TRAFFIC IMPACT ASSESSMENT

Transportation Impact Assessment

Proposed Commercial Development
265-289 Great Road
Littleton, Massachusetts

Prepared for:

NBTC Great Road, LLC
Woburn, Massachusetts

September 2022

Prepared by:

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EXECUTIVE SUMMARY

DESCRIPTION OF PROJECT

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment (TIA) to identify traffic impacts associated with a proposed commercial development to be located at 265-289 Great Road in Littleton, Massachusetts (the "Project"). The purpose of this TIA is to review existing and future traffic conditions in the vicinity of the site, determine the traffic impact of 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 site is bounded by Great Road to the south, residential properties to the north, commercial properties to the east, and Robinson Road to the west. Currently, the site contains a number of buildings with various commercial uses. The site currently has six curb cuts onto Great Road. The Project entails razing these existing buildings and constructing five new buildings. The buildings will consist of a 3,100 square foot (sf) bank with a drive-through window, a 7,600 sf grocery store, a 14,800 sf building with 7,400 sf of retail space on the first floor and 7,400 sf of office space on the second floor, a 6,000 sf building with 3,000 sf of retail space on the first floor and 3,000 sf of office space on the second floor, and a 3,100 coffee shop without a drive-through window. The site will provide 150 parking spaces. The six existing curb cuts onto Great Road will be closed and the site access will be provided via two new curb cuts onto Great Road.

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 collected in July 2022 at the intersections expected to receive the traffic impact from the Project. These are listed below:

- Great Road at Powers Road
- Great Road at Robinson Road
- Great Road at Stevens Street/Meetinghouse Road/Adams Street
- King Street at Meetinghouse Road

- Great Road at King Street
- King Street at Stevens Street/Goldsmith Street

FUTURE CONDITIONS

Traffic volumes within the study area were projected to 2029, which reflects 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 1,600 net new vehicle trips on an average weekday (two-way, 24-hour volume), with 93 net new vehicle trips (42 net new entering and 51 exiting) expected during the weekday evening peak hour. On Saturday, the Project is expected to generate 1,536 net new vehicle trips, with 122 net new vehicle trips (60 net new entering and 62 exiting) expected during the Saturday midday peak hour.

Project-related traffic-volume increases external to the study area relative to 2029 No-Build conditions are anticipated to range from 19 to 37 vehicles or 1.5 to 2.8 percent during the peak periods.

TRAFFIC OPERATIONS ANALYSIS

In future conditions, operations are generally preserved with minor increases to delay and vehicle queue lengths on the various approaches.

RECOMMENDATIONS

Access to the Project site will be provided via two driveways onto Great Road. As the site currently has six curb cuts onto Great Road, the Project will reduce the number of curb cuts onto Great Road by four. The following recommendations are offered with respect to the design and operation of the Project site driveways:

- The driveways should be placed under STOP-sign (*Manual on Uniform Traffic Control Devices* (MUTCD)[1] R1-1) control, with a painted STOP-bar included.
- All signs and other pavement markings to be installed within the Project site shall conform to the applicable standards of the current MUTCD.
- Signs and landscaping adjacent to the Project site driveways should be designed and maintained so as not to restrict lines of sight.

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

- Snow windrows within sight triangle areas of the Project site driveway should be promptly removed where such accumulations would impede sightlines.

CONCLUSIONS

As documented in this study, Project-related traffic increases will not result in significant increases on overall traffic volumes or traffic delays within the study area. The site driveways will provide efficient access to and from the development. In general, Project-related traffic can be adequately accommodated within the existing infrastructure with minimal impact on the traffic operations within the study area.

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment (TIA) in order to identify the traffic impacts associated with the proposed commercial development to be located at 265-289 Great Road in Littleton, Massachusetts. This report identifies and analyzes existing and future traffic conditions both with and without the Project and reviews access requirements, potential offsite improvements, and safety considerations.

STUDY METHODOLOGY

This study was prepared in accordance with the State guidelines for TIAs 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 July 2022. The field investigation consisted of an inventory of existing roadway geometrics; traffic volumes; and operating characteristics; as well as posted speed limits, sight distance, and land use information within the study area. The study area for the Project contains the major roadway which provides 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 in Figure 1.

- Great Road at Powers Road
- Great Road at Robinson Road
- Great Road at Stevens Street/Meetinghouse Road/Adams Street
- King Street at Meetinghouse Road
- Great Road at King Street
- King Street at Stevens Street/Goldsmith Street

The following describes the study area roadway which provides access/egress to the Project.

GEOMETRY

Roadway

Great Road

Great Road is classified as an urban principal arterial roadway under the jurisdiction of the Massachusetts Department of Transportation (MassDOT). Great Road runs in a general northwest to southeast alignment throughout the study area. Great Road provides one general-purpose travel lane in each direction separated by a double-yellow centerline with exclusive turn lanes provided at some intersections. The land uses along Great Road, throughout the study area, generally consist of commercial and residential uses.

Intersections

Figure 2 summarizes existing lane use, travel lane widths, and sidewalk and crosswalk locations at the study area intersections.

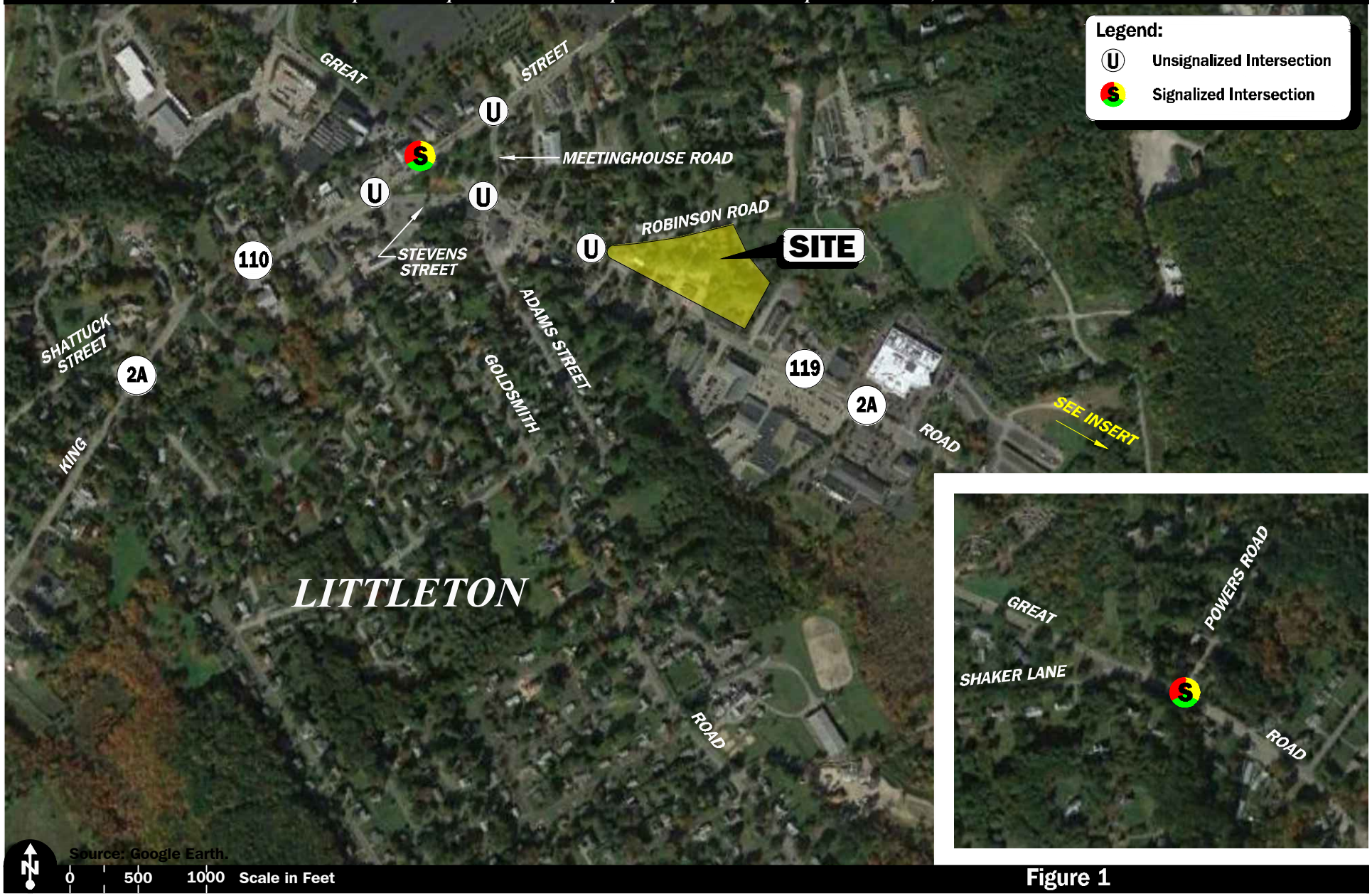

Figure 1

Site Location and Study Area Map

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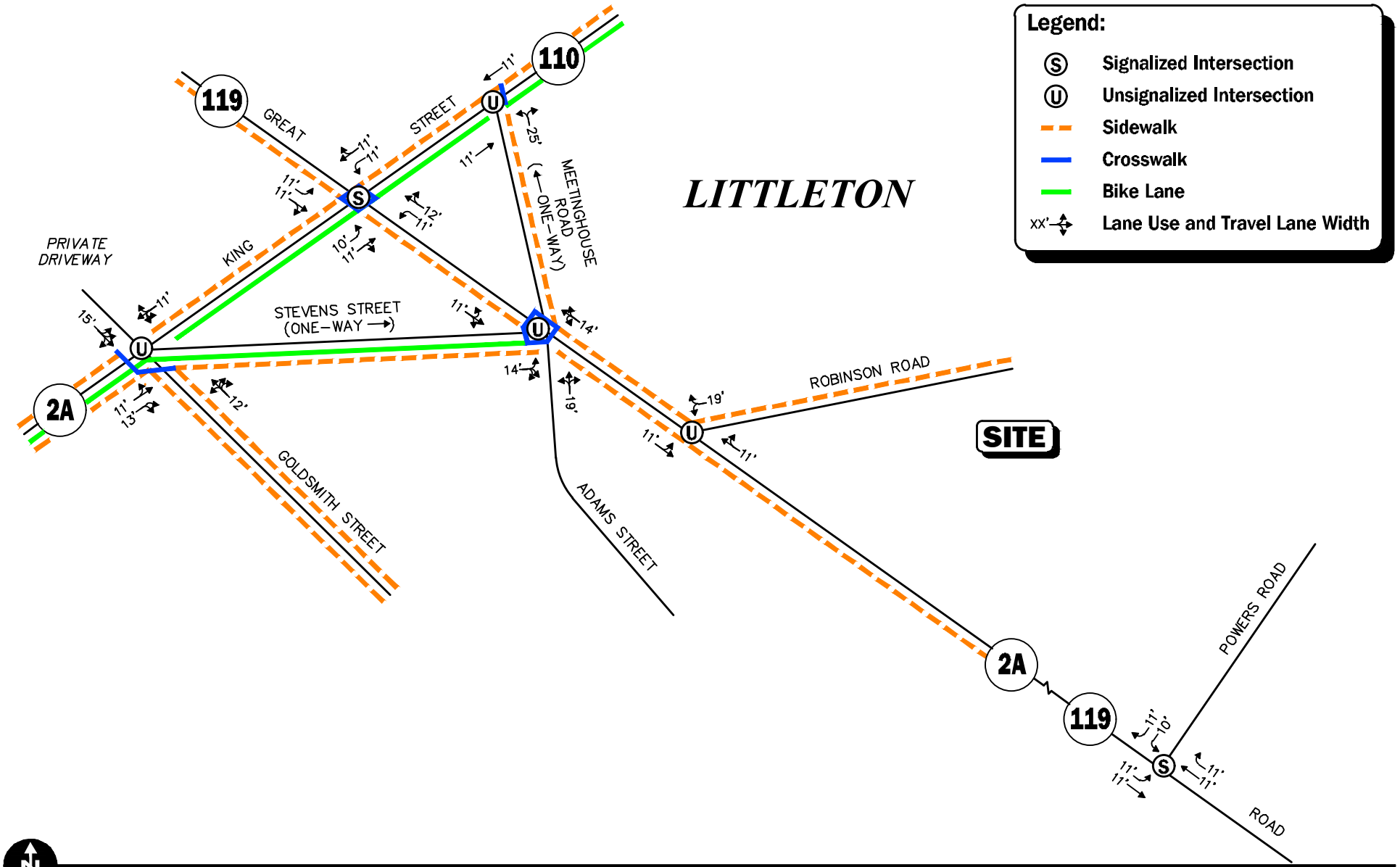

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Figure 2

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

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EXISTING TRAFFIC VOLUMES

In order to establish base traffic-volume demands and flow patterns within the study area, manual turning movement counts (TMCs) were completed in July 2022. The TMCs were conducted during the weekday evening (4:00 to 6:00 PM) and Saturday midday (11:00 AM to 2:00 PM) peak periods. Bicycles and pedestrians were also counted. In addition, an automatic traffic recorder count (ATR) was conducted in July 2022 on Great Road east of Robinson Road for 72 hours.

Traffic-Volume Adjustments

In order to develop 2022 Baseline traffic-volume conditions, the data collected required adjustment due to the effects of the COVID-19 pandemic. To achieve this, count data from MassDOT permanent count station ID 4172[2] located on Route 2 west of Route 27 were used. Daily count data from July 2019 and July 2022 were used to develop COVID-19 correction factors. Based on this evaluation, the 2022 weekday daily traffic volumes were increased by 4 percent, the weekday evening peak-hour traffic volumes were increased by 2 percent, the Saturday daily traffic volumes were increased by 3 percent, and the Saturday midday peak-hour traffic volumes were increase by 1 percent.

In addition to correction factors for COVID-19, adjustments were made to account for seasonal fluctuations in traffic. The MassDOT permanent count station ID 4172 was also used to adjust the traffic volumes for seasonal fluctuations. Based on this data, it was determined that July traffic volumes are approximately 2 percent lower than average-month conditions for this station. Therefore, traffic volumes were adjusted upwards by 2 percent to average-month conditions. The 2022 Baseline traffic volumes on Great Road are summarized in Table 1.

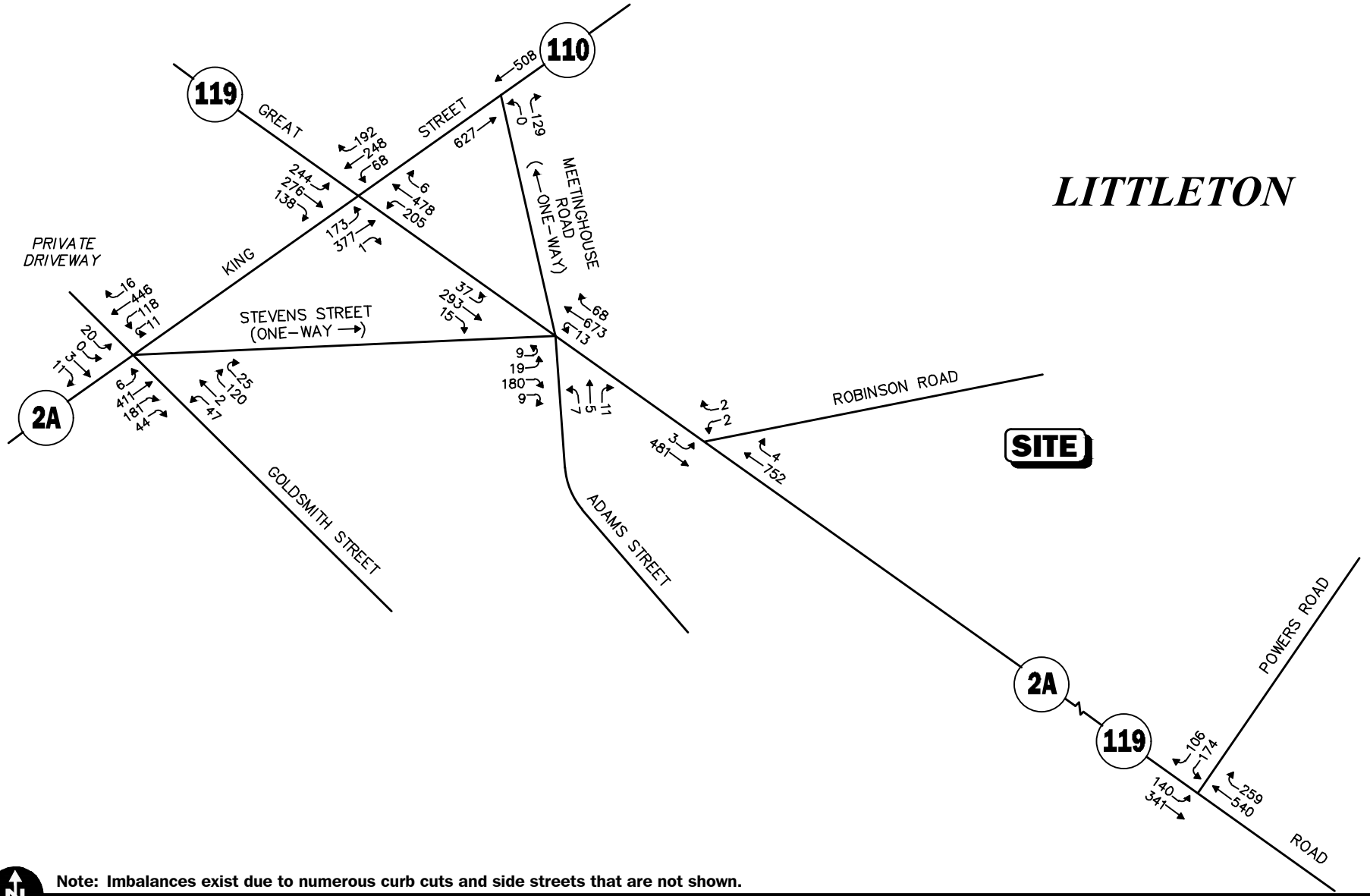
As can be seen in Table 1, Great Road was found to accommodate approximately 11,900 vehicles per day (vpd) with 1,239 vehicles per hour (vph) during the weekday evening peak hour. During the weekday evening peak hour, 61 percent of the traffic is traveling westbound. On Saturday, Great Road was found to accommodate approximately 9,900 vpd with 1,236 vph during the Saturday midday peak hour. During the Saturday midday peak hour, 52 percent of the traffic is traveling westbound. The baseline weekday evening and Saturday midday peak-hour traffic volumes for the study area intersections are graphically depicted in Figure 3 and Figure 4, respectively.

Table 1
2022 BASELINE ROADWAY TRAFFIC-VOLUME SUMMARY

	Weekday	Weekday Evening Peak Hour			Saturday	Saturday Midday Peak Hour		
Location	Daily Volume (vpd)[a]	Volume (vph)[b]	Percent of Daily Traffic[c]	Predominant Flow	Daily Volume (vpd)	Volume (vph)	Percent of Daily Traffic	Predominant Flow
Great Road, east of Robinson Road	11,900	1,239	10.4	61% WB	9,900	1,236	12.5	52% WB

Note: Includes COVID-19 correction factors applied to ATR and TMCs that were conducted in July 2022.
[a]Two-way daily traffic expressed in vehicles per day (estimated).
[b]Two-way peak-hour volume expressed in vehicles per hour.
[c]The percent of daily traffic that occurs during the peak hour.
WB = westbound.

[2]MassDOT Transportation Data Management System; Location ID 4172; Located on Route 2 west of Route 27.



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

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Figure 3

2022 Baseline
Weekday Evening
Peak-Hour Traffic Volumes

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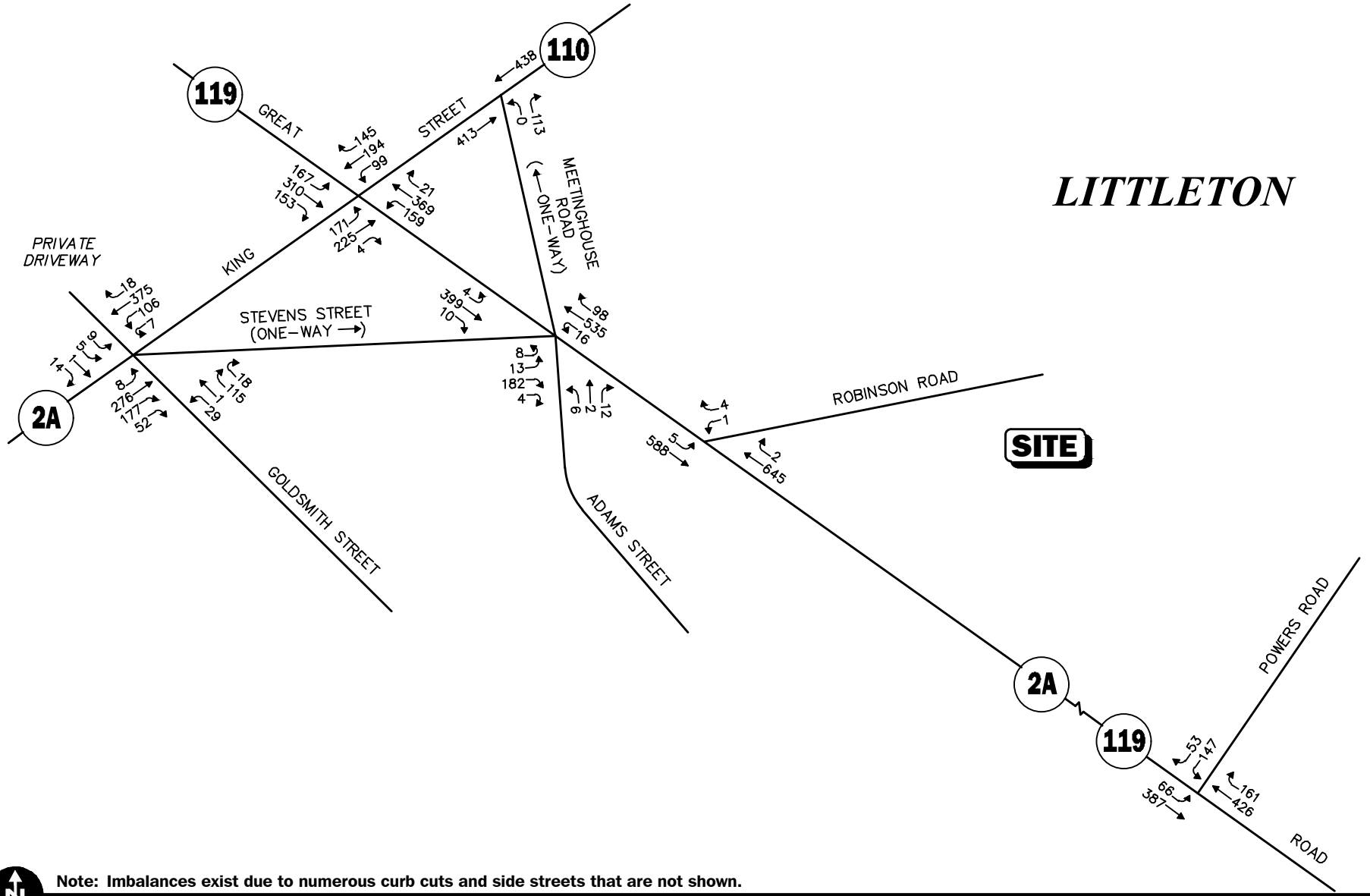

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 4

2022 Baseline
Saturday Midday
Peak-Hour Traffic Volumes

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PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in July 2022. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study area roadways and at the study area intersections, as well as the location of bicycle facilities. Sidewalks are provided along both sides of King Street southwest of Goldsmith Street, on Goldsmith Street, and on Great Road between Adams Street and Robinson Road. Sidewalks are also provided on the northwest side of King Street northeast of Goldsmith Street, on the southwest side of Great Road northwest of King Street continuing southeast to Couper Farm Lane, on the southeast side of Steven Street, on the northeast side of Meetinghouse Road, and on the northwest side of Robinson Road. Crosswalks are provided across the King Street southern leg and Goldsmith Street leg of the intersection of King Street at Goldsmith Street/Stevens Street/private driveway, across all legs to the intersection of King Street with Great Road, across all approaches to the intersection of Great Road with Adams Street/Stevens Street/Meetinghouse Road, and across the north leg of the intersection of King Street with Meetinghouse Road. Painted bicycle lanes are provided on King Street and on Stevens Street.

PUBLIC TRANSPORTATION

Public transportation services are provided within the study area by the Montachusett Regional Transit Authority (MART) for shuttle services. Table 2 summarizes the characteristics of this service. Schedule and fare information for the shuttle service is provided in the Appendix.

Table 2
PUBLIC TRANSPORTATION SERVICES

Service	Stop Closest to Site	Distance from Site	Weekday	
			Hours of Operation	Headway (minutes)
Littleton-Westford Commuter Rail Shuttle	Littleton Common	~ 850 feet northwest	7:10 AM – 9:15 AM and 4:40 PM – 6:38 PM	Only one bus in each direction for AM and PM service

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 three-year period available (2017 through 2019) in order to examine motor vehicle crash trends occurring within the study area. The data is summarized in Table 3 by intersection, type, weather condition, lighting condition, pavement condition, and severity.

As can be seen in Table 3, most of the study area intersections experienced 7 accidents or less over the three-year review period, averaging 2.33 accidents per year or less. The majority of the accidents were rear-end collisions, occurred on dry pavement, during the daylight, in clear weather, and caused property damage only. The intersection of King Street at Great Road experienced 46 accidents over the three-year review period, averaging 15.33 accidents per year. The majority of the accidents were rear-end collisions (20 out of 46), occurred on dry pavement (35 out of 46), during daylight (39 out of 46), in clear weather (27 out of 46), and caused property damage only (42 out of 46). No fatalities were reported over the three-year period reviewed.

The crash rates for the intersections were observed to be lower than the MassDOT District 3 crash rates for unsignalized and signalized intersections except for the intersection of King Street at Great Road. Therefore, the Highway Safety Improvement Program (HSIP) database was reviewed. The intersection is listed as a 2015-2017 HSIP cluster. Designation as an HSIP location allows MassDOT to prioritize funding for safety-related improvements in a specific region of the state. The intersection was not listed on the 2016-2018 or 2017-2019 HSIP cluster list. According to the MassDOT Road Safety Audit (RSA) database, no RSAs have been conducted at this location.

Table 3
MOTOR VEHICLE CRASH DATA SUMMARY

Scenario	Great Rd at Powers Rd	Great Rd at Robinson Rd	Great Rd at Site Driveways	Great Rd at Stevens St/ Meetinghouse Rd/ Adams St	King St at Meetinghouse Rd	King St at Stevens St/ Goldsmith St/ Private Driveway	King St at Great Rd
Year:							
2017	0	0	3	2	5	1	20
2018	1	0	3	2	1	6	9
2019	1	1	0	1	0	0	17
Total	2	1	6	5	6	7	46
Average[a]	0.67	0.33	2.0	1.67	2.0	2.33	15.33
Crash Rate[b]	0.15	0.08	3.54[d]	0.35	0.45	0.46	1.82
Significant[c]	No	No	No	No	No	No	Yes
Type:							
Angle	0	1	3	0	1	3	17
Rear-End	0	0	2	3	5	1	20
Head-On	1	0	0	0	0	0	2
Sideswipe	1	0	1	1	0	1	6
Fixed Object	0	0	0	0	0	0	1
Pedestrian	0	0	0	0	0	1	0
Bicyclist	0	0	0	0	0	1	0
Unknown/Other	0	0	0	1	0	0	0
Total	2	1	6	5	6	7	46
Weather Conditions:							
Clear	2	1	5	4	5	6	27
Cloudy/Rain	0	0	1	0	1	1	18
Snow/Ice	0	0	0	1	0	0	1
Fog	0	0	0	0	0	0	0
Unknown/Other	0	0	0	0	0	0	0
Total	2	1	6	5	6	7	46
Lighting Conditions:							
Daylight	1	0	3	4	5	6	39
Dawn/Dusk	0	1	0	0	1	0	1
Dark (lit)	0	0	3	1	0	1	6
Dark (unlit)	0	0	0	0	0	0	0
Unknown/Other	1	0	0	0	0	0	0
Total	2	1	6	5	6	7	46
Pavement Conditions :							
Dry	1	1	4	4	5	6	35
Wet	1	0	1	0	0	1	9
Snow/Ice	0	0	0	1	0	0	1
Unknown/Other	0	0	1	0	1	0	1
Total	2	1	6	5	6	7	46
Severity:							
Property Damage Only	2	1	5	4	6	6	42
Personal Injury	0	0	1	1	0	1	3
Fatality	0	0	0	0	0	0	0
Unknown/Other	0	0	0	0	0	0	1
Total	2	1	6	5	6	7	46

[a]Average number of crashes over three-year period.
[b]Crash rate per million entering vehicles (mev).
[c]Significant if crash rate > 0.89 for signalized intersections or > 0.61 for unsignalized intersections (MassDOT District 3 rates).
[d]Crash rate analyzed for the segment of Great Road that abuts the length of site's frontage. Includes crashes at the six existing site driveways. Significant if crash rate > 3.58 for urban principal arterials.
Source: MassDOT Crash Data, 2017 through 2019.

VEHICLE SPEEDS

Existing vehicle speeds along Great Road east of Robinson Road, were recorded to determine the average and 85th percentile vehicle speeds. The speed limit on Great Road eastbound is posted at 25 miles per hour (mph) west of the site and changes to 35 mph at the west end of the site. The speed limit on Great Road westbound is posted at 45 mph east of the site and changes to 25 mph at the west end of the site. The results of the speed measurements are shown in Table 4.

As can be seen from Table 4, the average speed recorded eastbound on Great Road was 30 mph and the 85th percentile speed recorded was 36 mph. The average speed recorded westbound was 27 mph and the 85th percentile speed was 32 mph.

Table 4
OBSERVED VEHICLE SPEEDS – (In Miles Per Hour)

Location/Direction	Average Speed	85th Percentile Speed[a]
Great Road, east of Robinson Road:		
Eastbound	30	36
Westbound	27	32

[a]The 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.

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 2029. 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 2029. Inclusion of these factors resulted in the development of 2029 No-Build traffic volumes. Anticipated site-generated traffic volumes were then superimposed upon these No-Build traffic-flow networks to develop the 2029 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 0.94 percent per year on average. Therefore, 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 Littleton was contacted in order to determine if there are any planned or approved development projects that are expected to influence future traffic volumes within the study area. Based on these discussions, the following project was identified for possible inclusion in this assessment:

550 King Street **–** This project entails construction of a mixed-use development included retail, residential, and office uses. A detailed traffic analysis has not yet been submitted for this development but will be provided prior to site plan approval for the first phase of the development. Based on this, it was determined that the 265-289 Great Road redevelopment would be ahead of the 550 King Street redevelopment in the permitting process. Therefore, no trips from the 550 King Street development were included in the future condition analysis. The Project would be included in the 550 King Street traffic analysis as a background development.

Planned Roadway Improvements

The Town of Littleton and MassDOT were 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. Based on these discussions, no roadway improvement projects are planned within the study area beyond general maintenance.

Existing Site Trip Generation

Currently, the site has three active uses which include an approximately 2,742 sf bank with drive-through window, an approximately 784 sf hair salon, and an approximately 840 sf Subway. In addition, an approximately 2,214 sf vehicle service station was in operation until 2020. The service station also provided vehicle fueling services but ceased this service and removed the fueling pumps prior to 2020. In order to develop the traffic characteristics of the existing site, trip-generation statistics published by the Institute of Transportation Engineers (ITE)[3] for Land Use Code (LUC) 912 *Drive-In Bank*, LUC 932, *High-Turnover (Sit-Down) Restaurant*, and LUC 943, *Automobile Parts and Service Center* were used. The traffic generated by the hair salon was not estimated as there is limited ITE data for that land use but is assumed to be included in the general background growth rate.

A summary of the existing site trip generation is provided in Table 5.

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

Table 5
EXISTING SITE TRIP-GENERATION SUMMARY

Time Period/ Directional Distribution	Drive-In Bank Trips[a]	Restaurant Trips[b]	Vehicle Service Center Trips[c]	Total Trips
Weekday Daily	276	90	36	402
Weekday Evening Peak Hour:				
Entering	29	5	2	36
Exiting	29	3	3	35
Total	58	8	5	71
Saturday Daily	238	102	36	376
Saturday Midday Peak Hour:				
Entering	37	5	2	44
Exiting	35	4	3	42
Total	72	9	5	86

[a]Based on ITE LUC 912, *Drive-In Bank;* 2,742 sf.
[b]Based on ITE LUC 932, *High-Turnover (Sit-Down) Restaurant;* 840 sf.
[c]Based on ITE LUC 943, *Automobile Parts and Service Center;* 2,214 sf.

As can be seen in Table 5, the existing site is expected to generate 402 vehicle trips on an average weekday (two-way, 24-hour volume), with 71 vehicle trips (36 entering and 35 exiting) expected during the weekday evening peak hour. On Saturday, the Project is expected to generate 377 vehicle trips, with 86 vehicle trips (44 entering and 42 exiting) expected during the Saturday midday peak hour.

No-Build Traffic Volumes

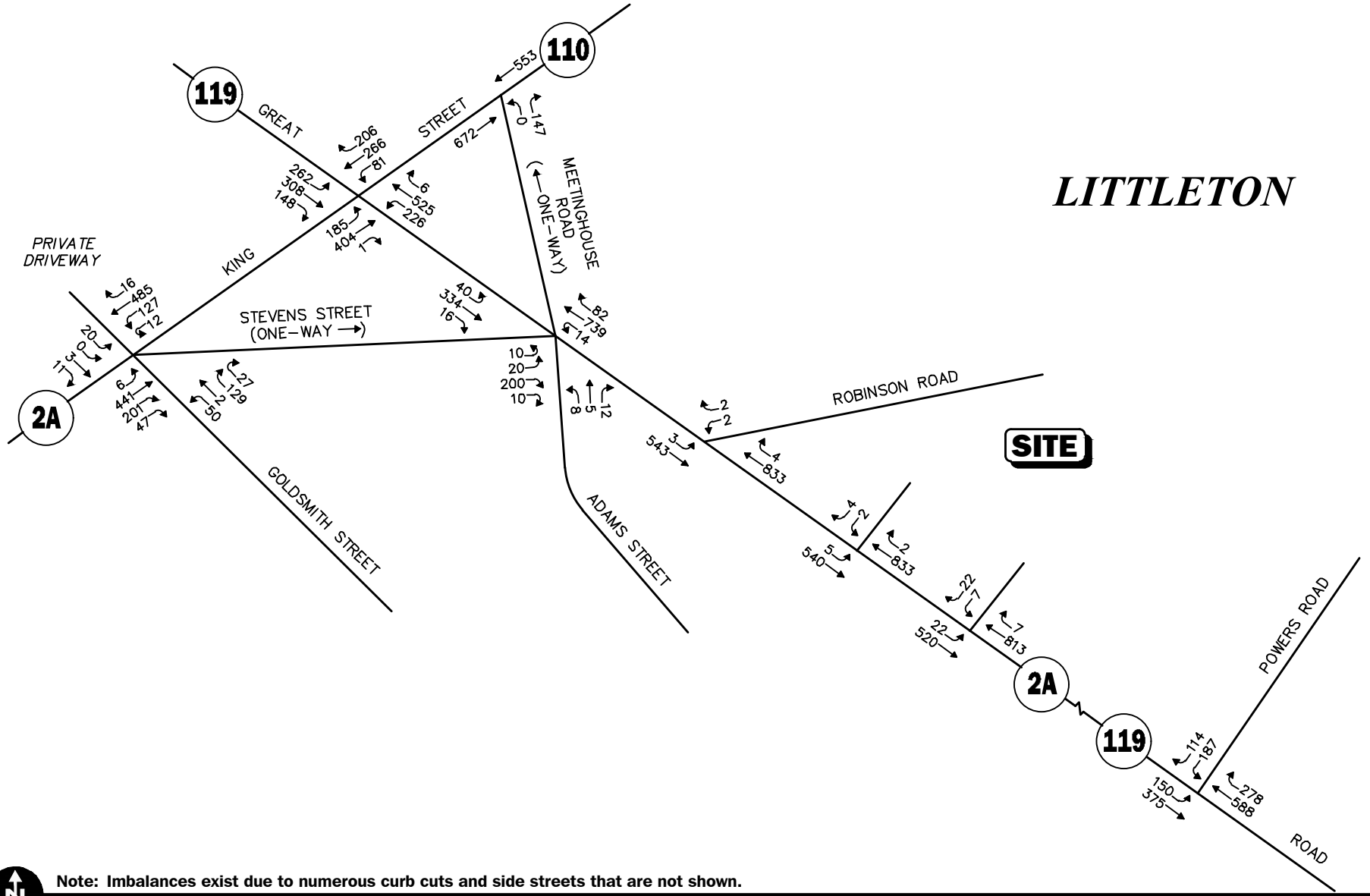
The 2029 No-Build peak-hour traffic-volume networks were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2022 Baseline peak-hour traffic volumes, incorporating traffic projections from the site as indicated by ITE. The resulting 2029 No-Build weekday evening and Saturday midday peak-hour traffic-volume networks are shown on Figure 5 and Figure 6, respectively.

PROJECT-GENERATED TRAFFIC

The Project entails constructing a 3,100 sf bank with drive-through window, a 3,100 sf coffee/donut shop without a drive-through window, a 7,600 sf grocery store, 10,400 sf of retail space, and 10,400 sf of office space. In order to develop the traffic characteristics of the proposed Project, trip-generation statistics published by the ITE for LUC 710, *General Office Building*, LUC 822, *Strip Retail Plaza (<40K)*, and LUC 936, *Coffee/Donut Shop without Drive-Through Window* were used.

Pass-By Trips

Deductions in the base trip-generation calculations can be made to account for pass-by trips. Pass-



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

Not To Scale

Figure 5

2029 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

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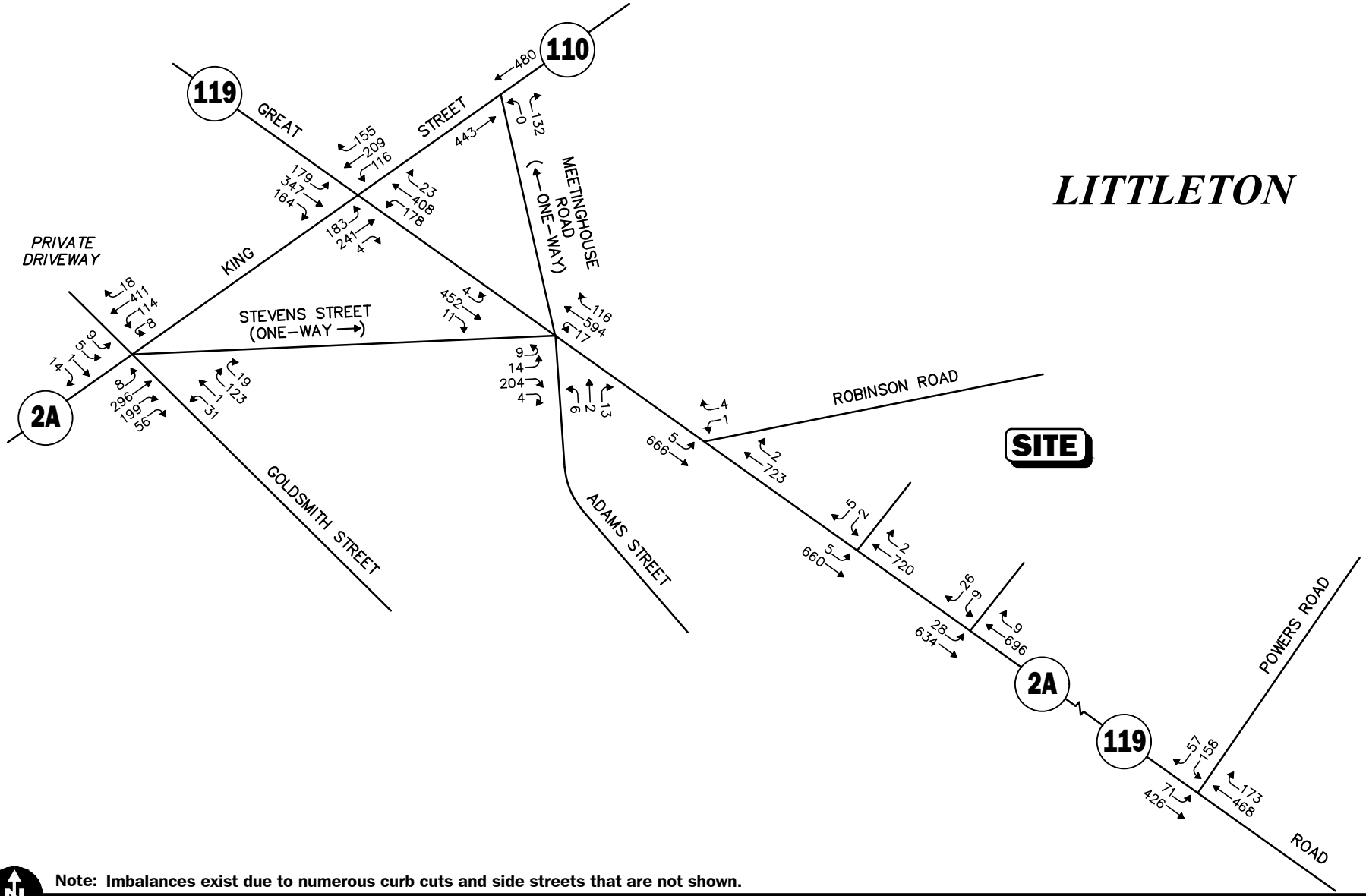


Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 6

2029 No-Build
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc

by trips are from drivers already traveling along adjacent roadways for other purposes that decide to patronize the existing site or the proposed Project in conjunction with their trip and then continue to their original destination. Statistics published by the ITE were used to determine the pass-by percentage for each use.

A summary of the expected vehicle-trip generation for the proposed site is provided in Table 6.

Table 6
PROPOSED SITE TRIP-GENERATION SUMMARY

Time Period/ Directional Distribution	Coffee/Donut Shop[a] ITE Trips	Coffee/Donut Shop[a] Pass-by Trips[d]	Coffee/Donut Shop[a] New Trips	Retail[b] ITE Trips	Retail[b] Pass-by Trips[e]	Retail[b] New Trips	Office[c] ITE Trips	Total ITE Trips	Total Pass-by Trips	Total New Trips
Weekday Daily	1,370	342	1,028	1,148	288	860	114	2,632	630	2,002
Weekday Evening Peak Hour:										
Entering	51	22	29	70	24	46	3	124	46	78
Exiting	51	22	29	69	24	45	12	132	46	86
Total	102	44	58	139	48	91	15	256	92	164
Saturday Daily	1,370	342	1,028	1,146	286	860	24	2,540	628	1,912
Saturday Midday Peak Hour:										
Entering	86	38	48	71	18	53	3	160	56	104
Exiting	89	38	51	68	18	50	3	160	56	104
Total	175	76	99	139	36	103	6	320	112	208

[a]Based on ITE LUC 936, *Coffee/Donut Shop without Drive-Through Window;* 3,100 sf.
[a]Based on ITE LUC 822, *Strip Retail Plaza (<40K);* 21,100 sf.
[a]Based on ITE LUC 710, *General Office Building;* 10,400 sf.
[d]Based on pass-by rate of 25 percent for daily and 43 percent for the peak hours.
[e]Based on pass-by rate of 25 percent for daily, 34 percent for the weekday evening peak hour, and 26 percent for the Saturday midday peak hour.

As can be seen in Table 6, the Project is expected to generate 2,002 new vehicle trips on an average weekday (two-way, 24-hour volume), with 164 new vehicle trips (78 new entering and 86 exiting) expected during the weekday evening peak hour. On Saturday, the Project is expected to generate 1,912 new vehicle trips, with 208 new vehicle trips (104 new entering and 104 exiting) expected during the Saturday midday peak hour

Net New Project Trip Generation

The existing site trips were then subtracted from the proposed site trips to determine the net new trips for the Project. A summary of the net new vehicle-trip generation for the proposed site is provided in Table 7.

Table 7
NET NEW PROJECT TRIP-GENERATION SUMMARY

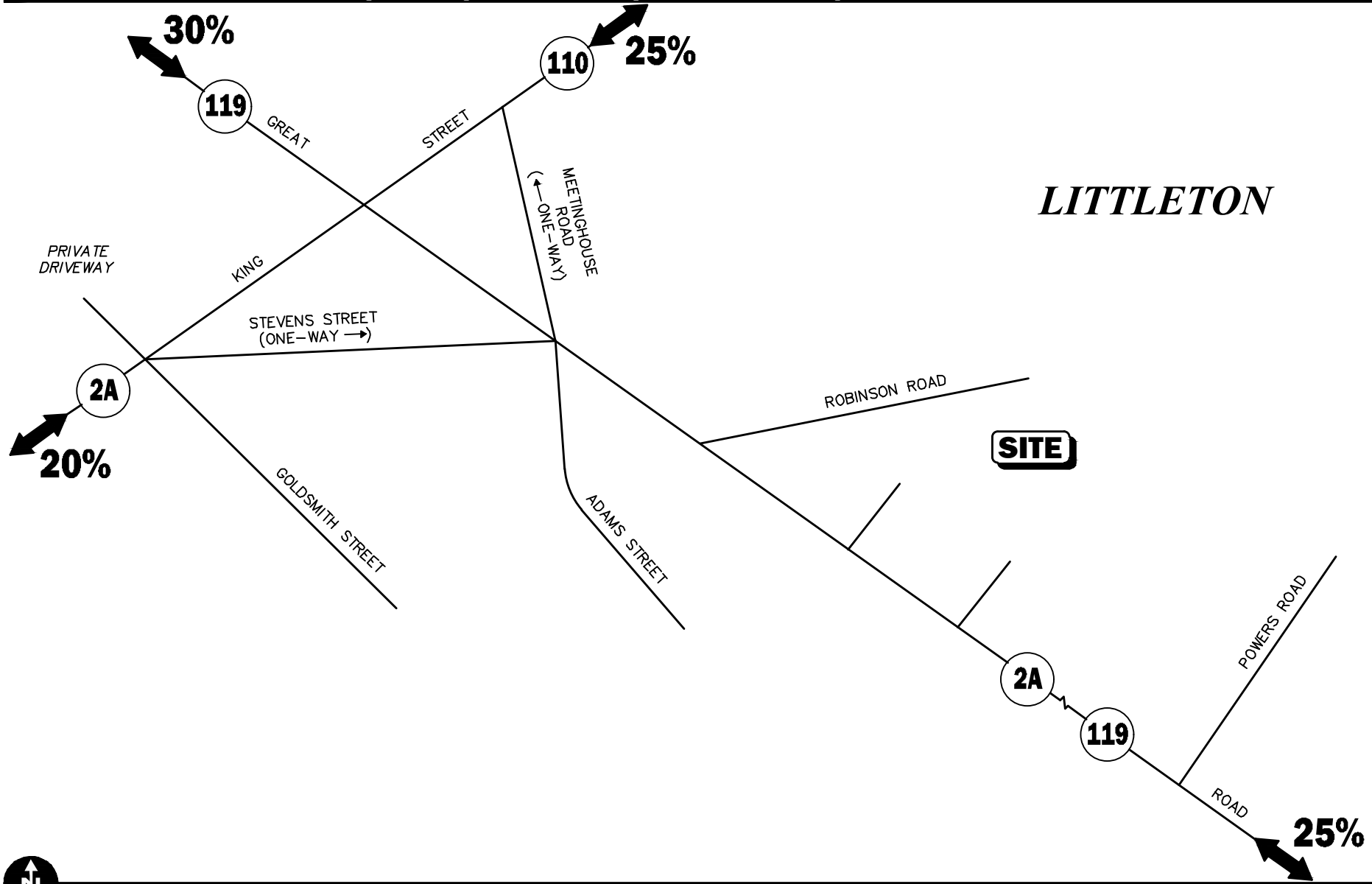
Time Period/ Directional Distribution	Proposed Site ITE Trips[a]	Existing Site ITE Trips[b]	Net ITE Trips	Pass-by Trips[b]	Net New Trips
Weekday Daily	2,632	402	2,230	630	1,600
Weekday Evening Peak Hour:					
Entering	124	36	88	46	42
Exiting	132	35	97	46	51
Total	256	71	185	92	93
Saturday Daily	2,540	376	2,164	628	1,536
Saturday Midday Peak Hour:					
Entering	160	44	116	56	60
Exiting	160	42	118	56	62
Total	320	86	234	112	122

[a]From Table 6.
[b]From Table 5.

As can be seen in Table 7, the Project is expected to generate 1,600 net new vehicle trips on an average weekday (two-way, 24-hour volume), with 93 net new vehicle trips (42 net new entering and 51 exiting) expected during the weekday evening peak hour. On Saturday, the Project is expected to generate 1,536 net new vehicle trips, with 122 net new vehicle trips (60 net new entering and 62 exiting) expected during the Saturday midday peak hour.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of the site-generated trips to and from the Project was determined based on a review of existing travel patterns at the study area intersections. The trip distribution for the Project is summarized in Table 8 and graphically depicted on Figure 7. The weekday evening and Saturday midday 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, respectively.



Not To Scale

Figure 7

Trip Distribution Map

Vanasse & Associates inc

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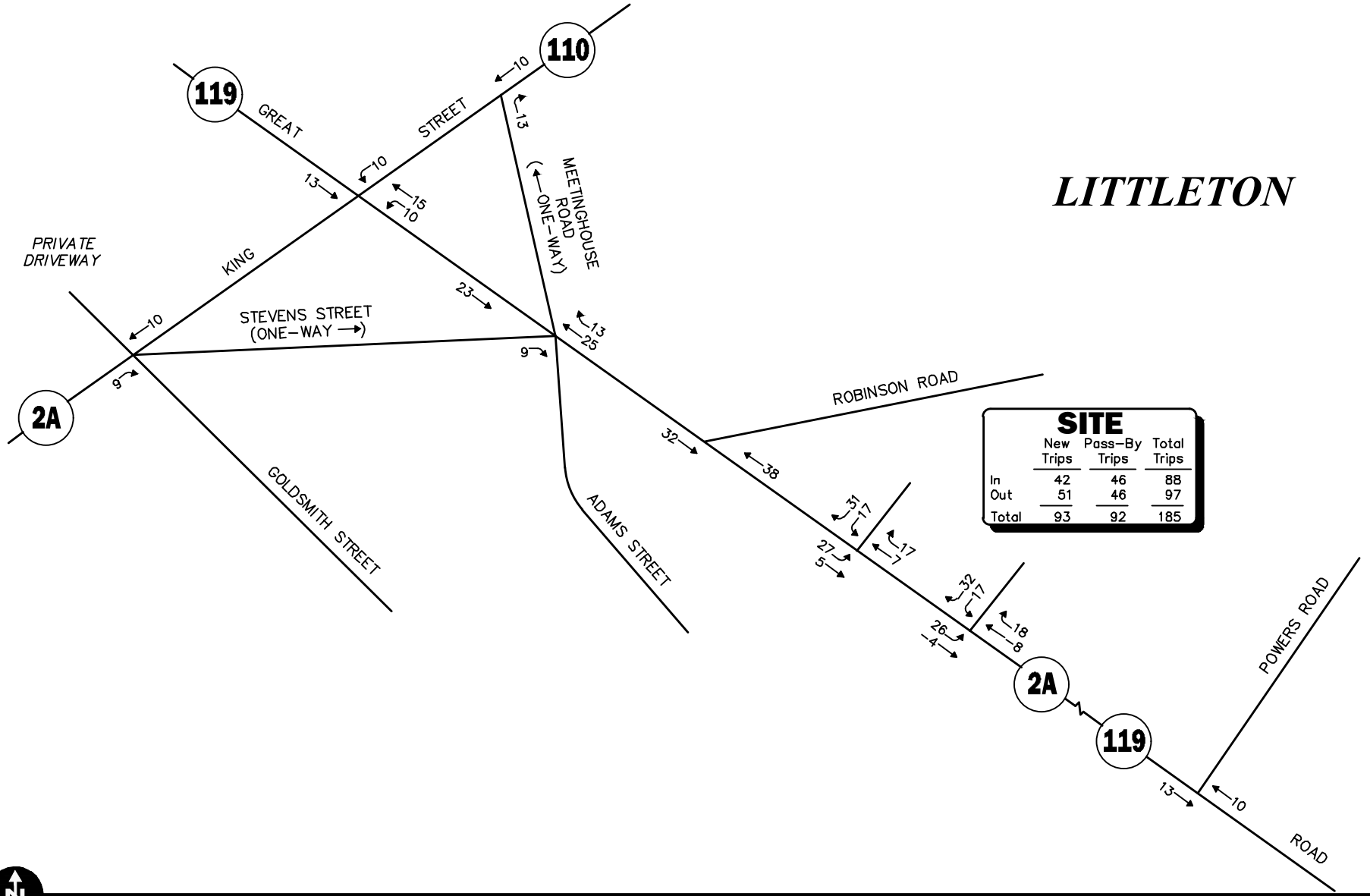

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Figure 8

Net New Site-Generated Weekday Evening Peak-Hour Traffic Volumes

Vanasse & Associates inc

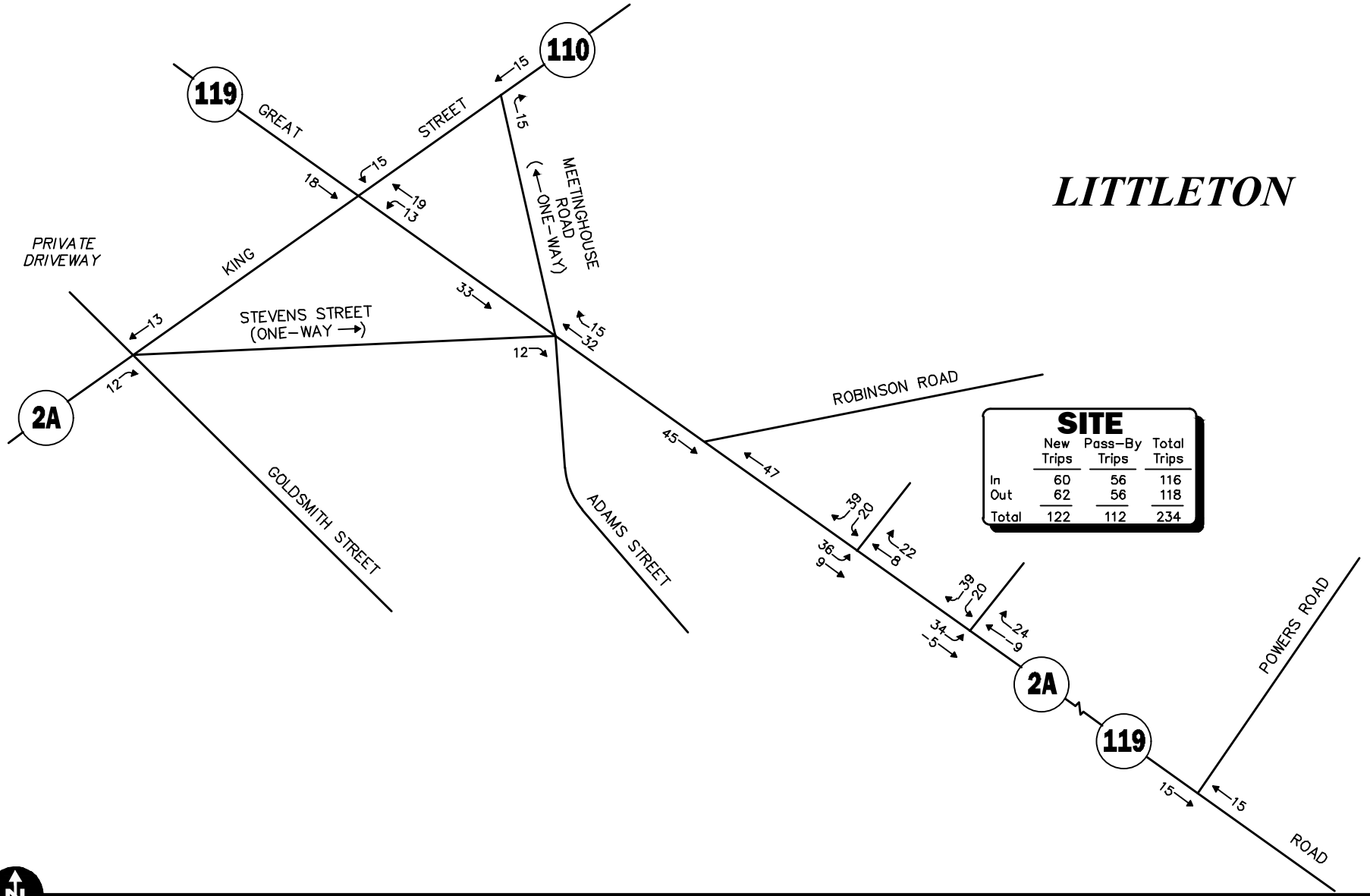

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Figure 9

Net New Site-Generated Saturday Midday Peak-Hour Traffic Volumes

Vanasse & Associates inc

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Table 8
TRIP-DISTRIBUTION SUMMARY

Roadway	Direction (To/From)	Percent (To/From)
King Street	North	25
King Street	South	20
Great Road	East	25
Great Road	West	30
TOTAL		100

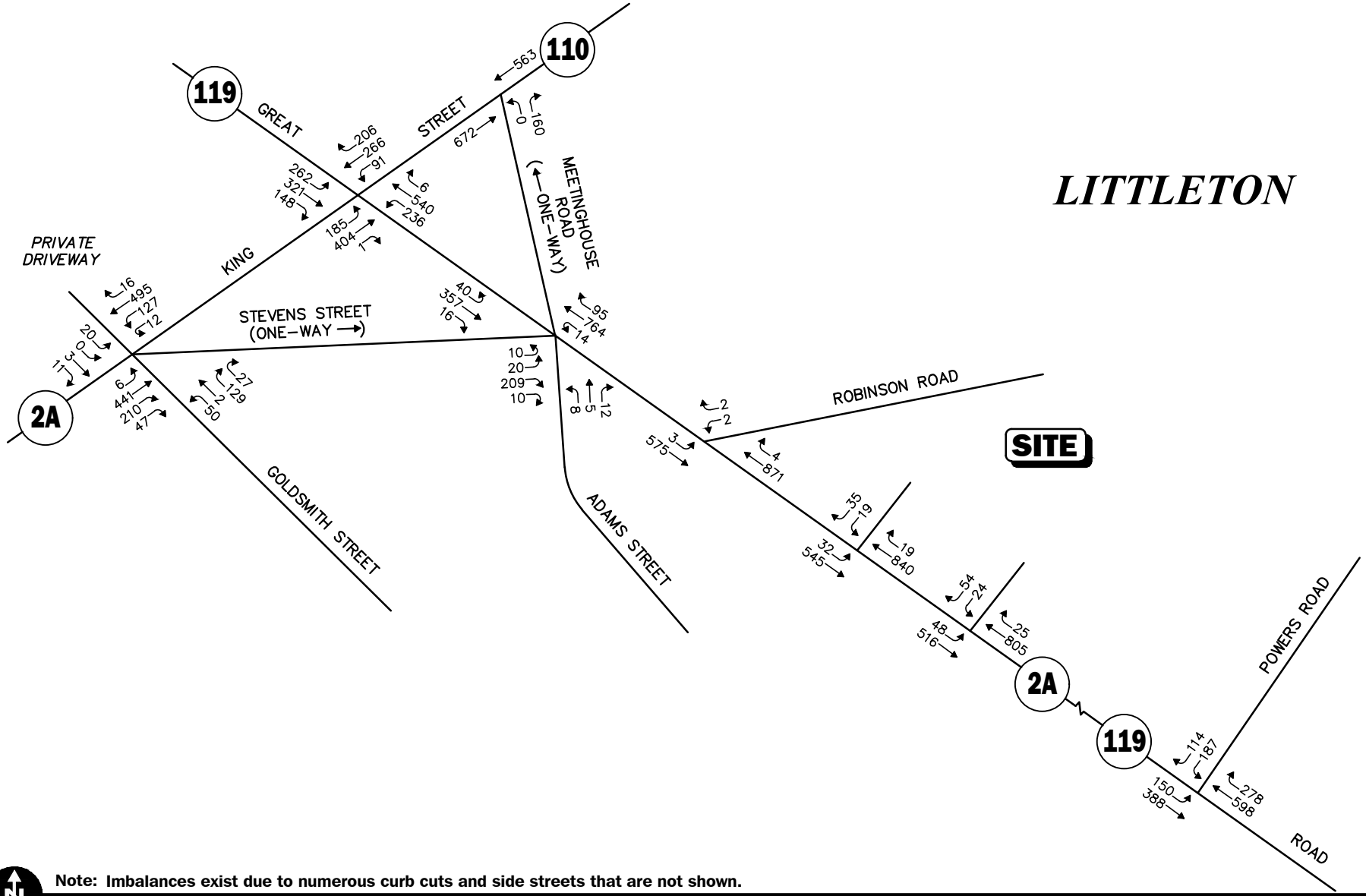
FUTURE TRAFFIC VOLUMES – BUILD CONDITION

The 2029 Build condition networks consist of the 2029 No-Build traffic volumes with the anticipated Project-generated traffic added to them. The 2029 Build weekday evening and Saturday midday peak-hour traffic-volume networks are graphically depicted on Figure 10 and Figure 11, respectively.

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.

Table 9
PEAK-HOUR TRAFFIC-VOLUME INCREASES

Location/Peak Hour	2029 No-Build	2029 Build	Traffic-Volume Increase Over No-Build	Percent Increase Over No-Build
Great Road, east of Powers Road:				
Weekday Evening	1,428	1,451	23	1.6
Saturday Midday	1,225	1,255	30	2.4
Great Road, west of King Street:				
Weekday Evening	1,634	1,662	28	1.7
Saturday Midday	1,436	1,473	37	2.6
King Street, north of Meetinghouse Road:				
Weekday Evening	1,372	1,395	23	1.7
Saturday Midday	1,055	1,085	30	2.8
King Street, south of Goldsmith Street:				
Weekday Evening	1,241	1,260	19	1.5
Saturday Midday	1,015	1,040	25	2.5



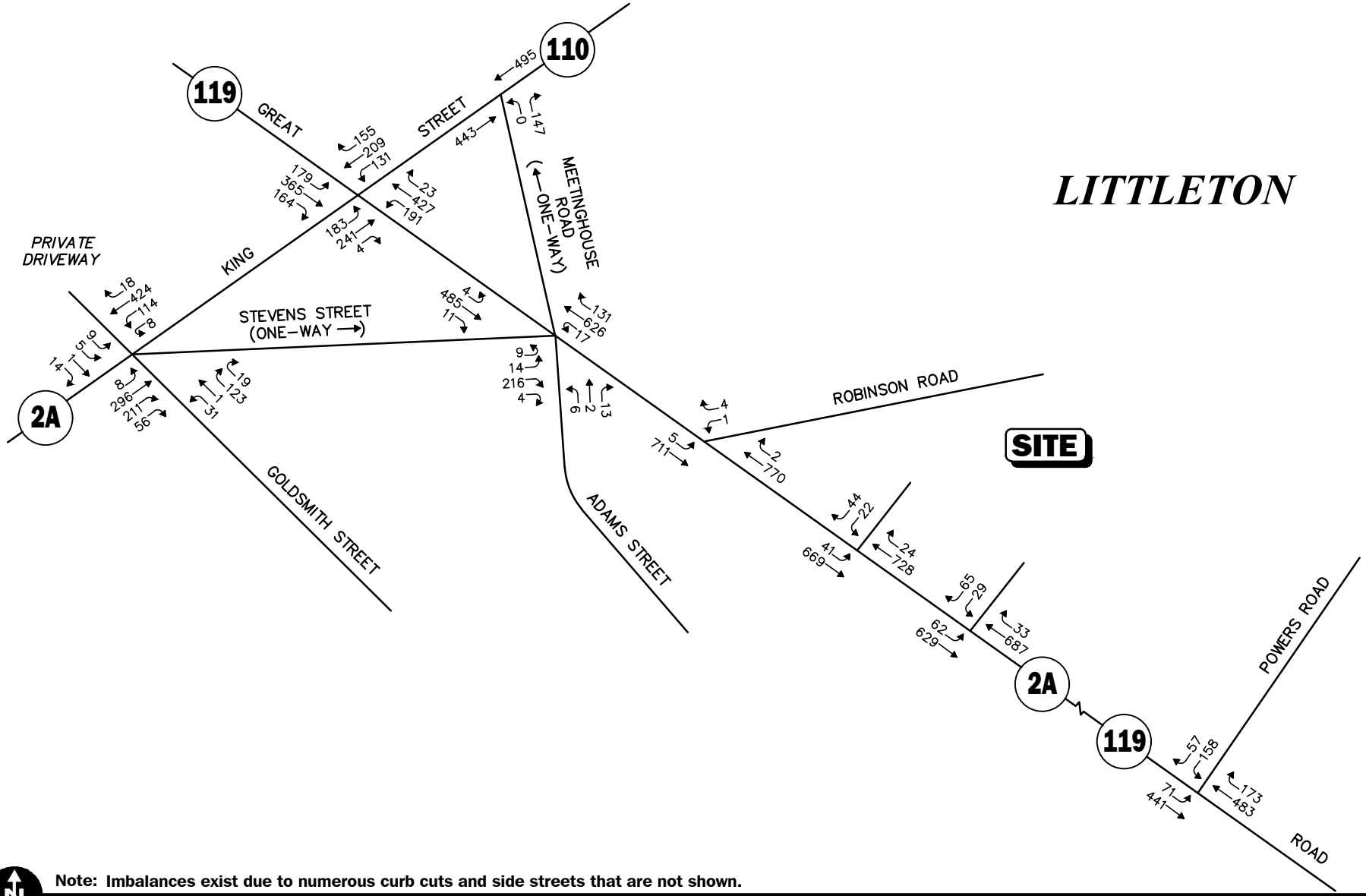
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 10

2029 Build
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc



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

Not To Scale

Figure 11

2029 Build
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc

As shown in Table 9, Project-related traffic-volume increases external to the study area relative to 2029 No-Build conditions are anticipated to range from 19 to 37 vehicles or 1.5 to 2.8 percent during the peak periods.

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at the site driveways intersections with Great Road in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)[4] recommendations. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance recommended to be provided by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD is the sight distance recommended to be provided by a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. ***In accordance with AASHTO standards, if the measured ISD is at least equal to the recommended SSD value for the appropriate design speed, the intersection can operate in a safe manner.*** Table 10 presents the measured SSD and ISD at the subject intersection.

[4] *A Policy on Geometric Design of Highway and Streets,* 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.

Table 10
SIGHT DISTANCE MEASUREMENTS[a]

Intersection/Sight Distance Measurement	Recommended Distances (Feet) Posted Speed Limit 35 mph on Great Road	Field Measured Distances (Feet)
Great Road at West Site Driveway		
Stopping Sight Distance:		
Great Road approaching from the east	250	600+
Great Road approaching from the west	250	600+
Intersection Sight Distance:[b]		
Left turn from Site Driveway (looking east)	390	600+
Left turn from Site Driveway (looking west)	390	600+
Great Road at West Site Driveway		
Stopping Sight Distance:		
Great Road approaching from the east	250	600+
Great Road approaching from the west	250	600+
Intersection Sight Distance:[b]		
Left turn from Site Driveway (looking east)	390	600+
Left turn from Site Driveway (looking west)	390	600+

[a]Recommended values obtained from *A Policy on Geometric Design of Highways and Streets,* 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018.
[b]Values shown are the intersection sight distance for a vehicle turning right or left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed.

As can be seen in Table 10, the sight distance at the intersection of the site driveways with Great Road was found to exceed the recommended values for both SSD and ISD based on a speed of 35 mph.

