

Attachment No. 2



City of Vaughan

**Napier Street Area
Traffic Operations and Road
Safety Study**

Paradigm Transportation Solutions Limited

December 2021
210004



Executive Summary

The City of Vaughan (the City) retained Paradigm Transportation Solutions Limited (Paradigm) to conduct the Napier Street Area Traffic Operations and Road Safety Study within the village of Kleinburg in the City of Vaughan, Ontario. The study area is bounded by Napier Street, Islington Avenue, Stegman's Mill Road and John Street.

Over the years, the City has studied traffic operations, intersection safety, and vehicle circulation within the study area in response to community requests. The City has implemented the following safety measures to date:

- ▶ A convex mirror at the intersection of Napier Street and Stegman's Mill Road to improve the sight visibility for outbound motorist movements
- ▶ Warning signage ("Hidden Intersection") on Stegman's Mill Road to inform motorists about the upcoming intersection
- ▶ Vegetation trimming on Stegman's Mills Road to improve sight lines

Paradigm was tasked with assisting the City as an independent consultant to review existing traffic operations and road safety conditions along with a review of existing traffic circulation and potential solutions.

Content

An objective review of Napier Street and the adjacent residential community area was undertaken to identify any design, operational and/or road safety issues. This included the following:

- ▶ A review of studies previously conducted
 - Findings from previous studies and/or investigations undertaken by City staff were reviewed and validated.
- ▶ A review and assessment of the study area roadway characteristics
 - Roadway classification and context within the surrounding transportation system;
 - Posted maximum speed limits; and
 - Roadway design including a high-level review of the cross-section, alignment, and sight distances.



- ▶ An assessment of traffic volumes, travel speeds, and travel routes along the study area roadways
 - Examination of daily and peak hour traffic volumes;
 - Vehicle operating speeds and travel times; and
 - Origin-destination routes through the adjacent residential area.
- ▶ A road safety review
 - Collision analysis;
 - Sight distance assessment; and
 - Speed limit review.
- ▶ A traffic operations review
 - Intersection operational analysis; and
 - Reviewing feasibility of closing the Napier Street/Stegman's Mill Road intersection from an operational perspective.
- ▶ Identifying potential mitigation measures
 - Applicable mitigation measures were assessed to address identified issues.

Study Findings

Background Studies

- ▶ The findings of this study validate and confirm findings from previous studies undertaken by City staff; and
- ▶ The exception would be, though we are in agreement with the previous staff findings that the overall magnitude of traffic infiltration occurring is low. A total of 10 to 15 vehicles were recorded as traffic infiltration (cut-through) during the weekday peak periods. A total of 5 to 16 vehicles were recorded as traffic infiltration (cut-through) during the weekend peak periods. Study area intersections were all found to be operating at acceptable levels of service and within capacity. Recognizing the presence of pedestrians, lack of sidewalks, and allowance for on-street parking, reducing the non-local cut through traffic would provide a more comfortable pedestrian environment, thereby encouraging more active modes of transportation.



Area Characteristics

- ▶ Islington Avenue and Stegman's Mill Road are both minor collector roadways with a posted 40 km/h maximum speed limit within the study area;
- ▶ On-street parking is permitted on Islington Avenue within the adjacent boulevard;
- ▶ Napier Street, John Street, and Kellam Street are local residential roadways. No maximum speed limit signage is posted; therefore, the statutory limit of 50 km/h governs; and
- ▶ Existing traffic calming measures are provided along the Islington Avenue corridor – speed humps at the north and south limits of the corridor. Additionally, a section of the roadway is designated as a "Community Safety Zone" at the south end of the corridor.

Overall it was determined that the study area roadways are operating as designed and are serving their intended function within the overall transportation system.

