Manitoba Infrastructure and Transportation
ENGINEERING & OPERATIONS DIVISION

General Guidelines for the Preparation of **Traffic Impact Studies**

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Manitoba

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1. INTRODUCTION

The main purpose of a Traffic Impact Study (TIS) is to:

a) Determine what the impacts will be from a proposed development or redevelopment upon the adjacent highway network; and
b) Determine what measures may be required to mitigate adverse impacts and allow the highway network to provide a satisfactory level of service.

The TIS shall be prepared under the supervision of a qualified and experienced transportation engineer, licensed in the Province of Manitoba.

Manitoba Infrastructure and Transportation (MIT) may require a TIS for any development or redevelopment that may generate significant traffic and requires direct access to a Provincial highway or lies within the highway control area. The proponent / developer or their Engineering Service Provider (ESP) is encouraged to contact MIT as early as possible in the development of their TIS to confirm project-specific requirements.

MIT has prepared this document to:

a) Provide guidance to the proponent / developer and their ESP in the preparation of the TIS; and
b) Identify requirements to meet MIT review objectives.

The scope of each development and each redevelopment is unique and the proponent / developer or their ESP should contact MIT to determine the number of copies required for submission and to ascertain if any special circumstances should be taken into consideration. The TIS does not replace the requirement for a permit from Highway Traffic Board or MIT for access or construction within the controlled area.

2. TRAFFIC IMPACT STUDY OUTLINE

A qualified Engineering Service Provider (ESP) with experience in traffic / transportation engineering shall undertake a Traffic Impact Study (TIS) to analyze the impact of the proposed development or redevelopment on existing and future traffic operations and to develop functional designs for any recommended on-site and highway upgrading. The TIS shall include the following:

I. Study Purpose and Objectives

II. Description of the Proposed Development

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2. Location
3. Site Plan
4. Adjacent Sites / Highway Conditions
5. Phasing and/or Timing of Development or Redevelopment

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3. TRAFFIC IMPACT STUDY OUTLINE DESCRIPTION

The Highway Planning and Design Branch has primary responsibility for coordinating all TIS reviews for MIT.

The following expanded Guidelines identify key components that the Highway Planning and Design Branch, Traffic Engineering Branch, Regional Operations' offices, and other appropriate Branches of MIT consider when reviewing any TIS. MIT believes that by providing transparency into its review requirements, the review and approval process can become more efficient and ultimately save the Province and private enterprise both time and money.

I. Study Purpose and Objectives

Identify study purpose and objectives.

II. Description of the Proposed Development or Redevelopment

1. Land Use

   Identify existing and proposed land use(s), including:
   - Any impacts upon highway right-of-way or other provincially-managed properties, and
   - Identification of other landowners adjacent to the proposed development or redevelopment

2. Location

   Identify project location by including a location map (overall context in regional perspective) and project-specific map (local context).

3. Site Plan

   The site plan should include site boundaries, orientation, adjacent roadways, and all existing and proposed access points to the site, as well as any proposed internal roadway networks (if applicable) and both existing and proposed pedestrian/cyclist facilities (if applicable). The site plan and any accompanying plans/drawings must include a north arrow and a proper identification of all highway routes being impacted.

4. Adjacent Sites and Highway Conditions

   Identify the location of access driveways, utilities, significant topographical / physical features, distances to major and minor intersections, etc.

5. Phasing and/or Timing of Development

   Identify the time horizon for percent complete and supporting rationale.

III. Traffic Volumes

1. Existing Traffic Volumes

   Existing traffic volumes along all adjacent roadways and accesses that could provide useful information in the review of the proposed access shall be provided.

   Traffic volumes on the Provincial highway network may be obtained from the University of Manitoba Transport Information Group (UMTIG)[1] which maintains the Manitoba Highway Traffic Information System (MHTIS).

   To supplement this data, the ESP may need to conduct traffic counts in order to prepare the TIS. In such cases, traffic counts must be conducted during the a.m. and p.m. peak periods, at a minimum.

