AITPM TRANSPORT MODELLING CODE OF CONDUCT – PROFESSIONALISM

Introduction

This Code of Conduct (the "Code") has been developed by the Transport Modelling Network of AITPM. It is intended to be read and adopted by transport modelling practitioners and consumers of modelling services who contribute to making decisions on improvements to the transport systems in Australia. The Code comprises two parts – Part 1: Principles of Professionalism, and Part 2: Technical Information. Part 2 is a 'live' document that is updated from time to time. This document includes a comprehensive glossary.

CODE OF CONDUCT – PART 1

Context

Providing and maintaining the efficient and safe operation of our transport system depends on timely and justified investments in improved infrastructure and services. Decision-makers are constantly challenged to balance numerous political, technical, social, environmental and financial considerations to determine the priority, timing and extent of individual investments. Transport modelling is a cost-effective way of assessing improvement options and future demand scenarios and is just one tool used to provide part of the (technical) information required by decision makers. Now, there is strong reliance on transport models and there is greater scrutiny of the validity of outputs from these models.

AITPM stands to provide leadership in the traffic and transport industry and, through its Transport Modelling Network, has worked with transport modellers and representatives of state government agencies around Australia to develop the Code of Conduct.

This Code aims to improve and seek consistency in transport modelling practices in the transport planning industry and promote positive and ethical behaviours. The Code is aimed at both the modelling practitioners and the consumers of their services. The Code aims to achieve this with six principles.

The purpose of the principles

The six Principles of Professionalism set out the minimum professional practice and ethical standards when providing transport modelling services or using outputs from transport models. The primary objectives of the Code are the achievement of good transport infrastructure outcomes, thereby fostering and enhancing the professional reputation of transport modellers and the transport planning industry.

The principles of the Code

1. Integrity and professional conduct
2. Best interests
3. Conflicts of interest
4. Informed consent
5. Service standards
6. Professional Expertise

Principle 1: Integrity and professional conduct

Act with the utmost integrity which encompasses the highest standards of professional conduct, honesty and ethics.

- Maintain high standards of personal and professional conduct to meet industry expectations, reflect favourably upon the transport planning/modelling profession and serve as an example to others.
- Act with respect and avoid actions that will bring you, your organisation and the transport planning/modelling profession into disrepute.
- Clearly and concisely explain:
  - The context for the work, the outcomes being sought, how these will be used and who the target audience is or might be.
  - The underlying assumptions of the transport modelling and the limitations of the modelling results. Use simple terms and avoid technical jargon.

Principle 2: Best interests

Act in the best interests of the community and the transport industry by providing 'best for project' advice.

- As a trusted professional, you owe a duty of care to the community and other professionals working in the transport industry and must always act to provide objective and impartial advice which may influence project outcomes.
- Recommendations should not be based on transport modelling outcomes alone but rather in conjunction with outcomes from other relevant investigations. Always be mindful of the limitations of the models.
- Be constructive when reviewing the work of another practitioner. Audits and reviews should be performed in a professional manner and reported confidentially to those who are required to know. Disagreements and differences of opinion should be resolved in a professional manner.

Principle 3: Conflicts of interest

Do not allow conflicts of interest to inappropriately influence your actions. Always place the interest of the project before your own interests.

- Conflicts must be identified before, or as they arise, and then managed appropriately or avoided to ensure the interests of the best project outcome are achieved.
- Be clear whom you represent and in whose interests you are advising, particularly when advising more than one person.

Principle 4: Informed client consent

Collaborate with decision makers and help them to understand how the information you have provided should and should not be used.

As a service provider:

- Present all information that is relevant and may contribute to effective decision making.
- Take all reasonable steps to inform of the risks, implications and potential consequences of decisions.
- Only adopt sound assumptions, realistic model inputs and reliable data and only present outputs that cannot be misinterpreted or lead to inappropriate decisions. Be prepared to challenge a result or request an independent opinion if you consider the model outcomes are being misrepresented.
- Always provide qualifiers and assumptions to support reports on model outputs and make it clear if the model limitations have been exceeded.
- Provide objective and impartial advice.
- Develop partnership approach to the development and use of the transport model. Ensure the model is 'transparent'.

Principle 5: Service standards

Provide professional advice that is aligned to your clients' circumstances and your agreements with them

- Only use reliable information (and identify gaps or deficiencies that might adversely influence outcomes)
- Do not present model outputs in a manner that suggests these are 'accurate' – i.e. round the results, provide ranges rather than single numbers, and minimise the number of significant places.
- Outline limitations of the modelling, noting the results are not absolute values. Bring 'common sense' and practicalities to the results.

Principle 6: Professional expertise

Strive to achieve high standards of professional expertise by maintaining and improving knowledge and skills, and those of your staff.

As a service provider:

- Always meet, and seek to exceed, the minimum training standards through qualifications and ongoing professional development (including project experience).
- Only provide advice in areas in which you are qualified, authorised, skilled and competent. Make it known when competencies are being challenged or exceeded and identify alternative resources.
- Consider the level and quality of information available and the desired outcomes in selecting and recommending the appropriate model.
- Where appropriate internal skills are not available, use an appropriately skilled third party to advise, guide and review the modelling process.

CODE OF CONDUCT – PART 2: ADDITIONAL INFORMATION

Introduction

Part 2 – Additional Information is intended to provide additional information pertinent to the AITPM Code of Practice. This document covers the following elements:

- List of Recommended Guidelines;
- Glossary;
- Reporting checklist;
- Data and assumptions; and
- Education and training.

LIST OF RECOMMENDED GUIDELINES

Purpose Statement: ***Provide a list of modelling guidelines that are recommended for use by the industry, appropriate to the objective and context of the modelling activity.***

It is also important to provide overarching guidance on the use of these documents such as:

- Identification that these are guidance documents, not rules;
- Users shouldn't "cherry pick" components out of each; and
- The use of guidance as prescriptions in Request for Tenders.

It is also seen as a key part of this for AITPM to encourage consistent advice by state authorities.

It is not the objective of the code of practice to develop AITPM Transport Modelling Guidelines.

It should be noted that the following guidance does not guarantee that a model will provide accurate results, or indeed result in a model which meets the objective of the task at hand.

Types of Guidelines

Broad categories of advice that can be provided in guidance documents are:

- **Model Choice** – what type and/or software of model should be used for a particular modelling activity?
- **Suggested parameters** – what parameters should be used in the model and/or how should these best be sampled in reality?
- **Model development** – how should a model be developed, what approaches/methods should be used

- **Check methods** – how well does the model fit observed data used? Does it meet certain benchmarks?
- **Option Testing and Sensitivity** – how should a model be used to test future scenarios? How should one test the sensitivity of parameters?

Advice in guidelines varies between states and countries. This highlights the fact that guidelines are just that – guides must be treated with respect.

Benefits of Guidelines

There are several benefits to using guidelines. These can include:

- Provide guidance on use of parameters in the absence of data;
- Provide standardised approaches/techniques for consistency and quality;
- Suggestions on appropriate techniques to be adopted;
- Details the types of ranges that are commonly observed, both for parameters and results;
- Provide increased confidence in suitability of work;
- Give ideas to modellers on alternate approaches to modelling;
- Suggest uniform formulae; and
- Useful for training and career development.

Choosing a set of Guidelines

In choosing a guidance document or a set of guidelines to be used, one should consider:

- **Are there preferences of the local authorities?** – Local authorities and stakeholders will often have a preference for approaches, parameters and checking methods to be used. Modellers should consult with their relevant stakeholders before developing models.
- **Can parameters be developed from relevant data?** – The use of default parameters is almost always less preferable to developing site specific parameters from empirical data. It is however noted that many authorities require notes which outline differences from default parameters, thereby discouraging the change from default values. This should be outlined in reporting on the models.
- **What is the level of risk associated with the modelling activity?** – As mentioned above, conformance of model development and/or option testing to recommended guidance manuals does not guarantee model accuracy.

Summary List of Guidelines

A non-exhaustive list of guidance reviewed by and / or familiar to the TMN are shown below, with their locations.

