

# ENVIRONMENTAL IMPACT STATEMENT

RED HILL  
MINING LEASE

Glossary, Abbreviations and Units



## Glossary

Term	Definition
Access	the location where vehicles move between private property and the public road
Alluvial	sediments deposited by flowing water
Alluvial aquifer	an aquifer formed of unconsolidated material deposited by water, typically occurring adjacent to river channels and in buried or palaeochannels
Alluvium	sediments (clays, sands, gravels and other materials) deposited by flowing water. Deposits can be made by streams on river beds, floodplains, and alluvial fans
Annual average daily traffic	the volume of traffic over a day as averaged from a complete years' worth of traffic counts.
Aquatic	associated with and dependant on water (e.g. aquatic vegetation)
Aquatic ecosystems	abiotic (physical and chemical) and biotic components, habitats and ecological processes contained within rivers and their riparian zones and reservoirs, lakes, wetlands and their fringing vegetation
Aquiclude	a low-permeability unit that forms either the upper or lower boundary of a groundwater flow system.
Aquifer	saturated permeable geological unit that is permeable enough to yield economic quantities of water to boreholes
Aquifer system	heterogeneous body of intercalated permeable and less permeable material that acts as a water-yielding hydraulic unit of regional extent
Aquifer test	a hydrological test performed on a well, aimed to increase the understanding of the aquifer properties, including any interference between wells, and to more accurately estimate the sustainable use of the water resource available for development from the well.
Aquitard	saturated geological unit with a relatively low permeability that retards and restricts the movement of water, but does not prevent the movement of water; while it may not readily yield water to boreholes and springs, it may act as a storage unit
Arboreal	living in trees
Assemblage	a group of species co-occurring at a location
Australian Height Datum (AHD)	the Australian height datum, adopted by the National Mapping Council of Australia, for referencing a level or height back to a standard base level.
Austroroads	The association of Australian and New Zealand road transport and traffic authorities that aims to promote improved road transport outcomes and produces nationally accepted guidelines.
Available drawdown	height of water above the depth at which the pump is set in a borehole at the time of water level measurement (metres)
Average daily traffic	the volume of traffic over a day as averaged from an incomplete year's worth of traffic counts
Averaging period	time period over which air quality measurements or predicted impacts are averaged
Background traffic	the expected volume of traffic at a particular point without the addition of the traffic associated with the project under consideration
Bank storage	water that percolates laterally from a river in flood into the adjacent geological material, some of which may flow back into the river during low-flow conditions
Baseflow	amount of groundwater flowing into a river
Basic model	with limited data availability and status of hydrogeological understanding, and possibly limited budgets, a Basic model could be suitable for preliminary quantitative assessment (rough calculations), or to guide a field program
Bore (borehole)	a well, excavation, or any other artificially constructed or improved groundwater cavity which can be used for the purpose of intercepting, collecting or storing water from an aquifer; observing or collecting data and information on water in an aquifer; or recharging an aquifer. Interchangeable with bores, wells, piezometers

Term	Definition
Brackish	water that contains between 1,000 and 10,000 mg/L of dissolved solids
Brine	water that contains more than 35,000 mg/L of dissolved solids
Buffer	area of vegetation providing protection from disturbance
Calibration	calibration of a model is the process where parameters in the model are fine tuned to get the best possible match between actual and modelled data over a defined period
Carbonaceous	defining attribute of a substance rich in carbon
Carrying capacity	The number of individuals that can be supported in a given area within natural resource limits without degradation of those resources. The carrying capacity for any given area is not fixed.
Catchment	area from which any rainfall will drain into the watercourse, contributing to the runoff at a particular point in a river system; synonymous with the term river basin
Chainage	the distance in kilometres along a road from a defined starting point
Community (ecology)	group of populations of plants and animals in a given place
CONCAWE	'the propagation of noise from petroleum and petrochemical complexes to neighbouring communities' prediction method
Conceptual model (groundwater)	A simplified and idealised representation (usually graphical) of the physical hydrogeologic setting and our hydrogeological understanding of the essential flow processes of the system. This includes the identification and description of the geologic and hydrologic framework, media type, hydraulic properties, sources and sinks, and important aquifer flow and surface-groundwater interaction processes.
Cone of depression	the radial decline of potentiometric levels or underground water levels around a point of water extraction from an aquifer
Confined aquifer	An aquifer that is overlain and underlain by impervious layers. The water level in bores tapping confined aquifers rises within the bore to a level above the top of the aquifer, and may result in an artesian or sub artesian bore. Confined aquifers tend to occur in the central and deeper parts of the Basin.
Confining layer	layer of low permeability material overlying an aquifer, which restricts the vertical movement of water
Connectivity	the connectedness between patches of suitable habitat for an individual species or group of species
Contamination	introduction of any substance into the environment by human activities
Corridor	a continuous link of suitable habitat between two vegetation patches allowing movement by fauna
Crash data	recorded road crashes along a particular section of public road
Critical delay	the highest average traffic delay experienced by any traffic movement at an intersection
Critical movement	in the context of critical traffic delay intersections, it is the traffic movement which experiences the highest average delay of any of the movements at that intersection
Cryptic (ecology)	difficult to observe
Degree of saturation (DOS)	The ratio of the number of vehicles requiring entry to an intersection in a specified period to the number which could enter if an approach was fully saturated (i.e. at capacity) during that period.
Dewatering	Removing underground water for construction or other activity. It is often used as a safety measure in mining below the water table or as a preliminary step to development in an area.
DIALOG	a computer based literature search database
Dissolved solids	minerals and organic matter dissolved in water
Diurnal	active during the day
Dominant	one or more species, by means of their number, coverage, or size that exerts considerable influence upon or control of the conditions of existence of associated species

