

MEMORANDUM

DATE: March 9, 2020

TO: Mr. Bob Fox
TD Development LLC
38 Benjamin's Gate
Plymouth, MA 02360

FROM: Robert J. Michaud, P.E. – Managing Principal
Daniel A. Dumais, P.E. – Senior Project Manager

RE: **Proposed Residential Development**
Ridge Street – Millis, Massachusetts



MDM Transportation Consultants, Inc. (MDM) has prepared this traffic impact assessment (TIA) for a proposed residential development to be located along Ridge Street in Millis, Massachusetts. The adjacent study area roadways and intersections are depicted in **Figure 1**. This memorandum describes existing (baseline) traffic conditions for adjacent roadways, trip generation characteristics of the proposed development, quantifies incremental traffic impacts of the site development on area roadways, and evaluates safety-related conditions at key study locations that provide access to the Site.

Key findings of the traffic assessment are as follows:

- *Modest Traffic Generation.* the development is estimated to generate approximately 32 vehicle trips (8 entering and 24 exiting) during the weekday morning peak hour and 43 vehicle trips (27 entering and 16 exiting) during the weekday evening peak hour. On a daily basis, the development is estimated to generate approximately 408 vehicle trips on a weekday with 50 percent entering and exiting.
- *Safety Characteristics.* Safe stopping sight distance (SSD) is available for oncoming vehicles to detect, react and stop for vehicles exiting the proposed roadway onto Ridge Street and Rolling Meadow Drive onto Ridge Street based on the observed travel speeds in the immediate area. Improvements are summarized under *Conclusions and Recommendations* to enhance the intersection sight distance (ISD) looking to the north onto Ridge Street when exiting the proposed roadway and Rolling Meadow Drive. A review of the crash data indicated that no immediate safety countermeasures are warranted based on the crash history at the study intersections.

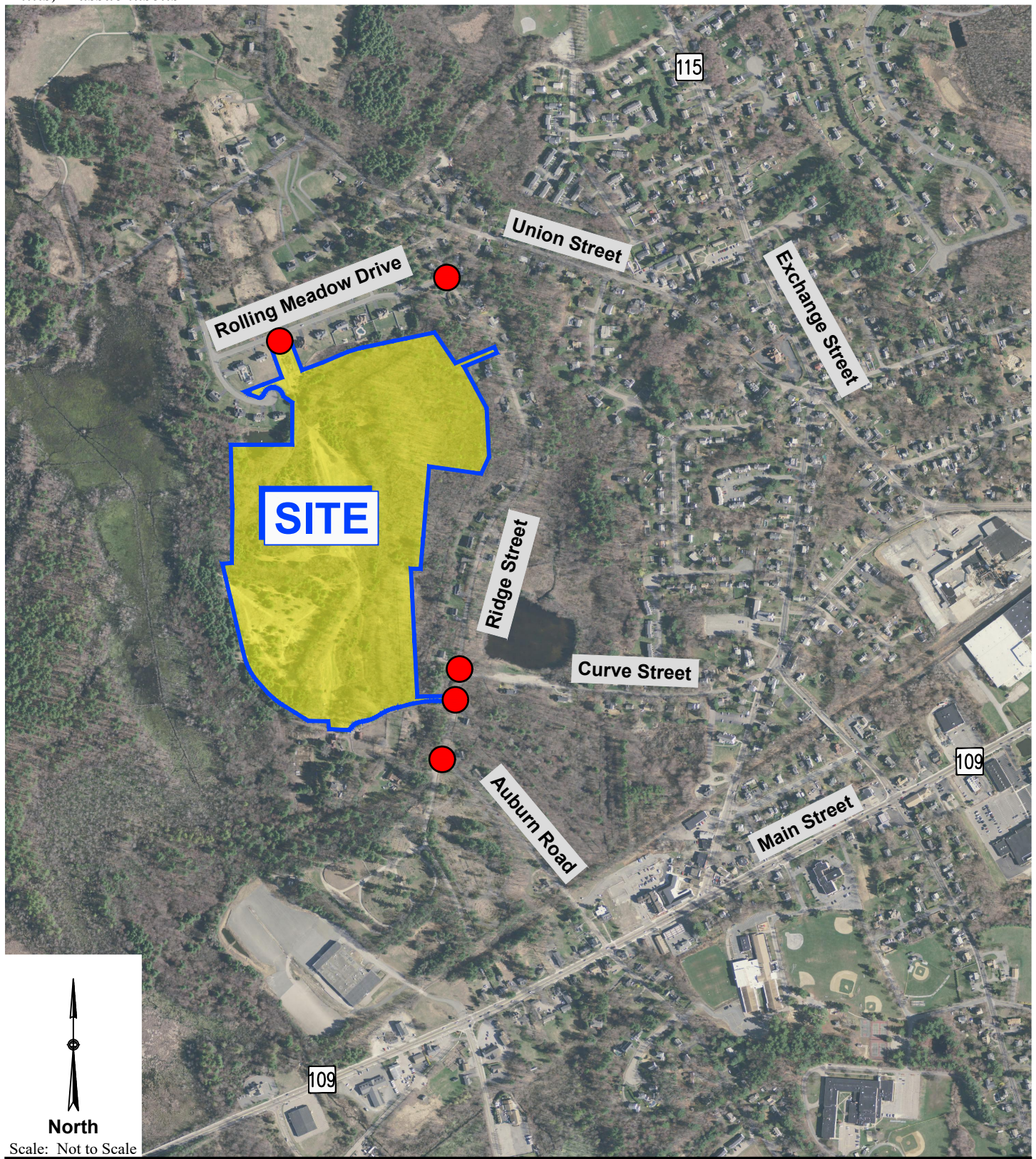


Figure 1

- *Adequate Roadway Capacity & Operations.* Adequate capacity is available along Ridge Street to accommodate modest increases associated with the proposed development. The proposed roadway intersection with Ridge Street will operate below capacity at LOS A or better during the peak hours. The proposed development will not materially impact study area intersections and will not result in any material changes in traffic operations in the study area between future No-Build and Build conditions.

In summary, MDM finds that incremental traffic associated with the proposed development is not expected to materially impact operating conditions at the study intersections. The study intersections exhibit below-average crash rates based on historic crash data; safety countermeasures are therefore not warranted. Implementation of access/egress improvement and a proposed pedestrian connection to Rolling Meadow Drive as summarized under *Conclusions and Recommendations* will establish a framework of minimizing Site traffic impacts.

PROJECT DESCRIPTION

The project site is an approximate 61.2-acre tract of undeveloped land located to the west of Ridge Street and to the south of Rolling Meadow Drive. Under the proposed development plan 43 single family homes will be constructed. Primary access/egress for the project is proposed via a direct connection to the western side of Ridge Street approximately 250 feet south of Curve Street. Secondary access/egress will be provided along Rolling Meadow Drive. The preliminary site layout prepared by Legacy Engineering is presented in **Figure 2**.

STUDY AREA

This TIA evaluates transportation characteristics of roadways and intersections that provide a primary means of access to the Site, and that are likely to sustain a measurable level of traffic impact from the development. The study area includes the following intersections, which are also identified in **Figure 1**:

- Ridge Street at Rolling Meadow Drive (Unsignalized)
- Ridge Street at Curve Street (Unsignalized)
- Ridge Street at Proposed Roadway (Unsignalized)
- Ridge Street at Auburn Street (Unsignalized)



Site Plan Source: Legacy Engineering

Figure 2

EXISTING TRAFFIC & SAFETY CHARACTERISTICS

An overview of existing roadway conditions, traffic volumes and safety characteristics is provided below.

Roadways

Ridge Street

Ridge Street is classified by the Massachusetts Department of Transportation (MassDOT) as a Local roadway and is under local (Town) jurisdiction. Ridge Street is generally a north-south roadway in the project area which connects Nason Hill Road in Sherborn to the north with Auburn Street to the south. The roadway provides a single travel lane in each direction with a marked double yellow centerline and white edge lines. There are not sidewalks along Ridge Street in the project area. Land use along Ridge Street in the immediate project area is primarily residential homes but also includes Richardson's Pond and Prospect Hill Cemetery.

Auburn Street

Auburn Street is classified by the Massachusetts Department of Transportation (MassDOT) as a Local roadway and is under local (Town) jurisdiction. Auburn Street is generally a north-south roadway in the project area which connects Ridge Street to the north with Main Street to the south. The roadway provides a single travel lane in each direction with a marked double yellow centerline. The sidewalk along Auburn Street is limited to the eastern side near the Millis Police Station. Land use along Auburn Street in the immediate project area includes residential homes, Prospect Hill Cemetery, and the Millis Police Department.

Curve Street

Curve Street is classified by the Massachusetts Department of Transportation (MassDOT) as a Local roadway and is under local (Town) jurisdiction. Curve Street is generally an east-west roadway in the project area which connects Ridge Street to the west with Union Street to the east. The roadway provides a single travel lane in each direction with a marked double yellow centerline. There are no sidewalks along Curve Street in the project area. Land use along Curve Street in the immediate project area includes residential homes, Richardson's Pond, and a church.

Rolling Meadow Drive

Rolling Meadow Drive is classified by the Massachusetts Department of Transportation (MassDOT) as a Local roadway and is under local (Town) jurisdiction. Rolling Meadow Drive is an east-west roadway in the project area which connects Paddock Lane to the west with Ridge Street to the east. The roadway provides a single travel lane in each direction. A sidewalk is provided along the southern side of Rolling Meadow Drive. Land use along Rolling Meadow Drive include single family residential homes.

Intersections

Ridge Street at Curve Street

Ridge Street meets Curve Street to form a three-legged unsignalized intersection. Each approach to the intersection provides a single travel lane. Land uses at the intersection consist of residential homes and Richardson's Pond. The Curve Street approach is under STOP sign control.

Ridge Street at Auburn Street

Ridge Street meets Auburn Street to form a three-legged unsignalized intersection. Each approach to the intersection provides a single travel lane. Land uses at the intersection consist of residential homes and Prospect Hill Cemetery. The northbound Ridge Street approach is under STOP control.

Baseline Traffic Data

Traffic volume data was collected at the study area intersections 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 use and the adjacent streets. Traffic data used in this evaluation was collected in October 2019. This data reflects slightly above average traffic conditions (2% above average) based on review of MassDOT permanent count station data for the area. No seasonal adjustment was applied to the observed traffic volumes to represent average conditions. Traffic count data and MassDOT permanent count station data are provided in the **Attachments**. To reflect 2020 Baseline conditions the October 2019 traffic volumes were increased by 1-percent based on MassDOT data for the area. The Baseline weekday morning and weekday evening peak hour traffic volumes for the study intersections are shown in **Figure 3** and **Figure 4**.

Daily traffic volumes along Ridge Street were obtained by mechanical methods using a radar-based traffic recorder. The results of the counts are summarized in **Table 1** and are discussed below.

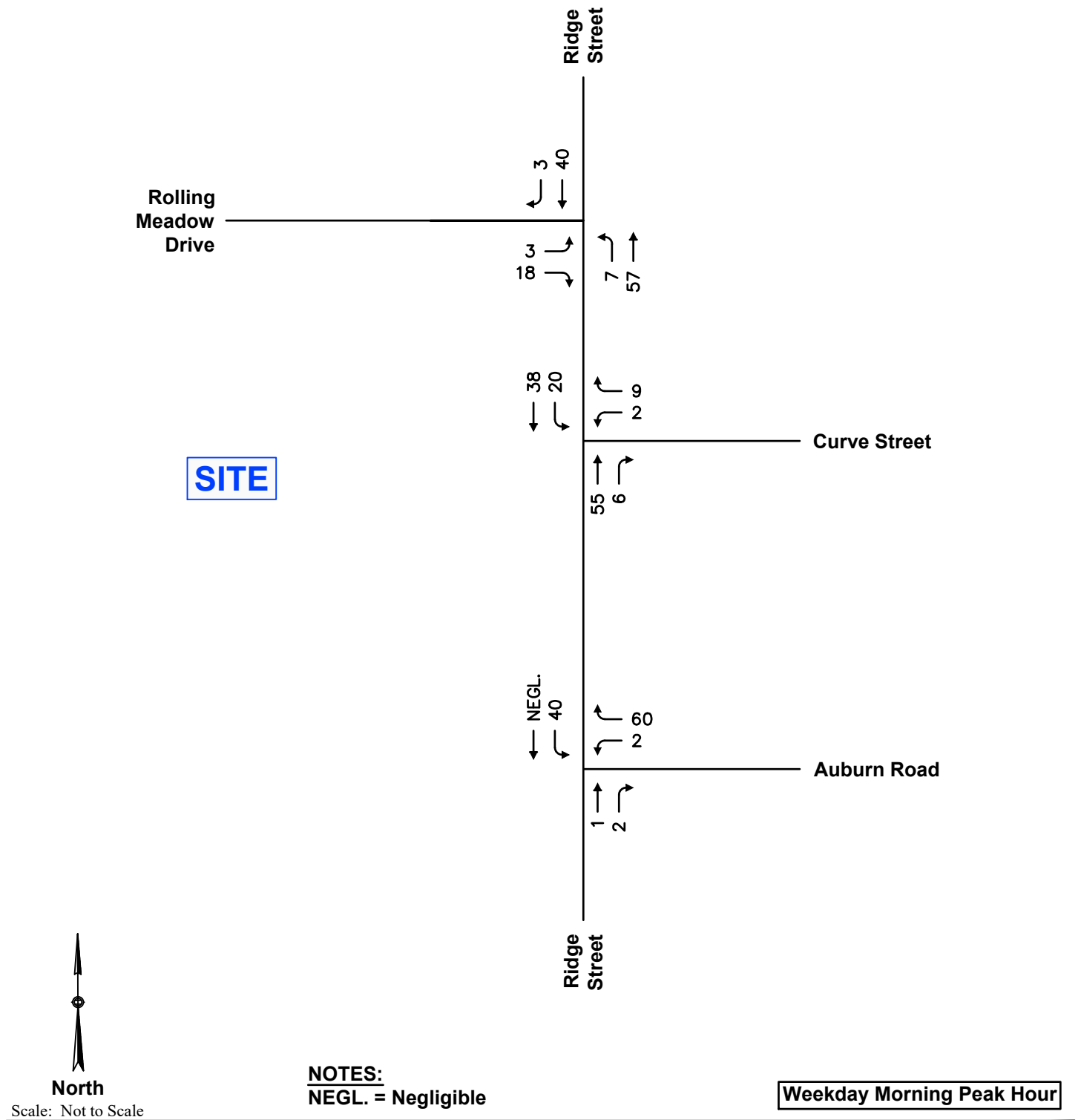


Figure 3

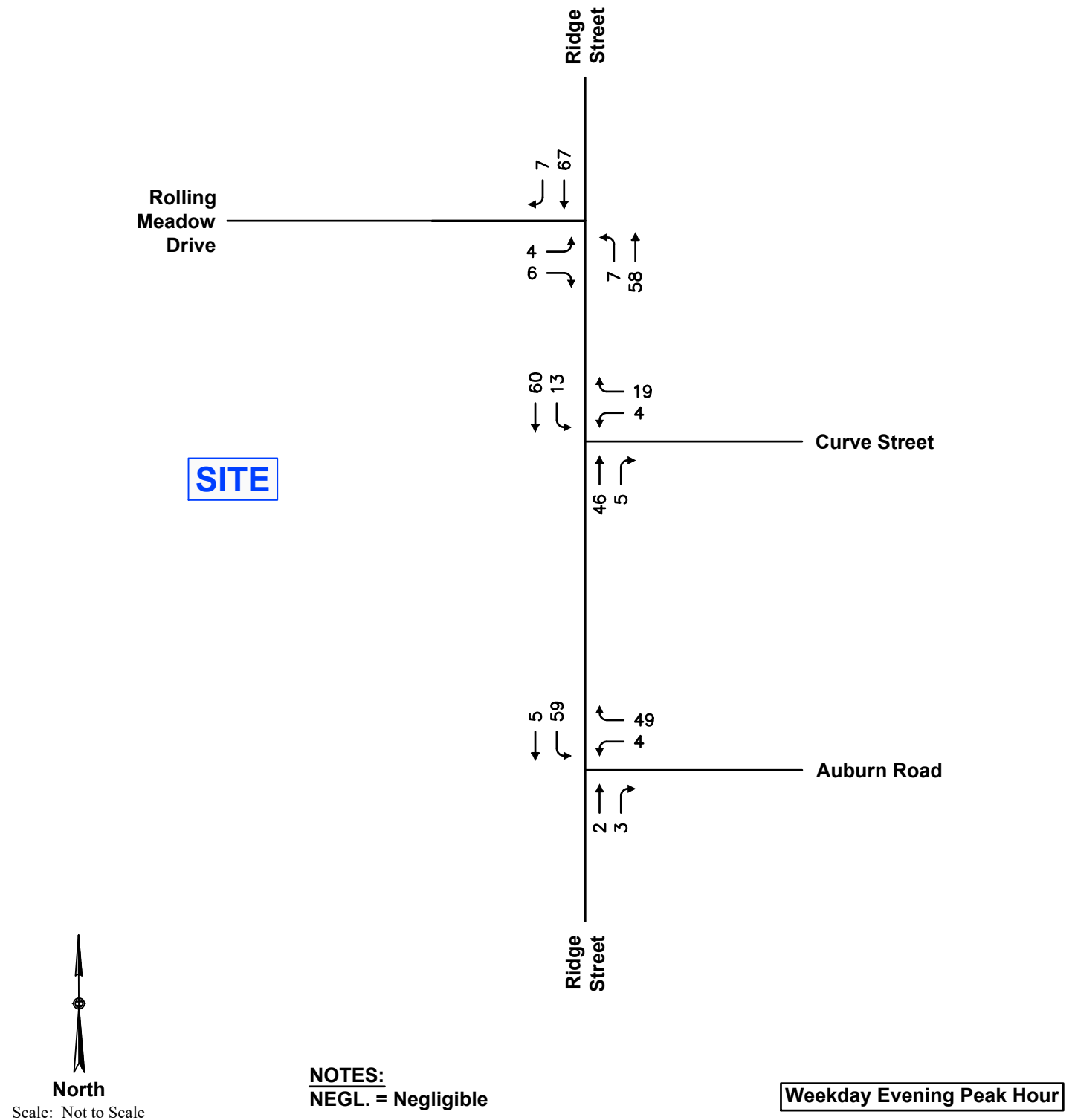


Figure 4

TABLE 1
EXISTING TRAFFIC VOLUME SUMMARY
RIDGE STREET SOUTH OF CURVE STREET

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	1,160	9%	100	57% NB	57
Weekday Evening Peak Hour	1,160	9%	105	58% SB	61

¹Two-way daily traffic expressed in vehicles per day without seasonal adjustment.

