ACT Government
Transport Canberra and City Services

Guidelines for Transport Impact Assessment – Volume 3 Technical Guidance

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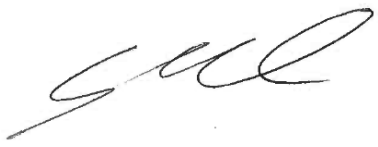

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Document management plan

Purpose

This management plan outlines the updating procedures for this document.

Amendment and review strategy

Activity	Comments	Frequency
Minor amendments	Minor amendments may be required throughout the lifecycle of this document. At a minimum, minor amendments will be made periodically. However, where possible and where the required change warrants an urgent update, the document may be updated immediately (subject to agreement from the review team).	6-monthly or less (as required)
Review	This document will be formally reviewed, and major updates made, if required. These changes may include structure and content changes.	At least every 5 years

The above timeframes are subject to change and may vary depending on the extent of the change required and any review periods.

Record of amendment

Any updates to this document will be recorded here.

Amendment number	Description of change	Effective date
0	12-month trial	1 July 2025

Distribution of amendments

The updated TIA Guidelines will be published when available on the ACT Government website. Please email: tccs.dcdevelopmentcoordination@act.gov.au to subscribe to the distribution list for any future revisions of this document.

1.0 Introduction

1.1 Purpose

This Volume provides technical guidance that may be referenced in preparing a Transport Impact Assessment (TIA), irrespective of the type of proposal. In particular, this Volume covers the following:

- Initial considerations e.g. advice on how to determine the study area and when to consider cumulative impacts
- Multimodal assessment considerations for the study areas' existing/current conditions
- Multimodal assessment considerations for the study areas' future conditions without proposal (planned conditions)
- Multimodal assessment considerations for the proposal including:
    - Design review
    - Network assessment
- Multimodal considerations mitigating the identified impacts.

1.2 Structure of Volume 3

This Volume has largely been structured by mode but also includes some initial considerations, as summarised in Table 1-1.

Table 1-1. Structure of this Volume

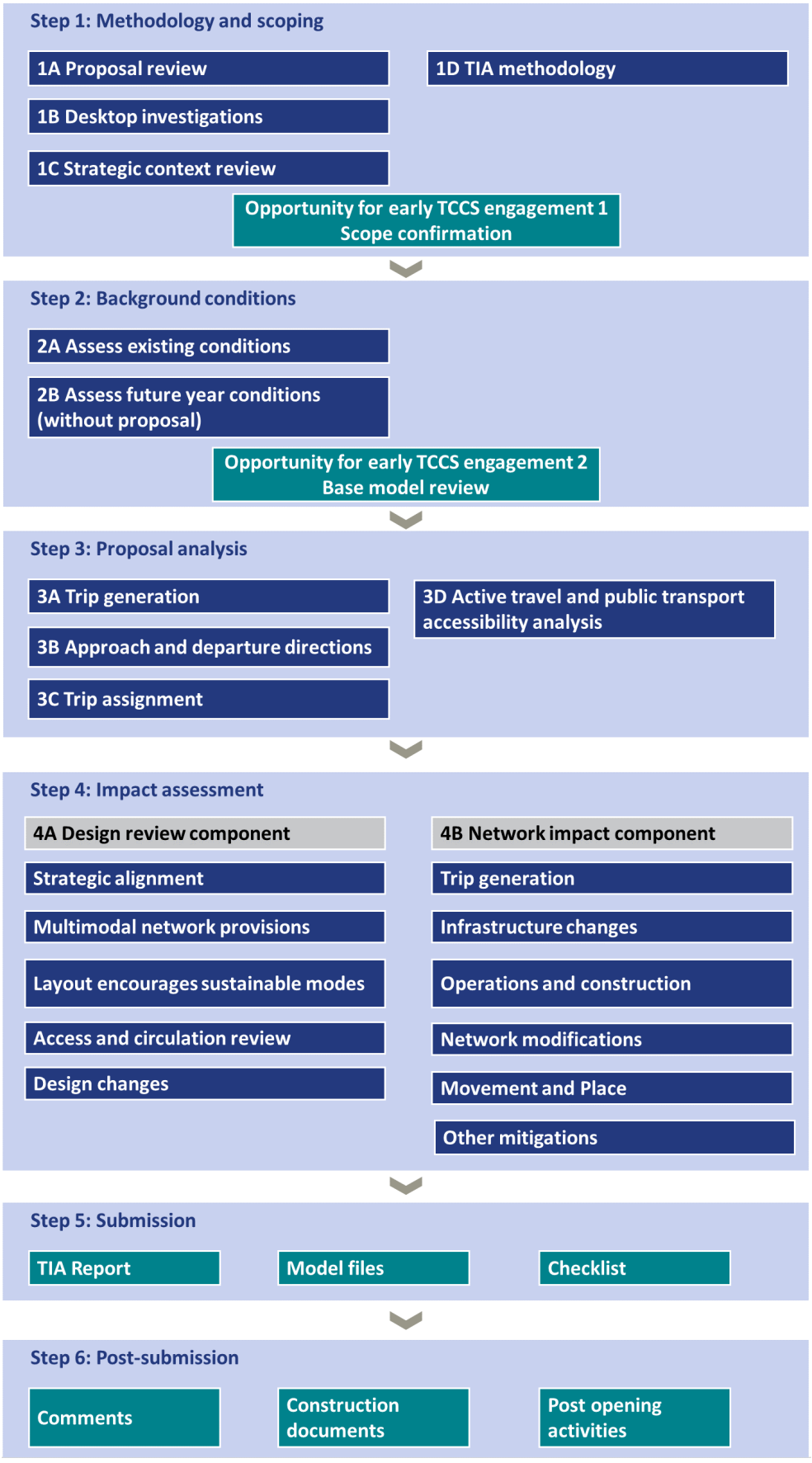
Impact type or considerations	Section in this Volume
Initial considerations • Determining a study area • Multimodal network assessment • Cumulative impacts • Mitigation measures • Travel plans	Section 2.0
Travel demand	Section 3.0
Transport modelling approach	Section 4.0
Road network capacity assessment	Section 5.0
Road safety	Section 6.0
Active travel impact assessment	Section 7.0
Public transport impact assessment	Section 8.0
Parking, loading docks and kerbside uses	Section 9.0
Construction	Section 10.0

1.3 General TIA process

The general TIA process is outlined in **Volume 2** and shown in Figure 1-1, including:

- **Step 1**: Methodology and scoping
    - Opportunity for early TCCS engagement 1: Scope confirmation
- **Step 2**: Background conditions
    - Opportunity for early TCCS engagement 2: Base model review
- **Step 3**: Proposed development analysis
- **Step 4:** Impact assessment
- **Step 5**: Documentation and submission
- **Step 6**: Post-submission activities.

Figure 1-1 TIA study process



1.4 Technical reference material

Relevant guidelines and sources of data and technical reference material which may be required for a TIA are included in Table 1-2. Other reference documents may also be relevant to the TIA, and it is the responsibility of the practitioner to confirm all reference materials etc.

Table 1-2 Data sources and technical reference material

Data/information	Source
ACT Movement and Place classifications	ACT Movement and Place Assessment Tool
ACT multimodal priorities for key transport corridors and significant areas such as the City Centre and other town centres	ACT Multimodal Network Plan *Note: Development of this document is currently underway*
ACT Access and Movement Assessment Outcomes and Requirements	Territory Plan Zone Policy and District Policy Technical Specifications
ACT parking requirements including: • Car • Motorcycle • Bike and end-of-trip facilities	Planning (Zones) Technical Specifications
ACT specific Access and Movement design guidance for relevant proposals	ACT Urban Design Guide (ACT Government, n.d.) City Centre Urban Design (ACT Government, n.d.) Other place specific design guides, where relevant
ACT specific technical design guidance for civil and open space assets	Municipal Infrastructure Design Standards (ACT Government, n.d.) Municipal Infrastructure Technical Specifications (ACT Government, n.d.) Trunk Road Infrastructure Standards (ACT Government, n.d.)
Plan that sets out ACT Government's actions for active travel and maps that guide investment and decision making to support walking and cycling	ACT Active Travel Plan 2024-2030 (ACT Transport Canberra and City Services, 2023)
ACT specific detailed pictorial guidance for ACT civil assets	Municipal Design Standard Drawings (ACT Government, n.d.)
ACT specific traffic generation rates for high density residential developments in the vicinity of Town Centres and Northbourne Avenue Corridor	Engineering Advisory Note 14 (ACT Transport Canberra and City Services, 2019)
ACT specific waste management principles and requirements	Development Control Code for Best Practice Waste Management in the ACT (ACT Transport Canberra and City Services, 2019)

Data/information	Source
ACT specific guidance on microsimulation model development, calibration and validation, and documentation of results.	ACT Traffic Microsimulation Modelling Guidelines (ACT Transport Canberra and City Services, 2019)
ACT specific temporary traffic management plan requirements	Guiding principles for temporary traffic management plans (ACT Transport Canberra and City Services)
Comprehensive traffic management guidance on traffic engineering, road design and road safety	Austroads Guide to Traffic Management (Austroads, 2020)
Guidelines for designers that provide a national reference for the development of safe, economical, and efficient road design solutions	Austroads Guide to Road Design
Technical guidance for measuring the Level of Service of pedestrian flows	Austroads Research Report Guide Information for Pedestrian Facilities (Austroads, 2013)
Trip generation sources	Guide to Transport Impact Assessment – Technical Guidance for Transport Practitioners (Transport for NSW, 2024)
	Roads & Maritime Services Guide to Traffic Generating Developments Updated traffic surveys (Roads & Maritime Services, 2013)
	Roads and Traffic Authority Guide to Traffic Generating Developments (Road Traffic Authority, 2002)
	Other published sources from Transport for NSW

2.0 Initial considerations

2.1 Overview

This section provides guidance around initial assessment considerations, including:

- How to determine the study area
- What is a multimodal network assessment
- Assessment of cumulative impacts
- General guidance about determining and assessing mitigation measures
- When a travel plan may be required or considered.

2.2 Determining a study area

The size of the study area that needs to be assessed in a TIA will generally vary for each proposal. The extent of the study area will depend on the size and type of the proposal, as well as the location and the condition of the existing and planned transport network.

