Stop
- xx' ↔ Crosswalk Width
- *xx' ↘ Channelized Right-turn lane
- Lane Use and Travel Lane
- Lake Quannapowitt Trail
- Sidewalk



Not To Scale

Figure 2

Existing Lane Use, Travel Lane Width and Pedestrian Facilities



INTERSECTIONS

Figure 2 also summarizes travel lane use and widths at the study area intersections as observed in 2020.

EXISTING TRAFFIC VOLUMES

Traffic-volume data for the study area intersections was collected in July 2018 as a part of a prior study conducted by VAI. In order to account for traffic-volume changes over past two years, VAI conducted turning movement counts (TMCs) and vehicle classification counts for a two-hour weekday morning period (7:00 to 9:00 AM) and a two-hour weekday evening period (4:00 to 6:00 PM) on an average weekday at the intersections of Quannapowitt Parkway at Lowell Street and North Avenue at Quannapowitt Parkway in February 2020 before Massachusetts “stay-at-home” order issued by governor as a result of COVID-19 pandemic.

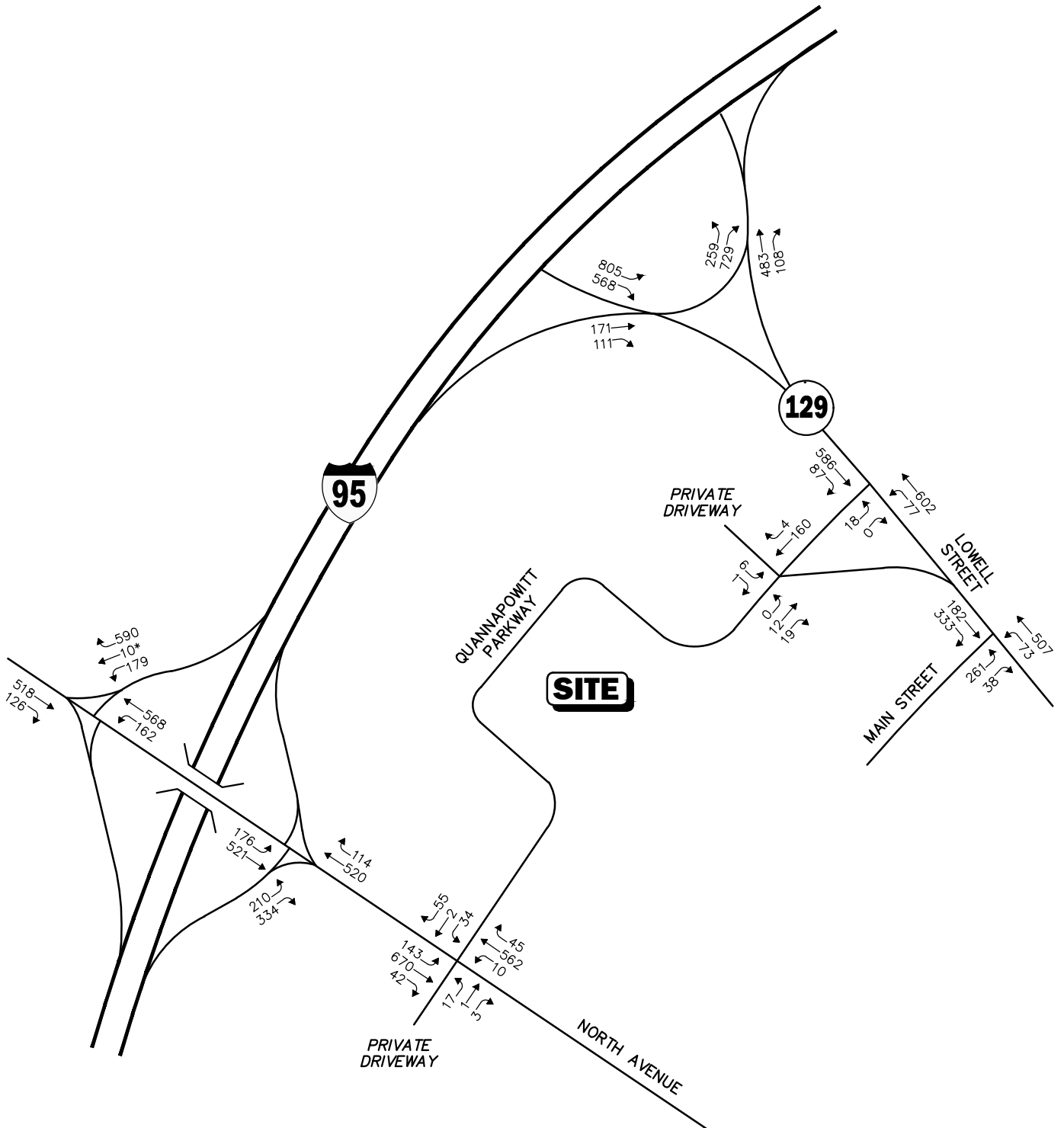
Traffic-Volume Adjustments

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, traffic volume data from MassDOT Continuous Count Station No. 5099 located on I-95 in Wakefield was reviewed.⁴ Based on a review of this data, it was determined that traffic volumes for the month of July are approximately 6.0 percent above average-month conditions and traffic volumes for the month of February are approximately 7.0 percent below average-month conditions. The July traffic volumes were not adjusted downward in order to provide a conservative (above-average) analysis condition and the February traffic volumes were adjusted upward.

Note that traffic-volume data for the intersection of Main Street at Lowell Street was collected in September 2020 and then adjusted upward by 10 and 24 percent based on the adjusted volumes at the intersection of Quannapowitt Parkway at Lowell Street during the morning and evening peak hours, respectively. These increases included seasonal characteristics as well as effects due to the COVID-19 pandemic.

VAI concluded that July 2018 traffic counts are approximately equal or higher than February 2020 volumes; as such, the July 2018 traffic counts were used (after increases to account for annual growth to 2021) as the base for 2021 Existing conditions. The 2021 Existing traffic volumes are summarized in Table 1, with the weekday morning and evening peak-hour traffic volumes graphically depicted on Figures 3 and 4.

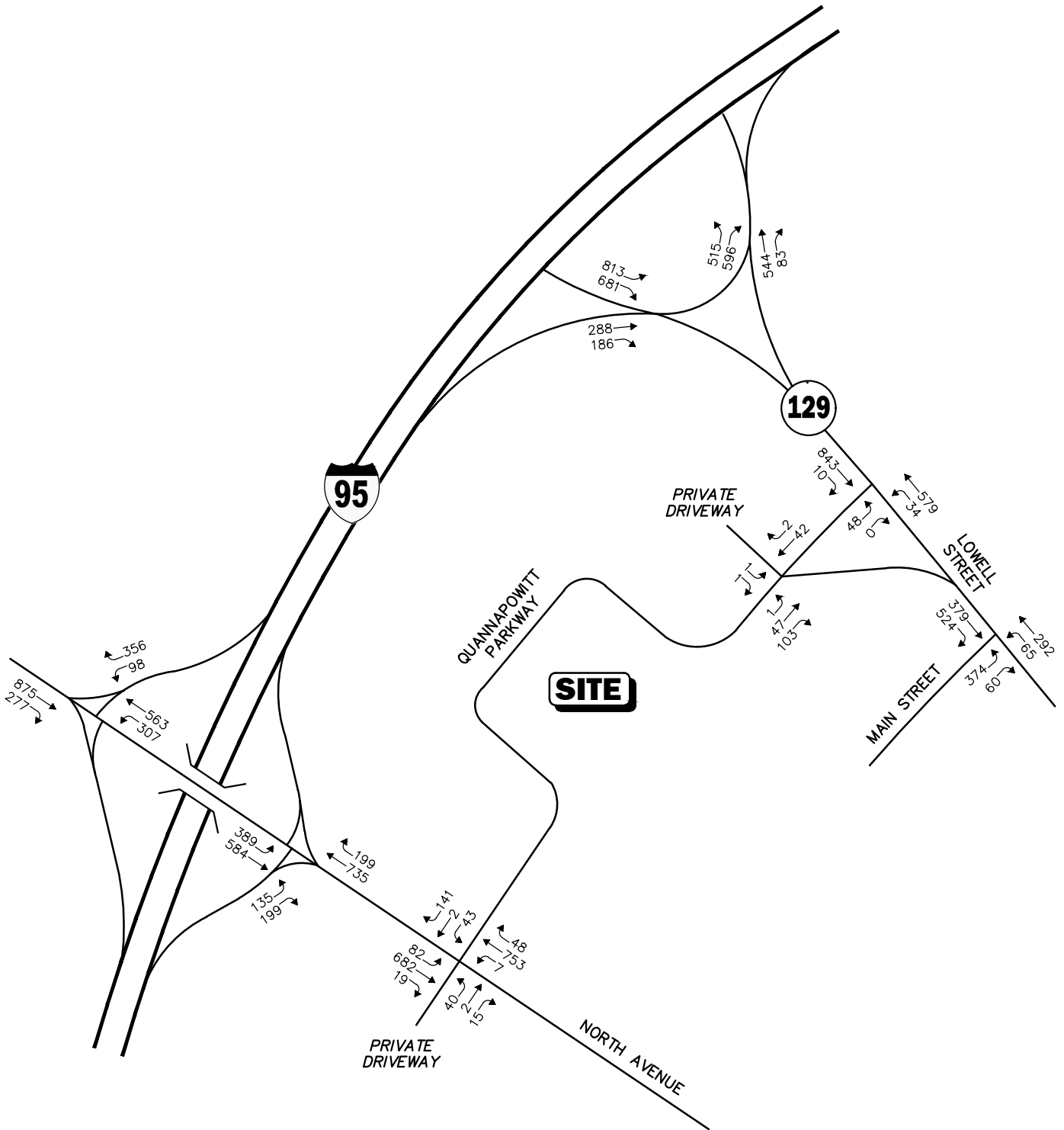
⁴MassDOT Traffic Volumes for the Commonwealth of Massachusetts; 2021.



Note: * Illegal movements
Not To Scale



Figure 3
2021 Existing
Weekday Morning
(8:00 - 9:00 AM)
Peak Hour Traffic Volumes



Not To Scale



Figure 4

2021 Existing
Weekday Evening
(4:45 - 5:45 PM)
Peak Hour Traffic Volumes

Table 1
EXISTING ROADWAY TRAFFIC-VOLUME SUMMARY

Location	Daily Volume (vpd) ^a	Weekday Morning Peak Hour (8:00 – 9:00 AM)			Weekday Afternoon Peak Hour (4:45 – 5:45 PM)		
		Volume (vph) ^b	Percent of Daily Traffic ^c	Predominant Flow	Volume (vph)	Percent of Daily Traffic	Predominant Flow
Quannapowitt Parkway, north of North Avenue	1,855	280	15.1	68% NB	318	17.1	58% SB
Quannapowitt Parkway, south of Lowell Street	1,655	192	11.6	84% SB	194	11.7	78% NB

^aTwo-way daily traffic expressed in vehicles per day; ATR conducted by VAI in July 2018; Increased 1 percent year to represent 2021 existing conditions).

^bVehicles per hour

^cThe percent of daily traffic that occurs during the peak hour.

NB = northbound, SB = southbound.

As can be seen in Table 1, Quannapowitt Parkway north of North Avenue was found to accommodate approximately 1,855 vehicles on an average weekday (24-hour, two-way volume), with approximately 280 vehicles per hour (vph) during the weekday morning peak hour and 318 vph during the weekday evening peak hour. It is important to note that Quannapowitt Parkway does accommodate some peak-hour cut-through traffic.

Quannapowitt Parkway south of Lowell Street was found to accommodate approximately 1,655 vehicles on an average weekday (24-hour, two-way volume), with approximately 192 vph during the weekday morning peak hour and 194 vph during the weekday evening peak hour.

A review of the peak-period traffic counts indicate that the weekday morning peak hour generally occurs between 8:00 and 9:00 AM, with the weekday evening peak hour generally occurring between 4:45 and 5:45 PM.

PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in August 2020. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study intersections, as well as the location of bicycle facilities. Pedestrian and bicycle counts were also provided for the study area and were collected in conjunction with the TMCs. As shown on Figure 2, sidewalks are generally provided along one or both sides of the study roadways with pedestrian traffic signal equipment and phasing provided for crossing north and west legs of the signalized intersection of North Avenue and Quannapowitt Parkway.

Lake Quannapowitt Trail

Lake Quannapowitt trail is a loop trail located in Town of Wakefield and generally traverses around Lake Quannapowitt. The trail is approximately 3.1 miles where access is provided from Quannapowitt Parkway, North Avenue, Lowell Street, Main Street, and Church Street and parking

spaces are available southern end of the lake. Within the study area, the trail is located south of the Project and connects to the provided sidewalks along Quannapowitt Parkway.

PUBLIC TRANSPORTATION

Public transportation services are provided within the study area by the Massachusetts Bay Transportation Authority (MBTA) (fixed-route bus and commuter rail services). The MBTA bus Route 137 (Reading Depot to Malden Center Station) provides stops along North Avenue and Lowell with approximate 5- to 8-minute walking distance from the Project site. Routes 136 and 137 have been temporarily combined as a consolidation measure due to reduced ridership during the COVID-19 pandemic.

In addition, Wakefield Station on the Haverhill Line of the MBTA commuter rail system is located approximately 2.0 miles south of the Quannapowitt Parkway (an approximate 8-minute driving distance) and is served by the Route 137 bus.

The public transportation schedules and fare information are provided in the attachments. Please note that the service schedules reflect reduced operations due to COVID-19 restrictions.

VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2014 through 2018, inclusive) in order to examine motor vehicle crash trends occurring within the study area. The data is summarized by intersection, type, severity, roadway and weather conditions, and day of occurrence, and presented in Table 2.

As can be seen in Table 2, the study intersections experienced an average of approximately five (5) or fewer reported motor vehicle crashes per year over the five-year review period, the majority of which occurred on a weekday, under clear weather conditions during daylight, and involved angle or rear-end type collisions that resulted in property damage only. With exception of intersection of Main Street at Lowell Street, all of the study intersections were found to have a motor vehicle crash rate below the MassDOT statewide and MassDOT Highway Division District 4 average crash rates for signalized or unsignalized intersections.

A review of the MassDOT statewide High Crash Location List indicated that none of the study intersections were included on MassDOT's Highway Safety Improvement Program (HSIP) listing as a high crash location. The detailed MassDOT Crash Rate Worksheets and high crash location mapping are provided in the Appendix.

Table 2
MOTOR VEHICLE CRASH DATA SUMMARY^a

	North Ave./ I-95 SB Ramps	North Ave./ I-95 NB Ramps	North Ave./ Quannapowitt Pkwy	Quannapowitt Pkwy/ Parking Lot/ Right-turn lane to Lowell St.	Lowell St./ Main St.	Quannapowitt Pkwy/ Lowell St.	Rotary at Lowell Street/ I-95 NB On-Ramp	Rotary at I-95 NB Off-Ramp/ Lowell St.
Traffic Control Type: ^b	TS	TS	TS	U	U	U	R	R
Year:								
2014	4	0	1	0	2	0	2	8
2015	6	3	5	0	4	1	4	6
2016	3	0	3	0	5	0	1	3
2017		1	6	0	8	1	4	0
2018	<u>6</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>6</u>	<u>1</u>
Total	23	4	16	0	21	2	17	19
Average	4.60	0.80	3.20	0.00	4.20	0.40	3.40	3.80
Crash Rate ^c	0.47	0.09	0.44	0.00	0.62	0.07	0.44	0.55
MassDOT Crash Rate: ^d	0.73	0.73	0.73	0.57	0.57	0.57	0.57	0.57
Significant? ^e	No	No	No	No	Yes	No	No	No
Type:								
Angle	6	2	4	0	9	1	0	1
Rear-End	12	1	5	0	4	1	14	13
Head-On	1	1	1	0	1	0	0	0
Sideswipe	2	0	5	0	3	0	2	3
Single Vehicle Crash	2	0	1	0	4	0	1	2
Unknown/Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	23	4	16	0	21	2	17	19
Conditions:								
Clear	16	1	11	0	13	1	13	15
Cloudy	2	1	3	0	3	1	3	2
Rain	4	1	0	0	2	0	0	1
Snow/Ice	0	1	1	0	3	0	1	1
Not Reported/Other	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	23	4	16	0	21	2	17	19
Lighting:								
Daylight	15	4	11	0	18	2	12	13
Dawn/Dusk	1	0	0	0	0	0	1	3
Dark (Road Lit)	6	0	4	0	3	0	2	1
Dark (Road Unlit)	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>2</u>
Total	23	4	16	0	21	2	17	19
Day of Week:								
Monday-Friday	17	2	13	0	13	1	16	13
Saturday	4	0	2	0	6	1	1	2
Sunday	<u>2</u>	<u>2</u>	<u>1</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>4</u>
Total	23	4	16	0	21	2	17	19
Severity:								
Property Damage Only	20	2	11	0	13	2	10	13
Non-fatal Injury	3	2	4	0	7	0	7	5
Not Reported	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	23	4	16	0	21	2	17	19

^aSource: MassDOT Safety Management/Traffic Operations Unit records, 2014 through 2018.

^bTraffic Control Type: U = unsignalized; TS = traffic signal.; R=rotary

^cCrash rate per million vehicles entering the intersection.

^dDistrict crash rate.

^eThe intersection crash rate is significant if it is found to exceed the MassDOT crash rate for the MassDOT Highway Division District in which the Project is located (District 4).

SPOT SPEED MEASUREMENTS

Vehicle travel speed measurements were performed on Quannapowitt Parkway in the vicinity of the Project site in conjunction with the automatic traffic recorder (ATR) counts. Table 3 summarizes the vehicle travel speed measurements.

Table 3
VEHICLE TRAVEL SPEED MEASUREMENTS

	Quannapowitt Parkway, North of North Avenue		Quannapowitt Parkway, South of Lowell Street	
	Northbound	Southbound	Northbound	Southbound
Mean Travel Speed (mph)	27	25	23	24
85 th Percentile Speed (mph)	31	29	27	28
Posted Speed Limit (mph)	Not Posted	Not Posted	Not Posted	Not Posted

mph = miles per hour.

As can be seen in Table 3, the mean (average) vehicle travel speed along Quannapowitt Parkway north of North Avenue was found to be approximately 27 miles per hour (mph) in the northbound direction and 25 mph in the southbound direction. The measured 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below, was found to be approximately 31 mph in the northbound and 29 mph in the southbound direction. The 85th percentile speed is used as the basis of engineering design and in the evaluation of sight distances and is often used in establishing posted speed limits.

The mean vehicle travel speed along Quannapowitt Parkway south of Lowell Street was found to be approximately 23 mph in the northbound direction and 24 mph in the southbound direction. The measured 85th percentile vehicle travel speed was found to be approximately 27 mph in the northbound and 28 mph in the southbound direction.

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2028, which reflects a seven-year planning horizon consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. Independent of the Project, traffic volumes on the roadway network in the year 2028 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon this 2028 No-Build traffic network reflect the 2028 Build conditions with the Project.

FUTURE TRAFFIC GROWTH

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

An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This procedure produces a more realistic estimate of growth for local traffic. However, 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, the salient components of which are described below.

GENERAL BACKGROUND TRAFFIC GROWTH

Traffic-volume data compiled by MassDOT from permanent count station located along I-95 was reviewed. This data provides the most recent data and indicates a growth rate of 0.91 percent over the past several years. In order to provide a prudent planning condition for the Project, a slightly higher 1.0 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

SPECIFIC DEVELOPMENT BY OTHERS

The Town of Wakefield was contacted in order to determine if there were any projects planned within the study area that would have a significant impact on future traffic volumes along Quannapowitt parkway and within the Project study area. Based on this discussion, no developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general background traffic growth rate (discussion follows).

ROADWAY IMPROVEMENT PROJECTS

The Town of Wakefield was contacted in order to determine if there were any planned roadway improvement projects expected to be completed within the study area. Based on these discussions, no improvements are planned beyond routine maintenance activities.

NO-BUILD TRAFFIC VOLUMES

The 2028 No-Build peak-hour traffic-volume networks were developed by applying the 1.0 percent per year compounded annual background traffic growth rate and addition of the traffic volumes associated with the full occupancy of the 28,782 sf data center and 195,285 sf office space to the 2021 baseline condition peak-hour traffic volumes. The resulting 2028 No-Build weekday morning and weekday evening peak-hour traffic-volume networks are shown on Figures 5 and 6.

PROJECT-GENERATED TRAFFIC

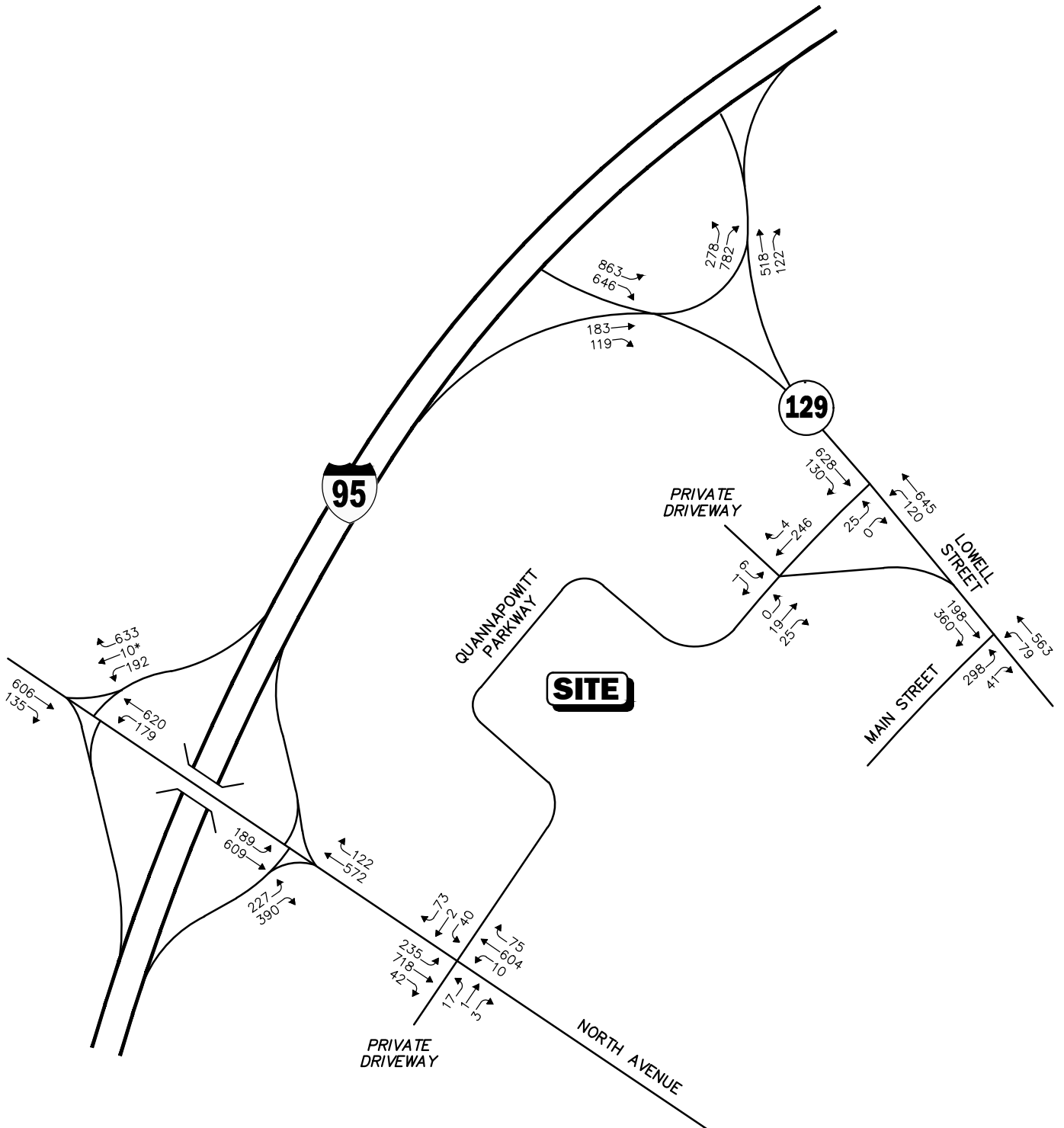
As proposed, the Project will entail the construction of a mixed-use development that will contain 485 multifamily residential units, and a 1,100± sf restaurant. In order to develop the traffic characteristics of the Project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)⁵ for similar land uses as those proposed were used. ITE Land Use Codes (LUCs) 221, *Multifamily Housing (Mid-Rise)*; and 932, *High Turn-Over (Sit-Down) Restaurant*; were used to establish the base traffic characteristics of the Project.

Transit Use

Given the availability of public transportation services to the Project site (MBTA fixed-route bus service along North Avenue and Lowell Street, and commuter rail service) and the interconnected network of sidewalks, it is expected that a portion of the residents of the Project will use public transportation services, thereby reducing the volume of traffic that may be associated with the Project. In order to determine the proportion of residents of the Project that may use public transportation as their primary mode of transportation, travel mode data obtained from the 2014-2018 American Community Survey (ACS) for the Town of Wakefield was reviewed. Based on a review of this data, the following commuting modes were identified for workers age 16 or older that reside within the Town:

- Single-occupant vehicle: 78.3 percent
- Car/vanpool/taxi: 5.7 percent
- Public transportation: 8.1 percent

⁵Ibid 1.



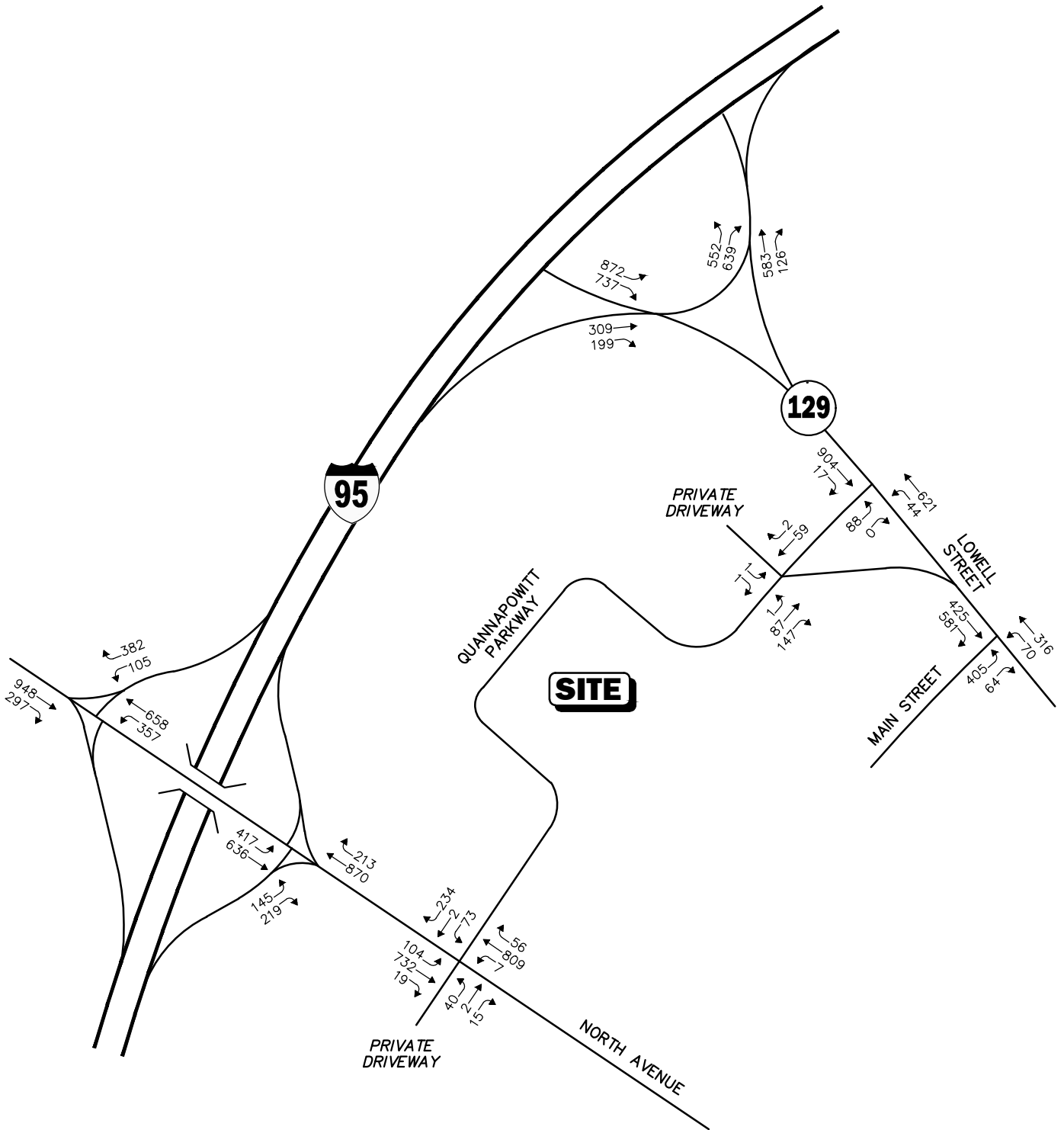
Note: * Illegal movements
 Not To Scale



Figure 5

**2028 No-Build
 Weekday Morning
 (8:00 - 9:00 AM)
 Peak Hour Traffic Volumes**

R:\8542\2021\8542NNT1.dwg, 2/24/2021 5:36:05 PM



Not To Scale



Figure 6

2028 No-Build
 Weekday Evening
 (4:45 - 5:45 PM)
 Peak Hour Traffic Volumes

- Walk: 2.2 percent
- Bicycle/other means: 1.7 percent
- Worked at home: 3.9 percent

According to the ACS, approximately 22 percent of workers that reside in the Census Tract reported that they used an alternative mode of transportation to single-occupancy vehicles (SOVs) to travel to/from work, with approximately 6.0 percent participating in a car or vanpool, 8.0 percent using public transportation, 4.0 percent walking/bicycling, and approximately 4 percent indicating that they work from home. That being said, in order to provide conservative (high) traffic volumes from which to assess the potential impact of the Project on the transportation infrastructure, a reduction to the ITE base trip-generation calculations was not applied to account for transit use or the use of alternative modes of transportation to SOVs.

A summary of the expected vehicle trip generation for the Project is Summarized in Table 4.

Table 4
TRIP-GENERATION SUMMARY

Time Period/Direction	Proposed Residential/Retail Space		Total Trips
	Restaurant (1,100 sf) ^a	Multifamily Housing (485 Units) ^b	
<i>Average Weekday Daily:</i>			
Entering	62	1,321	1,383
<u>Exiting</u>	<u>62</u>	<u>1,321</u>	<u>1,383</u>
Total	124	2,642	2,766
<i>Weekday Morning Peak Hour:</i>			
Entering	6	45	51
<u>Exiting</u>	<u>5</u>	<u>130</u>	<u>135</u>
Total	11	175	186
<i>Weekday Evening Peak Hour:</i>			
Entering	7	130	137
<u>Exiting</u>	<u>4</u>	<u>83</u>	<u>87</u>
Total	11	213	224

^aBased on ITE LUC 932, *High-Turnover (Sit-Down) Restaurant*.

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

Table 5 and Table 6 compare the traffic characteristics of the Project to those of the existing uses and the 2019 program approved by the Town (general office and R&D space) that operated within the Project site.

Table 5
TRAFFIC-VOLUME COMPARISON - EXISTING AND PROPOSED TRIPS

	Existing Vehicle Trips (A)			Proposed Vehicle Trips (B)	(B-A) Increase/ Decrease
	General Office (195,285 sf) ^a	Data Center (28,782 sf) ^b	Total	Total Trips	
Average Weekday Daily	2,032	28	2,060	2,766	+706
<i>Weekday Morning Peak Hour:</i>					
Entering	181	2	183	51	-132
<u>Exiting</u>	<u>29</u>	<u>1</u>	<u>30</u>	<u>135</u>	<u>+105</u>
Total	210	3	213	186	-27
<i>Weekday Evening Peak Hour:</i>					
Entering	34	1	35	137	+102
<u>Exiting</u>	<u>181</u>	<u>2</u>	<u>183</u>	<u>87</u>	<u>-96</u>
Total	215	3	218	224	+6

^aBased on ITE LUC 710, *General Office Building*, 195,285 sf.

^bBased on ITE LUC 160, *Data Center*, 28,782 sf.

Table 6
TRAFFIC-VOLUME COMPARISON –
2019 APPROVED PROGRAM AND PROPOSED TRIPS

	2019 Approved Program (A)			Proposed Vehicle Trips (B)	(B-A) Increase/ Decrease
	General Office (82,250 sf) ^a	R&D (141,817 sf) ^b	Total	Total Trips	
Average Weekday Daily	878	1,596	2,474	2,766	+292
<i>Weekday Morning Peak Hour:</i>					
Entering	89	144	233	51	-182
<u>Exiting</u>	<u>15</u>	<u>29</u>	<u>44</u>	<u>135</u>	<u>+91</u>
Total	104	173	277	186	-91
<i>Weekday Evening Peak Hour:</i>					
Entering	15	25	40	137	+97
<u>Exiting</u>	<u>80</u>	<u>132</u>	<u>212</u>	<u>87</u>	<u>-125</u>
Total	95	157	252	224	-28

^aBased on ITE LUC 710, *General Office Building*, 82,250 sf.

^bBased on ITE LUC 760, *Research & Development*, 141,817 sf.

Project-Generated Traffic-Volume Summary

As can be seen in Table 4, the Project is expected to generate approximately 2,766 vehicle trips on an average weekday (two-way volume, 24-hour volume), with 186 vehicle trips (51 vehicles entering and 135 exiting) expected during the weekday morning peak hour, and 224 vehicle trips (137 vehicles entering and 87 exiting) expected during the weekday evening peak hour.

In comparison to the existing 28,782 sf data center and 195,285 sf office space at the Project site, it can be seen in Table 5 that the proposed Project is expected to generate 706 *additional* new vehicle trips on an average weekday, with 27 *fewer* vehicle trips expected during the weekday morning peak hour, and 6 *additional* vehicle trips expected during the weekday evening peak hour.

In comparison to the 2019 approved program for 82,250 sf office space and 141,817 sf R&D space at the Project site, it can be seen in Table 6 that the proposed Project is expected to generate 292 *additional* new vehicle trips on an average weekday, with 91 *fewer* vehicle trips expected during the weekday morning peak hour, and 28 *fewer* vehicle trips expected during the weekday evening peak hour.

TRAFFIC COMPARISON BETWEEN RESIDENTIAL AND OFFICE USE

Residential and office building developments generate different traffic characteristics, traffic volume and trip patterns. Based on ITE data for office and residential developments, office buildings generate a higher magnitude of daily traffic during peak periods than residential developments. The data indicates approximately 10 percent of daily office traffic is generated during the weekday morning peak hour and 12 percent during the weekday evening peak hour. In comparison to an office building, residential developments have lower percent of daily traffic during peak periods (approximately 7 percent during the weekday morning and 10 percent during weekday evening peak hour) and traffic is more distributed throughout the day. This makes the trips associated with the residential developments less noticeable than those of commercial developments.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of generated trips to and from the Project site was determined based on a review of Journey-to-Work data obtained from the U.S. Census for persons residing in the Town of Wakefield and then refined based on existing traffic patterns within the study area during the commuter peak periods. This methodology is consistent with the residential and commercial nature of the Project and commuter traffic patterns during the peak hours. The anticipated distribution is shown in Table 7.

Table 7
TRIP-DISTRIBUTION SUMMARY

Route (To/From)	Trip Distribution
I-95, from West	40%
I-95, from East	25%
North Avenue, north of Quannapowitt Parkway	5%
North Avenue, south of Quannapowitt Parkway	20%
Lowell Street, east of Main Street	5%
Main Street, south of Lowell Street	<u>5%</u>
TOTAL	100%

The general trip distribution for the Project is graphically depicted on Figure 7. The additional traffic expected to be generated by the Project was assigned on the study area roadway network as shown on Figures 8 and 9.

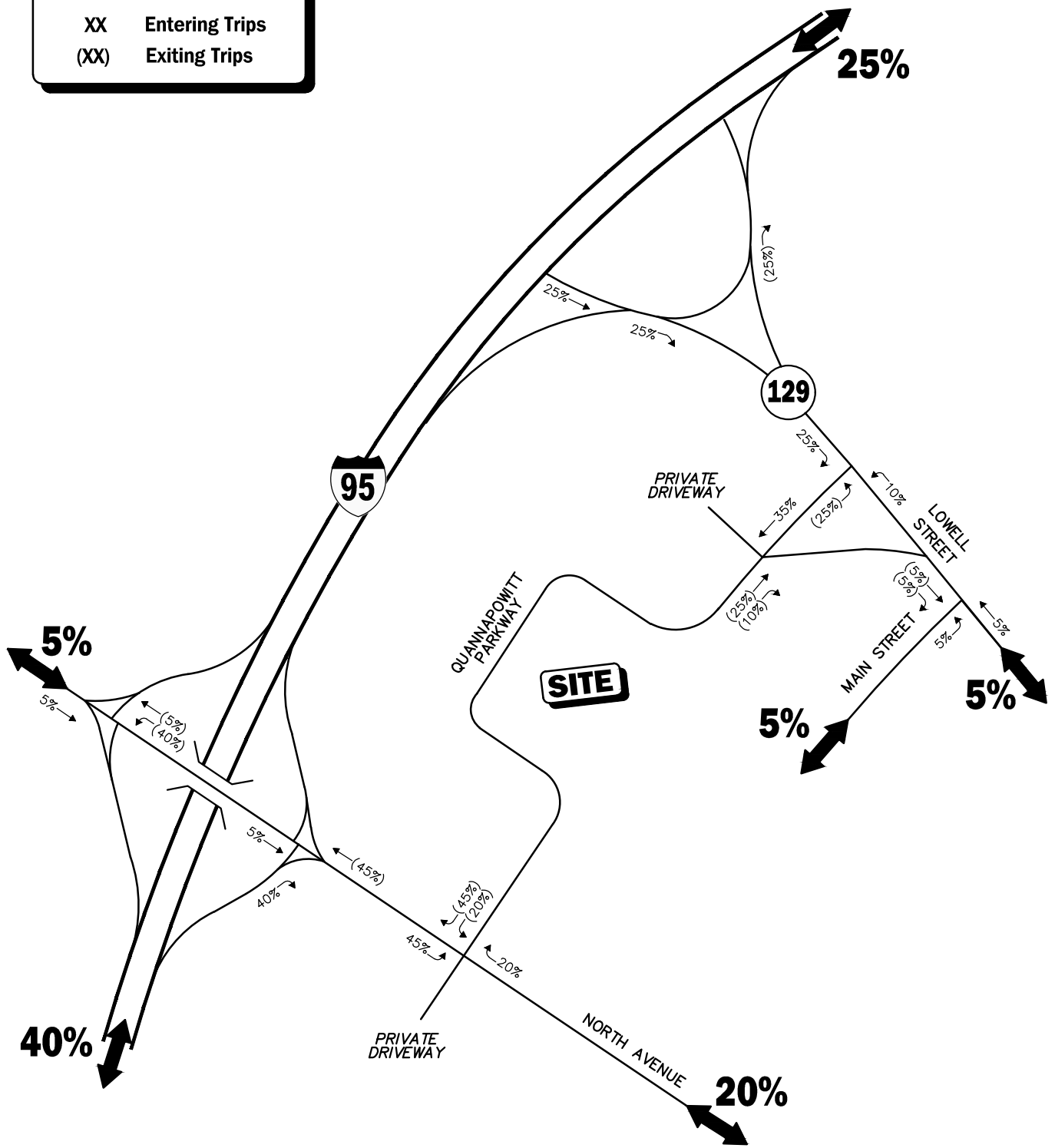
FUTURE TRAFFIC VOLUMES - BUILD CONDITION

The 2028 Build condition traffic volumes were developed by: i) removing the trips generated by the existing buildings (data center and office space) from the 2028 No-Build condition traffic volumes; and ii) adding the traffic expected to be generated by the Project. The 2028 Build weekday morning, and evening peak-hour traffic volumes are graphically depicted on Figures 10 and 11.

A summary of peak-hour projected traffic-volume increases external to the study area that is the subject of this assessment is shown in Table 8. These volumes are based on the expected increases from the Project.

Legend:

- XX Entering Trips
- (XX) Exiting Trips



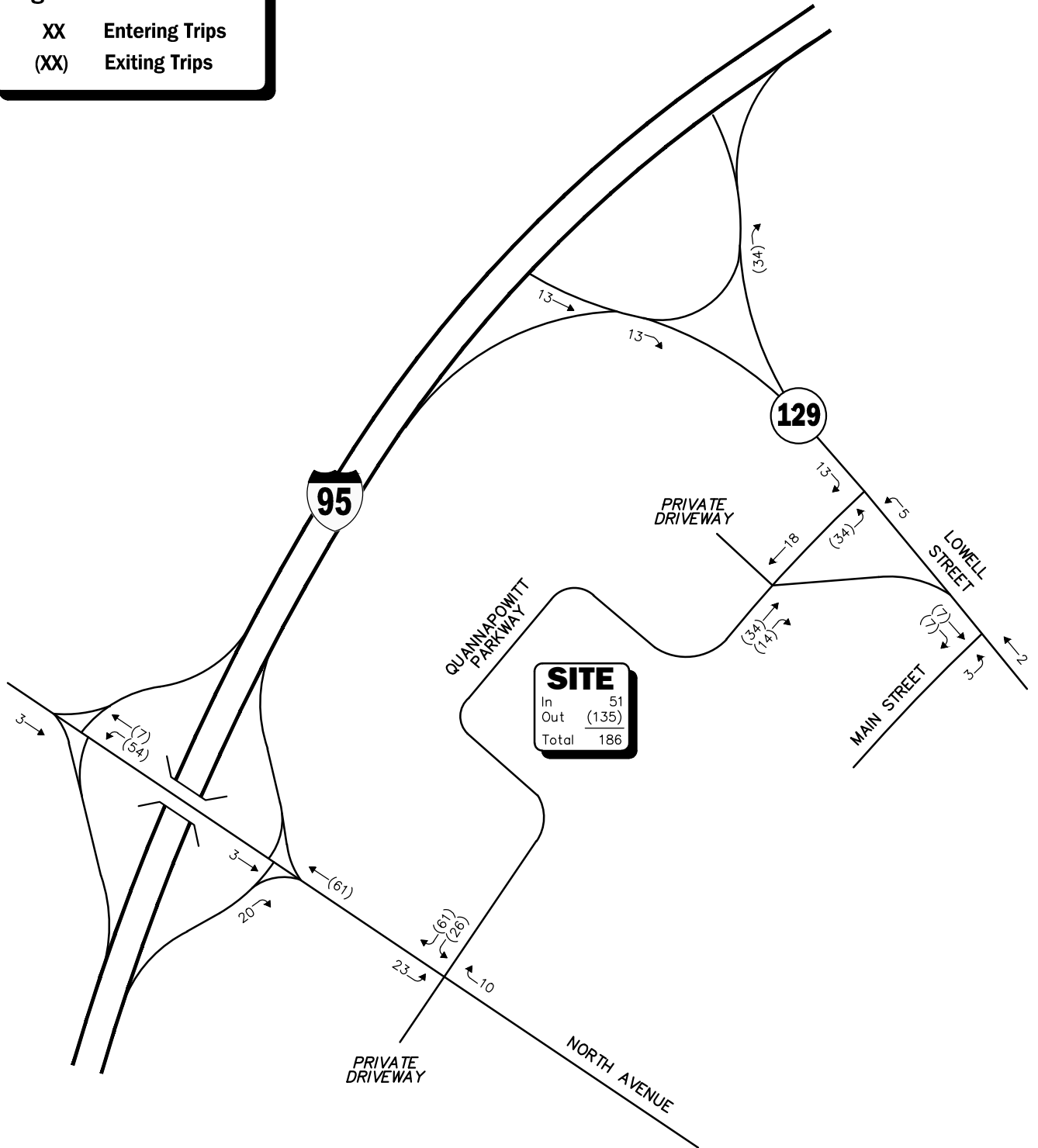
 Not To Scale

Figure 7
Trip Distribution Map



Legend:

- XX Entering Trips
- (XX) Exiting Trips



SITE	
In	51
Out	(135)
Total	186

Not To Scale



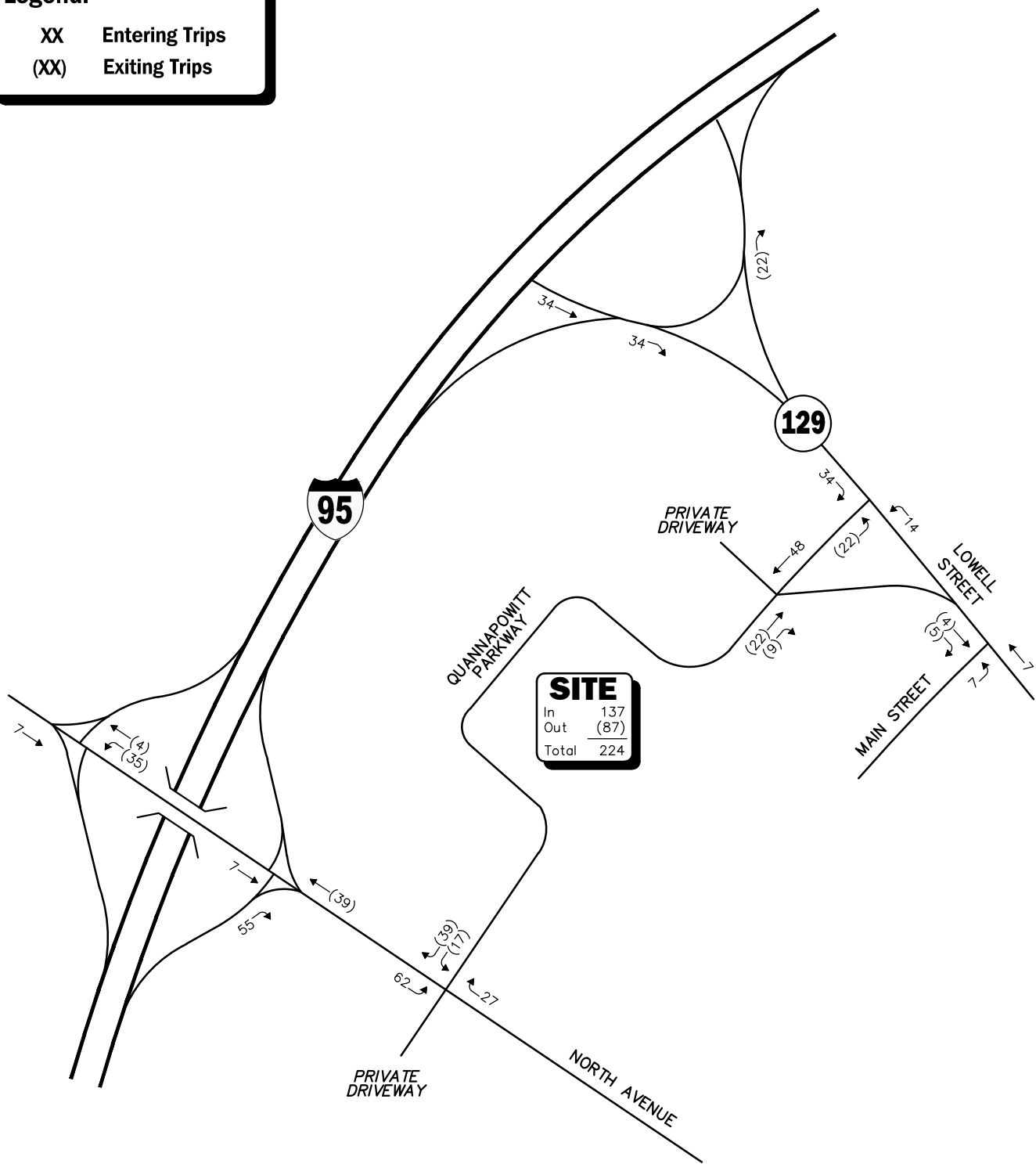
Figure 8

**Project Generated
Weekday Morning
Peak Hour Traffic Volumes**

R:\8542\2021\8542NNT1.dwg, 2/24/2021 5:36:31 PM

Legend:

- XX Entering Trips
- (XX) Exiting Trips

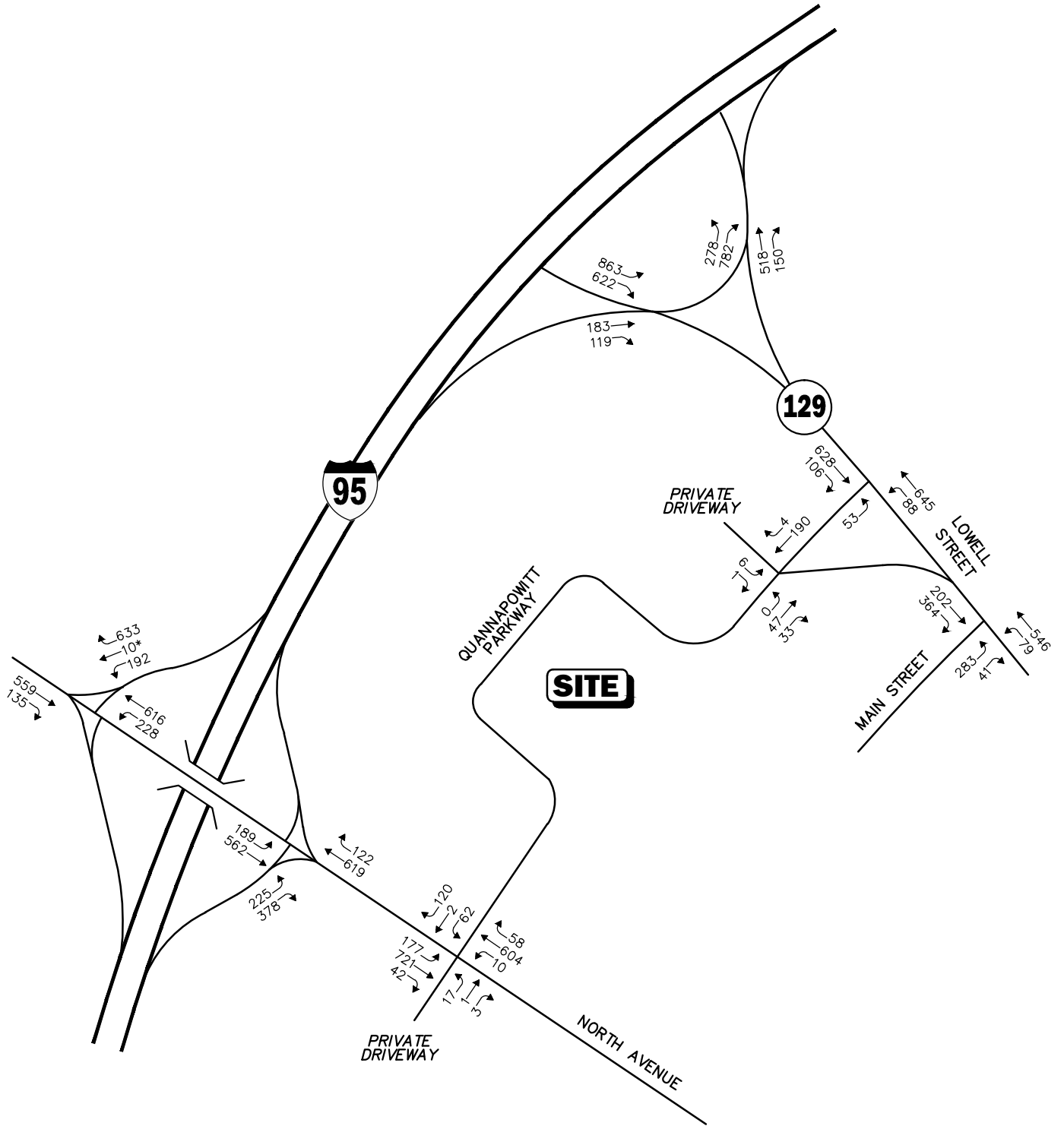


Not To Scale



Figure 9

**Project Generated
Weekday Evening
Peak Hour Traffic Volumes**

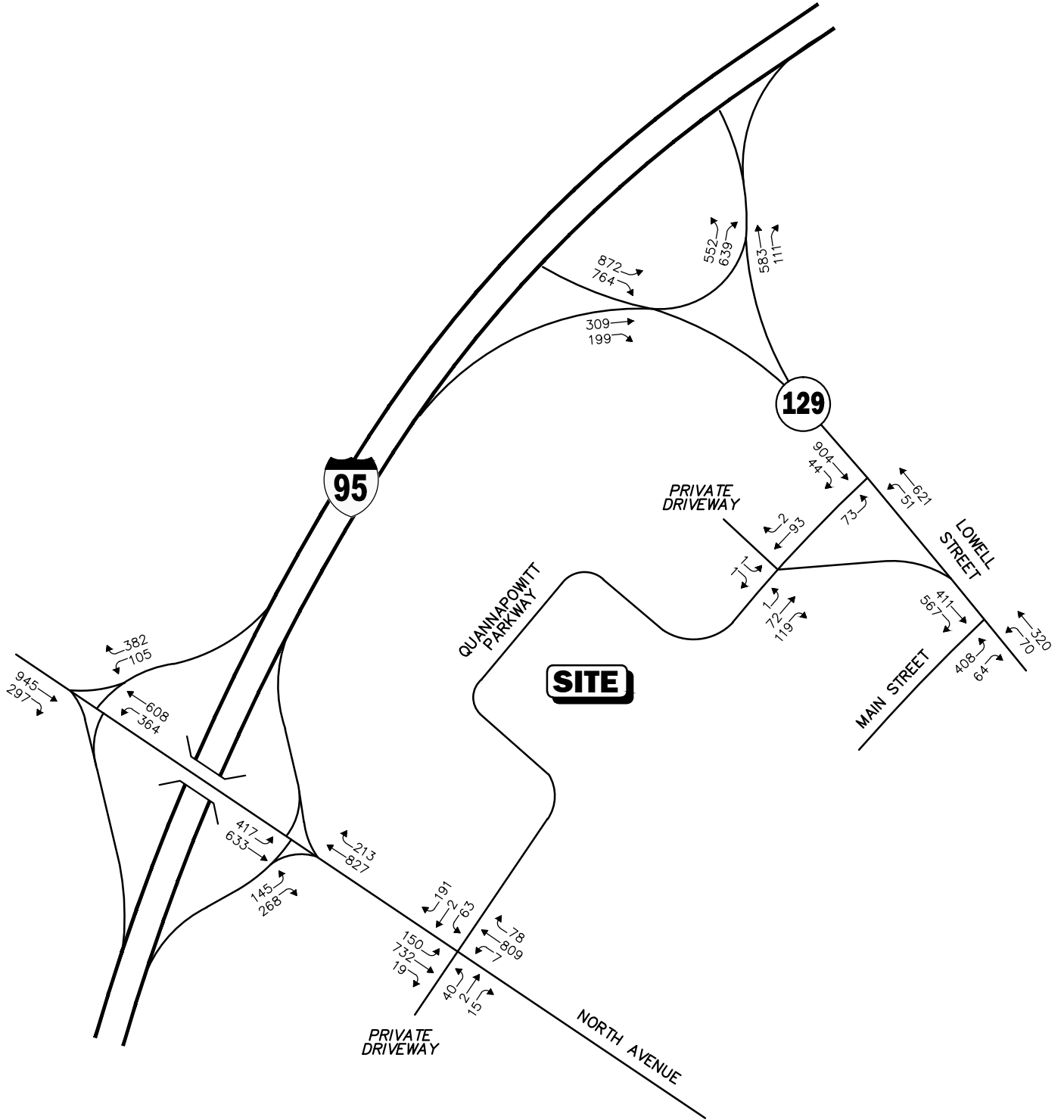


Note: * Illegal movements
Not To Scale

Figure 10



2028 Build
Weekday Morning
(8:00 - 9:00 AM)
Peak Hour Traffic Volumes



Not To Scale

VAI Vanasse & Associates inc

Figure 11

**2028 Build
Weekday Evening
(4:45 - 5:45 PM)
Peak Hour Traffic Volumes**

Table 8
PEAK-HOUR TRAFFIC-VOLUME INCREASES

Intersection/Peak Hour	2028 No-Build	2028 Build	Volume Increase (decrease)	Percent Increase (decrease)
<i>Lowell Street, east of Main Street:</i>				
Weekday Morning	881	868	(13)	(1.5)
Weekday Evening	875	865	(10)	(1.1)
<i>Main Street, south of Lowell Street:</i>				
Weekday Morning	778	767	(11)	(1.4)
Weekday Evening	1,120	1,109	(11)	-(1.0)
<i>Lowell Street, west of Quannapowitt Parkway:</i>				
Weekday Morning	1,428	1,432	4	0.3
Weekday Evening	1,630	1,642	12	0.7
<i>North Avenue, east of Quannapowitt Parkway:</i>				
Weekday Morning	1,450	1,458	8	0.6
Weekday Evening	1,692	1,704	12	0.7
<i>North Avenue, west of I-95 Ramps:</i>				
Weekday Morning	1,994	1,943	(51)	(2.6)
Weekday Evening	2,285	2,232	(53)	(2.3)

As shown in Table 8, Project-related traffic-volume increases within of the study area relative to 2028 No-Build conditions are anticipated to range from -2.6 to 0.7 percent during the peak periods, with vehicle increases shown to range from -53 to 12 vehicles. *When distributed over the peak hour, the predicted traffic-volume increases would not result in a significant impact (increase) on motorist delays or vehicle queuing within of the immediate study area that is the subject of this assessment.*

TRAFFIC OPERATIONS ANALYSIS

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

METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of level-of-service to traffic facilities under various traffic-flow conditions.⁶ The concept of level-of-service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

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

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

⁶The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

Signalized Intersections

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

- *LOS A* describes operations with very low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than *LOS A*.
- *LOS C* describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- *LOS D* describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop, and individual cycle failures are noticeable.
- *LOS E* describes operations with high control delay values. Individual cycle failures is frequent occurrences.
- *LOS F* describes operations with high control delay values that often occur with oversaturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Levels of service for signalized intersections were calculated using the Percentile Delay Method implemented as a part of the Synchro™ 10 software as required by MassDOT. The Percentile Delay Method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on “percentile” delay. Level-of-service designations are based on the criterion of percentile delay per vehicle and is a measure of: i) driver discomfort; ii) motorist frustration; and iii) fuel consumption; and includes a uniform delay based on percentile volumes using a Poisson arrival pattern, an initial queue move-up time, and a queue interaction delay that accounts for delays resulting from queues extending from adjacent intersections. Table 9 summarizes the relationship between level-of-service and percentile delay and uses the same numerical delay thresholds as the 2000 *Highway Capacity Manual*⁷ method. The tabulated percentile delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to entire intersections.

⁷*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2000.

**Table 9
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS**

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

Unsignalized Intersections

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

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The levels of service of unsignalized intersections are determined by application of a procedure described in the 2010 *Highway Capacity Manual*.⁸ Level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the HCM. Table 10 summarizes the relationship between level of service and average control delay for two-way stop controlled and all-way stop controlled intersections.

⁸*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

Table 10
LEVEL-OF-SERVICE CRITERIA FOR
UNSIGNALIZED INTERSECTIONS^a

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

^aSource: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010; page 19-2.

Weave Analysis

The analysis of weaving operations within rotary section of the study area is based on procedure presented in the *Highway Capacity Manual* for weaving in freeway facility. A weaving movement is defined as the interaction between the crossing of two or more traffic streams traveling in the same direction without the aid of traffic control devices. The measure of effectiveness to determine the level of service is based on many parameters, including density and the speed of both the weaving and no-weaving vehicles. Table 11 summarizes the relationship between level of service based on ranges of density.

Table 11
LEVEL-OF-SERVICE CRITERIA FOR WEAVE SEGMENT

Level of Service	Freeway Facility Density (pc/mi/ln)
A	<11.0
B	11.0 to 18.0
C	18.0 to 26.0
D	26.0 to 35.0
E	35.0 to 45.0
F	>45.0

ANALYSIS RESULTS

Level-of-service and vehicle queue analyses were conducted for 2021 Existing, 2028 No-Build, and 2028 Build conditions for the intersections within the study area. The results of the intersection capacity and vehicle queue analyses are summarized in Table 12 and Table 13 with the detailed analysis results presented in the Appendix. The following is a summary of the level-of-service and delay analyses for the intersections within the study area.

Signalized Intersection Analysis Results

Project-related impacts at the signalized study area intersections are shown on Table 12 and are defined as follows:

Quannapowitt Parkway at North Avenue and Private Driveway. Under all conditions, all the movements at this signalized intersection were shown to operate at LOS B or better during the weekday morning and evening peak hours with reduction in average control delay as a result of changes in the Project component in the future conditions.

North Avenue and I-95 Southbound Off-Ramp. Under all conditions, the overall operations at this signalized intersection were shown to operate at LOS A during the weekday morning and evening peak hours with negligible vehicle queuing expected over No-Build conditions.

North Avenue and I-95 Northbound Off-Ramp. Under 2021 Existing conditions, the intersection was shown to operate at LOS A during peak hours. Under 2028 No-Build, the overall levels of service were shown to operate at LOS A during weekday morning peak hour and LOS B during weekday evening peak hour as result of traffic volume increases independent of the Project. No changes over No-Build condition were predicted for any movements with reduction in average control delay as a result of changes in the Project component in the future conditions.

Unsignalized Intersection Analysis Results

Project-related impacts at the unsignalized study area intersections are shown in Table 13 and are defined as follows:

Quannapowitt Parkway at Private Driveway. All movements at this intersection were shown to operate at LOS B or better under all analysis conditions, with no change in level of service or vehicle queuing for any movement predicted to occur as a result of the Project.

Quannapowitt Parkway at Lowell Street. Under Existing conditions, the critical movements (left-turn/right-turn movements from Quannapowitt parkway) are predicted to operate at LOS E during the weekday morning peak hour and at LOS F during weekday evening peak hour. Under No-Build conditions, the critical movements are predicted to degrade to LOS F during the weekday morning peak hour and continue to operate at LOS F during weekday evening peak hour. Under Build conditions, the critical movements were shown to continue operate at LOS F during the weekday morning and evening peak hours.

Main Street at Lowell Street. Under all conditions, the critical movements (left-turn movements from Main Street) were shown to operate at LOS F. The vehicle queuing was shown to decrease or remain unchanged over No-Build conditions as a result of traffic-volume removal associated with the occupancy of the exiting uses.

Table 12
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Signalized Intersection/ Peak Hour/Critical Movement	2021 Existing				2028 No-Build				2028 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d Ave/95 th	V/C ^a	Delay	LOS	Queue Ave/95 th	V/C	Delay	LOS	Queue Ave/95 th
<i>Quannapowitt Parkway at North Avenue and Private Driveway</i>												
<i>Weekday Morning:</i>												
North Avenue EB LT/TH/RT	0.71	10.3	B	4/4	0.81	12.7	B	4/5	0.75	10.6	B	4/5
North Avenue WB LT/TH/RT	0.47	12.4	B	4/5	0.42	9.8	A	4/5	0.47	11.6	B	4/5
Private Driveway NB LT/TH	0.06	20.8	C	0/1	0.08	28.6	C	0/1	0.07	26.7	C	0/1
Private Driveway NB RT	0.01	0.0	A	0/0	0.01	0.0	A	0/0	0.01	0.0	A	0/0
Quannapowitt Parkway SB LT/TH	0.14	21.1	C	0/1	0.22	30.2	C	1/2	0.32	29.6	C	1/3
Quannapowitt Parkway SB RT	0.12	4.6	A	0/0	0.19	5.7	A	0/1	0.28	6.7	A	0/1
Overall	--	11.2	B	--	--	11.9	B	--	--	11.6	B	--
<i>Weekday Evening:</i>												
North Avenue EB LT/TH/RT	0.50	7.30	A	3/4	0.60	8.9	A	4/5	0.70	10.6	B	4/5
North Avenue WB LT/TH/RT	0.65	16.0	B	5/7	0.69	18.5	B	7/10	0.67	17.1	B	7/9
Private Driveway NB LT/TH	0.16	21.0	C	1/2	0.15	23.6	C	1/2	0.15	24.8	C	1/2
Private Driveway NB RT	0.04	0.1	A	0/0	0.04	0.1	A	0/0	0.04	0.1	A	0/0
Quannapowitt Parkway SB LT/TH	0.20	21.6	C	1/2	0.33	26.1	C	2/3	0.28	26.6	C	1/3
Quannapowitt Parkway SB RT	0.30	9.20	A	1/2	0.50	14.8	B	3/4	0.42	14.7	B	2/4
Overall	--	12.1	B	--	--	14.8	B	--	--	14.7	B	--
<i>North Avenue and I-95 SB Off-Ramp</i>												
<i>Weekday Morning:</i>												
North Avenue EB TH	0.24	5.3	A	1/3	0.27	5.2	A	2/3	0.29	5.5	A	1/3
North Avenue EB RT	0.08	0.1	A	0/0	0.08	0.1	A	0/0	0.08	0.1	A	0/0
North Avenue WB TH/LT	0.49	7.3	A	2/4	0.53	7.6	A	2/5	0.7	9.8	A	3/6
I-95 SB Off-ramp SB LT	0.38	16.6	B	2/4	0.44	20.3	C	2/5	0.50	23.3	C	2/6
I-95 SB Off-ramp SB RT	0.39	0.6	A	0/0	0.42	0.7	A	0/0	0.42	0.7	A	0/0
Overall	--	5.3	A	--	--	5.8	A	--	--	6.9	A	--
<i>Weekday Evening:</i>												
North Avenue EB TH	0.35	4.4	A	2/4	0.37	4.4	A	3/5	0.37	4.5	A	3/5
North Avenue EB RT	0.16	0.2	A	0/0	0.17	0.2	A	0/0	0.17	0.2	A	0/0
North Avenue WB TH/LT	0.86	8.5	A	3/7	1.06	12.0	B	5/12	1.09	11.2	B	5/10
I-95 SB Off-ramp SB LT	0.23	22.8	C	1/3	0.26	25.3	C	2/3	0.26	24.5	C	2/3
I-95 SB Off-ramp SB RT	0.22	0.3	A	0/0	0.24	0.3	A	0/0	0.24	0.3	A	0/0
Overall	--	5.6	A	--	--	7.0	A	--	--	5.6	A	--

See notes at end of table.

Table 12 (Continued)
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Signalized Intersection/ Peak Hour/Critical Movement	2021 Existing				2028 No-Build				2028 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d Ave/95 th	V/C ^a	Delay	LOS	Queue Ave/95 th	V/C	Delay	LOS	Queue Ave/95 th
North Avenue and I-95 NB Off-Ramp												
<i>Weekday Morning:</i>												
North Avenue EB TH/LT	0.58	8.5	A	2/4	0.64	9.5	A	3/5	0.63	9.2	A	3/5
North Avenue WB TH	0.30	5.8	A	1/3	0.31	5.8	A	2/3	0.33	5.8	A	2/3
North Avenue WB RT	0.07	0.1	A	0/0	0.07	0.1	A	0/0	0.07	0.1	A	0/0
I-95 NB Off-ramp NB LT	0.28	15.7	B	1/2	0.31	19.4	B	1/3	0.31	18.8	B	1/3
I-95 SB Off-ramp NB RT	0.53	6.6	A	0/2	0.67	13.9	B	1/6	0.63	11.0	B	1/5
Overall	--	7.8	A	--	--	9.9	A	--	--	9.1	A	--
<i>Weekday Evening:</i>												
North Avenue EB TH/LT												
North Avenue WB TH	1.08	13.1	B	4/8	1.38	19.3	B	5/11	1.30	18.2	B	5/11
North Avenue WB RT	0.37	4.5	A	2/3	0.43	5.0	A	3/4	0.41	4.8	A	2/4
I-95 NB Off-ramp NB LT	0.13	0.1	A	0/0	0.13	0.2	A	0/0	0.13	0.2	A	0/0
I-95 SB Off-ramp NB RT	0.22	22.6	C	1/2	0.25	23.6	C	1/2	0.24	23.5	C	1/2
Overall	0.41	7.0	A	0/2	0.44	7.1	A	0/2	0.49	7.1	A	0/2
	--	8.9	A	--	--	11.5	B	--	--	11.0	B	--

^aVolume-to-capacity ratio

^bDelay in seconds per vehicle.

^cLevel of service.

^dQueue length, in vehicle.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Table 13
UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Unsignalized Intersection/ Peak Hour/Critical Movement	2021 Existing				2028 No-Build				2028 Build			
	Demand ^a	Delay ^b	LOS ^c	Queue ^d 95 th	Demand	Delay	LOS	Queue 95 th	Demand	Delay	LOS	Queue 95 th
<i>Quannapowitt Parkway at Private Driveway</i>												
<i>Weekday Morning:</i>												
Private Driveway EB LT/TH/RT	7	9.7	A	0	7	10.4	B	0	7	10.3	B	0
Quannapowitt Parkway NB LT/TH	12	0.0	A	0	19	0.0	A	0	47	0.0	A	0
Quannapowitt Parkway SB LT/TH/RT	164	0.0	A	0	250	0.0	A	0	194	0.0	A	0
<i>Weekday Evening:</i>												
Private Driveway EB LT/TH/RT	2	9.0	A	0	2	9.4	A	0	2	9.5	A	0
Quannapowitt Parkway NB LT/TH	48	0.0	A	0	87	0.0	A	0	72	0.0	A	0
Quannapowitt Parkway SB LT/TH/RT	46	0.0	A	0	61	0.0	A	0	95	0.0	A	0
<i>Quannapowitt Parkway at Lowell Street:</i>												
<i>Weekday Morning:</i>												
Lowell Street WB LT	77	9.3	A	0	120	10.0	A	0	88	9.7	A	0
Quannapowitt Parkway NB LT/RT	18	35.9	E	1	25	>50.0	F	2	53	>50.0	F	3
<i>Weekday Evening:</i>												
Lowell Street WB LT	34	10.1	B	0	44	10.5	B	0	51	10.7	B	0
Quannapowitt Parkway NB LT/RT	48	>50.0	F	3	88	>50.0	F	8	73	>50.0	F	6
<i>Main Street at Lowell Street:</i>												
<i>Weekday Morning:</i>												
Lowell Street WB LT	73	7.8	A	0	79	7.9	A	0	79	9.7	A	0
Main Street NB LT	261	>50.0	F	24	298	>50.0	F	33	283	>50.0	F	30
<i>Weekday Evening:</i>												
Lowell Street WB LT	64	8.3	A	0	70	8.5	A	0	70	8.5	B	1
Main Street NB LT	371	>50.0	F	37	405	>50.0	F	46	408	>50.0	F	46

^aDemand in vehicles per hour.

^bAverage control delay per vehicle (in seconds).

^cLevel of service.

^dQueue length in vehicles.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Weave Segment Analysis Results

A weave capacity analysis was conducted for the weaving segments within the Route 129 rotary, I-95 ramps, and Lowell Street. A summary of the weave capacity analysis is presented in Table 14.

Table 14
WEAVE CAPACITY ANALYSIS SUMMARY

Unsignalized Intersection/Peak Hour	2021 Existing			2028 No-Build			2028 Build		
	V/C ^a	Density ^b	LOS ^c	V/C	Density	LOS	V/C	Density	LOS
<i>Rotary at Lowell Street and I-95 NB On-Ramp:</i>									
Weekday Morning	0.63	28.2	D	0.67	30.9	D	0.68	31.4	D
Weekday Evening	0.59	28.2	D	0.68	33.5	D	0.67	33.3	D
<i>Rotary at I-95 NB Off-Ramp and Lowell Street:</i>									
Weekday Morning	0.53	25.8	C	0.58	32.3	D	0.57	28.4	D
Weekday Evening	0.67	34.2	D	0.72	37.5	E	0.73	38.4	E

^aVolume to capacity.

^bPassenger cars per mile per lane.

^cLevel of service.

As shown in Table 14, with exception of movements between Lowell Street and the I-95 northbound on-ramp during a weekday evening, the weave segments along the rotary between the I-95 northbound off-ramp and the I-95 northbound on-ramp are expected to operate at LOS D or better during peak hours. Based upon field observations, the weaving areas were noted to maintain acceptable levels during peak hours.

RECOMMENDATIONS AND CONCLUSIONS

VAI has prepared this TIA in order to evaluate potential traffic impacts associated with the Proposed mixed-use development to be located at 200 Quannapowitt Parkway in Wakefield, Massachusetts. This study was prepared in accordance with the MassDOT Guidelines for *Transportation Impact Assessment (TIA) Guidelines*; and was conducted pursuant to the standards of the Traffic Engineering and Transportation Planning Professions for the preparation of such reports. Based on the results of this study, the following can be concluded:

- Based on trip-generation statistics published by ITE, in comparison to the existing data center and office space, the proposed Project is expected to generate 706 additional new vehicle trips on an average weekday, with 27 fewer vehicle trips expected during the weekday morning peak hour, and 6 additional new vehicle trips expected during the weekday evening peak hour.
- The traffic-volume changes from a 195,285 sf office space and 28,782 sf data center to a 485-unit multifamily residential building and an 1,100 sf restaurant building would not result in a significant impact (increase) on motorist delays or vehicle queuing within of the immediate study area that is the subject of this assessment.
- The Project represents a decrease in peak-hour vehicle trips from the most recent office/R&D program approved by the Town in 2019.
- The Project will not have a significant impact (increase) on motorist delays or vehicle queuing over Existing or anticipated future conditions without the Project (No-Build conditions).

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

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any conditions identified at off-site locations evaluated in conjunction with this study. The elements of the improvement program include Pro-

ject access, transportation system improvements, pedestrian improvements and a TDM program. These elements provide a comprehensive mitigation program, which not only provides transportation system improvements, but also promotes alternative healthy modes of transportation. The following improvements have been recommended as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

Project Access

Access to the Project site is provided by way of existing roadway that serves 200 Quannapowitt Parkway property. The following recommendations are offered with respect to Project access, internal circulation, and parking, many of which are already reflected on the Site Plans for the Project:

- The Project site driveways and internal circulating drives will be a minimum of 24 feet in width where two-way traffic is to be conveyed, and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle as defined by the Wakefield Fire Department;
- Vehicles exiting the Project site will be placed under STOP-sign control with a marked STOP-line provided;
- All signs and pavement markings to be installed within the Project site will conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD);⁹
- Americans with Disabilities Act (ADA)-compliant wheelchair ramps should be provided at all pedestrian crossings internal to the Project site and for crossing the Project site driveways;
- Signs and landscaping to be installed as a part of the Project within intersection sight triangle areas of the Project site driveways will be designed and maintained so as not to restrict lines of sight; and
- Snow windows within the sight triangle areas of the Project site driveways and at intersections within the Project site will be promptly removed where such accumulations would impede sight lines;

QUANNAPOWITT PARKWAY IMPROVEMENTS

The following are recommended in order to upgrade and improve Quannapowitt Parkway conditions in the vicinity of the Project site.

- The existing roadway within the Project will receive a full depth reconstruction to upgrade the poor pavement conditions;
- Addition of vertical granite curb and new drainage, and replacement of the streetlights;
- Restripe the crosswalks on Quannapowitt Parkway at site driveways; and

⁹Ibid 3.

- Restripe double-yellow centerline along Quannapowitt Parkway in the vicinity of the Project site.

Quannapowitt Parkway at Lowell Street

In order to improve safety conditions along Quannapowitt Parkway at its intersection with the adjacent parking lot at Lowell Street, the following is recommended to be offered by the Applicant: i) restripe double-yellow centerline along Quannapowitt Parkway ii) provide a crosswalk with pedestrian crossing signs for crossing Quannapowitt Parkway at the adjacent parking lot, iii) provide a STOP-sign control with a marked STOP-line for left-turn/right-turn movements from Quannapowitt Parkway to Lowell Street.

North Avenue at Wolcott Street and Linda Road

This signalized location with a pedestrian crosswalk is currently in need of an upgraded traffic signal. The Project proponent, in coordination with Town officials, is willing to offer a fair share contribution towards the future traffic signal upgrade.

TRANSPORTATION DEMAND MANAGEMENT (TDM) PLAN

As is the case with many developments, a major focus of the traffic mitigation plan focuses on the reduction of single-occupant vehicles arriving and departing to and from the site. This is predominantly accomplished by developing a comprehensive TDM strategy. In an effort to encourage the use of alternative modes of transportation to single-occupant vehicles, the following TDM measures will be implemented as a part of the Project:

- A transportation coordinator will be designated for the Project to coordinate the elements of the TDM program;
- Information regarding public transportation services, maps, schedules and fare information will be posted in a central location and/or otherwise made available to residents and employees;
- A “welcome packet” will be provided to residents and employees detailing available public transportation services, bicycle and walking alternatives, and available commuter options;
- Pedestrian accommodations will be incorporated into the Project and consist of sidewalks and ADA-compliant wheelchair ramps at all pedestrian crossings internal to the Project site that will link building entrances to the sidewalk infrastructure along Quannapowitt Parkway;
- Secure bicycle parking will be provided within the Project site consisting of both exterior and interior (covered) bicycle parking;
- Work-at-home workspaces will be provided to support telecommuting by residents of the Project; and
- Consideration should be given to installing accommodations for the charging of electric vehicles by residents of the Project.

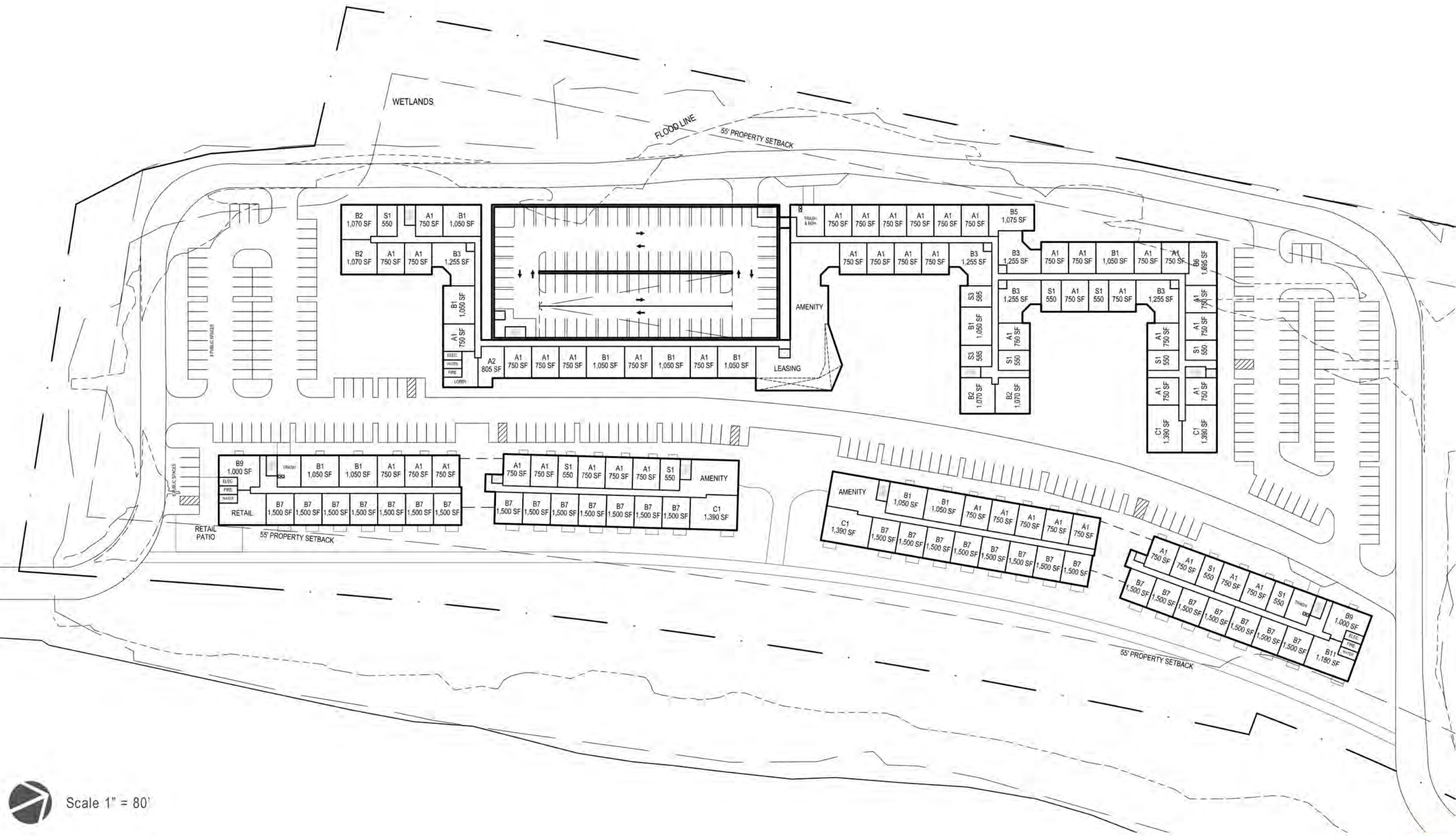
CONCLUSIONS


The proposed Project will not have a significant impact on overall operations. With the implementation of the above recommendations, safe and efficient access will be provided to the planned development and the proposed development can be constructed with minimal impact to the area as designed.

APPENDIX

PROJECT SITE PLAN
AUTOMATIC TRAFFIC RECORDER COUNT DATA
MANUAL TURNING MOVEMENT COUNT DATA AND ADJUSTMENTS
SEASONAL ADJUSTMENT DATA
PUBLIC TRANSPORTATION SCHEDULES
CRASH DATA
MASSDOT CRASH RATE WORKSHEETS
GENERAL BACKGROUND TRAFFIC GROWTH
TRAFFIC REMOVAL NETWORKS
TRIP-GENERATION CALCULATIONS
TRIP-DISTRIBUTION CALCULATIONS
CAPACITY ANALYSIS WORKSHEETS

PROJECT SITE PLAN



 Scale 1" = 80'

200 Quannapowitt Parkway
 Wakefield, MA
 27 January 2021

Ground Floor Plan



AUTOMATIC TRAFFIC RECORDER COUNT DATA

Accurate Counts

978-664-2565

Location : Quannapowitt Parkway
 Location : North of North Avenue
 City/State: Wakefield, MA

7977VOL1

Start Time	7/27/2018 Fri	SB		Hour Totals		NB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		7	31			3	21				
12:15		1	25			0	16				
12:30		0	32			2	30				
12:45		0	21	8	109	1	26	6	93	14	202
01:00		1	14			1	29				
01:15		0	26			1	39				
01:30		0	11			0	20				
01:45		0	13	1	64	0	21	2	109	3	173
02:00		0	15			0	15				
02:15		1	18			0	21				
02:30		0	10			0	20				
02:45		0	16	1	59	0	19	0	75	1	134
03:00		0	13			0	16				
03:15		0	14			1	19				
03:30		0	21			0	33				
03:45		0	18	0	66	0	18	1	86	1	152
04:00		0	40			0	32				
04:15		1	30			1	27				
04:30		0	38			0	26				
04:45		0	33	1	141	2	37	3	122	4	263
05:00		1	53			1	31				
05:15		1	31			2	33				
05:30		2	34			2	28				
05:45		0	29	4	147	2	31	7	123	11	270
06:00		1	22			2	24				
06:15		4	16			1	24				
06:30		3	10			5	17				
06:45		8	13	16	61	17	16	25	81	41	142
07:00		7	14			10	7				
07:15		12	9			16	9				
07:30		10	10			23	5				
07:45		16	10	45	43	24	8	73	29	118	72
08:00		14	7			25	7				
08:15		15	7			33	8				
08:30		20	7			47	9				
08:45		25	10	74	31	37	11	142	35	216	66
09:00		13	7			34	6				
09:15		15	3			36	2				
09:30		17	5			38	6				
09:45		12	2	57	17	30	3	138	17	195	34
10:00		19	3			26	3				
10:15		15	6			27	2				
10:30		12	2			20	3				
10:45		15	1	61	12	18	0	91	8	152	20
11:00		17	3			30	2				
11:15		13	4			18	1				
11:30		10	3			17	4				
11:45		22	0	62	10	19	0	84	7	146	17
Total		330	760			572	785			902	1545
Percent		30.3%	69.7%			42.2%	57.8%			36.9%	63.1%

Accurate Counts

Location : Quannapowitt Parkway
 Location : North of North Avenue
 City/State: Wakefield, MA

978-664-2565

7977VOL1

Start Time	7/28/2018 Sat	SB		Hour Totals		NB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		2	11			0	20				
12:15		1	9			1	20				
12:30		0	12			1	19				
12:45		2	14	5	46	3	13	5	72	10	118
01:00		1	9			1	15				
01:15		0	9			0	12				
01:30		0	15			0	9				
01:45		0	9	1	42	0	16	1	52	2	94
02:00		0	6			0	10				
02:15		2	11			0	16				
02:30		0	8			1	16				
02:45		1	15	3	40	0	4	1	46	4	86
03:00		0	8			0	9				
03:15		1	7			0	10				
03:30		0	10			0	19				
03:45		0	7	1	32	1	8	1	46	2	78
04:00		0	7			0	7				
04:15		0	7			0	9				
04:30		0	10			0	9				
04:45		0	5	0	29	0	8	0	33	0	62
05:00		0	5			0	12				
05:15		2	9			1	7				
05:30		1	2			1	11				
05:45		2	5	5	21	3	7	5	37	10	58
06:00		4	1			1	6				
06:15		1	5			2	5				
06:30		0	7			1	7				
06:45		4	11	9	24	3	7	7	25	16	49
07:00		3	7			1	8				
07:15		3	2			6	8				
07:30		3	9			1	7				
07:45		1	5	10	23	8	9	16	32	26	55
08:00		6	3			5	12				
08:15		7	4			9	6				
08:30		10	7			9	2				
08:45		2	1	25	15	11	4	34	24	59	39
09:00		5	3			11	7				
09:15		5	4			10	2				
09:30		13	2			15	3				
09:45		7	1	30	10	14	4	50	16	80	26
10:00		6	1			18	2				
10:15		5	3			10	2				
10:30		13	1			27	0				
10:45		10	1	34	6	21	4	76	8	110	14
11:00		19	3			17	3				
11:15		10	1			19	1				
11:30		15	0			23	2				
11:45		11	2	55	6	22	1	81	7	136	13
Total		178	294			277	398			455	692
Percent		37.7%	62.3%			41.0%	59.0%			39.7%	60.3%
Grand Total		508	1054			849	1183			1357	2237
Percent		32.5%	67.5%			41.8%	58.2%			37.8%	62.2%

ADT ADT 1,797 AADT 1,797

Accurate Counts

978-664-2565

Location : Quannapowitt Parkway
 Location : North of North Avenue
 City/State: Wakefield, MA

7977VOL1

Start Time	7/23/2018		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	*	*	*	*	*	*	*	*	8	6	5	5	*	*	6	6
01:00	*	*	*	*	*	*	*	*	1	2	1	1	*	*	1	2
02:00	*	*	*	*	*	*	*	*	1	0	3	1	*	*	2	0
03:00	*	*	*	*	*	*	*	*	0	1	1	1	*	*	0	1
04:00	*	*	*	*	*	*	*	*	1	3	0	0	*	*	0	2
05:00	*	*	*	*	*	*	*	*	4	7	5	5	*	*	4	6
06:00	*	*	*	*	*	*	*	*	16	25	9	7	*	*	12	16
07:00	*	*	*	*	*	*	*	*	45	73	10	16	*	*	28	44
08:00	*	*	*	*	*	*	*	*	74	142	25	34	*	*	50	88
09:00	*	*	*	*	*	*	*	*	57	138	30	50	*	*	44	94
10:00	*	*	*	*	*	*	*	*	61	91	34	76	*	*	48	84
11:00	*	*	*	*	*	*	*	*	62	84	55	81	*	*	58	82
12:00 PM	*	*	*	*	*	*	*	*	109	93	46	72	*	*	78	82
01:00	*	*	*	*	*	*	*	*	64	109	42	52	*	*	53	80
02:00	*	*	*	*	*	*	*	*	59	75	40	46	*	*	50	60
03:00	*	*	*	*	*	*	*	*	66	86	32	46	*	*	49	66
04:00	*	*	*	*	*	*	*	*	141	122	29	33	*	*	85	78
05:00	*	*	*	*	*	*	*	*	147	123	21	37	*	*	84	80
06:00	*	*	*	*	*	*	*	*	61	81	24	25	*	*	42	53
07:00	*	*	*	*	*	*	*	*	43	29	23	32	*	*	33	30
08:00	*	*	*	*	*	*	*	*	31	35	15	24	*	*	23	30
09:00	*	*	*	*	*	*	*	*	17	17	10	16	*	*	14	16
10:00	*	*	*	*	*	*	*	*	12	8	6	8	*	*	9	8
11:00	*	*	*	*	*	*	*	*	10	7	6	7	*	*	8	7
Lane	0	0	0	0	0	0	0	0	1090	1357	472	675	0	0	781	1015
Day	0	0	0	0	0	0	0	0	2447	2447	1147	1147	0	0	1796	1796
AM Peak	-	-	-	-	-	-	-	-	08:00	08:00	11:00	11:00	-	-	11:00	09:00
Vol.	-	-	-	-	-	-	-	-	74	142	55	81	-	-	58	94
PM Peak	-	-	-	-	-	-	-	-	17:00	17:00	12:00	12:00	-	-	16:00	12:00
Vol.	-	-	-	-	-	-	-	-	147	123	46	72	-	-	85	82

Comb. Total	0	0	0	0	2447	1147	0	1796
ADT	ADT 1,797	AADT 1,797						

Accurate Counts

978-664-2565

Location : Quannapowitt Parkway

Location : North of North Avenue

City/State: Wakefield, MA

7797SPD1

SB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
07/27/18	2	0	0	0	0	1	1	2	2	0	0	0	0	0	8
01:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
05:00	0	0	0	0	0	1	2	0	0	0	0	1	0	0	4
06:00	0	0	0	0	0	0	1	2	5	3	4	1	0	0	16
07:00	5	0	0	0	0	1	1	10	12	10	6	0	0	0	45
08:00	9	0	0	1	0	1	3	12	16	16	11	5	0	0	74
09:00	5	0	0	0	0	3	9	17	5	10	4	2	1	1	57
10:00	5	0	0	0	0	3	4	7	17	14	9	2	0	0	61
11:00	5	0	0	1	0	2	7	11	12	16	5	2	1	0	62
12 PM	6	0	0	0	1	0	8	16	44	19	10	4	1	0	109
13:00	5	0	0	0	0	0	1	11	12	17	11	6	0	1	64
14:00	4	0	0	0	0	1	6	13	11	12	6	4	2	0	59
15:00	7	0	0	0	0	1	1	13	19	13	7	2	3	0	66
16:00	7	0	0	1	1	2	10	37	31	33	12	5	2	0	141
17:00	6	0	0	0	1	2	18	34	49	21	12	3	1	0	147
18:00	4	0	0	0	0	1	10	12	19	10	5	0	0	0	61
19:00	1	0	0	0	1	1	4	10	11	8	6	1	0	0	43
20:00	1	0	0	0	0	2	2	9	9	5	3	0	0	0	31
21:00	1	0	0	0	1	1	1	8	3	1	1	0	0	0	17
22:00	1	0	0	0	0	0	1	2	2	4	1	0	1	0	12
23:00	0	0	0	0	0	0	1	1	2	4	1	1	0	0	10
Total	74	0	0	3	5	23	91	227	283	217	114	39	12	2	1090

Daily

15th Percentile : 19 MPH
 50th Percentile : 25 MPH
 85th Percentile : 30 MPH
 95th Percentile : 32 MPH

Mean Speed(Average) : 25 MPH
 10 MPH Pace Speed : 22-31 MPH
 Number in Pace : 765
 Percent in Pace : 70.2%
 Number of Vehicles > 25 MPH : 573
 Percent of Vehicles > 25 MPH : 52.5%

Accurate Counts

978-664-2565

Location : Quannapowitt Parkway
 Location : North of North Avenue
 City/State: Wakefield, MA

7797SPD1

SB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
07/28/18	0	0	0	0	1	0	0	0	3	0	1	0	0	0	5
01:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
02:00	0	0	0	0	0	0	0	0	1	1	1	0	0	0	3
03:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	1	1	1	0	1	1	0	0	5
06:00	0	0	0	0	0	0	0	1	2	4	1	1	0	0	9
07:00	1	0	0	0	1	0	3	2	1	1	1	0	0	0	10
08:00	3	0	0	0	0	1	2	4	6	7	2	0	0	0	25
09:00	1	0	0	0	0	0	0	6	6	13	4	0	0	0	30
10:00	0	0	0	0	1	2	3	5	8	10	3	2	0	0	34
11:00	6	0	0	0	1	2	3	13	17	7	4	2	0	0	55
12 PM	2	0	0	0	0	1	7	6	13	9	6	2	0	0	46
13:00	2	0	0	1	0	0	4	7	9	13	4	1	1	0	42
14:00	0	0	0	0	0	1	2	4	16	11	4	1	1	0	40
15:00	1	0	0	0	0	0	0	8	6	8	7	1	1	0	32
16:00	1	0	0	0	1	0	0	5	12	8	1	1	0	0	29
17:00	1	0	0	0	0	0	4	1	4	5	5	1	0	0	21
18:00	2	0	0	1	0	2	0	6	6	7	0	0	0	0	24
19:00	2	0	0	2	0	2	2	6	3	3	2	1	0	0	23
20:00	1	0	0	0	0	0	0	3	5	4	1	0	0	1	15
21:00	0	0	0	0	0	0	0	3	3	2	1	0	1	0	10
22:00	0	0	0	0	0	0	0	2	3	1	0	0	0	0	6
23:00	1	0	0	0	1	0	0	1	3	0	0	0	0	0	6
Total	24	0	0	4	6	11	32	84	128	114	49	15	4	1	472

Daily

15th Percentile : 20 MPH
 50th Percentile : 25 MPH
 85th Percentile : 29 MPH
 95th Percentile : 32 MPH

Mean Speed(Average) : 25 MPH
 10 MPH Pace Speed : 22-31 MPH
 Number in Pace : 342
 Percent in Pace : 72.5%
 Number of Vehicles > 25 MPH : 268
 Percent of Vehicles > 25 MPH : 56.9%

Grand Total	98	0	0	7	11	34	123	311	411	331	163	54	16	3	1562
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Overall

15th Percentile : 20 MPH
 50th Percentile : 25 MPH
 85th Percentile : 29 MPH
 95th Percentile : 32 MPH

Mean Speed(Average) : 25 MPH
 10 MPH Pace Speed : 22-31 MPH
 Number in Pace : 1107
 Percent in Pace : 70.9%
 Number of Vehicles > 25 MPH : 841
 Percent of Vehicles > 25 MPH : 53.8%

Accurate Counts

978-664-2565

Location : Quannapowitt Parkway
 Location : North of North Avenue
 City/State: Wakefield, MA

7797SPD1

NB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
07/27/18	0	0	0	0	1	1	1	1	1	1	0	0	0	0	6
01:00	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0	1	0	2	0	0	0	3
05:00	0	0	0	0	0	0	0	1	2	1	0	1	1	1	7
06:00	0	0	0	0	0	0	1	2	13	5	2	2	0	0	25
07:00	2	0	0	0	0	1	3	16	25	14	6	3	3	0	73
08:00	4	0	0	2	1	2	7	21	46	27	22	10	0	0	142
09:00	1	0	0	0	0	2	11	17	46	36	21	3	1	0	138
10:00	3	1	0	1	2	2	3	9	28	28	12	2	0	0	91
11:00	4	0	0	0	2	4	9	9	19	22	8	5	0	2	84
12 PM	3	0	0	0	0	2	2	8	22	28	13	11	3	1	93
13:00	1	0	0	0	0	0	1	11	31	36	14	12	3	0	109
14:00	1	1	0	0	0	2	0	7	23	15	14	10	1	1	75
15:00	2	0	0	0	2	2	0	6	20	23	11	9	7	4	86
16:00	6	0	0	1	2	3	3	18	23	22	28	8	7	1	122
17:00	3	0	0	1	3	4	4	17	38	32	12	7	2	0	123
18:00	0	0	0	2	0	3	4	14	14	26	8	7	2	1	81
19:00	2	0	0	0	0	0	2	6	6	7	3	2	1	0	29
20:00	0	0	0	0	0	0	2	11	13	6	3	0	0	0	35
21:00	0	0	0	0	0	0	1	3	4	4	5	0	0	0	17
22:00	0	0	0	0	0	0	1	0	1	4	0	2	0	0	8
23:00	0	0	0	0	0	0	0	0	2	3	2	0	0	0	7
Total	32	2	0	7	13	28	56	178	378	340	187	94	31	11	1357

Daily

- 15th Percentile : 22 MPH
- 50th Percentile : 26 MPH
- 85th Percentile : 31 MPH
- 95th Percentile : 34 MPH

Mean Speed(Average) : 27 MPH

- 10 MPH Pace Speed : 24-33 MPH
- Number in Pace : 964
- Percent in Pace : 71.0%
- Number of Vehicles > 25 MPH : 915
- Percent of Vehicles > 25 MPH : 67.4%

Accurate Counts

978-664-2565

Location : Quannapowitt Parkway
 Location : North of North Avenue
 City/State: Wakefield, MA

7797SPD1

NB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
07/28/18	0	0	0	0	0	1	0	0	0	1	1	1	1	0	5
01:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	2	0	1	1	0	0	1	5
06:00	0	0	0	0	0	1	1	3	0	1	1	0	0	0	7
07:00	0	0	0	0	0	1	0	3	5	3	2	1	1	0	16
08:00	2	0	0	0	0	1	0	8	10	10	2	0	1	0	34
09:00	0	0	0	0	0	1	2	12	17	11	6	1	0	0	50
10:00	2	0	0	0	0	0	7	21	22	15	7	2	0	0	76
11:00	3	0	0	0	0	0	1	14	29	19	10	5	0	0	81
12 PM	0	0	0	1	0	2	2	13	20	25	7	1	1	0	72
13:00	2	0	1	0	0	1	3	4	12	19	7	3	0	0	52
14:00	0	0	0	0	1	0	2	8	13	11	8	2	1	0	46
15:00	1	0	0	0	1	3	1	10	8	10	8	2	1	1	46
16:00	0	0	0	0	0	1	1	2	9	8	5	3	2	2	33
17:00	1	0	0	0	1	0	3	4	8	9	9	1	0	1	37
18:00	0	0	0	0	0	0	1	5	10	6	1	2	0	0	25
19:00	1	0	0	0	1	1	1	4	7	9	5	2	1	0	32
20:00	0	0	0	0	0	1	1	5	6	3	5	2	0	1	24
21:00	0	0	0	0	0	0	1	2	5	5	1	2	0	0	16
22:00	0	0	0	0	0	1	1	3	0	2	0	1	0	0	8
23:00	0	0	0	1	0	0	0	0	0	3	1	0	1	1	7
Total	12	0	1	2	4	15	28	124	182	172	87	31	10	7	675

Daily

15th Percentile : 21 MPH
 50th Percentile : 26 MPH
 85th Percentile : 30 MPH
 95th Percentile : 33 MPH

Mean Speed(Average) : 27 MPH
 10 MPH Pace Speed : 22-31 MPH
 Number in Pace : 507
 Percent in Pace : 75.1%
 Number of Vehicles > 25 MPH : 428
 Percent of Vehicles > 25 MPH : 63.5%

Grand Total	44	2	1	9	17	43	84	302	560	512	274	125	41	18	2032
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Overall

15th Percentile : 22 MPH
 50th Percentile : 26 MPH
 85th Percentile : 31 MPH
 95th Percentile : 34 MPH

Mean Speed(Average) : 27 MPH
 10 MPH Pace Speed : 22-31 MPH
 Number in Pace : 1465
 Percent in Pace : 72.1%
 Number of Vehicles > 25 MPH : 1343
 Percent of Vehicles > 25 MPH : 66.1%

Accurate Counts

978-664-2565

Location : Quannapowitt Parkway
 Location : South of Lowell Street
 City/State: Wakefield, MA

7977VOL2

Start Time	7/27/2018 Fri	NB		Hour Totals		SB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		3	23			1	12				
12:15		1	16			1	7				
12:30		2	23			0	17				
12:45		2	20	8	82	0	6	2	42	10	124
01:00		0	13			0	10				
01:15		0	21			0	17				
01:30		1	16			1	11				
01:45		0	16	1	66	0	11	1	49	2	115
02:00		0	15			0	11				
02:15		0	24			0	10				
02:30		0	13			0	8				
02:45		0	22	0	74	0	12	0	41	0	115
03:00		0	11			0	8				
03:15		1	19			0	10				
03:30		0	33			0	11				
03:45		0	26	1	89	0	10	0	39	1	128
04:00		0	29			0	14				
04:15		1	23			1	10				
04:30		0	27			0	15				
04:45		0	45	1	124	0	7	1	46	2	170
05:00		1	33			0	15				
05:15		0	40			2	10				
05:30		0	35			1	16				
05:45		5	23	6	131	2	6	5	47	11	178
06:00		2	32			4	9				
06:15		1	22			6	6				
06:30		6	20			4	5				
06:45		1	22	10	96	8	9	22	29	32	125
07:00		1	11			11	10				
07:15		5	8			18	3				
07:30		7	10			13	15				
07:45		9	10	22	39	26	9	68	37	90	76
08:00		4	8			18	5				
08:15		10	10			32	3				
08:30		7	10			29	6				
08:45		8	13	29	41	49	5	128	19	157	60
09:00		15	7			20	6				
09:15		9	6			16	5				
09:30		28	5			17	3				
09:45		17	6	69	24	9	4	62	18	131	42
10:00		26	4			13	3				
10:15		24	6			10	6				
10:30		16	5			14	3				
10:45		16	1	82	16	13	1	50	13	132	29
11:00		24	3			14	4				
11:15		22	8			9	3				
11:30		17	4			4	2				
11:45		25	0	88	15	13	0	40	9	128	24
Total		317	797			379	389			696	1186
Percent		28.5%	71.5%			49.3%	50.7%			37.0%	63.0%

Accurate Counts

Location : Quannapowitt Parkway
 Location : South of Lowell Street
 City/State: Wakefield, MA

978-664-2565

7977VOL2

Start Time	7/28/2018		NB		Hour Totals		SB		Hour Totals		Combined Totals	
	Sat	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	
12:00		1	24			0	12					
12:15		3	23			2	7					
12:30		1	26			0	15					
12:45		2	22	7	95	1	14	3	48	10	143	
01:00		1	17			2	11					
01:15		0	13			1	12					
01:30		0	12			0	10					
01:45		0	15	1	57	0	6	3	39	4	96	
02:00		1	16			1	10					
02:15		0	19			1	10					
02:30		1	9			0	8					
02:45		0	15	2	59	1	8	3	36	5	95	
03:00		0	14			0	7					
03:15		0	12			1	9					
03:30		2	20			0	10					
03:45		2	5	4	51	0	5	1	31	5	82	
04:00		0	11			0	5					
04:15		0	8			0	5					
04:30		0	10			0	5					
04:45		0	12	0	41	0	7	0	22	0	63	
05:00		0	14			0	3					
05:15		1	14			2	14					
05:30		0	12			2	7					
05:45		2	10	3	50	4	6	8	30	11	80	
06:00		2	8			3	3					
06:15		2	10			0	5					
06:30		2	11			0	7					
06:45		0	6	6	35	5	8	8	23	14	58	
07:00		3	9			5	5					
07:15		5	13			6	5					
07:30		5	4			5	8					
07:45		9	11	22	37	8	9	24	27	46	64	
08:00		6	14			11	2					
08:15		12	7			9	0					
08:30		7	5			10	5					
08:45		18	7	43	33	8	2	38	9	81	42	
09:00		11	4			10	3					
09:15		10	4			13	4					
09:30		11	2			16	3					
09:45		13	6	45	16	11	2	50	12	95	28	
10:00		18	2			11	3					
10:15		16	6			9	3					
10:30		24	1			18	2					
10:45		29	3	87	12	10	2	48	10	135	22	
11:00		17	4			15	2					
11:15		16	2			8	1					
11:30		28	2			11	1					
11:45		25	1	86	9	12	1	46	5	132	14	
Total		306	495			232	292			538	787	
Percent		38.2%	61.8%			44.3%	55.7%			40.6%	59.4%	
Grand Total		623	1292			611	681			1234	1973	
Percent		32.5%	67.5%			47.3%	52.7%			38.5%	61.5%	

ADT ADT 1,604 AADT 1,604

Accurate Counts

978-664-2565

Location : Quannapowitt Parkway
 Location : South of Lowell Street
 City/State: Wakefield, MA

7977VOL2

Start Time	7/23/2018		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	*	*	*	*	*	*	8	2	7	3	*	*	8	2
01:00	*	*	*	*	*	*	*	*	1	1	1	3	*	*	1	2
02:00	*	*	*	*	*	*	*	*	0	0	2	3	*	*	1	2
03:00	*	*	*	*	*	*	*	*	1	0	4	1	*	*	2	0
04:00	*	*	*	*	*	*	*	*	1	1	0	0	*	*	0	0
05:00	*	*	*	*	*	*	*	*	6	5	3	8	*	*	4	6
06:00	*	*	*	*	*	*	*	*	10	22	6	8	*	*	8	15
07:00	*	*	*	*	*	*	*	*	22	68	22	24	*	*	22	46
08:00	*	*	*	*	*	*	*	*	29	128	43	38	*	*	36	83
09:00	*	*	*	*	*	*	*	*	69	62	45	50	*	*	57	56
10:00	*	*	*	*	*	*	*	*	82	50	87	48	*	*	84	49
11:00	*	*	*	*	*	*	*	*	88	40	86	46	*	*	87	43
12:00 PM	*	*	*	*	*	*	*	*	82	42	95	48	*	*	88	45
01:00	*	*	*	*	*	*	*	*	66	49	57	39	*	*	62	44
02:00	*	*	*	*	*	*	*	*	74	41	59	36	*	*	66	38
03:00	*	*	*	*	*	*	*	*	89	39	51	31	*	*	70	35
04:00	*	*	*	*	*	*	*	*	124	46	41	22	*	*	82	34
05:00	*	*	*	*	*	*	*	*	131	47	50	30	*	*	90	38
06:00	*	*	*	*	*	*	*	*	96	29	35	23	*	*	66	26
07:00	*	*	*	*	*	*	*	*	39	37	37	27	*	*	38	32
08:00	*	*	*	*	*	*	*	*	41	19	33	9	*	*	37	14
09:00	*	*	*	*	*	*	*	*	24	18	16	12	*	*	20	15
10:00	*	*	*	*	*	*	*	*	16	13	12	10	*	*	14	12
11:00	*	*	*	*	*	*	*	*	15	9	9	5	*	*	12	7
Lane	0	0	0	0	0	0	0	0	1114	768	801	524	0	0	955	644
Day	0	0	0	0	0	0	0	0	1882	768	1325	524	0	0	1599	644
AM Peak	-	-	-	-	-	-	-	-	11:00	08:00	10:00	09:00	-	-	11:00	08:00
Vol.	-	-	-	-	-	-	-	-	88	128	87	50	-	-	87	83
PM Peak	-	-	-	-	-	-	-	-	17:00	13:00	12:00	12:00	-	-	17:00	12:00
Vol.	-	-	-	-	-	-	-	-	131	49	95	48	-	-	90	45

Comb. Total	0	0	0	0	1882	1325	0	1599
ADT	ADT 1,604	AADT 1,604						

Accurate Counts

978-664-2565

Location : Quannapowitt Parkway
 Location : South of Lowell Street
 City/State: Wakefield, MA

7977SPD2

NB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
07/27/18	0	0	0	0	1	2	1	2	2	0	0	0	0	0	8
01:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
04:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	0	0	0	0	1	1	3	0	0	0	1	0	0	6
06:00	0	0	0	0	0	2	1	1	4	2	0	0	0	0	10
07:00	2	0	0	0	0	1	6	5	5	1	2	0	0	0	22
08:00	0	0	0	0	0	2	6	5	12	2	2	0	0	0	29
09:00	4	0	0	0	1	3	18	23	14	4	2	0	0	0	69
10:00	3	0	0	0	1	5	14	25	24	9	1	0	0	0	82
11:00	8	0	0	1	2	4	16	28	21	7	1	0	0	0	88
12 PM	3	0	0	0	0	11	10	24	22	10	2	0	0	0	82
13:00	2	0	0	0	1	2	13	22	18	5	2	0	0	1	66
14:00	2	0	0	0	1	4	15	25	16	8	3	0	0	0	74
15:00	2	0	0	0	0	4	10	14	25	13	16	3	1	1	89
16:00	1	0	0	0	0	3	10	29	36	29	14	2	0	0	124
17:00	2	0	0	0	3	4	19	36	42	23	2	0	0	0	131
18:00	0	0	0	0	1	6	13	24	27	22	0	2	1	0	96
19:00	6	0	0	0	1	5	5	9	7	3	2	0	1	0	39
20:00	2	0	0	0	1	3	10	15	8	1	0	0	1	0	41
21:00	0	0	0	0	2	1	3	8	8	2	0	0	0	0	24
22:00	1	0	0	0	1	0	0	7	2	3	2	0	0	0	16
23:00	0	0	0	0	1	1	2	2	2	2	4	0	1	0	15
Total	39	0	0	1	17	65	173	308	295	146	55	8	5	2	1114

Daily

15th Percentile : 18 MPH
 50th Percentile : 23 MPH
 85th Percentile : 27 MPH
 95th Percentile : 30 MPH

Mean Speed(Average) : 23 MPH
 10 MPH Pace Speed : 19-28 MPH
 Number in Pace : 825
 Percent in Pace : 74.1%
 Number of Vehicles > 20 MPH : 877
 Percent of Vehicles > 20 MPH : 78.7%

Accurate Counts

978-664-2565

Location : Quannapowitt Parkway
 Location : South of Lowell Street
 City/State: Wakefield, MA

7977SPD2

NB

Start Time	1	4	7	10	13	16	19	22	25	28	31	34	37	40	999	Total
	3	6	9	12	15	18	21	24	27	30	33	36	39			
07/28/18	1	0	0	0	0	0	1	1	1	2	1	0	0	0	0	7
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
03:00	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	4
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	3
06:00	1	0	0	0	2	2	0	0	1	0	0	0	0	0	0	6
07:00	2	0	0	1	1	0	0	13	2	3	0	0	0	0	0	22
08:00	6	0	0	0	1	3	12	11	8	1	1	0	0	0	0	43
09:00	7	0	0	0	1	6	13	10	5	2	1	0	0	0	0	45
10:00	5	0	0	1	1	16	21	27	14	2	0	0	0	0	0	87
11:00	2	0	0	0	4	8	20	26	15	11	0	0	0	0	0	86
12 PM	8	0	0	1	1	3	30	23	20	7	2	0	0	0	0	95
13:00	4	0	0	0	0	5	11	21	10	6	0	0	0	0	0	57
14:00	5	0	0	0	7	4	12	15	13	3	0	0	0	0	0	59
15:00	0	0	0	0	4	0	21	10	10	3	2	0	1	0	0	51
16:00	1	0	0	0	1	1	8	15	8	5	1	0	1	0	0	41
17:00	4	0	0	1	4	3	8	17	8	5	0	0	0	0	0	50
18:00	3	0	0	0	0	5	11	10	5	0	1	0	0	0	0	35
19:00	3	0	1	0	1	7	3	9	9	3	1	0	0	0	0	37
20:00	1	0	0	0	0	7	9	5	7	3	0	0	1	0	0	33
21:00	0	0	0	0	0	1	2	3	6	3	1	0	0	0	0	16
22:00	0	0	0	0	1	1	1	5	4	0	0	0	0	0	0	12
23:00	0	0	0	0	0	0	0	2	2	3	1	1	0	0	0	9
Total	53	0	1	4	29	75	185	225	151	62	12	1	3	0	0	801

Daily

- 15th Percentile : 16 MPH
- 50th Percentile : 21 MPH
- 85th Percentile : 26 MPH
- 95th Percentile : 28 MPH
- Mean Speed(Average) : 21 MPH
- 10 MPH Pace Speed : 18-27 MPH
- Number in Pace : 586
- Percent in Pace : 73.2%
- Number of Vehicles > 20 MPH : 516
- Percent of Vehicles > 20 MPH : 64.4%

Grand Total	92	0	1	5	46	140	358	533	446	208	67	9	8	2	0	1915
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Overall

- 15th Percentile : 18 MPH
- 50th Percentile : 22 MPH
- 85th Percentile : 27 MPH
- 95th Percentile : 29 MPH
- Mean Speed(Average) : 23 MPH
- 10 MPH Pace Speed : 19-28 MPH
- Number in Pace : 1406
- Percent in Pace : 73.4%
- Number of Vehicles > 20 MPH : 1392
- Percent of Vehicles > 20 MPH : 72.7%

Accurate Counts

978-664-2565

Location : Quannapowitt Parkway
 Location : South of Lowell Street
 City/State: Wakefield, MA

7977SPD2

SB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
07/27/18	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
01:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
05:00	0	0	0	0	0	1	1	0	3	0	0	0	0	0	5
06:00	0	0	0	0	0	1	2	4	8	4	2	1	0	0	22
07:00	0	0	0	0	0	1	9	15	27	12	3	1	0	0	68
08:00	0	0	0	0	0	3	14	35	47	18	9	1	1	0	128
09:00	1	0	0	0	0	8	10	15	15	9	3	1	0	0	62
10:00	2	0	0	0	0	1	8	12	17	8	1	1	0	0	50
11:00	0	0	0	0	0	2	7	13	12	6	0	0	0	0	40
12 PM	2	0	0	0	0	1	10	14	7	5	3	0	0	0	42
13:00	3	0	0	0	0	1	6	11	15	7	4	1	0	1	49
14:00	1	0	0	0	0	3	5	11	15	4	1	1	0	0	41
15:00	0	0	0	0	0	3	4	11	8	6	7	0	0	0	39
16:00	1	0	0	0	0	1	4	6	13	13	4	4	0	0	46
17:00	0	0	0	0	0	2	11	7	13	7	3	1	2	1	47
18:00	0	0	0	0	0	0	7	5	7	8	1	1	0	0	29
19:00	0	0	0	0	0	4	3	12	12	5	1	0	0	0	37
20:00	1	0	0	0	1	2	6	5	2	1	0	1	0	0	19
21:00	0	0	0	0	1	0	3	4	4	5	0	1	0	0	18
22:00	1	0	1	0	0	0	0	2	3	5	1	0	0	0	13
23:00	0	0	0	0	0	0	0	3	2	3	1	0	0	0	9
Total	12	0	1	0	2	34	110	185	232	127	45	15	3	2	768

Daily

15th Percentile : 19 MPH
 50th Percentile : 24 MPH
 85th Percentile : 28 MPH
 95th Percentile : 31 MPH

Mean Speed(Average) : 25 MPH
 10 MPH Pace Speed : 21-30 MPH
 Number in Pace : 581
 Percent in Pace : 75.7%
 Number of Vehicles > 20 MPH : 646
 Percent of Vehicles > 20 MPH : 84.1%

Accurate Counts

978-664-2565

Location : Quannapowitt Parkway
 Location : South of Lowell Street
 City/State: Wakefield, MA

7977SPD2

SB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
07/28/18	0	0	0	0	0	0	0	1	1	1	0	0	0	0	3
01:00	0	0	0	0	0	0	1	0	0	1	1	0	0	0	3
02:00	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
03:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	1	3	2	2	0	0	0	0	8
06:00	0	0	0	0	0	0	1	4	1	2	0	0	0	0	8
07:00	0	0	1	0	1	1	2	8	6	5	0	0	0	0	24
08:00	0	0	0	0	1	1	6	13	11	4	2	0	0	0	38
09:00	1	0	0	0	3	4	12	16	11	3	0	0	0	0	50
10:00	1	0	0	0	0	1	10	14	16	4	2	0	0	0	48
11:00	1	0	0	0	1	2	12	16	9	3	2	0	0	0	46
12 PM	1	0	0	0	0	4	12	13	8	7	2	1	0	0	48
13:00	0	0	0	0	0	3	10	13	8	5	0	0	0	0	39
14:00	0	0	0	0	0	1	9	12	11	3	0	0	0	0	36
15:00	1	0	0	0	0	3	1	12	7	7	0	0	0	0	31
16:00	0	0	0	0	0	1	3	2	8	7	0	1	0	0	22
17:00	0	0	1	0	1	0	6	13	6	3	0	0	0	0	30
18:00	0	0	0	0	0	3	6	7	5	1	0	1	0	0	23
19:00	0	0	0	0	0	1	6	5	8	5	2	0	0	0	27
20:00	0	0	0	0	0	0	1	4	3	1	0	0	0	0	9
21:00	0	0	0	0	0	0	1	2	6	0	3	0	0	0	12
22:00	0	0	0	0	0	0	3	1	3	2	1	0	0	0	10
23:00	0	0	0	0	0	1	0	0	3	1	0	0	0	0	5
Total	5	0	2	0	7	26	103	160	136	67	15	3	0	0	524

Daily

15th Percentile : 19 MPH
 50th Percentile : 23 MPH
 85th Percentile : 27 MPH
 95th Percentile : 29 MPH

Mean Speed(Average) : 24 MPH
 10 MPH Pace Speed : 19-28 MPH
 Number in Pace : 421
 Percent in Pace : 80.3%
 Number of Vehicles > 20 MPH : 415
 Percent of Vehicles > 20 MPH : 79.3%

Grand Total	17	0	3	0	9	60	213	345	368	194	60	18	3	2	1292
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Overall

15th Percentile : 19 MPH
 50th Percentile : 23 MPH
 85th Percentile : 28 MPH
 95th Percentile : 30 MPH

Mean Speed(Average) : 24 MPH
 10 MPH Pace Speed : 19-28 MPH
 Number in Pace : 991
 Percent in Pace : 76.7%
 Number of Vehicles > 20 MPH : 1061
 Percent of Vehicles > 20 MPH : 82.1%

MANUAL TURNING MOVEMENT COUNT DATA AND ADJUSTMENTS

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770010
 Site Code : 79770010
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	From North			Rotary From East			Rte 95 NB Off Ramp From South			Rotary From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	0	0	0	0	36	0	17	137	0	80	270
07:15 AM	0	0	0	0	0	0	34	0	31	143	0	122	330
07:30 AM	0	0	0	0	0	0	31	0	31	187	0	127	376
07:45 AM	0	0	0	0	0	0	32	0	38	173	0	125	368
Total	0	0	0	0	0	0	133	0	117	640	0	454	1344
08:00 AM	0	0	0	0	0	0	36	0	24	194	0	134	388
08:15 AM	0	0	0	0	0	0	36	0	26	182	0	152	396
08:30 AM	0	0	0	0	0	0	46	0	29	201	0	122	398
08:45 AM	0	0	0	0	0	0	48	0	29	204	0	143	424
Total	0	0	0	0	0	0	166	0	108	781	0	551	1606
Grand Total	0	0	0	0	0	0	299	0	225	1421	0	1005	2950
Apprch %	0	0	0	0	0	0	57.1	0	42.9	58.6	0	41.4	
Total %	0	0	0	0	0	0	10.1	0	7.6	48.2	0	34.1	
Cars	0	0	0	0	0	0	298	0	222	1413	0	995	2928
% Cars	0	0	0	0	0	0	99.7	0	98.7	99.4	0	99	99.3
Trucks	0	0	0	0	0	0	1	0	3	8	0	10	22
% Trucks	0	0	0	0	0	0	0.3	0	1.3	0.6	0	1	0.7

Accurate Counts

978-664-2565

File Name : 79770010
 Site Code : 79770010
 Start Date : 7/26/2018
 Page No : 2

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

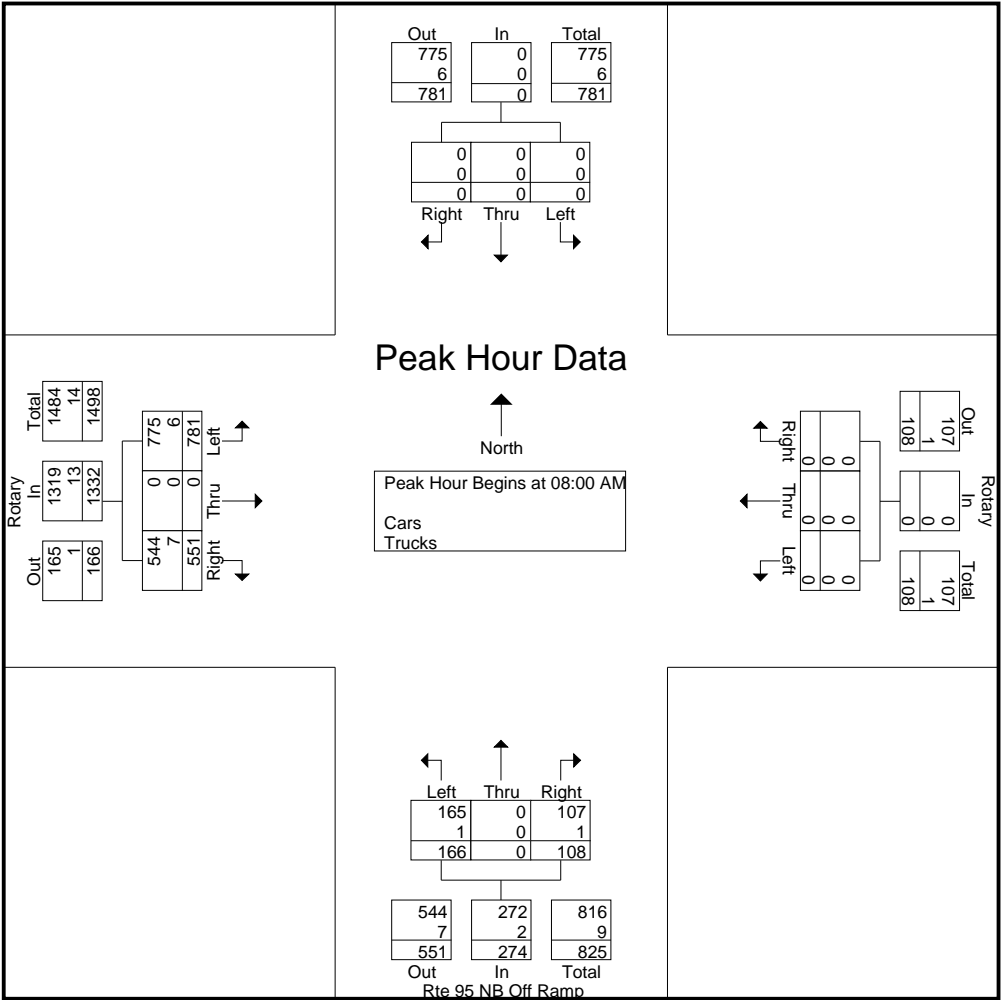
Start Time	From North				Rotary From East				Rte 95 NB Off Ramp From South				Rotary From West				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 08:00 AM																		
08:00 AM	0	0	0	0	0	0	0	0	0	36	0	24	60	194	0	134	328	388
08:15 AM	0	0	0	0	0	0	0	0	0	36	0	26	62	182	0	152	334	396
08:30 AM	0	0	0	0	0	0	0	0	0	46	0	29	75	201	0	122	323	398
08:45 AM	0	0	0	0	0	0	0	0	0	48	0	29	77	204	0	143	347	424
Total Volume	0	0	0	0	0	0	0	0	0	166	0	108	274	781	0	551	1332	1606
% App. Total	0	0	0		0	0	0			60.6	0	39.4		58.6	0	41.4		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.865	.000	.931	.890	.957	.000	.906	.960	.947
Cars	0	0	0	0	0	0	0	0	0	165	0	107	272	775	0	544	1319	1591
% Cars	0	0	0	0	0	0	0	0	0	99.4	0	99.1	99.3	99.2	0	98.7	99.0	99.1
Trucks	0	0	0	0	0	0	0	0	0	1	0	1	2	6	0	7	13	15
% Trucks	0	0	0	0	0	0	0	0	0	0.6	0	0.9	0.7	0.8	0	1.3	1.0	0.9

Accurate Counts

978-664-2565

File Name : 79770010
 Site Code : 79770010
 Start Date : 7/26/2018
 Page No : 3

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear



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

Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				08:00 AM				08:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	36	0	24	60	194	0	134	328
+15 mins.	0	0	0	0	0	0	0	0	36	0	26	62	182	0	152	334
+30 mins.	0	0	0	0	0	0	0	0	46	0	29	75	201	0	122	323
+45 mins.	0	0	0	0	0	0	0	0	48	0	29	77	204	0	143	347
Total Volume	0	0	0	0	0	0	0	0	166	0	108	274	781	0	551	1332
% App. Total	0	0	0		0	0	0		60.6	0	39.4		58.6	0	41.4	

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770010
 Site Code : 79770010
 Start Date : 7/26/2018
 Page No : 13

Groups Printed- Bikes Peds

Start Time	From North				Rotary From East				Rte 95 NB Off Ramp From South				Rotary From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0	1	3	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	0	2	3	5
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Grand Total	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	3	3	6
Apprch %	0	0	0		0	0	0		0	0	0		0	0	100				
Total %	0	0	0		0	0	0		0	0	0		0	0	100		50	50	

Accurate Counts

978-664-2565

File Name : 79770010
 Site Code : 79770010
 Start Date : 7/26/2018
 Page No : 14

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

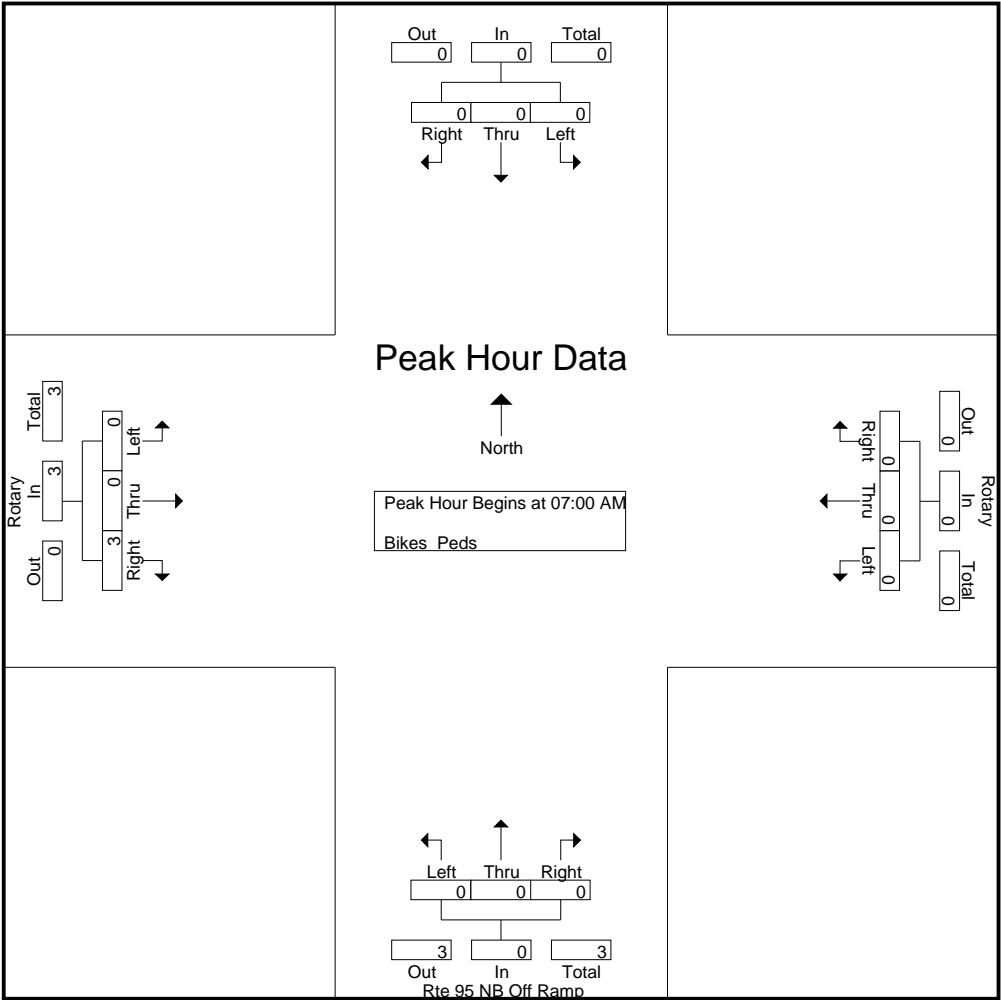
Start Time	From North				Rotary From East				Rte 95 NB Off Ramp From South				Rotary From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3
% App. Total	0	0	0		0	0	0		0	0	0		0	0	100		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.250

Accurate Counts

978-664-2565

File Name : 79770010
 Site Code : 79770010
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear



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

Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
% App. Total	0	0	0		0	0	0		0	0	0		0	0	100	

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770010
 Site Code : 79770010
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	From North			Rotary From East			Rte 95 NB Off Ramp From South			Rotary From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	0	0	0	0	0	71	0	43	180	0	133	427
04:15 PM	0	0	0	0	0	0	67	0	40	202	0	132	441
04:30 PM	0	0	0	0	0	0	69	0	57	177	0	172	475
04:45 PM	0	0	0	0	0	0	42	0	46	189	0	171	448
Total	0	0	0	0	0	0	249	0	186	748	0	608	1791
05:00 PM	0	0	0	0	0	0	61	0	40	216	0	123	440
05:15 PM	0	0	0	0	0	0	66	0	39	200	0	177	482
05:30 PM	0	0	0	0	0	0	91	0	40	164	0	177	472
05:45 PM	0	0	0	0	0	0	61	0	61	209	0	184	515
Total	0	0	0	0	0	0	279	0	180	789	0	661	1909
Grand Total	0	0	0	0	0	0	528	0	366	1537	0	1269	3700
Apprch %	0	0	0	0	0	0	59.1	0	40.9	54.8	0	45.2	
Total %	0	0	0	0	0	0	14.3	0	9.9	41.5	0	34.3	
Cars	0	0	0	0	0	0	527	0	365	1534	0	1262	3688
% Cars	0	0	0	0	0	0	99.8	0	99.7	99.8	0	99.4	99.7
Trucks	0	0	0	0	0	0	1	0	1	3	0	7	12
% Trucks	0	0	0	0	0	0	0.2	0	0.3	0.2	0	0.6	0.3

Accurate Counts

978-664-2565

File Name : 79770010
 Site Code : 79770010
 Start Date : 7/26/2018
 Page No : 2

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

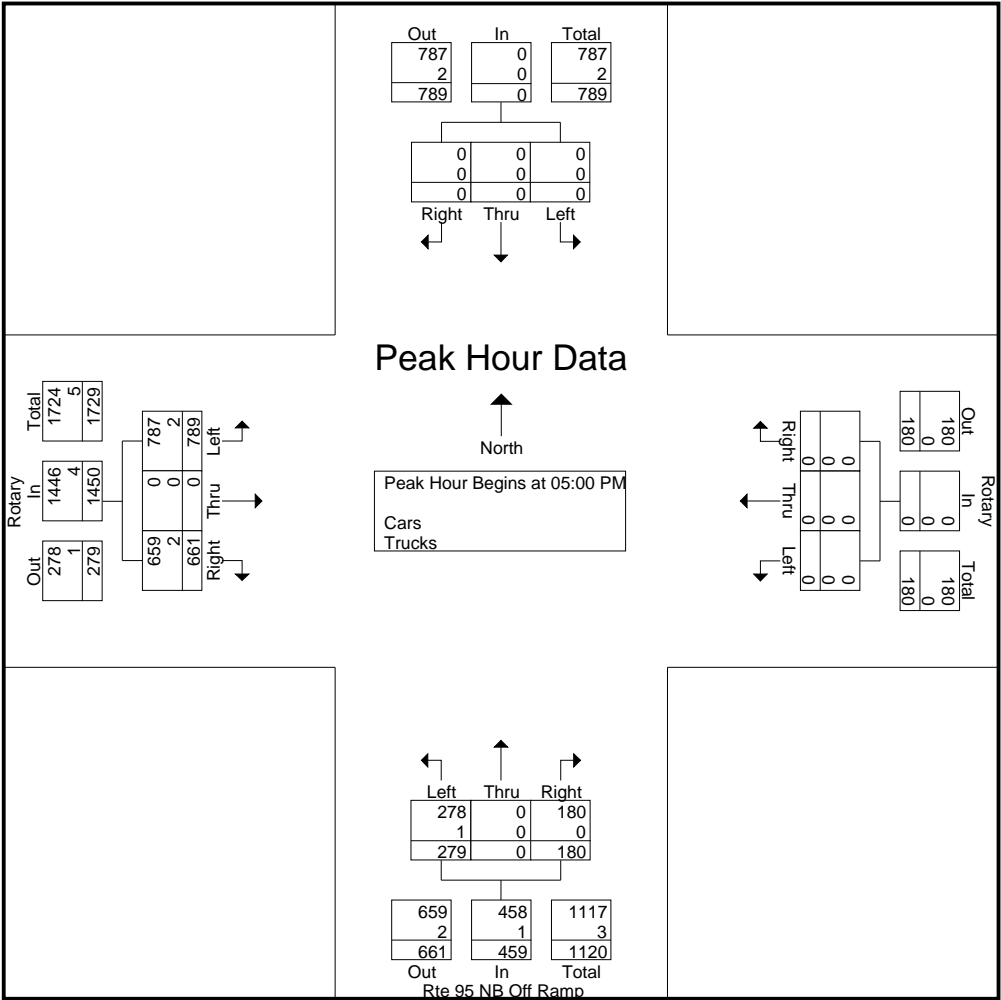
Start Time	From North				Rotary From East				Rte 95 NB Off Ramp From South				Rotary From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	0	0	0	61	0	40	101	216	0	123	339	440
05:15 PM	0	0	0	0	0	0	0	0	66	0	39	105	200	0	177	377	482
05:30 PM	0	0	0	0	0	0	0	0	91	0	40	131	164	0	177	341	472
05:45 PM	0	0	0	0	0	0	0	0	61	0	61	122	209	0	184	393	515
Total Volume	0	0	0	0	0	0	0	0	279	0	180	459	789	0	661	1450	1909
% App. Total	0	0	0		0	0	0		60.8	0	39.2		54.4	0	45.6		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.766	.000	.738	.876	.913	.000	.898	.922	.927
Cars	0	0	0	0	0	0	0	0	278	0	180	458	787	0	659	1446	1904
% Cars	0	0	0	0	0	0	0	0	99.6	0	100	99.8	99.7	0	99.7	99.7	99.7
Trucks	0	0	0	0	0	0	0	0	1	0	0	1	2	0	2	4	5
% Trucks	0	0	0	0	0	0	0	0	0.4	0	0	0.2	0.3	0	0.3	0.3	0.3

Accurate Counts

978-664-2565

File Name : 79770010
 Site Code : 79770010
 Start Date : 7/26/2018
 Page No : 3

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				05:00 PM				05:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	61	0	40	101	216	0	123	339
+15 mins.	0	0	0	0	0	0	0	0	66	0	39	105	200	0	177	377
+30 mins.	0	0	0	0	0	0	0	0	91	0	40	131	164	0	177	341
+45 mins.	0	0	0	0	0	0	0	0	61	0	61	122	209	0	184	393
Total Volume	0	0	0	0	0	0	0	0	279	0	180	459	789	0	661	1450
% App. Total	0	0	0		0	0	0		60.8	0	39.2		54.4	0	45.6	

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770010
 Site Code : 79770010
 Start Date : 7/26/2018
 Page No : 13

Groups Printed- Bikes Peds

Start Time	From North				Rotary From East				Rte 95 NB Off Ramp From South				Rotary From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

Accurate Counts

978-664-2565

File Name : 79770010
 Site Code : 79770010
 Start Date : 7/26/2018
 Page No : 14

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

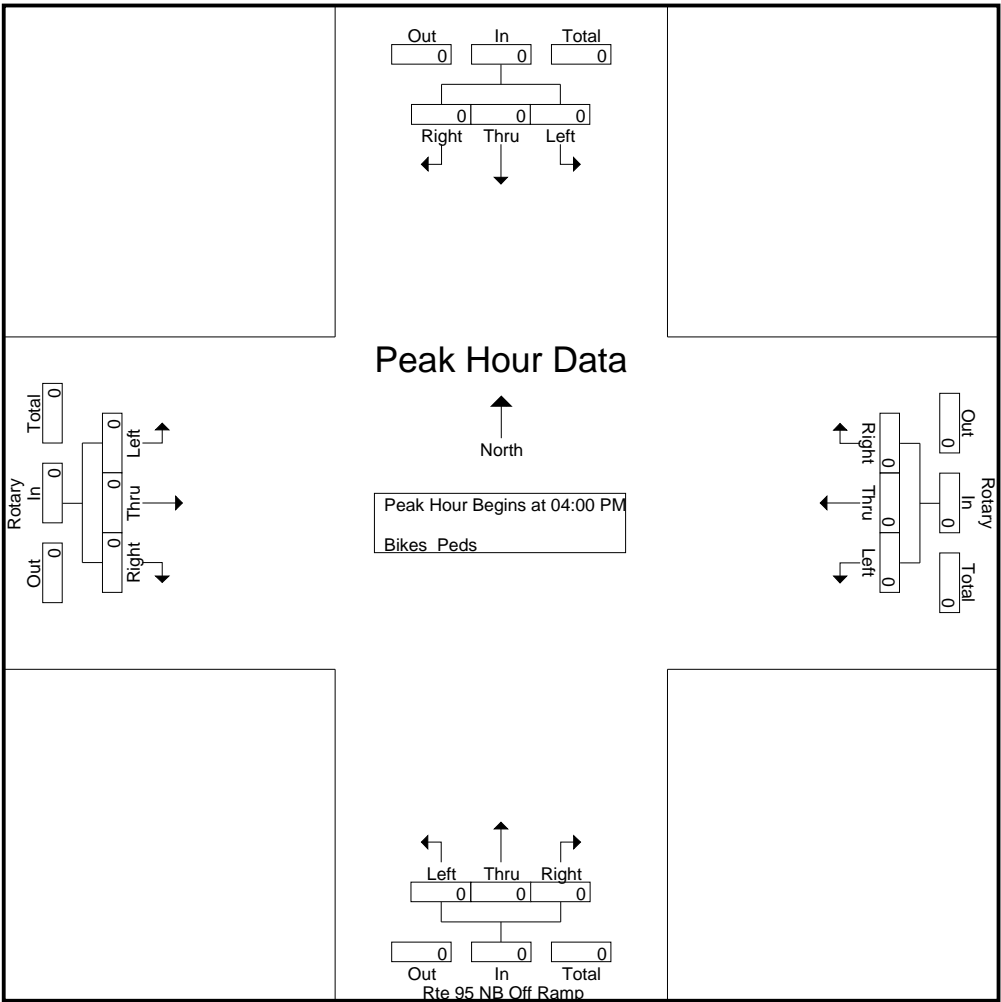
Start Time	From North				Rotary From East				Rte 95 NB Off Ramp From South				Rotary From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

File Name : 79770010
 Site Code : 79770010
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0	

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770S10
 Site Code : 79770010
 Start Date : 7/28/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	From North			Rotary From East			Rte 95 NB Off Ramp From South			Rotary From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:00 AM	0	0	0	0	0	0	59	0	52	112	0	117	340
11:15 AM	0	0	0	0	0	0	56	0	53	148	0	128	385
11:30 AM	0	0	0	0	0	0	65	0	43	128	0	132	368
11:45 AM	0	0	0	0	0	0	62	0	53	165	0	106	386
Total	0	0	0	0	0	0	242	0	201	553	0	483	1479
12:00 PM	0	0	0	0	0	0	54	0	44	140	0	98	336
12:15 PM	0	0	0	0	0	0	57	0	47	157	0	115	376
12:30 PM	0	0	0	0	0	0	53	0	41	169	0	123	386
12:45 PM	0	0	0	0	0	0	44	0	43	170	0	100	357
Total	0	0	0	0	0	0	208	0	175	636	0	436	1455
01:00 PM	0	0	0	0	0	0	52	0	37	152	0	119	360
01:15 PM	0	0	0	0	0	0	68	0	50	167	0	113	398
01:30 PM	0	0	0	0	0	0	57	0	41	170	0	116	384
01:45 PM	0	0	0	0	0	0	57	0	44	159	0	93	353
Total	0	0	0	0	0	0	234	0	172	648	0	441	1495
Grand Total	0	0	0	0	0	0	684	0	548	1837	0	1360	4429
Apprch %	0	0	0	0	0	0	55.5	0	44.5	57.5	0	42.5	
Total %	0	0	0	0	0	0	15.4	0	12.4	41.5	0	30.7	
Cars	0	0	0	0	0	0	684	0	546	1832	0	1352	4414
% Cars	0	0	0	0	0	0	100	0	99.6	99.7	0	99.4	99.7
Trucks	0	0	0	0	0	0	0	0	2	5	0	8	15
% Trucks	0	0	0	0	0	0	0	0	0.4	0.3	0	0.6	0.3

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770S10
 Site Code : 79770010
 Start Date : 7/28/2018
 Page No : 2

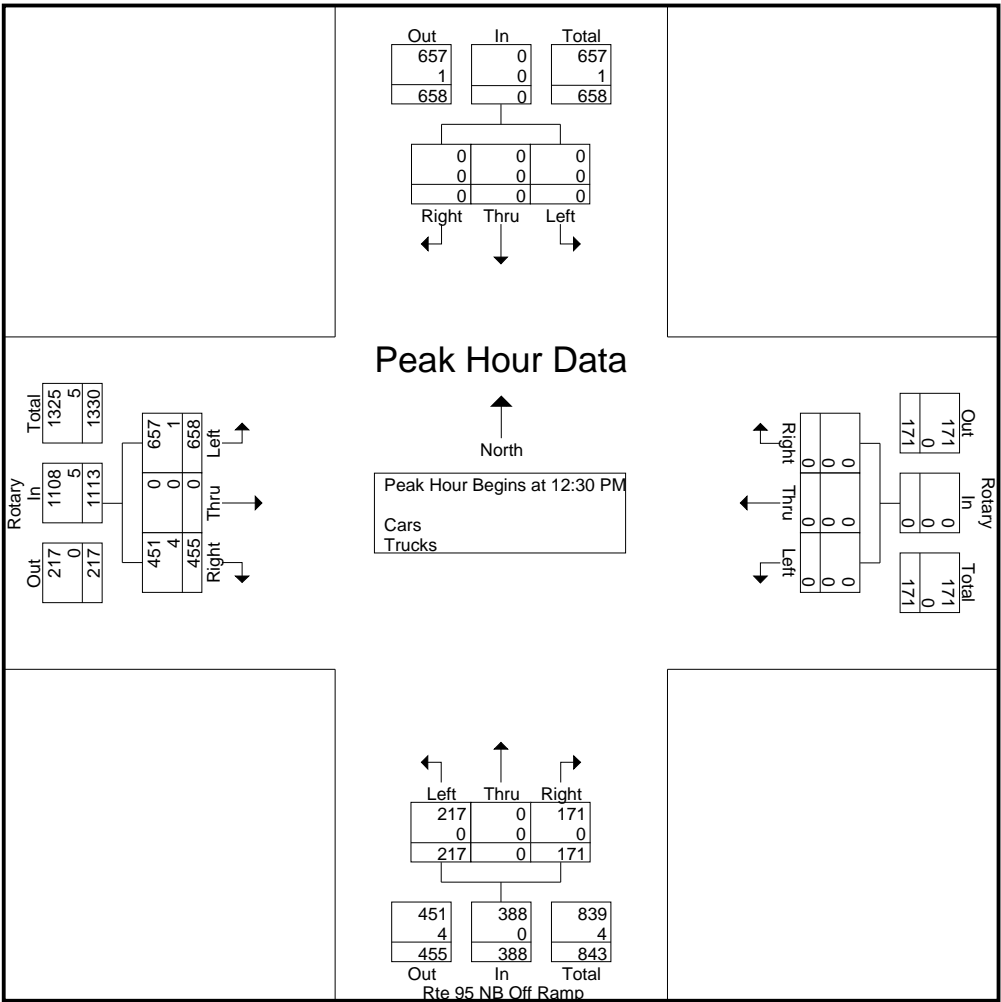
Start Time	From North				Rotary From East				Rte 95 NB Off Ramp From South				Rotary From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:30 PM																	
12:30 PM	0	0	0	0	0	0	0	0	53	0	41	94	169	0	123	292	386
12:45 PM	0	0	0	0	0	0	0	0	44	0	43	87	170	0	100	270	357
01:00 PM	0	0	0	0	0	0	0	0	52	0	37	89	152	0	119	271	360
01:15 PM	0	0	0	0	0	0	0	0	68	0	50	118	167	0	113	280	398
Total Volume	0	0	0	0	0	0	0	0	217	0	171	388	658	0	455	1113	1501
% App. Total	0	0	0		0	0	0		55.9	0	44.1		59.1	0	40.9		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.798	.000	.855	.822	.968	.000	.925	.953	.943
Cars	0	0	0	0	0	0	0	0	217	0	171	388	657	0	451	1108	1496
% Cars	0	0	0	0	0	0	0	0	100	0	100	100	99.8	0	99.1	99.6	99.7
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	5	5
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0.9	0.4	0.3

Accurate Counts

978-664-2565

File Name : 79770S10
 Site Code : 79770010
 Start Date : 7/28/2018
 Page No : 3

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				11:00 AM				12:30 PM			
+0 mins.	0	0	0	0	0	0	0	0	59	0	52	111	169	0	123	292
+15 mins.	0	0	0	0	0	0	0	0	56	0	53	109	170	0	100	270
+30 mins.	0	0	0	0	0	0	0	0	65	0	43	108	152	0	119	271
+45 mins.	0	0	0	0	0	0	0	0	62	0	53	115	167	0	113	280
Total Volume	0	0	0	0	0	0	0	0	242	0	201	443	658	0	455	1113
% App. Total	0	0	0	0	0	0	0	0	54.6	0	45.4		59.1	0	40.9	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.931	.000	.948	.963	.968	.000	.925	.953

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770S10
 Site Code : 79770010
 Start Date : 7/28/2018
 Page No : 13

Groups Printed- Bikes Peds

Start Time	From North				Rotary From East				Rte 95 NB Off Ramp From South				Rotary From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	1	2	3
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	2	1	3
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	2	2	4
Total	0	0	0	0	0	0	0	0	0	0	0	5	0	0	6	0	5	6	11
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	2
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	2
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	2
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4	0	1	4	5
Grand Total	0	0	0	0	0	0	0	0	0	0	0	7	0	0	11	0	7	11	18
Apprch %	0	0	0		0	0	0		0	0	0		0	0	100				
Total %	0	0	0		0	0	0		0	0	0		0	0	100		38.9	61.1	

Accurate Counts

978-664-2565

File Name : 79770S10

Site Code : 79770010

Start Date : 7/28/2018

Page No : 14

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

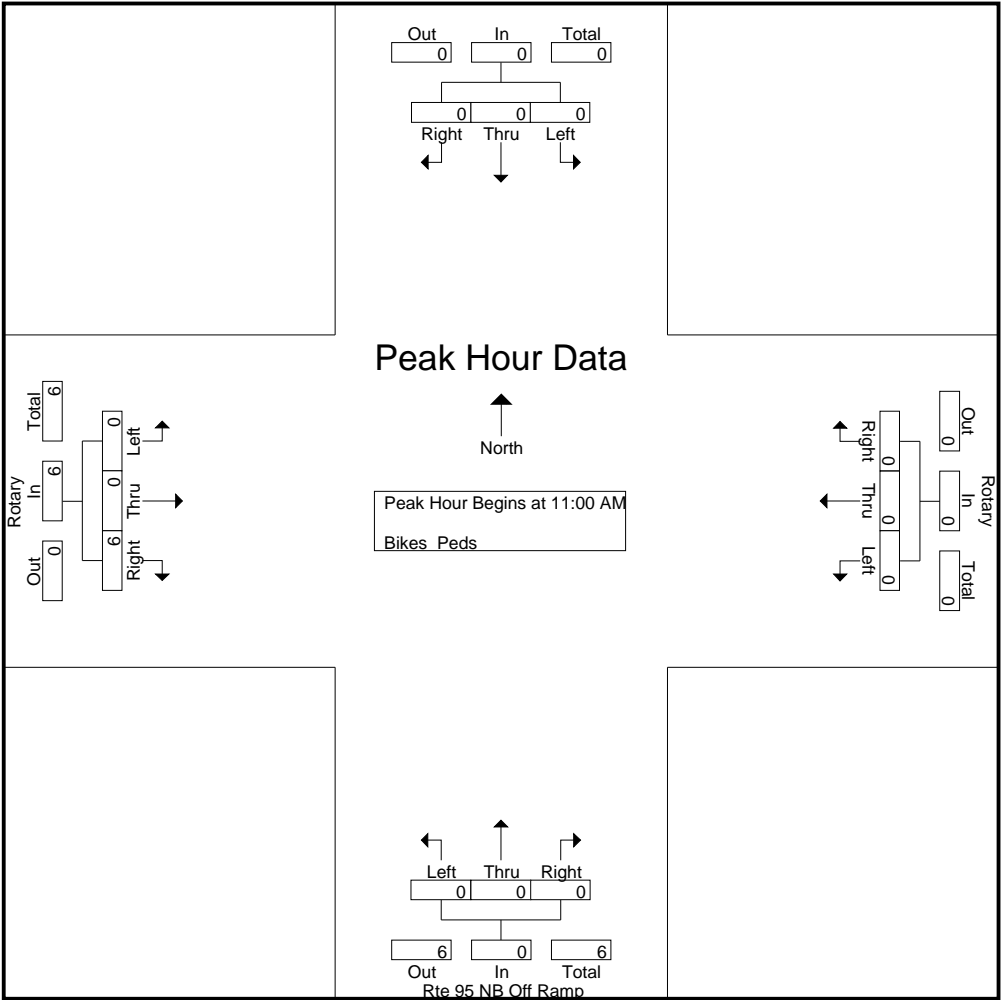
Start Time	From North				Rotary From East				Rte 95 NB Off Ramp From South				Rotary From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	6
% App. Total	0	0	0		0	0	0		0	0	0		0	0	100		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.750	.750	.750