   Existing traffic volumes are to be presented in the report as an actual representation of the data collected (they should not be rounded). Both total daily (AADT) and peak hourly volumes must be presented.

   For analysis purposes related to intersection treatment warrants, passenger car equivalent volumes will be required. The methodology used to determine these volumes, including the conversion factor, and the volumes themselves should be presented in the report text.

   All existing traffic data should be included in an appendix or an accompanying CD.

2. Traffic Growth Rate(s)

   Annual traffic growth rates along adjacent roadways should be calculated from historical traffic data obtained from UMTIG. When necessary, sound engineering judgment should be exercised to discount or eliminate any data which appears to vary substantially from a straight-line projection.

   In the absence of historical traffic data, annual traffic growth rates from other highways in the immediate area can be used to support the growth rate used in the TIS.

   In either situation, the report should identify the methodology used and provide supporting information in an appendix.

3. Site Generated Traffic

   The methodology used to determine site generated traffic should be explained including land use assumptions and vehicle make-up assumptions. As well, all information used to determine the total daily traffic and peak hourly traffic generated by the proposed development should be presented in the report text or in an appendix. This includes all applicable references and data obtained from trip generation manuals such as ITE *Trip Generation* [2].

   As with existing traffic volumes, all site generated traffic volumes should be converted to passenger car equivalent volumes and the methodology used to convert these, as well as any assumptions made, should be stated in the report text.

4. Total Future Traffic

   Using a 10-year design horizon, future traffic volumes along all applicable roadways should be presented in the report text both for actual traffic volumes and for passenger car equivalent volumes. The design horizon should commence in the year at which full build-out is anticipated (i.e. if full build-out is anticipated in 2020 and a 10-year design horizon is being used, then traffic volumes should be projected to 2030).

   For analysis purposes, both total daily and peak hourly volumes will be necessary and both should be presented in the report (or appendix as appropriate).

5. Trip Distribution

   The assumptions used to distribute site generated traffic on the highway network should be stated to support the splits used. To support the findings based on these distributions, a sensitivity analysis comparing other potential distributions (including pass-by traffic) should be considered.

IV. Traffic Analysis

1. Site Access

   The proposed highway access should be clearly defined in text and/or graphic form.

2. Intersection Capacity and Level of Service

   The TIS should clearly identify the impacts site generated traffic and pass-by traffic will have on the adjacent highway and intersections. For computer based analysis, Synchro should be used.

   At a minimum, this analysis should be carried out for:

   i. Existing Conditions (i.e. current year background traffic)
   ii. Existing Conditions plus Full Build-Out Site Generated Traffic (i.e. full build-out year background traffic with site generated traffic included)
   iii. Future Conditions (10-year design horizon).

   By analyzing these three conditions, the TIS will be able to compare the impacts of site generated traffic on the highway network versus growth in existing traffic on the highway network.

   The analysis should include identification of the total intersection performance as well as identification of the critical movements and any possible negative side-affects that may result (i.e. excessive queuing). Supporting information including Synchro output sheets should be included in an appendix or an accompanying CD.

   The TIS should also include a traffic signal warrant analysis to determine if traffic signals are or will be warranted at the proposed access or adjacent highway intersections. The traffic signal analysis should be carried out in accordance with the *Canadian Traffic Signal Warrant Matrix Procedure* as outlined in the Transportation Association of Canada's *Traffic Signal Warrant Handbook* (March 2007)[3]. MIT warrant levels differ from those presented by TAC. The actual warrant levels shall be as defined in MIT Traffic Engineering Policy 400-A-2[4]. Supporting information including the resulting matrix output sheet(s) should be included in an appendix.

3. Traffic Safety

   The TIS may include a collision analysis to determine if there are any areas of concern within the immediate area of the proposed access and to be able to support the position that the proposed access will not cause an existing area of concern to deteriorate further.

   If areas of concern are identified, the TIS should identify their location, discuss any impacts the proposed access (or the overall development or redevelopment) would have, and present possible mitigation measures if appropriate.

