

Section 7

Glossary of Technical Terms, Acronyms, Symbols and Units

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Technical Terms

A-weighted – an electronic filter having the frequency response corresponding approximately to that of human hearing.

AADT – Annual Average Daily Traffic.

ABS - Australian Bureau of Statistics.

absorption – the characteristic of a substance of taking up, assimilating or incorporating water, fluids or gases.

acceleration lane – a lane used for increasing speed before merging with the through lanes.

acid – substance with a pH less than 7.0; the lower the pH, the higher the corrosive ability of the substance.

acid formation – the process whereby acid is formed by the oxidation of minerals (particularly sulfides) exposed to air and water.

acidic – having a pH less than 7.0.

acoustics – the science of sound and vibration.

acute – short term (health risk assessment).

adverse weather conditions (in respect of noise and dust) – conditions, such as high wind, that assist the movement of dust or propagation of noise away from the mine towards receptors.

AEMR – Annual Environmental Management Report – to be referred to in the future as an “Annual Review”.

aerial photographs – photographs of landscape taken from a plane (typically areas several kilometres across) used for the surveying and interpretation of vegetation type, geology, land use, etc.

aesthetic significance – an item/area having visual or sensory appeal, landmark qualities and/or creative or technical excellence.

agricultural resources – the land on which agriculture is dependent and the associated water resources (quality and quantity) that are linked to that land.

AHD - Australian height datum (in metres).

airblast overpressure – a shock wave from the blast transmitted through the air, normally measured in dB(Linear).

air pollutant - a substance in ambient atmosphere, resulting from the activity of man or from natural processes, causing adverse effects to man and the environment (also called "air contaminant").

air pollution - presence of air pollutants.

air pollution emissions inventory – all information, collection and processing system containing data on emissions of, and sources of, air pollution from both man-made and natural causes.

air quality criteria – quantitative relationship between a pollutant's dose, concentration, deposition rate or any other air quality-related factors, and the related effects on receptors, e.g. humans, animals, plants, or materials. Air quality criteria serve as the scientific basis for formulating ambient air quality standards or objectives.

algorithm – a mathematical equation devised to solve a particular type of problem.

alkaline – having a pH greater than 7.0.

alkalinity – in water analysis a measure of the carbonates, bicarbonates, hydroxides and occasionally the borates, silicates and phosphates in the water.

Along strike – running parallel to the direction of strike.

ambient – relating to conditions outside the active project area.

ambient air quality – the quality of the ambient air near ground level, expressed as concentrations or deposition rates of air pollutants – also expressed as existing air quality.

ambient air quality criteria – quantitative relationship between a pollutant's dose, concentration, deposition rate or any other air quality-related factors, and the related effects on receptors, e.g. humans, animals, plants, or materials. Air quality criteria serve as the scientific basis for formulating ambient air quality standards or objectives.

ambient level – existing level of a phenomenon without the influence of the proposal.

amenity – the desirability of an area.

anthropogenic – affected by, or relating to, human beings.

Annual Review – a report submitted to the Director-General of DP&I identifying environmental performance for the previous period including activities, monitoring results (with evaluation), compliance, non-compliances and responses, discrepancies between actual and predicted impacts and measures to improve performance over the ensuing reporting period.

ANZECC – Australian and New Zealand Environment and Conservation Council.

Applicant – person, organisation or company proposing to carry out an activity / seeking development consent (i.e. Argent (Kempfield) Pty Ltd).

approx. – approximately.

aquatic – living in or on water, or concerning water.

aquifer – rock or sediment capable of holding and transmitting groundwater.

archaeology – the scientific study of human history, particularly the relics and cultural remains of the distant past.

area source – a group of pollutant-emitting facilities on surfaces which are evenly distributed across a well defined region.

artefact – anything made by human workmanship, particularly by previous cultures (such as chipped and modified stones used as tools).

AS – Australian Standard.

atmospheric stability – a measure of turbulence which determines the rate at which the effluent is dispersed as it is transported by the wind.

attenuation – reduction in sound pressure levels between two locations.

auxiliary turn lane – an additional lane approaching an intersection to allow vehicles intending to turn across traffic to wait while allowing through traffic movements to continue uninterrupted.

average annual daily traffic (AADT) – unit of assessment of traffic flow along a road.

average annual rainfall – the average amount of rain to fall at a specific location over the period of 1 year (measured in millimetres).

backfill – material used to fill created void.

background – the conditions (e.g. noise levels, bird populations) already present in an area before the commencement of a specific activity (e.g. a mining operation).

background level – the concentration (deposition) level of a pollutant which must be added to the concentration (deposition) level of the modelled sources in order to obtain a total.

background dust level – dust level in the absence of mining and processing activities.

background noise levels – the level of the ambient sound indicated on a sound level meter in the absence of the sound under investigation (e.g. sound from a particular noise source; or sound generated for test purposes).