Document Title	Location	Model Choice	Suggested Parameters	Model Development	Check Methods	Options Testing and Sensitivity
National Guidelines for Transport System Management - Department of Infrastructure and Regional Development (AUS)	https://atap.gov.au/		●	●		
Transport Analysis Guidelines: WebTAG - Department for Transport (UK)	https://www.gov.uk/guidance/transport-analysis-guidance-webtag		●	●		
Transport Assessment Guidance - Transport for London (UK)	https://tfl.gov.uk/info-for/urban-planning-and-construction/transport-assessment-guidance	●				●
Travel Model Validation and Reasonableness Checking Manual - Federal Highway Administration (US)	https://www.fhwa.dot.gov/planning/tmip/publications/other_reports/validation_and_reasonableness_2010/fhwahep10042.pdf				●	
Transport model development guidelines - NZ Transport Agency	https://www.nzta.govt.nz/resources/transport-model-development-guidelines/				●	
Traffic Modelling Guidelines - NSW Roads & Maritime Services	http://www.rms.nsw.gov.au/business-industry/partners-suppliers/documents/technical-manuals/modellingguidelines.pdf	●	●	●	●	
Aimsun Modelling Manual - Department of Planning Transport and Infrastructure (South Australia)	Held by DPTI		●	●	●	
Traffic Analysis Tools - Federal Highway Administration (US)	https://ops.fhwa.dot.gov/trafficanalysistools/		●	●	●	●
Traffic Modelling Guidelines - Transport for London (UK)	http://content.tfl.gov.uk/traffic-modelling-guidelines.pdf	●		●	●	
Operation Modelling Guidelines and Audit (OMeGA) – Main Roads Western Australia	TBC	●	●	●	●	

GLOSSARY

Purpose Statement: ***The objective of the glossary is to provide a key point of reference for modelling terms that are typically used across the industry to encourage consistent use.***

A larger glossary of key terms has been developed by the AITPM and is included for use as an Appendix to this document.

REPORTING CHECKLIST

Purpose Statement: ***The purpose of the checklist is to provide a check for writers that sufficient information is provided to adequately communicate assumptions, conclusions, risks and limitations associated with a modelling activity in a transparent way.***

Two checklists have been provided on the following pages - these being:

- **Model Calibration Report** – A report that outlines the development of a model; and
- **Model Options Report** – A report that outlines the outcomes of using a model for the purpose of projection.

Types of checklists have been divided into three risk categories; the following describes each:

- **High Risk Activities -** The highest risk transport modelling activities involve the forecasting of demand that impacts revenue for a facility that will be in part or totally privately funded. The most common example is forecasting for a toll road.
- **Medium Risk Activities** – These are typically where the model is being developed to provide information with respect to the development of publicly funded infrastructure. Examples include undertaking pedestrian modelling to assess platform requirements at a station, intersection modelling to evaluate geometric requirements (number of lanes, signal infrastructure).
- **Low Risk Activities** – This is where modelling is being used to assess likely projects and / or strategic priorities within a region.

It is noted that certain local authorities may also have their own reporting checklists to complete; this is provided as guidance only.

Options Report Checklist

Component of Report to be checked for **KEY:** ● Required ○ Desirable		Investment Level (High Risk)		Operational Level (Medium Risk)					Strategic Level (Low Risk)	
		Toll Road Forecasting	Private Revenue	Patronage Forecasting	Pedestrian Modelling	Intersection Upgrade Modelling	Corridor Modelling	Traffic Assignment Modelling	Travel Demand Modelling	LUTI Modelling
Inputs	Future Land Use Assumptions for each scenario	●	●	○	○		○	○	●	●
	Network Assumptions for each scenario	●	●	●	●	●	●	●	●	●
	Comparison of Land Use growth against historical growth	●	●	○	○		○	○	○	○
	Consideration of the likelihood of network assumptions being realised	●	●	○	○		○	○	○	○
Analysis	Expected Projection Range for key items (Demand)	●	●	●	○			●	●	●
	Expected Projection Range for key items (Operations)	○	○	○	●	●	●	●	●	●
	Waterfall Diagrams	●	●	○						
	Select Link Analysis	●	●	○	○	○	○	●	○	
	Modelled diversion	●	●	○				●	○	
	Change in Economic parameters (VKT, VHT, TOC)	●	●	○		○	○	○	●	●
	Change in average trip length (by mode and purpose)	●	●	○					●	●

Component of Report to be checked for **KEY:** ● Required ○ Desirable		Investment Level (High Risk)		Operational Level (Medium Risk)					Strategic Level (Low Risk)	
		Toll Road Forecasting	Private Revenue	Patronage Forecasting	Pedestrian Modelling	Intersection Upgrade Modelling	Corridor Modelling	Traffic Assignment Modelling	Travel Demand Modelling	LUTI Modelling
	Change in trip matrix size	●	●	○					●	●
	Change in system wide mode shares	●	●	○			○	○	●	●
	Comparison of modelled growth against historical growth	●	●	○		●	●	●	●	●
Review	Considerations of the risk associated with disruptive technology	●	●	●		○	○	○	●	●
	Description of sensitivity testing	●	●	●	●	○	○	○	●	●
	Qualitative consideration of the level of impact and likelihood of each risk and evaluation against a risk matrix	●	●	●	●		○	○	○	○
	Review by independent reviewer of the report and identification of the consideration of the biggest risks.	●	●	●			○	○	○	○

DATA AND ASSUMPTIONS

Purpose Statement: ***The purpose of the data checklist is to provide a check that an appropriate level of data has been used in the development of a transport model.***

A checklist for the collection of data is provided on the following pages:

	Strategic	Mesoscopic	Microscopic	Operational
Land Use Forecasts[1]	Typical categories of forecasts include total population projections for males and females (sometimes by age cohorts), dwellings/ households, education enrolments (primary, secondary, tertiary, TAFE), school aged children, household income (if available), and number of full time, part time and casually employed residents by occupation category. Employment forecasts are typically broken down into several industry categories (for example, retail, finance, construction, manufacturing, wholesale trade, technical, entertainment, education, services, etc). School enrolment forecasts are also required, preferably broken down by primary, secondary, tertiary and technical categories. For long term planning, land use forecasts are usually required 20-30 years into the future, preferably in five year intervals. Whenever possible, there should be multiple land use scenarios created, reflecting different growth strategies and underlying demographic assumptions (eg high, medium and low natural growth, interstate and overseas migration, etc).	Land use forecasts are required at a fine zone level for more detailed analysis of traffic and transport impacts. Land use is often available from the strategic model at a more coarse zoning system for comparison purposes.	Sub-area matrices are often generated from the mesoscopic level for detailed assignment at the micro level. Land use for individual developments or car parks is sometimes used for the trip generation component of micro models.	Not applicable.

[1] Note that in this section, the terms “forecasts” and “projections” are used interchangeably.

	Strategic	Mesoscopic	Microscopic	Operational
Household Travel Surveys	Trip rates (Number of trips made per person); Trip purpose and distance; car ownership; Time; and Trip modes (Car, Share car, PT, and Walk). Forms the primary behavioural travel demand database for all modelling. Involves study area wide (ie metro, regional, etc) face-to-face, telephone, mail-out/mail-back or GPS surveys (typically random sample of 1% to 5% of households and range of homogenous traffic analysis zones (TAZ) either large surveys every 5 or 10 years or rolling surveys that are undertaken on an ongoing basis (i.e. VISTA in Vic, and similar in NSW, QLD and WA). A relational database is created which consists of: **Household data** (no of persons, vehicles, relationships between persons, dwelling characteristics, household composition, etc) **Person data** (for each person in household: age, sex, income, education attainment, etc) **Travel data** (for each person in each household for one or more consecutive days within a 7 day period: trip origin, destination, start and end times along a journey or tour, mode of travel used for each leg of the journey, trip purpose, costs, travel times, temporal distribution (time slices), vehicle occupancy, etc) **Travel time** data along various routes used by respondents (eg GPS, Bluetooth)	Trip generation; Trip distribution; and Mode choice (Car, Shared Car, PT (bus, train), and Walk). Drawn from a subset of the primary household travel survey database augmented with more detailed temporal distribution of travel by mode, purpose within time slices. Typically uses the trip tables generated by macro model disaggregated at a finer zonal level than the parent TAZ Calibrated and validated at a smaller area/ regional level using traffic counts and travel time data drawn from GPS or Bluetooth, travel time surveys	Trip generation; Trip distribution; and Mode choice (Car, Shared Car, PT (bus, train), and Walk). Drawn from a similar subset to the meso model but with finer level of temporal distribution to accommodate needs of the models. Calibrated and validated at a smaller area level below meso level using traffic counts and travel time data drawn from GPS, or Bluetooth travel time surveys.	Trip generation; Trip distribution; and Mode choice (Car, Shared Car, PT (bus, train), and Walk). Primary sources are traffic counts and travel time data generated by traffic signal and control systems supplemented with special GPS or Bluetooth surveys.

	Strategic	Mesoscopic	Microscopic	Operational
	All of which us used to formulate, estimate, calibrate and validate strategic/ macro travel demand models of: • Trip Attraction • Trip Production • Market Segmentation • Trip Distribution • Mode Choice • Temporal distribution • Trip Assignment • Economic Analysis Such models typically incorporate freight/ commercial vehicle models to provide a complete coverage of travel demand patterns.			
Commercial Vehicle Surveys	How old is CV survey data? How reliable is CV survey data? How many categories of heavy vehicles are modelled? How are light CVs modelled? What is the average trip length for heavy and light CVs? What growth rates for CVs are assumed? Does assignment of heavy CVs match observed counts on a screeenline basis?	RAV vehicle? Heavy vehicle? CV routes and % breakdown? Speed? Hourly profile? Different vehicle types?	RAV vehicle? Heavy vehicle? CV routes and % breakdown? Speed? Hourly profile? Different vehicle types?	RAV vehicle? Heavy vehicle? CV routes and % breakdown? Speed? Hourly profile? Different vehicle types?

