

24. GLOSSARY AND ABBREVIATIONS

The following glossary words and abbreviations are defined in the context of their use in this Supplementary Report to the Surat Gas Project EIS. Some definitions have been adapted from the relevant supporting studies, the Macquarie Dictionary and online dictionaries and encyclopedias.

Symbols

°C *abbr.* degrees Celsius.

g/m³ *abbr.* microgram per cubic metre.

µS/cm *abbr.* microsiemen per centimetre.

A

ABARES *abbr.* Australian Bureau of Agricultural and Resource Economics and Sciences.

abatement measure *n.* suppression or termination measure.

ABS *abbr.* Australian Bureau of Statistics.

abstraction *n.* the act of taking water from a resource, such as pumping groundwater from an aquifer.

adsorption *n.* the adhesion of molecules of gas, liquid, or dissolved constituents to a surface (*compare with* desorption).

access track *n.* a cleared and graded track to a wellpad or other infrastructure constructed where existing tracks are not available.

AEMO *abbr.* Australian Energy Market Operator (this organisation replaced the National Electricity Market Management Company as of 1 July 2009).

aesthetics *n.* the science that deduces from nature and taste the rules and principles of art; the theory of the fine arts; the science of the beautiful or that branch of philosophy that deals with its principles or effects; the doctrines of taste.

AHD *abbr.* Australian height datum.

AIFL Committee *abbr.* Arrow Intensively Farmed Land Committee.

AIPP *abbr.* Australian Industry Participation Plan.

airshed *n.* a volume of air confined to a distinct geographic region and within which pollutants are contained.

ALARP *abbr.* as low as reasonably practicable.

alignment *n.* the line or lines that describe a linear infrastructure route; it defines accurately how the linear infrastructure (such as a road, railroad or pipeline) will be sited in relation to the features encountered along the route. *See also* route *and* corridor.

alkaline *adj.* having the properties of any of various bases, the hydroxides of the alkali metals and of ammonium, which neutralise acids to form salts.

alluvial *adj.* of or pertaining to alluvium.

alluvium *n.* unconsolidated deposits of inorganic materials (clay, silt, sand, gravel, boulders) deposited by flowing water.

ambient air quality *n.* the state of quality and chemical characteristics of air as it exists in the environment.

anabranching system *n.* a group of distributary channels that leaves a main channel and then rejoins it, sometimes many kilometres downstream.

anaerobic *adj.* of or pertaining to the biology and physiology (of organisms or tissues) requiring the absence of free oxygen or not destroyed by its absence; relating to or caused by the absence of oxygen, e.g., anaerobic decomposition.

animal enclosure *n.* an enclosed or partly enclosed industrial-sized shed or an enclosure (including holding pens, yards and cages) for keeping cattle, sheep, pigs, poultry or birds as a commercial farming business.

annual daily traffic *n.* the average traffic volume expected over a 24-hour period in a given year.

ANZECC *abbr.* Australian and New Zealand Environment Conservation Council.

anthropogenic *adj.* associated with human activities, as opposed to those occurring in biophysical environments without human influence.

API *abbr.* American Petroleum Institute.

APIA *abbr.* Australian Pipeline Industry Association.

APPEA *abbr.* Australian Petroleum Production and Exploration Association.

aquaculture *n.* cultivation of the food resources of the sea or of inland waters.

aquatic ecosystems *n.* the abiotic and biotic components, habitats and ecological processes contained within rivers and their riparian zones and within reservoirs, lakes, wetlands and their fringing vegetation.

aquifer *n.* rock or sediment in a formation, group of formations, or part of a formation that is saturated and sufficiently permeable to allow water to percolate through it.

aquitard *n.* a low-permeability geological formation.

arable *adj.* capable, without much modification, of producing crops by means of tillage (ploughing etc.).

arboreal *adj.* living in or among trees.

archaeological *adj.* relating to the systematic study of any culture, especially a prehistoric one, by excavation and description of its remains.

area of disturbance *n.* the area in which physical displacement of existing features occurs, leading to potential impacts.

ARI *abbr.* average recurrence interval.

Arrow *abbr.* Arrow Energy Pty Ltd.

Arrow Bowen Pipeline *n.* a proposed 600-km-long, high-pressure gas transmission pipeline consisting of a main pipeline and several lateral pipelines to convey coal seam gas from Arrow's gas fields in the Bowen Basin to Gladstone for eventual export as liquefied natural gas.

Arrow LNG Plant *n.* a large-scale (up to 16 Mtpa) liquefied natural gas facility that Arrow CSG (Australia) Pty Ltd proposes to develop on Curtis Island offshore from Gladstone.

Arrow Surat Pipeline *n.* a proposed 470-km-long, high-pressure gas transmission pipeline that will extend from the Kogan area of the Surat Basin to Gladstone.

artesian aquifer *n.* a confined aquifer with the piezometric level above ground level.

AS *abbr.* Australian Standard.

AS/NZS *abbr.* Australian/New Zealand Standard.

associated water *n.* term used in various Queensland acts for underground water produced from a production well during the course of or resulting from carrying out petroleum activities; such water may be potable, suitable for stock purposes, saline, high in fluoride, contaminated by hydrocarbons, or otherwise contaminated by a hazardous contaminant; and it may be classified as hazardous waste. *See also* coal seam gas water (which is the nomenclature preferred for use in this SREIS).

ATP *abbr.* authority to prospect.

AUSPLUME *n.* a plume dispersion model.

AusRivAS *abbr.* Australian Rivers Assessment System.

authority to prospect *n.* a tenure allowing the holder to undertake gas exploration activities and studies to evaluate the development potential of a defined resource.

avifauna *n.* the birds of a given region; avian fauna.

avulsion *n.* the sudden removal of soil from the land of one owner to that of another by a change in a river's course or by a flood.

B

backfill armouring *n.* the use of a top layer of grains on a river bed of sufficient coarseness to protect the finer material below it from erosion and thus stabilise the bed.

background creep *n.* the gradual increase in background noise levels in an area as a result of successive developments generating constant noise levels at a particular location.

background noise level *n.* the noise level in the absence of intermittent noise sources.

balanced water *n.* coal seam gas water that has been treated by reverse osmosis and to which trace elements have been added so that it is technically substitutable with water drawn from other resources.

BAMM *abbr.* Biodiversity Assessment and Mapping Methodology.

basalt *n.* the dark, fine-grained igneous rock of a lava flow, composed essentially of plagioclase and pyroxene, and sometimes displaying a columnar structure.

baseline *n.* a basic standard or level, usually regarded as a reference point for comparison. *adj.* of or pertaining to such a standard or level.

baseflow *n.* sustained flow of a stream in the absence of direct run-off, due to groundwater discharge.

beneficial use *n.* an alternative use for a material, such as coal seam gas water or salt, that changes the status of the material from a waste to a resource that can be used for a favourable or advantageous purpose.

bioaccumulate *v.* (of a substance, especially a toxin such as mercury, PCBs, and some pesticides) to remain within an organism, increasing in concentration with repeated doses.

biocondition *n.* the degree to which the attributes of a patch of vegetation differ from the attributes of the same vegetation in its reference (undisturbed) state. Provides a measure of how well a terrestrial ecosystem is functioning in terms of its biodiversity values.

biodiversity *n.* the variety of species of plants, animals and microorganisms, their genes, and the ecosystems they comprise, often considered in relation to a particular area.

biogenic *adj.* produced by living organisms or biological processes.

biogeographic *adj.* relating to the study of the distribution of species (biology), organisms, and ecosystems in space and through geological time.

bioregion *n.* a relatively large land area characterised by broad, landscape-scale natural features and environmental processes that influence the functions of entire ecosystems and capture the large-scale geophysical pattern of the area. These patterns in the landscape are linked to fauna and flora assemblages and processes at the ecosystem scale, thus providing a useful means for simplifying and reporting on more complex patterns of biodiversity.

biosecurity *n.* measures intended to protect the plants or animals of a particular region against the transmission of disease or harmful biological agents.

biosphere *n.* the part of the earth where living organisms are to be found.

BOM *abbr.* Bureau of Meteorology.

bore *n.* a hole drilled in the ground to obtain samples of soil or rock, to intersect groundwater for extractive use, monitoring or investigation, or for a range of other purposes. In Australia, it is also a commonly used term for a constructed groundwater well.

borrow pit *n.* a pit created to provide soil, gravel or rock that can be used as fill at another site.

Bowen Gas Project *n.* a proposed gas field development in the Bowen Basin located between Collinsville in the north and Middlesbrough in the south, approximately 475 km north of Brisbane and 75 km from Mackay.

brackish water *n.* water containing moderate salt concentrations significantly less than sea water, with total dissolved solids typically between 1,000 and 10,000 mg/L (*compare with* brine, fresh water and saline water).

breccia *n.* rock composed of angular fragments of older rocks embedded in a matrix.