²The percent of daily traffic that occurs during the peak hour.

³Two-way peak-hour volume expressed in vehicles per hour.

⁴NB = Northbound, SB = Southbound

As summarized in **Table 1**, the weekday daily traffic volume on Ridge Street to the south of the Curve Street is approximately 1,160 vehicles per day (vpd) on a weekday. Peak hour traffic flow on Ridge Street ranges from approximately 100 vehicles per hour (vph) to 105 vph representing 9 percent of daily traffic flow. Vehicle flow is skewed towards the northbound direction during the weekday morning and skewed towards the southbound direction during the weekday evening peak hour consistent with commuter travel patterns in the area.

Measured Travel Speeds

Vehicle travel speeds were obtained for the Ridge Street northbound and southbound directions using an ATR machine equipped with speed radar. **Table 2** summarizes the regulatory posted speed and observed average and 85th percentile speeds for Ridge Street to the south of Curve Street. Field data are provided in the **Attachments**.

TABLE 2
SPEED STUDY RESULTS – RIDGE STREET

Travel Direction	Regulatory Speed Limit ¹	Travel Speed	
		Average ²	85 th Percentile ³
Northbound	n/a	25	28
Southbound	n/a	26	29

¹Regulatory Posted Speed in miles per hour (mph).

²Arithmetic Mean in mph

³The speed at or below which 85 percent of the vehicles are traveling in mph.

As summarized in **Table 2**, the mean (average) travel speed on Ridge Street in the site vicinity is 25 mph traveling northbound and 26 mph southbound. The 85th percentile travel speed was observed to be 28 mph northbound and 29 mph southbound.

Intersection Crash History

In order to identify crash trends and safety characteristics for study area intersections, crash data were obtained from MassDOT for the Town of Millis for the five-year period 2014 through 2018 (the most recent full year of data currently available). Based on extensive review of MassDOT crash data, there were no crashes reported at the study intersections over the last 5-year period. None of the intersections are listed as a Highway Safety Improvement Project (HSIP) location. No additional safety countermeasures are warranted based on the review of the crash records and associated crash rates.

Sight Line Evaluation

An evaluation of sight lines was conducted at the proposed roadway and the Rolling Meadow intersections with Ridge Street to ensure that minimum recommended sight lines are available. The evaluation documents sight lines under proposed conditions for vehicles as they relate to Ridge Street with comparison to recommended guidelines.

The American Association of State Highway and Transportation Officials' (AASHTO) standards¹ reference two types of sight distance which are relevant at the proposed roadway intersections along Ridge Street: stopping sight distance (SSD) and intersection sight distance (ISD). Sight lines for critical vehicle movements at the proposed site roadway intersections with Ridge Street were compared to minimum SSD and ISD recommendations for the ambient travel speeds recorded along Ridge Street adjacent to the Site.

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 onto Ridge Street. 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 pavement. Adjustment factors are applied to account for roadway grades when applicable.

¹ *A policy on Geometric Design of Highways and Streets*, American Association of State Highway and Transportation Officials (AASHTO), 2018.

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 northbound and southbound Ridge Street approaches to the proposed roadway and to Rolling Meadow Drive. **Table 3** presents a summary of the available SSD as they relate to Ridge Street and AASHTO's recommended SSD based on observed ambient travel speeds along Ridge Street. Speed data is provided in the **Attachments**.

TABLE 3
STOPPING SIGHT DISTANCE SUMMARY
RIDGE STREET AT PROPOSED SITE ROADWAYS

Approach/ Travel Direction	Available SSD	AASHTO Recommended ¹	
		Average Speed ²	85 th Percentile Speed ³
<i>Ridge Street at Rolling Meadow Drive</i>			
<i>Northbound</i>	500± Feet	155 Feet	185 Feet
<i>Southbound</i>	300± Feet	165 Feet	195 Feet
<i>Ridge Street at Proposed Site Roadway</i>			
<i>Northbound</i>	300± Feet	155 Feet	185 Feet
<i>Southbound</i>	>500 Feet	165 Feet	195 Feet

¹Recommended 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.

²Average Speed; Ridge Street: NB = 25 mph and SB = 26 mph.

³85th Percentile Speed; Ridge Street: NB = 28 mph and SB = 29 mph.

As summarized in **Table 3**, analysis results indicate that the existing available sight lines exceed AASHTO's recommended SSD criteria for both travel directions along Ridge Street. Stopping sight distance calculations are provided in the **Attachments**.

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". In this case, the proposed site egress roadway and Rolling Meadow Drive approaches will be under STOP signal control and the ISD in question relates to the ability to turn left or right onto Ridge Street.

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 (between 8 to 14.5 feet back from marked edge lines) for the northbound and southbound directions along Ridge Street. **Table 4** presents a summary of the available ISD for the departures to Ridge Street and AASHTO's recommended ISD.

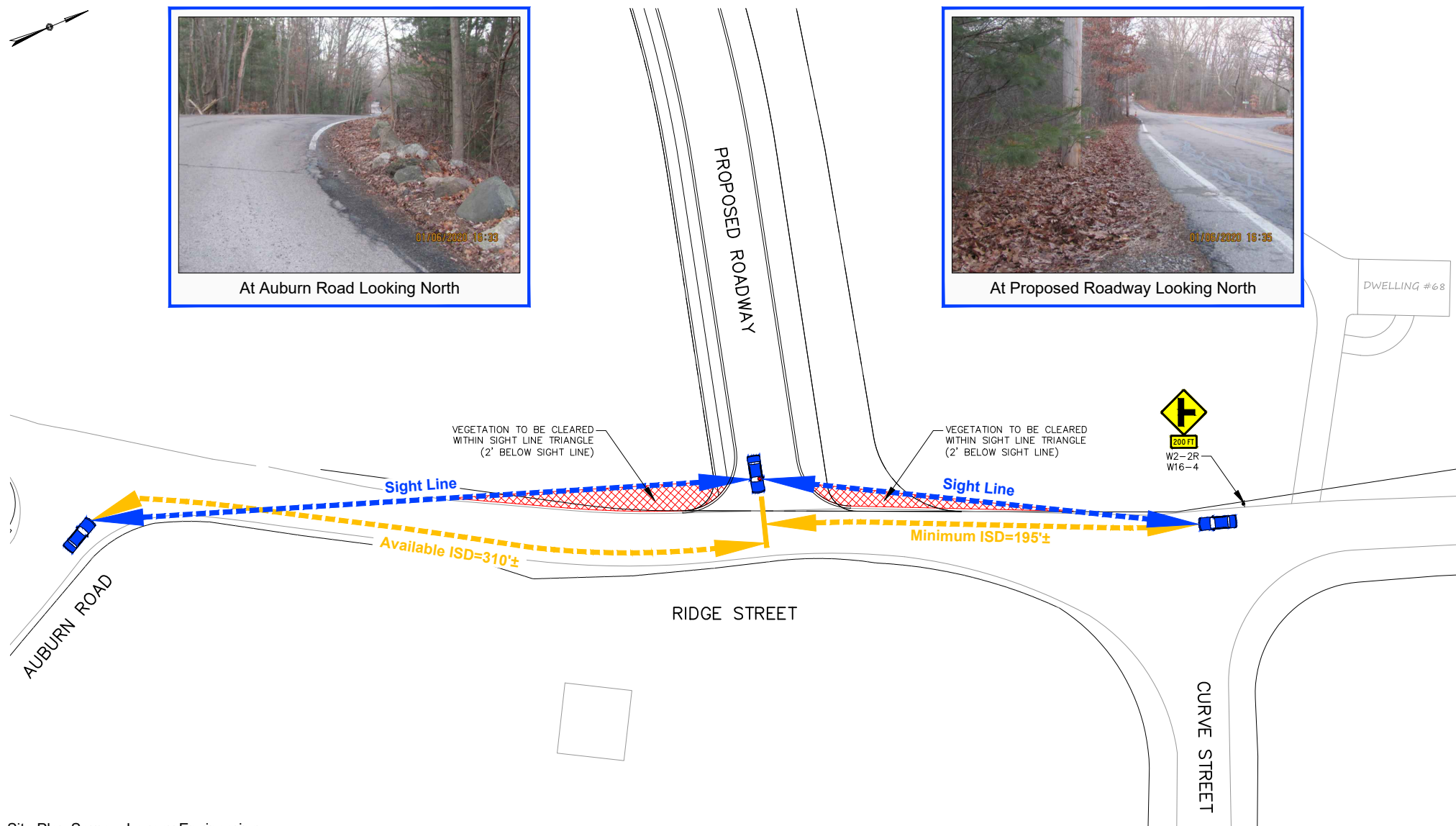
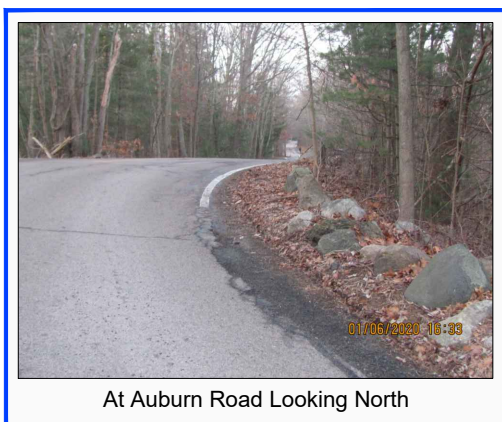
TABLE 4
INTERSECTION SIGHT DISTANCE SUMMARY
SITE ROADWAY DEPARTURE TO RIDGE STREET

View Direction	Available ISD	AASHTO Minimum ¹	AASHTO Ideal ²
		85 th Percentile Speed ²	85 th Percentile Speed ²
Ridge Street at Rolling Meadow Drive			
Looking North	200± Feet	195 Feet	280 Feet
Looking South	500± Feet	185 Feet	310 Feet
Ridge Street at Proposed Site Roadway			
Looking North	195± Feet	195 Feet	280 Feet
Looking South	310± Feet	185 Feet	310 Feet

¹Recommended 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.

²85th Percentile Speed; Ridge Street: NB = 28 mph and SB = 29 mph.

The results of the ISD analysis presented in **Table 4** indicate that with clearing and re-grading within the sight line triangles associated with the installation of the proposed roadway, the available ISD looking north and south from the proposed site roadway onto Ridge Street will satisfy the minimum AASHTO requirement for safety but is limited by the right-of-way to the north as shown in **Figure 5**. The available ISD looking north from Rolling Meadow Drive satisfies minimum AASHTO requirement for safety but is limited to 200± feet by a mature tree immediately adjacent to Ridge Street on its western side. Independent of the project, it is recommended that to the extent possible the tree should be removed to enhance sight lines. MDM recommends that an advanced intersection warning sign (W2-2) and a supplemental warning plaque (W16-2P – 200 feet) should be installed on the southbound approach to Rolling Meadow Drive and on the southbound approach to the proposed roadway. MDM recommends that any plantings (shrubs, bushes) or physical landscape features to be located within the sight lines should also be maintained at a height of 2 feet or less to ensure unobstructed lines of sight.



Site Plan Source: Legacy Engineering

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA 01752

Proposed Residential Development
Millis, Massachusetts

Scale: As Noted
DWG No. 1050 Sight Distance (2020-3-9).dwg

Date: March 2020
Project No. 1050

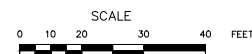


Figure 5
Intersection Sight
Distance Analysis

PROJECTED FUTURE TRAFFIC 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. For this evaluation, a five-year planning horizon (year 2025) was selected consistent with standard-industry practice.

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), includes existing traffic, new traffic due to general background traffic growth, and traffic related to specific developments by others that are 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 the future traffic volumes.

Background 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.

Nearby permanent count station data published by MassDOT indicates a 0.5-percent per year growth rate. For purposes of this evaluation, a 1.0-percent compounded annual growth rate was used (5.1. percent increase over a 5-year horizon). This growth rate is slightly 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 other potential small developments or vacancies in the area. MassDOT permanent count station data and background growth calculations are provided in the **Attachments**.

Based on review of Massachusetts Environmental Policy Act (MEPA) files, there are no projects planned for the area likely to generate a significant level of traffic through the study intersections.

2025 No-Build Traffic Volume Networks

In summary, to account for future traffic growth in the study area future No-Build traffic volumes are developed by increasing the 2020 Baseline volumes by approximately 5.1 percent (1.0 percent compounded annually over 5 years). The resulting 2025 No-Build traffic volumes are displayed in **Figure 6** and **Figure 7**.

Site Traffic

The trip generation estimates for the proposed development are provided for the weekday morning and weekday evening periods, which correspond to the critical analysis and periods for the proposed uses 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 5 presents the trip-generation estimate for the proposed development based on ITE methodology.

TABLE 5
TRIP-GENERATION SUMMARY

Period/Direction	Singe Family (43-Units)¹
<i>Weekday Morning Peak Hour</i>	
Entering	8
<u>Exiting</u>	<u>24</u>
Total	32
<i>Weekday Evening Peak Hour</i>	
Entering	27
<u>Exiting</u>	<u>16</u>
Total	43
<i>Weekday Daily</i>	408

¹Based on ITE LUC 210 trip rates applied to 43 Units.

²*Trip Generation*, 10th Edition; Institute of Transportation Engineers; Washington, DC; 2017.

