Glossary of Terms

The project identified includes land requirements for the provision of up to four tracks, rail infrastructure, earthworks and maintenance access tracks. The width of the project is approximately 60 m, but in some areas, it is wider due to greater extents of earthworks (cut or fill / embankments).

Adaptation - adjustment in natural or human systems in response to actual or expected climatic changes or their effects, which moderates, harm or exploits beneficial opportunities.

Aestivation the equivalent to hibernation, only it occurs in summer or at other times of the year when conditions are not favourable. In reference to frogs, it refers to a period of dormancy during drier times (in Australia this is often winter) when frogs seal themselves up in the ground.

AHD (Australian height datum) is used to determine elevations in Australia. AHD is based on mean sea level being zero.

AHD (Australian height datum) is the reference level for defining reduced levels adopted by the National Mapping Council of Australia. The level of 0.0 m AHD is approximately mean sea level.

Aquatic macrophytes plants that typically grow in water, detectable with the naked eye and located within the wetted stream area. Macrophytes were classified as submergent, emergent, or floating, in accordance with Sainty and Jacobs (1994). Nomenclature throughout this report follows Pusey et al. (2004) for fish and Bostock and Holland (2007) for aquatic vegetation.

ARI (Average Recurrence Interval) is a term used to describe flood size and is measured in years. The ARI describes how likely a flood is to occur in a given year on average every 100-years. For example, the 100-year ARI event will occur on average once every 100-years; this is equivalent to a 100-year ARI having a 1 % probability of occurring in any given year.

Assessment background level (ABL) is a single-number figure used to characterise the background noise levels from a single day of a noise survey. ABL is derived from the measured noise levels for the day, evening or nighttime period of a single day of background measurements. The ABL is calculated to be the tenth percentile of the background LA90 noise levels – i.e. the measured background noise is above the ABL 90 % of the time.

'A'-weighted sound level dB (A) - the unit generally used for measuring environmental, traffic or industrial noise is the A-weighted sound pressure level in decibels, denoted dB (A). An A-weighting network can be built into a sound level measuring instrument such that sound levels in dB (A) can be read directly from a meter. The weighting is based on the frequency response of the human ear and has been found to correlate well with human subjective reactions to various sounds. An increase or decrease of approximately 10 dB corresponds to a subjective doubling or halving of the loudness of a noise. A change of 2 to 3 dB is subjectively barely perceptible.

Baseline conditions describe the existing situation in the project area. This term can be applied to the range of issues that have been investigated for this study.

Bioregions are based on broad landscape patterns that reflect the major structural geologies and climate as well as major changes in floristic and faunal assemblages. Bioregions contain a number of sub regions. The exact location of the bioregion boundaries are held in digital electronic form by the Department of Environment and Resource Management service centres.

CAMCOS – Caboolture to Maroochydore Corridor Study – proposed future passenger rail between Beerwah and Maroochydore.

Carbon monoxide (CO) is created when carbon in fuels is not fully combusted. Motor vehicles contribute a significant proportion of ambient carbon monoxide concentrations to the atmosphere.

Climate change refers to a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and / or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. Note that the United Nations Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods'. The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes.

Confined aquifer - an aquifer in which ground water is confined under pressure, which is significantly greater than atmospheric pressure.

Decibel is the ratio of sound pressures, which we can hear, is a ratio of 106:1 (one million: one). For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound level' (L) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply. Some typical noise levels are given below:

Noise Level dB(A)	Example
130	threshold of pain
120	jet aircraft take-off at 100 m
110	chain saw at 1 m
100	inside disco
90	heavy lorries at 5 m
80	kerbside of busy street
70	loud radio (in typical domestic room)
60	office or restaurant
50	domestic fan heater at 1m
40	living room
30	theatre
20	remote countryside on still night
10	sound insulated test chamber
0	threshold of hearing

Defined flood event, terminology consistent with State Planning Policy (SPP 1/03, 2003) which states 'Defined Flood Event is the flood event adopted by a local government for the management of development in a particular locality'.

Defined flood level, a water level derived through mathematical modelling of the Defined Flood Event.

Directly affected properties or properties that are directly affected are those properties, which are included in the land requirements for the project. This does not include properties that are adjacent or in the vicinity of the project.

Downstream left bank (DLB) and **downstream right bank (DRB)** refers to the stream bank on the left and right hand side of the observer, respectively, when they face downstream.

Drainage deficient area - areas of land defined in accordance with Regulatory Map 1.5 Flood Prone and Drainage Constraint Areas of the Maroochy Planning Scheme.

