

Development Affected by Environmental Emissions from Transport Policy

Version 4 (October 2017)

Version history

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1.0	31 March 2011	Planning Legislation Unit, Integrated Transport Planning Branch	Initial policy.
2.0	10 May 2013	Policy, Legislation & Systems Unit, Policy & Planning Branch	Section 4: Edits to reflect machinery of government changes. Section 7: Restructure of tables to simplify presentation of environmental emission criteria. Section 8: Edits to reflect agreed implementation principles. Glossary: Insertion of definitions for office, private open space, outdoor education area and passive recreation area.
3.0	17 October 2014	Policy, Legislation & Systems Unit, Policy & Planning Branch	Sections 3 and 7: Updated terminology. Section 7: Minor restructure of tables to simplify presentation of environmental emission criteria.
4.0	9 October 2017	Corridor Management and Protection Unit, Transport Strategy & Planning Branch	Update template and title of policy. All sections: Minor edits and updates to terminology. Section 4: Removal of discussion of strategic context for the policy. Section 5: Updated to reflect current research on environmental impacts.

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1. Introduction

Queensland's transport system consists of a network of road, rail, light rail, bus, cycle, pedestrian, air and sea transport infrastructure. This network plays an important role in ensuring the continued wellbeing of the Queensland community by facilitating economic development and social connectivity. The ability of industry to produce goods and services is dependent on the transport system to bring materials, labour and energy from different locations and to deliver goods and services to markets and consumers. People also depend on the transport system to access employment and recreational opportunities and necessary social infrastructure and services including health, education and welfare services.

However, the transport system generates environmental emissions (such as noise, vibration, air emissions and particles, and light) which can have an adverse impact on the health and wellbeing of communities located directly adjacent to transport corridors and infrastructure. These environmental emissions mean that some parts of the transport system are not compatible with certain types of urban development.

Significant growth pressures in Queensland and an associated shortage of land to accommodate this growth has meant urban development is increasingly encroaching on transport corridors and infrastructure. This is increasing the risk of adverse impacts to the community and the long term sustainability of the transport system.

In addition, the Queensland Government has adopted growth management strategies focused on achieving a land use pattern where housing, jobs, key services and recreational destinations are consolidated in areas that are highly accessible by public passenger transport (PPT). While this land use pattern will support more efficient use of land and natural resources and a more efficient and effective transport system for Queensland, it is important to recognise this means more people will be exposed to environmental emissions generated from the transport system.

By increasing the number of people exposed to environmental emissions from the transport system (either through urban encroachment or consolidation), public concern about the impact of emissions on health and community wellbeing is also likely to increase. Public concern about the adverse impacts of environmental emissions can result in operating conditions or injunctions being placed on the transport system. Such conditions or injunctions mean that the transport system may not be able to operate efficiently. This in turn can result in detrimental impacts to the community's economic and social wellbeing and the ability of government to achieve land use patterns which ensure that quality of life is maintained into the future.

The environmental emissions generated from transport corridors and infrastructure can be mitigated in a majority of cases, making it suitable for the community to live and work at locations close to the transport system.

Both transport administering authorities and proponents seeking to develop land adjacent to the transport system have a role in ensuring the community's exposure to environmental emissions from transport corridors and infrastructure is reduced.

Transport administering authorities can reduce the risk of adverse impacts by, for example, ensuring that future transport infrastructure is designed and constructed to incorporate measures to mitigate the amount of noise emitted from a transport corridor or facility. Authorities can also adopt emission control and management practices to reduce the impact from existing transport operations and infrastructure where appropriate.

Proponents of development on land affected by environmental emissions from transport corridors and infrastructure can ensure development is located, orientated and designed to reduce the degree to which the user or occupiers of the development are exposed to the noise, vibration, air particles and emissions and light emitted from these sources.

The *Development Affected by Environmental Emissions from Transport Policy* (the policy) outlines the Department of Transport and Main Roads (TMR) policy position in relation to the development of land affected by environmental emissions from linear state transport corridors and infrastructure. This includes busway, railway, light rail and state-controlled road corridors and infrastructure.

The policy should be read and applied in conjunction with other transport and land use planning strategies, plans and policies including current regional plans, integrated regional transport plans and other state planning instruments. It should be noted the policy is not a state planning instrument under the *Planning Act 2017*.

2. Objective of the policy

The objective of the policy is to ensure:

- state transport corridors and infrastructure are protected from development on neighbouring land that may lead to operational constraints on the transport system
- the community is protected from significantly adverse impacts on health and wellbeing resulting from environmental emissions generated from existing and future state transport corridors and infrastructure
- the Queensland Government's approach to decision making regarding development of land near existing or future state transport corridors is transparent and consistent.

By ensuring land affected by environmental emissions from state transport corridors and infrastructure is developed in a way that reduces the community's exposure to such emissions, the health and wellbeing of the community and the operational integrity of Queensland's transport system can be maintained in the long term.

