TRAFFIC IMPACT ASSESSMENT

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PROPOSED 40B RESIDENTIAL DEVELOPMENT

Long Ridge Road
Carlisle, Massachusetts

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Prepared for:
Lifetime Green Homes, LLC

October 2014

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

TRAFFIC IMPACT ASSESSMENT

PROPOSED 40B RESIDENTIAL DEVELOPMENT

Long Ridge Road
Carlisle, Massachusetts

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October 2014

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EXECUTIVE SUMMARY

MDM Transportation Consultants, Inc. (MDM) has prepared this Traffic Impact Assessment (TIA) for the proposed 40B residential development (the Site) to be located along Long Ridge Road in Carlisle, Massachusetts. This report documents existing operational and safety-related characteristics of roadways serving the development Site, estimates future year operating characteristics of these roadways independent of the development, estimates development-related trip generation, and identifies incremental impacts of Site-related traffic.

E.1 PROJECT DESCRIPTION

The site is an approximate 10-acre primarily wooded area along the easterly side of Long Ridge Road in Carlisle, Massachusetts. The location of the site relative to adjacent streets is shown in **Figure 1**. The Site currently includes a single-family home with a detached barn. Access to the existing use is via a single, full-access driveway along Long Ridge Road.

Under the proposed site plan, a residential development will be constructed to include 20 single-family homes. Access to the residential homes will be via a proposed cul-de-sac roadway that intersects Long Ridge Road approximately 110 feet south of Garnet Rock Lane. The existing single-family home on the site is proposed to remain with a newly constructed driveway off the proposed interior roadway.

E.2 STUDY AREA

This TIA evaluates transportation characteristics of roadways and intersections that provide a primary means of access to the site. The study area was identified in consultation with the Town's transportation peer review consultant (Nitsch Engineering) and includes the following unsignalized intersections as shown in **Figure 1**:

- Long Ridge Road at Nowell Farme Road
- Nowell Farme Road at River Road and Skelton Road
- Bedford Road (Route 225) at Skelton Road
- Bedford Road (Route 225) at River Road
- Long Ridge Road at Proposed Site Driveway

E.3 SUMMARY OF ANALYSIS AND FINDINGS

Key findings of the traffic impact assessment are as follows:

- *Existing Traffic Conditions.* Traffic count data collected in October 2014 indicates that Long Ridge Road carries approximately 51 vpd on a weekday and approximately 3 vph during weekday morning and evening peak hours.

- *Safety Data.* Incident records indicate crash experience at the study intersections fall below the District-wide average crash rate for unsignalized intersections. Therefore, no immediate safety-based countermeasures are required at this time.

- *Site Traffic Generation.* The proposed 20-unit residential development is projected to generate up to 25 total vehicle-trips during weekday peak hours using industry-standard trip rates and methodology. This represents less than one additional vehicle trip every 2 minutes, on average – an increase that is not expected to materially impact travel on area roadways.

- *Adequate Roadway Capacity.* Capacity analyses indicate that ample capacity is generally available along study area roadways and intersections to accommodate projected site traffic increases under existing conditions. Project-related trip increases are anticipated to have negligible impact on intersection operations with no change in level of service expected. The exception is the River Road approach to Route 225 during the weekday evening peak hour which experiences relatively long delays (LOS F operations). However, project-related trip increases at this intersection amount to one additional vehicle every 6 minutes – an amount that is imperceptible to the average motorist and is not expected to materially impact intersection operations.

- *Proposed Roadway Sight Lines.* Available SSD and ISD at the proposed site roadway along Long Ridge Road generally exceed minimum AASHTO criteria based on observed travel speeds and assuming selective clearing of vegetation and on-site re-grading.

- *On-site Recommendations*. MDM recommends the elimination of the proposed divisional island or widening of the travel lane on both sides of the island to a minimum of 16-feet in order to better accommodate emergency apparatus. On-street parking around the cul-de-sac should be prohibited to enhance site circulation. In addition, landscaping could potentially limit sight lines on the inside of the horizontal curve at Unit 18. As such, a no-planting area should be designated along its frontage.

- *Off-site Recommendations*. Independent of the proposed development, MDM suggests that the Town conduct routine maintenance of the trees and vegetation located in the southwest and northwest quadrant of the River Road/Nowell Farme Road/Skelton Road intersection to improve sight lines at this location. In addition, MDM suggests that the Town consider formalizing a secondary means of access (gated) to the existing Nowell Farme Road neighborhood via Prospect Street for emergency purposes if desired by local emergency responders.

In summary, the proposed 20-unit residential development is not expected to have any material impact on traffic operations, safety or capacity on the adjacent roadway system. The proposed site roadway intersection along Long Ridge Road is expected to operate well below capacity with Level of Service (LOS) A operations and adequate sight lines.

1.0 INTRODUCTION

MDM Transportation Consultants, Inc. (MDM) has prepared this Traffic Impact Assessment (TIA) for the proposed 40B residential development to be located along Long Ridge Road in Carlisle, Massachusetts. This report documents existing operational and safety-related characteristics of roadways serving the development Site, estimates future year operating characteristics of these roadways independent of the development, estimates development-related trip generation, and identifies incremental impacts of Site-related traffic. Access improvements are identified for the development to meet operational needs of the Site.

1.1 PROPOSED DEVELOPMENT

The site is an approximate 10-acre primarily wooded area along the easterly side of Long Ridge Road in Carlisle, Massachusetts. The location of the site relative to adjacent streets is shown in **Figure 1**. The Site currently includes a single-family home with a detached barn. Access to the existing use is via a single, full-access driveway along Long Ridge Road.

Under the proposed site plan, a residential development will be constructed to include 20 single-family homes. Access to the residential homes will be via a proposed cul-de-sac roadway that intersects Long Ridge Road approximately 110 feet south of Garnet Rock Lane. The existing single-family home on the site is proposed to remain with a newly constructed driveway off the proposed interior roadway. **Figure 2** presents a preliminary site layout for the development prepared by Meisner Brem Corporation.

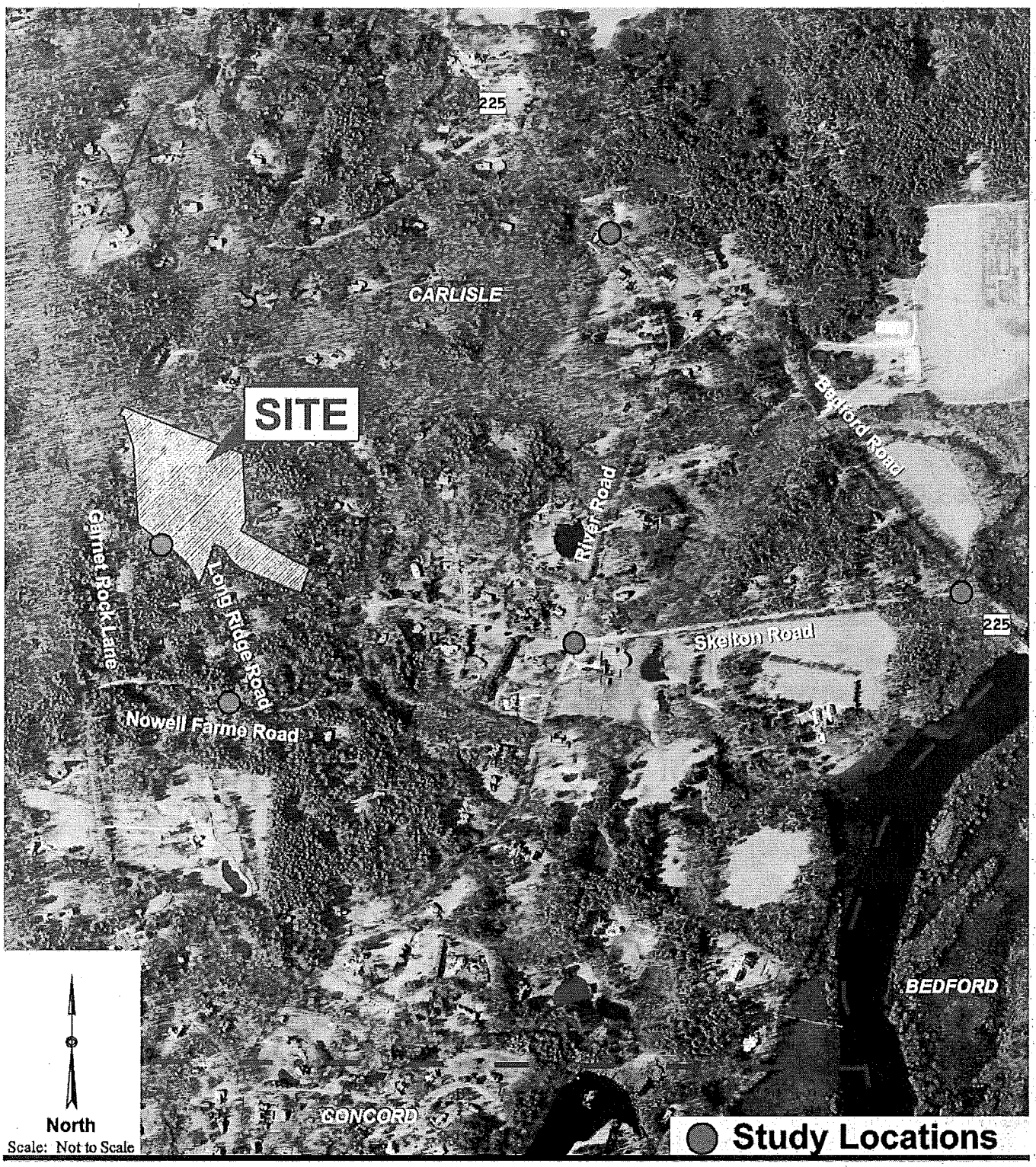

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Figure 1

Site Location

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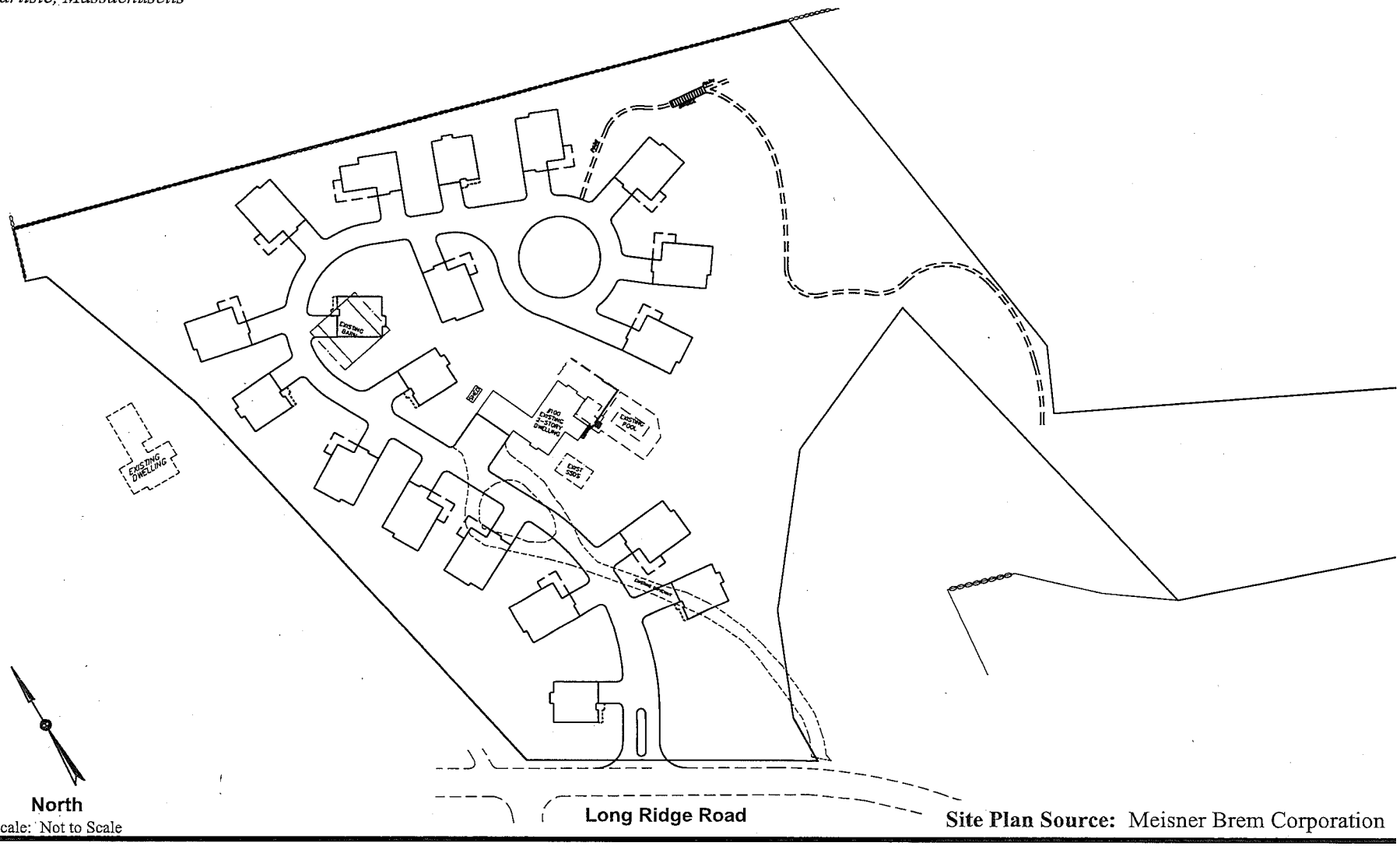

Scale: Not to Scale

Site Plan Source: Meisner Brem Corporation

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Figure 2

Preliminary Site Layout

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1.2 STUDY METHODOLOGY

This transportation impact assessment consists of several steps. The first step documents existing conditions in the transportation study area including an inventory of roadway geometry, observed traffic volumes, public transportation, and safety characteristics. Next, future year traffic conditions are forecast that account for other planned area developments, normal area growth, and development-related traffic increases. The third step quantifies operating characteristics of the study intersections. Specific attention is given to the incremental impacts of the proposed development. Finally, improvements are identified to address specific development-related requirements as needed.

1.3 STUDY AREA

This TIA evaluates transportation characteristics of roadways and intersections that provide a primary means of access to the site. The study area was identified in consultation with the Town's transportation peer review consultant (Nitsch Engineering) and includes the following unsignalized intersections as shown in **Figure 1**:

- Long Ridge Road at Nowell Farme Road
- Nowell Farme Road at River Road and Skelton Road
- Bedford Road (Route 225) at Skelton Road
- Bedford Road (Route 225) at River Road
- Long Ridge Road at Proposed Site Driveway

2.0 EXISTING CONDITIONS

2.1 STUDY AREA ROADWAY NETWORK

The study area roadways and intersections are described briefly in this section. A general description of the physical roadway and intersection features is provided. The study area includes roadways under local (Town) jurisdiction. The study area and intersection are depicted in **Figure 1**.

2.1.1 Roadways

Bedford Road (Route 225)

Bedford Road (Route 225) is primarily a north-south roadway within the study area and is classified by the Massachusetts Department of Transportation (MassDOT) as a rural major collector roadway under local (Town) jurisdiction. Bedford Road generally provides one lane of travel in each direction separated by a double yellow centerline within the study area. Route 225 connects Carlisle center with the Bedford town line to the east and the Westford town line to the west. In the immediate study area, the posted (regulatory) speed limit is 40 miles per hour (mph). Sidewalks are not provided along Bedford Road in the study area. Land use along Bedford Road in the study area is primarily residential with open space and conservation land.

Long Ridge Road

Long Ridge Road is primarily a north-south roadway classified by MassDOT as a local roadway under Town jurisdiction. Long Ridge Road is a dead-end road with a single travel lane in direction that connects Nowell Farme Road and Garnet Rock Lane. Sidewalks are not provided along Long Ridge Road. At the northerly end of Long Ridge Road, a trail connects Long Ridge Road to the David Corridor and Malcolm Lands walking trails. The Town of Carlisle's walking trail map for the site vicinity is provided in the **Appendix** for reference. Land use along Long Ridge Road consists of single-family homes and wooded area.

Nowell Farme Road

Nowell Farme Road is primarily an east-west roadway classified by MassDOT as a local roadway under Town jurisdiction. Nowell Road is a dead-end road with a single travel lane in each direction. Nowell Farme Road has a paved width of approximately 24 feet. Sidewalks are not provided along Nowell Farme Road. Nowell Farme Road provides a connection between River Road and Long Ridge Road, Garnet Rock Lane and other neighborhood roadways accessing approximately 49 single-family homes. School bus stop locations along Nowell Farme Road were identified based on bus route information provided on the Carlisle Public School's website and are presented in the **Appendix** for reference.

Skelton Road

Skelton Road is primarily an east-west roadway classified by MassDOT as a local roadway under Town jurisdiction. Skelton Road connects River Road with Route 225 and provides a single travel lane in each direction. Sidewalks are not provided along Skelton Road. The posted speed limit along Skelton Road is 30 mph. Land use along Skelton Road consists of single-family homes and wooded area.

River Road

River Road is primarily a north-south roadway that connects Route 225 with Monument Street in Concord. River Road is classified by MassDOT as a rural minor collector roadway under Town jurisdiction. River Road generally provides a single travel lane in each direction. Within the study area, the posted speed limit along River Road is 35 mph north of Skelton Road and 30 mph south of Skelton Road. The posted speed limit along River Road is reduced to 25 mph in the northbound travel direction near its intersection with Route 225. Land use along River Road primarily consists of single-family homes.

2.1.2 Intersections

Long Ridge Road at Nowell Farme Road

Long Ridge Road meets Nowell Farme Road to form a three-way, unsignalized intersection. All approaches to the intersection provide a single, general-purpose travel lane in each direction with Long Ridge Road under "STOP"-sign control. A school bus stop is located at the intersection (see **Appendix** for bus stop location). Land use at the intersection consists of residential uses.

Nowell Farme Road at River Road and Skelton Road

River Road meets Nowell Farme Road and Skelton Road to form a four-way, unsignalized intersection with the Nowell Farme Road and Skelton Road approaches operating under "STOP"-sign control. All approaches to the intersection provide a single, general-purpose travel lane in each direction. It should be noted that the roadside embankment located in the southwest quadrant and line of trees located in the northwest quadrant of the intersection restricts sight lines from Nowell Farme Road. Land use at the intersection consists of residential uses.

Bedford Road (Route 225) at Skelton Road

Bedford Road (Route 225) meets Skelton Road to form a three-legged, unsignalized intersection with the Skelton Road approach operating under "STOP"-sign control. All approaches to the intersection provide a single, general-purpose travel lane in each direction. Land use at the intersection consists of residential uses.

Bedford Road at River Road

Bedford Road (Route 225) meets River Road and the commercial driveway to 887 Bedford Road to form a four-way, unsignalized intersection. River Road operates under "STOP"-sign control. All approaches to the intersection provide a single, general-purpose travel lane in each direction. The commercial driveway at 1 River Road is located in immediate proximity to the intersection. Land use at the intersection primarily consists of commercial uses.

2.2 EXISTING TRAFFIC VOLUMES

Daily traffic volumes and manual turning movement count (TMC) data were collected at the study intersections and roadways during the weekday morning (7:00 AM – 9:00 AM) and weekday evening (4:00 PM – 6:00 PM) periods to coincide with peak traffic activity of the proposed residential use and the adjacent streets.

2.2.1 Daily Traffic

Daily traffic volumes were collected on Long Ridge Road in the site vicinity using a radar-based automatic traffic recorder (ATR) in October 2014 and are summarized in **Table 1** with detailed count data provided in the **Appendix**.

TABLE 1
EXISTING TRAFFIC-VOLUME SUMMARY – LONG RIDGE ROAD

Time Period	Daily Volume (vpd)[1]	Percent Daily Traffic[2]	Peak Hour Volume (vph)[3]	Peak Flow Direction[4]	Peak Hour Directional Volume (vph)
Weekday Morning Peak Hour	51	6%	3	67% SB	2
Weekday Evening Peak Hour	51	6%	3	67% NB	2

[1]Two-way daily traffic expressed in vehicles per day without seasonal adjustment.
[2]The percent of daily traffic that occurs during the peak hour (K-factor).
[3]Two-way peak-hour volume expressed in vehicles per hour.
[4]NB = Northbound, SB = Southbound

As summarized in **Table 1,** Long Ridge Road carries approximately 51 vpd in the site vicinity and approximately 3 vph during the weekday morning and weekday evening peak periods. Traffic was observed to be slightly heavier in the southbound direction (exiting the neighborhood) during the weekday morning peak hour and in the northbound direction (entering the neighborhood) during the weekday evening peak hour.

2.2.2 Peak-Hour Traffic

Daily traffic volumes and manual turning movement count (TMC) data were collected at the study intersections and roadways during the weekday morning (7:00 AM – 9:00 AM) and weekday evening (4:00 PM – 6:00 PM) periods to coincide with peak traffic activity of the proposed residential use and the adjacent streets. Traffic data used in this evaluation were collected in September and October 2014 when Carlisle Public Schools and Concord-Carlisle High School were in session. Permanent count station data published by MassDOT for the area indicates that September and October are above-average traffic months. Therefore, no adjustment (reduction) in observed traffic volumes was applied to present a conservative analysis.

The weekday morning and evening peak hour traffic volumes for the study intersection are shown in **Figure 3** and **Figure 4**. Traffic count data and MassDOT permanent count station data are provided in the **Appendix.**

2.3 MEASURED TRAVEL SPEEDS

Vehicle speeds were obtained for the Long Ridge Road northbound and southbound travel directions using a radar-based traffic recorder. **Table 3** summarizes the observed average and 85th percentile travel speeds for Long Ridge Road in the site vicinity. Field data are provided in the **Appendix**.

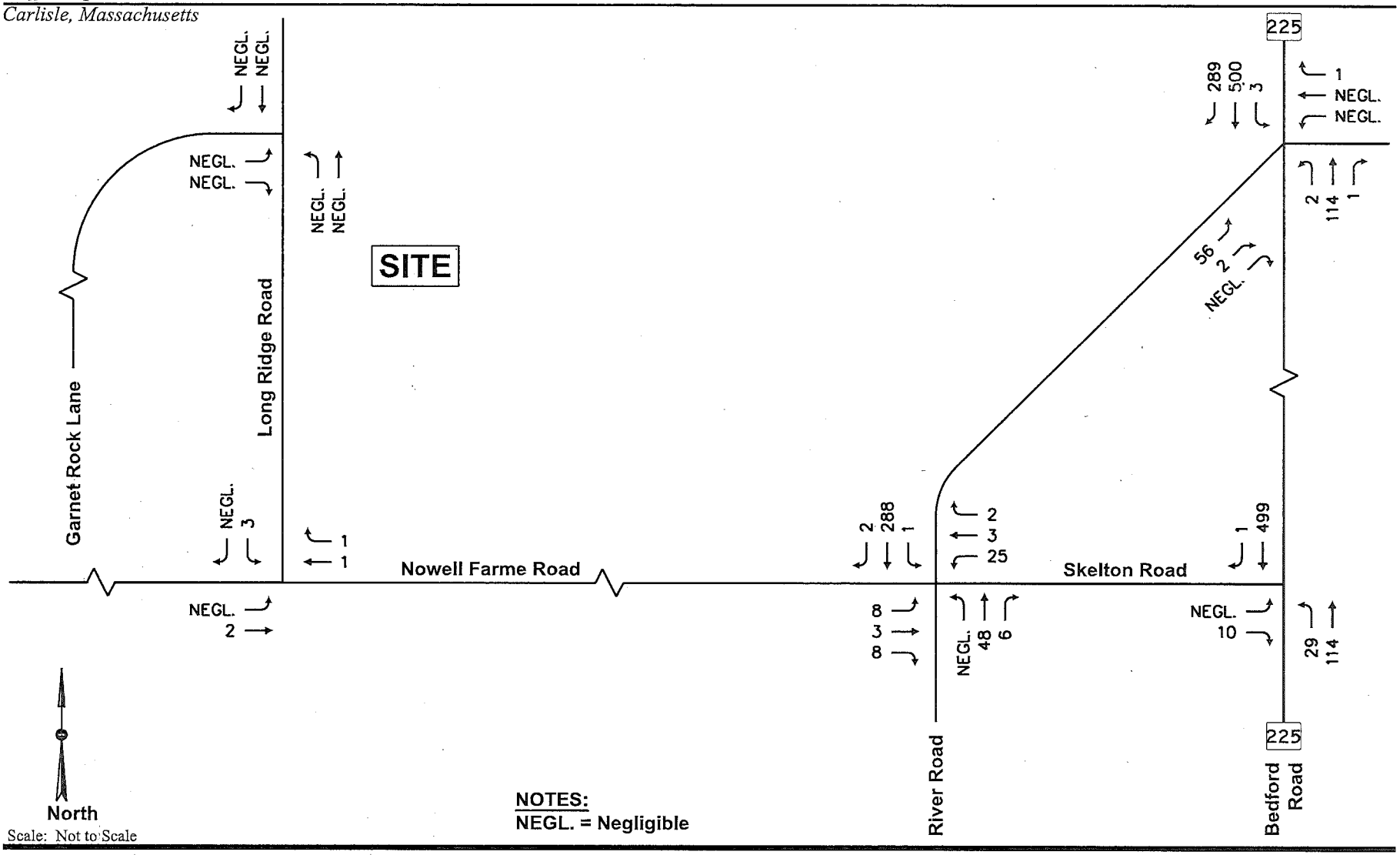

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Figure 3

2014 Existing Condition
Weekday Morning Peak Hour Traffic Volumes

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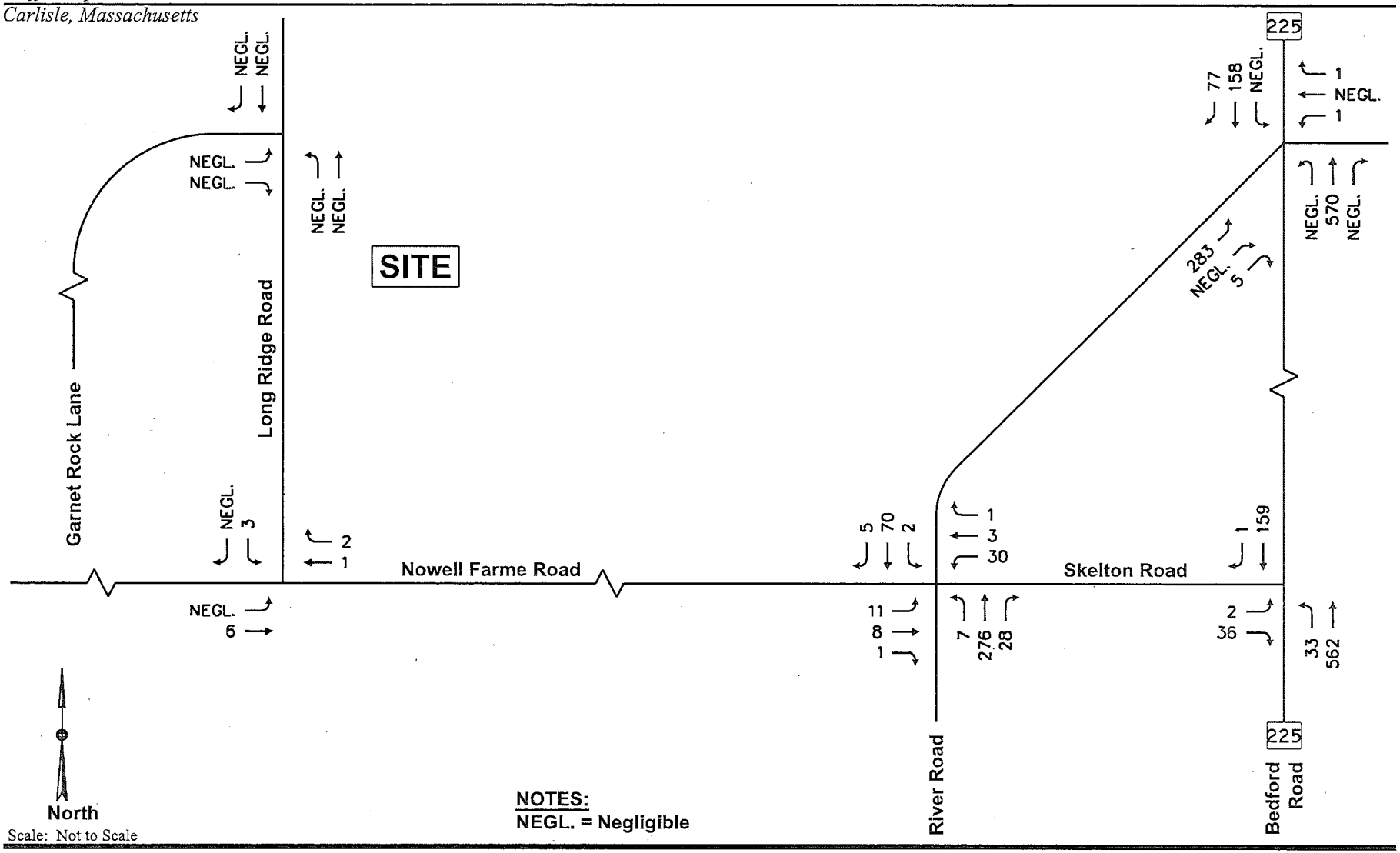

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Figure 4

2014 Existing Condition
Weekday Evening Peak Hour Traffic Volumes

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TABLE 3
SPEED STUDY RESULTS – LONG RIDGE ROAD

Travel Direction	Regulatory Speed Limit[1]	Observed Travel Speeds	
		Average[2]	85th Percentile[3]
Northbound	30	21	25
Southbound	30	22	27

[1] No posted speed limit along Long Ridge Road; Regulatory speed limit = prima facie speed limit of 30 mph.
[2] Arithmetic mean (mph)
[3] The speed at or below which 85 percent of the vehicles are traveling.

As summarized in **Table 3**, the average travel speed along Long Ridge Road in the site vicinity was observed to be 21 miles per hour (mph) in the northbound travel direction and 22 mph in the southbound travel direction. The 85th percentile travel speed on Long Ridge Road in the site vicinity was observed to be 25 mph for the northbound travel direction and 27 mph in the southbound travel direction.

In summary, the observed average and 85th percentile travel speeds along Long Ridge Road are lower than the regulatory speed limit and generally consistent with the functionality of the roadway.

2.4 SAFETY

In order to identify crash trends and safety characteristics for study area intersections, crash data were obtained from MassDOT and local police department records for the Town of Carlisle. Crash rates were determined for each study area intersection. These rates quantify the number of accidents per million entering vehicles. MassDOT has determined the accident rates within the District 4 area (which includes the Town of Carlisle) to be 0.77 for signalized intersections and 0.58 for unsignalized intersections. These rates represent MassDOT's "average" crash experience for communities within the District and serve as a basis for comparing reported crash rates for study area intersections located within the districts. Where calculated crash rates notably exceed the district average, some form of safety countermeasures may be warranted.

Crash data was obtained from MassDOT for the latest three-year period available (2010 through 2012). Crash data was also obtained from local police department records from 2011 through 2013 to supplement MassDOT data. A summary of the reported crash data with crash rates for the study area intersections is detailed in **Table 2**. The **Appendix** contains a tabulation of MassDOT crash data and associated crash rate calculations.

TABLE 2
INTERSECTION CRASH SUMMARY
2010 THROUGH 2013[1]

Data Category	Route 225 at River Road	Route 225 at Skelton Road	Nowell Farme Road at River Road
Traffic Control	Unsignalized	Unsignalized	Unsignalized
Crash Rate[2]	**0.28**	**0.08**	**0.14**
District 4 Avg[3]	0.58	0.58	0.58
Year:			
2010	2	0	1
2011	0	0	0
2012	1	0	0
2013	2	1	0
Total	**5**	**1**	**1**
Type:			
Angle	0	0	1
Rear-End	0	0	0
Head-On	0	0	0
Sideswipe	0	0	0
Single Vehicle	4	0	0
Other/Unknown	1	1	0
Severity:			
P. Damage Only	2	0	1
Personal Injury	2	0	0
Fatality	0	0	0
Unknown	1	1	0
Conditions:			
Dry	4	0	1
Wet	0	0	0
Snow	0	0	0
Other/Unknown	1	1	0
Time:			
7:00 to 9:00 AM	1	0	0
4:00 to 6:00 PM	0	0	0
Rest of Day	4	1	1

[1] Source: MassDOT Crash Database and Carlisle Police Department Records
[2]Crashes per million entering vehicles
[3]District 4 averages = 0.58 (unsignalized)

As summarized in **Table 2:**

- The Route 225/River Road intersection experienced a crash rate of 0.28 which is well below the District 4 average of 0.58. Five (5) crashes were reported at the intersection including four (4) single vehicle crashes and one (1) crash of unknown collision type. Two (2) of the crashes resulted in property damage only, two (2) resulted in non-fatal injury and one (1) crash was of unknown severity. The majority of crashes occurred under dry roadway conditions (80%) and occurred outside of peak commuting periods (80%). No fatalities or pedestrian-related incidents were reported during the study period.

- The Route 225/Skelton Road intersection experienced one (1) reported collision resulting in a crash rate of 0.08 which is well below the District 4 average of 0.58. The crash type, severity and roadway conditions were not reported for this collision. The crash occurred outside of the peak commuting periods.

- The River Road/Nowell Farme Road/Skelton Road intersection experienced one (1) reported crash resulting in a crash rate of 0.14 which is well below the District 4 average of 0.58. The reported crash involved an angle-type collision resulting in property damage only. The crash occurred under dry roadway conditions outside of the peak commuting periods. No fatalities or pedestrian-related incidents were reported.

There were no reported crashes at the Long Ridge Road/Nowell Farme Road intersection during the four-year study period.

2.5 SIGHT LINE ANALYSIS

The evaluation documents sight distances for vehicles exiting from the proposed site driveway onto Long Ridge Road with comparison to recommended guidelines for the posted speed limit and measured travel speeds.

The American Association of State Highway and Transportation Officials' (AASHTO) standards[1] reference two types of sight distance which are relevant at the proposed site driveway intersection with Long Ridge Road: stopping sight distance (SSD) and intersection sight distance (ISD). Sight lines for critical vehicle movements at the proposed Long Ridge Road/Site Driveway intersections were compared to minimum SSD and ISD for the measured travel speeds along Long Ridge Road in the site vicinity.

[1] *A policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials (AASHTO), 2011.

Stopping Sight Distance

Sight distance is the length of roadway visible to the motorist to a fixed object. The minimum sight distance available on a roadway should be sufficiently long enough to enable a below-average operator, traveling at or near a regulatory speed limit, to stop safely before reaching a stationary object in its path, in this case, a vehicle exiting from the proposed site driveway onto Long Ridge Road. The SSD criteria are defined by AASHTO based on design and operating speeds, anticipated driver behavior and vehicle performance, as well as physical roadway conditions. SSD includes the length of roadway traveled during the perception and reaction time of a driver to an object, and the distance traveled during brake application on wet, level pavements. Adjustment factors are applied to account for roadway grades.

SSD was estimated in the field using AASHTO standards for driver's eye (3.5 feet) and object height equivalent to the taillight height of a passenger car (2.0 feet) for the Long Ridge Road southbound approach to the proposed site driveway. **Table 4** presents a summary of the available SSD for the Long Ridge Road roadway segment approaching the proposed site driveway and AASHTO's recommended SSD for the observed average and 85th percentile travel speeds.

