

Permit

Environmental Protection Act 1994

Environmental authority EPPG00693213

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Environmental authority number: EPPG00693213

Environmental authority takes effect on 27 March 2018

Environmental authority holder(s)

Name(s)	Registered address
Mitsui E&P Australia Pty Limited	Level 22 2 The Esplanade PERTH WA 6000
Westside ATP769P Pty Ltd	Level 8 300 Queen Street BRISBANE CITY QLD 4000

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Resource Activity, Non-Scheduled, Petroleum Activity, Authority to Prospect - ATP	ATP769

Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the Environmental Protection Act 1994 (EP Act).

Contaminated land

It is a requirement of the EP Act that an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

- the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- a change in the condition of the contaminated land (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the contaminated land (notice must be given within 20 business days);

that is causing, or is reasonably likely to cause, serious or material environmental harm.

Environmental authority

For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

- a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority-on the nominated day; or
- b) if the authority states a day or an event for it to take effect-on the stated day or when the stated event happens; or
- c) otherwise-on the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the Sustainable Planning Act 2009 or an SDA Approval under the State Development and Public Works Organisation Act 1971), this EA will not take effect until the additional authorisation has taken effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.

Clancy Mackaway
Department of Environment and Heritage Protection
Delegate of the administering authority
Environmental Protection Act 1994

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Date issued: 27 March 2018

Legislative Requirements and Conditions of Environmental Authority

SCHEDULE A – GENERAL CONDITIONS

Authorised Petroleum Activities

- A1 This environmental authority authorises petroleum activities for exploration and appraisal purposes, which are limited to:
- a) coal seam gas wells including incidental activities such as well pads, water pumps and generators associated with well operations, sumps for storing drilling muds, and flare pits;
 - b) 4 tight gas wells with a maximum total authorised disturbance of 12ha (including incidental activities such as well pads, water pumps, generators associated with well operations, sumps for storing drilling muds, and flare pits)
 - c) low impact petroleum activities;
 - d) low hazard dams;
 - e) dams other than those defined as low hazard or regulated dams;
 - f) borrow pits;
 - g) pipelines associated with production testing (excluding pipelines that require a pipeline license);
 - h) temporary structures such as accommodation camps and sewage treatment plants; and
 - i) stimulation activities.

Maintenance of Measures, Plant and Equipment

- A2 The holder of the environmental authority must:
- a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;
 - b) maintain such measures, plant and equipment in their proper and effective condition; and
 - c) operate such measures, plant and equipment in a proper and effective manner.
- A3 No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration materially increases, or is likely to increase, the environmental harm caused by the petroleum activity(ies).

Financial Assurance

- A4 The holder or proposed holder of this environmental authority must:
- a) calculate a financial assurance as required by the administering authority; and
 - b) attach a completed Schedule of Disturbance to the original and any amended work program or development plan; and
 - c) provide to the administering authority the financial assurance in the amount and form required by the administering authority at the time of submission of any original, later or amended work program or development plan; and
 - d) maintain the financial assurance until the administering authority is satisfied that no claim is likely to be made on the assurance.

Existing Petroleum Activities

- A5 Within one year from the grant of the environmental authority, the holder of the environmental authority must conduct an audit of the existing petroleum activities that commenced before 9 September 2011.
- A6 The audit of existing petroleum activities required by condition (A4) must:
- a) identify all current infrastructure in place (including accurate location) on the tenement prior to 9 September 2011;
 - b) be included in an audit report;
 - c) assess whether the current financial assurance held for the environmental authority continues to be of an adequate amount.
- A7 The audit report required by condition (A6)(b) must be provided to the administering authority with the first annual return following the issue of this environmental authority.
- A8 Conditions (D4) to (D15) in *Schedule D — Land* relating to disturbance only apply to petroleum activities which commenced after 9 September 2011, subject to the petroleum activities being included within the audit of existing petroleum activities and audit report required by Conditions (A5), (A6) and (A7).

Monitoring Program

A9 The holder of this environmental authority must:

- a) develop a monitoring program that will demonstrate compliance with the conditions of the environmental authority;
- b) document monitoring and inspections carried out under the monitoring program and any actions taken; and
- c) record, compile and keep for a minimum of seven (7) years all monitoring results and data.

SCHEDULE B – WATER

Contaminant Release to Water

- B1 Contaminants must not be directly or indirectly released to waters except as permitted under this environmental authority.

Erosion and Sediment Control

- B2 A Erosion and Sediment Control Plan, which has been certified by a suitably qualified person, must be developed which includes, but is not necessarily be limited to:
- a) managing and / or diverting uncontaminated stormwater run-off around areas disturbed by the petroleum activity(ies) or where contaminants or wastes are stored or handled that may contribute to contamination of **waters**;
 - b) ensuring that contaminated stormwater runoff and incident rainfall is collected, treated, reused, or released in accordance with the conditions of this environmental authority;
 - c) roofing or minimising the size of areas where contaminants or wastes are stored or handled;
 - d) revegetating disturbed areas as soon as practicable after the completion of works;
 - e) using materials and or processes (e.g. dry absorbents) to clean up spills that will minimise contamination of **waters**;
 - f) placing erosion and sediment control structures to minimise erosion of disturbed areas and prevent the contamination of **waters**;
 - g) an inspection and maintenance program for the erosion and sediment control measures;
 - h) provision for adequate access to maintain all erosion and sediment control measures especially during the wet season from November to April;
 - i) additional erosion and sediment control measures for **construction** of wells and pipelines on slopes /-- GREATER THAN --/10%;
 - j) a surface water monitoring program designed to detect impacts from sediment runoff into **waters**;
 - k) identification of remedial actions required to ensure compliance with the conditions of this environmental authority; and
 - l) details of community consultation strategies and processes to be used in further developing and implementing the Erosion and Sediment Control Plan.
- B3 The Erosion and Sediment Control Plan must be implemented.

