Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

REPORT

Town of Pelham

Effingham Street
In Service Road Safety Review

January 2019

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1 Introduction

Associated Engineering (Ont.) Inc. (AE) was retained by the Town of Pelham to conduct an in-service road safety review of Effingham Street between Highway 20 (Regional Road 20) and Pelham Road (Regional Road 69). This report outlines the background/context for the study, purpose, study area, data reviewed, the findings of the office (desktop) review, the findings of the field investigation, conclusions and recommendations.

1.1 BACKGROUND

The section of Effingham Street under review is a winding two-lane rural roadway that has over the years experienced a significant number of collisions, including a recent fatal collision. Excessive speeds have been identified as an issue by Town staff, given the number of tight radius horizontal curves that exist. Residents along the roadway have expressed concern with the pattern of collisions. As a result of this, the Town of Pelham is seeking an independent review of the roadway that will identify low-cost potential solutions.

1.2 PURPOSE OF STUDY

The purpose of this study is:

- Undertake an office-based (desktop) review of:
  - Previous reports;
  - Collision history to characterize the overall level of safety and identify collision trends; and
  - Speed/traffic volume data assess speeds and traffic volumes.
- Undertake a field investigation to assess:
  - Roadway geometry;
  - Speed zone signs;
  - Curve warning signs and delineation;
  - Sight lines at intersections;
  - Pavement markings;
  - Roadside safety; and
- Identify potential low-cost mitigating measures to address the identified issues.

1.3 STUDY AREA

The study area encompasses all of Effingham Street between Highway 20 (Regional Road 20) and Pelham Road (Regional Road 69), consisting of 8.6 kilometres of roadway. Effingham Street is a rural paved two-lane roadway characterized as having a number of tight radius horizontal curves. Towards the south end, the roadway has a steep grade where the road climbs the Niagara Escarpment (at Moore Drive). Towards the north end, Effingham Street passes just to the west of Short Hill Provincial Park. The corridor is popular with motorcyclists and cyclists due to the scenic nature of the roadway. **Figure 1-1** shows the study area and all roadways that intersect with Effingham Street.

Figure 1-1
Study Area

1.4 DATA REVIEWED

Table 1-1 shows the data reviewed as part of the in-service road safety review.

Table 1-1
Data Reviewed

Data	Source	Year
Niagara Regional Road 28/32 – Effingham Street between Regional Road 69 – Pelham Road and Sulphur Spring Drive – Positive Guidance Review – Executive Summary	Synectics Transportation Consultants	2007
Consultation with Resident at 2746 Effingham Street	AE	November 21, 2018
Roadway Geometry	Niagara Navigator	2018
Video Log	AE	December 11, 2018
Collision History	Niagara Region	2009-2018
ATR Data (Traffic/speed) between Tice Road and Metler Road	Town of Pelham	June 6, 2018
ATR Data (Traffic/speed) 100 metres north of Sulphur Springs Road and 100 metres east of Oille Road	AE	November 22, 2018
Turning Movement Count – Effingham Street/Sixteen Road	AE	November 21, 2018
Ball Bank Study	AE	November 2018
Curve Warning Signs, Chevrons and Delineation	AE	November 2018
Sight Distance	AE	November 2018
Roadside Safety	AE	November 2018

2 Office Review

This section presents the findings of a 'desktop' review of the information provided by the Town along with data collected through Pyramid Traffic.

2.1 2007 SYNECTICS REPORT

An excerpt of a report (the Executive Summary) completed in 2007 by Synectics Transportation Consultants was provided to AE. The report only reviewed the northern portion of the study area (between

Sulphur Spring Drive and Regional Road 69 – Pelham Street) and only addressed positive guidance issues (review of human factors as it relates to the driving task). At that time, the roadway was a Regional Road. The following was noted in the review of the report:

- Warnings and advisories were noted as being generally conservative and not always consistent with the severity of the hazard;
- Two horizontal curves were noted as being problematic:
  - The first located between Oille Street and Regional Road 69 (Pelham Road) at 2796 Effingham Street due to the close proximity of fixed objects through the curve, superelevation issues and the condition of the pavement; and
  - The second located immediately north of Sulphur Spring Drive due to lack of advance visibility.

The positive guidance review recommended for the entire study area the following:

- Review all curve warning signs and advisory speed tabs to ensure that they are consistent;
- Undertake a night review to assess the retroreflectivity of the signs;
- Refresh the pavement markings; and
- Review the location of the speed limit signs.

For the horizontal curve at 2796 Effingham Street the following was recommended in the short term and longer term:

Short Term

- Replace existing Sharp Curve sign/advisory speed tab provided for northbound traffic with a retroflective/fluorescent yellow sign;
- Install a Slippery When Wet sign (retroflective/fluorescent yellow);
- Install a Checkerboard sign for northbound traffic at beginning of curve;
- Chevron improvements;
- Delineation of guide rail on inside of curve; and
- Evaluate wet weather skid resistance.

Longer Term

- Widen roadway through curve, relocate guide rail on inside of curve further away from roadway; and
- Resurface roadway to improve skid resistance.

While the Checkerboard sign has been added to the inside of the curve and the chevrons appear to be adequately placed, there is no evidence that any of the other recommendations have been implemented.

For the horizontal curve just north of Sulphur Spring Drive the following was recommended in the short term and longer term:

Short Term

- Install oversize Sharp Curve sign/speed advisory tab for southbound traffic with retroflective/fluorescent yellow sign;
- Install Checkerboard sign for northbound traffic at beginning of curve;
- Chevron improvements; and
- Evaluate wet weather skid resistance.

Longer Term

- Cut back embankment to improve sightlines; and
- Reprofile roadway to improve superelevation.

The chevrons appear to be adequately placed and the Checkerboard sign and the Sharp Curve Warning sign for southbound traffic has been installed. There is no evidence that wet weather skid resistance has been evaluated (as a short-term treatment) in addition to the long-term treatments recommended.

The Executive Summary for this study is provided in **Appendix A**.

2.2 STATIONING/HORIZONTAL CURVES

The geometry of the horizontal curves located along Effingham Street was reviewed in CAD and an exhibit was prepared displaying the radius of all horizontal curves, along with stationing (starting at Highway 20 at Station 0+000 and proceeding north to Station 8+679.434 at the north limit of the study area). **Appendix B** shows the stationing and the associated horizontal curves. Station references were used to identify the approximate location of warning signs/delineation, passing zones and roadside safety issues in later sections of this report.

2.3 COLLISION HISTORY

The Region of Niagara provided a summary of collisions reported on Effingham Street within the study area for the period 2008 – 2017. A copy of the collision reports is provided in **Appendix C** along with a set of charts and graphs presenting overall trends in collisions amongst the intersection and mid-block locations.

Figure 2-1 shows the collisions that occurred at intersections within the study area for the period reviewed. There is a total of 36 collisions within the study area (which includes intersections at either end of the study area). Twenty-three (23 or 64%) of the collisions were property damage only with a smaller number (7 or 19%) resulting in an injury. The remaining collisions were classified as ‘unknown’ or ‘non-reportable’.

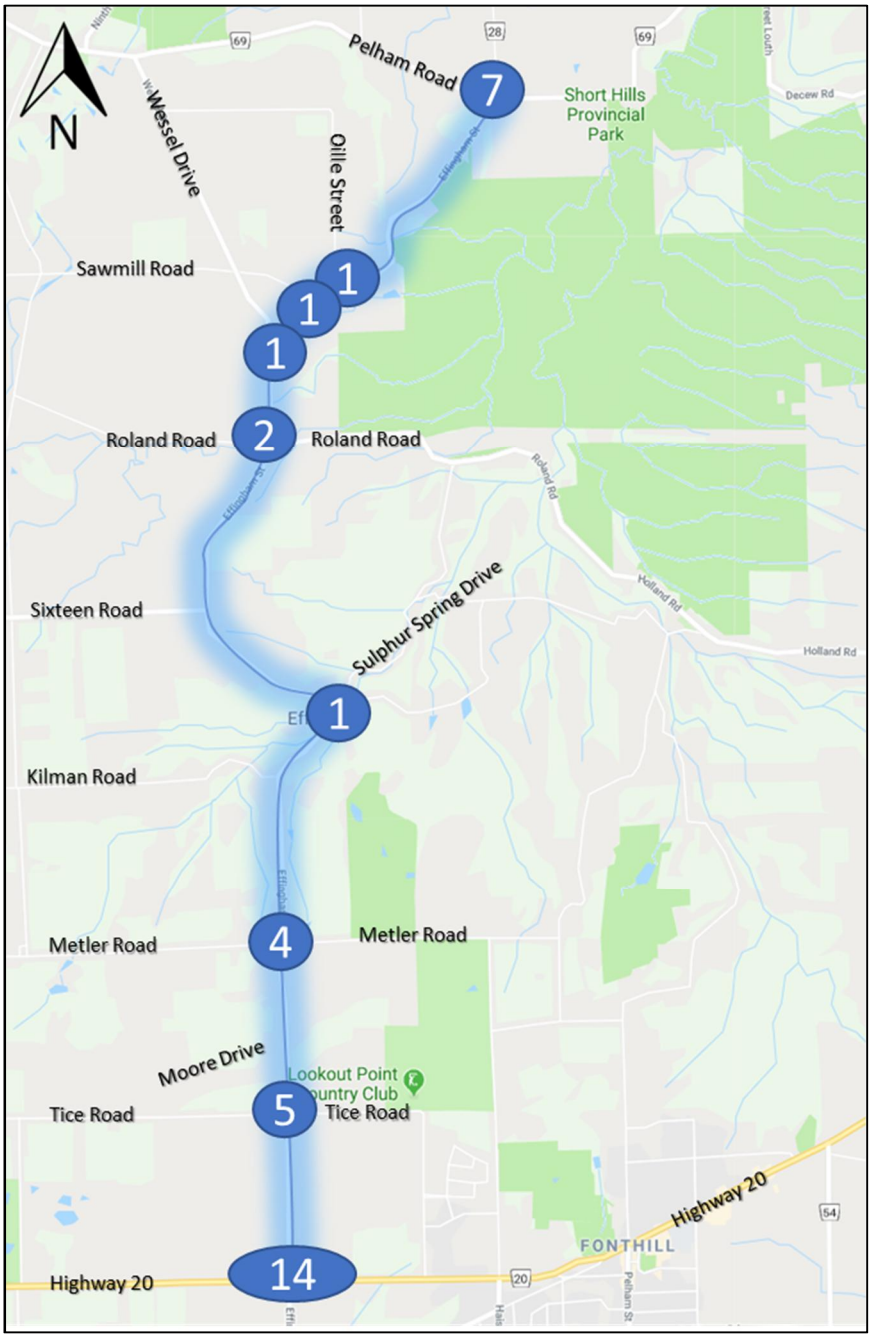


Figure 2-1
Collisions at Intersections

Both intersections either end of the study area were noted as having the highest frequency of collisions. Regional Road 20 (Highway 20) at Effingham Street had 14 collisions over the period reviewed. Regional Road 69 (Pelham Road) at Effingham Street at 7 collisions over the period reviewed. As both locations experience significantly, higher traffic volumes than the other intersections in the study area (being Regional Roads meant to serve intra-municipal traffic), a higher collision frequency is expected. Morever, these intersections are under the jurisdiction of the Region of Niagara., Two intersections under the jurisdiction of the Town of Pelham were noted as having a modest number of collisions over the period reviewed. Tice Road at Effingham Street had 5 collisions while Metler Road had 4 collisions. The remaining locations either had one or zero collisions over the period reviewed.

Figure 2-2 shows the collisions located at mid-block locations within the study area. A total of 68 collisions were reported to have occurred at a mid-block location. Of the 68 collisions, 50 (or 74%) were property damage only, 5 (or 7%) resulted in an injury and 1 (1%) resulted in a fatality. The circumstances of the fatal collision are discussed in further detail below.

Other trends noted were:

- A little over half the collisions occurred in ‘clear conditions’ – 39 or 57% with another 29 or 42% occurring in poor visibility conditions (rain/snow/fog);
- The majority of the collisions were single motor vehicle – 50 or 74%;
- More than half of the collisions occurred in darkness or at dawn/dusk – 37 or 54%;
- Almost half of the collisions occurred on a slippery (ice/slush/snow) or wet road surface – 36 or 53%; and
- January and December were noted as high-collision frequency months.

The locations with the highest frequency of mid-block collisions were the section of Effingham Street between Oille Street and Pelham Road, with a total of 21 collisions. This section was reviewed in further detail to determine the details and circumstances associated with the collisions. The following was noted:

- Of the 21 collisions, 18 were reported as ‘property damage only’, with other three being ‘personal injury’, ‘other’ or ‘fatal’;
- The 21 collisions were noted as being primarily single motor vehicle collisions – 17 or 81 percent of the collisions with the remaining 4 collisions being noted as approaching (vehicles moving in opposite direction striking each other);
- More than half (12 or 57 percent) of the collisions occurred on a slippery road surface (wet/loose snow, packed snow);
- Common events reported were ‘ran off road’, ‘skidding/sliding’, and ‘striking a wild animal’; and
- ‘Speed too fast for conditions’ or ‘lost control’ were reported as a driver action for 12 or 57 percent of the collisions

Figure 2-2
Collisions at Midblock Locations

Of particular note, a fatal collision occurred on September 23rd, 2014 within this section. The collision involved a northbound motorcycle striking a southbound pick-up truck. Conditions were clear (daytime) and the roadway was dry. According to the homeowner at 2796 Effingham Street, the fatal collision occurred in front of their property, the same curve reviewed in the 2008 Synectics report.

Further south, the section between Roland Road and Sixteen Road had a total of 13 collisions. A similar pattern of collisions was noted, with almost all of the collisions being characterized as being single motor vehicle. However, a higher proportion (7 collisions or 54 percent) of the collisions involved a 'wild animal'. Two of the collisions resulted in an injury (15 percent). Seven of the collisions (54 percent) were property damage only, with another 4 (or 30 percent) being 'non-reportable'.

2.4 SPEED ZONES

The following speed zones were noted on Effingham Street in the study area:

- Regional Road 20 to Kilman Road – 60 km/h;
- Kilman Road (approximate) to Sixteen Road – 50 km/h;
- Sixteen Road to Wessel Road – 60 km/h; and
- Wessel Road to Pelham Street – 50 km/h.

The sections with the lower posted speed correspond to sections of Effingham Street with the most significant tight radius horizontal curves.

2.5 AUTOMATED TRAFFIC COUNT (ATR) DATA

Automated Traffic Count (ATR) data was used to review and characterize traffic volume and speed at representative locations along Effingham Street. The Town of Pelham provided ATR data for a location in between Tice Road and Metler Road (towards the south end of the study corridor). Associated Engineering arranged for additional ATR data to be collected further north on Effingham Street. The posted speed at all three locations is 50 km/h. To obtain insights into traffic volumes and driver's choice of speed at different locations along Effingham Street, data was collected at the following locations:

- 100 metres north of Sulphur Springs Road; and
- 100 metres north of Oille Street.

Table 2-1 summarizes the results of the data.

Table 2-1
Summary of ATR Data Collected

Location	Direction	Date	24 hour Volume	85th Percentile	% Above Posted
Between Tice Road and Metler Road	Northbound	June 6, 2018	975	82 km/h	95
	Southbound	June 6, 2018	929		
100 metres north of Sulphur Springs Road	Northbound	November 22, 2018	921	58 km/h	47
	Southbound	November 22, 2018	982	61 km/h	70
100 metres north of Oille Street	Eastbound	November 22, 2018	1324	92 km/h	93
	Westbound	November 22, 2018	1293	78 km/h	96

The section of Effingham Street between Tice Road and Metler Road is a straight section. This section has a steep downhill street (south to north). The 24-hour traffic volumes were in the range of 1900 vehicles, resulting in a collector road classification. The 85th percentile speeds were significantly higher than the posted speed (50 km/h), with 95 percent of traffic travelling above the posted speed.

The section of Effingham Street 100 metres north of Sulphur Spring Road is near a horizontal curve with a 40 km/h advisory speed. The 24-hour traffic volumes were also in the range of 1900 vehicles, resulting in a collector road classification. The 85th percentile speeds were in the 58 – 61 km/h range, with between 47 – 70 percent of vehicles above the posted speed. The speeds are overall lower than the previous location, but still significantly higher than 40 km/h advisory speed.

The section of Effingham Street 100 metres east of Oille Street is a relatively straight section of roadway. The 24-hour traffic volumes were in the range of 2600 vehicles, resulting in a collector road classification. The 85th percentile speeds were in the 78 – 92 km/h range. The lower westbound speed may be due to presence of a horizontal curve located approximately 400 metres to the east of this location, slowing traffic. Almost all vehicles are travelling above the posted speed limit (93 – 96 percent).

Appendix D presents a copy of the data collected.

2.6 ALL-WAY STOP WARRANT

The need for an all-way Stop was investigated at the intersection of Effingham Street and Sixteen Road. The other intersections within the study corridor were not formally evaluated, given the low volume of traffic the roads are anticipated to carry.

In order to determine the need for a four-way Stop control, intersection turning movement counts (TMCs) were requested from Pyramid Traffic Inc. and subsequently collected during the periods 7:00 am – 9:00 am, 11:00 am – 2:00 pm, and 3:00 pm – 6:00 pm. The TMCs were collected on Wednesday, November 21st,2018, and are provided in **Appendix E**.

The location does not meet the warranting criteria for four-way Stop control as traffic volumes on Sixteen Road are not sufficient to meet the minimum threshold (200 vehicles per hour for an eight-hour period). In addition, the volume split between the major road (Effingham Street) and the minor road (Sixteen Road) is 77 / 23 (it must not exceed 70 / 30).

A copy of the warrant spreadsheet is provided in **Appendix D** also.

2.7 ACTIVE TRANSPORTATION

The study corridor has been identified in the 2017 Region of Niagara *Transportation Master Plan* as being part of the Strategic Cycling Network. It is noted as being an 'infill link'. Further information is provided in the companion document, the *Strategic Cycling Network Development Technical Paper.* The route is recommended to have bike route signing in the short term. In the long term, it is recommended that paved shoulders be provided along its length.

The Region may provide funding in support of active transportation improvements to locations on municipal roads that have been identified as an 'infill link'. The Town of Pelham should pursue obtaining funding for bike route signing for Effingham Street in the short term and for paved shoulders in the long term.

3 Field Investigation

A field investigation was conducted in order to assess the following:

- Speed zones;
- Sight lines at intersections;
- Curve warning signs and delineation;
- Pavement markings; and
- Roadside safety.

The following section outline the findings of the study.

3.1 SPEED ZONES

As noted earlier, two sections of Effingham Street are posted at 60 km/h, Regional Road 20 to Kilman Road and Sixteen Road to Wessel Road. Although both sections generally have a straighter alignment that would make consideration of a higher posted speed more appropriate, the following points to the need for a 50 km/h posted speed throughout the study area.

- The sections with a 60 km/h posted speed are both experiencing a sizeable number of mid-block and intersection collisions. The section between Sixteen Road and Roland Road experienced 13 mid-block collisions in the period reviewed;
- The section between Sixteen Road and Roland Road has two sharp radius horizontal curves (130 metres and 74 metres respectively); and
- Tice Road, Moore Street, Sixteen Road, and Roland Road all have issues with limited visibility for drivers on the minor road (see **Section 3.2**).

A consistent posted speed of 50 km/h throughout the study corridor will provide a uniform message to drivers travelling on Effingham Street. As noted earlier, there is evidence in the speed data that drivers are choosing to drive at speeds well in excess of the posted speed. Measures will need to be undertaken to encourage lower operating speeds.

3.2 EVALUATION OF SIGHT DISTANCE

Sight distance was reviewed at all the intersections in accordance with the Transportation Association of Canada's *Geometric Design Guide for Canadian Roads,* 2017 (Chapter 9 - Intersections). For the review, it was assumed that the design speed was 10 km/h greater than the posted speed. Sight distance measurements were taken on the minor road of traffic approaching on Effingham Street to determine if the driver would have sufficient visibility to make either a left, through or right turn (as appropriate).