Accurate Counts

978-664-2565

File Name : 79770S10
 Site Code : 79770010
 Start Date : 7/28/2018
 Page No : 15

N/S Street : Route 95 NB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				11:00 AM				11:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.750	.750

Accurate Counts

978-664-2565

File Name : 79770011

Site Code : 79770011

Start Date : 7/26/2018

Page No : 1

N/S Street : Ped Path
 E/W Street:
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes

	Path From North	Path From South	
Start Time	Thru	Thru	Int. Total
07:00 AM	0	0	0
07:15 AM	0	0	0
07:30 AM	0	0	0
07:45 AM	0	0	0
Total	0	0	0
08:00 AM	0	0	0
08:15 AM	0	0	0
08:30 AM	0	0	0
08:45 AM	0	0	0
Total	0	0	0
Grand Total	0	0	0
Apprch %	0	0	
Total %			

Accurate Counts

978-664-2565

File Name : 79770011

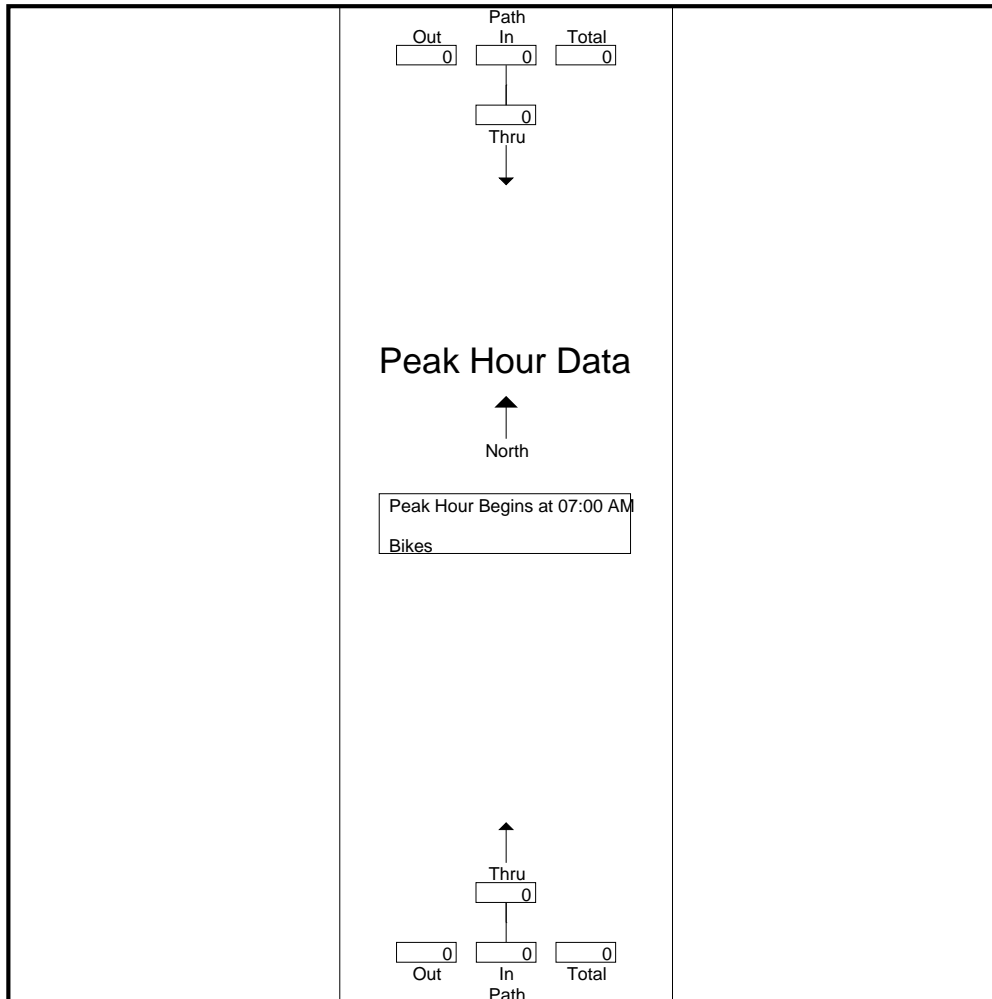
Site Code : 79770011

Start Date : 7/26/2018

Page No : 2

N/S Street : Ped Path
 E/W Street:
 City/State : Wakefield, MA
 Weather : Clear

Start Time	Path From North		Path From South		Int. Total
	Thru	App. Total	Thru	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1					
Peak Hour for Entire Intersection Begins at 07:00 AM					
07:00 AM	0	0	0	0	0
07:15 AM	0	0	0	0	0
07:30 AM	0	0	0	0	0
07:45 AM	0	0	0	0	0
Total Volume	0	0	0	0	0
% App. Total	0		0		
PHF	.000	.000	.000	.000	.000



Accurate Counts

978-664-2565

File Name : 79770011

Site Code : 79770011

Start Date : 7/26/2018

Page No : 1

N/S Street : Ped Path
 E/W Street:
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Peds

	Path From North	Path From South	
Start Time	Thru	Thru	Int. Total
07:00 AM	1	3	4
07:15 AM	4	5	9
07:30 AM	5	8	13
07:45 AM	3	16	19
Total	13	32	45
08:00 AM	2	17	19
08:15 AM	1	10	11
08:30 AM	9	12	21
08:45 AM	5	15	20
Total	17	54	71
Grand Total	30	86	116
Apprch %	100	100	
Total %	25.9	74.1	

Accurate Counts

978-664-2565

File Name : 79770011

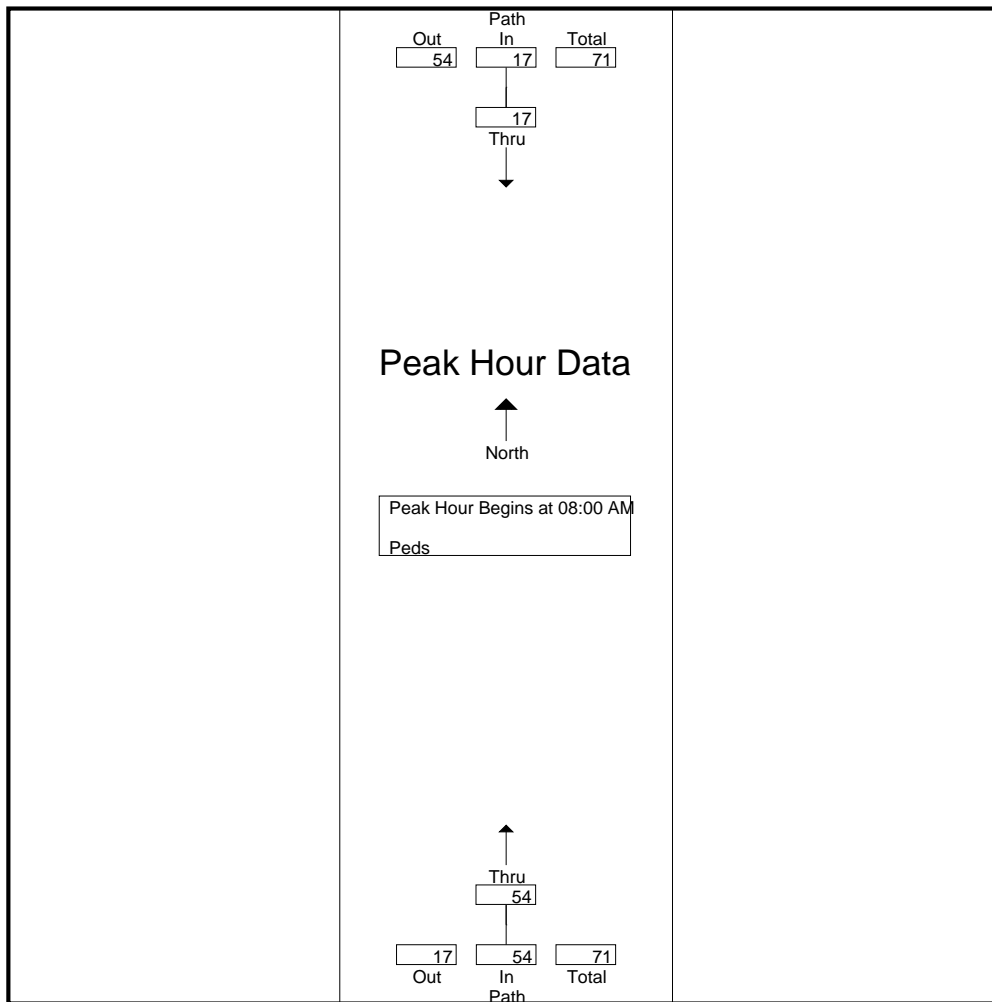
Site Code : 79770011

Start Date : 7/26/2018

Page No : 2

N/S Street : Ped Path
 E/W Street:
 City/State : Wakefield, MA
 Weather : Clear

Start Time	Path From North		Path From South		Int. Total
	Thru	App. Total	Thru	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1					
Peak Hour for Entire Intersection Begins at 08:00 AM					
08:00 AM	2	2	17	17	19
08:15 AM	1	1	10	10	11
08:30 AM	9	9	12	12	21
08:45 AM	5	5	15	15	20
Total Volume	17	17	54	54	71
% App. Total	100		100		
PHF	.472	.472	.794	.794	.845



Accurate Counts

978-664-2565

File Name : 79770011

Site Code : 79770011

Start Date : 7/26/2018

Page No : 1

N/S Street : Ped Path
 E/W Street:
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes

	Path From North	Path From South	
Start Time	Thru	Thru	Int. Total
04:00 PM	0	0	0
04:15 PM	0	0	0
04:30 PM	0	0	0
04:45 PM	0	0	0
Total	0	0	0
05:00 PM	0	0	0
05:15 PM	0	0	0
05:30 PM	0	0	0
05:45 PM	0	0	0
Total	0	0	0
Grand Total	0	0	0
Apprch %	0	0	
Total %			

Accurate Counts

978-664-2565

File Name : 79770011

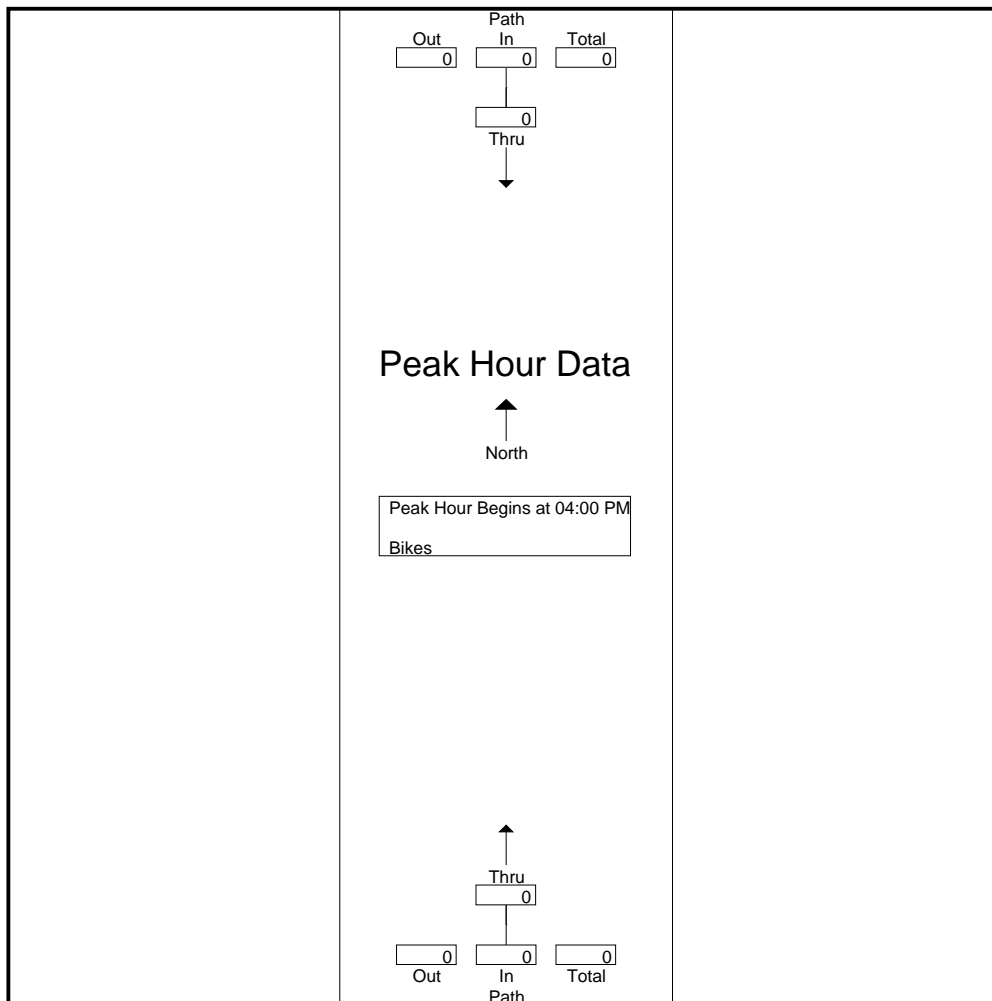
Site Code : 79770011

Start Date : 7/26/2018

Page No : 2

N/S Street : Ped Path
 E/W Street:
 City/State : Wakefield, MA
 Weather : Clear

Start Time	Path From North		Path From South		Int. Total
	Thru	App. Total	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1					
Peak Hour for Entire Intersection Begins at 04:00 PM					
04:00 PM	0	0	0	0	0
04:15 PM	0	0	0	0	0
04:30 PM	0	0	0	0	0
04:45 PM	0	0	0	0	0
Total Volume	0	0	0	0	0
% App. Total	0		0		
PHF	.000	.000	.000	.000	.000



Accurate Counts

978-664-2565

File Name : 79770011

Site Code : 79770011

Start Date : 7/26/2018

Page No : 1

N/S Street : Ped Path
 E/W Street:
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Peds

	Path From North	Path From South	
Start Time	Thru	Thru	Int. Total
04:00 PM	0	2	2
04:15 PM	1	1	2
04:30 PM	2	4	6
04:45 PM	0	1	1
Total	3	8	11
05:00 PM	0	2	2
05:15 PM	1	6	7
05:30 PM	4	4	8
05:45 PM	0	3	3
Total	5	15	20
Grand Total	8	23	31
Aprch %	100	100	
Total %	25.8	74.2	

Accurate Counts

978-664-2565

File Name : 79770011

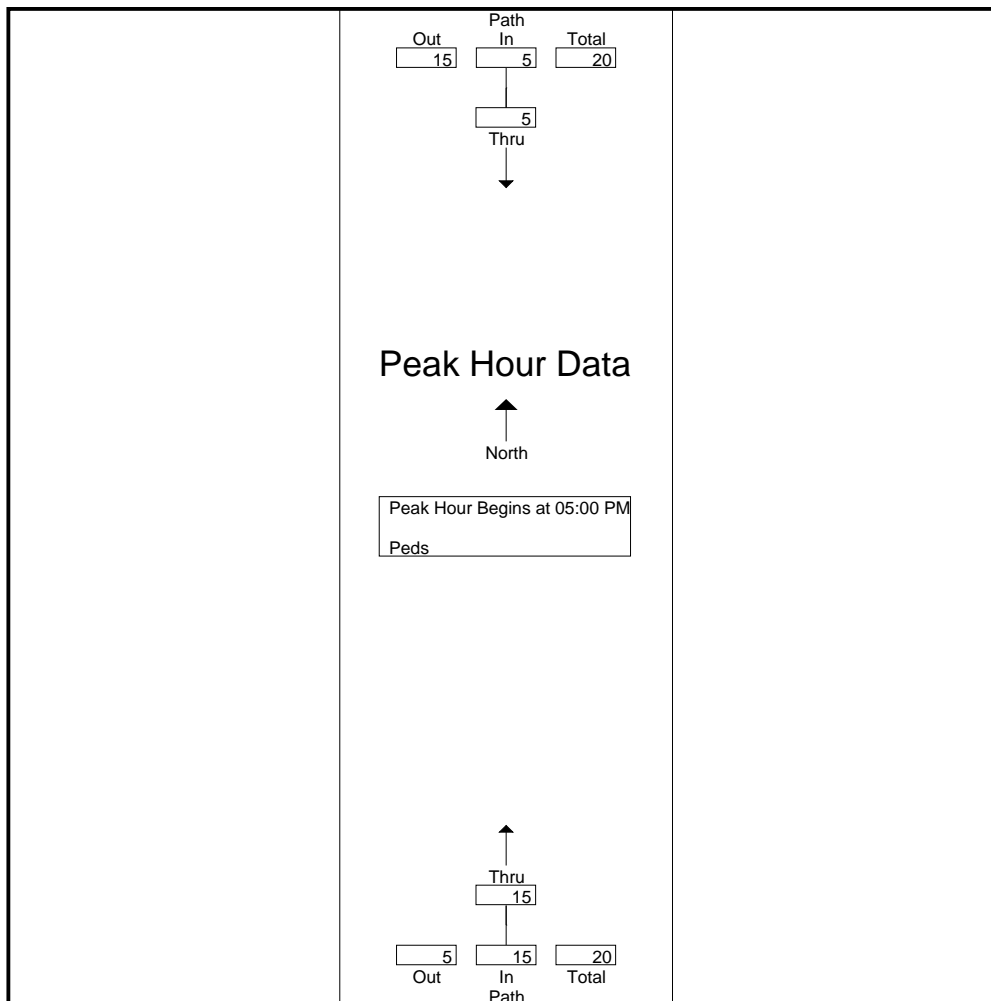
Site Code : 79770011

Start Date : 7/26/2018

Page No : 2

N/S Street : Ped Path
 E/W Street:
 City/State : Wakefield, MA
 Weather : Clear

Start Time	Path From North		Path From South		Int. Total
	Thru	App. Total	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1					
Peak Hour for Entire Intersection Begins at 05:00 PM					
05:00 PM	0	0	2	2	2
05:15 PM	1	1	6	6	7
05:30 PM	4	4	4	4	8
05:45 PM	0	0	3	3	3
Total Volume	5	5	15	15	20
% App. Total	100		100		
PHF	.313	.313	.625	.625	.625



Accurate Counts

978-664-2565

N/S Street : Ped Path
 E/W Street:
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770S11
 Site Code : 79770011
 Start Date : 7/28/2018
 Page No : 1

Groups Printed- Bikes

	Path From North	Path From South		
Start Time	Thru	Thru	Thru	Int. Total
11:00 AM	0	2		2
11:15 AM	0	0		0
11:30 AM	0	2		2
11:45 AM	1	0		1
Total	1	4		5
12:00 PM	0	1		1
12:15 PM	1	0		1
12:30 PM	0	0		0
12:45 PM	0	6		6
Total	1	7		8
01:00 PM	0	1		1
01:15 PM	1	1		2
01:30 PM	0	1		1
01:45 PM	0	0		0
Total	1	3		4
Grand Total	3	14		17
Apprch %	100	100		
Total %	17.6	82.4		

Accurate Counts

978-664-2565

File Name : 79770S11

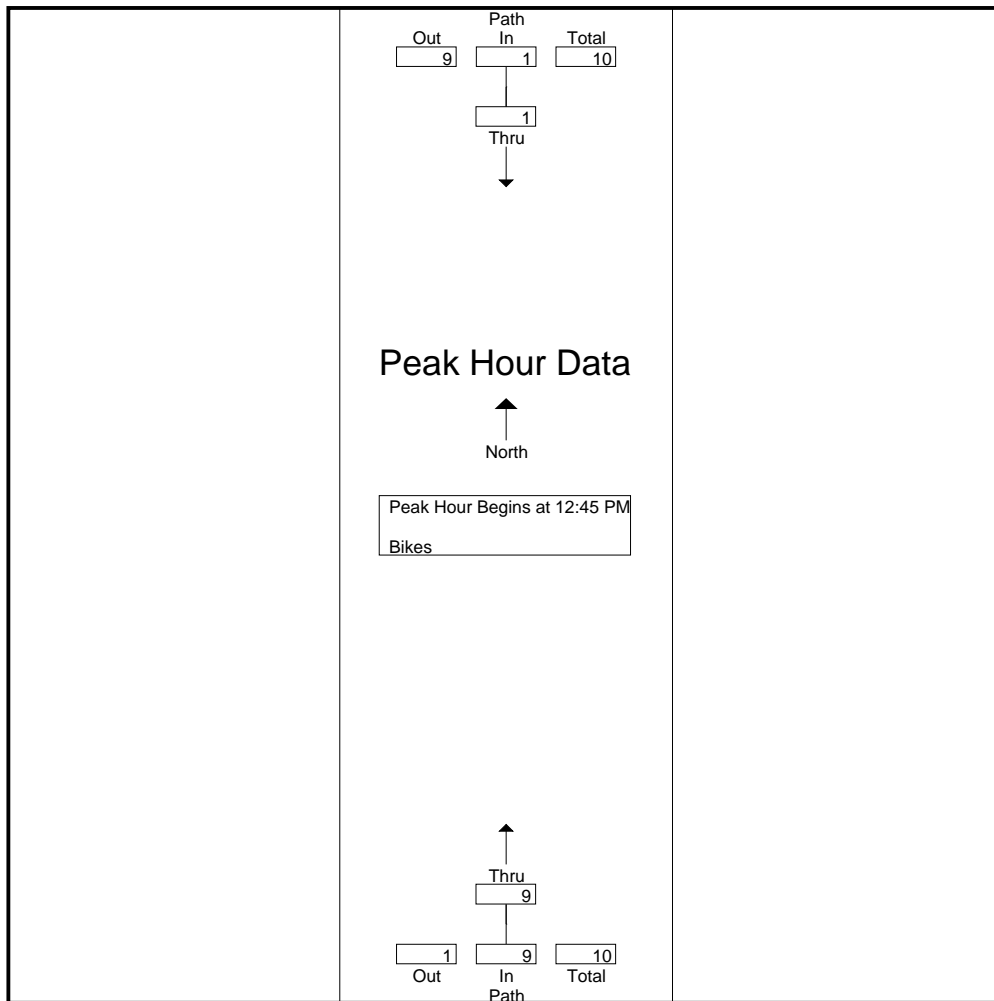
Site Code : 79770011

Start Date : 7/28/2018

Page No : 2

N/S Street : Ped Path
 E/W Street:
 City/State : Wakefield, MA
 Weather : Clear

Start Time	Path From North		Path From South		Int. Total
	Thru	App. Total	Thru	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1					
Peak Hour for Entire Intersection Begins at 12:45 PM					
12:45 PM	0	0	6	6	6
01:00 PM	0	0	1	1	1
01:15 PM	1	1	1	1	2
01:30 PM	0	0	1	1	1
Total Volume	1	1	9	9	10
% App. Total	100		100		
PHF	.250	.250	.375	.375	.417



Accurate Counts

978-664-2565

N/S Street : Ped Path
 E/W Street:
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770S11
 Site Code : 79770011
 Start Date : 7/28/2018
 Page No : 1

Groups Printed- Peds

	Path From North	Path From South	
Start Time	Thru	Thru	Int. Total
11:00 AM	10	32	42
11:15 AM	15	20	35
11:30 AM	9	28	37
11:45 AM	20	37	57
Total	54	117	171
12:00 PM	11	25	36
12:15 PM	8	24	32
12:30 PM	3	14	17
12:45 PM	6	26	32
Total	28	89	117
01:00 PM	6	13	19
01:15 PM	8	17	25
01:30 PM	7	17	24
01:45 PM	4	10	14
Total	25	57	82
Grand Total	107	263	370
Apprch %	100	100	
Total %	28.9	71.1	

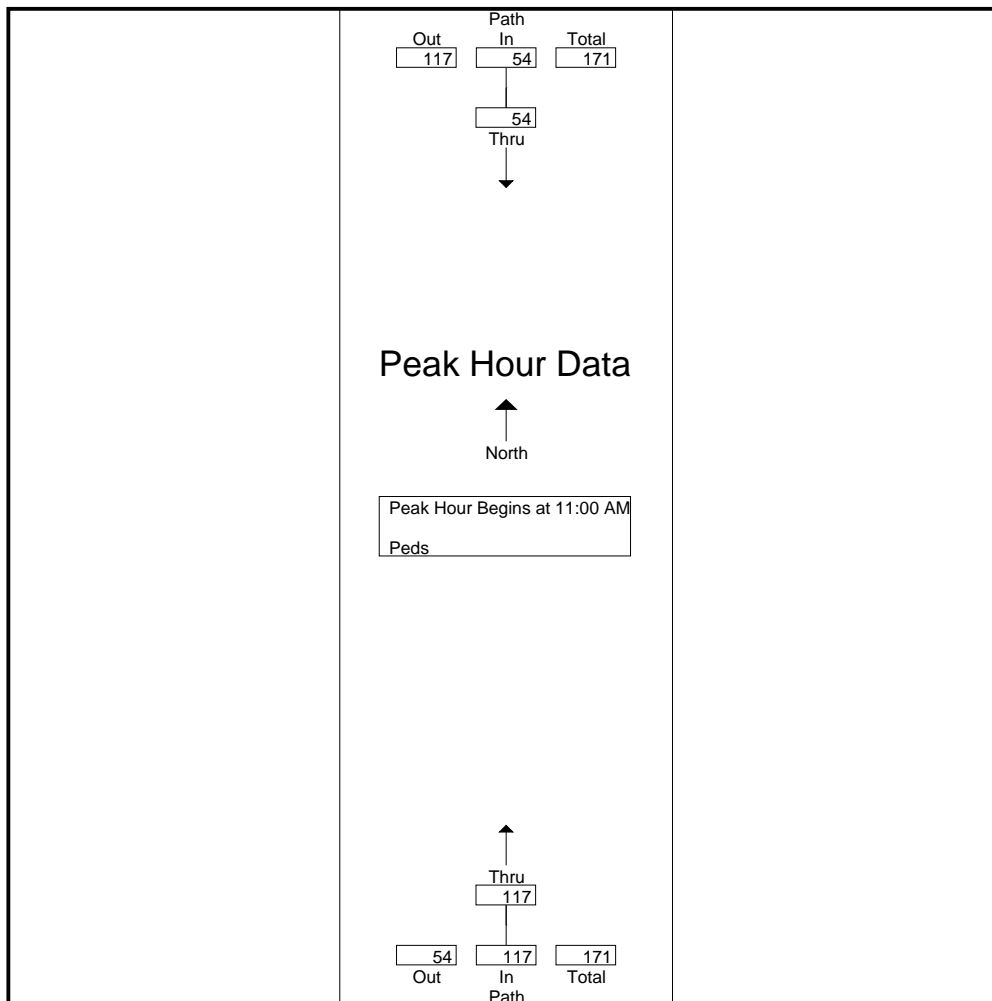
Accurate Counts

978-664-2565

N/S Street : Ped Path
 E/W Street:
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770S11
 Site Code : 79770011
 Start Date : 7/28/2018
 Page No : 2

Start Time	Path From North		Path From South		Int. Total
	Thru	App. Total	Thru	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1					
Peak Hour for Entire Intersection Begins at 11:00 AM					
11:00 AM	10	10	32	32	42
11:15 AM	15	15	20	20	35
11:30 AM	9	9	28	28	37
11:45 AM	20	20	37	37	57
Total Volume	54	54	117	117	171
% App. Total	100		100		
PHF	.675	.675	.791	.791	.750



Accurate Counts

978-664-2565

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770001
 Site Code : 79770001
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rte 95 SB Ramps From North			North Ave From East			Rte 95 SB Ramps From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	28	0	98	35	106	0	0	0	0	0	82	28	377
07:15 AM	26	1	104	34	100	0	0	0	0	0	82	37	384
07:30 AM	18	2	153	45	108	0	0	0	0	0	123	22	471
07:45 AM	16	2	190	29	133	0	0	0	0	0	122	26	518
Total	88	5	545	143	447	0	0	0	0	0	409	113	1750
08:00 AM	25	2	134	37	137	0	0	0	0	0	125	37	497
08:15 AM	43	3	148	33	132	0	0	0	0	0	122	26	507
08:30 AM	49	3	174	38	136	0	0	0	0	0	117	31	548
08:45 AM	57	2	117	49	146	0	0	0	0	0	139	28	538
Total	174	10	573	157	551	0	0	0	0	0	503	122	2090
Grand Total	262	15	1118	300	998	0	0	0	0	0	912	235	3840
Apprch %	18.8	1.1	80.1	23.1	76.9	0	0	0	0	0	79.5	20.5	
Total %	6.8	0.4	29.1	7.8	26	0	0	0	0	0	23.8	6.1	
Cars	260	15	1114	296	987	0	0	0	0	0	900	230	3802
% Cars	99.2	100	99.6	98.7	98.9	0	0	0	0	0	98.7	97.9	99
Trucks	2	0	4	4	11	0	0	0	0	0	12	5	38
% Trucks	0.8	0	0.4	1.3	1.1	0	0	0	0	0	1.3	2.1	1

Accurate Counts

978-664-2565

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770001
 Site Code : 79770001
 Start Date : 7/26/2018
 Page No : 2

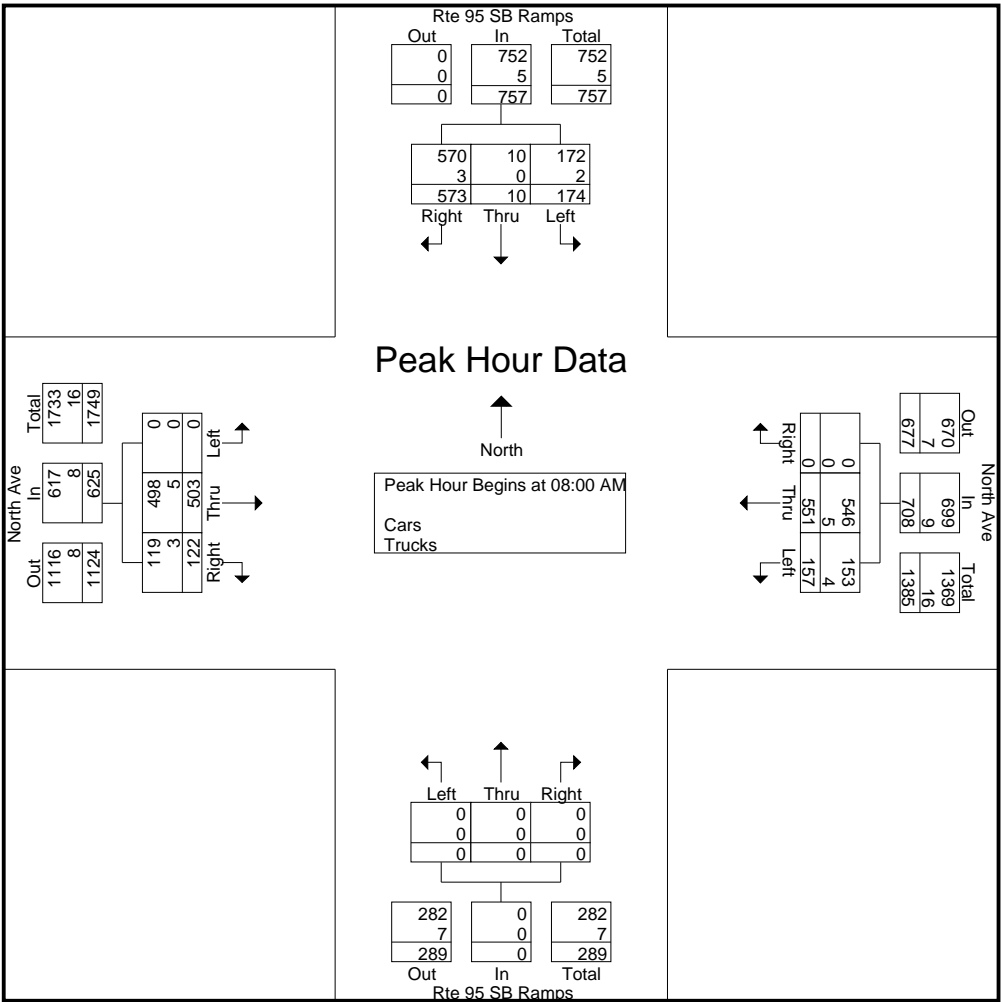
Start Time	Rte 95 SB Ramps From North				North Ave From East				Rte 95 SB Ramps From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	25	2	134	161	37	137	0	174	0	0	0	0	0	125	37	162	497
08:15 AM	43	3	148	194	33	132	0	165	0	0	0	0	0	122	26	148	507
08:30 AM	49	3	174	226	38	136	0	174	0	0	0	0	0	117	31	148	548
08:45 AM	57	2	117	176	49	146	0	195	0	0	0	0	0	139	28	167	538
Total Volume	174	10	573	757	157	551	0	708	0	0	0	0	0	503	122	625	2090
% App. Total	23	1.3	75.7		22.2	77.8	0		0	0	0		0	80.5	19.5		
PHF	.763	.833	.823	.837	.801	.943	.000	.908	.000	.000	.000	.000	.000	.905	.824	.936	.953
Cars	172	10	570	752	153	546	0	699	0	0	0	0	0	498	119	617	2068
% Cars	98.9	100	99.5	99.3	97.5	99.1	0	98.7	0	0	0	0	0	99.0	97.5	98.7	98.9
Trucks	2	0	3	5	4	5	0	9	0	0	0	0	0	5	3	8	22
% Trucks	1.1	0	0.5	0.7	2.5	0.9	0	1.3	0	0	0	0	0	1.0	2.5	1.3	1.1

Accurate Counts

978-664-2565

File Name : 79770001
 Site Code : 79770001
 Start Date : 7/26/2018
 Page No : 3

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear



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

Peak Hour for Each Approach Begins at:

	07:45 AM				08:00 AM				07:00 AM				08:00 AM			
+0 mins.	16	2	190	208	37	137	0	174	0	0	0	0	0	125	37	162
+15 mins.	25	2	134	161	33	132	0	165	0	0	0	0	0	122	26	148
+30 mins.	43	3	148	194	38	136	0	174	0	0	0	0	0	117	31	148
+45 mins.	49	3	174	226	49	146	0	195	0	0	0	0	0	139	28	167
Total Volume	133	10	646	789	157	551	0	708	0	0	0	0	0	503	122	625
% App. Total	16.9	1.3	81.9		22.2	77.8	0		0	0	0	0	0	80.5	19.5	

Accurate Counts

978-664-2565

File Name : 79770001

Site Code : 79770001

Start Date : 7/26/2018

Page No : 13

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

Start Time	Rte 95 SB Ramps From North				North Ave From East				Rte 95 SB Ramps From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	2
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Grand Total	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	4	0	4
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

Accurate Counts

978-664-2565

File Name : 79770001
 Site Code : 79770001
 Start Date : 7/26/2018
 Page No : 14

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

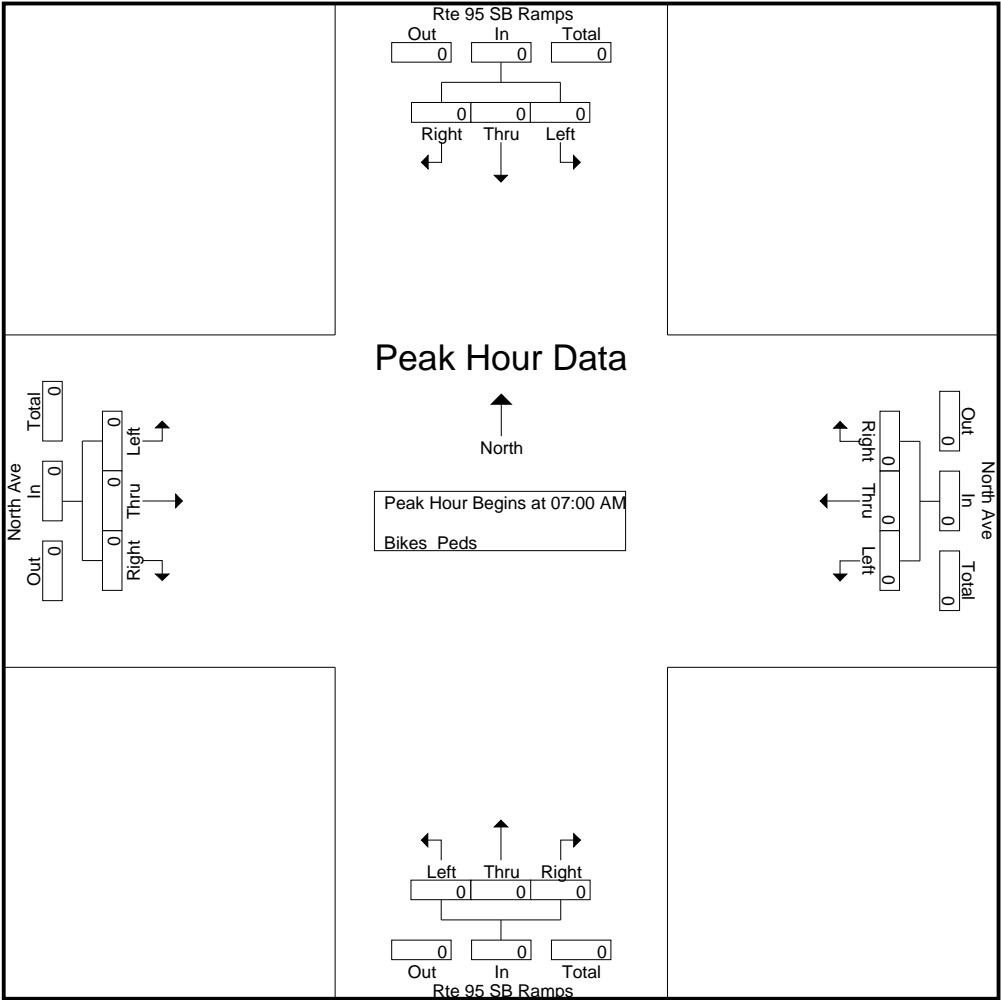
Start Time	Rte 95 SB Ramps From North				North Ave From East				Rte 95 SB Ramps From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

File Name : 79770001
 Site Code : 79770001
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear



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

Peak Hour for Each Approach Begins at:

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

Accurate Counts

978-664-2565

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770001
 Site Code : 79770001
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rte 95 SB Ramps From North			North Ave From East			Rte 95 SB Ramps From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	26	0	76	73	141	0	0	0	0	0	201	67	584
04:15 PM	20	0	81	49	143	0	0	0	0	0	187	51	531
04:30 PM	30	0	82	85	136	0	0	0	0	0	221	70	624
04:45 PM	19	0	76	54	143	0	0	0	0	0	203	69	564
Total	95	0	315	261	563	0	0	0	0	0	812	257	2303
05:00 PM	23	0	103	92	141	0	0	0	0	0	234	63	656
05:15 PM	23	0	85	63	121	0	0	0	0	0	191	67	550
05:30 PM	34	0	71	61	140	0	0	0	0	0	202	78	586
05:45 PM	30	0	91	52	136	0	0	0	0	0	184	55	548
Total	110	0	350	268	538	0	0	0	0	0	811	263	2340
Grand Total	205	0	665	529	1101	0	0	0	0	0	1623	520	4643
Apprch %	23.6	0	76.4	32.5	67.5	0	0	0	0	0	75.7	24.3	
Total %	4.4	0	14.3	11.4	23.7	0	0	0	0	0	35	11.2	
Cars	204	0	662	524	1097	0	0	0	0	0	1619	516	4622
% Cars	99.5	0	99.5	99.1	99.6	0	0	0	0	0	99.8	99.2	99.5
Trucks	1	0	3	5	4	0	0	0	0	0	4	4	21
% Trucks	0.5	0	0.5	0.9	0.4	0	0	0	0	0	0.2	0.8	0.5

Accurate Counts

978-664-2565

File Name : 79770001
 Site Code : 79770001
 Start Date : 7/26/2018
 Page No : 2

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

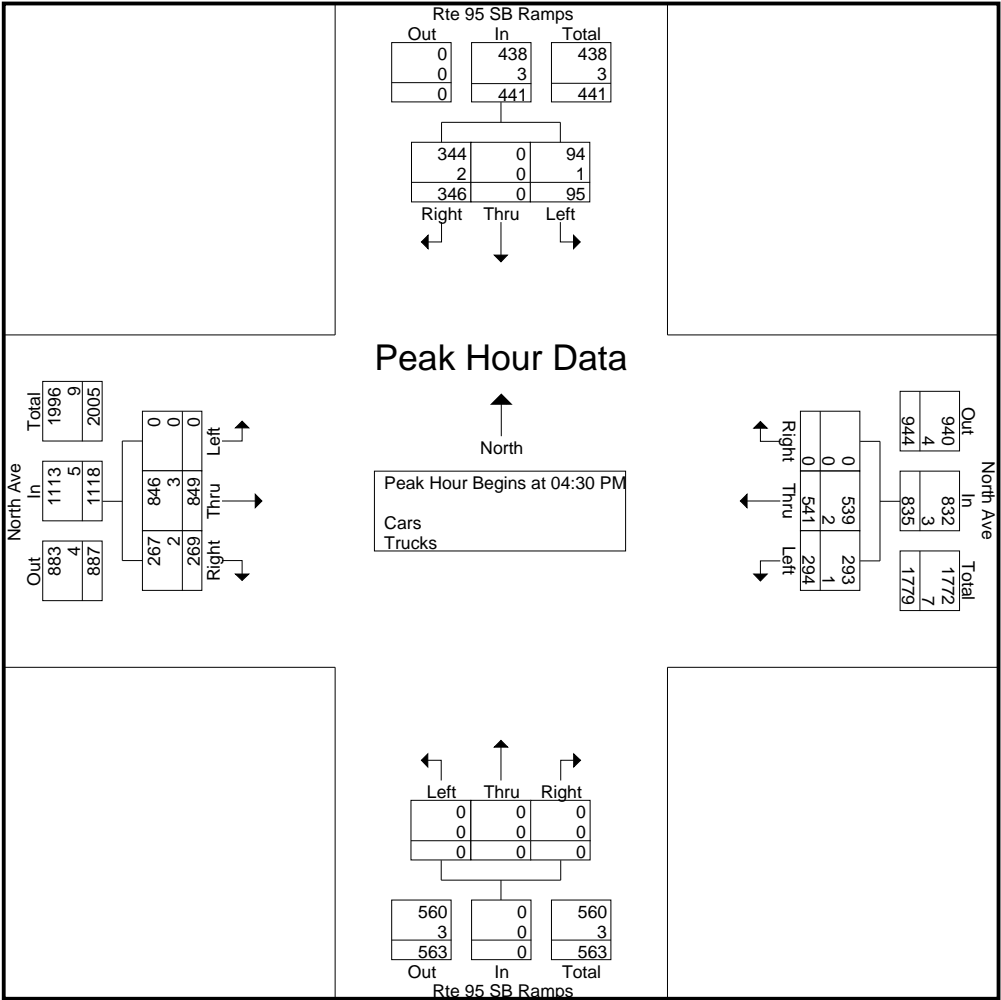
Start Time	Rte 95 SB Ramps From North				North Ave From East				Rte 95 SB Ramps From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	30	0	82	112	85	136	0	221	0	0	0	0	0	221	70	291	624
04:45 PM	19	0	76	95	54	143	0	197	0	0	0	0	0	203	69	272	564
05:00 PM	23	0	103	126	92	141	0	233	0	0	0	0	0	234	63	297	656
05:15 PM	23	0	85	108	63	121	0	184	0	0	0	0	0	191	67	258	550
Total Volume	95	0	346	441	294	541	0	835	0	0	0	0	0	849	269	1118	2394
% App. Total	21.5	0	78.5		35.2	64.8	0		0	0	0		0	75.9	24.1		
PHF	.792	.000	.840	.875	.799	.946	.000	.896	.000	.000	.000	.000	.000	.907	.961	.941	.912
Cars	94	0	344	438	293	539	0	832	0	0	0	0	0	846	267	1113	2383
% Cars	98.9	0	99.4	99.3	99.7	99.6	0	99.6	0	0	0	0	0	99.6	99.3	99.6	99.5
Trucks	1	0	2	3	1	2	0	3	0	0	0	0	0	3	2	5	11
% Trucks	1.1	0	0.6	0.7	0.3	0.4	0	0.4	0	0	0	0	0	0.4	0.7	0.4	0.5

Accurate Counts

978-664-2565

File Name : 79770001
 Site Code : 79770001
 Start Date : 7/26/2018
 Page No : 3

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	05:00 PM				04:15 PM				04:00 PM				04:30 PM			
+0 mins.	23	0	103	126	49	143	0	192	0	0	0	0	0	221	70	291
+15 mins.	23	0	85	108	85	136	0	221	0	0	0	0	0	203	69	272
+30 mins.	34	0	71	105	54	143	0	197	0	0	0	0	0	234	63	297
+45 mins.	30	0	91	121	92	141	0	233	0	0	0	0	0	191	67	258
Total Volume	110	0	350	460	280	563	0	843	0	0	0	0	0	849	269	1118
% App. Total	23.9	0	76.1		33.2	66.8	0		0	0	0	0	0	75.9	24.1	

Accurate Counts

978-664-2565

File Name : 79770001

Site Code : 79770001

Start Date : 7/26/2018

Page No : 13

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

Start Time	Rte 95 SB Ramps From North				North Ave From East				Rte 95 SB Ramps From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	2
Grand Total	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	2	1	3
Apprch %	0	0	0		0	0	0		0	0	0		0	100	0				
Total %	0	0	0		0	0	0		0	0	0		0	100	0		66.7	33.3	

Accurate Counts

978-664-2565

File Name : 79770001
 Site Code : 79770001
 Start Date : 7/26/2018
 Page No : 14

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

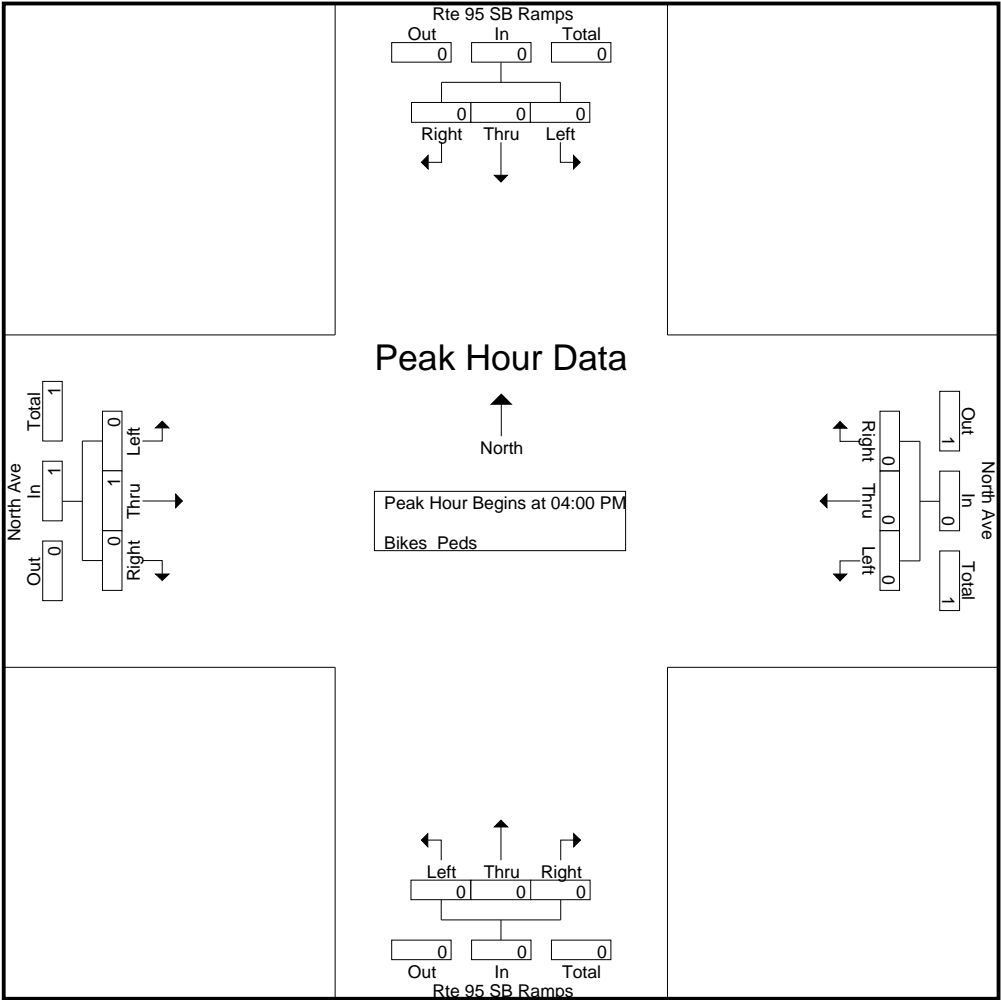
Start Time	Rte 95 SB Ramps From North				North Ave From East				Rte 95 SB Ramps From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250

Accurate Counts

978-664-2565

File Name : 79770001
 Site Code : 79770001
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0	

Accurate Counts

978-664-2565

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S1
 Site Code : 79770001
 Start Date : 7/28/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rte 95 SB Ramps From North			North Ave From East			Rte 95 SB Ramps From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:00 AM	38	0	107	53	210	0	0	0	0	0	180	71	659
11:15 AM	27	0	115	62	185	0	0	0	0	0	211	75	675
11:30 AM	23	0	123	55	197	0	0	0	0	0	164	79	641
11:45 AM	20	0	107	63	181	0	0	0	0	0	211	81	663
Total	108	0	452	233	773	0	0	0	0	0	766	306	2638
12:00 PM	28	0	114	49	222	0	0	0	0	0	192	81	686
12:15 PM	23	0	96	58	165	0	0	0	0	0	194	72	608
12:30 PM	36	0	120	57	180	0	0	0	0	0	197	80	670
12:45 PM	43	0	119	58	165	0	0	0	0	0	183	94	662
Total	130	0	449	222	732	0	0	0	0	0	766	327	2626
01:00 PM	22	0	92	40	183	0	0	0	0	0	200	93	630
01:15 PM	22	0	109	64	151	0	0	0	0	0	176	65	587
01:30 PM	24	1	109	67	172	0	0	0	0	0	182	74	629
01:45 PM	24	0	102	58	154	0	0	0	0	0	184	76	598
Total	92	1	412	229	660	0	0	0	0	0	742	308	2444
Grand Total	330	1	1313	684	2165	0	0	0	0	0	2274	941	7708
Apprch %	20.1	0.1	79.9	24	76	0	0	0	0	0	70.7	29.3	
Total %	4.3	0	17	8.9	28.1	0	0	0	0	0	29.5	12.2	
Cars	330	1	1312	680	2158	0	0	0	0	0	2269	940	7690
% Cars	100	100	99.9	99.4	99.7	0	0	0	0	0	99.8	99.9	99.8
Trucks	0	0	1	4	7	0	0	0	0	0	5	1	18
% Trucks	0	0	0.1	0.6	0.3	0	0	0	0	0	0.2	0.1	0.2

Accurate Counts

978-664-2565

File Name : 797700S1
 Site Code : 79770001
 Start Date : 7/28/2018
 Page No : 2

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

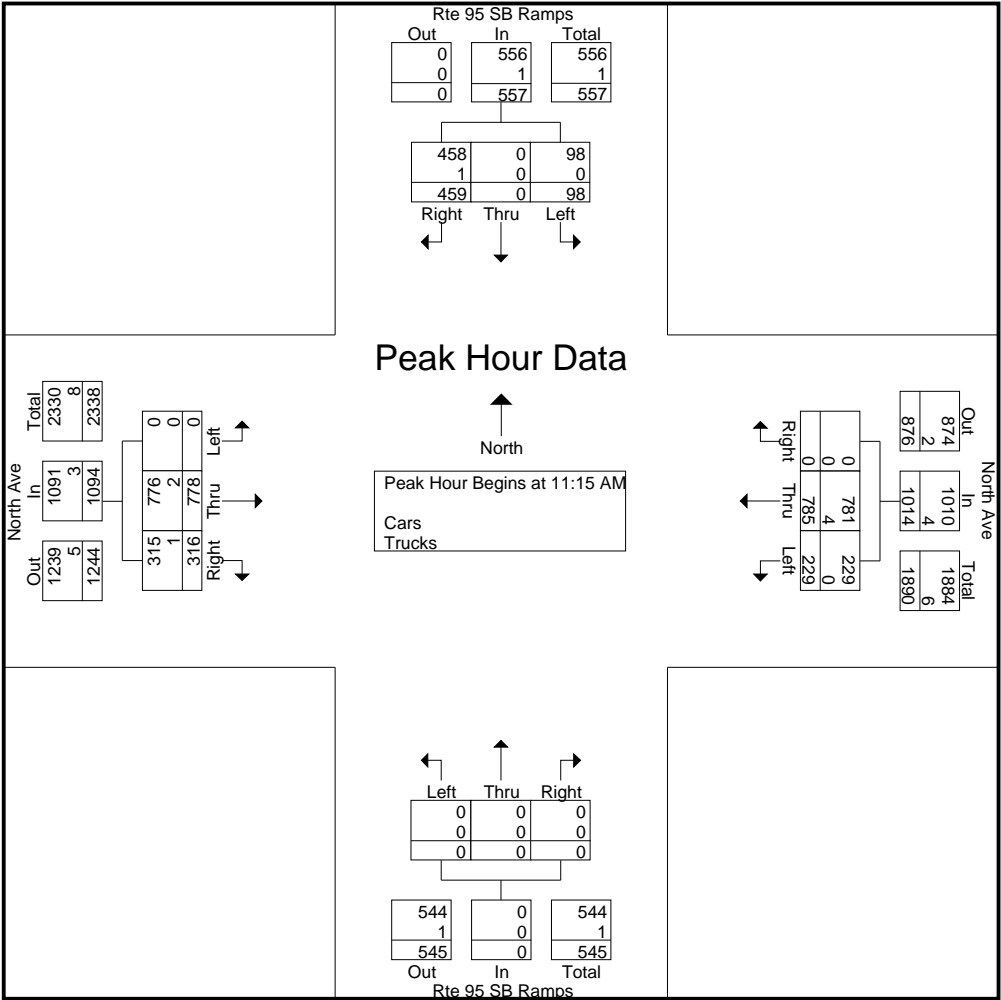
Start Time	Rte 95 SB Ramps From North				North Ave From East				Rte 95 SB Ramps From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	27	0	115	142	62	185	0	247	0	0	0	0	0	211	75	286	675
11:30 AM	23	0	123	146	55	197	0	252	0	0	0	0	0	164	79	243	641
11:45 AM	20	0	107	127	63	181	0	244	0	0	0	0	0	211	81	292	663
12:00 PM	28	0	114	142	49	222	0	271	0	0	0	0	0	192	81	273	686
Total Volume	98	0	459	557	229	785	0	1014	0	0	0	0	0	778	316	1094	2665
% App. Total	17.6	0	82.4		22.6	77.4	0		0	0	0		0	71.1	28.9		
PHF	.875	.000	.933	.954	.909	.884	.000	.935	.000	.000	.000	.000	.000	.922	.975	.937	.971
Cars	98	0	458	556	229	781	0	1010	0	0	0	0	0	776	315	1091	2657
% Cars	100	0	99.8	99.8	100	99.5	0	99.6	0	0	0	0	0	99.7	99.7	99.7	99.7
Trucks	0	0	1	1	0	4	0	4	0	0	0	0	0	2	1	3	8
% Trucks	0	0	0.2	0.2	0	0.5	0	0.4	0	0	0	0	0	0.3	0.3	0.3	0.3

Accurate Counts

978-664-2565

File Name : 797700S1
 Site Code : 79770001
 Start Date : 7/28/2018
 Page No : 3

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	12:00 PM				11:15 AM				11:00 AM				12:15 PM			
+0 mins.	28	0	114	142	62	185	0	247	0	0	0	0	0	194	72	266
+15 mins.	23	0	96	119	55	197	0	252	0	0	0	0	0	197	80	277
+30 mins.	36	0	120	156	63	181	0	244	0	0	0	0	0	183	94	277
+45 mins.	43	0	119	162	49	222	0	271	0	0	0	0	0	200	93	293
Total Volume	130	0	449	579	229	785	0	1014	0	0	0	0	0	774	339	1113
% App. Total	22.5	0	77.5		22.6	77.4	0		0	0	0		0	69.5	30.5	
PHF	.756	.000	.935	.894	.909	.884	.000	.935	.000	.000	.000	.000	.000	.968	.902	.950

Accurate Counts

978-664-2565

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S1
 Site Code : 79770001
 Start Date : 7/28/2018
 Page No : 13

Groups Printed- Bikes Peds

Start Time	Rte 95 SB Ramps From North				North Ave From East				Rte 95 SB Ramps From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
11:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
11:30 AM	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	2	1	3
11:45 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	0	0	1	2	0	0	0	0	0	2	0	1	0	0	2	4	6
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	2
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	2
01:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Grand Total	0	0	0	1	1	3	0	0	0	0	0	2	0	2	0	0	3	6	9
Apprch %	0	0	0		25	75	0		0	0	0		0	100	0				
Total %	0	0	0		16.7	50	0		0	0	0		0	33.3	0		33.3	66.7	

Accurate Counts

978-664-2565

File Name : 797700S1
 Site Code : 79770001
 Start Date : 7/28/2018
 Page No : 14

N/S Street : Route 95 SB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

Start Time	Rte 95 SB Ramps From North				North Ave From East				Rte 95 SB Ramps From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
11:15 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
11:30 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
11:45 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	1	2	0	3	0	0	0	0	0	1	0	1	4
% App. Total	0	0	0		33.3	66.7	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.250	.500	.000	.750	.000	.000	.000	.000	.000	.250	.000	.250	1.00

Accurate Counts

978-664-2565

File Name : 797700S1

Site Code : 79770001

Start Date : 7/28/2018

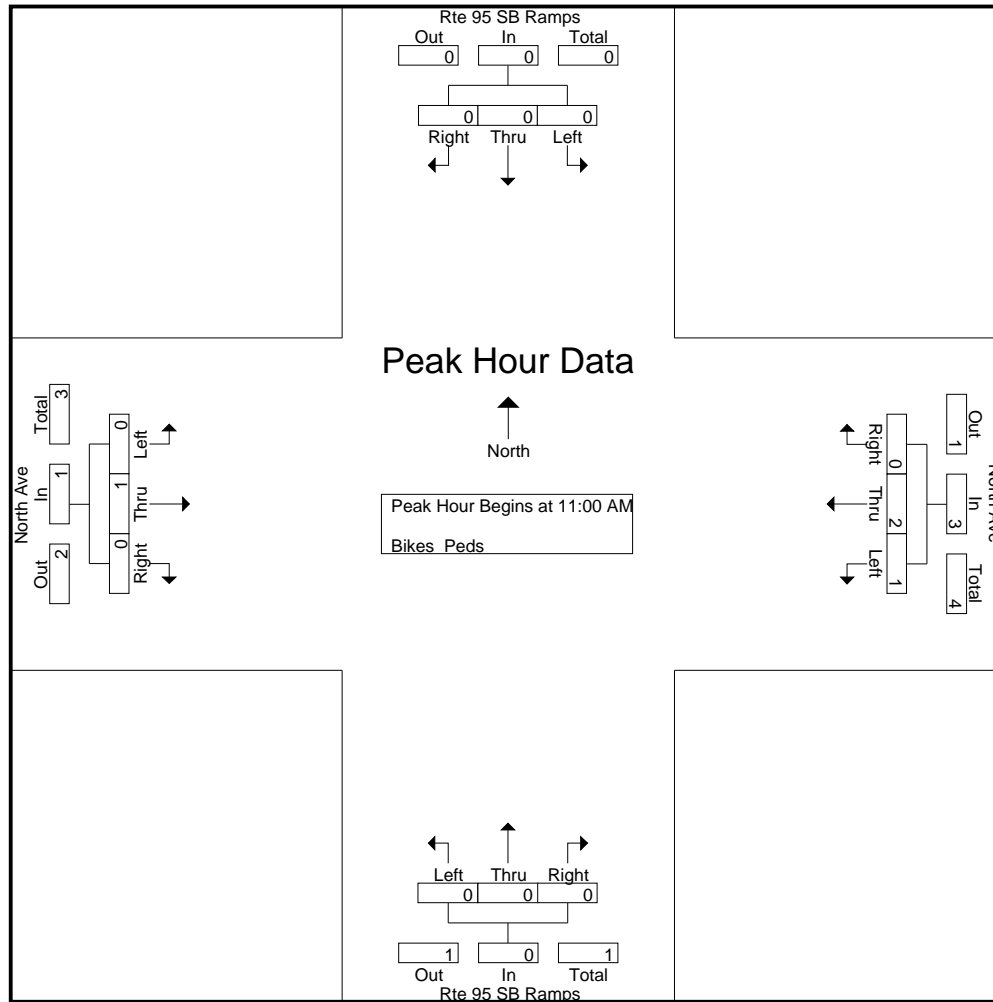
Page No : 15

N/S Street : Route 95 SB Ramps

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				11:00 AM				11:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+15 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	1	2	0	3	0	0	0	0	0	1	0	1
% App. Total	0	0	0	0	33.3	66.7	0	0	0	0	0	0	0	100	0	0
PHF	.000	.000	.000	.000	.250	.500	.000	.750	.000	.000	.000	.000	.000	.250	.000	.250

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770002
 Site Code : 79770002
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rte 95 NB Ramps From North			North Ave From East			Rte 95 NB Ramps From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	0	0	97	20	36	0	49	38	65	0	305
07:15 AM	0	0	0	0	102	23	33	0	60	41	69	0	328
07:30 AM	0	0	0	0	109	39	59	2	66	68	73	0	416
07:45 AM	0	0	0	0	117	19	31	1	62	44	97	0	371
Total	0	0	0	0	425	101	159	3	237	191	304	0	1420
08:00 AM	0	0	0	0	134	25	47	0	60	55	91	0	412
08:15 AM	0	0	0	0	106	18	46	0	82	32	132	0	416
08:30 AM	0	0	0	0	126	38	51	0	90	41	129	0	475
08:45 AM	0	0	0	0	136	30	60	0	92	41	152	0	511
Total	0	0	0	0	502	111	204	0	324	169	504	0	1814
Grand Total	0	0	0	0	927	212	363	3	561	360	808	0	3234
Apprch %	0	0	0	0	81.4	18.6	39.2	0.3	60.5	30.8	69.2	0	
Total %	0	0	0	0	28.7	6.6	11.2	0.1	17.3	11.1	25	0	
Cars	0	0	0	0	917	209	358	3	558	358	796	0	3199
% Cars	0	0	0	0	98.9	98.6	98.6	100	99.5	99.4	98.5	0	98.9
Trucks	0	0	0	0	10	3	5	0	3	2	12	0	35
% Trucks	0	0	0	0	1.1	1.4	1.4	0	0.5	0.6	1.5	0	1.1

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770002
 Site Code : 79770002
 Start Date : 7/26/2018
 Page No : 2

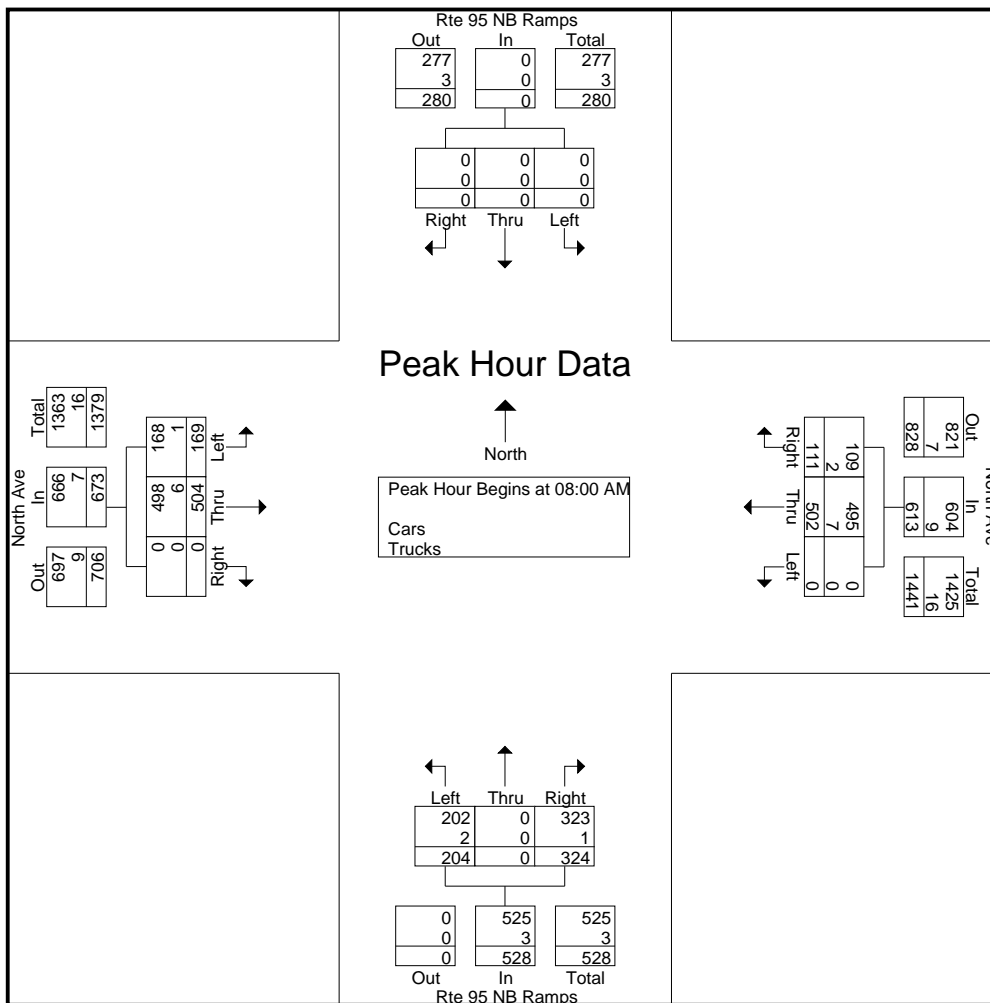
Start Time	Rte 95 NB Ramps From North				North Ave From East				Rte 95 NB Ramps From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	0	134	25	159	47	0	60	107	55	91	0	146	412
08:15 AM	0	0	0	0	0	106	18	124	46	0	82	128	32	132	0	164	416
08:30 AM	0	0	0	0	0	126	38	164	51	0	90	141	41	129	0	170	475
08:45 AM	0	0	0	0	0	136	30	166	60	0	92	152	41	152	0	193	511
Total Volume	0	0	0	0	0	502	111	613	204	0	324	528	169	504	0	673	1814
% App. Total	0	0	0		0	81.9	18.1		38.6	0	61.4		25.1	74.9	0		
PHF	.000	.000	.000	.000	.000	.923	.730	.923	.850	.000	.880	.868	.768	.829	.000	.872	.887
Cars	0	0	0	0	0	495	109	604	202	0	323	525	168	498	0	666	1795
% Cars	0	0	0	0	0	98.6	98.2	98.5	99.0	0	99.7	99.4	99.4	98.8	0	99.0	99.0
Trucks	0	0	0	0	0	7	2	9	2	0	1	3	1	6	0	7	19
% Trucks	0	0	0	0	0	1.4	1.8	1.5	1.0	0	0.3	0.6	0.6	1.2	0	1.0	1.0

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770002
 Site Code : 79770002
 Start Date : 7/26/2018
 Page No : 3



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

Peak Hour for Each Approach Begins at:

	07:00 AM				08:00 AM				08:00 AM				08:00 AM			
+0 mins.	0	0	0	0	0	134	25	159	47	0	60	107	55	91	0	146
+15 mins.	0	0	0	0	0	106	18	124	46	0	82	128	32	132	0	164
+30 mins.	0	0	0	0	0	126	38	164	51	0	90	141	41	129	0	170
+45 mins.	0	0	0	0	0	136	30	166	60	0	92	152	41	152	0	193
Total Volume	0	0	0	0	0	502	111	613	204	0	324	528	169	504	0	673
% App. Total	0	0	0	0	0	81.9	18.1		38.6	0	61.4		25.1	74.9	0	

Accurate Counts

978-664-2565

File Name : 79770002
 Site Code : 79770002
 Start Date : 7/26/2018
 Page No : 13

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

Start Time	Rte 95 NB Ramps From North				North Ave From East				Rte 95 NB Ramps From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

Accurate Counts

978-664-2565

File Name : 79770002
 Site Code : 79770002
 Start Date : 7/26/2018
 Page No : 14

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

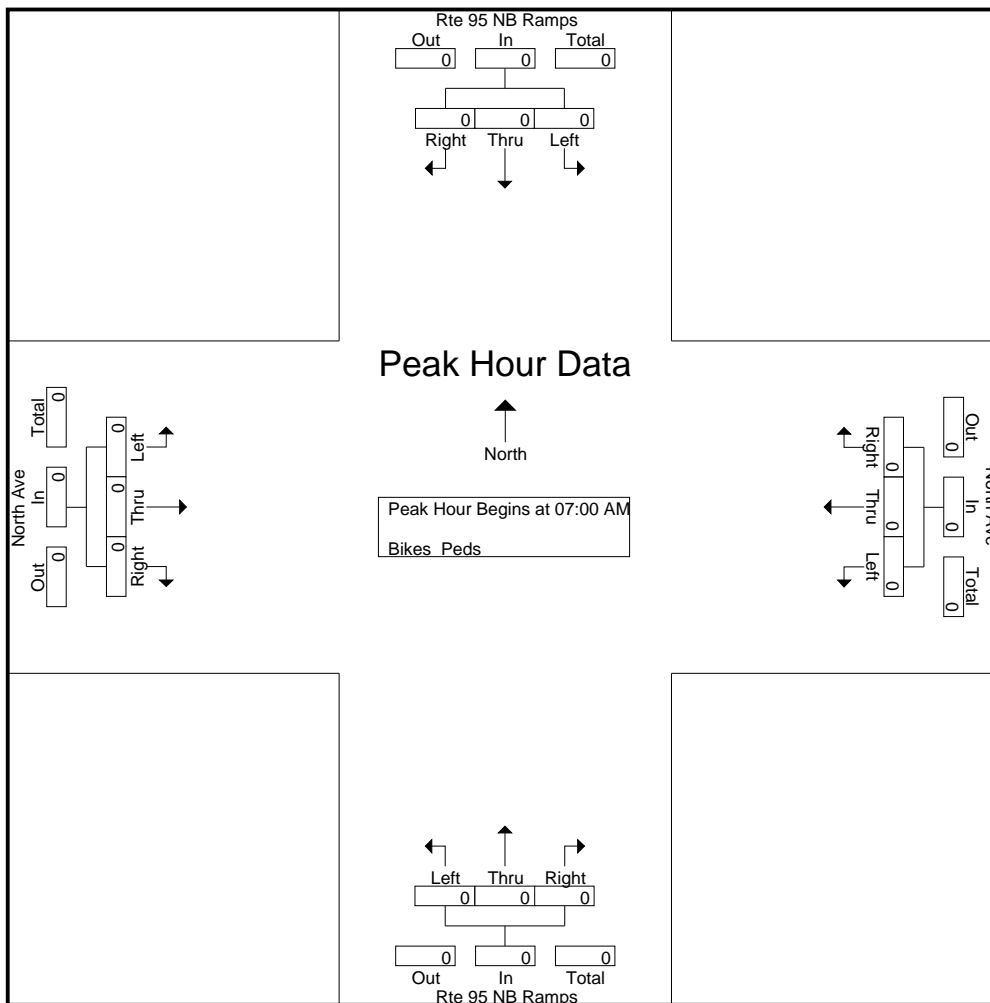
Start Time	Rte 95 NB Ramps From North				North Ave From East				Rte 95 NB Ramps From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770002
 Site Code : 79770002
 Start Date : 7/26/2018
 Page No : 15



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

Peak Hour for Each Approach Begins at:

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

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770002
 Site Code : 79770002
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rte 95 NB Ramps From North			North Ave From East			Rte 95 NB Ramps From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	0	0	0	174	48	36	1	42	97	118	0	516
04:15 PM	0	0	0	0	145	48	44	1	38	96	128	0	500
04:30 PM	0	0	0	0	201	46	26	0	50	98	137	0	558
04:45 PM	0	0	0	0	163	40	30	2	50	96	144	0	525
Total	0	0	0	0	683	182	136	4	180	387	527	0	2099
05:00 PM	0	0	0	0	202	58	31	1	54	85	152	0	583
05:15 PM	0	0	0	0	151	43	41	1	38	80	131	0	485
05:30 PM	0	0	0	0	169	39	26	3	60	83	158	0	538
05:45 PM	0	0	0	0	142	29	49	5	50	85	134	0	494
Total	0	0	0	0	664	169	147	10	202	333	575	0	2100
Grand Total	0	0	0	0	1347	351	283	14	382	720	1102	0	4199
Apprch %	0	0	0	0	79.3	20.7	41.7	2.1	56.3	39.5	60.5	0	
Total %	0	0	0	0	32.1	8.4	6.7	0.3	9.1	17.1	26.2	0	
Cars	0	0	0	0	1338	351	283	14	382	719	1098	0	4185
% Cars	0	0	0	0	99.3	100	100	100	100	99.9	99.6	0	99.7
Trucks	0	0	0	0	9	0	0	0	0	1	4	0	14
% Trucks	0	0	0	0	0.7	0	0	0	0	0.1	0.4	0	0.3

Accurate Counts

978-664-2565

File Name : 79770002
 Site Code : 79770002
 Start Date : 7/26/2018
 Page No : 2

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

Start Time	Rte 95 NB Ramps From North				North Ave From East				Rte 95 NB Ramps From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	0	0	0	0	145	48	193	44	1	38	83	96	128	0	224	500
04:30 PM	0	0	0	0	0	201	46	247	26	0	50	76	98	137	0	235	558
04:45 PM	0	0	0	0	0	163	40	203	30	2	50	82	96	144	0	240	525
05:00 PM	0	0	0	0	0	202	58	260	31	1	54	86	85	152	0	237	583
Total Volume	0	0	0	0	0	711	192	903	131	4	192	327	375	561	0	936	2166
% App. Total	0	0	0		0	78.7	21.3		40.1	1.2	58.7		40.1	59.9	0		
PHF	.000	.000	.000	.000	.000	.880	.828	.868	.744	.500	.889	.951	.957	.923	.000	.975	.929
Cars	0	0	0	0	0	708	192	900	131	4	192	327	374	557	0	931	2158
% Cars	0	0	0	0	0	99.6	100	99.7	100	100	100	100	99.7	99.3	0	99.5	99.6
Trucks	0	0	0	0	0	3	0	3	0	0	0	0	1	4	0	5	8
% Trucks	0	0	0	0	0	0.4	0	0.3	0	0	0	0	0.3	0.7	0	0.5	0.4

Accurate Counts

978-664-2565

File Name : 79770002

Site Code : 79770002

Start Date : 7/26/2018

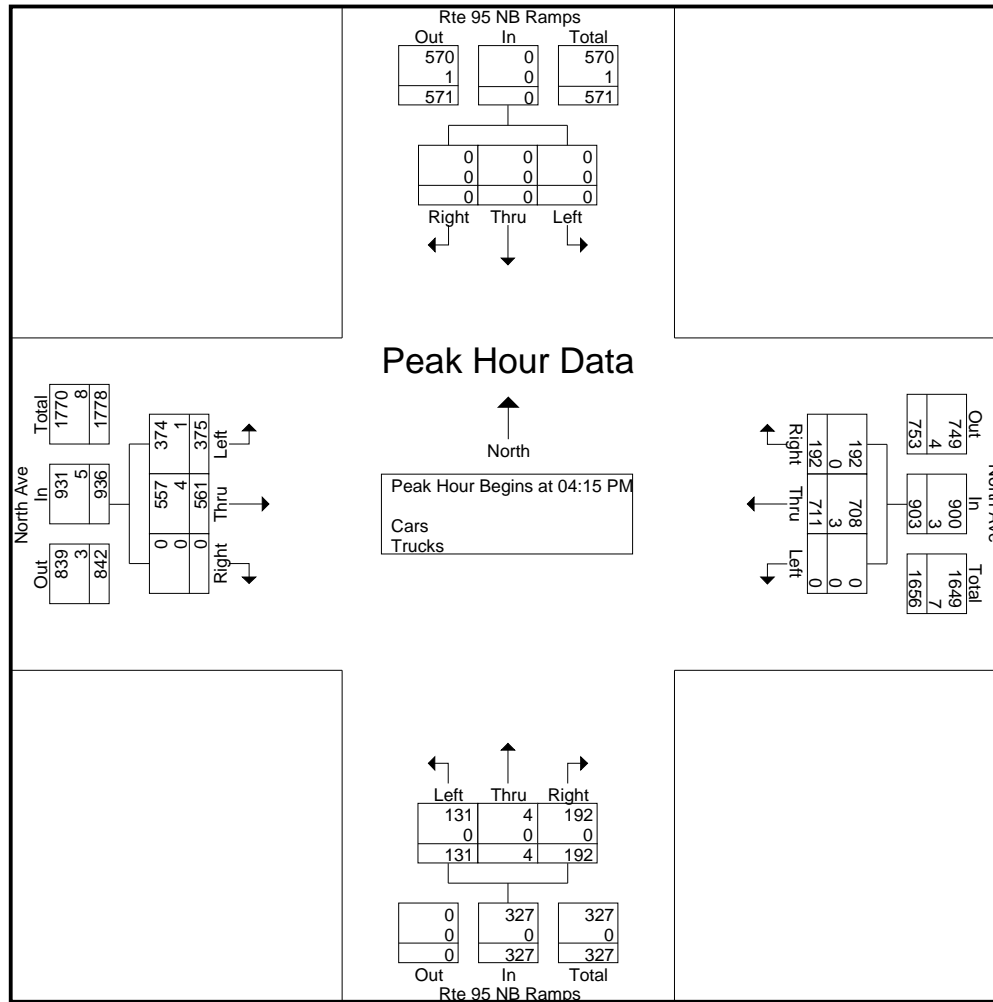
Page No : 3

N/S Street : Route 95 NB Ramps

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:30 PM				05:00 PM				04:15 PM			
+0 mins.	0	0	0	0	0	201	46	247	31	1	54	86	96	128	0	224
+15 mins.	0	0	0	0	0	163	40	203	41	1	38	80	98	137	0	235
+30 mins.	0	0	0	0	0	202	58	260	26	3	60	89	96	144	0	240
+45 mins.	0	0	0	0	0	151	43	194	49	5	50	104	85	152	0	237
Total Volume	0	0	0	0	0	717	187	904	147	10	202	359	375	561	0	936
% App. Total	0	0	0	0	0	79.3	20.7		40.9	2.8	56.3		40.1	59.9	0	

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770002
 Site Code : 79770002
 Start Date : 7/26/2018
 Page No : 13

Groups Printed- Bikes Peds

Start Time	Rte 95 NB Ramps From North				North Ave From East				Rte 95 NB Ramps From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
04:45 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	0	3
Grand Total	0	0	0	1	0	0	0	0	0	0	0	3	0	1	0	0	4	1	5
Apprch %	0	0	0		0	0	0		0	0	0		0	100	0				
Total %	0	0	0		0	0	0		0	0	0		0	100	0		80	20	

Accurate Counts

978-664-2565

File Name : 79770002
 Site Code : 79770002
 Start Date : 7/26/2018
 Page No : 14

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

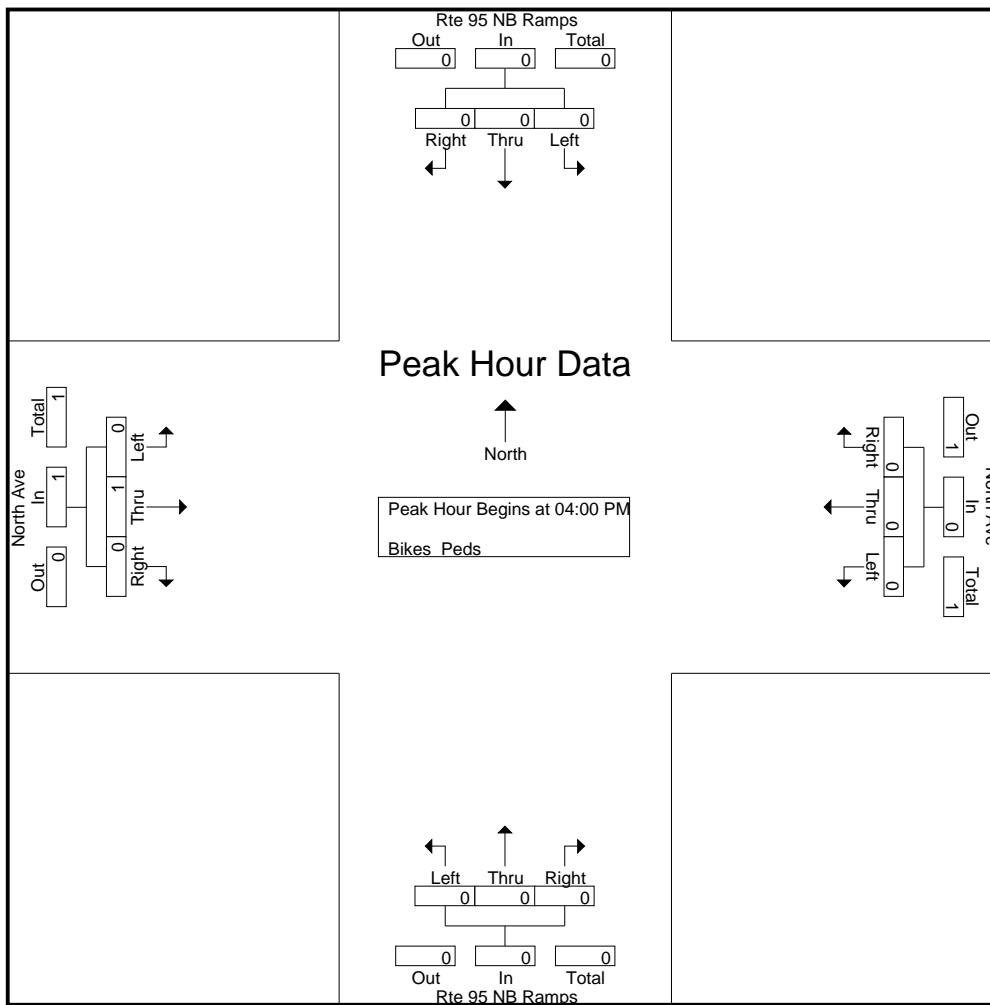
Start Time	Rte 95 NB Ramps From North				North Ave From East				Rte 95 NB Ramps From South				North Ave From West				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 04:00 PM																		
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0			
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250		.250

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770002
 Site Code : 79770002
 Start Date : 7/26/2018
 Page No : 15



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
% App. Total	0	0	0		0	0	0		0	0	0		0	100	0	

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S2
 Site Code : 79770002
 Start Date : 7/28/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rte 95 NB Ramps From North			North Ave From East			Rte 95 NB Ramps From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:00 AM	0	0	0	0	187	31	65	0	43	89	134	0	549
11:15 AM	0	0	0	0	186	31	65	2	54	107	125	0	570
11:30 AM	0	0	0	0	164	38	82	1	50	73	118	0	526
11:45 AM	0	0	0	0	180	30	71	2	44	93	133	0	553
Total	0	0	0	0	717	130	283	5	191	362	510	0	2198
12:00 PM	0	0	0	0	192	40	73	1	42	100	118	0	566
12:15 PM	0	0	0	0	165	24	56	0	27	93	128	0	493
12:30 PM	0	0	0	0	183	36	56	0	44	84	152	0	555
12:45 PM	0	0	0	0	168	32	62	0	44	77	140	0	523
Total	0	0	0	0	708	132	247	1	157	354	538	0	2137
01:00 PM	0	0	0	0	150	28	67	0	44	80	143	0	512
01:15 PM	0	0	0	0	151	25	61	0	35	95	110	0	477
01:30 PM	0	0	0	0	174	31	72	0	21	85	116	0	499
01:45 PM	0	0	0	0	146	22	64	0	49	92	118	0	491
Total	0	0	0	0	621	106	264	0	149	352	487	0	1979
Grand Total	0	0	0	0	2046	368	794	6	497	1068	1535	0	6314
Apprch %	0	0	0	0	84.8	15.2	61.2	0.5	38.3	41	59	0	
Total %	0	0	0	0	32.4	5.8	12.6	0.1	7.9	16.9	24.3	0	
Cars	0	0	0	0	2037	368	792	6	493	1067	1531	0	6294
% Cars	0	0	0	0	99.6	100	99.7	100	99.2	99.9	99.7	0	99.7
Trucks	0	0	0	0	9	0	2	0	4	1	4	0	20
% Trucks	0	0	0	0	0.4	0	0.3	0	0.8	0.1	0.3	0	0.3

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S2
 Site Code : 79770002
 Start Date : 7/28/2018
 Page No : 2

Start Time	Rte 95 NB Ramps From North				North Ave From East				Rte 95 NB Ramps From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:15 AM																	
11:15 AM	0	0	0	0	0	186	31	217	65	2	54	121	107	125	0	232	570
11:30 AM	0	0	0	0	0	164	38	202	82	1	50	133	73	118	0	191	526
11:45 AM	0	0	0	0	0	180	30	210	71	2	44	117	93	133	0	226	553
12:00 PM	0	0	0	0	0	192	40	232	73	1	42	116	100	118	0	218	566
Total Volume	0	0	0	0	0	722	139	861	291	6	190	487	373	494	0	867	2215
% App. Total	0	0	0		0	83.9	16.1		59.8	1.2	39		43	57	0		
PHF	.000	.000	.000	.000	.000	.940	.869	.928	.887	.750	.880	.915	.871	.929	.000	.934	.971
Cars	0	0	0	0	0	719	139	858	290	6	188	484	373	492	0	865	2207
% Cars	0	0	0	0	0	99.6	100	99.7	99.7	100	98.9	99.4	100	99.6	0	99.8	99.6
Trucks	0	0	0	0	0	3	0	3	1	0	2	3	0	2	0	2	8
% Trucks	0	0	0	0	0	0.4	0	0.3	0.3	0	1.1	0.6	0	0.4	0	0.2	0.4

Accurate Counts

978-664-2565

File Name : 797700S2

Site Code : 79770002

Start Date : 7/28/2018

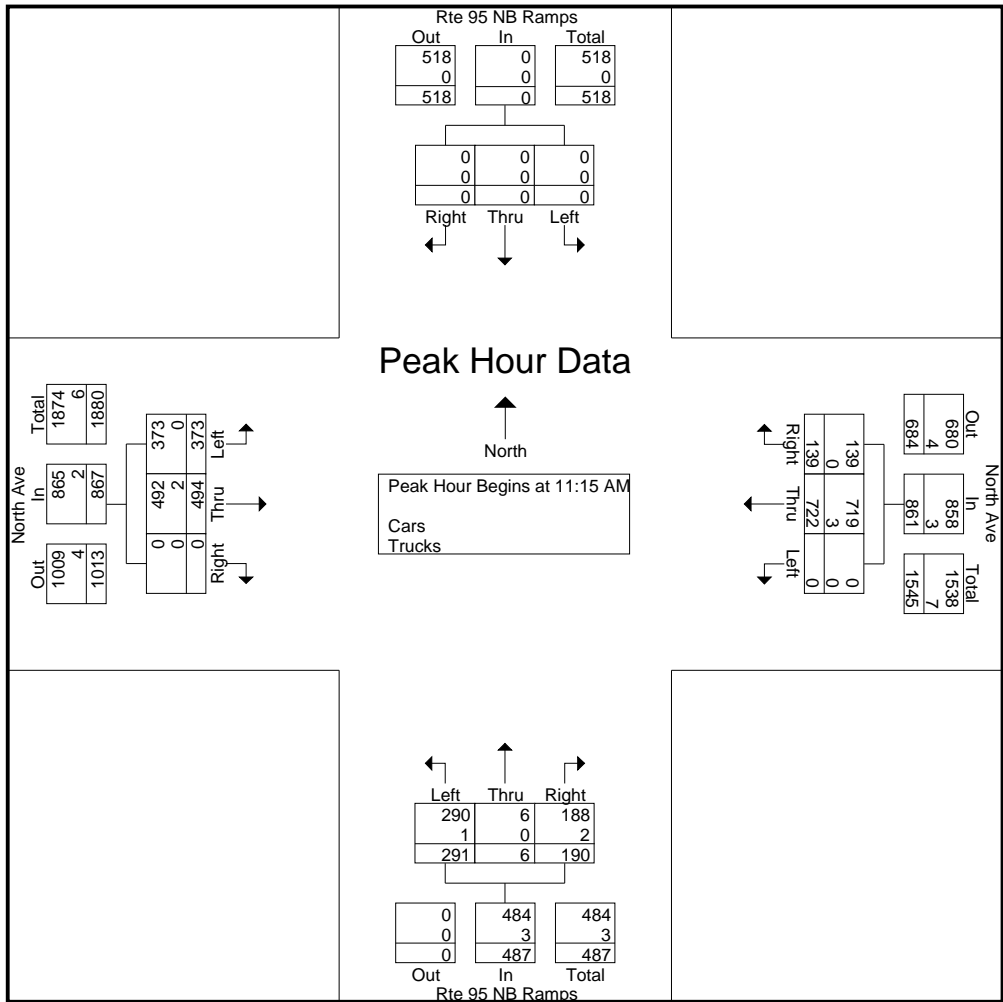
Page No : 3

N/S Street : Route 95 NB Ramps

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:15 AM				11:15 AM				11:45 AM			
+0 mins.	0	0	0	0	0	186	31	217	65	2	54	121	93	133	0	226
+15 mins.	0	0	0	0	0	164	38	202	82	1	50	133	100	118	0	218
+30 mins.	0	0	0	0	0	180	30	210	71	2	44	117	93	128	0	221
+45 mins.	0	0	0	0	0	192	40	232	73	1	42	116	84	152	0	236
Total Volume	0	0	0	0	0	722	139	861	291	6	190	487	370	531	0	901
% App. Total	0	0	0	0	0	83.9	16.1		59.8	1.2	39		41.1	58.9	0	
PHF	.000	.000	.000	.000	.000	.940	.869	.928	.887	.750	.880	.915	.925	.873	.000	.954

Accurate Counts

978-664-2565

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S2
 Site Code : 79770002
 Start Date : 7/28/2018
 Page No : 13

Groups Printed- Bikes Peds

Start Time	Rte 95 NB Ramps From North				North Ave From East				Rte 95 NB Ramps From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	2
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Total	0	0	0	0	0	1	0	0	0	0	0	2	0	1	0	0	2	2	4
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Grand Total	0	0	0	0	0	2	0	0	0	0	0	2	0	1	0	0	2	3	5
Apprch %	0	0	0		0	100	0		0	0	0		0	100	0				
Total %	0	0	0		0	66.7	0		0	0	0		0	33.3	0		40	60	

Accurate Counts

978-664-2565

File Name : 797700S2
 Site Code : 79770002
 Start Date : 7/28/2018
 Page No : 14

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

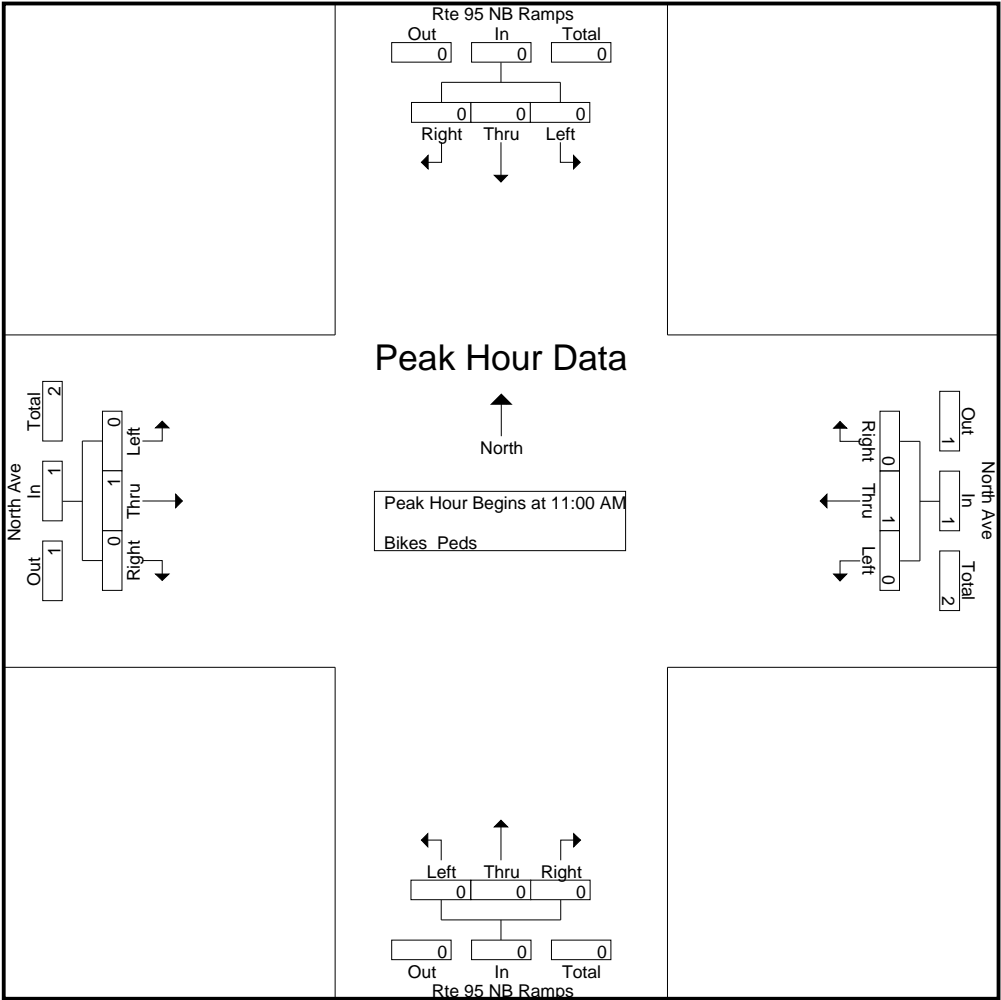
Start Time	Rte 95 NB Ramps From North				North Ave From East				Rte 95 NB Ramps From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250	.500

Accurate Counts

978-664-2565

File Name : 797700S2
 Site Code : 79770002
 Start Date : 7/28/2018
 Page No : 15

N/S Street : Route 95 NB Ramps
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				11:00 AM				11:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1
% App. Total	0	0	0	0	0	100	0	0	0	0	0	0	0	100	0	0
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250

Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770003
 Site Code : 79770003
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Quannapowitt Pkwy From North			North Ave From East			Private Dwy From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	4	0	10	2	100	10	3	0	1	10	96	11	247
07:15 AM	10	0	11	1	114	7	3	0	1	17	99	10	273
07:30 AM	3	0	18	0	116	5	10	0	1	14	104	20	291
07:45 AM	11	1	19	3	119	3	4	0	0	21	139	7	327
Total	28	1	58	6	449	25	20	0	3	62	438	48	1138
08:00 AM	12	1	20	1	128	8	4	0	0	17	118	9	318
08:15 AM	8	1	11	3	116	12	3	1	1	35	165	12	368
08:30 AM	5	0	11	6	139	12	6	0	1	43	169	11	403
08:45 AM	8	0	7	0	158	12	4	0	1	40	193	10	433
Total	33	2	49	10	541	44	17	1	3	135	645	42	1522
Grand Total	61	3	107	16	990	69	37	1	6	197	1083	90	2660
Apprch %	35.7	1.8	62.6	1.5	92.1	6.4	84.1	2.3	13.6	14.4	79.1	6.6	
Total %	2.3	0.1	4	0.6	37.2	2.6	1.4	0	0.2	7.4	40.7	3.4	
Cars	61	3	107	16	978	69	36	1	6	197	1069	89	2632
% Cars	100	100	100	100	98.8	100	97.3	100	100	100	98.7	98.9	98.9
Trucks	0	0	0	0	12	0	1	0	0	0	14	1	28
% Trucks	0	0	0	0	1.2	0	2.7	0	0	0	1.3	1.1	1.1

Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770003
 Site Code : 79770003
 Start Date : 7/26/2018
 Page No : 2

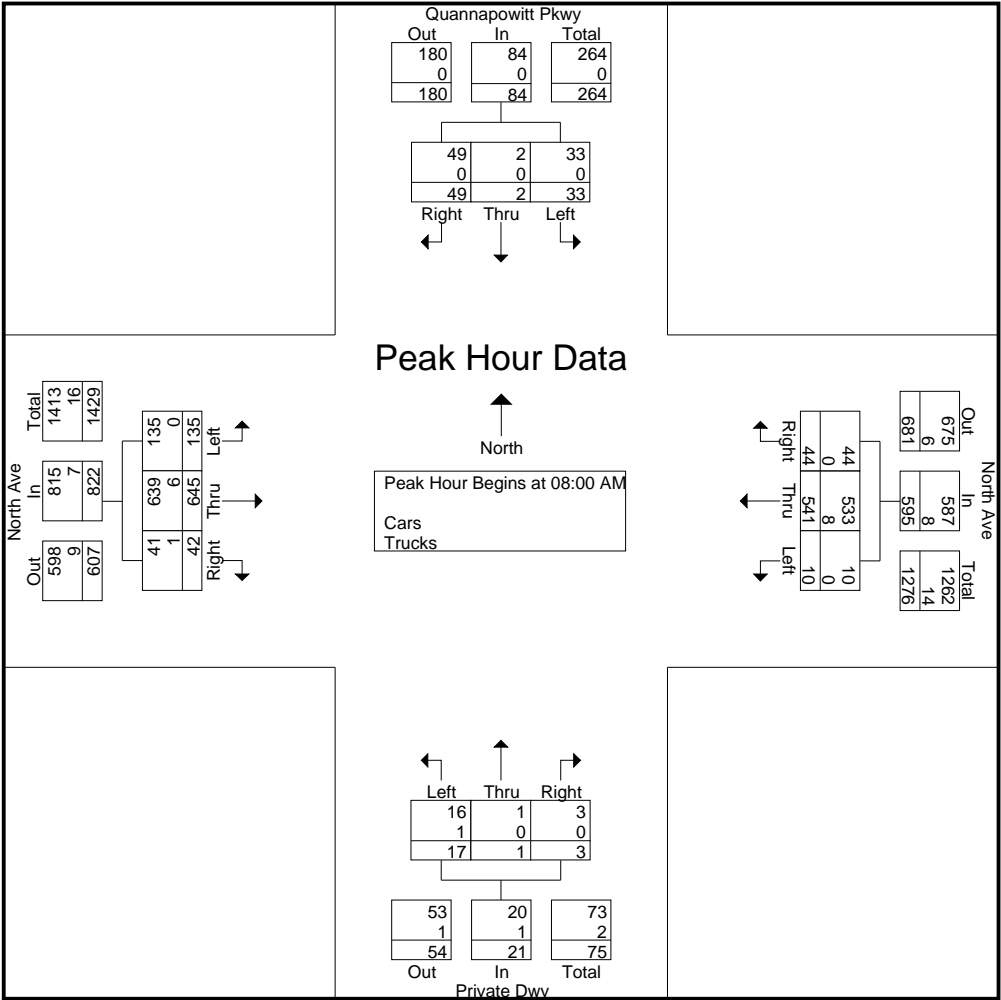
Start Time	Quannapowitt Pkwy From North				North Ave From East				Private Dwy From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	12	1	20	33	1	128	8	137	4	0	0	4	17	118	9	144	318
08:15 AM	8	1	11	20	3	116	12	131	3	1	1	5	35	165	12	212	368
08:30 AM	5	0	11	16	6	139	12	157	6	0	1	7	43	169	11	223	403
08:45 AM	8	0	7	15	0	158	12	170	4	0	1	5	40	193	10	243	433
Total Volume	33	2	49	84	10	541	44	595	17	1	3	21	135	645	42	822	1522
% App. Total	39.3	2.4	58.3		1.7	90.9	7.4		81	4.8	14.3		16.4	78.5	5.1		
PHF	.688	.500	.613	.636	.417	.856	.917	.875	.708	.250	.750	.750	.785	.835	.875	.846	.879
Cars	33	2	49	84	10	533	44	587	16	1	3	20	135	639	41	815	1506
% Cars	100	100	100	100	100	98.5	100	98.7	94.1	100	100	95.2	100	99.1	97.6	99.1	98.9
Trucks	0	0	0	0	0	8	0	8	1	0	0	1	0	6	1	7	16
% Trucks	0	0	0	0	0	1.5	0	1.3	5.9	0	0	4.8	0	0.9	2.4	0.9	1.1

Accurate Counts

978-664-2565

File Name : 79770003
 Site Code : 79770003
 Start Date : 7/26/2018
 Page No : 3

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear



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

Peak Hour for Each Approach Begins at:

	07:15 AM				08:00 AM				07:30 AM				08:00 AM			
+0 mins.	10	0	11	21	1	128	8	137	10	0	1	11	17	118	9	144
+15 mins.	3	0	18	21	3	116	12	131	4	0	0	4	35	165	12	212
+30 mins.	11	1	19	31	6	139	12	157	4	0	0	4	43	169	11	223
+45 mins.	12	1	20	33	0	158	12	170	3	1	1	5	40	193	10	243
Total Volume	36	2	68	106	10	541	44	595	21	1	2	24	135	645	42	822
% App. Total	34	1.9	64.2		1.7	90.9	7.4		87.5	4.2	8.3		16.4	78.5	5.1	

Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770003
 Site Code : 79770003
 Start Date : 7/26/2018
 Page No : 13

Groups Printed- Bikes Peds

Start Time	Quannapowitt Pkwy From North				North Ave From East				Private Dwy From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	3	0	3
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	2
Total	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	1	4	1	5
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	1	4	1	5
Apprch %	0	0	0		0	100	0		0	0	0		0	0	0				
Total %	0	0	0		0	100	0		0	0	0		0	0	0		80	20	

Accurate Counts

978-664-2565

File Name : 79770003
 Site Code : 79770003
 Start Date : 7/26/2018
 Page No : 14

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

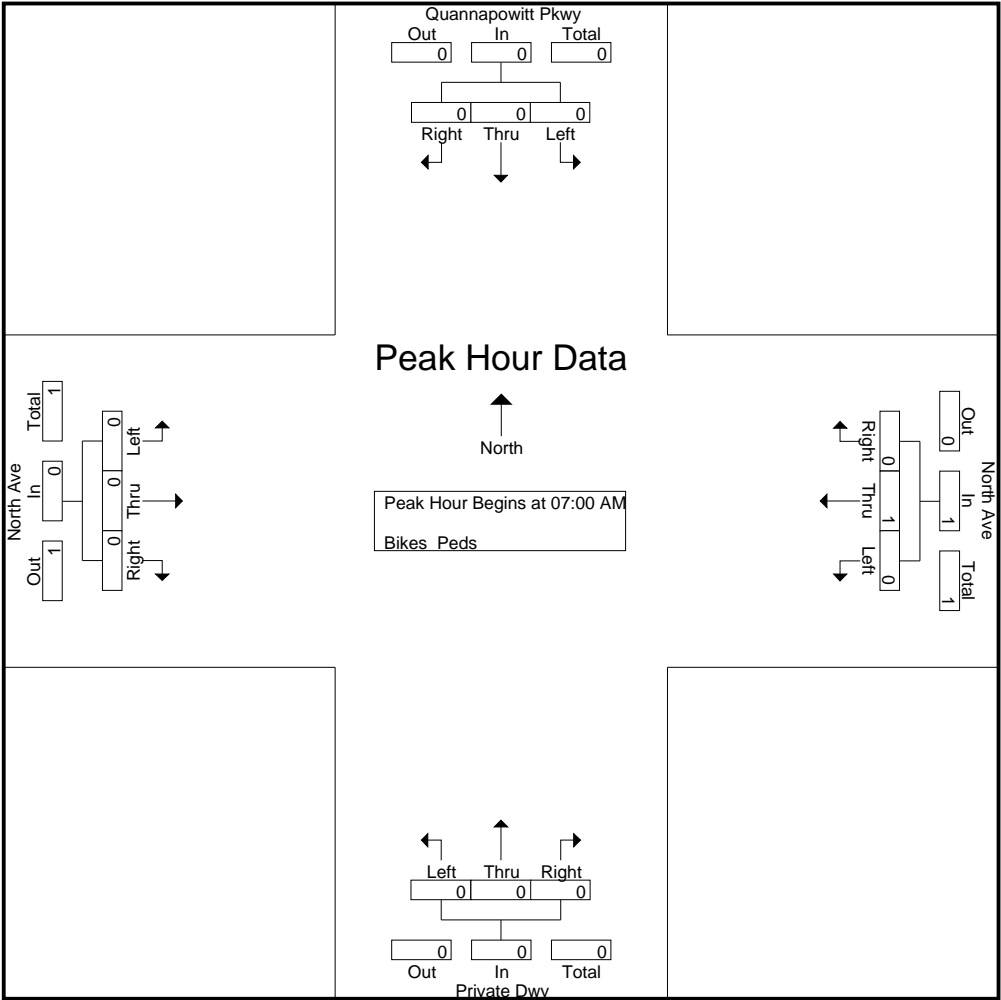
Start Time	Quannapowitt Pkwy From North				North Ave From East				Private Dwy From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
% App. Total	0	0	0		0	100	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.250

Accurate Counts

978-664-2565

File Name : 79770003
 Site Code : 79770003
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear



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

Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0

Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770003
 Site Code : 79770003
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Quannapowitt Pkwy From North			North Ave From East			Private Dwy From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	8	1	32	1	188	6	11	0	4	12	150	2	415
04:15 PM	10	0	19	2	159	11	7	1	3	9	148	5	374
04:30 PM	9	0	27	1	215	11	10	0	5	14	166	5	463
04:45 PM	5	2	22	2	162	14	12	0	2	18	178	4	421
Total	32	3	100	6	724	42	40	1	14	53	642	16	1673
05:00 PM	14	0	57	1	195	11	11	2	6	27	169	5	498
05:15 PM	14	0	31	3	159	11	7	0	2	21	149	5	402
05:30 PM	16	0	38	3	160	12	6	0	7	21	189	3	455
05:45 PM	13	0	29	0	132	15	8	0	5	22	155	3	382
Total	57	0	155	7	646	49	32	2	20	91	662	16	1737
Grand Total	89	3	255	13	1370	91	72	3	34	144	1304	32	3410
Apprch %	25.6	0.9	73.5	0.9	92.9	6.2	66.1	2.8	31.2	9.7	88.1	2.2	
Total %	2.6	0.1	7.5	0.4	40.2	2.7	2.1	0.1	1	4.2	38.2	0.9	
Cars	89	3	255	13	1361	91	72	3	34	144	1300	32	3397
% Cars	100	100	100	100	99.3	100	100	100	100	100	99.7	100	99.6
Trucks	0	0	0	0	9	0	0	0	0	0	4	0	13
% Trucks	0	0	0	0	0.7	0	0	0	0	0	0.3	0	0.4

Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770003
 Site Code : 79770003
 Start Date : 7/26/2018
 Page No : 2

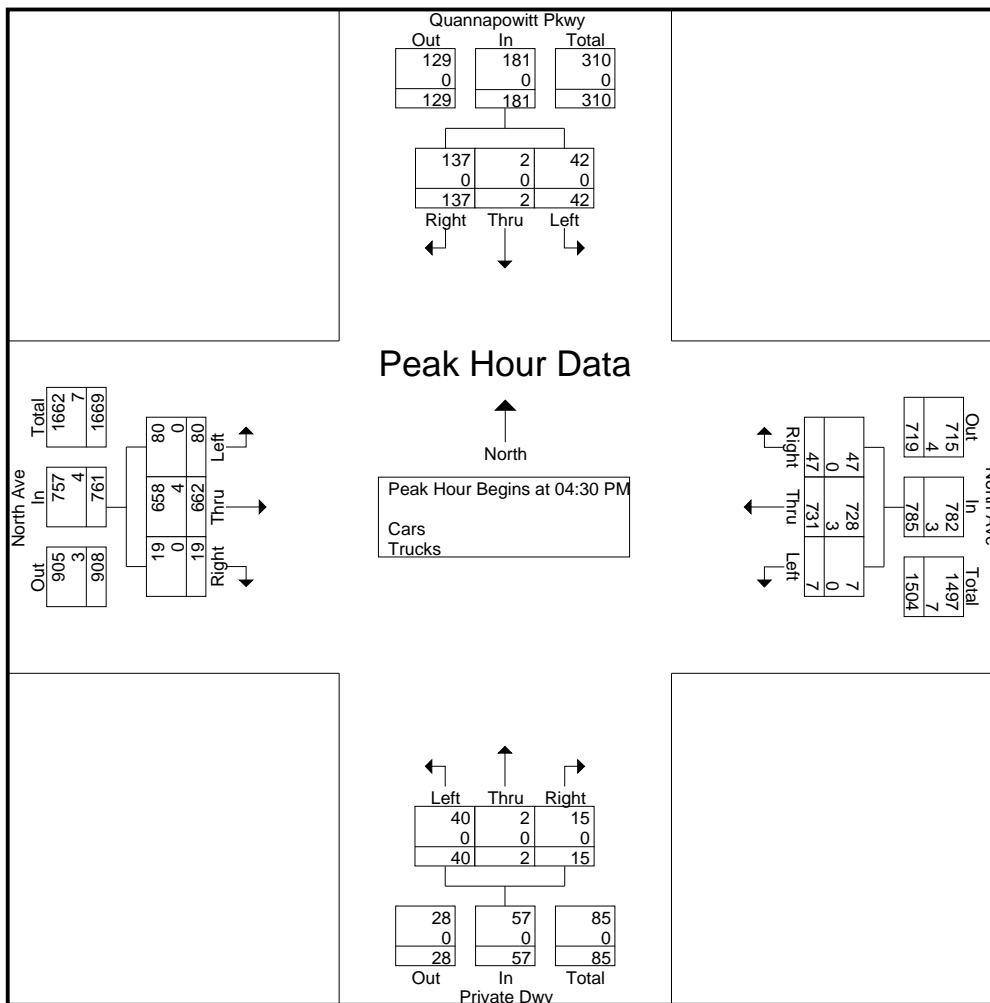
Start Time	Quannapowitt Pkwy From North				North Ave From East				Private Dwy From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	9	0	27	36	1	215	11	227	10	0	5	15	14	166	5	185	463
04:45 PM	5	2	22	29	2	162	14	178	12	0	2	14	18	178	4	200	421
05:00 PM	14	0	57	71	1	195	11	207	11	2	6	19	27	169	5	201	498
05:15 PM	14	0	31	45	3	159	11	173	7	0	2	9	21	149	5	175	402
Total Volume	42	2	137	181	7	731	47	785	40	2	15	57	80	662	19	761	1784
% App. Total	23.2	1.1	75.7		0.9	93.1	6		70.2	3.5	26.3		10.5	87	2.5		
PHF	.750	.250	.601	.637	.583	.850	.839	.865	.833	.250	.625	.750	.741	.930	.950	.947	.896
Cars	42	2	137	181	7	728	47	782	40	2	15	57	80	658	19	757	1777
% Cars	100	100	100	100	100	99.6	100	99.6	100	100	100	100	100	99.4	100	99.5	99.6
Trucks	0	0	0	0	0	3	0	3	0	0	0	0	0	4	0	4	7
% Trucks	0	0	0	0	0	0.4	0	0.4	0	0	0	0	0	0.6	0	0.5	0.4

Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770003
 Site Code : 79770003
 Start Date : 7/26/2018
 Page No : 3



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	05:00 PM				04:30 PM				04:15 PM				04:45 PM			
+0 mins.	14	0	57	71	1	215	11	227	7	1	3	11	18	178	4	200
+15 mins.	14	0	31	45	2	162	14	178	10	0	5	15	27	169	5	201
+30 mins.	16	0	38	54	1	195	11	207	12	0	2	14	21	149	5	175
+45 mins.	13	0	29	42	3	159	11	173	11	2	6	19	21	189	3	213
Total Volume	57	0	155	212	7	731	47	785	40	3	16	59	87	685	17	789
% App. Total	26.9	0	73.1		0.9	93.1	6		67.8	5.1	27.1		11	86.8	2.2	

Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770003
 Site Code : 79770003
 Start Date : 7/26/2018
 Page No : 13

Groups Printed- Bikes Peds

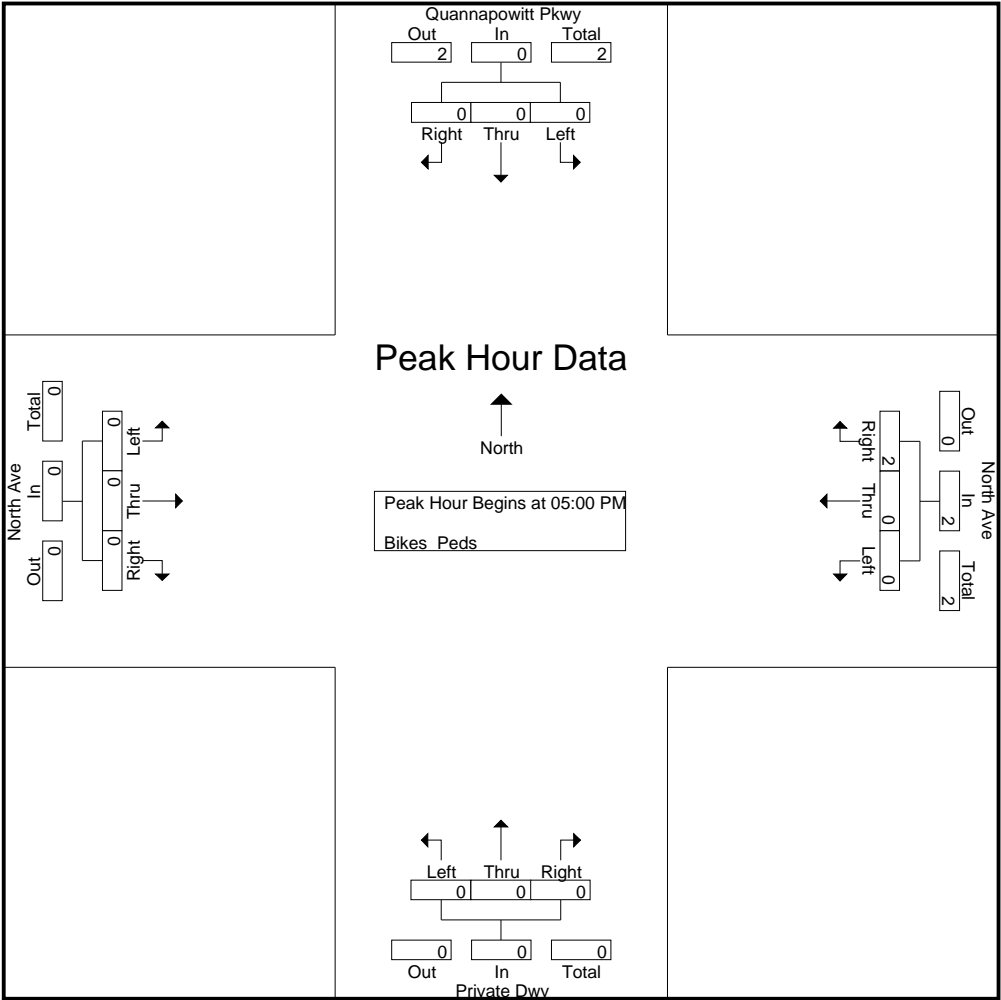
Start Time	Quannapowitt Pkwy From North				North Ave From East				Private Dwy From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	2
05:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
05:30 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
05:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	2
Total	0	0	0	0	0	0	2	2	0	0	0	2	0	0	0	1	5	2	7
Grand Total	0	0	0	0	0	0	2	2	0	0	0	2	0	1	0	1	5	3	8
Apprch %	0	0	0		0	0	100		0	0	0		0	100	0				
Total %	0	0	0		0	0	66.7		0	0	0		0	33.3	0		62.5	37.5	

Accurate Counts

978-664-2565

File Name : 79770003
 Site Code : 79770003
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				05:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	2	2	0	0	0	0	0	1	0	1
% App. Total	0	0	0		0	0	100		0	0	0		0	100	0	

Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S3
 Site Code : 79770003
 Start Date : 7/28/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Quannapowitt Pkwy From North			North Ave From East			Private Dwy From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:00 AM	11	1	5	3	203	5	7	1	2	9	151	11	409
11:15 AM	2	0	7	2	198	9	14	0	3	10	159	10	414
11:30 AM	6	1	2	1	186	14	8	0	1	10	151	11	391
11:45 AM	8	0	4	1	202	9	12	0	1	14	151	8	410
Total	27	2	18	7	789	37	41	1	7	43	612	40	1624
12:00 PM	5	0	5	2	202	14	16	0	1	5	143	13	406
12:15 PM	3	0	4	3	179	14	10	0	5	7	150	4	379
12:30 PM	3	0	9	2	203	10	4	0	3	12	172	7	425
12:45 PM	4	0	10	0	188	7	8	0	2	5	171	13	408
Total	15	0	28	7	772	45	38	0	11	29	636	37	1618
01:00 PM	2	0	7	3	162	3	4	1	6	10	166	5	369
01:15 PM	3	0	6	1	157	5	11	0	3	6	136	4	332
01:30 PM	6	0	8	1	194	4	6	0	6	6	126	7	364
01:45 PM	5	0	3	1	162	4	4	0	3	11	148	6	347
Total	16	0	24	6	675	16	25	1	18	33	576	22	1412
Grand Total	58	2	70	20	2236	98	104	2	36	105	1824	99	4654
Apprch %	44.6	1.5	53.8	0.8	95	4.2	73.2	1.4	25.4	5.2	89.9	4.9	
Total %	1.2	0	1.5	0.4	48	2.1	2.2	0	0.8	2.3	39.2	2.1	
Cars	58	2	70	20	2227	98	104	2	36	105	1816	99	4637
% Cars	100	100	100	100	99.6	100	100	100	100	100	99.6	100	99.6
Trucks	0	0	0	0	9	0	0	0	0	0	8	0	17
% Trucks	0	0	0	0	0.4	0	0	0	0	0	0.4	0	0.4

Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S3
 Site Code : 79770003
 Start Date : 7/28/2018
 Page No : 2

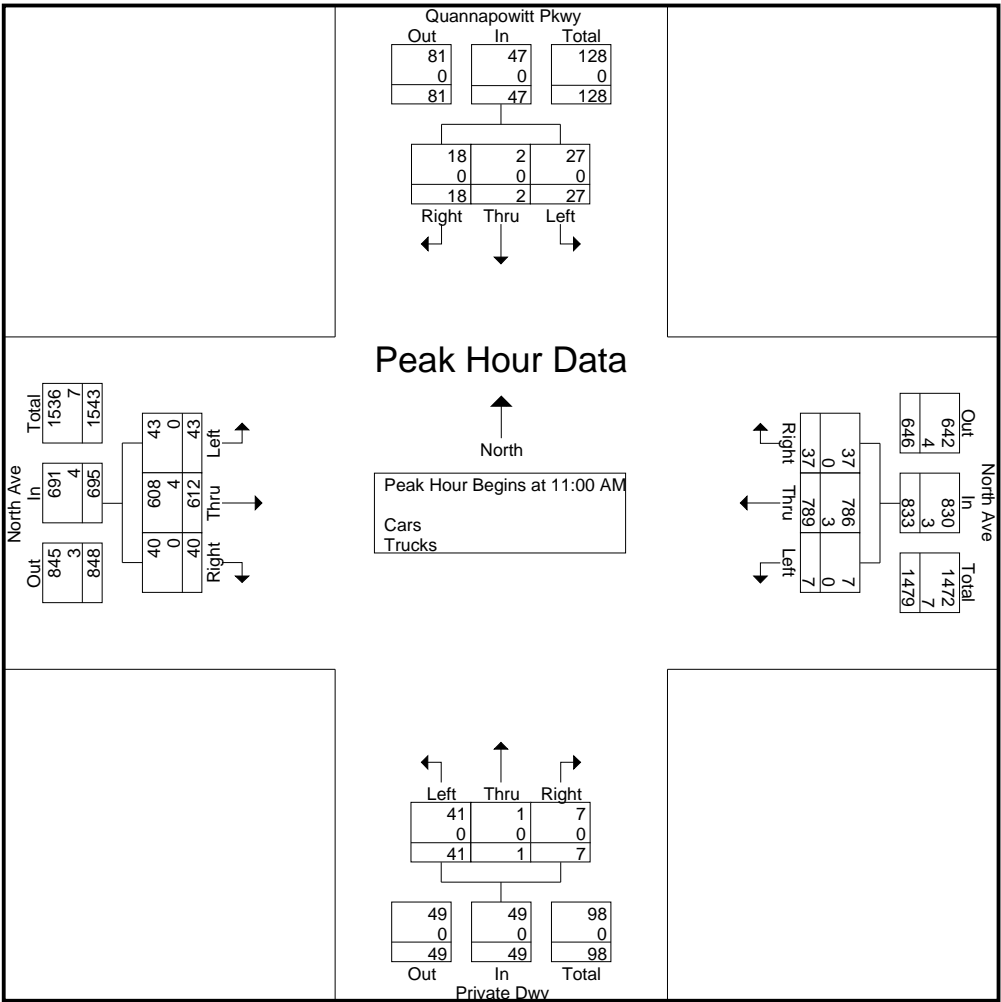
Start Time	Quannapowitt Pkwy From North				North Ave From East				Private Dwy From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	11	1	5	17	3	203	5	211	7	1	2	10	9	151	11	171	409
11:15 AM	2	0	7	9	2	198	9	209	14	0	3	17	10	159	10	179	414
11:30 AM	6	1	2	9	1	186	14	201	8	0	1	9	10	151	11	172	391
11:45 AM	8	0	4	12	1	202	9	212	12	0	1	13	14	151	8	173	410
Total Volume	27	2	18	47	7	789	37	833	41	1	7	49	43	612	40	695	1624
% App. Total	57.4	4.3	38.3		0.8	94.7	4.4		83.7	2	14.3		6.2	88.1	5.8		
PHF	.614	.500	.643	.691	.583	.972	.661	.982	.732	.250	.583	.721	.768	.962	.909	.971	.981
Cars	27	2	18	47	7	786	37	830	41	1	7	49	43	608	40	691	1617
% Cars	100	100	100	100	100	99.6	100	99.6	100	100	100	100	100	99.3	100	99.4	99.6
Trucks	0	0	0	0	0	3	0	3	0	0	0	0	0	4	0	4	7
% Trucks	0	0	0	0	0	0.4	0	0.4	0	0	0	0	0	0.7	0	0.6	0.4

Accurate Counts

978-664-2565

File Name : 797700S3
 Site Code : 79770003
 Start Date : 7/28/2018
 Page No : 3

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:45 AM				11:15 AM				12:15 PM			
+0 mins.	11	1	5	17	1	202	9	212	14	0	3	17	7	150	4	161
+15 mins.	2	0	7	9	2	202	14	218	8	0	1	9	12	172	7	191
+30 mins.	6	1	2	9	3	179	14	196	12	0	1	13	5	171	13	189
+45 mins.	8	0	4	12	2	203	10	215	16	0	1	17	10	166	5	181
Total Volume	27	2	18	47	8	786	47	841	50	0	6	56	34	659	29	722
% App. Total	57.4	4.3	38.3		1	93.5	5.6		89.3	0	10.7		4.7	91.3	4	
PHF	.614	.500	.643	.691	.667	.968	.839	.964	.781	.000	.500	.824	.708	.958	.558	.945

Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S3
 Site Code : 79770003
 Start Date : 7/28/2018
 Page No : 13

Groups Printed- Bikes Peds

Start Time	Quannapowitt Pkwy From North				North Ave From East				Private Dwy From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
11:00 AM	0	0	0	1	0	0	2	0	0	0	0	0	0	1	0	1	2	3	5
11:15 AM	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	4	4
11:30 AM	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	1	1	3	4
11:45 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	1	2	3
Total	0	0	0	1	0	2	9	0	0	0	0	0	0	1	0	3	4	12	16
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
12:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
12:45 PM	0	0	0	0	0	1	3	0	0	0	0	0	1	0	1	0	0	6	6
Total	0	0	0	0	0	1	5	0	0	0	0	0	1	0	1	0	0	8	8
01:00 PM	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	3	3
01:15 PM	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	4	4
01:30 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	4
01:45 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	3
Total	0	0	0	0	0	2	12	0	0	0	0	0	0	0	0	0	0	14	14
Grand Total	0	0	0	1	0	5	26	0	0	0	0	0	1	1	1	3	4	34	38
Apprch %	0	0	0		0	16.1	83.9		0	0	0		33.3	33.3	33.3				
Total %	0	0	0		0	14.7	76.5		0	0	0		2.9	2.9	2.9		10.5	89.5	

Accurate Counts

978-664-2565

File Name : 797700S3
 Site Code : 79770003
 Start Date : 7/28/2018
 Page No : 14

N/S Street : Quannapowitt Parkway
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Clear

Start Time	Quannapowitt Pkwy From North				North Ave From East				Private Dwy From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	0	0	0	0	0	1	3	4	0	0	0	0	1	0	1	2	6
01:00 PM	0	0	0	0	0	1	2	3	0	0	0	0	0	0	0	0	3
01:15 PM	0	0	0	0	0	1	3	4	0	0	0	0	0	0	0	0	4
01:30 PM	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0	4
Total Volume	0	0	0	0	0	3	12	15	0	0	0	0	1	0	1	2	17
% App. Total	0	0	0		0	20	80		0	0	0		50	0	50		
PHF	.000	.000	.000	.000	.000	.750	.750	.938	.000	.000	.000	.000	.250	.000	.250	.250	.708

Accurate Counts

978-664-2565

File Name : 797700S3

Site Code : 79770003

Start Date : 7/28/2018

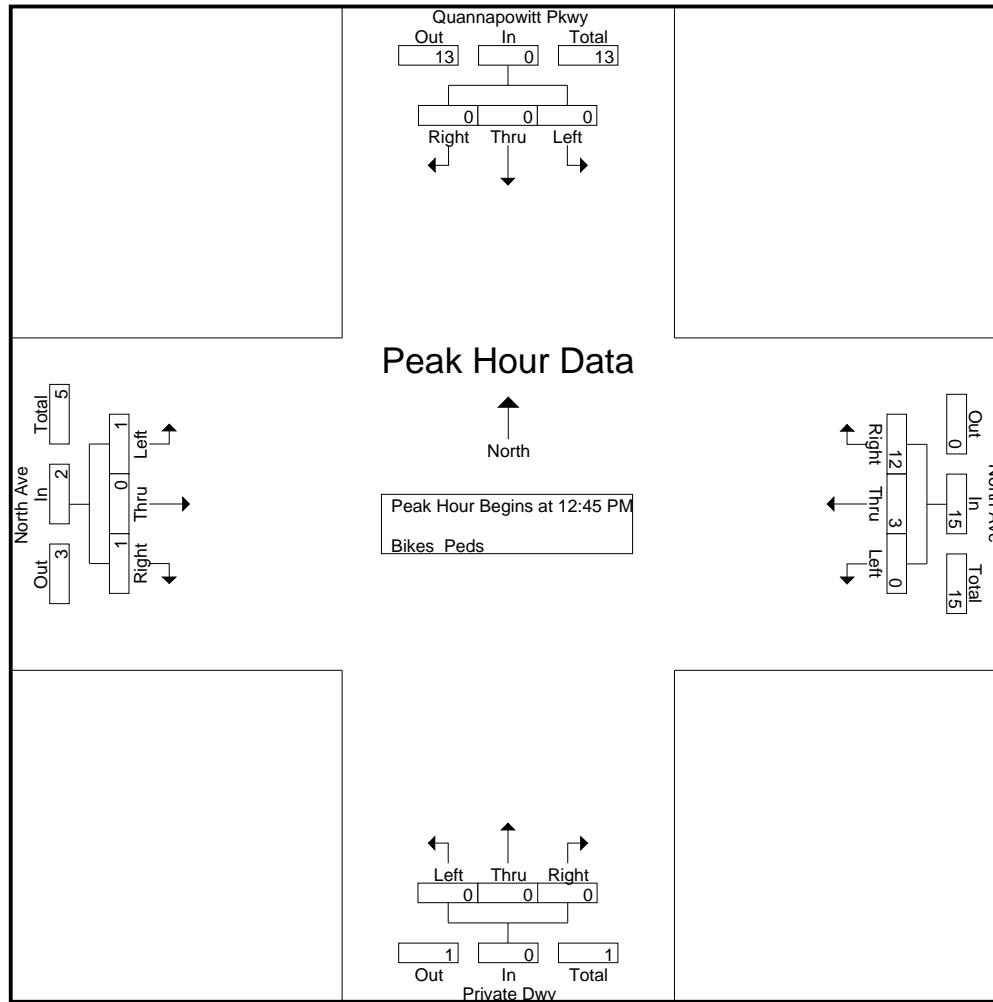
Page No : 15

N/S Street : Quannapowitt Parkway

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				12:45 PM				11:00 AM				12:00 PM			
+0 mins.	0	0	0	0	0	1	3	4	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	1	2	3	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	1	3	4	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	4	4	0	0	0	0	1	0	1	2
Total Volume	0	0	0	0	0	3	12	15	0	0	0	0	1	0	1	2
% App. Total	0	0	0	0	0	20	80	938	0	0	0	0	50	0	50	250
PHF	.000	.000	.000	.000	.000	.750	.750	.938	.000	.000	.000	.000	.250	.000	.250	.250

Accurate Counts

978-664-2565

File Name : 79770004

Site Code : 77970004

Start Date : 7/26/2018

Page No : 1

N/S Street : Quannapowitt Parkway

E/W Street: Parking Lot

City/State : Wakefield, MA

Weather : Clear

Groups Printed- Cars - Trucks

Start Time	Quannapowitt Pkwy From North		Quannapowitt Pkwy From South		Parking Lot From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
07:00 AM	17	1	0	5	0	0	23
07:15 AM	22	1	1	4	0	0	28
07:30 AM	38	1	0	2	0	0	41
07:45 AM	42	2	0	7	4	1	56
Total	119	5	1	18	4	1	148
08:00 AM	34	1	0	5	1	0	41
08:15 AM	41	0	0	10	1	0	52
08:30 AM	24	1	0	9	1	0	35
08:45 AM	37	1	0	8	0	0	46
Total	136	3	0	32	3	0	174
Grand Total	255	8	1	50	7	1	322
Apprch %	97	3	2	98	87.5	12.5	
Total %	79.2	2.5	0.3	15.5	2.2	0.3	
Cars	255	8	1	50	7	1	322
% Cars	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0

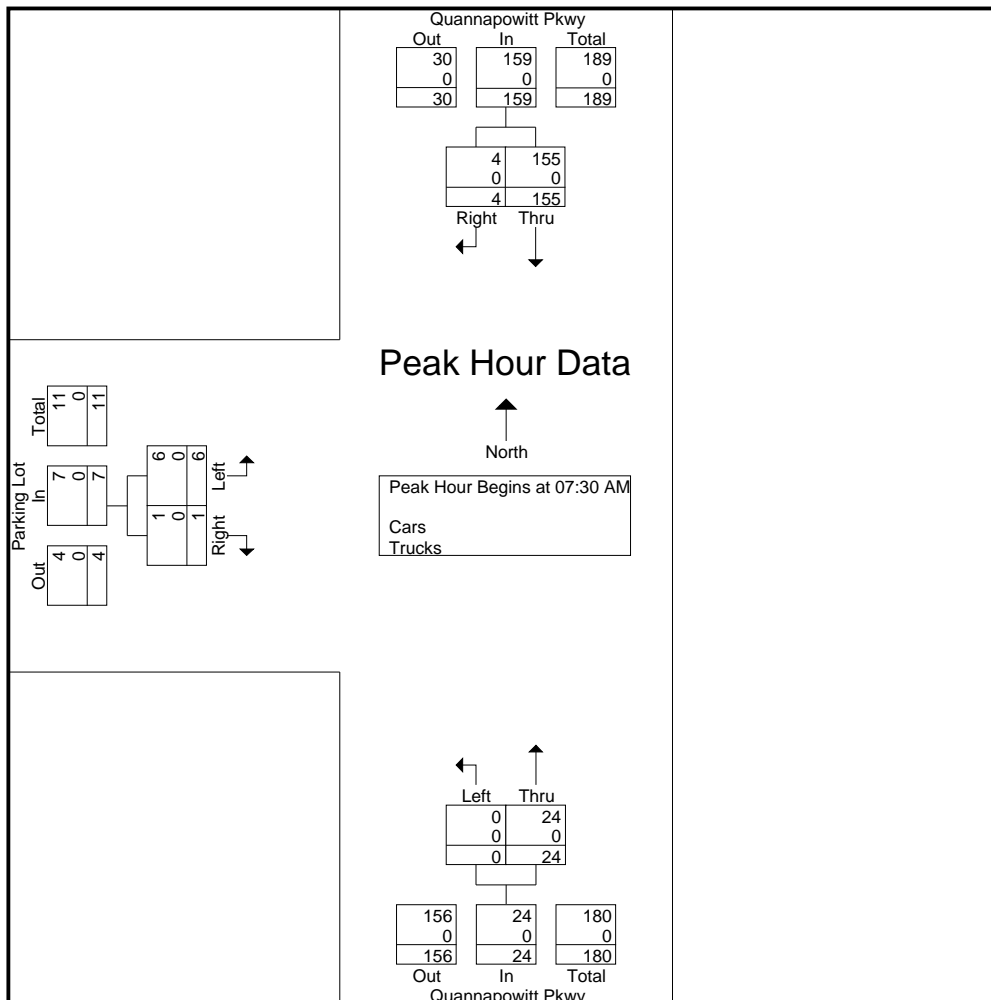
Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Parking Lot
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770004
 Site Code : 77970004
 Start Date : 7/26/2018
 Page No : 2

Start Time	Quannapowitt Pkwy From North			Quannapowitt Pkwy From South			Parking Lot From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	38	1	39	0	2	2	0	0	0	41
07:45 AM	42	2	44	0	7	7	4	1	5	56
08:00 AM	34	1	35	0	5	5	1	0	1	41
08:15 AM	41	0	41	0	10	10	1	0	1	52
Total Volume	155	4	159	0	24	24	6	1	7	190
% App. Total	97.5	2.5		0	100		85.7	14.3		
PHF	.923	.500	.903	.000	.600	.600	.375	.250	.350	.848
Cars	155	4	159	0	24	24	6	1	7	190
% Cars	100	100	100	0	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway

E/W Street: Parking Lot

City/State : Wakefield, MA

Weather : Clear

File Name : 79770004

Site Code : 77970004

Start Date : 7/26/2018

Page No : 10

Groups Printed- Bikes Peds

Start Time	Quannapowitt Pkwy From North			Quannapowitt Pkwy From South			Parking Lot From West			Exclu. Total	Inclu. Total	Int. Total
	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds			
07:00 AM	0	0	1	0	0	0	0	0	0	1	0	1
07:15 AM	0	0	2	0	0	2	0	0	0	4	0	4
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	1	0	0	0	0	0	0	1	0	1
Total	0	0	4	0	0	2	0	0	0	6	0	6
08:00 AM	0	0	0	0	0	3	0	0	0	3	0	3
08:15 AM	0	0	0	0	0	1	0	0	0	1	0	1
08:30 AM	0	0	1	0	0	2	0	0	0	3	0	3
08:45 AM	0	0	0	0	0	1	0	0	0	1	0	1
Total	0	0	1	0	0	7	0	0	0	8	0	8
Grand Total	0	0	5	0	0	9	0	0	0	14	0	14
Approch %	0	0		0	0		0	0				
Total %										100	0	

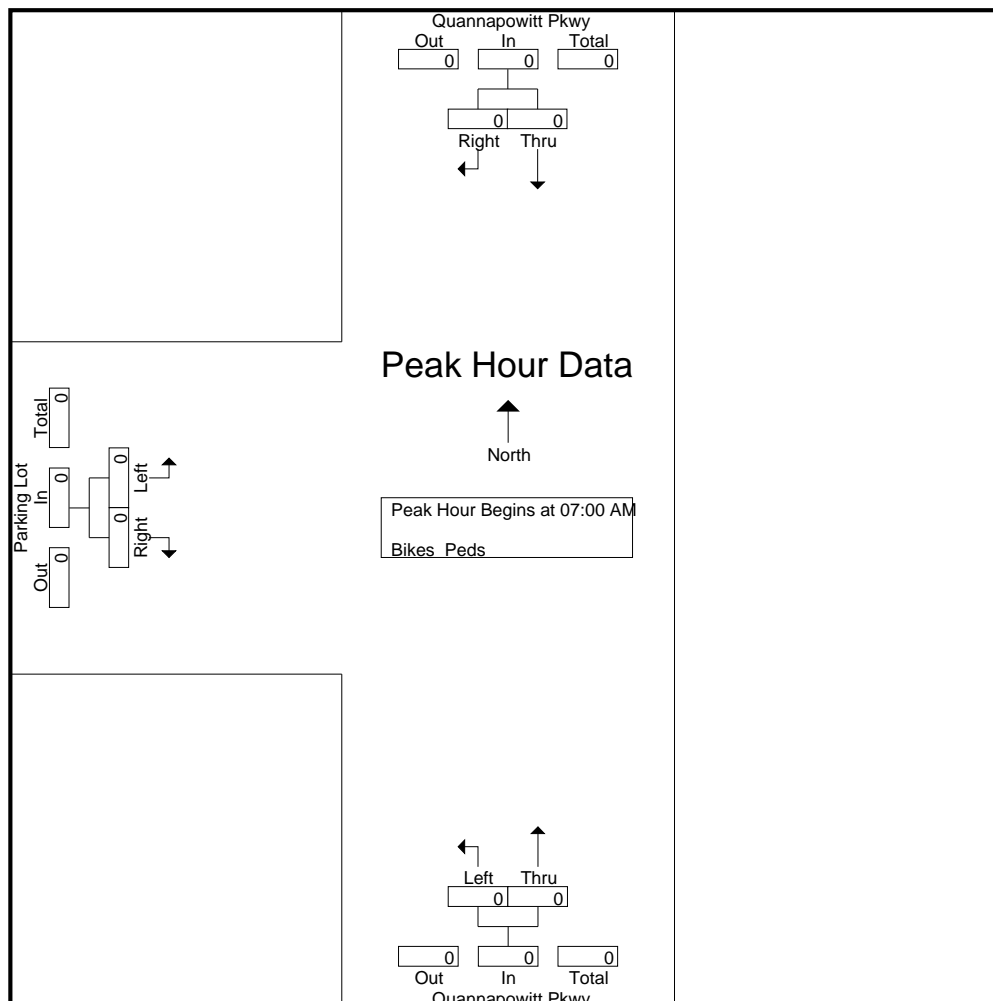
Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Parking Lot
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770004
 Site Code : 77970004
 Start Date : 7/26/2018
 Page No : 11

Start Time	Quannapowitt Pkwy From North			Quannapowitt Pkwy From South			Parking Lot From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Parking Lot
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770004
 Site Code : 77970004
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Quannapowitt Pkwy From North		Quannapowitt Pkwy From South		Parking Lot From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
04:00 PM	8	0	0	21	3	1	33
04:15 PM	9	0	0	14	1	0	24
04:30 PM	10	0	0	24	2	0	36
04:45 PM	11	0	0	33	0	0	44
Total	38	0	0	92	6	1	137
05:00 PM	8	0	0	47	0	0	55
05:15 PM	10	0	0	33	0	0	43
05:30 PM	13	2	0	24	0	1	40
05:45 PM	10	0	1	42	1	0	54
Total	41	2	1	146	1	1	192
Grand Total	79	2	1	238	7	2	329
Apprch %	97.5	2.5	0.4	99.6	77.8	22.2	
Total %	24	0.6	0.3	72.3	2.1	0.6	
Cars	79	2	1	238	7	2	329
% Cars	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0

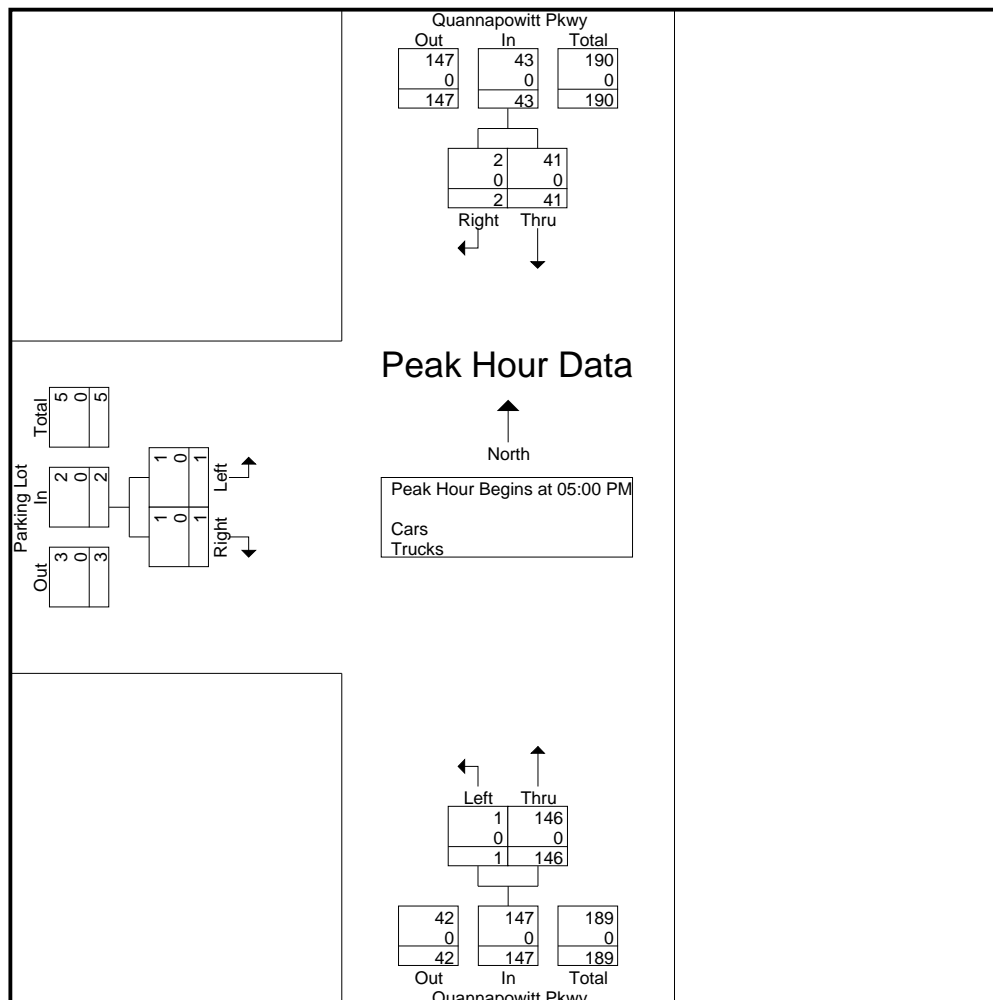
Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Parking Lot
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770004
 Site Code : 77970004
 Start Date : 7/26/2018
 Page No : 2

Start Time	Quannapowitt Pkwy From North			Quannapowitt Pkwy From South			Parking Lot From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	8	0	8	0	47	47	0	0	0	55
05:15 PM	10	0	10	0	33	33	0	0	0	43
05:30 PM	13	2	15	0	24	24	0	1	1	40
05:45 PM	10	0	10	1	42	43	1	0	1	54
Total Volume	41	2	43	1	146	147	1	1	2	192
% App. Total	95.3	4.7		0.7	99.3		50	50		
PHF	.788	.250	.717	.250	.777	.782	.250	.250	.500	.873
Cars	41	2	43	1	146	147	1	1	2	192
% Cars	100	100	100	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway

E/W Street: Parking Lot

City/State : Wakefield, MA

Weather : Clear

File Name : 79770004

Site Code : 77970004

Start Date : 7/26/2018

Page No : 10

Groups Printed- Bikes Peds

Start Time	Quannapowitt Pkwy From North			Quannapowitt Pkwy From South			Parking Lot From West			Exclu. Total	Inclu. Total	Int. Total
	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds			
04:00 PM	0	0	0	0	0	3	0	0	0	3	0	3
04:15 PM	0	0	0	0	0	1	0	0	0	1	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	4	0	0	0	4	0	4
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	1	0	0	0	1	0	1
05:45 PM	0	0	3	0	0	0	0	0	0	3	0	3
Total	0	0	3	0	0	1	0	0	0	4	0	4
Grand Total	0	0	3	0	0	5	0	0	0	8	0	8
Aprch %	0	0		0	0		0	0				
Total %										100	0	

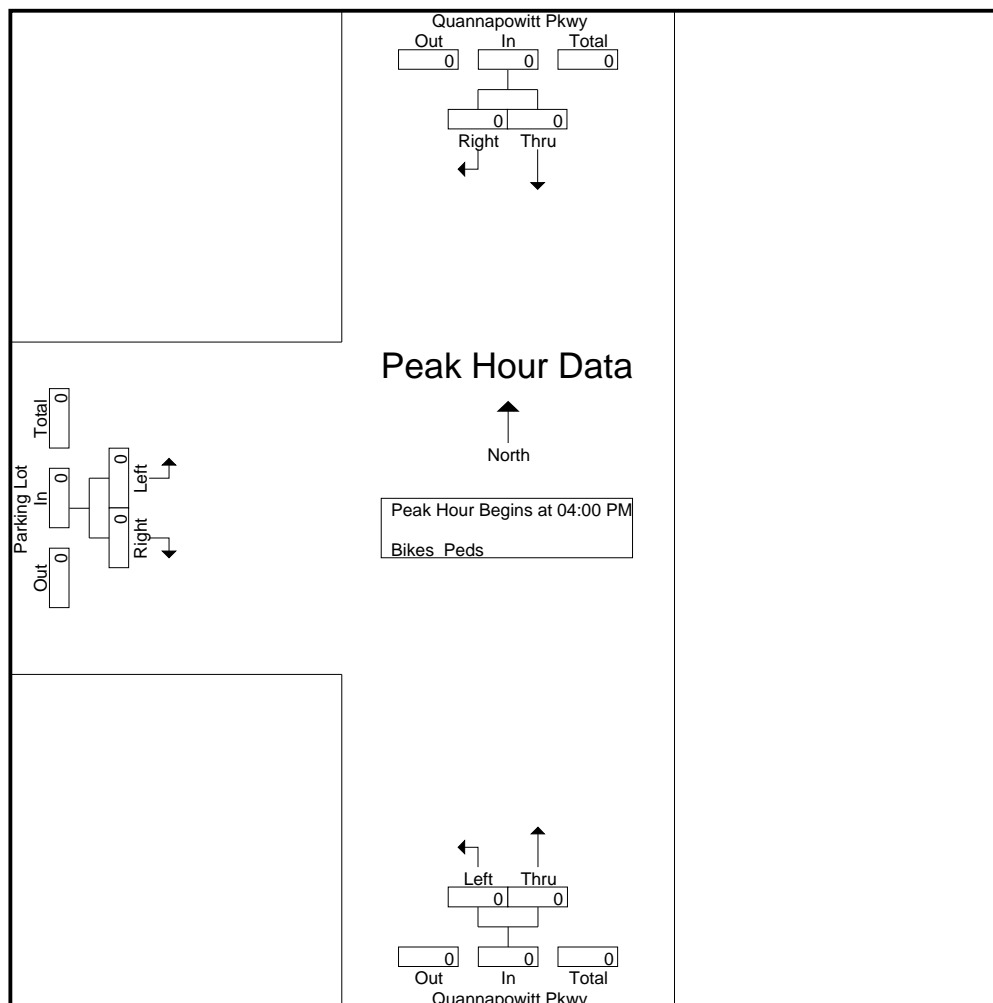
Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Parking Lot
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770004
 Site Code : 77970004
 Start Date : 7/26/2018
 Page No : 11

