Garden Hill Estates

Residential Subdivision

3852 Ganaraska Road

Garden Hill, Ontario

Municipality of Port Hope

Traffic Study Report

Prepared by:
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Mistral Land Development Inc.
Per Monument Geomatics
November, 2022

November 23, 2022

Mistral Land Development Inc.
5905 Earlscourt Crescent
Ottawa, ON K4M 1KZ

Attn: Mr. Chris Donegan

Dear Sir:

RE: Traffic Study - Proposed Garden Hill Estates Residential Subdivision To Be Located at 3852 Ganaraska Rd. (County Rd. 9), Garden Hill, Ontario

Tranplan Associates is pleased to present the results of the traffic study carried out to assess the potential traffic impacts of the proposed *Garden Hill Estates Residential Subdivision.* This traffic study has been based on a total of 50 residential homes and 10 apartment units. The final lot/apartment count has yet to be set but is expected to be less than the 50 lots assumed for the traffic study. The subdivision will be located in the Hamlet of Garden Hill on a new street (Street "A") running north from County Road (CR) 9. Additional access will be provided by connections to Frost Ave and Porter Cres. located on the east side of the subdivision. The site traffic volumes forecast to be generated by the 50 lot subdivision and 10 apartment units can be accommodated on existing roads and intersections. Drivers accessing CR 9 and CR 10 from the subdivision will experience acceptable levels of delay.

The future CR 9/site entrance intersection operating with single lane approaches will support new subdivision and background traffic. No auxiliary turning lanes or right turn taper will be required on CR 9 to support the new subdivision. The future Street "A" connecting the new residences to CR 9 should be constructed to current County/Municipal standards for a rural residential subdivision. Tranplan Associates is pleased to have the opportunity to work with your study team on this project. If you should require any further information on the study analyses or reporting, please contact me at your convenience

Yours truly,

REGISTERED PROFESSIONAL ENGINEER
W. J. COPELAND
PROVINCE OF ONTARIO

William Copeland, P.Eng.
Principal
Tranplan Associates

LIST OF TABLES

1. INTRODUCTION

1.1 Background

Tranplan Associates is pleased to present the results of a traffic study to determine the impact of the proposed *Garden Hill Estates Residential Subdivision* on adjacent roads and intersections. The subdivision will be located in the Hamlet of Garden Hill, Ontario on the north side of Northumberland County Road (CR) 9 (Ganaraska Rd.) The general location of the Garden Hill community and the study site within Northumberland County are illustrated *Exhibit 1 - Key Map* (following report text). The subdivision will be located on a green field site in the north-central part of the Hamlet. The traffic study has been based a 50 lot residential subdivision and a 10 unit apartment building. The final lot count has yet to be set, but it is expected to be less than the 50 lots assumed for the traffic study analyses. The proposed layout of the subdivision and its facilities are illustrated in *Exhibit 2 – Preliminary Site Plan*. Each lot on the east side of the subdivision will have direct access via its own driveway to the new Street “A” that will connect through a new intersection to CR 9. Street “A” will also have an easterly connection to Porter Crescent. Lots on the west side of the subdivision will be served by a secondary road, Street “B” that will connect to Street “A”. The location of the new subdivision and the main activity centres of the Garden Hill community are illustrated in *Exhibit 3 - Site Context*.

This traffic study has been requested by the County of Northumberland and the Municipality of Port Hope as part of the planning approval process for the proposed subdivision. Discussions were held with the study team and the approving agencies to establish the scope of the traffic study. Tranplan Associates staff have completed four site visits to collect peak hour traffic counts, observe current traffic operations, measure existing road and intersection geometrics, review adjacent land uses and measure sight lines along CR 9 from the proposed Street “A” intersection with CR 9.

Traffic analyses completed for this study included five existing intersections and the new site entrance to CR 9. The study intersections include the following (see *Exhibit 3*).

- The future Street “A”/CR 9 intersection (site entrance)
- The Mill Street/CR 9 intersection.
- The Woodland Ave./CR 9 intersection
- The CR 10/CR 9 intersection
- The Woodland Ave/CR 10 intersection
- The Woodland Ave/Frost Ave. intersection as a surrogate for the intersections in the *Woodlands of Garden Hill* subdivision

The study analyses considered the traffic impacts of peak traffic demands during representative weekday peak hour periods. The analyses included auxiliary lane warrant calculations to assess the need for auxiliary lanes to support future site and background traffic at each of the study intersections. The analyses were based on future peak hour volumes for a 10 year planning horizon to 2032. The total traffic volumes used in the analyses included traffic generated by full development of the new subdivision combined with growth in background traffic from observed 2021 volumes to 2032.

1.2 Principal Findings

The principal findings derived from the analyses of weekday peak hour periods include the following:

- The present adjacent road network and the five existing study intersections operate at good Levels of Service (LoS)[1] during weekday peak hour periods. There is considerable residual capacity for future growth in traffic.
- During 2032 weekday total traffic peak hour periods all six study intersections, with their present geometrics, are forecast to operate at good LoS with residual capacity for future growth beyond the 2032 planning horizon.
- All 2032 weekday peak hour traffic movements at the future Street "A"/CR 9 intersection are forecast to operate at the boundary of LoS "B" or better. This is considered a good LoS for peak hour traffic conditions. Drivers accessing CR 9 from the new subdivision will face acceptable delay.
- The new Street "A" intersection with CR 9, and the new internal roads in the subdivision (Street "A" & Street "B") should be designed to meet current Northumberland County and Municipality of Port Hope standards for local residential roads located in a rural residential subdivision. The roads and internal intersections should be designed to accommodate municipal service vehicles, EMS vehicles, school buses and vehicles supporting handicapped access.
- No auxiliary lanes will be required at the new Street "A"/CR 9 intersection to support 2032 total peak hour traffic volumes. The future Street "A" intersection with single lane approaches and Stop Control (TWSC) on Street "A" as the minor approach will support future 2032 total peak hour volumes.

In summary, during future 2032 weekday peak hour conditions, all five existing study intersections, with existing geometrics are forecast to operate at good LoS. There will be considerable residual capacity for future growth in site and background traffic at these intersections. The new Street "A" entrance to CR 9

[1] See Technical Appendix – Intersection Capacity Analysis for definitions of Levels of Service.

with single lane approaches and TWSC will operate at good LoS with considerable residual capacity for future growth in traffic.

2. EXISTING CONDITIONS

2.1 The Study Site

The proposed *Garden Hill Estates Residential Subdivision* will be located on part Lot 16, Concession 8, Geographic Township of Hope, now part of the Municipality of Port Hope. The proposed subdivision will be located on a green field site north of CR 9 in the east-central part of the Garden Hill Community (see *Exhibit 3*). The subdivision has been assumed to contain up to 50 individual lots for single family residential housing in the main part of the site. The final lot count will likely be less. The south east corner of the site is separated by a water course. This portion of the site will contain a 10 unit apartment building. The southern portion of the site has been in agricultural use. The northern portion is presently wooded.

Road/vehicle access to the main part of the new subdivision will be via a new municipal road, Street "A". Street "A" will access CR 9 as illustrated in *Exhibit 2*. Secondary access to the east will be provided by a new connection to the existing Porter Crescent. Access to the new apartments will be provided by a new connection to Frost Ave. These two streets are part of the existing local road network of the *Woodlands of Garden Hill* subdivision. Each residential lot will have its own driveway to access the new Streets "A" & "B" as illustrated in *Exhibit 2*. Additional development information for the study site is contained in related planning documentation that will be submitted with this traffic report for the necessary planning approvals.

2.2 Adjacent Development

The study site will be located on the north side of CR 9 in the north central part of the Garden Hill Community. *Exhibit 3* illustrates current development in Garden Hill. The main part of the community lies between CR 10 and Mill Street along CR 9. The *Woodlands of Garden Hill* subdivision is the main development on the east side of Garden Hill. It will form the east boundary of the *Garden Hill Estates*. The core of the traditional Garden Hill community lies between John Street and Mill Street along the south side of CR 9. It contains a mix of older residential development south of CR 9 and older commercial development along CR 9. This commercial development consists of the *Garden Hill General Store,* an LCBO outlet and community mail boxes. Parallel parking is available along both sides of CR 9 in the immediate vicinity of the general store. Additional commercial development includes the *Garden Hills Farmers Market* located in the southwest quadrant of the Mill Street/CR 9 intersection. Its layout is similar to a large scale "produce stand" with parking in front of the store along Mill Street south of CR 9.

A residential subdivision is located on LaRose Ave. about 500 m south of CR 9 on the east side of Mill Street. The subdivision contains about 25 single family homes.

A former mill pond is located along the west side of Mill Street north of CR 9. It is now a part of the *Garden Hill Conservation Area* located primarily along the west side of the mill pond. The *Alex Carruthers Memorial Park* is located about 400 m west of Mill Street on the south side of CR 9. The park contains outdoor community recreational facilities including ball diamonds and playing fields. The *Municipality of Port Hope EMS Station No 3* is located on the west side of the Park.

The *North Hope Central Public School* is located about 1 km west of Mill Street on the north side of CR 9. There is additional rural residential development located along CR 9 between Mill Street the elementary school.

2.3 Access to the Study Site

2.3.1 Northumberland County Road 9 (Ganaraska Road)

County Road 9 is under the jurisdiction of Northumberland County and is classed as a rural/semi-urban arterial road. It is one of the principal east/west travel corridors in the mid-central part of the County (see *Exhibit 1*). It runs from the former Highway 45 (now CR 45) in the east, along the south side of Rice Lake connecting to CR 28 at Bewdley. From there it continues westerly through Campbellcroft and Garden Hill to Cold Springs Camp Road where it becomes Durham Regional Road 9. From there it continues west to Highway 115 at Kirby. Continuing west as Concession Rd. 7 it connects to Highway 407 and beyond. With this link to the eastern GTA, CR 9 will provide good regional connectivity for the new subdivision.

The new Street “A” entrance to the study site will access north side of CR 9 as illustrated in *Exhibit 2*. In the vicinity of the study site CR 9 functions as a rural/suburban collector road providing local access to the Garden Hill community as well connectivity for through east/west traffic travelling to/from CR 28 and Highway 115. In the vicinity of the study site it has a two lane rural cross-section with a 7.25 m asphalt surface and 2.4 – 2.5 m gravel shoulders. In this section of CR 9 the posted speed is 60 kph. Based on Tranplan Associates traffic count data, CR 9 at this location is estimated to carry a 2021 average daily traffic (ADT) volume of about 3,500 vehicles per day (vpd). The 2018 County average annual daily traffic (AADT) volume data for this section of CR 9 are listed as 2,900 vpd. A design speed of 80 kph (20 kph over posted) was assumed in assessing the geometric requirements for the new Street “A” intersection with CR 9. *Exhibit 4* illustrates the current cross-section of CR 9 in the vicinity of the study site.

2.3.2 Northumberland County Road 10

CR 10 is a north/south rural/semi-urban arterial road under the jurisdiction of Northumberland County. It links Garden Hill to the west side of the Town of Port Hope as well as providing access to rural communities, residences and farms along the corridor itself (see *Exhibit 1*). North from Garden Hill it passes through the Ganaraska Forest into the County of Peterborough where it links to the Village of Millbrook. CR 10 will provide the new subdivision with access to adjacent communities to the south, as well as providing a direct link to the Town of Port Hope and regional access via Highway 401.

The new subdivision will have a connection to CR 10 through Woodland Ave. about 600 m north of the CR 10/CR9 intersection (see *Exhibit 3*). In the vicinity of the Woodland Ave. intersection, CR 10 has a rural open-ditch cross-section with a 6.7 m (2-lane) asphalt road platform and 0.5 m gravel shoulders. It has a posted speed of 80 kph. An assumed design speed of 100 kph was used for the auxiliary lane warrant analysis of the Woodland Ave./CR 10 intersection. *Exhibit 5* illustrates a representative CR 10 cross-section in the vicinity of Woodland Ave. Based on Tranplan Associates 2021 traffic count data, CR 10 carries an estimated ADT of about 1650 – 1700 vpd north of CR 9. Northumberland County 2018 AADT data lists this section of CR 10 as having an AADT of 1700 vpd.

2.3.3 Mill Street

Mill Street is a rural collector road under the jurisdiction of the Municipality of Port Hope. South of CR 9 it has a rural open ditch cross-section with a 6.5 m asphalt platform. It provides access to local residences and farms along its corridor. South of CR 9 it has a posted speed of 50 kph. Based on Tranplan Associates 2021 traffic counts it carries less than 100 vpd.

North of CR 9, Mill Street has a rural open ditch cross-section with a 5.4 m gravel platform. It has a posted speed of 50 kph. This section Mill Street runs along the east side of the mill pond and then north for about 1.5 km. It provides access to about 6 residences on the north side of Garden Hill and further north to 4 - 5 rural residences/farms. Based on Tranplan Associates 2021 traffic counts it carries an estimated 50 vpd.

2.3.4 Woodland Avenue & Frost Avenue

Woodland Ave and Frost Ave are local streets providing access to existing residences in *Woodlands of Garden Hill*, a rural estates residential subdivision. These streets are municipal roads under the jurisdiction of the Municipality of Port Hope. The layout of the streets is illustrated in *Exhibit*

3. Frost Ave. will provide access to the apartment units in *Garden Hill Estates.* Woodland Ave will provide access to CR 9 and CR 10 for both components of the new subdivision via connections through Frost Ave and Porter Cres.

Woodland Ave and Frost Ave are representative of the streets in the *Woodlands of Garden Hill* subdivision. They have a rural open ditch cross-section with 6.9 m all-weather surface (2-lane) and 0.8 - 1.0 m gravel shoulders.

2.3.5 The Mill Street/CR 9 Intersection

The Mill Street/CR 9 intersection is a four leg intersection with Two Way Stop Control (TWSC) with Stop signs on Mill Street as the minor approach. All four approaches have single through lanes with no auxiliary turning lanes. The east and west approaches (CR 9), carrying the higher volumes, have paved asphalt shoulders. To the east the paved shoulders run to the General Store and provide for parallel parking. To the west the paved shoulders run from Mill Street for about 200 m to the entrance to the Conservation Area. These paved shoulders provide an active transportation link connecting the core are of the traditional Garden Hill community to the Conservation Area. The current intersection approaches are illustrated in *Exhibit 6*.

Additional geometric details were collected for each of the intersection approaches during one of the site visits. These data included lane widths and approach grades that were subsequently used for input to the Synchro intersection analyses. These geometric data are summarized on the Synchro print-out sheets included in the *Technical Appendix – Intersection Capacity Analyses*.

2.3.6 The Woodland Ave/CR 9 Intersection

Woodland Ave. is the principal access from CR 9 into the *Woodlands of Garden Hill* residential subdivision. The intersection is located about 300 m west of the CR 10/CR 9 intersection. Woodland Ave forms a 3-leg intersection with CR 9. It has STOP-control on Woodland Ave. as the minor approach. All approaches are single lanes with no auxiliary turning lanes. The three approaches have rural open-ditch cross-sections as illustrated in *Exhibit 7*. In reviewing the exhibit it will be noted that Woodland Ave has boulevard splitting northbound and southbound traffic. The boulevard starts about 10 m from the north edge of CR 9 and runs an additional 15 m north.

The Woodland Ave site entrance geometric details were collected during one of the site visits. This information included data that were subsequently used for input to the Synchro intersection analyses. These geometric data are summarized on the Synchro print-out sheets included in the *Technical Appendix – Intersection Capacity Analyses*.

2.3.7 The CR 10/CR 9 Intersection

The CR 10/CR 9 intersection is a four leg intersection with Two Way Stop Control (TWSC) on CR 10 as the minor approach. All four approaches have single through lanes with no auxiliary turning lanes. The four quadrants of the intersection have concrete curb and gutter radii with paved asphalt maintenance strips. The curb and gutters drain into the adjacent open ditch sections on each of the intersection approaches. The current intersection approaches are illustrated in *Exhibit 8*.

The CR 10/CR 9 geometric details are summarized on the Synchro print-out sheets included in the *Technical Appendix – Intersection Capacity Analyses*.

2.3.8 The Woodland Ave/CR 10 Intersection

Woodland Ave. has a northern access point to CR 10 (see *Exhibit 3*). This intersection is located about 600 m north of the CR 10/CR 9 intersection. The intersection will provide the *Garden Hill Estates* subdivision with access to CR 10 for traffic travelling north towards Peterborough County. It is a 3-leg intersection with Woodland Ave forming the west approach. The intersection has STOP-control on Woodland Ave. as the minor approach. All approaches are single lanes with no auxiliary turning lanes. The three approaches have rural open-ditch cross-sections as illustrated in *Exhibit 5*. There are concrete curb and gutter radii on the Woodland Ave approach that drain into the adjacent open ditches.

The Woodland Ave/CR 10 geometric details are summarized on the Synchro print-out sheets included in the *Technical Appendix – Intersection Capacity Analyses*.

2.3.9 The Woodland Ave/Frost Ave Intersection

The Woodland Ave/Frost Ave. intersection has been included in the study analyses as a surrogate for the intersections within the *Woodlands of Garden Hill* subdivision. It has been evaluated to assess the potential impacts of new site traffic from the *Garden Hills Estate* subdivision. Woodland Ave/Frost Ave is a 3-leg intersection with stop control on Frost

Ave as the minor approach. All approaches have a rural open-ditch cross-section with all-weather road platforms and grassed ditches/berms.

Intersection geometric details are summarized on the Synchro print-out sheets included in the *Technical Appendix – Intersection Capacity Analyses*.

2.4 Current Traffic Data

Tranplan Associates staff reviewed the collection of the required 2021 traffic data with County and Municipal staff and the study team. The discussions covered peak periods to be included in the analyses and field collection of the traffic count data. It was determined that current September 2021 weekday peak periods would be acceptable for the traffic study analyses.

Tranplan Associates staff completed representative weekday peak period traffic counts on Tuesday/Wednesday September 28/29, 2021. These count data were collected at four study intersections as follows:

- Mill Street & CR 9
- Woodland Ave & CR 9
- CR 10 & CR 9
- Woodland Ave & CR 10

Copies of these count data are included in the *Technical Appendix – Traffic Data.* Peak hour turning volumes for the Woodland Ave/Frost Ave were estimated from the Woodland Ave approach volumes at CR 9 and CR 10 and the number adjacent residential units on these roads.

The observed peak hour volumes were collated and adjusted to produce "balanced" volumes between the intersections. The adjustment process consisted of factoring observed volumes of adjacent intersections to the higher of the two adjacent sets of volumes. This process produced 2021 Design Hour Volumes (DHV) for the AM and PM peak hour periods. Since the counts were taken during a non-lockdown period, no adjustments were made to the observed peak hour volumes. The observed peak hour data from the counts and the DHV are illustrated in *Exhibits 9A & 9B.* These DHV formed the base for forecasting future 2032 background and total peak hour volumes.

2.5 Current Traffic Operations

Detailed intersection capacity analyses were carried out based on the current 2021 DHV (see *Exhibits 9A & 9B*) for the five existing intersections as described in *Section 1.1*. The analyses applied the current *Highway Capacity Manual* (HCM) methodologies for intersection analyses using *Trafficware's Synchro 10* software. The parameters for the intersection analyses were derived as follows:

- Intersection geometrics were taken from the observed field data collected during the site visits.
- Peak hour factors (phf) were based on the Synchro recommended factors for the peak hour approach volumes[2].
- Observed pedestrian volumes were rounded up to the nearest 5 pedestrians
- Observed cyclist volumes were rounded up to the nearest 5 bicycles
- Percent heavy trucks were rounded up to the next 5%

These parameters were held constant for the 2021 and 2032 analyses so that any change in intersection performance could be attributed to the changes in the assigned volumes.

