

# TRANSPORTATION IMPACT ASSESSMENT

## GUIDELINES

Monday, July 24, 2023



Engineering for **people**

These guidelines are intended to provide an understanding of traffic operations and transportation impact assessment and cover a broad range of elements that are usually encountered in practice. They are based on various factors such as safety, convenience, adjoining land use, multimodal transportation operations, adjoining roadway classification and traffic control. However, no manual can cover all contingencies or all potential cases to be encountered in the field. Therefore, field experience and knowledge of application are essential in applying the direction stated in these Guidelines.

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# 1 Introduction

Niagara Region recognizes the importance of all modes of transportation to its citizens and businesses and to their ability to move around and through the Region. The Niagara Region Official Plan includes a number of objectives and policies that demonstrate this. The Region's Official Plan states that there is a desire for a safe, convenient, efficient, aesthetic, and economical transportation system for its residents and businesses, including the provision of efficient transit services. It is important to ensure that new developments and redevelopments are planned with these objectives in mind as well.

As a result, the Region seeks to move away from more traditional Traffic Impact Studies (TIS), which are generally focused on the impacts of car and truck traffic and to embrace a multi-modal approach to transportation. With the adoption of this Guideline Document, the Region will now require that benefits and impacts for all modes of transportation generated by, attracted to, or altered by a new development or redevelopment be assessed in a Transportation Impact Assessment (TIA).

Rather than focusing on the travelled lanes between the curbs, the TIA shall look at all means and modes of transportation. It should be noted that it is not the intention of this guideline to be a "barrier" to developments within the Region; rather it is meant to assist all parties in identifying what is required upfront to achieve a complete TIA document that will best serve the needs of all involved.

## 1.1 Objectives of a Transportation Impact Assessment

The main objectives of a TIA are to:

- Identify the benefits and impacts of a proposed project/ development/ redevelopment.
- Identify how any transportation impacts associated with the proposed project/development/redevelopment can be mitigated and addressed in a manner that is consistent with the objectives of Niagara Region and the Municipality.
- Evaluate transportation related improvements or measures to be included as a condition of the project or development or redevelopment by providing safe and efficient access and traffic flow.
- Identify any existing or potential safety concerns, and apply a road safety focus and undertake the necessary technical work related to conflict analysis, road safety audit, and safe system approach; and
- Identify countermeasures to enhance the level of safety for all road users including motorists and vulnerable users.

## **1.2 Purpose of this Guideline**

Niagara Region has prepared this document to provide a standardized approach to developers and consultants regarding the preparation and submission of a TIA. A standardized set of guidelines will assist Regional staff in reviewing TIAs and reduce revisions and resubmissions.

Following these guidelines and contacting appropriate Regional/Municipal staff in the preliminary stages of the development planning process will provide a more consistent and efficient review process. The Region will also use these guidelines for Class Environmental Assessment Studies for Capital Works Projects and for transportation analysis associated with Secondary Planning.

The TIA will provide information that identifies the impacts of proposed development on the existing transportation facilities and circulation networks and the recommended mitigation measures for the impacts identified.

The preparation of a TIA will consider the content of the Region's Official Plan, Transportation Master Plan, Complete Streets Design Manual, Access Management Guidelines, and other related transportation and planning documentation.

## **2 General Requirements**

### **2.1 Need for a Transportation Impact Assessment**

In general, a TIA will be required when any one of the following criteria is met:

- More than 100 new peak hour auto trips are expected to be generated as a result of the project/development/redevelopment.
- Localized safety or capacity issues already exist.
- Localized safety or capacity issues are anticipated as a result of the proposed project/development/redevelopment or other proposed developments in the area.
- There are site-specific or project-specific characteristics that warrant more detailed transportation analysis.
- The project/development/redevelopment, its access, or type of operation is not envisaged by existing land-use or transportation plans.
- The project/development/redevelopment is a large recreation or entertainment facility that would likely serve as a regional attraction.
- Any previous TIA study prepared for the same site is more than three (3) years old; or
- If a combination of environmental assessment study and proposed development application/s in the area.

