

Abbreviations

Abbreviation	Definition
AADT	Annual Average Daily Traffic
AADV	Annual Average Daily Vehicles
Absolute CNB	Absolute Community Noise Burden
AEP	Annual Exceedance Probabilities
AFG	Agricultural Focus Group
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment Conservation Council
BCR	Benefit Cost Ratio
CCD	Census Collection District
CLG	Community Liaison Group
CNB	Community Noise Burden
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CoRTN	Calculation of Road Traffic Noise
dB	Decibel
DCP	Development Control Plan
DEC	NSW Department of Environment and Conservation (formerly NSW EPA and NSW National Parks & Wildlife Service)
DIPNR	Department of Infrastructure, Planning and Natural Resources (now Department of Planning and Department of Natural Resources)
DoP	NSW Department of Planning (formerly part of DIPNR)
DPI	NSW Department of Primary Industries (formerly NSW Fisheries, State Forests NSW and NSW Agriculture)
DoNR	NSW Department of Natural Resources (formerly part of DIPNR)
ECRTN	Environmental Criteria for Road Traffic Noise (DEC)
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPA	NSW Environment Protection Authority (now part of NSW DEC)
EPBC Act	Commonwealth Environment Protection Biodiversity Conservation Act 1999
ESD	Ecologically Sustainable Development
GRP	Gross Regional Product
ha	Hectare
km	Kilometre
kV	Kilovolt
LEP	Local Environment Plan
LALC	Local Aboriginal Land Council

Abbreviation	Definition
LGA	Local Government Area
lin, peak	Linear weighted, peak sound pressure level
LOS	Level of Service
m	Metre
Mg/m ³	Milligram Per Cubic Meter
µg/m ³	Microgram Per Cubic Meter
MVK	Million Vehicle Kilometres Travelled
NAASRA	National Association of Australian State Road Authorities (now AUSTROADS)
NO	Nitric Oxide
NO _x	Oxides of Nitrogen
NO ₂	Nitrogen Dioxide
NPW Act	The National Parks and Wildlife Act 1974
NRRDB	Northern Rivers Regional Development Board
PAD	Potential Archaeological Deposit
PAH	Poly-Aromatic Hydrocarbon
PHUP	Pacific Highway Upgrading Program
PM ₁₀	Particulate Matter (smaller than 10 micrometers in diameter)
PM _{2.5}	Particulate Matter (smaller than 2.5 micrometers in diameter)
ppm	Parts per Million
PPV	Peak Particle Velocity
Relative CNB	Relative Community Noise Burden
REP	Regional Environmental Plan
RNE	Register of National Estate
RODR	Route Options Development Report
RTA	NSW Roads and Traffic Authority
SEPP	NSW State Environmental Planning Policy
T2E	Tintenbar to Ewingsdale Pacific Highway Upgrade Project
TSC Act	NSW Threatened Species Conservation Act 1995
VMW	Value Management Workshop