Term	Definition
Drawdown	drop in groundwater level below the general level occurring when a borehole is pumped
Duricrust	hardened soil crust
Ecosystem	organic community of plants, animals and bacteria and the physical and chemical environment they inhabit
Ecosystem function	processes including soil formation and stabilisation, nutrient cycling, water infiltration, pollination and seed production
Ecotone	transitional zone between two diverse communities/habitats
Effective storage (aquifers)	Volume of groundwater an aquifer takes in and releases is limited by the storage capacity. Aquifers may be regularly recharged but have insufficient storage to contain the recharge thus seasonal seeps are formed and the aquifer is incapable of storing groundwater volumes over extended dry periods.
Endemic	a species restricted to a particular place or region
Ephemeral	a stream or creek that carries water only during or immediately after rainfall
Ephemeral river	storm-event driven rivers where flow occurs less than 20 per cent of the time; these rivers have limited baseflow component with no groundwater discharge
Equivalent standard axles	the number of standard axle loads that are equivalent in damaging effect on a pavement to a given vehicle or axle loading
Exotic species	an introduced species
Extant	still in existence
External road network	The road network outside the direct control and ownership of a development project. The external road network is usually controlled by either the Department of Transport and Main Roads or a local council.
Extraction	in relation to any bore includes withdrawing, taking, using or permitting the withdrawing, taking or using of water from that bore
Evapotranspiration	the sum of evaporation and transpiration
Fault	zone of displacement in rock formations resulting from forces of tension or compression in the earth's crust
Fecundity	reproductive output; number of offspring produced
Flow regime	recorded or historical sequence of flows used to create a hydrological profile of a water resource
Fluvial	relating to or arising from the action of flowing water in a river
Flux	rate of groundwater flow per unit width of aquifer
Formation	general term used to describe a sequence of rock layers
Fracture	any break in a rock including cracks, joints, and faults
Fresh water	water that contains less than 1,000 mg/L salts
Gilgai	depression in an irregular land surface
Groundwater	water found in the subsurface in the saturated zone below the water table or piezometric surface i.e. the water table marks the upper surface of groundwater systems
Groundwater dependent ecosystems	ecosystems which have their species composition and natural ecological processes wholly or partially determined by groundwater
Groundwater flow	movement of water through openings and pore spaces in rocks below the water table (i.e. in the saturated zone)
Groundwater flow model	an application of a mathematical model to represent a site-specific groundwater flow system
Groundwater resource	groundwater available for beneficial use, including humans, aquatic ecosystems and the greater environment

Term	Definition
Growth rate (traffic)	the annual per cent change in the number of vehicles passing a given point on a road
Heavy vehicles	a heavy vehicle is defined as any vehicle with three or more axles or with dual tyres on the rear axle
Heterogeneous	composed of parts of different kinds; having widely dissimilar elements or constituents
Heterogeneous (ecology)	composed of species and/or structure that are not the same or similar
Homogeneous	composed of parts or elements that are all of the same kind; not heterogeneous
Homogeneous (ecology)	composed of species and/or structure that are all the same or similar
Homogeneous (groundwater)	characteristic of the geological unit in which hydraulic conductivity is independent of position or direction; opposite of heterogeneous
Hydraulic conductivity	measure of the ease with which water will pass through earth material; defined as the rate of flow through a cross-section of one square metre under a unit hydraulic gradient at right angles to the direction of flow (metres per day)
Hydraulic equation	an expression of the law of mass conservation for purposes of water budgets. It may be stated as inflow equals outflow plus or minus changes in storage
Hydraulic gradient	change in the hydraulic head over a certain distance
Hydraulic head	elevation to which water will rise in a borehole connected to a point in an aquifer
Hydrology	study of the properties, circulation and distribution of water
Infiltration	downward movement of water from the atmosphere into the ground; not to confused with percolation
Intergranular flow	Flow that occurs between individual grains of rock
Intersection capacity	The maximum sustainable traffic flow rate at which vehicles can reasonably be expected to traverse a point or uniform segment of a lane or roadway under given roadway, geometric, traffic, environmental and control conditions; usually expressed as vehicles per hour.
Intersection movement	a traffic path through an intersection with a discrete origin and destination
Isotropic	condition of having properties that are uniform in all directions, opposite of anisotropic
k-factor	soil erodibility
Kilde 130	Norwegian ministry of the environment and communications rail noise prediction method
Landform	a geomorphological unit
Level of service (LOS)	A qualitative measure describing traffic operational conditions within a traffic stream, and their perception by motorists and/or passengers. These conditions are generally described in terms of speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety.
Light vehicles	a light vehicle is defined as any vehicle with two axles and without dual tyres on the rear axle
Lithic	relating to or composed of stone
Lithology	physical character of rocks
Macro-invertebrate	aquatic invertebrates visible to the naked eye
Macrophyte	emergent, submergent or floating plants that are not microscopic
Major aquifer	highly permeable formations, usually with a known or probable presence of significant fracturing, may be highly productive and able to support large abstractions for public supply and other purposes; water quality is generally very good
Micro-bat	bats belonging to the suborder Microchiroptera, typically small, insectivorous and able to echolocate
Microchiropteran	bats belonging to the suborder Microchiroptera