At five intersections, issues were identified with visibility for drivers on the minor roadway as shown in **Table 3-1**. Four of the locations are intersections at which the posted speed on Effingham Street is 60 km/h, resulting in a higher design speed (70 km/h) and a higher standard for sight distance. Lowering the posted speed to 50 km/h will improve sight line adequacy for drivers on the minor roadway, provided that measures are taken to convey to drivers that higher operating speeds are not appropriate.

Other recommendations include trimming foliage, relocating the stop bar and installing Intersection Ahead signs to provide warning to drivers on Effingham Street that they are approaching an intersection that has limited visibility.

Table 3-1
Sight Distance Issues at Intersections

Location/Design Speed	Issue	Recommendation
Effingham Street and Tice Road (70 km/h)	Sight distance on eastbound approach of southbound traffic is inadequate (vertical grade to north)	Reducing speed in this section (to 50 km/h) as per **Section 3.1**.
Effingham Street and Moore Drive (70 km/h)	Sight distance on eastbound approach of northbound traffic is inadequate	Trim foliage on west side of Effingham Street south of intersection and install Intersection Ahead* sign for northbound traffic
Effingham Street and Sixteen Road (70 km/h)	Sight distance on westbound/eastbound approach of northbound traffic is inadequate (horizontal curve to south)	Relocate stop bar (see Section 3.5). Consider reducing speed in this section (to 50 km/h) as per **Section 3.1**.
Effingham Street and Roland Road (70 km/h)	Sight distance on eastbound approach of northbound traffic is inadequate.	Reduce the speed of the section (to 50 km/h) as per **Section 3.1** and trim vegetation on west side of Effingham Street south of intersection.
Effingham Street and Ollie Street (60 km/h)	Sight distance on northbound approach of westbound traffic is inadequate.	Install Intersection Ahead* sign for westbound traffic.
Note: *Intersection Ahead signs to be installed 140 metres upstream of intersection in accordance with OTM Book 6: Warning Signs.		

3.3 EVALUATION OF CURVE WARNING SIGNS, CHECKERBOARD SIGNS, CHEVRONS AND DELINEATION

A comprehensive review of all curve warning signs, checkerboard signs, chevrons and delineation was undertaken in order to determine whether the existing signs and delineation were in accordance with *Ontario Traffic Manual Book 6 (Warning Signs)* and *Ontario Traffic Manual Book 11 (Delineation).* In accordance with the previous recommendation, it was assumed that the entire road corridor would be posted at 50 km/h. This resulted in adjustments to the sign type and placement in some situations.

The following activities were undertaken:

- Review of appropriateness of speed advisory tabs (or lack thereof) based on ball bank indicator study;
- Review of curve warning sign type in accordance with *Table 5 – Selection of Turn/Curve Warning Signs* of Ontario Traffic Manual Book 6 (Warning Signs);

- Recommendations for placement of curve warning sign in advance of horizontal curves;
- Recommendations to improve visibility of signs;
- Review of and recommendations for chevron placement (required where a speed advisory tab is present/recommended);
- Recommendations for delineators (recommended where a speed advisor tab is not required).

The following general observations were noted:

- There is an overall inconsistency in the use of speed advisory tabs, with some horizontal curves having no speed advisory tab despite being warranted while other having a speed advisory tab, despite not being warranted;
- Some sign types are not appropriate given the posted speed on the roadway and the indicated advisory speed;
- Some warning signs appear to be posted too close to the horizontal curve;
- Chevrons are installed at locations where they are not required;
- Inappropriate spacing of chevrons in advance of and through horizontal curve based on radius;
- Absence of post mounted delineators at locations where chevrons are not present; and
- The use of engineering grade curve warning signs noted as lacking in retroreflectivity.

The above is resulting in inconsistency in the way that drivers are understanding and comprehending the geometry of the horizontal curves and the appropriate speed they should be driving through them.

Appendix F contains two tables summarizing the review of the horizontal curve warning signs, checkerboard signs, chevrons and delineation (identified by the nearest intersection and the approximate station #) along with recommendations that will bring the signs/delineation into conformance with *Ontario Traffic Manual Books 6 and 11*. The recommendations include details on:

- Replacement and/or removal of warning signs
- Replacement and/or removal of speed advisory tabs;
- Recommended distance of the warning sign in advance of the horizontal curve;
- Removal of chevrons (if not warranted);
- Recommended spacing of chevrons in advance of and through horizontal curves; and
- Recommendations for use of delineators (if chevrons not warranted).

Moreover, it is recommended when replacing and/or relocating horizontal curve warning signs that the Town use high intensity retroreflective sheeting to improve visibility in darkness or low visibility conditions (rain/snow/fog).

3.4 EVALUATION OF PAVEMENT MARKINGS

The evaluation of pavement markings included a review of pavement markings at study intersections and an evaluation of passing zones.

No pavement markings (stop bar and yellow double centreline) are provided at any of the study intersections with the exception of the eastbound and westbound approaches to Effingham Street on Sixteen Road. A stop bar must be installed at each of the intersection, in accordance with Figure 26 in *Ontario Traffic Manual Book 11: Pavement Markings and Delineation* Stop bars are to be placed 3 metres back from the edge of the travel lane on the major roadway (Effingham Street). Stop bars installed at Sixteen Road are located approximately 11 – 12 metres from the edge of the travelled way and should be relocated to the appropriate location (3 metres from edge of travelled way). A double centreline should be installed (extending 60 metres back from the stop bar).

As a whole, a double centreline is provided on Effingham Street indicating that passing is not permitted. Where a passing zone was provided, the appropriateness was evaluated in accordance with *Ontario Traffic Manual Book 11: Pavement Markings* – Tables 1 and 2. Two locations (Station 2+080 to 2+175 for northbound traffic and Station 2+400 to 2+500 for southbound traffic) in the vicinity of Metler Road were noted as being an insufficient length for a passing zone. The minimum requirement for a passing zone is 160 metres. The two passing zones should be restriped to provide 160 metres of dashed yellow line (for both northbound and southbound traffic).

3.5 EVALUATION OF ROADSIDE SAFETY

A high-level review of roadside safety was conducted along the study corridor to identify potential issues with unprotected roadside hazards and issues with guide rails. **Table 3-2** summarizes the location (by Station # along with the issues identified.

The following issues were identified:

- Unprotected hazards (rock face and culvert within clear zone);
- Incorrect use of end treatments (buried end treatment);
- Lack of delineation along guide rails (no hazard marker at leading end of guiderail, no delineator strips or snow plow markers);
- Inappropriate use of hazard markers (behind guide rail); and
- Evidence of soil erosion.

It is recommended that the Town of Pelham have a comprehensive review undertaken of the unprotected hazards and guide rail locations, evaluating their condition (rail, post, block-out and end treatment), conformance to design standards, delineation and adequacy of length of need in relationship to the hazard.

Table 3-2
Roadside Safety Issues

Approximate Location	Issue	Recommendation
Station 8+500 (Both Sides)	Hazard in clear zone – rock face	Evaluate need for guide rail at location.
Station 7+700 (East Side)	Hazard in clear zone – culvert	Evaluate need for guide rail at location.
Station 7+300 to 7+500 (East Side)	Incorrect/lack of end treatments. No guiderail delineation. No snow plow markers. Unnecessary hazard markers*.	Install appropriate end treatment and delineation. Remove unnecessary hazard signs.
Station 7+500 to 7+700 (East Side)	Incorrect/lack of end treatments. No guiderail delineation. No snow plow markers. Unnecessary hazard markers*.	Install appropriate end treatment and delineation. Remove unnecessary hazard signs.
Station 6+100 to 6+200 (East Side)	Mounting height inadequate. Incorrect end treatments. Unnecessary hazard markers*. No guiderail delineation. No snow plow markers.	Adjust mounting height or replace guide rail. Install appropriate end treatment and delineation. Remove unnecessary hazard signs.
Station 6+040 to 6+095 (West Side)	Incorrect end treatments. No guiderail delineation. No snow plow markers.	Install appropriate end treatment and delineation.
Station 3+500 to 3+510 (East Side)	Incorrect/lack of end treatments. No guiderail delineation.	Install appropriate end treatment and delineation.
Station 3+490 to 3+500 (West Side)	Incorrect end treatment. Mounting height incorrect. Soil erosion under guiderail.	Adjust mounting height or replace guide rail. Install appropriate end treatment and delineation. Address soil erosion.

Note:
*Unnecessary hazard markers refer to hazard markers installed behind a guide rail system. These hazard markers serve no purpose as the hazard they are highlighting is already fully protected by the guide rail system.

4 Conclusions

The following section outlines the conclusions made as a result of the office review and field investigation undertaken on Effingham Street.

4.1 OFFICE (DESKTOP REVIEW)

On the basis of the office (desktop) review, the following is noted.

4.1.1 2007 Synectics Report

A previous study was undertaken by Synectics Transportation that examined the section of Effingham Street between Sulphur Spring Drive and Regional Road 69 (Pelham Road) from a positive guidance perspective (human factors review of driving task). The study noted in general that the warnings and

advisories were generally conservative and not always consistent with the severity of the hazard. Two horizontal curves were noted as problematic, the first located near 2796 Effingham Street (between Oille Street and Regional Road 69) and the second just north of Sulphur Spring Drive.

The study recommended a review of all curve warning signs and advisory speed tabs, a night review to assess retroreflectivity, refresh the pavement markings and review the location of speed limit signs.

Short and long-term improvements were recommended at the location of the two horizontal curves. Some of the short-term improvements have been implemented. The remaining short-term improvements not implemented are still valid and should be considered. Consideration should be given to implementing the long-term treatments in the foreseeable future.

4.1.2 Collision History

A total of 36 collisions were noted at the study intersections and 68 collisions were noted at the mid-block locations over the ten-year period reviewed. Of the collisions occurring at the intersections, over half occurred at either end of the study corridor (at Highway 20 and Pelham Road). A relatively low number of collisions occurred at the intersections within the study corridor, with Metler Road and Tice Road having 4 and 5 collisions respectively. Of the collisions occurring at mid-block locations, a high number of collisions (21) were noted between Oille Street and Regional Road 69 (Pelham Road). The only fatal collision noted in the collision review occurred in this section, at 2796 Effingham Street, the horizontal curve noted in the 2008 Synectics report. Another section with a high number of collisions was between Sixteen Road and Roland Road with 13 collisions. The mid-block collisions, being the bulk of the collisions occurring within the study area, are characterized as being predominantly single motor vehicle with a sizable proportion occurring in poor visibility conditions, in darkness/dawn/dusk and on a slippery or wet road surface.

4.1.3 Speed Zones

Effingham Street is posted at 50 km/h with the exception of between Regional Road 20 and Kilman Road and between Sixteen Road and Wessel Road. The sections with the lower posted speed correspond to sections of Effingham Street with the most significant tight radius horizontal curves.

4.1.4 ATR Data

A review of the ATR data indicates that Effingham Street is functioning as a collector road, with daily traffic volumes in the range of 1900 – 2600 vehicles. The speed data clearly shows that speeds are well above the posted speed. At two locations, almost all drivers were travelling above the posted speed. North of Sulphur Spring Road, drivers appear to be ignoring the 40 km/h posted advisory speed noted at the horizontal curve, with 47 – 70 percent of drivers travelling above the posted speed (50 km/h) depending on the direction of travel.

4.1.5 All-Way Stop Warrant

An all-way Stop control is not warranted at the intersection of Effingham Street and Sixteen Road, given the low volume of traffic Sixteen Road carries.

4.1.6 Active Transportation

Effingham Street has been identified as an 'infill link' in the 2017 Region of Niagara *Transportation Master Plan.* In the short term it is recommended that bike route signing be provided along the study corridor. In the long term, it is recommended that paved shoulders be provided along its length. The Region may provide funding in support of active transportation improvements to locations on municipal roads that have been identified as infill link. The Town of Pelham should pursue obtaining bike route signing for Effingham Street in the short term and paved shoulders in the long term.

4.2 FIELD INVESTIGATION

On the basis of the field investigation, the following is noted.

4.2.1 Speed Zones

Within the 60 km/h speed zones, a significant number of collisions have been reported (between Sixteen Road and Roland Road and two sharp radius horizontal curves are present. Issues with limited visibility have been noted at Tice Road, Moore Street, Sixteen Road, and Roland Road.

A consistent posted speed of 50 km/h throughout the study corridor will provide a uniform message to drivers travelling on Effingham Street. As noted earlier, there is evidence in the speed data that drivers are choosing to drive at speeds well in excess of the posted speed. Measures will need to be undertaken to encourage lower operating speeds.

4.2.2 Sight Distance

Issues with limited visibility were flagged at five intersections due to issues with vegetation and stop bar placement. Lowering the posted speed (and corresponding operating speed) will provide drivers on the minor road with additional time to perceive and react to a driver approaching on Effingham Street.

4.2.3 Curve Warning Signs, Checkerboard Sign, Chevrons and Delineation

A comprehensive review of curve warning signs, checkerboard signs, chevrons and delineation was undertaken. The following general observations were noted:

- There is an overall inconsistency in the use of speed advisory tabs, with some horizontal curves having no speed advisory tab despite being warranted while other having a speed advisory tab, despite not being warranted;

- Some sign types are not appropriate given the posted speed on the roadway and the indicated advisory speed;
- Some warning signs appear to be posted too close to the horizontal curve;
- Chevrons are installed at locations where they are not required;
- Inappropriate spacing of chevrons in advance of and through horizontal curve based on radius;
- Absence of post mounted delineators at locations where chevrons are not present; and
- The use of engineering grade curve warning signs noted as lacking in retroreflectivity.

The above is resulting in inconsistency in the way that drivers are understanding and comprehending the geometry of the horizontal curves and the appropriate speed they should be driving.

4.2.4 Pavement Markings

Stop bars and centrelines are absent on all minor road approaches to Effingham Street. Stop bars are present on Sixteen Road, however, they are placed too far back from the intersection to be effective. On Effingham Street, a double centreline is used through almost the entirety of the study corridor. In two locations, passing zones are noted, however, the length of the passing zone is an insufficient length.

4.2.5 Roadside Safety

The following issues were flagged in the review of roadside safety:

- Unprotected hazards (rock face and culvert within clear zone);
- Incorrect use of end treatments (buried end treatment);
- Lack of delineation along guide rails (no hazard marker at leading end of guiderail, no delineator strips or snow plow markers);
- Inappropriate use of hazard markers (behind guide rail); and
- Evidence of soil erosion.

5 Recommendations

On the basis of the above, the following recommendations are made to address the issues noted in this report.

5.1 ACTIVE TRANSPORTATION

Short term (<1 year)

- Pursue obtaining Region funding for bike route signing along Effingham Street

Long term (>1 year)

- Pursue obtaining Region funding for a paved shoulder on Effingham Street

5.2 LOWER SPEED TO 50 KM/H / ENCOURAGE LOWER OPERATING SPEEDS

Short term (<1 year)

- Implement a uniform 50 km/h posted speed throughout the entire study corridor. The existing 60 km/h speed signs should be replaced with 50 km/h speed signs;
- Consider installing signs at the north and south ends of the study corridor noting the change in speed and the high frequency of collisions;
- Consider purchasing and installing a portable trailer with a speed feedback sign that will display the speed of approaching vehicles and rotating the trailer through various locations within the study area;
- Encourage Niagara Regional Police to conduct periodic enforcement of speed within the study area; and
- Investigate the feasibility of implementing low-cost traffic calming measures (i.e. transverse pavement markings on approaches to horizontal curves)

Longer Term (> 1 year)

- Investigate the feasibility of implementing higher-cost traffic calming measures that would be appropriate for a rural collector roadway, including:
  - Median treatments at key locations (Bruce Trail crossing or intersections);
  - Pavement treatments (coloured or textured pavement); and
  - Roundabouts.

5.3 SIGHT DISTANCE IMPROVEMENTS

Short term (<1 year)

- At Moore Drive - trim foliage on west side of Effingham Street south of intersection and install Intersection Ahead sign for northbound traffic (140 metres upstream of intersection);
- At Moore Drive - install Intersection Ahead sign for northbound traffic (140 metres upstream of intersection);
- At Roland Road - trim vegetation on west side of Effingham Street south of intersection; and
- At Ollie Street - install Intersection Ahead sign for westbound traffic (140 metres upstream of intersection).

5.4 IMPROVEMENTS TO CURVE WARNING SIGNS, CHECKERBOARD SIGNS, CHEVRONS AND DELINEATION

Short term (<1 year)

Implement all recommendations noted in **Appendix F**, notably:

- Replacement (using high intensity retroreflective sheeting) and/or removal of warning signs;
- Replacement (using high intensity retroreflective sheeting) and/or removal of speed advisory tabs;
- Adjust distance of the warning sign in advance of the horizontal curve to match recommendations (if required);
- Removal of chevrons (if not warranted);
- Adjust spacing of chevrons in advance of and through horizontal curves (if required);
- Install delineators (if chevrons not warranted) with recommendations for their placement in advance of and through horizontal curves in accordance with *Ontario Traffic Manual Book 11, Section 4.3*

5.5 IMPROVEMENTS TO PAVEMENT MARKINGS

Short term (<1 year)

- Install stop bars/centrelines at all minor road approaches to Effingham Street in accordance with Ontario Traffic Manual Book 11: Delineation;
- Adjust stop bars at Sixteen Road (to 3 metres); and
- Lengthen passing zone provided for northbound and southbound traffic to 160 metres.

Ongoing

- Reapply all pavement markings (centreline and edgeline) on an annual basis

5.6 ROADSIDE SAFETY IMPROVEMENTS

Short term (<1 year)

Conduct comprehensive review of roadside safety along the study corridor of the unprotected hazards and guide rail locations, evaluating their condition (rail, post, block-out and end treatment), conformance to design standards, delineation and adequacy of length of need in relationship to the hazard.

5.7 OTHER IMPROVEMENTS

Short term (<1 year)

- Install Deer Crossing signs on Effingham Street in section between Sixteen Road and Roland Road (given noted pattern of wildlife collisions in this area).

The following improvements were flagged in the 2008 Synectics report and are still considered to have merit for improving safety at the two horizontal curves (2796 Effingham Street and horizontal curve north of Sulphur Spring Road).

Short term (<1 year)

- Evaluate wet weather skid resistance through horizontal curve at 2796 Effingham Street; and
- Install Slippery When Wet sign if warranted.

Longer Term (> 1 year)

- Widen roadway through curve at 2796 Effingham Street, relocate guide rail on inside of curve further away from roadway;
- Resurface roadway to improve skid resistance through horizontal curve (both at 2796 Effingham Street and north of Sulphur Spring Drive); and
- Cut back embankment to improve sightlines (to horizontal curve north of Sulphur Spring Drive).

Certification Page

This report presents our findings regarding the Town of Pelham
Effingham Street In Service Road Safety Review.

Respectfully submitted,

Prepared by:

Jeff Suggett, M. Sc.
Acting Manager, Transportation

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
G. R. A. BURN
Jan 15/11
PROVINCE OF ONTARIO

Geoff Burn, P. Eng.
Division Manager

Appendix A – Synectics Report

EXECUTIVE SUMMARY

Background:

This report documents the results of a Positive Guidance review of a 3.5 kilometre section of Effingham Street between Regional Road 69 – Pelham Road and Sulphur Spring Drive, in the Village of Effingham. The Regional Municipality of Niagara retained Synectics Transportation Consultants Inc. (Synectics) to conduct the review in response to concerns expressed by local residents and identified safety problems, most notably collisions, uncovered at two locations within the study area.

Study Area:

The subject section of Effingham Street is a hard-surfaced, two-lane, rural roadway with curvilinear alignment that alternately traverses rolling, wooded terrain and flat agricultural land. It serves as a scenic route between nearby population centers, and services numerous side roads and driveways leading to adjacent residential and agricultural properties.