Niagara Region reserves the right to require submission of a TIA as part of the development application process notwithstanding the criteria listed above.

### **2.2 Region/Municipal Staff Consultation**

The evaluation of the impacts of a proposed project/development/redevelopment on the transportation network depends upon a number of assumptions about the type, amount, mode, and travel patterns expected to be produced from and attracted to the site.

As such, it is imperative that in the preliminary stages of the development planning process, the Developer attends a pre-consultation meeting to determine if a TIA is required. Prior to commencing work on a TIA, the Developer shall provide a draft Scope of Work to all associated agencies for their review and approval, in order to ensure that all requirements will be captured in the final TIA submitted with the formal application.

To this purpose, the Developer shall submit a proposed Scope of Work accompanied by the following information (to the best extent possible):

- A site plan that must include the following details:

- Title block including name of the applicant, project name, address, date of issue, application number(s)
- Scale
- North point
- Property lines
- Street name and number
- Location and names of adjacent roads.
- Existing right-of-way
- Future right-of-way widening if any including dimensions
- Daylighting Triangles, if required
- Existing and proposed municipal sidewalk(s)
- Location of proposed buildings and structures
- Proposed parking area layout with the maximum number of vehicles to be accommodated at one time.
- Location of existing and proposed entrances for the proposed development and the abutting properties as well as properties on the other side of the road.
- Fire access routes and waste/recycling truck routes, if required
- Existing transportation infrastructure in the access roads (i.e., Signals)
- Development details, including:
  - Type of development (i.e., residential, commercial, industrial, etc.)
  - Projected size of development (i.e., number of units, GFA, etc.)
  - Stages or phasing schemes of the development, including those in which several independent developments are considered as part of a permit application.
  - Expected buildout year.
- Traffic information:
  - Street operation (e.g. one-way vs. two-way) for all streets shown on the site plan.
  - All adjacent and affected intersections including lane configurations, lane width, and turning restrictions that will be included in analysis
  - Proposed developments in the area that they will be taken into consideration.
  - Proposed studies (i.e., EA's) that will be taken into consideration.
  - Proposal to calculate trip generations for the site.
  - Proposal to calculate trip distribution.



- Proposed traffic growth rate and rationale for the number provided.
- Analysis horizon years
- Analysis for additional requirements for pedestrian, bicycle network linkages
- Additional information – sight line study, review for signalization, vehicle turning paths, review of left turn lane requirements, etc.

After Region and/or Municipal staff have completed the review of the proposed Scope of Work, the requirements for the TIA – including suitable parameters to be used as part of the transportation impact analysis, will be formally communicated to the Developer which will proceed with the preparation of the TIA accordingly. For larger developments Regional and Municipal staff may require that prior to formal submission of the TIA, preliminary technical memorandums be prepared by the Developer and submitted for review and approval by Regional and Municipal staff to ensure that trip generation/distribution etc. are acceptable prior to the TIA being completed and submitted.

If this approach is determined suitable it will be relayed through the reviewing and commenting of the Scope of Work or at pre-consultation meeting.

## **2.3 Engineering Qualifications**

Where a TIA is required or requested by the Region or Municipal staff, it will be the responsibility of the Developer to retain a qualified transportation consultant with experience in transportation planning, road safety and traffic engineering. The consultant must be a registered Professional Engineer licenced and in good standing in the Province of Ontario and the TIA report shall be signed and stamped by the Professional Engineer prior to final approval.

## **2.4 Submission Requirements**

The TIA report must follow the format outlined in Section 3 of these guidelines. This format will facilitate efficient and effective review, discussion, and communication. Any variation from this format without prior consultation with the reviewing agency will result in delays to the processing of the application and in some cases the report may be denied and returned for revision.

The TIA report should consist of a main document containing the text and exhibits including summary tables, supplemented by technical appendices detailing the analysis as well as functional design drawings. Elements of the TIA report shall include those which were included in the approved Scope of Work.