Drainage deficient area - areas of land defined in accordance with Regulatory Map 1.5 Flood Prone and Drainage Constraint Areas of the Maroochy Planning Scheme.

Dust is the generic term to describe particulate matter in the size range 1 – 75 µm in diameter. Dust nuisance is the result of the soiling of surfaces by excessive rate of dust deposition. There are currently no formal standards for dust deposition or for nuisance dust in Queensland or Australia. This reflects the uncertainties in dust monitoring technologies and the highly subjective relationship between deposition events, surface soiling and the perception of an event as a nuisance.

Ecological equivalence must be demonstrated using all of the following factors:

Location for example the further away the offset, the less likely it will mitigate the impact of the clearing on local biodiversity values.

a) Strategic Position – for example, an offset that is located in a State or Regional Wildlife Corridor, part of a local government strategic biodiversity corridor or adjacent to the protected area estate or other protected areas would be a highly desirable outcome for conservation of biodiversity.

b) Area – size is strongly correlated with the long-term viability of areas of native vegetation. Larger areas are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller areas. Smaller areas may make wildlife more vulnerable to disease, bushfire, pests, changes in climate and inbreeding.

c) Comparable vegetation community attributes – an offset that is a regional ecosystem with similar species composition, structure and forest type to the area proposed to be cleared will minimise the loss of specific vegetation community attributes and hence better ensure ecological equivalence.

d) Condition of vegetation – condition can be described in terms of genetic or species diversity, vegetation community structure, presence and abundance of native fauna, presence and abundance of feral animals, pests and weeds, health of soil and water, long term viability of the vegetation and ability of the ecosystem to withstand threatening processes.

e) Regaining remnant status – the type, quality and successionally stage of regrowth is preferable to a degraded regrowth offset or an offset involving revegetation.

f) Landscape context attributes – incorporates size of patch, connectivity and context considerations.

Factors may not have equal weight every time. Ecological equivalence is achieved when the ecological equivalence factors achieve equivalence overall, despite one or more factors not achieving equivalence.

El Niño - Southern Oscillation (ENSO) — ENSO refers to widespread year-to-year oscillations in atmospheric pressure, ocean temperatures and rainfall associated with El Niño (the warming of the oceans in the equatorial eastern and central Pacific) and its opposite, La Niña. Over much of Australia, La Niña tends to bring above average rain, and El Niño tends to bring drought. A common measure of ENSO is the Southern Oscillation Index (SOI), which is the normalised mean sea level pressure difference between Tahiti and Darwin. The SOI is positive during La Niña events and negative during El Niño events.

Environmental offsets are a mechanism that can be used in environmental management to compensate for the impacts of developments on ecologically significant features. These are guided by various policies and legislation at the State and Federal level.

Glossary of Terms

Exposure of the eyes to liquid sulfur dioxide, (from, for example an industrial accident) can cause severe burns, resulting in the loss of vision. On the skin it produces burns.

Exposure to concentrations of 10 to 50 parts per million for 5 to 15 minutes causes irritation of the eyes, nose and throat, choking and coughing.

Exposure to elevated levels of NO2 can lead to respiratory problems, inflaming the lining of the lungs and airways. It can also exacerbate symptoms in people with pre-existing conditions such as asthma or heart disease. NO2 also contributes to the formation of photochemical smog, which can also impact human health.

Equivalent continuous sound level (LAeq) another index for assessment for overall noise exposure is the equivalent continuous sound level, Leq. 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. Hence fluctuating levels can be described in terms of a single figure level.

Fauna refers to all vertebrate fauna (excluding fish) and the terminology used in this chapter follows Strahan (2000) for non-flying mammals, Churchill (1998) for bats, Pizzey and Knight (2003) for birds and Cogger (2000) for reptiles and amphibians. Common names for frogs follow the nomenclature of Ingram et al. (1993). Vegetation type descriptions used (e.g. forest and grassland) are based on the structural types described by Specht (1970).

Flood regulation line where a 'regulation line' has been set by Council to define the limit to which development may encroach onto a floodplain, development is undertaken outside such `regulation line'.

Freeboard a factor of safety usually expressed as a height above the adopted Defined Flood Level. A freeboard tends to compensate for factors such as wave action and historical and modelling uncertainties.