basic – having a pH greater than 7.0.

best management practice – the most effective actions which minimise human impact on the environment.

bioaccumulation – the uptake and concentration of contaminants in the living tissue of biota.

biological diversity/biodiversity – a concept encompassing the diversity of indigenous species and communities occurring in a given region; biological diversity includes genetic diversity, which is the diversity of genes and genotypes within each species; species diversity, which is the variety of living species; and ecosystem diversity which is the diversity of the different types of communities formed by living organisms and the relations between them.

biota – living components of a habitat.

blasthole – hole drilled into rock to position explosive for blasting.

blasting – the operation of breaking rock by means of explosives.

bore – a well, usually of less than 20cm diameter, sunk into the ground and from which water is pumped.

buffer – a physical barrier / structure or width of land that encloses, partially encloses, or defines a particular environment. A buffer serves to minimise the impacts of non-desirable external influences on the adjoining environment.

bund - embankment of clay or weathered rock emplaced for visual or acoustic screening.

c./c.a. – abbreviation for about or proximity.

catchment area – the area determined by topographic features within which rainfall will contribute to runoff at a particular point.

channel – river or irrigation channel, includes bed and bank.

chronic – long term (health risk assessment).

clay - a size term denoting particles, regardless of mineral composition, with diameter less than 0.004 mm.

community – a combination of plants that are dependent on their environment and influence one another and modify their own environment. They form together, with their common habitat and other associated organisms, an ecosystem, which is also related to neighbouring ecosystems and to the macroclimate of the region.

concrete – mixture of gravel, cement, etc. for use in building.

conservation – the management of resources in a way that will benefit both present and future generations.

contaminant – a chemical compound or element which has been introduced as a result of human activity. It is noted, however, that some chemical compounds and elements also occur naturally in water and sediments.

contingency procedures – procedures put in place to handle an event considered unlikely to occur.

contractor – specialist brought in to perform a specific task, such as the construction of mine infrastructure or transportation of ore.

cross-section – a two-dimensional diagram of an object presented as if the object had been cut along its length.

crusher – that part of an ore-processing plant where the ore is mechanically crushed into smaller pieces.

crushing – the mechanical process of reducing rock size usually by pressure or impact.

cumulative – increasing by successive additions.

day time period – the period from 7:00am to 6:00pm Monday to Saturday and 8:00am on Sundays and Public Holidays (where relating to noise).

dB – decibel, unit used to express sound intensity.

dB(A) – decibels, A-weighted scale; unit used for most measurements of environmental noise; the scale is based upon typical responses of the human ear to sounds of different frequencies.

deceleration lane – a lane used for decreasing speed before leaving the road.

decibel - unit expressing difference in power between acoustic signals.

density – The mass of a substance (e.g. sediment) divided by its volume.

development application – an application to the local council for approval of an activity deemed to require an approval prior to commencement.

dispersion/diffusion – a mixing process in which air motions mix a pollutant plume over an ever increasing volume, thereby diluting the concentration of the pollutant in the ambient air.

dispersion model – a set of mathematical equations relating to the release of air pollutant to the corresponding concentrations in the ambient atmosphere or deposition on the surface.

dispersion parameters – the parameters which describe the growth of the dimensions of a Gaussian plume as a function of travel distance of travel time. The dispersion parameters are classified according to diffusion turbulence conditions in the atmospheric boundary layer on the dispersion.

drainage line – a passage along which water concentrates and flows towards a stream, drainage plain or swamp intermittently during or following rain.

drawdown – the difference between the water level observed during pumping and the non-pumping water level (static water level or static head).

dust – particles of mostly mineral origin generated by erosion of surfaces and the mining and handling of materials.

dust deposition – dust particles that settle out from the air – measured in grams per square metre per unit month ($g/m^2/month$).

dust gauge – instrument set up to record the rate of deposition of dust.

ecology – the relationship between living things and their environment.

ecologically sustainable development (ESD) – using, conserving and enhancing the community's resources so that ecological processes on which life depends are maintained and the total quality of life, now and in the future can be increased.

ecosystem – a functional unit of energy transfer and nutrient cycling in a given place, it includes all the relationships within the biotic community and between the biotic components of the system.

electrical conductivity (EC) – the ability of a substance (either solid, liquid or gas) to transmit electricity.

element – a substance consisting entirely of atoms of the same atomic number (e.g. oxygen, carbon, gold).

elevated concentration – a concentration of an element that substantially exceeds the average crustal abundance of that element.

emission – a discharge of a substance (e.g. dust) into the environment.

emission factor – an expression for the rate at which a pollutant is generated as a result of some activity, divided by the level of that activity.

emissions inventory – an information, collection and processing system containing data on emissions of, and sources of, air pollution from both man-made and natural causes.

environment – a general term for all the conditions (physical, chemical, biological and social) in which an organism or group of organisms (including human beings) exists.

environmental constraints – limitations on a project by components of the environment.