Generally, a TIA for a low impact proposal will be less detailed and cover a smaller study area compared to TIA for a large, complex and high-impact proposal.

Step 1 of the TIA process as outlined in **Volume 2** should be completed to determine the TIA scope and study area. This includes the following steps:

- **Step 1A Proposal review**: Describe the characteristics of the proposal
- **Step 1B Initial desktop investigations**: Review the existing traffic and transport conditions of the surrounding area
- **Step 1C Strategic context review**: Identify and review the planned land use and infrastructure changes and any strategic directions for the area and the proposals impact on the existing and planned network
- **Step 1D TIA methodology**: Propose a TIA methodology that comprehensively assesses the proposal's impacts on the surrounding area and the extent of that area which will be adopted as the TIA study area.

For example, the study area for a TIA may be driven by likely travel demand and the distribution of this demand across the network to assess critical impact points along the key access routes.

The extent of the study area can be agreed with TCCS during the **Opportunity for early engagement 1** in **Step 1** of the TIA process outlined in **Volume 2**. Additional guidance on how to select the study area for the various proposal types are included in **Volume 4**, **Volume 5**, **Volume 6**, **Volume 7**.

The TIA should include a plan of the study area and its key features and an explanation of the how the extent of the study area was determined.

2.3 Multimodal network assessment

This section is intended to provide context to a multimodal network assessment. It does not prescribe how the multimodal network assessment should be undertaken for a specific TIA. **Step 1** of the TIA process as outlined in **Volume 2** should be completed to determine the TIA scope including how the multimodal network assessment will be undertaken for the respective TIA.

The ACT Planning Strategy (ACT Environment, Planning, and Sustainable Development Directorate, 2018) introduced the concept of Movement and Place for the first time to Canberra. This framework

integrates land use and transport, recognising that roads and streets have dual purposes; they are both places for people to move through and places for people to stop and spend time. This land use and transport integration is essential for creating sustainable and cohesive communities.

Subsequently, the ACT Transport Strategy (ACT Transport Canberra and City Services, 2020) outlined how Canberra's transport network will evolve to respond to concept of Movement and Place. The ACT Transport Policy Plan Map - Conceptual transport network 2045 (ACT Transport Canberra and City Services, 2020) shows the prioritisation of key central links for public transport and active travel and the key orbital links for freight and general traffic. Additionally, it shows the urban intensification areas and local links and future walkable places outlined in the ACT Planning Strategy (ACT Environment, Planning, and Sustainable Development Directorate, 2018).

The Multimodal Network Plan will guide the ACT Government in its transport planning activities over the next twenty years to assist in achieving the vision set by the ACT Transport Strategy (ACT Transport Canberra and City Services, 2020). It will include a staging and prioritisation plan of integrated initiatives across all transport modes, including private vehicles, light rail, bus, walking, cycling, micromobility and freight.

When scoping and preparing a TIA, the Movement and Place principles and the expected modal priorities at specific sections of the network should be considered in the following ways:

- Reference the ACT Transport Strategy (ACT Transport Canberra and City Services, 2020) and Multimodal Network Plan (when available) and/or the relevant Area/Corridor Transport Plan (if available) to confirm the study area network's strategic transport objectives, Movement and Place typologies and modal priorities
- Utilise the ACT Movement and Place Assessment Tool to develop the most suitable approach in assessing the multimodal impacts of the proposal that aligns with Movement and Place principles
- Assess the network performance assessment of any given section of the existing or planned network based on its function, Movement and Place typology and modal priorities
- Consider the hierarchy of proposed mitigation measures for any given section of the network in light of its function, Movement and Place typology and modal priorities.

2.4 Cumulative impacts

As part of an Environmental Impact Statement for a Significant Development, the proponent should identify reasonably foreseeable and relevant planned projects whose impacts may overlap with those of the proposal. Subsequently, a cumulative impact assessment of both the proposal and the relevant planned projects is required as part of the EIS, including the TIA.

This approach is crucial for understanding the individual (incremental) and combined impacts of multiple planned projects or activities on the surrounding transport network. By distinguishing between incremental and cumulative impacts, the ACT Government can make informed decisions about responsibility for mitigation measures. Therefore, the assessment of cumulative impacts should not be limited to Significant Development and should be considered when scoping any TIA.

In **Step 1** of the TIA process, reasonably foreseeable and relevant planned projects should be identified and reviewed for:

- **Temporal impacts**: to understand if the planned project's impacts would occur concurrently with the proposal's impacts i.e. overlapping timeframes

- **Spatial impacts**: to understand if the planned project is likely to impact the transport network in the immediate vicinity of the proposal
- **Availability of data and information:** to understand if sufficient information is available to assess the cumulative transport impacts.

A cumulative transport impact assessment should be included in the TIA when the planned project's temporal and spatial impacts overlap with the proposal's and there is adequate information available to inform the cumulative assessment.

All proposals that are under construction, approved, or in the approval process, or committed/funded within the study area, and that are likely to be operational within the identified assessment years, should be identified and potentially included in the TIA.

The level of cumulative impact assessment may comprise a qualitative and/or quantitative assessment, depending on the amount of information available and the size and scale of the planned projects and the proposal.

The proponent can agree the approach to cumulative impacts with TCCS during the **Opportunity for early engagement with TCCS 1** in **Step 1** of the TIA process outlined in **Volume 2**.

2.5 Mitigation measures

The potential impacts resulting from the proposal should undergo a careful review through the lens of the hierarchy of mitigation framework. Not all impacts necessitate mitigation; however, it is a fundamental objective of the TIA to recommend mitigation measures that align with the hierarchy:

1. **Avoid:** Design to eliminate the impact
2. **Minimise:** Recommend operational measures to manage the impact
3. **Mitigate:** Propose works to mitigate the residual impact

In doing so, it is crucial to consider the overall performance within the study area. For instance, enhancing the performance of a minor movement at the expense of major flows within the network may not constitute the best overall solution.

The hierarchy of proposed mitigation measures for any given section of the transport network should take into consideration the area or section's function, Movement and Place typology and modal priorities. While the general principle is that pedestrians, followed by cyclists and public transport should be given priority over general vehicle impacts, this may not be the case in some parts of the network.

In addition, all mitigation measures proposed within a TIA also should be quantified to understand the extent of the mitigation (e.g. transport modelling should be conducted to justify the benefits and assess any impacts an additional lane).

For proposals attracting public transport to the site, the TIA should identify necessary measures to minimise delays for buses entering and leaving the site or interchanges associated with the site, following the hierarchy of mitigation.

If off-site parking impacts are identified, the hierarchy of mitigation should guide the proposal of alternative parking facilities and/or strategies to discourage off-site parking.

While not strictly related to impact mitigation, it is important to note the need for temporary traffic management and potential approaches, especially for proposals introducing new vehicle accesses to arterial roads.

Mitigation strategies should not rely on the assumption that the ACT government will implement any works, except for those currently included in the ACT capital works program, adhering to the hierarchy of mitigation principles. Therefore, the cost and responsibility of designing and constructing works required to mitigate residual impacts of the proposal should be confirmed. These may be conditioned, such that they are delivered and/or funded by the proponent.

Please also note that any mitigation measures proposed with respect to changes in traffic signal timings and phasing will need to be confirmed with TCCS prior to analysis.

2.6 Travel plans

2.6.1 What is a Travel Plan?

A Travel Plan is a package of measures and initiatives designed to encourage sustainable travel and reduce reliance on private car travel. In the ACT, TCCS may request that a Travel Plan be prepared in conjunction with a TIA, particularly where reduced trip generation or parking rates are being considered in the TIA. Alternatively, a Travel Plan may be required as a condition of approval.

Nevertheless, Travel Plans are increasingly required to identify site-specific initiatives and ongoing implementation, monitoring and evaluation tasks required to encourage future residents, employees, and visitors of a site to use active travel and public transport and rely less on private vehicles.

A Travel Plan should typically include the following key features:

- **Objectives**: The intended outcome of the Travel Plan
- **Travel data analysis**: Collection and analysis of travel data to provide insights into travel behaviour and the surrounding transport network
- Specific, Measurable, Attainable, Realistic and Timebound (SMART) goals/targets: To determine the success of the Plan
- **Package of site-specific measures/actions**: How to achieve the goals, comprising a mix of soft measures (policy change or management approach) and hard measures (e.g. infrastructure changes)
- **Implementation approach**: Who, how and when will the actions be implemented
- **Management, monitoring, and evaluation approach**: Who, how and when will the effectiveness of the actions and suitability of the goals be reviewed and adjusted accordingly.

2.6.2 Trigger for a Travel Plan

In the ACT, a Travel Plan is not a mandatory requirement for a TIA. However, a Travel Plan may be required in conjunction with a TIA for the following reasons:

- Where a proposal has the potential to generate more demand for personal vehicle trips than can be accommodated by the transport network, unless detailed initiatives to encourage active travel and public transport modes are implemented (e.g. large workplaces, hospitals)
- Where an applicant is seeking the use of significantly reduced trip generation rates within the TIA
- Where an applicant is seeking to provide minimal car parking
- Other reasons at the discretion of TCCS or another directorate.

The need to develop a Travel Plan to be prepared in conjunction with a TIA should be discussed with TCCS during the **Opportunity for early engagement 1**, as outlined in **Volume 2**.

3.0 Travel demand

The approach to estimating the proposal's travel demand could be discussed and agreed with TCCS in the Opportunity for early engagement in Step 1 of the TIA process

3.1 Trip generation

3.1.1 Trip generation sources

Estimates of peak hour and daily trip generation, as well as the associated directional distribution (in and out) should be based on the following sources, in order of preference:

1. ACT published trip generation rates, including:
    - ACT Traffic Generation Rates for High Density Residential Developments (HDRD) in Vicinity of Town Centres and Northbourne Avenue Corridor Engineering Advisory Note 14 (ACT Transport Canberra and City Services, 2019)
    - Previous Estate Development Code traffic generation rates - For residential zones, industrial zones and CZ5 zones, a traffic generation rate of 8 vehicle movements per day per dwelling for single dwellings, a rate of 6 vehicles per day per dwelling for multi-unit developments, and a rate of 7 vehicles per day for blocks 360m2 or smaller
    - Other relevant documents released by the ACT Government after the TIA Guidelines are published
2. Surveys of the existing site and/or another similar site (requiring agreement with TCCS)
3. Published trip generation rates in the Guide to Traffic Generating Developments (RMS, 2006) (Road Traffic Authority, 2002), Guide to Traffic Generating Developments Updated traffic surveys (Roads & Maritime Services, 2013) and Guide to Transport Impact Assessment – Technical Guidance for Transport Practitioners (Transport for NSW, 2024). Note that available data from the most recent surveys are to be considered in the assessment.
4. First principles assessment, limited to unique or uncommon land uses and should be evidence-based (e.g. the number of visitors to the site may be based on patterns from another similar land use)
5. Published trip generation rates from other sources if the above cannot be adopted.

