

**Subject: Riddell Road Intersection Analyses**

**Department: Infrastructure Services**

**Division: Transportation and Development**

**Report #: INS-2021-005**

**Meeting Date: 2021-01-25**

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## **Recommendations**

**That report INS-2021-005, Riddell Road Intersection Analyses be received;**

**And That Council direct Staff to implement Option \_\_ as presented within this Report and in accordance with the measures set out in the Paradigm Riddell Road Assessment of Intersections Report.**

## **Background**

The purpose of this report is to outline the findings and recommendations of the investigations of the intersections on Riddell Road at Alder and at Spencer Avenue and Centennial Road. In late 2019 Council received a delegation from a group of west end residents that were concerned about the overall safety of the intersections of Riddell Road and Alder Street, and Riddell Road and Spencer Avenue/Centennial Road. Specifically, the delegation questioned the safety of the left turning movement from northbound Riddell Road onto both westbound Alder Street and Spencer Avenue. The delegation requested that the existing traffic signals at both intersections be modified to include advanced left turns.

As a result, Council directed staff to engage the services of a traffic consultant to investigate the afore mentioned intersections. The consultant was to complete an assessment of options and further review what implications those options might impose on Riddell Road. As well, the investigations were to include a review of solutions implemented by other municipalities, more specifically the option of roundabouts at the two intersections on Riddell Road.

Staff prepared terms of reference for the required investigations. Engineering proposals were received, and the consulting services were awarded to Paradigm Transportation Solutions Limited (Paradigm). Paradigm completed their investigations and finalized

their report in January 2021. The results of their investigations are summarized below. Paradigm's full report is found as Attachment No. 1.

## Analysis

Paradigm were retained to assess the intersections on Riddell Road at Alder Street and Centennial Road/Spencer Avenue. The focus of Paradigm's study was to:

- Review existing geometry and operations of the above noted intersections;
- Review speed limits and collision data;
- Analyse future operations of the intersections with and without remedial measures;
- Provide recommendations of a short term and a long-term nature for the intersections;
- Provide guidance on future studies, and
- Prepare preliminary cost estimates for the recommended measures to be implemented, if any.

A review of the existing intersection geometry included a check on sight distances, stopping distances, left-turn lane sight lines and pavement markings. Checks were made in accordance with published design guidelines and specifically the *Geometric Design Guide for Canadian Roads, Transportation Association of Canada (TAC), June 2017* publication. The overall geometry of both intersections, including sight distances, left-turn lane sight lines, stopping distances and pavement markings all conform with the TAC guidelines and are also in compliance with Ontario Traffic Manual, Book 11 – Pavement, Hazard and Delineation Markings, March 2000. The report does however note that the northbound and southbound turn lanes at the Riddell Road, Centennial Rd./Spencer Avenue intersection is offset due to the presence of traffic islands. As such opposing left turn movements do not have a clear line of site to oncoming through traffic. While this intersection geometry is common and the intersection conforms to existing guidelines, it is not an optimal configuration and can be perceived as a safety issue by some drivers.

A review of safety performance at each intersection was also undertaken. This included a review of collision data and speed limits. The analysis determined that the intersection geometry at both study locations did not contribute to collision patterns. No discernible collision patterns were found. Also, the posted speed limits fell well under the recommended speed limit guidelines as determine by the TAC Speed Management Guide, Canadian Guidelines for Establishing Posted Speed Limits. As an example, the posted speed limit for Riddell Road is 70 km/hr. The recommended speed limit as per TAC guidelines is 80 km/hr.

The operational analysis also applied the level of service (LOS) methodology which quantifies timing delays experienced by vehicles making turning movements at intersections. The results of the study indicate that the intersections are operating at acceptable levels of service and that the intersections have spare capacity. As such, the

intersections are forecasted to continue to operate at acceptable levels of service and with spare capacity. Forecasted operations were evaluated for traffic volumes to the year, 2031.