Two locations within the study were given particular attention. The more northerly location, a sharp horizontal curve adjacent to 2796 Effingham Street, has been the site of sixteen (16) reportable collisions in the previous five years and, according to local residents, numerous unreported run-off-the-road excursions involving single vehicles. The collisions are primarily single vehicle, run-off-the-road type, involving northbound vehicles.

The more southerly location is immediately north of Sulphur Spring Drive. When viewed by southbound traffic, it involves a steep crest vertical immediately followed by a downgrade and a sharp curve to the right. A total of fourteen (14) collisions have reportedly occurred at this site in the past three years. The collisions are primarily single vehicle, run-off-the-road type, involving southbound vehicles.

For the purposes of addressing the concerns raised regarding the Study Area, Synectics broke the analysis down into three (3) separate sections, as follows:

- the Entire Study Area;
- the Curve Adjacent to 2796 Effingham Street; and
- the Curve North of Sulphur Spring Drive

Approach:

Previous operational reviews of these locations by Regional staff have led to interventions, primarily in the form of additional traffic controls, intended to more effectively forewarn and guide the unfamiliar or unwary driver. Despite these creditable

efforts however, the locations continue to experience collisions, and alternative solutions are required.

Synectics was engaged by the Region to generate recommendations via an alternative approach to traditional traffic engineering investigation. In response, Synectics applied a human-centered operational problem-solving technique known as Positive Guidance. The Positive Guidance approach applied by Synectics is consistent with that contained in the soon-to-be-published Ontario Traffic Manual (OTM) Book 1, Appendix C – Positive Guidance Toolkit.

Positive Guidance review uses an in-depth knowledge of human factors and the driving task to screen roadways for information deficiencies, expectancy violations, workload issues, environmental factors and operational scenarios that may potentially contribute to the occurrence of driver error and collisions. In conducting a Positive Guidance review, the analyst attempts to view the roadway through the eyes of an "average" driver – postulating as to what his perceptions, interpretations, expectations and actions might be. This is done in order to formulate theories and possible explanations regarding the cause or causes of prior or potential conflicts and/or collision occurrences.

Positive Guidance can be applied as a pro-active measure, to identify potentially hazardous locations without a demonstrated crash history, or as a supplementary investigative tool where crashes are occurring and conventional analysis offers no ready explanation for their occurrence. In such circumstances, a Positive Guidance review may stimulate new lines of conventional enquiry, or put forth a plausible scenario outlining the likely causality of a particular type of occurrence. This, in turn, may permit new, potentially mitigating measures to be identified and applied.

Positive Guidance normally focuses on low-cost, information-oriented improvements that can be implemented quickly, either as solutions in and of themselves, or as interim improvements until a more definitive solution can be achieved. Positive Guidance may also identify the need for additional investigation, in the form of conventional engineering analysis, to support theories regarding the contributory causes of collisions, and to justify mitigating measures.

In regards to the study area of Effingham Street, the following was observed and concluded during the review:

Findings:

Applicable to the Entire Study Area:

- In response to the geometric challenges presented by the roadway, a high standard of warning and directional guidance information is provided throughout. Drivers become reliant on this information.

- Warnings and advisories are generally conservative, and are not always entirely consistent with the severity of the hazard. This impacts their credibility. Drivers

quickly adapt to their conservative nature and begin to exceed the advisories, generally without consequence, thus reinforcing the behavior.

Applicable to the Curve Adjacent to 2796 Effingham Street:

- Forewarning is ample, however delineation is less so, due to the presence of a driveway tangent to the path of northbound traffic.

- Of greater concern are the lateral constraints, consisting of opposing traffic on the left and guiderail immediately on the right. Together, these constraints require a northbound driver to "thread the needle" in choosing a safe speed and path through the curve.

- Almost all of the reported collisions, and the unreported occurrences that were uncovered as anecdotal evidence, were instigated by northbound vehicles, and occurred while the roadway was wet.

- The curve possesses no appreciable superelevation, and the pavement appears smooth and polished. These observations, along with the anecdotal evidence and the crash record, have led to strong speculation that the pavement possesses reduced skid resistance, particularly in wet conditions.

- Fixed objects immediately adjacent to the traveled lane tend to intimidate most drivers. This is particularly true of objects on the right, where it is more difficult to judge lateral offset. Drivers will tend to "shy away" from these objects, by moving to the left. At this location, shying to the left places northbound drivers in conflict with southbound traffic, due to the narrow lanes and the lateral constraints, and may cause them to enter the curve at a steeper angle, and more aggressively, to regain their proper path. This may induce a slide or skid, particularly if their speed is excessive for the conditions.

- This evidence, taken together, suggests the following likely crash scenarios:

  Scenario A: The roadway is wet from a recent rainstorm. A northbound vehicle shies to the left, away from the guide rail on the right shoulder, as it approaches and enters the curve. Seeking to avoid encroaching into the opposing lanes, the driver "turns in" to the curve later and more aggressively than would otherwise be necessary. This maneuver exceeds the available side friction of the wet, polished pavement. The front tires break traction and the vehicle begins to slide towards the outside of the curve. The driver, taken by surprise, brakes abruptly, adding more steering input, without result. The vehicle crosses the southbound lane and comes to rest in west ditch.

Scenario B: The roadway is wet. A northbound vehicle shies to the left, away from the guide rail on the right shoulder. As it approaches and enters the curve, it encroaches into the opposing lanes. A southbound driver, unaware of the northbound vehicle and seeking to cut the apex of the curve, encroaches inwards, towards the centre line. Upon seeing each other, both drivers attempt evasive maneuvers. The southbound driver steers for the right shoulder. The northbound driver steers aggressively back towards his lane. This maneuver overcomes the available side friction of the polished pavement. The front tires of the vehicle break traction, and the vehicle slides further into the southbound lane, striking the southbound vehicle in an opposing sideswipe, forcing it into the west ditch.

To break the chain of causation outlined by these scenarios, it is necessary to do one or more of the following:

- induce drivers to travel more slowly through the curve, particularly in wet conditions;
- assist drivers in selecting a suitable speed and path through the curve to avoid conflicts;
- provide a path through the curve with a greater margin for error;
- superelevate the curve; and
- improve the skid resistance of the pavement.

Applicable to the Curve Immediately North of Sulphur Spring Drive:

- Upon reaching the curve, it is shielded from the driver's view. With only the now-familiar traffic controls to provide forewarning of what is ahead, drivers apply their learned response, and judge it no more severe - perhaps even less so - than other features they have successfully negotiated.
- The painted warnings on the road surface, although innovative and conspicuous in favourable conditions, only reinforce the speed advisory – already judged to be conservative - and are unlikely to elicit a change in driver behavior with respect to speed.
- Drivers crest the hill too fast (as evidenced by spot speed studies), carrying this speed into the downgrade. An embankment on the right continues to disguise the true severity of the curve and drivers fail to slow appropriately, losing control while attempting to negotiate the curve at too high a speed. Adverse weather conditions contribute to this occurrence.

The challenge in restructuring driver expectations in regards to this curve is to provide a forewarning of its severity of sufficient credibility to elicit a reduction in speed before the hill is crested and the curve comes into view. This demands a conspicuous information source that will achieve a high degree of credibility with drivers, and will function reliably in all conditions. Secondary and more manageable challenges include providing an emphasis of severity at the curve itself, improving directional guidance through the curve, and possibly providing greater sight distance across the inside of the curve.

Recommendations:

Based on the foregoing observations and conclusions, the following is recommended:

Applicable to the Entire Study Area:

G-1: Review the curve warning signs and advisory speed tabs throughout Effingham Street, from Pelham Road to Regional Road 20, to ensure that the degree of advance warning emphasis provided is consistent with the relative severity of the signed-for feature.

G-2: Undertake a night review of all signing between Pelham Road and Regional Road 20. Replace those signs with poor retroreflective qualities. Realign or replace those signs that are not optimally positioned to face oncoming traffic.

G-3: Refresh the pavement markings throughout the section, as soon as field conditions permit.

G-4: Examine the location of regulatory speed limit signing in relation to curve warnings with advisory speed tabs. Consider relocating the former to avoid presenting two potentially-conflicting messages in close succession.

Applicable to the Curve Adjacent to 2796 Effingham Street:

Short Term Recommendations:

N-1: For the northbound direction of travel, replace the existing sharp curve sign (Ontario MUTCD Wa-1R) and the advisory speed tab (advisory speed to be based on the results of a ball-bank indicator evaluation) on the right shoulder at the top of the crest vertical. Construct both signs from retroreflective/fluorescent yellow (NOT chartreuse/strong yellow-green) 3M Diamond Grade sheeting or equivalent.

N-2: Install a slippery-when-wet sign in advance of the sharp turn and advisory speed signs. Although inadequate skid resistance has yet to be confirmed through testing and evaluation, field observations and the crash record are sufficiently persuasive in this regard to warrant pre-emptive action. Construct this sign from retroreflective/fluorescent yellow 3M Diamond Grade sheeting or equivalent.

Note that slippery-when-wet signing should only be considered as an interim warning measure, and not as a solution. Signing should remain in place only until such time as resurfacing or re-texturing can be programmed and accomplished.

N-3: While continuing to accommodate the existing driveway on the west side of the curve, install a checkerboard sign with arrow to the right (Ontario MUTCD Wa-8R) on the outside of the curve, in the direct line of sight of a northbound driver topping the crest. Construct this sign from retroreflective/fluorescent yellow 3M Diamond Grade sheeting or equivalent.

N-4: Replace the existing chevron signs around the curve with (Ontario MUTCD Wa-9) chevron signs constructed from retroreflective/fluorescent yellow 3M Diamond Grade sheeting or equivalent. Position these signs to optimize their visibility and retroreflectance for each direction of travel, without interfering with access to the driveway on the west side of the curve. Make every effort to space them to ensure a minimum of three chevrons are visible at any point in advance of, and through, the curve.

Delineate the guide rail on the inside of the curve with white, post-mounted retroreflective delineators.

N-5: Conduct a wet-weather skid resistance evaluation of the subject curve. If skid resistance is found to be inadequate, program the location for re-texturizing or resurfacing as necessary.

Longer Term Recommendations:

N-6: Remove the existing guide rail on the inside of the curve, widen and pave the shoulder, and reinstall the guide rail at an offset from the traveled lane sufficient so that it does not pose a concern (at least 1.0 – 1.5 metres). Delineate the new guide rail installation with white, post-mounted retroreflective delineators. Note that this work could be combined efficiently into that recommended under Recommendation N-7 below.

N-7: If skid resistance problems are confirmed under Recommendation N-5 above, resurface or re-texture the pavement in the vicinity of the curve. In conjunction with any resurfacing to correct conditions of inadequate skid resistance, consider re-profiling the roadway through the curve to provide superelevation.

Applicable to the Curve Immediately North of Sulphur Spring Drive:

Short Term Recommendations:

S-1: For the southbound direction of travel, install an oversized sharp curve sign (Ontario MUTCD Wa-101R) and an oversized advisory speed tab (advisory speed to be based on the results of a ball-bank indicator evaluation) on the right shoulder before the top of the crest vertical, to replace the existing signing. Construct both signs from retroreflective/fluorescent yellow (NOT chartreuse/strong yellow-green) 3M Diamond Grade sheeting or equivalent.

S-2: Install a checkerboard sign with arrow to the right (Ontario MUTCD Wa-8R) on the outside of the curve, in the direct line of sight of a southbound driver topping the crest. Construct this sign from retroreflective/fluorescent yellow 3M Diamond Grade sheeting or equivalent.

S-3: Replace the existing chevron signs around the curve with oversized (Ontario MUTCD Wa-109) chevron signs constructed from retroreflective/fluorescent yellow 3M Diamond Grade sheeting or equivalent. Position these signs to optimize their visibility and retroreflectance for each direction of travel. Space them to ensure a minimum of three chevrons is visible at any point in advance of, and through, the curve.

S-4: Conduct a wet-weather skid resistance evaluation of the subject curve. If skid resistance is found to be inadequate, install a slippery-when-wet sign in advance of the sharp turn and advisory speed signs. Construct this sign from retroreflective/fluorescent yellow 3M Diamond Grade sheeting or equivalent.

Note that slippery-when-wet signing should only be used where skid resistance is known to be sub-standard, and is considered as an interim warning measure, and not a solution. Signing should remain in place only until such time as resurfacing or re-texturing can be programmed and accomplished.

Longer Term Recommendations:

S-5: Consider cutting back the embankment on the inside of the curve to open up the sight lines, providing approaching drivers with a more complete presentation of the curve.

S-6: In conjunction with any resurfacing to correct conditions of inadequate skid resistance, consider re-profiling the roadway through the curve to provide an augmented degree of superelevation.

Incidental Recommendations:

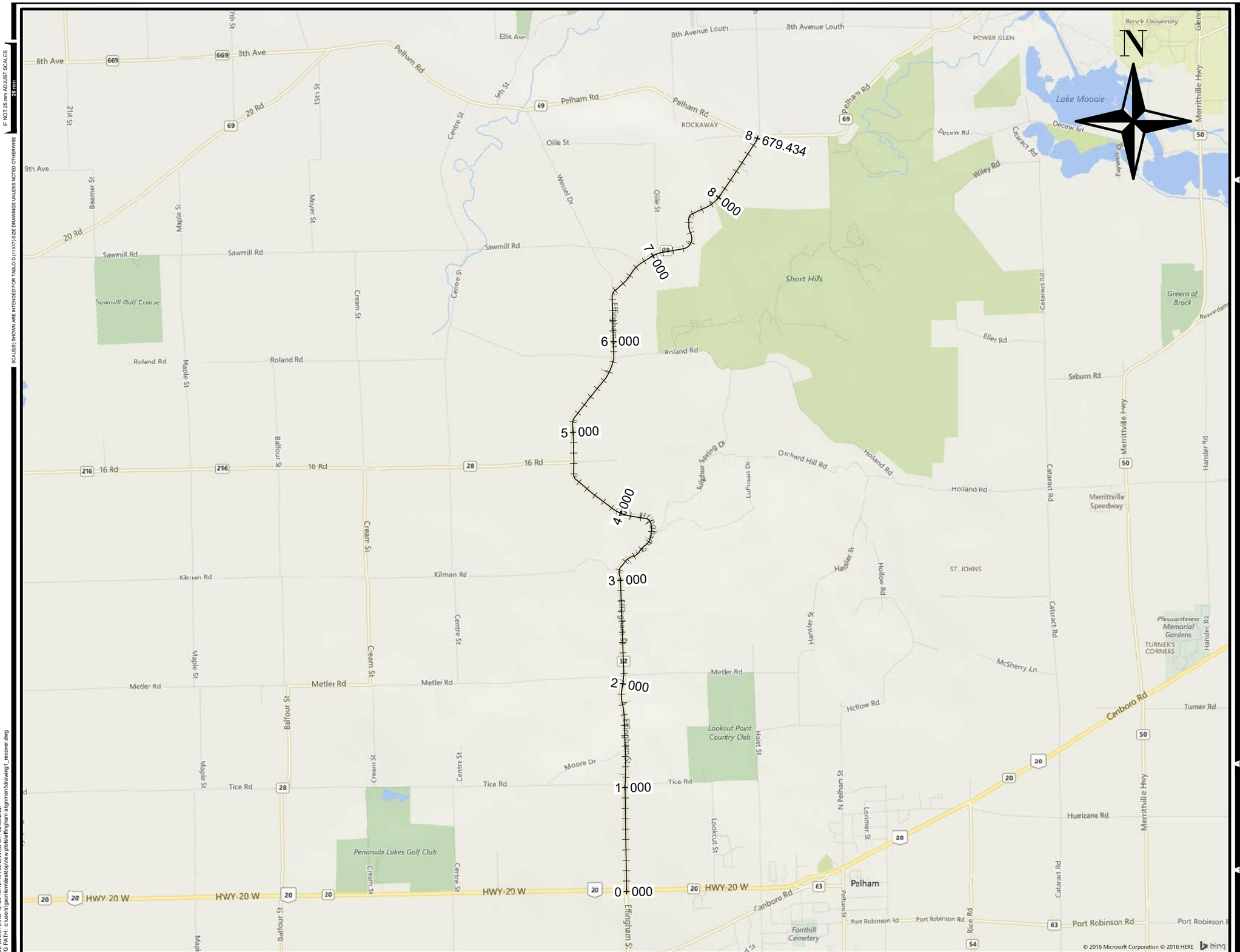
Other recommendations incidental to the objectives of this review, but noteworthy, are as follows:

I-1: Consider implementing street name signing policy revisions to improve the availability, conspicuity, and legibility of this key navigation-level information.

I-2: Consider the imposition of uniform requirements for the presentation of house numbers in rural areas, as a navigational aide to drivers, and to facilitate emergency response.

Appendix B - Stationing

IF NOT 25 mm ADJUST SCALES
25 mm
SCALES SHOWN ARE INTENDED FOR TABLOID (11X17) SIZE DRAWINGS UNLESS NOTED OTHERWISE



Associated Engineering

BEST MANAGED COMPANIES

REFERENCE ONLY

FIGURE A-1

TOWN OF PELHAM

CIVIL

OVERVIEW MAP - EFFINGHAM STREET

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APPROVED	
DATE	20181203
REV	0
DESCRIPTION	

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IF NOT 25 mm ADJUST SCALES
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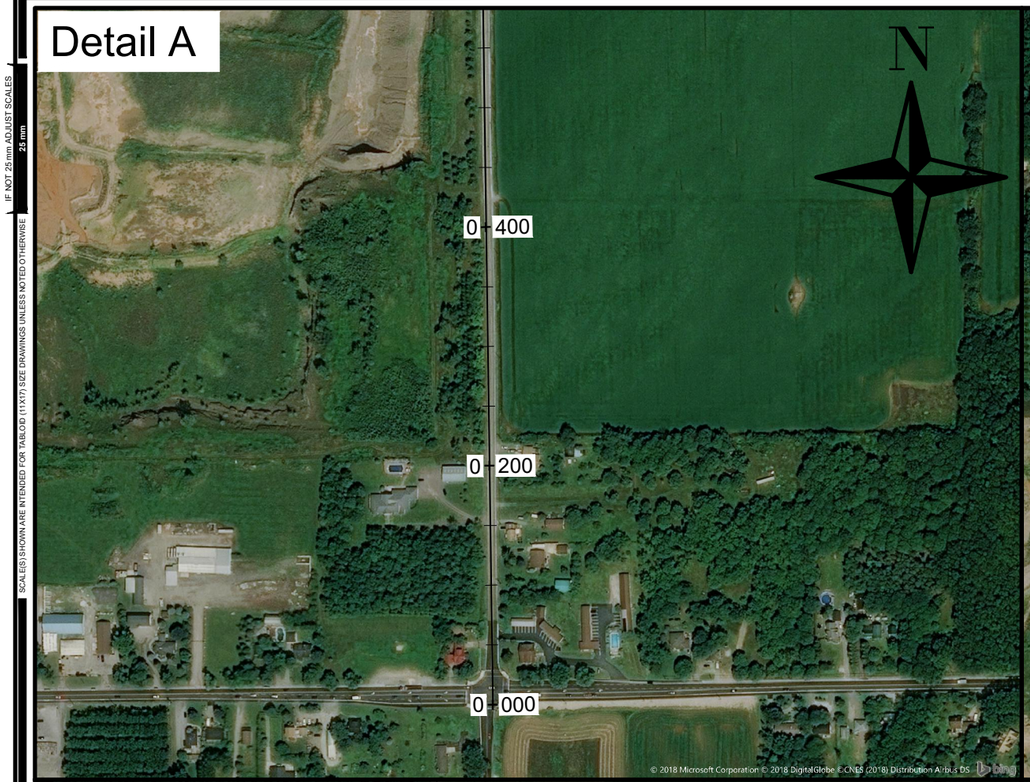

Associated Engineering

CANADA'S BEST MANAGED COMPANIES

REFERENCE ONLY

FIGURE A-2

TOWN OF PELHAM

CIVIL

STATION NOTES - EFFINGHAM STREET

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APPROVED	
DATE	20181203
REV	0
DESCRIPTION	