Based on the representative 2021 weekday AM and PM design hour volumes (DHV), all critical movements at the five study intersections presently operate at LoS "B" or better. Drivers at these intersections face little delay. All movements at the study intersections have considerable residual capacity for growth in future traffic. More detailed summaries of the intersections' critical movements are provided in *Table 3*. The full Synchro printouts of the weekday 2021 intersection capacity analyses for the five existing intersections are included in the *Technical Appendix – Intersection Capacity Analyses.*

[2] See *Technical Appendix – Traffic Data* for Summary of Synchro recommended peak hour factors.

3. THE PROPOSED DEVELOPMENT

3.1 Trip Generation Forecasts

The traffic analyses for the *Garden Hill Estates Residential Subdivision* were based on 50 new building lots for single family dwelling units and a single building with 10 apartment units. The layout of the proposed subdivision will have individual lots fronting on a new Street "A" and a supporting Street "B" as illustrated in *Exhibit 2*. Street "A" will provide the main access to CR 9. Both streets will terminate in culs-de-sac at the north end of the site. The 10 unit apartment building to be located on Lot 44 on the east side of the water course and will access Frost Ave. It will have connectivity to CR 9 and CR 10 via Woodland Ave.

Site trip generation forecasts were computed based on rates taken from the current Institute of Transportation Engineers (ITE) *Trip Generation Manual* (11th ed.). The selected land uses were *Single-Family Detached Housing* (LU 210) and *Multifamily Housing (Low Rise)* (LU 220). Two options are available for calculating site trip generation for many of the common land uses. The first is a statistically derived equation and the second is a computed average trip rate. The current ITE *Trip Generation Handbook* (3rd ed.) lays out the procedure for selecting either the equation or average rate for determining future site trip generation. Following this process LU 210 was computed using the equations for the AM and PM peak hours. The average rate method was selected for LU 220. The main reason for applying the average rate for LU 220 is that there will only be 10 apartment units and this number of units is below the boundary of the equation for that land use. *Table 1* following, summarizes the site trip generation by land use type for the *Garden Hill Estates* subdivision.

Table 1: Weekday Peak Hour Site Trip Generation (vph)

Garden Hill Estates Subdivision Residential Categories	**Units**	**AM Peak Hour**			**PM Peak Hour**		
		In[A]	Out	**Total**	In[A]	Out	**Total**
Residential Units (LU 210 – equation)	50	10	30	**40**	33	19	**52**
Apartment Units (LU 220 – avg. rate)	10	1	3	**4**	3	2	**5**
Total	60	11	33	**44**	36	21	**57**

A – In/out distribution split based on ITE surveys for LU 210.

The proposed development is forecast to generate a total of 44 new vehicle trips during a weekday AM peak hour and 57 new vehicle trips during a weekday PM peak hour. The forecast future traffic volumes during the PM peak hour will be, on the average less than 1 new vehicle trip every minute added to adjacent travel corridors. This will have little impact on future traffic operations on the existing road network. Since the proposed development is a residential subdivision, no trip volume reductions were made for "linked trips", "diverted trips" or "pass-by" trips.

3.2 Site Trip Distribution

There are four potential "gateways" to the study site as listed following:

- CR 10 North
- CR 10 South
- CR 9 East
- CR 9 West

The distribution of future *Garden Hill Estates* site traffic was derived from the observed distribution of site traffic from the *Woodlands of Garden Hill* subdivision. Both the existing and future subdivision will share similar land use characteristics, development and travel patterns.

The observed individual turning movements to/from Woodland Ave to CR 9 and CR 10 were extracted from the observed traffic counts (see *Exhibits 9A & 9B*) for each peak hour period. Based on the total observed *Woodlands of Garden Hill* peak hour trip generation, the percent trip distribution was computed for travel to/from each gateway. The split/distribution of site traffic at the CR 10/CR19 intersection was guided by the turning volumes at the intersection. The resulting assumed weekday trip distributions are summarized in *Table 2* following.

Table 2: Weekday Peak Hour Site Trip Distribution

	AM Peak Hour		PM Peak Hour	
Gateway	**Inbound**	**Outbound**	**Inbound**	**Outbound**
CR 10 North	20%	18%	20%	12%
CR 10 South	20%	27%	30%	34%
CR 9 East	20%	19%	20%	20%
CR 9 West	40%	36%	30%	34 %
Total	***100%***	***100%***	***100%***	***100%***

It is noted that there are some differences in the distribution of travel between the AM and PM peak hour periods. Some of this can be attributed to the different composition of trip purposes in each of the peak hour periods. The future AM peak hour will be comprised mostly of work trips and school trips. However, there will be a greater mix of other trip purposes during the PM peak hour.

Site traffic was assigned to adjacent roads and intersections based on the "shortest route" from the new subdivision to each of the "gateways".

4. FUTURE CONDITIONS

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4.1 Future Background Traffic

Future background traffic forecasts were developed for a 10 year planning horizon to 2032. It is assumed that site build out will occur over the next few years. The 10 year planning horizon will allow for planning approvals, build out of the study site and time for additional growth in background traffic. A 2% annual traffic growth rate is commonly applied to background traffic forecasts for traffic studies in Northumberland County. While it can overstate the historic growth rates in the more rural areas of the County, it is considered appropriate for use in these traffic studies. The 2% per year (compounded) traffic growth factor was applied to the 2021 design hour volumes as illustrated in *Exhibits 9A & 9B* to forecast 2032 weekday AM and PM background peak hour volumes.

4.2 Future Total Traffic

The 2032 total weekday peak hour volumes for the study road network were computed by adding the new subdivision traffic to 2032 background traffic. The new site traffic was distributed to the study road network based on the assumptions described in *Section 3.2*. The resulting total peak hour volumes are illustrated in *Exhibits 10A & 10B - 2032 Total Peak Hour Volumes*. The assigned site traffic volumes are also illustrated in these exhibits.

4.3 Weekday Site Traffic Impacts

Detailed intersection capacity analyses were carried out to assess the impact of future site traffic on the study intersections. This was done using current 2010 HCM intersection capacity analyses as contained in *Trafficware's Synchro 10* software. The weekday analyses were based on the 2032 total weekday peak hour volumes as illustrated in *Exhibits 10A & 10B*. *Table 3* below summarizes the weekday peak hour performance of the critical intersection movements in the six study intersections as measured by the three (3) HCM-defined measures of effectiveness (moe). The results of the 2021 capacity analyses have also been included in this summary table. This allows for a direct comparison in changes of LoS over the 11 year period from the 2021 Design Hour Volumes to the 2032 planning horizon.

In reviewing *Table 3* it can be seen that during weekday peak hour periods, future site traffic will have little impact on the overall performance of the adjacent intersections. During 2032 weekday peak hour periods, drivers passing through the six study intersections will face acceptable levels of delay.

Table 3: Summary – Study Intersections Critical Movement Capacity Analyses

Mill Street/CR 9						
	AM Peak Hour – Critical Movement			PM Peak Hour – Critical Movement		
	LoS (Delay)	Vol/Cap	Queue[A]	LoS (Delay)	Vol/Cap	Queue[A]
2021 Design Hr Vol	SB LTR "A/B" (10.0s)	0.01	0 veh	SB LTR "B" (11.3s)	0.01	0 veh
2032 Backgrd Vol	SB LTR "A/B" (10.4s)	0.01	0 veh	SB LTR "B" (12.2s)	0.01	0 veh
2032 Total Peak Hr	SB LTR "A/B" (10.6s)	0.01	0 veh	SB LTR "B" (12.5s)	0.01	0 veh
Site Entrance/CR 9						
	AM Peak Hour – Critical Movement			PM Peak Hour – Critical Movement		
	LoS (Delay)	Vol/Cap	Queue[A]	LoS (Delay)	Vol/Cap	Queue[A]
2032 Total Peak Hr	SB LR "A/B" (10.2s)	0.04	0.1 veh	SB LR "B" (12.2s)	0.04	0.1 veh
Woodland Ave/CR 9						
	AM Peak Hour – Critical Movement			PM Peak Hour – Critical Movement		
	LoS (Delay)	Vol/Cap	Queue[A]	LoS (Delay)	Vol/Cap	Queue[A]
2021 Design Hr Vol	SB LR "A/B" (9.4s)	0.01	0 veh	SB LR "A/B" (10.3s)	0.02	0.1 veh
2032 Backgrd Vol	SB LR "A/B" (9.7s)	0.02	0.1 veh	SB LR "A/B" (11.0s)	0.03	0.1 veh
2032 Total Peak Hr	SB LR "A/B" (9.8s)	0.02	0.1 veh	SB LR "B" (11.2s)	0.03	0.1 veh
CR 10/CR 9						
	AM Peak Hour – Critical Movement			PM Peak Hour – Critical Movement		
	LoS (Delay)	Vol/Cap	Queue[A]	LoS (Delay)	Vol/Cap	Queue[A]
2021 Design Hr Vol	SB LTR "B" (11.0s)	0.11	0.4 veh	NB LTR "B" (13.1s)	0.20	0.7 veh
2032 Backgrd Vol	SB LTR "B" (11.7s)	0.14	0.5 veh	NB LTR "B/C" (15.4s)	0.29	1.2 veh
2032 Total Peak Hr	SB LTR "B" (11.9s)	0.15	0.5 veh	NB LTR "C" (16.4s)	0.32	1.4 veh
Woodland Ave/CR 10						
	AM Peak Hour – Critical Movement			PM Peak Hour – Critical Movement		
	LoS (Delay)	Vol/Cap	Queue[A]	LoS (Delay)	Vol/Cap	Queue[A]
2021 Design Hr Vol	EB LR "A/B" (9.2s)	0.01	0 veh	EB LR "A/B" (9.3s)	0.01	0 veh
2032 Backgrd Vol	EB LR "A/B" (9.4s)	0.01	0 veh	EB LR "A/B" (9.3s)	0.01	0 veh
2032 Total Peak Hr	EB LR "A/B" (9.6s)	0.02	0 veh	EB LR "A/B" (9.6s)	0.01	0 veh
Frost Ave/Woodland Ave						
	AM Peak Hour – Critical Movement			PM Peak Hour – Critical Movement		
	LoS (Delay)	Vol/Cap	Queue[A]	LoS (Delay)	Vol/Cap	Queue[A]
2032 Backgrd Vol	EB LR "A" (8.6s)	0.003	0 veh	EB LR "A" (8.5s)	0.01	0 veh
2032 Total Peak Hr	EB LR "A" (8.6s)	0.01	0 veh	EB LR "A" (8.5s)	0.01	0 veh

A – Queue is the 95th percentile vehicle queue length measured in vehicles.

During future 2032 Total Peak Hour periods the critical turning movements at five of the six study intersections are forecast to operate at LoS "B" or better. This is considered to be a very good LoS for AM and PM peak hour conditions. The exception is the CR 10/CR 9 intersection. During the 2032 PM peak hour (total traffic) the northbound approach is forecast to operate at LoS "C" just beyond the boundary of LoS "B". This is considered a good LoS for suburban peak hour conditions. With a forecast maximum volume/capacity ratio of 0.32 on the south approach (northbound), there will be considerable residual capacity for future growth in site and background traffic.

In reviewing *Table 3,* it is noted that the combined growth in background traffic plus new site traffic during the 2032 PM peak hour will increase average driver delay about 1.0 second at the critical northbound movement at the CR 10/CR 9 intersection. The increase will be less for critical movements at the other five intersections. Based on the volume to capacity ratios listed in *Table 3* there will be considerable residual capacity in the adjacent intersections and road corridors to accommodate traffic from the *Garden Hill Estates Residential Subdivision*.

The critical southbound movement at the new site entrance from Street "A" to CR 9 is forecast to operate at LoS "B" or better during 2032 weekday peak hour periods. Drivers accessing the CR 9 will face acceptable levels of delay. There will be considerable residual capacity for future growth in background traffic on CR 9 corridor beyond the 2032 planning horizon.

Detailed printouts of the capacity analyses summarized in *Table 3* are included in the *Technical Appendix - Intersection Capacity Analyses*.

4.4 Auxiliary Lane Warrant Analyses

Auxiliary lane warrant analyses were carried out for each of the six study intersections to determine the need for auxiliary right and left turn lanes at the study intersections. Current *Ministry of Transportation Ontario* (MTO)/*Transportation Association of Canada* (TAC) criteria, standards, and procedures for the left turn lane warrant analyses were used for the assessments. The analyses were based on 2032 total peak hour volumes as illustrated in *Exhibits 10A & 10B*. Based these analyses there are no warrants for new left turn lanes at any of the existing study intersections. Details of the left turn lane analyses are contained in the *Technical Appendix – Auxiliary Lane Warrant Analyses*.

Current MTO/TAC standards and guidelines do not provide a specific warrant procedure for assessing the need for right turn tapers/lanes. Right turn lane warrant analyses were carried out for the six study intersections applying the current *Virginia Department of Transportation* (VDOT) right turn lane warrant procedures. This right turn lane warrant methodology has been used in a number of other traffic studies submitted to Northumberland County and the Municipality of Port Hope and found acceptable. The analyses were based on the forecast 2032 Total AM and PM peak hour volumes as illustrated in *Exhibits 10A* & *10B*. No warrant was found for new right turn lanes or tapers at the six study intersections for either 2032 weekday peak hour period. A summary of the right turn lane warrant analyses and a copies of the VDOT calculation sheet/nomographs used for the analyses are included in the *Technical Appendix – Auxiliary Lane Warrant Analyses.*

4.5 Future Site Access

Access to the *Garden Hill Estates Residential Subdivision* will be provided by a new local street, Street "A" running north from CR 9 (see *Exhibit 2*). At the County's request, the Street "A" intersection has been located to provide 200 m of separation from Mill Street[CO1], a local street located west of the new Street "A" intersection.

Street "A" will provide access to lots along the east side of the subdivision. This access will be supplemented with an eastern connection to Porter Crescent/CR 10 (see *Exhibit 3*). A new Street "B" connecting to Street "A" will provide access to lots on the western side of the subdivision. Both streets will terminate in culs-de-sac at the north end of the study site. The southeastern corner of the subdivision is separated from the main subdivision by a watercourse. This corner of the subdivision will contain a 10 unit apartment building. [CO2]Access to this part of the development will be provided by an extension of Frost Ave.

There are no sight line restrictions from Street "A" to the west along CR 9. There is clear visibility to the Mill Street intersection. To the east along CR 9 (see *Exhibit 4*) sight lines along CR 9 are reduced by a relatively short crest vertical curve. Field measurements were carried out by the study team to determine the available sight distance to the east. TAC criteria and field procedures were applied to measure available *Intersection Sight Distance* (ISD) and *Stopping Sight Distance* (SSD). The results of the field work are summarized in *Table 4* following:

Table 4: Summary Street "A" Sight Lines

Sight Line	Required (80 kph)	Available	Residual
SSD to East & to West	130 m	150+ m	20+ m
ISD to the West (Left Turn)	170 m	200+ m	30+ m
ISD to the East (Right Turn)	145 m	180+ m	35+ m

See TAC Reference[3].

[3] See Table 9.9.4, Chapt. 9, Geometric Design Guide for Canadian Roads, TAC pub., 2017

Given the available residual sight distances, the future Street "A" intersection will have acceptable sight lines along the CR 9 corridor. The new Street "A" entrance on the north side of CR 9 will likely require a "fill" approach (see *Exhibit 4*). The vertical alignment of the approach should include an appropriate "platform" for vehicles on the Street "A" approach to queue before entering CR 9.

Based on the auxiliary lane warrant analyses completed for the new Street "A"/CR 9 intersection, there will be no requirement for an eastbound left turn lane on CR 9 or a westbound right turn lane or taper. Right turn "roundings" with appropriate radiused curbing meeting County and Municipal standards, will accommodate vehicles entering/exiting Street "A" from CR 9. The curb[CO3] radii should be designed to accommodate delivery vehicles, municipal service vehicles, EMS vehicles, school buses and vehicles supporting handicapped access.

4.6 Active Transportation Links

The new subdivision will include pathways throughout the wetland compensation area and around the storm water retention pond(s) (see *Exhibit 2*). It is understood that the County is undertaking an Environmental Assessment (EA) study for the CR 9 corridor through Garden Hill. The County's current Transportation Master Plan (TMP) recommends that bike lanes be considered for any road reconstruction project. Plans for the new subdivision should consider appropriate active transportation connections within the new subdivision as well as connectivity to *Woodlands of Garden Hill* and the traditional areas of the Garden Hill Community including the General Store, Farmers Market, and Conservation Area. It is expected that concepts for future transportation links will be developed as part of the formal public consultation process to align with the requirements of the local residents and appropriate County and Municipal policies.

It is recommended that any active transportation linkages should be constructed during the first phase of site development so that they are available to new residents when they move into the subdivision. This will help to encourage non-auto travel for local trips within the community and reduce auto trip-dependency particularly during peak periods of traffic demand.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The following conclusions have been drawn from the traffic impact analyses completed for the proposed *Garden Hill Estates Residential Subdivision.* They include:

- The present (2021) study road network operates at a good LoS during weekday peak hour periods with residual capacity for future growth in traffic. Critical movements at the five study intersections during weekday peak hour periods operate a LoS “B” or better.
- Based on 2032 weekday peak hour conditions, no geometric improvements will be required at the five existing study intersections. The auxiliary lane warrant analyses for these intersections found that there is no requirement for either left turn lanes on or right turn tapers/lanes to support future 2032 peak hour traffic.
- The auxiliary lane warrant analyses for the new Street “A” site entrance intersection with CR 9 determined that there is no requirement for an eastbound left turn lane on CR 9 or a westbound right turn taper/lane to support access to new subdivision.
- Drivers accessing CR 9 from Street “A” at the new subdivision will experience acceptable delay when entering the CR 9 corridor.
- Based on an 80 kph design speed (20 kph over posted), available Intersection Sight Distance (ISD) and Stopping Sight Distance (SSD) at the new Street “A” entrance to CR 9 will meet/exceed current 2017 TAC requirements for both ISD and SSD.
- During future 2032 Total weekday peak hour periods, all traffic movements at the six study intersections are forecast to operate at Level of Service (LoS) "C" or better (see *Table 3*). This is considered a good LoS for peak hour traffic conditions.
- There will be considerable residual capacity at the study intersections to support future growth in traffic beyond the 2032 planning horizon.

5.2 Recommendations

The following recommendations have been developed from the study analyses and conclusions:

- The new subdivision access via Street “A”, Street “B” and the internal road intersections (see *Exhibit 2)*, should be constructed to current Northumberland County and Municipal of Port Hope standards for a local streets and intersections serving a rural residential subdivision.

- The Street “A” site entrance to CR 9 should be designed with appropriate curb radii, to accommodate commercial delivery vehicles, school buses, municipal service vehicles, EMS vehicles and vehicles supporting handicapped access.
- Active transportation links for the new subdivision should be developed to provide pedestrian/cycling facilities within the subdivision and connectivity to adjacent residential and commercial activities in the Garden Hill community. It is expected that planning for such facilities will be co-ordinated with the approving agencies and include community input.
- As required, all signage and pavement markings should be constructed in accordance with the guidance provided in th*e Ontario Traffic Manual* (OTM) an*d the Manual of Uniform Traffic Control Devices of Canada* (MUTCDC).

