

Executive Summary

The City has studied traffic operations, safety and heavy vehicle usage along Melville Avenue for over 10 years in response to Council and community requests. This resulted in numerous data collection programs including vehicle classification and travel speed surveys, reviews of reported collision data, the implementation of a Community Safety Zone and the subsequent extension of the zone limits, the installation of Radar Message Boards, and installation of traffic calming measures (medians for roadway narrowing).

All previous studies undertaken by the City have indicated the volume of trucks travelling within the Melville Avenue corridor are not excessive and are within the limits of the roadway classification and design. Past speed studies indicated the implementation of Radar Message Boards were effective in reducing the average and 85th percentile travel speeds. Staff have recommended on several occasions that a “Heavy Truck” prohibition not be implemented on Melville Avenue and that the existing speed limit not be reduced from 50 km/h to 40 km/h on Melville Avenue between Rutherford Road and Major Mackenzie Drive.

Paradigm was tasked with assisting the City as an independent consultant to review the existing operational and road safety conditions.

Content

An objective review of the Melville Avenue corridor between Major Mackenzie Drive and Rutherford Road was undertaken to identify any design, operational and/or safety issues. This included the following:

- ▶ A review of studies previously conducted
 - Findings from previous studies undertaken by City staff were reviewed and validated.
- ▶ A review and assessment of the roadway characteristics
 - Roadway classification and context within the overall transportation network;
 - Posted speed limits; and
 - Roadway design including cross-section, alignment, and sight distances.
- ▶ An assessment of traffic volumes along the corridor



- Examination of daily and peak hour traffic volumes;
 - Inventory of vehicle classification types travelling within the corridor. Including the detailed investigation of heavy truck vehicles;
 - Comparison of historical traffic volumes and growth within the corridor; and
 - Vehicle operating speeds.
- ▶ A safety review
- Collision analysis;
 - Roadway conditions; and
 - Speed limit review.
- ▶ A traffic operations review
- Intersection operational analysis;
 - Left turn lane warrant review; and
 - Intersection control warrant review.
- ▶ Multi-modal transportation review
- Active transportation infrastructure review

Conclusions

Background Studies

- ▶ The findings of this study validate and further confirm the findings from previous studies undertaken by City staff.

Area Characteristics

- ▶ Commercial/retail and municipal uses are located at the north and south ends of the corridor with back-lotted single family residential houses abutting the length of Melville Avenue in between;
- ▶ Melville Avenue is a major collector roadway and is acknowledged to be the only other alternative north-south route connecting Rutherford Road and Major Mackenzie Drive between Jane Street and Keele Street. The function of a collector roadway is to provide organization for the local street system within residential areas and to provide the main connecting points to the arterial system;



- ▶ Melville Avenue provides a four-lane cross-section that has been designed accordingly providing appropriate lane widths and sight distance;
- ▶ Has a posted maximum speed limit of 50 km/h between Rutherford Road and Hawker Road, and between Norwood Avenue and Major Mackenzie Drive. A Community Safety Zone is designated from Norwood Avenue to Hawker Road – within this section the maximum posted limit is reduced to 40 km/h;
- ▶ Existing traffic calming measures are provided within corridor – specifically, three sections along Melville Avenue exist where the roadway narrows and provides “courtesy” pedestrian crossings across Melville Avenue;
- ▶ Appropriate signage is posted throughout the study area corridor;
- ▶ Transit service is provided along the Melville Avenue corridor, with transit stop access easily accessible to nearby adjacent residents; and
- ▶ Sidewalk is provided along both sides of Melville Avenue. However, no dedicated bicycle facilities are provided with cyclists having to share the travelled roadway with vehicles.

Overall it was determined that Melville Avenue is operating as designed and is serving its intended function within the overall transportation system.

Transportation Conditions

- ▶ The average two-way daily total traffic along the Melville Avenue corridor ranges between 9,634 – 12,621 vehicles within the study area;
- ▶ The daily percentage of trucks currently experienced along the Melville Avenue corridor is in the range of 1.19% - 1.76%;
- ▶ The number and percentage of trucks experienced daily is noted to be within range for a Major Collector roadway. The data suggests that heavy truck traffic through the corridor is not excessive;
- ▶ Vehicle classification was reviewed and heavy truck percentages were found to be generally unremarkable, and can be considered typical for roadways in urban, non-heavy industrial areas.
 - The majority of trucks noted within the Melville Avenue corridor are within Class 6 – 8. The highest heavy vehicle type recorded being a three-axle single unit truck, typically



represented by delivery vehicle, small size concrete trucks, etc.

- Heavy vehicles within Class 9 – 13 (larger trucks, multi-trailer trucks) are not a significant component of the daily heavy vehicle traffic using the Melville Avenue corridor.
- ▶ The number of heavy vehicles has seen negative growth over the past few years at several locations along Melville Avenue, whereas total overall traffic volumes have remained stable or have increased slightly;
- ▶ A comparable major collector road within the City of Vaughan provides indication whether the volume of heavy vehicles travelling along the Melville Avenue corridor are either typical, less than or excessive to what other collector roads are experiencing.
 - Melville Avenue was found to experience lower directional and two-way daily traffic volumes in comparison to a similar major collector.
 - In regard to heavy vehicle volumes, Melville experiences a lower volume on a daily basis. The percentage of trucks recorded on Melville Avenue is close to half the amount travelling along the comparable major collector road.
- ▶ Vehicle operating speeds were found to be exceeding the posted maximum speed limits. High levels of non-compliance were reported from the speed study data.