Environmental Impact Statement (EIS) – a formal description of a project and an assessment of its likely impact on the physical, social and economic environment. It includes an evaluation of alternatives and an overall justification of the project. The EIS is used as a vehicle to facilitate public comment and as the basis for analysing the project with respect to granting approval under relevant legislation.

environmental planning – planning (e.g. of a mining operation) that places emphasis on the possible environmental impacts of a development.

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EPA – Environment Protection Authority – the successor to the SPCC.

EP&A Act – Environmental Planning and Assessment Act 1979.

ephemeral – not permanent, e.g. a stream that flows only seasonally or after rainfall or a lake that periodically dries out.

equilibrium – state of balance between opposing forces or effects.

erodibility – the tendency of soil, earth or rock to erode.

erosion – the wearing away of the land surface (whether natural or artificial) by the action of water, wind and ice.

erosivity – potential ability to cause erosion. The amount of erosion at a site is dependent on the erosivity of the eroding agent (rainfall, running water, wind, etc.). The term is commonly applied to rainfall.

evaporation – the loss of water as vapour from the surface of a liquid that has a temperature lower than its boiling point.

evening period – the period from 6:00pm to 10:00pm (when relating to noise).

excavate – to dig into natural material or fill using an excavator or other machinery.

excavator – item of earth moving equipment fitted with a bucket on an articulated boom and used for digging material from a face in front of, or below the machine. An excavator would be used around the perimeter of the lakes.

exceedance probability – statistical probability that a given value will be exceeded by sample values.

existing air quality – the quality of the ambient air near ground level, expressed as concentrations or deposition rates or air pollutants – also expressed as ambient air quality.

exotic – introduced or foreign, not native.

Exploration Licence (EL) – a licence issued for exploration in a defined area.

exploration program – a program set up by a company to explore for mineral deposits (typically involving aerial survey, ground survey, drilling and geophysical assessment).

extinction – the extinction of a species occurs when the entire population of the species (across the world) has died out.

extraction – a term synonymous with mining ore or waste rock.

fallout – the sedimentation of dust or fine particles in the atmosphere.

fault – a fracture in rock along which there has been observable displacement.

fauna – animals including birds, mammals, fish, etc.

fauna – a general term for animals (birds, reptiles, marsupials, fish etc.) particularly in a defined area or over a defined time period.

feldspar – a group of abundant rock forming minerals of general formula $MAl(Al,Si)_3 O_8$ where M can be K, Na, Ca, Ba, Rb, Sr and Fe.

fill – material imported and emplaced to raise the general surface level of a site.

flocculent – additive to fine material suspended in water which causes fine particles to agglomerate together resulting in a larger "flocculated particle" which will naturally settle out of the suspension to result in clean water.

flora – a general term for plant, particularly those found in a defined area or characteristic of a defined time period.

fluvial – pertaining to or produced by a river.

flyrock – rock that is propelled into the air by the force of an explosion. Usually comes from pre-broken material on the surface or upper open face.

forest – plant community dominated by trees having a mature height exceeding 5 metres and whose crowns shade more than 30 per cent of the ground.



formation – a large stratigraphic sequence of rock beds (sandstone, shale, limestone, etc.) generally deposited over a distinct geological period (e.g. during a glacial period).

fragmentation – the extent to which rock is broken into small pieces by primary blasting.

fugitive emissions – emissions not entering the atmosphere from a stationary vent (stack). Examples of fugitive dust sources include vehicular traffic on unpaved roads, handling of raw materials, wind erosion of dusty surfaces, etc.

gaussian plume model – an approximation of the dispersion of a plume from a continuous point source. The concentration distribution perpendicular to the plume axis is assumed to be Gaussian. The plume travels with a uniform wind velocity downwind.

geological reserves – the measured total quantity of in-situ mineralisation in a deposit, prior to consideration of mining parameters.

geotechnical – technical or engineering aspects relating to soil, rock and other materials.

“glory hole” – a surface expression of underground mine workings with slope fractures into the hole.

gradient – rate of change of a given variable (such as temperature or elevation) with distance.

granite – a coarse grained crystalline igneous rock comprising quartz, orthoclase feldspar and small amounts of biotite mica and/or hornblende.