Term	Definition
Micro-habitat	a small localised habitat within a larger ecosystem
Minor aquifer	fractured or potentially fractured rocks which do not have a high primary permeability, or other formations of variable permeability; aquifer extent may be limited and water quality variable
Model calibration	The process by which the independent variables (parameters) of a numerical model are adjusted, within realistic limits, to produce the best match between simulated and observed data (usually water-level values). This process involves refining the model representation of the hydrogeologic framework, hydraulic properties, and boundary conditions to achieve the desired degree of correspondence between the model simulations and observations of the groundwater flow system.
Network peak	The (usually) hour long period during which traffic volumes on the road network are at the highest level.
Nomenclature	system of names, terminology
Non-aquifer	formations with negligible permeability that are generally regarded as not containing groundwater in exploitable quantities; groundwater bodies, which are essentially impermeable, do not readily transmit water and/or have a water quality which renders it unfit for use
Nutrients	substances that help living things grow (e.g. nitrogen, phosphate, potassium)
Observation well	A non-pumping well used to observe the elevation of the water table or the potentiometric surface. An observation well is generally of larger diameter than a piezometer and typically is screened or slotted throughout the thickness of the aquifer.
Oxidation	addition of oxygen to a compound; entails the loss of an electron
Palaeochannel	buried stream channel
Passage	en route migration
Pavement impact	Pavements are designed to carry a pre-determined level of traffic load, measured in ESAs, after which the pavement is likely to require structural improvements. New developments can generate increased heavy vehicle traffic which may adversely impact the structure or condition of a pavement.
Pavement markings	Any painted lines, raised pavement markers, traffic domes and the like placed on the road to direct and control the movement or parking of traffic.
Peak period	typically the one hour period that has the highest traffic demands
Perched aquifer	Perched aquifers occur in the upper catchments. They sit over a thick layer of clayey weathered sediments and have no connection to the fractured rock aquifers beneath the clay. This lack of connection means that their ecosystems are highly dependent on rainfall runoff, lateral subflow, from unconsolidated sediments overlying the clay or upstream flow contributions. These systems are more sensitive to surface water changes. Development of surface water resources or disruptions to subsurface flow will have the greatest impact on flora and fauna in this setting.
Percolation	process of the downward movement of water in the unsaturated zone under the influence of gravity and hydraulic forces; term used to differentiate from infiltration, which specially refers to the movement of water from the atmosphere into the ground
Permeability	ease with which a fluid can pass through a porous medium and is defined as the volume of fluid discharged from a unit area of an aquifer under unit hydraulic gradient in unit time (metres per day)
Permeable (materials)	materials that allow liquids to flow through them
pH	absolute value of the decimal logarithm of the hydrogen-ion concentration (activity); used as an indicator of acidity (pH < 7) or alkalinity (pH > 7)
Piezometric level	elevation to which groundwater levels rise in boreholes that penetrate confined or semi-confined aquifers
Piezometric surface	imaginary surface representing the piezometric pressure or hydraulic head throughout all or part of a confined or semi-confined aquifer