Where surveys of a comparable existing site are undertaken, the site selection and survey details should be agreed with TCCS during early engagement in **Step 1** of the TIA process outlined in **Volume 2**. Guidance on site selection criteria and other relevant survey details is included in Appendix A. The ACT Government reserves the right to use and publish trip generation data derived from these surveys.

In addition to the previously mentioned trip generation sources, a demand modelling approach may be required for more complex assessments that involve transport modelling. In such cases, trip generation should be conducted using the Canberra Strategic Transport Model (CSTM) and proposal characteristics, such as anticipated population and employment, household demographics, and other socio-economic factors. The outputs should then be incorporated into the proposal's traffic model for trip assignment.

3.1.2 Person trip generation

Trip generation is commonly categorised into vehicle trips or person trips depending on the adopted trip generation source:

- Person trips refers to the count of individual movements regardless of the chosen mode of travel including walking, cycling, public transport, private vehicles and micromobility
- Vehicle trips refers to the number of vehicles entering or exiting the proposal. A single vehicle trip may encompass multiple person trips if multiple individuals are travelling in a single vehicle.

In a TIA, both person trips and vehicle trips could be estimated to provide a more comprehensive understanding of the project's impact on the holistic transport system. The trip generation estimates can be converted by considering the mode share and vehicle occupancy, using the following formulas:

- $Vehicle\ trips = \frac{Person\ trips \times Vehicle\ mode\ share\ (\%)}{Estimated\ vehicle\ occupancy\ (persons\ per\ vehicle)}$
-
- $Person\ trips = \frac{Vehicle\ trips \times Estimated\ vehicle\ occupancy\ (persons\ per\ vehicle)}{Vehicle\ mode\ share\ (\%)}$

3.1.3 Trip generation requirements

The following trip generation requirements should also be considered:

- A range of potential trip generation estimates are required. From this range, the following should be assessed in the subsequent steps of the TIA:
    - Most probable trip generation– best estimate of the site's trip generation
    - High trip generation estimate – sensitivity test
- For phased or staged proposals, the estimated generation for each phase is required
- Total site trip generation with and without the proposal is required for all future scenarios/phases.

3.2 Trip distribution

3.2.1 Origin and destination

After estimating trip generation, the likely origins and destinations for these trips should be determined. An origin-destination table and map should be included in all TIA reports. This process should be based on one or more of the following methodologies:

- Utilising existing or anticipated travel patterns, incorporating information from origin-destination surveys or comprehensive travel surveys
- Conducting market studies to understand travel behaviour
- Analysing census travel data for relevant insights
- Analysing Household Travel Survey results[1]
- Utilising population and employment distribution data
- Employing the CSTM or another industry-standard transport model.

[1] Note that the ACT and Queanbeyan-Palerang Household Travel Survey 2022 is available at https://www.transport.act.gov.au/planning-for-the-future/household-travel-survey

3.2.2 Network trip types

Not all trips generated by the proposal will be new trips across the broader transport network. Depending on the proposal type, study area and assessment particulars, trip generation estimates should differentiate between the following trip types:

- **New trips:** These are trips that would not exist without the proposal
- **Existing network trips:** These are trips that exist on the network, regardless of the proposal
- **Linked trips:** These are trips that involve one or more stops between the trip origin and the ultimate destination (e.g. visiting a supermarket on the way home from work).
- **Unlinked trips:** These are trips that involve direct journeys between the origin and the destination (e.g. travelling from home to work).
- **Transferred trips**: These are existing trips on the network accessing similar land uses that could transfer to the proposal. These trips may be either linked or unlinked such as retail trips transferring to a new supermarket within the proposal as a direct trip (unlinked) or on the way home from work (linked), respectively
- **Diverted drop-in trips**: These are linked trips which were passing close to the proposal and could divert to access the proposal before returning to their original route. For instance, visiting a new supermarket located a few blocks away from the existing travel route
- **Undiverted drop-in trips (pass-by trips)**: These are linked trips that were directly passing the proposal and do not require a route diversion to access the proposal (e.g. visiting a new petrol station located on the existing travel route)
- **Multi-purpose trips:** These are trips that involve visiting more than one facility in the proposal like visiting multiple retail shops. The Guide to Traffic Generating Developments (RMS, 2006) (Road Traffic Authority, 2002) suggests that an average discount of 15%-20% can be adopted for a shopping centre, depending on the proposal's Gross Leasable Floor Area (GLFA).

A summary of these trip types is provided in Figure 3-1. Table 3-1 provides further guidance of how these trip types are typically considered within a TIA depending on the location with the study area (e.g. a diverted trip may be considered a new trip at the site access which requires assessment but may be considered an existing trip at an intersection located two blocks away, therefore not requiring assessment at this location).

Figure 3-1 Summary of trip types

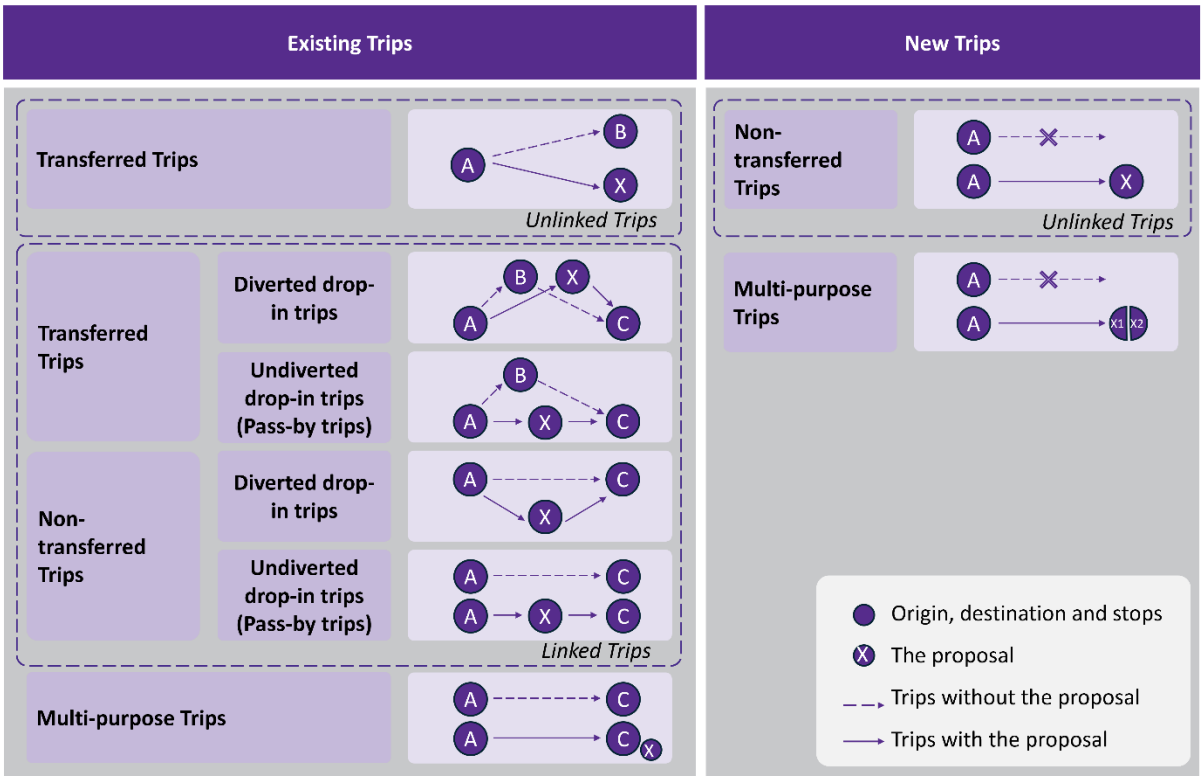


Table 3-1. Indicative guidance for applying trip types to the network analysis

Trip type	Location within study area			
	Internal intersection	Site/site area access	Adjacent external intersection	Nearby external intersection (two blocks away)
New trip/transferred trip	New trip	New trip	New trip	New trip
Pass-by trip	New trip	New trip	Existing trip	Existing trip
Diverted trip	New trip	New trip	New trip	Existing trip (may use an alternative movement)
Multipurpose trip	New trip with potential discount	New trip with potential discount	New trip with potential discount	New trip with potential discount

3.3 Mode split

3.3.1 Overview

Mode split is the proportion of trips taken by each different transport mode. Mode split can be estimated using the following methods in order of preference:

1. CSTM outputs, which can be requested from TCCS via email or as part of the **Opportunity for early engagement 1** of the TIA process outlined in **Volume 2**
2. Other available data, including Census Journey to Work data and Household Travel Survey results, accompanied by a reasonable and detailed description of key assumptions and a methodology
3. Surveys of the existing site and/or another similar site are encouraged to be agreed with TCCS during the **Opportunity for early engagement 1** (refer to Appendix A).

3.3.2 Trip generation reductions based on mode shift

Adjustments in trip generation for mode shift should be directly related to the on-site activities, programs and facilities encouraging travel by means other than single-occupant vehicles. Future CSTM projections and relevant transport policy or transport plans can be referenced to assess private vehicle trip generation reductions. However, these assumptions should be discussed and agreed with TCCS, before considering in the study.

Outside of the City Centre, the TIA should show that the proposal will feature significant changes from normal practices to encourage mode shift to apply reductions to the vehicle trip generation estimate. TCCS may also request that the proposed vehicle trip reduction be demonstrated by surveys of another similar site and/or a Travel Plan be prepared.