	Strategic	Mesoscopic	Microscopic	Operational
	Useful examples of freight demand models are the Freight Movement Models of: • Melbourne • Sydney • Brisbane • Adelaide • Perth Based on defining the origin and destination flow of commodities from industry generators and sinks converted into CV movements to provide travel patterns.			
Model Data Inputs and Assumptions	Economic variables: Petrol price; value of time. Trip Generation Rates. Are they constant over time? Trip Distribution. Trip lengths by purpose. Do they increase over time? Mode Choice. What factors affect mode choice? Network variables, household variables, any behavioural variables? Assignment assumptions: What type of auto assignment? Transit assignment assumptions such as walk time weights, wait time weights, transfer penalties. External trips – assumed growth rates?	Car following parameters for different road hierarchy, Including number of observed vehicles, Look ahead distance, safety distance, standstill distance, headway time Speed profile for different speed road. Mode Choice. What factors affect mode choice? Network variables, household variables, any behavioural variables? Traffic Signal types (fixed, variable, SCATS,	Car following parameters for different road hierarchy, Including number of observed vehicles, Look ahead distance, safety distance, standstill distance, and headway time. Speed profiles for different speeds. Headway and gap time. Traffic Signal types (fixed, variable, SCATS, synchronized) and time plans.	Headway and gap time. Traffic Signal types (fixed, variable, SCATS, synchronized) and time plans. Saturation flow. Traffic flow input/route choice

	Strategic	Mesoscopic	Microscopic	Operational
	Are air passengers included? Are visitors modelled?	synchronized) and time plans.	Simulation period (warm-up , peak and cool-down periods). Saturation flow.	
Traffic Count Data	Trip generation Trip distribution	Turning movement counts and speeds for each vehicle classes. Existing signal time plans. Data to be used for model calibration and validation, including average journey time for predefined routes, queue lengths, and saturation flows. Trip generation Trip distribution	Turning movement counts and speeds for each vehicle classes. Existing signal time plans. Data to be used for model calibration and validation, including average journey time for predefined routes, queue lengths, and saturation flows. Trip generation Trip distribution	Turning movement counts and speeds for each vehicle classes. Existing signal time plans. Queue lengths. Saturation flows. Trip generation Trip distribution

	Strategic	Mesoscopic	Microscopic	Operational
Public Transport Data	PT line routes and its information such as vehicle types and characteristics, service frequencies, start time, active stops, dwell times, and vehicle speed. Passenger patronage survey (period of day, time interval, location, route, PT type and size, occupancy) Bus rider survey (start and end points of trip, origin trip purpose, destination trip purpose, walk time, wait time, travel time, transfer time, fare) Travel time survey for different PT service routes and dwell time at stop points.	PT stop locations and geometry. PT line routes and its information such as vehicle types and characteristics, service frequencies, start time, active stops, dwell times, and vehicle speed. Passenger occupancy. PT ridership at PT stops	PT stop locations and geometry. PT line routes and its information such as vehicle types and characteristics, service frequencies, start time, active stops, dwell times, and vehicle speed. Passenger occupancy. PT ridership at PT stops	Public transport system types and characteristics, service frequencies, and vehicle speeds. Passenger occupancy. PT ridership at PT stops
Other Data		Background file to be used for building up road network, including background images, road hierarchy, post speed for roadways, lane widths, any lane closures for any vehicle type, junction control types and signal time plans. Driving behaviour at merging & diverging sections.	Background file to be used for building up road network, including background images, road hierarchy, post speed for roadways, lane widths, any lane closures for any vehicle type, junction control types and signal time plans.	Background file to be used for building up road network, including background images, post speed for roadways, lane widths, junction control types and signal time plans. Detector locations and configurations if any.

	Strategic	Mesoscopic	Microscopic	Operational
			Vehicle type and classes to be simulated in the model. Detector locations and configurations if any. Parking lot locations and configuration if any. Driving behaviour at merging & diverging sections.	Driving behaviour at merging & diverging sections.

EDUCATION AND TRAINING

It is a key behaviour for practitioners to develop their understanding and understand the opportunities and risks associated with transport modelling, and to know where to seek further guidance. In this, AITPM seeks to provide opportunities to develop in this practice through:

- The AITPM National Conference and associated National Transport Modellers Workshop; and
- Local State Events.

Depending on the proposed involvement, transport planners should also consider:

- Training by the Australian Road Research Board (ARRB);
- Software specific training; and
- University Training.

Further information can be found on: https://www.aitpm.com.au/transport-modelling-network/

GLOSSARY OF TERMS

Term	Definition	Source	
.PRT	Output file produced by TRANSYT detailing model results.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
85th percentile	Value of a variable characteristic of individuals in a population possessed by no more than 85% of that population.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
AADT	See Annual average daily traffic.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
AAWT	See Annual average weekday traffic.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
Absolute model	The trip matrix is constructed by splitting trip ends into smaller and smaller segments based on the cost of each segment.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Absolute model applied incrementally	Absolute model used to update a trip matrix for a historic year, i.e. the model base year.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Accessibility	An indication of the proximity of a person, site or zone to a particular activity or group of activities. It is also defined as the ease or difficulty of making trips to or from each zone.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Accuracy (of the model output)	How closely it represents the true value(s) of the network.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
ADT	See Average daily traffic.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
ADT count	The average daily number of vehicle/axle counts measured at a count station.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
ADT station	A traffic-measuring device installed at a specific location.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Aggregate data	Data that relates to a mass of group of people, vehicles or area. The collective properties of the variable are of interest.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
AIMSUN	Advanced Interactive Microscopic Simulator for Urban and nonurban Networks, modelling software developed by TSS.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Alternative hypothesis (one of statistical hypothesis tests for comparing models)	Of the test, usually denoted by H1. Here it is that the measures being compared are not equal.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	

Annual average daily traffic (AADT)	The total volume of traffic passing a roadside observation point over the period of a calendar year, divided by the number of days in that year (365 or 366 days).	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Annual average weekday traffic (AAWT)	The average 24 hour traffic volume on weekdays (Mondays to Thursdays or Fridays) throughout a 12 month period, at a specific observation point.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
ANPR	Automatic Number Plate Recognition.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
AON assignment	The AON (all-or-nothing) assignment technique by which minimum travel time paths are computed for each zone pair and all flows between these pairs are loaded onto these paths.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	Abbrv.
AQMA	Air Quality Management Area.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
ARCADY	Assessment of Roundabout Capacity And DelaY, modelling software developed by TRL.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
ASL	Advanced Stop Line (for cyclists).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Assignment model	Based on the most up-to-date estimate of the trip matrix and a network model (a mathematical representation of the transport network), which is used to calculate the cost of travel between each pair of zones.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Austroads	The association of Australian and New Zealand road transport and traffic authorities whose purpose is to contribute to the achievement of improved road transport outcomes.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Automatic traffic count	A traffic count obtained by machines or through the application of technology, rather than by manual recording.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Average daily traffic (ADT)	ADT is a sample of the AADT and is the traffic count averaged over a particular month, a week or a few days.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Average weekday daily traffic (AWDT)	Taken as the average 24-hour count over the period from Monday to Sunday. It is often considered because the longer the counting period used to observe a traffic stream, the better the resulting estimates of design parameters such as AADT.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Average weekday traffic (AWT)	The total traffic volume for all of the weekdays (Monday to Friday) less public holidays, Saturdays and Sundays in a stated period, divided by the number of such days in that period.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

AWDT	See Average weekday daily traffic.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
AWT	See Average weekday traffic.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
Base year	Either the current year or a recent year.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
BP	Bus Priority.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
BR&P	Better Routes and Places Directorate, formerly the London Road Safety Unit.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Calibration	The process of altering the model to reflect the observed data as well as necessary to satisfy the objectives of the study. Commonly an iterative process.	NZ Transport Agency 2014, *Transport Model Development Guidelines*, New Zealand	
Calibration	A process where the numerical parameters are used in the model, many of which cannot be observed directly and therefore need to be estimated using a sample of data and statistical principles.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Capacity restraint	A traffic assignment technique that takes into account the build up of congestion with increased traffic volumes. It adjusts the link travel times according to the prevailing flows.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
CE	Checking Engineer, key role identified in MAP.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Central limit theorem	A probability theory that underlines the foundation for many statistical procedures; it results in the understanding that the average of the model outputs will tend to be normally distributed as the no. of runs (sample size) increases, even if the actual network the model is based on is not normally istributed; it is suggested to use a minimum of 20 runs (observations).	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Centroid connector	Imaginary links that represent the street network within a zone. They 'connect' trips from a zone to the modelled network.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
CFP	Cyclic Flow Profile.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
CI	See Confidence interval.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	Abbrv.
Classification count	A sample count of traffic in which the vehicles within the traffic flow are classified into types or characteristics, such as speed and weight.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