Start Time	Quannapowitt Pkwy From North			Quannapowitt Pkwy From South			Parking Lot From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Parking Lot
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S4
 Site Code : 77970004
 Start Date : 7/28/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Quannapowitt Pkwy From North		Quannapowitt Pkwy From South		Parking Lot From West		Int. Total
	Thru	Right	Left	Thru	Left	Right	
11:00 AM	21	2	0	18	6	0	47
11:15 AM	15	3	0	19	3	0	40
11:30 AM	13	7	0	29	2	0	51
11:45 AM	21	2	0	30	3	0	56
Total	70	14	0	96	14	0	194
12:00 PM	14	3	1	21	4	0	43
12:15 PM	8	3	0	23	6	0	40
12:30 PM	16	3	0	24	1	0	44
12:45 PM	17	3	1	19	6	0	46
Total	55	12	2	87	17	0	173
01:00 PM	12	3	0	18	5	0	38
01:15 PM	12	2	0	12	2	1	29
01:30 PM	15	1	1	13	5	0	35
01:45 PM	5	1	0	12	2	0	20
Total	44	7	1	55	14	1	122
Grand Total	169	33	3	238	45	1	489
Apprch %	83.7	16.3	1.2	98.8	97.8	2.2	
Total %	34.6	6.7	0.6	48.7	9.2	0.2	
Cars	169	33	3	238	45	1	489
% Cars	100	100	100	100	100	100	100
Trucks	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0

Accurate Counts

978-664-2565

File Name : 797700S4

Site Code : 77970004

Start Date : 7/28/2018

Page No : 2

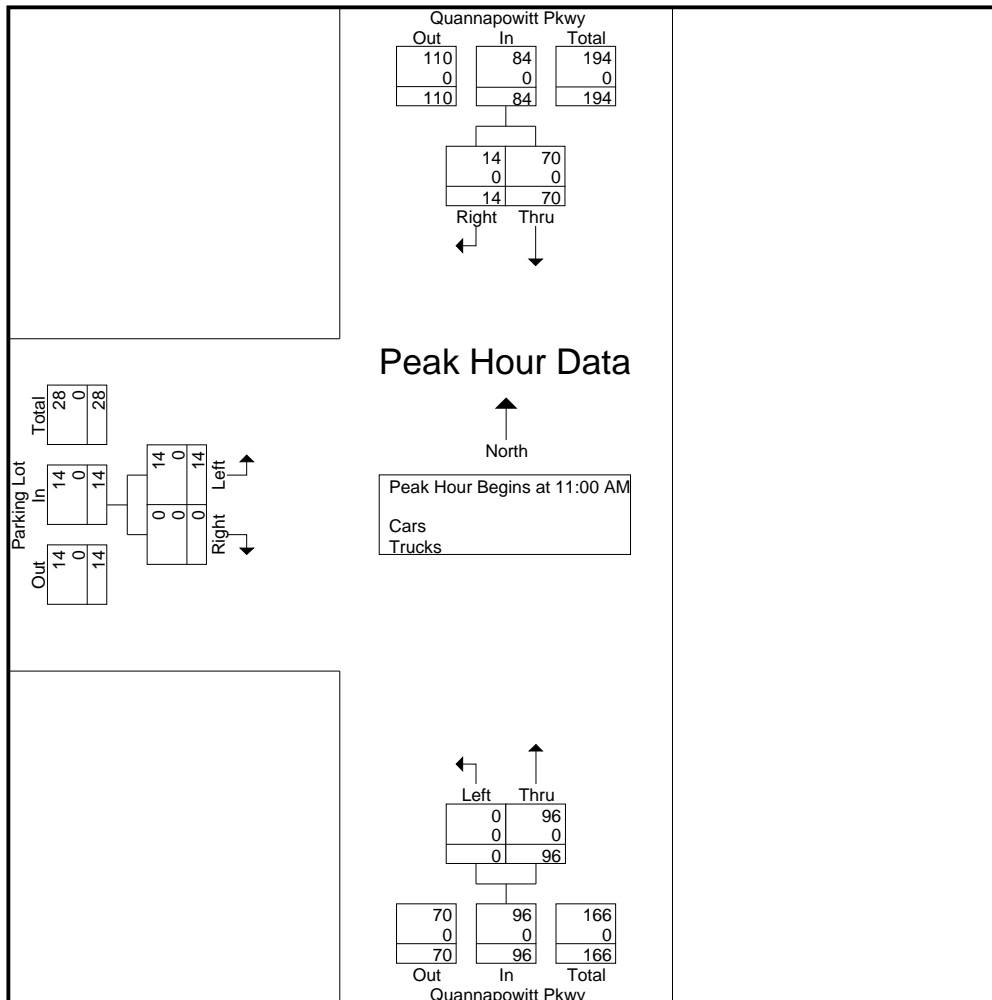
N/S Street : Quannapowitt Parkway

E/W Street: Parking Lot

City/State : Wakefield, MA

Weather : Clear

Start Time	Quannapowitt Pkwy From North			Quannapowitt Pkwy From South			Parking Lot From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:00 AM										
11:00 AM	21	2	23	0	18	18	6	0	6	47
11:15 AM	15	3	18	0	19	19	3	0	3	40
11:30 AM	13	7	20	0	29	29	2	0	2	51
11:45 AM	21	2	23	0	30	30	3	0	3	56
Total Volume	70	14	84	0	96	96	14	0	14	194
% App. Total	83.3	16.7		0	100		100	0		
PHF	.833	.500	.913	.000	.800	.800	.583	.000	.583	.866
Cars	70	14	84	0	96	96	14	0	14	194
% Cars	100	100	100	0	100	100	100	0	100	100
Trucks	0	0	0	0	0	0	0	0	0	0
% Trucks	0	0	0	0	0	0	0	0	0	0



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway

E/W Street: Parking Lot

City/State : Wakefield, MA

Weather : Clear

File Name : 797700S4

Site Code : 77970004

Start Date : 7/28/2018

Page No : 10

Groups Printed- Bikes Peds

Start Time	Quannapowitt Pkwy From North			Quannapowitt Pkwy From South			Parking Lot From West			Exclu. Total	Inclu. Total	Int. Total
	Thru	Right	Peds	Left	Thru	Peds	Left	Right	Peds			
11:00 AM	0	0	0	0	0	8	0	0	0	8	0	8
11:15 AM	0	0	0	0	0	7	0	0	0	7	0	7
11:30 AM	0	0	1	0	0	9	0	0	0	10	0	10
11:45 AM	0	0	2	0	0	13	0	0	0	15	0	15
Total	0	0	3	0	0	37	0	0	0	40	0	40
12:00 PM	0	0	4	0	0	2	0	0	0	6	0	6
12:15 PM	0	0	0	0	0	4	0	0	0	4	0	4
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	10	0	0	0	10	0	10
Total	0	0	4	0	0	16	0	0	0	20	0	20
01:00 PM	0	0	1	0	0	2	0	0	0	3	0	3
01:15 PM	0	0	0	0	0	2	0	0	0	2	0	2
01:30 PM	0	0	0	0	0	3	0	0	0	3	0	3
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	7	0	0	0	8	0	8
Grand Total	0	0	8	0	0	60	0	0	0	68	0	68
Apprch %	0	0		0	0		0	0				
Total %										100	0	

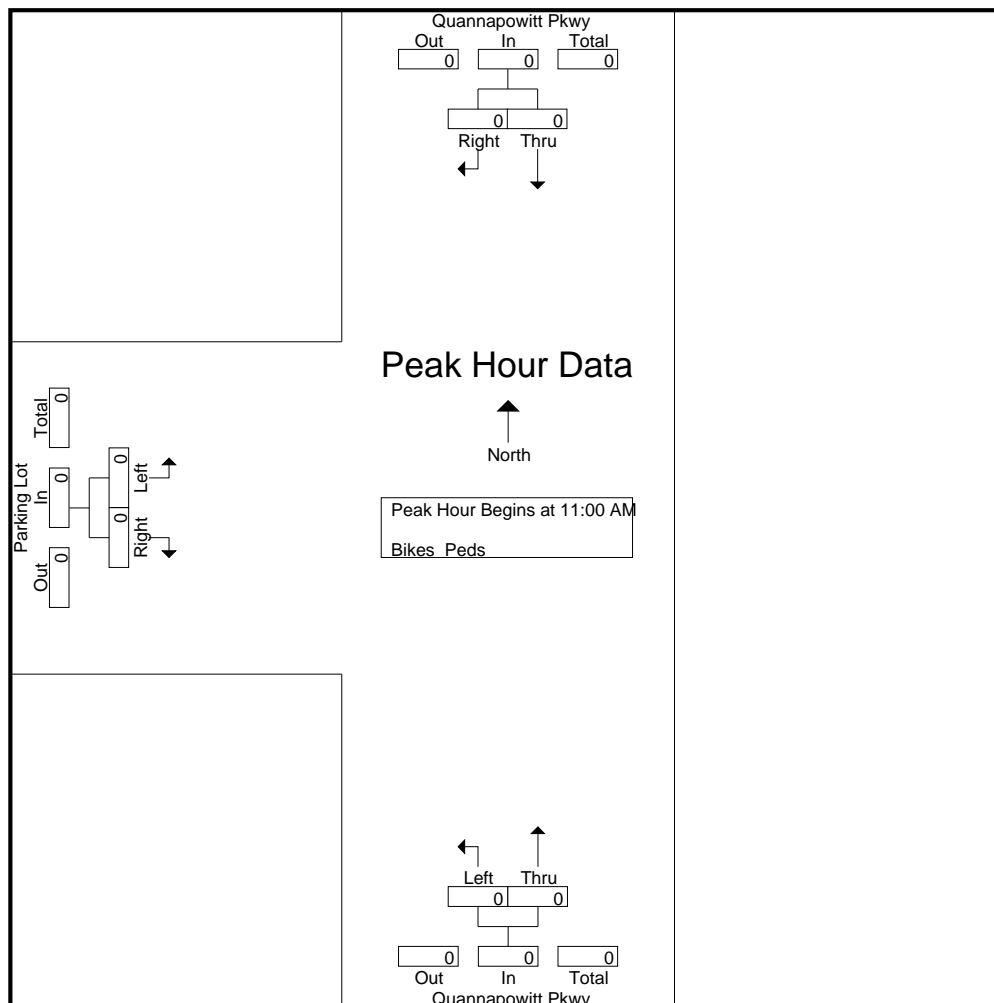
Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Parking Lot
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S4
 Site Code : 77970004
 Start Date : 7/28/2018
 Page No : 11

Start Time	Quannapowitt Pkwy From North			Quannapowitt Pkwy From South			Parking Lot From West			Int. Total
	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:00 AM										
11:00 AM	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770005
 Site Code : 79770005
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Lowell St From East		Quannapowitt Pkwy From South		Lowell St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
07:00 AM	10	110	1	4	90	8	223
07:15 AM	9	145	2	2	135	14	307
07:30 AM	22	151	0	2	144	17	336
07:45 AM	23	147	5	6	148	21	350
Total	64	553	8	14	517	60	1216
08:00 AM	16	141	2	4	135	19	317
08:15 AM	14	145	5	6	142	27	339
08:30 AM	12	138	3	7	139	13	312
08:45 AM	17	128	4	4	150	21	324
Total	59	552	14	21	566	80	1292
Grand Total	123	1105	22	35	1083	140	2508
Apprch %	10	90	38.6	61.4	88.6	11.4	
Total %	4.9	44.1	0.9	1.4	43.2	5.6	
Cars	123	1078	22	35	1068	140	2466
% Cars	100	97.6	100	100	98.6	100	98.3
Trucks	0	27	0	0	15	0	42
% Trucks	0	2.4	0	0	1.4	0	1.7

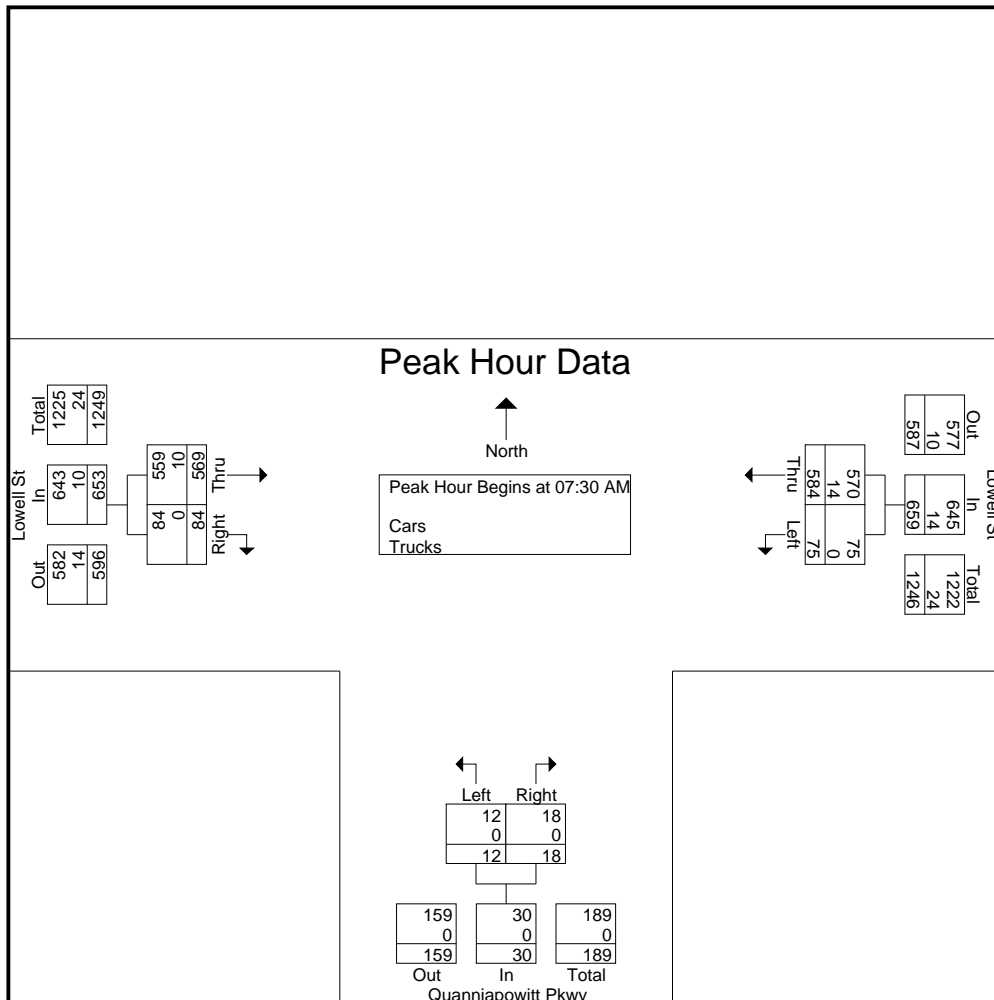
Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770005
 Site Code : 79770005
 Start Date : 7/26/2018
 Page No : 2

Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	22	151	173	0	2	2	144	17	161	336
07:45 AM	23	147	170	5	6	11	148	21	169	350
08:00 AM	16	141	157	2	4	6	135	19	154	317
08:15 AM	14	145	159	5	6	11	142	27	169	339
Total Volume	75	584	659	12	18	30	569	84	653	1342
% App. Total	11.4	88.6		40	60		87.1	12.9		
PHF	.815	.967	.952	.600	.750	.682	.961	.778	.966	.959
Cars	75	570	645	12	18	30	559	84	643	1318
% Cars	100	97.6	97.9	100	100	100	98.2	100	98.5	98.2
Trucks	0	14	14	0	0	0	10	0	10	24
% Trucks	0	2.4	2.1	0	0	0	1.8	0	1.5	1.8



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770005
 Site Code : 79770005
 Start Date : 7/26/2018
 Page No : 10

Groups Printed- Bikes Peds

Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	1	0	0	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	1	0	0	0	1	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	1	0	0	0	1	1
Apprch %	0	0		0	0		100	0				
Total %	0	0		0	0		100	0		0	100	

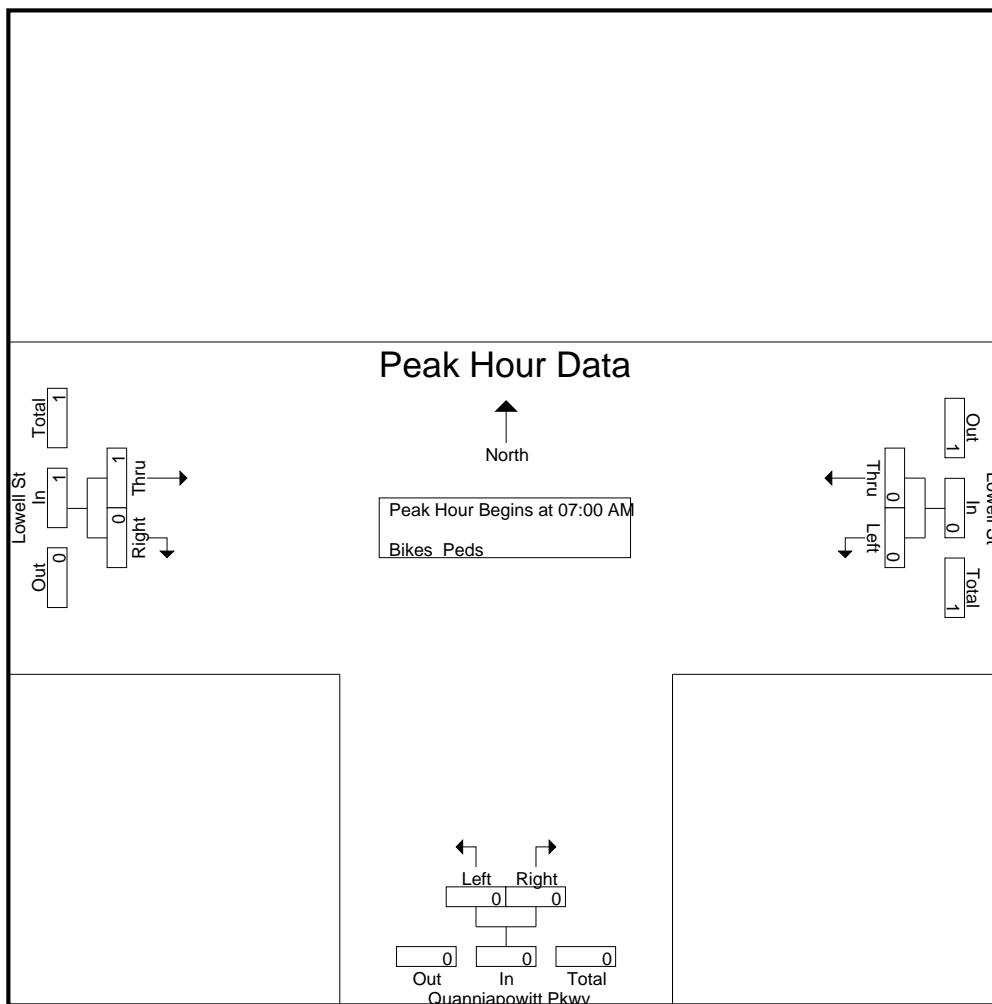
Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770005
 Site Code : 79770005
 Start Date : 7/26/2018
 Page No : 11

Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	1	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	1	0	1	1
% App. Total	0	0		0	0		100	0		
PHF	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770005
 Site Code : 79770005
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Lowell St From East		Quannapowitt Pkwy From South		Lowell St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
04:00 PM	5	157	5	19	170	3	359
04:15 PM	3	139	5	10	168	6	331
04:30 PM	9	135	6	20	222	1	393
04:45 PM	7	133	7	26	215	4	392
Total	24	564	23	75	775	14	1475
05:00 PM	6	145	18	29	168	2	368
05:15 PM	8	149	11	22	213	2	405
05:30 PM	10	121	6	18	220	5	380
05:45 PM	6	112	9	34	229	4	394
Total	30	527	44	103	830	13	1547
Grand Total	54	1091	67	178	1605	27	3022
Apprch %	4.7	95.3	27.3	72.7	98.3	1.7	
Total %	1.8	36.1	2.2	5.9	53.1	0.9	
Cars	54	1082	67	178	1589	27	2997
% Cars	100	99.2	100	100	99	100	99.2
Trucks	0	9	0	0	16	0	25
% Trucks	0	0.8	0	0	1	0	0.8

Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway

E/W Street: Lowell Street

City/State : Wakefield, MA

Weather : Clear

File Name : 79770005

Site Code : 79770005

Start Date : 7/26/2018

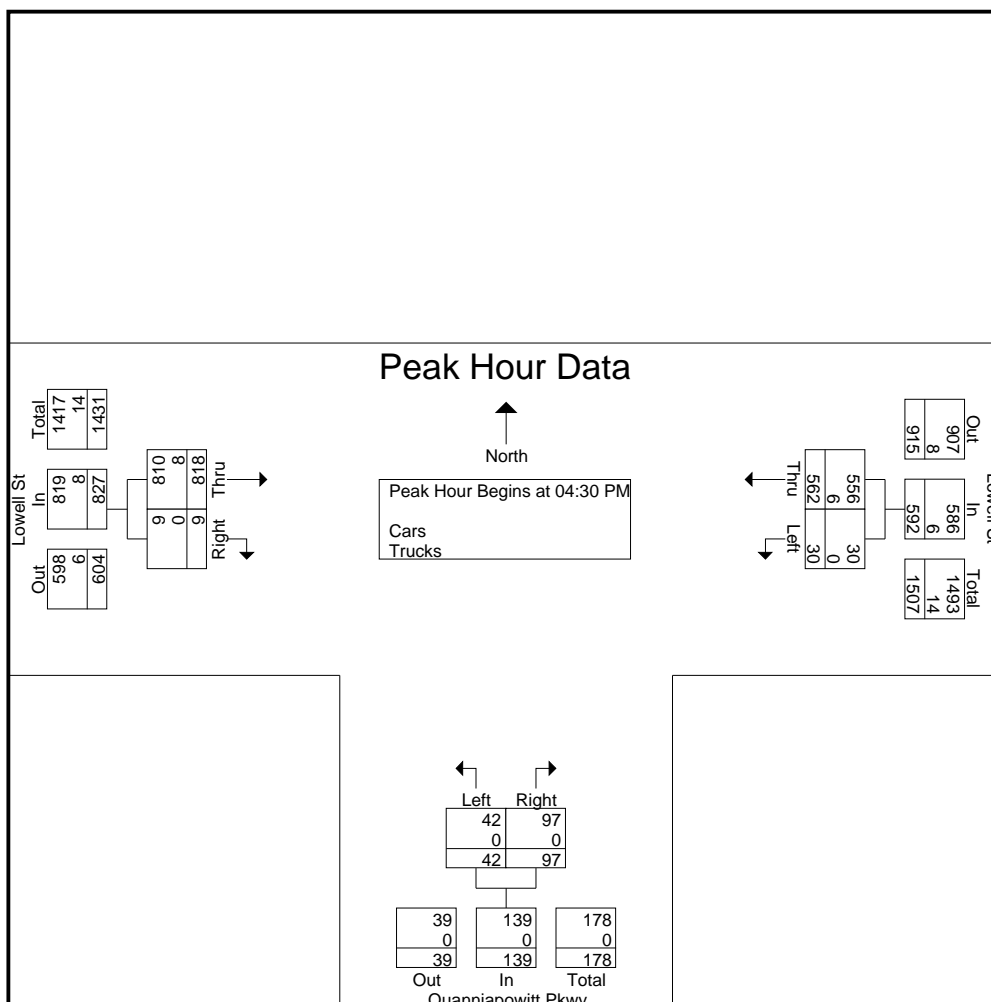
Page No : 2

Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:30 PM

04:30 PM	9	135	144	6	20	26	222	1	223	393
04:45 PM	7	133	140	7	26	33	215	4	219	392
05:00 PM	6	145	151	18	29	47	168	2	170	368
05:15 PM	8	149	157	11	22	33	213	2	215	405
Total Volume	30	562	592	42	97	139	818	9	827	1558
% App. Total	5.1	94.9		30.2	69.8		98.9	1.1		
PHF	.833	.943	.943	.583	.836	.739	.921	.563	.927	.962
Cars	30	556	586	42	97	139	810	9	819	1544
% Cars	100	98.9	99.0	100	100	100	99.0	100	99.0	99.1
Trucks	0	6	6	0	0	0	8	0	8	14
% Trucks	0	1.1	1.0	0	0	0	1.0	0	1.0	0.9



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770005
 Site Code : 79770005
 Start Date : 7/26/2018
 Page No : 10

Groups Printed- Bikes Peds

Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	1	0	0	0	0	0	1	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	0	0	0	1	1
Grand Total	0	0	0	0	1	0	0	0	0	0	1	1
Apprch %	0	0		0	100		0	0				
Total %	0	0		0	100		0	0		0	100	

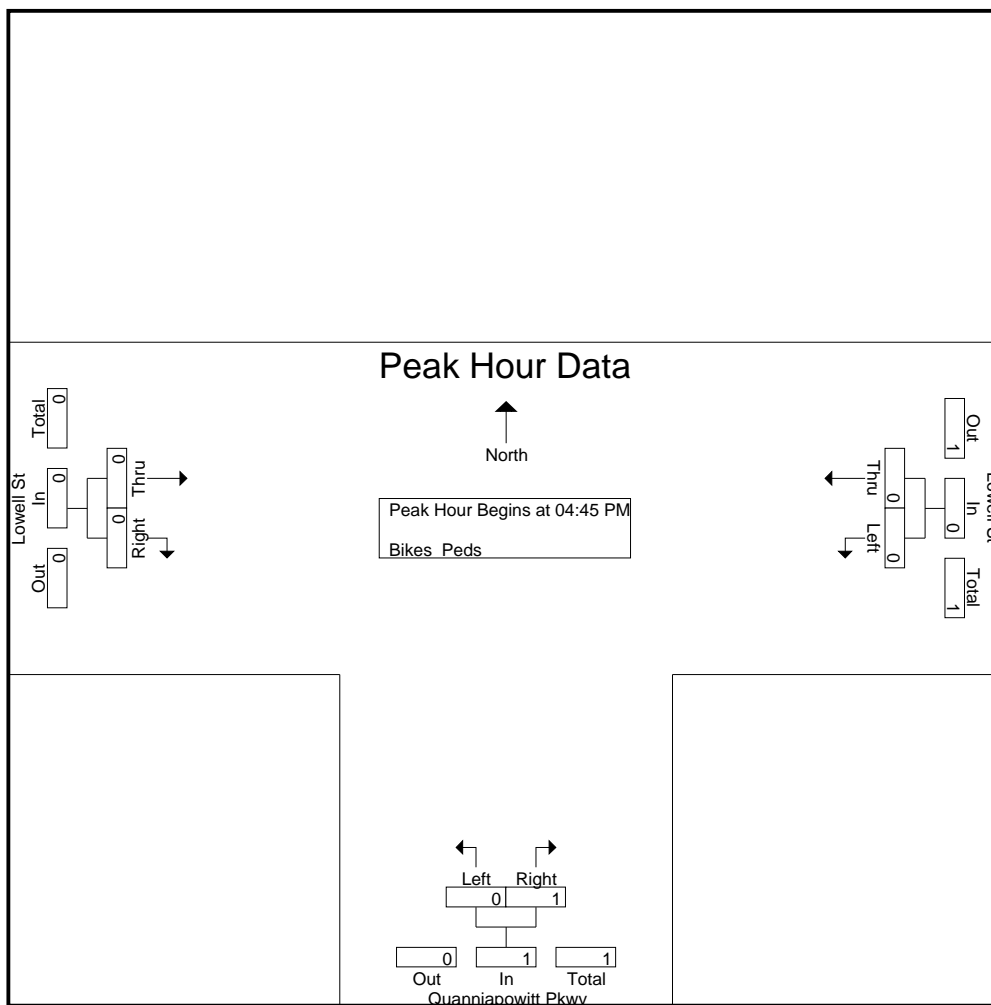
Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770005
 Site Code : 79770005
 Start Date : 7/26/2018
 Page No : 11

Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	1	1	0	0	0	1
Total Volume	0	0	0	0	1	1	0	0	0	1
% App. Total	0	0		0	100		0	0		
PHF	.000	.000	.000	.000	.250	.250	.000	.000	.000	.250



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S5
 Site Code : 79770005
 Start Date : 7/28/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Lowell St From East		Quannapowitt Pkwy From South		Lowell St From West		Int. Total
	Left	Thru	Left	Right	Thru	Right	
11:00 AM	13	152	6	18	152	10	351
11:15 AM	8	135	7	15	170	10	345
11:30 AM	14	148	9	22	167	6	366
11:45 AM	15	129	9	24	141	8	326
Total	50	564	31	79	630	34	1388
12:00 PM	9	140	7	18	142	8	324
12:15 PM	6	136	8	21	152	5	328
12:30 PM	9	124	7	18	158	10	326
12:45 PM	9	135	11	14	131	11	311
Total	33	535	33	71	583	34	1289
01:00 PM	9	136	12	13	155	6	331
01:15 PM	7	131	4	10	152	7	311
01:30 PM	11	137	8	10	158	5	329
01:45 PM	4	125	4	10	138	2	283
Total	31	529	28	43	603	20	1254
Grand Total	114	1628	92	193	1816	88	3931
Apprch %	6.5	93.5	32.3	67.7	95.4	4.6	
Total %	2.9	41.4	2.3	4.9	46.2	2.2	
Cars	114	1616	90	193	1800	88	3901
% Cars	100	99.3	97.8	100	99.1	100	99.2
Trucks	0	12	2	0	16	0	30
% Trucks	0	0.7	2.2	0	0.9	0	0.8

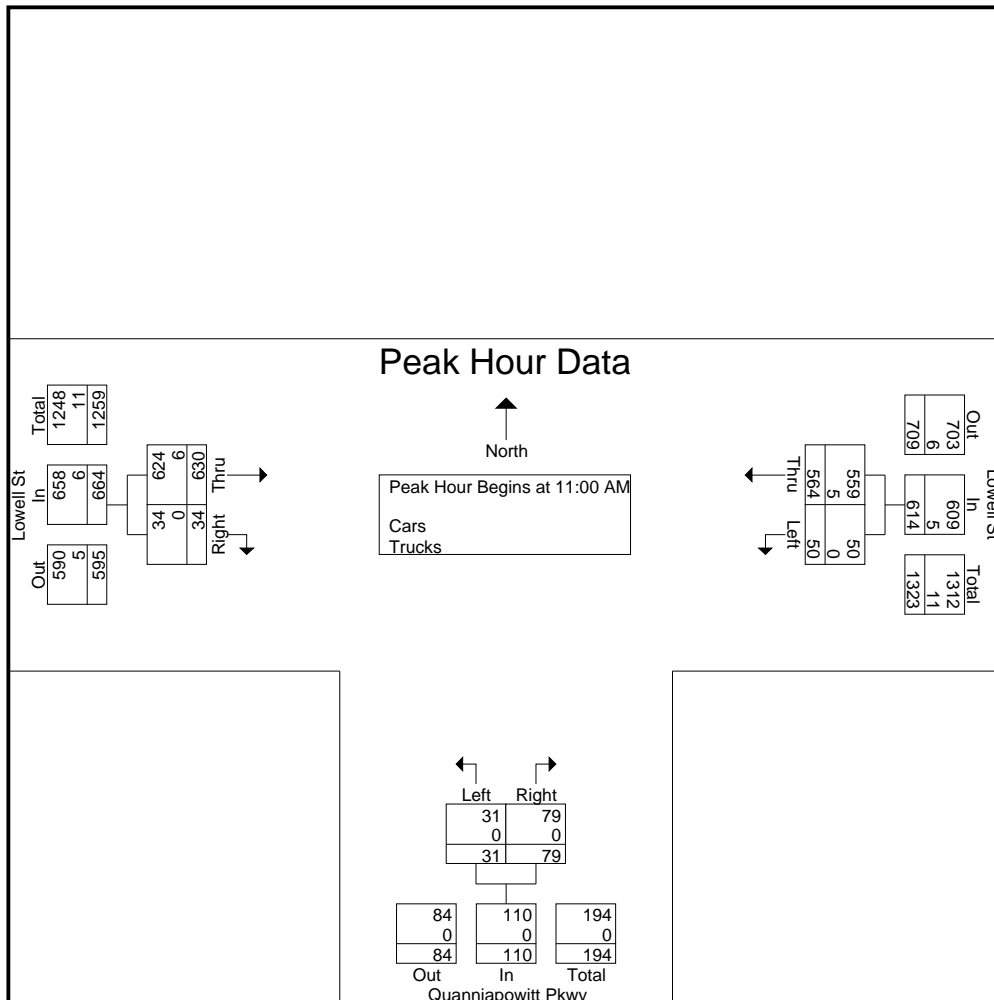
Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S5
 Site Code : 79770005
 Start Date : 7/28/2018
 Page No : 2

Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:00 AM										
11:00 AM	13	152	165	6	18	24	152	10	162	351
11:15 AM	8	135	143	7	15	22	170	10	180	345
11:30 AM	14	148	162	9	22	31	167	6	173	366
11:45 AM	15	129	144	9	24	33	141	8	149	326
Total Volume	50	564	614	31	79	110	630	34	664	1388
% App. Total	8.1	91.9		28.2	71.8		94.9	5.1		
PHF	.833	.928	.930	.861	.823	.833	.926	.850	.922	.948
Cars	50	559	609	31	79	110	624	34	658	1377
% Cars	100	99.1	99.2	100	100	100	99.0	100	99.1	99.2
Trucks	0	5	5	0	0	0	6	0	6	11
% Trucks	0	0.9	0.8	0	0	0	1.0	0	0.9	0.8



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway

E/W Street: Lowell Street

City/State : Wakefield, MA

Weather : Clear

File Name : 797700S5

Site Code : 79770005

Start Date : 7/28/2018

Page No : 10

Groups Printed- Bikes Peds

Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
11:00 AM	0	3	0	1	1	0	1	0	0	0	6	6
11:15 AM	0	1	0	0	2	0	2	0	0	0	5	5
11:30 AM	0	1	0	0	3	0	2	0	0	0	6	6
11:45 AM	0	1	0	1	6	1	0	0	0	1	8	9
Total	0	6	0	2	12	1	5	0	0	1	25	26
12:00 PM	0	2	0	0	1	0	4	0	0	0	7	7
12:15 PM	0	2	0	0	1	0	0	0	0	0	3	3
12:30 PM	0	2	0	0	3	0	1	0	0	0	6	6
12:45 PM	0	0	0	0	5	0	0	0	0	0	5	5
Total	0	6	0	0	10	0	5	0	0	0	21	21
01:00 PM	0	0	0	0	5	0	0	0	0	0	5	5
01:15 PM	1	1	0	0	3	0	1	0	0	0	6	6
01:30 PM	0	1	0	2	3	0	1	0	0	0	7	7
01:45 PM	0	0	0	0	1	0	0	0	0	0	1	1
Total	1	2	0	2	12	0	2	0	0	0	19	19
Grand Total	1	14	0	4	34	1	12	0	0	1	65	66
Apprch %	6.7	93.3		10.5	89.5		100	0				
Total %	1.5	21.5		6.2	52.3		18.5	0		1.5	98.5	

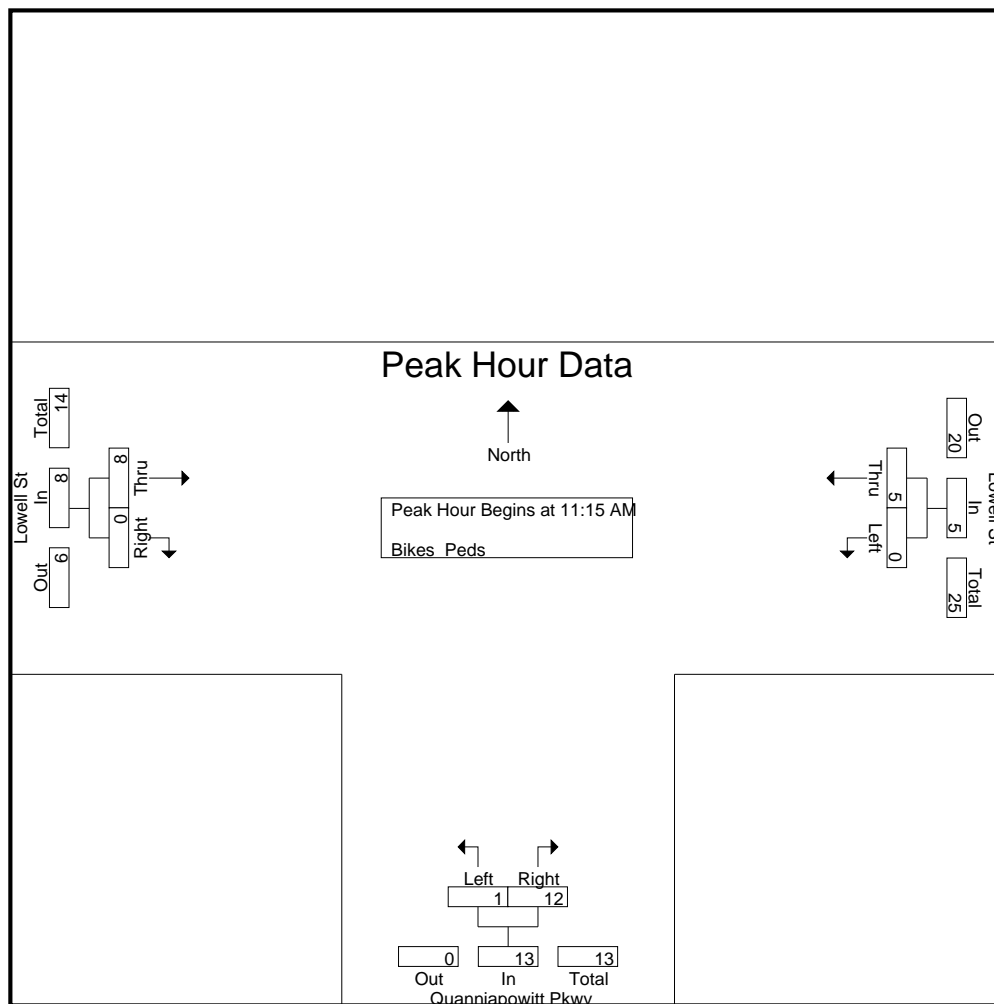
Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street: Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S5
 Site Code : 79770005
 Start Date : 7/28/2018
 Page No : 11

Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:15 AM										
11:15 AM	0	1	1	0	2	2	2	0	2	5
11:30 AM	0	1	1	0	3	3	2	0	2	6
11:45 AM	0	1	1	1	6	7	0	0	0	8
12:00 PM	0	2	2	0	1	1	4	0	4	7
Total Volume	0	5	5	1	12	13	8	0	8	26
% App. Total	0	100		7.7	92.3		100	0		
PHF	.000	.625	.625	.250	.500	.464	.500	.000	.500	.813



Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770006
 Site Code : 79770006
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rotary From North			Lowell St From East			Rotary From South			Lowell St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	0	105	0	11	48	0	123	0	0	0	287
07:15 AM	0	0	0	123	0	22	52	0	133	0	0	0	330
07:30 AM	0	0	0	124	0	32	42	0	168	0	0	0	366
07:45 AM	0	0	0	127	0	31	56	0	162	0	0	0	376
Total	0	0	0	479	0	96	198	0	586	0	0	0	1359
08:00 AM	0	0	0	112	0	29	63	0	177	0	0	0	381
08:15 AM	0	0	0	134	0	21	54	0	166	0	0	0	375
08:30 AM	0	0	0	116	0	28	61	0	188	0	0	0	393
08:45 AM	0	0	0	107	0	27	73	0	177	0	0	0	384
Total	0	0	0	469	0	105	251	0	708	0	0	0	1533
Grand Total	0	0	0	948	0	201	449	0	1294	0	0	0	2892
Apprch %	0	0	0	82.5	0	17.5	25.8	0	74.2	0	0	0	
Total %	0	0	0	32.8	0	7	15.5	0	44.7	0	0	0	
Cars	0	0	0	920	0	199	441	0	1253	0	0	0	2813
% Cars	0	0	0	97	0	99	98.2	0	96.8	0	0	0	97.3
Trucks	0	0	0	28	0	2	8	0	41	0	0	0	79
% Trucks	0	0	0	3	0	1	1.8	0	3.2	0	0	0	2.7

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770006
 Site Code : 79770006
 Start Date : 7/26/2018
 Page No : 2

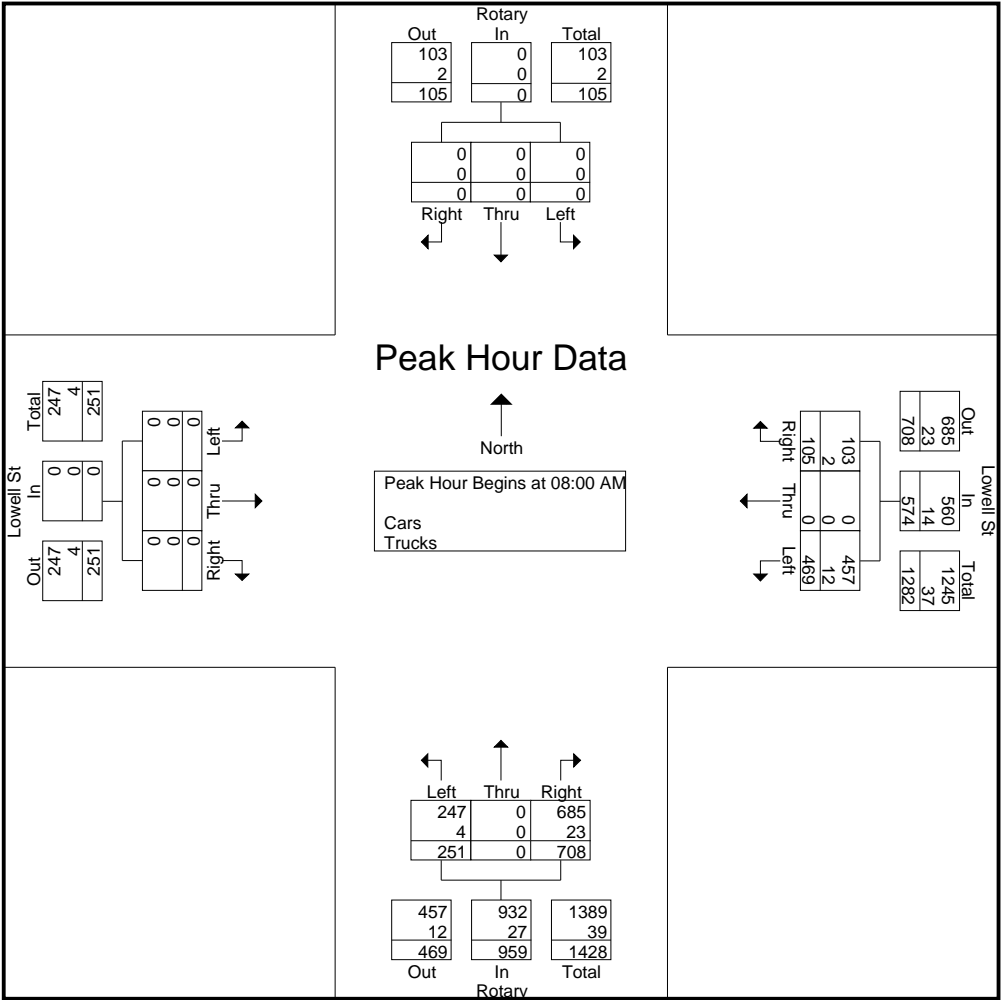
Start Time	Rotary From North				Lowell St From East				Rotary From South				Lowell St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	112	0	29	141	63	0	177	240	0	0	0	0	381
08:15 AM	0	0	0	0	134	0	21	155	54	0	166	220	0	0	0	0	375
08:30 AM	0	0	0	0	116	0	28	144	61	0	188	249	0	0	0	0	393
08:45 AM	0	0	0	0	107	0	27	134	73	0	177	250	0	0	0	0	384
Total Volume	0	0	0	0	469	0	105	574	251	0	708	959	0	0	0	0	1533
% App. Total	0	0	0		81.7	0	18.3		26.2	0	73.8		0	0	0		
PHF	.000	.000	.000	.000	.875	.000	.905	.926	.860	.000	.941	.959	.000	.000	.000	.000	.975
Cars	0	0	0	0	457	0	103	560	247	0	685	932	0	0	0	0	1492
% Cars	0	0	0	0	97.4	0	98.1	97.6	98.4	0	96.8	97.2	0	0	0	0	97.3
Trucks	0	0	0	0	12	0	2	14	4	0	23	27	0	0	0	0	41
% Trucks	0	0	0	0	2.6	0	1.9	2.4	1.6	0	3.2	2.8	0	0	0	0	2.7

Accurate Counts

978-664-2565

File Name : 79770006
 Site Code : 79770006
 Start Date : 7/26/2018
 Page No : 3

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear



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

Peak Hour for Each Approach Begins at:

	07:00 AM				07:30 AM				08:00 AM				07:00 AM			
+0 mins.	0	0	0	0	124	0	32	156	63	0	177	240	0	0	0	0
+15 mins.	0	0	0	0	127	0	31	158	54	0	166	220	0	0	0	0
+30 mins.	0	0	0	0	112	0	29	141	61	0	188	249	0	0	0	0
+45 mins.	0	0	0	0	134	0	21	155	73	0	177	250	0	0	0	0
Total Volume	0	0	0	0	497	0	113	610	251	0	708	959	0	0	0	0
% App. Total	0	0	0	0	81.5	0	18.5		26.2	0	73.8		0	0	0	

Accurate Counts

978-664-2565

File Name : 79770006

Site Code : 79770006

Start Date : 7/26/2018

Page No : 13

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

Start Time	Rotary From North				Lowell St From East				Rotary From South				Lowell St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	0	0	

Accurate Counts

978-664-2565

File Name : 79770006
 Site Code : 79770006
 Start Date : 7/26/2018
 Page No : 14

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

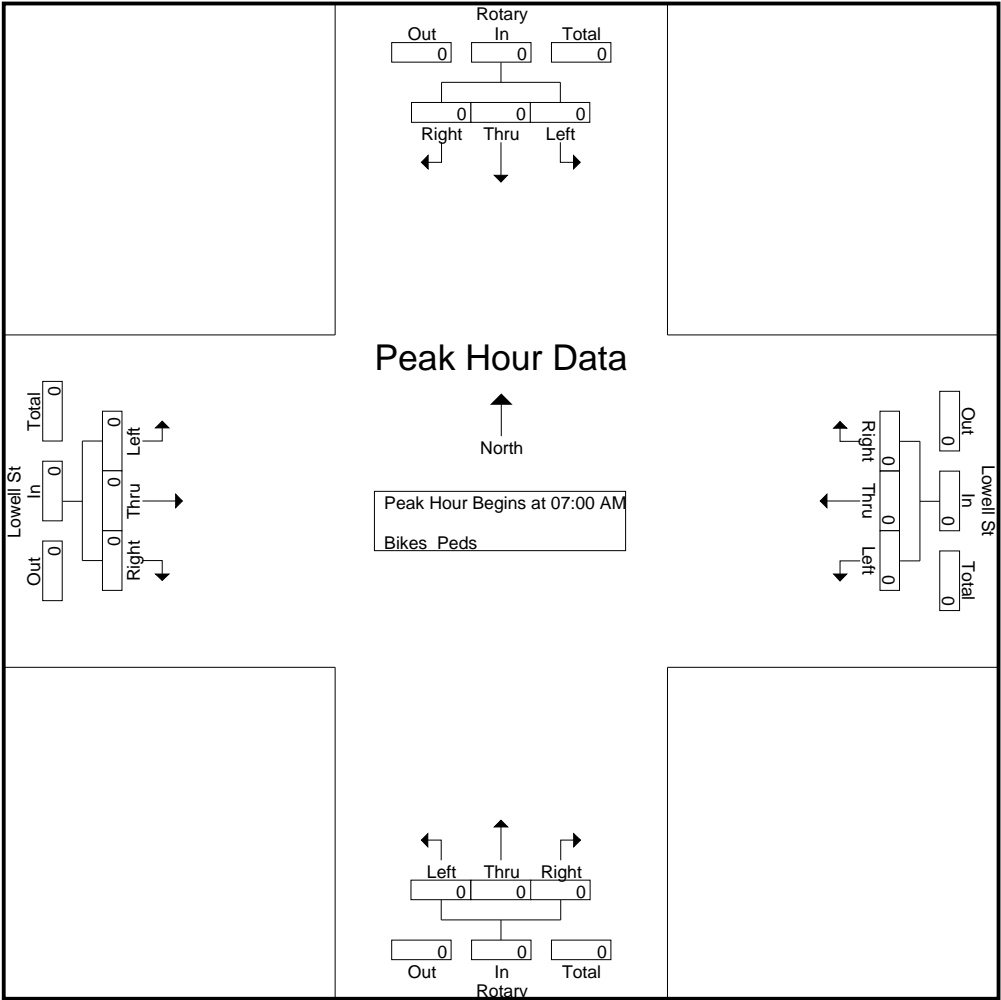
Start Time	Rotary From North				Lowell St From East				Rotary From South				Lowell St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak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

Accurate Counts

978-664-2565

File Name : 79770006
 Site Code : 79770006
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear



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

Peak Hour for Each Approach Begins at:

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

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770006
 Site Code : 79770006
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rotary From North			Lowell St From East			Rotary From South			Lowell St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	0	0	133	0	32	112	0	164	0	0	0	441
04:15 PM	0	0	0	120	0	28	94	0	175	0	0	0	417
04:30 PM	0	0	0	137	0	12	88	0	160	0	0	0	397
04:45 PM	0	0	0	123	0	22	81	0	152	0	0	0	378
Total	0	0	0	513	0	94	375	0	651	0	0	0	1633
05:00 PM	0	0	0	145	0	20	106	0	165	0	0	0	436
05:15 PM	0	0	0	136	0	19	126	0	145	0	0	0	426
05:30 PM	0	0	0	114	0	17	141	0	116	0	0	0	388
05:45 PM	0	0	0	106	0	20	127	0	152	0	0	0	405
Total	0	0	0	501	0	76	500	0	578	0	0	0	1655
Grand Total	0	0	0	1014	0	170	875	0	1229	0	0	0	3288
Apprch %	0	0	0	85.6	0	14.4	41.6	0	58.4	0	0	0	
Total %	0	0	0	30.8	0	5.2	26.6	0	37.4	0	0	0	
Cars	0	0	0	1003	0	167	872	0	1218	0	0	0	3260
% Cars	0	0	0	98.9	0	98.2	99.7	0	99.1	0	0	0	99.1
Trucks	0	0	0	11	0	3	3	0	11	0	0	0	28
% Trucks	0	0	0	1.1	0	1.8	0.3	0	0.9	0	0	0	0.9

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770006
 Site Code : 79770006
 Start Date : 7/26/2018
 Page No : 2

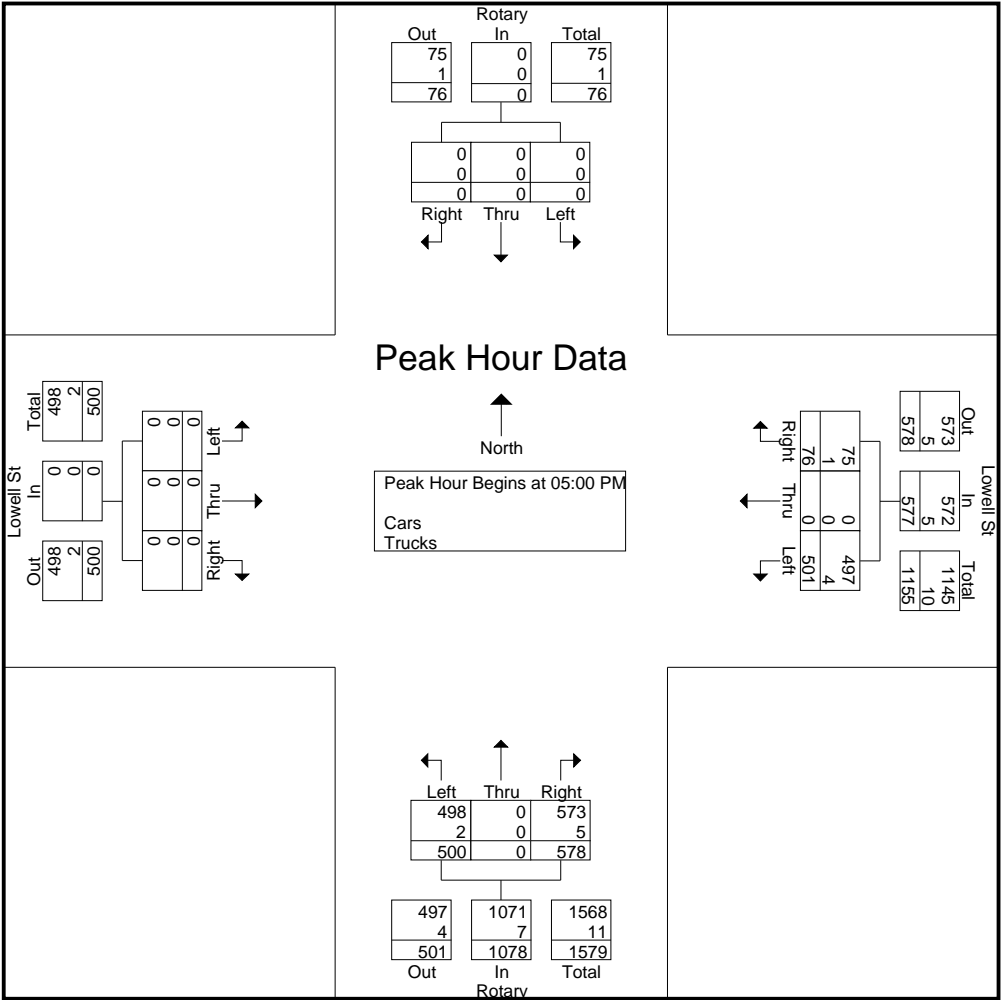
Start Time	Rotary From North				Lowell St From East				Rotary From South				Lowell St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	145	0	20	165	106	0	165	271	0	0	0	0	436
05:15 PM	0	0	0	0	136	0	19	155	126	0	145	271	0	0	0	0	426
05:30 PM	0	0	0	0	114	0	17	131	141	0	116	257	0	0	0	0	388
05:45 PM	0	0	0	0	106	0	20	126	127	0	152	279	0	0	0	0	405
Total Volume	0	0	0	0	501	0	76	577	500	0	578	1078	0	0	0	0	1655
% App. Total	0	0	0		86.8	0	13.2		46.4	0	53.6		0	0	0		
PHF	.000	.000	.000	.000	.864	.000	.950	.874	.887	.000	.876	.966	.000	.000	.000	.000	.949
Cars	0	0	0	0	497	0	75	572	498	0	573	1071	0	0	0	0	1643
% Cars	0	0	0	0	99.2	0	98.7	99.1	99.6	0	99.1	99.4	0	0	0	0	99.3
Trucks	0	0	0	0	4	0	1	5	2	0	5	7	0	0	0	0	12
% Trucks	0	0	0	0	0.8	0	1.3	0.9	0.4	0	0.9	0.6	0	0	0	0	0.7

Accurate Counts

978-664-2565

File Name : 79770006
 Site Code : 79770006
 Start Date : 7/26/2018
 Page No : 3

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:30 PM				05:00 PM				04:00 PM			
+0 mins.	0	0	0	0	137	0	12	149	106	0	165	271	0	0	0	0
+15 mins.	0	0	0	0	123	0	22	145	126	0	145	271	0	0	0	0
+30 mins.	0	0	0	0	145	0	20	165	141	0	116	257	0	0	0	0
+45 mins.	0	0	0	0	136	0	19	155	127	0	152	279	0	0	0	0
Total Volume	0	0	0	0	541	0	73	614	500	0	578	1078	0	0	0	0
% App. Total	0	0	0	0	88.1	0	11.9		46.4	0	53.6		0	0	0	

Accurate Counts

978-664-2565

File Name : 79770006

Site Code : 79770006

Start Date : 7/26/2018

Page No : 13

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

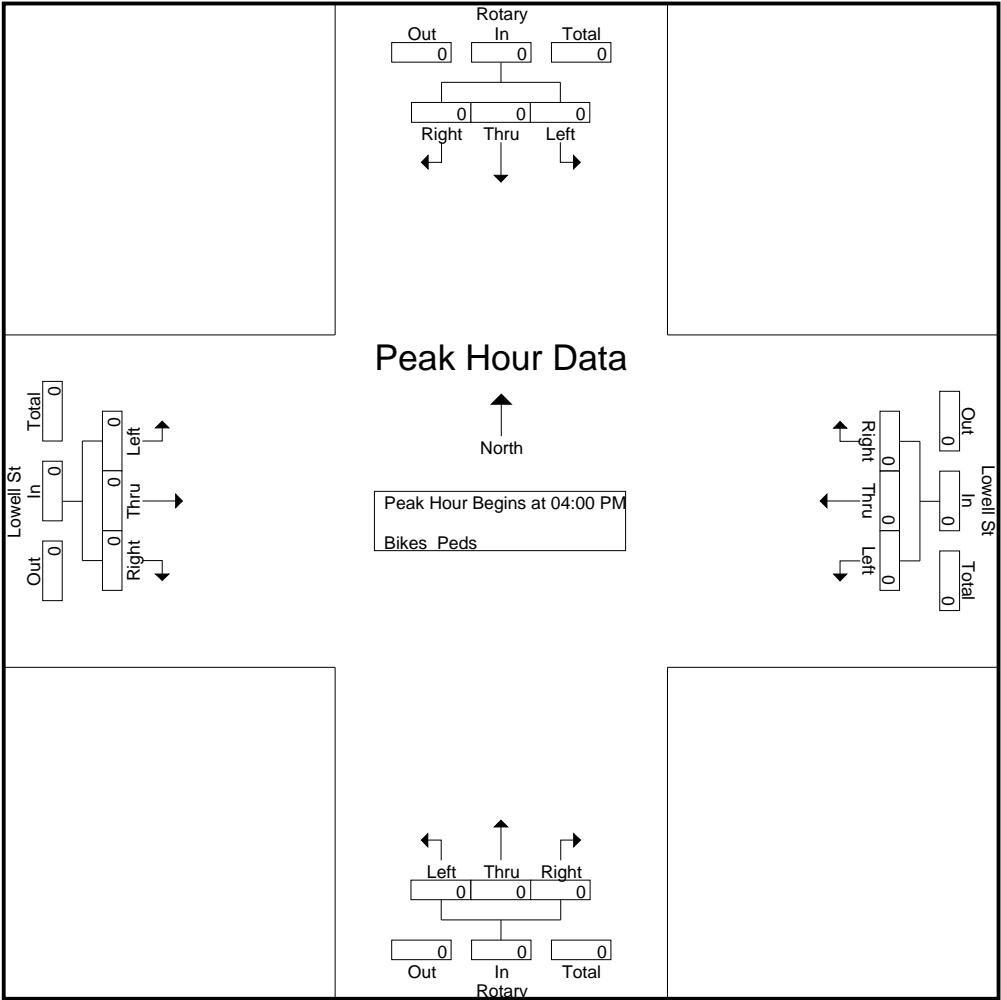
Start Time	Rotary From North				Lowell St From East				Rotary From South				Lowell St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	0	0	

Accurate Counts

978-664-2565

File Name : 79770006
 Site Code : 79770006
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0	

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S6
 Site Code : 79770006
 Start Date : 7/28/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rotary From North			Lowell St From East			Rotary From South			Lowell St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:00 AM	0	0	0	124	0	33	89	0	93	0	0	0	339
11:15 AM	0	0	0	113	0	34	96	0	114	0	0	0	357
11:30 AM	0	0	0	120	0	42	86	0	115	0	0	0	363
11:45 AM	0	0	0	106	0	31	99	0	114	0	0	0	350
Total	0	0	0	463	0	140	370	0	436	0	0	0	1409
12:00 PM	0	0	0	111	0	37	75	0	122	0	0	0	345
12:15 PM	0	0	0	102	0	39	76	0	138	0	0	0	355
12:30 PM	0	0	0	112	0	24	80	0	144	0	0	0	360
12:45 PM	0	0	0	121	0	25	61	0	151	0	0	0	358
Total	0	0	0	446	0	125	292	0	555	0	0	0	1418
01:00 PM	0	0	0	109	0	31	78	0	133	0	0	0	351
01:15 PM	0	0	0	116	0	29	81	0	167	0	0	0	393
01:30 PM	0	0	0	107	0	33	86	0	133	0	0	0	359
01:45 PM	0	0	0	107	0	24	83	0	138	0	0	0	352
Total	0	0	0	439	0	117	328	0	571	0	0	0	1455
Grand Total	0	0	0	1348	0	382	990	0	1562	0	0	0	4282
Apprch %	0	0	0	77.9	0	22.1	38.8	0	61.2	0	0	0	
Total %	0	0	0	31.5	0	8.9	23.1	0	36.5	0	0	0	
Cars	0	0	0	1340	0	379	988	0	1546	0	0	0	4253
% Cars	0	0	0	99.4	0	99.2	99.8	0	99	0	0	0	99.3
Trucks	0	0	0	8	0	3	2	0	16	0	0	0	29
% Trucks	0	0	0	0.6	0	0.8	0.2	0	1	0	0	0	0.7

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S6
 Site Code : 79770006
 Start Date : 7/28/2018
 Page No : 2

Start Time	Rotary From North				Lowell St From East				Rotary From South				Lowell St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:30 PM																	
12:30 PM	0	0	0	0	112	0	24	136	80	0	144	224	0	0	0	0	360
12:45 PM	0	0	0	0	121	0	25	146	61	0	151	212	0	0	0	0	358
01:00 PM	0	0	0	0	109	0	31	140	78	0	133	211	0	0	0	0	351
01:15 PM	0	0	0	0	116	0	29	145	81	0	167	248	0	0	0	0	393
Total Volume	0	0	0	0	458	0	109	567	300	0	595	895	0	0	0	0	1462
% App. Total	0	0	0		80.8	0	19.2		33.5	0	66.5		0	0	0		
PHF	.000	.000	.000	.000	.946	.000	.879	.971	.926	.000	.891	.902	.000	.000	.000	.000	.930
Cars	0	0	0	0	456	0	108	564	300	0	591	891	0	0	0	0	1455
% Cars	0	0	0	0	99.6	0	99.1	99.5	100	0	99.3	99.6	0	0	0	0	99.5
Trucks	0	0	0	0	2	0	1	3	0	0	4	4	0	0	0	0	7
% Trucks	0	0	0	0	0.4	0	0.9	0.5	0	0	0.7	0.4	0	0	0	0	0.5

Accurate Counts

978-664-2565

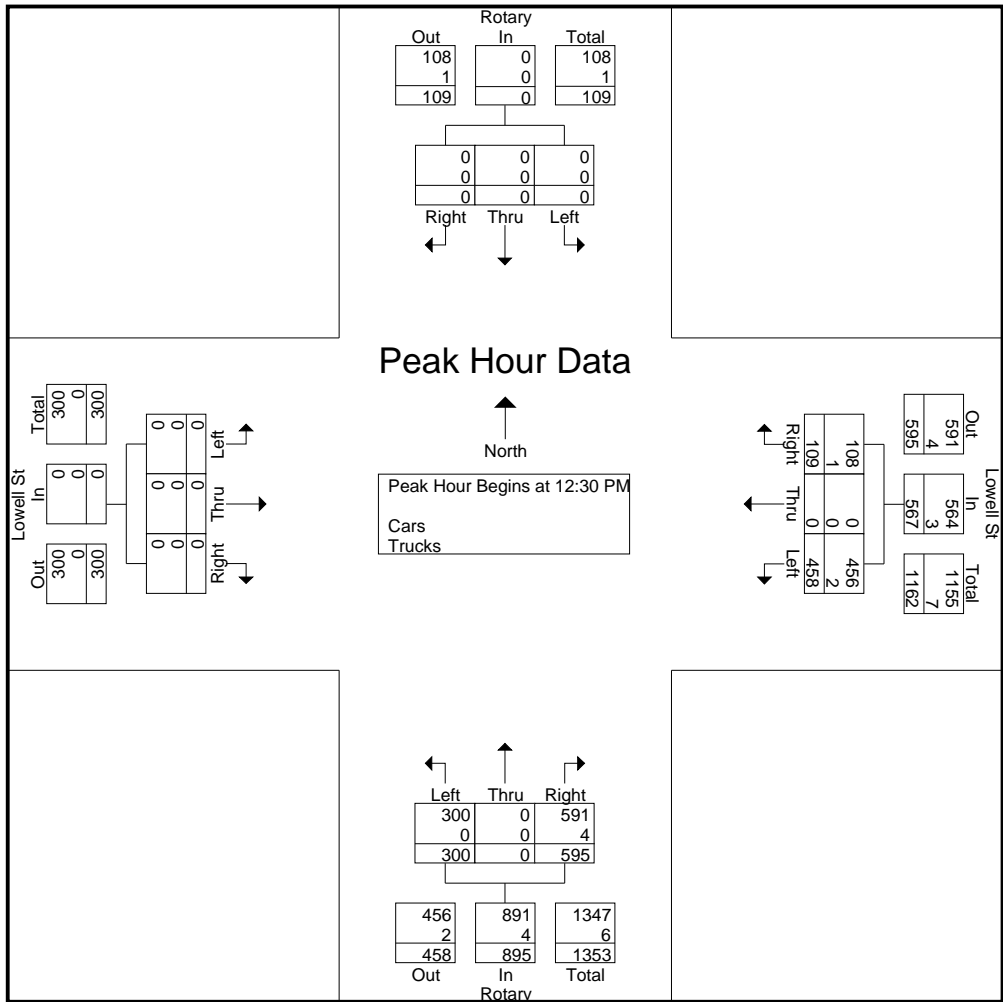
File Name : 797700S6

Site Code : 79770006

Start Date : 7/28/2018

Page No : 3

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				01:00 PM				11:00 AM			
+0 mins.	0	0	0	0	124	0	33	157	78	0	133	211	0	0	0	0
+15 mins.	0	0	0	0	113	0	34	147	81	0	167	248	0	0	0	0
+30 mins.	0	0	0	0	120	0	42	162	86	0	133	219	0	0	0	0
+45 mins.	0	0	0	0	106	0	31	137	83	0	138	221	0	0	0	0
Total Volume	0	0	0	0	463	0	140	603	328	0	571	899	0	0	0	0
% App. Total	0	0	0	0	76.8	0	23.2		36.5	0	63.5		0	0	0	0
PHF	.000	.000	.000	.000	.933	.000	.833	.931	.953	.000	.855	.906	.000	.000	.000	.000

Accurate Counts

978-664-2565

File Name : 797700S6
 Site Code : 79770006
 Start Date : 7/28/2018
 Page No : 13

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

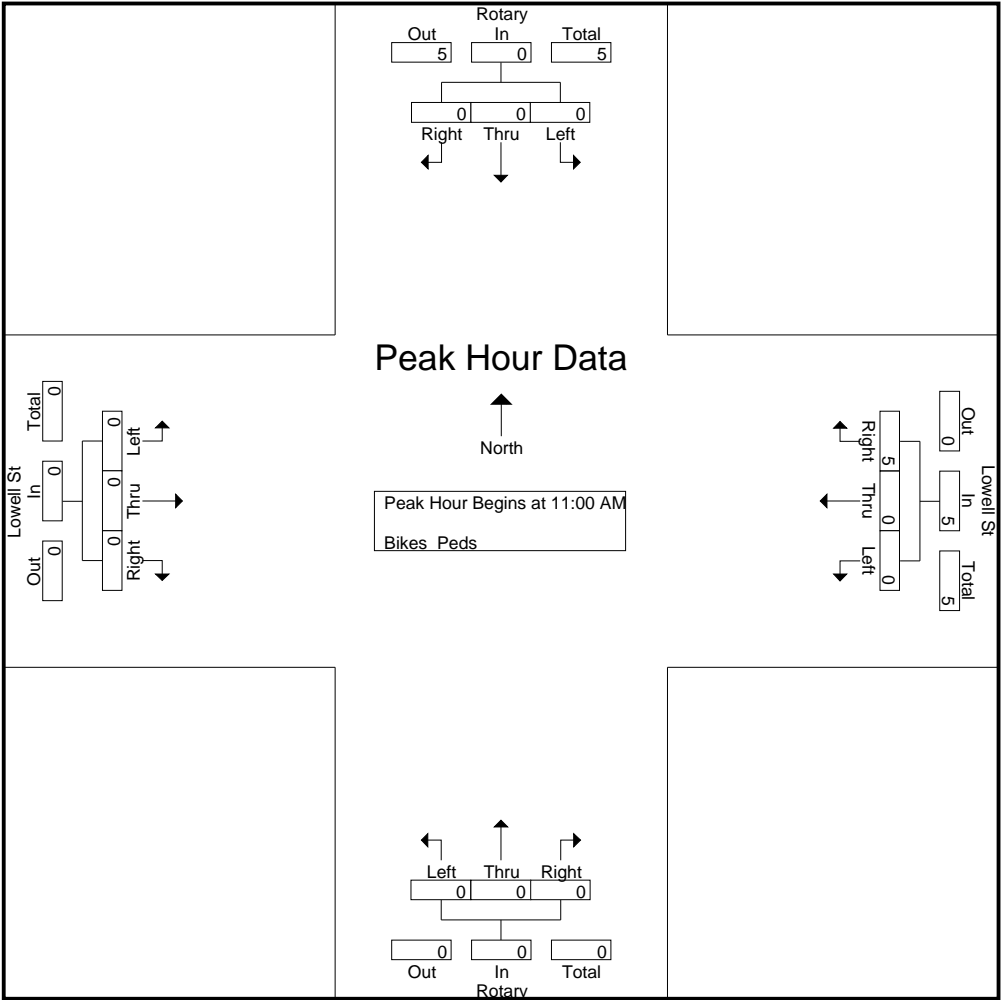
Start Time	Rotary From North				Lowell St From East				Rotary From South				Lowell St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
11:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
11:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	3
Total	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	5	5
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	4
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	4
Grand Total	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	10	10
Apprch %	0	0	0		0	0	100		0	0	0		0	0	0				
Total %	0	0	0		0	0	100		0	0	0		0	0	0		0	100	

Accurate Counts

978-664-2565

File Name : 797700S6
 Site Code : 79770006
 Start Date : 7/28/2018
 Page No : 15

N/S Street : Rotary
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				11:00 AM				11:00 AM			
+0 mins.	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	100	100	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.417	.417	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Route 95 SB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770007
 Site Code : 77970007
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rte 95 SB Off Ramp From North			Rotary From East			From South			Rotary From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	131	0	41	92	0	68	0	0	0	0	0	0	332
07:15 AM	169	0	57	89	0	90	0	0	0	0	0	0	405
07:30 AM	149	0	87	80	0	93	0	0	0	0	0	0	409
07:45 AM	152	0	84	93	0	89	0	0	0	0	0	0	418
Total	601	0	269	354	0	340	0	0	0	0	0	0	1564
08:00 AM	162	0	81	85	0	85	0	0	0	0	0	0	413
08:15 AM	151	0	86	82	0	106	0	0	0	0	0	0	425
08:30 AM	110	0	84	79	0	98	0	0	0	0	0	0	371
08:45 AM	111	0	60	74	0	108	0	0	0	0	0	0	353
Total	534	0	311	320	0	397	0	0	0	0	0	0	1562
Grand Total	1135	0	580	674	0	737	0	0	0	0	0	0	3126
Apprch %	66.2	0	33.8	47.8	0	52.2	0	0	0	0	0	0	
Total %	36.3	0	18.6	21.6	0	23.6	0	0	0	0	0	0	
Cars	1127	0	571	664	0	730	0	0	0	0	0	0	3092
% Cars	99.3	0	98.4	98.5	0	99.1	0	0	0	0	0	0	98.9
Trucks	8	0	9	10	0	7	0	0	0	0	0	0	34
% Trucks	0.7	0	1.6	1.5	0	0.9	0	0	0	0	0	0	1.1

Accurate Counts

978-664-2565

File Name : 79770007

Site Code : 77970007

Start Date : 7/26/2018

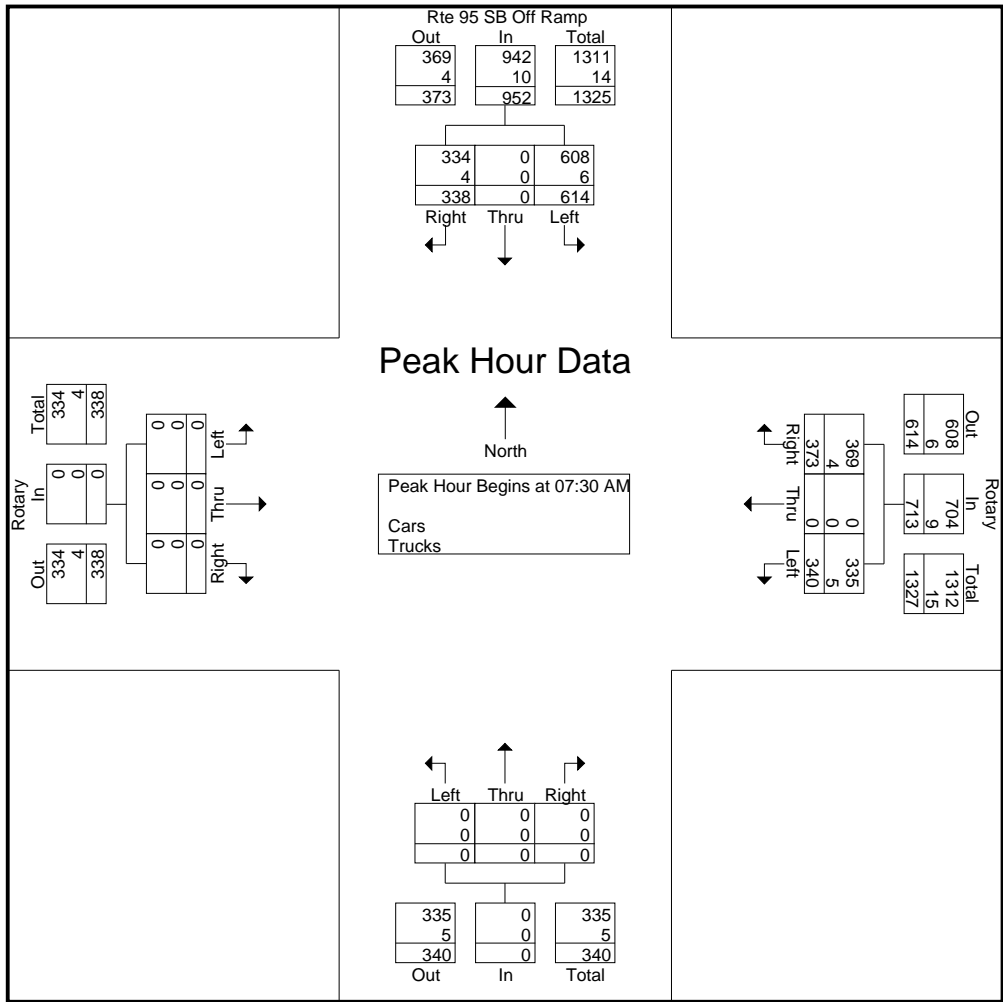
Page No : 3

N/S Street : Route 95 SB Off Ramp

E/W Street : Rotary

City/State : Wakefield, MA

Weather : Clear



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

Peak Hour for Each Approach Begins at:

	07:30 AM				07:45 AM				07:00 AM				07:00 AM			
+0 mins.	149	0	87	236	93	0	89	182	0	0	0	0	0	0	0	0
+15 mins.	152	0	84	236	85	0	85	170	0	0	0	0	0	0	0	0
+30 mins.	162	0	81	243	82	0	106	188	0	0	0	0	0	0	0	0
+45 mins.	151	0	86	237	79	0	98	177	0	0	0	0	0	0	0	0
Total Volume	614	0	338	952	339	0	378	717	0	0	0	0	0	0	0	0
% App. Total	64.5	0	35.5		47.3	0	52.7		0	0	0		0	0	0	

Accurate Counts

978-664-2565

File Name : 79770007
 Site Code : 77970007
 Start Date : 7/26/2018
 Page No : 13

N/S Street : Route 95 SB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

Start Time	Rte 95 SB Off Ramp From North				Rotary From East				From South				Rotary From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	0	0	

Accurate Counts

978-664-2565

File Name : 79770007
 Site Code : 77970007
 Start Date : 7/26/2018
 Page No : 14

N/S Street : Route 95 SB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

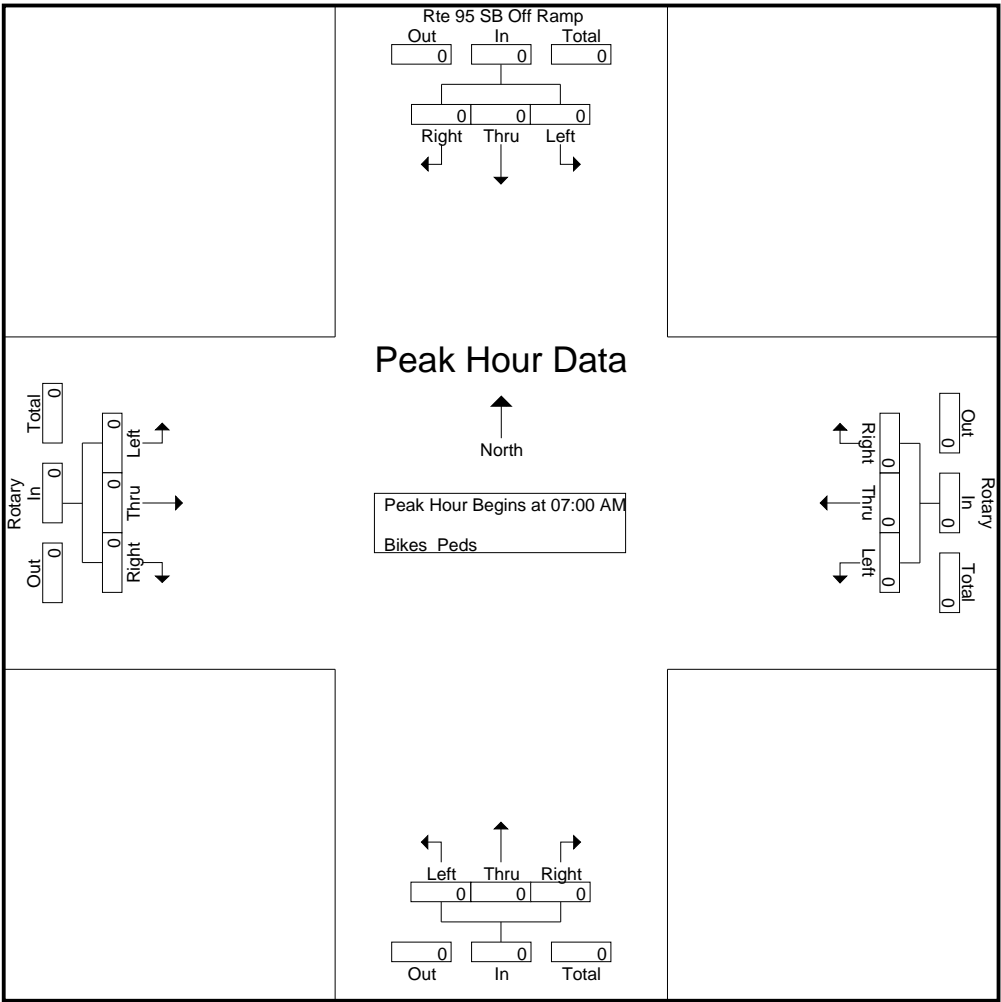
Start Time	Rte 95 SB Off Ramp From North				Rotary From East				From South				Rotary From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

File Name : 79770007
 Site Code : 77970007
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Route 95 SB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear



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

Peak Hour for Each Approach Begins at:

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

Accurate Counts

978-664-2565

N/S Street : Route 95 SB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770007
 Site Code : 77970007
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

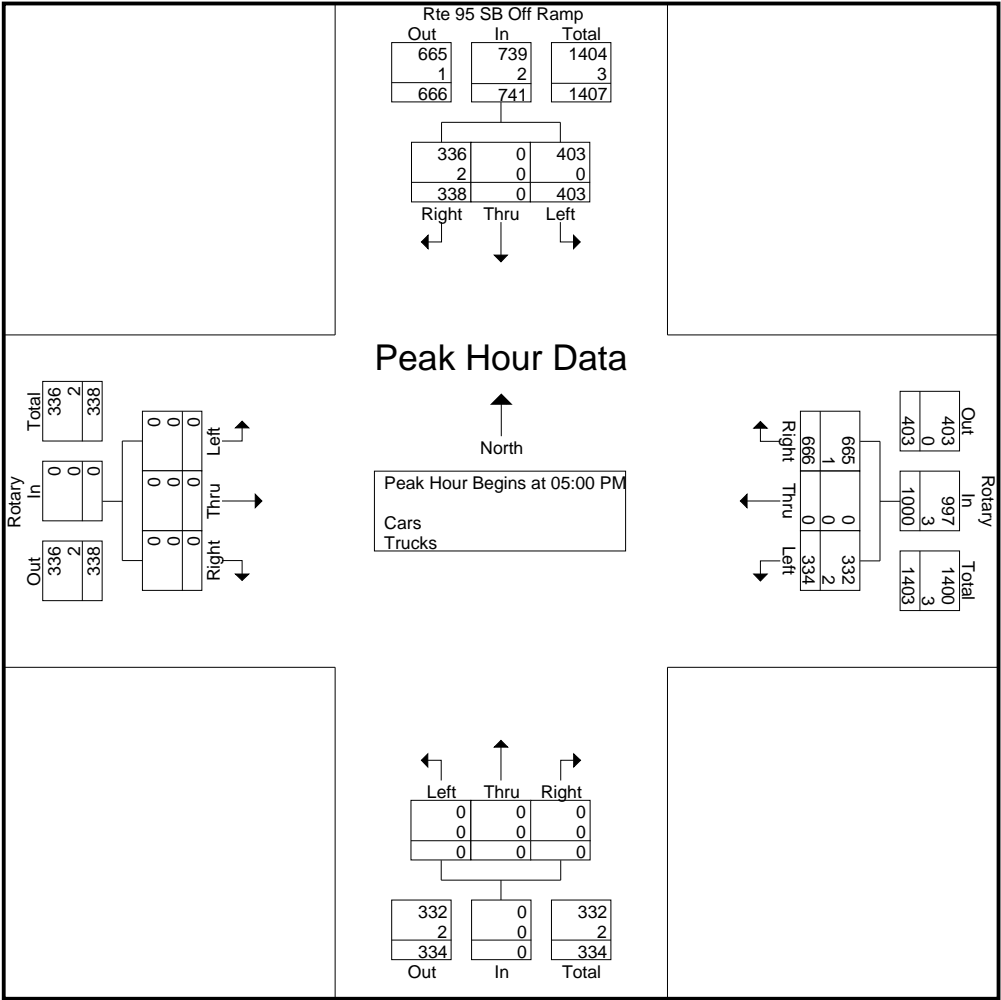
Start Time	Rte 95 SB Off Ramp From North			Rotary From East			From South			Rotary From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	104	0	74	94	0	157	0	0	0	0	0	0	429
04:15 PM	84	0	81	85	0	131	0	0	0	0	0	0	381
04:30 PM	77	0	93	79	0	137	0	0	0	0	0	0	386
04:45 PM	83	0	69	101	0	110	0	0	0	0	0	0	363
Total	348	0	317	359	0	535	0	0	0	0	0	0	1559
05:00 PM	88	0	95	83	0	167	0	0	0	0	0	0	433
05:15 PM	112	0	76	91	0	179	0	0	0	0	0	0	458
05:30 PM	97	0	86	78	0	165	0	0	0	0	0	0	426
05:45 PM	106	0	81	82	0	155	0	0	0	0	0	0	424
Total	403	0	338	334	0	666	0	0	0	0	0	0	1741
Grand Total	751	0	655	693	0	1201	0	0	0	0	0	0	3300
Apprch %	53.4	0	46.6	36.6	0	63.4	0	0	0	0	0	0	
Total %	22.8	0	19.8	21	0	36.4	0	0	0	0	0	0	
Cars	751	0	649	690	0	1198	0	0	0	0	0	0	3288
% Cars	100	0	99.1	99.6	0	99.8	0	0	0	0	0	0	99.6
Trucks	0	0	6	3	0	3	0	0	0	0	0	0	12
% Trucks	0	0	0.9	0.4	0	0.2	0	0	0	0	0	0	0.4

Accurate Counts

978-664-2565

File Name : 79770007
 Site Code : 77970007
 Start Date : 7/26/2018
 Page No : 3

N/S Street : Route 95 SB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				04:00 PM				04:00 PM			
+0 mins.	88	0	95	183	83	0	167	250	0	0	0	0	0	0	0	0
+15 mins.	112	0	76	188	91	0	179	270	0	0	0	0	0	0	0	0
+30 mins.	97	0	86	183	78	0	165	243	0	0	0	0	0	0	0	0
+45 mins.	106	0	81	187	82	0	155	237	0	0	0	0	0	0	0	0
Total Volume	403	0	338	741	334	0	666	1000	0	0	0	0	0	0	0	0
% App. Total	54.4	0	45.6		33.4	0	66.6		0	0	0		0	0	0	

Accurate Counts

978-664-2565

N/S Street : Route 95 SB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770007
 Site Code : 77970007
 Start Date : 7/26/2018
 Page No : 13

Groups Printed- Bikes Peds

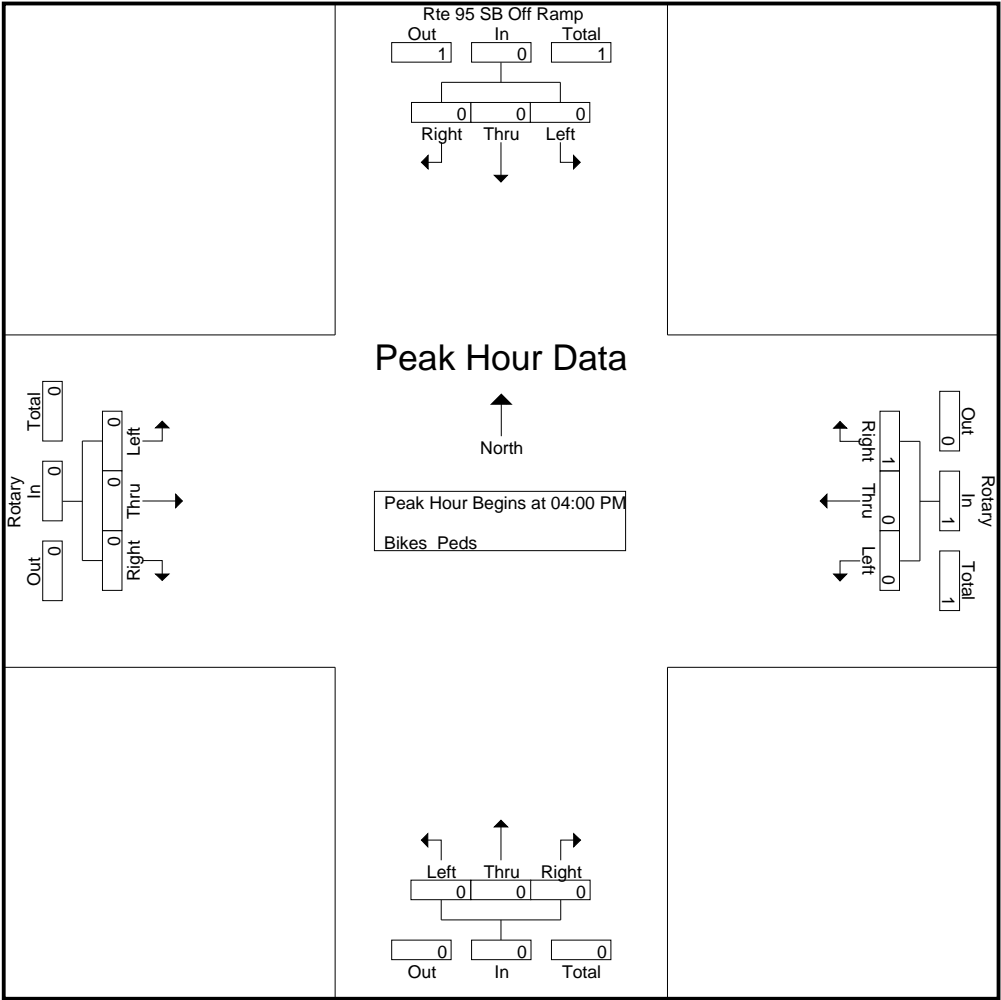
Start Time	Rte 95 SB Off Ramp From North				Rotary From East				From South				Rotary From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
Apprch %	0	0	0		0	0	100		0	0	0		0	0	0				
Total %	0	0	0		0	0	100		0	0	0		0	0	0		0	100	

Accurate Counts

978-664-2565

File Name : 79770007
 Site Code : 77970007
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Route 95 SB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	100		0	0	0		0	0	0	

Accurate Counts

978-664-2565

N/S Street : Route 95 SB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S7
 Site Code : 77970007
 Start Date : 7/28/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rte 95 SB Off Ramp From North			Rotary From East			From South			Rotary From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:00 AM	91	0	33	130	0	86	0	0	0	0	0	0	340
11:15 AM	72	0	43	114	0	89	0	0	0	0	0	0	318
11:30 AM	67	0	42	116	0	90	0	0	0	0	0	0	315
11:45 AM	60	0	43	101	0	103	0	0	0	0	0	0	307
Total	290	0	161	461	0	368	0	0	0	0	0	0	1280
12:00 PM	58	0	40	102	0	84	0	0	0	0	0	0	284
12:15 PM	58	0	38	86	0	89	0	0	0	0	0	0	271
12:30 PM	75	0	37	104	0	90	0	0	0	0	0	0	306
12:45 PM	79	0	48	95	0	94	0	0	0	0	0	0	316
Total	270	0	163	387	0	357	0	0	0	0	0	0	1177
01:00 PM	85	0	45	100	0	92	0	0	0	0	0	0	322
01:15 PM	73	0	46	106	0	92	0	0	0	0	0	0	317
01:30 PM	73	0	44	101	0	94	0	0	0	0	0	0	312
01:45 PM	58	0	44	109	0	82	0	0	0	0	0	0	293
Total	289	0	179	416	0	360	0	0	0	0	0	0	1244
Grand Total	849	0	503	1264	0	1085	0	0	0	0	0	0	3701
Apprch %	62.8	0	37.2	53.8	0	46.2	0	0	0	0	0	0	
Total %	22.9	0	13.6	34.2	0	29.3	0	0	0	0	0	0	
Cars	848	0	501	1260	0	1081	0	0	0	0	0	0	3690
% Cars	99.9	0	99.6	99.7	0	99.6	0	0	0	0	0	0	99.7
Trucks	1	0	2	4	0	4	0	0	0	0	0	0	11
% Trucks	0.1	0	0.4	0.3	0	0.4	0	0	0	0	0	0	0.3

Accurate Counts

978-664-2565

N/S Street : Route 95 SB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S7
 Site Code : 77970007
 Start Date : 7/28/2018
 Page No : 13

Groups Printed- Bikes Peds

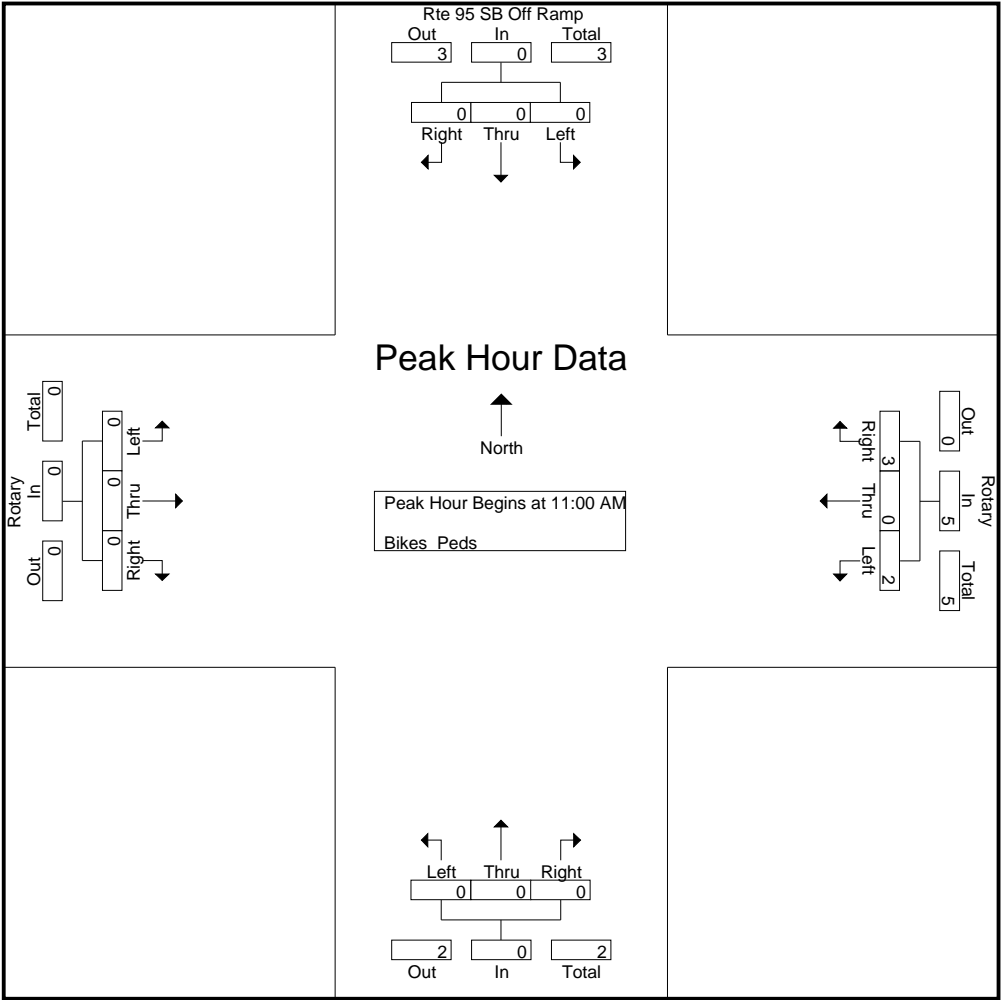
Start Time	Rte 95 SB Off Ramp From North				Rotary From East				From South				Rotary From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
11:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
11:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	3	3
Total	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0	0	5	5
12:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
12:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	2
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	2
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	2
Grand Total	0	0	0	0	2	0	7	0	0	0	0	0	0	0	0	0	0	9	9
Apprch %	0	0	0		22.2	0	77.8		0	0	0		0	0	0				
Total %	0	0	0		22.2	0	77.8		0	0	0		0	0	0		0	100	

Accurate Counts

978-664-2565

File Name : 797700S7
 Site Code : 77970007
 Start Date : 7/28/2018
 Page No : 15

N/S Street : Route 95 SB Off Ramp
 E/W Street : Rotary
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				11:00 AM				11:00 AM			
+0 mins.	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	2	0	1	3	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	2	0	3	5	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	40	0	60		0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.250	.000	.750	.417	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770008
 Site Code : 79770008
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rotary From North			From East			Rotary From South			Haverhill St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	53	0	171	0	0	0	0	0	0	119	0	39	382
07:15 AM	79	0	182	0	0	0	0	0	0	170	0	49	480
07:30 AM	92	0	132	0	0	0	0	0	0	176	0	42	442
07:45 AM	103	0	143	0	0	0	0	0	0	164	0	45	455
Total	327	0	628	0	0	0	0	0	0	629	0	175	1759
08:00 AM	107	0	143	0	0	0	0	0	0	181	0	43	474
08:15 AM	79	0	150	0	0	0	0	0	0	198	0	27	454
08:30 AM	62	0	117	0	0	0	0	0	0	199	0	38	416
08:45 AM	66	0	111	0	0	0	0	0	0	194	0	55	426
Total	314	0	521	0	0	0	0	0	0	772	0	163	1770
Grand Total	641	0	1149	0	0	0	0	0	0	1401	0	338	3529
Apprch %	35.8	0	64.2	0	0	0	0	0	0	80.6	0	19.4	
Total %	18.2	0	32.6	0	0	0	0	0	0	39.7	0	9.6	
Cars	638	0	1137	0	0	0	0	0	0	1388	0	338	3501
% Cars	99.5	0	99	0	0	0	0	0	0	99.1	0	100	99.2
Trucks	3	0	12	0	0	0	0	0	0	13	0	0	28
% Trucks	0.5	0	1	0	0	0	0	0	0	0.9	0	0	0.8

Accurate Counts

978-664-2565

File Name : 79770008
 Site Code : 79770008
 Start Date : 7/26/2018
 Page No : 2

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

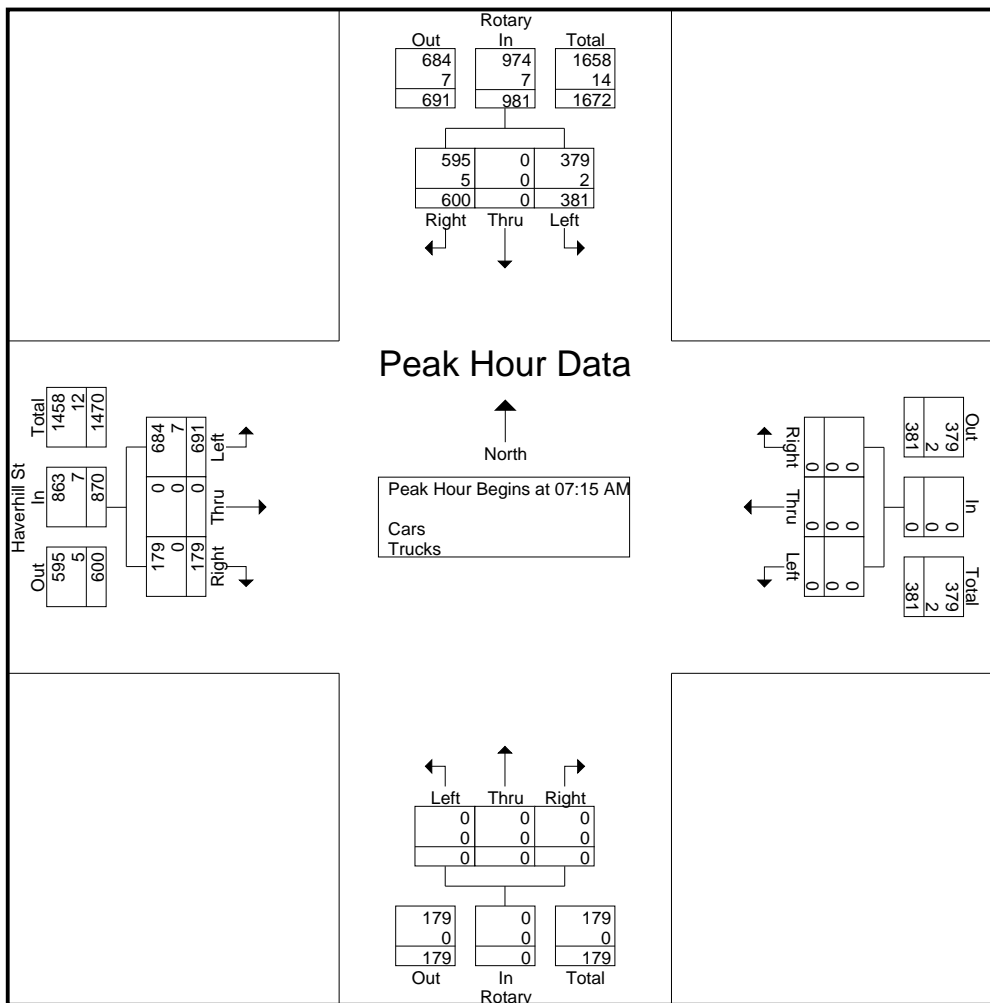
Start Time	Rotary From North				From East				Rotary From South				Haverhill St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	79	0	182	261	0	0	0	0	0	0	0	0	170	0	49	219	480
07:30 AM	92	0	132	224	0	0	0	0	0	0	0	0	176	0	42	218	442
07:45 AM	103	0	143	246	0	0	0	0	0	0	0	0	164	0	45	209	455
08:00 AM	107	0	143	250	0	0	0	0	0	0	0	0	181	0	43	224	474
Total Volume	381	0	600	981	0	0	0	0	0	0	0	0	691	0	179	870	1851
% App. Total	38.8	0	61.2		0	0	0		0	0	0		79.4	0	20.6		
PHF	.890	.000	.824	.940	.000	.000	.000	.000	.000	.000	.000	.000	.954	.000	.913	.971	.964
Cars	379	0	595	974	0	0	0	0	0	0	0	0	684	0	179	863	1837
% Cars	99.5	0	99.2	99.3	0	0	0	0	0	0	0	0	99.0	0	100	99.2	99.2
Trucks	2	0	5	7	0	0	0	0	0	0	0	0	7	0	0	7	14
% Trucks	0.5	0	0.8	0.7	0	0	0	0	0	0	0	0	1.0	0	0	0.8	0.8

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770008
 Site Code : 79770008
 Start Date : 7/26/2018
 Page No : 3



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

Peak Hour for Each Approach Begins at:

	07:15 AM				07:00 AM				07:00 AM				08:00 AM				
+0 mins.	79	0	182	261	0	0	0	0	0	0	0	0	0	181	0	43	224
+15 mins.	92	0	132	224	0	0	0	0	0	0	0	0	0	198	0	27	225
+30 mins.	103	0	143	246	0	0	0	0	0	0	0	0	0	199	0	38	237
+45 mins.	107	0	143	250	0	0	0	0	0	0	0	0	0	194	0	55	249
Total Volume	381	0	600	981	0	0	0	0	0	0	0	0	0	772	0	163	935
% App. Total	38.8	0	61.2		0	0	0		0	0	0		0	82.6	0	17.4	

Accurate Counts

978-664-2565

File Name : 79770008
 Site Code : 79770008
 Start Date : 7/26/2018
 Page No : 13

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

Start Time	Rotary From North				From East				Rotary From South				Haverhill St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	2	0	1	0	0	4	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	0	0	0	0	0	0	0	2	0	1	0	0	4	4
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	1	0	0	0	0	0	0	0	0	0	2	0	1	0	0	4	4
Apprch %	0	0	100		0	0	0		0	0	0		66.7	0	33.3				
Total %	0	0	25		0	0	0		0	0	0		50	0	25		0	100	

Accurate Counts

978-664-2565

File Name : 79770008
 Site Code : 79770008
 Start Date : 7/26/2018
 Page No : 14

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

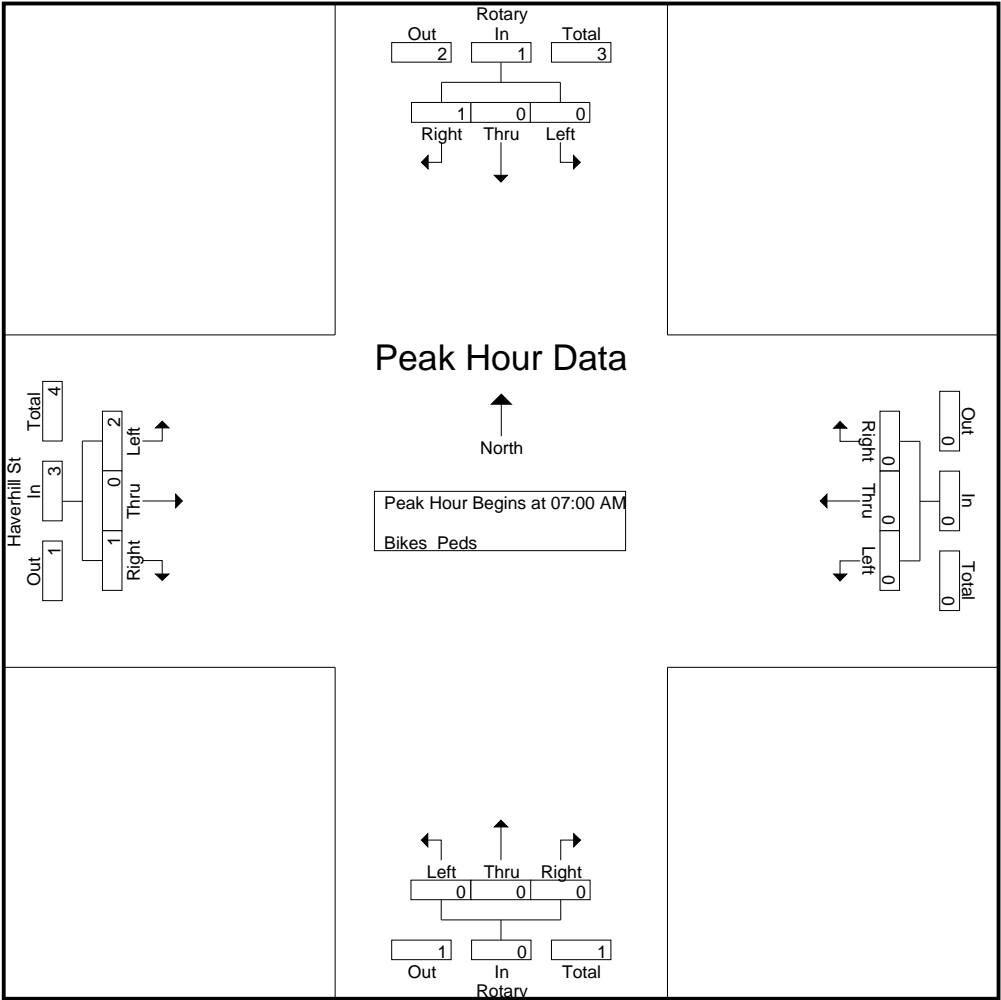
Start Time	Rotary From North				From East				Rotary From South				Haverhill St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	1	1	0	0	0	0	0	0	0	0	2	0	1	3	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	1	1	0	0	0	0	0	0	0	0	2	0	1	3	4
% App. Total	0	0	100		0	0	0		0	0	0		66.7	0	33.3		
PHF	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250	.250

Accurate Counts

978-664-2565

File Name : 79770008
 Site Code : 79770008
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear



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

Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	1	1	0	0	0	0	0	0	0	0	2	0	1	3
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	1	1	0	0	0	0	0	0	0	0	2	0	1	3
% App. Total	0	0	100		0	0	0		0	0	0		66.7	0	33.3	

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770008
 Site Code : 79770008
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

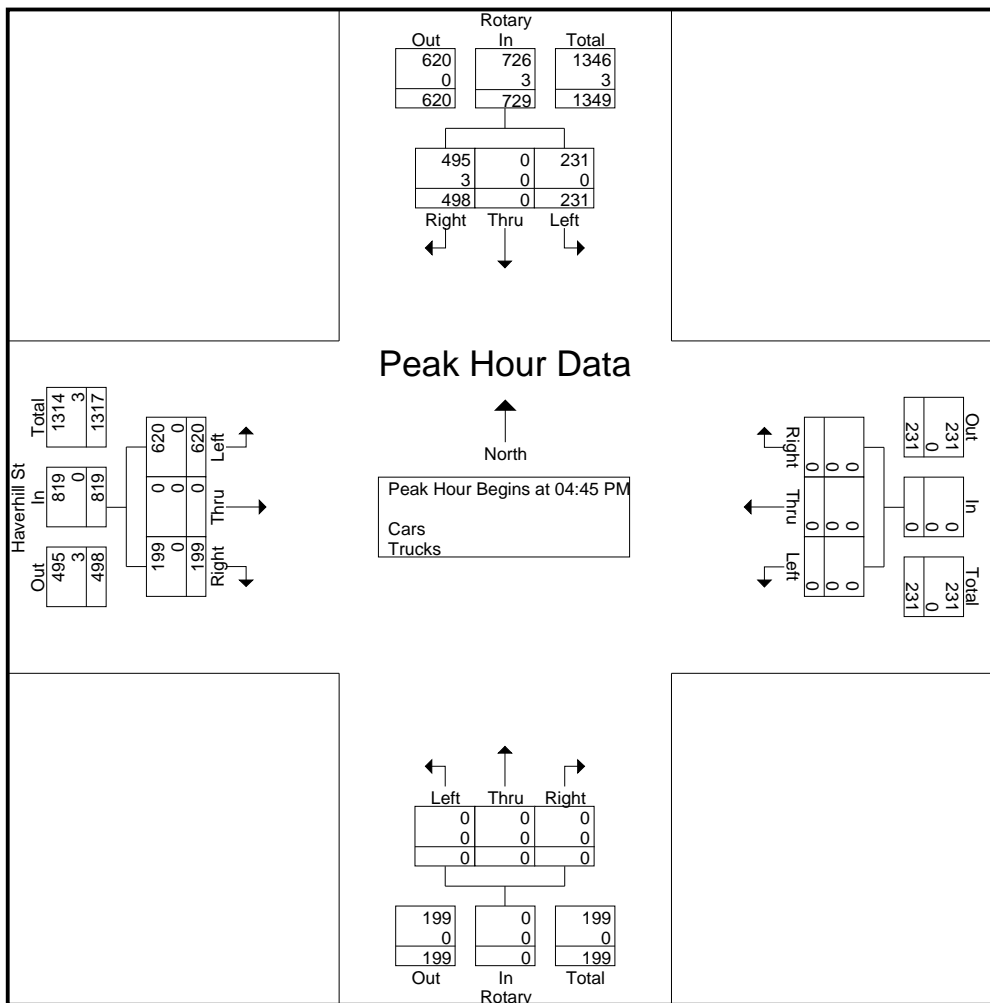
Start Time	Rotary From North			From East			Rotary From South			Haverhill St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	57	0	127	0	0	0	0	0	0	129	0	28	341
04:15 PM	52	0	122	0	0	0	0	0	0	137	0	42	353
04:30 PM	32	0	125	0	0	0	0	0	0	134	0	38	329
04:45 PM	69	0	109	0	0	0	0	0	0	149	0	65	392
Total	210	0	483	0	0	0	0	0	0	549	0	173	1415
05:00 PM	42	0	130	0	0	0	0	0	0	159	0	51	382
05:15 PM	63	0	139	0	0	0	0	0	0	155	0	44	401
05:30 PM	57	0	120	0	0	0	0	0	0	157	0	39	373
05:45 PM	53	0	128	0	0	0	0	0	0	110	0	25	316
Total	215	0	517	0	0	0	0	0	0	581	0	159	1472
Grand Total	425	0	1000	0	0	0	0	0	0	1130	0	332	2887
Apprch %	29.8	0	70.2	0	0	0	0	0	0	77.3	0	22.7	
Total %	14.7	0	34.6	0	0	0	0	0	0	39.1	0	11.5	
Cars	425	0	996	0	0	0	0	0	0	1127	0	332	2880
% Cars	100	0	99.6	0	0	0	0	0	0	99.7	0	100	99.8
Trucks	0	0	4	0	0	0	0	0	0	3	0	0	7
% Trucks	0	0	0.4	0	0	0	0	0	0	0.3	0	0	0.2

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770008
 Site Code : 79770008
 Start Date : 7/26/2018
 Page No : 3



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	05:00 PM				04:00 PM				04:00 PM				04:45 PM				
+0 mins.	42	0	130	172	0	0	0	0	0	0	0	0	0	149	0	65	214
+15 mins.	63	0	139	202	0	0	0	0	0	0	0	0	0	159	0	51	210
+30 mins.	57	0	120	177	0	0	0	0	0	0	0	0	0	155	0	44	199
+45 mins.	53	0	128	181	0	0	0	0	0	0	0	0	0	157	0	39	196
Total Volume	215	0	517	732	0	0	0	0	0	0	0	0	0	620	0	199	819
% App. Total	29.4	0	70.6		0	0	0		0	0	0		0	75.7	0	24.3	

Accurate Counts

978-664-2565

File Name : 79770008
 Site Code : 79770008
 Start Date : 7/26/2018
 Page No : 13

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

Start Time	Rotary From North				From East				Rotary From South				Haverhill St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	0	0	

Accurate Counts

978-664-2565

File Name : 79770008
 Site Code : 79770008
 Start Date : 7/26/2018
 Page No : 14

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

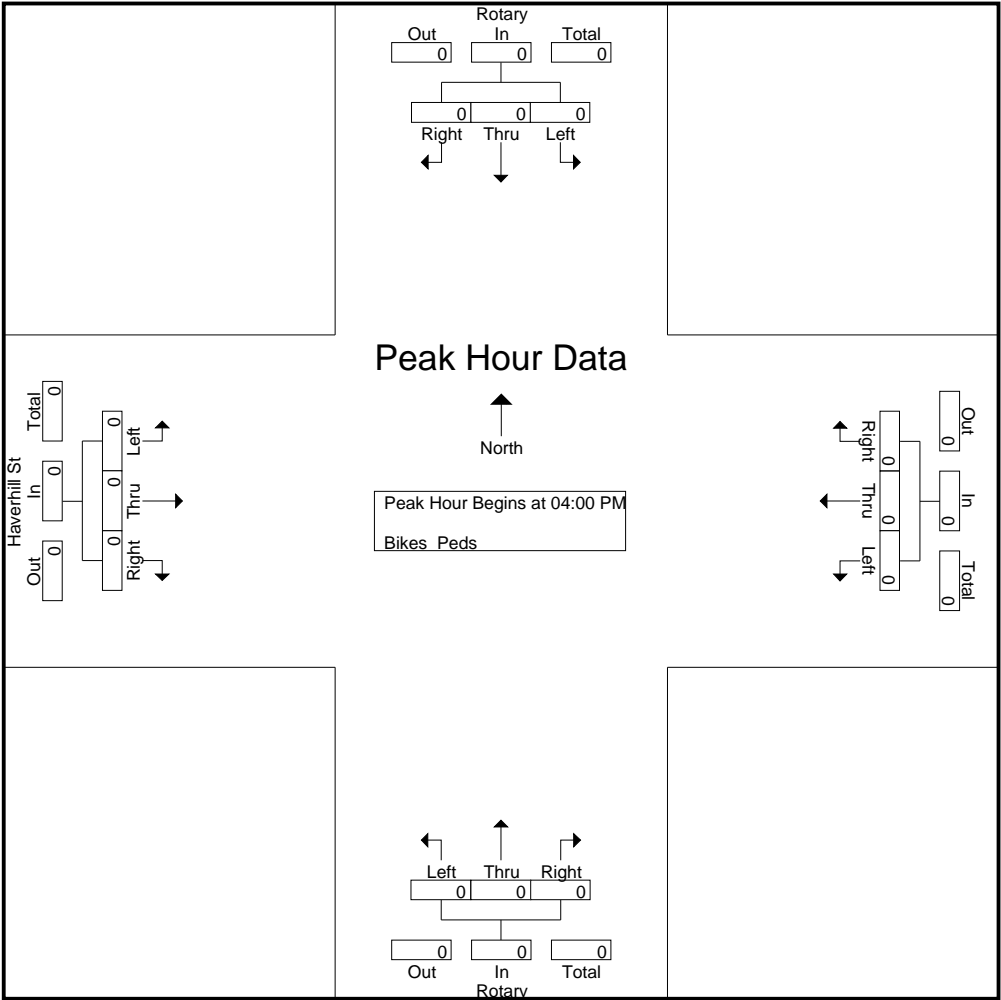
Start Time	Rotary From North				From East				Rotary From South				Haverhill St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

File Name : 79770008
 Site Code : 79770008
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0	

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S8
 Site Code : 79770008
 Start Date : 7/28/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rotary From North			From East			Rotary From South			Haverhill St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:00 AM	104	0	121	0	0	0	0	0	0	94	0	38	357
11:15 AM	110	0	79	0	0	0	0	0	0	113	0	38	340
11:30 AM	96	0	84	0	0	0	0	0	0	110	0	51	341
11:45 AM	85	0	68	0	0	0	0	0	0	91	0	41	285
Total	395	0	352	0	0	0	0	0	0	408	0	168	1323
12:00 PM	83	0	83	0	0	0	0	0	0	81	0	33	280
12:15 PM	83	0	72	0	0	0	0	0	0	97	0	55	307
12:30 PM	96	0	65	0	0	0	0	0	0	94	0	56	311
12:45 PM	101	0	82	0	0	0	0	0	0	82	0	63	328
Total	363	0	302	0	0	0	0	0	0	354	0	207	1226
01:00 PM	101	0	79	0	0	0	0	0	0	81	0	47	308
01:15 PM	94	0	89	0	0	0	0	0	0	79	0	38	300
01:30 PM	83	0	90	0	0	0	0	0	0	104	0	34	311
01:45 PM	97	0	78	0	0	0	0	0	0	93	0	32	300
Total	375	0	336	0	0	0	0	0	0	357	0	151	1219
Grand Total	1133	0	990	0	0	0	0	0	0	1119	0	526	3768
Apprch %	53.4	0	46.6	0	0	0	0	0	0	68	0	32	
Total %	30.1	0	26.3	0	0	0	0	0	0	29.7	0	14	
Cars	1131	0	987	0	0	0	0	0	0	1111	0	523	3752
% Cars	99.8	0	99.7	0	0	0	0	0	0	99.3	0	99.4	99.6
Trucks	2	0	3	0	0	0	0	0	0	8	0	3	16
% Trucks	0.2	0	0.3	0	0	0	0	0	0	0.7	0	0.6	0.4

Accurate Counts

978-664-2565

File Name : 797700S8
 Site Code : 79770008
 Start Date : 7/28/2018
 Page No : 2

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

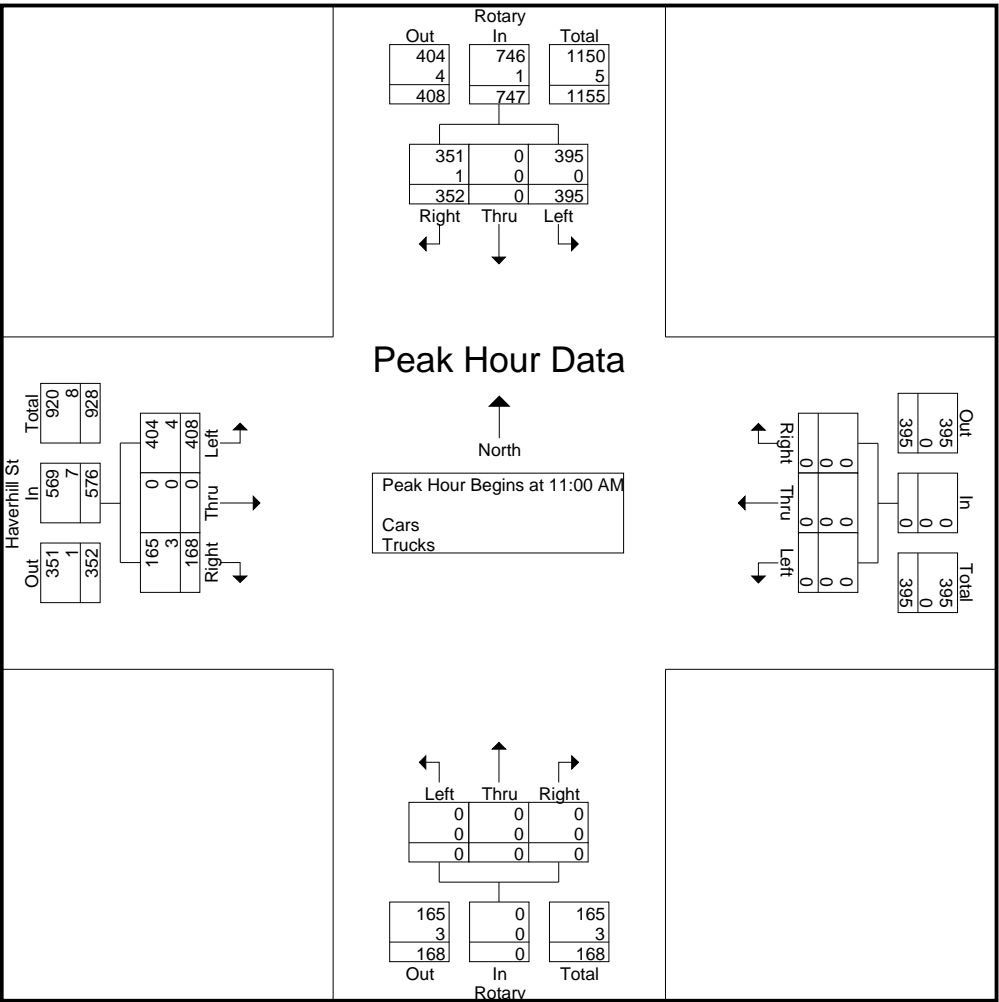
Start Time	Rotary From North				From East				Rotary From South				Haverhill St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	104	0	121	225	0	0	0	0	0	0	0	0	94	0	38	132	357
11:15 AM	110	0	79	189	0	0	0	0	0	0	0	0	113	0	38	151	340
11:30 AM	96	0	84	180	0	0	0	0	0	0	0	0	110	0	51	161	341
11:45 AM	85	0	68	153	0	0	0	0	0	0	0	0	91	0	41	132	285
Total Volume	395	0	352	747	0	0	0	0	0	0	0	0	408	0	168	576	1323
% App. Total	52.9	0	47.1		0	0	0		0	0	0		70.8	0	29.2		
PHF	.898	.000	.727	.830	.000	.000	.000	.000	.000	.000	.000	.000	.903	.000	.824	.894	.926
Cars	395	0	351	746	0	0	0	0	0	0	0	0	404	0	165	569	1315
% Cars	100	0	99.7	99.9	0	0	0	0	0	0	0	0	99.0	0	98.2	98.8	99.4
Trucks	0	0	1	1	0	0	0	0	0	0	0	0	4	0	3	7	8
% Trucks	0	0	0.3	0.1	0	0	0	0	0	0	0	0	1.0	0	1.8	1.2	0.6

Accurate Counts

978-664-2565

File Name : 797700S8
Site Code : 79770008
Start Date : 7/28/2018
Page No : 3

N/S Street : Rotary
E/W Street: Haverhill Street
City/State : Wakefield, MA
Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				11:00 AM				11:00 AM			
+0 mins.	104	0	121	225	0	0	0	0	0	0	0	0	94	0	38	132
+15 mins.	110	0	79	189	0	0	0	0	0	0	0	0	113	0	38	151
+30 mins.	96	0	84	180	0	0	0	0	0	0	0	0	110	0	51	161
+45 mins.	85	0	68	153	0	0	0	0	0	0	0	0	91	0	41	132
Total Volume	395	0	352	747	0	0	0	0	0	0	0	0	408	0	168	576
% App. Total	52.9	0	47.1		0	0	0		0	0	0		70.8	0	29.2	
PHF	.898	.000	.727	.830	.000	.000	.000	.000	.000	.000	.000	.000	.903	.000	.824	.894

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S8
 Site Code : 79770008
 Start Date : 7/28/2018
 Page No : 13

Groups Printed- Bikes Peds

Start Time	Rotary From North				From East				Rotary From South				Haverhill St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
11:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	2
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
11:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	2
Total	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	5	5
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	3	3
Grand Total	0	0	2	0	0	0	0	0	0	0	0	0	2	0	5	0	0	9	9
Apprch %	0	0	100		0	0	0		0	0	0		28.6	0	71.4				
Total %	0	0	22.2		0	0	0		0	0	0		22.2	0	55.6		0	100	

Accurate Counts

978-664-2565

File Name : 797700S8
 Site Code : 79770008
 Start Date : 7/28/2018
 Page No : 14

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear

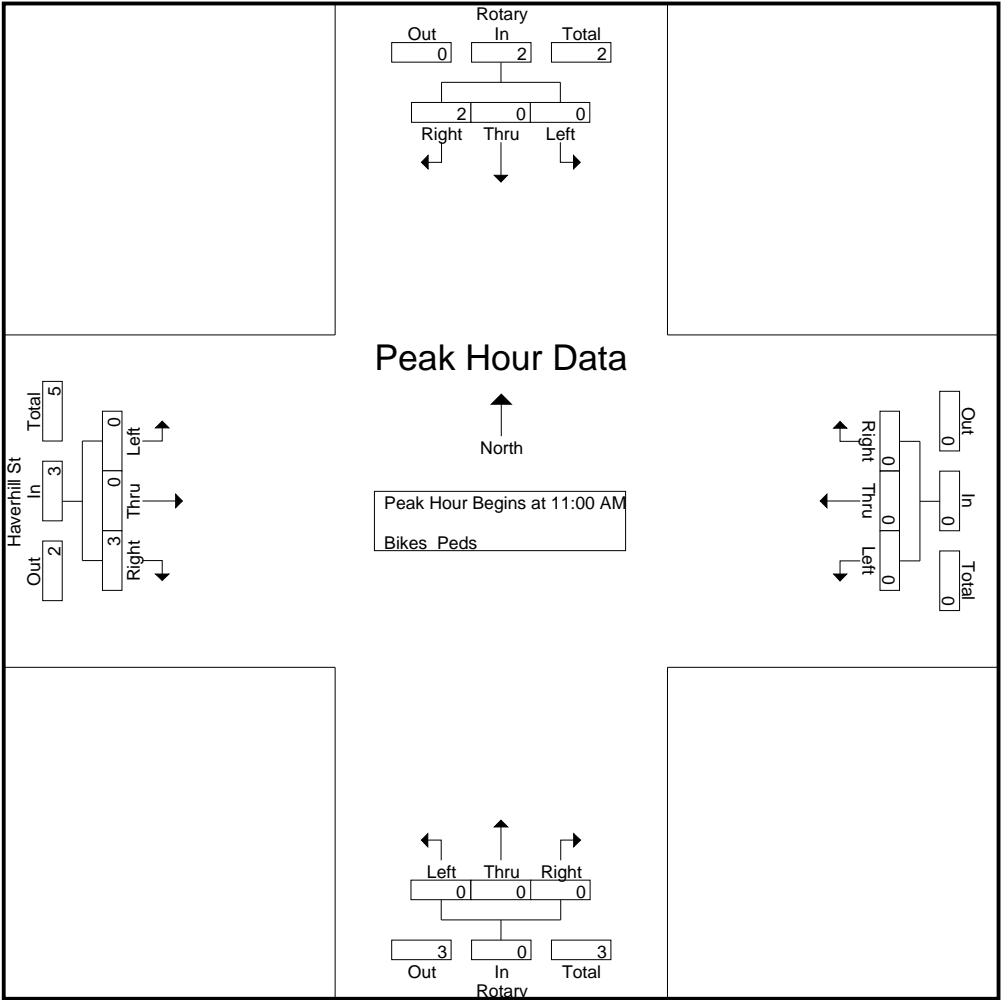
Start Time	Rotary From North				From East				Rotary From South				Haverhill St From West				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 11:00 AM																		
11:00 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
11:45 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Total Volume	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	3	3	5
% App. Total	0	0	100		0	0	0		0	0	0		0	0	100			
PHF	.000	.000	.500	.500	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.750	.750	.625

Accurate Counts

978-664-2565

File Name : 797700S8
 Site Code : 79770008
 Start Date : 7/28/2018
 Page No : 15

N/S Street : Rotary
 E/W Street: Haverhill Street
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				11:00 AM				11:00 AM			
+0 mins.	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
+45 mins.	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Total Volume	0	0	2	2	0	0	0	0	0	0	0	0	0	0	3	3
% App. Total	0	0	100		0	0	0		0	0	0		0	0	100	
PHF	.000	.000	.500	.500	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.750	.750

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770009
 Site Code : 77970009
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rotary From North			From East			Rotary From South			Salem St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	113	0	67	0	0	0	0	0	0	107	0	18	305
07:15 AM	151	0	96	0	0	0	0	0	0	111	0	31	389
07:30 AM	181	0	91	0	0	0	0	0	0	137	0	27	436
07:45 AM	169	0	106	0	0	0	0	0	0	130	0	25	430
Total	614	0	360	0	0	0	0	0	0	485	0	101	1560
08:00 AM	193	0	92	0	0	0	0	0	0	132	0	29	446
08:15 AM	199	0	82	0	0	0	0	0	0	130	0	23	434
08:30 AM	183	0	73	0	0	0	0	0	0	145	0	32	433
08:45 AM	189	0	84	0	0	0	0	0	0	151	0	19	443
Total	764	0	331	0	0	0	0	0	0	558	0	103	1756
Grand Total	1378	0	691	0	0	0	0	0	0	1043	0	204	3316
Apprch %	66.6	0	33.4	0	0	0	0	0	0	83.6	0	16.4	
Total %	41.6	0	20.8	0	0	0	0	0	0	31.5	0	6.2	
Cars	1356	0	682	0	0	0	0	0	0	1013	0	200	3251
% Cars	98.4	0	98.7	0	0	0	0	0	0	97.1	0	98	98
Trucks	22	0	9	0	0	0	0	0	0	30	0	4	65
% Trucks	1.6	0	1.3	0	0	0	0	0	0	2.9	0	2	2

Accurate Counts

978-664-2565

File Name : 79770009
 Site Code : 77970009
 Start Date : 7/26/2018
 Page No : 2

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear

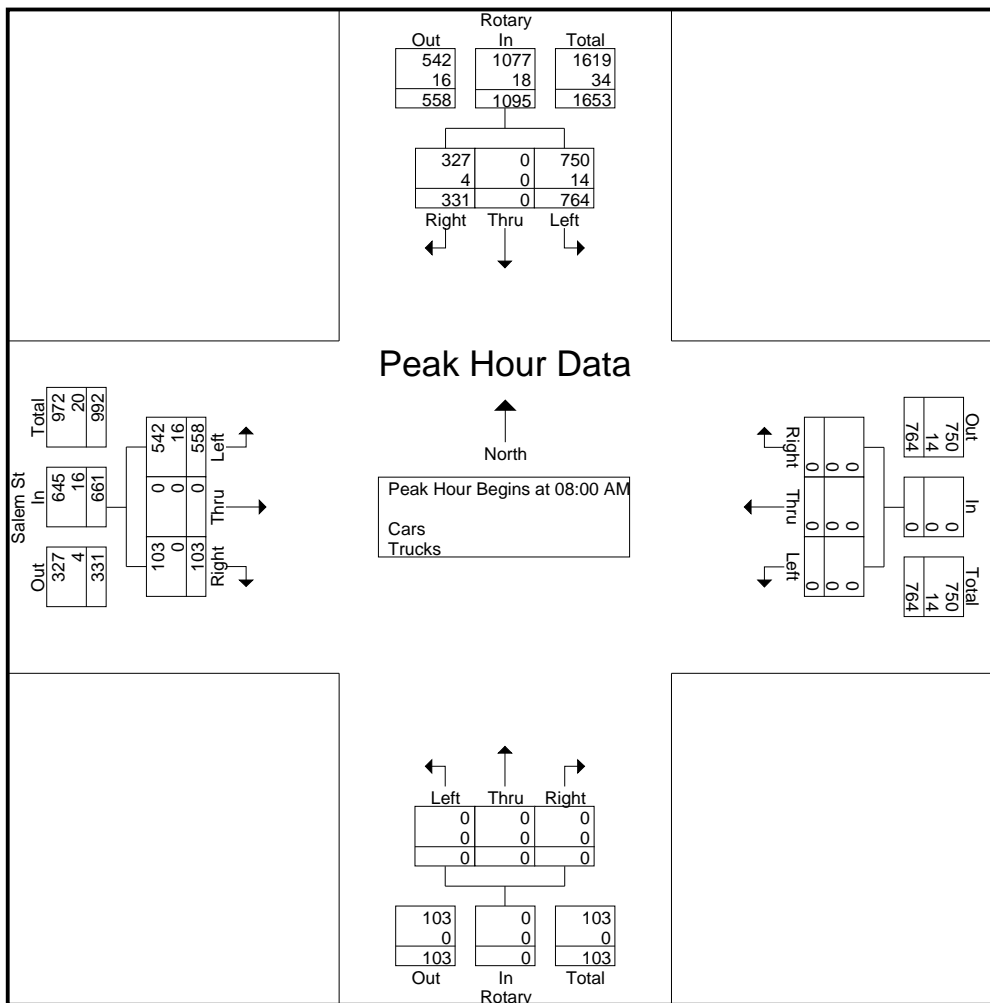
Start Time	Rotary From North				From East				Rotary From South				Salem St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	193	0	92	285	0	0	0	0	0	0	0	0	132	0	29	161	446
08:15 AM	199	0	82	281	0	0	0	0	0	0	0	0	130	0	23	153	434
08:30 AM	183	0	73	256	0	0	0	0	0	0	0	0	145	0	32	177	433
08:45 AM	189	0	84	273	0	0	0	0	0	0	0	0	151	0	19	170	443
Total Volume	764	0	331	1095	0	0	0	0	0	0	0	0	558	0	103	661	1756
% App. Total	69.8	0	30.2		0	0	0		0	0	0		84.4	0	15.6		
PHF	.960	.000	.899	.961	.000	.000	.000	.000	.000	.000	.000	.000	.924	.000	.805	.934	.984
Cars	750	0	327	1077	0	0	0	0	0	0	0	0	542	0	103	645	1722
% Cars	98.2	0	98.8	98.4	0	0	0	0	0	0	0	0	97.1	0	100	97.6	98.1
Trucks	14	0	4	18	0	0	0	0	0	0	0	0	16	0	0	16	34
% Trucks	1.8	0	1.2	1.6	0	0	0	0	0	0	0	0	2.9	0	0	2.4	1.9

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770009
 Site Code : 77970009
 Start Date : 7/26/2018
 Page No : 3



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

Peak Hour for Each Approach Begins at:

	07:30 AM				07:00 AM				07:00 AM				08:00 AM			
+0 mins.	181	0	91	272	0	0	0	0	0	0	0	0	132	0	29	161
+15 mins.	169	0	106	275	0	0	0	0	0	0	0	0	130	0	23	153
+30 mins.	193	0	92	285	0	0	0	0	0	0	0	0	145	0	32	177
+45 mins.	199	0	82	281	0	0	0	0	0	0	0	0	151	0	19	170
Total Volume	742	0	371	1113	0	0	0	0	0	0	0	0	558	0	103	661
% App. Total	66.7	0	33.3		0	0	0		0	0	0		84.4	0	15.6	

Accurate Counts

978-664-2565

File Name : 79770009
 Site Code : 77970009
 Start Date : 7/26/2018
 Page No : 13

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

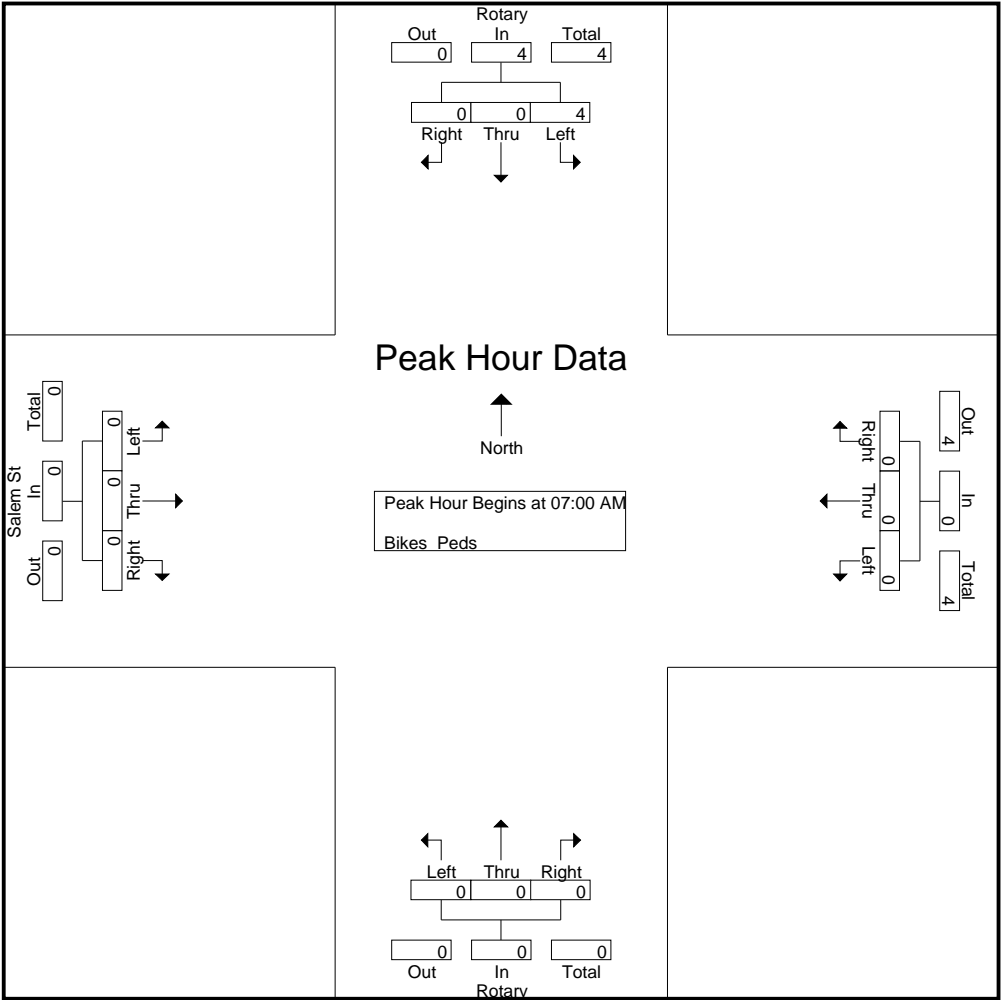
Start Time	Rotary From North				From East				Rotary From South				Salem St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
07:30 AM	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
Apprch %	100	0	0		0	0	0		0	0	0		0	0	0				
Total %	100	0	0		0	0	0		0	0	0		0	0	0		0	100	

Accurate Counts

978-664-2565

File Name : 79770009
 Site Code : 77970009
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear



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

Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	100	0	0		0	0	0		0	0	0		0	0	0	

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 79770009
 Site Code : 77970009
 Start Date : 7/26/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rotary From North			From East			Rotary From South			Salem St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	113	0	78	0	0	0	0	0	0	205	0	24	420
04:15 PM	107	0	78	0	0	0	0	0	0	224	0	23	432
04:30 PM	122	0	48	0	0	0	0	0	0	235	0	20	425
04:45 PM	140	0	84	0	0	0	0	0	0	216	0	27	467
Total	482	0	288	0	0	0	0	0	0	880	0	94	1744
05:00 PM	104	0	88	0	0	0	0	0	0	236	0	34	462
05:15 PM	137	0	72	0	0	0	0	0	0	234	0	22	465
05:30 PM	135	0	86	0	0	0	0	0	0	207	0	19	447
05:45 PM	109	0	56	0	0	0	0	0	0	270	0	23	458
Total	485	0	302	0	0	0	0	0	0	947	0	98	1832
Grand Total	967	0	590	0	0	0	0	0	0	1827	0	192	3576
Apprch %	62.1	0	37.9	0	0	0	0	0	0	90.5	0	9.5	
Total %	27	0	16.5	0	0	0	0	0	0	51.1	0	5.4	
Cars	961	0	590	0	0	0	0	0	0	1813	0	191	3555
% Cars	99.4	0	100	0	0	0	0	0	0	99.2	0	99.5	99.4
Trucks	6	0	0	0	0	0	0	0	0	14	0	1	21
% Trucks	0.6	0	0	0	0	0	0	0	0	0.8	0	0.5	0.6

Accurate Counts

978-664-2565

File Name : 79770009
 Site Code : 77970009
 Start Date : 7/26/2018
 Page No : 2

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear

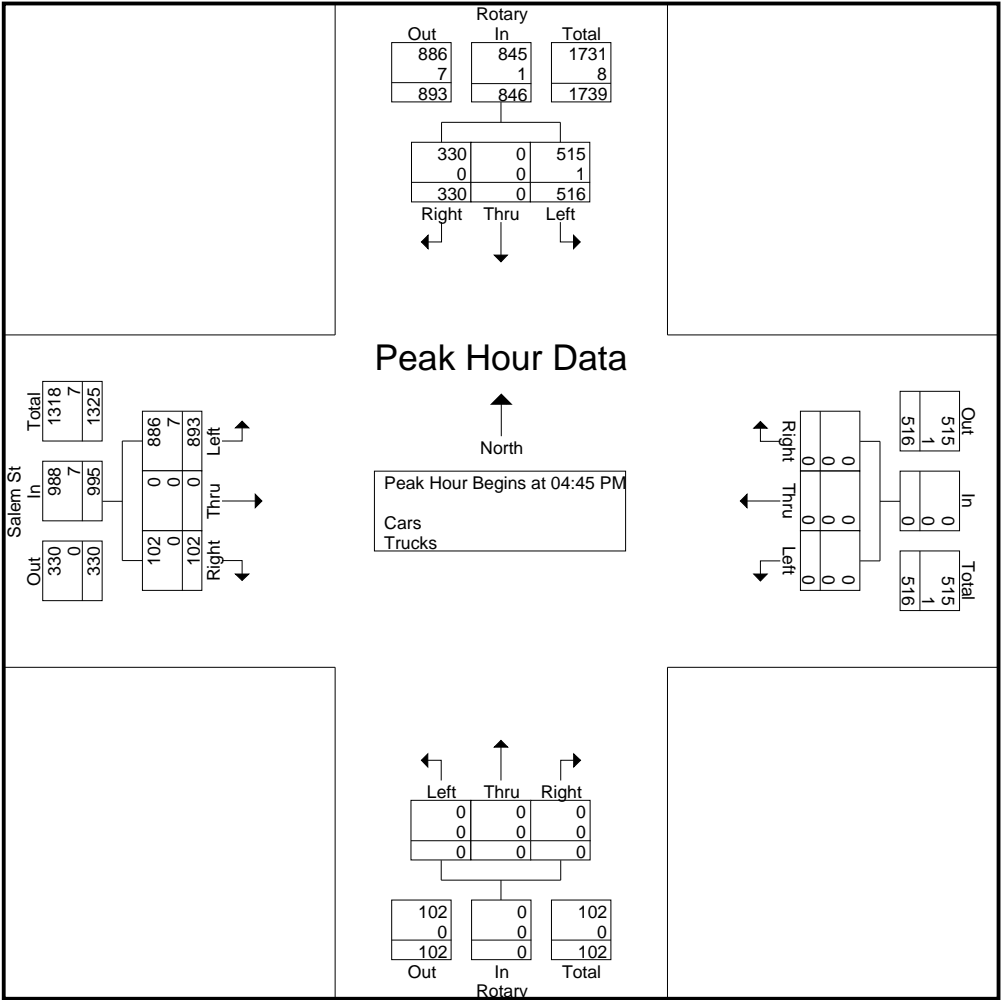
Start Time	Rotary From North				From East				Rotary From South				Salem St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	140	0	84	224	0	0	0	0	0	0	0	0	216	0	27	243	467
05:00 PM	104	0	88	192	0	0	0	0	0	0	0	0	236	0	34	270	462
05:15 PM	137	0	72	209	0	0	0	0	0	0	0	0	234	0	22	256	465
05:30 PM	135	0	86	221	0	0	0	0	0	0	0	0	207	0	19	226	447
Total Volume	516	0	330	846	0	0	0	0	0	0	0	0	893	0	102	995	1841
% App. Total	61	0	39		0	0	0		0	0	0		89.7	0	10.3		
PHF	.921	.000	.938	.944	.000	.000	.000	.000	.000	.000	.000	.000	.946	.000	.750	.921	.986
Cars	515	0	330	845	0	0	0	0	0	0	0	0	886	0	102	988	1833
% Cars	99.8	0	100	99.9	0	0	0	0	0	0	0	0	99.2	0	100	99.3	99.6
Trucks	1	0	0	1	0	0	0	0	0	0	0	0	7	0	0	7	8
% Trucks	0.2	0	0	0.1	0	0	0	0	0	0	0	0	0.8	0	0	0.7	0.4

Accurate Counts

978-664-2565

File Name : 79770009
 Site Code : 77970009
 Start Date : 7/26/2018
 Page No : 3

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:45 PM				04:00 PM				05:00 PM						
+0 mins.	140	0	84	224	0	0	0	0	0	0	0	236	0	34	270
+15 mins.	104	0	88	192	0	0	0	0	0	0	0	234	0	22	256
+30 mins.	137	0	72	209	0	0	0	0	0	0	0	207	0	19	226
+45 mins.	135	0	86	221	0	0	0	0	0	0	0	270	0	23	293
Total Volume	516	0	330	846	0	0	0	0	0	0	0	947	0	98	1045
% App. Total	61	0	39		0	0	0		0	0	0	90.6	0	9.4	

Accurate Counts

978-664-2565

File Name : 79770009

Site Code : 77970009

Start Date : 7/26/2018

Page No : 13

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

Start Time	Rotary From North				From East				Rotary From South				Salem St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	0	0	

Accurate Counts

978-664-2565

File Name : 79770009
 Site Code : 77970009
 Start Date : 7/26/2018
 Page No : 14

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear

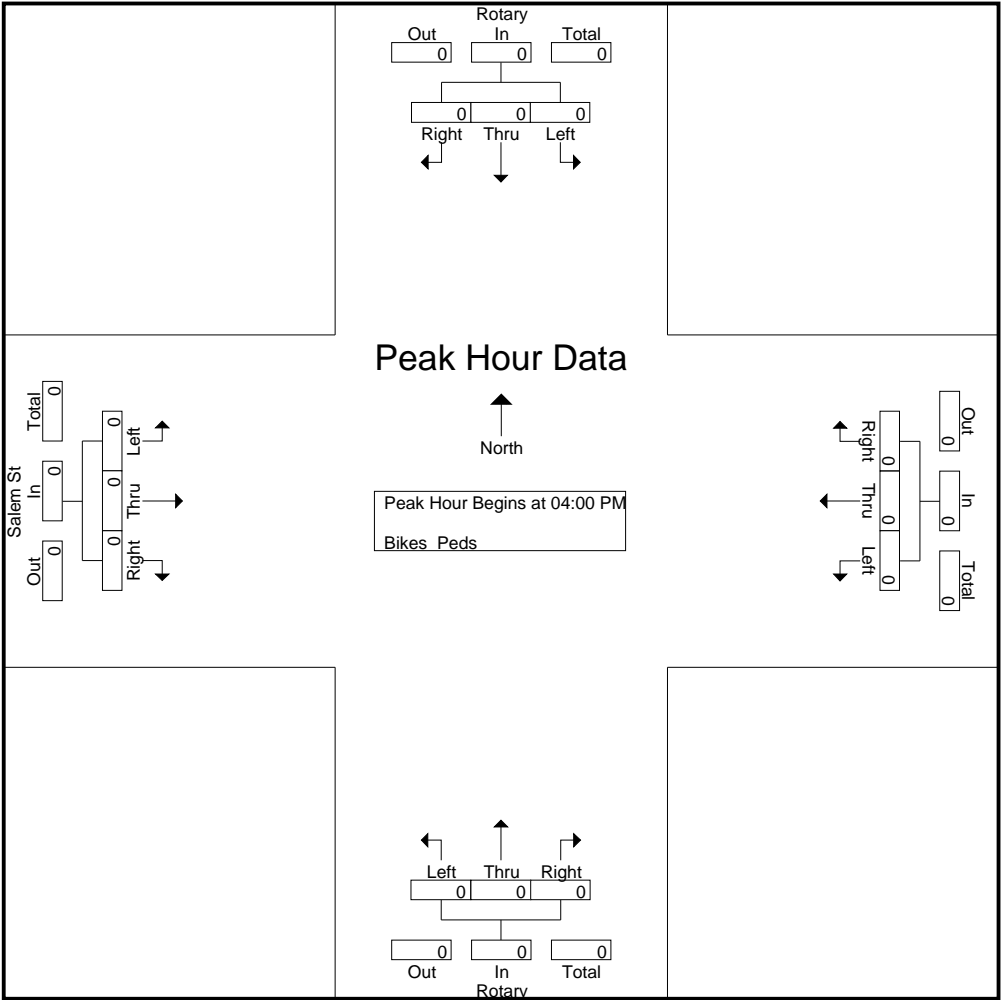
Start Time	Rotary From North				From East				Rotary From South				Salem St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

File Name : 79770009
 Site Code : 77970009
 Start Date : 7/26/2018
 Page No : 15

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0	

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S9
 Site Code : 77970009
 Start Date : 7/28/2018
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Rotary From North			From East			Rotary From South			Salem St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:00 AM	100	0	90	0	0	0	0	0	0	122	0	40	352
11:15 AM	118	0	114	0	0	0	0	0	0	147	0	34	413
11:30 AM	96	0	107	0	0	0	0	0	0	157	0	39	399
11:45 AM	85	0	86	0	0	0	0	0	0	183	0	34	388
Total	399	0	397	0	0	0	0	0	0	609	0	147	1552
12:00 PM	83	0	86	0	0	0	0	0	0	155	0	37	361
12:15 PM	92	0	93	0	0	0	0	0	0	183	0	35	403
12:30 PM	105	0	79	0	0	0	0	0	0	194	0	52	430
12:45 PM	97	0	90	0	0	0	0	0	0	170	0	61	418
Total	377	0	348	0	0	0	0	0	0	702	0	185	1612
01:00 PM	94	0	85	0	0	0	0	0	0	181	0	43	403
01:15 PM	99	0	78	0	0	0	0	0	0	191	0	46	414
01:30 PM	89	0	100	0	0	0	0	0	0	192	0	25	406
01:45 PM	82	0	96	0	0	0	0	0	0	179	0	42	399
Total	364	0	359	0	0	0	0	0	0	743	0	156	1622
Grand Total	1140	0	1104	0	0	0	0	0	0	2054	0	488	4786
Aprrch %	50.8	0	49.2	0	0	0	0	0	0	80.8	0	19.2	
Total %	23.8	0	23.1	0	0	0	0	0	0	42.9	0	10.2	
Cars	1128	0	1098	0	0	0	0	0	0	2042	0	484	4752
% Cars	98.9	0	99.5	0	0	0	0	0	0	99.4	0	99.2	99.3
Trucks	12	0	6	0	0	0	0	0	0	12	0	4	34