Glossary of Terms

Term	Definition
Aboriginal Heritage Information Management System	A list of known Aboriginal sites held by the DEC.
Absolute Community Noise Burden (CNB)	Absolute Community Noise Burden (ACNB) is a quantitative evaluation of potential annoyance caused by absolute traffic noise levels on residential receivers up to 500 m from the preferred route. Larger numbers imply a greater potential noise impact.
Acid Sulfate Soils (ASS)	Naturally acid clays, mud and other sediments usually found in swamps and estuaries. They may become extremely acidic when drained and exposed to oxygen, and may produce acidic leachate and runoff, which can pollute receiving waters and liberate toxins. ASS is classified as material, which is above the groundwater, is undergoing oxidation and has a pH of less than 4.0.
Afflux	The maximum difference in water level caused by a structure (such as a bridge or culvert) in relation to the "without structure" flow condition.
Alignment	A detailed geometric layout, in plan and profile, following a general route.
Amenity	Natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence and cultural and recreational attributes.
Annual Exceedance Probability (AEP)	The chance of a flood of a given size (or larger) occurring in any one year, usually expressed as a percentage. For example, if a peak flood discharge of 500 m ³ /s has an AEP of 5%, it means that there is a 5% chance (i.e. a 1 in 20 chance) of a peak discharge of 500 m ³ /s (or larger) occurring in any one year.
Archaeological Site	A site is defined as any material evidence of past Aboriginal activity that remains within a context or place that can be reliably related to that activity. Usually a site classification requires a minimum of two detected artefacts.
Annual Average Daily Traffic (AADT)	Volume representing the total traffic in both directions at each location, calculated from mechanically obtained axle counts.
Annual Average Daily Vehicles (AADV)	Represents the average number of vehicles passing in both directions during a 24-hour period estimated over a period of one year.
B-Double vehicle	Heavy transport vehicles that are 17.5 m to 36.5 m long, and have six or more axles in four groups. They are classified as Class 10 under the AUSTRROADS vehicle classification system.
Barrier	An obstruction placed to prevent vehicle access to a particular area. This includes structures whose prime purpose is to restrain and/or redirect in a controlled manner vehicles which are out of control.
Batter	The side slope of walls, embankments and cuttings or the degree of such slope.
Benefit Cost Ratio (BCR)	The ratio of the present value of benefits to the present value of costs of a project.
Biological Diversity (Biodiversity)	The range and relative abundance of plant and animal life in a nominated area.

Term	Definition
Biota	Animal and plant life characterising a particular region or flora and fauna collectively.
Blackspot	An intersection, mid-block or short road section with a history of at least three casualty crashes over a five year period.
Buffer	Something that lessens or absorbs an impact.
Carriageway	Portion of a road or bridge used by vehicles (inclusive of shoulders and auxiliary lanes).
Census	The enumeration of an entire population, usually with details being recorded on residence, age, sex, occupation, ethnic group, marital status, birth history, and relationship to head of household.
Climbing Lanes	An auxiliary lane, usually on a long upgrade, primarily for the use of slow-moving vehicles. They differ from overtaking lanes in that the linemarking does not initially direct all traffic to the left hand side of the road.
Census Collection District (CCD)	The areas designed for use in census years for the collection and dissemination of Population Census data
Community Noise Burden (CNB)	A measure of the potential annoyance caused by traffic noise levels on residential receivers.
Culvert	An enclosed channel used for the passage of surface water under a road or other embankment.
Cut (batter)	The material removed (excavated) from the existing ground surface.
Decibel (dB)	A unit used in the comparison of powers and levels of sound energy. A comprehensive glossary of noise terms can be found in Section 1 of the RTA's <i>Environmental Noise Management Manual</i> (2001), which can be obtained from RTA's website at www.rta.nsw.gov.au/environment/noise/ .
dB(A)	Decibels using the 'A' weighted scale, measured according to the frequency of the human ear.
Demographic	Of or pertaining to population, especially in statistical terms.
Design speed	A nominal speed used for the design of geometric features of the road, such as curves.
Dispersion	The spatial property of being scattered about over an area or volume.
Dual carriageway	A road with separated carriageways for traffic travelling in each direction.
Earthworks	The process of extracting, moving and depositing earth during construction.
Ecologically Sustainable Development (ESD)	Development that maintains and improves the total quality of life. Development both now and in the future in a way that maintains the ecological processes on which life depends. Key components of ESD are intergenerational equity, maintenance of biodiversity, improved economic evaluation of environmental costs and benefits and the precautionary principle.
Ephemeral	Watercourse which flows after heavy rain, and dries up during fine weather.
Evaluation Criteria	A list of criteria and measurables used to evaluate the route options. Sieve 1 criteria were used to evaluate the long list of options. Sieve 2 criteria were used to evaluate the shortlist of options.

