

# TRANSPORT IMPACT ASSESSMENT GUIDELINES

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## VOLUME 4 INDIVIDUAL DEVELOPMENTS

REVISED  
AUGUST 2016



Department of  
**Planning**



Western  
Australian  
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Published by the  
Western Australian Planning Commission  
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140 William Street  
Perth WA 6000

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Published August 2016

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## Part A – The assessment process

### 1 Introduction

**Volume 4** of the guidelines is intended for use by transport planning professionals.

It provides advice on the scale and content of the transport information that should be submitted to the approving authority in support of an individual development application. It also provides detailed technical advice on how to undertake the transport impact assessment (TIA).

Volume 4 should be read in conjunction with **Volume 1**, which provides general guidance on the transport assessment process; **Volume 5**, which provides additional technical guidance; and *Liveable Neighbourhoods* and various WAPC development control (DC) policies, which set out the transport-related objectives, measures and requirements for individual developments.

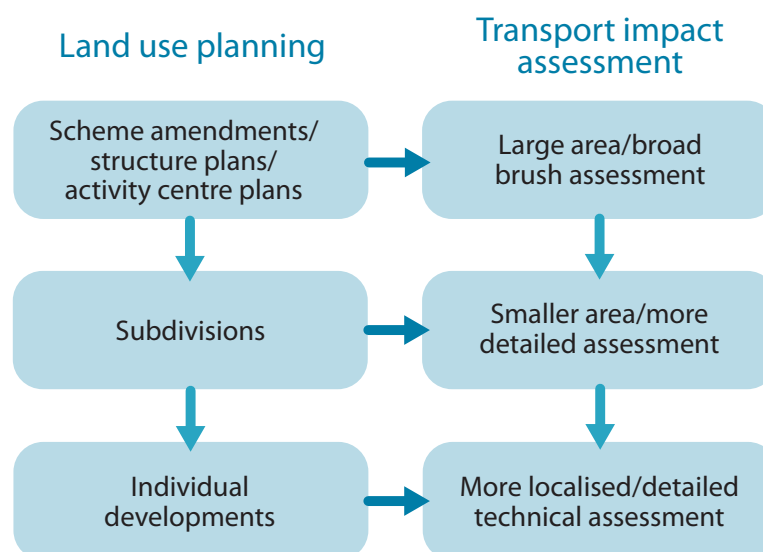
### 2 The development application stage

The individual development application is the third and final stage of the land use/TIA process as illustrated in **Figure 1**. It generally provides much more detail over a smaller area compared to the structure plan and subdivision stages, for both the land use and transport proposals.

The objectives of the TIA of an individual development are to:

- demonstrate that the proposal is consistent with the overall structure and subdivision planning;
- provide a greater level of technical detail on the development and its immediate surrounds; and

**Figure 1: The land use/transport planning process**



- provide details of any transport issues specific to the development not covered in the subdivision assessment.

## 3 Prior transport impact assessments

### 3.1 Introduction

Many individual developments are likely to be part of a local structure plan and/or subdivision for which TIAs may have already been carried out. (**Volume 2** provides details on TIAs for structure plans and **Volume 3** for subdivisions).

As these guidelines have now been in use for some years, most existing assessments are quite likely to be in the format required under the guidelines, or at least provide the same level of information.

However, if the existing TIA does not meet the requirements of the guidelines, the applicant is recommended to follow the approaches identified in **Sections 3.3 or 3.4**, as appropriate.

### 3.2 Prior assessment consistent with guidelines

The majority of developments should be part of a structure plan or subdivision for which a TIA has been carried out in accordance with these guidelines.

In these cases reference should be made to the prior TIA when preparing the TIA for the development. The relevant information should generally be extracted from the prior assessment and expanded as required; the prior assessment having been carried out at a broader brush level and most likely covering a potentially larger area at a lower level of detail than is required for the development assessment.

On some limited occasions it may be sufficient to briefly summarise the relevant information and provide a reference back to the prior assessment. It may also be appropriate to provide a copy of the prior assessment when submitting the development application.

### 3.3 Prior assessment not consistent with guidelines

Where the TIA provided at the structure plan stage fails to meet the requirements of the guidelines, the development assessment should draw on any appropriate information and expand as required.

Where the required information is not available from the prior assessment, it should be provided at the development stage. This may require expansion of the area of assessment beyond that normally required for a development.

In other words, the first stage of the development assessment may be to expand the prior assessment and provide the information required for the local structure plan/subdivision under these guidelines. This information can then be used to prepare the development assessment.

This expansion of the prior assessment may not need to be as comprehensive as a full structure plan/subdivision assessment. It should concentrate on those parts of the surrounding area that would impact most on the development. For example, the surrounding land uses may generate traffic that would use the roads fronting the development and there may be the potential, or need, for bus routes and pedestrian/cycle networks to pass directly in front of the development.



This approach is recommended to ensure that individual developments within a structure plan/subdivision area are not developed in isolation but are consistent with the overall structure and subdivision planning.

When the prior assessment is less recent, (that is, more than five years old), it may be appropriate to review those parts of the assessment relevant to the development to ensure that they are still current and valid. It is recommended that the proponent discuss this with the approving authority prior to commencing the development assessment.

### 3.4 No prior assessment

In the cases where no prior TIA has been undertaken, it is recommended that a local structure plan or subdivision (as appropriate) TIA be undertaken prior to undertaking the development assessment.

Again, this assessment may not need to be as comprehensive as a full structure plan/subdivision assessment as it should concentrate on those parts of the surrounding area that would impact most on the development.

For developments in built up areas not covered by structure planning or are not part of a larger subdivision, this preliminary assessment may not be required. The development assessment must, nevertheless, address the context of the development with respect to, and its integration with, the surrounding land uses.

## 4 Policy context

Current WAPC development control (DC) policy requires individual development applications to be supported by transport information. The transport objectives for individual developments under DC policy are similar to those for subdivisions, namely to:

- facilitate appropriate access and movement systems for all modes of transport;
- integrate the development with the surrounding land uses and transport networks;
- provide high quality pedestrian and cycle networks both within the development and connected to the surrounding area; and
- ensure adequate consideration is given to public transport access.

In particular, *DCI.2, Development Control – General Principles* (August 2004) sets out the requirements for the transport information to be provided in support of individual development applications.

Section 3.1 of the policy outlines what the WAPC needs to consider in making its decision. This includes:

- integration of development into the site and its surroundings;
- transport and traffic impacts; and
- vehicular and non-vehicular access, circulation and car parking.

Appendix 2 of Policy DCI.2 outlines what needs to be submitted to the WAPC in support of a development application.



The transport information is:

- “1 (v) The existing and proposed means of access and egress for pedestrians and vehicles to and from the site;*
- 1 (vi) The location, number, dimensions and layout of all car parking spaces intended to be provided, including provision for the disabled;*
- 1 (vii) The location and dimensions of any area proposed to be provided for the loading and unloading of vehicles carrying goods or commodities to and from the site and the means of access to and from those areas; and*
- 3 Any specialist studies that the responsible authority may require the applicant to undertake in support of the application such as traffic, heritage, environmental, engineering or urban design studies.”*

The following sections provide further guidance on the transport information required under DC 1.2 and other appropriate WAPC policies, to support a development application.

## 5 Transport impact assessment components

The key components of a TIA for a development are to:

- assess the proposed access arrangements for all modes, that is, vehicle, public transport, pedestrian and cyclist;
- assess the level of transport integration between the development and the surrounding land uses;
- determine the impacts of the traffic generated by the development on the surrounding land uses; and
- determine the impacts of the traffic generated by the development on the surrounding transport networks.



## 6 Level of assessment

### 6.1 Size of development

Individual developments can range from very large scale with either a single land use (for example, retail) or a range of land uses, (for example, mixed use residential/commercial/retail) down to the development of a single dwelling or small shop. Obviously, each would have widely different transport implications and a 'one size fits all' assessment process would not be appropriate.

Therefore, under these guidelines, the level of TIA required is related to the level of transport impact the proposed development would be likely to have on the surrounding land uses and transport networks.