Brigalow Belt bioregion *n.* a bioregion that spans inland and eastern Queensland from Townsville in the north to northern New South Wales in the south, covering an area of about 6 million hectares.

brine *n.* water that contains more than 35,000 mg/L of dissolved solids; the waste product of reverse osmosis water treatment (*compare with* brackish water, fresh water and saline water).

brine dam *n.* an impoundment constructed at a water treatment facility to store the brine produced by reverse osmosis prior to its disposal.

broadband noise *n.* noise consisting of a wide range of frequencies that individually are not dominant.

buffer *n.* a zone or an area that serves not for any anthropogenic use but as a conserved natural habitat where plants and animals can thrive.

C

cadastral *adj.* relating to the official register of property, with details of boundaries, ownership, etc.

catchment *n.* (1) a geographical area that drains to a common point, such as a single river or reservoir. (2) the area from which persons may come to a central institution, as a school or hospital.

CAMBA *abbr.* China–Australia Migratory Bird Agreement.

carbon dioxide *n.* a colourless, odourless, incombustible gas included in the major greenhouse gases.

carbon monoxide *n.* a toxic, colourless, odourless gas produced by burning any fuel.

carbon sequestration *n.* the process by which carbon dioxide is removed from the atmosphere. This occurs either naturally by plants in their growth or artificially by various means, whereby it is prevented from returning to the atmosphere by the creation of products within which it is contained by the product's long-term use, such as timber from forests, or by storing it in sealed reservoirs, such as injecting it into underground geological formations.

carbonaceous *adj.* of, like, or containing carbon.

carcinogenic *adj.* of or pertaining to any substance that tends to produce a cancer in a body.

Category A environmentally sensitive area *n.* any area designated as a national park under the *Nature Conservation Act 1999* (Qld), as well as conservation parks, forest reserves, and the Wet Tropics World Heritage areas.

CBA *abbr.* cost benefit analysis.

CCTV *abbr.* closed-circuit television.

- central gas processing facility** *n.* co-located high-pressure compression facilities, power supply, and water transfer station or water treatment facility where gas is dehydrated to sales specification and increased to export pipeline pressure and, if a water treatment facility is included, where coal seam gas water is treated.
- CH₄** *abbr.* methane.
- CGE** *abbr.* computable general equilibrium.
- CGPF** *abbr.* central gas processing facility.
- chemical evolution** *n.* changes and trends in the chemistry of groundwater as it moves through different aquifers and rock types over geologic time.
- Chemical Transport Model** *n.* an air pollution model.
- CHMP** *abbr.* cultural heritage management plan.
- cleat** *n.* a natural fracture within a coal bed; cleats account for most of the permeability and much of the porosity of coal-bed gas reservoirs.
- CLR** *abbr.* contaminated land register.
- cm** *abbr.* centimetre.
- CO** *abbr.* carbon monoxide.
- CO₂** *abbr.* carbon dioxide.
- CO₂-e** *abbr.* carbon dioxide equivalent.
- COAG** *abbr.* Council of Australian Governments.
- coal** *n.* a black or brown carbon-based sedimentary rock formed by the accumulation and decomposition of plant material in layers and used as a fuel; main types are hard coal (anthracite), soft coal (bituminous coal), and brown coal (lignite).
- coal seam gas** *n.* a form of natural gas extracted from coal beds.
- coal seam gas water** *n.* water extracted from coal seams as a by-product of petroleum activities.
- cofferdam** *n.* a watertight enclosure constructed in a watercourse and then pumped dry so that bridge foundations, pipeline crossings etc. may be constructed in the open.
- cohesive** *adj.* characterised by cohering, uniting, or sticking together.
- colonisation** *n.* the process of establishing a colony; forming into a colony; settling.
- combustion** *n.* the act or process of burning.
- co-mingling** *n.* mixing together.
- CSIRO** *abbr.* Commonwealth Scientific and Industrial Research Organisation.
- CONCAWE** *abbr.* the oil companies' European association for environment, health and safety in refining and distribution
- conceptual project design** *n.* an array of activities from generating ideas to planning how these ideas could become a realisable project, including timeframes, for gas field and facility development presented for the purpose of environmental impact assessment.
- Condamine** *n.* a river in southeastern Queensland, rising on the western side of the Great Dividing Range and flowing west to join Dogwood Creek to form the Balonne River.
- confined aquifer** *n.* an aquifer bounded above and below by impervious layers; in a confined aquifer, the water is under sufficient pressure to cause it to rise above the top of the aquifer if given the opportunity, for example, if penetrated by a bore.
- confining layer** *n.* geological material through which significant quantities of water cannot move, located below unconfined aquifers and both above and below confined aquifers. Synonym for impervious layer.
- conglomerate** *n.* anything composed of heterogeneous materials or elements; geology: a rock consisting of rounded and waterworn pebbles etc. embedded in a finer cementing material; consolidated gravel.
- congruency** *n.* condition of agreeing; agreement.
- constraints mapping** *n.* one of the items comprising the environmental framework (see environmental framework) undertaken to graphically depict areas of environmental sensitivity that could constrain development.
- contaminant** *n.* a gas, liquid or solid substance or an organism that has an adverse effect on people, animals or plants.
- core habitat known** *v.* Identifies habitat where a spatially accurate confirmed record of a particular species exists. Core habitat known is attributed to the particular habitat polygon in which it occurs. Also applies to a 1 km buffer around all spatially accurate (< 400 m accuracy) species records.
- core habitat possible** *v.* Previous records of a particular species are not known to occur within a given area or habitat, although specific habitat features are present which are known to be favoured by the species and the habitat occurs within the species known geographic range.
- cost benefit analysis** *n.* the study of a project's financial viability by comparing its cost to its actual or expected returns or benefits.

cover material *n.* soil, alluvium, weathered basalt or other suitable plant-growth medium, typically non-crusting and of low salinity, placed on reshaped spoil surfaces.

critically endangered species or ecological community *n.* a flora or fauna species or an ecological community categorised as critically endangered in terms of the EPBC Act and that faces an extremely high risk of extinction in the wild in the immediate future.

CTM *abbr.* Chemical Transport Model.

cumulative effect *n.* the combined impact on one or more environmental values delivered by multiple projects being undertaken within one physical area.

Cwth *abbr.* Commonwealth.

D

Dalby Expansion Project *n.* an increase in production wells and associated infrastructure within Arrow's area of existing operations in the vicinity of Dalby scheduled for 2011 to meet Arrow's contractual obligations under current domestic gas supply agreements.

dB(A) *abbr.* A-weighted noise or sound power level in decibels.

DEEDI *abbr.* Department of Employment, Economic Development and Innovation, the functions of which have been transferred to other Queensland government departments.

demography *n.* the science of vital and social statistics, as of the births, deaths, diseases, marriages, etc. of populations; the range of different groups existing in a particular populace, as distinguished by such factors as age, ethnicity, social background, etc.

depressurisation *n.* the lowering of the groundwater elevations over an area.

DERM *abbr.* Department of Environment and Resource Management (now the Department of Environment and Heritage Protection (EHP), a Queensland Government department).

desalinate *v.* to subject (saline water) to a process of desalination (removal of dissolved salts so that it becomes suitable for drinking water or for agricultural irrigation).

desorption *n.* the processes releasing molecules of gas, liquid, or dissolved constituents from a surface (*compare with* adsorption).

development region *n.* a term used in the EIS to describe areas into which the project development area had been divided for the purpose of phasing the project across the project development area; the development regions were Dalby, Wandoan, Chinchilla, Millmerran/Kogan, and Goondiwindi. For the purposes of the SREIS, the term 'development region' is no longer used. The term 'drainage area' is now used to divide the project development area.

dewatering *n.* the draining, permanently or temporarily, of a wet area of land for agriculture, construction, etc.; the draining of an aquifer.

DIDO *abbr.* drive-in, drive-out.

DIICCSRTE *abbr.* Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education, a Commonwealth Government department.