Study analyses have shown the existing road network has the capacity to accept future site traffic from the *Garden Hill Estates Residential Subdivision.* With the new site entrance and roadways constructed to current Northumberland County and Municipal of Port Hope standards, future site traffic will have an acceptable impact on adjacent roads and intersections. No other new road infrastructure will be required to support traffic from the *Garden Hill Estates Residential Subdivision.*

REPORT EXHIBITS

Exhibit 1
Key Map

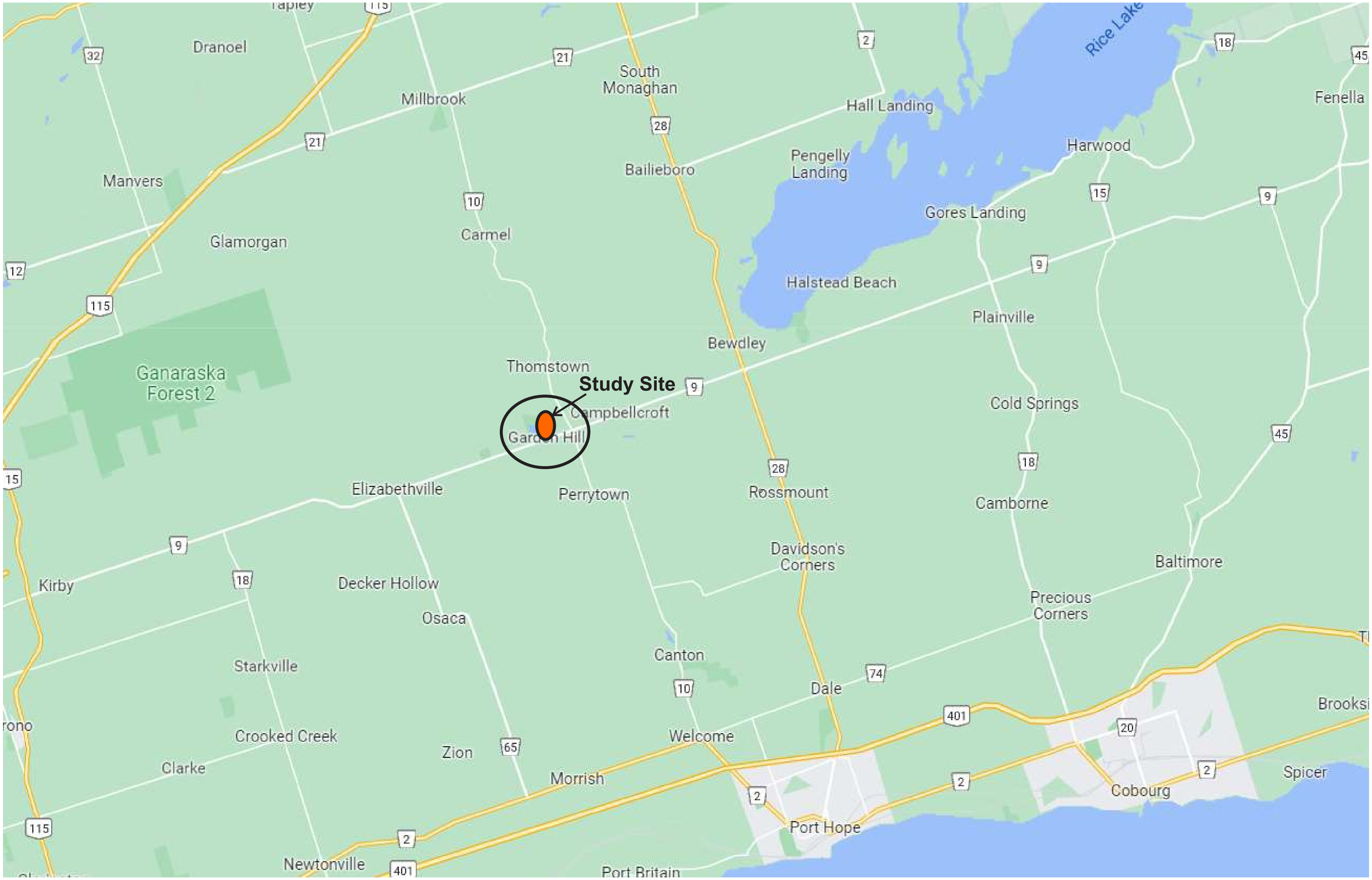


Exhibit 2

Preliminary Site Plan

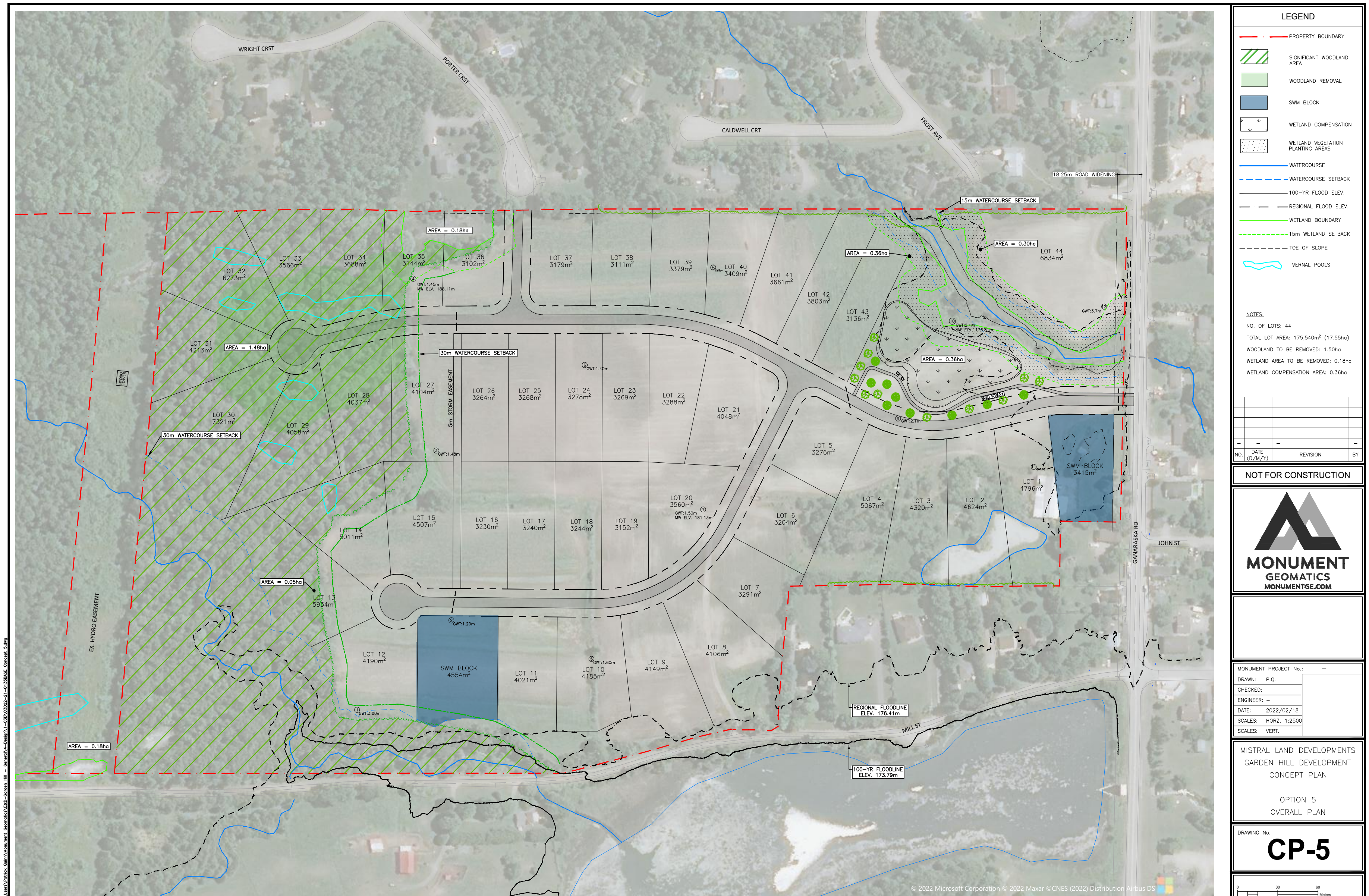


Exhibit 3
Site Context

Exhibit 4
CR 9 at Future Site Entrance

CR 9 Looking East from Future Site Entrance

CR 9 Looking West from Future Site Entrance

Exhibit 5
CR 10 and Woodland Ave

CR 10 Looking North at Woodland Ave

CR 10 Looking West at Woodland Ave

Exhibit 6
CR 9 and Mill Street

CR 9 at Mill St Looking East

Mill Street Looking North at CR 9

Exhibit 7
Woodland Ave and CR 9

CR 9 Looking North at Woodland Ave

CR 9 Looking West at Woodland Ave

Exhibit 8
CR 10 and CR 9

CR 9 Looking West at CR 10

CR 10 Looking North at CR 9

Exhibit 9A

2021 AM Peak Hour Volumes

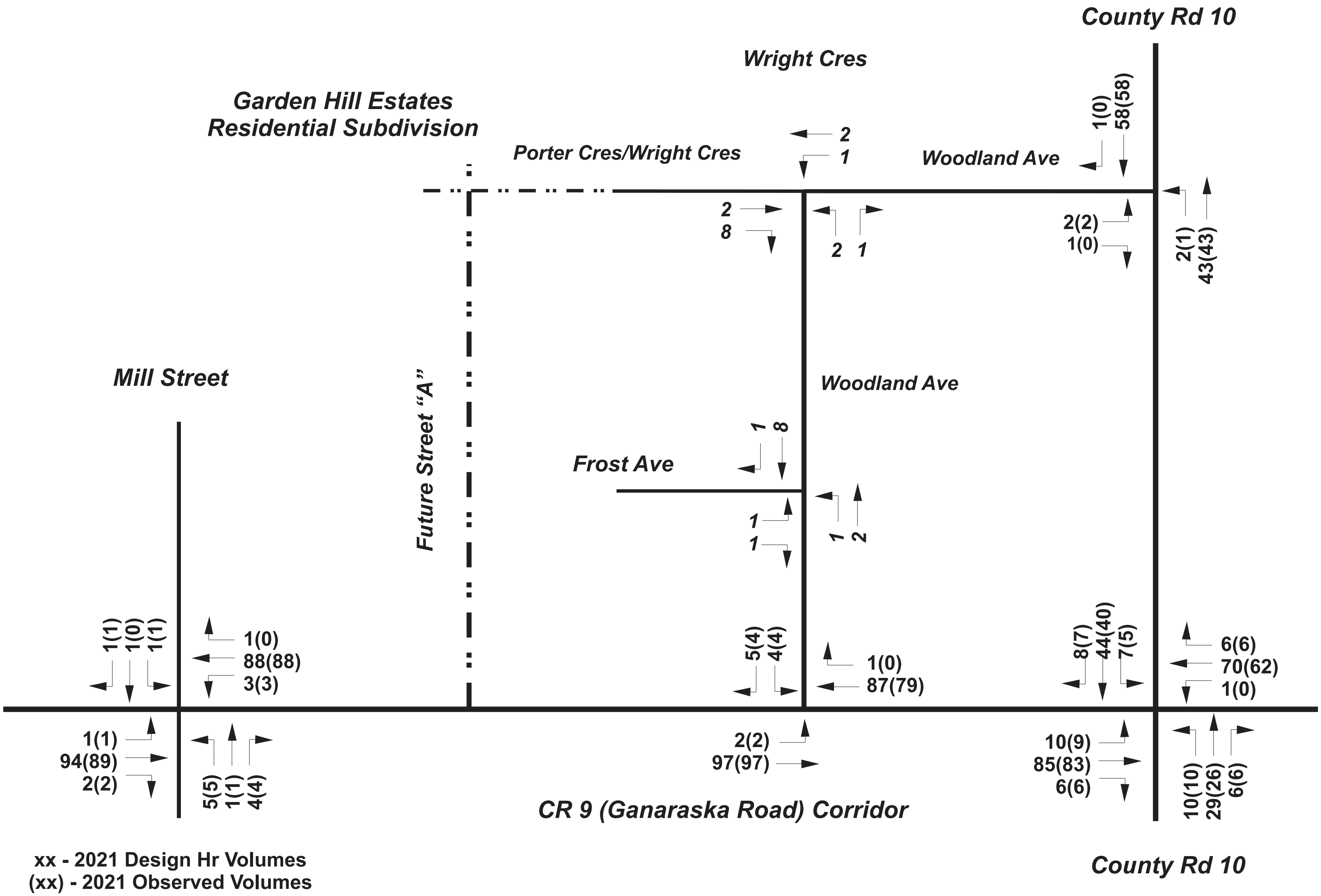
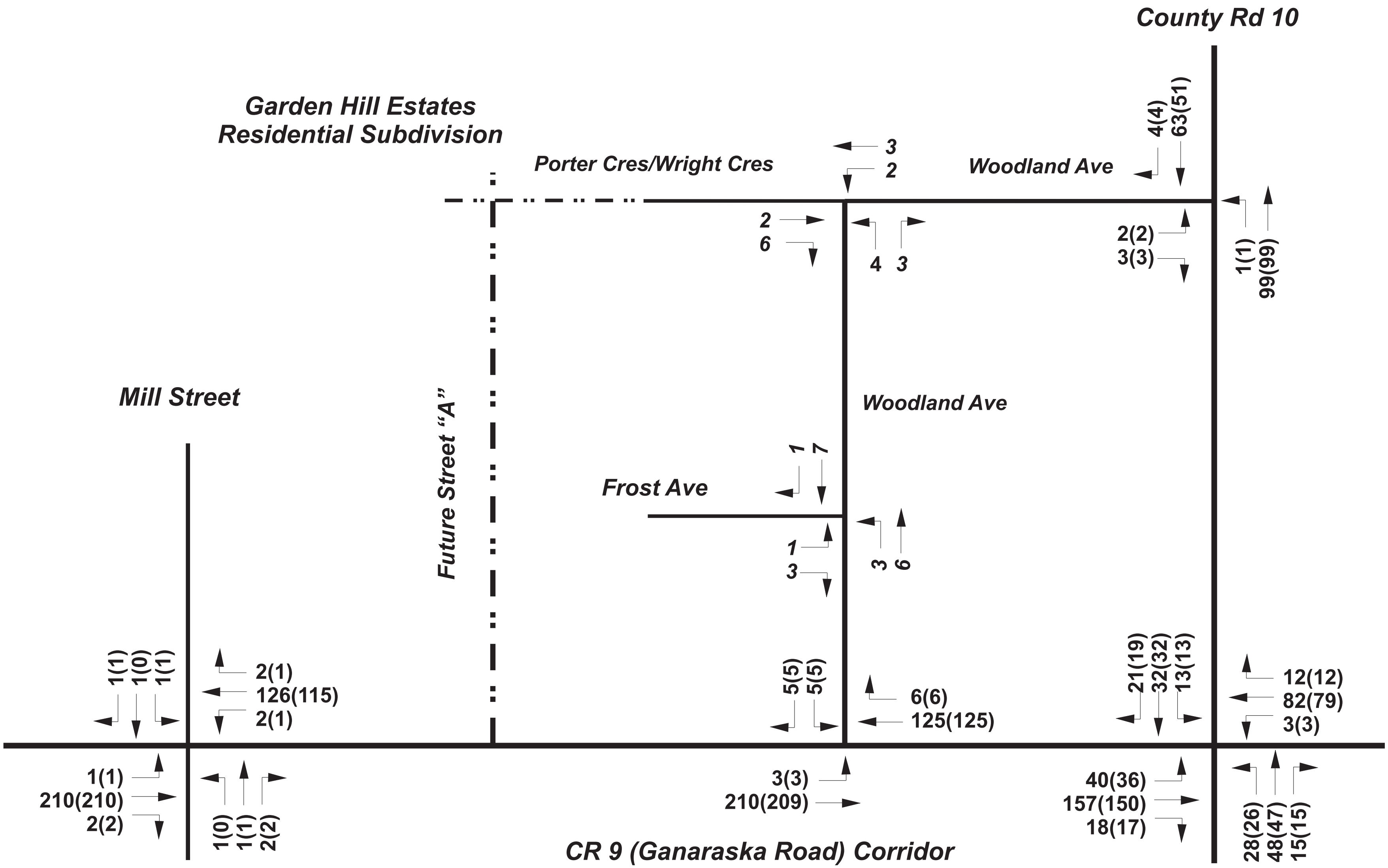
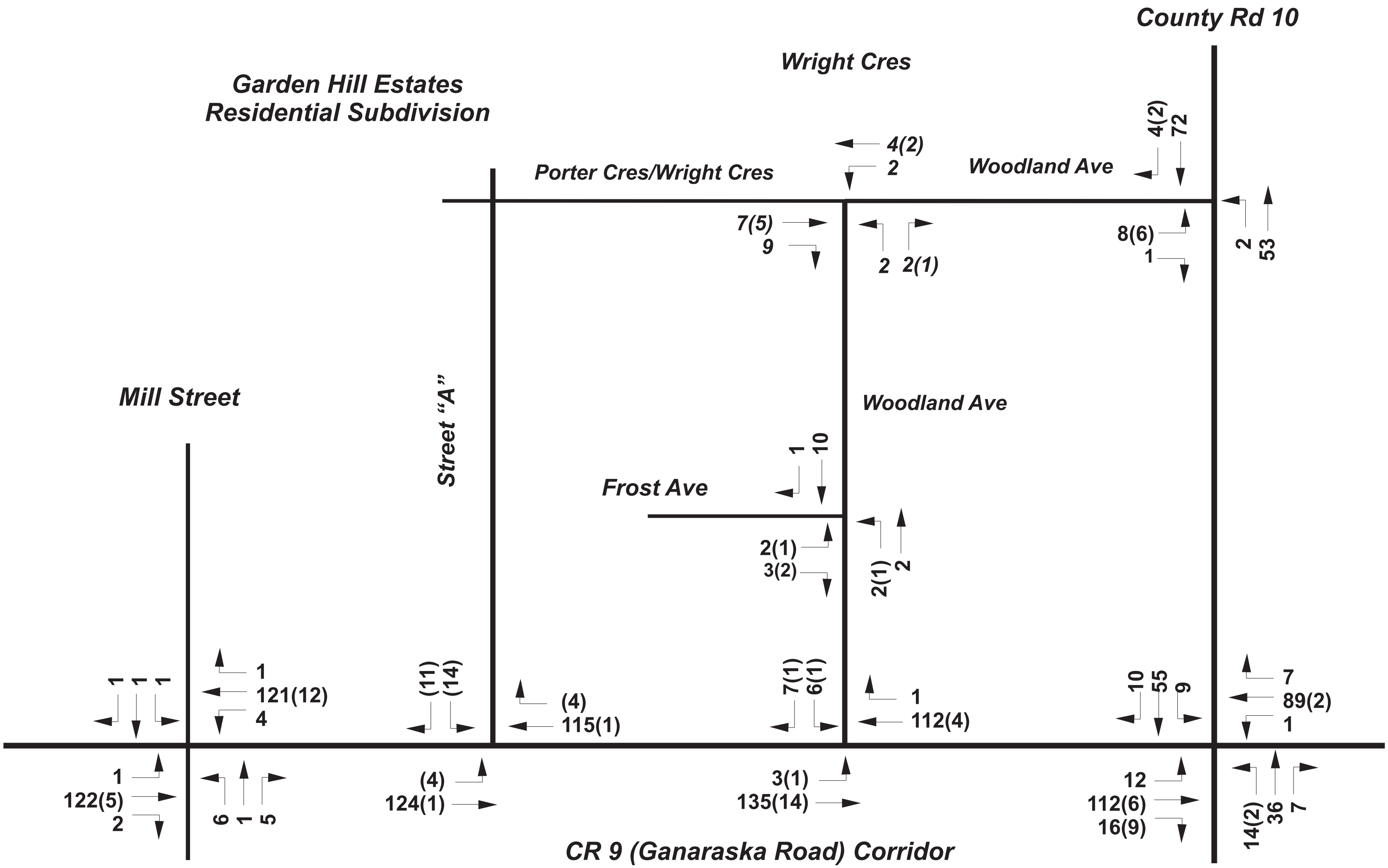