TRAFFIC OPERATIONS ANALYSIS

Measuring existing and future traffic volumes quantify 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.[5] 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.

Signalized Intersections

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

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

- *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 over-saturation. 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™ 11 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 are a measure of: i) driver discomfort; ii) motorist frustration; and iii) fuel consumption; and include 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 11 summarizes the relationship between level-of-service and percentile delay and uses the same numerical delay thresholds as the *Highway Capacity Manual*[6] method. The tabulated percentile delay criterion may be applied in assigning level-of-service designations to individual lane groups, individual intersection approaches, or to entire intersections.

Table 11
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

[6] *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.* 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 12 summarizes the relationship between level of service and average control delay for two-way STOP-controlled and all-way STOP-controlled intersections.

Table 12
LEVEL-OF-SERVICE CRITERIA
FOR UNSIGNALIZED INTERSECTIONS[a]

Level-of-Service by Volume-to-Capacity Ratio		Average Control Delay
v/c ≤ 1.0	v/c > 1.0	(Seconds Per Vehicle)
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

[a]Source: *Highway Capacity Manual 6th Edition*; Transportation Research Board; Washington, DC; 2016; page 20-6.

SIDRA: Unsignalized

The unsignalized capacity analysis for the intersections of Great Road at Adams Street/Stevens Street/Meetinghouse Road and King Street at Goldsmith Street/Stevens Street/private driveway is based on the procedures described in the *Traffic Signalized* and *Unsignalized Intersection Design and Research Aid* (*SIDRA*) *Intersection*.[7] The main features of the *SIDRA Intersection* method for unsiganlized capacity estimation are the dependence of gap acceptance parameters on roadway geometry, entry lane flows, and the designation of traffic control on approach lanes.

The SIDRA analytical model calculates several components of delay. One of these, the average total delay component, produces level-of-service results based on the concepts described in the HCM. The delay ranges that define levels of service for roundabouts are shown in Table 13.

Table 13
LEVEL-OF-SERVICE CRITERIA FOR SIDRA: UNSIGNALIZED INTERSECTIONS[a]

Level-Of-Service by Volume-to-Capacity Ratio		Control Delay Per Vehicle (Seconds)
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

[a]Source: *SIDRA Intersection 9.0 User Guide;* Akcelik & Associates Pty Ltd; Greythorn, Victoria 3104, Australia; October 2020.

[7]Traffic Signalized and Unsignalized Intersection Design and Research Aid, SIDRA Intersection 9.0 User Guide; Akcelik & Associates Pty Ltd; Greythorn, Victoria 3104, Australia; October 2020.

ANALYSIS RESULTS

Level-of-service analyses were conducted for 2022 Baseline, 2029 No-Build, and 2029 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 14 and Table 15.

Signalized Intersections

Great Road at King Street

Under 2022 Baseline conditions, this intersection operates at an overall LOS E during the weekday evening peak hour and at an overall LOS D during the Saturday midday peak hour. Under 2029 No-Build conditions, this intersection operates at an overall LOS F during the weekday evening peak hour and at an overall LOS D during the Saturday midday hour. No changes to overall level of service occur under 2029 Build conditions due to the addition of Project traffic. The vehicle queue lengths increase by less than 3 vehicles with the addition of Project traffic.

Great Road at Powers Road

Under 2022 Baseline and 2029 No-Build conditions, this intersection operates at an overall LOS B during the weekday evening and Saturday midday peak hours. No changes to overall level of service occur under 2029 Build conditions due to the addition of Project traffic. The vehicle queue lengths increase by less than 1 vehicle with the addition of Project traffic.

Table 14
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Signalized Intersection/ Peak Hour/Movement	2022 Baseline				2029 No-Build				2029 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] Avg/95th	V/C	Delay	LOS	Queue Avg/95th	V/C	Delay	LOS	Queue Avg/95th
Great Road at King Street												
Weekday Evening:												
Great Road EB LT	0.88	50.4	D	109/325	1.07	>80.0	F	164/423	1.12	>80.0	F	184/443
Great Road EB TH/RT	0.73	40.5	D	282/525	0.81	45.3	D	325/618	0.83	47.1	D	340/648
Great Road WB LT	0.66	29.2	C	86/190	0.80	40.2	D	96/261	0.87	49.1	D	101/305
Great Road WB TH/RT	0.77	43.7	D	335/626	0.84	48.8	D	382/724	0.87	51.0	D	397/755
King Street NB LT	>1.20	>80.0	F	152/338	>1.20	>80.0	F	166/358	>1.20	>80.0	F	166/358
King Street NB TH/RT	0.90	65.9	E	332/595	1.05	>80.0	F	384/653	1.05	>80.0	F	384/653
King Street SB LT	0.42	34.2	C	36/86	0.51	37.6	D	43/98	0.56	40.7	D	49/116
King Street SB TH/RT	1.08	>80.0	F	380/722	1.15	>80.0	F	432/787	1.15	>80.0	F	432/787
Overall	--	**70.3**	**E**	--	--	**>80.0**	**F**	--	--	**>80.0**	**F**	--
Saturday Midday:												
Great Road EB LT	0.47	23.2	C	62/163	0.57	28.1	C	72/177	0.60	29.6	C	72/192
Great Road EB TH/RT	0.72	39.0	D	280/633	0.82	45.6	D	340/740	0.85	48.0	D	359/780
Great Road WB LT	0.56	27.8	C	63/171	0.75	41.3	D	77/233	0.85	53.5	D	83/285
Great Road WB TH/RT	0.59	35.4	D	238/492	0.68	39.4	D	285/585	0.71	40.5	D	302/628
King Street NB LT	1.03	>80.0	F	90/278	1.12	>80.0	F	110/318	1.12	>80.0	F	110/318
King Street NB TH/RT	0.52	41.9	D	146/267	0.52	41.3	D	158/284	0.52	41.3	D	158/284
King Street SB LT	0.36	29.5	C	54/113	0.41	30.4	C	64/129	0.46	32.0	C	74/144
King Street SB TH/RT	0.86	58.9	E	251/418	0.87	58.7	E	276/457	0.87	58.7	E	276/457
Overall	--	**45.4**	**D**	--	--	**51.1**	**D**	--	--	**52.7**	**D**	--

See notes at end of table.

Table 14 (Continued)
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Signalized Intersection/ Peak Hour/Movement	2022 Baseline				2029 No-Build				2029 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] Avg/95th	V/C	Delay	LOS	Queue Avg/95th	V/C	Delay	LOS	Queue Avg/95th
Great Road at Powers Road												
Weekday Evening:												
Great Road EB LT	0.31	7.3	A	19/44	0.43	8.2	A	24/44	0.44	8.3	A	24/44
Great Road EB TH	0.40	7.9	A	52/107	0.36	6.4	A	69/111	0.37	6.5	A	73/115
Great Road WB TH	0.60	19.7	B	88/170	0.79	23.8	C	204/321	0.80	24.0	C	209/328
Great Road WB RT	0.23	1.0	A	0/15	0.25	0.8	A	0/13	0.25	0.8	A	0/13
Powers Road SB LT	0.50	22.4	C	53/112	0.66	36.8	D	79/178	0.66	37.4	D	80/181
Power Road SB RT	0.26	5.9	A	0/29	0.32	8.0	A	0/38	0.32	8.1	A	0/38
Overall	--	**11.2**	**B**	--	--	**15.3**	**B**	--	--	**15.4**	**B**	--
Saturday Midday:												
Great Road EB LT	0.16	5.7	A	8/23	0.18	5.9	A	9/25	0.19	6.0	A	9/25
Great Road EB TH	0.47	8.1	A	58/123	0.50	8.5	A	69/139	0.51	8.7	A	74/146
Great Road WB TH	0.68	19.2	B	119/235	0.71	19.9	B	140/266	0.72	20.5	C	148/280
Great Road WB RT	0.14	0.8	A	0/12	0.15	0.8	A	0/12	0.15	0.8	A	0/12
Powers Road SB LT	0.44	22.8	C	48/102	0.48	24.1	C	55/109	0.48	24.3	C	56/109
Power Road SB RT	0.15	7.3	A	0/23	0.16	7.3	A	0/24	0.16	7.3	A	0/24
Overall	--	**12.6**	**B**	--	--	**13.1**	**B**	--	--	**13.5**	**B**	--

[a]Volume-to-capacity ratio.
[b]Control (signal) delay per vehicle in seconds.
[c]Level of service.
[d]Queue length in feet.
NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Unsignalized Intersection Analysis Results

Great Road at Robinson Road

Under 2022 Baseline and 2029 No-Build conditions, the critical movement at this intersection operates at LOS C during the weekday evening and Saturday midday peak hours. Under 2029 Build conditions, the critical movement at this intersection operates at LOS D during the weekday evening peak hour and at LOS C during the Saturday midday peak hour. Critical movement delay increases by 2 seconds or less and the queue length remains unchanged under 2029 Build conditions compared to 2029 No-Build conditions.

King Street at Meetinghouse Road

Under 2022 Baseline and 2029 No-Build conditions, the critical movement at this intersection operates at LOS C during the weekday evening peak hour and at LOS B during the Saturday midday peak hour. No changes to critical movement level of service occur as a result of the addition of Project volumes under 2029 Build conditions.

Great Road at Adams Street/Stevens Street/Private Driveway

Under 2022 Baseline and 2029 No-Build conditions, the critical movements at this intersection operate at LOS D or better during the weekday evening and the Saturday midday peak hours. Under 2029 Build conditions, the critical movement at this intersection operates at LOS D during the weekday evening and Saturday midday peak hours except for the Steven Street approach during the Saturday midday peak hour which operates at LOS E. Although LOS changes from D to E for the Stevens Street approach, maximum vehicle queue lengths are expected to increase by less than 2 vehicles compared to the 2029 No-Build conditions.

King Street at Goldsmith Street/Stevens Street/Private Driveway

Under 2022 Baseline conditions, the critical movements at this intersection operate at LOS F and LOS D during the weekday evening peak hour and at LOS C during the Saturday midday peak hour. Under 2029 No-Build conditions, the critical movements at this intersection operate at LOS F and LOS E during the weekday evening peak hour and at LOS D and LOS C during the Saturday midday peak hour. No changes to critical movement level of service occur as a result of the addition of Project volumes under 2029 Build conditions.

Great Road at West Site Driveway

Under 2029 No-Build conditions, the critical movement at this intersection operates at LOS C during the weekday evening and Saturday midday peak hours. Under 2029 Build conditions, the critical movement at this intersection operates at LOS D during the weekday evening and Saturday midday peak hours.

Great Road at East Site Driveway

Under 2029 No-Build conditions, the critical movement at this intersection operates at LOS C during the weekday evening and Saturday midday peak hours. Under 2029 Build conditions, the critical movement at this intersection operates at LOS D during the weekday evening peak hour and at LOS E during the Saturday midday peak hour.

Table 15
UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Unsignalized Intersection/ Critical Movement/Peak Hour	2022 Baseline				2029 No-Build				2029 Build			
	Demand[a]	Delay[b]	LOS[c]	Queue[d]	Demand	Delay	LOS	Queue	Demand	Delay	LOS	Queue
Great Road at Robinson Road												
Weekday Evening:												
Robinson Road SB LT/RT	4	20.8	C	3	4	24.1	C	3	4	26.1	D	3
Saturday Midday:												
Robinson Road SB LT/RT	5	16.1	C	3	5	18.0	C	3	5	19.5	C	3
King Street at Meetinghouse Road												
Weekday Evening:												
Meetinghouse Road NB LT/RT	129	17.9	C	38	147	20.6	C	50	160	21.6	C	55
Saturday Midday:												
Meetinghouse Road NB LT/RT	113	12.1	B	18	132	12.8	B	23	147	13.1	B	28
Great Road at Adams Street/Stevens Street/Meetinghouse Drive[e]												
Weekday Evening:												
Adams Street NB LT/TH/RT	23	21.6	C	12	25	26.2	D	15	25	28.6	D	16
Stevens Street NEB LT/TH/RT	217	20.1	C	120	240	26.8	D	176	249	31.4	D	207
Saturday Midday:												
Adams Street NB LT/TH/RT	20	21.6	C	12	21	25.5	D	14	21	28.7	D	16
Stevens Street NEB LT/TH/RT	207	20.8	C	97	231	28.4	D	142	243	35.3	E	177
King Street at Goldsmith Street/Stevens Street/Private Driveway[e]												
Weekday Evening:												
Goldsmith Street EB LT/TH/RT	194	>50.0	F	191	208	>50.0	F	350	208	>50.0	F	375
Private Driveway WB LT/TH/RT	34	33.1	D	27	34	39.9	E	32	34	40.9	E	33
Saturday Midday:												
Goldsmith Street EB LT/TH/RT	163	23.0	C	95	174	29.3	D	123	174	31.0	D	128
Private Driveway WB LT/TH/RT	29	19.7	C	12	29	22.0	C	13	29	22.7	C	14

See notes at end of table.

Table 15 (Continued)
UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Unsignalized Intersection/ Critical Movement/Peak Hour	2022 Baseline				2029 No-Build				2029 Build			
	Demand[a]	Delay[b]	LOS[c]	Queue[d]	Demand	Delay	LOS	Queue	Demand	Delay	LOS	Queue
Great Road at West Site Driveway												
Weekday Evening:												
West Site Driveway SB LT/RT	**Site Traffic Neglected Under 2022 Baseline Conditions**				6	21.2	C	3	54	30.3	D	30
Saturday Midday:												
West Site Driveway SB LT/RT					7	19.6	C	3	66	32.1	D	38
Great Road at East Site Driveway												
Weekday Evening:												
East Site Driveway SB LT/RT	**Site Traffic Neglected Under 2022 Baseline Conditions**				29	21.3	C	10	78	32.0	D	45
Saturday Midday:												
East Site Driveway SB LT/RT					35	21.2	C	13	94	36.0	E	58

[a]Demand in vehicles per hour.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]95th percentile queue length in feet.
[e]Analysis conducted using SIDRA methodology.
NB = northbound; SB = southbound; EB = eastbound; WB = westbound; NEB = northeastbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

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 265-289 Great Road in Littleton, Massachusetts. This study was prepared in accordance with MassDOT Guidelines for *Transportation Impact Assessment (TIA);* 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:

- The study area intersections crash rates were observed to be lower than the MassDOT District 4 crash rates for unsignalized and signalized intersections except for the intersection of King Street with Great Road. No fatalities were reported over the five-year period reviewed. The intersection of King Street with Great Road is listed as a 2015-2017 HSIP cluster. The intersection was not listed on the 2016-2018 or 2017-2019 HSIP cluster list. According to the MassDOT Road Safety Audit (RSA) database, no RSAs have been conducted at this location.

- The Project is expected to generate 1,600 net new vehicle trips on an average weekday (two-way, 24-hour volume), with 93 net new vehicle trips (42 net new entering and 51 exiting) expected during the weekday evening peak hour. On Saturday, the Project is expected to generate 1,536 net new vehicle trips, with 122 net new vehicle trips (60 net new entering and 62 exiting) expected during the Saturday midday peak hour.

- The sight distance at the intersection of the site driveways with Great Road was found to exceed the recommended values for both SSD and ISD based on a speed of 35 mph.

- The analysis has indicated that the Project will generally result in minimal impact on motorist delays and vehicle queue lengths at the study intersection.

RECOMMENDATIONS

A transportation improvement program has been developed that is designed to provide safe and efficient access to the Project and address any deficiencies identified at the study area locations. The following improvements have been recommended as a part of this evaluation:

Project Access

Access to the Project site will be provided via the two new driveways onto Great Road. Currently, the site has six curb cuts onto Great Road so the Project will reduce the number of curb cuts onto Great Road by four. The following recommendations are offered with respect to the design and operation of the Project site driveways:

- The driveways should be placed under STOP-sign (*Manual on Uniform Traffic Control Devices* (MUTCD)[8] R1-1) control, with a painted STOP-bar included.

- All signs and other pavement markings to be installed within the Project site shall conform to the applicable standards of the current MUTCD.

- Signs and landscaping adjacent to the Project site driveways should be designed and maintained so as not to restrict lines of sight.

- Snow windrows within sight triangle areas of the Project site driveway should be promptly removed where such accumulations would impede sight lines.

CONCLUSIONS

As documented in this study, Project-related traffic increases will not result in significant increases on overall traffic volumes or traffic delays within the study area. The site driveways will provide efficient access to and from the development. In general, Project-related traffic can be adequately accommodated within the existing infrastructure with minimal impact on the traffic operations within the study area.

[8]Ibid 1.

APPENDIX

TRAFFIC COUNT DATA
COVID-19 ADJUSTMENT DATA
SEASONAL ADJUSTMENT DATA
PUBLIC TRANSPORTATION SCHEDULES
MOTOR VEHICLE CRASH DATA
VEHICLE SPEED DATA
GROWTH RATE DATA
TRIP GENERATION DATA
CAPACITY ANALYSIS

TRAFFIC COUNT DATA

Accurate Counts

978-664-2565

Location : Great Road 94160001
Location : East of Robinson Road
City/State: Littleton, MA

7/14/2022	WB,		Hour Totals		EB,		Hour Totals		Combined Totals	
Time	Morning	Afternoon	Morning	Afternon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	2	78			6	113				
12:15	4	70			6	112				
12:30	5	69			2	113				
12:45	3	61	14	278	3	129	17	467	31	745
1:00	4	59			8	124				
1:15	1	70			2	110				
1:30	0	58			2	116				
1:45	1	30	6	217	1	107	13	457	19	674
2:00	1	47			2	85				
2:15	0	61			1	98				
2:30	4	84			1	110				
2:45	4	55	9	247	1	133	5	426	14	673
3:00	0	71			1	124				
3:15	1	53			0	145				
3:30	2	71			7	127				
3:45	2	97	5	292	4	130	12	526	17	818
4:00	2	109			3	121				
4:15	1	82			6	98				
4:30	2	91			12	95				
4:45	7	96	12	378	17	117	38	431	50	809
5:00	1	98			26	90				
5:15	3	99			36	113				
5:30	9	105			61	125				
5:45	16	103	29	405	77	98	200	426	229	831
6:00	12	102			75	86				
6:15	20	102			111	86				
6:30	37	84			125	75				
6:45	43	70	112	358	137	69	448	316	560	674
7:00	25	55			114	74				
7:15	41	64			123	69				
7:30	44	48			162	55				
7:45	41	57	151	224	188	42	587	240	738	464
8:00	55	80			136	66				
8:15	49	37			161	62				
8:30	64	39			150	49				
8:45	62	34	230	190	175	56	622	233	852	423
9:00	60	20			117	51				
9:15	57	31			119	48				
9:30	67	27			113	37				
9:45	58	14	242	92	135	21	484	157	726	249
10:00	57	20			110	25				
10:15	63	6			119	19				
10:30	41	19			124	11				
10:45	69	30	230	75	97	17	450	72	680	147
11:00	71	12			102	4				
11:15	88	6			111	4				
11:30	66	6			117	4				
11:45	86	2	311	26	112	3	442	15	753	41
Total	1351	2782			3318	3766			4669	6548
Percent	32.7%	67.3%			46.8%	53.2%			41.6%	58.4%

Accurate Counts
978-664-2565

Location : Great Road 94160001
Location : East of Robinson Road
City/State: Littleton, MA

7/15/2022	WB,		Hour Totals		EB,		Hour Totals		Combined Totals	
Time	Morning	Afternoon	Morning	Afternon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	2	76			4	105				
12:15	4	73			3	120				
12:30	1	73			7	119				
12:45	2	68	9	290	4	119	18	463	27	753
1:00	1	88			2	104				
1:15	1	58			1	127				
1:30	1	87			1	122				
1:45	0	69	3	302	0	118	4	471	7	773
2:00	3	75			1	128				
2:15	0	61			4	109				
2:30	3	78			3	100				
2:45	1	89	7	303	2	93	10	430	17	733
3:00	1	88			1	96				
3:15	2	110			3	93				
3:30	1	127			1	90				
3:45	1	106	5	431	7	94	12	373	17	804
4:00	1	117			3	94				
4:15	1	84			5	104				
4:30	5	104			14	98				
4:45	4	83	11	388	15	91	37	387	48	775
5:00	2	95			22	100				
5:15	4	92			35	94				
5:30	11	89			69	109				
5:45	10	89	27	365	66	120	192	423	219	788
6:00	14	84			69	100				
6:15	10	77			92	94				
6:30	46	68			111	95				
6:45	32	75	102	304	108	88	380	377	482	681
7:00	31	68			95	64				
7:15	41	60			103	73				
7:30	43	68			125	74				
7:45	50	51	165	247	146	47	469	258	634	505
8:00	72	51			130	55				
8:15	47	41			128	55				
8:30	60	38			136	42				
8:45	51	35	230	165	129	60	523	212	753	377
9:00	60	33			118	45				
9:15	57	31			119	47				
9:30	51	34			97	50				
9:45	65	27	233	125	135	35	469	177	702	302
10:00	84	14			106	26				
10:15	62	21			107	21				
10:30	74	44			105	21				
10:45	57	34	277	113	119	18	437	86	714	199
11:00	68	30			97	12				
11:15	71	24			135	15				
11:30	69	18			114	15				
11:45	60	10	268	82	121	10	467	52	735	134
Total	1337	3115			3018	3709			4355	6824
Percent	30.0%	70.0%			44.9%	55.1%			39.0%	61.0%

Accurate Counts
978-664-2565

Location : Great Road 94160001
Location : East of Robinson Road
City/State: Littleton, MA

7/16/2022	WB,		Hour Totals		EB,		Hour Totals		Combined Totals	
Time	Morning	Afternoon	Morning	Afternon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00	9	75			13	124				
12:15	5	83			12	151				
12:30	6	50			4	120				
12:45	4	61	24	269	5	112	34	507	58	776
1:00	2	80			5	102				
1:15	0	69			2	110				
1:30	8	62			2	110				
1:45	1	72	11	283	1	112	10	434	21	717
2:00	1	70			2	99				
2:15	1	63			1	89				
2:30	2	56			3	95				
2:45	4	56	8	245	4	93	10	376	18	621
3:00	1	72			1	119				
3:15	0	87			0	106				
3:30	0	64			1	98				
3:45	1	57	2	280	3	100	5	423	7	703
4:00	2	75			4	99				
4:15	3	60			5	109				
4:30	4	58			9	96				
4:45	3	68	12	261	4	88	22	392	34	653
5:00	3	53			7	84				
5:15	6	59			16	90				
5:30	9	71			13	104				
5:45	5	51	23	234	16	86	52	364	75	598
6:00	9	61			16	95				
6:15	10	49			34	89				
6:30	36	57			44	59				
6:45	38	48	93	215	40	70	134	313	227	528
7:00	14	51			45	71				
7:15	31	45			32	53				
7:30	34	42			39	61				
7:45	34	39	113	177	70	56	186	241	299	418
8:00	48	34			64	64				
8:15	45	39			69	52				
8:30	48	43			94	42				
8:45	60	32	201	148	123	50	350	208	551	356
9:00	55	34			97	50				
9:15	55	33			76	56				
9:30	58	31			92	37				
9:45	62	17	230	115	116	30	381	173	611	288
10:00	71	24			109	31				
10:15	79	19			104	28				
10:30	95	21			104	15				
10:45	84	17	329	81	123	15	440	89	769	170
11:00	87	12			110	13				
11:15	67	*			135	*				
11:30	91	*			137	*				
11:45	64	*	309	12	142	*	524	13	833	25
Total	1355	2320			2148	3533			3503	5853
Percent	36.9%	63.1%			37.8%	62.2%			37.4%	62.6%
Grand Total	4043	8217			8484	11008			12527	19225
Percent	33.0%	67.0%			43.5%	56.5%			39.5%	60.5%
ADT		ADT: 10,607		AADT: 10,607						

Accurate Counts
978-664-2565

Location : Great Road
Location : East of Robinson Road
City/State: Littleton, MA

94160001

7/11/2022	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Week Average	
Time	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,	WB,	EB,
12:00 AM	*	*	*	*	*	*	14	17	9	18	24	34	*	*	16	23
1:00	*	*	*	*	*	*	6	13	3	4	11	10	*	*	7	9
2:00	*	*	*	*	*	*	9	5	7	10	8	10	*	*	8	8
3:00	*	*	*	*	*	*	5	12	5	12	2	5	*	*	4	10
4:00	*	*	*	*	*	*	12	38	11	37	12	22	*	*	12	32
5:00	*	*	*	*	*	*	29	200	27	192	23	52	*	*	26	148
6:00	*	*	*	*	*	*	112	448	102	380	93	134	*	*	102	321
7:00	*	*	*	*	*	*	151	587	165	469	113	186	*	*	143	414
8:00	*	*	*	*	*	*	230	622	230	523	201	350	*	*	220	498
9:00	*	*	*	*	*	*	242	484	233	469	230	381	*	*	235	445
10:00	*	*	*	*	*	*	230	450	277	437	329	440	*	*	279	442
11:00	*	*	*	*	*	*	311	442	268	467	309	524	*	*	296	478
12:00 PM	*	*	*	*	*	*	278	467	290	463	269	507	*	*	279	479
1:00	*	*	*	*	*	*	217	457	302	471	283	434	*	*	267	454
2:00	*	*	*	*	*	*	247	426	303	430	245	376	*	*	265	411
3:00	*	*	*	*	*	*	292	526	431	373	280	423	*	*	334	441
4:00	*	*	*	*	*	*	378	431	388	387	261	392	*	*	342	403
5:00	*	*	*	*	*	*	405	426	365	423	234	364	*	*	335	404
6:00	*	*	*	*	*	*	358	316	304	377	215	313	*	*	292	335
7:00	*	*	*	*	*	*	224	240	247	258	177	241	*	*	216	246
8:00	*	*	*	*	*	*	190	233	165	212	148	208	*	*	168	218
9:00	*	*	*	*	*	*	92	157	125	177	115	173	*	*	111	169
10:00	*	*	*	*	*	*	75	72	113	86	81	89	*	*	90	82
11:00	*	*	*	*	*	*	26	15	82	52	12	13	*	*	40	27
Total	0	0	0	0	0	0	4133	7084	4452	6727	3675	5681	0	0	4087	6497
Day	0		0		0		11217		11179		9356		0		10584	
AM Peak							11:00	8:00	10:00	8:00	10:00	11:00			11:00	8:00
Volume							311	622	277	523	329	524			296	498
PM Peak							5:00	3:00	3:00	1:00	1:00	12:00 PM			4:00	12:00 PM
Volume							405	526	431	471	283	507			342	479
Comb Total	0		0		0		11217		11179		9356		0		10584	
ADT	ADT: 10,607		AADT: 10,607													

Accurate Counts

978-664-2565

N/S Street : Powers Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160001
Site Code : 94160001
Start Date : 7/14/2022
Page No : 1

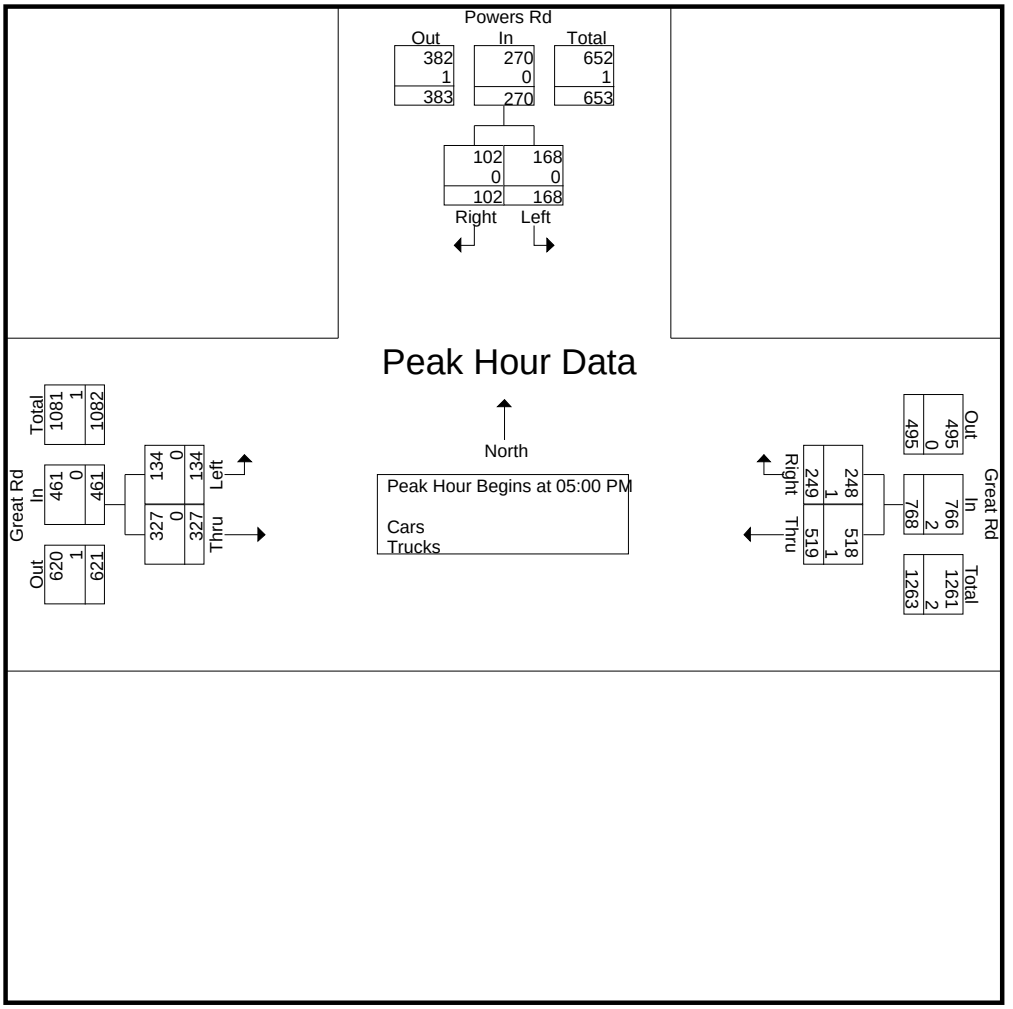
Groups Printed- Cars - Trucks

	Powers Rd From North		Great Rd From East		Great Rd From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM	31	27	135	65	104	90	452
04:15 PM	33	33	120	43	33	84	346
04:30 PM	50	34	95	35	19	71	304
04:45 PM	29	29	116	49	25	88	336
Total	143	123	466	192	181	333	1438
05:00 PM	45	35	142	61	29	73	385
05:15 PM	42	26	137	63	38	78	384
05:30 PM	40	19	119	69	37	92	376
05:45 PM	41	22	121	56	30	84	354
Total	168	102	519	249	134	327	1499
Grand Total	311	225	985	441	315	660	2937
Apprch %	58	42	69.1	30.9	32.3	67.7	
Total %	10.6	7.7	33.5	15	10.7	22.5	
Cars	311	224	981	439	314	657	2926
% Cars	100	99.6	99.6	99.5	99.7	99.5	99.6
Trucks	0	1	4	2	1	3	11
% Trucks	0	0.4	0.4	0.5	0.3	0.5	0.4

	Powers Rd From North			Great Rd From East			Great Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. 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	**45**	**35**	**80**	**142**	61	**203**	29	73	102	**385**
05:15 PM	42	26	68	137	63	200	**38**	78	116	384
05:30 PM	40	19	59	119	**69**	188	37	**92**	**129**	376
05:45 PM	41	22	63	121	56	177	30	84	114	354
Total Volume	168	102	270	519	249	768	134	327	461	1499
% App. Total	62.2	37.8		67.6	32.4		29.1	70.9		
PHF	.933	.729	.844	.914	.902	.946	.882	.889	.893	.973
Cars	168	102	270	518	248	766	134	327	461	1497
% Cars	100	100	100	99.8	99.6	99.7	100	100	100	99.9
Trucks	0	0	0	1	1	2	0	0	0	2
% Trucks	0	0	0	0.2	0.4	0.3	0	0	0	0.1

N/S Street : Powers Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160001
Site Code : 94160001
Start Date : 7/14/2022
Page No : 2



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			05:00 PM			04:00 PM		
+0 mins.	**50**	34	**84**	**142**	61	**203**	**104**	**90**	**194**
+15 mins.	29	29	58	137	63	200	33	84	117
+30 mins.	45	**35**	80	119	**69**	188	19	71	90
+45 mins.	42	26	68	121	56	177	25	88	113
Total Volume	166	124	290	519	249	768	181	333	514
% App. Total	57.2	42.8		67.6	32.4		35.2	64.8	
PHF	.830	.886	.863	.914	.902	.946	.435	.925	.662
Cars	166	124	290	518	248	766	180	330	510
% Cars	100	100	100	99.8	99.6	99.7	99.4	99.1	99.2
Trucks	0	0	0	1	1	2	1	3	4
% Trucks	0	0	0	0.2	0.4	0.3	0.6	0.9	0.8

Accurate Counts

978-664-2565

N/S Street : Powers Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160001
Site Code : 94160001
Start Date : 7/14/2022

Groups Printed- Trucks

	Powers Rd From North		Great Rd From East		Great Rd From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM	0	1	2	0	1	1	5
04:15 PM	0	0	0	1	0	1	2
04:30 PM	0	0	1	0	0	1	2
04:45 PM	0	0	0	0	0	0	0
Total	0	1	3	1	1	3	9
05:00 PM	0	0	0	1	0	0	1
05:15 PM	0	0	1	0	0	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	1	1	0	0	2
Grand Total	0	1	4	2	1	3	11
Apprch %	0	100	66.7	33.3	25	75	
Total %	0	9.1	36.4	18.2	9.1	27.3	

	Powers Rd From North			Great Rd From East			Great Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. 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	**1**	**1**	**2**	0	**2**	**1**	**1**	**2**	**5**
04:15 PM	0	0	0	0	**1**	1	0	1	1	2
04:30 PM	0	0	0	1	0	1	0	1	1	2
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	1	3	1	4	1	3	4	9
% App. Total	0	100		75	25		25	75		
PHF	.000	.250	.250	.375	.250	.500	.250	.750	.500	.450

Accurate Counts

978-664-2565

N/S Street : Powers Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160001
Site Code : 94160001
Start Date : 7/14/2022

Groups Printed- Bikes Peds

	Powers Rd From North			Great Rd From East			Great Rd From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Exclu. Total	Inclu. Total	Int. Total
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	1	0	0	0	0	0	0	1	1
04:45 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
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	1	0	0	0	0	0	1	1
05:30 PM	0	1	0	0	0	0	0	0	0	0	1	1
05:45 PM	0	0	1	0	0	0	0	0	0	1	0	1
Total	0	1	1	0	1	0	0	0	0	1	2	3
Grand Total	0	1	1	1	1	0	0	0	0	1	3	4
Apprch %	0	100		50	50		0	0				
Total %	0	33.3		33.3	33.3		0	0		25	75	

	Powers Rd From North			Great Rd From East			Great Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. 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	0	0	**1**	0	**1**	0	0	0	**1**
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	**1**	1	0	0	0	1
Total Volume	0	0	0	1	1	2	0	0	0	2
% App. Total	0	0		50	50		0	0		
PHF	.000	.000	.000	.250	.250	.500	.000	.000	.000	.500

Accurate Counts

978-664-2565

N/S Street : Powers Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S1
Site Code : 94160001
Start Date : 7/16/2022
Page No : 1

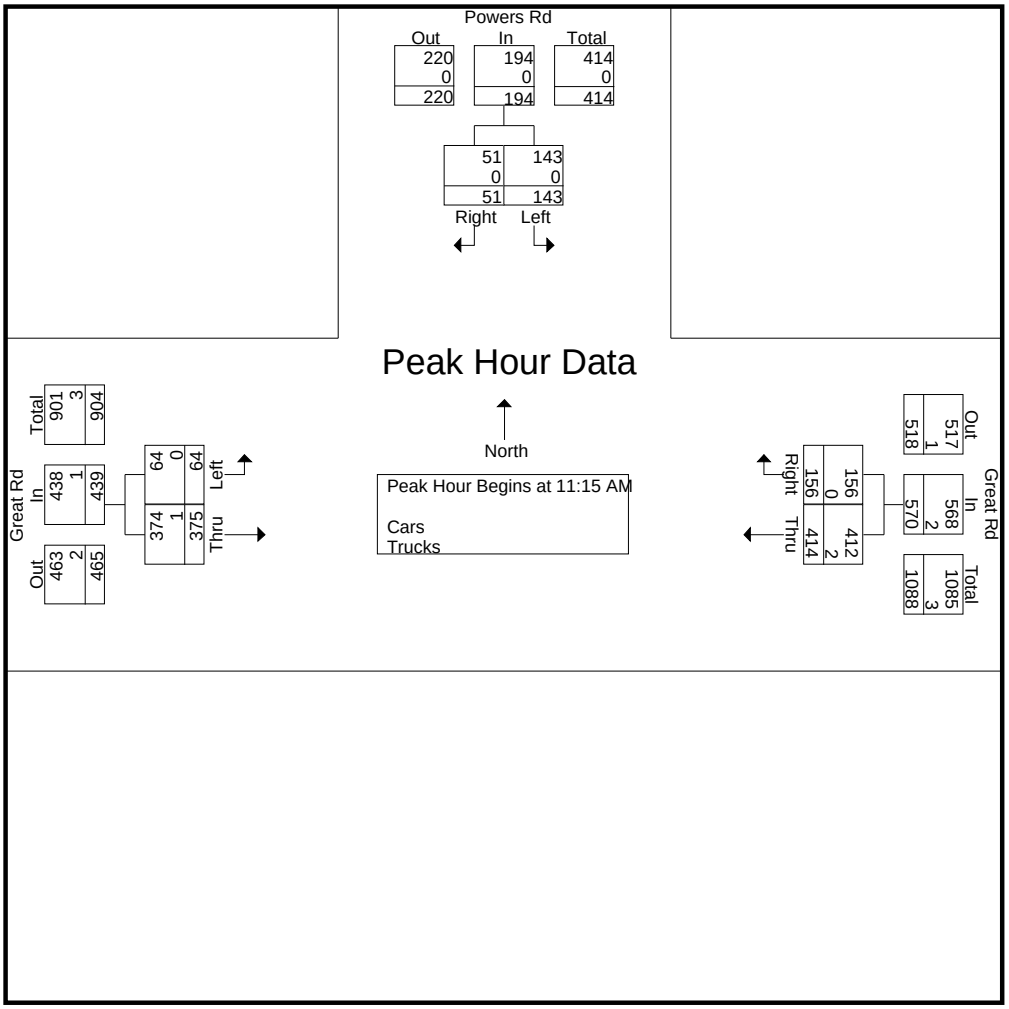
Groups Printed- Cars - Trucks

	Powers Rd From North		Great Rd From East		Great Rd From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
11:00 AM	17	11	109	37	20	81	275
11:15 AM	29	8	110	48	18	96	309
11:30 AM	38	11	113	39	12	89	302
11:45 AM	41	17	96	39	21	102	316
Total	125	47	428	163	71	368	1202
12:00 PM	35	15	95	30	13	88	276
12:15 PM	34	18	107	43	15	85	302
12:30 PM	31	18	74	25	15	83	246
12:45 PM	45	17	99	37	17	89	304
Total	145	68	375	135	60	345	1128
01:00 PM	34	29	84	30	10	89	276
01:15 PM	35	23	79	26	15	80	258
01:30 PM	36	17	89	35	20	75	272
01:45 PM	31	22	96	29	15	95	288
Total	136	91	348	120	60	339	1094
Grand Total	406	206	1151	418	191	1052	3424
Apprch %	66.3	33.7	73.4	26.6	15.4	84.6	
Total %	11.9	6	33.6	12.2	5.6	30.7	
Cars	406	206	1149	418	191	1049	3419
% Cars	100	100	99.8	100	100	99.7	99.9
Trucks	0	0	2	0	0	3	5
% Trucks	0	0	0.2	0	0	0.3	0.1

	Powers Rd From North			Great Rd From East			Great Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. 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	29	8	37	110	**48**	**158**	18	96	114	309
11:30 AM	38	11	49	**113**	39	152	12	89	101	302
11:45 AM	**41**	**17**	**58**	96	39	135	**21**	**102**	**123**	**316**
12:00 PM	35	15	50	95	30	125	13	88	101	276
Total Volume	143	51	194	414	156	570	64	375	439	1203
% App. Total	73.7	26.3		72.6	27.4		14.6	85.4		
PHF	.872	.750	.836	.916	.813	.902	.762	.919	.892	.952
Cars	143	51	194	412	156	568	64	374	438	1200
% Cars	100	100	100	99.5	100	99.6	100	99.7	99.8	99.8
Trucks	0	0	0	2	0	2	0	1	1	3
% Trucks	0	0	0	0.5	0	0.4	0	0.3	0.2	0.2

N/S Street : Powers Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S1
Site Code : 94160001
Start Date : 7/16/2022
Page No : 2



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:45 PM			11:00 AM			11:00 AM		
+0 mins.	**45**	17	62	109	37	146	20	81	101
+15 mins.	34	**29**	**63**	110	**48**	**158**	18	96	114
+30 mins.	35	23	58	**113**	39	152	12	89	101
+45 mins.	36	17	53	96	39	135	**21**	**102**	**123**
Total Volume	150	86	236	428	163	591	71	368	439
% App. Total	63.6	36.4		72.4	27.6		16.2	83.8	
PHF	.833	.741	.937	.947	.849	.935	.845	.902	.892
Cars	150	86	236	427	163	590	71	367	438
% Cars	100	100	100	99.8	100	99.8	100	99.7	99.8
Trucks	0	0	0	1	0	1	0	1	1
% Trucks	0	0	0	0.2	0	0.2	0	0.3	0.2

Accurate Counts

978-664-2565

N/S Street : Powers Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S1
Site Code : 94160001
Start Date : 7/16/2022

Groups Printed- Trucks

	Powers Rd From North		Great Rd From East		Great Rd From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
11:00 AM	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	1	1
11:45 AM	0	0	1	0	0	0	1
Total	0	0	1	0	0	1	2
12:00 PM	0	0	1	0	0	0	1
12:15 PM	0	0	0	0	0	1	1
12:30 PM	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0
Total	0	0	1	0	0	1	2
01:00 PM	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	1	1
Total	0	0	0	0	0	1	1
Grand Total	0	0	2	0	0	3	5
Apprch %	0	0	100	0	0	100	
Total %	0	0	40	0	0	60	

	Powers Rd From North			Great Rd From East			Great Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:30 AM										
11:30 AM	0	0	0	0	0	0	0	**1**	**1**	**1**
11:45 AM	0	0	0	**1**	0	**1**	0	0	0	1
12:00 PM	0	0	0	1	0	1	0	0	0	1
12:15 PM	0	0	0	0	0	0	0	1	1	1
Total Volume	0	0	0	2	0	2	0	2	2	4
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.500	.000	.500	.000	.500	.500	1.00

Accurate Counts

978-664-2565

N/S Street : Powers Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S1
Site Code : 94160001
Start Date : 7/16/2022

Groups Printed- Bikes Peds

	Powers Rd From North			Great Rd From East			Great Rd From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Exclu. Total	Inclu. Total	Int. Total
11:00 AM	0	0	0	0	0	0	0	1	0	0	1	1
11:15 AM	0	3	0	0	0	0	0	0	0	0	3	3
11:30 AM	0	0	0	1	0	0	0	1	0	0	2	2
11:45 AM	1	0	0	0	0	0	0	1	0	0	2	2
Total	1	3	0	1	0	0	0	3	0	0	8	8
12:00 PM	0	1	0	0	0	0	0	1	0	0	2	2
12:15 PM	0	0	0	0	0	0	3	0	0	0	3	3
12:30 PM	0	1	0	0	0	0	0	0	0	0	1	1
12:45 PM	0	2	0	0	1	0	2	1	0	0	6	6
Total	0	4	0	0	1	0	5	2	0	0	12	12
01:00 PM	0	2	0	0	0	0	2	0	0	0	4	4
01:15 PM	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
01:45 PM	0	1	0	1	0	0	0	0	0	0	2	2
Total	0	3	0	1	0	0	2	0	0	0	6	6
Grand Total	1	10	0	2	1	0	7	5	0	0	26	26
Apprch %	9.1	90.9		66.7	33.3		58.3	41.7				
Total %	3.8	38.5		7.7	3.8		26.9	19.2		0	100	

	Powers Rd From North			Great Rd From East			Great Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 12:15 PM										
12:15 PM	0	0	0	0	0	0	**3**	0	**3**	3
12:30 PM	0	1	1	0	0	0	0	0	0	1
12:45 PM	0	**2**	**2**	0	**1**	**1**	2	**1**	3	**6**
01:00 PM	0	2	2	0	0	0	2	0	2	4
Total Volume	0	5	5	0	1	1	7	1	8	14
% App. Total	0	100		0	100		87.5	12.5		
PHF	.000	.625	.625	.000	.250	.250	.583	.250	.667	.583

Accurate Counts

978-664-2565

N/S Street : Robinson Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160002
Site Code : 94160002
Start Date : 7/14/2022
Page No : 1

Groups Printed- Cars - Trucks

	Robinson Rd From North		Great Rd From East		Great Rd From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM	1	0	180	3	2	127	313
04:15 PM	0	2	160	0	1	102	265
04:30 PM	3	0	143	1	0	93	240
04:45 PM	0	0	176	2	2	117	297
Total	4	2	659	6	5	439	1115
05:00 PM	1	1	177	0	0	92	271
05:15 PM	1	1	186	0	0	120	308
05:30 PM	0	0	153	2	1	124	280
05:45 PM	0	4	157	1	1	100	263
Total	2	6	673	3	2	436	1122
Grand Total	6	8	1332	9	7	875	2237
Apprch %	42.9	57.1	99.3	0.7	0.8	99.2	
Total %	0.3	0.4	59.5	0.4	0.3	39.1	
Cars	6	8	1324	9	7	872	2226
% Cars	100	100	99.4	100	100	99.7	99.5
Trucks	0	0	8	0	0	3	11
% Trucks	0	0	0.6	0	0	0.3	0.5

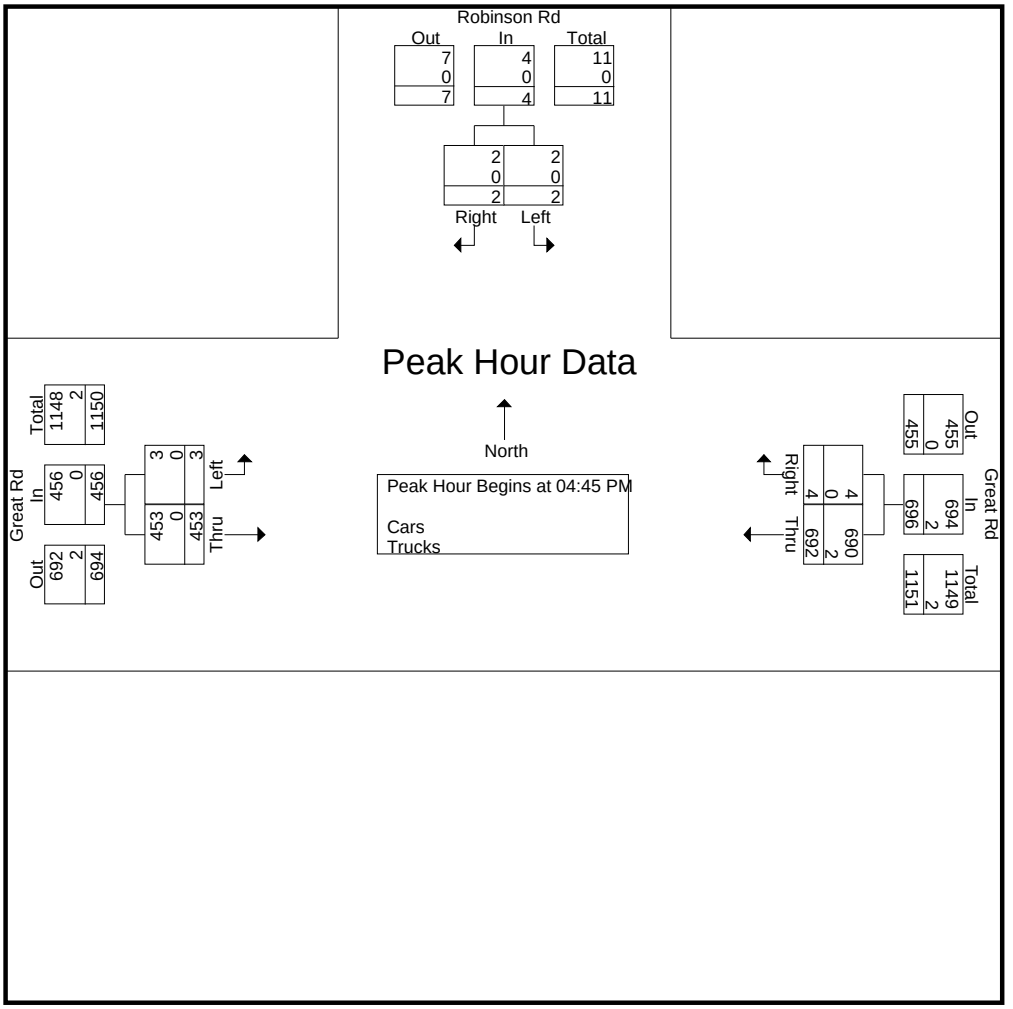
	Robinson Rd From North			Great Rd From East			Great Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	0	0	0	176	**2**	178	**2**	117	119	297
05:00 PM	**1**	**1**	**2**	177	0	177	0	92	92	271
05:15 PM	1	1	2	**186**	0	**186**	0	120	120	**308**
05:30 PM	0	0	0	153	2	155	1	**124**	**125**	280
Total Volume	2	2	4	692	4	696	3	453	456	1156
% App. Total	50	50		99.4	0.6		0.7	99.3		
PHF	.500	.500	.500	.930	.500	.935	.375	.913	.912	.938
Cars	2	2	4	690	4	694	3	453	456	1154
% Cars	100	100	100	99.7	100	99.7	100	100	100	99.8
Trucks	0	0	0	2	0	2	0	0	0	2
% Trucks	0	0	0	0.3	0	0.3	0	0	0	0.2

Accurate Counts

978-664-2565

N/S Street : Robinson Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160002
Site Code : 94160002
Start Date : 7/14/2022
Page No : 2



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			04:45 PM			04:45 PM		
+0 mins.	**1**	1	2	176	**2**	178	**2**	117	119
+15 mins.	1	1	2	177	0	177	0	92	92
+30 mins.	0	0	0	**186**	0	**186**	0	120	120
+45 mins.	0	**4**	**4**	153	2	155	1	**124**	**125**
Total Volume	2	6	8	692	4	696	3	453	456
% App. Total	25	75		99.4	0.6		0.7	99.3	
PHF	.500	.375	.500	.930	.500	.935	.375	.913	.912
Cars	2	6	8	690	4	694	3	453	456
% Cars	100	100	100	99.7	100	99.7	100	100	100
Trucks	0	0	0	2	0	2	0	0	0
% Trucks	0	0	0	0.3	0	0.3	0	0	0

Accurate Counts

978-664-2565

N/S Street : Robinson Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160002
Site Code : 94160002
Start Date : 7/14/2022

Groups Printed- Trucks

	Robinson Rd From North		Great Rd From East		Great Rd From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM	0	0	4	0	0	2	6
04:15 PM	0	0	1	0	0	0	1
04:30 PM	0	0	1	0	0	1	2
04:45 PM	0	0	1	0	0	0	1
Total	0	0	7	0	0	3	10
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	1	0	0	0	1
05:45 PM	0	0	0	0	0	0	0
Total	0	0	1	0	0	0	1
Grand Total	0	0	8	0	0	3	11
Apprch %	0	0	100	0	0	100	
Total %	0	0	72.7	0	0	27.3	

	Robinson Rd From North			Great Rd From East			Great Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. 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	**4**	0	**4**	0	**2**	**2**	**6**
04:15 PM	0	0	0	1	0	1	0	0	0	1
04:30 PM	0	0	0	1	0	1	0	1	1	2
04:45 PM	0	0	0	1	0	1	0	0	0	1
Total Volume	0	0	0	7	0	7	0	3	3	10
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.438	.000	.438	.000	.375	.375	.417

Accurate Counts

978-664-2565

N/S Street : Robinson Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160002
Site Code : 94160002
Start Date : 7/14/2022

Groups Printed- Bikes Peds

	Robinson Rd From North			Great Rd From East			Great Rd From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	1	0	0	0	0	0	0	1	1
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	1	0	0	1	1
Total	0	0	0	1	0	0	0	1	0	0	2	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	1	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	1	0	0	0	0	0	0	1	1
Total	0	1	0	1	0	0	0	0	0	0	2	2
Grand Total	0	1	0	2	0	0	0	1	0	0	4	4
Apprch %	0	100		100	0		0	100				
Total %	0	25		50	0		0	25		0	100	

	Robinson Rd From North			Great Rd From East			Great Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. 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	**1**	0	**1**	0	0	0	**1**
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	**1**	**1**	1
Total Volume	0	0	0	1	0	1	0	1	1	2
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.250	.000	.250	.000	.250	.250	.500

Accurate Counts

978-664-2565

N/S Street : Robinson Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S2
Site Code : 94160002
Start Date : 7/16/2022
Page No : 1

Groups Printed- Cars - Trucks

	Robinson Rd From North		Great Rd From East		Great Rd From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
11:00 AM	1	0	142	1	1	120	265
11:15 AM	1	2	129	0	1	139	272
11:30 AM	0	2	153	1	2	133	291
11:45 AM	0	1	142	0	0	147	290
Total	2	5	566	2	4	539	1118
12:00 PM	0	0	144	1	1	128	274
12:15 PM	1	1	162	0	2	153	319
12:30 PM	1	0	112	1	0	133	247
12:45 PM	0	0	119	0	1	117	237
Total	2	1	537	2	4	531	1077
01:00 PM	0	1	133	1	0	99	234
01:15 PM	1	0	98	0	0	116	215
01:30 PM	0	0	126	0	0	115	241
01:45 PM	0	1	136	1	0	112	250
Total	1	2	493	2	0	442	940
Grand Total	5	8	1596	6	8	1512	3135
Apprch %	38.5	61.5	99.6	0.4	0.5	99.5	
Total %	0.2	0.3	50.9	0.2	0.3	48.2	
Cars	5	8	1590	6	8	1503	3120
% Cars	100	100	99.6	100	100	99.4	99.5
Trucks	0	0	6	0	0	9	15
% Trucks	0	0	0.4	0	0	0.6	0.5

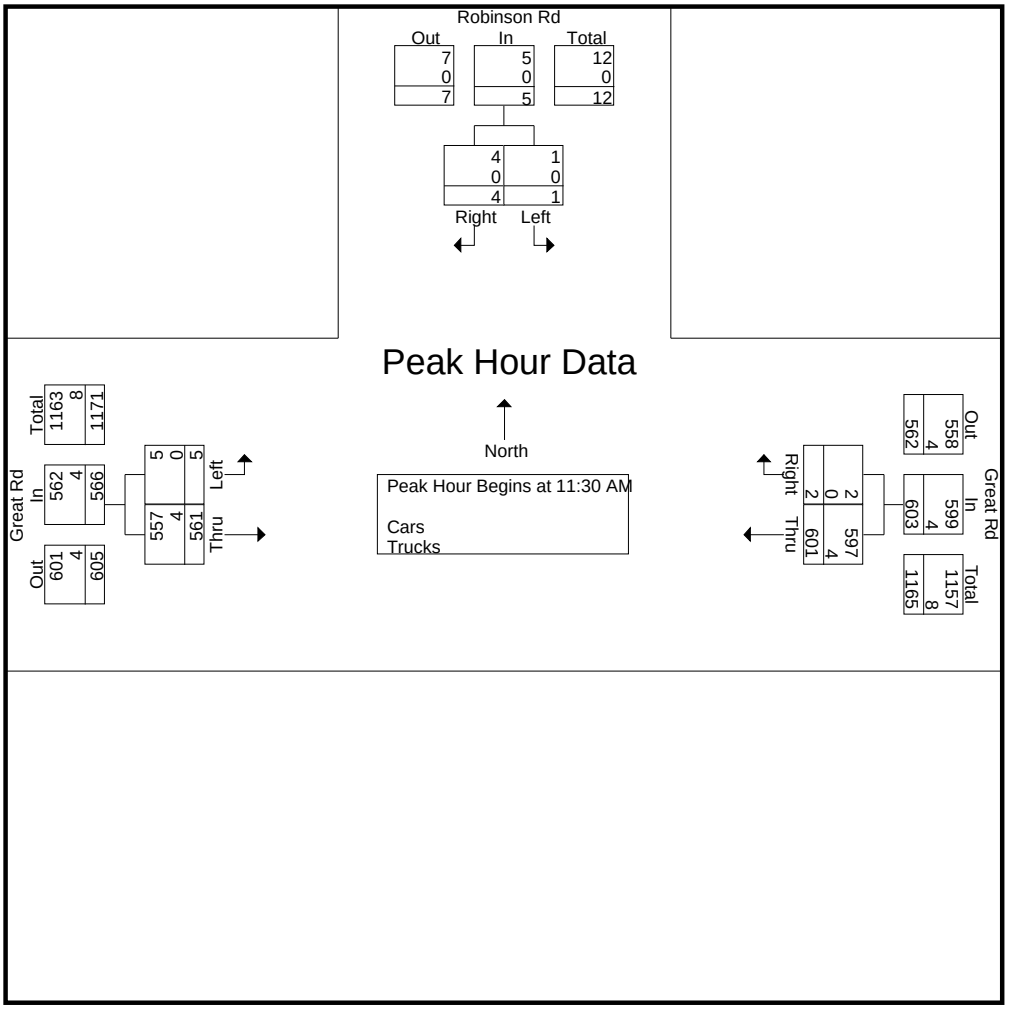
	Robinson Rd From North			Great Rd From East			Great Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:30 AM										
11:30 AM	0	**2**	**2**	153	**1**	154	**2**	133	135	291
11:45 AM	0	1	1	142	0	142	0	147	147	290
12:00 PM	0	0	0	144	1	145	1	128	129	274
12:15 PM	**1**	1	2	**162**	0	**162**	2	**153**	**155**	**319**
Total Volume	1	4	5	601	2	603	5	561	566	1174
% App. Total	20	80		99.7	0.3		0.9	99.1		
PHF	.250	.500	.625	.927	.500	.931	.625	.917	.913	.920
Cars	1	4	5	597	2	599	5	557	562	1166
% Cars	100	100	100	99.3	100	99.3	100	99.3	99.3	99.3
Trucks	0	0	0	4	0	4	0	4	4	8
% Trucks	0	0	0	0.7	0	0.7	0	0.7	0.7	0.7

Accurate Counts

978-664-2565

N/S Street : Robinson Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S2
Site Code : 94160002
Start Date : 7/16/2022
Page No : 2



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			11:30 AM			11:30 AM		
+0 mins.	**1**	0	1	153	**1**	154	**2**	133	135
+15 mins.	1	**2**	**3**	142	0	142	0	147	147
+30 mins.	0	2	2	144	1	145	1	128	129
+45 mins.	0	1	1	**162**	0	**162**	2	**153**	**155**
Total Volume	2	5	7	601	2	603	5	561	566
% App. Total	28.6	71.4		99.7	0.3		0.9	99.1	
PHF	.500	.625	.583	.927	.500	.931	.625	.917	.913
Cars	2	5	7	597	2	599	5	557	562
% Cars	100	100	100	99.3	100	99.3	100	99.3	99.3
Trucks	0	0	0	4	0	4	0	4	4
% Trucks	0	0	0	0.7	0	0.7	0	0.7	0.7

Accurate Counts

978-664-2565

N/S Street : Robinson Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S2
Site Code : 94160002
Start Date : 7/16/2022

Groups Printed- Trucks

	Robinson Rd From North		Great Rd From East		Great Rd From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
11:00 AM	0	0	2	0	0	1	3
11:15 AM	0	0	0	0	0	2	2
11:30 AM	0	0	1	0	0	0	1
11:45 AM	0	0	0	0	0	2	2
Total	0	0	3	0	0	5	8
12:00 PM	0	0	3	0	0	1	4
12:15 PM	0	0	0	0	0	1	1
12:30 PM	0	0	0	0	0	1	1
12:45 PM	0	0	0	0	0	0	0
Total	0	0	3	0	0	3	6
01:00 PM	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	1	1
Total	0	0	0	0	0	1	1
Grand Total	0	0	6	0	0	9	15
Apprch %	0	0	100	0	0	100	
Total %	0	0	40	0	0	60	

	Robinson Rd From North			Great Rd From East			Great Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. 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	0	0	**2**	**2**	2
11:30 AM	0	0	0	1	0	1	0	0	0	1
11:45 AM	0	0	0	0	0	0	0	2	2	2
12:00 PM	0	0	0	**3**	0	**3**	0	1	1	**4**
Total Volume	0	0	0	4	0	4	0	5	5	9
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.333	.000	.333	.000	.625	.625	.563

Accurate Counts

978-664-2565

N/S Street : Robinson Road
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S2
Site Code : 94160002
Start Date : 7/16/2022

Groups Printed- Bikes Peds

	Robinson Rd From North			Great Rd From East			Great Rd From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Exclu. Total	Inclu. Total	Int. Total
11:00 AM	0	0	1	0	0	0	0	0	0	1	0	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	1	0	0	1	1
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	0	0	0	1	0	1	1	2
12:00 PM	0	0	2	0	0	0	0	0	0	2	0	2
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	2	0	0	0	0	0	0	2	2
12:45 PM	0	1	0	0	0	0	0	0	0	0	1	1
Total	0	1	2	2	0	0	0	0	0	2	3	5
01:00 PM	0	0	0	2	0	0	0	0	0	0	2	2
01:15 PM	0	0	0	0	1	0	0	1	0	0	2	2
01:30 PM	0	0	0	1	0	1	0	0	0	1	1	2
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	3	1	1	0	1	0	1	5	6
Grand Total	0	1	3	5	1	1	0	2	0	4	9	13
Apprch %	0	100		83.3	16.7		0	100				
Total %	0	11.1		55.6	11.1		0	22.2		30.8	69.2	

	Robinson Rd From North			Great Rd From East			Great Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. 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	**2**	0	**2**	0	0	0	**2**
12:45 PM	0	**1**	**1**	0	0	0	0	0	0	1
01:00 PM	0	0	0	2	0	2	0	0	0	2
01:15 PM	0	0	0	0	**1**	1	0	**1**	**1**	2
Total Volume	0	1	1	4	1	5	0	1	1	7
% App. Total	0	100		80	20		0	100		
PHF	.000	.250	.250	.500	.250	.625	.000	.250	.250	.875

Accurate Counts

978-664-2565

N/S Street : Meetinghouse Rd / Adams St
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160003
Site Code : 94160003
Start Date : 7/14/2022
Page No : 1

Groups Printed- Cars - Trucks

	Meetinghouse Rd From North				Great Rd From East				Adams St From South				Stevens St From Southwest				Great Rd From West				
Start Time	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Left	Thru	Right	Hd Rt	Int. Total
04:00 PM	0	0	0	0	3	0	150	15	0	3	1	4	6	8	41	1	3	86	5	0	326
04:15 PM	0	0	0	0	0	0	148	22	0	3	0	5	0	4	43	4	3	53	3	0	288
04:30 PM	0	0	0	0	4	0	124	13	0	0	0	4	2	0	31	1	2	61	5	0	247
04:45 PM	0	0	0	0	6	0	142	25	0	0	0	2	0	0	43	3	1	75	3	0	300
Total	0	0	0	0	13	0	564	75	0	6	1	15	8	12	158	9	9	275	16	0	1161
05:00 PM	0	0	0	0	4	0	154	18	0	2	4	1	4	4	42	3	12	50	4	0	302
05:15 PM	0	0	0	0	1	0	166	12	0	2	0	4	1	6	40	1	15	74	3	0	325
05:30 PM	0	0	0	0	2	0	153	10	0	3	1	4	4	9	48	2	7	82	5	0	330
05:45 PM	0	0	0	0	2	0	144	20	0	1	0	0	3	0	29	2	0	72	1	0	274
Total	0	0	0	0	9	0	617	60	0	8	5	9	12	19	159	8	34	278	13	0	1231
Grand Total	0	0	0	0	22	0	1181	135	0	14	6	24	20	31	317	17	43	553	29	0	2392
Apprch %	0	0	0	0	1.6	0	88.3	10.1	0	31.8	13.6	54.5	5.2	8.1	82.3	4.4	6.9	88.5	4.6	0	
Total %	0	0	0	0	0.9	0	49.4	5.6	0	0.6	0.3	1	0.8	1.3	13.3	0.7	1.8	23.1	1.2	0	
Cars	0	0	0	0	22	0	1175	135	0	14	6	22	20	31	317	17	42	550	29	0	2380
% Cars	0	0	0	0	100	0	99.5	100	0	100	100	91.7	100	100	100	100	97.7	99.5	100	0	99.5
Trucks	0	0	0	0	0	0	6	0	0	0	0	2	0	0	0	0	1	3	0	0	12
% Trucks	0	0	0	0	0	0	0.5	0	0	0	0	8.3	0	0	0	0	2.3	0.5	0	0	0.5

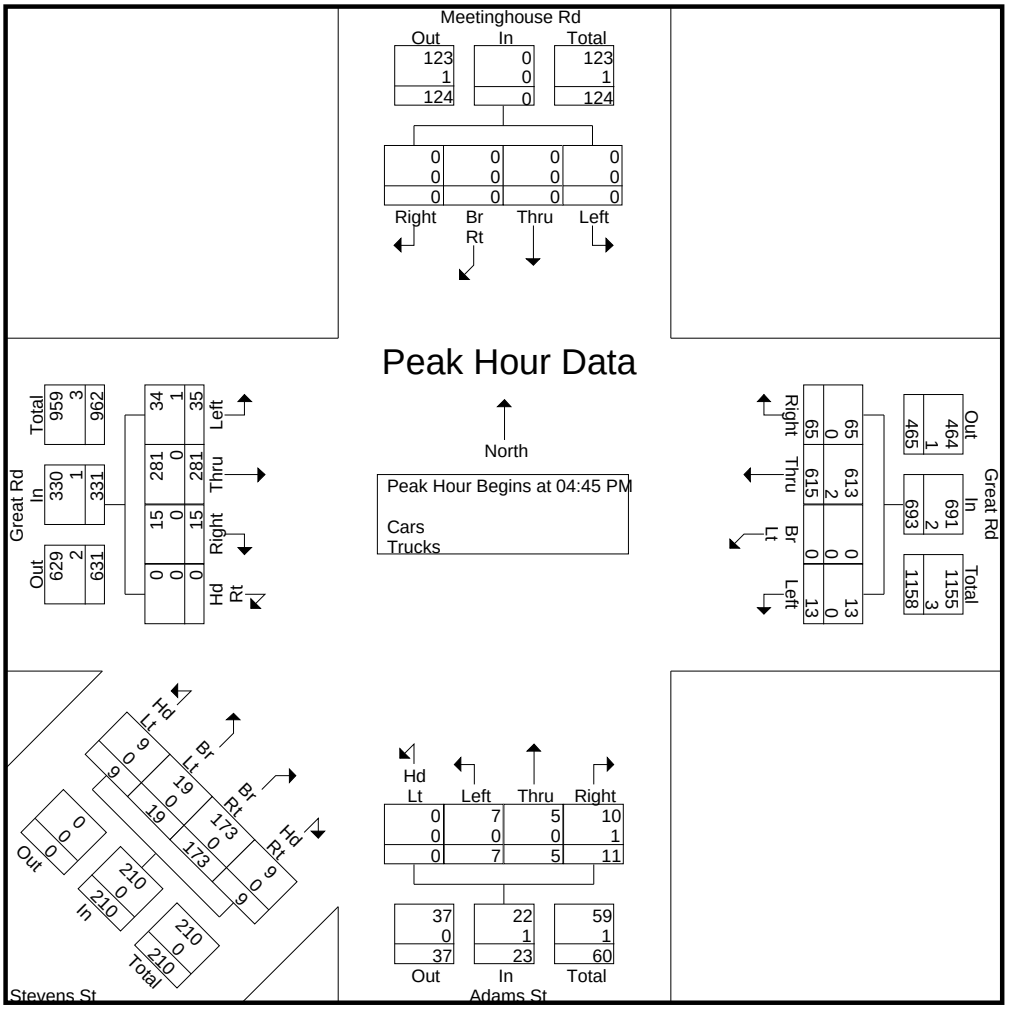
	Meetinghouse Rd From North					Great Rd From East					Adams St From South					Stevens St From Southwest					Great Rd From West					
Start Time	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Left	Thru	Right	Hd Rt	App. Total	Int. 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	**6**	0	142	**25**	173	0	0	0	2	2	0	0	43	**3**	46	1	75	3	0	79	300
05:00 PM	0	0	0	0	0	4	0	154	18	176	0	2	**4**	1	7	**4**	4	42	3	53	12	50	4	0	66	302
05:15 PM	0	0	0	0	0	1	0	**166**	12	**179**	0	2	0	**4**	6	1	6	40	1	48	**15**	74	3	0	92	325
05:30 PM	0	0	0	0	0	2	0	153	10	165	0	**3**	1	4	**8**	4	**9**	**48**	2	**63**	7	**82**	**5**	0	**94**	**330**
Total Volume	0	0	0	0	0	13	0	615	65	693	0	7	5	11	23	9	19	173	9	210	35	281	15	0	331	1257
% App. Total	0	0	0	0		1.9	0	88.7	9.4		0	30.4	21.7	47.8		4.3	9	82.4	4.3		10.6	84.9	4.5	0		
PHF	.000	.000	.000	.000	.000	.542	.000	.926	.650	.968	.000	.583	.313	.688	.719	.563	.528	.901	.750	.833	.583	.857	.750	.000	.880	.952
Cars	0	0	0	0	0	13	0	613	65	691	0	7	5	10	22	9	19	173	9	210	34	281	15	0	330	1253
% Cars	0	0	0	0	0	100	0	99.7	100	99.7	0	100	100	90.9	95.7	100	100	100	100	100	97.1	100	100	0	99.7	99.7
Trucks	0	0	0	0	0	0	0	2	0	2	0	0	0	1	1	0	0	0	0	0	1	0	0	0	1	4
% Trucks	0	0	0	0	0	0	0	0.3	0	0.3	0	0	0	9.1	4.3	0	0	0	0	0	2.9	0	0	0	0.3	0.3