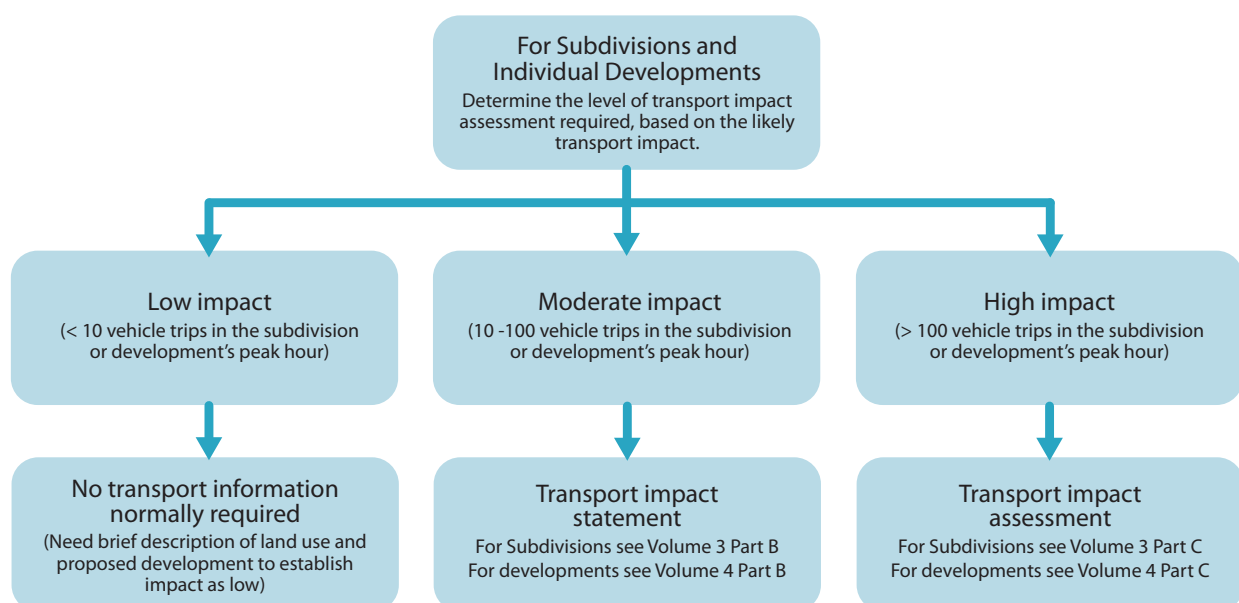
This depends upon a number of factors including type and quantities of land uses, location and catchment, the surrounding road and public transport networks and accessibility for pedestrians, cyclists and people with disabilities.

### 6.2 Assessment levels

A three level assessment process has been developed to accommodate this diversity. This process is essentially the same as for subdivisions, although the level of detail required and area of assessment will be different.

The process for determining the level of assessment required is illustrated in **Figure 2**.

**Figure 2: Level of assessment required**



**Table I** presents these levels in terms of land use units, (for example, number of dwellings or retail floor space), for the main land use categories, based on indicative trip generation rates.

See **Volume 5, Part B** for the derivation of the threshold values in **Table I**.

Note that the level of traffic generated relates to the number of vehicle trips generated by the development during its busiest hour(s) of operation. This peak hour(s) may or may not occur at the same time as the peak periods of the surrounding roads.

## 6.3 Vehicle trips versus person trips

The use of vehicle trips generated to determine the level of assessment required should be seen as a proxy for person trips as there are no land use types that generate high volumes of non-car trips but very low volumes of car trips.

There may be a specific development in a specific location that would generate high person trips but low car trips, for example, a retail development in the CBD. Typically, however, retail generates high levels of car trips.

Take, for example, two retail developments of 2,000m<sup>2</sup>, one in a suburban shopping centre and one in the Perth CBD. Both would require a full assessment under the

**Table I: Level of TIA required by land use and size**

LAND USE	MODERATE IMPACT	HIGH IMPACT
	Transport Impact Statement required	Transport Impact Assessment required
	10 – 100 vehicle trips in the peak hour	> 100 vehicle trips in the peak hour
Residential	10–100 dwellings	> 100 dwellings
Schools	10–100 students	> 100 students
Entertainment venues, restaurants, etc.	100–1000 persons (seats) OR 200–2000 m <sup>2</sup> gross floor area	> 1000 persons (seats) OR > 2000 m <sup>2</sup> gross floor area
Fast food restaurants	50–500 m <sup>2</sup> gross floor area	> 500 m <sup>2</sup> gross floor area
Food retail / Shopping centres with a significant food retail content	100–1000 m <sup>2</sup> gross floor area	> 1000 m <sup>2</sup> gross floor area
Non-food retail	250–2500 m <sup>2</sup> gross floor area	> 2500 m <sup>2</sup> gross floor area
Offices	500–5000 m <sup>2</sup> gross floor area	> 5000 m <sup>2</sup> gross floor area
Service Station	1–7 refuelling positions	> 7 refuelling positions
Industrial/Warehouse	1000–10,000 m <sup>2</sup> gross floor area	> 10,000 m <sup>2</sup> gross floor area
Other Uses	Discuss with approving authority	Discuss with approving authority

guidelines. The suburban development would be likely to generate mainly car trips and (in most cases) typical retail car trip rates would be used in the TIA.

The CBD development would be likely to generate a (much) lower number of car trips but a (much) higher number of public transport trips and walking trips (from people already in the CBD). The CBD development TIA would adopt a lower car trip rate and would also need to address the higher than normal non-car mode share.

By applying standard vehicle trip generation rates for the land use within the development (retail in this case), the appropriate level of assessment required will be identified.

For reductions in vehicle trip generation rates, travel demand management measures should be considered in line with **Section 6, Volume 2**.

## 6.4 Advice from approving authority

While the level of assessment should generally be in accordance with these guidelines, it is recommended that the level required be **confirmed by the approving authority**.

Advice from the approving authority to proponents on the level of assessment required is to be given, and taken, on a 'without prejudice' basis. This does not preclude the approving authority requesting further information at its discretion.

This particularly applies to transport impact statements where the information provided may indicate that specific issues require more detailed assessment or that the impact is greater than initially anticipated and a more detailed TIA is required.

While this may result in a degree of uncertainty for the proponent, it is considered that some flexibility is required to allow approving authorities to ask for further information, when the preliminary assessment raises additional issues or concerns.

If approving authorities were to be bound by their initial advice on the level and extent of assessment and the parameters for the assessment, they would be likely to use a conservative approach. For example, they may ask for a larger study area just in case the impacts extend beyond what would normally be expected. This would result in unnecessary work for the proponent in many cases.

By allowing approving authorities some powers to request additional information after the initial assessment, it is considered that their initial requests for assessment will be more reasonable, thereby reducing the level of unnecessary work required to be undertaken by proponents.

## 6.5 Application of table

The levels in **Table I** are to be applied to the ultimate development so that the full potential impact is assessed. For large developments where staging is proposed, it may be appropriate to also assess each stage individually to determine when various aspects of transport infrastructure may be required. The level of assessment required is, however, to be determined by the size of the ultimate development.

For developments smaller in size than those in the transport impact statement column, no transport information will generally be required. The applicant is nevertheless recommended to confirm this with the relevant approving authority prior to submitting the application.



For mixed use developments, a pro rata approach should be used to determine the level of assessment required. For example, a development with 70 dwellings and 500m<sup>2</sup> of retail would be likely to generate more than 100 trips in the peak hour, requiring a full TIA.

## 6.6 Detailed guidance

Detailed guidance on how to undertake the two levels of assessment above is provided in this volume as follows:

**Part B – Transport impact statement;**

**Part C – Transport impact assessment.**



## Part B – Transport impact statement

### I Introduction

A *Transport Impact Statement* (TIA) is required for those developments that would be likely to generate moderate volumes of traffic and therefore would have a moderate overall impact on the surrounding land uses and transport networks, (in accordance with **Table I**).

A transport impact statement is a brief statement outlining the transport aspects of the proposed development. The intent of the statement is to provide the approving authority with sufficient transport information to confirm that the proponent has adequately considered the transport aspects of the development and that it would not have an adverse transport impact on the surrounding area.

Of particular relevance is the accessibility of the development by non-car modes, in accordance with the State Government's sustainable development objectives, and its integration with the surrounding area. It is essential that planning for pedestrians and cyclists is still well assessed at this level. For further technical guidance on Level of Service for pedestrians and cyclists **see Volume 5 – Technical Guidance**.

The transport impact statement should also address any issues specific to the particular development, but without requiring a full TIA to be undertaken—an unnecessary requirement for most developments of this size.

The site-specific issues to be assessed should be discussed and agreed with the approving authorities prior to commencing the transport statement and may include:

- the generation of traffic past sensitive uses such as schools or hospitals;
- the generation of traffic on low-volume residential roads;
- particular intersections or sections of road that may be adversely affected;
- the potential for rat-running, especially through residential areas;
- issues associated with the heavy vehicles generated by the development;
- developments operating outside normal business hours in/near residential areas;
- developments with a potentially high non-car mode share; and
- developments close to major transport nodes.