3. Application of the policy

The policy applies throughout Queensland to development proposals for new sensitive development on land affected by environmental emissions generated from state transport corridors and government supported transport infrastructure including:

- busway corridors and busway transport infrastructure
- railway corridors, rail transport infrastructure and other rail infrastructure
- light rail corridors and light rail transport infrastructure
- state-controlled roads and road transport infrastructure.

New sensitive development is development whose primary users or occupiers are considered to be 'sensitive' to environmental emissions generated from state transport corridors and infrastructure. This sensitivity may result from several factors including susceptibility to types of emissions and duration of exposure at a particular location. For example, noise and air emissions are generally more likely to have an adverse health impact on the elderly and very young children. Similarly, the risk of adverse impact may be increased at locations with a higher level of exposure to noise and air emissions, especially if a person were to spend a significant proportion of their time at that location (for example, a place of residence or work).

For the purposes of the policy the following types of development are considered sensitive developments:

- accommodation activities (including caretaker's accommodation, community residence, dual occupancy, dwelling house, dwelling unit, home-based business, multiple dwelling, nature-based tourism, non-resident workforce accommodation, relocatable home park, residential care facility, resort complex, retirement facility, rooming accommodation, rural workers' accommodation, short term accommodation and tourist park)
- educational establishments (including primary and secondary schools, colleges, technical institutes, universities or other educational institutions)
- child care centres (including crèche, early childhood centres, kindergartens and pre-schools)
- health care services (including medical centres, health clinics, surgeries and other medical institutions)
- hospitals
- community uses (including art galleries, community halls, libraries and museums)
- places of worship
- offices
- a mix of any of the uses listed above.

It should be noted the policy specifically addresses development on land affected by the environmental emissions generated by state transport corridors and infrastructure including busway, railway, light rail and state-controlled roads. For development on land affected by environmental emissions from a strategic airport, aviation facility, priority port or strategic port refer to the State Planning Policy.

4. Legislative provision for the policy

In Queensland, transport system planning is governed by the *Transport Planning and Coordination Act 1994* (TPCA) and the *Transport Infrastructure Act 1994* (TIA). The objective of both the TPCA and TIA is to achieve overall transport effectiveness and efficiency through strategic planning and management of transport resources. This includes ensuring that the transport system is integrated with surrounding development to encourage the efficient use of transport resources.

Under the TPCA and TIA the way in which the objective is to be achieved includes ensuring:

- development addresses any impacts on the development from environmental emissions generated by existing or future public passenger transport or public passenger transport infrastructure (s.8A(2)(b) TPCA)
- development addresses impacts on the development from environmental emissions generated by railways and future railways (s.258(2)(b) TIA)
- impacts on development from environmental emissions generated by state-controlled roads are addressed by development (s.2(b)(iv) and 49A TIA).

This policy seeks to achieve the above outcomes by ensuring adverse impacts on development from environmental emissions generated from state transport corridors and infrastructure are addressed during land use planning decision-making processes.

5. Impacts of environmental emissions

Environmental emissions generated from state transport corridors and infrastructure can have adverse impacts on health and community wellbeing. The risk of impact on an individual or community at a particular location varies depending on several factors. These include:

- the type of transport infrastructure (for example, a railway, road)
- the type of goods being transported (for example, passengers, dangerous goods, livestock, mineral ore)
- surrounding geography
- proximity of surrounding land uses
- the safety practices employed in operating transport infrastructure.

The environmental emissions generated from state transport corridors and infrastructure of most concern for health and community wellbeing are noise, vibration, air emissions and particles and light. Major transport sources of these environmental emissions and their most common impacts on health and community wellbeing are summarised in Table 1 and detailed in the following sections.

TMR is aware of growing community concern about the health risks associated with exposure to ultrafine particles, dust and electric and magnetic fields generated from state transport corridors and infrastructure. While these environmental emissions are not specifically addressed in this policy, information about their potential impact is provided in the following sections.

Table 1: Major sources of environmental emissions and most common impacts

Environmental emission	Major transport sources	Most common impacts on health and community wellbeing	General standards
Noise	Vehicles (for example, cars, buses) and trains and activity at stations and stops	Fatigue, reduced performance and concentration (often as a result of sleep disturbance) and feelings of general annoyance	Acoustic quality objectives stated in Schedule 1 of the Environmental Protection (Noise) Policy 2008 ¹
Air emissions and particles	Vehicle exhaust or 'tail pipe' emissions from vehicles and transport, handling and storage of bulk goods	Eye and throat irritation, headache, fatigue, nausea, exacerbation of pre-existing respiratory and cardiovascular conditions including asthma, odour problems, visibility degradation	Air quality objectives stated in Schedule 1 of the Environmental Protection (Air) Policy 2008 ²
Vibration	Low frequency pressure waves from vehicles and trains	Temporary discomfort and annoyance, damage to structural integrity of buildings or structures and their contents	Values for continuous, impulsive and intermittent vibration stated in 'Assessing Vibration: A Technical Guideline' ³
Light	Lighting of transport infrastructure and vehicle and train headlights	Nuisance, sleep disturbance	Reduce ingress of artificial lighting from outdoor sources between 10pm and 6am

¹ Office of the Queensland Parliamentary Counsel

² Office of the Queensland Parliamentary Counsel

³ Department of Environment and Conservation (NSW)

5.1 Noise

The term noise is used to describe any unwanted sound. Sound is primarily generated from the transport system by vehicles (that is, cars and buses), trains and patron activity at PPT stations and stops. Most people consider these sounds to be unwanted and therefore noise.