Greenhouse effect – the heating of the earth’s surface because outgoing long-wavelength radiation from the earth is absorbed and re-emitted by the carbon dioxide and water vapour in the lower atmosphere and eventually returns to the surface.

ground vibration – oscillatory motion of the ground caused by the passage of seismic waves originating from a blast.

groundcover – vegetation that grows close to the ground (such as grasses and herbs) providing protection from erosion.

groundwater – water contained in voids such as fractures and cavities in rocks and inter-particle spaces in sediments.

groundwater dependent ecosystems – ecosystems that use groundwater as part of survival, and can potentially include wetlands, vegetation, springs, base flows, cave ecosystems, river pools and hanging swamps.

habitat – the place where an organism normally lives; habitats can be described by their floristic and physical characteristics.

haul road – road used in a mine for haulage of rock from the active face to the crusher and for general site access.

haul truck – a truck specifically designed for hauling and tipping soil or rock within the mine.

heavy metals – normally trace metals which occur in ore deposits which, depending on their concentration may be environmentally hazardous e.g. copper, lead and zinc.

heavy vehicle – a motor vehicle or trailer that has a gross vehicle mass greater than 4.5 tonnes. Also includes motor vehicles with seats for more than 12 adults.

heritage – the things of value which are inherited.

heritage significance – of aesthetic, historic, scientific, cultural, social, archaeological, natural or aesthetic value for past, present or future generations.

heritage study – a conservation study of an area. The study usually includes historical context report, an inventory of heritage items within the area and recommendations for conserving their significance.

homogeneous – composed of parts all of the same kind or nature.

host rocks – the surrounding rock into which igneous magma is injected or mineralisation forms.

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hydrogeology (geohydrology) – the study of groundwater and the related geologic aspects of surface waters.

hydrology – the study of water, particularly its movement in streams, rivers, or underground.

hypothesis – a supposition put forward in explanation of observed facts.

igneous rock – rock formed from molten material that has cooled and solidified either at the earth's surface (volcanic rock) or within the earth's crust (plutonic rock).

in-pit drainage system – drainage system to remove water from the pit.

in-situ – a term used to distinguish material (e.g. rocks, minerals, fossils, etc.) found in its original position of formation, deposition, or growth, as opposed to transported material.

indicator – any physical, chemical, or biological characteristic of the environment used to assess (i.e. indicate) environmental condition.

indigenous – belonging to, or found naturally in, a particular environment (see also exotic).

infiltration – the process of surface water soaking into the soil.

inflow – flow directed into a particular feature, such as a lake or a mine pit.

infrastructure – the necessary buildings, roads and equipment associated with a mining operation.

inter-generational equity – the principle that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

intermittent – flows periodically, irregularly.

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inversion – generally used in meteorology with respect to an increase of temperature with height in contrast with the usual decrease of temperature with height in the troposphere. An inversion layer is distinguished by its large stability, which limits the turbulence and therefore the dispersion of pollutants.

invertebrates – commonly, animals without a backbone (jellyfish, worms, molluscs, etc.).

landform – a specific feature of a landscape (such as a hill) or the general shape of the land.

LEP – Local Environmental Plan.

light vehicle – a vehicle that has a gross vehicle mass of 4.5 tonnes or less.

loader – machine used to lift and place soil, earth, rocks, etc. on a construction site.

Local Environmental Plan (LEP) – a plan developed by a council to control development in part or all of their shire or municipality.

long-term – a period of time associated with annual air quality standards. Long-term models usually address pollutant concentrations over several seasons to one year.

mammal – animal of the class mammalia, distinguished by the presence of hair and mammary glands.

management strategy – a policy or direction that assists in actions required to address issues.

maximum instantaneous charge (MIC) – the maximum amount of explosives detonated during each delay during a blast.

metallurgical – relating to mode of occurrence and method of extraction of metals from ores.

metamorphic rock – rock type such as shale changed to rock type such as slate and phyllite by earth forces (heat, pressure, fluids, etc.).

metamorphosed rocks – rocks changed from their composition and/or texture by heat and pressure.



metasediments – sedimentary rocks which have undergone some degree of metamorphism without significant alteration to appearance.

metavolcanics – volcanic rocks which have undergone some degree of metamorphism without significant alteration to appearance.

mill – ore processing plant.

mineralisation – the process by which minerals are introduced and concentrated within a host rock, and the product of this process.

Mine Site – the area of land which corresponds with the area of application for development consent and containing the Mining Lease area.

mine water – all water used in mining and processing (for dust suppression, in leach tanks, etc.).

mitigation measures – measures employed to reduce (mitigate) an impact (such as the construction of a perimeter bund to reduce sound emissions).

mobile equipment – wheeled or tracked self-propelled equipment such as trucks and front-end loaders.

mobility – the capacity of an element or compound (e.g. arsenic or cyanide) to move through the environment; usually determined by the chemical and physical properties of the contaminant (such as its reactivity) and ambient environmental conditions (such as pH).

monitoring – the regular measurement of components of the environment to establish environmental standards are being met.

morbidity – the rate of incidence of disease or health implication.

mortality – a measure of deaths within a population due to specific cause.

natural – existing in, or formed by, nature (generally excludes anything obviously modified by human beings).

neutral – neither acidic nor basic (e.g. a pH equal to 7.0).

neutral weather conditions – weather conditions that neither particularly exacerbate nor mitigate the dispersal of pollutant emissions (dust, noise etc.) from the project area.