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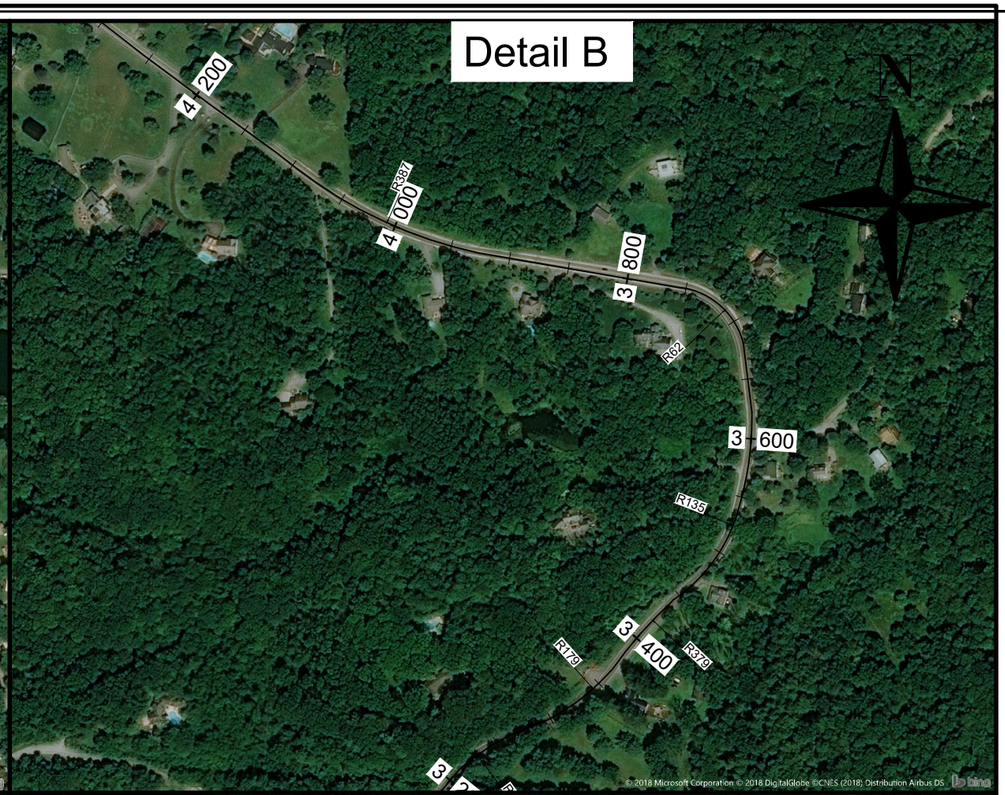
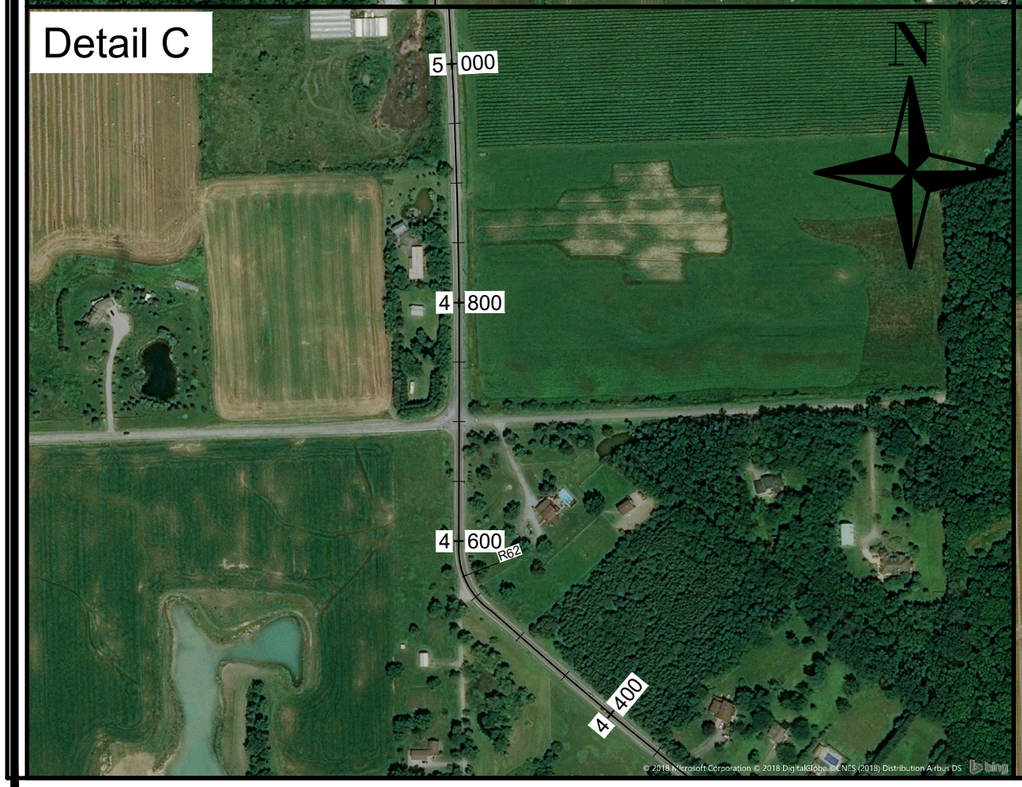
IF NOT 25 mm ADJUST SCALES
25 mm
SCALES SHOWN ARE INTENDED FOR TABLOID (11X17) SIZE DRAWINGS UNLESS NOTED OTHERWISE

Detail A

Detail B



Detail C



Detail D

Associated Engineering

CANADA'S BEST MANAGED COMPANIES

REFERENCE ONLY

FIGURE A-3

TOWN OF PELHAM

CIVIL

STATION NOTES - EFFINGHAM STREET

AE PROJECT No.	2018-5290-00
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APPROVED	
DATE	20181203
REV	0
DESCRIPTION	

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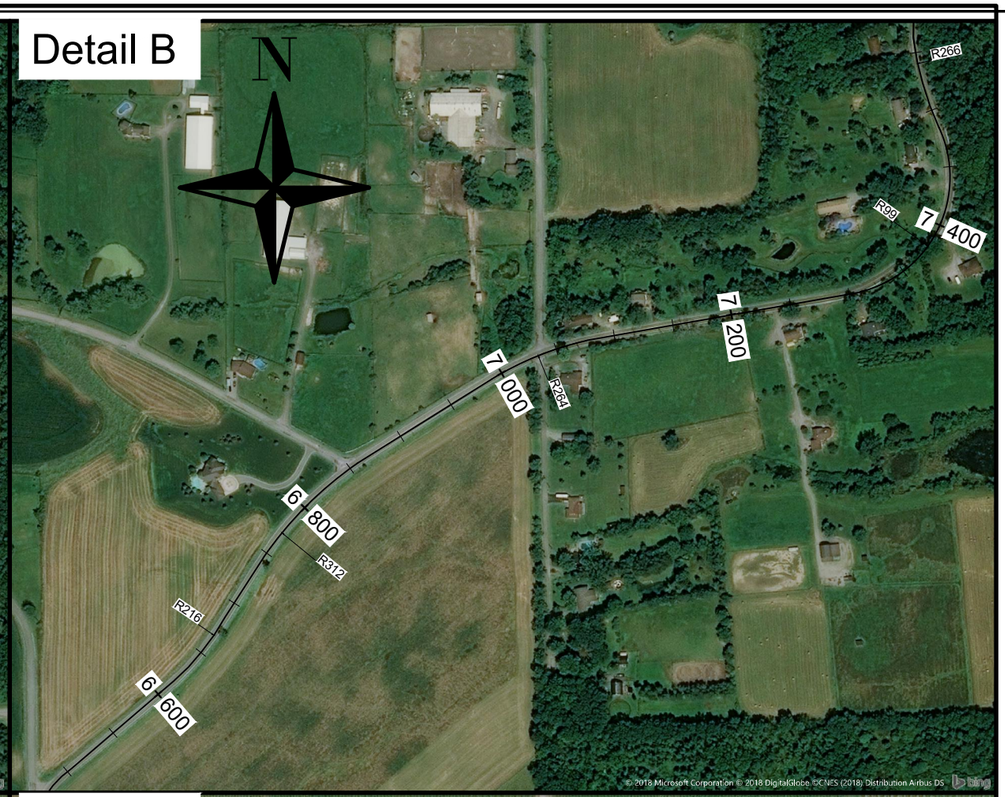
25 mm
SCALE(S) SHOWN ARE INTENDED FOR TABLOID (11X17) SIZE DRAWINGS UNLESS NOTED OTHERWISE

Detail A

Detail B



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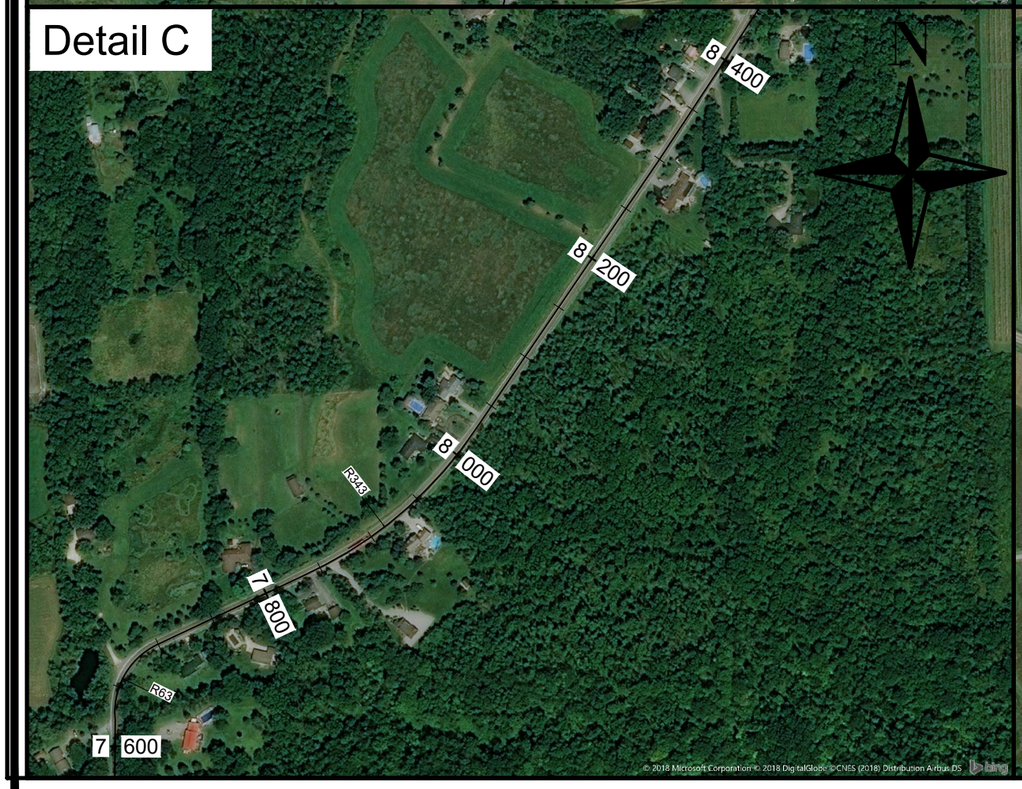
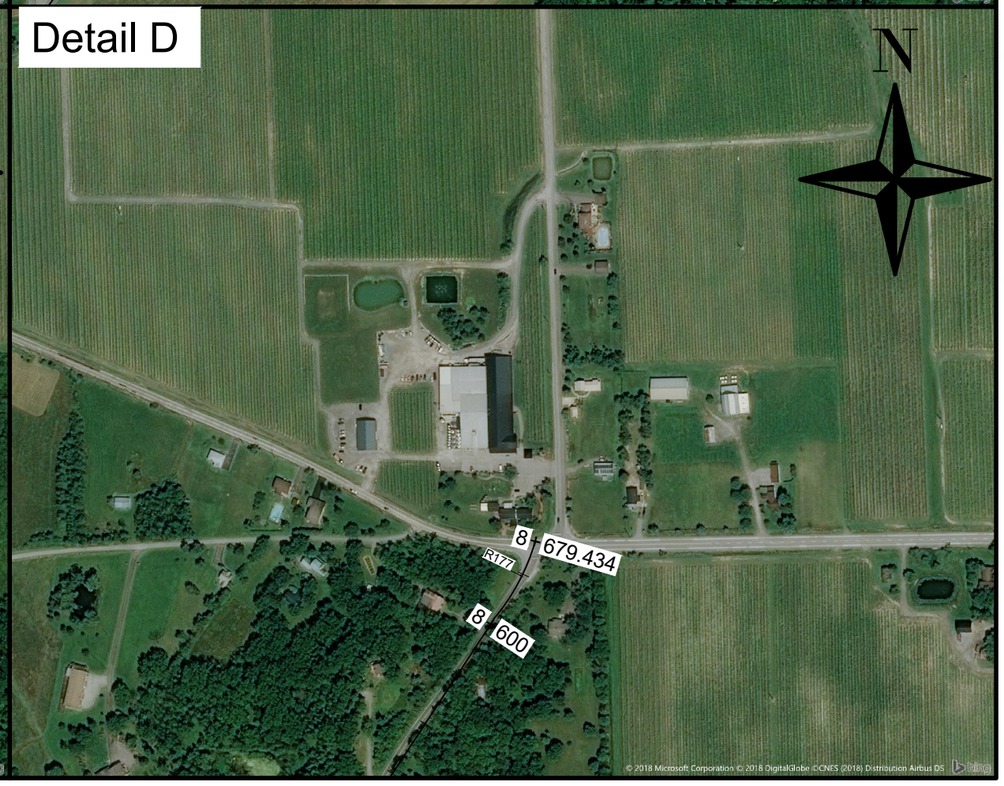


Detail D



Associated Engineering

CANADA'S BEST MANAGED COMPANIES

REFERENCE ONLY

FIGURE A-4

TOWN OF PELHAM

CIVIL

STATION NOTES - EFFINGHAM STREET

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REV	0
DESCRIPTION	

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Appendix C - Collision History

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street @ Highway 20 **Municipality.....** PELHAM

Traffic Control.... Traffic signal **Total Collisions....** 15

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
17123996A	2017-Dec-26, Tue,14:25	Clear	Rear end		East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Dry	Going ahead	Truck - dump	Other motor vehicle	Following too close	
1734751	2017-Apr-26, Wed,08:00	Clear	Rear end	P.D. only	West	Dry	Slowing or stopping	Pick-up truck	Other motor vehicle	Driving properly	
Comments:					West	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly	
17123996	2017-Dec-26, Tue,14:25	Clear	Rear end		East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Dry	Going ahead	Truck - dump	Other motor vehicle	Following too close	
1728764	2017-Apr-07, Fri,08:00	Snow	SMV other		South	Slush	Going ahead	Pick-up truck	Ran off road	Driving properly	
Comments:											
1792457	2017-Sep-25, Mon,11:30	Clear	Rear end	Non-reportable	West	Dry	Stopped	Pick-up truck	Other motor vehicle	Driving properly	
Comments:	d2 charged				West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
16104522	2016-Nov-22, Tue,19:50	Clear	Turning movement	P.D. only	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-25544s	2015-Apr-04, Sat,16:15	Clear	Rear end	Non-reportable	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Dry	Slowing or stopping	Pick-up truck	Skidding/sliding	Driving properly	
14-51663	2014-Jun-23, Mon,06:19	Clear	Rear end	P.D. only	East	Dry	Going ahead	Pick-up truck	Other motor vehicle	Following too close	
Comments:	d1 charged				East	Dry	Stopped	Passenger van	Other motor vehicle	Driving properly	
12-100632	2012-Oct-27, Sat,15:54	Rain	Rear end	P.D. only	East	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Lost control	

09-62806	2009-Jul-07, Tue,17:44	Clear	Angle	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					West	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
09-49946	2009-Jun-05, Fri,17:27	Clear	Rear end	P.D. only	North	Dry	Slowing or stopping	Pick-up truck	Other motor vehicle	Following too close
Comments:					North	Dry	Stopped	Passenger van	Other motor vehicle	Driving properly
09-111669	2009-Nov-18, Wed,15:00	Clear	Rear end	P.D. only	East	Dry	Going ahead	Passenger van	Other motor vehicle	Disobeyed traffic control
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
08-39793	2008-May-05, Mon,08:05	Clear	Angle	P.D. only	South	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Passenger van	Other motor vehicle	Failed to yield right-of-way
08-115452	2008-Nov-14, Fri,16:01	Clear	Angle	Non-fatal injury	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
08-73482	2008-Jul-28, Mon,15:09	Clear	Angle	Non-fatal injury	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street @ Tice Road **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 5

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
1747609	2017-Jun-01, Thu,18:10	Clear	Angle	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:	d1 charged				South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-69198	2015-Aug-17, Mon,10:02	Clear	Angle	P.D. only	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
14-76668	2014-Aug-31, Sun,18:30	Clear	Angle	Non-fatal injury	East	Dry	Going ahead	Passenger van	Other motor vehicle	Failed to yield right-of-way	
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
13-44137	2013-May-30, Thu,15:11	Clear	Angle	P.D. only							
Comments:											
09-9427	2009-Feb-01, Sun,18:35	Clear	SMV other	P.D. only	South	Ice	Going ahead	Pick-up truck	Skidding/sliding	Speed too fast for condition	
Comments:						Ice					

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street @ Metler Road **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 4

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
14-19807	2014-Mar-13, Thu,16:05	Clear	SMV other	P.D. only	North	Dry	Going ahead	Pick-up truck	Ran off road	Driving properly	
Comments:											
12-098912	2012-Oct-21, Sun,21:35	Clear	SMV unattended vehicle	P.D. only	West	Dry	Going ahead	Truck - open	Animal - wild	Driving properly	
Comments:						Dry					
11-46583	2011-Jun-02, Thu,20:27	Clear	Angle	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
10-51306	2010-Jun-08, Tue,17:47	Clear	Angle	P.D. only	South	Dry	Going ahead	Passenger van	Other motor vehicle	Driving properly	
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street @ Sulphur Spring Drive **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 1

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
12-12070	2012-Feb-11, Sat,08:45	Snow	SMV other	Non-fatal injury	South	Loose snow	Going ahead	Pick-up truck	Ran off road	Lost control	
Comments:						Loose snow					

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street btwn Effingham Street & Sixteen Road **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 3

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
1728399	2017-Apr-06, Thu,08:42	Rain	SMV other	P.D. only	North	Wet	Turning right	Automobile, station wagon	Ran off road	Speed too fast for condition	
Comments:	d1 charged										
13-45007	2013-Jun-01, Sat,21:32	Rain	SMV other	P.D. only							
Comments:											
10-112796	2010-Nov-22, Mon,13:30	Rain	SMV other	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Ran off road	Speed too fast for condition	
Comments:						Wet					

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street @ Roland Road **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 2

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
16110794	2016-Dec-13, Tue,14:00	Clear	Other	Non-reportable	North	Wet	Other	Automobile, station wagon			
Comments:	not contact				West	Wet	Slowing or stopping	Automobile, station wagon	Other		
1687183	2016-Sep-30, Fri,02:00	Clear	SMV other	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Tree, shrub, stump	Lost control	
Comments:	d1 charged					Dry					

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street @ Wessel Drive **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 1

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
17105922	2017-Nov-01, Wed,16:50	Rain	Approaching	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	
Comments:	d1 charged				South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street @ Sawmill Road **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 1

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
11-54250	2011-Jun-23, Thu,16:16	Clear	Turning movement	P.D. only	North	Wet	Turning left	Pick-up truck	Other motor vehicle	Driving properly	
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street @ Oille Street **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 1

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
1761525	2017-Jul-07, Fri,12:50	Clear	Angle	Non-fatal injury	South	Dry	Going ahead	Passenger van	Other motor vehicle	Disobeyed traffic control	
Comments:	d1 charged				West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street & Fifth Street Louth @ Fifth Street Louth/Pelham Road **Municipality.....** ST. CATHARINES