Accurate Counts

978-664-2565

% Trucks |

1.1

0

0.5 |

0

0

0 |

0

0

0 |

0.6

0

0.8 |

0.7

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear

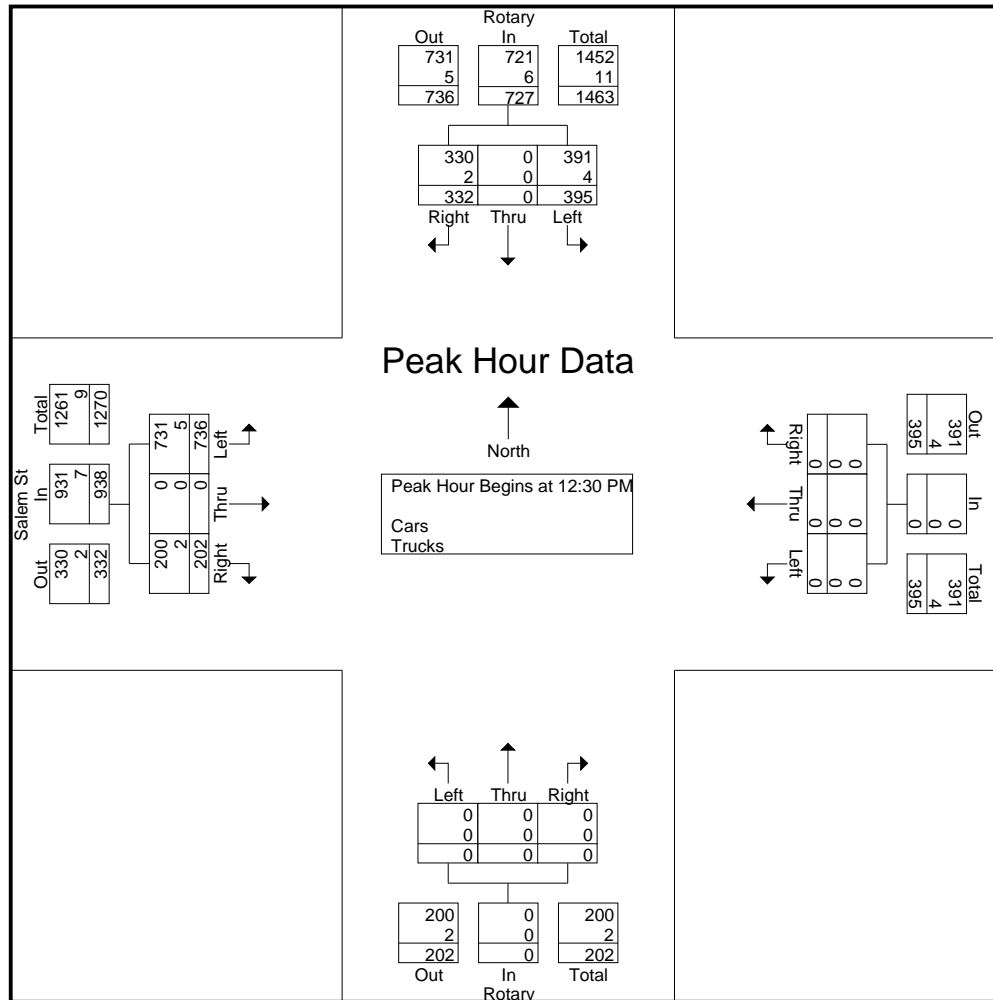
File Name : 797700S9
 Site Code : 77970009
 Start Date : 7/28/2018
 Page No : 3

Start Time	Rotary From North				From East				Rotary From South				Salem St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:30 PM																	
12:30 PM	105	0	79	184	0	0	0	0	0	0	0	0	194	0	52	246	430
12:45 PM	97	0	90	187	0	0	0	0	0	0	0	0	170	0	61	231	418
01:00 PM	94	0	85	179	0	0	0	0	0	0	0	0	181	0	43	224	403
01:15 PM	99	0	78	177	0	0	0	0	0	0	0	0	191	0	46	237	414
Total Volume	395	0	332	727	0	0	0	0	0	0	0	0	736	0	202	938	1665
% App. Total	54.3	0	45.7		0	0	0		0	0	0		78.5	0	21.5		
PHF	.940	.000	.922	.972	.000	.000	.000	.000	.000	.000	.000	.000	.948	.000	.828	.953	.968
Cars	391	0	330	721	0	0	0	0	0	0	0	0	731	0	200	931	1652
% Cars	99.0	0	99.4	99.2	0	0	0	0	0	0	0	0	99.3	0	99.0	99.3	99.2
Trucks	4	0	2	6	0	0	0	0	0	0	0	0	5	0	2	7	13
% Trucks	1.0	0	0.6	0.8	0	0	0	0	0	0	0	0	0.7	0	1.0	0.7	0.8

Accurate Counts
978-664-2565

File Name : 797700S9
Site Code : 77970009
Start Date : 7/28/2018
Page No : 4

N/S Street : Rotary
E/W Street : Salem Street
City/State : Wakefield, MA
Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				11:00 AM				12:30 PM			
+0 mins.	100	0	90	190	0	0	0	0	0	0	0	0	194	0	52	246
+15 mins.	118	0	114	232	0	0	0	0	0	0	0	0	170	0	61	231
+30 mins.	96	0	107	203	0	0	0	0	0	0	0	0	181	0	43	224
+45 mins.	85	0	86	171	0	0	0	0	0	0	0	0	191	0	46	237
Total Volume	399	0	397	796	0	0	0	0	0	0	0	0	736	0	202	938
% App. Total	50.1	0	49.9		0	0	0		0	0	0		78.5	0	21.5	

Accurate Counts

978-664-2565

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear

File Name : 797700S9
 Site Code : 77970009
 Start Date : 7/28/2018
 Page No : 14

Groups Printed- Bikes Peds

Start Time	Rotary From North				From East				Rotary From South				Salem St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
11:00 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
11:30 AM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2
11:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2
Total	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	6	6
12:00 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
01:00 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
01:15 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
01:30 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Grand Total	7	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	10	10
Apprch %	100	0	0		0	0	0		0	0	0		100	0	0				
Total %	70	0	0		0	0	0		0	0	0		30	0	0		0	100	

Accurate Counts

978-664-2565

File Name : 797700S9
 Site Code : 77970009
 Start Date : 7/28/2018
 Page No : 15

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear

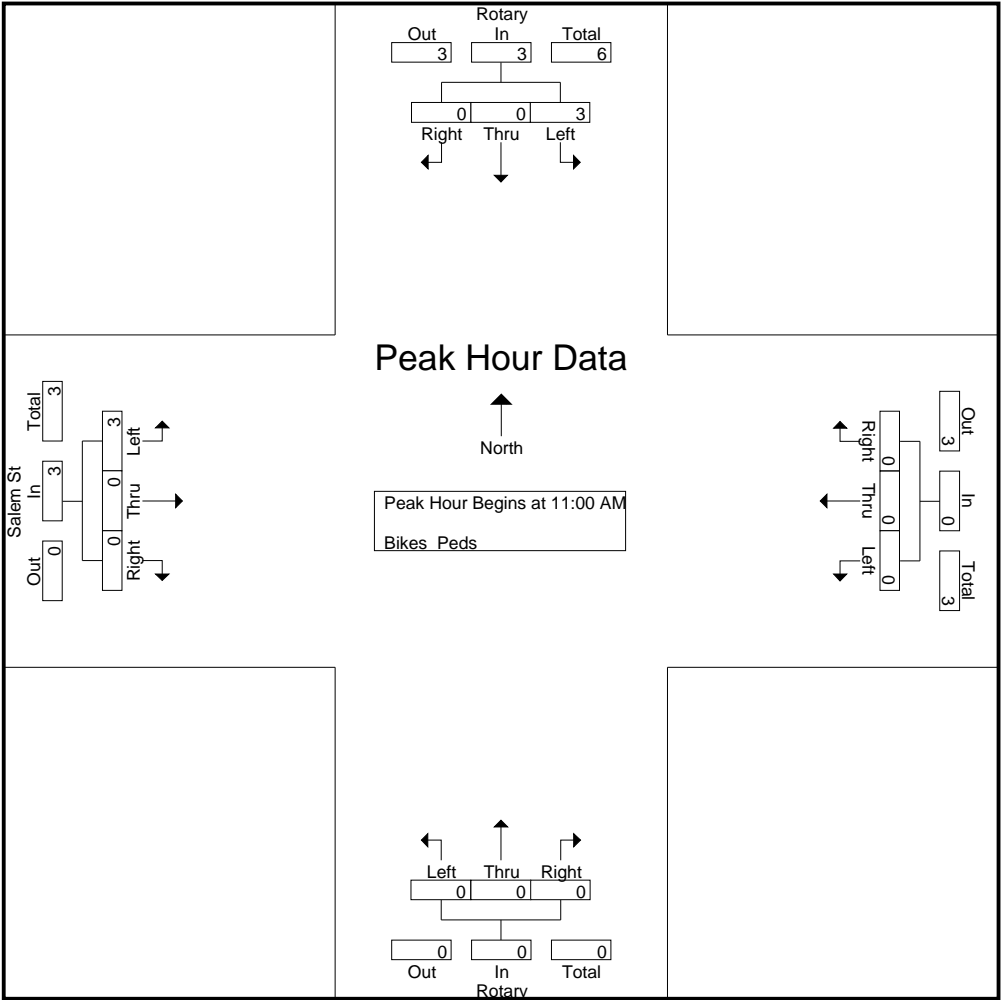
Start Time	Rotary From North				From East				Rotary From South				Salem St From West				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 11:00 AM																		
11:00 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1
11:30 AM	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	2
11:45 AM	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	2
Total Volume	3	0	0	3	0	0	0	0	0	0	0	0	3	0	0	3	0	6
% App. Total	100	0	0		0	0	0		0	0	0		100	0	0			
PHF	.750	.000	.000	.750	.000	.000	.000	.000	.000	.000	.000	.000	.750	.000	.000	.750		.750

Accurate Counts

978-664-2565

File Name : 797700S9
 Site Code : 77970009
 Start Date : 7/28/2018
 Page No : 16

N/S Street : Rotary
 E/W Street : Salem Street
 City/State : Wakefield, MA
 Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				11:00 AM				11:00 AM			
+0 mins.	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
+30 mins.	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1
+45 mins.	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1
Total Volume	3	0	0	3	0	0	0	0	0	0	0	0	3	0	0	3
% App. Total	100	0	0		0	0	0		0	0	0		100	0	0	

Accurate Counts

978-664-2565

N/S Street : Quannapowitt Pkwy / Dwy
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Cloudy

File Name : 79770001
 Site Code : 79770001
 Start Date : 2/11/2020
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Quannapowitt Pkwy From North			North Ave From East			Dwy From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	3	1	7	1	100	3	1	1	0	9	96	9	231
07:15 AM	7	0	9	0	124	10	4	0	1	20	126	8	309
07:30 AM	8	0	13	1	104	6	1	0	1	23	124	3	284
07:45 AM	11	2	10	1	122	5	1	0	0	21	132	2	307
Total	29	3	39	3	450	24	7	1	2	73	478	22	1131
08:00 AM	14	1	9	5	104	15	1	0	0	25	153	6	333
08:15 AM	5	1	9	2	128	10	5	0	0	26	160	9	355
08:30 AM	13	1	21	1	118	6	3	1	4	26	133	6	333
08:45 AM	12	0	14	5	99	16	0	1	5	31	165	8	356
Total	44	3	53	13	449	47	9	2	9	108	611	29	1377
Grand Total	73	6	92	16	899	71	16	3	11	181	1089	51	2508
Apprch %	42.7	3.5	53.8	1.6	91.2	7.2	53.3	10	36.7	13.7	82.4	3.9	
Total %	2.9	0.2	3.7	0.6	35.8	2.8	0.6	0.1	0.4	7.2	43.4	2	
Cars	73	6	91	16	883	71	16	3	11	180	1066	50	2466
% Cars	100	100	98.9	100	98.2	100	100	100	100	99.4	97.9	98	98.3
Trucks	0	0	1	0	16	0	0	0	0	1	23	1	42
% Trucks	0	0	1.1	0	1.8	0	0	0	0	0.6	2.1	2	1.7

Start Time	Quannapowitt Pkwy From North				North Ave From East				Dwy From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	14	1	9	24	5	104	15	124	1	0	0	1	25	153	6	184	333
08:15 AM	5	1	9	15	2	128	10	140	5	0	0	5	26	160	9	195	355
08:30 AM	13	1	21	35	1	118	6	125	3	1	4	8	26	133	6	165	333
08:45 AM	12	0	14	26	5	99	16	120	0	1	5	6	31	165	8	204	356
Total Volume	44	3	53	100	13	449	47	509	9	2	9	20	108	611	29	748	1377
% App. Total	44	3	53		2.6	88.2	9.2		45	10	45		14.4	81.7	3.9		
PHF	.786	.750	.631	.714	.650	.877	.734	.909	.450	.500	.450	.625	.871	.926	.806	.917	.967
Cars	44	3	52	99	13	444	47	504	9	2	9	20	108	600	29	737	1360
% Cars	100	100	98.1	99.0	100	98.9	100	99.0	100	100	100	100	100	98.2	100	98.5	98.8
Trucks	0	0	1	1	0	5	0	5	0	0	0	0	0	11	0	11	17
% Trucks	0	0	1.9	1.0	0	1.1	0	1.0	0	0	0	0	0	1.8	0	1.5	1.2

Accurate Counts

978-664-2565

File Name : 79770001

Site Code : 79770001

Start Date : 2/11/2020

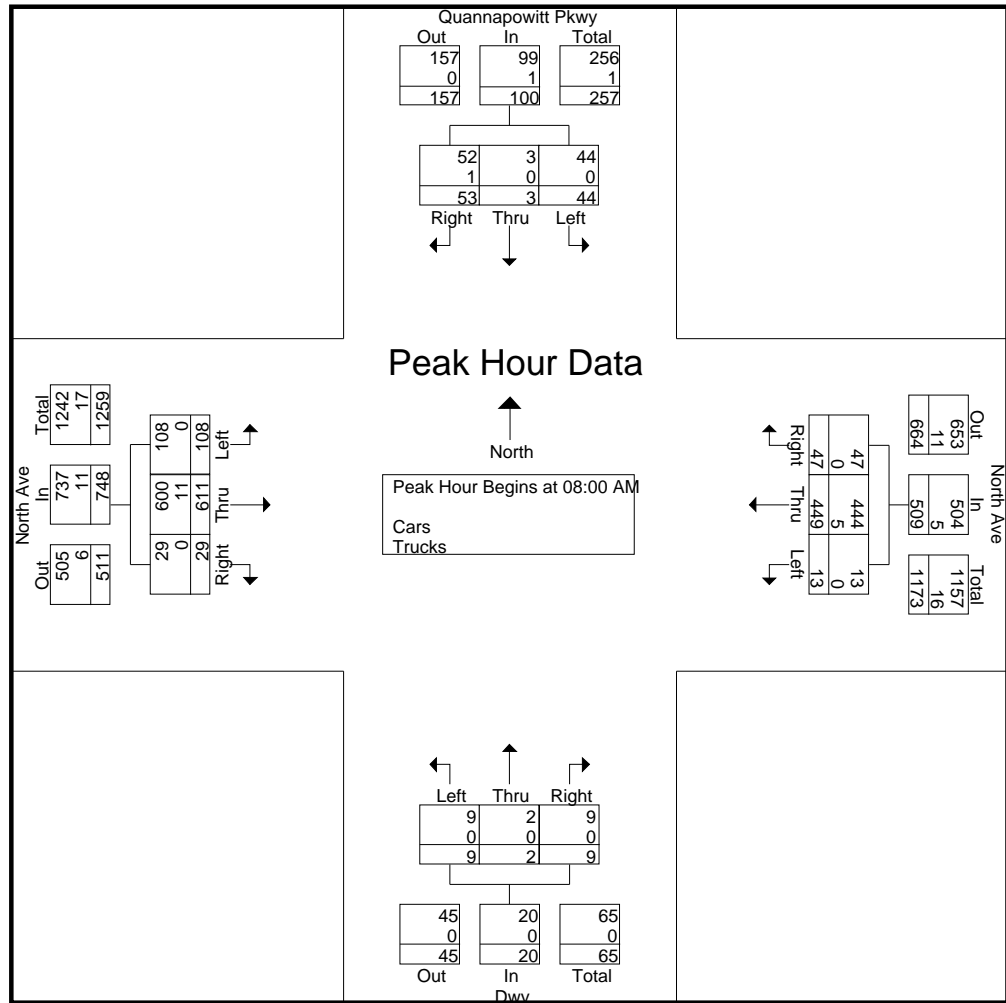
Page No : 2

N/S Street : Quannapowitt Pkwy / Dwy

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Cloudy

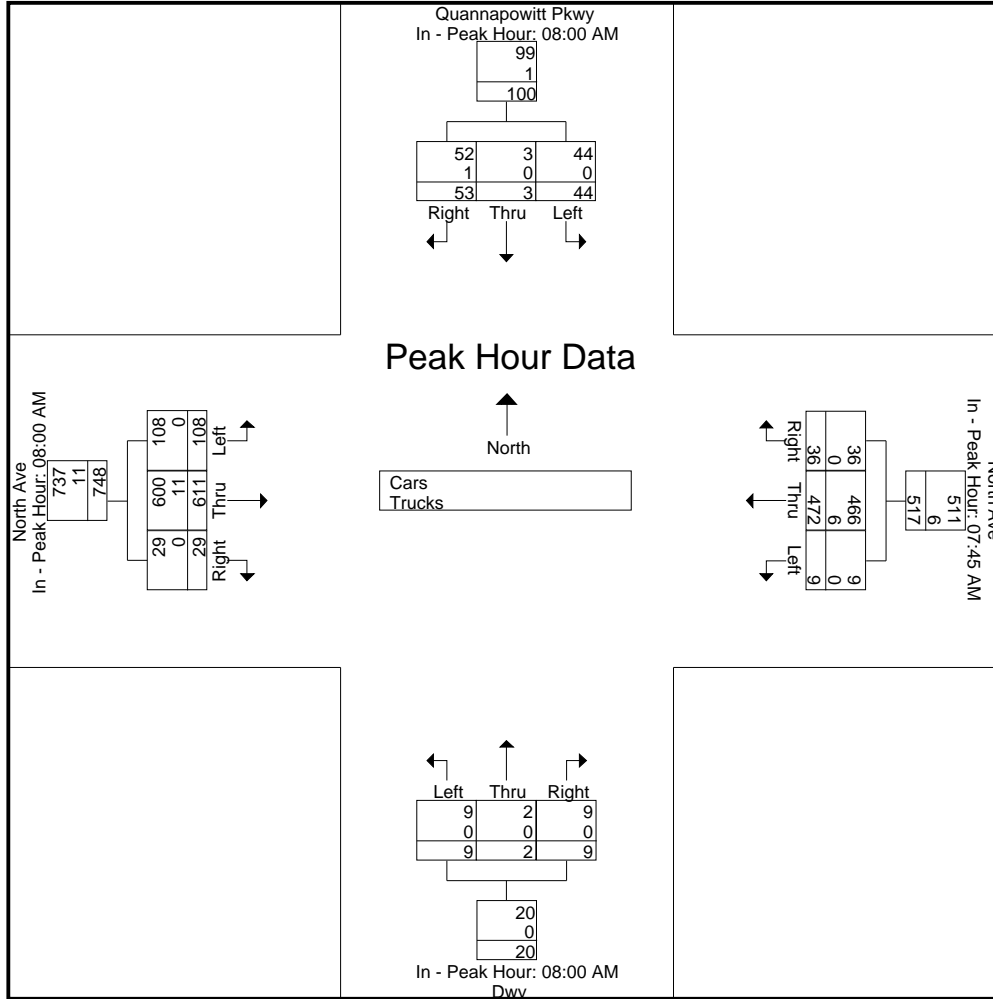


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	08:00 AM				07:45 AM				08:00 AM				08:00 AM			
+0 mins.	14	1	9	24	1	122	5	128	1	0	0	1	25	153	6	184
+15 mins.	5	1	9	15	5	104	15	124	5	0	0	5	26	160	9	195
+30 mins.	13	1	21	35	2	128	10	140	3	1	4	8	26	133	6	165
+45 mins.	12	0	14	26	1	118	6	125	0	1	5	6	31	165	8	204
Total Volume	44	3	53	100	9	472	36	517	9	2	9	20	108	611	29	748
% App. Total	44	3	53		1.7	91.3	7		45	10	45		14.4	81.7	3.9	
PHF	.786	.750	.631	.714	.450	.922	.600	.923	.450	.500	.450	.625	.871	.926	.806	.917
Cars	44	3	52	99	9	466	36	511	9	2	9	20	108	600	29	737
% Cars	100	100	98.1	99	100	98.7	100	98.8	100	100	100	100	100	98.2	100	98.5
Trucks	0	0	1	1	0	6	0	6	0	0	0	0	0	11	0	11

Accurate Counts
978-664-2565



Accurate Counts

978-664-2565

File Name : 79770001

Site Code : 79770001

Start Date : 2/11/2020

Page No : 4

N/S Street : Quannapowitt Pkwy / Dwy

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Cloudy

Groups Printed- Cars

Start Time	Quannapowitt Pkwy From North			North Ave From East			Dwy From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	3	1	7	1	96	3	1	1	0	9	92	8	222
07:15 AM	7	0	9	0	120	10	4	0	1	20	121	8	300
07:30 AM	8	0	13	1	103	6	1	0	1	22	122	3	280
07:45 AM	11	2	10	1	120	5	1	0	0	21	131	2	304
Total	29	3	39	3	439	24	7	1	2	72	466	21	1106
08:00 AM	14	1	9	5	102	15	1	0	0	25	148	6	326
08:15 AM	5	1	9	2	128	10	5	0	0	26	160	9	355
08:30 AM	13	1	20	1	116	6	3	1	4	26	131	6	328
08:45 AM	12	0	14	5	98	16	0	1	5	31	161	8	351
Total	44	3	52	13	444	47	9	2	9	108	600	29	1360
Grand Total	73	6	91	16	883	71	16	3	11	180	1066	50	2466
Apprch %	42.9	3.5	53.5	1.6	91	7.3	53.3	10	36.7	13.9	82.3	3.9	
Total %	3	0.2	3.7	0.6	35.8	2.9	0.6	0.1	0.4	7.3	43.2	2	

Start Time	Quannapowitt Pkwy From North				North Ave From East				Dwy From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	14	1	9	24	5	102	15	122	1	0	0	1	25	148	6	179	326
08:15 AM	5	1	9	15	2	128	10	140	5	0	0	5	26	160	9	195	355
08:30 AM	13	1	20	34	1	116	6	123	3	1	4	8	26	131	6	163	328
08:45 AM	12	0	14	26	5	98	16	119	0	1	5	6	31	161	8	200	351
Total Volume	44	3	52	99	13	444	47	504	9	2	9	20	108	600	29	737	1360
% App. Total	44.4	3	52.5		2.6	88.1	9.3		45	10	45		14.7	81.4	3.9		
PHF	.786	.750	.650	.728	.650	.867	.734	.900	.450	.500	.450	.625	.871	.932	.806	.921	.958

Accurate Counts

978-664-2565

File Name : 79770001

Site Code : 79770001

Start Date : 2/11/2020

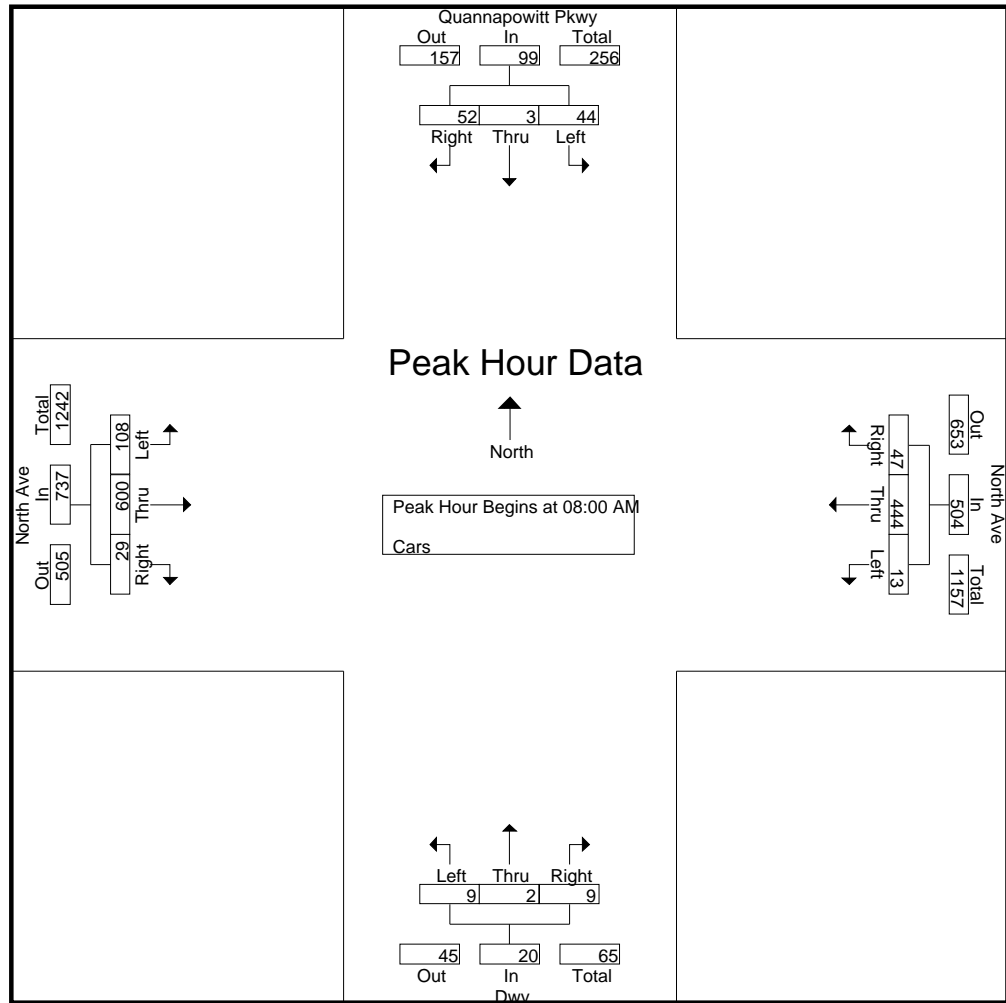
Page No : 5

N/S Street : Quannapowitt Pkwy / Dwy

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Cloudy



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

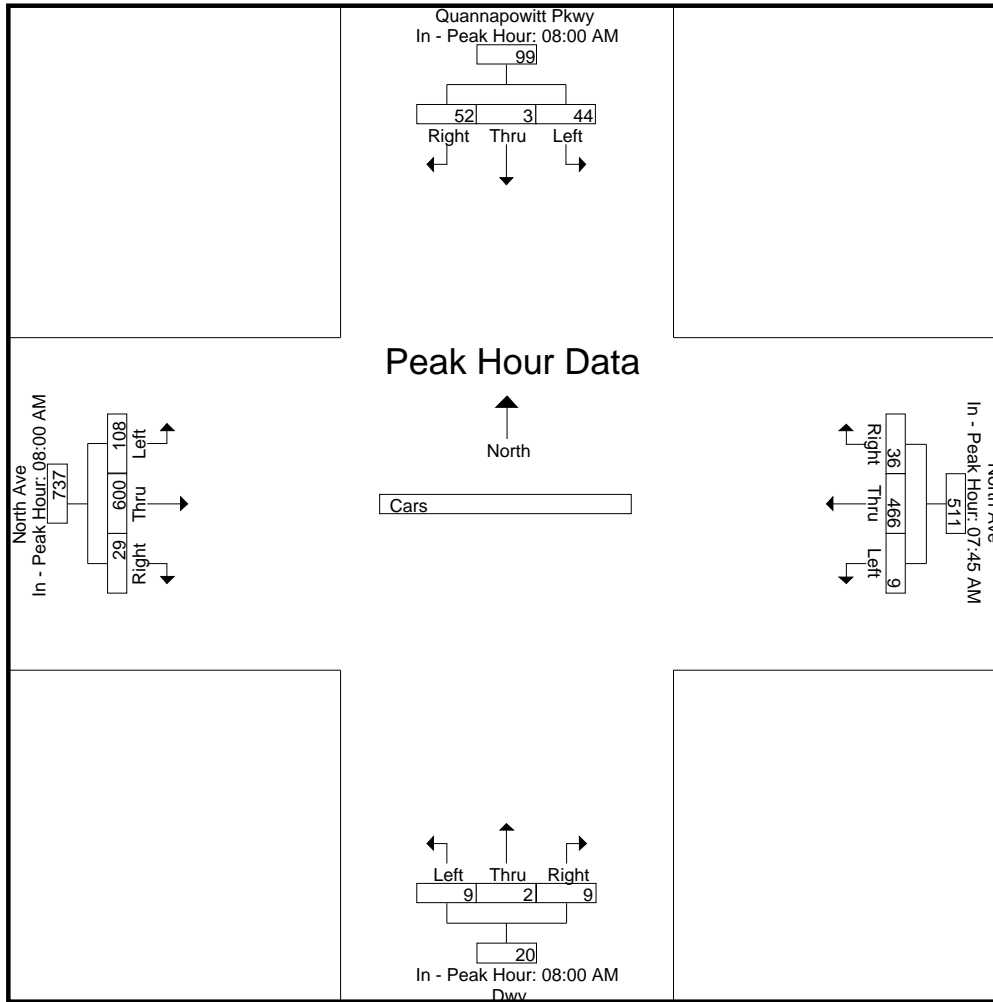
Peak Hour for Each Approach Begins at:

	08:00 AM				07:45 AM				08:00 AM				08:00 AM			
+0 mins.	14	1	9	24	1	120	5	126	1	0	0	1	25	148	6	179
+15 mins.	5	1	9	15	5	102	15	122	5	0	0	5	26	160	9	195
+30 mins.	13	1	20	34	2	128	10	140	3	1	4	8	26	131	6	163
+45 mins.	12	0	14	26	1	116	6	123	0	1	5	6	31	161	8	200
Total Volume	44	3	52	99	9	466	36	511	9	2	9	20	108	600	29	737
% App. Total	44.4	3	52.5		1.8	91.2	7		45	10	45		14.7	81.4	3.9	
PHF	.786	.750	.650	.728	.450	.910	.600	.913	.450	.500	.450	.625	.871	.932	.806	.921

Accurate Counts
978-664-2565

File Name : 79770001
Site Code : 79770001
Start Date : 2/11/2020
Page No : 6

N/S Street : Quannapowitt Pkwy / Dwy
E/W Street : North Avenue
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

File Name : 79770001

Site Code : 79770001

Start Date : 2/11/2020

Page No : 7

N/S Street : Quannapowitt Pkwy / Dwy

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Cloudy

Groups Printed- Trucks

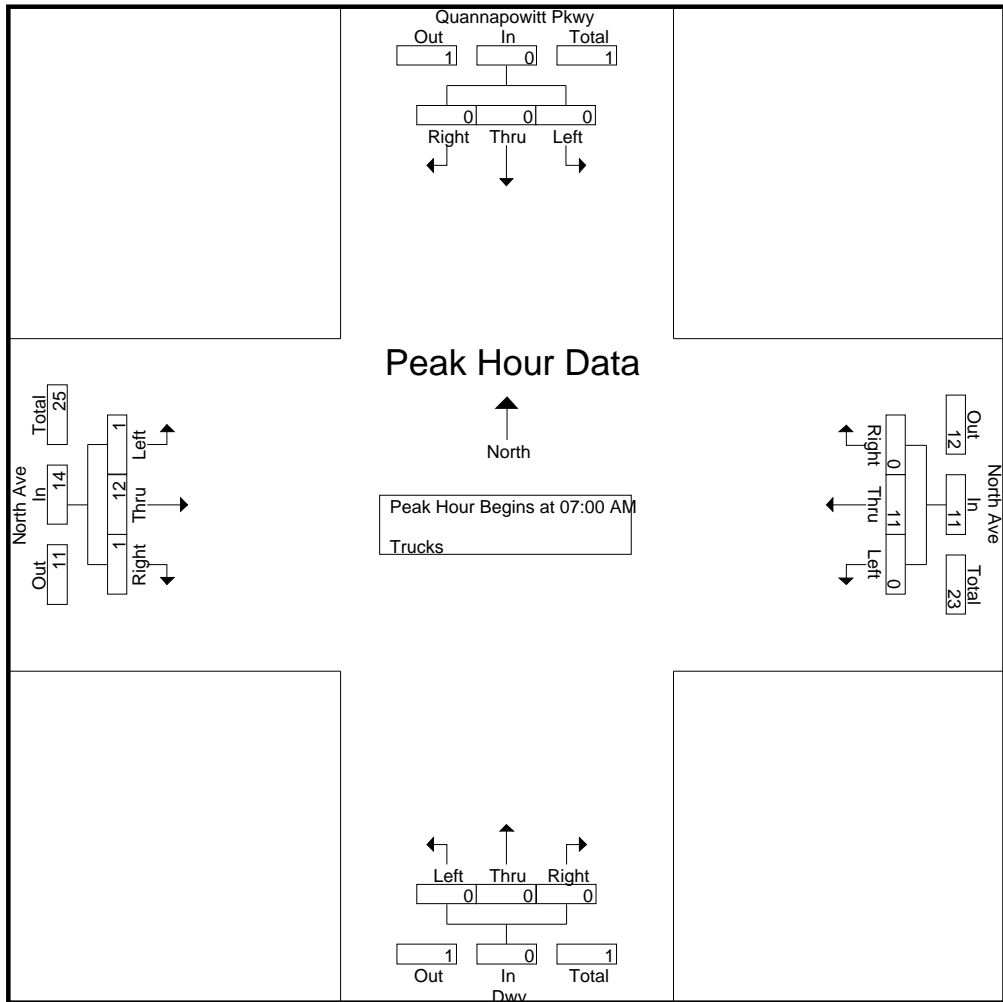
Start Time	Quannapowitt Pkwy From North			North Ave From East			Dwy From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	0	0	4	0	0	0	0	0	4	1	9
07:15 AM	0	0	0	0	4	0	0	0	0	0	5	0	9
07:30 AM	0	0	0	0	1	0	0	0	0	1	2	0	4
07:45 AM	0	0	0	0	2	0	0	0	0	0	1	0	3
Total	0	0	0	0	11	0	0	0	0	1	12	1	25
08:00 AM	0	0	0	0	2	0	0	0	0	0	5	0	7
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	1	0	2	0	0	0	0	0	2	0	5
08:45 AM	0	0	0	0	1	0	0	0	0	0	4	0	5
Total	0	0	1	0	5	0	0	0	0	0	11	0	17
Grand Total	0	0	1	0	16	0	0	0	0	1	23	1	42
Apprch %	0	0	100	0	100	0	0	0	0	4	92	4	
Total %	0	0	2.4	0	38.1	0	0	0	0	2.4	54.8	2.4	

Start Time	Quannapowitt Pkwy From North				North Ave From East				Dwy From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	4	0	4	0	0	0	0	0	4	1	5	9
07:15 AM	0	0	0	0	0	4	0	4	0	0	0	0	0	5	0	5	9
07:30 AM	0	0	0	0	0	1	0	1	0	0	0	0	1	2	0	3	4
07:45 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
Total Volume	0	0	0	0	0	11	0	11	0	0	0	0	1	12	1	14	25
% App. Total	0	0	0	0	0	100	0		0	0	0		7.1	85.7	7.1		
PHF	.000	.000	.000	.000	.000	.688	.000	.688	.000	.000	.000	.000	.250	.600	.250	.700	.694

Accurate Counts
978-664-2565

File Name : 79770001
Site Code : 79770001
Start Date : 2/11/2020
Page No : 8

N/S Street : Quannapowitt Pkwy / Dwy
E/W Street : North Avenue
City/State : Wakefield, MA
Weather : Cloudy



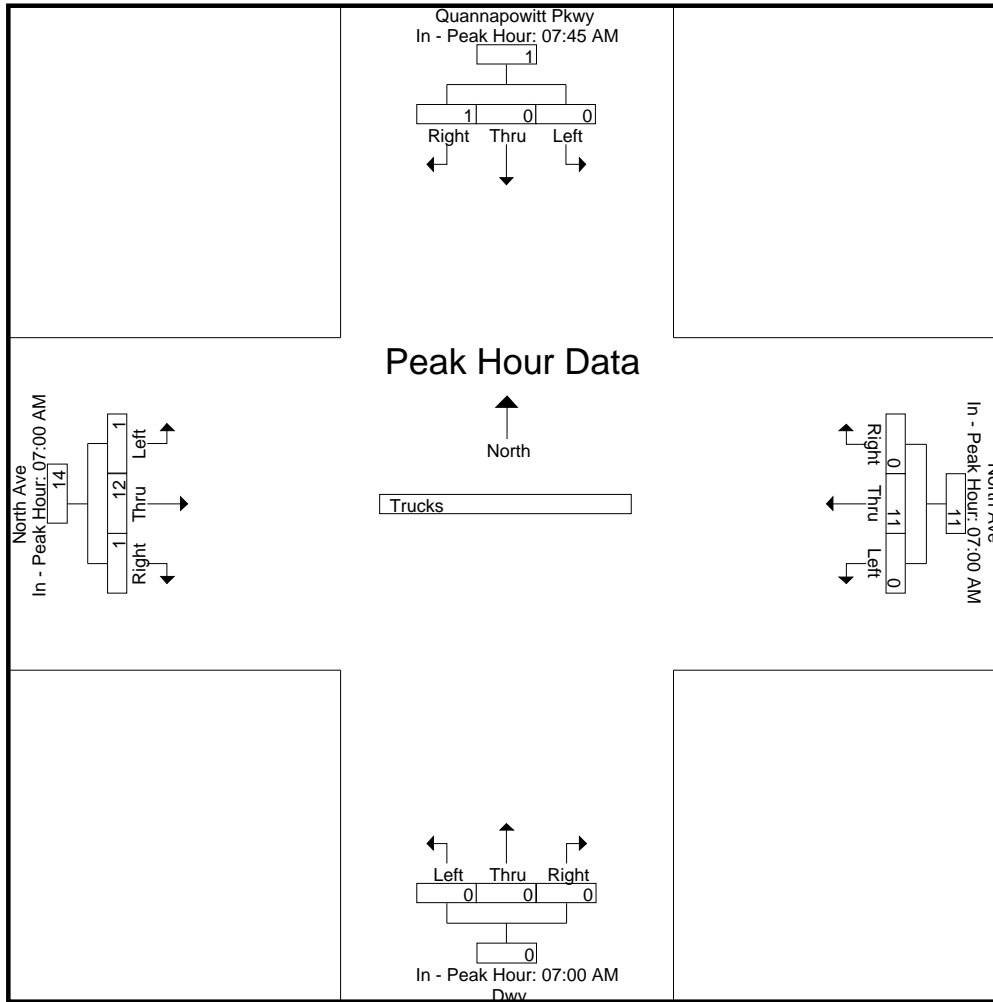
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	4	0	4	0	0	0	0	0	4	1	5
+15 mins.	0	0	0	0	0	4	0	4	0	0	0	0	0	5	0	5
+30 mins.	0	0	0	0	0	1	0	1	0	0	0	0	1	2	0	3
+45 mins.	0	0	1	1	0	2	0	2	0	0	0	0	0	1	0	1
Total Volume	0	0	1	1	0	11	0	11	0	0	0	0	1	12	1	14
% App. Total	0	0	100		0	100	0		0	0	0		7.1	85.7	7.1	
PHF	.000	.000	.250	.250	.000	.688	.000	.688	.000	.000	.000	.000	.250	.600	.250	.700

Accurate Counts
978-664-2565

File Name : 79770001
Site Code : 79770001
Start Date : 2/11/2020
Page No : 9

N/S Street : Quannapowitt Pkwy / Dwy
E/W Street : North Avenue
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

File Name : 79770001

Site Code : 79770001

Start Date : 2/11/2020

Page No : 10

N/S Street : Quannapowitt Pkwy / Dwy

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Cloudy

Groups Printed- Bikes Peds

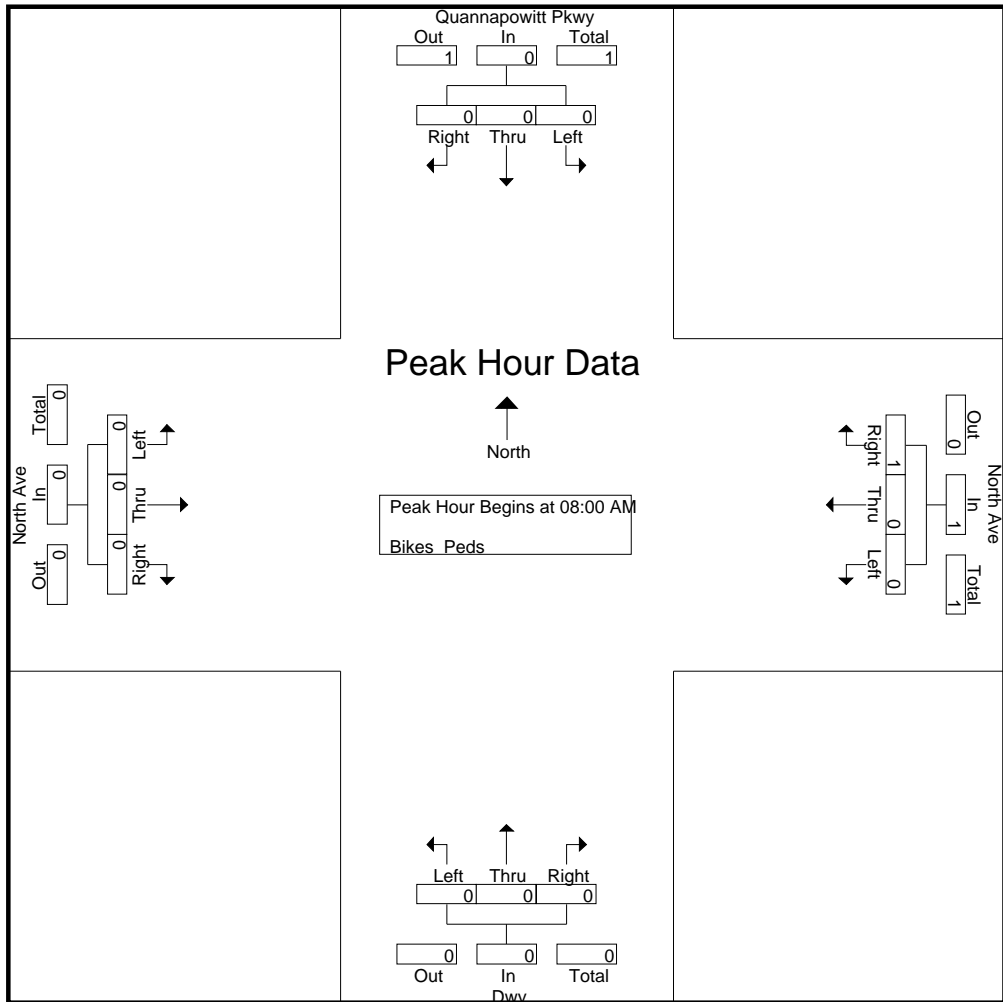
Start Time	Quannapowitt Pkwy From North				North Ave From East				Dwy From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	2	5	0	5
Total	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	2	5	0	5
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	2	1	3
Total	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	2	1	3
Grand Total	0	0	0	2	0	0	1	0	0	0	0	2	0	0	0	3	7	1	8
Apprch %	0	0	0		0	0	100		0	0	0		0	0	0				
Total %	0	0	0		0	0	100		0	0	0		0	0	0		87.5	12.5	

Start Time	Quannapowitt Pkwy From North				North Ave From East				Dwy From South				North Ave From West				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 08:00 AM																		
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1
% App. Total	0	0	0		0	0	100		0	0	0		0	0	0			
PHF	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

Accurate Counts
978-664-2565

File Name : 79770001
Site Code : 79770001
Start Date : 2/11/2020
Page No : 11

N/S Street : Quannapowitt Pkwy / Dwy
E/W Street : North Avenue
City/State : Wakefield, MA
Weather : Cloudy



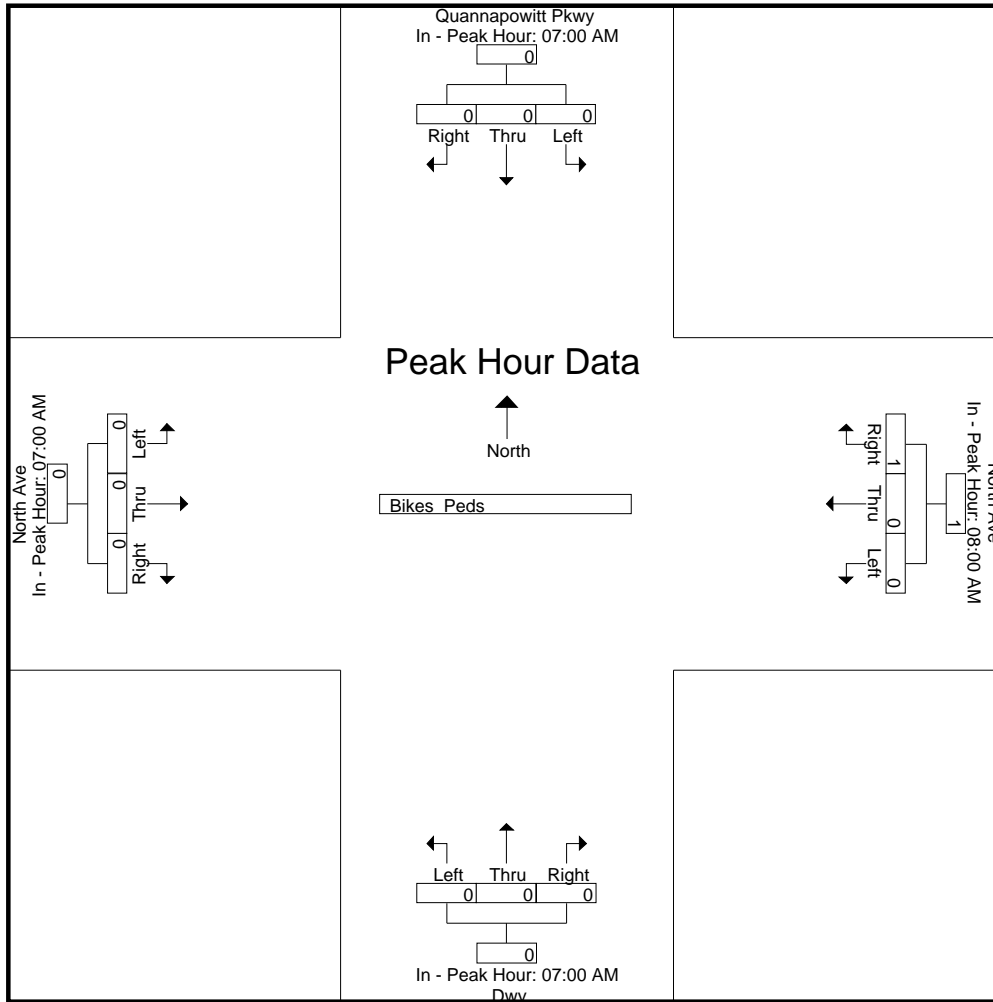
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				08:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	100	100	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts
978-664-2565

File Name : 79770001
Site Code : 79770001
Start Date : 2/11/2020
Page No : 12

N/S Street : Quannapowitt Pkwy / Dwy
E/W Street : North Avenue
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

File Name : 79770001

Site Code : 79770001

Start Date : 2/11/2020

Page No : 1

N/S Street : Quannapowitt Pkwy / Dwy

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Cloudy

Groups Printed- Cars - Trucks

Start Time	Quannapowitt Pkwy From North			North Ave From East			Dwy From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	5	0	32	1	153	14	9	1	2	5	146	5	373
04:15 PM	4	0	18	2	171	7	6	0	4	5	120	6	343
04:30 PM	3	1	32	1	156	6	7	0	7	12	143	4	372
04:45 PM	6	1	27	3	134	10	13	0	2	7	161	6	370
Total	18	2	109	7	614	37	35	1	15	29	570	21	1458
05:00 PM	10	0	50	2	187	6	10	0	3	8	188	3	467
05:15 PM	17	0	45	0	149	9	2	0	1	13	168	5	409
05:30 PM	13	1	29	1	133	8	5	0	1	14	154	3	362
05:45 PM	11	0	42	1	123	6	5	0	1	10	175	3	377
Total	51	1	166	4	592	29	22	0	6	45	685	14	1615
Grand Total	69	3	275	11	1206	66	57	1	21	74	1255	35	3073
Apprch %	19.9	0.9	79.3	0.9	94	5.1	72.2	1.3	26.6	5.4	92	2.6	
Total %	2.2	0.1	8.9	0.4	39.2	2.1	1.9	0	0.7	2.4	40.8	1.1	
Cars	69	3	275	11	1200	66	57	1	21	74	1249	34	3060
% Cars	100	100	100	100	99.5	100	100	100	100	100	99.5	97.1	99.6
Trucks	0	0	0	0	6	0	0	0	0	0	6	1	13
% Trucks	0	0	0	0	0.5	0	0	0	0	0	0.5	2.9	0.4

Start Time	Quannapowitt Pkwy From North				North Ave From East				Dwy From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	3	1	32	36	1	156	6	163	7	0	7	14	12	143	4	159	372
04:45 PM	6	1	27	34	3	134	10	147	13	0	2	15	7	161	6	174	370
05:00 PM	10	0	50	60	2	187	6	195	10	0	3	13	8	188	3	199	467
05:15 PM	17	0	45	62	0	149	9	158	2	0	1	3	13	168	5	186	409
Total Volume	36	2	154	192	6	626	31	663	32	0	13	45	40	660	18	718	1618
% App. Total	18.8	1	80.2		0.9	94.4	4.7		71.1	0	28.9		5.6	91.9	2.5		
PHF	.529	.500	.770	.774	.500	.837	.775	.850	.615	.000	.464	.750	.769	.878	.750	.902	.866
Cars	36	2	154	192	6	624	31	661	32	0	13	45	40	656	17	713	1611
% Cars	100	100	100	100	100	99.7	100	99.7	100	0	100	100	100	99.4	94.4	99.3	99.6
Trucks	0	0	0	0	0	2	0	2	0	0	0	0	0	4	1	5	7
% Trucks	0	0	0	0	0	0.3	0	0.3	0	0	0	0	0	0.6	5.6	0.7	0.4

Accurate Counts

978-664-2565

File Name : 79770001

Site Code : 79770001

Start Date : 2/11/2020

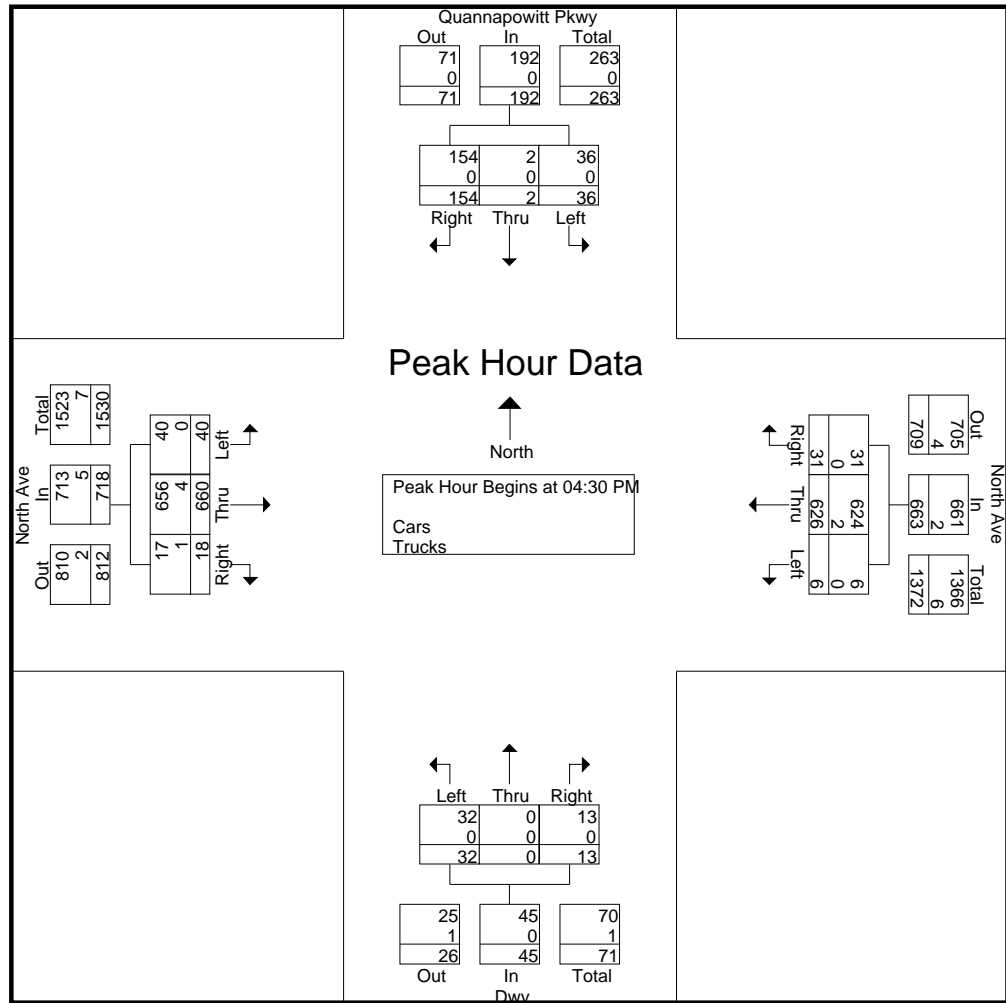
Page No : 2

N/S Street : Quannapowitt Pkwy / Dwy

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Cloudy

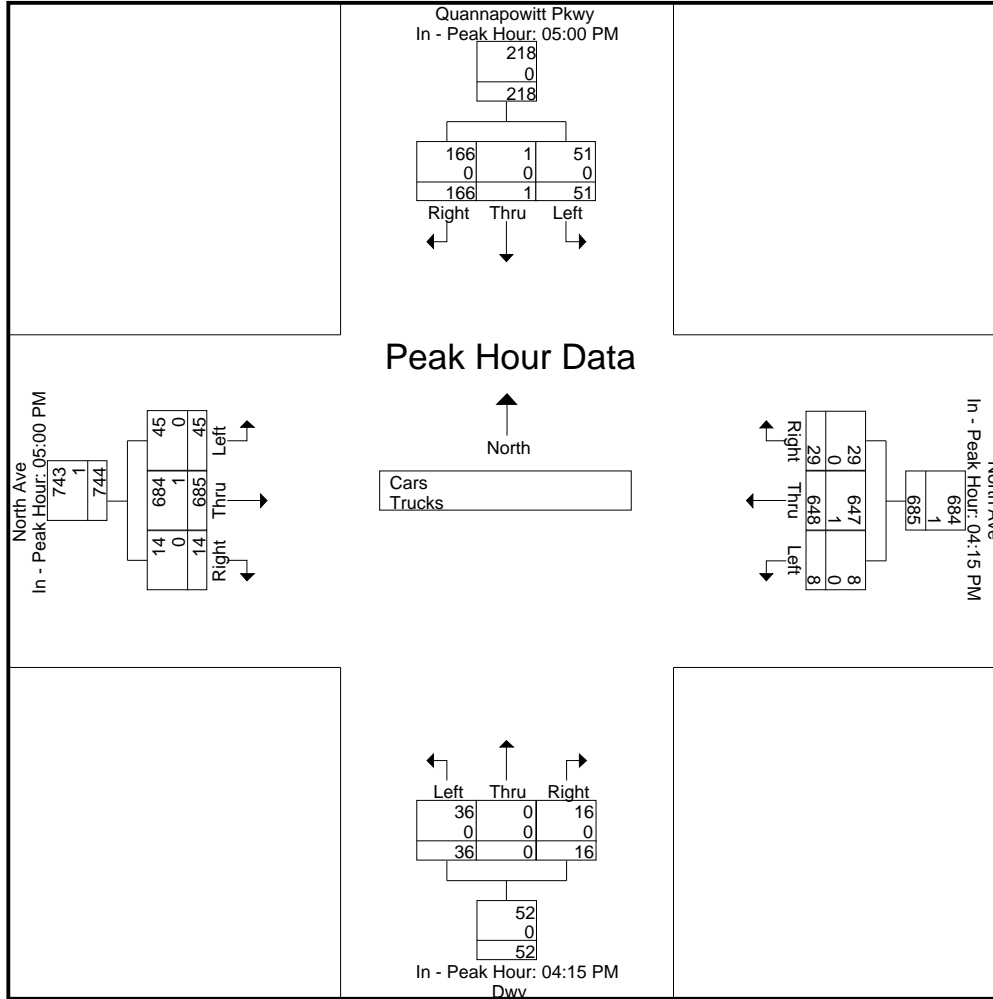


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	05:00 PM				04:15 PM				04:15 PM				05:00 PM			
+0 mins.	10	0	50	60	2	171	7	180	6	0	4	10	8	188	3	199
+15 mins.	17	0	45	62	1	156	6	163	7	0	7	14	13	168	5	186
+30 mins.	13	1	29	43	3	134	10	147	13	0	2	15	14	154	3	171
+45 mins.	11	0	42	53	2	187	6	195	10	0	3	13	10	175	3	188
Total Volume	51	1	166	218	8	648	29	685	36	0	16	52	45	685	14	744
% App. Total	23.4	0.5	76.1		1.2	94.6	4.2		69.2	0	30.8		6	92.1	1.9	
PHF	.750	.250	.830	.879	.667	.866	.725	.878	.692	.000	.571	.867	.804	.911	.700	.935
Cars	51	1	166	218	8	647	29	684	36	0	16	52	45	684	14	743
% Cars	100	100	100	100	100	99.8	100	99.9	100	0	100	100	100	99.9	100	99.9
Trucks	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1

Accurate Counts
978-664-2565



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Pkwy / Dwy
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Cloudy

File Name : 79770001
 Site Code : 79770001
 Start Date : 2/11/2020
 Page No : 4

Groups Printed- Cars

Start Time	Quannapowitt Pkwy From North			North Ave From East			Dwy From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	5	0	32	1	152	14	9	1	2	5	145	5	371
04:15 PM	4	0	18	2	171	7	6	0	4	5	119	6	342
04:30 PM	3	1	32	1	156	6	7	0	7	12	142	4	371
04:45 PM	6	1	27	3	134	10	13	0	2	7	159	5	367
Total	18	2	109	7	613	37	35	1	15	29	565	20	1451
05:00 PM	10	0	50	2	186	6	10	0	3	8	187	3	465
05:15 PM	17	0	45	0	148	9	2	0	1	13	168	5	408
05:30 PM	13	1	29	1	131	8	5	0	1	14	154	3	360
05:45 PM	11	0	42	1	122	6	5	0	1	10	175	3	376
Total	51	1	166	4	587	29	22	0	6	45	684	14	1609
Grand Total	69	3	275	11	1200	66	57	1	21	74	1249	34	3060
Apprch %	19.9	0.9	79.3	0.9	94	5.2	72.2	1.3	26.6	5.5	92	2.5	
Total %	2.3	0.1	9	0.4	39.2	2.2	1.9	0	0.7	2.4	40.8	1.1	

Start Time	Quannapowitt Pkwy From North				North Ave From East				Dwy From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	3	1	32	36	1	156	6	163	7	0	7	14	12	142	4	158	371
04:45 PM	6	1	27	34	3	134	10	147	13	0	2	15	7	159	5	171	367
05:00 PM	10	0	50	60	2	186	6	194	10	0	3	13	8	187	3	198	465
05:15 PM	17	0	45	62	0	148	9	157	2	0	1	3	13	168	5	186	408
Total Volume	36	2	154	192	6	624	31	661	32	0	13	45	40	656	17	713	1611
% App. Total	18.8	1	80.2		0.9	94.4	4.7		71.1	0	28.9		5.6	92	2.4		
PHF	.529	.500	.770	.774	.500	.839	.775	.852	.615	.000	.464	.750	.769	.877	.850	.900	.866

Accurate Counts

978-664-2565

File Name : 79770001

Site Code : 79770001

Start Date : 2/11/2020

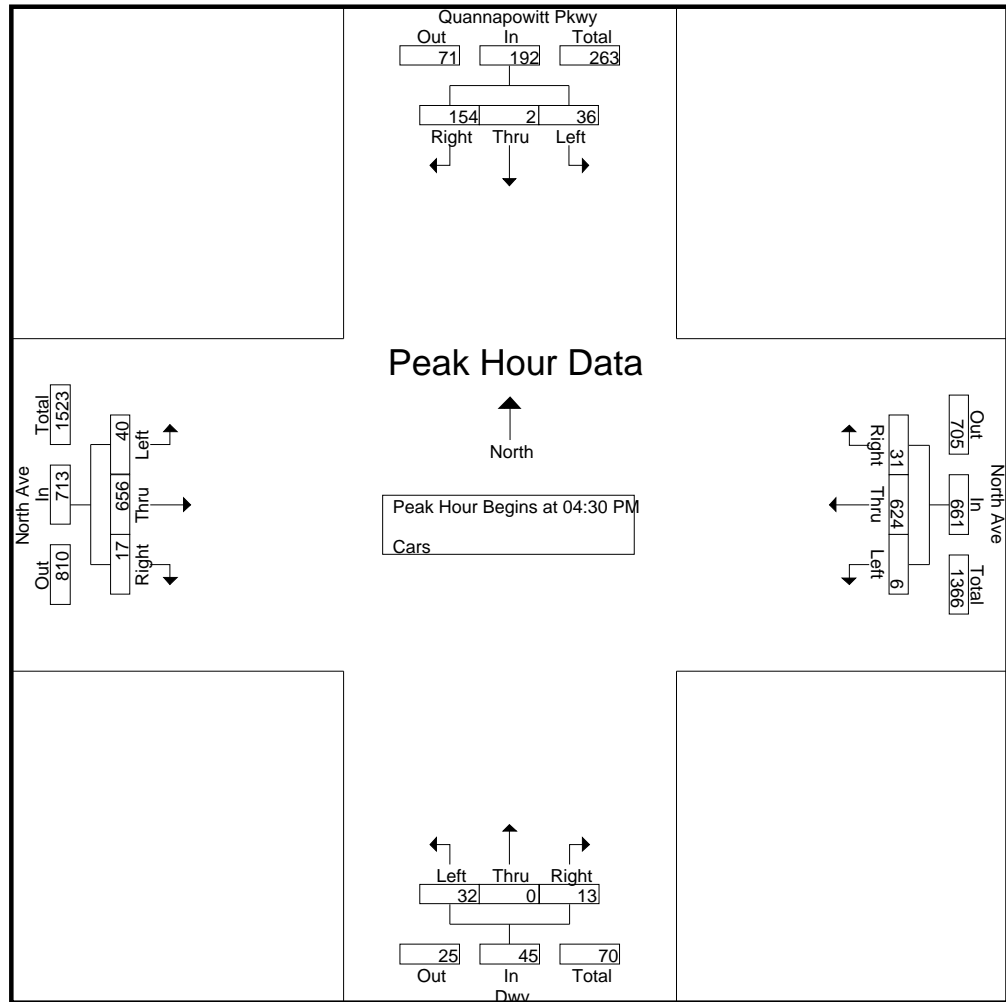
Page No : 5

N/S Street : Quannapowitt Pkwy / Dwy

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Cloudy



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

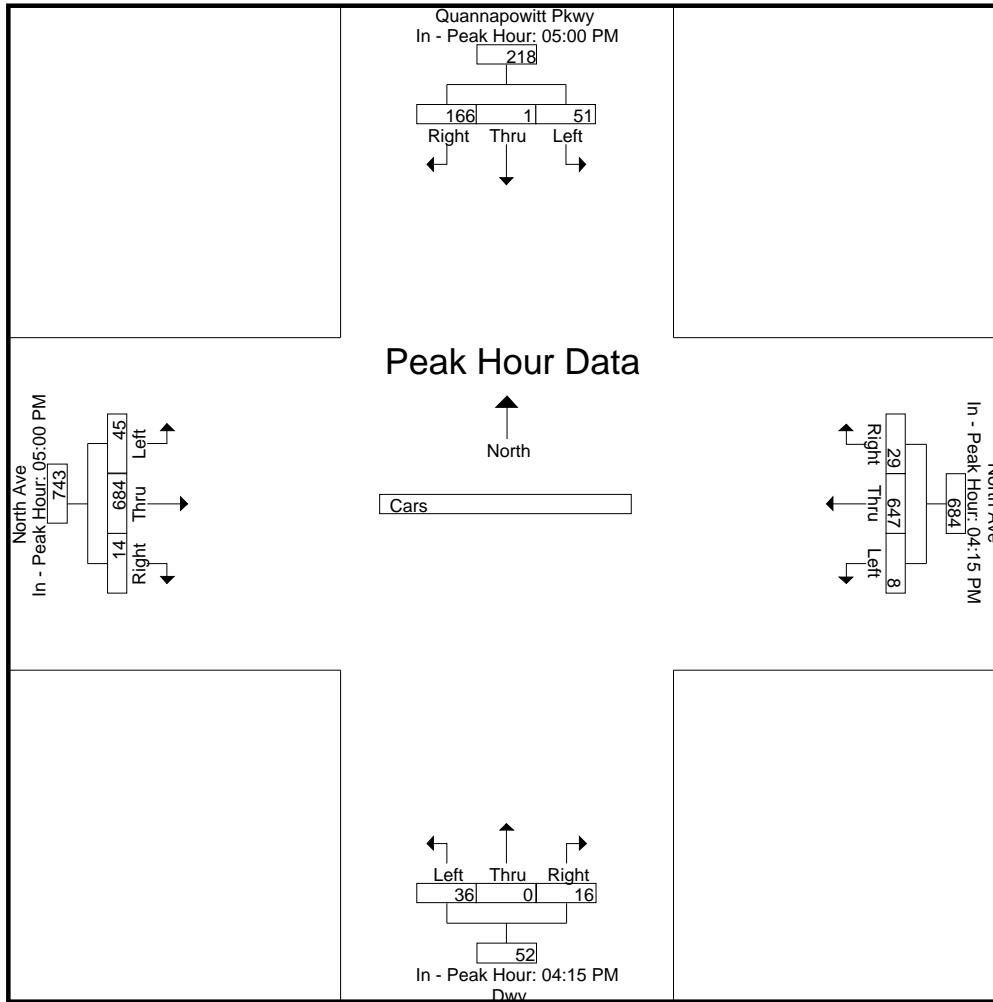
Peak Hour for Each Approach Begins at:

	05:00 PM				04:15 PM				04:15 PM				05:00 PM			
+0 mins.	10	0	50	60	2	171	7	180	6	0	4	10	8	187	3	198
+15 mins.	17	0	45	62	1	156	6	163	7	0	7	14	13	168	5	186
+30 mins.	13	1	29	43	3	134	10	147	13	0	2	15	14	154	3	171
+45 mins.	11	0	42	53	2	186	6	194	10	0	3	13	10	175	3	188
Total Volume	51	1	166	218	8	647	29	684	36	0	16	52	45	684	14	743
% App. Total	23.4	0.5	76.1		1.2	94.6	4.2		69.2	0	30.8		6.1	92.1	1.9	
PHF	.750	.250	.830	.879	.667	.870	.725	.881	.692	.000	.571	.867	.804	.914	.700	.938

Accurate Counts
978-664-2565

File Name : 79770001
Site Code : 79770001
Start Date : 2/11/2020
Page No : 6

N/S Street : Quannapowitt Pkwy / Dwy
E/W Street : North Avenue
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Pkwy / Dwy
 E/W Street : North Avenue
 City/State : Wakefield, MA
 Weather : Cloudy

File Name : 79770001
 Site Code : 79770001
 Start Date : 2/11/2020
 Page No : 7

Groups Printed- Trucks

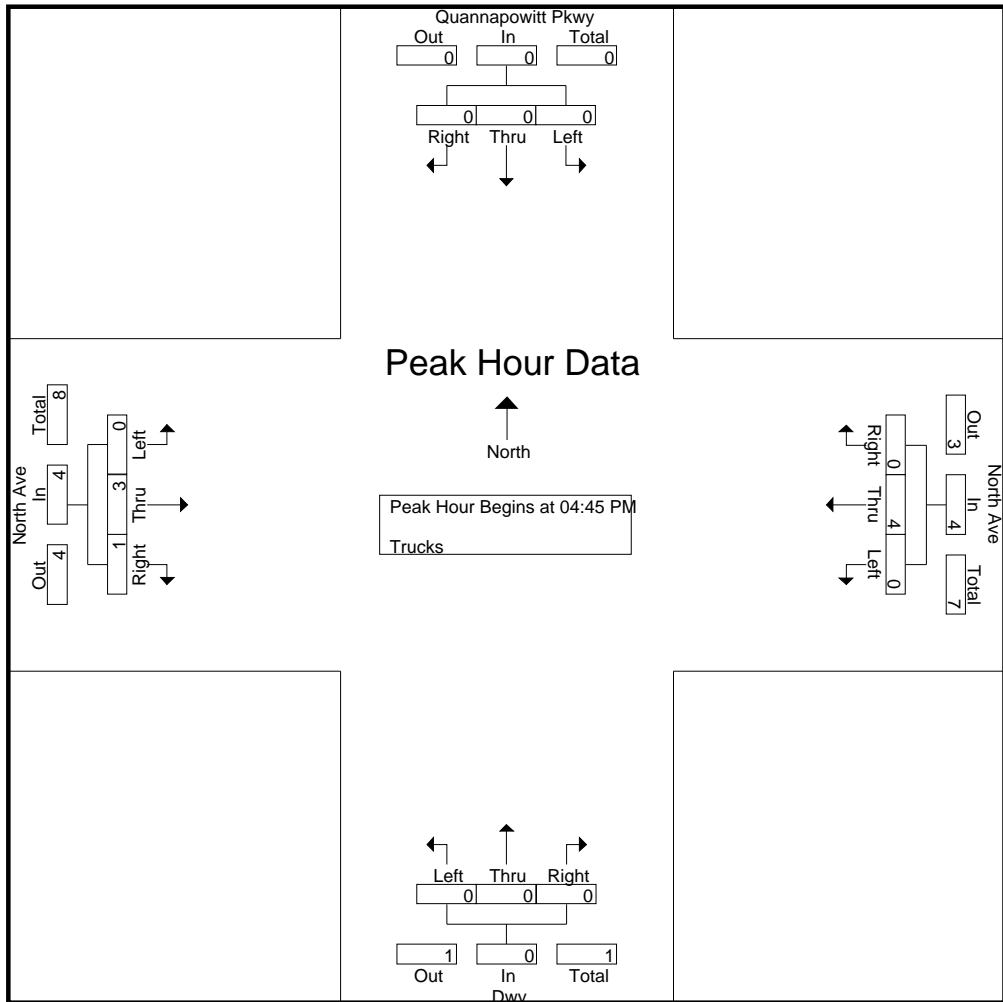
Start Time	Quannapowitt Pkwy From North			North Ave From East			Dwy From South			North Ave From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	0	0	0	1	0	0	0	0	0	1	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	2	1	3
Total	0	0	0	0	1	0	0	0	0	0	5	1	7
05:00 PM	0	0	0	0	1	0	0	0	0	0	1	0	2
05:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	2	0	0	0	0	0	0	0	2
05:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	0	0	0	0	5	0	0	0	0	0	1	0	6
Grand Total	0	0	0	0	6	0	0	0	0	0	6	1	13
Apprch %	0	0	0	0	100	0	0	0	0	0	85.7	14.3	
Total %	0	0	0	0	46.2	0	0	0	0	0	46.2	7.7	

Start Time	Quannapowitt Pkwy From North				North Ave From East				Dwy From South				North Ave From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3	
05:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	
05:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	
05:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	2	
Total Volume	0	0	0	0	0	4	0	4	0	0	0	0	0	3	1	4	
% App. Total	0	0	0	0	0	100	0	0	0	0	0	0	0	75	25	0	
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.000	.375	.250	.333	

Accurate Counts
978-664-2565

File Name : 79770001
Site Code : 79770001
Start Date : 2/11/2020
Page No : 8

N/S Street : Quannapowitt Pkwy / Dwy
E/W Street : North Avenue
City/State : Wakefield, MA
Weather : Cloudy



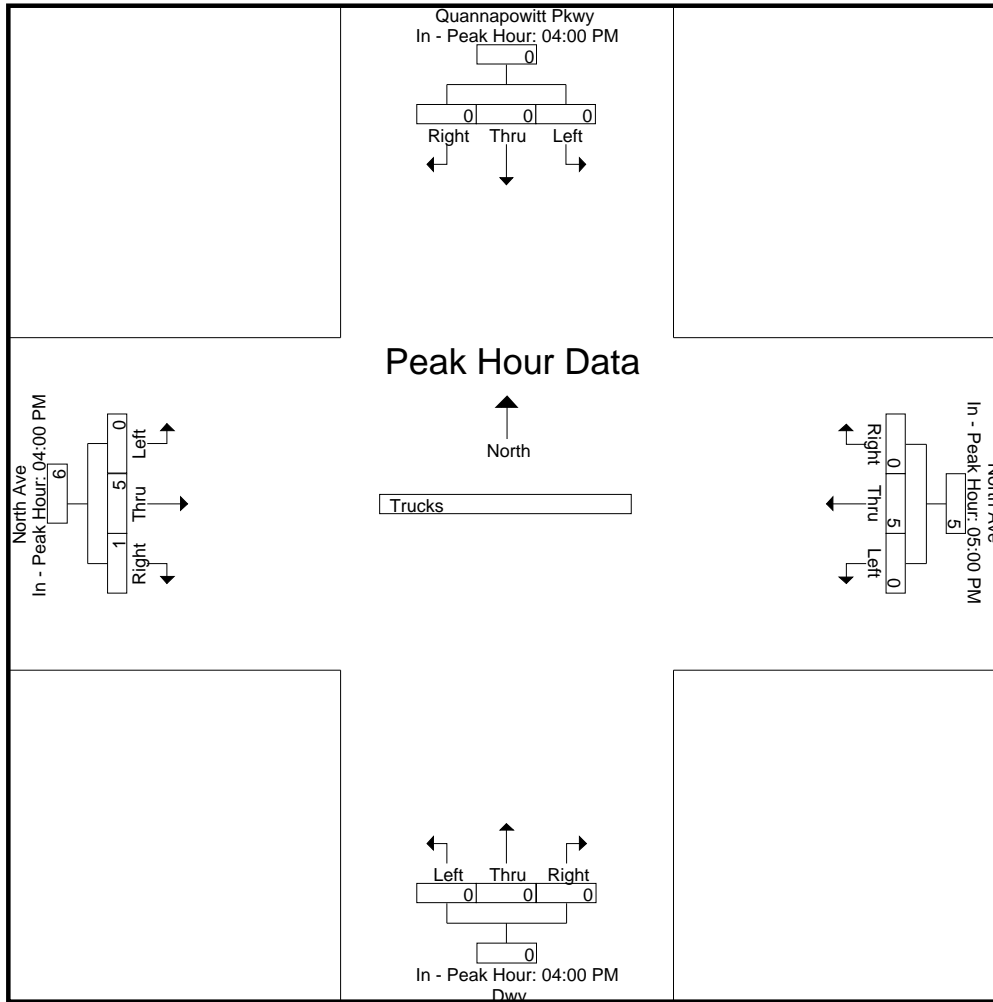
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				05:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1
+15 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1
+30 mins.	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	1	0	1	0	0	0	0	0	2	1	3
Total Volume	0	0	0	0	0	5	0	5	0	0	0	0	0	5	1	6
% App. Total	0	0	0	0	0	100	0	0	0	0	0	0	0	83.3	16.7	0
PHF	.000	.000	.000	.000	.000	.625	.000	.625	.000	.000	.000	.000	.000	.625	.250	.500

Accurate Counts
978-664-2565

File Name : 79770001
Site Code : 79770001
Start Date : 2/11/2020
Page No : 9

N/S Street : Quannapowitt Pkwy / Dwy
E/W Street : North Avenue
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

File Name : 79770001

Site Code : 79770001

Start Date : 2/11/2020

Page No : 10

N/S Street : Quannapowitt Pkwy / Dwy

E/W Street : North Avenue

City/State : Wakefield, MA

Weather : Cloudy

Groups Printed- Bikes Peds

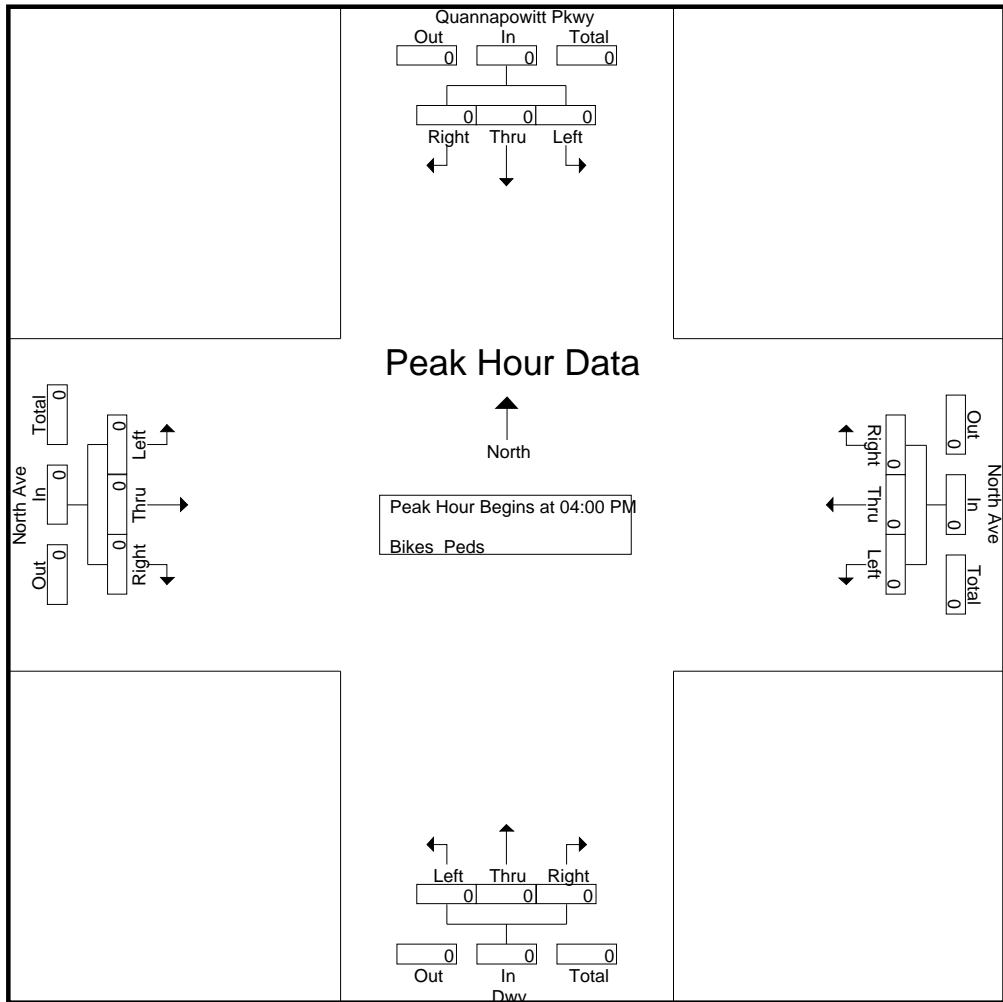
Start Time	Quannapowitt Pkwy From North				North Ave From East				Dwy From South				North Ave From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2	0	2
04:30 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	4	0	4
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Grand Total	0	0	0	1	0	0	0	1	0	0	0	2	0	0	0	1	5	0	5
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

Start Time	Quannapowitt Pkwy From North				North Ave From East				Dwy From South				North Ave From West				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 04:00 PM																		
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0			
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts
978-664-2565

File Name : 79770001
Site Code : 79770001
Start Date : 2/11/2020
Page No : 11

N/S Street : Quannapowitt Pkwy / Dwy
E/W Street : North Avenue
City/State : Wakefield, MA
Weather : Cloudy



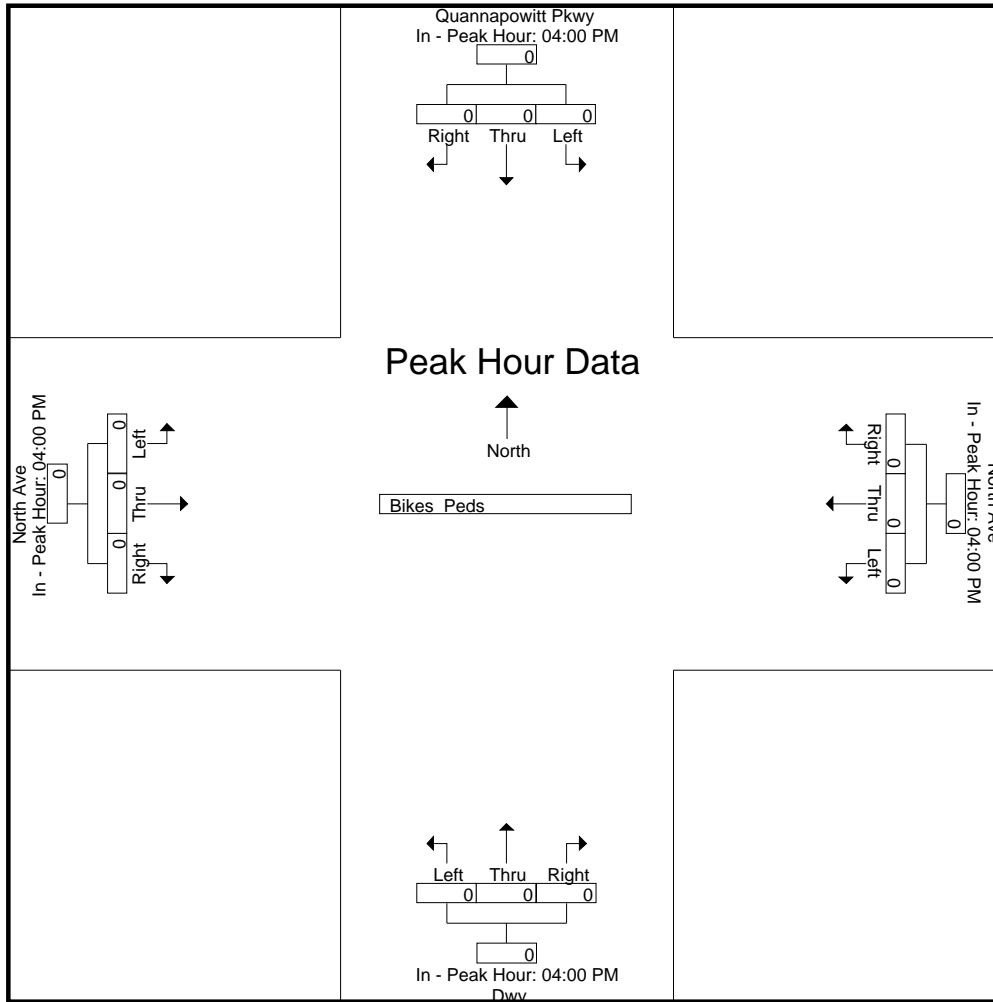
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts
978-664-2565

File Name : 79770001
Site Code : 79770001
Start Date : 2/11/2020
Page No : 12

N/S Street : Quannapowitt Pkwy / Dwy
E/W Street : North Avenue
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

Page No : 1

N/S Street : Quannapowitt Parkway

E/W Street : Lowell Street

City/State : Wakefield, MA

Weather : Cloudy

Groups Printed- Cars - Trucks

Start Time	Lowell St From East		Quannapowitt Pkwy From South				Lowell St From West		Int. Total
	Left	Thru	Left	Right	1st RT	Thru	Right		
07:00 AM	8	119	2	0	1	130	4	264	
07:15 AM	13	137	0	0	2	157	6	315	
07:30 AM	23	140	1	0	4	135	9	312	
07:45 AM	13	152	4	1	2	163	16	351	
Total	57	548	7	1	9	585	35	1242	
08:00 AM	16	128	1	0	7	147	11	310	
08:15 AM	17	134	3	0	1	135	25	315	
08:30 AM	24	142	5	0	5	138	16	330	
08:45 AM	16	100	2	1	5	123	21	268	
Total	73	504	11	1	18	543	73	1223	
Grand Total	130	1052	18	2	27	1128	108	2465	
Apprch %	11	89	38.3	4.3	57.4	91.3	8.7		
Total %	5.3	42.7	0.7	0.1	1.1	45.8	4.4		
Cars	129	1021	18	2	26	1100	108	2404	
% Cars	99.2	97.1	100	100	96.3	97.5	100	97.5	
Trucks	1	31	0	0	1	28	0	61	
% Trucks	0.8	2.9	0	0	3.7	2.5	0	2.5	

Start Time	Lowell St From East			Quannapowitt Pkwy From South				Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	1st RT	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:45 AM											
07:45 AM	13	152	165	4	1	2	7	163	16	179	351
08:00 AM	16	128	144	1	0	7	8	147	11	158	310
08:15 AM	17	134	151	3	0	1	4	135	25	160	315
08:30 AM	24	142	166	5	0	5	10	138	16	154	330
Total Volume	70	556	626	13	1	15	29	583	68	651	1306
% App. Total	11.2	88.8		44.8	3.4	51.7		89.6	10.4		
PHF	.729	.914	.943	.650	.250	.536	.725	.894	.680	.909	.930
Cars	69	540	609	13	1	14	28	566	68	634	1271
% Cars	98.6	97.1	97.3	100	100	93.3	96.6	97.1	100	97.4	97.3
Trucks	1	16	17	0	0	1	1	17	0	17	35
% Trucks	1.4	2.9	2.7	0	0	6.7	3.4	2.9	0	2.6	2.7

Accurate Counts

978-664-2565

File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

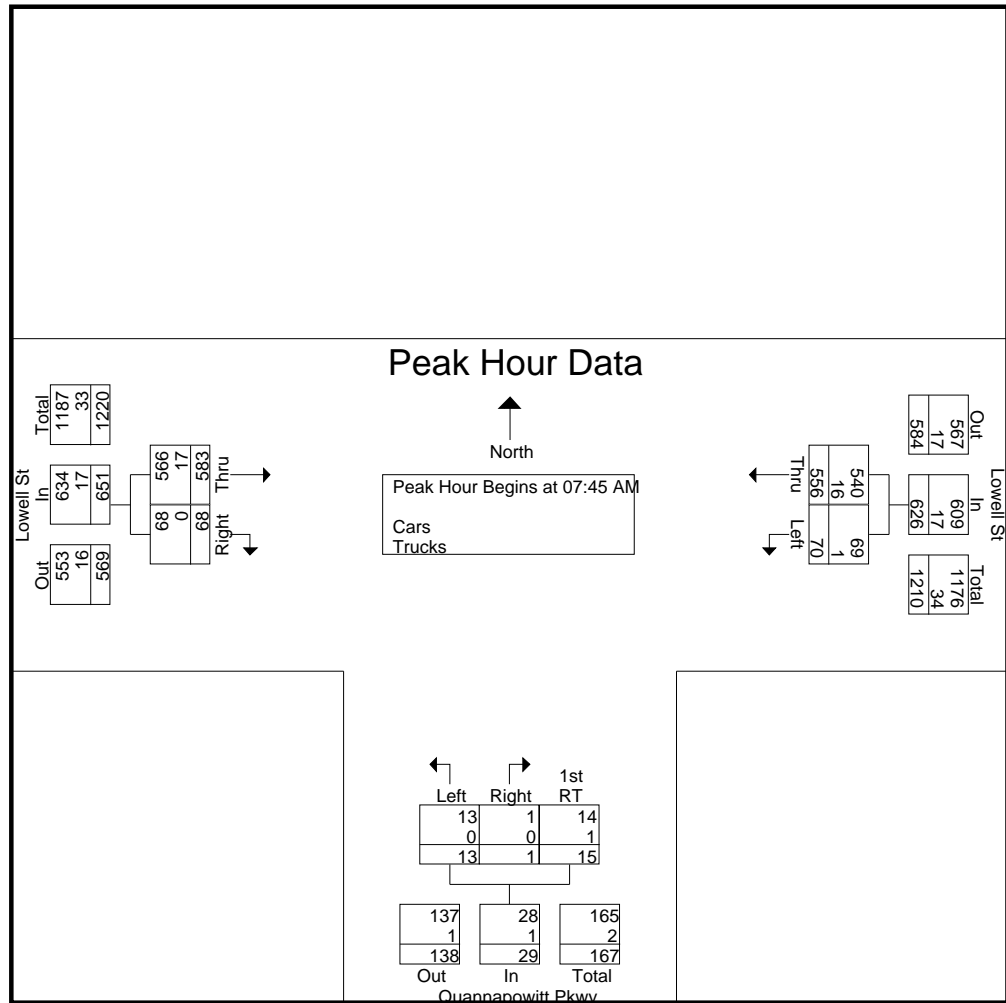
Page No : 2

N/S Street : Quannapowitt Parkway

E/W Street : Lowell Street

City/State : Wakefield, MA

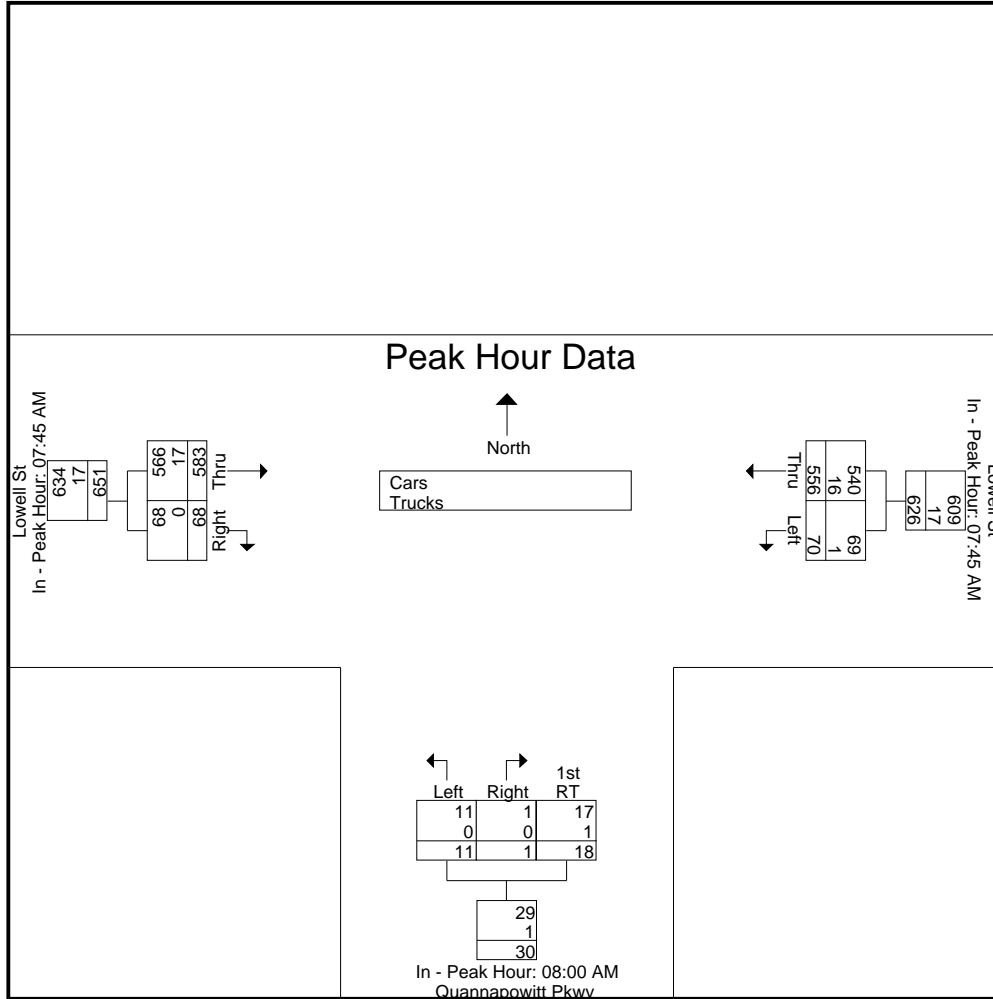
Weather : Cloudy



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

Peak Hour for Each Approach Begins at:

	07:45 AM			08:00 AM			07:45 AM			
+0 mins.	13	152	165	1	0	7	8	163	16	179
+15 mins.	16	128	144	3	0	1	4	147	11	158
+30 mins.	17	134	151	5	0	5	10	135	25	160
+45 mins.	24	142	166	2	1	5	8	138	16	154
Total Volume	70	556	626	11	1	18	30	583	68	651
% App. Total	11.2	88.8		36.7	3.3	60		89.6	10.4	
PHF	.729	.914	.943	.550	.250	.643	.750	.894	.680	.909
Cars	69	540	609	11	1	17	29	566	68	634
% Cars	98.6	97.1	97.3	100	100	94.4	96.7	97.1	100	97.4
Trucks	1	16	17	0	0	1	1	17	0	17



Accurate Counts

978-664-2565

File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

Page No : 1

N/S Street : Quannapowitt Parkway

E/W Street : Lowell Street

City/State : Wakefield, MA

Weather : Cloudy

Groups Printed- Cars

Start Time	Lowell St From East		Quannapowitt Pkwy From South				Lowell St From West		Int. Total
	Left	Thru	Left	Right	1st RT	Thru	Right		
07:00 AM	8	115	2	0	1	125	4	255	
07:15 AM	13	132	0	0	2	155	6	308	
07:30 AM	23	137	1	0	4	134	9	308	
07:45 AM	13	148	4	1	2	156	16	340	
Total	57	532	7	1	9	570	35	1211	
08:00 AM	15	126	1	0	7	143	11	303	
08:15 AM	17	131	3	0	0	132	25	308	
08:30 AM	24	135	5	0	5	135	16	320	
08:45 AM	16	97	2	1	5	120	21	262	
Total	72	489	11	1	17	530	73	1193	
Grand Total	129	1021	18	2	26	1100	108	2404	
Apprch %	11.2	88.8	39.1	4.3	56.5	91.1	8.9		
Total %	5.4	42.5	0.7	0.1	1.1	45.8	4.5		

Start Time	Lowell St From East			Quannapowitt Pkwy From South				Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	1st RT	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:45 AM											
07:45 AM	13	148	161	4	1	2	7	156	16	172	340
08:00 AM	15	126	141	1	0	7	8	143	11	154	303
08:15 AM	17	131	148	3	0	0	3	132	25	157	308
08:30 AM	24	135	159	5	0	5	10	135	16	151	320
Total Volume	69	540	609	13	1	14	28	566	68	634	1271
% App. Total	11.3	88.7		46.4	3.6	50		89.3	10.7		
PHF	.719	.912	.946	.650	.250	.500	.700	.907	.680	.922	.935

Accurate Counts

978-664-2565

File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

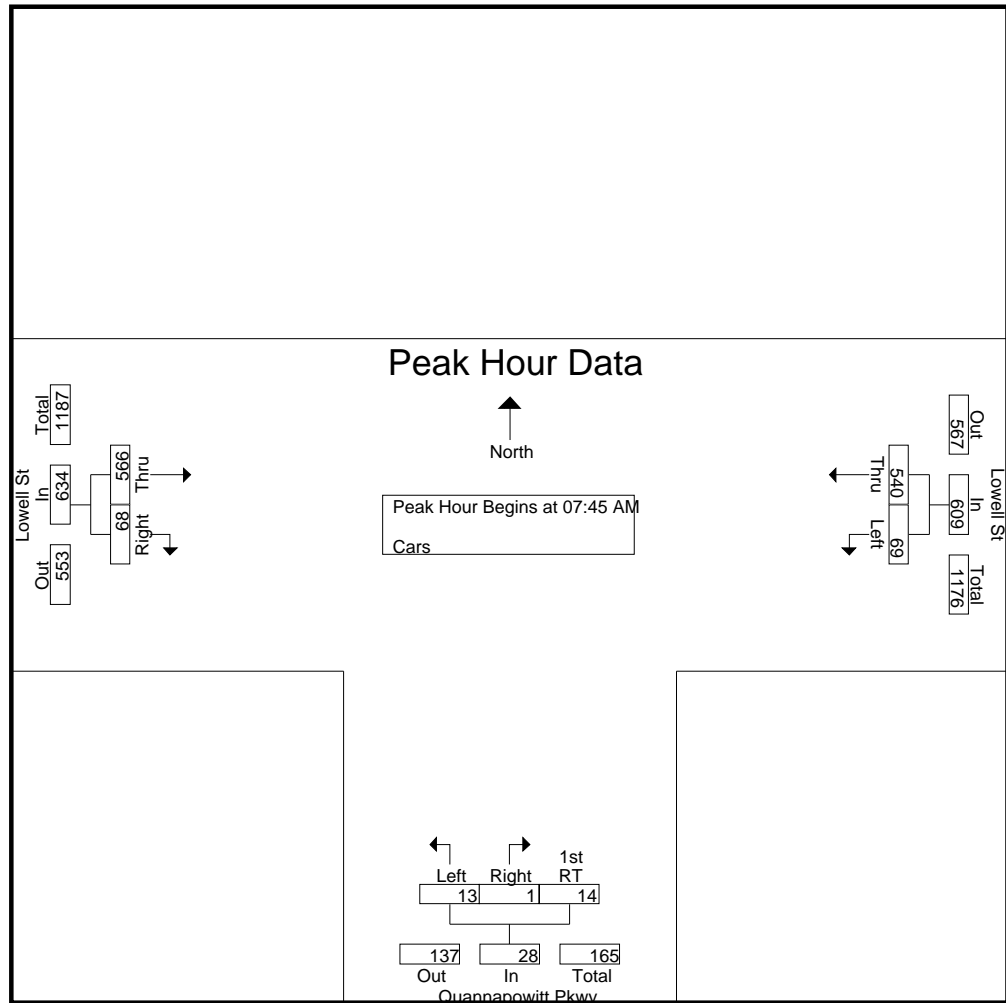
Page No : 2

N/S Street : Quannapowitt Parkway

E/W Street : Lowell Street

City/State : Wakefield, MA

Weather : Cloudy

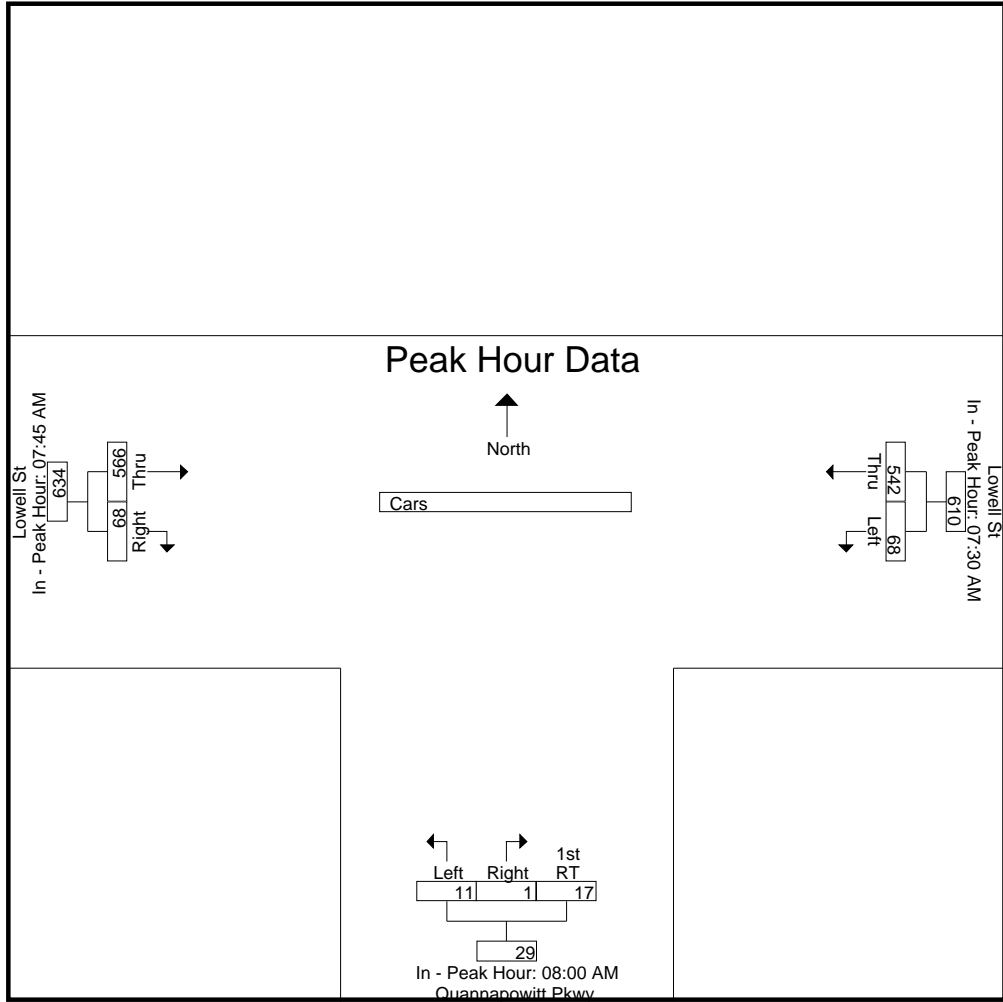


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:30 AM			08:00 AM			07:45 AM			
+0 mins.	23	137	160	1	0	7	8	156	16	172
+15 mins.	13	148	161	3	0	0	3	143	11	154
+30 mins.	15	126	141	5	0	5	10	132	25	157
+45 mins.	17	131	148	2	1	5	8	135	16	151
Total Volume	68	542	610	11	1	17	29	566	68	634
% App. Total	11.1	88.9		37.9	3.4	58.6		89.3	10.7	
PHF	.739	.916	.947	.550	.250	.607	.725	.907	.680	.922

N/S Street : Quannapowitt Parkway
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

Page No : 1

N/S Street : Quannapowitt Parkway

E/W Street : Lowell Street

City/State : Wakefield, MA

Weather : Cloudy

Groups Printed- Trucks

Start Time	Lowell St From East		Quannapowitt Pkwy From South				Lowell St From West		Int. Total
	Left	Thru	Left	Right	1st RT	Thru	Right		
07:00 AM	0	4	0	0	0	5	0	9	
07:15 AM	0	5	0	0	0	2	0	7	
07:30 AM	0	3	0	0	0	1	0	4	
07:45 AM	0	4	0	0	0	7	0	11	
Total	0	16	0	0	0	15	0	31	
08:00 AM	1	2	0	0	0	4	0	7	
08:15 AM	0	3	0	0	1	3	0	7	
08:30 AM	0	7	0	0	0	3	0	10	
08:45 AM	0	3	0	0	0	3	0	6	
Total	1	15	0	0	1	13	0	30	
Grand Total	1	31	0	0	1	28	0	61	
Apprch %	3.1	96.9	0	0	100	100	0		
Total %	1.6	50.8	0	0	1.6	45.9	0		

Start Time	Lowell St From East			Quannapowitt Pkwy From South				Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	1st RT	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:45 AM											
07:45 AM	0	4	4	0	0	0	0	7	0	7	11
08:00 AM	1	2	3	0	0	0	0	4	0	4	7
08:15 AM	0	3	3	0	0	1	1	3	0	3	7
08:30 AM	0	7	7	0	0	0	0	3	0	3	10
Total Volume	1	16	17	0	0	1	1	17	0	17	35
% App. Total	5.9	94.1		0	0	100		100	0		
PHF	.250	.571	.607	.000	.000	.250	.250	.607	.000	.607	.795

Accurate Counts

978-664-2565

File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

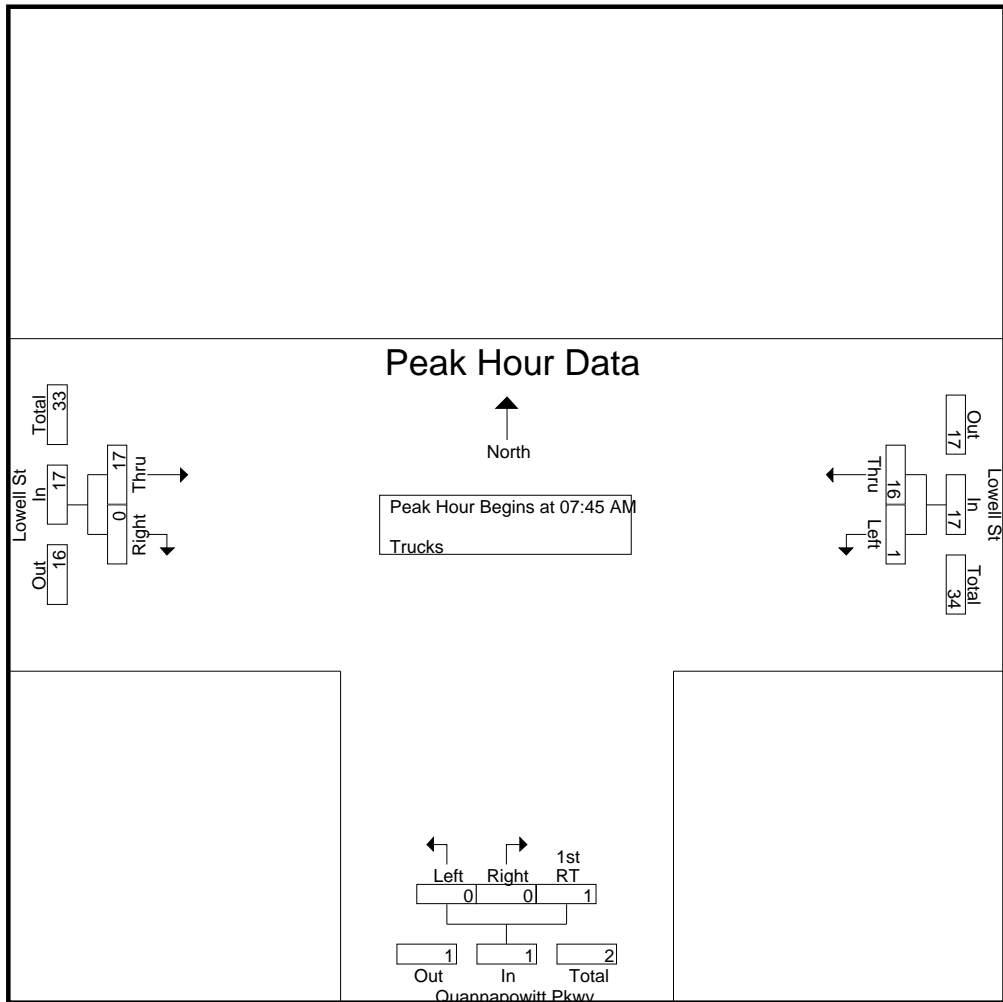
Page No : 2

N/S Street : Quannapowitt Parkway

E/W Street : Lowell Street

City/State : Wakefield, MA

Weather : Cloudy

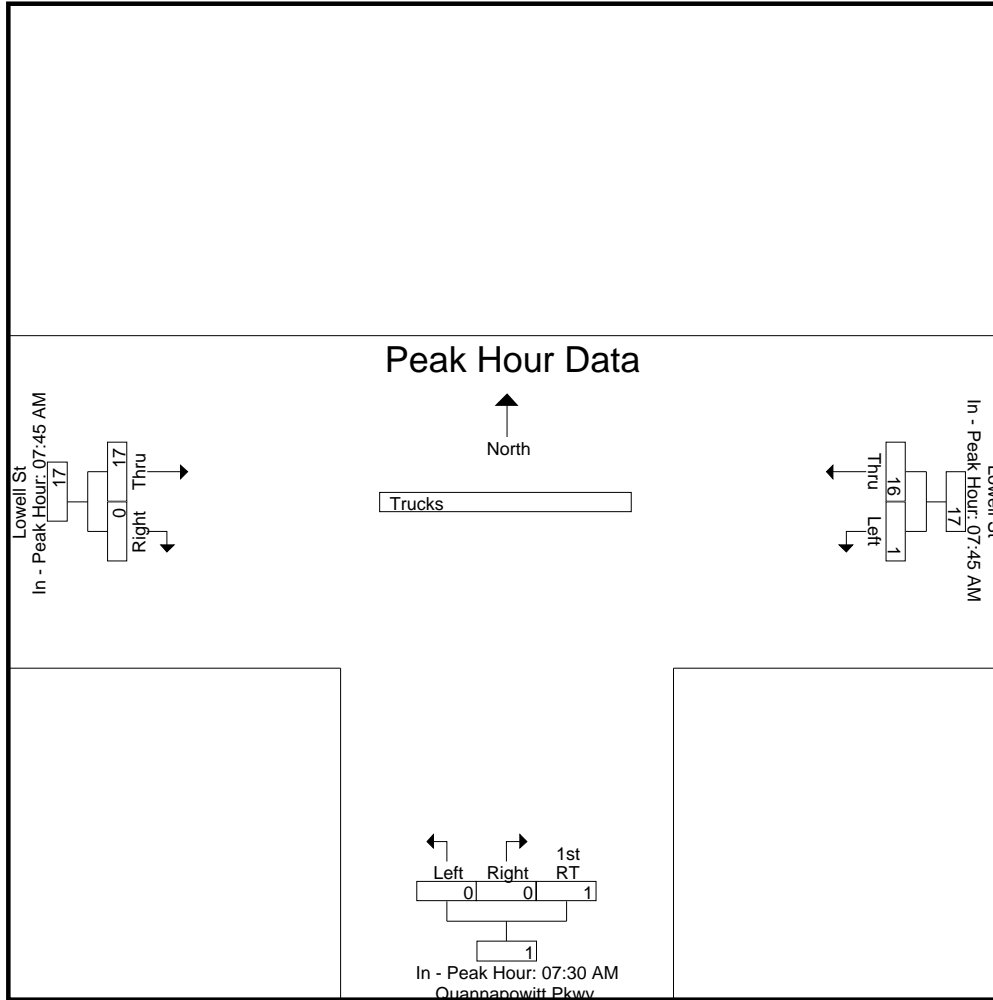


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:45 AM			07:30 AM				07:45 AM		
+0 mins.	0	4	4	0	0	0	0	7	0	7
+15 mins.	1	2	3	0	0	0	0	4	0	4
+30 mins.	0	3	3	0	0	0	0	3	0	3
+45 mins.	0	7	7	0	0	1	1	3	0	3
Total Volume	1	16	17	0	0	1	1	17	0	17
% App. Total	5.9	94.1		0	0	100		100	0	
PHF	.250	.571	.607	.000	.000	.250	.250	.607	.000	.607

N/S Street : Quannapowitt Parkway
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

Page No : 1

N/S Street : Quannapowitt Parkway

E/W Street : Lowell Street

City/State : Wakefield, MA

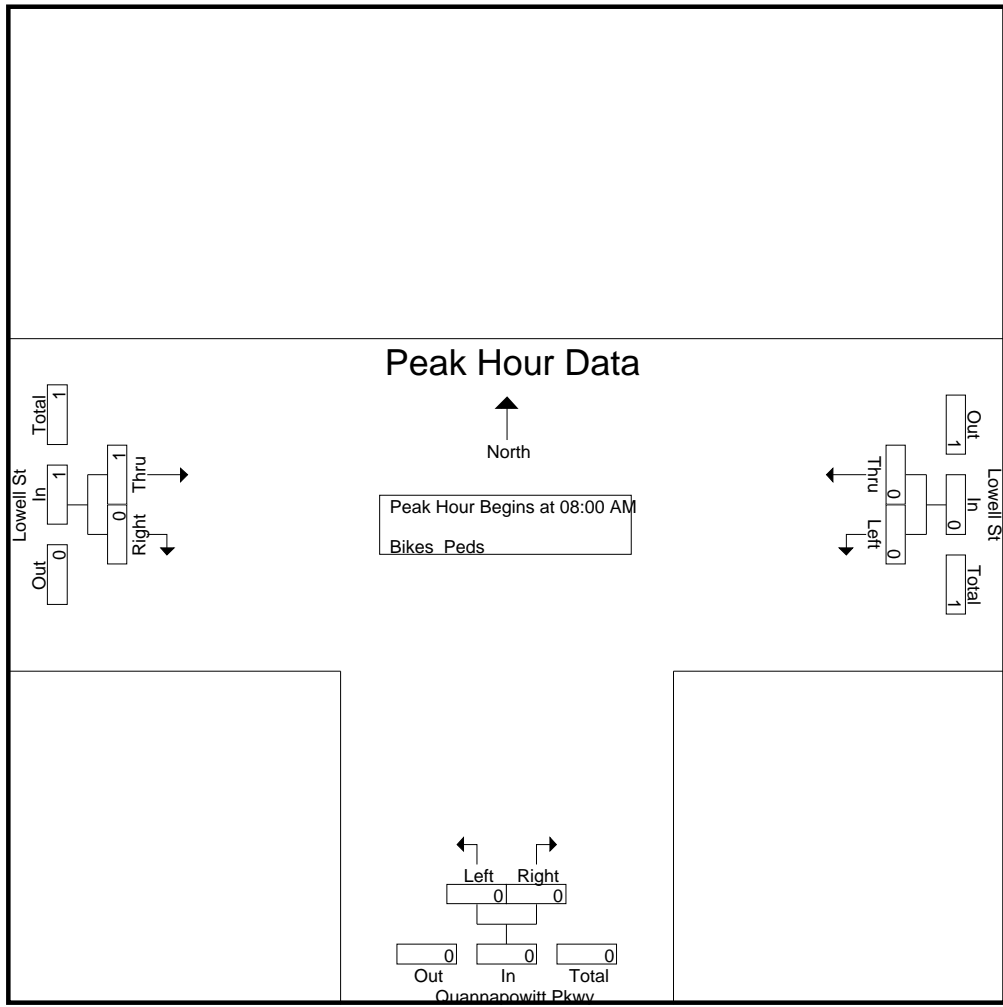
Weather : Cloudy

Groups Printed- Bikes Peds

Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	1	0	0	0	1	1
Total	0	0	0	0	0	0	1	0	0	0	1	1
Grand Total	0	0	0	0	0	0	1	0	0	0	1	1
Apprch %	0	0		0	0		100	0				
Total %	0	0		0	0		100	0		0	100	

Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	1	0	1	1
Total Volume	0	0	0	0	0	0	1	0	1	1
% App. Total	0	0		0	0		100	0		
PHF	.000	.000	.000	.000	.000	.000	.250	.000	.250	.250

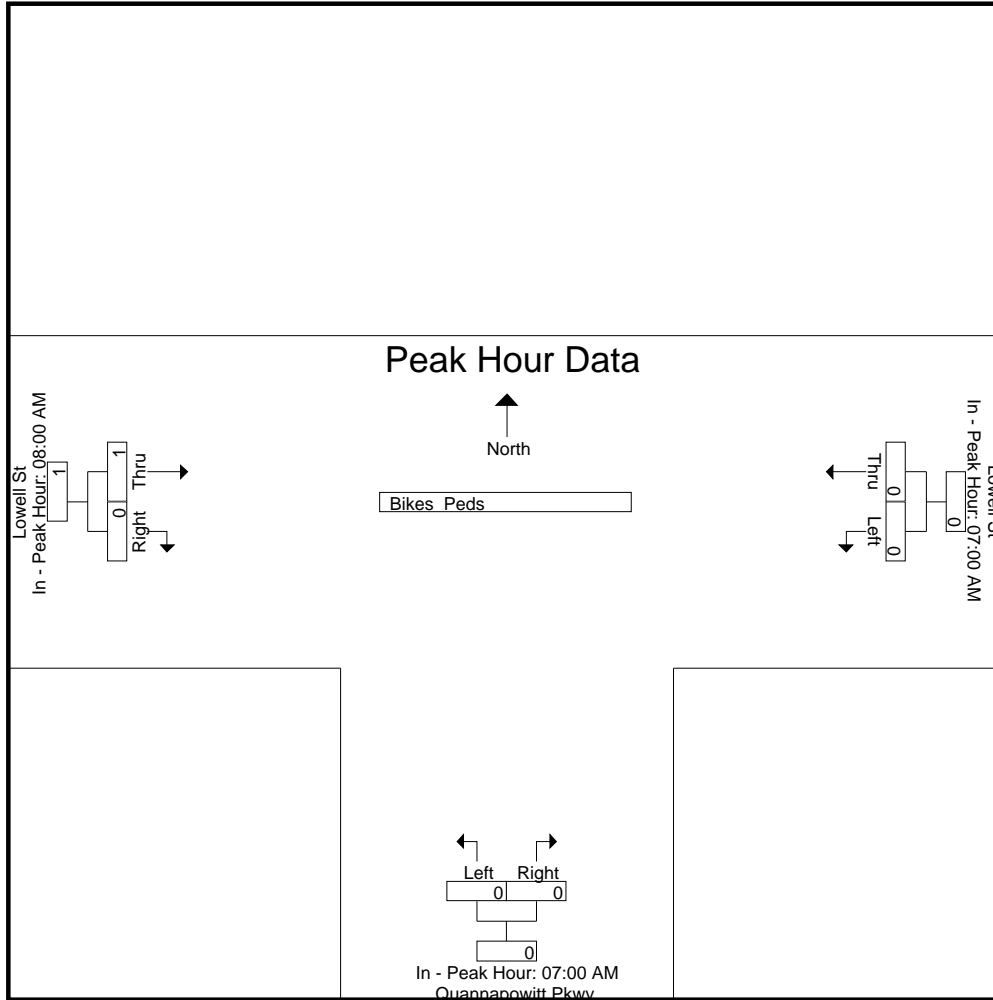
N/S Street : Quannapowitt Parkway
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			08:00 AM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	1	0	1
Total Volume	0	0	0	0	0	0	1	0	1
% App. Total	0	0	0	0	0	0	100	0	0
PHF	.000	.000	.000	.000	.000	.000	.250	.000	.250

N/S Street : Quannapowitt Parkway
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Quannapowitt Parkway
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Cloudy

File Name : 79770002
 Site Code : 79770002
 Start Date : 2/11/2020
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Lowell St From East		Quannapowitt Pkwy From South				Lowell St From West		Int. Total
	Left	Thru	Left	Right	1st RT	Thru	Right		
04:00 PM	4	127	2	1	2	146	1	283	
04:15 PM	4	143	6	2	0	162	4	321	
04:30 PM	6	121	5	0	0	136	7	275	
04:45 PM	2	117	3	2	3	185	1	313	
Total	16	508	16	5	5	629	13	1192	
05:00 PM	5	147	4	0	3	157	2	318	
05:15 PM	3	122	6	1	20	218	2	372	
05:30 PM	3	122	9	2	10	196	1	343	
05:45 PM	4	114	8	5	7	195	1	334	
Total	15	505	27	8	40	766	6	1367	
Grand Total	31	1013	43	13	45	1395	19	2559	
Apprch %	3	97	42.6	12.9	44.6	98.7	1.3		
Total %	1.2	39.6	1.7	0.5	1.8	54.5	0.7		
Cars	31	1005	43	12	44	1384	19	2538	
% Cars	100	99.2	100	92.3	97.8	99.2	100	99.2	
Trucks	0	8	0	1	1	11	0	21	
% Trucks	0	0.8	0	7.7	2.2	0.8	0	0.8	

Start Time	Lowell St From East			Quannapowitt Pkwy From South				Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	1st RT	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 05:00 PM											
05:00 PM	5	147	152	4	0	3	7	157	2	159	318
05:15 PM	3	122	125	6	1	20	27	218	2	220	372
05:30 PM	3	122	125	9	2	10	21	196	1	197	343
05:45 PM	4	114	118	8	5	7	20	195	1	196	334
Total Volume	15	505	520	27	8	40	75	766	6	772	1367
% App. Total	2.9	97.1		36	10.7	53.3		99.2	0.8		
PHF	.750	.859	.855	.750	.400	.500	.694	.878	.750	.877	.919
Cars	15	504	519	27	7	40	74	758	6	764	1357
% Cars	100	99.8	99.8	100	87.5	100	98.7	99.0	100	99.0	99.3
Trucks	0	1	1	0	1	0	1	8	0	8	10
% Trucks	0	0.2	0.2	0	12.5	0	1.3	1.0	0	1.0	0.7

Accurate Counts

978-664-2565

File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

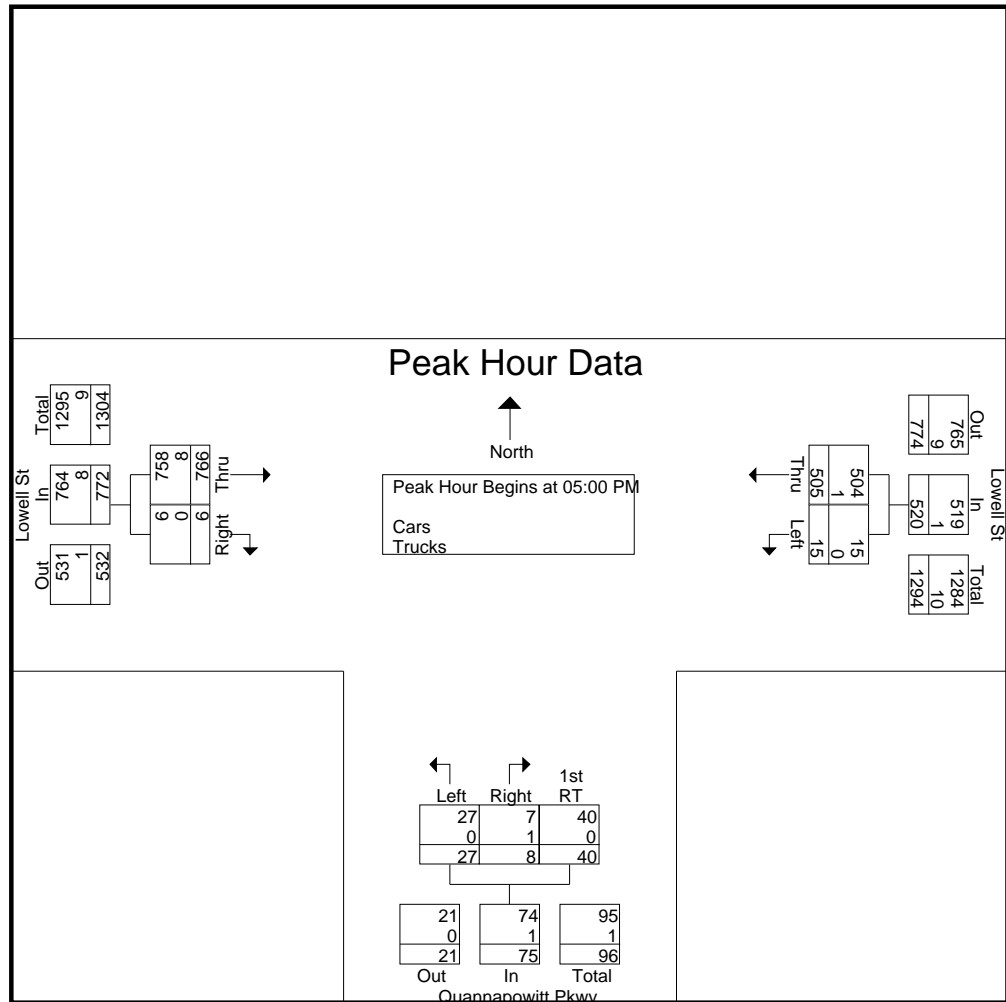
Page No : 2

N/S Street : Quannapowitt Parkway

E/W Street : Lowell Street

City/State : Wakefield, MA

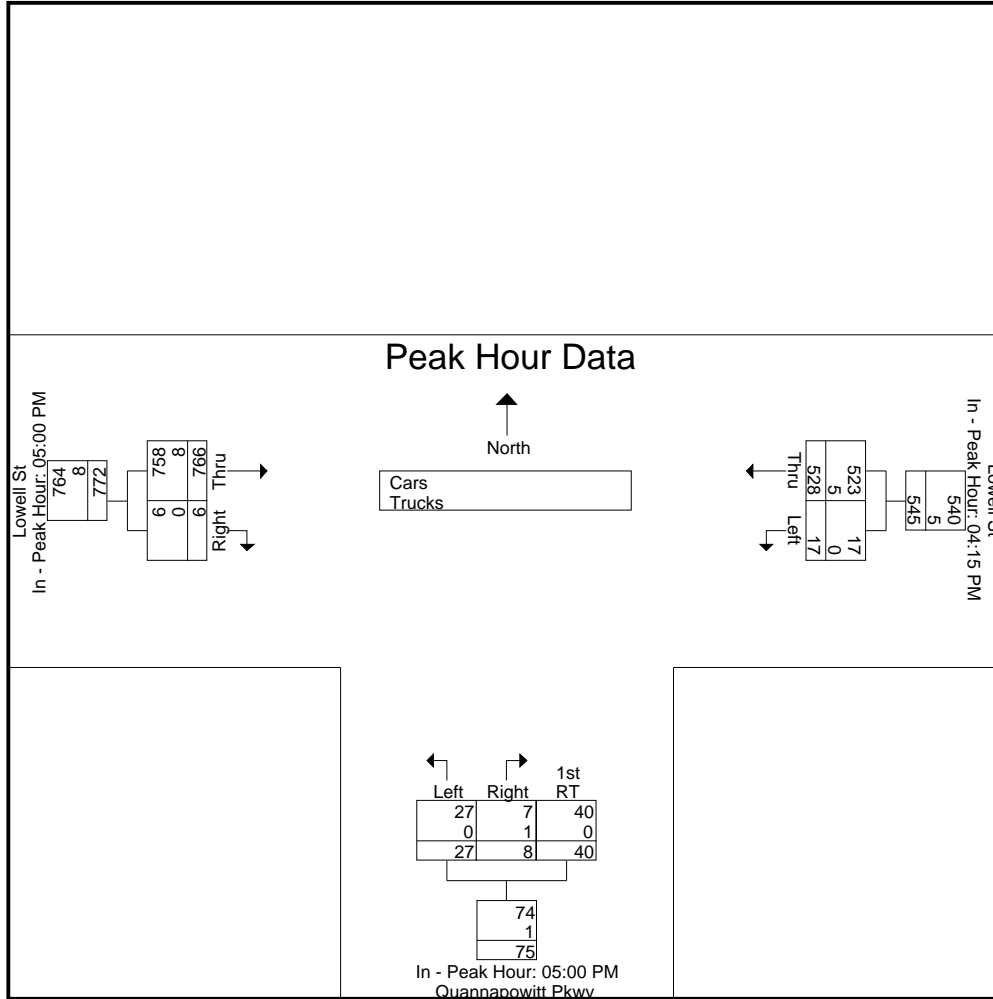
Weather : Cloudy



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:15 PM			05:00 PM				05:00 PM		
+0 mins.	4	143	147	4	0	3	7	157	2	159
+15 mins.	6	121	127	6	1	20	27	218	2	220
+30 mins.	2	117	119	9	2	10	21	196	1	197
+45 mins.	5	147	152	8	5	7	20	195	1	196
Total Volume	17	528	545	27	8	40	75	766	6	772
% App. Total	3.1	96.9		36	10.7	53.3		99.2	0.8	
PHF	.708	.898	.896	.750	.400	.500	.694	.878	.750	.877
Cars	17	523	540	27	7	40	74	758	6	764
% Cars	100	99.1	99.1	100	87.5	100	98.7	99	100	99
Trucks	0	5	5	0	1	0	1	8	0	8



Accurate Counts

978-664-2565

File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

Page No : 1

N/S Street : Quannapowitt Parkway

E/W Street : Lowell Street

City/State : Wakefield, MA

Weather : Cloudy

Groups Printed- Cars

Start Time	Lowell St From East		Quannapowitt Pkwy From South				Lowell St From West		Int. Total
	Left	Thru	Left	Right	1st RT	Thru	Right		
04:00 PM	4	125	2	1	1	146	1	280	
04:15 PM	4	142	6	2	0	161	4	319	
04:30 PM	6	119	5	0	0	136	7	273	
04:45 PM	2	115	3	2	3	183	1	309	
Total	16	501	16	5	4	626	13	1181	
05:00 PM	5	147	4	0	3	154	2	315	
05:15 PM	3	121	6	0	20	215	2	367	
05:30 PM	3	122	9	2	10	195	1	342	
05:45 PM	4	114	8	5	7	194	1	333	
Total	15	504	27	7	40	758	6	1357	
Grand Total	31	1005	43	12	44	1384	19	2538	
Apprch %	3	97	43.4	12.1	44.4	98.6	1.4		
Total %	1.2	39.6	1.7	0.5	1.7	54.5	0.7		

Start Time	Lowell St From East			Quannapowitt Pkwy From South				Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	1st RT	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 05:00 PM											
05:00 PM	5	147	152	4	0	3	7	154	2	156	315
05:15 PM	3	121	124	6	0	20	26	215	2	217	367
05:30 PM	3	122	125	9	2	10	21	195	1	196	342
05:45 PM	4	114	118	8	5	7	20	194	1	195	333
Total Volume	15	504	519	27	7	40	74	758	6	764	1357
% App. Total	2.9	97.1		36.5	9.5	54.1		99.2	0.8		
PHF	.750	.857	.854	.750	.350	.500	.712	.881	.750	.880	.924

Accurate Counts

978-664-2565

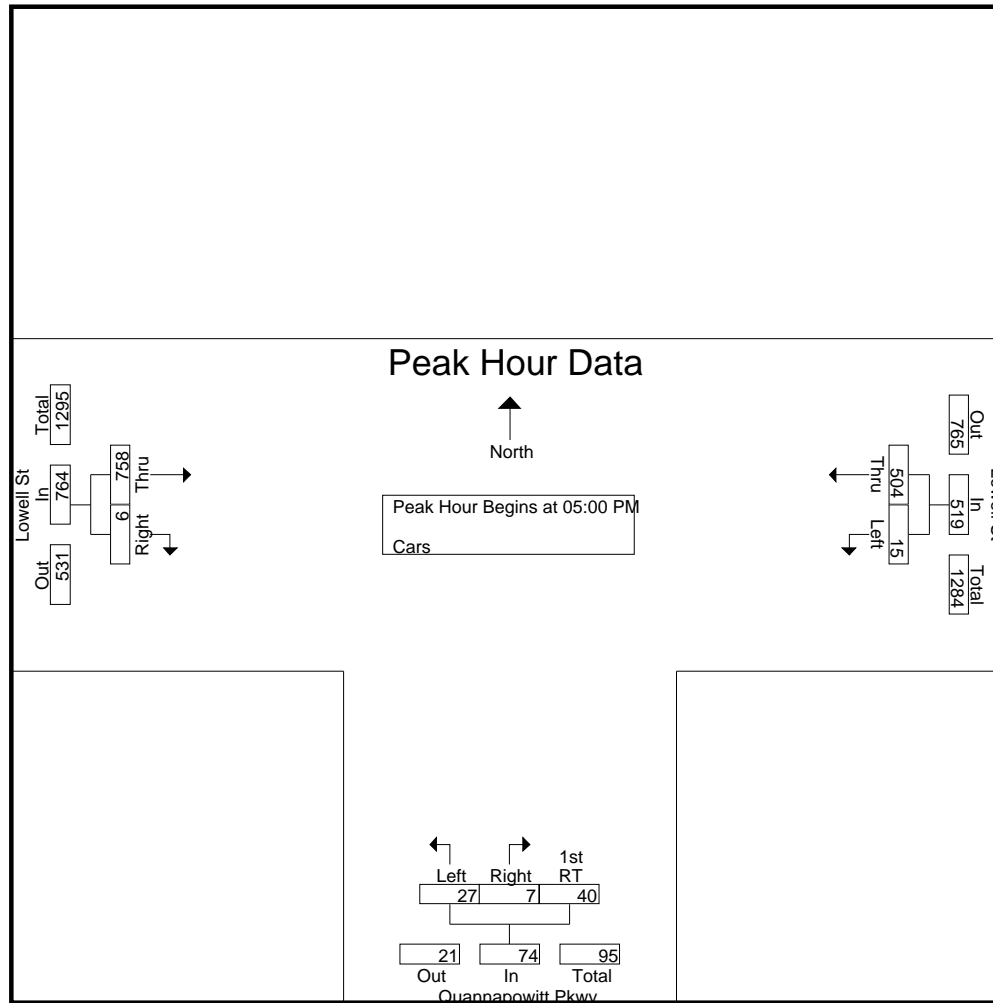
File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

Page No : 2

N/S Street : Quannapowitt Parkway
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Cloudy

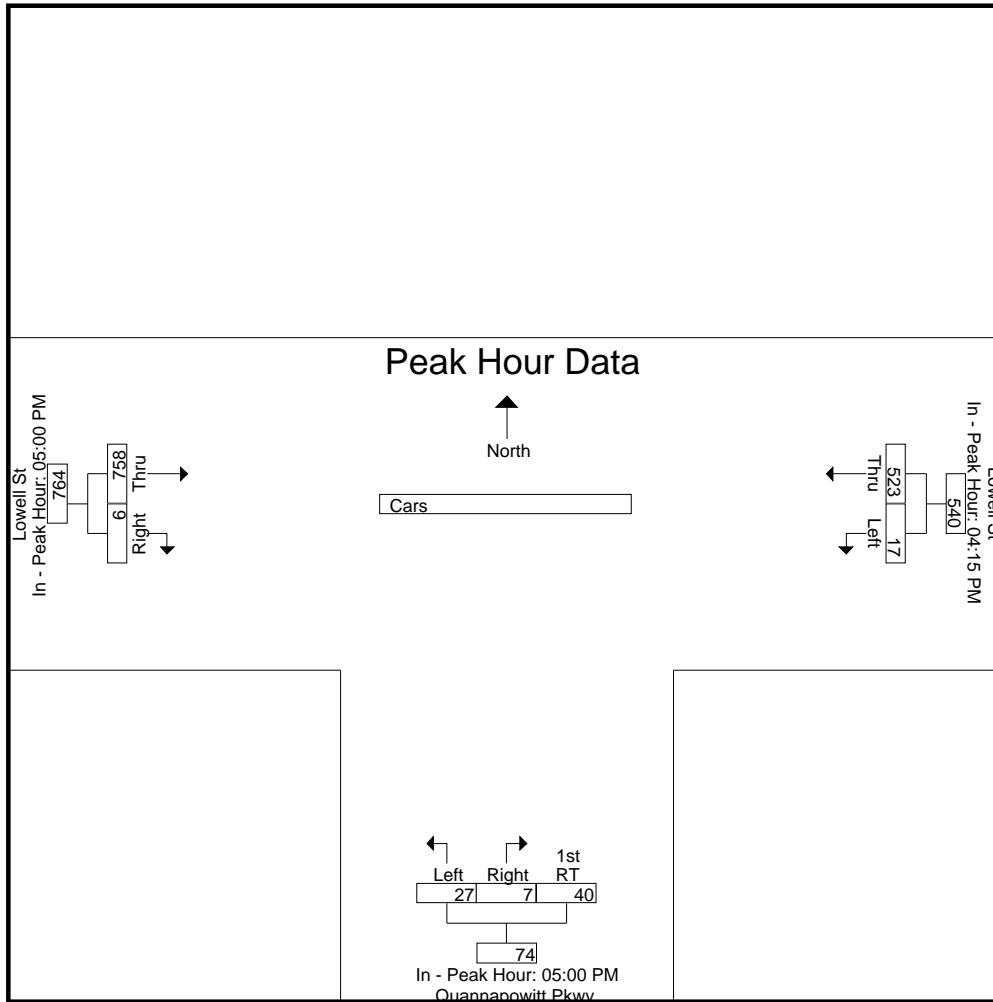


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:15 PM			05:00 PM				05:00 PM		
+0 mins.	4	142	146	4	0	3	7	154	2	156
+15 mins.	6	119	125	6	0	20	26	215	2	217
+30 mins.	2	115	117	9	2	10	21	195	1	196
+45 mins.	5	147	152	8	5	7	20	194	1	195
Total Volume	17	523	540	27	7	40	74	758	6	764
% App. Total	3.1	96.9		36.5	9.5	54.1		99.2	0.8	
PHF	.708	.889	.888	.750	.350	.500	.712	.881	.750	.880

N/S Street : Quannapowitt Parkway
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

Page No : 1

N/S Street : Quannapowitt Parkway

E/W Street : Lowell Street

City/State : Wakefield, MA

Weather : Cloudy

Groups Printed- Trucks

Start Time	Lowell St From East		Quannapowitt Pkwy From South				Lowell St From West		Int. Total
	Left	Thru	Left	Right	1st RT	Thru	Right		
04:00 PM	0	2	0	0	1	0	0	3	
04:15 PM	0	1	0	0	0	1	0	2	
04:30 PM	0	2	0	0	0	0	0	2	
04:45 PM	0	2	0	0	0	2	0	4	
Total	0	7	0	0	1	3	0	11	
05:00 PM	0	0	0	0	0	3	0	3	
05:15 PM	0	1	0	1	0	3	0	5	
05:30 PM	0	0	0	0	0	1	0	1	
05:45 PM	0	0	0	0	0	1	0	1	
Total	0	1	0	1	0	8	0	10	
Grand Total	0	8	0	1	1	11	0	21	
Apprch %	0	100	0	50	50	100	0		
Total %	0	38.1	0	4.8	4.8	52.4	0		

Start Time	Lowell St From East			Quannapowitt Pkwy From South				Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	1st RT	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 04:30 PM											
04:30 PM	0	2	2	0	0	0	0	0	0	0	2
04:45 PM	0	2	2	0	0	0	0	2	0	2	4
05:00 PM	0	0	0	0	0	0	0	3	0	3	3
05:15 PM	0	1	1	0	1	0	1	3	0	3	5
Total Volume	0	5	5	0	1	0	1	8	0	8	14
% App. Total	0	100		0	100	0		100	0		
PHF	.000	.625	.625	.000	.250	.000	.250	.667	.000	.667	.700

Accurate Counts

978-664-2565

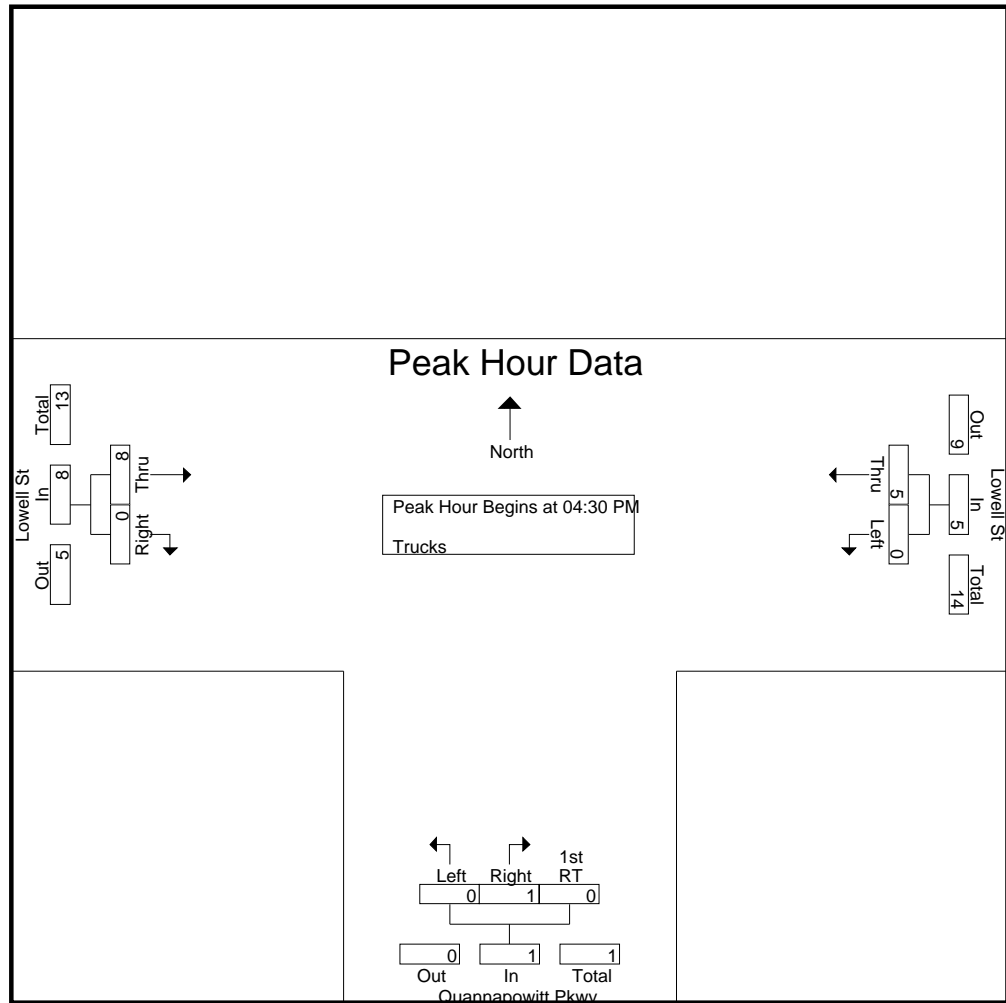
File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

Page No : 2

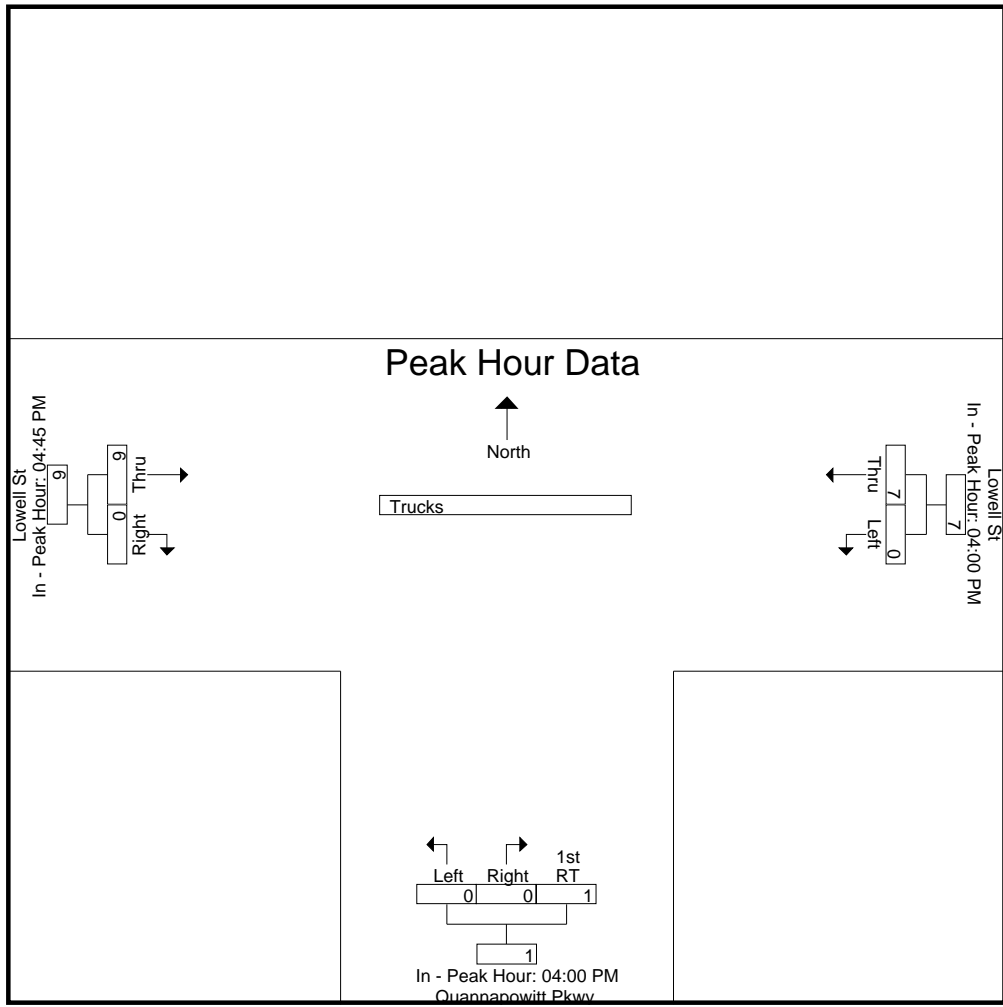
N/S Street : Quannapowitt Parkway
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Cloudy



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM				04:45 PM			
+0 mins.	0	2	2	0	0	1	1	2	0	2	
+15 mins.	0	1	1	0	0	0	0	3	0	3	
+30 mins.	0	2	2	0	0	0	0	3	0	3	
+45 mins.	0	2	2	0	0	0	0	1	0	1	
Total Volume	0	7	7	0	0	1	1	9	0	9	
% App. Total	0	100		0	0	100		100	0		
PHF	.000	.875	.875	.000	.000	.250	.250	.750	.000	.750	

N/S Street : Quannapowitt Parkway
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

File Name : 79770002

Site Code : 79770002

Start Date : 2/11/2020

Page No : 1

N/S Street : Quannapowitt Parkway

E/W Street : Lowell Street

City/State : Wakefield, MA

Weather : Cloudy

Groups Printed- Bikes Peds

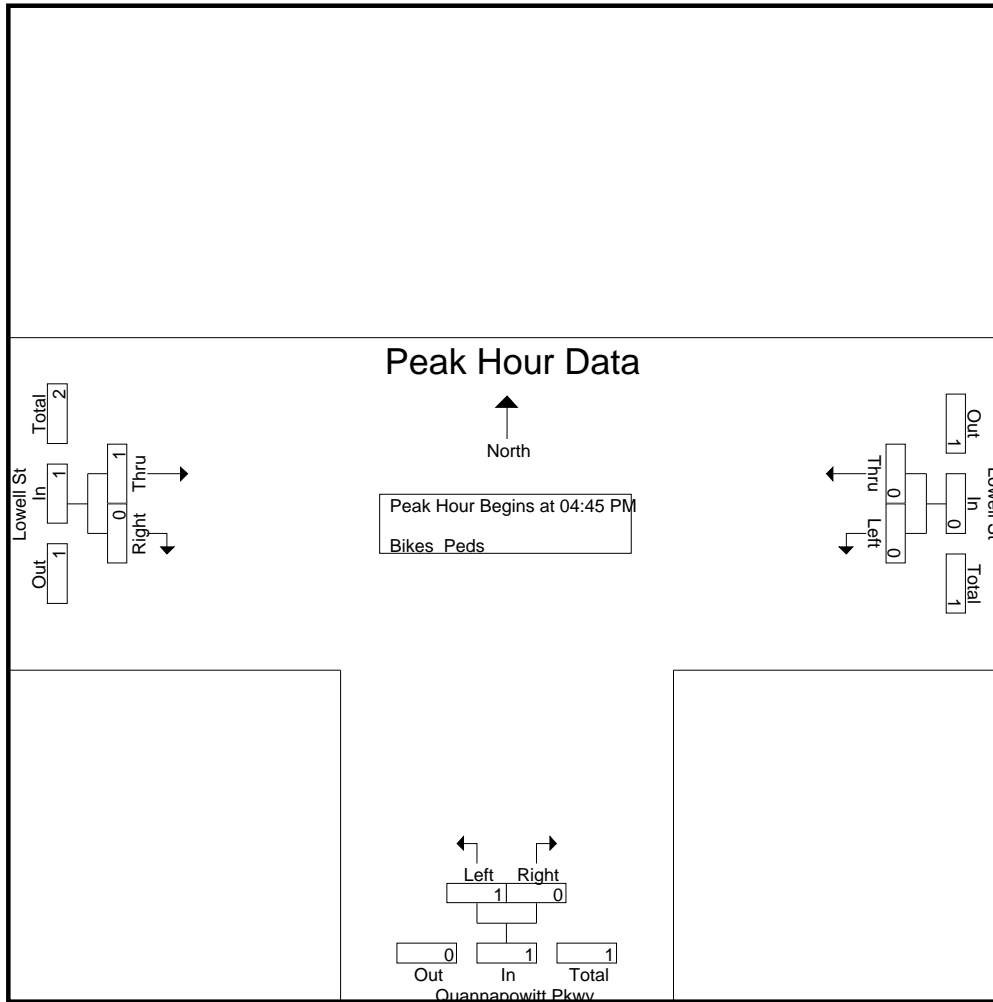
Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	1	0	0	0	1	1
Total	0	0	0	0	0	0	1	0	0	0	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	1	0	0	0	0	0	0	1	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	0	0	0	0	1	1
Grand Total	0	0	0	1	0	0	1	0	0	0	2	2
Apprch %	0	0		100	0		100	0				
Total %	0	0		50	0		50	0		0	100	