night-time period – the period from 10:00pm to 7:00am Monday to Saturday and 10:00pm to 8:00am on Sundays and Public Holidays (when relating to noise).

noise contours – theoretical lines connecting points of equal noise value.

offset strategy – a method of providing for disturbance of native vegetation attributable to the project through additional or compensatory measures.

operations phase – that period of the mining project, after construction and prior to decommissioning, during which pit excavation and metal extraction takes place.

ore – a mineral or mixture of minerals containing a metal in sufficient amounts for its extraction to be profitable.

ore processing – the mechanical and chemical process by which a metal is extracted from an ore.

orebody – a solid mass of ore (both high and low grade) that is geologically distinct from the rock that surrounds it and that is commercially extractable.

overburden (waste rock) – in the mining context refers to non-economic material to be removed to allow access to the resource.

particle size distribution – the relative proportions of particles (e.g. in a sediment) that fall within specific size categories.

particulate matter – small solid or liquid particles suspended in or falling through the atmosphere - sometimes expressed by the term particulates.

passive – performing a function without electrical or mechanical action or movement (e.g. a jar-and-funnel rain gauge).

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pavement deformation – the change in road surface from the intended construction profile. This may include corrugations, depressions, wheel rutting or shoving.

perimeter – outer boundary.

pH – a measure of the degree of acidity or alkalinity of a solution; expressed numerically (logarithmically) on a scale of 1 to 14, on which 1 is most acid, 7 is neutral acid, and 14 is most basic (alkaline).

pillar – a block of ore and waste rock left to hold up the roof and formed by driving a connecting series of headings/bords and cut-throughs.

pit water – water inflow into the pit from incident rainfall or groundwater seepage from pit walls.

point source – a single activity that causes the release of a pollutant plume from a stationary vent. Large smoke-stack emissions are modelled as a single point source.

pollution – the alteration of air, soil, or water as a result of human activities such that it is less suitable for any purpose for which it could be used in its natural state.

population – a group of organisms all of the same species occupying a particular area.

porphyritic – a textural term describing rock containing relatively large crystals set in a finer-grained “groundmass”.

precautionary principle – a principle of ESD which states that decisions about any proposed development should be guided by careful management to avoid serious and irreversible damage to the environment.

precipitation – natural water phenomena producing quantities of water measurable by standard methods (e.g. rainfall, snow).

privately-owned residence – an occupied dwelling not owned or under an option to purchase by the Applicant or another resource company, or the subject of a purchase or lease agreement with the Applicant or by any other resource company – referred to as receptors when

considered with the predicted noise and/or air quality impacts.

product truck – a registered truck used for the delivery of products from the Mine to the customer.

progressive rehabilitation – rehabilitation of mine or disturbed areas as soon as practicable after they are released during the life of the mine.

pump test – the systematic pumping of water from a bore to test the response of an aquifer.

pyrite – the most wide-spread sulphide material FeS_2 . Found in many geological settings.

quantify – to determine the quantity or amount of a component in a substance.

quartz – the most common form of silica (SiO_2), usually clear or white.

quartzite – metamorphosed sandstone.

radius – distance from the centre of a circle to its perimeter.

raw water pond – storage pond for makeup process plant water.

Receptor – A privately-owned residence, community facility or enterprise at which noise and/or air quality is predicted as a result of modelling of the Proposal.

recharge – the addition of water to an aquifer, directly from the surface, indirectly from the unsaturated zone, or by discharge from overlying or underlying aquifer systems.

Regional Environmental Plan – a plan prepared by the State Government Department responsible for planning where controls on development are considered on a regional and/or statewide basis.

regrowth – a forest stand established by natural regeneration after major disturbance of the previous forest canopy by wildfire, windthrow or logging.

rehabilitation – the preparation of a final landform after mining and its stabilisation with grasses, trees and shrubs.



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relief – the variation in landscape elevation over a region.

remnant vegetation – vegetation remaining after widespread clearing has taken place.

reptiles – cold-blooded vertebrates, including lizards, snakes, turtles, and crocodiles.

reserves – in the mining context refers to those parts of a resource where sufficient information is available to undertake mine planning.

residual environmental impacts – impacts from an activity (e.g. mining) that remain after mitigation measures.

resilient – able to survive disturbance.

resource – an estimate of potentially usable ore in a defined area based on preliminary information.

revegetated – an area that has been planted with trees, bushes and grasses after being disturbed.

revegetation – replacement of vegetation, principally grasses and legumes on areas disturbed by mining activities.

risk-weighting – quantifying hazard and risk.

road watering – use of water to prevent or reduce dust generation from roads.

routine monitoring – monitoring performed on a regular basis, with the same observations and tests conducted each time.

runoff – that portion of the rainfall falling on a catchment area that flows from the catchment past a specified point.

run-of-mine (ROM) – ore or overburden in condition as loaded from the underground mining operations.

salinity – the total content of dissolved solids in groundwater, commonly expressed as parts of dissolved solids per million parts of solution, or milligrams of dissolved solids per litre of solution (mg/L); the significance of salinity depends on the nature as well as the amount of the dissolved solids.

