



THE CORPORATION OF THE CITY OF WINDSOR

Memo

To: Development Applicants
From: Transportation Planning
Date: October 10, 2013
Subject: Transportation Impact Study Guidelines

1 Introduction

The Corporation of the City of Windsor, in accordance with Windsor's Community Strategic Plan, has set out goals of growing business and allowing responsible development while also protecting infrastructure and ensuring that transportation is efficient, convenient, and meets the needs of all citizens. An important factor in achieving these goals is identifying, planning for, and where necessary mitigating the impacts of development on the transportation network and on the people who rely on it. For these reasons, a transportation impact study (TIS) is required for development applications that have the potential to adversely affect the transportation network in the City of Windsor.

This memo provides guidelines for the preparation of TIS in support of development applications. They are intended to address the majority of applications; however, situations not envisioned by these regulations may occur, as may extraordinary developments or conditions. Therefore, the City of Windsor retains the right to vary these requirements at its discretion.

1.1 Public Record

All TIS reports submitted to the City will become part of the public record. Information from these reports may be included in reports to Council or other public documents or shared with other municipalities or agencies, and excerpts from the study reports may be shared with other applicants or consultants to allow other transportation impact studies to properly reflect the anticipated traffic due to area developments.

2 General Requirements

2.1 Details Not Addressed

For any details not addressed in these guidelines, good professional practice based on established standards and methodologies should be followed.

2.2 Need for a Transportation Impact Study

A TIS will be required if any of the following conditions are met:

- The proposed development is anticipated to generate 100 auto trips or more in the peak hour of traffic for the development;
- The proposal includes a new access on or connection to an arterial road;

- The proposal includes a new access or connection at any location where stopping or turning sight distance standards (based on the standards and methodologies given in the Transportation Association of Canada *Geometric Design Manual*) are not met;
- The proposal includes the closure of an existing through road;
- Site generated traffic associated with the proposed development will result in an intersection or driveway turning movement becoming critical (see definition below) or will make operations for a critical movement worse.

A critical movement is defined as follows:

- All intersections
 - Any movement where the 95th percentile queue exceeds available storage.
- Unsignalized intersections
 - Any movement with level of service “E” or worse.
- Signalized intersections
 - Any movement with level of service “F”.
 - Through movements and shared through/turning movements: any movement with v/c of 0.85 or higher.
 - Exclusive turning movements: any movement with v/c of 1.0 or higher.

2.3 Transportation Statement (Limited Scope Study)

For some applications, the need for a transportation impact study may be based only a single factor or a limited number of factors. In these cases, a limited scope *transportation statement* dealing with the specific areas of concern identified may be required in rather than a full TIS. For example, for a development application where the sole factor triggering the need for a TIS is a sight distance deficiency at the site entrance, a transportation statement might examine sight distance specifically and not the other elements of a typical TIS.

The City of Windsor, at its sole discretion, will determine whether a transportation statement will be sufficient, as well as the specific scope for the transportation statement.

2.4 Qualifications to Carry Out a Transportation Impact Study

A TIS must be prepared by or under the supervision of a Professional Engineer (or Limited Engineering Licence holder practicing within the limits of his/her licence) licensed in the Province of Ontario with experience and expertise in the field of transportation and traffic engineering and the preparation of traffic impact studies, who must stamp, sign, and date the report, and take professional responsibility for the work.

A transportation statement (limited scope study) must be prepared by or under the supervision of an individual with experience and expertise in the field of transportation and traffic engineering and the preparation of traffic impact studies, who must sign and date the transportation statement, and take professional responsibility for the work. If the scope of the transportation statement includes elements that constitute *the practice of professional engineering* (as defined by the Professional Engineers Act), then this individual must also be a Professional Engineer (or Limited Engineering Licence holder practicing within the limits of his/her licence) licensed in the Province of Ontario, and the transportation statement must be stamped.

2.5 Study Updates

An updated analysis to confirm that the findings of the original TIS are still valid will be required for any development that does not proceed within 5 years of the original study date.