All supporting information such as the traffic analysis outputs, trip generation/distribution data source, collision history, etc. shall be submitted with the TIA. All Synchro files or other traffic simulation software shall be submitted in digital form.

Developers are also reminded that approval of the TIA does not constitute approval of the development application.

## **2.5 Study Updates**

A TIA will have a functional life of three (3) years from the date of the study. Consideration may be given to extending the functional life of the TIA should build-out not take place as expected and other major changes within the study area have not occurred (i.e., for infill developments in a mature area or new development applications). Major changes within the study area or the proposed development may reduce the applicability of the study if they were not considered in the original impact assessment and may require an update to the assessment if the development has not already begun or completed build-out.

## **3 Report Format and Contents**

The following section outlines the typical content for the TIA. In general, the content and extent of the TIA will depend on the location, nature and size of the proposed project/development/redevelopment and the prevailing transportation network and conditions in the surrounding area. Municipality or Provincial roadway authorities may require additional information or analyses beyond the Regional requirements outlined in these guidelines.

### **3.1 Title Page**

Contains date of submission, report version (draft or final) as well as general information about the related development application.

### **3.2 Executive Summary**

Contains key findings, conclusions and recommendations of the TIA and should be located at the front of the document.

### **3.3 Introduction**

The purpose for submitting the TIA shall be explicitly indicated as part of the Introduction and shall contain a brief description or overview of the project that is the subject of the TIA as well as a description of the components of the TIA.

### **3.4 Context**

#### **3.4.1 Study Area**

The TIA shall contain a description and a map of the study area including, but not limited to, the following information:

- Site location.
- Existing and adjacent land use type.
- Road jurisdictions.
- All adjacent and nearby roads indicating the names, road classifications (using AADT), typologies, speed limits, and lane configurations.
- Signalized and/or unsignalized intersections and their locations including control type and turning restrictions.
- Transit services (routes and stop locations), parking facilities, pedestrian and cycling facilities (existing and planned).

The study area should be determined through the Scope of Work where the Region and Municipal staff reserve the right to establish the study area as may be deemed necessary.

The study area will include all municipal, regional, and provincial roads, expressways, intersections, interchanges, transit services, pedestrian and cycling facilities, etc. that Regional and Municipal Staff consider to be noticeably affected by the trips generated/attracted by the proposed project/development/redevelopment.

### **3.4.2 Site Plan and Proposed Land Uses**

The TIA shall provide a full description of the proposed development that includes the following elements:

- The type of land uses proposed.
- Detail and size of the proposed development, expressed in units related to transportation analysis such as property size (area), number and size of residential units, industrial gross floor area, number of employees, number of hotel rooms, commercial gross leasable floor area, etc. Special attention should be paid to the correct gross versus net definitions.
- Other developments in the study area that are under construction, approved or in the approval process that have the potential to impact the regional facility or proposed access (to be confirmed by the Municipality).
- Any road improvements that are planned within the next 10-20 years plans or currently under construction within the defined study area.
- Any improvements included within existing EA documents for the study area.

The anticipated construction year for the proposed development shall also be identified. If the proposed development is to be constructed in phases, the TIA shall identify the stages or phasing schemes of the development as well as the expected dates of full and partial completion/occupancy, estimated length of construction and opening dates if available, for each phase.

A detailed site plan shall be provided showing structures, parking, access and site circulation, fire routes, waste recycling truck routes, as well as existing road edges, entrances, pedestrian and cycling facilities, pavement markings and traffic control for roads adjacent to the proposed development as described in Section 2.2.

## **3.5 Travel Demand**

### **3.5.1 Horizon Year**

In general, the horizon year(s) for impact analysis must be: (1) for existing conditions at the time of the preparation of the TIA; (2) at the time confirmed by the Developer in which the proposed development will be fully completed (build-out condition); and (3) five years from the anticipated build-out of the site. Where applicable, each major phase in a multi-phased development shall be assessed separately for the five-year horizon beyond full build-out of each phase.