Start Time	Lowell St From East			Quannapowitt Pkwy From South			Lowell St From West			Int. Total
	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	0	0	0	0	0	0	1	0	1	1
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	1	0	1	0	0	0	1
Total Volume	0	0	0	1	0	1	1	0	1	2
% App. Total	0	0		100	0		100	0		
PHF	.000	.000	.000	.250	.000	.250	.250	.000	.250	.500

Accurate Counts
978-664-2565

File Name : 79770002
Site Code : 79770002
Start Date : 2/11/2020
Page No : 2

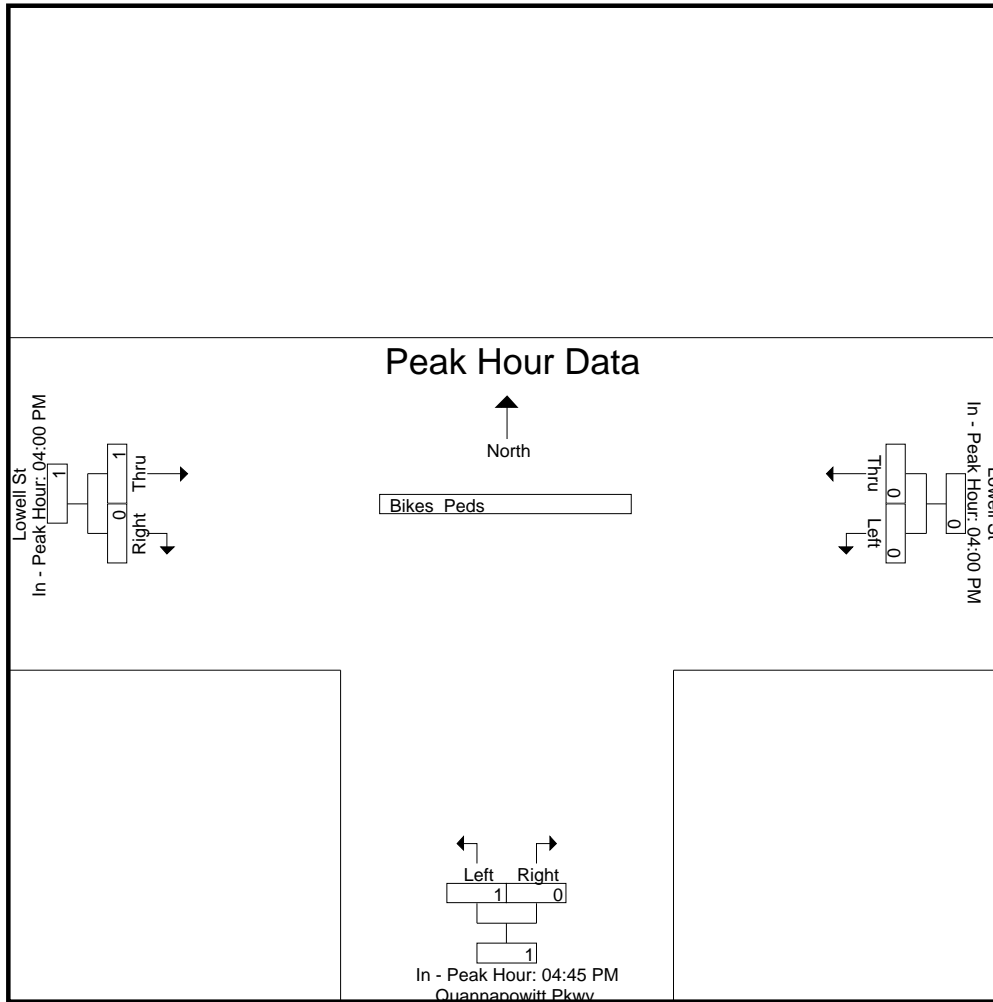
N/S Street : Quannapowitt Parkway
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			04:45 PM			04:00 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	1	0	1	1	0	1
Total Volume	0	0	0	1	0	1	1	0	1
% App. Total	0	0	0	100	0	100	100	0	100
PHF	.000	.000	.000	.250	.000	.250	.250	.000	.250

N/S Street : Quannapowitt Parkway
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Driveway / Main Street
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Cloudy

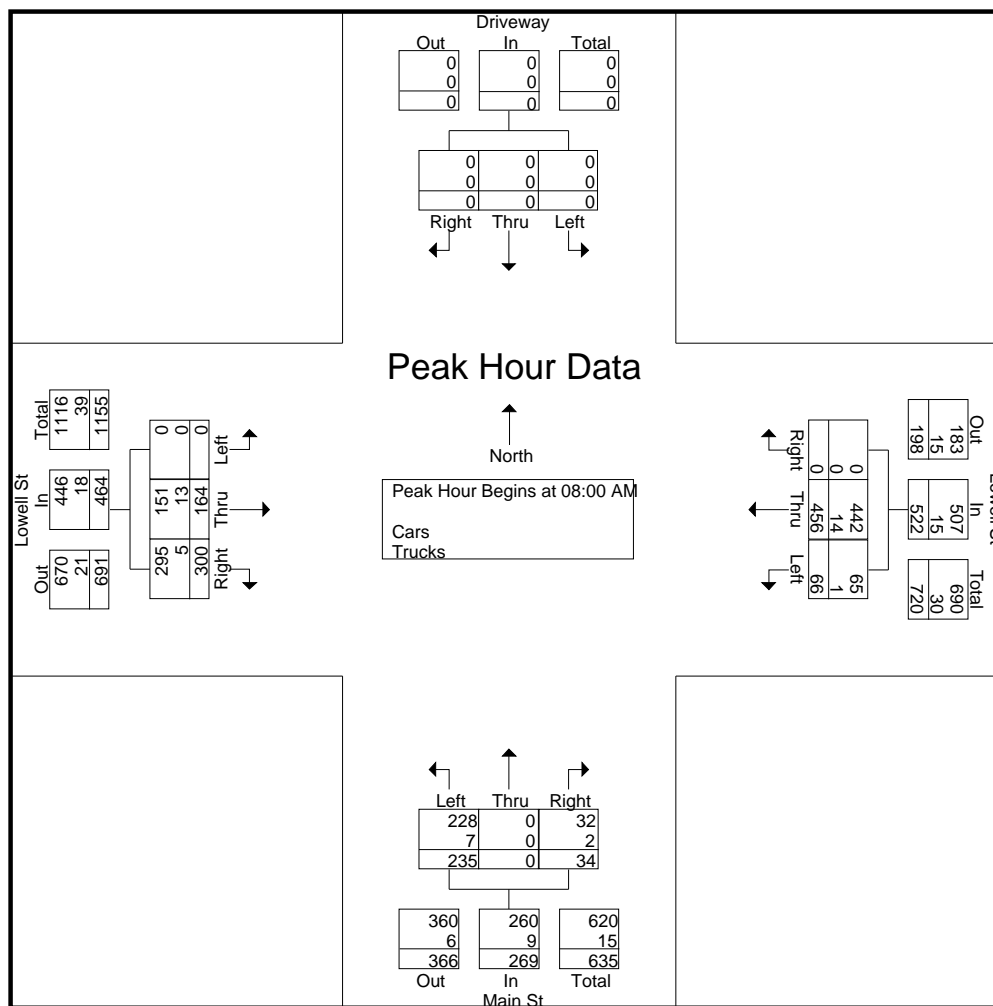
File Name : 85420001
 Site Code : 85420001
 Start Date : 9/29/2020
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Driveway From North			Lowell St From East			Main St From South			Lowell St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	0	6	66	0	56	0	2	0	33	64	227
07:15 AM	0	0	0	6	68	0	59	0	5	0	30	27	195
07:30 AM	0	0	0	7	63	0	47	0	8	0	30	56	211
07:45 AM	0	0	0	10	70	0	51	0	9	0	58	69	267
Total	0	0	0	29	267	0	213	0	24	0	151	216	900
08:00 AM	0	0	0	15	97	0	50	0	6	0	39	77	284
08:15 AM	0	0	0	23	106	0	56	0	8	0	44	65	302
08:30 AM	0	0	0	15	149	0	62	0	8	0	40	76	350
08:45 AM	0	0	0	13	104	0	67	0	12	0	41	82	319
Total	0	0	0	66	456	0	235	0	34	0	164	300	1255
Grand Total	0	0	0	95	723	0	448	0	58	0	315	516	2155
Apprch %	0	0	0	11.6	88.4	0	88.5	0	11.5	0	37.9	62.1	
Total %	0	0	0	4.4	33.5	0	20.8	0	2.7	0	14.6	23.9	
Cars	0	0	0	94	697	0	433	0	56	0	291	506	2077
% Cars	0	0	0	98.9	96.4	0	96.7	0	96.6	0	92.4	98.1	96.4
Trucks	0	0	0	1	26	0	15	0	2	0	24	10	78
% Trucks	0	0	0	1.1	3.6	0	3.3	0	3.4	0	7.6	1.9	3.6

Start Time	Driveway From North				Lowell St From East				Main St From South				Lowell St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	15	97	0	112	50	0	6	56	0	39	77	116	284
08:15 AM	0	0	0	0	23	106	0	129	56	0	8	64	0	44	65	109	302
08:30 AM	0	0	0	0	15	149	0	164	62	0	8	70	0	40	76	116	350
08:45 AM	0	0	0	0	13	104	0	117	67	0	12	79	0	41	82	123	319
Total Volume	0	0	0	0	66	456	0	522	235	0	34	269	0	164	300	464	1255
% App. Total	0	0	0	0	12.6	87.4	0		87.4	0	12.6		0	35.3	64.7		
PHF	.000	.000	.000	.000	.717	.765	.000	.796	.877	.000	.708	.851	.000	.932	.915	.943	.896
Cars	0	0	0	0	65	442	0	507	228	0	32	260	0	151	295	446	1213
% Cars	0	0	0	0	98.5	96.9	0	97.1	97.0	0	94.1	96.7	0	92.1	98.3	96.1	96.7
Trucks	0	0	0	0	1	14	0	15	7	0	2	9	0	13	5	18	42
% Trucks	0	0	0	0	1.5	3.1	0	2.9	3.0	0	5.9	3.3	0	7.9	1.7	3.9	3.3

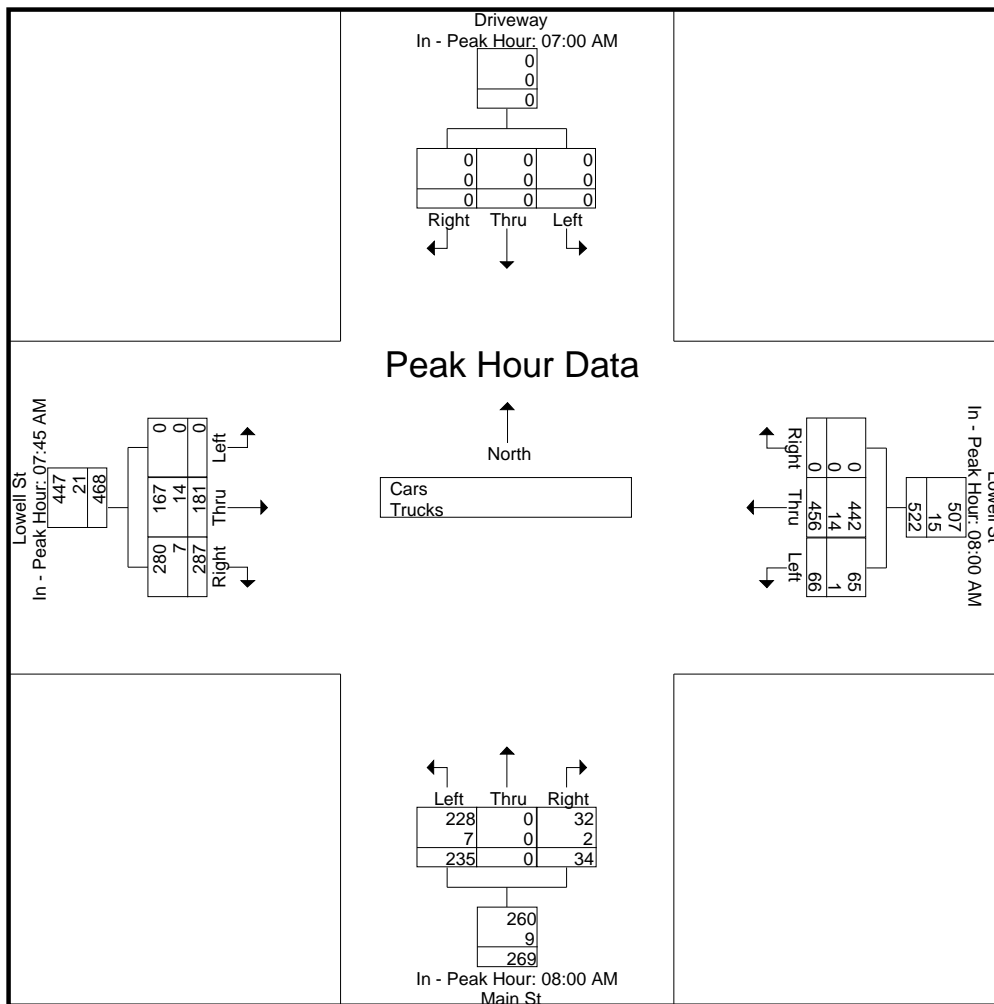
N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				08:00 AM				08:00 AM				07:45 AM			
+0 mins.	0	0	0	0	15	97	0	112	50	0	6	56	0	58	69	127
+15 mins.	0	0	0	0	23	106	0	129	56	0	8	64	0	39	77	116
+30 mins.	0	0	0	0	15	149	0	164	62	0	8	70	0	44	65	109
+45 mins.	0	0	0	0	13	104	0	117	67	0	12	79	0	40	76	116
Total Volume	0	0	0	0	66	456	0	522	235	0	34	269	0	181	287	468
% App. Total	0	0	0	0	12.6	87.4	0		87.4	0	12.6		0	38.7	61.3	
PHF	.000	.000	.000	.000	.717	.765	.000	.796	.877	.000	.708	.851	.000	.780	.932	.921
Cars	0	0	0	0	65	442	0	507	228	0	32	260	0	167	280	447
% Cars	0	0	0	0	98.5	96.9	0	97.1	97	0	94.1	96.7	0	92.3	97.6	95.5
Trucks	0	0	0	0	1	14	0	15	7	0	2	9	0	14	7	21
% Trucks	0	0	0	0	1.5	3.1	0	2.9	3	0	5.9	3.3	0	7.7	2.4	4.5

N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Driveway / Main Street
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Cloudy

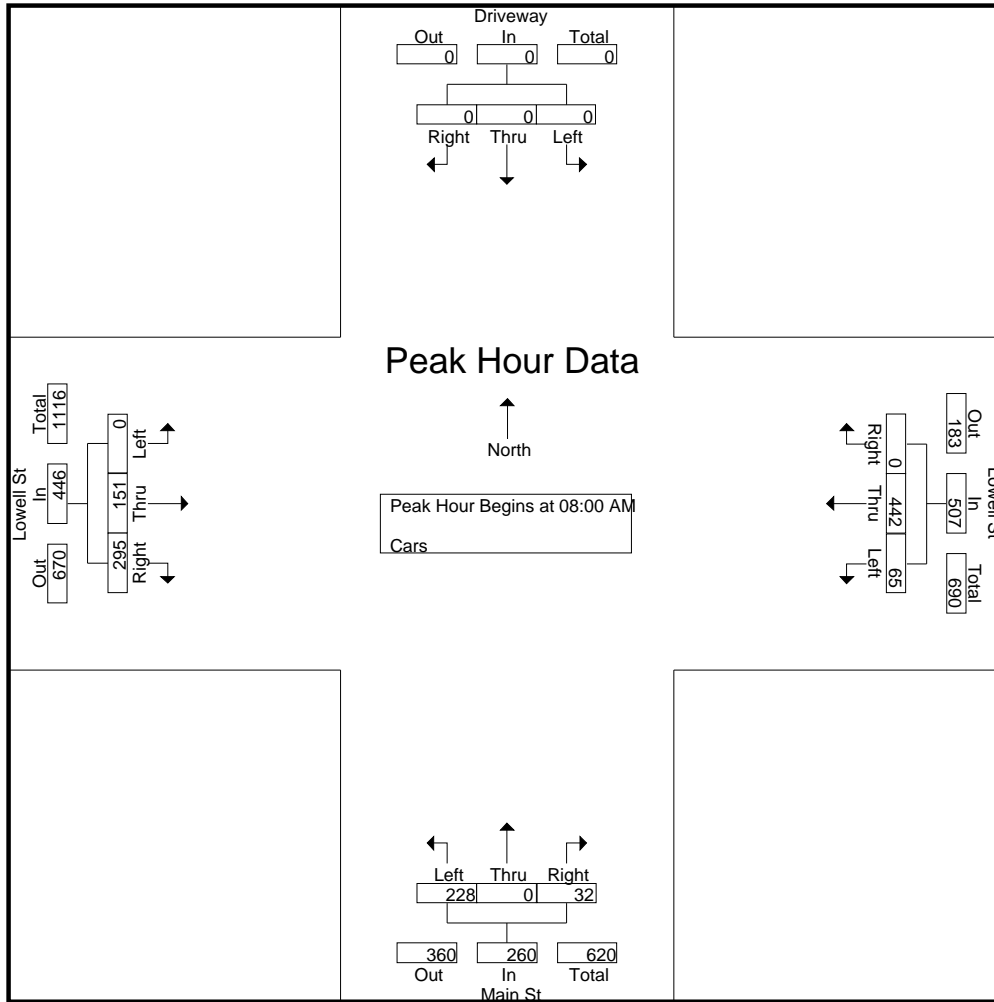
File Name : 85420001
 Site Code : 85420001
 Start Date : 9/29/2020
 Page No : 4

Groups Printed- Cars

Start Time	Driveway From North			Lowell St From East			Main St From South			Lowell St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	0	6	61	0	56	0	2	0	29	63	217
07:15 AM	0	0	0	6	63	0	58	0	5	0	29	26	187
07:30 AM	0	0	0	7	62	0	42	0	8	0	29	55	203
07:45 AM	0	0	0	10	69	0	49	0	9	0	53	67	257
Total	0	0	0	29	255	0	205	0	24	0	140	211	864
08:00 AM	0	0	0	14	93	0	49	0	6	0	37	76	275
08:15 AM	0	0	0	23	105	0	56	0	6	0	40	63	293
08:30 AM	0	0	0	15	146	0	60	0	8	0	37	74	340
08:45 AM	0	0	0	13	98	0	63	0	12	0	37	82	305
Total	0	0	0	65	442	0	228	0	32	0	151	295	1213
Grand Total	0	0	0	94	697	0	433	0	56	0	291	506	2077
Apprch %	0	0	0	11.9	88.1	0	88.5	0	11.5	0	36.5	63.5	
Total %	0	0	0	4.5	33.6	0	20.8	0	2.7	0	14	24.4	

Start Time	Driveway From North				Lowell St From East				Main St From South				Lowell St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	14	93	0	107	49	0	6	55	0	37	76	113	275
08:15 AM	0	0	0	0	23	105	0	128	56	0	6	62	0	40	63	103	293
08:30 AM	0	0	0	0	15	146	0	161	60	0	8	68	0	37	74	111	340
08:45 AM	0	0	0	0	13	98	0	111	63	0	12	75	0	37	82	119	305
Total Volume	0	0	0	0	65	442	0	507	228	0	32	260	0	151	295	446	1213
% App. Total	0	0	0	0	12.8	87.2	0		87.7	0	12.3		0	33.9	66.1		
PHF	.000	.000	.000	.000	.707	.757	.000	.787	.905	.000	.667	.867	.000	.944	.899	.937	.892

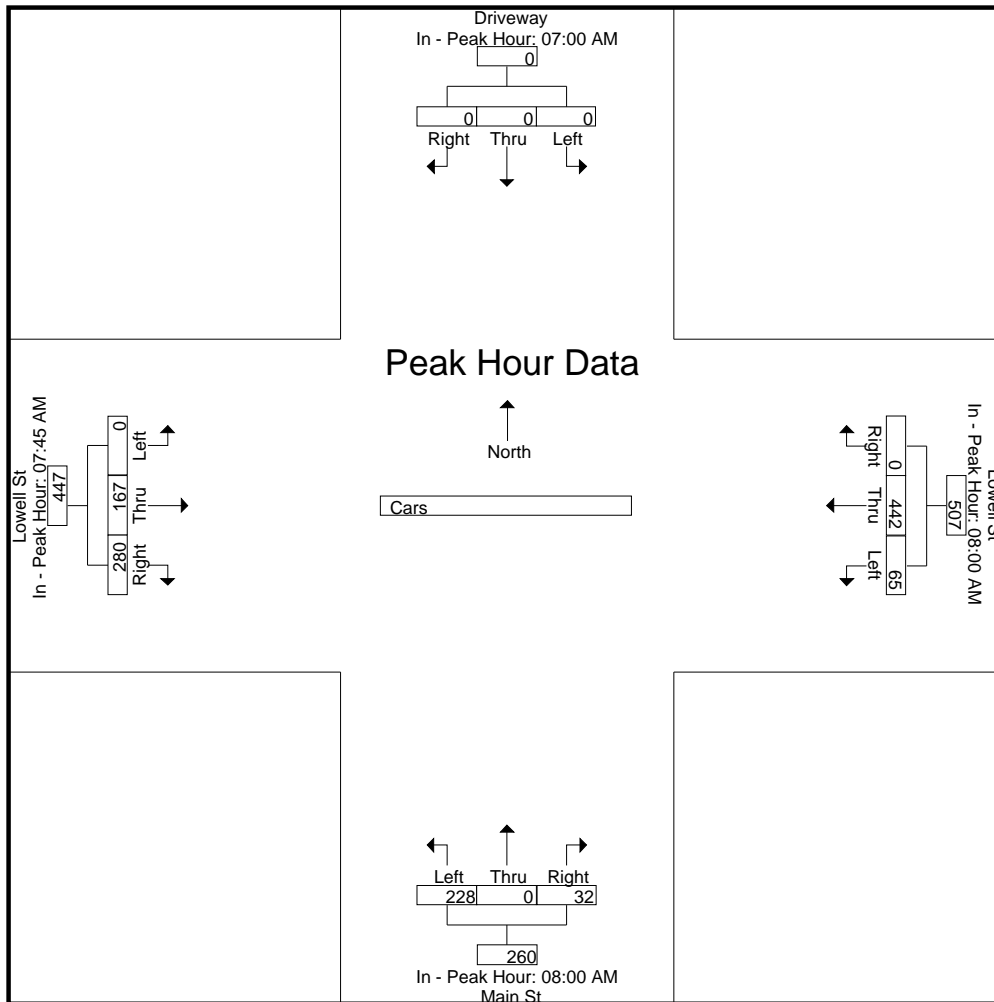
N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				08:00 AM				08:00 AM				07:45 AM			
+0 mins.	0	0	0	0	14	93	0	107	49	0	6	55	0	53	67	120
+15 mins.	0	0	0	0	23	105	0	128	56	0	6	62	0	37	76	113
+30 mins.	0	0	0	0	15	146	0	161	60	0	8	68	0	40	63	103
+45 mins.	0	0	0	0	13	98	0	111	63	0	12	75	0	37	74	111
Total Volume	0	0	0	0	65	442	0	507	228	0	32	260	0	167	280	447
% App. Total	0	0	0	0	12.8	87.2	0		87.7	0	12.3		0	37.4	62.6	
PHF	.000	.000	.000	.000	.707	.757	.000	.787	.905	.000	.667	.867	.000	.788	.921	.931

N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Driveway / Main Street
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Cloudy

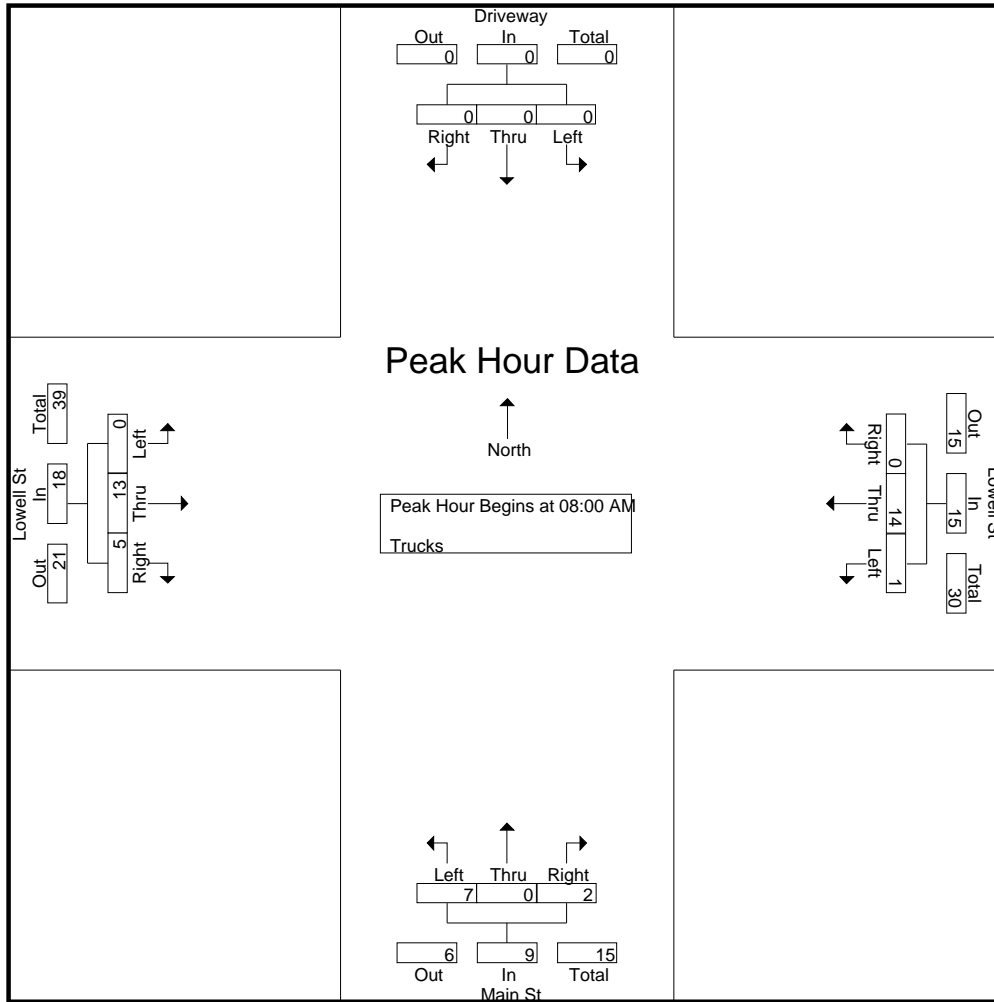
File Name : 85420001
 Site Code : 85420001
 Start Date : 9/29/2020
 Page No : 7

Groups Printed- Trucks

Start Time	Driveway From North			Lowell St From East			Main St From South			Lowell St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	0	0	0	5	0	0	0	0	0	4	1	10
07:15 AM	0	0	0	0	5	0	1	0	0	0	1	1	8
07:30 AM	0	0	0	0	1	0	5	0	0	0	1	1	8
07:45 AM	0	0	0	0	1	0	2	0	0	0	5	2	10
Total	0	0	0	0	12	0	8	0	0	0	11	5	36
08:00 AM	0	0	0	1	4	0	1	0	0	0	2	1	9
08:15 AM	0	0	0	0	1	0	0	0	2	0	4	2	9
08:30 AM	0	0	0	0	3	0	2	0	0	0	3	2	10
08:45 AM	0	0	0	0	6	0	4	0	0	0	4	0	14
Total	0	0	0	1	14	0	7	0	2	0	13	5	42
Grand Total	0	0	0	1	26	0	15	0	2	0	24	10	78
Apprch %	0	0	0	3.7	96.3	0	88.2	0	11.8	0	70.6	29.4	
Total %	0	0	0	1.3	33.3	0	19.2	0	2.6	0	30.8	12.8	

Start Time	Driveway From North				Lowell St From East				Main St From South				Lowell St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	1	4	0	5	1	0	0	1	0	2	1	3	9
08:15 AM	0	0	0	0	0	1	0	1	0	0	2	2	0	4	2	6	9
08:30 AM	0	0	0	0	0	3	0	3	2	0	0	2	0	3	2	5	10
08:45 AM	0	0	0	0	0	6	0	6	4	0	0	4	0	4	0	4	14
Total Volume	0	0	0	0	1	14	0	15	7	0	2	9	0	13	5	18	42
% App. Total	0	0	0	0	6.7	93.3	0	62.5	77.8	0	22.2	56.3	0	72.2	27.8	16.7	75.0
PHF	.000	.000	.000	.000	.250	.583	.000	.625	.438	.000	.250	.563	.000	.813	.625	.750	.750

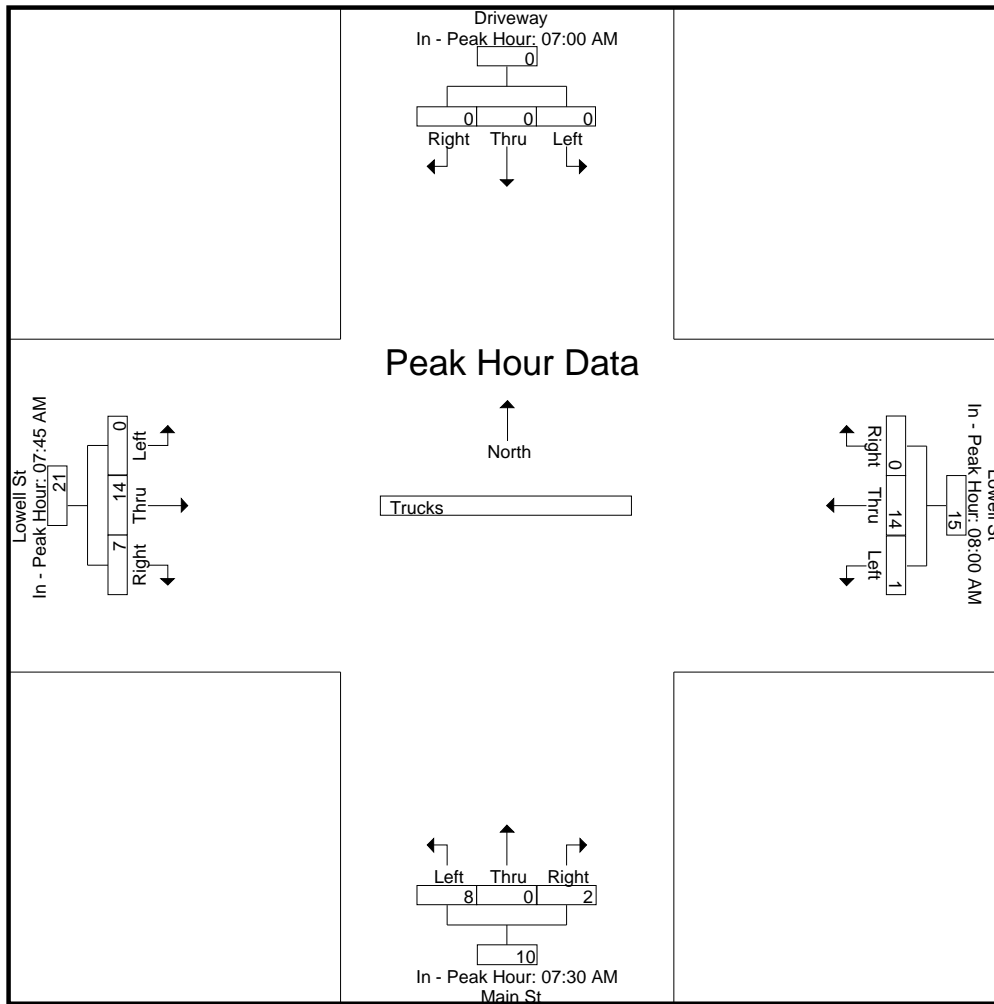
N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				08:00 AM				07:30 AM				07:45 AM			
+0 mins.	0	0	0	0	1	4	0	5	5	0	0	5	0	5	2	7
+15 mins.	0	0	0	0	0	1	0	1	2	0	0	2	0	2	1	3
+30 mins.	0	0	0	0	0	3	0	3	1	0	0	1	0	4	2	6
+45 mins.	0	0	0	0	0	6	0	6	0	0	2	2	0	3	2	5
Total Volume	0	0	0	0	1	14	0	15	8	0	2	10	0	14	7	21
% App. Total	0	0	0	0	6.7	93.3	0		80	0	20		0	66.7	33.3	
PHF	.000	.000	.000	.000	.250	.583	.000	.625	.400	.000	.250	.500	.000	.700	.875	.750

N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts
978-664-2565

File Name : 85420001
Site Code : 85420001
Start Date : 9/29/2020
Page No : 10

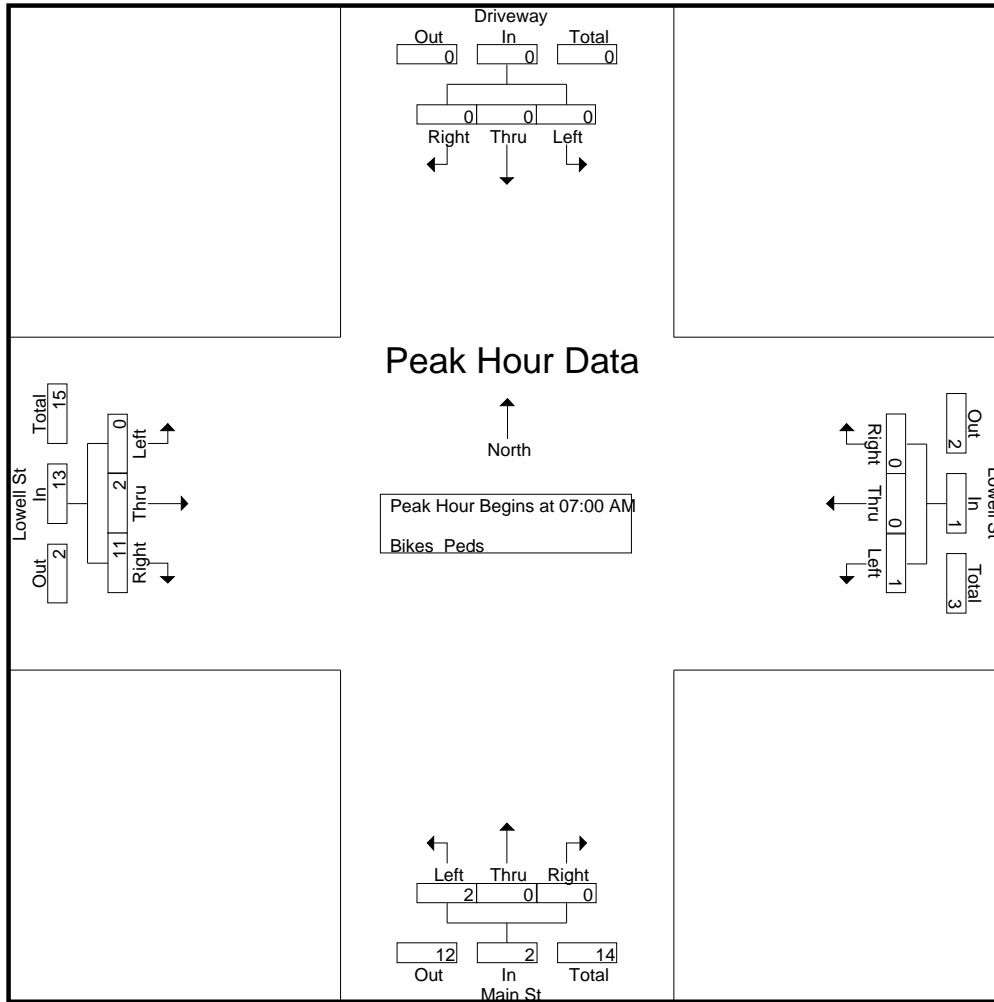
N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy

Groups Printed- Bikes Peds

Start Time	Driveway From North				Lowell St From East				Main St From South				Lowell St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	1	0	0	0	0	1	0	0	0	0	1	2	0	1	4	5
07:15 AM	0	0	0	1	0	0	0	1	1	0	0	1	0	0	1	0	3	2	5
07:30 AM	0	0	0	0	1	0	0	0	0	0	0	2	0	1	3	0	2	5	7
07:45 AM	0	0	0	1	0	0	0	1	0	0	0	1	0	0	5	0	3	5	8
Total	0	0	0	3	1	0	0	2	2	0	0	4	0	2	11	0	9	16	25
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0	2	2	4
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	2	1	3
08:30 AM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	2	1	3
08:45 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	1	2
Total	0	0	0	1	0	0	0	1	1	0	0	5	0	1	3	0	7	5	12
Grand Total	0	0	0	4	1	0	0	3	3	0	0	9	0	3	14	0	16	21	37
Apprch %	0	0	0		100	0	0		100	0	0		0	17.6	82.4				
Total %	0	0	0		4.8	0	0		14.3	0	0		0	14.3	66.7		43.2	56.8	

Start Time	Driveway From North				Lowell St From East				Main St From South				Lowell St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	2	3	4
07:15 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	2
07:30 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	3	4	5
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5
Total Volume	0	0	0	0	1	0	0	1	2	0	0	2	0	2	11	13	16
% App. Total	0	0	0		100	0	0		100	0	0		0	15.4	84.6		
PHF	.000	.000	.000	.000	.250	.000	.000	.250	.500	.000	.000	.500	.000	.500	.550	.650	.800

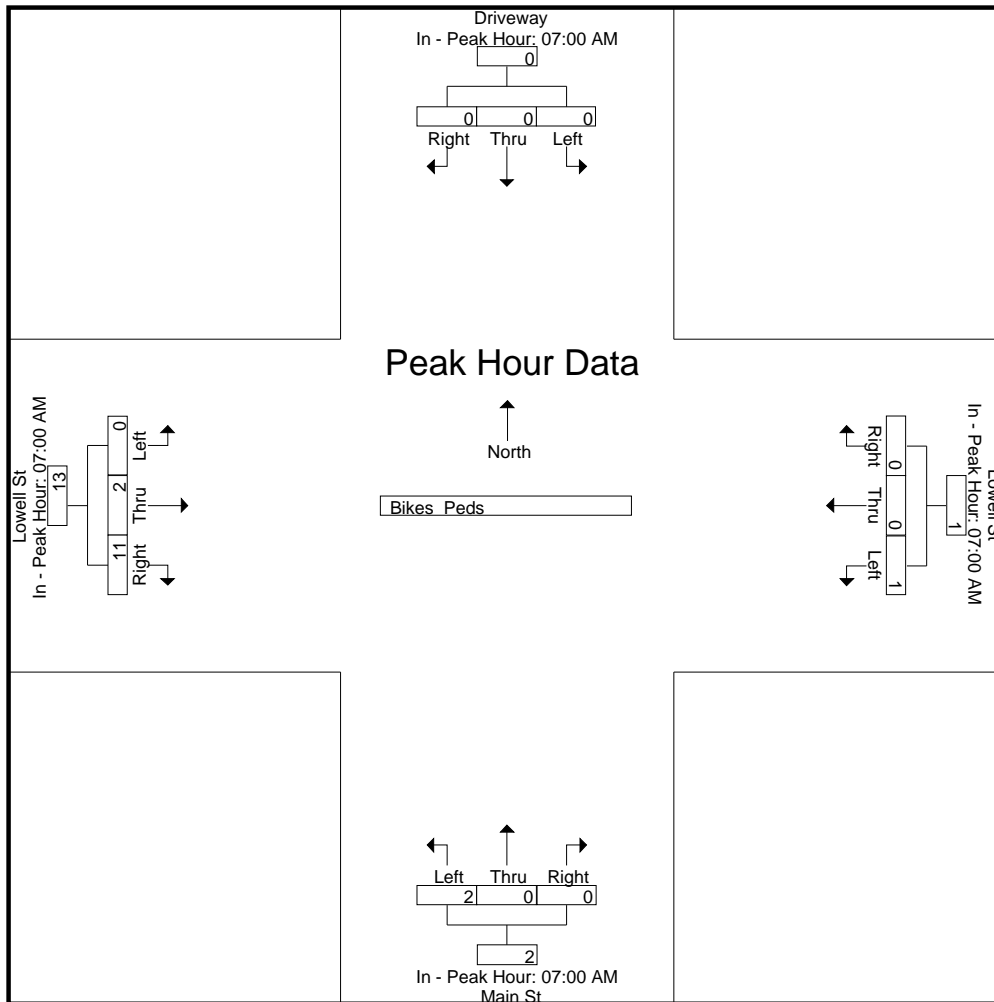
N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	1	0	0	1	0	1	2	3
+15 mins.	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1
+30 mins.	0	0	0	0	1	0	0	1	0	0	0	0	0	1	3	4
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
Total Volume	0	0	0	0	1	0	0	1	2	0	0	2	0	2	11	13
% App. Total	0	0	0	0	100	0	0	0	100	0	0	0	0	15.4	84.6	0
PHF	.000	.000	.000	.000	.250	.000	.000	.250	.500	.000	.000	.500	.000	.500	.550	.650

N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Driveway / Main Street
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Cloudy

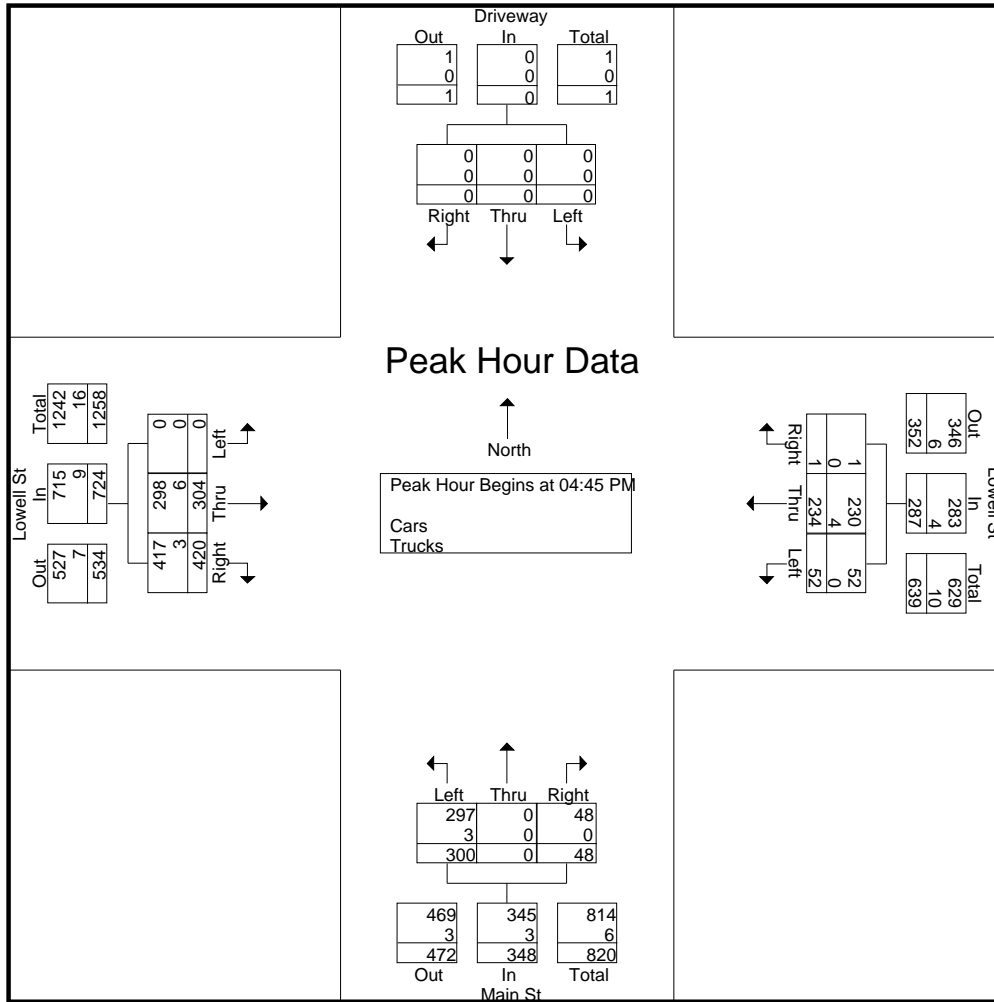
File Name : 85420001
 Site Code : 85420001
 Start Date : 9/29/2020
 Page No : 1

Groups Printed- Cars - Trucks

Start Time	Driveway From North			Lowell St From East			Main St From South			Lowell St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	0	0	14	63	0	56	0	10	0	75	83	301
04:15 PM	0	0	0	16	45	0	60	0	10	0	68	96	295
04:30 PM	0	0	0	16	61	0	79	0	9	0	75	91	331
04:45 PM	0	0	0	15	64	1	76	0	14	0	74	86	330
Total	0	0	0	61	233	1	271	0	43	0	292	356	1257
05:00 PM	0	0	0	12	47	0	77	0	7	0	78	116	337
05:15 PM	0	0	0	12	66	0	66	0	12	0	68	104	328
05:30 PM	0	0	0	13	57	0	81	0	15	0	84	114	364
05:45 PM	0	0	0	9	45	0	66	0	6	0	65	98	289
Total	0	0	0	46	215	0	290	0	40	0	295	432	1318
Grand Total	0	0	0	107	448	1	561	0	83	0	587	788	2575
Apprch %	0	0	0	19.2	80.6	0.2	87.1	0	12.9	0	42.7	57.3	
Total %	0	0	0	4.2	17.4	0	21.8	0	3.2	0	22.8	30.6	
Cars	0	0	0	107	443	1	555	0	83	0	575	783	2547
% Cars	0	0	0	100	98.9	100	98.9	0	100	0	98	99.4	98.9
Trucks	0	0	0	0	5	0	6	0	0	0	12	5	28
% Trucks	0	0	0	0	1.1	0	1.1	0	0	0	2	0.6	1.1

Start Time	Driveway From North				Lowell St From East				Main St From South				Lowell St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	15	64	1	80	76	0	14	90	0	74	86	160	330
05:00 PM	0	0	0	0	12	47	0	59	77	0	7	84	0	78	116	194	337
05:15 PM	0	0	0	0	12	66	0	78	66	0	12	78	0	68	104	172	328
05:30 PM	0	0	0	0	13	57	0	70	81	0	15	96	0	84	114	198	364
Total Volume	0	0	0	0	52	234	1	287	300	0	48	348	0	304	420	724	1359
% App. Total	0	0	0	0	18.1	81.5	0.3		86.2	0	13.8		0	42	58		
PHF	.000	.000	.000	.000	.867	.886	.250	.897	.926	.000	.800	.906	.000	.905	.905	.914	.933
Cars	0	0	0	0	52	230	1	283	297	0	48	345	0	298	417	715	1343
% Cars	0	0	0	0	100	98.3	100	98.6	99.0	0	100	99.1	0	98.0	99.3	98.8	98.8
Trucks	0	0	0	0	0	4	0	4	3	0	0	3	0	6	3	9	16
% Trucks	0	0	0	0	0	1.7	0	1.4	1.0	0	0	0.9	0	2.0	0.7	1.2	1.2

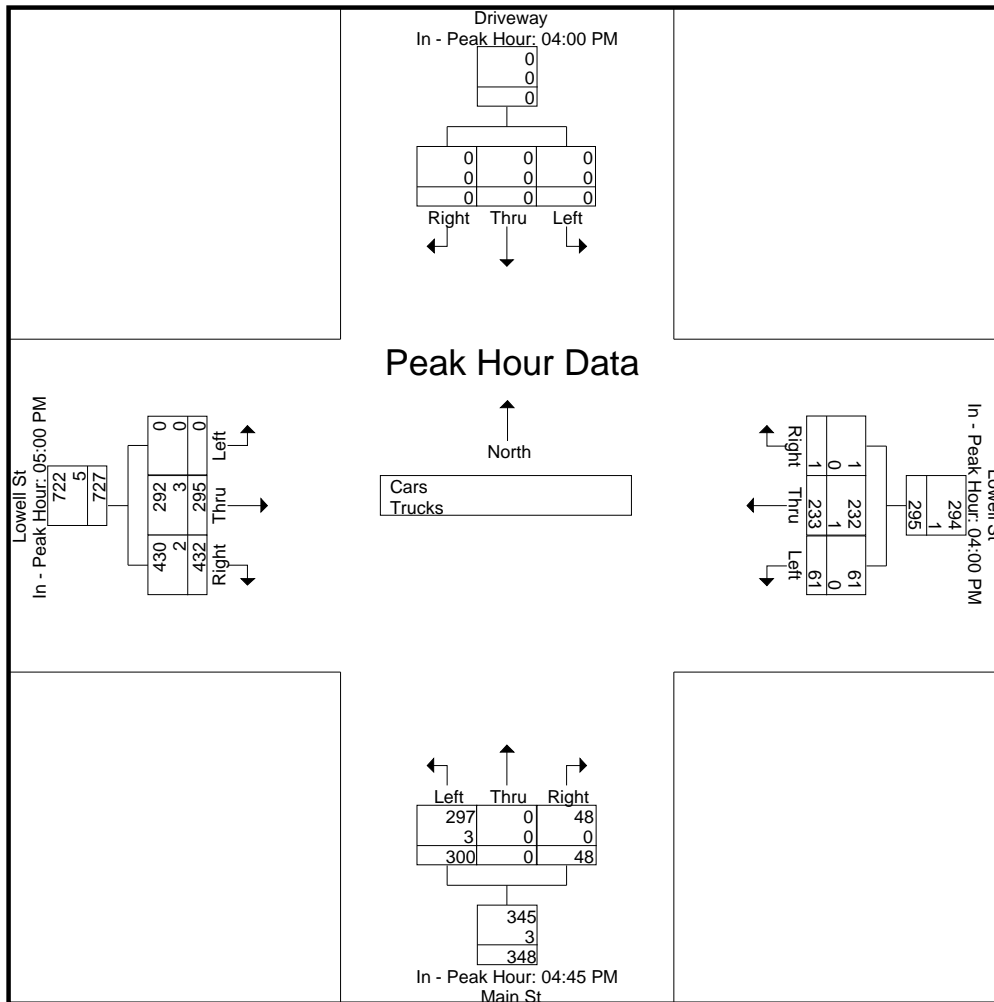
N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:45 PM				05:00 PM							
+0 mins.	0	0	0	0	14	63	0	77	76	0	14	90	0	78	116	194
+15 mins.	0	0	0	0	16	45	0	61	77	0	7	84	0	68	104	172
+30 mins.	0	0	0	0	16	61	0	77	66	0	12	78	0	84	114	198
+45 mins.	0	0	0	0	15	64	1	80	81	0	15	96	0	65	98	163
Total Volume	0	0	0	0	61	233	1	295	300	0	48	348	0	295	432	727
% App. Total	0	0	0	0	20.7	79	0.3		86.2	0	13.8		0	40.6	59.4	
PHF	.000	.000	.000	.000	.953	.910	.250	.922	.926	.000	.800	.906	.000	.878	.931	.918
Cars	0	0	0	0	61	232	1	294	297	0	48	345	0	292	430	722
% Cars	0	0	0	0	100	99.6	100	99.7	99	0	100	99.1	0	99	99.5	99.3
Trucks	0	0	0	0	0	1	0	1	3	0	0	3	0	3	2	5
% Trucks	0	0	0	0	0	0.4	0	0.3	1	0	0	0.9	0	1	0.5	0.7

N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Driveway / Main Street
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Cloudy

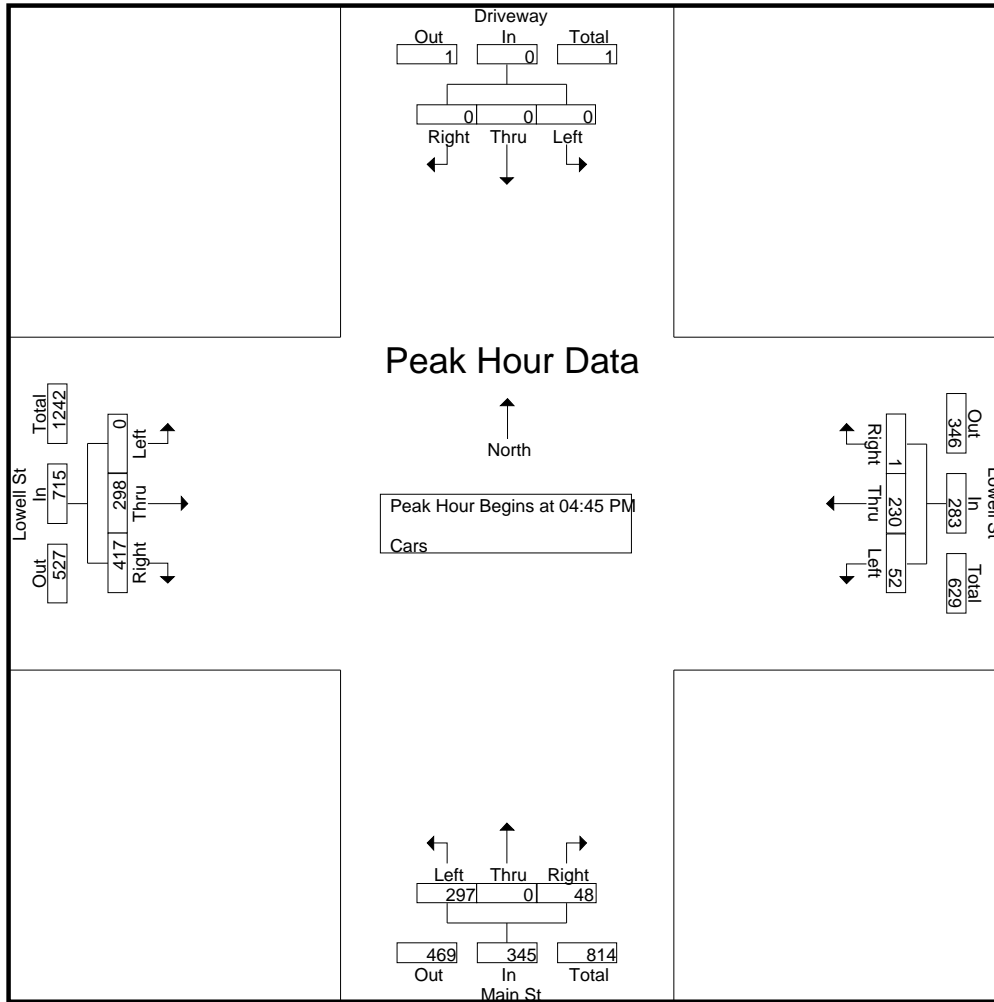
File Name : 85420001
 Site Code : 85420001
 Start Date : 9/29/2020
 Page No : 4

Groups Printed- Cars

Start Time	Driveway From North			Lowell St From East			Main St From South			Lowell St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	0	0	14	62	0	55	0	10	0	72	83	296
04:15 PM	0	0	0	16	45	0	59	0	10	0	66	95	291
04:30 PM	0	0	0	16	61	0	79	0	9	0	75	90	330
04:45 PM	0	0	0	15	64	1	76	0	14	0	70	85	325
Total	0	0	0	61	232	1	269	0	43	0	283	353	1242
05:00 PM	0	0	0	12	47	0	75	0	7	0	78	116	335
05:15 PM	0	0	0	12	64	0	65	0	12	0	68	103	324
05:30 PM	0	0	0	13	55	0	81	0	15	0	82	113	359
05:45 PM	0	0	0	9	45	0	65	0	6	0	64	98	287
Total	0	0	0	46	211	0	286	0	40	0	292	430	1305
Grand Total	0	0	0	107	443	1	555	0	83	0	575	783	2547
Apprch %	0	0	0	19.4	80.4	0.2	87	0	13	0	42.3	57.7	
Total %	0	0	0	4.2	17.4	0	21.8	0	3.3	0	22.6	30.7	

Start Time	Driveway From North				Lowell St From East				Main St From South				Lowell St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	15	64	1	80	76	0	14	90	0	70	85	155	325
05:00 PM	0	0	0	0	12	47	0	59	75	0	7	82	0	78	116	194	335
05:15 PM	0	0	0	0	12	64	0	76	65	0	12	77	0	68	103	171	324
05:30 PM	0	0	0	0	13	55	0	68	81	0	15	96	0	82	113	195	359
Total Volume	0	0	0	0	52	230	1	283	297	0	48	345	0	298	417	715	1343
% App. Total	0	0	0	0	18.4	81.3	0.4	283	86.1	0	13.9	345	0	41.7	58.3	715	1343
PHF	.000	.000	.000	.000	.867	.898	.250	.884	.917	.000	.800	.898	.000	.909	.899	.917	.935

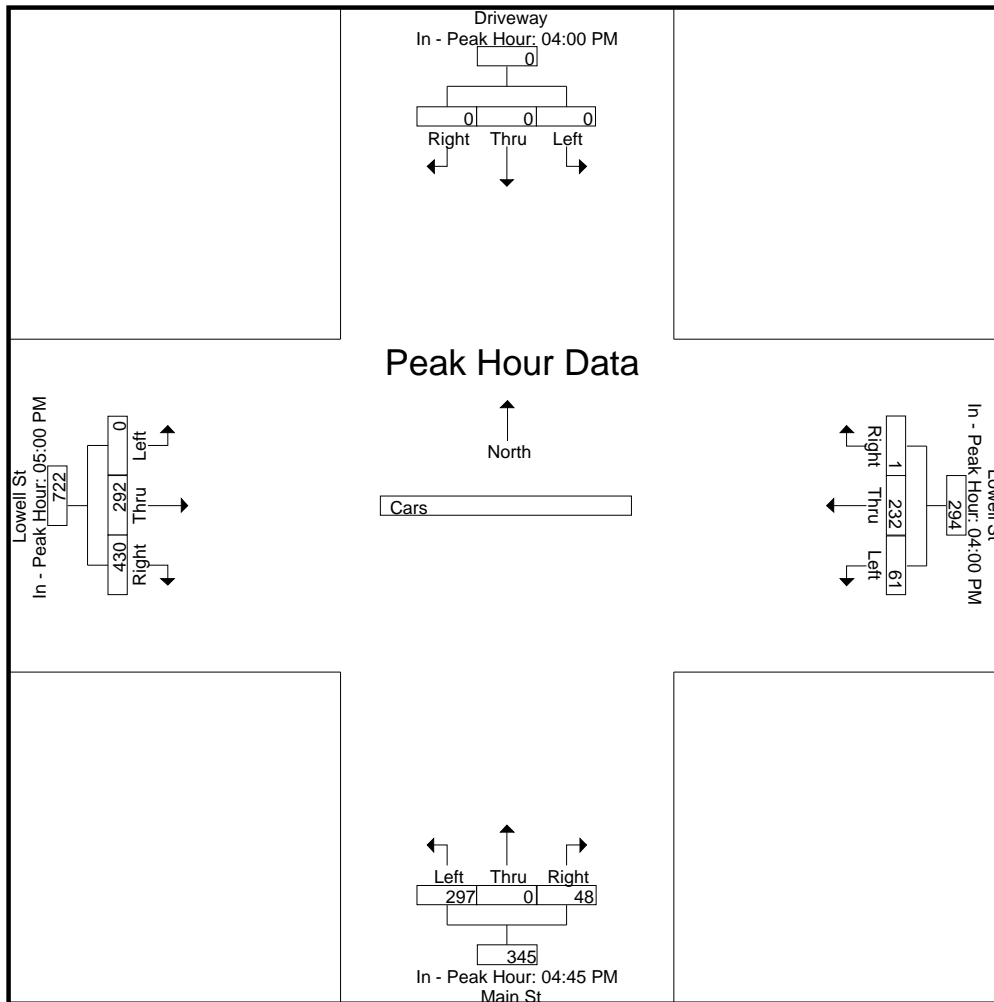
N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:45 PM				05:00 PM							
+0 mins.	0	0	0	0	14	62	0	76	76	0	14	90	0	78	116	194
+15 mins.	0	0	0	0	16	45	0	61	75	0	7	82	0	68	103	171
+30 mins.	0	0	0	0	16	61	0	77	65	0	12	77	0	82	113	195
+45 mins.	0	0	0	0	15	64	1	80	81	0	15	96	0	64	98	162
Total Volume	0	0	0	0	61	232	1	294	297	0	48	345	0	292	430	722
% App. Total	0	0	0	0	20.7	78.9	0.3		86.1	0	13.9		0	40.4	59.6	
PHF	.000	.000	.000	.000	.953	.906	.250	.919	.917	.000	.800	.898	.000	.890	.927	.926

N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts
978-664-2565

N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy

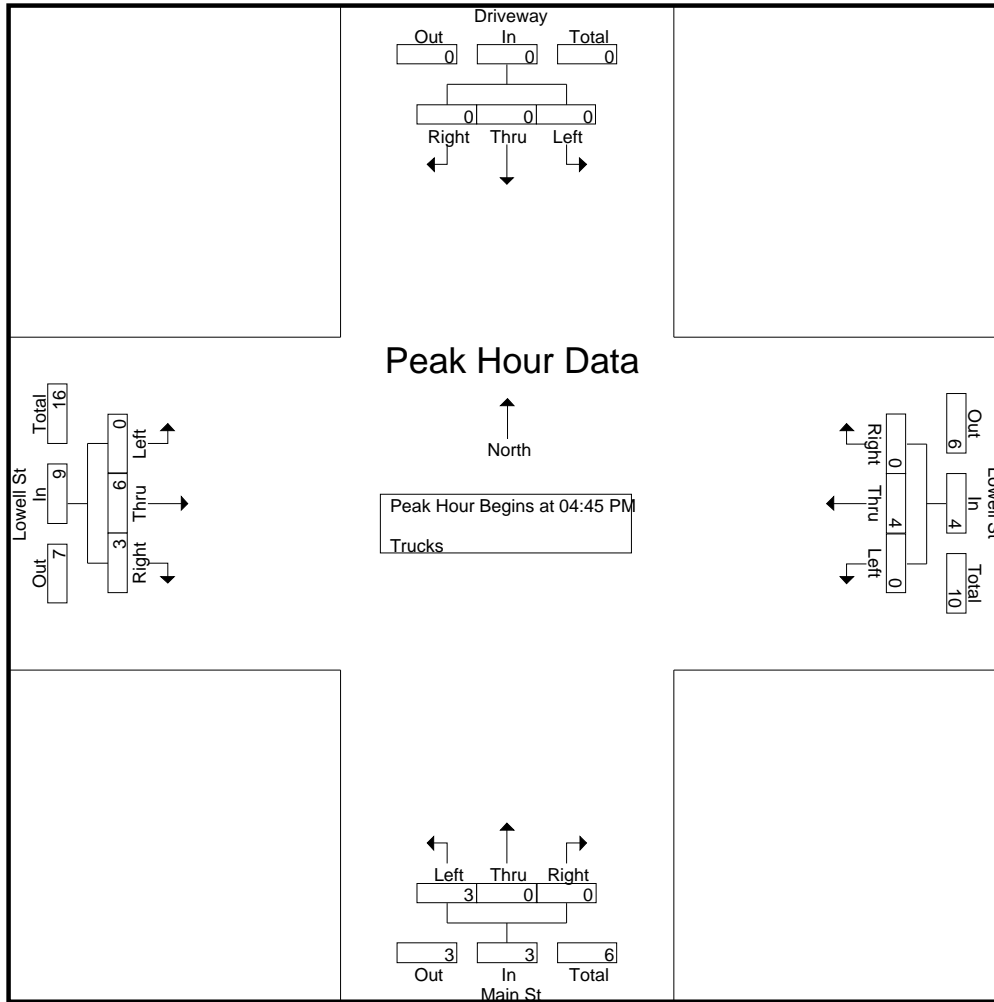
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Site Code : 85420001
Start Date : 9/29/2020
Page No : 7

Groups Printed- Trucks

Start Time	Driveway From North			Lowell St From East			Main St From South			Lowell St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	0	0	0	1	0	1	0	0	0	3	0	5
04:15 PM	0	0	0	0	0	0	1	0	0	0	2	1	4
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	4	1	5
Total	0	0	0	0	1	0	2	0	0	0	9	3	15
05:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	2
05:15 PM	0	0	0	0	2	0	1	0	0	0	0	1	4
05:30 PM	0	0	0	0	2	0	0	0	0	0	2	1	5
05:45 PM	0	0	0	0	0	0	1	0	0	0	1	0	2
Total	0	0	0	0	4	0	4	0	0	0	3	2	13
Grand Total	0	0	0	0	5	0	6	0	0	0	12	5	28
Apprch %	0	0	0	0	100	0	100	0	0	0	70.6	29.4	
Total %	0	0	0	0	17.9	0	21.4	0	0	0	42.9	17.9	

Start Time	Driveway From North				Lowell St From East				Main St From South				Lowell St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	5	5
05:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	2
05:15 PM	0	0	0	0	0	2	0	2	1	0	0	1	0	0	1	1	4
05:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	2	1	3	5
Total Volume	0	0	0	0	0	4	0	4	3	0	0	3	0	6	3	9	16
% App. Total	0	0	0	0	0	100	0	500	100	0	0	375	0	66.7	33.3	450	800
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.375	.000	.000	.375	.000	.375	.750	.450	.800

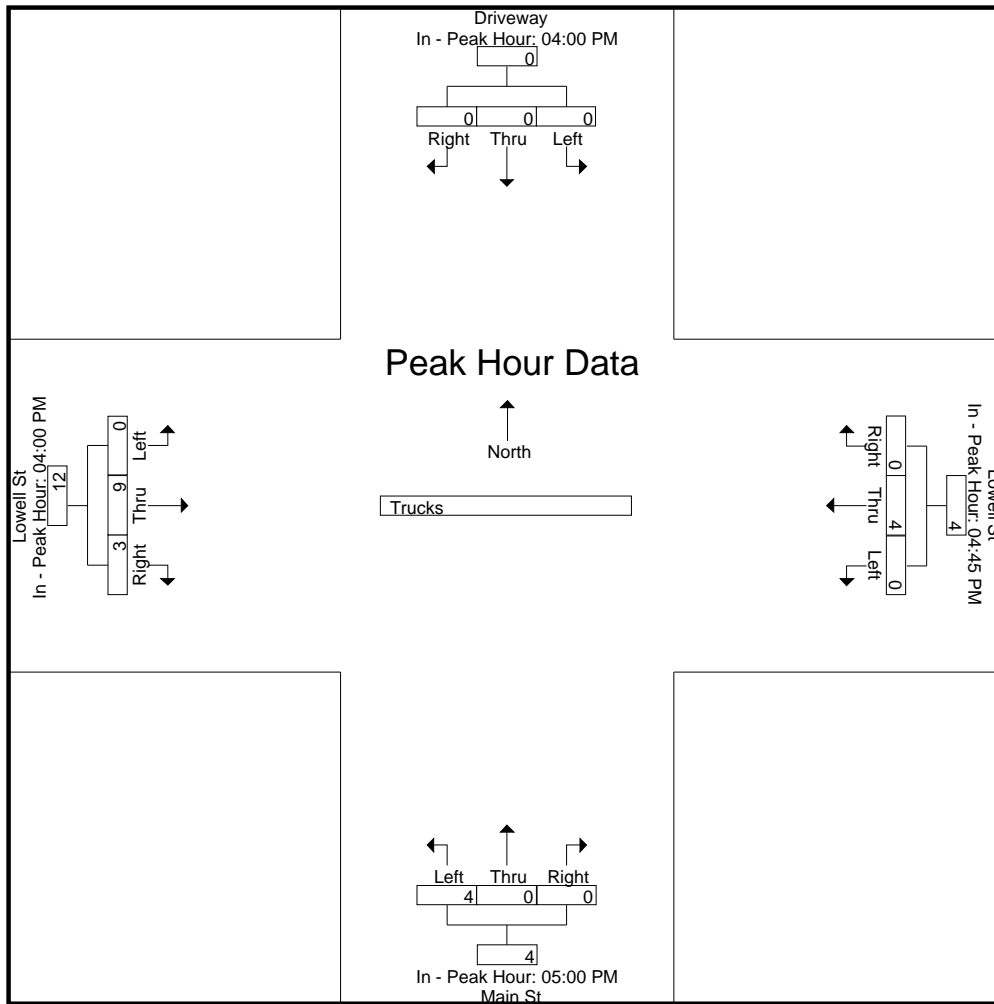
N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:45 PM				05:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	2	0	0	2	0	3	0	3
+15 mins.	0	0	0	0	0	0	0	0	1	0	0	1	0	2	1	3
+30 mins.	0	0	0	0	0	2	0	2	0	0	0	0	0	0	1	1
+45 mins.	0	0	0	0	0	2	0	2	1	0	0	1	0	4	1	5
Total Volume	0	0	0	0	0	4	0	4	4	0	0	4	0	9	3	12
% App. Total	0	0	0	0	0	100	0	0	100	0	0	0	0	75	25	0
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.500	.000	.000	.500	.000	.563	.750	.600

N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Accurate Counts

978-664-2565

N/S Street : Driveway / Main Street
 E/W Street : Lowell Street
 City/State : Wakefield, MA
 Weather : Cloudy

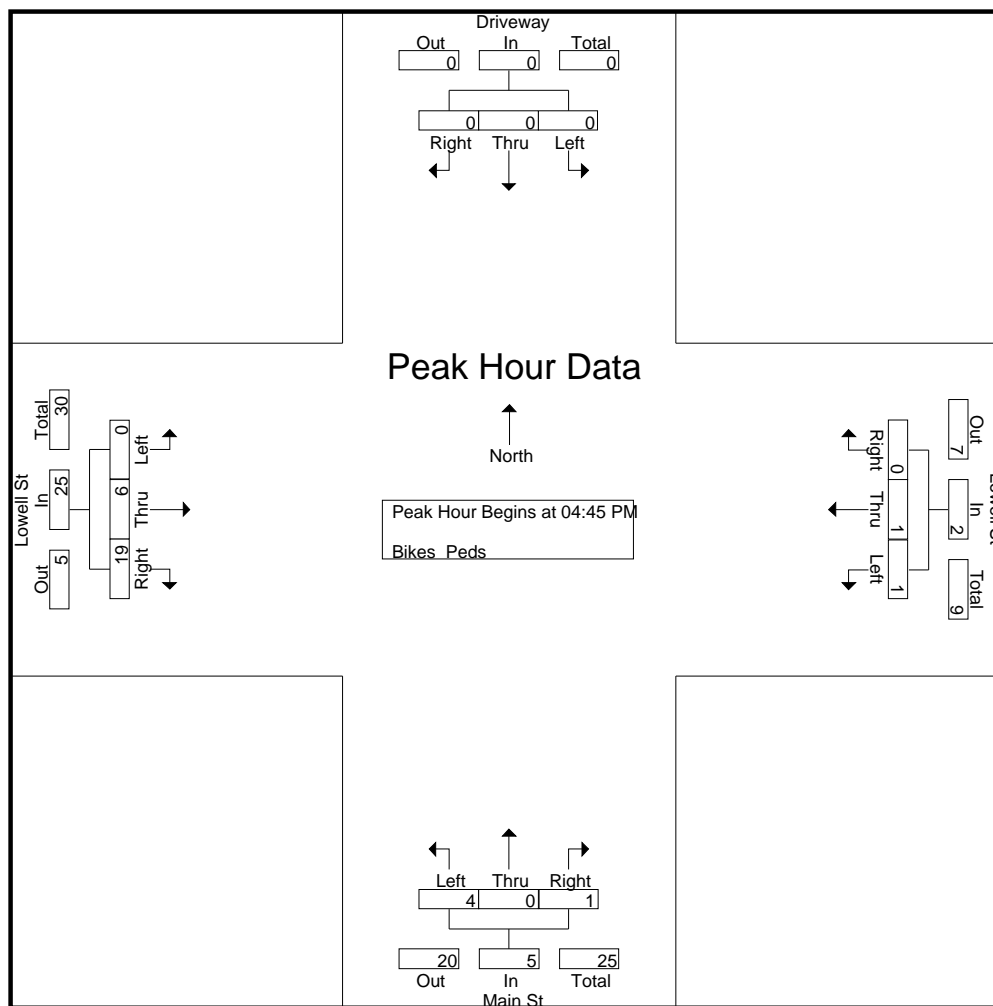
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 Site Code : 85420001
 Start Date : 9/29/2020
 Page No : 10

Groups Printed- Bikes Peds

Start Time	Driveway From North				Lowell St From East				Main St From South				Lowell St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	1	1	3	4
04:15 PM	0	0	0	1	0	0	0	1	1	0	1	2	0	1	2	2	6	5	11
04:30 PM	0	0	0	3	0	0	0	2	0	0	0	1	0	0	3	0	6	3	9
04:45 PM	0	0	0	0	0	0	0	2	2	0	0	2	0	2	7	0	4	11	15
Total	0	0	0	4	0	0	0	5	4	0	2	5	0	3	13	3	17	22	39
05:00 PM	0	0	0	0	0	0	0	1	0	0	1	1	0	1	4	0	2	6	8
05:15 PM	0	0	0	1	0	0	0	0	1	0	0	2	0	3	3	0	3	7	10
05:30 PM	0	0	0	0	1	1	0	0	1	0	0	2	0	0	5	0	2	8	10
05:45 PM	0	0	0	1	0	0	0	1	0	0	0	1	0	1	3	2	5	4	9
Total	0	0	0	2	1	1	0	2	2	0	1	6	0	5	15	2	12	25	37
Grand Total	0	0	0	6	1	1	0	7	6	0	3	11	0	8	28	5	29	47	76
Apprch %	0	0	0		50	50	0		66.7	0	33.3		0	22.2	77.8				
Total %	0	0	0		2.1	2.1	0		12.8	0	6.4		0	17	59.6		38.2	61.8	

Start Time	Driveway From North				Lowell St From East				Main St From South				Lowell St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	2	7	9	11
05:00 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	1	4	5	6
05:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	3	3	6	7
05:30 PM	0	0	0	0	1	1	0	2	1	0	0	1	0	0	5	5	8
Total Volume	0	0	0	0	1	1	0	2	4	0	1	5	0	6	19	25	32
% App. Total	0	0	0		50	50	0		80	0	20		0	24	76		
PHF	.000	.000	.000	.000	.250	.250	.000	.250	.500	.000	.250	.625	.000	.500	.679	.694	.727

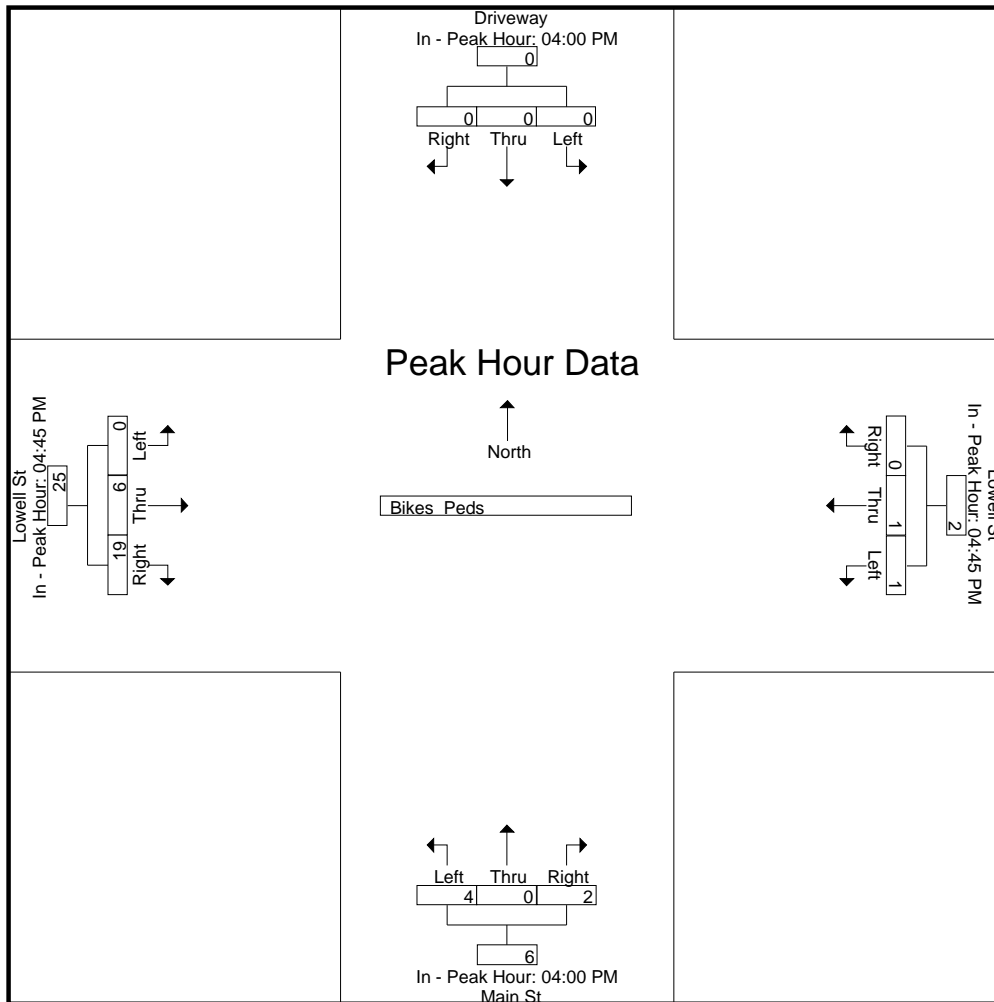
N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:45 PM				04:00 PM				04:45 PM			
+0 mins.	0	0	0	0	0	0	0	0	1	0	1	2	0	2	7	9
+15 mins.	0	0	0	0	0	0	0	0	1	0	1	2	0	1	4	5
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	6
+45 mins.	0	0	0	0	1	1	0	2	2	0	0	2	0	0	5	5
Total Volume	0	0	0	0	1	1	0	2	4	0	2	6	0	6	19	25
% App. Total	0	0	0	0	50	50	0		66.7	0	33.3		0	24	76	
PHF	.000	.000	.000	.000	.250	.250	.000	.250	.500	.000	.500	.750	.000	.500	.679	.694

N/S Street : Driveway / Main Street
E/W Street : Lowell Street
City/State : Wakefield, MA
Weather : Cloudy

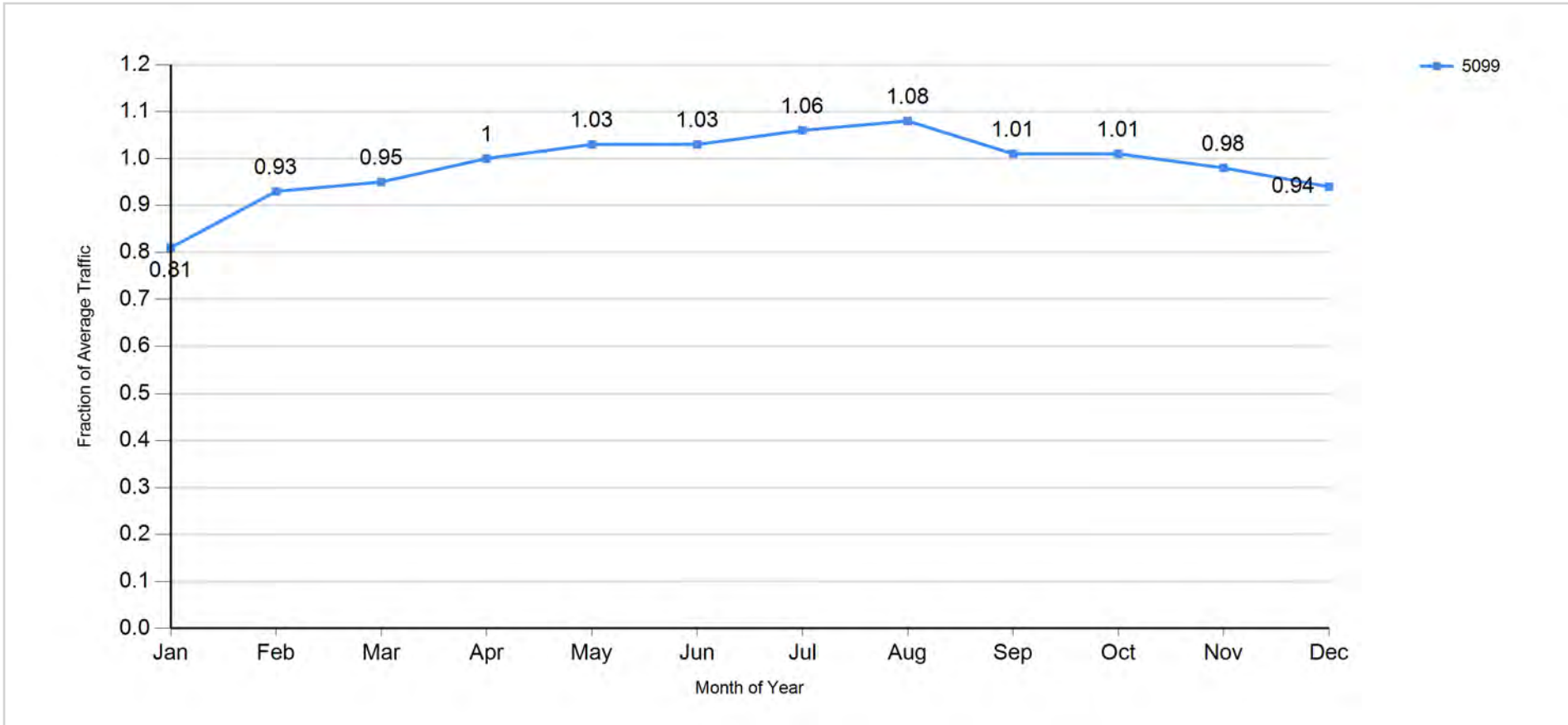


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 Start Date: 7/26/2018 Start Date: 2/11/2020
 Start Time: 7:00:00 AM Start Time: 7:00:00 AM
 Site Code: 79770005 Site Code: 79770002
 Comment 1: N/S Street : Quannapowitt Parkway Comment 1: N/S Street : Quannapowitt Parkway
 Comment 2: E/W Street: Lowell Street Comment 2: E/W Street : Lowell Street
 Comment 3: City/State : Wakefield, MA Comment 3: City/State : Wakefield, MA
 Comment 4: Weather : Clear Comment 4: Weather : Cloudy

Start Time	Jul-18						Feb-20							
	Lowell St		Quannapowitt		Lowell St		Lowell St		Quannapowitt		Lowell St			
	Left	Thru	Left	Right	Thru	Right		Left	Thru	Left	Right	Thru	Right	
07:00 AM	10	110	1	4	90	8		8	119	2	0	130	4	
07:15 AM	9	145	2	2	135	14		13	137	0	0	157	6	
07:30 AM	22	151	0	2	144	17		23	140	1	0	135	9	
07:45 AM	23	147	5	6	148	21		13	152	4	1	163	16	
08:00 AM	16	141	2	4	135	19		16	128	1	0	147	11	
08:15 AM	14	145	5	6	142	27		17	134	3	0	135	25	
08:30 AM	12	138	3	7	139	13		24	142	5	0	138	16	
08:45 AM	17	128	4	4	150	21		16	100	2	1	123	21	
	123	1105	22	35	1083	140	2508	130	1052	18	2	1128	108	2438
04:00 PM	5	157	5	19	170	3		4	127	2	1	146	1	
04:15 PM	3	139	5	10	168	6		4	143	6	2	162	4	
04:30 PM	9	135	6	20	222	1		6	121	5	0	136	7	
04:45 PM	7	133	7	26	215	4		2	117	3	2	185	1	
05:00 PM	6	145	18	29	168	2		5	147	4	0	157	2	
05:15 PM	8	149	11	22	213	2		3	122	6	1	218	2	
05:30 PM	10	121	6	18	220	5		3	122	9	2	196	1	
05:45 PM	6	112	9	34	229	4		4	114	8	5	195	1	
	54	1091	67	178	1605	27	3022	31	1013	43	13	1395	19	2514

SEASONAL ADJUSTMENT DATA

Traffic Pattern by Month for 1/1/2019 - 12/31/2019



Massachusetts Highway Department

Traffic Pattern by Month for 1/1/2019 - 12/31/2019

Factor Group	Station	Weight	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
U1-Essex	5099	0	0.814	0.934	0.953	1.005	1.029	1.028	1.062	1.082	1.011	1.015	0.977	0.936
Average of Weighted Factors			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

PUBLIC TRANSPORTATION SCHEDULES



Monday to Friday

Inbound to Boston			AM			PM			
ZONE	STATION	TRAIN #	7200	1200	1202	1204	1206	1208	1210
	Bikes Allowed								
7	Haverhill	♻️	5:15	7:15	10:20	1:25	4:20	7:15	10:05
7	Bradford	♻️	5:18	7:18	10:23	1:28	4:23	7:18	10:08
6	Lawrence	♻️	5:27	7:27	10:32	1:37	4:32	7:27	10:17
5	Andover	♻️	5:32	7:32	10:37	1:42	4:37	7:33	10:23
4	Ballardvale	♻️	5:37	7:37	10:42	1:47	4:42	7:37	10:27
3	North Wilmington		5:44	7:44	10:49	1:54	4:49	7:44	10:34
2	Reading	♻️	5:50	7:50	10:56	2:01	4:55	7:50	10:40
2	Wakefield		5:55	7:55	11:01	2:06	5:00	7:55	10:45
2	Greenwood		5:59	7:59	11:05	2:10	5:04	7:59	10:49
1	Melrose Highlands	♻️	6:02	8:02	11:08	2:13	5:07	8:02	10:52
1	Melrose/Cedar Park		6:04	8:04	11:10	2:15	5:09	8:04	10:54
1	Wyoming Hill		6:06	8:06	11:12	2:17	5:11	8:06	10:56
1A	Malden Center	♻️	6:10	8:10	11:16	2:21	5:15	8:10	11:00
1A	North Station	♻️	6:21	8:21	11:27	2:32	5:26	8:21	11:11

Monday to Friday

Outbound from Boston			AM		PM			
ZONE	STATION	TRAIN #	1201	1203	1205	1207	1209	1211
	Bikes Allowed							
1A	North Station	♻️	8:40	11:55	2:50	5:20	8:35	11:30
1A	Malden Center	♻️	8:50	12:05	3:00	5:30	8:45	11:40
1	Wyoming Hill		8:54	12:09	3:04	5:34	8:49	11:44
1	Melrose/Cedar Park		8:56	12:11	3:06	5:36	8:51	11:46
1	Melrose Highlands	♻️	8:59	12:14	3:09	5:39	8:54	11:49
2	Greenwood		9:02	12:17	3:12	5:42	8:57	11:52
2	Wakefield		9:05	12:20	3:15	5:45	9:00	11:55
2	Reading	♻️	9:11	12:26	3:21	5:51	9:06	12:01
3	North Wilmington		9:17	12:32	3:27	5:57	9:12	12:07
4	Ballardvale	♻️	9:24	12:39	3:34	6:04	9:19	12:14
5	Andover	♻️	9:29	12:44	3:39	6:09	9:24	12:19
6	Lawrence	♻️	9:36	12:51	3:46	6:16	9:31	12:26
7	Bradford	♻️	9:46	1:01	3:56	6:26	9:41	12:36
7	Haverhill	♻️	9:49	1:04	3:59	6:29	9:44	12:39

Keep in Mind:

This schedule will be effective from January 23, 2021 and will replace the schedule of November 2, 2020.

Bikes: Bicycles are allowed on all trains.

High level platform and bridge plate available. Visit mbta.com/accessibility for more information.

Effective Mar 14, 2021

**Route/
Schedule
Change**

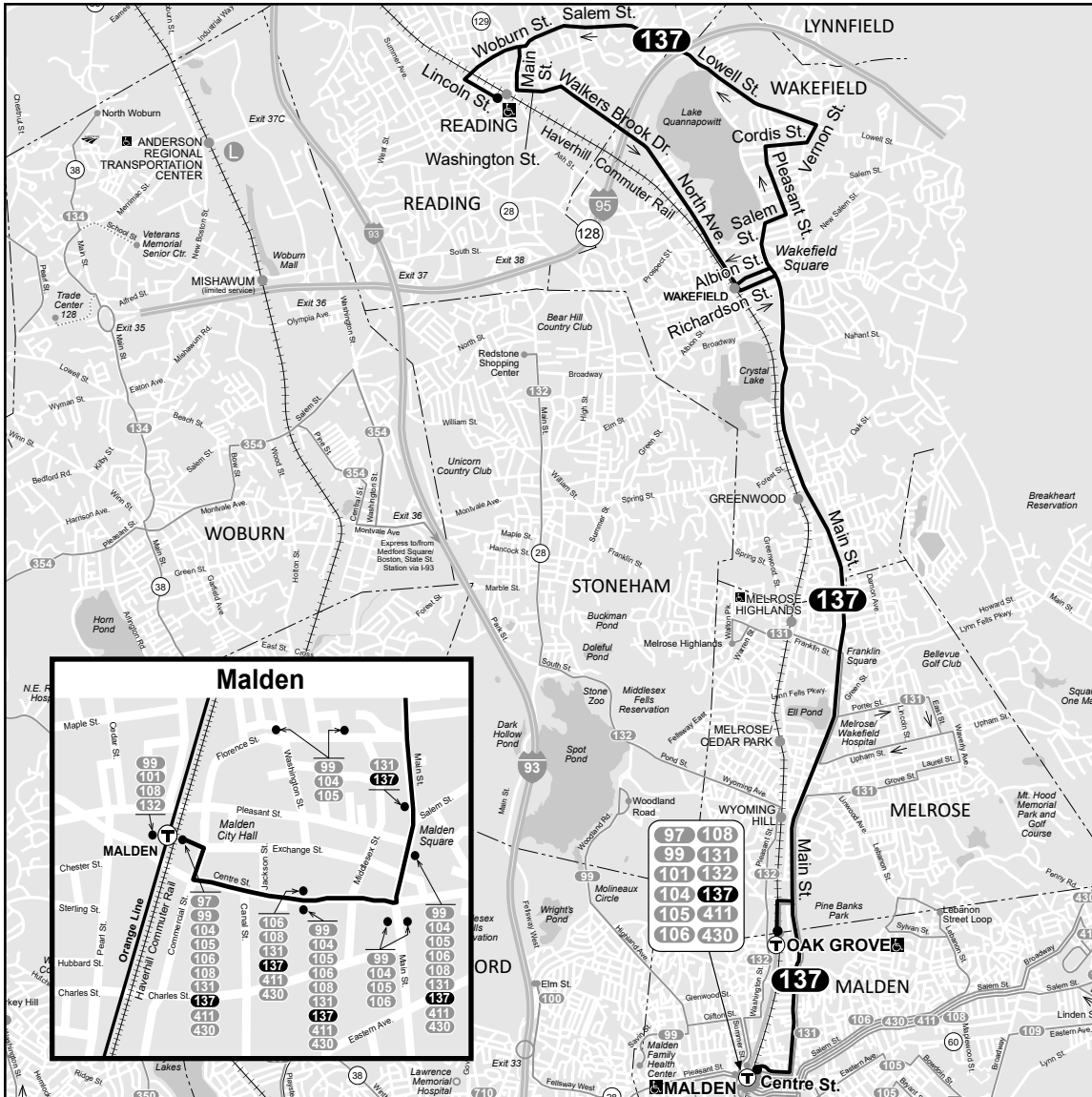
137

**Reading Depot -
Malden Center Sta**



mbta.com
617-222-3200
617-222-5146 (TTY)

Lost & Found
617-222-5607



Information in this timetable is subject to change without notice. Traffic conditions and weather can affect running time.

137

Weekday

Table with columns for Inbound and Outbound routes, listing departure and arrival times for Reading Depot, Franklin Square, Oak Grove Station, Malden Station, and Malden Center Station. Includes holiday schedule: 12:25P-12:35, 12:59-1:30, 2:10-2:40.

s - Does NOT run during school vacation

Spring/Summer 2021 Holidays
4/19: Sat; 5/31 Sun; 7/4-5 Sun

137

Saturday

Table with columns for Inbound and Outbound routes, listing departure and arrival times for Reading Depot, Franklin Square, Oak Grove Station, Malden Station, and Malden Center Station. Includes holiday schedule: 12:10P-12:22P.

137

Sunday

Table with columns for Inbound and Outbound routes, listing departure and arrival times for Reading Depot, Franklin Square, Oak Grove Station, Malden Station, and Malden Center Station.



All buses are accessible to persons with disabilities

Routes 136 & 137 operate as a combined route.

For schedules, alerts and updates, visit: mbta.com/schedules/136 mbta.com/schedules/137

Route 137
Reading Depot - Malden Center Station

Fare table with columns: Fare, Local Bus, Bus + Bus, Subway, Bus + Subway. Rows include CharlieCard, CharlieTicket, Cash-on-Board, Student/Youth, and Senior/TAP.

FREE FARES: Children 11 and under ride free when accompanied by a paying customer; Blind Access CharlieCard holders ride free... ** Requires Student CharlieCard or Youth CharlieCard... *** Requires Senior/TAP CharlieCard...

CRASH DATA

MASSDOT CRASH RATE WORKSHEETS

Masshighway

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : North Avenue

ST #

MINOR STREET(S) : I-95 SB ramp

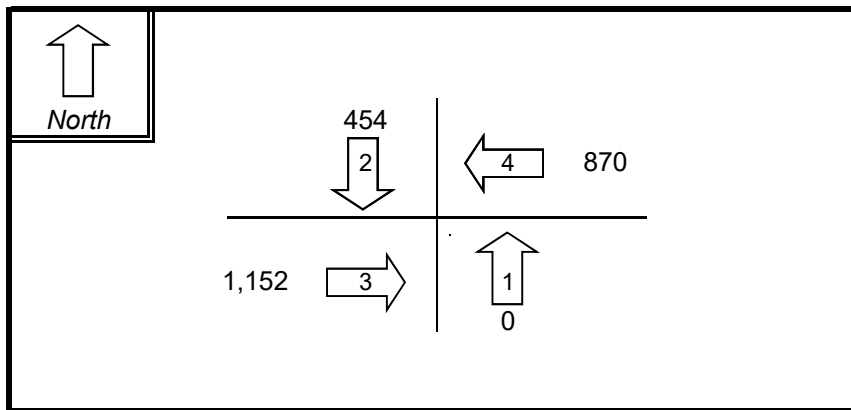
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM
(Label Approaches)**



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :		454	1,152	870		2,476

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73
Accident Rate for District 4 unsignalized intersections = 0.57

Statewide Accident Rate for Signalized Inteserction = 0.78 and Unsignalized/Inteserction = 0.57

Masshighway

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : North Avenue

ST #

MINOR STREET(S) : I-95 NB ramp

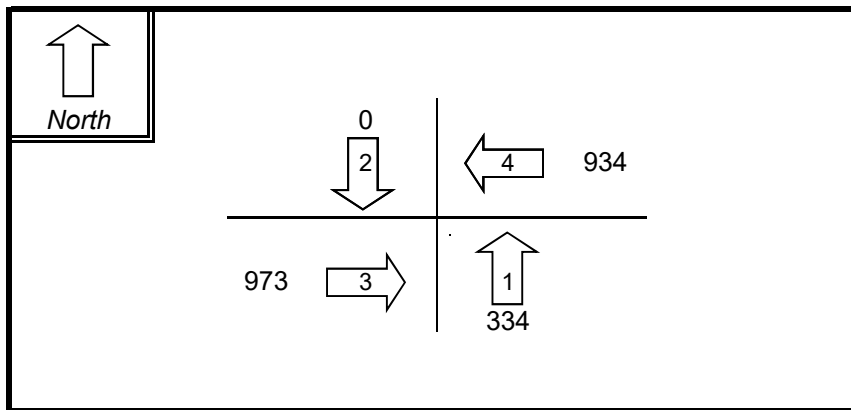
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	334	0	973	934		2,241

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73

Accident Rate for District 4 unsignalized intersections = 0.57

Statewide Accident Rate for Signalized Inteserction = 0.78 and Unsignalized/Inteserction = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : North Avenue

ST #

MINOR STREET(S) : Quannapowitt Parkway

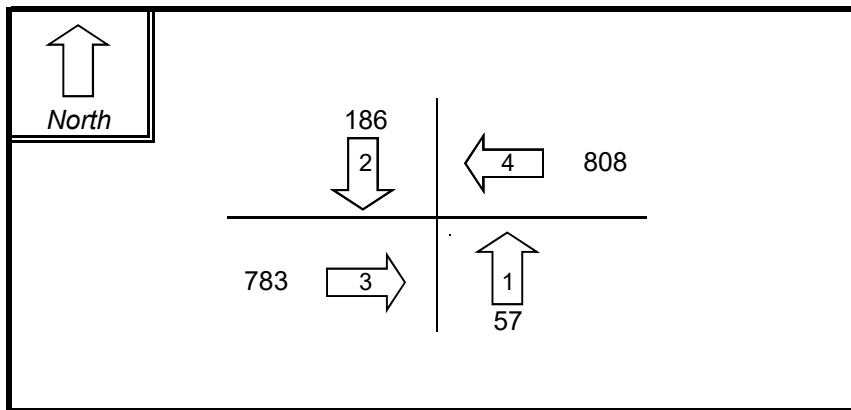
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	57	186	783	808		1,834

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73
Accident Rate for District 4 unsignalized intersections = 0.57

Statewide Accident Rate for Signalized Inteserction = 0.78 and Unsignalized/Inteserction = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021

DISTRICT : 4 UNSIGNALIZED : x SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Main Street

ST #

MINOR STREET(S) : Lowell Street

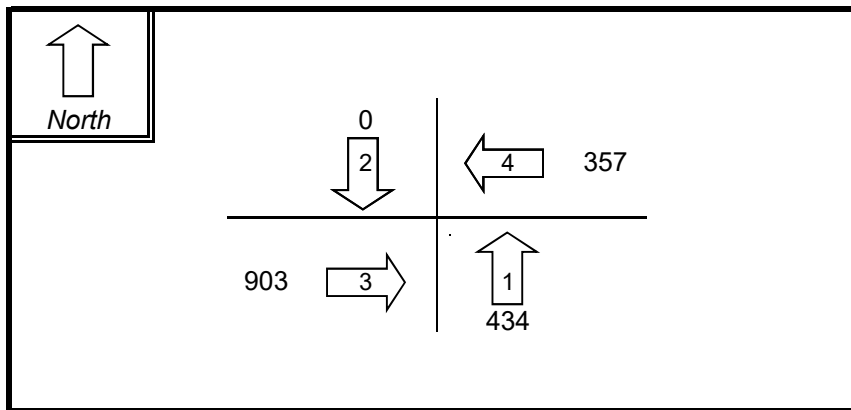
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	434	0	903	357		1,694

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73
Accident Rate for District 4 unsignalized intersections = 0.57

Statewide Accident Rate for Signalized Inteserction = 0.78 and Unsignalized/Inteserction = 0.57

Masshighway

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021

DISTRICT : 4 UNSIGNALIZED : x SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Rotary at Lowell Street

ST #

MINOR STREET(S) : I-95 NB on-ramp

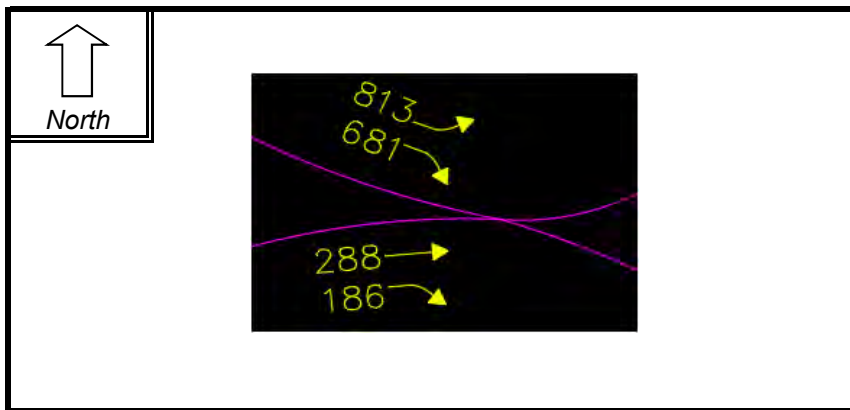
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	474	1,494	0	0		1,968

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73
Accident Rate for District 4 unsignalized intersections = 0.57

Statewide Accident Rate for Signalized Inteserction = 0.78 and Unsignalized/Inteserction = 0.57

Masshighway

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021

DISTRICT : 4 UNSIGNALIZED : x SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Rotary

ST #

MINOR STREET(S) : I-95 NB off-ramp/Lowell Street

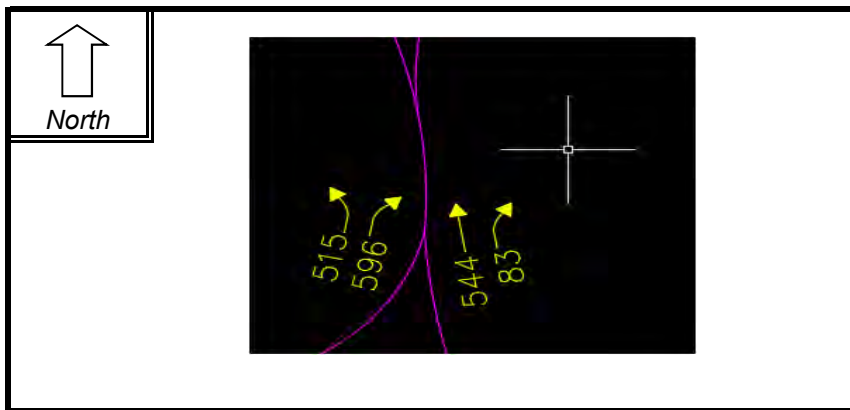
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NEB	NB				
VOLUMES (PM) :	1,111	627				1,738

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73
Accident Rate for District 4 unsignalized intersections = 0.57

Statewide Accident Rate for Signalized Inteserction = 0.78 and Unsignalized/Inteserction = 0.57

MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Quannapowitt Prkwy

ST #

MINOR STREET(S) : Lowell St.

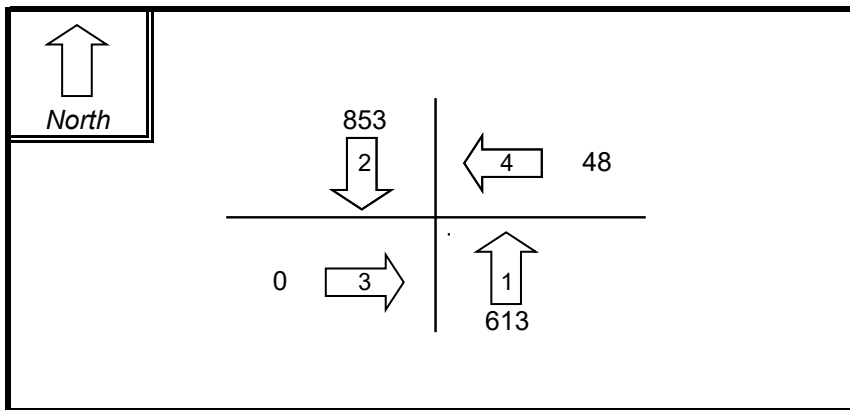
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	613	853		48		1,514

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73
Accident Rate for District 4 unsignalized intersections = 0.57

Statewide Accident Rate for Signalized Inteserction = 0.78 and Unsignalized/Inteserction = 0.57

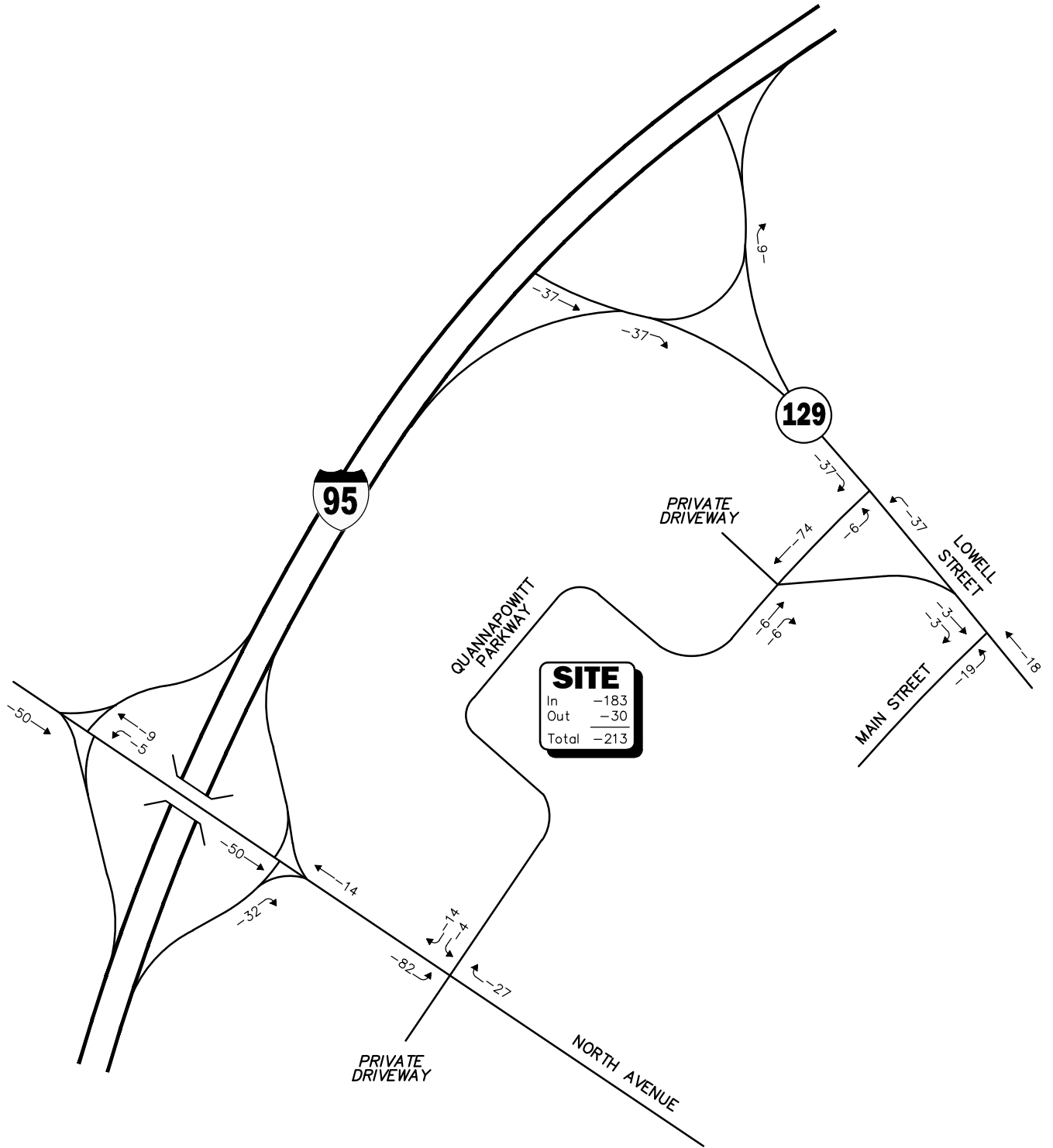
GENERAL BACKGROUND TRAFFIC GROWTH

General Background Traffic Growth - Daily Traffic Volumes

Station Number	ROUTE/STREET	LOCATION	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average Annual Growth Rate
4147	YANKEE DIVISION HIGHWAY	NORTH OF RTE.28	142,638		141,000					137,541	148,269	147,824	146,684	0.91%
														0.91%

Adjusted Rate:1.0%

TRAFFIC REMOVAL NETWORKS

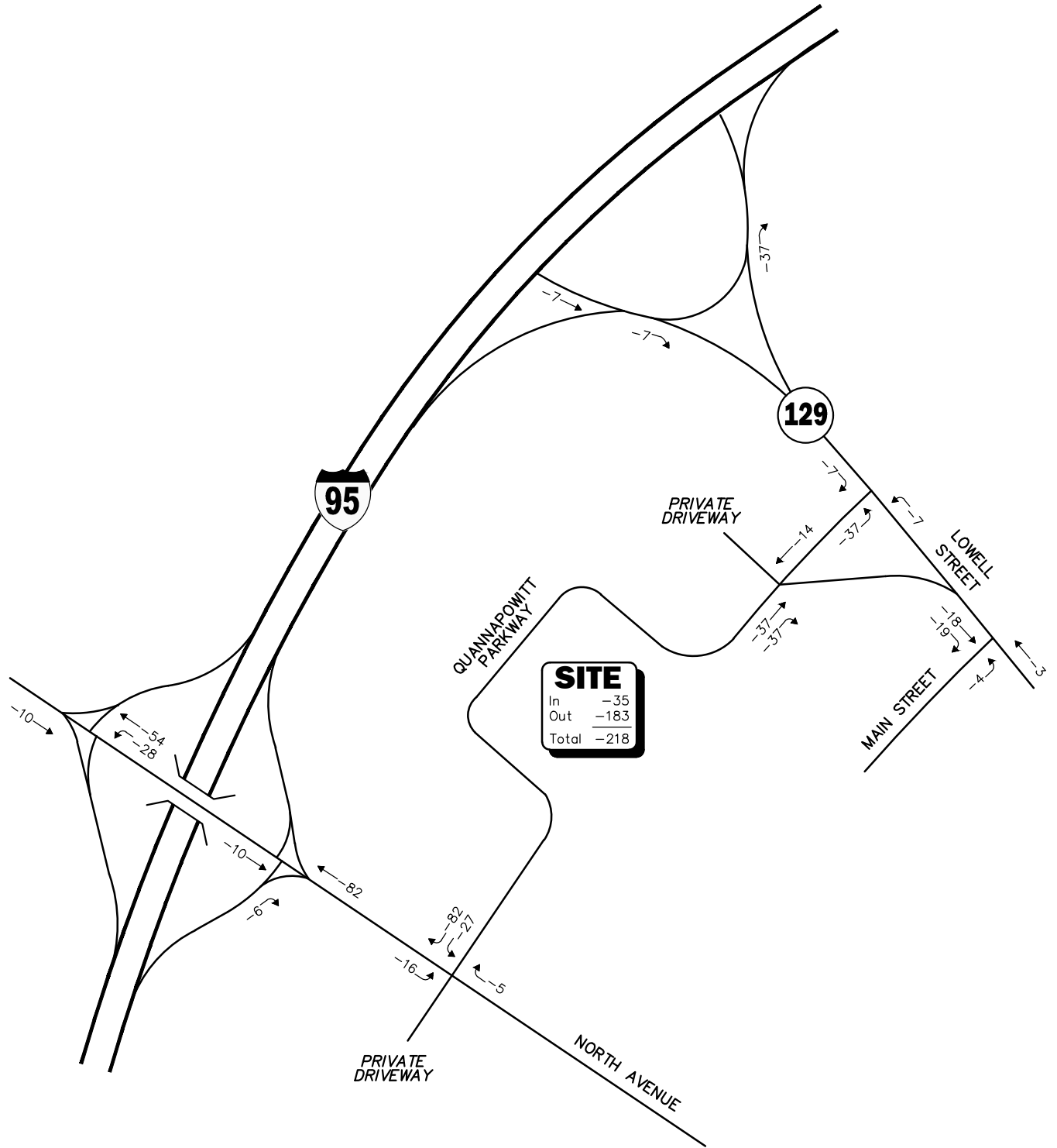


Not To Scale



Figure A-1

Traffic Removal Network
Data Center and Office Space
Weekday Morning
Peak Hour Traffic Volumes



Not To Scale



Figure A-2

Traffic Removal Network
Data Center and Office Space
Weekday Evening
Peak Hour Traffic Volumes

TRIP-GENERATION CALCULATIONS

Institute of Transportation Engineers (ITE)
Trip Generation, 10th Edition
Land Use Code (LUC) 932 - High-Turnover (Sit-Down) Restaurant

Average Vehicle Trips Ends vs: 1000 Square Feet Gross Floor Area
Independent Variable (X): 1.100

AVERAGE WEEKDAY DAILY

$T = 112.18 * (X)$
 $T = 112.18 * 1.100$
 $T = 123.40$
 $T = 124$ vehicle trips
with 50% (62 vpd) entering and 50% (62 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 9.94 * (X)$
 $T = 9.94 * 1.100$
 $T = 10.93$
 $T = 11$ vehicle trips
with 55% (6 vph) entering and 45% (5 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 9.77 * (X)$
 $T = 9.77 * 1.100$
 $T = 10.75$
 $T = 11$ vehicle trips
with 62% (7 vph) entering and 38% (4 vph) exiting.

SATURDAY DAILY

$T = 122.40 * (X)$
 $T = 122.40 * 1.100$
 $T = 134.64$
 $T = 134$ vehicle trips
with 50% (67 vpd) entering and 50% (67 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$T = 11.19 * (X)$
 $T = 11.19 * 1.100$
 $T = 12.31$
 $T = 12$ vehicle trips
with 51% (6 vph) entering and 49% (6 vph) exiting.

Land Use: 221

Multifamily Housing (Mid-Rise)

Description

Mid-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three and 10 levels (floors). Multifamily housing (low-rise) (Land Use 220), multifamily housing (high-rise) (Land Use 222), off-campus student apartment (Land Use 225), and mid-rise residential with 1st-floor commercial (Land Use 231) are related land uses.

Additional Data

In prior editions of *Trip Generation Manual*, the mid-rise multifamily housing sites were further divided into rental and condominium categories. An investigation of vehicle trip data found no clear differences in trip making patterns between the rental and condominium sites within the ITE database. As more data are compiled for future editions, this land use classification can be reinvestigated.

For the six sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.46 residents per occupied dwelling unit.

For the five sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 95.7 percent of the total dwelling units were occupied.

Time-of-day distribution data for this land use are presented in Appendix A. For the eight general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:00 and 8:00 a.m. and 4:45 and 5:45 p.m., respectively.

For the four dense multi-use urban sites with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:15 and 5:15 p.m., respectively. For the three center city core sites with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 6:45 and 7:45 a.m. and 5:00 and 6:00 p.m., respectively.

For the six sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.46 residents per occupied dwelling unit.

For the five sites for which data were provided for both occupied dwelling units and total dwelling units, an average of 95.7 percent of the units were occupied.

The average numbers of person trips per vehicle trip at the five center city core sites at which both person trip and vehicle trip data were collected were as follows:

- 1.84 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.94 during Weekday, AM Peak Hour of Generator
- 2.07 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.59 during Weekday, PM Peak Hour of Generator

The average numbers of person trips per vehicle trip at the 32 dense multi-use urban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.90 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.90 during Weekday, AM Peak Hour of Generator
- 2.00 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.08 during Weekday, PM Peak Hour of Generator

The average numbers of person trips per vehicle trip at the 13 general urban/suburban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.56 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.88 during Weekday, AM Peak Hour of Generator
- 1.70 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.07 during Weekday, PM Peak Hour of Generator

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), British Columbia (CAN), California, Delaware, District of Columbia, Florida, Georgia, Illinois, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, Ontario, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Utah, Virginia, and Wisconsin.

Source Numbers

168, 188, 204, 305, 306, 321, 357, 390, 436, 525, 530, 579, 638, 818, 857, 866, 901, 904, 910, 912, 918, 934, 936, 939, 944, 947, 948, 949, 959, 963, 964, 966, 967, 969, 970

Multifamily Housing (Mid-Rise) (221)

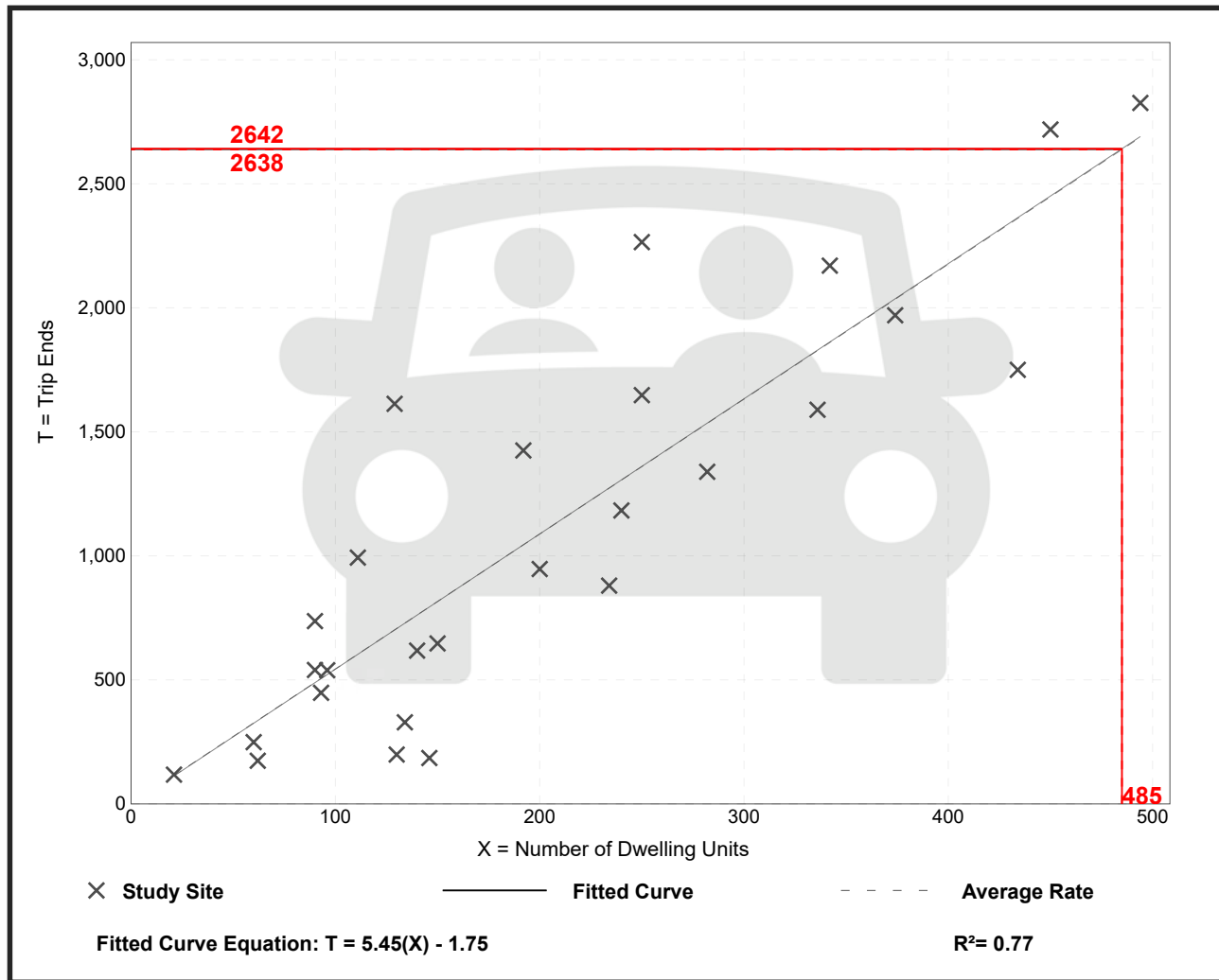
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 27
Avg. Num. of Dwelling Units: 205
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
5.44	1.27 - 12.50	2.03

Data Plot and Equation



Trip Gen Manual, 10th Ed + Supplement • Institute of Transportation Engineers

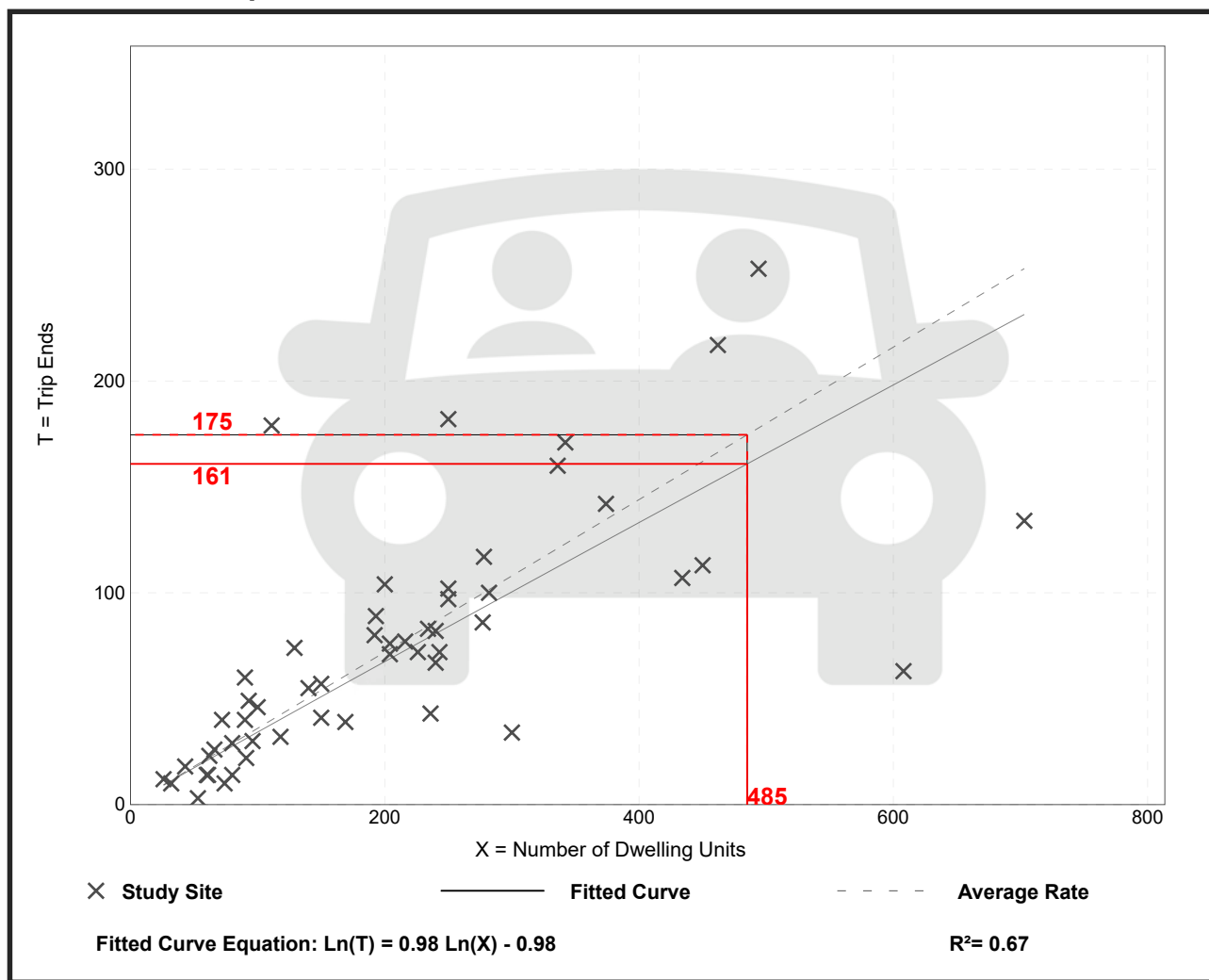
Multifamily Housing (Mid-Rise) (221)

Vehicle Trip Ends vs: Dwelling Units
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: 53
 Avg. Num. of Dwelling Units: 207
 Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



Trip Gen Manual, 10th Ed + Supplement • Institute of Transportation Engineers

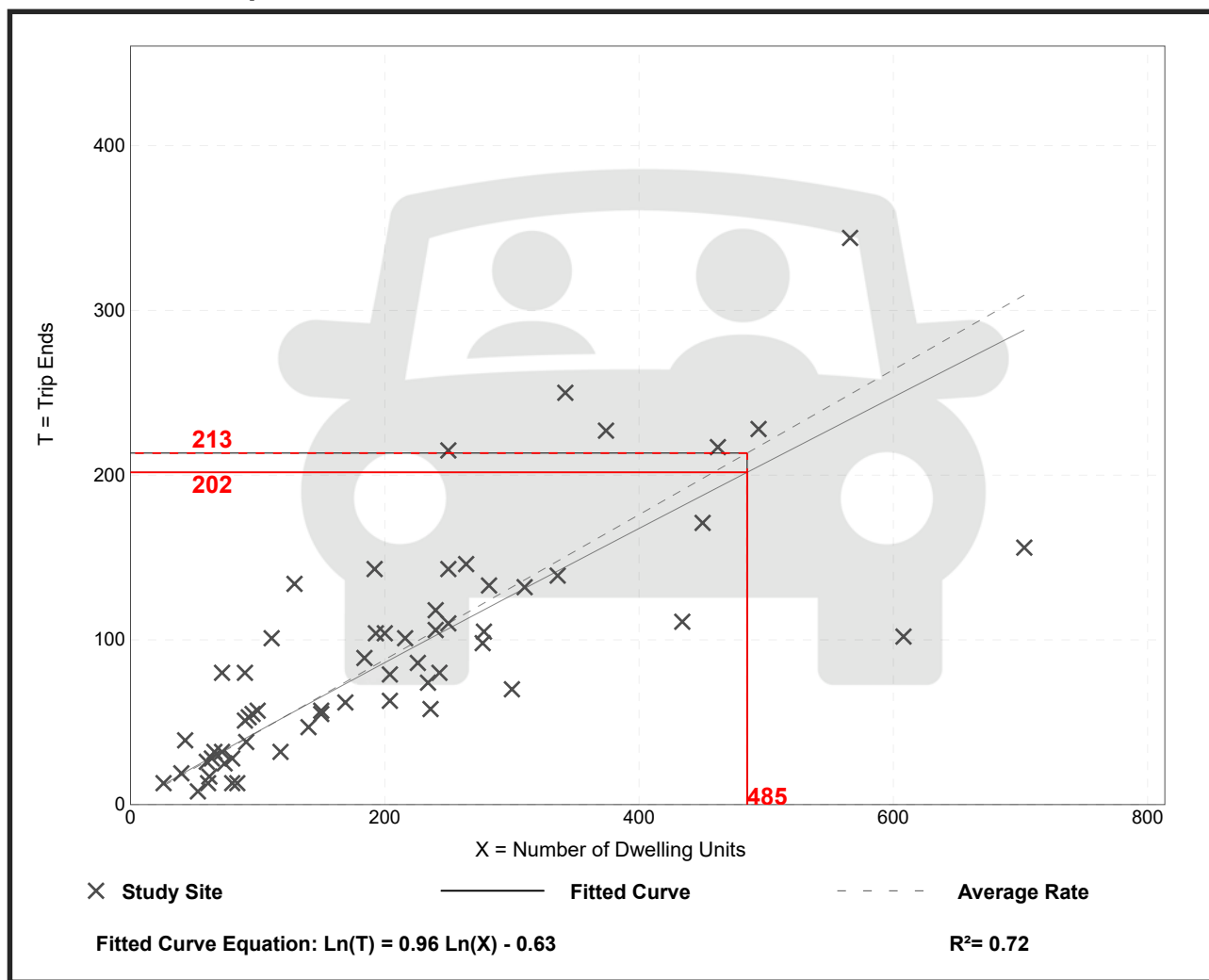
Multifamily Housing (Mid-Rise) (221)

Vehicle Trip Ends vs: Dwelling Units
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: 60
 Avg. Num. of Dwelling Units: 208
 Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation



Trip Gen Manual, 10th Ed + Supplement • Institute of Transportation Engineers

Institute of Transportation Engineers (ITE)
Trip Generation, 10th Edition
Land Use Code (LUC) 710 - General Office Building

Average Vehicle Trips Ends vs: 1,000 Square Feet Gross Floor Area
Independent Variable (X): 195.285

AVERAGE WEEKDAY DAILY

$$\ln T = 0.97 \ln(X) + 2.50$$

$$\ln T = 0.97 \ln(195.285) + (2.50)$$

$$\ln T = 7.62$$

$$T = 2030.88$$

$$T = 2,032 \text{ vehicle trips}$$

with 50% (1,016 vpd) entering and 50% (1,016 vpd) exiting.

WEEKDAY MORNING PEAK HOUR

$$T = 0.94(X) + 26.49$$

$$T = 0.94 * (195.285) + (26.49)$$

$$T = 210.06$$

$$T = 210 \text{ vehicle trips}$$

with 86% (181 vph) entering and 14% (29 vph) exiting.

WEEKDAY EVENING PEAK HOUR

$$\ln T = 0.95 \ln(X) + 0.36$$

$$\ln T = 0.95 * \ln(195.285) + (0.36)$$

$$\ln T = 5.37$$

$$T = 215.02$$

$$T = 215 \text{ vehicle trips}$$

with 16% (34 vph) entering and 84% (181 vph) exiting.

SATURDAY DAILY

$$T = 2.21 * (X)$$

$$T = 2.21 * 195.285$$

$$T = 431.58$$

$$T = 432 \text{ vehicle trips}$$

with 50% (216 vph) entering and 50% (216 vph) exiting.

SATURDAY PEAK HOUR OF GENERATOR

$$T = 0.53 * (X)$$

$$T = 0.53 * 195.285$$

$$T = 103.50$$

$$T = 104 \text{ vehicle trips}$$

with 54% (56 vph) entering and 46% (48 vph) exiting.

Institute of Transportation Engineers (ITE)
Trip Generation, 10th Edition
Land Use Code (LUC) 160 - Data Center

Average Vehicle Trips Ends vs: 1000 Sq. Feet Gross Floor Area
Independent Variable (X): 29

AVERAGE WEEKDAY DAILY

$$T = 0.99 * (X)$$

$$T = 0.99 * 29$$

$$T = 28.71$$

- T = 28 vehicle trips
with 50% (14 vpd) entering and 50% (14 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 0.11 * (X)$$

$$T = 0.11 (29)$$

$$T = 3.19$$

- T = 3 vehicle trips
with 55% (2 vph) entering and 45% (1 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 0.09 * (X)$$

$$T = 0.09 (0)$$

$$T = 2.61$$

- T = 3 vehicle trips
with 30% (1 vph) entering and 70% (2 vph) exiting.

SATURDAY DAILY

$$T =$$

$$T =$$

$$T =$$

$$T = 0 \text{ vehicle trips}$$

with 50% (0 vph) entering and 50% (0 vph) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$$T =$$

$$T =$$

$$T =$$

$$T = 0 \text{ vehicle trips}$$

with 64% (0 vph) entering and 36% (0 vph) exiting.

COMMUTING CHARACTERISTICS BY SEX



Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.

Wakeeld CDP , Massachusetts			
Total			
Label	Estimate	Margin of Error	
▼ Workers 16 years and over	14,963	±449	
▼ MEANS OF TRANSPORTATION TO WORK			
▼ Car, truck, or van	84.1%	±2.5	
Drove alone	78.3%	±2.9	
▼ Carpooled	5.7%	±1.6	
In 2-person carpool	4.3%	±1.4	
In 3-person carpool	1.1%	±0.9	
In 4-or-more person carpool	0.3%	±0.3	
Workers per car, truck, or van	1.04	±0.01	
Public transportation (excluding taxicab)	8.1%	±1.5	
Walked	2.2%	±1.1	
Bicycle	0.6%	±0.3	
Taxicab, motorcycle, or other means	1.2%	±0.8	
Worked at home	3.9%	±1.1	
▼ PLACE OF WORK			
▼ Worked in state of residence	98.2%	±0.8	
Worked in county of residence	59.3%	±2.3	
Worked outside county of residence	38.9%	±2.2	
Worked outside state of residence	1.8%	±0.8	
▼ Living in a place	100.0%	±0.2	
Worked in place of residence	19.3%	±2.3	
Worked outside place of residence	80.7%	±2.3	
Not living in a place	0.0%	±0.2	
▼ Living in 12 selected states	100.0%	±0.2	
Worked in minor civil division of residence	19.3%	±2.3	
Worked outside minor civil division of residence	80.7%	±2.3	

Table Notes

COMMUTING CHARACTERISTICS BY SEX

Survey/Program:

American Community Survey

Year:

2018

Estimates:

5-Year

Table ID:

S0801

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Source: U.S. Census Bureau, 2014-2018 American Community Survey 5-Year Estimates

When information is missing or inconsistent, the Census Bureau logically assigns an acceptable value using the response to a related question or questions. If a logical assignment is not possible, data are filled using a statistical process called allocation, which uses a similar individual or household to provide a donor value. The "Allocated" section is the number of respondents who received an allocated value for a particular subject.

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.

The 12 selected states are Connecticut, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin.

Workers include members of the Armed Forces and civilians who were at work last week.

While the 2014-2018 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Explanation of Symbols:

An "***" entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.

An "-" entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution, or the margin of error associated with a median was larger than the median itself.

An "-" following a median estimate means the median falls in the lowest interval of an open-ended distribution.
An "+" following a median estimate means the median falls in the upper interval of an open-ended distribution.
An "***" entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
An "*****" entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
An "N" entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
An "(X)" means that the estimate is not applicable or not available.

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

TRIP-DISTRIBUTION CALCULATIONS

Table 3. Residence MCD/County to Workplace MCD/County Commuting Flows for the
 For more information on sampling and estimation methods, confidentiality protection, and sampling
 Universe: Workers 16 years and over.

Commuting flows are sorted by residence state, residence county, and residence minor civil division.

Residence				Place of Work				Commuting Flow
State FIPS Code	State Name	County Name	Minor Civil Division Name	State FIPS Code	State Name	County Name	Minor Civil Division Name	Workers in Commuting Flow
25	Massachu	Middlese	Wakefield	025	Massachu	Suffolk	Boston city	2,756
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Wakefield	2,443
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Woburn city	816
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Cambridge	683
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Reading	624
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Burlington	458
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Waltham	362
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Melrose city	357
25	Massachu	Middlese	Wakefield	025	Massachu	Essex	Beverly city	251
25	Massachu	Middlese	Wakefield	025	Massachu	Essex	Danvers	247
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Wilmington	244
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Medford	240
25	Massachu	Middlese	Wakefield	025	Massachu	Essex	Saugus	225
25	Massachu	Middlese	Wakefield	025	Massachu	Essex	Andover	217
25	Massachu	Middlese	Wakefield	025	Massachu	Essex	Peabody	215

19.3% 27.2%
 17.2% 24.1%
 5.7% 8.0%
 4.8% 6.7%
 4.4% 6.2%
 3.2% 4.5%
 2.5% 3.6%
 2.5% 3.5%
 1.8% 2.5%
 1.7% 2.4%
 1.7% 2.4%
 1.7% 2.4%
 1.6% 2.2%
 1.5% 2.1%
 1.5% 2.1%

14,244

10,138

Exiting					Entering				
Matrix %					Matrix %				
Rte. 95 (East) OR Roundabout SB on Lowell	Lowell Street	Rte. 95 (West)	North Avenue (North)	North Avenue (South)	Rte. 95 (East)	Lowell Street	Rte. 95 (West)	North Avenue (North)	North Avenue (South)
0.3		0.7			0.3		0.7		
	0.3			0.6		0.3			0.6
		1					1		
		1					1		
0.4			0.6		0.4			0.6	
		1					1		
		1					1		
	0.2			0.8		0.2			0.8
1					1				
1					1				
0.1		0.7	0.2		0.1		0.7	0.2	
		1					1		
0.7	0.1			0.2	0.7	0.1			0.2
0.5			0.5		0.5			0.5	
1				1.5%	1				1.5%

Table 3. Residence MCD/County to Workplace MCD/County Commuting Flows for the

For more information on sampling and estimation methods, confidentiality protection, and sampling Universe: Workers 16 years and over.

Commuting flows are sorted by residence state, residence county, and residence minor civil division.

Residence				Place of Work				Commuting Flow
State FIPS Code	State Name	County Name	Minor Civil Division Name	State FIPS Code	State Name	County Name	Minor Civil Division Name	Workers in Commuting Flow
25	Massachu	Middlese	Wakefield	025	Massachu	Suffolk	Boston city	2,756
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Wakefield	2,443
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Woburn city	816
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Cambridge	683
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Reading	624
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Burlington	458
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Waltham	362
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Melrose city	357
25	Massachu	Middlese	Wakefield	025	Massachu	Essex	Beverly city	251
25	Massachu	Middlese	Wakefield	025	Massachu	Essex	Danvers	247
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Wilmington	244
25	Massachu	Middlese	Wakefield	025	Massachu	Middlese	Medford	240
25	Massachu	Middlese	Wakefield	025	Massachu	Essex	Saugus	225
25	Massachu	Middlese	Wakefield	025	Massachu	Essex	Andover	217
25	Massachu	Middlese	Wakefield	025	Massachu	Essex	Peabody	215
								14,244
								10,138

19.3% 27.2%
17.2% 24.1%
5.7% 8.0%
4.8% 6.7%
4.4% 6.2%
3.2% 4.5%
2.5% 3.6%
2.5% 3.5%
1.8% 2.5%
1.7% 2.4%
1.7% 2.4%
1.7% 2.4%
1.6% 2.2%
1.5% 2.1%
1.5% 2.1%

Exiting					%	Entering					%
Trip Distribution						Trip Distribution					
Rte. 95 (East)	Lowell Street	Rte. 95 (West)	North Avenue (North)	North Avenue (South)		Rte. 95 (East)	Lowell Street	Rte. 95 (West)	North Avenue (North)	North Avenue (South)	
826.8	0	1929.2	0	0	2756	826.8	0	1929.2	0	0	2756
0	732.9	0	0	1465.8	2198.7	0	732.9	0	0	1465.8	2198.7
0	0	816	0	0	816	0	0	816	0	0	816
0	0	683	0	0	683	0	0	683	0	0	683
249.6	0	0	374.4	0	624	249.6	0	0	374.4	0	624
0	0	458	0	0	458	0	0	458	0	0	458
0	0	362	0	0	362	0	0	362	0	0	362
0	71.4	0	0	285.6	357	0	71.4	0	0	285.6	357
251	0	0	0	0	251	251	0	0	0	0	251
247	0	0	0	0	247	247	0	0	0	0	247
24.4	0	170.8	48.8	0	244	24.4	0	170.8	48.8	0	244
0	0	240	0	0	240	0	0	240	0	0	240
157.5	22.5	0	0	45	225	157.5	22.5	0	0	45	225
108.5	0	0	108.5	0	217	108.5	0	0	108.5	0	217
215	0	0	0	0	215	215	0	0	0	0	215
2079.8	826.8	4659	531.7	1796.4	9893.7	2079.8	826.8	4659	531.7	1796.4	9893.7
21%	8%	47%	5%	18%		21%	8%	46%	8%	18%	
25%	10%	40%	5%	20%	100%	25%	10%	45%	5%	20%	100%

CAPACITY ANALYSIS WORKSHEETS

CAPACITY ANALYSIS WORKSHEETS

North Avenue at I-95 Northbound Ramps

North Avenue at I-95 Southbound Ramps

North Avenue at Quannapowitt Parkway /Private Driveway

Quannapowitt Parkway at Parking Lot and Channelized Right-Turn Lane to Lowell Street

Quannapowitt Parkway at Lowell Street

Main Street/Lowell Street

Rotary at Lowell Street / I-95 Northbound On-Ramp





















Rotary at I-95 Northbound Off-Ramp / Lowell Street

North Avenue at I-95 Northbound Ramps

Lanes, Volumes, Timings
6: I-95 NB Off-ramp & North Avenue

2021 Existing Weekday Morning Peak-Hour

03/01/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 					
Traffic Volume (vph)	176	521	0	0	520	114	210	0	334	0	0	0
Future Volume (vph)	176	521	0	0	520	114	210	0	334	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	16	11	12	16	12	12	12
Storage Length (ft)	0		0	0		100	0		0	0		0
Storage Lanes	0		0	0		1	2		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr _t						0.850			0.850			
Fl _t Protected		0.988					0.950					
Satd. Flow (prot)	0	3540	0	0	3455	1794	3351	0	1830	0	0	0
Fl _t Permitted		0.700					0.950					
Satd. Flow (perm)	0	2508	0	0	3455	1794	3351	0	1830	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						224			341			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		523			440			287			259	
Travel Time (s)		10.2			8.6			6.5			5.9	
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.87	0.87	0.87	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	1%	2%	1%	0%	0%	2%	2%	2%
Adj. Flow (vph)	202	599	0	0	565	124	241	0	384	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	801	0	0	565	124	241	0	384	0	0	0
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (ft)	20	100			100	20	20		20			
Trailing Detector (ft)	0	0			0	0	0		0			
Detector 1 Position(ft)	0	0			0	0	0		0			
Detector 1 Size(ft)	20	6			6	20	20		20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Free	Prot		Perm			
Protected Phases	7	4			8		5					
Permitted Phases	4					Free			5			
Detector Phase	7	4			8		5		5			
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0		5.0		5.0			
Minimum Split (s)	11.0	24.0			24.0		11.0		11.0			
Total Split (s)	16.0	52.0			36.0		21.0		21.0			
Total Split (%)	21.9%	71.2%			49.3%		28.8%		28.8%			

Lanes, Volumes, Timings
6: I-95 NB Off-ramp & North Avenue

2021 Existing Weekday Morning Peak-Hour

03/01/2021

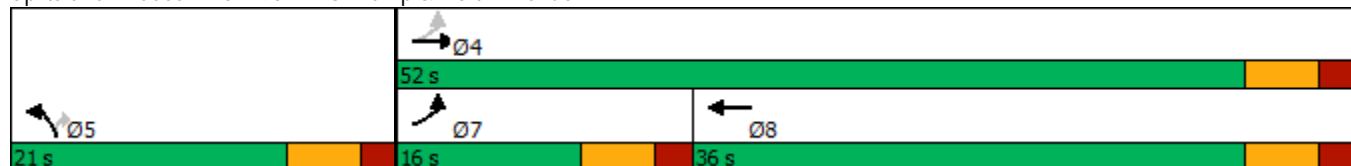


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	10.0	46.0			30.0		15.0		15.0			
Yellow Time (s)	4.0	4.0			4.0		4.0		4.0			
All-Red Time (s)	2.0	2.0			2.0		2.0		2.0			
Lost Time Adjust (s)		-2.0			-2.0		-2.0		-2.0			
Total Lost Time (s)		4.0			4.0		4.0		4.0			
Lead/Lag	Lead			Lag								
Lead-Lag Optimize?	Yes			Yes								
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	None			None		None		None			
Walk Time (s)		7.0										
Flash Dont Walk (s)		11.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)		24.6			24.6	44.5	11.5		11.5			
Actuated g/C Ratio		0.55			0.55	1.00	0.26		0.26			
v/c Ratio		0.58			0.30	0.07	0.28		0.53			
Control Delay		8.5			5.8	0.1	15.7		6.6			
Queue Delay		0.0			0.0	0.0	0.0		0.0			
Total Delay		8.5			5.8	0.1	15.7		6.6			
LOS		A			A	A	B		A			
Approach Delay		8.5			4.7			10.1				
Approach LOS		A			A			B				
Queue Length 50th (ft)		53			30	0	23		8			
Queue Length 95th (ft)		116			69	0	60		64			
Internal Link Dist (ft)		443			360			207			179	
Turn Bay Length (ft)						100						
Base Capacity (vph)		2379			2679	1794	1349		940			
Starvation Cap Reductn		0			0	0	0		0			
Spillback Cap Reductn		0			0	0	0		0			
Storage Cap Reductn		0			0	0	0		0			
Reduced v/c Ratio		0.34			0.21	0.07	0.18		0.41			

Intersection Summary

Area Type: Other
 Cycle Length: 73
 Actuated Cycle Length: 44.5
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.58
 Intersection Signal Delay: 7.8
 Intersection Capacity Utilization 49.9%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A





















Splits and Phases: 6: I-95 NB Off-ramp & North Avenue



Lanes, Volumes, Timings
6: I-95 NB Off-ramp & North Avenue

2021 Existing Weekday Evening Peak-Hour

03/01/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 					
Traffic Volume (vph)	389	584	0	0	735	199	135	0	199	0	0	0
Future Volume (vph)	389	584	0	0	735	199	135	0	199	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	16	11	12	16	12	12	12
Storage Length (ft)	0		0	0		100	0		0	0		0
Storage Lanes	0		0	0		1	2		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr _t						0.850			0.850			
Fl _t Protected		0.980					0.950					
Satd. Flow (prot)	0	3517	0	0	3490	1830	3385	0	1830	0	0	0
Fl _t Permitted		0.566					0.950					
Satd. Flow (perm)	0	2031	0	0	3490	1830	3385	0	1830	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						224			209			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		523			440			287			259	
Travel Time (s)		10.2			8.6			6.5			5.9	
Peak Hour Factor	0.98	0.98	0.98	0.87	0.87	0.87	0.95	0.95	0.95	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Adj. Flow (vph)	397	596	0	0	845	229	142	0	209	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	993	0	0	845	229	142	0	209	0	0	0
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (ft)	20	100			100	20	20		20			
Trailing Detector (ft)	0	0			0	0	0		0			
Detector 1 Position(ft)	0	0			0	0	0		0			
Detector 1 Size(ft)	20	6			6	20	20		20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Free	Prot		Perm			
Protected Phases	7	4			8		5					
Permitted Phases	4					Free			5			
Detector Phase	7	4			8		5		5			
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0		5.0		5.0			
Minimum Split (s)	11.5	24.5			24.5		11.5		11.5			
Total Split (s)	16.0	52.0			36.0		21.0		21.0			
Total Split (%)	21.9%	71.2%			49.3%		28.8%		28.8%			

Lanes, Volumes, Timings
6: I-95 NB Off-ramp & North Avenue

2021 Existing Weekday Evening Peak-Hour

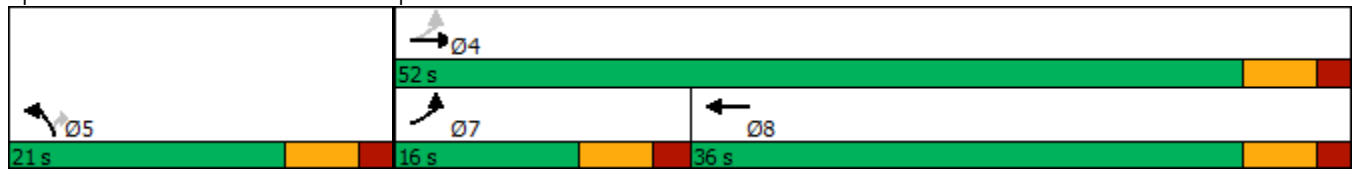
03/01/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	10.0	46.0			30.0		15.0		15.0			
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			-2.0		-2.0		-2.0			
Total Lost Time (s)		6.0			4.0		4.0		4.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	None			None		None		None			
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)		33.3			35.4	54.0	10.2		10.2			
Actuated g/C Ratio		0.62			0.66	1.00	0.19		0.19			
v/c Ratio		1.08dl			0.37	0.13	0.22		0.41			
Control Delay		13.1			4.5	0.1	22.6		7.0			
Queue Delay		0.0			0.0	0.0	0.0		0.0			
Total Delay		13.1			4.5	0.1	22.6		7.0			
LOS		B			A	A	C		A			
Approach Delay		13.1			3.6			13.3				
Approach LOS		B			A			B				
Queue Length 50th (ft)		98			48	0	20		0			
Queue Length 95th (ft)		191			79	0	49		50			
Internal Link Dist (ft)		443			360			207			179	
Turn Bay Length (ft)						100						
Base Capacity (vph)		1723			2526	1830	1118		744			
Starvation Cap Reductn		0			0	0	0		0			
Spillback Cap Reductn		0			0	0	0		0			
Storage Cap Reductn		0			0	0	0		0			
Reduced v/c Ratio		0.58			0.33	0.13	0.13		0.28			

Intersection Summary

Area Type: Other
 Cycle Length: 73
 Actuated Cycle Length: 54
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 8.9
 Intersection LOS: A
 Intersection Capacity Utilization 63.3%
 ICU Level of Service B
 Analysis Period (min) 15
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.


