B4 A copy of the Erosion and Sediment Control Plan must be made available to any potentially affected landholders upon request by that landholder.

B5 A copy of the Erosion and Sediment Control Plan must be submitted to the administering authority at any time upon request.

Protection of Riverine Areas

B6 The holder of the environmental authority must:

- a) ensure that there is no significant disturbance in riverine areas containing permanent water, except for the necessary construction and/or maintenance of roads, tracks and pipelines; and
- b) minimise disturbance of all other riverine areas.

Works in Watercourses, Wetlands, Lakes And Springs – Tight Gas Activities

B7 Tight gas activities authorised by this environmental authority that require earthworks, vegetation clearing and / or placing fill is not permitted in or within:

- a) 200 metres from any wetland, lake or spring; or
- b) 100 metres of the high bank of any other watercourse.

B7A All reasonable and practicable locations must be considered prior to the construction of linear infrastructure that will result in significant disturbance in or on the bed and banks of a watercourse or within the areas specified in (B7)(b).

B7B The construction and/or maintenance of linear infrastructure that will result in significant disturbance in or on the **bed and banks** of a watercourse or within the areas specified in (B7)(a) and (b) must be conducted in accordance with the following order of preference:

- a) conducting works in times when there is no water present;
- b) conducting works in times of no flow;
- c) conducting works in times of flow but in a way that does not impede low flow.

B7CA The construction and/or maintenance of linear infrastructure that will result in significant disturbance in or on the bed and banks of a watercourse, lake, wetland or spring must be

designed and undertaken by a suitably qualified person in accordance with the guideline Activities in a watercourse, lake or spring associated with a resource activity or mining operations.

- B7CB Petroleum activities must not result in water turbidity increases of more than 10% in high ecological value waters outside contained construction or maintenance areas.
- B7D Background water turbidity must be measure within 20 metres upstream of the significant disturbance and be unaffected by turbidity from the significant disturbance.
- B7E Monitoring must be undertaken during the construction and maintenance of linear infrastructure on a daily basis to demonstrate performance in relation to condition (B7CB).
- B7F The environmental authority holder must provide the administering authority with the following information at least five (5) business days prior to significant disturbance from linear infrastructure construction or maintenance works occurring in or on the beds and banks of a watercourse:
- a) the commencement date of the significant disturbance and likely duration of significant disturbance;
 - b) a brief description of works;
 - c) c. the location of the proposed significant disturbance (e.g. GPS coordinates, watercourse name)

Works in River Improvement Areas

- B8 All measures must be taken to prevent and/or minimise adverse impacts to, or reversal of, any river improvement works carried out in River Improvement Areas by Queensland's River Improvement Trusts.

Floodplains — Tight Gas Activities

- B9 Where the tight gas activities are to be carried out on floodplains, the petroleum activity(ies) must be carried out in a way that does not:
- a) concentrate flood flows in a way that will or may cause or threaten an adverse environmental impact; or
 - b) divert flood flows from natural drainage paths and alter flow distribution; or

- c) increase the local duration of floods; or
- d) increase the risk of detaining flood flows; or
- e) pose an unacceptable risk to the safety of persons from flooding; or
- f) pose an unacceptable risk of damage to property from flooding.

SCHEDULE BB – GROUNDWATER

- BB1 The extraction of groundwater as part of the tight gas activities authorised by this environmental authority from underground aquifers must not directly or indirectly cause environmental harm to any watercourse, lake, wetland or spring.

SCHEDULE C – REGULATED STRUCTURES

Assessment of Hazard Category

- C1 The hazard category of each low hazard dam must be assessed by a suitably qualified and experienced person in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.
- C2 The hazard assessment required under condition (C1) must occur in any of the following situations:
- a) prior to the design and construction of the dam;
 - b) prior to any change in its purpose or its stored contents;
 - c) for a structure assessed and certified as a high or significant hazard structure, at least biennially after its construction.
- C3 A hazard assessment report and certification must be prepared for any dam assessed and the report may include a hazard assessment for more than one dam.
- C4 The holder must, on receipt of a hazard assessment report and certification, provide to the Administering Authority one paper copy and one electronic copy of the hazard assessment report and certification.
- C5 All certifications must be in the form set out in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.
- C6 Regulated dams are not permitted on ATP 769.

Construction of Low Hazard Dam to Contain Wetting Front

- C7 Where a dam is assessed as low hazard, it must be:
- a) constructed, operated and maintained in accordance with accepted engineering standards currently appropriate for the purpose for which the dam is intended to be used; and
 - b) designed with a floor and sides made of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during both its operational life and including any period of decommissioning and rehabilitation.

C8 In the event of early signs of loss of structural or hydrological integrity of a low hazard dam, the holder of this environmental authority must:

- a) take immediate action to prevent or minimise any actual or potential environmental harm; and
- b) report in writing to the administering authority, any findings and actions taken within 20 business days of that event.

C9 Monitoring of Low Hazard Dams

The condition of all low hazard dams must be monitored for early signs of loss of structural or hydraulic integrity, based on the advice of a suitably qualified and experienced person. The methods of monitoring and frequency of monitoring shall be as assessed by the person who conducts the hazard assessment based on the particular circumstances of each dam.

SCHEDULE D - LAND

Contaminant Release to Land

- D1 Contaminants must not be directly or indirectly released to land, except as permitted under this environmental authority.

Significant disturbance

- D2 The holder of this environmental authority must ensure that petroleum activities do not cause more than 0.1% of the total land area on the relevant petroleum authorities (excluding pipeline licences) that constitute the petroleum project to be significantly disturbed at any one time.