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satellite imagery – computer-generated information obtained from orbiting satellites produced as photo-like mosaics (e.g. infra-red response, magnetic intensity).

scarred tree – tree with cuts in its bark or wood made by Aborigines.

sclerophyll – any type of various plants, typically found in low rainfall areas, having tough leaves which help to reduce water loss.

sedimentary rocks – rocks formed from material derived from pre-existing rocks or by chemical precipitation.

seepage – 1) subsurface movement of water. 2) emergence of subsurface flow at the ground surface.

sequence (geological) – layers of (predominantly) sedimentary rocks sourced from a common geological environment or period.

settling pond – an artificially constructed pond designed to allow particulate matter to settle out of water.

short-term – a period of time associated with air quality standards for pollutant exposures ranging between one hour and twenty four hours.

sight distance – the distance along the road visible to the driver. It is measured along the normal travelled path of a roadway from the driver's location (such as at an intersection) to a specified height above the roadway when the view is unobstructed by traffic.

significance level (e.g. of 0.05) – there is a 5% probability of having incorrectly predicted the outcome of an environmental impact.

significance test – statistical procedure used to decide whether a parameter (e.g. a mean or variance) of a population is different from that of some other population or from some standard value.

silt – a classic sediment, most of the particles of which are between 0.063mm and 0.004mm in diameter.

silt-stop fencing – fine mesh fencing normally installed downslope of a sediment source, designed to trap silt and sediment and allow the water to pass through.

social capital – the expected collective or economic benefits derived from the preferential treatment and cooperation between individuals and groups.

social cohesion – the bonds and relationships people have with their family, friends and the wider community.

social infrastructure – community facilities, services and networks which help individuals, families, groups and communities meet their social needs, maximise their potential for development and enhance community wellbeing.

soil erosion hazard – the susceptibility of an area of land to erosion and includes rainfall erosivity, slope, soil erodibility and cover.

solubility – the ability of a substance (such as copper) to dissolve in a solvent (such as water); solubility depends on such factors as temperature and pH.

solubized – to make soluble or increase solubility

Soluble –capable of being dissolved.

source – the place where pollutants are emitted into the atmosphere. Sources may be point, area or line sources. Often the term “source” is used for a whole plant or an installation. In air pollution modelling, the terms “continuous source” and “instantaneous source” are used:

spatial – related to areal extent.

species – a taxonomic grouping of organisms that are able to interbreed with each other but not with members of other species.

species diversity – a measure of the number of different species in a given area.

specific gravity – the weight of any body or substance considered with regard to the weight of an equal bulk of pure water.

stakeholder – person, group or organisation or company with an interest in an activity or outcome.

statistical analysis – mathematical analysis of data undertaken to test hypotheses.

statistical confidence – an assessment of the variance inherent in estimating statistical variables (e.g. a 95% confidence interval means that 95% of the results would be expected to occur within this interval).

sterilise – to make physically unavailable.

stockpile – a pile used to store material (such as low-grade ore) for future use.

stope – an underground excavation from which ore has been extracted.

storage capacity – the maximum volume of liquid able to be retained in a container (e.g. a reservoir or lake).

stream order – defined by the Strahler stream order used to define stream size based upon a hierarchy of tributaries.

- **first order streams** – the smallest streams in a drainage network that have no tributary streams.
- **second order streams** – two first order streams unite to form a second order stream.
- **third order streams** – have second and first order streams as tributaries.
- **fourth, fifth, sixth, etc. orders** – reflect a similar approach to second or third order streams.

As the order of the stream increases, the discharge increases, the gradient decreases and the channel dimensions increase to accommodate discharge.

strike – a measure used to define the orientation of a geological feature, such as a sedimentary layer or fault line.

stripping – removal of vegetation and topsoil.

Study Area – a defined area for the purposes of a specific area of environmental study.

subsidence – the lowering of the surface over an area of undermining where the level of ore and waste rock removal is such that the overlying rock strata break and collapse into the void.

sump (underground) – an area of mine workings (roadway and/or goaf) either naturally lower or dammed (walls built) used to collect water for further pumping from the mine.

supernatant – ponded process water after settlement of tailings solids.

surface waters – all water flowing over, or contained on, a landscape (e.g. runoff, streams, lakes, etc.).

surface-to-volume ratio – a ratio of the exposed surface area of an object to the volume of that object; deep objects have a small surface-to-volume ratio.

suspended solids – analytical term applicable to water samples referring to material recoverable from the sample by filtration.