It is envisaged that the transport impact statement will generally be from two to three pages up to several pages in length, but this will depend upon the number and nature of any specific issues that need to be addressed.

It is expected that most, if not all, of the information to be provided will be of a non-technical nature, that is, will not require input from a specialist in transportation planning or traffic engineering. This will, however, depend upon the nature of the specific issues to be addressed and specialist technical input may be required on occasions.

## 2 Prior TIA

The development may be part of a structure plan or subdivision for which a TIA has already been undertaken. If this is the case, the transport impact statement should extract the relevant information and revise or expand it as appropriate.

Where there is no prior TIA, the transport impact statement may need to provide additional information on the surrounding land uses and transport networks.

Further advice on prior assessments is provided in **Section 3 of Part A** of this volume.

## 3 Extent of assessment

The area to be covered by the transport impact statement is to include, as a minimum:

- the proposed development site;
- all roads fronting the site, for the extent of the site frontage plus 100 metres beyond the site;
- pedestrian routes to the nearest bus stops (for all bus routes passing within 400 metres of the site);
- pedestrian routes to nearest train station(s) (if within 800 metres);
- pedestrian/cycle routes to any major attractors within 400 metres, (five-minutes walk) of the site, for example, for a small residential development attractors could be a corner shop, the primary school and the nearby park; and
- the area(s) likely to be affected by the site specific issue(s).

## 4 Checklist

A checklist of the typical information required is provided in **Appendix A I** of this volume. This checklist may be used by the proponent and/or the person undertaking the transport impact statement as a method of ensuring that all items have been addressed and submitted with the transport information.

While it is not mandatory for the checklist to be submitted with the application/TIA report, this may assist the assessors in identifying any further information required to process the application.

The level of information sought and the format for providing the information are set out below.

## 5 Content

### 5.1 Introduction

The statement is intended to be an informal, non-technical statement of the transport aspects of the development. Its format is therefore relatively flexible but should include the following sections:

- Proposed development;
- Vehicle access and parking;
- Provision for service vehicles;
- Hours of operation (if applicable);
- Daily traffic volumes and vehicle types;
- Traffic management on frontage streets;
- Public transport access;
- Pedestrian access;



- Cycle access and end of trip facilities;
- Site specific issues; and
- Safety issues.

The information required for each section is outlined below. *Note that some of the information may be better provided graphically on a map and/or plan rather than by a text description. Examples are given in **Volume 5**.*

## 5.2 Proposed development

- Show on a plan/describe the proposed development land uses and their quantities (for example, retail floorspace, number of dwellings);
- Comment on any existing uses or changes of use;
- Show on a plan/describe the development's relationship/context with the surrounding land uses.

## 5.3 Vehicle access and parking

- Show on a plan/describe the vehicle access arrangements to the development from the frontage road(s);
- Show the locations and indicate the number of proposed public and/or private car and disabled parking spaces and the provision for set down, pick up and taxis (if appropriate);
- Include details of parking management.

## 5.4 Provision for service vehicles

- For the non-residential developments (or the non-residential components of mixed use developments), briefly describe/show the access arrangements and on-site loading or unloading facilities for service vehicles;
- For residential developments, discuss/show the access to the site for rubbish collection and emergency vehicles.



## 5.5 Hours of operation

- For non-residential developments only, outline the proposed hours of operation.

## 5.6 Daily traffic volumes and vehicle types

- For non-residential developments, provide where possible a rough estimate of the likely daily, and/or peak, traffic volumes generated by the development, split by types of vehicle, for example, car, light commercial or heavy commercial.

Note that this is not intended to be a comprehensive assessment carried out by a transport specialist but a rough guide only to the amount and type of traffic likely to be generated.

## 5.7 Traffic management on the frontage streets

- Describe/show the existing traffic management on the roads fronting the development and for 100 metres either side of the development.

Information to include:

- road width/number of lanes;
- footpaths/cycleways;
- any parking provision or restrictions;
- posted traffic speed;
- intersections and type of control (for example, give way, roundabout
- accesses/driveways to properties.

## 5.8 Public transport access

- Identify/show the nearest bus and train routes to the development and the locations of the nearest bus stops and train stations.
- Describe/show briefly the pedestrian and cycle links between the development and the bus stops and train station.

See **Section 3** for advice on the extent of the area to be covered.

## 5.9 Pedestrian access

- Describe/show the existing pedestrian facilities, for example, footpaths, signalised crossings, within the development (if any).
- Describe/show any proposed pedestrian facilities within the development.
- Describe/show the pedestrian facilities on the roads surrounding the development. Outline any proposals by the applicant to improve pedestrian access.

See **Section 3** for advice on the extent of the area to be covered.

## 5.10 Cycle access

- Describe/show any existing cycle facilities, (for example, cycle parking) within the development.
- Describe/show any proposed cycle facilities within the development.
- Describe/show any existing cycle facilities on the roads surrounding the development. Outline any proposals by the applicant to improve cycle access.

See **Section 3** for advice on the extent of the area to be covered.

## 5.11 Site specific issues

- Provide details of any site specific transport issues.

Some flexibility is required here to address these specific issues, as they will be different for each development. The general approach should be along the following lines:

- Describe any transport issues specific to the development, as discussed and agreed with the approving authority.
- Demonstrate that these will not have an adverse impact on the surrounding area, or, if they may, propose remedial measures to redress these impacts.
- Alternatively, the specific issues may relate to demonstrating that the development satisfies a certain policy objective, for example, that a development close to a major train station provides a high level of access to the station and would encourage increased use of the train.

- direct access onto a busy road; and
- the need for pedestrians/cyclists to cross a busy road to access the development.

This section should also include a discussion of possible measures to address these issues.

## 5.12 Safety issues

- Identify and discuss any existing or potential safety issues. Where appropriate, suggest remedial measures.

The previous sections may have identified existing or potential safety issues that should be expanded upon. Examples of possible safety issues include:

- an access to the development crossing a busy footpath, especially one used by school children;
- the development increasing traffic through a busy priority intersection;



## Part C – Transport impact assessment

### I Introduction

A TIA is a detailed assessment of the transport aspects of a development. It is to be submitted as part of all large development applications, in accordance with **Figure 2** and **Table 1 of Part A** of this volume.

It is a detailed technical assessment and is therefore likely to require input from a transport planning professional. The intent of a transport assessment is to clearly demonstrate to the approving authority that the development would:

- provide safe and efficient access for all modes;
- be well integrated with the surrounding land uses;
- not adversely impact on the surrounding land uses; and
- not adversely impact on the surrounding transport networks and the users of those networks.

It should also demonstrate that the proposed development is consistent with the transportation aspects of the structure and subdivision planning for the area.

### 2 Prior structure plan or subdivision assessment

The development may be part of a structure plan or subdivision for which a TIA has already been undertaken. If this is the case, the development TIA should extract the relevant information and revise or expand it as appropriate.

Where there is no prior TIA, the development TIA may need to provide additional information on the surrounding land uses and transport networks.

Further advice on prior assessments is provided in **Section 3 of Part A** of this volume.

### 3 Background

Historically, traffic impact assessments have been carried out on a somewhat ad hoc basis, mainly for large developments and concentrating on the vehicular traffic impacts, often with little or no consideration of the accessibility by, or impact on, non-car modes.

The current approach is to consider and cater for all transport modes. The term '*transport* impact assessment' has been adopted to differentiate between this multi-modal approach and the more previous vehicular focussed approach '*traffic* impact assessment'.

The TIA therefore encompasses all modes of transport, that is, public transport, walking and cycling as well as private motor vehicles and freight movements.

### 4 Extent of assessment

The TIA should cover, as a minimum:

- all sections of road where the development traffic would be likely to increase traffic on any lane by more than 100 vehicles per hour (See explanatory note 1);



- all intersections where flows on any leg would increase by 10 per cent, or any movement by 20 per cent;
- Existing and proposed public transport routes.
- pedestrian routes to the nearest bus stop (for all bus routes passing within 400 metres of the development);
- pedestrian routes to the nearest train station(s), (if within 800 metres of the development);
- pedestrian routes to any major attractors within 400 metres, (five-minute walk), of the development;
- cycle routes to any major attractors within 1,200 metres, (five-minute cycle), of the development.

## Explanatory Note 1

*The 100vph threshold equates to around 10 per cent of the mid-block capacity of an urban arterial lane (Austroads Guide to Traffic Management, Part 3, Traffic Studies and Analysis (2009)).*

The TIA should cover all parts of the transport network that would be likely to be materially affected by the proposed land uses.

The study area will typically be larger than just the site area. It should include, at least, all abutting roads and is likely to extend significantly further along particular roads or other transport corridors.