Exhibit 9B
2021 PM Peak Hour Volumes



xx - 2021 Design Hr Volumes
(xx) - 2021 Observed Volumes

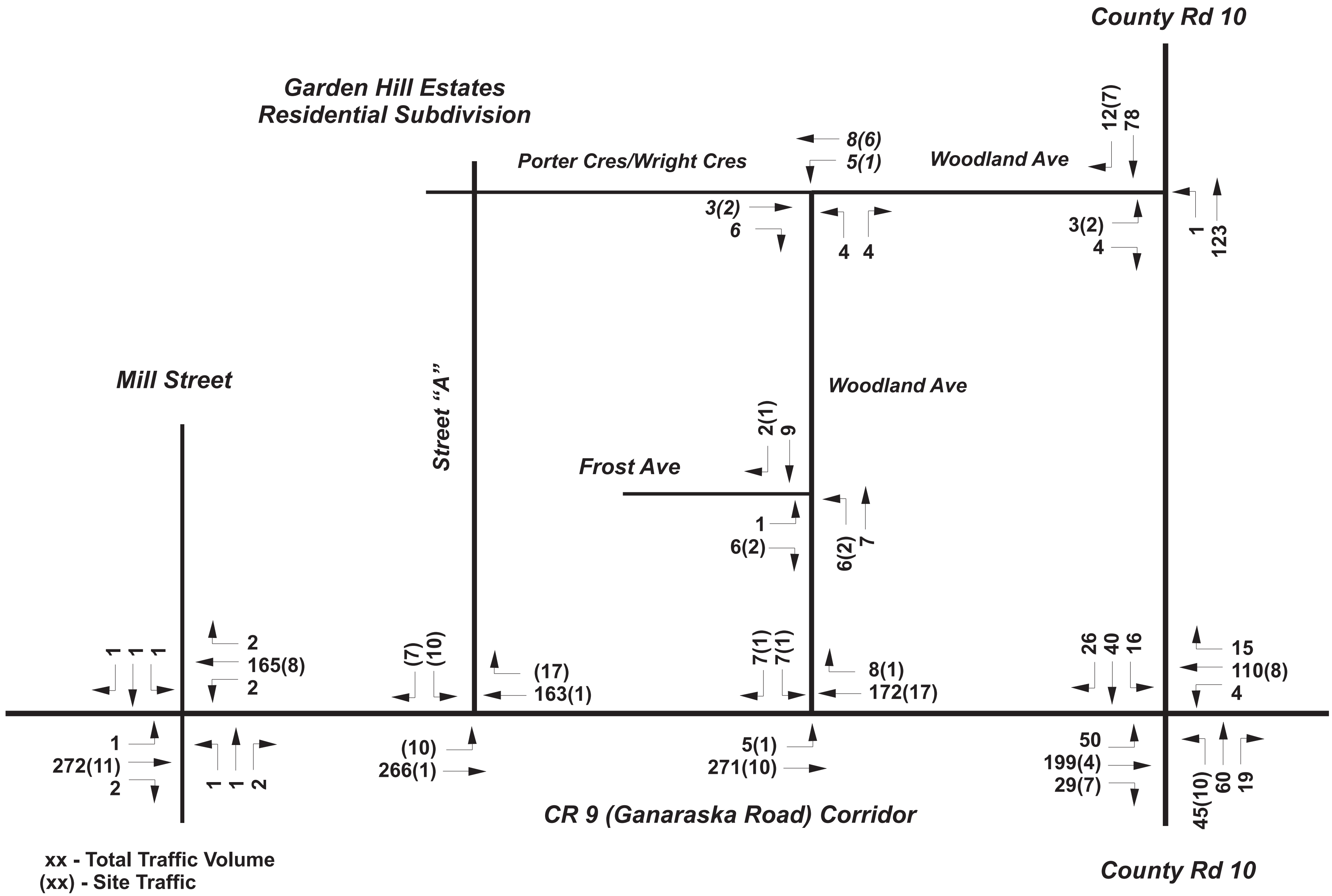
Exhibit 10A
2032 AM Total Peak Hour



xx - Total Traffic Volume
(xx) - Site Traffic

Exhibit 10B

2032 PM Total Peak Hour



TECHNICAL APPENDIX

Intersection Capacity Analyses

DEFINITION OF LEVELS OF SERVICE
Automobile Mode

UNSIGNALIZED INTERSECTIONS

Analysis of the Level of Service for unsignalized intersections is based on the ***Highway Capacity Manual*** *(HCM 2010)* procedures using current software for unsignalized intersections. The Level of Service for intersections is based on *Control Delay*. At two way stop controlled intersections (TWSC), *Control Delay* is the total elapsed time from a vehicle joining the queue until its departure from the stopped position at the head of the queue. The *Control Delay* includes the time required to decelerate to a stop and to accelerate to the free-flow speed.

The analysis of individual movements at TWSC intersections can also include the estimate of the ratio of volume or demand to available capacity for the movements. This is commonly know as the (v/c) ratio. The v/c ratio provides some indication of how well these individual intersection movements will function during peak hour periods.

Level of Service definitions for unsignalized intersections as defined by the ***Highway Capacity Manual*** are summarized in the table below.

Definition of Level of Service for Unsignalized Intersections
(see Exhibit 19-1, Highway Capacity Manual 2010)

Level of Service	Average Delay (seconds)
A	0 - 10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	More than 50s and/or v/c > 1

Level of Service (LoS) for a TWSC intersection is determined by the computed or measured *Control Delay* and is defined for each minor movement at the intersection. LoS is not defined for the major street approaches or the intersection as a whole. LoS "F" is considered to be undesirable for design or planning purposes. However, many individual turning movements at TWSC intersections and commercial entrances along urban arterial corridors operate at LoS "F" during peak hour periods.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	94	2	3	88	1	5	1	4	1	1	1
Future Vol, veh/h	1	94	2	3	88	1	5	1	4	1	1	1
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	3	-	-	-3	-	-	3	-	-	4	-
Peak Hour Factor	78	87	78	78	87	78	78	78	78	78	78	78
Heavy Vehicles, %	2	10	5	5	10	2	5	2	5	2	2	2
Mvmt Flow	1	108	3	4	101	1	6	1	5	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	107	0	0	116	0	0	233	232	120	235	233	112
Stage 1	-	-	-	-	-	-	117	117	-	115	115	-
Stage 2	-	-	-	-	-	-	116	115	-	120	118	-
Critical Hdwy	4.12	-	-	4.15	-	-	7.75	7.12	6.55	7.92	7.32	6.62
Critical Hdwy Stg 1	-	-	-	-	-	-	6.75	6.12	-	6.92	6.32	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.75	6.12	-	6.92	6.32	-
Follow-up Hdwy	2.218	-	-	2.245	-	-	3.545	4.018	3.345	3.518	4.018	3.318
Pot Cap-1 Maneuver	1484	-	-	1454	-	-	688	643	914	683	634	929
Stage 1	-	-	-	-	-	-	863	783	-	867	780	-
Stage 2	-	-	-	-	-	-	865	785	-	861	777	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1479	-	-	1449	-	-	678	636	907	671	627	922
Mov Cap-2 Maneuver	-	-	-	-	-	-	678	636	-	671	627	-
Stage 1	-	-	-	-	-	-	859	779	-	864	775	-
Stage 2	-	-	-	-	-	-	856	780	-	850	773	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.3	9.9	10
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	749	1479	-	-	1449	-	-	719
HCM Lane V/C Ratio	0.017	0.001	-	-	0.003	-	-	0.005
HCM Control Delay (s)	9.9	7.4	0	-	7.5	0	-	10
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	210	2	2	126	2	1	1	2	1	1	1
Future Vol, veh/h	1	210	2	2	126	2	1	1	2	1	1	1
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	3	-	-	-3	-	-	3	-	-	4	-
Peak Hour Factor	78	87	78	78	87	78	78	78	78	78	78	78
Heavy Vehicles, %	2	10	5	5	10	2	5	2	5	2	2	2
Mvmt Flow	1	241	3	3	145	3	1	1	3	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	153	0	0	249	0	0	409	409	253	410	409	157
Stage 1	-	-	-	-	-	-	250	250	-	158	158	-
Stage 2	-	-	-	-	-	-	159	159	-	252	251	-
Critical Hdwy	4.12	-	-	4.15	-	-	7.75	7.12	6.55	7.92	7.32	6.62
Critical Hdwy Stg 1	-	-	-	-	-	-	6.75	6.12	-	6.92	6.32	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.75	6.12	-	6.92	6.32	-
Follow-up Hdwy	2.218	-	-	2.245	-	-	3.545	4.018	3.345	3.518	4.018	3.318
Pot Cap-1 Maneuver	1428	-	-	1299	-	-	511	497	762	504	486	873
Stage 1	-	-	-	-	-	-	717	671	-	815	741	-
Stage 2	-	-	-	-	-	-	814	746	-	711	661	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1423	-	-	1294	-	-	504	492	756	496	481	867
Mov Cap-2 Maneuver	-	-	-	-	-	-	504	492	-	496	481	-
Stage 1	-	-	-	-	-	-	713	668	-	812	737	-
Stage 2	-	-	-	-	-	-	806	742	-	704	658	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	11.1	11.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	600	1423	-	-	1294	-	-	572
HCM Lane V/C Ratio	0.009	0.001	-	-	0.002	-	-	0.007
HCM Control Delay (s)	11.1	7.5	0	-	7.8	0	-	11.3
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	97	87	1	4	5
Future Vol, veh/h	2	97	87	1	4	5
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	3	-	2	-
Peak Hour Factor	78	87	87	78	78	78
Heavy Vehicles, %	2	10	10	2	2	2
Mvmt Flow	3	111	100	1	5	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	106	0	-	0	228	111
Stage 1	-	-	-	-	106	-
Stage 2	-	-	-	-	122	-
Critical Hdwy	4.12	-	-	-	6.82	6.42
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1485	-	-	-	741	936
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	891	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1479	-	-	-	734	928
Mov Cap-2 Maneuver	-	-	-	-	734	-
Stage 1	-	-	-	-	903	-
Stage 2	-	-	-	-	887	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1479	-	-	-	830
HCM Lane V/C Ratio	0.002	-	-	-	0.014
HCM Control Delay (s)	7.4	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	210	125	6	5	5
Future Vol, veh/h	3	210	125	6	5	5
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	3	-	2	-
Peak Hour Factor	78	87	87	78	78	78
Heavy Vehicles, %	2	10	10	2	2	2
Mvmt Flow	4	241	144	8	6	6

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	157	0	-	0	407	158
Stage 1	-	-	-	-	153	-
Stage 2	-	-	-	-	254	-
Critical Hdwy	4.12	-	-	-	6.82	6.42
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1423	-	-	-	574	880
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	766	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1417	-	-	-	568	873
Mov Cap-2 Maneuver	-	-	-	-	568	-
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	763	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1417	-	-	-	688
HCM Lane V/C Ratio	0.003	-	-	-	0.019
HCM Control Delay (s)	7.5	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	85	6	1	70	6	10	29	6	7	44	8
Future Vol, veh/h	10	85	6	1	70	6	10	29	6	7	44	8
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	-3	-	-	2	-
Peak Hour Factor	83	87	83	83	87	83	83	83	83	83	83	83
Heavy Vehicles, %	5	10	5	5	10	5	5	5	5	5	5	5
Mvmt Flow	12	98	7	1	80	7	12	35	7	8	53	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	92	0	0	110	0	0	253	225	112	243	225	94
Stage 1	-	-	-	-	-	-	131	131	-	91	91	-
Stage 2	-	-	-	-	-	-	122	94	-	152	134	-
Critical Hdwy	4.15	-	-	4.15	-	-	6.55	5.95	5.95	7.55	6.95	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	5.55	4.95	-	6.55	5.95	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.55	4.95	-	6.55	5.95	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1484	-	-	1462	-	-	724	694	942	686	652	950
Stage 1	-	-	-	-	-	-	884	799	-	900	806	-
Stage 2	-	-	-	-	-	-	893	824	-	829	768	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1478	-	-	1456	-	-	661	682	934	644	640	942
Mov Cap-2 Maneuver	-	-	-	-	-	-	661	682	-	644	640	-
Stage 1	-	-	-	-	-	-	873	789	-	888	802	-
Stage 2	-	-	-	-	-	-	821	820	-	776	758	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.8			0.1			10.6			11		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	702	1478	-	-	1456	-	-	670
HCM Lane V/C Ratio	0.077	0.008	-	-	0.001	-	-	0.106
HCM Control Delay (s)	10.6	7.5	0	-	7.5	0	-	11
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.4

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	157	18	3	82	12	28	48	15	13	32	21
Future Vol, veh/h	40	157	18	3	82	12	28	48	15	13	32	21
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	-3	-	-	2	-
Peak Hour Factor	83	87	83	83	87	83	83	83	83	83	83	83
Heavy Vehicles, %	5	10	5	5	10	5	5	5	5	5	5	5
Mvmt Flow	48	180	22	4	94	14	34	58	18	16	39	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	113	0	0	207	0	0	438	413	201	444	417	111
Stage 1	-	-	-	-	-	-	292	292	-	114	114	-
Stage 2	-	-	-	-	-	-	146	121	-	330	303	-
Critical Hdwy	4.15	-	-	4.15	-	-	6.55	5.95	5.95	7.55	6.95	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	5.55	4.95	-	6.55	5.95	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.55	4.95	-	6.55	5.95	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1458	-	-	1346	-	-	563	562	846	494	498	928
Stage 1	-	-	-	-	-	-	745	699	-	872	785	-
Stage 2	-	-	-	-	-	-	871	806	-	653	636	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1452	-	-	1341	-	-	494	535	839	427	474	920
Mov Cap-2 Maneuver	-	-	-	-	-	-	494	535	-	427	474	-
Stage 1	-	-	-	-	-	-	714	670	-	836	780	-
Stage 2	-	-	-	-	-	-	799	800	-	560	610	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.2	13.1	12.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	554	1452	-	-	1341	-	-	546
HCM Lane V/C Ratio	0.198	0.033	-	-	0.003	-	-	0.146
HCM Control Delay (s)	13.1	7.6	0	-	7.7	0	-	12.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Vol, veh/h	2	1	58	1	2	43
Future Vol, veh/h	2	1	58	1	2	43
Conflicting Peds, #/hr	5	5	0	5	5	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, %	2	-	-2	-	-	2
Peak Hour Factor	78	78	83	78	78	83
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	3	1	70	1	3	52

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	139	81	0	0	76	0
Stage 1	76	-	-	-	-	-
Stage 2	63	-	-	-	-	-
Critical Hdwy	6.9	6.5	-	-	4.2	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.29	-
Pot Cap-1 Maneuver	823	953	-	-	1474	-
Stage 1	919	-	-	-	-	-
Stage 2	933	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	815	946	-	-	1468	-
Mov Cap-2 Maneuver	815	-	-	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	927	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	9.2	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	1468	-	854	-	-
HCM Lane V/C Ratio	0.002	-	0.005	-	-
HCM Control Delay (s)	7.5	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Vol, veh/h	2	3	63	4	1	99
Future Vol, veh/h	2	3	63	4	1	99
Conflicting Peds, #/hr	5	5	0	5	5	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, %	2	-	-2	-	-	2
Peak Hour Factor	78	78	83	78	78	83
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	3	4	76	5	1	119