The horizon year(s) will be confirmed by the Region and Municipal staff as part of the approved Scope of Work.

### **3.5.2 Time Periods of Analysis**

Typically, the weekday morning AM and afternoon PM peak hour periods should be evaluated. If the site is located in a major tourism area or is expected to generate significant weekend traffic, then the weekend peak hour may also require analysis.

Selection of the most appropriate peak period – especially for those areas in which weekend peaks may be considered as most suitable scenario will be determined by the Region and Municipal staff as part of the approved Scope of Work.

### **3.5.3 Data Collection**

The Developer is responsible for collecting, assembling, analysing, and presenting all types of data required for the study. A field observation (peak one-hour count at minimum) should be undertaken to verify that traffic volumes through an intersection reflect normal conditions and to determine the necessary adjustments to level-of-service calculation so that actual conditions are fairly represented.

Current traffic and collision data (data collected within at least three years of the study) shall be used. Turning movement count (TMC), signal timing data, historical and recent AADT volume information for regional roads, and collision data can be requested from Niagara Region for a fee: (<https://www.niagararegion.ca/living/roads/permits/traffic-data-requests.aspx>).

Additional current volume data (including pedestrian and cyclist) should be collected to supplement the available data, as necessary. Transit counts should be based on the peak points of the routes involved. Particular care should be taken in conducting/ reviewing traffic counts in congested situations to identify/account for distortions caused by capacity constraints.

Where the development is adjacent to an area with identified traffic/safety issues, existing collision data (available from the Region) should be reviewed and an assessment of the impact of the proposed development should be provided as part of the TIA.

In the event of Regional or Municipal data not being available or if the data is not current enough to be used for the study, the Developer shall undertake collection of the required data on their own. However, traffic counts that appear not to be reflecting existing conditions should be updated so they reflect current traffic levels.

### **3.5.1 Background Traffic Forecast**

The background growth in traffic should be established in consultation with Regional and Municipal staff through one of the following methods:

- Estimation of roadway growth factors from a calibrated transportation demand model, such as the Region's EMME model.
- A growth rate based on area transportation studies.

In absence of these methods, a background traffic growth factor between 1 to 2 percent will be determined by the Region and Municipal Staff as part of the review of the Scope of Work.

The Region can also provide additional information regarding travel demand and/or unique study areas through reference to the Region's EMME model.

### **3.5.2 Site-Generated Traffic**

#### **3.5.2.1 Trip Generation**

The volume of traffic generated by a proposed project/development/redevelopment shall be estimated using the procedures described in ITE's Trip Generation Manual. Trip generation parameters shall be selected using the guiding principles included in the ITE's Trip Generation Handbook.

If local data is available, or an alternative methodology for trip generation is proposed, including the use of proxy sites, the use of this data or methodology shall be presented as part of the proposed Scope of Work for approval by the Regional and Municipal staff. A minimum of three comparable studies should be provided.

The TIA shall present trip generation assumptions and results in a tabular form identifying the categories and quantities of land uses, with the corresponding trip generation rates or equations and the resulting number of trips.

The report should also include a description of any initiatives proposed to provide alternatives to single-occupancy vehicle use and any steps that will be taken to support transit use, walking, cycling or other forms of Transportation Demand Management.

### **3.5.2.2 Trip Distribution/Assignment**

The TIA shall describe methods and assumptions for distribution and route assignment of traffic. Assumptions for trip distribution shall be supported by one or more of the following:

- Transportation Tomorrow Survey (TTS) data.
- Origin-destination Surveys.
- Comprehensive Travel Surveys.
- Planning models.
- Market studies.

Assumptions for route assignment shall be supported by:

- Existing travel patterns.
- Expected future travel patterns.