Frequency is the rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the Hertz (Hz), which is identical to cycles per second. A thousand hertz is often denoted kilohertz (kHz), e.g. 2 kHz = 2000 Hz. Human hearing ranges from approximately 20 Hz to 20 kHz. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For design purposes, the octave bands between 63 Hz to 8 kHz are generally used. For a more detailed analysis, each octave band may be split into three one-third octave bands or, in some cases, narrow frequency bands.

General circulation modelling (GCM) a time dependent numerical model of the atmosphere used to stimulate human induced climate change. GCMs are highly complex and used to model such factors as ocean temperatures, annual and daily solar heating and ice boundaries.

Global warming an increase in global average surface temperature due to natural or anthropogenic climate change.

Greenhouse gases a group of gases in the atmosphere that absorb and emit infrared or heat radiation, causing the greenhouse effect. The main greenhouse gases are water vapour, carbon dioxide, nitrous oxide and methane. The atmospheric concentration in the latter three gases is primarily due to anthropogenic activities thus 'enhancing' the natural greenhouse effect.

Health-related standards for NOx generally relate to NO2.

Highest historical flood level - the highest flood water level from all historic events for which Council has records.

Intergovernmental panel on Climate Change (IPCC) was jointly established by the World Meteorological Organisation (WMO) and the United Nations Environmental Program (UNEP) to assess the scientific, technical and socio-economic information relevant for the understanding of the risk of human-induced climate change.

It is a pollutant of concern as it reduces the oxygen-carrying capacity of the blood can exacerbate pre-existing cardiovascular conditions and in very high doses can be fatal. Typical ambient concentrations of carbon monoxide are not high enough to be hazardous to human health.

Landzone is a simplified geology/substrate – landform classification for Queensland utilised in the regional ecosystem framework.

LA90 (T) refers to the sound pressure level measured in dB (A), exceeded for 90 % of the time interval (T) i.e. measured noise levels were greater than this value for 90 % of the time interval. This is also often referred to the background noise level.

LA10 (T) refers to the sound pressure level measured in dB (A), exceeded for 10 % of the time interval (T). This is often referred to as the average maximum noise level and is frequently used to describe traffic noise.

Meso-habitats are broad scale habitat types that are roughly the same scale as the channel width and delineated by localised slope, channel shape and structure. Riffles, runs, pools and off stream wetlands represent potential types of meso-habitats.

Micro-habitats are smaller scale features and are defined here as relatively homogenous areas, approximately the same scale as used by an individual fish engaged in a specific activity, such as feeding or spawning. Tree snags, undercut banks and submergent vegetation are examples of in stream habitat units at the microhabitat scale.

Maximum Sound Level, Lmax - the maximum sound level is the maximum weighted sound pressure level experienced during the measurement period.

Minimum floor level - the minimum floor level calculated in accordance with Maroochy Plan 2000 R2 through the addition of the relevant freeboard to the Defined Flood Level and the Highest Historical Flood Level. Council requires that the higher of these two levels be used as the minimum floor level.

Ovipositing, the depositing of eggs at a chosen site by insects and / or amphibians.

Oxides of Nitrogen (NOx) and **Nitrogen Dioxide (NO2)**: Oxides of nitrogen Principally comprise nitric oxide (NO) and nitrogen dioxide (NO2). Oxides of nitrogen (NOx) may be formed from the oxidation of nitrogen in fuel during combustion or from the reaction of atmospheric nitrogen and oxygen at high temperatures. The majority of NOx in the ambient atmosphere is emitted as NO (typically over 90 %), that rapidly oxidises to NO2 in ambient air.

Palustrine wetland is a non-tidal wetland.

Particles as PM10 – Particles of less than 10 µm (0.01 mm), referred to scientifically as PM10, are considered a pollutant as they are easily inhaled into human lungs, potentially damaging health. The wide range of sources of particles means that their physical and chemical characteristics are also widely varied.

Particles originate from a wide variety of sources, including natural sources such as bushfires, living vegetation, dust storms and sea spray. Particles are also generated through anthropogenic activities such as forestry and agricultural activities, motor vehicles, power plants and industry. Particulate matter can also be formed when gases such as nitrous oxides and sulfur dioxide, react in the atmosphere.

Peak particle velocity (PPV) is the parameter most often used for the quantification of ground borne and structure-borne vibration. It is the maximum positive or negative magnitude of vibration in a defined direction caused by the passage of a wave front during a specified interval. Particle velocity is used in most cases because this parameter has been found to correlate best with the onset of structural damage. It can also be used to provide some guidance on disturbance to people and the sensitivity of equipment and processes to vibration.