DIP *abbr.* Department of Infrastructure and Planning, a Queensland Government department.

directional drilling *n.* the technique of drilling non-vertical wells by intentionally deviating a wellbore from usual vertical path; horizontal drilling is a subcategory of directional drilling.

discharge *n.* the action of allowing a liquid, gas, or other substance to flow out from where it is confined; *v.* 1. to allow a substance to flow out from its usual location. 2. to remove water from or flow out of an aquifer, including flow to surface water or another aquifer, by artificial means, such as pumping.

discharge area *n.* that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater.

dissolved solids *n.* soluble inorganic or organic substances, such as minerals, salts or elements, that are in suspended in a solution.

distribution lines *n.* see power distribution lines.

disturbance *n.* a physical displacement of existing features that leads to impacts.

diversion channel *n.* a constructed waterway used to redirect drainage lines and watercourses around infrastructure areas.

drainage area *n.* one of the 11 subdivisions of the project development area that has been designed to take advantage of natural topography, encouraging flow of gas and water to natural low points, and that will encompass the production wells and associated water and gas gathering network required to service one CGPF.

draw down *v.* to lower the groundwater level in a bore or within the watertable.

drawdown *n.* the distance that the groundwater level in a bore or within a watertable is lowered from the standing water level when influenced by pumping; the act of lowering the groundwater level.

drilling rig *n.* a machine that creates holes (usually called boreholes) or shafts in the ground.

DTMR *abbr.* Department of Transport and Main Roads, a Queensland Government department.

E

EA *abbr.* environmental authority.

easement *n.* a legal term used to describe land over which a third party has rights to locate infrastructure and undertake certain activities.

ecohydrogeology *n.* the study of the interaction between ecosystems and groundwater.

ecologically sustainable *adj.* designed or developed to have the capacity to continue operating perpetually and to avoid adverse effects on ecology.

ecology *n.* the branch of biology that deals with the relations between organisms and their environment.

ecosystem *n.* a community of organisms interacting with one another and with the environment in which they live, as in a pond, a forest, etc.

edge effect *n.* the degree to which adjacent habitats influence each other or interact. Commonly used in conjunction with the boundary between natural habitats, especially forests, and disturbed or developed land. Edge effects are especially pronounced in small habitat fragments where they may extend throughout the patch.

EHP *abbr.* Department of Environment and Heritage Protection (previously known as DERM), a Queensland Government department.

EIS *abbr.* environmental impact statement.

electric drive compressor *n.* an electrically powered mechanical device that increases the pressure of a gas by reducing its volume.

electrofishing *n.* a non-destructive technique for sampling and surveying fish and crustacean communities. A backpack or boat-mounted pulse generator creates a highly configured electric field that temporarily stuns fish and attracts them to the operator. Fish can be released unharmed after identification and measurements have been completed.

EMP *abbr.* environmental management plan.

EMR *abbr.* environmental management register.

endangered *adj.* of or relating to a plant, animal or ecosystem the population size of which has declined or is likely to decline to the extent that the wildlife may be threatened by extinction.

endemic *adj.* (of a plant or animal) native to a country or a locality, although also found elsewhere.

environmental authority *n.* the primary statutory document, issued in accordance with the EP Act, that sets conditions on authorised petroleum activities that will be used by EHP to assess and administer regulatory environmental compliance of the project.

environmental framework *n.* a tool used by Arrow to assess site selection and manage the potential impacts of development, wherever the infrastructure is ultimately located, comprised of constraints maps and environmental controls.

environmental impact statement *n.* a structured document that is prepared to identify and assess the environmental impacts of a proposed activity and to outline safeguards to mitigate or control such impacts.

environmental management plan *n.* a document that provides operational detail of how environmental management measures identified in the EIS or SREIS will be implemented.

environmental nuisance *n.* an unreasonable interference or likely interference with an environmental value caused by noise, dust, odour or light; caused by an unhealthy, offensive or unsightly condition; or caused in another way prescribed by regulation (*compare with*. disturbance).

environmental offsetting *n.* actions, such as setting aside land or contributing money, that aim to ensure adverse environmental impacts caused by a development are balanced by environmental gains, with a goal of achieving a net environmental benefit.

environmental values *n.* desirable characteristics, properties, behaviours or other aspects of the environment.

environmentally relevant activity *n.* an activity defined under s. 19 of the EP Act.

environmentally sensitive area *n.* a location, however large or small, that has environmental values that contribute to maintaining biological diversity and integrity; has intrinsic or attributed scientific, historical or cultural heritage value; or is important in providing amenity, harmony or sense of community.

EP Act *abbr.* *Environmental Protection Act 1994* (Qld).

EPBC Act *abbr.* *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth).

EPBC threshold criteria *n.* the rules or principles used to measure the significance of a plant, animal or ecosystem against the requirements of the EPBC Act.

ephemeral *adj.* of or pertaining to a water body that exists for a limited period following precipitation.

EPP (Air) *abbr.* *Environment Protection Policy (Air) 2008* (Qld).

erosion *n.* the wearing away of rock or soil caused by physical or chemical processes.

erosional stability *n.* the ability of a rehabilitated area to resist the natural forces of soil erosion.

ERP *abbr.* emergency response procedure.

ESA *abbr.* environmentally sensitive area.

essential habitat *n.* for species of wildlife listed as endangered, vulnerable, rare, or near threatened under the *Nature Conservation Act 1992* (Qld), an area of vegetation shown on the regional ecosystem map or remnant map as remnant vegetation (a) that has at least three essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database or (b) in which the protected wildlife, at any stage of its life cycle, is located. Essential habitat areas are identified on a map certified by the chief executive of EHP for the purposes of the *Vegetation Management Act 1999* (Qld).

estuarine *adj.* of or formed in an estuary.

eutrophication *n.* a process by which pollution from such sources as sewage effluent or leachate from fertilised fields causes a lake, pond, or marsh to become overrich in organic and mineral nutrients, so that algae and cyanobacteria grow rapidly and deplete the oxygen supply.

exhaust stack silencer *n.* a noise muffler incorporated into an exhaust stack.

exploration *n.* the activities conducted across the project development area to identify and define the gas resource.

exploration track *n.* a temporary vehicular traffic route used for exploration or infrequent access from which topsoil has not been removed.

external drainage *n.* rainfall runoff water that discharges to the environment off the lease area via collection systems.

extractive resources *n.* materials, such as sand, gravel, soil, rock and other similar materials, that are quarried or extracted from the earth.

EVNT *abbr.* endangered, vulnerable and near threatened. Relates to species listed under the *Nature Conservation Act 1992* (Qld).

F

fault *n.* a structural discontinuity in a rock mass or geological formation.

faulting *n.* a fracture in the Earth's crust that occurs when shear stress on a rock overcomes the forces that hold it together. The fracture itself is called a fault plane.

fauna *n.* the animals of a given region or period, taken collectively.

FCF *abbr.* field compression facility.

FEED *abbr.* front-end engineering design.

FFU *abbr.* fitness for use.

field compression facility *n.* co-located compression facilities, including a power supply, where gas from a number of pods of wells is compressed to increase the pressure of the gas from low (approximately 100 kPa) to medium (approximately 1,000 kPa) located in an area where wellhead pressure is insufficient to transport the gas from the field directly to the processing facility.

FIFO *abbr.* fly-in, fly-out.

financial assurance *n.* a security deposit, either cash or a bank guarantee, held by the administering authority to cover the potential cost of rehabilitating areas significantly disturbed by petroleum activities.

flare *v.* to burn excess gas from a petroleum activity.

flora *n.* the plants of a given region or period, taken collectively.

flow component *n.* key element, describing flow condition in a watercourse, that is used to characterise the flow regime of a watercourse. Flow components include baseflow, freshes, bankfull and overbank flows.

fluvial *adj.* pertaining to a river or stream.

fluvial geomorphology *n.* the study of river-related landforms and the processes that shape them.

flux *n.* the rate of flow (mass transport) of a liquid or gas or of other material or compound transported by that liquid or gas.

footprint *n.* see area of disturbance.

formation *n.* in geology, a sequence of rock layers that have similar properties.

fossil fuel *n.* a hydrocarbon deposit, such as petroleum, coal, or natural gas, derived from living matter of a previous geologic time and used for fuel.

fracking *n.* see hydraulic fracturing.

fragmentation *n.* discontinuities in an organism's preferred habitat.

fresh water *n.* water containing low salt concentrations, typically less than 1,000 mg/L (*compare with* brine, brackish water and saline water).

fugitive emission *n.* a discharge resulting from intentional or unintentional release of liquids or gases, such as leaks from joints, seals (pump and compressor), valves or flanges or discharges of methane or carbon dioxide from equipment, venting or flaring.

furrow irrigation *n.* the practice of watering crops by flowing water down trenches between individual rows of plants and perpendicular to the slope. Also called surface irrigation or flood irrigation.

G

g *abbr.* gram.

g/s *abbr.* gram per second.