Accurate Counts

978-664-2565

N/S Street : Meetinghouse Rd / Adams St
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160003
Site Code : 94160003
Start Date : 7/14/2022
Page No : 2



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					04:45 PM					04:45 PM					04:45 PM				
+0 mins.	0	0	0	0	0	**6**	0	142	**25**	173	0	0	0	2	2	0	0	43	**3**	46	1	75	3	0	79
+15 mins.	0	0	0	0	0	4	0	154	18	176	0	2	**4**	1	7	**4**	4	42	3	53	12	50	4	0	66
+30 mins.	0	0	0	0	0	1	0	**166**	12	**179**	0	2	0	**4**	6	1	6	40	1	48	**15**	74	3	0	92
+45 mins.	0	0	0	0	0	2	0	153	10	165	0	**3**	1	4	**8**	4	**9**	**48**	2	**63**	7	**82**	**5**	0	**94**
Total Volume	0	0	0	0	0	13	0	615	65	693	0	7	5	11	23	9	19	173	9	210	35	281	15	0	331
% App. Total	0	0	0	0		1.9	0	88.7	9.4		0	30.4	21.7	47.8		4.3	9	82.4	4.3		10.6	84.9	4.5	0	
PHF	.000	.000	.000	.000	.000	.542	.000	.926	.650	.968	.000	.583	.313	.688	.719	.563	.528	.901	.750	.833	.583	.857	.750	.000	.880
Cars	0	0	0	0	0	13	0	613	65	691	0	7	5	10	22	9	19	173	9	210	34	281	15	0	330
% Cars	0	0	0	0	0	100	0	99.7	100	99.7	0	100	100	90.9	95.7	100	100	100	100	100	97.1	100	100	0	99.7
Trucks	0	0	0	0	0	0	0	2	0	2	0	0	0	1	1	0	0	0	0	0	1	0	0	0	1
% Trucks	0	0	0	0	0	0	0	0.3	0	0.3	0	0	0	9.1	4.3	0	0	0	0	0	2.9	0	0	0	0.3

Accurate Counts

978-664-2565

N/S Street : Meetinghouse Rd / Adams St
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160003
Site Code : 94160003
Start Date : 7/14/2022
Page No : 7

Groups Printed- Trucks

	Meetinghouse Rd From North				Great Rd From East				Adams St From South				Stevens St From Southwest				Great Rd From West				
Start Time	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Left	Thru	Right	Hd Rt	Int. Total
04:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	4
04:15 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2
04:45 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Total	0	0	0	0	0	0	5	0	0	0	0	2	0	0	0	0	0	3	0	0	10
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
05:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2
Grand Total	0	0	0	0	0	0	6	0	0	0	0	2	0	0	0	0	1	3	0	0	12
Apprch %	0	0	0	0	0	0	100	0	0	0	0	100	0	0	0	0	25	75	0	0	
Total %	0	0	0	0	0	0	50	0	0	0	0	16.7	0	0	0	0	8.3	25	0	0	

	Meetinghouse Rd From North					Great Rd From East					Adams St From South					Stevens St From Southwest					Great Rd From West					
Start Time	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Left	Thru	Right	Hd Rt	App. Total	Int. 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	**2**	0	**2**	0	0	0	0	0	0	0	0	0	0	0	**2**	0	0	**2**	**4**
04:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	**1**	**1**	0	0	0	0	0	0	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
04:45 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Total Volume	0	0	0	0	0	0	0	5	0	5	0	0	0	2	2	0	0	0	0	0	0	3	0	0	3	10
% App. Total	0	0	0	0		0	0	100	0		0	0	0	100		0	0	0	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.625	.000	.625	.000	.000	.000	.500	.500	.000	.000	.000	.000	.000	.000	.375	.000	.000	.375	.625

Accurate Counts

978-664-2565

N/S Street : Meetinghouse Rd / Adams St
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160003
Site Code : 94160003
Start Date : 7/14/2022

Groups Printed- Bikes Peds

	Meetinghouse Rd From North					Great Rd From East					Adams St From South					Stevens St From Southwest					Great Rd From West							
Start Time	Left	Thru	Br Rt	Right	Peds	Left	Br Lt	Thru	Right	Peds	Hd Lt	Left	Thru	Right	Peds	Hd Lt	Br Lt	Br Rt	Hd Rt	Peds	Left	Thru	Right	Hd Rt	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	5
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	0	3
04:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	4	0	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	2
Total	0	0	0	0	0	0	0	2	0	4	0	0	0	1	2	0	0	0	0	5	0	0	0	0	0	11	3	14
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0	3
05:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	5	1	6
05:30 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	5	0	5
05:45 PM	0	0	0	0	0	0	0	1	0	5	0	0	0	0	7	0	0	0	0	1	0	0	0	0	0	13	1	14
Total	0	0	0	0	0	0	0	2	0	9	0	0	0	0	15	0	0	0	0	2	0	0	0	0	0	26	2	28
Grand Total	0	0	0	0	0	0	0	4	0	13	0	0	0	1	17	0	0	0	0	7	0	0	0	0	0	37	5	42
Apprch %	0	0	0	0		0	0	100	0		0	0	0	100		0	0	0	0		0	0	0	0				
Total %	0	0	0	0		0	0	80	0		0	0	0	20		0	0	0	0		0	0	0	0		88.1	11.9	

	Meetinghouse Rd From North					Great Rd From East					Adams St From South					Stevens St From Southwest					Great Rd From West					
Start Time	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Left	Thru	Right	Hd Rt	App. Total	Int. 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	**2**	0	**2**	0	0	0	0	0	0	0	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	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	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	0	0	2	0	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	3
% App. Total	0	0	0	0		0	0	100	0		0	0	0	100		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.375

Accurate Counts

978-664-2565

N/S Street : Meetinghouse Rd / Adams St
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S3
Site Code : 94160003
Start Date : 7/16/2022
Page No : 1

Groups Printed- Cars - Trucks

	Meetinghouse Rd From North				Great Rd From East				Adams St From South				Stevens St From Southwest				Great Rd From West				
Start Time	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Left	Thru	Right	Hd Rt	Int. Total
11:00 AM	0	0	0	0	3	0	135	12	0	0	0	1	1	1	45	3	0	72	2	0	275
11:15 AM	0	0	0	0	2	0	102	24	0	1	0	0	6	4	45	2	0	99	0	0	285
11:30 AM	0	0	0	0	2	0	128	22	0	3	2	1	1	2	52	1	0	84	2	0	300
11:45 AM	0	0	0	0	5	0	118	28	0	0	0	0	4	4	47	1	1	93	1	0	302
Total	0	0	0	0	12	0	483	86	0	4	2	2	12	11	189	7	1	348	5	0	1162
12:00 PM	0	0	0	0	3	0	126	22	0	3	0	5	2	2	37	2	1	94	3	0	300
12:15 PM	0	0	0	0	6	0	137	19	0	0	0	6	1	5	40	0	2	112	4	0	332
12:30 PM	0	0	0	0	4	0	97	11	0	0	0	1	3	2	47	0	0	86	1	0	252
12:45 PM	0	0	0	0	0	0	96	28	0	1	1	2	3	1	33	0	3	86	3	0	257
Total	0	0	0	0	13	0	456	80	0	4	1	14	9	10	157	2	6	378	11	0	1141
01:00 PM	0	0	0	0	2	0	120	14	0	1	2	4	6	2	39	0	1	62	1	0	254
01:15 PM	0	0	0	0	2	0	80	21	0	0	0	3	4	0	40	1	0	77	3	0	231
01:30 PM	0	0	0	0	3	0	109	10	0	1	2	4	4	0	38	0	1	69	3	0	244
01:45 PM	0	0	0	0	4	0	122	12	0	1	0	1	2	0	42	0	1	72	1	0	258
Total	0	0	0	0	11	0	431	57	0	3	4	12	16	2	159	1	3	280	8	0	987
Grand Total	0	0	0	0	36	0	1370	223	0	11	7	28	37	23	505	10	10	1006	24	0	3290
Apprch %	0	0	0	0	2.2	0	84.1	13.7	0	23.9	15.2	60.9	6.4	4	87.8	1.7	1	96.7	2.3	0	
Total %	0	0	0	0	1.1	0	41.6	6.8	0	0.3	0.2	0.9	1.1	0.7	15.3	0.3	0.3	30.6	0.7	0	
Cars	0	0	0	0	36	0	1365	223	0	10	7	28	37	21	505	10	10	1002	24	0	3278
% Cars	0	0	0	0	100	0	99.6	100	0	90.9	100	100	100	91.3	100	100	100	99.6	100	0	99.6
Trucks	0	0	0	0	0	0	5	0	0	1	0	0	0	2	0	0	0	4	0	0	12
% Trucks	0	0	0	0	0	0	0.4	0	0	9.1	0	0	0	8.7	0	0	0	0.4	0	0	0.4

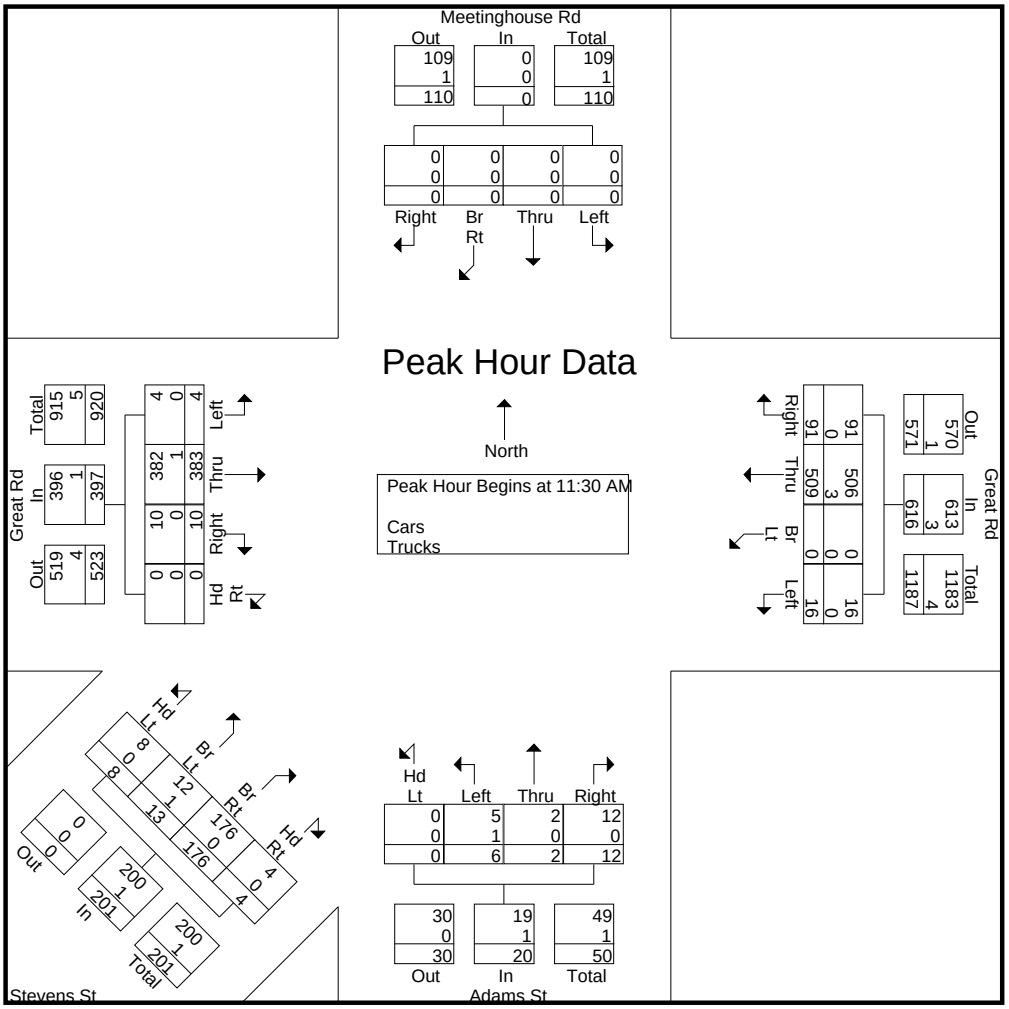
	Meetinghouse Rd From North					Great Rd From East					Adams St From South					Stevens St From Southwest					Great Rd From West					
Start Time	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Left	Thru	Right	Hd Rt	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 11:30 AM																										
11:30 AM	0	0	0	0	0	2	0	128	22	152	0	**3**	**2**	1	6	1	2	**52**	1	**56**	0	84	2	0	86	300
11:45 AM	0	0	0	0	0	5	0	118	**28**	151	0	0	0	0	0	**4**	4	47	1	56	1	93	1	0	95	302
12:00 PM	0	0	0	0	0	3	0	126	22	151	0	3	0	5	**8**	2	2	37	**2**	43	1	94	3	0	98	300
12:15 PM	0	0	0	0	0	**6**	0	**137**	19	**162**	0	0	0	**6**	6	1	**5**	40	0	46	**2**	**112**	**4**	0	**118**	**332**
Total Volume	0	0	0	0	0	16	0	509	91	616	0	6	2	12	20	8	13	176	4	201	4	383	10	0	397	1234
% App. Total	0	0	0	0		2.6	0	82.6	14.8		0	30	10	60		4	6.5	87.6	2		1	96.5	2.5	0		
PHF	.000	.000	.000	.000	.000	.667	.000	.929	.813	.951	.000	.500	.250	.500	.625	.500	.650	.846	.500	.897	.500	.855	.625	.000	.841	.929
Cars	0	0	0	0	0	16	0	506	91	613	0	5	2	12	19	8	12	176	4	200	4	382	10	0	396	1228
% Cars	0	0	0	0	0	100	0	99.4	100	99.5	0	83.3	100	100	95.0	100	92.3	100	100	99.5	100	99.7	100	0	99.7	99.5
Trucks	0	0	0	0	0	0	0	3	0	3	0	1	0	0	1	0	1	0	0	1	0	1	0	0	1	6
% Trucks	0	0	0	0	0	0	0	0.6	0	0.5	0	16.7	0	0	5.0	0	7.7	0	0	0.5	0	0.3	0	0	0.3	0.5

Accurate Counts

978-664-2565

N/S Street : Meetinghouse Rd / Adams St
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S3
Site Code : 94160003
Start Date : 7/16/2022
Page No : 2



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					11:30 AM					12:45 PM					11:00 AM					11:45 AM				
+0 mins.	0	0	0	0	0	2	0	128	22	152	0	**1**	1	2	4	1	1	45	**3**	50	1	93	1	0	95
+15 mins.	0	0	0	0	0	5	0	118	**28**	151	0	1	**2**	**4**	**7**	**6**	**4**	45	2	**57**	1	94	3	0	98
+30 mins.	0	0	0	0	0	3	0	126	22	151	0	0	0	3	3	1	2	**52**	1	56	**2**	**112**	**4**	0	**118**
+45 mins.	0	0	0	0	0	**6**	0	**137**	19	**162**	0	1	2	4	7	4	4	47	1	56	0	86	1	0	87
Total Volume	0	0	0	0	0	16	0	509	91	616	0	3	5	13	21	12	11	189	7	219	4	385	9	0	398
% App. Total	0	0	0	0		2.6	0	82.6	14.8		0	14.3	23.8	61.9		5.5	5	86.3	3.2		1	96.7	2.3	0	
PHF	.000	.000	.000	.000	.000	.667	.000	.929	.813	.951	.000	.750	.625	.813	.750	.500	.688	.909	.583	.961	.500	.859	.563	.000	.843
Cars	0	0	0	0	0	16	0	506	91	613	0	3	5	13	21	12	10	189	7	218	4	384	9	0	397
% Cars	0	0	0	0	0	100	0	99.4	100	99.5	0	100	100	100	100	100	90.9	100	100	99.5	100	99.7	100	0	99.7
Trucks	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1
% Trucks	0	0	0	0	0	0	0	0.6	0	0.5	0	0	0	0	0	0	9.1	0	0	0.5	0	0.3	0	0	0.3

Accurate Counts

978-664-2565

N/S Street : Meetinghouse Rd / Adams St
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S3
Site Code : 94160003
Start Date : 7/16/2022
Page No : 7

Groups Printed- Trucks

	Meetinghouse Rd From North				Great Rd From East				Adams St From South				Stevens St From Southwest				Great Rd From West				
Start Time	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Left	Thru	Right	Hd Rt	Int. Total
11:00 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	3
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
11:30 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
Total	0	0	0	0	0	0	3	0	0	1	0	0	0	1	0	0	0	3	0	0	8
12:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:15 PM	0	0	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	1	0	0	0	0	0	0	1
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	3
01:00 PM	0	0	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	0	0
01:30 PM	0	0	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	1	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Grand Total	0	0	0	0	0	0	5	0	0	1	0	0	0	2	0	0	0	4	0	0	12
Apprch %	0	0	0	0	0	0	100	0	0	100	0	0	0	100	0	0	0	100	0	0	
Total %	0	0	0	0	0	0	41.7	0	0	8.3	0	0	0	16.7	0	0	0	33.3	0	0	

	Meetinghouse Rd From North					Great Rd From East					Adams St From South					Stevens St From Southwest					Great Rd From West					
Start Time	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Left	Thru	Right	Hd Rt	App. Total	Int. 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	**2**	0	**2**	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	**1**	**3**
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
11:30 AM	0	0	0	0	0	0	0	1	0	1	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	2
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	1	0	0	1	2
Total Volume	0	0	0	0	0	0	0	3	0	3	0	1	0	0	1	0	1	0	0	1	0	3	0	0	3	8
% App. Total	0	0	0	0		0	0	100	0		0	100	0	0		0	100	0	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.375	.000	.375	.000	.250	.000	.000	.250	.000	.250	.000	.000	.250	.000	.750	.000	.000	.750	.667

Accurate Counts

978-664-2565

N/S Street : Meetinghouse Rd / Adams St
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S3
Site Code : 94160003
Start Date : 7/16/2022
Page No : 10

Groups Printed- Bikes Peds

	Meetinghouse Rd From North					Great Rd From East					Adams St From South					Stevens St From Southwest					Great Rd From West							
Start Time	Left	Thru	Br Rt	Right	Peds	Left	Br Lt	Thru	Right	Peds	Hd Lt	Left	Thru	Right	Peds	Hd Lt	Br Lt	Br Rt	Hd Rt	Peds	Left	Thru	Right	Hd Rt	Peds	Exclu. Total	Inclu. Total	Int. Total
11:00 AM	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4	0	4
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	4	1	5
12:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
12:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	1	6
12:30 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
12:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	0	0	0	1	0	3	0	1	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	6	4	10
01:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	2
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
01:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	5	0	5
01:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	2
Total	0	0	0	0	1	0	0	1	0	1	0	0	0	0	5	0	0	1	0	1	0	0	0	0	0	8	2	10
Grand Total	0	0	0	0	2	1	0	4	0	3	0	0	0	0	7	0	0	1	0	6	0	1	0	0	0	18	7	25
Apprch %	0	0	0	0		20	0	80	0		0	0	0	0		0	0	100	0		0	100	0	0				
Total %	0	0	0	0		14.3	0	57.1	0		0	0	0	0		0	0	14.3	0		0	14.3	0	0		72	28	

	Meetinghouse Rd From North					Great Rd From East					Adams St From South					Stevens St From Southwest					Great Rd From West					
Start Time	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Left	Thru	Right	Hd Rt	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 12:15 PM																										
12:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	**2**	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
12:45 PM	0	0	0	0	0	**1**	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
01:00 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	1	0	4	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
% App. Total	0	0	0	0		20	0	80	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.250	.000	.500	.000	.625	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.625

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160004
Site Code : 94160004
Start Date : 7/14/2022
Page No : 1

Groups Printed- Cars - Trucks

	King St From North			Great Rd From East			King St From South			Great Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	31	59	53	54	128	4	44	99	0	55	63	30	620
04:15 PM	20	62	50	49	108	1	46	82	0	50	36	33	537
04:30 PM	24	80	44	41	87	1	38	65	1	40	44	34	499
04:45 PM	20	72	39	35	96	3	33	57	0	41	55	38	489
Total	95	273	186	179	419	9	161	303	1	186	198	135	2145
05:00 PM	14	59	61	46	117	1	32	78	0	61	51	28	548
05:15 PM	15	57	54	54	121	4	32	125	0	59	75	28	624
05:30 PM	27	65	30	55	117	0	56	95	0	63	71	41	620
05:45 PM	8	56	39	42	105	1	46	62	1	51	63	35	509
Total	64	237	184	197	460	6	166	360	1	234	260	132	2301
Grand Total	159	510	370	376	879	15	327	663	2	420	458	267	4446
Apprch %	15.3	49.1	35.6	29.6	69.2	1.2	33	66.8	0.2	36.7	40	23.3	
Total %	3.6	11.5	8.3	8.5	19.8	0.3	7.4	14.9	0	9.4	10.3	6	
Cars	157	505	368	375	873	15	326	658	2	415	455	264	4413
% Cars	98.7	99	99.5	99.7	99.3	100	99.7	99.2	100	98.8	99.3	98.9	99.3
Trucks	2	5	2	1	6	0	1	5	0	5	3	3	33
% Trucks	1.3	1	0.5	0.3	0.7	0	0.3	0.8	0	1.2	0.7	1.1	0.7

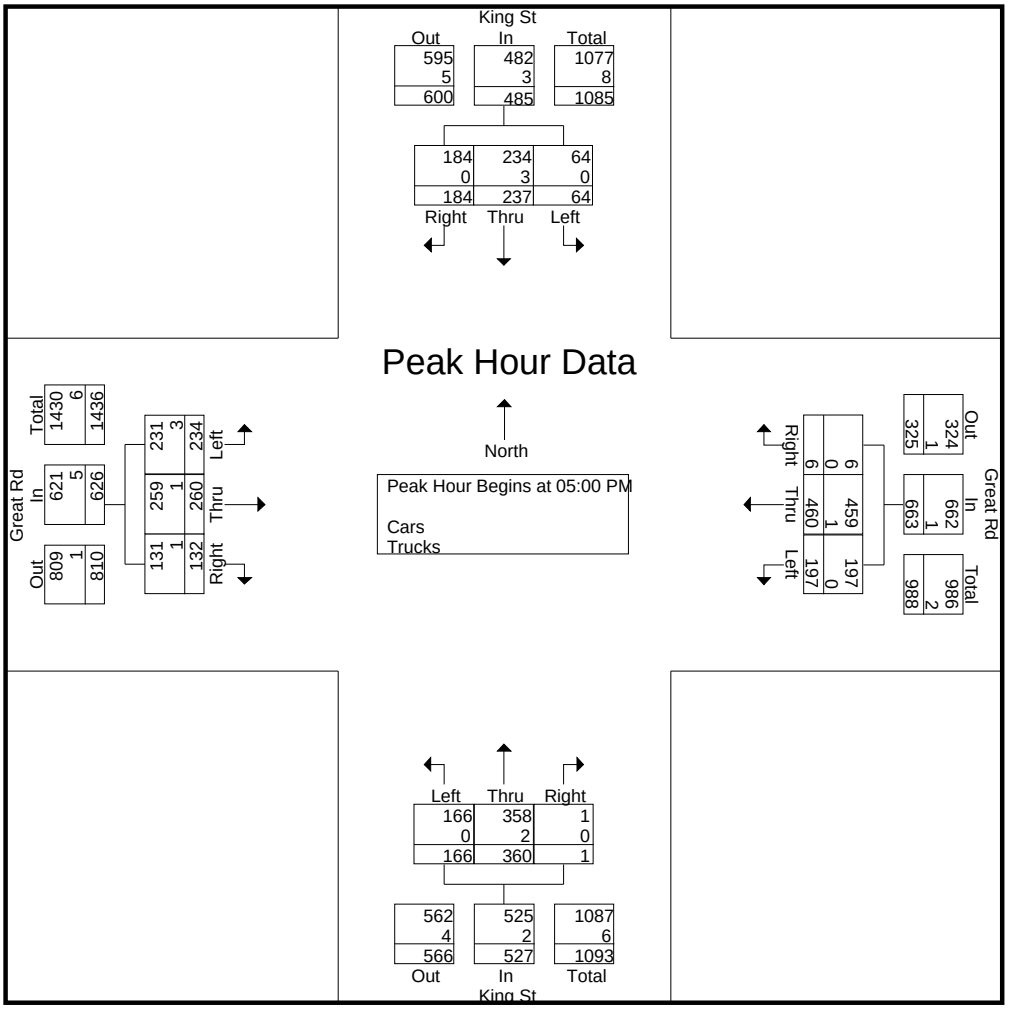
	King St From North				Great Rd From East				King St From South				Great Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	14	59	**61**	**134**	46	117	1	164	32	78	0	110	61	51	28	140	548
05:15 PM	15	57	54	126	54	**121**	**4**	**179**	32	**125**	0	**157**	59	**75**	28	162	**624**
05:30 PM	**27**	**65**	30	122	**55**	117	0	172	**56**	95	0	151	**63**	71	**41**	**175**	620
05:45 PM	8	56	39	103	42	105	1	148	46	62	**1**	109	51	63	35	149	509
Total Volume	64	237	184	485	197	460	6	663	166	360	1	527	234	260	132	626	2301
% App. Total	13.2	48.9	37.9		29.7	69.4	0.9		31.5	68.3	0.2		37.4	41.5	21.1		
PHF	.593	.912	.754	.905	.895	.950	.375	.926	.741	.720	.250	.839	.929	.867	.805	.894	.922
Cars	64	234	184	482	197	459	6	662	166	358	1	525	231	259	131	621	2290
% Cars	100	98.7	100	99.4	100	99.8	100	99.8	100	99.4	100	99.6	98.7	99.6	99.2	99.2	99.5
Trucks	0	3	0	3	0	1	0	1	0	2	0	2	3	1	1	5	11
% Trucks	0	1.3	0	0.6	0	0.2	0	0.2	0	0.6	0	0.4	1.3	0.4	0.8	0.8	0.5

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160004
Site Code : 94160004
Start Date : 7/14/2022
Page No : 2



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				05:00 PM				05:00 PM			
+0 mins.	**31**	59	**53**	143	46	117	1	164	32	78	0	110	61	51	28	140
+15 mins.	20	62	50	132	54	**121**	**4**	**179**	32	**125**	0	**157**	59	**75**	28	162
+30 mins.	24	**80**	44	**148**	**55**	117	0	172	**56**	95	0	151	**63**	71	**41**	**175**
+45 mins.	20	72	39	131	42	105	1	148	46	62	**1**	109	51	63	35	149
Total Volume	95	273	186	554	197	460	6	663	166	360	1	527	234	260	132	626
% App. Total	17.1	49.3	33.6		29.7	69.4	0.9		31.5	68.3	0.2		37.4	41.5	21.1	
PHF	.766	.853	.877	.936	.895	.950	.375	.926	.741	.720	.250	.839	.929	.867	.805	.894
Cars	93	271	184	548	197	459	6	662	166	358	1	525	231	259	131	621
% Cars	97.9	99.3	98.9	98.9	100	99.8	100	99.8	100	99.4	100	99.6	98.7	99.6	99.2	99.2
Trucks	2	2	2	6	0	1	0	1	0	2	0	2	3	1	1	5
% Trucks	2.1	0.7	1.1	1.1	0	0.2	0	0.2	0	0.6	0	0.4	1.3	0.4	0.8	0.8

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160004
Site Code : 94160004
Start Date : 7/14/2022
Page No : 7

Groups Printed- Trucks

	King St From North			Great Rd From East			King St From South			Great Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	2	0	0	0	3	0	0	2	0	1	1	0	9
04:15 PM	0	1	2	0	1	0	0	1	0	1	0	0	6
04:30 PM	0	1	0	0	1	0	1	0	0	0	1	1	5
04:45 PM	0	0	0	1	0	0	0	0	0	0	0	1	2
Total	2	2	2	1	5	0	1	3	0	2	2	2	22
05:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	1
05:15 PM	0	1	0	0	0	0	0	1	0	1	1	0	4
05:30 PM	0	2	0	0	1	0	0	0	0	0	0	0	3
05:45 PM	0	0	0	0	0	0	0	1	0	1	0	1	3
Total	0	3	0	0	1	0	0	2	0	3	1	1	11
Grand Total	2	5	2	1	6	0	1	5	0	5	3	3	33
Apprch %	22.2	55.6	22.2	14.3	85.7	0	16.7	83.3	0	45.5	27.3	27.3	
Total %	6.1	15.2	6.1	3	18.2	0	3	15.2	0	15.2	9.1	9.1	

	King St From North				Great Rd From East				King St From South				Great Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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	**2**	0	0	2	0	**3**	0	**3**	0	**2**	0	**2**	**1**	**1**	0	**2**	**9**
04:15 PM	0	**1**	**2**	**3**	0	1	0	1	0	1	0	1	1	0	0	1	6
04:30 PM	0	1	0	1	0	1	0	1	**1**	0	0	1	0	1	**1**	2	5
04:45 PM	0	0	0	0	**1**	0	0	1	0	0	0	0	0	0	1	1	2
Total Volume	2	2	2	6	1	5	0	6	1	3	0	4	2	2	2	6	22
% App. Total	33.3	33.3	33.3		16.7	83.3	0		25	75	0		33.3	33.3	33.3		
PHF	.250	.500	.250	.500	.250	.417	.000	.500	.250	.375	.000	.500	.500	.500	.500	.750	.611

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 94160004
Site Code : 94160004
Start Date : 7/14/2022

Groups Printed- Bikes Peds

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

	King St From North				Great Rd From East				King St From South				Great Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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	**1**	0	0	**1**	0	0	0	0	0	0	0	0	**1**
04:15 PM	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	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	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	2
% App. Total	0	100	0		100	0	0		0	0	0		0	0	0		
PHF	.000	.250	.000	.250	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.500

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S4
Site Code : 94160004
Start Date : 7/16/2022
Page No : 1

Groups Printed- Cars - Trucks

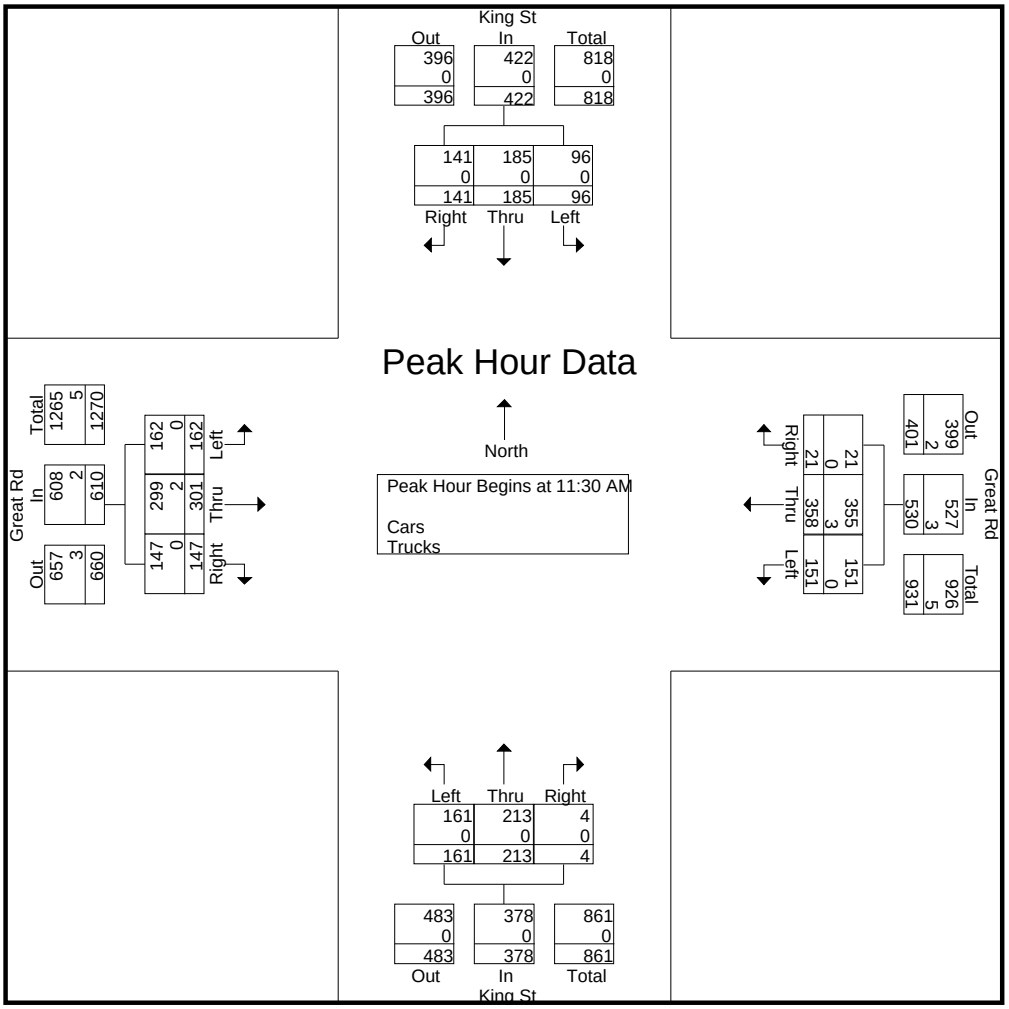
	King St From North			Great Rd From East			King St From South			Great Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
11:00 AM	12	25	29	43	93	3	40	36	0	35	66	29	411
11:15 AM	27	38	32	31	72	5	48	59	0	28	69	27	436
11:30 AM	19	48	47	31	93	2	42	50	1	43	67	35	478
11:45 AM	24	39	27	34	91	3	39	58	0	43	74	43	475
Total	82	150	135	139	349	13	169	203	1	149	276	134	1800
12:00 PM	21	42	34	40	82	9	42	48	0	45	74	40	477
12:15 PM	32	56	33	46	92	7	38	57	3	31	86	29	510
12:30 PM	20	58	48	41	61	3	38	51	3	34	64	35	456
12:45 PM	18	64	37	34	62	4	37	45	1	38	74	34	448
Total	91	220	152	161	297	23	155	201	7	148	298	138	1891
01:00 PM	15	62	37	37	82	8	37	41	1	35	54	29	438
01:15 PM	13	42	35	29	53	2	40	41	0	24	70	55	404
01:30 PM	22	56	38	27	78	6	44	37	0	32	49	29	418
01:45 PM	13	42	47	35	83	7	34	33	0	44	62	37	437
Total	63	202	157	128	296	23	155	152	1	135	235	150	1697
Grand Total	236	572	444	428	942	59	479	556	9	432	809	422	5388
Apprch %	18.8	45.7	35.5	30	65.9	4.1	45.9	53.3	0.9	26	48.6	25.4	
Total %	4.4	10.6	8.2	7.9	17.5	1.1	8.9	10.3	0.2	8	15	7.8	
Cars	236	570	444	428	936	59	478	556	9	431	804	420	5371
% Cars	100	99.7	100	100	99.4	100	99.8	100	100	99.8	99.4	99.5	99.7
Trucks	0	2	0	0	6	0	1	0	0	1	5	2	17
% Trucks	0	0.3	0	0	0.6	0	0.2	0	0	0.2	0.6	0.5	0.3

	King St From North				Great Rd From East				King St From South				Great Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:30 AM																	
11:30 AM	19	48	**47**	114	31	**93**	2	126	**42**	50	1	93	43	67	35	145	478
11:45 AM	24	39	27	90	34	91	3	128	39	**58**	0	97	43	74	**43**	**160**	475
12:00 PM	21	42	34	97	40	82	**9**	131	42	48	0	90	**45**	74	40	159	477
12:15 PM	**32**	**56**	33	**121**	**46**	92	7	**145**	38	57	**3**	**98**	31	**86**	29	146	**510**
Total Volume	96	185	141	422	151	358	21	530	161	213	4	378	162	301	147	610	1940
% App. Total	22.7	43.8	33.4		28.5	67.5	4		42.6	56.3	1.1		26.6	49.3	24.1		
PHF	.750	.826	.750	.872	.821	.962	.583	.914	.958	.918	.333	.964	.900	.875	.855	.953	.951
Cars	96	185	141	422	151	355	21	527	161	213	4	378	162	299	147	608	1935
% Cars	100	100	100	100	100	99.2	100	99.4	100	100	100	100	100	99.3	100	99.7	99.7
Trucks	0	0	0	0	0	3	0	3	0	0	0	0	0	2	0	2	5
% Trucks	0	0	0	0	0	0.8	0	0.6	0	0	0	0	0	0.7	0	0.3	0.3

Accurate Counts
978-664-2565

N/S Street : King Street
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S4
Site Code : 94160004
Start Date : 7/16/2022



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:15 PM				11:30 AM				11:15 AM				11:30 AM			
+0 mins.	**32**	56	33	121	31	**93**	2	126	**48**	**59**	0	**107**	43	67	35	145
+15 mins.	20	58	**48**	**126**	34	91	3	128	42	50	**1**	93	43	74	**43**	**160**
+30 mins.	18	**64**	37	119	40	82	**9**	131	39	58	0	97	**45**	74	40	159
+45 mins.	15	62	37	114	**46**	92	7	**145**	42	48	0	90	31	**86**	29	146
Total Volume	85	240	155	480	151	358	21	530	171	215	1	387	162	301	147	610
% App. Total	17.7	50	32.3		28.5	67.5	4		44.2	55.6	0.3		26.6	49.3	24.1	
PHF	.664	.938	.807	.952	.821	.962	.583	.914	.891	.911	.250	.904	.900	.875	.855	.953
Cars	85	240	155	480	151	355	21	527	171	215	1	387	162	299	147	608
% Cars	100	100	100	100	100	99.2	100	99.4	100	100	100	100	100	99.3	100	99.7
Trucks	0	0	0	0	0	3	0	3	0	0	0	0	0	2	0	2
% Trucks	0	0	0	0	0	0.8	0	0.6	0	0	0	0	0	0.7	0	0.3

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S4
Site Code : 94160004
Start Date : 7/16/2022

Groups Printed- Trucks

	King St From North			Great Rd From East			King St From South			Great Rd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
11:00 AM	0	1	0	0	2	0	0	0	0	0	1	0	4
11:15 AM	0	0	0	0	0	0	0	0	0	1	1	0	2
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	1	0	0	2	0	0	0	0	1	3	0	7
12:00 PM	0	0	0	0	3	0	0	0	0	0	0	0	3
12:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
12:30 PM	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	1	1
Total	0	0	0	0	3	0	0	0	0	0	1	1	5
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	1	0	0	1	0	1	0	0	0	0	0	3
01:30 PM	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	1	1	2
Total	0	1	0	0	1	0	1	0	0	0	1	1	5
Grand Total	0	2	0	0	6	0	1	0	0	1	5	2	17
Apprch %	0	100	0	0	100	0	100	0	0	12.5	62.5	25	
Total %	0	11.8	0	0	35.3	0	5.9	0	0	5.9	29.4	11.8	

	King St From North				Great Rd From East				King St From South				Great Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. 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	**1**	0	**1**	0	**2**	0	**2**	0	0	0	0	0	**1**	0	1	**4**
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	**1**	1	0	**2**	2
11:30 AM	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	0	0	0	0	0	0	0	1	0	1	1
Total Volume	0	1	0	1	0	2	0	2	0	0	0	0	1	3	0	4	7
% App. Total	0	100	0		0	100	0		0	0	0		25	75	0		
PHF	.000	.250	.000	.250	.000	.250	.000	.250	.000	.000	.000	.000	.250	.750	.000	.500	.438

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Great Road
City/State : Littleton, MA
Weather : Clear

File Name : 941600S4
Site Code : 94160004
Start Date : 7/16/2022
Page No : 10

Groups Printed- Bikes Peds

	King St From North				Great Rd From East				King St From South				Great Rd From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	1	0	0	0	1	1
11:45 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	1	0	0	0	1	1
12:00 PM	0	1	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	6	0	0	0	0	6	0	6
12:30 PM	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	3	3
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	2	0	0	0	0	1	0	6	0	0	0	0	6	4	10
01:00 PM	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
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	1	0	0	0	0	1	1
01:45 PM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	2
Total	1	5	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	7	8
Grand Total	1	6	0	0	2	0	0	0	0	1	0	7	1	1	0	0	7	12	19
Apprch %	14.3	85.7	0		100	0	0		0	100	0		50	50	0				
Total %	8.3	50	0		16.7	0	0		0	8.3	0		8.3	8.3	0		36.8	63.2	

	King St From North				Great Rd From East				King St From South				Great Rd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:15 PM																	
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	**2**	0	0	**2**	0	**1**	0	**1**	0	0	0	0	3
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	**1**	**4**	0	**5**	0	0	0	0	0	0	0	0	0	0	0	0	**5**
Total Volume	1	4	0	5	2	0	0	2	0	1	0	1	0	0	0	0	8
% App. Total	20	80	0		100	0	0		0	100	0		0	0	0		
PHF	.250	.250	.000	.250	.250	.000	.000	.250	.000	.250	.000	.250	.000	.000	.000	.000	.400

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Goldsmith St / Driveway
City/State : Littleton, MA
Weather : Clear

File Name : 94160005
Site Code : 94160005
Start Date : 7/14/2022
Page No : 1

Groups Printed- Cars - Trucks

	King St From North				Stevens St From Northeast				Goldsmith St From East				King St From South				Driveway From West				
Start Time	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Left	Thru	Right	Hd Rt	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Int. Total
04:00 PM	4	15	116	2	0	0	0	0	11	2	20	12	2	126	44	7	0	1	0	5	367
04:15 PM	2	18	124	1	0	0	0	0	8	0	30	8	0	93	42	7	1	0	0	0	334
04:30 PM	2	31	112	2	0	0	0	0	6	0	29	5	0	72	30	16	0	0	0	0	305
04:45 PM	3	39	92	2	0	0	0	0	6	1	24	3	0	60	45	16	0	0	0	3	294
Total	11	103	444	7	0	0	0	0	31	3	103	28	2	351	161	46	1	1	0	8	1300
05:00 PM	4	18	107	7	0	0	0	0	10	0	28	3	1	79	44	11	6	0	2	4	324
05:15 PM	1	22	105	3	0	0	0	0	13	0	25	5	2	135	36	9	4	0	0	2	362
05:30 PM	2	41	108	4	0	0	0	0	10	0	28	12	3	110	47	12	3	0	1	1	382
05:45 PM	3	28	94	2	0	0	0	0	12	2	35	3	0	71	31	10	7	0	0	4	302
Total	10	109	414	16	0	0	0	0	45	2	116	23	6	395	158	42	20	0	3	11	1370
Grand Total	21	212	858	23	0	0	0	0	76	5	219	51	8	746	319	88	21	1	3	19	2670
Apprch %	1.9	19	77	2.1	0	0	0	0	21.7	1.4	62.4	14.5	0.7	64.3	27.5	7.6	47.7	2.3	6.8	43.2	
Total %	0.8	7.9	32.1	0.9	0	0	0	0	2.8	0.2	8.2	1.9	0.3	27.9	11.9	3.3	0.8	0	0.1	0.7	
Cars	21	211	852	23	0	0	0	0	76	5	219	51	7	740	319	88	21	1	3	18	2655
% Cars	100	99.5	99.3	100	0	0	0	0	100	100	100	100	87.5	99.2	100	100	100	100	100	94.7	99.4
Trucks	0	1	6	0	0	0	0	0	0	0	0	0	1	6	0	0	0	0	0	1	15
% Trucks	0	0.5	0.7	0	0	0	0	0	0	0	0	0	12.5	0.8	0	0	0	0	0	5.3	0.6

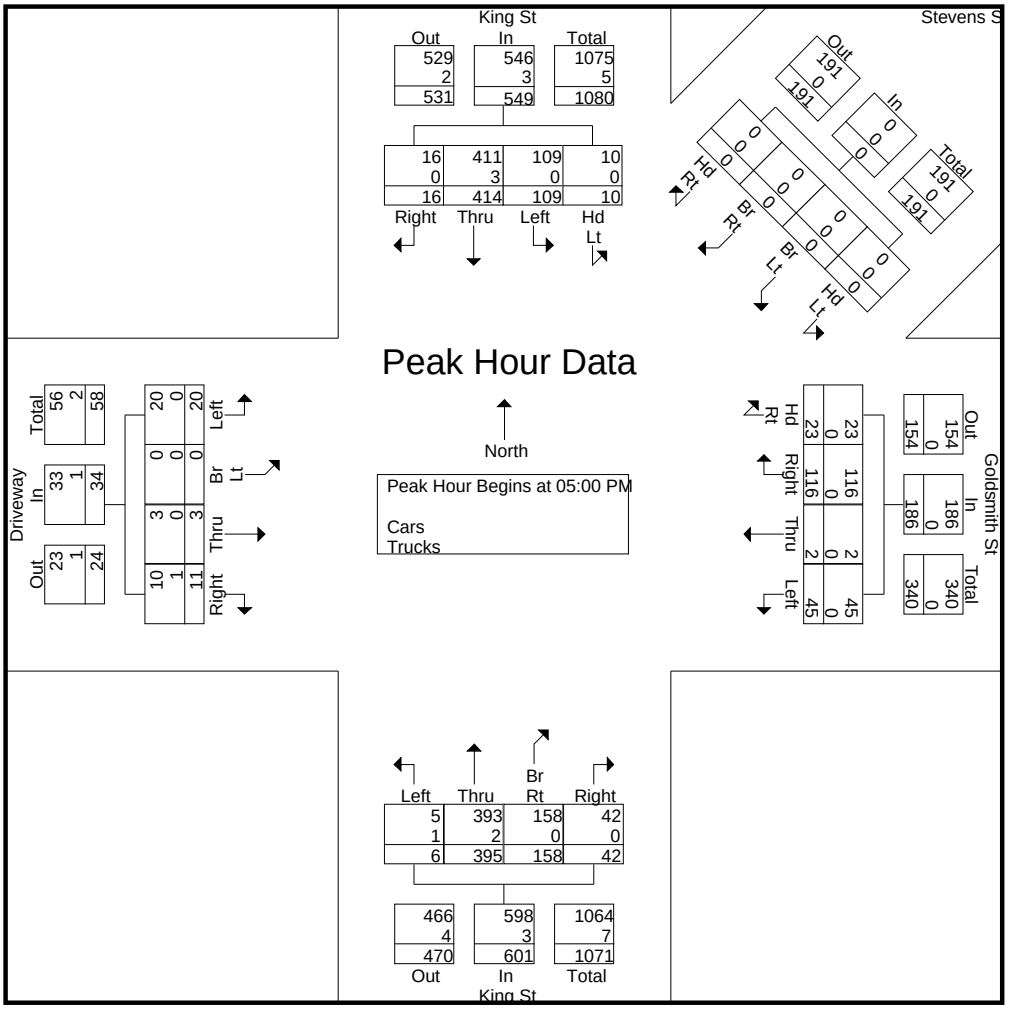
	King St From North					Stevens St From Northeast					Goldsmith St From East					King St From South					Driveway From West					
Start Time	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Int. 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	**4**	18	107	**7**	136	0	0	0	0	0	10	0	28	3	41	1	79	44	11	135	6	0	**2**	**4**	**12**	324
05:15 PM	1	22	105	3	131	0	0	0	0	0	**13**	0	25	5	43	2	**135**	36	9	**182**	4	0	0	2	6	362
05:30 PM	2	**41**	**108**	4	**155**	0	0	0	0	0	10	0	28	**12**	50	**3**	110	**47**	**12**	172	3	0	1	1	5	**382**
05:45 PM	3	28	94	2	127	0	0	0	0	0	12	**2**	**35**	3	**52**	0	71	31	10	112	**7**	0	0	4	11	302
Total Volume	10	109	414	16	549	0	0	0	0	0	45	2	116	23	186	6	395	158	42	601	20	0	3	11	34	1370
% App. Total	1.8	19.9	75.4	2.9		0	0	0	0		24.2	1.1	62.4	12.4		1	65.7	26.3	7		58.8	0	8.8	32.4		
PHF	.625	.665	.958	.571	.885	.000	.000	.000	.000	.000	.865	.250	.829	.479	.894	.500	.731	.840	.875	.826	.714	.000	.375	.688	.708	.897
Cars	10	109	411	16	546	0	0	0	0	0	45	2	116	23	186	5	393	158	42	598	20	0	3	10	33	1363
% Cars	100	100	99.3	100	99.5	0	0	0	0	0	100	100	100	100	100	83.3	99.5	100	100	99.5	100	0	100	90.9	97.1	99.5
Trucks	0	0	3	0	3	0	0	0	0	0	0	0	0	0	0	1	2	0	0	3	0	0	0	0	1	7
% Trucks	0	0	0.7	0	0.5	0	0	0	0	0	0	0	0	0	0	16.7	0.5	0	0	0.5	0	0	0	9.1	2.9	0.5

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Goldsmith St / Driveway
City/State : Littleton, MA
Weather : Clear

File Name : 94160005
Site Code : 94160005
Start Date : 7/14/2022
Page No : 2



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					04:45 PM					05:00 PM				
+0 mins.	**4**	15	116	**2**	137	0	0	0	0	0	10	0	28	3	41	0	60	45	**16**	121	6	0	**2**	**4**	**12**
+15 mins.	2	18	**124**	1	145	0	0	0	0	0	**13**	0	25	5	43	1	79	44	11	135	4	0	0	2	6
+30 mins.	2	31	112	2	**147**	0	0	0	0	0	10	0	28	**12**	50	2	**135**	36	9	**182**	3	0	1	1	5
+45 mins.	3	**39**	92	2	136	0	0	0	0	0	12	**2**	**35**	3	**52**	**3**	110	**47**	12	172	**7**	0	0	4	11
Total Volume	11	103	444	7	565	0	0	0	0	0	45	2	116	23	186	6	384	172	48	610	20	0	3	11	34
% App. Total	1.9	18.2	78.6	1.2		0	0	0	0		24.2	1.1	62.4	12.4		1	63	28.2	7.9		58.8	0	8.8	32.4	
PHF	.688	.660	.895	.875	.961	.000	.000	.000	.000	.000	.865	.250	.829	.479	.894	.500	.711	.915	.750	.838	.714	.000	.375	.688	.708
Cars	11	102	441	7	561	0	0	0	0	0	45	2	116	23	186	5	383	172	48	608	20	0	3	10	33
% Cars	100	99	99.3	100	99.3	0	0	0	0	0	100	100	100	100	100	83.3	99.7	100	100	99.7	100	0	100	90.9	97.1
Trucks	0	1	3	0	4	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	1	1
% Trucks	0	1	0.7	0	0.7	0	0	0	0	0	0	0	0	0	0	16.7	0.3	0	0	0.3	0	0	0	9.1	2.9

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Goldsmith St / Driveway
City/State : Littleton, MA
Weather : Clear

File Name : 94160005
Site Code : 94160005
Start Date : 7/14/2022
Page No : 7

Groups Printed- Trucks

	King St From North				Stevens St From Northeast				Goldsmith St From East				King St From South				Driveway From West				
Start Time	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Left	Thru	Right	Hd Rt	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
04:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
04:30 PM	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3
04:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	3	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	8
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
05:30 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
05:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Total	0	0	3	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	1	7
Grand Total	0	1	6	0	0	0	0	0	0	0	0	0	1	6	0	0	0	0	0	1	15
Apprch %	0	14.3	85.7	0	0	0	0	0	0	0	0	0	14.3	85.7	0	0	0	0	0	100	
Total %	0	6.7	40	0	0	0	0	0	0	0	0	0	6.7	40	0	0	0	0	0	6.7	

	King St From North					Stevens St From Northeast					Goldsmith St From East					King St From South					Driveway From West					
Start Time	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Int. 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	**2**	0	0	**2**	0	0	0	0	0	2
04:15 PM	0	0	**1**	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
04:30 PM	0	**1**	1	0	**2**	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	**3**
04:45 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	1	3	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	8
% App. Total	0	25	75	0		0	0	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.250	.750	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.667

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Goldsmith St / Driveway
City/State : Littleton, MA
Weather : Clear

File Name : 94160005
Site Code : 94160005
Start Date : 7/14/2022
Page No : 10

Groups Printed- Bikes Peds

	King St From North					Stevens St From Northeast					Goldsmith St From East					King St From South					Driveway From West							
Start Time	Hd Lt	Left	Thru	Right	Peds	Hd Lt	Br Lt	Br Rt	Hd Rt	Peds	Left	Thru	Right	Hd Rt	Peds	Left	Thru	Br Rt	Right	Peds	Left	Br Lt	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	1	5	1	6
04:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	1	3	4
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0
Total	0	0	2	0	0	0	0	0	0	0	0	0	0	0	5	0	0	1	1	2	0	0	0	0	1	8	4	12
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
05:15 PM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2	2	4
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	1	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	1	0	0	0	0	0	0	1	2	4	6
Grand Total	0	1	2	0	0	0	0	0	0	0	2	0	0	0	6	0	0	2	1	2	0	0	0	0	2	10	8	18
Apprch %	0	33.3	66.7	0		0	0	0	0		100	0	0	0		0	0	66.7	33.3		0	0	0	0				
Total %	0	12.5	25	0		0	0	0	0		25	0	0	0		0	0	25	12.5		0	0	0	0		55.6	44.4	

	King St From North					Stevens St From Northeast					Goldsmith St From East					King St From South					Driveway From West					
Start Time	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Int. 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	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:15 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**	**2**	0	0	0	0	0	**3**
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	4
% App. Total	0	0	100	0		0	0	0	0		0	0	0	0		0	0	50	50		0	0	0	0		
PHF	.000	.000	.500	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.250	.000	.000	.000	.000	.000	.333

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Goldsmith St / Driveway
City/State : Littleton, MA
Weather : Clear

File Name : 941600S5
Site Code : 94160005
Start Date : 7/16/2022
Page No : 1

Groups Printed- Cars - Trucks

	King St From North				Stevens St From Northeast				Goldsmith St From East				King St From South				Driveway From West				
Start Time	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Left	Thru	Right	Hd Rt	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Int. Total
11:00 AM	2	15	70	6	0	0	0	0	9	0	31	2	2	45	46	14	0	1	0	0	243
11:15 AM	4	19	66	6	0	0	0	0	13	0	29	9	0	75	47	15	4	4	1	2	294
11:30 AM	4	22	79	6	0	0	0	0	10	0	30	10	2	60	41	5	5	0	0	2	276
11:45 AM	2	32	75	5	0	0	0	0	8	0	30	4	5	70	51	19	2	1	0	6	310
Total	12	88	290	23	0	0	0	0	40	0	120	25	9	250	185	53	11	6	1	10	1123
12:00 PM	3	28	87	6	0	0	0	0	7	1	22	2	2	59	40	11	3	0	0	4	275
12:15 PM	2	19	99	5	0	0	0	0	3	0	27	4	1	80	35	12	4	3	1	1	296
12:30 PM	0	24	103	2	0	0	0	0	10	0	33	8	0	59	46	8	0	1	0	3	297
12:45 PM	3	33	86	8	0	0	0	0	9	0	25	3	1	50	31	8	3	1	2	3	266
Total	8	104	375	21	0	0	0	0	29	1	107	17	4	248	152	39	10	5	3	11	1134
01:00 PM	5	21	93	5	0	0	0	0	4	2	26	5	0	53	35	20	2	2	2	2	277
01:15 PM	4	35	74	7	0	0	0	0	10	1	25	2	0	52	39	18	3	2	4	1	277
01:30 PM	4	23	76	8	0	0	0	0	9	0	20	5	2	55	34	6	7	1	1	0	251
01:45 PM	4	28	75	3	0	0	0	0	7	1	24	7	1	42	28	15	2	2	1	1	241
Total	17	107	318	23	0	0	0	0	30	4	95	19	3	202	136	59	14	7	8	4	1046
Grand Total	37	299	983	67	0	0	0	0	99	5	322	61	16	700	473	151	35	18	12	25	3303
Apprch %	2.7	21.6	70.9	4.8	0	0	0	0	20.3	1	66.1	12.5	1.2	52.2	35.3	11.3	38.9	20	13.3	27.8	
Total %	1.1	9.1	29.8	2	0	0	0	0	3	0.2	9.7	1.8	0.5	21.2	14.3	4.6	1.1	0.5	0.4	0.8	
Cars	37	298	980	67	0	0	0	0	99	5	322	61	16	699	471	151	35	18	12	25	3296
% Cars	100	99.7	99.7	100	0	0	0	0	100	100	100	100	100	99.9	99.6	100	100	100	100	100	99.8
Trucks	0	1	3	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	7
% Trucks	0	0.3	0.3	0	0	0	0	0	0	0	0	0	0	0.1	0.4	0	0	0	0	0	0.2

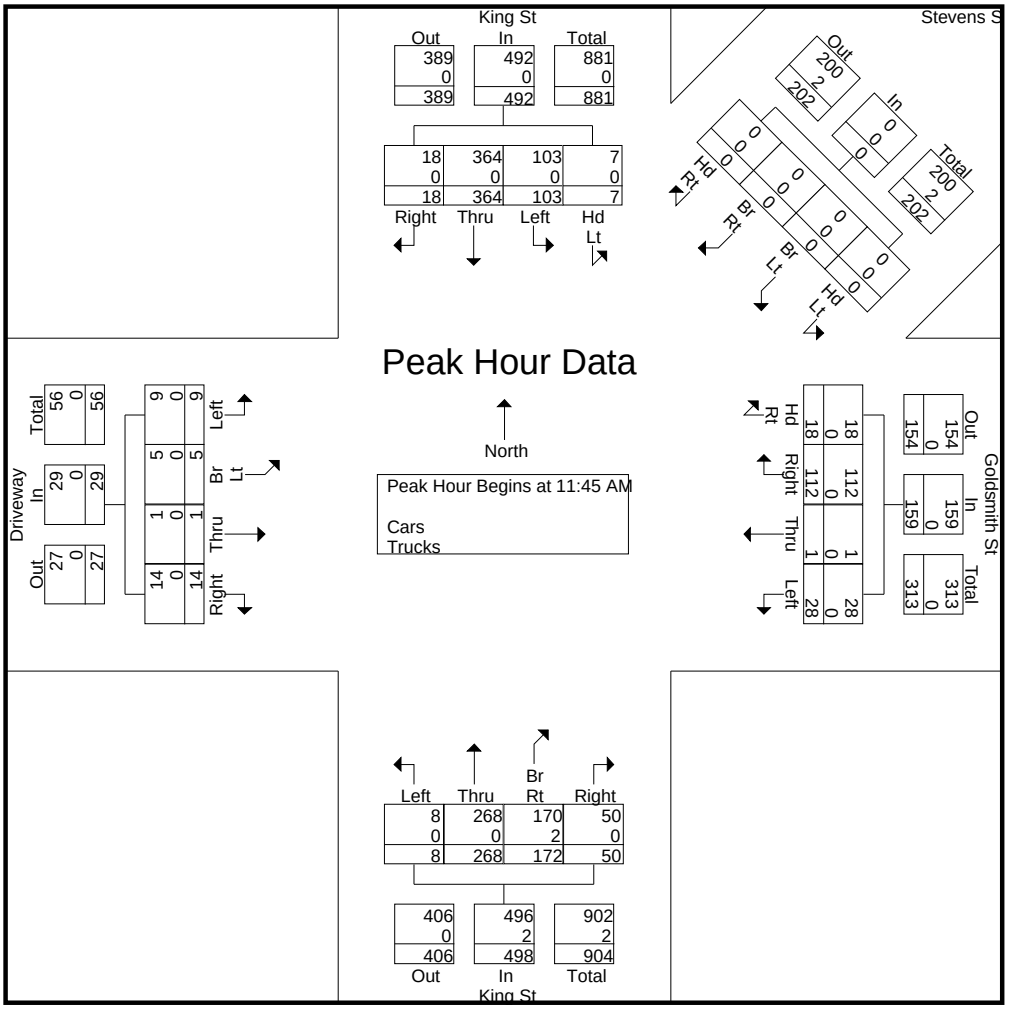
	King St From North					Stevens St From Northeast					Goldsmith St From East					King St From South					Driveway From West					
Start Time	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 11:45 AM																										
11:45 AM	2	**32**	75	5	114	0	0	0	0	0	8	0	30	4	42	**5**	70	**51**	**19**	**145**	2	1	0	**6**	**9**	**310**
12:00 PM	**3**	28	87	**6**	124	0	0	0	0	0	7	**1**	22	2	32	2	59	40	11	112	3	0	0	4	7	275
12:15 PM	2	19	99	5	125	0	0	0	0	0	3	0	27	4	34	1	**80**	35	12	128	**4**	**3**	**1**	1	9	296
12:30 PM	0	24	**103**	2	**129**	0	0	0	0	0	**10**	0	**33**	**8**	**51**	0	59	46	8	113	0	1	0	3	4	297
Total Volume	7	103	364	18	492	0	0	0	0	0	28	1	112	18	159	8	268	172	50	498	9	5	1	14	29	1178
% App. Total	1.4	20.9	74	3.7		0	0	0	0		17.6	0.6	70.4	11.3		1.6	53.8	34.5	10		31	17.2	3.4	48.3		
PHF	.583	.805	.883	.750	.953	.000	.000	.000	.000	.000	.700	.250	.848	.563	.779	.400	.838	.843	.658	.859	.563	.417	.250	.583	.806	.950
Cars	7	103	364	18	492	0	0	0	0	0	28	1	112	18	159	8	268	170	50	496	9	5	1	14	29	1176
% Cars	100	100	100	100	100	0	0	0	0	0	100	100	100	100	100	100	100	98.8	100	99.6	100	100	100	100	100	99.8
Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2
% Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	0	0.4	0	0	0	0	0	0.2

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Goldsmith St / Driveway
City/State : Littleton, MA
Weather : Clear

File Name : 941600S5
Site Code : 94160005
Start Date : 7/16/2022
Page No : 2



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					11:00 AM					11:00 AM					11:15 AM					12:45 PM				
+0 mins.	**3**	28	87	6	124	0	0	0	0	0	9	0	**31**	2	42	0	**75**	47	15	137	3	1	2	**3**	9
+15 mins.	2	19	99	5	125	0	0	0	0	0	**13**	0	29	9	**51**	2	60	41	5	108	2	**2**	2	2	8
+30 mins.	0	24	**103**	2	129	0	0	0	0	0	10	0	30	**10**	50	**5**	70	**51**	**19**	**145**	3	2	**4**	1	**10**
+45 mins.	3	**33**	86	**8**	**130**	0	0	0	0	0	8	0	30	4	42	2	59	40	11	112	**7**	1	1	0	9
Total Volume	8	104	375	21	508	0	0	0	0	0	40	0	120	25	185	9	264	179	50	502	15	6	9	6	36
% App. Total	1.6	20.5	73.8	4.1		0	0	0	0		21.6	0	64.9	13.5		1.8	52.6	35.7	10		41.7	16.7	25	16.7	
PHF	.667	.788	.910	.656	.977	.000	.000	.000	.000	.000	.769	.000	.968	.625	.907	.450	.880	.877	.658	.866	.536	.750	.563	.500	.900
Cars	8	104	374	21	507	0	0	0	0	0	40	0	120	25	185	9	264	178	50	501	15	6	9	6	36
% Cars	100	100	99.7	100	99.8	0	0	0	0	0	100	0	100	100	100	100	100	99.4	100	99.8	100	100	100	100	100
Trucks	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
% Trucks	0	0	0.3	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0.6	0	0.2	0	0	0	0	0

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Goldsmith St / Driveway
City/State : Littleton, MA
Weather : Clear

File Name : 941600S5
Site Code : 94160005
Start Date : 7/16/2022
Page No : 7

Groups Printed- Trucks

	King St From North				Stevens St From Northeast				Goldsmith St From East				King St From South				Driveway From West				
Start Time	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Left	Thru	Right	Hd Rt	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Int. Total
11:00 AM	0	0	1	0	0	0	0	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	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	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Total	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
12:00 PM	0	0	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	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
12:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3
Grand Total	0	1	3	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	7
Apprch %	0	25	75	0	0	0	0	0	0	0	0	0	0	33.3	66.7	0	0	0	0	0	
Total %	0	14.3	42.9	0	0	0	0	0	0	0	0	0	0	14.3	28.6	0	0	0	0	0	

	King St From North					Stevens St From Northeast					Goldsmith St From East					King St From South					Driveway From West					
Start Time	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Int. 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	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0	1
12:45 PM	0	0	**1**	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	**1**	0	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	1	0	0	0	0	0	**2**
Total Volume	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	4
% App. Total	0	50	50	0		0	0	0	0		0	0	0	0		0	50	50	0		0	0	0	0		
PHF	.000	.250	.250	.000	.500	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.500	.000	.000	.000	.000	.000	.500

Accurate Counts

978-664-2565

N/S Street : King Street
E/W Street : Goldsmith St / Driveway
City/State : Littleton, MA
Weather : Clear

File Name : 941600S5
Site Code : 94160005
Start Date : 7/16/2022
Page No : 10

Groups Printed- Bikes Peds

	King St From North					Stevens St From Northeast					Goldsmith St From East					King St From South					Driveway From West							
Start Time	Hd Lt	Left	Thru	Right	Peds	Hd Lt	Br Lt	Br Rt	Hd Rt	Peds	Left	Thru	Right	Hd Rt	Peds	Left	Thru	Br Rt	Right	Peds	Left	Br Lt	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
11:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	4	1	5
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	2
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
11:45 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	3	8	1	9
12:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	3	1	4
12:15 PM	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
12:30 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	2	3	5
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	3	0	3	0	0	0	0	0	0	0	0	0	2	0	1	0	0	1	0	0	0	0	2	8	4	12
01:00 PM	0	4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	4	5
01:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	3	0	3
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2
Total	0	4	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2	5	5	10
Grand Total	0	4	4	0	6	0	0	0	0	0	0	0	0	0	6	0	1	0	1	2	0	0	0	0	7	21	10	31
Apprch %	0	50	50	0		0	0	0	0		0	0	0	0		0	50	0	50		0	0	0	0				
Total %	0	40	40	0		0	0	0	0		0	0	0	0		0	10	0	10		0	0	0	0		67.7	32.3	

