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Intersection Signage at Gibraltar - Engineering Opinion Letter

Mr. McCannell,

As requested, please see the following traffic engineering opinion letter for the intersection of 4th Line and Side Road 6, Gibraltar, within the Town of Blue Mountains.

Introduction

The Town of Blue Mountain has previously received complaints from residents at the 4th Line and Side Road 6 intersection regarding drivers not complying to the stop signs, particularly in the north-south direction. The residents claimed vehicles, in particular school buses, are not stopping at the intersection and they suspected either general non-compliance or potential visibility issues to the stop signs.

Following the complaints, the Town of Blue Mountains have already implemented mitigation measures including:

- Lowering the speed limit to 50km/h along 4th Line.
- Installing additional stop ahead signs and oversized stop signs raising them to upper range in height (bottom of the sign is 2.0m).
- Vegetation clearing to avoid interference with the drivers' sight lines.
- Ontario Provincial Police (OPP) were requested to attend the area for enforcement.

Through the above and other investigations by the Town, it was also found that:

- OPP that attended the site found no evidence of non-compliance of the stop signs.
- The Town contacted the bus company (First Student Inc.) regarding sightlines to which they reported no concerns with visibility or issues with the signs themselves.

The Town requested CIMA+ to provide this opinion letter...

Stop-Control Warrant Consideration



Given the low-volume, rural context of this intersection, the intersection was reviewed in regard to the stop-control condition. With such low volumes, a question arises if the all-way stop condition is required. According to the Ontario Traffic Manual (OTM) Book 5, all way stop control measures should be considered using criteria of traffic volume, collision history and visibility.

Traffic volume

According to the traffic counter installed in the area, an annual average daily traffic (AADT) count was recorded between 170 to 180 on the 4th Line north and south approach. The AADT for Side Road 6 was not recorded however, existing traffic history has shown for traffic counts to be low along the east and west approach. As per OTM Book 5, the following conditions must be met for an all stop controls conditions from a traffic volume perspective:

- The total traffic volume on all approaches along the intersection need to exceed 375 vehicles per hour during the 8-hour peak time of the day.
- The combined vehicle and pedestrian volume on the minor street need to exceed 150 combined units per day for each of the same 8-hour peak time of the day for each of the same 8 hours as the total volume of traffic.
- The combined vehicle and pedestrian volume on the minor street need to exceed 120 combined units per day for each of the same 8-hour peak time of the day for each of the same 8 hours as the total volume of traffic with an average delay to all the minor street traffic greater than 30 seconds for the entire 8-hour peak time of the day.
- The volume split does not exceed 70/30 which is defined as the minor street traffic being less than 30 percent of the total traffic approaching the intersection measured over the entire 8-hour peak time of the day. The volume of the major street will consist of vehicles only and the volume of the minor street will consist of both vehicles and pedestrians.

As per the conditions stated above and the traffic data provided, the intersection does not meet the criteria for an all-way stop control from a traffic volume perspective. With the AADT providing a count of 170 to 180 units per year along 4th Line and a lower traffic count volume alongside Side Road 6, the data does not exceed the limit of 375 vehicles per hour of the peak 8-hour time period, nor does Side Road 6 (minor street) exceed the combined 120 to 150 units per hour for the same time period as the total traffic volume. The volume split should not exceed the 70/30 split as mentioned in the data which is important as this dictates the conditions to accommodate the shifts in traffic volume and peak directions.

Collision history

The Town reviewed crash data and collision history, and the most recent incident occurred in 2016 with no collisions occurring up to the date of 2024. As per OTM Book 5, the following conditions must be met for an all stop control conditions from a collision perspective:



- The intersection itself has a previous history of high collisions frequencies with right angle or turning movements.
- The frequency data if available should be used a threshold or condition to the following if over three collisions have occurred per year in a three-year period (nine collisions in 36 months) for local/collector/rural arterials.

