

Terms of Reference and Guidelines for Conduct of Traffic Impact Study in the Cayman Islands

The main objectives of a Traffic Impact Study (TIS) are to optimize the use of the existing transportation network and provide adequate infrastructure capacity to accommodate planned growth. The review and management of development generated trips is an integral part of these objectives.

The TIS is an important tool in the overall development planning process. It assists developers and public agencies in making land use decisions, and provides information that identifies the impacts of proposed development on the existing streets and circulation networks and recommends mitigation measures for the impacts identified. The following is a general terms of reference for all traffic impact studies. Not all elements listed below are required, and will be evaluated on a case-by-case basis. Formal terms of reference must be submitted to the NRA's Transportation & Planning Unit prior to submitting a report.

Trip Generation Threshold for TIS

The following criterion is a starting point in determining when a TIS is needed: when a project:

1. Generates over 100 peak hour trips.
2. Generates 50 to 100 peak hour trips – and, directly affects a declared public road currently experiencing noticeable delay or approaching unstable traffic flow conditions (LOS “C” or “D”).
3. Generates 1 to 49 peak hour trips assigned to a declared public road – the following are examples that may require a full TIS or some lesser analysis:
 - a. Affected public road facilities experiencing significant delay; unstable or forced traffic flow conditions (LOS “E” or “F”).
 - b. The potential risk for a traffic incident is significantly increased (i.e., congestion related collisions, non-standard sight distance considerations, increase in traffic conflict points, etc.).
 - c. Change in local circulation networks that impact a public road facility (i.e., direct access onto a Primary Arterial or Secondary Arterial, a non-standard geometric design, etc.).

Note: A traffic study may be as simple as providing a traffic count to as complex as a microscopic simulation. The appropriate level of study will be determined by the particulars of a project, the prevailing traffic conditions of the surrounding area, and the forecasted traffic. A “lesser analysis” may include *obtaining traffic counts, preparing signal warrants, or a focused TIS*, etc.

Data Collection

The consultant/applicant is responsible for collecting, assembling, analyzing, and presenting all types of data required for the study.

The assembly of available data should be accompanied by a detailed investigation of the project site, area streets and the surrounding vicinity. This process should include recording all

relevant characteristics needed for the analysis (e.g. land use type, intensity, and arrangement of the building, parking and access) plus observations of existing traffic conditions.

Current data should be collected to supplement the available data as necessary. Such data should be obtained through surveys consistent with procedures described in the current edition of the Manual of Traffic Engineering Studies published by the Institute of Transportation Engineers.

Full Description

The study must provide a full description of the proposed development. This includes, but is not limited to:

1. Location of all parcels of the project.
2. Existing land uses that are permitted and use provisions in the Development Plan.
3. Proposed land uses.
4. Floor space, including a summary of each type of use and/or number of residential units (where applicable) by phasing of development.
5. Planned phasing of the development with anticipated date of occupancy by phasing.
6. Approximate hour of operation.
7. Nearby intersections and access to adjacent developments, including type of control (signalized or unsignalized).
8. Number of lanes, width and configuration.
9. Proposed access points and type of access:
 - When determining the location of an access, consideration should be given to how the access will affect the surrounding road network, area residents and area businesses. All proposed site access points on public roads should be evaluated for capacity, safety and adequacy of queue storage capacity. Approval of the proposed access will be evaluated on the basis of sound engineering judgment.
10. A combination of maps and other documentation, which identify all relevant information of the project under consideration.

Traffic Volume Analysis

A traffic volume analysis must include:

1. Horizon years of 5 and 10 and 20 depending on full build-out, or as advised by NRA staff.
2. AM and PM peak periods at a minimum. Commercial development requires Saturday analysis - note that the analysis of turning movement counts (TMCs) for a Saturday of a holiday weekend will not be accepted.
3. Background, site-generated and total traffic volumes.
4. "Worst case" combination of site-related and background traffic.
 - Please contact NRA staff to confirm growth rates along surrounding road network.
 - Please contact NRA staff to obtain availability of the most recent TMCs and/or average daily traffic (ADT).
 - Contact the National Roads Authority – Operation & Engineering staff to obtain traffic signal timing parameters and ensure that the information includes the appropriate walk/don't walk splits, recall modes and offsets.

- Contact Planning Department staff to obtain details on surrounding developments in the area that would affect traffic capacity in the planning horizon year(s).

Trip Generation and Distribution

A trip distribution and trip generation analysis must include:

1. Trip generation surveys from similar developments which have similar operating characteristics as the proposed development.
2. Latest edition of the Institute of Transportation Engineers (ITE) trip generation rates are acceptable (use the greater of the average rate method or the fitted line equation).
3. A table summarizing your findings.
4. Trip distribution assumptions must be supported by one or more of the following:
 - Origin-destination surveys
 - Comprehensive travel surveys
 - Existing/anticipated travel patterns
 - Market studies

Capacity Analysis

The report must include capacity analysis completed. The following parameters must be used analytical purposes:

- Saturation flow rate of 1,900 vehicles per hour;
- 12 feet lane width on all roads; and

All parameters of analysis should be clearly defined and described in a table in the report along with an indication of the application software used for the analysis.

The analysis must also include the identification of signalized intersections, unsignalized intersections and unsignalized accesses where:

1. Volume/capacity (V/C) ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.90 or above.
2. V/C ratios for exclusive movements that will exceed 1.00.
3. 95th percentile queue lengths for individual movements and do they exceed available lane storage.