Traffic Control.... Stop sign **Total Collisions....** 7

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
15-66516	2015-Aug-09, Sun,11:15	Clear	Other	Non-fatal injury	North	Dry	Turning right	Automobile, station wagon		Disobeyed traffic control	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Skidding/sliding	Driving properly	
14-34241	2014-May-03, Sat,02:38	Clear	SMV other	P.D. only	West	Dry	Turning left	Automobile, station wagon	Pole (sign, parking meter)	Improper turn	
Comments:	V1 DOES NOT NEGOTIATE LEFT TURN LEAVES ROADWAY STRIKING SIGN										
14-79966	2014-Sep-09, Tue,00:00	Clear	SMV other	P.D. only	East	Dry	Going ahead	Unknown	Pole (sign, parking meter)	Lost control	
Comments:											
13-44514	2013-May-31, Fri,13:30	Clear	Rear end	P.D. only							
Comments:											
12-25324	2012-Mar-24, Sat,10:15	Rain	Rear end	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					South	Wet	Slowing or stopping	Passenger van	Other motor vehicle	Lost control	
11-12389	2011-Feb-13, Sun,16:55	Clear	Angle	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	
10-120330	2010-Dec-18, Sat,04:00	Clear	SMV other	P.D. only	South	Dry	Turning right	Automobile, station wagon	Ditch	Lost control	
Comments:						Dry					

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street btwn Highway 20 West & Tice Road **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 5

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
1728690	2017-Apr-07, Fri,01:30	Snow	SMV other	P.D. only	North	Slush	Going ahead		Pole (utility, power)		
Comments:						Slush					
1688193	2016-Oct-02, Sun,02:50	Clear	SMV other	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Animal - wild		
Comments:	deer										
12-117274	2012-Dec-02, Sun,15:04	Other	SMV other	P.D. only							
Comments:	V1 STRUCK DEER ON RIGHT SIDE										
12-112312	2012-Dec-05, Wed,18:00	Clear	SMV other	P.D. only							
Comments:	V1 STRUCK DEER WHEN IT RAN IN FRONT OF V1 THE DEER RAN AWAY										
09-5843	2009-Jan-21, Wed,04:55	Clear	SMV unattended vehicle	P.D. only	South	Loose snow	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:											

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street btwn Tice Road & Moore Drive **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 1

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
16104413	2016-Nov-18, Fri,19:00	Clear	SMV other	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Animal - wild		

Comments: deer

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street btwn Moore Drive & Metler Road **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 2

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
10-12339	2010-Feb-12, Fri,18:55	Clear	SMV unattended vehicle	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:						Dry					
09-113390	2009-Nov-23, Mon,17:41	Clear	SMV unattended vehicle	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:						Dry					

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street btwn Metler Road & Kilman Road **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 5

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
1728684	2017-Apr-07, Fri,07:05	Snow	SMV other		North	Loose snow	Going ahead	Automobile, station wagon	Ditch	Driving properly	
Comments:											
13-17077	2013-Mar-03, Sun,19:03	Snow	SMV other	P.D. only							
Comments:	V1 STRIKES DEER										
11-4034	2011-Jan-15, Sat,15:54	Clear	SMV other	P.D. only	North	Slush	Going ahead	Passenger van	Skidding/sliding	Exceeding speed limit	
Comments:						Slush					
10-117946	2010-Dec-09, Thu,23:03	Clear	SMV unattended vehicle	P.D. only	North	Dry	Going ahead	Pick-up truck	Animal - wild	Driving properly	
Comments:											
10-103788	2010-Oct-25, Mon,16:09	Rain	SMV other	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Skidding/sliding	Speed too fast for condition	
Comments:						Wet					

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street btwn Kilman Road & Sulphur Spring Drive **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 7

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
171636	2017-Jan-06, Fri,14:35	Snow	Approaching	P.D. only	North	Ice	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control	
Comments:	d1 charged				South		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
15-32146s	2015-Apr-25, Sat,00:05	Clear	SMV other	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	deer										
15-6450	2015-Jan-24, Sat,16:58	Freezing Rain	SMV other	Non-fatal injury	North	Ice	Going ahead	Passenger van	Skidding/sliding	Speed too fast for condition	
Comments:											
15-84392s	2015-Sep-29, Tue,11:15	Rain	SMV other	Non-reportable	North	Wet	Slowing or stopping	Pick-up truck	Skidding/sliding	Lost control	
Comments:											
14-58048s	2014-Jul-10, Thu,06:40	Clear	SMV other		North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	struck deer										
10-122182	2010-Dec-24, Fri,12:26	Clear	SMV other	P.D. only	North	Ice	Going ahead	Automobile, station wagon	Pole (sign, parking meter)	Driving properly	
Comments:						Ice					
10-100100	2010-Oct-14, Thu,21:00	Clear	SMV other	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Ran off road	Lost control	
Comments:						Dry					

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street btwn Sulphur Spring Drive & Effingham Street **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 10

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
17119166	2017-Dec-11, Mon,17:45	Snow	SMV other		South	Ice	Turning right	Automobile, station wagon	Ditch	Lost control	
Comments:											
14-108373	2014-Dec-10, Wed,21:23	Snow	SMV other	P.D. only	South	Ice	Going ahead	Automobile, station wagon	Ran off road	Lost control	
Comments:											
14-16625	2014-Mar-01, Sat,20:18	Snow	SMV other	P.D. only	South	Loose snow	Going ahead	Other	Ran off road	Lost control	
Comments:											
13-110007	2013-Dec-13, Fri,21:55	Snow	SMV other	P.D. only	South	Slush	Going ahead	Truck - dump	Ran off road	Speed too fast for condition	
Comments:											
12-106085	2012-Nov-13, Tue,22:30	Clear	SMV unattended vehicle	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:						Dry					
12-106939	2012-Nov-17, Sat,23:24	Fog, mist, smoke, dust	SMV other	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Ran off road	Speed too fast for condition	
Comments:						Dry					
10-96710	2010-Oct-25, Mon,09:41	Rain	SMV other	P.D. only	South	Wet	Turning right	Automobile, station wagon	Pole (utility, power)	Lost control	
Comments:						Wet					
10-102424	2010-Oct-21, Thu,16:05	Rain	Approaching	P.D. only	North	Wet	Slowing or stopping	Delivery van	Other motor vehicle	Driving properly	
Comments:					South	Wet	Going ahead	Pick-up truck	Other motor vehicle	Speed too fast for condition	
09-83193	2009-Aug-22, Sat,21:45	Rain	SMV other	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:											
09-49923	2009-Jun-05, Fri,16:25	Clear	SMV other	Non-fatal injury	South	Loose sand or gravel	Going ahead	Motorcycle	Skidding/sliding	Exceeding speed limit	
Comments:											

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street btwn Sixteen Road & Roland Road **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 13

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
1615670	2016-Feb-27, Sat,14:50	Clear	SMV other	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	Deer										
1695256	2016-Oct-24, Mon,06:00	Clear	SMV other	Non-reportable	North	Dry	Going ahead	Automobile, station wagon	Animal - wild		
Comments:	deer					Dry					
15-78896	2015-Sep-13, Sun,11:38	Clear	Sideswipe	Non-fatal injury	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper passing	
Comments:					North	Dry	Overtaking	Automobile, station wagon	Other motor vehicle	Driving properly	
15-73282s	2015-Aug-28, Fri,05:30	Clear	SMV other	Non-reportable	North	Dry	Going ahead	Pick-up truck	Animal - wild	Driving properly	
Comments:	Deer										
15-3031s	2015-Jan-11, Sun,21:50	Clear	SMV other	Non-reportable	North	Loose snow	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	Deer										
14-111522	2014-Dec-21, Sun,19:00	Clear	SMV other	P.D. only	North	Dry	Going ahead	Pick-up truck	Animal - wild	Driving properly	
Comments:	v1 swerved to miss deer										
15-37837s	2014-Dec-04, Thu,21:00	Clear	SMV other	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	Deer										
14-5739	2014-Jan-21, Tue,16:39	Clear	SMV other	P.D. only	South	Loose snow	Going ahead	Automobile, station wagon	Ditch	Lost control	
Comments:											
13-022206	2013-Mar-21, Thu,20:30	Clear	SMV unattended vehicle	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:						Dry					
11-5734	2011-Jan-21, Fri,18:07	Clear	SMV other	Non-fatal injury	North	Packed snow	Going ahead	Automobile, station wagon	Ditch	Lost control	
Comments:											

10-122284	2010-Dec-24, Fri,20:50	Clear	SMV unattended vehicle	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:						Dry				
10-122703	2010-Dec-27, Mon,07:49	Clear	SMV other	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Ditch	Lost control
Comments:						Dry				
10-9905	2010-Feb-03, Wed,19:39	Clear	SMV unattended vehicle	P.D. only	East	Wet	Going ahead	Truck-other	Animal - wild	Driving properly
Comments:										

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street btwn Sawmill Road & Oille Street **Municipality.....** PELHAM

Traffic Control.... Unknown **Total Collisions....** 1

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
15108716	2015-Dec-17, Thu,09:09	Clear	Other	P.D. only	West	Dry	Reversing	Pick-up truck	Other motor vehicle	Lost control	
Comments:					North		Stopped	Pick-up truck	Other motor vehicle	Driving properly	

Collision Details Report

From: January 1, 2008 **To:** December 30, 2017

Location ..... Effingham Street btwn Oille Street & Fifth Street Louth & Pelham Road **Municipality.....** PELHAM

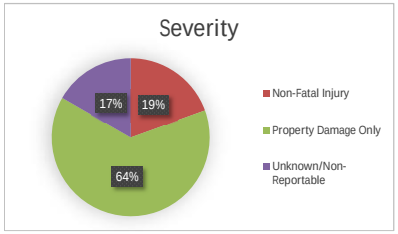
Traffic Control.... Unknown **Total Collisions....** 21

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
17113597	2017-Nov-25, Sat,10:10	Rain	SMV other	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Pole (utility, power)	Lost control	
Comments:	d1 charged										
1793971	2017-Sep-29, Fri,10:57	Rain	SMV other	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Skidding/sliding	Driving properly	
Comments:											
1728676	2017-Apr-07, Fri,06:04	Snow	SMV other	P.D. only	South	Slush	Going ahead	Automobile, station wagon	Ran off road	Speed too fast for condition	
Comments:	d1 charged										
1784865	2017-Sep-05, Tue,15:45	Clear	SMV other	P.D. only	North	Dry	Making "U" turn	Automobile, station wagon	Ditch	Lost control	
Comments:											
15-40855	2015-May-24, Sun,12:01	Clear	SMV other	Other	South	Dry	Going ahead	Motorcycle	Skidding/sliding	Lost control	
Comments:											
15-56455	2015-Jul-10, Fri,21:26	Clear	SMV other	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	Deer										
15-14090s	2015-Feb-20, Fri,21:00	Clear	SMV other	Non-reportable	South	Slush	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	Deer										
14-84452	2014-Sep-23, Tue,18:30	Clear	Approaching	Fatal injury	South	Dry	Going ahead	Pick-up truck	Other motor vehicle	Speed too fast for condition	
Comments:					North		Going ahead	Motorcycle	Other motor vehicle	Driving properly	
14-17517	2014-Mar-05, Wed,07:53	Snow	SMV other	P.D. only	North	Loose snow	Going ahead	Automobile, station wagon	Steel guide rail	Driving properly	
Comments:											
14-102359	2014-Nov-19, Wed,15:30	Snow	Approaching	P.D. only	North	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	
Comments:					South		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

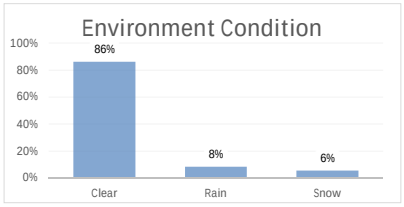
13-98338	2013-Nov-02, Sat,17:00	Clear	Approaching	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Skidding/sliding	Lost control
Comments:					South		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
13-7506	2013-Jan-28, Mon,05:43	Snow	SMV other	P.D. only						
Comments:										
13-96290	2013-Oct-27, Sun,16:15	Clear	Approaching	P.D. only	North	Dry	Going ahead	Bicycle	Other motor vehicle	Improper turn
Comments:					South	Dry	Going ahead	Automobile, station wagon	Cyclist	Driving properly
12-3478	2012-Jan-13, Fri,10:50	Drifting Snow	Approaching	P.D. only	West	Packed snow	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					East	Packed snow	Going ahead	Automobile, station wagon	Skidding/sliding	Driving properly
11-51577	2011-Jun-16, Thu,16:45	Rain	SMV other	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Ran off road	Lost control
Comments:						Wet				
11-2941	2011-Jan-11, Tue,16:14	Clear	SMV other	P.D. only	East	Dry	Going ahead	Passenger van	Skidding/sliding	Lost control
Comments:										
11-6670	2011-Jan-25, Tue,07:00	Clear	SMV unattended vehicle	P.D. only	North	Packed snow	Going ahead	Pick-up truck	Animal - wild	Driving properly
Comments:						Packed snow				
10-123475	2010-Dec-30, Thu,07:45	Clear	SMV unattended vehicle	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:						Dry				
10-121353	2010-Dec-21, Tue,14:55	Snow	SMV other	P.D. only	North	Packed snow	Parked	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Packed snow	Going ahead	Automobile, station wagon	Other motor vehicle	
10-2089	2010-Jan-08, Fri,09:26	Snow	SMV other	P.D. only	South	Loose snow	Going ahead	Automobile, station wagon	Skidding/sliding	Lost control
Comments:						Loose snow				
08-108977	2008-Oct-26, Sun,20:30	Clear	SMV other	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Ran off road	Speed too fast for condition
Comments:										

Figure C1: Intersection Collision Characteristics Summary (January 1, 2008 - December 30, 2017)
Effingham Street - All

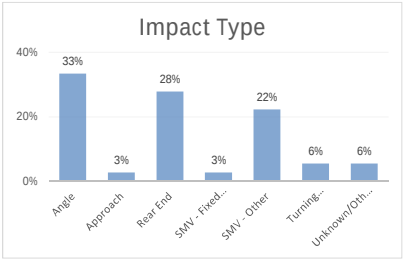
Severity		
Non-Fatal Injury	7	19%
Property Damage Only	23	64%
Unknown/Non-Reportable	6	17%
Total	36	100%



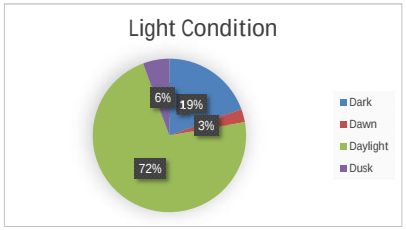
Environment Condition		
Clear	31	86%
Rain	3	8%
Snow	2	6%
Total	36	100%



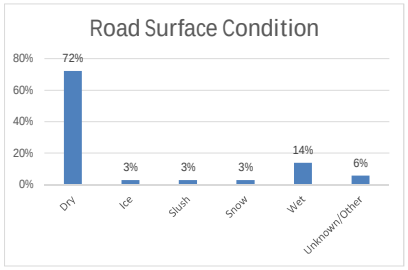
Impact Type		
Angle	12	33%
Approach	1	3%
Rear End	10	28%
SMV - Fixed Object	1	3%
SMV - Other	8	22%
Turning Movement	2	6%
Unknown/Other	2	6%
Total	36	100%

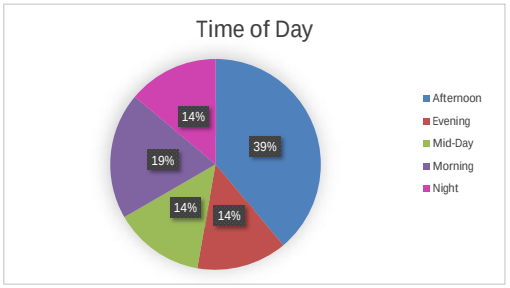


Light Condition		
Dark	7	19%
Dawn	1	3%
Daylight	26	72%
Dusk	2	6%
Total	36	100%

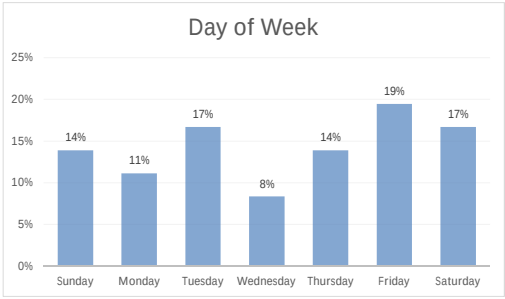


Road Surface Condtion		
Dry	26	72%
Ice	1	3%
Slush	1	3%
Snow	1	3%
Wet	5	14%
Unknown/Other	2	6%
Total	36	100%

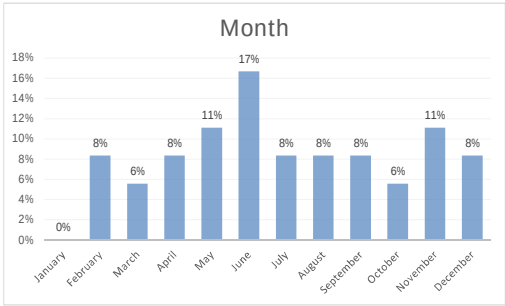




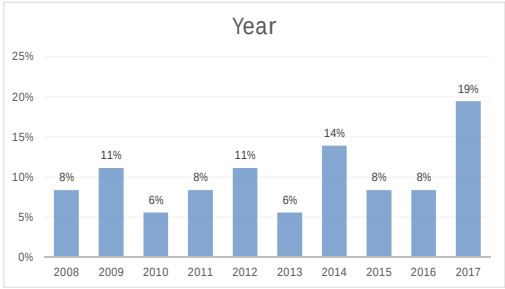
Time of Day		
Afternoon	14	39%
Evening	5	14%
Mid-Day	5	14%
Morning	7	19%
Night	5	14%
Total	36	100%



Day of Week		
Sunday	5	14%
Monday	4	11%
Tuesday	6	17%
Wednesday	3	8%
Thursday	5	14%
Friday	7	19%
Saturday	6	17%
Total	36	100%



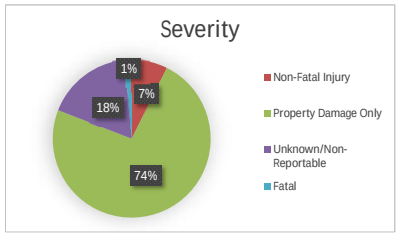
Month		
January	0	0%
February	3	8%
March	2	6%
April	3	8%
May	4	11%
June	6	17%
July	3	8%
August	3	8%
September	3	8%
October	2	6%
November	4	11%
December	3	8%
Total	36	100%



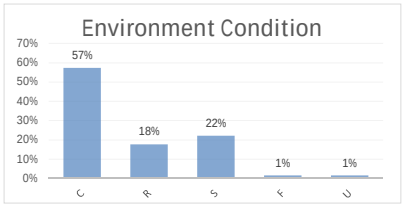
Year		
2008	3	8%
2009	4	11%
2010	2	6%
2011	3	8%
2012	4	11%
2013	2	6%
2014	5	14%
2015	3	8%
2016	3	8%
2017	7	19%
Total	36	100%

Figure C2: Midblock Collision Characteristics Summary (January 1, 2008 - December 30, 2017)
Effingham Street - All

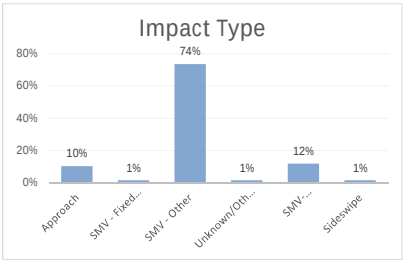
Severity		
Non-Fatal Injury	5	7%
Property Damage Only	50	74%
Unknown/Non-Reportable	12	18%
Fatal	1	1%
Total	68	100%