Splits and Phases: 6: I-95 NB Off-ramp & North Avenue



Lanes, Volumes, Timings
6: I-95 NB Off-ramp & North Avenue

2028 No-Build Weekday Morning Peak-Hour

03/01/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	189	609	0	0	572	122	227	0	390	0	0	0
Future Volume (vph)	189	609	0	0	572	122	227	0	390	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	16	11	12	16	12	12	12
Storage Length (ft)	0		0	0		100	0		0	0		0
Storage Lanes	0		0	0		1	2		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr _t						0.850			0.850			
Fl _t Protected		0.988					0.950					
Satd. Flow (prot)	0	3540	0	0	3455	1794	3351	0	1830	0	0	0
Fl _t Permitted		0.679					0.950					
Satd. Flow (perm)	0	2433	0	0	3455	1794	3351	0	1830	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						224			281			
Link Speed (mph)		35			35			30				30
Link Distance (ft)		523			440			287				259
Travel Time (s)		10.2			8.6			6.5				5.9
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.87	0.87	0.87	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	1%	2%	1%	0%	0%	2%	2%	2%
Adj. Flow (vph)	217	700	0	0	622	133	261	0	448	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	917	0	0	622	133	261	0	448	0	0	0
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (ft)	20	100			100	20	20		20			
Trailing Detector (ft)	0	0			0	0	0		0			
Detector 1 Position(ft)	0	0			0	0	0		0			
Detector 1 Size(ft)	20	6			6	20	20		20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Free	Prot		Perm			
Protected Phases	7	4			8		5					
Permitted Phases	4					Free			5			
Detector Phase	7	4			8		5		5			
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0		5.0		5.0			
Minimum Split (s)	11.0	24.0			24.0		11.0		11.0			
Total Split (s)	16.0	52.0			36.0		21.0		21.0			
Total Split (%)	21.9%	71.2%			49.3%		28.8%		28.8%			

Lanes, Volumes, Timings
6: I-95 NB Off-ramp & North Avenue

2028 No-Build Weekday Morning Peak-Hour

03/01/2021

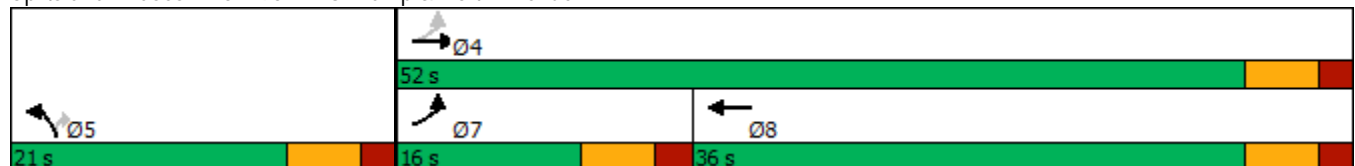


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	10.0	46.0			30.0		15.0		15.0			
Yellow Time (s)	4.0	4.0			4.0		4.0		4.0			
All-Red Time (s)	2.0	2.0			2.0		2.0		2.0			
Lost Time Adjust (s)		-2.0			-2.0		-2.0		-2.0			
Total Lost Time (s)		4.0			4.0		4.0		4.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	None			None		None		None			
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)		30.7			30.7	52.3	13.0		13.0			
Actuated g/C Ratio		0.59			0.59	1.00	0.25		0.25			
v/c Ratio		0.64			0.31	0.07	0.31		0.67			
Control Delay		9.5			5.8	0.1	19.4		13.9			
Queue Delay		0.0			0.0	0.0	0.0		0.0			
Total Delay		9.5			5.8	0.1	19.4		13.9			
LOS		A			A	A	B		B			
Approach Delay		9.5			4.8			15.9				
Approach LOS		A			A			B				
Queue Length 50th (ft)		78			40	0	32		41			
Queue Length 95th (ft)		140			74	0	78		149			
Internal Link Dist (ft)		443			360			207			179	
Turn Bay Length (ft)						100						
Base Capacity (vph)		2128			2488	1794	1172		822			
Starvation Cap Reductn		0			0	0	0		0			
Spillback Cap Reductn		0			0	0	0		0			
Storage Cap Reductn		0			0	0	0		0			
Reduced v/c Ratio		0.43			0.25	0.07	0.22		0.55			

Intersection Summary

Area Type: Other
 Cycle Length: 73
 Actuated Cycle Length: 52.3
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 9.9
 Intersection LOS: A
 Intersection Capacity Utilization 54.6%
 ICU Level of Service A
 Analysis Period (min) 15













Splits and Phases: 6: I-95 NB Off-ramp & North Avenue



Lanes, Volumes, Timings
6: I-95 NB Off-ramp & North Avenue

2028 No-Build Weekday Evening Peak-Hour

03/01/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↕↕	↗	↖↖		↗			
Traffic Volume (vph)	417	636	0	0	870	213	145	0	219	0	0	0
Future Volume (vph)	417	636	0	0	870	213	145	0	219	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	16	11	12	16	12	12	12
Storage Length (ft)	0		0	0		100	0		0	0		0
Storage Lanes	0		0	0		1	2		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr _t						0.850			0.850			
Fl _t Protected		0.981					0.950					
Satd. Flow (prot)	0	3520	0	0	3490	1830	3385	0	1830	0	0	0
Fl _t Permitted		0.537					0.950					
Satd. Flow (perm)	0	1927	0	0	3490	1830	3385	0	1830	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						224			231			
Link Speed (mph)		35			35			30				30
Link Distance (ft)		523			440			287				259
Travel Time (s)		10.2			8.6			6.5				5.9
Peak Hour Factor	0.98	0.98	0.98	0.87	0.87	0.87	0.95	0.95	0.95	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Adj. Flow (vph)	426	649	0	0	1000	245	153	0	231	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1075	0	0	1000	245	153	0	231	0	0	0
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (ft)	20	100			100	20	20		20			
Trailing Detector (ft)	0	0			0	0	0		0			
Detector 1 Position(ft)	0	0			0	0	0		0			
Detector 1 Size(ft)	20	6			6	20	20		20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Free	Prot		Perm			
Protected Phases	7	4			8		5					
Permitted Phases	4					Free			5			
Detector Phase	7	4			8		5		5			
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0		5.0		5.0			
Minimum Split (s)	11.5	24.5			24.5		11.5		11.5			
Total Split (s)	16.0	52.0			36.0		21.0		21.0			
Total Split (%)	21.9%	71.2%			49.3%		28.8%		28.8%			

Lanes, Volumes, Timings
6: I-95 NB Off-ramp & North Avenue

2028 No-Build Weekday Evening Peak-Hour

03/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	10.0	46.0			30.0		15.0		15.0			
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			-2.0		-2.0		-2.0			
Total Lost Time (s)		6.0			4.0		4.0		4.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	None			None		None		None			
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)		35.6			37.7	56.5	10.4		10.4			
Actuated g/C Ratio		0.63			0.67	1.00	0.18		0.18			
v/c Ratio		1.38dl			0.43	0.13	0.25		0.44			
Control Delay		19.3			4.9	0.2	23.6		7.1			
Queue Delay		0.0			0.1	0.0	0.0		0.0			
Total Delay		19.3			5.0	0.2	23.6		7.1			
LOS		B			A	A	C		A			
Approach Delay		19.3			4.1			13.7				
Approach LOS		B			A			B				
Queue Length 50th (ft)		127			63	0	24		0			
Queue Length 95th (ft)		#284			100	0	52		52			
Internal Link Dist (ft)		443			360			207			179	
Turn Bay Length (ft)						100						
Base Capacity (vph)		1573			2486	1830	1063		733			
Starvation Cap Reductn		0			515	0	0		0			
Spillback Cap Reductn		0			0	0	0		0			
Storage Cap Reductn		0			0	0	0		0			
Reduced v/c Ratio		0.68			0.51	0.13	0.14		0.32			

Intersection Summary

Area Type: Other

Cycle Length: 73

Actuated Cycle Length: 56.5

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 11.5

Intersection LOS: B

Intersection Capacity Utilization 69.5%

ICU Level of Service C

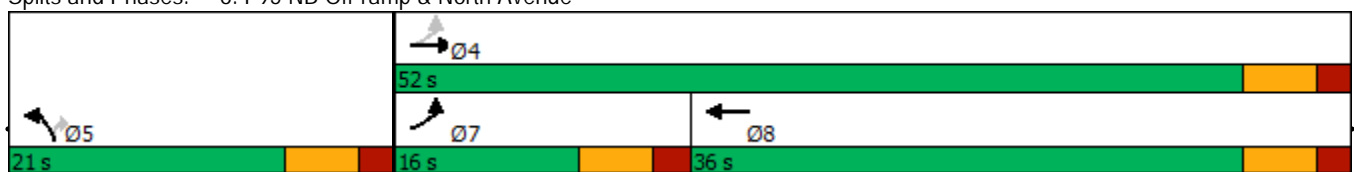
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 6: I-95 NB Off-ramp & North Avenue



RE

Lanes, Volumes, Timings
6: I-95 NB Off-ramp & North Avenue

2028 Build Weekday Morning Peak-Hour

03/01/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↕↕	↗	↗↗		↗			
Traffic Volume (vph)	189	562	0	0	619	122	225	0	378	0	0	0
Future Volume (vph)	189	562	0	0	619	122	225	0	378	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	16	11	12	16	12	12	12
Storage Length (ft)	0		0	0		100	0		0	0		0
Storage Lanes	0		0	0		1	2		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr _t						0.850			0.850			
Fl _t Protected		0.988					0.950					
Satd. Flow (prot)	0	3540	0	0	3455	1794	3351	0	1830	0	0	0
Fl _t Permitted		0.657					0.950					
Satd. Flow (perm)	0	2354	0	0	3455	1794	3351	0	1830	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						224			313			
Link Speed (mph)		35			35			30				30
Link Distance (ft)		523			440			287				259
Travel Time (s)		10.2			8.6			6.5				5.9
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.87	0.87	0.87	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	1%	2%	1%	0%	0%	2%	2%	2%
Adj. Flow (vph)	217	646	0	0	673	133	259	0	434	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	863	0	0	673	133	259	0	434	0	0	0
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (ft)	20	100			100	20	20		20			
Trailing Detector (ft)	0	0			0	0	0		0			
Detector 1 Position(ft)	0	0			0	0	0		0			
Detector 1 Size(ft)	20	6			6	20	20		20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Free	Prot		Perm			
Protected Phases	7	4			8		5					
Permitted Phases	4					Free			5			
Detector Phase	7	4			8		5		5			
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0		5.0		5.0			
Minimum Split (s)	11.0	24.0			24.0		11.0		11.0			
Total Split (s)	16.0	52.0			36.0		21.0		21.0			
Total Split (%)	21.9%	71.2%			49.3%		28.8%		28.8%			

Lanes, Volumes, Timings
6: I-95 NB Off-ramp & North Avenue

2028 Build Weekday Morning Peak-Hour

03/01/2021

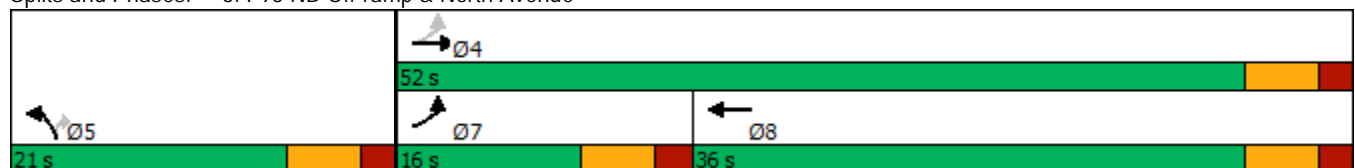


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	10.0	46.0			30.0		15.0		15.0			
Yellow Time (s)	4.0	4.0			4.0		4.0		4.0			
All-Red Time (s)	2.0	2.0			2.0		2.0		2.0			
Lost Time Adjust (s)		-2.0			-2.0		-2.0		-2.0			
Total Lost Time (s)		4.0			4.0		4.0		4.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	None			None		None		None			
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0							
Pedestrian Calls (#/hr)		0			0							
Act Effct Green (s)		29.3			29.3	50.3	12.4		12.4			
Actuated g/C Ratio		0.58			0.58	1.00	0.25		0.25			
v/c Ratio		0.63			0.33	0.07	0.31		0.63			
Control Delay		9.2			5.8	0.1	18.8		11.0			
Queue Delay		0.0			0.0	0.0	0.0		0.0			
Total Delay		9.2			5.8	0.1	18.8		11.0			
LOS		A			A	A	B		B			
Approach Delay		9.2			4.9			13.9				
Approach LOS		A			A			B				
Queue Length 50th (ft)		65			40	0	29		27			
Queue Length 95th (ft)		131			82	0	76		118			
Internal Link Dist (ft)		443			360			207			179	
Turn Bay Length (ft)						100						
Base Capacity (vph)		2111			2535	1794	1213		862			
Starvation Cap Reductn		0			0	0	0		0			
Spillback Cap Reductn		0			0	0	0		0			
Storage Cap Reductn		0			0	0	0		0			
Reduced v/c Ratio		0.41			0.27	0.07	0.21		0.50			

Intersection Summary

Area Type: Other
 Cycle Length: 73
 Actuated Cycle Length: 50.3
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 9.1
 Intersection LOS: A
 Intersection Capacity Utilization 54.6%
 ICU Level of Service A
 Analysis Period (min) 15













Splits and Phases: 6: I-95 NB Off-ramp & North Avenue



Lanes, Volumes, Timings
6: I-95 NB Off-ramp & North Avenue

2028 Build Weekday Evening Peak-Hour

03/01/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↑			↑↑	↗	↗↗		↗			
Traffic Volume (vph)	417	633	0	0	827	213	145	0	268	0	0	0
Future Volume (vph)	417	633	0	0	827	213	145	0	268	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	16	11	12	16	12	12	12
Storage Length (ft)	0		0	0		100	0		0	0		0
Storage Lanes	0		0	0		1	2		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr _t						0.850			0.850			
Fl _t Protected		0.981					0.950					
Satd. Flow (prot)	0	3520	0	0	3490	1830	3385	0	1830	0	0	0
Fl _t Permitted		0.545					0.950					
Satd. Flow (perm)	0	1956	0	0	3490	1830	3385	0	1830	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						224			282			
Link Speed (mph)		35			35			30				30
Link Distance (ft)		523			440			287				259
Travel Time (s)		10.2			8.6			6.5				5.9
Peak Hour Factor	0.98	0.98	0.98	0.87	0.87	0.87	0.95	0.95	0.95	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	2%	2%	2%
Adj. Flow (vph)	426	646	0	0	951	245	153	0	282	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1072	0	0	951	245	153	0	282	0	0	0
Number of Detectors	1	2			2	1	1		1			
Detector Template	Left	Thru			Thru	Right	Left		Right			
Leading Detector (ft)	20	100			100	20	20		20			
Trailing Detector (ft)	0	0			0	0	0		0			
Detector 1 Position(ft)	0	0			0	0	0		0			
Detector 1 Size(ft)	20	6			6	20	20		20			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0		0.0			
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type	pm+pt	NA			NA	Free	Prot		Perm			
Protected Phases	7	4			8		5					
Permitted Phases	4					Free			5			
Detector Phase	7	4			8		5		5			
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0		5.0		5.0			
Minimum Split (s)	11.5	24.5			24.5		11.5		11.5			
Total Split (s)	16.0	52.0			36.0		21.0		21.0			
Total Split (%)	21.9%	71.2%			49.3%		28.8%		28.8%			

Lanes, Volumes, Timings
6: I-95 NB Off-ramp & North Avenue

2028 Build Weekday Evening Peak-Hour

03/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	10.0	46.0			30.0		15.0		15.0			
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			-2.0		-2.0		-2.0			
Total Lost Time (s)		6.0			4.0		4.0		4.0			
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	None			None		None		None			
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0							
Pedestrian Calls (#/hr)		0			0							
Act Effect Green (s)		35.7			37.8	56.8	10.6		10.6			
Actuated g/C Ratio		0.63			0.67	1.00	0.19		0.19			
v/c Ratio		1.30dl			0.41	0.13	0.24		0.49			
Control Delay		18.2			4.8	0.2	23.5		7.1			
Queue Delay		0.0			0.0	0.0	0.0		0.0			
Total Delay		18.2			4.8	0.2	23.5		7.1			
LOS		B			A	A	C		A			
Approach Delay		18.2			3.9			12.8				
Approach LOS		B			A			B				
Queue Length 50th (ft)		124			58	0	24		0			
Queue Length 95th (ft)		#279			100	0	52		57			
Internal Link Dist (ft)		443			360			207			179	
Turn Bay Length (ft)						100						
Base Capacity (vph)		1592			2479	1830	1060		766			
Starvation Cap Reductn		0			0	0	0		0			
Spillback Cap Reductn		0			0	0	0		0			
Storage Cap Reductn		0			0	0	0		0			
Reduced v/c Ratio		0.67			0.38	0.13	0.14		0.37			

Intersection Summary

Area Type: Other

Cycle Length: 73

Actuated Cycle Length: 56.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 11.0

Intersection LOS: B

Intersection Capacity Utilization 68.3%

ICU Level of Service C

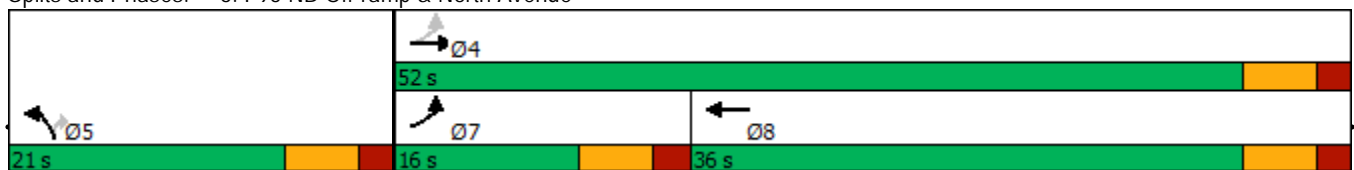
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 6: I-95 NB Off-ramp & North Avenue



North Avenue at I-95 Southbound Ramps

Lanes, Volumes, Timings
3: North Avenue & I-95 SB Off-ramp

2021 Existing Weekday Morning Peak-Hour

03/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑					↓		↑
Traffic Volume (vph)	0	518	126	162	568	0	0	0	0	179	0	590
Future Volume (vph)	0	518	126	162	568	0	0	0	0	179	0	590
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	16	12	16
Storage Length (ft)	0		125	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850									0.850
Fl _t Protected					0.989					0.950		
Satd. Flow (prot)	0	3574	1777	0	3519	0	0	0	0	2025	0	1812
Fl _t Permitted					0.733					0.950		
Satd. Flow (perm)	0	3574	1777	0	2608	0	0	0	0	2025	0	1812
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			159									525
Link Speed (mph)		30			35			30				30
Link Distance (ft)		245			523			292				252
Travel Time (s)		5.6			10.2			6.6				5.7
Peak Hour Factor	0.94	0.94	0.94	0.91	0.91	0.91	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	0%	1%	3%	3%	1%	0%	2%	2%	2%	1%	0%	1%
Adj. Flow (vph)	0	551	134	178	624	0	0	0	0	213	0	702
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	551	134	0	802	0	0	0	0	213	0	702
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Free	pm+pt	NA					Prot		Free
Protected Phases		4		3	8					1		
Permitted Phases			Free	8								Free
Detector Phase		4		3	8					1		
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0					5.0		
Minimum Split (s)		22.5		9.5	22.5					9.5		
Total Split (s)		36.0		16.0	52.0					20.0		
Total Split (%)		50.0%		22.2%	72.2%					27.8%		

Lanes, Volumes, Timings
 3: North Avenue & I-95 SB Off-ramp

2021 Existing Weekday Morning Peak-Hour

03/01/2021

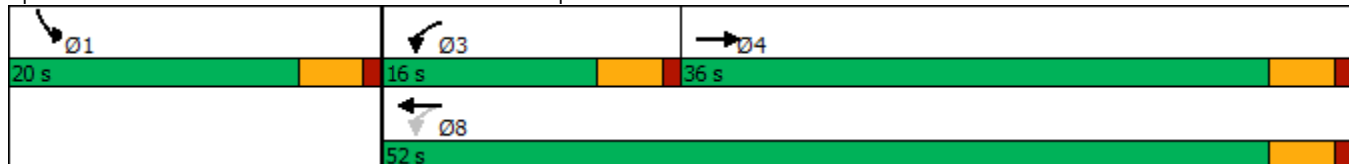


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)		31.5		11.5	47.5					15.5		
Yellow Time (s)		3.5		3.5	3.5					3.5		
All-Red Time (s)		1.0		1.0	1.0					1.0		
Lost Time Adjust (s)		0.0			0.0					0.0		
Total Lost Time (s)		4.5			4.5					4.5		
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Recall Mode		None		None	None					None		
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0							
Pedestrian Calls (#/hr)		0			0							
Act Effect Green (s)		23.8	37.8		23.8					10.4		37.8
Actuated g/C Ratio		0.63	1.00		0.63					0.28		1.00
v/c Ratio		0.24	0.08		0.49					0.38		0.39
Control Delay		5.3	0.1		7.3					16.6		0.6
Queue Delay		0.0	0.0		0.0					0.0		0.0
Total Delay		5.3	0.1		7.3					16.6		0.6
LOS		A	A		A					B		A
Approach Delay		4.3			7.3							4.3
Approach LOS		A			A							A
Queue Length 50th (ft)		29	0		52					38		0
Queue Length 95th (ft)		63	0		113					99		0
Internal Link Dist (ft)		165			443			212				172
Turn Bay Length (ft)			125									
Base Capacity (vph)		2883	1777		2536					977		1812
Starvation Cap Reductn		0	0		0					0		0
Spillback Cap Reductn		0	0		0					0		0
Storage Cap Reductn		0	0		0					0		0
Reduced v/c Ratio		0.19	0.08		0.32					0.22		0.39

Intersection Summary

Area Type: Other
 Cycle Length: 72
 Actuated Cycle Length: 37.8
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 5.3
 Intersection LOS: A
 Intersection Capacity Utilization 55.5%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 3: North Avenue & I-95 SB Off-ramp



Lanes, Volumes, Timings
3: North Avenue & I-95 SB Off-ramp

2021 Existing Weekday Evening Peak-Hour

03/01/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑					↖		↗
Traffic Volume (vph)	0	875	277	307	563	0	0	0	0	98	0	356
Future Volume (vph)	0	875	277	307	563	0	0	0	0	98	0	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	16	12	16
Storage Length (ft)	0		125	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850									0.850
Fl _t Protected					0.983					0.950		
Satd. Flow (prot)	0	3610	1812	0	3549	0	0	0	0	2025	0	1812
Fl _t Permitted					0.561					0.950		
Satd. Flow (perm)	0	3610	1812	0	2025	0	0	0	0	2025	0	1812
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			227									405
Link Speed (mph)		30			35			30			30	
Link Distance (ft)		245			523			292			252	
Travel Time (s)		5.6			10.2			6.6			5.7	
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	2%	2%	2%	1%	0%	1%
Adj. Flow (vph)	0	931	295	341	626	0	0	0	0	111	0	405
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	931	295	0	967	0	0	0	0	111	0	405
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Free	pm+pt	NA					Prot		Free
Protected Phases		4		3	8					1		
Permitted Phases			Free	8								Free
Detector Phase		4		3	8					1		
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0					5.0		
Minimum Split (s)		24.0		11.0	24.0					11.0		
Total Split (s)		36.0		16.0	52.0					20.0		
Total Split (%)		50.0%		22.2%	72.2%					27.8%		

Lanes, Volumes, Timings
3: North Avenue & I-95 SB Off-ramp

2021 Existing Weekday Evening Peak-Hour

03/01/2021

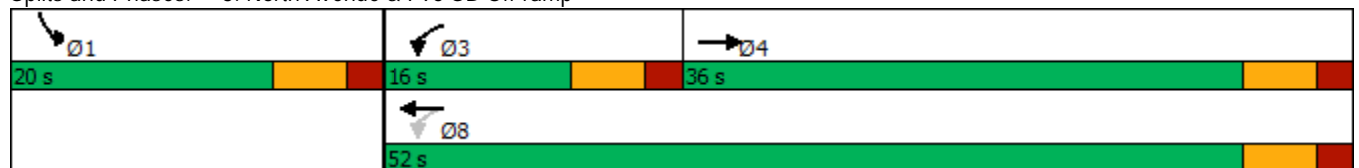


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)		30.0		10.0	46.0					14.0		
Yellow Time (s)		4.0		4.0	4.0					4.0		
All-Red Time (s)		2.0		2.0	2.0					2.0		
Lost Time Adjust (s)		-2.0			-2.0					-2.0		
Total Lost Time (s)		4.0			4.0					4.0		
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Recall Mode		None		None	None					None		
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0							
Pedestrian Calls (#/hr)		0			0							
Act Effect Green (s)		36.6	50.2		36.6					12.2		50.2
Actuated g/C Ratio		0.73	1.00		0.73					0.24		1.00
v/c Ratio		0.35	0.16		0.86dl					0.23		0.22
Control Delay		4.4	0.2		8.5					22.8		0.3
Queue Delay		0.0	0.0		0.0					0.0		0.0
Total Delay		4.4	0.2		8.5					22.8		0.3
LOS		A	A		A					C		A
Approach Delay		3.4			8.5							5.1
Approach LOS		A			A							A
Queue Length 50th (ft)		57	0		85					30		0
Queue Length 95th (ft)		102	0		176					80		0
Internal Link Dist (ft)		165			443			212				172
Turn Bay Length (ft)			125									
Base Capacity (vph)		2687	1812		1754					821		1812
Starvation Cap Reductn		0	0		0					0		0
Spillback Cap Reductn		0	0		0					0		0
Storage Cap Reductn		0	0		0					0		0
Reduced v/c Ratio		0.35	0.16		0.55					0.14		0.22

Intersection Summary

Area Type: Other
 Cycle Length: 72
 Actuated Cycle Length: 50.2
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 5.6
 Intersection LOS: A
 Intersection Capacity Utilization 64.1%
 ICU Level of Service C
 Analysis Period (min) 15
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 3: North Avenue & I-95 SB Off-ramp



Lanes, Volumes, Timings
3: North Avenue & I-95 SB Off-ramp

2028 No-Build Weekday Morning Peak-Hour

03/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑					↑		↑
Traffic Volume (vph)	0	606	135	179	620	0	0	0	0	192	0	633
Future Volume (vph)	0	606	135	179	620	0	0	0	0	192	0	633
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	16	12	16
Storage Length (ft)	0		125	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850									0.850
Fl _t Protected					0.989					0.950		
Satd. Flow (prot)	0	3574	1777	0	3519	0	0	0	0	2025	0	1812
Fl _t Permitted					0.697					0.950		
Satd. Flow (perm)	0	3574	1777	0	2480	0	0	0	0	2025	0	1812
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			159									501
Link Speed (mph)		30			35			30			30	
Link Distance (ft)		245			523			292			252	
Travel Time (s)		5.6			10.2			6.6			5.7	
Peak Hour Factor	0.94	0.94	0.94	0.91	0.91	0.91	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	0%	1%	3%	3%	1%	0%	2%	2%	2%	1%	0%	1%
Adj. Flow (vph)	0	645	144	197	681	0	0	0	0	229	0	754
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	645	144	0	878	0	0	0	0	229	0	754
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Free	pm+pt	NA					Prot		Free
Protected Phases		4		3		8				1		
Permitted Phases		Free		8								Free
Detector Phase		4		3		8				1		
Switch Phase												
Minimum Initial (s)		5.0		5.0		5.0				5.0		
Minimum Split (s)		22.5		9.5		22.5				9.5		
Total Split (s)		36.0		16.0		52.0				20.0		
Total Split (%)		50.0%		22.2%		72.2%				27.8%		

Lanes, Volumes, Timings
 3: North Avenue & I-95 SB Off-ramp

2028 No-Build Weekday Morning Peak-Hour

03/01/2021

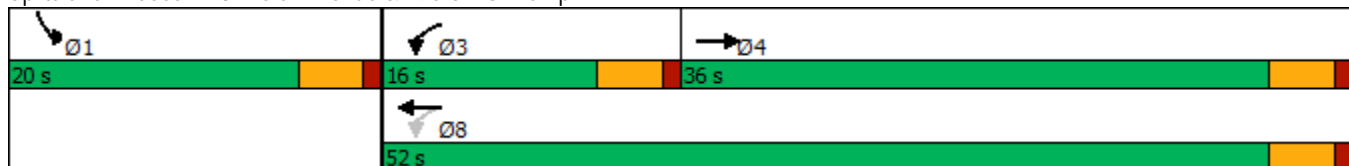


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)		31.5		11.5	47.5					15.5		
Yellow Time (s)		3.5		3.5	3.5					3.5		
All-Red Time (s)		1.0		1.0	1.0					1.0		
Lost Time Adjust (s)		0.0			0.0					0.0		
Total Lost Time (s)		4.5			4.5					4.5		
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Recall Mode		None		None	None					None		
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0							
Pedestrian Calls (#/hr)		0			0							
Act Effect Green (s)		29.0	43.8		29.0					11.4		43.8
Actuated g/C Ratio		0.66	1.00		0.66					0.26		1.00
v/c Ratio		0.27	0.08		0.53					0.44		0.42
Control Delay		5.2	0.1		7.6					20.3		0.7
Queue Delay		0.0	0.0		0.0					0.0		0.0
Total Delay		5.2	0.1		7.6					20.3		0.7
LOS		A	A		A					C		A
Approach Delay		4.3			7.6							5.3
Approach LOS		A			A							A
Queue Length 50th (ft)		38	0		66					50		0
Queue Length 95th (ft)		76	0		137					128		0
Internal Link Dist (ft)		165			443			212				172
Turn Bay Length (ft)			125									
Base Capacity (vph)		2695	1777		2291					858		1812
Starvation Cap Reductn		0	0		0					0		0
Spillback Cap Reductn		0	0		0					0		0
Storage Cap Reductn		0	0		0					0		0
Reduced v/c Ratio		0.24	0.08		0.38					0.27		0.42

Intersection Summary

Area Type: Other
 Cycle Length: 72
 Actuated Cycle Length: 43.8
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 5.8
 Intersection LOS: A
 Intersection Capacity Utilization 60.6%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 3: North Avenue & I-95 SB Off-ramp



Lanes, Volumes, Timings
3: North Avenue & I-95 SB Off-ramp

2028 No-Build Weekday Evening Peak-Hour

03/01/2021

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖					↘		↖
Traffic Volume (vph)	0	948	297	357	658	0	0	0	0	105	0	382
Future Volume (vph)	0	948	297	357	658	0	0	0	0	105	0	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	16	12	16
Storage Length (ft)	0		125	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850									0.850
Fl _t Protected					0.983					0.950		
Satd. Flow (prot)	0	3610	1812	0	3549	0	0	0	0	2025	0	1812
Fl _t Permitted					0.545					0.950		
Satd. Flow (perm)	0	3610	1812	0	1967	0	0	0	0	2025	0	1812
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			227									434
Link Speed (mph)		30			35			30			30	
Link Distance (ft)		245			523			292			252	
Travel Time (s)		5.6			10.2			6.6			5.7	
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	2%	2%	2%	1%	0%	1%
Adj. Flow (vph)	0	1009	316	397	731	0	0	0	0	119	0	434
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1009	316	0	1128	0	0	0	0	119	0	434
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Free	pm+pt	NA					Prot		Free
Protected Phases		4		3	8					1		
Permitted Phases			Free	8								Free
Detector Phase		4		3	8					1		
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0					5.0		
Minimum Split (s)		24.0		11.0	24.0					11.0		
Total Split (s)		36.0		16.0	52.0					20.0		
Total Split (%)		50.0%		22.2%	72.2%					27.8%		

Lanes, Volumes, Timings
 3: North Avenue & I-95 SB Off-ramp

2028 No-Build Weekday Evening Peak-Hour

03/01/2021

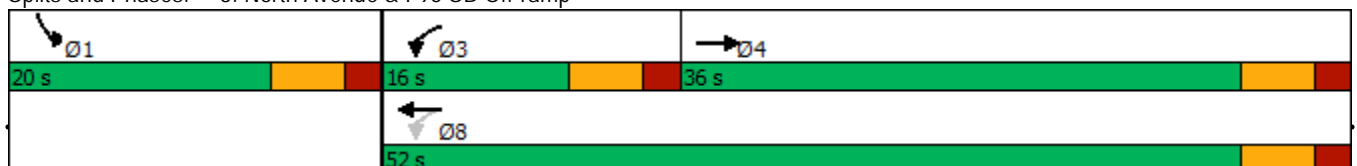


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)		30.0		10.0	46.0					14.0		
Yellow Time (s)		4.0		4.0	4.0					4.0		
All-Red Time (s)		2.0		2.0	2.0					2.0		
Lost Time Adjust (s)		-2.0			-2.0					-2.0		
Total Lost Time (s)		4.0			4.0					4.0		
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Recall Mode		None		None	None					None		
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0							
Pedestrian Calls (#/hr)		0			0							
Act Effect Green (s)		41.9	55.8		41.9					12.5		55.8
Actuated g/C Ratio		0.75	1.00		0.75					0.22		1.00
v/c Ratio		0.37	0.17		1.06dl					0.26		0.24
Control Delay		4.4	0.2		12.0					25.3		0.3
Queue Delay		0.0	0.0		0.0					0.0		0.0
Total Delay		4.4	0.2		12.0					25.3		0.3
LOS		A	A		B					C		A
Approach Delay		3.4			12.0							5.7
Approach LOS		A			B							A
Queue Length 50th (ft)		67	0		127					42		0
Queue Length 95th (ft)		116	0		#300					84		0
Internal Link Dist (ft)		165			443			212				172
Turn Bay Length (ft)			125									
Base Capacity (vph)		2711	1812		1575					720		1812
Starvation Cap Reductn		0	0		0					0		0
Spillback Cap Reductn		0	0		0					0		0
Storage Cap Reductn		0	0		0					0		0
Reduced v/c Ratio		0.37	0.17		0.72					0.17		0.24

Intersection Summary

Area Type: Other
 Cycle Length: 72
 Actuated Cycle Length: 55.8
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 7.0
 Intersection LOS: A
 Intersection Capacity Utilization 70.6%
 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.
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.






















Splits and Phases: 3: North Avenue & I-95 SB Off-ramp



Lanes, Volumes, Timings
3: North Avenue & I-95 SB Off-ramp

2028 Build Weekday Morning Peak-Hour

03/01/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 	 		 							 
Traffic Volume (vph)	0	559	135	228	616	0	0	0	0	192	0	633
Future Volume (vph)	0	559	135	228	616	0	0	0	0	192	0	633
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	16	12	16
Storage Length (ft)	0		125	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850									0.850
Fl _t Protected					0.987					0.950		
Satd. Flow (prot)	0	3574	1777	0	3509	0	0	0	0	2025	0	1812
Fl _t Permitted					0.678					0.950		
Satd. Flow (perm)	0	3574	1777	0	2410	0	0	0	0	2025	0	1812
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			159									503
Link Speed (mph)		30			35			30			30	
Link Distance (ft)		245			523			292			252	
Travel Time (s)		5.6			10.2			6.6			5.7	
Peak Hour Factor	0.94	0.94	0.94	0.91	0.91	0.91	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	0%	1%	3%	3%	1%	0%	2%	2%	2%	1%	0%	1%
Adj. Flow (vph)	0	595	144	251	677	0	0	0	0	229	0	754
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	595	144	0	928	0	0	0	0	229	0	754
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Free	pm+pt	NA					Prot		Free
Protected Phases		4		3	8					1		
Permitted Phases			Free	8								Free
Detector Phase		4		3	8					1		
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0					5.0		
Minimum Split (s)		22.5		9.5	22.5					9.5		
Total Split (s)		36.0		16.0	52.0					20.0		
Total Split (%)		50.0%		22.2%	72.2%					27.8%		

Lanes, Volumes, Timings
3: North Avenue & I-95 SB Off-ramp

2028 Build Weekday Morning Peak-Hour

03/01/2021

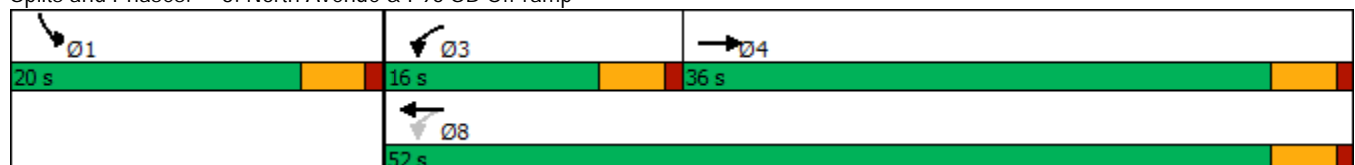


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)		31.5		11.5	47.5					15.5		
Yellow Time (s)		3.5		3.5	3.5					3.5		
All-Red Time (s)		1.0		1.0	1.0					1.0		
Lost Time Adjust (s)		0.0			0.0					0.0		
Total Lost Time (s)		4.5			4.5					4.5		
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Recall Mode		None		None	None					None		
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0							
Pedestrian Calls (#/hr)		0			0							
Act Effect Green (s)		27.8	48.5		27.8					10.9		48.5
Actuated g/C Ratio		0.57	1.00		0.57					0.22		1.00
v/c Ratio		0.29	0.08		0.67					0.50		0.42
Control Delay		5.5	0.1		9.8					23.3		0.7
Queue Delay		0.0	0.0		0.0					0.0		0.0
Total Delay		5.5	0.1		9.8					23.3		0.7
LOS		A	A		A					C		A
Approach Delay		4.4			9.8							6.0
Approach LOS		A			A							A
Queue Length 50th (ft)		35	0		75					54		0
Queue Length 95th (ft)		69	0		151					139		0
Internal Link Dist (ft)		165			443			212				172
Turn Bay Length (ft)			125									
Base Capacity (vph)		2678	1777		2181					701		1812
Starvation Cap Reductn		0	0		0					0		0
Spillback Cap Reductn		0	0		0					0		0
Storage Cap Reductn		0	0		0					0		0
Reduced v/c Ratio		0.22	0.08		0.43					0.33		0.42

Intersection Summary

Area Type: Other
 Cycle Length: 72
 Actuated Cycle Length: 48.5
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 6.9
 Intersection LOS: A
 Intersection Capacity Utilization 60.6%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 3: North Avenue & I-95 SB Off-ramp



Lanes, Volumes, Timings
3: North Avenue & I-95 SB Off-ramp

2028 Build Weekday Evening Peak-Hour

03/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖					↘		↗
Traffic Volume (vph)	0	945	297	364	608	0	0	0	0	105	0	382
Future Volume (vph)	0	945	297	364	608	0	0	0	0	105	0	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	16	12	16
Storage Length (ft)	0		125	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr t			0.850									0.850
Flt Protected					0.982					0.950		
Satd. Flow (prot)	0	3610	1812	0	3545	0	0	0	0	2025	0	1812
Flt Permitted					0.542					0.950		
Satd. Flow (perm)	0	3610	1812	0	1957	0	0	0	0	2025	0	1812
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			227									434
Link Speed (mph)		30			35			30				30
Link Distance (ft)		245			523			292				252
Travel Time (s)		5.6			10.2			6.6				5.7
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.92	0.92	0.92	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	2%	2%	2%	1%	0%	1%
Adj. Flow (vph)	0	1005	316	404	676	0	0	0	0	119	0	434
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1005	316	0	1080	0	0	0	0	119	0	434
Number of Detectors		2	1	1	2					1		1
Detector Template		Thru	Right	Left	Thru					Left		Right
Leading Detector (ft)		100	20	20	100					20		20
Trailing Detector (ft)		0	0	0	0					0		0
Detector 1 Position(ft)		0	0	0	0					0		0
Detector 1 Size(ft)		6	20	20	6					20		20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0	0.0	0.0	0.0					0.0		0.0
Detector 2 Position(ft)		94			94							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							
Turn Type		NA	Free	pm+pt	NA					Prot		Free
Protected Phases		4		3	8					1		
Permitted Phases			Free	8								Free
Detector Phase		4		3	8					1		
Switch Phase												
Minimum Initial (s)		5.0		5.0	5.0					5.0		
Minimum Split (s)		24.0		11.0	24.0					11.0		
Total Split (s)		36.0		16.0	52.0					20.0		
Total Split (%)		50.0%		22.2%	72.2%					27.8%		

Lanes, Volumes, Timings
3: North Avenue & I-95 SB Off-ramp

2028 Build Weekday Evening Peak-Hour

03/01/2021

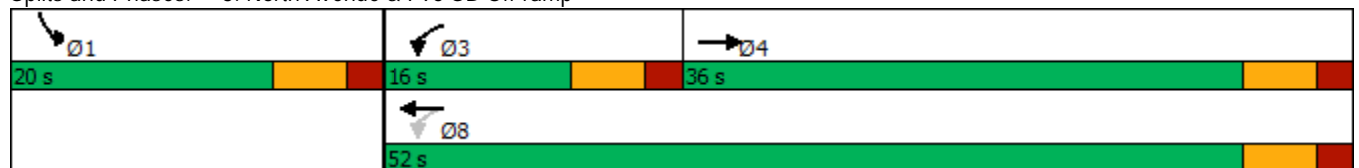


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)		30.0		10.0	46.0					14.0		
Yellow Time (s)		4.0		4.0	4.0					4.0		
All-Red Time (s)		2.0		2.0	2.0					2.0		
Lost Time Adjust (s)		-2.0			-2.0					-2.0		
Total Lost Time (s)		4.0			4.0					4.0		
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0		
Recall Mode		None		None	None					None		
Walk Time (s)		7.0			7.0							
Flash Dont Walk (s)		11.0			11.0							
Pedestrian Calls (#/hr)		0			0							
Act Effect Green (s)		40.1	54.0		40.1					12.4		54.0
Actuated g/C Ratio		0.74	1.00		0.74					0.23		1.00
v/c Ratio		0.37	0.17		1.09dl					0.26		0.24
Control Delay		4.5	0.2		11.2					24.5		0.3
Queue Delay		0.0	0.0		0.0					0.0		0.0
Total Delay		4.5	0.2		11.2					24.5		0.3
LOS		A	A		B					C		A
Approach Delay		3.5			11.2							5.5
Approach LOS		A			B							A
Queue Length 50th (ft)		67	0		116					38		0
Queue Length 95th (ft)		115	0		246					84		0
Internal Link Dist (ft)		165			443			212				172
Turn Bay Length (ft)			125									
Base Capacity (vph)		2681	1812		1615					747		1812
Starvation Cap Reductn		0	0		0					0		0
Spillback Cap Reductn		0	0		0					0		0
Storage Cap Reductn		0	0		0					0		0
Reduced v/c Ratio		0.37	0.17		0.67					0.16		0.24

Intersection Summary

Area Type: Other
 Cycle Length: 72
 Actuated Cycle Length: 54
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 6.7
 Intersection LOS: A
 Intersection Capacity Utilization 69.3%
 ICU Level of Service C
 Analysis Period (min) 15
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 3: North Avenue & I-95 SB Off-ramp



North Avenue at Quannapowitt Parkway

Lanes, Volumes, Timings

2021 Existing Weekday Morning Peak-Hour

2: Private Driveway/Quannapowitt Parkway & North Avenue

03/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕	↕		↕	↕
Traffic Volume (vph)	143	670	42	10	562	45	17	1	3	34	2	55
Future Volume (vph)	143	670	42	10	562	45	17	1	3	34	2	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	12	12	12	11	16	12	11	11
Storage Length (ft)	0		0	140		0	0		0	210		210
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00										
Frt		0.993			0.989				0.850			0.850
Flt Protected		0.992			0.999			0.954			0.955	
Satd. Flow (prot)	0	3407	0	0	3503	0	0	1657	1830	0	1754	1531
Flt Permitted		0.664			0.935			0.799			0.771	
Satd. Flow (perm)	0	2280	0	0	3278	0	0	1388	1830	0	1416	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			13				101			86
Link Speed (mph)		35			35			30				30
Link Distance (ft)		440			439			316				1282
Travel Time (s)		8.6			8.6			7.2				29.1
Confl. Peds. (#/hr)	3											
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.75	0.75	0.75	0.64	0.64	0.64
Heavy Vehicles (%)	0%	1%	2%	0%	2%	0%	6%	0%	0%	0%	0%	2%
Adj. Flow (vph)	168	788	49	11	639	51	23	1	4	53	3	86
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1005	0	0	701	0	0	24	4	0	56	86
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pm+ov
Protected Phases	7	4			8			2			6	7
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		8	8		2	2	2	6	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0		24.0	24.0		23.0	23.0	23.0	23.0	23.0	9.5

Lanes, Volumes, Timings

2021 Existing Weekday Morning Peak-Hour

2: Private Driveway/Quannapowitt Parkway & North Avenue

03/01/2021

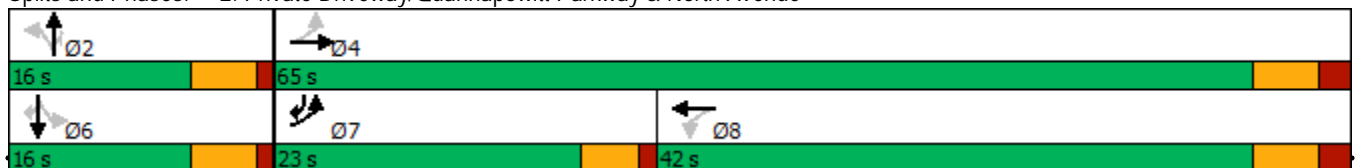


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	23.0	65.0		42.0	42.0		16.0	16.0	16.0	16.0	16.0	23.0
Total Split (%)	28.4%	80.2%		51.9%	51.9%		19.8%	19.8%	19.8%	19.8%	19.8%	28.4%
Maximum Green (s)	18.5	59.0		36.0	36.0		11.0	11.0	11.0	11.0	11.0	18.5
Yellow Time (s)	3.5	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.5
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-2.0			-2.0			-1.0	0.0		-1.0	0.0
Total Lost Time (s)		4.0			4.0			4.0	5.0		4.0	4.5
Lead/Lag	Lead			Lag	Lag							Lead
Lead-Lag Optimize?	Yes			Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	None	None	Max	Max	None
Walk Time (s)		5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Pedestrian Calls (#/hr)		4		0	0		0	0	0	4	4	
Act Effct Green (s)		34.3			26.5			16.4	15.4		16.4	26.2
Actuated g/C Ratio		0.58			0.45			0.28	0.26		0.28	0.44
v/c Ratio		0.71			0.47			0.06	0.01		0.14	0.12
Control Delay		10.2			12.4			20.8	0.0		21.1	4.6
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		10.3			12.4			20.8	0.0		21.1	4.6
LOS		B			B			C	A		C	A
Approach Delay		10.3			12.4			17.8			11.1	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)		92			89			6	0		14	0
Queue Length 95th (ft)		113			122			23	0		35	11
Internal Link Dist (ft)		360			359			236			1202	
Turn Bay Length (ft)												210
Base Capacity (vph)		2271			2191			386	552		394	1054
Starvation Cap Reductn		151			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		0.47			0.32			0.06	0.01		0.14	0.08

Intersection Summary

Area Type:	Other
Cycle Length:	81
Actuated Cycle Length:	58.9
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	11.2
Intersection LOS:	B
Intersection Capacity Utilization:	59.9%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 2: Private Driveway/Quannapowitt Parkway & North Avenue

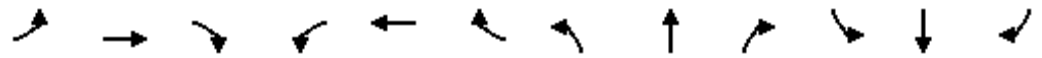


Lanes, Volumes, Timings

2021 Existing Weekday Evening Peak-Hour

2: Private Driveway/Quannapowitt Parkway & North Avenue

03/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕	↗		↕	↗
Traffic Volume (vph)	82	682	19	7	753	48	40	2	15	43	2	141
Future Volume (vph)	82	682	19	7	753	48	40	2	15	43	2	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	12	12	12	11	16	12	11	11
Storage Length (ft)	0		0	140		0	0		0	210		210
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996			0.991				0.850			0.850
Flt Protected		0.995						0.955			0.954	
Satd. Flow (prot)	0	3428	0	0	3578	0	0	1754	1830	0	1752	1561
Flt Permitted		0.737			0.947			0.741			0.732	
Satd. Flow (perm)	0	2539	0	0	3388	0	0	1361	1830	0	1344	1561
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			11				108			94
Link Speed (mph)		35			35			30				30
Link Distance (ft)		440			439			316				1282
Travel Time (s)		8.6			8.6			7.2				29.1
Confl. Peds. (#/hr)	3											
Peak Hour Factor	0.95	0.95	0.95	0.87	0.87	0.87	0.75	0.75	0.75	0.64	0.64	0.64
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	86	718	20	8	866	55	53	3	20	67	3	220
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	824	0	0	929	0	0	56	20	0	70	220
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pm+ov
Protected Phases	7	4			8			2			6	7
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		8	8		2	2	2	6	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0		24.0	24.0		23.0	23.0	23.0	23.0	23.0	10.0

Lanes, Volumes, Timings

2021 Existing Weekday Evening Peak-Hour

2: Private Driveway/Quannapowitt Parkway & North Avenue

03/01/2021

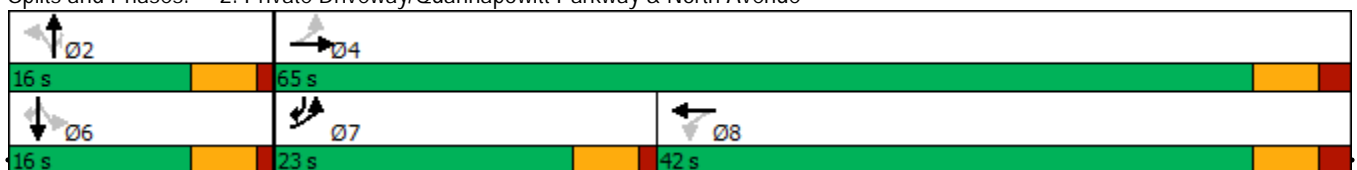


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	23.0	65.0		42.0	42.0		16.0	16.0	16.0	16.0	16.0	23.0
Total Split (%)	28.4%	80.2%		51.9%	51.9%		19.8%	19.8%	19.8%	19.8%	19.8%	28.4%
Maximum Green (s)	18.0	59.0		36.0	36.0		11.0	11.0	11.0	11.0	11.0	18.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-2.0			-2.0			-1.0	0.0		-1.0	0.0
Total Lost Time (s)		4.0			4.0			4.0	5.0		4.0	5.0
Lead/Lag	Lead			Lag	Lag							Lead
Lead-Lag Optimize?	Yes			Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	None	None	Max	Max	None
Walk Time (s)		5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Pedestrian Calls (#/hr)		4		0	0		0	0	0	4	4	
Act Effect Green (s)		36.6			25.5			16.2	15.2		16.2	26.2
Actuated g/C Ratio		0.60			0.42			0.27	0.25		0.27	0.43
v/c Ratio		0.50			0.65			0.16	0.04		0.20	0.30
Control Delay		7.3			16.0			21.0	0.1		21.6	9.2
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		7.3			16.0			21.0	0.1		21.6	9.2
LOS		A			B			C	A		C	A
Approach Delay		7.3			16.0			15.5			12.2	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)		70			133			16	0		20	27
Queue Length 95th (ft)		97			178			40	0		40	47
Internal Link Dist (ft)		360			359			236			1202	
Turn Bay Length (ft)												210
Base Capacity (vph)		2546			2143			361	537		357	1020
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		0.32			0.43			0.16	0.04		0.20	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 81
 Actuated Cycle Length: 60.8
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 12.1
 Intersection LOS: B
 Intersection Capacity Utilization 63.5%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2: Private Driveway/Quannapowitt Parkway & North Avenue

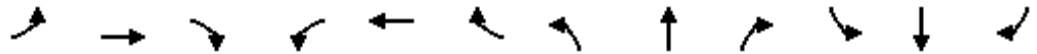


Lanes, Volumes, Timings

2028 No-Build Weekday Morning Peak-Hour

2: Private Driveway/Quannapowitt Parkway & North Avenue

03/01/2021



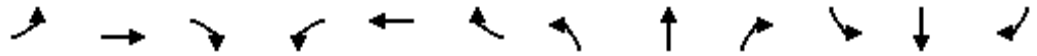
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕	↕		↕	↕
Traffic Volume (vph)	236	721	42	10	604	75	17	1	3	40	2	73
Future Volume (vph)	236	721	42	10	604	75	17	1	3	40	2	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	12	12	12	11	16	12	11	11
Storage Length (ft)	0		0	140		0	0		0	210		210
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00										
Frt		0.994			0.984				0.850			0.850
Flt Protected		0.988			0.999			0.954			0.954	
Satd. Flow (prot)	0	3400	0	0	3488	0	0	1657	1830	0	1752	1531
Flt Permitted		0.593			0.934			0.781			0.745	
Satd. Flow (perm)	0	2040	0	0	3261	0	0	1356	1830	0	1368	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			22				101			114
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		440			439			316			1282	
Travel Time (s)		8.6			8.6			7.2			29.1	
Confl. Peds. (#/hr)	3											
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.75	0.75	0.75	0.64	0.64	0.64
Heavy Vehicles (%)	0%	1%	2%	0%	2%	0%	6%	0%	0%	0%	0%	2%
Adj. Flow (vph)	278	848	49	11	686	85	23	1	4	63	3	114
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1175	0	0	782	0	0	24	4	0	66	114
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pm+ov
Protected Phases	7	4			8			2			6	7
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		8	8		2	2	2	6	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0		24.0	24.0		23.0	23.0	23.0	23.0	23.0	9.5

Lanes, Volumes, Timings

2028 No-Build Weekday Morning Peak-Hour

2: Private Driveway/Quannapowitt Parkway & North Avenue

03/01/2021

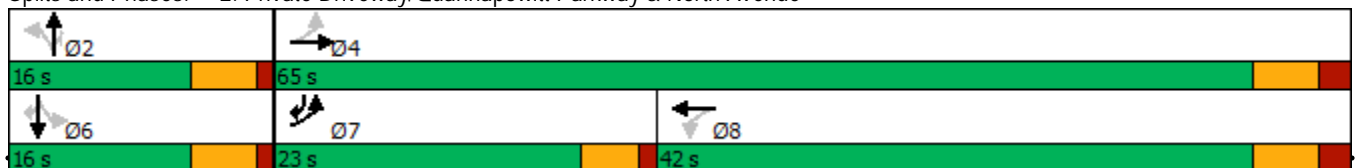


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	23.0	65.0		42.0	42.0		16.0	16.0	16.0	16.0	16.0	23.0
Total Split (%)	28.4%	80.2%		51.9%	51.9%		19.8%	19.8%	19.8%	19.8%	19.8%	28.4%
Maximum Green (s)	18.5	59.0		36.0	36.0		11.0	11.0	11.0	11.0	11.0	18.5
Yellow Time (s)	3.5	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.5
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-2.0			-2.0		-1.0	0.0		-1.0	0.0	
Total Lost Time (s)		4.0			4.0		4.0	5.0		4.0	4.0	4.5
Lead/Lag	Lead			Lag	Lag							Lead
Lead-Lag Optimize?	Yes			Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	None	None	Max	Max	None
Walk Time (s)		5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Pedestrian Calls (#/hr)		4		0	0		0	0	0	4	4	
Act Effect Green (s)		49.9			42.3			16.4	15.3		16.4	26.2
Actuated g/C Ratio		0.67			0.57			0.22	0.21		0.22	0.35
v/c Ratio		0.81			0.42			0.08	0.01		0.22	0.19
Control Delay		12.1			9.8			28.6	0.0		30.2	5.7
Queue Delay		0.6			0.0			0.0	0.0		0.0	0.0
Total Delay		12.7			9.8			28.6	0.0		30.2	5.7
LOS		B			A			C	A		C	A
Approach Delay		12.7			9.8			24.5			14.7	
Approach LOS		B			A			C			B	
Queue Length 50th (ft)		116			101			10	0		27	0
Queue Length 95th (ft)		138			135			26	0		46	12
Internal Link Dist (ft)		360			359			236			1202	
Turn Bay Length (ft)												210
Base Capacity (vph)		1768			1955			297	457		300	863
Starvation Cap Reductn		250			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			0.40			0.08	0.01		0.22	0.13

Intersection Summary

Area Type:	Other
Cycle Length:	81
Actuated Cycle Length:	74.5
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.81
Intersection Signal Delay:	11.9
Intersection LOS:	B
Intersection Capacity Utilization:	66.5%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Private Driveway/Quannapowitt Parkway & North Avenue



Lanes, Volumes, Timings

2028 No-Build Weekday Evening Peak-Hour

2: Private Driveway/Quannapowitt Parkway & North Avenue

03/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	732	19	7	809	56	40	2	15	73	2	234
Future Volume (vph)	104	732	19	7	809	56	40	2	15	73	2	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	12	12	12	11	16	12	11	11
Storage Length (ft)	0		0	140		0	0		0	210		210
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00										
Frt		0.997			0.990				0.850			0.850
Flt Protected		0.994						0.955			0.954	
Satd. Flow (prot)	0	3429	0	0	3574	0	0	1754	1830	0	1752	1561
Flt Permitted		0.651			0.947			0.719			0.697	
Satd. Flow (perm)	0	2245	0	0	3384	0	0	1321	1830	0	1280	1561
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			12				108			78
Link Speed (mph)		35			35			30				30
Link Distance (ft)		440			439			316				1282
Travel Time (s)		8.6			8.6			7.2				29.1
Confl. Peds. (#/hr)	3											
Peak Hour Factor	0.95	0.95	0.95	0.87	0.87	0.87	0.75	0.75	0.75	0.64	0.64	0.64
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	109	771	20	8	930	64	53	3	20	114	3	366
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	900	0	0	1002	0	0	56	20	0	117	366
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pm+ov
Protected Phases	7	4			8			2			6	7
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		8	8		2	2	2	6	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0		24.0	24.0		23.0	23.0	23.0	23.0	23.0	10.0

Lanes, Volumes, Timings

2028 No-Build Weekday Evening Peak-Hour

2: Private Driveway/Quannapowitt Parkway & North Avenue

03/01/2021

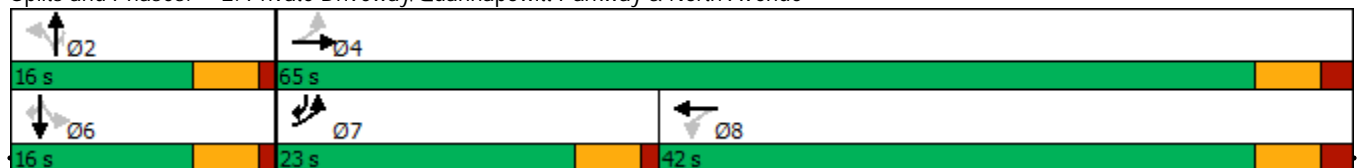


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	23.0	65.0		42.0	42.0		16.0	16.0	16.0	16.0	16.0	23.0
Total Split (%)	28.4%	80.2%		51.9%	51.9%		19.8%	19.8%	19.8%	19.8%	19.8%	28.4%
Maximum Green (s)	18.0	59.0		36.0	36.0		11.0	11.0	11.0	11.0	11.0	18.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-2.0			-2.0			-1.0	0.0		-1.0	0.0
Total Lost Time (s)		4.0			4.0			4.0	5.0		4.0	5.0
Lead/Lag	Lead			Lag	Lag							Lead
Lead-Lag Optimize?	Yes			Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	None	None	Max	Max	None
Walk Time (s)		7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		4		0	0		0	0	0	4	4	
Act Effect Green (s)		42.3			29.9			19.2	18.2		19.2	30.6
Actuated g/C Ratio		0.61			0.43			0.28	0.26		0.28	0.44
v/c Ratio		0.60			0.69			0.15	0.04		0.33	0.50
Control Delay		8.8			18.5			23.6	0.1		26.1	14.8
Queue Delay		0.1			0.0			0.0	0.0		0.0	0.0
Total Delay		8.9			18.5			23.6	0.1		26.1	14.8
LOS		A			B			C	A		C	B
Approach Delay		8.9			18.5			17.4			17.6	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)		92			167			18	0		39	82
Queue Length 95th (ft)		124			242			44	0		66	104
Internal Link Dist (ft)		360			359			236			1202	
Turn Bay Length (ft)												210
Base Capacity (vph)		2119			1875			364	558		353	961
Starvation Cap Reductn		272			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		0.49			0.53			0.15	0.04		0.33	0.38

Intersection Summary

Area Type:	Other
Cycle Length:	81
Actuated Cycle Length:	69.6
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	14.8
Intersection LOS:	B
Intersection Capacity Utilization:	69.0%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Private Driveway/Quannapowitt Parkway & North Avenue



Lanes, Volumes, Timings

2028 Build Weekday Morning Peak-Hour

2: Private Driveway/Quannapowitt Parkway & North Avenue

03/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕	↕		↕	↕
Traffic Volume (vph)	177	721	42	10	604	58	17	1	3	62	2	120
Future Volume (vph)	177	721	42	10	604	58	17	1	3	62	2	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	12	12	12	11	16	12	11	11
Storage Length (ft)	0		0	140		0	0		0	210		210
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00										
Frt		0.993			0.987				0.850			0.850
Flt Protected		0.991			0.999			0.954			0.954	
Satd. Flow (prot)	0	3405	0	0	3497	0	0	1657	1830	0	1752	1531
Flt Permitted		0.610			0.935			0.771			0.721	
Satd. Flow (perm)	0	2095	0	0	3273	0	0	1339	1830	0	1324	1531
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			16				101			159
Link Speed (mph)		35			35			30				30
Link Distance (ft)		440			439			316				1282
Travel Time (s)		8.6			8.6			7.2				29.1
Confl. Peds. (#/hr)	3											
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.75	0.75	0.75	0.64	0.64	0.64
Heavy Vehicles (%)	0%	1%	2%	0%	2%	0%	6%	0%	0%	0%	0%	2%
Adj. Flow (vph)	208	848	49	11	686	66	23	1	4	97	3	188
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1105	0	0	763	0	0	24	4	0	100	188
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pm+ov
Protected Phases	7	4			8			2			6	7
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		8	8		2	2	2	6	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0		24.0	24.0		23.0	23.0	23.0	23.0	23.0	9.5

Lanes, Volumes, Timings

2028 Build Weekday Morning Peak-Hour

2: Private Driveway/Quannapowitt Parkway & North Avenue

03/01/2021

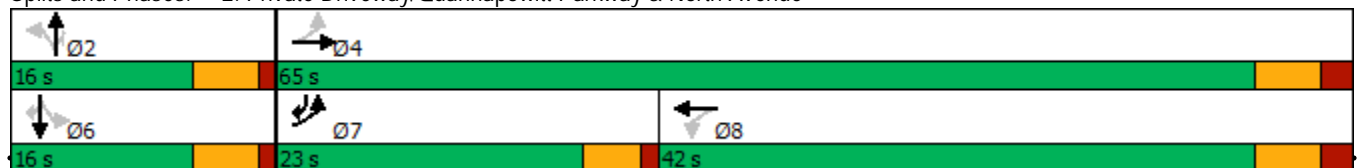


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	23.0	65.0		42.0	42.0		16.0	16.0	16.0	16.0	16.0	23.0
Total Split (%)	28.4%	80.2%		51.9%	51.9%		19.8%	19.8%	19.8%	19.8%	19.8%	28.4%
Maximum Green (s)	18.5	59.0		36.0	36.0		11.0	11.0	11.0	11.0	11.0	18.5
Yellow Time (s)	3.5	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.5
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-2.0			-2.0			-1.0	0.0		-1.0	0.0
Total Lost Time (s)		4.0			4.0			4.0	5.0		4.0	4.5
Lead/Lag	Lead			Lag	Lag							Lead
Lead-Lag Optimize?	Yes			Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	None	None	Max	Max	None
Walk Time (s)		5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		10.0		10.0	10.0		10.0	10.0	10.0	10.0	10.0	
Pedestrian Calls (#/hr)		4		0	0		0	0	0	4	4	
Act Effect Green (s)		44.3			33.9			16.5	15.5		16.5	26.4
Actuated g/C Ratio		0.64			0.49			0.24	0.22		0.24	0.38
v/c Ratio		0.75			0.47			0.08	0.01		0.32	0.28
Control Delay		10.4			11.6			26.7	0.0		29.6	6.7
Queue Delay		0.2			0.0			0.0	0.0		0.0	0.0
Total Delay		10.6			11.6			26.7	0.0		29.6	6.7
LOS		B			B			C	A		C	A
Approach Delay		10.6			11.6			22.9			14.7	
Approach LOS		B			B			C			B	
Queue Length 50th (ft)		105			99			8	0		35	8
Queue Length 95th (ft)		126			133			26	0		64	21
Internal Link Dist (ft)		360			359			236			1202	
Turn Bay Length (ft)												210
Base Capacity (vph)		1955			2010			319	488		316	947
Starvation Cap Reductn		234			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		0.64			0.38			0.08	0.01		0.32	0.20

Intersection Summary

Area Type:	Other
Cycle Length:	81
Actuated Cycle Length:	69.1
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	11.6
Intersection LOS:	B
Intersection Capacity Utilization:	65.4%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Private Driveway/Quannapowitt Parkway & North Avenue



Lanes, Volumes, Timings

2028 Build Weekday Evening Peak-Hour

2: Private Driveway/Quannapowitt Parkway & North Avenue

03/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕	↗		↕	↗
Traffic Volume (vph)	150	732	19	7	809	78	40	2	15	63	2	191
Future Volume (vph)	150	732	19	7	809	78	40	2	15	63	2	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	12	12	12	11	16	12	11	11
Storage Length (ft)	0		0	140		0	0		0	210		210
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00										
Frt		0.997			0.987				0.850			0.850
Flt Protected		0.992						0.955			0.954	
Satd. Flow (prot)	0	3424	0	0	3563	0	0	1754	1830	0	1752	1561
Flt Permitted		0.566			0.947			0.728			0.707	
Satd. Flow (perm)	0	1953	0	0	3374	0	0	1337	1830	0	1299	1561
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			17				108			78
Link Speed (mph)		35			35			30				30
Link Distance (ft)		440			439			316				1282
Travel Time (s)		8.6			8.6			7.2				29.1
Confl. Peds. (#/hr)	3											
Peak Hour Factor	0.95	0.95	0.95	0.87	0.87	0.87	0.75	0.75	0.75	0.64	0.64	0.64
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	158	771	20	8	930	90	53	3	20	98	3	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	949	0	0	1028	0	0	56	20	0	101	298
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA	Perm	Perm	NA	pm+ov
Protected Phases	7	4			8			2			6	7
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		8	8		2	2	2	6	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0		24.0	24.0		23.0	23.0	23.0	23.0	23.0	10.0

Lanes, Volumes, Timings

2028 Build Weekday Evening Peak-Hour

2: Private Driveway/Quannapowitt Parkway & North Avenue

03/01/2021

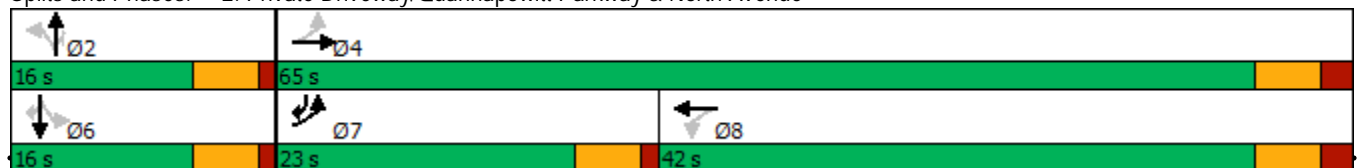


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	23.0	65.0		42.0	42.0		16.0	16.0	16.0	16.0	16.0	23.0
Total Split (%)	28.4%	80.2%		51.9%	51.9%		19.8%	19.8%	19.8%	19.8%	19.8%	28.4%
Maximum Green (s)	18.0	59.0		36.0	36.0		11.0	11.0	11.0	11.0	11.0	18.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0		2.0	2.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		-2.0			-2.0			-1.0	0.0		-1.0	0.0
Total Lost Time (s)		4.0			4.0			4.0	5.0		4.0	5.0
Lead/Lag	Lead			Lag	Lag							Lead
Lead-Lag Optimize?	Yes			Yes	Yes							Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	None	None	Max	Max	None
Walk Time (s)		7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		4		0	0		0	0	0	4	4	
Act Effct Green (s)		43.3			31.8			19.4	18.3		19.4	29.8
Actuated g/C Ratio		0.61			0.45			0.27	0.26		0.27	0.42
v/c Ratio		0.70			0.67			0.15	0.04		0.28	0.42
Control Delay		10.5			17.1			24.8	0.1		26.6	14.7
Queue Delay		0.1			0.0			0.0	0.0		0.0	0.0
Total Delay		10.6			17.1			24.8	0.1		26.6	14.7
LOS		B			B			C	A		C	B
Approach Delay		10.6			17.1			18.3			17.7	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)		100			171			18	0		33	59
Queue Length 95th (ft)		131			218			48	0		64	99
Internal Link Dist (ft)		360			359			236			1202	
Turn Bay Length (ft)												210
Base Capacity (vph)		1856			1935			365	554		355	952
Starvation Cap Reductn		209			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		0.58			0.53			0.15	0.04		0.28	0.31

Intersection Summary

Area Type:	Other
Cycle Length:	81
Actuated Cycle Length:	70.8
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.70
Intersection Signal Delay:	14.7
Intersection LOS:	B
Intersection Capacity Utilization:	70.5%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Private Driveway/Quannapowitt Parkway & North Avenue



Quannapowitt Parkway at Parking Lot and Channelized Right-Turn Lane to Lowell Street

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕	↕		↕↔	
Traffic Vol, veh/h	6	0	1	0	0	0	0	12	19	0	160	4
Future Vol, veh/h	6	0	1	0	0	0	0	12	19	0	160	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	190	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	35	35	35	92	92	92	60	60	60	90	90	90
Heavy Vehicles, %	0	0	0	2	2	2	0	0	0	0	0	0
Mvmt Flow	17	0	3	0	0	0	0	20	32	0	178	4

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	216	232	91				182	0	0	52	0	0
Stage 1	180	180	-				-	-	-	-	-	-
Stage 2	36	52	-				-	-	-	-	-	-
Critical Hdwy	6.6	6.5	6.9				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.8	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	767	672	955				1405	-	-	1567	-	-
Stage 1	839	754	-				-	-	-	-	-	-
Stage 2	992	856	-				-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	767	0	955				1405	-	-	1567	-	-
Mov Cap-2 Maneuver	767	0	-				-	-	-	-	-	-
Stage 1	839	0	-				-	-	-	-	-	-
Stage 2	992	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1405	-	-	789	1567	-	-
HCM Lane V/C Ratio	-	-	-	0.025	-	-	-
HCM Control Delay (s)	0	-	-	9.7	0	-	-
HCM Lane LOS	A	-	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	-	-

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕	↕		↕	
Traffic Vol, veh/h	1	0	1	0	0	0	1	47	103	0	42	2
Future Vol, veh/h	1	0	1	0	0	0	1	47	103	0	42	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	190	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	50	92	92	92	78	78	78	71	71	71
Heavy Vehicles, %	0	0	0	2	2	2	0	0	0	0	0	0
Mvmt Flow	2	0	2	0	0	0	1	60	132	0	59	3

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	189	255	31				62	0	0	192	0	0
Stage 1	61	61	-				-	-	-	-	-	-
Stage 2	128	194	-				-	-	-	-	-	-
Critical Hdwy	6.6	6.5	6.9				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.8	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	796	652	1043				1554	-	-	1394	-	-
Stage 1	960	848	-				-	-	-	-	-	-
Stage 2	903	744	-				-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	795	0	1043				1554	-	-	1394	-	-
Mov Cap-2 Maneuver	795	0	-				-	-	-	-	-	-
Stage 1	959	0	-				-	-	-	-	-	-
Stage 2	903	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1554	-	-	902	1394	-	-
HCM Lane V/C Ratio	0.001	-	-	0.004	-	-	-
HCM Control Delay (s)	7.3	0	-	9	0	-	-
HCM Lane LOS	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	-	-

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔	↔		↔	
Traffic Vol, veh/h	6	0	1	0	0	0	0	19	25	0	246	4
Future Vol, veh/h	6	0	1	0	0	0	0	19	25	0	246	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	190	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	35	35	35	92	92	92	60	60	60	90	90	90
Heavy Vehicles, %	0	0	0	2	2	2	0	0	0	0	0	0
Mvmt Flow	17	0	3	0	0	0	0	32	42	0	273	4

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	328	349	139				277	0	0	74	0	0
Stage 1	275	275	-				-	-	-	-	-	-
Stage 2	53	74	-				-	-	-	-	-	-
Critical Hdwy	6.6	6.5	6.9				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.8	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	658	578	890				1298	-	-	1538	-	-
Stage 1	753	686	-				-	-	-	-	-	-
Stage 2	975	837	-				-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	658	0	890				1298	-	-	1538	-	-
Mov Cap-2 Maneuver	658	0	-				-	-	-	-	-	-
Stage 1	753	0	-				-	-	-	-	-	-
Stage 2	975	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1298	-	-	683	1538	-	-
HCM Lane V/C Ratio	-	-	-	0.029	-	-	-
HCM Control Delay (s)	0	-	-	10.4	0	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	-	-

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕	↕		↕↔	
Traffic Vol, veh/h	1	0	1	0	0	0	1	87	147	0	59	2
Future Vol, veh/h	1	0	1	0	0	0	1	87	147	0	59	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	190	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	50	92	92	92	78	78	78	71	71	71
Heavy Vehicles, %	0	0	0	2	2	2	0	0	0	0	0	0
Mvmt Flow	2	0	2	0	0	0	1	112	188	0	83	3

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	293	387	43				86	0	0	300	0	0
Stage 1	85	85	-				-	-	-	-	-	-
Stage 2	208	302	-				-	-	-	-	-	-
Critical Hdwy	6.6	6.5	6.9				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.8	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	691	551	1025				1523	-	-	1273	-	-
Stage 1	935	828	-				-	-	-	-	-	-
Stage 2	832	668	-				-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	690	0	1025				1523	-	-	1273	-	-
Mov Cap-2 Maneuver	690	0	-				-	-	-	-	-	-
Stage 1	934	0	-				-	-	-	-	-	-
Stage 2	832	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1523	-	-	825	1273	-	-
HCM Lane V/C Ratio	0.001	-	-	0.005	-	-	-
HCM Control Delay (s)	7.4	0	-	9.4	0	-	-
HCM Lane LOS	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	-	-

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕	↕		↕↔	
Traffic Vol, veh/h	6	0	1	0	0	0	0	47	33	0	190	4
Future Vol, veh/h	6	0	1	0	0	0	0	47	33	0	190	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	190	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	35	35	35	92	92	92	60	60	60	90	90	90
Heavy Vehicles, %	0	0	0	2	2	2	0	0	0	0	0	0
Mvmt Flow	17	0	3	0	0	0	0	78	55	0	211	4

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	319	346	108				215	0	0	133	0	0
Stage 1	213	213	-				-	-	-	-	-	-
Stage 2	106	133	-				-	-	-	-	-	-
Critical Hdwy	6.6	6.5	6.9				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.8	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	667	580	932				1367	-	-	1464	-	-
Stage 1	808	730	-				-	-	-	-	-	-
Stage 2	923	790	-				-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	667	0	932				1367	-	-	1464	-	-
Mov Cap-2 Maneuver	667	0	-				-	-	-	-	-	-
Stage 1	808	0	-				-	-	-	-	-	-
Stage 2	923	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1367	-	-	695	1464	-	-
HCM Lane V/C Ratio	-	-	-	0.029	-	-	-
HCM Control Delay (s)	0	-	-	10.3	0	-	-
HCM Lane LOS	A	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	-	-

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕	↕		↕	
Traffic Vol, veh/h	1	0	1	0	0	0	1	72	119	0	93	2
Future Vol, veh/h	1	0	1	0	0	0	1	72	119	0	93	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	190	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	50	92	92	92	78	78	78	71	71	71
Heavy Vehicles, %	0	0	0	2	2	2	0	0	0	0	0	0
Mvmt Flow	2	0	2	0	0	0	1	92	153	0	131	3

Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	304	380	67				134	0	0	245	0	0
Stage 1	133	133	-				-	-	-	-	-	-
Stage 2	171	247	-				-	-	-	-	-	-
Critical Hdwy	6.6	6.5	6.9				4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	5.8	5.5	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.4	5.5	-				-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3				2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	680	556	989				1463	-	-	1333	-	-
Stage 1	885	790	-				-	-	-	-	-	-
Stage 2	864	706	-				-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	679	0	989				1463	-	-	1333	-	-
Mov Cap-2 Maneuver	679	0	-				-	-	-	-	-	-
Stage 1	884	0	-				-	-	-	-	-	-
Stage 2	864	0	-				-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBL	SBT	SBR
Capacity (veh/h)	1463	-	-	805	1333	-	-
HCM Lane V/C Ratio	0.001	-	-	0.005	-	-	-
HCM Control Delay (s)	7.5	0	-	9.5	0	-	-
HCM Lane LOS	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	-	-

Quannapowitt Parkway at Lowell Street

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	585	87	77	602	18	0
Future Vol, veh/h	585	87	77	602	18	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	95	95	70	70
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	603	90	81	634	26	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	693	0	1399
Stage 1	-	-	-	-	603
Stage 2	-	-	-	-	796
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	912	-	156
Stage 1	-	-	-	-	550
Stage 2	-	-	-	-	448
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	912	-	142
Mov Cap-2 Maneuver	-	-	-	-	142
Stage 1	-	-	-	-	550
Stage 2	-	-	-	-	408

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	35.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	142	-	-	-	912	-
HCM Lane V/C Ratio	0.181	-	-	-	0.089	-
HCM Control Delay (s)	35.9	0	-	-	9.3	-
HCM Lane LOS	E	A	-	-	A	-
HCM 95th %tile Q(veh)	0.6	-	-	-	0.3	-

Intersection						
Int Delay, s/veh	2.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Vol, veh/h	843	10	34	579	48	0
Future Vol, veh/h	843	10	34	579	48	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	94	94	80	80
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	906	11	36	616	60	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	917	0	1594
Stage 1	-	-	-	-	906
Stage 2	-	-	-	-	688
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	752	-	119
Stage 1	-	-	-	-	398
Stage 2	-	-	-	-	503
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	752	-	113
Mov Cap-2 Maneuver	-	-	-	-	113
Stage 1	-	-	-	-	398
Stage 2	-	-	-	-	479

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	68.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	113	-	-	-	752	-
HCM Lane V/C Ratio	0.531	-	-	-	0.048	-
HCM Control Delay (s)	68.3	0	-	-	10	-
HCM Lane LOS	F	A	-	-	B	-
HCM 95th %tile Q(veh)	2.5	-	-	-	0.2	-

Intersection						
Int Delay, s/veh	2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	628	130	120	645	25	0
Future Vol, veh/h	628	130	120	645	25	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	95	95	70	70
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	647	134	126	679	36	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	781	0	1578
Stage 1	-	-	-	-	647
Stage 2	-	-	-	-	931
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	845	-	122
Stage 1	-	-	-	-	525
Stage 2	-	-	-	-	387
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	845	-	104
Mov Cap-2 Maneuver	-	-	-	-	104
Stage 1	-	-	-	-	525
Stage 2	-	-	-	-	329

Approach	EB	WB	NB
HCM Control Delay, s	0	1.6	56.7
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	104	-	-	-	845	-
HCM Lane V/C Ratio	0.343	-	-	-	0.149	-
HCM Control Delay (s)	56.7	0	-	-	10	-
HCM Lane LOS	F	A	-	-	B	-
HCM 95th %tile Q(veh)	1.4	-	-	-	0.5	-

Intersection						
Int Delay, s/veh	14.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	904	17	44	621	88	0
Future Vol, veh/h	904	17	44	621	88	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	94	94	80	80
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	972	18	47	661	110	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	990	0	1727 972
Stage 1	-	-	-	-	972 -
Stage 2	-	-	-	-	755 -
Critical Hdwy	-	-	4.1	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	-	-	2.2	-	3.5 3.3
Pot Cap-1 Maneuver	-	-	706	-	- 99 309
Stage 1	-	-	-	-	370 -
Stage 2	-	-	-	-	468 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	706	-	- 92 309
Mov Cap-2 Maneuver	-	-	-	-	- 92 -
Stage 1	-	-	-	-	370 -
Stage 2	-	-	-	-	437 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	239.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	92	-	-	-	706	-
HCM Lane V/C Ratio	1.196	-	-	-	0.066	-
HCM Control Delay (s)	239.8	0	-	-	10.5	-
HCM Lane LOS	F	A	-	-	B	-
HCM 95th %tile Q(veh)	7.6	-	-	-	0.2	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	4.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Vol, veh/h	628	106	88	645	53	0
Future Vol, veh/h	628	106	88	645	53	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	95	95	70	70
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	647	109	93	679	76	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	756	0	1512
Stage 1	-	-	-	-	647
Stage 2	-	-	-	-	865
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	864	-	134
Stage 1	-	-	-	-	525
Stage 2	-	-	-	-	416
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	864	-	120
Mov Cap-2 Maneuver	-	-	-	-	120
Stage 1	-	-	-	-	525
Stage 2	-	-	-	-	371

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	76.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	120	-	-	-	864	-
HCM Lane V/C Ratio	0.631	-	-	-	0.107	-
HCM Control Delay (s)	76.1	0	-	-	9.7	-
HCM Lane LOS	F	A	-	-	A	-
HCM 95th %tile Q(veh)	3.2	-	-	-	0.4	-

Intersection						
Int Delay, s/veh	9.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Vol, veh/h	904	44	51	621	73	0
Future Vol, veh/h	904	44	51	621	73	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	250	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	94	94	80	80
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	972	47	54	661	91	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	1019	0	1741
Stage 1	-	-	-	-	972
Stage 2	-	-	-	-	769
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	689	-	97
Stage 1	-	-	-	-	370
Stage 2	-	-	-	-	461
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	689	-	89
Mov Cap-2 Maneuver	-	-	-	-	89
Stage 1	-	-	-	-	370
Stage 2	-	-	-	-	425

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	187.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	89	-	-	-	689	-
HCM Lane V/C Ratio	1.025	-	-	-	0.079	-
HCM Control Delay (s)	187.9	0	-	-	10.7	-
HCM Lane LOS	F	A	-	-	B	-
HCM 95th %tile Q(veh)	6	-	-	-	0.3	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Main Street/Lowell Street

Intersection						
Int Delay, s/veh	82.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	182	333	73	507	261	38
Future Vol, veh/h	182	333	73	507	261	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	80	80	85	85
Heavy Vehicles, %	8	2	2	3	3	6
Mvmt Flow	194	354	91	634	307	45

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	194	0	1187
Stage 1	-	-	-	-	371
Stage 2	-	-	-	-	816
Critical Hdwy	-	-	4.12	-	6.43
Critical Hdwy Stg 1	-	-	-	-	5.43
Critical Hdwy Stg 2	-	-	-	-	5.43
Follow-up Hdwy	-	-	2.218	-	3.527
Pot Cap-1 Maneuver	-	-	1379	-	~ 207
Stage 1	-	-	-	-	696
Stage 2	-	-	-	-	433
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1379	-	~ 186
Mov Cap-2 Maneuver	-	-	-	-	~ 186
Stage 1	-	-	-	-	696
Stage 2	-	-	-	-	389

Approach	EB	WB	NB
HCM Control Delay, s	0	1	\$ 378.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	206	-	-	1379	-
HCM Lane V/C Ratio	1.708	-	-	0.066	-
HCM Control Delay (s)	\$ 378.6	-	-	7.8	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	23.8	-	-	0.2	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	153.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	379	524	65	292	374	60
Future Vol, veh/h	379	524	65	292	374	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	90	90	91	91
Heavy Vehicles, %	2	1	0	2	1	0
Mvmt Flow	416	576	72	324	411	66

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	416	0	1172 704
Stage 1	-	-	-	-	704 -
Stage 2	-	-	-	-	468 -
Critical Hdwy	-	-	4.1	-	6.41 6.2
Critical Hdwy Stg 1	-	-	-	-	5.41 -
Critical Hdwy Stg 2	-	-	-	-	5.41 -
Follow-up Hdwy	-	-	2.2	-	3.509 3.3
Pot Cap-1 Maneuver	-	-	1154	-	~ 214 440
Stage 1	-	-	-	-	492 -
Stage 2	-	-	-	-	632 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1154	-	~ 198 440
Mov Cap-2 Maneuver	-	-	-	-	~ 198 -
Stage 1	-	-	-	-	492 -
Stage 2	-	-	-	-	584 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	\$ 598.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	215	-	-	1154	-
HCM Lane V/C Ratio	2.218	-	-	0.063	-
HCM Control Delay (s)	\$ 598.9	-	-	8.3	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	37.5	-	-	0.2	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	147.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔		↔
Traffic Vol, veh/h	198	360	79	563	298	41
Future Vol, veh/h	198	360	79	563	298	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	Free	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	80	80	85	85
Heavy Vehicles, %	8	2	2	3	3	6
Mvmt Flow	211	383	99	704	351	48

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	211	0	1305 403
Stage 1	-	-	-	-	403 -
Stage 2	-	-	-	-	902 -
Critical Hdwy	-	-	4.12	-	6.43 6.26
Critical Hdwy Stg 1	-	-	-	-	5.43 -
Critical Hdwy Stg 2	-	-	-	-	5.43 -
Follow-up Hdwy	-	-	2.218	-	3.527 3.354
Pot Cap-1 Maneuver	-	-	1360	-	~ 176 639
Stage 1	-	-	-	-	673 -
Stage 2	-	-	-	-	394 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1360	-	~ 155 639
Mov Cap-2 Maneuver	-	-	-	-	~ 155 -
Stage 1	-	-	-	-	673 -
Stage 2	-	-	-	-	~ 347 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1	\$ 660.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	171	-	-	1360	-
HCM Lane V/C Ratio	2.332	-	-	0.073	-
HCM Control Delay (s)	\$ 660.4	-	-	7.9	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	33	-	-	0.2	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	226.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	425	581	70	316	405	64
Future Vol, veh/h	425	581	70	316	405	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	90	90	91	91
Heavy Vehicles, %	2	1	0	2	1	0
Mvmt Flow	467	638	78	351	445	70

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	467	0	1293 786
Stage 1	-	-	-	-	786 -
Stage 2	-	-	-	-	507 -
Critical Hdwy	-	-	4.1	-	6.41 6.2
Critical Hdwy Stg 1	-	-	-	-	5.41 -
Critical Hdwy Stg 2	-	-	-	-	5.41 -
Follow-up Hdwy	-	-	2.2	-	3.509 3.3
Pot Cap-1 Maneuver	-	-	1105	-	~ 181 395
Stage 1	-	-	-	-	451 -
Stage 2	-	-	-	-	607 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1105	-	~ 165 395
Mov Cap-2 Maneuver	-	-	-	-	~ 165 -
Stage 1	-	-	-	-	451 -
Stage 2	-	-	-	-	554 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	\$ 900.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	179	-	-	1105	-
HCM Lane V/C Ratio	2.879	-	-	0.07	-
HCM Control Delay (s)	\$ 900.5	-	-	8.5	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	46.2	-	-	0.2	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	126.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	202	364	79	546	283	41
Future Vol, veh/h	202	364	79	546	283	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	80	80	85	85
Heavy Vehicles, %	8	2	2	3	3	6
Mvmt Flow	215	387	99	683	333	48

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	215	0	1290
Stage 1	-	-	-	-	409
Stage 2	-	-	-	-	881
Critical Hdwy	-	-	4.12	-	6.43
Critical Hdwy Stg 1	-	-	-	-	5.43
Critical Hdwy Stg 2	-	-	-	-	5.43
Follow-up Hdwy	-	-	2.218	-	3.527
Pot Cap-1 Maneuver	-	-	1355	-	~ 180
Stage 1	-	-	-	-	668
Stage 2	-	-	-	-	403
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1355	-	~ 159
Mov Cap-2 Maneuver	-	-	-	-	~ 159
Stage 1	-	-	-	-	668
Stage 2	-	-	-	-	355

Approach	EB	WB	NB
HCM Control Delay, s	0	1	\$ 585.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	176	-	-	1355	-
HCM Lane V/C Ratio	2.166	-	-	0.073	-
HCM Control Delay (s)	\$ 585.6	-	-	7.9	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	30.4	-	-	0.2	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	223.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	411	567	70	320	408	64
Future Vol, veh/h	411	567	70	320	408	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Yield	-	None	-	Yield
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	90	90	91	91
Heavy Vehicles, %	2	1	0	2	1	0
Mvmt Flow	452	623	78	356	448	70

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	452	0	1276 764
Stage 1	-	-	-	-	764 -
Stage 2	-	-	-	-	512 -
Critical Hdwy	-	-	4.1	-	6.41 6.2
Critical Hdwy Stg 1	-	-	-	-	5.41 -
Critical Hdwy Stg 2	-	-	-	-	5.41 -
Follow-up Hdwy	-	-	2.2	-	3.509 3.3
Pot Cap-1 Maneuver	-	-	1119	-	~ 185 407
Stage 1	-	-	-	-	462 -
Stage 2	-	-	-	-	604 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1119	-	~ 169 407
Mov Cap-2 Maneuver	-	-	-	-	~ 169 -
Stage 1	-	-	-	-	462 -
Stage 2	-	-	-	-	551 -

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	\$ 872.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	184	-	-	1119	-
HCM Lane V/C Ratio	2.819	-	-	0.07	-
HCM Control Delay (s)	\$ 872.4	-	-	8.5	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	46.1	-	-	0.2	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Rotary at Lowell Street / I-95 Northbound On-Ramp

HCS7 Freeway Weaving Report

Project Information

Analyst	RE	Date	9/1/2020
Agency	VAI	Analysis Year	2021
Jurisdiction		Time Period Analyzed	
Project Description	2021 Existing Weekday Morning Peak Hour-Rotary at I-95 NB Off-Ramp/ Lowell Street	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	2	Segment Type	Freeway
Segment Length (Ls), ft	200	Number of Maneuver Lanes (NWL), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LCRF), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LCFR), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LCRR), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (Vi), veh/h	805	171	111	568
Peak Hour Factor (PHF)	0.96	0.90	0.90	0.96
Total Trucks, %	1.00	1.00	1.00	1.00
Heavy Vehicle Adjustment Factor (fHV)	0.990	0.990	0.990	0.990
Flow Rate (vi), pc/h	847	192	125	598
Weaving Flow Rate (vw), pc/h	790	Freeway Max Capacity (cIFL), pc/h/ln		2200
Non-Weaving Flow Rate (vNW), pc/h	972	Density-Based Capacity (cIWL), pc/h/ln		1663
Total Flow Rate (v), pc/h	1762	Demand Flow-Based Capacity (cIW), pc/h		5357
Volume Ratio (VR)	0.448	Weaving Segment Capacity (cw), veh/h		3293
Minimum Lane Change Rate (LCMIN), lc/h	790	Adjusted Weaving Area Capacity, pc/h		3326
Maximum Weaving Length (LMAX), ft	7225	Volume-to-Capacity Ratio (v/c)		0.53

Speed and Density

Non-Weaving Vehicle Index (INW)	6	Average Weaving Speed (SW), mi/h	33.0
Non-Weaving Lane Change Rate (LCNW), lc/h	0	Average Non-Weaving Speed (SNW), mi/h	35.1
Weaving Lane Change Rate (LCW), lc/h	790	Average Speed (S), mi/h	34.1
Weaving Lane Change Rate (LCAII), lc/h	790	Density (D), pc/mi/ln	25.8
Weaving Intensity Factor (W)	0.668	Level of Service (LOS)	C

HCS7 Freeway Weaving Report

Project Information

Analyst	RE	Date	9/1/2020
Agency	VAI	Analysis Year	2021
Jurisdiction		Time Period Analyzed	
Project Description	2021 Existing Weekday Evening Peak Hour-Rotary at I-95 NB Off-Ramp/ Lowell Street	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	2	Segment Type	Freeway
Segment Length (Ls), ft	200	Number of Maneuver Lanes (NWL), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LCRF), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LCFR), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LCRR), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (Vi), veh/h	813	288	186	681
Peak Hour Factor (PHF)	0.92	0.88	0.88	0.92
Total Trucks, %	0.00	0.00	0.00	0.00
Heavy Vehicle Adjustment Factor (fHV)	1.000	1.000	1.000	1.000
Flow Rate (vi), pc/h	884	327	211	740
Weaving Flow Rate (vw), pc/h	1067	Freeway Max Capacity (cIFL), pc/h/ln		2200
Non-Weaving Flow Rate (vNW), pc/h	1095	Density-Based Capacity (cIWL), pc/h/ln		1622
Total Flow Rate (v), pc/h	2162	Demand Flow-Based Capacity (cIW), pc/h		4858
Volume Ratio (VR)	0.494	Weaving Segment Capacity (cw), veh/h		3244
Minimum Lane Change Rate (LCMIN), lc/h	1067	Adjusted Weaving Area Capacity, pc/h		3244
Maximum Weaving Length (LMAX), ft	7756	Volume-to-Capacity Ratio (v/c)		0.67

Speed and Density

Non-Weaving Vehicle Index (INW)	7	Average Weaving Speed (SW), mi/h	31.2
Non-Weaving Lane Change Rate (LCNW), lc/h	0	Average Non-Weaving Speed (SNW), mi/h	32.1
Weaving Lane Change Rate (LCW), lc/h	1067	Average Speed (S), mi/h	31.6
Weaving Lane Change Rate (LCAII), lc/h	1067	Density (D), pc/mi/ln	34.2
Weaving Intensity Factor (W)	0.847	Level of Service (LOS)	D

HCS7 Freeway Weaving Report

Project Information

Analyst	RE	Date	9/1/2020
Agency	VAI	Analysis Year	2021
Jurisdiction		Time Period Analyzed	
Project Description	2028 No-Build Weekday Morning Peak Hour-Rotary at I-95 NB Off-Ramp/ Lowell Street	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	2	Segment Type	Freeway
Segment Length (Ls), ft	200	Number of Maneuver Lanes (NWL), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LCRF), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LCFR), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LCRR), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (Vi), veh/h	863	183	119	646
Peak Hour Factor (PHF)	0.96	0.90	0.90	0.96
Total Trucks, %	1.00	1.00	1.00	1.00
Heavy Vehicle Adjustment Factor (fHV)	0.990	0.990	0.990	0.990
Flow Rate (vi), pc/h	908	205	134	680
Weaving Flow Rate (vw), pc/h	885	Freeway Max Capacity (ciFL), pc/h/ln		2200
Non-Weaving Flow Rate (vNW), pc/h	1042	Density-Based Capacity (ciWL), pc/h/ln		1653
Total Flow Rate (v), pc/h	1927	Demand Flow-Based Capacity (ciW), pc/h		5229
Volume Ratio (VR)	0.459	Weaving Segment Capacity (cw), veh/h		3273
Minimum Lane Change Rate (LCMIN), lc/h	885	Adjusted Weaving Area Capacity, pc/h		3306
Maximum Weaving Length (LMAX), ft	7351	Volume-to-Capacity Ratio (v/c)		0.58

Speed and Density

Non-Weaving Vehicle Index (INW)	7	Average Weaving Speed (SW), mi/h	32.3
Non-Weaving Lane Change Rate (LCNW), lc/h	0	Average Non-Weaving Speed (SNW), mi/h	34.0
Weaving Lane Change Rate (LCW), lc/h	885	Average Speed (S), mi/h	33.2
Weaving Lane Change Rate (LCAII), lc/h	885	Density (D), pc/mi/ln	29.0
Weaving Intensity Factor (W)	0.731	Level of Service (LOS)	D

HCS7 Freeway Weaving Report

Project Information

Analyst	RE	Date	9/1/2020
Agency	VAI	Analysis Year	2021
Jurisdiction		Time Period Analyzed	
Project Description	2028 No-Build Weekday Evening Peak Hour-Rotary at I-95 NB Off-Ramp/ Lowell Street	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	2	Segment Type	Freeway
Segment Length (Ls), ft	200	Number of Maneuver Lanes (NWL), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LCRF), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LCFR), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LCRR), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (Vi), veh/h	872	309	199	737
Peak Hour Factor (PHF)	0.92	0.88	0.88	0.92
Total Trucks, %	0.00	0.00	0.00	0.00
Heavy Vehicle Adjustment Factor (fHV)	1.000	1.000	1.000	1.000
Flow Rate (vi), pc/h	948	351	226	801
Weaving Flow Rate (vw), pc/h	1152	Freeway Max Capacity (ciFL), pc/h/ln		2200
Non-Weaving Flow Rate (vNW), pc/h	1174	Density-Based Capacity (ciWL), pc/h/ln		1621
Total Flow Rate (v), pc/h	2326	Demand Flow-Based Capacity (ciW), pc/h		4848
Volume Ratio (VR)	0.495	Weaving Segment Capacity (cw), veh/h		3242
Minimum Lane Change Rate (LCMIN), lc/h	1152	Adjusted Weaving Area Capacity, pc/h		3242
Maximum Weaving Length (LMAX), ft	7768	Volume-to-Capacity Ratio (v/c)		0.72

Speed and Density

Non-Weaving Vehicle Index (INW)	8	Average Weaving Speed (SW), mi/h	30.8
Non-Weaving Lane Change Rate (LCNW), lc/h	0	Average Non-Weaving Speed (SNW), mi/h	31.1
Weaving Lane Change Rate (LCW), lc/h	1152	Average Speed (S), mi/h	31.0
Weaving Lane Change Rate (LCAII), lc/h	1152	Density (D), pc/mi/ln	37.5
Weaving Intensity Factor (W)	0.900	Level of Service (LOS)	E

HCS7 Freeway Weaving Report

Project Information

Analyst	RE	Date	9/1/2020
Agency	VAI	Analysis Year	2021
Jurisdiction		Time Period Analyzed	
Project Description	2028 Build Weekday Morning Peak Hour-Rotary at I-95 NB Off-Ramp/Lowell Street	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	2	Segment Type	Freeway
Segment Length (Ls), ft	200	Number of Maneuver Lanes (NWL), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LCRF), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LCFR), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LCRR), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (Vi), veh/h	863	183	119	622
Peak Hour Factor (PHF)	0.96	0.90	0.90	0.96
Total Trucks, %	1.00	1.00	1.00	1.00
Heavy Vehicle Adjustment Factor (fHV)	0.990	0.990	0.990	0.990
Flow Rate (vi), pc/h	908	205	134	654
Weaving Flow Rate (vw), pc/h	859	Freeway Max Capacity (cIFL), pc/h/ln		2200
Non-Weaving Flow Rate (vNW), pc/h	1042	Density-Based Capacity (cIWL), pc/h/ln		1659
Total Flow Rate (v), pc/h	1901	Demand Flow-Based Capacity (cIW), pc/h		5310
Volume Ratio (VR)	0.452	Weaving Segment Capacity (cW), veh/h		3285
Minimum Lane Change Rate (LCMIN), lc/h	859	Adjusted Weaving Area Capacity, pc/h		3318
Maximum Weaving Length (LMAX), ft	7271	Volume-to-Capacity Ratio (v/c)		0.57

Speed and Density

Non-Weaving Vehicle Index (INW)	7	Average Weaving Speed (SW), mi/h	32.5
Non-Weaving Lane Change Rate (LCNW), lc/h	0	Average Non-Weaving Speed (SNW), mi/h	34.3
Weaving Lane Change Rate (LCW), lc/h	859	Average Speed (S), mi/h	33.5
Weaving Lane Change Rate (LCAII), lc/h	859	Density (D), pc/mi/ln	28.4
Weaving Intensity Factor (W)	0.714	Level of Service (LOS)	D

HCS7 Freeway Weaving Report

Project Information

Analyst	RE	Date	9/1/2020
Agency	VAI	Analysis Year	2021
Jurisdiction		Time Period Analyzed	
Project Description	2028 Build Weekday Evening Peak Hour-Rotary at I-95 NB Off-Ramp/Lowell Street	Unit	United States Customary

Geometric Data

Number of Lanes (N), In	2	Segment Type	Freeway
Segment Length (Ls), ft	200	Number of Maneuver Lanes (NWL), In	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LCRF), Ic	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LCFR), Ic	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LCRR), Ic	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (Vi), veh/h	872	309	199	764
Peak Hour Factor (PHF)	0.92	0.88	0.88	0.92
Total Trucks, %	0.00	0.00	0.00	0.00
Heavy Vehicle Adjustment Factor (fHV)	1.000	1.000	1.000	1.000
Flow Rate (vi), pc/h	948	351	226	830
Weaving Flow Rate (vw), pc/h	1181	Freeway Max Capacity (cIFL), pc/h/ln		2200
Non-Weaving Flow Rate (vNW), pc/h	1174	Density-Based Capacity (cIWL), pc/h/ln		1616
Total Flow Rate (v), pc/h	2355	Demand Flow-Based Capacity (cIW), pc/h		4790
Volume Ratio (VR)	0.501	Weaving Segment Capacity (cW), veh/h		3232
Minimum Lane Change Rate (LCMIN), lc/h	1181	Adjusted Weaving Area Capacity, pc/h		3232
Maximum Weaving Length (LMAX), ft	7838	Volume-to-Capacity Ratio (v/c)		0.73

Speed and Density

Non-Weaving Vehicle Index (INW)	8	Average Weaving Speed (SW), mi/h	30.6
Non-Weaving Lane Change Rate (LCNW), lc/h	0	Average Non-Weaving Speed (SNW), mi/h	30.8
Weaving Lane Change Rate (LCW), lc/h	1181	Average Speed (S), mi/h	30.7
Weaving Lane Change Rate (LCAII), lc/h	1181	Density (D), pc/mi/ln	38.4
Weaving Intensity Factor (W)	0.917	Level of Service (LOS)	E

Rotary at I-95 Northbound Off-Ramp / Lowell Street

HCS7 Freeway Weaving Report

Project Information

Analyst	RE	Date	9/1/2020
Agency	VAI	Analysis Year	2021
Jurisdiction		Time Period Analyzed	
Project Description	2021 Existing Weekday Morning Peak Hour-Rotary at Lowell Street/I-95 NB On-Ramp	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	2	Segment Type	Freeway
Segment Length (Ls), ft	200	Number of Maneuver Lanes (NWL), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LCRF), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LCFR), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LCRR), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (Vi), veh/h	259	483	108	729
Peak Hour Factor (PHF)	0.96	0.93	0.93	0.96
Total Trucks, %	2.00	3.00	2.00	3.00
Heavy Vehicle Adjustment Factor (fHV)	0.980	0.971	0.980	0.971
Flow Rate (vi), pc/h	275	535	118	782
Weaving Flow Rate (vw), pc/h	1317	Freeway Max Capacity (ciFL), pc/h/ln		2200
Non-Weaving Flow Rate (vNW), pc/h	393	Density-Based Capacity (ciWL), pc/h/ln		1362
Total Flow Rate (v), pc/h	1710	Demand Flow-Based Capacity (ciW), pc/h		3117
Volume Ratio (VR)	0.770	Weaving Segment Capacity (cw), veh/h		2651
Minimum Lane Change Rate (LCMIN), lc/h	1317	Adjusted Weaving Area Capacity, pc/h		2724
Maximum Weaving Length (LMAX), ft	11149	Volume-to-Capacity Ratio (v/c)		0.63

Speed and Density

Non-Weaving Vehicle Index (INW)	3	Average Weaving Speed (SW), mi/h	30.0
Non-Weaving Lane Change Rate (LCNW), lc/h	0	Average Non-Weaving Speed (SNW), mi/h	31.4
Weaving Lane Change Rate (LCW), lc/h	1317	Average Speed (S), mi/h	30.3
Weaving Lane Change Rate (LCAII), lc/h	1317	Density (D), pc/mi/ln	28.2
Weaving Intensity Factor (W)	1.000	Level of Service (LOS)	D

HCS7 Freeway Weaving Report

Project Information

Analyst	RE	Date	9/1/2020
Agency	VAI	Analysis Year	2021
Jurisdiction		Time Period Analyzed	
Project Description	2021 Existing Weekday Evening Peak Hour-Rotary at Lowell Street/I-95 NB On-Ramp	Unit	United States Customary

Geometric Data

Number of Lanes (N), In	2	Segment Type	Freeway
Segment Length (Ls), ft	200	Number of Maneuver Lanes (NWL), In	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LCRF), Ic	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LCFR), Ic	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LCRR), Ic	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (Vi), veh/h	515	544	83	515
Peak Hour Factor (PHF)	0.87	0.97	0.87	0.97
Total Trucks, %	0.00	0.00	1.00	1.00
Heavy Vehicle Adjustment Factor (fHV)	1.000	1.000	0.990	0.990
Flow Rate (vi), pc/h	592	561	96	536
Weaving Flow Rate (vw), pc/h	1097	Freeway Max Capacity (cIFL), pc/h/ln		2200
Non-Weaving Flow Rate (vNW), pc/h	688	Density-Based Capacity (cIWL), pc/h/ln		1511
Total Flow Rate (v), pc/h	1785	Demand Flow-Based Capacity (cIW), pc/h		3902
Volume Ratio (VR)	0.615	Weaving Segment Capacity (cw), veh/h		3011
Minimum Lane Change Rate (LCMIN), lc/h	1097	Adjusted Weaving Area Capacity, pc/h		3022
Maximum Weaving Length (LMAX), ft	9201	Volume-to-Capacity Ratio (v/c)		0.59

Speed and Density

Non-Weaving Vehicle Index (INW)	5	Average Weaving Speed (SW), mi/h	31.1
Non-Weaving Lane Change Rate (LCNW), lc/h	0	Average Non-Weaving Speed (SNW), mi/h	32.8
Weaving Lane Change Rate (LCW), lc/h	1097	Average Speed (S), mi/h	31.7
Weaving Lane Change Rate (LCAII), lc/h	1097	Density (D), pc/mi/ln	28.2
Weaving Intensity Factor (W)	0.866	Level of Service (LOS)	D

HCS7 Freeway Weaving Report

Project Information

Analyst	RE	Date	9/1/2020
Agency	VAI	Analysis Year	2021
Jurisdiction		Time Period Analyzed	
Project Description	2028 No-Build Weekday Morning Peak Hour-Rotary at Lowell Street/I-95 NB On-Ramp	Unit	United States Customary

Geometric Data

Number of Lanes (N), In	2	Segment Type	Freeway
Segment Length (Ls), ft	200	Number of Maneuver Lanes (NWL), In	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LCRF), Ic	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LCFR), Ic	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LCRR), Ic	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (Vi), veh/h	278	518	122	782
Peak Hour Factor (PHF)	0.96	0.93	0.93	0.96
Total Trucks, %	2.00	3.00	2.00	3.00
Heavy Vehicle Adjustment Factor (fHV)	0.980	0.971	0.980	0.971
Flow Rate (vi), pc/h	295	574	134	839
Weaving Flow Rate (vw), pc/h	1413	Freeway Max Capacity (ciFL), pc/h/ln		2200
Non-Weaving Flow Rate (vNW), pc/h	429	Density-Based Capacity (ciWL), pc/h/ln		1365
Total Flow Rate (v), pc/h	1842	Demand Flow-Based Capacity (ciW), pc/h		3129
Volume Ratio (VR)	0.767	Weaving Segment Capacity (cw), veh/h		2657
Minimum Lane Change Rate (LCMIN), Ic/h	1413	Adjusted Weaving Area Capacity, pc/h		2730
Maximum Weaving Length (LMAX), ft	11110	Volume-to-Capacity Ratio (v/c)		0.67

Speed and Density

Non-Weaving Vehicle Index (INW)	3	Average Weaving Speed (SW), mi/h	29.6
Non-Weaving Lane Change Rate (LCNW), Ic/h	0	Average Non-Weaving Speed (SNW), mi/h	30.4
Weaving Lane Change Rate (LCW), Ic/h	1413	Average Speed (S), mi/h	29.8
Weaving Lane Change Rate (LCAII), Ic/h	1413	Density (D), pc/mi/ln	30.9
Weaving Intensity Factor (W)	1.057	Level of Service (LOS)	D

HCS7 Freeway Weaving Report

Project Information

Analyst	RE	Date	9/1/2020
Agency	VAI	Analysis Year	2021
Jurisdiction		Time Period Analyzed	
Project Description	2028 No-Build Weekday Evening Peak Hour-Rotary at Lowell Street/I-95 NB On-Ramp	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	2	Segment Type	Freeway
Segment Length (Ls), ft	200	Number of Maneuver Lanes (NWL), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LCRF), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LCFR), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LCRR), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (Vi), veh/h	552	583	126	639
Peak Hour Factor (PHF)	0.87	0.97	0.87	0.97
Total Trucks, %	0.00	0.00	1.00	1.00
Heavy Vehicle Adjustment Factor (fHV)	1.000	1.000	0.990	0.990
Flow Rate (vi), pc/h	634	601	146	665
Weaving Flow Rate (vw), pc/h	1266	Freeway Max Capacity (ciFL), pc/h/ln		2200
Non-Weaving Flow Rate (vNW), pc/h	780	Density-Based Capacity (ciWL), pc/h/ln		1508
Total Flow Rate (v), pc/h	2046	Demand Flow-Based Capacity (ciW), pc/h		3877
Volume Ratio (VR)	0.619	Weaving Segment Capacity (cw), veh/h		3004
Minimum Lane Change Rate (LCMIN), lc/h	1266	Adjusted Weaving Area Capacity, pc/h		3016
Maximum Weaving Length (LMAX), ft	9250	Volume-to-Capacity Ratio (v/c)		0.68

Speed and Density

Non-Weaving Vehicle Index (INW)	5	Average Weaving Speed (SW), mi/h	30.2
Non-Weaving Lane Change Rate (LCNW), lc/h	0	Average Non-Weaving Speed (SNW), mi/h	31.0
Weaving Lane Change Rate (LCW), lc/h	1266	Average Speed (S), mi/h	30.5
Weaving Lane Change Rate (LCAII), lc/h	1266	Density (D), pc/mi/ln	33.5
Weaving Intensity Factor (W)	0.969	Level of Service (LOS)	D

HCS7 Freeway Weaving Report

Project Information

Analyst	RE	Date	9/1/2020
Agency	VAI	Analysis Year	2021
Jurisdiction		Time Period Analyzed	
Project Description	2028 Build Weekday Morning Peak Hour-Rotary at Lowell Street/I-95 NB On-Ramp	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	2	Segment Type	Freeway
Segment Length (Ls), ft	200	Number of Maneuver Lanes (NWL), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LCRF), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LCFR), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LCRR), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (Vi), veh/h	278	518	150	782
Peak Hour Factor (PHF)	0.96	0.93	0.93	0.96
Total Trucks, %	2.00	3.00	2.00	3.00
Heavy Vehicle Adjustment Factor (fHV)	0.980	0.971	0.980	0.971
Flow Rate (vi), pc/h	295	574	165	839
Weaving Flow Rate (vw), pc/h	1413	Freeway Max Capacity (ciFL), pc/h/ln		2200
Non-Weaving Flow Rate (vNW), pc/h	460	Density-Based Capacity (ciWL), pc/h/ln		1378
Total Flow Rate (v), pc/h	1873	Demand Flow-Based Capacity (ciW), pc/h		3183
Volume Ratio (VR)	0.754	Weaving Segment Capacity (cw), veh/h		2682
Minimum Lane Change Rate (LCMIN), lc/h	1413	Adjusted Weaving Area Capacity, pc/h		2756
Maximum Weaving Length (LMAX), ft	10943	Volume-to-Capacity Ratio (v/c)		0.68

Speed and Density

Non-Weaving Vehicle Index (INW)	3	Average Weaving Speed (SW), mi/h	29.6
Non-Weaving Lane Change Rate (LCNW), lc/h	0	Average Non-Weaving Speed (SNW), mi/h	30.3
Weaving Lane Change Rate (LCW), lc/h	1413	Average Speed (S), mi/h	29.8
Weaving Lane Change Rate (LCAII), lc/h	1413	Density (D), pc/mi/ln	31.4
Weaving Intensity Factor (W)	1.057	Level of Service (LOS)	D

HCS7 Freeway Weaving Report

Project Information

Analyst	RE	Date	9/1/2020
Agency	VAI	Analysis Year	2021
Jurisdiction		Time Period Analyzed	
Project Description	2028 Build Weekday Evening Peak Hour-Rotary at Lowell Street/I-95 NB On-Ramp	Unit	United States Customary

Geometric Data

Number of Lanes (N), ln	2	Segment Type	Freeway
Segment Length (Ls), ft	200	Number of Maneuver Lanes (NWL), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LCRF), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LCFR), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LCRR), lc	0
Interchange Density (ID), int/mi	0.33	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Final Capacity Adjustment Factor (CAF)	1.000
Incident Type	No Incident	Demand Adjustment Factor (DAF)	1.000

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (Vi), veh/h	552	583	111	639
Peak Hour Factor (PHF)	0.87	0.97	0.87	0.97
Total Trucks, %	0.00	0.00	1.00	1.00
Heavy Vehicle Adjustment Factor (fHV)	1.000	1.000	0.990	0.990
Flow Rate (vi), pc/h	634	601	129	665
Weaving Flow Rate (vw), pc/h	1266	Freeway Max Capacity (cIFL), pc/h/ln		2200
Non-Weaving Flow Rate (vNW), pc/h	763	Density-Based Capacity (cIWL), pc/h/ln		1503
Total Flow Rate (v), pc/h	2029	Demand Flow-Based Capacity (cIW), pc/h		3846
Volume Ratio (VR)	0.624	Weaving Segment Capacity (cw), veh/h		2994
Minimum Lane Change Rate (LCMIN), lc/h	1266	Adjusted Weaving Area Capacity, pc/h		3006
Maximum Weaving Length (LMAX), ft	9311	Volume-to-Capacity Ratio (v/c)		0.67

Speed and Density

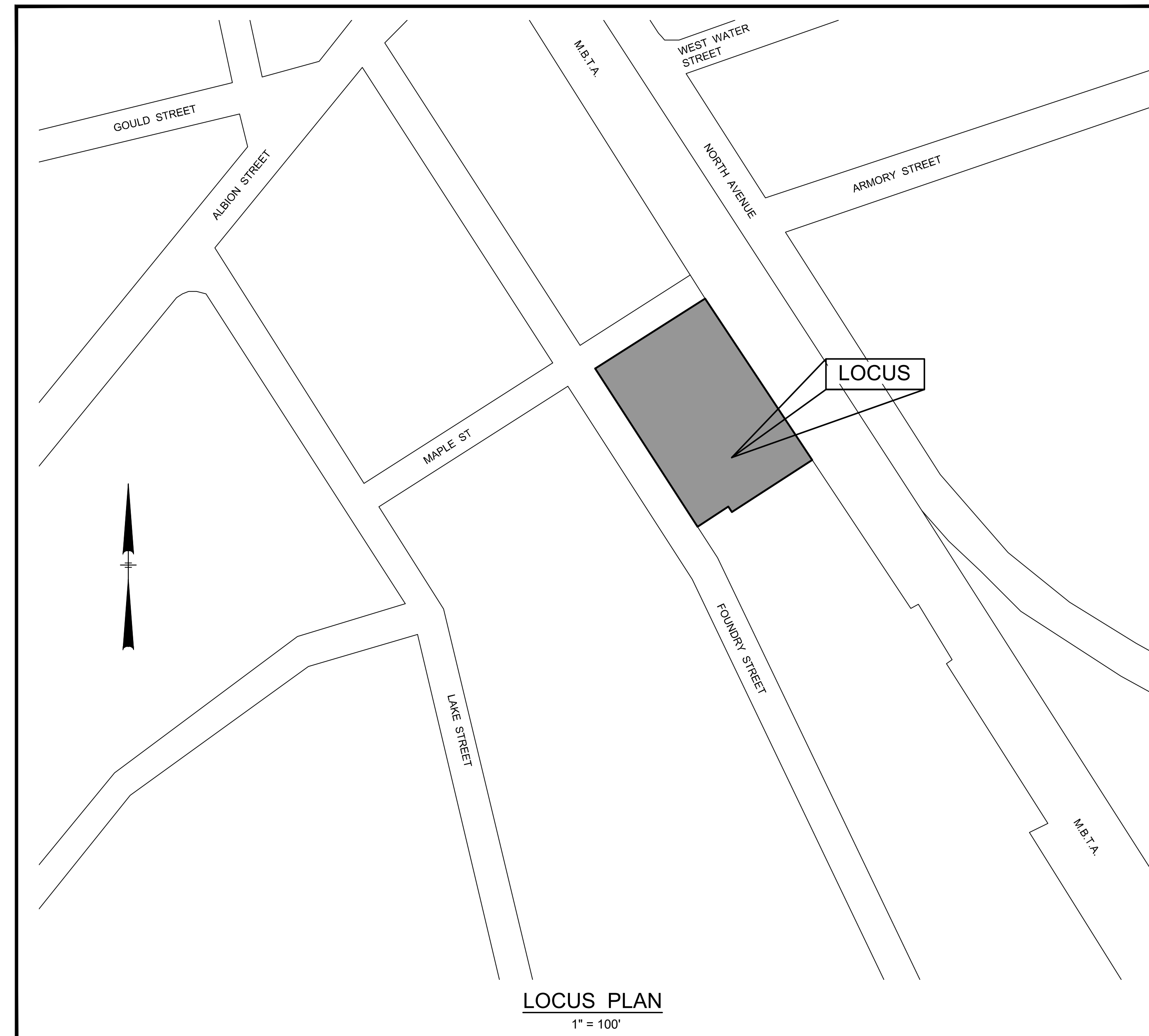
Non-Weaving Vehicle Index (INW)	5	Average Weaving Speed (SW), mi/h	30.2
Non-Weaving Lane Change Rate (LCNW), lc/h	0	Average Non-Weaving Speed (SNW), mi/h	31.0
Weaving Lane Change Rate (LCW), lc/h	1266	Average Speed (S), mi/h	30.5
Weaving Lane Change Rate (LCAII), lc/h	1266	Density (D), pc/mi/ln	33.3
Weaving Intensity Factor (W)	0.969	Level of Service (LOS)	D

PROPOSED SITE PLAN FOUNDRY PLACE 62-76 FOUNDRY STREET WAKEFIELD, MASSACHUSETTS

OCTOBER 7, 2020
REV: MARCH 18.2021

GENERAL NOTES

1. Boundary and Topographic are based on a field survey performed in May 2019. Elevations are based on NAVD 1988.
2. The subject parcel is located in Industrial (I) zoning district.
3. The site is currently served by municipal sewer and water, natural gas, and overhead electric and telecommunications services.
4. Locations of existing utilities are based on locations of surface features and available record information. The contractor is required to contact DigSafe and the Wakefield Public Works Department to have underground utilities marked in the field prior to performing any excavation activities.
5. The proposed development is a mid-rise apartment building in accordance with section 190-32 of the Wakefield Zoning Bylaws.
6. The subject property is not located within a Zone A special flood hazard area, based on FEMA flood insurance rate map 25017C0427E, effective date June 4, 2010.



SHEET INDEX

- 1 -- TITLE SHEET
- 2 -- EXISTING CONDITIONS PLAN
- 3 -- SITE LAYOUT PLAN - GROUND FLOOR
- 4 -- SITE LAYOUT PLAN - SECOND FLOOR
- 5 -- SITE GRADING AND UTILITIES PLAN
- 6 -- CONSTRUCTION DETAILS

APPLICANT

62 FOUNDRY, L.L.C.
5 ROBERTSON WAY
WOBURN, MA 01801

RECORD OWNERS

62 FOUNDRY, L.L.C.
5 ROBERTSON WAY
WOBURN, MA 01801

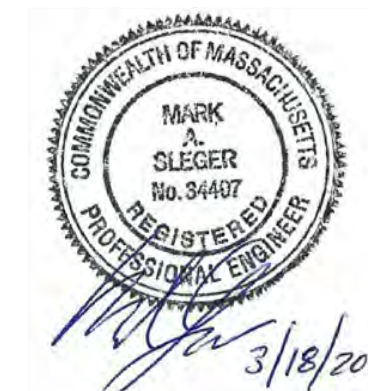
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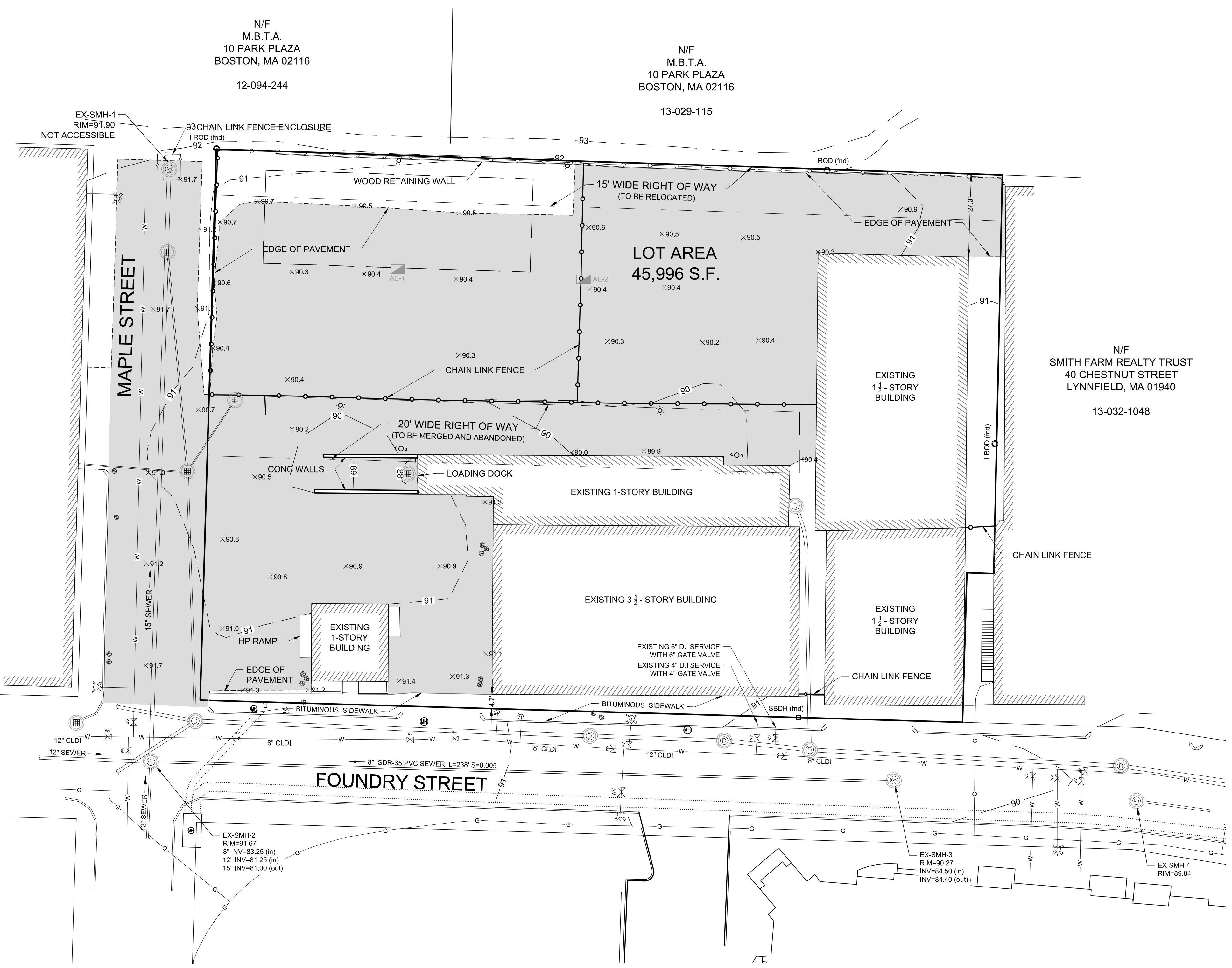
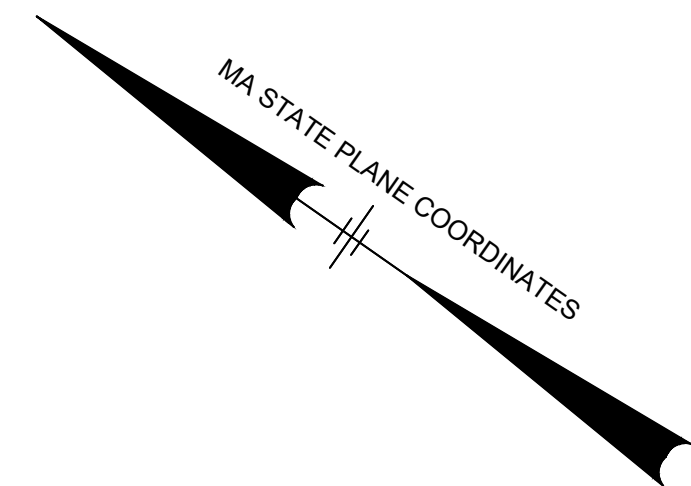
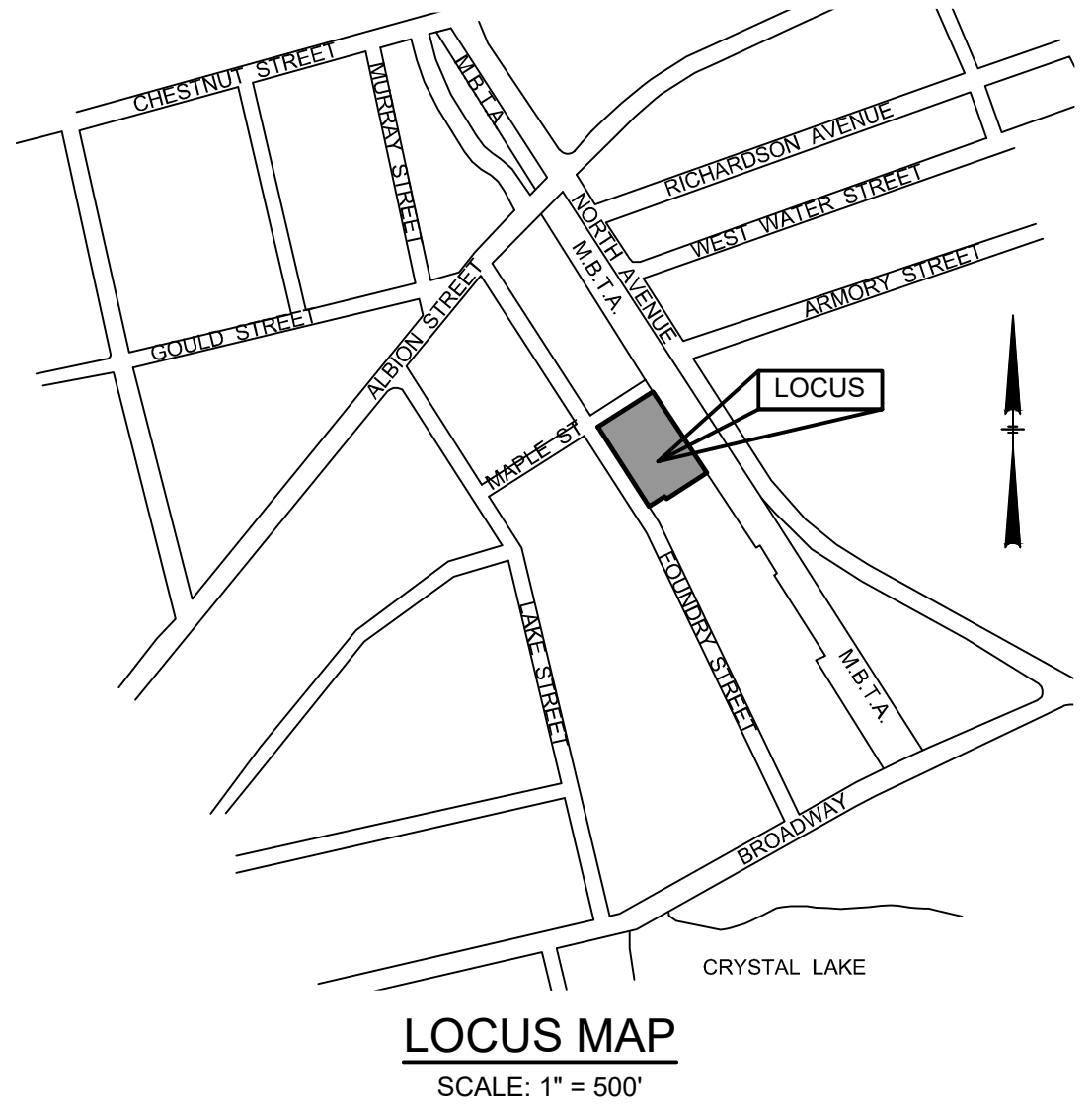
M.S.R.D. BOOK 71132, PAGE 336
M.S.R.D. BOOK 71505, PAGE 261

ASSESSORS REFERENCE

MAP 13, BLOCK 030, LOT 104A+
MAP 13, BLOCK 031, LOT 104G

ALAN Engineering, L.L.C.
110 WINN STREET, SUITE 209
WOBURN, MA 01801
(781) 287-9789
alan.eng@verizon.net





GENERAL NOTES

- Boundary and topography is the result of a field survey performed in March 2019.
- Elevations shown are based on N.A.V.D. 1988.
- Existing utilities are based on the locations of surface structures. Additional underground utilities may be present.
- According to FEMA Flood Insurance Rate Map 25017C0427E, effective date June 4, 2010, the subject property is not located within a Zone A Special Flood Hazard Area.
- The subject property is located in the Industrial (I) Zoning District.
Minimum Area: 20,000 s.f.
Minimum Frontage: 80'
Minimum Lot Width: 80'
Yard Setbacks: Front: 15'
Side: 20'
Rear: 20'
Maximum Building Height: 60'

PLAN REFERENCES

- M.S.R.D. Plan 720 of 1939
- M.S.R.D. Plan 221 of 1944
- M.S.R.D. Plan 902 of 1945

DEED REFERENCES

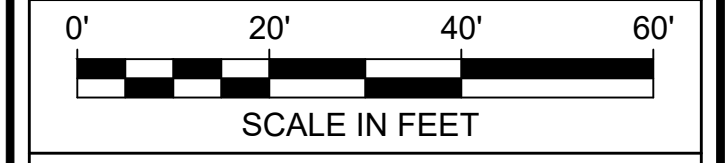
- M.S.R.D. Book 71132 Page 336
- M.S.R.D. Book 71505 Page 261

RECORD OWNER

62 Foundry LLC
5 Robertson Way
Woburn, MA 01801

ASSESSORS PARCELS

13-030-104A+
13-031-104G



MAS	TOWN COMMENTS	3/18/2021
BY	REVISIONS	DATE

**EXISTING CONDITIONS PLAN
FOUNDRY PLACE
62-76 FOUNDRY STREET
WAKEFIELD, MA**

**ALAN
ENGINEERING, L.L.C.**
110 WINN STREET, SUITE 209
WOBURN, MA 01801
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PREPARED FOR:
62 FOUNDRY LLC
5 ROBERTSON WAY
WOBURN, MA 01801

JOB NO: 1131	DWG NO: 1829
OCTOBER 7, 2020	2 of 6
SCALE: 1" = 20'	

LEGEND

- EXISTING CONTOUR ———— 07 ————
- EXISTING SPOT ELEVATION ×90.5
- PROPOSED CONTOUR ———— 07 ————
- PROPOSED SPOT ELEVATION ×92.3
- EXISTING EDGE OF PAVEMENT - - - - -
- PROPOSED EDGE OF PAVEMENT - - - - -
- PROPOSED GRANITE CURB ————
- EXISTING CATCH BASIN (Symbol)
- EXISTING DRAIN MANHOLE (Symbol)
- PROPOSED CATCH BASIN (Symbol)
- PROPOSED DRAIN MANHOLE (Symbol)
- EXISTING DRAIN LINE ————
- PROPOSED DRAIN LINE ————
- EXISTING WATER MAIN ————
- PROPOSED WATER SERVICE ————
- EXISTING HYDRANT (Symbol)
- EXISTING GATE VALVE (Symbol)
- EXISTING SEWER MAIN ————
- EXISTING SEWER MANHOLE (Symbol)
- PROPOSED SEWER SERVICE ————
- EXISTING GAS MAIN ————
- PROPOSED GAS SERVICE ————
- EXISTING UTILITY POLE (Symbol)
- EXISTING U/G CONDUITS ————
- PROPOSED U/G CONDUITS ————
- EXISTING MONITORING WELL (Symbol)

GENERAL NOTES

- Boundary and topography is the result of a field survey performed in March 2019.
- Elevations shown are based on N.A.V.D. 1988.
- Existing utilities are based on the locations of surface structures. Additional underground utilities may be present.
- According to FEMA Flood Insurance Rate Map 25017C0427E, effective date June 4, 2010, the subject property is not located within a Zone A Special Flood Hazard Area.
- The subject property is located in the Industrial (I) Zoning District.

PLAN REFERENCES

- M.S.R.D. Plan 720 of 1939
- M.S.R.D. Plan 221 of 1944
- M.S.R.D. Plan 902 of 1945

DEED REFERENCES

- M.S.R.D. Book 71132 Page 336
- M.S.R.D. Book 71505 Page 261

RECORD OWNER

62 Foundry LLC
5 Robertson Way
Woburn, MA 01801

ASSESSORS PARCELS

13-030-104A+
13-031-104G



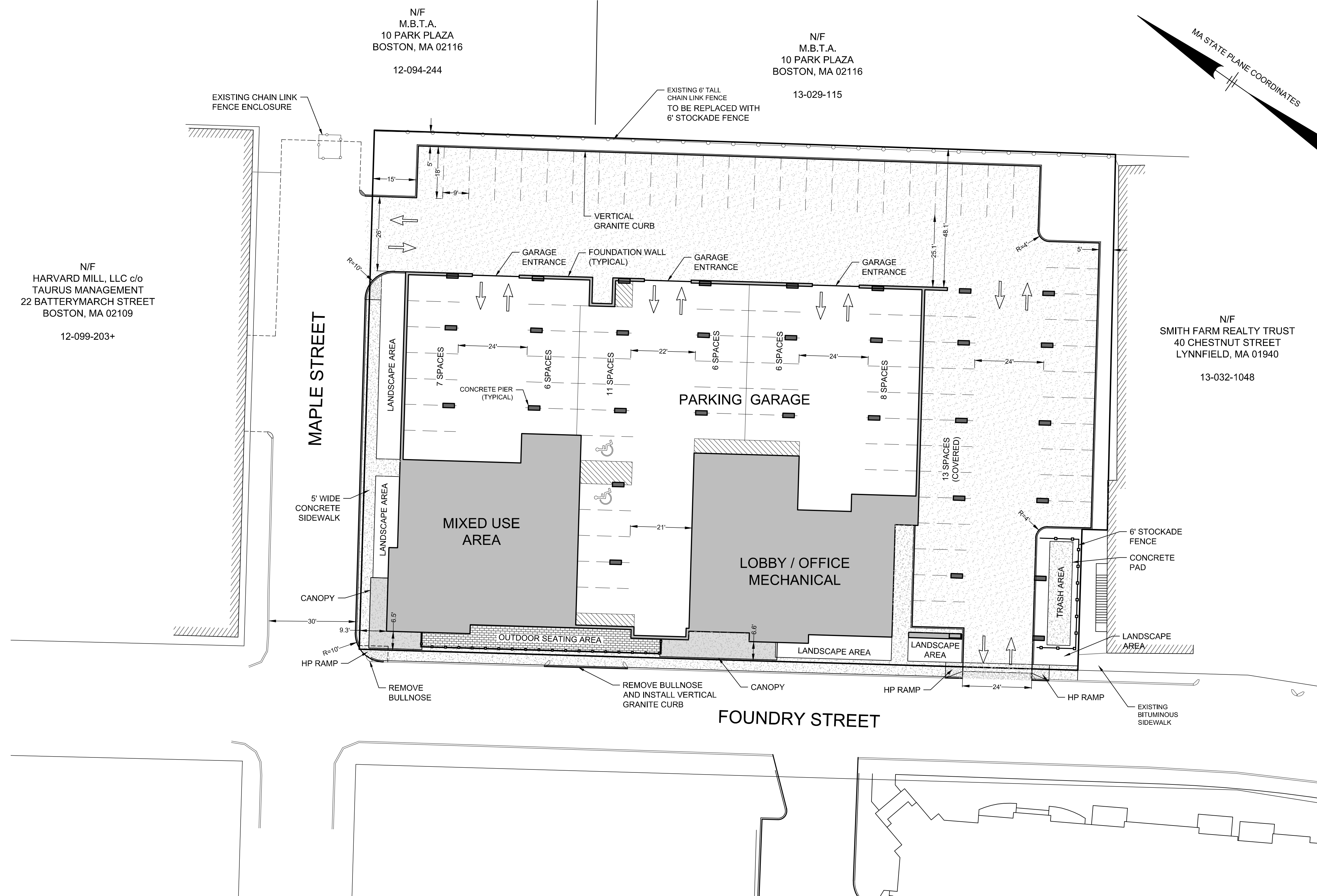
MAS	TOWN COMMENTS	3/18/2021
BY	REVISIONS	DATE

**SITE LAYOUT PLAN
GROUND FLOOR
FOUNDRY PLACE
62-76 FOUNDRY STREET
WAKEFIELD, MA**

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PREPARED FOR:
62 FOUNDRY LLC
5 ROBERTSON WAY
WOBBURN, MA 01801

JOB NO: 1182	DWG NO: 1773
OCTOBER 7, 2020	3 of 6
SCALE: 1" = 20'	



LEGEND

- EXISTING CONTOUR ——— 87 ———
- EXISTING SPOT ELEVATION × 90.5
- PROPOSED CONTOUR ——— 87 ———
- PROPOSED SPOT ELEVATION
- EXISTING EDGE OF PAVEMENT - - - - -
- PROPOSED EDGE OF PAVEMENT ———
- PROPOSED GRANITE CURB ———
- EXISTING CATCH BASIN [Symbol]
- EXISTING DRAIN MANHOLE [Symbol]
- PROPOSED CATCH BASIN [Symbol]
- PROPOSED DRAIN MANHOLE [Symbol]
- EXISTING DRAIN LINE [Symbol]
- PROPOSED DRAIN LINE [Symbol]
- EXISTING WATER MAIN [Symbol]
- PROPOSED WATER SERVICE [Symbol]
- EXISTING HYDRANT [Symbol]
- EXISTING GATE VALVE [Symbol]
- EXISTING SEWER MAIN [Symbol]
- EXISTING SEWER MANHOLE [Symbol]
- PROPOSED SEWER SERVICE [Symbol]
- EXISTING GAS MAIN [Symbol]
- PROPOSED GAS SERVICE [Symbol]
- EXISTING UTILITY POLE [Symbol]
- EXISTING U/G CONDUITS [Symbol]
- PROPOSED U/G CONDUITS [Symbol]

PARKING REQUIREMENTS

USE CATEGORY	REQUIRED	PROPOSED
RESIDENTIAL	1.5 PER UNIT (87)	87
RETAIL	1 PER 250 S.F. OF GFA	
RESTAURANT	1 PER 3 EMPLOYEES + 1 PER 4 SEATS + 1 PER 100 S.F. OF FUNCTION AREA	5
TOTAL	92	92

ZONING COMPARISON

CATEGORY	EXISTING	PROPOSED
LOT AREA	45,996 S.F.	45,996 S.F.
FRONT YARD SETBACK	4.7 FT.	6.5 FT.
SIDE YARD SETBACK	0.0 FT.	10.0 FT.
REAR YARD SETBACK	27.3 FT.	46.1 FT.
BUILDING COVERAGE	34.2% (15,728 S.F.)	47.5% (21,858 S.F.)
OPEN AREA	8.6% (3,933 S.F.)	15.4% (7,100 S.F.)

**ZONING SUMMARY
INDUSTRIAL (I) - MID RISE APARTMENTS**

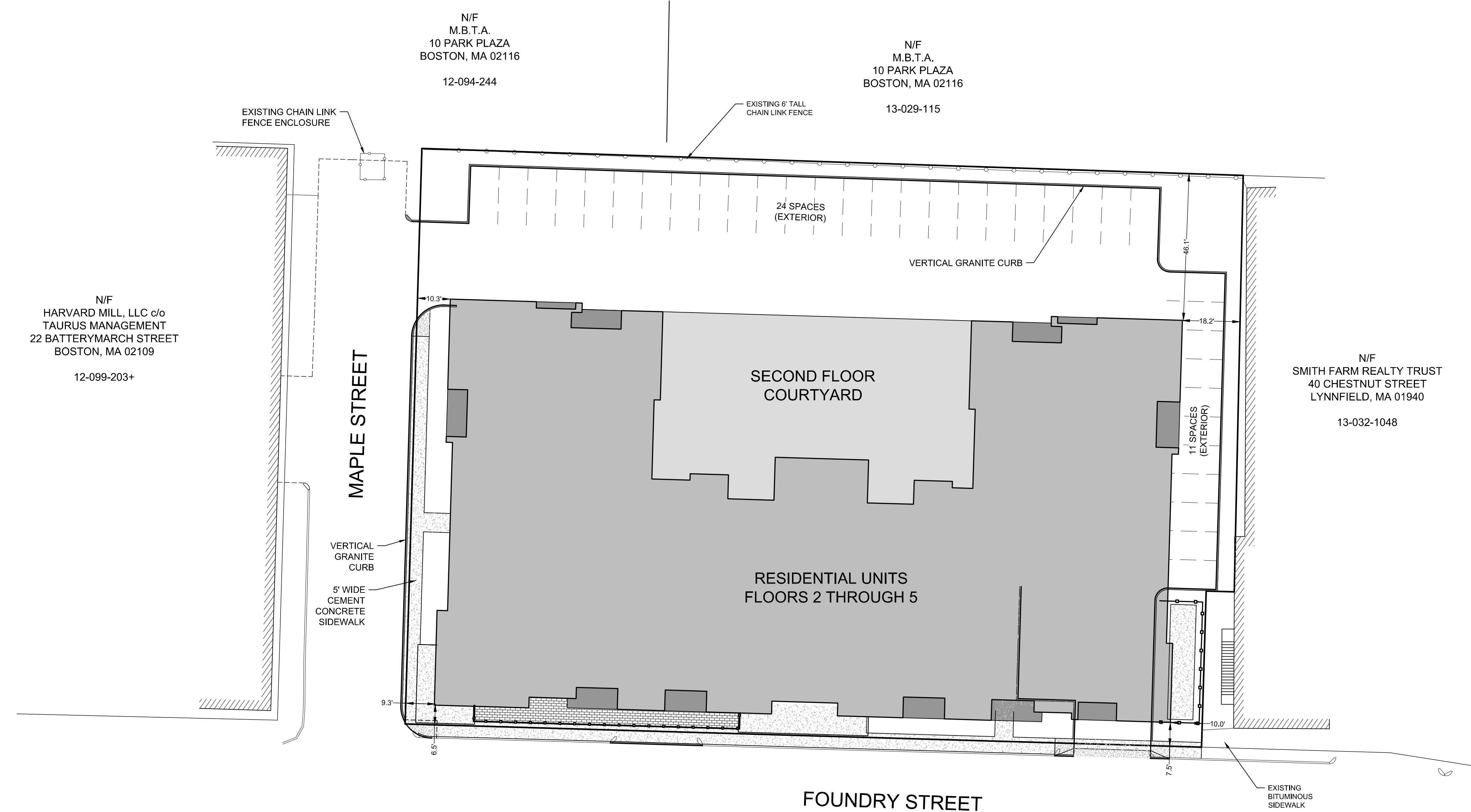
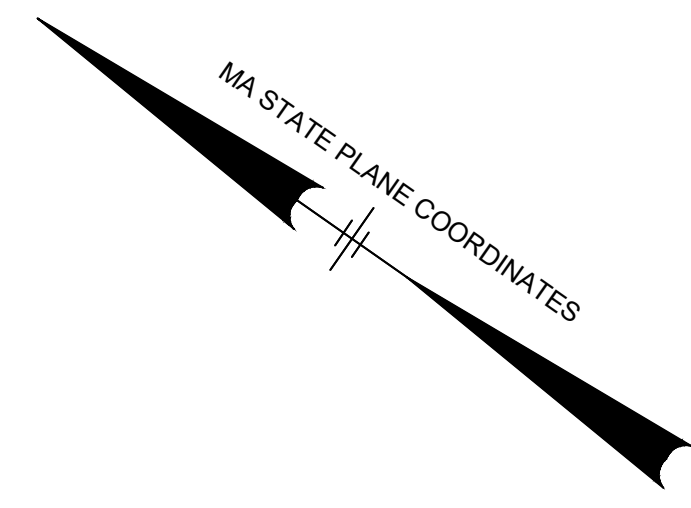
CATEGORY	INDUSTRIAL USE	MID RISE APARTMENT COMPLEX (190-32)	PROPOSED
AREA	20,000 S.F.	4,000 S.F.	45,996 S.F.
FRONTAGE	80 FT.	180 FT.	249.61 FT.
LOT WIDTH	80 FT.	180 FT.	249.61 FT.
FRONT YARD SETBACK	15 FT.	30 FT or BLDG HEIGHT	6.5 FT.
SIDE YARD SETBACK	20 FT.	30 FT or BLDG HEIGHT	10.0 FT.
REAR YARD SETBACK	20 FT.	30 FT or BLDG HEIGHT	46.1 FT.
FLOOR AREA RATIO (FAR)	1.5 (68,994 S.F.)	N/A	2.02 (93,072 S.F.)
UNIT DENSITY	N/A	1 PER 750 S.F. (61 UNITS)	58 UNITS
BUILDING COVERAGE	50% (22,998 S.F.)	35% (16,097 S.F.)	47.5% (21,858 S.F.)
OPEN AREA	20% (9,199 S.F.)	30% (13,799 S.F.)	15.4% (7,100 S.F.)
BUILDING HEIGHT	60 FT.	50 FT. - 5 STORIES	64.7 FT.

PARKING SUMMARY

DESCRIPTION	QTY
GARAGE / COVERED	57
EXTERIOR	35
TOTAL	92

UNIT SUMMARY

DESCRIPTION	QTY
1 BEDROOM	18
2 BEDROOM	40
TOTAL	58



LEGEND

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- EXISTING SPOT ELEVATION x90.5
- PROPOSED CONTOUR -87-
- PROPOSED SPOT ELEVATION x92.3
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- PROPOSED EDGE OF PAVEMENT
- PROPOSED GRANITE CURB
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- PROPOSED CATCH BASIN
- PROPOSED DRAIN MANHOLE
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- PROPOSED DRAIN LINE
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- PROPOSED WATER SERVICE
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- EXISTING GATE VALVE
- EXISTING SEWER MAIN
- EXISTING SEWER MANHOLE
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- EXISTING GAS MAIN
- PROPOSED GAS SERVICE
- EXISTING UTILITY POLE
- EXISTING U/G CONDUITS
- PROPOSED U/G CONDUITS

GENERAL NOTES

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4. According to FEMA Flood Insurance Rate Map 25017C0427E, effective date June 4, 2010, the subject property is not located within a Zone A Special Flood Hazard Area.
5. The subject property is located in the Industrial (I) Zoning District.