GAB *abbr.* Great Artesian Basin.

gas reserve *n.* the quantity of gas in a natural gas field.

gathering infrastructure *n.* small-diameter pipelines through which either coal seam gas or coal seam gas water flows on a petroleum lease from the wellhead to the production facility.

gathering line *n.* a small-diameter pipeline through which liquids or gases flow on a petroleum lease before being distributed via a transmission pipeline from the wellhead to a production facility or transmission pipeline.

GDP *abbr.* gross domestic product.

general habitat *n.* Where a species has not been recorded in a given location and habitat accounts for some of the features favoured by a particular species. The habitat occurs on the margins of a species known geographic range. Otherwise, the habitat is suitable for the species although has been subject to intensive survey and the species has not been recorded.

geographical information system *n.* a computer system that can capture, store, analyse, and present in various ways data that locates places on the earth's surface.

geoheritage *n.* an inheritance of geological features from the past.

geomorphic process *n.* a chemical, physical or biological operation at the earth's surface that shape the landscape and its deposits.

geomorphology *n.* the branch of geology dealing with the characteristics, origin, and development of land forms.

geotechnical stability *n.* the resistance of a slope to mass movement, such as a landslide.

gilgai *n.* a patterned or hummocky microrelief formed by the shrinking and swelling of vertosols.

GIS *abbr.* geographical information systems.

Gladstone LNG Project – Fishermans Landing

n. a mid-scale (3 Mtpa) liquefied natural gas plant that Gladstone LNG Pty Ltd proposes to build at Fishermans Landing in the Port of Gladstone.

global warming *n.* an increase in the Earth's average surface temperature that causes corresponding changes in climate and may result from the greenhouse effect.

good-quality agricultural land *n.* agricultural land of high quality, as defined under State Planning Policy 1/92.

GPS *abbr.* global positioning system.

GQAL *abbr.* good-quality agricultural land.

greenfield *adj.* of or relating to land that has not previously been developed or polluted.

greenhouse effect *n.* the effect on the temperature of the earth caused by its atmosphere acting as the glass of a greenhouse does, thus warming the lower atmosphere to maintain temperatures suitable for life on earth.

greenhouse gas *n.* a gas that contributes to the greenhouse effect by absorbing infrared radiation, e.g., water vapour or carbon dioxide.

Greenhouse Gas Protocol *n.* a set of corporate accounting and reporting standards for greenhouse gas emissions developed by the World Business Council.

gross regional product *n.* the market value of all final goods and services produced within a metropolitan area in a given period of time.

ground truthing *n.* the process of sending technicians to gather data in the field that either complements or disputes remote sensing data collected by aerial photography, satellite images, or infrared images.

groundwater *n.* subsurface water, generally saturating the soil or rock in which it occurs.

groundwater flow *n.* the movement of water in an aquifer.

GRP *abbr.* gross regional product.

GSP *abbr.* gross state product.

H

ha *abbr.* hectare.

habitat heterogeneity *n.* the variety, relative abundance, and spatial configuration of habitat types (based on geological, geochemical, physical, and biological parameters) found in an environment.

hazardous material *n.* a substance that, if improperly treated, stored, disposed of, or otherwise managed, is likely to cause serious or material environmental harm because of (a) its quantity, concentration, acute or chronic toxic effects, carcinogenicity, teratogenicity, mutagenicity, corrosiveness, explosiveness, radioactivity, or flammability or (b) its physical, chemical, or infectious characteristics.

HDPE *abbr.* high-density polyethylene.

heavy vehicle *n.* any vehicle with three or more axles or with dual tyres on the rear axle.

herbarium *n.* a collection of dried plants systematically arranged.

heterogeneous *adj.* having different properties or composition at different locations.

high bank *n.* the terrace or bank or, if no bank is present, the point on the active floodplain that confines the average annual peak flow.

high-pressure gas pipeline *n.* a subsurface pipeline constructed of steel with an operating pressure of 10,200 kPa; transports gas from production facilities to export pipelines.

highway *n.* a high-order road of a high standard, facilitating vehicular traffic between regional centres.

Holocene *n.* the period of the geological timescale.

horizon *n.* see soil horizon.

hostile spoil *n.* acid or saline spoil deleterious to seed emergence.

hp *abbr.* horse power.

HSEMS *abbr.* health, safety and environmental management system.

hydraulic conductivity *n.* the rate at which water can move through a permeable medium.

hydraulic fracturing *n.* the propagation of fractures in a rock layer caused by the presence of a pressurised liquid or gas.

hydraulic gradient *n.* the slope of the watertable in an unconfined aquifer, or the piezometric level in a confined aquifer.

hydraulic head *n.* a measure of the pressure of water in an aquifer, commonly measured as the elevation to which groundwater will rise in a constructed well. Differences in these elevations determine the hydraulic gradient and therefore the direction of groundwater flow.

hydrogen sulfide *n.* a poisonous gas, potentially contributing to annoyance due to its odour, which resembles rotten eggs.

hydrograph *n.* a graph that shows groundwater or surface water flow as a function of time.

hydrostatic testing *n.* the process in which a pipeline is filled with water and subjected to higher than normal operational pressures to test its physical integrity (also referred to as hydrotesting).

hydrotest water *n.* water used for hydrostatic testing.

I

IAS *abbr.* initial advice statement.

IFL *abbr.* intensively farmed land.

igneous rock *n.* rock formed from magma that has cooled and solidified either at the earth's surface (volcanic rock) or deep within the earth's crust (plutonic rock).

ILUA *abbr.* Indigenous Land Use Agreement.

impact *n.* an event that disrupts ecosystem, community, or population structure and alters the physical environment, directly or indirectly.

impermeable subsoil *n.* a layer of soil below the topsoil that slows or stops infiltration.

incident register *n.* a database of environmental incidents, their causes, and any remedial action taken.

IESC *abbr.* Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development. The IESC provides advice to the federal minister on research priorities to improve the understanding of potential impacts of coal seam gas and large mining developments on water resources.

infiltration *n.* the downward movement of water from the atmosphere into the ground (*compare with percolation*).

initial advice statement *n.* a document prepared to provide preliminary information about the physical, ecological and socioeconomic environment of a project.

integrated processing facility *n.* used in the EIS to describe a production facility that receives gas from field compression facilities and production wells and compresses it to export pipeline pressure and also includes a water treatment facility to treat coal seam gas water. The SREIS does not use this term; it refers to a CGPF with a water treatment facility located adjacent to it.

intensively farmed land *n.* term used by Arrow, primarily used by Arrow in its consultation and liaison processes, to indicate agricultural areas on sensitive soils (i.e., black soils and similar high-value soils) that are currently intensively farmed (i.e., irrigation, cropping or other intensive agricultural enterprise), where relatively minor changes to the landform can have a disproportionate impact on the productivity of the land.

intensive farming operation *n.* term used to describe agricultural enterprises where the farm infrastructure and management activities are consolidated in a relatively small area and the animals or crops are sometimes confined to animal enclosures, for example, piggeries, feedlots, vineyards, orchards, horticultural enterprises, poultry farms and small-lot plantations.

interfluve *n.* the ridge between two adjacent river valleys.

intrinsic value *n.* the worth of a thing by its very nature.

invertebrate *n.* an animal without a backbone.

IPCC *abbr.* Intergovernmental Panel on Climate Change.

isotopic analysis *n.* the determination of stable isotope ratios to age date groundwater.

IVMS *abbr.* in-vehicle monitoring system.

J

JAMBA *abbr.* Japan–Australia Migratory Bird Agreement.

jumpup *n.* steep-sided, rounded, isolated hills formed by remnant resistant sandstone.

K

K *abbr.* kelvin; a unit of measurement for temperature used in the International System of Units.

kg/d *abbr.* kilogram per day.

kL/d *abbr.* kilolitre per day.

km *abbr.* kilometre.

km/h *abbr.* kilometre per hour.

km² *abbr.* square kilometre.

kPa *abbr.* kilopascal.

kurosol *n.* a soil type in which the B horizon is significantly more clayey in texture than the A horizon, the upper part of the B horizon being strongly acidic.

kV *abbr.* kilovolt.

kW *abbr.* kilowatt.

L

L *abbr.* litre.

lacustrine *adj.* of or relating to a lake.

L_{Aeq,adj,15mins} *abbr.* the noise level, adjusted to represent the response of the human ear, measured in decibels over a period of 15 minutes and adjusted for tonality.

lake *n.* a permanent or ephemeral natural or artificial body of water of considerable size surrounded by land.

land degradation *n.* an adverse change in the characteristics of the Earth's surface that results in one or more of the following: soil erosion, rising watertable, the expression of salinity, mass movement by gravity of soil or rock, streambank instability, or declining water quality.

landholder *n.* the owner, occupier, manager, or controller of land or water, including anyone acting on their behalf.

landowner *n.* the registered proprietor or person having a registerable interest in land.

lean-burn *adj.* of or pertaining to equipment designed to use a lean mixture of fuel and air to reduce petrol consumption and exhaust emissions.

lean production *n.* an operational principle adopted by Arrow to reduce waste in work processes and improve business efficiency.

lentic *adj.* (of organisms) situated in non-flowing or still fresh water.

licensed waste disposal facility *n.* a facility approved under a development approval and operated by a holder of a registered certificate for environmentally relevant activity 75 under Schedule 1 of the Environmental Protection Regulation 1998.