CLF	Cableless Linking Facility.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
COBA	COst Benefit Analysis, described in the DMRB.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Competing opportunities model	Mathematical model for distributing trips based on the assumption that the trips originating in any zone will distribute themselves to other zones in proportion to the probability that the trips have not found another destination at that trip length.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Confidence interval (CI)	A range of values around a "sample" statistic (such as mean, median, mode, standard deviation) where the 'true' statistic can be found. It has a level of confidence (or confidence level), usually set at 95 per cent. It does not mean that the true value has a 95 per cent chance of being in the interval, providing that the statistical framework is correct. The two major factors determining the width of a confidence interval are the sample size and the variation of these data – the larger the sample size, the more reliable its mean; the larger the variation, the less reliable the mean.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Confidence level	See Confidence interval.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Congestion pricing	Pricing of public and private urban road transport until each covers its real resource costs.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Cost matrix	Based on outputs from the assignment model and is used to inform the demand model. Various measures of cost, such as travel time, distance, and charges such as public transport fares or highway tolls, are extracted for each origin-destination pair in the assignment model – a process known as skimming.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
CTM	Cell Transmission Model, new traffic model introduced in TRANSYT v13 in addition to PDM.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
CYOP	CYcle time OPtimisation, a TRANSYT feature used to select an appropriate cycle time for a modelled network.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
DE	Design Engineer, key role identified in MAP.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Delay	The additional travel time experienced by a vehicle or pedestrian with reference to a base travel time (e.g. the free flow travel time).	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Demand	The representation of movements (vehicles, persons etc.) across the area. Commonly in the form of origin – destination trip matrices and the profile of demand through the time period modelled.	NZ Transport Agency 2014, *Transport Model Development Guidelines*, New Zealand	
Demand	The traffic volume desiring to travel along a given route.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Demand flow	The number of vehicles or pedestrians arriving during a given period as measured at the back of the queue (as distinct from departure flows measured in front of the queue).	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Demand management	The active intervention in the market to influence the demand for services and the assets generated and/or used in the supply of these services in order to best match available resources to real needs and to ensure the services provided are delivered with the best value for money.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Demand model	Forecasts trip matrices based on trip ends and travel costs, and assumptions about travellers' behavioural response to cost (in most cases).	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Demand responsive transport	System providing radio control despatched door-to-door or point-to-point service. The vehicle is usually summoned by phone and routed by computer or manual means to respond to a number of calls; it may also operate on a fixed route with diversions to pick up passengers upon telephone requests. It provides service to travellers with different origins and destinations and may also include permanent bookings on a subscription basis.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Design hour volume (DHV)	1. The number of vehicles expected to use the highway adopted for the purpose of design, normally expressed as the number of vehicles per hour. 2. The number of vehicles per hour for which the road is designed.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Design queue length	The predicted maximum length of a vehicle queue in a particular lane or lanes at an intersection during a period of peak traffic flow.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Design speed	A speed fixed for the design and correlation of those geometric features of a carriageway that influence vehicle operation. Design speed should not be less than the intended 85th percentile speed.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Destination	The point or area of termination of a trip.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Destination	Point or area in which a trip ends.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Deterministic model	Model that produces a mathematically exact solution.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

DfT	The Department for Transport.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
DHV	See Design hour volume.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
Disaggregate data	Data at the level of individual persons, households, etc.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Disaggregate model	Mathematical model of travel behaviour related to individual traveller characteristics.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Distance	A linear measurement along the road alignment from a permanent reference point.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
DMRB	Design Manual for Roads and Bridges.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
DoS	Degree of Saturation.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
DSD	Desired Speed Decision (used in VISSIM modelling).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
EFROMD/ELMOD	Computer models which back-calculate the elastic moduli of pavement layers from measured deflection bowl data.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
EFROMD/ELMOD	Computer models which back-calculate the elastic moduli of pavement layers from measured deflection bowl data.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
Employment	The number of employees, or jobs, in relation to the zone of work. This may be stratified by employment type e.g. retail, manufacturing, etc.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Equilibration	Process of allowing for fluctuations in traffic demand.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Equilibrium assignment	An assignment process by which all used routes between zone pairs have equal and minimum costs, while all unused routes have greater or equal costs.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Equilibrium assignment	Process of allocating the total number of trips between two zones to minimum impedance paths or routes, which reflects a state of balance between travel impedance and flow as determined by the assignment.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
EQUISAT	A TRANSYT feature that provides an initial set of signal timings prior to optimisation, based on equal saturation of critical conflicting links.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.

Evaluation	The process of determining whether the outcomes are desirable, affordable or acceptable; properly involves those with an interest in the result, or at least an overt consideration of their requirements.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
External cordon survey	Cordon survey of a regional study area involving a roadside interview or postcard survey with data related to traffic counts.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
External traffic zone	Traffic zone located outside the boundaries of the study area. Trips crossing the study area boundary are allocated to the appropriate external traffic zone in which they start or end.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
External trip	A trip that has either an origin or destination, but not both, in the study area.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
External trip	Trip that starts or ends outside the study area.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Extreme points	Sometimes called outliers; they are the runs that are very different to all the others or a large section of the others; they are easily displayed in box plots (by "*" and need to be investigated to ascertain if they are caused by an error in the simulation or are actually indicative of the network being simulated; can be defined as a point that falls > 1.5 times the inter-quartile range away from the "box" in a boxplot.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Fixed demand	Demand is independent of cost, and the trip matrix is adjusted using trip ends and no behavioural model is required.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Flow rate	Number of vehicles or pedestrians per unit time passing (arriving or departing) a given reference point.		
FlowRound	Software for the analysis of spiral traffic lane movements at signalised and unsignalised roundabouts, developed by JCT.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
FPT	Forward Planning Team, formerly Network Assurance Team.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
F-Test (one of statistical hypothesis tests for comparing models)	The statistical test used to compare the variances/standard deviations from two models.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Full variable demand	Demand in each cell of the matrix can vary according to demand in other cells of the trip matrix and costs in all cells of the cost matrix.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	

Generalised cost	The various costs of travel, including travel time and financial cost, combined into a (usually) linear combination of each cost component, which reflects overall perception of difficulty of travel.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Generalised cost	Measure of the composite cost of a trip by a motorist or user of public transport where the travel time and out-of-pocket costs are expressed in monetary units, which involve the estimation of the monetary value of time and the perceived cost of access, transfer, waiting and egress time associated with public transport.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Generalised cost matrix	Usually a linear combination of the various components of cost (travel time, fuel costs, and public transport fares for example). This is usually calculated in units of time as opposed to money (as the Monetary costs are converted into time units by dividing the monetary value by the value of time which varies by trip purpose and year. The value of time varies by trip purpose and can also vary by income and distance.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Generalised cost	This cost is usually a linear additive function of some, or all, of the following costs: travel time between zones, access and wait times, ride time, distance between zones, fares, fuel costs and parking charges.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Generated traffic	1. Traffic created by a new or improved facility as distinct from traffic that is diverted to a facility and normal traffic increase. 2. Traffic created by changes in land use.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Geographic information system (GIS)	A map based system that enables display of layers of data for various analysis purposes.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
GIS	Geographic Information System.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
GIS	See Geographic information system.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
GLA	Greater London Authority.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Gravity model	A model that distributes the number of trips between all trip-producing zones and trip-attracting zones.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
HCM	Highway Capacity Manual.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.