PLAN REFERENCES

1. M.S.R.D. Plan 720 of 1939
2. M.S.R.D. Plan 221 of 1944
3. M.S.R.D. Plan 902 of 1945

DEED REFERENCES

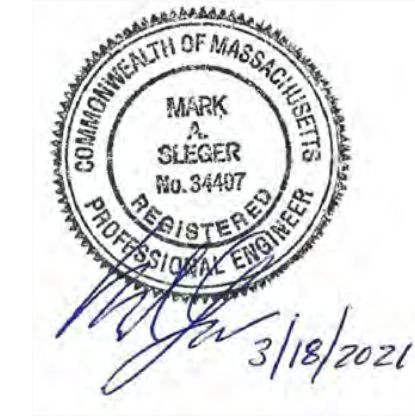
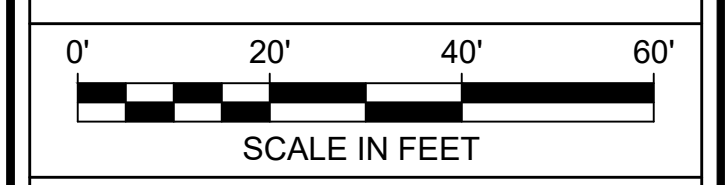
1. M.S.R.D. Book 71132 Page 336
2. M.S.R.D. Book 71505 Page 261

RECORD OWNER

62 Foundry LLC
5 Robertson Way
Woburn, MA 01801

ASSESSORS PARCELS

13-030-104A+
13-031-104G



MAS	TOWN COMMENTS	3/18/2021
BY	REVISIONS	DATE

**SITE LAYOUT PLAN
SECOND FLOOR
FOUNDRY PLACE
62-76 FOUNDRY STREET
WAKEFIELD, MA**

**ALAN
ENGINEERING, L.L.C.**
110 WINN STREET, SUITE 209
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PREPARED FOR:
62 FOUNDRY LLC
5 ROBERTSON WAY
WOBURN, MA 01801

JOB NO: 1182	DWG NO: 1773
OCTOBER 7, 2020	4 of 6
SCALE: 1" = 20'	

GENERAL NOTES

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PLAN REFERENCES

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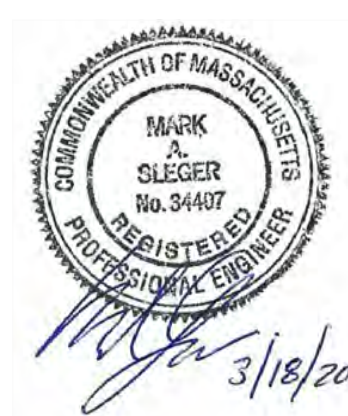
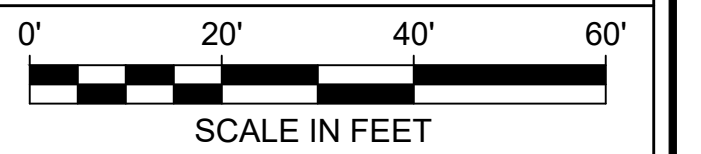
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Woburn, MA 01801

ASSESSORS PARCELS

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13-031-104G



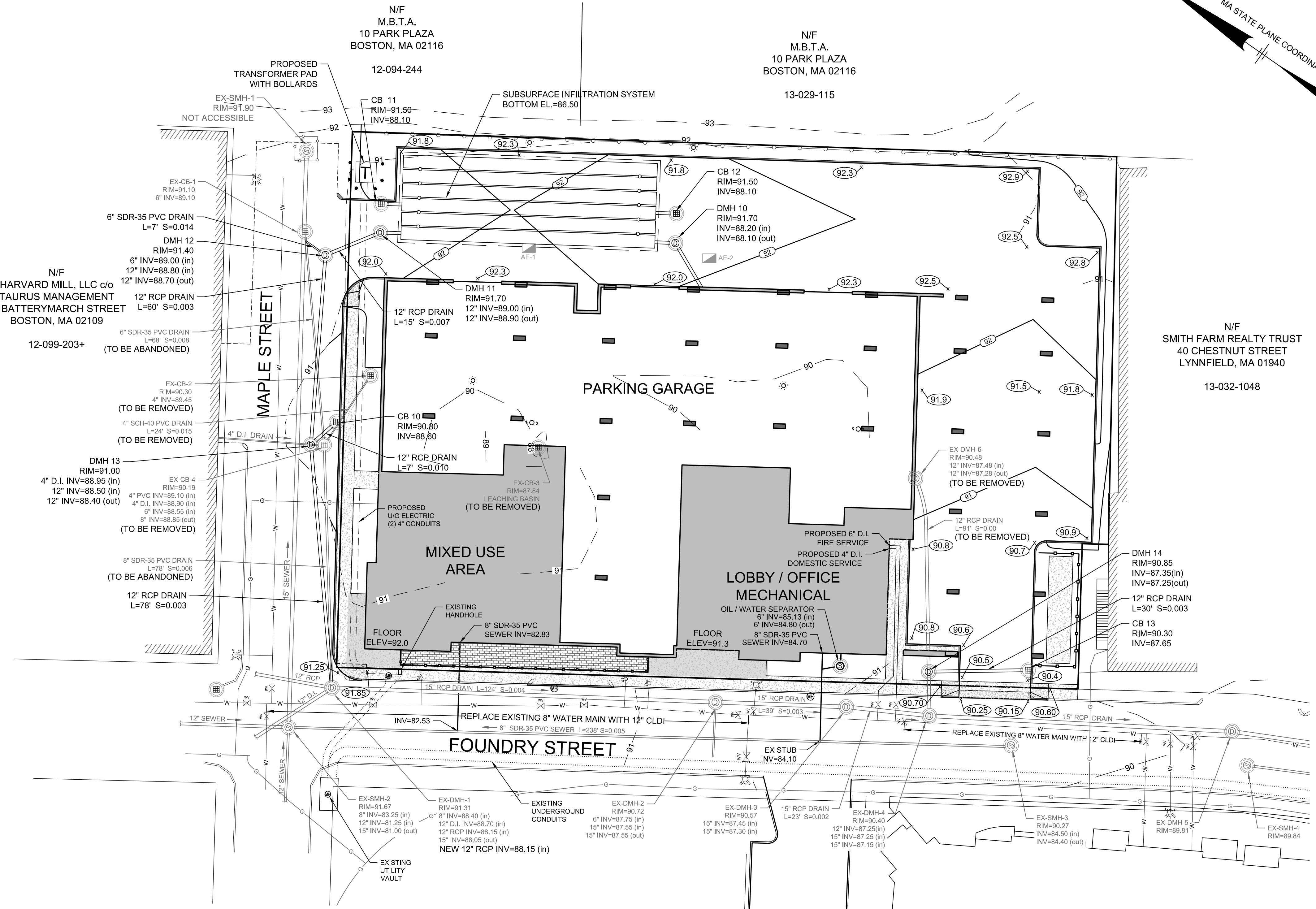
MAS	TOWN COMMENTS	3/18/2021
BY	REVISIONS	DATE

SITE GRADING AND UTILITIES PLAN
FOUNDRY PLACE
62-76 FOUNDRY STREET
WAKEFIELD, MA

ALAN ENGINEERING, L.L.C.
110 WINN STREET, SUITE 209
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PREPARED FOR:
62 FOUNDRY LLC
5 ROBERTSON WAY
WOBURN, MA 01801

JOB NO: 1182	DWG NO: 1773
OCTOBER 7, 2020	5 of 6
SCALE: 1" = 20'	



LEGEND

- EXISTING CONTOUR ——— 87 ———
- EXISTING SPOT ELEVATION × 90.5
- PROPOSED CONTOUR ——— 87 ———
- PROPOSED SPOT ELEVATION × 92.3
- EXISTING EDGE OF PAVEMENT - - - - -
- PROPOSED EDGE OF PAVEMENT - - - - -
- PROPOSED GRANITE CURB ———
- EXISTING CATCH BASIN (circle with cross)
- EXISTING DRAIN MANHOLE (circle with cross)
- PROPOSED CATCH BASIN (circle with cross)
- PROPOSED DRAIN MANHOLE (circle with cross)
- EXISTING DRAIN LINE (line with circles)
- PROPOSED DRAIN LINE (line with circles)
- EXISTING WATER MAIN (line with 'W')
- PROPOSED WATER SERVICE (line with 'W')
- EXISTING HYDRANT (circle with 'H')
- EXISTING GATE VALVE (line with 'V')
- EXISTING SEWER MAIN (line with 'S')
- EXISTING SEWER MANHOLE (circle with 'S')
- PROPOSED SEWER SERVICE (line with 'S')
- EXISTING GAS MAIN (line with 'G')
- PROPOSED GAS SERVICE (line with 'G')
- EXISTING UTILITY POLE (circle with 'U')
- PROPOSED U/G CONDUITS (line with 'C')
- EXISTING MONITORING WELL (circle with 'M')

DEEP OBSERVATION HOLE AE-1

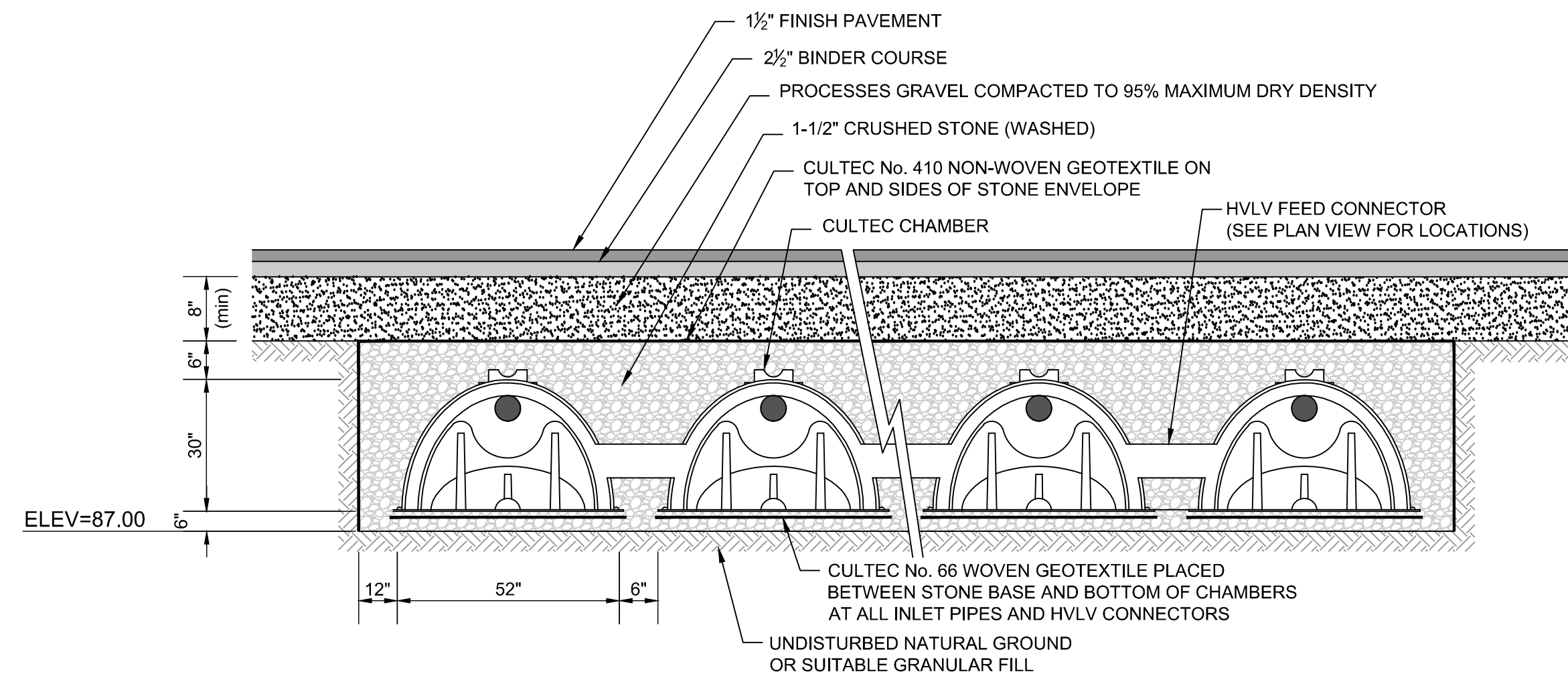
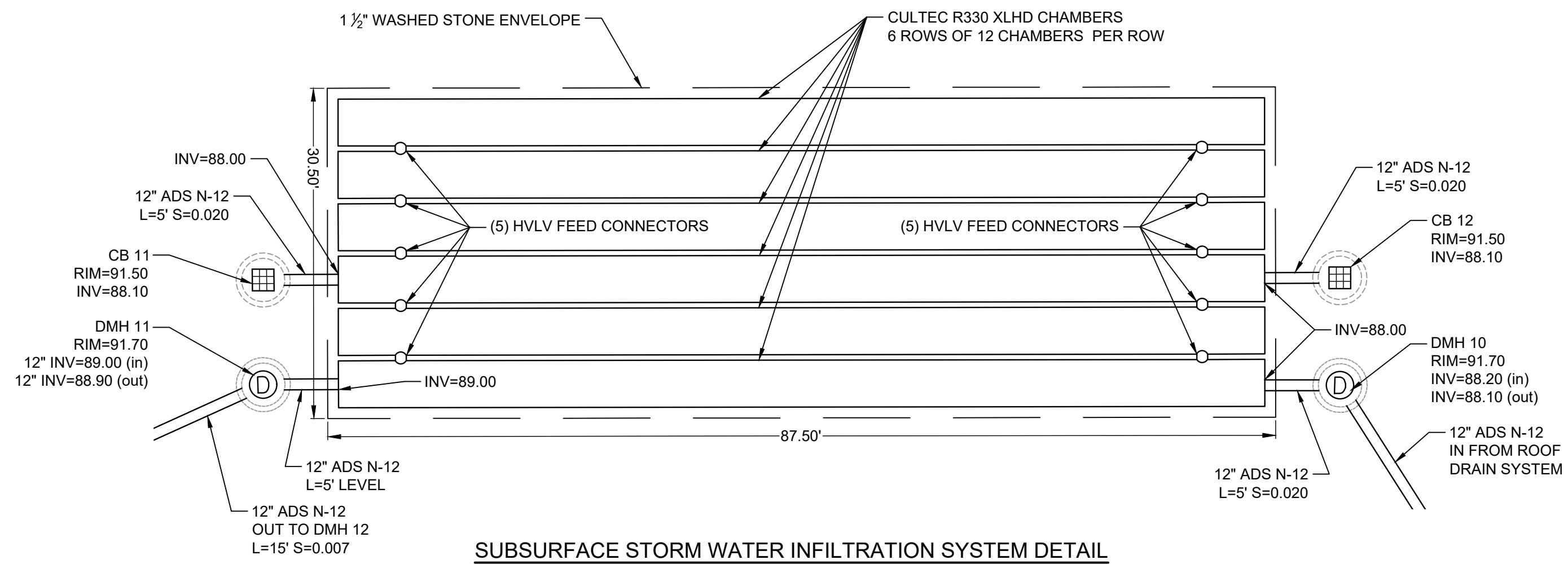
DATE: 10/24/2019 SOIL EVALUATOR: MARK SLEGER, P.E.
SURFACE ELEVATION: 90.4

DEPTH	LAYER	TEXTURE	COLOR	COMMENTS		
0' - 3"	FILL	PAVEMENT				
3' - 16"	FILL	COARSE SAND		W/ GRAVEL		
16' - 60"	FILL	GENERAL FILL		W/ ORGANICS AND		
60' - 102"	C	COARSE SAND	10YR6/4	W/ GRAVEL		
REFUSAL ENCOUNTERED	SEEPAGE OBSERVED	STANDING WATER	DEPTH TO MOTTLES	DEPTH TO ROOTS	DEPTH TO E.S.H.W.T.	E.S.H.W.T. ELEVATION
NONE	84"	96"	NONE	NONE	78"	83.9

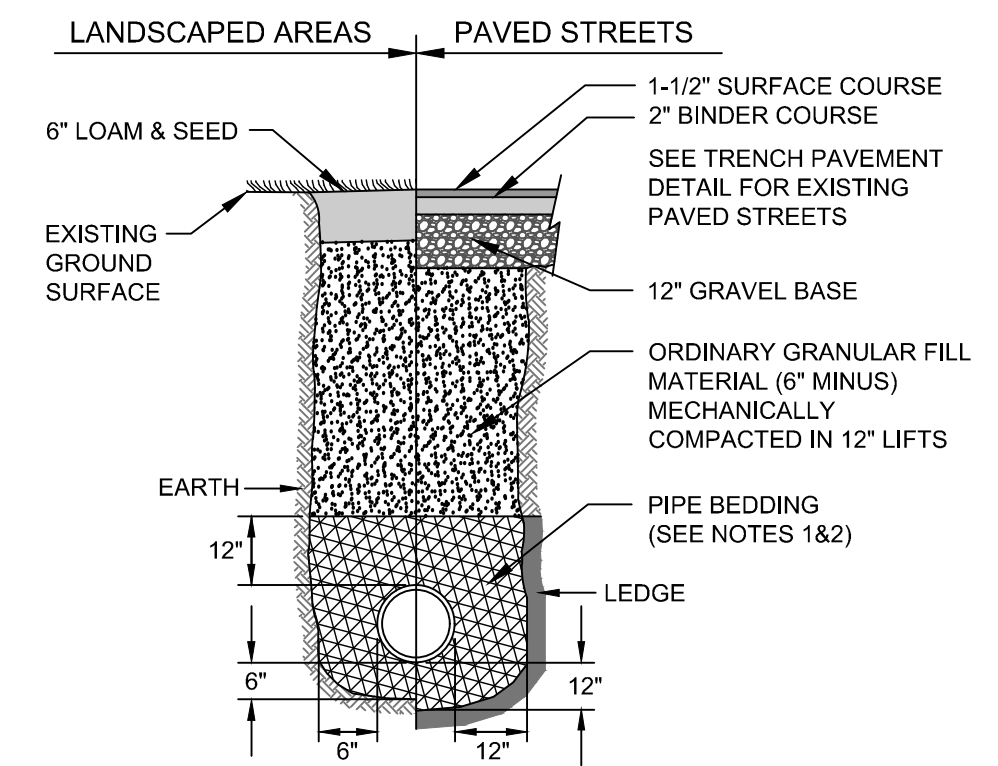
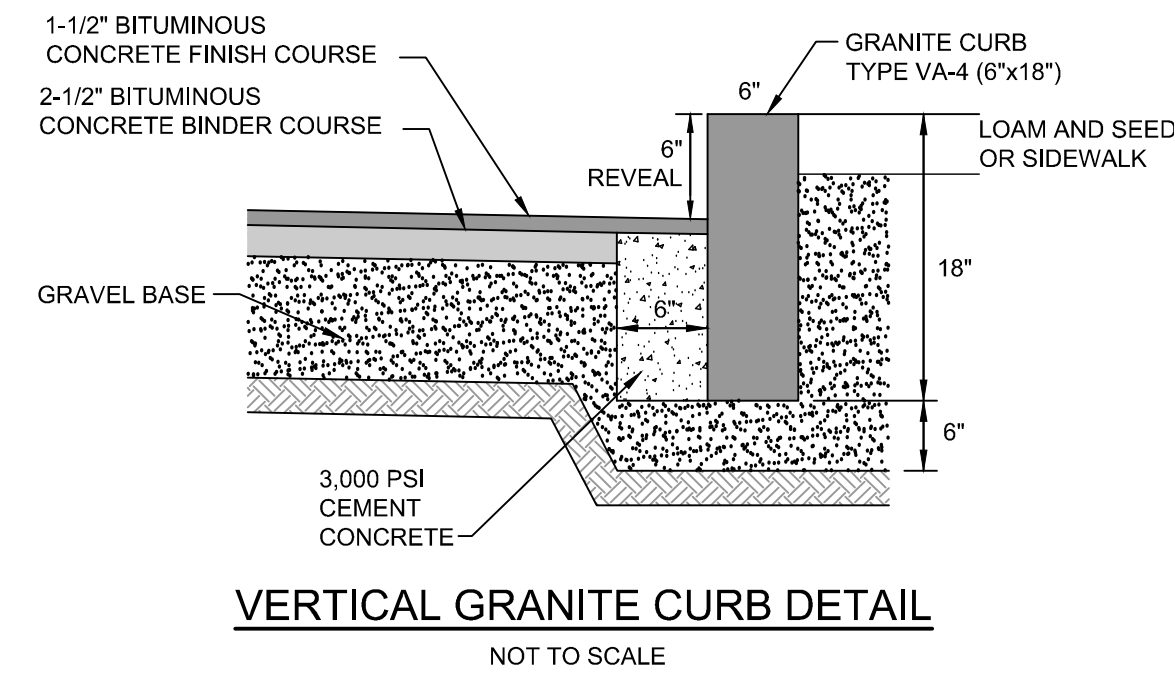
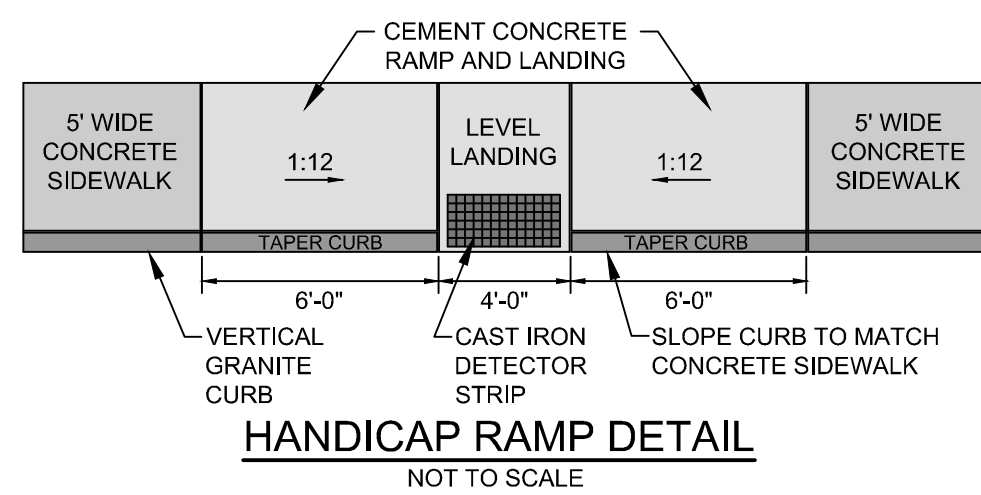
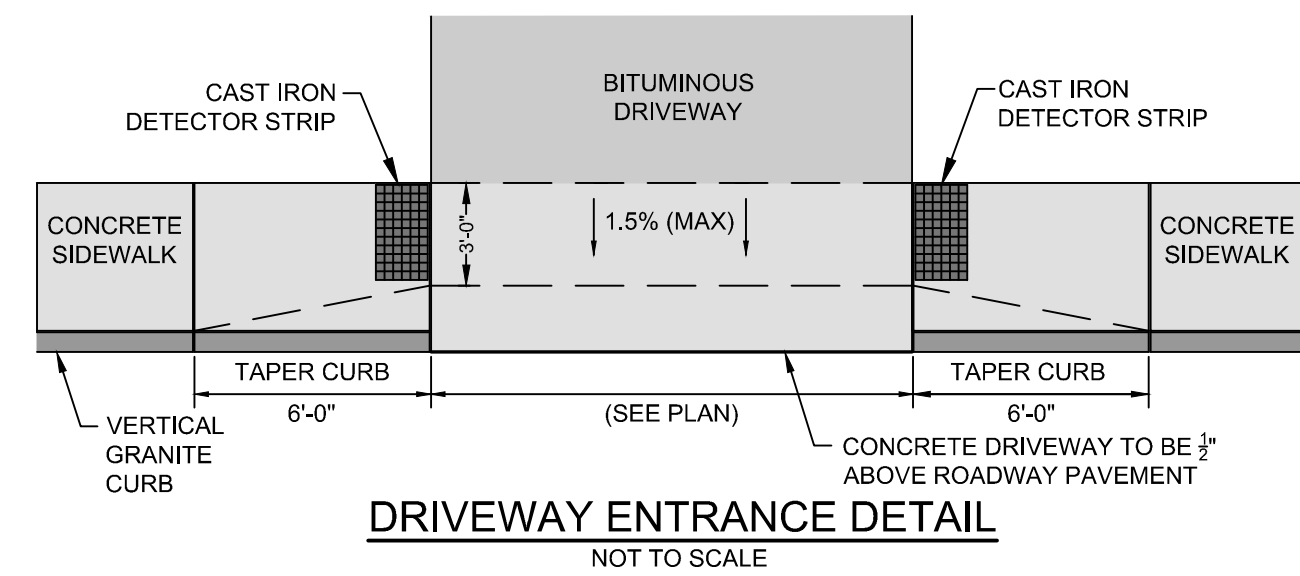
DEEP OBSERVATION HOLE AE-2

DATE: 10/24/2019 SOIL EVALUATOR: MARK SLEGER, P.E.
SURFACE ELEVATION: 90.4

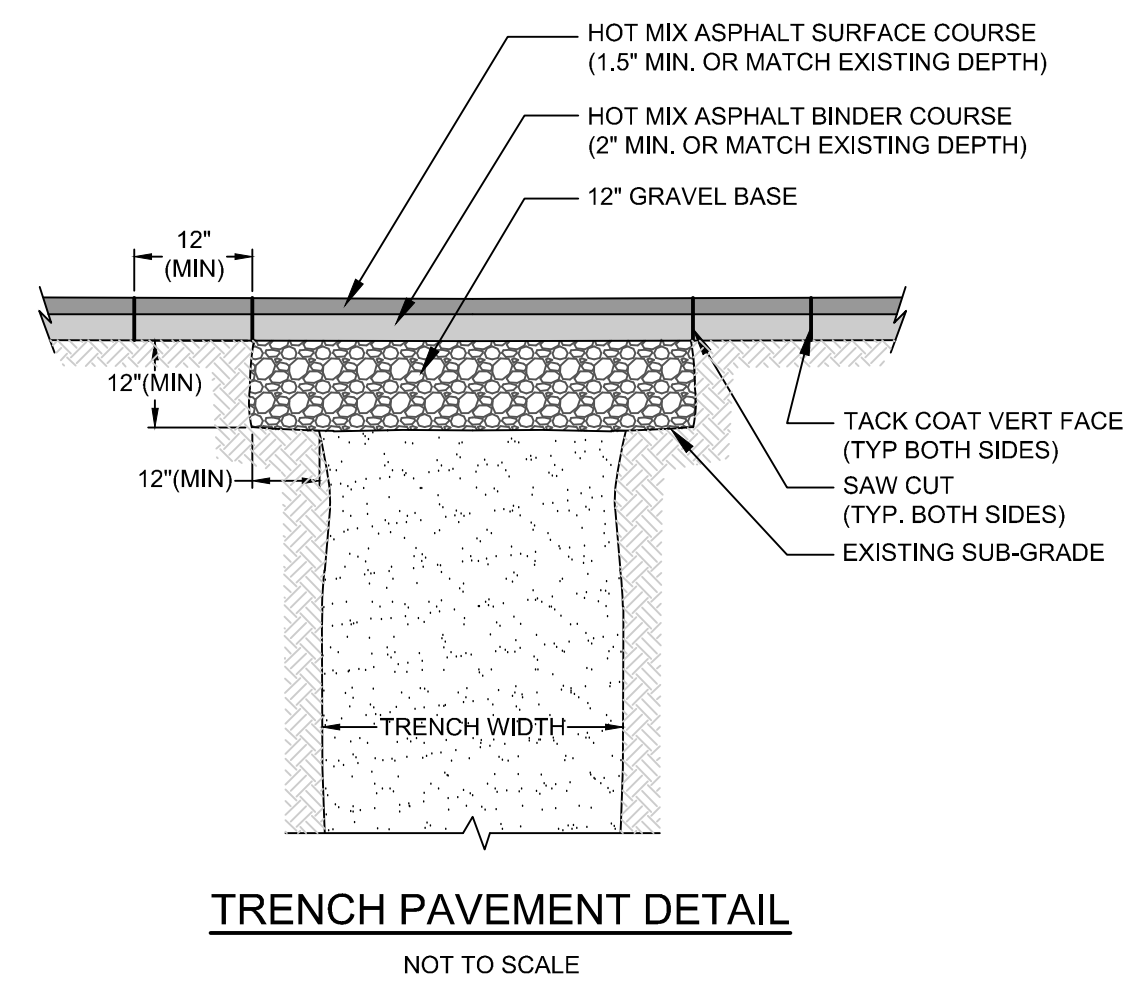
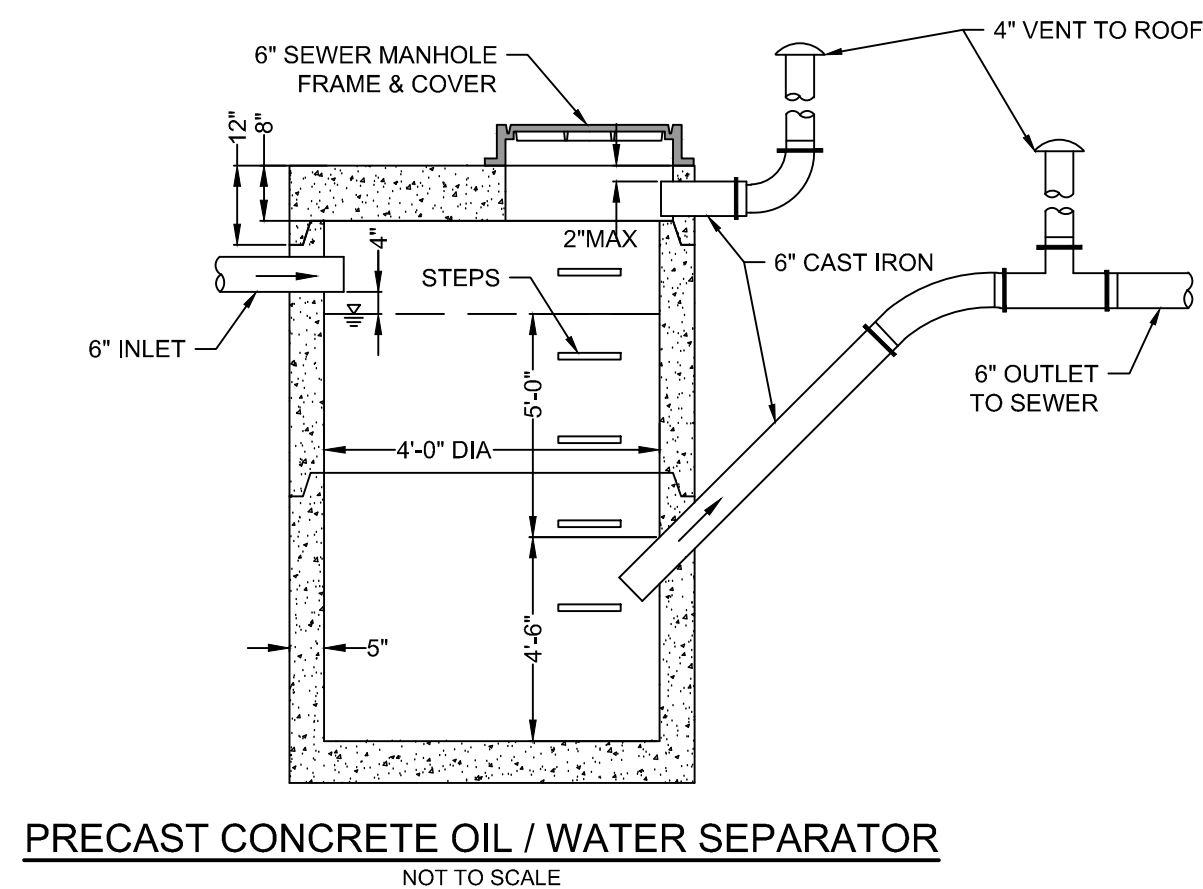
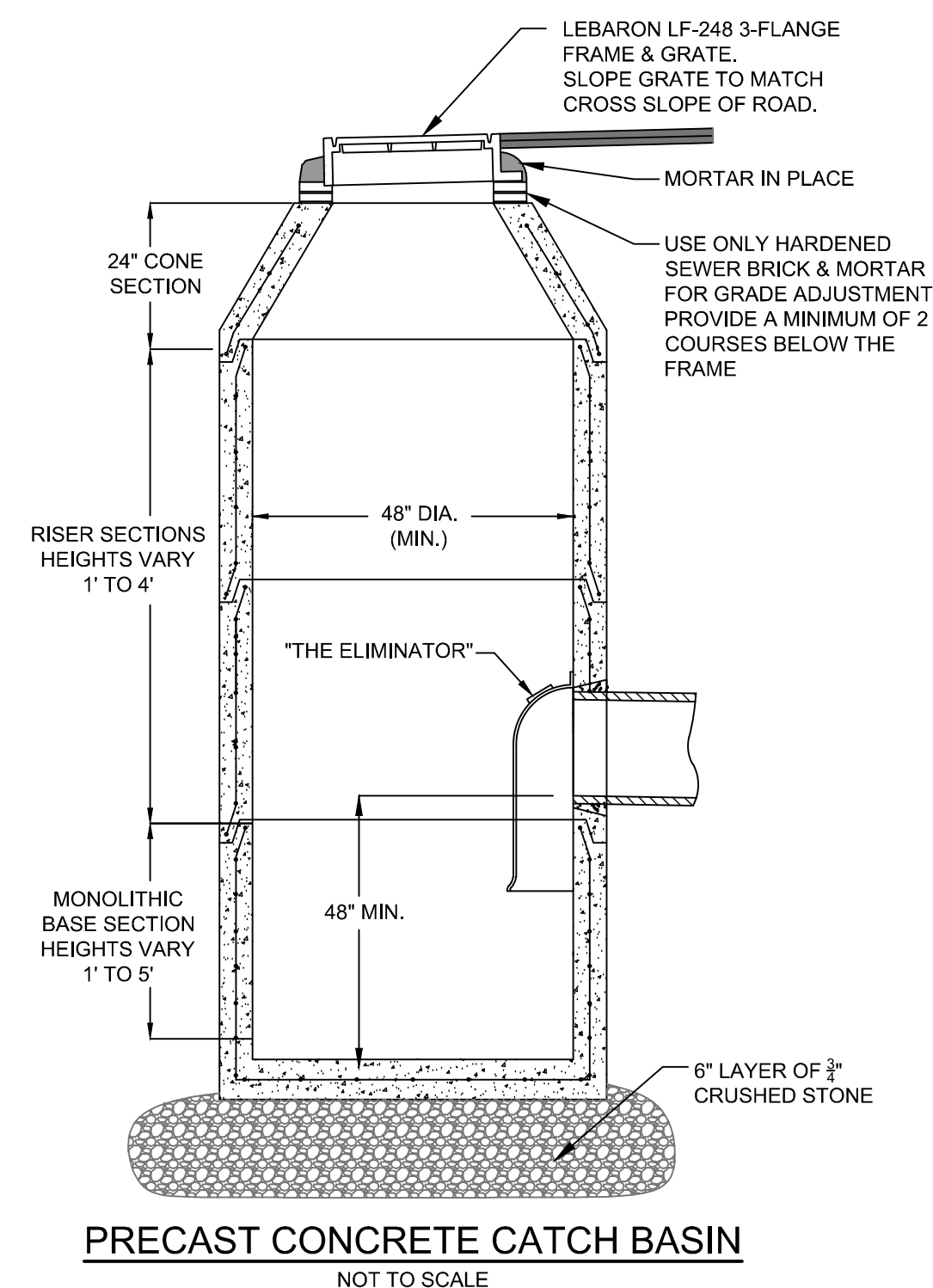
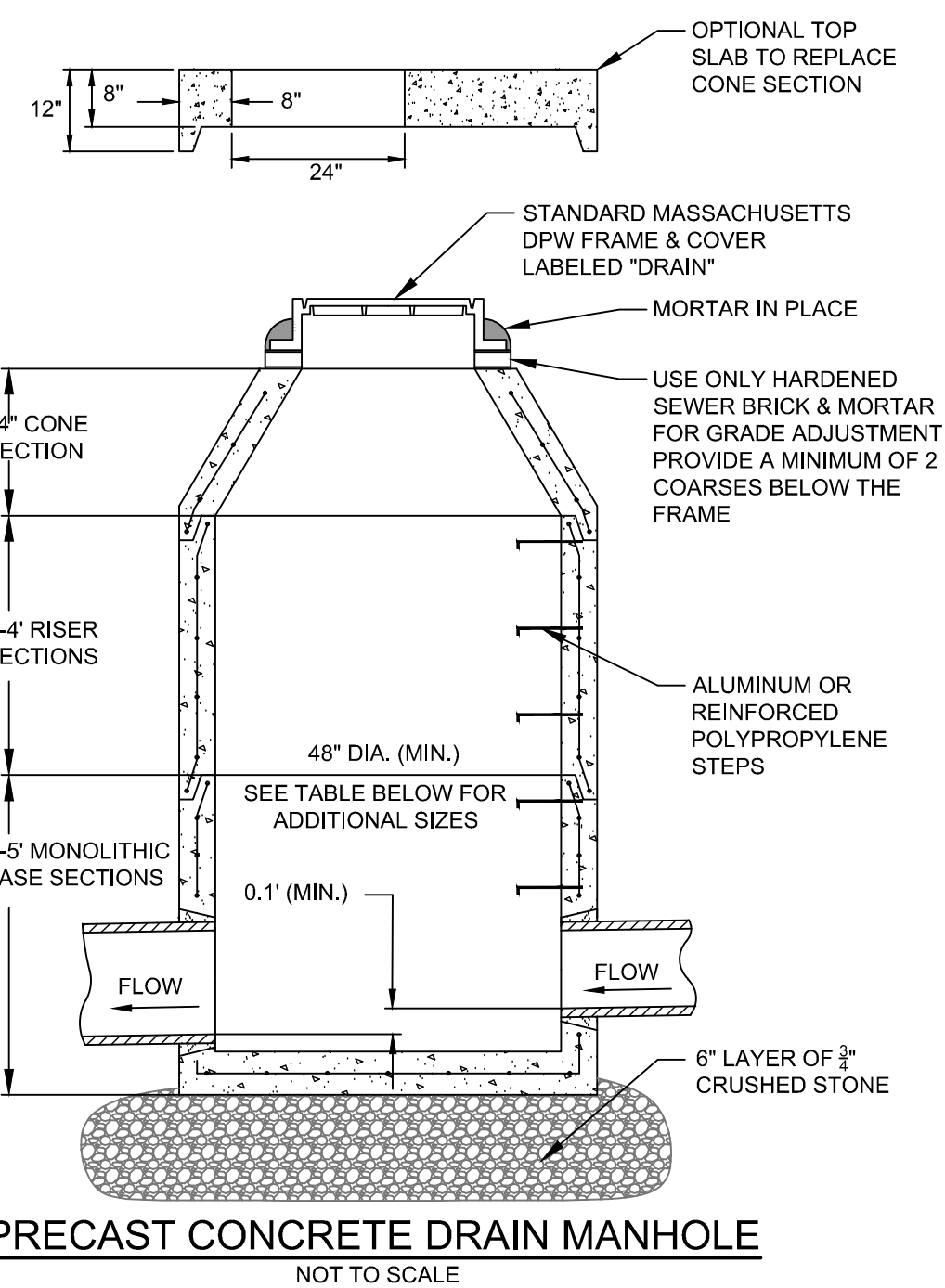
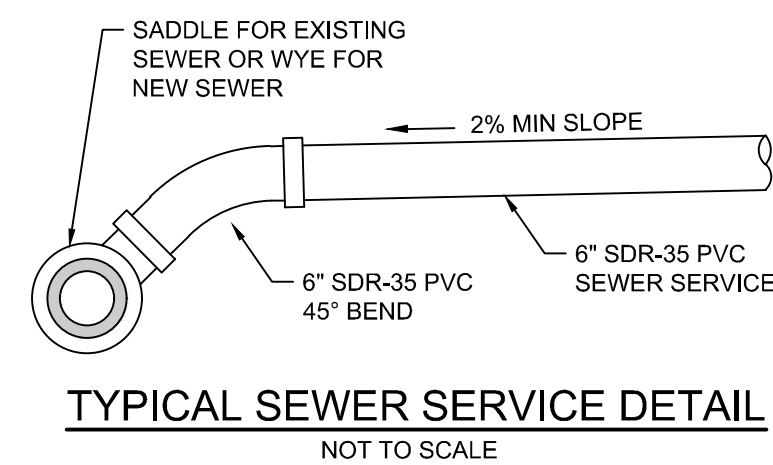
DEPTH	LAYER	TEXTURE	COLOR	COMMENTS		
0' - 3"	FILL	PAVEMENT				
3' - 16"	FILL	COARSE SAND		W/ GRAVEL		
16' - 54"	FILL	GENERAL FILL		W/ ORGANICS AND		
54' - 102"	C	COARSE SAND	10YR6/4	W/ GRAVEL		
REFUSAL ENCOUNTERED	SEEPAGE OBSERVED	STANDING WATER	DEPTH TO MOTTLES	DEPTH TO ROOTS	DEPTH TO E.S.H.W.T.	E.S.H.W.T. ELEVATION
NONE	84"	96"	NONE	NONE	78"	83.9



NOTES:
 1. REMOVE ALL TOP AND SUBSOIL AND ANY ORGANIC OR OTHERWISE UNSUITABLE MATERIAL.
 2. THE BOTTOM OF THE EXCAVATION IS TO BE INSPECTED BY THE DESIGN ENGINEER OR MUNICIPAL ENGINEERING DEPARTMENT PRIOR TO THE PLACEMENT OF THE FILTER FABRIC AND STONE ENVELOPE.



NOTES:
 1. PIPE BEDDING MATERIAL TO BE AS FOLLOWS:
 • FOR CLDI WATER MAINS USE SAND
 • FOR PVC AND HDPE PIPING USE 3/4" CRUSHED STONE
 • FOR RCP USE SUITABLE GRANULAR FILL (2" MINUS)
 2. FOR ANTI-SEEP COLLAR SUBSTITUTE BEDDING MATERIAL WITH BENTONITE FOR A DISTANCE OF 24 INCHES ALONG THE TRENCH.



NOTES:
 1. 12" OF GRAVEL BASE COURSE SHALL BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY.
 2. HOT MIX ASPHALT TRENCH PATCH SHALL BE A MINIMUM OF 3.5" TOTAL THICKNESS, OR SHALL MATCH THE EXISTING PAVEMENT THICKNESS, WHICHEVER IS GREATER.
 3. TRENCHES IN EXCESS OF 100 FEET IN LENGTH SHALL HAVE THE JOINT BETWEEN THE NEW AND OLD PAVEMENT SEALED WITH AN ASPHALT FIBER CRACK SEALER (M3.09.1)

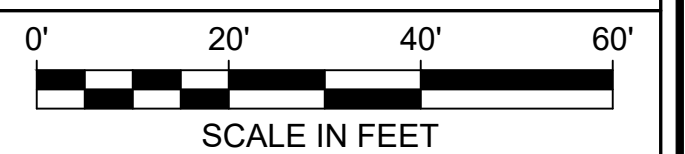
GENERAL NOTES

- PLAN REFERENCES**
 1. M.S.R.D. Plan 720 of 1939
 2. M.S.R.D. Plan 221 of 1944
 3. M.S.R.D. Plan 902 of 1945

- DEED REFERENCES**
 1. M.S.R.D. Book 71132 Page 336
 2. M.S.R.D. Book 71505 Page 261

RECORD OWNER
 62 Foundry LLC
 5 Robertson Way
 Woburn, MA 01801

ASSESSORS PARCELS
 13-030-104A+
 13-031-104G



MAS	TOWN COMMENTS	3/18/2021
BY	REVISIONS	DATE

CONSTRUCTION DETAILS
FOUNDRY PLACE
 62-76 FOUNDRY STREET
 WAKEFIELD, MA

ALAN ENGINEERING, L.L.C.
 110 WINN STREET, SUITE 209
 WOBURN, MA 01801
 (781) 287-9789
 alan.eng@verizon.net

PREPARED FOR:
 62 FOUNDRY LLC
 5 ROBERTSON WAY
 WOBURN, MA 01801

JOB NO: 1182	DWG NO: 1773
OCTOBER 7, 2020	6 of 6
SCALE: AS NOTED	

MEMORANDUM

TO: Lt. Joseph Anderson
Wakefield TAC
Wakefield Town Hall
1 Lafayette Street
Wakefield, MA 01880

FROM: Scott W. Thornton, P.E. *and*
Rana Eslamifard
Vanasse & Associates, Inc.
35 New England Business Center Drive
Suite 140
Andover, MA 01810-1066
(978) 474-8800

DATE: May 14, 2021

RE: 8813

SUBJECT: Responses to Traffic Advisory Committee Comments – 44-48 Crescent Street
Wakefield, Massachusetts

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Statement (TIS) in order to determine the potential impacts on the transportation infrastructure associated with a proposed multifamily residential building to be located off of Crescent Street in Wakefield, Massachusetts (hereafter referred to as the “Project”). This memo updates previously prepared TIS information dated February 8, 2021 (“February TIS”) to support the Project, including an assessment of the trip-generation and traffic operations impacted by the Project. In addition, this memo incorporates additional recommendations and provides additional information requested by VHB as consultant to the Wakefield Traffic Advisory Committee (TAC) in their TIS review memo dated March 8, 2021.

REVISED PROJECT DESCRIPTION

The Project entails construction of a multifamily residential building to be located at 44-48 Crescent Street in Wakefield, Massachusetts. The Project was initially proposed at 56 units, but as requested by the TAC, the Project has been revised to 45 units, so as to provide a parking supply that meets zoning requirements. On-site parking will be provided for 70 vehicles including 3 handicapped accessible spaces.

TRAFFIC VOLUMES

An appendix is attached that identifies the intersection traffic counts, trip generation, calculations, crash data, and traffic analysis worksheets prepared to generate the results shown in this memorandum.

MODIFIED PROJECT-GENERATED TRAFFIC¹

As requested by the TAC, the Project now entails the construction of 45 multifamily residential units. In order to develop the traffic characteristics of the Project, trip-generation statistics published by ITE for similar land uses as those proposed were used. ITE Land Use Code (LUC) 221, *Multifamily Housing (Mid-Rise)* was used to establish the base traffic characteristics of the Project. A summary of the modified vehicle-trip generation for the Project along with the previous development trips and the resulting reduction in trip generation is provided in Table 1.

Table 1
TRIP-GENERATION SUMMARY

Time Period/Direction	Currently Proposal Vehicle Trips ^a	Previous Proposal Vehicle Trips ^b	Reduction Vehicle Trips
<i>Average Weekday:</i>			
Entering	122	152	-30
<u>Exiting</u>	<u>122</u>	<u>152</u>	<u>-30</u>
Total	244	304	-60
<i>Weekday Morning Peak Hour:</i>			
Entering	4	5	-1
<u>Exiting</u>	<u>12</u>	<u>14</u>	<u>-2</u>
Total	16	19	-3
<i>Weekday Evening Peak Hour:</i>			
Entering	13	15	-2
<u>Exiting</u>	<u>8</u>	<u>10</u>	<u>-2</u>
Total	21	25	-4

^aBased on ITE LUC 221, *Multifamily Housing (Mid-Rise), 45 units.*

^bBased on ITE LUC 221, *Multifamily Housing (Mid-Rise), 56 units.*

TRAFFIC OPERATIONS ANALYSIS

Level-of-service and vehicle queue analyses were conducted for 2021 Existing, 2028 No-Build, and 2028 Build conditions for the intersections within the study area based on the revised program. The results of the intersection capacity and vehicle queue analyses are summarized in Table 2 and Table 3, with the detailed analysis results presented in the Appendix. The following is a summary of the level of service and delay analyses for the intersections within the study area:

Water Street at Crescent Street

Before and after the Project, all the movements at this signalized intersection were shown to operate at LOS C or better during the weekday morning and evening peak hours with negligible increases in overall delay and vehicle queuing.

Crescent Street at Crescent Hill

Before and after the Project, all movements at this unsignalized intersection were shown to operate at LOS B or better with no vehicle queuing expected to occur.

Project Site Driveways

All movements exiting the Project site driveways to Crescent Street and Crescent Hill were shown to operate at LOS B or better, with no vehicle queuing predicted to occur.

Table 2
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Signalized Intersection/Peak Hour Critical Movement	2021 Existing				2028 No-Build				2028 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d Ave/95 th	V/C	Delay	LOS	Queue/ Ave/95 th	V/C	Delay	LOS	Queue/ Ave/95 th
<i>Water Street at Crescent Street</i>												
<i>Weekday Morning:</i>												
Water Street EB LT/TH/RT	0.51	12.9	B	4/12	0.53	12.9	B	4/13	0.53	12.9	B	4/13
Water Street WB LT/TH/RT	0.76	19.0	B	7/21	0.78	19.6	B	8/26	0.78	19.7	B	8/26
Private Driveway NB LT/TH/RT	0.02	21.2	C	0/0	0.02	22.2	C	0/0	0.02	22.2	C	0/0
Crescent Street SB LT/TH/RT	0.33	22.0	C	2/4	0.37	23.9	C	2/5	0.39	24.1	C	2/5
Overall	--	17.2	B	--	--	17.7	B	--	--	17.8	B	--
<i>Weekday Evening:</i>												
Water Street EB LT/TH/RT	0.70	20.1	C	5/16	0.73	20.6	C	6/18	0.73	20.8	C	6/18
Water Street WB LT/TH/RT	0.65	18.6	B	4/14	0.67	18.8	B	5/15	0.67	18.7	B	5/15
Private Driveway NB LT/TH/RT	0.05	21.5	C	0/1	0.06	22.1	C	0/1	0.06	22.1	C	0/1
Crescent Street SB LT/TH/RT	0.31	24.9	C	1/5	0.34	26.1	C	1/6	0.35	26.3	C	1/6
Overall	--	20.1	C	--	--	20.6	C	--	--	20.7	C	--

^aVolume-to-capacity ratio

^bDelay in seconds per vehicle.

^cLevel of service.

^dQueue length, in vehicle.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Table 3
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Unsignalized Intersection/Peak Hour/ Critical Movement	2021 Existing				2028 No-Build				2028 Build			
	Demand ^a	Delay ^b	LOS ^c	Queue ^d 95 th	Demand	Delay	LOS	Queue 95 th	Demand	Delay	LOS	Queue 95 th
<i>Crescent Street at Crescent Hill:</i>												
<i>Weekday Morning:</i>												
Crescent Hill WB LT	6	10.0	B	0	6	10.1	B	0	7	9.9 ^e	A	0
Crescent Street SB LT	1	7.6	A	0	1	7.6	A	0	2	7.6	A	0
<i>Weekday Evening:</i>												
Crescent Hill WB LT	3	9.8	A	0	3	9.9	A	0	4	9.8 ^e	A	0
Crescent Street SB LT	2	7.5	A	0	2	7.5	A	0	6	7.5	A	0
<i>Crescent Hill at the Project Site Driveway:</i>												
<i>Weekday Morning:</i>												
Site Driveway NB LT	--	--	--	--	--	--	--	--	4	10.1	B	0
<i>Weekday Evening:</i>												
Site Driveway NB LT	--	--	--	--	--	--	--	--	3	8.6	A	0
<i>Crescent Street at the Project Site Driveway:</i>												
<i>Weekday Morning:</i>												
Site Driveway WB LT	--	-	--	--	--	--	--	--	5	8.6	A	0
<i>Weekday Evening:</i>												
Site Driveway WB LT	--	--	--	--	--	--	--	--	4	10.1	B	0

^aDemand in vehicles per hour.

^bAverage control delay per vehicle (in seconds).

^cLevel of service.

^dQueue length in vehicle.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements

^eRudction in delay as a result of right-turn volumes added to this approach.

SITE ACCESS

A delivery vehicle driveway accessed from Crescent Hill will be incorporated into the site design. This driveway is intended to be used for mail, Amazon, UPS, etc. during the day. Delivery vehicles will not be permitted to park in front of the Project either on Crescent Street or Crescent Hill. This delivery vehicle driveway is shown on the attached site plan exhibit.

PARKING

The Project has decreased the number of units from the initial submittal but has unchanged the number of parking spaces. Accordingly, the Project is now providing 70 spaces for 45 units, which meets Town of Wakefield zoning requirements. The breakdown of the unit count and parking spaces is provided below in Table 4.

**Table 4
PROJECT PARKING SUPPLY**

<u>Unit Type</u>	<u>Number</u>	<u>Parking Rate</u>	<u>Resulting Parking Total</u>
2-bedroom	40 units	1.5 spaces/unit	60 spaces
3-bedroom	5 units	2.0 spaces/unit	10 spaces
Project Parking Supply Required under Zoning:			70 spaces
Project Parking Supply Provided:			70 spaces

As shown in Table 4, the Project is now compliant with zoning requirements for the Town. While the Project is less than ½ mile from the Wakefield Commuter Rail station and other public transit services that would likely result in less reliance on personal vehicles, the Applicant has provided more parking supply to address the Town’s concerns.

SAFETY

As requested by the TAC and referenced in the VHB memo, the crash history was expanded to include the intersections of Crescent Street at Lincoln Street, Crescent Street at Princess Street, and Crescent Street at Otis Street and Centre Street in addition to the Water Street at Crescent Street and Crescent Street at Crescent Hill intersections. Motor vehicle crash information from the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2014 through 2018, inclusive) in order to examine motor vehicle crash trends occurring within the study area. In addition to MassDOT crash data, the Wakefield Police Department (WPD) was contacted in order to obtain actual crash reports. However, these crash reports were not available from the WPD for these incidents; therefore, the MassDOT data was used for the analysis.

The data is summarized by intersection, type, severity, roadway and weather conditions, and day of occurrence, and presented in Table 5.

Table 5
MOTOR VEHICLE CRASH DATA SUMMARY^a

	Water Street at Crescent Street	Crescent Street at Crescent Hill	Crescent Street at Lincoln Street	Crescent Street at Princess Street	Crescent Street at Otis Street and Centre Street
Traffic Control Type: ^b	TS	U	U	U	U
Year:					
2014	5	1	0	1	1
2015	3	1	.0	1	0
2016	2	0	1	0	1
2017	2	0	2	1	5
<u>2018</u>	<u>3</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>3</u>
Total	15	2	3	3	10
Average	3.00	0.40	0.60	0.60	2.0
Crash Rate ^c	0.51	0.33	--	--	--
MassDOT Crash Rate: ^d	0.73	0.57	0.57	0.57	0.57
Significant? ^e	No	No	No	No	No
Type:					
Angle	9	0	0	1	4
Rear-End	4	1	1	1	0
Head-On	0	0	0	0	1
Sideswipe	1	0	0	0	1
Single Vehicle Crash	0	0	1	0	0
Crashes with Parked Vehicles	1	1	1	1	3
<u>Unknown/Other</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	15	2	3	3	10
Conditions:					
Clear	9	2	1	2	6
Cloudy	3	0	1	1	2
Rain	3	0	0	0	2
Snow/Ice	0	0	1	0	0
<u>Not Reported/Other</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	15	2	3	3	10
Lighting:					
Daylight	14	2	2	3	9
Dawn/Dusk	0	0	1	0	0
Dark (Road Lit)	1	0	0	0	1
<u>Dark (Road Unlit)</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	15	2	3	3	10
Day of Week:					
Monday-Friday	12	2	3	2	8
Saturday	2	0	0	1	1
<u>Sunday</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	15	2	3	3	10
Severity:					
Property Damage Only	11	1	3	2	6
Non-fatal Injury	3	0	0	0	1
<u>Unknown</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>3</u>
Total	15	2	3	3	10

^aSource: MassDOT Safety Management/Traffic Operations Unit records, 2014 through 2018.

^bTraffic Control Type: U = unsignalized; TS = traffic signal.

^cCrash rate per million vehicles entering the intersection.

^dDistrict crash rate.

^eThe intersection crash rate is significant if greater than the MassDOT crash rate for District 4 shown.

As can be seen in Table 5, all the above intersections were found to have averaged approximately 3 or fewer

reported motor vehicle crashes per year over the five-year review period, the majority of which occurred on a weekday, under clear weather conditions, during daylight, and involved angle or rear-end type collisions that resulted in property damage only.

In the February TIS, the Crescent Street at Crescent Hill intersection was shown to have experienced five crashes over the 5-year review period. However, upon expanding the search as requested by the TAC, it was determined that three of the crashes attributed to the Crescent Street at Crescent Hill intersection actually occurred at Crescent Street at Lincoln Street. The data indicated that the Crescent Street at Crescent Hill intersection actually had only two reported motor vehicle crashes in the five-year review period and a motor vehicle crash rate of 0.33 which is *below* the MassDOT District 4 average crash rates for an unsignalized intersection. Detailed MassDOT crash rate worksheets are provided in the Appendix.

It should be noted that one crash with a parked car on Crescent Street was observed at each intersection, while three crashes involving parked cars were observed at the intersection of Otis Street with Centre Street and Crescent Street. These crashes were all sideswipe-type crashes with no injuries involved and total seven crashes in five years which is an overall low number of crashes across five intersections.

VEHICLE SPEEDS

Existing vehicle travel speeds on Crescent Street were collected to determine the average and 85th percentile vehicle speeds and provide a better representation of traffic conditions than standard assumptions. Data was collected off-peak (when traffic speeds are typically higher) with 40 observations in each direction on Crescent Street. This data is summarized in Table 6.

**Table 6
OBSERVED VEHICLE SPEEDS (IN MILES PER HOUR)**

Location/Direction	Posted Speed Limit	Average Speed	85 th Percentile Speed ^a
<i>Crescent Street, south of Crescent Hill:</i>			
Northbound	30	18	21
Southbound	30	21	23

^aThe 85th percentile speed is the speed at which 85 percent of the traffic is traveling at or below. It is commonly used for setting speed limits on roadways.

SIGHT DISTANCE EVALUATION²

As requested by the TAC, sight distances were reviewed at the locations of the proposed driveways where they intersect with Crescent Street and Crescent Hill, and also at the intersection of Crescent Street at Crescent Hill. These distances were reviewed in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)³ standards. Stopping sight distance (SSD) is the minimum distance required for an approaching driver at a height of 3.5 feet to perceive and react

² Ibid 5.

³ *A Policy on Geometric Design of Highway and Streets*, 6th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018.

accordingly to a stationary object 2 feet tall in its path. The values are based on a perception and reaction time of 2.5 seconds and braking distance required under wet, level pavements. Intersection sight distance (ISD) is based on the time required to perceive, react, and complete the desired exiting maneuver from a driveway once the driver decides to execute the maneuver. Values for exiting sight distance represent the time to: 1) turn left or right, in addition to accelerating to the operating speed of the roadway, without causing approaching vehicles to reduce speed by more than 10 miles per hour (mph), and 2) upon turning left, to clear the near half of the intersection without conflicting with the vehicles approaching from the left. Table 7 summarizes sight distance measurements at the site driveway locations.

Table 7
SIGHT DISTANCE MEASUREMENTS

Location/Sight Distance	Required Distances (Feet)	Measured Distances (Feet)
<i>Crescent Hill at Site Driveway</i>		
<i>Stopping Sight Distance:</i>		
Looking east to the driveway	45 ^a	60 ^b
Looking west to the driveway	115 ^c	181 ^d
<i>Intersection Sight Distance:</i>		
Looking east from the driveway	220 ^c	181
Looking west from the driveway	95 ^a	60
<i>Crescent Street at Site Driveway</i>		
<i>Stopping Sight Distance:</i>		
Looking north to the driveway	115 ^c	135 ^f
Looking south to the driveway	132	486
<i>Intersection Sight Distance:</i>		
Looking north from the driveway	235 ^e	179/500+ ^g
Looking south from the driveway	235	135
<i>Crescent Street at Crescent Hill</i>		
<i>Stopping Sight Distance:</i>		
Looking north to Crescent Hill	200	331 ⁱ
Looking south to Crescent Hill	200	500+
<i>Intersection Sight Distance:</i>		
Looking north from Crescent Hill	335 ^h	253 ^j
Looking south from Crescent Hill	335	331

^aBased on a 10-mph speed associated with vehicles turning from Crescent Street into Crescent Hill.

^bMeasured from driveway to Crescent Street at Crescent Hill terminus.

^cBased on a 20-mph speed associated with vehicles traveling on Crescent Hill towards Crescent Street.

^dMeasured from driveway to Crescent Hill terminus.

^eBased on a 21-mph speed associated with vehicles traveling on Crescent Street in the vicinity of the driveway and +8% grade on Crescent Street.

^fMeasured from driveway to Water Street at Crescent Street terminus.

^gAvailable sight distance/sight distance with selective trimming/removal of trees situated within the sight triangle of the driveway.

^hBased on 30-mph approach speed at the intersection of Crescent Street at Crescent Hill.

ⁱMeasured to Crescent Street terminus.

^jLimited by retaining wall at 40 Crescent Street.

As shown in Table 7, adequate lines of sight are provided for vehicles at these locations. For vehicles exiting the site driveway to Crescent Hill, vehicles turning into Crescent Hill will be traveling at a low speed (+/- 10 mph) while executing left or right turns; therefore, this distance is adequate. In all locations, the minimum level of Stopping Sight Distance is able to be met. For motorists looking north to the Crescent Street driveway, the length of Crescent Street between Water Street and the site driveway limits the sight distance to 135 feet; however, based on the 85th percentile speed of 21 mph and the measured 8% upgrade, safe stopping sight distance of 115 feet is required. Therefore, the available sight distance is sufficient for motorists traveling north and south on Crescent Street to be able to react to vehicles exiting the driveway. As indicated by AASHTO, since the available sight distance for an entering vehicle is at least equal to the appropriate stopping sight distance, then drivers have sufficient sight distance to anticipate and avoid collisions.

CONCLUSIONS

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

1. The Project is providing parking consistent with the Town of Wakefield zoning requirements, with 70 spaces provided for 45 units. The reduction from 56 units to 45 units results in a decrease of 60 daily trips, 3 weekday morning peak hour trips, and 4 weekday evening peak hour trips.
2. Typical delivery vehicles for mail, Amazon, UPS, etc. will use a dedicated driveway accessed from Crescent Hill. These vehicles can back into or pull into this driveway and cause no more impact to travel than the other driveways on the street.
3. A review of the crash data at area intersections along Crescent Street indicates that crashes at the intersection of Crescent Street at Crescent Hill numbered only 2 crashes in five years, not the 5 crashes previously reported. Three of the crashes at this location were actually noted to have occurred at the Crescent Street at Lincoln Street intersection.
4. The field measurements and vehicle speed observations indicate that the site driveway intersections and the intersection of Crescent St and Crescent Hill meet SSD requirements, which meets AASHTO guidance.
5. The Applicant is in favor of installing “No Parking Here to Corner” on Crescent Hill south of the site driveway and also on Crescent Street north of the site driveway.

It is our conclusion that safe and efficient access will be provided to the project site and the project can be accommodated within the confines of the existing and improved transportation system.

Enclosures:

- Technical Appendix

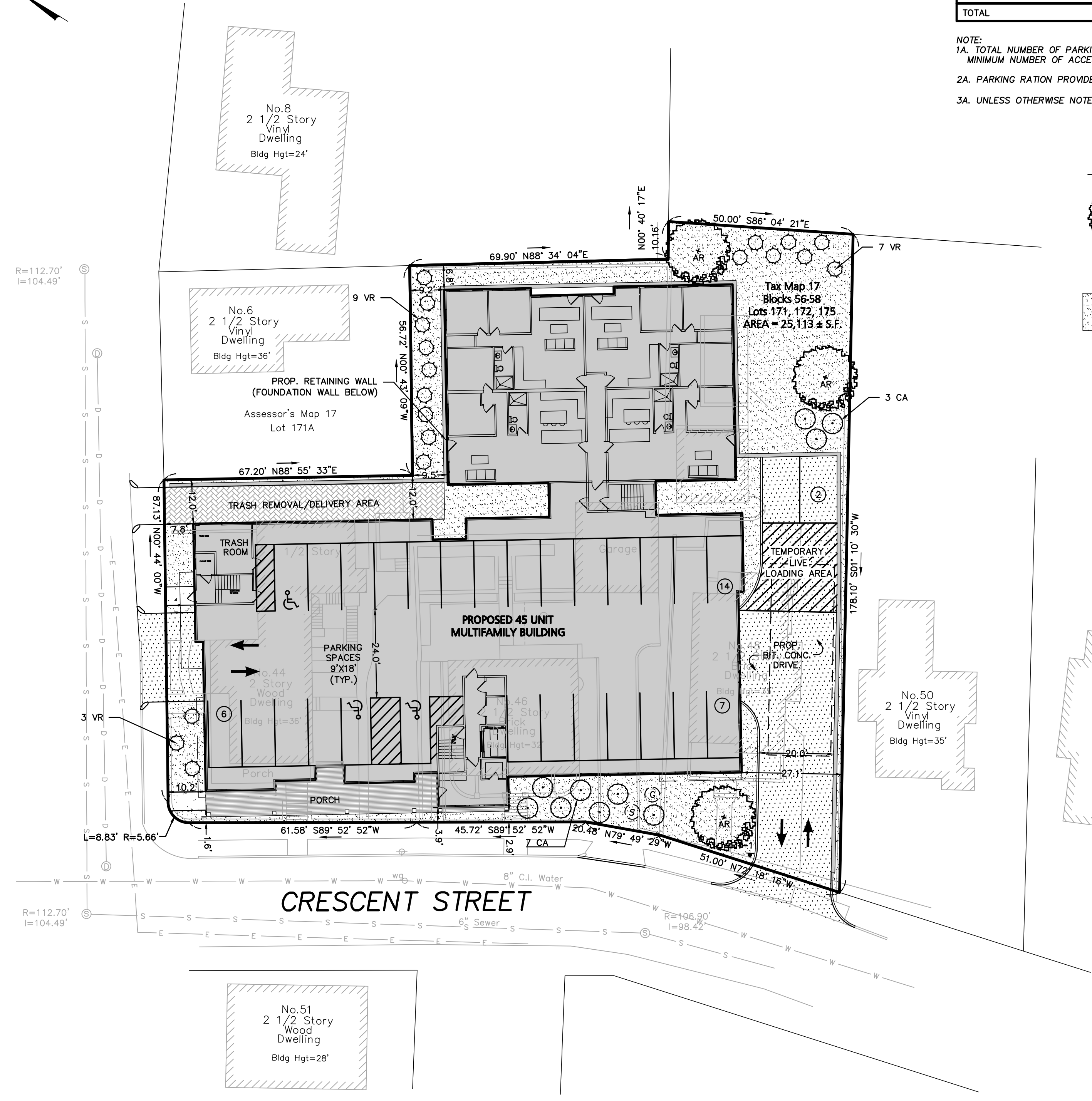
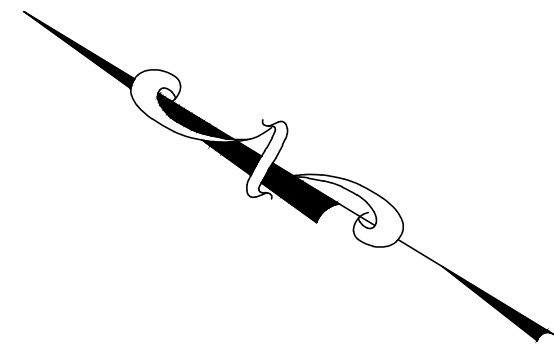
APPENDIX

PROJECT SITE PLAN
TRAFFIC COUNT DATA
PUBLIC TRANSPORTATION SCHEDULES
MOTOR VEHICLE CRASH DATA
GROWTH RATE DATA
TRIP GENERATION CALCULATIONS
JOURNEY TO WORK DATA
CAPACITY ANALYSIS



PROJECT SITE PLAN

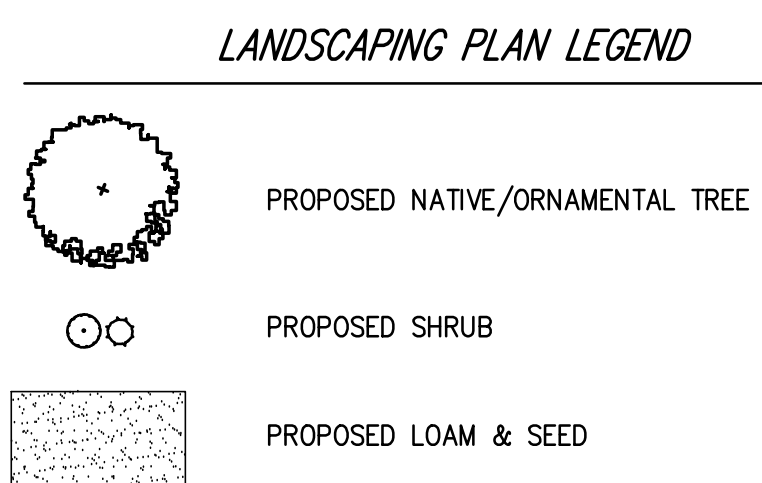




PARKING CALCULATIONS

COMPONENT	REQUIRED	PROPOSED
MULTIFAMILY DWELLING:		
2 BEDROOMS OR FEWER (40 UNITS)	60 SPACES (1.5 spaces per unit) 40 units x 1.5 spaces = 60 Spaces	41 SPACES (Lower Level) 27 SPACES (Upper Level)
3 BEDROOMS (5 UNITS)	10 SPACES (2.0 spaces per unit) 5 units x 2.0 spaces = 10 Spaces	2 SPACES (Exterior)
TOTAL	70 SPACES	70 SPACES

NOTE:
 1A. TOTAL NUMBER OF PARKING SPACES IN PARKING FACILITY: 70 SPACES
 MINIMUM NUMBER OF ACCESSIBLE PARKING SPACES REQUIRED FOR 51-75 SPACES: 3 SPACES
 2A. PARKING RATION PROVIDED = 1.6 SPACES PER UNIT
 3A. UNLESS OTHERWISE NOTED, PARKING SPACES ARE 9'x18'



LAND USAGE TABLE
GENERAL RESIDENCE (GR)

ITEM	REQUIRED	PROVIDED
MINIMUM LOT WIDTH	80 FT	87.13 FT
MINIMUM LOT SIZE	8,000 SF	25,113 SF
MINIMUM LOT FRONTAGE	80 FT	178.78 FT
MINIMUM FRONT YARD SETBACK	15 FT	1.6 FT
MINIMUM SIDE YARD SETBACK	10 FT / 15 FT	7.8 FT / 27.1 FT
MINIMUM REAR YARD SETBACK	20 FT	6.8 FT
MAXIMUM HEIGHT	35 FT	65 FT
MAXIMUM STORIES	3	5
MINIMUM OPEN AREA	30%	20%
MAXIMUM BUILDING COVERAGE	35%	59%

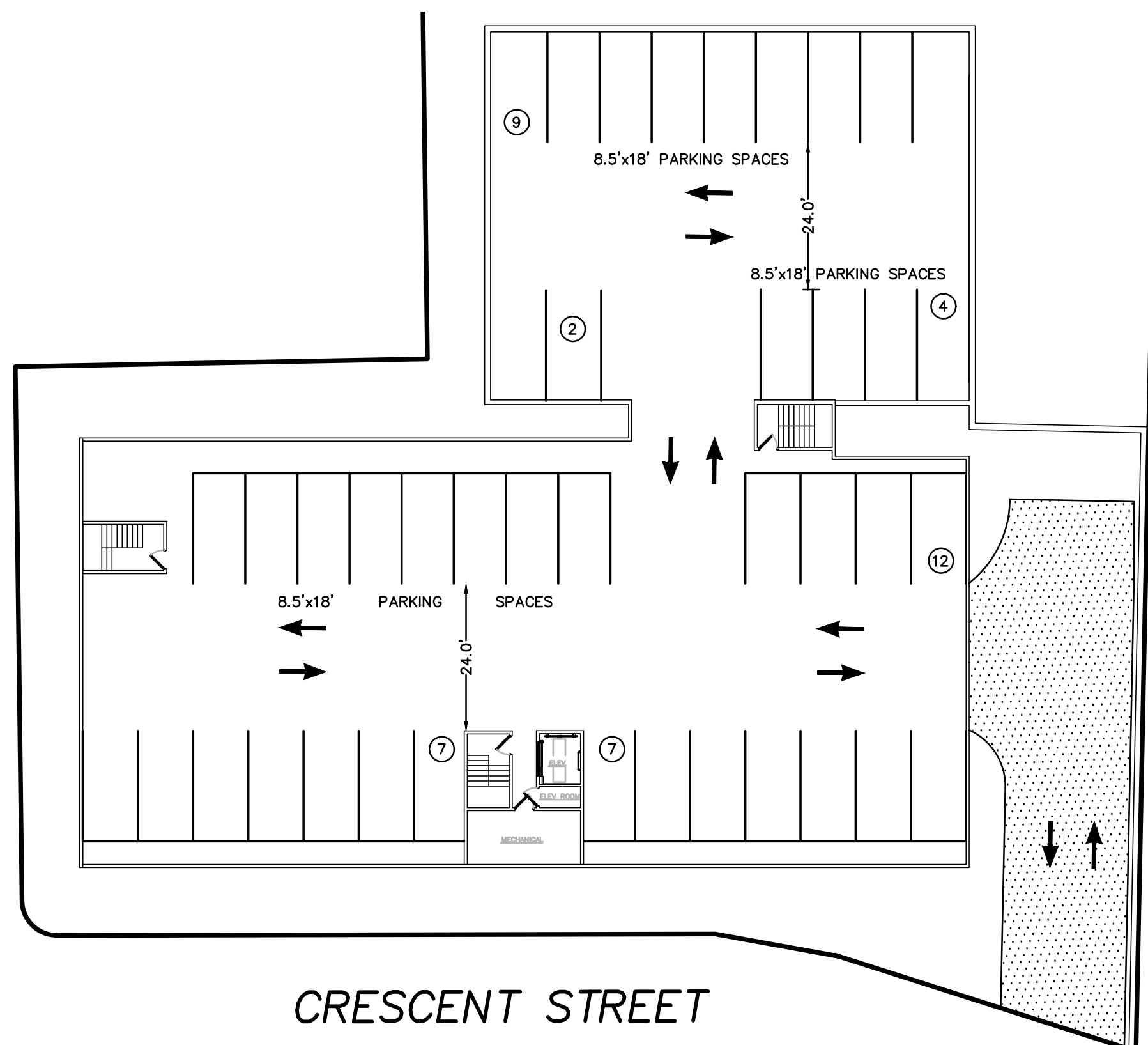
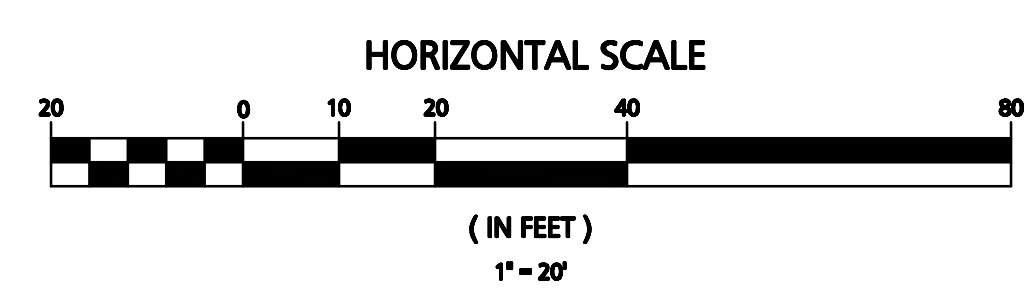
ZONING TABLE
MULTIFAMILY DWELLING

ITEM	REQUIRED	PROVIDED
MINIMUM LOT AREA	4,000 SF	25,113 SF
FRONTAGE AND WIDTH	180 FT	178.78 SF/87.13 FT
MINIMUM FRONT SETBACK ¹	30 FT	1.6 FT
MINIMUM SIDE SETBACK ¹	30 FT	7.8 FT
MINIMUM REAR SETBACK ¹	30 FT	6.8 FT
MAXIMUM NUMBER OF STORIES	5	5
MAXIMUM HEIGHT	50 FT	65 FT
MAXIMUM LOT COVERAGE	35%	59%
MINIMUM OPEN AREA	30%	20%
DISTANCE BETWEEN UNATTACHED BUILDINGS	50 FT	-

ZONING TABLE NOTE:
 1. OR HEIGHT OF BUILDING, WHICHEVER IS GREATER

PLANT LIST

	BOTANICAL NAME	COMMON NAME	QTY	SIZE
	ACER RUBRUM	RED MAPLE	3	2"
	VIBURNUM RECOGNITION	NORTHERN ARROWWOOD	13	2 GAL
	CORNUS AMOMUM	SILKY DOGWOOD	10	2"



LOWER LEVEL PARKING LAYOUT
SCALE: 1"=20'

Engineering Alliance, Inc.
 Civil Engineering & Land Planning Consultants
 194 Central Street
 Portsmouth, NH 03801
 Tel: (603) 610-7100 Fax: (603) 610-7101

PREPARED BY: [Signature]

PROJECT: Crescent Commons
 44-48 Crescent Street
 (Tax Map 17 Blocks 56-58 Lots 171, 172, 175)
 Wakefield, Massachusetts

DATE: May 12, 2020
DWG FILE NAME: 20-13402.dwg
CHECKED BY: Richard A. Salvo, P.E.

SCALE: AS NOTED
DESIGN BY: Garrett Anderson

APPLICANT: Crescent Commons Development, LLC.
 222 Central Street
 Saugus, MA 01906

DRAWING TITLE: Site Layout Plan

DWG. NO.: C-2

REVISIONS:

NO.	DATE	DESCRIPTION OF REVISIONS
5/14/21	DATE	REVISE FOOTPRINT AND PARKING CONFIGURATION

MANUAL TURNING MOVEMENT COUNT DATA



Accurate Counts

978-664-2565

File Name : 17160003
 Site Code : 17160003
 Start Date : 3/30/2016
 Page No : 1

N/S Street : Crescent St / Middle Site
 E/W Street: Water Street
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Cars - Trucks

Start Time	Crescent St From North			Water St From East			Middle Site Dr From South			Water St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
06:00 AM	0	0	2	0	53	5	0	0	0	1	30	0	91
06:15 AM	2	0	1	0	72	15	0	0	0	0	37	0	127
06:30 AM	4	0	2	0	105	25	0	0	0	0	49	1	186
06:45 AM	7	0	1	1	107	19	0	0	0	0	52	1	188
Total	13	0	6	1	337	64	0	0	0	1	168	2	592
07:00 AM	13	0	6	0	116	41	0	0	0	0	82	1	259
07:15 AM	29	1	10	0	113	42	0	1	0	3	114	2	315
07:30 AM	18	3	8	0	126	30	0	1	0	6	105	0	297
07:45 AM	15	5	1	1	139	31	0	1	0	4	95	3	295
Total	75	9	25	1	494	144	0	3	0	13	396	6	1166
08:00 AM	11	2	2	1	138	31	1	1	1	3	81	1	273
08:15 AM	11	2	3	0	142	17	0	0	0	4	99	0	278
08:30 AM	11	4	4	1	126	31	1	0	0	3	77	2	260
08:45 AM	10	1	1	2	129	35	0	0	1	5	94	7	285
Total	43	9	10	4	535	114	2	1	2	15	351	10	1096
Grand Total	131	18	41	6	1366	322	2	4	2	29	915	18	2854
Apprch %	68.9	9.5	21.6	0.4	80.6	19	25	50	25	3	95.1	1.9	
Total %	4.6	0.6	1.4	0.2	47.9	11.3	0.1	0.1	0.1	1	32.1	0.6	
Cars	128	18	41	6	1318	318	2	4	2	28	880	18	2763
% Cars	97.7	100	100	100	96.5	98.8	100	100	100	96.6	96.2	100	96.8
Trucks	3	0	0	0	48	4	0	0	0	1	35	0	91
% Trucks	2.3	0	0	0	3.5	1.2	0	0	0	3.4	3.8	0	3.2

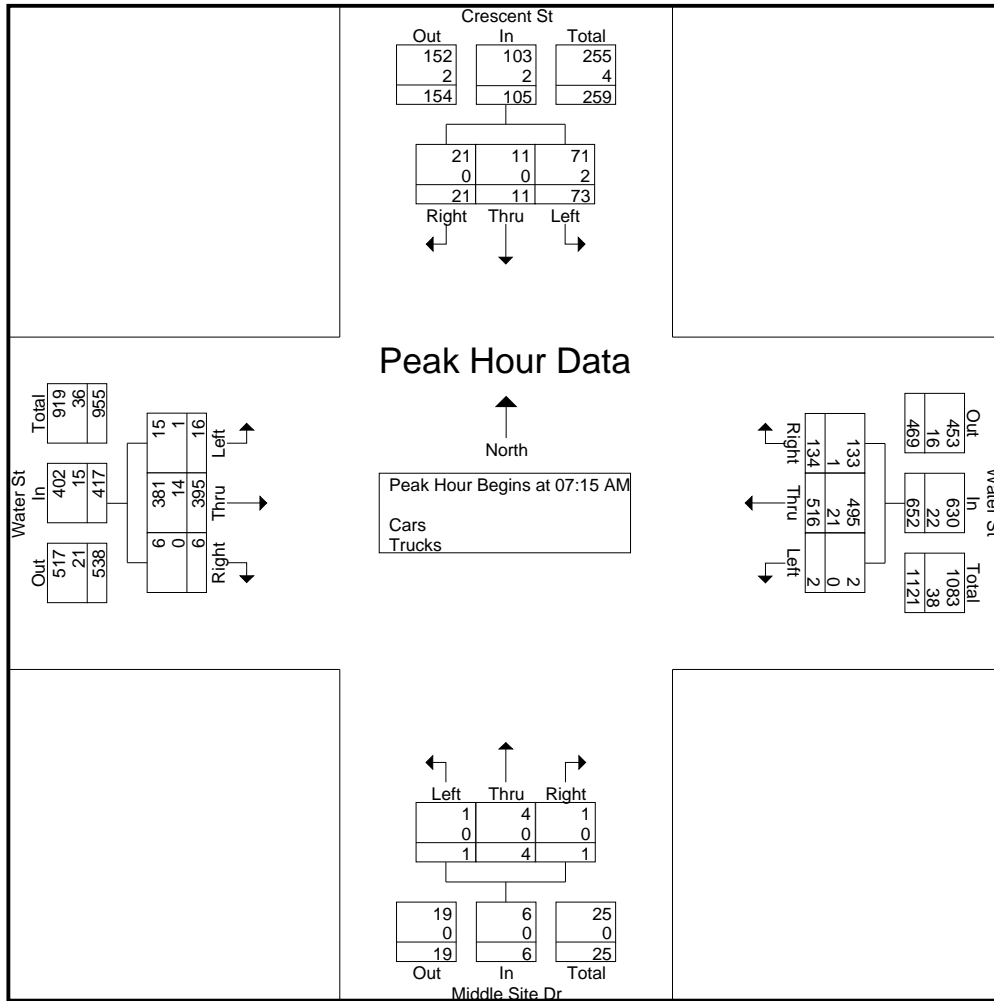
Accurate Counts

978-664-2565

File Name : 17160003
 Site Code : 17160003
 Start Date : 3/30/2016
 Page No : 2

N/S Street : Crescent St / Middle Site
 E/W Street: Water Street
 City/State : Wakefield, MA
 Weather : Clear

Start Time	Crescent St From North				Water St From East				Middle Site Dr From South				Water St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	29	1	10	40	0	113	42	155	0	1	0	1	3	114	2	119	315
07:30 AM	18	3	8	29	0	126	30	156	0	1	0	1	6	105	0	111	297
07:45 AM	15	5	1	21	1	139	31	171	0	1	0	1	4	95	3	102	295
08:00 AM	11	2	2	15	1	138	31	170	1	1	1	3	3	81	1	85	273
Total Volume	73	11	21	105	2	516	134	652	1	4	1	6	16	395	6	417	1180
% App. Total	69.5	10.5	20		0.3	79.1	20.6		16.7	66.7	16.7		3.8	94.7	1.4		
PHF	.629	.550	.525	.656	.500	.928	.798	.953	.250	1.00	.250	.500	.667	.866	.500	.876	.937
Cars	71	11	21	103	2	495	133	630	1	4	1	6	15	381	6	402	1141
% Cars	97.3	100	100	98.1	100	95.9	99.3	96.6	100	100	100	100	93.8	96.5	100	96.4	96.7
Trucks	2	0	0	2	0	21	1	22	0	0	0	0	1	14	0	15	39
% Trucks	2.7	0	0	1.9	0	4.1	0.7	3.4	0	0	0	0	6.3	3.5	0	3.6	3.3



Accurate Counts

978-664-2565

File Name : 17160003
 Site Code : 17160003
 Start Date : 3/30/2016
 Page No : 10

N/S Street : Crescent St / Middle Site
 E/W Street: Water Street
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

Start Time	Crescent St From North				Water St From East				Middle Site Dr From South				Water St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
06:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 AM	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	0	5	0	5
06:30 AM	0	0	0	3	0	0	0	1	0	0	0	6	0	1	0	0	10	1	11
06:45 AM	0	0	0	1	0	0	0	0	0	0	0	6	0	0	0	2	9	0	9
Total	0	0	0	8	0	0	0	1	0	0	0	13	0	1	0	2	24	1	25
07:00 AM	0	0	0	2	0	0	0	1	0	0	0	1	0	0	0	1	5	0	5
07:15 AM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	3	0	3
07:30 AM	0	0	0	7	0	0	0	1	0	0	0	2	0	0	0	0	10	0	10
07:45 AM	0	0	0	5	0	0	0	0	0	0	0	2	0	0	0	0	7	0	7
Total	0	0	0	15	0	0	0	2	0	0	0	6	0	0	0	2	25	0	25
08:00 AM	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
08:15 AM	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	3	0	3
08:30 AM	0	0	0	5	0	0	0	0	0	0	0	4	0	0	0	1	10	0	10
08:45 AM	0	0	0	5	0	0	0	1	0	0	0	2	0	0	0	1	9	0	9
Total	0	0	0	16	0	0	0	1	0	0	0	7	0	0	0	2	26	0	26
Grand Total	0	0	0	39	0	0	0	4	0	0	0	26	0	1	0	6	75	1	76
Apprch %	0	0	0		0	0	0		0	0	0		0	100	0				
Total %	0	0	0		0	0	0		0	0	0		0	100	0		98.7	1.3	

Accurate Counts

978-664-2565

File Name : 17160003
 Site Code : 17160003
 Start Date : 3/30/2016
 Page No : 1

N/S Street : Crescent St / Middle Site
 E/W Street: Water Street
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Cars - Trucks

Start Time	Crescent St From North			Water St From East			Middle Site Dr From South			Water St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	30	1	4	0	106	22	0	5	1	6	110	1	286
04:15 PM	25	0	3	1	98	22	0	1	0	7	125	0	282
04:30 PM	25	0	5	2	110	18	1	3	1	5	115	1	286
04:45 PM	33	1	4	0	105	14	2	1	2	5	126	1	294
Total	113	2	16	3	419	76	3	10	4	23	476	3	1148
05:00 PM	28	1	3	1	99	27	1	5	2	4	126	4	301
05:15 PM	20	1	3	0	105	18	2	2	1	8	139	0	299
05:30 PM	27	0	4	0	72	18	0	2	0	5	135	0	263
05:45 PM	20	2	8	2	95	13	2	1	1	4	114	0	262
Total	95	4	18	3	371	76	5	10	4	21	514	4	1125
Grand Total	208	6	34	6	790	152	8	20	8	44	990	7	2273
Apprch %	83.9	2.4	13.7	0.6	83.3	16	22.2	55.6	22.2	4.2	95.1	0.7	
Total %	9.2	0.3	1.5	0.3	34.8	6.7	0.4	0.9	0.4	1.9	43.6	0.3	
Cars	208	6	34	6	784	151	8	20	8	44	980	7	2256
% Cars	100	100	100	100	99.2	99.3	100	100	100	100	99	100	99.3
Trucks	0	0	0	0	6	1	0	0	0	0	10	0	17
% Trucks	0	0	0	0	0.8	0.7	0	0	0	0	1	0	0.7

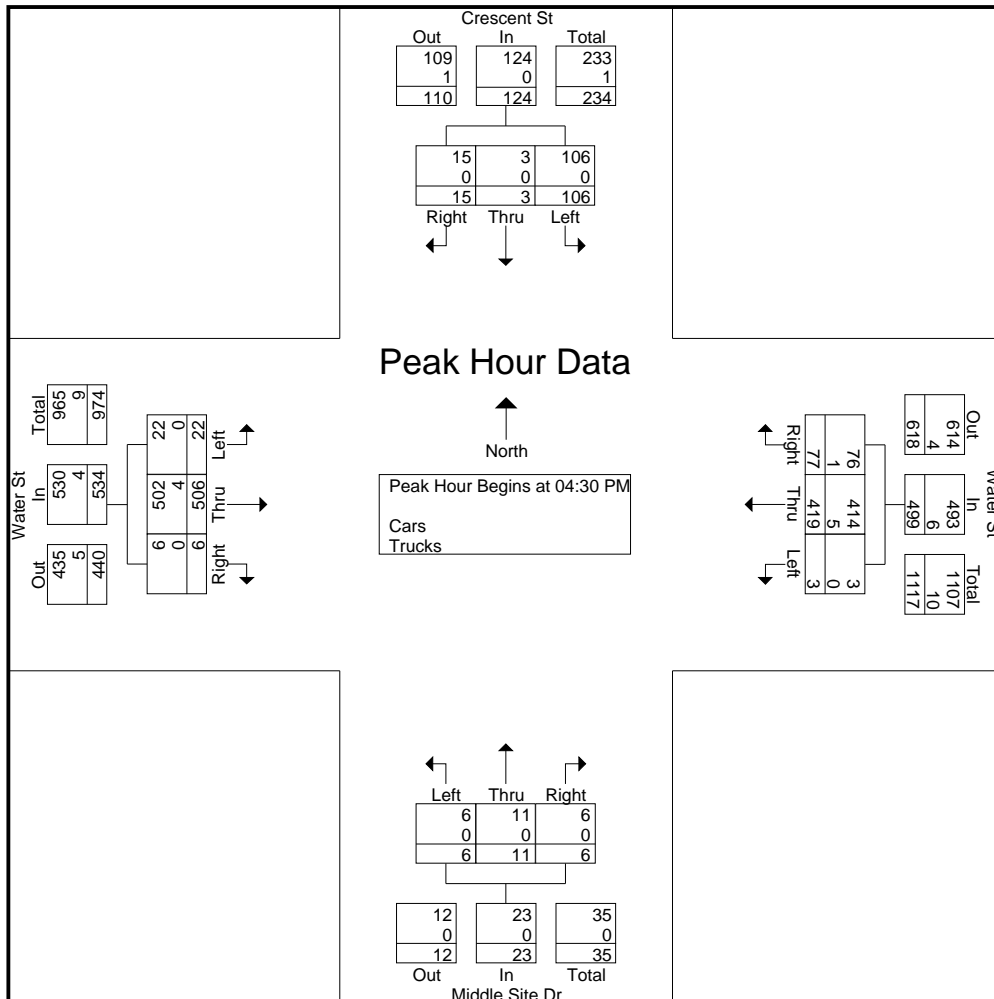
Accurate Counts

978-664-2565

File Name : 17160003
 Site Code : 17160003
 Start Date : 3/30/2016
 Page No : 2

N/S Street : Crescent St / Middle Site
 E/W Street: Water Street
 City/State : Wakefield, MA
 Weather : Clear

Start Time	Crescent St From North				Water St From East				Middle Site Dr From South				Water St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	25	0	5	30	2	110	18	130	1	3	1	5	5	115	1	121	286
04:45 PM	33	1	4	38	0	105	14	119	2	1	2	5	5	126	1	132	294
05:00 PM	28	1	3	32	1	99	27	127	1	5	2	8	4	126	4	134	301
05:15 PM	20	1	3	24	0	105	18	123	2	2	1	5	8	139	0	147	299
Total Volume	106	3	15	124	3	419	77	499	6	11	6	23	22	506	6	534	1180
% App. Total	85.5	2.4	12.1		0.6	84	15.4		26.1	47.8	26.1		4.1	94.8	1.1		
PHF	.803	.750	.750	.816	.375	.952	.713	.960	.750	.550	.750	.719	.688	.910	.375	.908	.980
Cars	106	3	15	124	3	414	76	493	6	11	6	23	22	502	6	530	1170
% Cars	100	100	100	100	100	98.8	98.7	98.8	100	100	100	100	100	99.2	100	99.3	99.2
Trucks	0	0	0	0	0	5	1	6	0	0	0	0	0	4	0	4	10
% Trucks	0	0	0	0	0	1.2	1.3	1.2	0	0	0	0	0	0.8	0	0.7	0.8



Accurate Counts

978-664-2565

File Name : 17160003
 Site Code : 17160003
 Start Date : 3/30/2016
 Page No : 10

N/S Street : Crescent St / Middle Site
 E/W Street: Water Street
 City/State : Wakefield, MA
 Weather : Clear

Groups Printed- Bikes Peds

Start Time	Crescent St From North				Water St From East				Middle Site Dr From South				Water St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	5	0	0	0	2	0	0	0	6	0	1	0	1	14	1	15
04:15 PM	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	1	6	0	6
04:30 PM	2	0	0	3	0	0	0	1	0	0	0	2	0	1	0	2	8	3	11
04:45 PM	0	0	0	7	0	0	0	2	0	0	0	5	0	1	0	0	14	1	15
Total	2	0	0	19	0	0	0	5	0	0	0	14	0	3	0	4	42	5	47
05:00 PM	0	0	0	2	0	0	0	1	0	0	0	8	0	0	0	6	17	0	17
05:15 PM	0	0	0	2	0	0	0	0	0	0	0	4	0	0	0	1	7	0	7
05:30 PM	1	0	0	4	0	0	0	0	0	0	0	2	0	3	0	0	6	4	10
05:45 PM	0	0	0	1	0	1	0	0	0	0	0	2	0	1	0	0	3	2	5
Total	1	0	0	9	0	1	0	1	0	0	0	16	0	4	0	7	33	6	39
Grand Total	3	0	0	28	0	1	0	6	0	0	0	30	0	7	0	11	75	11	86
Apprch %	100	0	0		0	100	0		0	0	0		0	100	0				
Total %	27.3	0	0		0	9.1	0		0	0	0		0	63.6	0		87.2	12.8	

Accurate Counts
978-664-2565

N/S Street : Crescent Street / Driveway
E/W Street : Water Street
City/State : Wakefield, MA
Weather : Clear

File Name : 88130001
Site Code : 88130001
Start Date : 1/6/2021
Page No : 1

Groups Printed- Cars - Trucks

Start Time	Crescent St From North			Water St From East			Dwy From South			Water St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	3	0	2	0	46	6	0	0	1	1	47	0	106
07:15 AM	4	0	2	0	67	6	0	0	0	0	37	0	116
07:30 AM	7	0	1	0	47	8	0	1	0	1	52	0	117
07:45 AM	8	0	1	0	54	12	1	0	0	5	70	0	151
Total	22	0	6	0	214	32	1	1	1	7	206	0	490
08:00 AM	6	0	2	0	63	4	1	1	0	3	73	0	153
08:15 AM	0	0	4	1	75	17	1	0	1	4	60	0	163
08:30 AM	11	0	3	0	66	9	2	1	0	1	69	1	163
08:45 AM	10	0	3	0	64	12	1	0	3	4	70	1	168
Total	27	0	12	1	268	42	5	2	4	12	272	2	647
Grand Total	49	0	18	1	482	74	6	3	5	19	478	2	1137
Apprch %	73.1	0	26.9	0.2	86.5	13.3	42.9	21.4	35.7	3.8	95.8	0.4	
Total %	4.3	0	1.6	0.1	42.4	6.5	0.5	0.3	0.4	1.7	42	0.2	
Cars	45	0	18	1	471	72	6	3	5	19	468	2	1110
% Cars	91.8	0	100	100	97.7	97.3	100	100	100	100	97.9	100	97.6
Trucks	4	0	0	0	11	2	0	0	0	0	10	0	27
% Trucks	8.2	0	0	0	2.3	2.7	0	0	0	0	2.1	0	2.4

Start Time	Crescent St From North				Water St From East				Dwy From South				Water St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	6	0	2	8	0	63	4	67	1	1	0	2	3	73	0	76	153
08:15 AM	0	0	4	4	1	75	17	93	1	0	1	2	4	60	0	64	163
08:30 AM	11	0	3	14	0	66	9	75	2	1	0	3	1	69	1	71	163
08:45 AM	10	0	3	13	0	64	12	76	1	0	3	4	4	70	1	75	168
Total Volume	27	0	12	39	1	268	42	311	5	2	4	11	12	272	2	286	647
% App. Total	69.2	0	30.8		0.3	86.2	13.5		45.5	18.2	36.4		4.2	95.1	0.7		
PHF	.614	.000	.750	.696	.250	.893	.618	.836	.625	.500	.333	.688	.750	.932	.500	.941	.963
Cars	25	0	12	37	1	264	40	305	5	2	4	11	12	268	2	282	635
% Cars	92.6	0	100	94.9	100	98.5	95.2	98.1	100	100	100	100	100	98.5	100	98.6	98.1
Trucks	2	0	0	2	0	4	2	6	0	0	0	0	0	4	0	4	12
% Trucks	7.4	0	0	5.1	0	1.5	4.8	1.9	0	0	0	0	0	1.5	0	1.4	1.9

Accurate Counts
978-664-2565

N/S Street : Crescent Street / Driveway
E/W Street : Water Street
City/State : Wakefield, MA
Weather : Clear

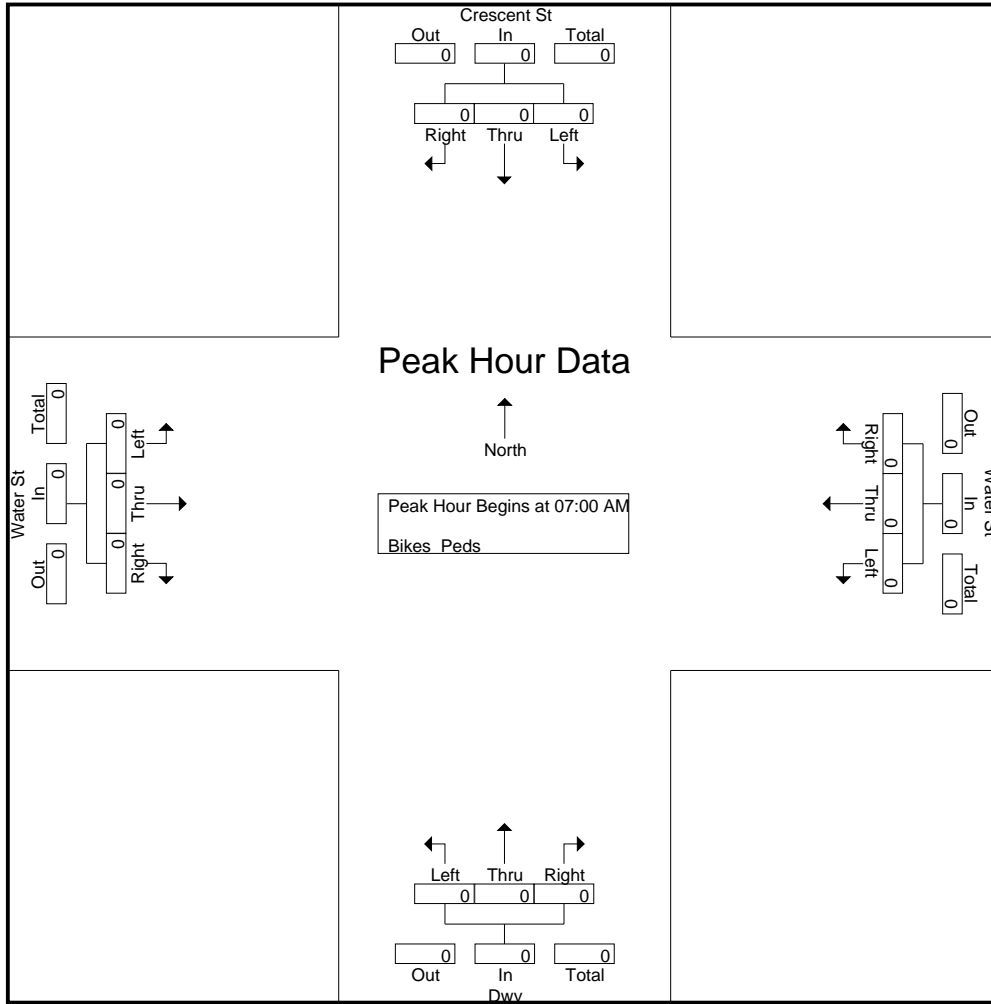
File Name : 88130001
Site Code : 88130001
Start Date : 1/6/2021
Page No : 10

Groups Printed- Bikes Peds

Start Time	Crescent St From North				Water St From East				Dwy From South				Water St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	3	0	3
07:15 AM	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	1	4	0	4
07:30 AM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	0	2
07:45 AM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	0	2
Total	0	0	0	6	0	0	0	0	0	0	0	4	0	0	0	1	11	0	11
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	4	0	4
08:45 AM	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	4	0	4
Total	0	0	0	3	0	0	0	0	0	0	0	6	0	0	0	0	9	0	9
Grand Total	0	0	0	9	0	0	0	0	0	0	0	10	0	0	0	1	20	0	20
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	100	0	

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

N/S Street : Crescent Street / Driveway
E/W Street : Water Street
City/State : Wakefield, MA
Weather : Clear



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

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

Accurate Counts
978-664-2565

File Name : 88130001
Site Code : 88130001
Start Date : 1/6/2021
Page No : 1

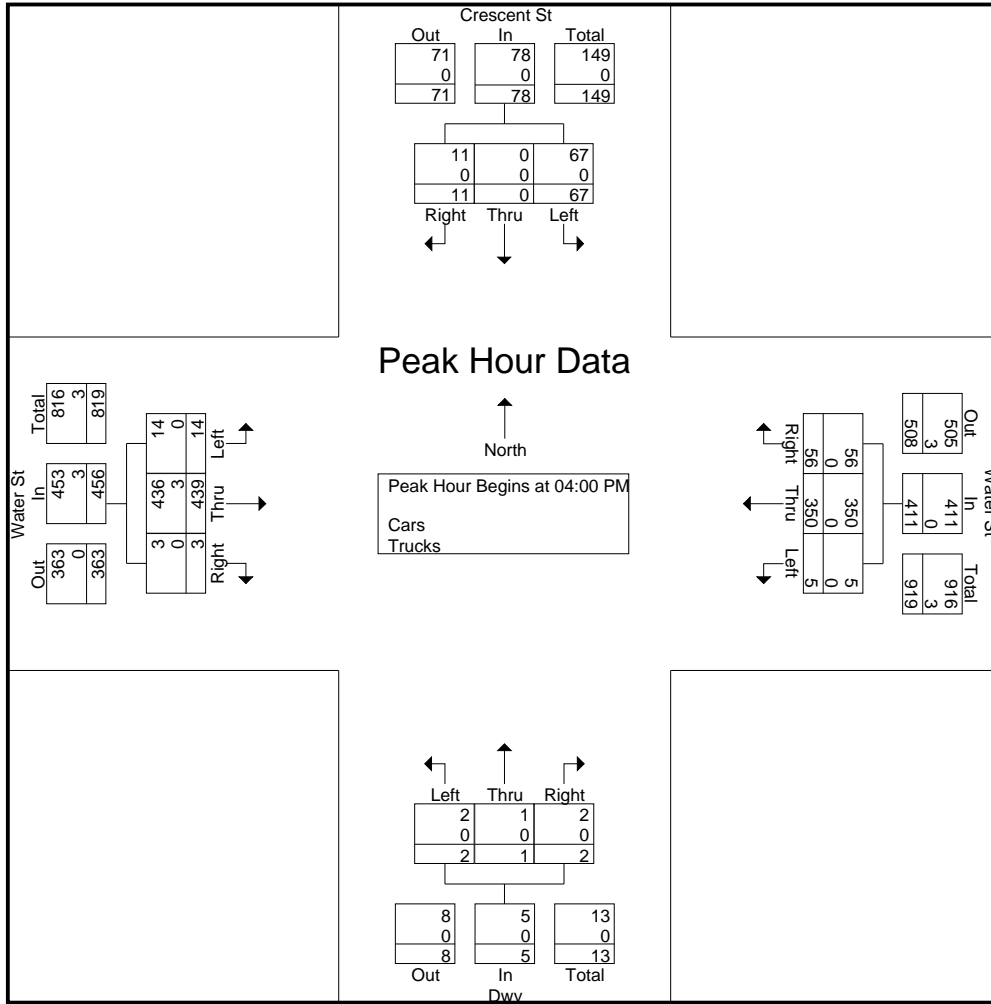
N/S Street : Crescent Street / Driveway
E/W Street : Water Street
City/State : Wakefield, MA
Weather : Clear

Groups Printed- Cars - Trucks

Start Time	Crescent St From North			Water St From East			Dwy From South			Water St From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	13	0	6	0	98	11	0	0	1	2	108	2	241
04:15 PM	20	0	1	2	85	18	2	1	1	7	105	1	243
04:30 PM	17	0	2	2	93	12	0	0	0	4	110	0	240
04:45 PM	17	0	2	1	74	15	0	0	0	1	116	0	226
Total	67	0	11	5	350	56	2	1	2	14	439	3	950
05:00 PM	28	0	2	2	87	14	4	1	2	2	98	1	241
05:15 PM	22	0	5	1	91	15	2	1	0	2	93	2	234
05:30 PM	14	0	5	2	80	16	1	1	3	1	105	4	232
05:45 PM	7	0	1	2	57	14	1	0	1	1	100	1	185
Total	71	0	13	7	315	59	8	3	6	6	396	8	892
Grand Total	138	0	24	12	665	115	10	4	8	20	835	11	1842
Apprch %	85.2	0	14.8	1.5	84	14.5	45.5	18.2	36.4	2.3	96.4	1.3	
Total %	7.5	0	1.3	0.7	36.1	6.2	0.5	0.2	0.4	1.1	45.3	0.6	
Cars	138	0	24	12	664	114	10	4	8	20	829	11	1834
% Cars	100	0	100	100	99.8	99.1	100	100	100	100	99.3	100	99.6
Trucks	0	0	0	0	1	1	0	0	0	0	6	0	8
% Trucks	0	0	0	0	0.2	0.9	0	0	0	0	0.7	0	0.4

Start Time	Crescent St From North				Water St From East				Dwy From South				Water St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	13	0	6	19	0	98	11	109	0	0	1	1	2	108	2	112	241
04:15 PM	20	0	1	21	2	85	18	105	2	1	1	4	7	105	1	113	243
04:30 PM	17	0	2	19	2	93	12	107	0	0	0	0	4	110	0	114	240
04:45 PM	17	0	2	19	1	74	15	90	0	0	0	0	1	116	0	117	226
Total Volume	67	0	11	78	5	350	56	411	2	1	2	5	14	439	3	456	950
% App. Total	85.9	0	14.1		1.2	85.2	13.6		40	20	40		3.1	96.3	0.7		
PHF	.838	.000	.458	.929	.625	.893	.778	.943	.250	.250	.500	.313	.500	.946	.375	.974	.977
Cars	67	0	11	78	5	350	56	411	2	1	2	5	14	436	3	453	947
% Cars	100	0	100	100	100	100	100	100	100	100	100	100	100	99.3	100	99.3	99.7
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	0	0.7	0.3

N/S Street : Crescent Street / Driveway
E/W Street : Water Street
City/State : Wakefield, MA
Weather : Clear



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:00 PM				05:00 PM				04:00 PM			
+0 mins.	17	0	2	19	0	98	11	109	4	1	2	7	2	108	2	112
+15 mins.	17	0	2	19	2	85	18	105	2	1	0	3	7	105	1	113
+30 mins.	28	0	2	30	2	93	12	107	1	1	3	5	4	110	0	114
+45 mins.	22	0	5	27	1	74	15	90	1	0	1	2	1	116	0	117
Total Volume	84	0	11	95	5	350	56	411	8	3	6	17	14	439	3	456
% App. Total	88.4	0	11.6		1.2	85.2	13.6		47.1	17.6	35.3		3.1	96.3	0.7	
PHF	.750	.000	.550	.792	.625	.893	.778	.943	.500	.750	.500	.607	.500	.946	.375	.974
Cars	84	0	11	95	5	350	56	411	8	3	6	17	14	436	3	453
% Cars	100	0	100	100	100	100	100	100	100	100	100	100	100	99.3	100	99.3
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	0	0.7

Accurate Counts
978-664-2565

N/S Street : Crescent Street / Driveway
E/W Street : Water Street
City/State : Wakefield, MA
Weather : Clear

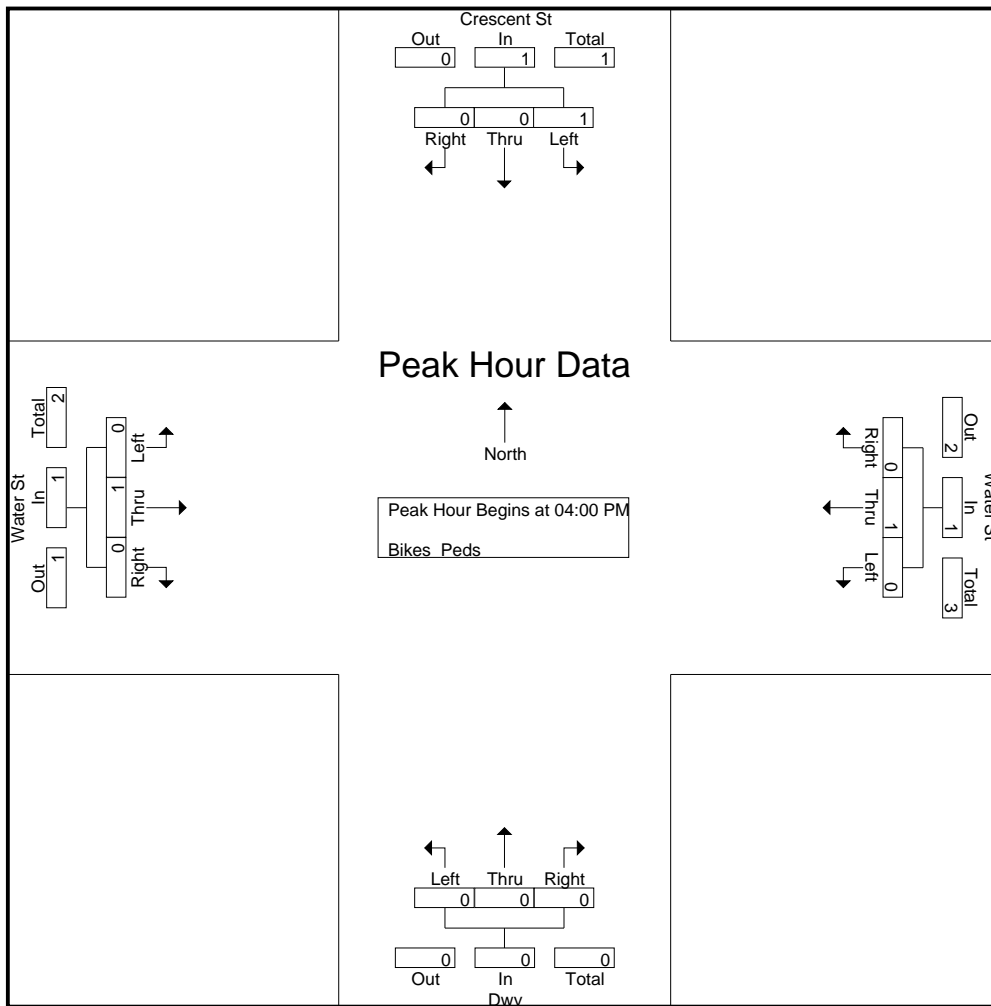
File Name : 88130001
Site Code : 88130001
Start Date : 1/6/2021
Page No : 10

Groups Printed- Bikes Peds

Start Time	Crescent St From North				Water St From East				Dwy From South				Water St From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	1	0	0	4	0	1	0	0	0	0	0	3	0	0	0	1	8	2	10
04:15 PM	0	0	0	4	0	0	0	0	0	0	0	1	0	1	0	2	7	1	8
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	2
04:45 PM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	0	2
Total	1	0	0	9	0	1	0	0	0	0	0	7	0	1	0	3	19	3	22
05:00 PM	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	2	5	0	5
05:15 PM	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	4	0	4
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	0	4
05:45 PM	0	0	0	2	0	0	0	1	0	0	0	1	0	0	0	0	4	0	4
Total	0	0	0	8	0	0	0	1	0	0	0	6	0	0	0	2	17	0	17
Grand Total	1	0	0	17	0	1	0	1	0	0	0	13	0	1	0	5	36	3	39
Apprch %	100	0	0		0	100	0		0	0	0		0	100	0				
Total %	33.3	0	0		0	33.3	0		0	0	0		0	33.3	0		92.3	7.7	

Start Time	Crescent St From North				Water St From East				Dwy From South				Water St From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	1	0	0	1	0	1	0	1	0	0	0	0	0	1	0	1	3
% App. Total	100	0	0		0	100	0		0	0	0		0	100	0		
PHF	.250	.000	.000	.250	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250	.375

N/S Street : Crescent Street / Driveway
E/W Street : Water Street
City/State : Wakefield, MA
Weather : Clear



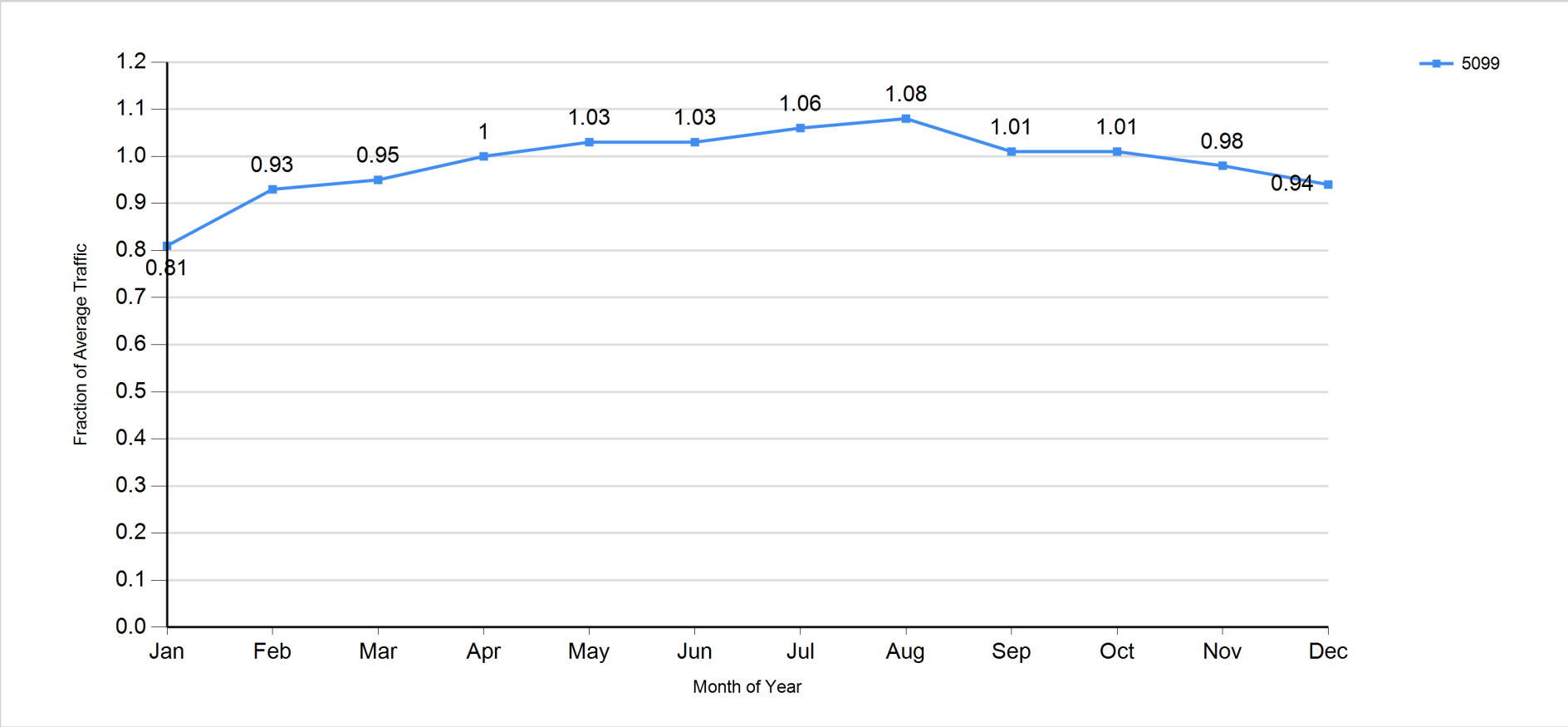
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	1	0	0	1	0	1	0	1	0	0	0	0	0	1	0	1
% App. Total	100	0	0		0	100	0		0	0	0		0	100	0	
PHF	.250	.000	.000	.250	.000	.250	.000	.250	.000	.000	.000	.000	.000	.250	.000	.250

SEASONAL ADJUSTMENT DATA



Traffic Pattern by Month for 1/1/2019 - 12/31/2019



Massachusetts Highway Department

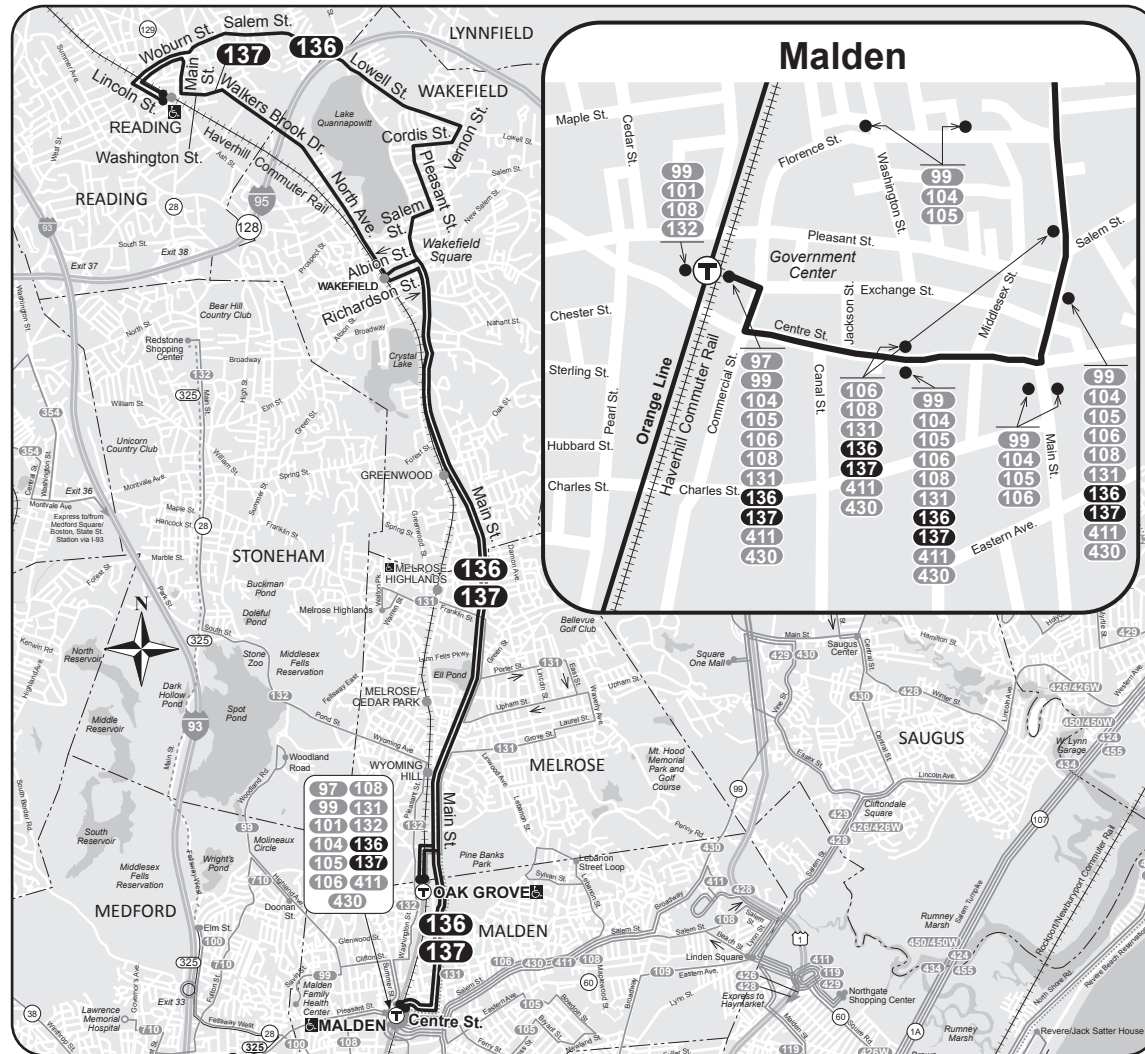
Traffic Pattern by Month for 1/1/2019 - 12/31/2019

Factor Group	Station	Weight	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
U1-Essex	5099	0	0.814	0.934	0.953	1.005	1.029	1.028	1.062	1.082	1.011	1.015	0.977	0.936
Average of Weighted Factors			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

PUBLIC TRANSPORTATION SCHEDULES



Route 136/137 Reading Depot - Malden Center Station



Schedule Change

136•137

Effective August 30, 2020

Reading Depot- Malden Center Station

Serving

- Wakefield Square
- Greenwood Station
- Oak Grove Station
- Malden Square
- Franklin Square, Melrose
- Orange Line
- Haverhill Commuter Rail



T Massachusetts Bay Transportation Authority *massDOT*
Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

136/137

Weekday

Inbound					Outbound				
Leave Reading Depot	Lv/Arrive Wakefield Square	Arrive Franklin Square	Arrive Oak Grove Station	Arrive Malden Station	Leave Malden Station	Lv/Arrive Oak Grove Station	Arrive Franklin Square	Arrive Wakefield Square	Arrive Reading Depot
.....	5:30A	5:40A	5:52A	6:04A	4:45A	4:59A	5:15A	5:26A	.....
.....	6:10	6:20	6:32	6:44	5:25	5:39	5:55	6:06	.....
6:15A	6:26	6:36	6:48	7:00	6:00	6:07	6:17	6:24	6:44A
6:30	6:44	6:54	7:08	7:20	6:15	6:22	6:32	6:39	6:59
6:50	7:01	7:12	7:32	7:44	6:35	6:42	6:52	6:59	7:17
.....	7:10	7:21	7:41	.....	6:50	6:57	7:06	7:16	7:34
7:05	7:19	7:30	7:50	8:03	7:05	7:16	7:25	7:35	7:53
.....	7:30	7:41	8:01	8:15	7:25	7:36	7:45	7:55	8:13
7:25	7:38	7:49	8:08	8:22	7:40	7:51	8:00	8:10	8:28
7:40	7:54	8:05	8:21	8:35	7:55	8:06	8:15	8:25	8:43
.....	8:00	8:10	8:26	8:40	8:10	8:21	8:30	8:40	8:58
7:58	8:09	8:19	8:35	8:49	8:25	8:36	8:45	8:55	9:13
8:15	8:28	8:38	8:54	9:09	9:05	9:16	9:25	9:35	9:53
8:35	8:46	8:56	9:09	9:24	9:20	9:31	9:40	9:50	10:08
8:50	9:03	9:11	9:24	9:39	10:05	10:16	10:25	10:35	10:53
9:05	9:16	9:24	9:37	9:52	11:05	11:16	11:25	11:35	11:53
9:20	9:32	9:40	9:53	10:08	12:05P	12:16P	12:25P	12:35P	12:53P
10:00	10:11	10:19	10:32	10:47	1:05	1:16	1:25	1:35	1:53
11:00	11:11	11:19	11:32	11:47	s 1:56	2:10	2:26	2:37	.....
12:00N	12:11P	12:19P	12:32P	12:46P	2:00	2:12	2:25	2:34	2:54
1:00	1:12	1:20	1:33	1:47	2:35	2:47	3:00	3:11	3:29
2:00	2:12	2:21	2:35	2:50	3:00	3:14	3:30	3:41	3:59
.....	s 2:45	2:54	3:08	3:23	3:30	3:44	4:00	4:11	4:29
3:00	3:13	3:22	3:36	3:51	4:00	4:14	4:30	4:41	4:59
3:35	3:47	3:56	4:10	4:27	4:35	4:49	5:05	5:16	5:34
4:05	4:20	4:29	4:43	5:00	.....	5:00	5:16	5:27	5:45
4:35	4:48	4:57	5:11	5:28	.....	5:15	5:31	5:42	6:00
5:05	5:20	5:29	5:43	6:00	5:15	5:29	5:45	5:56	6:11
5:50	6:04	6:12	6:23	6:37	.....	5:50	6:06	6:15	6:29
6:16	6:28	6:36	6:47	7:01	6:05	6:18	6:34	6:43	6:57
6:50	7:02	7:08	7:19	7:32	6:30	6:43	6:59	7:08	7:23
7:27	7:37	7:43	7:54	8:07	7:05	7:17	7:28	7:37	7:52
8:55	9:06	9:12	9:23	9:36	8:10	8:19	8:30	8:37	8:52
10:25	10:35	10:41	10:52	11:05	9:40	9:49	10:00	10:07	10:22

Route 137 indicated by shaded areas

s - Does NOT run during school vacation

Route 136/137
Reading Depot - Malden Center Station

136/137

Saturday

Inbound					Outbound				
Leave Reading Depot	Lv/Arrive Wakefield Square	Arrive Franklin Square	Arrive Oak Grove Station	Arrive Malden Station	Leave Malden Station	Arrive Oak Grove Station	Arrive Franklin Square	Arrive Wakefield Square	Arrive Reading Depot
6:00A	6:10A	6:17A	6:25A	6:34A	6:00A	6:07A	6:16A	6:22A	6:33A
6:45	6:55	7:02	7:10	7:19	6:45	6:52	7:00	7:07	7:19
7:30	7:43	7:49	7:58	8:05	7:30	7:37	7:46	7:53	8:05
8:15	8:25	8:34	8:43	8:51	8:15	8:22	8:32	8:40	8:55
9:00	9:13	9:19	9:32	9:39	9:00	9:08	9:18	9:26	9:40
9:45	9:55	10:04	10:13	10:21	9:45	9:54	10:05	10:14	10:28
10:35	10:48	10:54	11:07	11:14	10:30	10:38	10:51	11:00	11:15
11:20	11:30	11:38	11:52	12:02P	11:20	11:28	11:42	11:52	12:05P
12:10P	12:23P	12:29P	12:42P	12:49P	12:10P	12:18P	12:31P	12:40P	12:55P
1:00	1:14	1:22	1:36	1:46	1:00	1:09	1:20	1:29	1:43
1:50	2:03	2:12	2:23	2:34	1:50	1:59	2:10	2:19	2:33
2:40	2:54	3:02	3:16	3:26	2:40	2:49	3:00	3:09	3:23
3:30	3:43	3:52	4:03	4:14	3:30	3:39	3:50	3:59	4:13
4:20	4:34	4:42	4:56	5:06	4:20	4:29	4:39	4:48	5:00
5:10	5:21	5:28	5:39	5:48	5:10	5:19	5:30	5:38	5:49
6:00	6:11	6:17	6:27	6:36	6:00	6:10	6:20	6:29	6:41
6:45	6:56	7:03	7:14	7:23	6:50	6:59	7:10	7:18	7:29
7:45	7:56	8:02	8:12	8:21	8:30	8:38	8:47	8:54	.....
.....	9:00	9:06	9:14	9:22					

136/137

Sunday

Inbound					Outbound				
Leave Reading Depot	Arrive Wakefield Square	Arrive Franklin Square	Arrive Oak Grove Station	Arrive Malden Station	Leave Malden Station	Arrive Oak Grove Station	Arrive Franklin Square	Arrive Wakefield Square	Arrive Reading Depot
8:00A	8:08A	8:14A	8:26A	8:33A	8:45A	8:52A	9:01A	9:09A	9:22A
9:30	9:38	9:45	9:57	10:05	10:15	10:23	10:33	10:41	10:55
11:00	11:09	11:17	11:28	11:38	11:45	11:53	12:03P	12:12P	12:25P
12:30P	12:40P	12:48P	1:00P	1:11P	1:15P	1:24P	1:33P	1:42P	1:55P
2:00	2:10	2:18	2:28	2:38	2:45	2:53	3:03	3:11	3:24
3:30	3:39	3:46	3:56	4:06	4:15	4:24	4:35	4:42	4:53
5:00	5:09	5:16	5:26	5:36					

Saturday and Sunday trips are circular in Wakefield, so that a passenger can always use either Route 136 or 137. If necessary, just stay on the bus through the Reading end of the line if you need to board or alight from a stop which is only on Route 136 or 137.

Fall 2020 & Winter 2021 Holidays
 9/7/20, Sunday; 10/12/20 & 11/11/20, Weekday
 11/26/20, 12/25/20, & 1/1/21, Sun; 1/18/21 & 2/15/21, Sat

All buses are accessible to persons with disabilities

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	\$1.70	\$1.70	\$2.40	\$2.40
CharlieTicket	\$2.00	\$2.00	\$2.90	\$4.90
Cash-on-Board	\$2.00	\$4.00	\$2.90	\$4.90
Student/Youth*	\$0.85	\$0.85	\$1.10	\$1.10
Senior/TAP**	\$0.85	\$0.85	\$1.10	\$1.10

VALID PASSES: LinkPass (\$90.00/mo.); Local Bus (\$55/mo.); *Student/Youth LinkPass (\$30.00/mo.); **Senior/TAP LinkPass (\$30/mo.); and express bus, commuter rail, and boat passes.

FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.

* Requires Student CharlieCard or Youth CharlieCard. Student CharlieCards are available to students through participating middle schools and high schools. Youth CharlieCards are available through community partners in the Boston metro area. Visit www.mbta.com/youthpass for details.

** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

HAVERHILL LINE

Summer 2020 schedule, effective June 22, 2020

Monday to Friday

Inbound to Boston			AM								PM							
ZONE	STATION	TRAIN #	200	7204	7206	288	7208	210	212	214	216	218	7292	7220	7222	224	226	228
	Bikes Allowed																	
7	Haverhill		5:05	6:00	6:51	-	7:50	9:05	10:49	12:05	2:00	3:25	-	4:47	6:03	7:45	9:10	10:50
7	Bradford		5:07	6:02	6:53	-	7:52	f 9:07	f 10:52	f 12:07	f 2:02	f 3:27	-	f 4:49	f 6:05	f 7:47	f 9:12	f 10:52
6	Lawrence		5:16	6:11	7:02	-	8:01	9:15	10:59	12:15	2:10	3:35	-	4:57	6:13	7:55	9:20	11:00
5	Andover		5:23	6:18	7:09	-	8:08	f 9:22	f 11:06	f 12:22	f 2:17	f 3:42	-	f 5:04	f 6:20	f 8:02	f 9:27	f 11:07
4	Ballardvale		5:29	6:24	7:15	-	8:14	f 9:27	f 11:11	f 12:27	f 2:22	f 3:47	-	f 5:09	f 6:25	f 8:07	f 9:32	f 11:12
3	North Wilmington		5:36	6:31	-	-	-	f 9:34	f 11:18	f 12:34	f 2:29	-	-	-	-	-	f 9:39	f 11:19
2	Reading		5:43	6:38	7:30	8:00	8:29	9:41	11:25	12:41	2:36	-	4:45	5:25	6:40	8:21	9:46	11:26
2	Wakefield		5:49	6:44	7:36	8:06	8:35	f 9:46	f 11:30	f 12:46	f 2:41	-	f 4:50	f 5:30	f 6:45	f 8:27	f 9:51	f 11:31
2	Greenwood		5:52	6:47	7:39	8:09	8:38	f 9:49	f 11:33	f 12:49	f 2:44	-	f 4:53	f 5:33	f 6:48	f 8:30	f 9:54	f 11:34
1	Melrose Highlands		5:54	6:49	7:41	8:11	8:40	f 9:51	f 11:35	f 12:51	f 2:46	-	f 4:55	f 5:35	f 6:50	f 8:32	f 9:56	f 11:36
1	Melrose/Cedar Park		5:56	6:51	7:43	8:13	8:42	f 9:53	f 11:37	f 12:53	f 2:48	-	f 4:56	f 5:36	f 6:51	f 8:34	f 9:58	f 11:38
1	Wyoming Hill		5:58	6:53	7:45	8:15	8:44	f 9:55	f 11:39	f 12:55	f 2:50	-	f 4:58	f 5:39	f 6:53	f 8:36	f 10:00	f 11:40
1A	Malden Center		L 6:03	L 6:58	L 7:51	L 8:19	L 8:48	L 9:58	L 11:43	L 12:58	L 2:54	-	L 5:01	L 5:42	L 6:56	L 8:39	L 10:03	L 11:43
1A	North Station		6:15	7:10	8:02	8:30	8:59	10:10	11:55	1:10	3:06	4:23	5:12	5:53	7:07	8:50	10:15	11:55

Trains in purple box indicate peak period trains.

Monday to Friday

Outbound from Boston			AM								PM								AM
ZONE	STATION	TRAIN #	287	201	203	205	207	209	211	291	213	7215	7217	219	223	225	227	229	
	Bikes Allowed																		
1A	North Station		7:10	7:35	9:20	10:30	12:20	1:44	3:15	3:50	4:30	5:05	5:45	6:25	7:30	9:20	11:00	12:10	
1A	Malden Center		f 7:21	f 7:45	f 9:31	f 10:41	f 12:31	f 1:55	3:26	4:01	4:41	5:16	5:56	6:36	f 7:41	f 9:31	f 11:11	f 12:21	
1	Wyoming Hill		f 7:24	f 7:49	f 9:34	f 10:44	f 12:34	f 1:58	3:30	4:05	4:45	5:20	6:00	6:40	f 7:44	f 9:34	f 11:14	f 12:24	
1	Melrose/Cedar Park		f 7:26	f 7:51	f 9:36	f 10:46	f 12:36	f 2:00	3:32	4:07	4:47	5:22	6:02	6:42	f 7:46	f 9:36	f 11:16	f 12:26	
1	Melrose Highlands		f 7:29	f 7:54	f 9:39	f 10:49	f 12:39	f 2:03	3:36	4:11	4:51	5:26	6:06	6:46	f 7:49	f 9:39	f 11:19	f 12:29	
2	Greenwood		f 7:32	f 7:57	f 9:42	f 10:52	f 12:42	f 2:06	3:39	4:14	4:54	5:29	6:09	6:49	f 7:52	f 9:42	f 11:22	f 12:32	
2	Wakefield		f 7:36	f 8:01	f 9:46	f 10:56	f 12:46	f 2:10	3:43	4:18	4:58	5:33	6:13	6:53	f 7:56	f 9:46	f 11:26	f 12:36	
2	Reading		7:42	8:07	9:52	11:02	12:52	2:16	3:49	4:24	5:04	5:39	6:19	6:59	8:02	9:52	11:32	12:42	
3	North Wilmington		-	f 8:13	f 9:58	f 11:08	f 12:58	f 2:22	3:56	-	5:11	5:46	6:26	7:06	f 8:08	f 9:58	f 11:38	f 12:48	
4	Ballardvale		-	f 8:20	f 10:05	f 11:16	f 1:05	f 2:30	4:03	-	5:18	5:53	6:33	7:13	f 8:15	f 10:05	f 11:45	f 12:55	
5	Andover		-	f 8:25	f 10:10	f 11:21	f 1:10	f 2:35	4:09	-	5:24	5:59	6:39	7:19	f 8:20	f 10:10	f 11:50	f 1:00	
6	Lawrence		-	8:32	10:17	11:28	1:17	2:42	4:16	-	5:31	6:06	6:46	7:26	8:28	10:17	11:57	1:07	
7	Bradford		-	L 8:41	L 10:26	L 11:38	L 1:27	L 2:54	L 4:26	-	L 5:42	L 6:17	L 6:57	L 7:37	L 8:39	L 10:26	L 12:06	L 1:16	
7	Haverhill		-	8:44	10:29	11:41	1:30	2:57	4:29	-	5:45	6:20	7:00	7:40	8:42	10:29	12:09	1:19	

Trains in purple box indicate peak period trains.

Saturday & Sunday

Inbound to Boston			AM				PM					
SATURDAY TRAIN #	1200	1202	1204	1206	1208	1210	1201	1203	1205	1207	1209	1211
SUNDAY TRAIN #	2200	2202	2204	2206	2208	2210	2201	2203	2205	2207	2209	2211
	Bikes Allowed											
7	Haverhill		7:15	10:20	1:20	4:20	7:15	10:00				
7	Bradford		7:18	10:23	1:23	4:23	7:18	10:03				
6	Lawrence		7:27	10:32	1:32	4:32	7:27	10:12				
5	Andover		7:32	10:37	1:37	4:37	7:33	10:18				
4	Ballardvale		f 7:37	f 10:42	f 1:42	f 4:42	f 7:37	f 10:22				
3	North Wilmington		f 7:44	f 10:49	f 1:49	f 4:49	f 7:44	f 10:29				
2	Reading		7:50	10:56	1:56	4:55	7:50	10:35				
2	Wakefield		7:55	11:01	2:01	5:00	7:55	10:40				
2	Greenwood		f 7:59	f 11:05	f 2:05	f 5:04	f 7:59	f 10:44				
1	Melrose Highlands		8:02	11:08	2:08	5:07	8:02	10:47				
1	Melrose/Cedar Park		f 8:04	f 11:10	f 2:10	f 5:09	f 8:04	f 10:49				
1	Wyoming Hill		f 8:06	f 11:12	f 2:12	f 5:11	f 8:06	f 10:51				
1A	Malden Center		L 8:10	L 11:16	L 2:16	L 5:15	L 8:10	L 10:55				
1A	North Station		8:21	11:27	2:27	5:26	8:21	11:06				

Saturday & Sunday

Outbound from Boston			AM				PM					
SATURDAY TRAIN #	1201	1203	1205	1207	1209	1211	2201	2203	2205	2207	2209	2211
SUNDAY TRAIN #	2201	2203	2205	2207	2209	2211	2201	2203	2205	2207	2209	2211
	Bikes Allowed											
1A	North Station		8:40	11:40	2:50	5:20	8:20	11:30				
1A	Malden Center		8:50	11:50	3:00	5:30	8:30	11:40				
1	Wyoming Hill		f 8:54	f 11:54	f 3:04	f 5:34	f 8:34	f 11:44				
1	Melrose/Cedar Park		f 8:56	f 11:56	f 3:06	f 5:36	f 8:36	f 11:46				
1	Melrose Highlands		8:59	11:59	3:09	5:39	8:39	11:49				
2	Greenwood		f 9:02	f 12:02	f 3:12	f 5:42	f 8:42	f 11:52				
2	Wakefield		9:05	12:05	3:15	5:45	8:45	11:55				
2	Reading		9:11	12:11	3:21	5:51	8:51	12:01				
3	North Wilmington		f 9:17	f 12:17	f 3:27	f 5:57	f 8:57	f 12:07				
4	Ballardvale		f 9:24	f 12:24	f 3:34	f 6:04	f 9:04	f 12:14				
5	Andover		9:29	12:29	3:39	6:09	9:09	12:19				
6	Lawrence		9:36	12:36	3:46	6:16	9:16	12:26				
7	Bradford		L 9:46	L 12:46	L 3:56	L 6:26	L 9:26	L 12:36				
7	Haverhill		9:49	12:49	3:59	6:29	9:29	12:39				

Keep in Mind:

This schedule will be effective from June 22, 2020 and will replace the schedule of October 21, 2019.

Presidents' Day and 4th of July operate on a **Saturday service schedule**.

New Year's Day, Memorial Day, Labor Day, Thanksgiving Day, and Christmas Day operate on a **Sunday service schedule**.

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

For the latest information regarding weekend disruptions, visit MBTA.com/weekend.

Via Lowell Line: Operates via the Lowell Line between Wilmington and North Station. See the Lowell Line schedule for all stops.

Times in purple with "f" indicate a flag stop: Passengers must tell the conductor that they wish to leave. Passengers waiting to board must be visible on the platform for the train to stop.

Times in blue indicate an early departure (L stop): The train may leave ahead of schedule at these stops.

Bikes: Bicycles are allowed on trains with the bicycle symbol shown below the train number.

High level platform and bridge plate available. Visit mbta.com/accessibility for more information.

mbta.com/ridesafer



Face coverings are required



Buy tickets with mTicket



Wash hands before and after riding



Socially distance whenever possible

MOTOR VEHICLE CRASH DATA



Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Crash Year	Max Injury Severity Reported	Age of Driver - Youngest Known	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Vehicle Actions Prior to Crash (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Latitude	Longitude
Crescent Street at Lincoln Street																
4231383	WAKEFIELD	08/05/2016	Property damage only (none injured)	6:20 PM	2016	No injury	25-34	D1: (Distracted)	Daylight	Single vehicle crash	Dry	V1: Travelling straight ahead	V1: N	Clear	42.50326	-71.06827
4307543	WAKEFIELD	01/06/2017	Property damage only (none injured)	7:24 AM	2017	No injury	21-24	D1: (Unknown)	Daylight	Rear-end	Snow	V1: Travelling straight ahead / V2: Parked	V1: S / V2:	Snow/Blowing sand, snow	42.50327	-71.06827
4371640	WAKEFIELD	05/25/2017	Property damage only (none injured)	7:29 PM	2017	No injury	18-20	D1: (No improper driving)	Dusk	Angle	Wet	V1: Travelling straight ahead	V1: N	Cloudy	42.50327	-71.06827
Crescent Street at Crescent Hill																
3866863	WAKEFIELD	06/24/2014	Not Reported	2:53 PM	2014	Not reported			Unknown	Sideswipe, same direction	Dry	V1: Parked	V1: Not Rep	Clear	42.50374	-71.06857
4068211	WAKEFIELD	07/23/2015	Property damage only (none injured)	10:45 AM	2015	No injury	55-64	D1: (Wrong side or wrong way)	Daylight	Rear-end	Dry	V1: Backing / V2: Slowing or stopped in traffic	V1: E / V2:	Clear	42.50357	-71.06844
Crescetn Street at Otis Street and Centre Street																
3964848	WAKEFIELD	10/22/2014	Non-fatal injury	3:50 PM	2014	Non-fatal injury - Possible	35-44	D1: (No improper driving) / D2: (No improper driving)	Daylight	Head-on	Wet	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: S	Rain	42.50458	-71.0692
4244580	WAKEFIELD	09/04/2016	Property damage only (none injured)	11:43 AM	2016	No injury	25-34	D1: (No improper driving) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: N / V2: W	Clear	42.50458	-71.0692
4314007	WAKEFIELD	01/18/2017	Property damage only (none injured)	12:15 PM	2017	No injury	35-44	D1: (No improper driving) / D2: (Failed to yield right of way)	Daylight	Angle	Wet	V1: Travelling straight ahead / V2: Entering traffic lane	V1: N / V2: W	Cloudy/Rain	42.50458	-71.0692
4342007	WAKEFIELD	03/23/2017	Property damage only (none injured)	3:12 PM	2017	No injury	25-34	D1: (No improper driving) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Turning left	V1: N / V2: W	Clear	42.50458	-71.0692
4456083	WAKEFIELD	11/16/2017	Property damage only (none injured)	3:14 PM	2017	No injury	45-54		Daylight	Single vehicle	Wet	V1: Turning right	V1: W	Rain	42.50458	-71.0692
4462036	WAKEFIELD	11/18/2017	Not Reported	1:51 PM	2017	Not reported			Daylight	Sideswipe, op	Dry	V1: Parked	V1: N	Clear	42.50473	-71.06932
4475934	WAKEFIELD	12/13/2017	Property damage only (none injured)	1:12 PM	2017	No injury	16-17	D1: (Over-correcting/over-steering) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Turning left / V2: Slowing or stopped in traffic	V1: W / V2: E	Clear	42.50458	-71.0692
4493657	WAKEFIELD	01/19/2018	Property damage only (none injured)	8:12 AM	2018	No injury	45-54	D1: (Unknown)	Daylight	Sideswipe, op	Wet	V1: Travelling straight ahead	V1: W	Clear	42.50458	-71.06919
4611514	WAKEFIELD	10/19/2018	Unknown	9:06 AM	2018	Not reported	45-54	D1: (Physical impairment)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Parked	V1: E / V2: Not Reported	Clear	42.50476	-71.06935
4635146	WAKEFIELD	12/03/2018	Unknown	11:33 AM	2018	Not reported			Dark - lighte	Sideswipe, sar	Unknown	V1: Parked	V1: W	Cloudy	42.50464	-71.0688
Crescent Street at princess Street																
3866863	WAKEFIELD	06/24/2014	Not Reported	2:53 PM	2014	Not reported			Unknown	Sideswipe, same direction	Dry	V1: Parked	V1: Not Reported	Clear	42.50374	-71.06857
4001538	WAKEFIELD	01/31/2015	Property damage only (none injured)	9:29 AM	2015	No injury	18-20	D1: (Inattention) / D2: (No improper driving)	Daylight	Rear-end	Ice	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: S / V2: S	Cloudy/Blowing	42.50405	-71.06879
4385718	WAKEFIELD	07/03/2017	Property damage only (none injured)	6:35 PM	2017	No injury	55-64	D1: (Failed to yield right of way) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Turning right / V2: Travelling straight ahead	V1: E / V2: N	Clear	42.50403	-71.06878
Crescent Street at Water Street																
3802802	WAKEFIELD	05/16/2014	Property damage only (none injured)	2:26 PM	2014	No injury	16-17	D1: (No improper driving) / D2: (No improper driving)	Daylight	Rear-end	Wet	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Rain	42.50265	-71.06815
3908626	WAKEFIELD	08/09/2014	Property damage only (none injured)	2:42 PM	2014	No injury	21-24	D1: (Inattention) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Turning right	V1: W / V2: S	Clear	42.50265	-71.06815

3914853	WAKEFIELD	08/19/2014	Non-fatal injury	12:25 PM	2014	Non-fatal injury - Non-incapacitating	25-34	D1: (No improper driving) / D2: (Unknown) / D3: (No improper driving) / D4: (No improper driving)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead / V3: Slowing or stopped in traffic / V4: Slowing or stopped in traffic	V1: E / V2: E / V3: N / V4: N	Clear	42.50254	-71.06879
3963525	WAKEFIELD	10/18/2014	Non-fatal injury	3:31 PM	2014	Non-fatal injury - Non-incapacitating	16-17	D1: (No improper driving) / D2: (Inattention)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear/Unknown	42.50265	-71.06815
3989860	WAKEFIELD	12/23/2014	Property damage only (none injured)	2:16 PM	2014	No injury	45-54	D1: (Unknown) / D2: (Unknown)	Daylight	Sideswipe, same direction	Wet	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: E	Rain	42.50272	-71.06781
3996113	WAKEFIELD	01/16/2015	Property damage only (none injured)	10:56 AM	2015	No injury	21-24	D1: (No improper driving) / D2: (Failed to yield right of way)	Daylight	Angle	Wet	V1: Travelling straight ahead / V2: Turning left	V1: N / V2: S	Clear	42.50265	-71.06815
3999936	WAKEFIELD	01/28/2015	Property damage only (none injured)	11:11 AM	2015	No injury	35-44	D1: (Unknown) / D2: (Unknown)	Daylight	Rear-end	Snow	V1: Travelling straight ahead / V2: Turning left	V1: W / V2: S	Clear	42.50265	-71.06815
4076317	WAKEFIELD	08/21/2015	Property damage only (none injured)	6:27 PM	2015	No injury	21-24	D1: (No improper driving) / D2: (Disregarded traffic signs, signals, road markings)	Daylight	Angle	Wet	V1: Turning left / V2: Turning left	V1: N / V2: W	Cloudy	42.50265	-71.06819
4196368	WAKEFIELD	05/08/2016	Property damage only (none injured)	12:17 PM	2016	No injury	18-20	D1: (Unknown) / D2: (Unknown)	Daylight	Angle	Wet	V1: Travelling straight ahead / V2: Turning left	V1: E / V2: N	Cloudy/Rain	42.50274	-71.06771
4271446	WAKEFIELD	10/28/2016	Property damage only (none injured)	1:47 PM	2016	No injury	35-44	D1: (No improper driving) / D2: (Unknown)	Daylight	Angle	Wet	V1: Travelling straight ahead / V2: Turning left	V1: N / V2: E	Rain	42.50265	-71.06815
4325601	WAKEFIELD	02/14/2017	Property damage only (none injured)	9:09 AM	2017	No injury	25-34	D1: (No improper driving) / D2: (Inattention)	Daylight	Angle	Wet	V1: Turning left / V2: Backing	V1: E / V2: W	Clear	42.50265	-71.06815
4328003	WAKEFIELD	02/14/2017	Non-fatal injury	3:00 PM	2017	Non-fatal injury - Possible	55-64	D1: (Inattention)	Daylight	Angle	Wet	V1: Turning left	V1: S	Clear	42.50265	-71.06815
4524113	WAKEFIELD	04/06/2018	Unknown	9:05 PM	2018	Not reported			Dark - lighted roadway	Angle	Wet	V1: Parked	V1: Not Reported	Cloudy/Unknown	42.50272	-71.06781
4532418	WAKEFIELD	04/23/2018	Property damage only (none injured)	5:46 PM	2018	No injury	35-44	D1: (Failure to keep in proper lane or running off road) / D2: (Failed to yield right of way)	Daylight	Angle	Dry	V1: Changing lanes / V2: Turning left	V1: E / V2: N	Clear	42.50275	-71.06766
4610373	WAKEFIELD	10/15/2018	Property damage only (none injured)	4:14 PM	2018	No injury	45-54	D1: (No improper driving) / D2: (Unknown)	Daylight	Angle	Wet	V1: Turning right / V2: Travelling straight ahead	V1: E / V2: E	Clear	42.50258	-71.06852

MASSDOT CRASH RATE WORKSHEETS



Masshighway

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021

DISTRICT : 4 UNSIGNALIZED : x SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Crescent Street

ST #

MINOR STREET(S) : Crescent Hill

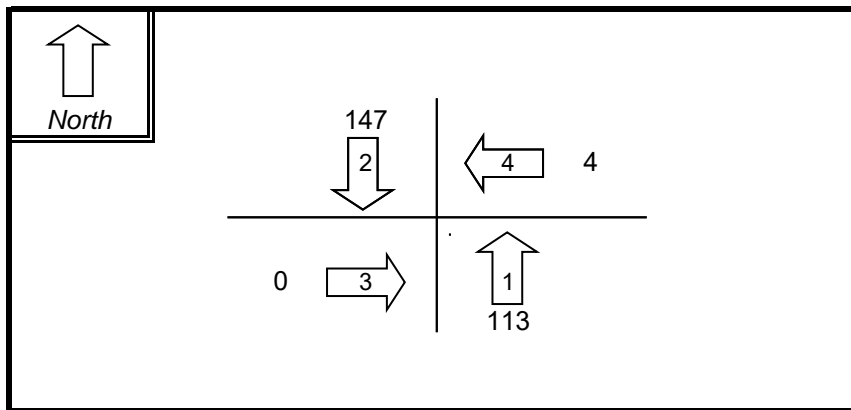
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	113	147	0	4		264

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73
Accident Rate for District 4 unsignalized intersections = 0.57

Statewide Accident Rate for Signalized Inteserction = 0.78 and Unsignalized/Inteserction = 0.57

CRASH RATE WORKSHEET

CITY/TOWN : Wakefield COUNT DATE : 2021

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Water Street

ST #

MINOR STREET(S) : Crescent Street

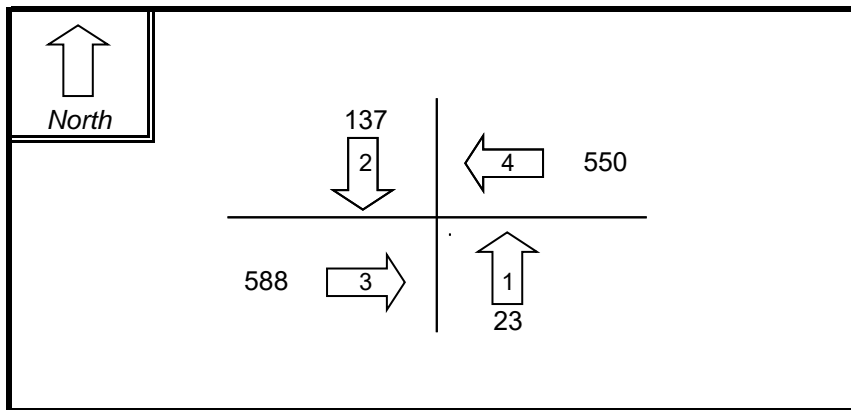
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION

REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	23	137	588	550		1,298

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : # OF YEARS : AVERAGE # OF ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 signalized intersections = 0.73
Accident Rate for District 4 unsignalized intersections = 0.57

Statewide Accident Rate for Signalized Inteserction = 0.78 and Unsignalized/Inteserction = 0.57

GENERAL BACKGROUND TRAFFIC GROWTH



General Background Traffic Growth - Daily Traffic Volumes

Station Number	ROUTE/STREET	LOCATION	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average Annual Growth Rate
4147	YANKEE DIVISION HIGHWAY	NORTH OF RTE.28	142,638		141,000					137,541	148,269	147,824	146,684	0.91%
														0.91%

Adjusted Rate:1.0%

TRIP GENERATION CALCULATIONS



Institute of Transportation Engineers (ITE)
Trip Generation, 10th Edition
Land Use Code (LUC) 221 - Multifamily Housing (Mid-Rise)

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 56

AVERAGE WEEKDAY DAILY

$T = 5.45 * (X) - 1.75$
 $T = 5.45 * 56 - (1.75)$
 $T = 303.45$
 $T = 304$ vehicle trips
with 50% (152 vpd) entering and 50% (152 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$\ln T = 0.98 * \ln(X) - 0.98$
 $\ln T = 0.98 * \ln 56 - (0.98)$
 $\ln T = 2.96$
 $T = 19.39$
 $T = 19$ vehicle trips
with 26% (5 vph) entering and 74% (14 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$\ln T = 0.96 * \ln(X) - 0.63$
 $\ln T = 0.96 * \ln 56 - (0.63)$
 $\ln T = 3.23$
 $T = 25.39$
 $T = 25$ vehicle trips
with 61% (15 vph) entering and 39% (10 vph) exiting.