TABLE 4
STOPPING SIGHT DISTANCE SUMMARY
LONG RIDGE ROAD APPROACHES TO PROPOSED SITE DRIVEWAY

		AASHTO Recommended[1]		
Intersection/ Approach	**Available Stopping Sight Distance**	**Regulatory Speed Limit[2]**	**Average Travel Speed[3]**	**85th Percentile Travel Speed[4]**
Northbound	>300 Feet	190 Feet	120 Feet	150 Feet
Southbound	270± Feet	200 Feet	130 Feet	170 Feet

[1] Recommended sight distance based on AASHTO, A Policy on Geometric Design of Highways and Streets. Based on driver height of eye of 3.5 feet to object height of 2.0 feet and adjustments for roadway grade.
[2] No posted speed limit along Long Ridge Road; Regulatory speed limit = prima facie speed limit of 30 mph.
[3] Average travel speeds: Long Ridge Road = 21 mph NB and 22 mph SB
[4] 85th Percentile travel speeds: Long Ridge Road = 25 mph NB and 27 mph SB

As summarized in **Table 4,** available SSD generally exceeds AASHTO recommended SSD criteria at the proposed site driveway intersection with Long Ridge Road for the regulatory speed limit and ambient travel speeds.

Intersection Sight Distance

Clear sight lines provide sufficient sight distance for a stopped driver on a minor-road approach to depart from the intersection and enter or cross the major road. As stated under AASHTO's Intersection Sight Distance (ISD) considerations, "*...If the available sight distance for an entering ...vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to avoid collisions...To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road.*" AASHTO's ISD criteria are defined into several "cases". Each case depends on the type of traffic control at the intersection (e.g. no control, *Yield* sign, *Stop* sign, and signal control), and the specific vehicle maneuver in question (crossing, right- or left-turn). In this case, the proposed site driveway approach to Long Ridge Road is proposed to be under STOP sign control. The ISD in question relates to the ability to turn left onto Long Ridge Road.

Available ISD was estimated in the field using AASHTO standards for driver's eye (3.5 feet), object height (3.5 feet) and decision point (14.5 feet from edge of travel way) for the westerly direction along Long Ridge Road. **Table 5** presents a summary of the available ISD for the departure from the proposed site driveway and AASHTO's recommended ISD for the measured travel speeds.

TABLE 5
INTERSECTION SIGHT DISTANCE SUMMARY
PROPOSED SITE DRIVEWAY DEPARTURE TO LONG RIDGE ROAD

		AASHTO Minimum[1]		
Intersection/ Approach	**Available Intersection Sight Distance**	**Regulatory Speed Limit[2]**	**Average Travel Speed[3]**	**85th Percentile Travel Speed[4]**
Looking North	285± Feet[5]	200 Feet	130 Feet	170 Feet
Looking South	>300 Feet[5]	190 Feet	120 Feet	150 Feet

[1]Recommended sight distance based on AASHTO, A Policy on Geometric Design of Highways and Streets. Based on driver height of eye of 3.5 feet and an object height of 3.5 feet and adjustments for roadway grade if required. Minimum value as noted represents SSD per AASHTO guidance.
[2]No posted speed limit along Long Ridge Road; Regulatory speed limit = prima facie speed limit of 30 mph.
[3]Average travel speeds: Long Ridge Road = 21 mph NB and 22 mph SB
[4]85th Percentile travel speeds: Long Ridge Road = 25 mph NB and 27 mph SB
[5]Assumes selective removal of on-site vegetation and re-grading as needed.

As summarized in **Table 5**, analysis results indicate that ample ISD will be provided at the proposed site driveway along Long Ridge Road assuming selective removal of on-site vegetation and re-grading as necessary. New plantings (shrubs, bushes) or physical landscape features to be located within the driveway sight lines should be maintained at a height of 2 feet or less to ensure unobstructed lines of sight.

3.0 FUTURE CONDITIONS

Evaluation of the proposed development impacts requires the establishment of a future baseline analysis condition. This section estimates future roadway and traffic conditions with and without the proposed development. To be consistent with industry standards, a five-year planning horizon was selected.

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 a future year condition. Traffic volumes on the roadway network at that time, in the absence of the development (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 that is currently under review at the local and/or state level. Consideration of these factors resulted in the development of No-Build traffic volumes. Anticipated Site-generated traffic volumes were then superimposed upon these No-Build traffic-flow networks to develop future Build conditions.

The following sections provide an overview of future No-Build traffic volumes and projected Build traffic volumes.

3.1 BACKGROUND TRAFFIC GROWTH

Background traffic includes demand generated by other planned developments in the area as well as demand increases caused by external factors. External factors are general increases in traffic not attributable to a specific development and are determined using historical data.

3.1.1 Historical Area Growth

Nearby permanent count station data published by MassDOT indicates a declining (-0.9% per year) growth rate in recent years. For purposes of this evaluation and to present a conservative analysis, a 0.5 percent growth rate was used (approximate 2.5 percent increase over a 5-year horizon). This growth rate is higher than historic rates, and as such, is also expected to account for any small fluctuation in hourly traffic as may occur from time to time in the study area and traffic associated with small vacancies or developments in the area. Background growth rate calculations are provided in the **Appendix.**

3.1.2 Background Development-Related Growth

Development of future No-Build traffic volumes also considers traffic generated through the study area from other specific area developments. Based on discussion with Town Planning staff, there is currently one permitted development project in the area that may increase traffic at the study intersections:

- ***Skelton Road Subdivision:*** This residential project is permitted for 6 single-family homes of which one (1) is completed. Traffic associated with the remaining 5 single-family homes to be built was estimated using industry-standard trip rates published by the Institute of Transportation Engineers (ITE) and applied to the study area roadway network using existing travel patterns. The site-specific trip tracings are provided in the **Appendix**.

In addition, MDM contacted the Town of Bedford Planning Department to determine if there are any approved projects in Bedford that may impact traffic in the study area. MDM has reviewed several approved projects identified by Bedford Planning Staff and found that each project is at least 2.5 miles from the study area. Given each project's size, use and location relative to the study area, traffic associated with these developments in Bedford are considered to be reasonably accounted for in the conservative background growth rate of 0.5 percent per year.

3.2 NO-BUILD TRAFFIC VOLUMES

To account for future traffic growth in the study area, future No-Build traffic volumes are developed by increasing the existing (baseline) volumes by approximately 2.5 percent (0.5 percent compounded annually over 5 years) and adding traffic associated with the remaining build-out of the Skelton Road subdivision project. The resulting No-Build traffic volumes are displayed in **Figure 5** and **Figure 6**.

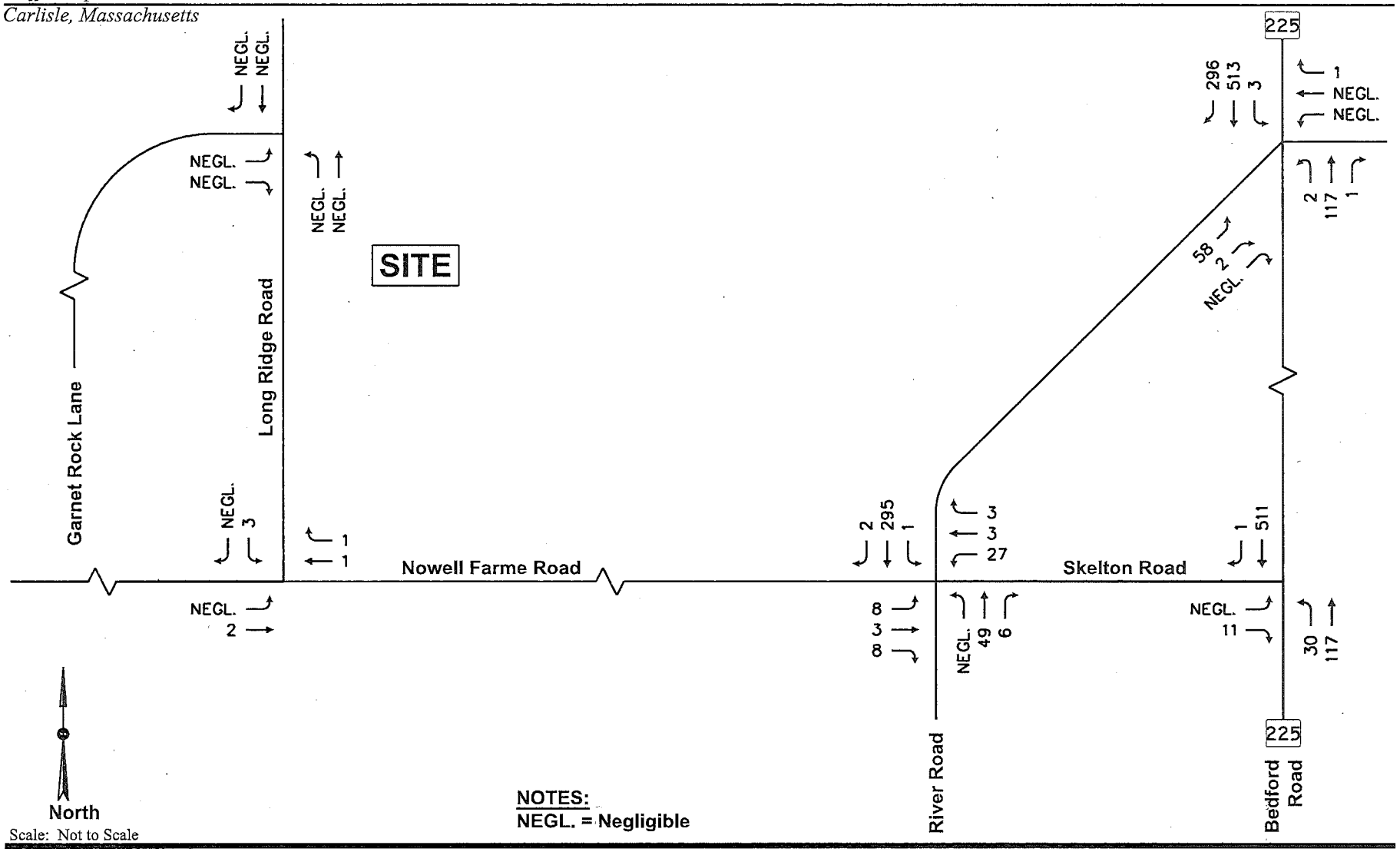

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Figure 5

2019 No-Build Condition
Weekday Morning Peak Hour Traffic Volumes

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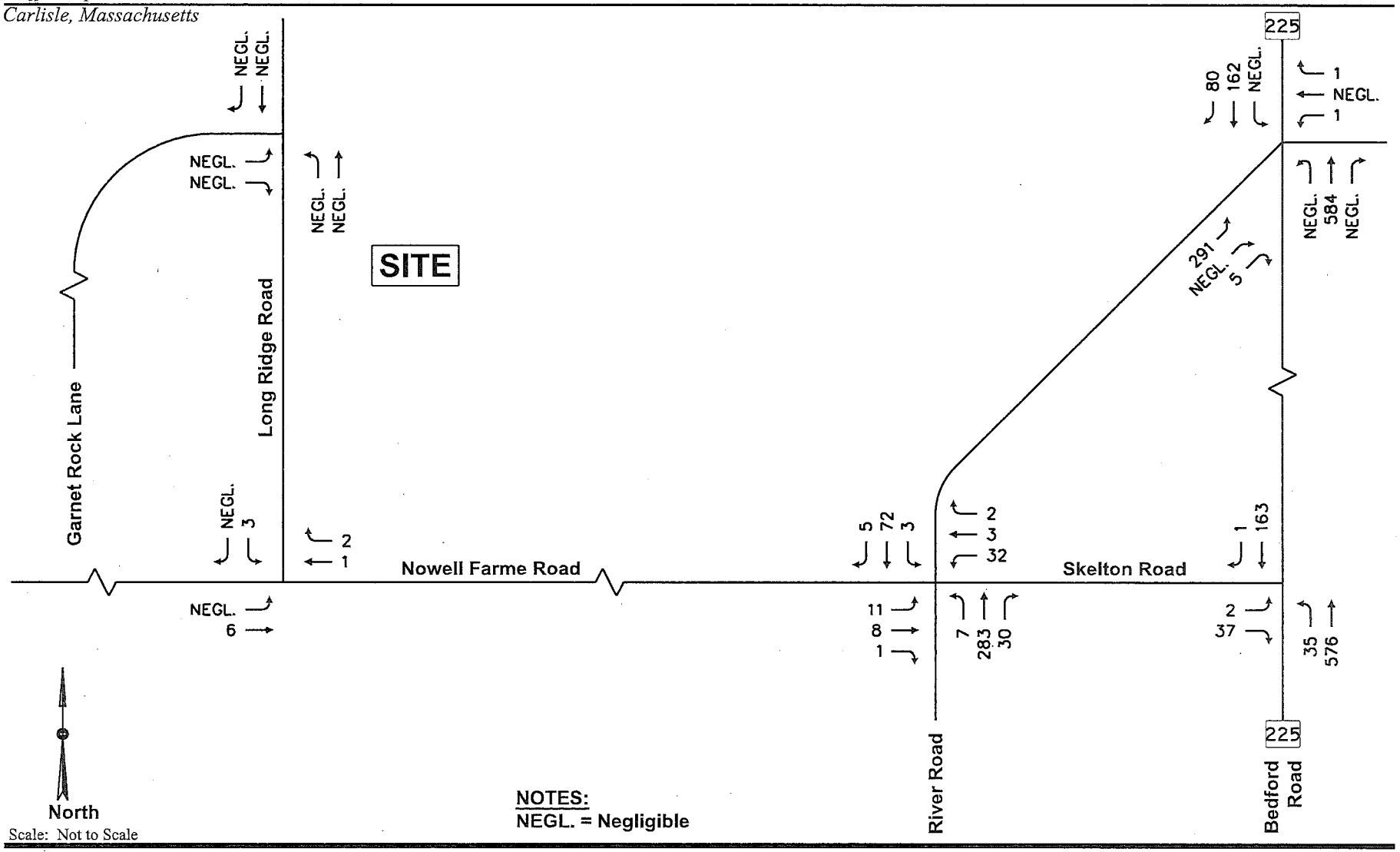

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Figure 6

2019 No-Build Condition
Weekday Evening Peak Hour Traffic Volumes

Date: October 2014
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3.3 SITE-GENERATED TRAFFIC

The trip generation estimates for the proposed residential use are provided for the weekday morning and weekday evening peak periods, which correspond to the critical analysis periods for the proposed residential use and adjacent street traffic flow. New traffic generated by the project was estimated using trip rates published in ITE's *Trip Generation*[2] for the Land Use Code (LUC) 210 – Single-Family Detached Housing.

Table 6 presents the trip-generation estimate for the proposed development based on ITE methodology.

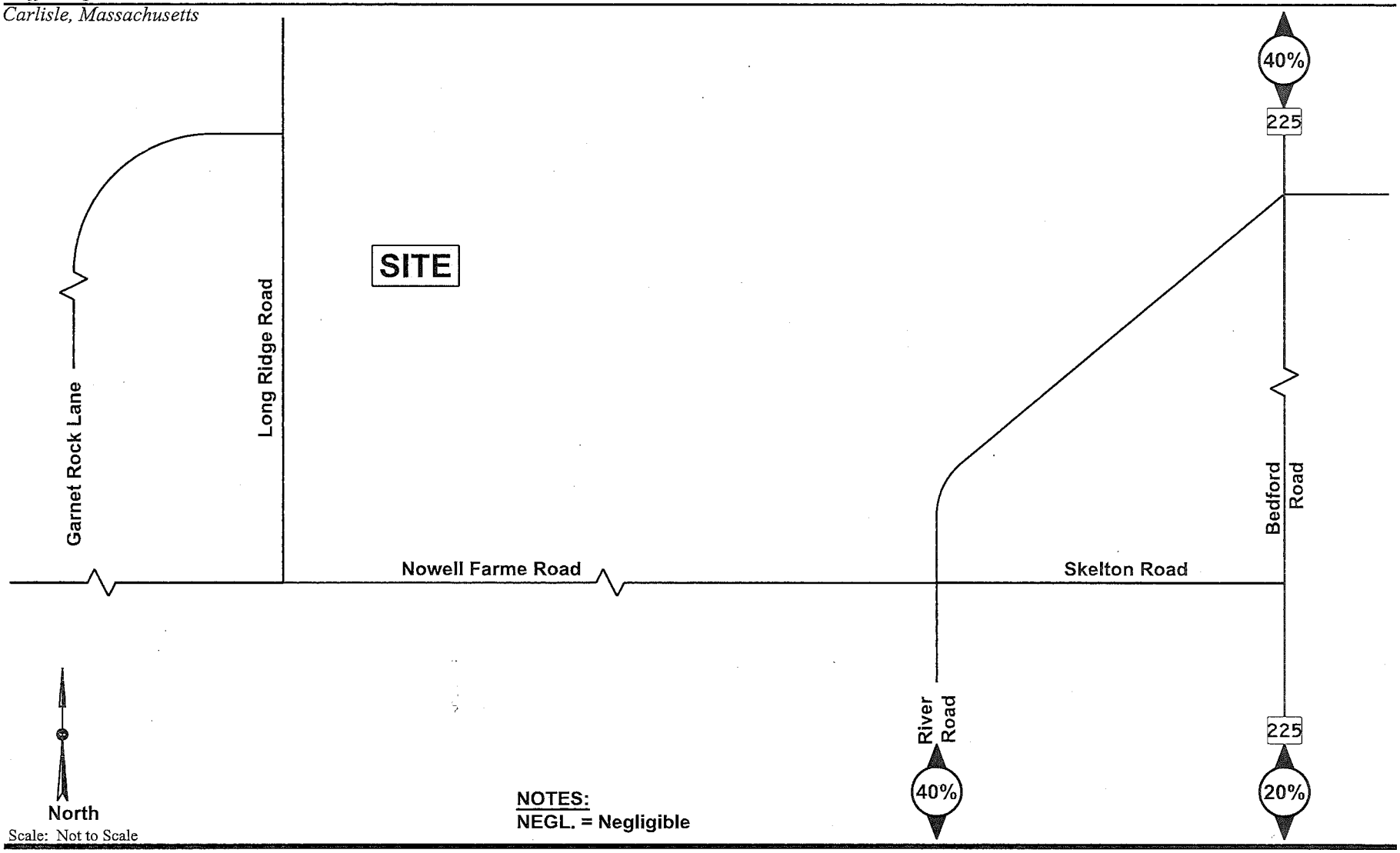
TABLE 6
TRIP-GENERATION SUMMARY

Period/Direction	Vehicle Trips[1]
Weekday Morning Peak Hour	
Entering	6
Exiting	18
Total	24
Weekday Evening Peak Hour	
Entering	16
Exiting	9
Total	25
Weekday Daily	238

Source: ITE *Trip Generation*, Ninth Edition; 2012.
[1] Based on ITE LUC 210 applied to 20 single-family homes.

As summarized in **Table 6**, the proposed development is estimated to generate approximately 24 vehicle trips (6 entering and 18 exiting) during the weekday morning peak hour and 25 vehicle trips (16 entering and 9 exiting) during the weekday evening peak hour. On a daily basis, the proposed residential uses are estimated to generate approximately 238 vehicle trips on a weekday with 50 percent entering and exiting. Trip generation calculations are provided in the **Appendix**. In order to provide a conservative analysis, no credit was taken for the existing residential home on the site.

[2] *Trip Generation*, Ninth Edition; Institute of Transportation Engineers; Washington, DC; 2012.



Scale: Not to Scale

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Figure 7

Trip Distribution

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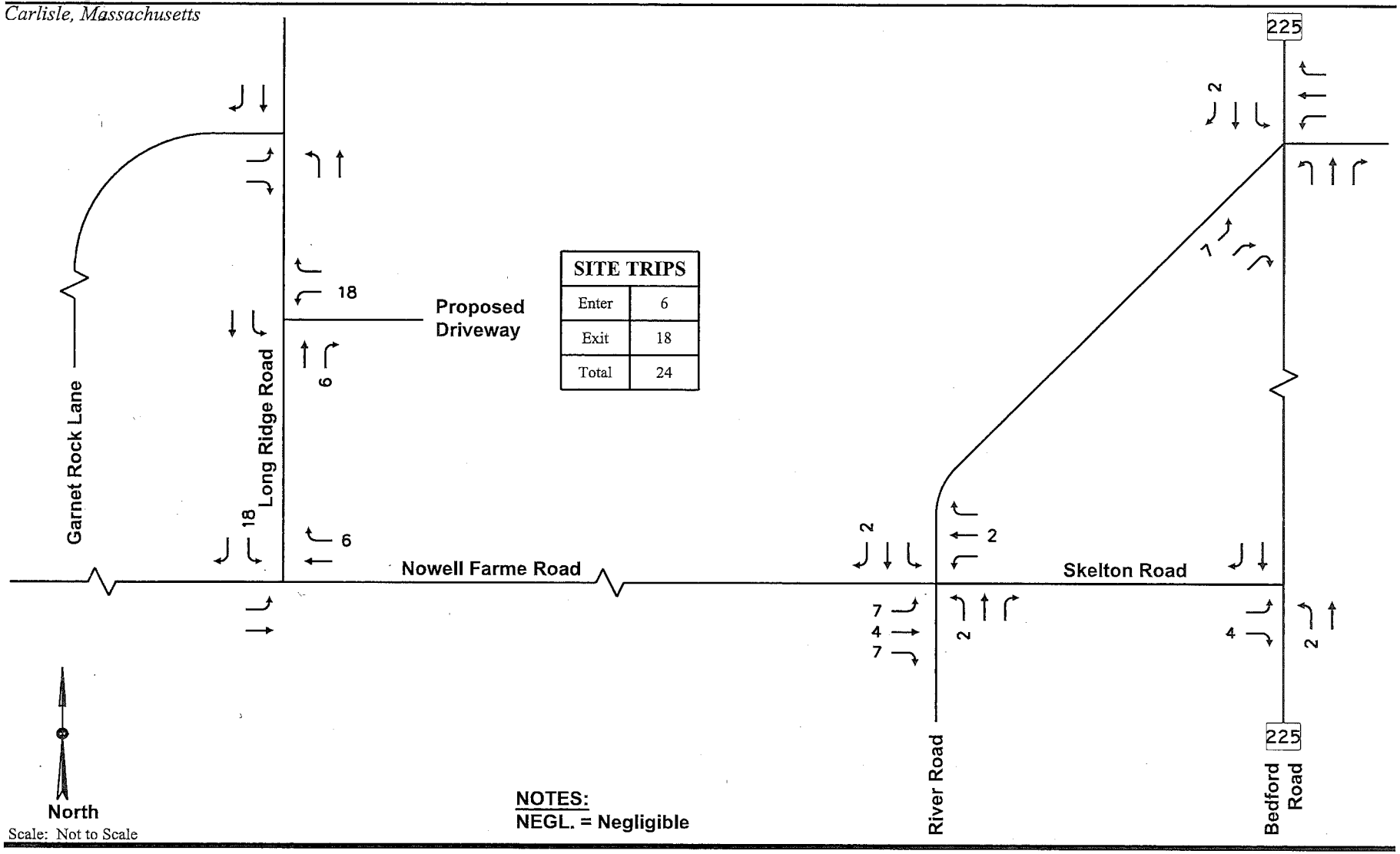

SITE TRIPS	
Enter	6
Exit	18
Total	24

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Figure 8

Site Generated Trips
Weekday Morning Peak Hour Traffic Volumes

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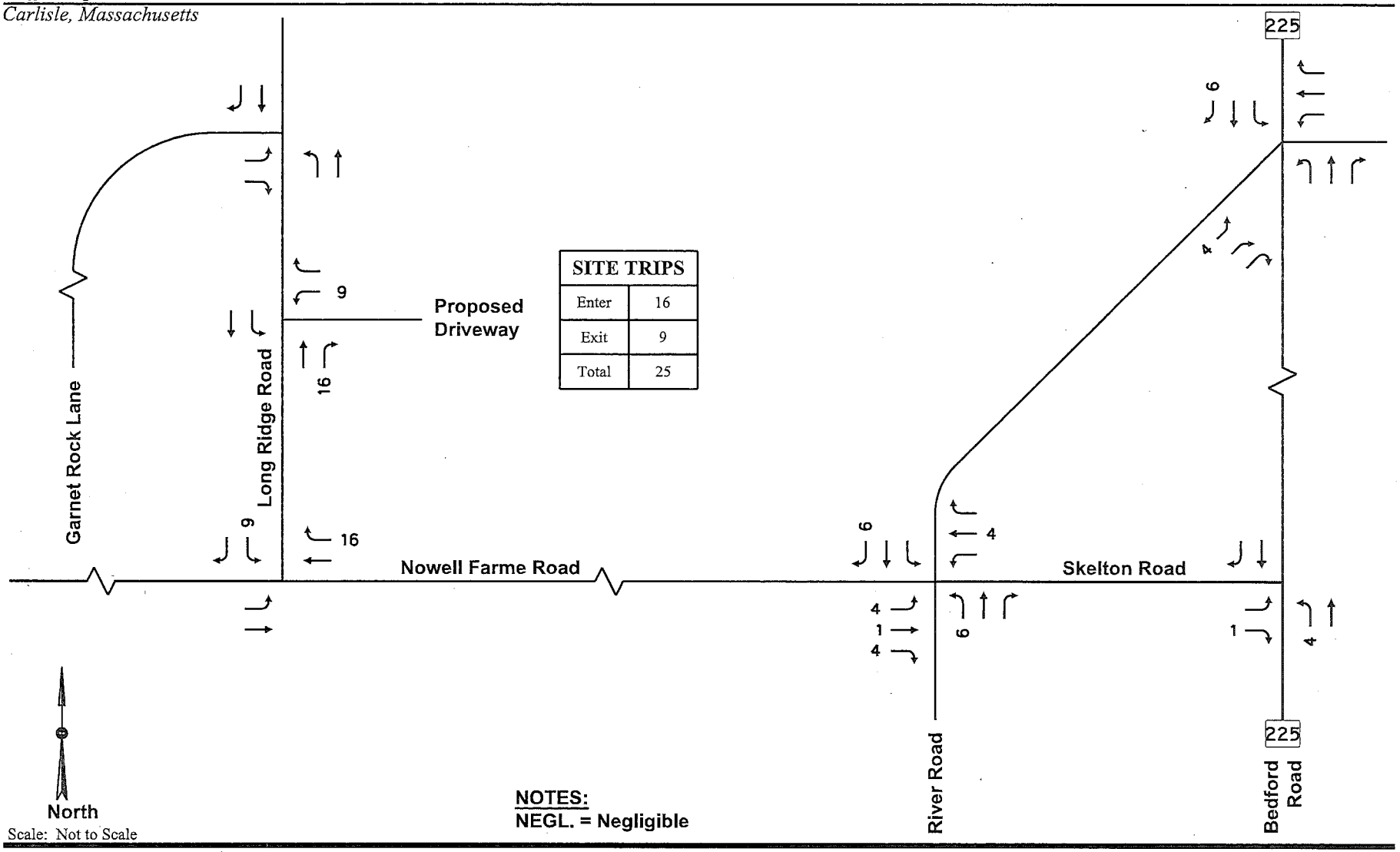

SITE TRIPS	
Enter	16
Exit	9
Total	25

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Figure 9

Site Generated Trips
Weekday Evening Peak Hour Traffic Volumes

Date: October 2014
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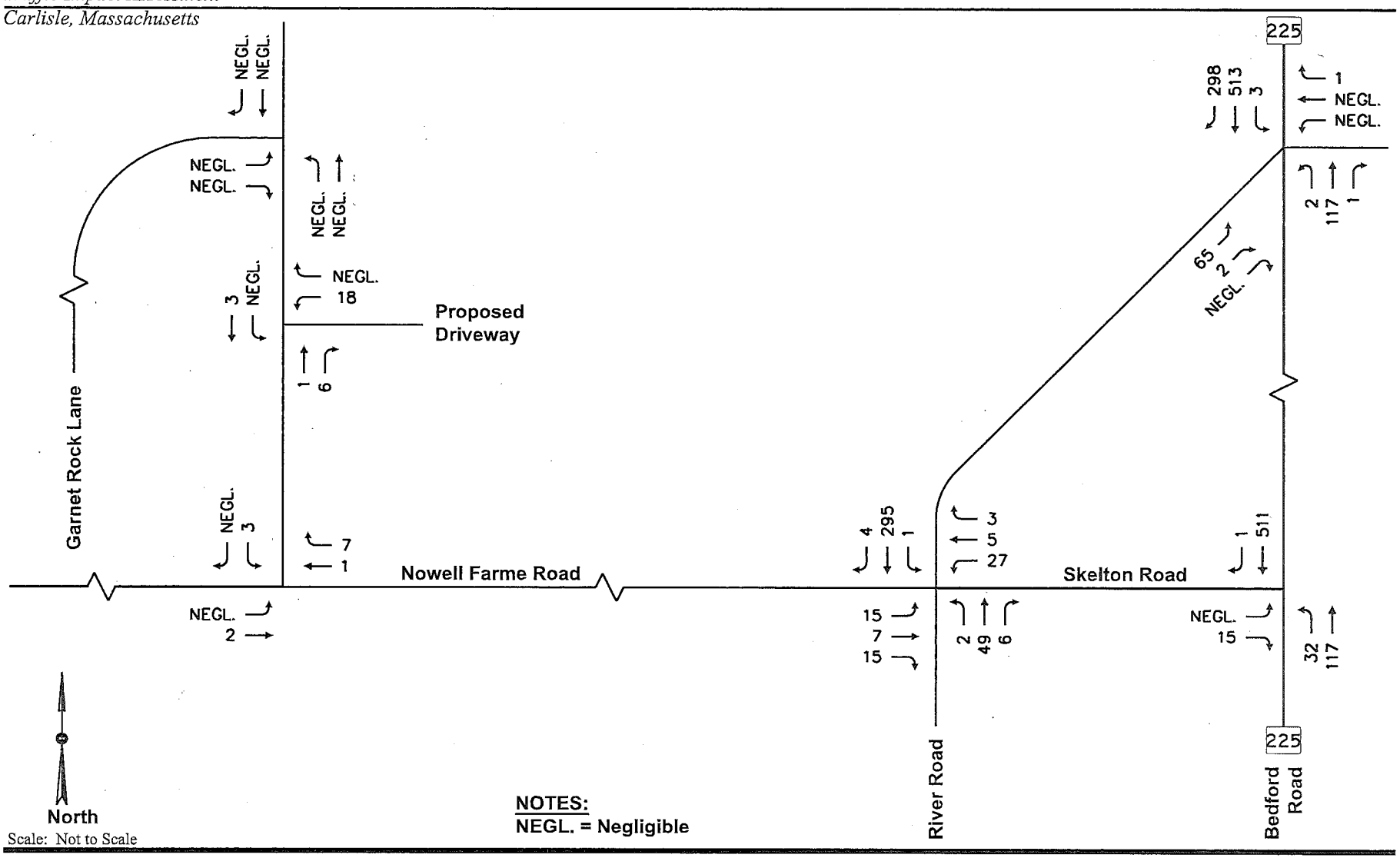

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Figure 10

2019 Build Condition
Weekday Morning Peak Hour Traffic Volumes

Date: October 2014
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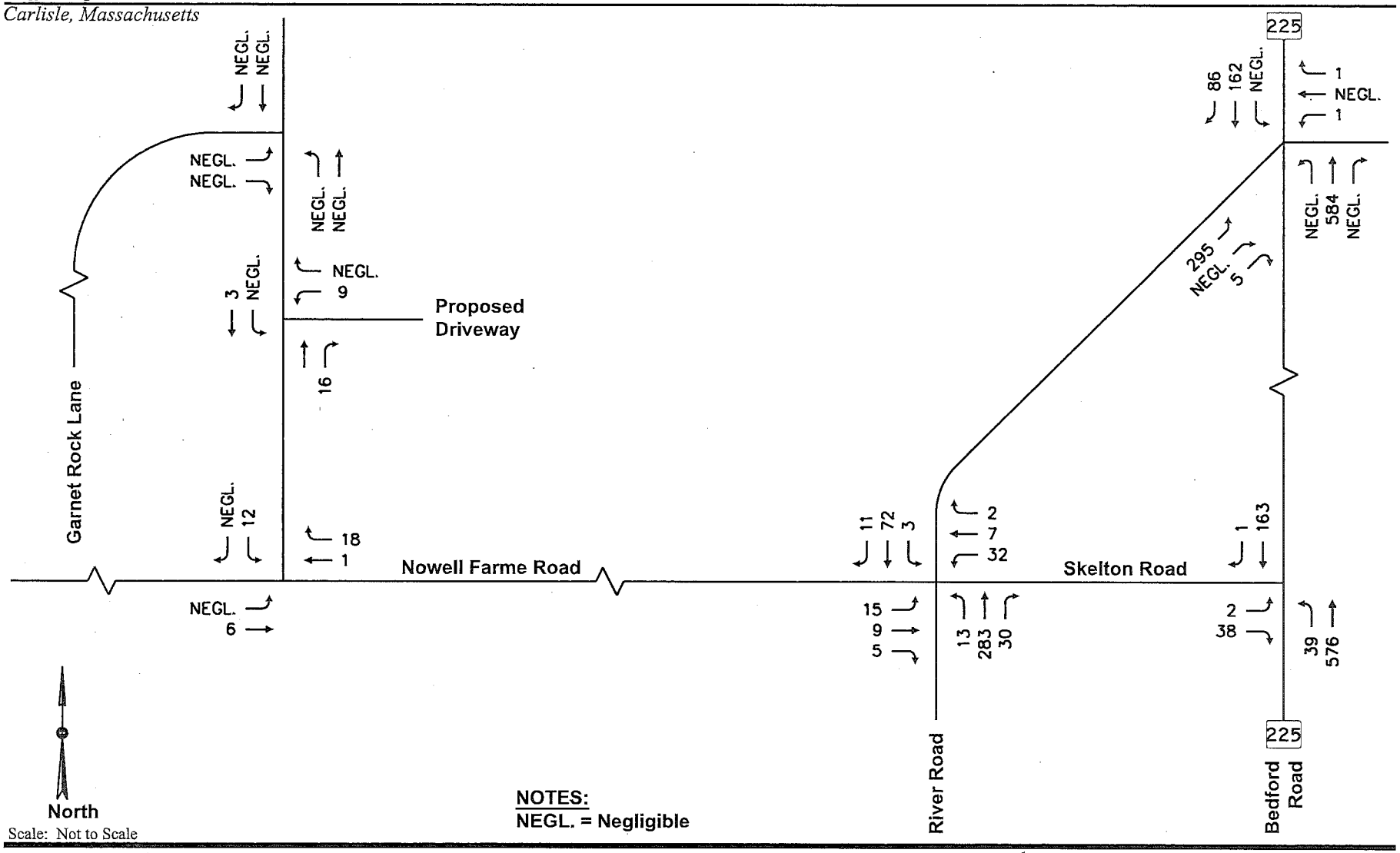

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Figure 11

2019 Build Condition
Weekday Evening Peak Hour Traffic Volumes

Date: October 2014
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3.4 TRIP DISTRIBUTION AND ASSIGNMENT

The distribution for projected traffic for the residential development is based on existing travel patterns of the adjacent roadway system (specifically, traffic patterns involving Nowell Farme Road). The resulting trip distribution is presented in **Figure 7**. Trip distribution calculations are provided in the **Appendix.**

Figure 8 and **Figure 9** show projected site-generated traffic volumes for the proposed residential development for the weekday morning and weekday evening peak hours, respectively, based on trip generation estimates presented in **Table 6** and projected travel patterns presented in **Figure 7**.

3.5 BUILD TRAFFIC VOLUMES

2019 Build condition traffic volumes are derived by adding the incremental traffic increases for the residential use at the site to the 2019 No-Build condition traffic volumes. **Figure 10** and **Figure 11** present the 2019 Build condition traffic-volume networks for the weekday morning and weekday evening peak hours, respectively.