As a general guide, an increase in traffic of less than 10 per cent of capacity would not normally be likely to have a material impact on any particular section of road, but increases over 10 per cent may. All sections

of road with an increase greater than 10 per cent of capacity should therefore be included in the analysis.

For ease of assessment, an increase of 100 vehicles per hour for any lane can be considered as equating to around 10 per cent of capacity. Therefore any section of road where the structure plan traffic would increase flows by more than 100 vehicles per hour for any lane should be included in the analysis.

For sensitive areas, (for example, past schools), or where a significant proportion of the development's traffic is likely to be heavy commercial vehicles, a lower threshold than the above might trigger the need for assessment.

An intersection would generally be considered to be materially affected if flows on any leg increase by more than 10 per cent or any individual movement by more than 20 per cent. For already congested intersections, lower thresholds may again trigger the need for assessment.

Other factors that should be taken into consideration when determining the study area include:

- change of intersection control type (for example, from priority to traffic signals);
- new or modified intersections or crossovers;
- new or widened roads, shared paths, etc.; and
- new or modified bus routes or bus stop locations.

For pedestrian and cycle routes, the area to be assessed is based on five minute walk and cycle times to bus stops and major attractors/generators and a 10 minute walk to train stations. The objective of this component of the assessment is to identify

how well the development is integrated with the surrounding area and would encourage non-car modes.

The above criteria are guidelines only and the extent of the initial study area should be discussed with the approval authority prior to commencement of the assessment.

The study area may need to be revised, in agreement with the approving authority, during the course of the assessment. For example, the initial assessment may indicate that a development would have a wider impact than initially thought requiring expansion of the study area, or conversely less impact allowing a reduction in the study area.

It should be noted that inclusion of a particular road, intersection or other feature in the study area does not necessarily imply that the proponent will be responsible for all improvements that the assessment might recommend at that location.

Such decisions are beyond the scope of the guidelines. They are subject to other policies and current practice and may require detailed negotiation with the approval authority. For further information see WAPC Policy DC1.7 *General Road Planning* and State Planning Policy 3.6 *Developers Contributions for Infrastructure*.

## 5 Liaison with the relevant approving Authorities

### 5.1 Introduction

Prior to commencement of the assessment, the proponent is **strongly recommended** to contact the appropriate approving authority or authorities to discuss and where possible agree its scope.

This is particularly important for developments where no prior TIA has been undertaken. However, it is also important when there is a prior assessment as some of the assessment parameters are likely to be different. For example, a different assessment year may be appropriate and the development may generate its peak traffic outside the period adopted for the structure plan or subdivision assessment.

It is also possible that there have been changes to the structure and/or subdivision planning since the prior assessment, and these should be accounted for at this development stage.

It should be noted that any agreements on the scope of the assessment given by the approving authority will be on a 'without prejudice' basis. The approving authority thereby reserves the right to require the proponent to amend or expand the scope or to amend the parameters used depending upon the outcomes of the initial assessment.

### 5.2 Scope

Issues to be discussed in determining the scope of the assessment include:

- extent of the area to be assessed;
- intersections to be assessed in detail;
- assessment years;
- assessment time periods;
- issues specific to the development and/or its location;
- any specific safety issues to be addressed;
- any committed or proposed developments in the area that need to be taken into consideration; and
- any committed or proposed improvements to the surrounding transport infrastructure that need to be taken into consideration.

## 5.3 Parameters

Parameters to be discussed include:

1. trip generation rates;
2. proportions of pass-by, diverted and new trips;
3. directional distribution of trips;
4. future year base flows; and
5. traffic growth rates.

## 5.4 Activity Centres

For developments that include or consist of an *Activity Centre*, proponents are urged to begin consultation with the relevant authorities at an early stage, and refer to DoT's *Transport Modelling Guidelines for Developments in Activity Centres*.

## 6 Format of assessment

### 6.1 Introduction

This section details the information that would normally be included in a TIA. The assessment should follow the general format and sequence identified in the guidelines. When reports follow a standard format, processing by the assessing officers is simplified and the time required for approval is likely to be reduced.

The assessment should be written in a clear and simple style as some of the people reading it may not be familiar with technical terminology. Where appropriate, technical details should be provided in appendices with the main findings and conclusions summarised in the body of the report.

**Maps, plans and diagrams should be used wherever possible** for clarity of presentation and to avoid the need for lengthy descriptions.





The analysis should be fully explained to allow the reviewer to trace the steps followed in the process. Conclusions should follow logically in the order in which issues were addressed so that they can be reviewed easily based on the information provided.

Data sources should be referenced, to allow retrieval of relevant information if required at a later date. Results of data collection and related detailed analysis should be attached as technical appendices. Electronic copies of data and/or analysis should be provided as part of the report where appropriate.

## 6.2 Structure

While there is scope for some flexibility in preparing an individual development stage TIA, the recommended general structure is along the lines of the following:

- Summary
- Introduction and background
- Existing situation
- Development proposal
- Committed developments and other transport proposals
- Changes to surrounding transport networks
- Integration with surrounding area
- Assessment years and time periods
- Development generation and distribution
- Design traffic flows
- Analysis of development accesses
- Impact on surrounding roads
- Impact on intersections
- Impact on neighbouring areas
- Road safety

- Public transport access
- Pedestrian access/amenity
- Cycle access/amenity
- Analysis of pedestrian/cycle networks
- Safe routes to school (where appropriate)
- Parking and parking management
- Traffic management plan (where appropriate)
- Conclusions

Note that while the non-car modes are towards the end of the assessment this does not imply that they are any less important than the vehicle based assessment. This order is required because the impact of the development generated vehicular traffic on pedestrian and cycle amenity and safety, needs to be assessed. The vehicle traffic volumes on the surrounding roads therefore need to be determined first.

## 6.3 Checklists

A checklist of the typical information required is provided in **Appendix A2** of this volume. This checklist is to be filled out, signed by the proponent and the transport specialist, and submitted with the TIA, as part of the development application. In the case that revision of the TIA or further information is required by the approving authority a checklist is included to ensure requested information is included.

The level of information sought in a TIA and the format of that information are set out below.

## 7 Details of Content

### 7.1 Introduction

This section details what should be provided in each of the items in Section 6.2. The key information to be provided is shown initially, followed by further guidance on what should be provided and how to undertake the assessment, as appropriate.

Where appropriate, references are given to additional information and guidance which can be found in **Volume 5 – Technical guidance**.

### 7.2 Summary

- Provide a summary of the TIA including a brief description of the development proposal, the key transport issues, potential transport impacts and any proposed modifications to the surrounding transport networks.

### 7.3 Introduction and background

- Provide a brief description of the development and the purpose and contents of the transport report including any appropriate background information.

The introduction should include the following information:

- the name of the applicant/agent/proponent and the consultant who prepared the TIA;
- a description of the development location and a map showing the site area in context;
- a brief description of the proposed land uses;

- whether or not there is a current structure plan or subdivision TIA covering the area;
- a summary of key issues to be addressed; and
- background information, for example, previous reports or earlier planning proposals for the site.

### 7.4 Existing situation

- Show on a plan/describe the existing situation including:
  - existing site uses, if any;
  - existing parking provision and, if appropriate, demand;
  - existing access arrangement;
  - existing site traffic generation (See explanatory note 2);
  - existing land uses surrounding the development;
  - surrounding road network (See explanatory note 3);
  - traffic management on frontage roads (See explanatory note 4);
  - available traffic counts on existing roads surrounding the development (See explanatory note 5);
  - available traffic counts at major intersections surrounding the development (See explanatory note 5);
  - operation of surrounding intersections (site observations and analysis) (See explanatory note 6);
  - existing pedestrian/cyclist networks surrounding the development;
  - existing public transport routes and bus stops/train stations surrounding the development;

- public transport - routes, frequencies and bus stop/train station locations surrounding the site; and
- crash data for surrounding roads (See note 6).

See **Section 4** for advice on the extent of the area generally to be covered.