tailings – by-product of the metal extraction process consisting of crushed rock from which the metal has been extracted (the solid fraction or portion) and a liquid fraction or portion composed of water and residual chemicals used in the extraction process.

tailings cells – an individual deposition cell that, combined with other cells, forms the tailings storage.

tailings supernatant – the liquid portion of a tailings slurry after the solids have settled.

temperature gradient – the rate that temperature changes with distance, expressed in degrees per unit length.

temperature inversion – an increase in air temperature with height.

temporal – related to time.

tenure – the ownership status of a tract of land.

terrestrial – of or relating to the land, as distinct from air or water.

threatened species – a species specified in Part 1 or 4 of Schedule 1, Part 1 of Schedule 1A or Part 1 of Schedule 2 of the TSC Act 1995 or listed in the categories as defined in Section 179 of the EPBC Act 1999.

topography – the physical relief and contour of a region.

topographic maps – maps that show the variation in elevation of a landscape.

total suspended particulate matter (TSP) – the mass of all particulate matter suspended in a solution.

total suspended solids (TSS) – a common measure used to determine suspended solids concentrations in a waterbody and expressed in terms of mass per unit of volume (e.g. milligrams per litre).

toxic – poisonous to a specific organism, sometimes resulting in death.

toxicity – effect of any substance that produces a harmful effect on living organisms; described as acute (short term) or chronic (long term).

tributary – a stream or river that flows into a larger river or lake.

tubestock – tree seedlings supplied with roots enclosed in soil.

turbidity – the optical property of water that prevents light from being transmitted; turbidity or muddiness is caused by the presence of very fine suspended matter such as clay or organic matter.

turbulence – any irregular or disturbed flow in the atmosphere that produces gusts and eddies.

uniform – similar or unvarying.

variability – degree or amount of change.

variable – not constant, subject to change (e.g. temperature, rainfall or population).

variance – statistical measure of the variation within a set of data, equal to the square of the standard deviation.

vegetated – covered with plants.

vehicle movement – a one-way trip.

velocity – speed in a given direction.

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vertebrate fauna – animals with a backbone or spinal cord, includes mammals, birds, reptiles, amphibians and fishes.

vibration – oscillating movement.

visual amenity – attractiveness to the eye.

volcanic rocks – rocks that have formed from molten rock extruded near to or over the surface of the earth (lava).

volcanics – a general term applied to rock types of volcanic origin (e.g. basalt).

waste oils – old oils and lubricants retrieved from machinery.

waste rock – uneconomic rock extracted from the ground during a mining operation to gain access to the ore.

waste rock emplacement – the area set aside for disposal of low grade or waste rock materials encountered during mining.

water quality – degree of the lack of contamination of water.

water table – the upper limit of the saturated zone within a rock mass, generally at atmospheric pressure. It is characteristic of unconfined aquifers.

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waterbody – any expanse of water, such as a sea, river, swamp, lake, or dam.

watercourse – stream or river, running water.

weathering – the in-situ physical disintegration and chemical decomposition of rock materials at or near the earth's surface.

weed – any plant (in particular an herbaceous one) that survives in an area where it is harmful or troublesome to the desired land use.

wetland – a low-lying area regularly inundated or permanently covered by shallow water.

wildlife – non-domesticated fauna.

wind direction – the direction from which the wind, averaged over a certain period of time, is blowing.

wind rose – diagrammatic representation of wind direction, strength, and frequency of occurrence over a specified period.

worst-case scenario – a sequence of events likely to result in the worst-case effects on the environment.

yield – (of a water bore) 1) the capacity of the bore to produce water. 2) the amount of water actually withdrawn.



Acronyms, Symbols and Units

~ - approximately.

°C – degrees Celsius.

µg/L – micrograms per litre.

µg/m³ – micrograms per cubic metre.

µm – micron, one millionth of a metre (one thousandth of a millimetre).

µS/cm – microsiemens per centimetre; a measure of conductivity.

% – percentage.

\$M – one million dollars.

3-D – three dimensional.

24-hour air quality standard – value of an air quality variable not to be exceeded when averaged over 24 hours.

'000 t – multiples of one thousand tonnes.

< – less than.

≤ – less than or equal to.

> – greater than.

≥ – greater than or equal to.

AADT – Average Annual Daily Traffic.

ABS – Australian Bureau of Statistics.

Ag – silver.

AHD – Australian Height Data; in metres above mean sea level.

AHIMS – Aboriginal Heritage Information Management System.

am – “ante meridiem”, which means “before noon”.

ANZECC – Australian and New Zealand Environment and Conservation Council.

AS – Australian Standard

BOM – Bureau of Meteorology.

cm – centimetre (unit of measure).

CML – Consolidated Mining Lease.

CO₂ – carbon dioxide

CO₂-e – carbon dioxide equivalent.

CSIRO – Commonwealth Scientific and Industrial Research Organisation.