The assessment should also demonstrate that there is sufficient facility and capacity within the public transport, micromobility, pedestrian or cycling network to support the proposed modal shift. In all cases the TIA should document how the proposal would support travel demand management and encourage travel by means other than single occupant vehicles.

3.4 Trip assignment

Trip assignment is the process of determining the routes for travel between identified origins and destinations. For the proposal's trip generation, the following methods can be used to assign trips within the study area:

- **Iterative simulation model** based on equilibrating travel time such as mesoscopic or microsimulation modelling and adopting shortest generalised cost or shortest time paths
- **Manual methods** adopting short time paths, relying on evidence-based assumptions of likely routes. This may include:
    - Existing surveyed travel patterns
    - Journey to Work data
    - Household Travel Survey results.

Additionally, the trip assignment process should consider surrounding land use, road hierarchy, congestion, and the specific operational characteristics of the proposal.

It is noted that while the CSTM may be of assistance, it is a strategic transport model and is not suitable for assignment of localised traffic. This means that vehicle trips may need to be reassigned if high delays are predicted along the preferred route. Therefore, the use of microsimulation models is highly recommended for large proposals on complex or congested signalised road networks.

All assumptions, input information and the methodology used to establish the trip traffic assignment is to be documented in the TIA report.

4.0 Transport modelling approach

The approach to the proposal's transport modelling could be discussed and agreed with TCCS in the Opportunity for early engagement in Step 1 of the TIA process

4.1 Overview

Transport modelling is a technique used to represent and/or predict current and future transport networks and user behaviours. In preparing a TIA, transport models may be required to assess the impacts of a proposal on traffic, the transport network and/or user behaviour.

A suite of transport modelling tools is available. The modelling types most used in the TIA process in the ACT, their use cases and typically used software are summarised in Table 4-1. It is recommended that the modelling methodology and software be confirmed with TCCS in the **Opportunity for early engagement** in **Step 1** of the TIA process. Multiple modelling approaches may be required depending on the proposal's type, size, and its anticipated extent of impact.

Additional modelling types and tools are also available to assess project specific impacts (e.g. pedestrian modelling may be needed for proposals generated high pedestrian demands or in a high pedestrian activity area).

Reference should be made to relevant technical modelling guidelines for more comprehensive guidance around modelling types, including but not limited to the following:

- ACT Traffic Microsimulation Modelling Guidelines (ACT Transport Canberra and City Services, 2019)
- Transport Modelling Guidelines, Volume 5: Intersection Modelling (Victorian Department of Transport, 2020)
- Management of Traffic Modelling Processes and Applications (Austroads, 2021)

Table 4-1. Summary of modelling types commonly used in the TIA process

Modelling type	Level of detail	Typical use case	Typically used software
Strategic (macroscopic)	High-level analysis of entire urban areas e.g. CSTM covers the whole ACT	Strategic planning including: • Forecasting future travel demand • Evaluating large-scale infrastructure proposals • Developing transportation policy	TransCAD
Mesoscopic	Mid-level analysis considering aggregated traffic flow to capture regional traffic patterns and congestion dynamics e.g. covering multiple suburbs that surround a proposal or all of the suburbs surrounding a transit proposal	Major infrastructure proposals, including assessing the impacts of traffic congestion and network performance of a large area	Aimsun
Microsimulation	Detailed modelling of individual vehicles, including light rail and buses and pedestrians and cyclists at intersections within a transport network	Small-major infrastructure proposals and large land development proposals, including: • Detailed analysis of traffic and public transport operations and signalised intersections • Evaluating the impact of specific geometric features on road networks	Aimsun
Intersection (micro-analytical)	Highly detailed modelling of individual vehicles, including light rail and buses and pedestrians and cyclists at intersections	Small-large infrastructure and/or land development proposals, including: • Optimising signal timings • Assessing queuing and delay • Testing options to improve safety and efficiency at intersections.	SIDRA INTERSECTION

4.2 Level of road network and traffic assessment

The level of road network and traffic assessment and associated transport modelling requirements are driven by the existing and planned network conditions, such as intersection performance, and the likely extent of the proposal's impact. The level of road network and traffic assessment required for a TIA should be established in **Step 1** and should be agreed with TCCS during the **Opportunity for early engagement 1** of the TIA process outlined in **Volume 2.**

As a guide, the level of road network and traffic assessment for a TIA can be indicatively categorised as:

- **Level 1: Proposals that are anticipated to have minimal road network impact**. The TIA process may potentially be terminated at **Step 1** of the TIA process outlined in **Volume 2**. **Level 1** assessment can typically be attributed to proposals generating less than 20 vehicle trips per hour, and/or proposing minimal changes to the surrounding transport network, subject to the existing and planned network features identified in **Step 1.** When submitting proposal documents, the reasoning for why a TIA is not required for the site needs to be provided.
- **Level 2: Proposals that are anticipated to have localised road network impact**. This assessment may require localised network assessment including spreadsheet assignment and intersection modelling for nearby intersections. **Level 2** assessment can typically be attributed to proposals generating between 20 and 100 vehicle trips per hour, and/or proposing minimal changes to the surrounding transport network, subject to the existing and planned network features identified in **Step 1**
- **Level 3: Major proposal that could have wider road network impacts.** This assessment may require modelling of a larger area that may include traffic assignment and route choice. **Level 3** assessment can typically be attributed to proposals generating more than 100 vehicle trips per hour, and/or proposing minimal changes to the surrounding transport network, subject to the existing and planned network features identified in **Step 1**.

Note: Distinguishing between a Transport Modelling Report and a TIA

It is important to note that a Transport Modelling Report (and associated documentation) should be required where any mesoscopic and/or microsimulation transport modelling is completed. The Transport Modelling Report will be submitted as an appendix to the TIA but does not replace the TIA report. This is because a Transport Modelling Report typically documents the transport modelling approach, methodology and findings of results which may form part of the TIA. Whereas the TIA report documents a comprehensive multimodal assessment of impacts covering the whole transport network.

Transport modelling tools are suitable only for assessing the traffic and occasionally transport impact and operation but cannot verify alignment with other important factors such as safety and feasibility of the design and adherence to policies and standards. It is strongly suggested to assess and verify any proposed access arrangements to the public road network infrastructure against the civil design, road safety/traffic management standards and practices, prior to undertaking assessment using transport modelling tools.

4.3 Future year traffic conditions (without proposal)

4.3.1 Background traffic growth

A compound annual growth rate can be calculated from the base year and future year CSTM outputs. This rate should be applied to recent traffic survey data to estimate future year traffic volumes including turning movements at intersections. However, the future year traffic volumes and/or compound annual growth rate should be checked against an alternative approach to demonstrate reasonableness. Additionally, the inclusion of proposal trips within the CSTM zones should be verified to avoid double counting the proposal's trip generating characteristics.

The alternative approach may include calculating a compound annual growth factor from historical traffic data. The second method does not need to provide a precise replicate of results but should demonstrate reasonableness. Alternatively, when limited data is available and the calculated compound annual growth rate cannot be checked, sensitivity tests of varying growth rates should be undertaken.

4.3.2 Planned transport network changes (cumulative impact assessment)

Changes to the existing transportation network occur over time and should be reflected in the future year conditions. Details of significant planned transport network changes are typically published online. However, smaller-scale transportation changes may also occur as part of other local proposals. These should also be considered and identified through consultation with TCCS during the **Opportunity for early engagement 1** in **Step 1** of the TIA process.

4.3.3 Other proposals (cumulative impact assessment)

All proposals that are under construction, approved, or in the approval process, or committed/funded within the study area, and that are likely to be operational within the identified assessment years, should be identified and potentially included in the TIA. These should be identified through consultation with TCCS during the **Opportunity early engagement 1** of the TIA process and through this process it should be determined whether they should be considered in the TIA methodology.

Where other proposals are progressing in close proximity to the proposal, the proponent should consult and coordinate with the other proponent/s to ensure wholistic public road infrastructure treatments are proposed to benefit both proposals and ACT road traffic management.

4.4 Assessment scenarios

Developing a base scenario representing the existing transport environment should be undertaken for any TIA where transport modelling is being undertaken. This is commonly completed as the first stage of the transport modelling process and forms a foundation upon which further analysis should be carried out. If transport modelling is required, the following scenarios are normally required:

- **Existing conditions**: existing land use + existing network configuration calibrated to observed conditions
- **Future year without proposal**/base case (year of opening): existing land use + future background growth + planned land use and/or network changes
- **Future year with proposal**/project case (year of opening): future year base case + proposal
- **Design year without proposal**/base case (year of opening + 10 years): existing land use + future background growth + planned land use and/or network changes

- **Design year with proposal**/ project case (year of opening + 10 years): future design year base case + proposal.

In some instances a 20 year design year may also be required e.g. major infrastructure proposals.

The impact of the proposal to the agreed performance metrics should be determined by comparing the results from the **without proposal** and the **with proposal** assessments.

Additional/alternative scenarios which may be required depending on the specific details of the proposal and assessment methodology are detailed in Table 4-2.

Table 4-2. Additional/alternative modelling scenarios

Assessment type	Scenarios	Description
Existing conditions	• With proposal • Without proposal	• Where the proposal is planned to be built soon after the TIA and background growth, planned land use and network changes do not need to be considered (e.g. small proposal with low vehicle trip generation)
Proposal's construction	• With proposal • Without proposal	• Where the construction works warrant modelling (e.g. major infrastructure/corridor projects
Interim years	• With proposal • Without proposal	• Where the proposal is planned to be staged (e.g. staged subdivision (all stages should be assessed
Cumulative	• With proposal • Without proposal	• Where multiple proposals are planned at the same time and the combined impacts of these should be identified and there is a need to distinguish between background changes and a specific planned project
Mitigation measures / options	• With proposal • Without proposal	• Where potential infrastructure or network changes have been identified to address an impact, this scenario demonstrates the benefit/impact of the proposed mitigation measure.

4.5 Time periods for analysis

The period that should be assessed in the TIA is dependent on the type of proposal and the adopted modelling approach. While some modelling may require assessment of peak periods, the TIA should typically assess the peak hour. The following peak hours should only be used as a guide:

- **Weekday AM and PM peak hour** of the adjacent street traffic for residential, office, industrial and institutional uses, as well as infrastructure proposals
- **Weekday PM peak hour and Saturday midday peak hour** of adjacent street for retail, restaurant, and entertainment uses
- **Weekday PM peak hour and weekend peak hour** of adjacent street for sporting facilities
- **Alternative time periods** for analysis based on the proposed land uses and adjacent land uses is required for mixed use proposals.