The amount of sound emitted from state transport corridors and infrastructure varies depending on a range of factors. These include vehicle type and speed, operational practices and infrastructure design and maintenance. State transport corridors are often referred to as a 'line source' of noise because the noise is emitted from a long and narrow (linear) area. This means that noise spreads out cylindrically so the level of noise is the same at all points that are an equal distance from the corridor.

Furthermore, the noise emitted from transport can be characterised as one of two major types: continuous or intermittent. Continuous noise is noise where the level is constant for a period of time, while intermittent noise is produced when the noise level increases and decreases rapidly (for example, when a train passes by). Transport mostly produces intermittent noise. However, the flow of traffic may increase to a point (especially during peak hours) where the noise emitted from a state transport corridor may be perceived to be continuous, especially at distances further away from the corridor.

The impact noise has on an individual depends on the level of noise and its characteristics, the activity being impacted upon and how it is perceived by the person affected. For example, some people may have a higher tolerance to very high pitched sounds such as a circular saw. Others may experience a greater feeling of annoyance by low-pitched sounds like a bass drum. Generally, noise impacts range from feelings of general annoyance to interference with communication and in the most severe cases hearing impairment and/or deafness. The noise emitted from transport is more commonly associated with physiological conditions such as fatigue, reduced performance and concentration (often as a result of sleep disturbance) and feelings of general annoyance.

In Queensland, noise emissions are regulated by the *Environmental Protection Act 1994* and Environmental Protection (Noise) Policy 2008 (the Noise Policy). The Environmental Protection Act stipulates when a noise emission is considered to be an offence. The Noise Policy outlines the levels of noise (or 'acoustic quality objectives') that should not be exceeded in new sensitive developments if individual and community health and wellbeing is not to be adversely impacted. A copy of the Noise Policy can be obtained from the Office of the Queensland Parliamentary Counsel (<https://www.legislation.qld.gov.au>).

5.2 Air emissions and particles

The combustion of fossil fuels (such as diesel and compressed natural gas) generates a range of gaseous air emissions and particles. The majority of air emissions and particles are released from transport sources as exhaust or 'tail pipe' emissions. The compounds found in vehicle exhaust with the potential to cause adverse impacts on health and community wellbeing are carbon monoxide, nitrogen oxides, sulphur dioxide, photochemical oxidants (ozone), respirable and fine particulate matter, volatile organic compounds and lead.

From a health perspective, these compounds have the potential to cause a range of adverse impacts. These include:

- physiological symptoms such as eye and throat irritation, headache, fatigue and nausea
- exacerbation of pre-existing respiratory conditions such as asthma and bronchitis

- exacerbation of pre-existing cardiovascular conditions which may increase the risk of angina and cardiac arrest.

These compounds may also be contributing factors in the development of some type of cancers.

From an amenity perspective, air particle emissions can result in odour problems, photochemical smog formation, visibility degradation and destruction of both man-made and biological material.

In Queensland, air emissions are regulated by the Environmental Protection (Air) Policy 2008 (the Air Policy) under the Environmental Protection Act. The Air Policy outlines the levels of air pollutants (or 'air quality objectives') that should not be exceeded if individual and community health and wellbeing is not to be adversely impacted. A copy of the Air Policy can be obtained from the Office of the Queensland Parliamentary Counsel (<https://www.legislation.qld.gov.au>).

5.2.1 Note on ultrafine particles

TMR is aware of growing concern about health risks associated with exposure to ultrafine particles emitted from transport vehicles in vehicle exhaust. Ultrafine particles are particles less than 0.1 micrometres in size (PM_{0.1}).

The impact of ultrafine particles on human health and wellbeing is an ongoing area of medical research. Currently, there is insufficient research to enable the World Health Organisation to make a recommendation about the level of exposure to ultrafine particles that should not be exceeded if individual and community health and wellbeing is not to be adversely affected.

In recognition of this, TMR sponsored a five-year study into the effects of ultrafine particles on the health of sensitive populations located in close proximity to transport infrastructure. The study found that while exposure to ambient ultrafine particles had no measurable impact on lung function or respiratory symptoms, it did influence airway and systemic inflammation. The study did not provide any data about the level of exposure to ultrafine particles with which to update this policy. This policy will be updated as more scientific knowledge becomes available.