Land Management

- D3 The holder of the environmental authority must:
- a) take all reasonable and practicable measures to minimise disturbance to land in order to prevent land degradation; and
 - b) ensure that for land that is to be significantly disturbed by petroleum activities, the top layer of the soil profile is removed and
 - i. stockpiled in a manner that will preserve its biological and chemical properties; and
 - ii. used for rehabilitation purposes.

Environmentally Sensitive Areas

- D4 The holder of this environmental authority must ensure that the petroleum activity(ies) is only conducted in accordance with *Schedule D, Table 1 — Environmentally Sensitive Areas (ESAs)* below for each of the ESA categories and associated primary and secondary protection zones.

Schedule D, Table 1 — Environmentally Sensitive Areas (ESAs)

ESA Category	Within the ESA	Within primary protection zone of the ESA	Within secondary protection zone of the ESA
All Category A ESAs	No petroleum activities permitted	No petroleum activities permitted	Limited petroleum activities permitted subject to conditions (D5), (D6), (D8) and (D11).
Category B ESAs excluding Endangered Regional Ecosystems	No petroleum activities permitted other than seismic activities subject to condition (D11)	No petroleum activities permitted other than seismic activities subject to condition (D11)	Limited petroleum activities permitted subject to conditions (D5), (D6), (D8) and (D11).
Category B ESAs: Endangered Regional Ecosystems	No petroleum activities permitted other than seismic activities subject to condition (D11) and access tracks subject to conditions (D6), (D8) and (D15).	No petroleum activities permitted other than seismic activities subject to condition (D11) and access tracks subject to conditions (D6), (D8) and (D15).	Limited petroleum activities permitted subject to conditions (D5), (D6), (D8) and (D11).
Category C ESAs excluding 'Of Concern' regional ecosystems, State Forests and Timber Reserves	No petroleum activities other than seismic activities permitted subject to condition (D11).	No petroleum activities other than seismic activities permitted subject to condition (D11).	Limited petroleum activities permitted subject to conditions (D5) and (D6).
Category C ESAs: State Forests, Timber Reserves and 'Of Concern' regional ecosystems	Limited petroleum activities (are permitted subject to conditions (D5) to (D8), and (D12) to (D14).	Limited petroleum activities permitted subject to conditions (D5) to (D8), and (D12) to (D14).	Limited petroleum activities permitted subject to conditions (D5) and (D6).

Note: Approvals may be required under the Forestry Act 1959 where the petroleum activity(ies) is proposed to be carried out in Environmentally Sensitive Areas that are State Forests or Timber Reserves.

Note: Indicative Environmentally Sensitive Area mapping is available on the Department of Environment and Resource Management website at:

http://www.derm.qld.gov.au/ecoaccess/maps_of_environmentally_sensitive_areas.php.

- D5 Limited petroleum activities carried out in the secondary protection zone in accordance with condition (D4) must be preferentially located in pre-existing areas of clearing or significant

disturbance to the greatest practicable extent and avoid the clearing of mature trees to the greatest practicable extent.

- D6 Limited petroleum activities carried out within an environmentally sensitive area, primary protection zone or secondary protection zone as authorised under condition (D4) must not be conducted where there is an overlap with another environmentally sensitive area or primary protection zone where limited petroleum activities are not authorised.
- D7 Where limited petroleum activities are proposed to be undertaken within the primary protection zone of, or in the Category C Environmentally Sensitive Area specified in condition (D4), the holder of this environmental authority must be able to demonstrate that no reasonable or practicable alternative exists and that disturbance to land only be located and carried out in areas according to the following order of preference:
- a) pre-existing cleared areas or significantly disturbed land within the primary protection zone of a Category C Environmentally Sensitive Area;
 - b) undisturbed areas within the primary protection zone of a Category C Environmentally Sensitive Area;
 - c) pre-existing areas of significant disturbance within a Category C Environmentally Sensitive Area (e.g. areas where significant clearing or thinning has been undertaken within a Regional Ecosystem, and / or areas containing high densities of weed or pest species which has inhibited re-colonisation of native regrowth);
 - d) areas where clearing of a Category C Environmentally Sensitive Area is unavoidable.
- D8 Prior to conducting limited petroleum activity(ies) that involve significant disturbance to land within an ESA, primary protection zones, or secondary protection zones:
- a) an assessment must be undertaken of the condition, type and ecological value of any vegetation in such areas where the activity is proposed to take place. The assessment must be submitted to the administering authority at any time upon request;
 - b) the assessment required by condition (D8)(a) must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any category A, B or C Environmentally Sensitive Areas (ESA's) and the presence of species classed as endangered, vulnerable, rare or near threatened under the Nature Conservation Act 1992; and
 - c) a record of the assessment required by conditions (D8)(a) and (D8)(b) must be kept and submitted to the administering authority upon request.

- D9 If the assessment required by conditions (D8)(a) and (D8)(b) indicates that the biodiversity status of a Regional Ecosystem mapped as Endangered or Of Concern by the Queensland Herbarium should be in a different conservation value classification, the holder of the environmental authority must advise the administering authority in writing before any significant disturbance to land takes place.
- D10 If, within the 20 business days following the lodgement of the notification under condition (D9), the administering authority notifies the holder of the environmental authority, in writing, that the Regional Ecosystem mapping requires further validation, then significant disturbance to land in the mapped regional ecosystem is prohibited until the administering authority provides written advice that significant disturbance to land may proceed.
- D11 Where seismic activities are proposed to be undertaken within Endangered Regional Ecosystems, primary and secondary protection zones of Endangered Regional Ecosystems, secondary protection zones of a Category A ESA, Category C ESAs (excluding 'Of Concern' regional ecosystems, State Forests and timber reserves), or primary protection zone of a Category C ESA (excluding 'Of Concern' regional ecosystems, State Forests and timber reserves) the holder of this environmental authority must:
- a) not cause significant disturbance and/or clearing of vegetation;
 - b) use pre-existing access and fence line tracks and other disturbed areas;
 - c) not construct new access tracks;
 - d) conduct seismic activities by foot where there are no existing access tracks;
 - e) not clear or stick rake in any Endangered RE; and
 - f) utilise existing vehicular crossings for seismic activities in watercourses and where vehicular crossings do not exist, either:
 - i. deploy and retrieve geophones and cable through the crossing by foot; or
 - ii. skip acquisition over the watercourse and restart on the other side.
- D12 Notwithstanding conditions (D4) and (D7), where limited petroleum activities are proposed to be undertaken within the primary protection zone of, or in a Category C Environmentally Sensitive Area specified in conditions (D4), any vegetation clearing must not exceed any of the following areas:
- a) for the life of the project and before any activity commences, if the disturbance relates to an Of Concern Regional Ecosystem, 5% of the remnant unit of Of Concern Regional