Assumptions for Origin/Destination and Percent Distribution shall be presented in tabular form; traffic assignment should be presented as a diagram. For each time period, include figures that summarize:

- Existing traffic/transit volumes.
- Existing plus background growth for each horizon year; and,
- Existing plus background growth plus site generated volumes for each horizon year

### **3.5.2.3 Pass-By and Internal Capture Trips**

Pass-by trips are defined as intermediate stops made on the way from an origin to a primary destination. Methods and assumptions for adjusting gross trip generation for pass-by trips shall be in accordance with the ITE's Trip Generation Handbook.

Internal Capture trips are defined as those trips made among land uses internal to the site. The method addressed in the ITE's Trip Generation Handbook shall be followed to estimate the percentage reduction in trip generation due to internal capture.

For land uses not currently included in the ITE's Trip Generation Handbook, all trips will be considered as primary trips.

Assumptions for Pass-by and Internal Capture Trips should be presented in a tabular and graphical form.

## **3.6 Evaluation of Impacts**

### **3.6.1 Traffic Operations Analysis**

The evaluation of impacts shall be conducted for all time periods of each horizon year, including any interim phasing years if applicable, as established by Regional and/or Municipal staff as part of the approved Scope of Work. The peak hour analysis should be undertaken for existing, future background and future total traffic conditions as detailed below:

- Existing traffic conditions.
- Existing traffic conditions plus background growth (i.e., future background traffic conditions).
- Existing traffic conditions plus background growth plus site-generated traffic (i.e., future total traffic conditions)

Where required, separate scenarios should be developed to present findings with and without possible road/intersection improvements.

Capacity analysis shall be performed at all proposed site access points and intersections in the study area in accordance with the methodology described in the latest edition of the Highway Capacity Manual (HCM). Critical movements should be identified according to the following:

- At signalized intersections, movements with v/c ratio greater than 0.85 and/or LOS “E” or worse are deemed to be “critical” in terms of operations. Movements that exceed those thresholds shall be evaluated for possible operational improvements.
- At unsignalized intersections, movements expected to operate at LOS “D” or worse and/or where the estimated 95th percentile queue length for an individual movement exceeds the available queuing space.
- Any site accesses where entrances or egress is anticipated to be blocked by traffic queues from an upstream/downstream intersection.
- An exclusive turning movement in which the 95<sup>th</sup> percentile queue will exceed the available storage space.
- Exclusive left- and right turn lanes that are inaccessible due to the length of queues in the adjacent through lanes.

Conventional signal timing plans should be used and all proposed adjustments to traffic signal timing, phasing and cycle lengths should be evaluated in terms of pedestrian crossing time, effect on queue lengths, adequacy of existing storage and effects on the existing signal co-ordination in accordance to Niagara Region standards.

Two stages left turning movements or pedestrian crossings shall not be considered as part of the capacity analysis.

For developments in which truck trip generation and their effects on the study area have been identified in the Scope of Work, heavy/commercial vehicles shall be considered as part of the capacity analysis and the following information shall be included as part of the TIA:

- Existing conditions related to truck traffic (percentage, number of collisions).
- Relationship between land use and truck traffic (cargo, service hours, routing).
- Physical requirements (dedicated access, dedicated lanes).

The Region and Municipal staff will accept the use of Highway Capacity Software, Synchro/SimTraffic or similar simulation software for intersection/roundabout capacity, operational analysis, and geometric delay analysis. Regional and Municipal staff will confirm the approved software and the version of its packages as part of the approved Scope of Work. The Developer shall request approval from Regional and Municipal staff as part of the proposed Scope of Work to use any software and may be required to submit an electronic copy of the calculation files.

### **3.6.1.1 Saturation Flow Rates**

A saturation flow rate represents the maximum number of vehicles per hour a traffic lane can process during a green phase. Since saturation flows vary based on driver behaviour and movement type, local saturation flow rates for different turning movements were estimated by collecting field data at multiple signalized intersections across the Region.

Selection of the most appropriate saturation flow will be determined by the Region and Municipal staff as part of the approved Scope of Work. Saturation flows others than the ones shown in **Table 1** will not be accepted unless substantiated through surveys of existing conditions can be presented for consideration by the Developer's consultant.