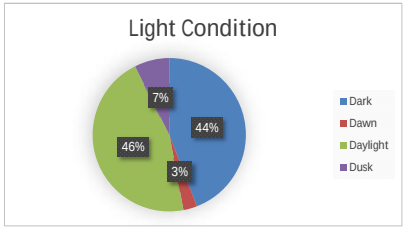
Environment Condition		
Clear	39	57%
Rain	12	18%
Snow	15	22%
Fog	1	1%
Unknown/Other	1	1%
Total	68	100%



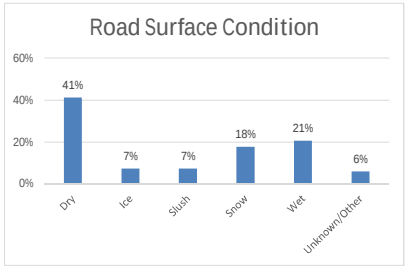
Impact Type		
Approach	7	10%
SMV - Fixed Object	1	1%
SMV - Other	50	74%
Unknown/Other	1	1%
SMV- Unattended Vehicle	8	12%
Sideswipe	1	1%
Total	68	100%



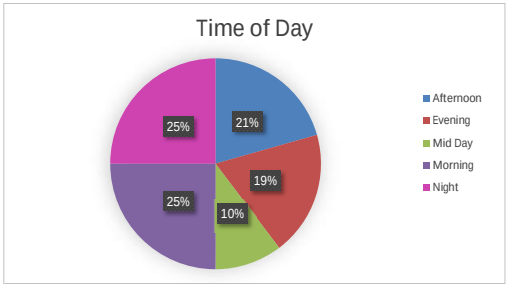
Light Condition		
Dark	30	44%
Dawn	2	3%
Daylight	31	46%
Dusk	5	7%
Total	68	100%



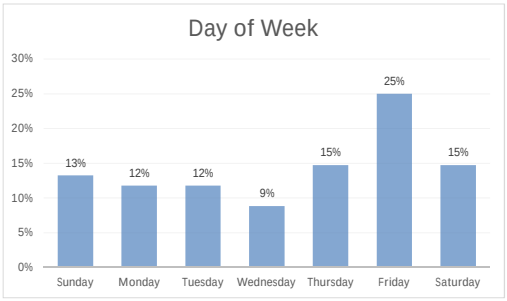
Road Surface Condtion		
Dry	28	41%
Ice	5	7%
Slush	5	7%
Snow	12	18%
Wet	14	21%
Unknown/Other	4	6%
Total	68	100%



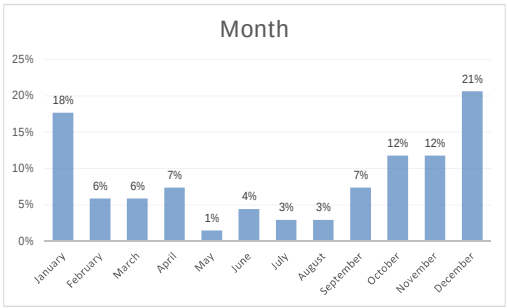
Time of Day		
Afternoon	14	21%
Evening	13	19%
Mid Day	7	10%
Morning	17	25%
Night	17	25%
Total	68	100%



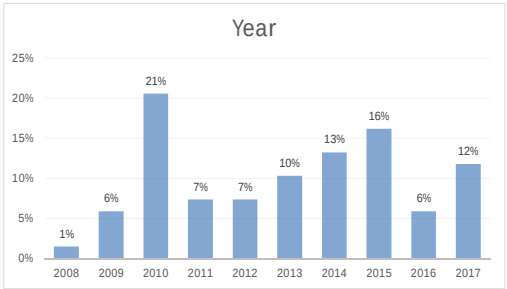
Day of Week		
Sunday	9	13%
Monday	8	12%
Tuesday	8	12%
Wednesday	6	9%
Thursday	10	15%
Friday	17	25%
Saturday	10	15%
Total	68	100%



Month		
January	12	18%
February	4	6%
March	4	6%
April	5	7%
May	1	1%
June	3	4%
July	2	3%
August	2	3%
September	5	7%
October	8	12%
November	8	12%
December	14	21%
Total	68	100%



Year		
2008	1	1%
2009	4	6%
2010	14	21%
2011	5	7%
2012	5	7%
2013	7	10%
2014	9	13%
2015	11	16%
2016	4	6%
2017	8	12%
Total	68	100%



Appendix D - ATR Data

Vehicle Volume Study

Town ID	47
Road Name	Effingham Street between Tice Road to Metler Road
Location	420m South of Metler Rd
Date	June 6, 2018
Posted Limit	50

Time	TotPN	TotSS
0000	2	1
0015	0	1
0030	0	1
0045	0	1
0100	1	0
0115	0	1
0130	0	1
0145	0	0
0200	0	0
0215	0	0
0230	0	0
0245	0	1
0300	0	0
0315	0	0
0330	0	0
0345	1	0
0400	1	0
0415	0	1
0430	0	0
0445	1	0
0500	1	1
0515	3	6
0530	2	1
0545	8	1
0600	3	4
0615	9	0
0630	12	9
0645	8	6
0700	11	8
0715	12	7
0730	23	16
0745	35	15
0800	36	16
0815	17	10
0830	24	7
0845	17	11
0900	25	10
0915	18	7
0930	11	13
0945	11	10
1000	10	9
1015	14	8
1030	14	7
1045	17	16
1100	12	11
1115	13	16
1130	11	7
1145	12	14
1200	7	8
1215	17	10
1230	15	15
1245	9	14
1300	16	26
1315	14	12
1330	12	11
1345	7	13
1400	10	16
1415	15	16
1430	21	16
1445	15	19
1500	16	21
1515	19	18
1530	19	14
1545	18	21
1600	13	30
1615	22	33
1630	14	24
1645	19	48
1700	22	25
1715	23	34
1730	20	15
1745	23	18
1800	16	15
1815	14	19
1830	18	13
1845	18	12
1900	17	17
1915	8	17
1930	8	10
1945	23	13
2000	11	10
2015	7	13
2030	7	8
2045	7	7
2100	7	7
2115	8	11
2130	4	4
2145	3	4
2200	5	5
2215	3	1
2230	5	3
2245	1	1
2300	2	2
2315	1	4
2330	1	0
2345	0	2
06-09	**207**	**109**
11-14	**145**	**157**
15-18	**228**	**301**
Total	**975**	**929**
AM Peak Hour	**0730**	
Volume	**168**	
PM Peak Hour	**1630**	
Volume	**209**	

Vehicle Classification Study

Town ID 47
Road Name Effingham Street between Tice Road to Metler Road
Location 420m South of Metler Rd
Date June 6, 2018
Posted Limit 50

Time	Dir	Bikes	Cars & Trailers	2 Axle 4 Tires	Buses	2 Axle 6 Tires	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Total
		1	2	3	4	5	6	7	8	9	10	11	12	13	
0000	N	0	1	1	0	0	0	0	0	0	0	0	0	0	2
0000	S	0	1	0	0	0	0	0	0	0	0	0	0	0	1
0015	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0015	S	0	1	0	0	0	0	0	0	0	0	0	0	0	1
0030	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0030	S	0	0	1	0	0	0	0	0	0	0	0	0	0	1
0045	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0045	S	0	1	0	0	0	0	0	0	0	0	0	0	0	1
0100	N	0	1	0	0	0	0	0	0	0	0	0	0	0	1
0100	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0115	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0115	S	0	0	1	0	0	0	0	0	0	0	0	0	0	1
0130	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0130	S	0	1	0	0	0	0	0	0	0	0	0	0	0	1
0145	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0145	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0200	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0200	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0215	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0215	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0230	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0230	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0245	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0245	S	0	1	0	0	0	0	0	0	0	0	0	0	0	1
0300	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0300	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0315	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0315	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0330	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0330	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0345	N	0	1	0	0	0	0	0	0	0	0	0	0	0	1
0345	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0400	N	0	0	1	0	0	0	0	0	0	0	0	0	0	1
0400	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0415	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0415	S	0	0	1	0	0	0	0	0	0	0	0	0	0	1
0430	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0430	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0445	N	0	0	1	0	0	0	0	0	0	0	0	0	0	1
0445	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0500	N	0	1	0	0	0	0	0	0	0	0	0	0	0	1
0500	S	0	0	1	0	0	0	0	0	0	0	0	0	0	1
0515	N	0	3	0	0	0	0	0	0	0	0	0	0	0	3
0515	S	0	3	1	0	0	1	0	0	1	0	0	0	0	6
0530	N	0	2	0	0	0	0	0	0	0	0	0	0	0	2
0530	S	0	1	0	0	0	0	0	0	0	0	0	0	0	1
0545	N	0	2	6	0	0	0	0	0	0	0	0	0	0	8
0545	S	0	1	0	0	0	0	0	0	0	0	0	0	0	1
0600	N	0	3	0	0	0	0	0	0	0	0	0	0	0	3
0600	S	0	0	1	1	0	0	0	0	1	1	0	0	0	4
0615	N	0	5	4	0	0	0	0	0	0	0	0	0	0	9
0615	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0630	N	0	5	7	0	0	0	0	0	0	0	0	0	0	12
0630	S	0	4	4	0	1	0	0	0	0	0	0	0	0	9
0645	N	0	5	2	1	0	0	0	0	0	0	0	0	0	8
0645	S	0	4	2	0	0	0	0	0	0	0	0	0	0	6
0700	N	0	7	4	0	0	0	0	0	0	0	0	0	0	11
0700	S	0	7	1	0	0	0	0	0	0	0	0	0	0	8
0715	N	1	9	2	0	0	0	0	0	0	0	0	0	0	12
0715	S	0	3	3	0	1	0	0	0	0	0	0	0	0	7
0730	N	0	16	6	1	0	0	0	0	0	0	0	0	0	23
0730	S	1	9	3	1	1	0	0	0	1	0	0	0	0	16
0745	N	2	26	5	0	0	2	0	0	0	0	0	0	0	35
0745	S	0	10	4	0	1	0	0	0	0	0	0	0	0	15

0800	N	1	31	3	0	1	0	0	0	0	0	0	0	0	36
0800	S	0	9	4	2	0	0	0	1	0	0	0	0	0	16
0815	N	1	15	1	0	0	0	0	0	0	0	0	0	0	17
0815	S	0	3	3	1	1	1	0	0	0	1	0	0	0	10
0830	N	0	20	4	0	0	0	0	0	0	0	0	0	0	24
0830	S	0	4	2	1	0	0	0	0	0	0	0	0	0	7
0845	N	0	11	5	0	0	0	0	0	0	1	0	0	0	17
0845	S	0	10	0	0	1	0	0	0	0	0	0	0	0	11
0900	N	0	19	6	0	0	0	0	0	0	0	0	0	0	25
0900	S	0	7	2	0	1	0	0	0	0	0	0	0	0	10
0915	N	0	15	1	0	1	0	0	0	0	1	0	0	0	18
0915	S	0	3	3	0	1	0	0	0	0	0	0	0	0	7
0930	N	0	8	3	0	0	0	0	0	0	0	0	0	0	11
0930	S	0	8	4	0	1	0	0	0	0	0	0	0	0	13
0945	N	0	7	4	0	0	0	0	0	0	0	0	0	0	11
0945	S	0	6	2	0	1	1	0	0	0	0	0	0	0	10
1000	N	0	9	0	0	0	1	0	0	0	0	0	0	0	10
1000	S	0	4	5	0	0	0	0	0	0	0	0	0	0	9
1015	N	0	12	1	0	0	0	0	1	0	0	0	0	0	14
1015	S	0	4	3	0	1	0	0	0	0	0	0	0	0	8
1030	N	2	7	5	0	0	0	0	0	0	0	0	0	0	14
1030	S	0	6	1	0	0	0	0	0	0	0	0	0	0	7
1045	N	0	15	2	0	0	0	0	0	0	0	0	0	0	17
1045	S	0	9	6	0	1	0	0	0	0	0	0	0	0	16
1100	N	0	8	2	0	2	0	0	0	0	0	0	0	0	12
1100	S	0	7	4	0	0	0	0	0	0	0	0	0	0	11
1115	N	0	10	2	0	1	0	0	0	0	0	0	0	0	13
1115	S	0	11	5	0	0	0	0	0	0	0	0	0	0	16
1130	N	1	8	2	0	0	0	0	0	0	0	0	0	0	11
1130	S	0	3	4	0	0	0	0	0	0	0	0	0	0	7
1145	N	0	9	3	0	0	0	0	0	0	0	0	0	0	12
1145	S	0	10	4	0	0	0	0	0	0	0	0	0	0	14
1200	N	0	5	2	0	0	0	0	0	0	0	0	0	0	7
1200	S	0	3	3	1	0	1	0	0	0	0	0	0	0	8
1215	N	0	14	3	0	0	0	0	0	0	0	0	0	0	17
1215	S	0	7	3	0	0	0	0	0	0	0	0	0	0	10
1230	N	0	12	2	0	1	0	0	0	0	0	0	0	0	15
1230	S	1	7	5	0	2	0	0	0	0	0	0	0	0	15
1245	N	0	7	1	0	0	1	0	0	0	0	0	0	0	9
1245	S	0	7	7	0	0	0	0	0	0	0	0	0	0	14
1300	N	1	10	4	0	1	0	0	0	0	0	0	0	0	16
1300	S	0	15	9	0	1	1	0	0	0	0	0	0	0	26
1315	N	0	13	0	0	0	1	0	0	0	0	0	0	0	14
1315	S	1	9	2	0	0	0	0	0	0	0	0	0	0	12
1330	N	0	8	3	0	1	0	0	0	0	0	0	0	0	12
1330	S	0	5	4	0	2	0	0	0	0	0	0	0	0	11
1345	N	0	5	2	0	0	0	0	0	0	0	0	0	0	7
1345	S	0	7	5	0	1	0	0	0	0	0	0	0	0	13
1400	N	0	5	2	0	2	1	0	0	0	0	0	0	0	10
1400	S	0	12	3	0	1	0	0	0	0	0	0	0	0	16
1415	N	0	12	2	1	0	0	0	0	0	0	0	0	0	15
1415	S	0	9	4	2	1	0	0	0	0	0	0	0	0	16
1430	N	1	11	8	1	0	0	0	0	0	0	0	0	0	21
1430	S	0	9	5	0	1	0	0	0	0	1	0	0	0	16
1445	N	2	10	1	0	0	2	0	0	0	0	0	0	0	15
1445	S	1	11	6	1	0	0	0	0	0	0	0	0	0	19
1500	N	0	10	6	0	0	0	0	0	0	0	0	0	0	16
1500	S	0	10	11	0	0	0	0	0	0	0	0	0	0	21
1515	N	1	14	2	1	0	0	1	0	0	0	0	0	0	19
1515	S	0	16	1	0	1	0	0	0	0	0	0	0	0	18
1530	N	0	17	1	1	0	0	0	0	0	0	0	0	0	19
1530	S	0	8	4	0	2	0	0	0	0	0	0	0	0	14
1545	N	0	14	3	1	0	0	0	0	0	0	0	0	0	18
1545	S	1	13	7	0	0	0	0	0	0	0	0	0	0	21
1600	N	0	11	2	0	0	0	0	0	0	0	0	0	0	13
1600	S	3	17	6	1	3	0	0	0	0	0	0	0	0	30
1615	N	0	12	7	1	1	1	0	0	0	0	0	0	0	22
1615	S	0	19	12	0	2	0	0	0	0	0	0	0	0	33
1630	N	1	12	1	0	0	0	0	0	0	0	0	0	0	14
1630	S	3	11	7	0	2	1	0	0	0	0	0	0	0	24
1645	N	0	16	3	0	0	0	0	0	0	0	0	0	0	19
1645	S	2	30	15	0	0	0	1	0	0	0	0	0	0	48
1700	N	1	16	4	0	0	0	0	0	1	0	0	0	0	22
1700	S	0	17	7	0	1	0	0	0	0	0	0	0	0	25
1715	N	2	14	5	1	0	0	0	0	1	0	0	0	0	23
1715	S	1	23	8	0	2	0	0	0	0	0	0	0	0	34
1730	N	0	16	4	0	0	0	0	0	0	0	0	0	0	20
1730	S	1	12	2	0	0	0	0	0	0	0	0	0	0	15
1745	N	0	22	1	0	0	0	0	0	0	0	0	0	0	23
1745	S	0	15	2	1	0	0	0	0	0	0	0	0	0	18

1800	N	0	13	3	0	0	0	0	0	0	0	0	0	0	0	16
1800	S	0	14	1	0	0	0	0	0	0	0	0	0	0	0	15
1815	N	0	10	4	0	0	0	0	0	0	0	0	0	0	0	14
1815	S	1	16	2	0	0	0	0	0	0	0	0	0	0	0	19
1830	N	0	15	3	0	0	0	0	0	0	0	0	0	0	0	18
1830	S	0	8	5	0	0	0	0	0	0	0	0	0	0	0	13
1845	N	2	13	3	0	0	0	0	0	0	0	0	0	0	0	18
1845	S	0	10	2	0	0	0	0	0	0	0	0	0	0	0	12
1900	N	1	14	1	0	0	0	1	0	0	0	0	0	0	0	17
1900	S	0	11	6	0	0	0	0	0	0	0	0	0	0	0	17
1915	N	0	7	1	0	0	0	0	0	0	0	0	0	0	0	8
1915	S	0	12	5	0	0	0	0	0	0	0	0	0	0	0	17
1930	N	0	8	0	0	0	0	0	0	0	0	0	0	0	0	8
1930	S	0	7	3	0	0	0	0	0	0	0	0	0	0	0	10
1945	N	6	12	3	0	0	0	2	0	0	0	0	0	0	0	23
1945	S	0	9	3	0	1	0	0	0	0	0	0	0	0	0	13
2000	N	1	9	1	0	0	0	0	0	0	0	0	0	0	0	11
2000	S	1	6	3	0	0	0	0	0	0	0	0	0	0	0	10
2015	N	1	4	2	0	0	0	0	0	0	0	0	0	0	0	7
2015	S	1	11	1	0	0	0	0	0	0	0	0	0	0	0	13
2030	N	0	6	1	0	0	0	0	0	0	0	0	0	0	0	7
2030	S	0	5	3	0	0	0	0	0	0	0	0	0	0	0	8
2045	N	2	4	1	0	0	0	0	0	0	0	0	0	0	0	7
2045	S	0	5	2	0	0	0	0	0	0	0	0	0	0	0	7
2100	N	0	6	1	0	0	0	0	0	0	0	0	0	0	0	7
2100	S	0	5	2	0	0	0	0	0	0	0	0	0	0	0	7
2115	N	0	6	2	0	0	0	0	0	0	0	0	0	0	0	8
2115	S	0	7	4	0	0	0	0	0	0	0	0	0	0	0	11
2130	N	0	2	2	0	0	0	0	0	0	0	0	0	0	0	4
2130	S	0	2	1	0	1	0	0	0	0	0	0	0	0	0	4
2145	N	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
2145	S	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
2200	N	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
2200	S	0	4	1	0	0	0	0	0	0	0	0	0	0	0	5
2215	N	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
2215	S	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
2230	N	0	4	1	0	0	0	0	0	0	0	0	0	0	0	5
2230	S	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
2245	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
2245	S	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
2300	N	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
2300	S	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
2315	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
2315	S	0	3	1	0	0	0	0	0	0	0	0	0	0	0	4
2330	N	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
2330	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2345	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2345	S	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	**N**	**30**	**725**	**182**	**9**	**11**	**9**	**4**	**1**	**2**	**2**	**0**	**0**	**0**	**975**	
% Totals		**3.1%**	**74.4%**	**18.7%**	**0.9%**	**1.1%**	**0.9%**	**0.4%**	**0.1%**	**0.2%**	**0.2%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**	
Total	**S**	**18**	**590**	**259**	**12**	**36**	**6**	**1**	**1**	**3**	**3**	**0**	**0**	**0**	**929**	
% Totals		**1.9%**	**63.5%**	**27.9%**	**1.3%**	**3.9%**	**0.6%**	**0.1%**	**0.1%**	**0.3%**	**0.3%**	**0.0%**	**0.0%**	**0.0%**	**100.0%**	