4.0 TRAFFIC OPERATIONS ANALYSIS

Intersection capacity analyses for the study intersections are presented in this section for the Existing, No-Build, and Build traffic-volume conditions. Capacity analyses, conducted in accordance with industry guidelines, provide an index of how well the roadway facilities serve the traffic demands placed upon them. The operational results provide the basis for recommended access and roadway improvements in the following section.

4.1 CAPACITY ANALYSIS PROCEDURES

Capacity analysis of intersections is developed using the Synchro® computer software, which implements the methods of the 2010 Highway Capacity Manual (HCM). The resulting analysis presents a level-of-service (LOS) designation for individual intersection movements. The LOS is a letter designation that provides a qualitative measure of operating conditions based on several factors including roadway geometry, speeds, ambient traffic volumes, traffic controls, and driver characteristics. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of year. A range of six levels of service are defined on the basis of average delay, ranging from LOS A (the least delay) to LOS F (delays greater than 50 seconds for unsignalized movements). The specific control delays and associated LOS designations are presented in the **Appendix**.

4.2 INTERSECTION CAPACITY ANALYSIS RESULTS

Capacity analysis results for the weekday morning and weekday evening peak hour capacity analysis results for the study intersections are described below, with detailed analysis results presented in the **Appendix**.

4.2.1 Level of Service Analysis

Level-of-Service (LOS) analyses were conducted for the 2014 Existing, 2019 No-Build and 2019 Build conditions for the study intersections. The results of the intersection capacity are summarized below in **Table 7** and **Table 8**. Detailed analysis results are presented in the **Appendix**.

TABLE 7
INTERSECTION CAPACITY ANALYSIS RESULTS
WEEKDAY MORNING PEAK HOUR

		2014 Existing			2019 No-Build			2019 Build		
Period/Intersection	Approach	v/c[1]	Delay[2]	LOS[3]	v/c	Delay	LOS	v/c	Delay	LOS
Route 225 at River Road	Eastbound	0.28	25	C	0.30	26	D	0.34	27	D
	Westbound	0.00	9	A	0.00	9	A	0.00	9	A
	Northbound Left	0.00	10	A	0.00	10	A	0.00	10	A
Route 225 at Skelton Road	Eastbound	0.03	13	B	0.03	13	B	0.04	13	B
	Northbound Left	0.04	9	A	0.04	9	A	0.04	9	A
Nowell Farme Road at Skelton Road and River Road	Eastbound	0.03	11	B	0.03	11	B	0.06	11	B
	Westbound	0.05	12	B	0.06	12	B	0.07	12	B
	Northbound	0.00	<5	A	0.00	<5	A	0.00	8	A
	Southbound	0.00	7	A	0.00	7	A	0.00	7	A
Nowell Farme Road at Long Ridge Road	Eastbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Westbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Southbound	0.00	9	A	0.00	9	A	0.03	9	A
Long Ridge Road at Proposed Site Driveway	Westbound Exit	n/a[4]	n/a	n/a	n/a	n/a	n/a	0.02	9	A
	Southbound Left	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A

[1]Volume-to-capacity ratio
[2]Average control delay per vehicle (in seconds)
[3]Level of service
[4]n/a = not applicable

TABLE 8
INTERSECTION CAPACITY ANALYSIS RESULTS
WEEKDAY EVENING PEAK HOUR

		2014 Existing			2019 No-Build			2019 Build		
Period/Intersection	Approach	v/c[1]	Delay[2]	LOS[3]	v/c	Delay	LOS	v/c	Delay	LOS
Route 225 at River Road	Eastbound	>1.0	>50	F	>1.0	>50	F	>1.0	>50	F
	Westbound	0.01	15	B	0.01	15	B	0.01	15	B
	Northbound Left	0.00	<5	A	0.00	<5	A	0.00	<5	A
Route 225 at Skelton Road	Eastbound	0.05	10	A	0.05	10	A	0.05	10	A
	Northbound Left	0.02	8	A	0.03	8	A	0.03	8	A
Nowell Farme Road at Skelton Road and River Road	Eastbound	0.05	12	B	0.05	13	B	0.07	13	B
	Westbound	0.08	13	B	0.09	13	B	0.10	13	B
	Northbound	0.01	7	A	0.01	7	A	0.01	7	A
	Southbound	0.00	8	A	0.00	8	A	0.00	8	A
Nowell Farme Road at Long Ridge Road	Eastbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Westbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Southbound	0.01	9	A	0.01	9	A	0.02	9	A
Long Ridge Road at Proposed Site Driveway	Westbound	n/a[4]	n/a	n/a	n/a	n/a	n/a	0.01	9	A
	Southbound Left	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A

[1]Volume-to-capacity ratio
[2]Average control delay per vehicle (in seconds)
[3]Level of service
[4]n/a = not applicable

As summarized in **Tables 7** and **8**, operations at study intersections are generally below capacity, with LOS D or better operations. Delay increases due to the proposed development are negligible (<3 seconds). The exception is the River Road approach to Route 225 during the weekday evening peak hour which currently experiences relatively long delays (LOS F operations). However, project-related trip increases at this intersection amount to one additional vehicle every 6 minutes – an amount that is imperceptible to the average motorist and is not expected to materially impact intersection operations.

5.0 INTERIOR ROADWAY LAYOUT

5.1 ROADWAY DESIGN

The site has been designed to include a 20-foot wide interior roadway and 25-foot curb radii at its intersection with Long Ridge Road which meets or exceeds local design standards. The divisional island proposed at the entrance provides a gateway to the development and area for locating signage and landscape features.

5.2 SITE CIRCULATION

An AutoTurn® analysis for the Town's emergency apparatus (aerial ladder truck) is provided in the **Appendix** and simulates the vehicle's travel path through the site. In order to better accommodate emergency apparatus, MDM recommends the elimination of the proposed divisional island or widening of the travel lane on both sides of the island to a minimum of 16-feet. In addition, landscaping and other obstructions could potentially restrict sight lines on the inside of the horizontal curve at Unit 18. As such, a no-planting area should be designated along its frontage.

According to the Carlisle Public School's website, the nearest school bus stop is located at the intersection of Long Ridge Road and Nowell Farme Road. Given the existing bus route, this existing stop or a potential bus stop at the entrance to the proposed development limits the need for school bus traffic to circulate within the site.

5.3 INTERSECTION SPACING

Design guidelines[3] generally recommend a minimum 50- to 125-foot spacing between offset intersections in order to eliminate potential conflicts between back-to-back left-turning vehicles. The proposed site roadway provides approximately 110-foot centerline spacing to Garnet Rock Lane located to the west and therefore falls within this range. In addition, since Garnet Rock Lane is not expected to be used by site traffic, back-to-back left-turn conflicts are unlikely to occur. Nevertheless, the 110-foot spacing could accommodate the infrequent back-to-back left turn situation.

[3] *Project Development & Design Guide*, Massachusetts Highway Department dated 2006 & *Neighborhood Street Design Guidelines*, Institute of Transportation Engineers, 2010

6.0 CONCLUSIONS AND RECOMMENDATIONS

Development of the site to include 20 single-family homes will generate modest traffic increases – 25 vehicle trips or less during peak hours. The proposed residential development is not expected to materially impact operating conditions at the study intersections during peak hours; no change in intersection operations are anticipated. The study area roadways and intersections generally provide ample capacity to support project-related traffic. The River Road approach to Route 225 operates with relatively long delays (LOS F operations) during the weekday evening peak hour. However, project-related trip increases at this intersection amount to one additional vehicle every 6 minutes – an amount that is imperceptible to the average motorist and is not expected to materially impact intersection operations. MDM recommends the following on-site improvements to enhance traffic operations:

- In order to better accommodate emergency apparatus, MDM recommends the elimination of the proposed divisional island or widening of the travel lane on both sides of the island to a minimum of 16-feet. On-street parking around the cul-de-sac should be prohibited to enhance site circulation. In addition, landscaping could potentially limit sight lines on the inside of the horizontal curve at Unit 18. As such, a no-planting area should be designated along its frontage.

- MDM recommends that any plantings (shrubs/bushes) or structures (fences, walls, signs, etc.) be maintained at a height of 2 feet or less within the Long Ridge Road layout at the site roadway intersection to ensure clear sight lines to approaching traffic.

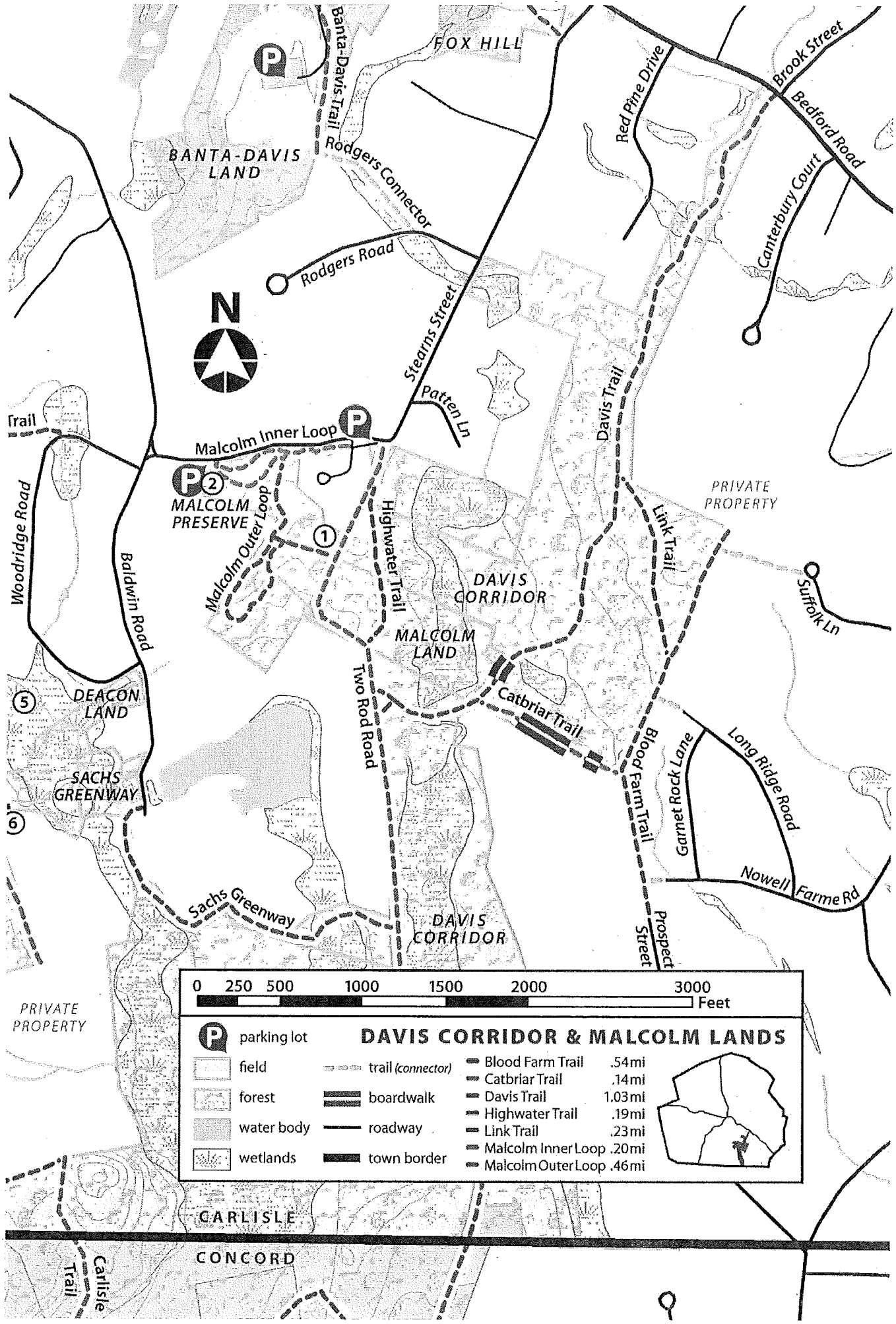
- MUTCD compliant signs and pavement markings are recommended at the proposed site driveway along Long Ridge Road. Signs and pavement markings should including a "STOP" sign (R1-1) and STOP line pavement markings.

Independent of the proposed residential development, MDM suggests that the Town conduct routine maintenance of the trees and vegetation located in the southwest and northwest quadrant of the River Road/Nowell Farme Road/Skelton Road intersection to improve driver sight lines at this location. In addition, MDM suggests that the Town consider formalizing a secondary means of access (gated) to the existing Nowell Farme Road neighborhood via Prospect Street and the Blood Farm Trail for emergency purposes if desired by local emergency responders.

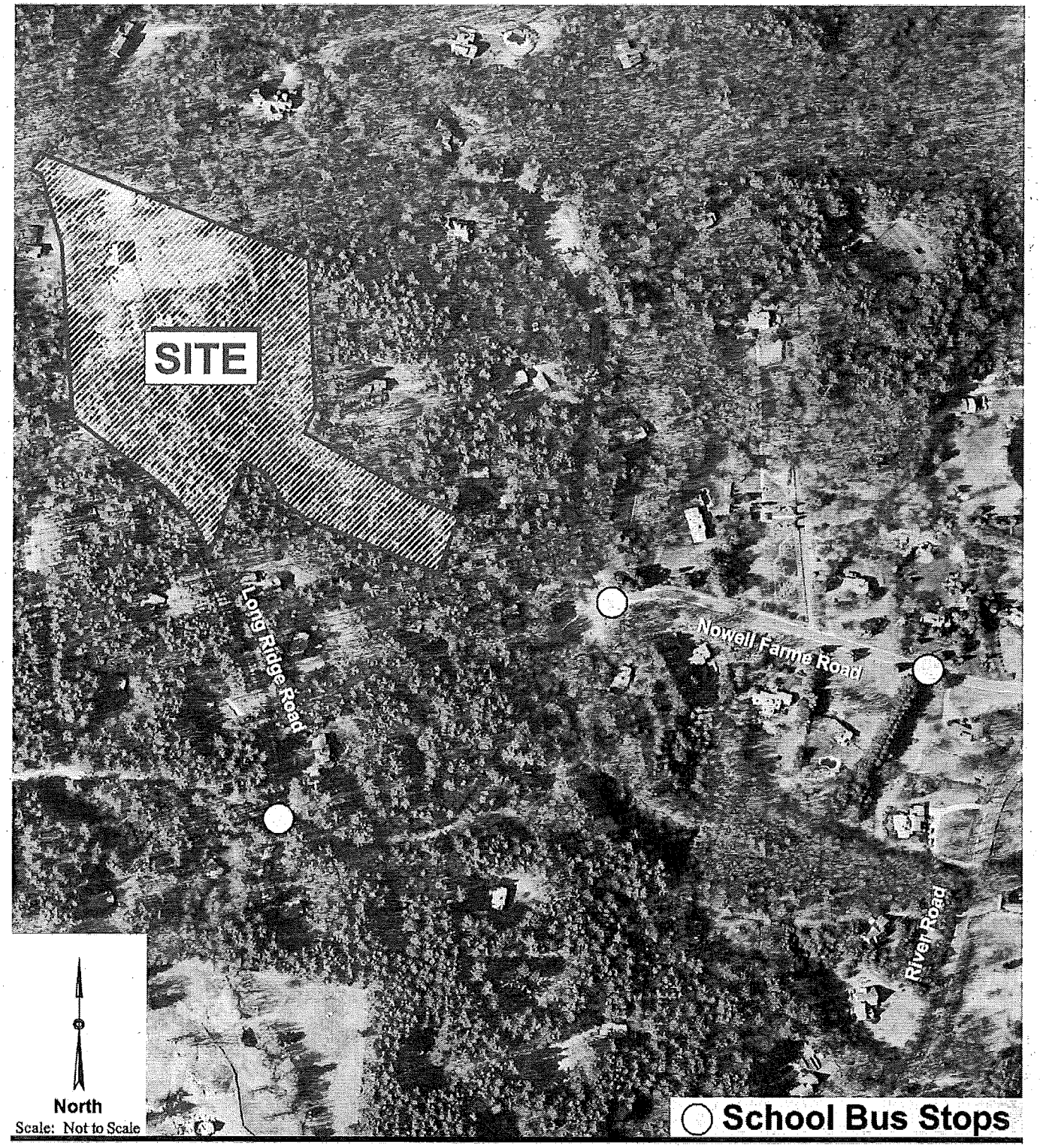
Appendix

- Davis Corridor & Malcolm Lands Trail Map
- School Bus Stop Locations
- Traffic Volume Data
- Seasonal Adjustment Calculations
- Intersection Crash Data
- Speed Data
- Sight Line Analysis
- Background Growth
- Trip Generation Data
- Trip Distribution Calculations
- Capacity Analyses
- AutoTurn® Analysis

□ Davis Corridor & Malcolm Lands Trail Map


DAVIS CORRIDOR & MALCOLM LANDS
0 250 500 1000 1500 2000 3000 Feet
parking lot
field
forest
water body
wetlands
trail (connector)
boardwalk
roadway
town border
Blood Farm Trail .54mi
Catbriar Trail .14mi
Davis Trail 1.03mi
Highwater Trail .19mi
Link Trail .23mi
Malcolm Inner Loop .20mi
Malcolm Outer Loop .46mi
N
FOX HILL
BANTA-DAVIS LAND
Banta-Davis Trail
Rodgers Connector
Rodgers Road
Red Pine Drive
Brook Street
Bedford Road
Canterbury Court
Stearns Street
Patten Ln
Davis Trail
Malcolm Inner Loop
MALCOLM PRESERVE
Malcolm Outer Loop
Highwater Trail
DAVIS CORRIDOR
MALCOLM LAND
Link Trail
PRIVATE PROPERTY
Suffolk Ln
Woodridge Road
Baldwin Road
DEACON LAND
SACHS GREENWAY
Two Rod Road
Catbriar Trail
Blood Farm Trail
Garnet Rock Lane
Long Ridge Road
Nowell Farme Rd
Sachs Greenway
DAVIS CORRIDOR
Prospect Street
PRIVATE PROPERTY
CARLISLE
CONCORD
Carlisle Trail

□ School Bus Stop Locations



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Attachments

School Bus Stops

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2014 – 2015 Elementary Morning Bus Routes

Bus C1 begins at 8:03 AM	**Bus C2 begins at 8:07 AM**	**Bus C3 begins at 7:58AM**
Carlisle Public School	Carlisle Public School	Carlisle Public School
52 East St	292 Westford Street	Rodgers Rd & Stearns St
Blaisdell & East	360 Westford Street	Baldwin & Stearns
104 East	Westford St & Johnson Road	122 Baldwin Road
410 East Street	Hanover & Westford	395/401 School Street
476 East Street	1181 Curve Street	623 School St
East St & Ice Pond Rd	Kimball Rd & Wilkins Ln	332 Russell St
525 East Street	Curve & Hart Farm	193 Russell
Rutland & Great Brook Path	867 Curve St	Russell St & Spencer Brook Ln
139 Rutland Street	810 Curve Street	Concord St & South St
Rutland & Calderwood	146 Martin Street	273 Cross Street
Rutland & Chestnut	Lowell St & Wolf Rock Rd	381 Cross
461 Rutland Street	Lowell & Ember	491 Cross
610 Rutland St.	652 Lowell Street	Carlisle Pines Dr & Evergreen Ln
630 Rutland St	Sunset & Elizabeth Ridge	Evergreen Ln & Forest Park Dr
Patch Meadow Ln & Rutland	33 Sunset Road	Old Quarry Dr & West St
99 Pine Brook Rd	501 Lowell Street	94 Acton Street
North & Aldershot	Lowell & Ledgeways	637 Westford Street
1095 North	Lowell And Rocky Point	547 Westford St.
1173 North Road	Lowell St & Elizabeth Ridge	131 Virginia Farme
916 Maple	239 Lowell Street	Munroe Hill & Nathan
536 Maple	9 Lowell	117 Munroe Hill
491 Maple Street		75 Westford Street
391 Maple Street		
357 Maple Street		
287 Maple		
Maple & Davis (2nd Entrance)		
59 Maple		
588 Bedford Road		
549 Bedford		
Bedford Rd & Red Pine Dr		
303 Bedford Road		
142 Bedford Road		

2014 – 2015 Elementary Morning Bus Routes

Bus C4 begins at 8:01 AM	**Bus C5 begins at 7:59 AM**	**Bus C6 begins at 8:01 AM**
Carlisle Public School	Carlisle Public School	Carlisle Public School
24 Bingham Road	East & Cutters Ridge	564 East Street
168 Bingham Road	Meadowbrook & Partridge Ln	Carroll Dr & East St
190 Bingham Road	Partridge Ln & Woodbine Rd	East & E Meadow
	52 East Riding Drive	Laurelwood & Hemlock Hill
315 Cross	112 Tophet Road	Hemlock Hill & Oak Knoll
Trillium And Cross	Carleton Rd & Tophet Rd	1034 East St.
Cross & Captain Wilson	7 Carleton Road	511 Brook St
131 Cross Street	212 East Riding Drive	Brook & Peter Hans
Cross St & Greystone Ln	E Riding & Carriage Way	Bedford & Stony Gate South
40 Cross	Brook St & Timothy Ln	90 River
103 Heald	76 Bellows Hill Rd.	18 Nowell Farme Road
Heald & Judy Farm South	61 Estabrook Road	Nowell Farme & Suffolk
Heald Rd & Berry Corner	185 Estabrook Road	Long Ridge & Nowell Farme
Judy Farm & Heald North	Autumn & Kibby	554 River Road
250 Acton	312 Autumn	River & Prospect
270 Acton Street	Autumn & Indian Hl & Robbins	387 River
Acton St & Koning Farm	182 Indian Hl	8 Skelton
Acton & West	Indian Hill Rd & Indian Hl	26 Skelton Rd
West & Highwoods	52 Indian Hill Road	1094 Bedford Road
Log Hill Rd & West St	61 Hartwell Rd	1036 Bedford Road
532 South Street	Concord & Buttrick North	981 Bedford Road
South St & Wildwood Dr	800 Concord St	965 Bedford Road
333 Concord St.		
301 Concord Street		
201 Concord Street		
185 Concord St.		
Carlisle Kids House		
43 Bedford Road		

2014 – 2015 Elementary Afternoon Bus Routes
All Buses Leave School At About 3:10 Pm

Bus C1	**Bus C2**	**Bus C3**
142 Bedford Road	292 Westford Street	Rodgers Rd & Stearns St
52 East	360 Westford Street	Baldwin & Stearns
East & Blaisdell	Johnson & Westford	122 Baldwin Road
104 East Street	Hanover & Westford	395/401 School Street
Carlisle Kids House	1181 Curve Street	623 School St
410 East Street	Kimball Rd & Wilkins Ln	332 Russell St
476 East Street	Fiske St & Kimball Rd	193 Russell
East St & Ice Pond Rd	Curve & Hart Farm	Russell St & Spencer Brook Ln
525 East Street	867 Curve Street	South & Concord
139 Rutland Street	810 Curve St	273 Cross St
Rutland & Great Brook Path	146 Martin Street	381 Cross
Rutland & Calderwood	Lowell St & Wolf Rock Rd	491 Cross
Rutland & Chestnut	Lowell & Ember	Carlisle Pines And Evergreen
461 Rutland	652 Lowell Street	Evergreen Ln & Forest Park Dr
610 Rutland	33 Sunset Road	Old Quarry Dr & West St
630 Rutland	Sunset & Elizabeth Ridge	94 Acton Street
Patch Meadow Ln & Rutland St	501 Lowell	637 Westford St.
99 Pine Brook Rd	Lowell & Ledgeways	547 Westford Street
North & Aldershot	Lowell & Elizabeth Ridge	131 Virginia Farme
1095 North	Lowell And Rocky Point	Munroe Hill & Nathan
1173 North	239 Lowell Street	117 Munroe Hill
916 Maple	9 Lowell	75 Westford Street
536 Maple		
491 Maple Street		
357 Maple Street		
287 Maple Street		
Maple & Davis (2nd Entrance)		
59 Maple		
588 Bedford Road		
549 Bedford Road		
Bedford Rd & Red Pine Dr		
303 Bedford Road		

2014 – 2015 Elementary Afternoon Bus Routes
All Buses Leave School At About 3:10 Pm

Bus C4	**Bus C5**	**Bus C6**
43 Bedford Road	Carlisle Kids House	Carlisle Kids House
185 Concord St.	East & Cutters Ridge	564 East Street
201 Concord Street	Meadowbrook Rd & Partridge Ln	Carroll Dr & East St
301 Concord	Partridge Ln & Woodbine Rd	East & E Meadow
333 Concord St.	52 East Riding Drive	Laurelwood & Hemlock Hill
24 Bingham Road	112 Tophet Road	Hemlock Hill Rd & Oak Knoll Rd
168 Bingham Road	Carleton Rd & Tophet Rd	1034 East St.
190 Bingham Road	7 Carleton Road	511 Brook St
Cross & Bingham	212 East Riding Drive	Brook & Peter Hans
Trillium And Cross	E Riding & Carriage Way	Bedford & Stoney Gate (2nd Entrance)
Cross & Captain Wilson	Brook St & Timothy Ln	90 River
131 Cross Street	76 Bellows Hill Rd.	18 Nowell Farme Road
Cross St & Greystone Ln	61 Estabrook Road	Nowell Farme & Suffolk
40 Cross	185 Estabrook Road	Long Ridge Rd & Nowell Farme Rd
103 Heald	Autumn & Kibby	554 River Road
Heald & Judy Farm South	312 Autumn	River & Prospect
Heald Rd & Berry Corner	Autumn Ln & Indian Hl & Robbins Dr	387 River
Judy Farm Rd & Heald North	182 Indian Hl	26 Skelton Rd
250 Acton	Indian Hill Rd & Indian Hl	8 Skelton
270 Acton Street	52 Indian Hill Road	1094 Bedford Road
Acton St & Koning Farm Rd	61 Hartwell Rd	1036 Bedford Road
Acton & West	Concord & Buttrick (2nd Entrance)	981 Bedford Road
West & Highwoods	800 Concord St	965 Bedford Road
Log Hill Rd & West St		
532 South Street		
South St & Wildwood Dr		

2014 - 2015 Middle School Morning Bus Routes

Bus C1 begins at 7:12 AM	Bus C2 begins at 7:14 AM	Bus C3 begins at 7:13AM
25 Rutland	322 Westford	151 Concord
Rutland & Great Brook Path	Westford St & Johnson Rd	185 Concord
Rutland & Calderwood	Hanover & Westford	301 Concord
Rutland & Chestnut Street	546 Westford	24 Bingham Rd
Rutland And Twin Beech	Curve & Forest Park	54 Bingham Rd
Rutland And Patch Meadow	Curve St & Hutchins Rd	119 Bingham Rd.
585 Rutland St.	1078 Curve St	Bingham & Pheasant Hill
847 North Rd	1056 Curve St.	Bingham Rd & Cross St
815 North Rd	211 Fiske St.	381 Cross St.
99 Pine Brook Rd	Fiske St & Kimball Rd	484 Cross St
1090 North	Curve & Hart Farm	600 Cross Street
Mcallister Dr & North Rd	810 Curve St	1230 Westford
1192 North Rd.	498 Curve	Old Quarry Dr & West St
916 Maple	481 Curve Street	300 West Street
848 Maple Street	787 Lowell	West & Acton
Maple & Davis East	Lowell & Wolf Rock Rd	Acton & Koning Farm
Maple & Davis West	Lowell St & Ember	250 Acton Street
110 Maple	Lowell St & Orchard Acres	Acton St & Heald Rd
59 Maple	Elizabeth Ridge & Sunset	547 Westford St
Maple & Bedford	501 Lowell Street	45 Virginia Farme
Bedford Rd & Shady Brook Ln	Lowell & Ledgeways	Munroe Hill & Nathan
	Lowell St & Elizabeth Ridge	117 Munroe Hill Rd.
		Aaron Way & Munroe Hill
		147 Westford Street

2014 – 2015 Middle School Morning Bus Routes

Bus C4 Begins At 7:08 AM	**Bus C5 Begins At 7:09 AM**	**Bus C6 Begins At 7:09 AM**
271 Cross St.	Carriage Way & E Riding Dr	East & East Meadow
Cross And Trillium	Carleton Rd & E Riding Dr	883 East Street
Cross & Captain Wilson	E Riding Dr & Tophet Rd	East & Milne Cove
Cross St & Greystone Ln	East St & Ice Pond Rd	Hemlock Hill & Laurelwood
88 Heald	391 East	Brook & Peter Hans
Heald & Berry Corner	East & Woodbine	Brook St & Timothy Ln
Heald & Judy Farm North	294 East	Brook & Page Brook
533 West	Cutters Ridge Rd & East St	Bedford & Canterbury
542 West	52 East St.	Bedford & Stoney Gate
West & Highwoods	East & Blaisdell	8 Skelton Road
West & Log Hill	395 School Street	26 Skelton Rd
West & Applegrove	613 School	Nowell Farme & Suffolk
545 South Street	100 Bellows Hill Rd	Long Ridge & Nowell Farme
South St & Wildwood Dr	61 Estabrook Road	389 River Rd
152 South Street	185 Estabrook	River & Foss Way
Russell & Spencer Brook	Autumn & Kibby	871 Bedford
193 Russell Street	Autumn & Indian Hl & Robbins	72 Bedford Road
Russell & Robbins	183 Indian Hl	
352 School Street	60 Hartwell Rd	
Baldwin Rd & Stearns St	Buttrick & Concord South	
Rodgers Rd & Stearns St	Concord & Buttrick North	
	941 Concord	
	899 Concord St	
	800 Concord St	
	600 Concord St	
	515 Concord St	

2014 - 2015 Middle School Afternoon Bus Routes
All Buses Leave School At About 2:25 Pm

Bus C1	**Bus C2**	**Bus C3**
25 Rutland	Lowell St & Elizabeth Ridge	151 Concord St.
Rutland & Great Brook Path	Lowell & Ledgeways	185 Concord St.
Rutland & Calderwood	501 Lowell Street	301 Concord St
Rutland & Chestnut Street	Elizabeth Ridge Rd & Sunset Rd	24 Bingham Rd
Rutland & Twin Beech	Lowell St & Orchard Acres	54 Bingham Rd
Rutland And Patch Meadow	Lowell & Ember	119 Bingham Rd.
585 Rutland St.	Lowell St & Wolf Rock Rd	Bingham & Pheasant Hill
847 North Rd	787 Lowell	Bingham Rd & Cross St
815 North Rd	481 Curve St	381 Cross St.
99 Pine Brook Rd	498 Curve St	484 Cross St
1090 North	810 Curve St	600 Cross Street
Mcallister Dr & North Rd	Curve & Hart Farm	1230 Westford
1192 North Rd.	Fiske St & Kimball Rd	Old Quarry Dr & West St
916 Maple Street	211 Fiske St.	300 West Street
848 Maple	1056 Curve St	West & Acton
Maple & Davis East	1078 Curve St.	Acton & Koning Farm
Maple & Davis West	Curve St & Hutchins Rd	250 Acton Street
110 Maple	Curve & Forest Park	Acton & Heald
59 Maple	Hanover & Westford	447 Westford St
Maple & Bedford	Westford St & Johnson Road	45 Virginia Farme
Bedford Rd & Shady Brook Ln	546 Westford	Munroe Hill & Nathan
	322 Westford	117 Munroe Hill Rd.
		Aaron Way & Munroe Hill Rd
		147 Westford Street

2014 - 2015 Middle School Afternoon Bus Routes
All Buses Leave School At About 2:25 Pm

Bus C4	**Bus C5**	**Bus C6**
271 Cross St.	.Carriage Way & E Riding Dr	72 Bedford Road
Cross & Trillium	Carleton Rd & E Riding Dr	Carlisle Kids House
Cross St & Captain Wilson Ln	E Riding Dr & Tophet Rd	East & East Meadow
Cross St & Greystone Ln	East St & Ice Pond Rd	883 East Street
88 Heald	391 East	East & Milne Cove
Heald & Berry Corner	East & Woodbine	Hemlock Hill & Laurelwood
Heald & Judy Farm North	294 East	Brook & Peter Hans
533 West	Cutters Ridge Rd & East St	Brook St & Timothy Ln
542 West	East & Blaisdell	Brook & Page Brook
West & Highwoods	52 East St.	Bedford & Canterbury
West & Log Hill	395 School Street	Bedford Rd & Stoney Gate
West & Applegrove	613 School	871 Bedford
545 South Street	100 Bellows Hill Rd	River & Foss Way
South St & Wildwood Dr	61 Estabrook Road	8 Skelton Road
152 South St	185 Estabrook	26 Skelton Rd
Russell St & Spencer Brook Ln	Autumn & Kibby	Nowell Farme Rd & Suffolk Ln
193 Russell	Autumn Ln & Indian Hl & Robbins Dr	Long Ridge Rd & Nowell Farme Rd
Russell & Robbins	183 Indian Hl	389 River Rd
352 School Street	60 Hartwell Rd	
Baldwin Rd & Stearns St	Buttrick Ln & Concord South	
Rodgers Rd & Stearns St	Buttrick & Concord North	
	941 Concord	
	879 Concord	
	800 Concord	
	600 Concord	
	515 Concord	

2014 – 2015 Kindergarten Noon Routes
Tuesdays & Thursdays Except Early Release Days

North Leaves School at 12:10	South Leaves School at 12:10
142 Bedford Road	29 Bingham Road
Carlisle Kids House	168 Bingham Road
43 Partridge Lane	273 Cross Street
40 Meadowbrook Road	Trillium and Cross
159 Partridge Lane	129 Cross Street
Aberdeen and Ice Pond	Highwoods Ln & West St
146 Tophet Road	270 Acton Street
7 Carleton Road	250 Acton Street
74 Peter Hans Road	253 Acton Street
47 Old East Street	113 Judy Farm Road
1034 East Street	103 Heald Road
4 Oak Knoll Road	55 Hartwell Road
1095 North Road	145 Indian Hill Road
Aldershot and North	29 Indian Hl
640 Rutland St.	182 Indian Hl
239 Lowell Street	342 Autumn Lane
501 Lowell Street	128 Robbins Drive
33 Sunset	74 Rodgers Road
174 Sunset Road	588 Bedford
652 Lowell Street	357 Maple Street
Curve St & Hart Farm Rd	Bedford & Stoney Gate
Westford St & Johnson Road	981 Bedford Road
	33 Nowell Farme Road
	Suffolk Lane first circle

□ Traffic Volume Data

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA 01752
508-303-0370
www.mdmtrans.com

N/S: Long Ridge Road
south of Garnet Rock Lane
Carlisle, MA

Site Code: 00077902
Station ID:

779 Long Ridge Road (Volume)

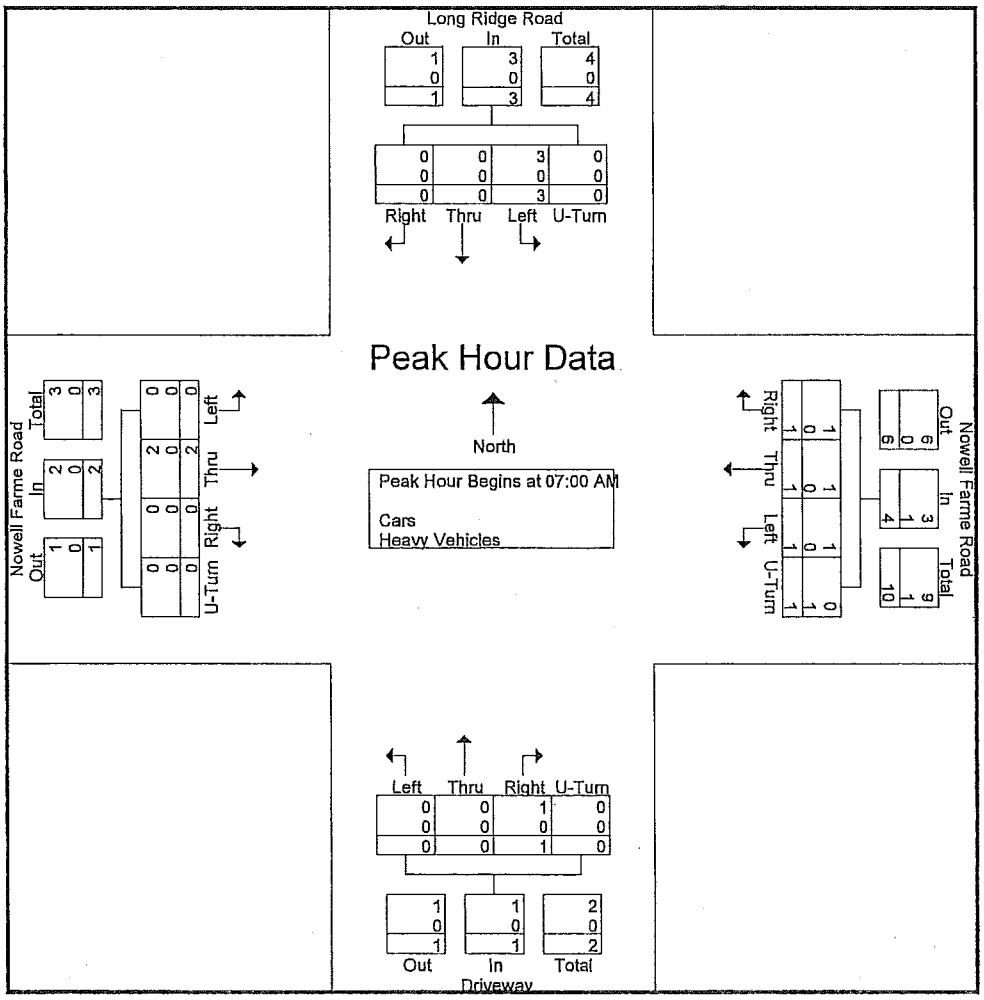
Start Time	15-Oct-14 Wed	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		0	0			0	0				
12:15		0	1			0	1				
12:30		0	1			0	0				
12:45		0	2	0	4	0	0	0	1	0	5
01:00		0	0			0	4				
01:15		0	0			0	0				
01:30		0	0			0	0				
01:45		0	0	0	0	0	0	0	4	0	4
02:00		0	2			0	0				
02:15		0	0			0	0				
02:30		0	0			0	2				
02:45		0	0	0	2	0	0	0	2	0	4
03:00		0	0			0	1				
03:15		0	0			0	0				
03:30		0	0			0	2				
03:45		0	0	0	0	0	0	0	3	0	3
04:00		0	1			0	0				
04:15		0	0			0	0				
04:30		0	0			0	0				
04:45		0	0	0	1	1	0	1	0	1	1
05:00		0	2			0	0				
05:15		0	0			1	1				
05:30		1	0			0	0				
05:45		0	0	1	2	0	0	1	1	2	3
06:00		0	1			0	1				
06:15		0	2			0	0				
06:30		0	0			0	1				
06:45		0	0	0	3	0	0	0	2	0	5
07:00		0	0			2	0				
07:15		1	0			0	0				
07:30		0	0			0	0				
07:45		0	0	1	0	0	0	2	0	3	0
08:00		0	1			0	0				
08:15		2	2			1	0				
08:30		0	0			0	0				
08:45		0	0	2	3	0	0	1	0	3	3
09:00		2	0			0	0				
09:15		0	0			0	0				
09:30		1	0			0	1				
09:45		1	0	4	0	1	1	1	2	5	2
10:00		0	0			0	0				
10:15		0	1			0	0				
10:30		0	0			0	0				
10:45		1	0	1	1	0	0	0	0	1	1
11:00		0	0			2	0				
11:15		0	0			1	0				
11:30		0	0			0	0				
11:45		2	0	2	0	0	0	3	0	5	0
Total		11	16			9	15			20	31
Percent	0.0%	40.7%	59.3%			37.5%	62.5%			39.2%	60.8%
Combined Total		27				24				51	
Total		11	16			9	15			20	31
Percent		40.7%	59.3%			37.5%	62.5%			39.2%	60.8%
Combined Total		27				24				51	
ADT		ADT 51		AADT 51							

PRECISION
D A T A
INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Long Ridge Road/ Driveway
E/W: Nowell Farme Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

File Name : 144091 A
Site Code : 779
Start Date : 9/24/2014
Page No : 1

	Long Ridge Road From North					Nowell Farme Road From East					Driveway From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	1	0	1	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	3
07:15 AM	0	0	1	0	1	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1	3
07:30 AM	0	0	1	0	1	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total Volume	0	0	3	0	3	1	1	1	1	4	1	0	0	0	1	0	2	0	0	2	10
% App. Total	0	0	100	0		25	25	25	25		100	0	0	0		0	100	0	0		
PHF	.000	.000	.750	.000	.750	.250	.250	.250	.250	.500	.250	.000	.000	.000	.250	.000	.500	.000	.000	.500	.833
Cars	0	0	3	0	3	1	1	1	0	3	1	0	0	0	1	0	2	0	0	2	9
% Cars	0	0	100	0	100	100	100	100	0	75.0	100	0	0	0	100	0	100	0	0	100	90.0
Heavy Vehicles	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
% Heavy Vehicles	0	0	0	0	0	0	0	0	100	25.0	0	0	0	0	0	0	0	0	0	0	10.0



PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

N/S: Long Ridge Road/ Driveway
E/W: Nowell Farme Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

File Name : 144091 A
Site Code : 779
Start Date : 9/24/2014
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Long Ridge Road From North				Nowell Farme Road From East				Driveway From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	3
07:15 AM	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	3
07:30 AM	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total	0	0	3	0	1	1	1	1	1	0	0	0	0	2	0	0	10
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
08:15 AM	1	0	0	0	2	0	0	1	0	0	0	0	0	1	0	0	5
08:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	3
Total	1	0	1	0	3	1	0	1	0	0	0	0	0	3	0	0	10
Grand Total	1	0	4	0	4	2	1	2	1	0	0	0	0	5	0	0	20
Apprch %	20	0	80	0	44.4	22.2	11.1	22.2	100	0	0	0	0	100	0	0	
Total %	5	0	20	0	20	10	5	10	5	0	0	0	0	25	0	0	
Cars	1	0	4	0	4	2	1	0	1	0	0	0	0	5	0	0	18
% Cars	100	0	100	0	100	100	100	0	100	0	0	0	0	100	0	0	90
Heavy Vehicles	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
% Heavy Vehicles	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	10

	Long Ridge Road From North					Nowell Farme Road From East					Driveway From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	1	0	1	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	3
07:15 AM	0	0	1	0	1	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1	3
07:30 AM	0	0	1	0	1	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total Volume	0	0	3	0	3	1	1	1	1	4	1	0	0	0	1	0	2	0	0	2	10
% App. Total	0	0	100	0		25	25	25	25		100	0	0	0		0	100	0	0		
PHF	.000	.000	.750	.000	.750	.250	.250	.250	.250	.500	.250	.000	.000	.000	.250	.000	.500	.000	.000	.500	.833
Cars	0	0	3	0	3	1	1	1	0	3	1	0	0	0	1	0	2	0	0	2	9
% Cars	0	0	100	0	100	100	100	100	0	75.0	100	0	0	0	100	0	100	0	0	100	90.0
Heavy Vehicles	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
% Heavy Vehicles	0	0	0	0	0	0	0	0	100	25.0	0	0	0	0	0	0	0	0	0	0	10.0

N/S: Long Ridge Road/ Driveway
E/W: Nowell Farme Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

PRECISION DATA INDUSTRIES, LLC
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Office: 508.481.3999 Fax: 508.545.1234
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File Name : 144091 A
Site Code : 779
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Page No : 1

Groups Printed- Cars

	Long Ridge Road From North				Nowell Farme Road From East				Driveway From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	3
07:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2
07:30 AM	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Total	0	0	3	0	1	1	1	0	1	0	0	0	0	2	0	0	9
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
08:15 AM	1	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	4
08:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	3
Total	1	0	1	0	3	1	0	0	0	0	0	0	0	3	0	0	9
Grand Total	1	0	4	0	4	2	1	0	1	0	0	0	0	5	0	0	18
Apprch %	20	0	80	0	57.1	28.6	14.3	0	100	0	0	0	0	100	0	0	
Total %	5.6	0	22.2	0	22.2	11.1	5.6	0	5.6	0	0	0	0	27.8	0	0	

	Long Ridge Road From North					Nowell Farme Road From East					Driveway From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
eak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
eak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	1	0	1	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	3
07:15 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
07:30 AM	0	0	1	0	1	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total Volume	0	0	3	0	3	1	1	1	0	3	1	0	0	0	1	0	2	0	0	2	9
% App. Total	0	0	100	0		33.3	33.3	33.3	0		100	0	0	0		0	100	0	0		
PHF	.000	.000	.750	.000	.750	.250	.250	.250	.000	.375	.250	.000	.000	.000	.250	.000	.500	.000	.000	.500	.750

N/S: Long Ridge Road/ Driveway
E/W: Nowell Farme Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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File Name : 144091 A
Site Code : 779
Start Date : 9/24/2014
Page No : 1

Groups Printed- Heavy Vehicles

	Long Ridge Road From North				Nowell Farme Road From East				Driveway From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Grand Total	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Apprch %	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	
Total %	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	

	Long Ridge Road From North					Nowell Farme Road From East					Driveway From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
eak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
'eak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
% App. Total	0	0	0	0		0	0	0	100		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

N/S: Long Ridge Road/ Driveway
E/W: Nowell Farme Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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Site Code : 779
Start Date : 9/24/2014
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Groups Printed- Peds and Bicycles

	Long Ridge Road From North				Nowell Farme Road From East				Driveway From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total %																	

	Long Ridge Road From North					Nowell Farme Road From East					Driveway From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

N/S: Long Ridge Road/ Driveway
E/W: Nowell Farme Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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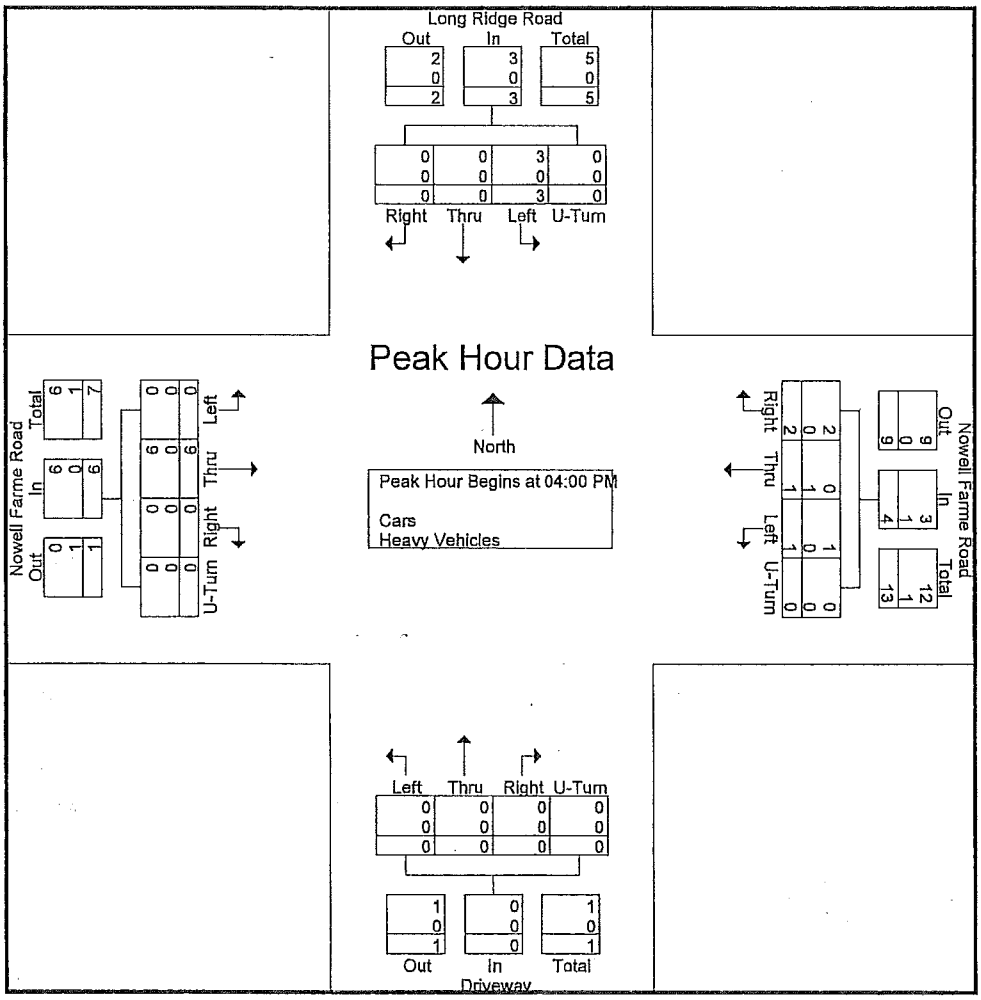
	Long Ridge Road From North					Nowell Farme Road From East					Driveway From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 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	1	0	1	0	2	0	0	0	0	0	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	3	0	0	3	4
04:30 PM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	2
04:45 PM	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	5
Total Volume	0	0	3	0	3	2	1	1	0	4	0	0	0	0	0	0	6	0	0	6	13
% App. Total	0	0	100	0		50	25	25	0		0	0	0	0		0	100	0	0		
PHF	.000	.000	.375	.000	.375	.500	.250	.250	.000	.500	.000	.000	.000	.000	.000	.000	.500	.000	.000	.500	.650
Cars	0	0	3	0	3	2	0	1	0	3	0	0	0	0	0	0	6	0	0	6	12
% Cars	0	0	100	0	100	100	0	100	0	75.0	0	0	0	0	0	0	100	0	0	100	92.3
Heavy Vehicles	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
% Heavy Vehicles	0	0	0	0	0	0	100	0	0	25.0	0	0	0	0	0	0	0	0	0	0	7.7



N/S: Long Ridge Road/ Driveway
E/W: Nowell Farme Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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File Name : 144091 AA
Site Code : 779
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Groups Printed- Cars - Heavy Vehicles

	Long Ridge Road From North				Nowell Farme Road From East				Driveway From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
04:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	3	0	0	4
04:30 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
04:45 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	3	0	0	5
Total	0	0	3	0	2	1	1	0	0	0	0	0	0	6	0	0	13
05:00 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
05:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	3
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	2	4	0	0	0	0	0	0	0	0	0	0	7
Grand Total	0	0	4	0	4	5	1	0	0	0	0	0	0	6	0	0	20
Apprch %	0	0	100	0	40	50	10	0	0	0	0	0	0	100	0	0	
Total %	0	0	20	0	20	25	5	0	0	0	0	0	0	30	0	0	
Cars	0	0	4	0	4	4	1	0	0	0	0	0	0	6	0	0	19
% Cars	0	0	100	0	100	80	100	0	0	0	0	0	0	100	0	0	95
Heavy Vehicles	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
% Heavy Vehicles	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	5

	Long Ridge Road From North					Nowell Farme Road From East					Driveway From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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	1	0	1	0	2	0	0	0	0	0	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	3	0	0	3	4
04:30 PM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	2
04:45 PM	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	5
Total Volume	0	0	3	0	3	2	1	1	0	4	0	0	0	0	0	0	6	0	0	6	13
% App. Total	0	0	100	0		50	25	25	0		0	0	0	0		0	100	0	0		
PHF	.000	.000	.375	.000	.375	.500	.250	.250	.000	.500	.000	.000	.000	.000	.000	.000	.500	.000	.000	.500	.650
Cars	0	0	3	0	3	2	0	1	0	3	0	0	0	0	0	0	6	0	0	6	12
% Cars	0	0	100	0	100	100	0	100	0	75.0	0	0	0	0	0	0	100	0	0	100	92.3
Heavy Vehicles	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
% Heavy Vehicles	0	0	0	0	0	0	100	0	0	25.0	0	0	0	0	0	0	0	0	0	0	7.7

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N/S: Long Ridge Road/ Driveway
E/W: Nowell Farme Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

File Name : 144091 AA
Site Code : 779
Start Date : 9/24/2014
Page No : 1

Groups Printed- Cars

	Long Ridge Road From North				Nowell Farme Road From East				Driveway From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
04:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	3	0	0	4
04:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	3	0	0	5
Total	0	0	3	0	2	0	1	0	0	0	0	0	0	6	0	0	12
05:00 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
05:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	3
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	0	2	4	0	0	0	0	0	0	0	0	0	0	7
Grand Total	0	0	4	0	4	4	1	0	0	0	0	0	0	6	0	0	19
Apprch %	0	0	100	0	44.4	44.4	11.1	0	0	0	0	0	0	100	0	0	
Total %	0	0	21.1	0	21.1	21.1	5.3	0	0	0	0	0	0	31.6	0	0	

	Long Ridge Road From North					Nowell Farme Road From East					Driveway From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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	1	0	1	0	2	0	0	0	0	0	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	3	0	0	3	4
04:30 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	5
Total Volume	0	0	3	0	3	2	0	1	0	3	0	0	0	0	0	0	6	0	0	6	12
% App. Total	0	0	100	0		66.7	0	33.3	0		0	0	0	0		0	100	0	0		
PHF	.000	.000	.375	.000	.375	.500	.000	.250	.000	.375	.000	.000	.000	.000	.000	.000	.500	.000	.000	.500	.600

N/S: Long Ridge Road/ Driveway
E/W: Nowell Farme Road
City, State: Carlisle, MA
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File Name : 144091 AA
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Page No : 1

Groups Printed- Heavy Vehicles

	Long Ridge Road From North				Nowell Farme Road From East				Driveway From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Apprch %	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	
Total %	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	

	Long Ridge Road From North					Nowell Farme Road From East					Driveway From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	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	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
% App. Total	0	0	0	0		0	100	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250

N/S: Long Ridge Road/ Driveway
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Groups Printed- Peds and Bicycles

	Long Ridge Road From North				Nowell Farme Road From East				Driveway From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	3	0	0	0	0	0	0	0	1	0	1	1	0	6
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	3	0	0	0	0	0	0	0	1	0	1	1	0	6
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	4
05:30 PM	4	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	7
05:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Total	6	0	0	0	3	0	0	0	0	0	0	0	0	0	3	0	12
Grand Total	6	0	0	3	3	0	0	0	0	0	0	1	0	1	4	0	18
Apprch %	66.7	0	0	33.3	100	0	0	0	0	0	0	100	0	20	80	0	
Total %	33.3	0	0	16.7	16.7	0	0	0	0	0	0	5.6	0	5.6	22.2	0	

	Long Ridge Road From North					Nowell Farme Road From East					Driveway From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	2	0	0	0	2	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
05:30 PM	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	7
05:45 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total Volume	6	0	0	0	6	3	0	0	0	3	0	0	0	0	0	0	0	3	0	3	12
% App. Total	100	0	0	0		100	0	0	0		0	0	0	0		0	0	100	0		
PHF	.375	.000	.000	.000	.375	.375	.000	.000	.000	.375	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.429

J/S: River Road
:/W: Skelton Road/ Nowell Farme Road
:ity, State: Carlisle, MA
:lient: MDM/ C. Jones

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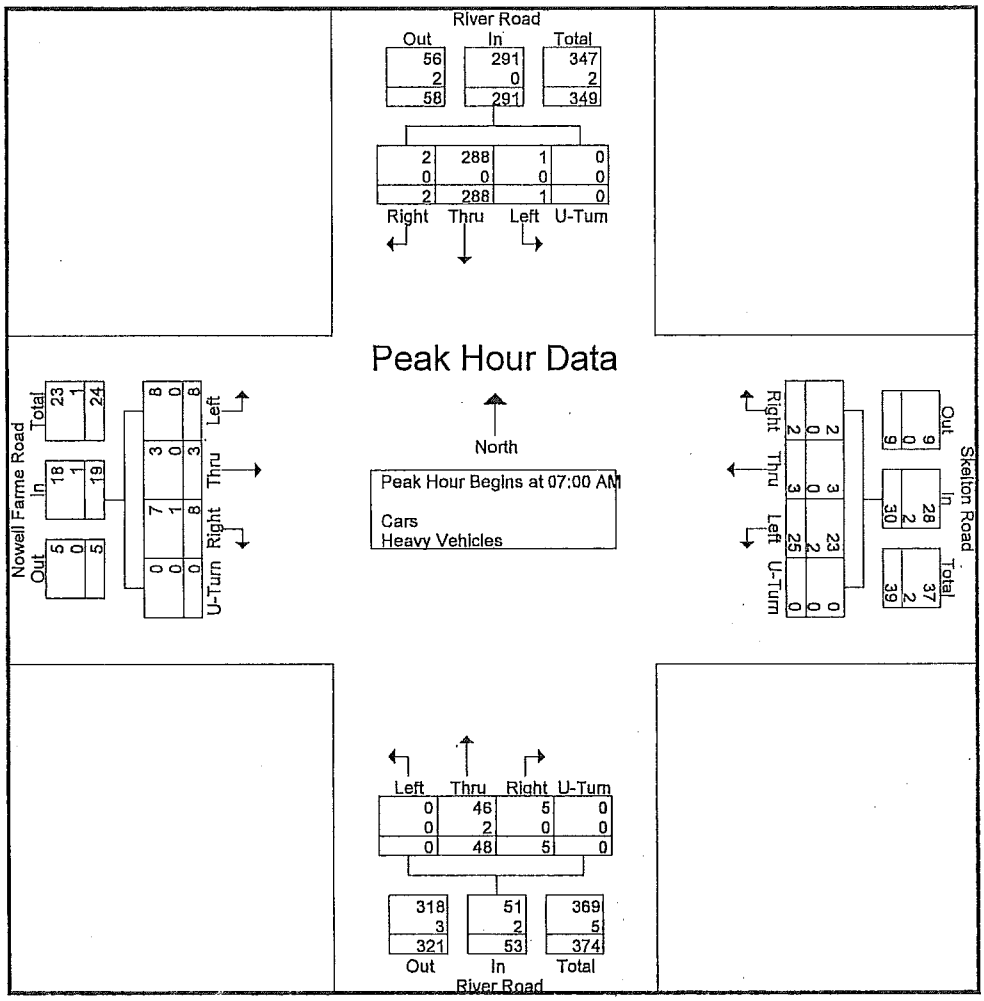
File Name : 144091 B
Site Code : 779
Start Date : 9/24/2014
Page No : 1

	River Road From North					Skelton Road From East					River Road From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
ak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
eak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	85	0	0	85	0	1	2	0	3	2	7	0	0	9	3	1	1	0	5	102
07:15 AM	0	67	0	0	67	0	0	8	0	8	1	12	0	0	13	2	2	1	0	5	93
07:30 AM	1	60	0	0	61	0	2	10	0	12	2	16	0	0	18	1	0	2	0	3	94
07:45 AM	1	76	1	0	78	2	0	5	0	7	0	13	0	0	13	2	0	4	0	6	104
Total Volume	2	288	1	0	291	2	3	25	0	30	5	48	0	0	53	8	3	8	0	19	393
% App. Total	0.7	99	0.3	0		6.7	10	83.3	0		9.4	90.6	0	0		42.1	15.8	42.1	0		
PHF	.500	.847	.250	.000	.856	.250	.375	.625	.000	.625	.625	.750	.000	.000	.736	.667	.375	.500	.000	.792	.945
Cars	2	288	1	0	291	2	3	23	0	28	5	46	0	0	51	7	3	8	0	18	388
% Cars	100	100	100	0	100	100	100	92.0	0	93.3	100	95.8	0	0	96.2	87.5	100	100	0	94.7	98.7
Heavy Vehicles	0	0	0	0	0	0	0	2	0	2	0	2	0	0	2	1	0	0	0	1	5
% Heavy Vehicles	0	0	0	0	0	0	0	8.0	0	6.7	0	4.2	0	0	3.8	12.5	0	0	0	5.3	1.3



J/S: River Road
E/W: Skelton Road/ Nowell Farme Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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File Name : 144091 B
Site Code : 779
Start Date : 9/24/2014
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Groups Printed- Cars - Heavy Vehicles

	River Road From North				Skelton Road From East				River Road From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	85	0	0	0	1	2	0	2	7	0	0	3	1	1	0	102
07:15 AM	0	67	0	0	0	0	8	0	1	12	0	0	2	2	1	0	93
07:30 AM	1	60	0	0	0	2	10	0	2	16	0	0	1	0	2	0	94
07:45 AM	1	76	1	0	2	0	5	0	0	13	0	0	2	0	4	0	104
Total	2	288	1	0	2	3	25	0	5	48	0	0	8	3	8	0	393
08:00 AM	0	62	0	0	0	0	13	0	5	8	0	0	1	0	1	0	90
08:15 AM	2	50	0	0	1	1	5	0	4	11	0	0	4	0	1	0	79
08:30 AM	1	42	0	0	2	0	6	0	2	13	1	0	0	0	2	0	69
08:45 AM	3	29	0	0	0	1	2	0	5	17	0	0	1	2	2	0	62
Total	6	183	0	0	3	2	26	0	16	49	1	0	6	2	6	0	300
Grand Total	8	471	1	0	5	5	51	0	21	97	1	0	14	5	14	0	693
Apprch %	1.7	98.1	0.2	0	8.2	8.2	83.6	0	17.6	81.5	0.8	0	42.4	15.2	42.4	0	
Total %	1.2	68	0.1	0	0.7	0.7	7.4	0	3	14	0.1	0	2	0.7	2	0	
Cars	6	469	1	0	5	5	49	0	19	95	1	0	12	5	14	0	681
% Cars	75	99.6	100	0	100	100	96.1	0	90.5	97.9	100	0	85.7	100	100	0	98.3
Heavy Vehicles	2	2	0	0	0	0	2	0	2	2	0	0	2	0	0	0	12
% Heavy Vehicles	25	0.4	0	0	0	0	3.9	0	9.5	2.1	0	0	14.3	0	0	0	1.7

	River Road From North					Skelton Road From East					River Road From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	**85**	0	0	**85**	0	1	2	0	3	**2**	7	0	0	9	**3**	1	1	0	5	102
07:15 AM	0	67	0	0	67	0	0	8	0	8	1	12	0	0	13	2	**2**	1	0	5	93
07:30 AM	**1**	60	0	0	61	0	**2**	**10**	0	**12**	2	**16**	0	0	**18**	1	0	2	0	3	94
07:45 AM	1	76	**1**	0	78	**2**	0	5	0	7	0	13	0	0	13	2	0	**4**	0	**6**	**104**
Total Volume	2	288	1	0	291	2	3	25	0	30	5	48	0	0	53	8	3	8	0	19	393
% App. Total	0.7	99	0.3	0		6.7	10	83.3	0		9.4	90.6	0	0		42.1	15.8	42.1	0		
PHF	.500	.847	.250	.000	.856	.250	.375	.625	.000	.625	.625	.750	.000	.000	.736	.667	.375	.500	.000	.792	.945
Cars	2	288	1	0	291	2	3	23	0	28	5	46	0	0	51	7	3	8	0	18	388
% Cars	100	100	100	0	100	100	100	92.0	0	93.3	100	95.8	0	0	96.2	87.5	100	100	0	94.7	98.7
Heavy Vehicles	0	0	0	0	0	0	0	2	0	2	0	2	0	0	2	1	0	0	0	1	5
% Heavy Vehicles	0	0	0	0	0	0	0	8.0	0	6.7	0	4.2	0	0	3.8	12.5	0	0	0	5.3	1.3

N/S: River Road
E/W: Skelton Road/ Nowell Farme Road
City, State: Carlisle, MA
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File Name : 144091 B
Site Code : 779
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Page No : 1

Groups Printed- Cars

	River Road From North				Skelton Road From East				River Road From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	85	0	0	0	1	2	0	2	7	0	0	3	1	1	0	102
07:15 AM	0	67	0	0	0	0	6	0	1	12	0	0	1	2	1	0	90
07:30 AM	1	60	0	0	0	2	10	0	2	15	0	0	1	0	2	0	93
07:45 AM	1	76	1	0	2	0	5	0	0	12	0	0	2	0	4	0	103
Total	2	288	1	0	2	3	23	0	5	46	0	0	7	3	8	0	388
08:00 AM	0	61	0	0	0	0	13	0	5	8	0	0	1	0	1	0	89
08:15 AM	0	49	0	0	1	1	5	0	2	11	0	0	3	0	1	0	73
08:30 AM	1	42	0	0	2	0	6	0	2	13	1	0	0	0	2	0	69
08:45 AM	3	29	0	0	0	1	2	0	5	17	0	0	1	2	2	0	62
Total	4	181	0	0	3	2	26	0	14	49	1	0	5	2	6	0	293
Grand Total	6	469	1	0	5	5	49	0	19	95	1	0	12	5	14	0	681
Apprch %	1.3	98.5	0.2	0	8.5	8.5	83.1	0	16.5	82.6	0.9	0	38.7	16.1	45.2	0	
Total %	0.9	68.9	0.1	0	0.7	0.7	7.2	0	2.8	14	0.1	0	1.8	0.7	2.1	0	

	River Road From North					Skelton Road From East					River Road From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	**85**	0	0	**85**	0	1	2	0	3	**2**	7	0	0	9	**3**	1	1	0	5	102
07:15 AM	0	67	0	0	67	0	0	6	0	6	1	12	0	0	13	1	**2**	1	0	4	90
07:30 AM	**1**	60	0	0	61	0	**2**	**10**	0	**12**	2	**15**	0	0	**17**	1	0	2	0	3	93
07:45 AM	1	76	**1**	0	78	**2**	0	5	0	7	0	12	0	0	12	2	0	**4**	0	**6**	**103**
Total Volume	2	288	1	0	291	2	3	23	0	28	5	46	0	0	51	7	3	8	0	18	388
% App. Total	0.7	99	0.3	0		7.1	10.7	82.1	0		9.8	90.2	0	0		38.9	16.7	44.4	0		
PHF	.500	.847	.250	.000	.856	.250	.375	.575	.000	.583	.625	.767	.000	.000	.750	.583	.375	.500	.000	.750	.942

N/S: River Road
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File Name : 144091 B
Site Code : 779
Start Date : 9/24/2014
Page No : 1

Groups Printed- Heavy Vehicles

	River Road From North				Skelton Road From East				River Road From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	3
07:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	2	0	0	2	0	0	1	0	0	0	5
08:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	2	1	0	0	0	0	0	0	2	0	0	0	1	0	0	0	6
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	2	0	0	0	0	0	0	2	0	0	0	1	0	0	0	7
Grand Total	2	2	0	0	0	0	2	0	2	2	0	0	2	0	0	0	12
Apprch %	50	50	0	0	0	0	100	0	50	50	0	0	100	0	0	0	
Total %	16.7	16.7	0	0	0	0	16.7	0	16.7	16.7	0	0	16.7	0	0	0	

	River Road From North					Skelton Road From East					River Road From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
08:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	2	1	0	0	3	0	0	0	0	0	2	0	0	0	2	1	0	0	0	1	6
Total Volume	2	2	0	0	4	0	0	0	0	0	2	2	0	0	4	1	0	0	0	1	9
% App. Total	50	50	0	0		0	0	0	0		50	50	0	0		100	0	0	0		
PHF	.250	.500	.000	.000	.333	.000	.000	.000	.000	.000	.250	.500	.000	.000	.500	.250	.000	.000	.000	.250	.375

N/S: River Road
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Start Date : 9/24/2014
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Groups Printed- Peds and Bicycles

	River Road From North				Skelton Road From East				River Road From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3
07:15 AM	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2
07:30 AM	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	1	0	0	1	1	2	1	0	1	0	0	0	0	8
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
08:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
Total	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	5
Grand Total	0	3	0	1	0	0	1	1	2	4	0	1	0	0	0	0	13
Apprch %	0	75	0	25	0	0	50	50	28.6	57.1	0	14.3	0	0	0	0	
Total %	0	23.1	0	7.7	0	0	7.7	7.7	15.4	30.8	0	7.7	0	0	0	0	

	River Road From North					Skelton Road From East					River Road From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	1	0	0	1	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	3
07:15 AM	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
07:30 AM	0	0	0	0	0	0	0	0	1	1	0	1	0	1	2	0	0	0	0	0	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	0	1	2	0	0	1	1	2	2	1	0	1	4	0	0	0	0	0	8
% App. Total	0	50	0	50		0	0	50	50		50	25	0	25		0	0	0	0		
PHF	.000	.250	.000	.250	.500	.000	.000	.250	.250	.500	.250	.250	.000	.250	.500	.000	.000	.000	.000	.000	.667

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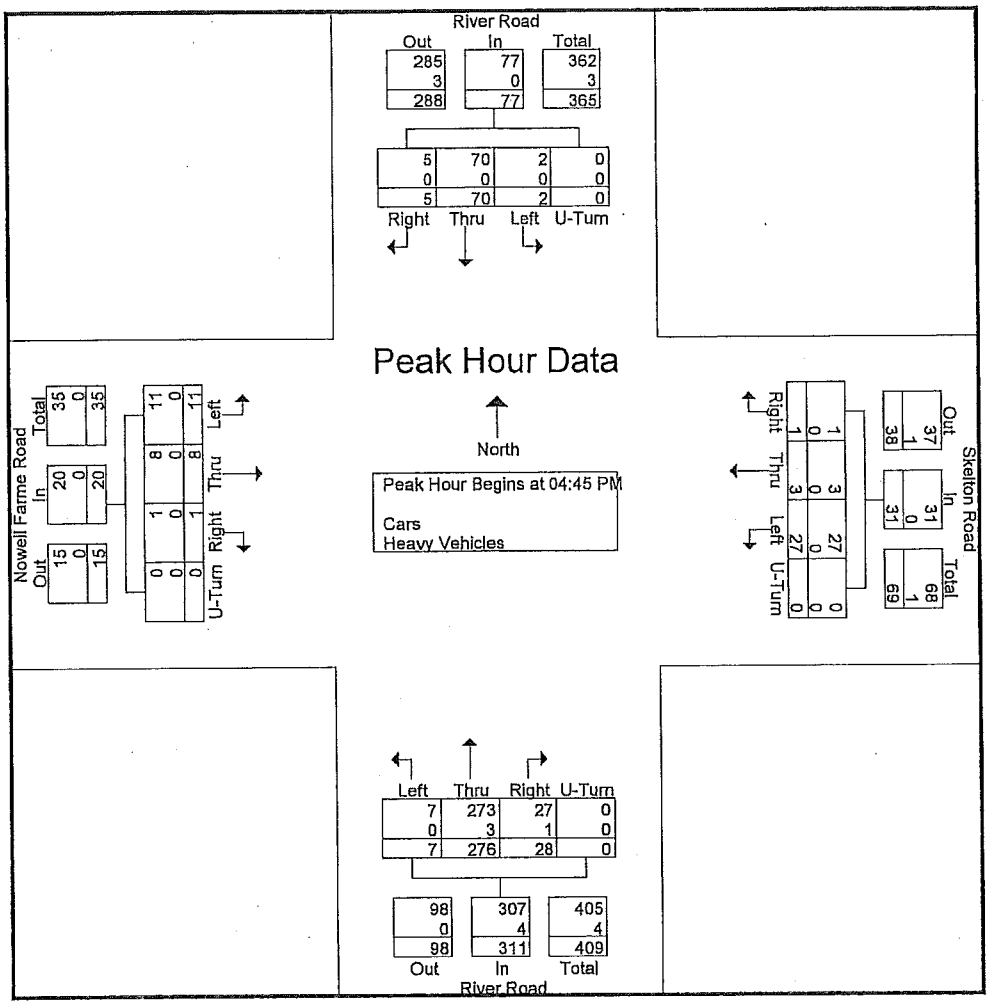
	River Road From North					Skelton Road From East					River Road From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	1	13	0	0	14	1	1	4	0	6	5	63	0	0	68	1	3	3	0	7	95
05:00 PM	1	15	1	0	17	0	0	10	0	10	8	64	2	0	74	0	3	3	0	6	107
05:15 PM	2	19	0	0	21	0	1	5	0	6	9	62	2	0	73	0	2	4	0	6	106
05:30 PM	1	23	1	0	25	0	1	8	0	9	6	87	3	0	96	0	0	1	0	1	131
Total Volume	5	70	2	0	77	1	3	27	0	31	28	276	7	0	311	1	8	11	0	20	439
% App. Total	6.5	90.9	2.6	0		3.2	9.7	87.1	0		9	88.7	2.3	0		5	40	55	0		
PHF	.625	.761	.500	.000	.770	.250	.750	.675	.000	.775	.778	.793	.583	.000	.810	.250	.667	.688	.000	.714	.838
Cars	5	70	2	0	77	1	3	27	0	31	27	273	7	0	307	1	8	11	0	20	435
% Cars	100	100	100	0	100	100	100	100	0	100	96.4	98.9	100	0	98.7	100	100	100	0	100	99.1
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	0	0	0	0	0	4
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	3.6	1.1	0	0	1.3	0	0	0	0	0	0.9