Term	Definition
Pollution	introduction into the environment of any substance by the action of humans, which is or results in significant harmful effects to humans or the environment
Porosity	porosity of a water-bearing formation is determined by that part of its volume consisting of openings or pores
Potable water	water that is safe and palatable for human use
Preferential flow	preferential movement of groundwater through more permeable zones in the subsurface
Primary aquifer	aquifer in which water moves through the original interstices of the geological formation
Recharge	recharge is defined as the process by which water is added from outside to the z zone of saturation of an aquifer, either directly into a formation, or indirectly by way of another formation
Rehabilitation	restore to former condition or status
Remediation	restore to health, requires that impact is reduced to some acceptable level
Residual	something left after other parts/components have been removed or addressed.
Resource (water)	quality of all aspects of a water resource including (a) the quality, pattern, timing, water level and assurance of instream flow, (b) the water quality, including the physical, chemical and biological characteristics of water, (c) the characteristic and condition of the instream and riparian habitat; and (d) the characteristics, condition and distribution of aquatic biota
Rest water level	groundwater level in a borehole not influenced by abstraction; synonymous with static water level, but no groundwater levels are ever truly static as they continually respond to recharge, discharge and abstraction
Right turn bay	a lane allocated for use exclusively by right turning vehicles
River	physical channel in which runoff will flow; generally larger than a stream, but often used interchangeably
Road and Traffic Authority	the State Road Authority in New South Wales which is the State Government Agency responsible for the state road network
Roundabout	A channelised intersection at which all traffic moves clockwise around a central traffic island.
Runoff	surface and subsurface flow from a catchment, but in practice refers to the flow in a river i.e. excludes groundwater not discharged into a river
Run-of-mine	material from a mine that has not been crushed or screened
Safe yield	amount of water that can be withdrawn from an aquifer without producing an undesired effect like water level reaching the position of the main water yielding fracture
Saline water	water that is generally considered unsuitable for human consumption or for irrigation because of its high content of dissolved solids
Saturated zone	subsurface zone below the water table where interstices are filled with water under pressure greater than that of the atmosphere
Seagull intersection	An intersection where a triangular island is used to separate turning traffic from through traffic in the same carriageway
Seal width	The width of the carriageway sealed to protect and waterproof the underlying pavement inclusive of sealed shoulders.
Seasonal river	rivers driven by seasonal rainfall patterns where flow occurs between 20% and 80% of the time; these rivers have a limited baseflow component with little or no groundwater discharge
Secondary aquifer	aquifer in which water moves through secondary openings and interstices, which developed after the rocks were formed i.e. weathering, fracturing, faulting
Secondary interstices	openings in the rock that were developed by processes that affected the rocks after they were formed
Sediment	particles derived from rocks or biological material that have been transported by air or water



Term	Definition
Sedimentary aquifer	These occur in consolidated sediments such as porous sandstones and conglomerates, in which water is stored in the intergranular pores, and limestone, in which water is stored in solution cavities and joints. These aquifers are generally located in sedimentary basins that are continuous over large areas and may be tens or hundreds of metres thick. In terms of quantity, they contain the largest groundwater resources
Seep	diffuse wetland area where interflow and groundwater emerges, usually at a slow rate or small volume, to become surface flow
Semi confined aquifer	An aquifer confined by a low-permeability layer that permits water to slowly flow through it. During pumping of the aquifer, recharge to the aquifer can occur across the confining layer. Also known as a leaky artesian or leaky confined aquifer
Sensitivity analysis	The measurement of the uncertainty in a calibrated model as a function of uncertainty in estimates of aquifer parameters and boundary conditions
SIDRA	Traffic analysis software developed by SIDRA SOLUTIONS which provides estimates of capacity and performance statistics for isolated intersections
SIGNAL analysis	Stream Invertebrate Grade Number – Average Level; a biotic index for measuring habitat quality based on invertebrate families
Signalised intersection	an intersection at which the movement of vehicles and pedestrians is generally controlled by traffic signals
Simulation	one complete execution of a groundwater modelling program, including input and output
Source population	breeding group that produces enough offspring to be self-sustaining and that often produces excess young that must disperse to other areas
Specific capacity	The ratio of the rate of discharge of water from the well to the drawdown of the water level in the well. Specific capacity should be described on the basis of the number of hours of pumping prior to the time the drawdown measurement is made. It will generally decrease with time as the drawdown increases
Specific storage	The amount of water per unit volume of a saturated formation that is expelled from storage due to compression of the mineral skeleton and the pore water
Specific yield	ratio of the volume of water that a given mass of saturated rock or soil will yield by gravity from that mass
Spring	point where groundwater emerges, usually as a result of topographical, lithological or structural controls
State-controlled roads	a road declared to be controlled by the Department of Transport and Main Roads, including all AusLink National Roads in Queensland
Static water level	rest water level
Stepping stones	disconnected patches of habitat that more mobile species, or species with some tolerance of modified habitat, move through from one vegetation patch to another
Stochastic	A description of a parameter or a process with random qualities. A stochastic parameter has a range of possible values, each with a defined probability. The outcome of a stochastic process is not known with certainty
Storage coefficient	volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head
Storativity	Storage can be defined as the volume of water that a saturated confined aquifer releases from storage per unit surface area of the aquifer per unit decline in the water table. Quantifies the aquifers ability to release water
Sub-artesian	Groundwater that does not rise above the surface of the ground when accessed by a bore and must be pumped to the surface
Successional (succession)	replacement of one kind of community by another kind
Surface runoff	part of the total runoff that travels over the ground surface to reach a stream or river channel
Sustainable yield	safe amount of water that can be abstracted from a borehole over a long period of time (usually 1 or 2 years) without the water level reaching the position of the pump or main water strike