Ecosystem as ground truthed and mapped as per condition (D8)(b) of this environmental authority; and

- b) more than 30 m² for the construction of a sump; or
- c) more than ten (10) metres in width for tracks; or
- d) more than 12 metres in width for flow pipeline construction purposes.

D13 For each well site within the primary protection zone of, or in a Category C Environmentally Sensitive Area specified in condition (D4), all reasonable and practical measures must be taken to minimize the area cleared which must include but not be limited to, for each well site, ranked constraints mapping and a risk assessment which considers safety and environmental impacts.

D14 Details of any significant disturbance to land undertaken within the primary protection zone of, or in a Category C Environmentally Sensitive Area, along with a record of the assessment required by condition (D8) must be kept and submitted to the administering authority with each annual return.

D15 Access tracks are permitted within the primary protection zone of, or in Endangered Regional Ecosystems, if:

- a) there is no viable alternative access option that avoids the Endangered Regional Ecosystem; and
- b) the access track is pre-existing;
- c) the upgrade of the existing access track will not:
 - i. negatively impact on the Endangered Regional Ecosystem; nor
 - ii. result in the clearing of native vegetation (other than grass, isolated immature individuals or branch lopping of isolated mature individuals); and
- d) the width of an access track is limited to:
 - i. 6 metres where the pre-existing access track is less than 6 metres in width; and
 - ii. the width of pre-existing access track to a maximum width of 10 metres where the pre-existing access track is greater than 6 metres.

D16 Prior to carrying out field based petroleum activities authorised under this environmental authority the holder of this environmental authority must make all relevant staff, contractors or agents carrying out those petroleum activities, aware of the location of any Category A, B or C

Environmentally Sensitive Areas, wetlands and presence of species classed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992* and the requirements of this environmental authority.

D16A Subject to condition (D16B), tight gas well pads are permitted where limited petroleum activities are authorised under condition (D4).

D16B Where tight gas well pads are proposed to be undertaken within ESAs:

- a) It must be demonstrated that no alternative exists to avoid the disturbance in the ESA;
- b) Tight gas well pads must be preferentially located in areas of pre-existing disturbance; and
- c) Disturbance to land from tight gas well pads must be minimised to 3 hectares for a single well and 3.5 hectares for a multi-well pad.

D16C Records must be kept demonstrating compliance with condition

Clearing Vegetation

D17 The holder of the environmental authority must:

- a) take all reasonable and practicable measures to prevent or minimise disturbance to vegetation by petroleum activities; and
- b) manage the effects of clearing to prevent the loss of biodiversity, reduction of ecological processes and land degradation.

D18 The holder of this environmental authority, when carrying out (a) petroleum activity(ies) must avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value and avoid clearing mature trees to the greatest possible extent.

Note: This environmental authority does not authorise the taking of protected animals or the tampering with an animal breeding place as defined under the *Nature Conservation Act 1992* and Regulations.

D19 Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not significantly impede vehicle, stock or wildlife movements.

- D20 The holder of this environmental authority, must ensure that clearing of remnant vegetation shall not exceed ten (10) metres in width for the purpose of establishing tracks and 20 metres in width for dual carriageway roads unless otherwise approved by the administering authority in writing.
- D21 The holder of this environmental authority must not clear vegetation or place fill:
- a) in a way which significantly isolates, fragments or dissects tracts of vegetation resulting in a reduction in the current level of ecosystem functioning, ecological connectivity (i.e. stepping stone or contiguous bioregional/local corridor networks) and/or results in an increase in threatening processes.
 - b) on dispersible soils or highly erodible soils to the greatest practicable extent; or
 - c) in discharge areas.
- D22 Where proposed tight gas related activities authorised by this environmental authority are undertaken within remnant vegetation that is other than a Category A, B or C Environmentally Sensitive Area and their associated protection zones, the holder of this environmental authority must be able to demonstrate that no reasonable or practicable alternative exists and for linear infrastructure, that significant disturbance to land does not exceed the following areas:
- a) 20 metres in width for dual carriage way roads; and
 - b) Ten (10) metres in width for access tracks not associated with a water or gas line.
- D23 When carrying out the tight gas activities the location of activities must be determined to ensure that for land that is to be **significantly disturbed** by the petroleum activity(ies):
- a) the top layer of the soil profile is removed and stockpiled separately in a manner that will preserve its biological and chemical properties; and
 - b) soils are used for **rehabilitation** purposes;

Fauna Management — Tight Gas Activities

- D24 Measures must be employed to prevent fauna entrapment during the conduct of tight gas activities authorised by this environmental authority during the construction and operation of well infrastructure and dams.

Heritage Places and Archaeological Artefacts

- D25 The holder of this environmental authority must take all reasonable and practicable measures to avoid impacting upon places of known or potential cultural heritage significance whilst carrying out petroleum activities.

Storage of Hazardous Substances, Fuel and Oil

- D26 The holder of the environmental authority must ensure that the storage of all flammable and combustible liquids are:
- a) contained within an on-site containment system;
 - b) controlled in a manner that prevents environmental harm; and
 - c) maintained in accordance with Section 2.3 for minor storages and Section 5.8 for storages above 10,000 L of AS 1940 —2004 *Storage and Handling of Flammable and Combustible Liquids*.