Overall it was determined that Melville Avenue is operating as designed and is serving its intended function within the overall transportation system. Total traffic and heavy traffic volumes are representative of the designated roadway classification and have been found to be similar to a comparable major collector road within the City.

Vehicle travel speeds through the Melville Avenue corridor were found to be exceeding the maximum posted limits with low compliance. Operating speeds are a function of the roadway design.

Safety Review

- ▶ Review of collision data indicates the average number of yearly reported collisions and the resultant impact types as generally unremarkable with no identifiable concerning patterns or trends;



- ▶ A total of two collisions involving pedestrians were reported which were determined to be minor in nature and did not result in any fatalities;
- ▶ A single collision was reported involving a heavy truck within the eight-year collision dataset reviewed. Reported at the Fortino's Access driveway on Melville Avenue. The collision resulted in property damage only and was due to driver error (i.e., failing to yield to right-of-way);
- ▶ Overall, the collision incidences are generally unremarkable. The majority of collisions involve property damage only (i.e. no injuries). No significant or immediate safety issues have been identified;
- ▶ The maximum posted speed limits are lower than what the roadway is designed for. In consideration of the roadway geometry, curvature, lane widths, pedestrian and cyclist exposure, pavement surface conditions, number of intersections, and number of intersections with private access driveways, the desirable operating speed for an urban, undivided, collector roadway is 60 to 70 km/h. The existing posted maximum speed limits are well below the desirable operating speeds per TAC guidelines. Motorists will typically travel at speeds they feel comfortable driving at and will disregard posted signage;
- ▶ The existing speed limits outside the Community Safety Zone limits are recommended not to be reduced from 50 km/h to 40 km/h on Melville Avenue between Rutherford Road and Major Mackenzie Drive;
- ▶ No substandard road widths are provided within the study area corridor, with the exception of the three sections where road narrowing was purposely implemented as a traffic calming measure; and
- ▶ The pavement condition is noted to be acceptable with no major visible wearing on the asphalt surface and no wheel rutting or other major deficiencies. The current volume of trucks travelling along Melville Avenue are not impacting the pavement structure (i.e. not causing damage to the hard-surfaced roadway).

Overall, the reported collision incidences are generally unremarkable. No immediate safety issues have been flagged.

Vehicle travel speed through the Melville Avenue corridor is a potential safety concern. The current maximum posted speed limits are below the recommended speed limit, which further



validates that the roadway has been designed and constructed for a design speed much higher than the posted limit.

Higher speeds contribute to a higher risk of serious injuries and fatalities by reducing driver reaction time, increasing the vehicle stopping distance, and inflicting more severe blunt force trauma on victims upon impact. However, it is noted that the reported highest operating speeds are within the design limits for a collector roadway. No reported collisions were the result of high travel speed.

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. Exceptions are noted at the intersections of:
 - Major Mackenzie Drive and Melville Avenue during the AM and PM peak hours;
 - Hawker Road and Melville Avenue during the AM peak hour; and
 - Rutherford Road and Melville Avenue/Creditstone Road during the AM and PM peak hours.
- ▶ The two signalized intersections at the north and south end of the study area along Melville Avenue were identified to operate with several critical movements;
- ▶ The unsignalized study area intersections were determined not to warrant upgrading existing traffic control to all-way stop control nor traffic signal control; and
- ▶ Auxiliary left turn lane warrants were investigated and determined to be warranted at several locations. Although left turn lanes are warranted, the existing operational analysis is noted to show that all intersections and the shared left/through movements operate well without the provision of turn lanes and therefore implementation would be negligible. Furthermore, from a safety perspective the collision analysis did not indicate any predominant trends or patterns related to intersection collisions that could be mitigated through the provision of an auxiliary turn lane.

Study area intersections under the jurisdiction of the City of Vaughan were all found to be operating at acceptable levels of service and well within capacity.



The Melville Avenue intersections with the arterial roads of Major Mackenzie Drive and Rutherford Road were noted to be operating with several movements approaching or at-capacity. There are relatively minor improvements that could be made to increase the intersections and movement's capacity. This includes adjustments to signal phasing and timing. The amount of timing adjustments that could be made would be limited due to signal coordination of adjacent intersections along the Major Mackenzie Drive and Rutherford Road Regional arterial corridors.

Multi-Modal Transportation Review

- ▶ Transit stops are located throughout the corridor and are easily accessible for adjacent residents/patrons;
- ▶ The study area of Melville Avenue between Rutherford Road and Major Mackenzie Drive West currently does not provide any bicycle infrastructure to accommodate traveling cyclists;
- ▶ It was documented during the in-field investigations a number of cyclists were observed on the sidewalk, providing indication that these cyclists may not feel safe sharing the roadway with vehicles;
- ▶ The pedestrian infrastructure throughout the study area is well maintained and supportive of those who choose to travel by walking. Delineated crosswalks at the intersections of Melville Avenue with Springside Road and Avro Road provide pedestrian push buttons to actuate the pedestrian crossing phases, in addition to the mid-block pedestrian crossings provided.