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Groups Printed- Cars - Heavy Vehicles

	River Road From North				Skelton Road From East				River Road From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	3	13	0	0	1	2	3	0	6	41	1	0	0	0	1	0	71
04:15 PM	2	13	0	0	0	1	9	0	5	38	3	0	2	0	4	0	77
04:30 PM	1	12	0	0	0	0	5	0	9	50	2	0	0	0	2	0	81
04:45 PM	1	13	0	0	1	1	4	0	5	63	0	0	1	3	3	0	95
Total	7	51	0	0	2	4	21	0	25	192	6	0	3	3	10	0	324
05:00 PM	1	15	1	0	0	0	10	0	8	64	2	0	0	3	3	0	107
05:15 PM	2	19	0	0	0	1	5	0	9	62	2	0	0	2	4	0	106
05:30 PM	1	23	1	0	0	1	8	0	6	87	3	0	0	0	1	0	131
05:45 PM	1	16	0	0	0	2	5	0	7	59	1	0	0	0	1	0	92
Total	5	73	2	0	0	4	28	0	30	272	8	0	0	5	9	0	436
Grand Total	12	124	2	0	2	8	49	0	55	464	14	0	3	8	19	0	760
Apprch %	8.7	89.9	1.4	0	3.4	13.6	83.1	0	10.3	87.1	2.6	0	10	26.7	63.3	0	
Total %	1.6	16.3	0.3	0	0.3	1.1	6.4	0	7.2	61.1	1.8	0	0.4	1.1	2.5	0	
Cars	11	124	2	0	2	8	48	0	54	455	14	0	2	8	19	0	747
% Cars	91.7	100	100	0	100	100	98	0	98.2	98.1	100	0	66.7	100	100	0	98.3
Heavy Vehicles	1	0	0	0	0	0	1	0	1	9	0	0	1	0	0	0	13
% Heavy Vehicles	8.3	0	0	0	0	0	2	0	1.8	1.9	0	0	33.3	0	0	0	1.7

	River Road From North					Skelton Road From East					River Road From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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	1	13	0	0	14	1	1	4	0	6	5	63	0	0	68	1	3	3	0	7	95
05:00 PM	1	15	1	0	17	0	0	10	0	10	8	64	2	0	74	0	3	3	0	6	107
05:15 PM	2	19	0	0	21	0	1	5	0	6	9	62	2	0	73	0	2	4	0	6	106
05:30 PM	1	23	1	0	25	0	1	8	0	9	6	87	3	0	96	0	0	1	0	1	131
Total Volume	5	70	2	0	77	1	3	27	0	31	28	276	7	0	311	1	8	11	0	20	439
% App. Total	6.5	90.9	2.6	0		3.2	9.7	87.1	0		9	88.7	2.3	0		5	40	55	0		
PHF	.625	.761	.500	.000	.770	.250	.750	.675	.000	.775	.778	.793	.583	.000	.810	.250	.667	.688	.000	.714	.838
Cars	5	70	2	0	77	1	3	27	0	31	27	273	7	0	307	1	8	11	0	20	435
% Cars	100	100	100	0	100	100	100	100	0	100	96.4	98.9	100	0	98.7	100	100	100	0	100	99.1
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	0	0	0	0	0	4
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	3.6	1.1	0	0	1.3	0	0	0	0	0	0.9

N/S: River Road
E/W: Skelton Road/ Nowell Farme Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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File Name : 144091 BB
Site Code : 779
Start Date : 9/24/2014
Page No : 1

Groups Printed- Cars

	River Road From North				Skelton Road From East				River Road From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	2	13	0	0	1	2	2	0	6	39	1	0	0	0	1	0	67
04:15 PM	2	13	0	0	0	1	9	0	5	38	3	0	1	0	4	0	76
04:30 PM	1	12	0	0	0	0	5	0	9	46	2	0	0	0	2	0	77
04:45 PM	1	13	0	0	1	1	4	0	5	63	0	0	1	3	3	0	95
Total	6	51	0	0	2	4	20	0	25	186	6	0	2	3	10	0	315
05:00 PM	1	15	1	0	0	0	10	0	8	64	2	0	0	3	3	0	107
05:15 PM	2	19	0	0	0	1	5	0	9	61	2	0	0	2	4	0	105
05:30 PM	1	23	1	0	0	1	8	0	5	85	3	0	0	0	1	0	128
05:45 PM	1	16	0	0	0	2	5	0	7	59	1	0	0	0	1	0	92
Total	5	73	2	0	0	4	28	0	29	269	8	0	0	5	9	0	432
Grand Total	11	124	2	0	2	8	48	0	54	455	14	0	2	8	19	0	747
Apprch %	8	90.5	1.5	0	3.4	13.8	82.8	0	10.3	87	2.7	0	6.9	27.6	65.5	0	
Total %	1.5	16.6	0.3	0	0.3	1.1	6.4	0	7.2	60.9	1.9	0	0.3	1.1	2.5	0	

	River Road From North					Skelton Road From East					River Road From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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	1	13	0	0	14	1	1	4	0	6	5	63	0	0	68	1	3	3	0	7	95
05:00 PM	1	15	1	0	17	0	0	10	0	10	8	64	2	0	74	0	3	3	0	6	107
05:15 PM	2	19	0	0	21	0	1	5	0	6	9	61	2	0	72	0	2	4	0	6	105
05:30 PM	1	23	1	0	25	0	1	8	0	9	5	85	3	0	93	0	0	1	0	1	128
Total Volume	5	70	2	0	77	1	3	27	0	31	27	273	7	0	307	1	8	11	0	20	435
% App. Total	6.5	90.9	2.6	0		3.2	9.7	87.1	0		8.8	88.9	2.3	0		5	40	55	0		
PHF	.625	.761	.500	.000	.770	.250	.750	.675	.000	.775	.750	.803	.583	.000	.825	.250	.667	.688	.000	.714	.850

N/S: River Road
E/W: Skelton Road/ Nowell Farme Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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File Name : 144091 BB
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Groups Printed- Heavy Vehicles

	River Road From North				Skelton Road From East				River Road From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	1	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	4
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	0	1	0	0	6	0	0	1	0	0	0	9
05:00 PM	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	1	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	3
05:45 PM	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	1	3	0	0	0	0	0	0	4
Grand Total	1	0	0	0	0	0	1	0	1	9	0	0	1	0	0	0	13
Apprch %	100	0	0	0	0	0	100	0	10	90	0	0	100	0	0	0	
Total %	7.7	0	0	0	0	0	7.7	0	7.7	69.2	0	0	7.7	0	0	0	

	River Road From North					Skelton Road From East					River Road From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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	1	0	0	0	1	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	4
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	1	0	0	0	1	0	0	1	0	1	0	6	0	0	6	1	0	0	0	1	9
% App. Total	100	0	0	0		0	0	100	0		0	100	0	0		100	0	0	0		
PHF	.250	.000	.000	.000	.250	.000	.000	.250	.000	.250	.000	.375	.000	.000	.375	.250	.000	.000	.000	.250	.563

N/S: River Road
E/W: Skelton Road/ Nowell Farme Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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Site Code : 779
Start Date : 9/24/2014
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Groups Printed- Peds and Bicycles

	River Road From North				Skelton Road From East				River Road From South				Nowell Farme Road From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
04:30 PM	0	2	0	0	0	0	1	0	0	0	0	0	0	0	1	0	4
04:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Total	0	2	0	0	0	0	1	0	0	2	0	0	0	0	1	0	6
05:00 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
05:15 PM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	3	0	0	0	0	3	0	1	2	0	0	0	0	0	0	9
05:45 PM	0	2	0	0	0	1	0	0	0	4	0	0	0	0	0	0	7
Total	2	6	0	0	0	1	3	0	1	7	0	0	0	0	0	0	20
Grand Total	2	8	0	0	0	1	4	0	1	9	0	0	0	0	1	0	26
Apprch %	20	80	0	0	0	20	80	0	10	90	0	0	0	0	100	0	
Total %	7.7	30.8	0	0	0	3.8	15.4	0	3.8	34.6	0	0	0	0	3.8	0	

	River Road From North					Skelton Road From East					River Road From South					Nowell Farme Road From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
eak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
'eak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
05:15 PM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	3	0	0	3	0	0	3	0	3	1	2	0	0	3	0	0	0	0	0	9
05:45 PM	0	2	0	0	2	0	1	0	0	1	0	4	0	0	4	0	0	0	0	0	7
Total Volume	2	6	0	0	8	0	1	3	0	4	1	7	0	0	8	0	0	0	0	0	20
% App. Total	25	75	0	0		0	25	75	0		12.5	87.5	0	0		0	0	0	0		
PHF	.250	.500	.000	.000	.667	.000	.250	.250	.000	.333	.250	.438	.000	.000	.500	.000	.000	.000	.000	.000	.556

J/S: Bedford Road (Route 225)
V: Skelton Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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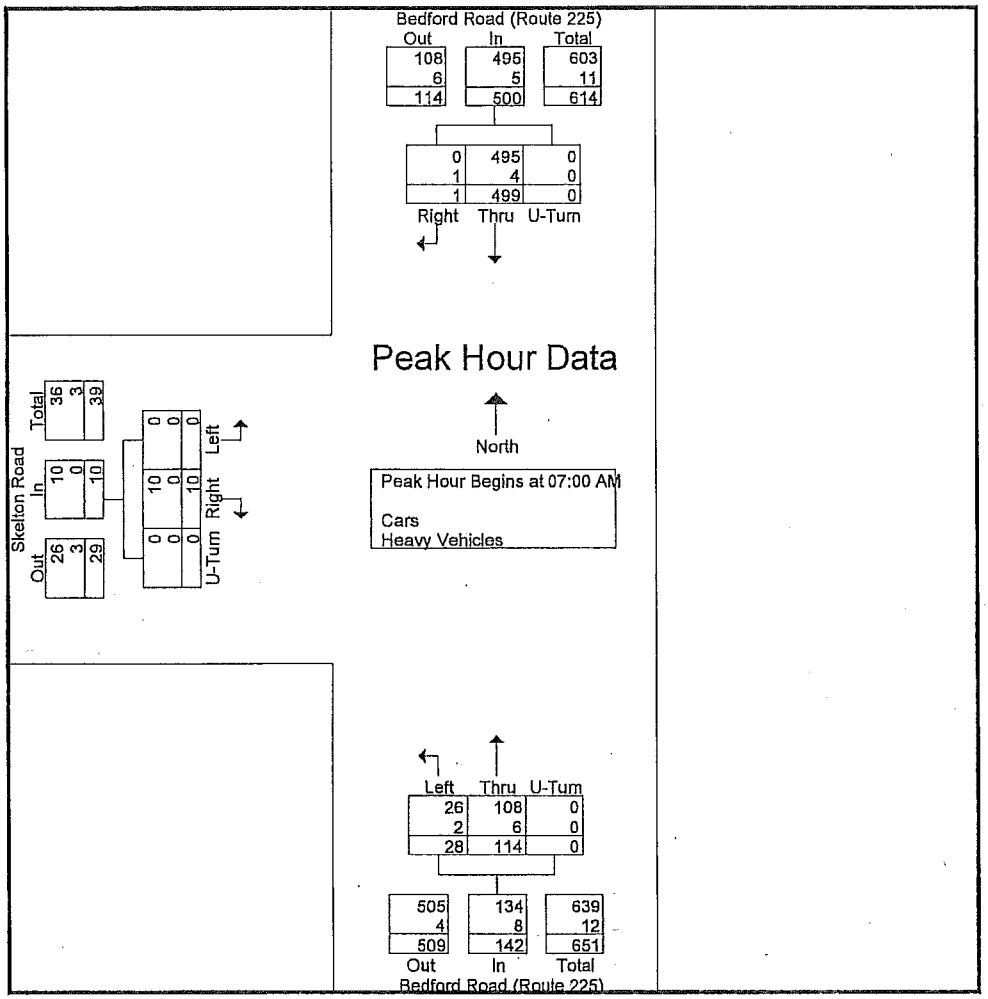
	Bedford Road (Route 225) From North				Bedford Road (Route 225) From South				Skelton Road From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
eak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
eak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	0	**179**	0	**179**	19	3	0	22	4	0	0	4	**205**
07:15 AM	1	153	0	154	33	8	0	41	3	0	0	3	198
07:30 AM	0	76	0	76	21	13	0	34	2	0	0	2	112
07:45 AM	0	91	0	91	41	4	0	45	1	0	0	1	137
Total Volume	1	499	0	500	114	28	0	142	10	0	0	10	652
% App. Total	0.2	99.8	0		80.3	19.7	0		100	0	0		
PHF	.250	.697	.000	.698	.695	.538	.000	.789	.625	.000	.000	.625	.795
Cars	0	495	0	495	108	26	0	134	10	0	0	10	639
% Cars	0	99.2	0	99.0	94.7	92.9	0	94.4	100	0	0	100	98.0
Heavy Vehicles	1	4	0	5	6	2	0	8	0	0	0	0	13
% Heavy Vehicles	100	0.8	0	1.0	5.3	7.1	0	5.6	0	0	0	0	2.0



J/S: Bedford Road (Route 225)
V: Skelton Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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File Name : 144091 C
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Groups Printed- Cars - Heavy Vehicles

	Bedford Road (Route 225) From North			Bedford Road (Route 225) From South			Skelton Road From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
07:00 AM	0	179	0	19	3	0	4	0	0	205
07:15 AM	1	153	0	33	8	0	3	0	0	198
07:30 AM	0	76	0	21	13	0	2	0	0	112
07:45 AM	0	91	0	41	4	0	1	0	0	137
Total	1	499	0	114	28	0	10	0	0	652
08:00 AM	0	95	0	26	12	0	5	0	0	138
08:15 AM	0	97	0	25	7	0	3	1	0	133
08:30 AM	0	93	0	27	4	0	2	1	0	127
08:45 AM	1	100	0	11	1	0	3	2	0	118
Total	1	385	0	89	24	0	13	4	0	516
Grand Total	2	884	0	203	52	0	23	4	0	1168
Apprch %	0.2	99.8	0	79.6	20.4	0	85.2	14.8	0	
Total %	0.2	75.7	0	17.4	4.5	0	2	0.3	0	
Cars	1	876	0	195	50	0	22	3	0	1147
% Cars	50	99.1	0	96.1	96.2	0	95.7	75	0	98.2
Heavy Vehicles	1	8	0	8	2	0	1	1	0	21
% Heavy Vehicles	50	0.9	0	3.9	3.8	0	4.3	25	0	1.8

	Bedford Road (Route 225) From North				Bedford Road (Route 225) From South				Skelton Road From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	0	**179**	0	**179**	19	3	0	22	4	0	0	**4**	**205**
07:15 AM	**1**	153	0	154	33	8	0	41	3	0	0	3	198
07:30 AM	0	76	0	76	21	**13**	0	34	2	0	0	2	112
07:45 AM	0	91	0	91	**41**	4	0	**45**	1	0	0	1	137
Total Volume	1	499	0	500	114	28	0	142	10	0	0	10	652
% App. Total	0.2	99.8	0		80.3	19.7	0		100	0	0		
PHF	.250	.697	.000	.698	.695	.538	.000	.789	.625	.000	.000	.625	.795
Cars	0	495	0	495	108	26	0	134	10	0	0	10	639
% Cars	0	99.2	0	99.0	94.7	92.9	0	94.4	100	0	0	100	98.0
Heavy Vehicles	1	4	0	5	6	2	0	8	0	0	0	0	13
% Heavy Vehicles	100	0.8	0	1.0	5.3	7.1	0	5.6	0	0	0	0	2.0

N/S: Bedford Road (Route 225)
W: Skelton Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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Groups Printed- Cars

	Bedford Road (Route 225) From North			Bedford Road (Route 225) From South			Skelton Road From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
07:00 AM	0	178	0	15	3	0	4	0	0	200
07:15 AM	0	152	0	33	6	0	3	0	0	194
07:30 AM	0	75	0	21	13	0	2	0	0	111
07:45 AM	0	90	0	39	4	0	1	0	0	134
Total	0	495	0	108	26	0	10	0	0	639
08:00 AM	0	95	0	24	12	0	5	0	0	136
08:15 AM	0	97	0	25	7	0	2	1	0	132
08:30 AM	0	90	0	27	4	0	2	0	0	123
08:45 AM	1	99	0	11	1	0	3	2	0	117
Total	1	381	0	87	24	0	12	3	0	508
Grand Total	1	876	0	195	50	0	22	3	0	1147
Apprch %	0.1	99.9	0	79.6	20.4	0	88	12	0	
Total %	0.1	76.4	0	17	4.4	0	1.9	0.3	0	

	Bedford Road (Route 225) From North				Bedford Road (Route 225) From South				Skelton Road From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	0	**178**	0	**178**	15	3	0	18	**4**	0	0	**4**	**200**
07:15 AM	0	152	0	152	33	6	0	39	3	0	0	3	194
07:30 AM	0	75	0	75	21	**13**	0	34	2	0	0	2	111
07:45 AM	0	90	0	90	**39**	4	0	**43**	1	0	0	1	134
Total Volume	0	495	0	495	108	26	0	134	10	0	0	10	639
% App. Total	0	100	0		80.6	19.4	0		100	0	0		
PHF	.000	.695	.000	.695	.692	.500	.000	.779	.625	.000	.000	.625	.799

J/S: Bedford Road (Route 225)
V: Skelton Road
City, State: Carlisle, MA
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Groups Printed- Heavy Vehicles

	Bedford Road (Route 225) From North			Bedford Road (Route 225) From South			Skelton Road From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
07:00 AM	0	1	0	4	0	0	0	0	0	5
07:15 AM	1	1	0	0	2	0	0	0	0	4
07:30 AM	0	1	0	0	0	0	0	0	0	1
07:45 AM	0	1	0	2	0	0	0	0	0	3
Total	1	4	0	6	2	0	0	0	0	13
08:00 AM	0	0	0	2	0	0	0	0	0	2
08:15 AM	0	0	0	0	0	0	1	0	0	1
08:30 AM	0	3	0	0	0	0	0	1	0	4
08:45 AM	0	1	0	0	0	0	0	0	0	1
Total	0	4	0	2	0	0	1	1	0	8
Grand Total	1	8	0	8	2	0	1	1	0	21
Apprch %	11.1	88.9	0	80	20	0	50	50	0	
Total %	4.8	38.1	0	38.1	9.5	0	4.8	4.8	0	

	Bedford Road (Route 225) From North				Bedford Road (Route 225) From South				Skelton Road From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
eak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
'eak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	0	1	0	1	4	0	0	4	0	0	0	0	5
07:15 AM	1	1	0	2	0	2	0	2	0	0	0	0	4
07:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	1
07:45 AM	0	1	0	1	2	0	0	2	0	0	0	0	3
Total Volume	1	4	0	5	6	2	0	8	0	0	0	0	13
% App. Total	20	80	0		75	25	0		0	0	0		
PHF	.250	1.00	.000	.625	.375	.250	.000	.500	.000	.000	.000	.000	.650

J/S: Bedford Road (Route 225)
V: Skelton Road
:ity, State: Carlisle, MA
:lient: MDM/ C. Jones

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File Name : 144091 C
Site Code : 779
Start Date : 9/24/2014
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Groups Printed- Peds and Bicycles

	Bedford Road (Route 225) From North			Bedford Road (Route 225) From South			Skelton Road From West			
Start Time	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	Int. Total
07:00 AM	0	0	0	0	0	0	1	0	0	1
07:15 AM	0	0	0	0	1	0	1	0	1	3
07:30 AM	0	1	0	0	0	0	0	0	0	1
07:45 AM	0	3	0	0	0	0	0	0	0	3
Total	0	4	0	0	1	0	2	0	1	8
08:00 AM	0	8	0	0	0	0	0	0	0	8
08:15 AM	0	6	0	0	0	0	0	0	0	6
08:30 AM	0	0	0	1	0	0	0	0	0	1
08:45 AM	0	1	0	0	0	0	0	0	0	1
Total	0	15	0	1	0	0	0	0	0	16
Grand Total	0	19	0	1	1	0	2	0	1	24
Apprch %	0	100	0	50	50	0	66.7	0	33.3	
Total %	0	79.2	0	4.2	4.2	0	8.3	0	4.2	

	Bedford Road (Route 225) From North				Bedford Road (Route 225) From South				Skelton Road From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
eak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
'eak Hour for Entire Intersection Begins at 07:30 AM													
07:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	1
07:45 AM	0	3	0	3	0	0	0	0	0	0	0	0	3
08:00 AM	0	8	0	8	0	0	0	0	0	0	0	0	8
08:15 AM	0	6	0	6	0	0	0	0	0	0	0	0	6
Total Volume	0	18	0	18	0	0	0	0	0	0	0	0	18
% App. Total	0	100	0		0	0	0		0	0	0		
PHF	.000	.563	.000	.563	.000	.000	.000	.000	.000	.000	.000	.000	.563

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N/S: Bedford Road (Route 225)
W: Skelton Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

File Name : 144091 CC
Site Code : 779
Start Date : 9/24/2014
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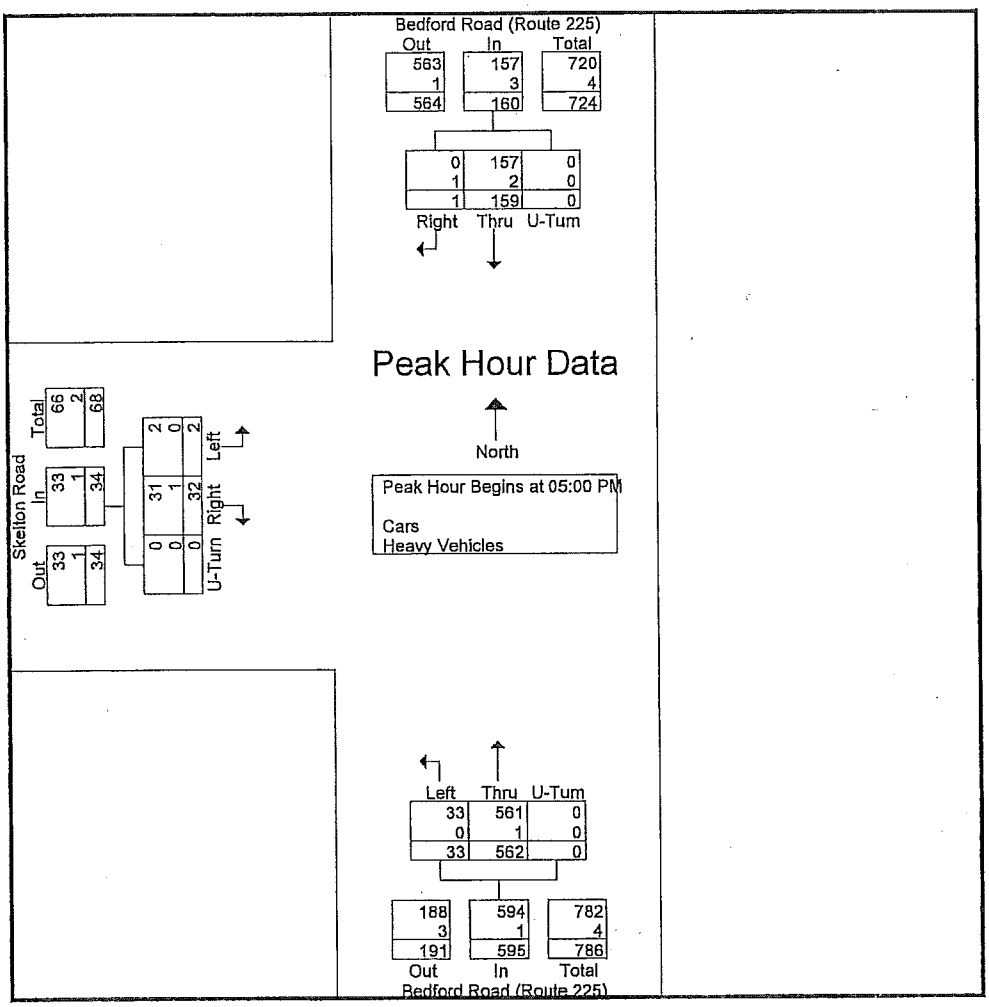
	Bedford Road (Route 225) From North				Bedford Road (Route 225) From South				Skelton Road From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	0	34	0	34	129	11	0	140	11	0	0	11	185
05:15 PM	0	44	0	44	139	7	0	146	10	1	0	11	201
05:30 PM	0	32	0	32	158	7	0	165	5	1	0	6	203
05:45 PM	1	49	0	50	136	8	0	144	6	0	0	6	200
Total Volume	1	159	0	160	562	33	0	595	32	2	0	34	789
% App. Total	0.6	99.4	0		94.5	5.5	0		94.1	5.9	0		
PHF	.250	.811	.000	.800	.889	.750	.000	.902	.727	.500	.000	.773	.972
Cars	0	157	0	157	561	33	0	594	31	2	0	33	784
% Cars	0	98.7	0	98.1	99.8	100	0	99.8	96.9	100	0	97.1	99.4
Heavy Vehicles	1	2	0	3	1	0	0	1	1	0	0	1	5
% Heavy Vehicles	100	1.3	0	1.9	0.2	0	0	0.2	3.1	0	0	2.9	0.6



N/S: Bedford Road (Route 225)
W: Skelton Road
City, State: Carlisle, MA
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Groups Printed- Cars - Heavy Vehicles

	Bedford Road (Route 225) From North			Bedford Road (Route 225) From South			Skelton Road From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
04:00 PM	0	30	0	102	3	0	4	1	0	140
04:15 PM	0	42	0	143	12	0	4	1	0	202
04:30 PM	0	36	0	127	5	0	9	0	0	177
04:45 PM	0	41	0	114	8	0	9	0	0	172
Total	0	149	0	486	28	0	26	2	0	691
05:00 PM	0	34	0	129	11	0	11	0	0	185
05:15 PM	0	44	0	139	7	0	10	1	0	201
05:30 PM	0	32	0	158	7	0	5	1	0	203
05:45 PM	1	49	0	136	8	0	6	0	0	200
Total	1	159	0	562	33	0	32	2	0	789
Grand Total	1	308	0	1048	61	0	58	4	0	1480
Apprch %	0.3	99.7	0	94.5	5.5	0	93.5	6.5	0	
Total %	0.1	20.8	0	70.8	4.1	0	3.9	0.3	0	
Cars	0	302	0	1044	61	0	57	4	0	1468
% Cars	0	98.1	0	99.6	100	0	98.3	100	0	99.2
Heavy Vehicles	1	6	0	4	0	0	1	0	0	12
% Heavy Vehicles	100	1.9	0	0.4	0	0	1.7	0	0	0.8

	Bedford Road (Route 225) From North				Bedford Road (Route 225) From South				Skelton Road From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	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	0	34	0	34	129	**11**	0	140	**11**	0	0	**11**	185
05:15 PM	0	44	0	44	139	7	0	146	10	**1**	0	11	201
05:30 PM	0	32	0	32	**158**	7	0	**165**	5	1	0	6	**203**
05:45 PM	**1**	**49**	0	**50**	136	8	0	144	6	0	0	6	200
Total Volume	1	159	0	160	562	33	0	595	32	2	0	34	789
% App. Total	0.6	99.4	0		94.5	5.5	0		94.1	5.9	0		
PHF	.250	.811	.000	.800	.889	.750	.000	.902	.727	.500	.000	.773	.972
Cars	0	157	0	157	561	33	0	594	31	2	0	33	784
% Cars	0	98.7	0	98.1	99.8	100	0	99.8	96.9	100	0	97.1	99.4
Heavy Vehicles	1	2	0	3	1	0	0	1	1	0	0	1	5
% Heavy Vehicles	100	1.3	0	1.9	0.2	0	0	0.2	3.1	0	0	2.9	0.6

J/S: Bedford Road (Route 225)
V: Skelton Road
:ity, State: Carlisle, MA
:lient: MDM/ C. Jones

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Groups Printed- Cars

	Bedford Road (Route 225) From North			Bedford Road (Route 225) From South			Skelton Road From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
04:00 PM	0	28	0	102	3	0	4	1	0	138
04:15 PM	0	41	0	143	12	0	4	1	0	201
04:30 PM	0	35	0	126	5	0	9	0	0	175
04:45 PM	0	41	0	112	8	0	9	0	0	170
Total	0	145	0	483	28	0	26	2	0	684
05:00 PM	0	34	0	129	11	0	11	0	0	185
05:15 PM	0	44	0	139	7	0	10	1	0	201
05:30 PM	0	31	0	157	7	0	4	1	0	200
05:45 PM	0	48	0	136	8	0	6	0	0	198
Total	0	157	0	561	33	0	31	2	0	784
Grand Total	0	302	0	1044	61	0	57	4	0	1468
Apprch %	0	100	0	94.5	5.5	0	93.4	6.6	0	
Total %	0	20.6	0	71.1	4.2	0	3.9	0.3	0	

	Bedford Road (Route 225) From North				Bedford Road (Route 225) From South				Skelton Road From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
:eak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
eak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	0	34	0	34	129	**11**	0	140	**11**	0	0	**11**	185
05:15 PM	0	44	0	44	139	7	0	146	10	**1**	0	11	**201**
05:30 PM	0	31	0	31	**157**	7	0	**164**	4	1	0	5	200
05:45 PM	0	**48**	0	**48**	136	8	0	144	6	0	0	6	198
Total Volume	0	157	0	157	561	33	0	594	31	2	0	33	784
% App. Total	0	100	0		94.4	5.6	0		93.9	6.1	0		
PHF	.000	.818	.000	.818	.893	.750	.000	.905	.705	.500	.000	.750	.975

I/S: Bedford Road (Route 225)
7: Skelton Road
ity, State: Carlisle, MA
lient: MDM/ C. Jones

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File Name : 144091 CC
Site Code : 779
Start Date : 9/24/2014
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Groups Printed- Heavy Vehicles

	Bedford Road (Route 225) From North			Bedford Road (Route 225) From South			Skelton Road From West			
Start Time	Right	Thru	U-Turn	Thru	Left	U-Turn	Right	Left	U-Turn	Int. Total
04:00 PM	0	2	0	0	0	0	0	0	0	2
04:15 PM	0	1	0	0	0	0	0	0	0	1
04:30 PM	0	1	0	1	0	0	0	0	0	2
04:45 PM	0	0	0	2	0	0	0	0	0	2
Total	0	4	0	3	0	0	0	0	0	7
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	1	0	1	0	0	1	0	0	3
05:45 PM	1	1	0	0	0	0	0	0	0	2
Total	1	2	0	1	0	0	1	0	0	5
Grand Total	1	6	0	4	0	0	1	0	0	12
Apprch %	14.3	85.7	0	100	0	0	100	0	0	
Total %	8.3	50	0	33.3	0	0	8.3	0	0	

	Bedford Road (Route 225) From North				Bedford Road (Route 225) From South				Skelton Road From West				
Start Time	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Int. Total
eak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
eak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	0	2	0	2	0	0	0	0	0	0	0	0	2
04:15 PM	0	1	0	1	0	0	0	0	0	0	0	0	1
04:30 PM	0	1	0	1	1	0	0	1	0	0	0	0	2
04:45 PM	0	0	0	0	2	0	0	2	0	0	0	0	2
Total Volume	0	4	0	4	3	0	0	3	0	0	0	0	7
% App. Total	0	100	0		100	0	0		0	0	0		
PHF	.000	.500	.000	.500	.375	.000	.000	.375	.000	.000	.000	.000	.875

J/S: Bedford Road (Route 225)
V: Skelton Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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File Name : 144091 CC
Site Code : 779
Start Date : 9/24/2014
Page No : 1

Groups Printed- Peds and Bicycles

	Bedford Road (Route 225) From North			Bedford Road (Route 225) From South			Skelton Road From West			
Start Time	Right	Thru	Peds	Thru	Left	Peds	Right	Left	Peds	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	1	0	0	0	0	0	0	0	1
04:30 PM	1	1	0	1	0	0	1	0	0	4
04:45 PM	0	2	0	1	0	0	0	0	0	3
Total	1	4	0	2	0	0	1	0	0	8
05:00 PM	0	0	0	4	0	0	0	0	0	4
05:15 PM	0	0	0	1	0	0	0	1	0	2
05:30 PM	0	0	0	1	0	0	0	0	0	1
05:45 PM	0	0	0	3	0	0	0	0	0	3
Total	0	0	0	9	0	0	0	1	0	10
Grand Total	1	4	0	11	0	0	1	1	0	18
Apprch %	20	80	0	100	0	0	50	50	0	
Total %	5.6	22.2	0	61.1	0	0	5.6	5.6	0	

	Bedford Road (Route 225) From North				Bedford Road (Route 225) From South				Skelton Road From West				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	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	1	1	0	2	1	0	0	1	1	0	0	1	4
04:45 PM	0	2	0	2	1	0	0	1	0	0	0	0	3
05:00 PM	0	0	0	0	4	0	0	4	0	0	0	0	4
05:15 PM	0	0	0	0	1	0	0	1	0	1	0	1	2
Total Volume	1	3	0	4	7	0	0	7	1	1	0	2	13
% App. Total	25	75	0		100	0	0		50	50	0		
PHF	.250	.375	.000	.500	.438	.000	.000	.438	.250	.250	.000	.500	.813