Where the peak hours for the existing and/or proposed land use do not coincide with the road network peak hours, both the road network and proposal peak hours should also be assessed.

For specific modelling requirements refer to ACT Microsimulation Modelling Guidelines (ACT Transport Canberra and City Services, 2019) and the Victorian or Austroads Guidelines (Victorian Department of Transport, 2020) (Austroads, 2021), where specific guidance is not covered by the ACT Microsimulation Modelling Guidelines .

5.0 Road network capacity assessment

The approach to the proposal's road network capacity assessment could be discussed and agreed with TCCS in the Opportunity for early engagement in Step 1 of the TIA process

5.1 Objectives

The objectives of traffic and road network assessment within a TIA are to:

- Evaluate existing and planned road network infrastructure and traffic volumes
- Assess the proposal's alignment with the ACT Government's planning system and policies particularly for the modal priorities of the study area roads
- Demonstrate how the proposal provides safe and convenient access between the site and the existing/planned network
- Estimate the number of vehicle trips generated by the proposal and detail how they are accommodated by the road network
- Evaluate the proposal's impact on traffic flow and existing/planned road network efficiency, capacity, congestion, and heavy vehicle proportions
- Identify and assess mitigation measures to avoid, manage or mitigate the potential impacts of the proposal to the existing/planned road network
- Explore measures available to reduce the demand for private vehicle travel, by encouraging public transport use, micromobility, cycling, walking, and car sharing services.

5.2 Existing and planned road network

The following tasks could be completed as part of a TIA to gain an understanding of any existing and planned road network and traffic volumes in the study area:

- Review the current and planned road network including:
    - Functional road classification
    - Movement and Place typology and modal priorities within the study area
    - Strategic importance
    - Freight route and heavy vehicle proportions
    - Lane configuration
    - Intersections including control and turn restrictions
    - Traffic control and management
    - Access management
    - Posted speed limit
    - Designated routes (e.g. heavy vehicle routes)
    - Adjacent property driveways (both sides of all frontage roads) within 200m of the proposed driveway and the land use associated with each of the driveways
    - Other relevant features (e.g. steep grades)
- Identify and interrogate any known operational issues
- Collect or obtain recent classified traffic volume data for road sections and intersections in the study area, as well as the existing site/site area, and may include a combination of the following:
    - Classified intersection turning movement surveys
    - Mid-block automatic tube count data
    - Queue length surveys
    - Origin and destination surveys
    - CSTM outputs from TCCS to estimate background traffic growth

- Review historical traffic volume data to illustrate historical growth, seasonal variations, and other traffic characteristics
- Assess the existing and planned road sections and intersections including:
    - Road section capacity (e.g. mid-block environmental capacity)
    - Intersection performance, usually including Level of Service, Degree of Saturation, vehicle queueing and delay
    - Travel times and vehicle speeds.

Recent traffic data of less than 2 years old is preferred to assess the existing conditions, unless it can be demonstrated that traffic patterns have not changed and there has been prior agreement with TCCS.

5.3 Road network capacity analysis

Road network performance and capacity analysis should consider the study area network's Movement and Place typologies and modal priorities but typically includes one or more of the following:

- Intersection performance by assessing intersection delay, Level of Service and/or queueing
- Roadway capacity by assessing mid-block Level of Service, Volume/Capacity ratio, environmental capacities including consideration for heavy vehicle proportions
- Network assessment (microsimulation or mesoscopic modelling) by assessing network performance statistics, link density, network delays, travel times and vehicle speeds.

5.3.1 Intersections (including site accesses)

Intersection analyses should be undertaken in accordance with Transport Modelling Guidelines, Volume 5: Intersection Modelling (Victorian Department of Transport, 2020). The TIA should demonstrate how the proposal would seek to maintain the intersection Level of Service that would have otherwise occurred in the study area. In instances where maintaining this standard is not feasible, the TIA should identify and assess mitigation measures. These measures should demonstrate how they can achieve the objective of maintaining, at a minimum, a Level of Service D for individual movements and full intersections.

Also, the 95th percentile queue should not extend beyond the available storage for any short lanes (the parallel length of the turn slot excluding the taper) or beyond the next adjacent intersection for any lane.

Where SIDRA INTERSECTION modelling is used, reference should be made to the Transport Modelling Guidelines, Volume 5: Intersection Modelling (Victorian Department of Transport, 2020).

5.3.2 Mid-block roadway (link) capacity

In addition to intersection analysis, mid-block roadway capacity analysis should also be undertaken in accordance with Austroads Guide to Traffic Management (Austroads, 2020). The TIA should demonstrate how the proposal would seek to maintain the mid-block roadway Level of Service or Volume/Capacity ratio that would have otherwise occurred in the study area. In instances where maintaining this standard is not feasible, the TIA should identify and assess mitigation measures. These measures should demonstrate how they can achieve the objective of maintaining, at a minimum, a Level of Service D.

5.4 Design review

Where relevant, the adequacy and safety of the proposed access layout should be assessed against the Territory Plan (ACT Government, 2023) and supporting Design Guides and Technical Specifications and other relevant reference material. Several other design considerations which should be assessed depending on the proposal type, size and scale include:

- Intersection turn lane lengths and acceleration and deceleration lanes
- Sight distance across all new or modified roads, site accesses and intersections
- Site access driveway locations and design
- Internal street layout including:
    - Hierarchy of on-site circulation routes
    - Cross-sections
    - Methods to promote low-speed travel
    - Safety at site-access points
    - Suitability considering modal priorities
    - Swept path assessment to demonstrate that vehicles can properly manoeuvre on any new or modified roads, at intersections and access points
- Other assessment requirements outlined in the Territory Plan (ACT Government, 2023) and supporting Design Guides and Technical Specifications.

5.5 Mitigation measures

Table 5-1 lists examples of mitigation options that could be considered to reduce the impact of the proposal on the road network. This is not an exhaustive list, and the context of the proposal should be considered when considering each option.

Determining the most suitable mitigation measure should take into consideration the study areas function, Movement and Place typology and modal priorities.

Table 5-1. Road network impacts mitigation options

Type	Mitigation
Avoid	• Reduce the number of vehicle trips generated by the proposal e.g. by encouraging alternative travel modes • Locate access points away from congested intersections and corridors and to encourage an alternative and less congested corridor • Reschedule vehicle trips to avoid the peak periods
Manage	• Restrict turning movements at intersections or access points • Optimise signal operation (in consultation with TCCS) • Implementing operational strategies • Transporting workers by bus • Traffic calming devices
Mitigate	• Intersection modification • Road widening • Build a new intersection and/or corridor

6.0 Road safety

The approach to road safety could be discussed and agreed with TCCS in the Opportunity for early engagement in Step 1 of the TIA process, as TCCS may request a Road Safety Audit for certain developments.

6.1 Objectives

Maintaining road safety across the transport network is a key consideration for TCCS and Roads ACT.

The objectives of considering road safety in a TIA is to:

- Evaluate existing road safety issues associated with the proposal's site and across the broader study area
- Identify how the proposal's road safety implications have been considered and how the proposal seeks not to compromise or worsen the safety of the surrounding transport network during construction and operation
- Mitigate the proposal's impacts to road safety
- Explore measures available to improve road safety.

6.2 Existing and planned road safety considerations

The following tasks could be completed as part of a TIA to gain an understanding of any existing and planned road safety issues in the study area:

- Review any previous road safety assessments that have been conducted in the study area, if available
- Review the most recently available five-year crash history for the study area and identify any crash trends or locations with potential safety risks
- Consult with TCCS and/or Roads ACT to identify known safety issues within the study area
- Review speed data to identify areas where vehicle speeds may exceed and could therefore increase the severity of collisions
- Visit the site to observe the existing traffic and transport conditions and road user behaviour and identify any potential road safety risks
- Identify how the existing safety issues or environment could change due to planned land use and/or network changes.

6.3 Road safety impacts

A TIA could consider the following potential road safety implications of a proposal:

- Identify if any existing road safety risks may be changed due to the proposal. In particular:
    - Does the proposal improve existing safety issues and how?
    - Does the proposal avoid making existing road safety issues worse and how?
    - Does the proposal allow for or does not preclude future works to be completed by others to address the issue?
- Identify if any new road safety risks may be introduced on the surrounding transport network because of the proposal
- Assess whether the proposal would create new road safety risks on the surrounding transport network (e.g. impacts on intersections, traffic control devices, and conflicts between different

road users, such as vehicles, pedestrians, cyclists and micromobility and other examples included in Table 6-1).

- Review if the proposed site layout or any infrastructure changes meet the requirements of the Australian Standards, the Territory Plan, Design Guides and Technical Specifications, Austroads guidance and other local guidelines to minimise potential road safety risks
- Respond to other safety related design guidance outlined in the Access and Movement section of the Urban Design Guide, where relevant to the proposal.

Table 6-1 includes a list of potential impacts from a proposal that can affect road safety during operation and construction. While not an exhaustive list, where relevant the road safety risks associated with these issues should be identified and discussed in the TIA.

Table 6-1. Key areas that typically require road safety consideration

Area	Description
Network and/or access changes	• Proposed access routes and facilities for vehicles, pedestrians, cyclists and micromobility • Proximity of access points in relation to other access points, intersections, and traffic control devices • Changes to existing infrastructure and the introduction of new infrastructure such as access roads and driveways • New conflict points between road users including vehicles and other vehicles, pedestrians, and cyclists
Travel patterns	• Increased travel demand, including general traffic, freight, public transport, pedestrians, cyclists, micromobility • Changes to the number of movements at intersections and at traffic control devices • Changes to travel characteristics and the vehicle types or vehicle mix using the transport network
Parking	• Changes to on-street parking and kerbside uses • Paths of travel between a site and any off-site car parking proposed or expected to be used
Accessibility	• Consideration should be given to any additional road safety implications that may arise for people who have vision impairment, mobility impairments or other disabilities

If a road safety issue is identified that requires a more in-depth understanding, TCCS may request a supplementary road safety assessment to inform a targeted mitigation strategy. This additional assessment could involve a detailed analysis of specific road user behaviours or network issues, further crash analysis, or other contributing factors to better pinpoint the nature and extent of the identified safety concern.