Spills and Clean Up Action

- D27 Notwithstanding the other conditions of this authority, if a hazardous contaminant is released to waters or land, the holder of the environmental authority must:
- a) take immediate action to stop any further release;
 - b) take immediate action to contain the hazardous contaminant to the affected area, taking particular care to protect environmentally sensitive areas;
 - c) restore or rehabilitate the environment to its condition before the release occurred; and
 - d) take necessary action to prevent a recurrence of the release.

Chemical and Fuel Storage — Tight Gas Activities

- D28 All explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids (including petroleum products and associated piping and infrastructure) used in association with the tight gas activities authorised by this environmental authority must be stored and handled in accordance with the relevant Australian Standard where such is available.
- D29 Notwithstanding the requirements of any Australian Standard, any liquids stored on site that have the potential to cause environmental harm must be stored in, or serviced by, an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land.

- D30 Where no relevant Australian Standard is available for the chemical and / or fuel storage activity, the following requirements apply:
- a) storage tanks must be bunded so that the capacity and construction of the bund is sufficient to contain at least 110 % of a single storage tank or 100 % of the largest storage tank plus 10 % of the second largest storage tank in multiple storage areas; and
 - b) drum storages must be bunded so that the capacity and construction of the bund is sufficient to contain at least 25 % of the maximum design storage volume within the bund.
- D31 All containment systems must be designed to minimise rainfall collection within the system.

Ground-truthing Surveys — Tight Gas Activities

- D32 Prior to conducting any of the tight gas activities authorised under this environmental authority that involve significant disturbance to land, an assessment must be undertaken of the condition and type of vegetation and soils in such areas where the activity is proposed to take place.
- D33 The assessment required by condition (D32) must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any Category A, B or C Environmentally Sensitive Areas, wetlands and the presence of species classed as endangered, vulnerable, rare or near threatened under the Nature Conservation Act 1992.
- D34 The assessment required by condition (D32) must include, but not necessarily be limited to:
- a) baseline soils quality data for soil to be significantly disturbed;
 - b) identification of the vegetation communities present (including species composition and regional ecosystem type for native vegetation communities) within each area(s) to be disturbed;
 - c) data on the level of **ecosystem functioning**; and
 - d) a map or series of maps of suitable scale displaying the distributing of vegetation communities.

Note: Regional ecosystem type should be established using the most current version of the Qld Government's "Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland". Assessment of the vegetation communities should be sufficient to establish any inherent variation within a single regional ecosystem type.

- D35 If the holder of this environmental authority is not able to identify a suitable analogue site for the area where the tight gas activity(ies) is proposed to take place, then the assessment required by condition (D33) must also include, but not necessarily be limited to:
- a) data representing each vegetation community present within each area(s) to be rehabilitated including:
 - i. flora species richness and species diversity;
 - ii. structural data including woody stem count densities for dominant species within each stratum;
 - iii. percent foliage cover (accounting for seasonal variation and excluding pests);
 - b) data regarding habitat features, including but not necessarily limited to:
 - i. organic litter cover (%); and
 - ii. trees with hollows;
 - iii. hollow bearing logs (count and number per hectare); and
 - iv. fallen woody material.

Mapping Validation — Tight Gas Activities

- D36 If the assessment required by conditions (D32) to (D35) indicates that an environmentally sensitive area or wetland is incorrectly identified through state mapping, or is present and not identified by state mapping, proposed activities may proceed in accord with the conditions of the environmental authority and the field validated values.
- D37 In the instance where a proposed activity is authorised under the environmental authority based upon the field validated value(s), but not the State mapped value(s), the environmental authority holder must notify the administering authority of the precise location and nature of the proposed activity in writing at least five (5) business days prior to the activity commencing.
- D38 The environmental authority holder must maintain for the life of the environmental authority all documentation survey information photographs, field data or any material associated with the field validation requirements in (D33) to demonstrate to the administering authority that surveys were conducted in a manner consistent with requirements contained in (D33).

SCHEDULE E – NUISANCE

Release of Contaminants to the Atmosphere

- E1 The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity(ies) must not cause an environmental nuisance at any sensitive place.

Nuisance Monitoring (Other than Noise)

- E2 When the administering authority advises the holder of this environmental authority of a complaint alleging nuisance other than noise, the holder must investigate the complaint as soon as practicable.
- E3 The holder of this environmental authority must advise the administering authority in writing of the action proposed or undertaken to resolve the complaint within three (3) business days of completing the complaint investigation.
- E4 When requested by the administering authority, the holder of this environmental authority must undertake monitoring as specified by the administering authority, within a reasonable and practical timeframe nominated by the administering authority to investigate any complaint of environmental nuisance at any sensitive place.
- E5 The results of the investigation (including an analysis and interpretation of the monitoring results) and the abatement measures implemented must be provided to the administering authority within five (5) business days of receiving the advice under condition (E4), unless a longer time is agreed to in writing by the administering authority.
- E6 If monitoring in accordance with condition (E4) indicates that emissions exceed the limits set in this environmental authority or are causing environmental nuisance, then the holder of this environmental authority must:
- a) address the complaint including the use of alternative dispute resolution services if required; and / or
 - b) implement abatement or attenuation measures so that the authorised petroleum activity(ies) does not result in further environmental nuisance.