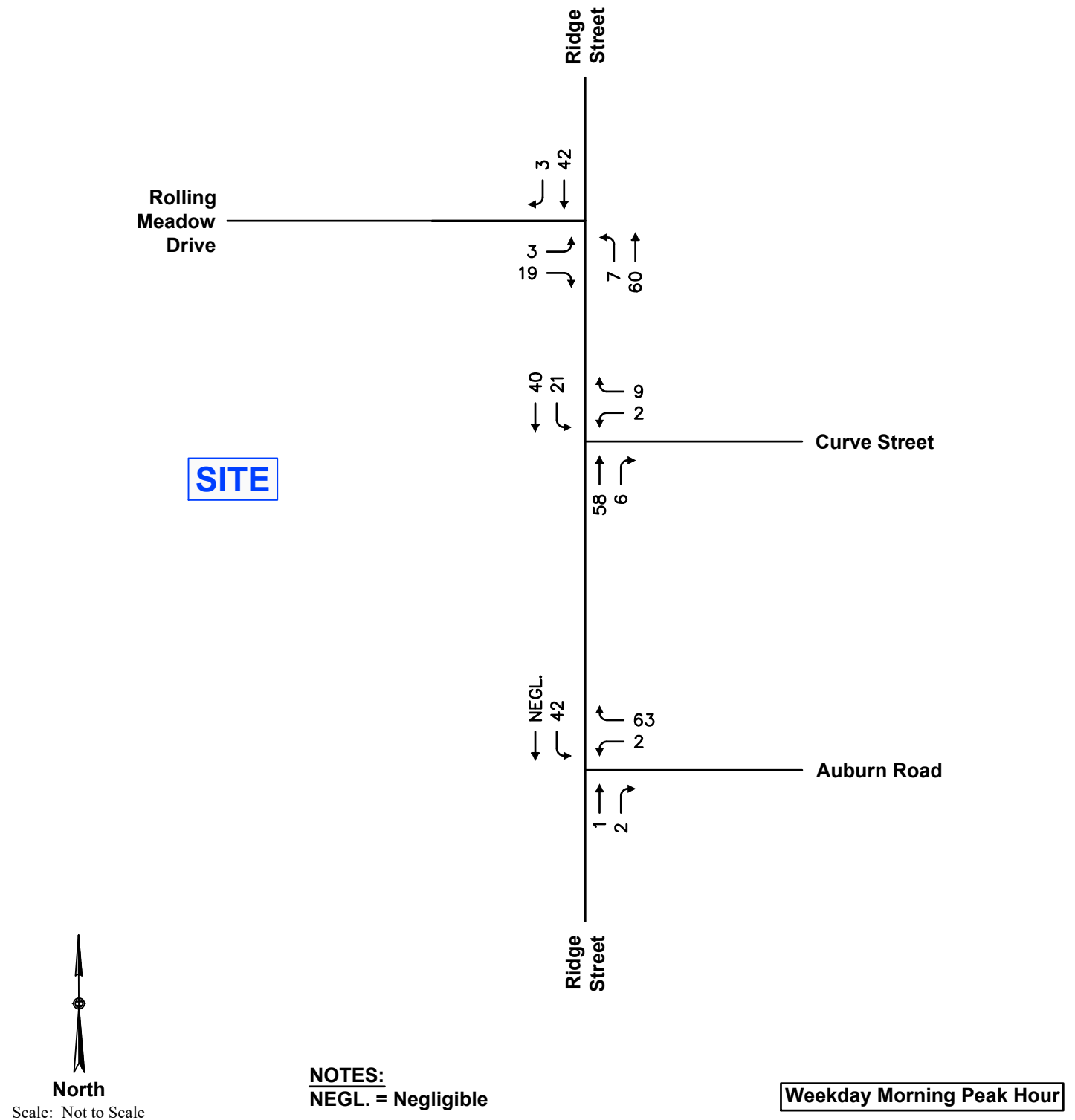


Figure 6

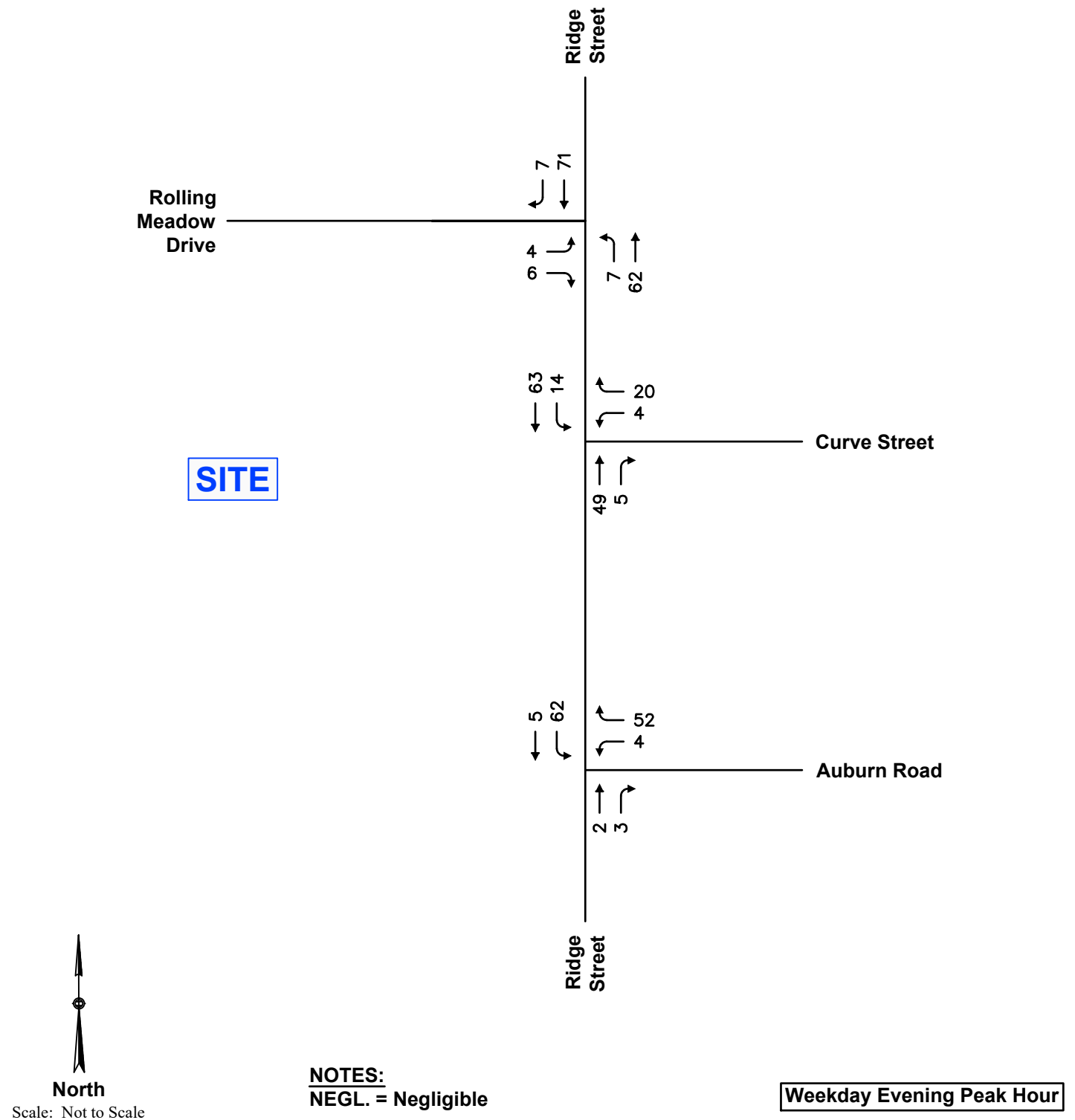


Figure 7

As summarized in **Table 5**, the development is estimated to generate approximately 32 vehicle trips (8 entering and 24 exiting) during the weekday morning peak hour and 43 vehicle trips (27 entering and 16 exiting) during the weekday evening peak hour. On a daily basis, the development is estimated to generate approximately 408 vehicle trips on a weekday with 50 percent entering and exiting. Trip generation calculations are provided in the **Attachments**.

Trip Distribution

The distribution for projected traffic for the proposed development is based primarily on Journey to Work Census data for persons living within the Town of Millis. The resulting trip distribution for new trips is presented in **Figure 8**. Trip distribution calculations are provided in the **Attachments**.

Development-related trips for the proposed development are assigned to the roadway network using the ITE trip-generation estimates shown in **Table 5** and the distribution patterns presented in **Figure 8**. Development-related trips at each intersection approach for the weekday morning and weekday evening peak hours are quantified in **Figure 9** and **Figure 10**.

2025 Build Traffic Conditions

2025 Build condition traffic volumes are derived by adding the incremental traffic increases for development to the 2025 No-Build conditions. **Figure 11** and **12** present the 2025 Build condition traffic-volume networks for the weekday morning and weekday evening peak hours.