Vehicle Speed Study

Town ID 47
Road Name Effingham Street between Tice Road to Metler Road
Location 420m South of Metler Rd
Date June 6, 2018
Posted Limit 50

Time	Dir	Vbin 0 40	Vbin 40 50	Vbin 50 60	Vbin 60 70	Vbin 70 80	Vbin 80 90	Vbin 90 100	Vbin 100 200	Total
0000	N	0	0	0	1	0	1	0	0	2
0000	S	0	0	1	0	0	0	0	0	1
0015	N	0	0	0	0	0	0	0	0	0
0015	S	0	0	0	0	1	0	0	0	1
0030	N	0	0	0	0	0	0	0	0	0
0030	S	0	0	1	0	0	0	0	0	1
0045	N	0	0	0	0	0	0	0	0	0
0045	S	0	0	0	0	0	0	1	0	1
0100	N	0	0	0	0	0	1	0	0	1
0100	S	0	0	0	0	0	0	0	0	0
0115	N	0	0	0	0	0	0	0	0	0
0115	S	0	0	0	0	0	0	0	1	1
0130	N	0	0	0	0	0	0	0	0	0
0130	S	0	0	0	0	1	0	0	0	1
0145	N	0	0	0	0	0	0	0	0	0
0145	S	0	0	0	0	0	0	0	0	0
0200	N	0	0	0	0	0	0	0	0	0
0200	S	0	0	0	0	0	0	0	0	0
0215	N	0	0	0	0	0	0	0	0	0
0215	S	0	0	0	0	0	0	0	0	0
0230	N	0	0	0	0	0	0	0	0	0
0230	S	0	0	0	0	0	0	0	0	0
0245	N	0	0	0	0	0	0	0	0	0
0245	S	0	0	0	0	0	1	0	0	1
0300	N	0	0	0	0	0	0	0	0	0
0300	S	0	0	0	0	0	0	0	0	0
0315	N	0	0	0	0	0	0	0	0	0
0315	S	0	0	0	0	0	0	0	0	0
0330	N	0	0	0	0	0	0	0	0	0
0330	S	0	0	0	0	0	0	0	0	0
0345	N	0	0	0	0	1	0	0	0	1
0345	S	0	0	0	0	0	0	0	0	0
0400	N	0	0	0	0	1	0	0	0	1
0400	S	0	0	0	0	0	0	0	0	0
0415	N	0	0	0	0	0	0	0	0	0
0415	S	0	0	0	1	0	0	0	0	1
0430	N	0	0	0	0	0	0	0	0	0
0430	S	0	0	0	0	0	0	0	0	0
0445	N	0	0	1	0	0	0	0	0	1
0445	S	0	0	0	0	0	0	0	0	0
0500	N	0	0	0	0	1	0	0	0	1
0500	S	0	0	0	0	1	0	0	0	1
0515	N	0	0	0	0	2	0	1	0	3
0515	S	0	0	0	2	3	0	0	1	6
0530	N	0	0	0	1	0	1	0	0	2
0530	S	0	0	1	0	0	0	0	0	1
0545	N	0	0	1	0	1	4	2	0	8
0545	S	0	0	0	0	1	0	0	0	1
0600	N	0	0	0	1	2	0	0	0	3
0600	S	0	1	0	2	0	1	0	0	4
0615	N	0	0	0	1	6	2	0	0	9
0615	S	0	0	0	0	0	0	0	0	0
0630	N	0	0	1	2	4	5	0	0	12
0630	S	0	0	0	3	2	2	1	1	9
0645	N	0	0	2	1	3	1	1	0	8
0645	S	0	0	1	1	2	1	1	0	6
0700	N	0	0	0	3	4	1	3	0	11
0700	S	0	0	0	4	2	0	1	1	8
0715	N	0	1	0	3	6	2	0	0	12
0715	S	0	0	0	2	4	0	0	1	7
0730	N	0	1	2	6	8	5	1	0	23
0730	S	0	1	1	5	5	3	0	1	16
0745	N	0	1	9	10	9	6	0	0	35
0745	S	0	0	3	5	6	1	0	0	15
0800	N	0	1	6	14	11	3	1	0	36
0800	S	5	1	3	1	4	2	0	0	16
0815	N	0	0	1	5	9	0	2	0	17
0815	S	0	0	1	4	5	0	0	0	10
0830	N	0	1	3	6	6	4	4	0	24
0830	S	1	0	0	4	1	1	0	0	7
0845	N	0	5	3	5	4	0	0	0	17
0845	S	0	0	2	4	3	0	0	2	11

0900	N	0	0	4	11	8	1	1	0	25
0900	S	0	0	4	2	3	1	0	0	10
0915	N	0	3	2	7	4	1	1	0	18
0915	S	0	0	2	2	2	1	0	0	7
0930	N	0	0	3	4	2	1	1	0	11
0930	S	0	0	1	1	6	3	2	0	13
0945	N	0	0	0	4	4	3	0	0	11
0945	S	0	0	0	3	4	3	0	0	10
1000	N	0	0	3	1	6	0	0	0	10
1000	S	0	1	1	3	2	1	1	0	9
1015	N	3	1	1	5	1	3	0	0	14
1015	S	0	2	0	3	3	0	0	0	8
1030	N	1	2	3	6	1	0	1	0	14
1030	S	0	0	2	2	1	2	0	0	7
1045	N	0	1	4	3	4	3	2	0	17
1045	S	0	1	2	8	4	1	0	0	16
1100	N	0	0	3	5	4	0	0	0	12
1100	S	0	0	0	5	3	3	0	0	11
1115	N	0	0	3	6	3	0	1	0	13
1115	S	0	0	7	5	3	1	0	0	16
1130	N	0	0	2	5	3	1	0	0	11
1130	S	0	0	2	1	4	0	0	0	7
1145	N	0	0	1	4	6	0	1	0	12
1145	S	0	0	1	7	2	2	2	0	14
1200	N	0	0	0	3	1	3	0	0	7
1200	S	1	1	0	2	2	1	0	1	8
1215	N	0	0	2	6	6	3	0	0	17
1215	S	1	0	1	4	3	1	0	0	10
1230	N	0	1	1	5	5	3	0	0	15
1230	S	3	2	2	3	4	1	0	0	15
1245	N	0	0	2	1	2	2	2	0	9
1245	S	0	1	3	2	6	1	1	0	14
1300	N	0	0	0	6	9	1	0	0	16
1300	S	0	1	9	7	6	1	2	0	26
1315	N	1	1	6	3	2	0	1	0	14
1315	S	0	2	2	1	5	2	0	0	12
1330	N	0	0	4	2	6	0	0	0	12
1330	S	1	0	1	3	6	0	0	0	11
1345	N	0	1	1	2	2	1	0	0	7
1345	S	0	1	0	3	7	2	0	0	13
1400	N	0	0	3	4	1	1	1	0	10
1400	S	0	0	0	8	3	4	1	0	16
1415	N	0	0	0	6	4	4	1	0	15
1415	S	0	0	4	5	4	2	0	1	16
1430	N	0	1	6	7	4	1	2	0	21
1430	S	1	0	0	9	4	2	0	0	16
1445	N	0	1	4	2	2	4	2	0	15
1445	S	1	1	6	3	5	1	2	0	19
1500	N	0	1	7	5	3	0	0	0	16
1500	S	1	1	4	6	4	5	0	0	21
1515	N	0	0	2	6	5	6	0	0	19
1515	S	0	0	1	10	5	2	0	0	18
1530	N	0	2	1	7	5	3	1	0	19
1530	S	0	2	1	5	3	3	0	0	14
1545	N	0	1	2	6	5	3	1	0	18
1545	S	0	0	6	5	5	1	3	1	21
1600	N	0	0	0	3	5	5	0	0	13
1600	S	0	1	9	11	6	2	1	0	30
1615	N	0	1	3	11	6	1	0	0	22
1615	S	1	0	3	7	16	4	0	2	33
1630	N	0	0	0	3	5	3	2	1	14
1630	S	0	0	5	6	4	5	1	3	24
1645	N	0	1	4	7	4	2	0	1	19
1645	S	1	1	10	9	20	6	0	1	48
1700	N	0	1	2	6	10	2	1	0	22
1700	S	0	1	0	16	5	2	0	1	25
1715	N	1	0	2	6	8	3	3	0	23
1715	S	0	0	7	7	13	6	1	0	34
1730	N	0	1	2	3	10	3	1	0	20
1730	S	0	0	2	2	7	4	0	0	15
1745	N	0	1	4	4	11	2	1	0	23
1745	S	0	3	3	4	2	4	2	0	18
1800	N	0	0	3	4	7	2	0	0	16
1800	S	0	1	3	5	5	1	0	0	15
1815	N	0	1	1	4	5	3	0	0	14
1815	S	0	0	1	5	8	5	0	0	19
1830	N	0	0	0	6	8	3	1	0	18
1830	S	0	0	1	5	5	1	1	0	13
1845	N	0	0	0	7	7	4	0	0	18
1845	S	0	1	5	1	2	0	3	0	12
1900	N	0	0	0	5	10	1	1	0	17
1900	S	0	0	0	2	9	4	1	1	17
1915	N	1	1	2	2	1	1	0	0	8
1915	S	0	1	3	7	3	3	0	0	17
1930	N	1	0	2	0	4	1	0	0	8
1930	S	0	0	1	4	3	1	1	0	10
1945	N	0	0	2	6	9	5	1	0	23
1945	S	0	1	2	4	6	0	0	0	13

2000	N	0	1	2	3	4	1	0	0	11
2000	S	0	1	1	3	3	0	1	1	10
2015	N	0	0	2	1	3	1	0	0	7
2015	S	1	1	2	5	2	2	0	0	13
2030	N	0	0	0	2	2	1	2	0	7
2030	S	0	0	0	3	4	1	0	0	8
2045	N	0	0	1	2	2	2	0	0	7
2045	S	0	0	0	4	1	2	0	0	7
2100	N	0	1	0	0	2	1	3	0	7
2100	S	0	1	0	4	1	0	1	0	7
2115	N	0	0	3	2	1	1	1	0	8
2115	S	1	1	2	6	0	1	0	0	11
2130	N	0	0	0	1	1	1	1	0	4
2130	S	0	0	1	2	1	0	0	0	4
2145	N	0	1	0	0	1	1	0	0	3
2145	S	0	0	1	1	1	1	0	0	4
2200	N	0	1	0	2	0	0	1	1	5
2200	S	0	0	0	2	1	2	0	0	5
2215	N	0	0	0	0	2	1	0	0	3
2215	S	0	0	1	0	0	0	0	0	1
2230	N	0	0	0	1	3	1	0	0	5
2230	S	1	0	0	0	1	1	0	0	3
2245	N	0	0	1	0	0	0	0	0	1
2245	S	0	0	1	0	0	0	0	0	1
2300	N	0	0	0	1	0	1	0	0	2
2300	S	0	0	0	1	0	1	0	0	2
2315	N	0	1	0	0	0	0	0	0	1
2315	S	0	0	1	2	0	1	0	0	4
2330	N	0	0	0	0	0	1	0	0	1
2330	S	0	0	0	0	0	0	0	0	0
2345	N	0	0	0	0	0	0	0	0	0
2345	S	0	0	0	0	2	0	0	0	2
Total	**N**	**8**	**38**	**135**	**283**	**317**	**138**	**53**	**3**	**975**
Total	**S**	**20**	**33**	**141**	**284**	**281**	**119**	**31**	**20**	**929**

Vehicles = 1904
Posted speed limit = 50 km/h, Exceeding = 1805 (94.80%), Mean Exceeding = 71.62 km/h
Maximum = 185.4 km/h, Minimum = 10.7 km/h, Mean = 70.1 km/h
85% Speed = 82.19 km/h, 95% Speed = 90.45 km/h, Median = 70.16 km/h
20 km/h Pace = 59 - 79, Number in Pace = 1172 (61.55%)
Variance = 170.09, Standard Deviation = 13.04 km/h

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Town of Pelham
Street: Effingham St - NB
Location: 1

A study of vehicle traffic was conducted with the device having serial number 123717. The study was done in the NB lane at Effingham St - NB in Town of Pelham, ON in 100m north of Sulphur Springs county. The study began on 2018-11-22 at 12:00 AM and concluded on 2018-11-23 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 921 vehicles passed through the location with a peak volume of 46 on 2018-11-22 at [08:00 AM-08:15 AM] and a minimum volume of 0 on 2018-11-22 at [11:30 PM-11:45 PM]. The AADT count for this study was 921.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 40 - 50 KM/H range or lower. The average speed for all classifed vehicles was 49 KM/H with 47.28% vehicles exceeding the posted speed of 50 KM/H. 0.33% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 40KM/H and the 85th percentile was 58.15 KM/H.

< to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to >							
46	438	363	61	7	0	1	2							

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 873 which represents 95 percent of the total classified vehicles. The number of Small Trucks in the study was 23 which represents 3 percent of the total classified vehicles. The number of Trucks/Buses in the study was 10 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 12 which represents 1 percent of the total classified vehicles.

< to 4.9	5.0 to 7.9	8.0 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 24.9	25.0 to >							
435	438	23	10	6	5	1	0							

CHART 2

HEADWAY

During the peak traffic period, on 2018-11-22 at [08:00 AM-08:15 AM] the average headway between vehicles was 19.149 seconds. During the slowest traffic period, on 2018-11-22 at [11:30 PM-11:45 PM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 0.00 and 8.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Town of Pelham
Street: Effingham St - SB
Location: 1

A study of vehicle traffic was conducted with the device having serial number 123726. The study was done in the SB lane at Effingham St - SB in Town of Pelham, ON in 100m north of Sulphur Springs county. The study began on 2018-11-22 at 12:00 AM and concluded on 2018-11-23 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 982 vehicles passed through the location with a peak volume of 34 on 2018-11-22 at [03:45 PM-04:00 PM] and a minimum volume of 0 on 2018-11-22 at [12:45 AM-01:00 AM]. The AADT count for this study was 982.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 60 KM/H range or lower. The average speed for all classifed vehicles was 54 KM/H with 70.49% vehicles exceeding the posted speed of 50 KM/H. 0.72% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 60.94 KM/H.

< to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to >							
11	277	528	138	15	3	3	1							

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 941 which represents 96 percent of the total classified vehicles. The number of Small Trucks in the study was 17 which represents 2 percent of the total classified vehicles. The number of Trucks/Buses in the study was 11 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 7 which represents 1 percent of the total classified vehicles.

< to 4.9	5.0 to 7.9	8.0 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 24.9	25.0 to >							
604	337	17	11	2	2	3	0							

CHART 2

HEADWAY

During the peak traffic period, on 2018-11-22 at [03:45 PM-04:00 PM] the average headway between vehicles was 25.714 seconds. During the slowest traffic period, on 2018-11-22 at [12:45 AM-01:00 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 0.00 and 9.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Town of Pelham
Street: Effingham St - EB
Location: 2

A study of vehicle traffic was conducted with the device having serial number 134643. The study was done in the EB lane at Effingham St - EB in Town of Pelham, ON in 100m east of Oille St county. The study began on 2018-11-22 at 12:00 AM and concluded on 2018-11-23 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 1,324 vehicles passed through the location with a peak volume of 43 on 2018-11-22 at [04:15 PM-04:30 PM] and a minimum volume of 0 on 2018-11-22 at [12:45 AM-01:00 AM]. The AADT count for this study was 1,324.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 70 - 80 KM/H range or lower. The average speed for all classifed vehicles was 74 KM/H with 92.79% vehicles exceeding the posted speed of 50 KM/H. 35.41% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 70KM/H and the 85th percentile was 92.31 KM/H.

< to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to >							
29	51	65	267	305	201	108	84							

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 1004 which represents 90 percent of the total classified vehicles. The number of Small Trucks in the study was 76 which represents 7 percent of the total classified vehicles. The number of Trucks/Buses in the study was 27 which represents 2 percent of the total classified vehicles. The number of Tractor Trailers in the study was 3 which represents 0 percent of the total classified vehicles.

< to 4.9	5.0 to 7.9	8.0 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 24.9	25.0 to >							
461	543	76	27	3	0	0	0							

CHART 2

HEADWAY

During the peak traffic period, on 2018-11-22 at [04:15 PM-04:30 PM] the average headway between vehicles was 20.455 seconds. During the slowest traffic period, on 2018-11-22 at [12:45 AM-01:00 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 0.00 and 5.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Town of Pelham
Street: Effingham St - WB
Location: 2

A study of vehicle traffic was conducted with the device having serial number 132657. The study was done in the WB lane at Effingham St - WB in Town of Pelham, ON in 100m east of Oille St county. The study began on 2018-11-22 at 12:00 AM and concluded on 2018-11-23 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 1,293 vehicles passed through the location with a peak volume of 50 on 2018-11-22 at [08:00 AM-08:15 AM] and a minimum volume of 0 on 2018-11-22 at [12:00 AM-12:15 AM]. The AADT count for this study was 1,293.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 60 - 70 KM/H range or lower. The average speed for all classifed vehicles was 67 KM/H with 96.90% vehicles exceeding the posted speed of 50 KM/H. 8.92% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 60KM/H and the 85th percentile was 77.69 KM/H.

< to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to >							
3	37	239	553	342	93	18	4							

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 1243 which represents 96 percent of the total classified vehicles. The number of Small Trucks in the study was 23 which represents 2 percent of the total classified vehicles. The number of Trucks/Buses in the study was 19 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 4 which represents 0 percent of the total classified vehicles.

< to 4.9	5.0 to 7.9	8.0 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 24.9	25.0 to >							
520	723	23	19	4	0	0	0							

CHART 2

HEADWAY

During the peak traffic period, on 2018-11-22 at [08:00 AM-08:15 AM] the average headway between vehicles was 17.647 seconds. During the slowest traffic period, on 2018-11-22 at [12:00 AM-12:15 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 0.00 and 7.00 degrees C.