Peri-urban relates to the area around an urban settlement. It is distinctive in its diversity, having a mix of land uses and residents. It is rural in appearance but many residents will have jobs in the nearby urban area to which they commute.

Preferred alignment is the alignment we are working with.

Preliminary design refers to the next stage of design, where the current design will be further refined. This will include the identification of bridge structures, retaining walls, tunnel requirements form part of the preliminary design process.

Project area the corridor immediately impacted by the selected alignment.

Rating background level (RBL) a single-number figure used to characterise the background noise levels from a complete noise survey. The RBL for a day, evening or night time period for the overall survey is calculated from the individual Assessment Background Levels (ABL) for each day of the measurement period, and is numerically equal to the median (middle value) of the ABL values for the days in the noise survey.

Regional ecosystems were defined by Sattler and Williams (1999) as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. Compilation of the information about regional ecosystems presented in Sattler and Williams (1999) was derived from a broad range of existing information sources including land system, vegetation and geology mapping and reports. However, the framework is dynamic and is regularly reviewed as new information becomes available. The Queensland Herbarium has created maps of extant remnant vegetation in Queensland, which classifies vegetation into various Regional Ecosystems (RE). These RE's are then associated with a conservation status of endangered, of concern or not of concern and provided with an associated level of protection under the *Vegetation Management Act 1999*.

Remnant vegetation as described under the *Queensland Vegetation Management Act 1999* is vegetation, part of which forms the predominant canopy of the vegetation:

a) covering more than 50 % of the undisturbed predominant canopy

b) averaging more than 70 % of the vegetation's undisturbed height

c) composed of species characteristic of the vegetation's predominant canopy

The Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (produced by the Department of Environment and Resource Management provides detailed guidance in the regional ecosystem and remnant vegetation mapping process).

Remnant vegetation is defined by Regional Ecosystem mapping by the Department of Environment and Resource Management (2005), but also includes vegetation that has not been covered by that mapping process due to reasons of scale or error.

SimCLIM simulated computer-modelling software developed by the International Global Change Institute at the University of Waikato New Zealand, used as a tool to examine the effect of climatic variability and change over time and space.

Glossary of Terms

Special report emission scenarios (SRES) – the IPCC developed a number of plausible 'storylines' to quantify the range of potential future GHG emissions. Future GHG emissions are a product of very complex dynamic systems, determined by driving forces such as demographic development, socio-economic development, and technological change.

Sound exposure level (SEL) - the sound exposure level or single event noise exposure Level, denoted SEL or LAE, is a measure of the total amount of acoustic energy contained in an acoustic event. The SEL is the constant sound pressure level that would produce in a period of one second the same amount of acoustic energy contained in the acoustic event.

Sound power and sound pressure - the sound power level (Lw) of a source is a measure of the total acoustic power radiated by a source. The sound pressure level (Lp) varies as a function of distance from a source. However, the sound power level is an intrinsic characteristic of a source (analogous to its mass), which is not affected by the environment within which the source is located.

Spill kit is a kit containing materials and instruction for cleaning spills of hazardous or potentially hazardous materials.

Statistical noise levels - for levels of noise that vary widely with time, for example road traffic noise, it is necessary to employ an index, which allows for this variation. 'A'-weighted statistical noise levels are denoted LA10, dBLA90 etc. The reference time period (T) is normally included, e.g. dBLA10, 5 min or dBLA90, 8 hr.

Stabling yards are areas where trains can be parked (i.e. stabled) overnight. These areas also allow for cleaning and access for drivers and maintenance crew.

Sub region is an area that is contained within a specific bioregion and that is usually associated with specific geology and geomorphology, finer climatic patterns, ecological processes at a subregional level, interrelationships of natural values, species distributions and movements. The exact location of the subregion boundaries are held in digital electronic form by the Department of Environment and Resource Management, and are available from the Department of Environment and Resource Management service centres.

Sulfur dioxide (SO2) - sulfur dioxide is a common pollutant to which we are exposed at very low levels every day by breathing air in cities and some industrial environments. Higher exposure levels are more likely to be found in the workplace where it is produced as a by-product, such as in smelting and the combustion of coal or oil. Exposure can also happen from the manufacture of fumigants, food preservatives, bleaches and wine making. It can be ingested by eating preserved foods and breathed in causing a risk to asthmatics and other individuals sensitive to its effects.

The project area defined for the Route Identification Report is approximately 3 km wide, extending approximately 22 km from Landsborough to Nambour. This area was initially selected by the Department of Transport and Main Roads as it was considered to provide a realistic area within which to define corridor options. This project area provides the opportunity to identify feasible corridor options that take into consideration the physical, environmental and social constraints that occur within the project area.