The results of the analysis should be presented in the report text and any supporting information should be included in an appendix.

A separate analysis and write-up should also be provided discussing pedestrian and cyclist issues related to the development or redevelopment (relative to highway operations), including recommended mitigation measures as may be appropriate/required.

4. Site Circulation and On-Site Queuing Requirements

In situations where the proposed access point will function as a driveway to a single-use parcel (such as a travel plaza), the TIS should clearly show the site has been adequately designed to handle all turning movements and that no queuing or reversing movements will occur on the adjacent highway. Although AutoTURN is most often used for this analysis, any industry-accepted method is sufficient.

V. Improvement Analysis

1. Intersection Treatment Warrant Analysis

Developments on Rural Two-Lane Highways

The full complement of intersection treatments that MIT considers for rural two-lane highways should be considered. This analysis should be carried out in accordance with MIT's *Warrants and Standards for Intersection Treatments of Rural Two-Lane Highways, Design Guide, Second Edition, May 2001*[5]. This guide is intended for isolated intersections on high speed rural highways and may not be applicable in urban or suburban situations.

Deviations from this Design Guide will be considered on a case-by-case basis when supported by sound engineering judgment and in cases with unusual circumstances.

Developments on Multi-Lane Highways and in Urban Settings

This analysis should be carried out in accordance with Transportation Association of Canada's *Geometric Design Guide for Canadian Roads*[6] and supporting engineering standards and guidelines.

All analyses used to support the intersection treatment warrant analysis should be included in an appendix, including calculations, figures and graphs.

2. Functional/Conceptual Design of Proposed Intersection Improvements and On-Highway Revisions

   A figure(s) should be provided to identify all on-highway improvements upstream and downstream of the proposed access (or overall development or redevelopment). This figure could include potential improvements based on the collision analysis, recommended access closures, and other network improvements.

   Functional drawings should include basic dimensioning for existing and proposed lanes, tapers, radii, existing and future right-of-way widths, and approximate distances to important features such as drains, bridges, driveways, utilities, railway crossings, etc. All drawings should clearly identify what is to be constructed (and when) including all design-related information. Drawings should not simply recreate the intersection treatments presented in the Design Guide, but rather illustrate how they would actually tie-in to the proposed development.

3. Preliminary Cost Estimates

   The TIS shall include a preliminary cost estimate for the proposed functional design, and also include an appropriate staging plan (complete with projected timing for each stage).

VI. Conclusions and Recommendations

The report shall present all conclusions reached as a result of the analyses carried out including traffic analysis, collision analysis, traffic signal warrant analysis, and intersection treatment warrant analysis.

The report shall summarize all recommendations including any construction that is recommended along the highway network and the year in which it is anticipated.

The report shall identify that, in most cases, the full cost to construct the recommended improvement will be borne by the party proposing the development / redevelopment.

4. REFERENCE MATERIAL

The following reference material is cited above. Additional material may be required and in all instances the ESP is encouraged to use the most current standards and guidance available.

[1]University of Manitoba Transport Information Group. http://umtig.mgmt.umanitoba.ca/

[2]*Trip Generation*, 7th Edition, 2003, Institute of Transportation Engineers. Washington, D.C.

[3]*Traffic Signal Warrant Handbook*, March 2007, Transportation Association of Canada, Ottawa, Ontario.

[4]Traffic Engineering Policy No. 400-A-2, January 15, 1998, Manitoba Infrastructure and Transportation, Traffic Engineering, Winnipeg, Manitoba.

[5]*Warrants and Standards for Intersection Treatments of Rural Two-Lane Highways*, Second Edition, May 2001, Manitoba Infrastructure and Transportation (formerly Manitoba Transportation and Government Services), Winnipeg, Manitoba.

[6]*Geometric Design Guide for Canadian Roads,* 1999 Edition (Updated December 2007), Transportation Association of Canada, Ottawa, Ontario.