## Explanatory Note 2 – Existing site traffic generation

*For other than vacant or greenfield sites, provide details of the current levels of traffic generated by the existing uses on the site. For small sites, an estimate of the likely level of traffic would normally be sufficient.*

*For large and/or high generating sites this should be determined by traffic surveys and include, as appropriate, counts of cars, commercial vehicles, public transport users, pedestrians and cyclists.*

*If in doubt, the developer should confirm the requirements with the approving authority in advance of any survey or assessment.*

*The time periods for assessment/survey will generally be the peak period(s) for the surrounding roads and the peak for the proposed development as determined in Section 7.9. In situations where the peak generation of the existing uses occurs at a different time to the proposed development or highway peaks, an assessment of the existing uses peak period(s) may also be appropriate.*

*The traffic figures for the existing uses are to be used later in the assessment to estimate the likely increase in traffic, or in some cases a possible reduction in traffic, resulting from the change in use of the site.*

*In most situations it will be this difference in traffic generation, i.e. between the new and existing uses, that the proponent will need*

*to demonstrate can be accommodated on the surrounding road network, or will need to provide improvements to accommodate.*

## Explanatory Note 3 – Surrounding road network

*The existing road network in the study area should be documented in the text and shown on appropriate maps and plans. The required information includes:*

- *road hierarchy and jurisdiction for example, Main Roads WA (MRWA) or local government;*
- *road network – basic cross-section, number of lanes, widths, posted speed;*
- *intersection layout and traffic control including traffic signals/roundabouts lane configuration, movement/turning restrictions, etc.;*
- *heavy vehicle/freight restrictions, if any.*

## Explanatory Note 4 – Traffic management on frontage roads

*Describe/show the existing traffic management on the roads fronting the development and for 100 metres either side of the development. Information to include:*

- *road width/number of lanes;*
- *footpaths/cycleways;*
- *parking provision or restrictions;*
- *posted traffic speed;*
- *intersections and type of control (for example, give way, roundabout etc.);*
- *accesses/driveways to properties (for roads fronting development only).*

## Explanatory Note 5 – Traffic data

Traffic counts are to be provided for the main roads and intersections surrounding the development. The counts are to be by direction for the roads and turning movement counts for the intersections.

The traffic data should be for the following periods:

- the peak period(s) on the surrounding roads (generally the AM and PM weekday peak hours);
- the peak period(s) for the proposed development (See also **Section 7.9**).

The required data can be obtained either from existing traffic flow databases or from traffic surveys. The two main sources of existing data are MRWA and local councils.

Further advice on obtaining the required data is provided in the traffic data section of **Volume 5 - Technical Guidance**.

## Explanatory Note 6 – Operation of surrounding intersections

The main intersections around the site should be analysed using approved techniques under existing traffic flows for the peak periods above. The result of the intersection analysis should be compared with and calibrated against observed traffic conditions during the peaks. This comparison should include average delays, queue lengths and levels of service as appropriate.

For traffic signals, the analysis should use actual signal timings and saturation flow measurements may be required to calibrate the relevant analysis models.

These intersection analysis models will form the basis of the analysis of the impact of the development generated traffic and of any proposed intersection improvements. It

is therefore important that the initial models accurately represent the actual intersection operation.

See **Volume 5** – Assessment of intersections for further guidance on appropriate analytical techniques for the intersection analysis.

## Explanatory Note 7 – Traffic crash data

Crash data for the study area for the last five recorded years can be obtained from MRWA's online CARS database.

The crash data should be analysed to identify any patterns in crashes and hence potential safety issues and possible remedial measures.

Care should be exercised in assessing five-year crash data with regard to any other developments and/or changes to the road network configuration that may have occurred during this time period.

Note that the absolute number of crashes at an intersection or on a road is not necessarily an indication of the relative safety of that location but that the volume of traffic passing through the intersection, or along the road, should also be taken into consideration.

## 7.5 Development proposal

- Show on a plan/describe the proposed development including:
  - its regional/structure plan context;
  - the proposed land uses;
  - a table of the quantum of each land use type proposed (for example, number of dwellings, square metres of retail floor space, etc.);
  - any proposed staging of development;
  - access arrangement for cars, service vehicles, public transport, pedestrians and cyclists and people with disabilities;

- the locations of pedestrian entrances to the building(s);
- car and cycle parking provision;
- end of trip facilities for walking and cycling (for example, lockers and showers); and
- any specific issues.

## 7.6 Changes to surrounding transport networks

- Show on a plan/describe any committed or proposed changes or additions to the surrounding transport networks including:
  - the road network;
  - intersection layouts and/or traffic controls;
  - pedestrian/cycle networks and crossing facilities;
  - public transport routes and bus stops/ train stations.

These changes could be those committed to or proposed by others, (for example, MRWA or the local authority), or by the proponent, as part of the development.

- Provide details of any discussions/ agreements with the local authority, Main Roads Western Australia (MRWA) or the Public Transit Authority (PTA), with respect to any such proposals put forward by the proponent.

Discussions are likely to be required with the affected local authority, MRWA and PTA to determine any proposed or potential changes.

## 7.7 Integration with surrounding area

The intent of this section is to identify how well the proposed development integrates with the surrounding land uses with respect to transport links and accessibility. Note that this is to be a qualitative assessment of the level of accessibility between the





development and the surrounding land uses. A quantitative analysis of the transport networks is to be undertaken in the following sections.

- Describe/show the level of integration with the surrounding area by:
  - identifying the major attractors and generators surrounding the development. (See explanatory note 8);
  - identifying any proposals for major changes to the surrounding land uses;
  - determining the main desire lines between the development and these external attractors and generators;
  - assessing whether the existing transport networks, plus any proposed changes, would adequately match these desire lines, particularly for pedestrians, cyclists and public transport users (See note 9);
  - identifying any deficiencies in the surrounding transport networks, and/or areas where improvements could be made (See note 10);
  - suggesting remedial measures to address these deficiencies.

See **Section 4** for advice on the extent of the area generally to be covered.

## Explanatory Note 8

*Major generators would be those external land uses, primarily residential, from which people would be attracted to the development.*

*Major attractors would be those external land uses (for example, schools, shopping centres or sports facilities) that people from the development would be attracted to.*

## Explanatory Note 9

*The assessment should consider the directness of the route(s) and the quality of the connecting pedestrian and cycle networks. It should identify whether there are any existing public transport services or whether any are proposed.*

## Explanatory Note 10

*Potential deficiencies, or areas for improvement, could include missing or substandard sections of footpath and/or cycle path, the absence of safe crossing facilities where major roads need to be crossed and the absence of public transport links.*

## 7.8 Committed developments and other transport proposals

- Identify any other committed or proposed developments in the vicinity of the proposed development;
- Identify any committed or proposed changes to the surrounding transport networks.

The relevant local authorities should be approached to obtain information on any significant developments in the area that have received planning approval but have not yet been completed, or are within the planning system awaiting approval. The potential transport impact of these developments should then be considered in the TIA.

Equally, the relevant authorities (for example, MRWA, local authority or PTA/Transperth) should be approached to identify any existing transport proposals in the area such as road widening, intersection improvements, cycle lanes and new bus routes. These should also, where appropriate, be included in the TIA.

For developments and/or proposals that may or may not be implemented, the assessment may need to consider scenarios where they are constructed and scenarios where they are not.

## 7.9 Analysis of transport networks – General advice

The assessment to date has provided a description and an inventory of the development proposal and surrounding area with respect to land uses and transport networks. The next sub-sections require a more detailed quantitative analysis of the impact of the development-generated traffic on the surrounding transport networks.

The analysis should also demonstrate that the proposed development would provide a high level of accessibility and safety for all modes. The recommended steps to undertake and present the analysis are outlined below.

### 7.9.1 Assessment years

- Determine the appropriate years for assessment. These are generally to be:
  - the year of full opening of the development; and
  - 10 years after full opening, (or a similar year if one is available from the prior structure plan or subdivision assessments).

It is recommended that the applicant discuss and agree the assessment years with the approving authority in advance of undertaking the assessment.

The 'year of full opening' assessment will provide a measure of the transport impact once the development is fully open.

The 'post full development' assessment, (10 years after opening or similar), will determine the medium to longer term impacts of the proposed development on the surrounding road network, i.e. it will provide a measure of the ability of the transport infrastructure to accommodate development flows plus further growth in the surrounding traffic.

It will therefore provide the approving authority with advice on whether or not the development is likely to trigger the need for additional improvements to the transport networks over the next ten years or so, or bring forward any planned improvements.

Where there is a prior structure plan/subdivision assessment, the post full development assessment should consider whether the development is substantially unchanged from that assumed in the structure plan/subdivision assessment. If it is unchanged, the "post" assessment may be able to be extracted from the structure plan/subdivision assessment. If it is significantly changed, then a revised assessment is required.

Where there is no prior assessment, a more detailed assessment of the post full development scenario is required to determine the potential medium to longer term impacts of the development on the surrounding transport networks.



## 7.9.2 Time periods for assessment

- Determine the appropriate time periods for assessment. These are generally to be:
  - the peak period(s) of the surrounding road network; and
  - the peak period(s) for the development.

It is recommended that the applicant discusses and agrees the time periods for assessment with the approving authority in advance of undertaking the assessment.