6.4 Mitigation

If any existing road safety issues are expected to worsen due to the proposal or if new road safety risks are identified, the TIA should propose measures to avoid, minimise or manage these risks.

Table 6-2 presents potential mitigation measures that could be considered to minimise road safety risks. While not an exhaustive list, and the specifics of the proposal should be considered when determining the most appropriate mitigation measure.

Additionally, mitigations measures may have subsequent impacts, and these should be thoroughly considered and detailed in the relevant section of the TIA.

Determining the most suitable mitigation measure should take into consideration the study areas function, Movement and Place typology and modal priorities.

Table 6-2. Potential road safety mitigation options

Type	Mitigation
Avoid	• Provide separate access points for vehicles and cyclists • Remove conflicts between vehicles and/or other road users • Locate construction vehicle access to avoid construction vehicles crossing a footpath and cycleway • Provide good sight lines at access points and intersections
Manage	• Restrict vehicle access on main roads • Restrict all vehicles to enter and exit a site in a forward direction instead of reversing • Restrict construction vehicles to particular types of vehicles and/or time of day • Provide local area traffic management measures to reduce vehicle speeds
Mitigate	• Install safety facilities such as crash barriers and mirrors and warning signage • Provide new crossing infrastructure • Improve the quality of paths and road pavement • Upgrade or modify the road network or intersections

7.0 Active travel assessment

This section covers what should be considered for each proposal regarding walking, cycling and micromobility.

7.1 Objectives

The objectives of a walking, cycling and micromobility assessment within a TIA are to:

- Evaluate existing and planned walking, cycling and micromobility infrastructure and demands
- Assess the alignment of the proposal with the ACT Government's strategic direction regarding active travel
- Demonstrate how the proposal provides safe and convenient access between the site and the existing and planned path network
- Determine the needs and demands of pedestrians and cyclists generated by the proposal and how these have been accommodated in the proposal
- Identify and mitigate the potential impacts of the proposal to the existing and planned walking, cycling and micromobility networks surrounding the proposal
- Explore measures available to reduce the demand for private vehicle travel, particularly single occupant car trips by encouraging active travel modes.

7.2 Existing and planned conditions

The following tasks could be completed, where relevant to gain an appreciation for the existing and planned active travel network and demand within the study area:

- Identify Active Travel Routes surrounding the site as defined in Municipal Infrastructure Standards 05 Active Travel Facilities Design (MIS 05) (ACT Transport Canberra City Services, 2021):
    - Community Routes
    - Accessible Pedestrian Routes
    - Equestrian Routes
    - On-Road Cycling Routes
- For any identified Community Routes, include the hierarchy level (i.e. Principal, Main, or Local), destination and name (if applicable). Further details on the definitions of these routes are provided in the ACT Active Travel Plan (ACT Transport Canberra and City Services, 2023) and MIS05 (ACT Transport Canberra City Services, 2021)
- Identify if the proposal is in a central or high intensity walking area as outlined in the ACT Active Travel Plan (ACT Transport Canberra and City Services, 2023)
- Identify any existing and planned paths and formal crossing locations
- Describe the existing walking, cycling and micromobility activity in the study area including the demand on the existing network
- Identify the locations of key trip generators for pedestrians, cyclists and micromobility in the study area and the existing active travel routes to/from these locations, (e.g. schools and public transport stops)
- Identify existing and planned infrastructure that encourages walking, cycling and micromobility trips (e.g. street furniture, traffic calming measures)
- Identify any gaps or inadequacies in the micromobility, pedestrian and cycle networks, particularly in relation to safety, accessibility, and attractiveness of the network

- Identify any changes to the active travel network or any new active travel infrastructure that is planned in the study area. Any planned changes that have been committed to by the ACT government or nearby projects should be included.

7.3 Pedestrian, cyclist and micromobility impacts

7.3.1 Design review

A TIA should consider walking, cycling and micromobility access to/from and within the proposal while considering the study area network's Movement and Place typologies and modal priorities. Key considerations include:

- Demonstrating access to walking, cycling, and micromobility networks and infrastructure, both on-road and off-road
- Providing safe, convenient, and attractive site access for pedestrians, cyclists, and micromobility users, with separation where possible
- Ensuring sufficient bicycle parking that prioritizes safety, convenience, and user needs as per the Technical Specifications
- Including End of Trip facilities as per the Technical Specifications
- Supporting safe and convenient walking, cycling, and micromobility within the proposal's internal layout, including car park design and road crossings
- Incorporating design elements that accommodate individuals with mobility or vision impairments, or other disabilities (note: a formal accessibility study is beyond TIA scope).
- Mapping internal or external attractors/generators and proposed path types for access
- Responding to other walking, cycling and micromobility design guidance outlined in Territory Plan and supporting Technical Specifications and Design Guides, where relevant to the proposal.

7.3.2 Network impact

A TIA should evaluate impacts on the active travel network while considering the study area network's Movement and Place typologies and modal priorities. This involves the following, where relevant:

- Discuss the impact of increased vehicle traffic due to the proposal on pedestrians and cyclists, encompassing access points, active travel routes, and crossing locations
- Assess if the travel time or distance for pedestrians or cyclists would decline because of the proposal
- Demonstrate the adequacy of the network to meet future demand for pedestrians and cyclists, using an appropriate assessment method such as Fruin Level of Service, applying a Level of Service measurement to pedestrian flows and a measure of crowding
- Present the catchment from the proposal that can be reached by pedestrians and cyclists in a 5, 10, and 15-minute walk or cycle. Outline key locations of public transport stops and other attractors within these catchments
- Describe how pedestrians and cyclists would move between the proposal and locations identified in the catchment, including available or proposed infrastructure and any gaps, particularly considering safe crossing locations
- Explore additional opportunities to improve active travel provisions, connectivity, and promote mode shift toward active modes.

7.4 Mitigation

Table 7-1 lists examples of mitigation options that could be considered to reduce the impact of the proposal on active travel. This is not an exhaustive list, and the context of the proposal should be considered when considering each option.

Determining the most suitable mitigation measure should take into consideration the study areas function, Movement and Place typology and modal priorities.

Table 7-1. Pedestrian and cyclist impacts mitigation options

Type	Mitigation
Avoid	• Avoid conflicts between vehicles and pedestrians and cyclists by providing separate infrastructure • Provide separate access points for all road users • Provide pedestrian only corridors through the site • Divert traffic away from heavily used micromobility, pedestrian and cyclist routes
Manage	• Introduce traffic calming measures to reduce vehicle speeds • Restrict vehicle types in areas of micromobility, pedestrian and cyclist activity • Optimise traffic signal timings to facilitate safer and more efficient pedestrian crossings • Implement Travel Demand Management to promote alternative transport modes
Mitigate	• Improve infrastructure including lighting, weather protection, signage, footpath grades, kerb ramps • Provide public access through a site to improve connectivity and permeability • Provide or improve dedicated crossing facilities for micromobility, pedestrians and cyclists

8.0 Public transport assessment

This section covers what should be considered for each proposal regarding public transport.

8.1 Objectives

The objectives of a public transport assessment within a TIA are to:

- Evaluate existing and planned public transport infrastructure, services and demands
- Assess the alignment of the proposal with the ACT Government's planning system and policies regarding public transport
- Demonstrate how the proposal provides safe and convenient access between the site and the existing and planned public transport network
- Outline how public transport can be safely integrated into the proposal
- Determine the needs and demands of public transport generated by the proposal and how these have been accommodated in the proposal
- Identify and mitigate the impacts of the proposal to existing public transport networks surrounding the proposal and how these have been minimised and can be mitigated
- Explore measures available to reduce the demand for private vehicle travel, particularly single occupant car trips by encouraging public transport modes

The following public transport should be considered, where relevant:

- Bus
- Rapid bus
- School bus
- Light rail
- Private coach
- Train
- Other emerging public transport modes, where relevant.

8.2 Existing and planned conditions

The following tasks should be completed, where relevant to gain an appreciation for the existing public transport network and demand within the study area:

- Identify the existing and planned public transport routes and stops within the study area including:
    - Frequency of services
    - Usage and demand for services
    - Capacity constraints on the public transport network
    - Public transport priority measures
- Identify the existing routes for micromobility, pedestrians and cyclists between the proposal and the public transport stops in the study area
- Identify any changes to the public transport network or any new public transport that is planned for the study. Any planned changes that have been committed to by the ACT government should be included.

8.3 Public transport impacts

8.3.1 Design review

A TIA should evaluate how the proposal can be conveniently accessed by public transport and where relevant, how the proposal could integrate public transport within the proposal while considering the study area network's Movement and Place typologies and modal priorities. This involves the following, where relevant:

- Illustrate how the proposal provides access to existing and planned public transport
- Identify how a pedestrian or cyclist would move between the proposal and public transport stops, including available or proposed infrastructure and any gaps, particularly considering safe crossing locations and design elements to cater for individuals with movement impairments, vision impairment, or other disabilities
- Review the layout of new or modified street networks and demonstrate that the proposal meets the needs of public transport vehicles and users
- Demonstrate the following:
    - Routes to/from stops are attractive and convenient, with safe crossings provided, especially for arterial and collector routes
    - Adequate space is allowed for the appropriate design vehicle and checking vehicle to be accommodated at bus stops and intersections
    - Land use planning and road layout allows for public transport accessibility across the site
    - Priority for public transport has been included where appropriate.
- Respond to other public transport related design guidance outlined in the Access and Movement section of the Urban Design Guide, where relevant to the proposal
- Other assessment requirements outlined in the Territory Plan (ACT Government, 2023) and supporting Design Guides and Technical Specifications, where relevant.

Proposals within new and existing suburbs that will influence new and existing roads, Transport Canberra Planning Delivery/Bus Operations are to be consulted so that network constraints and opportunities for new public transport or altered routes/corridors can be considered as part of future planning for light rail and bus services.