HGV	Heavy Goods Vehicle.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Home	A group of rooms or a single room, occupied or intended for occupancy as separate living quarters by a family, group of persons or by a person living alone.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Home-based trip	A trip that has its origin or destination at the home end. It may be a person trip, vehicle trip, walk trip, or public transport trip.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Household	A person or persons living in the one home.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
HTA	Highway Traffic Assignment.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
ICA	Intersection Capacity Analysis (used in VISUM modelling).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Incremental assignment	The process by which flows between all zone pairs are loaded onto the network in pre-specified steps.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Incremental/pivot-point model	Changes in cost (rather than absolute cost) are used to update the trip matrix.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Independent data	Observed data not used in any model calibration process, ie data compared once and not used in any iterative adjustment of the model.	NZ Transport Agency 2014, *Transport Model Development Guidelines*, New Zealand	
Internal trip	A trip that has both its origin and destination in the study area.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Internal trip	Trip that starts and ends in the study area.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Inter-quartile range (IQR)	The range of the middle 50 per cent and is equal to Q3 - Q1.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Intervening opportunities model	Mathematical model for distributing trips based on the assumption that the trips originating in any zone will distribute themselves to other zones in proportion to the probability that the trips have not found a prior destination and that they will be as short as possible.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Interview survey	Survey in which the means of data collection is by interview with drivers or other members of the public.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Interzonal time	Total time to travel between zones consisting of the terminal times at each end of the trip plus the driving time.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Interzonal trip	Trip between two zones.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Intrazonal time	Average time of travel for trips beginning and ending in the same zone, including the terminal time at each end of the trip.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Intrazonal trip	Trip with both its origin and destination in the same zone.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Intra-zonal trips	Trips with origin and destination in the same zone.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
In-vehicle survey	Survey in which passengers of public transport modes (e.g. bus, train, ferry) are interviewed while travelling in the vehicle.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
In-vehicle time	Time spent travelling in a vehicle.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
IQR	See Inter-quartile range.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	Abbrv.
Iterative assignment	Process in which all trips are allocated to minimum impedance paths, the travel impedance is adjusted to reflect the flow, and the allocation is repeated.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
ITS	Institute for Transport Studies, University of Leeds.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
JCT	JCT Consultancy Ltd, developer of FlowRound, LinSat, LinSig and TranEd.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Journey	Movement involving one or more trips e.g. 1. 'journey-to-work', which could involve a direct trip to work or an immediate stop for some other, but secondary purpose; or 2. an 'origin-to-origin' journey, which could involve several trips, each for a particular purpose. Note: Home-to-home journeys have also been termed 'tours'.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Journey leg	Part of a multi-modal journey covered by only one mode of travel. Note: A journey leg is an unlinked trip that forms part of a longer journey; e.g. a journey may consist of a walk leg, followed by a bus leg, a train leg and another walk leg.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Journey time	The time taken to travel between two specified points on a route, excluding the time for any stoppages other than those due to interruptions by traffic.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Journey-to-work survey	Information extracted from the national census, which includes where people live and work, their industry, occupation and sex.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Kiss-and-ride	System in which people are driven in a car to a specified location to board public transport after which the car is driven away.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
LAMP	Local area management plan.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
LAMP	See Local area management plan.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
Land use	Use to which land is put, e.g. residential, commercial, open space. In transport analysis the term encompasses measures of social and economic activity that take place on the land, e.g. size of population, number of employees.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Land-use model	A model which looks at the formation of households, migration of people, business start-up etc. (Often responding to accessibility provided by the network, showing the resulting demand for travel, and complementing with a transport model to form a land-use interaction (LUTI) model).	NZ Transport Agency 2014, *Transport Model Development Guidelines*, New Zealand	
Land-use planning	Way in which planners recommend that land resources be utilised whether by housing, commerce, industry, etc.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Latent demand	Quantity of demand that is suppressed through the unavailability of a transport service.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
LATM	See Local area management plan.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
Legion	Pedestrian modelling software, developed by Legion Ltd.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
LGV	Light Goods Vehicle.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Link	A section of a highway or public transport network defined by a node at each end.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Linked trip	One-way movement from one place to another for a specific purpose, involving more than one mode of travel.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
LinSat	Freely available software developed by JCT, allowing the estimation of effective flare usage based on flow data.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
LinSig	Modelling software developed by JCT.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Local (traffic) precinct	An area, sometimes a sub-area within a local traffic area, containing only local streets, where specific local problems exist which can be treated separately from other parts of the local traffic area.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Local access path	Minor path generally located in a local or residential area that links road and/or other path cycling routes.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Local area	An area containing only local and collector roads, which is bounded by arterial and sub-arterial roads or features such as rivers, railway lines, or the limit of urban development.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Local area traffic management (LATM)	The use of physical devices, streetscaping treatments and other measures (including regulations and other non-physical measures) to influence vehicle operation, in order to create safer and more liveable local streets. Note: The use of the acronym LATM as a noun to mean device, common in some parts of Australia, is best avoided.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Local traffic area	A traffic analysis area usually bounded by arterial roads or other roads serving a significant road transportation function, or other physical barriers such as creeks, railways, reserves or impassable terrain.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Local traffic precinct	Area that will be used only by traffic that either starts or ends a trip within a precinct.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Location	A single site (either an intersection or a point along a road), a route (length of road), or an area covering a number of roads. In connection with 'mass action programs' it also means a multitude of locations across a road network which have a common hazardous feature.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Logit model	Also known as the 'multinomial logit model', it calculates the proportion of trips that will select a specific mode or activity.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Lost time	The amount of time in a cycle which is effectively lost to traffic movement because of starting delays, the falling-off of the discharge rate which occurs during the yellow period and any all-red periods.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
LSTCC	London Streets Traffic Control Centre (within TD).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
LTA	Local Traffic Authority.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
LTS	London Transportation Studies, strategic model.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
LUTI model	Land-Use Transport Interaction model.	NZ Transport Agency 2014, *Transport Model Development Guidelines*, New Zealand	Abbrv.

MAE	Model Auditing Engineer, key role identified in MAP.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Main mode of travel	Journeys involving more than one transport mode: the mode of travel used for the longest distance or, in the case of equal distances, the mode of travel used for the greatest time.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
MAP	Model Auditing Process.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Matrix adjustments	The processes involved in developing the representation of demand movements through the network, notably model or direct adjustments made to improve some form of observed or starter matrix.	NZ Transport Agency 2014, *Transport Model Development Guidelines*, New Zealand	
Mean	Denoted by x throughout the guidelines, it is the average of the values from the simulation model, eg for VHT the mean VHT would be their sum divided by the number of runs in the model. The mean can be affected by extreme points.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Mean queue length	The average number of vehicles waiting at the stop line at the commencement of a phase.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Measure	A general term which covers regulation and other non-physical actions, as well as devices and other physical actions, to manage traffic at the local level.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Measurement repeatability	An indication of variation in measures about the mean.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Measures of central tendency	A way to specify the central value of the simulation model, which should always be reported with their corresponding confidence intervals. There are three types listed in this glossary: mean, median and mode. For a normal distribution the three measures are equal. Figure 1 is a comparison of the three measures from two distributions of differing skewness. Note how the median maintains its location regardless of variation of the values as opposed to the mean and mode.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Measures of dispersion	Measures that reflect how the outputs vary or how they are dispersed (i.e. their variability).	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	

Median	If the model outputs are placed in order from lowest to highest, the median is the middle value. When the number of runs in the sample is even, the median is computed as the average of the two middle values. It is less affected by extreme points than the mean and so can be more "robust" (if there is a substantial variation in the values of the runs).	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Merging	The converging of separate streams of traffic into a single stream.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Metered access	A system of allowing vehicles to enter a highway or road only when a control mechanism allows it. The mechanism can, therefore, control traffic by allowing vehicles to enter only when traffic permits.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Metered access	The capacity of a road between intersections.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
MGV	Medium Goods Vehicle.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Minimum path	The route between a zone pair that has the least cost (time, distance, generalised) in comparison to all other possible routes.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Minimum path tree	All the minimum paths between zone pairs that emanate from an origin zone.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
MME	Mean Modulus of Error.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
MMQ	Mean Maximum Queue.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Mobility management	European term for travel demand management.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Modal choice	Choice on the use of different forms of transport related to individual, business or household characteristics and the travel parameters of the competing modes.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Modal choice model	Mathematical model used to allocate trips between zones to each of the reasonable modes of transport available, which is normally applied on the basis of the relationship between disutilities for each mode and the socio-economic characteristics of the likely users.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Modal interchange	A transport node of a major nature, which has a facility where people can readily change from one mode of transport to another.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Modal split	The division of trips between different modes of travel (private transport, public transport).	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Modal split	Describes the percentage of people or goods on different forms of transport e.g. the percentage of people using private cars as opposed to public transport.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Mode	The value that occurs most frequently in the model output.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Mode	Method of transport e.g. motor vehicle travel (as driver or passenger), bus, light rail and walking.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Model	Mathematical description of a situation that uses data on past and present conditions to make predictions about the effects of changes.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Model (Transportation related)	A single network including either the assigned demand or the mathematical quations representing trip-making relationships.	NZ Transport Agency 2014, *Transport Model Development Guidelines*, New Zealand	
MOVA	Microprocessor Optimised Vehicle Activation.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
MUC	Multiple User Class (assignment).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Multimodal	Combination of two or more modes of travel in a single journey.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
NAE	Network Assurance Engineer, key role identified in MAP.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
NAQS	National Air Quality Strategy.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Network	The transport infrastructure (links and services) and features that provide for, control, and influence travel across a (study) area.	NZ Transport Agency 2014, *Transport Model Development Guidelines*, New Zealand	
Network	1. Set of roads which provide a means of road based travel within a region. In transport terms it is defined in terms of links and nodes. 2. A schematic mathematical model of a road or public transport system which contains a link-by-link description of the routes covered by the public transport system and the speed and capacities of road links.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Network description	Computer record that describes the transport system in terms of time, distance and link and node attributes.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Network level	A type of road condition survey or data analysis where the main purpose is to monitor network performance or assist with network asset management decisions, as distinct from project decisions.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Nilsson's power model	A series of power equations developed by Nilsson to relate the change in casualties and casualty crashes given a change in mean speed.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Ninety-fifth percentile queue length	Queue length expected to be exceeded in 5% of signal cycles only, used for designing adequate queue storage length.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
NMD	Network Management Duty (see TMA).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
NMG	TfL Surface Network Management Group.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Node	A numbered point on a network representing a centroid or a junction of two or more links.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Non home-based trip	A trip that has neither origin nor destination at the home end. It may be a person trip, vehicle trip, walk trip, bicycle trip or public transport trip.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Non-home based trip	Trip that does not start or finish at home.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Normal distribution	Illustrated by a bell-shaped histogram – meaning there is symmetry about the mean. The comparison of the means of two models uses a paired t-test which assumes the models are normally distributed which stresses the importance of having 20–30 simulation runs.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
NP	Network Performance (within TD), formerly Urban Traffic Control (UTC).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Null hypothesis (one of statistical hypothesis tests for comparing models)	The general position usually denoted by H0 of a hypothesis test. Here it is that the measures (eg mean, variance) being compared are equal.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Number plate survey	Survey involving the recording of vehicle licence plate numbers at different locations for the purpose of developing origin-destination data.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
O/D	Origin-Destination (matrix).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.