5.2.2 Note on dust emissions

TMR is aware of growing concerns about the impact of dust generated from the transport, handling and storage of bulk materials (such as coal and other mineral ores) on human health and community wellbeing. Dust comprises a range of visible particles ranging in size from the width of a human hair (PM₆₀) to 1 millimetre (PM₁₀₀₀).

Currently, bulk material handling is defined as an environmentally relevant activity (known as a 'Chapter 4 activity') under the Environmental Protection Act. Under the Environmental Protection Act an operator undertaking an environmentally relevant activity must have a development approval and a registration certificate. The operator must abide by the conditions of the approval and registration certificate including conditions regarding dust emissions.

There is a need to review current industry dust deposition guidelines to ensure the guideline accurately describes the level of dust deposition that should not be exceeded if individual and community health and wellbeing is not to be adversely impacted. When a new dust deposition guideline is developed Schedule 1 of the Air Policy will be amended accordingly. This policy will be updated to reflect the new dust deposition guideline.

5.3 Vibration

Transport vehicles emit low frequency pressure waves that can cause vibration. In some cases, vibration may give rise to audible effects such as noise from structural movement and rattling of building elements or contents.

Like noise, vibration from transport can be characterised as being either continuous or intermittent in nature. Transport mostly produces intermittent vibration (that is, vibration that increases and decreases rapidly), for example, when a bus or train passes by. This can become continuous vibration when traffic flow becomes constant.

In most cases people will experience vibration from transport when inside a building or other structure that is being affected by vibration. While individuals can detect building vibration at levels well below those that can cause any risk of damage to the building or its contents, the most likely effects are temporary discomfort and/or annoyance.

The most significant impact resulting from vibration caused by transport is damage to the structural integrity of nearby buildings or structures and their contents.

The former New South Wales Department of Environment and Conservation prepared *Assessing Vibration: A Technical Guideline* (the Vibration Guideline). The Vibration Guideline outlines current industry standards for the levels of vibration that should not be exceeded in new sensitive developments if individual and community health and wellbeing is not to be adversely impacted. The Vibration Guideline is based on British Standard 6472-1992: Evaluation of human exposure to vibration in buildings (1-80Hz).

A copy of the Vibration Guideline can be obtained from the New South Wales Office of Environment and Heritage (<http://www.epa.nsw.gov.au>).

5.4 Light

During evening and night hours (6pm to 6am) artificial lighting and vehicle headlights illuminate transport infrastructure to ensure public and passenger safety. While lighting is designed to only illuminate the state transport corridor and infrastructure, at times light emissions can 'spill' over the corridor boundary onto surrounding property.

Light spill is generally perceived as a nuisance rather than a source of significant adverse impacts on the health and wellbeing of the affected community. However, ongoing exposure to light during the night has the potential to cause sleep disturbance. This may have consequential effects such as fatigue, reduced performance and concentration. Therefore it is desirable for lighting from outdoor sources to not intrude into buildings between the hours of 10pm and 6am.

5.5 Note on electric and magnetic fields

Electric and magnetic fields exist wherever electric current flows, for example, in power lines and cables, residential wiring and electrical appliances. Electric and magnetic fields are generated from the overhead wires or 'catenary' used to supply electricity to the network of light rail and railway infrastructure. Both types of fields are strongest close to the overhead wires and quickly diminish with distance.

The generation and transmission of electricity is classified as an Extremely Low-Frequency (ELF) field (50/60Hz). It is acknowledged there is a general perception in the community that there are health risks associated with exposure to ELF.

The impact of ELF fields on human health and wellbeing is an ongoing area of medical research. Currently, the World Health Organisation and Australian radiation health authorities do not regard exposure to electric and magnetic fields at the levels commonly found in the environment as a health risk.

6. Identifying land affected by environmental emissions from transport

The area of land affected by environmental emissions generated from state transport corridors and infrastructure varies depending on several factors. These include:

- the mode(s) of transport operating within the corridor
- operational characteristics of the corridor (for example, traffic density, frequency, speed, vehicle type)
- the width of a corridor
- whether the corridor is at-grade, elevated or depressed in the surrounding landscape
- whether strategies have been adopted to reduce the level of emissions generated from a corridor (for example, construction of noise barriers or adoption of new technology)
- whether impervious objects are located on land adjacent to a corridor (for example, a barrier or building may block or diffuse the spread of environmental emissions)
- local environmental conditions (for example, topography, prevailing meteorological conditions such as wind direction or speed, and vegetation coverage can all influence the dispersal of environmental emissions).

Generally, the measured level of environmental emissions generated from a state transport corridor will tend to be highest at locations adjacent to the corridor and will decrease as the distance from the corridor increases. For example, the measured noise level declines at least three decibels each time the distance from a corridor is doubled. Similarly, under unfavourable conditions (temperature inversion and light winds where little mixing occurs in the atmosphere), the concentration of air particles and emissions from a corridor can reduce by approximately 65% in the first 10 metres from the corridor and up to 90% within 100 metres from the corridor. Under favourable conditions (no temperature inversion and higher wind speeds) the concentration of air particles and emissions reduces more rapidly, reducing the area of land impacted by these emissions.