The peaks on the surrounding roads are generally the weekday morning (7am– 9am) and evening (4pm– 6pm) periods. These may be different closer to specific land uses or in specific locations, for example, roads near beaches may be busiest during summer weekends. The appropriate highway peaks should therefore be agreed in advance with the approving authority if there is any doubt.

For developments near schools it may also be appropriate to assess the afternoon end of school period, for example, 2.30pm–3.30pm.

The peak period(s) for the development depends upon the type of land uses within it. The appropriate peak(s) is likely to be identified as part of determining the trip generation in **Section 7.10** and should, if there is any doubt, also be agreed with the approving authority.

Further advice is provided in the time periods for analysis section of **Volume 5**.

## 7.10 Development generation and distribution

- Determine the trip generating potential of the development. Determine the proportions of new, pass-by and diverted trips. Distribute these trips on the surrounding road network.

The trip generating potential of the development is to be determined for the assessment years and time periods. The trips rates used should be based on surveys of comparable developments or extracted from recognised land use traffic generation databases.

Not all trips attracted to the development will be new to the surrounding road network. Depending upon the type of development, a proportion will already be on the network passing directly in front of or nearby the development and will simply divert in. An example of this is PM peak period shopping trips where customers may shop on the way home from work.

Some developments will generate relatively few totally new trips, for example, petrol stations and some fast food outlets. Most of their customers are drawn from cars directly passing, or passing very close to, the development. The traffic impact of these types of developments is therefore usually very localised, often just at the accesses themselves.

The development generated traffic should therefore be split into these three trip types, that is, pass-by, diverted and new trips. These three trip types should then be distributed onto the surrounding road network based on survey data or using a recognised transport engineering technique.

The trip generation rates, the level of new versus diverted (pass-by) trips and the directional distribution of the development trips should be discussed, and where possible, agreed in advance with the approving authority.

For greenfield or vacant sites, that is, sites with no existing uses, the development flows will simply be those generated by the proposed uses. For brownfield sites, that is, sites with existing uses, the 'effective' development flows, that is, the net impact of

the development, would be the difference between the traffic generated by the existing uses and that by the proposed development.

Further technical guidance on trip generation rates, mode choice, trip types and trip distribution is provided in **Volume 5**.

## 7.1.1 Base and 'with development' traffic flows

- Determine the base and 'with development' traffic flows on the surrounding road network for each of the assessment years and time periods.

This task will depend upon whether or not there is a prior TIA undertaken in accordance with these guidelines.

If there is, the surrounding road network traffic flows should be extracted from the assessment and adjusted as required for any changes to the proposed development compared to that assumed in the structure plan or subdivision assessment.

Where the development assessment years and/or time periods differ from those in the prior assessment, the prior assessment should be used as a basis for determining the required development time period flows.

If there is no prior assessment, or if the assessment did not include projected flows on the surrounding roads, the following approach is suggested.

### 7.1.1.1 Base flows

The base flows, that is, without development, can be determined by:

- Extracting the existing traffic flows (from **Section 7.4**);
- Adjusting these to the development assessment years and time periods by:
  - obtaining future year volumes from the State's transport models, if available; or
  - applying a growth factor, agreed with the approving authority, to existing traffic volumes; or
  - using a recognised traffic engineering technique, as agreed with the approving authority;
- Adjusting for any committed or proposed developments;
- Adjusting for any committed or proposed transport network changes.

Note that the State's transport models may or may not contain the proposed development land uses. Flows extracted from the two models may therefore need to be adjusted to allow for any variations in the assumed land uses.

### 7.1.1.2 'With development' flows

The 'with development' flows can be determined from the base flows by:

- Subtracting the traffic generated by any existing land uses on the development site that are being removed, (from **Section 7.4**);
- Adding the traffic generated by the proposed development (from **Section 7.10**).

## 7.12 Analysis of development accesses

- Demonstrate that adequate sight distance is provided at each proposed access. Undertake an analysis of the operation of each access to demonstrate that it would be able to accommodate the projected development generated traffic.

The development access analysis should be undertaken in accordance with *Austroads Guide to Road Design (GRD) parts 4 – Intersections and Crossings – General, 4a – Traffic Signals and 4b – Roundabouts*.

It should demonstrate that adequate sight distances would be provided at each access to the development and that the proposed methods of control are appropriate and would satisfy operational and safety requirements.

The key measure of whether a proposed access would operate satisfactorily is the length of delay for the various movements. To ensure an adequate level of service is provided the analysis should demonstrate that delays would be less than shown in **Table 2**.

## 7.13 Impact on surrounding roads

- Assess whether the existing road cross-sections, for example, two lane or four lane, would be adequate to accommodate the above design traffic flows; and
- If not, indicate what improvements would be required.

The impact of changes in traffic flows on the roads surrounding the development are to be assessed using the appropriate volumes of the *Austroads Guides to Road Design and Traffic Management*, or a recognised alternative technique as agreed with the approving authority.

The assessment is to consider the capacity of the links to carry the projected volumes, and, where appropriate, the likely change in level of service or impact on travel times and safety.

**Table 2: Guideline thresholds for intersection operation**

Criteria	Average Delay (secs/veh)
<b>Signalised intersections</b> Average delay for all vehicles passing through the intersection Average delay for any individual vehicle, pedestrian or cyclist movement	<55 secs <65 secs
<b>Priority intersections (roundabouts, give way and stop)</b> Average delay for all vehicles on the non-priority arms (, that is, have to give way or stop) Average delay for any individual vehicle, pedestrian or cyclist movement	<35 secs <45 secs
<b>Right turn lanes</b> Exclusive turning movement queue length	Less than available storage length (95th percentile queue)

Note – This table is based on the US Highways Capacity Manual's level of service approach. The delays above equate to the upper limit delay of Level of Service D for intersections as a whole and the middle of Level of Service E for individual movements.

## 7.14 Impact on intersections

- Assess whether the existing intersections would be able to accommodate the above design traffic flows; and
- If not, indicate what improvements would be required.

The analysis of intersections will be a major component of the assessment of the surrounding road network as the greatest impacts of a development's traffic usually occur at intersections. Most approving authorities would expect such analysis to be carried out using a recognised intersection analysis software package, such as SIDRA. The relevant input and output files should be supplied as an addendum to the assessment report, as well as a list of all assumptions made in the analysis and justifications for any variations from the software's standard default values.

The operation of all relevant intersections in the study area, should be evaluated for each time period in the assessment years for both the 'with' and 'without' proposed development scenarios.

The two scenarios should be compared to identify the changes in operation, (for example, delays and queue lengths), due to the development. The analysis should indicate whether the development traffic could be accommodated under the current intersection layout and control or whether remedial measures (improvements) may be required.

The thresholds for consideration of remedial measures are shown in **Table 2**. These are guideline thresholds only and remedial measures may be required, at the discretion of the approving authority, even when the thresholds have not been reached.

When any of the thresholds are exceeded in the 'with development' scenario, the developer should identify and assess remedial measures to achieve the following.

- Where the thresholds are exceeded in the base flow scenario, the remedial measures should return conditions to their 'without development' levels.
- Where thresholds are not exceeded in the base scenario, the remedial measures should reduce conditions to no more than the above threshold levels.

The objective of the remedial measures is therefore for the operation of the intersections to remain within the thresholds or, if the thresholds will be exceeded even without the addition of the proposed development, conditions should be made no worse by the proposed development than they would be without it.

Further advice on assessing intersections is provided in **Volume 5**.

## 7.15 Impact on neighbouring areas

- Identify whether the proposed development traffic has the potential to adversely impact surrounding residential areas.

The potential for traffic generated by the proposed land uses to impact on surrounding residential areas is often a sensitive issue that needs to be considered by the approval authority.

Where the traffic assignment indicates additional traffic flows in such areas, the assessment should address this issue directly. The capacity thresholds identified in **Sections 7.13 and 7.14** should form part of this discussion, but the assessment should

also consider the potential social, and in some cases environmental, impacts. Possible treatments to minimise potential problems should be discussed.

## 7.16 Road safety

- Determine whether the development generated traffic could potentially raise any road safety issues;
- If so, propose remedial measures to address the safety concerns.

The assessment should examine any particular intersections or other locations that have been identified as black spots or may be of concern, (that is, identified from examination of the existing crash data in **Section 7.4**, identified as part of the assessment, or raised by the approval authority).

If the land use proposal would worsen conditions at black spots (for example, by increasing traffic volumes on hazardous movements) or potentially raise safety concerns at other locations, then the TIA should present proposals to address these concerns.