8.3.2 Network impact

A TIA should evaluate impacts on the public transport network while considering the study area network's Movement and Place typologies and modal priorities. This involves the following, where relevant:

- Discuss the impact of increased vehicle traffic due to the proposal on public transport particularly where suitable transport modelling tools have been used to assess this
- Assess if the travel time or distance for public transport would change because of the proposal particularly where suitable transport modelling tools have been used to assess this
- Demonstrate the adequacy of the network to meet future demand for public transport use (e.g. make bus patronage observations and/or review available public transport data to estimate current public transport patronage levels and compare with the estimated public transport trips)
- Indicatively present the 15-minute public transport catchment from the proposal and key locations of destinations and attractors within this catchment. This can be completed using GIS catchment mapping tools

- Describe how micromobility, pedestrians and cyclists would move between the proposal and public transport stops, including available or proposed infrastructure and any gaps, particularly considering safe crossing locations and the convenience of using these routes
- Explore additional opportunities to improve or enhance public travel provisions, connectivity, and promote mode shift toward public transport.
-

8.4 Mitigation

Table 8-1 lists examples of mitigation options that could be considered to reduce the impact of the proposal on public transport. This is not an exhaustive list, and the context of the proposal should be considered when considering each option.

Determining the most suitable mitigation measure should take into consideration the study areas function, Movement and Place typology and modal priorities.

Table 8-1. Public transport mitigation options

Type	Mitigation
Avoid	• Plan higher residential densities to be near major public transport services • Avoid providing property vehicle points access along streets that accommodate public transport routes • Consider land reservation for public transport corridors should be considered (e.g. for light rail or rapid bus services).
Manage	• Encourage mode shift by promoting the benefits of public transport • Optimise traffic signal timings to facilitate safer and more efficient pedestrian crossings to improve public transport priority offset delays. Demonstrating the benefits of this is required • Implement Travel Demand Management to promote alternative transport modes
Mitigate	• Public transport improvements such as new interchanges, bus priority lanes, or other initiatives to enhance the overall efficiency and attractiveness of public transport • Infrastructure modifications to improve accessibility to/from public transport • Provide additional bus stops at the intervals outlined in the relevant Design Guides, if available, or within 400 metre intervals • Improve infrastructure including lighting, weather protection and bus stop shelters, information signage, footpath grades, kerb ramps • Provide public access through a site to improve connectivity and permeability to/from public transport stops • Provide dedicated crossing facilities to access public transport stops

9.0 Parking, loading docks and kerbside uses

This section outlines the considerations for each proposal concerning parking and kerbside uses.

9.1 Objectives

The objectives of a parking impact assessment within a TIA are to:

- Evaluate existing and planned parking and kerbside provision, restrictions, and usage levels
- Assess the alignment of the proposal with the ACT Government's planning system and policies regarding parking and kerbside uses (e.g. limiting access on streets with active frontages and key elements such as trees and landscaping)
- Demonstrate that safe parking and loading access and design is proposed
- Determine the needs and demands of parking and kerbside activity generated by the proposal
- Evaluate the adequacy of the proposal to cater for the needs and demands
- Identify and mitigate potential impacts of the proposal on existing and planned parking and kerbside uses
- Explore measures available to reduce the demand for private vehicle travel, particularly single occupant car trips and parking requirements.

9.2 Existing and planned conditions

The existing and planned car parking and kerbside conditions on the site and within the study area should be identified, including:

- **Supply:** Number of on-street and off-street spaces available
- **Inventory:** Type of restrictions including days and times that these apply, any fees and the land uses these may be attributed to
- **Occupancy/utilisation:** Number of vehicles occupying the available spaces
- **Duration:** Length of time a vehicle occupies a space
- **Turnover:** How frequently the space is unoccupied.

Additionally, any parking strategies or policies relevant to the area should be reviewed.

9.3 Parking, loading docks and kerbside impacts

9.3.1 Design review

A TIA should demonstrate that the proposals' on-street and off-street parking, and loading areas are designed to comply with the Territory Plan's supporting Design Guides and Technical Specifications, AS2890 (Standards Australia) and Engineering Note 6 (ACT Transport Canberra and City Services, 2017) for bicycles, car parking, vehicular access. This involves the following, where relevant:

- Car park, loading dock and bicycle parking access including ramps
- Car parking and loading dock layout including dimensions of parking spaces, width of aisles
- Car park and loading dock control points and associated queuing assessment to demonstrate that vehicle queuing would not extend to the surrounding road network
- Electric vehicle infrastructure
- Swept path assessment
- Locations and design of bicycle parking
- Pedestrian safety through car parking areas

- Sight distance and other geometric design elements of accesses and parking layout are to be evaluated in accordance with the Territory Plan, Design Guides and Technical Specifications
- Other assessment requirements outlined in the Territory Plan
- Other design guidance outlined in the ACT Design Guides, where relevant.

9.3.2 Network impact

A TIA should evaluate how the proposals' parking and site access arrangements would impact the surrounding network while considering the study area network's Movement and Place typologies and modal priorities. This involves the following, where relevant:

- Identify parking requirements for the proposal as outlined in the Territory Plan, Design Guides and Technical Specifications. This includes car parking, motorcycle parking and bicycle or micromobility parking
- Identify any kerbside uses that are assumed to be used to support the proposal (e.g. couriers, pick-up/set-down including for ride share or removal of parking to accommodate a new site access)
- Assess the impact of this kerbside activity on any adjacent land uses or facilities relying on this kerbside space (noting that the proposal is typically not permitted to rely on on-street facilities, particularly for loading and servicing)
- Assess if the proposed parking arrangements adequately meet the requirements of the Territory Plan and supporting Design Guides and Technical Specifications
- While the preference is to provide off-street parking in accordance with the Territory Plan, Design Guidelines and Technical Specifications, if the proposal does not adequately meet the requirements, estimate the parking demand adopting the following methods in order of preference:
    1. Parking surveys of another similar site
    2. Benchmark the site against other sites that have been surveyed by others to inform published trip generation rates and parking requirements, (e.g. (Roads & Maritime Services, 2013) Guide to Traffic Generating Developments Updated traffic surveys (RMS, 2013))
    3. First principles assessment, limited to unique or uncommon land use and should be evidence-based (e.g. the number of visitors to the site may be based on patterns from another similar land use)
- Assess whether the proposed parking arrangements adequately meet the parking demand estimates and identify any shortfall
- Assess whether the shortfall can be accommodated by the surrounding publicly available on-street and/or off-street parking within the relevant distances specified within the Territory Plan (ACT Government, 2023), Design Guides and Technical Specifications

It is noted that publicly available on-street and of-street parking should not be relied upon in the City Centre and other centres. The on-street kerbside is typically prioritised for public transport, accessible parking, existing loading etc. Similarly, off-street public car parks in the City Centre have been flagged for future redevelopment sites and should not be relied upon for future unrelated proposals.

It should be noted where the parking occupancy exceeds 85 percent of the available supply, parking management changes may be necessary to avoid vehicles circulating to find an available spot, causing congestion.

9.4 Mitigation

Table 9-1 lists examples of mitigation options that could be considered to reduce the impact of the proposal on the surrounding parking supply and demand. This is not an exhaustive list, and the context of the proposal should be considered when evaluating each option.

Determining the most suitable mitigation measure should take into consideration the study areas function, Movement and Place typology and modal priorities.

Table 9-1. Public transport mitigation options

Type	Mitigation
Avoid	• Provide alternative parking supply in accordance with the Territory Plan requirements, Design Guides and Technical Specifications • Provisions that avoid vehicles reversing in/out of an access • Implement strategies within a vehicle t to provide alternatives to accessing the site via car
Manage	• Measures to discourage off-street parking such as restrictions, time based pricing, permit systems • Manage parking demand through shared parking arrangements • Implement parking fees • Implement parking management strategies • Implement Travel Demand Management to promote alternative transport modes
Mitigate	• Expand car parking supply • Install smart parking infrastructure • Improve public transport options, pedestrian infrastructure, and cycling facilities to reduce reliance on private vehicles.

These mitigation options aim to address the impact of the proposal's parking supply and demand. It is crucial to tailor the chosen strategies based on the specific characteristics and requirements of the proposal and the surrounding context. The effectiveness of each option should be assessed in conjunction with the unique aspects of the proposal and the local area.

10.0 Construction

The approach to the proposal's construction transport assessment could be discussed and agreed with TCCS in the Opportunity for early engagement in Step 1 of the TIA process

10.1 Objectives

A proposal may be conditioned to provide Temporary Traffic Management Plans and/or Construction Traffic Management Plans prior to any construction works commencing. However, at this stage it is often too late to make changes to the construction methodology and approach to minimise impacts to the transport network. Therefore, a TIA should consider the likely construction requirements including site access locations, parking arrangements, and any modifications to the transport network to accommodate the construction works where information is known.

The objectives of assessing the transport impacts of the proposal's construction in a TIA include:

- Identify locations for construction worker parking (on-site and/or off-site) and assess the impact of this on the available car parking for the study area
- Evaluate if the proposal's construction works would alter the existing transport network
- Assess impacts to the transport network because of the proposal's construction traffic volumes and/or required network changes
- Demonstrate that construction impacts could be managed safely and efficiently
- Identify opportunities to modify the approach to avoid the impacts and/or potential mitigation measures to reduce or manage the impacts.

10.2 Existing and planned conditions

In most instances the existing site area and network conditions would remain unchanged from those assessed for the operational impact assessment. However, the future year assessment is likely to be for a year prior to the operational assessment. Therefore, the planned conditions require consideration for any approved and/or planned land use or network changes that are expected to occur before the proposal's construction.

10.3 Network impact

A TIA should evaluate the construction transport impacts on the transport network, where sufficient information is available. This involves the following, where relevant:

- Outline the potential construction staging and any other construction methodology information, acknowledging that this will likely change as the proposal develops
- Identify any changes to the existing/planned transport network that may be required for the proposal's construction staging (e.g. site access arrangements, lane closures, path closures)
- Map the likely haulage routes and/or construction vehicle routes and identify any constraints and safety considerations, including but not limited to:
    - Conflicts with high pedestrian activity areas
    - Locations of School Zones along the route
    - Congested corridors
- Estimate the number of construction and/or heavy vehicles, as well as light vehicles for workers and visitors to be generated by the proposal's construction works. This is typically informed by:
    - Indicative construction program
    - Potential workforce

    - High-level quantities of high-traffic generation construction activities such as concrete pours and/or bulk earthworks
- Estimate the proportion of these trips that would likely occur during the surrounding network's peak periods by considering likely construction hours and worker shift times
- Evaluate if the surrounding road network and intersections have the capacity to accommodate the estimated vehicle trips, particularly during the peak periods
- Identify any potential path, road, lane, or intersection closures that would be required and identify if suitable alternative routes are available and if these have any network impacts
- Identify the largest vehicle that is expected to access the site and if any oversized vehicles are likely to be required
- Outline proposed measures to avoid, manage or mitigate identified impacts.

