

TECHNICAL MEMORANDUM

To: Livia McEachern, P.Eng.

RVA: 226408

From: Michael Kong, C.E.T.
Altaf Hussain, P.Eng.

Date: April 10, 2025

Subject: Transportation Master Plan – Appendix 7 – Roundabout Implementation
Guidelines – City of Welland

1.0 Introduction

Roundabouts are a form of intersection control that are becoming increasingly prevalent in North America, and specifically in the Niagara Region (see **Figure 1.1**). However, while roundabouts have been proven as a safer and likely efficient mode of control as compared to traffic signals, the implementation of roundabouts is usually preceded by a complex planning and justification process. Determining whether a traffic signal or roundabout is more suitable for an intersection is location-specific, with each option presenting unique advantages and disadvantages.

Therefore, in alignment with the ongoing Transportation Master Plan (TMP), a review of best practices has been completed to formulate a set of Roundabout Implementation Guidelines for the City of Welland. The primary objective of this policy will be to provide general guidelines on where roundabouts are appropriate, and in contrast, where other forms of traffic control should be explored.



2.0 Roundabout Implementation Policy

2.1 Policy Applicability

Roundabouts should be considered as an intersection control alternative in existing development areas where:

- The existing roadway geometry permits;
- There is sufficient land available to accommodate the roundabout footprint;
- A stop-controlled intersection is being contemplated for an upgraded traffic control;
- Capital improvements are being considered;
- Traffic safety and/or capacity issues exist; and/or
- The implementation of a roundabout is supported by a traffic study.

Furthermore, roundabouts should be considered in new development areas where:

- A new intersection is planned along an arterial or major collector road that warrants or may warrant a future traffic signal or all-way stop;
- A new intersection is planned along a local road where traffic calming or development staging is required; and/or
- The implementation of a roundabout is supported by a traffic study.

2.2 Roundabout Suitability

2.2.1 Roundabout Criteria

Roundabouts, traffic signals, and all-way stops all present their own benefits and complications. The items outlined in this section are important to consider but are not mandatory requirements for a roundabout. When evaluating the preferred traffic control of an intersection, judgement must be applied to evaluate the most appropriate alternative based on various site-specific criteria.

Roundabouts are generally preferred as an alternative intersection control where:

- The entering and exiting volumes are generally balanced across all approaches, with a high percentage of turning movements;
- There are concerns regarding traffic safety;

- An unconventional configuration exists (i.e., skewed approaches, more than four (4) legs, etc.);
- Vehicles are travelling at excessive operating speeds;
- Significant delays exist for minor street volumes (two-way stop control) and signal warrants are not met;
- The node is a transitional area for the surrounding land use i.e., residential to commercial, urban to rural, etc.;
- The node serves as a gateway to a neighbourhood, commercial development, or urban area; and/or
- There is a notable number of U-turn manoeuvres.

Roundabouts should generally be avoided at intersections where:

- There are property constraints or utility conflicts;
- Problematic vertical grades exist;
- There is close proximity to a signalized intersection where vehicle queues could disrupt roundabout operations;
- There is close proximity to a rail crossing where vehicle queues could disrupt rail or roundabout operations;
- Traffic signal progression exists along the corridor; and/or
- A significant number of cyclists or pedestrians regularly traverse the intersection.

2.2.2 Roundabout Pre-Screening

A pre-screening assessment can be completed to evaluate the suitability and desirability of a roundabout. The pre-screening criteria is summarized in **Table 1.1**.

Table 1.1 – Roundabout Pre-Screening Assessment

Criteria	Assessment
Safety	- Is there an abnormally high number of angle and/or turning movement collisions at the intersection? - Would a roundabout allow for access management benefits?
Operations (Delays, Queues)	- Would excessive delays or vehicle queues be mitigated by a roundabout? - Will the roundabout exhibit the desired level of service?
Traffic Flows	- Are entering and exiting traffic volumes relatively balanced under existing and/or future conditions? - Is there a high percentage of turning movements?
Property Availability	- Is there sufficient property available for a roundabout? - If property constraints exist, can the surrounding lands be feasibly acquired?
Intersection Geometry	- Would the roundabout alleviate sightline concerns caused by skewed horizontal alignment? - Are there more than four (4) approaches?
Proximity to Signals/Rail	- Could queues from a nearby traffic signal spill back into the roundabout? - Could queues from a nearby rail crossing spill back into the roundabout? - Could queues from a roundabout spill back into a rail crossing?
Land Use	Would the roundabout serve as a transition point between land uses (i.e., residential to commercial, etc.)?
Traffic Calming	Could a roundabout serve to reduce excessive operating speeds?
Vulnerable Road Users	- Is there a high number of cyclists and/or pedestrians that regularly traverse the intersection? - Is there a large number of visually or mobility impaired pedestrians that are expected to traverse the intersection?
Cost	Is a roundabout financially feasible compared to other forms of traffic control (implementation, maintenance, etc.)

2.3 Roundabout Implementation

Whenever possible, input from various stakeholders and the general public should be solicited and considered for the roundabout design option. This can be done through the use of in-person or online public information centres (PICs). However, all design aspects will be carried out in accordance with the latest *Transportation Association of Canada (TAC)* standards and *NCHRP 672 Roundabouts: An Informational Guide, Second Edition* guidelines.

Where new development plans are received by the City that are suitable for a roundabout, the City reserves the right to incorporate roundabouts into the development plans as needed.