If traffic control signals are found to be warranted at a particular intersection in an earlier horizon year (e.g. 5 year horizon), a warrant is not required for the subsequent horizon year (e.g. 10 year horizon). The horizon year in which a particular intersection is warranted for traffic control signals must be documented in the text of the TIS.

A roundabout feasibility analysis may also be required at the direction of NRA staff – such access **option** must be investigated based on various factors including capacity, safety performance, and site conditions.

In unsignalized intersection analysis, if an unacceptable LOS ("E" or higher) and v/c ratio results on the minor approach in existing conditions analysis, the consultant shall conduct a gap study

to establish an average value for gaps accepted (in seconds) and override the resultant value for the HCM-calculated critical gap.

Evaluation of Impacts

Impacts on streets and transit facilities will be evaluated for each time analysis period, taking into consideration the horizon year(s) for full development and interim phases. The evaluation will be undertaken for:

- existing conditions;
- existing plus background growth (i.e. future background traffic conditions);
- existing plus background growth plus site-generated travel (i.e. future total traffic conditions);
- scenarios with and without relevant major transportation system improvements as identified in the pre-study conference; and
- scenarios with different driveway/access locations if queuing or traffic operations become an issue.

Traffic volumes, turning movement volumes, level of service, delay, queue, and volume/capacity ratios, must be documented in a clearly understandable table in an appendix for all signalized intersections (overall volume/capacity ratio) and for each individual traffic movement.

The criteria for identifying “**critical**” intersections are:

- overall Level of Service E or F (i.e. average control delay per vehicle greater than 55 seconds) for signalized intersections; and
 - overall Level of Service E or F (i.e. average control delay per vehicle greater than 35 seconds) for unsignalized intersections.
- The criteria for identifying “**critical**” movements are:
- the average control delay for individual movements is greater than 55 seconds;
 - estimated 95th percentile queue length for an exclusive movement exceeds the available storage space;
 - estimated 95th percentile queue length for an individual movement will block an existing access;

Sight Distance Evaluation

A review and analysis of the sight distance availability for all proposed accesses or roads is required. The sight distance requirements must be determined based on the most current standards and guidelines used by the NRA. Available sight distance should be taken from actual field measurements to ensure accurate conditions.

Assess the sightlines based on the NRA’s standard practice, eye height and object height of 3 feet 6 inch and 6 inch above road surface, respectively. The NRA requires the access to meet the following sightline requirements:

- 1. Stopping sight distance; and
- 2. Turning sight distance.

Sight distances must be in accordance with the latest edition of **AASHTO A Policy on Geometric Design of Highways and Streets** at the time of carrying out the TIS.

Safety

Identification of potential safety or operational issues must be reviewed that are associated with:

- - weaving
- - merging
- - corner clearances
- - sight distances
- - vehicle/pedestrian conflicts
- - traffic infiltration
- - access conflicts
- - cyclist movements
- - heavy truck movement conflicts

In addition, should the development be determined by NRA staff to be adjacent to a major intersection or road segment with significant collision history, most recent five-year collision data for the intersection(s) and/or road segment (s) must be reviewed and an assessment of the impact of the proposed development provided. Such information may be helpful to minimize any additional problems through the design or location of access points along the subject public road(s). Please contact the RCIPS for availability of collision information.

Functional Design

A functional design detailing a recommended access configuration and/or proposed intersection geometrics may be required at the discretion of NRA staff.

Minimum Content Final Report

- I. EXECUTIVE SUMMARY
- II. TABLE OF CONTENTS
 - A. List of Figures (Maps)
 - B. List of Tables
- III. INTRODUCTION
 - A. Description of the proposed project
 - B. Location of project
 - C. Site plan including all access to State highways (site plan, map)
 - D. Circulation network including all access to State highways (vicinity map)
 - E. Land use and zoning
 - F. Phasing plan including proposed dates of project (phase) completion
 - G. Project sponsor and contact person(s)
 - H. References to other traffic impact studies

IV. IV. TRAFFIC ANALYSIS

A. Clearly stated assumptions B. Existing and projected traffic volumes (including turning movements), facility geometry (including storage lengths), and traffic controls (including signal phasing and multi-signal progression where appropriate) (figure) C. Project trip generation including references (table) D. Project generated trip distribution and assignment (figure) E. LOS and warrant analyses - existing conditions, cumulative conditions, and full build of general plan conditions with and without project

V. V. CONCLUSIONS AND RECOMMENDATIONS

A. LOS and appropriate MOE quantities of impacted facilities with and without mitigation measures B. Mitigation phasing plan including dates of proposed mitigation measures C. Define responsibilities for implementing mitigation measures D. Cost estimates for mitigation measures and financing plan

VI. VI. APPENDICES

A. Description of traffic data and how data was collected B. Description of methodologies and assumptions used in analyses C. Worksheets used in analyses (i.e., signal warrant, LOS, traffic count information, etc.)

The appendices must include:

- Turning movement counts (include date counted) with breakdown of heavy vehicle counts where appropriate;
- Signal timing plan(s) for signalized intersections;
- and any other support documentation.

The NRA will require 1 copy to be in electronic format and 1 hard copy complete with the appropriate supporting documentation. This shall be submitted to the Managing Director for our review, comments and approval.

All information submitted to the NRA in connection with any Traffic Impact Study will be considered to be in the public domain.

Study Updates

From the date of submission, the Traffic Impact Study will have a "shelf life" of 5 years.

Where timing of subsequent development approvals exceeds 5 years, a new study will be required at the discretion of the NRA.