N/S: Bedford Road (Route 225)
E/W/SW: Driveways/ River Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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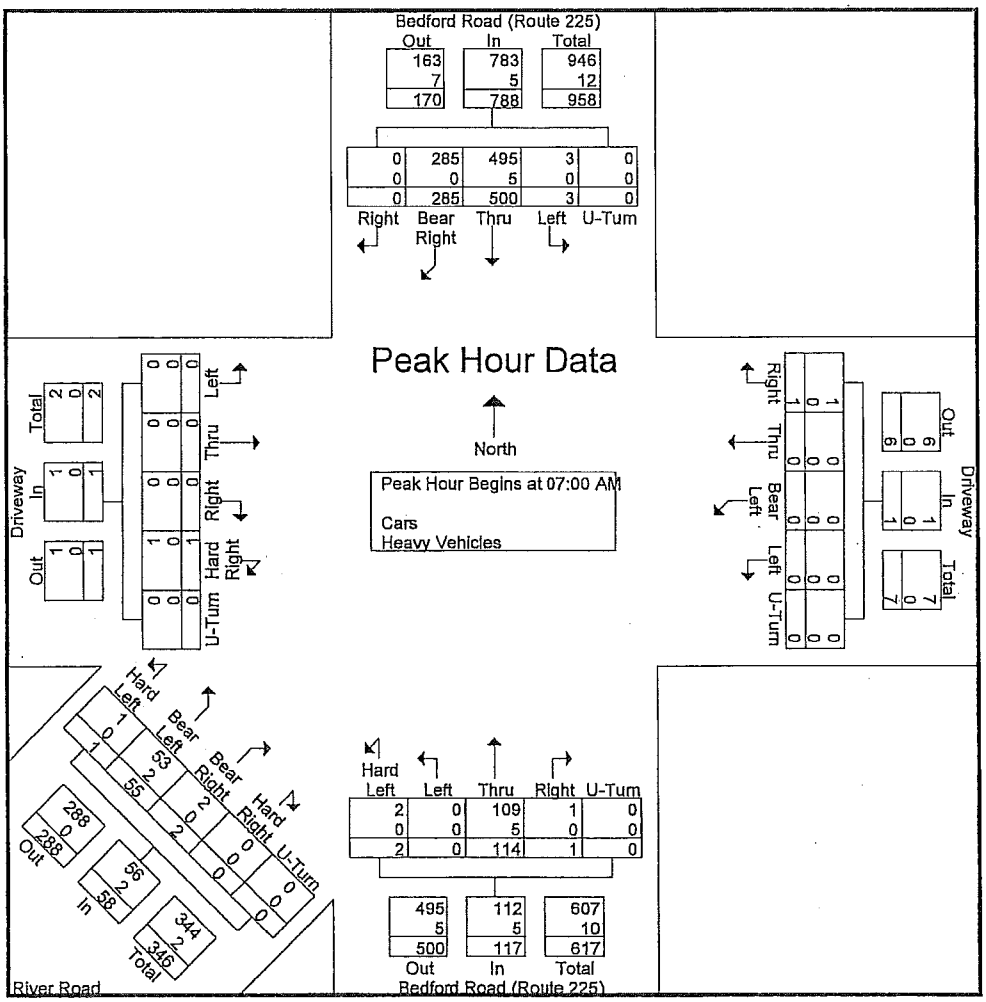
	Bedford Road (Route 225) From North						Driveway From East						Bedford Road (Route 225) From South						River Road From Southwest						Driveway From West						
Start Time	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Int. Total
3 Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 07:00 AM																															
07:00 AM	0	83	178	0	0	261	0	0	0	0	0	0	0	22	0	0	0	22	0	0	8	1	0	9	0	0	0	0	0	0	292
07:15 AM	0	60	149	1	0	210	0	0	0	0	0	0	0	29	0	2	0	31	0	0	11	0	0	11	1	0	0	0	0	1	253
07:30 AM	0	63	84	2	0	149	0	0	0	0	0	0	1	21	0	0	0	22	0	1	18	0	0	19	0	0	0	0	0	0	190
07:45 AM	0	79	89	0	0	168	1	0	0	0	0	1	0	42	0	0	0	42	0	1	18	0	0	19	0	0	0	0	0	0	230
Total Volume	0	285	500	3	0	788	1	0	0	0	0	1	1	114	0	2	0	117	0	2	55	1	0	58	1	0	0	0	0	1	965
% App. Total	0	36.2	63.5	0.4	0		100	0	0	0	0		0.9	97.4	0	1.7	0		0	3.4	94.8	1.7	0		100	0	0	0	0		
PHF	.000	.858	.702	.375	.000	.755	.250	.000	.000	.000	.000	.250	.250	.679	.000	.250	.000	.696	.000	.500	.764	.250	.000	.763	.250	.000	.000	.000	.000	.250	.826
Cars	0	285	495	3	0	783	1	0	0	0	0	1	1	109	0	2	0	112	0	2	53	1	0	56	1	0	0	0	0	1	953
% Cars	0	100	99.0	100	0	99.4	100	0	0	0	0	100	100	95.6	0	100	0	95.7	0	100	96.4	100	0	96.6	100	0	0	0	0	100	98.8
Heavy Vehicles	0	0	5	0	0	5	0	0	0	0	0	0	0	5	0	0	0	5	0	0	2	0	0	2	0	0	0	0	0	0	12
% Heavy Vehicles	0	0	1.0	0	0	0.6	0	0	0	0	0	0	0	4.4	0	0	0	4.3	0	0	3.6	0	0	3.4	0	0	0	0	0	0	1.2



J/S: Bedford Road (Route 225)
E/W/SW: Driveways/ River Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

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Groups Printed- Cars - Heavy Vehicles

	Bedford Road (Route 225) From North					Driveway From East					Bedford Road (Route 225) From South					River Road From Southwest					Driveway From West					
Start Time	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	83	178	0	0	0	0	0	0	0	0	22	0	0	0	0	0	8	1	0	0	0	0	0	0	292
07:15 AM	0	60	149	1	0	0	0	0	0	0	0	29	0	2	0	0	0	11	0	0	1	0	0	0	0	253
07:30 AM	0	63	84	2	0	0	0	0	0	0	1	21	0	0	0	0	1	18	0	0	0	0	0	0	0	190
07:45 AM	0	79	89	0	0	1	0	0	0	0	0	42	0	0	0	0	1	18	0	0	0	0	0	0	0	230
Total	0	285	500	3	0	1	0	0	0	0	1	114	0	2	0	0	2	55	1	0	1	0	0	0	0	965
08:00 AM	0	61	99	1	0	0	0	0	0	0	1	25	0	0	0	0	0	10	0	0	0	0	0	0	0	197
08:15 AM	0	50	96	1	0	0	0	0	0	0	0	25	0	1	0	0	1	11	0	0	0	0	0	0	0	185
08:30 AM	0	43	87	0	0	0	0	0	0	0	0	33	0	0	0	0	0	16	0	0	0	0	0	0	0	179
08:45 AM	0	27	101	1	0	0	0	0	0	0	0	12	0	0	0	1	0	19	0	0	0	0	0	0	0	161
Total	0	181	383	3	0	0	0	0	0	0	1	95	0	1	0	1	1	56	0	0	0	0	0	0	0	722
Grand Total	0	466	883	6	0	1	0	0	0	0	2	209	0	3	0	1	3	111	1	0	1	0	0	0	0	1687
Apprch %	0	34.4	65.2	0.4	0	100	0	0	0	0	0.9	97.7	0	1.4	0	0.9	2.6	95.7	0.9	0	100	0	0	0	0	
Total %	0	27.6	52.3	0.4	0	0.1	0	0	0	0	0.1	12.4	0	0.2	0	0.1	0.2	6.6	0.1	0	0.1	0	0	0	0	
Cars	0	463	873	6	0	1	0	0	0	0	2	201	0	2	0	1	3	109	1	0	1	0	0	0	0	1663
% Cars	0	99.4	98.9	100	0	100	0	0	0	0	100	96.2	0	66.7	0	100	100	98.2	100	0	100	0	0	0	0	98.6
Heavy Vehicles	0	3	10	0	0	0	0	0	0	0	0	8	0	1	0	0	0	2	0	0	0	0	0	0	0	24
% Heavy Vehicles	0	0.6	1.1	0	0	0	0	0	0	0	0	3.8	0	33.3	0	0	0	1.8	0	0	0	0	0	0	0	1.4

	Bedford Road (Route 225) From North						Driveway From East						Bedford Road (Route 225) From South						River Road From Southwest						Driveway From West						
Start Time	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Int. Total
ak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
'eak Hour for Entire Intersection Begins at 07:00 AM																															
07:00 AM	0	**83**	178	0	0	**261**	0	0	0	0	0	0	0	22	0	0	0	22	0	0	8	**1**	0	9	0	0	0	0	0	0	**292**
07:15 AM	0	60	149	1	0	210	0	0	0	0	0	0	0	29	0	**2**	0	31	0	0	11	0	0	11	**1**	0	0	0	0	**1**	253
07:30 AM	0	63	84	**2**	0	149	0	0	0	0	0	0	**1**	21	0	0	0	22	0	**1**	**18**	0	0	**19**	0	0	0	0	0	0	190
07:45 AM	0	79	89	0	0	168	**1**	0	0	0	0	**1**	0	**42**	0	0	0	**42**	0	1	18	0	0	19	0	0	0	0	0	0	230
Total Volume	0	285	500	3	0	788	1	0	0	0	0	1	1	114	0	2	0	117	0	2	55	1	0	58	1	0	0	0	0	1	965
% App. Total	0	36.2	63.5	0.4	0		100	0	0	0	0		0.9	97.4	0	1.7	0		0	3.4	94.8	1.7	0		100	0	0	0	0		
PHF	.000	.858	.702	.375	.000	.755	.250	.000	.000	.000	.000	.250	.250	.679	.000	.250	.000	.696	.000	.500	.764	.250	.000	.763	.250	.000	.000	.000	.000	.250	.826
Cars	0	285	495	3	0	783	1	0	0	0	0	1	1	109	0	2	0	112	0	2	53	1	0	56	1	0	0	0	0	1	953
% Cars	0	100	99.0	100	0	99.4	100	0	0	0	0	100	100	95.6	0	100	0	95.7	0	100	96.4	100	0	96.6	100	0	0	0	0	100	98.8
Heavy Vehicles	0	0	5	0	0	5	0	0	0	0	0	0	0	5	0	0	0	5	0	0	2	0	0	2	0	0	0	0	0	0	12
% Heavy Vehicles	0	0	1.0	0	0	0.6	0	0	0	0	0	0	0	4.4	0	0	0	4.3	0	0	3.6	0	0	3.4	0	0	0	0	0	0	1.2

N/S: Bedford Road (Route 225)
E/W/SW: Driveways/ River Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

PRECISION DATA INDUSTRIES, LLC
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File Name : 144091 D
Site Code : 779
Start Date : 9/24/2014
Page No : 1

Groups Printed- Cars

	Bedford Road (Route 225) From North					Driveway From East					Bedford Road (Route 225) From South					River Road From Southwest					Driveway From West					
Start Time	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	83	177	0	0	0	0	0	0	0	0	17	0	0	0	0	0	8	1	0	0	0	0	0	0	286
07:15 AM	0	60	147	1	0	0	0	0	0	0	0	29	0	2	0	0	0	11	0	0	1	0	0	0	0	251
07:30 AM	0	63	83	2	0	0	0	0	0	0	1	21	0	0	0	0	1	17	0	0	0	0	0	0	0	188
07:45 AM	0	79	88	0	0	1	0	0	0	0	0	42	0	0	0	0	1	17	0	0	0	0	0	0	0	228
Total	0	285	495	3	0	1	0	0	0	0	1	109	0	2	0	0	2	53	1	0	1	0	0	0	0	953
08:00 AM	0	60	99	1	0	0	0	0	0	0	1	23	0	0	0	0	0	10	0	0	0	0	0	0	0	194
08:15 AM	0	48	96	1	0	0	0	0	0	0	0	25	0	0	0	0	1	11	0	0	0	0	0	0	0	182
08:30 AM	0	43	84	0	0	0	0	0	0	0	0	32	0	0	0	0	0	16	0	0	0	0	0	0	0	175
08:45 AM	0	27	99	1	0	0	0	0	0	0	0	12	0	0	0	1	0	19	0	0	0	0	0	0	0	159
Total	0	178	378	3	0	0	0	0	0	0	1	92	0	0	0	1	1	56	0	0	0	0	0	0	0	710
Grand Total	0	463	873	6	0	1	0	0	0	0	2	201	0	2	0	1	3	109	1	0	1	0	0	0	0	1663
Apprch %	0	34.5	65.1	0.4	0	100	0	0	0	0	1	98	0	1	0	0.9	2.6	95.6	0.9	0	100	0	0	0	0	
Total %	0	27.8	52.5	0.4	0	0.1	0	0	0	0	0.1	12.1	0	0.1	0	0.1	0.2	6.6	0.1	0	0.1	0	0	0	0	

	Bedford Road (Route 225) From North						Driveway From East						Bedford Road (Route 225) From South						River Road From Southwest						Driveway From West						
Start Time	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Int. Total
ak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
'eak Hour for Entire Intersection Begins at 07:00 AM																															
07:00 AM	0	**83**	177	0	0	**260**	0	0	0	0	0	0	0	17	0	0	0	17	0	0	8	**1**	0	9	0	0	0	0	0	0	**286**
07:15 AM	0	60	147	1	0	208	0	0	0	0	0	0	0	29	0	**2**	0	31	0	0	11	0	0	11	**1**	0	0	0	0	**1**	251
07:30 AM	0	63	83	**2**	0	148	0	0	0	0	0	0	**1**	21	0	0	0	22	0	**1**	**17**	0	0	**18**	0	0	0	0	0	0	188
07:45 AM	0	79	88	0	0	167	**1**	0	0	0	0	**1**	0	**42**	0	0	0	**42**	0	1	17	0	0	18	0	0	0	0	0	0	228
Total Volume	0	285	495	3	0	783	1	0	0	0	0	1	1	109	0	2	0	112	0	2	53	1	0	56	1	0	0	0	0	1	953
% App. Total	0	36.4	63.2	0.4	0		100	0	0	0	0		0.9	97.3	0	1.8	0		0	3.6	94.6	1.8	0		100	0	0	0	0		
PHF	.000	.858	.699	.375	.000	.753	.250	.000	.000	.000	.000	.250	.250	.649	.000	.250	.000	.667	.000	.500	.779	.250	.000	.778	.250	.000	.000	.000	.000	.250	.833

J/S: Bedford Road (Route 225)
:/W/SW: Driveways/ River Road
:ity, State: Carlisle, MA
:lient: MDM/ C. Jones

PRECISION DATA INDUSTRIES, LLC
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File Name : 144091 D
Site Code : 779
Start Date : 9/24/2014
Page No : 1

Groups Printed- Heavy Vehicles

	Bedford Road (Route 225) From North					Driveway From East					Bedford Road (Route 225) From South					River Road From Southwest					Driveway From West					
Start Time	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	1	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	6
07:15 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
07:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
07:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
Total	0	0	5	0	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	0	0	0	0	0	0	12
08:00 AM	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
08:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
08:30 AM	0	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4
08:45 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	3	5	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	12
Grand Total	0	3	10	0	0	0	0	0	0	0	0	8	0	1	0	0	0	2	0	0	0	0	0	0	0	24
Apprch %	0	23.1	76.9	0	0	0	0	0	0	0	0	88.9	0	11.1	0	0	0	100	0	0	0	0	0	0	0	
Total %	0	12.5	41.7	0	0	0	0	0	0	0	0	33.3	0	4.2	0	0	0	8.3	0	0	0	0	0	0	0	

	Bedford Road (Route 225) From North						Driveway From East						Bedford Road (Route 225) From South						River Road From Southwest						Driveway From West						
Start Time	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Int. Total
k Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
eak Hour for Entire Intersection Begins at 07:00 AM																															
07:00 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	6
07:15 AM	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
07:30 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
07:45 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
Total Volume	0	0	5	0	0	5	0	0	0	0	0	0	0	5	0	0	0	5	0	0	2	0	0	2	0	0	0	0	0	0	12
% App. Total	0	0	100	0	0		0	0	0	0	0		0	100	0	0	0		0	0	100	0	0		0	0	0	0	0		
PHF	.000	.000	.625	.000	.000	.625	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.000	.250	.000	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.000	.500

PRECISION
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INDUSTRIES, LLC
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N/S: Bedford Road (Route 225)
E/W/SW: Driveways/ River Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

File Name : 144091 D
Site Code : 779
Start Date : 9/24/2014
Page No : 1

Groups Printed- Peds and Bicycles

	Bedford Road (Route 225) From North					Driveway From East					Bedford Road (Route 225) From South					River Road From Southwest					Driveway From West					
Start Time	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Hard Right	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 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
07:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
07:45 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	5
08:00 AM	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
08:15 AM	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
08:30 AM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	3
08:45 AM	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	4
Total	0	2	14	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	1	0	0	0	0	0	20
Grand Total	0	3	17	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	1	0	0	0	0	0	25
Apprch %	0	15	85	0	0	0	0	0	0	0	0	100	0	0	0	0	0	75	0	25	0	0	0	0	0	
Total %	0	12	68	0	0	0	0	0	0	0	0	4	0	0	0	0	0	12	0	4	0	0	0	0	0	

	Bedford Road (Route 225) From North						Driveway From East						Bedford Road (Route 225) From South						River Road From Southwest						Driveway From West						
Start Time	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total	Int. Total
8 Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 08:00 AM																															
08:00 AM	0	0	7	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
08:15 AM	0	0	6	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
08:30 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	3
08:45 AM	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	4
Total Volume	0	2	14	0	0	16	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2	0	1	3	0	0	0	0	0	0	20
% App. Total	0	12.5	87.5	0	0		0	0	0	0	0		0	100	0	0	0		0	0	66.7	0	33.3		0	0	0	0	0		
PHF	.000	.500	.500	.000	.000	.571	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.000	.250	.000	.000	.250	.000	.250	.375	.000	.000	.000	.000	.000	.000	.714

N/S: Bedford Road (Route 225)
E/W/SW: Driveways/ River Road
City, State: Carlisle, MA
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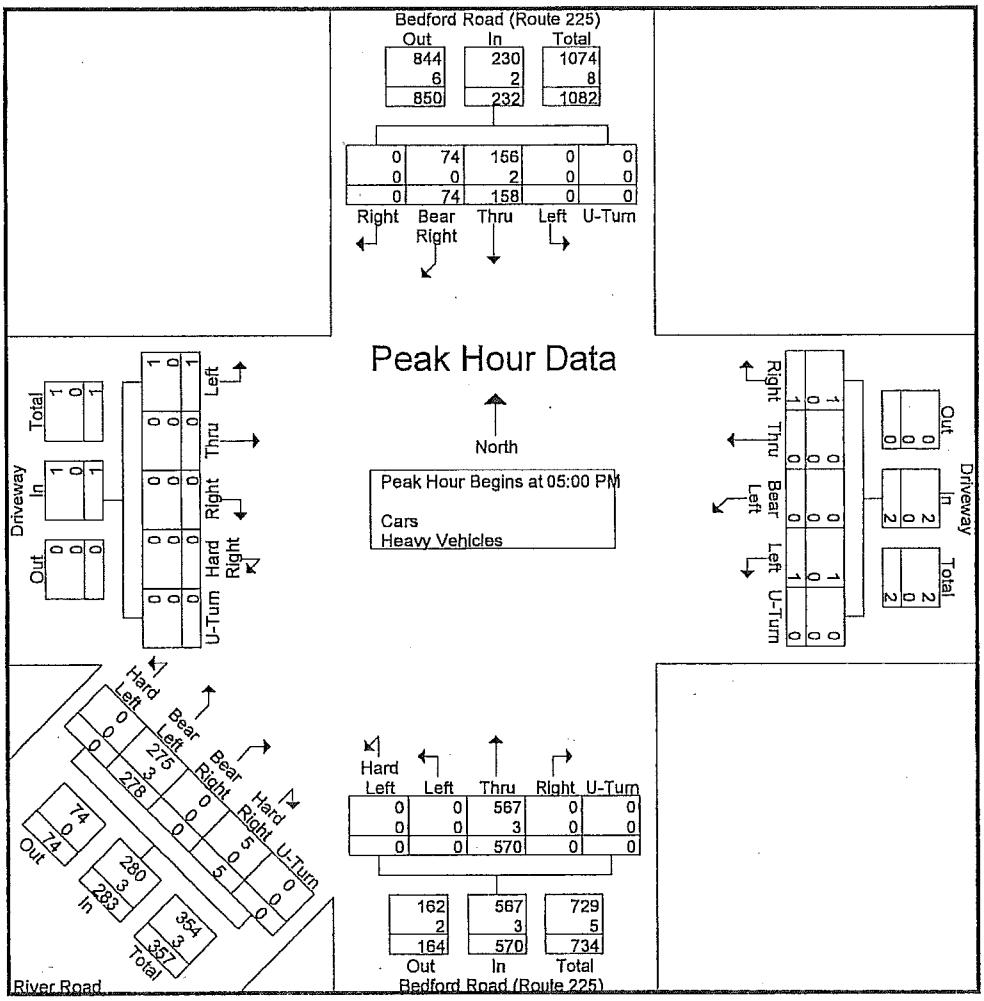
	Bedford Road (Route 225) From North						Driveway From East						Bedford Road (Route 225) From South						River Road From Southwest						Driveway From West						
Start Time	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Int. Total
1 Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 05:00 PM																															
05:00 PM	0	16	33	0	0	49	1	0	0	0	0	1	0	124	0	0	0	124	3	0	69	0	0	72	0	0	0	0	0	0	246
05:15 PM	0	16	50	0	0	66	0	0	0	1	0	1	0	145	0	0	0	145	1	0	64	0	0	65	0	0	0	1	0	1	278
05:30 PM	0	26	28	0	0	54	0	0	0	0	0	0	0	162	0	0	0	162	0	0	78	0	0	78	0	0	0	0	0	0	294
05:45 PM	0	16	47	0	0	63	0	0	0	0	0	0	0	139	0	0	0	139	1	0	67	0	0	68	0	0	0	0	0	0	270
Total Volume	0	74	158	0	0	232	1	0	0	1	0	2	0	570	0	0	0	570	5	0	278	0	0	283	0	0	0	1	0	1	1088
% App. Total	0	31.9	68.1	0	0		50	0	0	50	0		0	100	0	0	0		1.8	0	98.2	0	0		0	0	0	100	0		
PHF	.000	.712	.790	.000	.000	.879	.250	.000	.000	.250	.000	.500	.000	.880	.000	.000	.000	.880	.417	.000	.891	.000	.000	.907	.000	.000	.000	.250	.000	.250	.925
Cars	0	74	156	0	0	230	1	0	0	1	0	2	0	567	0	0	0	567	5	0	275	0	0	280	0	0	0	1	0	1	1080
% Cars	0	100	98.7	0	0	99.1	100	0	0	100	0	100	0	99.5	0	0	0	99.5	100	0	98.9	0	0	98.9	0	0	0	100	0	100	99.3
Heavy Vehicles	0	0	2	0	0	2	0	0	0	0	0	0	0	3	0	0	0	3	0	0	3	0	0	3	0	0	0	0	0	0	8
% Heavy Vehicles	0	0	1.3	0	0	0.9	0	0	0	0	0	0	0	0.5	0	0	0	0.5	0	0	1.1	0	0	1.1	0	0	0	0	0	0	0.7



N/S: Bedford Road (Route 225)
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Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Bedford Road (Route 225) From North					Driveway From East					Bedford Road (Route 225) From South					River Road From Southwest					Driveway From West					
Start Time	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	17	27	0	0	1	0	0	0	0	0	110	0	0	0	1	0	46	0	0	0	0	0	0	0	202
04:15 PM	0	17	41	0	0	0	0	0	1	0	0	139	0	0	0	1	0	41	0	0	0	0	0	1	0	241
04:30 PM	0	14	40	0	0	1	0	0	0	0	0	129	0	1	0	1	0	52	0	0	0	0	0	0	0	238
04:45 PM	1	15	36	0	0	1	0	0	0	0	0	121	0	0	0	0	0	61	1	0	1	0	0	1	0	238
Total	1	63	144	0	0	3	0	0	1	0	0	499	0	1	0	3	0	200	1	0	1	0	0	2	0	919
05:00 PM	0	16	33	0	0	1	0	0	0	0	0	124	0	0	0	3	0	69	0	0	0	0	0	0	0	246
05:15 PM	0	16	50	0	0	0	0	0	1	0	0	145	0	0	0	1	0	64	0	0	0	0	0	1	0	278
05:30 PM	0	26	28	0	0	0	0	0	0	0	0	162	0	0	0	0	0	78	0	0	0	0	0	0	0	294
05:45 PM	0	16	47	0	0	0	0	0	0	0	0	139	0	0	0	1	0	67	0	0	0	0	0	0	0	270
Total	0	74	158	0	0	1	0	0	1	0	0	570	0	0	0	5	0	278	0	0	0	0	0	1	0	1088
Grand Total	1	137	302	0	0	4	0	0	2	0	0	1069	0	1	0	8	0	478	1	0	1	0	0	3	0	2007
Apprch %	0.2	31.1	68.6	0	0	66.7	0	0	33.3	0	0	99.9	0	0.1	0	1.6	0	98.2	0.2	0	25	0	0	75	0	
Total %	0	6.8	15	0	0	0.2	0	0	0.1	0	0	53.3	0	0	0	0.4	0	23.8	0	0	0	0	0	0.1	0	
Cars	0	137	296	0	0	3	0	0	2	0	0	1063	0	1	0	8	0	471	1	0	1	0	0	3	0	1986
% Cars	0	100	98	0	0	75	0	0	100	0	0	99.4	0	100	0	100	0	98.5	100	0	100	0	0	100	0	99
Heavy Vehicles	1	0	6	0	0	1	0	0	0	0	0	6	0	0	0	0	0	7	0	0	0	0	0	0	0	21
% Heavy Vehicles	100	0	2	0	0	25	0	0	0	0	0	0.6	0	0	0	0	0	1.5	0	0	0	0	0	0	0	1

	Bedford Road (Route 225) From North						Driveway From East						Bedford Road (Route 225) From South						River Road From Southwest						Driveway From West						
Start Time	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Int. Total
4 Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 05:00 PM																															
05:00 PM	0	16	33	0	0	49	1	0	0	0	0	1	0	124	0	0	0	124	3	0	69	0	0	72	0	0	0	0	0	0	246
05:15 PM	0	16	50	0	0	66	0	0	0	1	0	1	0	145	0	0	0	145	1	0	64	0	0	65	0	0	0	1	0	1	278
05:30 PM	0	26	28	0	0	54	0	0	0	0	0	0	0	162	0	0	0	162	0	0	78	0	0	78	0	0	0	0	0	0	294
05:45 PM	0	16	47	0	0	63	0	0	0	0	0	0	0	139	0	0	0	139	1	0	67	0	0	68	0	0	0	0	0	0	270
Total Volume	0	74	158	0	0	232	1	0	0	1	0	2	0	570	0	0	0	570	5	0	278	0	0	283	0	0	0	1	0	1	1088
% App. Total	0	31.9	68.1	0	0		50	0	0	50	0		0	100	0	0	0		1.8	0	98.2	0	0		0	0	0	100	0		
PHF	.000	.712	.790	.000	.000	.879	.250	.000	.000	.250	.000	.500	.000	.880	.000	.000	.000	.880	.417	.000	.891	.000	.000	.907	.000	.000	.000	.250	.000	.250	.925
Cars	0	74	156	0	0	230	1	0	0	1	0	2	0	567	0	0	0	567	5	0	275	0	0	280	0	0	0	1	0	1	1080
% Cars	0	100	98.7	0	0	99.1	100	0	0	100	0	100	0	99.5	0	0	0	99.5	100	0	98.9	0	0	98.9	0	0	0	100	0	100	99.3
Heavy Vehicles	0	0	2	0	0	2	0	0	0	0	0	0	0	3	0	0	0	3	0	0	3	0	0	3	0	0	0	0	0	0	8
% Heavy Vehicles	0	0	1.3	0	0	0.9	0	0	0	0	0	0	0	0.5	0	0	0	0.5	0	0	1.1	0	0	1.1	0	0	0	0	0	0	0.7

N/S: Bedford Road (Route 225)
E/W/SW: Driveways/ River Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

PRECISION DATA INDUSTRIES, LLC
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File Name : 144091 DD
Site Code : 779
Start Date : 9/24/2014
Page No : 1

Groups Printed- Cars

	Bedford Road (Route 225) From North					Driveway From East					Bedford Road (Route 225) From South					River Road From Southwest					Driveway From West					
Start Time	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	17	26	0	0	1	0	0	0	0	0	110	0	0	0	1	0	44	0	0	0	0	0	0	0	199
04:15 PM	0	17	39	0	0	0	0	0	1	0	0	139	0	0	0	1	0	41	0	0	0	0	0	1	0	239
04:30 PM	0	14	39	0	0	1	0	0	0	0	0	127	0	1	0	1	0	50	0	0	0	0	0	0	0	233
04:45 PM	0	15	36	0	0	0	0	0	0	0	0	120	0	0	0	0	0	61	1	0	1	0	0	1	0	235
Total	0	63	140	0	0	2	0	0	1	0	0	496	0	1	0	3	0	196	1	0	1	0	0	2	0	906
05:00 PM	0	16	33	0	0	1	0	0	0	0	0	123	0	0	0	3	0	69	0	0	0	0	0	0	0	245
05:15 PM	0	16	50	0	0	0	0	0	1	0	0	144	0	0	0	1	0	63	0	0	0	0	0	1	0	276
05:30 PM	0	26	26	0	0	0	0	0	0	0	0	161	0	0	0	0	0	76	0	0	0	0	0	0	0	289
05:45 PM	0	16	47	0	0	0	0	0	0	0	0	139	0	0	0	1	0	67	0	0	0	0	0	0	0	270
Total	0	74	156	0	0	1	0	0	1	0	0	567	0	0	0	5	0	275	0	0	0	0	0	1	0	1080
Grand Total	0	137	296	0	0	3	0	0	2	0	0	1063	0	1	0	8	0	471	1	0	1	0	0	3	0	1986
Apprch %	0	31.6	68.4	0	0	60	0	0	40	0	0	99.9	0	0.1	0	1.7	0	98.1	0.2	0	25	0	0	75	0	
Total %	0	6.9	14.9	0	0	0.2	0	0	0.1	0	0	53.5	0	0.1	0	0.4	0	23.7	0.1	0	0.1	0	0	0.2	0	

	Bedford Road (Route 225) From North						Driveway From East						Bedford Road (Route 225) From South						River Road From Southwest						Driveway From West						
Start Time	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Int. Total
k Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
eak Hour for Entire Intersection Begins at 05:00 PM																															
05:00 PM	0	16	33	0	0	49	**1**	0	0	0	0	1	0	123	0	0	0	123	**3**	0	69	0	0	72	0	0	0	0	0	0	245
05:15 PM	0	16	**50**	0	0	**66**	0	0	0	**1**	0	1	0	144	0	0	0	144	1	0	63	0	0	64	0	0	0	**1**	0	**1**	276
05:30 PM	0	**26**	26	0	0	52	0	0	0	0	0	0	0	161	0	0	0	**161**	0	0	**76**	0	0	**76**	0	0	0	0	0	0	**289**
05:45 PM	0	16	47	0	0	63	0	0	0	0	0	0	0	139	0	0	0	139	1	0	67	0	0	68	0	0	0	0	0	0	270
Total Volume	0	74	156	0	0	230	1	0	0	1	0	2	0	567	0	0	0	567	5	0	275	0	0	280	0	0	0	1	0	1	1080
% App. Total	0	32.2	67.8	0	0		50	0	0	50	0		0	100	0	0	0		1.8	0	98.2	0	0		0	0	0	100	0		
PHF	.000	.712	.780	.000	.000	.871	.250	.000	.000	.250	.000	.500	.000	.880	.000	.000	.000	.880	.417	.000	.905	.000	.000	.921	.000	.000	.000	.250	.000	.250	.934

N/S: Bedford Road (Route 225)
E/W/SW: Driveways/ River Road
City, State: Carlisle, MA
Client: MDM/ C. Jones

PRECISION DATA INDUSTRIES, LLC
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File Name : 144091 DD
Site Code : 779
Start Date : 9/24/2014
Page No : 1

Groups Printed- Heavy Vehicles

	Bedford Road (Route 225) From North					Driveway From East					Bedford Road (Route 225) From South					River Road From Southwest					Driveway From West					
Start Time	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3
04:15 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
04:30 PM	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	5
04:45 PM	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Total	1	0	4	0	0	1	0	0	0	0	0	3	0	0	0	0	0	4	0	0	0	0	0	0	0	13
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2
05:30 PM	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	5
05:45 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	0	0	2	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0	0	0	8
Grand Total	1	0	6	0	0	1	0	0	0	0	0	6	0	0	0	0	0	7	0	0	0	0	0	0	0	21
Apprch %	14.3	0	85.7	0	0	100	0	0	0	0	0	100	0	0	0	0	0	100	0	0	0	0	0	0	0	
Total %	4.8	0	28.6	0	0	4.8	0	0	0	0	0	28.6	0	0	0	0	0	33.3	0	0	0	0	0	0	0	

	Bedford Road (Route 225) From North						Driveway From East						Bedford Road (Route 225) From South						River Road From Southwest						Driveway From West						
Start Time	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Int. Total
ak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
'eak Hour for Entire Intersection Begins at 04:00 PM																															
04:00 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3
04:15 PM	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
04:30 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	2	0	0	0	2	0	0	2	0	0	2	0	0	0	0	0	0	5
04:45 PM	1	0	0	0	0	1	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
Total Volume	1	0	4	0	0	5	1	0	0	0	0	1	0	3	0	0	0	3	0	0	4	0	0	4	0	0	0	0	0	0	13
% App. Total	20	0	80	0	0		100	0	0	0	0		0	100	0	0	0		0	0	100	0	0		0	0	0	0	0		
PHF	.250	.000	.500	.000	.000	.625	.250	.000	.000	.000	.000	.250	.000	.375	.000	.000	.000	.375	.000	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.000	.650

N/S: Bedford Road (Route 225)
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Groups Printed- Peds and Bicycles

	Bedford Road (Route 225) From North					Driveway From East					Bedford Road (Route 225) From South					River Road From Southwest					Driveway From West					
Start Time	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Hard Right	Right	Thru	Left	Peds	Int. Total
04:00 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
04:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3
04:30 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	0	1
04:45 PM	0	1	2	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	7
Total	0	1	4	0	0	0	0	0	0	0	0	1	0	1	0	1	0	3	0	0	0	0	0	0	0	11
05:00 PM	0	0	2	0	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	0	0	7
05:15 PM	0	2	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	5
05:30 PM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
05:45 PM	0	1	1	0	0	0	0	0	0	0	0	2	0	1	0	0	0	4	0	0	0	0	0	0	0	9
Total	0	4	3	0	0	0	0	0	0	0	0	10	0	1	0	0	0	5	0	0	0	0	0	0	0	23
Grand Total	0	5	7	0	0	0	0	0	0	0	0	11	0	2	0	1	0	8	0	0	0	0	0	0	0	34
Apprch %	0	41.7	58.3	0	0	0	0	0	0	0	0	84.6	0	15.4	0	11.1	0	88.9	0	0	0	0	0	0	0	
Total %	0	14.7	20.6	0	0	0	0	0	0	0	0	32.4	0	5.9	0	2.9	0	23.5	0	0	0	0	0	0	0	

	Bedford Road (Route 225) From North						Driveway From East						Bedford Road (Route 225) From South						River Road From Southwest						Driveway From West						
Start Time	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total	Int. Total
1 Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 05:00 PM																															
05:00 PM	0	0	2	0	0	2	0	0	0	0	0	0	0	4	0	0	0	4	0	0	1	0	0	1	0	0	0	0	0	0	7
05:15 PM	0	2	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	5
05:30 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
05:45 PM	0	1	1	0	0	2	0	0	0	0	0	0	0	2	0	1	0	3	0	0	4	0	0	4	0	0	0	0	0	0	9
Total Volume	0	4	3	0	0	7	0	0	0	0	0	0	0	10	0	1	0	11	0	0	5	0	0	5	0	0	0	0	0	0	23
% App. Total	0	57.1	42.9	0	0		0	0	0	0	0		0	90.9	0	9.1	0		0	0	100	0	0		0	0	0	0	0		
PHF	.000	.500	.375	.000	.000	.875	.000	.000	.000	.000	.000	.000	.000	.625	.000	.250	.000	.688	.000	.000	.313	.000	.000	.313	.000	.000	.000	.000	.000	.000	.639