DA – **development application** – an application to the local council for approval of an activity deemed to require an approval prior to commencement.

dB – decibel, unit used to express sound intensity.

dB(A) – decibels, A-weighted scale; unit used for most measurements of environmental noise; the scale is based upon typical responses of the human ear to sounds of different frequencies.

dB(Linear) – the measurement of sound pressure level in which the amplitudes of the sound signal, though all frequencies of the signal, are treated equally, i.e. not weighted.

DECCW – Department of Environment, Climate Change and Water (NSW). Now OEH.

DPE – Department of Planning and Environment (NSW).

DP – Deposited Plan.

DPI – Department of Primary Industries (NSW)

EC – Electrical Conductivity.

EIS – Environmental Impact Statement.

EL – Exploration Licence.

EP&A Act – Environmental Planning and Assessment Act 1979 (NSW).

EP&A Regulation – Environmental Assessment and Planning Regulation 2000.

EPA – Environment Protection Authority (NSW).

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EPL – Environment Protection Licence.

ESD – Ecologically Sustainable Development.

g – gram (= 0.001 kilogram).

g/m²/month – grams per square metre per month-unit for deposited dust.

g/t – grams per tonne.

GL – gigalitre (1GL = 1 000 000 000 litres).

ha – hectare (100 m x 100 m).

HDPE – high density polyethylene.

HRA – health risk assessment.

INP – Industrial Noise Policy.

JORC – Joint Ore Reserve Committee.

kg – kilogram (weight measure).

kL – kilolitre (thousand litre).

km – kilometre (= 1 000 metres).

km² – square kilometres.

km/hr – kilometres per hour.

L – litre.

L/day – litres per day.

L/s – litres per second.

L_{A10} – sound level exceeded 10 per cent of the sampling time.

L_{A90} – sound level exceeded 90 per cent of the sampling time.

L_{Aeq} – the L_{Aeq} is the “equal energy” average noise levels, and is used in some instances for the assessment of traffic noise effects or the risk of hearing impairment due to noise exposures.

L_{Aeq 1 hour} – the “equal energy” average noise level over 60 minutes – used for assessing impacts of motor vehicles.

L_{Aeq T} – Sound level of continuous noise which emits the same energy as the fluctuation sound over a given time period (T).

L_{Amax} – the absolute maximum noise level measured in a given time interval.

L_{AN} – the A-weighted sound pressure level exceeded by N% of a given measured period.

LALC – Local Aboriginal Land Council.

LEP – Local Environmental Plan.

LGA – Local Government Area

m – metre.

M – million.

m AHD – metres Australian Height Datum.

m BGL – metres below ground level.

m² – square metre.

m³ – cubic metre.

mg – milligram (weight unit).

Mcm – million cubic metres.

Mlcm – million loose cubic metres.

mg/L – milligrams per litre (parts per million).

MIC – Maximum Instantaneous Charge.

ML – megalitre (1ML = 100 0000 litres).

MLA – Mining Lease Application.

mm – millimetre (= 0.001 metres).

Mm³ – million cubic metres.

MOP – Mining Operations Plan.

m/s – metres per second.

Mt – million tonnes (metric tonne = 1 000 kg).

Mtpa – million tonnes per annum.

NP&W Act – National Parks and Wildlife Act 1974 (NSW).

NP&W Act – National Parks and Wildlife Act 1974 (NSW).

NSW EPA – New South Wales Environment Protection Authority.



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O₃ – ozone.

Pb – lead.

pH – a measure of the degree of acidity or alkalinity of a solution; expressed numerically (logarithmically) on a scale of 1 to 14, on which 1 is most acidic, 7 is neutral acid, and 14 is most basic (alkaline).

pm – “Post Meridien”, which means “after midday”.

PM₁₀ – particulate matter <10µm in diameter.

PM_{2.5} - particulate matter <2.5µm in diameter.

POEO Act – Protection of the Environment Operations Act 1997.

ROM – Run-of-Mine.

RMS – Roads and Maritime Services.

RTA – Roads and Traffic Authority (NSW).

SCSC – Specialist Consultant Studies Compendium.

SEARs – Secretary’s Environmental Assessment Requirements

SEPP – State Environmental Planning Policy.

t – tonnes.

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TAPM – The Air Pollution Model.

TDS – total dissolved solids expressed in mg/L

TSS – total suspended solids expressed in mg/L

t/m³ – tonnes per cubic metre.

tpa – tonnes per annum.

tpd – tonnes per day

TSC Act – Threatened Species Conservation Act 1995 (NSW).

TSP – Total Suspended Particulate.

µg/m³ – micrograms per cubic metre.

µm – micron (1 micron=0.001 millimetre).

UNEP – United Nations Environment Programme

µS/cm – micro seimens per centimetre.

V:H – vertical to horizontal ratio.

WAL – Water Access Licence.

WSP – Water Sharing Plan.

Zn – zinc.