Term	Definition
Fill (batter)	The material placed in an embankment.
Floodplain	Valley floor flat adjacent to a stream that is flooded by the 'annual' flood (often considered to be the flood with a recurrence interval of about 1.6 years).
Footprint	The footprint is indicative of the likely actual road reserve width requirements and includes the land that would be required for the physical roadway (highway and service roads), public utility plant (if required), earthworks, and maintenance clearances. The footprint also includes a margin for drainage or other works that may be required beyond the extent of earthworks.
Geotechnical	Work relating to soil mechanics, foundation engineering, rock mechanics, engineering geology, hydrogeology and materials testing.
Grade Separation	The separation of traffic so that crossing movements that would otherwise conflict are at different levels.
Groundwater	Water beneath the surface of the earth which saturates the pores and fractures of sand, gravel, and rock formations.
Habitat	The place where an organism lives, habitats are measurable and can be described by their flora and physical components.
Horizontal Alignment	The geometric form of the centreline of a roadway in the horizontal plane.
Hydraulic	Related to water and the flows and pressures within a connected water-containing system.
Hydrologic	Dealing with the properties, distribution, and circulation of water on the surface of the land, in the soil and underlying rocks and in the atmosphere
Interchange	A grade separation of two or more roads with one or more interconnecting carriageways or ramps.
Intersection	A meeting of two or more roads.
Littoral	The shallow, shoreward region of a body of water sometimes inhabited by aquatic plants.
L_{eq}	The 'equivalent continuous' noise level over the measurement period (sometimes called the 'average' noise level). This is a notional steady level, which would, over a given period of time, deliver the same sound energy as the actual time-varying sound over the same period.
Level of Service	A qualitative analysis providing a means of determining the traffic-carrying performance of a road or any element of it under the prevailing roadway and traffic control conditions.
Median	A strip of land which separates carriageways for traffic in opposite directions.
National Highway	A highway that has been declared a National Highway by the Federal Government.
Noise Wall	A wall or barrier (noise barrier) erected to block or deflect noise.
Oxidation	The chemical process of oxygen combining with an element or compound (e.g. the oxidation of iron to form rust).

Term	Definition
Pairwise	A tool used to assess the relative importance of the evaluation criteria. It allows stakeholders the opportunity to weight the evaluation criteria in order of importance to them. This allows the study team to gain an understanding of which evaluation criteria are viewed as more important.
PM ₁₀	Usually airborne particulate matter less than 10 µm (microns or one millionth of a metre) in diameter, a measure of dust.
PM _{2.5}	Usually airborne particulate matter less than 2.5 µm (microns or one millionth of a metre) in diameter, a measure of dust.
Portal	Entry and/or exit of a tunnel.
Potential Acid Sulfate Soil (PASS)	Defined as material below the groundwater which has not been oxidised and generally has a pH of greater than 4.0. The pH has the potential to become much lower when the soil is exposed to oxygen as a result of activities such as excavation and drainage.
Preferred Route Corridor	'Footprint' plus a margin added to the 'footprint' for future design refinement.
Relative Community Noise Burden (RCNB)	Relative Community Noise Burden (RCNB) is a quantitative evaluation of potential annoyance caused by change in noise levels at residential receivers up to 500 m from the preferred route. Larger numbers imply a greater potential noise impact (i.e. – 230 represents a greater potential noise impact than – 550).
Service Road	A subsidiary carriageway constructed between the principal carriageway and the property line, connected only at selected points with the principal carriageway. It reduces the number of access points to a major road, with a consequent improvement in safety.
Shotcrete	Mortar or concrete sprayed using compressed air onto a disturbed surface to stabilise against erosion.
Shoulder	The strip of pavement bordering the carriageway beyond the traffic lanes and constructed at the same level as the pavement surface. Used by traffic in emergencies and provides clearance to batter slopes.
Sieve 1	A system used to evaluate the long list of options and assist in selection of the shortlisted route options. The long list of route options are scored individually against a range of Sieve 1 selection criteria. These scores are then weighted according to the relative importance of each selection criteria as determined by the Sieve 1 pairwise process and then summed to determine a relative score for each option.
Sieve 2	A similar system used to evaluate the shortlist of options and assist in selection of the preferred route. Shortlisted options are scored individually against the Sieve 2 selection criteria.
State Highway	A main road that is a principal avenue of road communication between the east coast and the interior or otherwise within the State and connecting similar roads in other States.
Quaternary	The geologic time period comprising about the last 1.65 million years.
Terrestrial	Living or growing on land; not aquatic.
Tributaries	Rivers or streams flowing into a larger river or lake.
Vertical Alignment	The geometric form of the centreline of a carriageway in the vertical