□ Seasonal Adjustment Calculations

SECTION I - CONTINUOUS COUNTING STATION MONTHLY AVERAGE DAILY TRAFFIC

STATION 403 - CONCORD - RTE.2 - 0.2 km EAST OF CONCORD ROTARY

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	September Adjustment to Year	October Adjustment to Year	
06	44,150	43,659	46,395	45,607	46,453	49,481	43,449	45,449	45,925	49,000	44,963	*43,417*	45,662	0.99	0.93	
	-5%	-4%	-5%	-2%	1%	-1%	2%	0%	-1%	0%	-4%	-4%	-2%			
07	41,988	41,749	43,930	44,696	46,932	49,031	44,131	45,508	45,546	49,000	43,366	41,478	44,780	0.98	0.91	
	2%	2%	-1%	2%	-3%	-3%	-1%	-4%	-1%	-5%	-3%	-4%	-1%			
08	43,000	42,665	43,583	45,399	45,662	47,666	43,805	43,567	45,196	46,795	42,144	39,843	44,110	0.98	0.94	
	-3%	-2%	7%	11%	1%	-2%	-1%	-9%	-10%	-1%	3%	11%	0%			
10	41,546	41,883	46,472	50,492	45,910	46,524	43,534	39,595	40,709	46,285	43,576	44,350	44,240	1.09	0.96	
	-6%	-4%	-6%	-12%	0%	-1%	0%	9%	10%	-2%	-1%	-5%	-2%			
11	39,037	40,138	43,732	44,191	45,777	46,145	43,496	43,117	44,740	45,508	43,282	42,043	43,434	0.97	0.95	
	6%	5%	-2%	0%	0%	-1%	-7%	4%	0%	-1%	-1%	-1%	0%			
12	41,311	42,111	43,069	44,294	45,759	45,640	40,408	44,775	44,720	44,904	42,980	41,701	43,473	0.97	0.97	
	1%	-7%	-2%	-3%	-3%	-1%	4%	-3%	-1%	0%	-1%	3%	-1%			
13	41,792	39,095	42,007	42,993	44,222	44,984	41,995	43,310	44,422	45,062	42,684	42,773	42,945	0.97	0.95	
												Growth	**-1.01%**	0.99	0.95	Sub Average

STATION 4118 - LEXINGTON - RTE.I-95 - NORTH OF RTE. 2A

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR			
06	156,000	158,000	158,611	157,414	160,279	161,390	159,906	164,944	165,971	164,465	158,286	151,556	159,735	0.96	0.97	
	-1%	-3%	-2%	-1%	1%	1%	-1%	1%	-4%	0%	-3%	-8%	-2%			
07	155,113	153,838	155,532	155,246	162,424	163,391	158,026	165,812	159,259	164,227	154,304	138,731	157,159	0.99	0.96	
	-4%	-5%	0%	2%	-2%	-2%	0%	-5%	-1%	-2%	-4%	0%	-2%			
08	148,307	146,065	155,000	157,894	158,459	159,757	157,487	157,557	157,046	160,802	147,668	138,475	153,710	0.98	0.96	
	-1%	1%	-5%	-1%	-2%	1%	0%	1%	-5%	-1%	1%	6%	0%			
09	146,747	148,146	147,704	156,341	155,155	161,371	158,076	158,995	149,923	159,664	149,557	146,893	153,214	1.02	0.96	
	-1%	-3%	2%	0%	3%	1%	0%	2%	5%	0%	2%	-2%	1%			
10	145,074	144,155	151,175	156,908	159,226	163,246	158,271	162,003	157,224	160,437	152,104	143,561	154,449	0.98	0.96	
												Growth	**-0.83%**	0.99	0.96	Sub Average

	September	October
Average Adjusment Factor	0.99	0.95

Average Yearly Growth Calculated -0.92%
Yearly Growth Factor Used 0.5%

□ Intersection Crash Data

Moving Massachusetts Forward. massDOT Highway

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Carlisle, MA COUNT DATE : Sep-14

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

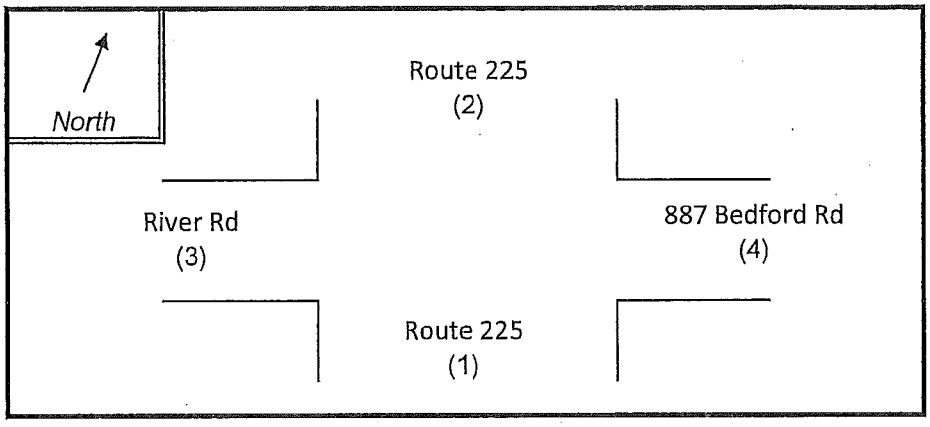
~ INTERSECTION DATA ~

MAJOR STREET : Bedford Road (Route 225)

MINOR STREET(S) : River Road

887 Bedford Road Driveway

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (PM) :	570	235	288	2		1,095

" K " FACTOR : 0.090 INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : 12,167

TOTAL # OF CRASHES : 5 # OF YEARS : 4 AVERAGE # OF CRASHES PER YEAR (**A**) : 1.25

CRASH RATE CALCULATION : 0.28 RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : District 4 Avgs: Signalized = 0.77, Unsignalized = 0.58

Project Title & Date: 779 - Carlisle

Moving Massachusetts Forward. massDOT Highway

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Carlisle, MA COUNT DATE : Sep-14

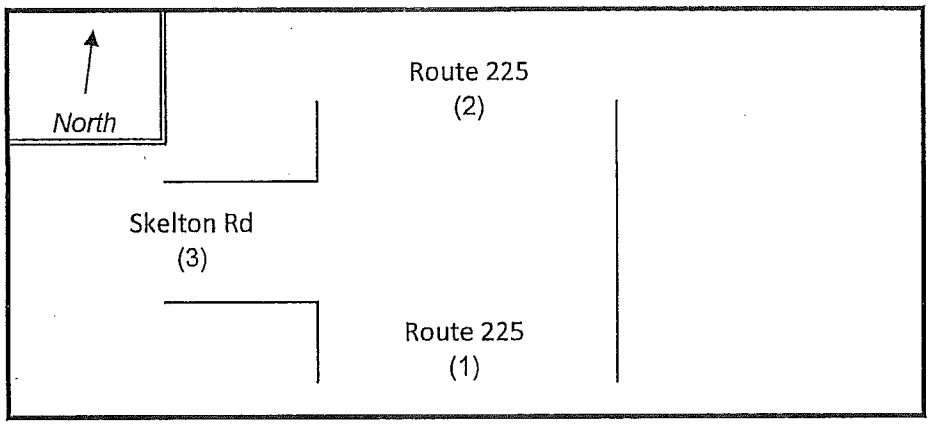
DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Bedford Road (Route 225)

MINOR STREET(S) : Skelton Road

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB			
PEAK HOURLY VOLUMES (PM) :	595	160	38			793

" K " FACTOR : 0.090 INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : 8,811

TOTAL # OF CRASHES : 1 # OF YEARS : 4 AVERAGE # OF CRASHES PER YEAR (**A**) : 0.25

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

Comments : District 4 Avgs: Signalized = 0.77, Unsignalized = 0.58

Project Title & Date: 779 - Carlisle

Moving Massachusetts Forward. massDOT Highway

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Carlisle, MA COUNT DATE : Sep-14

DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

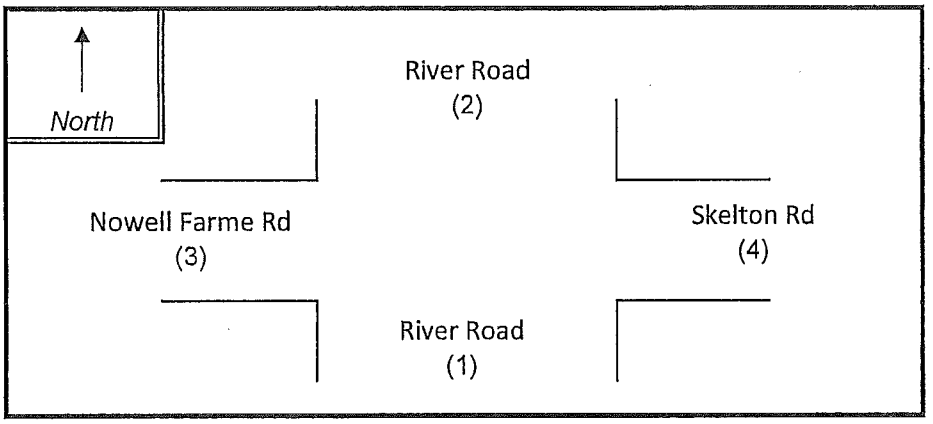
~ INTERSECTION DATA ~

MAJOR STREET : River Road

MINOR STREET(S) : Nowell Farme Road

Skelton Road

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (PM) :	311	77	20	34		442

" K " FACTOR : 0.090 INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : 4,911

TOTAL # OF CRASHES : 1 # OF YEARS : 4 AVERAGE # OF CRASHES PER YEAR (**A**) : 0.25

CRASH RATE CALCULATION : 0.14 RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : District 4 Avgs: Signalized = 0.77, Unsignalized = 0.58

Project Title & Date: 779 - Carlisle

MassDOT Crash Report for Carlisle for the year 2010

Crash Number	Crash Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Direction	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type
2673216	CARLISLE	10-Dec-2010	7:00 AM	Property damage only (none injured)	1	0	0	Single vehicle crash	V1: Travelling straight ahead	V1:Not reported	V1: Collision with animal - deer	V1: Not reported	Dry	Daylight	Clear/Clear		646 BEDFORD ROAD				
2692258	CARLISLE	16-Dec-2010	9:27 AM	Property damage only (none injured)	1	0	0	Single vehicle crash	V1: Travelling straight ahead	V1:Eastbound	V1: Collision with animal - deer	V1: Light truck(van, mini-van, panel, pickup, sport utility) with only four tires	Dry	Dawn	Clear		687 BEDFORD ROAD				
2641014	CARLISLE	09-Sep-2010	2:01 PM	Property damage only (none injured)	2	0	0	Angle	V1: Travelling straight ahead / V2: Travelling straight ahead	V1:Eastbound / V2:Northbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: Not reported / V2:Not reported	Dry	Daylight	Cloudy		RIVER ROAD Rte 225 / NOWELL FARM ROAD Rte 225				

MassDOT Crash Report for Carlisle for the year 2011

Crash Number	Crash Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Direction	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type
(no crashes reported)																					

MassDOT Crash Report for Carlisle for the year 2012

Crash Number	Crash Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Direction	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type
3239401	CARLISLE	31-Jul-2012	10:03 AM	Non-fatal injury	1	1	0	Single vehicle crash	V1: Travelling straight ahead	V1:Westbound	V1: Collision with guardrail	V1: Light truck(van, mini-van, panel, pickup, sport utility) with only four tires	Dry	Daylight	Clear/Clear		964 BEDFORD ROAD Rte 225 W	Rte 225 Milemarker 21.7			

Carlisle Police Department Crash Records

Crash Number	Crash Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles	Total Nonfatal Injuries	Total Fatal Injuries	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Direction	Most Harmful Events	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At Roadway Intersection	Distance from Nearest Roadway Intersection	Distance from Nearest Milemarker	Distance from Nearest Exit	Distance from Nearest Landmark	Non Motorist Type
	CARLISLE	14-Oct-13	14:38	Unknown	Unknown	Unknown	0	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Bedford Road/River Road					
	CARLISLE	6-Dec-13	15:10	Non-fatal injury	1	1	0	Single vehicle crash	V1: Travelling straight ahead	V1:Eastbound	V1: Collision with tree	Unknown	Dry				871 Dedford Road				
	CARLISLE	10-Oct-13	19:17	Unknown	Unknown	Unknown	0	Unknown	Unknown	Unknown	V1: Collision with deer	Unknown	Unknown			Bedford Road/Bedford Road					

□ Speed Data

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA 01752
508-303-0370
www.mdmtrans.com

N/S: Long Ridge Road
Approx. 300' south of Site Drive
Carlisle, MA

Site Code: 00000779
Station ID:
Latitude: 0' 0.0000 Undefined

779 Long Ridge Road (Speed)

Northbound

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

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N/S: Long Ridge Road
Approx. 300' south of Site Drive
Carlisle, MA

Site Code: 00000779
Station ID:
Latitude: 0' 0.0000 Undefined

779 Long Ridge Road (Speed)

Northbound

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

15th Percentile :	16 MPH
50th Percentile :	21 MPH
85th Percentile :	28 MPH
95th Percentile :	31 MPH

Statistics

Mean Speed(Average) :	23 MPH
10 MPH Pace Speed :	19-28 MPH
Number in Pace :	31
Percent in Pace :	64.6%
Number of Vehicles > 30 MPH :	4
Percent of Vehicles > 30 MPH :	8.3%

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Carlisle, MA

Site Code: 00000779
Station ID:
Latitude: 0' 0.0000 Undefined

779 Long Ridge Road (Speed)

Southbound

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
10/01/14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
06:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
07:00	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
08:00	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
09:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
10:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 PM	0	0	0	0	1	0	1	0	1	0	0	0	0	0	3
13:00	0	0	0	5	9	1	0	0	1	0	0	0	0	0	16
14:00	2	0	1	27	19	2	1	0	0	0	0	0	0	0	52
15:00	0	0	0	4	6	1	0	0	0	0	0	0	0	0	11
16:00	0	0	0	0	2	0	0	0	0	1	0	0	0	0	3
17:00	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2
18:00	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
19:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
22:00	0	0	0	2	2	1	0	0	0	0	0	0	0	0	5
23:00	0	0	0	3	5	3	1	0	0	0	0	0	0	0	12
Total	2	0	1	41	45	11	3	3	7	3	0	1	0	0	117

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Site Code: 00000779
Station ID:
Latitude: 0' 0.0000 Undefined

779 Long Ridge Road (Speed)

Southbound

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
10/02/14	0	0	0	2	5	1	0	0	0	0	0	0	0	0	8
01:00	0	0	0	7	4	2	1	0	0	0	0	0	0	0	14
02:00	0	0	0	1	2	0	0	0	0	0	0	0	0	0	3
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
06:00	0	0	0	1	2	0	0	0	0	0	0	0	0	0	3
07:00	0	0	0	2	2	0	0	0	0	2	0	0	0	0	6
08:00	0	0	0	0	3	0	2	0	0	2	0	0	0	0	7
09:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
10:00	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
11:00	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
12 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
13:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
14:00	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
15:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
16:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
19:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
20:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	13	20	5	5	5	2	7	0	0	0	0	57
Grand Total	2	0	1	54	65	16	8	8	9	10	0	1	0	0	174

15th Percentile :	10 MPH
50th Percentile :	13 MPH
85th Percentile :	21 MPH
95th Percentile :	27 MPH

Statistics

Mean Speed(Average) :	15 MPH
10 MPH Pace Speed :	10-19 MPH
Number in Pace :	138
Percent in Pace :	79.3%
Number of Vehicles > 30 MPH :	1
Percent of Vehicles > 30 MPH :	0.6%

□ Sight Line Analysis

Stopping Sight Distance

Proposed Site Roadway at Long Ridge Road
Regulatory Speed Limit

		SPEED (MPH)	BRAKE REACTION DISTANCE (FT)	BRAKING DISTANCE (FT)	CALCULATED STOPPING SIGHT DISTANCE (FT)
Direction 1	NB	30	110.25	79.4	189.7
Direction 2	SB	30	110.25	86.3	196.5

INPUTS	Direction 1	Direction 2
Travel Direction	NB	SB
Speed	30	30
Grade	0.03	0
t	2.5	2.5
a	11.2	11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = 1.47 x t x V

Brake Distance = V^2 / (30 x ((a/32.2)+G))

Where:
t = reaction time (sec)
V = travel speed (mph)
G= roadway grade
a - deceleration rate (ft/sec^2)

Stopping Sight Distance

Proposed Site Roadway at Long Ridge Road
Average Observed Travel Speeds

		SPEED (MPH)	BRAKE REACTION DISTANCE (FT)	BRAKING DISTANCE (FT)	CALCULATED STOPPING SIGHT DISTANCE (FT)
Direction 1	NB	21	77.175	38.9	116.1
Direction 2	SB	22	80.85	46.4	127.2

INPUTS	Direction 1	Direction 2
Travel Direction	NB	SB
Speed	21	22
Grade	0.03	0
t	2.5	2.5
a	11.2	11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = 1.47 x t x V

Brake Distance = V^2 / (30 x ((a/32.2)+G))

Where:
t = reaction time (sec)
V = travel speed (mph)
G= roadway grade
a - deceleration rate (ft/sec^2)

Stopping Sight Distance

Proposed Site Roadway at Long Ridge Road
85th Percentile Observed Travel Speeds

		SPEED (MPH)	BRAKE REACTION DISTANCE (FT)	BRAKING DISTANCE (FT)	CALCULATED STOPPING SIGHT DISTANCE (FT)
Direction 1	NB	25	91.875	55.1	147.0
Direction 2	SB	27	99.225	69.9	169.1

INPUTS	Direction 1	Direction 2
Travel Direction	NB	SB
Speed	25	27
Grade	0.03	0
t	2.5	2.5
a	11.2	11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = 1.47 x t x V

Brake Distance = V^2 / (30 x ((a/32.2)+G))

Where:
t = reaction time (sec)
V = travel speed (mph)
G= roadway grade
a - deceleration rate (ft/sec^2)

□ Background Growth

Institute of Transportation Engineers (ITE) 9th Edition
Land Use Code (LUC) 210 - Single-Family Detached Housing

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 5

AVERAGE WEEKDAY DAILY

T = 9.52* (X)
T = 9.52* 5
T = 47.60
T = 48 vehicle trips
with 50% (24 vpd) entering and 50% (24 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.75* (X)
T = 0.75 * 5
T = 3.75
T = 4 vehicle trips
with 25% (1 vph) entering and 75% (3 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

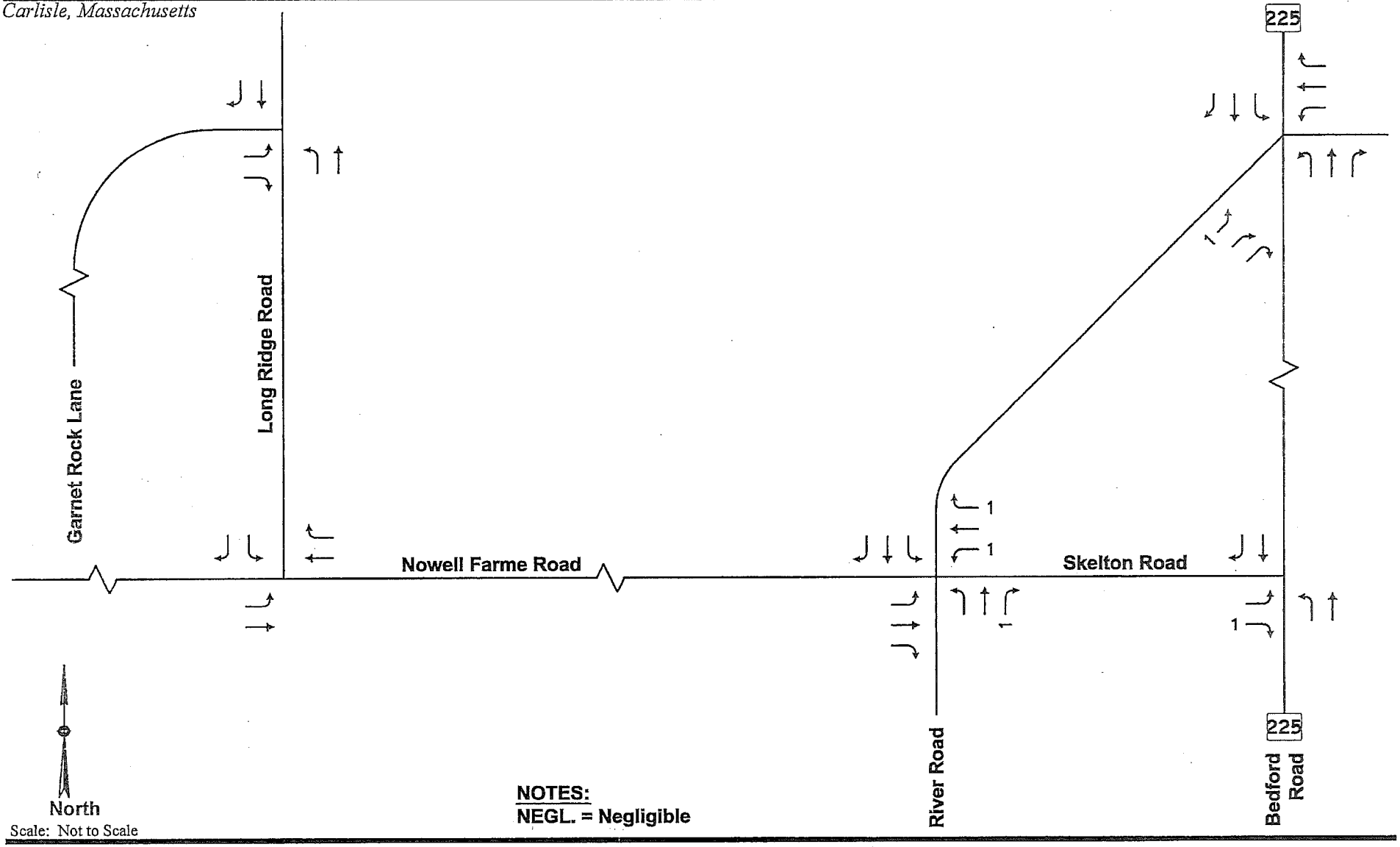
T = 1.00* (X)
T = 1.00* 5
T = 5.00
T = 5 vehicle trips
with 63% (3 vph) entering and 37% (2 vph) exiting.

SATURDAY DAILY

T = 9.91* (X)
T = 9.91* 5
T = 49.55
T = 50 vehicle trips
with 50% (25 vph) entering and 50% (25 vph) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 0.93* (X)
T = 0.93* 5
T = 4.65
T = 5 vehicle trips
with 54% (3 vph) entering and 46% (2 vph) exiting.



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Attachments

5 Lot Residential Development
Site Generated Trips
Weekday Morning Peak Hour Traffic Volumes

Date: October 2014
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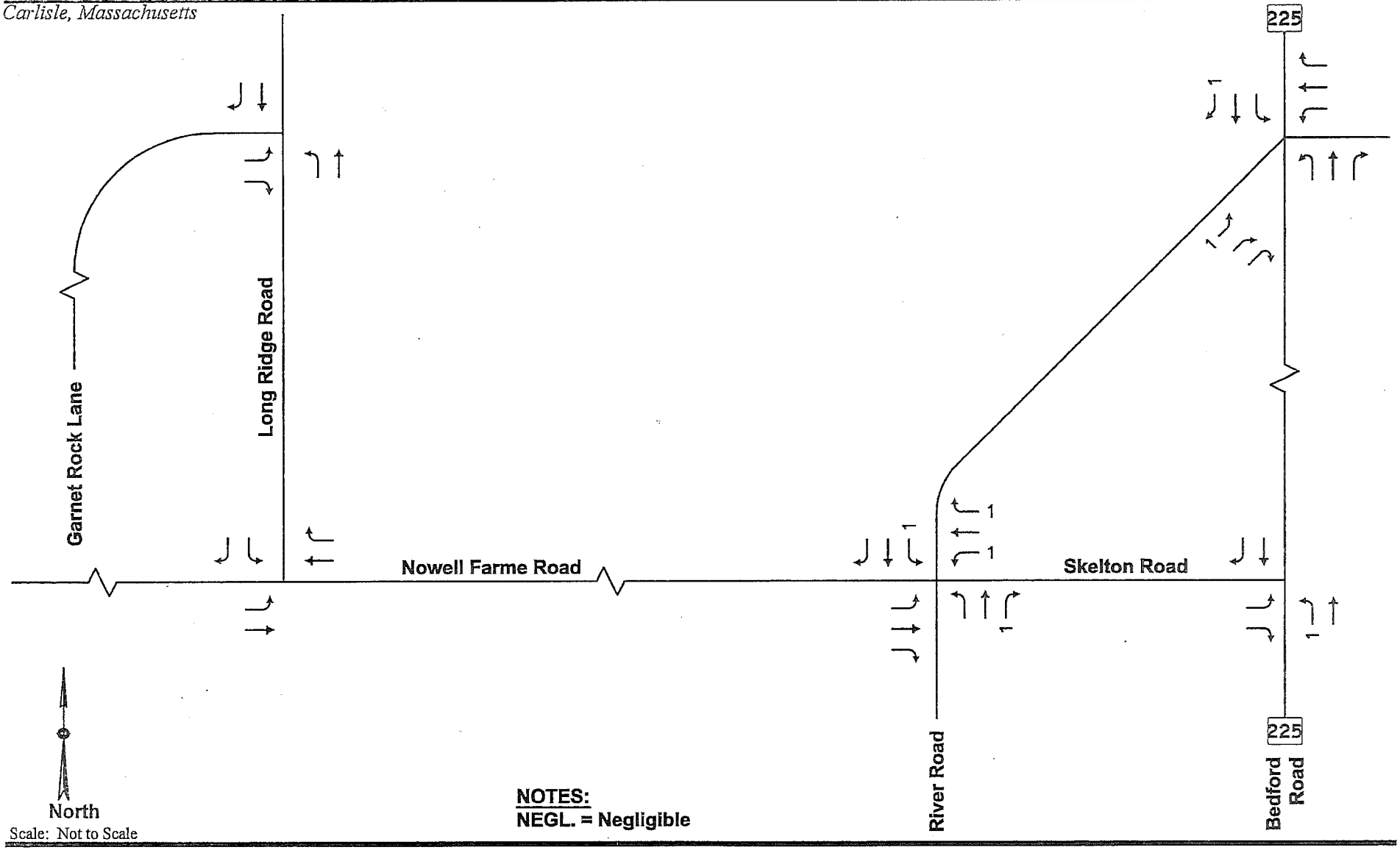

MDM TRANSPORTATION CONSULTANTS, INC.
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Attachments

5 Lot Residential Development
Site Generated Trips
Weekday Evening Peak Hour Traffic Volumes

Date: October 2014
Dwg No. 779 TIAS01.dwg
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SECTION I - CONTINUOUS COUNTING STATION MONTHLY AVERAGE DAILY TRAFFIC

STATION 403 - CONCORD - RTE.2 - 0.2 km EAST OF CONCORD ROTARY

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	September Adjustment to Year	October Adjustment to Year	
06	44,150	43,659	46,395	45,607	46,453	49,481	43,449	45,449	45,925	49,000	44,963	*43,417*	45,662	0.99	0.93	
	-5%	-4%	-5%	-2%	1%	-1%	2%	0%	-1%	0%	-4%	-4%	-2%			
07	41,988	41,749	43,930	44,696	46,932	49,031	44,131	45,508	45,546	49,000	43,366	41,478	44,780	0.98	0.91	
	2%	2%	-1%	2%	-3%	-3%	-1%	-4%	-1%	-5%	-3%	-4%	-1%			
08	43,000	42,665	43,583	45,399	45,662	47,666	43,805	43,567	45,196	46,795	42,144	39,843	44,110	0.98	0.94	
	-3%	-2%	7%	11%	1%	-2%	-1%	-9%	-10%	-1%	3%	11%	0%			
10	41,546	41,883	46,472	50,492	45,910	46,524	43,534	39,595	40,709	46,285	43,576	44,350	44,240	1.09	0.96	
	-6%	-4%	-6%	-12%	0%	-1%	0%	9%	10%	-2%	-1%	-5%	-2%			
11	39,037	40,138	43,732	44,191	45,777	46,145	43,496	43,117	44,740	45,508	43,282	42,043	43,434	0.97	0.95	
	6%	5%	-2%	0%	0%	-1%	-7%	4%	0%	-1%	-1%	-1%	0%			
12	41,311	42,111	43,069	44,294	45,759	45,640	40,408	44,775	44,720	44,904	42,980	41,701	43,473	0.97	0.97	
	1%	-7%	-2%	-3%	-3%	-1%	4%	-3%	-1%	0%	-1%	3%	-1%			
13	41,792	39,095	42,007	42,993	44,222	44,984	41,995	43,310	44,422	45,062	42,684	42,773	42,945	0.97	0.95	
												Growth	**-1.01%**	0.99	0.95	Sub Average

STATION 4118 - LEXINGTON - RTE.I-95 - NORTH OF RTE. 2A

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR			
06	156,000	158,000	158,611	157,414	160,279	161,390	159,906	164,944	165,971	164,465	158,286	151,556	159,735	0.96	0.97	
	-1%	-3%	-2%	-1%	1%	1%	-1%	1%	-4%	0%	-3%	-8%	-2%			
07	155,113	153,838	155,532	155,246	162,424	163,391	158,026	165,812	159,259	164,227	154,304	138,731	157,159	0.99	0.96	
	-4%	-5%	0%	2%	-2%	-2%	0%	-5%	-1%	-2%	-4%	0%	-2%			
08	148,307	146,065	155,000	157,894	158,459	159,757	157,487	157,557	157,046	160,802	147,668	138,475	153,710	0.98	0.96	
	-1%	1%	-5%	-1%	-2%	1%	0%	1%	-5%	-1%	1%	6%	0%			
09	146,747	148,146	147,704	156,341	155,155	161,371	158,076	158,995	149,923	159,664	149,557	146,893	153,214	1.02	0.96	
	-1%	-3%	2%	0%	3%	1%	0%	2%	5%	0%	2%	-2%	1%			
10	145,074	144,155	151,175	156,908	159,226	163,246	158,271	162,003	157,224	160,437	152,104	143,561	154,449	0.98	0.96	
												Growth	**-0.83%**	0.99	0.96	Sub Average

Average Adjusment Factor	0.99	0.95

Average Yearly Growth Calculated -0.92%
Yearly Growth Factor Used 0.5%

MADT
ITALICS = ESTIMATED DATA

□ Trip Generation Data

Institute of Transportation Engineers (ITE) 9th Edition
Land Use Code (LUC) 210 - Single-Family Detached Housing

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 20

AVERAGE WEEKDAY DAILY

Ln T = 0.920 Ln (X) + 2.72
Ln T = 0.920 Ln 20 + (2.72)
Ln T = 5.48
T = 238.91
T = 238 vehicle trips
with 50% (119 vpd) entering and 50% (119 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.700 * (X) + 9.74
T = 0.700 * 20 + (9.74)
T = 23.74
T = 24 vehicle trips
with 25% (6 vph) entering and 75% (18 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

Ln T = 0.90 Ln (X) + 0.51
Ln T = 0.90 Ln 20 + (0.51)
Ln T = 3.21
T = 24.68
T = 25 vehicle trips
with 63% (16 vph) entering and 37% (9 vph) exiting.

SATURDAY DAILY

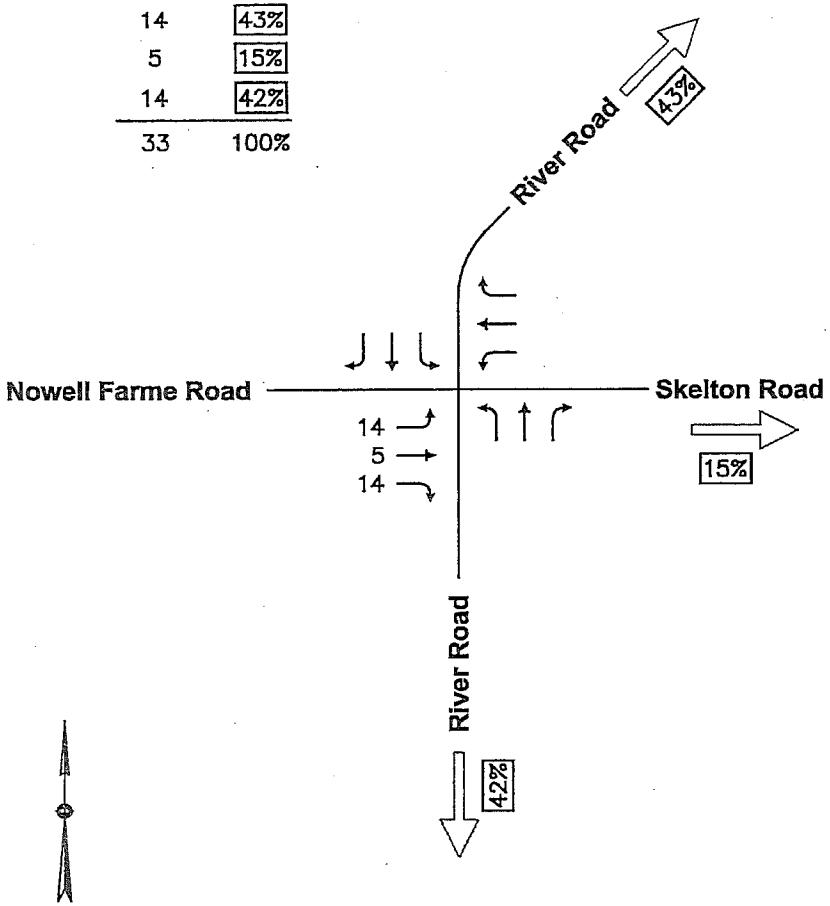
Ln T = 0.93 Ln (X) + 2.64
Ln T = 0.93 Ln 20 + (2.64)
Ln T = 5.43
T = 227.25
T = 228 vehicle trips
with 50% (114 vph) entering and 50% (114 vph) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 0.89 * (X) + 8.77
T = 0.89 * 20 + (8.77)
T = 26.57
T = 27 vehicle trips
with 54% (15 vph) entering and 46% (12 vph) exiting.