Term	Definition
Synergism	interaction of different components that produces a total effect greater than that of the sum of the individual effects
Total dissolved solids	concentration of dissolved solids
Through flow	Movement of water horizontally beneath the land surface; it occurs once water has infiltrated the soil; the water moves downwards under gravity and because the soil becomes more compact and less permeable with increasing depth, water will begin to move sideways at speeds of between 0.005 to 0.3 metres per hour. It usually happens when the soil is completely saturated with water
Topographic divide	The boundary between adjacent surface water boundaries. It is represented by a topographically high area.
Transmissivity	Rate at which water is transferred through a unit width of an aquifer under a unit hydraulic gradient; it is expressed as the product of the hydraulic conductivity and the thickness of the saturated portion of an aquifer. Transmissivity is the rate at which water moves through the aquifer
Transpiration	evaporation of water from plants
Uncertainty analysis	the quantification of uncertainty in model results due to incomplete knowledge of model aquifer parameters, boundary conditions or stresses
Unconfined aquifer	aquifer with no confining layer between the water table and the ground surface where the water table is free to fluctuate
Unsaturated zone	part of the geological stratum above the water table where interstices and voids contain a combination of air and water; synonymous with zone of aeration or vadose zone
Volant	capable of flying
Vulnerability (groundwater contamination)	the tendency or likelihood for contamination to reach a specified position in the groundwater system after introduction at some location above the uppermost aquifer
Water budget	an evaluation of all the sources of supply and the corresponding discharges with respect to an aquifer or a drainage basin
Water table	surface within the zone of saturation of an unconfined aquifer over which the pressure is atmospheric
Well field	group of boreholes in a particular area usually used for groundwater abstraction purposes
Well point	shallow, small diameter hole used to abstract groundwater from primary aquifers
Wind-throw	trees uprooted by wind
Yield	quantity of water removed from a water resource (e.g. yield of a borehole)

## Abbreviations

Abbreviation	Definition
1D	one-dimensional
2D	two-dimensional
ABS	Australian Bureau of Statistics
AADT	annual average daily traffic
AAMC	Anglo American Metallurgical Coal
AC	acid consuming
ACARP	Australian Coal Association Research Program
ACH	Aboriginal cultural heritage
ACH Act	<i>Aboriginal Cultural Heritage Act 2003</i>
AED	Advanced Environmental Dynamics Pty Ltd
AEP	annual exceedence probability (or probability of occurrence in a one year period)
AFC	armoured face conveyor
AHD	Australian Height Datum
Al	aluminium
ALC	agricultural land classification
Alluvium	Alluvium Consulting
AMD	acid and metalliferous drainage
ANC	acid neutralising capacity
ANZECC	Australia and New Zealand Environmental Conservation Council
ARI	average recurrence interval
As	arsenic
AS	Australian Standard
ASC	Australian soil classification
ASS	acid sulphate soils
AUD\$	Australian dollar
ave	average
AWBM	Australian Water Balance Model
BA	Birds Australia
BAC	BMA Local Buy Program advisory committee
BBCGP	Bowen Basin Coal Growth Project
BCN	BMA Community Networks
BoM	Bureau of Meteorology
BOP	Biodiversity Offset Policy
BMA	BHP Billiton Mitsubishi Alliance
BMC	BHP Mitsui Coal
BPA	biodiversity planning assessment
BRM	Broadmeadow Underground Mine
BSO	Broadmeadow Sustaining Operations
c.	circa

Abbreviation	Definition
CALMET	CALifornia METeorological Model
CALPUFF	California Plume Dispersion Model
CAMBA	China-Australia Migratory Bird Agreement
Cd	cadmium
CEC	cation exchange capacity
CFC	chlorofluorocarbons
CH <sub>4</sub>	methane
CHMP	cultural heritage management plan
CHPP	coal handling and preparation plant
CLR	Contaminated Land Register
CMSH Act	Coal Mining Safety and Health Act 1999
CMSH Regulation	Coal Mine Safety and Health Regulation 2001
Co	cobalt
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> -e	carbon dioxide equivalent
Converge	Converge Heritage + Community
CoRTN	calculation of road traffic noise
CPP	Community Partnerships Program
CPRS	Carbon Pollution Reduction Scheme
CQ	Central Queensland
CQCA	Central Queensland Coal Association
CQSS	Central Queensland Strategy for Sustainability
Cr	chromium
CRA	Conzinc Riotinto of Australia
CRS	chromium reducible sulfide
CSG	coal seam gas
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSN	crucible swell number
CSR	crown separation ratio
C-Res	Community Resourcing
Cu	copper
Cwith	Commonwealth
DBH	diameter at breast height
DCCEE	Department of Climate Change and Energy Efficiency
DCS	Department of Community and Safety
DEEDI	Department of Employment, Economic Development and Innovation (Queensland – former)
DEEWR	Department of Education, Employment and Workplace Relations (Commonwealth)
DERM	Department of Environment and Resource Management (Queensland – former)
DET	Department of Education and Training (Queensland – former)
DHSA	Drill Hole Spacing Analysis