Based on these observations, the areas of land most likely to be affected by environmental emissions from state transport corridors and infrastructure are:

- land within or abutting (that is, shares a common boundary with) a corridor
- land adjacent to a corridor (for example, separated from a corridor by only a road, access way, service or utility easement or other undeveloped land such as a park or nature reserve)
- land with a direct line of sight to a corridor
- land within 100 metres of a state transport corridor and/or infrastructure.

It is noted that depending on factors such as mode of transport and operational characteristics of the state transport corridor, mitigation strategies adopted, location of impervious objects and local environmental conditions, other areas of land may be adversely

affected by environmental emissions generated by transport. This can happen at distances greater than 100 metres from the external boundary of the state transport corridor.

TMR may consider delineating those areas of land considered to be adversely affected by environmental emissions from state transport corridors and infrastructure as part of future work to implement this policy.

7. Developing land affected by environmental emissions from transport

7.1 Environmental emission criteria for new sensitive development

Where land is identified as being adversely affected by environmental emissions from state transport corridors or infrastructure it should be developed in a way that takes account of the risks posed to the health and wellbeing of an individual or the community at that location.

Specifically, new sensitive development should not be located on land that is considered to be adversely affected by environmental emissions from state transport corridors and infrastructure unless the level of exposure to environmental emissions can be mitigated to meet specific environmental emission criteria.

When designing new sensitive development developers must ensure that the predicted impact of environmental emissions generated by future transport infrastructure (10 years from the time of development) are mitigated.

Table 2 provides an indication of the types of environmental emissions which may adversely impact new sensitive development near particular types of state transport corridors. Where it is considered that an environmental emission is likely to have an adverse impact on a new sensitive development, attenuation treatments should be incorporated into the development proposal to ensure that the relevant environmental emission criteria shown in Tables 3, 4, 5, 6, and 7 are achieved.

Table 2: Environmental emissions of most relevance for new sensitive development

Type of new sensitive development proposed	State transport corridor					
	Passenger (only) railway	Shared/ freight railway	Busway	Light rail	State-controlled road	Tunnel (any mode)
Accommodation activity	NVL	NVAL	NVAL	NVL	NAL	NVAL
Educational establishment Child care centres	NV	NVA	NVA	NV	NA	NVA
Health care services Hospitals	NVL	NVAL	NVAL	NVL	NAL	NVAL
Community uses Places of worship Offices	NV	NVA	NVA	NV	NA	NVA

N = Noise V = Vibration A = Air emissions and particles L = Light

Table 3: Primary (external) noise criteria for new sensitive development

State transport corridor	Development type	Location within development	Environmental criteria
Railway OR Multi-modal corridor which includes a railway	Accommodation activities	All facades	≤ 65 dB(A) L_{eq} (24hr) façade corrected
			≤ 87 dB(A) (single event maximum sound pressure level) façade corrected
		Outdoor spaces for passive recreation	≤ 62 dB(A) L_{eq} (24hr) free field
			≤ 84 dB(A) (single event maximum sound pressure level) free field
	Educational establishments Child care centres	All facades	≤ 65 dB(A) L_{eq} (1hr) facade corrected (maximum hour during normal opening hours)
			≤ 87 dB(A) (single event maximum sound pressure level) façade corrected
		Outdoor education areas Outdoor play areas	≤ 62 dB(A) L_{eq} (12hr) free field (between 6am and 6pm)
			≤ 84 dB(A) (single event maximum sound pressure level) free field
	Health care services Hospitals Community uses Places of worship Offices	All facades	≤ 65 dB(A) L_{eq} (1hr) facade corrected (maximum hour during normal opening hours)
			≤ 87 dB(A) (single event maximum sound pressure level) façade corrected
		Outdoor spaces for passive recreation	≤ 62 dB(A) L_{eq} (12hr) free field (between 6am and 6pm)
			≤ 84 dB(A) (single event maximum sound pressure level) free field
Busway or Light rail	Accommodation activities	All facades	≤ 55 dB(A) L_{eq} (1hr) façade corrected (maximum hour between 6am and 10pm)
			≤ 50 dB(A) L_{eq} (1hr) façade corrected (maximum hour between 10pm and 6am)
			≤ 64 dB(A) L_{max} façade corrected (between 10pm and 6am)
		Outdoor spaces for passive recreation	≤ 52 dB(A) L_{eq} (1hr) free field (maximum hour between 6am and 10pm)
			≤ 66 dB(A) L_{max} free field
	Educational establishments Child care centres	All facades	≤ 55 dB(A) L_{eq} (1hr) façade corrected (maximum hour during normal opening hours)
		Outdoor education areas Outdoor play areas	≤ 52 dB(A) L_{eq} (1hr) free field (maximum hour during normal opening hours)
			≤ 66 dB(A) L_{max} free field (during normal opening hours)
		Health care services Hospitals Community uses Places of worship Offices	All facades
	Outdoor spaces for passive recreation		≤ 52 dB(A) L_{eq} (1hr) free field (maximum hour during normal opening hours)
			≤ 66 dB(A) L_{max} free field (during normal opening hours)