	King St From North					Stevens St From Northeast					Goldsmith St From East					King St From South					Driveway From West					
Start Time	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 12:15 PM																										
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	**2**	0	2	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0	0	3
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	**4**	0	0	**4**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**
Total Volume	0	4	2	0	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	7
% App. Total	0	66.7	33.3	0		0	0	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.250	.250	.000	.375	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.438

COVID-19 ADJUSTMENT DATA

Massachusetts Highway Department

4172: Monthly Hourly Volume for July 2019

Location ID:	**4172**	**Seasonal Factor Group:**	**UR2**
County:	**Middlesex**	**Daily Factor Group:**	
Functional Class	**2**	**Axle Factor Group:**	**UR2**
Location:	**ROUTE 2**	**Growth Factor Group:**	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1	197	111	157	550	2236	2651	3228	3074	2768	2263	2204	2149	2195	2274	3003	3504	3867	3334	2537	1609	1171	852	583	407	46924	Accepted
2	254	123	179	513	2264	2842	3079	3153	2856	2456	2126	2189	2350	2434	3011	3528	3953	3462	2590	1685	1289	911	602	467	48316	Accepted
4	244	169	133	177	328	561	719	940	1103	1395	1602	1769	1762	1653	1562	1464	1377	1310	1215	1181	958	820	867	581	23890	Accepted
5	472	217	130	265	886	1282	1501	1766	1802	1768	1894	2109	2170	2390	2475	2414	2319	2066	1595	1224	1009	789	672	529	33744	Accepted
7	312	179	127	133	220	535	647	1111	1494	1730	2048	2248	2468	2509	2424	2238	2152	2070	1696	1453	1185	859	550	356	30744	Accepted
8	213	153	164	545	2152	2994	2921	3603	3030	2379	2103	2128	2223	2388	2883	3485	3837	3465	2750	1698	1129	903	593	393	48132	Accepted
9	234	130	173	505	2327	2988	3557	3657	2966	2534	2229	2177	2317	2461	2880	3543	4117	3732	2965	1993	1388	928	644	467	50912	Accepted
11	273	148	185	556	2332	3005	3552	3515	3056	2563	2242	2352	2367	2607	3213	3828	4019	3718	3005	1999	1259	1055	707	496	52052	Accepted
12	335	170	186	493	1983	2552	3001	3055	2956	2555	2416	2488	2803	3015	3212	3749	3982	3438	2589	1844	1244	1027	766	594	50453	Accepted
14	385	174	101	171	290	546	874	1173	1638	1995	2299	2496	2433	2463	2593	2514	2425	2254	1840	1548	1159	930	596	449	33346	Accepted
15	224	197	162	552	2277	2947	3075	3570	2906	2472	2284	2324	2373	2482	2866	3575	4080	3552	2716	1692	1203	895	617	498	49539	Accepted
16	263	136	180	630	2306	3093	3524	3586	3003	2516	2196	2272	2403	2679	3090	3777	4208	3600	2741	1918	1348	917	686	540	51612	Accepted
18	256	162	182	534	2294	3013	3340	3495	3014	2603	2369	2314	2504	2694	3220	3779	4012	3678	2920	2059	1300	1039	749	548	52078	Accepted
19	326	166	198	547	1984	2649	3064	3121	2849	2546	2535	2597	2841	3242	3434	3801	3735	3330	2432	1822	1247	1024	661	540	50691	Accepted
21	309	183	142	165	277	510	734	1085	1403	1604	2064	2179	2243	2532	2416	2369	2213	2066	1727	1483	1229	962	595	400	30890	Accepted
22	216	115	169	575	2223	3057	3291	3226	2883	2476	2186	2059	2328	2408	2919	3460	3826	3568	2620	1629	1047	742	534	360	47917	Accepted
23	176	147	166	517	2113	2735	3394	3507	3109	2464	2091	2240	2371	2585	2967	3524	4021	3515	2620	1732	1294	917	666	447	49318	Accepted
25	228	151	183	548	2268	2927	3429	3356	3144	2538	2263	2238	2395	2655	3218	3904	4206	3657	2930	2032	1351	1053	816	590	52080	Accepted
26	326	165	179	532	2009	2640	3005	3167	2805	2593	2485	2616	2856	2976	3445	3906	3932	3397	2551	1786	1254	974	817	668	51084	Accepted
28	319	167	146	181	290	526	709	990	1449	1709	2054	2355	2568	2391	2459	2399	2411	2162	1762	1446	1158	953	613	499	31716	Accepted
29	263	134	155	537	2205	2828	3314	3001	2856	2354	2183	2189	2273	2492	2997	3537	3807	3618	2666	1679	1146	809	582	406	48031	Accepted
30	197	134	162	628	2327	3003	3650	3450	3052	2532	2254	2209	2241	2659	3102	3681	4014	3555	2805	1871	1335	856	648	502	50867	Accepted
																	3477.9	3115.8						Average	44742.55	
																Average	3296.8									

Massachusetts Highway Department

4172: Monthly Hourly Volume for July 2022

Location ID:	**4172**	**Seasonal Factor Group:**	**UR2**
County:	**Middlesex**	**Daily Factor Group:**	
Functional Class	**2**	**Axle Factor Group:**	**UR2**
Location:	**ROUTE 2**	**Growth Factor Group:**	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1	299	156	117	172	435	1519	2515	2783	2526	2368	2450	2444	2764	3014	3187	3117	2965	2500	2013	1615	1200	996	846	599	42600	Accepted
4	306	148	106	113	152	320	586	651	798	1131	1355	1714	1742	1773	1701	1628	1633	1593	1609	1356	1232	962	846	543	23998	Accepted
5	466	172	94	130	424	1576	2732	3021	2889	2422	2129	2158	2271	2452	2839	3164	3331	3273	2240	1468	1044	713	565	460	42033	Accepted
6	203	92	81	124	438	1752	3023	3296	3165	2441	2223	2239	2348	2534	3132	3374	3357	3431	2395	1680	1285	947	786	609	44955	Accepted
7	251	147	104	173	479	1750	3093	3154	3176	2470	2288	2275	2461	2520	3021	3352	3514	3364	2480	1699	1308	989	748	633	45449	Accepted
8	263	136	114	169	444	1635	2738	2926	2853	2382	2356	2481	2583	2815	3408	3434	3542	3243	2569	1714	1327	1061	856	666	45715	Accepted
11	309	124	100	155	497	1793	3036	2949	3336	2460	2115	2169	2240	2300	2954	3354	3390	3463	2409	1613	1123	881	639	477	43886	Accepted
12	210	131	99	145	474	1892	3152	3568	3327	2553	2324	2372	2418	2546	3040	3380	3641	3689	2671	1728	1229	932	643	461	46625	Accepted
13	333	119	102	146	501	1832	3120	3560	3308	2632	2438	2349	2398	2421	3015	3305	3492	3496	2560	1782	1383	1068	728	513	46601	Accepted
14	254	150	108	143	459	1789	3091	3498	3244	2615	2394	2430	2498	2650	3188	3493	3731	3721	2835	1891	1384	1110	709	542	47927	Accepted
15	268	178	124	151	431	1638	2896	3147	2891	2573	2437	2567	2779	2903	3299	3561	3749	3401	2417	1703	1269	990	915	725	47012	Accepted
18	203	114	104	156	471	1741	2989	3340	3033	2475	2296	2153	2252	2371	2823	3117	3237	3465	2440	1485	1024	800	566	411	43066	Accepted
19	229	120	103	159	502	1822	3157	3622	3402	2752	2408	2379	2457	2522	3052	3298	3592	3669	2529	1593	1223	1016	749	485	46840	Accepted
20	282	135	102	167	492	1814	3100	3609	3294	2480	2328	2279	2471	2579	2970	3430	3376	3660	2551	1693	1269	1038	797	489	46405	Accepted
21	271	140	114	183	496	1825	3155	3552	3180	2657	2355	2446	2555	2539	3131	3392	3568	3571	2718	1724	1382	976	716	582	47228	Accepted
22	297	208	138	178	437	1651	2738	3035	2919	2517	2506	2381	2741	3023	3359	3599	3606	3242	2402	1794	1286	1038	860	666	46621	Accepted
24																	3357.8	3298.8						Average	44185.06	
25																Average	3328.3									
26																										
27																										
28																										
29																										
30																										
31																										

Massachusetts Highway Department

4172: Monthly Hourly Volume for July 2019

Location ID:	**4172**	**Seasonal Factor Group:**	**UR2**
County:	**Middlesex**	**Daily Factor Group:**	
Functional Class	**2**	**Axle Factor Group:**	**UR2**
Location:	**ROUTE 2**	**Growth Factor Group:**	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
6	286	158	122	176	354	635	802	1248	1482	1637	1908	2099	2182	2227	2204	2099	1816	1552	1345	1047	984	778	634	417	28192	Accepted
13	383	251	158	247	549	914	1379	1845	2067	2266	2595	2805	2590	2608	2556	2475	2225	1933	1880	1518	1264	1052	847	652	37059	Accepted
20	313	208	156	255	532	907	1178	1619	1899	2087	2289	2177	1933	2338	2249	2127	1900	1770	1571	1243	1156	997	748	519	32171	Accepted
27	359	183	155	243	602	885	1165	1506	1958	2345	2810	3102	2981	2833	2788	2457	2209	1958	1601	1334	1345	1069	818	579	37285	Accepted
												2545.8	2421.5	2501.5										Average	33676.75	
											Average	2489.6														

Massachusetts Highway Department

4172: Monthly Hourly Volume for July 2022

Location ID:	**4172**	**Seasonal Factor Group:**	**UR2**
County:	**Middlesex**	**Daily Factor Group:**	
Functional Class	**2**	**Axle Factor Group:**	**UR2**
Location:	**ROUTE 2**	**Growth Factor Group:**	

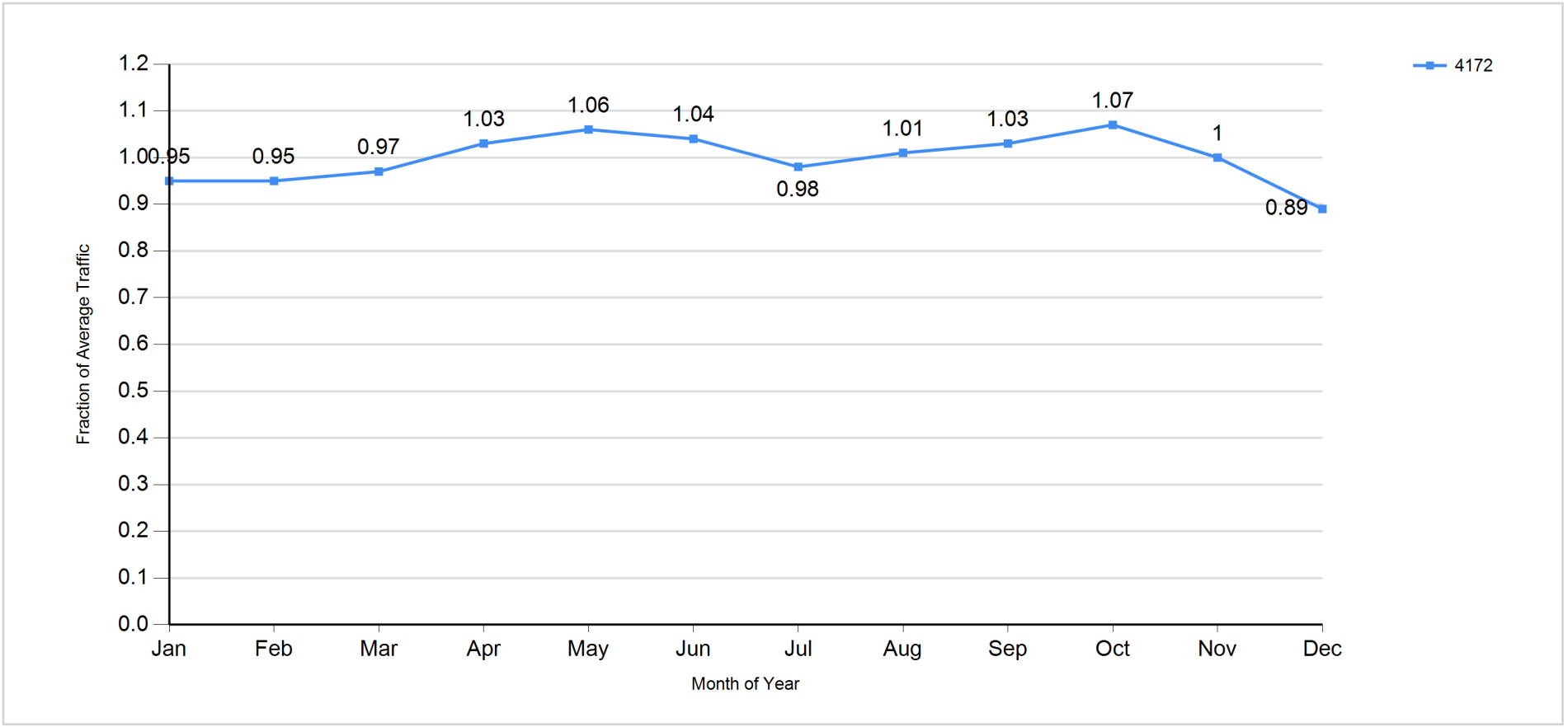
	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
2	299	192	134	132	184	370	834	975	1369	1641	1826	2100	2164	2183	2062	1879	1724	1720	1387	1148	955	824	741	576	27419	Accepted
9	435	183	124	150	247	631	1222	1522	1889	2166	2361	2560	2782	2740	2633	2468	2340	2253	2072	1597	1348	1137	1026	782	36668	Accepted
16	485	226	150	133	234	545	1217	1694	1892	2185	2429	2665	2750	2749	2593	2437	2594	2248	1873	1563	1235	1097	912	705	36611	Accepted
23	434	196	151	149	230	605	1140	1548	1808	2099	2274	2578	2716	2538	2340	2258	1920	1990	1809	1470	1435	1244	966	700	34598	Accepted
24												2475.8	2603	2552.5										Average	33824	
25											Average	2543.8														
26																										
27																										
28																										
29																										
30																										
31																										

		Weeday Daily	PM Peak	Saturday Daily	SAT Peak
July	2019	44743	3297	33677	2490
July	2022	46098	3397	34697	2565
July	2022	44185	3328	33824	2544
	Change	1.0433	1.0206	1.0258	1.0084
	Use	1.04	1.02	1.03	1.01

SEASONAL ADJUSTMENT DATA

Massachusetts Highway Department

Traffic Pattern by Month for 1/1/2019 - 12/31/2019
Criteria: Location ID = 4172, From 1/1/1900 To 12/31/2049 12:00:00 AM



Traffic Pattern by Month for 1/1/2019 - 12/31/2019
Criteria: Location ID = 4172, From 1/1/1900 To 12/31/2049 12:00:00 AM

Factor Group	Station	Weight	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
UR2	4172	0	0.951	0.951	0.974	1.028	1.063	1.044	0.981	1.014	1.029	1.071	0.999	0.888
	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

HOW TO RIDE

- Please arrive at your stop five minutes ahead of time.
- Signal the driver by raising your arm as the bus approaches.
- Please have your fare ready when boarding to avoid delays.
- Allow other passengers to de-board before you enter the bus.
- After boarding please be seated immediately.

FOR DISABLED RIDERS

- All MART buses are equipped with wheelchair lifts and reserved seating areas with chair ties.
- In the event a lift is not available, your driver will notify MART, and a lift-equipped MART van will be sent to enable you to complete your journey.
- To qualify for discount fares and get a proper ID, please call 800-922-5636.
- The TDD number for deaf and hearing-impaired passengers is 800-789-0577.

BAD WEATHER RULES

- For safety reasons, MART has the right to postpone or cancel service or to deviate from its regular routes because of accidents, bad weather or other emergencies. For updates tune to **WPKZ AM 1280**; call MART at **800-922-5636**; or visit our website at http://www.mrta.us/customer-information/service-alerts.

NO SERVICE ON WEEKENDS OR THESE HOLIDAYS:

New Year's Day, Martin Luther King Jr. Day, President's Day, Patriot's Day, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran's Day, Thanksgiving, and Christmas Day

FARES

FIXED ROUTE

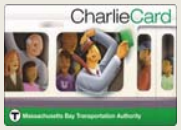
Adult	$1.25
Student (18 & younger,)	$0.60
Elders (60 and older)	$0.60
Disabled Riders (with Medicare, Statewide or other proper ID)	$0.60
Children (5 and under with an adult)	Free

PASSES

Monthly Regular	$25.00
Monthly Elderly, Disabled, Veterans, Students	$20.00

Exact Fare Required: You can pay the driver cash or load cash value (don't have to worry about exact change) on the CharlieCard. If you use the shuttle regularly then a monthly pass is the best value. **Paper passes can be purchased at Littleton Town Hall (Tax Collector's Office) or from the bus driver until further notice.**

You may purchase passes at any of the following MART locations:



- 100 Main St, Fitchburg, MA
- 1427R Water St, Fitchburg, MA

Also Littleton Town Hall or bus driver

MART buses and shuttle vans, if equipped with a farebox or card validator, accept the CharlieCard™. This fare card is how we issue MART's bus passes. Riders can also put cash stored-value on the card to use for single bus trips. CharlieCard™ stored-value lets you ride on MART and nine other RTA's (such as WRTA in Worcester) or the MBTA bus/subway system.

Littleton-Westford Commuter Rail Shuttle

Fares & Schedules

Effective Date: June 4, 2018

www.mrta.us
Montachusett Regional Transit Authority
1427R Water St, Fitchburg, MA 01420
(978) 345-7711 or (800) 922-5636
E-mail: contactMART@mrta.us

IB = Inbound Train to Boston

OB = Outbound Train from Boston

A.M. Service
Monday-Friday Only

Stop Location	Departure Time	Corresponding MBTA Train
Juniper Networks (Park & Ride Lot)	7:10 AM	
Littleton Commuter Rail Station (Arrive)	7:35 AM	IB: 7:46 AM
Littleton Commuter Rail Station (Depart)	7:50 AM	OB: 7:40 AM
IBM	8:00 AM	
Red Hat, Inc.	8:05 AM	
Juniper Networks	8:13 AM	
Technology Park Entrance	8:15 AM	
Littleton Commuter Rail Station	8:50 AM	IB: 8:35 AM OB: 8:41 AM
IBM	9:00 AM	
Red Hat, Inc.	9:05 AM	
Juniper Networks	9:13 AM	
Technology Park Entrance	9:15 AM	

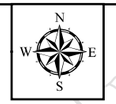
P.M. Service
Monday-Friday Only

Stop Location	Departure Time	Corresponding MBTA Train
Technology Park Entrance	4:40 PM	
Juniper Networks	4:42 PM	
Red Hat, Inc.	4:50 PM	
IBM	4:55 PM	
Littleton Commuter Rail Station (Arrive)	5:05 PM	IB: 5:15 PM
Littleton Commuter Rail Station (Depart)	5:20 PM	OB: 5:00 PM & 5:14 PM
Technology Park Entrance	5:40 PM	
Juniper Networks (Park & Ride Lot)	5:42 PM	
Red Hat, Inc.	5:55 PM	
IBM	6:00 PM	
Littleton Commuter Rail Station (Arrive)	6:10 PM	IB: 6:18 PM
Littleton Commuter Rail Station (Depart)	6:38 PM	OB: 6:28 PM
Juniper Networks (Park & Ride Lot)	on-demand	

Roads Travelled - To Train Station: Start at Juniper Park & Ride Lot to Technology Park Drive, Nixon Rd, Littleton Rd (Rte. 110/2A Westford) to King St (Rte. 110/2A Littleton), IBM Parking Lot, Auman St, King St, Rogers St, Foster St to MBTA Littleton/495 Station.
From Train Station: Foster, King, Auman, IBM Parking Lot, King, Littleton, Nixon, Technology Park, Juniper Parking Lot, Technology Park Drive.

MART now has bike racks on all our fixed route buses and shuttle vans

Littleton-Westford Commuter Rail Shuttle



GROTON

AYER

BOSTON ROAD

FORGE VILLAGE ROAD

MAIN STREET

TADMUCK ROAD

GARRISON ROAD

TECHNOLOGY PARK DRIVE

Park and Ride Lot at Juniper

Technology Park Entrance

CHELMSFORD

225

110

119

495

BEAVER BROOK ROAD

LITTLETON ROAD

CARLISLE ROAD

Roudenbush Community Center

Westford House

NETSCOUT

Red Hat

IBM

Kimball Farm

AUMAN STREET

225

GRIFFIN ROAD

27

2A

Littleton Common

Littleton Town Hall & Library

WESTFORD

LITTLETON

POWERS ROAD

HARVARD ROAD

110

KING STREET

2A

OAK HILL ROAD

TAYLOR STREET

FOSTER STREET

HARWOOD AVENUE

495

Littleton Station

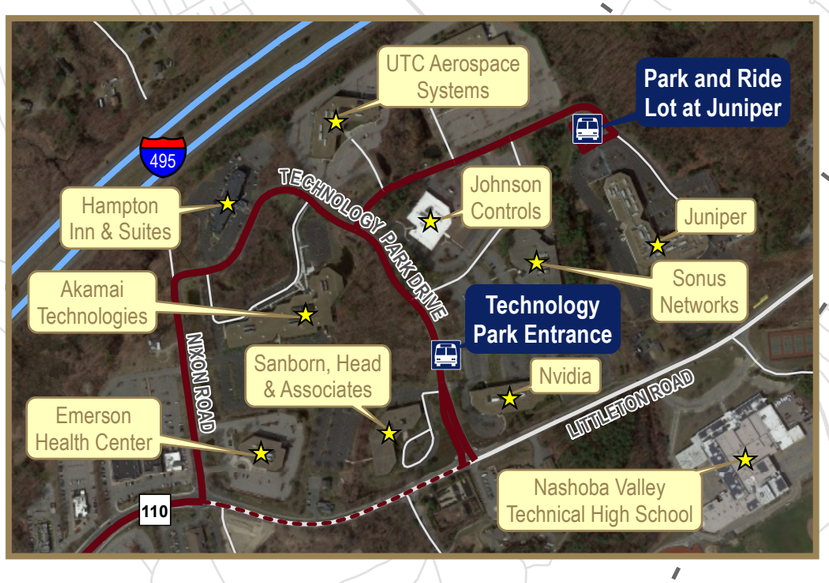
BOXBORO

2

TAYLOR STREET

CARLISLE

ACTON



Legend

- Shuttle Stops
- Points of Reference
- Active Rail Lines
- Community Boundaries

Shuttle Route

- Full Service
- Limited Service

Roadways

- Interstate Routes
- US & State Routes
- Other Roadways

MART

DATA SOURCES: MassGIS, MassDOT, MART and the MRPC.

DISCLAIMER: The information depicted on this map is for planning purposes only. All data are representational and are not adequate for boundary definition, regulatory interpretation, or parcel-based analysis.

PREPARED BY:
Montachusett Regional Planning Commission
GIS Department, May 2018
464 Abbott Avenue
Leominster, MA 01453
Phone: 978-345-7376
E-mail: mrpc@mrpc.org

0 0.5 1 2 Miles

MOTOR VEHICLE CRASH DATA

MassHighway

C+A2:L45RASH RATE WORKSHEET

CITY/TOWN : Littleton COUNT DATE : 2022

DISTRICT : 3 UNSIGNALIZED : SIGNALIZED : X

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Great Road ST #

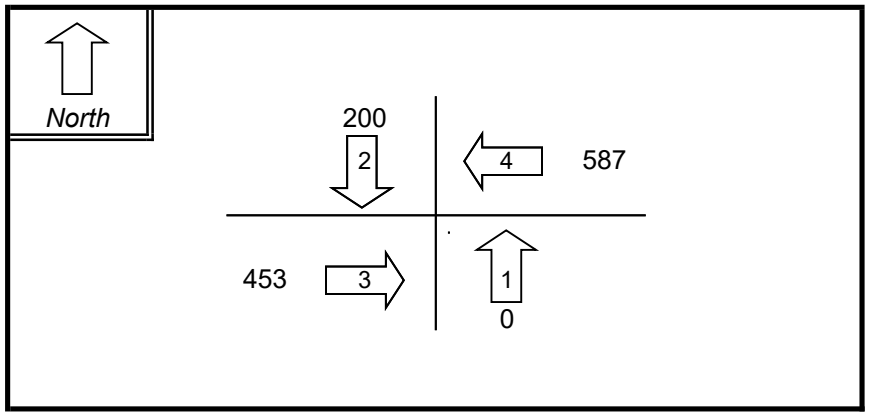
MINOR STREET(S) : Powers Road ST #

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) :		200	453	587		1,240

" K " FACTOR : 0.104 APPROACH ADT : 11,923 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 2 # OF YEARS : 3 AVERAGE # OF ACCIDENTS (**A**) : 0.67

CRASH RATE CALCULATION : 0.15 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 3 signalized intersections = 0.89

Accident Rate for District 3 unsignalized intersections = 0.61

MassDOT Crash Report for Great Road at Powers Road in Littelton MA 2017-2019

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
01/18/2018	Property damage only (none injured)	7:17 PM	2	D1: (No improper driving) / D2: (Failure to keep in proper lane or running off road)	Dark - unknown roadway lighting	Sideswipe, opposite direction	Wet	V1: Slowing or stopped in traffic / V2: Turning left	V1: S / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		POWERS ROAD / GREAT ROAD
01/02/2019	Property damage only (none injured)	2:09 PM	2	D1: (No improper driving) / D2: (Made an improper turn)	Daylight	Head-on	Dry	V1: Travelling straight ahead / V2: Turning left	V1: W / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD / POWERS RD

MassHighway

C+A2:L45RASH RATE WORKSHEET

CITY/TOWN : Littleton COUNT DATE : 2022

DISTRICT : 3 UNSIGNALIZED : X SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Great Road ST #

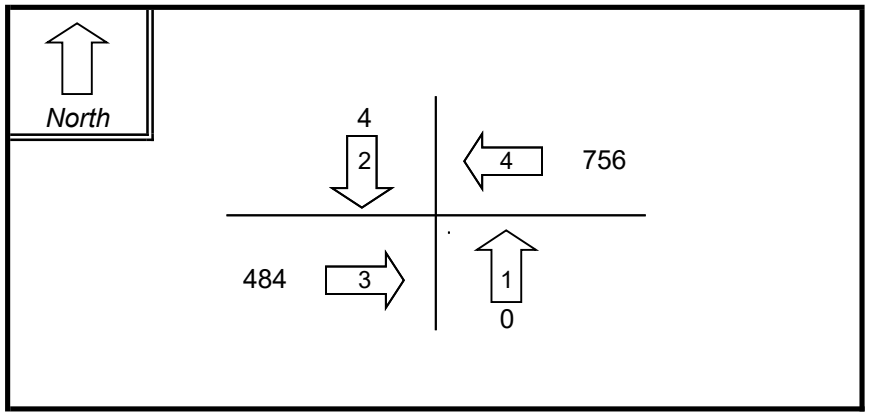
MINOR STREET(S) : Robinson Road ST #

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) :		4	484	756		1,244

" K " FACTOR : 0.104 APPROACH ADT : 11,962 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 1 # OF YEARS : 3 AVERAGE # OF ACCIDENTS (**A**) : 0.33

CRASH RATE CALCULATION : 0.08 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 3 signalized intersections = 0.89

Accident Rate for District 3 unsignalized intersections = 0.61

MassDOT Crash Report for Great Road at Robinson Road in Littelton MA 2017-2019

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
02/27/2019	Property damage only (none injured)	5:29 PM	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Dusk	Angle	Dry	V1: Turning left / V2: Travelling straight ahead	V1: S / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD / ROBINSON RD

MassHighway

C+A2:L45RASH RATE WORKSHEET

CITY/TOWN : Littleton COUNT DATE : 2022

DISTRICT : 3 UNSIGNALIZED : X SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Great Road ST #

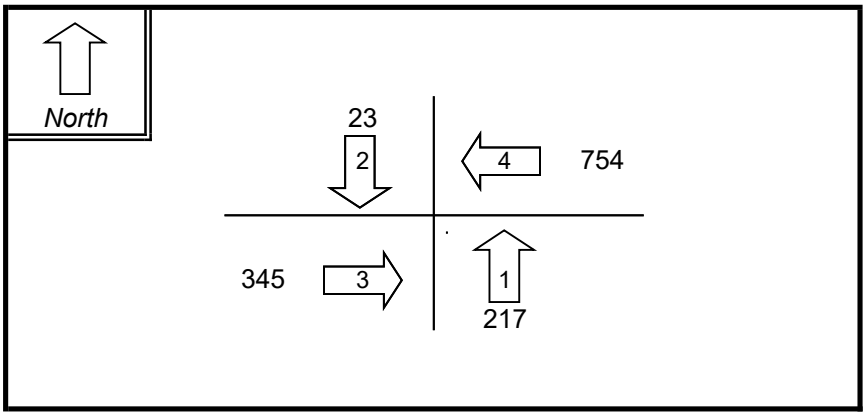
MINOR STREET(S) : Steven Street ST #

Meetinghouse Road ST #

Adams Street ST #

ST #

INTERSECTION DIAGRAM
(Label Approaches)



INTERSECTION REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NEB	NWB	EB	WB		
VOLUMES (PM) :	217	23	345	754		1,339

" K " FACTOR : 0.104 APPROACH ADT : 12,875 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 5 # OF YEARS : 3 AVERAGE # OF ACCIDENTS (**A**) : 1.67

CRASH RATE CALCULATION : 0.35 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 3 signalized intersections = 0.89

Accident Rate for District 3 unsignalized intersections = 0.61

MassDOT Crash Report for Great Road at Stevens Street/Meetinghouse Road/Adams Street in Littelton MA 2017-2019

Crash Date	Crash Severity	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	Near Intersection Roadway
02/07/2017	Non-fatal injury	2	D1: (No improper driving) / D2: (Inattention)	Dark - lighted roadway	Rear-to-rear	Snow	V1: Slowing or stopped in traffic / V2: Backing	V1: N / V2: N	hail (freezing rain or drizzle)	vehicle in traffic) V2:(Collision with motor vehicle in traffic)	320	GREAT RD	
08/20/2017	damage only (none	2	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	vehicle in traffic) V2:(Collision with motor vehicle in traffic)		STEVENS ST	GREAT RD
02/27/2018	damage only (none	2	D1: (No improper driving) / D2: (Unknown)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: W / V2: W	Clear	vehicle in traffic) V2:(Collision with motor vehicle in traffic)		/ MEETINGHOUSE RD	
10/16/2018	damage only (none	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Sideswipe, same direction	Dry	V1: Travelling straight ahead / V2: Other	V1: W / V2: W	Clear	vehicle in traffic) V2:(Collision with motor vehicle in traffic)	319	GREAT RD	
06/05/2019	damage only (none	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Rear-end	Dry	V1: Turning right / V2: Turning right	V1: E / V2: E	Clear	vehicle in traffic) V2:(Collision with motor vehicle in traffic)		STEVENS ST / GREAT RD	

MassHighway

C+A2:L45RASH RATE WORKSHEET

CITY/TOWN : Littleton COUNT DATE : 2022

DISTRICT : 3 UNSIGNALIZED : X SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : King Street ST #

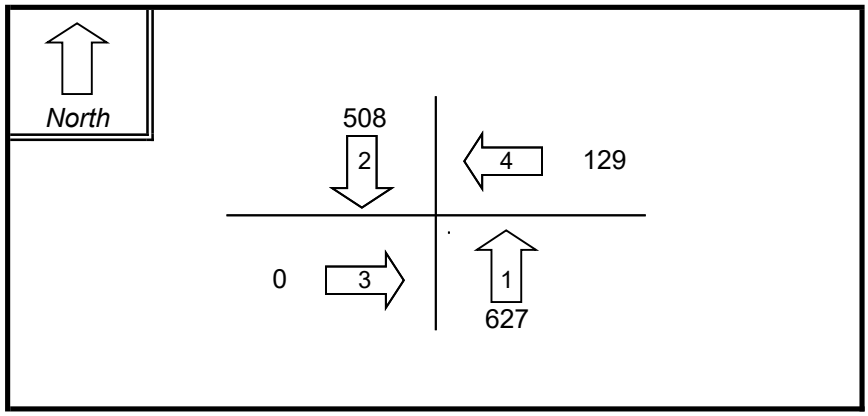
MINOR STREET(S) : Meetinghouse Road ST #

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) :	627	508		129		1,264

" K " FACTOR : 0.104 APPROACH ADT : 12,154 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 6 # OF YEARS : 3 AVERAGE # OF ACCIDENTS (**A**) : 2.00

CRASH RATE CALCULATION : 0.45 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 3 signalized intersections = 0.89

Accident Rate for District 3 unsignalized intersections = 0.61

MassDOT Crash Report for King Street at Meetinghouse Road in Littelton MA 2017-2019

Crash Date	Crash Severity	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	Near Intersection Roadway
03/16/2017	damage only (none	2	D1: (Unknown) / D2: (No improper driving)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic	V1: S / V2: S	Clear/Other	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	510	KING ST	
03/29/2017	damage only (none	2	D1: (Visibility obstructed) / D2: (Unknown)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Entering traffic lane	V1: S / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	510	KING ST	
08/28/2017	damage only (none	2	D1: (No improper driving) / D2: (Followed too closely)	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)		KING ST / MEETINGHOUSE RD	
11/07/2017	damage only (none	2	D1: (No improper driving) / D2: (Inattention)	Dusk	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: N / V2: N	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	510	KING ST Rte 110 S	
12/13/2017	damage only (none	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Daylight	Rear-end	Sand, mud, dirt, oil, gravel	V1: Turning right / V2: Turning right	V1: N / V2: N	Clear/Unknown	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		MEETINGHOUSE ROAD	KING STREET Rte 110 W
10/18/2018	damage only (none	3	D1: (No improper driving) / D2: (No improper driving) / D3: (Inattention),(Followed too closely)	Daylight	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Slowing or stopped in traffic / V3: Travelling straight ahead	V1: W / V2: W / V3: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic)	510	KING ST	

MassHighway

C+A2:L45RASH RATE WORKSHEET

CITY/TOWN : Littleton COUNT DATE : 2022

DISTRICT : 3 UNSIGNALIZED : X SIGNALIZED :

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : King Street ST #

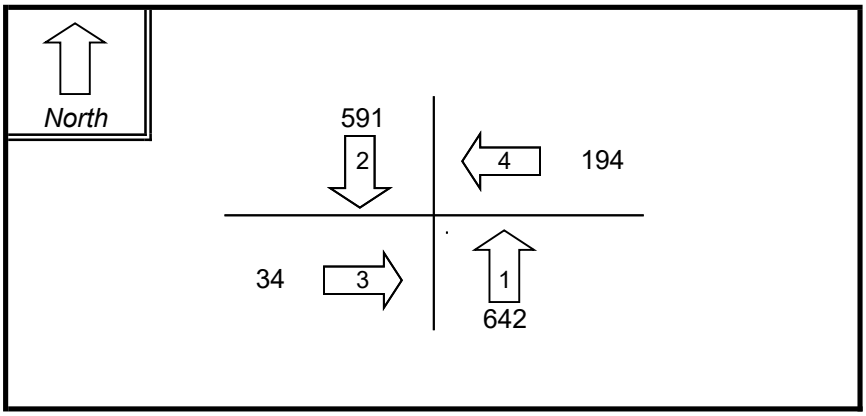
MINOR STREET(S) : Stevens Street ST #

Goldsmith Street ST #

Private Driveway 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) :	642	591	34	194		1,461

" K " FACTOR : 0.104 APPROACH ADT : 14,048 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 7 # OF YEARS : 3 AVERAGE # OF ACCIDENTS (**A**) : 2.33

CRASH RATE CALCULATION : 0.46 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 3 signalized intersections = 0.89

Accident Rate for District 3 unsignalized intersections = 0.61

MassDOT Crash Report for King Street at Stevens Street/Goldsmith Street/Private Driveway in Littelton MA 2017-2019

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
06/23/2017	Property damage only (none injured)	12:43 PM	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GOLDSMITH ST / STEVENS ST
02/18/2018	Property damage only (none injured)	11:55 AM	2	D1: (No improper driving) / D2: (Operating vehicle in erratic, reckless, careless, negligent or aggressive manner)	Daylight	Angle	Wet	V1: Travelling straight ahead / V2: Entering traffic lane	V1: W / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GOLDSMITH STREET / KING STREET Rte 110 W
05/14/2018	Non-fatal injury	7:04 PM	1	D1: (Inattention)	Daylight	Pedestrian	Dry	V1: Backing	V1: E	Clear	V1:(Collision with pedestrian)	468	KING STREET
06/06/2018	Property damage only (none injured)	8:17 AM	2	D1: (Other improper action) / D2: (No improper driving)	Daylight	Angle	Dry	V1: Turning left / V2: Travelling straight ahead	V1: E / V2: N	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		KING ST / GOLDSMITH ST
06/13/2018	Property damage only (none injured)	5:49 PM	2	D1: (Inattention) / D2: (No improper driving)	Daylight	Sideswipe, same direction	Dry	V1: Turning left / V2: Travelling straight ahead	V1: N / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		KING ST / GOLDSMITH ST
08/09/2018	Property damage only (none injured)	6:06 PM	1	D1: (No improper driving)	Daylight	Bicyclist	Dry	V1: Turning left	V1: E	Clear	V1:(Collision with cyclist)		STEVENS ST / GOLDSMITH ST
09/03/2018	Property damage only (none injured)	8:43 PM	2	D1: (Operating vehicle in erratic, reckless, careless, negligent or aggressive manner),(Followed too closely) / D2: (No improper driving)	Dark - lighted roadway	Rear-end	Dry	V1: Travelling straight ahead / V2: Slowing or stopped in traffic	V1: N / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GOLDSMITH ST / STEVENS ST / KING ST

MassHighway

C+A2:L45RASH RATE WORKSHEET

CITY/TOWN : Littleton COUNT DATE : 2022

DISTRICT : 3 UNSIGNALIZED : SIGNALIZED : X

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : King Street ST #

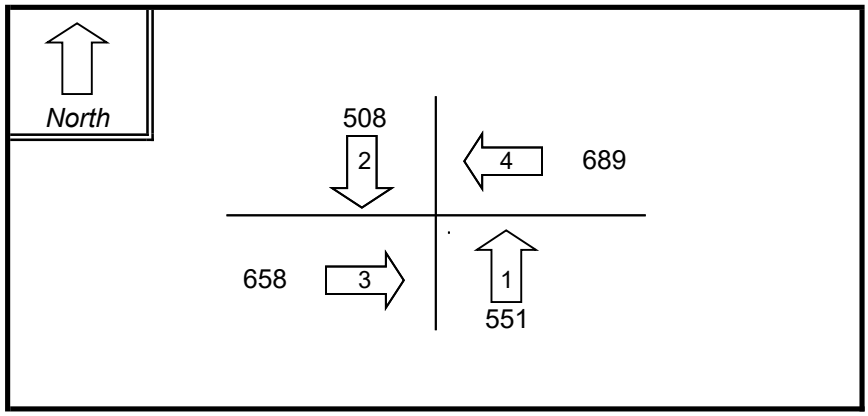
MINOR STREET(S) : Great Road ST #

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) :	551	508	658	689		2,406

" K " FACTOR : 0.104 APPROACH ADT : 23,135 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF ACCIDENTS : 46 # OF YEARS : 3 AVERAGE # OF ACCIDENTS (**A**) : 15.33

CRASH RATE CALCULATION : 1.82 RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : Accident Rate for District 3 signalized intersections = 0.89

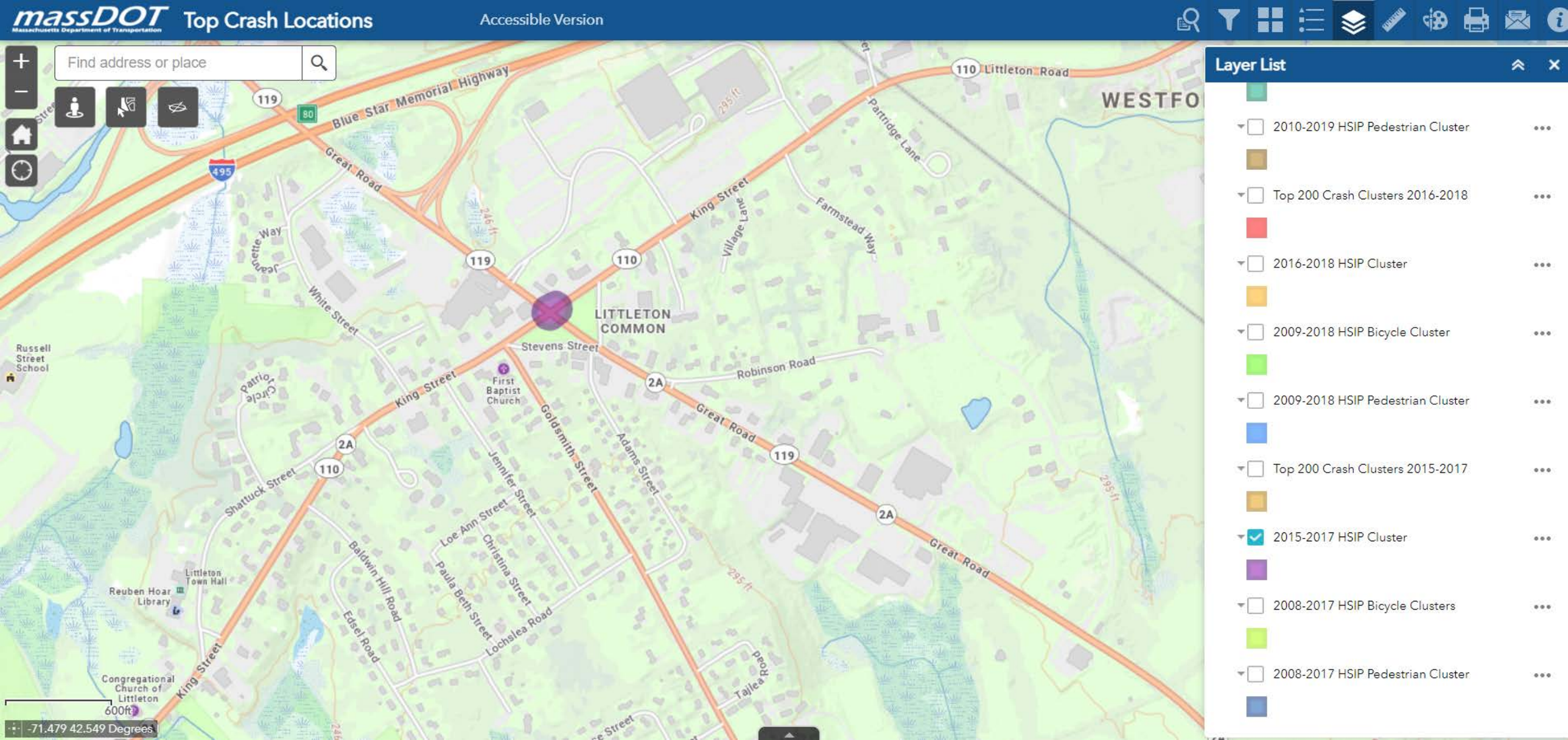
Accident Rate for District 3 unsignalized intersections = 0.61

MassDOT Crash Report for King Street at Great Road in Littleton MA 2017-2019

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Vehicle Towed From Scene (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Vehicle Sequence of Events (All Vehicles)	Street Number	Roadway	Near Intersection Roadway
01/07/2017	Property damage only (none injured)	3:47 PM	2	D1: (No improper driving) / D2: (Inattention),(Visibility obstructed)	Daylight	Angle	Snow	Driveway	V1:(Yes, vehicle or trailer disabled) / V2:(No)	V1: S / V2: E	Snow/Other	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD / KING ST	
01/18/2017	Property damage only (none injured)	6:17 PM	2	D1: (No improper driving) / D2: (Followed too closely)	Dark - lighted roadway	Rear-end	Wet	Four-way intersection	V1:(No) / V2:(No)	V1: S / V2: S	Rain	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		KING ST / GREAT RD	
01/20/2017	Property damage only (none injured)	2:21 PM	2	D1: (No improper driving) / D2: (Followed too closely)	Daylight	Rear-end	Dry	Not at junction	V1:(No) / V2:(No)	V1: W / V2: W	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST	
02/02/2017	Property damage only (none injured)	4:18 PM	2	D1: (No improper driving) / D2: (Visibility obstructed)	Daylight	Angle	Dry	Not at junction	V1:(Yes, vehicle or trailer disabled) / V2:(No)	V1: W / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT ROAD / KING STREET	
02/20/2017	Property damage only (none injured)	5:24 PM	2	D1: (No improper driving) / D2: (Inattention),(Failed to yield right of way)	Dusk	Angle	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD / KING ST	
02/21/2017	Property damage only (none injured)	3:56 PM	3	D1: (Distracted) / D2: (No improper driving) / D3: (No improper driving)	Daylight	Rear-end	Dry	Four-way intersection	V1:(Yes, vehicle or trailer disabled) / V2:(Yes, vehicle or trailer disabled) / V3:(No)	V1: S / V2: S / V3: S	Clear/Unknown	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic)	500	KING ST	
04/03/2017	Property damage only (none injured)	4:12 PM	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Rear-end	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD / KING ST	
04/11/2017	Property damage only (none injured)	2:33 PM	2	D1: (Unknown) / D2: (No improper driving)	Daylight	Rear-end	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: S / V2: S	Clear/Other	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST	
05/05/2017	Property damage only (none injured)	6:04 PM	2	D1: (Distracted) / D2: (No improper driving)	Daylight	Rear-end	Wet	Not at junction	V1:(Yes, vehicle or trailer disabled) / V2:(No)	V1: S / V2: S	Cloudy/Rain	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST	
05/12/2017	Property damage only (none injured)	4:51 PM	2	D1: (No improper driving) / D2: (No improper driving)	Daylight	Sideswipe, same direction	Dry	Not at junction	V1:(No) / V2:(No)	V1: S / V2: S	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST Rte 110 S	
05/13/2017	Property damage only (none injured)	6:29 PM	2	D1: (No improper driving) / D2: (Inattention),(Operating vehicle in erratic, reckless, careless, negligent or aggressive manner)	Daylight	Rear-end	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: S / V2: S	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD / KING ST	
05/13/2017	Property damage only (none injured)	4:49 PM	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Daylight	Angle	Dry	T-intersection	V1:(No) / V2:(No)	V1: W / V2: W	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD / KING ST	
08/04/2017	Property damage only (none injured)	10:06 AM	1	D1: (Failure to keep in proper lane or running off road)	Daylight	Fixed-Object	Dry	Four-way intersection	V1:(No)	V1: E	Cloudy	V1:(Collision with highway traffic sign post)		KING ST Rte 110 W / GREAT RD Rte 119 E	
08/14/2017	Property damage only (none injured)	6:33 PM	2	D1: (Unknown) / D2: (No improper driving)	Daylight	Rear-end	Dry	Not at junction	V1:(Yes, vehicle or trailer disabled) / V2:(No)	V1: W / V2: W	Clear/Unknown	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	486	KING ST	
09/13/2017	Property damage only (none injured)	10:45 AM	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Rear-end	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD	KING ST
10/13/2017	Property damage only (none injured)	5:25 PM	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Rear-end	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD Rte 119 W / KING ST Rte 110 N	
10/19/2017	Property damage only (none injured)	6:33 PM	2	D1: (Unknown) / D2: (Unknown)	Dark - lighted roadway	Angle	Dry	Four-way intersection	V1:(No) / V2:(Yes, vehicle or trailer disabled)	V1: W / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		KING ST / GREAT RD	
10/23/2017	Property damage only (none injured)	2:48 PM	2	D1: (Inattention) / D2: (No improper driving)	Daylight	Rear-end	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD / KING ST	
11/29/2017	Non-fatal injury	7:00 PM	2	D1: (Unknown) / D2: (No improper driving)	Dark - lighted roadway	Head-on	Dry	Four-way intersection	V1:(Yes, vehicle or trailer disabled) / V2:(Yes, vehicle or trailer disabled)	V1: E / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD / KING ST	
12/14/2017	Property damage only (none injured)	7:10 AM	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Daylight	Sideswipe, opposite direction	Dry	Driveway	V1:(Yes, vehicle or trailer disabled) / V2:(Yes, vehicle or trailer disabled)	V1: W / V2: E	Cloudy/Unknown	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		KING ST / GREAT RD	
02/23/2018	Property damage only (none injured)	12:00 PM	2	D1: (Failed to yield right of way) / D2: (No improper driving)	Daylight	Angle	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: W / V2: W	Clear/Unknown	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD / KING ST	
04/25/2018	Property damage only (none injured)	11:58 AM	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Rear-end	Wet	Four-way intersection	V1:(No) / V2:(No)	V1: S / V2: S	Rain	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		KING ST / GREAT RD	
05/14/2018	Property damage only (none injured)	4:25 PM	3	D1: (Unknown) / D2: (No improper driving) / D3: (No improper driving)	Daylight	Rear-end	Dry	Not at junction	V1:(No) / V2:(No) / V3:(No)	V1: W / V2: W / V3: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic) V3:(Collision with motor vehicle in traffic)	400	GREAT RD	
09/12/2018	Property damage only (none injured)	12:23 PM	2	D1: (Disregarded traffic signs, signals, road markings) / D2: (No improper driving)	Daylight	Angle	Wet	Four-way intersection	V1:(Yes, vehicle or trailer disabled) / V2:(No)	V1: E / V2: W	Rain/Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		KING ST / GREAT RD	
10/15/2018	Property damage only (none injured)	3:13 PM	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Daylight	Angle	Wet	Not at junction	V1:(Yes, vehicle or trailer disabled) / V2:(No)	V1: W / V2: E	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST	
10/24/2018	Property damage only (none injured)	1:39 PM	2	D1: (No improper driving) / D2: (No improper driving)	Daylight	Angle	Wet	Not at junction	V1:(Yes, vehicle or trailer disabled) / V2:(No)	V1: W / V2: S	Rain	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST	
10/26/2018	Property damage only (none injured)	9:30 PM	2	D1: (No improper driving) / D2: (Unknown)	Dark - lighted roadway	Sideswipe, same direction	Dry	T-intersection	V1:(No) / V2:(No)	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		KING STREET Rte SR110 W / GREAT ROAD	
11/01/2018	Property damage only (none injured)	10:10 PM	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Dark - lighted roadway	Angle	Wet	Four-way intersection	V1:(Yes, vehicle or trailer disabled) / V2:(Yes, vehicle or trailer disabled)	V1: W / V2: N	Rain	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD / KING ST	
11/16/2018	Property damage only (none injured)	5:43 PM	2	D1: (No improper driving) / D2: (No improper driving)	Dark - lighted roadway	Sideswipe, same direction	Wet	Four-way intersection	V1:(No) / V2:(No)	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		KING ST Rte 110 / GREAT RD Rte 119	
02/07/2019	Property damage only (none injured)	2:52 PM	2	D1: (No improper driving) / D2: (Distracted)	Daylight	Rear-end	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: W / V2: W	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with parked motor vehicle)		GREAT RD / KING ST	
04/10/2019	Property damage only (none injured)	11:42 AM	2	D1: (Other improper action) / D2: (No improper driving)	Daylight	Angle	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: S / V2: N	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD Rte 119 / KING ST Rte 110	

MassDOT Crash Report for King Street at Great Road in Littelton MA 2017-2019

Crash Date	Crash Severity	Crash Time	Number of Vehicles	Driver Contributing Circumstances (All Drivers)	Light Conditions	Manner of Collision	Road Surface Condition	Roadway Junction Type	Vehicle Towed From Scene (All Vehicles)	Vehicle Travel Directions (All Vehicles)	Weather Conditions	Vehicle Sequence of Events (All Vehicles)	Street Number	Roadway	Near Intersection Roadway
04/11/2019	Property damage only (none injured)	4:51 PM	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Daylight	Head-on	Dry	Four-way intersection	V1:(Yes, vehicle or trailer disabled) / V2:(Yes, vehicle or trailer disabled)	V1: W / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD / KING ST	
04/12/2019	Non-fatal injury	1:49 PM	2	D1: (Unknown) / D2: (Unknown)	Daylight	Sideswipe, opposite direction	Dry	Four-way intersection	V1:(Yes, vehicle or trailer disabled) / V2:(Yes, vehicle or trailer disabled)	V1: E / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST	
05/15/2019	Property damage only (none injured)	7:28 AM	2	D1: (No improper driving) / D2: (Distracted)	Daylight	Rear-end	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD Rte 119 / KING ST Rte 110	
06/02/2019	Property damage only (none injured)	3:54 PM	2	D1: (Visibility obstructed) / D2: (No improper driving)	Daylight	Angle	Dry	Not at junction	V1:(No) / V2:(Yes, vehicle or trailer disabled)	V1: E / V2: S	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST	
06/08/2019	Property damage only (none injured)	12:05 PM	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Rear-end	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD Rte 119 S / KING ST Rte 110 E	
06/18/2019	Property damage only (none injured)	2:43 PM	2	D1: (No improper driving) / D2: (Inattention),(Fatigued/asleep)	Daylight	Rear-end	Dry	Four-way intersection	V1:(No) / V2:(Yes, vehicle or trailer disabled)	V1: W / V2: W	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		KING ST / GREAT RD	
06/25/2019	Not Reported	11:01 AM	2	D1: (Exceeded authorized speed limit) / D2: (Visibility obstructed)	Daylight	Angle	Dry	Not at junction	V1:(Yes, vehicle or trailer disabled) / V2:(Yes, vehicle or trailer disabled)	V1: S / V2: N	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with other movable object)	500	KING ST	
07/18/2019	Property damage only (none injured)	4:07 PM	2	D1: (Followed too closely) / D2: (No improper driving)	Daylight	Rear-end		Not at junction	V1:(No) / V2:(No)	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST	
08/05/2019	Property damage only (none injured)	1:11 PM	2	D1: (Inattention) / D2: (No improper driving)	Daylight	Sideswipe, same direction	Dry	Not at junction	V1:(No) / V2:(No)	V1: E / V2: S	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST	
08/06/2019	Non-fatal injury	8:23 AM	2	D1: (Other improper action) / D2: (No improper driving)	Daylight	Angle	Dry	Not at junction	V1:(No) / V2:(Yes, vehicle or trailer disabled)	V1: E / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST Rte 110 W	
08/26/2019	Property damage only (none injured)	2:09 PM	2	D1: (Visibility obstructed) / D2: (No improper driving)	Daylight	Angle	Dry	Not at junction	V1:(No) / V2:(No)	V1: S / V2: S	Clear/Other	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST	
09/10/2019	Property damage only (none injured)	10:42 AM	2	D1: (Distracted) / D2: (No improper driving)	Daylight	Rear-end	Dry	Four-way intersection	V1:(No) / V2:(No)	V1: W / V2: W	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)		GREAT RD Rte 119 W / KING ST Rte 110	
09/18/2019	Property damage only (none injured)	1:55 PM	2	D1: (Other improper action) / D2: (No improper driving)	Daylight	Angle	Dry	Not at junction	V1:(No) / V2:(Yes, vehicle or trailer disabled)	V1: E / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST	
11/12/2019	Property damage only (none injured)	2:19 PM	2	D1: (No improper driving) / D2: (Failed to yield right of way)	Daylight	Angle	Wet	Not at junction	V1:(No) / V2:(No)	V1: S / V2: E	Cloudy	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	500	KING ST	
12/13/2019	Property damage only (none injured)	12:23 PM	2	D1: (Followed too closely) / D2: (No improper driving)	Daylight	Rear-end	Dry	Not at junction	V2:(No) / V1:(No)	V2: W / V1: W	Cloudy	V2:(Collision with motor vehicle in traffic) V1:(Collision with motor vehicle in traffic)	500	KING STREET	


massDOT
Massachusetts Department of Transportation
Top Crash Locations
Accessible Version
Find address or place
Layer List
2010-2019 HSIP Pedestrian Cluster
Top 200 Crash Clusters 2016-2018
2016-2018 HSIP Cluster
2009-2018 HSIP Bicycle Cluster
2009-2018 HSIP Pedestrian Cluster
Top 200 Crash Clusters 2015-2017
2015-2017 HSIP Cluster
2008-2017 HSIP Bicycle Clusters
2008-2017 HSIP Pedestrian Cluster
Blue Star Memorial Highway
Great Road
King Street
Littleton Road
Partridge Lane
Village Lane
Farmstead Way
Jeannette Way
White Street
LITTLETON COMMON
Stevens Street
Robinson Road
Russell Street School
First Baptist Church
Patriot Circle
Goldsmith Street
Adams Street
Jennifer Street
Shattuck Street
Loe Ann Street
Christina Street
Paula Beth Street
Lochslea Road
Baldwin Hill Road
Edsel Road
Littleton Town Hall
Reuben Hoar Library
Congregational Church of Littleton
Tajlea Road
WESTFO
600ft
-71.479 42.549 Degrees

SEGMENT CRASH RATE WORKSHEET

CITY/TOWN : Littleton COUNT DATE : 2022

DISTRICT : 3

~ SEGMENT DATA ~

ROADWAY NAME: Great Road

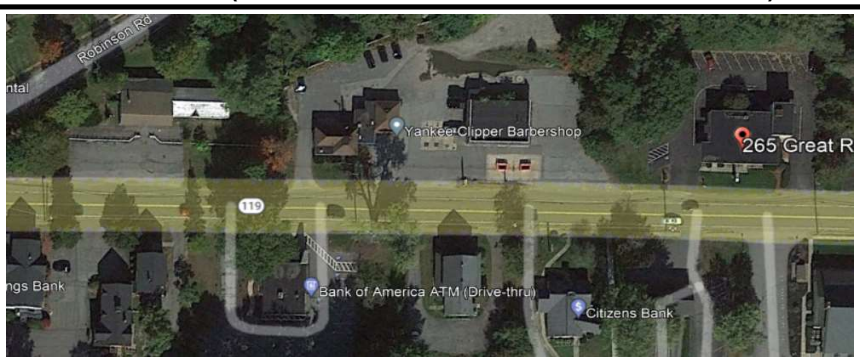
START POINT: Northern Site Driveway

END POINT: Southern Site Driveway

FUNCTIONAL CLASSIFICATION OF ROADWAY: Urban Principal Arterial

ROADWAY DIAGRAM (LABEL ROADWAY AND CROSS STREETS)

North



AVERAGE DAILY TRAFFIC

SEGMENT LENGTH IN MILES (**L**):	**0.13**
AVERAGE DAILY TRAFFIC VOLUME (**V**):	11,900

TOTAL # OF CRASHES:	6	# OF YEARS :	3	AVERAGE # OF CRASHES PER YEAR (**A**) :	**2.00**

CRASH RATE CALCULATION : **3.54**

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(L * V * 365)}$$

Comments : Accident Rate for Urban Principal Arterials = 3.58

Project Title & Date:

MassDOT Crash Report for Great Road at Site Driveways in Littelton MA 2017-2019

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
01/10/2017	Property damage only (none injured)	12:16 PM	2	D1: (Inattention) / D2: (No improper driving)	Daylight	Sideswipe, same direction	Wet	V1: Turning left / V2: Parked	V1: N / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	256	GREAT RD
02/23/2017	Property damage only (none injured)	4:12 PM	2	D1: (No improper driving) / D2: (No improper driving)	Daylight	Angle	Sand, mud, dirt, oil, gravel	V1: Backing / V2: Parked	V1: S / V2: Not Reported	Clear/Unknown	V1:(Collision with parked motor vehicle) V2:(Other)	287	GREAT RD
12/16/2017	Property damage only (none injured)	4:50 PM	2	D1: (Unknown) / D2: (No improper driving)	Dark - lighted roadway	Angle	Dry	V1: Turning left / V2: Travelling straight ahead	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	287	GREAT RD
03/15/2018	Property damage only (none injured)	7:22 PM	2	D1: (No improper driving) / D2: (Inattention)	Dark - lighted roadway	Rear-end	Dry	V1: Slowing or stopped in traffic / V2: Travelling straight ahead	V1: E / V2: E	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	288	GREAT RD
08/21/2018	Property damage only (none injured)	3:13 PM	2	D1: (No improper driving) / D2: (Inattention)	Daylight	Rear-end	Dry	V1: Travelling straight ahead / V2: Travelling straight ahead	V1: W / V2: W	Clear	V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)	288	GREAT RD
11/07/2018	Non-fatal injury	5:06 PM	2	D1: (No improper driving) / D2: (Other improper action)	Dark - lighted roadway	Angle	Dry	V1: Travelling straight ahead / V2: Turning right	V1: E / V2: N	Cloudy	V1:(Collision with motor vehicle in traffic),(Collision with utility pole) V2:(Collision with motor vehicle in traffic)	294	GREAT RD

VEHICLE SPEED DATA

Accurate Counts
978-664-2565

Location : Great Road 94160001
Location : East of Robinson Road
City/State: Littleton, MA
Direction: WB,

7/14/2022 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	1	5	6	1	0	1	0	0	0	0	0	0	14
1:00	0	0	2	2	1	1	0	0	0	0	0	0	0	6
2:00	0	0	1	4	4	0	0	0	0	0	0	0	0	9
3:00	0	1	2	0	1	1	0	0	0	0	0	0	0	5
4:00	0	1	4	3	2	2	0	0	0	0	0	0	0	12
5:00	0	0	8	6	9	3	3	0	0	0	0	0	0	29
6:00	1	0	14	44	34	13	5	1	0	0	0	0	0	112
7:00	0	4	16	63	50	15	2	1	0	0	0	0	0	151
8:00	1	2	54	101	51	17	4	0	0	0	0	0	0	230
9:00	1	9	53	124	36	17	2	0	0	0	0	0	0	242
10:00	0	14	77	84	38	13	3	1	0	0	0	0	0	230
11:00	3	18	98	124	48	18	2	0	0	0	0	0	0	311
12:00 PM	5	33	70	100	58	12	0	0	0	0	0	0	0	278
1:00	1	5	57	87	52	14	1	0	0	0	0	0	0	217
2:00	3	20	66	103	48	6	1	0	0	0	0	0	0	247
3:00	1	13	59	151	55	12	1	0	0	0	0	0	0	292
4:00	17	36	123	144	49	8	1	0	0	0	0	0	0	378
5:00	47	48	94	147	58	10	0	1	0	0	0	0	0	405
6:00	2	13	99	142	82	18	1	1	0	0	0	0	0	358
7:00	0	2	37	99	72	10	4	0	0	0	0	0	0	224
8:00	0	6	43	91	39	10	1	0	0	0	0	0	0	190
9:00	1	8	22	36	19	5	1	0	0	0	0	0	0	92
10:00	0	2	15	30	20	7	1	0	0	0	0	0	0	75
11:00	0	0	5	10	8	1	2	0	0	0	0	0	0	26
Total	83	236	1024	1701	835	213	36	5	0	0	0	0	0	4133

Accurate Counts
978-664-2565

Location : Great Road 94160001
Location : East of Robinson Road
City/State: Littleton, MA
Direction: WB,

7/15/2022 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	2	3	3	0	1	0	0	0	0	0	0	0	9
1:00	0	0	2	0	0	1	0	0	0	0	0	0	0	3
2:00	2	1	1	1	1	1	0	0	0	0	0	0	0	7
3:00	2	0	1	1	1	0	0	0	0	0	0	0	0	5
4:00	1	0	3	6	0	0	1	0	0	0	0	0	0	11
5:00	0	2	8	11	4	2	0	0	0	0	0	0	0	27
6:00	4	4	20	29	31	10	4	0	0	0	0	0	0	102
7:00	0	1	13	69	59	21	2	0	0	0	0	0	0	165
8:00	0	5	37	105	68	13	0	1	1	0	0	0	0	230
9:00	0	8	65	93	60	5	0	2	0	0	0	0	0	233
10:00	6	6	70	108	62	23	2	0	0	0	0	0	0	277
11:00	4	13	80	120	38	10	1	0	1	1	0	0	0	268
12:00 PM	7	17	86	115	54	9	2	0	0	0	0	0	0	290
1:00	4	15	88	127	58	5	5	0	0	0	0	0	0	302
2:00	0	14	73	137	66	11	1	0	1	0	0	0	0	303
3:00	312	41	38	28	8	4	0	0	0	0	0	0	0	431
4:00	63	38	102	140	38	6	1	0	0	0	0	0	0	388
5:00	1	9	87	206	54	7	1	0	0	0	0	0	0	365
6:00	3	4	49	138	90	15	5	0	0	0	0	0	0	304
7:00	0	4	40	115	71	14	3	0	0	0	0	0	0	247
8:00	0	2	27	69	49	17	1	0	0	0	0	0	0	165
9:00	0	5	23	55	33	9	0	0	0	0	0	0	0	125
10:00	0	0	16	42	43	12	0	0	0	0	0	0	0	113
11:00	0	0	8	34	30	8	2	0	0	0	0	0	0	82
Total	409	191	940	1752	918	204	31	3	3	1	0	0	0	4452

Accurate Counts
978-664-2565

Location : Great Road 94160001
Location : East of Robinson Road
City/State: Littleton, MA
Direction: WB,

7/16/2022 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	4	8	9	2	0	1	0	0	0	0	0	24
1:00	1	0	4	5	0	1	0	0	0	0	0	0	0	11
2:00	0	1	3	1	3	0	0	0	0	0	0	0	0	8
3:00	0	0	0	1	1	0	0	0	0	0	0	0	0	2
4:00	0	0	4	5	1	2	0	0	0	0	0	0	0	12
5:00	0	0	3	6	7	7	0	0	0	0	0	0	0	23
6:00	0	1	6	27	44	12	2	1	0	0	0	0	0	93
7:00	1	2	12	41	37	14	6	0	0	0	0	0	0	113
8:00	0	4	29	92	55	18	3	0	0	0	0	0	0	201
9:00	0	13	60	91	52	13	1	0	0	0	0	0	0	230
10:00	0	22	74	151	63	17	2	0	0	0	0	0	0	329
11:00	2	25	62	141	65	10	4	0	0	0	0	0	0	309
12:00 PM	2	16	68	131	44	8	0	0	0	0	0	0	0	269
1:00	0	9	83	117	54	18	2	0	0	0	0	0	0	283
2:00	0	10	54	116	56	8	0	1	0	0	0	0	0	245
3:00	1	6	56	128	77	11	1	0	0	0	0	0	0	280
4:00	0	3	34	139	63	17	3	1	0	0	1	0	0	261
5:00	0	3	41	118	58	12	1	1	0	0	0	0	0	234
6:00	2	4	41	83	62	20	3	0	0	0	0	0	0	215
7:00	2	0	20	90	50	13	2	0	0	0	0	0	0	177
8:00	0	0	24	59	48	15	2	0	0	0	0	0	0	148
9:00	0	2	17	63	26	5	2	0	0	0	0	0	0	115
10:00	0	0	13	38	25	5	0	0	0	0	0	0	0	81
11:00	0	0	0	5	4	2	1	0	0	0	0	0	0	12
Total	11	121	712	1656	904	230	35	5	0	0	1	0	0	3675
Grand Total	503	548	2676	5109	2657	647	102	13	3	1	1	0	0	12260

Stats	Percentile	15th	50th	85th	95th
	Speed	22	27	32	35
	Mean Speed (Average)	27.0			
	10 MPH Pace Speed	21-30			
	Number in Pace	7782			
	Percent in Pace	63.5%			
	Number > 45 MPH	18			
	Percent > 45 MPH	0.1%			