Abbreviation	Definition
DIDO	drive-in, drive-out
DITR	Department of Industry, Tourism and Resources
DIP	Department of Infrastructure and Planning (Queensland – former)
DLA	designated landscape area
DLGP	Department of Local Government and Planning (Queensland) (Queensland – former)
DLGPSR	Department of Local Government, Planning, Sport and Recreation (Queensland – former)
DMC	dense medium cyclones
DoPC	Department of Premier and Cabinet (Queensland)
DOS	degree of saturation
DPI	Department of Primary Industries
DSDIP	Department of Science, Information Technology, Innovation and the Arts
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (Commonwealth - former) (now Department of Environment)
EA	environmental authority
EAP	employee assistance program
EAT	Emerson Aggregate Test
EC	electrical conductivity
EC (1:5)	EC measured on a solid to water ratio of 1:5 (water extract)
ECe	electrical conductivity of a saturated soil paste extract
eCEC	effective cation exchange capacity
EEO	Energy Efficiency Opportunities
EEO Act	<i>Energy Efficiency Opportunities Act 2006</i>
EETM	Emission Estimation Technique Manual
EFM	Eaglefield Mine
EFO	environmental flow objectives
EHP	Department of Environment and Heritage Protection
EIS	environmental impact statement
EM plan	environmental management plan
EMP(s)	environmental management program(s)
EMR	Environmental Management Register
enHealth	environmental health committee
EP Act	<i>Environmental Protection Act 1994</i>
EPA	Environmental Protection Agency
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPC	exploration permit (coal)
EPCA	application for exploration permit coal
EPCM	engineering, procurement and construction management
EPHC	Environment Protection Heritage Council, (established by Council of Australian Governments)
EPM	exploration permit (minerals)
EPP(s)	environmental protection policy(ies)

Abbreviation	Definition
EPP	exploration permits (petroleum)
EPP (Air)	<i>Environmental Protection (Air) Policy 2008</i>
EPP (Noise)	<i>Environmental Protection (Noise) Policy 2008</i>
EPP (Water)	<i>Environmental Protection (Water) Policy 2009</i>
EP Regulation	Environmental Protection Regulation 2008
EP (Waste Management) Regulation	Environmental Protection (Waste Management) Regulation 2000
ERA	environmentally relevant activity
ESA	environmentally sensitive area
ESCP	erosion and sediment control plan
ESD	ecologically sustainable development
ESP	exchangeable sodium percentage
Ext	extreme
FCM	Fort Cooper Measures
FHA	fish habitat area
FIFO	fly-in, fly-out
FPC	foliage protection cover
FTE	full-time equivalent
FY	financial year
GBR	Great Barrier Reef
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GBRWHA	Great Barrier Reef World Heritage Area
GCE	Goonyella Complex Expansion
GDE	groundwater dependant ecosystem
GED	general environmental duty
GHG	greenhouse gas
GI	ground integrity
GIS	geographic information systems
GLD	BHP Billiton Group Level Document
GLS	Goonyella Lower Seam
GMA	groundwater management area
GMS	Goonyella Middle Seam
GP	general practitioner
GPR	ground penetrating radar
GPS	Global Positioning System
GQAL	good quality agricultural land
GRB	Goonyella Riverside and Broadmeadow
GRM	Goonyella Riverside Mine
Gros	Grosvenor

Abbreviation	Definition
Growth Projects BCN	Bowen Basin Coal Growth Projects Community Network
GS1	Goonyella tailings dam
GSQ	Geological Survey of Queensland
GSSE	GSS Environmental
GSV	ground surface visibility
GUS	Goonyella Upper Seam
HAS	historical archaeological site
HAZOP	hazard and operability
HDD	horizontal directional drilling
HEC-RAS	Hydrologic Engineering Centre River Analysis System (flood modelling software)
HERBRECS	Queensland DERM Herbarium Database
HES	high ecological significance
HGI	Hardgrove Grindability Index
HI	historical interest
HIL(s)	health-based Investigation level(s)
HPCT	Hay Point Coal Terminal
HVR	high value regrowth
IAS	initial advice statement
ICOMOS	International Council on Monuments and Sites
IDAS	integrated development assessment system
ILUA(s)	Indigenous land use agreement(s)
IMC	IMC Mining Group Pty Ltd
IMG	incidental mine gas
IPCC	Intergovernmental Panel on Climate Change
IQQM	integrated quantity quality model (water resources systems modelling software)
IRC	Isaac Regional Council
IRCA	Isaac River Cumulative Impact Assessment (of Mine Developments)
JAMBA	Japan-Australia Migratory Bird Agreement
JORC	Joint Ore Reserves Committee
KPI	key performance indicator
KRA(s)	key resource area(s)
LCZ	landscape character zones
LFA	landscape function analysis
LGA	local government area
LOS	level of service
LOX	limit of oxidation
LP Act	<i>Land Protection (Pest and Stock Route Management) Act 2002</i>
LP Regulation	Land Protection (Pest and Stock Route Management) Regulation 2003
LPG	liquefied petroleum gas
LS	land suitability