**Table 1 Saturation Flow Rate by Jurisdiction**

Variable	Saturation Flow Rate (pc/h/ln)			
	St. Catharines / Welland	Niagara Falls	Grimsby	Other Municipalities*
T	1,776	1,579	1,532	1,629
L	1,651	1,454	1,407	1,504
LT	1,375	1,178	1,131	1,228
LL	2,341	2,144	2,097	2,194
R	1,498	1,301	1,254	1,351
RT	1,535	1,338	1,291	1,388
LTR	1,630	1,433	1,386	1,483

\* The survey conducted for the saturation flow rate modelling only included municipalities in St Catharines, Welland, Niagara Falls, and Grimsby. For other municipalities in the Niagara Region, the average value of estimated saturation flow rates is recommended.

### 3.6.2 Active Transportation Analysis

For all developments, the following information shall be included as part of the TIA:

- Existing and proposed pedestrian and cyclist facilities – including proposed if applicable.
- Measures to maintain and/or improve existing conditions, including interconnection of existing facilities.
- Any possible effects in existing or proposed facilities generated by the proposed development.

The Multi-Modal Level of Service (MMLOS) indicators as presented in the Ontario Traffic Council’s MMLOS Guideline should be used as part of the evaluation of impacts and the results presented as part of the TIA.

### 3.6.3 Transit Analysis

The Multi-Modal Level of Service (MMLOS) indicators as presented in the Ontario Traffic Council’s MMLOS Guideline should be used as part of the evaluation of impacts and the results presented as part of the TIA. Existing transit services should be evaluated in terms of available capacity and need for increased service.

Potential transit impacts and mitigation measures to be considered as part of the TIA will be determined as part of the approved Scope of Work but the analysis may include among others the following elements:

- Pedestrian access to transit services from the proposed development shall be evaluated and desirable improvements to the site plan to facilitate access should be noted and/or recommended.
- Any impacts on transit operations caused by site-generated traffic shall be identified and suitable remedial measures noted and recommended.
- Any required relocation of transit facilities, such as bus stops, shall be identified and alternative locations determined and evaluated regarding their effect on traffic and transit operations.

### **3.6.4 Safety Impact Analysis**

Potential safety or operational issues associated with the following, as applicable, should be identified:

- Weaving maneuver.
- Merging conflicts.
- Transit operational conflicts.
- Corner clearances.
- Sight distances.
- Vehicle-pedestrian and vehicle-cyclist conflicts.
- Traffic infiltration.
- Access conflicts.
- Cyclist movements.
- Heavy truck volumes and consideration (e.g., turning paths) and size of the trucks.
- Speeding.

The safety impact analysis should include but is not limited to:

- A road safety review of existing conditions including any remedial measures to address unusual collision patterns that are identified through the Scope of Work.
- An estimate of the impacts that the development will have on collision patterns.

Where the development is expected to contribute to speeding or other road safety issues, the Developer will be required to review existing speed and traffic data (available from the Region) and propose road safety countermeasures, in consultation with Regional staff,

appropriate for regional roads. Implementation of the identified and approved countermeasures will be the responsibility of the developer/owner.

The TIA shall include consideration of the safety of vulnerable users, including the identification of pedestrian desire lines and areas of potential conflicts between motorized vehicles and cyclists, motorized vehicles and pedestrians, and cyclists and pedestrians, as well as the need for pedestrian and/or cycling controlled crossings.

### **3.6.5 Site Access and Access Management**

Site access location and design shall be determined based on the results of the traffic impact analysis in accordance with the Region's Access Management Guidelines. In general, any new access should be designed to restrict the inbound and outbound left turns if they conflict with an expected queue on the main road.

### **3.6.6 Transportation Demand Management**

Transportation demand management (TDM) refers to various strategies that change travel behavior (how, when, and where people travel) in order to increase the efficiency of transport and parking systems in alignment with planning objectives.

Depending on the size and the type of the proposed development, the context, need and opportunity for transportation demand management measures should be presented by the Developer in the TIA.