Pedestrian infrastructure within the Melville Avenue corridor is continuous and connects seamlessly with the overall pedestrian network. Mid-block crossings and adequate facilities (including delineated ladder crossings and pedestrian signal heads at intersections) are provided.

The Melville Avenue corridor is lacking 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.

Recommendations

Based upon the operational and safety review, several issues have been identified. Namely, speeding throughout the Melville Avenue corridor and minor intersection related issues noted within the corridor.



Based on our findings, the following is recommended to address the identified issues:

Shorter Term Improvement Plan

The following combination of alternatives is recommended for immediate implementation.

- ▶ Application of pavement markings, longitudinal and/or transverse markings can be applied to influence drivers' perceptions of the roadway environment. Longitudinal edge of pavement markings to artificially narrow the roadway and travel lanes. Transverse text stencils indicating the posted speed limit (i.e. 40 km/h) or advisory text (i.e. SLOW) to visibly enforce adjacent posted signage. Currently the existing roadway design caters to a higher operating speed in comparison to the posted maximum speed limit. The application of pavement markings can be completed as a pilot program;
- ▶ Installation of a flashing beacon to increase effectiveness of signage. The beacon would augment the existing "School Crossing Ahead" warning signage as this would visibly enforce the posted signage with the Community Safety Zone;
- ▶ Increased York Regional Police enforcement and rollout of education materials to the adjacent community residents. This would alter the "reputation" of the corridor and deter motorists from speeding. The educational outreach would cater to the portion of residents that speed while providing a reminder of the consequences and associated fines for speeding within designated the Community Safety Zone and adjacent sections along the corridor;
- ▶ Through the collision reports, several motorists were found to disobey the traffic signal and running the red-light resulting in collisions at the intersections of Melville Avenue with Avro Road and Springside Drive. To confirm whether the resultant collisions are the result of driver behaviour or a function of traffic signal head visibility, it is advised to check and confirm the visibility of the traffic signal heads are conspicuous during various lighting conditions;
- ▶ Provision of pedestrian countdown timers in addition to the existing pedestrian signals at the intersections of Melville Avenue with Avro Road and Springside Drive. Furthermore, the City will be reviewing all intersection locations starting in 2021 as part of the Traffic Management Strategy; and
- ▶ Request signal timing adjustments from York Region to provide additional green time to the Melville Avenue approaches with



Major Mackenzie Drive and Rutherford Road to improve queues approaching these arterial roads.

The recommended combination of shorter-term improvements is expected to:

- ▶ Mitigate the speeding and non-compliance issues along the Melville Avenue corridor;
- ▶ Reduce the potential risk of motorists running the red-light signal at the intersections of Melville Avenue with Avro Road and Springside Drive; and
- ▶ Reduce the potential risk of turning movement and angle movement collisions associated at driveways along Melville Avenue in vicinity to Major Mackenzie Drive and Rutherford Road.

Longer Term Improvement Plan

The following combination of alternatives is recommended for future implementation and consideration.

- ▶ Application pavement markings to influence drivers' perceptions of the roadway environment. Longitudinal and/or transverse pavement markings to be investigated for long term implementation when Melville Avenue is subject to resurfacing;
- ▶ Continued long-term York Regional Police enforcement. It is recommended frequent enforcement continue until the "reputation" of the corridor has altered and vehicle compliance with the posted maximum speed limits is achieved;
- ▶ Installation of gateway features at the north and south ends of the Melville Avenue corridor. Provision of entrance features to the corridor will help to alert motorists they have entered a community where the roadway connects and provides access to adjacent residential areas. Features could include signage, art, landscaping, and/or pavement treatments;
- ▶ Provision of dedicated cycling infrastructure along Melville Avenue. The 2019 City of Vaughan Pedestrian and Bicycle Plan Update identifies the Melville Avenue corridor as part of the local cycling route network. The plan specifically proposes the provision of Class 1 separated (in boulevard) facilities implemented by 2023. The infrastructure would result in a noticeable change in the "feel" of the roadway as the boulevard will not appear as wide. Provision of the infrastructure will have cost implications and possible road width constraints for design. It is assumed cost implications and design constraints will be



investigated in further detail through a feasibility and design study; and

- ▶ Continue to monitor traffic operations at the intersections of Melville Avenue with Major Mackenzie Drive and Rutherford Road, specifically the queues on Melville Avenue approaching the arterial roads and the impact and interaction it causes with the driveway accesses in proximity.

The recommended combination of longer-term improvements is expected to:

- ▶ Provide an identify for the Melville Avenue corridor;
- ▶ Manage the identified speeding issues and ensure compliance with the posted speed limits occurs; and
- ▶ Provide safe separated cycling infrastructure, which in turn promotes increased use of the bicycle travel mode, reduces the reliance on the automobile for short trips, and promotion of a healthy lifestyle.