LiDAR *abbr.* light detection and ranging, a remote sensing technology that uses laser pulses to generate three-dimensional structural data about the terrain and landscape features.

light vehicle *n.* a car, a four-wheel drive vehicle, a motorcycle or a car towing a caravan.

liquefied natural gas *n.* a gas consisting primarily of methane, liquefied to facilitate transport and storage.

lithology *n.* the physical composition of a rock.

LNG *abbr.* liquefied natural gas.

LNG train *n.* one continuous processing unit containing the liquefaction and purification facilities required to condense natural gas from a gaseous state to a liquid state.

loam *n.* loose soil of clay and sand with organic matter, often very fertile.

localised irrigation *n.* a spray or low-pressure drip directed at a plant's base or root system (*compare with* furrow irrigation).

lotic *adj.* of or relating to flowing water.

low-pressure gathering line *n.* a pipeline that transports raw natural gas from a wellhead to a production facility.

M

m *abbr.* metre.

m/s *abbr.* metre per second.

m³/s *abbr.* cubic metre per second.

macroinvertebrate *n.* an animal that has no backbone and is invisible without magnification.

macrophyte *n.* an aquatic plant that grows in or near water and is either emergent, submergent, or floating.

matters of national environmental significance *n.* listed under the EPBC Act. The matters of national environmental significance are listed threatened species and ecological communities, migratory species protected under international agreements, Ramsar wetlands of international importance, the Commonwealth marine environment, World Heritage properties, National Heritage places, the Great Barrier Reef Marine Park, and nuclear actions.

marine regression *n.* a period of sea level fall over geological time.

marine transgression *n.* a period of sea level rise over geological time.

max_{Lp,A,15mins} *abbr.* the maximum noise level, adjusted to represent the response of the human ear, measured in decibels over a period of 15 minutes.

medium-pressure gas pipeline *n.* a subsurface pipeline constructed of plastic composite, glass-reinforced epoxy or steel and with an operating pressure of 1,000 kPa that transports gas from a field compression facility to a central gas processing facility.

meteorological *adj.* relating to meteorology or to phenomena of the atmosphere or weather.

methane *n.* a colourless, odourless, flammable gas, one of the greenhouse gases.

mg/L *abbr.* milligram per litre.

mg/m³ *abbr.* milligram per cubic metre.

microcrustacean *n.* a microscopic crustacean, including cladocerans, copepods and ostracods.

microrelief *n.* surface features of the Earth that generally have variations in elevation of less than 15 m.

microscale *adj.* very small-scale.

migratory species *n.* a species that passes periodically from one region to another.

mineral dissolution *n.* the act of minerals dissolving in a liquid substance.

mineralogy *n.* the science of minerals.

mitigation *n.* the act of lessening in force or intensity or moderating the severity of (anything distressing).

MJ/Sm³ *abbr.* megajoule per standard cubic metre.

ML *abbr.* megalitre.

ML/a *abbr.* megalitre per annum.

ML/d *abbr.* megalitre per day.

mm *abbr.* millimetre.

modelling *v.* to create a computerised model that predicts future outcomes; *n.* the act of creating such a model.

MODFLOW software *n.* a numerical code used to simulate groundwater flow.

mol% *abbr.* molar percentage.

moratorium *n.* a general suspension of some type of legal obligation; an agreed or imposed respite; a temporary cessation.

mound spring *n.* a naturally occurring outlet of upwelling groundwater, with a characteristic mound or crater shape formed by deposition of minerals.

MPa *abbr.* megapascal.

MSDS *abbr.* material safety data sheet.

Mt *abbr.* million tonnes.

Mtpa *abbr.* million tonnes per annum.

mudstone *n.* a clayey rock of nearly uniform texture throughout, with little or no lamination.

multi-well pads *n.* a group of wells at one surface location, comprising one central vertical production well with the remainder of the wells being deviated production wells.

multivariate statistical analysis *n.* statistical analysis involving a number of different random variables.

MW *abbr.* megawatt.

MW hr *abbr.* megawatt-hour.

N

n+1 *n.* see sparing capacity.

native title *n.* in Australia, the right to land or water enjoyed by Indigenous people who have maintained their connection to said land or water and whose possession under their traditional law or customs is recognised by Australian law; established by the *Native Title Act 1993*, which followed the Mabo decision of 1992.

natural recruitment *n.* the regeneration of a flora or fauna species in a natural manner.

natural resource *n.* a resource that occurs naturally, such as sunlight, wind, soil, or water.

NEPM *abbr.* National Environment Protection Measure.

neutron probe moisture meter *n.* a device lowered into soil or rock to measure moisture.

NGAF *abbr.* National Greenhouse Account Factors.

NGER Scheme *abbr.* National Greenhouse and Energy Reporting Scheme.

nitrogen dioxide *n.* an air pollutant, high concentrations of which can contribute to acid rain, eutrophication of watercourses and formation of photochemical smog.

NO *abbr.* nitric oxide.

N₂O *abbr.* nitrous oxide.

NO₂ *abbr.* nitrogen dioxide.

NO_x *abbr.* oxides of nitrogen.

non-cohesive *adj.* not characterised by cohering, uniting, or sticking together.

normal cubic metre *n.* the volume of dry gaseous contaminant that occupies 1 m³ at a temperature of 0°C and at an absolute pressure of 101.3 kPa.

notifiable activity *n.* an activity that could result in land contamination.

NPI *abbr.* National Pollutant Inventory.

nutrient *n.* a chemical that an organism needs to live and grow, or a substance used in an organism's metabolism obtained from its environment.

NZS *abbr.* New Zealand Standard.

O

O₃ *abbr.* ozone.

OH&S *abbr.* operational health and safety.

OGIA *abbr.* Office of Groundwater Impact Assessment.

1P *abbr.* proven gas reserves.

oxidation *n.* the addition of oxygen to a compound.

oxides of nitrogen *n.* nitric oxide and nitrogen dioxide.

ozone *n.* a secondary pollutant that is formed as a product of chemical reactions between primary pollutants (NO_x and VOCs).

P

P&G Act *abbr.* *Petroleum and Gas (Production and Safety) Act 2004* (Qld).

palaeo *prefix.* of or pertaining to great age or remoteness in time; ancient conditions.

palustrine *adj.* of, relating to, or living in a wetland or swampy area.

parcel *n.* to conceptualise the well development sequence in the EIS, the development regions were divided into parcels, each containing a nominal 100 production wells or approximately 10 pods. The SREIS refers to drainage areas instead of development regions.

particulate matter *n.* dust particles that are introduced or resuspended into the air through certain activities, such as soil cultivation or vehicles operating on open fields or dirt roadways.

perched aquifer *n.* an unconfined aquifer of limited extent located above the true watertable.

percolation *n.* the movement and filtering of liquids or gases through porous materials (*compare with* infiltration).

perennial *adj.* of or relating to a stream or river (channel) that has continuous flow in parts of its bed all year round during years of normal rainfall.

permanent infrastructure *n.* any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads, pipelines, etc.) that is to be left in place following project decommissioning by agreement with the landowner.

permeability *n.* the ease with which a liquid or gas can pass through a porous medium, such as an aquifer; it is expressed in metres per day (m/d).

pest *n.* an organism considered harmful.

petroleum activity *n.* as defined in the EP Act: (a) activities that, under the *Petroleum Act 1923*, are authorised activities for a petroleum tenure under that act; (b) activities that, under the P&G Act, are authorised activities for a petroleum authority under that act; (c) exploring for, exploiting or conveying petroleum resources under a licence, permit, pipeline licence, primary licence, secondary licence or special prospecting authority granted under the *Petroleum (Submerged Lands) Act 1982*; (d) rehabilitating or remediating environmental harm because of activities mentioned in paragraphs (a) to (c); (e) actions taken to prevent environmental harm because of activities mentioned in paragraphs (a) to (d); (f) activities required under a condition of an environmental authority for activities mentioned in paragraphs (a) to (e); or (g) activities required under a condition of an environmental authority mentioned in paragraphs (a) to (e) that has ended or ceased to have effect, if the condition (i) continues to apply after the authority has ended or ceased to have effect and (ii) has not been complied with.