Term	Definition
Viaduct	plane. A long bridge, generally composed of a series of spans over land, which carries a road or railway.
Wetland	Land either permanently or temporarily covered by water. These areas are usually characterised by vegetation of a moist-soil or aquatic type.

References

State Acts and Regulations

- Environmental Planning and Assessment Act 1979.* NSW Government.
- Environmental Planning and Assessment Amendment (Infrastructure and Other Planning Reform) Act 2005.* NSW Government
- Environmental Planning and Assessment Regulation 2000.* NSW Government.
- Threatened Species Conservation Act 1995.*
- Fisheries Management Act 1994.*
- National Parks and Wildlife Act 1974.*
- Heritage Act 1977.*
- Roads Act 1993.*

Environmental Planning Instruments

- State Environmental Planning Policy No.4 – Development Without Consent and Miscellaneous Exempt and Complying Development.*
- State Environmental Planning Policy No.14 – Coastal Wetlands.*
- State Environmental Planning Policy No.26 – Littoral Rainforests.*
- State Environmental Planning Policy (Major Projects) 2005.*
- North Coast Regional Environmental Plan 1988.*
- Ballina Local Environmental Plan 1987.*
- Byron Local Environmental Plan 1988.*

Tintenbar to Ewingsdale Working Papers

- RTA. 2006. Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Aquatic Ecology and Water Quality Working Paper.*
- RTA. 2006. Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Terrestrial Ecology Working Paper.*
- RTA. 2006. Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Cultural Heritage Working Paper.*
- RTA. 2006. Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Air Quality Working Paper.*
- RTA. 2006. Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Working Paper on Agricultural Considerations for Route Options.*
- RTA. 2006. Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Working Paper on Regional Economic Impacts of Changes in Agricultural Land Use.*
- RTA. 2006. Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Report on Qualitative Economic Impacts on Local Business.*
- RTA. 2006. Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Noise Working Paper.*
- RTA. 2006. Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Landscape and Visual Working Paper.*
- RTA. 2006. Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Traffic Working Paper.*
- RTA. 2006. Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Geotechnical Working Paper.*
- RTA. 2006. Tintenbar to Ewingsdale: Upgrading the Pacific Highway – Hydrology/Hydraulic Working Paper.*