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	210	89	0	0	86	0
Stage 1	84	-	-	-	-	-
Stage 2	126	-	-	-	-	-
Critical Hdwy	6.9	6.5	-	-	4.2	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.29	-
Pot Cap-1 Maneuver	743	943	-	-	1461	-
Stage 1	911	-	-	-	-	-
Stage 2	868	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	736	936	-	-	1455	-
Mov Cap-2 Maneuver	736	-	-	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	864	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	9.3	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	1455	-	844	-	-
HCM Lane V/C Ratio	0.001	-	0.008	-	-
HCM Control Delay (s)	7.5	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	1	1	2	8	1
Future Vol, veh/h	1	1	1	2	8	1
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-4	-	-	2	-2	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	1	1	3	10	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	26	21	16	0	-	0
Stage 1	16	-	-	-	-	-
Stage 2	10	-	-	-	-	-
Critical Hdwy	5.62	5.82	4.12	-	-	-
Critical Hdwy Stg 1	4.62	-	-	-	-	-
Critical Hdwy Stg 2	4.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	995	1059	1602	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	1015	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	986	1051	1596	-	-	-
Mov Cap-2 Maneuver	986	-	-	-	-	-
Stage 1	1005	-	-	-	-	-
Stage 2	1011	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	2.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1596	-	1017	-	-
HCM Lane V/C Ratio	0.001	-	0.003	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	117	2	4	109	1	6	1	5	1	1	1
Future Vol, veh/h	1	117	2	4	109	1	6	1	5	1	1	1
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	3	-	-	-3	-	-	3	-	-	4	-
Peak Hour Factor	78	87	78	78	87	78	78	78	78	78	78	78
Heavy Vehicles, %	2	10	5	5	10	2	5	2	5	2	2	2
Mvmt Flow	1	134	3	5	125	1	8	1	6	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	131	0	0	142	0	0	285	284	146	287	285	136
Stage 1	-	-	-	-	-	-	143	143	-	141	141	-
Stage 2	-	-	-	-	-	-	142	141	-	146	144	-
Critical Hdwy	4.12	-	-	4.15	-	-	7.75	7.12	6.55	7.92	7.32	6.62
Critical Hdwy Stg 1	-	-	-	-	-	-	6.75	6.12	-	6.92	6.32	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.75	6.12	-	6.92	6.32	-
Follow-up Hdwy	2.218	-	-	2.245	-	-	3.545	4.018	3.345	3.518	4.018	3.318
Pot Cap-1 Maneuver	1454	-	-	1423	-	-	631	596	882	624	586	899
Stage 1	-	-	-	-	-	-	833	760	-	835	756	-
Stage 2	-	-	-	-	-	-	834	762	-	829	753	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1449	-	-	1418	-	-	622	589	875	612	579	892
Mov Cap-2 Maneuver	-	-	-	-	-	-	622	589	-	612	579	-
Stage 1	-	-	-	-	-	-	829	756	-	832	751	-
Stage 2	-	-	-	-	-	-	825	757	-	817	749	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.3	10.2	10.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	703	1449	-	-	1418	-	-	669
HCM Lane V/C Ratio	0.022	0.001	-	-	0.004	-	-	0.006
HCM Control Delay (s)	10.2	7.5	0	-	7.5	0	-	10.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	261	2	2	157	2	1	1	2	1	1	1
Future Vol, veh/h	1	261	2	2	157	2	1	1	2	1	1	1
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	3	-	-	-3	-	-	3	-	-	4	-
Peak Hour Factor	78	87	78	78	87	78	78	78	78	78	78	78
Heavy Vehicles, %	2	10	5	5	10	2	5	2	5	2	2	2
Mvmt Flow	1	300	3	3	180	3	1	1	3	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	188	0	0	308	0	0	503	503	312	504	503	192
Stage 1	-	-	-	-	-	-	309	309	-	193	193	-
Stage 2	-	-	-	-	-	-	194	194	-	311	310	-
Critical Hdwy	4.12	-	-	4.15	-	-	7.75	7.12	6.55	7.92	7.32	6.62
Critical Hdwy Stg 1	-	-	-	-	-	-	6.75	6.12	-	6.92	6.32	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.75	6.12	-	6.92	6.32	-
Follow-up Hdwy	2.218	-	-	2.245	-	-	3.545	4.018	3.345	3.518	4.018	3.318
Pot Cap-1 Maneuver	1386	-	-	1236	-	-	436	433	703	428	421	832
Stage 1	-	-	-	-	-	-	660	626	-	775	710	-
Stage 2	-	-	-	-	-	-	775	717	-	653	615	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1382	-	-	1232	-	-	429	428	698	421	416	826
Mov Cap-2 Maneuver	-	-	-	-	-	-	429	428	-	421	416	-
Stage 1	-	-	-	-	-	-	657	623	-	772	706	-
Stage 2	-	-	-	-	-	-	767	713	-	646	612	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	11.8	12.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	531	1382	-	-	1232	-	-	501
HCM Lane V/C Ratio	0.01	0.001	-	-	0.002	-	-	0.008
HCM Control Delay (s)	11.8	7.6	0	-	7.9	0	-	12.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	121	108	1	5	6
Future Vol, veh/h	2	121	108	1	5	6
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	3	-	2	-
Peak Hour Factor	78	87	87	78	78	78
Heavy Vehicles, %	2	10	10	2	2	2
Mvmt Flow	3	139	124	1	6	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	130	0	-	0	280	135
Stage 1	-	-	-	-	130	-
Stage 2	-	-	-	-	150	-
Critical Hdwy	4.12	-	-	-	6.82	6.42
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1455	-	-	-	688	907
Stage 1	-	-	-	-	883	-
Stage 2	-	-	-	-	863	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1449	-	-	-	681	899
Mov Cap-2 Maneuver	-	-	-	-	681	-
Stage 1	-	-	-	-	878	-
Stage 2	-	-	-	-	860	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1449	-	-	-	785
HCM Lane V/C Ratio	0.002	-	-	-	0.018
HCM Control Delay (s)	7.5	0	-	-	9.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	261	155	7	6	6
Future Vol, veh/h	4	261	155	7	6	6
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	3	-	2	-
Peak Hour Factor	78	87	87	78	78	78
Heavy Vehicles, %	2	10	10	2	2	2
Mvmt Flow	5	300	178	9	8	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	192	0	-	0	503	193
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	315	-
Critical Hdwy	4.12	-	-	-	6.82	6.42
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1381	-	-	-	500	839
Stage 1	-	-	-	-	827	-
Stage 2	-	-	-	-	714	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1375	-	-	-	494	832
Mov Cap-2 Maneuver	-	-	-	-	494	-
Stage 1	-	-	-	-	820	-
Stage 2	-	-	-	-	711	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1375	-	-	-	620
HCM Lane V/C Ratio	0.004	-	-	-	0.025
HCM Control Delay (s)	7.6	0	-	-	11
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	106	7	1	87	7	12	36	7	9	55	10
Future Vol, veh/h	12	106	7	1	87	7	12	36	7	9	55	10
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	-3	-	-	2	-
Peak Hour Factor	83	87	83	83	87	83	83	83	83	83	83	83
Heavy Vehicles, %	5	10	5	5	10	5	5	5	5	5	5	5
Mvmt Flow	14	122	8	1	100	8	14	43	8	11	66	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	113	0	0	135	0	0	309	274	136	296	274	114
Stage 1	-	-	-	-	-	-	159	159	-	111	111	-
Stage 2	-	-	-	-	-	-	150	115	-	185	163	-
Critical Hdwy	4.15	-	-	4.15	-	-	6.55	5.95	5.95	7.55	6.95	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	5.55	4.95	-	6.55	5.95	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.55	4.95	-	6.55	5.95	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1458	-	-	1431	-	-	671	657	915	629	609	925
Stage 1	-	-	-	-	-	-	859	781	-	876	788	-
Stage 2	-	-	-	-	-	-	867	810	-	793	744	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1452	-	-	1425	-	-	596	645	908	581	597	918
Mov Cap-2 Maneuver	-	-	-	-	-	-	596	645	-	581	597	-
Stage 1	-	-	-	-	-	-	847	770	-	864	784	-
Stage 2	-	-	-	-	-	-	779	806	-	731	734	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.1	11.1	11.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	657	1452	-	-	1425	-	-	624
HCM Lane V/C Ratio	0.101	0.01	-	-	0.001	-	-	0.143
HCM Control Delay (s)	11.1	7.5	0	-	7.5	0	-	11.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	195	22	4	102	15	35	60	19	16	40	26
Future Vol, veh/h	50	195	22	4	102	15	35	60	19	16	40	26
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	-3	-	-	2	-
Peak Hour Factor	83	87	83	83	87	83	83	83	83	83	83	83
Heavy Vehicles, %	5	10	5	5	10	5	5	5	5	5	5	5
Mvmt Flow	60	224	27	5	117	18	42	72	23	19	48	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	140	0	0	256	0	0	544	513	248	551	517	136
Stage 1	-	-	-	-	-	-	363	363	-	141	141	-
Stage 2	-	-	-	-	-	-	181	150	-	410	376	-
Critical Hdwy	4.15	-	-	4.15	-	-	6.55	5.95	5.95	7.55	6.95	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	5.55	4.95	-	6.55	5.95	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.55	4.95	-	6.55	5.95	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1425	-	-	1292	-	-	487	502	800	414	432	898
Stage 1	-	-	-	-	-	-	690	658	-	842	762	-
Stage 2	-	-	-	-	-	-	839	787	-	585	586	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1419	-	-	1287	-	-	407	472	794	338	406	891
Mov Cap-2 Maneuver	-	-	-	-	-	-	407	472	-	338	406	-
Stage 1	-	-	-	-	-	-	653	623	-	797	756	-
Stage 2	-	-	-	-	-	-	752	781	-	476	555	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.3	15.4	14.7
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	481	1419	-	-	1287	-	-	468
HCM Lane V/C Ratio	0.286	0.042	-	-	0.004	-	-	0.211
HCM Control Delay (s)	15.4	7.6	0	-	7.8	0	-	14.7
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0	-	-	0.8

Intersection						
Int Delay, s/veh	0.4					

Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Vol, veh/h	2	1	72	2	2	53
Future Vol, veh/h	2	1	72	2	2	53
Conflicting Peds, #/hr	5	5	0	5	5	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, %	2	-	-2	-	-	2
Peak Hour Factor	78	78	83	78	78	83
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	3	1	87	3	3	64

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	169	99	0	0	95	0
Stage 1	94	-	-	-	-	-
Stage 2	75	-	-	-	-	-
Critical Hdwy	6.9	6.5	-	-	4.2	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.29	-
Pot Cap-1 Maneuver	788	930	-	-	1450	-
Stage 1	901	-	-	-	-	-
Stage 2	920	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	780	923	-	-	1444	-
Mov Cap-2 Maneuver	780	-	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	914	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	9.4	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	1444	-	822	-	-
HCM Lane V/C Ratio	0.002	-	0.005	-	-
HCM Control Delay (s)	7.5	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Vol, veh/h	1	4	78	5	1	123
Future Vol, veh/h	1	4	78	5	1	123
Conflicting Peds, #/hr	5	5	0	5	5	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, %	2	-	-2	-	-	2
Peak Hour Factor	78	78	83	78	78	83
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	1	5	94	6	1	148

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	257	107	0	0	105	0
Stage 1	102	-	-	-	-	-
Stage 2	155	-	-	-	-	-
Critical Hdwy	6.9	6.5	-	-	4.2	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.29	-
Pot Cap-1 Maneuver	695	920	-	-	1438	-
Stage 1	892	-	-	-	-	-
Stage 2	839	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	689	913	-	-	1432	-
Mov Cap-2 Maneuver	689	-	-	-	-	-
Stage 1	888	-	-	-	-	-
Stage 2	835	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	9.2	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	1432	-	857	-	-
HCM Lane V/C Ratio	0.001	-	0.007	-	-
HCM Control Delay (s)	7.5	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	1	1	2	10	1
Future Vol, veh/h	1	1	1	2	10	1
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-4	-	-	2	-2	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	1	1	3	13	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	29	24	19	0	-	0
Stage 1	19	-	-	-	-	-
Stage 2	10	-	-	-	-	-
Critical Hdwy	5.62	5.82	4.12	-	-	-
Critical Hdwy Stg 1	4.62	-	-	-	-	-
Critical Hdwy Stg 2	4.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	992	1055	1597	-	-	-
Stage 1	1008	-	-	-	-	-
Stage 2	1015	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	983	1047	1591	-	-	-
Mov Cap-2 Maneuver	983	-	-	-	-	-
Stage 1	1003	-	-	-	-	-
Stage 2	1011	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	2.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1591	-	1014	-	-
HCM Lane V/C Ratio	0.001	-	0.003	-	-
HCM Control Delay (s)	7.3	0	8.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	4	4	7	9	1
Future Vol, veh/h	1	4	4	7	9	1
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-4	-	-	2	-2	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	5	5	9	12	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	42	23	18	0	-	0
Stage 1	18	-	-	-	-	-
Stage 2	24	-	-	-	-	-
Critical Hdwy	5.62	5.82	4.12	-	-	-
Critical Hdwy Stg 1	4.62	-	-	-	-	-
Critical Hdwy Stg 2	4.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	978	1057	1599	-	-	-
Stage 1	1009	-	-	-	-	-
Stage 2	1004	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	967	1049	1593	-	-	-
Mov Cap-2 Maneuver	967	-	-	-	-	-
Stage 1	1002	-	-	-	-	-
Stage 2	1000	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	2.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1593	-	1032	-	-
HCM Lane V/C Ratio	0.003	-	0.006	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	122	2	4	121	1	6	1	5	1	1	1
Future Vol, veh/h	1	122	2	4	121	1	6	1	5	1	1	1
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	3	-	-	-3	-	-	3	-	-	4	-
Peak Hour Factor	78	87	78	78	87	78	78	78	78	78	78	78
Heavy Vehicles, %	2	10	5	5	10	2	5	2	5	2	2	2
Mvmt Flow	1	140	3	5	139	1	8	1	6	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	145	0	0	148	0	0	305	304	152	307	305	150
Stage 1	-	-	-	-	-	-	149	149	-	155	155	-
Stage 2	-	-	-	-	-	-	156	155	-	152	150	-
Critical Hdwy	4.12	-	-	4.15	-	-	7.75	7.12	6.55	7.92	7.32	6.62
Critical Hdwy Stg 1	-	-	-	-	-	-	6.75	6.12	-	6.92	6.32	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.75	6.12	-	6.92	6.32	-
Follow-up Hdwy	2.218	-	-	2.245	-	-	3.545	4.018	3.345	3.518	4.018	3.318
Pot Cap-1 Maneuver	1437	-	-	1415	-	-	610	579	875	603	569	882
Stage 1	-	-	-	-	-	-	826	755	-	819	743	-
Stage 2	-	-	-	-	-	-	818	750	-	822	748	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1432	-	-	1410	-	-	601	572	868	591	562	875
Mov Cap-2 Maneuver	-	-	-	-	-	-	601	572	-	591	562	-
Stage 1	-	-	-	-	-	-	822	751	-	816	738	-
Stage 2	-	-	-	-	-	-	809	745	-	810	744	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.3	10.4	10.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	686	1432	-	-	1410	-	-	650
HCM Lane V/C Ratio	0.022	0.001	-	-	0.004	-	-	0.006
HCM Control Delay (s)	10.4	7.5	0	-	7.6	0	-	10.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	272	2	2	165	2	1	1	2	1	1	1
Future Vol, veh/h	1	272	2	2	165	2	1	1	2	1	1	1
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	3	-	-	-3	-	-	3	-	-	4	-
Peak Hour Factor	78	87	78	78	87	78	78	78	78	78	78	78
Heavy Vehicles, %	2	10	5	5	10	2	5	2	5	2	2	2
Mvmt Flow	1	313	3	3	190	3	1	1	3	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	198	0	0	321	0	0	526	526	325	527	526	202
Stage 1	-	-	-	-	-	-	322	322	-	203	203	-
Stage 2	-	-	-	-	-	-	204	204	-	324	323	-
Critical Hdwy	4.12	-	-	4.15	-	-	7.75	7.12	6.55	7.92	7.32	6.62
Critical Hdwy Stg 1	-	-	-	-	-	-	6.75	6.12	-	6.92	6.32	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.75	6.12	-	6.92	6.32	-
Follow-up Hdwy	2.218	-	-	2.245	-	-	3.545	4.018	3.345	3.518	4.018	3.318
Pot Cap-1 Maneuver	1375	-	-	1222	-	-	419	419	690	411	407	820
Stage 1	-	-	-	-	-	-	648	617	-	764	701	-
Stage 2	-	-	-	-	-	-	765	708	-	640	605	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1371	-	-	1218	-	-	413	414	685	404	403	814
Mov Cap-2 Maneuver	-	-	-	-	-	-	413	414	-	404	403	-
Stage 1	-	-	-	-	-	-	645	614	-	761	697	-
Stage 2	-	-	-	-	-	-	757	704	-	633	602	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	12	12.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	516	1371	-	-	1218	-	-	485
HCM Lane V/C Ratio	0.01	0.001	-	-	0.002	-	-	0.008
HCM Control Delay (s)	12	7.6	0	-	8	0	-	12.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	124	115	4	14	11
Future Vol, veh/h	4	124	115	4	14	11
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	3	-	3	-
Peak Hour Factor	78	78	87	78	78	87
Heavy Vehicles, %	2	10	10	2	2	2
Mvmt Flow	5	159	132	5	18	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	142	0	-	0	314	145
Stage 1	-	-	-	-	140	-
Stage 2	-	-	-	-	174	-
Critical Hdwy	4.12	-	-	-	7.02	6.52
Critical Hdwy Stg 1	-	-	-	-	6.02	-
Critical Hdwy Stg 2	-	-	-	-	6.02	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1441	-	-	-	644	891
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	832	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1435	-	-	-	636	884
Mov Cap-2 Maneuver	-	-	-	-	636	-
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	829	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1435	-	-	-	719
HCM Lane V/C Ratio	0.004	-	-	-	0.043
HCM Control Delay (s)	7.5	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	266	163	17	10	7
Future Vol, veh/h	10	266	163	17	10	7
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	3	-	3	-
Peak Hour Factor	78	78	87	78	78	87
Heavy Vehicles, %	2	10	10	2	2	2
Mvmt Flow	13	341	187	22	13	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	214	0	-	0	575	208
Stage 1	-	-	-	-	203	-
Stage 2	-	-	-	-	372	-
Critical Hdwy	4.12	-	-	-	7.02	6.52
Critical Hdwy Stg 1	-	-	-	-	6.02	-
Critical Hdwy Stg 2	-	-	-	-	6.02	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1356	-	-	-	436	818
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	655	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1351	-	-	-	427	811
Mov Cap-2 Maneuver	-	-	-	-	427	-
Stage 1	-	-	-	-	790	-
Stage 2	-	-	-	-	652	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	12.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1351	-	-	-	522
HCM Lane V/C Ratio	0.009	-	-	-	0.04
HCM Control Delay (s)	7.7	0	-	-	12.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	135	112	1	6	7
Future Vol, veh/h	3	135	112	1	6	7
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	3	-	2	-
Peak Hour Factor	78	87	87	78	78	78
Heavy Vehicles, %	2	10	10	2	2	2
Mvmt Flow	4	155	129	1	8	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	135	0	-	0	303	140
Stage 1	-	-	-	-	135	-
Stage 2	-	-	-	-	168	-
Critical Hdwy	4.12	-	-	-	6.82	6.42
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1449	-	-	-	666	901
Stage 1	-	-	-	-	878	-
Stage 2	-	-	-	-	846	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1443	-	-	-	659	893
Mov Cap-2 Maneuver	-	-	-	-	659	-
Stage 1	-	-	-	-	872	-
Stage 2	-	-	-	-	843	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1443	-	-	-	767
HCM Lane V/C Ratio	0.003	-	-	-	0.022
HCM Control Delay (s)	7.5	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	271	172	8	7	7
Future Vol, veh/h	5	271	172	8	7	7
Conflicting Peds, #/hr	5	0	0	5	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	3	-	2	-
Peak Hour Factor	78	87	87	78	78	78
Heavy Vehicles, %	2	10	10	2	2	2
Mvmt Flow	6	311	198	10	9	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	213	0	-	0	536	213
Stage 1	-	-	-	-	208	-
Stage 2	-	-	-	-	328	-
Critical Hdwy	4.12	-	-	-	6.82	6.42
Critical Hdwy Stg 1	-	-	-	-	5.82	-
Critical Hdwy Stg 2	-	-	-	-	5.82	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1357	-	-	-	476	817
Stage 1	-	-	-	-	808	-
Stage 2	-	-	-	-	704	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1351	-	-	-	470	810
Mov Cap-2 Maneuver	-	-	-	-	470	-
Stage 1	-	-	-	-	801	-
Stage 2	-	-	-	-	701	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1351	-	-	-	595
HCM Lane V/C Ratio	0.005	-	-	-	0.03
HCM Control Delay (s)	7.7	0	-	-	11.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	112	16	1	89	7	14	36	7	9	55	10
Future Vol, veh/h	12	112	16	1	89	7	14	36	7	9	55	10
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	-3	-	-	2	-
Peak Hour Factor	83	87	83	83	87	83	83	83	83	83	83	83
Heavy Vehicles, %	5	10	5	5	10	5	5	5	5	5	5	5
Mvmt Flow	14	129	19	1	102	8	17	43	8	11	66	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	115	0	0	153	0	0	324	289	149	310	294	116
Stage 1	-	-	-	-	-	-	172	172	-	113	113	-
Stage 2	-	-	-	-	-	-	152	117	-	197	181	-
Critical Hdwy	4.15	-	-	4.15	-	-	6.55	5.95	5.95	7.55	6.95	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	5.55	4.95	-	6.55	5.95	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.55	4.95	-	6.55	5.95	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1455	-	-	1409	-	-	658	646	901	615	592	922
Stage 1	-	-	-	-	-	-	847	773	-	874	786	-
Stage 2	-	-	-	-	-	-	865	809	-	781	729	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1449	-	-	1404	-	-	582	633	894	568	580	915
Mov Cap-2 Maneuver	-	-	-	-	-	-	582	633	-	568	580	-
Stage 1	-	-	-	-	-	-	834	761	-	861	782	-
Stage 2	-	-	-	-	-	-	777	805	-	718	718	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.1	11.3	11.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	642	1449	-	-	1404	-	-	609
HCM Lane V/C Ratio	0.107	0.01	-	-	0.001	-	-	0.146
HCM Control Delay (s)	11.3	7.5	0	-	7.6	0	-	11.9
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	199	29	4	110	15	45	60	19	16	40	26
Future Vol, veh/h	50	199	29	4	110	15	45	60	19	16	40	26
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-2	-	-	-3	-	-	2	-
Peak Hour Factor	83	87	83	83	87	83	83	83	83	83	83	83
Heavy Vehicles, %	5	10	5	5	10	5	5	5	5	5	5	5
Mvmt Flow	60	229	35	5	126	18	54	72	23	19	48	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	149	0	0	269	0	0	562	531	257	569	539	145
Stage 1	-	-	-	-	-	-	372	372	-	150	150	-
Stage 2	-	-	-	-	-	-	190	159	-	419	389	-
Critical Hdwy	4.15	-	-	4.15	-	-	6.55	5.95	5.95	7.55	6.95	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	5.55	4.95	-	6.55	5.95	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.55	4.95	-	6.55	5.95	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1414	-	-	1277	-	-	476	491	791	402	419	887
Stage 1	-	-	-	-	-	-	683	653	-	831	755	-
Stage 2	-	-	-	-	-	-	831	781	-	578	578	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1409	-	-	1272	-	-	396	461	785	327	393	880
Mov Cap-2 Maneuver	-	-	-	-	-	-	396	461	-	327	393	-
Stage 1	-	-	-	-	-	-	646	618	-	786	749	-
Stage 2	-	-	-	-	-	-	744	775	-	469	547	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.3	16.4	15.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	463	1409	-	-	1272	-	-	455
HCM Lane V/C Ratio	0.323	0.043	-	-	0.004	-	-	0.217
HCM Control Delay (s)	16.4	7.7	0	-	7.8	0	-	15.1
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.4	0.1	-	-	0	-	-	0.8

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Vol, veh/h	8	1	72	4	2	53
Future Vol, veh/h	8	1	72	4	2	53
Conflicting Peds, #/hr	5	5	0	5	5	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, %	2	-	-2	-	-	2
Peak Hour Factor	78	78	83	78	78	83
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	10	1	87	5	3	64