petroleum authority *n.* a right granted under the *Petroleum Act 1923* (Qld) or P&G Act to allow a proponent to explore for or develop the state's petroleum resources; the types of authorities that may be granted under these acts include authority to prospect, petroleum lease, data acquisition authority, water monitoring authority, petroleum facility licence, survey license, and pipeline licence.

petroleum lease *n.* see petroleum authority.

petroleum pipeline licence *n.* authorises the construction and operation of a pipeline.

petroleum project *n.* all petroleum activities conducted on one or more petroleum authorities as a single integrated operation; to be a single integrated operation, (a) the activities must be carried out under the day-to-day management of a single responsible person (for example, a site or operations manager), must be operationally interrelated, must be operated in a way that leads to a lower risk of environmental harm being caused by the activities, and must be carried out in two or more places at about the same time and (b) the places where the activities are carried out must be separated by a distance short enough to make integrated day-to-day management of activities feasible.

petroleum tenure *n.* a right granted under the *Petroleum Act 1923* (Qld) or P&G Act to allow a proponent to explore for or develop the state's petroleum resources; the types of authorities that may be granted under these acts include authority to prospect, petroleum lease, data acquisition authority, water monitoring authority, petroleum facility licence, survey licence, and pipeline licence.

pH *n.* an indicator of acidity (pH less than 7) or alkalinity (pH greater than 7) or neutrality (pH 7) (the absolute value of the decimal logarithm of the hydrogen-ion concentration (activity)).

photochemical *adj.* of, relating to, or produced by the action of light triggering a chemical process.

photochemical dispersion modeling (air dispersion modeling) *n.* a mathematical simulation of how air pollutants disperse in the ambient atmosphere.

photochemical smog *n.* air pollution formed by chemical reactions that take place in the presence of sunlight between NO_x and VOC and which form ground-level O₃.

piezometer *n.* a type of well specifically constructed in an aquifer for monitoring purposes, and screened at a specific depth to provide measurements of pressure head at that point.

piezometric level *n.* the elevation to which groundwater will rise in a borehole that penetrates a confined or semi-confined aquifer.

pilot well *n.* a borehole drilled to rapidly assess the gas and water deliverability of the gas reserve being targeted.

PJ *abbr.* petajoule.

PJ/a *abbr.* petajoule per annum.

plateau *n.* an elevated area of relatively level land, surrounded by steeper slopes or cliffs and larger in extent than a mesa.

Pliocene *n.* the period in the geologic timescale that extends from 5.332 million years ago to 2.588 million years ago.

PM₁₀ *abbr.* particulate matter less than 10 µm in diameter.

PM_{2.5} *abbr.* particulate matter less than 2.5 µm in diameter.

pneumatic pressure testing *n.* the process in which a pipeline is filled with compressed inert gas or air and subjected to higher than normal operational pressures to test its physical integrity.

pod *n.* a group of approximately 10 wells, located geographically close to each other and associated with common access roadways or common gathering system rights of way.

point source *n.* the theoretical concept of a source of radiation that emanates from a point.

pollution *n.* the introduction into the environment of any substance or factor by the action of humans that is harmful or results in harmful effects to humans or the environment.

porosity *n.* the state or quality of being porous ; determined by the proportion of openings or pores.

potential discharge area *n.* a low-lying part of the landscape (relative to adjacent terrain) where groundwater levels are within 2 to 5 m of the land surface and the landscape may be subject to upward movement of groundwater and thus to surface expression of groundwater in the future.

power distribution lines *n.* Lines that carry power from a transmission system and distribute it to the consumer. Power distribution networks include substations, transformers and medium and low voltage power lines (either on overhead power poles or buried underground).

ppm *abbr.* part per million.

ppmvd *abbr.* part per million (volumetric dry).

precautionary principle *n.* a professed rule of action that states that, if an action or policy has a suspected risk of causing harm to the public or the environment, in the absence of scientific consensus that the action or policy is harmful, the burden of proof that it is not harmful falls on those taking the action.

preferential flow *n.* the movement of groundwater through more permeable zones in the subsurface.

produced water *n.* see associated water.

production facility *n.* a field compression facility or a central gas processing facility.

production well *n.* a well producing coal seam gas.

project development area *n.* the area for which Arrow is seeking approval to develop through the EIS assessment process; it comprises an approximately 6,100-km² area extending from the township of Wandoan in the north towards Goondiwindi in the south, in an arc through Dalby; also called Surat Gas Project development area.

project life *n.* the total duration of the construction, operation and decommissioning phases of the project used in this assessment.

project *n.* a collaborative enterprise, often involving research or design, carefully planned to achieve a particular aim.

putrescible waste *n.* refuse or other discarded material that is liable to become putrid or rotten through decay or decomposition.

Q

QATSIF *abbr.* Queensland Aboriginal and Torres Strait Islander Foundation.

QFRS *abbr.* Queensland Fire and Rescue Service.

Qld *abbr.* Queensland.

qualitative *adj.* relating to or concerned with quality or qualities.

quantitative *adj.* of or pertaining to an assessment based on the amount or number of something.

Quaternary *n.* the period in the geological timescale beginning approximately 2 to 3 million years ago and extending to the present; this period encompasses the Pleistocene and Holocene epochs.

QWC *abbr.* Queensland Water Commission.

QWQG *abbr.* Queensland Water Quality Guidelines 2009.

R

ramp down *v.* to decrease the effort involved in a process.

ramp up *v.* to increase the effort involved in a process.

RAP *abbr.* Reconciliation Action Plan.

raw water *n.* untreated water from the environment.

RE *abbr.* regional ecosystem.

- recharge area or zone** *n.* a land area in which water reaches the zone of saturation via surface infiltration, e.g., a place where rainwater soaks through the earth to reach an aquifer.
- recharge** *n.* the process by which water is added to the zone of saturation of an aquifer from the outside, either directly into a formation or indirectly by way of another formation.
- recovery** *n.* a rise of the water level in a bore or an aquifer after the pumping rate has been reduced, the pump has been shut off, or petroleum activities have ceased.
- regional connecting road** *n.* a high-order road of a high standard, facilitating vehicular traffic between townships.
- regional ecosystem** *n.* the relationships between major floral species and the environment at the regional scale; regional ecosystems are mostly derived by linking vegetation mapping units based on dominant canopy species (those recognisable at a scale of 1:100,000) to land zones that represent major environmental variables, in particular, geology, rainfall and landform; under the *Vegetation Management Act 1999* (Qld), each regional ecosystem is assigned a conservation status based on an assessment of the preclearing and remnant extent of that regional ecosystem.
- regulated waste** *n.* refuse or other discarded material listed in schedule 7 of the Environment Protection (Waste) Regulation 1998 (whether treated or immobilised).
- regulatory framework** *n.* a system of regulations and the means to enforce them, usually established by a government to regulate a specific activity.
- rehabilitation** *n.* the process of restoring an aspect of the environment to its former condition.
- release** *v.* to deposit, discharge, emit, or disturb a contaminant; to cause or allow a contaminant to be deposited, discharged, emitted, or disturbed; to fail to prevent a contaminant from being deposited, discharged, emitted, or disturbed; or to fail to prevent the contaminant from escaping.
- remediation** *n.* the restoration of an environment to its pristine state, as by the removal of pollutants, contaminants, etc.
- remnant vegetation** *n.* under the *Vegetation Management Act 1999* (Qld), an aggregation of native vegetation in which the predominant canopy of the vegetation covers more than 50% of the equivalent undisturbed canopy, averages more than 70% of the vegetation's undisturbed height, and is composed of species characteristic of the vegetation's undisturbed predominant canopy.
- representative** *adj.* exemplifying a class; typical.
- reserve** *n.* the portion of an identified resource that can be economically mined or extracted at the time of determination.
- residual impact** *n.* the effect remaining or left over after application of mitigation measures.
- reverse osmosis** *n.* a water-purifying technique by which a liquid or gas moves under pressure through a semipermeable membrane from a high solute concentration to a lesser concentration.
- RFS** *abbr.* Rural Fire Service.
- rich-burn** *adj.* of or pertaining to equipment using excess fuel where the limiting reactant is air; this increases power and also increases petrol consumption and exhaust emissions.
- right of way** *n.* the linear area within which a pipeline, road, access track or (overhead) power distribution line is constructed.
- rilling** *n.* a type of erosion that removes soil by water from very small but well-defined, visible channels.
- riparian** *adj.* of, relating to, or situated or dwelling on the bank of a river or other body of water.
- riverine** *adj.* of or relating to a river.
- riverine area** *n.* the land confined to the flood-flow channel of a watercourse.
- RO** *abbr.* reverse osmosis.
- rock mulch** *n.* durable or competent rock purposely placed on an area under rehabilitation to provide additional resistance to erosion.
- ROKAMBA** *abbr.* Republic of Korea–Australia Migratory Bird Agreement.
- ROW** *abbr.* right of way.
- RPL** *abbr.* recognition of prior learning.
- RTO** *abbr.* registered training organisation.
- RTU** *abbr.* remote telemetry unit.
- runoff** *n.* the water from rain or irrigation that flows over the land surface and is not absorbed into the ground, instead flowing into watercourses or other surface waters or land depressions.

rural access road *n.* a low-order road predominately facilitating access to local uses.

rural connecting road *n.* a lower-order road facilitating vehicular traffic between higher-order roads.