Accurate Counts
978-664-2565

Location : Great Road 94160001
Location : East of Robinson Road
City/State: Littleton, MA
Direction: EB,

7/14/2022 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	0	0	5	4	5	2	1	0	0	0	0	0	17
1:00	0	0	2	2	5	4	0	0	0	0	0	0	0	13
2:00	0	0	0	3	2	0	0	0	0	0	0	0	0	5
3:00	2	2	0	3	4	0	1	0	0	0	0	0	0	12
4:00	1	0	1	13	15	5	3	0	0	0	0	0	0	38
5:00	2	3	11	30	68	53	29	4	0	0	0	0	0	200
6:00	2	1	11	80	217	105	30	1	0	1	0	0	0	448
7:00	9	13	55	158	229	96	24	2	0	1	0	0	0	587
8:00	34	17	43	175	228	101	19	4	0	1	0	0	0	622
9:00	15	16	58	159	148	71	16	1	0	0	0	0	0	484
10:00	38	19	59	133	133	57	8	3	0	0	0	0	0	450
11:00	44	14	53	144	130	48	8	1	0	0	0	0	0	442
12:00 PM	34	20	68	176	115	43	9	1	1	0	0	0	0	467
1:00	64	40	61	126	120	40	6	0	0	0	0	0	0	457
2:00	52	25	44	125	131	40	9	0	0	0	0	0	0	426
3:00	31	29	76	171	165	45	7	2	0	0	0	0	0	526
4:00	16	12	54	114	142	75	18	0	0	0	0	0	0	431
5:00	15	18	49	100	136	85	22	1	0	0	0	0	0	426
6:00	19	13	11	79	118	58	16	2	0	0	0	0	0	316
7:00	3	2	13	43	105	53	16	4	1	0	0	0	0	240
8:00	2	2	9	59	102	49	6	4	0	0	0	0	0	233
9:00	9	2	11	31	73	26	5	0	0	0	0	0	0	157
10:00	0	0	2	21	25	22	2	0	0	0	0	0	0	72
11:00	0	0	0	5	5	3	2	0	0	0	0	0	0	15
Total	392	248	691	1955	2420	1084	258	31	2	3	0	0	0	7084

Accurate Counts
978-664-2565

Location : Great Road 94160001
Location : East of Robinson Road
City/State: Littleton, MA
Direction: EB,

7/15/2022 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	0	2	0	4	9	1	2	0	0	0	0	0	0	18
1:00	0	0	0	1	2	0	1	0	0	0	0	0	0	4
2:00	0	0	0	1	8	1	0	0	0	0	0	0	0	10
3:00	2	0	1	2	3	4	0	0	0	0	0	0	0	12
4:00	0	0	3	8	11	11	4	0	0	0	0	0	0	37
5:00	1	1	4	29	91	56	9	1	0	0	0	0	0	192
6:00	0	6	8	59	165	98	33	8	3	0	0	0	0	380
7:00	6	5	31	115	178	101	31	1	1	0	0	0	0	469
8:00	29	8	49	129	201	91	12	3	0	1	0	0	0	523
9:00	48	19	60	111	132	80	16	2	1	0	0	0	0	469
10:00	52	16	49	124	130	52	9	2	0	3	0	0	0	437
11:00	59	30	86	123	110	53	5	1	0	0	0	0	0	467
12:00 PM	42	31	55	150	130	41	11	2	1	0	0	0	0	463
1:00	50	18	67	146	125	56	6	1	2	0	0	0	0	471
2:00	46	20	52	117	125	61	6	2	1	0	0	0	0	430
3:00	37	25	85	101	77	41	6	1	0	0	0	0	0	373
4:00	21	18	49	114	118	54	13	0	0	0	0	0	0	387
5:00	11	7	39	119	153	68	25	1	0	0	0	0	0	423
6:00	7	4	7	107	153	81	14	4	0	0	0	0	0	377
7:00	5	5	5	43	112	73	12	3	0	0	0	0	0	258
8:00	1	1	10	56	90	43	9	2	0	0	0	0	0	212
9:00	8	1	5	49	74	35	3	1	1	0	0	0	0	177
10:00	1	2	3	18	41	19	2	0	0	0	0	0	0	86
11:00	0	0	1	10	19	15	6	1	0	0	0	0	0	52
Total	426	219	669	1736	2257	1135	235	36	10	4	0	0	0	6727

Accurate Counts
978-664-2565

Location : Great Road 94160001
Location : East of Robinson Road
City/State: Littleton, MA
Direction: EB,

7/16/2022 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
12:00 AM	1	1	1	12	13	4	1	1	0	0	0	0	0	34
1:00	0	0	0	0	6	2	2	0	0	0	0	0	0	10
2:00	0	0	0	2	5	2	1	0	0	0	0	0	0	10
3:00	0	0	0	3	1	0	1	0	0	0	0	0	0	5
4:00	0	0	1	6	8	6	0	1	0	0	0	0	0	22
5:00	2	0	1	9	19	11	9	1	0	0	0	0	0	52
6:00	4	0	2	12	59	40	12	4	1	0	0	0	0	134
7:00	1	4	6	39	67	52	15	2	0	0	0	0	0	186
8:00	27	8	16	89	109	75	21	5	0	0	0	0	0	350
9:00	44	12	35	111	131	38	8	2	0	0	0	0	0	381
10:00	40	15	66	137	131	43	7	1	0	0	0	0	0	440
11:00	62	36	74	132	151	57	10	2	0	0	0	0	0	524
12:00 PM	24	32	70	171	145	52	10	1	2	0	0	0	0	507
1:00	11	14	47	156	142	55	8	1	0	0	0	0	0	434
2:00	13	13	19	103	146	72	9	1	0	0	0	0	0	376
3:00	13	8	24	109	158	90	19	2	0	0	0	0	0	423
4:00	4	2	22	85	168	79	28	4	0	0	0	0	0	392
5:00	7	5	16	103	134	76	20	3	0	0	0	0	0	364
6:00	11	4	14	57	116	82	20	9	0	0	0	0	0	313
7:00	2	3	1	50	99	67	15	2	2	0	0	0	0	241
8:00	0	0	13	44	99	41	8	3	0	0	0	0	0	208
9:00	1	2	7	56	72	28	7	0	0	0	0	0	0	173
10:00	0	3	4	18	40	18	5	1	0	0	0	0	0	89
11:00	0	0	0	3	4	4	0	0	2	0	0	0	0	13
Total	267	162	439	1507	2023	994	236	46	7	0	0	0	0	5681
Grand Total	1085	629	1799	5198	6700	3213	729	113	19	7	0	0	0	19492

Stats				
	Percentile	15th	50th	85th	95th
	Speed	24	30	36	40

Mean Speed (Average)	29.7
10 MPH Pace Speed	25-34
Number in Pace	11800
Percent in Pace	60.5%
Number > 45 MPH	139
Percent > 45 MPH	0.7%

GROWTH RATE DATA

Massachusetts Highway Department
Annual Growth Rate

Location ID:	**R13116**	**Seasonal Factor Group:**	**UR2**
County:		**Daily Factor Group:**	
Functional Class	**2 - Freeway & Expressway**	**Axle Factor Group:**	**UR2**
Location:	**Ramp I495 NB to Route 119**	**Growth Factor Group:**	**UR2**

Year	**AADT**
2019	6076
2013	3936
A = 2019/2013	1.5437
B = A^(1/6)	1.0750
Average Annual Growth Rate	**7.50**

Massachusetts Highway Department
Annual Growth Rate

Location ID:	**R13117**	**Seasonal Factor Group:**	**UR2**
County:		**Daily Factor Group:**	
Functional Class	**2 - Freeway & Expressway**	**Axle Factor Group:**	**UR2**
Location:	**Ramp Route 119 to I495 NB**	**Growth Factor Group:**	**UR2**

Year	**AADT**
2019	3781
2013	5176
A = 2019/2013	0.7305
B = A^(1/6)	0.9490
Average Annual Growth Rate	**-5.10**

Massachusetts Highway Department
Annual Growth Rate

Location ID:	**R13128**	**Seasonal Factor Group:**	**UR2**
County:		**Daily Factor Group:**	
Functional Class	**2 - Freeway & Expressway**	**Axle Factor Group:**	**UR2**
Location:	**Ramp I495 SB to Route 119**	**Growth Factor Group:**	**UR2**

Year	**AADT**
2019	7005
2013	4596
A = 2019/2013	1.5242
B = A^(1/6)	1.0728
Average Annual Growth Rate	**7.28**

Massachusetts Highway Department
Annual Growth Rate

Location ID:	**R13129**	**Seasonal Factor Group:**	**UR2**
County:		**Daily Factor Group:**	
Functional Class	**2 - Freeway & Expressway**	**Axle Factor Group:**	**UR2**
Location:	**Ramp Route 119 to I495 SB**	**Growth Factor Group:**	**UR2**

Year	**AADT**
2019	4212
2013	5134
A = 2019/2013	0.8204
B = A^(1/6)	0.9675
Average Annual Growth Rate	**-3.25**

Massachusetts Highway Department
Annual Growth Rate

Location ID:	**4001**	**Seasonal Factor Group:**	**U3**
County:		**Daily Factor Group:**	
Functional Class	**3 - Other Principal Arterial**	**Axle Factor Group:**	**U3**
Location:	**Main Street**	**Growth Factor Group:**	**U3**
	north of Route 2A		

Year	**AADT**
2019	9541
2013	9978
A = 2019/2013	0.9562
B = A^(1/6)	0.9926
Average Annual Growth Rate	**-0.74**

Massachusetts Highway Department
Annual Growth Rate

Location ID:	**4002**	**Seasonal Factor Group:**	**U3**
County:		**Daily Factor Group:**	
Functional Class	**3 - Other Principal Arterial**	**Axle Factor Group:**	**U3**
Location:	**Great Road**	**Growth Factor Group:**	**U3**
	at Littleton Town Line		

Year	**AADT**
2019	14771
2013	14810
A = 2019/2013	0.9974
B = A^(1/6)	0.9996
Average Annual Growth Rate	**-0.04**

Station	Average Annual Growth
4002	-0.04
4001	-0.74
R13117	-5.10
R13116	7.50
R13128	7.28
R13129	-3.25
Average	0.94

TRIP GENERATION DATA

Institute of Transportation Engineers (ITE)
Trip Generation, 11th Edition
Land Use Code (LUC) 936 - Coffee/Donut Shop without Drive-Through Window

Average Vehicle Trips Ends vs: 1000 Square Feet Gross Floor Area
Independent Variable (X): 3.100

WEEKDAY DAILY

LUC 937 Daily 533.57 LUC 936 Daily X x= 441.88
LUC 937 PM 38.99 LUC 936 PM 32.29

T = 441.88 * (X)
T = 441.88 * 3.100
T = 1369.83
T = 1,370 vehicle trips
with 50% (685 vph) entering and 50% (685 vph) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 93.08 * (X)
T = 93.08 * 3.100
T = 288.55
T = 289 vehicle trips
with 51% (147 vph) entering and 49% (142 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 32.29 * (X)
T = 32.29 * 3.100
T = 100.10
T = 102 vehicle trips
with 50% (51 vph) entering and 50% (51 vph) exiting.

SATURDAY DAILY

Assume same as Weekday Daily

T = 441.88 * (X)
T = 441.88 * 3.100
T = 1369.83
T = 1,370 vehicle trips
with 50% (685 vph) entering and 50% (685 vph) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 56.50 * (X)
T = 56.50* 3.100
T = 175.15
T = 175 vehicle trips
with 49% (86 vph) entering and 51% (89 vph) exiting.

Institute of Transportation Engineers (ITE)
Trip Generation, 11 th Edition
Land Use Code (LUC) 710 - General Office Building

Average Vehicle Trips Ends vs: 1,000 Square Feet Gross Floor Area
Independent Variable (X): 10.400

AVERAGE WEEKDAY DAILY

T = 10.84 * (X)
T = 10.84 * 10.400
T = 112.74
T = 114 vehicle trips
with 50% (57 vpd) entering and 50% (57 vpd) exiting.

WEEKDAY MORNING PEAK HOUR

T = 1.52 * (X)
T = 1.52 * 10.400
T = 15.81
T = 16 vehicle trips
with 88% (14 vph) entering and 12% (2 vph) exiting.

WEEKDAY EVENING PEAK HOUR

T = 1.44 * (X)
T = 1.44 * 10.4
T = 14.98
T = 15 vehicle trips
with 17% (3 vph) entering and 83% (12 vph) exiting.

SATURDAY DAILY

T = 2.21 * (X)
T = 2.21 * 10.400
T = 22.98
T = 24 vehicle trips
with 50% (12 vpd) entering and 50% (12 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 0.53 * (X)
T = 0.53 * 10.400
T = 5.51
T = 6 vehicle trips
with 54% (3 vpd) entering and 46% (3 vpd) exiting.

Institute of Transportation Engineers (ITE)
Trip Generation, 11 th Edition
Land Use Code (LUC) 822 - Strip Retail Plaza (<40K)

Average Vehicle Trips Ends vs: 1,000 Square Feet Gross Leasable Area
Independent Variable (X): 21.100

2.125

AVERAGE WEEKDAY DAILY

T = 54.45 * X
T = 54.45 * 21.100
T = 1,148.90
T = 1,148 vehicle trips
with 50% (574 vpd) entering and 50% (574 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 2.36 * (X)
T = 2.36 * 21.100
T = 49.80
T = 50 vehicle trips
with 60% (30 vph) entering and 40% (20 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 6.59 * X
T = 6.59 * 21.100
T = 139.05
T = 139 vehicle trips
with 50% (70 vph) entering and 50% (69 vph) exiting.

SATURDAY DAILY

LUC 822 Daily	54.45	LUC 822 Daily	X	X=	54.28
LUC 822 PM	6.59	LUC 822 PM	6.57		

T = 54.28 * X
T = 54.28 21.100
T = 1,145.31
T = 1,146 vehicle trips
with 50% (573 vph) entering and 50% (573 vph) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 6.57 * X
T = 6.57 * 21.100
T = 138.63
T = 139 vehicle trips
with 51% (71 vph) entering and 49% (68 vph) exiting.

Institute of Transportation Engineers (ITE)
Trip Generation, 11 th Edition
Land Use Code (LUC) 912 - Drive-In Bank

Average Vehicle Trips Ends vs: 1,000 Square Feet Gross Floor Area
Independent Variable (X): 2.742

AVERAGE WEEKDAY DAILY

T = 100.35 * (X)
T = 100.35 * 2.742
T = 275.16
T = 276 vehicle trips
with 50% (138 vpd) entering and 50% (138 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 9.95 * (X)
T = 9.95 * 2.742
T = 27.28
T = 27 vehicle trips
with 58% (16 vph) entering and 42% (11 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 21.01 * (X)
T = 21.01 * 2.742
T = 57.61
T = 58 vehicle trips
with 50% (29 vph) entering and 50% (29 vph) exiting.

SATURDAY DAILY

T = 86.48 * (X)
T = 86.48 * 2.742
T = 237.13
T = 238 vehicle trips
with 50% (119 vpd) entering and 50% (119 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 26.35 * (X)
T = 26.35 * 2.742
T = 72.25
T = 72 vehicle trips
with 51% (37 vph) entering and 49% (35 vph) exiting.

Institute of Transportation Engineers (ITE)
Trip Generation, 11th 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): 0.840

AVERAGE WEEKDAY DAILY

T = 107.20 * (X)
T = 107.20 * 0.840
T = 90.05
T = 90 vehicle trips
with 50% (45 vpd) entering and 50% (45 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 9.57 * (X)
T = 9.57 * 0.840
T = 8.04
T = 8 vehicle trips
with 55% (4 vph) entering and 45% (4 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 9.05 * (X)
T = 9.05 * 0.840
T = 7.60
T = 8 vehicle trips
with 61% (5 vph) entering and 39% (3 vph) exiting.

SATURDAY DAILY

T = 122.40 * (X)
T = 122.40 * 0.840
T = 102.82
T = 103 vehicle trips
with 50% (52 vpd) entering and 50% (51 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 11.19 * (X)
T = 11.19 * 0.840
T = 9.40
T = 9 vehicle trips
with 51% (5 vph) entering and 49% (4 vph) exiting.

Institute of Transportation Engineers (ITE)
***Trip Generation*, 11th Edition**
Land Use Code (LUC) 943 - Automobile Parts and Service Center

Average Vehicle Trips Ends vs: 1,000 Sq. Feet Gross Floor Area
Independent Variable (X): 2.214

AVERAGE WEEKDAY DAILY

T = 16.60* (X)
T = 16.60 * 2.214
T = 36.75
T = 36 vehicle trips
with 50% (18 vpd) entering and 50% (18 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 1.91 * (X)
T = 1.91 * 2.214
T = 4.23
T = 4 vehicle trips
with 72% (3 vph) entering and 28% (1 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 2.06 * (X)
T = 2.06* 2.214
T = 4.56
T = 5 vehicle trips
with 39% (2 vph) entering and 61% (3 vph) exiting.

NO SATURDAY DATA PROVIDED. ASSUME SAME AS WEEKDAY DAILY AND WEEKDAY EVENING PEAK HOUR
SATURDAY DAILY

T = 16.60* (X)
T = 16.60 * 2.214
T = 36.75
T = 36 vehicle trips
with 50% (18 vpd) entering and 50% (18 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 2.06 * (X)
T = 2.06* 2.214
T = 4.56
T = 5 vehicle trips
with 39% (2 vph) entering and 61% (3 vph) exiting.

CAPACITY ANALYSIS

2022 Baseline Weekday Evening Peak Hour
2022 Baseline Saturday Midday Peak Hour
2029 No-Build Weekday Evening Peak Hour
2029 No-Build Saturday Midday Peak Hour
2029 Build Weekday Evening Peak Hour
2029 Build Saturday Midday Peak Hour

2022 Baseline Weekday Evening Peak Hour

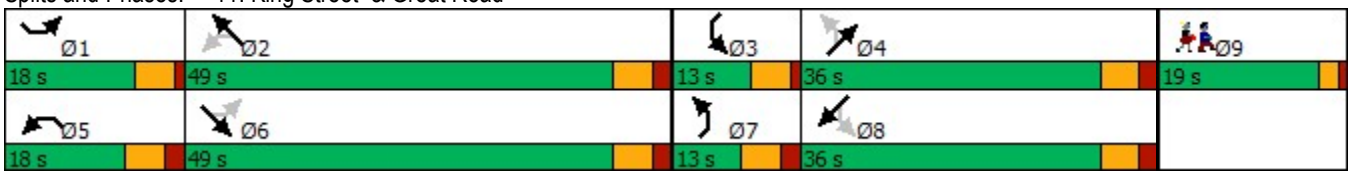
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	244	276	138	205	478	6	173	377	1	68	248	192
Future Volume (vph)	244	276	138	205	478	6	173	377	1	68	248	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	11	12	12	10	11	12	11	11	12
Storage Length (ft)	0		0	260		0	150		0	260		0
Storage Lanes	1		0	1		0	1		0	1		0
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		0.950			0.998						0.935	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1728	1728	0	1745	1878	0	1685	1819	0	1745	1708	0
Flt Permitted	0.181			0.248			0.122			0.142		
Satd. Flow (perm)	329	1728	0	455	1878	0	216	1819	0	261	1708	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20									26	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		234			401			318			358	
Travel Time (s)		5.3			9.1			7.2			8.1	
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.84	0.84	0.84	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	274	310	155	220	514	6	206	449	1	75	273	211
Shared Lane Traffic (%)												
Lane Group Flow (vph)	274	465	0	220	520	0	206	450	0	75	484	0
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			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.00	1.04	1.00	1.00	1.09	1.04	1.00	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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		pm+pt	NA		pm+pt	NA		pm+pt	NA	

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	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	24.0		11.0	24.0		11.0	24.0		10.0	24.0	
Total Split (s)	18.0	49.0		18.0	49.0		13.0	36.0		13.0	36.0	
Total Split (%)	13.3%	36.3%		13.3%	36.3%		9.6%	26.7%		9.6%	26.7%	
Maximum Green (s)	13.0	43.0		12.0	43.0		7.0	30.0		8.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		6.0	6.0		6.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		None	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	57.5	43.4		54.9	43.2		38.4	32.9		38.7	30.1	
Actuated g/C Ratio	0.48	0.36		0.46	0.36		0.32	0.27		0.32	0.25	
v/c Ratio	0.88	0.73		0.66	0.77		1.33	0.90		0.42	1.08	
Control Delay	50.4	40.5		29.2	43.7		214.2	65.9		34.2	105.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	50.4	40.5		29.2	43.7		214.2	65.9		34.2	105.9	
LOS	D	D		C	D		F	E		C	F	
Approach Delay		44.1			39.4			112.5			96.3	
Approach LOS		D			D			F			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 119.8			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.33			
Intersection Signal Delay: 70.3		Intersection LOS: E	
Intersection Capacity Utilization 92.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 11: King Street & Great Road



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	14%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	6
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

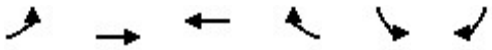
Intersection Summary

Lane Group	SEL	SET	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	274	465	220	520	206	450	75	484
v/c Ratio	0.88	0.73	0.66	0.77	1.33	0.90	0.42	1.08
Control Delay	50.4	40.5	29.2	43.7	214.2	65.9	34.2	105.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.4	40.5	29.2	43.7	214.2	65.9	34.2	105.9
Queue Length 50th (ft)	109	282	86	335	~152	332	36	~380
Queue Length 95th (ft)	#325	#525	#190	#626	#338	#595	86	#722
Internal Link Dist (ft)		154		321		238		278
Turn Bay Length (ft)			260		150		260	
Base Capacity (vph)	310	639	339	676	155	499	185	449
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.73	0.65	0.77	1.33	0.90	0.41	1.08

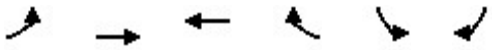
Intersection Summary

~ 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.



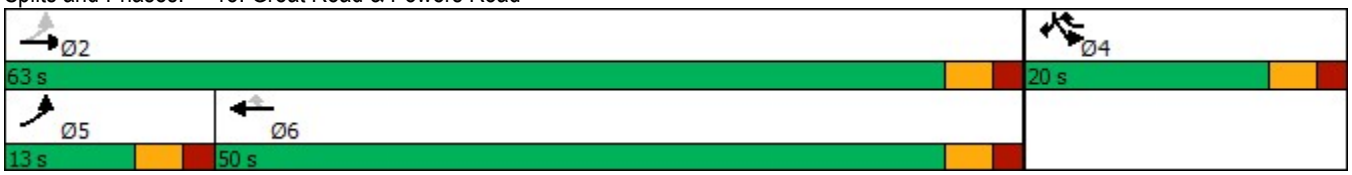
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	140	341	340	259	174	106
Future Volume (vph)	140	341	340	259	174	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	11
Storage Length (ft)	220			220	0	100
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1745	1837	1818	1546	1685	1561
Flt Permitted	0.332				0.950	
Satd. Flow (perm)	610	1837	1818	1546	1685	1561
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				273		126
Link Speed (mph)		30	30		30	
Link Distance (ft)		297	344		294	
Travel Time (s)		6.8	7.8		6.7	
Peak Hour Factor	0.89	0.89	0.95	0.95	0.84	0.84
Heavy Vehicles (%)	0%	0%	1%	1%	0%	0%
Adj. Flow (vph)	157	383	358	273	207	126
Shared Lane Traffic (%)						
Lane Group Flow (vph)	157	383	358	273	207	126
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		10	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.09	1.04
Turning Speed (mph)	15			9	15	9
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	pm+ov	Prot	Prot

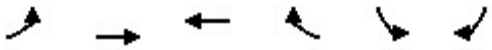


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases	5	2	6	4	4	4
Permitted Phases	2			6		
Detector Phase	5	2	6	4	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	15.0	15.0	15.0
Total Split (s)	13.0	63.0	50.0	20.0	20.0	20.0
Total Split (%)	15.7%	75.9%	60.2%	24.1%	24.1%	24.1%
Maximum Green (s)	8.0	58.0	45.0	15.0	15.0	15.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	25.1	25.1	15.6	34.5	11.8	11.8
Actuated g/C Ratio	0.53	0.53	0.33	0.72	0.25	0.25
v/c Ratio	0.31	0.40	0.60	0.23	0.50	0.26
Control Delay	7.3	7.9	19.7	1.0	22.4	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	7.9	19.7	1.0	22.4	5.9
LOS	A	A	B	A	C	A
Approach Delay		7.7	11.6		16.2	
Approach LOS		A	B		B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 83			
Actuated Cycle Length: 47.7			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 11.2		Intersection LOS: B	
Intersection Capacity Utilization 47.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 18: Great Road & Powers Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	157	383	358	273	207	126
v/c Ratio	0.31	0.40	0.60	0.23	0.50	0.26
Control Delay	7.3	7.9	19.7	1.0	22.4	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	7.9	19.7	1.0	22.4	5.9
Queue Length 50th (ft)	19	52	88	0	53	0
Queue Length 95th (ft)	44	107	170	15	112	29
Internal Link Dist (ft)		217	264		214	
Turn Bay Length (ft)	220			220		100
Base Capacity (vph)	526	1821	1617	1244	574	615
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	0.30	0.21	0.22	0.22	0.36	0.20

Intersection Summary

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	3	481	752	4	2	2
Future Vol, veh/h	3	481	752	4	2	2
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	91	91	94	94	50	50
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	3	529	800	4	4	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	804	0	-	0	1337	802
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	-	535	-
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	829	-	-	-	171	387
Stage 1	-	-	-	-	445	-
Stage 2	-	-	-	-	591	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	829	-	-	-	170	387
Mov Cap-2 Maneuver	-	-	-	-	170	-
Stage 1	-	-	-	-	443	-
Stage 2	-	-	-	-	591	-

Approach	EB	WB	SW
HCM Control Delay, s	0.1	0	20.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	829	-	-	-	236
HCM Lane V/C Ratio	0.004	-	-	-	0.034
HCM Control Delay (s)	9.4	0	-	-	20.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	627	0	0	508	0	129
Future Vol, veh/h	627	0	0	508	0	129
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	84	84	91	91	92	92
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	746	0	0	558	0	140

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	1304	746
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	558	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	0	0	-	179	417
Stage 1	-	0	0	-	472	-
Stage 2	-	0	0	-	577	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	179	417
Mov Cap-2 Maneuver	-	-	-	-	179	-
Stage 1	-	-	-	-	472	-
Stage 2	-	-	-	-	577	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	17.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	417	-	-
HCM Lane V/C Ratio	0.336	-	-
HCM Control Delay (s)	17.9	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	1.5	-	-

LANE SUMMARY

Site: 101 [Great Road at Adams Street/Stevens Street/ Meetinghouse Road (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Adams Street													
Lane 1	32	4.3	249	0.129	100	21.6	LOS C	0.4	11.4	Full	1600	0.0	0.0
Approach	32	4.3		0.129		21.6	LOS C	0.4	11.4				
SouthEast: Great Road													
Lane 1	777	0.9	1851	0.420	100	3.7	LOS A	0.4	9.9	Full	1600	0.0	0.0
Approach	777	0.9		0.420		3.7	NA	0.4	9.9				
NorthWest: Great Road													
Lane 1	392	0.3	1637	0.240	100	3.3	LOS A	0.7	18.2	Full	1600	0.0	0.0
Approach	392	0.3		0.240		3.3	NA	0.7	18.2				
West: Stevens Street													
Lane 1	261	0.0	496	0.527	100	20.1	LOS C	4.8	119.6	Full	1600	0.0	0.0
Approach	261	0.0		0.527		20.1	LOS C	4.8	119.6				
Intersection	1463	0.7		0.527		6.9	NA	4.8	119.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Adams Street

Mov. From S To Exit:	L1 NW	T1 N	R3 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	7	15	32	4.3	249	0.129	100	NA	NA
Approach	10	7	15	32	4.3		0.129			

SouthEast: Great Road

Mov. From SE To Exit:	L3 S	T1 NW	R1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	694	70	777	0.9	1851	0.420	100	NA	NA
Approach	13	694	70	777	0.9		0.420			

NorthWest: Great Road											
Mov. From NW To Exit:	L3 N	T1 SE	R1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	42	333	17	392	0.3	1637	0.240	100	NA	NA	
Approach	42	333	17	392	0.3		0.240				
West: Stevens Street											
Mov. From W To Exit:	L3 NW	L2 N	R1 SE	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	23	217	11	261	0.0	496	0.527	100	NA	NA
Approach	11	23	217	11	261	0.0		0.527			

	Total	%HV	Deg.Satn (v/c)
Intersection	1463	0.7	0.527

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Adams Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
SouthEast Exit: Great Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Meetinghouse Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthWest Exit: Great Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

LANE SUMMARY

Site: 101 [King Street at Goldsmith Street-Stevens Street-Private Driveway (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
SouthEast: Goldsmith Street													
Lane 1	206	0.0	253	0.814	100	60.8	LOS F	7.6	190.8	Full	1600	0.0	0.0
Approach	206	0.0		0.814		60.8	LOS F	7.6	190.8				
NorthEast: King Street													
Lane 1	664	0.8	1478	0.449	100	6.6	LOS A	4.0	100.8	Full	1600	0.0	0.0
Approach	664	0.8		0.449		6.6	NA	4.0	100.8				
NorthWest: Private Driveway													
Lane 1	48	2.9	175	0.273	100	33.1	LOS D	1.0	26.8	Full	1600	0.0	0.0
Approach	48	2.9		0.273		33.1	LOS D	1.0	26.8				
SouthWest: King Street													
Lane 1	502	1.2	1849	0.272	100	2.2	LOS A	0.1	2.6	Full	1600	0.0	0.0
Lane 2	271	0.0	1767	0.153	100	0.0	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	773	0.8		0.272		1.5	NA	0.1	2.6				
Intersection	1692	0.7		0.814		11.6	NA	7.6	190.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

SouthEast: Goldsmith Street

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	R3 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	50	2	128	27	206	0.0	253	0.814	100	NA	NA
Approach	50	2	128	27	206	0.0		0.814			

NorthEast: King Street

Mov. From NE To Exit:	L3 E	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	12	133	501	18	664	0.8	1478	0.449	100	NA	NA

Approach	12	133	501	18	664	0.8		0.449				
NorthWest: Private Driveway												
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	28	4	15	48	2.9		175	0.273	100	NA	NA	
Approach	28	4	15	48	2.9			0.273				
SouthWest: King Street												
Mov. From SW To Exit:	L2 NW	T1 NE	R1 E	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	7	495	-	-	502	1.2	1849	0.272	100	NA	NA	
Lane 2	-	-	218	53	271	0.0	1767	0.153	100	NA	NA	
Approach	7	495	218	53	773	0.8		0.272				

	Total	%HV	Deg.Satn (v/c)
Intersection	1692	0.7	0.814

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Goldsmith Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Stevens Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthEast Exit: King Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthWest Exit: Private Driveway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
SouthWest Exit: King Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

2022 Baseline Saturday Midday Peak Hour

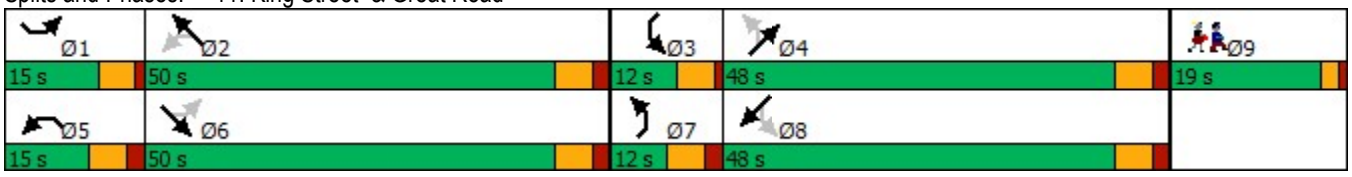
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	167	310	153	159	369	21	171	225	4	99	194	145
Future Volume (vph)	167	310	153	159	369	21	171	225	4	99	194	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	11	12	12	10	11	12	11	11	12
Storage Length (ft)	0		0	260		0	150		0	260		0
Storage Lanes	1		0	1		0	1		0	1		0
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		0.950			0.992			0.997			0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1745	1733	0	1745	1867	0	1685	1831	0	1745	1719	0
Flt Permitted	0.321			0.251			0.191			0.451		
Satd. Flow (perm)	590	1733	0	461	1867	0	339	1831	0	828	1719	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			2			1			26	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		234			401			318			358	
Travel Time (s)		5.3			9.1			7.2			8.1	
Peak Hour Factor	0.95	0.95	0.95	0.91	0.91	0.91	0.96	0.96	0.96	0.87	0.87	0.87
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	176	326	161	175	405	23	178	234	4	114	223	167
Shared Lane Traffic (%)												
Lane Group Flow (vph)	176	487	0	175	428	0	178	238	0	114	390	0
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			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.00	1.04	1.00	1.00	1.09	1.04	1.00	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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		pm+pt	NA		pm+pt	NA		pm+pt	NA	

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	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	24.0		11.0	24.0		11.0	24.0		10.0	24.0	
Total Split (s)	15.0	50.0		15.0	50.0		12.0	48.0		12.0	48.0	
Total Split (%)	10.4%	34.7%		10.4%	34.7%		8.3%	33.3%		8.3%	33.3%	
Maximum Green (s)	10.0	44.0		9.0	44.0		6.0	42.0		7.0	42.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		6.0	6.0		6.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		None	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	55.4	44.6		54.1	45.0		35.3	29.3		37.4	29.3	
Actuated g/C Ratio	0.48	0.38		0.46	0.39		0.30	0.25		0.32	0.25	
v/c Ratio	0.47	0.72		0.56	0.59		1.03	0.52		0.36	0.86	
Control Delay	23.2	39.0		27.8	35.4		111.1	41.9		29.5	58.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.2	39.0		27.8	35.4		111.1	41.9		29.5	58.9	
LOS	C	D		C	D		F	D		C	E	
Approach Delay		34.8			33.2			71.5			52.3	
Approach LOS		C			C			E			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 144			
Actuated Cycle Length: 116.5			
Natural Cycle: 110			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 45.4		Intersection LOS: D	
Intersection Capacity Utilization 83.0%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 11: King Street & Great Road



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	13%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	1
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

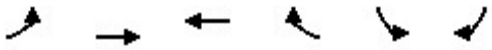
Intersection Summary

Lane Group	SEL	SET	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	176	487	175	428	178	238	114	390
v/c Ratio	0.47	0.72	0.56	0.59	1.03	0.52	0.36	0.86
Control Delay	23.2	39.0	27.8	35.4	111.1	41.9	29.5	58.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	39.0	27.8	35.4	111.1	41.9	29.5	58.9
Queue Length 50th (ft)	62	280	63	238	~90	146	54	251
Queue Length 95th (ft)	163	#633	#171	492	#278	267	113	418
Internal Link Dist (ft)		154		321		238		278
Turn Bay Length (ft)			260		150		260	
Base Capacity (vph)	383	674	314	722	172	669	321	644
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.72	0.56	0.59	1.03	0.36	0.36	0.61

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.

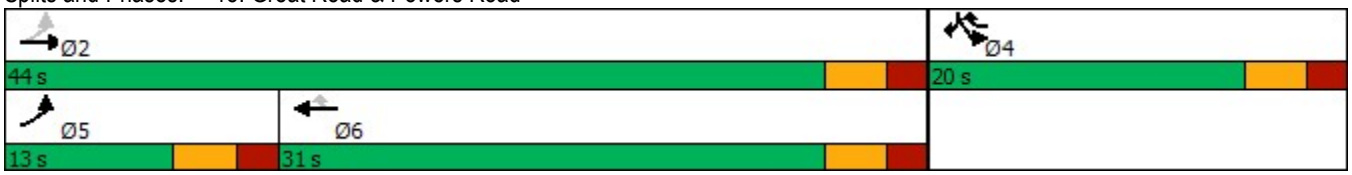


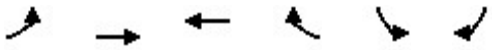
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	66	387	426	161	147	53
Future Volume (vph)	66	387	426	161	147	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	11
Storage Length (ft)	220			220	0	100
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1745	1818	1818	1561	1685	1561
Flt Permitted	0.262				0.950	
Satd. Flow (perm)	481	1818	1818	1561	1685	1561
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				179		63
Link Speed (mph)		30	30		30	
Link Distance (ft)		297	344		294	
Travel Time (s)		6.8	7.8		6.7	
Peak Hour Factor	0.89	0.89	0.90	0.90	0.84	0.84
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	74	435	473	179	175	63
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	435	473	179	175	63
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		10	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.09	1.04
Turning Speed (mph)	15			9	15	9
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	pm+ov	Prot	Prot

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases	5	2	6	4	4	4
Permitted Phases	2			6		
Detector Phase	5	2	6	4	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	15.0	15.0	15.0
Total Split (s)	13.0	44.0	31.0	20.0	20.0	20.0
Total Split (%)	20.3%	68.8%	48.4%	31.3%	31.3%	31.3%
Maximum Green (s)	8.0	39.0	26.0	15.0	15.0	15.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	23.6	23.6	17.5	37.5	10.8	10.8
Actuated g/C Ratio	0.51	0.51	0.38	0.82	0.24	0.24
v/c Ratio	0.16	0.47	0.68	0.14	0.44	0.15
Control Delay	5.7	8.1	19.2	0.8	22.8	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	8.1	19.2	0.8	22.8	7.3
LOS	A	A	B	A	C	A
Approach Delay		7.8	14.1		18.7	
Approach LOS		A	B		B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 64			
Actuated Cycle Length: 45.9			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 12.6		Intersection LOS: B	
Intersection Capacity Utilization 47.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 18: Great Road & Powers Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	74	435	473	179	175	63
v/c Ratio	0.16	0.47	0.68	0.14	0.44	0.15
Control Delay	5.7	8.1	19.2	0.8	22.8	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	8.1	19.2	0.8	22.8	7.3
Queue Length 50th (ft)	8	58	119	0	48	0
Queue Length 95th (ft)	23	123	235	12	102	23
Internal Link Dist (ft)		217	264		214	
Turn Bay Length (ft)	220			220		100
Base Capacity (vph)	501	1460	1177	1339	637	629
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	0.15	0.30	0.40	0.13	0.27	0.10

Intersection Summary

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	5	588	645	2	1	4
Future Vol, veh/h	5	588	645	2	1	4
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	91	91	93	93	63	63
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	5	646	694	2	2	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	696	0	-	0	1351	695
Stage 1	-	-	-	-	695	-
Stage 2	-	-	-	-	656	-
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	909	-	-	-	167	446
Stage 1	-	-	-	-	499	-
Stage 2	-	-	-	-	520	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	909	-	-	-	165	446
Mov Cap-2 Maneuver	-	-	-	-	165	-
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	520	-

Approach	EB	WB	SW
HCM Control Delay, s	0.1	0	16.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	909	-	-	-	333
HCM Lane V/C Ratio	0.006	-	-	-	0.024
HCM Control Delay (s)	9	0	-	-	16.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	413	0	0	438	0	113
Future Vol, veh/h	413	0	0	438	0	113
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	96	96	87	87	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	430	0	0	503	0	123

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	933	430
Stage 1	-	-	-	-	430	-
Stage 2	-	-	-	-	503	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	0	0	-	298	629
Stage 1	-	0	0	-	660	-
Stage 2	-	0	0	-	612	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	298	629
Mov Cap-2 Maneuver	-	-	-	-	298	-
Stage 1	-	-	-	-	660	-
Stage 2	-	-	-	-	612	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	629	-	-
HCM Lane V/C Ratio	0.195	-	-
HCM Control Delay (s)	12.1	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.7	-	-

LANE SUMMARY

Site: 101 [Great Road at Adams Street/Stevens Street/ Meetinghouse Road (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Adams Street													
Lane 1	32	5.1	249	0.128	100	21.6	LOS C	0.4	11.3	Full	1600	0.0	0.0
Approach	32	5.1		0.128		21.6	LOS C	0.4	11.3				
SouthEast: Great Road													
Lane 1	683	0.8	1829	0.373	100	3.3	LOS A	0.5	12.0	Full	1600	0.0	0.0
Approach	683	0.8		0.373		3.3	NA	0.5	12.0				
NorthWest: Great Road													
Lane 1	492	1.0	1858	0.265	100	2.2	LOS A	0.1	2.5	Full	1600	0.0	0.0
Approach	492	1.0		0.265		2.2	NA	0.1	2.5				
West: Stevens Street													
Lane 1	230	0.5	455	0.506	100	20.8	LOS C	3.8	96.3	Full	1600	0.0	0.0
Approach	230	0.5		0.506		20.8	LOS C	3.8	96.3				
Intersection	1437	0.9		0.506		6.1	NA	3.8	96.3				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Adams Street

Mov. From S To Exit:	L1 NW	T1 N	R3 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	3	19	32	5.1	249	0.128	100	NA	NA
Approach	10	3	19	32	5.1		0.128			

SouthEast: Great Road

Mov. From SE To Exit:	L3 S	T1 NW	R1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	17	563	103	683	0.8	1829	0.373	100	NA	NA
Approach	17	563	103	683	0.8		0.373			

NorthWest: Great Road											
Mov. From NW To Exit:	L3 N	T1 SE	R1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	5	475	12	492	1.0	1858	0.265	100	NA	NA	
Approach	5	475	12	492	1.0		0.265				
West: Stevens Street											
Mov. From W To Exit:	L3 NW	L2 N	R1 SE	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	9	14	202	4	230	0.5	455	0.506	100	NA	NA
Approach	9	14	202	4	230	0.5		0.506			

	Total	%HV	Deg.Satn (v/c)
Intersection	1437	0.9	0.506

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Adams Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
SouthEast Exit: Great Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Meetinghouse Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthWest Exit: Great Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

LANE SUMMARY

Site: 101 [King Street at Goldsmith Street-Stevens Street-Private Driveway (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
SouthEast: Goldsmith Street													
Lane 1	209	0.0	405	0.517	100	23.0	LOS C	3.8	94.1	Full	1600	0.0	0.0
Approach	209	0.0		0.517		23.0	LOS C	3.8	94.1				
NorthEast: King Street													
Lane 1	533	0.0	1562	0.341	100	4.9	LOS A	2.1	52.3	Full	1600	0.0	0.0
Approach	533	0.0		0.341		4.9	NA	2.1	52.3				
NorthWest: Private Driveway													
Lane 1	36	0.0	281	0.127	100	19.7	LOS C	0.5	11.8	Full	1600	0.0	0.0
Approach	36	0.0		0.127		19.7	LOS C	0.5	11.8				
SouthWest: King Street													
Lane 1	330	0.0	1864	0.177	100	1.5	LOS A	0.1	2.4	Full	1600	0.0	0.0
Lane 2	266	0.8	1747	0.152	100	0.0	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	597	0.3		0.177		0.9	NA	0.1	2.4				
Intersection	1374	0.1		0.517		6.3	NA	3.8	94.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

SouthEast: Goldsmith Street

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	R3 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	37	1	147	23	209	0.0	405	0.517	100	NA	NA
Approach	37	1	147	23	209	0.0		0.517			

NorthEast: King Street

Mov. From NE To Exit:	L3 E	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	7	112	395	19	533	0.0	1562	0.341	100	NA	NA

Approach	7	112	395	19	533	0.0		0.341			
NorthWest: Private Driveway											
Mov. From NW To Exit:	L2 NE	L1 E	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	6	1	17	36	0.0	281	0.127	100	NA	NA
Approach	11	6	1	17	36	0.0		0.127			
SouthWest: King Street											
Mov. From SW To Exit:	L2 NW	T1 NE	R1 E	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	9	321	-	-	330	0.0	1864	0.177	100	NA	NA
Lane 2	-	-	206	60	266	0.8	1747	0.152	100	NA	NA
Approach	9	321	206	60	597	0.3		0.177			

	Total	%HV	Deg.Satn (v/c)
Intersection	1374	0.1	0.517

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Goldsmith Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Stevens Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthEast Exit: King Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthWest Exit: Private Driveway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
SouthWest Exit: King Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

2029 No-Build Weekday Evening Peak Hour

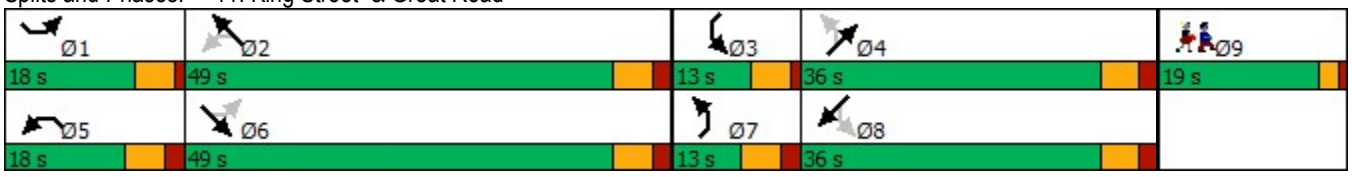
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	262	308	148	226	525	6	185	404	1	81	266	206
Future Volume (vph)	262	308	148	226	525	6	185	404	1	81	266	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	11	12	12	10	11	12	11	11	12
Storage Length (ft)	0		0	260		0	150		0	260		0
Storage Lanes	1		0	1		0	1		0	1		0
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		0.951			0.998						0.935	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1728	1729	0	1745	1878	0	1685	1819	0	1745	1708	0
Flt Permitted	0.131			0.196			0.132			0.133		
Satd. Flow (perm)	238	1729	0	360	1878	0	234	1819	0	244	1708	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19									27	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		234			401			318			358	
Travel Time (s)		5.3			9.1			7.2			8.1	
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.84	0.84	0.84	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	294	346	166	243	565	6	220	481	1	89	292	226
Shared Lane Traffic (%)												
Lane Group Flow (vph)	294	512	0	243	571	0	220	482	0	89	518	0
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			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.00	1.04	1.00	1.00	1.09	1.04	1.00	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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		pm+pt	NA		pm+pt	NA		pm+pt	NA	

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	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	24.0		11.0	24.0		11.0	24.0		10.0	24.0	
Total Split (s)	18.0	49.0		18.0	49.0		13.0	36.0		13.0	36.0	
Total Split (%)	13.3%	36.3%		13.3%	36.3%		9.6%	26.7%		9.6%	26.7%	
Maximum Green (s)	13.0	43.0		12.0	43.0		7.0	30.0		8.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		6.0	6.0		6.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		None	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	57.2	43.2		55.2	43.2		37.4	30.4		38.9	30.1	
Actuated g/C Ratio	0.48	0.36		0.46	0.36		0.31	0.25		0.32	0.25	
v/c Ratio	1.07	0.81		0.80	0.84		1.39	1.05		0.51	1.15	
Control Delay	101.1	45.3		40.2	48.8		238.5	98.0		37.6	130.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	101.1	45.3		40.2	48.8		238.5	98.0		37.6	130.6	
LOS	F	D		D	D		F	F		D	F	
Approach Delay		65.7			46.2			142.0			117.0	
Approach LOS		E			D			F			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 119.8			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.39			
Intersection Signal Delay: 89.2		Intersection LOS: F	
Intersection Capacity Utilization 98.5%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 11: King Street & Great Road



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	14%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	6
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

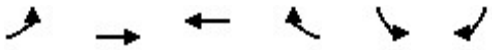
Intersection Summary

Lane Group	SEL	SET	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	294	512	243	571	220	482	89	518
v/c Ratio	1.07	0.81	0.80	0.84	1.39	1.05	0.51	1.15
Control Delay	101.1	45.3	40.2	48.8	238.5	98.0	37.6	130.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	101.1	45.3	40.2	48.8	238.5	98.0	37.6	130.6
Queue Length 50th (ft)	~164	325	96	382	~166	~384	43	~432
Queue Length 95th (ft)	#423	#618	#261	#724	#358	#653	98	#787
Internal Link Dist (ft)		154		321		238		278
Turn Bay Length (ft)			260		150		260	
Base Capacity (vph)	275	634	304	676	158	461	180	449
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.07	0.81	0.80	0.84	1.39	1.05	0.49	1.15

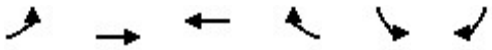
Intersection Summary

~ 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.



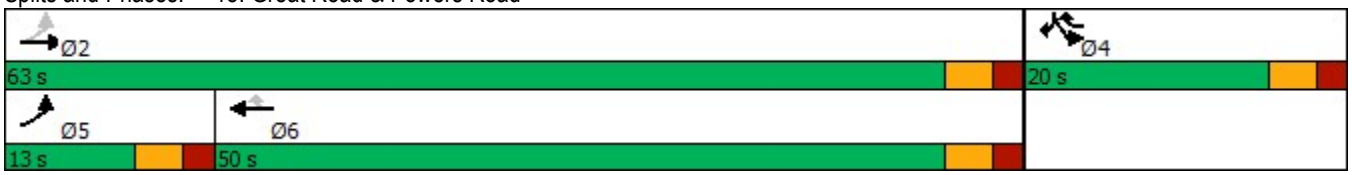
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	150	375	588	278	187	114
Future Volume (vph)	150	375	588	278	187	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	11
Storage Length (ft)	220			220	0	100
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1745	1837	1818	1546	1685	1561
Flt Permitted	0.183				0.950	
Satd. Flow (perm)	336	1837	1818	1546	1685	1561
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				293		136
Link Speed (mph)		30	30		30	
Link Distance (ft)		297	344		294	
Travel Time (s)		6.8	7.8		6.7	
Peak Hour Factor	0.89	0.89	0.95	0.95	0.84	0.84
Heavy Vehicles (%)	0%	0%	1%	1%	0%	0%
Adj. Flow (vph)	169	421	619	293	223	136
Shared Lane Traffic (%)						
Lane Group Flow (vph)	169	421	619	293	223	136
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		10	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.09	1.04
Turning Speed (mph)	15			9	15	9
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	pm+ov	Prot	Prot

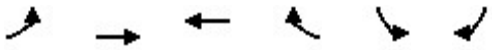


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases	5	2	6	4	4	4
Permitted Phases	2			6		
Detector Phase	5	2	6	4	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	15.0	15.0	15.0
Total Split (s)	13.0	63.0	50.0	20.0	20.0	20.0
Total Split (%)	15.7%	75.9%	60.2%	24.1%	24.1%	24.1%
Maximum Green (s)	8.0	58.0	45.0	15.0	15.0	15.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	40.6	40.6	27.4	45.4	12.8	12.8
Actuated g/C Ratio	0.64	0.64	0.43	0.71	0.20	0.20
v/c Ratio	0.43	0.36	0.79	0.25	0.66	0.32
Control Delay	8.2	6.4	23.8	0.8	36.8	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	6.4	23.8	0.8	36.8	8.0
LOS	A	A	C	A	D	A
Approach Delay		6.9	16.4		25.9	
Approach LOS		A	B		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 83			
Actuated Cycle Length: 63.8			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 62.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 18: Great Road & Powers Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	169	421	619	293	223	136
v/c Ratio	0.43	0.36	0.79	0.25	0.66	0.32
Control Delay	8.2	6.4	23.8	0.8	36.8	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	6.4	23.8	0.8	36.8	8.0
Queue Length 50th (ft)	24	69	204	0	79	0
Queue Length 95th (ft)	44	111	321	13	#178	38
Internal Link Dist (ft)		217	264		214	
Turn Bay Length (ft)	220			220		100
Base Capacity (vph)	397	1629	1332	1239	411	483
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	0.43	0.26	0.46	0.24	0.54	0.28

Intersection Summary

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

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	3	543	833	4	2	2
Future Vol, veh/h	3	543	833	4	2	2
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	91	91	94	94	50	50
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	3	597	886	4	4	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	890	0	-	0	1491	888
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	603	-
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	770	-	-	-	138	345
Stage 1	-	-	-	-	405	-
Stage 2	-	-	-	-	550	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	770	-	-	-	137	345
Mov Cap-2 Maneuver	-	-	-	-	137	-
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	550	-

Approach	EB	WB	SW
HCM Control Delay, s	0.1	0	24.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	770	-	-	-	196
HCM Lane V/C Ratio	0.004	-	-	-	0.041
HCM Control Delay (s)	9.7	0	-	-	24.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	5	540	833	2	2	4
Future Vol, veh/h	5	540	833	2	2	4
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	91	91	94	94	92	92
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	5	593	886	2	2	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	888	0	-	0	1490	887
Stage 1	-	-	-	-	887	-
Stage 2	-	-	-	-	603	-
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	771	-	-	-	138	346
Stage 1	-	-	-	-	406	-
Stage 2	-	-	-	-	550	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	771	-	-	-	137	346
Mov Cap-2 Maneuver	-	-	-	-	137	-
Stage 1	-	-	-	-	402	-
Stage 2	-	-	-	-	550	-

Approach	EB	WB	SW
HCM Control Delay, s	0.1	0	21.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	771	-	-	-	229
HCM Lane V/C Ratio	0.007	-	-	-	0.028
HCM Control Delay (s)	9.7	0	-	-	21.2
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	520	813	7	7	22
Future Vol, veh/h	22	520	813	7	7	22
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	91	91	94	94	92	92
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	24	571	865	7	8	24

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	872	0	-	0	1488	869
Stage 1	-	-	-	-	869	-
Stage 2	-	-	-	-	619	-
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	782	-	-	-	138	354
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	541	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	782	-	-	-	132	354
Mov Cap-2 Maneuver	-	-	-	-	132	-
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	541	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	21.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	782	-	-	-	252
HCM Lane V/C Ratio	0.031	-	-	-	0.125
HCM Control Delay (s)	9.8	0	-	-	21.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↱	
Traffic Vol, veh/h	672	0	0	553	0	147
Future Vol, veh/h	672	0	0	553	0	147
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	84	84	91	91	92	92
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	800	0	0	608	0	160

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	1408	800
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	608	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	0	0	-	155	388
Stage 1	-	0	0	-	446	-
Stage 2	-	0	0	-	547	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	155	388
Mov Cap-2 Maneuver	-	-	-	-	155	-
Stage 1	-	-	-	-	446	-
Stage 2	-	-	-	-	547	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	20.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	388	-	-
HCM Lane V/C Ratio	0.412	-	-
HCM Control Delay (s)	20.6	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	2	-	-

LANE SUMMARY

Site: 101 [Great Road at Adams Street/Stevens Street/ Meetinghouse Road (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Adams Street													
Lane 1	35	4.3	204	0.170	100	26.2	LOS D	0.6	14.7	Full	1600	0.0	0.0
Approach	35	4.3		0.170		26.2	LOS D	0.6	14.7				
SouthEast: Great Road													
Lane 1	861	0.9	1850	0.465	100	4.2	LOS A	0.6	14.4	Full	1600	0.0	0.0
Approach	861	0.9		0.465		4.2	NA	0.6	14.4				
NorthWest: Great Road													
Lane 1	443	0.3	1622	0.273	100	3.7	LOS A	1.0	25.2	Full	1600	0.0	0.0
Approach	443	0.3		0.273		3.7	NA	1.0	25.2				
West: Stevens Street													
Lane 1	289	0.0	446	0.649	100	26.8	LOS D	7.0	175.1	Full	1600	0.0	0.0
Approach	289	0.0		0.649		26.8	LOS D	7.0	175.1				
Intersection	1628	0.6		0.649		8.5	NA	7.0	175.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Adams Street

Mov. From S To Exit:	L1 NW	T1 N	R3 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	7	17	35	4.3	204	0.170	100	NA	NA
Approach	11	7	17	35	4.3		0.170			

SouthEast: Great Road

Mov. From SE To Exit:	L3 S	T1 NW	R1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	14	762	85	861	0.9	1850	0.465	100	NA	NA
Approach	14	762	85	861	0.9		0.465			

NorthWest: Great Road											
Mov. From NW To Exit:	L3 N	T1 SE	R1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	45	380	18	443	0.3	1622	0.273	100	NA	NA	
Approach	45	380	18	443	0.3		0.273				
West: Stevens Street											
Mov. From W To Exit:	L3 NW	L2 N	R1 SE	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	12	24	241	12	289	0.0	446	0.649	100	NA	NA
Approach	12	24	241	12	289	0.0		0.649			

	Total	%HV	Deg.Satn (v/c)
Intersection	1628	0.6	0.649

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Adams Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
SouthEast Exit: Great Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Meetinghouse Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthWest Exit: Great Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

LANE SUMMARY

Site: 101 [King Street at Goldsmith Street-Stevens Street-Private Driveway (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
SouthEast: Goldsmith Street													
Lane 1	221	0.0	220	1.005	100	108.5	LOS F	14.0	349.4	Full	1600	0.0	0.0
Approach	221	0.0		1.005		108.5	LOS F	14.0	349.4				
NorthEast: King Street													
Lane 1	719	0.8	1450	0.496	100	7.4	LOS A	5.0	125.7	Full	1600	0.0	0.0
Approach	719	0.8		0.496		7.4	NA	5.0	125.7				
NorthWest: Private Driveway													
Lane 1	48	2.9	150	0.319	100	39.9	LOS E	1.2	31.5	Full	1600	0.0	0.0
Approach	48	2.9		0.319		39.9	LOS E	1.2	31.5				
SouthWest: King Street													
Lane 1	539	1.2	1849	0.291	100	2.4	LOS A	0.1	3.2	Full	1600	0.0	0.0
Lane 2	299	0.0	1768	0.169	100	0.0	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	837	0.8		0.291		1.6	NA	0.1	3.2				
Intersection	1826	0.7		1.005		17.8	NA	14.0	349.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

SouthEast: Goldsmith Street

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	R3 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	53	2	137	29	221	0.0	220	1.005	100	NA	NA
Approach	53	2	137	29	221	0.0		1.005			

NorthEast: King Street

Mov. From NE To Exit:	L3 E	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	143	545	18	719	0.8	1450	0.496	100	NA	NA

Approach	13	143	545	18	719	0.8		0.496				
NorthWest: Private Driveway												
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	28	4	15	48	2.9		150	0.319	100	NA	NA	
Approach	28	4	15	48	2.9			0.319				
SouthWest: King Street												
Mov. From SW To Exit:	L2 NW	T1 NE	R1 E	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	7	531	-	-	539	1.2	1849	0.291	100	NA	NA	
Lane 2	-	-	242	57	299	0.0	1768	0.169	100	NA	NA	
Approach	7	531	242	57	837	0.8		0.291				

	Total	%HV	Deg.Satn (v/c)
Intersection	1826	0.7	1.005

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Goldsmith Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Stevens Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthEast Exit: King Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthWest Exit: Private Driveway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
SouthWest Exit: King Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

2029 No-Build Saturday Midday Peak Hour

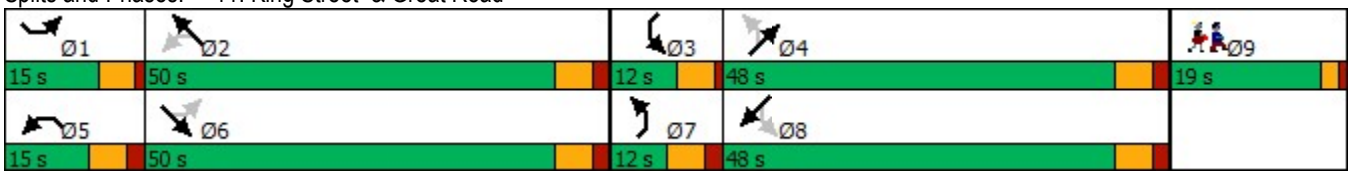
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	179	347	164	178	408	23	183	241	4	116	209	155
Future Volume (vph)	179	347	164	178	408	23	183	241	4	116	209	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	11	12	12	10	11	12	11	11	12
Storage Length (ft)	0		0	260		0	150		0	260		0
Storage Lanes	1		0	1		0	1		0	1		0
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		0.952			0.992			0.998			0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1745	1737	0	1745	1867	0	1685	1833	0	1745	1719	0
Flt Permitted	0.256			0.185			0.177			0.437		
Satd. Flow (perm)	470	1737	0	340	1867	0	314	1833	0	803	1719	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			2			1			26	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		234			401			318			358	
Travel Time (s)		5.3			9.1			7.2			8.1	
Peak Hour Factor	0.95	0.95	0.95	0.91	0.91	0.91	0.96	0.96	0.96	0.87	0.87	0.87
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	188	365	173	196	448	25	191	251	4	133	240	178
Shared Lane Traffic (%)												
Lane Group Flow (vph)	188	538	0	196	473	0	191	255	0	133	418	0
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			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.00	1.04	1.00	1.00	1.09	1.04	1.00	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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		pm+pt	NA		pm+pt	NA		pm+pt	NA	

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	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	24.0		11.0	24.0		11.0	24.0		10.0	24.0	
Total Split (s)	15.0	50.0		15.0	50.0		12.0	48.0		12.0	48.0	
Total Split (%)	10.4%	34.7%		10.4%	34.7%		8.3%	33.3%		8.3%	33.3%	
Maximum Green (s)	10.0	44.0		9.0	44.0		6.0	42.0		7.0	42.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		6.0	6.0		6.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		None	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	55.7	44.5		53.6	44.5		38.0	31.9		40.0	31.9	
Actuated g/C Ratio	0.47	0.37		0.45	0.37		0.32	0.27		0.34	0.27	
v/c Ratio	0.57	0.82		0.75	0.68		1.12	0.52		0.41	0.87	
Control Delay	28.1	45.6		41.3	39.4		138.8	41.3		30.4	58.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.1	45.6		41.3	39.4		138.8	41.3		30.4	58.7	
LOS	C	D		D	D		F	D		C	E	
Approach Delay		41.1			39.9			83.1			51.8	
Approach LOS		D			D			F			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 144			
Actuated Cycle Length: 119.1			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.12			
Intersection Signal Delay: 51.1		Intersection LOS: D	
Intersection Capacity Utilization 88.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 11: King Street & Great Road



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	13%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	1
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

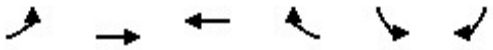
Intersection Summary

Lane Group	SEL	SET	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	188	538	196	473	191	255	133	418
v/c Ratio	0.57	0.82	0.75	0.68	1.12	0.52	0.41	0.87
Control Delay	28.1	45.6	41.3	39.4	138.8	41.3	30.4	58.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	45.6	41.3	39.4	138.8	41.3	30.4	58.7
Queue Length 50th (ft)	72	340	77	285	~110	158	64	276
Queue Length 95th (ft)	#177	#740	#233	#585	#318	284	129	457
Internal Link Dist (ft)		154		321		238		278
Turn Bay Length (ft)			260		150		260	
Base Capacity (vph)	328	660	260	699	170	655	326	630
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.82	0.75	0.68	1.12	0.39	0.41	0.66

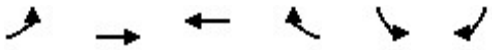
Intersection Summary

~ 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.