A road safety audit is not a standard component of a TIA and would not normally be required. However, in cases where the development would significantly increase traffic volumes and/or major changes to the transport infrastructure are proposed, the approving authority may require the applicant to submit a road safety audit to assess any safety implications. The road safety audit would need to be prepared by accredited road safety auditors and should be presented separately.

## 7.17 Public transport access

- Describe the level of access to the site by public transport, including:
  - the route number; general route (origin/destination/mid-points), frequency and hours of service for all routes passing within 400 metres of the site;
  - the locations of the nearest bus stops for all routes passing within 400 metres of the site;
  - the location of any train stations within 800 metres of the site;
  - the existing pedestrian/cycle routes between the site and the nearest bus stops/train stations (if within 400 metres for bus stops and 800 metres for train stations).
- Describe any proposals to improve public transport access.

The main issue to be addressed in the assessment is whether access from the development to the nearest bus stops and/or railway station is direct, safe and convenient. Factors that may be considered include:

- conflicts between pedestrian and vehicle movements;
- the ability to cross major roads;
- directness of pedestrian routes;
- adequacy of street lighting and shelter;
- bus stop location(s); and
- building orientation and access points.

In some cases it may also be appropriate to consider whether additional initiatives to encourage public transport use should be incorporated in the proposal, for example, the development of a green transport plan. One trigger for such consideration might be if the impact of traffic generated from the proposed development is considered

unacceptable by the approval authority and needs to be reduced. Travel demand management strategies should be considered in these instances which are seeking to improve public transport options.

Public transport capacity is usually not an issue for individual development applications but should be addressed for any development likely to generate larger public transport demand than would be considered typical of development within the study area.

Developments that will generate large 'special event' travel demands should address public transport capacity issues and also consider whether additional initiatives to encourage public transport use should be incorporated in the proposal.

The assessment should describe any proposals by the proponent to improve public transport accessibility, including new or improved services, new or relocated bus stops and new or improved pedestrian links between the development and the nearby bus stops and train stations. This should include details of any discussions the proponent has had with the PTA, Transperth, MRWA or the local authority regarding these proposals.

## 7.18 Pedestrian access/amenity

- Describe/show the existing level of access/amenity for pedestrians, including:
  - existing pedestrian facilities/routes within the site (from **Section 7.4**);
  - existing pedestrian access to the site (from **Section 7.4**);
  - existing pedestrian facilities on the surrounding roads (from **Section 7.4**);

- any potential deficiencies or areas where improvements may be warranted or of benefit, for example, missing sections of footpath or uncontrolled crossings of major roads (from **Section 7.7**).
- Describe/show any proposals to improve access/amenity for pedestrians, including:
  - pedestrian facilities within the development;
  - pedestrian access to the site;
  - pedestrian facilities on the surrounding roads.

This section essentially combines the pedestrian information provided earlier in a number of separate sections into a single section. It therefore provides an inventory of existing and proposed pedestrian access and amenity.

Analysis of the pedestrian network is outlined in **Section 7.20**.

### *Note on designing for improved pedestrian access*

*For many developments it is normal practice for developers to locate the building to the rear of the site with car parking to the front and sides. This reduces accessibility by non-car modes and should be discouraged.*

*Buildings should wherever possible front onto roads providing direct access for pedestrians and public transport users. If the site is on a bus route, consideration should be given to the location of existing bus stops and whether these provide an adequate level of access (as per **Section 7.17**).*

*If appropriate, new bus stops or the relocation of existing stops so that they are close to the entrance to the development should be considered. The locations of the bus stops should also consider how passengers would cross the*



*road to the bus stop on the opposite side or from the bus stop on the opposite side to the development.*

*Pedestrian entrances to buildings, where practical, should be adjacent to pedestrian crossing facilities on the frontage roads. This is particularly relevant to large corner sites on major roads where the intersection is signalised. Providing pedestrian access at the corner encourages pedestrians to access the site via the signalised intersection where crossing facilities will already be in place or can more readily be provided.*

*The design of the pedestrian access should include consideration that Australia has an ageing population and it is expected that the number of people with mobility disabilities will also increase.*

## 7.19 Cycle access/amenity

- Describe/show the existing level of access/amenity for cycles, including:
  - existing cycle facilities/routes within the site (from **Section 7.4**);
  - existing cycle access to the site (from **Section 7.4**);
  - existing cycle facilities on the surrounding roads (from **Section 7.4**);
  - any potential deficiencies or areas where improvements may be warranted, or of benefit, for example, missing sections of cycle paths or lanes or uncontrolled crossings of major roads (from **Section 7.7**).
- Describe/show any proposals to improve access/amenity for cycles, including:
  - cycle facilities within the development;
  - cycle access to the site;
  - cycle facilities on the surrounding roads.

This section essentially combines the cycle information provided earlier in a number of separate sections into a single section. It therefore provides an inventory of existing and proposed cycle access and amenity.

Note that it may be appropriate, and provide greater clarity, if this information is put on the same plan as the above pedestrian information, (and possibly public transport information).

Analysis of the cycling network is outlined in **Section 7.20**.

## 7.20 Analysis of pedestrian/cycle networks

- Undertake an analysis of the operation and safety of the external pedestrian/cycle networks including:
  - identifying which roads could potentially be difficult for pedestrians and cyclists to cross;
  - identifying where safe crossing facilities should be provided;
  - indicating where safe crossing facilities are proposed.

Further to **Sections 7.18 and 7.19**, an analysis of the operation and safety of the pedestrian and cycle networks is required. The extent of the assessment is to be as outlined in **Section 4**, that is:

- pedestrians routes to attractors within 400 metres (five-minute walk);
- pedestrian routes to bus stops within 400 metres (five-minute walk);
- pedestrian routes to train stations within 800 metres (10-minutes walk);
- cycle routes to attractors within 1200 metres (five-minute cycle).



The key component of the analysis is the ability of pedestrians/cyclists to cross major roads and at intersections. This includes the ability of public transport users to cross the road to access bus stops. It should consider both the pedestrians/cyclists generated by the development land uses and the impact of the development traffic on existing pedestrians and cyclists.

The analysis should identify which roads are likely to have traffic volumes that would adversely impact the efficiency and safety of pedestrians trying to cross, as per **Table 3**. The traffic volumes are to be as determined in **Section 7.12**.

Note that four lane undivided roads without pedestrian refuge islands are the most difficult to cross, the difficulties occurring at lower volumes than for a two lane road. This is due to the longer time required to cross the road, requiring a longer gap in the traffic. For this, and other safety reasons, (for example, greater potential for head on

collisions), four lane undivided roads should not be considered in any new road network planning.

While the analysis should concentrate on the network outlined above, there may be roads further afield where flows have increased to above those in **Table 3** due to the development traffic. The potential need for safe crossings on these roads should also be identified.

The analysis should also identify where adequate safe crossing facilities are already provided, where they may be required and indicate where any new facilities are proposed. The analysis should concentrate on:

- key locations on the pedestrian network (that is, along major pedestrian desire lines);
- existing bus stop locations;
- proposed or potential bus stop locations.

**Table 3: Traffic volumes affecting pedestrian crossing amenity**

Road cross-section	Traffic volume affecting ability of pedestrians to cross * (vehicles per hour – two-way)
2 lane undivided	1,100 vph
2 lane divided (or with pedestrian refuge islands)	2,800 vph
4 lane undivided (without pedestrian refuge islands)	700 vph
4 lane divided (or with pedestrian refuge islands)	1,600 vph

\* See the Pedestrian assessment section of **Volume 5** for details on how the above volume thresholds were determined.

In addition, to ensure an efficient and safe pedestrian/cyclist network, safe crossing facilities should be provided at intervals no greater than shown in **Table 4** for the roads identified above as posing difficulties for pedestrians.

Examples of safe crossing facilities are:

- pedestrian refuge islands (up to the volumes shown in **Table 3**);
- zebra crossings;
- signalised pedestrian crossings (mid-block);
- crossing facilities at signalised intersections; and
- overpasses/underpasses (where appropriate).

Note that for undivided roads carrying greater volumes than those in **Table 3**, the provision of pedestrian refuge islands may not provide an acceptable level of service to pedestrians and one of the other facilities above may need to be considered.

## 7.21 Safe walk/cycle to school (as appropriate)

- For residential developments, undertake a safe walk/cycle to school assessment by:
  - identifying all schools within 800 metres of the development;
  - identifying the most likely walk and cycle routes to each school from the development;
  - determining any potential deficiencies along these routes;
  - proposing measures to address these deficiencies.
- For school site developments, undertake a safe walk/cycle to school assessment by:
  - identifying the school's potential walk catchment, i.e. residential areas within 800 metres of the school;
  - identifying the most likely walk and cycle routes to the school from the residential catchments;
  - determining the existing walk/cycle facilities along these routes;
  - determining any potential deficiencies along these routes;
  - proposing measures to address these deficiencies.