S

saline water *n.* water that is generally considered unsuitable for human consumption or for irrigation because of its high content of dissolved solids (*compare with* brine, brackish water and fresh water).

sandstone *n.* rock formed by the consolidation of sand, the grains being held together by a cement of silica, lime, gypsum, or iron salts.

sanitation *n.* the treatment and disposal of waste from the human body and of greywater generated through household activity.

saturated zone *n.* the zone in which the voids in the rock are completely filled with water. The watertable represents the top of the saturated zone in an unconfined aquifer.

SCADA *abbr.* supervisory control and data acquisition.

scope 1 greenhouse gas emission *n.* a direct greenhouse gas emission, from turbines, vehicles or other equipment owned and operated by the company conducting a greenhouse gas inventory.

scope 2 greenhouse gas emission *n.* an indirect greenhouse gas emission resulting from the use of electricity or other utilities provided by a third party.

scope 3 greenhouse gas emission *n.* an indirect greenhouse gas emission produced as a result of a company's activities but from sources not owned or operated by that company, e.g., emissions from transport, end use, or raw material supply.

SDPWO Act *abbr.* *State Development and Public Works Organisation Act 1971* (Qld).

sediment *n.* unconsolidated geological material that has been formed by a process of deposition as discrete particles.

sediment mobilisation *n.* the process of dislodgement and movement of sediment by rainfall or flowing water, such as runoff or streamflow.

sedimentation *n.* the deposition or accumulation of mineral or organic matter deposited by water, air, or ice.

selective catalytic reduction *n.* a means of converting nitrogen oxides, with the aid of a catalyst, into nitrogen and water.

semiaquatic *adj.* partly aquatic; growing or living close to water and sometimes found in or entering water.

sensitive place or **sensitive receptor** *n.* an area or structure sensitive to a predicted environmental impact (usually from air emissions or noise), such as a dwelling (excluding dwellings owned by Arrow and that will be unoccupied at the time of operation); a library, childcare centre, kindergarten, school, college, university or other educational institution; a hospital, surgery or other medical institution; a protected area or an area identified under a conservation plan as a critical habitat or an area of major interest under the *Nature Conservation Act 1992* (Qld); a marine park under the *Marine Parks Act 2004* (Qld); or a park or garden that is open to the public.

separation distance *n.* the distance required between an emission source and a sensitive receptor needed to meet applicable criteria or guidelines, e.g., , e.g., in the EIS air quality impact assessment, the distance required to meet the 1-hour NO₂ EPP (Air) guideline of 250 µg/m³ for a CGPF was 175 m.

SEWPaC *abbr.* Department of Sustainability, Environment, Water, Population and Communities, a Commonwealth Government department.

SIA *abbr.* social impact assessment.

sight distance *n.* the length of roadway ahead visible to the driver.

single-well pad *n.* a well pad with only one wellhead.

silt trap *n.* a small impoundment structure built within a drainage line that retards water flow and allows suspended sediments to settle.

siltstone *n.* a consolidated silt; a fine-grained sandstone.

SIMP *abbr.* social impact management plan.

simultaneous *adj.* existing, occurring, or operating at the same time.

skid *n.* a plank, bar, log, or the like, especially one of a pair, on which something heavy may be slid or rolled along.

SO₂ *abbr.* sulfur dioxide.

social impact management plan *n.* a document that details how social impact management recommendations will be implemented.

soda ash *n.* a compound of sodium, Na₂CO₃, occurring in an anhydrous form as a white powder.

sodic *adj.* of or relating to soils that have a high level of sodicity.

- sodicity** *n.* a measure of the amount of available sodium present in soil or water.
- sodium absorption ratio** *n.* a measure of the suitability of water for use in agricultural irrigation, determined by the concentrations of dissolved solids.
- sodosol** *n.* a soil type in which the B horizon is more clayey than the A horizon and in which the upper part of the B horizon is sodic.
- soil horizon** *n.* one of the series of distinct layers found in a vertical cross-section of any well-developed soil, grouped primarily into O, A, B, and C horizons.
- soil profile** *n.* a vertical section through all the constituent horizons, or relatively uniform layers, of a soil.
- sorption capacity** *n.* the capacity to bind one substance to another by any mechanism, such as absorption, adsorption, or persorption.
- SP Act** *abbr.* Sustainable Planning Act 2009 (Qld).
- sparing capacity** *n.* the duplication of critical components or functions of a system with the intention of increasing reliability of the system, usually in the case of a backup or fail-safe.
- spatial scale** *n.* the term used to describe the scale of mapping, e.g., 1:10,000, 1:40,000.
- specific storage** *n.* the amount of water that a portion of an aquifer releases, per unit mass or volume of aquifer, per unit change in hydraulic head, while remaining fully saturated.
- specific yield** *n.* the ratio of the volume of water a rock will release by gravity drainage to the bulk volume of the rock.
- spells analysis** *n.* an assessment of a hydrologic dataset to determine the frequency and duration of particular 'spells' (flow components) in order to characterise the flow regime of a watercourse.
- spoil** *n.* the waste material (such as rock or earth) removed during such activities as mining, excavation, and dredging.
- spring** *n.* the land to which water rises naturally from below the ground and the land over which the water then flows.
- SQIT** *abbr.* Southern Queensland Institute of TAFE.
- stable** *adj.* of or pertaining to the geotechnical steadiness of a rehabilitated landform where unsteadiness related to the excessive settlement and subsidence caused by consolidation or settlement of the waste deposited, as well as sliding or slumping unsteadiness, has ceased.
- stakeholder** *n.* a person or group affected by or concerned with an issue or enterprise.
- standard cubic metre** *n.* unit of measurement of volume used for gases, under 'standard' conditions, i.e., at atmospheric pressure at a temperature of 15°C.
- standard operating procedure** *n.* a written document that describes in detail (and frequently step by step) how a particular activity or process should be accomplished.
- state wildlife corridor** *n.* an area identified as a state wildlife corridor on a map certified by the chief executive of EHP for the purposes of the *Vegetation Management Act 1999* (Qld).
- state-controlled road** *n.* a road declared to be controlled by the Department of Transport and Main Roads, including all AusLink national roads in Queensland.
- static high water mark** *n.* the settled ordinary water level that occurs under average meteorological conditions; it is less than the extreme levels that can be caused by storm surges.
- stationary energy sector** *n.* the portion of emissions that arise from fuel consumed for electricity generation and fuel consumed in the manufacturing, construction, and commercial sectors and other sources.
- statutory guideline** *n.* a written document under a legislative authority that commands or prohibits something or declares policy.
- sterile zone** *n.* a potentially hazardous zone to which uncontrolled entry is prohibited and that must be maintained free of combustible material; for example, the area around the base of a flare stack.
- stock route network** *n.* the network of facilities established to facilitate the movement of livestock on foot between grazing areas and markets, consisting of areas for stock to travel along (often within existing road corridors adjacent to the roadways) and areas for livestock to rest overnight, as well as watering facilities and holding yards.
- stockpile** *n.* a large supply of essential materials, held in reserve for later use.