O/D format	See Origin / Destination format.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	Abbrv.
Occasional service	Service by a nominated design vehicle less than once per day.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Occupancy	Proportion of the time that a designated point in a traffic lane is covered by vehicles.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Occupancy time	The time that starts when the front of a vehicle enters the detection zone and finishes when the back of the vehicle exits the detection zone. Thus, it is the duration of the period when the detection zone is occupied by a vehicle.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
OD matrix	See Origin-destination matrix.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
Off-peak hour	A representative hourly flow indicative of the average flow outside the peak period.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Off-peak period	The periods that have low demand volumes of traffic during the day.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
ONE	Operational Network Evaluator.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
On-road public transport (ORPT)	Includes on-road public transport such as buses, trams, taxis.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Operating speed	The 85th percentile speed of cars at a time when traffic volumes are low and which allows a free choice of speed within the road alignment. NZ: The highest overall speed, exclusive of stops, at which a driver can safely travel on a given section of road under the prevailing traffic conditions.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Origin	The point or zone at which a trip begins.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Origin	Point or area in which a trip starts.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Origin-destination matrix (OD matrix)	Tabulation containing all the trips being made in a network over a given time interval. The number of trips between a specified origin-destination pair is one cell (element) of an O-D matrix.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Origin-destination survey	The measurement and study of an aspect of traffic movement.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
ORPT	See On-road public transport.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
OS	Ordnance Survey (Mapping).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.

OSCADY PRO	Optimised Signal Capacity And Delay: Phase-based Rapid Optimisation, modelling software developed by TRL.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Overall time	Time taken to travel between two specified points on a route, including the time of all stops.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Overall travel speed	The total distance traversed by a vehicle divided by the total time required including all traffic delays.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Overflow queue	The number of vehicles left in a queue at the expiry of green time for that queue.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Own cost elasticity	Demand in each cell of the trip matrix can vary, but the source of any variation is limited to the corresponding cell of the cost matrix only.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
P	Promoter, key role identified in MAP.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
P/A format	Production / Attraction format.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	Abbrv.
Paired T-test (one of statistical hypothesis tests for comparing models)	The statistical test used to compare means from two models.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Park-and-ride	System in which people drive to a specified location, park there, and board public transport for a defined destination.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Park-and-ride ticket	Combined vehicle parking and public transport ticket.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
PCU	Passenger Car Unit.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
PDM	Platoon Dispersion Model, the traditional traffic model used in TRANSYT.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Peak hour	The hour of the day having the highest traffic volume and/or number of passengers during the peak period.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Peak hour factor	Typically defined as the ratio of hourly volume to the maximum 15 minutes rate of flow expanded to an hourly volume.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Peak hour volume	The maximum traffic count observed in any 60 minute interval during a day. In rural areas it is usually sufficient to quote a single peak hour volume. In urban areas two peak hour volumes are often considered: one for the morning and one for the evening. This practice is adopted because of the likelihood of significant differences in the directional flows on urban roads at different times of day.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Peak period	The period that has the highest demand volume of traffic and/or number of passengers during the day (peak hour, peak half hour, etc.) (see Off-peak period).	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Peak traffic flow	The traffic volume during a time period of specified length during which such volume is at its maximum.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Pedestrian	A person walking, and including people in wheelchairs, on roller skates or riding vehicles such as skate boards or other vehicles, other than a bicycle, powered by effort or a motor and with a maximum speed of 7 km/h.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Percentile / Centile	The value of for example VHT below which a certain per cent of runs fall, eg 95 per cent percentile is the VHT value below which 95 per cent of runs are found.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Percentile speed	Speed at or below which the nominated percentage (e.g. 15, 50, 85) of vehicles are observed to travel under free flow conditions.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Person trip	Any trip made by a person.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Person trip	Any trip made by a person except those trips undertaken by the driver of a commercial vehicle where the vehicle, at the time, was being used for commercial purposes.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Person type characteristics	Include age, the extent to which the person is working, household structure and household car ownership.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
PI	Performance Index, a monetary value used in TRANSYT to assess the cost of stops and delays in a network.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
PICADY	Priority Intersection Capacity And DelaY, modelling software developed by TRL.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Potential traffic	The total traffic that would move between two terminals assuming ideal travelling conditions.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

PRC	Practical Reserve Capacity.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Precision	A function of the scale of the test. It has two different meanings depending on the context: When trying to detect a difference between two scenarios: the precision is the size of the difference the study is trying to detect, eg a study aiming to detect a 1 per cent difference in results between two scenarios will need a larger number of runs than if only trying to detect a 10 per cent difference. In a single model analysis precision of an output (for example Mean VHT): precision is the desired width of the confidence interval for the output.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Priority mode	In a multimodal journey, a single mode can be assigned to that journey by ranking all possible modes and using the mode of highest ranking.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Probabilistic assignment	Multipath assignment method, which assigns trips to one or more 'reasonable' paths through the network on the basis of their relative probability of use.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Project/assignment traffic model	A traffic model which assigns vehicle demand to a network and has no direct incorporation of landuse, demographics etc. This form of model requires the demands to be specified as an input. They may be developed with a specific task or transport project in mind. These models range from single intersections to entire inter-urban areas and are built using a wide range of model forms. These models will generate travel times between zones, vehicle emissions, queues etc.	NZ Transport Agency 2014, *Transport Model Development Guidelines*, New Zealand	
PTV	Planung Transport Verkehr (PTV) AG, developer of VISSIM and VISUM.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Purpose of travel	Reason why a journey is undertaken. In transport planning these reasons are usually grouped into general purpose categories within the two sets of home based and non-home based.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Quartiles	Q1 =the 25th percentile or 1st quartile; Q2 =the median or 2nd quartile; Q3 = the 75th percentile or 3rd quartile.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
QueProb	TRANSYT feature allowing the estimation of effective flare usage based on flow data.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.