The study focus area is a refinement of the original project area identified-using information gathered from the community and other technical, social and environmental studies. The study focus area shows a number of areas where it would be possible to locate a suitable route for the upgrade of the Landsborough to Nambour section of the North Coast Line.

The study focus area was broken into **segments** to allow for the evaluation of route options on a segment-by-segment basis, instead of for the full length of the project.

The study is an early phase of the Landsborough to Nambour Rail project. It includes route identification, the preparation of an Environmental Impact Statement.

Thermal expansion is the tendency of matter to change in volume in response to a change in temperature – regarding sea level rise as water warms it will expand.

Threatened a commonly used term to collectively describe Endangered and Vulnerable species.

Vagile by vagility able to move about or disperse in a given environment: a vagile animal species.

Vibration may be expressed in terms of displacement, velocity and acceleration. Velocity and acceleration are most commonly used when assessing structure borne noise or human comfort issues respectively. Vibration amplitude may be quantified as a peak value, or as a root mean squared (rms) value. Vibration amplitude can be expressed as an engineering unit value e.g. 1 mms -1 or as a ratio on a logarithmic scale in decibels:

- vibration velocity level, LV (dB) = 20 log (V/Vref)
- where the preferred reference level, Vref, for vibration velocity = 10-9 m/s
- the decibel approach has advantages for manipulation and comparison of data

Waste stream is the flow or movement of waste generated by a particular process or group from the point of generation to final disposal.

Waste management hierarchy is a framework for prioritising waste management practices to achieve the best environmental outcomes. It promotes the avoidance or minimisation of waste and where this is not possible, recycling and re-use of waste materials is encouraged, ahead of treating and disposing of waste. Usually, items from all framework levels are required to address the full range of current solid waste streams.

Abbreviations

ACH Act	*Aboriginal Cultural Heritage Act 2003* (Qld)
AHD	Australian Height Datum
ALCAM	Australian Level Crossing Assessment Model
ANZECC	Australian and New Zealand Environment and Conservation Council
ASS	Acid Sulphate Soils
AVH	Australia's Virtual Herbarium
BPA	Biodiversity Planning Assessment
CAMCOS	Caloundra to Maroochydore Corridor and Land Use Study
CG	The Coordinator-General of the State of Queensland
CHMP	Cultural Heritage Management Plan
CO2	Carbon Dioxide
DEWHA	Australian Government Department of the Environment, Water, Heritage and the Arts
DIP	Department of Infrastructure and Planning
DMR	Former Queensland Department of Main Roads
EIS	Environmental Impact Statement, as defined by Part 4 of the State *Development and Public Works Organisation Act 1971*
EMP	Environmental Management Plan
EP Act	*Environmental Protection Act 1994 (Qld)*
EPA	Former Queensland Environmental Protection Agency, now Department of Environment and Resource Management
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (C'th)
EPP	Environnemental Protection Policy
EPP (Air)	Environnemental Protection (Air) Policy 1997
EPP (Noise)	Environnemental Protection (Noise) Policy 1997
EPP (Water)	Environmental Protection (Water) Policy 2008
EVR	Endangered, Vulnerable and Rare (same meaning as Rare and Threatened)
GCM	Global Circulation Modelling
GHG	Greenhouse gas emissions
GIS	Geographical Information System
GPS	Global Positioning System
GQAL	*Good Quality Agricultural Land in State Planning Policy 1/92: Development and the Conservation of Agricultural Land*
IAS	Initial Advice Statement, as defined by Part 4 of the *State Development and Public Works Organisation Act 1971*
IDAS	Integrated Development Assessment System
IPA	*Integrated Planning Act 1997 (Qld)*
IRTP	Integrated Regional Transport Plan
LGMS	*Local Growth Management Strategy*
LP Act	*Land Protection (Land and Stock Route Management) Act 2002*
MNES	Matters of National Environmental Significance
MSL	Moura Short Line
Mtpa	Million tonnes per annum
NCA	*Nature Conservation Act 1992 (Qld)*
NCL	North Coast Line
NP	National Park
OLC	Open Level Crossing
QR	Queensland Rail
SCRC	Sunshine Coast Regional Council
SDPWO Act	*State Development and Public Works Organisation Act 1971*
SEQ	South East Queensland
SEQRP	*South East Queensland Regional Plan*
SEQIPP	*South East Queensland Infrastructure Plan and Program*