**Table 4: Maximum desirable spacings for safe pedestrian crossings**

Road type	Maximum spacing of safe pedestrian crossing facilities*
Arterial – minimal frontage activity	400 metres
Arterial – significant frontage activity	200 metres
Local distributor/Neighbourhood connector	100 metres

\* See the Pedestrian assessment section of **Volume 5** for the rationale behind these spacings.

The key component of the safer routes to school assessment is the assessment of the ability to safely cross major roads. This should be based on the analysis method of **Section 7.20**, but with recognition that school children, particularly primary school children, may experience difficulties at lower traffic levels.

The analysis should therefore identify locations where potential crossing difficulties are likely and recommend remedial measures. These could include signalised pedestrians crossings or a children's crossing with a warden. The latter should include a discussion on whether the relevant crossing warrants would be likely to be met.

The assessment should also identify any missing or substandard sections of footpath/ cycleway along these routes.

## 7.22 Parking

- Assess the demand for parking (for non-residential developments only); and
- Determine whether the proposed parking supply is appropriate.

Parking may need to be considered for individual developments at the development application stage, especially for retail developments, public institutions such as hospitals and universities and major sporting and cultural developments, that is, those sites likely to generate significant levels of public parking. If there is any doubt, the proponent should confirm whether parking needs to be addressed with the approving authority.

An assessment of the parking demand of the development is to be made based on surveys of comparable developments or extraction from recognised land use traffic generation databases. Consideration should

be given to the location of the development, for example, CBD, inner or outer suburbs, and accessibility by non-car modes.

Comparison should be made between the projected demand and the proposed supply and with reference to the provision required, or recommended, by the appropriate town planning scheme.

Where there is discretion under the town planning scheme with respect to the parking provision, justification for the proposed provision should be provided.

Where a reduced parking provision is proposed, compared to that generally required or recommended by the town planning scheme, an assessment of the potential impact of any overflow parking on the surrounding streets should be provided.

Specific advice for parking associated with Activity Centres can be obtained from *SPP 4.2 Activity Centres for Perth and Peel*.

Further advice is provided in the Parking section of **Volume 5**.

## 7.23 Provision for service vehicles

- For the non-residential developments (or the non-residential components of mixed use developments), describe/show the access arrangements and on-site loading or unloading facilities for service vehicles;
- For residential developments, discuss/show the access to the site for rubbish collection and emergency vehicles.

The required swept path movements of the appropriate service vehicles should be shown on a site layout plan, using the AutoTrack software package or similar.

## 7.24 Traffic management plan (for appropriate developments only)

- For all school sites, and other developments as requested by the approving authority, prepare a traffic management plan for the frontage roads, showing:
  - parking provision;
  - parking restrictions/time limits;
  - set down/pick up areas;
  - taxi stands;
  - loading zones;
  - bus stops/lay over areas;
  - pedestrian facilities/crossings;
  - cycle facilities/crossings;
  - pedestrian accesses to the development.

Some developments generate high levels of activity on the roads fronting the development. This is particularly the case for schools but may also apply to other land uses, especially in older urban areas where on-site parking may be more constrained. In these locations more parking, set down/pick up areas are likely to take place on street.

Therefore, for all schools sites and other developments as requested by the approving authority, the proponent is to prepare a traffic management plan for the frontage roads and extending 100 metres along the roads beyond the development boundaries.

## 7.25 Conclusions

- Provide a summary of the findings and conclusions of the TIA.



## Appendix A I: Checklist for individual development transport impact statement



## Checklist for a transport impact assessment for individual development

- Tick the provided column for items for which information is provided.
- Enter N/A in the provided column if the item is not appropriate and enter reason in comment column.
- Provide brief comments on any relevant issues.
- Provide brief description of any proposed transport improvements, for example, new bus routes or signalisation of an existing intersection.

ITEM	PROVIDED	COMMENTS/PROPOSALS
<b>Proposed development</b>		
existing land uses		
proposed land use		
context with surrounds		
<b>Vehicular access and parking</b>		
access arrangements		
public, private, disabled parking set down/pick up		
<b>Service vehicles (non-residential)</b>		
access arrangements		
on/off-site loading facilities		
<b>Service vehicles (residential)</b>		
rubbish collection and emergency vehicle access		
<b>Hours of operation (non-residential only)</b>		
<b>Traffic volumes</b>		
daily or peak traffic volumes		
type of vehicles (for example, cars, trucks)		
<b>Traffic management on frontage streets</b>		
<b>Public transport access</b>		
nearest bus/train routes		
nearest bus stops/train stations		
pedestrian/cycle links to bus stops/ train station		

# TRANSPORT IMPACT ASSESSMENT GUIDELINES

ITEM	PROVIDED	COMMENTS/PROPOSALS
<b>Pedestrian access/facilities</b>		
existing pedestrian facilities within the development (if any)		
proposed pedestrian facilities within development		
existing pedestrian facilities on surrounding roads		
proposals to improve pedestrian access		
<b>Cycle access/facilities</b>		
existing cycle facilities within the development (if any)		
proposed cycle facilities within development		
existing cycle facilities on surrounding roads		
proposals to improve cycle access		
<b>Site specific issues</b>		
<b>Safety issues</b>		
identify issues		
remedial measures		

**Proponent's name** .....

**Company** ..... **Date** .....

**Transport assessor's name** .....

**Company** ..... **Date** .....

## Appendix A2: Checklists for individual development transport impact assessment

## Checklist for a transport impact assessment for individual development

- Tick the provided column for items for which information is provided.
- Enter N/A in the provided column if the item is not appropriate and enter reason in comment column.
- Provide brief comments on any relevant issues.
- Provide brief description of any proposed transport improvements, for example, new bus routes or signalisation of an existing intersection.

ITEM	PROVIDED	COMMENTS/PROPOSALS
<b>Summary</b>		
<b>Introduction/Background</b>		
name of applicant and consultant		
development location and context		
brief description of development proposal		
key issues		
background information		
<b>Existing situation</b>		
existing site uses (if any)		
existing parking and demand (if appropriate)		
existing access arrangements		
existing site traffic		
surrounding land uses		
surrounding road network		
traffic management on frontage roads		
traffic flows on surrounding roads (usually AM and PM peak hours)		
traffic flows at major intersections (usually AM and PM peak hours)		
operation of surrounding intersections		
existing pedestrian/cycle networks		
existing public transport services surrounding the development		
crash data		

# TRANSPORT IMPACT ASSESSMENT GUIDELINES

ITEM	PROVIDED	COMMENTS/PROPOSALS
<b>Development proposal</b>		
regional context		
proposed land uses		
table of land uses and quantities		
access arrangements		
parking provision		
end of trip facilities		
any specific issues		
road network		
intersection layouts and controls		
pedestrian/cycle networks and crossing facilities		
public transport services		
<b>Integration with surrounding area</b>		
surrounding major attractors/ generators		
committed developments and transport proposals		
proposed changes to land uses within 1200 metres		
travel desire lines from development to these attractors/ generators		
adequacy of existing transport networks		
deficiencies in existing transport networks		
remedial measures to address deficiencies		
<b>Analysis of transport networks</b>		
assessment years		
time periods		
development generated traffic		
distribution of generated traffic		
parking supply and demand		
base and 'with development' traffic flows		
analysis of development accesses		
impact on surrounding roads		
impact on intersections		



# TRANSPORT IMPACT ASSESSMENT GUIDELINES

ITEM	PROVIDED	COMMENTS/PROPOSALS
<b>Analysis of transport networks (cont.)</b>		
impact on neighbouring areas		
road safety		
public transport access		
pedestrian access/amenity		
cycle access/amenity		
analysis of pedestrian/cycle networks		
safe walk/cycle to school (for residential and school site developments only)		
traffic management plan (where appropriate)		
<b>Conclusions</b>		

**Proponent's name** .....

**Company** ..... **Date** .....

**Transport assessor's name** .....

**Company** ..... **Date** .....

# TRANSPORT IMPACT ASSESSMENT GUIDELINES

## Transport impact assessment revision checklist

Please include this checklist when providing revisions to transport impact assessments (TIAs) to the Department of Planning, to identify changes made.

**Name of planning application:** .....

**Date/revision no. of previous TIA:** .....

**Date/revision no. of revised TIA:** .....

[illegible]

If information/changes not provided, please attach explanatory notes, using item no. to identify information/change request.