Queue	A line of vehicles or pedestrians waiting to proceed through an intersection. Slowly moving vehicles or pedestrians joining the back of the queue are usually considered part of the queue. The internal queue dynamics can involve starts and stops. A faster-moving line of vehicles is often referred to as a moving queue or a platoon.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Queuing	The forming of a line of delayed vehicles.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Queuing area	The area of a circulation roadway between the property boundary and the vehicle control point, available for the queuing of vehicles.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Range	The maximum minus the minimum.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
RD	TfL Streets Road Directorate.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Realism testing	Rerunning the model with some standard changes to inputs, such as fuel prices, public transport fares and car journey time, to check that the model responses (elasticities) are realistic.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Regional growth model	Land-use model used to estimate and distribute growth in population, employment, etc.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Regional transport model	A transport model comprises a traffic assignment model with a demand model. These models are concerned with the movement of people and goods and provide information on mode share, induced travel, volume of freight carried etc. Transport models are built on relationships between land-use activity, demographics, etc. and commonly cover the movement of transport demand across an entire region. The forms of these models can be 3 or 4-stage, or activity based. May also be referred to as strategic, macro(scopic), or demand models.	NZ Transport Agency 2014, *Transport Model Development Guidelines*, New Zealand	
Residual queue	The number of vehicles left in a queue at the expiry of a signal phase.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Reverse commuting	1. Process of travelling in a direction opposite to the direction of peak traffic. An example is travelling from a residence in the city to a place of employment in the suburbs. Referred to as 'reverse' because it is the opposite of the usual pattern of travel from a suburban residence to a job in the city. 2. Quantity of demand in a direction opposite to the direction of peak traffic.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Road capacity	Maximum number of vehicles or pedestrians that can pass over a given section of a lane, road or footpath in one direction (or in both directions for a two-lane or three-lane road) during a given time period under prevailing road and traffic conditions. It is the maximum rate of flow that has a reasonable expectation of occurring. In the absence of a time modifier, capacity is an hourly volume. The capacity would not normally be exceeded without changing one or more of the conditions that prevail. In expressing capacity, it is essential to state the prevailing road and traffic conditions under which the capacity is applicable.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Round trip	Any journey by one vehicle or unit from the start of the route to the end of it and back again to the start.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Route	1. That combination of road sections connecting an origin and destination. 2. In traffic assignment, a continuous group of links connecting two centroids, which normally requires the minimum time to traverse. 3. The path travelled by a public transport vehicle.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
RR67	Research Report 67, publication by TRL describing a methodology for the prediction of saturation flows.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
RSA	Reduced Speed Area (used in VISSIM modelling).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
SAE	Signals Auditing Engineer, key role identified in MAP.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
SAFENET	Software for Accident Frequency Estimation for NETworks, accident modelling software developed by TRL.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Sample size	The number of runs; larger sample sizes lead to increased precision for model outputs (based on model inputs); it is important to have between 20–30 runs at least (see Central limit theorem).	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
SASS	System Activated Strategy Selection.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
SATURN	Simulation and Assignment of Traffic to Urban Road Networks, modelling software suite developed by ITS.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.

SCOOT	Split, Cycle and Offset Optimisation Technique, developed by TRL.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Screenline	An imaginary line, usually along physical barriers such as rivers, railway lines or roads. Screenlines split the study area into a number of parts. Traffic classification counts, and possibly interviews, may be conducted along these lines to compare or calibrate data and models.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Sensitivity testing	Rerunning the model with changes to model parameters, to check the model results are robust to changes in these parameters (or otherwise indicate areas of risk if the model inputs are changed).	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Skewness	A measure of the asymmetry of the model. Can be positively (right tail longer) or negatively skewed (left tail longer).	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Skimming	A process in which various measures of cost, such as travel time, distance, and charges such as public transport fares or highway tolls, are extracted for each origin-destination pair in the assignment model.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
SLD	Site Layout Drawing.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
SQA-0064	TfL TD Document, Technical Specification SQA-0064, containing Design Standards for Signal Schemes in London (formerly 'TTS 6').	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Square trip table	Matrix of zone-to-zone trips showing trips by direction between each pair of zones.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
SRN	Strategic Road Network.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Standard deviation	Denoted by s throughout the guidelines; it is a measure of variation or "dispersion" from the mean (in fact it is the square root of the variance). A large S indicates the runs vary widely from the mean VHT whereas a small s indicates that they vary more closely around the mean VHT. Like the mean, the standard deviation is also affected by extreme points.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
Statistical inference	Describing characteristics of a population based on analysis of a representative sample.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Stochastic assignment	See Probabilistic assignment.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Street speed	The highest mean, 85th or any other percentile speed actually observed along the street (or street section).	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Study area	The area of influence defined for the study. Depending on the study, it may be limited to the area influenced by the transport scheme being investigated, or a wider region encompassing most of the land uses that generate demand for travel in the area.	NZ Transport Agency 2014, *Transport Model Development Guidelines*, New Zealand	
SUE	Stochastic User Equilibrium (assignment).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
SVD	Selective Vehicle Detection.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
TD	TfL Streets Traffic Directorate, formerly Directorate of Traffic Operations (DTO).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
TfL	Transport for London.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Through trip	Trip that starts and ends outside the study area, but that passes through the study area.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
TI	Traffic Infrastructure (within TD).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Time-distance diagram	A graphical representation of the movement of a vehicle or traffic stream in terms of its time and distance coordinates, e.g. used to show signal coordination along a route or for showing vehicles queuing at traffic signals.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
TLRN	Transport for London Road Network.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
TMA	Traffic Management Act 2004.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
TMAP	TRANSYT Model Auditing Process (see MAP).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
TMAP	See Transport management and accessibility plan.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
Tour	A series of trips undertaken between leaving home and returning home.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Traffic count	The process of determining the number of vehicles or pedestrians passing a given point or points during a specified period of time.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Traffic counter	A device that counts and records the number of vehicles.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic engineering	The measurement and study of traffic, the determination of its characteristics, and the application of the knowledge so gained to improving the safety, convenience and economy of road transport.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic flow	The number of vehicles passing a given point during a specified period of time.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic forecast	An estimate of future traffic parameters including projected growth rates.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic generator	A development or area capable of generating traffic, e.g. shopping complex, industrial area, car park.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic growth factor	A factor used to estimate the percentage annual increase in traffic volume.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic management	The use of traffic engineering techniques to control the flow of traffic.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic patterns	The variation of traffic volumes over a period of time.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic planning	Making provision for future traffic and parking conditions.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic regulations	Statutory rules in relation to driving and/or vehicular requirements, enforceable by law.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic restraints	Procedure or quantitative term indicating an imposed limitation on the volume of motor vehicle traffic.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic statistic	Information related to traffic, e.g. traffic volumes, traffic accidents, origin/destination data, vehicle occupancy data.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic stream	Traffic, usually vehicular, moving in one or more lines in the same direction.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic survey	The measurement and study of some aspect of traffic movement.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traffic volume	The number of vehicles or pedestrians passing a given point on a lane or carriageway during a specified period of time.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trajectory diagram	Graph showing the movement of a vehicle (or vehicles) along a length of road over a given period.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
TranEd	Software developed by JCT to provide an improved graphical user interface for RANSYT versions 12 and earlier.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Transport management and accessibility plan (TMAP)	A comprehensive assessment of the transport impacts, addressing both the movement of people and goods, of a major site development or redevelopment proposal including the identification of a package of appropriate measures that will help to manage the demand for travel.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Transport planning	Planning of the operations and development of transport including the efficient and equitable allocation of resources.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Transport study	Analysis and synthesis of a specific transport problem. Usually involves data collection, analysis, forecasting, evaluation and recommendation.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Transport system	Sum of the interacting components that constitute a system for the purpose of transporting passengers and/or goods.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
TRANSYT	TRAffic Network StudY Tool, modelling software developed by TRL.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Travel demand management	Intervention (excluding provision of major infrastructure) to modify travel decisions so that more desirable transport, social, economic and/or environmental objectives can be achieved, and the adverse impacts of travel can be reduced.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Travel model	System of mathematical relationships which can be used to estimate the volume and distribution of travel likely to occur in a given set of circumstances.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Travel speed	The representative (usually 85th percentile) speed of traffic at a site.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Travel time	The time taken to travel between two points.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Travel time	Time required to travel between two points.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Travel time ratio	Travel time between points of choice by a freeway route divided by the travel time between the same points by a non-freeway route used in a diversion assignment.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Travel time survey	Survey designed to obtain data on travel times over selected traffic routes.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Traverse	A survey consisting a continuous series of connected straight lines, the lengths and bearings of which are measured. When the lines form a complete circuit or lie between two known points it is termed a closed traverse; otherwise it is termed an open traverse.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Triangular trip table	Matrix of zone-to-zone trips between each pair of zones nondirectionally, normally in the low-to-high direction only.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trip	A one-way movement from an origin to a destination for a particular purpose. It may be a person trip, a vehicle trip, walking trip or public transport trip.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	