3 Transportation Impact Study Requirements

3.1 Study Area

The study area should include:

- All site accesses (in cases where the subject development is an individual site) or all proposed connections to the existing road network (in cases where the subject development is a subdivision)
- All intersections where site traffic will increase the volume for a movement by 5% or more
- All intersections where site traffic will cause a movement to become critical (as defined in Section 2.1) or will cause operations for an already critical movement to worsen

Consultants are encouraged to confirm the study area with Transportation Planning staff before beginning the study.

3.2 Horizon Year(s) / Scenarios

For smaller developments (i.e. generating less than 500 peak hour, peak direction trips) that are built in a single phase, typical analysis scenarios are as follows:

- Existing Conditions (current year)
- Future Background Conditions (current year + 5 years)
- Future Total Traffic Conditions (current year + 5 years)

For developments built over more than one phase, future total conditions should be analyzed for the anticipated full build-out date. If access to the site will vary between phases (e.g. if some accesses or auxiliary lanes will not be built until later phases, or if an access that will be ultimately signalized will operate under stop control in an interim phase), then an interim analysis (both background and total traffic conditions) should be performed for each phase.

For larger developments (i.e. generating 500 peak hour, peak direction trips or more), horizon years should be determined in consultation with Transportation Planning staff.

3.3 Time Periods

In all cases, the time periods selected for analysis should include the hour of the week in which the impact of development traffic on traffic operations is greatest. Typical analysis periods are given in the table below:

Land Use Category	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Peak Hour	Other - see notes	Notes
Residential	X	X			
Commercial – Retail		X	X		
Recreation / Amusement		X	X		e.g. movie theatres, batting cages, golf courses.
Commercial – Office	X	X			
Restaurant	Note	X	X		Include weekday AM if open in this period.
Industrial	X	X			
Elementary or Secondary School	X	X			
College, University, or Vocational School	X	X			
Place of Worship	Note	Note	Note	X	<ul style="list-style-type: none"> Analyze peak hour on main day of worship If a significant amount of traffic (i.e. enough that the criteria in Section 2.1 are met) is associated with other events throughout the week, also analyze other identified peaks.

Multi-use developments should be analyzed for all periods noted for each of the proposed land uses. Alternately, the analysis time periods for multi-use developments may be established based on discussions between the consultant and Transportation Planning staff.

The analysis peak hours for types of land uses not identified should be established based on discussions between the consultant and Transportation Planning staff.

3.4 Background Traffic

3.4.1 Background Growth & Other Area Developments

Transportation Planning staff should be consulted to confirm background growth assumptions and other area developments to include in background traffic.

3.4.2 Transportation Network Changes

Where information is available (e.g. the 5-year capital plan), the analysis should take into account planned network changes in the study area.

If possible, any proposed improvements to address background conditions should be in accordance with relevant official documents (e.g. the Official Plan and Secondary Plans, a relevant Transportation Master Plan, or environmental assessments for any proposed area projects). If improvements that are not in keeping with official documents/plans are proposed, these must be clearly identified and justified.

3.5 Site Generated Traffic

3.5.1 Trip Generation

Estimates of trip generation for the proposed development should follow the procedures in the most recent version of the *ITE Trip Generation Handbook*. If the *ITE Trip Generation Manual* is used to estimate trip generation for the development, the most recent version should be used.

3.5.2 Modal Split

Justification should be given for any modal split adjustments to the trip generation rates from established sources. It should be noted that trip generation rates in the *ITE Trip Generation Manual* are for vehicle trips specifically and in most cases already reflect a typical degree of non-auto modal split. Any further decreases to the auto mode share should be justified by explaining how the mode share will be achieved (e.g. transportation demand management measures).

3.5.3 Trip Distribution

Trip distribution estimates should be based on market studies, origin-destination surveys, or transportation planning models where available. In cases where these sources are not available, trip distribution estimates should be developed in accordance with good engineering practice.