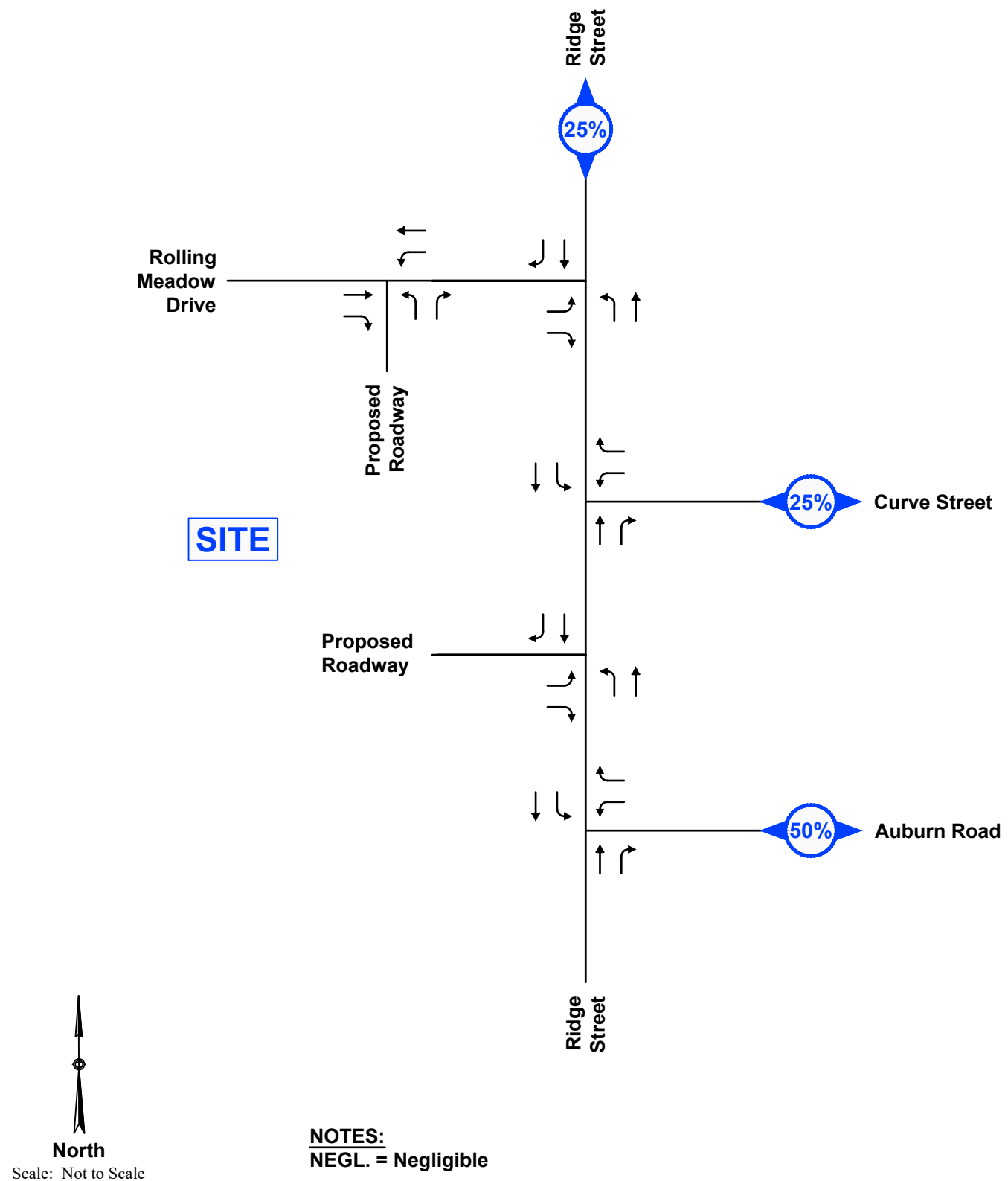


Figure 8

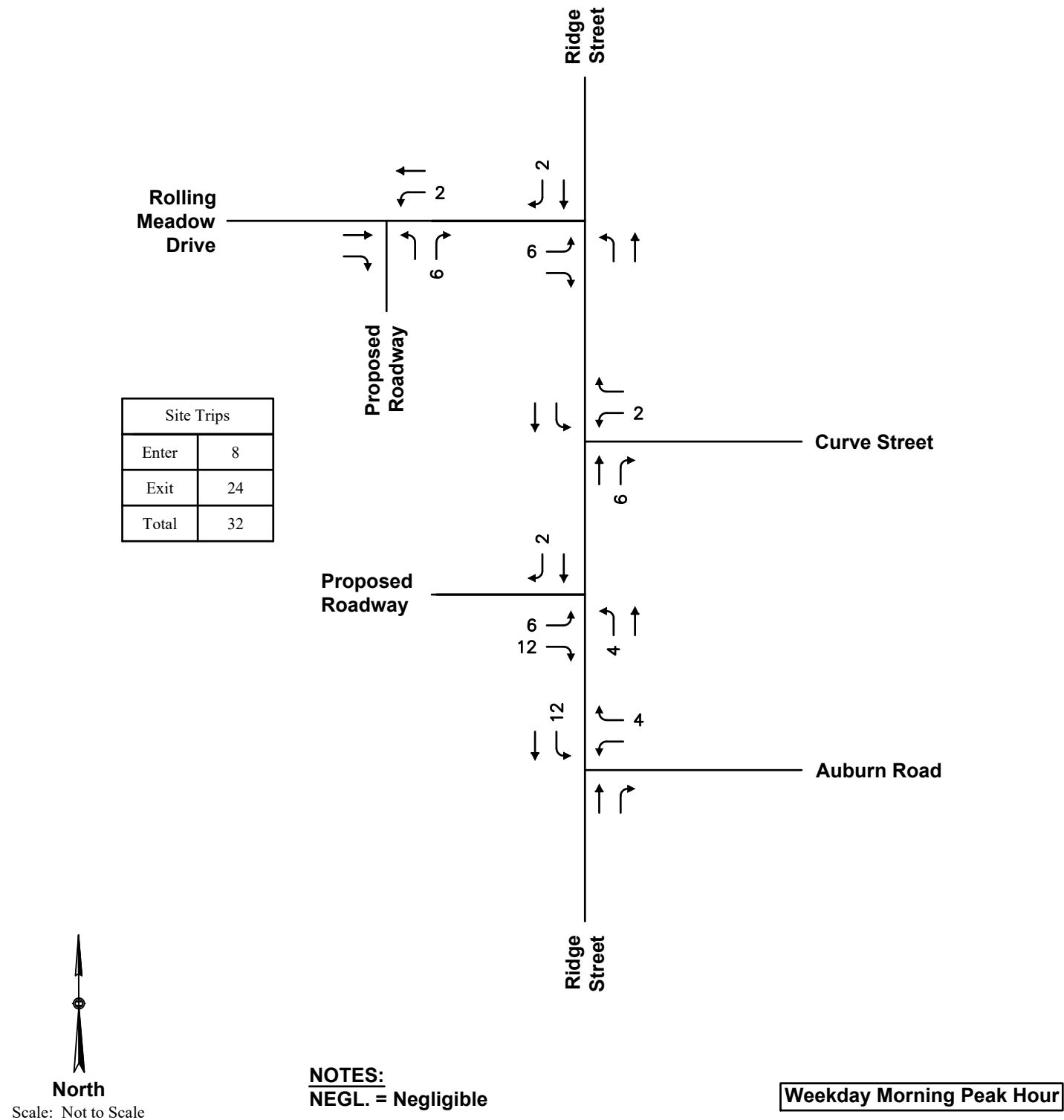


Figure 9

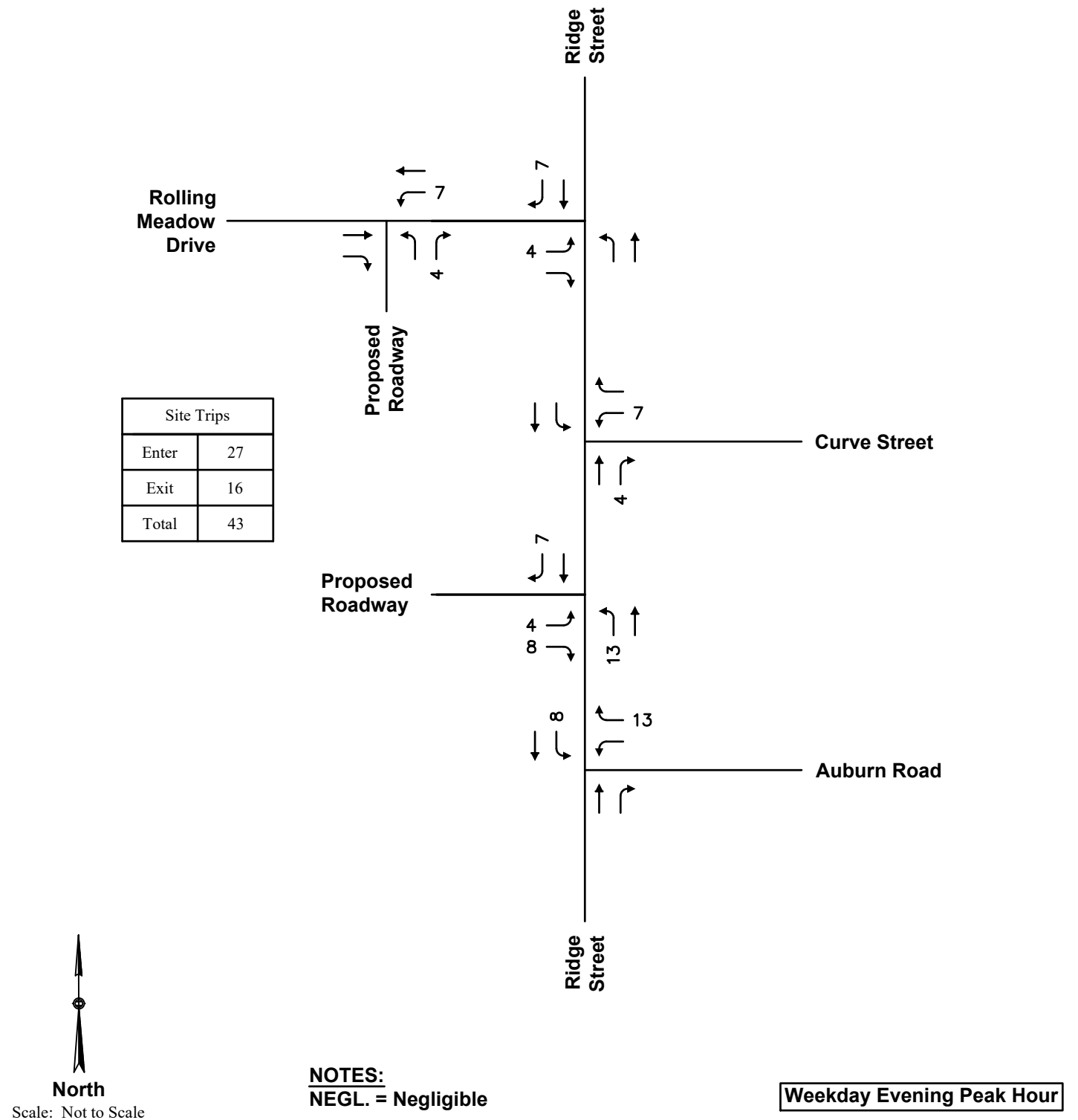


Figure 10

Site Generated Trips
Weekday Evening Peak Hour Volumes

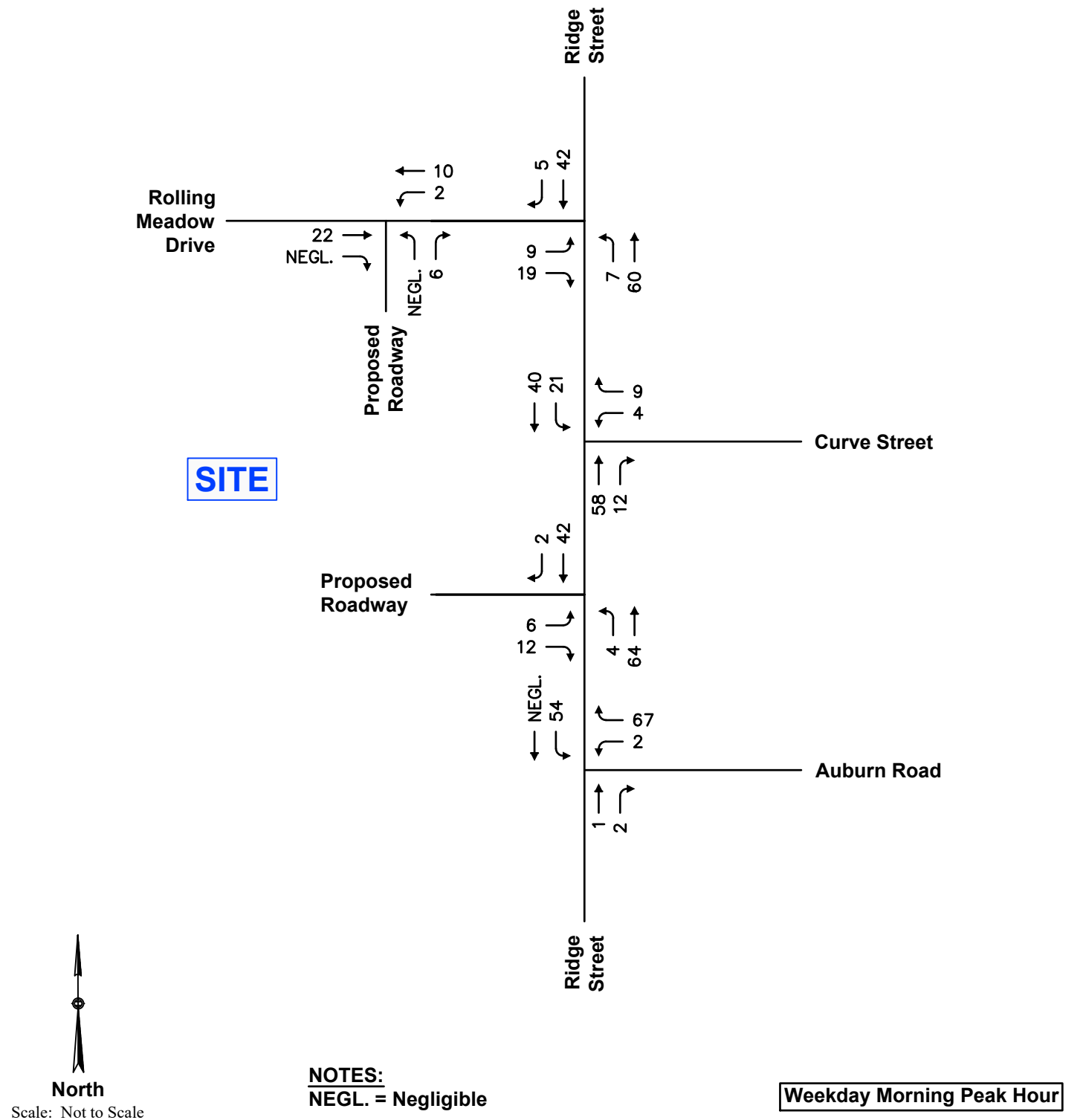
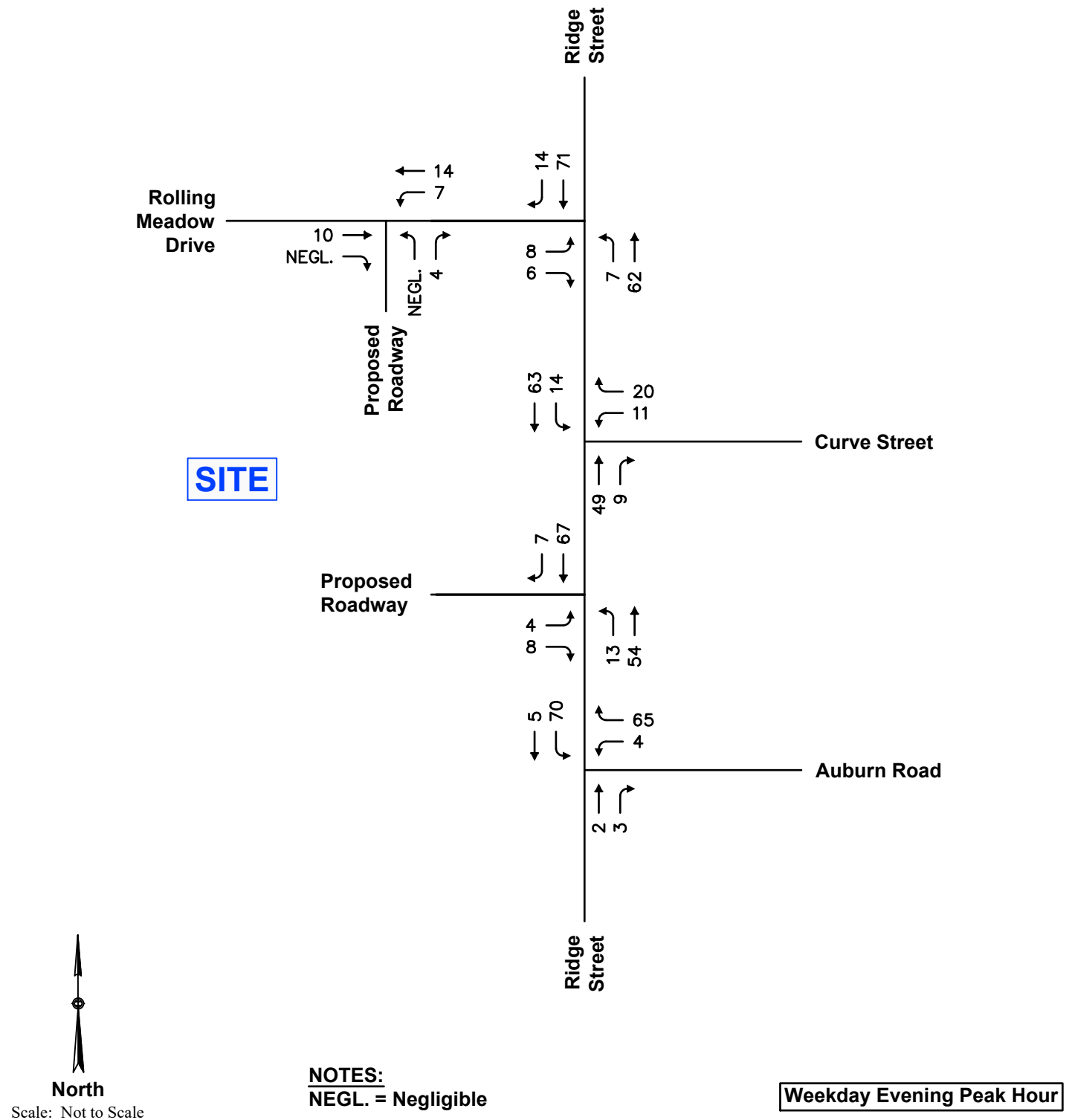


Figure 11



OPERATIONS ANALYSIS

This section provides an overview of operational analysis methodology, an assessment of roadway operations under Baseline and projected future No-Build and Build conditions.

Analysis Methodology

Intersection capacity analyses are presented in this section for the Baseline, No-Build, and Build traffic-volume conditions. Capacity analyses, conducted in accordance with EEA/MassDOT 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.

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 **Attachments**.

Analysis Results

Level-of-Service (LOS) analyses were conducted for the Baseline, No-Build, and Build conditions for the study intersections. The results of the intersection capacity are summarized below in **Table 6** and **Table 7**. Detailed analysis results are presented in the **Attachments**.

TABLE 6
INTERSECTION CAPACITY ANALYSIS RESULTS
WEEKDAY MORNING PEAK HOUR

Period	Approach	2020 Baseline			2025 No-Build			2025 Build		
		v/c ¹	Delay ²	LOS ³	v/c	Delay	LOS	v/c	Delay	LOS
<i>Ridge Street at Rolling Meadow Drive</i>	Northbound	0.01	<5	A	0.01	<5	A	0.01	<5	A
	Southbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	EB L/R Exit	0.03	9	A	0.03	9	A	0.04	9	A
<i>Ridge Street at Curve Street</i>	Northbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Southbound	0.02	<5	A	0.02	<5	A	0.02	<5	A
	WB L/R Exit	0.01	9	A	0.01	9	A	0.02	9	A
<i>Ridge Street at Proposed Site Roadway</i>	Northbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	Southbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	EB L/R Exit	n/a	n/a	n/a	n/a	n/a	n/a	0.02	9	A
<i>Ridge Street at Auburn Street</i>	Northbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Southbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	EB L/R Exit	0.00	<5	A	0.00	<5	A	0.00	<5	A

¹Volume-to-capacity ratio

²Average control delay per vehicle (in seconds)

³Level of service

⁴n/a = not applicable

TABLE 7
INTERSECTION CAPACITY ANALYSIS RESULTS
WEEKDAY EVENING PEAK HOUR

Period	Approach	2020 Baseline			2025 No-Build			2025 Build		
		v/c ¹	Delay ²	LOS ³	v/c	Delay	LOS	v/c	Delay	LOS
<i>Ridge Street at Rolling Meadow Drive</i>	Northbound	0.01	<5	A	0.01	<5	A	0.01	<5	A
	Southbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	EB L/R Exit	0.02	9	A	0.02	9	A	0.02	9	A
<i>Ridge Street at Curve Street</i>	Northbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	Southbound	0.01	<5	A	0.01	<5	A	0.01	<5	A
	WB L/R Exit	0.03	9	A	0.04	9	A	0.05	9	A
<i>Ridge Street at Proposed Site Roadway</i>	Northbound	n/a	n/a	n/a	n/a	n/a	n/a	0.01	<5	A
	Southbound	n/a	n/a	n/a	n/a	n/a	n/a	0.00	<5	A
	EB L/R Exit	n/a	n/a	n/a	n/a	n/a	n/a	0.02	9	A
<i>Ridge Street at Auburn Street</i>	Northbound	0.01	8	A	0.01	8	A	0.01	8	A
	Southbound	0.00	<5	A	0.00	<5	A	0.00	<5	A
	EB L/R Exit	0.00	<5	A	0.00	<5	A	0.00	<5	A

¹Volume-to-capacity ratio

²Average control delay per vehicle (in seconds)

³Level of service

⁴n/a = not applicable

As summarized in **Table 6** and **Table 7**:

- *Ridge Street at Curve Street.* The Curve Street approach to Ridge Street will continue to operate below capacity at LOS A during the peak hours. Mainline operations are expected to operate unimpeded at LOS A operations during peak hours.
- *Ridge Street at Auburn Street.* The Auburn Street approach to Ridge Street will continue to operate below capacity at LOS A or better during the peak hours. Mainline operations are expected to operate unimpeded at LOS A operations during peak hours.
- *Ridge Street at Rolling Meadow Drive.* The Rolling Meadow Drive approach to Ridge Street will continue to operate below capacity at LOS A during the peak hours. Mainline operations are expected to operate unimpeded at LOS A operations during peak hours.
- *Ridge Street at Proposed Site Roadway.* The proposed roadway along Ridge Street will operate below capacity at LOS A or better during the peak hours. Mainline operations are expected to operate unimpeded at LOS A operations during peak hours.

In summary, the proposed development is not expected to materially impact study area intersections and will not result in any material changes in traffic operations in the study area between future No-Build and Build conditions. Therefore, no off-site mitigation is required at area intersections.

CONCLUSIONS AND RECOMMENDATIONS

Redevelopment of the site will generate modest traffic increases of 32 and 43 vehicular trips during weekday morning and weekday evening peak hours, respectively. The proposed development is not expected to materially impact operating conditions at the study intersections during peak hours with only nominal delay increases anticipated. Proposed access improvements as described below will provide ample capacity to accommodate site-generated traffic while also enhancing safety and capacity.

MDM finds that the following access related improvements will enhance traffic operations and/or travel safety:

- *Signage and Markings.* A STOP sign (R1-1) and STOP line pavement markings should be installed on the proposed roadway and the Rolling Meadow Drive approaches to Ridge Street. The signs and pavement markings shall be compliant with the Manual on Uniform Traffic Control Devices (MUTCD).
- *Roadway Design.* Roadway alignment, widths and curb radii should be designed to achieve (a) approximate perpendicular orientation at Ridge Street; (b) total minimum width to facilitate full access/egress; and (c) minimum curb radii as required to accommodate the largest design vehicle (delivery truck) and the Town's largest fire apparatus (ladder truck). Roadway grading and orientation should meet or exceed minimum recommended stopping sight distance presented herein.
- *Sight Line Triangles.* The sight lines should be cleared and graded within the right-of-way with the construction of the proposed roadway approach to Ridge Street. The available ISD looking north from the proposed site roadway onto Ridge Street satisfies the minimum AASHTO requirement for safety but is limited to 195± feet by the right-of-way. MDM recommends the installation of an advanced intersection warning sign (W2-2) and supplemental warning plaque (W16-2P – 200 feet) be installed on the southbound approach to the proposed roadway. Similarly, the available ISD looking north from Rolling Meadow Drive onto Ridge Street satisfies the minimum AASHTO requirement for safety but is limited to 200± feet by a mature tree immediately adjacent to Ridge Street on its western side. Independent of the project, it is recommended that to the extent possible the tree should be removed to enhance sight lines. MDM recommends the installation of an advanced intersection warning sign (W2-2) and supplemental warning plaque (W16-2P – 200 feet) be installed on the southbound approach to Rolling Meadow Drive. Any new plantings (shrubs, bushes) or physical landscape features to be located within the proposed roadway sight lines should also be maintained at a height of 2 feet or less above the adjacent roadway grade to ensure unobstructed lines of sight.

- *Sidewalk Connections.* A pedestrian sidewalk connection should be provided between the Site and the existing sidewalk system along Rolling Meadow Drive. MDM recommends that any proposed sidewalks and ramps be ADA-compliant.

In summary, MDM finds that incremental traffic associated with the proposed development is not expected to materially impact operating conditions at the study intersections. The study intersections exhibit below-average crash rates based on historic crash data; safety countermeasures are therefore not warranted. Implementation of access/egress improvement and a proposed pedestrian connection to Rolling Meadow Drive will establish a framework of minimizing Site traffic impacts.