Noise

- E7 Prior to the commencement of each petroleum activity (excluding seismic activities) authorised by this environmental authority, an Interim Noise Management Plan is required to be in place for that activity, which:
- a) minimises noise impacts resulting from petroleum activities; and
 - b) ensures compliance with Schedule E, Table 1— Noise limits at Sensitive Receptors.
- E8 Where there is a conflict between the contents of the Interim Noise Management Plan and the conditions of this environmental authority, the conditions of this environmental authority prevail.
- E9 The holder of this environmental authority must prepare and implement a Final Noise Management Plan which has been certified by a suitably qualified person by 9 December 2011.
- E10 The Final Noise Management Plan required by condition (E9) must include, but not necessarily be limited to:
- a) a commitment by the Chief Executive Officer for the holder of this environmental authority, or their delegate, to ensure adequate allocation of staff and resources to the establishment and operation of the Noise Management Plan;
 - b) definition of roles, responsibilities and authorities within the staffing of the Noise Management Plan;
 - c) delivery of training to staff and contractors and maintenance of competencies;
 - d) risk / constraint analysis methods to be undertaken prior to any new operation (e.g. drill site) or installation of new equipment that has the potential to create noise nuisance;
 - e) procedures and methods to undertake assessments to determine compliance with the noise limits in *Schedule E, Table 1 — Noise limits at Sensitive Receptors* in the event of a valid complaint being received and when there are no alternative arrangements in place, taking in to account any tonal or impulsive noise impacts;
 - f) procedures for handling noise complaints;
 - g) community liaison and consultation procedures including but not limited to consultation for when night time petroleum activities (i.e. between 10:00 pm and 6:00 am) are assessed as being likely to exceed 25 dBA at sensitive receptors;
 - h) procedures for managing records associated with all aspects of the Noise Management Plan including standardised forms for recording monitoring results and complaints;

- i) details of petroleum activities and measured and / or predicted noise levels of noise sources associated with those activities;
- j) reasonable and practicable control or abatement measures (including relocating the activity, altering the hours of operation, or having an alternate arrangement in place with any potentially affected person) that can be undertaken to ensure compliance with the noise limits in *Schedule E, Table 1 — Noise limits at Sensitive Receptors for coal Seam Gas Activities*.
- k) the level of noise at sensitive receptors that would be achieved from implementing the measures detailed under condition (E10)(j); and
- l) mediation processes to be used in the event that noise complaints are not able to be resolved.

E11 Prior to undertaking petroleum activities that will result in short-term, medium-term or long term noise events that are likely to impact on a sensitive receptor, the holder of this environmental authority must model or calculate any potential noise emissions from the relevant petroleum activity(ies) and determine if noise emissions are likely to exceed the noise levels specified in *Schedule E, Table 1— Noise limits at Sensitive Receptors*.

E12 The emission of noise from the petroleum activity(ies) authorised under this environmental authority must not result in levels greater than those specified in *Schedule E, Table 1 — Noise Limits at Sensitive Receptors* in the event of a valid complaint about noise being made to the administering authority.

Schedule E, Table 1 — Noise Limits at Sensitive Receptors

Time Period	Metric	Short-term Noise Event	Medium-term Noise Event	Long Term Noise Event
7:00am — 6:00pm	L _{Aeq,adj} ,15 mins	LABG + 10 dBA	LABG + 8 dBA	LABG + 5 dBA
	Max L _{pA} , 15 mins	55 dBA	51 dBA	45 dBA
6:00pm — 10:00pm	L _{Aeq,adj} ,15 mins	LABG + 10 dBA	LABG + 8 dBA	LABG + 5 dBA
	Max L _{pA} , 15 mins	50 dBA	46 dBA	40 dBA
10:00pm — 6:00am	L _{Aeq,adj} ,15 mins	LABG + 3 dBA	LABG + 3 dBA	LABG + 3 dBA
	Max L _{pA} , 15 mins	38 dBA	36 dBA	33 dBA
6:00am — 7:00am	L _{Aeq,adj} ,15 mins	LABG + 10 dBA	LABG + 8 dBA	LABG + 5 dBA
	Max L _{pA} , 15 mins	50 dBA	46 dBA	40 dBA
Drilling activities undertaken from 10:00pm — 7:00am	L _{mq,adj} ,15 mins		30 dBA (Must be measured indoors at any sensitive receptor)	

L_{Aeq} and Max L_{pA} are to be measured over any 15 minute period.

LABG is the deemed background noise levels which for the purposes of *Schedule E Table 1 -*

Noise Limits at Sensitive Receptors as L_{Aeq,adj} are:

7:00 am — 6:00 pm: 35 dBA

6:00 pm — 10:00 pm: 30 dBA

10:00 pm— 6:00 am: 25 dBA
6:00 am — 7:00 am: 30 dBA

- E13 If the noise subject to a complaint is tonal or impulsive, the adjustments detailed in *Schedule E, Table 2 — Adjustments to be Added to Noise Levels at Sensitive Receptors* are to be added to the measured noise level(s) to derive LAeq, adj, 15 min.

Schedule E, Table 2— Adjustments to be Added to Noise Levels at Sensitive Receptors

Noise Characteristic	Adjustment to Noise
Tonal characteristic is just audible	+ 2 dBA
Tonal characteristic is clearly audible	+ 5 dBA
Impulsive characteristic is just audible	+ 2 dBA
Impulsive characteristic is clearly audibly	+ 5 dBA

Note: Where the application of a tonal or impulsive adjustment as per Table 2 is unclear or in dispute, refer to AS1055.1 Section 6.6 for a quantitative methodology to confirm the applicability of noise adjustments

- E14 Where alternative arrangements are in place with an affected person(s) at a sensitive receptor as referred to by condition (E10)(j), the noise limits in *Schedule E, Table 1 — Noise limits at Sensitive Receptors* do not apply at that sensitive receptor for the duration for which the alternative arrangements are in place.

Low Frequency Noise

- E15 Notwithstanding condition (E12), emission of any low frequency noise must not exceed the following limits in the event of a valid complaint about low frequency noise being made to the administering authority:
- a) 60 dB(C) measured outside the sensitive receptor; and
 - b) the difference between the external A-weighted and C-weighted noise levels is no greater than 20 dB; or
 - c) 50 dB(Z) measured inside the sensitive receptor; and
 - d) the difference between the internal A-weighted and Z-weighted noise levels is no greater than 15 dB.