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	170	100	0	0	97	0
Stage 1	95	-	-	-	-	-
Stage 2	75	-	-	-	-	-
Critical Hdwy	6.9	6.5	-	-	4.2	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.29	-
Pot Cap-1 Maneuver	787	929	-	-	1448	-
Stage 1	899	-	-	-	-	-
Stage 2	920	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	779	922	-	-	1442	-
Mov Cap-2 Maneuver	779	-	-	-	-	-
Stage 1	895	-	-	-	-	-
Stage 2	914	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	9.6	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	1442	-	793	-	-
HCM Lane V/C Ratio	0.002	-	0.015	-	-
HCM Control Delay (s)	7.5	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.4					

Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Vol, veh/h	3	4	78	12	1	123
Future Vol, veh/h	3	4	78	12	1	123
Conflicting Peds, #/hr	5	5	0	5	5	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, %	2	-	-2	-	-	2
Peak Hour Factor	78	78	83	78	78	83
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	4	5	94	15	1	148

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	262	112	0	0	114	0
Stage 1	107	-	-	-	-	-
Stage 2	155	-	-	-	-	-
Critical Hdwy	6.9	6.5	-	-	4.2	-
Critical Hdwy Stg 1	5.9	-	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.29	-
Pot Cap-1 Maneuver	690	914	-	-	1427	-
Stage 1	887	-	-	-	-	-
Stage 2	839	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	684	907	-	-	1421	-
Mov Cap-2 Maneuver	684	-	-	-	-	-
Stage 1	883	-	-	-	-	-
Stage 2	835	-	-	-	-	-

Approach	EB	SE	NW
HCM Control Delay, s	9.6	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NWL	NWT	EBLn1	SET	SER
Capacity (veh/h)	1421	-	796	-	-
HCM Lane V/C Ratio	0.001	-	0.011	-	-
HCM Control Delay (s)	7.5	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	3	2	2	10	1
Future Vol, veh/h	2	3	2	2	10	1
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-4	-	-	2	-2	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	4	3	3	13	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	33	24	19	0	-	0
Stage 1	19	-	-	-	-	-
Stage 2	14	-	-	-	-	-
Critical Hdwy	5.62	5.82	4.12	-	-	-
Critical Hdwy Stg 1	4.62	-	-	-	-	-
Critical Hdwy Stg 2	4.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	988	1055	1597	-	-	-
Stage 1	1008	-	-	-	-	-
Stage 2	1012	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	978	1047	1591	-	-	-
Mov Cap-2 Maneuver	978	-	-	-	-	-
Stage 1	1002	-	-	-	-	-
Stage 2	1008	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	3.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1591	-	1018	-	-
HCM Lane V/C Ratio	0.002	-	0.006	-	-
HCM Control Delay (s)	7.3	0	8.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	3.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	6	6	7	9	2
Future Vol, veh/h	1	6	6	7	9	2
Conflicting Peds, #/hr	5	5	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-4	-	-	2	-2	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	8	8	9	12	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	49	24	20	0	-	0
Stage 1	19	-	-	-	-	-
Stage 2	30	-	-	-	-	-
Critical Hdwy	5.62	5.82	4.12	-	-	-
Critical Hdwy Stg 1	4.62	-	-	-	-	-
Critical Hdwy Stg 2	4.62	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	971	1055	1596	-	-	-
Stage 1	1008	-	-	-	-	-
Stage 2	999	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	958	1047	1590	-	-	-
Mov Cap-2 Maneuver	958	-	-	-	-	-
Stage 1	999	-	-	-	-	-
Stage 2	995	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.5	3.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1590	-	1033	-	-
HCM Lane V/C Ratio	0.005	-	0.009	-	-
HCM Control Delay (s)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Traffic Data

15 MINUTE REPORT

North-South Road: Mill Street **Municipality:** Township of Port Hope **Day:** Wednesday
East-West Road: Ganaraska Road/CR 9 **Weather:** AM: Mainly Clear **Survey Date:** September 29, 2021

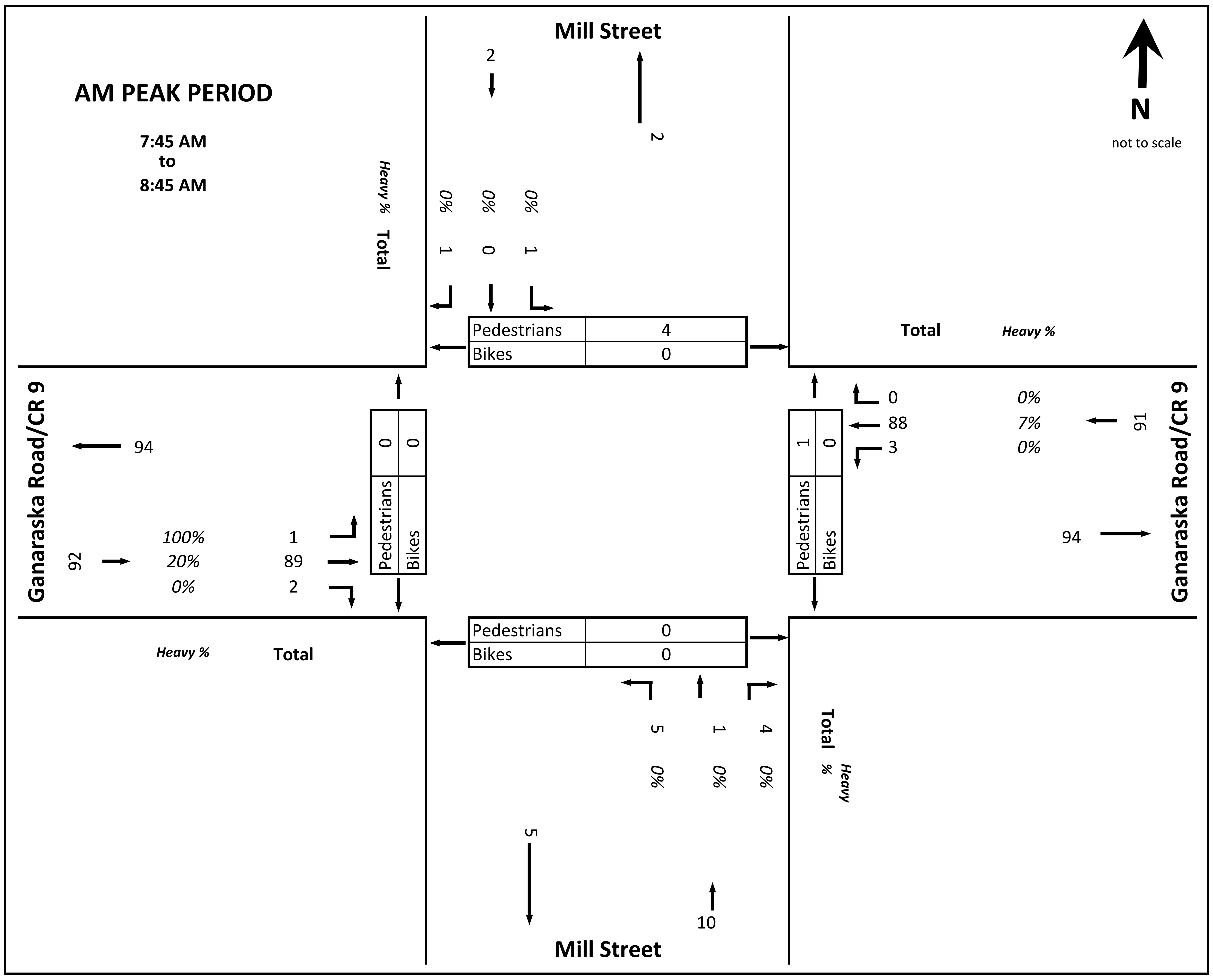
TIME BEGINNING	NORTH APPROACH CAR & PICKUP Left	Thru	Right	HEAVY Left	Thru	Right	Ped	Bike	EAST APPROACH CAR & PICKUP Left	Thru	Right	HEAVY Left	Thru	Right	Ped	Bike	SOUTH APPROACH CAR & PICKUP Left	Thru	Right	HEAVY Left	Thru	Right	Ped	Bike	WEST APPROACH CAR & PICKUP Left	Thru	Right	HEAVY Left	Thru	Right	Ped	Bike	Total Vehicular Traffic	Total PED/BIKE Traffic
7:00	0	0	0	0	0	0	0	0	0	16	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	1	0	0	0	25	0
7:15	1	0	0	0	0	0	0	0	0	33	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	8	0	0	2	0	0	0	47	0
7:30	0	0	0	0	0	0	0	0	0	32	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	1	0	0	0	46	0
7:45	0	0	0	0	0	0	0	0	1	24	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	14	0	0	3	0	0	0	44	0
8:00	1	0	1	0	0	0	4	0	0	21	0	0	2	0	1	0	2	0	0	0	0	0	0	0	0	16	1	0	4	0	0	0	47	5
8:15	0	0	0	0	0	0	0	0	1	20	0	0	1	0	0	0	1	0	3	0	0	0	0	0	0	18	1	1	4	0	0	0	50	0
8:30	0	0	0	0	0	0	0	0	1	17	0	0	2	0	0	0	1	1	1	0	0	0	0	0	0	23	0	0	7	0	0	0	53	0
8:45	0	0	1	0	0	0	0	0	0	21	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	12	1	0	3	0	0	0	38	0
9:00	0	0	0	0	0	0	0	0	2	27	1	0	3	0	0	0	1	0	1	0	0	0	0	0	0	20	0	0	0	0	0	0	55	0

North-South Road: Mill Street **Municipality:** Township of Port Hope **Day:** Tuesday
East-West Road: Ganaraska Road/CR 9 **Weather:** PM: Mainly Clear **Survey Date:** September 28, 2021

TIME BEGINNING	NORTH APPROACH CAR & PICKUP Left	Thru	Right	HEAVY Left	Thru	Right	Ped	Bike	EAST APPROACH CAR & PICKUP Left	Thru	Right	HEAVY Left	Thru	Right	Ped	Bike	SOUTH APPROACH CAR & PICKUP Left	Thru	Right	HEAVY Left	Thru	Right	Ped	Bike	WEST APPROACH CAR & PICKUP Left	Thru	Right	HEAVY Left	Thru	Right	Ped	Bike	Total Vehicular Traffic	Total PED/BIKE Traffic
15:00	0	0	0	0	0	0	0	0	0	31	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	2	0	0	0	50	0
15:15	0	0	0	0	0	0	0	0	1	35	0	0	8	0	0	0	0	0	1	0	0	0	0	0	0	34	0	0	6	0	0	0	85	0
15:30	0	0	1	0	0	0	0	0	0	35	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	32	1	0	3	0	0	0	75	0
15:45	0	0	0	0	0	0	0	0	1	37	0	0	5	0	0	0	1	0	2	0	0	0	0	0	0	24	0	0	4	0	0	0	74	0
16:00	1	0	0	0	0	0	0	0	2	33	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	40	0	0	3	0	0	0	82	0
16:15	0	0	0	0	0	0	0	0	0	31	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	56	1	0	2	0	0	0	91	0
16:30	0	0	0	0	0	0	0	0	1	29	1	0	2	0	0	0	1	0	1	0	0	0	0	0	0	32	0	0	1	0	0	0	68	0
16:45	0	0	1	0	0	0	0	0	0	27	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	54	0	0	3	0	0	0	88	0
17:00	0	0	0	0	0	0	0	0	0	24	1	0	2	0	0	0	0	1	1	0	0	0	0	0	1	46	1	0	2	0	0	0	79	0
17:15	1	0	0	0	0	0	0	0	0	30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	59	0	0	2	0	0	0	93	0
17:30	0	0	0	0	0	0	0	0	1	27	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	41	1	0	3	0	0	0	74	0
17:45	0	0	0	0	0	0	0	0	0	34	1	0	3	0	0	0	1	0	1	0	0	0	0	0	0	41	0	0	0	0	0	0	81	0
18:00	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	0	60	0

TURNING MOVEMENT DIAGRAMS

North-South Road: Mill Street
Municipality: Township of Port Hope
Day: Wednesday
East-West Road: Ganaraska Road/CR 9
Weather: AM: Mainly Clear
Survey Date: September 29, 2021



South Road: Mill Street
Municipality: Township of Port Hope
Day: Tuesday
East-West Road: Ganaraska Road/CR 9
Weather: PM: Mainly Clear
Survey Date: September 28, 2021

15 MINUTE REPORT

North-South Road: Woodland Avenue **Municipality:** Township of Port Hope **Day:** Wednesday
East-West Road: Ganaraska Road/CR 9 **Weather:** AM: Mainly Clear **Survey Date:** September 29, 2021

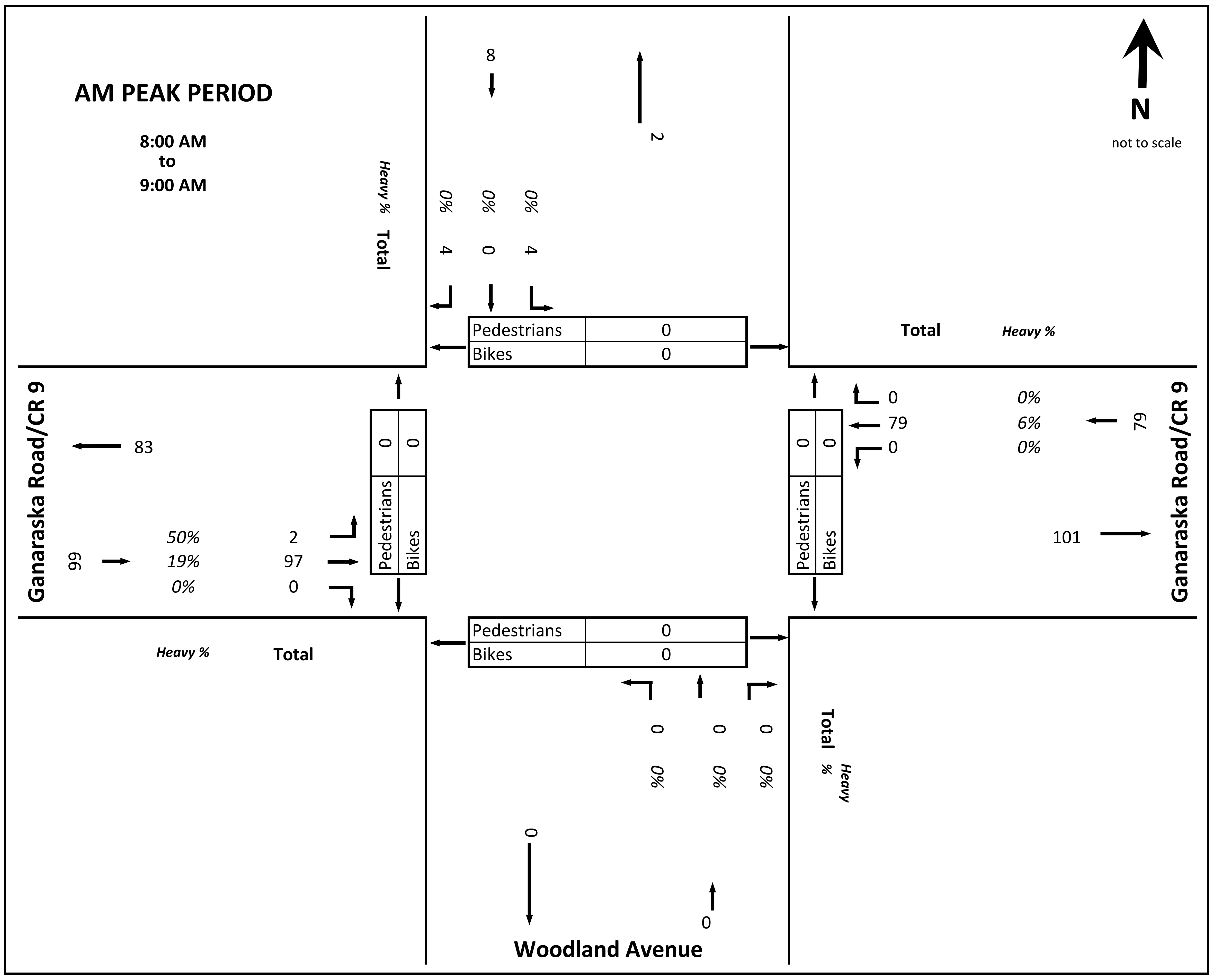
TIME	NORTH APPROACH								EAST APPROACH								SOUTH APPROACH								WEST APPROACH								Total	Total
	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	Vehicular	PED/BIKE
BEGINNING	Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Traffic	Traffic
7:00	0	0	1	0	0	0	0	0	0	15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	1	0	0	0	24	0
7:15	0	0	1	0	0	1	0	0	0	32	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	2	0	0	0	45	0
7:30	0	0	0	0	0	0	0	0	0	32	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	1	0	0	0	46	0
7:45	0	0	0	0	0	0	0	0	0	24	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	3	0	0	0	42	0
8:00	0	0	2	0	0	0	0	0	0	20	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	4	0	0	0	43	0
8:15	2	0	0	0	0	0	0	0	0	19	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	24	0	1	4	0	0	0	51	0
8:30	0	0	2	0	0	0	0	0	0	18	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	7	0	0	0	42	0
8:45	2	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	23	0	0	3	0	0	0	46	0
9:00	0	0	2	0	0	0	0	0	0	22	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	40	0

North-South Road: Woodland Avenue **Municipality:** Township of Port Hope **Day:** Tuesday
East-West Road: Ganaraska Road/CR 9 **Weather:** PM: Mainly Clear **Survey Date:** September 28, 2021

TIME	NORTH APPROACH								EAST APPROACH								SOUTH APPROACH								WEST APPROACH								Total	Total
	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	Vehicular	PED/BIKE
BEGINNING	Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Traffic	Traffic
15:00	0	0	0	0	0	0	0	0	0	31	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	14	0	0	2	0	0	0	51	0
15:15	0	0	3	0	0	0	0	0	0	32	0	0	8	0	0	0	0	0	0	0	0	0	0	0	1	34	0	0	6	0	0	0	81	0
15:30	1	0	0	0	0	0	0	0	0	35	1	0	2	0	0	0	0	0	0	0	0	0	0	0	2	32	0	0	3	0	0	0	76	0
15:45	0	0	0	0	0	0	0	0	0	37	1	0	5	0	0	0	0	0	0	0	0	0	0	0	4	24	0	1	4	0	0	0	76	0
16:00	0	0	1	0	0	0	0	0	0	32	1	0	2	1	0	0	0	0	0	0	0	0	0	0	2	40	0	0	3	0	0	0	81	0
16:15	3	0	2	0	0	1	0	0	0	29	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	56	0	0	2	0	0	0	93	0
16:30	0	0	0	0	0	1	0	0	0	29	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	1	0	0	0	86	0
16:45	2	0	0	0	0	0	0	0	0	27	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	54	0	0	3	0	0	0	90	0
17:00	1	0	1	0	0	0	0	0	0	23	0	0	2	0	0	0	0	0	0	0	0	0	0	0	4	46	0	1	2	0	0	0	79	0
17:15	1	0	1	0	0	0	0	0	0	29	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	59	0	0	2	0	0	0	94	0
17:30	1	0	0	0	0	0	0	0	0	27	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	41	0	1	3	0	0	0	77	0
17:45	1	0	1	0	0	0	0	0	0	33	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	41	0	0	0	0	0	0	79	0
18:00	0	0	1	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	35	0	0	0	0	0	0	61	0

TURNING MOVEMENT DIAGRAMS

South Road: Woodland Avenue | **Municipality:** Township of Port Hope | **Day:** Wednesday
East-West Road: Ganaraska Road/CR 9 | **Weather:** AM: Mainly Clear | **Survey Date:** September 29, 2021