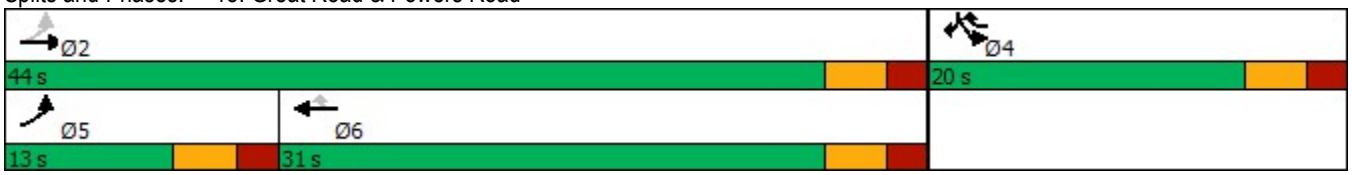
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	71	426	468	173	158	57
Future Volume (vph)	71	426	468	173	158	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	11
Storage Length (ft)	220			220	0	100
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1745	1818	1818	1561	1685	1561
Flt Permitted	0.237				0.950	
Satd. Flow (perm)	435	1818	1818	1561	1685	1561
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				192		68
Link Speed (mph)		30	30		30	
Link Distance (ft)		297	344		294	
Travel Time (s)		6.8	7.8		6.7	
Peak Hour Factor	0.89	0.89	0.90	0.90	0.84	0.84
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	80	479	520	192	188	68
Shared Lane Traffic (%)						
Lane Group Flow (vph)	80	479	520	192	188	68
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		10	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.09	1.04
Turning Speed (mph)	15			9	15	9
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	pm+ov	Prot	Prot

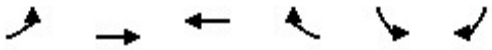


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases	5	2	6	4	4	4
Permitted Phases	2			6		
Detector Phase	5	2	6	4	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	15.0	15.0	15.0
Total Split (s)	13.0	44.0	31.0	20.0	20.0	20.0
Total Split (%)	20.3%	68.8%	48.4%	31.3%	31.3%	31.3%
Maximum Green (s)	8.0	39.0	26.0	15.0	15.0	15.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	25.7	25.7	19.6	39.8	11.3	11.3
Actuated g/C Ratio	0.53	0.53	0.40	0.82	0.23	0.23
v/c Ratio	0.18	0.50	0.71	0.15	0.48	0.16
Control Delay	5.9	8.5	19.9	0.8	24.1	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	8.5	19.9	0.8	24.1	7.3
LOS	A	A	B	A	C	A
Approach Delay		8.1	14.7		19.6	
Approach LOS		A	B		B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 64			
Actuated Cycle Length: 48.4			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 13.1		Intersection LOS: B	
Intersection Capacity Utilization 50.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 18: Great Road & Powers Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	80	479	520	192	188	68
v/c Ratio	0.18	0.50	0.71	0.15	0.48	0.16
Control Delay	5.9	8.5	19.9	0.8	24.1	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	8.5	19.9	0.8	24.1	7.3
Queue Length 50th (ft)	9	69	140	0	55	0
Queue Length 95th (ft)	25	139	266	12	109	24
Internal Link Dist (ft)		217	264		214	
Turn Bay Length (ft)	220			220		100
Base Capacity (vph)	477	1433	1106	1341	593	594
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	0.17	0.33	0.47	0.14	0.32	0.11

Intersection Summary

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	5	666	723	2	1	4
Future Vol, veh/h	5	666	723	2	1	4
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	91	91	93	93	63	63
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	5	732	777	2	2	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	779	0	-	0	1520	778
Stage 1	-	-	-	-	778	-
Stage 2	-	-	-	-	742	-
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	847	-	-	-	132	400
Stage 1	-	-	-	-	456	-
Stage 2	-	-	-	-	474	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	847	-	-	-	131	400
Mov Cap-2 Maneuver	-	-	-	-	131	-
Stage 1	-	-	-	-	451	-
Stage 2	-	-	-	-	474	-

Approach	EB	WB	SW
HCM Control Delay, s	0.1	0	18
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	847	-	-	-	284
HCM Lane V/C Ratio	0.006	-	-	-	0.028
HCM Control Delay (s)	9.3	0	-	-	18
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	5	660	720	2	2	5
Future Vol, veh/h	5	660	720	2	2	5
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	91	91	93	93	92	92
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	5	725	774	2	2	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	776	0	-	0	1510	775
Stage 1	-	-	-	-	775	-
Stage 2	-	-	-	-	735	-
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	849	-	-	-	134	401
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	478	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	849	-	-	-	133	401
Mov Cap-2 Maneuver	-	-	-	-	133	-
Stage 1	-	-	-	-	453	-
Stage 2	-	-	-	-	478	-

Approach	EB	WB	SW
HCM Control Delay, s	0.1	0	19.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	849	-	-	-	254
HCM Lane V/C Ratio	0.006	-	-	-	0.03
HCM Control Delay (s)	9.3	0	-	-	19.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	634	696	9	9	26
Future Vol, veh/h	28	634	696	9	9	26
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	91	91	93	93	92	92
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	31	697	748	10	10	28

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	758	0	-	0	1512	753
Stage 1	-	-	-	-	753	-
Stage 2	-	-	-	-	759	-
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	862	-	-	-	134	413
Stage 1	-	-	-	-	469	-
Stage 2	-	-	-	-	466	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	862	-	-	-	126	413
Mov Cap-2 Maneuver	-	-	-	-	126	-
Stage 1	-	-	-	-	441	-
Stage 2	-	-	-	-	466	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	21.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	862	-	-	-	260
HCM Lane V/C Ratio	0.036	-	-	-	0.146
HCM Control Delay (s)	9.3	0	-	-	21.2
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	443	0	0	480	0	132
Future Vol, veh/h	443	0	0	480	0	132
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	96	96	87	87	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	461	0	0	552	0	143

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	1013	461
Stage 1	-	-	-	-	461	-
Stage 2	-	-	-	-	552	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	0	0	-	267	605
Stage 1	-	0	0	-	639	-
Stage 2	-	0	0	-	581	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	267	605
Mov Cap-2 Maneuver	-	-	-	-	267	-
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	581	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	605	-	-
HCM Lane V/C Ratio	0.237	-	-
HCM Control Delay (s)	12.8	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.9	-	-

LANE SUMMARY

Site: 101 [Great Road at Adams Street/Stevens Street/ Meetinghouse Road (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Adams Street													
Lane 1	33	4.9	209	0.160	100	25.5	LOS D	0.5	13.7	Full	1600	0.0	0.0
Approach	33	4.9		0.160		25.5	LOS D	0.5	13.7				
SouthEast: Great Road													
Lane 1	765	0.8	1827	0.419	100	3.8	LOS A	0.7	16.5	Full	1600	0.0	0.0
Approach	765	0.8		0.419		3.8	NA	0.7	16.5				
NorthWest: Great Road													
Lane 1	556	1.0	1858	0.299	100	2.5	LOS A	0.1	3.4	Full	1600	0.0	0.0
Approach	556	1.0		0.299		2.5	NA	0.1	3.4				
West: Stevens Street													
Lane 1	257	0.5	402	0.638	100	28.4	LOS D	5.6	141.5	Full	1600	0.0	0.0
Approach	257	0.5		0.638		28.4	LOS D	5.6	141.5				
Intersection	1611	0.9		0.638		7.7	NA	5.6	141.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Adams Street

Mov. From S To Exit:	L1 NW	T1 N	R3 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	3	21	33	4.9	209	0.160	100	NA	NA
Approach	10	3	21	33	4.9		0.160			

SouthEast: Great Road

Mov. From SE To Exit:	L3 S	T1 NW	R1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	18	625	122	765	0.8	1827	0.419	100	NA	NA
Approach	18	625	122	765	0.8		0.419			

NorthWest: Great Road											
Mov. From NW To Exit:	L3 N	T1 SE	R1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	5	538	13	556	1.0	1858	0.299	100	NA	NA	
Approach	5	538	13	556	1.0		0.299				
West: Stevens Street											
Mov. From W To Exit:	L3 NW	L2 N	R1 SE	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	16	227	4	257	0.5	402	0.638	100	NA	NA
Approach	10	16	227	4	257	0.5		0.638			
	Total	%HV	Deg.Satn (v/c)								
Intersection	1611	0.9	0.638								

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Adams Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
SouthEast Exit: Great Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Meetinghouse Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthWest Exit: Great Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

LANE SUMMARY

Site: 101 [King Street at Goldsmith Street-Stevens Street-Private Driveway (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
SouthEast: Goldsmith Street													
Lane 1	223	0.0	364	0.612	100	29.3	LOS D	4.9	122.6	Full	1600	0.0	0.0
Approach	223	0.0		0.612		29.3	LOS D	4.9	122.6				
NorthEast: King Street													
Lane 1	580	0.0	1540	0.377	100	5.4	LOS A	2.7	67.3	Full	1600	0.0	0.0
Approach	580	0.0		0.377		5.4	NA	2.7	67.3				
NorthWest: Private Driveway													
Lane 1	36	0.0	247	0.145	100	22.0	LOS C	0.5	13.1	Full	1600	0.0	0.0
Approach	36	0.0		0.145		22.0	LOS C	0.5	13.1				
SouthWest: King Street													
Lane 1	353	0.0	1863	0.190	100	1.6	LOS A	0.1	2.6	Full	1600	0.0	0.0
Lane 2	297	0.8	1748	0.170	100	0.0	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	650	0.4		0.190		0.9	NA	0.1	2.6				
Intersection	1489	0.2		0.612		7.4	NA	4.9	122.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

SouthEast: Goldsmith Street

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	R3 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	40	1	158	24	223	0.0	364	0.612	100	NA	NA
Approach	40	1	158	24	223	0.0		0.612			

NorthEast: King Street

Mov. From NE To Exit:	L3 E	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	8	120	433	19	580	0.0	1540	0.377	100	NA	NA

Approach	8	120	433	19	580	0.0		0.377			
NorthWest: Private Driveway											
Mov. From NW To Exit:	L2 NE	L1 E	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	6	1	17	36	0.0	247	0.145	100	NA	NA
Approach	11	6	1	17	36	0.0		0.145			
SouthWest: King Street											
Mov. From SW To Exit:	L2 NW	T1 NE	R1 E	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	9	344	-	-	353	0.0	1863	0.190	100	NA	NA
Lane 2	-	-	231	65	297	0.8	1748	0.170	100	NA	NA
Approach	9	344	231	65	650	0.4		0.190			

	Total	%HV	Deg.Satn (v/c)
Intersection	1489	0.2	0.612

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Goldsmith Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Stevens Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthEast Exit: King Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthWest Exit: Private Driveway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
SouthWest Exit: King Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

2029 Build Weekday Evening Peak Hour

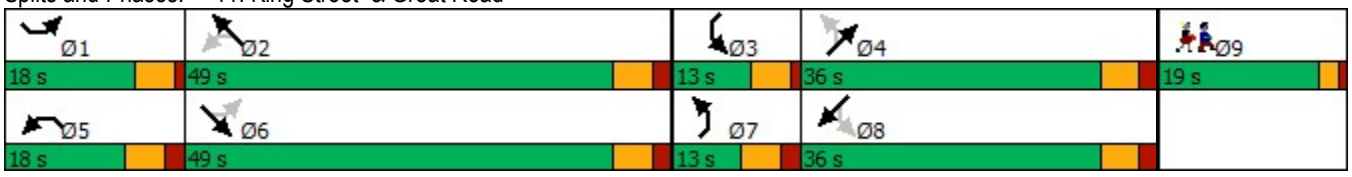
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	262	321	148	236	540	6	185	404	1	91	266	206
Future Volume (vph)	262	321	148	236	540	6	185	404	1	91	266	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	11	12	12	10	11	12	11	11	12
Storage Length (ft)	0		0	260		0	150		0	260		0
Storage Lanes	1		0	1		0	1		0	1		0
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		0.953			0.998						0.935	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1728	1733	0	1745	1878	0	1685	1819	0	1745	1708	0
Flt Permitted	0.113			0.179			0.132			0.133		
Satd. Flow (perm)	205	1733	0	329	1878	0	234	1819	0	244	1708	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18									27	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		234			401			318			358	
Travel Time (s)		5.3			9.1			7.2			8.1	
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.84	0.84	0.84	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	294	361	166	254	581	6	220	481	1	100	292	226
Shared Lane Traffic (%)												
Lane Group Flow (vph)	294	527	0	254	587	0	220	482	0	100	518	0
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			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.00	1.04	1.00	1.00	1.09	1.04	1.00	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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		pm+pt	NA		pm+pt	NA		pm+pt	NA	

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	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	24.0		11.0	24.0		11.0	24.0		10.0	24.0	
Total Split (s)	18.0	49.0		18.0	49.0		13.0	36.0		13.0	36.0	
Total Split (%)	13.3%	36.3%		13.3%	36.3%		9.6%	26.7%		9.6%	26.7%	
Maximum Green (s)	13.0	43.0		12.0	43.0		7.0	30.0		8.0	30.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		6.0	6.0		6.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		None	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	57.2	43.2		55.2	43.2		37.3	30.3		38.9	30.1	
Actuated g/C Ratio	0.48	0.36		0.46	0.36		0.31	0.25		0.32	0.25	
v/c Ratio	1.12	0.83		0.87	0.87		1.39	1.05		0.56	1.15	
Control Delay	119.3	47.1		49.1	51.0		239.2	98.8		40.7	130.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	119.3	47.1		49.1	51.0		239.2	98.8		40.7	130.6	
LOS	F	D		D	D		F	F		D	F	
Approach Delay		72.9			50.4			142.8			116.1	
Approach LOS		E			D			F			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 135			
Actuated Cycle Length: 119.8			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.39			
Intersection Signal Delay: 92.0		Intersection LOS: F	
Intersection Capacity Utilization 99.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 11: King Street & Great Road



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	14%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	6
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

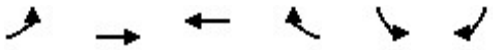
Intersection Summary

Lane Group	SEL	SET	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	294	527	254	587	220	482	100	518
v/c Ratio	1.12	0.83	0.87	0.87	1.39	1.05	0.56	1.15
Control Delay	119.3	47.1	49.1	51.0	239.2	98.8	40.7	130.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	119.3	47.1	49.1	51.0	239.2	98.8	40.7	130.6
Queue Length 50th (ft)	~184	340	101	397	~166	~384	49	~432
Queue Length 95th (ft)	#443	#648	#305	#755	#358	#653	#116	#787
Internal Link Dist (ft)		154		321		238		278
Turn Bay Length (ft)			260		150		260	
Base Capacity (vph)	263	635	293	676	158	460	180	449
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.12	0.83	0.87	0.87	1.39	1.05	0.56	1.15

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.

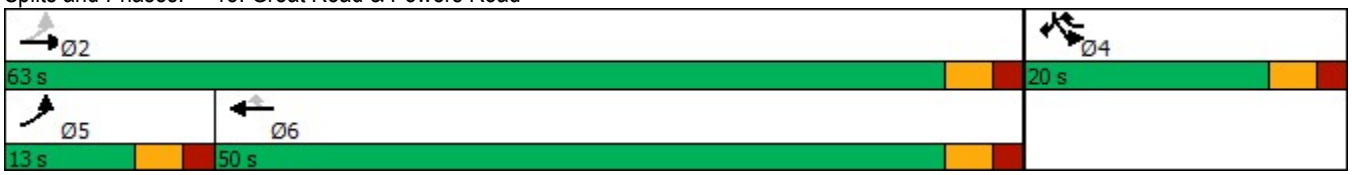


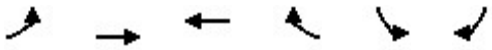
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	150	388	598	278	187	114
Future Volume (vph)	150	388	598	278	187	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	11
Storage Length (ft)	220			220	0	100
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1745	1837	1818	1546	1685	1561
Flt Permitted	0.178				0.950	
Satd. Flow (perm)	327	1837	1818	1546	1685	1561
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				293		136
Link Speed (mph)		30	30		30	
Link Distance (ft)		297	344		294	
Travel Time (s)		6.8	7.8		6.7	
Peak Hour Factor	0.89	0.89	0.95	0.95	0.84	0.84
Heavy Vehicles (%)	0%	0%	1%	1%	0%	0%
Adj. Flow (vph)	169	436	629	293	223	136
Shared Lane Traffic (%)						
Lane Group Flow (vph)	169	436	629	293	223	136
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		10	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.09	1.04
Turning Speed (mph)	15			9	15	9
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	pm+ov	Prot	Prot

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases	5	2	6	4	4	4
Permitted Phases	2			6		
Detector Phase	5	2	6	4	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	15.0	15.0	15.0
Total Split (s)	13.0	63.0	50.0	20.0	20.0	20.0
Total Split (%)	15.7%	75.9%	60.2%	24.1%	24.1%	24.1%
Maximum Green (s)	8.0	58.0	45.0	15.0	15.0	15.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	41.1	41.1	28.0	46.0	12.9	12.9
Actuated g/C Ratio	0.64	0.64	0.43	0.71	0.20	0.20
v/c Ratio	0.44	0.37	0.80	0.25	0.66	0.32
Control Delay	8.3	6.5	24.0	0.8	37.4	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	6.5	24.0	0.8	37.4	8.1
LOS	A	A	C	A	D	A
Approach Delay		7.0	16.6		26.3	
Approach LOS		A	B		C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 83			
Actuated Cycle Length: 64.4			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 15.4		Intersection LOS: B	
Intersection Capacity Utilization 62.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 18: Great Road & Powers Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	169	436	629	293	223	136
v/c Ratio	0.44	0.37	0.80	0.25	0.66	0.32
Control Delay	8.3	6.5	24.0	0.8	37.4	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	6.5	24.0	0.8	37.4	8.1
Queue Length 50th (ft)	24	73	209	0	80	0
Queue Length 95th (ft)	44	115	328	13	#181	38
Internal Link Dist (ft)		217	264		214	
Turn Bay Length (ft)	220			220		100
Base Capacity (vph)	391	1621	1320	1241	407	480
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	0.43	0.27	0.48	0.24	0.55	0.28

Intersection Summary

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

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	3	575	871	4	2	2
Future Vol, veh/h	3	575	871	4	2	2
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	91	91	94	94	50	50
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	3	632	927	4	4	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	931	0	-	0	1567	929
Stage 1	-	-	-	-	929	-
Stage 2	-	-	-	-	638	-
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	743	-	-	-	124	327
Stage 1	-	-	-	-	388	-
Stage 2	-	-	-	-	530	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	743	-	-	-	123	327
Mov Cap-2 Maneuver	-	-	-	-	123	-
Stage 1	-	-	-	-	386	-
Stage 2	-	-	-	-	530	-

Approach	EB	WB	SW
HCM Control Delay, s	0.1	0	26.1
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	743	-	-	-	179
HCM Lane V/C Ratio	0.004	-	-	-	0.045
HCM Control Delay (s)	9.9	0	-	-	26.1
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	32	545	840	19	19	35
Future Vol, veh/h	32	545	840	19	19	35
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	91	91	94	94	92	92
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	35	599	894	20	21	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	914	0	-	0	1573	904
Stage 1	-	-	-	-	904	-
Stage 2	-	-	-	-	669	-
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	754	-	-	-	123	338
Stage 1	-	-	-	-	398	-
Stage 2	-	-	-	-	513	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	754	-	-	-	114	338
Mov Cap-2 Maneuver	-	-	-	-	114	-
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	513	-

Approach	EB	WB	SW
HCM Control Delay, s	0.6	0	30.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	754	-	-	-	200
HCM Lane V/C Ratio	0.047	-	-	-	0.293
HCM Control Delay (s)	10	0	-	-	30.3
HCM Lane LOS	B	A	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	1.2

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	48	516	805	25	24	54
Future Vol, veh/h	48	516	805	25	24	54
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	91	91	94	94	92	92
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	53	567	856	27	26	59

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	883	0	-	0	1543	870
Stage 1	-	-	-	-	870	-
Stage 2	-	-	-	-	673	-
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	775	-	-	-	128	354
Stage 1	-	-	-	-	413	-
Stage 2	-	-	-	-	511	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	775	-	-	-	115	354
Mov Cap-2 Maneuver	-	-	-	-	115	-
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	511	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	32
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	775	-	-	-	216
HCM Lane V/C Ratio	0.068	-	-	-	0.393
HCM Control Delay (s)	10	0	-	-	32
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.2	-	-	-	1.8

Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↱	
Traffic Vol, veh/h	672	0	0	563	0	160
Future Vol, veh/h	672	0	0	563	0	160
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	84	84	91	91	92	92
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	800	0	0	619	0	174

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	1419	800
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	619	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	0	0	-	152	388
Stage 1	-	0	0	-	446	-
Stage 2	-	0	0	-	541	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	152	388
Mov Cap-2 Maneuver	-	-	-	-	152	-
Stage 1	-	-	-	-	446	-
Stage 2	-	-	-	-	541	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	21.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	388	-	-
HCM Lane V/C Ratio	0.448	-	-
HCM Control Delay (s)	21.6	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	2.2	-	-

LANE SUMMARY

Site: 101 [Great Road at Adams Street/Stevens Street/ Meetinghouse Road (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Adams Street													
Lane 1	35	4.3	187	0.186	100	28.6	LOS D	0.6	15.9	Full	1600	0.0	0.0
Approach	35	4.3		0.186		28.6	LOS D	0.6	15.9				
SouthEast: Great Road													
Lane 1	900	0.9	1849	0.487	100	4.4	LOS A	0.6	16.1	Full	1600	0.0	0.0
Approach	900	0.9		0.487		4.4	NA	0.6	16.1				
NorthWest: Great Road													
Lane 1	469	0.3	1624	0.289	100	3.8	LOS A	1.1	27.9	Full	1600	0.0	0.0
Approach	469	0.3		0.289		3.8	NA	1.1	27.9				
West: Stevens Street													
Lane 1	300	0.0	425	0.706	100	31.4	LOS D	8.3	206.6	Full	1600	0.0	0.0
Approach	300	0.0		0.706		31.4	LOS D	8.3	206.6				
Intersection	1704	0.6		0.706		9.5	NA	8.3	206.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Adams Street

Mov. From S To Exit:	L1 NW	T1 N	R3 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	7	17	35	4.3	187	0.186	100	NA	NA
Approach	11	7	17	35	4.3		0.186			

SouthEast: Great Road

Mov. From SE To Exit:	L3 S	T1 NW	R1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	14	788	98	900	0.9	1849	0.487	100	NA	NA
Approach	14	788	98	900	0.9		0.487			

NorthWest: Great Road											
Mov. From NW To Exit:	L3 N	T1 SE	R1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	45	406	18	469	0.3	1624	0.289	100	NA	NA	
Approach	45	406	18	469	0.3		0.289				
West: Stevens Street											
Mov. From W To Exit:	L3 NW	L2 N	R1 SE	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	12	24	252	12	300	0.0	425	0.706	100	NA	NA
Approach	12	24	252	12	300	0.0		0.706			

	Total	%HV	Deg.Satn (v/c)
Intersection	1704	0.6	0.706

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Adams Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
SouthEast Exit: Great Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Meetinghouse Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthWest Exit: Great Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

LANE SUMMARY

Site: 101 [King Street at Goldsmith Street-Stevens Street-Private Driveway (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
SouthEast: Goldsmith Street													
Lane 1	221	0.0	214	1.033	100	118.1	LOS F	15.0	374.8	Full	1600	0.0	0.0
Approach	221	0.0		1.033		118.1	LOS F	15.0	374.8				
NorthEast: King Street													
Lane 1	730	0.8	1450	0.504	100	7.5	LOS A	5.1	129.3	Full	1600	0.0	0.0
Approach	730	0.8		0.504		7.5	NA	5.1	129.3				
NorthWest: Private Driveway													
Lane 1	48	2.9	147	0.326	100	40.9	LOS E	1.3	32.1	Full	1600	0.0	0.0
Approach	48	2.9		0.326		40.9	LOS E	1.3	32.1				
SouthWest: King Street													
Lane 1	539	1.2	1848	0.291	100	2.4	LOS A	0.1	3.2	Full	1600	0.0	0.0
Lane 2	310	0.0	1769	0.175	100	0.0	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	848	0.8		0.291		1.5	NA	0.1	3.2				
Intersection	1848	0.7		1.033		18.9	NA	15.0	374.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

SouthEast: Goldsmith Street

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	R3 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	53	2	137	29	221	0.0	214	1.033	100	NA	NA
Approach	53	2	137	29	221	0.0		1.033			

NorthEast: King Street

Mov. From NE To Exit:	L3 E	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	143	556	18	730	0.8	1450	0.504	100	NA	NA

Approach	13	143	556	18	730	0.8		0.504				
NorthWest: Private Driveway												
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	28	4	15	48	2.9		147	0.326	100	NA	NA	
Approach	28	4	15	48	2.9			0.326				
SouthWest: King Street												
Mov. From SW To Exit:	L2 NW	T1 NE	R1 E	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	7	531	-	-	539	1.2	1848	0.291	100	NA	NA	
Lane 2	-	-	253	57	310	0.0	1769	0.175	100	NA	NA	
Approach	7	531	253	57	848	0.8		0.291				

	Total	%HV	Deg.Satn (v/c)
Intersection	1848	0.7	1.033

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Goldsmith Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Stevens Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthEast Exit: King Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthWest Exit: Private Driveway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
SouthWest Exit: King Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

2029 Build Saturday Midday Peak Hour

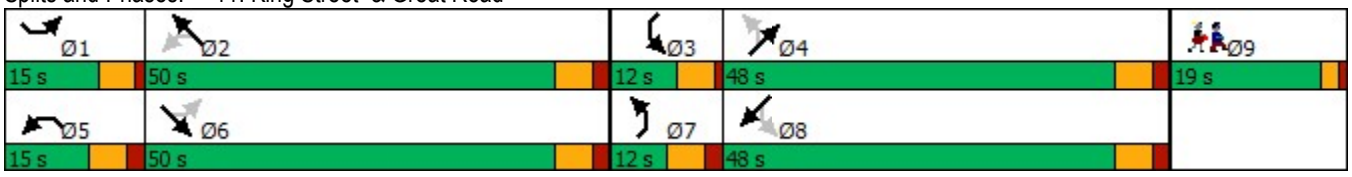
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	179	365	164	191	427	23	183	241	4	131	209	155
Future Volume (vph)	179	365	164	191	427	23	183	241	4	131	209	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	11	12	12	10	11	12	11	11	12
Storage Length (ft)	0		0	260		0	150		0	260		0
Storage Lanes	1		0	1		0	1		0	1		0
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		0.953			0.992			0.998			0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1745	1738	0	1745	1867	0	1685	1833	0	1745	1719	0
Flt Permitted	0.233			0.165			0.177			0.437		
Satd. Flow (perm)	428	1738	0	303	1867	0	314	1833	0	803	1719	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			2			1			26	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		234			401			318			358	
Travel Time (s)		5.3			9.1			7.2			8.1	
Peak Hour Factor	0.95	0.95	0.95	0.91	0.91	0.91	0.96	0.96	0.96	0.87	0.87	0.87
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	188	384	173	210	469	25	191	251	4	151	240	178
Shared Lane Traffic (%)												
Lane Group Flow (vph)	188	557	0	210	494	0	191	255	0	151	418	0
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			11			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.00	1.04	1.00	1.00	1.09	1.04	1.00	1.04	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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		pm+pt	NA		pm+pt	NA		pm+pt	NA	

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	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	24.0		11.0	24.0		11.0	24.0		10.0	24.0	
Total Split (s)	15.0	50.0		15.0	50.0		12.0	48.0		12.0	48.0	
Total Split (%)	10.4%	34.7%		10.4%	34.7%		8.3%	33.3%		8.3%	33.3%	
Maximum Green (s)	10.0	44.0		9.0	44.0		6.0	42.0		7.0	42.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.0		6.0	6.0		6.0	6.0		5.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max		None	Max		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	55.7	44.5		53.6	44.5		38.0	31.9		40.0	31.9	
Actuated g/C Ratio	0.47	0.37		0.45	0.37		0.32	0.27		0.34	0.27	
v/c Ratio	0.60	0.85		0.85	0.71		1.12	0.52		0.46	0.87	
Control Delay	29.6	48.0		53.5	40.5		138.8	41.3		32.0	58.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.6	48.0		53.5	40.5		138.8	41.3		32.0	58.7	
LOS	C	D		D	D		F	D		C	E	
Approach Delay		43.4			44.4			83.1			51.6	
Approach LOS		D			D			F			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 144			
Actuated Cycle Length: 119.1			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.12			
Intersection Signal Delay: 52.7		Intersection LOS: D	
Intersection Capacity Utilization 90.4%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 11: King Street & Great Road



Lane Group	Ø9
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	19.0
Total Split (s)	19.0
Total Split (%)	13%
Maximum Green (s)	16.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	1
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

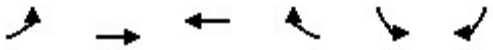
Intersection Summary

Lane Group	SEL	SET	NWL	NWT	NEL	NET	SWL	SWT
Lane Group Flow (vph)	188	557	210	494	191	255	151	418
v/c Ratio	0.60	0.85	0.85	0.71	1.12	0.52	0.46	0.87
Control Delay	29.6	48.0	53.5	40.5	138.8	41.3	32.0	58.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	48.0	53.5	40.5	138.8	41.3	32.0	58.7
Queue Length 50th (ft)	72	359	83	302	~110	158	74	276
Queue Length 95th (ft)	#192	#780	#285	#628	#318	284	144	457
Internal Link Dist (ft)		154		321		238		278
Turn Bay Length (ft)			260		150		260	
Base Capacity (vph)	311	659	246	699	170	655	326	630
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.85	0.85	0.71	1.12	0.39	0.46	0.66

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.

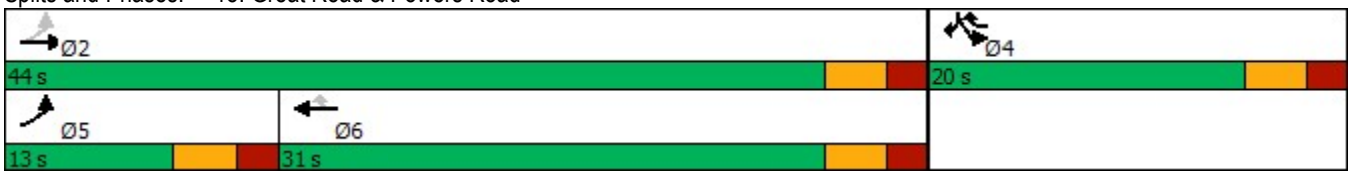


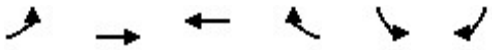
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	71	441	483	173	158	57
Future Volume (vph)	71	441	483	173	158	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	11
Storage Length (ft)	220			220	0	100
Storage Lanes	1			1	1	1
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1745	1818	1818	1561	1685	1561
Flt Permitted	0.227				0.950	
Satd. Flow (perm)	417	1818	1818	1561	1685	1561
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				192		68
Link Speed (mph)		30	30		30	
Link Distance (ft)		297	344		294	
Travel Time (s)		6.8	7.8		6.7	
Peak Hour Factor	0.89	0.89	0.90	0.90	0.84	0.84
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	80	496	537	192	188	68
Shared Lane Traffic (%)						
Lane Group Flow (vph)	80	496	537	192	188	68
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		11	11		10	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.04	1.04	1.04	1.04	1.09	1.04
Turning Speed (mph)	15			9	15	9
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	pm+ov	Prot	Prot

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases	5	2	6	4	4	4
Permitted Phases	2			6		
Detector Phase	5	2	6	4	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	15.0	15.0	15.0
Total Split (s)	13.0	44.0	31.0	20.0	20.0	20.0
Total Split (%)	20.3%	68.8%	48.4%	31.3%	31.3%	31.3%
Maximum Green (s)	8.0	39.0	26.0	15.0	15.0	15.0
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	26.3	26.3	20.1	40.4	11.4	11.4
Actuated g/C Ratio	0.54	0.54	0.41	0.82	0.23	0.23
v/c Ratio	0.19	0.51	0.72	0.15	0.48	0.16
Control Delay	6.0	8.7	20.5	0.8	24.3	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	8.7	20.5	0.8	24.3	7.3
LOS	A	A	C	A	C	A
Approach Delay		8.3	15.3		19.8	
Approach LOS		A	B		B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 64			
Actuated Cycle Length: 49			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 50.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 18: Great Road & Powers Road





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	80	496	537	192	188	68
v/c Ratio	0.19	0.51	0.72	0.15	0.48	0.16
Control Delay	6.0	8.7	20.5	0.8	24.3	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	8.7	20.5	0.8	24.3	7.3
Queue Length 50th (ft)	9	74	148	0	56	0
Queue Length 95th (ft)	25	146	#280	12	109	24
Internal Link Dist (ft)		217	264		214	
Turn Bay Length (ft)	220			220		100
Base Capacity (vph)	469	1427	1092	1341	584	585
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	0.17	0.35	0.49	0.14	0.32	0.12

Intersection Summary

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

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	5	711	770	2	1	4
Future Vol, veh/h	5	711	770	2	1	4
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	91	91	93	93	63	63
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	5	781	828	2	2	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	830	0	-	0	1620	829
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	791	-
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	811	-	-	-	115	374
Stage 1	-	-	-	-	432	-
Stage 2	-	-	-	-	450	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	811	-	-	-	114	374
Mov Cap-2 Maneuver	-	-	-	-	114	-
Stage 1	-	-	-	-	427	-
Stage 2	-	-	-	-	450	-

Approach	EB	WB	SW
HCM Control Delay, s	0.1	0	19.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	811	-	-	-	257
HCM Lane V/C Ratio	0.007	-	-	-	0.031
HCM Control Delay (s)	9.5	0	-	-	19.5
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	41	669	728	24	22	44
Future Vol, veh/h	41	669	728	24	22	44
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	91	91	93	93	92	92
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	45	735	783	26	24	48

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	809	0	-	0	1621	796
Stage 1	-	-	-	-	796	-
Stage 2	-	-	-	-	825	-
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	825	-	-	-	115	390
Stage 1	-	-	-	-	448	-
Stage 2	-	-	-	-	434	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	825	-	-	-	104	390
Mov Cap-2 Maneuver	-	-	-	-	104	-
Stage 1	-	-	-	-	407	-
Stage 2	-	-	-	-	434	-

Approach	EB	WB	SW
HCM Control Delay, s	0.6	0	32.1
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	825	-	-	-	203
HCM Lane V/C Ratio	0.055	-	-	-	0.353
HCM Control Delay (s)	9.6	0	-	-	32.1
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.2	-	-	-	1.5

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	62	629	687	33	29	65
Future Vol, veh/h	62	629	687	33	29	65
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	91	91	93	93	92	92
Heavy Vehicles, %	0	0	1	0	2	2
Mvmt Flow	68	691	739	35	32	71

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	774	0	-	0	1584	757
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	827	-
Critical Hdwy	4.1	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.2	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	851	-	-	-	119	408
Stage 1	-	-	-	-	463	-
Stage 2	-	-	-	-	430	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	851	-	-	-	104	408
Mov Cap-2 Maneuver	-	-	-	-	104	-
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	430	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	36
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	851	-	-	-	215
HCM Lane V/C Ratio	0.08	-	-	-	0.475
HCM Control Delay (s)	9.6	0	-	-	36
HCM Lane LOS	A	A	-	-	E
HCM 95th %tile Q(veh)	0.3	-	-	-	2.3

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	443	0	0	495	0	147
Future Vol, veh/h	443	0	0	495	0	147
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	96	96	87	87	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	461	0	0	569	0	160

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	1030	461
Stage 1	-	-	-	-	461	-
Stage 2	-	-	-	-	569	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	0	0	-	261	605
Stage 1	-	0	0	-	639	-
Stage 2	-	0	0	-	570	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	261	605
Mov Cap-2 Maneuver	-	-	-	-	261	-
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	570	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	13.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	605	-	-
HCM Lane V/C Ratio	0.264	-	-
HCM Control Delay (s)	13.1	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	1.1	-	-

LANE SUMMARY

Site: 101 [Great Road at Adams Street/Stevens Street/ Meetinghouse Road (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Adams Street													
Lane 1	33	4.9	185	0.180	100	28.7	LOS D	0.6	15.2	Full	1600	0.0	0.0
Approach	33	4.9		0.180		28.7	LOS D	0.6	15.2				
SouthEast: Great Road													
Lane 1	815	0.8	1826	0.446	100	4.1	LOS A	0.7	18.9	Full	1600	0.0	0.0
Approach	815	0.8		0.446		4.1	NA	0.7	18.9				
NorthWest: Great Road													
Lane 1	595	1.0	1858	0.320	100	2.6	LOS A	0.2	3.8	Full	1600	0.0	0.0
Approach	595	1.0		0.320		2.6	NA	0.2	3.8				
West: Stevens Street													
Lane 1	270	0.5	377	0.716	100	35.3	LOS E	7.0	176.2	Full	1600	0.0	0.0
Approach	270	0.5		0.716		35.3	LOS E	7.0	176.2				
Intersection	1713	0.9		0.716		9.0	NA	7.0	176.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

South: Adams Street

Mov. From S To Exit:	L1 NW	T1 N	R3 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	3	21	33	4.9	185	0.180	100	NA	NA
Approach	10	3	21	33	4.9		0.180			

SouthEast: Great Road

Mov. From SE To Exit:	L3 S	T1 NW	R1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	18	659	138	815	0.8	1826	0.446	100	NA	NA
Approach	18	659	138	815	0.8		0.446			

NorthWest: Great Road											
Mov.	L3	T1	R1	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane
From NW To Exit:	N	SE	S			veh/h	v/c	%	%	No.
Lane 1	5	577	13	595	1.0	1858	0.320	100	NA	NA
Approach	5	577	13	595	1.0		0.320			

West: Stevens Street											
Mov.	L3	L2	R1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane
From W To Exit:	NW	N	SE	S			veh/h	v/c	%	%	No.
Lane 1	10	16	240	4	270	0.5	377	0.716	100	NA	NA
Approach	10	16	240	4	270	0.5		0.716			

	Total	%HV	Deg.Satn (v/c)
Intersection	1713	0.9	0.716

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: Adams Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
SouthEast Exit: Great Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
North Exit: Meetinghouse Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthWest Exit: Great Road Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

LANE SUMMARY

Site: 101 [King Street at Goldsmith Street-Stevens Street-Private Driveway (Site Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
SouthEast: Goldsmith Street													
Lane 1	223	0.0	354	0.631	100	31.0	LOS D	5.1	127.8	Full	1600	0.0	0.0
Approach	223	0.0		0.631		31.0	LOS D	5.1	127.8				
NorthEast: King Street													
Lane 1	594	0.0	1541	0.385	100	5.5	LOS A	2.8	70.3	Full	1600	0.0	0.0
Approach	594	0.0		0.385		5.5	NA	2.8	70.3				
NorthWest: Private Driveway													
Lane 1	36	0.0	239	0.150	100	22.7	LOS C	0.5	13.5	Full	1600	0.0	0.0
Approach	36	0.0		0.150		22.7	LOS C	0.5	13.5				
SouthWest: King Street													
Lane 1	353	0.0	1862	0.190	100	1.6	LOS A	0.1	2.6	Full	1600	0.0	0.0
Lane 2	310	0.8	1750	0.177	100	0.0	LOS A	0.0	0.0	Full	1600	0.0	0.0
Approach	664	0.4		0.190		0.9	NA	0.1	2.6				
Intersection	1517	0.2		0.631		7.6	NA	5.1	127.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Approach Lane Flows (veh/h)

SouthEast: Goldsmith Street

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	R3 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	40	1	158	24	223	0.0	354	0.631	100	NA	NA
Approach	40	1	158	24	223	0.0		0.631			

NorthEast: King Street

Mov. From NE To Exit:	L3 E	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	8	120	446	19	594	0.0	1541	0.385	100	NA	NA

Approach	8	120	446	19	594	0.0		0.385			
NorthWest: Private Driveway											
Mov. From NW To Exit:	L2 NE	L1 E	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	6	1	17	36	0.0	239	0.150	100	NA	NA
Approach	11	6	1	17	36	0.0		0.150			
SouthWest: King Street											
Mov. From SW To Exit:	L2 NW	T1 NE	R1 E	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	9	344	-	-	353	0.0	1862	0.190	100	NA	NA
Lane 2	-	-	245	65	310	0.8	1750	0.177	100	NA	NA
Approach	9	344	245	65	664	0.4		0.190			

	Total	%HV	Deg.Satn (v/c)
Intersection	1517	0.2	0.631

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
SouthEast Exit: Goldsmith Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
East Exit: Stevens Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthEast Exit: King Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
NorthWest Exit: Private Driveway Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
SouthWest Exit: King Street Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

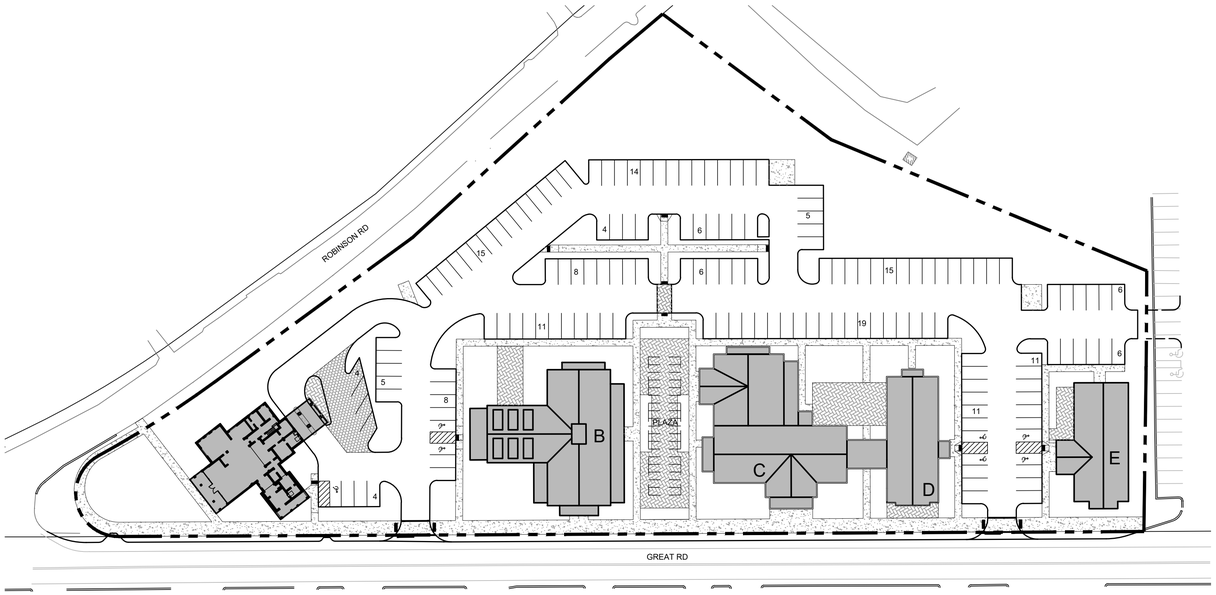
PROJECT SITE PLANS

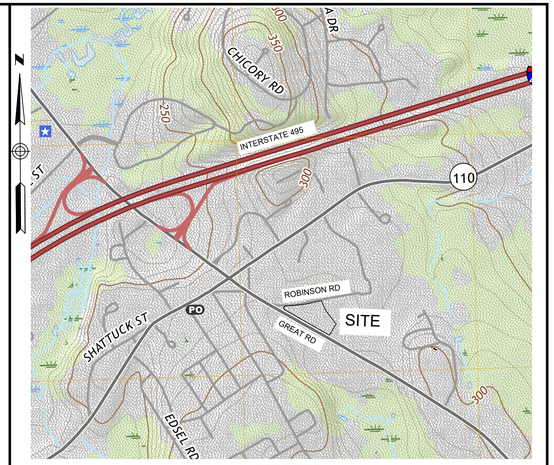
Northern Bank Town Common

Great Road

in

Littleton, Massachusetts





VICINITY MAP
SCALE 1"=1000'

PREPARED FOR

Northern Bank and Trust Company

275 Mishawum Road

Woburn, Massachusetts 01801

SHEET INDEX

Landscape Plans by Allen & Major Associates, Inc

Site:

NORTHERN BANK
TOWN COMMON

265-289 GREAT ROAD
LITTLETON, MASSACHUSETTS

Prepared for:

NORTHERN BANK AND
TRUST COMPANY

275 MISHAWUM ROAD
WOBURN, MASSACHUSETTS

COMMONWEALTH OF MASSACHUSETTS
SEAN P. MALONE
CIVIL
No. 46204
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TITLE SHEET

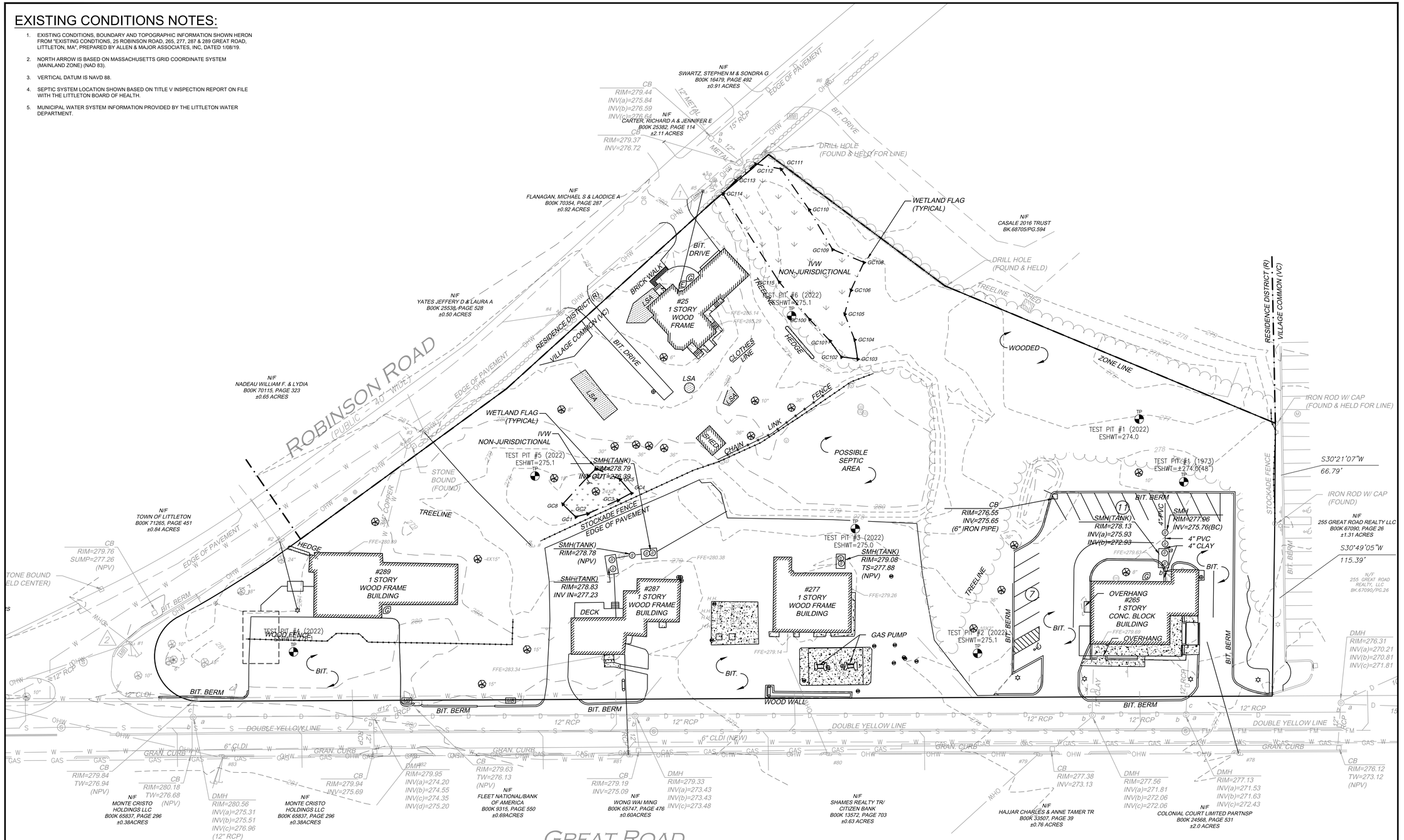
No.	Revision/Issue	Date

Design by: SPM	Checked by: SPM
Drawn by: SPM	Approved by: SPM
Project: 18017	Date: September 7, 2022

Sheet: T-100

EXISTING CONDITIONS NOTES:

1. EXISTING CONDITIONS, BOUNDARY AND TOPOGRAPHIC INFORMATION SHOWN HERON FROM "EXISTING CONDTIONS, 25 ROBINSON ROAD, 265, 277, 287 & 289 GREAT ROAD, LITTLETON, MA", PREPARED BY ALLEN & MAJOR ASSOCIATES, INC, DATED 1/08/19.
2. NORTH ARROW IS BASED ON MASSACHUSETTS GRID COORDINATE SYSTEM (MAINLAND ZONE) (NAD 83).
3. VERTICAL DATUM IS NAVD 88.
4. SEPTIC SYSTEM LOCATION SHOWN BASED ON TITLE V INSPECTION REPORT ON FILE WITH THE LITTLETON BOARD OF HEALTH.
5. MUNICIPAL WATER SYSTEM INFORMATION PROVIDED BY THE LITTLETON WATER DEPARTMENT.



Site:

NORTHERN BANK TOWN COMMON

265-289 GREAT ROAD
LITTLETON, MASSACHUSETTS

Prepared for:

NORTHERN BANK AND TRUST COMPANY

275 MISHAWUM ROAD
WOBURN, MASSACHUSETTS

LEGEND

- PROPERTY LINE
- W — WATER PIPE
- D — DRAIN PIPE
- GAS — GAS PIPE
- S — SEWER PIPE
- OHW — OVERHEAD ELECTRIC
- CONTOUR
- FENCE
- CONTOUR
- SIGN
- DRAIN STRUCTURE
- UTILITY POLE
- SEWER MANHOLE
- 10" TREE

0 15 30 60

SCALE in FEET
1"=30'

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EXISTING CONDITIONS PLAN

No.	Revision/Issue	Date

Design by: SPM	Checked by: SPM
Drawn by: SPM	Approved by: SPM
Project: 18017	Date: September 7, 2022

Sheet: C-100

ZONING COMPLIANCE CHECKLIST:

PROPERTY ID: MAP 7; LOTS 20, 22, 23, 24, 25
ROBINSON AND GREAT ROAD
LITTLETON, MA

ZONE: VC - VILLAGE COMMON
USE: COMMERCIAL

	REQUIRED	PROPOSED
FRONT SETBACK (MINIMUM)	10 FEET	±13 FEET
FRONT SETBACK (MAXIMUM)	20 FEET	±19 FEET
SIDE SETBACK (MINIMUM)	10 FEET	±16 FEET
SIDE SETBACK (ABUT RES.)	10 FEET	±44 FEET
REAR SETBACK (MINIMUM)	10 FEET	±38 FEET
REAR SETBACK (ABUT RES.)	20 FEET	±38 FEET
BUILDING HEIGHT	2.5 STORIES	2.0 STORIES
MAX BLDG + PAVE COVER	80%	±65%
FACADE BUILD OUT (MIN)	60%	62%
PARKING SETBACK	20 FEET	20 FEET

PARKING CALCULATION:

USE	MINIMUN REQUIRE RATE
RETAIL	1 PER 250 SF LEASABLE AREA
RESTAURANT	1 PER 250 SF LEASABLE AREA
OFFICE	1 PER 333 SF LEASABLE AREA

	GFA
RETAIL	
NORTHERN BANK BRANCH	3,336 SF
BUILDING B	6,574 SF
BUILDING C (FIRST FLOOR)	7,400 SF
BUILDING D (FIRST FLOOR)	3,000 SF
TOTAL RETAIL SPACE =	20,310 SF @ 1 SPACE/250 SF = 82 SPACES REQUIRED

RESTAURANT (BUILDING E) 3,500 SF @ 1 SPACE/250 SF = 14 SPACES REQUIRED

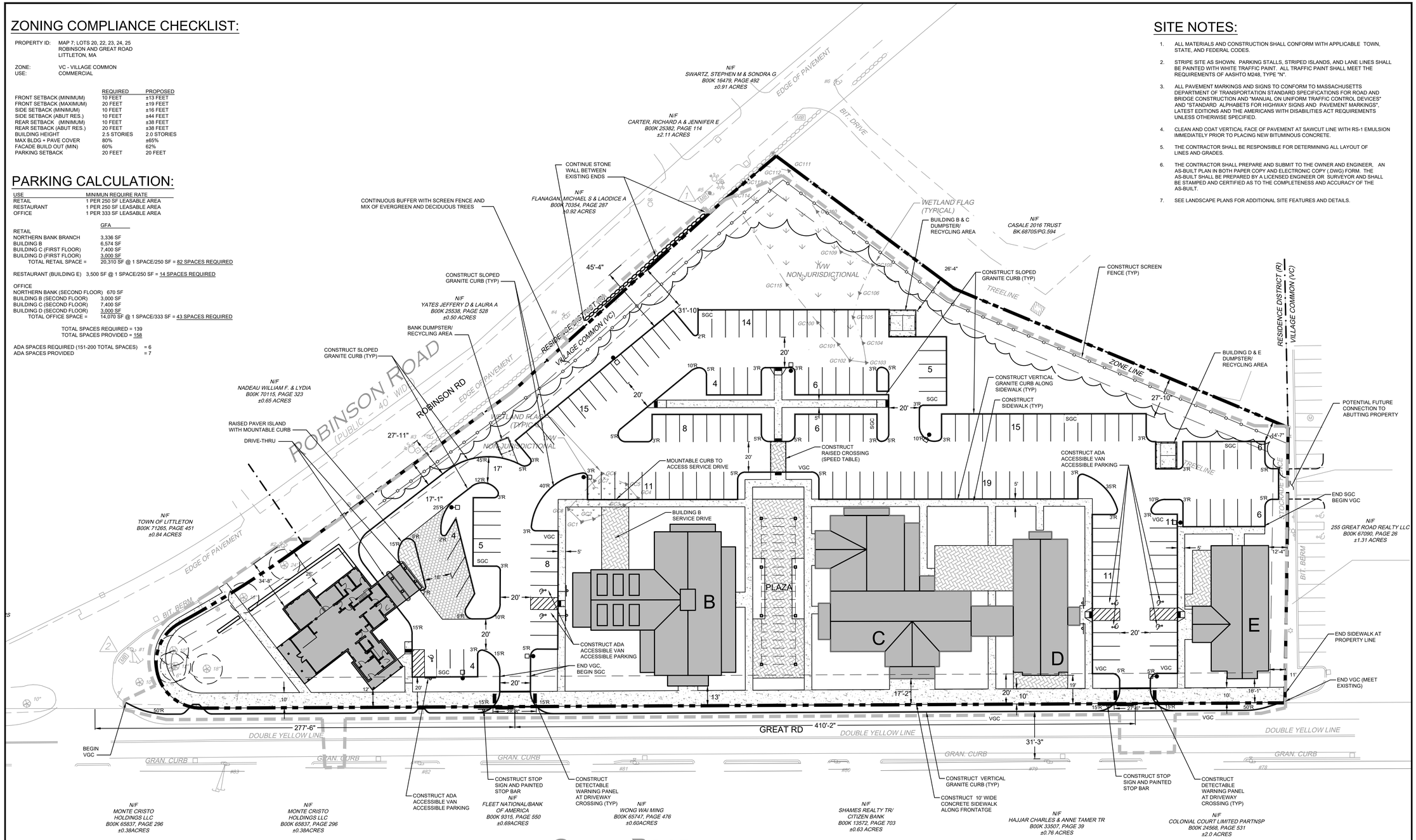
OFFICE	
NORTHERN BANK (SECOND FLOOR)	670 SF
BUILDING B (SECOND FLOOR)	3,000 SF
BUILDING C (SECOND FLOOR)	7,400 SF
BUILDING D (SECOND FLOOR)	3,000 SF
TOTAL OFFICE SPACE =	14,070 SF @ 1 SPACE/333 SF = 43 SPACES REQUIRED

TOTAL SPACES REQUIRED = 139
TOTAL SPACES PROVIDED = 158

ADA SPACES REQUIRED (151-200 TOTAL SPACES) = 6
ADA SPACES PROVIDED = 7

SITE NOTES:

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE TOWN, STATE, AND FEDERAL CODES.
2. STRIPE SITE AS SHOWN. PARKING STALLS, STRIPED ISLANDS, AND LANE LINES SHALL BE PAINTED WITH WHITE TRAFFIC PAINT. ALL TRAFFIC PAINT SHALL MEET THE REQUIREMENTS OF AASHTO M248, TYPE "N".
3. ALL PAVEMENT MARKINGS AND SIGNS TO CONFORM TO MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS", LATEST EDITIONS AND THE AMERICANS WITH DISABILITIES ACT REQUIREMENTS UNLESS OTHERWISE SPECIFIED.
4. CLEAN AND COAT VERTICAL FACE OF PAVEMENT AT SAWCUT LINE WITH RS-1 EMULSION IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING ALL LAYOUT OF LINES AND GRADES.
6. THE CONTRACTOR SHALL PREPARE AND SUBMIT TO THE OWNER AND ENGINEER. AN AS-BUILT PLAN IN BOTH PAPER COPY AND ELECTRONIC COPY (.DWG) FORM. THE AS-BUILT SHALL BE PREPARED BY A LICENSED ENGINEER OR SURVEYOR AND SHALL BE STAMPED AND CERTIFIED AS TO THE COMPLETENESS AND ACCURACY OF THE AS-BUILT.
7. SEE LANDSCAPE PLANS FOR ADDITIONAL SITE FEATURES AND DETAILS.



Site:

NORTHERN BANK TOWN COMMON

265-289 GREAT ROAD
LITTLETON, MASSACHUSETTS

Prepared for:

NORTHERN BANK AND TRUST COMPANY

275 MISHAWUM ROAD
WOBURN, MASSACHUSETTS

LEGEND-PROPOSED

- CURB
- SIGN
- SITE LIGHTING
- SIDEWALK
- PERVIOUS PAVERS
- BITUMINOUS PAVEMENT
- FENCE
- APPROXIMATE LIMIT OF WORK

0 15 30 60
SCALE in FEET
1"=30'

COMMONWEALTH OF MASSACHUSETTS
SEAN P. MALONE
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SITE LAYOUT PLAN

No.	Revision/Issue	Date

Design by: SPM	Checked by: SPM
Drawn by: SPM	Approved by: SPM
Project: 18017	Date: September 7, 2022

Sheet: C-200

GRADING AND DRAINAGE NOTES:

1. FOR ALL DISTURBED AREAS NOT OTHERWISE TREATED INSTALL 4" MIN SCREENED LOAM AND HYDROSEED.
2. ALL STORM DRAIN PIPE SHALL BE HIGH DENSITY POLYETHYLENE UNLESS OTHERWISE NOTED (HANCOR "HIQ", ADS "N-12", OR APPROVED EQUAL).
3. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE TOWN AND STATE CODES.
4. ADJUST ALL MANHOLES, CATCHBASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
5. CONTRACTOR SHALL PROVIDE A FINISH PAVEMENT SURFACE FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCE AND EXIT RAMPS AND LOADING AREAS ADJACENT TO THE BUILDING.
6. ALL CATCHBASINS AND DRAIN LINES SHALL BE THOROUGHLY CLEANED OF ALL SEDIMENT AND DEBRIS AFTER THE UPSTREAM AREA IS STABILIZED.
7. COORDINATE ALL GRADING AROUND BUILDING AND BUILDING DOOR ELEVATIONS WITH ARCHITECTURAL PLANS.
8. THE PROPOSED CATCHBASINS AND STORMWATER TREATMENT UNITS MUST BE CLEANED OF ANY SEDIMENT AND/OR DEBRIS AFTER ALL UPSTREAM AREAS HAVE BEEN STABILIZED.

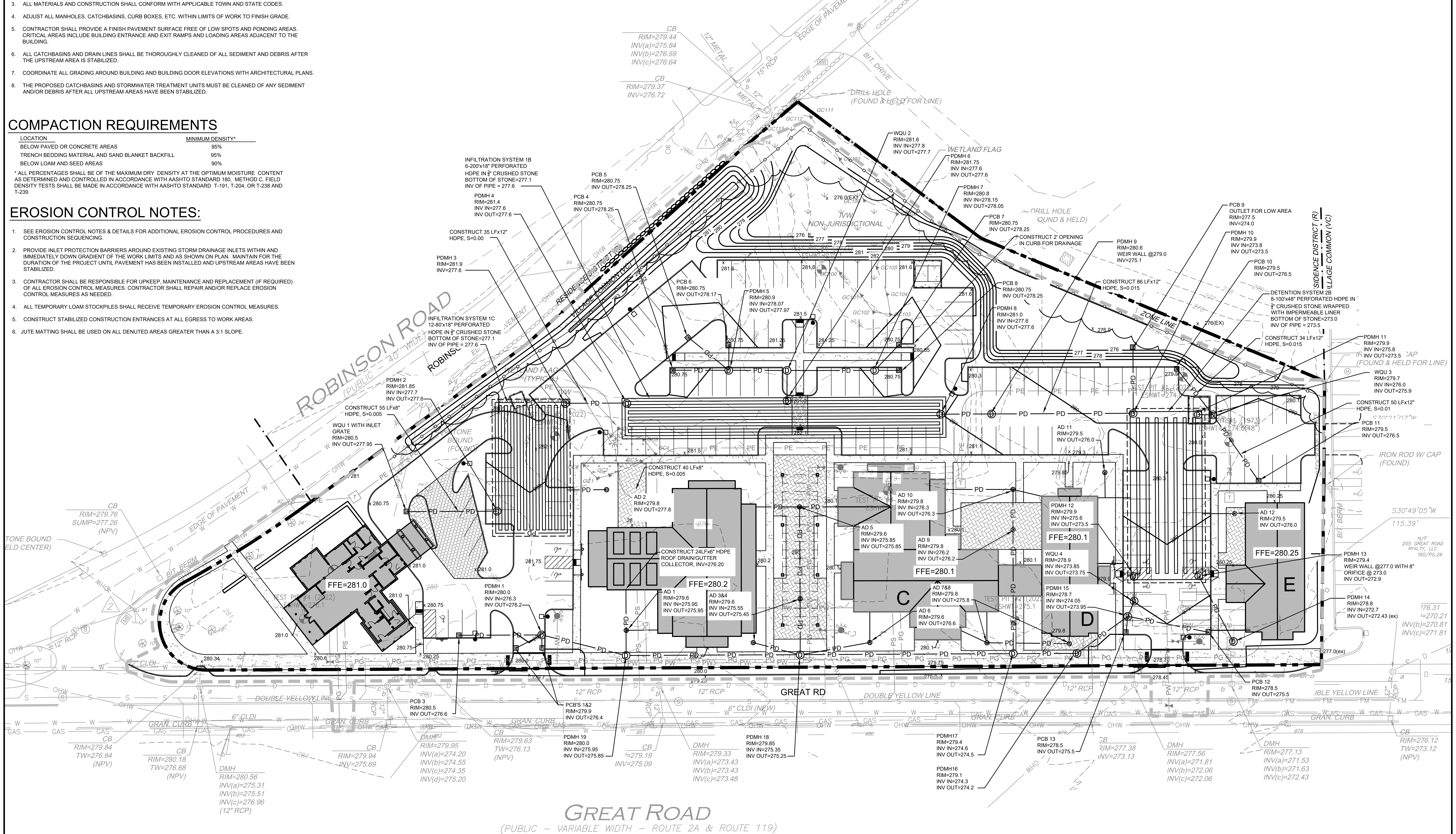
COMPACTION REQUIREMENTS

LOCATION	MINIMUM DENSITY*
BELOW PAVED OR CONCRETE AREAS	95%
TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL	95%
BELOW LOAM AND SEED AREAS	90%

* ALL PERCENTAGES SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH AASHTO STANDARD 180, METHOD C. FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH AASHTO STANDARD T-191, T-204, OR T-238 AND T-239.

EROSION CONTROL NOTES:

1. SEE EROSION CONTROL NOTES & DETAILS FOR ADDITIONAL EROSION CONTROL PROCEDURES AND CONSTRUCTION SEQUENCING.
2. PROVIDE INLET PROTECTION BARRIERS AROUND EXISTING STORM DRAINAGE INLETS WITHIN AND IMMEDIATELY DOWN GRADIENT OF THE WORK LIMITS AND AS SHOWN ON PLAN. MAINTAIN FOR THE DURATION OF THE PROJECT UNTIL PAVEMENT HAS BEEN INSTALLED AND UPSTREAM AREAS HAVE BEEN STABILIZED.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR UPKEEP, MAINTENANCE AND REPLACEMENT (IF REQUIRED) OF ALL EROSION CONTROL MEASURES. CONTRACTOR SHALL REPAIR AND/OR REPLACE EROSION CONTROL MEASURES AS NEEDED.
4. ALL TEMPORARY LOAM STOCKPILES SHALL RECEIVE TEMPORARY EROSION CONTROL MEASURES.
5. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCES AT ALL EGRESS TO WORK AREAS.
6. JUTE MATTING SHALL BE USED ON ALL DENUTED AREAS GREATER THAN A 3:1 SLOPE.



LEGEND - PROPOSED

Symbol	Description
— 53 —	CONTOUR
—o—o—	SEDIMENTATION BARRIER
x 52.2	SPOT GRADE
— PD —	DRAIN PIPE
(D)	DRAIN MANHOLE
⊕	AREA DRAIN
⊞	CATCH BASIN
(hatch)	PERVIOUS PAVERS
— — —	APPROXIMATE LIMIT OF WORK

SCALE in FEET 0 15 30 60
1"=30'

Site:

NORTHERN BANK TOWN COMMON

265-289 GREAT ROAD
LITTLETON, MASSACHUSETTS

Prepared for:

NORTHERN BANK AND TRUST COMPANY

275 MISHAWUM ROAD
WOBURN, MASSACHUSETTS

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GRADING, DRAINAGE AND EROSION CONTROL PLAN

No.	Revision/Issue	Date

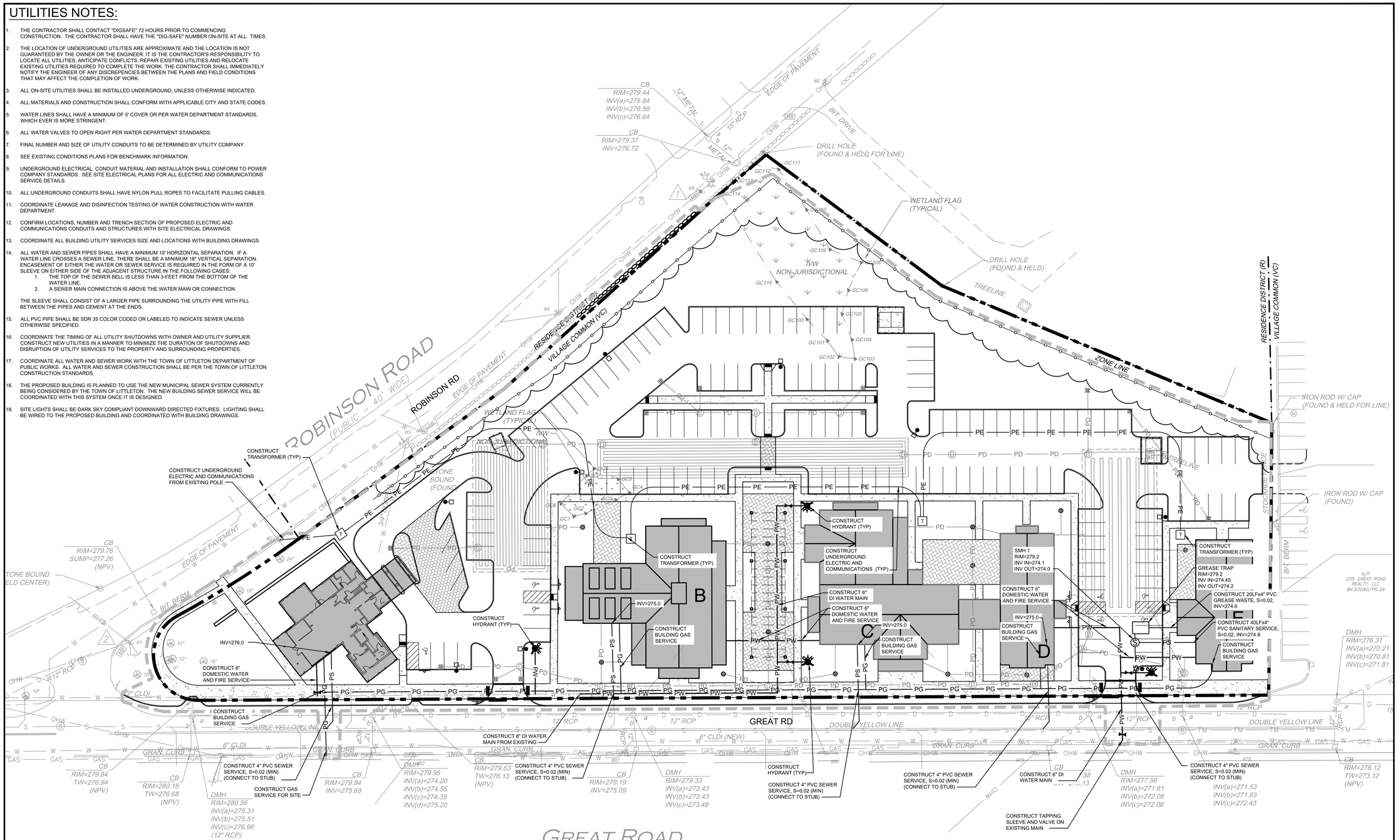
Design by: SPM	Checked by: SPM
Drawn by: SPM	Approved by: SPM
Project: 18017	Date: September 7, 2022

Sheet: C-300

UTILITIES NOTES:

1. THE CONTRACTOR SHALL CONTACT "DIGSAFE" 72 HOURS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL HAVE THE "DIG-SAFE" NUMBER ON-SITE AT ALL TIMES.
2. THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATION IS NOT GUARANTEED BY THE OWNER OR THE ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPENCIES BETWEEN THE PLANS AND FIELD CONDITIONS THAT MAY AFFECT THE COMPLETION OF WORK.
3. ALL ON-SITE UTILITIES SHALL BE INSTALLED UNDERGROUND, UNLESS OTHERWISE INDICATED.
4. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE CITY AND STATE CODES.
5. WATER LINES SHALL HAVE A MINIMUM OF 5' COVER OR PER WATER DEPARTMENT STANDARDS, WHICH EVER IS MORE STRINGENT.
6. ALL WATER VALVES TO OPEN RIGHT PER WATER DEPARTMENT STANDARDS.
7. FINAL NUMBER AND SIZE OF UTILITY CONDUITS TO BE DETERMINED BY UTILITY COMPANY.
8. SEE EXISTING CONDITIONS PLANS FOR BENCHMARK INFORMATION.
9. UNDERGROUND ELECTRICAL, CONDUIT MATERIAL AND INSTALLATION SHALL CONFORM TO POWER COMPANY STANDARDS. SEE SITE ELECTRICAL PLANS FOR ALL ELECTRIC AND COMMUNICATIONS SERVICE DETAILS.
10. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES.
11. COORDINATE LEAKAGE AND DISINFECTION TESTING OF WATER CONSTRUCTION WITH WATER DEPARTMENT.
12. CONFIRM LOCATIONS, NUMBER AND TRENCH SECTION OF PROPOSED ELECTRIC AND COMMUNICATIONS CONDUITS AND STRUCTURES WITH SITE ELECTRICAL DRAWINGS.
13. COORDINATE ALL BUILDING UTILITY SERVICES SIZE AND LOCATIONS WITH BUILDING DRAWINGS.
14. ALL WATER AND SEWER PIPES SHALL HAVE A MINIMUM 10' HORIZONTAL SEPARATION. IF A WATER LINE CROSSES A SEWER LINE, THERE SHALL BE A MINIMUM 18" VERTICAL SEPARATION. ENCASEMENT OF EITHER THE WATER OR SEWER SERVICE IS REQUIRED IN THE FORM OF A 10' SLEEVE ON EITHER SIDE OF THE ADJACENT STRUCTURE IN THE FOLLOWING CASES:
    1. THE TOP OF THE SEWER BELL IS LESS THAN 3-FEET FROM THE BOTTOM OF THE WATER LINE.
    2. A SEWER MAIN CONNECTION IS ABOVE THE WATER MAIN OR CONNECTION.