Transportation Conditions

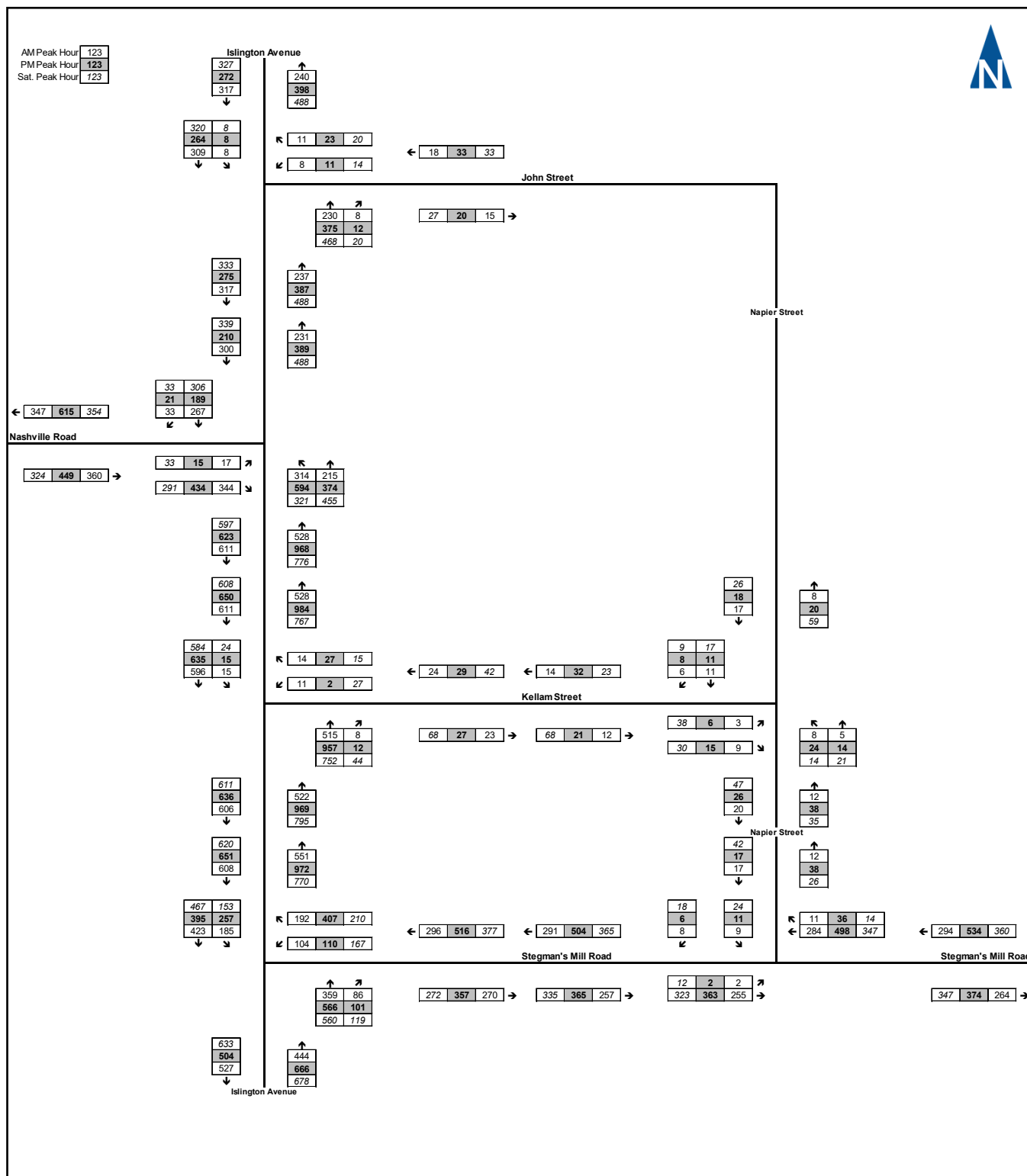
- ▶ The average two-way daily traffic volumes along the study area roadways are reported to be within range for their roadway classification;
- ▶ Vehicle operating speeds along the local roadways of Napier Street, John Street, and Kellam Street were found to be in the range of 40 km/h;
- ▶ Vehicle operating speeds along Islington Avenue, north of John Street and Stegman's Mill Road, east of Islington Avenue exceeded the posted maximum speed limit. High levels of non-compliance were reported for these sections from the speed study data; and
- ▶ Review of origin-destination survey data confirms that non-local traffic is infiltrating the residential streets of Napier Street, John Street, and Kellam Street to by-pass the Islington Avenue/Stegman's Mill Road intersection.

Figure E1, Figure E2, and Figure E3 illustrate the traffic infiltration volumes, intersection volumes, and travel speeds within the neighbourhood area.