ATTACHMENTS

- Traffic Volume Data
- Seasonal/Yearly Growth Data
- Speed Data
- Sight Distance Calculations
- Trip Generation
- Trip Distribution Calculations
- Capacity Analysis

□ Traffic Volume Data

N/S: Ridge Street
South of Curve Street
Millis, MA

MDM TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA 01752

Site Code: 1050

Start Time	29-Oct-19 Tue	Northbound		Hour Totals		Southbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		2	13			1	10				
12:15		0	6			1	6				
12:30		0	5			0	13				
12:45		1	6	3	30	0	8	2	37	5	67
01:00		0	13			0	9				
01:15		1	12			0	11				
01:30		0	12			0	10				
01:45		0	7	1	44	0	7	0	37	1	81
02:00		0	10			0	3				
02:15		0	9			0	10				
02:30		0	15			1	15				
02:45		0	12	0	46	0	7	1	35	1	81
03:00		0	12			0	11				
03:15		0	10			1	7				
03:30		0	9			0	13				
03:45		0	13	0	44	0	19	1	50	1	94
04:00		0	9			0	10				
04:15		0	13			0	14				
04:30		0	11			1	26				
04:45		1	11	1	44	1	11	2	61	3	105
05:00		1	15			1	12				
05:15		0	8			3	15				
05:30		0	6			2	16				
05:45		0	16	1	45	1	16	7	59	8	104
06:00		8	17			1	15				
06:15		2	12			1	10				
06:30		4	14			10	3				
06:45		9	8	23	51	10	8	22	36	45	87
07:00		7	5			11	5				
07:15		13	4			11	1				
07:30		19	5			8	4				
07:45		18	4	57	18	10	10	40	20	97	38
08:00		7	7			11	3				
08:15		16	5			7	2				
08:30		17	7			5	4				
08:45		9	1	49	20	13	4	36	13	85	33
09:00		15	6			11	2				
09:15		4	5			4	5				
09:30		6	2			8	0				
09:45		6	0	31	13	5	2	28	9	59	22
10:00		8	0			8	1				
10:15		4	1			6	1				
10:30		9	3			5	2				
10:45		7	1	28	5	9	3	28	7	56	12
11:00		7	1			2	3				
11:15		9	1			6	1				
11:30		16	0			7	0				
11:45		12	0	44	2	6	0	21	4	65	6
Total		238	362			188	368			426	730
Percent		39.7%	60.3%			33.8%	66.2%			36.9%	63.1%
Total		238	362			188	368			426	730
Percent		39.7%	60.3%			33.8%	66.2%			36.9%	63.1%
Combined Total		600				556				1156	

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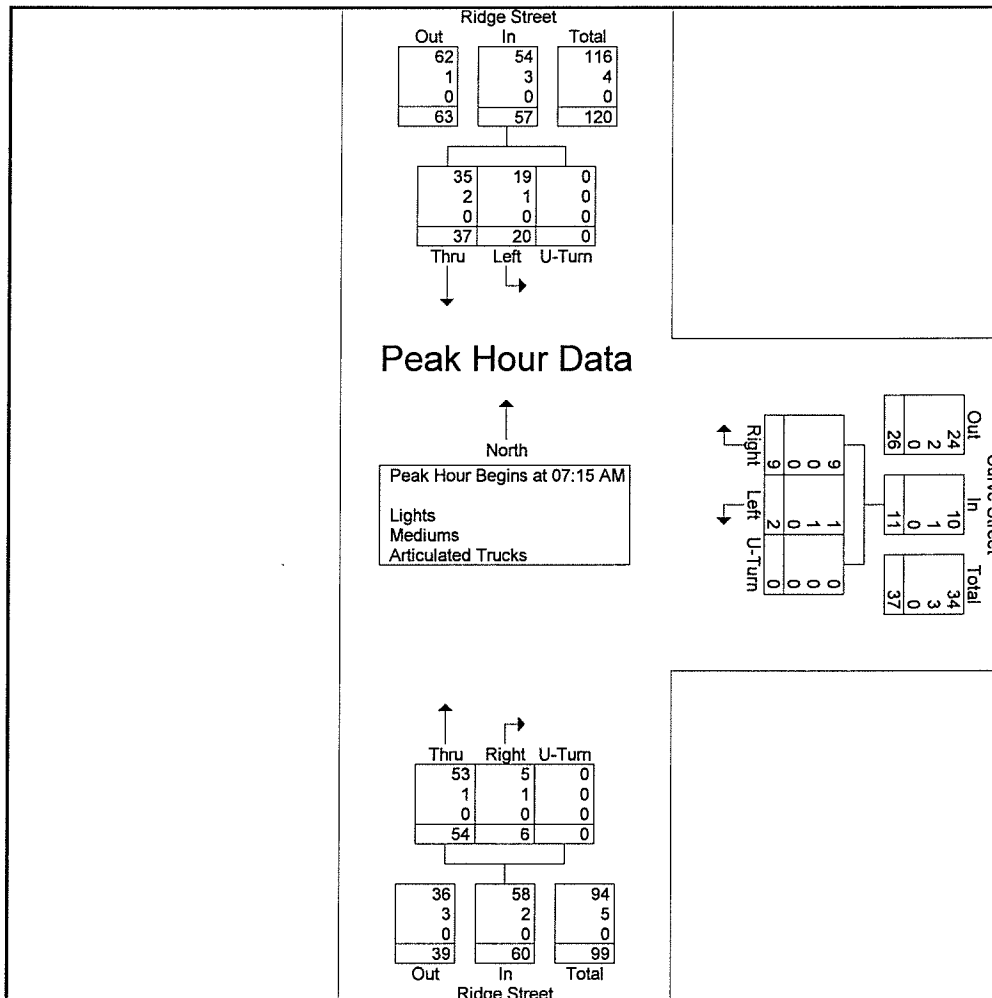
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Ridge Street
WB: Curve Street
Millis, MA

File Name : 1050 Ridge at Curve
Site Code : 1050
Start Date : 10/29/2019
Page No : 2

	Ridge Street From North				Curve Street From East				Ridge Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:00 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	10	5	0	15	1	0	0	1	3	11	0	14	30
07:30 AM	8	9	0	17	2	0	0	2	1	18	0	19	38
07:45 AM	10	4	0	14	2	1	0	3	0	19	0	19	36
08:00 AM	9	2	0	11	4	1	0	5	2	6	0	8	24
Total Volume	37	20	0	57	9	2	0	11	6	54	0	60	128
% App. Total	64.9	35.1	0		81.8	18.2	0		10	90	0		
PHF	.925	.556	.000	.838	.563	.500	.000	.550	.500	.711	.000	.789	.842
Lights	35	19	0	54	9	1	0	10	5	53	0	58	122
% Lights	94.6	95.0	0	94.7	100	50.0	0	90.9	83.3	98.1	0	96.7	95.3
Mediums	2	1	0	3	0	1	0	1	1	1	0	2	6
% Mediums	5.4	5.0	0	5.3	0	50.0	0	9.1	16.7	1.9	0	3.3	4.7
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0



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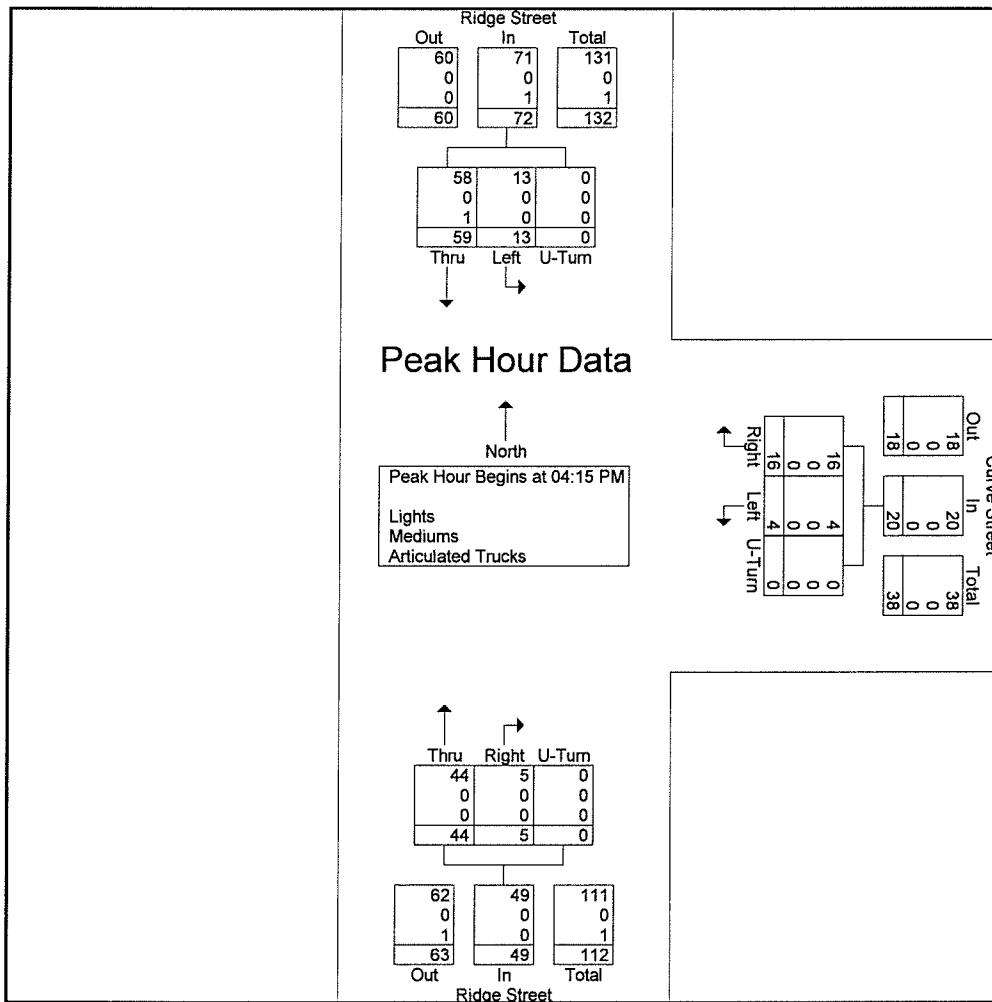
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Ridge Street
WB: Curve Street
Millis, MA

File Name : 1050 Ridge at Curve
Site Code : 1050
Start Date : 10/29/2019
Page No : 3

	Ridge Street From North				Curve Street From East				Ridge Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:15 PM													
04:15 PM	14	1	0	15	5	0	0	5	0	12	0	12	32
04:30 PM	24	7	0	31	5	2	0	7	1	11	0	12	50
04:45 PM	7	1	0	8	2	2	0	4	3	7	0	10	22
05:00 PM	14	4	0	18	4	0	0	4	1	14	0	15	37
Total Volume	59	13	0	72	16	4	0	20	5	44	0	49	141
% App. Total	81.9	18.1	0		80	20	0		10.2	89.8	0		
PHF	.615	.464	.000	.581	.800	.500	.000	.714	.417	.786	.000	.817	.705
Lights	58	13	0	71	16	4	0	20	5	44	0	49	140
% Lights	98.3	100	0	98.6	100	100	0	100	100	100	0	100	99.3
Mediums	0	0	0	0	0	0	0	0	0	0	0	0	0
% Mediums	0	0	0	0	0	0	0	0	0	0	0	0	0
Articulated Trucks	1	0	0	1	0	0	0	0	0	0	0	0	1
% Articulated Trucks	1.7	0	0	1.4	0	0	0	0	0	0	0	0	0.7



28 Lord Road, Suite 280
Marlborough, MA

File Name : 1050 Ridge at Curve
Site Code : 1050
Start Date : 10/29/2019
Page No : 1

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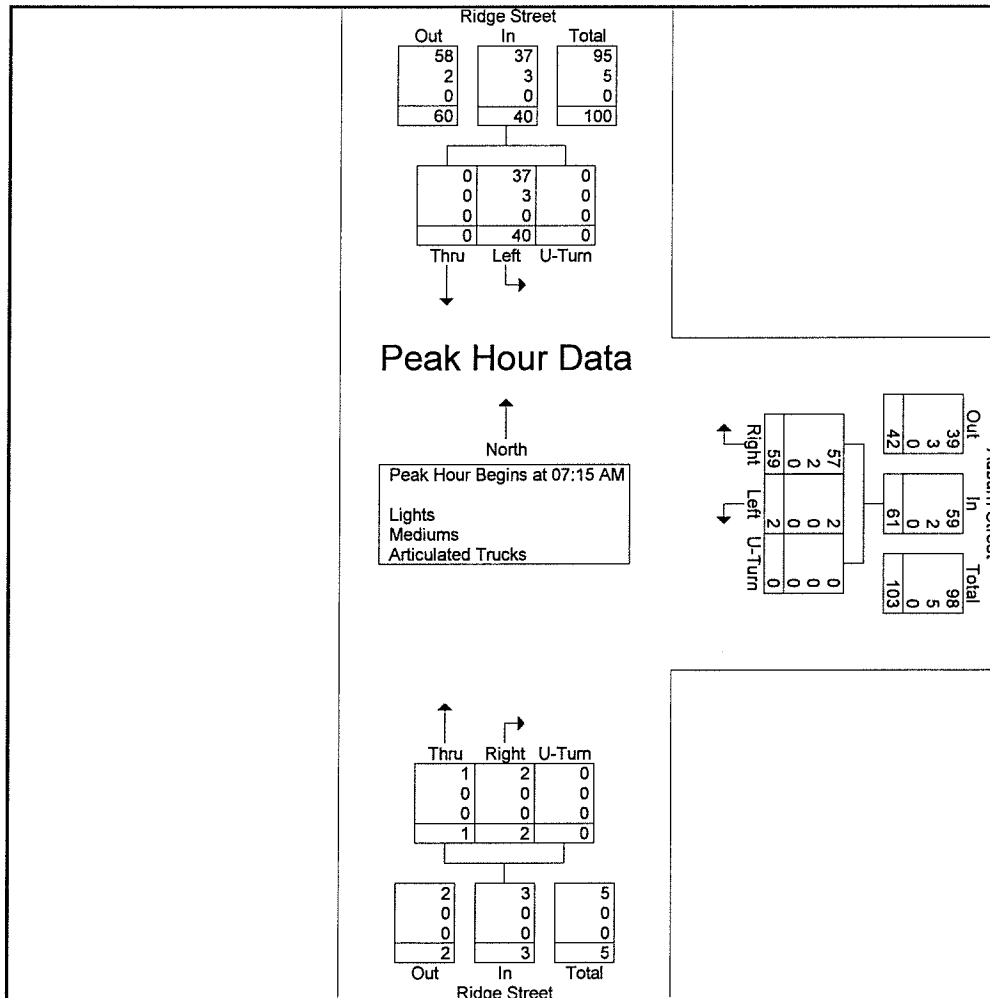
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Ridge Street
WB: Auburn Street
Millis, MA

File Name : 1050 Ridge at Auburn
Site Code : 1050
Start Date : 10/29/2019
Page No : 2

	Ridge Street From North				Auburn Street From East				Ridge Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	0	11	0	11	13	1	0	14	0	1	0	1	26
07:30 AM	0	8	0	8	19	1	0	20	0	0	0	0	28
07:45 AM	0	10	0	10	18	0	0	18	2	0	0	2	30
08:00 AM	0	11	0	11	9	0	0	9	0	0	0	0	20
Total Volume	0	40	0	40	59	2	0	61	2	1	0	3	104
% App. Total	0	100	0		96.7	3.3	0		66.7	33.3	0		
PHF	.000	.909	.000	.909	.776	.500	.000	.763	.250	.250	.000	.375	.867
Lights	0	37	0	37	57	2	0	59	2	1	0	3	99
% Lights	0	92.5	0	92.5	96.6	100	0	96.7	100	100	0	100	95.2
Mediums	0	3	0	3	2	0	0	2	0	0	0	0	5
% Mediums	0	7.5	0	7.5	3.4	0	0	3.3	0	0	0	0	4.8
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0