4 Evaluation of Impacts

4.1 Capacity Analysis at Intersections & Accesses

Analysis should be done using a software package employing Highway Capacity Manual methodology; Synchro is preferred. The consultant may elect to use microsimulation (e.g. SimTraffic, Paramics) if appropriate.

4.1.1 Values for Analysis

- **Bus blockages:** bus blockages should be entered in accordance with the current transit schedule and the location of transit stops. If increased transit frequency is proposed for future, or if new transit stop locations are proposed, this should be reflected in future scenarios.
- **Lane widths:** lane widths used for analysis should be the actual existing or proposed lane widths, as appropriate.
- **Lost time:** in versions of Synchro or HCS where lost time is specified, lost time should normally be equal to the sum of the amber and all-red times. In versions with a lost time adjustment, the lost time adjustment should normally be zero. Any other approaches for lost time should be justified.
- **Peak hour factor:** the observed peak hour factor obtained from count data should be used for analysis. Normally, the intersection peak hour factor should be used for all movements; however, if the peaking characteristics for a leg or movement are significantly different from those of the intersection as a whole, the leg or movement peak hour factor should be used as appropriate. If the peaking characteristics of site traffic are significantly different from those of the surrounding road network, an adjustment to the peak hour factor for total traffic conditions may be appropriate; justification for such adjustments should be provided in the report.
- **Pedestrian calls:** for each approach, pedestrian calls should be equal to the number of pedestrians crossing in the peak hour, up to a maximum of one call every cycle.
- **Right turn on red (RTOR):** RTOR should only be used for exclusive turning lanes. RTOR should be disabled when right turns are made from a shared lane.
- **Saturation flow rate:** use of saturation flow rates above the Synchro default should be justified with a saturation flow study.
- **Storage lane lengths:** when determining storage lane lengths, the taper should not be considered part of the storage length.

- **Truck Percentage:** the observed truck / heavy vehicle percentage for each movement should be used. If the development will generate a significant number of truck trips, future traffic scenarios should include adjustments to truck percentages to reflect increased truck volumes.

All values not addressed specifically above (e.g. link speed, grade, adjacent parking lanes) should reflect actual conditions, either existing or proposed.

4.1.2 Signal Timings

Existing traffic signal timings should be used for analysis unless unsatisfactory operations will result, in which case any assumed modifications to existing timings should be clearly identified in the report. New or modified signal timings should be in accordance with City of Windsor guidelines; Transportation Planning should be consulted to confirm that proposed timings will be acceptable.

The City of Windsor's philosophy is to coordinate the signal timings along roadways, including crossing arterials. Proposed changes to signal timings (or proposed new signals) at one intersection along an arterial should take into account the need for coordination along the corridor as a whole, as well as the need to provide a high level of capacity and good arterial level of service along the corridor.

4.2 Acceptable vs. Unacceptable Conditions

Criteria for acceptable vs. unacceptable conditions may vary depending on factors such as:

- Surrounding environment (e.g. urban core vs. suburban/rural fringe)
- Availability of non-auto modes to access the site
- Existing deficiencies in the study area
- For temporary conditions, the duration of an impact

Transportation Planning staff should be consulted to determine the appropriate criteria for a given development.

Sight distance deficiencies shall be considered unacceptable in all cases regardless of duration.

4.3 Traffic Calming

For new residential subdivisions, the report should identify how the City of Windsor Traffic Calming Policy requirements for new developments will be met.

4.4 Non-Auto Modes

The report should provide a discussion of impacts to non-auto modes, including identifying pedestrian and cyclist connections to the surrounding network and pedestrian and cyclist linkages between the site and transit stops. Discussion should be provided with respect to the Windsor Bicycle Use Master Plan (BUMP) as it relates to the development (for instance, by confirming that proposed connections in a new subdivision adhere to their classifications in the BUMP).

4.5 Safety Analysis

4.5.1 Sight Distance

A sight distance review should be carried out for any new accesses and for any existing accesses where a sight distance deficiency has been identified. Turning and stopping sight distance requirements in the Transportation Association of Canada *Geometric Design Manual* should be used for evaluation.