Visibility

Visibility is key at intersections and industry standards¹, provides guidance of providing stopping sight distance at intersections. If visibility is obstructed due to environmental constraints, and all other options are not practical, then an all-way stop controlled intersection will need to be considered. As per TAC Manual Chapter 9, the specified areas along the intersection approach legs and the corners should be free of obstructions that can potentially block the drivers view of conflicting vehicles. The geometry between both points at the minor and major road approaches create a sight triangle as shown in Figure 1. As indicated in Figure 1, trees and bushes are in the southeast corner which obstructs sight lines. As mentioned in the town's mitigation measures, bushes have been removed to avoid interference with sight lines, however the bushes and trees closer to the intersection fall under private property and the Town will need to further review bylaws etc. to see if they can be removed.

Also, 4th Line experiences a rolling profile either side of the intersection, particularly for those heading north to the intersection. Therefore, it can be determined from a visibility perspective that all-way stop control is currently warranted at this intersection.

Existing Intersection and Evidence of Noncompliance

At the intersection, the Town has installed additional stop ahead signs and oversized stop signs raising them to upper range in height (bottom of the sign is 2.0m). Due to the layout of the intersection, the stop sign along the east side of Side Road 6 is shifted to around 18 m from the intersection, assumed to accommodate the turning movements of larger vehicles, and this could be investigated to be closer as it's beyond the recommended range of 15 m as per OTM Book 5. However, no issues have been observed with the signage used. From available imagery (dated Aug 2023) there are no pavement markings on 4th Line or at the intersection (i.e. stop bars).

¹ Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads - 2017



Figure 1: 4th Line and Side Road 6 Departure Sight Triangle

OPP have attended the area for enforcement and according to their reports from their onsite activity had mentioned no vehicles running the intersection, however, have observed rolling stops from the residents at the intersection. In addition, the Town of Blue Mountains have reached out to the First Student Inc. regarding sight lines to which they reported no concerns with the visibility of the stop signs or issues with the signs themselves.

Traffic Engineering Opinion

Through above review of the 4th Line and Side Road 6 intersection, several key findings are evident.

- While not warranted from traffic volume or collisions, the all-way stop control is currently still recommended from the visibility perspective.
- The intersection is currently signed with elevated stop signs and stop ahead signs, however there is no pavement marking at the intersection (i.e. stop bars).
- While the Town has received complaints of non-compliance at the stop signs, with resident-assumed issues with sign visibility, there is no evidence or corroboration of these issues from the OPP or First Student Inc..



The complaints from the residents should not be ignored; however, from the above observations, our opinion is that the problem may stem from the residents' perception of the non-compliance. There are no observable issues with the stop signs and due to the lack of pavement markings (i.e. stop bars), and with the east stop sign located slightly further than typically located, it is speculated that drivers may only be stopping in the vicinity of the stop signs. For the east arm, where visibility is constrained, drivers maybe more generous with their consideration of this vicinity, as encroaching forward would better the sight lines. This could be perceived as non-compliance by the resident. What would also exacerbate this action, is that the volumes are very low and so drivers are likely to feel more comfortable in expanding what they deem as the 'vicinity' of the stop sign.

As there are no observable issues with the stop signs, it is considered that any further additional signs and/or even larger stop signs will not solve the immediate issue.

It is recommended the Town consider implementing pavement markings (the stop bars on each arm at a minimum) and re-evaluate the location of the eastern arm stop sign. Further, the Town could consider the use of video monitoring at the intersection, to validate the concerns and/or the effectiveness of the pavement marking, if implemented. The argument to OPP not observing any non-compliance, is that drivers will alter their behaviour at the sight of the OPP. Video monitoring could therefore provide further validation through a record of uninfluenced driver behaviour at the intersection.

This opinion letter has provided an overview of the issue along with opinions based on the available data and information. To quantify and/or further validate the findings will require additional detailed site investigation and review.

Sincerely,

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