Abbreviation	Definition
LTCC	longwall top coal caving
LW	longwall
MDL	mineral development license
MIA	mine industrial area
MIBC	methyl isobutyl carbinol
MIWRP	Mackay Isaac Whitsunday Regional Plan
MIW	Mackay Isaac Whitsunday
ML	mining lease
MLA	mining lease application
MNES	matters of national environmental significance
MNM	Moranbah North Mine
Mo	molybdenum
Mod	moderate
MoU	Memorandum of Understanding
MPA	maximum potential acidity
MPS	multi-purpose services
MR Act	Mineral Resources Act 1989
MRF	materials recycling facility
MRPHP	Major Resource Projects Housing Policy
MSDS	material safety data sheets
N <sub>2</sub> O	nitrous oxide
Na	sodium
NAF	non-acid forming
NAG	net acid generation
NAPP	net acid producing potential
NASA	National Aeronautics and Space Administration
NATA	National Association of Testing Authorities
NC Act	<i>Nature Conservation Act 1992</i>
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NET	northern economic triangle
NGA	National Greenhouse Accounts
NGER	National Greenhouse and Energy Reporting
NGER Act	<i>National Greenhouse and Energy Reporting Act 2007</i>
Ni	nickel
NICH	non-Indigenous cultural heritage
NPI	National Pollutant Inventory
NQBPC	North Queensland Bulk Ports Corporation
NQRR	North Queensland Resource Recovery
NRM	Department of Natural Resources and Mines
NRSET	National Resources Sector Employment Taskforce



Abbreviation	Definition
NSESD	National Strategy for Ecologically Sustainable Development
NSW	New South Wales
NSW DEC	New South Wales Department of Environment and Conservation
NZS	New Zealand Standard
O <sub>3</sub>	ozone
OESR	Office of Economic and Statistical Research
Pa	Pascals
PAF	potentially acid forming
PAF-LC	potentially acid forming – low capacity
PAWC	plant available water capacity
Pb	lead; or Permian (Undivided) Back Creek Group
PCB	polychlorinated biphenyl
PDS	Property Data Solutions
PET	Plecoptera Ephemeroptera Trichoptera
pH	per hydroden - absolute value of the decimal logarithm of the hydrogen-ion concentration (activity); used as an indicator of acidity (pH < 7) or alkalinity (pH > 7)
pH (1:5)	pH measured on a solid to water ratio of 1:5 (water extract)
PHA	preliminary hazard analysis
PL	petroleum lease
PM <sub>10</sub>	particulate matter with an equivalent aerodynamic diameter less than 10 micrometres and a density of one gram per cubic centimetre
PM <sub>2.5</sub>	particulate matter with an equivalent aerodynamic diameter less than 2.5 micrometres and a density of one gram per cubic centimetre
PNC	potential neutralising capacity
PNL	planning noise level
PPE	personal protective equipment
PPL	petroleum pipeline licence
project	Red Hill Mining Lease
PSA	particle size analysis
PSI	preliminary site investigation
Pwt	Late Permian Fort Cooper Coal Measures
Qa	Quaternary Alluvium
QAS	Queensland Ambulance Services
QFRS	Queensland Fire and Rescue Service
QH Act	<i>Queensland Heritage Act 1992</i>
Qld	Queensland
QPP	Queensland Planning Provisions
QPS	Queensland Police Service
QR	Queensland Rail
QRC	Queensland Resources Council

Abbreviation	Definition
QWQ	Queensland Water Quality
RBL	rating background level
RE	regional ecosystem
REDC	Regional Economic Development Corporation
REDD	regional ecosystems description database
REM	rapid eye movement
RFS	rural fire service
RHHAS	Red Hill Heritage or Archaeological Site
RHHI	Red Hill Historical Interest
RHM	Red Hill Mine
RIA	river improvement areas
ROKAMBA	Republic of Korea – Australia Migratory Bird Agreement
ROM	run-of-mine
ROP	resource operation plan (water)
ROPS	rollover protective structures
RS1	Riverside tailings dam
RTA	Residential Tenancies Authority
RUSLE	revised universal soil loss equation
S	sulphur
SAR	sodium absorption ratio
Sb	antimony
SCL	strategic cropping land
SCT	Strata Control Technology Operations
SD	statistical division
SDPWO Act	<i>State Development and Public Works Organisation Act 1971</i>
Se	selenium
SES	State Emergency Services
SHMS	Safety and Health Management System
SIA	social impact assessment
SIGNAL	Stream Invertebrate Grade Number – Average Level
SIMP	Social Impact Management Plan
SIS	surface to in-seam
SKM	Sinclair Knight Merz Pty Ltd
SL	special lease
SNL	specific noise level
Sp.	species (singular)
Spp.	species (plural)
SP Act	<i>Sustainable Planning Act 2009</i>
SPP(s)	State Planning Policy(ies)
SPRP	State Planning Regulatory Provision