□ Trip Distribution Calculations

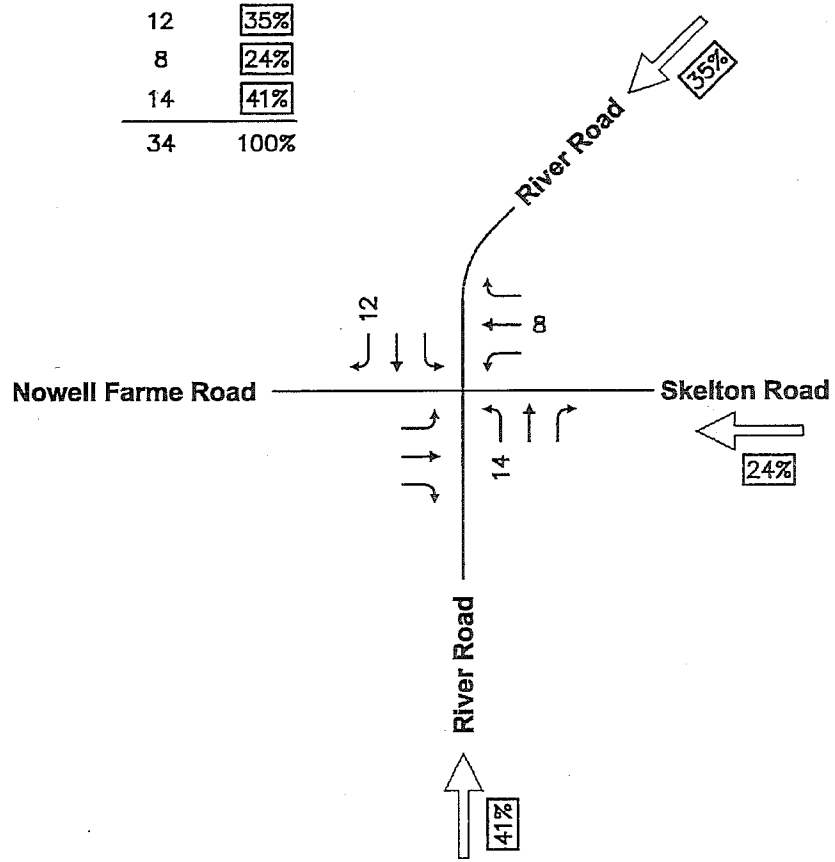
VOLUME OUT	%
14	43%
5	15%
14	42%
33	100%



Scale: Not to Scale

Weekday Morning 7:00 am - 9:00 am Volumes

VOLUME IN	%
12	35%
8	24%
14	41%
34	100%



Weekday Evening 4:00 pm - 6:00 Volumes

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Attachments

Trip Distribution Calculations
Step 1

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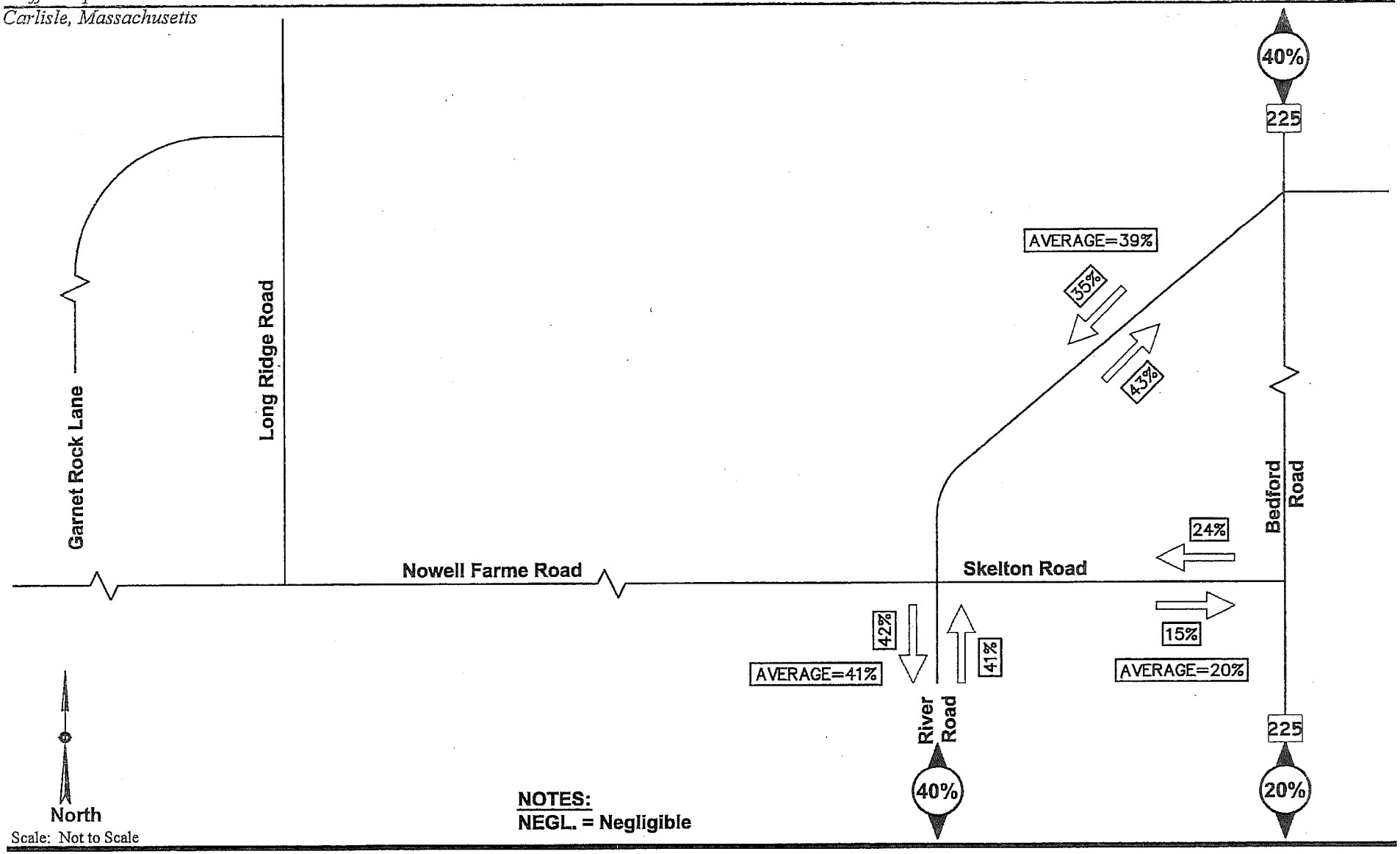

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Trip Distribution Calculations
Step 2

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□ Capacity Analyses

LEVEL OF SERVICE METHODOLOGY

Capacity analysis of intersections is developed using the Synchro® computer software, which implements the methods of the 2010 Highway Capacity Manual (HCM). The resulting analysis presents a level-of-service (LOS) designation for individual intersection movements and (for signalized intersections) for the entire intersection. The LOS is a letter designation that provides a qualitative measure of operating conditions based on several factors including roadway geometry, speeds, ambient traffic volumes, traffic controls, and driver characteristics. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of year. A range of six levels of service are defined on the basis of average delay, ranging from LOS A (the least delay) to LOS F (delays greater than 50 seconds for unsignalized movements, and greater than 80 seconds for signalized movements).

Signalized Intersection Performance Measures

The six LOS designations for signalized intersections may be described as follows:

- *LOS A* describes operations with 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.

The LOS for signalized intersections are calculated using the operational analysis methodology of the 2010 *Highway Capacity Manual*.[1] This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. LOS designations are based on the criterion of control or signal delay per vehicle. Control or signal delay is a measure of driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay and final acceleration delay. **Table A1** summarizes the relationship between LOS and control delay. The tabulated control delay criterion may be applied in assigning LOS designations to individual lane groups, to individual intersection approaches, or to entire intersections.

Table A1
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS[1]

Level of Service	Control (Signal) 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

[1]Source: *Highway Capacity Manual 2010;* Transportation Research Board; Washington, DC; 2010.

[1]*Highway Capacity Manual* 2010; Transportation Research Board; Washington, DC; 2010.

Unsignalized Intersection Performance Measures

The six LOS designations 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 LOS designations of unsignalized intersections are determined by application of a procedure described in the 2010 *Highway Capacity Manual.*[2] LOS 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 LOS at unsignalized intersections are also given in the *Highway Capacity Manual 2010*. **Table A2** summarizes the relationship between LOS and average control delay.

Table A2
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[1]

Average Control Delay (seconds per vehicle)	Level of Service	
	$v/c \leq 1$	$v/c > 1$
≤ 10.0	A	F
10.1 to 15.0	B	F
15.1 to 25.0	C	F
25.1 to 35.0	D	F
35.1 to 50.0	E	F
>50.0	F	F

[1]Source: *Highway Capacity Manual 2010,* Transportation Research Board; Washington, DC; 2010.

[2] ibid

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	56	2	0	0	0	1	2	114	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	4	0	0	0	4	0
Mvmt Flow	67	2	0	0	0	1	2	137	1

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	927	927	777	928	1101	138	951	0	0
Stage 1	784	784	-	143	143	-	-	-	-
Stage 2	143	143	-	785	958	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.14	6.5	6.2	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.14	5.5	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.14	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.536	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	251	270	400	246	214	916	730	-	-
Stage 1	389	407	-	855	782	-	-	-	-
Stage 2	865	782	-	383	338	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	249	268	400	243	212	916	730	-	-
Mov Cap-2 Maneuver	249	268	-	243	212	-	-	-	-
Stage 1	388	405	-	852	780	-	-	-	-
Stage 2	861	780	-	378	336	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	24.9	8.9	0.2
HCM LOS	C	A	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	730	-	-	250	916	1457	-	-
HCM Lane V/C Ratio	0.003	-	-	0.28	0.001	0.002	-	-
HCM Control Delay (s)	9.9	0	-	24.9	8.9	7.5	0	-
HCM Lane LOS	A	A	-	C	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.1	0	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	3	500	289
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	83	83	83
Heavy Vehicles, %	0	1	0
Mvmt Flow	4	602	348

Major/Minor	Major2		
Conflicting Flow All	139	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	1457	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1457	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	10	29	114	499	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	0	0	7	5	1	100
Mvmt Flow	0	12	36	142	624	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	839	624	625	0	-	0
Stage 1	624	-	-	-	-	-
Stage 2	215	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.17	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.263	-	-	-
Pot Cap-1 Maneuver	339	489	933	-	-	-
Stage 1	538	-	-	-	-	-
Stage 2	826	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	325	489	933	-	-	-
Mov Cap-2 Maneuver	325	-	-	-	-	-
Stage 1	538	-	-	-	-	-
Stage 2	791	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.6	1.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	933	-	489	-	-
HCM Lane V/C Ratio	0.039	-	0.026	-	-
HCM Control Delay (s)	9	0	12.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	8	3	8	25	3	2	0	48	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	13	8	0	0	0	4	0
Mvmt Flow	8	3	8	26	3	2	0	51	5

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	362	362	304	365	360	53	305	0	0
Stage 1	306	306	-	53	53	-	-	-	-
Stage 2	56	56	-	312	307	-	-	-	-
Critical Hdwy	7.1	6.5	6.33	7.18	6.5	6.2	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.18	5.5	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.18	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.417	3.572	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	598	569	711	580	570	1020	1267	-	-
Stage 1	708	665	-	945	855	-	-	-	-
Stage 2	961	852	-	686	665	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	594	568	711	570	569	1020	1267	-	-
Mov Cap-2 Maneuver	594	568	-	570	569	-	-	-	-
Stage 1	708	664	-	945	855	-	-	-	-
Stage 2	955	852	-	674	664	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	10.9	11.5	0
HCM LOS	B	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1267	-	-	633	587	1562	-	-
HCM Lane V/C Ratio	-	-	-	0.032	0.054	0.001	-	-
HCM Control Delay (s)	0	-	-	10.9	11.5	7.3	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	1	288	2
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	0	0	0
Mvmt Flow	1	303	2

Major/Minor	Major2		
Conflicting Flow All	56	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	1562	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1562	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	2	1	1	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	2	1	1	4	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	2	0	-	0	4	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	2	-
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	1634	-	-	-	1023	1088
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	1026	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1634	-	-	-	1023	1088
Mov Cap-2 Maneuver	-	-	-	-	1023	-
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	1026	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1634	-	-	-	1023
HCM Lane V/C Ratio	-	-	-	-	0.004
HCM Control Delay (s)	0	-	-	-	8.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	27.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	283	0	5	1	0	1	0	570	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	1	0	0	0	1	0
Mvmt Flow	304	0	5	1	0	1	0	613	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	824	824	211	827	866	613	253	0	0
Stage 1	211	211	-	613	613	-	-	-	-
Stage 2	613	613	-	214	253	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.11	6.5	6.2	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.11	5.5	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.11	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.509	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	~ 294	310	834	292	293	496	1324	-	-
Stage 1	796	731	-	481	486	-	-	-	-
Stage 2	483	486	-	790	701	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	~ 293	310	834	290	293	496	1324	-	-
Mov Cap-2 Maneuver	~ 293	310	-	290	293	-	-	-	-
Stage 1	796	731	-	481	486	-	-	-	-
Stage 2	482	486	-	785	701	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	103.9	14.9	0
HCM LOS	F	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1324	-	-	296	366	976	-	-
HCM Lane V/C Ratio	-	-	-	1.046	0.006	-	-	-
HCM Control Delay (s)	0	-	-	103.9	14.9	0	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	11.7	0	0	-	-

Notes

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

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	0	158	77
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	93	93	93
Heavy Vehicles, %	0	1	0
Mvmt Flow	0	170	83

Major/Minor	Major2		
Conflicting Flow All	613	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	976	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	976	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	2	36	33	562	159	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	3	0	0	1	100
Mvmt Flow	2	37	34	579	164	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	811	164	165	0	-	0
Stage 1	164	-	-	-	-	-
Stage 2	647	-	-	-	-	-
Critical Hdwy	6.4	6.23	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.327	2.2	-	-	-
Pot Cap-1 Maneuver	352	878	1426	-	-	-
Stage 1	870	-	-	-	-	-
Stage 2	525	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	340	878	1426	-	-	-
Mov Cap-2 Maneuver	340	-	-	-	-	-
Stage 1	870	-	-	-	-	-
Stage 2	507	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1426	-	811	-	-
HCM Lane V/C Ratio	0.024	-	0.048	-	-
HCM Control Delay (s)	7.6	0	9.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	11	8	1	30	3	1	7	276	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	1	4
Mvmt Flow	13	10	1	36	4	1	8	329	33

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	455	470	86	458	456	345	89	0	0
Stage 1	91	91	-	362	362	-	-	-	-
Stage 2	364	379	-	96	94	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	519	495	978	516	504	702	1519	-	-
Stage 1	921	823	-	661	629	-	-	-	-
Stage 2	659	618	-	916	821	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	512	491	978	504	499	702	1519	-	-
Mov Cap-2 Maneuver	512	491	-	504	499	-	-	-	-
Stage 1	915	821	-	656	625	-	-	-	-
Stage 2	650	614	-	902	819	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	12.3	12.7	0.2
HCM LOS	B	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1519	-	-	515	508	1208	-	-
HCM Lane V/C Ratio	0.005	-	-	0.046	0.08	0.002	-	-
HCM Control Delay (s)	7.4	0	-	12.3	12.7	8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	2	70	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	84	84	84
Heavy Vehicles, %	0	0	0
Mvmt Flow	2	83	6

Major/Minor	Major2		
Conflicting Flow All	362	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	1208	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1208	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0.2
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	6	1	2	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	65	65	65	65	65	65
Heavy Vehicles, %	0	0	100	0	0	0
Mvmt Flow	0	9	2	3	5	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	5	0	-	0	12	3
Stage 1	-	-	-	-	3	-
Stage 2	-	-	-	-	9	-
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	1630	-	-	-	1013	1087
Stage 1	-	-	-	-	1025	-
Stage 2	-	-	-	-	1019	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1630	-	-	-	1013	1087
Mov Cap-2 Maneuver	-	-	-	-	1013	-
Stage 1	-	-	-	-	1025	-
Stage 2	-	-	-	-	1019	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1630	-	-	-	1013
HCM Lane V/C Ratio	-	-	-	-	0.005
HCM Control Delay (s)	0	-	-	-	8.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	58	2	0	0	0	1	2	117	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	4	0	0	0	4	0
Mvmt Flow	70	2	0	0	0	1	2	141	1

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	951	951	796	951	1128	142	975	0	0
Stage 1	804	804	-	146	146	-	-	-	-
Stage 2	147	147	-	805	982	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.14	6.5	6.2	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.14	5.5	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.14	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.536	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	242	262	390	238	206	911	716	-	-
Stage 1	380	398	-	852	780	-	-	-	-
Stage 2	860	779	-	373	330	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	240	259	390	235	204	911	716	-	-
Mov Cap-2 Maneuver	240	259	-	235	204	-	-	-	-
Stage 1	379	395	-	849	778	-	-	-	-
Stage 2	856	777	-	368	328	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	26.2	9	0.2
HCM LOS	D	A	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	716	-	-	241	911	1453	-	-
HCM Lane V/C Ratio	0.003	-	-	0.3	0.001	0.002	-	-
HCM Control Delay (s)	10	0	-	26.2	9	7.5	0	-
HCM Lane LOS	B	A	-	D	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.2	0	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	3	513	296
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	83	83	83
Heavy Vehicles, %	0	1	0
Mvmt Flow	4	618	357

Major/Minor	Major2		
Conflicting Flow All	142	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	1453	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1453	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	11	30	117	511	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	0	0	7	5	1	100
Mvmt Flow	0	14	38	146	639	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	860	639	640	0	-	0
Stage 1	639	-	-	-	-	-
Stage 2	221	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.17	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.263	-	-	-
Pot Cap-1 Maneuver	329	480	921	-	-	-
Stage 1	530	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	314	480	921	-	-	-
Mov Cap-2 Maneuver	314	-	-	-	-	-
Stage 1	530	-	-	-	-	-
Stage 2	784	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	1.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	921	-	480	-	-
HCM Lane V/C Ratio	0.041	-	0.029	-	-
HCM Control Delay (s)	9.1	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	8	3	8	27	3	3	0	49	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	13	8	0	0	0	4	0
Mvmt Flow	8	3	8	28	3	3	0	52	6

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	372	372	312	374	370	55	313	0	0
Stage 1	314	314	-	55	55	-	-	-	-
Stage 2	58	58	-	319	315	-	-	-	-
Critical Hdwy	7.1	6.5	6.33	7.18	6.5	6.2	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.18	5.5	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.18	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.417	3.572	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	589	561	703	572	563	1018	1259	-	-
Stage 1	701	660	-	942	853	-	-	-	-
Stage 2	959	851	-	680	659	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	584	560	703	562	562	1018	1259	-	-
Mov Cap-2 Maneuver	584	560	-	562	562	-	-	-	-
Stage 1	701	659	-	942	853	-	-	-	-
Stage 2	952	851	-	668	658	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	11	11.5	0
HCM LOS	B	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1259	-	-	624	586	1559	-	-
HCM Lane V/C Ratio	-	-	-	0.032	0.059	0.001	-	-
HCM Control Delay (s)	0	-	-	11	11.5	7.3	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	1	295	2
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	0	0	0
Mvmt Flow	1	311	2

Major/Minor	Major2		
Conflicting Flow All	58	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	1559	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1559	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	2	1	1	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	2	1	1	4	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	2	0	-	0	4	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	2	-
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	1634	-	-	-	1023	1088
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	1026	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1634	-	-	-	1023	1088
Mov Cap-2 Maneuver	-	-	-	-	1023	-
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	1026	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1634	-	-	-	1023
HCM Lane V/C Ratio	-	-	-	-	0.004
HCM Control Delay (s)	0	-	-	-	8.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	32.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	291	0	5	1	0	1	0	584	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	1	0	0	0	1	0
Mvmt Flow	313	0	5	1	0	1	0	628	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	845	845	217	848	888	628	260	0	0
Stage 1	217	217	-	628	628	-	-	-	-
Stage 2	628	628	-	220	260	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.11	6.5	6.2	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.11	5.5	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.11	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.509	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	~ 285	302	828	282	285	487	1316	-	-
Stage 1	790	727	-	472	479	-	-	-	-
Stage 2	474	479	-	785	697	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	~ 284	302	828	280	285	487	1316	-	-
Mov Cap-2 Maneuver	~ 284	302	-	280	285	-	-	-	-
Stage 1	790	727	-	472	479	-	-	-	-
Stage 2	473	479	-	780	697	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	124.9	15.2	0
HCM LOS	F	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1316	-	-	287	356	964	-	-
HCM Lane V/C Ratio	-	-	-	1.109	0.006	-	-	-
HCM Control Delay (s)	0	-	-	124.9	15.2	0	-	-
HCM Lane LOS	A	-	-	F	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	13.1	0	0	-	-

Notes

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

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	0	162	80
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	93	93	93
Heavy Vehicles, %	0	1	0
Mvmt Flow	0	174	86

Major/Minor	Major2		
Conflicting Flow All	628	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	964	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	964	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	2	37	35	576	163	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	3	0	0	1	100
Mvmt Flow	2	38	36	594	168	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	835	169	169	0	-	0
Stage 1	169	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Critical Hdwy	6.4	6.23	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.327	2.2	-	-	-
Pot Cap-1 Maneuver	340	872	1421	-	-	-
Stage 1	866	-	-	-	-	-
Stage 2	515	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	327	872	1421	-	-	-
Mov Cap-2 Maneuver	327	-	-	-	-	-
Stage 1	866	-	-	-	-	-
Stage 2	495	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1421	-	803	-	-
HCM Lane V/C Ratio	0.025	-	0.05	-	-
HCM Control Delay (s)	7.6	0	9.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	11	8	1	32	3	2	7	283	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	1	4
Mvmt Flow	13	10	1	38	4	2	8	337	36

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	470	485	89	472	470	355	92	0	0
Stage 1	96	96	-	371	371	-	-	-	-
Stage 2	374	389	-	101	99	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	507	485	975	506	495	693	1515	-	-
Stage 1	916	819	-	653	623	-	-	-	-
Stage 2	651	612	-	910	817	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	498	480	975	494	490	693	1515	-	-
Mov Cap-2 Maneuver	498	480	-	494	490	-	-	-	-
Stage 1	910	816	-	648	619	-	-	-	-
Stage 2	641	608	-	895	814	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	12.5	12.9	0.2
HCM LOS	B	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1515	-	-	503	501	1197	-	-
HCM Lane V/C Ratio	0.006	-	-	0.047	0.088	0.003	-	-
HCM Control Delay (s)	7.4	0	-	12.5	12.9	8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	3	72	5
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	84	84	84
Heavy Vehicles, %	0	0	0
Mvmt Flow	4	86	6

Major/Minor	Major2		
Conflicting Flow All	373	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	1197	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1197	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0.3
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	6	1	2	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	65	65	65	65	65	65
Heavy Vehicles, %	0	0	100	0	0	0
Mvmt Flow	0	9	2	3	5	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	5	0	-	0	12	3
Stage 1	-	-	-	-	3	-
Stage 2	-	-	-	-	9	-
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	1630	-	-	-	1013	1087
Stage 1	-	-	-	-	1025	-
Stage 2	-	-	-	-	1019	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1630	-	-	-	1013	1087
Mov Cap-2 Maneuver	-	-	-	-	1013	-
Stage 1	-	-	-	-	1025	-
Stage 2	-	-	-	-	1019	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1630	-	-	-	1013
HCM Lane V/C Ratio	-	-	-	-	0.005
HCM Control Delay (s)	0	-	-	-	8.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	65	2	0	0	0	1	2	117	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	4	0	0	0	4	0
Mvmt Flow	78	2	0	0	0	1	2	141	1

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	952	952	798	952	1130	142	977	0	0
Stage 1	805	805	-	146	146	-	-	-	-
Stage 2	147	147	-	806	984	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.14	6.5	6.2	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.14	5.5	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.14	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.536	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	241	261	389	237	205	911	714	-	-
Stage 1	379	398	-	852	780	-	-	-	-
Stage 2	860	779	-	373	329	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	239	258	389	234	203	911	714	-	-
Mov Cap-2 Maneuver	239	258	-	234	203	-	-	-	-
Stage 1	378	395	-	849	778	-	-	-	-
Stage 2	856	777	-	368	327	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	27.4	9	0.2
HCM LOS	D	A	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	714	-	-	240	911	1453	-	-
HCM Lane V/C Ratio	0.003	-	-	0.336	0.001	0.002	-	-
HCM Control Delay (s)	10.1	0	-	27.4	9	7.5	0	-
HCM Lane LOS	B	A	-	D	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.4	0	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	3	513	298
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	83	83	83
Heavy Vehicles, %	0	1	0
Mvmt Flow	4	618	359

Major/Minor	Major2		
Conflicting Flow All	142	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	1453	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1453	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	15	32	117	511	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	0	0	7	5	1	100
Mvmt Flow	0	19	40	146	639	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	865	639	640	0	-	0
Stage 1	639	-	-	-	-	-
Stage 2	226	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.17	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.263	-	-	-
Pot Cap-1 Maneuver	327	480	921	-	-	-
Stage 1	530	-	-	-	-	-
Stage 2	816	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	312	480	921	-	-	-
Mov Cap-2 Maneuver	312	-	-	-	-	-
Stage 1	530	-	-	-	-	-
Stage 2	778	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.8	2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	921	-	480	-	-
HCM Lane V/C Ratio	0.043	-	0.039	-	-
HCM Control Delay (s)	9.1	0	12.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	15	7	15	27	5	3	2	49	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	13	8	0	0	0	4	0
Mvmt Flow	16	7	16	28	5	3	2	52	6

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	378	377	313	385	376	55	315	0	0
Stage 1	315	315	-	59	59	-	-	-	-
Stage 2	63	62	-	326	317	-	-	-	-
Critical Hdwy	7.1	6.5	6.33	7.18	6.5	6.2	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.18	5.5	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.18	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.417	3.572	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	583	558	702	563	558	1018	1257	-	-
Stage 1	700	659	-	938	850	-	-	-	-
Stage 2	953	847	-	674	658	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	576	556	702	544	556	1018	1257	-	-
Mov Cap-2 Maneuver	576	556	-	544	556	-	-	-	-
Stage 1	699	658	-	936	848	-	-	-	-
Stage 2	942	845	-	651	657	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	11.2	11.8	0.3
HCM LOS	B	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1257	-	-	617	568	1559	-	-
HCM Lane V/C Ratio	0.002	-	-	0.063	0.065	0.001	-	-
HCM Control Delay (s)	7.9	0	-	11.2	11.8	7.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	1	295	4
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	95	95	95
Heavy Vehicles, %	0	0	0
Mvmt Flow	1	311	4

Major/Minor	Major2		
Conflicting Flow All	58	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	1559	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1559	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	2	1	7	21	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	2	1	8	25	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	10	0	-	0	7	5
Stage 1	-	-	-	-	5	-
Stage 2	-	-	-	-	2	-
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	1623	-	-	-	1019	1084
Stage 1	-	-	-	-	1023	-
Stage 2	-	-	-	-	1026	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1623	-	-	-	1019	1084
Mov Cap-2 Maneuver	-	-	-	-	1019	-
Stage 1	-	-	-	-	1023	-
Stage 2	-	-	-	-	1026	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1623	-	-	-	1019
HCM Lane V/C Ratio	-	-	-	-	0.025
HCM Control Delay (s)	0	-	-	-	8.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	5.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	18	0	1	6	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	20	0	1	7	0	3

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	7	4	0	0	8	0
Stage 1	4	-	-	-	-	-
Stage 2	3	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	1019	1085	-	-	1625	-
Stage 1	1024	-	-	-	-	-
Stage 2	1025	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	1019	1085	-	-	1625	-
Mov Cap-2 Maneuver	1019	-	-	-	-	-
Stage 1	1024	-	-	-	-	-
Stage 2	1025	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1019	1625	-
HCM Lane V/C Ratio	-	-	0.019	-	-
HCM Control Delay (s)	-	-	8.6	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	34.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	295	0	5	1	0	1	0	584	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	1	0	0	0	1	0
Mvmt Flow	317	0	5	1	0	1	0	628	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	848	848	220	851	895	628	267	0	0
Stage 1	220	220	-	628	628	-	-	-	-
Stage 2	628	628	-	223	267	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.11	6.5	6.2	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.11	5.5	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.11	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.509	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	~ 284	301	825	281	282	487	1308	-	-
Stage 1	787	725	-	472	479	-	-	-	-
Stage 2	474	479	-	782	692	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	~ 283	301	825	279	282	487	1308	-	-
Mov Cap-2 Maneuver	~ 283	301	-	279	282	-	-	-	-
Stage 1	787	725	-	472	479	-	-	-	-
Stage 2	473	479	-	777	692	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	131.3	15.2	0
HCM LOS	F	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1308	-	-	286	355	964	-	-
HCM Lane V/C Ratio	-	-	-	1.128	0.006	-	-	-
HCM Control Delay (s)	0	-	-	131.3	15.2	0	-	-
HCM Lane LOS	A	-	-	F	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	13.5	0	0	-	-

Notes

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

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	0	162	86
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	93	93	93
Heavy Vehicles, %	0	1	0
Mvmt Flow	0	174	92

Major/Minor	Major2		
Conflicting Flow All	628	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	964	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	964	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	2	38	39	576	163	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	3	0	0	1	100
Mvmt Flow	2	39	40	594	168	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	843	169	169	0	-	0
Stage 1	169	-	-	-	-	-
Stage 2	674	-	-	-	-	-
Critical Hdwy	6.4	6.23	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.327	2.2	-	-	-
Pot Cap-1 Maneuver	337	872	1421	-	-	-
Stage 1	866	-	-	-	-	-
Stage 2	510	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	323	872	1421	-	-	-
Mov Cap-2 Maneuver	323	-	-	-	-	-
Stage 1	866	-	-	-	-	-
Stage 2	489	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1421	-	804	-	-
HCM Lane V/C Ratio	0.028	-	0.051	-	-
HCM Control Delay (s)	7.6	0	9.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	15	9	5	32	7	2	13	283	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	1	4
Mvmt Flow	18	11	6	38	8	2	15	337	36

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	490	503	92	494	492	355	99	0	0
Stage 1	99	99	-	386	386	-	-	-	-
Stage 2	391	404	-	108	106	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	492	474	971	489	481	693	1507	-	-
Stage 1	912	817	-	641	614	-	-	-	-
Stage 2	637	603	-	902	811	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	477	466	971	471	473	693	1507	-	-
Mov Cap-2 Maneuver	477	466	-	471	473	-	-	-	-
Stage 1	900	814	-	633	606	-	-	-	-
Stage 2	618	595	-	881	808	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	12.4	13.4	0.3
HCM LOS	B	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1507	-	-	519	479	1197	-	-
HCM Lane V/C Ratio	0.01	-	-	0.067	0.102	0.003	-	-
HCM Control Delay (s)	7.4	0	-	12.4	13.4	8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.3	0	-	-

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	3	72	11
Conflicting Peds, #/hr	0	0	0
Sign Control	Free	Free	Free
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	84	84	84
Heavy Vehicles, %	0	0	0
Mvmt Flow	4	86	13

Major/Minor	Major2		
Conflicting Flow All	373	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.1	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.2	-	-
Pot Cap-1 Maneuver	1197	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1197	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	SB
HCM Control Delay, s	0.3
HCM LOS	

Minor Lane/Major Mvmt

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	6	1	18	12	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	65	65	65	65	65	65
Heavy Vehicles, %	0	0	100	0	0	0
Mvmt Flow	0	9	2	28	18	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	29	0	-	0	24	15
Stage 1	-	-	-	-	15	-
Stage 2	-	-	-	-	9	-
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	1597	-	-	-	997	1070
Stage 1	-	-	-	-	1013	-
Stage 2	-	-	-	-	1019	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1597	-	-	-	997	1070
Mov Cap-2 Maneuver	-	-	-	-	997	-
Stage 1	-	-	-	-	1013	-
Stage 2	-	-	-	-	1019	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1597	-	-	-	997
HCM Lane V/C Ratio	-	-	-	-	0.019
HCM Control Delay (s)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	2.6

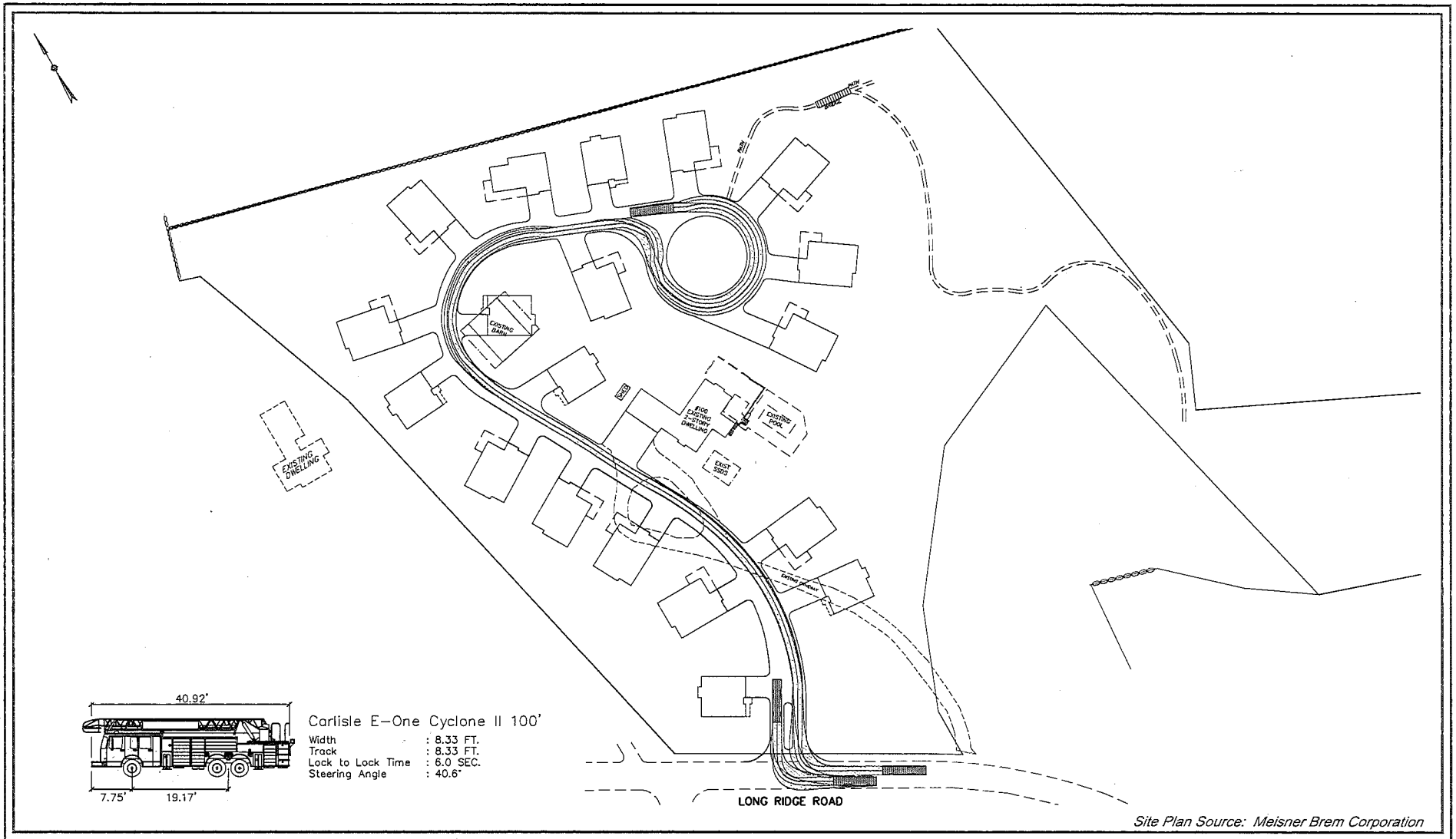
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	9	0	2	16	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	10	0	2	17	0	3

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	14	11	0	0	20	0
Stage 1	11	-	-	-	-	-
Stage 2	3	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	1010	1076	-	-	1609	-
Stage 1	1017	-	-	-	-	-
Stage 2	1025	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	1010	1076	-	-	1609	-
Mov Cap-2 Maneuver	1010	-	-	-	-	-
Stage 1	1017	-	-	-	-	-
Stage 2	1025	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1010	1609	-
HCM Lane V/C Ratio	-	-	0.01	-	-
HCM Control Delay (s)	-	-	8.6	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

□ AutoTurn® Analysis



Site Plan Source: Meisner Brem Corporation

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers
28 Lord Road, Suite 280
Marlborough, MA 01752

Scale: As Noted
DWG No. 779 Autoturn.dwg

Date: October 2014
Project No. 779

Proposed Development
Carlisle, Massachusetts

Exhibit 1
Fire Truck AutoTurn Analysis
Carlisle Ladder