### **Intersection Remedial Measures:**

#### **Riddell Road at Spencer Avenue/Centennial Road**

The intersection geometry complies with design guidelines and is expected to continue to operate at acceptable levels of service, thus it does not require any remedial measures. With that said, Paradigm did identify two measures that could be implemented to mitigate the perceived safety concerns. These are the offset northbound and southbound left turn lanes which contribute to visibility concerns and the southbound dedicated right-turn lane onto Spencer Avenue from Riddell Road being used as a southbound through lane to avoid lane queueing. Protected left-turn signal phasing will address resident concerns regarding safety at the intersection. In addition to changes to the signal head equipment, left-turn lane extension pavement markings should be provided to guide vehicles making left hand turn movements.

To mitigate the issue of motorists using the dedicated southbound right turn lane to avoid southbound through lane queueing, Paradigm recommended that additional pavement markings, signage and/or maintenance free barriers, i.e. knock-down type barriers be put in place.

Note that the proposed protected left turn signal will result in a decreased LOS and added traffic congestion. To address these matters, the consultant reviewed longer term solutions. The consultant considered the option of a full roadway re-alignment to remove the offset left turn lane configuration and the conversion of the southbound right-turn lane into a shared through/right-turn lane. These longer-term alternatives are significantly more complex and would require further study.

#### **Riddell Road and Alder Street**

The intersection geometry at Riddell Road and Alder also complies with design guidelines and is expected to continue to operate at acceptable levels of service. However, the intersection has comparable concerns with the northbound–southbound left-turn lanes and straight through movements. Accordingly, these concerns may be addressed by implementing a protected left-turn signal as well as adding additional through lanes as a longer term recommendation. The protected left-turn signal is considered to be a short-term solution.

The additional through lanes would provide additional capacity and result in overall improvements to the intersection's critical northbound and southbound movements. It should also be recognized that a future access for the Alder Street Recreation facility is planned. This entrance is proposed to be constructed as a right-in/right-out entrance approximately 285 metres north of the intersection. The provision to integrate the new recreation centre entrance and the recommended additional south-bound and north-

bound lanes should be co-ordinated simultaneously and is considered as an intermediate timing alternative.

### **Supplemental Recommendations**

The Consultants supplemental investigations included a review of roundabouts at both study area intersections. Roundabouts have been considered as a possible long-term option to accommodate future traffic volumes. In analyzing roundabouts, Paradigm noted that Riddell Road serves as a major arterial by-pass road. It is used for routing heavy vehicles and oversized/wide loads. As such the minimum inscribed circle to accommodate vehicles is most likely required to be increased and would need to be confirmed as part of any final engineering design. Based on current conditions the consultant has determined that a roundabout with a minimum 47.5 metre inscribed circle diameter with two entering lanes on Riddell Road and one entering lane on the side street approaches will provide adequate levels of service. It is noted that a roundabout of this size can be accommodated within the existing municipal right of way at both intersections.

The Consultant's report notes that roundabouts are not required to provide adequate levels of service at the study intersections. Most importantly the consultant has indicated that with the provision of roundabouts at these intersections, it is likely to cause operational impacts at upstream and downstream intersections on Riddell Road. Accordingly, it is recommended that a corridor study be carried out to assess potential impacts and to develop a long-term plan that would meet the Town's needs as well as the County of Dufferin's. Roundabouts are costly to construct; estimated to be in the order of \$1.25 to \$1.5 Million each. It is recommended that along with the assessment of potential corridor impacts, the Town should also consider a cost-benefit analysis of roundabouts versus the intersection-specific recommendations.

The Consultant's final recommendations suggest regular reviews of signal timing and phasing plans and resulting intersection operations. These reviews are intended to assist in mitigating capacity and safety issues before intersection operations deteriorate to unacceptable levels.

### **Option Summary**

Paradigm has analyzed two intersections on Riddell Road, specifically the intersection at Alder Street and the intersection at Centennial Road/Spencer Avenue. While both intersections were found to be in compliance with current standards and guidelines there were a number of measures proposed which are intended to enhance road safety. Therefore, based on the Consultant's findings the following options have been provided for consideration:

#### **Option No.1 – Do-Nothing**

At present, the Riddell Road intersections at Alder Street and Centennial Road/Spencer Avenue are operating at overall acceptable levels with spare capacity. The existing

geometry at both intersections meets published guidelines. As such, no improvements are required and there is the option to do nothing.