South Road: Woodland Avenue | **Municipality:** Township of Port Hope | **Day:** Tuesday
East-West Road: Ganaraska Road/CR 9 | **Weather:** PM: Mainly Clear | **Survey Date:** September 28, 2021

15 MINUTE REPORT

North-South Road: County Road 10 **Municipality:** Township of Port Hope **Day:** Wednesday
East-West Road: Ganaraska Road/CR 9 **Weather:** AM: Mainly Clear **Survey Date:** September 29, 2021

tranplan associates

TIME BEGINNING	NORTH APPROACH								EAST APPROACH								SOUTH APPROACH								WEST APPROACH								Total Vehicular Traffic	Total PED/BIKE Traffic
	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike		
	Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right				
7:00	0	9	1	0	0	0	0	0	0	13	0	0	1	0	0	0	1	11	0	0	0	0	0	0	1	5	1	0	1	0	0	0	44	0
7:15	0	10	1	0	0	0	0	0	0	29	0	0	2	0	0	0	2	9	1	0	0	0	0	0	1	7	0	0	2	0	0	0	64	0
7:30	1	10	1	0	0	0	0	0	0	29	0	0	3	0	0	0	2	8	1	0	0	0	0	0	0	9	1	0	1	0	0	0	66	0
7:45	0	11	1	0	0	0	0	0	0	20	0	0	1	0	0	0	3	7	0	0	0	0	0	0	2	11	1	0	3	0	0	0	60	0
8:00	1	9	2	0	0	0	0	0	0	15	2	0	2	0	0	0	3	10	1	0	0	0	0	0	2	14	1	0	4	0	0	0	66	0
8:15	2	12	2	0	0	0	0	0	0	14	1	0	1	0	0	0	3	1	2	0	0	0	0	0	3	19	2	1	4	0	0	0	67	0
8:30	1	11	2	0	0	0	0	0	0	15	2	0	2	0	0	0	1	3	2	0	0	0	0	0	1	13	1	0	7	0	0	0	61	0
8:45	1	8	1	0	0	0	0	0	0	13	1	0	0	0	0	0	3	12	1	0	0	0	0	0	2	19	2	0	3	0	0	0	66	0
9:00	1	9	2	0	0	0	0	0	0	18	1	0	3	0	0	0	2	1	2	0	0	0	0	0	1	12	2	0	0	0	0	0	54	0

North-South Road: County Road 10 **Municipality:** Township of Port Hope **Day:** Tuesday
East-West Road: Ganaraska Road/CR 9 **Weather:** PM: Mainly Clear **Survey Date:** September 28, 2021

tranplan associates

TIME BEGINNING	NORTH APPROACH								EAST APPROACH								SOUTH APPROACH								WEST APPROACH								Total Vehicular Traffic	Total PED/BIKE Traffic
	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike		
	Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right				
15:00	1	6	2	0	0	0	0	0	1	23	2	0	3	0	0	0	6	3	2	0	0	0	0	0	2	11	1	0	2	0	0	0	65	0
15:15	1	5	3	0	0	0	0	0	2	20	1	0	8	0	0	0	9	4	2	0	0	0	0	0	6	25	3	0	6	0	0	0	95	0
15:30	2	8	4	0	0	0	0	0	1	22	2	0	2	0	0	0	9	5	1	0	0	0	0	0	6	23	3	0	3	0	0	0	91	0
15:45	1	5	5	0	0	0	0	0	1	23	2	0	5	0	0	0	9	3	3	0	0	0	0	0	4	18	2	0	4	0	0	0	85	0
16:00	3	5	3	0	0	0	0	0	0	20	1	0	2	0	0	0	9	4	1	0	0	0	0	0	8	28	4	0	3	0	0	0	91	0
16:15	4	6	2	0	0	0	0	0	1	22	2	0	1	0	0	0	5	6	2	0	0	0	0	0	12	38	6	0	2	0	0	0	109	0
16:30	7	12	2	0	0	0	0	0	1	19	3	0	2	0	0	0	5	10	3	0	0	0	0	0	10	34	6	0	1	0	0	0	113	0
16:45	3	3	6	0	0	0	1	0	1	16	3	0	3	0	0	0	6	15	4	0	0	0	0	0	12	33	6	0	3	0	0	0	108	1
17:00	2	8	6	0	0	0	0	0	1	19	2	0	2	0	0	0	6	12	3	0	0	0	0	0	9	35	3	0	2	0	0	0	104	0
17:15	1	9	5	0	0	0	0	0	0	17	4	0	1	0	0	0	9	10	5	0	0	0	0	0	5	40	2	0	2	0	0	0	105	0
17:30	1	5	2	0	0	0	0	0	2	15	1	0	1	0	0	0	6	8	1	0	0	0	0	0	8	28	7	0	3	0	0	0	86	0
17:45	2	2	3	0	0	0	1	0	3	13	1	0	3	0	0	0	3	8	2	0	0	0	0	0	9	26	5	0	0	0	0	0	77	1
18:00	0	7	3	0	0	0	2	0	2	11	2	0	0	0	0	0	2	6	2	0	0	0	0	0	6	20	5	0	0	0	2	0	63	4

TURNING MOVEMENT DIAGRAMS

North-South Road: County Road 10
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Municipality: Township of Port Hope
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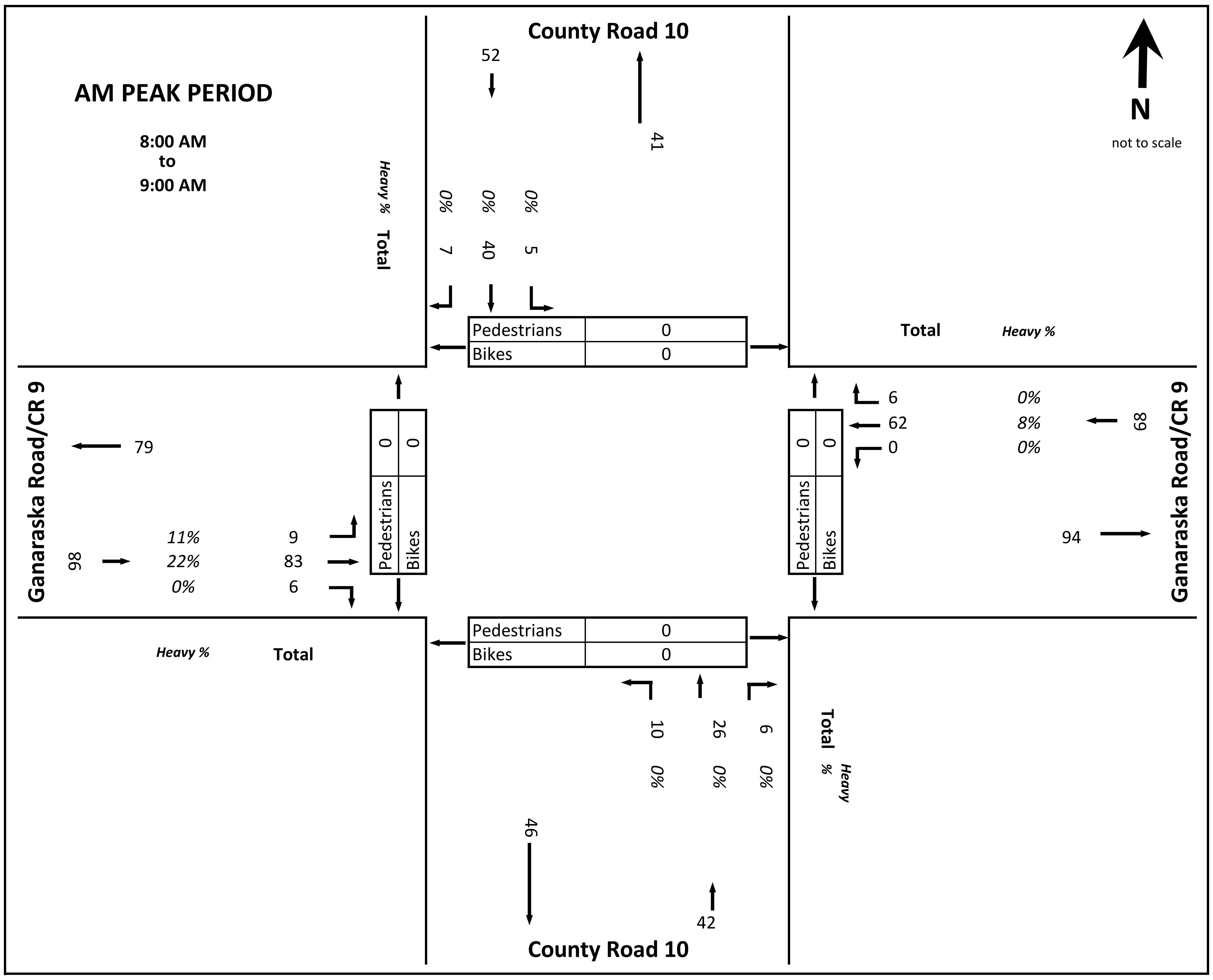
tranplan associates



South Road: County Road 10
East-West Road: Ganaraska Road/CR 9
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tranplan associates

15 MINUTE REPORT

North-South Road: County Road 10 **Municipality:** Township of Port Hope **Day:** Wednesday
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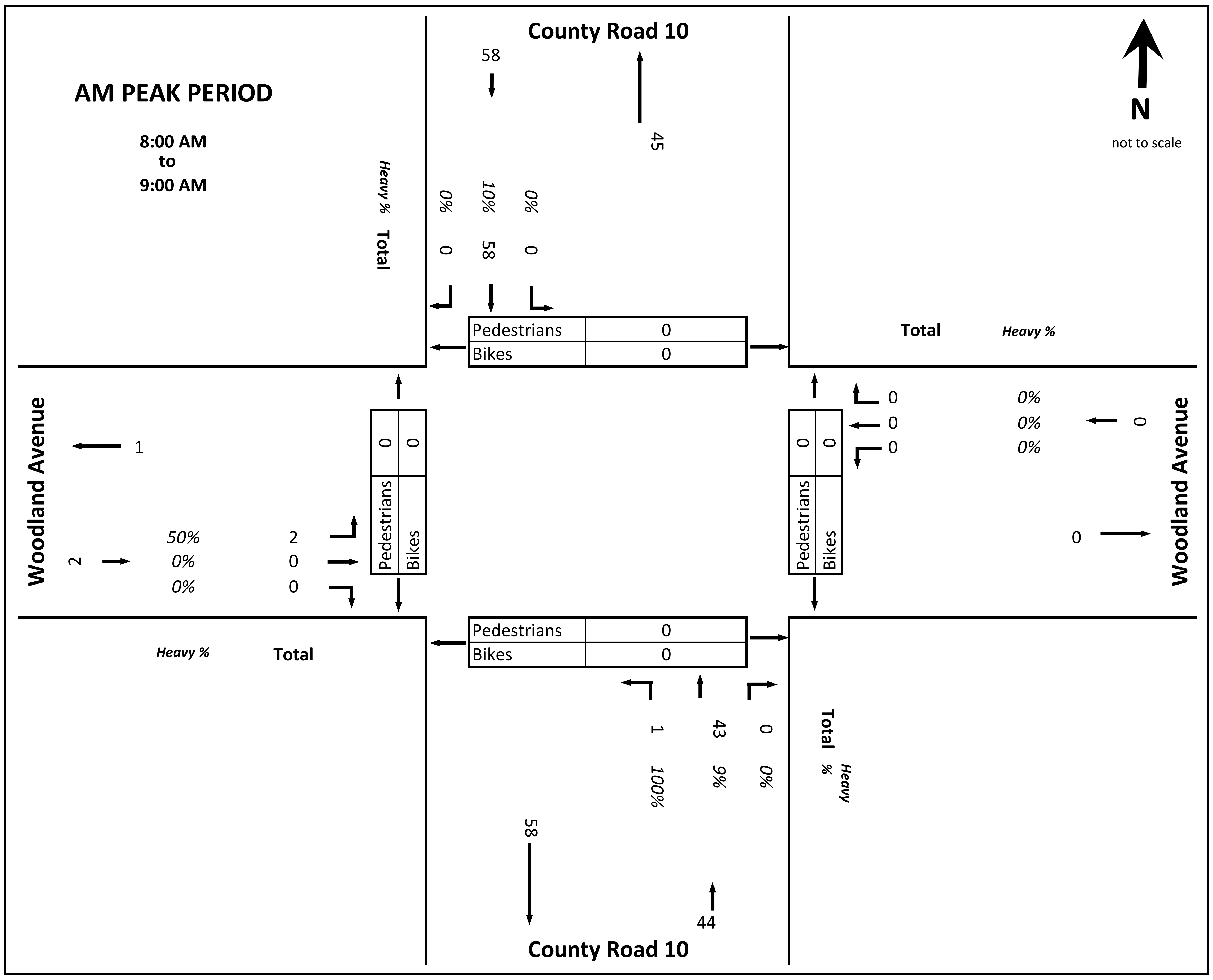
TIME	NORTH APPROACH								EAST APPROACH								SOUTH APPROACH								WEST APPROACH								Total	Total
	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	Vehicular	PED/BIKE
BEGINNING	Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Traffic	Traffic
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	0	12	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	0
8:15	0	16	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	2	0	0	0	1	0	0	1	0	0	0	0	29	0
8:30	0	14	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	2	0	0	0	0	0	0	0	0	0	0	0	23	0
8:45	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0
9:00	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	1	2	0	0	0	0	0	0	0	0	0	0	0	21	0

North-South Road: County Road 10 **Municipality:** Township of Port Hope **Day:** Tuesday
East-West Road: Woodland Avenue **Weather:** PM: Mainly Clear **Survey Date:** September 28, 2021

TIME	NORTH APPROACH								EAST APPROACH								SOUTH APPROACH								WEST APPROACH								Total	Total
	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	CAR & PICKUP			HEAVY			Ped	Bike	Vehicular	PED/BIKE
BEGINNING	Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Left	Thru	Right	Left	Thru	Right			Traffic	Traffic
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	12	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	2	0	0	0	0	0	40	0
16:45	0	17	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	27	0	0	2	0	0	0	1	0	1	1	0	0	0	0	51	0
17:00	0	6	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0
17:15	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	1	0	0	0	0	0	0	0	0	0	0	0	32	0
17:30	0	9	1	0	1	0	1	0	0	0	0	0	0	0	1	0	2	15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	28	2
17:45	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	1	0	0	0	0	0	0	0	25	0
18:00	0	8	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	1	0	0	0	0	0	0	0	0	0	0	0	27	0

TURNING MOVEMENT DIAGRAMS

North-South Road: County Road 10
East-West Road: Woodland Avenue
Municipality: Township of Port Hope
Weather: AM: Mainly Clear
Day: Wednesday
Survey Date: September 29, 2021



South Road: County Road 10
East-West Road: Woodland Avenue
Municipality: Township of Port Hope
Weather: PM: Mainly Clear
Day: Tuesday
Survey Date: September 28, 2021

Auxiliary Lane Warrant Analyses

Garden Hills Estate Subdivision

Left Turn Lane Warrant Evaluation Based on 2032 Total Peak Hour Volumes

1. **Mill Street/CR 9 Intersection**

   AM Peak Hour
   Westbound CR 9 Left Turns
   V_A = 126 vph
   V_L = 4 vph ~ 3.2% Assume 5% - ***See Nomograph***
   V_O = 125 vph
   Eastbound CR 9 Left Turns
   V_A = 125 vph
   V_L = 1 vph < 1% - No Warrant
   V_O = 126 vph

   PM Peak Hour
   Westbound CR 9 Left Turns
   V_A = 169 vph
   V_L = 2 vph ~ 1.2% - No Warrant
   V_O = 275 vph
   Eastbound CR 9 Left Turns
   V_A = 275 vph
   V_L = 1 vph < 1% No Warrant
   V_O = 169 vph

2. **New Site Entrance (Street "A")/CR 9 Intersection**

   AM Peak Hour
   Eastbound CR 9 Left Turns
   V_A = 128 vph
   V_L = 4 vph ~ 3.1% - Assume 5% - ***See Nomograph***
   V_O = 119 vph

   PM Peak Hour
   Eastbound CR 9 Left Turns
   V_A = 276 vph
   V_L = 10 vph ~3.6% - Assume 5% - ***See Nomograph***
   V_O = 180 vph

3. **WoodLand Ave/CR 9 Intersection**

   AM Peak Hour
   Eastbound CR 9 Left Turns
   V_A = 138 vph
   V_L = 3 vph ~ 2.2% No Warrant
   V_O = 113 vph

PM Peak Hour
Eastbound CR 9 Left Turns
V_A = 276 vph
V_L = 5 vph ~ 1.8% - No Warrant
V_O = 180 vph

4. **CR 10/CR 9 Intersection**
AM Peak Hour
Westbound CR 9 Left Turns
V_A = 97 vph
V_L = 1 vph ~ 1% - No Warrant
V_O = 140 vph
Eastbound CR 9 Left Turns
V_A = 140 vph
V_L = 12 vph ~ 8.6% - V_O < 100 vph – No Warrant
V_O = 97 vph

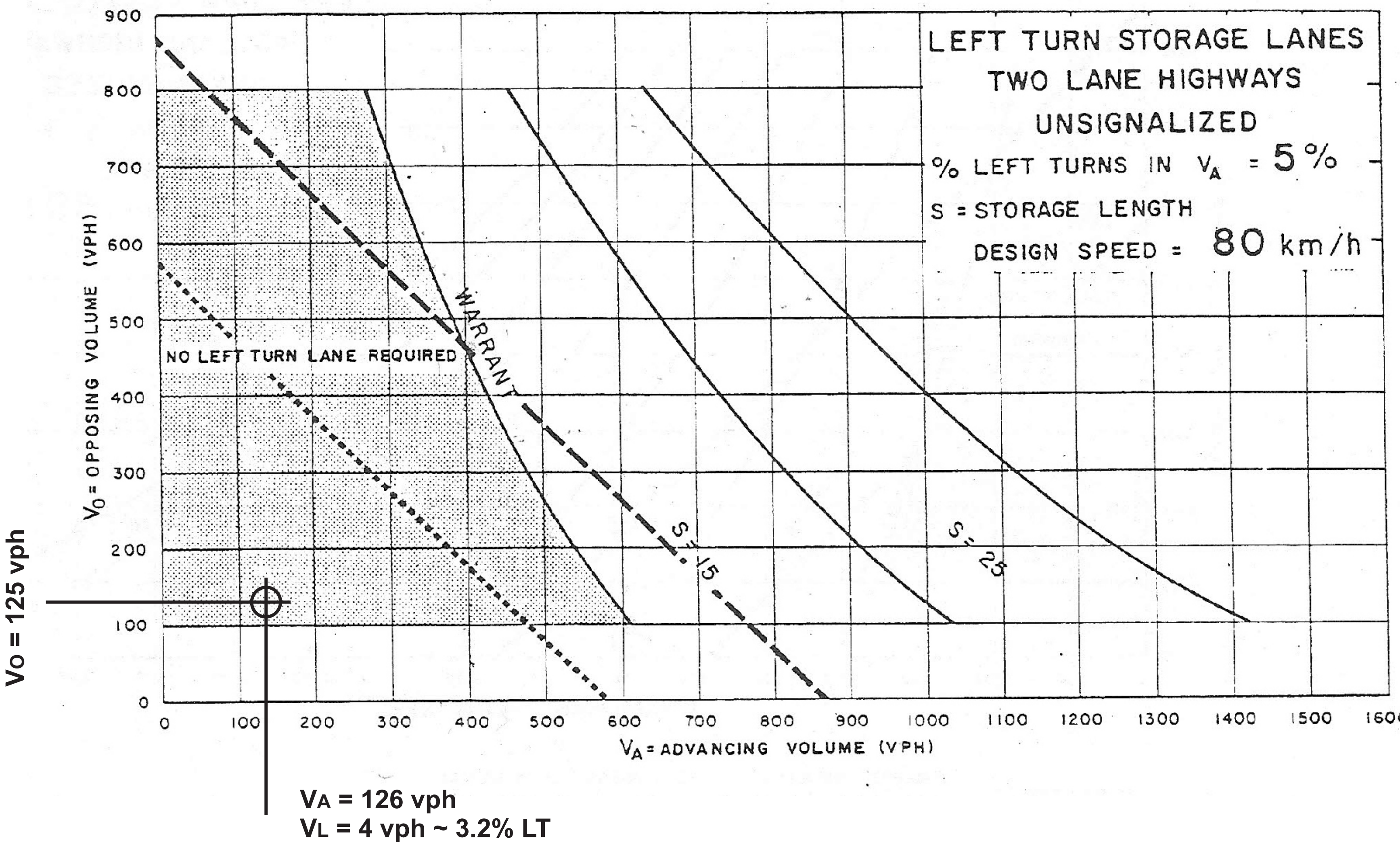
PM Peak Hour
Westbound CR 9 Left Turns
V_A = 129 vph
V_L = 4 vph ~ 3.1% - Assume 5% - ***See Nomograph***
V_O = 278 vph
Eastbound CR 9 Left Turns
V_A = 278 vph
V_L = 50 vph ~ 18% - Assume 20% - ***See Nomograph***
V_O = 129 vph