4.5.2 Collision Review

If the proposed development has the potential to impact a high collision location, a collision review may be required, including a forecast of the effect that the proposed development will have on collisions in the study area. Transportation Planning staff should be consulted to determine whether any high collision locations have been identified in the study area.

4.6 Warrants

When determining the need for off-site modifications, warrants that have been established or adopted by the City of Windsor should be used as applicable, such as:

- All-way stops: City of Windsor all-way stop warrant
- Intersection signalization: Ontario Traffic Manual Book 12 – Signals (note: the City of Windsor does not use the 4-hour warrant as justification for signals)
- Traffic calming: City of Windsor traffic calming policy

The list above is not exhaustive and the applicable warrants may change from time to time. If needed, Transportation Planning staff can be consulted for guidance as to what warrants are currently in effect.

For the following items, the warrants given in the most recent version of the Ontario Ministry of Transportation *Geometric Design Standards for Ontario Highways* have not been officially adopted by the City of Windsor, but are considered by City staff to reflect good professional practice:

- Right turn storage lanes
- Left turn storage lanes
- Acceleration and deceleration lanes/tapers

For off-site modifications relating to items under the jurisdiction of other agencies (e.g. railway crossings or provincial highways), these agencies should be consulted as necessary for their applicable warrants and standards.

It should be noted that the meeting of a warrant does not guarantee that a particular off-site modification will be constructed at a particular time or at all. When (or whether) changes to the transportation network may made can be dictated by factors such as budget, coordination with other works, prioritization against other projects, available land, compatibility with other planned changes, community needs, and other concerns.

5 Parking

Typically, the adequacy of parking supply is not analyzed as part of a TIS unless the applicant has proposed a variance from the parking requirement in the zoning by-law. If the need for a parking study has been identified (either by the consultant or by City staff), this can be documented as part of the TIS report or provided as a separate document.

6 Documentation

A traffic impact study report should include at least the following information:

- Professional details
 - Name(s) of the report author(s)
 - Name, seal and signature of the person(s) taking professional responsibility for the report contents
- Development characteristics
 - Precise location identification (municipal address if available, or lot & concession)
 - Proposed land use type(s)

- Existing Official Plan and zoning by-law designations for the site (and proposed designations, if an OP or zoning amendment is proposed for the development)
 - Development size for each land use type/building/etc. (site area, gross floor area, gross leasable area, number of employees/dwelling units, etc. as appropriate)
 - Anticipated date of opening
 - Anticipated hours of operation (if applicable)
 - Location and type of accesses, clearly distinguishing between existing and proposed accesses and noting the movements permitted
 - Development phasing (including the above details for each phase)
- A site plan for the proposed development, showing the full right-of-way width of all adjacent roads and streets, including any existing entrances opposite the proposed development and any transit stops on adjacent roads
- General study details
 - Horizon years
 - Time periods analyzed
 - Study area map
- Trip generation, distribution and assignment assumptions
- Volume diagrams showing all peak hours analysed:
 - Existing traffic
 - For each horizon year:
 - Future background traffic
 - New site trips
 - Pass-by trips (if the development will experience pass-by traffic)
 - Future total trips
- Analysis Details
 - For each scenario:
 - Lane configurations at all intersections analysed
 - Level of service, volume to capacity ratio, and delay for all movements (except free-flow movements at unsignalized intersections) at all intersections analysed
 - Identification of all critical movements along with proposed mitigation measures (if applicable)
 - Non-auto modes discussion
 - Traffic calming discussion (if applicable)
 - Summary of the sight distance review (if applicable)
 - Collision review (if applicable)
- Conclusions
 - An overall statement of whether the transportation network can or cannot accommodate the development, along with:
 - Details of the mitigation measures and network improvements required to accommodate the development;
 - Details of any special restrictions on the development (e.g. limits on types of tenant or hours of operation) required for the network to be able to accommodate the development.
- Appendices
 - Traffic count data
 - Operational analysis reports
 - Warrant worksheets (if applicable)