#### Option No. 2 – Protected Left Turn Signals

Some drivers perceive the two intersections to be a safety concern due to limited visibility and vehicle speed. To increase overall intersection safety the option of implementing protected left-turn phasing to address left turn movements when potential visibility issues exist. Accordingly, Option 2 would consider the installation of protected left-turn signals at each intersection within this Study.

#### Option No. 3 – Long Term Measures

The Consultant also considered a number of intermediate and long-term measures. Measures include roadway re-alignments, lane extensions and intersection lane reassignments, traffic control and roundabouts. All of the intermediate and long-term recommendations could be considered in the context of a future corridor study. This study should also include input from the County of Dufferin.

Timing for implementation of the measures is broken into short term (within one year), intermediate (2 to 5 years) and long-term (> 5 years) timeframes. The remedial measures and estimated costing are summarized in the following table.

TABLE No. 1

| <b>Intersection Location</b>                  | <b>Timelines</b>             | <b>Remedial Measures</b>  | <b>Costing</b>                                 |
|---|------------------------------|---|--|
| Centennial Road/Spencer Avenue & Riddell Road | Short term (within one year) | <ul style="list-style-type: none"> <li>i) Protected left-turn signal phasing</li> <li>ii) Lane extension markings</li> <li>iii) Southbound right turn lane modifications</li> </ul> | \$25k to \$35K<br>\$3500<br>\$7500 to \$10,000 |
|   | Intermediate (2 to 5 years)  | <ul style="list-style-type: none"> <li>i) Left turn lane alignment</li> <li>ii) Southbound right-turn lane conversion</li> <li>iii) Associated lane markings</li> </ul>             | Subject to further design review<br>\$50,000   |

|                               |                                 |   |   |
|-------------------------------|---------------------------------|---|---|
|                               |                                 |   | \$3500  |
|                               | Long Tenure<br>(> 5 years)      | <ul style="list-style-type: none"> <li>i) Roundabout implementation (Scenario 2)</li> <li>ii) Corridor Study</li> <li>iii) Signal timing &amp; collision data review</li> </ul> | <ul style="list-style-type: none"> <li>\$1.25M to \$1.5M</li> <li>\$50,000</li> <li>\$2,500</li> </ul>      |
| Alder Street and Riddell Road | Short term<br>(within one year) | <ul style="list-style-type: none"> <li>i) Protected left turn signal phasing</li> <li>ii) Lane extension markings</li> </ul>  | <ul style="list-style-type: none"> <li>\$25K to \$35K</li> <li>\$3500</li> </ul>                            |
|                               | Intermediate<br>(2 to 5 years)  | <ul style="list-style-type: none"> <li>i) Lane improvements and modifications; co-ordinate with Alder Street Recreation Centre Entrance</li> </ul>                              | Subject to further design review  |
|                               | Long Term<br>(> 5 years)        | <ul style="list-style-type: none"> <li>i) Roundabout implementation (Scenario 2)</li> <li>ii) Corridor Study</li> <li>iii) Signal timing &amp; collision review</li> </ul>      | <ul style="list-style-type: none"> <li>\$1.25M to \$1.5M</li> <li>Included above</li> <li>\$2500</li> </ul> |

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## Strategic Alignment

### Orangeville Forward – Strategic Plan

Priority Area: Sustainable Infrastructure

Objective: Provide Systems That Keep People Moving

### Sustainable Neighbourhood Action Plan

Theme: Transportation System

Strategy: Promote More Sustainable & Efficient Transportation Systems

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### **Financial Impact**

The proposed 2021 capital budget includes neither an allowance for traffic signal modifications, i.e. protected left-turn signal timing, lane modifications, through south/northbound lane additions and/or undertaking corridor studies. While there is no direct financial impact associated with the recommendations of this report, there will be a financial impact if the Town proceeds with intersection modifications, traffic signal changes and future corridor study investigations.

Respectfully submitted

Douglas G. Jones, P. Eng.,  
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**Attachment(s):** 1. Paradigm Transportation Solutions, Riddell Road  
Assessment of Intersections Report, January 2021