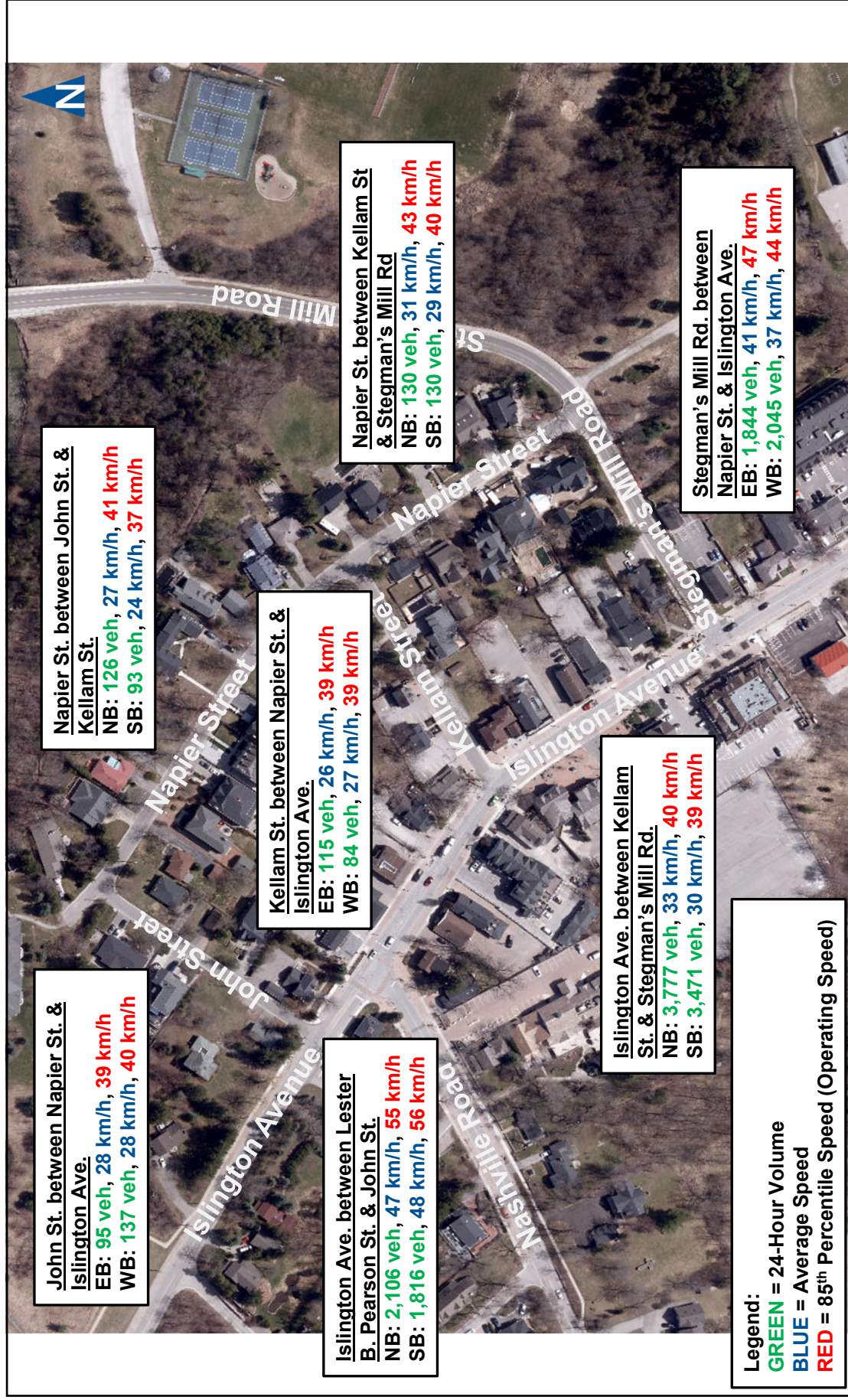
Overall it was determined that the study area roadways are operating as designed and are serving their intended function.







Peak Hour Intersection Volumes



Vehicle Speeds

The exception would be travel speeds for two noted sections. Islington Avenue, north of John Street and Stegman's Mill Road, east of Islington Avenue, exceeded the maximum posted limits with low compliance.

Non-local traffic was identified to be infiltrating through the local residential street; however, the overall magnitude of cut-through traffic was low.