5. **Woodland Ave/CR 10 Intersection**
AM Peak Hour
Northbound CR 10 Left Turns
V_A = 55 vph
V_L = 2 vph ~ 4 % - All approach volumes < 100 vph – No Warrant
V_O = 76 vph

PM Peak Hour
Northbound CR 10 Left Turns
V_A = 124 vph
V_L = 1 vph ~ 0.8% - Opposing Volume < 100 vph – No Warrant
V_O = 90 vph

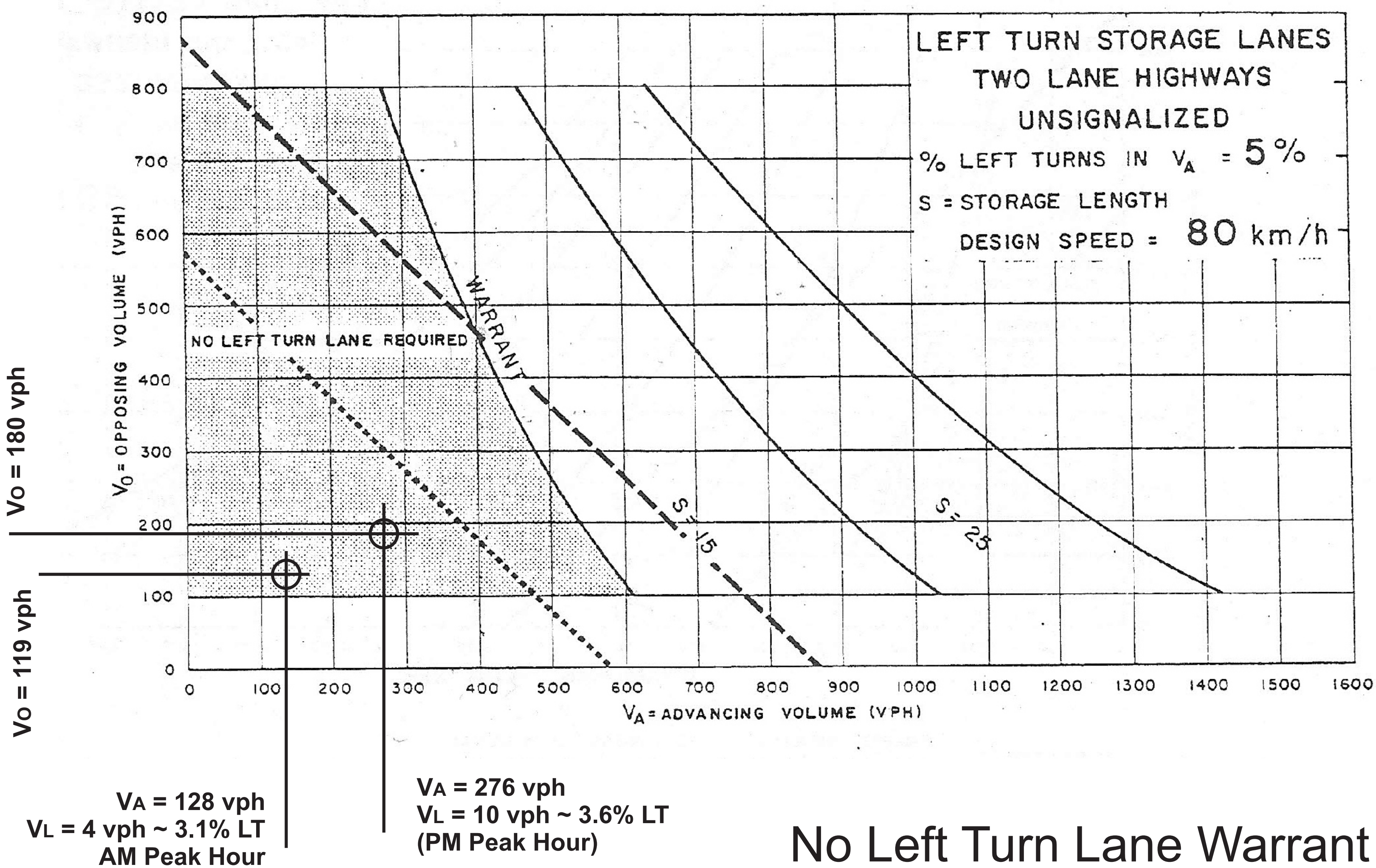
6. **Frost Ave/Woodland Ave**
All approach volumes < 10 vph during both 2032 peak hour periods
No LT warrants for Woodland Ave

Left Turn Warrant Analysis
Westbound CR 9 @ Mill Street
2032 Weekday AM Total Peak Hour



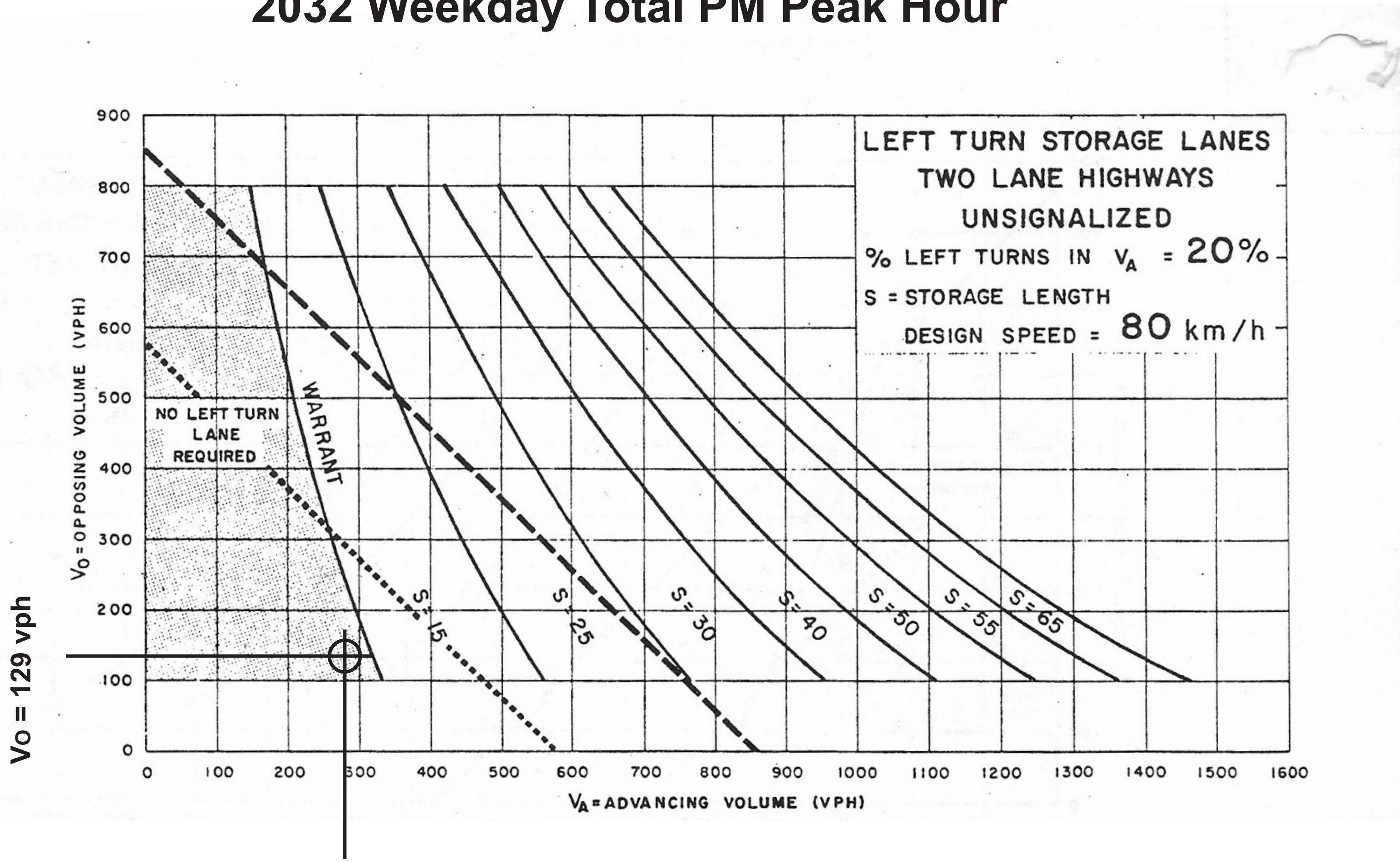
No Left Turn Lane Warrant

Left Turn Warrant Analysis
Eastbound CR 9 @ New Site Entrance
2032 Weekday Total Peak Hour



No Left Turn Lane Warrant

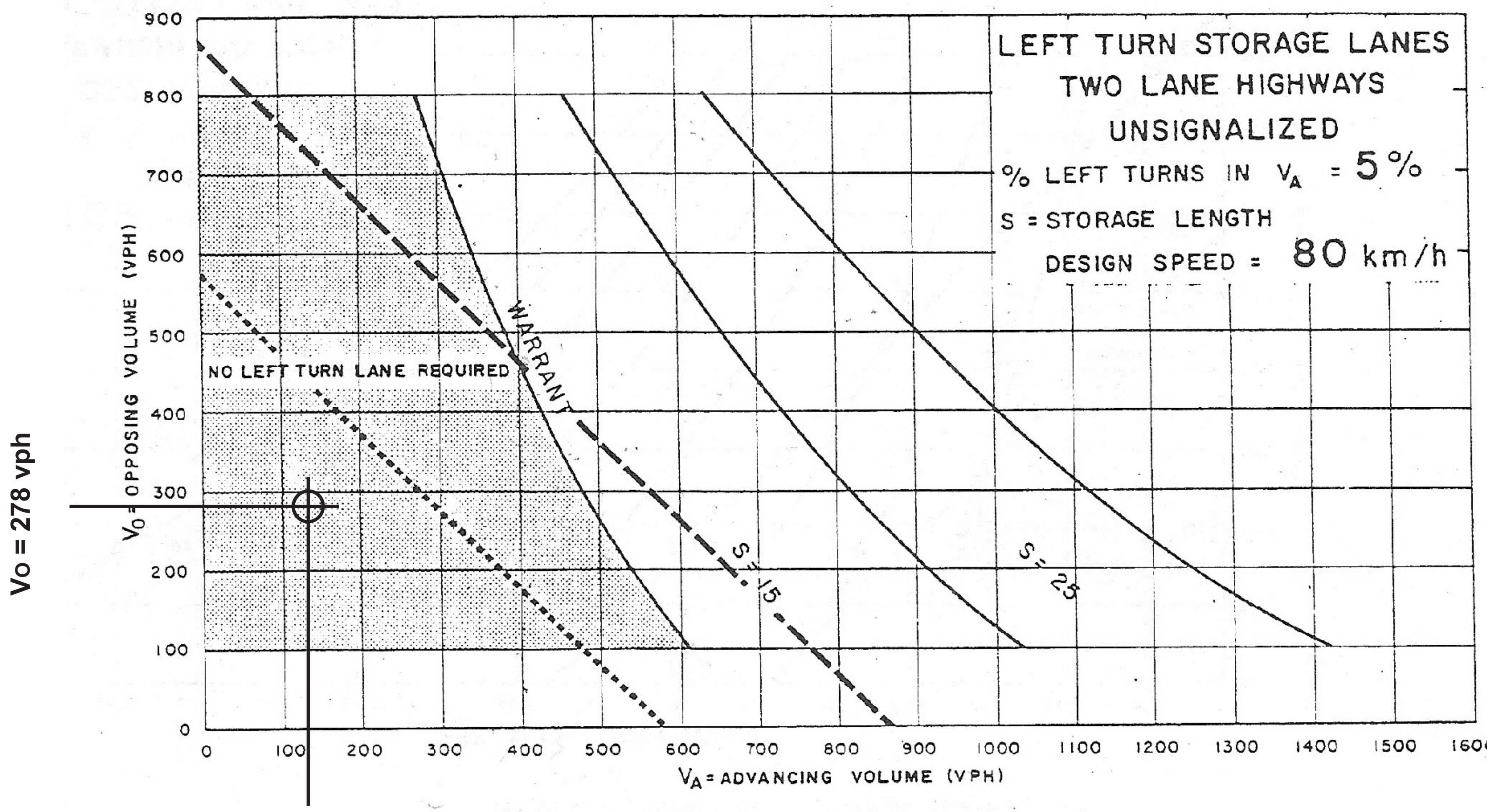
Left Turn Warrant Analysis
Eastbound CR 9 @ CR 10
2032 Weekday Total PM Peak Hour



V_A = 278 vph
V_L = 50 vph ~ 18% LT

No Left Turn Lane Warrant

Left Turn Warrant Analysis
Westbound CR 9 @ CR 10
2032 Weekday Total PM Peak Hour



VA = 129 vph
VL = 4 vph ~ 3.1% LT

No Left Turn Lane Warrant

Garden Hills Estate Subdivision

Right Turn Lane Warrant Evaluation Based on 2032 Total Peak Hour Volumes

1. **Mill Street/CR 9 Intersection**
   AM Peak Hour & PM Peak Hour
   No eastbound or westbound right turn lanes or tapers required on CR 9 at this intersection. All Right Turns < 20 vph (see following VDOT Nomograph)

2. **New Site Entrance (Street "A")/CR 9 Intersection**
   AM Peak Hour & PM Peak Hour
   No eastbound or westbound right turn lanes or tapers required on CR 9 at this intersection. All Right Turns < 20 vph

3. **WoodLand Ave/CR 9 Intersection**
   AM Peak Hour & PM Peak Hour
   No eastbound or westbound right turn lanes or tapers required on CR 9 at this intersection. All Right Turns < 20 vph

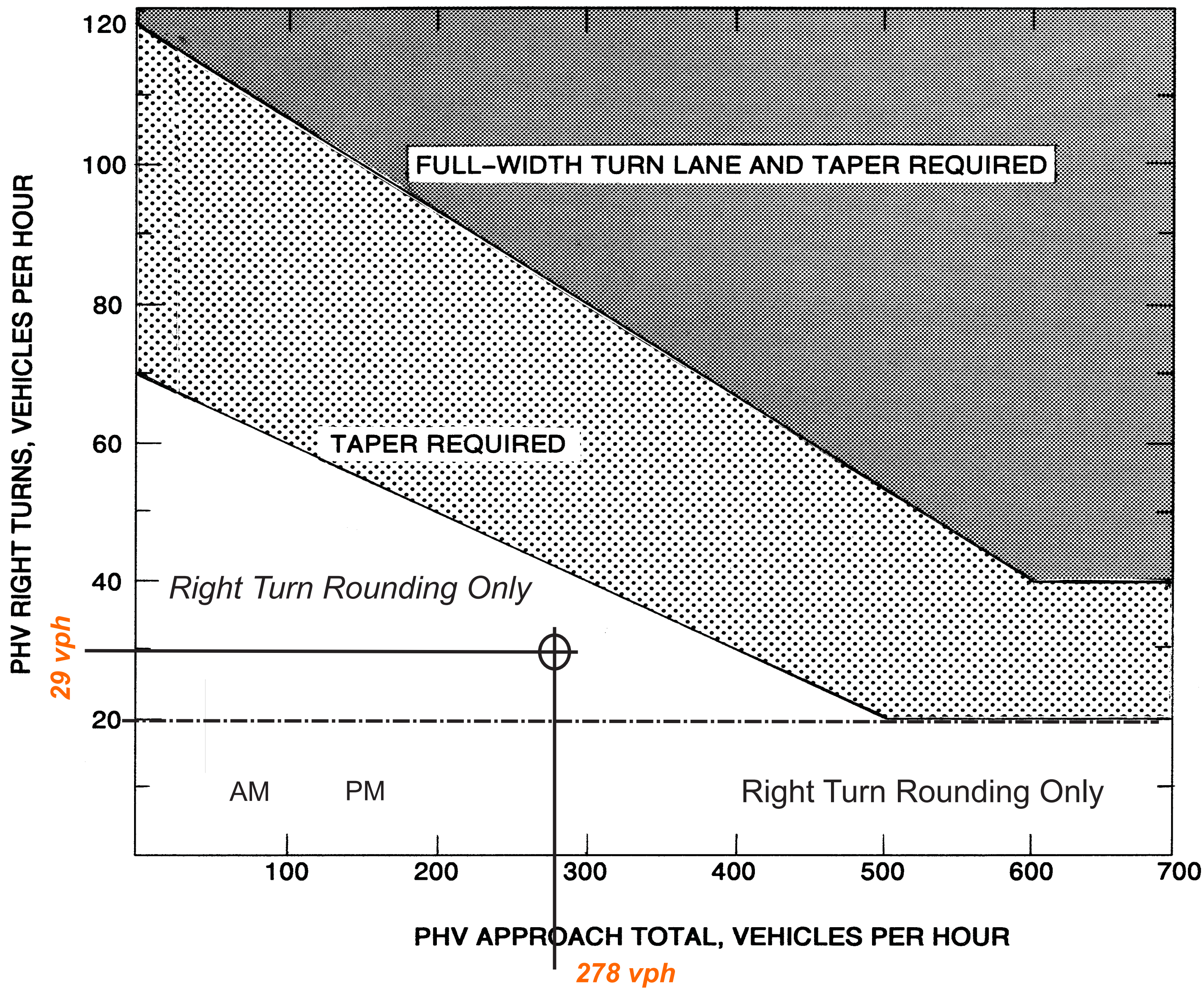
4. **CR 10/CR 9 Intersection**
   AM Peak Hour
   No eastbound or westbound right turn lanes or tapers required on CR 9 at this intersection during AM Peak Hour. All Right Turns < 20 vph

   PM Peak Hour
   Westbound CR 9 Right Turns < 20 vph - No Warrant
   Eastbound CR 9 Right Turns
   V_A = 278 vph
   V_R = 29 vph - No Warrant - ***See Nomograph***

5. **Woodland Ave/CR 10 Intersection**
   AM Peak Hour & PM Peak Hour
   No southbound right turn lanes or tapers required on CR 10 at this intersection. All Right Turns < 20 vph

6. **Frost Ave/Woodland Ave**
   All approach volumes < 10 vph during both 2032 peak hour periods
   No right turn lane or tapers required for this Woodland Ave intersection.

Right Turn Lane Warrant Analyses
Eastbound CR 9 @ CR10
2032 Weekday PM Total Peak Hour Volumes



Appropriate Radius required at all Intersections and Entrances (Commercial or Private).

VDOT Guidelines for Right Turn Treatment
Two Lane Highway