State transport corridor	Development type	Location within development	Environmental criteria
State-controlled road OR Multi-modal corridor which does not include a railway or includes <15 single railway events	Accommodation activities	All facades	≤ 60 dB(A) L ₁₀ (18hr) facade corrected (measured L ₉₀ (8hr) free field between 10pm and 6am ≤ 40dB(A))
			≤ 63 dB(A) L ₁₀ (18hr) facade corrected (measured L ₉₀ (8hr) free field between 10pm and 6am > 40dB(A))
		Private and communal open space	≤ 57 dB(A) L ₁₀ (18hr) free field (measured L ₉₀ (18hr) free field between 6am and midnight ≤ 45dB(A))
			≤ 60 dB(A) L ₁₀ (18hr) free field (measured L ₉₀ (18hr) free field between 6am and midnight > 45dB(A))
		Public open space	≤ 63 dB(A) L ₁₀ (12hr) free field (between 6am and 6pm)
	Educational establishments Child care centres	All facades	≤ 58 dB(A) L ₁₀ (1hr) façade corrected (maximum hour during normal opening hours)
		Outdoor education areas Outdoor play areas	≤ 63 dB(A) L ₁₀ (12hr) free field (between 6am and 6pm)
	Health care services Hospitals Community uses Places of worship Offices	All facades	≤ 58 dB(A) L ₁₀ (1hr) façade corrected (maximum hour during normal opening hours)
		Outdoor spaces for passive recreation	≤ 63 dB(A) L ₁₀ (12hr) free field (between 6am and 6pm)

Table 4: Secondary (internal) noise criteria for new sensitive development

State transport corridor	Development type	Location within building	Environmental criteria
Railway OR Multi-modal corridor which includes a railway	Accommodation activities	Habitable rooms all times	≤ 45 dB(A) single event maximum sound pressure level (railway)
	Child care centres	Sleeping rooms	≤ 45 dB(A) single event maximum sound pressure level (railway)
		Indoor education areas Indoor play areas	≤ 50 dB(A) single event maximum sound pressure level (railway)
	Health care services Hospitals	Ward areas	≤ 45 dB(A) single event maximum sound pressure level (railway)
		Treatment areas	≤ 50 dB(A) single event maximum sound pressure level (railway)
	Educational establishments	Indoor education areas	≤ 50 dB(A) single event maximum sound pressure level (railway)
	Community uses (library only) Places of worship		≤ 50 dB(A) single event maximum sound pressure level (railway)

	Community uses (except libraries) Offices		≤ 55 dB(A) single event maximum sound pressure level (railway)
State-controlled road OR Busway OR Light rail OR Multi-modal corridor which does not include a railway or includes <15 single railway events	Accommodation activities	Habitable rooms all times	≤ 35 dB(A) L _{eq} (1hr) (maximum hour over 24 hours)
	Child care centres	Indoor education areas Indoor play areas	≤ 35 dB(A) L _{eq} (1hr) (maximum hour during normal opening hours)
	Health care services Hospitals	Patient care areas	≤ 35 dB(A) L _{eq} (1hr) (maximum hour during normal opening hours)
	Educational establishments	Indoor education areas	≤ 35 dB(A) L _{eq} (1hr) (maximum hour during normal opening hours)
	Community uses (library only) Places of worship		≤ 35 dB(A) L _{eq} (1hr) (maximum hour during normal opening hours)
	Community uses (except libraries) Offices		≤ 45 dB(A) L _{eq} (1hr) (maximum hour during normal opening hours)
It is noted that the Environmental Protection (Noise) Policy 2008 includes more stringent noise criteria for sleeping areas and/or during night-time periods. However, since the Queensland Development Code does not currently differentiate sleeping areas from other habitable rooms TMR has chosen not to implement these criteria at this time.			

Table 5: Air emissions and particles criteria (external) for new sensitive development⁴

State transport corridor	Development type	Indicator	Environmental criteria
All transport corridors	All sensitive development	Carbon Monoxide (CO)	9ppm (8hr average)*
		Nitrogen Dioxide (NO ₂)	0.12ppm (1hr average)*
		Sulphur Dioxide (SO ₂)	0.2ppm (1hr average)*
			0.08ppm (24hr average)*
		Photochemical Oxidants (O ₃)	0.1ppm (1hr average)*
			0.08ppm (4hr average)*
		Respirable Particulate Matter (PM ₁₀)	50µg/m ³ (24hr average)*
		Fine Particulate Matter (PM _{2.5})	25µg/m ³ (24hr average)*
		Lead (Pb)	0.5µg/m ³ (annual average)*
		Toluene	1ppm (24hr average)*
		Formaldehyde	0.04ppm (24hr average)*
Xylenes	0.25ppm (24hr average)*		

* Measured at the development site in accordance with the Department of Environment and Heritage Protection's Air Quality Sampling Manual – available online www.ehp.qld.gov.au.