Noise Monitoring

- E16 The holder of this environmental authority must undertake noise monitoring as soon as practicable when requested by the administering authority.

- E17 The holder of this environmental authority must report the results of noise monitoring to the administering authority within three (3) business days of completion of the monitoring event.
- E18 Noise monitoring and recording must include, but not necessarily be limited to:
- a) $L_{AN,T}$ (where N equals the statistical levels of 1, 10 and 90 and T=15 mins);
 - b) $L_{Aeq\ adj, 15\ mins}$;
 - c) background noise level as $L_{A\ 90, 15\ mins}$;
 - d) Max $L_{pA, 15\ mins}$;
 - e) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to measured noise levels;
 - f) atmospheric conditions including temperature, relative humidity and wind speed and directions;
 - g) effects due to any extraneous factors such as traffic noise;
 - h) location, date and time of monitoring;
 - i) if the complaint concerns low frequency noise, Max $L_{pZ, 15mins}$; and
 - j) if the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 — 200 Hz range for both the noise source and the background noise in the absence of the noise source.
- E19 The method of measurement and reporting of noise levels and background sound pressure levels must comply with the Department of Environment and Resource Management's "Noise Measurement Manual" 2000 or Australian Standard 1055 as amended from time to time.

Vibration and Blasting

- E20 A Blast Management Plan must be developed in accordance with Australian Standard 2187 by a suitably qualified person prior to each blasting activity.
- E21 The Blast Management Plan must include measures to minimise the likelihood of any adverse effects being caused by airblast overpressure and / or ground borne vibrations at any sensitive receptor and demonstrate current best practice environmental management.

- E22 All blasting must be carried out in a proper manner by a suitably qualified person.
- E23 All blasting must be carried out in accordance with the Blast Management Plan.
- E24 Noise from blasting operations must not exceed an airblast overpressure level of 120 dB (linear peak) at any time, when measured at or extrapolated to any sensitive receptor.
- E25 Ground-borne vibration peak particle velocity caused by blasting operations must not exceed 10 mm/s at any time, when measured at or extrapolated to any sensitive receptor.

Blast and Vibration Monitoring

- E26 Monitoring and recording of the air blast overpressure and ground borne vibration of blasting which has the potential to impact on sensitive receptors.
- E27 Blast and vibration monitoring must include but not necessarily be limited to:
- a) maximum instantaneous charge;
 - b) location of the blast within the site (including any bench level);
 - c) airblast overpressure level (dB Linear Peak);
 - d) peak particle velocity (mm/s);
 - e) location, date and time of recording;
 - f) measurement instrumentation and procedure;
 - g) meteorological conditions for blast monitoring (including temperature, relative humidity, temperature gradient, cloud cover, wind speed and direction); and
 - h) distances from the blast site to potentially noise-affected buildings or structures.

SCHEDULE F - WASTE

Waste Management

- F1 All general waste must only be removed from the site and sent to a recycling facility or disposal facility licensed to accept the waste under the *Environmental Protection Act 1994*.
- F2 All regulated waste must only be removed from the site by a person who holds a current authority to transport such waste under the provisions of the *Environmental Protection Act 1994* and sent to a recycling facility or disposal facility licensed to accept the waste.
- F3 Waste must not be burned or be allowed to be burned on the site, unless it is vegetation and is authorised in writing under the *Forestry Act 1959*.
- F4 All waste fluids and muds resulting from drilling and exploration petroleum activities must be contained in a properly lined dam or containment structure for disposal, remediation or reuse where applicable.

Coal Seam Gas Water

- F5 The holder of the environmental authority must ensure that coal seam gas water is not released to land or waters, other than to an appropriate containment facility except as provided for under section 186 of the *Petroleum and Gas (Production and Safety) Act 2004*.
- F6 Despite condition (F5) the holder of the environmental authority must ensure that coal seam gas water to be used for domestic or stock purposes meets the accepted *ANZECC and ARMCANZ Water Quality Guidelines 2000* for Stock and Domestic Purposes, as amended from time to time.

Sewage Management and Disposal

- F7 The construction and operation of sewage treatment works is authorised if:
- a) the combined total daily peak design capacity is less than 21 equivalent persons; or
 - b) it is operated as a no-release works.
- F8 The holder of this environmental authority must ensure that:

- a) plant and equipment used in the carrying out of the activity is installed, maintained and operated in a proper and efficient manner;
- b) sewage effluent is not released to waters (including groundwater);
- c) the disposal of sewage effluent does not cause the contamination of any water used for drinking or domestic purposes or manufacturing purposes or for consumption by animals;
- d) any area(s) used for the disposal of sewage wastes (liquids or solids) is securely fenced to prevent animals entering such area(s);
- e) where sewage sludge is buried on land the sludge is covered with at least 250 mm of top soil and where practicable located above known flood levels;
- f) where sewage effluent is irrigated on land it is carried out in accordance with the National Water Quality Guidelines for Sewage Systems — Use of Reclaimed Water;
- g) there is no surface pond of effluent on land disposal area(s);
- h) any noxious offence odours or any other noxious or offensive contaminant resulting from the activity do not cause a nuisance at any odour sensitive place; and
- i) public access to any sewage effluent land disposal area must be denied during the release of contaminants to the land and until the irrigation/disposal area has dried.