Trip	1. One-way movement from one place to another for a particular purpose (see Journey). Note: Care is required in applying this general definition. In particular, the definition of 'purpose' will affect the way in which person, vehicle or commodity movements are classified into trips. In travel surveys, the 'purpose' set often includes 'change mode' and 'serve passenger', thus making a trip correspond to a movement by only one mode. Movements for these purposes have been varyingly termed 'legs', 'segments' or 'unlinked trips', in transport planning practice. For analyses, trips are often 'linked', thus making a trip embrace more than one mode and/or lower order purpose. 2. In public vehicle operations, the movement by one vehicle or unit in one direction from the start of a route to the end of it.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trip assignment	The process by which flows between zones derived from the trip distribution process are allocated to the minimum path routes through a network.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Trip attraction	Usually used to describe trip ends connected with non-residential land uses in a zone. Also defined as the non home end of a home based trip or the destination of a non home based trip.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Trip attraction	Total number of trips made to a particular destination.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trip distribution	The process by which the total numbers of trips originating in each zone are distributed among all the possible destination zones.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Trip distribution	1. The geographical distribution of trips. 2. The process by which the total number of trips is converted to individual zone-to-zone movements.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trip distribution model	Mathematical relationship used to distribute trips between zones on the basis of certain parameters such as spatial separation and relative attractiveness.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trip end	Either a trip origin or trip destination.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Trip end	A measure of travel demand based on the demographic data assumptions (population and employment).	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Trip end	The unit used to express the total number of trip productions and attractions, which can also be used in relation to trip origin or destination.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Trip end summary	Summary of the total number of trips entering a zone and leaving a zone. These equal the row and column totals of a trip table.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trip factor	Number of trips represented by the trip record in which the trip factor appears. Basically it is the ratio of dwelling units to the interviewed dwelling units or a similar ratio of vehicles. It may be modified to offset a poor screenline check.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trip generation	The process by which the total numbers of trips beginning, or ending, in a zone are determined, based on demographic, socio-economic and land use characteristics.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Trip generation	1. Number of trips produced or attracted to a zone. 2. Process by which the numbers of such trips are calculated in a model (see Trip-generation model).	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trip generation model	Mathematical model of trip generation based on the premise that trips generated by a zone will be related to the land-use parameters of that zone.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trip length frequency distribution	Histogram showing the number of trips or the percentage of trips made at various trip time or distance intervals.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trip matrix	A two dimensional matrix that represents the demand for travel among all zones in a study area for individual or grouped purposes, modes or types.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Trip matrix	Output from the demand model and input to the assignment model. It needs to be converted from Production/ Attraction (P/A) format to Origin / Destination (O/D) format for the purpose of assignment.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Trip production	Usually used to describe trip ends connected with residential land uses in a zone. Also defined as the home end of a home-based trip, or the origin of a non home-based trip.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Trip production	Total number of trips made from one origin.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trip production and attraction	The production end of a home-based trip is the home end of the trip, and the attraction end the non-residential end. Non-home-based trips are assumed to be produced in the origin zone and attracted to the destination zone.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Trip purpose	This can be defined as work trips, school trips, recreational or social trips and shopping trips.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	

Trip records	Survey-derived trip information and related information. The data for each surveyed trip are recorded in one trip record (see Trip). Comprehensive surveys, depending on the degree of detail required, can produce the following types of trip records: 1. Dwelling unit summary: a summary of trips and related information regarding the occupants of one dwelling unit. 2. External trip record: contains the information describing one trip by a vehicle that has crossed the external cordon line. 3. Internal trip record: contains information describing one trip by a resident of the survey area, and also contains certain information regarding the person making the trip. 4. Truck trip record: contains the information describing one trip by a truck registered or garaged in the survey area.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
TRL	Transport Research Laboratory (TRL Ltd), developer of ARCADY, OSCADY PRO, PICADY, SAFENET, SCOOT and TRANSYT.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
TSS	Transport Simulation Systems, developer of AIMSUN.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
TSSR	Traffic Signal Supplementary Report.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Twelve hour volume	The 12-hour volume on a road is the number of vehicles passing an observation point over a given 12-hour interval during a day.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
UDA	User-Defined Attribute (used in VISUM modelling).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
UGT	Underutilised Green Time.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Uninterrupted flow	Condition of traffic flow on a road in which there are no factors external to the traffic stream which affect its flow.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Unlinked trip	Journey, or part of a journey, for a single purpose, using only one mode of travel.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
UTC	Urban Traffic Control.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.

Utility of travel	Measure of 'satisfaction' as perceived by the transport user, which is used in economic analyses and in modelling to measure benefits that people perceive from a transportation system.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
V/L/D	A measure of the volume of traffic, expressed as vehicles per lane, per day.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
V85	Same as 85th percentile speed.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
V85 (85th percentile speed)	The speed at or below which 85% of vehicles are observed to travel under free flowing conditions past a nominated point.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
VA	Vehicle Actuation.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Validation	Observed and modelled comparisons using independent data that has not been used for calibration.	NZ Transport Agency 2014, *Transport Model Development Guidelines*, New Zealand	
Validation	Comparing model outputs with independent data.	Department of Transport (UK), 2014, *TAG UNIT M1 – Principles of Modelling and Forecasting*	
Validation	Confirmation, through the provision of objective evidence, that requirements for a specific intended use or application have been fulfilled.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Validation test	A standardised procedure to test the validity of test results from a measuring device.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
VAP	Vehicle Actuated Programming (used in VISSIM modelling).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Variance	Squared value of standard deviation.	Roads and Maritime Services 2013, *Traffic Modelling Guidelines*, NSW	
VDF	Volume-Delay Function (used in strategic/HTA modelling).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Vehicle availability	1. Whether or not a person has a vehicle available for a particular trip. 2. Number of vehicles normally available for use by members of a household, including government or company cars. 3. Percentage of time for which a scheduled vehicle is available for use to carry passengers or commodities.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Vehicle hours of travel (VHT)	Total vehicle hours of travel over a road segment or number of road segments for a certain period, usually a specified year.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Vehicle kilometres of travel (VKT)	A measure of traffic demand and is the length of a section of road in kilometres multiplied by the AADT on it. The yearly VKT is the daily VKT multiplied by the number of days in that year (365 or 366 days).	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	

Vehicle passage time	The time between the passage of the front and back ends of a vehicle from a given point along the road.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Vehicle type	Classification of vehicles by type, e.g. car, station wagon, utility, light commercial vehicle, and the like, and/or by number of axles.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Vehicles per day (VPD)	The number of vehicles observed passing a point on a road in both directions for 24 hours.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Vehicles per lane per day	See V/L/D.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
VHT	See Vehicle hours of travel.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
Vision Zero	On October 9, 1997 the Road Traffic Safety Bill founded on 'Vision Zero' was passed by a majority in the Swedish Parliament. It represents a paradigm shift in road traffic safety and is based on four principles: 1) ethics - human life and health are paramount and take priority over mobility and other objectives of the road traffic system; 2) responsibility - providers and regulators of the road traffic system share responsibility with users; 3) safety - road traffic systems should take account of human fallibility and minimise both the opportunities for errors and the harm done when they occur; and, 4) mechanisms for change - providers and regulators must do their utmost to guarantee the safety of all citizens; they must cooperate with road users; and all three must be ready to change to achieve safety. 'Vision Zero' refers to the ultimate goal of zero fatalities on the road.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
VISSIM	Verkehr In Städten – SIMulation (meaning: Traffic In Towns – SIMulation), modelling software developed by PTV.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
VISUM	Verkehr In Städten – UMlegung (meaning: Traffic In Towns – Assignment), modelling software developed by PTV.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
VKT	See Vehicle kilometres of travel.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.
VMAP	VISSIM Model Auditing Process (see MAP).	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Volume	Number of vehicles (or pedestrians, bicyclists etc.) passing a fixed point on a road per unit of time.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Volume of traffic	See Traffic volume.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
VPD	See Vehicles per day.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	Abbrv.

Wait time	Time spent waiting for a public transport vehicle.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Walk time	Duration of the Walk display (steady green person) for pedestrians.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Warrant	A criterion, usually numerical, used to determine whether the construction of a traffic facility or the installation of a traffic control device may be justified.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Weaving	The movement in the same general direction of vehicles within two or more traffic streams intersecting at a small angle so that the vehicles in one stream cross other streams gradually (see Merging).	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Weaving area	The area of a carriageway in which weaving occurs.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Weaving distance	The length of a carriageway in which weaving occurs.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Weaving section	The length of one-way carriageway, designed to accommodate weaving, at one end of which two one-way carriageways merge and at the other end of which they separate.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
WebTag	DfT Transport Analysis Guidance.	Smith, J & Blewitt, R (eds) 2010, *Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice*, London	Abbrv.
Work hours	Work schedule in which employees are required to work a certain number of hours but can schedule those hours as they wish. Note: For example, some employees may choose to work from 7.30 am to 3.30 pm, while others may choose to work from 9.30 am to 5.30 pm. It differs from staggered hours in that it is the employee, not the employer, who sets the work schedule. Flexible work hours can decrease traffic congestion if instituted by major employers.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Zone	A portion of the study area with homogenous land use, socio-economic and demographic characteristics.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Zone	Portion of the study area, delineated as such for particular land use and traffic analysis purposes.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	
Zone centroid	An assumed point in a zone that represents the origin or destination of all trips to or from that zone. Generally, it is the weighted centre of trip ends, rather than the geometrical centre of a zone.	Transport and Infrastructure Council 2015, *2015 National Guidelines for Transport System Management in Australia: Travel Demand Modelling*, Canberra	
Zoning	Partitioning of a city or town by ordinance into sections reserved for different purposes of land usage such as residences, business or manufacturing. Note: Commonly used zoning terms are residential, commercial, industrial, public purposes, recreational, special uses, etc.	Austroads, 2008, *Glossary of Austroads Terms 3rd Edition*	