Safety Review

- ▶ Review of available collision data indicates the number of yearly reported collisions and the resultant impact types as generally unremarkable with no identifiable patterns or trends concerning reported collisions;
- ▶ No fatal injuries were reported or collisions involving pedestrians or cyclists. All reported collisions were property damage only (no injuries);
- ▶ A detailed sight distance and sight line review were undertaken at the Napier Street/Stegman's Mill Road intersection. The available sight distances were determined to be deficient in comparison to TAC Guide requirements. The outbound left turn movement from Napier Street to Stegman's Mill Road was identified as a critical movement. Effectively, the available sight distances are equivalent to low travel speeds in the range of 20 – 30 km/h along Stegman's Mill Road, whereas the actual reported operating speeds were found to be in the range of 44 – 47 km/h;
- ▶ As the local residential roadways of Napier Street, John Street, and Kellam Street do not have posted speed limit signage, a speed limit review was undertaken. Based on the TAC Guidelines methodology, the recommended speed limit determined by road characteristics along Napier Street, John Street, and Kellam Street is 40 km/h. The observed 85th percentile speed shows compliance with the recommended speed limit.

Overall, the reported collision incidences are generally unremarkable.

While the overall magnitude of cut-through traffic volumes is noted to be low – Recognizing the presence of pedestrians, lack of sidewalk, and allowance for on-street parking, reducing the non-local cut through traffic would be beneficial to improving traffic operations and providing a more comfortable pedestrian



environment thereby encouraging more active modes of transportation.

The potential safety concern is the sight distance deficiencies documented at the Napier Street/Stegman's Mill Road intersection for outbound left turn movements. The lack of collisions reported at this location is surprising – however, not entirely given the low volume and the fact it may be a by-product of users of this intersection exercising extreme caution when traversing through (i.e., familiar with the issues); however, this may be a potential future collision waiting to occur for a motorist unfamiliar with this location.

Traffic Operations Review

- ▶ The analysis of existing conditions indicates that all traffic movements at the study area intersections are currently operating at acceptable levels of service and well within capacity; and
- ▶ Feasibility of closing the Napier Street/Stegman's Mill Road intersection was confirmed possible. The redistribution of traffic to adjacent intersections was determined to result in imperceptible operational impact.

Study area intersections were all found to be operating at acceptable levels of service and well within capacity.

The exceptions would be at the two all-way stop controlled intersections. While they report acceptable operations, the volume of pedestrian crossings across each roadway approach may result in an additional delay to motorists.

Since motorists and pedestrians have a varying degree of understanding on who has the right-of-way, the vehicular delay experienced will vary (i.e., motorists are aggressive and do not yield to pedestrians, or motorists will yield the right-of-way, allowing large groups of pedestrians to cross). The latter may contribute to non-local traffic infiltrating the adjacent local streets to by-pass.

Multi-Modal Transportation Review

- ▶ The village of Kleinburg is not serviced by local transit;
- ▶ The study area currently does not provide any bicycle infrastructure to accommodate cyclists;



- ▶ The pedestrian infrastructure throughout the area is discontinuous. Sidewalk is provided along Islington Avenue and Stegman's Mill Road (south side only). The remaining local roadways of Napier Street, John Street, and Kellam Street within the study area do not provide any sidewalks; and
- ▶ It was documented during the in-field investigations, several pedestrians were observed walking and jogging along Napier Street, John Street, and Kellam Street (the local residential streets).

Pedestrian infrastructure within the study area is discontinuous. The local residential streets do not provide infrastructure connecting with the larger municipal network.

The study area lacks cycling infrastructure. As dedicated facilities are not provided, cycling trips are either made within the travelled roadway shared with other vehicles or on the sidewalk (where available).

The options to close part or all of Napier Street at Stegman's Mill Road

Options to close part or all of Napier Street to increase safety at the intersection were developed. These include:

Three options for a full road closure of Napier Street at Stegman's Mill Road were considered:

- ▶ Option 1A: A Cul-de-Sac
- ▶ Option 1B: Dead End – curb reinstatement along with bollards or other similar permanent traffic barriers, resulting in a dead-end
- ▶ Option 1C: Gated Emergency Access – Traffic/barrier gate

Three options for the partial road closure of Napier Street at Stegman's Mill Road were considered:

- ▶ Option 2A: A right in/right out and left in access from Stegman's Mill Road by implementing a physical island to restrict outbound left turn movements from Napier Street
- ▶ Option 2B: A right in/right out access by implementing a physical island to restrict inbound and outbound left movements
- ▶ Option 2C: A right in access by implementing a curb bump out to restrict outbound movements (allow inbound movements only)



The full closure of Napier Street would eliminate traffic infiltration and sightline issues; it would restrict vehicle access for residents and non-residents alike and would not be feasible from an operational perspective.