    THE SLEEVE SHALL CONSIST OF A LARGER PIPE SURROUNDING THE UTILITY PIPE WITH FILL BETWEEN THE PIPES AND CEMENT AT THE ENDS.
15. ALL PVC PIPE SHALL BE SDR 35 COLOR CODED OR LABELED TO INDICATE SEWER UNLESS OTHERWISE SPECIFIED.
16. COORDINATE THE TIMING OF ALL UTILITY SHUTDOWNS WITH OWNER AND UTILITY SUPPLIER. CONSTRUCT NEW UTILITIES IN A MANNER TO MINIMIZE THE DURATION OF SHUTDOWNS AND DISRUPTION OF UTILITY SERVICES TO THE PROPERTY AND SURROUNDING PROPERTIES.
17. COORDINATE ALL WATER AND SEWER WORK WITH THE TOWN OF LITTLETON DEPARTMENT OF PUBLIC WORKS. ALL WATER AND SEWER CONSTRUCTION SHALL BE PER THE TOWN OF LITTLETON CONSTRUCTION STANDARDS.
18. THE PROPOSED BUILDING IS PLANNED TO USE THE NEW MUNICIPAL SEWER SYSTEM CURRENTLY BEING CONSIDERED BY THE TOWN OF LITTLETON. THE NEW BUILDING SEWER SERVICE WILL BE COORDINATED WITH THIS SYSTEM ONCE IT IS DESIGNED.
19. SITE LIGHTS SHALL BE DARK SKY COMPLIANT DOWNWARD DIRECTED FIXTURES. LIGHTING SHALL BE WIRED TO THE PROPOSED BUILDING AND COORDINATED WITH BUILDING DRAWINGS.



Site:

NORTHERN BANK TOWN COMMON

265-289 GREAT ROAD
LITTLETON, MASSACHUSETTS

Prepared for:

NORTHERN BANK AND TRUST COMPANY

275 MISHAWUM ROAD
WOBURN, MASSACHUSETTS

LEGEND-PROPOSED

- PS — SEWER LINE
- PW — WATER PIPE
- PG — GAS PIPE
- PE — UNDERGROUND ELECTRIC & TEL/DATA
- WATER SHUTOFF
- SEWER MANHOLE
- HYDRANT
- APPROXIMATE LIMIT OF WORK

0 15 30 60
SCALE in FEET
1"=30'

COMMONWEALTH OF MASSACHUSETTS
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SITE UTILITIES PLAN

No.	Revision/Issue	Date

Design by: SPM	Checked by: SPM
Drawn by: SPM	Approved by: SPM
Project: 18017	Date: September 7, 2022

Sheet: C-400

PROJECT NAME AND LOCATION

NORTHERN BANK
GREAT ROAD
LITTLETON, MA

LAT: 42°32'43"N
LON: 71°28'11"W

DESCRIPTION

THE PROJECT CONSISTS OF CONSTRUCTING A NEW STAND ALONE BANK AND MIXED USE COMMERCIAL DEVELOPMENT WITH SUPPORTING INFRASTRUCTURE ON PREVIOUSLY DEVELOPED LAND.

SOIL CHARACTERISTICS

EXISTING SITE SOILS ARE GENERALLY COMPRISED PREVIOUSLY DISTURBED URBAN LAND

DISTURBED AREA

THE TOTAL AREA TO BE DISTURBED IS APPROXIMATELY 5.0 ACRES.

SEQUENCE OF MAJOR ACTIVITIES

1. INSTALL EROSION CONTROLS. CLEAR AND GRUB SITE.
2. STRIP AND STOCKPILE SOILS.
3. ROUGH GRADE SITE/CONSTRUCT BUILDING PAD.
4. CONSTRUCT UTILITIES AND DRAINAGE.
5. CONSTRUCT PAVEMENT AND FINAL STABILIZATION OF THE SITE.
6. CONSTRUCT LANDSCAPING AND SIGNAGE.
7. REMOVE EROSION CONTROLS.

EROSION AND SEDIMENT CONTROLS AND STABILIZATION PRACTICES

STABILIZATION: AN AREA SHALL BE CONSIDERED STABILIZED WHEN ONCE ONE OF THE FOLLOWING HAS OCCURRED:

1. A MINIMUM OF 85% VEGETATIVE GROWTH HAS BEEN ESTABLISHED;
2. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED; OR
3. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.

STABILIZATION SHALL BE INITIATED ON ALL LOAM STOCKPILES AND DISTURBED AREAS WHERE CONSTRUCTION ACTIVITY WILL NOT OCCUR FOR MORE THAN THIRTY (30) CALENDAR DAYS BY THE FOURTEENTH (14TH) DAY AFTER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED IN THAT AREA. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 60 DAYS OF INITIAL DISTURBANCE. ALL CUT AND FILL SLOPES AND ROADWAYS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING GRADE. STABILIZATION MEASURES TO BE USED INCLUDE:

1. TEMPORARY SEEDING;
2. MULCHING;
3. STONE RIP-RAP; OR
4. JUTE MATTING.

DURING CONSTRUCTION, RUNOFF WILL BE DIVERTED AROUND THE SITE WITH EARTH DIKES, PIPING OR STABILIZED CHANNELS WHERE POSSIBLE. SHEET RUNOFF FROM THE SITE WILL BE FILTERED THROUGH HAY BALE BARRIERS AND/OR SILT FENCES. ALL STORM DRAIN INLETS SHALL BE PROVIDED WITH BARRIER FILTERS.

OFF-SITE VEHICLE TRACKING

STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT ALL EGRESSES TO THE ACTIVE WORK AREAS ON THE SITE AND MAINTAINED FOR THE DURATION OF CONSTRUCTION.

TIMING OF CONTROLS/MEASURES

AS INDICATED IN THE SEQUENCE OF MAJOR ACTIVITIES THE EROSION AND SEDIMENT BARRIERS SHALL BE INSTALLED PRIOR TO COMMENCING ANY CLEARING OR GRADING OF THE SITE. STRUCTURAL CONTROLS SHALL BE INSTALLED CONCURRENTLY WITH THE APPLICABLE ACTIVITY. AREAS WHERE CONSTRUCTION ACTIVITY TEMPORARILY CEASES FOR MORE THAN THIRTY (30) DAYS WILL BE STABILIZED WITH A TEMPORARY SEED AND MULCH WITHIN FOURTEEN (14) DAYS OF THE LAST DISTURBANCE. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN AREA, SILT FENCES AND HAY BALE BARRIERS AND ANY EARTH/DIKES WILL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED.

INSTALLATION, MAINTENANCE AND INSPECTION PROCEDURES OF EROSION AND SEDIMENT CONTROLS

A. GENERAL – THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FOLLOWING:

INSPECTION

1. ALL CONTROL MEASURES WILL BE INSPECTED DAILY;
2. A MAINTENANCE INSPECTION REPORT WILL BE MADE WEEKLY; AND
3. THE CONTRACTOR'S SITE SUPERINTENDENT WILL BE RESPONSIBLE FOR INSPECTIONS, MAINTENANCE AND REPAIR ACTIVITIES AND FILLING OUT THE INSPECTION AND MAINTENANCE REPORT.

MAINTENANCE

1. STABILIZATION OF ALL SWALES, DITCHES IS REQUIRED PRIOR TO DIRECTING FLOW TO THEM.
2. ALL MEASURES WILL BE MAINTAINED IN GOOD WORKING ORDER; IF A REPAIR IS NECESSARY, IT WILL BE INITIATED WITHIN 24 HOURS OF REPORT.
3. BUILT UP SEDIMENT WILL BE REMOVED FROM SILT FENCE OR HAY BALE BARRIERS WHEN IT HAS REACHED ONE THIRD THE HEIGHT OF THE FENCE OR BALE.
4. ALL DIVERSION DIKES WILL BE INSPECTED AND ANY BREACHES PROMPTLY REPAIRED.
5. TEMPORARY SEEDING AND PLANTING WILL BE INSPECTED FOR BARE SPOTS, WASHOUTS, AND UNHEALTHY GROWTH.

B. SEDIMENTATION BARRIERS

1. PRODUCTS

   SEDIMENTATION BARRIERS SHALL BE AS SPECIFIED ON THESE DRAWINGS AND PROJECT SPECIFICATIONS.

2. INSTALLATION

   SEDIMENTATION BARRIERS SHALL BE INSTALLED PER MANUFACTURE'S SPECIFICATIONS AND RECOMMENDATIONS. SEDIMENTATION BARRIERS SHALL BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS AND IN ALL OTHER LOCATIONS REQUIRED TO PREVENT THE MIGRATION OF SEDIMENT FROM THE ACTIVE CONSTRUCTION SITE.

3. SEQUENCE OF INSTALLATION

   SEDIMENT BARRIERS SHALL BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF THE CONTRIBUTING DRAINAGE AREA ABOVE THEM.

4. MAINTENANCE

   SEDIMENTATION BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. THEY SHALL BE REPAIRED IF THERE ARE ANY SIGNS OF EROSION OR SEDIMENTATION BELOW THEM. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY. IF THERE ARE SIGNS OF UNDERCUTTING AT THE CENTER OR THE EDGES, OR IMPOUNDING OF LARGE VOLUMES OF WATER BEHIND THEM, SEDIMENT BARRIERS SHALL BE REPLACED WITH A TEMPORARY CHECK DAM.

   SHOULD THE FABRIC ON A SEDIMENTATION BARRIER DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER IS STILL NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.

   SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY 1/3 THE HEIGHT OF THE BARRIER.

   ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SEDIMENTATION BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.

C. MULCHING

1. TIMING

   IN ORDER FOR THE MULCH TO BE EFFECTIVE IT MUST BE IN PLACE PRIOR TO MAJOR STORM EVENTS. THERE ARE TWO TYPES OF STANDARDS WHICH SHALL BE USED:

   APPLY MULCH PRIOR TO ANY STORM EVENT

   THIS STANDARD IS APPLICABLE WHEN WORKING WITHIN 100 FEET OF WETLANDS. IT WILL BE NECESSARY TO CLOSELY MONITOR WEATHER PREDICTIONS, USUALLY BY CONTACTING THE NATIONAL WEATHER SERVICE TO HAVE ADEQUATE WARNING OF SIGNIFICANT STORMS.

   REQUIRED MULCHING WITHIN A SPECIFIED TIME PERIOD

   THE TIME PERIOD CAN RANGE FROM 14 TO 21 DAYS OF INACTIVITY ON AN AREA, THE LENGTH OF TIME VARYING WITH SITE CONDITIONS. PROFESSIONAL JUDGMENT SHALL BE USED TO EVALUATE THE INTERACTION OF SITE CONDITIONS (SOIL ERODIBILITY, SEASON OF YEAR, EXTENT OF DISTURBANCE, PROXIMITY TO SENSITIVE RESOURCES, ETC.) AND THE POTENTIAL IMPACT OF EROSION ON ADJACENT AREAS TO CHOOSE AN APPROPRIATE TIME RESTRICTION.

2. GUIDELINES FOR WINTER MULCH APPLICATION

   WHEN MULCH IS APPLIED TO PROVIDE PROTECTION OVER THE WINTER (PAST THE GROWING SEASON) IT SHALL BE AT A RATE OF 6,000 POUNDS OF HAY OR STRAW PER ACRE. A TACKIFIER MAY BE ADDED TO THE MULCH.

3. MAINTENANCE

   ALL MULCHES MUST BE INSPECTED PERIODICALLY, IN PARTICULAR AFTER RAIN STORMS, TO CHECK FOR RILL EROSION. IF LESS THAN 90% OF THE SOIL SURFACE IS COVERED BY MULCH, ADDITIONAL MULCH SHALL BE APPLIED.

A. VEGETATIVE PRACTICES

FOR PERMANENT MEASURES AND PLANTINGS FROM EARLY SPRING TO SEPTEMBER 30:

AFTER ROUGH GRADING OF THE SUBGRADE HAS BEEN COMPLETED AND APPROVED, THE SUBGRADE SURFACE SHALL BE SCARIFIED TO A DEPTH OF FOUR INCHES. THEN FURNISH AND INSTALL A LAYER OF LOAM PROVIDING A ROLLED FOUR INCH THICKNESS. ANY DEPRESSIONS WHICH MAY OCCUR DURING ROLLING SHALL BE FILLED WITH ADDITIONAL LOAM, REGRADED AND REROLLED UNTIL THE SURFACE IS TRUE TO THE FINISHED LINES AND GRADES. ALL LOAM NECESSARY TO COMPLETE THE WORK UNDER THIS SECTION SHALL BE SUPPLIED BY THE SITE SUBCONTRACTOR.

ALL LARGE STIFF CLODS, LUMPS, BRUSH, ROOTS, DEBRIS, GLASS, STUMPS, LITTER AND OTHER FOREIGN MATERIAL AS WELL AS STONES OVER ONE INCH IN DIAMETER SHALL BE REMOVE FROM THE LOAM AND DISPOSED OF OFF SITE, AND THE LOAM SHALL BE RAKED SMOOTH AND EVEN.

THE LOAM SHALL BE PREPARED TO RECEIVE SEED BY REMOVING STONES, FOREIGN OBJECTS AND GRADING TO ELIMINATE WATER POCKETS AND IRREGULARITIES PRIOR TO PLACING SEED. FINISH GRADING SHALL RESULT IN STRAIGHT UNIFORM GRADES AND SMOOTH, EVEN SURFACES WITHOUT IRREGULARITIES TO LOW POINTS.

SHAPE THE AREAS TO THE LINES AND GRADES REQUIRED. THE SITE SUBCONTRACTOR'S ATTENTION IS DIRECTED TO THE SCHEDULING OF LOAMING AND SEEDING OF GRADED AREAS TO PERMIT SUFFICIENT TIME FOR THE STABILIZATION OF THESE AREAS. IT SHALL BE THE SITE SUBCONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE AREAS DURING THE CONSTRUCTION PERIOD AND REGRADE, LOAM AND RESEED ANY DAMAGED AREAS.

ALL AREAS DISTURBED BY CONSTRUCTION WITHIN THE PROPERTY LINES AND NOT COVERED BY STRUCTURES, PAVEMENT, OR MULCH SHALL BE LOAMED AND SEEDED.

LIMESTONE SHALL BE THOROUGHLY INCORPORATED INTO THE LOAM LAYER AT A RATE OF 2 TONS PER ACRE IN ORDER TO PROVIDE A PH VALUE OF 5.5 TO 6.5.

IF REQUIRED, FERTILIZER SHALL BE SPREAD ON THE TOP LAYER OF LOAM AND WORKED INTO THE SURFACE. FERTILIZER APPLICATION RATE SHALL BE 500 POUNDS PER ACRE OF 10-20-20 FERTILIZER. USE OF FERTILIZER SHOULD BE AVOIDED IN INFILTRATION AREAS.

SOIL CONDITIONERS AND FERTILIZER SHALL BE APPLIED AT THE RECOMMENDED RATES AND SHALL BE THOROUGHLY WORKED INTO THE LOAM. LOAM SHALL BE RAKED UNTIL THE SURFACE IS FINELY PULVERIZED, SMOOTH AND EVEN, AND THEN COMPACTED TO AN EVEN SURFACE CONFORMING TO THE REQUIRED LINES AND GRADES WITH APPROVED ROLLERS WEIGHING BETWEEN 4 1/2 POUNDS AND 5 1/2 POUNDS PER INCH OF WIDTH.

SEED SHALL BE SOWN AT THE RATE SHOWN BELOW. SOWING SHALL BE DONE ON A CALM, DRY DAY, PREFERABLY BY MACHINE, BUT IF BY HAND, ONLY BY EXPERIENCED WORKMEN. IMMEDIATELY BEFORE SEEDING, THE SOIL SHALL BE LIGHTLY RAKED. ONE HALF THE SEED SHALL BE SOWN IN ONE DIRECTION AND THE OTHER HALF AT RIGHT ANGLES TO THE ORIGINAL DIRECTION. IT SHALL BE LIGHTLY RAKED INTO THE SOIL TO A DEPTH NOT OVER 1/4 INCH AND ROLLED WITH A HAND ROLLER WEIGHING NOT OVER 100 POUNDS PER LINEAR FOOT OF WIDTH.

HAY MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING AT A RATE OF 1.5 TO 2 TONS PER ACRE. MULCH THAT BLOWS OR WASHES AWAY SHALL BE REPLACED IMMEDIATELY AND ANCHORED USING APPROPRIATE TECHNIQUES FROM THE EROSION AND SEDIMENT CONTROL HANDBOOK.

THE SURFACE SHALL BE WATERED AND KEPT MOIST WITH A FINE SPRAY AS REQUIRED, WITHOUT WASHING AWAY THE SOIL, UNTIL THE GRASS IS WELL ESTABLISHED. ANY AREAS WHICH ARE NOT SATISFACTORILY COVERED WITH GRASS SHALL BE RESEEDED, AND ALL NOXIOUS WEEDS REMOVED.

THE SITE SUBCONTRACTOR SHALL PROTECT AND MAINTAIN THE SEEDED AREAS UNTIL ACCEPTED, INCLUDING CUTTING, AS SPECIFIED HEREIN AFTER UNDER MAINTENANCE AND PROTECTION.

UNLESS OTHERWISE APPROVED, SEEDING SHALL BE DONE DURING THE APPROXIMATE PERIODS OF EARLY SPRING TO SEPTEMBER 30, WHEN SOIL CONDITIONS AND WEATHER ARE SUITABLE FOR SUCH WORK. A GRASS SEED MIXTURE CONTAINING THE FOLLOWING SEED REQUIREMENTS SHALL BE:

	POUNDS/ACRE	MIN GERMINATION	MIN PURITY
GENERAL COVER			
CREEPING RED FESCUE	50	85%	96%
KENTUCKY BLUE GRASS	50	85%	97%
	100		
SLOPE SEED (USED ON SLOPES GREATER THAN OR EQUAL TO 3:1			
CREEPING RED FESCUE	20	85%	96%
TALL FESCUE	20	85%	97%
RED TOP	2	80%	95%
	42		

IN NO CASE SHALL THE WEED CONTENT EXCEED 1 PERCENT BY WEIGHT. ALL SEED SHALL COMPLY WITH STATE AND FEDERAL LAW.

FOR TEMPORARY PLANTINGS AFTER SEPTEMBER TO EARLY SPRING AND FOR TEMPORARY PROTECTION OF DISTURBED AREAS:

- FOLLOW ABOVE SLOPE, LOAM DEPTH AND GRADING REQUIREMENTS.
- FERTILIZER SHALL BE SPREAD AND WORKED INTO THE SURFACE AT A RATE OF 300 POUNDS PER ACRE.
- MULCHING AND SEEDING SHALL BE APPLIED AT THE FOLLOWING RATES:

WINTER RYE (FALL SEEDING)	2.5 LBS/1,000 SF
OATS (SPRING SEEDING)	2 LBS/1,000 SF
MULCH	1.5 TONS/ACRE

STABILIZED CONSTRUCTION ENTRANCE

A. SPECIFICATIONS

1. AGGREGATE SIZE: USE TWO (2) INCHES STONE OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT
2. AGGREGATE THICKNESS: NOT LESS THAN SIX (6) INCHES.
3. WIDTH: TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH OF THE POINTS WHERE INGRESS OR EGRESS OCCURS.
4. LENGTH: AS REQUIRED BUT NOT LESS THAN 50 FEET.

B. MAINTENANCE

THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH AGGREGATE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING STORM DRAINS, DITCHES, OR WATERWAYS.

WASTE DISPOSAL

A. WASTE MATERIALS

ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN A DUMPSTER. NO CONSTRUCTION WASTE MATERIALS WILL BE BURIED ON SITE. ALL PERSONNEL WILL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.

B. HAZARDOUS WASTE

ALL HAZARDOUS WASTE MATERIALS WILL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER. SITE PERSONNEL WILL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.

C. SANITARY WASTE

ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

ADDITIONAL NOTES FOR WINTER CONSTRUCTION

A. ALL PROPOSED POST-DEVELOPMENT LANDSCAPED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY NOVEMBER 15TH, OR WHICH ARE DISTURBED AFTER NOVEMBER 15TH, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 4:1 AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE PLACEMENT OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR FROZEN GROUND.

B. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY NOVEMBER 15TH, OR WHICH ARE DISTURBED AFTER NOVEMBER 15TH, SHALL BE STABILIZED WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.

C. AFTER NOVEMBER 15TH, ALL TRAVEL SURFACES SHALL BE PROTECTED WITH A MINIMUM OF 3-INCHES OF CRUSHED GRAVEL OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOWFALL AFTER EACH STORM EVENT

DUST CONTROL

THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST THROUGHOUT THE CONSTRUCTION PERIOD. DUST CONTROL METHODS SHALL INCLUDE, BUT NOT LIMITED TO SPRINKLING WATER ON EXPOSED AREAS, COVERING LOADED DUMP TRUCKS LEAVING THE SITE, AND TEMPORARY MULCHING. DUST CONTROL MEASURES SHALL BE UTILIZED SO AS TO PREVENT THE MIGRATION OF DUST FROM THE ACTIVE SITE TO ABUTTING AREAS.

Site:

NORTHERN BANK
TOWN COMMON

265-289 GREAT ROAD
LITTLETON, MASSACHUSETTS

Prepared for:

NORTHERN BANK AND TRUST COMPANY

275 MISHAWUM ROAD
WOBURN, MASSACHUSETTS

COMMONWEALTH OF MASSACHUSETTS
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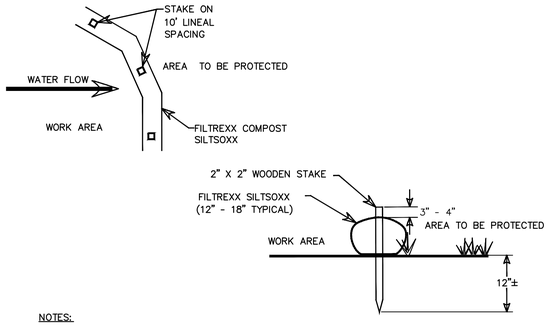
EROSION CONTROL NOTES

No.	Revision/Issue	Date

Design by: SPM	Checked by: SPM
Drawn by: SPM	Approved by: SPM
Project: 18017	Date: September 7, 2022

Sheet:

C-500

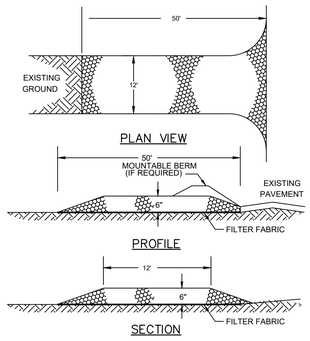


NOTES:

1. ALL MATERIAL TO MEET FILTREXX SPECIFICATIONS
2. SILTSOXX COMPOST/SOIL/ROCK/SEED FILL TO MEET APPLICATION REQUIREMENTS.
3. SILTSOXX SHALL BE INSTALLED PERPENDICULAR TO THE SLOPE AND PER MANUFACTURER'S RECOMMENDATIONS
4. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

SEDIMENTATION BARRIER

NOT TO SCALE



CONSTRUCTION SPECIFICATIONS

STONE SIZE - SEE GRADATION TABLE

LENGTH - 50 FOOT MINIMUM.

THICKNESS - SIX (6) INCHES (MINIMUM).

WIDTH - 12' MINIMUM

FILTER FABRIC - MIRAFI 600X OR APPROVED EQUAL.

INSTALLATION - THE AREA OF THE ENTRANCE SHOULD BE CLEARED OF ALL VEGETATION, ROOTS, AND OTHER OBJECTIONABLE MATERIAL. A ROAD STABILIZATION FILTER CLOTH CAN BE PLACED ON THE SUBGRADE PRIOR TO THE GRAVEL PLACEMENT TO PREVENT PUMPING. THE GRAVEL SHALL BE PLACED TO THE SPECIFIED DIMENSIONS.

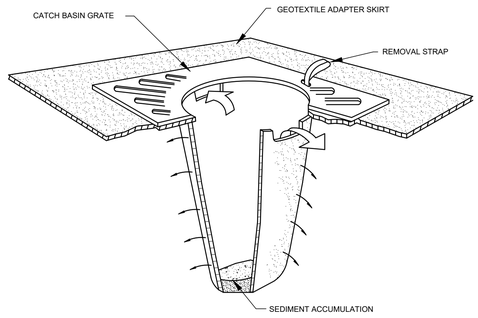
MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS WILL REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR ADDITIONAL LENGTH AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.

CRUSHED STONE GRADATION TABLE

SIEVE SIZE	% PASSING BY WEIGHT
2 inches	100
1 1/2 inches	90-100
1 inch	20-55
3/4 inch	0-15
3/8 inch	0-5

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE

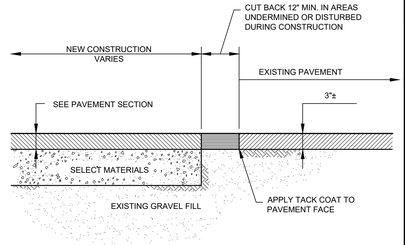


NOTES:

1. CATCH BASIN PROTECTION TO BE "SILTSACK" (BY ACF ENVIRONMENTAL) OR "STREAM GUARD" (BY FOSS ENVIRONMENTAL SERVICES) OR EQUAL.
2. INSERT TO BE EMPTIED AND PROPERLY DISPOSED OF WHEN IT IS 1/2 FULL OF SEDIMENT.
3. INSPECT INSERT AFTER ALL RAINFALL EVENTS, REPAIR AND MAINTAIN AS REQUIRED.
4. INSTALL INLET PROTECTION BARRIERS IN ALL EXISTING AND PROPOSED CATCH BASINS WITHIN AND IMMEDIATELY DOWN STREAM OF THE AREA OF WORK.

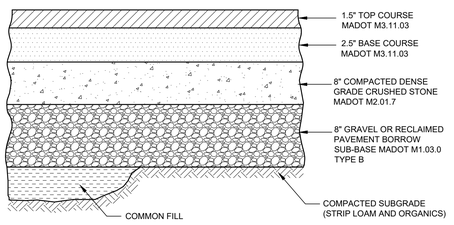
INLET PROTECTION BARRIER

NOT TO SCALE



PAVEMENT SAWCUT

NOT TO SCALE

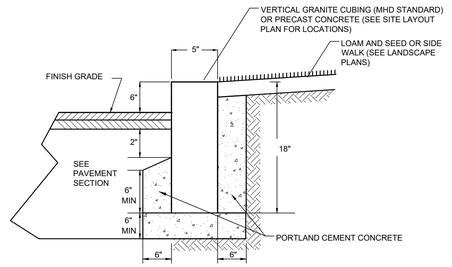


NOTE:

1. SEE SITE PLAN FOR PAVEMENT WIDTH AND LOCATION.
2. SEE GRADING PLAN FOR PAVEMENT SLOPE AND CROSS-SLOPE.
3. RECLAIMED ASPHALT PAVEMENT PAVEMENT MATERIAL MAY BE SUBSTITUTED FOR GRAVEL SUB-BASE. RECLAIMED BASE MATERIAL SHALL BE REMOVED TO FINISH SUBGRADE ELEVATION AND STOCKPILED. THE SUBGRADE SHALL BE INSPECTED AND ANY UNSUITABLE MATERIAL SHALL BE REMOVED AND REPLACED WITH SUBBASE MATERIAL PRIOR TO COMPACTION.
4. PAVEMENT FINISH GRADES IN EXISTING PARKING AREAS SHALL MATCH EXISTING GRADES UNLESS OTHERWISE SHOWN ON THE DRAWINGS.

PAVEMENT SECTION

NOT TO SCALE

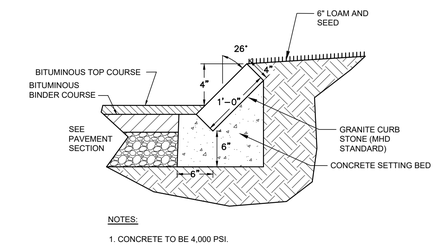


NOTES:

1. CONCRETE TO BE 4,000 PSI.
2. ALL RADII 50' AND SMALLER TO BE CONSTRUCTED USING CURVED SECTIONS.
3. GROUT ALL GAPS BETWEEN CURB STONES.

VERTICAL GRANITE CURB

NOT TO SCALE

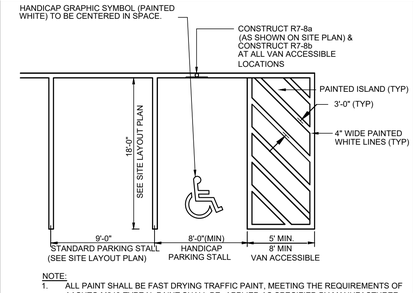


NOTES:

1. CONCRETE TO BE 4,000 PSI.
2. MORTAR ALL GAPS BETWEEN CURB STONES

SLOPED GRANITE CURB

NOT TO SCALE



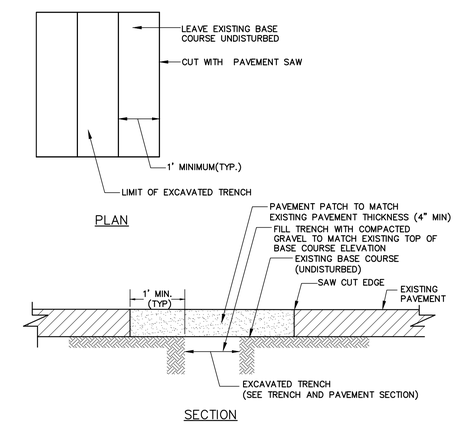
NOTE:

1. ALL PAINT SHALL BE FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE N. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOLS & PARKING STALLS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICAN WITH DISABILITIES ACT.

3.1. SEE SITE LAYOUT PLAN FOR LOCATION AND SIZES OF SPACES. ALL NON-HANDICAP SPACES SHALL BE 9'x18' UNLESS OTHERWISE NOTED.

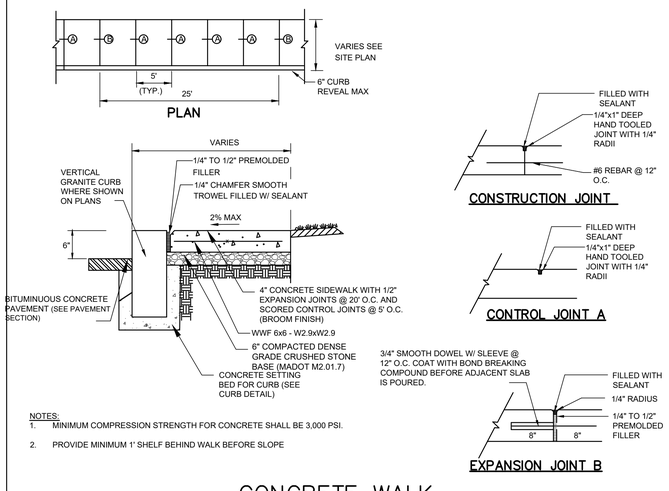
PARKING STALL STRIPING

NOT TO SCALE



TRENCH PATCH

NOT TO SCALE

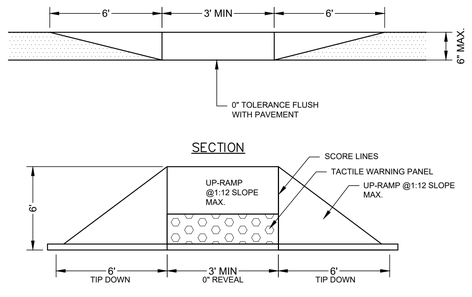


NOTES:

1. MINIMUM COMPRESSION STRENGTH FOR CONCRETE SHALL BE 3,000 PSI.
2. PROVIDE MINIMUM 1' SHELF BEHIND WALK BEFORE SLOPE

CONCRETE WALK

NOT TO SCALE

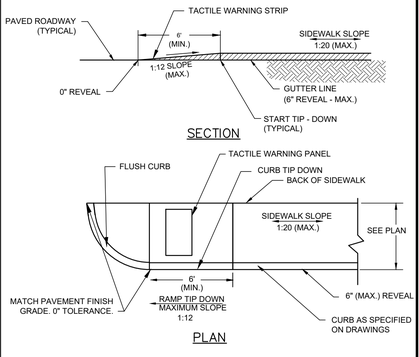


NOTES:

1. HANDICAP RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH AMERICANS WITH DISABILITIES ACT (ADA).
2. REFER TO SITE DRAWINGS FOR RAMP LOCATIONS AND WIDTHS.

HANDICAP RAMP

NOT TO SCALE



NOTES:

1. SEE SITE PLAN FOR TIP DOWN RAMP AND SIDEWALK WIDTHS AND LOCATIONS.
2. SEE GRADING, DRAINAGE, AND EROSION CONTROL PLANS FOR SIDEWALK SLOPES AND GRADES.

SIDEWALK END TIP DOWN RAMP

NOT TO SCALE

Site:

NORTHERN BANK TOWN COMMON

265-289 GREAT ROAD
LITTLETON, MASSACHUSETTS

Prepared for:

NORTHERN BANK AND TRUST COMPANY

275 MISHAWUM ROAD
WOBURN, MASSACHUSETTS

COMMONWEALTH OF MASSACHUSETTS
SEAN P. MALONE
CIVIL
No. 46204
REGISTERED PROFESSIONAL ENGINEER

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P.O. Box 1123
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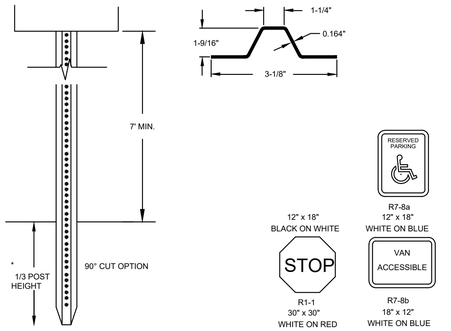
SITE DETAILS PLAN

No.	Revision/Issue	Date

Design by: SPM	Checked by: SPM
Drawn by: SPM	Approved by: SPM
Project: 18017	Date: September 7, 2022

Sheet: C-501



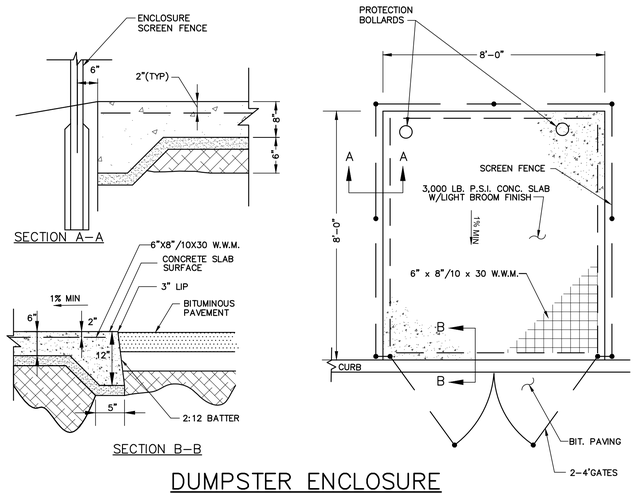
* IN LEDGE DRILL & GROUT TO A MIN OF 2'
* IN EARTH POSTS SHALL BE DRIVEN A MINIMUM OF 30" INTO UNDISTURBED SOIL.

NOTE:
ALL SIGNS TO BE INSTALLED AS INDICATED

LENGTH: AS REQUIRED
WEIGHT PER LINEAR FOOT: 2.50 LBS (MIN.)
HOLES: 3/8" DIAMETER, 1" C-C FULL LENGTH
STEEL: SHALL CONFORM TO ASTM A-499 (GRADE 60) OR ASTM A-576 (GRADE 1070 - 1080)
FINISH: SHALL BE PAINTED WITH TWO COATS OF AN APPROVED MEDIUM GREEN BAKED ON OR AIR DRIED, PAINT OF WEATHER RESISTANT QUALITY. ALL FABRICATION SHALL BE COMPLETE BEFORE PAINTING.

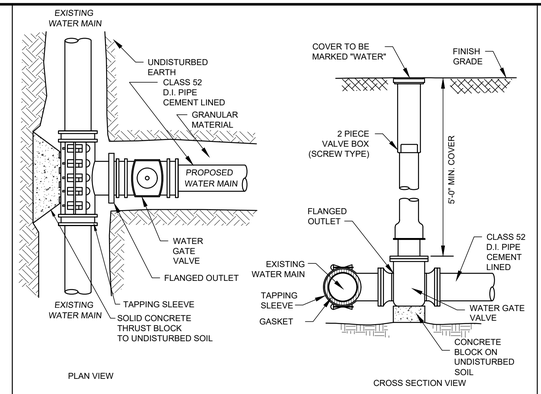
SIGN POST AND LEGEND

NOT TO SCALE



DUMPSTER ENCLOSURE

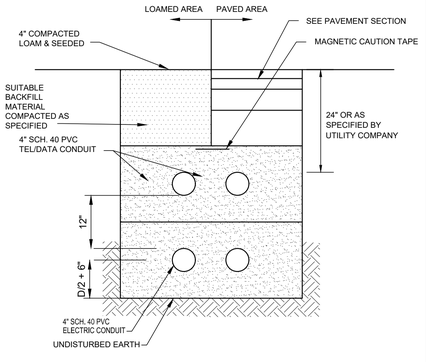
(NOT TO SCALE)



NOTES:
1. COORDINATE TAPPING SLEEVE AND VALVE AND INSTALLATION WITH THE TOWN OF LITTLETON WATER AND SEWER DEPARTMENT.
2. PROPOSED MATERIALS AND FITTINGS FOR WATER LINE CONSTRUCTION SHALL CONFORM TO THE LITTLETON WATER AND SEWER DEPARTMENT DESIGN AND INSTALLATION STANDARD SPECIFICATIONS UNLESS OTHERWISE APPROVED BY THE SUPERINTENDENT.

TAPPING SLEEVE AND VALVE

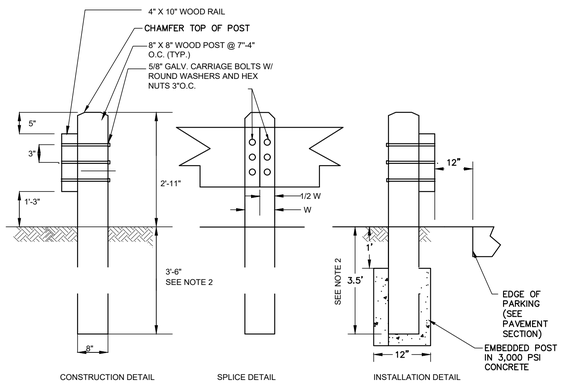
NOT TO SCALE



NOTE:
FINAL SIZE, LOCATION AND NUMBER OF CONDUITS SHALL BE DETERMINED BY THE SERVICE PROVIDER AND ELECTRICAL ENGINEER

TYPICAL ELECTRIC AND COMMUNICATIONS TRENCH

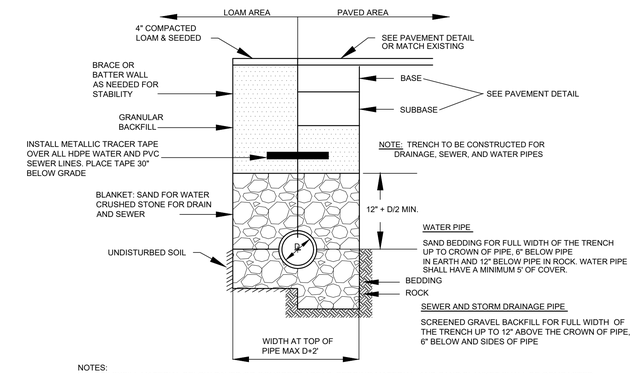
NOT TO SCALE



NOTES:
1. ALL TIMBERS SHALL BE PRESSURE TREATED.
2. WHERE GUARD RAIL IS CONSTRUCTED ADJACENT TO RETAINING WALL, POST DEPTHS SHALL BE MEASURED FROM FINISH GRADE ON THE LOW SIDE OF THE WALL.

TIMBER GUARD RAIL DETAIL

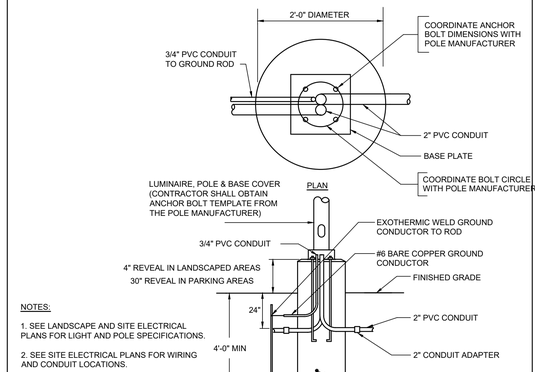
NOT TO SCALE



NOTES:
1. BACKFILL MATERIAL BELOW PAVED OR CONCRETE AREAS, BEDDING MATERIAL, AND SAND BLANKET SHALL BE COMPACTED TO NOT LESS THAN 95% OF AASHTO T 99, METHOD C. SUITABLE BACKFILL MATERIAL BELOW LOAM AREAS SHALL BE COMPACTED TO NOT LESS THAN 90% OF AASHTO T 99, METHOD C.
2. CONTRACTOR SHALL SUPPLY EXCAVATION, BEDDING AND BACKFILL FOR GAS LINE CONSTRUCTION. BEDDING AND BACKFILL MATERIAL SHALL CONFORM TO SERVICE PROVIDER STANDARDS.
3. ALL HDPE MATERIAL FOR DOMESTIC WATER SERVICE CONNECTIONS SHALL BE COLOR CODED OR LABELED FOR IN-GROUND IDENTIFICATION AS WATER PIPE. LABEL SHALL BE INSTALLED FACING UP FOR EASY VIEWING UPON EXCAVATION.

UTILITY TRENCH

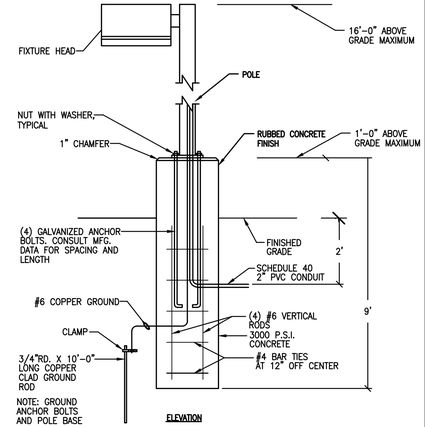
NOT TO SCALE



NOTES:
1. SEE LANDSCAPE AND SITE ELECTRICAL PLANS FOR LIGHT AND POLE SPECIFICATIONS.
2. SEE SITE ELECTRICAL PLANS FOR WIRING AND CONDUIT LOCATIONS.
3. SEE LANDSCAPE PLANS FOR POLE LOCATIONS.

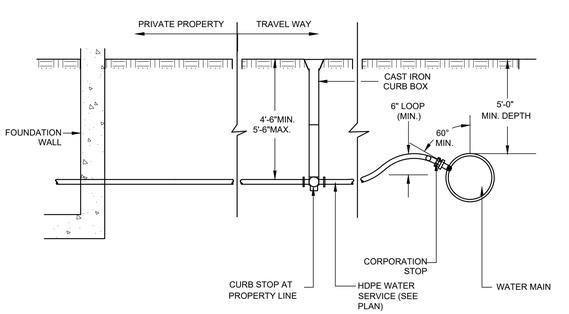
TYPICAL LIGHTPOLE BASE

NOT TO SCALE



TYPICAL SITE LIGHT

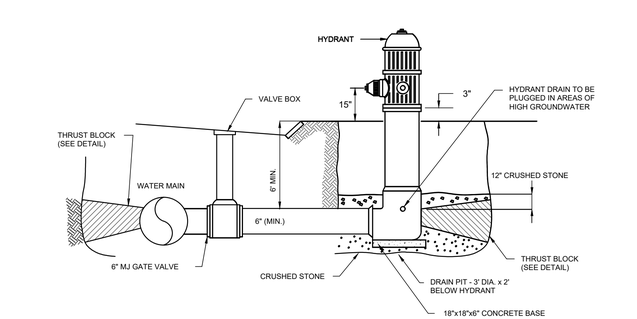
NOT TO SCALE



NOTES:
1. COORDINATE WATER SERVICE INSTALLATION WITH THE TOWN OF LITTLETON WATER DEPARTMENT.
2. PROPOSED MATERIALS AND FITTINGS FOR WATER LINE CONSTRUCTION SHALL CONFORM TO THE LITTLETON PUBLIC WORKS WATER AND SEWER DIVISION DESIGN AND INSTALLATION STANDARD SPECIFICATIONS UNLESS OTHERWISE APPROVED BY THE SUPERINTENDENT.

DOMESTIC SERVICE CONNECTION

NOT TO SCALE

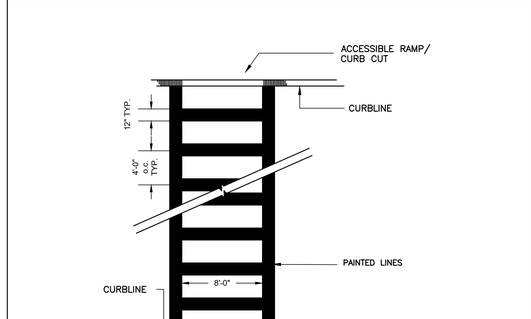


NOTES:

HYDRANT INSTALLATION AND OPERATION, MANUFACTURE AND MODEL, AND STANDARD DIMENSIONAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE TOWN OF LITTLETON WATER & SEWER DIVISION RULES AND PROCEDURES.

FIRE HYDRANT

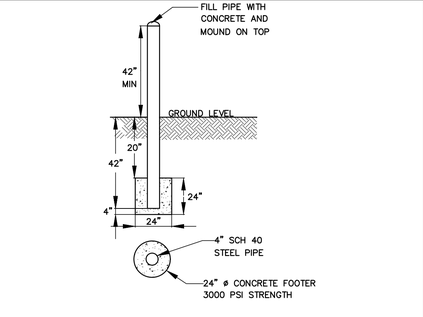
NOT TO SCALE



NOTES:
1.) THIS DETAIL IS A GENERAL CROSSWALK DETAIL. CONTRACTOR SHALL MATCH EXISTING CROSSWALKS ON SITE WITH SAME COLORS, LINE WIDTHS AND SIZES.
2.) ALL PAINT USED SHALL BE TRAFFIC PAINT.
3.) COORDINATE CROSSWALKS WITHIN RIGHT OF WAYS WITH THE TOWN OF LITTLETON STANDARDS.

CROSSWALK DETAIL

NOT TO SCALE



NOTES:
1. BOLLARDS SHALL BE PAINTED "SAFETY YELLOW"
2. ROUND ANY SHARP EDGES.
3. PROVIDE PIPE BOLLARDS TO PROTECT ABOVE-GROUND COMPONENTS AT THE LOCATIONS SHOWN ON THE DRAWINGS.

PROTECTION BOLLARD

NOT TO SCALE

Site:

NORTHERN BANK TOWN COMMON

265-289 GREAT ROAD
LITTLETON, MASSACHUSETTS

Prepared for:

NORTHERN BANK AND TRUST COMPANY

275 MISHAWUM ROAD
WOBURN, MASSACHUSETTS

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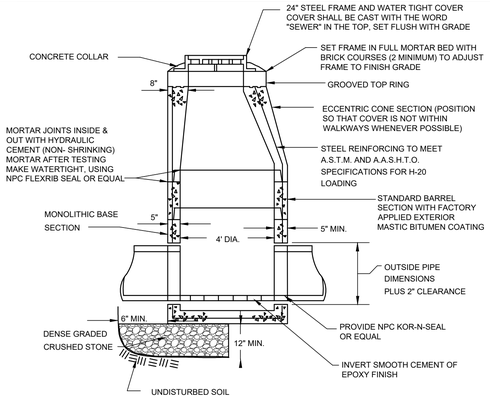
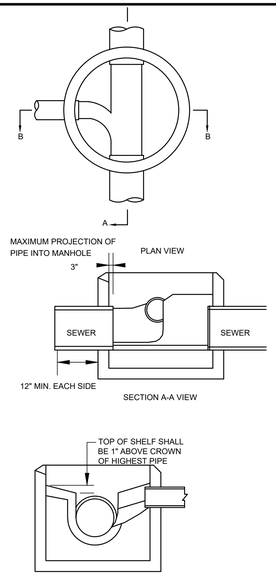
Sheet: C-502

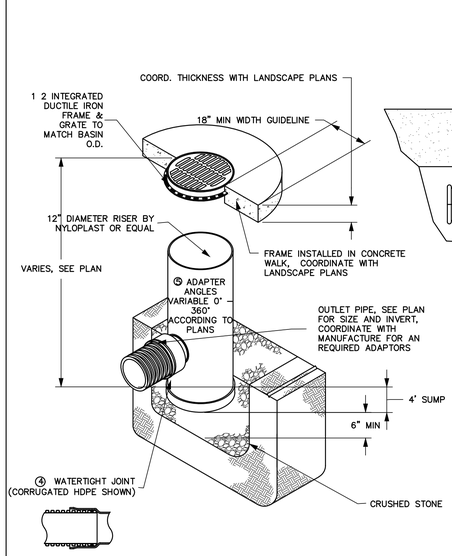


NOTES:
1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE.
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
3. THE TONGUE OR THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO .12 SQUARE INCHES PER LINEAR FOOT.
4. BITUMINOUS WATERPROOF COATING TO BE APPLIED TO ENTIRE EXTERIOR OF MANHOLE.
5. STRUCTURE SHALL BE DESIGNED FOR H20 LOADING.
6. INVERT AND SHELF TO BE PLACED AFTER LEAKAGE TEST
7. CARE SHALL BE TAKEN TO INSURE THAT THE INVERT IS A SMOOTH CONTINUATION OF THE SEWER INVERT. INVERTS AND SHELVES SHALL BE SMOOTH CONCRETE OF BRICK COATED IN EPOXY.
8. COORDINATE SEWER MANHOLE CONSTRUCTION WITH THE TOWN OF CONCORD SEWER DEPARTMENT STANDARDS.



PRECAST SEWER MANHOLE

NOT TO SCALE

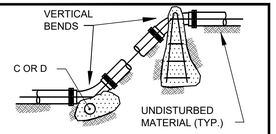


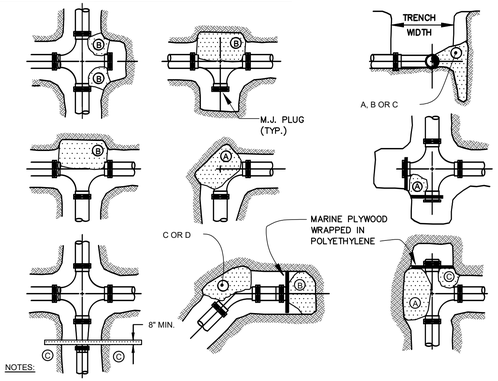
NOTES
1. GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS.
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-013.
6. THE BACKFILL MATERIAL SHALL BE CRUSHED STONE OR OTHER GRANULAR MATERIAL MEETING THE REQUIREMENTS OF CLASS II MATERIAL AS DEFINED IN ASTM D2321. BEDDING & BACKFILL FOR SURFACE DRAINAGE INLETS SHALL BE PLACED & COMPACTED UNIFORMLY IN ACCORDANCE WITH ASTM D2321.
7. PAINT THE TOP 18" OF THE INSIDE OF THE BASIN MATTE BLACK.

AREA DRAIN

NOT TO SCALE

TEST PRESSURE = 200psi	SQUARE FEET OF CONCRETE THRUST BLOCKING BEARING ON UNDISTURBED MATERIAL				
REACTION TYPE	PIPE SIZE 4"	6"	8"	10"	12"
A 90°	0.89	2.19	3.82	11.14	17.24
B 180°	0.65	1.55	2.78	8.38	12.00
C 45°	0.48	1.19	2.12	6.02	9.32
D 22-1/2°	0.25	0.60	1.06	3.08	4.74
E 11-1/4°	0.13	0.30	0.54	1.54	2.38

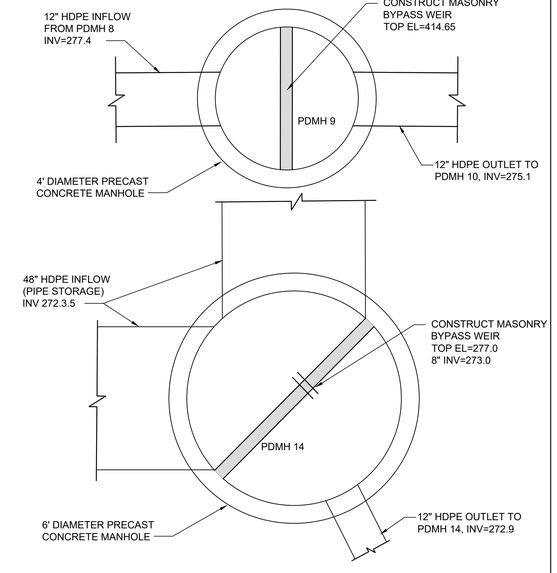




NOTES:
1. POUR THRUST BLOCKS AGAINST UNDISTURBED MATERIAL, WHERE TRENCH WALL HAS BEEN DISTURBED, EXCAVATE LOOSE MATERIAL AND EXTEND THRUST BLOCK TO UNDISTURBED MATERIAL. NO JOINTS SHALL BE COVERED WITH CONCRETE.
2. ON BENDS AND TEES, EXTEND THRUST BLOCKS FULL LENGTH OF FITTING.
3. PLACE BOARD IN FRONT OF ALL PLUGS BEFORE POURING THRUST BLOCKS.
4. WHERE M.J. PIPE IS USED, M.J. PLUG WITH RETAINER GLANDS MUST BE USED, GRIP RING, MEGA-LUG OR STAR GRIP

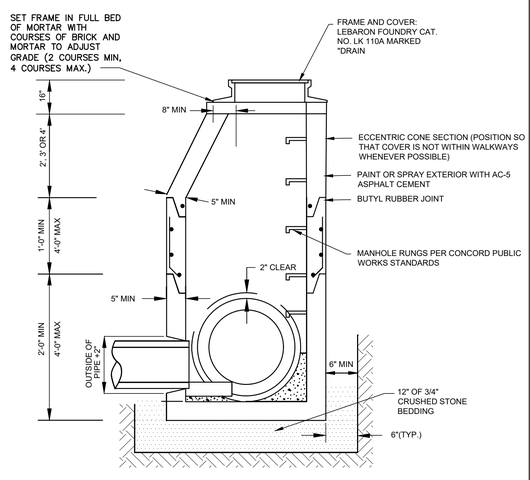
THRUST BLOCKS

NOT TO SCALE



SPECIAL MANHOLE DETAILS

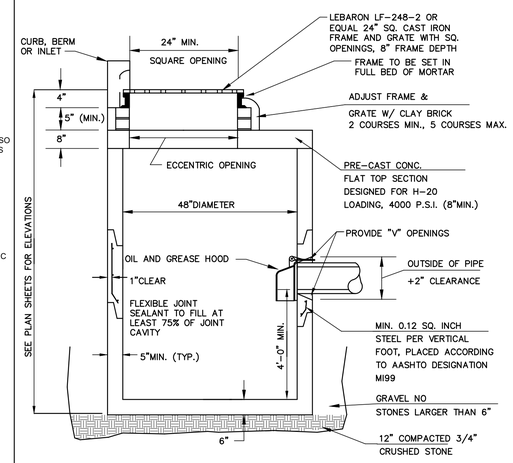
NOT TO SCALE



NOTES:
1. STRUCTURE SHALL BE DESIGNED FOR H20 LOADING.
2. CONTRACTOR ROTATE TOP SECTION AND FRAME AND COVER TO AVOID SURFACE FEATURES SUCH AT CURBS, SIDEWALKS OR OTHER LANDSCAPE TREATMENTS WHEREVER POSSIBLE.

DRAIN MANHOLE

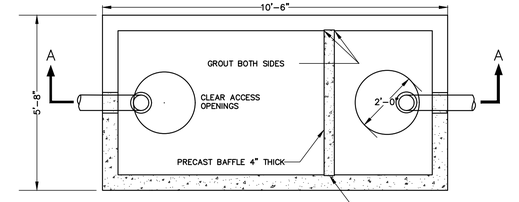
NOT TO SCALE



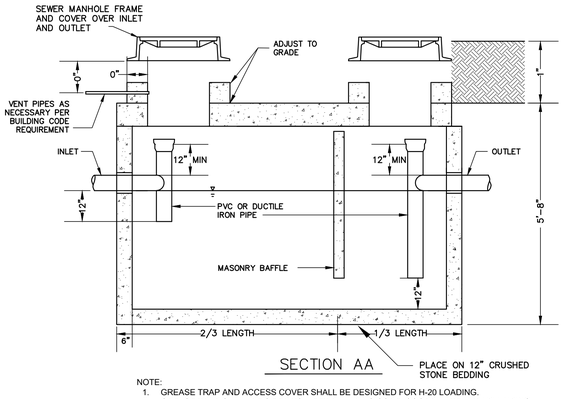
NOTES:
1. RISERS OF 1', 2', 3' & 4' CAN BE USED TO REACH DESIRED DEPTH.
2. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
3. CATCH BASIN FRAME AND GRATE SHALL PEDESTRIAN SAFE AND RATED FOR H20 LOADING.

CATCHBASIN

NOT TO SCALE



PLAN VIEW



SECTION AA

NOTE:
1. GREASE TRAP AND ACCESS COVER SHALL BE DESIGNED FOR H-20 LOADING.
2. GREASE TRAP SHALL BE SIZED TO MEET PLUMBING CODE, COORDINATE WITH PLUMBING ENGINEER. 1,500 GALLON GREASE TRAP SHOWN

GREASE TRAP

NOT TO SCALE

Site:

NORTHERN BANK TOWN COMMON

265-289 GREAT ROAD
LITTLETON, MASSACHUSETTS

Prepared for:

NORTHERN BANK AND TRUST COMPANY

275 MISHAWUM ROAD
WOBURN, MASSACHUSETTS

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SITE DETAILS PLAN

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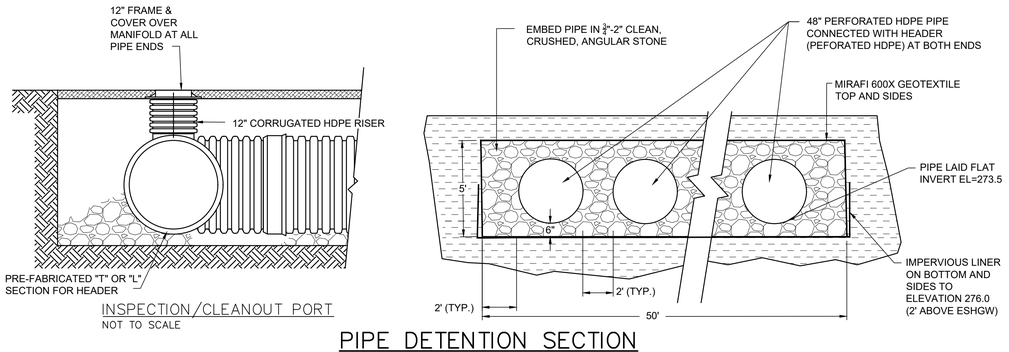
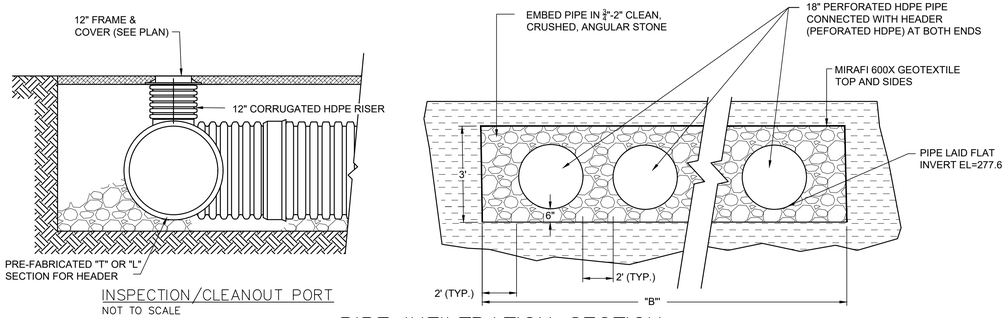


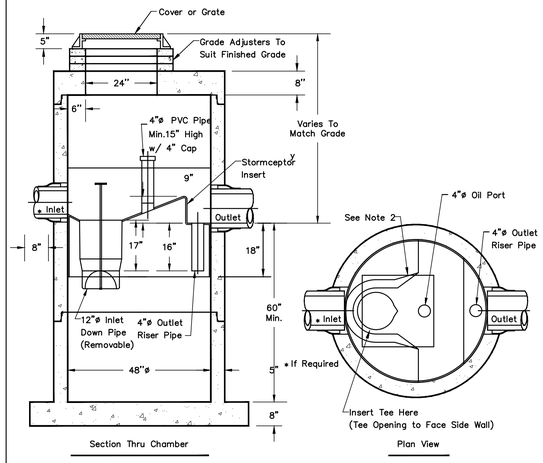
INSPECTION/CLEANOUT PORT
NOT TO SCALE

PIPE DETENTION SECTION
NOT TO SCALE



INSPECTION/CLEANOUT PORT
NOT TO SCALE

PIPE INFILTRATION SECTION
NOT TO SCALE



NOTES:
1. THE USE OF FLEXIBLE CONNECTION IS RECOMMENDED AT THE INLET AND OUTLET WHERE APPLICABLE.
2. THE COVER SHOULD BE POSITIONED OVER THE INLET DROP PIPE AND THE OIL PORT.
3. STORMWATER TREATMENT UNITS SHALL BE STORMCEPTOR OR EQUAL.

STORMWATER TREATMENT UNIT
NOT TO SCALE

Site:

NORTHERN BANK
TOWN COMMON

265-289 GREAT ROAD
LITTLETON, MASSACHUSETTS

Prepared for:

NORTHERN BANK AND
TRUST COMPANY

275 MISHAWUM ROAD
WOBURN, MASSACHUSETTS

COMMONWEALTH OF MASSACHUSETTS
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SITE DETAILS
PLAN

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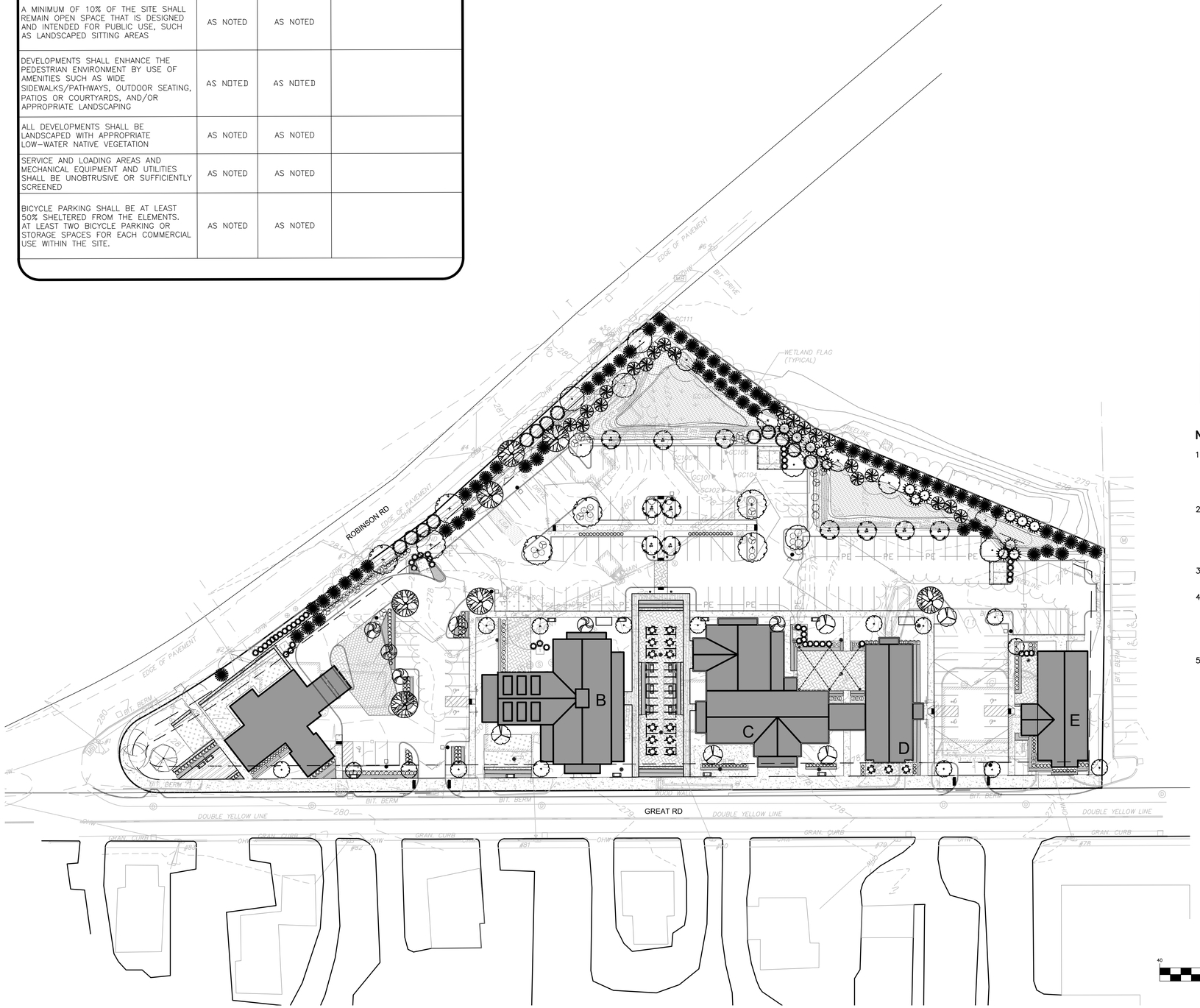
Sheet:

C-504

LITTLETON VILLAGE OVERLAY DISTRICT DESIGN STANDARDS

LANDSCAPING AND PUBLIC REALM	REQUIRED	PROVIDE	NOTES
A MINIMUM OF 10% OF THE SITE SHALL REMAIN OPEN SPACE THAT IS DESIGNED AND INTENDED FOR PUBLIC USE, SUCH AS LANDSCAPED SITTING AREAS	AS NOTED	AS NOTED	
DEVELOPMENTS SHALL ENHANCE THE PEDESTRIAN ENVIRONMENT BY USE OF AMENITIES SUCH AS WIDE SIDEWALKS/PATHWAYS, OUTDOOR SEATING, PATIOS OR COURTYARDS, AND/OR APPROPRIATE LANDSCAPING	AS NOTED	AS NOTED	
ALL DEVELOPMENTS SHALL BE LANDSCAPED WITH APPROPRIATE LOW-WATER NATIVE VEGETATION	AS NOTED	AS NOTED	
SERVICE AND LOADING AREAS AND MECHANICAL EQUIPMENT AND UTILITIES SHALL BE UNOBTRUSIVE OR SUFFICIENTLY SCREENED	AS NOTED	AS NOTED	
BICYCLE PARKING SHALL BE AT LEAST 50% SHELTERED FROM THE ELEMENTS. AT LEAST TWO BICYCLE PARKING OR STORAGE SPACES FOR EACH COMMERCIAL USE WITHIN THE SITE.	AS NOTED	AS NOTED	



DIG SAFE

BEFORE YOU DIG CALL 811 OR 1-888-DIG-SAFE 1-888-344-7233

LEGEND

- DECIDUOUS TREE
- EVERGREEN TREE
- FLOWERING TREE
- SHRUBS
- MULCH BED
- PERENNIALS/GROUNDCOVER
- WILDFLOWER SEED MIX
- EROSION CONTROL SEED MIX

NOTES:

1. EXISTING CONDITIONS SHOWN HEREON ARE TAKEN FROM A PLAN ENTITLED "EXISTING CONDITIONS, 25 ROBINSON ROAD, 265, 277, 287 & 289 GREAT ROAD", DATED JANUARY 8, 2019, PREPARED BY ALLEN & MAJOR ASSOCIATES, INC.
2. THE PURPOSE OF THIS DRAWING IS TO SHOW THE OVERALL LANDSCAPE FEATURES FOR A COMMERCIAL DEVELOPMENT. SEE SHEETS L-102 AND L-103 FOR DETAILED LANDSCAPE PLANS AND SHEETS L-501 AND L-502 FOR LANDSCAPE DETAILS.
3. THE CONTRACTOR SHALL CONTACT DIGSAFE AT 811 PRIOR TO ANY EXCAVATION ACTIVITIES.
4. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ANY STRUCTURAL RETAINING WALLS (WALLS WITH AN EXPOSED FACE OF GREATER THAN 4'). DESIGN SHALL BE BY A REGISTERED STRUCTURAL ENGINEER AND SHALL BE STAMPED ACCORDINGLY.
5. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ITS INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

MASSACHUSETTS
BETHANY C. DERMODY
No. 4071
REGISTERED LANDSCAPE ARCHITECT
9.7.22

REGISTERED LANDSCAPE ARCHITECT FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

APPLICANT\OWNER:

NBTC GREAT ROAD, LLC
275 MISHAWUM ROAD, 4TH FLOOR
WOBURN, MA 01801

PROJECT:

25 ROBINSON ROAD,
265, 277, 287 & 289
GREAT ROAD
LITTLETON, MA 01460

PROJECT NO.	2371-04	DATE:	09-07-2022
SCALE:	1" = 40'	DWG. NAME:	C-2371-04.dwg
DESIGNED BY:	BCD	CHECKED BY:	BDJ

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896

WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:

OVERALL
LANDSCAPE PLAN

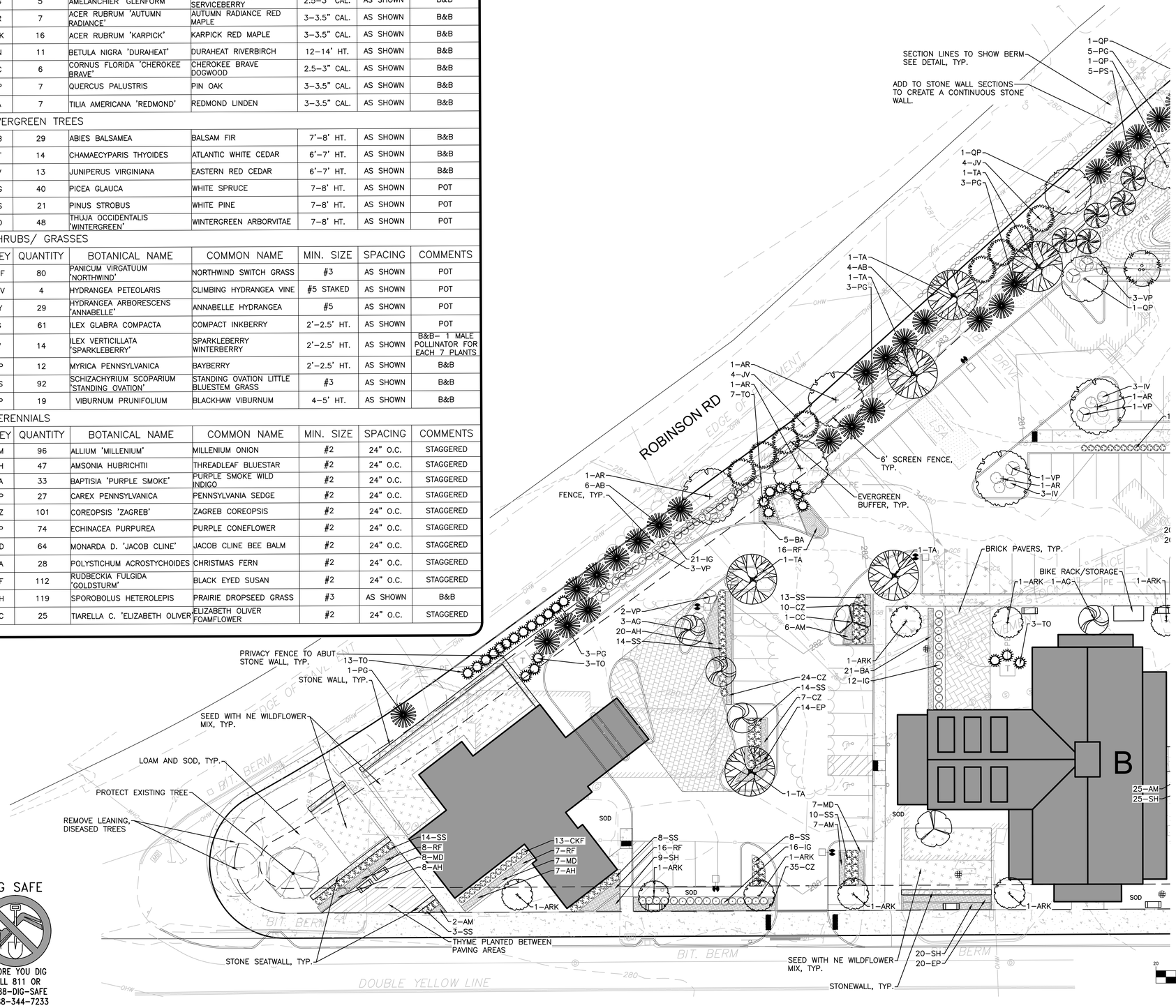
SHEET No.