At minimum the Developer needs to consider the implementation of TDM measures, such as electric vehicle charging stations, bicycle parking, pedestrian treatment within the development to provide safe access for pedestrians to/from the development, transit connections, carpool parking spaces, etc., that can increase the travel options available for residents, employees and costumers of the proposed development; manage travel demand along the roadway network servicing the proposed development and reduce traffic congestion generated by the proposed development.

## **3.7 Potential Improvements**

All physical and operational road network deficiencies identified during the Evaluation of Impacts shall be addressed. The need for improvements shall be reviewed at all locations in the study area and for each proposed development stage, as required. The TIA should clearly identify transportation impact by mode, the transportation improvements that are needed to mitigate these impacts, timing of any recommended improvements, as well as a high-level cost estimate of the recommended improvements.

Improvements that are required for the proposed development/redevelopment will be identified through the application and will be responsibility of the developer/owner and will require a legal agreement including letters of credit with the Region.

### **3.7.1 Geometric Improvements**

All geometric improvements should be shown on a functional plan indicating dimension, required pavement widening, required right-of-way widening, traffic control and other significant characteristics including the location of all driveways/intersections/points of access opposite the property being developed. All geometric improvements must be in accordance with the Niagara Region Complete Street Design Manual and Roadway Design Standards.

Where the need for pedestrian and/or cycling supporting infrastructure exist, treatments shall be considered in accordance with guidelines from Ontario Traffic Manual Book 15 – Pedestrian Crossing Treatments, Book 12A – Bicycle Traffic Signals and Book 18 – Cycling Facilities.

When improvements to an intersection are proposed, the design plans should show all legs of the intersection so that turning paths and lane continuity can be reviewed. The design requirements for traffic signals are outlined in the Region of Niagara Traffic Signal Standards.

### **3.7.2 Traffic Signal Justification**

Refer to OTM Book 12 to determine when traffic signals or provisions for signals are warranted following OTM Book 12 Traffic Signal Justifications. All proposed new traffic signals should consider the requirements described in the Region's Access Management Guidelines regarding their proximity to other adjacent traffic signals and any impacts on the corridor. If a traffic signal is justified, then a screening to determine the suitability of a roundabout may be required by the Region and Municipal staff.

The need for traffic and pedestrian signals and/or underground provisions (conduits) should be reviewed at all locations affected by the proposed development and for each proposed development stage(s).

All assumptions concerning lane configurations, pedestrian activity, cycle lengths, signal phasing and signal timings shall be documented. The Developer's consultant shall confirm that any assumptions are in conformance with the Region of Niagara and/or corresponding Municipal standards and/or practices.

### **3.7.3 Roundabout Feasibility**

If a traffic signal is justified, then a screening to determine the suitability of a roundabout may be required by the Region and Municipal staff. Potential use of a roundabout(s) instead of signalized intersection(s) should be identified as part of the proposed Scope of Work.

However, if this did not occur, the Region shall be contacted at the moment that the potential need is identified. To this purpose, a Microsoft Excel spreadsheet containing the Roundabout Screening Form can be requested from Niagara Region.

### **3.7.4 Other Improvements**

The results of the Multimodal Level of Service evaluation should be used to determine the need for improvements to pedestrian, cycling and transit supporting infrastructure. Niagara Region will work with the local Municipality to ensure that there is proper integration between pedestrian walkways, cycling paths and transit routes and vehicular access to development. Niagara Region will also support any Municipal initiatives to encourage and increase safety for pedestrians and cyclists as well as ridership of current and future transit services.

The design of new road networks and subdivisions should include built in features that will ensure vehicle speeds remain below acceptable speeding thresholds and reduce or even eliminate the need for expensive retrofits.

## **3.8 Conclusions and Recommendations**

A summary of the key findings with respect to the transportation impact of the proposed development shall be presented along with a summary of the recommended improvements if necessary as well as a high-level cost estimate of the recommended improvements.



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