- storage coefficient** *n.* a measure of the ability of an aquifer material to store water, due to volumetric storage (specific yield) plus elastic storage.
- storativity** *n.* a measure of the ability of an aquifer to store water. Storativity is a function of storage coefficient and aquifer thickness.
- Strahler classification** *n.* a method of classifying streams. See stream order.
- strata** *n.* a single bed of sedimentary rock, generally consisting of one kind of matter representing continuous deposition.
- strategic cropping land** *n.* lands specifically identified as suitable for cropping as an ongoing land use.
- stratigraphy** *n.* a branch of geology dealing with the classification, nomenclature, correlation, and interpretation of stratified rocks.
- stream order** *n.* a number that designates the relative position of a stream in a drainage basin network, ranked from headwaters to river terminus.
- study area** *n.* an area defined by each of the relevant supporting studies and specific to the particular environmental aspect being considered.
- subgrade** *n.* the soil or rock levelled off to support the foundation of a structure.
- subsoil** *n.* the B horizon within the soil profile, which lies immediately below the topsoil, or A horizon; it is not enriched or is less enriched with organic material than the topsoil and may be subject to clay or salt accumulation.
- sulfur dioxide** *n.* a toxic gas found in the emissions of volcanoes and of burning coal or petroleum; it dissolves in water to form sulfurous acid and, in the presence of oxygen, sulfuric acid.
- sustained production** *n.* the phase of the project when the output rate is maintained at a constant rate.
- sustainable yield** *n.* amount of water that can be abstracted from an aquifer over a long period of time without dewatering the aquifer or impacting the resource.
- SREIS** *abbr.* Supplementary Report to the Surat Gas Project Environmental Impact Statement.
- Surat CMA** *abbr.* Surat Cumulative Management Area.
- Surat Cumulative Management Area** *n.* an area of land in the Surat and southern Bowen Basin areas, including the alluvium of the Condamine River, in which overlapping underground water impacts from multiple petroleum tenures (on which such activities as coal seam gas operate) will be assessed and managed by the Queensland Water Commission.
- Surat Header Pipeline** *n.* a proposed 106-km-long, high-pressure gas transmission pipeline to connect the Arrow Surat Pipeline to the production facilities that will be located in the southern region of the project development area.
- surface rill** *n.* a small channel or trench formed by soil erosion; minor trenches that can be ploughed out.
- T**
- t** *abbr.* tonne.
- TAPM** *abbr.* The Air Pollution Model.
- TAPM-CTM** *abbr.* The Air Pollution Model-Chemical Transport Model.
- TDS** *abbr.* total dissolved solids.
- technical specialist** *n.* a person qualified in a particular area of expertise and engaged to undertake assessments as part of the EIS or SREIS.
- temporal scale** *n.* a graduated progression of steps or degrees indicating the passage of time.
- tensiometer** *n.* an instrument used to measure the surface tension of liquids.
- tension crack** *n.* a subsidence-induced fissure at the ground surface that occurs between and at the ends of extracted coal blocks.
- terms of reference** *n.* a written document developed by the regulatory authority (i.e., EHP) that provides the minimum expectations for the scope of an EIS.
- terrestrial** *adj.* 1. relating to, consisting of, or representing the Earth. 2. of or relating to the land as distinct from the water.
- The Air Pollution Model** *n.* a three-dimensional prognostic meteorological model developed by CSIRO and used for air pollution modelling.
- thematic data** *n.* information designed to show a particular topic connected with a specific geographic area.
- thermal radiation** *n.* heat, generated by the internal motion of charged particles in matter, that radiates from an object.

threatened *adj.* (of flora and fauna species) having an uncertain chance of continued survival owing to habitat disturbance or modification, recreational or commercial pressures, and so forth.

3P *abbr.* proven, probable and possible gas reserves.

tillage *n.* ploughing, harrowing, or other land cultivation methods for the raising of crops.

TJ/d *abbr.* terrajoule per day.

tonal noise *n.* a sound with a discrete or dominant frequency.

topography *n.* the detailed description and analysis of the features of a relatively small area, district, or locality.

topsoil *n.* the A horizon, or top layer, of soil, alluvium, or weathered rock that may form a suitable plant-growth medium; it varies in depth depending on soil-forming factors, including parent material, location and slope, but generally is not greater than about 30 mm in depth from the natural surface.

TOR *abbr.* terms of reference.

total suspended particulate *n.* the total amount of the particulate matter suspended by air (regardless of size).

TransCAD *n.* a commercial computer-aided transportation modelling program.

transfer dam *n.* see water transfer dam.

transmission pipeline *n.* a pipeline that transports gas, particularly from a central gas processing facility to an export pipeline.

transmissivity *n.* the rate at which water of a prevailing density and viscosity is transmitted through a unit width of an aquifer or confining bed under a unit hydraulic gradient.

treated water dam *n.* an impoundment constructed to store treated coal seam gas water received from a water treatment facility prior to distribution for beneficial use.

trigger level *n.* the point at which some form of action is begun, such as exceedence of guidelines.

TSP *abbr.* total suspended particulates.

turbid *adj.* (of liquids) opaque or muddy with particles of extraneous matter.

turbulence *n.* the haphazard secondary motion due to eddies within a moving liquid or gas.

TWAF *abbr.* temporary workers accommodation facility.

2P *abbr.* proven and probable gas reserves.

U

unconfined aquifer *n.* saturated rock or sediment with no confining layer between the watertable and the ground surface where the watertable is free to fluctuate.

unconformable *adj.* of or pertaining to a geological layer that does not parallel underlying strata or does not overlie rocks in an immediate age sequence.

univariate *adj.* one-variable.

unmitigated *adj.* without mitigation measures in place.

unsaturated zone *n.* the part of the geological stratum above the watertable where interstices and voids contain a combination of air and water.

uplift *n.* the relative upward movement of rocks due to tectonic forces.

upset conditions (flaring) *n.* unexpected circumstances, such as an emergency plant shutdown for equipment maintenance, that requires gas to be flared.

UWIR *abbr.* underground water impact report.

V

vadose zone *n.* the upper soil water zone that is aerated by watertable fluctuations.

vehicle kilometres travelled *n.* a measure of traffic demand, calculated as the length of a section of road in kilometres multiplied by the annual average daily traffic on it. The yearly vehicle kilometres travelled is the daily vehicle kilometres travelled multiplied by the number of days in that year.

venting (gas) *n.* the direct release of gas from a pipeline or from equipment.

viewshed *n.* an area, frequently bounded by a ridge of land, that defines the extent of a project that is visible within the human field of view from a fixed vantage point. Synonymous with visual envelope and typically represents the limit of the zone of theoretical visibility (ZTV).

VOC *abbr.* volatile organic compound.

volatile organic compound *n.* any organic compound that participates in atmospheric photochemical reactions.

W

water storage dam *n.* any of the impoundments used to store coal seam gas water prior to treatment, distribution for beneficial use, or disposal.

water transfer dam *n.* an impoundment constructed to allow the storage of water that is in process between storage and treatment facilities or between facilities and end users.

water transfer station *n.* a facility located at a central gas processing facility that includes pumps and associated pipe work for the pumping of water between facilities and wells.

water treatment facility *n.* an installation that employs filtration and reverse osmosis techniques to purify water with a high solute concentration to a lesser concentration; may also include balancing to ensure that the water is suitable for beneficial end uses.

waterlogging *n.* the saturation of soil by soil water.

waters *n.* includes rivers, streams, lakes, wetlands, the bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater runoff, and groundwater and any part thereof.

watershed *n.* a drainage basin.

watertable *n.* the surface in an unconfined aquifer or confining bed at which the pore water pressure is atmospheric; it can be measured by installing shallow wells extending a few feet into the zone of saturation (piezometers) and then measuring the water level in those wells.

well *n.* a hole drilled into a groundwater resource (aquifer) or an oil or gas resource (reservoir) and constructed with a casing and screen or similar. In Australia, also commonly referred to as a bore or borehole.

well field *n.* a group of boreholes in a particular area having a common use, such as groundwater, oil or gas extraction.

wellhead *n.* the surface termination of the well, which incorporates facilities for installing various items. It is the interface for drilling and production equipment.

wellpad *n.* the cleared ground or built platform from which drilling is done and on which wellhead facilities are installed.

WHO *abbr.* World Health Organization.

wild river area *n.* a part of the state of Queensland declared as a wild river area under the *Wild Rivers Act 2005* (Qld). Wild river areas may include high preservation areas, preservation areas, floodplain management areas, and subartesian management areas.

wildlife corridor *n.* a habitat linked to other habitats (often remnant patches) to allow natural migration or movement of wildlife.

wildlife refugium *n.* an area that has avoided ecological change to accommodate the survival of a relictual species; *pl.* wildlife refugia.

work program *n.* a program required under the P&G Act in which holders of or applicants for an authority to prospect are required to submit detailed information about the nature and extent of the activities to be carried out under the authority.

workover *n.* well maintenance involving the cleaning of the production zone by high-velocity air or water jetting, maintaining or replacing the pump and, if necessary, replacing the well tubing and rods to ensure continued flow of gas or water from a coal seam.

worst-case (noise issues) *adj.* of or pertaining to conditions resulting in the highest noise level at or inside dwellings.

WRF model *abbr.* Weather Research and Forecast model.

X, Y

yield *n.* the quantity of water removed from a water resource, for example, the yield of a borehole.

Z

zone of saturation *n.* the area in an aquifer, below the watertable, in which essentially all pores and fractures are saturated with water.