Appendix E - All-way Stop Warrant

Effingham St @ Sixteen Rd

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

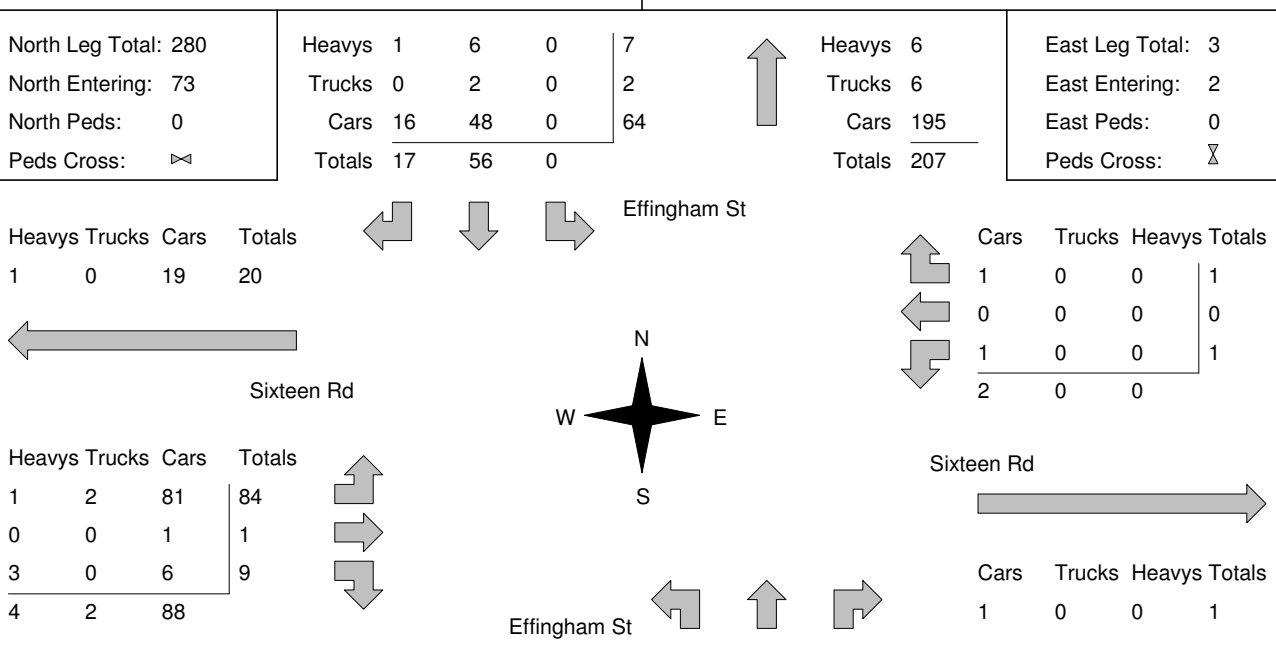
Municipality: Pelham
Site #: 0000000007
Intersection: Effingham St & Sixteen Rd
TFR File #: 7
Count date: 21-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Effingham St runs N/S



Comments

Effingham St @ Sixteen Rd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

Municipality: Pelham
Site #: 0000000007
Intersection: Effingham St & Sixteen Rd
TFR File #: 7
Count date: 21-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Effingham St runs N/S

North Leg Total:	161			
North Entering:	96			
North Peds:	0			
Peds Cross:	⋈			
Heavys	0	1	0	1
Trucks	3	0	0	3
Cars	32	59	1	92
Totals	35	60	1	
Heavys	1			
Trucks	1			
Cars	63			
Totals	65			
East Leg Total:	3			
East Entering:	2			
East Peds:	0			
Peds Cross:	⧖			

Effingham St

Heavys	Trucks	Cars	Totals
0	3	37	40

Sixteen Rd

Heavys	Trucks	Cars	Totals
1	1	28	30
0	0	0	0
0	1	6	7
1	2	34	

Cars	Trucks	Heavys	Totals
1	0	0	1
0	0	0	0
1	0	0	1
2	0	0	

N
W E
S

Sixteen Rd

Cars	Trucks	Heavys	Totals
1	0	0	1

Effingham St

Peds Cross:	⧖			
West Peds:	0			
West Entering:	37			
West Leg Total:	77			
Cars	66			
Trucks	1			
Heavys	1			
Totals	68			
Cars	5	34	0	39
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	5	34	0	
Peds Cross:	⋈			
South Peds:	0			
South Entering:	39			
South Leg Total:	107			

Comments

Effingham St @ Sixteen Rd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:45:00
To: 17:45:00

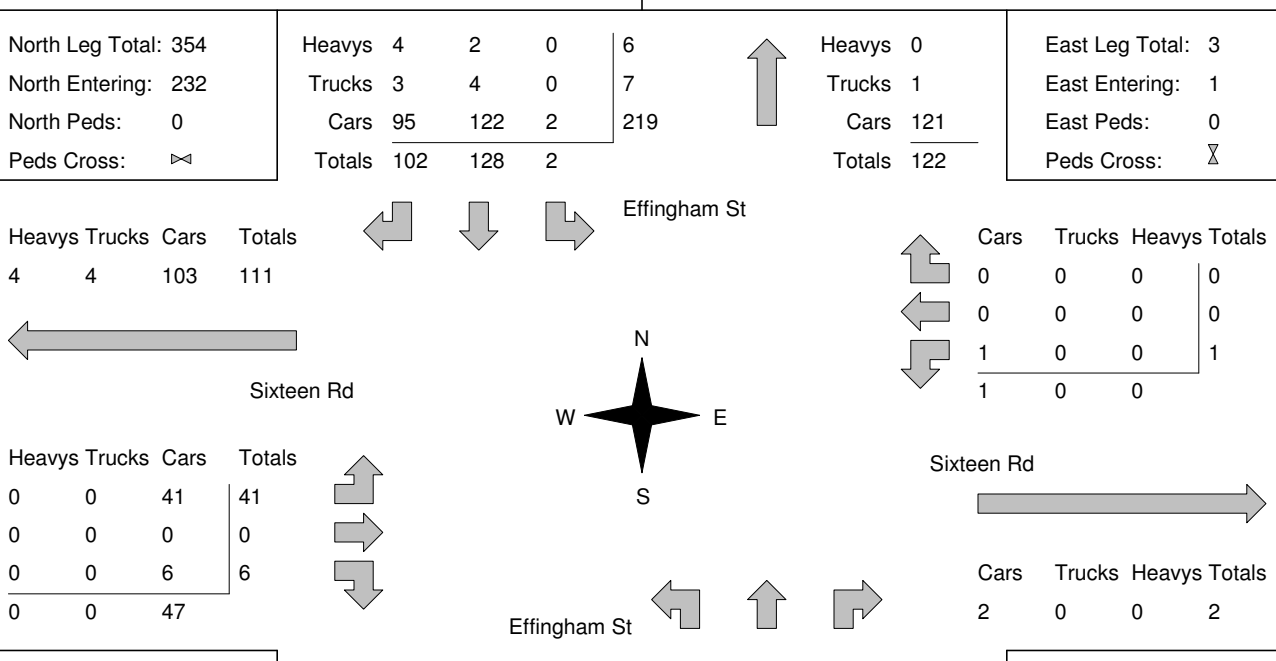
Municipality: Pelham
Site #: 0000000007
Intersection: Effingham St & Sixteen Rd
TFR File #: 7
Count date: 21-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Effingham St runs N/S



Comments

Effingham St @ Sixteen Rd

Total Count Diagram

Municipality: Pelham
Site #: 0000000007
Intersection: Effingham St & Sixteen Rd
TFR File #: 7
Count date: 21-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Effingham St runs N/S

North Leg Total: 1748
North Entering: 879
North Peds: 0
Peds Cross: ⋈

Heavys	14	16	0	30
Trucks	9	13	0	22
Cars	308	511	8	827
Totals	331	540	8	

Heavys	22
Trucks	17
Cars	830
Totals	869

East Leg Total: 27
East Entering: 15
East Peds: 0
Peds Cross: ⧖

Effingham St

Heavys	Trucks	Cars	Totals
16	11	350	377

Sixteen Rd

Cars	Trucks	Heavys	Totals
8	0	0	8
0	1	1	2
5	0	0	5
13	1	1	

N
W E
S

Heavys	Trucks	Cars	Totals
7	8	314	329
0	0	2	2
5	2	43	50
12	10	359	

Sixteen Rd

Cars	Trucks	Heavys	Totals
11	1	0	12

Effingham St

Peds Cross: ⧖
West Peds: 0
West Entering: 381
West Leg Total: 758

Cars	559
Trucks	15
Heavys	21
Totals	595

Cars	42	508	1	551
Trucks	1	9	1	11
Heavys	1	15	0	16
Totals	44	532	2	

Peds Cross: ⋈
South Peds: 0
South Entering: 578
South Leg Total: 1173

Comments

All-Way Stop Warrant Analysis: Arterial and Major Road

Location: Effingham St @ Sixteen Rd
Date: Data - November 21/, 2018, Analysis - De
Posted Speed: 60 km/h
Minor Street: Sixteen Road
Major Street: Effingham Street
Type: 4 Way Stop

Conditions: According to Ontario Traffic Manual Book 5 - (March,2000)

Condition 1: The combined vehicular and pedestrian volume on the minor street exceeds 200 units per hour (all vehicles plus pedestrians wishing to enter the intersection)

Condition 2: The average delay to traffic on the minor street (either vehicles or pedestrians wishing to enter the intersection) is greater than 30 seconds

Condition 3: The volume split does not exceed 70/30

Condition 4: The total vehicle volume on all intersection approaches exceeds 500 vehicles per hour for each of any eight hours of the day

Calcuation Summary:

	Hourly Period								Total
	6:00 to 07:00	07:00 to 08:00	8:00 to 09:00	11:00 to 12:00	12:00 to 13:00	15:00 to 16:00	16:00 to 17:00	17:00 to 18:00	
Minor Approach Vehicle Volume		69	96	35	57	46	51	41	***395***
Number of Peds Crossing Minor Approach		0	0	0	0	0	0	0	***0***
Combined Minor Approach Volume	*0*	*69*	*96*	*35*	*57*	*46*	*51*	*41*	
Minimum / Hour	200	200	200	200	200	200	200	200	
Criteria Met	NO	NO	NO	NO	NO	NO	NO	NO	
Condition 1:	**Not Met**								
Average Minor Road Delay Time (sec) (Car or Ped)	0	0	0	0	0	0	0	0	
Total Average Minor Road Delay Time (sec)	*0*								
Minimum Average (sec)	*30*								
Criteria Met	*NO*								
Condition 2:	**Not Met**								
Combined Major Approach Volume (Not Including Ped)		140	197	131	126	185	272	270	***1321***
Total Volume Split	**Major**	*77%*							
	Minor	*23%*							
Criteria Met		*NO*							
Condition 3:	**Not Met**								
Total Volume:	*0*	*209*	*293*	*166*	*183*	*231*	*323*	*311*	
Minimum / Hour	*500*	*500*	*500*	*500*	*500*	*500*	*500*	*500*	
Criteria Met:	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	*NO*	
Conditon 4:	**Not Met**								

RESULT OF ANALYSIS: All-Way Stop - NOT WARRANTED ; All conditions must be met

Additional Considerations If Warrented:		
Sight Lines	Where sight lines prohibit an operator of a passenger car vehicle from observing a minimum distance of 84 metres	NO
Geometric Design	(A) A distance of 250m must be maintained between traffic control devices, signals, other stop signs or legal pedestrian crossovers	YES
	(B) All-Way stop sign must only be used at two like roadways. Each approach should contain the same number of lanes and have non-skewed approaches	YES

Appendix F - Curve Warning Signs, Checkerboard Signs, Chevons and Delineation

Effingham Street
Curve Assessment - NORTHBOUND

Curve Warning / Checkerboard Signs									Chevron Signs						Remediation / Mitigating Measures for Chevrons and Delineators
Station No.	Nearest Intersecting Road	Curve Type	Radius (metres)	Existing Sign Code	Existing Speed Advisory Tab (km/h)	Issues / Needs	Remediation / Mitigating Measures for Curve Warning Signs	Recommended Distance of Signs from Start of Curve (as per OTM Book 6, Table 4) (metres)	Station No.	Existing Chevrons (quantity)	Recommended Chevrons (quantity)	Spacing	Immediately in Advance	In Advance	
60 km/h (to be changed to 50 km/h)									60 km/h (to be changed to 50 km/h)						
1+100	Tice Road	Reverse	1449	Wa5R	None.	Sign not required since curve radius is greater than 1,150 metres.	Remove Wa5R.	95	1+100	0	0	n/a	n/a	n/a	None.
1+900	Metler Road	Reverse	347	Wa3R, Wa3L	None.	Inappropriate sign(s). Two Curve warning signs should be replaced with a single Reverse sign.	Use Wa5R.	95	1+900	0	0	n/a	n/a	n/a	None.
3+050	Kilman Road	Curve	168	Wa5L	40	Single Reverse sign not appropriate for consecutive curves. Use 2 separate Curve warning signs at Stn. 3+050 and 3+100.	Remove Wa5L and 40 km/h speed advisory tab and use Wa3L.	95	3+050	0	0	n/a	n/a	n/a	None.
3+100	Kilman Road	Curve	87	See above.	See above.	See above.	Use Wa2R. Based on Ball Bank Study.	95	3+100	5	0	n/a	n/a	n/a	Remove all Chevrons and replace with Delineators (Yellow) as per OTM Book 11, Section 4.3.
50 km/h									50 km/h						
3+250	Sulphur Springs Drive	Multiple	191	Wa6R	40	Inappropriate combination of signs. Only 1 x Winding Road sign (Wa6R) is required.	Remove 40 km/h speed advisory tab. Keep Wa6R.	95	3+250	3	0	n/a	n/a	n/a	Remove all Chevrons and replace with Delineators (Yellow) as per OTM Book 11, Section 4.3.
			179									n/a	n/a	n/a	
3+350			379	Wa3L	40		Remove Wa3L and 40 km/h speed advisory speed tab.	n/a	3+350	3	0	n/a	n/a	n/a	Remove all Chevrons and replace with Delineators (White) as per OTM Book 11, Section 4.3.
			135									n/a	n/a	n/a	
3+700	Sulphur Springs Drive	Curve	62	Wa3L	40	Inappropriate sign and speed advisory tab.	Use Wa2L.	95	3+700	8	0	15	30	45	Remove all Chevrons and replace with Delineators (White) as per OTM Book 11, Section 4.3.
4+000	Sulphur Springs Drive	Curve	387	Wa3R	None.	None.	None.	95	4+000	0	0	n/a	n/a	n/a	None.
4+600	Sixteen Road	Curve	62	Wa102R	40	Inappropriate sign and speed advisory tab.	Use Wa101R with 30 km/h advisory tab.	115	4+600	5	5	15	30	45	None.
60 km/h (to be changed to 50 km/h)									60 km/h (to be changed to 50 km/h)						
5+100	Sixteen Road	Curve	130	Wa2R	40	Speed advisory tab not required as per OTM Book 6, Table 5.	Remove 40 km/h speed advisory tab. Based on Ball Bank Study.	95	5+100	3	0	20	40	65	Remove all Chevrons and replace with Delineators (Yellow) as per OTM Book 11, Section 4.3.
5+800	Roland Road	Curve	502	Wa3L	None.	None.	None.	95	5+800	0	0	n/a	n/a	n/a	None.
6+500	Wessel Drive	Curve	74	Wa2R	None.	Inappropriate sign(s). Safe speed on curve is 30 km/h, based on Ball Bank Study.	Use Wa101R with 30 km/h advisory tab.	115	6+500	4	4	20	30	50	None.
6+800	Sawmill Road	Reverse	216	Wa6R	None.	Winding Road sign not appropriate.	Use Wa5L.	95	6+800	0	0	n/a	n/a	n/a	None.
50 km/h									50 km/h						
7+000	Ollie Street	Curve	264	Wa3R	None.	None.	None.	95	7+000	0	0	n/a	n/a	n/a	None.
7+400	Ollie Street	Curve	99	Wa102L	30	Inappropriate sign(s) as per OTM Book 6, Table 5.	Use Wa101L with 30 km/h advisory tab.	115	7+400	7	7	20	35	60	None.
7+650	Ollie Street	Curve	266	None.	None.	Curve radius is less than 1,150 metres, therefore a Curve warning sign is required.	Use Wa3R.	95	7+650	0	0	n/a	n/a	n/a	None.
7+700	Ollie Street	Curve	63	Wa1R	30	Inappropriate sign(s). Sign too small as per OTM Book 6, Table 5.	Use Wa101R with 30 km/h advisory tab.	115	7+700	7	7	15	30	45	None.
7+700	Ollie Street	Curve	63	Wa8R	n/a	Existing Checkerboard sign appears to be too low; visibility obscured by vertical curve (crest) approaching the horizontal curve.	Raise height of sign to be visible to approaching traffic. Raise height to a maximum 2.5 metres measured from outer edge of travelled road, as per OTM Book 1B, Figure 5.	n/a	7+700	0	0	n/a	n/a	n/a	None.
7+900	Pelham Road	Curve	343	Wa3L	None.	None.	None.	95	7+900	0	0	n/a	n/a	n/a	None.

Effingham Street
Curve Warning Assessment - SOUTHBOUND

Curve Warning / Checkerboard Signs									Chevron Signs						Remediation / Mitigating Measures for Chevrons and Delineators
Station No.	**Nearest Intersecting Road**	**Curve Type**	**Radius (metres)**	**Existing Sign Code**	**Existing Speed Advisory Tab (km/h)**	**Issues / Needs**	**Remediation / Mitigating Measures for Curve Warning Signs**	**Recommended Distance of Signs from Start of Curve (as per OTM Book 6, Table 4) (metres)**	**Station No.**	**Existing Chevrons (quantity)**	**Recommended Chevrons (quantity)**	**Spacing**	**Immediately in Advance**	**In Advance**	
50 km/h									50 km/h						
7+900	Pelham Road	Curve	343	Wa3R	None.	None.	None.	95	7+900	0	0	n/a	n/a	n/a	None.
7+700	Ollie Street	Curve	63	Wa1L	30	Sign size too small.	Use Wa101L with 30 km/h advisory tab.	115	7+700	7	7	15	30	45	None.
7+650	Ollie Street	Curve	266	Wa6L	30	Inappropriate sign and speed advisory tab. Sign too close to start of curve.	Use Wa3L (no speed advisory tab). Position sign further upstream from existing.	95	7+650	0	0	n/a	n/a	n/a	None.
7+400	Ollie Street	Curve	99	See above.	See above.	See above.	Use Wa101R with 30 km/h advisory tab.	115	7+400	7	7	20	35	60	None.
7+000	Ollie Street	Curve	264	Wa2L	None.	Inappropriate sign(s).	Use Wa3L.	95	7+000	0	0	n/a	n/a	n/a	None.
6+800	Sawmill Road	Reverse	216	Wa5L	None.	None.	None.	95	6+800	0	0	n/a	n/a	n/a	None.
6+500	Wessel Drive	Curve	74	Wa2L	30	Sign size too small.	Use Wa101L with 30 km/h advisory tab.	115	6+500	5	5	20	30	50	None.
60 km/h (to be changed to 50 km/h)									60 km/h (to be changed to 50 km/h)						
5+800	Roland Road	Curve	502	Wa3R	50	Speed advisory tab not required.	Remove 50 km/h advisory tab.	95	5+800	0	0	n/a	n/a	n/a	None.
5+100	Sixteen Road	Curve	130	Wa2L	40	Speed advisory tab not required as per OTM Book 6, Table 5.	Remove 40 km/h advisory tab.	95	5+100	3	0	n/a	n/a	n/a	Install Delineators (White) as per OTM Book 11, Section 4.3.
4+600	Sixteen Road	Curve	62	Wa2L	40	Speed advisory tab not required as per OTM Book 6, Table 5.	Remove 40 km/h advisory tab.	95	4+600	5	0	n/a	n/a	n/a	Install Delineators (White) as per OTM Book 11, Section 4.3.
50 km/h									50 km/h						
4+000	Sulphur Springs Drive	Curve	387	Wa2L	None.	None.	None.	95	4+000	0	0	n/a	n/a	n/a	Install Delineators (White) as per OTM Book 11, Section 4.3.
3+700	Sulphur Springs Drive	Curve	62	Wa2R	40	Inappropriate sign and speed advisory tab. Based on Ball Bank Study.	Use Wa101R with 30 km/h advisory tab.	115	3+700	8	8	15	30	45	None.
3+400	Sulphur Springs Drive	Multiple	135	Wa4R	40	Inappropriate combination of signs. Only 1 x Winding Road sign (Wa6R) is required.	Remove all Curve / Reverse Curve warning signs and use 1 x Winding Road sign (Wa6R).	95	3+400	2	0	n/a	n/a	n/a	None.
			379									n/a	n/a	n/a	None.
3+300			179	None.	None.				3+300	3		n/a	n/a	n/a	None.
			191	Wa3L	40							n/a	n/a	n/a	None.
3+100	Kilman Road	Curve	87	Wa5L	40	Inappropriate sign and speed advisory tab. Based on Ball Bank Study.	Use Wa101L with 30 km/h advisory tab.	115	3+100	4	4	20	30	55	None.
3+050	Kilman Road	Curve	168	See above.	See above.	Reverse sign not appropriate; use separate curve warning sign.	Use Wa3R.	95	3+050	0	0	n/a	n/a	n/a	None.
60 km/h (to be changed to 50 km/h)									60 km/h (to be changed to 50 km/h)						
1+900	Metler Road	Reverse	347	Wa5R	None.	None.	None.	95	1+900	0	0	n/a	n/a	n/a	None.
1+100	Tice Road	Curve	1449	Wa5R	None.	Inappropriate sign(s).	Remove Wa5R since curve radius is greater than 1,150 metres.	n/a	1+100	0	0	n/a	n/a	n/a	None.