⁴ Source: Environmental Protection (Air) Policy 2008, Office of the Queensland Parliamentary Counsel.

Table 6: Vibration criteria (internal) for new sensitive development⁵

State transport corridor	Development type	Environmental criteria
All transport corridors	• Accommodation activities (10pm – 6am)	$\leq 0.13\text{m/s}^{1.75}$
	• Accommodation activities (6am – 10pm)	$\leq 0.2 \text{ m/s}^{1.75}$
	• Health care services and hospitals (critical areas)	$\leq 0.1\text{m/s}^{1.75}$
	• Educational establishments • Child care centres • Health care services and hospitals (non critical areas) • Community use and places of worship • Offices	$\leq 0.4\text{m/s}^{1.75}$

Table 7: Light Objective (Internal) for New Sensitive Development

State transport corridors	Development type	Environmental objective
All transport corridors	<ul style="list-style-type: none"> • Accommodation activities • Health care services/hospitals 	Reduce ingress of artificial lighting from outdoor sources between the hours of 10pm – 6am

7.2 Strategies for achieving the environmental criteria

The degree to which land is affected by environmental emissions from state transport corridors and infrastructure will ultimately determine:

- the amount of mitigation required
- the mix of measures to be adopted in order to achieve the required environmental emission criteria.

This policy does not prescribe the way environmental criteria should be achieved. It is recognised that different strategies may be more or less practicable or desirable, depending on the specifics of the development proposal and/or the stage of the land use planning process. Developers should seek to adopt the most effective means of achieving the environmental criteria given any project-specific or site-specific opportunities or constraints.

Some common strategies for mitigating the impact of environmental emissions include the following:

- Separation distances/setbacks: locating emission sensitive development on land that is appropriately separated from a state transport corridor (where possible).
- Topography: using the natural topography to prevent line of sight between the emission source and a new sensitive development.

⁵ Source: Assessing Vibration - A Technical Guideline, Department of Environment and Conservation (NSW) 2006.

- Site design (building location and orientation): locating emission sensitive components of the development furthest from the state transport corridor (for example, in a mixed use development placing residential buildings furthest from, and commercial and retail spaces closest to, the transport corridor); orientating buildings so that outdoor living areas are shielded from the source of emissions.
- Building design/layout: designing the internal layout of a building so that emission sensitive rooms are located furthest from the state transport corridor (for example, ensuring bedrooms and other habitable areas in a residence are placed on the side of the building furthest from the transport corridor); designing the internal layout of a building so that less sensitive rooms (such as garages, laundries, bathrooms, corridors etc.) are placed on the side of the building closest to the transport corridor to act as a buffer; minimising the number of doors and windows that can be opened on the side of the building closest to the transport corridor.
- Building treatments/construction materials: using building materials which mitigate the impact of environmental emissions, such as masonry walls, acoustic insulation, laminated and double-glazed windows, solid doors and window and door seals.
- Fences/barriers/mounds/screens: constructing fences, barriers, mounds and screens may be appropriate where space allows and there is no significant adverse impact on the amenity of a locality.
- Landscaping: vegetation buffers placed between emission sensitive buildings and transport corridors may assist in mitigating impacts caused by air particle and dust emissions and light spill.

The above list is not exhaustive. Alternative strategies may be used to achieve the environmental criteria as long as there are no adverse effect on the safety and operational integrity/efficiency of a state transport corridor.

Many of the strategies or techniques that can be integrated into development to reduce the impact of one type of environmental emission may reduce the impacts resulting from other types of emissions. For example, many building materials designed to reduce the impacts of noise on a building's occupiers or users can also assist in reducing the impact of vibration and air particle emissions.

The following documents are a good source of guidance for developers on how to mitigate adverse impacts from environmental emissions associated with transport operations and infrastructure:

- Department of Transport and Main Roads Road Traffic Noise Management Code of Practice
- Development near Rail Corridors and Busy Roads – Interim Guideline (The State Government of NSW through the Department of Planning 2008)
- AS 3671 – 1989: Acoustics – Road traffic noise intrusion – Building siting and construction (Standards Australia)
- Assessing vibration: a technical guideline – (Department of Environment and Conservation (NSW) 2006).

7.3 Development outside departmental jurisdiction

There are some types of development where TMR does not have jurisdiction to enforce compliance with this policy. TMR's position is that all members of the community should be afforded the same level of protection from any significantly adverse impacts on health and community wellbeing resulting from environmental emissions generated from state transport corridors and infrastructure. Developers should actively seek to avoid creating areas of social and locational disadvantage by ensuring the environmental emission criteria are met when the development is not bound to comply with government policy and by avoiding locations where the environmental emission criteria cannot be met.