SATURDAY DAILY

$T = 3.04 * (X) + 417.11$
 $T = 3.04 * 56 + (417.11)$
 $T = 587.35$
 $T = 588$ vehicle trips
with 50% (294 vpd) entering and 50% (294 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$T = 0.42 * (X) + 6.73$
 $T = 0.42 * 56 + (6.73)$
 $T = 30.25$
 $T = 30$ vehicle trips
with 49% (15 vph) entering and 51% (15 vph) exiting.
(same distribution split as ITE LUC 210 during the Saturday midday peak hour of generator)

TRIP-DISTRIBUTION CALCULATIONS



Table 3. Residence MCD/County to Workplace MCD/County Commuting Flows for the

For more information on sampling and estimation methods, confidentiality protection, and sampling and nonsampling errors, see <http://www2.census.gov/programs-surveys/acs/tech_docs/accuracy/MultiyearACSAccuracyofData2015.pdf>. Universe: Workers 16 years and over.

Commuting flows are sorted by residence state, residence county, and residence minor civil division.

Residence				Place of Work				Commuting Flow
State FIPS Code	State Name	County Name	Minor Civil Division Name	State FIPS Code	State Name	County Name	Minor Civil Division Name	Workers in Commuting Flow
25	Massachu	Middlesex	Wakefield	025	Massachu	Suffolk	Boston city	2,756
25	Massachu	Middlesex	Wakefield	025	Massachu	Middlesex	Wakefield	2,443
25	Massachu	Middlesex	Wakefield	025	Massachu	Middlesex	Woburn city	816
25	Massachu	Middlesex	Wakefield	025	Massachu	Middlesex	Cambridge	683
25	Massachu	Middlesex	Wakefield	025	Massachu	Middlesex	Reading	624
25	Massachu	Middlesex	Wakefield	025	Massachu	Middlesex	Burlington	458
25	Massachu	Middlesex	Wakefield	025	Massachu	Middlesex	Waltham	362
25	Massachu	Middlesex	Wakefield	025	Massachu	Middlesex	Melrose city	357
25	Massachu	Middlesex	Wakefield	025	Massachu	Essex	Beverly city	251
25	Massachu	Middlesex	Wakefield	025	Massachu	Essex	Danvers	247
25	Massachu	Middlesex	Wakefield	025	Massachu	Middlesex	Wilmington	244
25	Massachu	Middlesex	Wakefield	025	Massachu	Middlesex	Medford	240
25	Massachu	Middlesex	Wakefield	025	Massachu	Essex	Saugus	225
25	Massachu	Middlesex	Wakefield	025	Massachu	Essex	Andover	217
25	Massachu	Middlesex	Wakefield	025	Massachu	Essex	Peabody	215

19.3% 27.2%
17.2% 24.1%
5.7% 8.0%
4.8% 6.7%
4.4% 6.2%
3.2% 4.5%
2.5% 3.6%
2.5% 3.5%
1.8% 2.5%
1.7% 2.4%
1.7% 2.4%
1.7% 2.4%
1.6% 2.2%
1.5% 2.1%
1.5% 2.1%

14,244
10,138

USE

Exiting				Entering			Exiting				Entering			%	
Matrix %				Matrix %			Trip Distribution				Trip Distribution				
Crescent North	Water St East	Water St West	%	Crescent North	Water St East	Water St West	%	Crescent North	Water St East	Water St West	%	Crescent North	Water St East	Water St West	
0.5	0.2	0.3	1	0.5	0.2	0.3	1	1378	551.2	826.8	2756	1378	551.2	826.8	2756
0.1	0.2	0.7	1	0.1	0.2	0.7	1	244.3	488.6	1710.1	2443	244.3	488.6	1710.1	2443
		1	1			1	1	0	0	816	816	0	0	816	816
0.5	0.5		1	0.5	0.5		1	341.5	341.5	0	683	341.5	341.5	0	683
1			1	1			1	624	0	0	624	624	0	0	624
1			1	1			1	458	0	0	458	458	0	0	458
1			1	1			1	362	0	0	362	362	0	0	362
	0.8	0.2	1		0.8	0.2	1	0	285.6	71.4	357	0	285.6	71.4	357
1			1	1			1	251	0	0	251	251	0	0	251
	1		1		1		1	0	247	0	247	0	247	0	247
0.8		0.2	1	0.8		0.2	1	195.2	0	48.8	244	195.2	0	48.8	244
0.5		0.5	1	0.5		0.5	1	120	0	120	240	120	0	120	240
	1		1		1		1	0	225	0	225	0	225	0	225
1			1	1			1	217	0	0	217	217	0	0	217
1			1	1			1	215	0	0	215	215	0	0	215
								4406	2138.9	3593.1	10138	4406	2144.425	3593.98	10138
								43%	21%	35%	100%	43%	21%	35%	
								40%	25%	35%	100%	40%	25%	35%	

CAPACITY ANALYSIS



CAPACITY ANALYSIS WORKSHEETS

Water Street at Crescent Street
Crescent Street at Crescent Hill
Crescent Hill at Site Driveway
Crescent Street at Site Driveway

Water Street at Crescent Street

Lanes, Volumes, Timings
9: Water Street & Crescent Street

2021 Existing Weekday Morning Peak Hour

04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	18	436	6	2	570	148	1	4	1	81	11	23
Future Volume (vph)	18	436	6	2	570	148	1	4	1	81	11	23
Satd. Flow (prot)	0	2062	0	0	1906	0	0	1685	0	0	1924	0
Flt Permitted		0.963			0.999			0.967			0.799	
Satd. Flow (perm)	0	1989	0	0	1904	0	0	1643	0	0	1591	0
Satd. Flow (RTOR)		1			19			2			12	
Lane Group Flow (vph)	0	529	0	0	758	0	0	12	0	0	175	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5		23.5	23.5		23.5	23.5		23.5	23.5	
Total Split (s)	50.0	50.0		50.0	50.0		22.0	22.0		22.0	22.0	
Total Split (%)	52.1%	52.1%		52.1%	52.1%		22.9%	22.9%		22.9%	22.9%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effct Green (s)		32.9			32.9			21.2			21.2	
Actuated g/C Ratio		0.52			0.52			0.33			0.33	
v/c Ratio		0.51			0.76			0.02			0.33	
Control Delay		12.9			19.0			21.2			22.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.9			19.0			21.2			22.0	
LOS		B			B			C			C	
Approach Delay		12.9			19.0			21.2			22.0	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)		100			170			2			40	
Queue Length 95th (ft)		296			533			11			106	
Internal Link Dist (ft)		375			593			161			694	
Turn Bay Length (ft)												
Base Capacity (vph)		1558			1496			549			538	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.34			0.51			0.02			0.33	

Intersection Summary

Cycle Length: 96

Actuated Cycle Length: 63.5

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Lanes, Volumes, Timings
 9: Water Street & Crescent Street

2021 Existing Weekday Morning Peak Hour

04/15/2021

Intersection Signal Delay: 17.2

Intersection LOS: B

Intersection Capacity Utilization 59.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 9: Water Street & Crescent Street

 Ø2	 Ø4	 Ø9
22 s	50 s	24 s
 Ø6	 Ø8	
22 s	50 s	

Lanes, Volumes, Timings
9: Water Street & Crescent Street

2021 Existing Weekday Evening Peak Hour

04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	24	558	6	3	462	85	6	11	6	117	3	17
Future Volume (vph)	24	558	6	3	462	85	6	11	6	117	3	17
Satd. Flow (prot)	0	2127	0	0	1965	0	0	1689	0	0	1970	0
Flt Permitted		0.972			0.997			0.939			0.750	
Satd. Flow (perm)	0	2071	0	0	1959	0	0	1607	0	0	1541	0
Satd. Flow (RTOR)		1			14			8			7	
Lane Group Flow (vph)	0	646	0	0	573	0	0	31	0	0	168	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5		23.5	23.5		23.5	23.5		23.5	23.5	
Total Split (s)	50.0	50.0		50.0	50.0		22.0	22.0		22.0	22.0	
Total Split (%)	52.1%	52.1%		52.1%	52.1%		22.9%	22.9%		22.9%	22.9%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effct Green (s)		28.4			28.4			22.5			22.5	
Actuated g/C Ratio		0.44			0.44			0.35			0.35	
v/c Ratio		0.70			0.65			0.05			0.31	
Control Delay		20.1			18.6			21.5			24.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		20.1			18.6			21.5			24.9	
LOS		C			B			C			C	
Approach Delay		20.1			18.6			21.5			24.9	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)		130			109			4			29	
Queue Length 95th (ft)		399			342			28			137	
Internal Link Dist (ft)		375			593			161			694	
Turn Bay Length (ft)												
Base Capacity (vph)		1648			1562			569			545	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.39			0.37			0.05			0.31	

Intersection Summary
 Cycle Length: 96
 Actuated Cycle Length: 64.1
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.70

Lanes, Volumes, Timings
 9: Water Street & Crescent Street

2021 Existing Weekday Evening Peak Hour

04/15/2021

Intersection Signal Delay: 20.1

Intersection LOS: C

Intersection Capacity Utilization 67.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 9: Water Street & Crescent Street

 Ø2	 Ø4	 Ø9
22 s	50 s	24 s
 Ø6	 Ø8	
22 s	50 s	

Lanes, Volumes, Timings
 9: Water Street & Crescent Street

2028 No Build Weekday Morning Peak Hour

04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	19	467	6	2	611	159	1	4	1	87	11	25
Future Volume (vph)	19	467	6	2	611	159	1	4	1	87	11	25
Satd. Flow (prot)	0	2062	0	0	1906	0	0	1719	0	0	1924	0
Flt Permitted		0.961			0.999			0.966			0.793	
Satd. Flow (perm)	0	1985	0	0	1904	0	0	1674	0	0	1579	0
Satd. Flow (RTOR)		1			19			2			12	
Lane Group Flow (vph)	0	566	0	0	812	0	0	12	0	0	187	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5		23.5	23.5		23.5	23.5		23.5	23.5	
Total Split (s)	50.0	50.0		50.0	50.0		22.0	22.0		22.0	22.0	
Total Split (%)	52.1%	52.1%		52.1%	52.1%		22.9%	22.9%		22.9%	22.9%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effct Green (s)		36.1			36.1			21.0			21.0	
Actuated g/C Ratio		0.54			0.54			0.32			0.32	
v/c Ratio		0.53			0.78			0.02			0.37	
Control Delay		12.9			19.6			22.2			23.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.9			19.6			22.2			23.9	
LOS		B			B			C			C	
Approach Delay		12.9			19.6			22.2			23.9	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)		110			191			3			49	
Queue Length 95th (ft)		324			#657			11			114	
Internal Link Dist (ft)		375			593			161			694	
Turn Bay Length (ft)												
Base Capacity (vph)		1469			1414			528			505	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.39			0.57			0.02			0.37	

Intersection Summary	
Cycle Length:	96
Actuated Cycle Length:	66.6
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.78

Lanes, Volumes, Timings
 9: Water Street & Crescent Street

2028 No Build Weekday Morning Peak Hour

04/15/2021

Intersection Signal Delay: 17.7

Intersection LOS: B

Intersection Capacity Utilization 62.8%

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: 9: Water Street & Crescent Street

 Ø2 22 s	 Ø4 50 s	 Ø9 24 s
 Ø6 22 s	 Ø8 50 s	

Lanes, Volumes, Timings
9: Water Street & Crescent Street

2028 No Build Weekday Evening Peak Hour

04/15/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	598	6	3	495	91	6	11	6	125	3	18
Future Volume (vph)	26	598	6	3	495	91	6	11	6	125	3	18
Satd. Flow (prot)	0	2127	0	0	1965	0	0	1689	0	0	1970	0
Flt Permitted		0.968			0.998			0.937			0.745	
Satd. Flow (perm)	0	2063	0	0	1961	0	0	1603	0	0	1531	0
Satd. Flow (RTOR)		1			13			8			7	
Lane Group Flow (vph)	0	693	0	0	614	0	0	31	0	0	178	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5		23.5	23.5		23.5	23.5		23.5	23.5	
Total Split (s)	50.0	50.0		50.0	50.0		22.0	22.0		22.0	22.0	
Total Split (%)	52.1%	52.1%		52.1%	52.1%		22.9%	22.9%		22.9%	22.9%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effct Green (s)		30.5			30.5			22.4			22.4	
Actuated g/C Ratio		0.46			0.46			0.34			0.34	
v/c Ratio		0.73			0.67			0.06			0.34	
Control Delay		20.6			18.8			22.1			26.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		20.6			18.8			22.1			26.1	
LOS		C			B			C			C	
Approach Delay		20.6			18.8			22.1			26.1	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)		145			121			4			33	
Queue Length 95th (ft)		442			378			28			145	
Internal Link Dist (ft)		375			593			161			694	
Turn Bay Length (ft)												
Base Capacity (vph)		1615			1538			549			523	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.43			0.40			0.06			0.34	
Intersection Summary												
Cycle Length: 96												
Actuated Cycle Length: 66.1												
Natural Cycle: 80												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.73												

Lanes, Volumes, Timings
 9: Water Street & Crescent Street

2028 No Build Weekday Evening Peak Hour

04/15/2021

Intersection Signal Delay: 20.6

Intersection LOS: C

Intersection Capacity Utilization 71.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 9: Water Street & Crescent Street

 Ø2	 Ø4	 Ø9
22 s	50 s	24 s
 Ø6	 Ø8	
22 s	50 s	

Queues
9: Water Street & Crescent Street

2028 Build Weekday Morning Peak Hour

04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	21	467	6	2	611	160	1	4	1	89	11	30
Future Volume (vph)	21	467	6	2	611	160	1	4	1	89	11	30
Satd. Flow (prot)	0	2062	0	0	1906	0	0	1719	0	0	1919	0
Flt Permitted		0.956			0.999			0.965			0.797	
Satd. Flow (perm)	0	1975	0	0	1904	0	0	1672	0	0	1582	0
Satd. Flow (RTOR)		1			19			2			14	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.95	0.95	0.95	0.50	0.50	0.50	0.66	0.66	0.66
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	4%	0%	0%	4%	1%	0%	0%	0%	3%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	568	0	0	813	0	0	12	0	0	197	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5		23.5	23.5		23.5	23.5		23.5	23.5	
Total Split (s)	50.0	50.0		50.0	50.0		22.0	22.0		22.0	22.0	
Total Split (%)	52.1%	52.1%		52.1%	52.1%		22.9%	22.9%		22.9%	22.9%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effect Green (s)		36.2			36.2			21.0			21.0	
Actuated g/C Ratio		0.54			0.54			0.31			0.31	
v/c Ratio		0.53			0.78			0.02			0.39	
Control Delay		12.9			19.7			22.2			24.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.9			19.7			22.2			24.1	
LOS		B			B			C			C	
Approach Delay		12.9			19.7			22.2			24.1	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)		110			192			3			52	
Queue Length 95th (ft)		326			#658			11			118	
Internal Link Dist (ft)		375			593			161			294	
Turn Bay Length (ft)												
Base Capacity (vph)		1460			1412			527			507	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	

Queues
 9: Water Street & Crescent Street

2028 Build Weekday Morning Peak Hour

04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.39			0.58			0.02			0.39	

Intersection Summary

Cycle Length: 96

Actuated Cycle Length: 66.7

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 17.8

Intersection LOS: B

Intersection Capacity Utilization 63.3%

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: 9: Water Street & Crescent Street

Ø2 22 s	Ø4 50 s	Ø9 24 s
Ø6 22 s	Ø8 50 s	

Lanes and Geometrics
9: Water Street & Crescent Street

2028 Build Weekday Evening Peak Hour
04/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	31	598	6	3	495	94	6	11	6	127	3	21
Future Volume (vph)	31	598	6	3	495	94	6	11	6	127	3	21
Satd. Flow (prot)	0	2127	0	0	1965	0	0	1689	0	0	1968	0
Flt Permitted		0.961			0.998			0.935			0.747	
Satd. Flow (perm)	0	2048	0	0	1961	0	0	1600	0	0	1532	0
Satd. Flow (RTOR)		1			14			8			8	
Lane Group Flow (vph)	0	698	0	0	617	0	0	31	0	0	185	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5		23.5	23.5		23.5	23.5		23.5	23.5	
Total Split (s)	50.0	50.0		50.0	50.0		22.0	22.0		22.0	22.0	
Total Split (%)	52.1%	52.1%		52.1%	52.1%		22.9%	22.9%		22.9%	22.9%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effct Green (s)		30.8			30.8			22.4			22.4	
Actuated g/C Ratio		0.46			0.46			0.34			0.34	
v/c Ratio		0.73			0.67			0.06			0.35	
Control Delay		20.8			18.7			22.1			26.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		20.8			18.7			22.1			26.3	
LOS		C			B			C			C	
Approach Delay		20.8			18.7			22.1			26.3	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)		147			122			4			35	
Queue Length 95th (ft)		450			379			28			150	
Internal Link Dist (ft)		375			593			161			294	
Turn Bay Length (ft)												
Base Capacity (vph)		1596			1531			544			522	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.44			0.40			0.06			0.35	

Intersection Summary	
Cycle Length:	96
Actuated Cycle Length:	66.4
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.73

Lanes and Geometrics
 9: Water Street & Crescent Street

2028 Build Weekday Evening Peak Hour

04/15/2021

Intersection Signal Delay: 20.7

Intersection LOS: C

Intersection Capacity Utilization 75.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 9: Water Street & Crescent Street

 Ø2 22 s	 Ø4 50 s	 Ø9 24 s
 Ø6 22 s	 Ø8 50 s	

Crescent Street at Crescent Hill

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Vol, veh/h	6	3	151	2	1	134
Future Vol, veh/h	6	3	151	2	1	134
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	3	164	2	1	146

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	313	165	0	0	166	0
Stage 1	165	-	-	-	-	-
Stage 2	148	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	680	879	-	-	1412	-
Stage 1	864	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	679	879	-	-	1412	-
Mov Cap-2 Maneuver	679	-	-	-	-	-
Stage 1	864	-	-	-	-	-
Stage 2	879	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	735	1412
HCM Lane V/C Ratio	-	-	0.013	0.001
HCM Control Delay (s)	-	-	10	7.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Vol, veh/h	3	1	108	5	2	145
Future Vol, veh/h	3	1	108	5	2	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	1	117	5	2	158

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	282	120	0	0	122	0
Stage 1	120	-	-	-	-	-
Stage 2	162	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	708	931	-	-	1465	-
Stage 1	905	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	707	931	-	-	1465	-
Mov Cap-2 Maneuver	707	-	-	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	866	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	752	1465
HCM Lane V/C Ratio	-	-	0.006	0.001
HCM Control Delay (s)	-	-	9.8	7.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Vol, veh/h	6	3	162	2	1	144
Future Vol, veh/h	6	3	162	2	1	144
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	3	176	2	1	157

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	336	177	0	0	178	0
Stage 1	177	-	-	-	-	-
Stage 2	159	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	659	866	-	-	1398	-
Stage 1	854	-	-	-	-	-
Stage 2	870	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	658	866	-	-	1398	-
Mov Cap-2 Maneuver	658	-	-	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	869	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	715	1398
HCM Lane V/C Ratio	-	-	0.014	0.001
HCM Control Delay (s)	-	-	10.1	7.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Vol, veh/h	3	1	116	5	2	155
Future Vol, veh/h	3	1	116	5	2	155
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	1	126	5	2	168

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	301	129	0	0	131
Stage 1	129	-	-	-	-
Stage 2	172	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	691	921	-	-	1454
Stage 1	897	-	-	-	-
Stage 2	858	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	690	921	-	-	1454
Mov Cap-2 Maneuver	690	-	-	-	-
Stage 1	897	-	-	-	-
Stage 2	856	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	736	1454
HCM Lane V/C Ratio	-	-	0.006	0.001
HCM Control Delay (s)	-	-	9.9	7.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Vol, veh/h	7	7	163	3	2	144
Future Vol, veh/h	7	7	163	3	2	144
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	8	177	3	2	157

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	340	179	0	0	180
Stage 1	179	-	-	-	-
Stage 2	161	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	656	864	-	-	1396
Stage 1	852	-	-	-	-
Stage 2	868	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	655	864	-	-	1396
Mov Cap-2 Maneuver	655	-	-	-	-
Stage 1	852	-	-	-	-
Stage 2	866	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	745	1396
HCM Lane V/C Ratio	-	-	0.02	0.002
HCM Control Delay (s)	-	-	9.9	7.6
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Vol, veh/h	4	3	117	6	6	156
Future Vol, veh/h	4	3	117	6	6	156
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	3	127	7	7	170

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	315	131	0	0	134	0
Stage 1	131	-	-	-	-	-
Stage 2	184	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	678	919	-	-	1451	-
Stage 1	895	-	-	-	-	-
Stage 2	848	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	675	919	-	-	1451	-
Mov Cap-2 Maneuver	675	-	-	-	-	-
Stage 1	895	-	-	-	-	-
Stage 2	844	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	762	1451
HCM Lane V/C Ratio	-	-	0.01	0.004
HCM Control Delay (s)	-	-	9.8	7.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Crescent Hill at Site Driveway

Intersection						
Int Delay, s/veh	2.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	3	2	0	9	5	0
Future Vol, veh/h	3	2	0	9	5	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	2	0	10	5	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	5	0	14
Stage 1	-	-	-	-	4
Stage 2	-	-	-	-	10
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1616	-	1005
Stage 1	-	-	-	-	1019
Stage 2	-	-	-	-	1013
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1616	-	1005
Mov Cap-2 Maneuver	-	-	-	-	1005
Stage 1	-	-	-	-	1019
Stage 2	-	-	-	-	1013

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1005	-	-	1616	-
HCM Lane V/C Ratio	0.005	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	7	5	0	4	3	0
Future Vol, veh/h	7	5	0	4	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	5	0	4	3	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	13	0	15
Stage 1	-	-	-	-	11
Stage 2	-	-	-	-	4
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1606	-	1004
Stage 1	-	-	-	-	1012
Stage 2	-	-	-	-	1019
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1606	-	1004
Mov Cap-2 Maneuver	-	-	-	-	1004
Stage 1	-	-	-	-	1012
Stage 2	-	-	-	-	1019

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1004	-	-	1606	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Crescent Street at Site Driveway

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Vol, veh/h	6	1	165	2	0	151
Future Vol, veh/h	6	1	165	2	0	151
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	1	179	2	0	164

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	344	180	0	0	181	0
Stage 1	180	-	-	-	-	-
Stage 2	164	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	652	863	-	-	1394	-
Stage 1	851	-	-	-	-	-
Stage 2	865	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	652	863	-	-	1394	-
Mov Cap-2 Maneuver	652	-	-	-	-	-
Stage 1	851	-	-	-	-	-
Stage 2	865	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

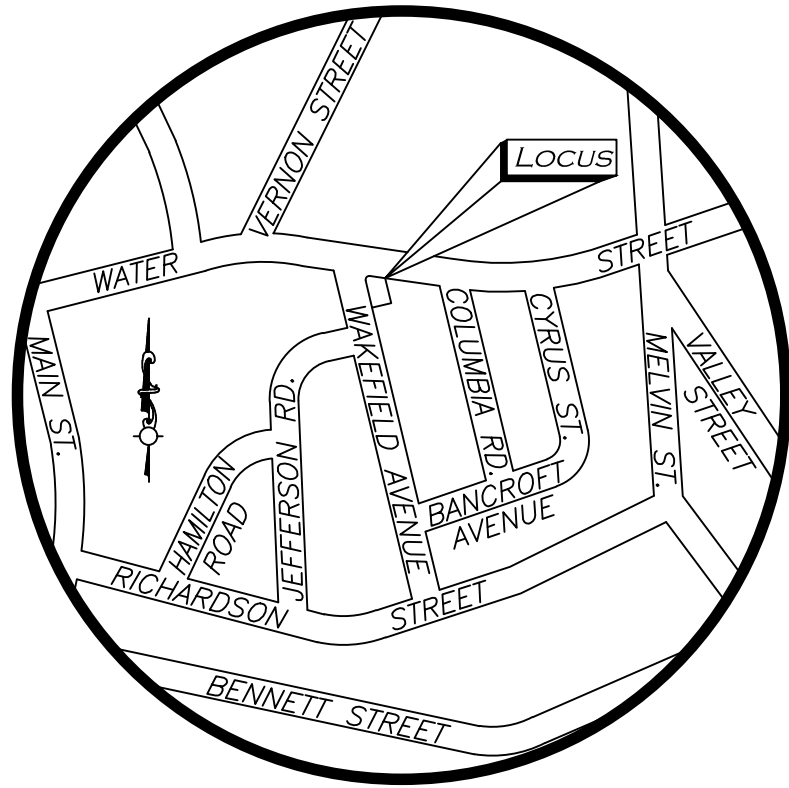
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	676	1394
HCM Lane V/C Ratio	-	-	0.011	-
HCM Control Delay (s)	-	-	10.4	0
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	4	1	122	7	1	159
Future Vol, veh/h	4	1	122	7	1	159
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	1	133	8	1	173

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	312	137	0	0	141	0
Stage 1	137	-	-	-	-	-
Stage 2	175	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	681	911	-	-	1442	-
Stage 1	890	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	680	911	-	-	1442	-
Mov Cap-2 Maneuver	680	-	-	-	-	-
Stage 1	890	-	-	-	-	-
Stage 2	854	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	716	1442
HCM Lane V/C Ratio	-	-	0.008	0.001
HCM Control Delay (s)	-	-	10.1	7.5
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0



LOCUS MAP
(NOT TO SCALE)

LOCUS REFERENCES

- TOWN OF WAKEFIELD ASSESSORS PARCEL 18-185-K41
- DEED BOOK 69572, PAGE 146
- PLAN BOOK 202, PLAN 36
- PLAN 1114 OF 1981
- RECORD OWNER: THAIS & PATRICK DUMAY

PLAN REFERENCES

- L.C.C. 28432 A
- L.C.C. 25061 A & B
- PLAN BOOK 202, PLAN 36
- PLAN 1114 OF 1981

NOTES

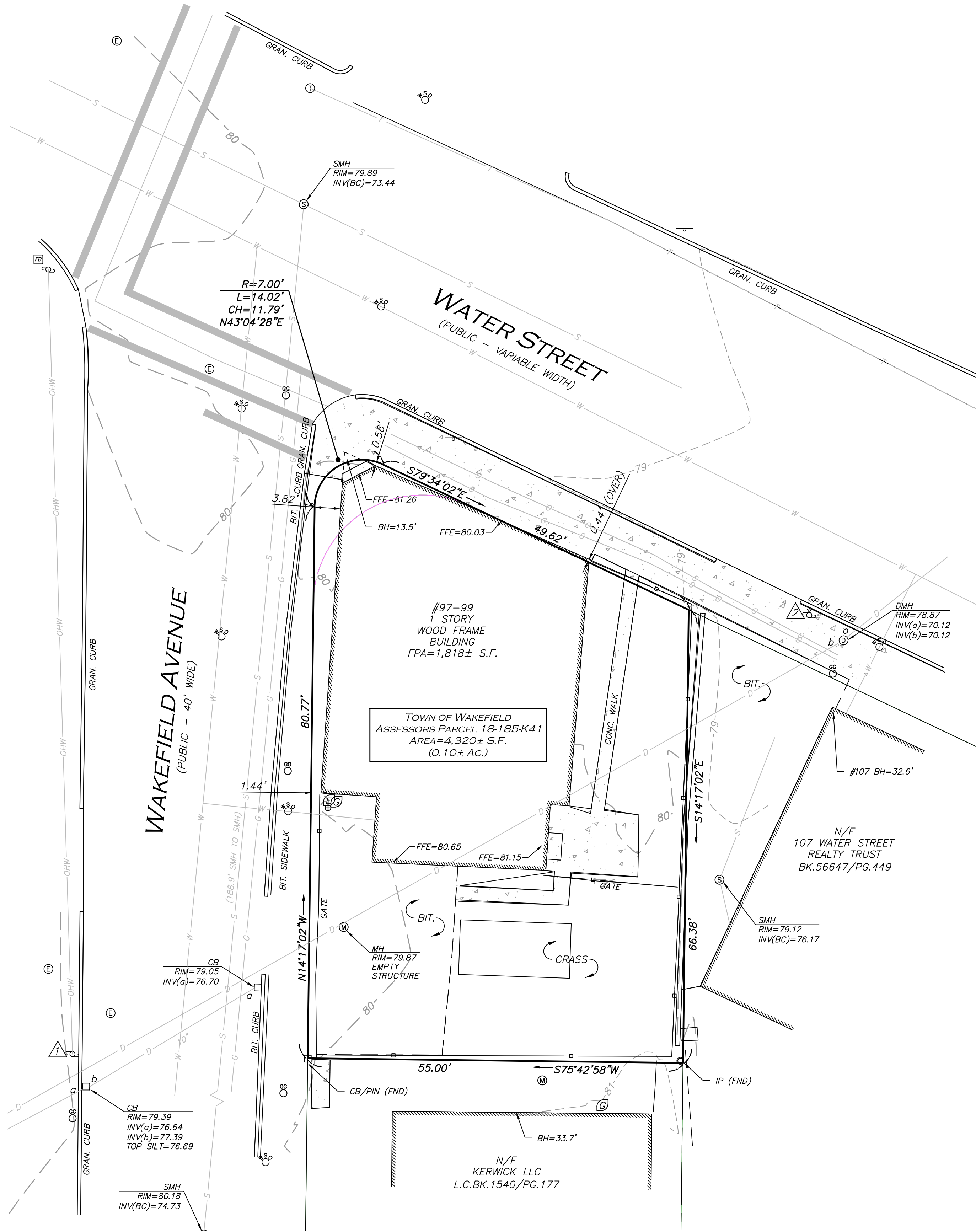
1. NORTH ARROW IS BASED ON MASSACHUSETTS GRID COORDINATE SYSTEM (MAINLAND ZONE) (NAD 83).
2. BOOK/PAGE AND PLAN REFERENCES ARE TAKEN FROM MIDDLESEX (SOUTH) REGISTRY OF DEEDS IN CAMBRIDGE, MA.
3. VERTICAL DATUM IS NAVD 88.
4. CONTOUR INTERVAL IS ONE FOOT (1').

UTILITY STATEMENT

THE UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. ALLEN & MAJOR ASSOCIATES, INC. (A&M) MAKES NO GUARANTEE THAT THE UTILITIES SHOWN HEREON COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. A&M FURTHER DOES NOT WARRANT THAT THE UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED. A&M HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

BENCHMARK SUMMARY

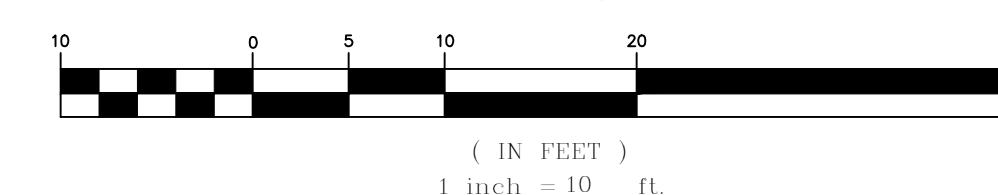
TBM #	DESCRIPTION	ELEV.
1	COTTON GIN SPINDLE IN UTILITY POLE	80.83
2	COTTON GIN SPINDLE IN UTILITY POLE	80.15



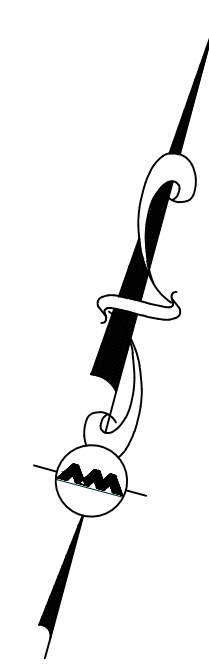
LEGEND

- CONCRETE BOUND (CB) □
- IRON PIPE (IP) ○
- DRAIN MANHOLE (DMH) ⊙
- SEWER MANHOLE (SMH) ⊙
- ELECTRIC MANHOLE (EMH) ⊙
- TELEPHONE MANHOLE (TMH) ⊙
- WATER MANHOLE (WMH) ⊙
- CATCH BASIN (CB) □
- UTILITY POLE ○
- UTILITY POLE W/RISER ○
- UTILITY POLE W/LIGHT ○
- WATER GATE ○
- GAS GATE ○
- BOLLARD ○
- SIGN ○
- FIRE ALARM BOX ○
- GAS METER ○
- ELECTRIC METER ○
- CONCRETE BUILDING [hatched]
- BUILDING OVERHANG [dashed]
- 1' CONTOUR -53-
- 5' CONTOUR -55-
- PROPERTY LINE [dashed]
- ABUTTERS LINE [dashed]
- CONCRETE RETAINING WALL [hatched]
- EDGE OF PAVEMENT [dashed]
- CURB [solid]
- STOCKADE FENCE [dashed]
- WATER LINE [wavy]
- SEWER LINE [dashed]
- DRAIN LINE [dashed]
- GAS LINE [dashed]
- ELECTRIC LINE [dashed]
- TELEPHONE LINE [dashed]
- FOOTPRINT AREA FPA [dotted]
- FINISHED FLOOR ELEVATION FFE [dotted]
- BUILDING HEIGHT BH [dotted]
- BITUMINOUS BIT. [dotted]
- CONCRETE CONC. [dotted]
- GRANITE GRAN. [dotted]
- BOTTOM CENTER (BC) [dotted]
- CONC. BOUND W/PIN CB/PIN [dotted]
- FOUND FND [dotted]
- NOW OR FORMERLY N/F [dotted]
- BOOK BK. [dotted]
- PAGE PG. [dotted]
- LAND COURT L.C. [dotted]
- LAND COURT CASE L.C.C. [dotted]

GRAPHIC SCALE



N:\PROJECTS\2398-05\SURVEY\DRAWINGS\CURRENT\5-2398-05-EC.DWG
FB# 1740 PG. 125



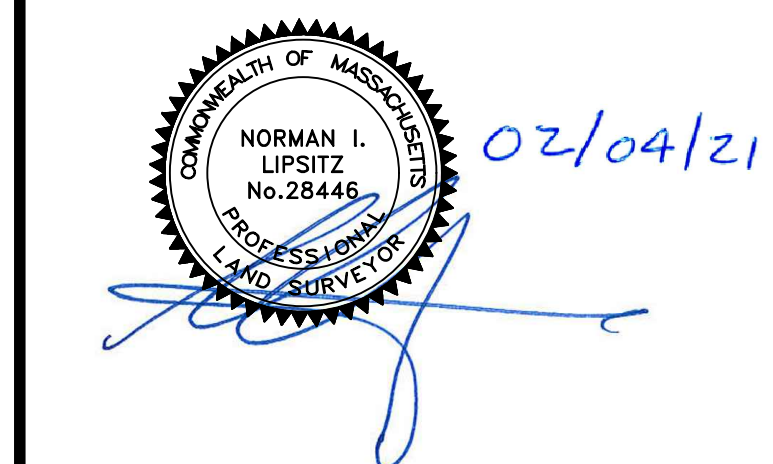
FOR REGISTRY USE ONLY

WE HEREBY CERTIFY THAT:

THIS PLAN IS THE RESULT OF AN ACTUAL ON THE GROUND SURVEY PERFORMED ON OR BETWEEN AUGUST 12, 2019 AND JULY 2, 2020.
THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS DATED JANUARY 1, 1976 AND REVISED JANUARY 12, 1988.
ACCORDING TO DEEDS AND PLANS OF RECORD, THE PROPERTY LINES SHOWN ON THIS PLAN ARE THE LINES DIVIDING EXISTING OWNERSHIP, AND THE LINES OF THE STREETS OR WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS AND WAYS ALREADY ESTABLISHED, AND THAT NO NEW LINES FOR THE DIVISION OF EXISTING OWNERSHIP OR FOR NEW WAYS ARE SHOWN.
THE ABOVE CERTIFICATION IS INTENDED TO MEET REGISTRY OF DEEDS REQUIREMENTS FOR THE RECORDING OF PLANS AND IS NOT A CERTIFICATION TO THE TITLE OR OWNERSHIP OF THE PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE SHOWN ACCORDING TO CURRENT TOWN OF WAKEFIELD ASSESSOR'S INFORMATION.
THE ABOVE IS CERTIFIED TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, INFORMATION AND BELIEF.

ALLEN & MAJOR ASSOCIATES, INC.

Feb. 4, 2021
PROFESSIONAL LAND SURVEYOR FOR ALLEN & MAJOR ASSOCIATES, INC.



APPLICANT/OWNER:
SGD MANAGEMENT GROUP, LLC
P.O. BOX 4449
PEABODY, MA 01960

PROJECT:
97-99 WATER STREET
WAKEFIELD, MA

PROJECT NO. 2398-05 DATE: 02/04/2021

SCALE: 1" = 10' DWG. NAME: S-2398-05-EC

DRAFTED BY: COB CHECKED BY: NL

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil & structural engineering • land surveying
environmental consulting • landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBBURN MA 01801-8501
TEL: (781) 935-6889
FAX: (781) 935-2896

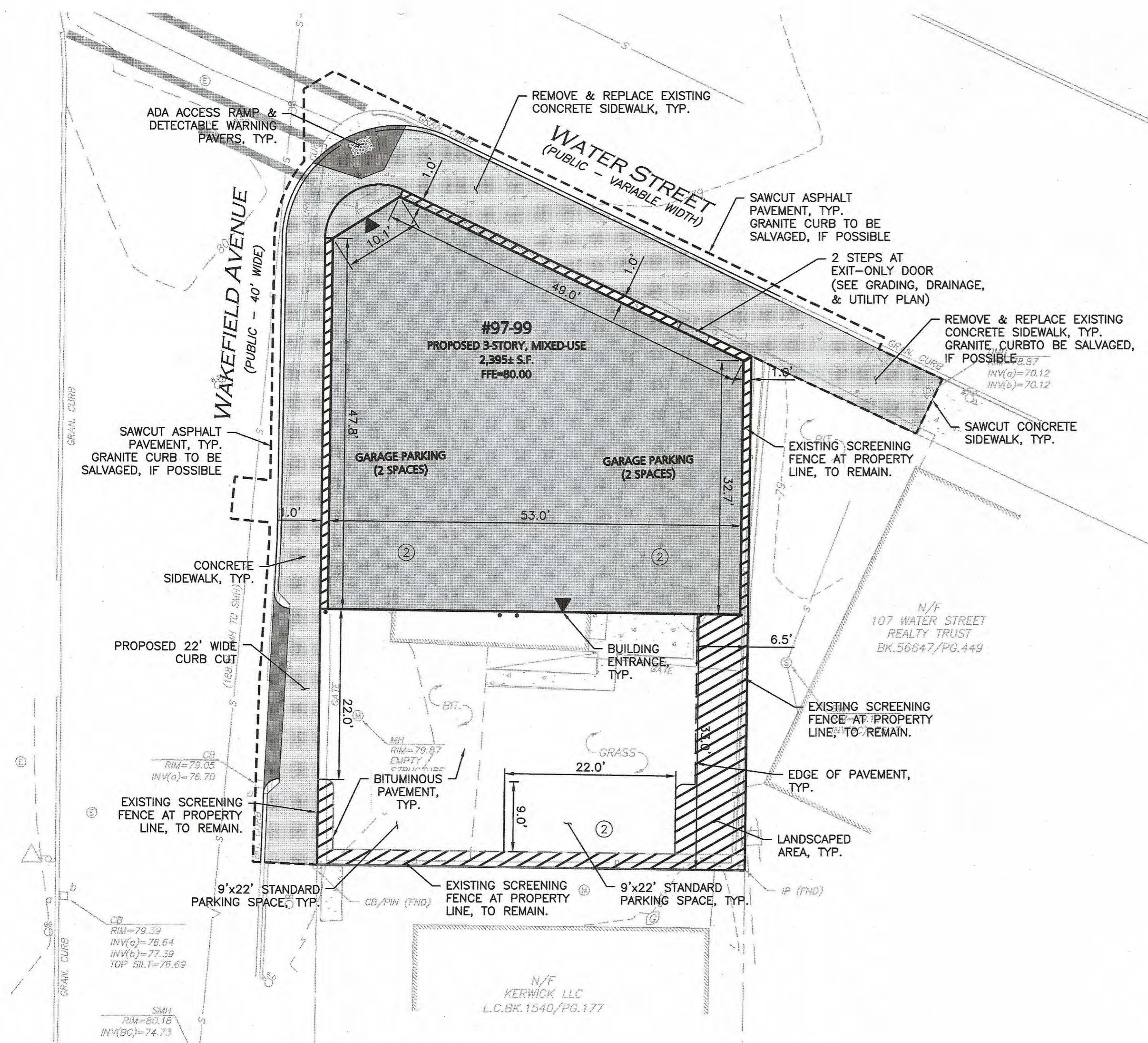
WOBBURN, MA • LAKEVILLE, MA • MANCHESTER, NH

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DRAWING TITLE: **EXISTING CONDITIONS** SHEET No. **1**

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N:\PROJECTS\2398-05\CIVIL\DRAWINGS\CURRENT\C-2398-05_LAYOUT & MATERIALS.DWG



LEGEND	
PROP. PROPERTY LINE	---
SIGN	+
BOLLARD	•
BUILDING	[Hatched Box]
BUILDING ARCHITECTURE	[Line with Dash]
BUILDING INTERIOR WALLS	[Dotted Line]
CURB	[Double Line]
SIDEWALK	[Hatched Box]
BRICK SIDEWALK	[Cross-hatched Box]
ADA ACCESSIBLE RAMP	[Triangle]
ADA DET. WARNING SURFACE	[Dotted Box]
EDGE OF PAVEMENT	---(10)
PARKING COUNT	(10)
LANDSCAPE	[Diagonal Hatched Box]
CONCRETE DRIVEWAY	[Cross-hatched Box]

- NOTES:**
- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
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 - ALL MAIN BUILDING ENTRANCES AND WALKS SHALL BE ACCESSIBLE PER FEDERAL ADA & MA AAB REGULATIONS.
 - SEE ARCHITECTURAL PLANS FOR BUILDING DIMENSIONS.
 - THE CONTRACTOR SHALL CONTACT "DIGSAFE" AND THE TOWN OF WAKEFIELD DEPARTMENT OF PUBLIC WORKS AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST THE LOCATION OF THE EXISTING UTILITIES.
- DIGSAFE: 1-888-344-7233
 WAKEFIELD DEPARTMENT OF PUBLIC WORKS: (508) 532-5600
 WAKEFIELD WATER DEPARTMENT: (508) 532-6050

ZONING & LAND USAGE SUMMARY TABLE
 97-99 WATER STREET
 ZONING: BUSINESS (B) DISTRICT & WIRELESS COMMUNICATIONS SERVICES OVERLAY DISTRICT

ITEM	REQUIRED (BUSINESS)	REQUIRED (2) (MID-RISE APARTMENT COMPLEX)	EXISTING	PROPOSED
LOT AREA (MIN.)	N/A	4,000 S.F.	4,320± S.F.	4,320± S.F.
LOT FRONTAGE (MIN.)	40'	180'	144.4'	144.4'
LOT WIDTH (MIN.)	40'	180'	±55.0'	±55.0'
OPEN AREA (MIN)	10%	30% (3)	±38.7%	11.1%
BUILDING HEIGHT	60'	50'	13.5'	40.33' (40'-4")
FRONT YARD SETBACK (MIN)	N/A (1)	30'	-0.44' (OVER)	±1.0'
SIDE YARD SETBACK (MIN)	N/A (1)	30'	±15.1'	±1.0'
REAR YARD SETBACK (MIN)	N/A (1)	30'	±27.9'	±33.0'
FLOOR AREA RATIO	1.5	N/A	±0.42	1.36
BUILDING COVERAGE (MAX)	80%	35%	41.8%	55.4%

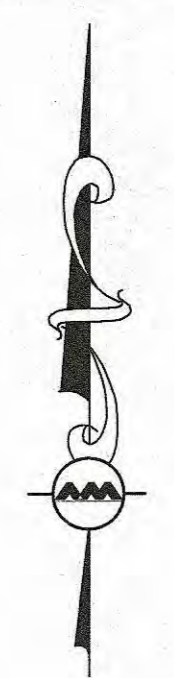
(1) SECTION 190-31(C): YARD REQUIREMENTS FOR ALL DISTRICTS. WHERE A SIDE OR REAR YARD IS ADJACENT TO A STREET, THE SIDE OR REAR YARD REQUIREMENT SHALL BE THE SAME AS THE DISTANCE SPECIFIED FOR FRONT YARD SETBACK.
 (2) SECTION 190-32 - MULTIFAMILY DWELLINGS, MIXED USE DEVELOPMENT
 (3) 190-32.C(2): AT LEAST 30% OF THE TOTAL AREA OF THE MULTIFAMILY DWELLING COMPLEX SHALL BE MAINTAINED AS OPEN AREA.

PARKING SUMMARY CHART

PRINCIPAL USE:
 MULTI-FAMILY DWELLINGS OR ATTACHED DWELLINGS (4 TWO-BEDROOM UNITS PROPOSED)
 PARKING FOR 2 BEDROOMS OR FEWER SHALL BE 1.5 SPACES PER DWELLING (2)
 (4 TWO-BEDROOM UNITS TOTAL) * (1.5 SPACES/DWELLING) = 6 SPACES
 RETAIL & SERVICE ESTABLISHMENTS (911 S.F. OF PROPOSED RETAIL)
 1.0 PER 250 SQUARE FEET OF GROSS FLOOR AREA (1)
 (911 S.F.) / (1.0 SPACE/250 G.S.F.) = 0 SPACES
 TOTAL OFF-STREET PARKING REQUIREMENT = 6 SPACES

	SURFACE SPACES	GARAGE SPACES	TOTAL PROPOSED SPACES	REQUIRED SPACES
PROPOSED PARKING	2	4	6	6

- PARKING NOTES:**
- PER SECTION 190-36.B(3) - PARKING EXEMPTION FOR SMALL ESTABLISHMENTS. OFF-STREET PARKING SPACE SHALL NOT BE REQUIRED FOR NONRESIDENTIAL USES WHEN THE COMPUTED REQUIREMENT RESULTS IN FOUR SPACES OR FEWER FOR ALL THE NONRESIDENTIAL USES ON THE LOT.
 - PER SECTION 190-41.B.(TABLE 3)



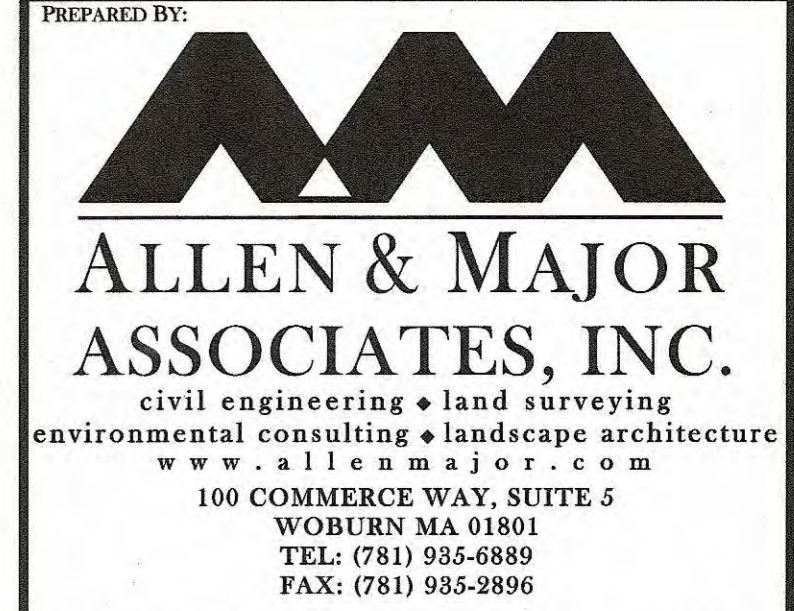
Carlton M. Quinn 4.14.21
 PROFESSIONAL ENGINEER FOR
 ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	04-14-2021	REVISED PER TOWN COMMENT

APPLICANT/OWNER:
 SAVERIO P. FULCINITI
 PO BOX 4449
 PEABODY, MA 01960

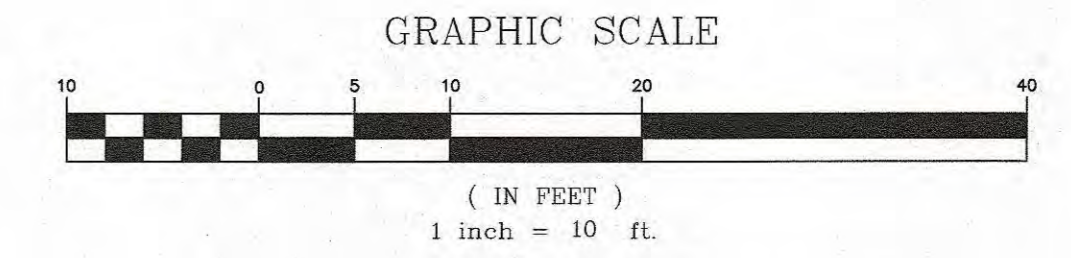
PROJECT:
 97-99 WATER STREET
 WAKEFIELD, MA

PROJECT NO. 2398-05 DATE: 02-09-2021
 SCALE: 1" = 10' DWG. NAME: CIVIL
 DESIGNED BY: SJL CHECKED BY: CMQ

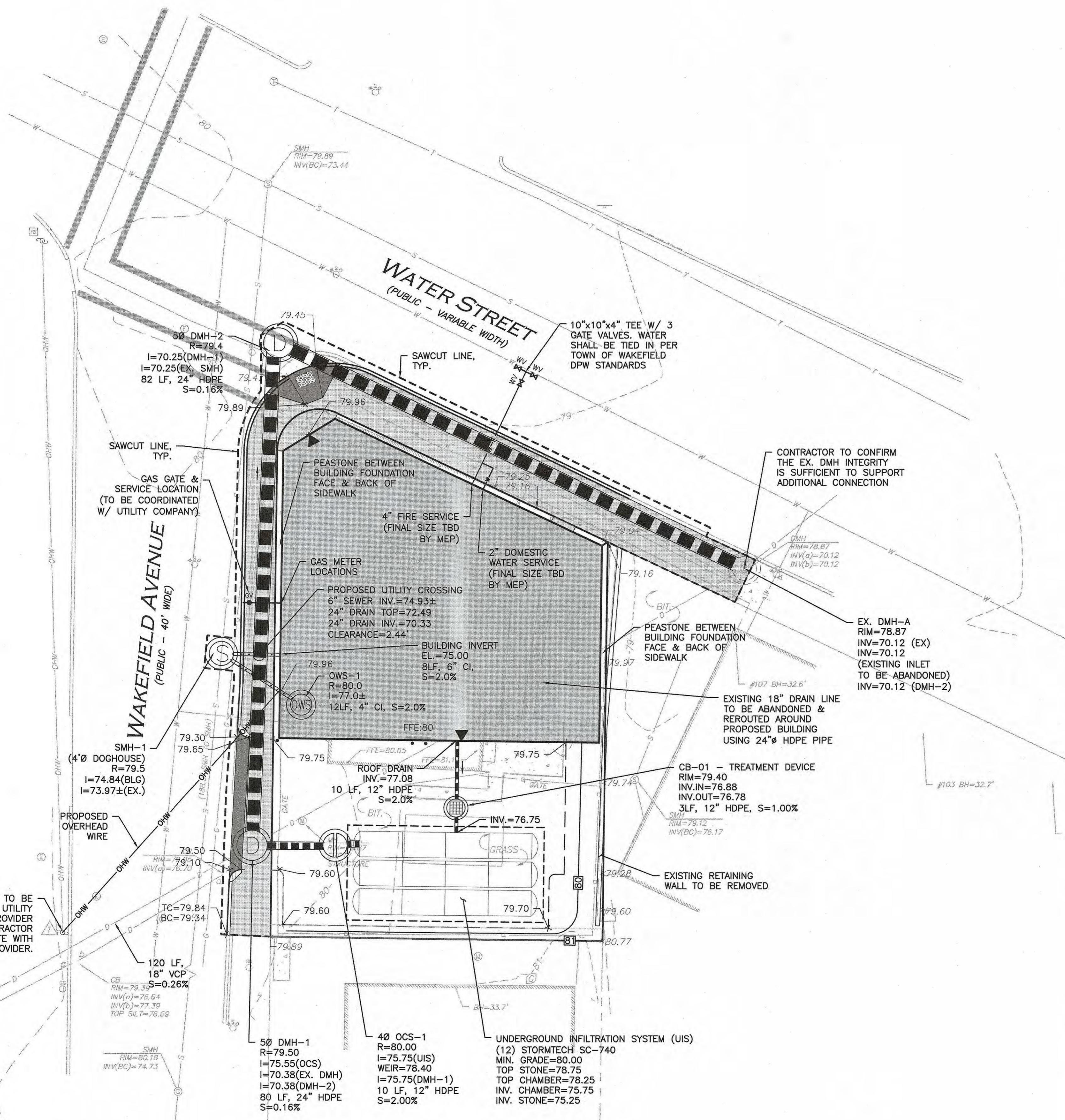


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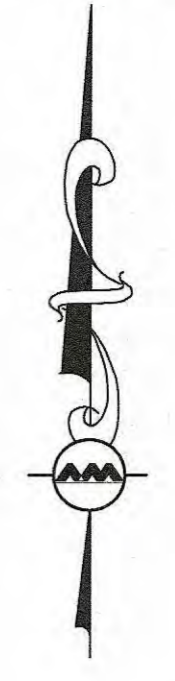


N:\PROJECTS\2398-05\CIVIL\DRAWINGS\CURRENT\C-2398-05_GRADING & DRAINAGE.DWG



LEGEND	
DRAIN MANHOLE	
DIVERSION WEIR	
CATCH BASIN	
DRAIN LINE	
1' CONTOUR	
EXISTING SPOT GRADE	X79.49
PROPOSED SPOT GRADE	X81.50
INFILTRATION SYSTEM	
INFILTRATION PIPE	
FLOW DIRECTION	
SEWER MANHOLE	
SEWER LINE	
WATER LINE (DOMESTIC)	
WATER (FIRE SERVICE)	
WATER VALVE	
GAS LINE	
GAS VALVE	
OVER HEAD WIRE	
SAWCUT LINE	

- NOTES:**
1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR IT'S REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
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 3. THE CONTRACTOR SHALL CONTACT "DIGSAFE" AND THE AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST THE LOCATION OF THE EXISTING UTILITIES. DIGSAFE: 1-888-344-7233



PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	04-14-2021	REVISED PER TOWN COMMENT

APPLICANT/OWNER:
SAVERIO P. FULCINITI
PO BOX 4449
PEABODY, MA 01960

PROJECT:
97-99 WATER STREET
WAKEFIELD, MA

PROJECT NO.	2398-05	DATE:	02-09-2021
SCALE:	1" = 10'	DWG. NAME:	CIVIL
DESIGNED BY:	SIL	CHECKED BY:	CMQ

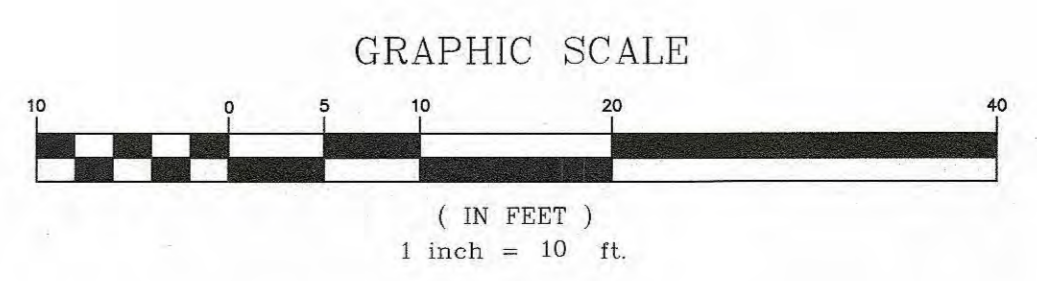
ALLEN & MAJOR ASSOCIATES, INC.
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environmental consulting • landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
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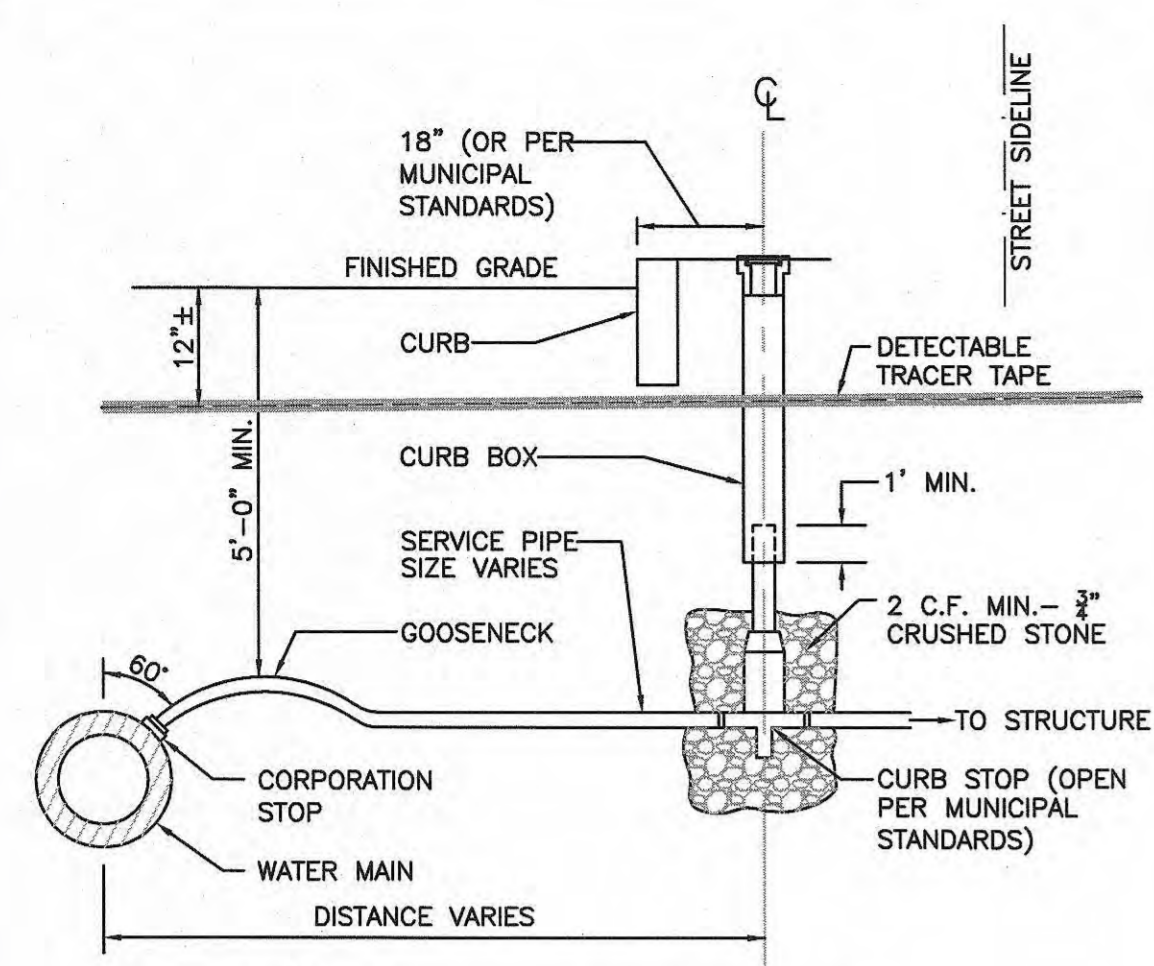
DRAWING TITLE:	SHEET No.
GRADING, DRAINAGE, & UTILITY PLAN	C-103

DIG SAFE

BEFORE YOU DIG
CALL 811 OR
1-888-DIG-SAFE
1-888-344-7233

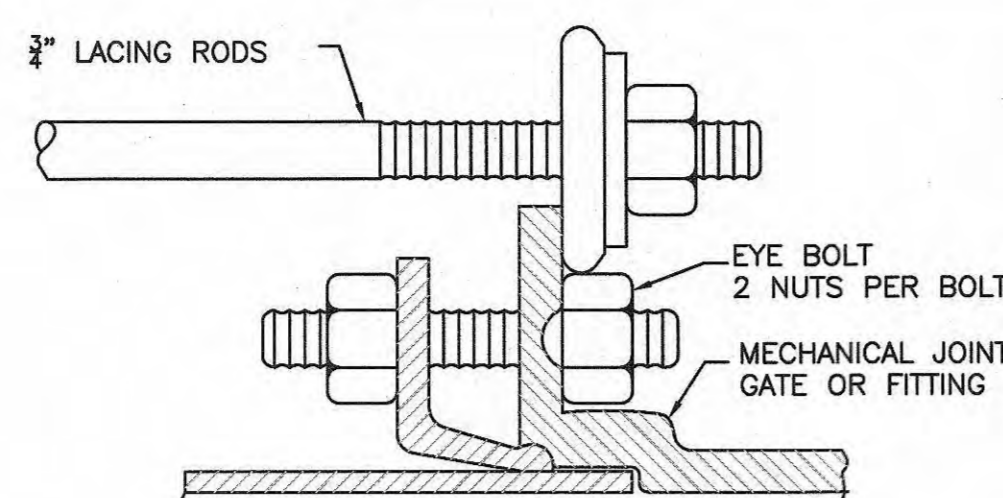


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TYPICAL WATER SERVICE CONNECTION
NOT TO SCALE

1



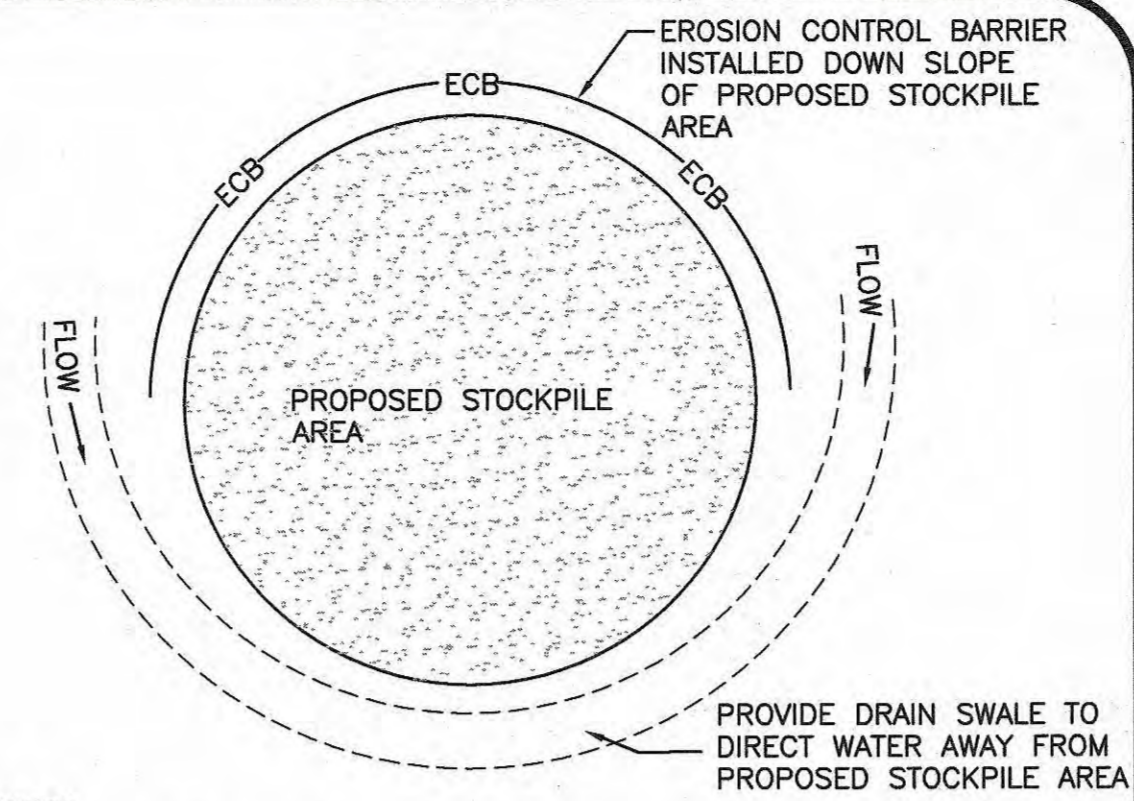
PIPE SIZE	No. LACING RODS
4", 6" & 8"	2 - 3/4"
10" & 12"	4 - 3/4"
16"	4 - 3/4"
20"	6 - 3/4"

* STANDARD LENGTHS ARE 6' & 10'. COUPLINGS MAY BE USED FOR LONGER LENGTHS.

- NOTES:
- NUMBER OF LACING RODS IS BASED ON MAXIMUM PRESSURE OF 125 P.S.I. IN MAIN.
 - EYE-BOLTS AND LACING RODS ARE TO BE FABRICATED FROM A-36 STEEL.
 - STEEL LACING RODS SHALL HAVE A YIELD STRESS OF NOT LESS THAN 36,000 P.S.I.
 - EYE-BOLTS SHALL HAVE A MINIMUM TENSILE STRENGTH OF 7,000 LBS. EACH.

MECHANICAL JOINT LACING DETAIL
NOT TO SCALE

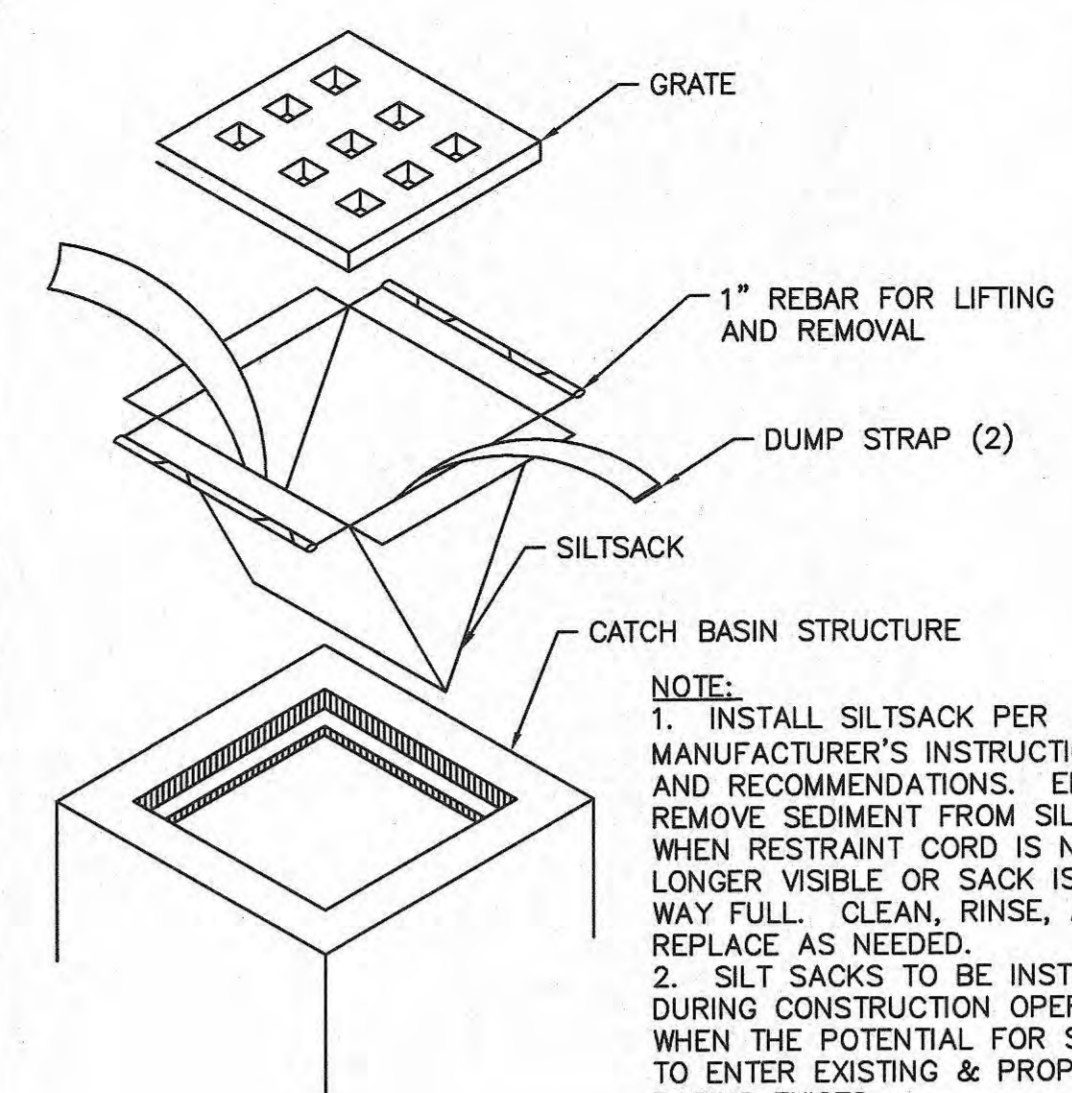
2



- NOTES:
- SOIL AND FILL STOCKPILES EXPECTED TO REMAIN IN PLACE FOR LESS THAN 90 DAYS SHALL BE COVERED WITH STRAW AND MULCH (AT 100 LBS/1,000 S.F.), OR WITH AN ANCHORED TARP WITHIN 7 DAYS OR PRIOR TO ANY RAINFALL.
 - SOIL AND FILL STOCKPILES EXPECTED TO REMAIN IN PLACE FOR 90 DAYS OR MORE SHALL BE SEEDED WITH WINTER RYE (FOR FALL SEEDING AT 1LB/1,000 SF) OR OATS (FOR SUMMER SEEDING AT 2LB/1,000 SF) AND THEN COVERED WITH HAY MULCH (AT 100LB/1,000 SF) OR AN ANCHORED TARP WITHIN 7 DAYS OR PRIOR TO ANY RAINFALL.

STOCKPILE PROTECTION
NOT TO SCALE

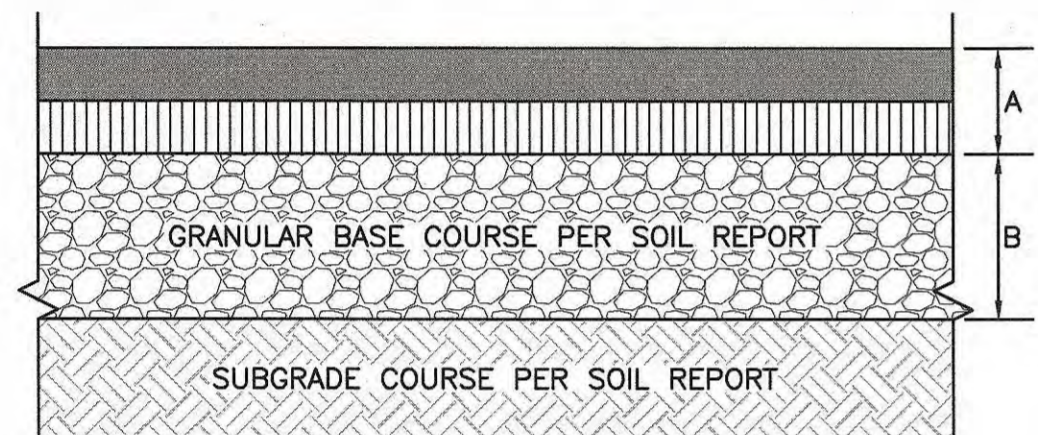
3



- NOTE:
- INSTALL SILTSACK PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. EMPTY OR REMOVE SEDIMENT FROM SILTSACK WHEN RESTRAINT CORD IS NO LONGER VISIBLE OR SACK IS HALF WAY FULL. CLEAN, RINSE, AND REPLACE AS NEEDED.
 - SILT SACKS TO BE INSTALLED DURING CONSTRUCTION OPERATIONS WHEN THE POTENTIAL FOR SEDIMENT TO ENTER EXISTING & PROPOSED BASINS EXISTS.

SILTSACK INLET DETAIL
NOT TO SCALE

4



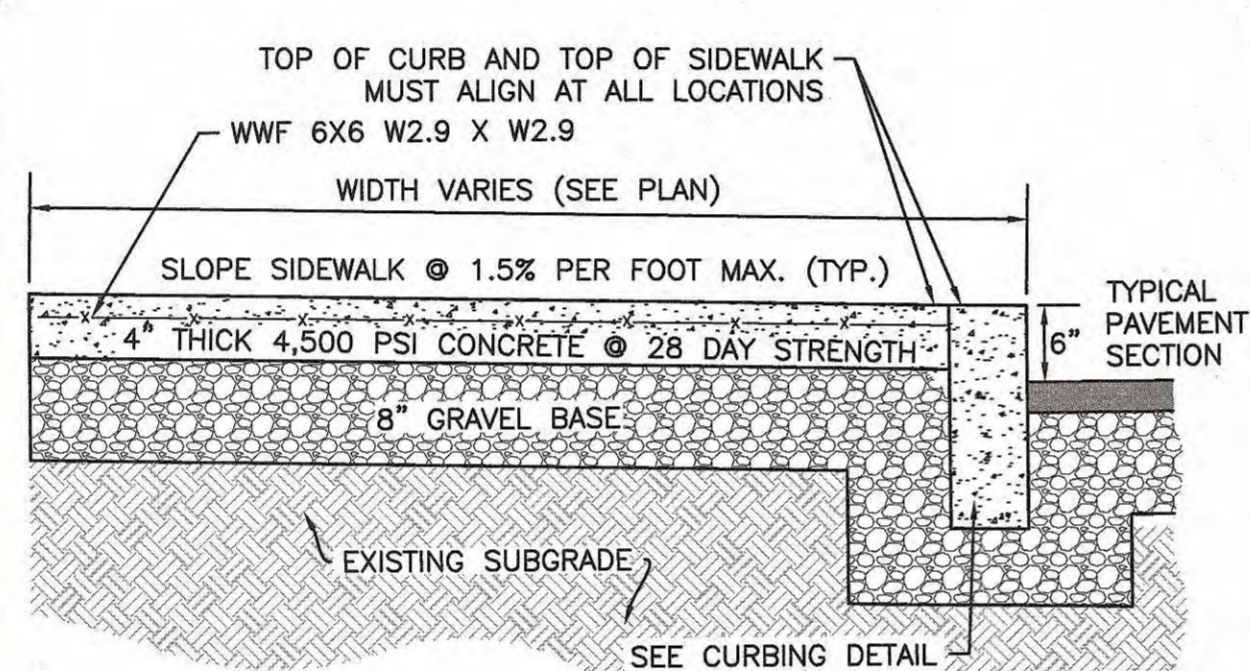
NOTES:

- COMPACT SOIL SUBGRADE UNIFORMLY TO AT LEAST 95 PERCENT OF ASTM D1557 LABORATORY DENSITY.
- PROOF-ROLL PREPARED SUBGRADE TO IDENTIFY SIFT POCKETS AND AREAS OF EXCESS YIELDING. EXCAVATE SOFT SPOTS, UNSATISFACTORY SOILS, AND AREAS OF EXCESSIVE PUMPING OR RUTTING, AND REPLACE WITH COMPACTED BACKFILL OR FILL AS DIRECTED.
- CONTRACTOR SHALL COORDINATE SURFACE, BINDER, BASE, AND SUBBASE COURSES WITH GEOTECHNICAL OR SOILS REPORT. IF AVAILABLE, REFER TO REPORT FOR RECOMMENDATIONS FOR LOCAL SOILS OR DRAINAGE CONDITIONS AND/OR METHODS.
- BASE COURSE SHALL EXTEND 6 INCHES BEYOND PAVEMENT EDGE WHERE PAVEMENT DOES NOT ABUT CURB, WALL, STEPS, OR FIXED OBJECT.
- PAVEMENT EDGES SHALL BE TAMPED WHERE PAVEMENT DOES NOT ABUT CURB, WALL, STEPS, OR FIXED OBJECT.

STANDARD DUTY PAVING
A = 1.5" ASPHALT CONCRETE - SURFACE COURSE (M3.11.03, TABLE A, TOP COURSE)
1.5" ASPHALT CONCRETE - BINDER COURSE (M3.11.03, TABLE A, BINDER COURSE)
B = 12" GRANULAR BASE COURSE - M1.03.1, PROCESSED GRAVEL FOR SUBBASE

STANDARD DUTY BITUMINOUS PAVEMENT
NOT TO SCALE

5



NOTES:

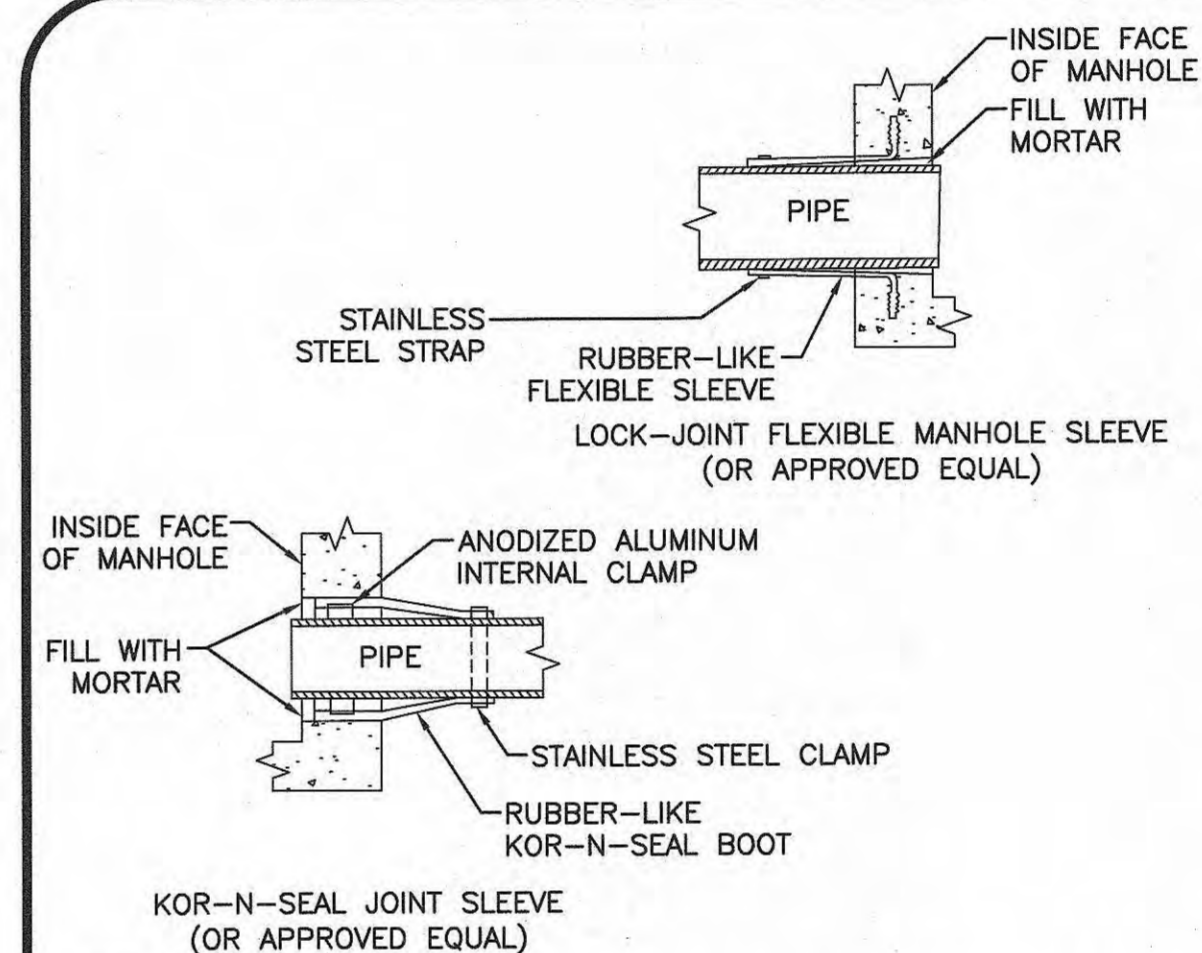
- SIDEWALK TO HAVE TOOLED JOINTS IN A 5' x 5' (TYP.) GRID WITH EXPANSION JOINTS 15' ON CENTER AND PREMOLDED FILLER
- TOOLED JOINT 6" FROM FACE OF CURB
- SEE PLAN FOR ELEVATIONS AT CURB
- SIDEWALK CROSS SLOPE TO BE 1.5% MAX & SIDEWALK LONGITUDINAL SLOPE TO BE 4.5% MAX, TYP.

CONCRETE SIDEWALK WITH CURB
NOT TO SCALE

6

UNUSED
NOT TO SCALE

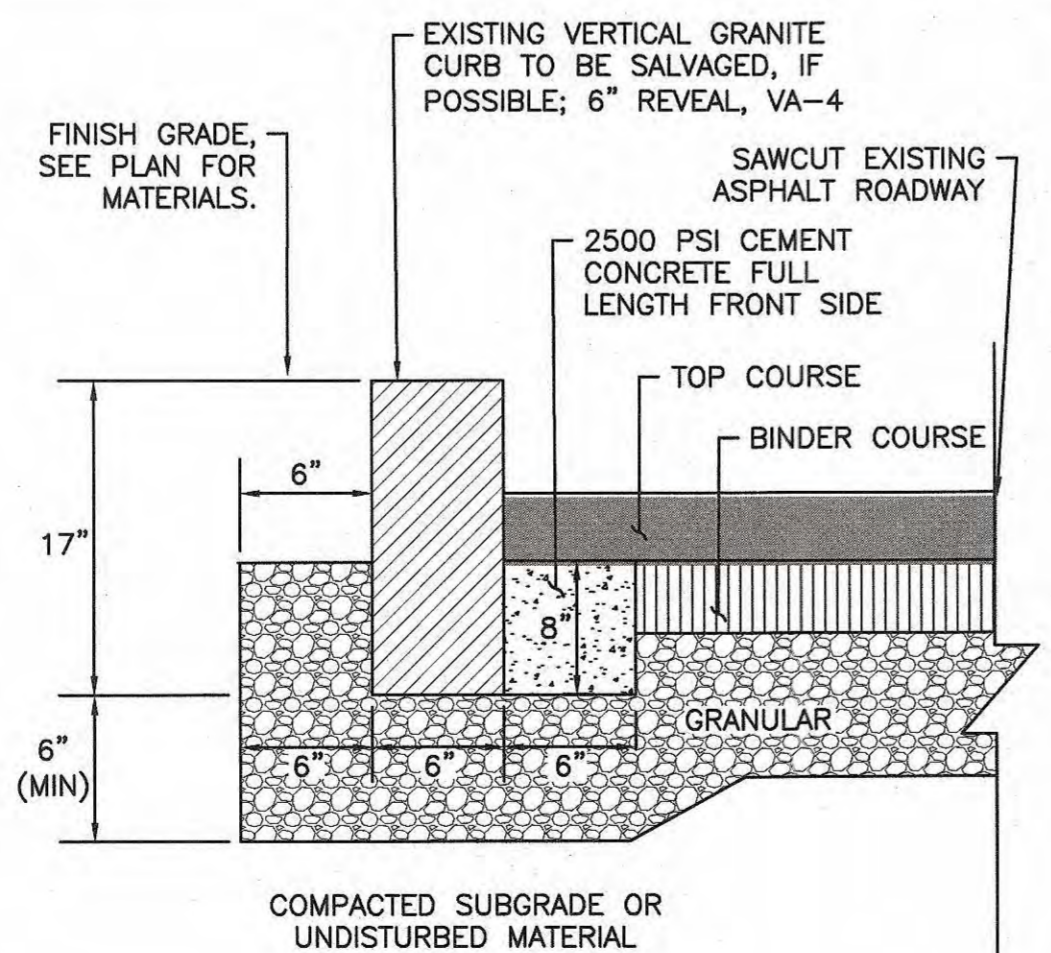
7



- NOTE:
- PIPE TO MANHOLE JOINTS SHALL BE ONLY AS APPROVED BY THE ENGINEER AND IN GENERAL, WILL DEPEND FOR WATER TIGHTNESS UPON ELASTOMETRIC SEALANT
 - NON-SHRINKING MORTAR SHALL ONLY BE USED WHERE SPECIFICALLY APPROVED BY THE ENGINEER.

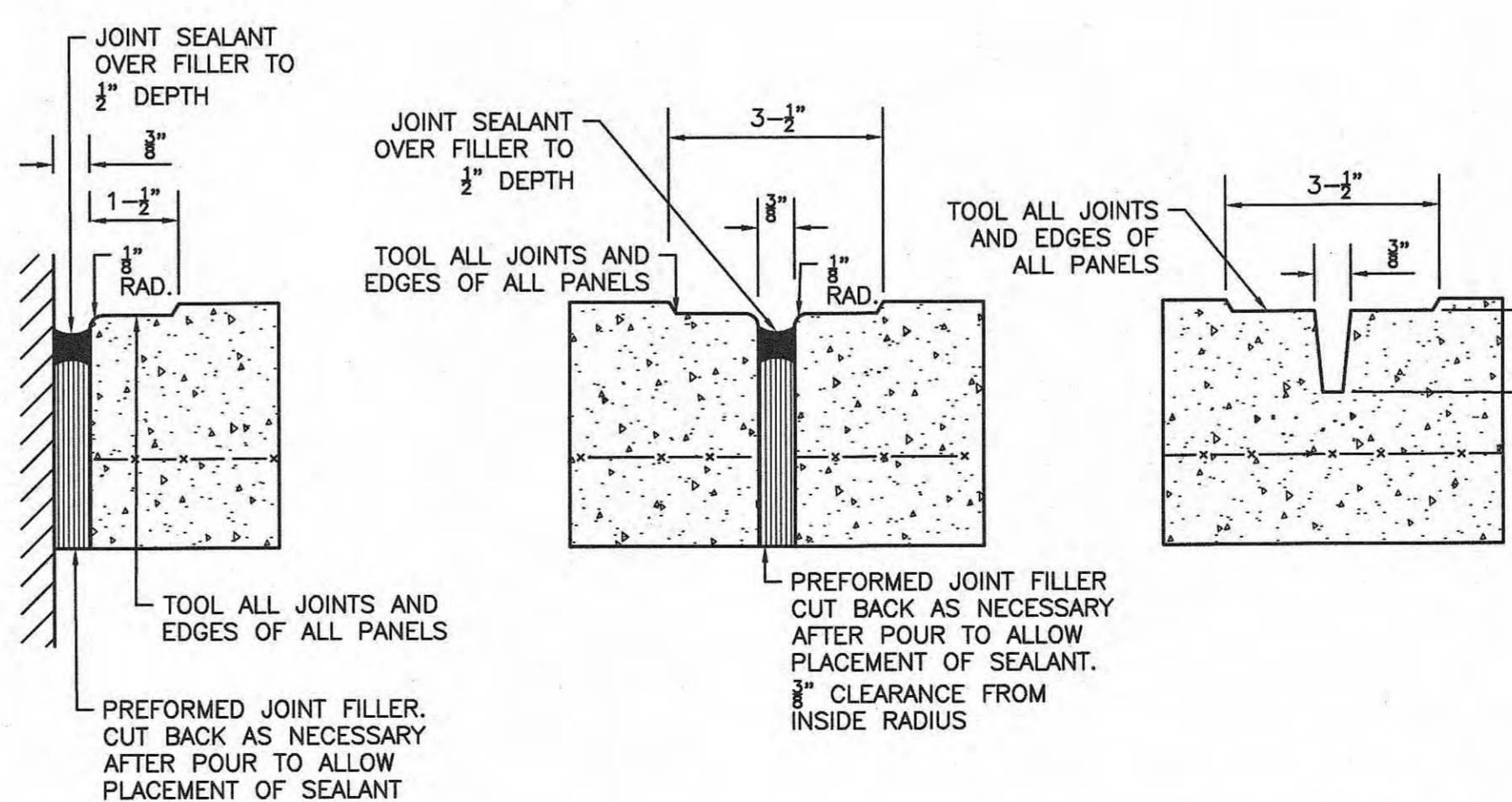
PIPE CONNECTIONS TO SEWER MANHOLE
NOT TO SCALE

8



VERTICAL GRANITE CURB
NOT TO SCALE

9



EXPANSION JOINT AT FIXED OBJECTS DETAIL

EXPANSION JOINT DETAIL

CONTROL JOINT DETAIL

CONCRETE SIDEWALK JOINTS
NOT TO SCALE

9

- NOTES:
- PROVIDE EXPANSION JOINTS AT MIN. 15' O.C. MIN.
 - PROVIDE CONTROL JOINTS AT 5' O.C. UNLESS SHOWN OTHERWISE.
 - PROVIDE BROOM FINISH IN DIRECTION PERPENDICULAR TO DIRECTION OF TRAVEL.
 - CEMENT CONCRETE SHALL BE 4,500 PSI AIR ENTRAINED.
 - REFER TO LANDSCAPING PLANS FOR ADDITIONAL JOINTS.
 - JOINT FILLERS SHALL BE RESILIENT PREMOLDED BITUMINOUS IMPREGNATED FIBERBOARD. SUBMIT SHOP DRAWINGS.
 - JOINT SEALANTS SHALL BE NON-PRIMING POURABLE SELF-LEVELING TYPE. SUBMIT SHOP DRAWINGS.
 - ALL CURBS TO HAVE 3/8" EXPANSION JOINTS AT MAXIMUM 100 FEET WITH DOWELS AND CONTROL JOINTS AT MAXIMUM 15 FEET



PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	04-14-2021	REVISED PER TOWN COMMENT

APPLICANT/OWNER:

SAVERIO P. FULCINITI
PO BOX 4449
PEABODY, MA 01960

PROJECT:

97-99 WATER STREET
WAKEFIELD, MA

PROJECT NO. 2398-05 DATE: 02-09-2021

SCALE: AS SHOWN DWG. NAME: CIVIL

DESIGNED BY: SJL CHECKED BY: CMQ

PREPARED BY:



ALLEN & MAJOR ASSOCIATES, INC.

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environmental consulting • landscape architecture
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DETAILS

SHEET No.

C-501

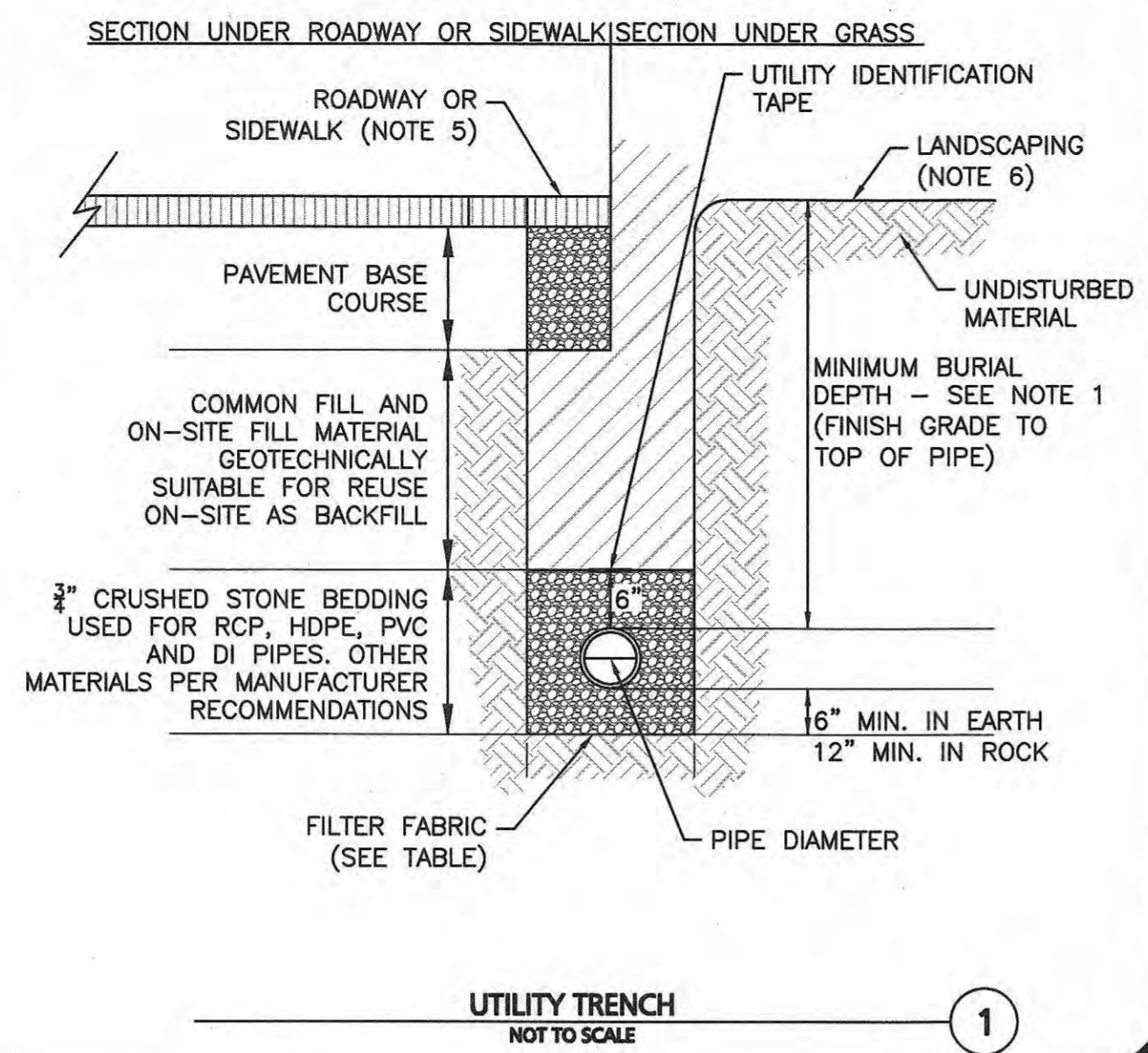
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NOTES:

- MINIMUM BURIAL DEPTH (FINISH GRADE TO TOP OF PIPE)
GRAVITY PIPE (SEWER & DRAIN) - SEE PLAN OR PROFILE
PRESSURE PIPE UNDER PAVING - 4'
PRESSURE PIPE BENEATH UNPAVED - 3'
WATER PIPE - 5'
- WHERE BACKFILL IS DESIGNATED AS COMPACTED, THIS MEANS 90 TO 95% STANDARD PROCTOR, AASHTO T-99. ALL FILL PLACED BELOW PIPES AND STRUCTURES MUST MEET THIS REQUIREMENT.
- TRENCHES WITHIN PUBLIC RIGHT OF WAY MAY REQUIRE FLOWABLE FILL. VERIFY WITH MUNICIPAL ENGINEER.
- WHERE WASTE FILLS ARE ENCOUNTERED AT SUBGRADE LEVEL FOR NEW UTILITIES, THE FILL SHOULD BE OVER-EXCAVATED, THE SUBGRADE SHOULD BE RE-COMPACTED, AND BACKFILL CONSISTING OF PIPE BEDDING MATERIAL, CRUSHED STONE OR OTHER SUITABLE GRANULAR FILL SHOULD BE PLACED TO A SUFFICIENT DEPTH TO CREATE A FIRM AND STABLE SUBGRADE (TYPICALLY 12 TO 18 INCHES OVER-EXCAVATION).
- REFER TO PAVING, CURBS, WALKS AND DRIVEWAY DETAILS.
- REFER TO LANDSCAPING DETAILS.

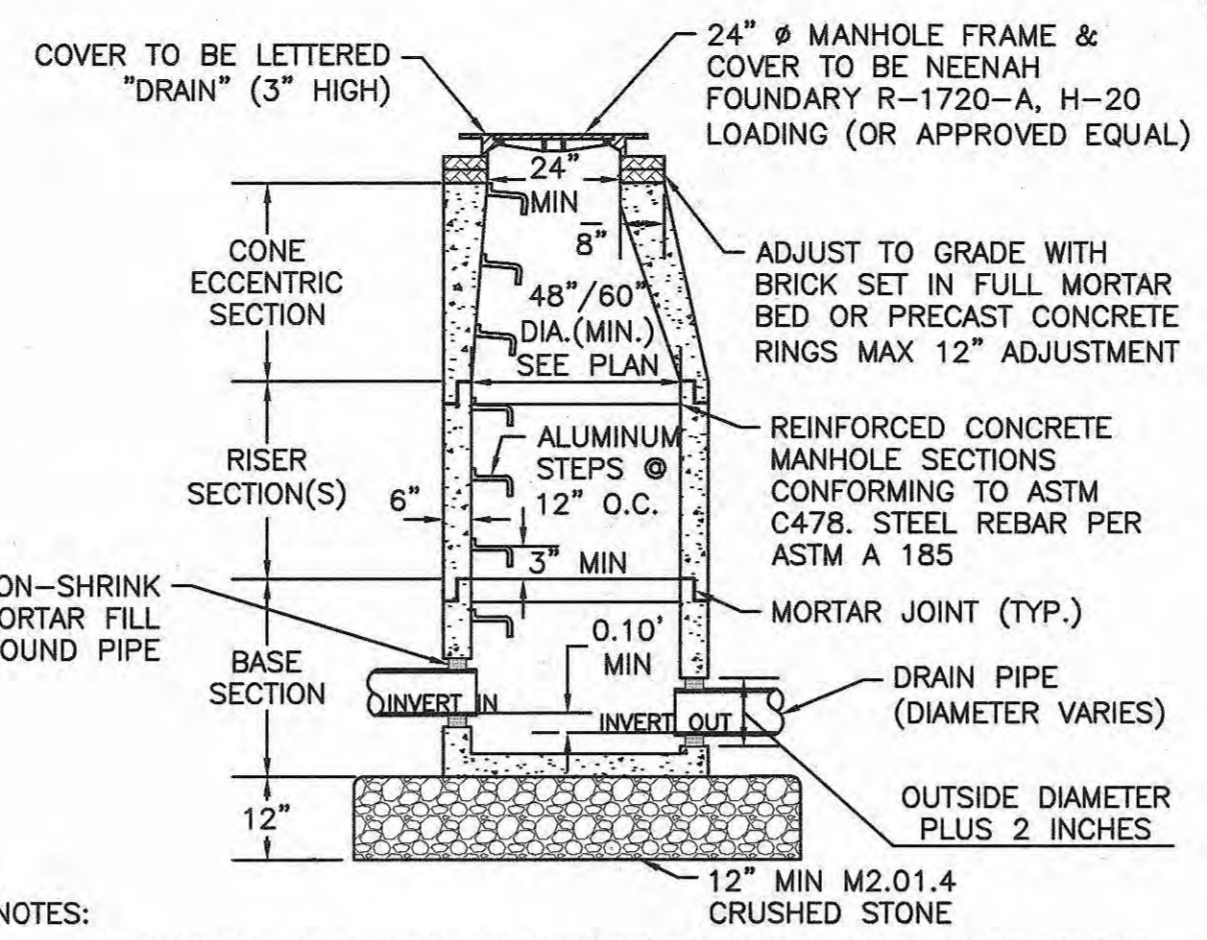
FILTER FABRIC USE

	SOIL TYPE	
	SILT OR CLAY	GRANULAR SOIL
ABOVE GROUND WATER	FILTER FABRIC NOT REQUIRED	FILTER FABRIC NOT REQUIRED
BELOW GROUND WATER	FILTER FABRIC REQUIRED	FILTER FABRIC NOT REQUIRED



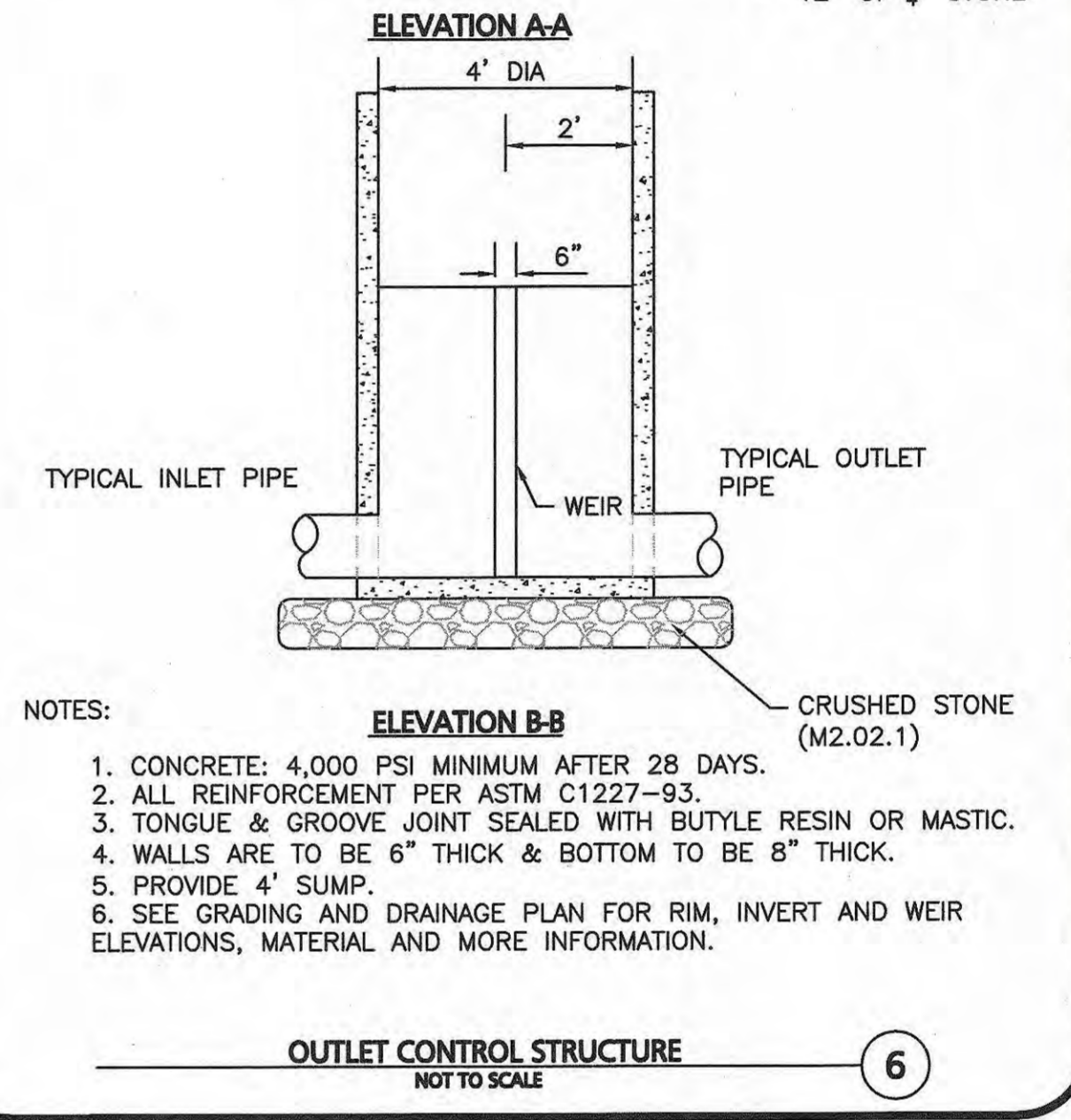
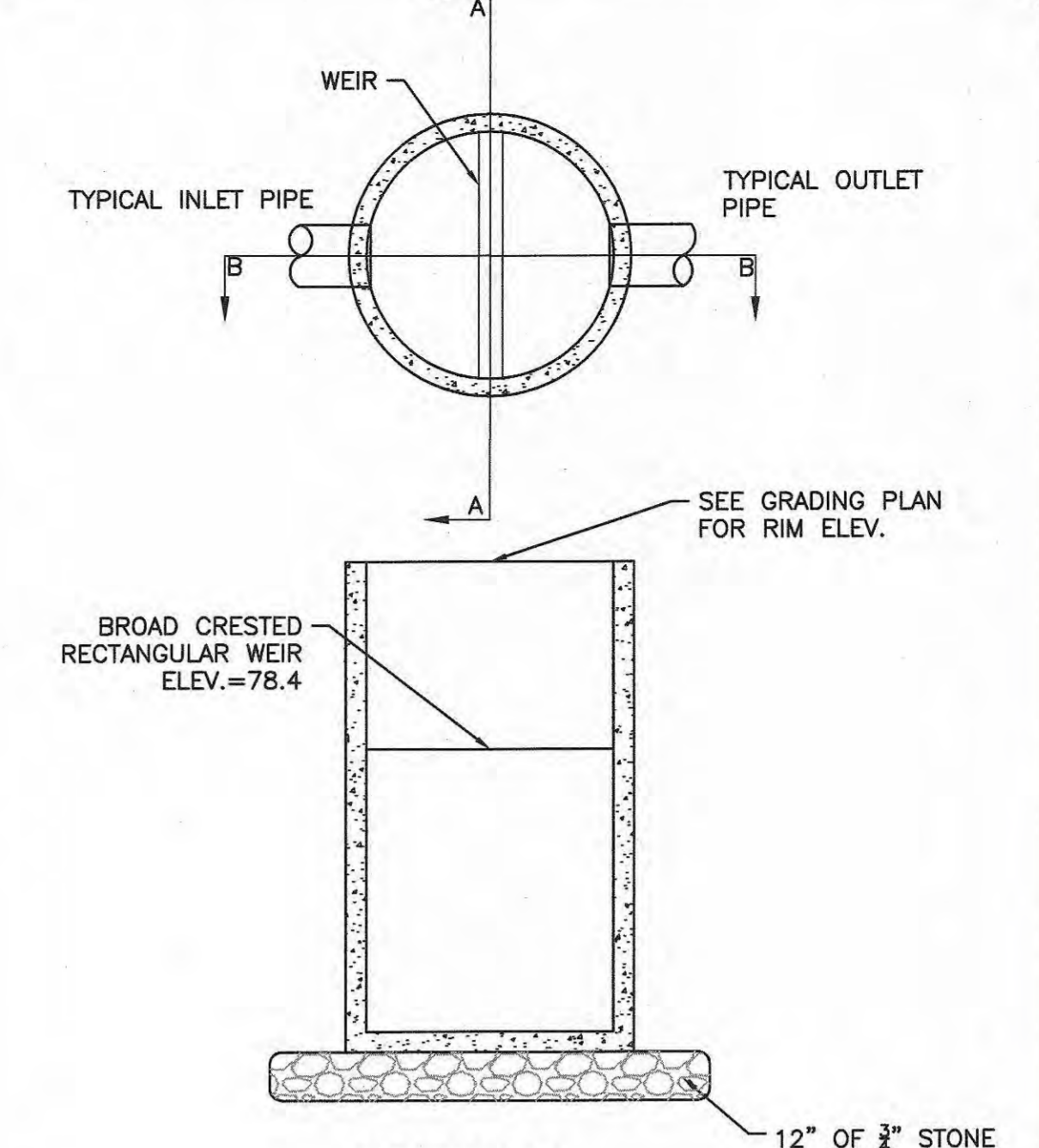
UTILITY TRENCH
NOT TO SCALE

1



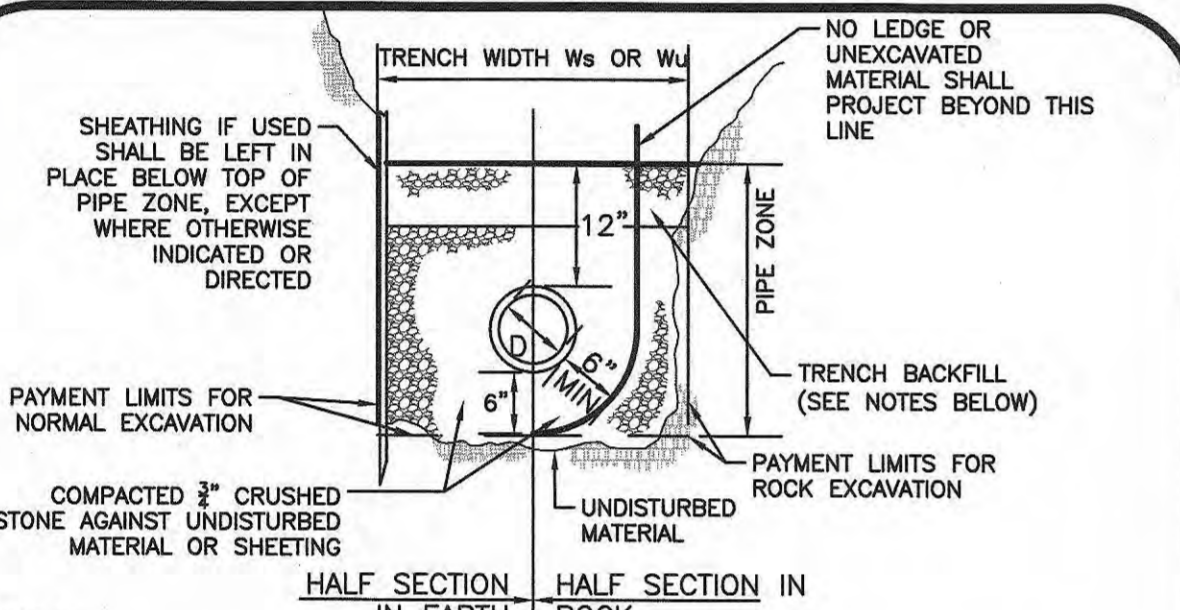
4' & 5\"/>

2



OUTLET CONTROL STRUCTURE
NOT TO SCALE

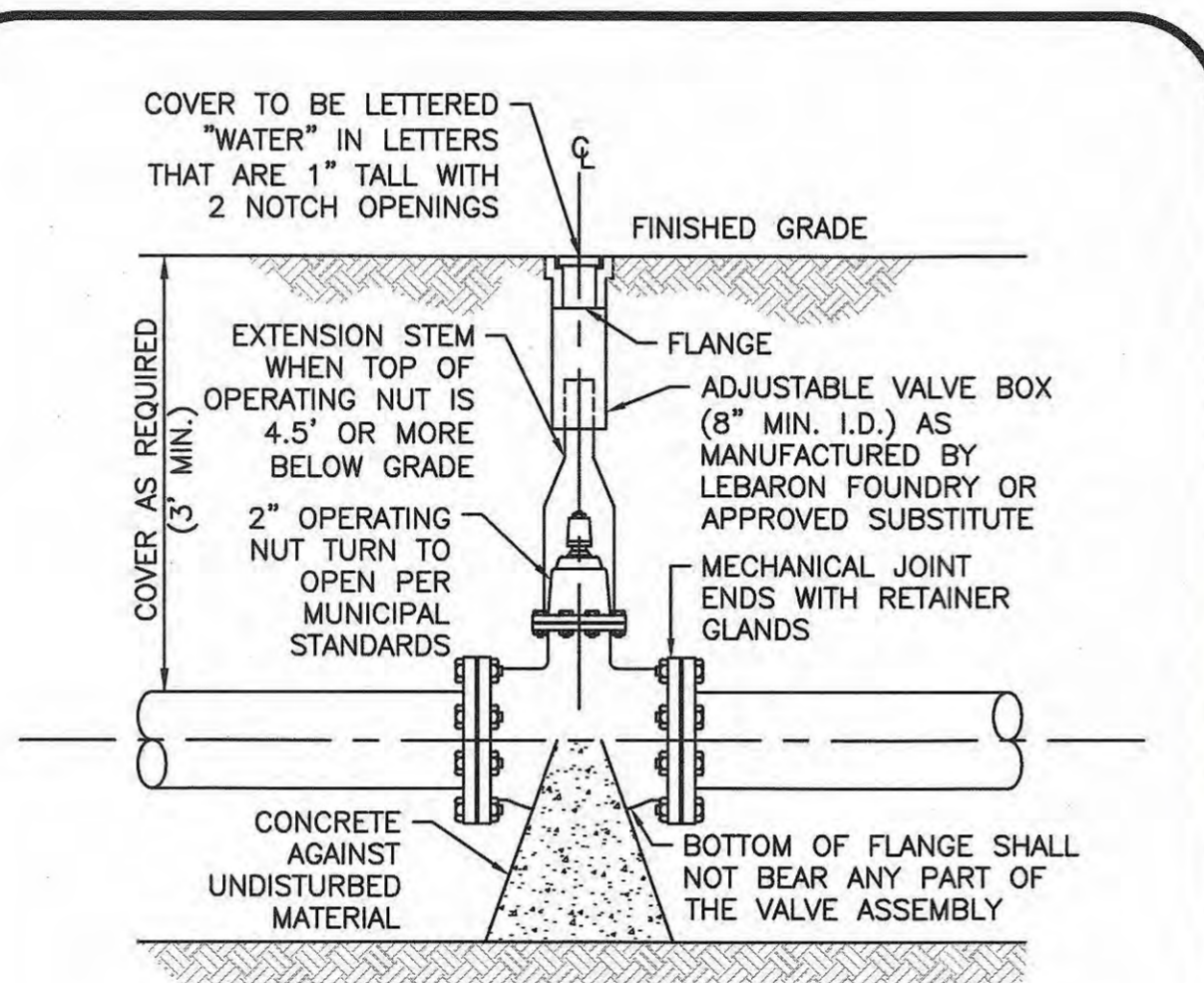
6



- NOTES:**
- TRENCH BACKFILL TO BE USED WITHIN THE RIGHT-OF-WAY SHALL CONSIST OF EITHER GRAVEL BORROW MEETING MHD SPECIFICATION M1.03.0, TYPE "B" OR PROCESSED GRAVEL BORROW FOR SUBBASE MEETING MHD SPECIFICATION M1.03.1.
 - WHERE THE REMOVAL OF 100 SQUARE FEET OR LESS OF ASPHALT IS REQUIRED WITHIN THE RIGHT OF WAY, THEN THE TRENCH BACKFILL MATERIAL SHALL CONSIST OF CONTROLLED DENSITY FILL MEETING MHD SPECIFICATION M4.08.0, TYPE "1E" OR "2E".
 - TRENCH BACKFILL MATERIAL TO BE USED OF THE RIGHT-OF-WAY MAY CONSIST OF MATERIAL GENERATED DURING EXCAVATIONS PROVIDED ALL STONES GREATER THAN 4" ARE REMOVED PRIOR TO PLACEMENT AND COMPACTION.
 - GRANULAR TRENCH BACKFILL MATERIAL USED WITHIN THE RIGHT-OF-WAY SHALL BE PLACED IN MAXIMUM 6" LIFTS AND MECHANICALLY COMPACTED TO A MINIMUM OF 95% OF THE MATERIAL'S MAXIMUM DRY DENSITY AND TO 90% ELSEWHERE AS DETERMINED BY ASTM D 1557.

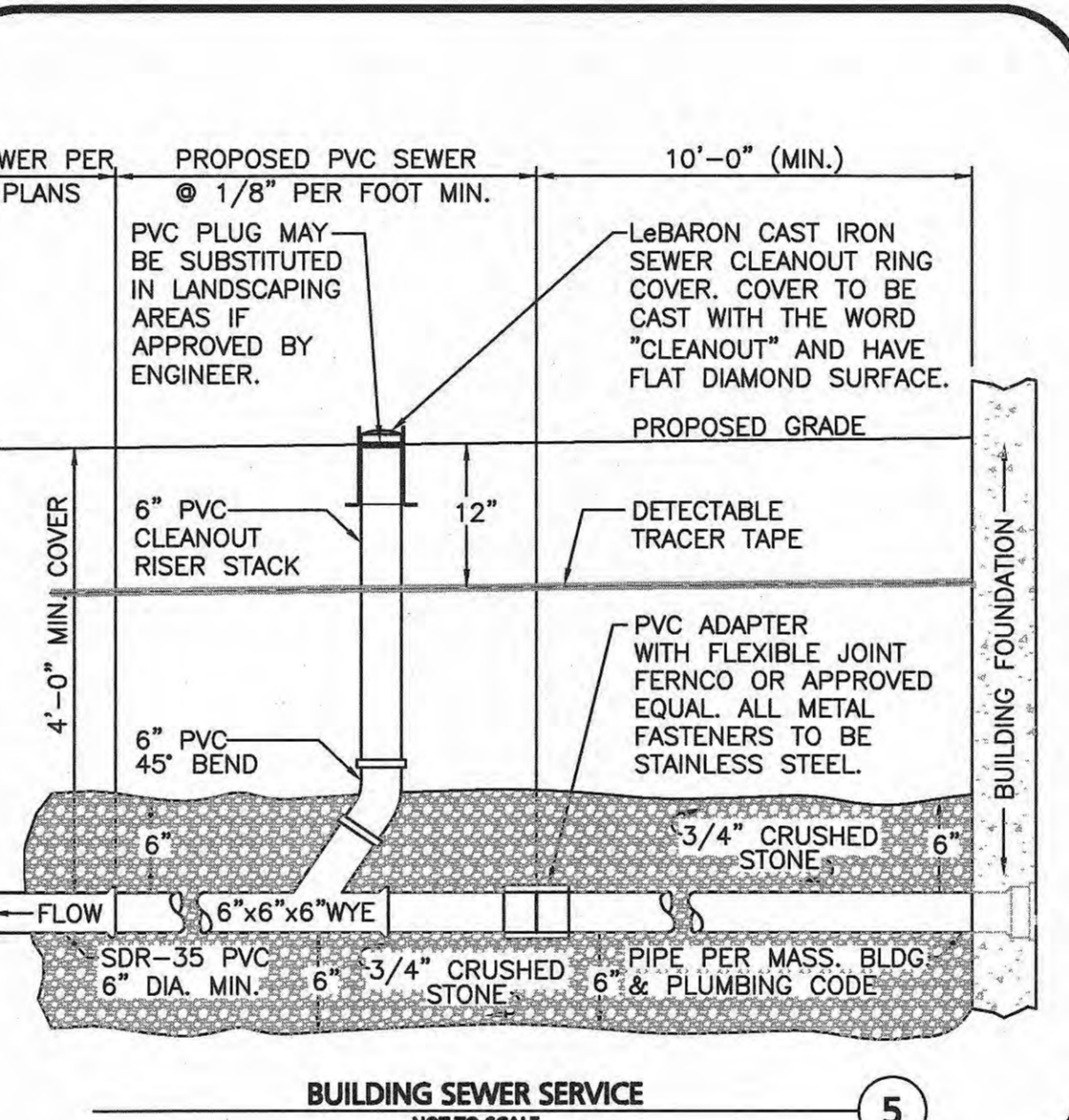
SEWER TRENCH
NOT TO SCALE

3



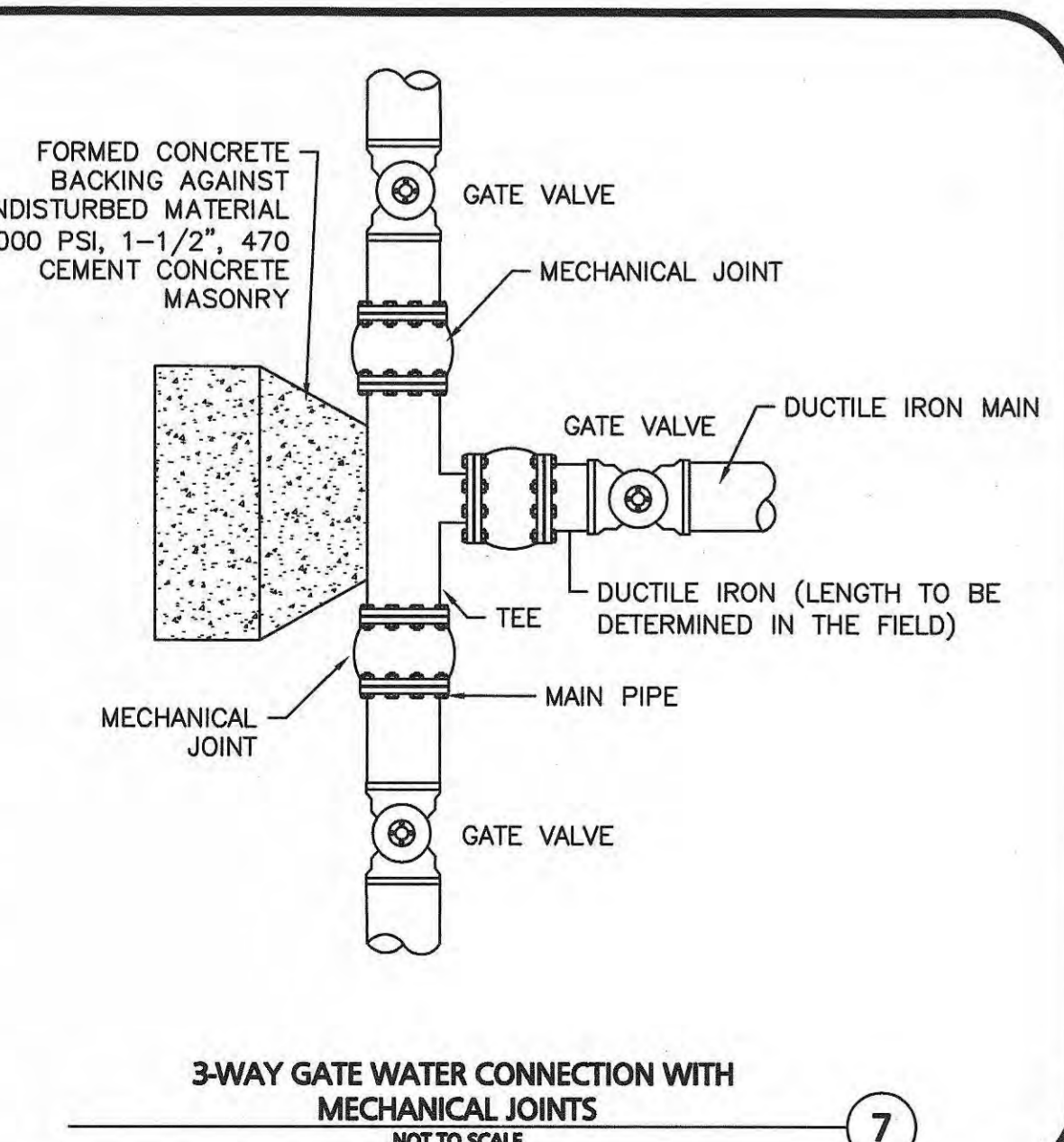
GATE VALVE
NOT TO SCALE

4



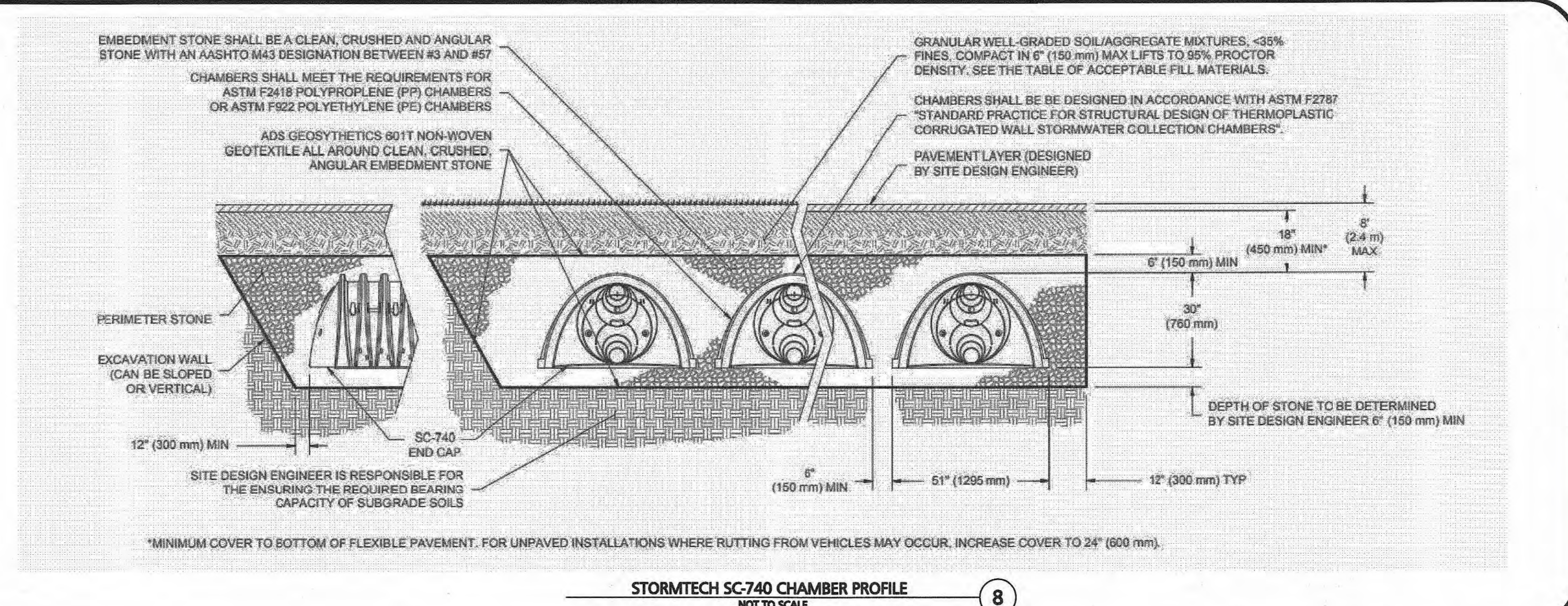
BUILDING SEWER SERVICE
NOT TO SCALE

5



3-WAY GATE WATER CONNECTION WITH MECHANICAL JOINTS
NOT TO SCALE

7



STORMTECH SC-740 CHAMBER PROFILE
NOT TO SCALE

8



PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
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SAVERIO P. FULCINITI
PO BOX 4449
PEABODY, MA 01960

PROJECT:
97-99 WATER STREET
WAKEFIELD, MA

PROJECT NO.	2398-05	DATE:	02-09-2021
SCALE:	AS SHOWN	DWG. NAME:	CIVIL
DESIGNED BY:	SIL	CHECKED BY:	CMQ

PREPARED BY:

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DRAWING TITLE: **DETAILS** SHEET No. **C-502**

PIPE MATERIAL NOTES:

1. NO-HUB CAST IRON WITH PRODUCT-APPROVED STAINLESS STEEL CLAMPS.
2. SERVICE WEIGHT CAST IRON WITH PRODUCT-APPROVED RESILIENT GASKETS OR LEAD AND OAKUM JOINTS.
3. EXTRA HEAVY CAST IRON WITH PRODUCT-APPROVED RESILIENT GASKETS OR LEAD AND OAKUM JOINTS.

MWRA INSPECTION NOTES:

1. AT LEAST 10 DAYS PRIOR TO INSTALLATION CONTRACTOR SHALL SUBMIT A "NOTIFICATION OF PROPOSED GAS/OIL SEPARATOR INSTALLATION" TO THE MWRA PER THE MASSACHUSETTS UNIFORM PLUMBING CODE AND THE MWRA'S SEWER USE REGULATIONS. FOR ADDITIONAL INFORMATION OR TO REQUEST AN INSPECTION PLEASE CONTACT THOMAS J. COFFEY, JR. (MWRA SOURCE COORDINATOR) @ (617)-305-5624.
2. PLUMBING SHALL BE INSTALLED, BUT STRUCTURE SHALL NOT BE BACKFILLED PRIOR TO MWRA INSPECTION.
3. MORTAR THE JOINTS (NO RUBBER BOOTS ALLOWED - HYDRAULIC CEMENT ONLY).
4. THE STRUCTURES SEAM MUST BE COMPLETELY VISIBLE AROUND THE ENTIRE STRUCTURE FOR INSPECTION. ADDITIONALLY THE AREA ONE FOOT BELOW THE OUTLET PIPE MUST ALSO BE VISIBLE. FOR INSPECTION.
5. OUTLET LINE SHALL BE PLUGGED (ON THE OUTSIDE) WHERE IT CAN BE REMOVED ONCE IT IS CONFIRMED THAT THE STRUCTURE HAS NO LEAKS

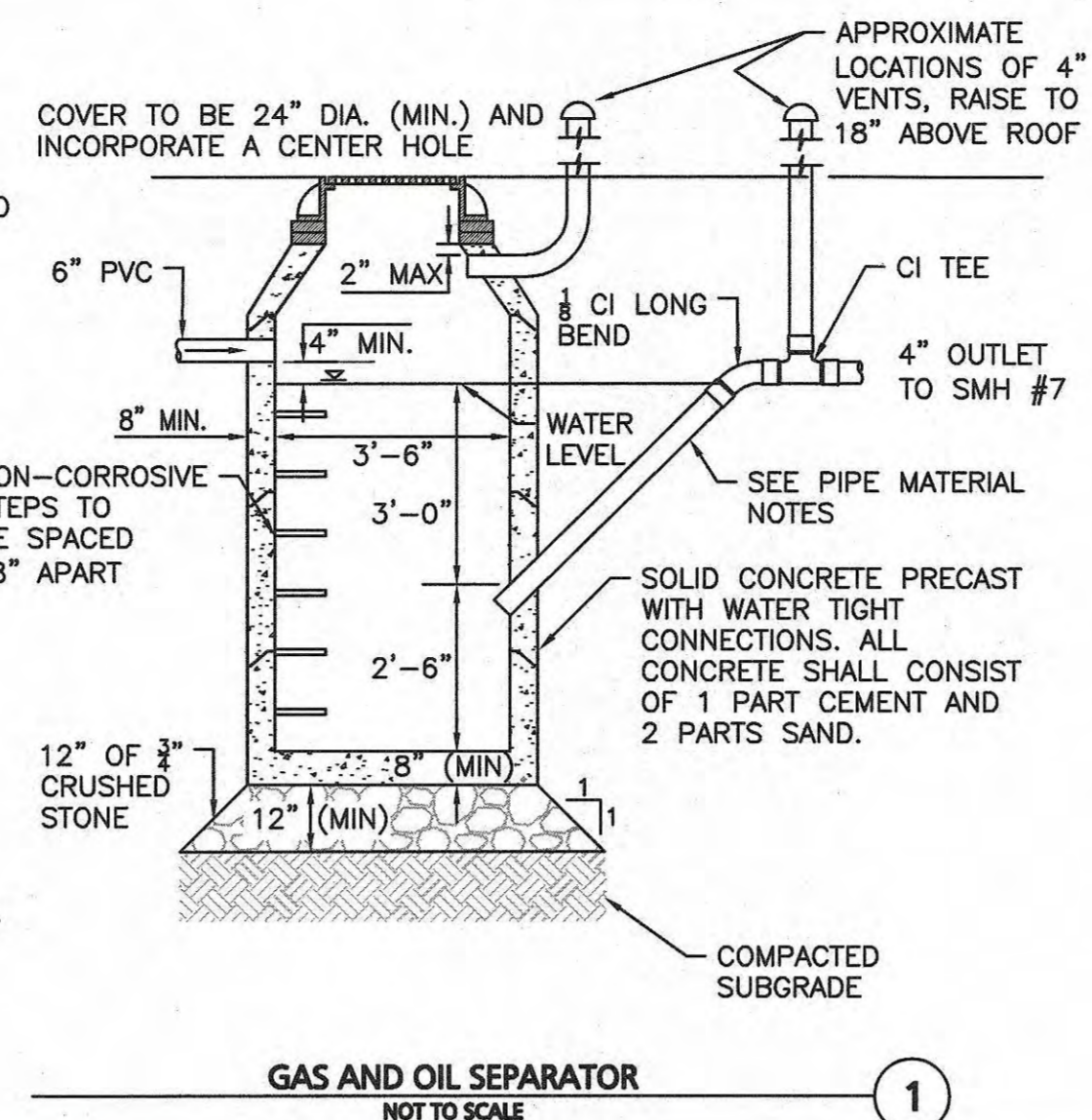
NOTES:

6. THE CONTRACTOR SHALL FILL THE STRUCTURE WITH WATER AND CONFIRM THAT THERE ARE NO LEAKS PRIOR TO SCHEDULING THE MWRA INSPECTION. THE CONTRACTOR SHOULD NOTE THAT THE MWRA INSPECTOR WILL BE SPECIFICALLY LOOKING AT THE OUTLET PIPE "45 DEGREE ANGLE" AND UNDERSTANDS THAT IT IS PARTICULARLY DIFFICULT TO SEAL. SO THE CONTRACTOR SHOULD BE CAREFUL WHEN MORTARING THE JOINT. NOTE THE INSPECTOR WILL WANT TO INSPECT THE CONNECTION WITH THE TANK 1' BELOW THAT JOINT.
7. ONCE ON SITE, THE INSPECTOR WILL FIRST INSPECT THE STRUCTURE COMPLETELY FULL TO INSURE IT HAS NO LEAKS. THE INSPECTOR WILL THEN REQUIRE THAT THE OUTLET PIPE PLUG BE REMOVED TO OBSERVE THE WATER LEVEL. THE WATER LEVEL MUST BE OBSERVED AT LEAST 4" BELOW THE INLET PIPE.

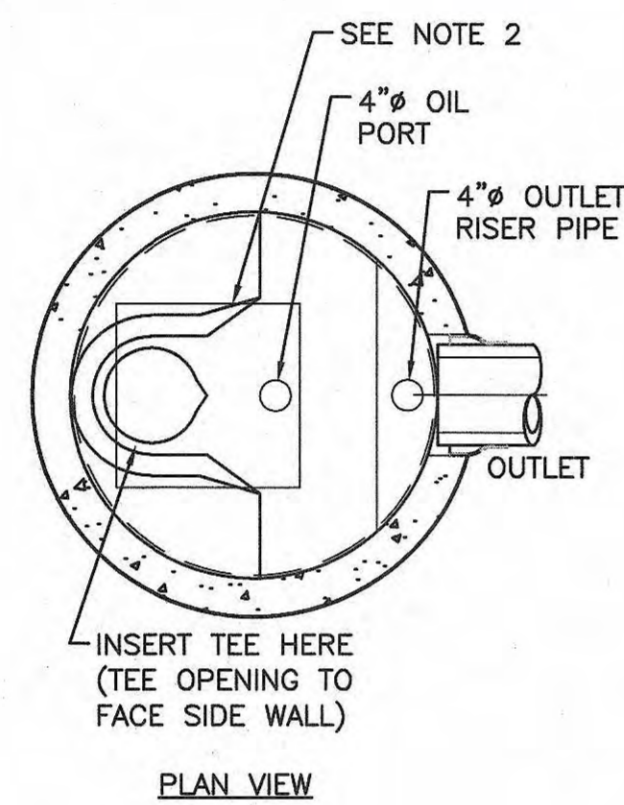
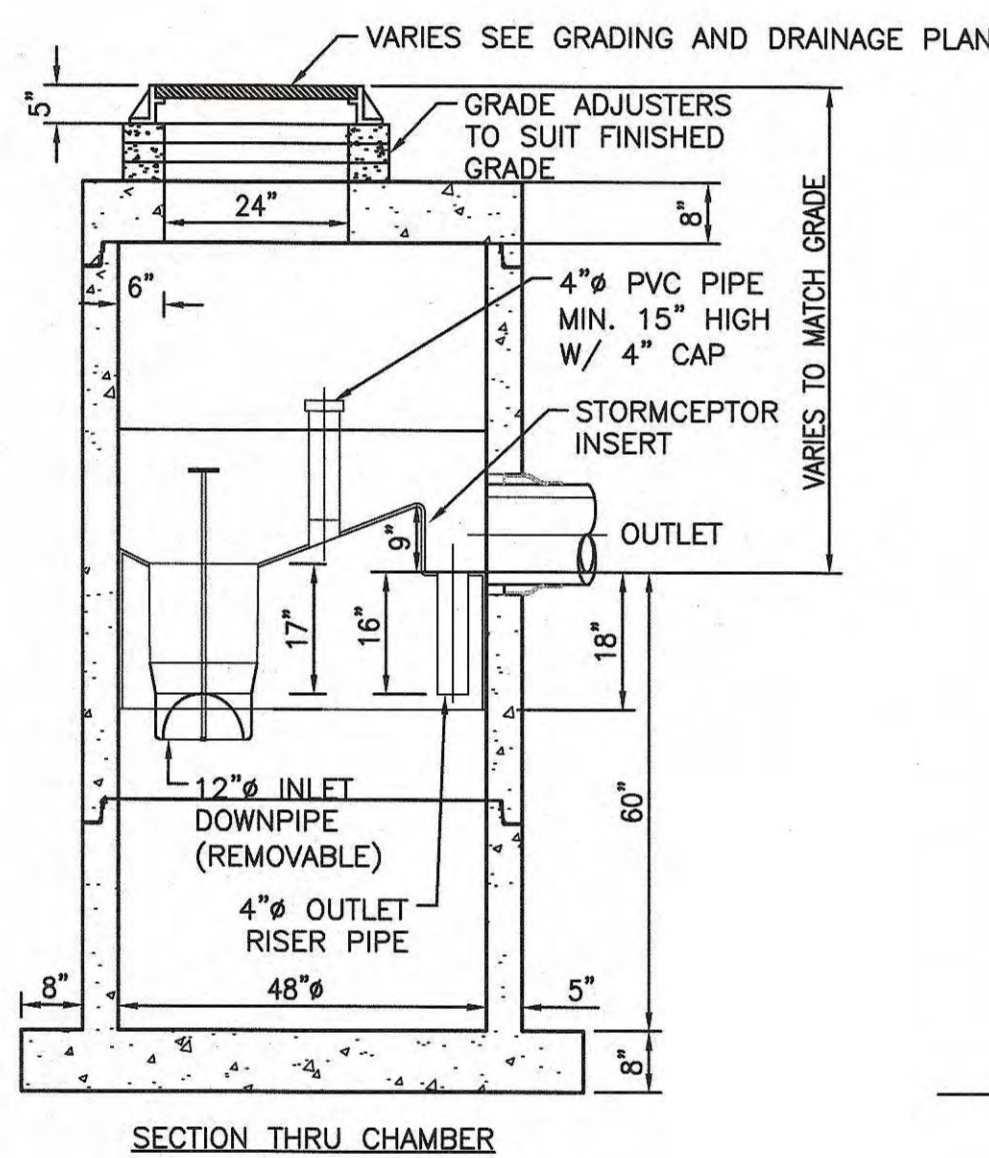
8. THE CONTRACTOR MUST HAVE A 2" PUMP ON-SITE DURING THE INSPECTION TO ALLOW THE INSPECTOR TO VERIFY THE INTERIOR MEASUREMENT OF THE TANK FOR CODE COMPLIANCE.
9. THE OUTLET PIPE MUST NOT STICK INTO THE STRUCTURE CHAMBER ANY MORE THAN ILLUSTRATED.

GENERAL CONSTRUCTION NOTES:

1. SEPARATOR TO BE LOCATED OUTSIDE WHERE POSSIBLE, WHEN LOCATED OUTSIDE, MANHOLE SHALL HAVE A CENTER HOLE.
2. SEPARATOR SHALL BE LOCATED AND CONSTRUCTED TO PREVENT SURFACE OR SUB-SURFACE WATER FROM ENTERING.
3. OUTLET TO BE BELOW FROST LINE.
4. SEPARATOR MUST BE FILLED WITH CLEAN WATER AND LEAK TESTED BEFORE BEING INTRODUCED INTO SERVICE.
5. OIL AND GAS TO BE REMOVED BEFORE CLEANING AND SHALL NOT BE DISCHARGED TO THE SEWER THROUGH ANY FIXTURES.
6. INLET SHALL BE SET A MINIMUM OF THREE FEET BELOW GRADE



GAS AND OIL SEPARATOR
NOT TO SCALE 1



STORMCEPTOR ST-450i
NOT TO SCALE

GENERAL NOTES:

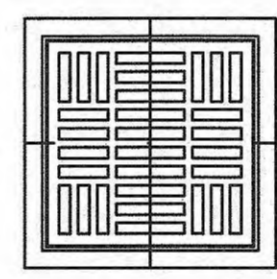
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
3. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING.
4. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES:

- A. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
- B. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
- C. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
- D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.



FRAME AND COVER



FRAME AND GRATE

DETAILS PROVIDED BY:
CONTECH
ENGINEERED SOLUTIONS LLC
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45389
600-338-1122 513-646-7000 513-646-7903 FAX

WATER QUALITY INLET
NOT TO SCALE 2



PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

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PROJECT NO.	2398-05	DATE:	02-09-2021
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DRAWING TITLE:	SHEET No.
DETAILS	C-503

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MEMORANDUM

TO: Mr. Saverio Fulciniti
ACG RE Reading, LLC
P.O. Box 4449
Peabody, MA 01960

FROM: Mr. Shaun P. Kelly ^{SPK}
Associate
Vanasse & Associates, Inc.
35 New England Business Center Drive
Suite 140
Andover, MA 01810
(978) 474-8800

DATE: April 9, 2021

RE: 8944

SUBJECT: Traffic and Parking Analysis
Proposed Residential Development
97-99 Water Street
Wakefield, Massachusetts

INTRODUCTION

As requested, Vanasse & Associates, Inc. (VAI) has prepared a traffic and parking analysis for the proposed mixed-use redevelopment to be located at 97-99 Water Street in Wakefield, Massachusetts. The proposed project would replace an existing one-story, two unit residential building with a proposed three-story building that would accommodate a mix of residential and ground level commercial space.

As documented in this assessment, the project is expected to result in minimal increase to area traffic on both a daily and peak hour basis. The proposed parking supply is adequate to accommodate the peak demand for the residential uses, with adequate on-street parking provided in close proximity of the site to accommodate the limited commercial space. The proposed access plan, including modifications to the Wakefield Avenue alignment have been properly designed to allow safe access to the project for both vehicular and pedestrian traffic.

PROPOSED PROJECT

The proposed project would replace an existing one-story, two unit residential building with a proposed three-story building that would accommodate four two bedroom apartments, as well as 999 square feet (sf) of ground level commercial space. A total of six (6) parking spaces would be provided for exclusive use of the residents of the project, including four (4) garage spaces and two (2) on-site surface spaces. Access to the parking garage and surface spaces is proposed via a new 22-foot driveway from the eastern side of Wakefield Avenue. The location of the project site, relative to the surrounding transportation system is displayed in Figure 1.

RESIDENTIAL PARKING REQUIREMENTS

Town of Wakefield Zoning (Section 190-41.B) requires 1.5 spaces per residential unit for multifamily attached dwellings that provide 2 bedrooms or fewer. This equates to a requirement of six (6) parking



Figure 1 – Site Location Map

spaces to accommodate the proposed residential use.

Additionally, data provided by the Institute of Transportation Engineers (ITE) as part of the *Parking Generation* manual¹ was reviewed to identify the anticipated peak demand for the residential units. The ITE data indicates that multi-family housing located within 0.5-mile of transit service requires 1.25 parking spaces per unit on average, for a total residential parking demand of five (5) space. As such, the proposed parking supply of six (6) spaces is adequate to accommodate the peak residential demand for the project.

COMMERCIAL PARKING

The project will only accommodate a small 999 sf commercial space. The expected retail use will be community focused such as food, entertainment, or personal services. Given the location of the project, the retail space is expected to rely heavily upon existing foot traffic in the area. For mixed-use developments where the commercial component includes small businesses, whose total parking requirement is less than or equal to four (4) spaces based on a 1 space per 250 sf ratio, the Wakefield Zoning code (Section 190-36.B3) allows for an off-street parking exemption.

In addition, on-street parking proximate to the project exists with unrestricted parking provided on the eastern side of Wakefield Avenue and northern side of Water Street with one-hour parking provided along the southern side of Water Street. It is expected that this available off-street parking is adequate to accommodate the minimal parking demand expected to be generated by the limited commercial space.

¹*Parking Generation*, Fifth Edition; Institute of Transportation Engineers; Washington, DC; January 2019.

TRIP GENERATION

In order to develop the traffic characteristics of the proposed project, trip-generation statistics published by the ITE for LUC 220, *Multifamily Housing (Low-Rise)* and LUC 820, *Shopping Center* were utilized. The land use codes represent the appropriate categories for the existing and proposed use of the site. A summary of the expected vehicle trip generation during the critical weekday morning and weekday evening peak commuter hours is provided in Table 1.

Table 1
TRIP GENERATION SUMMARY

Time Period/ Directional Distribution	Proposed Residential Trips ^a	Proposed Commercial Trips ^b	Existing Residential Trips ^c	Total New Trips
<i>Weekday Morning</i>				
<i>Peak Hour:</i>				
Entering	0	1	-0	1
<u>Exiting</u>	<u>2</u>	<u>0</u>	<u>-1</u>	<u>1</u>
Total	2	1	-1	2
<i>Weekday Evening</i>				
<i>Peak Hour:</i>				
Entering	1	2	-1	2
<u>Exiting</u>	<u>1</u>	<u>2</u>	<u>-0</u>	<u>3</u>
Total	2	4	-1	5

^aBased on ITE LUC 220, Multi-Family Housing (Low-Rise) applied to 4 units.

^bBased on ITE LUC 820, Shopping Center applied to 999 sf.

^cBased on ITE LUC 220, Multi-Family Housing (Low-Rise) applied to 2 units.

As summarized in Table 1, in comparison to the existing use of the project site, the proposed redevelopment project is expected to generate 2 new vehicle trips (1 vehicle entering and 1 vehicle exiting) during the weekday morning peak-hour and 5 new vehicle trips (2 vehicles entering and 3 vehicles exiting) expected during the weekday evening peak hour. This minimal level of traffic increase is not expected to result in any notable impact to area traffic operations and falls within the level of daily fluctuation of traffic flow along the corridors serving the site. It is also noted that these projections are likely conservative given that a percentage of residential traffic will likely include walking trips to nearby bus and commuter rail service provided by the Massachusetts Bay Transit Authority (MBTA) and well as a percentage of the commercial trips occurring via walking trips.

SITE LAYOUT AND CIRCULATION

VAI has reviewed the proposed site layout and circulation plan. The proposed site access driveway onto Wakefield Avenue is adequately sized to accommodate entering and exiting movements to the residential parking spaces. The site layout proposes modifications to the existing curb line along Wakefield Avenue. Proposed modifications will include increasing the radius at the eastern corner of Wakefield Avenue and Water Street which will improve the turning area for vehicles making a right-turn from Wakefield Avenue to Water Street. It is recommended that the proposed sidewalk and wheelchair ramp be designed and constructed to meet applicable Americans with Disabilities Act (ADA) design criteria, including provision

of a five foot sidewalk along the site frontage.

CONCLUSION

In summary, the proposed 6 parking spaces are adequate for the proposed project and the 999 sf of commercial space is expected to have a minimal impact to on-street parking in the vicinity of the site. In terms of traffic impact, there will be a minimal amount of peak-hour traffic associated with the project, with peak hour increases projected to result in only 2 to 5 additional trips per hour as compared to the current use of the site. The proposed access plan, including modifications to the Wakefield Avenue alignment have been properly designed to allow safe access to the project for both vehicular and pedestrian traffic. As such, the project can be accommodated safely as planned with minimal impact to traffic and parking in the area.

cc: File