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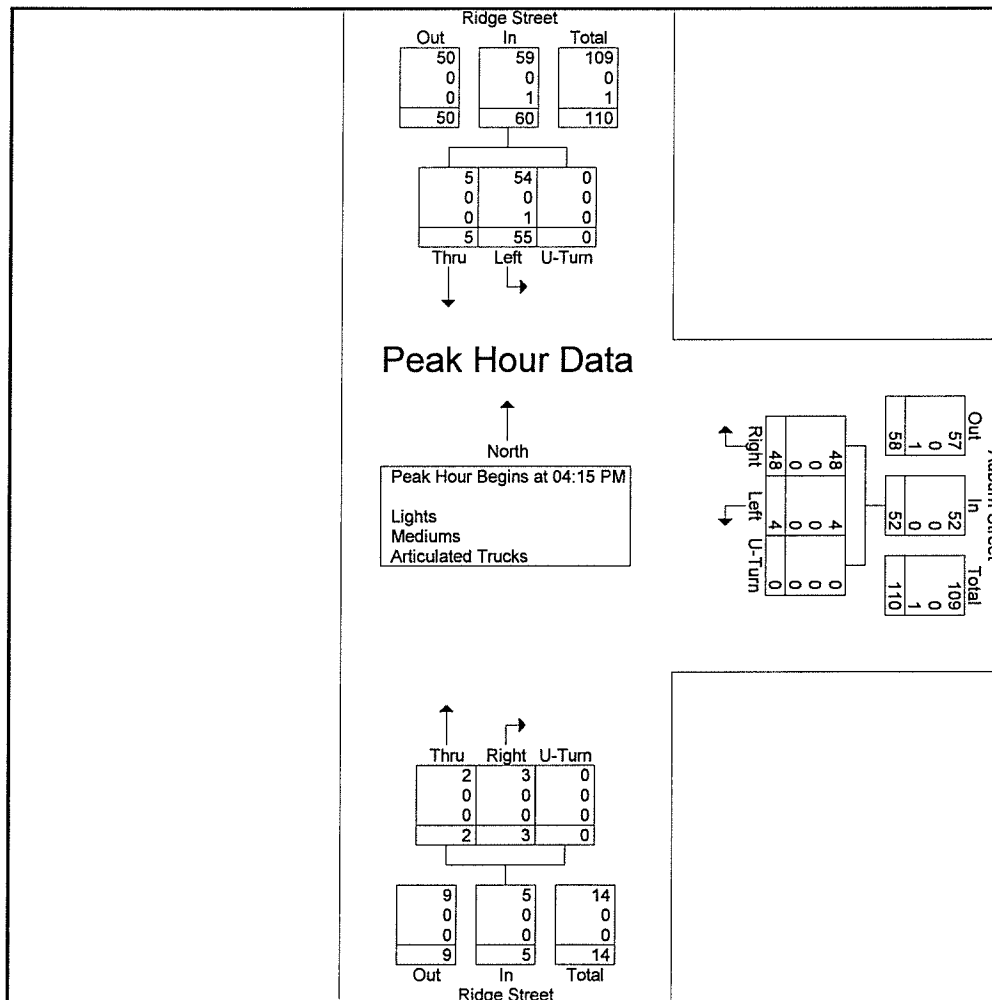
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28 Lord Road, Suite 280
Marlborough, MA

N/S: Ridge Street
WB: Auburn Street
Millis, MA

File Name : 1050 Ridge at Auburn
Site Code : 1050
Start Date : 10/29/2019
Page No : 3

	Ridge Street From North				Auburn Street From East				Ridge Street From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:15 PM													
04:15 PM	0	14	0	14	12	0	0	12	0	0	0	0	26
04:30 PM	4	22	0	26	12	2	0	14	2	0	0	2	42
04:45 PM	1	7	0	8	9	2	0	11	0	2	0	2	21
05:00 PM	0	12	0	12	15	0	0	15	1	0	0	1	28
Total Volume	5	55	0	60	48	4	0	52	3	2	0	5	117
% App. Total	8.3	91.7	0		92.3	7.7	0		60	40	0		
PHF	.313	.625	.000	.577	.800	.500	.000	.867	.375	.250	.000	.625	.696
Lights	5	54	0	59	48	4	0	52	3	2	0	5	116
% Lights	100	98.2	0	98.3	100	100	0	100	100	100	0	100	99.1
Mediums	0	0	0	0	0	0	0	0	0	0	0	0	0
% Mediums	0	0	0	0	0	0	0	0	0	0	0	0	0
Articulated Trucks	0	1	0	1	0	0	0	0	0	0	0	0	1
% Articulated Trucks	0	1.8	0	1.7	0	0	0	0	0	0	0	0	0.9



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Marlborough, MA

Millis, MA

Page No : 1

Groups Printed- Lights - Mediums - Articulated Trucks

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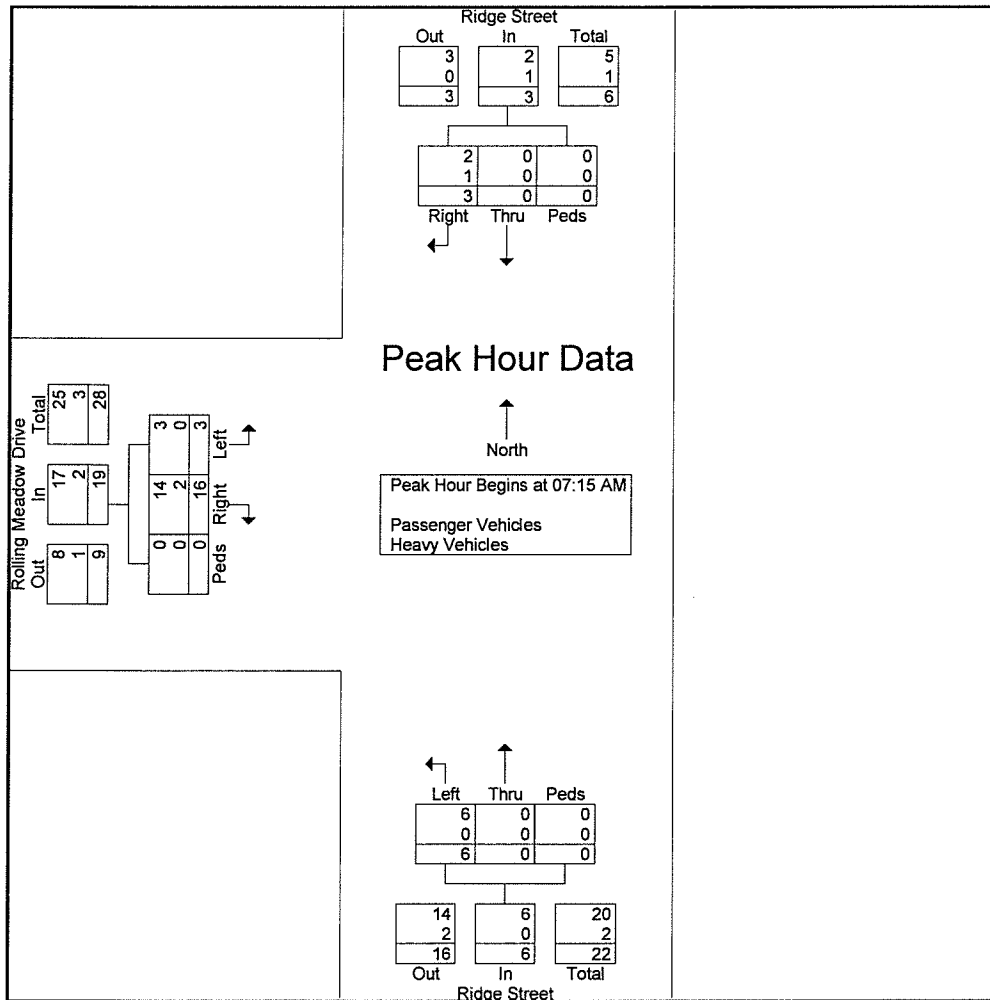
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28 Lord Road, Suite 280
Marlborough, MA

N/S: Ridge Street
E/W: Rolling Meadow Drive
Millis, MA

File Name : 1050 Ridge at Rolling Meadow AM
Site Code : 1050
Start Date : 1/7/2020
Page No : 2

	Ridge Street From North				Ridge Street From South				Rolling Meadow Drive 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 07:15 AM to 08:00 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	0	0	0	0	0	2	0	2	1	1	0	2	4
07:30 AM	1	0	0	1	0	0	0	0	8	1	0	9	10
07:45 AM	0	0	0	0	0	4	0	4	2	0	0	2	6
08:00 AM	2	0	0	2	0	0	0	0	5	1	0	6	8
Total Volume	3	0	0	3	0	6	0	6	16	3	0	19	28
% App. Total	100	0	0		0	100	0		84.2	15.8	0		
PHF	.375	.000	.000	.375	.000	.375	.000	.375	.500	.750	.000	.528	.700
Passenger Vehicles	2	0	0	2	0	6	0	6	14	3	0	17	25
% Passenger Vehicles	66.7	0	0	66.7	0	100	0	100	87.5	100	0	89.5	89.3
Heavy Vehicles	1	0	0	1	0	0	0	0	2	0	0	2	3
% Heavy Vehicles	33.3	0	0	33.3	0	0	0	0	12.5	0	0	10.5	10.7



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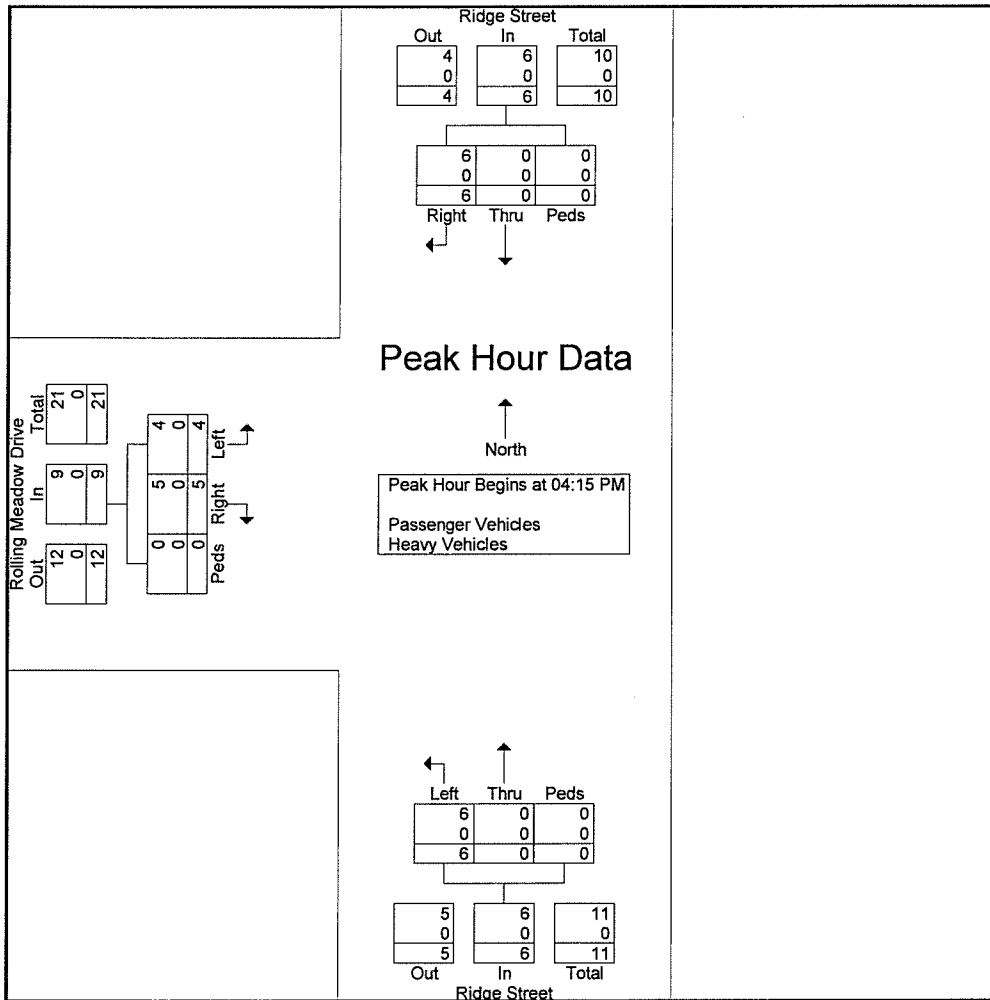
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA

N/S: Ridge Street
E/W: Rolling Meadow Drive
Millis, MA

File Name : 1050 Ridge at Rolling Meadow PM
Site Code : 1050
Start Date : 1/7/2020
Page No : 2

	Ridge Street From North				Ridge Street From South				Rolling Meadow Drive 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 04:15 PM to 05:00 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:15 PM													
04:15 PM	1	0	0	1	0	0	0	0	1	0	0	1	2
04:30 PM	1	0	0	1	0	0	0	0	0	1	0	1	2
04:45 PM	1	0	0	1	0	5	0	5	1	1	0	2	8
05:00 PM	3	0	0	3	0	1	0	1	3	2	0	5	9
Total Volume	6	0	0	6	0	6	0	6	5	4	0	9	21
% App. Total	100	0	0		0	100	0		55.6	44.4	0		
PHF	.500	.000	.000	.500	.000	.300	.000	.300	.417	.500	.000	.450	.583
Passenger Vehicles	6	0	0	6	0	6	0	6	5	4	0	9	21
% Passenger Vehicles	100	0	0	100	0	100	0	100	100	100	0	100	100
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0



□ Seasonal/Yearly Crash Data

STATION 307 - WESTBOROUGH - RTE.9 - EAST OF NORTHBOROUGH T.L.

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
06	44,301	44,864	50,326	51,170	51,729	52,438	48,062	50,270	50,998	50,194	50,043	50,032	49,534
	7%	5%	-2%	-4%	-3%	-1%	10%	4%	-4%	1%	-1%	-6%	0%
07	47,505	47,283	49,268	49,136	50,000	52,000	53,000	52,322	49,031	50,571	49,662	47,007	49,732
	-4%	-2%	-3%	1%	1%	-4%	-8%	-7%	-1%	-3%	-4%	-1%	-3%
08	45,614	46,112	47,829	49,816	50,518	49,936	48,629	48,759	48,531	49,009	47,480	46,696	48,245
	-3%	1%	-3%	-2%	-2%	0%	-2%	-3%	-2%	-1%	0%	2%	-1%
09	44,103	46,434	46,455	49,049	49,474	49,934	47,638	47,056	47,762	48,663	47,379	47,564	47,626
	-1%	0%	2%	0%	0%	1%	-1%	1%	1%	1%	2%	2%	1%
11	43,244	46,150	48,016	48,943	49,781	50,525	46,812	48,234	48,825	49,198	49,151	49,888	48,231
	7%	2%	1%	-1%	1%	-1%	3%	4%	0%	2%	2%	5%	1%
12	46,381	46,883	48,608	48,662	50,126	49,961	48,380	49,941	48,882	50,056	50,015	47,600	48,791
	0%	-1%	-2%	1%	1%	-9%	3%	-1%	2%	0%	-1%	2%	0%
13	46,393	46,220	47,421	49,359	50,657	45,623	49,797	49,223	49,935	50,021	49,651	48,441	48,562
	1%	1%	2%	1%	1%	6%	0%	1%	0%	1%	1%	1%	1%
16	47,447	47,570	50,342	50,977	52,259	53,476	49,724	50,789	50,057	51,035	51,749	50,442	50,489
Seasonal Adjustment Fact	1.07	1.05	1.01	0.99	0.97	0.97	1.00	0.99	0.99	0.98	0.99	1.01	
(to average month)												Growth	-0.2%

STATION 3180 - MILFORD - RTE.1-495 - AT MEDWAY T.L.