Where limited information is available, the TIA should identify potential opportunities and constraints for the proposal's construction that require further consideration as the construction methodology is developed.

10.4 Mitigation

Table 10-1 lists examples of mitigation options that could be considered to reduce the construction transport impacts of the proposal. This is not an exhaustive list, and the context of the proposal should be considered when considering each option.

Table 10-1. Construction mitigation options

Type	Mitigation
Avoid	• Avoid access streets as haulage routes • Reduce the number of vehicle trips generated by the works
Manage	• Consider how impacts could be minimised – consolidation centre, sharing vehicles, sharing loads, out of hours deliveries • Consider minimising the number of vehicle trips generated during peak periods • Limit major network impacts (e.g. potential lane closure) to off-peak periods, if possible • Temporary Traffic Management Plan • Construction logistics plan
Mitigate	• Construct a new intersection or modify an intersection to accommodate construction vehicle access

Appendix A: Traffic survey checklist

The following traffic and parking survey checklist should be used when undertaking traffic surveys to demonstrate a trip generation rate. The site chosen should have similar land use types and mix and geographic attributes. Where applicable, the attributes of the proposal should be included to show the similarities and differences between the sites.

Depending on the type of land use being surveyed, different variables may apply. As many as possible should be included if relevant to the site.

Table A-1. Traffic survey checklist

Detail	Detail of proposed survey site (add additional columns where multiple sites are surveyed)	Detail of proposal, if applicable
Site details and characteristics		
Address		
Land zoning		
Land use type		
Land use size and mix (e.g. floor space, number of dwellings)		
Year of opening		
Other relevant characteristics (e.g. typical number of employees, number of bedrooms per dwelling, hours of operation)		
Estimated/historical site peak hour		
Estimated/historical road network peak hour		
On-site car parking supply		
Number of vehicle access points		
Reliance on off-site car parking use		
Public transport accessibility		
Survey details		
Survey date/s		
Survey time periods		
Survey types/scope		
Additional details required to be captured at the time of the surveys (e.g. site occupation, number of employees on-site and percent occupied, on-site parking spaces occupied)		

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12.0 Glossary

Term	Definition
Access	Generally refers to approaching/entering and departing/exiting a place.
Access management	How access is managed in relation to a public road. It may be permitted, restricted, or denied. It could be in the form of a controlled or uncontrolled intersection or driveway.
Access streets	A road typology used where the residential environment is dominant, traffic is subservient, speed and volumes are low, and pedestrian and cycle movements are facilitated. Access streets are often referred to as local and residential streets (refer to MIS 01).
Accessibility	The ease of reaching destinations. In a highly accessible location, a person, regardless of age, ability or income, can reach many activities or destinations quickly, whereas people in places with low accessibility can reach fewer places in the same amount of time.
ACT	Australian Capital Territory
Active travel	Any form of transport involving physical activity, e.g. cycling and walking.
Arterial road	A road typology that is strategically significant catering for high vehicle volumes travelling over large distances. They do not interact with the places that the road passes through (refer to MIS 01).
Background conditions	Step 2 of the process for undertaking a TIA including assessing and reviewing the existing and future 'base' or 'without proposal' conditions
Checking vehicle	The largest manoeuvrable vehicle that is ever planned to use a street, but on an occasional basis.
CSTM	Canberra Strategic Transport Model - The overarching strategic transport model for Canberra.
CPTED	Crime Prevention Through Environmental Design
Density	Average number of residents, households, dwellings, or habitable space in a given area, usually expressed as dwellings/ people per hectare or floor area ratio.
Desire lines	The preferred route a person takes to travel between origin and destination.

Term	Definition
Development	Has the same meaning as in Section 14 (1) of the ACT Planning Act 2023.
Development Assessment or Development Approval	Has the same meaning as in Section 166 (1) of the ACT Planning Act 2023.
Design vehicle	The design vehicle is the largest vehicle likely to regularly perform a movement at an intersection rather than the largest of the vehicles that may operate at that location.
Diverted drop-in trip	These are linked trips which were passing close to the proposal and could divert to access the proposal before returning to their original route. For instance, visiting a new supermarket located a few blocks away from the existing travel route.
EIS	Environmental Impact Statement – Has the same meaning as in Section 94 (c) of the ACT Planning Act 2023.
EPSDD	Environment, Planning and Sustainable Development Directorate
Existing network trips	These are trips that exist on the network, regardless of the proposal.
Footpath	A non-specific term to refer to a minor path.
Functional road classifications	Based on traffic volumes and land uses. The hierarchical road network aims to maximise road safety, priority for pedestrians and cyclists, residential amenity, and legibility. Place making is not explicitly considered. Other overlapping terms may be used to describe the character of the place in relation to the road typology.
GFA	Gross Floor Area - Total floor area inside the building envelope, including the external walls.
GLFA	Gross Leasable Floor Area - Total floor space available to be leased, which typically excludes hallways, elevator shafts, stairways, and other non-leasable space.
ILRP	Indicative Land Release Program
Infrastructure	The basic systems, facilities or framework that support a community's population, e.g. roads, transport, utilities, water, sewage.
Interchange	A facility that allows for transfer from one mode of transport, or one transport service, to another. It may be a single bus stop or a major train station.

Term	Definition
Intersection	The place at which two or more roads meet or cross including signalised intersections and unsignalised intersections (e.g. priority controlled intersections and roundabouts).
Land use	A term used to describe how land is used.
Land development proposal	Has the same meaning as in section 14 (1) of the ACT Planning Act 2023.
Linked trips	These are trips that involve one or more stops between the trip origin and the ultimate destination (e.g. visiting a supermarket on the way home from work).
Major collector road	A road typology that collects and distribute traffic between the primary (arterial and sub-arterial) road network and the user destinations in neighbourhoods (refer to MIS 01).
Methodology	The principles and procedures undertaken to assess the transport impacts of a proposal as part of the TIA.
Micromobility	These are trips undertaken by pedestrians or lightweight vehicles used to travel short distances such as e-scooters or bikes.
Mixed-use	Mixing residential, commercial, retail, entertainment and community uses in same building, site, or precinct.
Mode share	The proportion or percentage of trips taken by users of different transport modes.
Minor collector road	A road typology that distributes traffic from access streets to major collector or arterial roads. A reasonable level of residential amenity and safety is maintained by restricting vehicle speeds by means of street alignment, intersection design or by speed control measures.
Micromobility	Generally, in this guide it refers to powered devices that can be used on paths including e-bikes and personal mobility devices.
MIS	Municipal Infrastructure Standard
Multimodal	A combination of two or more types of transport modes.
Multi-purpose trips	These are trips that involve visiting more than one facility in the proposal like visiting multiple retail shops.
NCA	National Capital Authority
NCDRP	National Capital Design Review Panel
New trips	These are trips that would not exist without the proposal.

Term	Definition
Path	A paved off-road facility of varying width and surfacing, for shared use by people walking, riding, and using other mobility devices, including horses (refer to MIS). By law, all paths in the ACT can be used by all people walking and using devices that are legal for use on paths.
Permeability	The extent to which the urban structure allows or restricts movement of people or vehicles through an area.
Person trip	A one-way movement by a person from one point (origin) to another (destination) by any mode of transport (e.g. a single vehicle trip with two occupants would constitute two person trips).
Planned conditions	The future conditions in the study area without the proposal but considering impacts or changes proposed as part of a planned project.
Planned project	A project that may be approved, committed and/or funded or otherwise identified by TCCS as requiring consideration in understanding the planned network conditions.
Proponent	The person or entity proposing to carry out a development or proposal.
Proposal	A project that is proposed by a proponent inclusive of land development proposals and infrastructure proposals.
Rear lane	Rear lanes are narrow and short streets which have the primary function of providing vehicular access to the rear of blocks.
Road (also referred to as street)	A designated facility forming a route between two places for vehicular traffic and services. Roads include verge space, carriageways and associated public areas and may also provide vehicular access to properties.
SCATS	Sydney Coordinated Adaptive Traffic System - This is a traffic management platform which control signal phasing at intersections.
Sight distance	The distance, measured along the roadway, over which visibility occurs between a driver and an object or between two drivers at specific heights above the roadway in their lane of travel.
Study area	The geographical or spatial extent over which a proposal is expected to have an impact on the transport network.
Sustainability	An approach that considers the environmental, social, and economic aspects so it can meet the needs of the present, without compromising the ability of future generations to meet their needs.

Term	Definition
Swept path	The area covered by the outermost and innermost points of the vehicle during a turning manoeuvre.
TCCS	Transport Canberra and City Services
Territory Plan	Provides statutory planning guidance for development in the ACT.
TIA	Transport Impact Assessment
Transferred trip	These are existing trips on the network accessing similar land use that could transfer to the proposal. These trips may be either linked or unlinked such as retail trips transferring to a new supermarket within the proposal as a direct trip (unlinked) or on the way home from work (linked), respectively.
Travel plan	A management strategy for delivering behavioural change and sustainable travel patterns across a development, organisation, or precinct.
Trip	A one-way movement of people, goods, and services from one point (origin) to another (destination) by any mode of transport.
Trip generation	Travel demand 'attracted' or 'produced' by a proposed development.
TRIS	Trunk Road Infrastructure Standard
Undiverted drop-in trips or pass-by trip	These are linked trips that were directly passing the proposal and do not require a route diversion to access the proposal (e.g. visiting a new petrol station located on the existing travel route.
Unlinked trip	These are trips that involve direct journeys between the origin and the destination (e.g. travelling from home to work).
Vehicle trip	A one-way movement from one point (origin) to another (destination) by a single vehicle such as a car, van, truck, motorcycle.