Abbreviation	Definition
SRC	Sustainable Resource Communities
SRTM	Shuttle Radar Topography Mission
STP	sewage treatment plant
SWL	sound power level
TAPM	the air pollution model
Tb	Tertiary Basalt Flows and Plugs
TDS	total dissolved solids
TDM	Thiess Dampier Mitsui Coal Pty Ltd
TEC	threatened ecological community
TEOM	Tapered Element Oscillating Microbalance
TEP	transitional environmental program
TIA	traffic impact assessment
TLO	train load-out
TMR	Department of Transport and Main Roads
TOR	Terms of Reference
TQa	Tertiary-Quaternary Older Alluvial Deposits
TQr	Tertiary-Quaternary Residual Soils and Colluvium
Ts	Tertiary Suttor Formation
TSF	tailings storage facility
TSM	thick seam mining
TSP	total suspended particulates
TSS	total suspended solids
TUFLOW	two dimensional flood modelling software
U	uranium
UC	uncertain
UDA	urban development area
UDC	Utah Development Company
UIS	underground in-seam
ULDA	Urban Land Development Authority
ULP	unleaded petroleum
URS	URS Australia Pty Ltd
UTM	Universal Transverse Mercator
V	vanadium
VAM	ventilation air methane
VM	volatile matter
VM Act	<i>Vegetation Management Act 1999</i>
VWP	vibrating wire piezometer
Water Act	<i>Water Act 2000</i>
WCED	World Commission on Environment and Development
WEEE	waste electrical and electronic equipment
WGS	World Geodetic System

Abbreviation	Definition
WHAM	Whitsunday Hinterland and Mackay
WHO	World Health Organisation
WPA	wetland protection area
WMA	wetland management areas
WRP	water resource plan
WTP	water treatment plant
WRR Act	<i>Waste Reduction and Recycling Act 2011</i>
Zn	zinc

## Units

Unit	Definition
~	approximately
<	greater than
>	less than
≤	greater than or equal to
≥	less than or equal to
%	per cent
°C	degrees Celsius
°E	degrees east
°S	degrees south
BCM	bank cubic metres
cm	centimetre
dB	decibels
dBA	decibels A weighted
dB	decibels (unweighted or linear)
dS/m	deciSiemens per metre
dwt	dead weight tonnes
GL	gigalitre
GJ	gigajoules
GWh	gigawatt hour(s)
ha	hectares
Hz	hertz
kg	kilogram
kg H <sub>2</sub> SO <sub>4</sub> /t	kilograms of sulfuric acid per tonne
kg/a	kilograms per annum
kg/ha	kilograms per hectare
kL	kilolitres
km	kilometre
km <sup>2</sup>	square kilometre
km/cm	kilometres per centimetre
km/hr	kilometres per hour
kt	kilotonnes
kV	kilovolt(s)
kVA	kilovolt-ampere
kWh	kilowatt hours
L	litres
L/a	litres per annum
L/min	litres per minute
L/s	litres per second

Unit	Definition
L/t	litres per tonne
L <sub>A90</sub>	noise level (in decibels – A weighted) exceeded for 90 per cent of the measurement period
L <sub>Aeq</sub>	equivalent continuous (or ‘average’) noise level (in decibels – A weighted)
L <sub>Amax</sub>	maximum noise level
m	metres
m/day	metres per day
m/s	metres per second
m <sup>2</sup>	square metres
m <sup>3</sup>	cubic metres
m <sup>3</sup> /ROM tonne	cubic metres per ROM tonne
m <sup>3</sup> /s	cubic metres per second
mbcm	million bulk cubic metres
mbgl	metres below ground level
µg	micrograms
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
µg/L	micrograms per litre
µg/m <sup>3</sup>	micrograms per cubic metre
mg/m <sup>2</sup> /day	milligrams per square metre per day
ML	megalitres
ML/a	megalitres per annum
ML/year	megalitres per year
mm	millimetres
mm/day	millimetres per day
mm/s	millimetres per second
mm/yr	millimetres per year
µS/cm	microSiemens per centimetre
mt	million tonnes
mtpa	million tonnes per annum
MW	megawatt
MWh	megawatt hour
PJ	petajoules = 1 x10 <sup>15</sup> joules
ppb	parts per billion
ppm	parts per million
t	tonne
t/a	tonnes per annum
t/ha/year	tonnes per hectare per year
t/m <sup>3</sup>	tonnes per cubic metre
tph	tonne per hour
W/m <sup>2</sup>	watts per square metre