Publications

- ANZECC. 1990. *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration*. Australian and New Zealand Environment and Conservation Council, September 1990.
- ANZECC. 2000. *Australian and New Zealand Guidelines for Freshwater and Marine Water Quality 2000*. Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ).
- Australian Department of Transport and Regional Services. 2004. *AusLink White Paper*. Commonwealth Government of Australia.
- AUSTROADS. 2003. *Rural Road Design – A Guide to the Geometric Design of Rural Roads*. AUSTROADS, Sydney.
- Ballina Shire Council. 2000. *Ballina Shire Urban Land Release Strategy*. Ballina Shire Council, Ballina.
- Ballina Shire Council. 2006. *Cumbalum Structure Plan*. Ballina Shire Council, Ballina.
- Ballina Shire Council. 2003. *Development Control Plan No. 12: Newrybar Scenic Escarpment*. Ballina Shire Council, Ballina.
- Byron Shire Council. 1998. *Byron Rural Settlement Strategy*. Byron Shire Council, Mullumbimby.
- Byron Shire Council. 2002. *Byron Bay and Suffolk Park Settlement Strategy*. Byron Shire Council, Mullumbimby.
- Byron Shire Council. 2003a. *Place-Based Plan for Ewingsdale (Draft)*. Byron Shire Council, Mullumbimby.
- Byron Shire Council. 2003b. *Bangalow Settlement Strategy*. Byron Shire Council, Mullumbimby.
- Byron Shire Council. 2003c. *Byron Shire Community Profile*. Byron Shire Council, Mullumbimby.
- Byron Shire Council. 2004. *Byron Shire Sustainable Agriculture Strategy*. Byron Shire Council, Mullumbimby.
- National Association of Australian State Road Authorities (NAASRA). 1984. *NAASRA Grade Separated Interchanges (A Design Guide)*. Sydney.
- NSW Department of Infrastructure, Planning and Natural Resources and NSW Department of Primary Industries. 2005. *Northern Rivers Farmland Protection Project – Final Recommendations*. Department of Infrastructure, Planning and Natural Resources and Department of Primary Industries.
- NSW Department of Planning. 2006. *Far North Coast Regional Strategy (draft)*. DoP. Sydney.
- NSW Department of Planning. 1995. *North Coast Urban Planning Strategy (NCUPS) - into the 21st Century*. NSW Department of Planning, Sydney.
- Northern Rivers Regional Development Board. 2005. *Regional Industry and Economic Plan for the Northern Rivers*. Northern Rivers Regional Development Board, NSW.
- Northern Rivers Regional Development Board. 2003 *Working Paper for the Regional Industry and Economic Plan*. Northern Rivers Regional Development Board, Lismore.
- Queensland Department of Urban Management. 1998. *South-east Queensland Regional Framework for Growth Management*. Queensland Department of Urban Management, Brisbane.
- Queensland Transport. 1997. *Integrated Regional Transport Plan for South-east Queensland*. Queensland Transport, Brisbane.
- Queensland Transport. 2001. *Transport 2007 – An Action Plan for South East Queensland*. Queensland Transport, Brisbane.
- Roads and Traffic Authority. 1992. *North Coast Road Strategy*. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 1994. *State Road Network Strategy: strategic road network initiatives and policy framework for NSW*. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 1996. *Road Design Guide*. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 1997. *Upgrading the Pacific Highway: Ten Year Pacific Highway Reconstruction Program*. Discussion Paper. NSW Roads and Traffic Authority, Sydney.

- Roads and Traffic Authority. 1997, December. *Economic Evaluation of Rural Road Improvements, Rural Evaluation System (REVS)*. Use Guide Version 4.0 for Windows. NSW Roads and Traffic Authority, Traffic Technology Branch, Sydney.
- Roads and Traffic Authority. 1998. *Roadscape Guidelines*. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 1999a. *Beyond the Pavement - Urban and Regional Design Practice Notes*. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 1999b. *Pacific Highway: Managing the Impact of Delay*. Discussion Paper. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 2003a. *Northern Pacific Highway Noise Taskforce Report*. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 2003b. *State Highway No 10, Pacific Highway at Ewingsdale - Predictions of Future Traffic Volumes*. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 2003c. *Noise Wall Design Guidelines*. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 2003d. *Bridge Aesthetics - Design guidelines to improve the appearance of bridges in NSW*. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 2004a. *Bangalow to St Helena Pacific Highway Upgrade Submissions Report, Volumes 1 and 2*. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 2004b. *Pacific Highway Safety Review - May 2004*. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 2005a. *Pacific Highway Urban Design Framework*. NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 2005b. *Upgrading the Pacific Highway - Upgrading Program beyond 2006 - Design Guidelines Issue 1*. (Draft). NSW Roads and Traffic Authority, Sydney.
- Roads and Traffic Authority. 2005c. *Shotcrete Design Guidelines - Design guidelines to avoid, minimise and improve the appearance of shotcrete*. NSW Roads and Traffic Authority, Sydney.