L-101

R:\PROJECTS\2371-04\CIVIL\DRAWINGS\CURRENT\C-2371-04_LANDSCAPING.DWG

PLANTING PALETTE

KEY	QUANTITY	BOTANICAL NAME	COMMON NAME	MIN. SIZE	SPACING	COMMENTS
DECIDUOUS SHADE TREES						
AG	5	AMELANCHIER 'GLENFORM'	RAINBOW PILLAR SERVICEBERRY	2.5–3" CAL.	AS SHOWN	B&B
AR	7	ACER RUBRUM 'AUTUMN RADIANCE'	AUTUMN RADIANCE RED MAPLE	3–3.5" CAL.	AS SHOWN	B&B
ARK	16	ACER RUBRUM 'KARPICK'	KARPICK RED MAPLE	3–3.5" CAL.	AS SHOWN	B&B
BN	11	BETULA NIGRA 'DURAHEAT'	DURAHEAT RIVERBIRCH	12–14' HT.	AS SHOWN	B&B
CC	6	CORNUS FLORIDA 'CHEROKEE BRAVE'	CHEROKEE BRAVE DOGWOOD	2.5–3" CAL.	AS SHOWN	B&B
QP	7	QUERCUS PALUSTRIS	PIN OAK	3–3.5" CAL.	AS SHOWN	B&B
TA	7	TILIA AMERICANA 'REDMOND'	REDMOND LINDEN	3–3.5" CAL.	AS SHOWN	B&B
EVERGREEN TREES						
AB	29	ABIES BALSAMEA	BALSAM FIR	7'–8' HT.	AS SHOWN	B&B
CT	14	CHAMAECYPARIS THYOIDES	ATLANTIC WHITE CEDAR	6'–7' HT.	AS SHOWN	B&B
JV	13	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	6'–7' HT.	AS SHOWN	B&B
PG	40	PICEA GLAUCA	WHITE SPRUCE	7–8' HT.	AS SHOWN	POT
PS	21	PINUS STROBUS	WHITE PINE	7–8' HT.	AS SHOWN	POT
TO	48	THUJA OCCIDENTALIS 'WINTERGREEN'	WINTERGREEN ARBORVITAE	7–8' HT.	AS SHOWN	POT
SHRUBS/ GRASSES						
KEY	QUANTITY	BOTANICAL NAME	COMMON NAME	MIN. SIZE	SPACING	COMMENTS
CKF	80	PANICUM VIRGATUUM 'NORTHWIND'	NORTHWIND SWITCH GRASS	#3	AS SHOWN	POT
HPV	4	HYDRANGEA PETEOLARIS	CLIMBING HYDRANGEA VINE	#5 STAKED	AS SHOWN	POT
HY	29	HYDRANGEA ARBORESCENS 'ANNABELLE'	ANNABELLE HYDRANGEA	#5	AS SHOWN	POT
IG	61	ILEX GLABRA COMPACTA	COMPACT INKBERRY	2'–2.5' HT.	AS SHOWN	POT
IV	14	ILEX VERTICILLATA 'SPARKLEBERRY'	SPARKLEBERRY WINTERBERRY	2'–2.5' HT.	AS SHOWN	B&B– 1 MALE POLLINATOR FOR EACH 7 PLANTS
MP	12	MYRICA PENNSYLVANICA	BAYBERRY	2'–2.5' HT.	AS SHOWN	B&B
SS	92	SCHIZACHYRIUM SCOPARIUM 'STANDING OVATION'	STANDING OVATION LITTLE BLUESTEM GRASS	#3	AS SHOWN	B&B
VP	19	VIBURNUM PRUNIFOLIUM	BLACKHAW VIBURNUM	4–5' HT.	AS SHOWN	B&B
PERENNIALS						
KEY	QUANTITY	BOTANICAL NAME	COMMON NAME	MIN. SIZE	SPACING	COMMENTS
AM	96	ALLIUM 'MILLENIUM'	MILLENIUM ONION	#2	24" O.C.	STAGGERED
AH	47	AMSONIA HUBRICHTII	THREADLEAF BLUESTAR	#2	24" O.C.	STAGGERED
BA	33	BAPTISIA 'PURPLE SMOKE'	PURPLE SMOKE WILD INDIGO	#2	24" O.C.	STAGGERED
CP	27	CAREX PENNSYLVANICA	PENNSYLVANIA SEDGE	#2	24" O.C.	STAGGERED
CZ	101	COREOPSIS 'ZAGREB'	ZAGREB COREOPSIS	#2	24" O.C.	STAGGERED
EP	74	ECHINACEA PURPUREA	PURPLE CONEFLOWER	#2	24" O.C.	STAGGERED
MD	64	MONARDA D. 'JACOB CLINE'	JACOB CLINE BEE BALM	#2	24" O.C.	STAGGERED
PA	28	POLYSTICHUM ACROSTYCHOIDES	CHRISTMAS FERN	#2	24" O.C.	STAGGERED
RF	112	RUDBECKIA FULGIDA 'GOLDSTURM'	BLACK EYED SUSAN	#2	24" O.C.	STAGGERED
SH	119	SPOROBOLUS HETEROLEPIS	PRAIRIE DROPSEED GRASS	#3	AS SHOWN	B&B
TC	25	TIARELLA C. 'ELIZABETH OLIVER'	ELIZABETH OLIVER FOAMFLOWER	#2	24" O.C.	STAGGERED



LEGEND

- DECIDUOUS TREE
- EVERGREEN TREE
- FLOWERING TREE
- SHRUBS
- MULCH BED
- PERENNIALS/GROUNDCOVER
- WILDFLOWER SEED MIX
- EROSION CONTROL SEED MIX

NOTES:

1. EXISTING CONDITIONS SHOWN HEREON ARE TAKEN FROM A PLAN ENTITLED "EXISTING CONDITIONS, 25 ROBINSON ROAD, 265, 277, 287 & 289 GREAT ROAD", DATED JANUARY 8, 2019, PREPARED BY ALLEN & MAJOR ASSOCIATES, INC.
2. THE CONTRACTOR SHALL CONTACT DIGSAFE AT 811 PRIOR TO ANY EXCAVATION ACTIVITIES.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ANY STRUCTURAL RETAINING WALLS (WALLS WITH AN EXPOSED FACE OF GREATER THAN 4'). DESIGN SHALL BE BY A REGISTERED STRUCTURAL ENGINEER AND SHALL BE STAMPED ACCORDINGLY.
4. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ITS INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.

DIG SAFE

BEFORE YOU DIG CALL 811 OR 1–888–DIG–SAFE 1–888–344–7233

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

R:\PROJECTS\2371-04\CIVIL\DRAWINGS\CURRENT\C-2371-04_LANDSCAPING.DWG

MASSACHUSETTS REGISTERED LANDSCAPE ARCHITECT BETHANY C. DERMODY No. 4071 9.7.22

REGISTERED LANDSCAPE ARCHITECT FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

APPLICANT\OWNER:

NBTC GREAT ROAD, LLC
275 MISHAWUM ROAD, 4TH FLOOR
WOBURN, MA 01801

PROJECT:

25 ROBINSON ROAD,
265, 277, 287 & 289
GREAT ROAD
LITTLETON, MA 01460

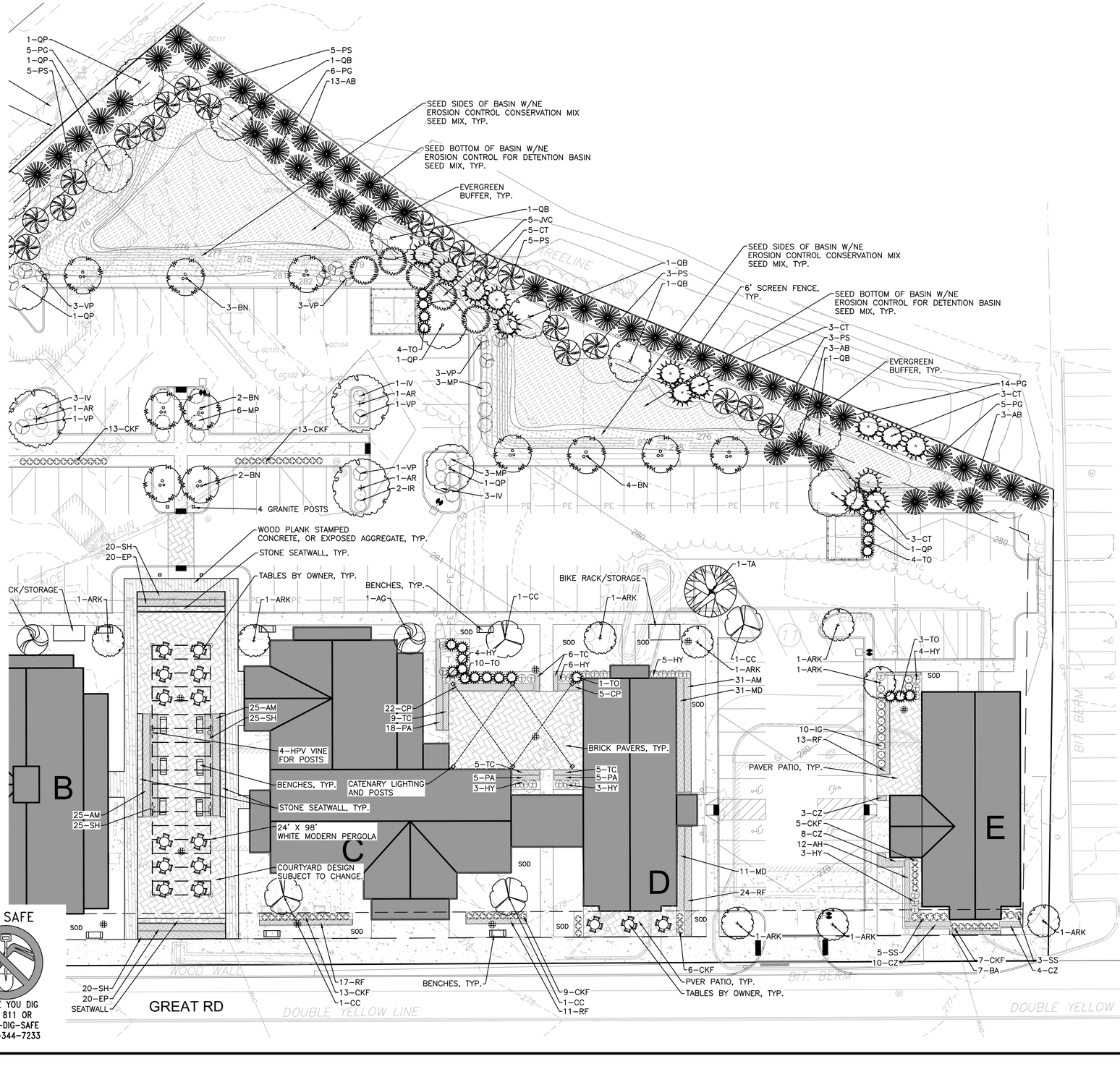
PROJECT NO.	2371-04	DATE:	09-07-2022
SCALE:	1" = 20'	DWG. NAME:	C-2371-04.dwg
DESIGNED BY:	BCD	CHECKED BY:	BDJ

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: LANDSCAPE PLAN

SHEET No. L-102



DIG SAFE

BEFORE YOU DIG CALL 811 OR 1–888–DIG–SAFE 1–888–344–7233

LEGEND

- DECIDUOUS TREE
- EVERGREEN TREE
- FLOWERING TREE
- SHRUBS
- MULCH BED
- PERENNIALS/GROUNDCOVER
- WILDFLOWER SEED MIX
- EROSION CONTROL SEED MIX

NOTES:

1. EXISTING CONDITIONS SHOWN HEREON ARE TAKEN FROM A PLAN ENTITLED "EXISTING CONDITIONS, 25 ROBINSON ROAD, 265, 277, 287 & 289 GREAT ROAD", DATED JANUARY 8, 2019, PREPARED BY ALLEN & MAJOR ASSOCIATES, INC.
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GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

MASSACHUSETTS
BETHANY C. DERMODY
No. 4071
REGISTERED LANDSCAPE ARCHITECT
9.7.22

REGISTERED LANDSCAPE ARCHITECT FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

APPLICANT\OWNER:

NBTC GREAT ROAD, LLC
275 MISHAWUM ROAD, 4TH FLOOR
WOBURN, MA 01801

PROJECT:

25 ROBINSON ROAD,
265, 277, 287 & 289
GREAT ROAD
LITTLETON, MA 01460

PROJECT NO.	2371-04	DATE:	09-07-2022
SCALE:	1" = 20'	DWG. NAME:	C-2371-04.dwg
DESIGNED BY:	BCD	CHECKED BY:	BDJ

PREPARED BY:

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civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
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WOBURN MA 01801
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FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:

LANDSCAPE PLAN

SHEET No.

L-103

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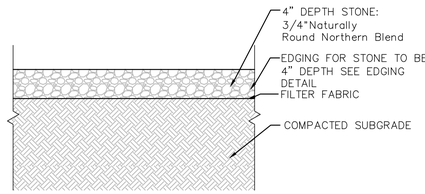
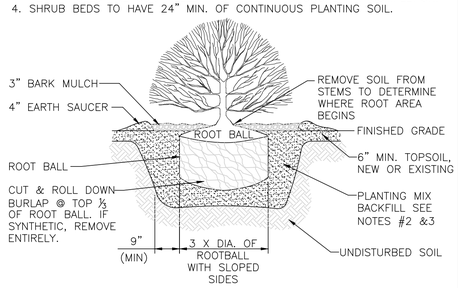
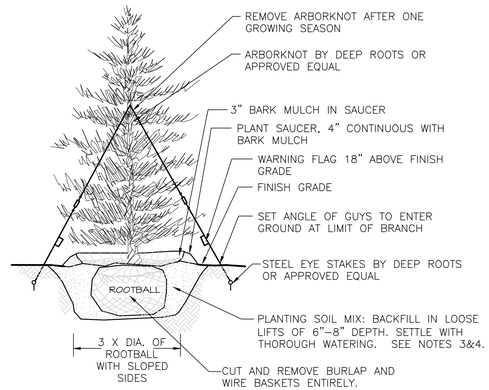


LANDSCAPE STONE AROUND BUILDING DETAIL (1)
NOT TO SCALE

NOTES:
1. ALL SHRUBS SHALL HAVE THE SAME RELATIONSHIP TO FINISH GRADE AFTER PLANTING AS THEY HAD AT THE ORIGINAL NURSERY SETTING. SET SHRUB 1"–2" ABOVE FINISH GRADE.
2. BACKFILL WITH PLANTING MIX. PLANT MIX TO BE: 50% NATIVE TOPSOIL, 20% COMPOST (LEAVES & ORGANIC MATERIAL, NO ASH) 20% PEAT MOSS, 10% SAND.
3. ADD MYCORRHIZA SOIL ADDITIVES AND SLOW RELEASE FERTILIZER WHEN PLANT HOLES ARE 50% FILLED AND WATER THOROUGHLY AT COMPLETION.
4. SHRUB BEDS TO HAVE 24" MIN. OF CONTINUOUS PLANTING SOIL.

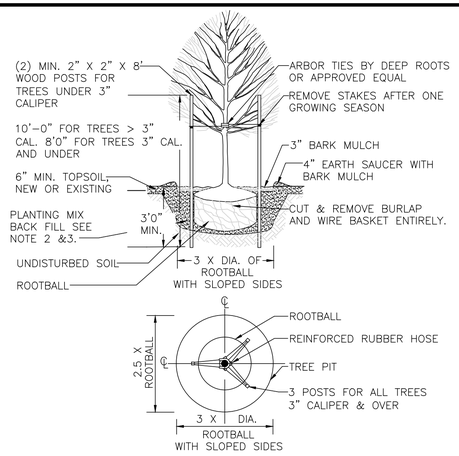


SHRUB PLANTING DETAIL (2)
NOT TO SCALE



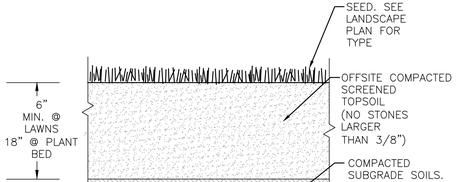
NOTES
1. TREES SHALL BEAR SAME RELATIONSHIP TO FINISH GRADE AS IT BORE TO NURSERY OR FIELD GRADE. ROOT FLARE SHALL BE 2" ABOVE FINISH GRADE. REMOVE SOIL FROM TRUNK FLARE OF TREE TO DETERMINE ACTUAL TOP OF ROOTBALL AREA.
2. INSTALL THREE GUYS PER TREE; EQUALLY SPACED AROUND BALL.
3. ATTACH GUYS AT 2/3 HEIGHT OF TREE.
4. BACKFILL WITH PLANTING MIX. PLANT MIX TO BE: 50% NATIVE TOPSOIL, 20% COMPOST (LEAVES & ORGANIC MATERIAL, NO ASH) 20% PEAT MOSS, 10% SAND.
5. ADD MYCORRHIZA SOIL ADDITIVES AND SLOW RELEASE FERTILIZER WHEN PLANT HOLES ARE 50% FILLED AND WATER THOROUGHLY AT COMPLETION.

EVERGREEN TREE DETAIL (3)
NOT TO SCALE



NOTES:
1. ALL TREES SHALL HAVE THE SAME RELATIONSHIP TO FINISH GRADE AFTER PLANTING AS THEY HAD AT THE ORIGINAL NURSERY SETTING. ROOT FLARE SHALL BE 2" ABOVE FINISH GRADE. REMOVE SOIL FROM TRUNK FLARE OF TREE TO DETERMINE ACTUAL ROOTBALL AREA.
2. BACKFILL WITH PLANTING MIX. PLANT MIX TO BE: 50% NATIVE TOPSOIL, 20% COMPOST (LEAVES & ORGANIC MATERIAL, NO ASH) 20% PEAT MOSS, 10% SAND.
3. ADD MYCORRHIZA SOIL ADDITIVES AND SLOW RELEASE FERTILIZER WHEN PLANT HOLES ARE 50% FILLED AND WATER THOROUGHLY AT COMPLETION.

DECIDUOUS TREE DETAIL (4)
NOT TO SCALE

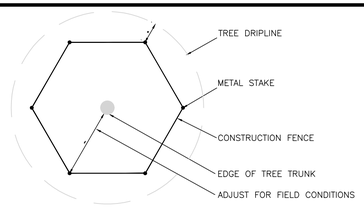


TEXTURE CLASS	% OF TOTAL WEIGHT
SAND	45% – 65%
SILT	15% – 35%
CLAY	5% – 20%

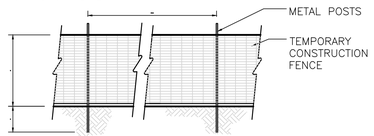
SIEVE	% PASSING
3/8"	100
NO. 4	85–100
NO. 40	60–85
NO. 100	38–60
NO. 200	10–35
20 um	LESS THAN 5%

NOTES:
1. TOP OF LOAM (TOPSOIL) IS FINISH GRADE.
2. ALL TOPSOIL (BOTH ONSITE AND OFFSITE SOURCES) SHALL BE COMPOSED OF A NATURAL, FERTILE, FRIABLE SOIL TYPICAL OF CULTIVATED TOPSOILS OF THE LOCALITY. OFFSITE SOIL SHALL BE SUITABLE FOR THE GERMINATION OF SEEDS AND SUPPORT OF VEGETATIVE GROWTH, WITH ADDITIVES, IF REQUIRED, TO ACHIEVE PARTICLE DISTRIBUTION AND ORGANIC CONTENT BELOW. TOPSOIL SHALL BE TAKEN FROM A WELL–DRAINED, ARIABLE SITE, FREE OF SUBSOIL, LARGE STONES, EARTH CLODS, STICKS, STUMPS, CLAY LUMPS, ROOTS, OTHER OBJECTIONABLE, EXTRANEOUS MATTER OR DEBRIS NOR CONTAIN TOXIC SUBSTANCES.
3. THE CONTRACTOR SHALL PROVIDE THE OWNER / LANDSCAPE ARCHITECT WITH TOPSOIL TEST RESULTS (RECOMMEND UMASS AMHERST SOIL TESTING LAB) FOR APPROVAL PRIOR TO OBTAINING AND PLACING THE SOIL. IF ANY TOPSOIL IS PURCHASED OR PLACED PRIOR TO APPROVAL BY OWNER / LANDSCAPE ARCHITECT, IT IS AT CONTRACTORS RISK, AND IT CAN BE REMOVED AT NO ADDITIONAL COST TO THE OWNER. IF THE PLANTING SOIL (BOTH ONSITE AND OFFSITE SOURCES) DOES NOT FALL WITHIN THE REQUIRED SIEVE ANALYSIS, TEXTURAL CLASS, ORGANIC CONTENT, OR PH RANGE, IT SHALL BE ADJUSTED TO MEET THE SPECIFICATIONS THROUGH THE ADDITION OF SAND, COMPOST, LIMESTONE, OR ALUMINUM SULFATE TO BRING IT WITHIN THE SPECIFIED LIMITS AT NO ADDITIONAL COST TO THE OWNER.
4. TOPSOIL SHALL HAVE A PH VALUE BETWEEN 5.5 AND 6.5. TOPSOIL SHALL CONTAIN 8% ORGANIC MATTER OF TOTAL DRY WEIGHT AND SHALL CONFORM TO THE FOLLOWING GRADATION AND TEXTURE CLASS ABOVE.

TOPSOIL FOR LAWN, TREES, SHRUBS, & PERENNIALS (5)
NOT TO SCALE



NOTE:
1. CONSTRUCTION FENCE TO BE "VISUAL BARRIER FENCE" AS MANUFACTURED BY EXXON CHEMICAL COMPANY ATLANTA, GA; "KONTROL SAFETY FENCE" AS MANUFACTURED BY MIRAFI, CHARLOTTE, N.C. OR APPROVED EQUAL.
2. IF GROUPS OF TREES ARE TO BE PROTECTED, EXTEND FENCE AROUND PERIMETER TO CONFORM TO MINIMUM DIMENSIONS FOR TREE TRUNKS AND DRIPLINE.



TEMP. CONST. FENCE / TREE PROTECTION (6)
NOT TO SCALE

MASSACHUSETTS
BETHANY C. DERMODY
REGISTERED LANDSCAPE ARCHITECT
No. 4071
9.7.22
REGISTERED LANDSCAPE ARCHITECT FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

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NBTC GREAT ROAD, LLC
275 MISHAWUM ROAD, 4TH FLOOR
WOBURN, MA 01801

PROJECT:
25 ROBINSON ROAD,
265, 277, 287 & 289
GREAT ROAD
LITTLETON, MA 01460

PROJECT NO.	2371-04	DATE:	09-07-2022
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PREPARED BY:
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WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
LANDSCAPE DETAILS

SHEET No.
L-501

ADDITIONAL SEED MIX SPECIFICATIONS FOR DETENTION BASINS, AND ALL SLOPE AREAS: (AS NOTED ON THE PLAN)

SEED MIXES:

NEW ENGLAND WETLAND PLANTS
820 WEST STREET, AMHERST, MA 01002
PHONE: 413-548-8000 FAX 413-549-4000
EMAIL: INFO@NEWP.COM WEB ADDRESS: WWW.NEWP.COM
NEW ENGLAND CONSERVATION/WILDLIFE MIX

BOTANICAL NAME	COMMON NAME	WETLAND INDICATOR
ELYMUS VIRGINICUS	VIRGINIA WILD RYE	FACW
SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	FACU
ANDROPOGON GERARDII	BIG BLUESTEM	FAC
FESTUCA RUBRA	RED FESCUE	FACU
SORGHASTRUM NUTANS	INDIAN GRASS	UPL
PANICUM VIRGATUM	SWITCH GRASS	FAC
CHAMAECRISTA FASCICULATA	PARTRIDGE PEA	FACU
DESMODIUM PANICULATUM	PANICLEDLEAF TICK TREFOIL	
VERBENA HASTATA	BLUE VERVAIN	FACW
ASCLEPIAS TUBEROSA	BUTTERFLY MILKWEED	NI
RUDBECKIA HIRTA	BLACK EYED SUSAN	FACU
HELENIUM AUTUMNALE	COMMON SNEEZEWEED	FACW+
ASTER PILOSUS (SYMPHYOTRICHUM PILOSUM)	HEATH ASTER	UPL
SOLIDAGO JUNCEA	EARLY GOLDENROD	FACU
AGROSTIS PERENNANS	UPLAND BENTGRASS	FACU

THE NEW ENGLAND CONSERVATION/WILDLIFE MIX PROVIDES A PERMANENT COVER OF GRASSES, WILDFLOWERS, AND LEGUMES FOR BOTH GOOD EROSION CONTROL AND WILDLIFE HABITAT VALUE. THE MIX IS DESIGNED TO BE A NO MAINTENANCE SEEDING, AND IS APPROPRIATE FOR CUT AND FILL SLOPES, DETENTION BASIN SIDE SLOPES, AND DISTURBED AREAS ADJACENT TO COMMERCIAL AND RESIDENTIAL PROJECTS.

PRICE PER LB $36.50 MIN. QUANITY 2 LBS. TOTAL: $73.00
APPLY: 25 LBS/ACRE :1750 SQ FT/LB
EROSION CONTROL BLANKET FOR SLOPES SEE LANDSCAPE NOTES

SEED MIXES:

NEW ENGLAND WETLAND PLANTS
820 WEST STREET, AMHERST, MA 01002
PHONE: 413-548-8000 FAX 413-549-4000
EMAIL: INFO@NEWP.COM WEB ADDRESS: WWW.NEWP.COM

NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS AND MOIST SITES

BOTANICAL NAME	COMMON NAME	INDICATOR
ELYMUS RIPARIUS	RIVERBANK WILD RYE	FACW
FESTUCA RUBRA	RED FESCUE	FACU
SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	FACU
PANICUM VIRGATUM	SWITCH GRASS	FAC
ANDROPOGON GERARDII	BIG BLUESTEM	FAC
VERBENA HASTATA	BLUE VERVAIN	FACW
AGROSTIS PERENNANS	UPLAND BENTGRASS	FACU
BIDENS CERNUA	NODDING BUR MARIGOLD	OBL
EUPATORIUM FISTULOSUM	HOLLOW-STEM JOE PYE WEED	FACW
EUPATORIUM PERFOLIATUM	BONESET	FACW
ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	FACW
SCIRPUS CYPERINUS	WOOL GRASS	FACW
JUNCUS EFFUSUS	SOFT RUSH	FACW+

THE NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS AND MOIST SITES CONTAINS A SELECTION OF NATIVE GRASSES AND WILDFLOWERS DESIGNED TO COLONIZE GENERALLY MOIST, RECENTLY DISTURBED SITES WHERE QUICK GROWTH OF VEGETATION IS DESIRED TO STABILIZE THE SOIL SURFACE. IT IS AN APPROPRIATE SEED MIX FOR ECOLOGICALLY SENSITIVE RESTORATIONS THAT REQUIRE STABILIZATION AS WELL AS LONG-TERM ESTABLISHMENT OF NATIVE VEGETATION. THIS MIX IS PARTICULARLY APPROPRIATE FOR DETENTION BASINS THAT DO NOT HOLD STANDING WATER. MANY OF THE PLANTS IN THIS MIX CAN TOLERATE INFREQUENT INUNDATION, BUT NOT CONSTANT FLOODING. THE MIX MAY BE APPLIED BY HAND, BY MECHANICAL SPREADER, OR BY HYDROSEEDER. AFTER SOWING, LIGHTLY RAKE, ROLL OR CULTIPACK TO INSURE GOOD SEED-TO-SOIL CONTACT. BEST RESULTS ARE OBTAINED WITH A SPRING OR LATE SUMMER SEEDING. LATE FALL AND WINTER DORMANT SEEDING REQUIRES AN INCREASE IN THE APPLICATION RATE. A LIGHT MULCHING OF CLEAN, WEED-FREE STRAW IS RECOMMENDED
PRICE PER LB $34.00 MIN. QUANITY 3 LBS. TOTAL: $102.00 APPLY: 35 LBS/ACRE :1250 SQ FT/LB

EROSION CONTROL BLANKET FOR SLOPES SEE LANDSCAPE NOTES

SEED MIXES:

NEW ENGLAND WETLAND PLANTS
820 WEST STREET, AMHERST, MA 01002
PHONE: 413-548-8000 FAX 413-549-4000
EMAIL: INFO@NEWP.COM WEB ADDRESS: WWW.NEWP.COM
SHOWY NEW ENGLAND WILDFLOWER MIX

SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	FACU
CHAMAECRISTA FASCICULATA	PARTRIDGE PEA	FACU
SORGHASTRUM NUTANS	INDIAN GRASS	UPL
FESTUCA RUBRA	RED FESCUE	FACU
ELYMUS CANADENSIS	CANADA WILD RYE	FACU+
ELYMUS RIPARIUS	RIVERBANK WILD RYE	FACW
HELIOPSIS HELIANTHOIDES	OX EYE SUNFLOWER	UPL
COREOPSIS LANCEOLATA	LANCE LEAVED COREOPSIS	FACU
RUDBECKIA HIRTA	BLACK EYED SUSAN	FACU
LIATRIS SPICATA SPIKED GAYFEATHER/MARSH BLAZING STAR		FAC+
ASCLEPIAS SYRIACA	COMMON MILKWEED	FACU
VERNONIA NOVEBORACENSIS	NEW YORK IRONWEED	FACW+
ASTER NOVAE-ANGLIAE (SYMPHYOTRICHUM NOVAE-ANGLIA	NEW ENGLAND ASTER	FACW
EUPATORIUM PURPUREUM (EUTROCHIUM MACULATUM)	PURPLE JOE PYE WEED	FAC
ASCLEPIAS TUBEROSA	BUTTERFLY MILKWEED	NI
SOLIDAGO JUNCEA	EARLY GOLDENROD	
EUPATORIUM PERFOLIATUM	BONESET	FACW

THE NEW ENGLAND SHOWY WILDFLOWER MIX INCLUDES A SELECTION OF NATIVE WILDFLOWERS AND GRASSES THAT WILL MATURE INTO A COLORFUL AND VIBRANT NATIVE MEADOW. IT IS APPROPRIATE SEED MIX FOR ROADSIDES, COMMERCIAL LANDSCAPING, PARKS, GOLF COURSES, AND INDUSTRIAL SITES. ALWAYS APPLY ON CLEAN BARE SOIL. THE MIX MAY BE APPLIED BY MECHANICAL SPREADER, OR ON SMALL SITES IT CAN BE SPREAD BY HAND. LIGHTLY RAKE, OR ROLL TO ENSURE PROPER SEED TO SOIL CONTACT. BEST RESULTS ARE OBTAINED WITH A SPRING OR LATE FALL DORMANT SEEDING. LATE SPRING AND EARLY SUMMER SEEDING WILL BENEFIT WITH A LIGHT MULCHING OF WEED-FREE STRAW TO CONSERVE MOISTURE. IF CONDITIONS ARE DRIER THAN USUAL, WATERING MAY BE REQUIRED. LATE FALL AND WINTER DORMANT SEEDING REQUIRE AN INCREASE IN THE SEEDING RATE. FERTILIZATION IS NOT REQUIRED UNLESS THE SOILS ARE PARTICULARLY INFERTILE. PREPARATION OF A CLEAN WEED FREE SEED BED IS NECESSARY FOR OPTIMAL RESULTS.
PRICE PER LB. $86.00 MIN. QUANITY 1 LBS. TOTAL: $86.00 APPLY: 23 LBS/ACRE :1900 SQ FT/LB

LANDSCAPE NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY OF LITTLETON, MA.
2. PLANTING PLAN IS DIAGRAMMATIC IN NATURE. FINAL PLACEMENT OF PLANTS TO BE APPROVED BY THE LANDSCAPE ARCHITECT IN THE FIELD.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY COMPANIES, ANY PERMITTING AGENCIES, AND "DIG-SAFE" (1-888-344-7233) AT LEAST 72 HOURS IN ADVANCE OF ANY WORK THAT WILL REQUIRE EXCAVATION. CONTRACTOR SHALL NOTIFY THE OWNERS REPRESENTATIVE OF NAY CONFLICTS IN WRITING.
4. NO PLANT MATERIAL SHALL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA, ANY TREES NOTED AS "SEAL OR SELECTED SPECIMEN" SHALL BE TAGGED AND SEALED BY THE LANDSCAPE ARCHITECT.
5. ALL TREES SHALL BE BALLED AND BURLAPPED (B&B) UNLESS OTHERWISE NOTED OR APPROVED BY THE OWNER'S REPRESENTATIVE AND LANDSCAPE ARCHITECT.
6. CONTRACTOR SHALL VERIFY QUANTITIES SHOWN ON PLANT LIST. QUANTITIES SHOWN ON PLANS SHALL GOVERN OVER PLANT LIST.
7. ANY PROPOSED PLANT SUBSTITUTIONS MUST BE APPROVED IN WRITING BY OWNER'S REPRESENTATIVE AND LANDSCAPE ARCHITECT.
8. ALL PLANT MATERIALS INSTALLED SHALL MEET THE GUIDELINES ESTABLISHED BY THE STANDARDS FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
9. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF ACCEPTANCE. ANY PLANT MATERIALS WHICH DIE WITHIN THE ONE YEAR PLANT GUARANTEE PERIOD WILL BE REPLACED BY THE LANDSCAPE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNERS. OWNERS TO COORDINATE DIRECTLY WITH THE LANDSCAPE CONTRACTOR FOR REPLACEMENT PLANTINGS.
10. ALL DISTURBED AREAS NOT OTHERWISE NOTED SHALL RECEIVE 6" OF SUITABLE LOAM & SEED.
11. LAWNS OR SEED MIX WITH 3:1 OR STEEPER (GREATER) SLOPES SHALL BE PROTECTED WITH JUTE EROSION CONTROL NETTING.
12. ANY FALL TRANSPLANTING HAZARD PLANTS SHALL BE DUG IN THE SPRING AND STORED FOR FALL PLANTING.
12. TREES SHALL HAVE A MINIMUM CALIPER AS INDICATED ON THE PLANTING SCHEDULE TAKEN ONE FOOT ABOVE THE ROOT CROWN.
13. ALL PLANT BEDS AND TREE SAUCERS TO RECEIVE 3" OF PINE BARK MULCH. GROUND COVER AREAS SHALL RECEIVE 1" OF PINE BARK MULCH
14. ALL DECIDUOUS TREES ADJACENT TO WALKWAYS AND ROADWAYS SHALL HAVE A BRANCHING PATTERN TO ALLOW FOR A MINIMUM OF 7' OF CLEARANCE BETWEEN THE GROUND AND THE LOWEST BRANCH.
15. ALL TREE STAKES SHALL BE STAINED DARK BROWN.
16. CONTRACTOR RESPONSIBLE FOR WATERING, MAINTENANCE, FERTILIZING, AND RESEEDING OF LAWN BARE SPOTS UNTIL A UNIFORM STAND OF VEGETATION IS ESTABLISHED AND ACCEPTED.
17. ALL PARKING ISLANDS PLANTED WITH SHRUBS OR PERENNIALS SHALL HAVE 24" OF TOPSOIL. FINISH GRADE SHALL BE EQUAL TO THE TOP OF CURB.
18. SOIL SAMPLES, TESTS, AND SHOP DRAWINGS SHALL BE PROVIDED TO THE LANDSCAPE ARCHITECT OR THE OWNER FOR APPROVAL PRIOR TO CONSTRUCTION.
19. A MINIMUM 18" WIDE BARRIER OF 1" GRAY OR TAN PEASTONE SHALL BE INSTALLED IN ALL PLANT BEDS WHICH ABUT THE BUILDINGS. NO MULCH IS ALLOWED WITHIN 18" OF ALL BUILDINGS PER THE EXECUTIVE OFFICE OF PUBLIC SAFETY AND SECURITY DEPARTMENT OF FIRE SERVICES REGULATION (527 CMR 17.00). INSTALL 4" DEEP OF PEASTONE WITH MIRAFI WEED FABRIC BENEATH AND STEEL EDGING BETWEEN THE PEASTONE AND ADJACENT MULCH BED. PROVIDE SHOP DRAWINGS TO A&M FOR APPROVAL PRIOR TO PURCHASE OF PEASTONE, MIRAFI WEED FABIRC & STEEL EDGING.
20. ALL PROPOSED LANDSCAPE AREAS INCLUDING MOWED LAWNS, TREES, SHRUB BEDS, PERENNIALS, AND ANNUALS SHALL BE PROVIDED WITH WATER EFFICIENT UNDERGROUND IRRIGATION. DESIGN AND INSTALLATION OF IRRIGATION SYSTEM TO BE PERFORMED BY AN APPROVED IRRIGATION DESIGN BUILD CONTRACTOR OR BY AN APPROVED EQUAL, TO BE DETERMINED BY THE OWNERS REPRESENTATIVE AND LANDSCAPE ARCHITECT. IRRIGATION SYSTEM IS TO BE DESIGNED FOR EFFICIENT WATER USAGE INCLUDING: USE OF DRIP IRRIGATION FOR TREES, SHRUBS AND PERENNIALS, IRRIGATION SYSTEM WITH HEAD-TO-HEAD COVERAGE, A CENTRAL SHUT-OFF VALVE, SEPARATE ZONES FOR EACH TYPE OF BEDDING AREA BASED ON WATERING NEEDS, AND A RAIN SENSOR TO SHUT OFF IRRIGATION DURING RAIN EVENTS.
21. PRIOR TO LAYING TOPSOIL, ALL SUBSOIL (BELOW PROPOSED TOPSOIL) TO BE TILLED TO A DEPTH OF AT LEAST 18" TO REMOVE CONSTRUCTION COMPACTION AND ALLOW FOR PROPER DRAINAGE OF TOPSOILS.
22. SEEDING OF DETENTION AREAS & OTHER SLOPE AREAS SHALL OCCUR IN THE DRY & AFTER SLOPES ARE COMPACTED. IT IS IMPORTANT, THAT THE DETENTION BASIN BE SEEDED AT THE BEGINNING OF THE PROJECT & PRIOR TO ANY DRAINAGE BEING DIRECTED TOWARDS THE BASIN. THE SEED AT DETENTION AREAS & OTHER SLOPED ARES WILL NEED A MIN. OF 6 MONTHS TO INITIALLY ESTABLISH PRIOR TO THE DETENTION BASIN BEING UTILIZED SO THAT THERE IS NOT EROSION & SLOPE FAILURE. SEED MIXES AVAILABLE FROM NEW ENGLAND WETLAND PLANTS, 820 WEST ST., AMHERST, MA, 413-548-8000. LIGHTLY RAKE SOIL TO ENSURE GOOD SEED-TO-SOIL CONTACT. SEE SEED MIX DETAIL NOTES.

ALL SEEDING TO BE COMPLETED "IN SEASON" BETWEEN APRIL 1 TO JUNE 15 OR AUGUST 15 TO OCTOBER 1, EXCEPT FOR RE-SEEDING OF BARE SPOTS. AT ALL SLOPED AREAS CONTRACTOR TO INSTALL COCONUT FIBER JUTE MESH NETTING ON ALL SLOPES 3:1 AND OVER, HYDROSEED ALL EXPOSED AREAS, ADD SOIL STABILIZER "FLUX TERRA HP-FGM SOIL STABILIZER" AS MANUFACTURED BY "PROFILE" TO HYDROSEED (AT RATE OF 3,000 LBS PER ACRE), AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR TO ALSO BE RESPONSIBLE FOR RE-GRADING AND RE-SEEDING ALL DISTURBED, ERODED, OR BARE SPOTS AT NO ADDITIONAL COST TO OWNER & UNTIL SLOPES ARE FULLY STABLE. CONTRACTOR RESPONSIBLE FOR ALL MAINTENANCE UNTIL FINAL ACCEPTANCE OF LAWN AREAS INCLUDING: WATERING, ADDING FERTILIZERS AND LIME AND MOWING AT NO ADDITIONAL COST TO OWNER.

AFTER SEEDING, ALL AREAS TO BE LIGHTLY MULCHED WITH WEED FREE STRAW & CONTINUALLY WATERED EVERY DAY UNTIL SEED IS ESTABLISHED & APPROVED BY A&M LANDSCAPE ARCHITECT (USE NO HAY) SO THAT SEED IS KEPT MOIST. FOR SPREADING OF THE SEED WITH DRY DETENTION BASINS, WATER LEVELS MAY BE LOWERED IN THE DETENTION AREAS BY RELYING ON DRY SEASON AND OR DRY SPELLS; OR MAY BE ACCOMPLISHED THROUGH THE USE OF DEWATERING METHODS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF ANY DEWATERING METHODS FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. WATER FROM ANY DEWATERING OPERATION SHALL BE TREATED TO REDUCE TOTAL SUSPENDED SOLIDS AND BE IN COMPLIANCE WITH STATE AND FEDERAL STANDARDS.

SPREAD THE NEW ENGLAND SEED MIXES AT AREAS SHOWN ON THE PLAN. SEE SEED MIX DETAIL NOTES. SEED MIXES AVAILABLE FROM NEW ENGLAND WETLAND PLANTS, 820 WEST ST., AMHERST, MA, 413-548-8000. LIGHTLY RAKE SOIL TO ENSURE GOOD SEED-TO-SOIL CONTACT.

LOAM AND SEEDING NOTES:

CONTRACTOR SHALL SEED ALL DISTURBED AREAS NOT NOTED TO RECEIVE OTHER MATERIALS, AND AT AREAS SHOWN ON THE PLAN PER SPECIFICATIONS BELOW

SCIENTIFIC NAME	COMMON NAME	PROPORTION BY WEIGHT	PERCENT PURITY	PERCENT GERMINATION
FESTUCA RUBRA "RUBRA"	CREEPING RED FESCUE	37%	95%	90%
PAO PRAENTENSIS "BARON"	BARON KENTUCKY BLUEGRASS	40%	85%	90%
LOLIUM PERENNE "PALMER"	PALMER PERENNIAL RYEGRASS	15%	95%	90%
FESTUCA RUBRA COMMUTATA WILMA	WILMA CHEWINGS	8%	95%	80%

1. SEED TO BE SPREAD AT MINIMUM RATE OF 5 LBS. PER 1000 SQ. FT.
2. SEEDING TO BE COMPLETED "IN SEASON" BETWEEN APRIL 1 TO JUNE 15 OR AUGUST 15 TO OCTOBER 1, EXCEPT FOR RESEEDING OF BARE SPOTS. IF UNABLE TO SEED WITHIN THESE TIMEFRAMES, CONTRACTOR TO INSTALL EROSION CONTROL MATS ON ALL SLOPES 3:1 AND OVER, HYDROSEED ALL EXPOSED AREAS, ADD SOIL STABILIZER "FLUX TERRA HP-FGM SOIL STABILIZER" AS MANUFACTURED BY "PROFILE" TO HYDROSEED (AT RATE OF 3,000 LBS PER ACRE), AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR TO COMPLETE ALL ABOVE "OUT OF SEASON" REQUIREMENTS AND THEN ALSO BE RESPONSIBLE FOR RE-GRADING AND RE-SEEDING ALL DISTURBED, ERODED, OR BARE SPOTS WITHIN NEXT CLOSEST PLANTING SEASON IN FALL OR SPRING AT NO ADDITIONAL COST TO OWNER. CONTRACTOR RESPONSIBLE FOR ALL MAINTENANCE UNTIL FINAL ACCEPTANCE OF LAWN AREAS INCLUDING: WATERING, ADDING FERTILIZERS AND LIME AND MOWING AT NO ADDITIONAL COST TO OWNER.
3. COMMERCIAL FERTILIZER SHALL BE APPLIED AT THE RATE OF 25 POUNDS PER 1000 SQ. FT. OR AS RECOMMENDED BY THE TESTING AGENCY. LIME TO BE SPREAD AT THE RATE OF 100 POUNDS PER 1000 SQ. FT OR AS RECOMMENDED BY THE TESTING AGENCY. COMMERCIAL FERTILIZER SHALL BE A COMPLETE FERTILIZER CONTAINING AT LEAST 50% OF THE NITROGEN OF WHICH IS DERIVED FROM NATURAL ORGANIZE SOURCES OF UREAFORM. IT SHALL CONTAIN THE FOLLOWING PERCENTAGES BY WEIGHT: NITROGEN (N) 10%, PHOSPHORUS (P) 6%, POTASH (K) 4%. LIME SHALL BE AN APPROVED AGRICULTURAL LIMESTONE CONTAINING NOT LESS THAN 85% OF TOTAL CARBONATES. LIMESTONE SHALL BE GROUND TO SUCH FINENESS THAT 50% WILL PASS A 100 MESH SIEVE AND 90% WILL PASS THROUGH A 20 MESH SIEVE.
4. LAWN AREAS TO BE SEEDED BY SOWING EVENLY WITH AN APPROVED MECHANICAL SEEDER AT THE RATE OF TEN POUNDS PER 1000 SQUARE FEET.
5. CONTRACTOR RESPONSIBLE FOR WATERING, MOWING, AND RESEEDING OF LAWN BARE SPOTS UNTIL A UNIFORM, HEALTHY STAND OF GRASS IS ESTABLISHED AND ACCEPTED.

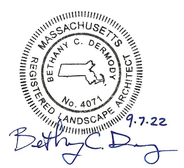
LOAM AND SODDING:

CONTRACTOR SHALL SOD AREAS NOTED ON THE PLANS OR AT ANY AREA DISTURBED BY CONSTRUCTION NOT NOTED TO BE ANOTHER MATERIAL.

SOD IS TO BE A BLEND OF FOUR TO FIVE CURRENT AND IMPROVED HYBRID BLUEGRASS AND FESCUE MIXES APPROPRIATE FOR BOTH SEMI-SHADED AND AREAS OF SUN.

HYBRIDS MAY INCLUDE: BLACKSTONE KENTUCKY BLUEGRASS, AWARD KENTUCKY BLUEGRASS, CHALLENGER KENTUCKY BLUEGRASS, BLACKBURG II KENTUCKY BLUEGRASS OR COMPARABLE AND EQUAL BLUEGRASS HYBRIDS.

1. PROVIDE A&M A SHOP DRAWING FOR APPROVAL PRIOR TO ORDERING OF SOD.
2. SOD SHALL BE HIGH QUALITY, NURSERY GROWN ON CULTIVATED MINERAL AGRICULTURAL SOILS. SOD SHALL BE MOIST, AND MACHINE CUT AT A UNIFORM SOIL THICKNESS OF AT LEAST ⅝" AT TIME OF CUTTING. MEASUREMENT FOR THICKNESS SHALL INCLUDE TOP GROWTH AND THATCH. SOD SHALL BE FREE OF DISEASES, WEEDS, BARE SPOTS, OR INSECTS.
3. SODDING TO BE COMPLETED "IN SEASON" BETWEEN APRIL 1 TO JUNE 15 OR AUGUST 15 TO OCTOBER 1, EXCEPT FOR RE-SODDING OF BARE SPOTS. IF UNABLE TO SOD WITHIN THESE TIMEFRAMES, CONTRACTOR TO INSTALL EROSION CONTROL MATS ON ALL SLOPES 3:1 AND OVER, HYDROSEED ALL EXPOSED AREAS, ADD SOIL STABILIZER "FLUX TERRA HP-FGM SOIL STABILIZER" AS MANUFACTURED BY "PROFILE" TO HYDROSEED (AT RATE OF 3,000 LBS PER ACRE), AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR TO COMPLETE ALL ABOVE "OUT OF SEASON" REQUIREMENTS AND THEN ALSO BE RESPONSIBLE FOR RE-GRADING AND RE-SODDING ALL DISTURBED, ERODED, OR BARE SPOTS WITHIN NEXT CLOSEST PLANTING SEASON IN FALL OR SPRING AT NO ADDITIONAL COST TO OWNER. CONTRACTOR RESPONSIBLE FOR ALL MAINTENANCE UNTIL FINAL ACCEPTANCE OF LAWN AREAS INCLUDING: WATERING, ADDING FERTILIZERS AND LIME AND MOWING AT NO ADDITIONAL COST TO OWNER.
4. COMMERCIAL FERTILIZER SHALL BE APPLIED AT THE RATE OF 25 POUNDS PER 1000 SQ. FT. OR AS RECOMMENDED BY THE TESTING AGENCY. LIME TO BE SPREAD AT THE RATE OF 100 POUNDS PER 1000 SQ. FT OR AS RECOMMENDED BY THE TESTING AGENCY. COMMERCIAL FERTILIZER SHALL BE A COMPLETE FERTILIZER CONTAINING AT LEAST 50% OF THE NITROGEN OF WHICH IS DERIVED FROM NATURAL ORGANIZE SOURCES OF UREAFORM. IT SHALL CONTAIN THE FOLLOWING PERCENTAGES BY WEIGHT: NITROGEN (N) 10%, PHOSPHORUS (P) 6%, POTASH (K) 4%. LIME SHALL BE AN APPROVED AGRICULTURAL LIMESTONE CONTAINING NOT LESS THAN 85% OF TOTAL CARBONATES. LIMESTONE SHALL BE GROUND TO SUCH FINENESS THAT 50% WILL PASS A 100 MESH SIEVE AND 90% WILL PASS THROUGH A 20 MESH SIEVE.
5. CONTRACTOR RESPONSIBLE FOR WATERING, MOWING, AND RE-SODDING OF LAWN BARE SPOTS UNTIL A UNIFORM, HEALTHY STAND OF GRASS IS ESTABLISHED AND ACCEPTED. IF PROPOSED IRRIGATION SYSTEM IS NOT OPERATIONAL, LANDSCAPE CONTRACTOR RESPONSIBLE TO WATER WITH TEMPORARY IRRIGATION OR WATER TRUCKS UNTIL IRRIGATION SYSTEM IS OPERATIONAL AT NO ADDITIONAL COST.



REGISTERED LANDSCAPE ARCHITECT FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

APPLICANT\OWNER:
NBTC GREAT ROAD, LLC
275 MISHAWUM ROAD, 4TH FLOOR
WOBURN, MA 01801

PROJECT:
25 ROBINSON ROAD,
265, 277, 287 & 289
GREAT ROAD
LITTLETON, MA 01460

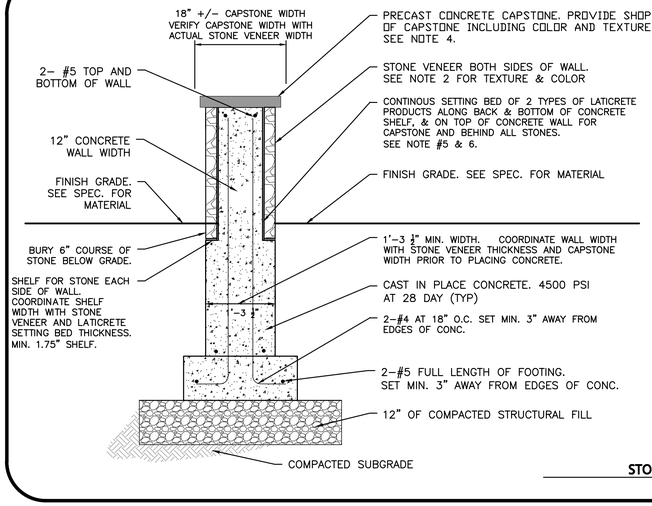
PROJECT NO.	2371-04	DATE:	09-07-2022
SCALE:	AS SHOWN	DWG. NAME:	C-2371-04.dwg
DESIGNED BY:	BCD	CHECKED BY:	BDJ

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 5
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
LANDSCAPE NOTES

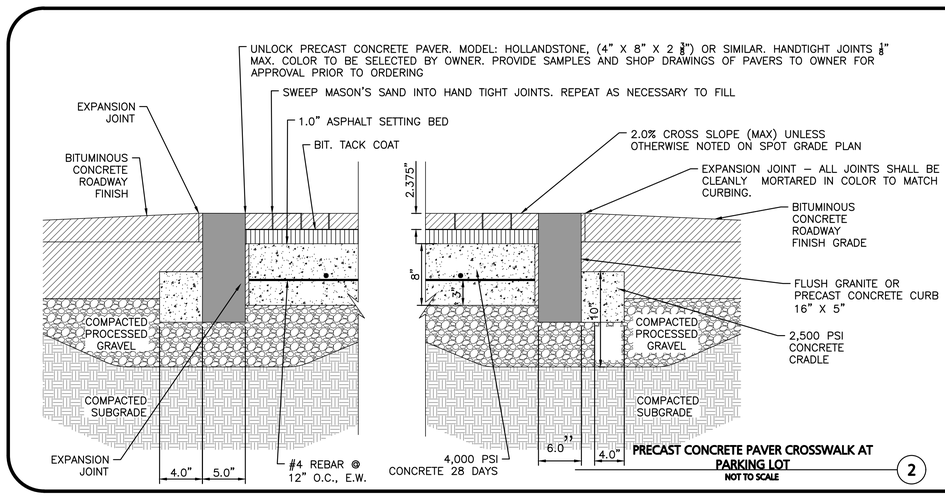
SHEET No.
L-502

R:\PROJECTS\2371-04\CIVIL\DRAWINGS\CURRENT\C-2371-04_LANDSCAPING.DWG

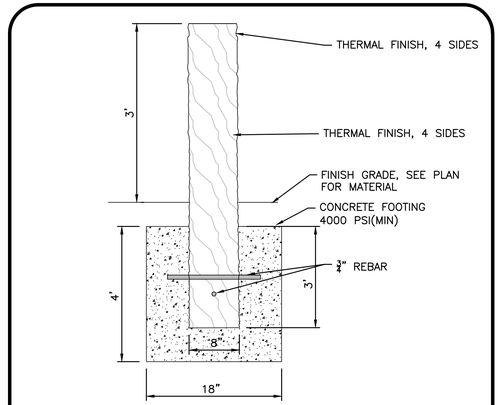


NOTES:
1. INSTALL STONE VENEER PER MANUFACTURERS RECOMMENDATIONS FOR EXTERIOR CONCRETE WALL USE IN MASSACHUSETTS.
2. STONE VENEER TO BE FROM STONEYARD IN LITTLETON, MA OR APPROVED EQUAL. VENEER TO BE BOSTON BLEN ASHLAR. STONE SAMPLE TO BE APPROVED BY LANDSCAPE ARCHITECT OR OWNER.
3. WALLS INCLUDING FOOTING TO BE REVIEWED AS A SHOP DRAWING, AND APPROVED BY STRUCTURAL ENGINEER AND AT CONTRACTOR COST. CONTRACTOR TO INCORPORATE ANY NECESSARY REVISIONS.
4. PRECAST CONCRETE CAPSTONE TO BE FROM NORTHERN DESIGN PRECAST IN LOUDON, NH OR EQUAL. PROVIDE OWNER WITH SAMPLES OF EACH STYLE AND SHOP DRAWINGS FOR APPROVAL PRIOR TO ORDERING.
5. DO NOT USE ORDINARY MASONARY MORTAR BEHIND STONE VENEER. AFTER CONCRETE WALL HAS FULLY CURED UTILIZE 2 LATICRETE PRODUCTS BETWEEN STONE VENEER AND CONCRETE WALL. FIRST CLEAN CONCRETE WALL AND MAKE SURE NO LOOSE CONCRETE OR DIRT. THEN APPLY 2 COATS (15-22 MILS) OF LATICRETE AIR AND WATER BARRIER CONTINUOUS ACROSS ENTIRE WALL SIDES, TOP AND SHELF TO RECEIVE STONES. ALLOW TO CURE. THEN APPLY LATICRETE HI-BOND MASONRY VENEER MORTAR (PRODUCT IS A POLYMER FORTIFIED MORTAR) CONTINUOUS ACROSS ENTIRE WALL AND SHELF TO RECEIVE STONES. PRESS STONES VENEER INTO MORTAR. AFTER STONES SET USE LATICRETE PREMIUM MASONRY POINTING MORTAR. PROVIDE SHOP DRAWINGS OF ALL LATICRETE PRODUCTS FOR APPROVAL TO LANDSCAPE ARCHITECT PRIOR TO PURCHASING. INSTALL LATICRETE PRODUCTS AND STONE VENEER PER MANUFACTURERS INSTRUCTIONS.
6. PRESS STONE INTO LATICRETE SETTING BED BEHIND STONE. SETTING BED TO BE 3/4" DEPTH BEFORE COMPRESSION. EACH STONE TO BE HAND TIGHT JOINTS AND NO MORE THAN 1/4" BETWEEN STONES. STAGGER ALL JOINTS. CREATE RANDOM APPEARANCE OF VENEER WITH VARYING STONE SIZES. REMOVE EXCESS MORTAR FROM JOINTS. AFTER STONES ARE SET, APPLY LATICRETE PREMIUM MASONRY POINTING MORTAR TO JOINTS. JOINTS TO HAVE SMOOTH FINISH AND BE CLEAN IN APPEARANCE.

STONE VENEER DOUBLE SIDED (1)
NOT TO SCALE



PRECAST CONCRETE PAVER CROSSWALK AT PARKING LOT (2)
NOT TO SCALE



NOTES:
1. LANDSCAPE ARCHITECT TO APPROVE GRANITE IN FIELD.
2. SUBMIT SOURCE FOR APPROVAL.

GRANITE BOLLARD DETAIL (3)
NOT TO SCALE

MASSACHUSETTS
BETHANY C. DERMODY
No. 4071
REGISTERED LANDSCAPE ARCHITECT
9.7.22

REGISTERED LANDSCAPE ARCHITECT FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION

APPLICANT\OWNER:
NBTC GREAT ROAD, LLC
275 MISHAWUM ROAD, 4TH FLOOR
WOBURN, MA 01801

PROJECT:
25 ROBINSON ROAD,
265, 277, 287 & 289
GREAT ROAD
LITTLETON, MA 01460

PROJECT NO.	2371-04	DATE:	09-07-2022
SCALE:	AS SHOWN	DWG. NAME:	C-2371-04.dwg
DESIGNED BY:	BCD	CHECKED BY:	BDJ

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
100 COMMERCE WAY, SUITE 3
WOBURN MA 01801
TEL: (781) 935-6889
FAX: (781) 935-2896
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
LANDSCAPE NOTES

SHEET No.
L-503

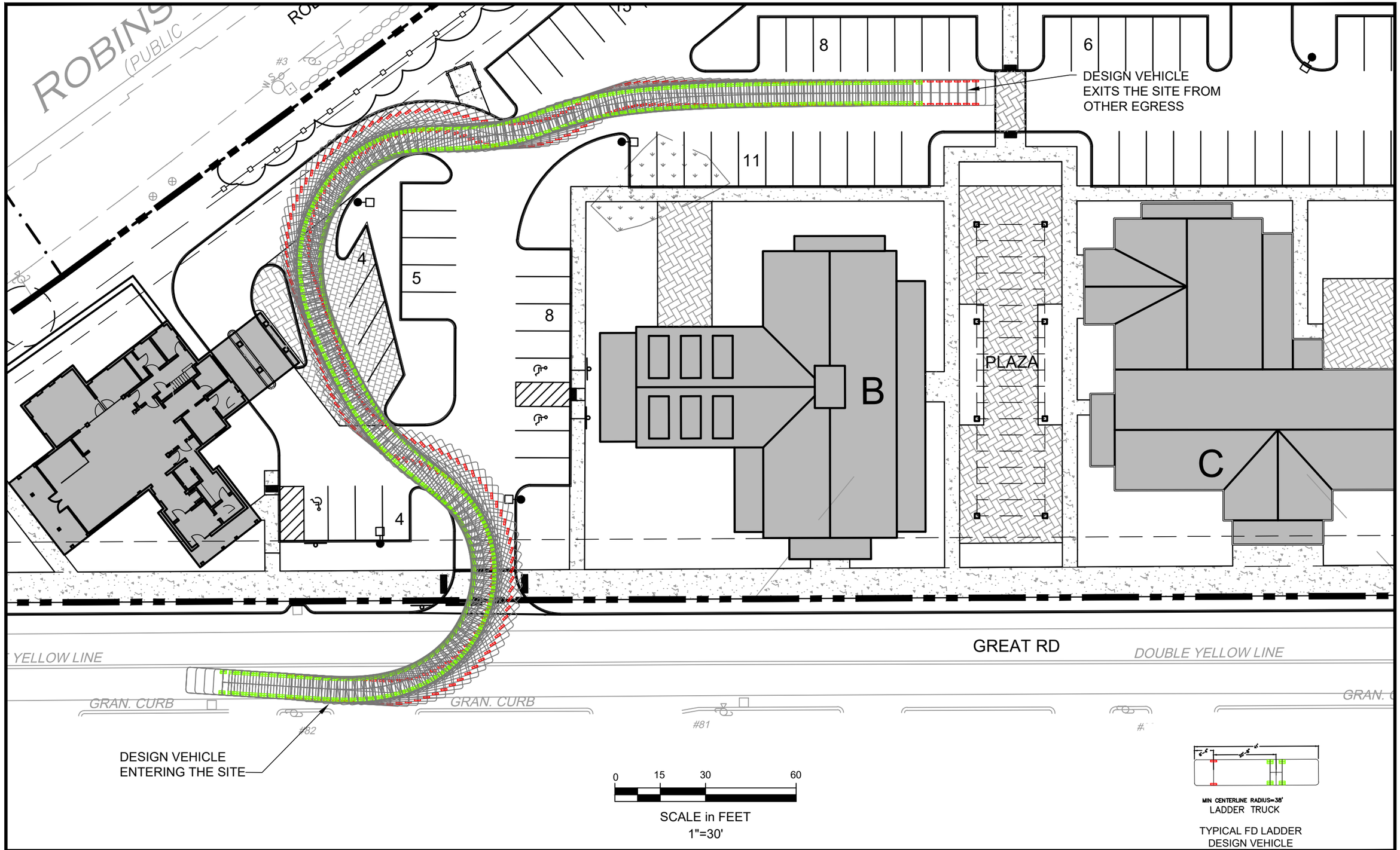
15
8
6
15
11
19
5
8
11
B
PLAZA
C
D
GREAT RD
DOUBLE YELLOW LINE
GRAN. CURB
GRAN. CURB
#81
#80
#79
DESIGN VEHICLE
EXITING THE SITE
(CROSS OVER
CENTERLINE)
DESIGN VEHICLE
ENTERING THE SITE
0 15 30 60
SCALE in FEET
1"=30'
MIN CENTERLINE RADIUS=38'
LADDER TRUCK
TYPICAL FD LADDER
DESIGN VEHICLE

OCG
Oak Consulting Group
P.O. Box 1123
Newburyport, MA 01950
Ph. 978.312.3120

PROJECT:
NORTHERN BANK TOWN COMMON
KING ROAD
LITTLETON, MA

FIGURE:
VEHICLE TURNING MOVEMENT 1
FIRE APPARATUS

DATE: 9/7/22
PROJECT: 18017
FIGURE: 1 OF 3



OCG
Oak Consulting Group
P.O. Box 1123
Newburyport, MA 01950
Ph. 978.312.3120

PROJECT:
NORTHERN BANK TOWN COMMON
KING ROAD
LITTLETON, MA

FIGURE:
VEHICLE TURNING MOVEMENT 2
FIRE APPARATUS

DATE: 9/7/22
PROJECT: 18017
FIGURE: 2 OF 3