8. Implementation

The following principles outline TMR's position regarding implementation of the policy:

- state planning instruments should require the impacts of environmental emissions generated from state transport corridors and infrastructure to be considered when preparing a local planning instrument and designating land for infrastructure. This will ensure that the impact of environmental emissions on new development are considered during early stages of planning, allowing more cost effective mitigation techniques such as separation distances/setbacks, topography, site design (building location and orientation) and building design/layout to be utilised where appropriate.
- development applications referred to the state in its role as a concurrence agency for the Integrated Development Assessment System (IDAS) under the Planning Act should be conditioned to comply with the relevant environmental emission criteria listed in the policy.
- development assessment should focus on ensuring the impacts of noise emissions and vibration on new sensitive development proposed on land near state transport corridors and infrastructure are attenuated when required by the policy. This is because adverse impacts from these emissions are known to occur frequently.
- although adverse impacts resulting from air emissions, particles and light generated by state transport corridors and infrastructure occur much less frequently, these emissions may be of concern for proposals near certain types of transport infrastructure (e.g. freight railways, tunnels) and should be attenuated where required.
- Queensland Development Code Mandatory Part 4.4 Buildings in a Transport Noise Corridor should ensure that the secondary noise criteria in the policy are achieved. Compliance with the secondary noise criteria should not be assessed at the development assessment stage.

9. Information about the policy

The policy has been prepared by TMR's Transport Strategy and Planning Branch.

Comments, suggestions for changes, further inclusions or additions can be mailed to:

Planning Policy
Transport System Management
Transport Strategy and Planning Branch
Department of Transport and Main Roads
GPO Box 213
Brisbane QLD 4001

Alternatively, you can email your comments and suggestions to:

planningpolicy@tmr.qld.gov.au

Glossary

Busway corridor	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Busway transport infrastructure	Refer to Schedule 6 of the <i>Transport Infrastructure Act 1994</i>
Caretaker's accommodation	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Child care centre	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Community residence	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Community use	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Critical area	Includes hospital operating theatres and precision laboratories where sensitive operations are occurring
Dual occupancy	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Dwelling house	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Dwelling unit	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Educational establishments	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Environmental emissions	Emissions to the environment considered to have the potential to have an adverse impact on health, community wellbeing and quality of life or cause nuisance. These include noise, air particles and emissions, vibration, light, odour and electric and magnetic fields
Government supported transport infrastructure	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Habitable room	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Health care service	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Home-based business	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Hospital	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Indoor education area	An enclosed area within a child care centre or educational establishment intended for use for the training or teaching of people including a classroom, lecture hall/theatre and library
Indoor play area	An enclosed area within a child care centre or educational establishment intended for use for children's play. Does not include functional areas such as bathroom, food preparation areas, washing facilities and other spaces of a specialised nature
Light rail corridor	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Light rail transport infrastructure	Refer to Schedule 6 of the <i>Transport Infrastructure Act 1994</i>
Multiple dwelling	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Nature-based tourism	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
New sensitive development	See section 3 of the policy
Non-resident workforce accommodation	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Office	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Other rail infrastructure	Refer to Schedule 6 of the <i>Transport Infrastructure Act 1994</i>
Outdoor education area	Outdoor areas intended for use for the training or teaching of persons. Does not include playgrounds or outdoor sport and recreational areas.
Outdoor play area	An unenclosed area located outside the external walls of a building. Only includes playgrounds/play areas in a child care centre or educational establishment
Outdoor space for passive recreation	Includes private open space, communal open space and public open space as defined under a local government planning scheme
Patient care area	A part of a health care building normally used for the treatment, care, accommodation, recreation, dining and holding of patients including a ward area and treatment area (Building Code of Australia)
Places of worship	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>

Rail transport infrastructure	Refer to Schedule 6 of the <i>Transport Infrastructure Act 1994</i>
Railway corridor	Refer Schedule 24 of the <i>Planning Regulation 2017</i>
Relocatable home park	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Residential care facility	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Resort complex	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Retirement facility	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Road transport infrastructure	Refer to Schedule 6 of the <i>Transport Infrastructure Act 1994</i>
Rooming accommodation	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Rural workers' accommodation	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Short term accommodation	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Single event maximum sound pressure level	The arithmetic average of maximum levels from the highest 15 single events over a given 24 hour period
Sleeping room	A room used for the primary purpose of sleeping
State-controlled road	Refer to Schedule 6 of the <i>Transport Infrastructure Act 1994</i>
State transport corridor	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Treatment area	An area within a patient care area such as an operating theatre and rooms used for recovery, minor procedures, resuscitation, intensive care and coronary care from which a patient may not be readily moved (Building Code of Australia)
Tourist park	Refer to Schedule 24 of the <i>Planning Regulation 2017</i>
Ward area	A part of a patient care area for resident patients and may contain areas for accommodation, sleeping, associated living and nursing facilities (Building Code of Australia)