The partial road closure options would improve traffic safety by eliminating the critical left turn movement at the intersection; it would restrict vehicle access for residents and non-residents alike (based on the access configuration) and reduce traffic infiltration.

Community Engagement

A community meeting was held virtually on November 23, 2021, followed by an online survey posted to the City's engagement platform "Have Your Say, Vaughan" from November 23, 2021, to December 17, 2021. A paper copy of the survey was also mailed to all households in the Napier Street area. The community meeting and online survey were advertised and promoted through the City's project website, mobile signage, Council packages, social media messages, an engagement eNewsletter, and direct mail to homes within the Napier Street area. A total of 16 people attended the virtual public meeting. A total of 20 surveys were completed.

The mitigation measure options were presented to the community to address intersection safety issues at Napier Street/Stegman's Mill Road, travel speed within the immediate Napier Street area and adjacent areas, and traffic infiltration.

Community members provided feedback on elements of the proposed traffic operations and road safety study options. Through this process, the project team heard several key perspectives shared by participants in the virtual public meeting and online survey, including the following:

- ▶ Public meeting participants and survey respondents are eager to improve study area safety.
- ▶ Community members agreed that significant changes need to be made to this study area to improve traffic safety.
- ▶ Participants in the public meeting and online survey reiterated safety concerns about speed, a narrow roadway, through traffic on Napier Street and dangerous intersections.
- ▶ Residents sought clarity on how each mitigation option would impact the wider neighbourhood traffic patterns.
- ▶ Residents who live on Napier Street requested further enforcement of no parking.



- ▶ The influx of tourists and visitors who drive through this neighbourhood on the weekend contributes to resident concerns, especially on Kellam and Napier Streets.

Based upon the survey responses received from the community, the following is noted:

- ▶ 60% responded in support of a partial intersection closure; specifically, the option of a right-in/right-out access (Option 2B) is preferred.
- ▶ 75% of respondents confirmed they lived within the study area, while 25% chose not to disclose their addresses.

Stakeholder Engagement

In consultation with York Region Emergency Services and York Region Traffic Safety, City Fire Services, Road operations, and Environmental Services (waste collection) departments, a partial closure providing a right-in/right-out access is preferred to balance road safety while providing and maintaining access.

Conclusions and Recommendations

Based on the operational and road safety review, the study area roadways serve their intended function within the overall transportation system. Key issues identified include:

- ▶ Lack of available sight distances to perform turning movements safely at the Napier Street/Stegman's Mill Road intersection for the outbound left turn movement;
- ▶ Speeding at noted sections; and
- ▶ Traffic infiltration in combination with the presence of pedestrians, lack of sidewalks, and allowance for on-street parking.

Based on our findings, applicable mitigation measures were considered. The following preferred improvements are recommended to address the identified issues from a road safety perspective.

Sight Distance/Sight Lines

Regarding road safety, community, and stakeholder comments, the recommended preferred option to mitigate the sight distance and sight line deficiencies noted at the Napier Street/Stegman's Mill Road intersection would be a right in/right out access (Option 2B).



Provision of a partial closure facilitated through a physical island to restrict movements to right-in/right-out only while maintaining access for emergency and service vehicles when necessary.

Travel Speed

From a safety perspective, the recommended preferred option to mitigate the noted travel speed issues and low compliance would be a combination of Options 3, 4, 7, 8, and 9. This includes longitudinal and transverse pavement markings, such that motorists have to navigate through a “perceived” narrow road section, lowering the posted speed limit from 50 km/h to 40 km/h for the section of Islington Avenue (north of John Street to Highway 27), and increased signage and the installation of speed boards.

From a safety perspective, to ensure travel speeds along the local streets of Napier Street, John Street, and Kellam Street remain consistent and to protect them from increasing, the recommended preferred mitigation measure would be to designate the residential area as a “40 km/h Neighbourhood Area”.

Traffic Infiltration

From a safety perspective, to minimize traffic infiltration, the recommended preferred mitigation measure would be to implement a right in/right out access (Option 2B).