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
06	72,492	71,145	76,347	78,305	80,480	85,728	84,957	89,595	83,740	80,518	79,468	76,386	79,930
	-2%	-1%	-4%	-2%	6%	3%	4%	2%	-1%	2%	-2%	-5%	0%
07	70,749	70,432	73,596	76,751	85,024	88,000	88,401	91,080	83,309	82,221	77,941	72,362	79,989
	-2%	-3%	3%	-1%	-7%	-8%	-4%	-5%	-5%	-3%	-5%	-2%	-4%
08	69,200	68,456	76,000	75,934	79,352	81,166	84,701	86,189	78,778	79,645	73,861	70,747	77,002
	-5%	1%	-8%	1%	-1%	-1%	-1%	1%	6%	0%	2%	3%	0%
09	65,444	69,136	69,739	76,913	78,876	80,700	84,000	86,829	83,273	79,419	75,486	73,169	76,915
	3%	-1%	5%	1%	-1%	7%	4%	4%	0%	4%	3%	3%	3%
10	67,428	68,595	73,544	77,906	77,940	86,167	87,728	90,295	83,463	82,244	77,516	75,273	79,010
	-3%	2%	1%	-1%	3%	1%	-1%	-4%	1%	-2%	3%	2%	0%
11	65,217	69,804	73,992	77,115	80,458	87,344	86,859	87,108	84,288	80,223	79,773	76,729	79,076
	8%	2%	1%	1%	2%	2%	-1%	4%	-1%	3%	0%	-2%	1%
12	70,333	71,280	74,372	78,117	81,707	87,015	85,909	90,589	83,100	82,647	79,570	74,989	79,969
	-1%	1%	2%	2%	2%	2%	2%	1%	1%	2%	2%	2%	2%
17	66,101	76,457	80,500	85,524	91,188	96,164	93,860	97,247	92,026	92,357	87,401	81,383	86,684
Seasonal Adjustment Fact	1.17	1.13	1.07	1.02	0.98	0.92	0.92	0.89	0.95	0.97	1.01	1.06	
(to average month)												Growth	0.3%

STATION 6647 - PLAINVILLE - RTE.1 - SOUTH OF RTE.152

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
06	16,136	16,177	16,793	16,635	16,763	17,137	16,432	16,995	17,013	17,067	17,113	17,769	16,836
	-1%	-2%	3%	2%	7%	4%	3%	2%	-2%	0%	1%	-5%	1%
07	15,944	15,859	17,304	17,030	17,864	17,901	16,906	17,416	16,727	17,138	17,324	16,879	17,024
	-1%	-1%	-3%	-1%	-4%	-4%	-1%	0%	3%	4%	-1%	5%	0%
08	15,821	15,698	16,800	16,942	17,171	17,178	16,746	17,340	17,202	17,760	17,072	17,679	16,951
	1%	4%	2%	4%	5%	7%	7%	5%	5%	3%	7%	8%	5%
09	16,043	16,380	17,174	17,667	17,999	18,392	17,996	18,129	18,133	18,217	18,190	19,022	17,779
	6%	-3%	1%	4%	6%	6%	1%	3%	2%	3%	0%	-9%	2%
13	16,927	15,836	17,405	18,408	19,117	19,419	18,199	18,723	18,472	18,737	18,205	17,328	18,065
	-7%	3%	2%	0%	2%	2%	1%	1%	2%	1%	0%	11%	1%
14	15,736	16,233	17,681	18,472	19,522	19,772	18,390	18,970	18,813	18,662	18,248	19,311	18,326
	5%	-6%	-1%	2%	-1%	0%	2%	0%	0%	0%	1%	3%	0%
15	16,524	15,242	17,452	18,866	19,424	19,678	18,842	18,863	18,782	18,894	18,426	19,907	18,408
	4%	9%	1%	0%	1%	0%	-1%	0%	-1%	0%	1%	-4%	1%
17	17,706	17,890	17,915	19,029	20,003	19,636	18,552	18,745	18,579	18,970	18,705	18,257	18,666
Seasonal Adjustment Fact	1.09	1.10	1.03	0.99	0.96	0.95	1.00	0.98	0.99	0.98	0.99	0.97	
(to average month)												Growth	1.4%

Average	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Seasonal Adjustment Fact	1.11	1.09	1.03	1.00	0.97	0.95	0.97	0.95	0.98	0.98	1.00	1.02
(to average month)												

Average Growth Rate 0.5%

□ Speed Data

Ridge Street
South of Curve Street
Millis, MA

28 Lord Road, Suite 280
Marlborough, MA 01752

Site Code: 00000000000000001032

[illegible]

[illegible]

	15th Percentile :	20 MPH
	50th Percentile :	24 MPH
	85th Percentile :	28 MPH
	95th Percentile :	29 MPH
Statistics	10 MPH Pace Speed :	21-30 MPH
	Number in Pace :	1089
	Percent in Pace :	91.1%
	Number of Vehicles > 25 MPH :	514
	Percent of Vehicles > 25 MPH :	43.0%
	Mean Speed(Average) :	25 MPH

28 Lord Road, Suite 280
Marlborough, MA 01752

Southbound

[illegible]

MDM

TRANSPORTATION CONSULTANTS, INC.

Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA 01752

Site Code: 0000000000000000001032

Ridge Street
South of Curve Street
Millis, MA

Southbound		1	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	85th Percent
Start Time	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85		
10/30/19	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	29
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
02:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	24
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
04:00	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	3	32
05:00	0	0	5	4	2	0	0	0	0	0	0	0	0	0	0	11	30
06:00	0	3	11	14	1	0	0	0	0	0	0	0	0	0	0	29	28
07:00	0	4	9	26	2	0	0	0	0	0	0	0	0	0	0	41	29
08:00	0	3	11	13	4	0	0	0	0	0	0	0	0	0	0	31	29
09:00	0	0	13	23	1	0	0	0	0	0	0	0	0	0	0	37	29
10:00	0	1	8	15	4	0	0	0	0	0	0	0	0	0	0	28	29
11:00	1	1	8	18	0	0	0	0	0	0	0	0	0	0	0	28	28
12 PM	0	6	13	16	0	0	0	0	0	0	0	0	0	0	0	35	28
13:00	1	5	18	10	1	0	0	0	0	0	0	0	0	0	0	35	27
14:00	0	3	17	21	1	0	0	0	0	0	0	0	0	0	0	42	28
15:00	0	3	16	28	3	0	0	0	0	0	0	0	0	0	0	50	29
16:00	0	4	18	30	5	0	0	0	0	0	0	0	0	0	0	57	29
17:00	0	3	38	54	2	0	0	0	0	0	0	0	0	0	0	97	28
18:00	2	1	21	18	4	0	0	0	0	0	0	0	0	0	0	46	29
19:00	0	1	5	11	1	0	0	0	0	0	0	0	0	0	0	18	29
20:00	0	3	4	3	2	0	0	0	0	0	0	0	0	0	0	12	30
21:00	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	3	28
22:00	0	1	6	2	0	0	0	0	0	0	0	0	0	0	0	9	26
23:00	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	4	29
Total	4	42	226	312	34	0	0	0	0	0	0	0	0	0	0	618	

15th Percentile :	21 MPH
50th Percentile :	25 MPH
85th Percentile :	29 MPH
95th Percentile :	31 MPH
10 MPH Pace Speed :	21-30 MPH
Number in Pace :	1002
Percent in Pace :	85.3%
Number of Vehicles > 25 MPH :	675
Percent of Vehicles > 25 MPH :	57.5%
Mean Speed(Average) :	26 MPH

□ Sight Distribution Calculations

Stopping Sight Distance - Regulatory

Approaches to Site Driveway

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

INPUTS

Direction 1

Direction 2

Travel Direction
Speed
Grade
t
a

NB
30
0
2.5
11.2

SB
30
0
2.5
11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = $1.47 \times t \times V$

Brake Distance = $V^2 / (30 \times ((a/32.2) + G))$

Where:

t = reaction time (sec)

V = travel speed (mph)

G = roadway grade

a = deceleration rate (ft/sec²)

Stopping Sight Distance - Observed 85th Percentile

Approaches to Site Driveway

		SPEED (MPH)	BRAKE REACTION DISTANCE (FT)	BRAKING DISTANCE (FT)	CALCULATED STOPPING SIGHT DISTANCE (FT)
Direction 1	NB	27	99.225	69.9	169
Direction 2	SB	29	106.575	80.6	187

INPUTS

Direction 1

Direction 2

Travel Direction
Speed
Grade
t
a

NB
27
0
2.5
11.2

SB
29
0
2.5
11.2

Stopping Sight Distance (SSD) - Source: AASHTO

SSD = Reaction Distance + Brake Distance

Reaction Distance = $1.47 \times t \times V$

Brake Distance = $V^2 / (30 \times ((a/32.2) + G))$

Where:

t = reaction time (sec)

V = travel speed (mph)

G = roadway grade

a = deceleration rate (ft/sec²)

Intersection Sight Distance Calculations

Source: *A Policy on Geometric Design of Highways and Street, 6th Edition*; AASHTO; 2011.

$$ISD = 1.47 * V * t$$

V = speed

t = time gap

t = 7.5 s for a passenger car for Left Turn from a Stop

t = 6.5 s for a passenger car for Right Turn from a Stop

Ridge St Driveway

ISD = $1.47 * 30 * 7.5 = 331$ ft **SAY 335 ft**
(left-turn from a stop)

ISD = $1.47 * 30 * 6.5 = 287$ ft **SAY 290 ft**
(right-turn from a stop)

Intersection Sight Distance Calculations

Source: *A Policy on Geometric Design of Highways and Street, 6th Edition*; AASHTO; 2011.

$$ISD = 1.47 * V * t$$

V = speed

t = time gap

t = 7.5 s for a passenger car for Left Turn from a Stop

t = 6.5 s for a passenger car for Right Turn from a Stop

Ridge St Driveway (85th)

$ISD = 1.47 * 27 * 7.5 = 298 \text{ ft}$ **SAY 300 ft**
(left-turn from a stop)

$ISD = 1.47 * 29 * 6.5 = 277 \text{ ft}$ **SAY 280 ft**
(right-turn from a stop)

□ Trip Generation

Institute of Transportation Engineers (ITE) 10th Edition Land Use Code (LUC) 210 - Single-Family Detached Housing
--

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 43

AVERAGE WEEKDAY DAILY

$T = 9.5^* (X)$
 $T = 9.5^* \quad 43$
 $T = 408.50$
 $T = 408$ vehicle trips
with 50% (204 vpd) entering and 50% (204 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 0.74^* (X)$
 $T = 0.74^* \quad 43$
 $T = 31.82$
 $T = 32$ vehicle trips
with 25% (8 vph) entering and 75% (24 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 0.99^* (X)$
 $T = 0.99^* \quad 43$
 $T = 42.57$
 $T = 43$ vehicle trips
with 63% (27 vph) entering and 37% (16 vph) exiting.

SATURDAY DAILY

$T = 9.54^* (X)$
 $T = 9.54^* \quad 43$
 $T = 410.22$
 $T = 410$ vehicle trips
with 50% (205 vph) entering and 50% (205 vph) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$T = 0.93^* (X)$
 $T = 0.93^* \quad 43$
 $T = 39.99$
 $T = 40$ vehicle trips
with 54% (22 vph) entering and 46% (18 vph) exiting.

□ Trip Distribution Calculations

Journey-to-Work Distribution
US Census Journey-to-Work Data

Residence Town Name	Workplace Town Name	All Workers	% of Total Rounded
Millis town	Millis town	642	16.7%
Millis town	Boston city	408	10.6%
Millis town	Natick town	251	6.5%
Millis town	Newton city	250	6.5%
Millis town	Framingham town	239	6.2%
Millis town	Medfield town	129	3.3%
Millis town	Wellesley town	98	2.5%
Millis town	Medway town	94	2.4%
Millis town	Needham town	92	2.4%
Millis town	Waltham city	89	2.3%
Millis town	Cambridge city	88	2.3%
Millis town	Walpole town	86	2.2%
Millis town	Canton town	84	2.2%
Millis town	Norwood town	84	2.2%
Millis town	Norfolk town	77	2.0%
Millis town	Weston town	71	1.8%
Millis town	Franklin Town city	66	1.7%
Millis town	Stoughton town	66	1.7%
Millis town	Holliston town	60	1.6%
Millis town	Dover town	53	1.4%
Millis town	Westwood town	53	1.4%
Millis town	Weymouth Town city	47	1.2%
Millis town	Marlborough city	40	1.0%
Millis town	Dedham town	28	0.7%
Millis town	Milford town	28	0.7%
Millis town	Worcester city	26	0.7%
Millis town	Andover town	25	0.6%
Millis town	Hartford town	21	0.5%
Millis town	Somerville city	20	0.5%
Millis town	Watertown Town city	20	0.5%
Millis town	Holden town	20	0.5%
Millis town	Concord town	19	0.5%
Millis town	Avon town	19	0.5%
Millis town	Blackstone town	19	0.5%
Millis town	North Attleborough town	18	0.5%
Millis town	Nashua city	18	0.5%
Sub-Total		3,448	89.5%
Other		403	10.5%
Total		3,851	100%

Workplace	To/From Routes				
	Auburn Street (South)	Curve Street (East)	Ridge Street (North)	Total	
Millis town	45%	35%	20%	3.3%	16.7%
Boston city	50%	50%		0.0%	10.6%
Natick town		50%	50%	3.3%	6.5%
Newton city	50%	25%	25%	1.6%	6.5%
Framingham town		0.0%	100%	6.2%	6.2%
Medfield town	75%	25%		0.0%	3.3%
Wellesley town	50%	25%	25%	0.6%	2.5%
Medway town	100%			0.0%	2.4%
Needham town	50%	25%	25%	0.6%	2.4%
Waltham city	50%	25%	25%	0.6%	2.3%
Cambridge city	50%	25%	25%	0.6%	2.3%
Walpole town	100%			0.0%	2.2%
Canton town	100%			0.0%	2.2%
Norwood town	50%	25%	25%	0.5%	2.2%
Norfolk town	100%			0.0%	2.0%
Weston town		50%	50%	0.9%	1.8%
Franklin Town city		50%	50%	0.9%	1.7%
Stoughton town	100%			0.0%	1.7%
Holliston town			100%	1.6%	1.6%
Dover town	50%	25%	25%	0.3%	1.4%
Westwood town	100%			0.0%	1.4%
Weymouth Town city	100%			0.0%	1.2%
Marlborough city	50%		50%	0.5%	1.0%
Dedham town	100%			0.0%	0.7%
Milford town	50%		50%	0.4%	0.7%
Worcester city	100%			0.0%	0.7%
Andover town	50%	25%	25%	0.2%	0.6%
Hartford town	100%			0.0%	0.5%
Somerville city	50%	25%	25%	0.1%	0.5%
Watertown Town city	50%	25%	25%	0.1%	0.5%
Holden town	100%			0.0%	0.5%
Concord town		50%	50%	0.2%	0.5%
Avon town	100%			0.0%	0.5%
Blackstone town	100%			0.0%	0.5%
North Attleborough town	100%			0.0%	0.5%
Nashua city	50%	25%	25%	0.1%	0.5%
Sub-Total	44.1%	22.7%		22.7%	89.5%
Other					
Total	SAY	49.3%	25.3%	25%	100.0%

□ Capacity Analysis

HCM 2010 TWSC
1: Ridge Street & Rolling Meadow Drive

Baseline Conditions
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 1.8

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations	Y			4	4	
Traffic Vol, veh/h	3	18	7	57	40	3
Future Vol, veh/h	3	18	7	57	40	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	84	84	84	84	84	84
Heavy Vehicles, %	0	12	0	2	5	33
Mvmt Flow	4	21	8	68	48	4

Major/Minor Minor2 Major1 Major2

Conflicting Flow All	134	50	52	0	-	0
Stage 1	50	-	-	-	-	-
Stage 2	84	-	-	-	-	-
Critical Hdwy	6.4	6.32	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.408	2.2	-	-	-
Pot Cap-1 Maneuver	864	991	1567	-	-	-
Stage 1	978	-	-	-	-	-
Stage 2	944	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	860	991	1567	-	-	-
Mov Cap-2 Maneuver	860	-	-	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	944	-	-	-	-	-

Approach EB NB SB

HCM Control Delay, s	8.8	0.8	0
HCM LOS	A		

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR




Capacity (veh/h)	1567	-	970	-	-
HCM Lane V/C Ratio	0.005	-	0.026	-	-
HCM Control Delay (s)	7.3	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 2010 TWSC
2: Ridge Street & Curve Street

Baseline Conditions
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	9	55	6	20	38
Future Vol, veh/h	2	9	55	6	20	38
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	84	84	84	84	84	84
Heavy Vehicles, %	50	0	2	17	5	5
Mvmt Flow	2	11	65	7	24	45

Major/Minor Minor1 Major1 Major2

Conflicting Flow All	162	69	0	0	72	0
Stage 1	69	-	-	-	-	-
Stage 2	93	-	-	-	-	-
Critical Hdwy	6.9	6.2	-	-	4.15	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.95	3.3	-	-	2.245	-
Pot Cap-1 Maneuver	729	1000	-	-	1509	-
Stage 1	845	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	717	1000	-	-	1509	-
Mov Cap-2 Maneuver	717	-	-	-	-	-
Stage 1	845	-	-	-	-	-
Stage 2	810	-	-	-	-	-

Approach WB NB SB

HCM Control Delay, s	8.9	0	2.6
HCM LOS	A		

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

Capacity (veh/h)	-	-	933	1509	-
HCM Lane V/C Ratio	-	-	0.014	0.016	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

HCM 2010 TWSC
4: Ridge Street & Auburn Road

Baseline Conditions
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 0

Movement WBL WBR NBT NBR SBL SBT

Lane Configurations	W		T			
Traffic Vol, veh/h	2	60	1	2	40	0
Future Vol, veh/h	2	60	1	2	40	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	3	0	0	7	0
Mvmt Flow	2	69	1	2	46	0

Major/Minor Minor2 Major2

Conflicting Flow All	92	0	0	0
Stage 1	92	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.17	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.263	-
Pot Cap-1 Maneuver	802	-	-	-
Stage 1	823	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	-	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach NB SB

HCM Control Delay, s

HCM LOS




Minor Lane/Major Mvmt NBLn1 SBL SBT

Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-

HCM 2010 TWSC
1: Ridge Street & Rolling Meadow Drive

Baseline Conditions
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	6	7	58	67	7
Future Vol, veh/h	4	6	7	58	67	7
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	71	71	71	71	71	71
Heavy Vehicles, %	0	0	0	0	2	0
Mvmt Flow	6	8	10	82	94	10

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	201	99	104	0	-	0
Stage 1	99	-	-	-	-	-
Stage 2	102	-	-	-	-	-
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	792	962	1500	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	927	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	786	962	1500	-	-	-
Mov Cap-2 Maneuver	786	-	-	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	927	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	0.8	0
HCM LOS	A		




Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1500	-	883	-	-
HCM Lane V/C Ratio	0.007	-	0.016	-	-
HCM Control Delay (s)	7.4	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCM 2010 TWSC
2: Ridge Street & Curve Street

Baseline Conditions
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh 2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	19	46	5	13	60
Future Vol, veh/h	4	19	46	5	13	60
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	71	71	71	71	71	71
Heavy Vehicles, %	0	0	0	0	0	2
Mvmt Flow	6	27	65	7	18	85

Major/Minor Minor1 Major1 Major2

Conflicting Flow All	190	69	0	0	72	0
Stage 1	69	-	-	-	-	-
Stage 2	121	-	-	-	-	-
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	804	1000	-	-	1541	-
Stage 1	959	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	794	1000	-	-	1541	-
Mov Cap-2 Maneuver	794	-	-	-	-	-
Stage 1	959	-	-	-	-	-
Stage 2	898	-	-	-	-	-

Approach WB NB SB

HCM Control Delay, s	8.9	0	1.3
HCM LOS	A		

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

Capacity (veh/h)	-	-	957	1541	-
HCM Lane V/C Ratio	-	-	0.034	0.012	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

HCM 2010 TWSC
4: Ridge Street & Auburn Road

Baseline Conditions
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh 0.6

Movement WBL WBR NBT NBR SBL SBT

Lane Configurations	W	W	N	N	S	S
Traffic Vol, veh/h	4	49	2	3	59	5
Future Vol, veh/h	4	49	2	3	59	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	70	70	70	70	70	70
Heavy Vehicles, %	0	0	0	0	2	0
Mvmt Flow	6	70	3	4	84	7

Major/Minor Minor2 Major2

Conflicting Flow All	175	7	0	0
Stage 1	175	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.218	-
Pot Cap-1 Maneuver	722	1081	-	-
Stage 1	758	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	1081	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach NB SB

HCM Control Delay, s	8.4
HCM LOS	A

Minor Lane/Major Mvmt NBLn1 SBL SBT

Capacity (veh/h)	1081	-	-
HCM Lane V/C Ratio	0.007	-	-
HCM Control Delay (s)	8.4	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

HCM 2010 TWSC
1: Ridge Street & Rolling Meadow Drive

2025 No-Build Conditions
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 1.8

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations	W					
Traffic Vol, veh/h	3	19	7	60	42	3
Future Vol, veh/h	3	19	7	60	42	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	84	84	84	84	84	84
Heavy Vehicles, %	0	12	0	2	5	33
Mvmt Flow	4	23	8	71	50	4

Major/Minor Minor2 Major1 Major2

Conflicting Flow All	139	52	54	0	-	0
Stage 1	52	-	-	-	-	-
Stage 2	87	-	-	-	-	-
Critical Hdwy	6.4	6.32	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.408	2.2	-	-	-
Pot Cap-1 Maneuver	859	988	1564	-	-	-
Stage 1	976	-	-	-	-	-
Stage 2	941	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	855	988	1564	-	-	-
Mov Cap-2 Maneuver	855	-	-	-	-	-
Stage 1	971	-	-	-	-	-
Stage 2	941	-	-	-	-	-

Approach EB NB SB

HCM Control Delay, s	8.8	0.8	0
HCM LOS	A		

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h)	1564	-	967	-	-
HCM Lane V/C Ratio	0.005	-	0.027	-	-
HCM Control Delay (s)	7.3	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 2010 TWSC
2: Ridge Street & Curve Street

2025 No-Build Conditions
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh	1.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	2	9	58	6	21	40
Traffic Vol, veh/h	2	9	58	6	21	40
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	Stop	Stop	Free	Free	Free	Free
Sign Control	-	None	-	None	-	None
RT Channelized	0	-	-	-	-	-
Storage Length	0	-	0	-	-	0
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	84	84	84	84	84	84
Peak Hour Factor	50	0	2	17	5	5
Heavy Vehicles, %	2	11	69	7	25	48
Mvmt Flow						

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	171	73	0
Stage 1	73	-	-
Stage 2	98	-	-
Critical Hdwy	6.9	6.2	-
Critical Hdwy Stg 1	5.9	-	-
Critical Hdwy Stg 2	5.9	-	-
Follow-up Hdwy	3.95	3.3	-
Pot Cap-1 Maneuver	720	995	-
Stage 1	841	-	-
Stage 2	819	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	708	995	-
Mov Cap-2 Maneuver	708	-	-
Stage 1	841	-	-
Stage 2	805	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	2.6
HCM LOS	A		




Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	927	1504
HCM Lane V/C Ratio	-	-	0.014	0.017
HCM Control Delay (s)	-	-	8.9	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0.1

HCM 2010 TWSC
4: Ridge Street & Auburn Road

2025 No-Build Conditions
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	63	1	2	42	0
Future Vol, veh/h	2	63	1	2	42	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	3	0	0	7	0
Mvmt Flow	2	72	1	2	48	0

Major/Minor	Minor2	Major2		
Conflicting Flow All	96	0	0	0
Stage 1	96	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.17	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.263	-
Pot Cap-1 Maneuver	798	-	-	-
Stage 1	819	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	-	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach NB SB

HCM Control Delay, s

HCM LOS -

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-

HCM 2010 TWSC
1: Ridge Street & Rolling Meadow Drive

2025 No-Build Conditions
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh 0.9

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations	W			4	1	
Traffic Vol, veh/h	4	6	7	62	71	7
Future Vol, veh/h	4	6	7	62	71	7
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	71	71	71	71	71	71
Heavy Vehicles, %	0	0	0	0	2	0
Mvmt Flow	6	8	10	87	100	10

Major/Minor Minor2 Major1 Major2

Conflicting Flow All	212	105	110	0	-	0
Stage 1	105	-	-	-	-	-
Stage 2	107	-	-	-	-	-
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	781	955	1493	-	-	-
Stage 1	924	-	-	-	-	-
Stage 2	922	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	776	955	1493	-	-	-
Mov Cap-2 Maneuver	776	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	922	-	-	-	-	-

Approach EB NB SB

HCM Control Delay, s	9.2	0.8	0
HCM LOS	A		

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h)	1493	-	874	-	-
HCM Lane V/C Ratio	0.007	-	0.016	-	-
HCM Control Delay (s)	7.4	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCM 2010 TWSC
2: Ridge Street & Curve Street

2025 No-Build Conditions
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T			T
Traffic Vol, veh/h	4	20	49	5	14	63
Future Vol, veh/h	4	20	49	5	14	63
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	71	71	71	71	71	71
Heavy Vehicles, %	0	0	0	0	0	2
Mvmt Flow	6	28	69	7	20	89

Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	202	73	0	0	76	0
Stage 1	73	-	-	-	-	-
Stage 2	129	-	-	-	-	-
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	791	995	-	-	1536	-
Stage 1	955	-	-	-	-	-
Stage 2	902	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	780	995	-	-	1536	-
Mov Cap-2 Maneuver	780	-	-	-	-	-
Stage 1	955	-	-	-	-	-
Stage 2	889	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	1.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	951	1536
HCM Lane V/C Ratio	-	-	0.036	0.013
HCM Control Delay (s)	-	-	8.9	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 2010 TWSC
4: Ridge Street & Auburn Road

2025 No-Build Conditions
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh 0.6

Movement WBL WBR NBT NBR SBL SBT

Lane Configurations	W		T			
Traffic Vol, veh/h	4	52	2	3	62	5
Future Vol, veh/h	4	52	2	3	62	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	70	70	70	70	70	70
Heavy Vehicles, %	0	0	0	0	2	0
Mvmt Flow	6	74	3	4	89	7

Major/Minor Minor2 Major2

Conflicting Flow All	185	7	0	0
Stage 1	185	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.5	6.2	4.12	-
Critical Hdwy Stg 1	5.5	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	4	3.3	2.218	-
Pot Cap-1 Maneuver	713	1081	-	-
Stage 1	751	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	0	1081	-	-
Mov Cap-2 Maneuver	0	-	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-

Approach NB SB

HCM Control Delay, s	8.4
HCM LOS	A

Minor Lane/Major Mvmt NBLn1 SBL SBT

Capacity (veh/h)	1081	-	-
HCM Lane V/C Ratio	0.007	-	-
HCM Control Delay (s)	8.4	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

HCM 2010 TWSC
1: Ridge Street & Rolling Meadow Drive

2025 Build Conditions
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 2.2

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations	Y					
Traffic Vol, veh/h	9	19	7	60	42	5
Future Vol, veh/h	9	19	7	60	42	5
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	84	84	84	84	84	84
Heavy Vehicles, %	0	12	0	2	5	33
Mvmt Flow	11	23	8	71	50	6

Major/Minor Minor2 Major1 Major2

Conflicting Flow All	140	53	56	0	-	0
Stage 1	53	-	-	-	-	-
Stage 2	87	-	-	-	-	-
Critical Hdwy	6.4	6.32	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.408	2.2	-	-	-
Pot Cap-1 Maneuver	858	987	1562	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	941	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	854	987	1562	-	-	-
Mov Cap-2 Maneuver	854	-	-	-	-	-
Stage 1	970	-	-	-	-	-
Stage 2	941	-	-	-	-	-

Approach EB NB SB

HCM Control Delay, s	9	0.8	0
HCM LOS	A		

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h)	1562	-	940	-	-
HCM Lane V/C Ratio	0.005	-	0.035	-	-
HCM Control Delay (s)	7.3	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 2010 TWSC
2: Ridge Street & Curve Street

2025 Build Conditions
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh	1.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑			↑
Traffic Vol, veh/h	4	9	58	12	21	40
Future Vol, veh/h	4	9	58	12	21	40
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	84	84	84	84	84	84
Heavy Vehicles, %	50	0	2	17	5	5
Mvmt Flow	5	11	69	14	25	48

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	174	76	0	0	83
Stage 1	76	-	-	-	-
Stage 2	98	-	-	-	-
Critical Hdwy	6.9	6.2	-	-	4.15
Critical Hdwy Stg 1	5.9	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-
Follow-up Hdwy	3.95	3.3	-	-	2.245
Pot Cap-1 Maneuver	717	991	-	-	1495
Stage 1	839	-	-	-	-
Stage 2	819	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	705	991	-	-	1495
Mov Cap-2 Maneuver	705	-	-	-	-
Stage 1	839	-	-	-	-
Stage 2	805	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	2.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	881	1495
HCM Lane V/C Ratio	-	-	0.018	0.017
HCM Control Delay (s)	-	-	9.2	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1




HCM 2010 TWSC
3: Ridge Street & Proposed Roadway

2025 Build Conditions
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh 1.4

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations						
Traffic Vol, veh/h	6	12	4	64	42	2
Future Vol, veh/h	6	12	4	64	42	2
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	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	2	5	0
Mvmt Flow	7	14	5	76	50	2

Major/Minor Minor2 Major1 Major2

Conflicting Flow All	137	51	52	0	-	0
Stage 1	51	-	-	-	-	-
Stage 2	86	-	-	-	-	-
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	861	1023	1567	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	942	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	858	1023	1567	-	-	-
Mov Cap-2 Maneuver	858	-	-	-	-	-
Stage 1	974	-	-	-	-	-
Stage 2	942	-	-	-	-	-

Approach EB NB SB

HCM Control Delay, s	8.8	0.4	0
HCM LOS	A		




Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h)	1567	-	961	-	-
HCM Lane V/C Ratio	0.003	-	0.022	-	-
HCM Control Delay (s)	7.3	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 2010 TWSC
4: Ridge Street & Auburn Road

2025 Build Conditions
Weekday Morning Peak Hour

Intersection

Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	67	1	2	54	0
Future Vol, veh/h	2	67	1	2	54	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	3	0	0	7	0
Mvmt Flow	2	77	1	2	62	0

Major/Minor	Minor2	Major2			
Conflicting Flow All	124	0	0	0	0
Stage 1	124	-	-	-	-
Stage 2	0	-	-	-	-
Critical Hdwy	6.5	6.2	4.17	-	-
Critical Hdwy Stg 1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	4	3.3	2.263	-	-
Pot Cap-1 Maneuver	770	-	-	-	-
Stage 1	797	-	-	-	-
Stage 2	-	-	-	-	-
Platoon blocked, %					-
Mov Cap-1 Maneuver	0	-	-	-	-
Mov Cap-2 Maneuver	0	-	-	-	-
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-

Approach NB SB

HCM Control Delay, s
HCM LOS




-

Minor Lane/Major Mvmt	NBLn1	SBL	SBT
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	-	-	-
HCM Lane LOS	-	-	-
HCM 95th %tile Q(veh)	-	-	-

HCM 2010 TWSC
1: Ridge Street & Rolling Meadow Drive

2025 Build Conditions
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	6	7	62	71	14
Future Vol, veh/h	8	6	7	62	71	14
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	71	71	71	71	71	71
Heavy Vehicles, %	0	0	0	0	2	0
Mvmt Flow	11	8	10	87	100	20

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	217	110	120	0	-	0
Stage 1	110	-	-	-	-	-
Stage 2	107	-	-	-	-	-
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	776	949	1480	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	922	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	771	949	1480	-	-	-
Mov Cap-2 Maneuver	771	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	922	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	0.8	0
HCM LOS	A		




Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1480	-	838	-	-
HCM Lane V/C Ratio	0.007	-	0.024	-	-
HCM Control Delay (s)	7.4	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 2010 TWSC
2: Ridge Street & Curve Street

2025 Build Conditions
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh 2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	20	49	9	14	63
Future Vol, veh/h	11	20	49	9	14	63
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	71	71	71	71	71	71
Heavy Vehicles, %	0	0	0	0	0	2
Mvmt Flow	15	28	69	13	20	89

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	205	76	0	0	82
Stage 1	76	-	-	-	-
Stage 2	129	-	-	-	-
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	788	991	-	-	1528
Stage 1	952	-	-	-	-
Stage 2	902	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	777	991	-	-	1528
Mov Cap-2 Maneuver	777	-	-	-	-
Stage 1	952	-	-	-	-
Stage 2	889	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	1.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	903	1528
HCM Lane V/C Ratio	-	-	0.048	0.013
HCM Control Delay (s)	-	-	9.2	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0




HCM 2010 TWSC
3: Ridge Street & Proposed Roadway

2025 Build Conditions
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh 1.3

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations						
Traffic Vol, veh/h	4	8	13	54	67	7
Future Vol, veh/h	4	8	13	54	67	7
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	71	71	71	71	71	71
Heavy Vehicles, %	0	0	0	0	2	0
Mvmt Flow	6	11	18	76	94	10

Major/Minor Minor2 Major1 Major2

Conflicting Flow All	211	99	104	0	-	0
Stage 1	99	-	-	-	-	-
Stage 2	112	-	-	-	-	-
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	782	962	1500	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	918	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	772	962	1500	-	-	-
Mov Cap-2 Maneuver	772	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	918	-	-	-	-	-

Approach EB NB SB

HCM Control Delay, s	9.1	1.4	0
HCM LOS	A		

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h)	1500	-	889	-	-
HCM Lane V/C Ratio	0.012	-	0.019	-	-
HCM Control Delay (s)	7.4	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 2010 TWSC
4: Ridge Street & Auburn Road

2025 Build Conditions
Weekday Evening Peak Hour

Intersection

Int Delay, s/veh 0.5

Movement WBL WBR NBT NBR SBL SBT

Lane Configurations      

Traffic Vol, veh/h 4 65 2 3 70 5

Future Vol, veh/h 4 65 2 3 70 5

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Stop Stop Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage, # - - 0 - - 0

Grade, % 0 - 0 - - 0

Peak Hour Factor 70 70 70 70 70 70

Heavy Vehicles, % 0 0 0 0 2 0

Mvmt Flow 6 93 3 4 100 7

Major/Minor Minor2 Major2

Conflicting Flow All 207 7 0 0

Stage 1 207 - - -

Stage 2 0 - - -

Critical Hdwy 6.5 6.2 4.12 -

Critical Hdwy Stg 1 5.5 - - -

Critical Hdwy Stg 2 - - - -

Follow-up Hdwy 4 3.3 2.218 -

Pot Cap-1 Maneuver 693 1081 - -

Stage 1 734 - - -

Stage 2 - - - -

Platoon blocked, % -

Mov Cap-1 Maneuver 0 1081 - -

Mov Cap-2 Maneuver 0 - - -

Stage 1 0 - - -

Stage 2 0 - - -

Approach NB SB

HCM Control Delay, s 8.4

HCM LOS A

Minor Lane/Major Mvmt NBLn1 SBL SBT

Capacity (veh/h) 1081 - -

HCM Lane V/C Ratio 0.007 - -

HCM Control Delay (s) 8.4 - -

HCM Lane LOS A - -

HCM 95th %tile Q(veh) 0 - -