SCHEDULE GA – REHABILITATION RELATING TO COAL SEAM GAS ACTIVITIES

Rehabilitation of Land Disturbed By Coal Seam Gas Activities

- GA1 As soon as practicable and within 6 months (or longer period agreed in writing with the administering authority) of the completion of coal seam gas causing significant disturbance to land, the holder of the environmental authority must:
- a) remediate contaminated land (e.g. evaporation ponds containing hazardous waste) in accordance with EP Act requirements;
 - b) reshape all significantly disturbed land to a stable landform similar to that of surrounding undisturbed areas;
 - c) reprofile all significantly disturbed land to representative contours of the surrounding landscape;
 - d) on all significantly disturbed land, take all reasonable and practicable measures to:
 - i. re-establish surface drainage lines;
 - ii. reinstate the top layer of the soil profile; and
 - iii. establish groundcover to ensure that erosion is minimised;
 - iv. re-establish vegetation based upon the floristic species composition found in analogue sites (using stock of local provenance where possible and where active revegetation is required); and
 - e) undertake rehabilitation in a manner such that any actual and potential acid sulfate soils in or on the site are either not disturbed, or submerged, or are treated to prevent and / or minimise environmental harm.

Final Acceptance Criteria for Significantly Disturbed Land Caused by Coal Seam Gas Activities

- GA2 All significantly disturbed land caused by the carrying out of coal seam gas activity(ies) must be rehabilitated to meet the following final acceptance criteria:
- a) all significantly disturbed land is reinstated to the pre-disturbed land use unless otherwise agreed to between the holder of this environmental authority, the landholder and the administering authority and is provided for in the Operational Plan;
 - b) all significantly disturbed land is reinstated to the pre-disturbed soil suitability class;
 - c) all significantly disturbed land is reinstated so that the distribution of vegetation communities represent that of the pre-disturbed distribution;
 - d) each vegetation community must be re-established so that the following rehabilitation parameters are achieved:

- i. the rehabilitated site shows distinct and progressive re-establishment of the various strata which characterise the pre-disturbed vegetation communities;
 - ii. all dominant species within each strata are re-established at densities and frequencies equivalent to that of the pre-disturbed site;
 - iii. notwithstanding (i) and (ii) above, a minimum of 80% species diversity and richness observed in the original site is achieved; and
 - iv. a Minimum of 80% foliage cover is achieved when compared to the pre-disturbed vegetation community;
- e) each vegetation community must be rehabilitated and maintained until it can be demonstrated that it is a self-sustaining vegetation community;
- f) notwithstanding (GA2)(e) each vegetation community must be established and maintained for a period of not less than 5 years unless otherwise agreed to by the administering authority;
- g) habitat structures, including (but not limited to) litter cover, fallen woody material, hollow logs, etc. should be re-established to reflect pre-disturbed values to the greatest extent possible;
- h) the landform is safe for humans and fauna;
- i) the landform is stable with no subsidence or erosion gullies for at least five (5) years unless otherwise agreed to by the administering authority;
- j) erosion is minimised with appropriate sediment traps and erosion control measures installed as determined by a suitably qualified person;
- k) the water quality of any residual void or water bodies constructed by the petroleum activity(ies) meets criteria for subsequent uses and does not have potential to cause environmental harm;
- l) there is no ongoing contamination to waters;
- m) there is no ongoing contamination to groundwater from dams (demonstrated via groundwater monitoring); and
- n) the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance caused by carrying out the petroleum activity(ies).

SCHEDULE GB – REHABILITATION RELATING TO TIGHT GAS ACTIVITIES

Decommissioning Of Dams Relating To Tight Gas Activities

GB1 Dams must not be abandoned but be either:

- a) decommissioned and rehabilitated to achieve compliance with condition (GB12); or
- b) be left in-situ for a beneficial use provided that it:
- c) no longer contains contaminants that will migrate in to the environment; and
- d) the administering authority and the landholder agree in writing that the dam will be used by the landholder following the cessation of the petroleum activity(ies).

Rehabilitation Plan

GB2 A Rehabilitation Plan must be developed by 11 June 2013 and include strategies for the determination of final land use(s) and rehabilitation goals and details of how rehabilitation objectives will be achieved. The Rehabilitation Plan must include:

- a) a **rehabilitation** hierarchy for:
 - i. reinstating a native ecosystem(s) as similar as possible to the original ecosystem(s) present prior to disturbance from petroleum activities as the preferred option; then
 - ii. establishing an alternative outcome with a higher environmental value than that present prior to disturbance from petroleum activities where it can be demonstrated that (GB2)(a)(i) is not possible; then
 - iii. reinstating the previous land use (e.g. grazing or cropping); and
- b) methods to achieve **rehabilitation** goals including, but not necessarily being limited to:
 - i. establishing final land use(s) in consultation with affected landholder(s) and the administering authority;
 - ii. identifying suitable **analogue* sites** to measure **rehabilitation** success that may either be the pre-disturbed area or another area that has equivalent values and characteristics as the intended final land use(s); and
 - iii. for sites that are being reinstated to a land use other than a native ecosystem, the Rehabilitation Plan must identify any additional and relevant indicators to be measured at both the **analogue** and **rehabilitation** site(s) so as to assess progressive and final **rehabilitation** success for that land use;
 - iv. for sites that are being reinstated to native ecosystems and the **analogue site** is the pre-disturbed site, the Rehabilitation Plan must include indicators that, as a minimum include those in condition (D34)(a) — (D34)(b) and (D35)(a)-(b) and will

be able to measure success against the progressive and final **rehabilitation** criteria in this environmental authority;

- v. identification of any land use constraints which have resulted from the petroleum activity(ies);
 - vi. residual pollution risks with strategies for managing and mitigating them;
 - vii. landscape planning and landform design principles to achieve **stable** landforms including slope designs, erosion controls and drainage lines;
 - viii. integrating rehabilitated areas so they are compatible with the surrounding landscape, including linking rehabilitated areas of native vegetation with undisturbed native vegetation to provide larger areas and wildlife corridors where feasible;
 - ix. ensuring that **significantly disturbed areas** are rehabilitated progressively and that the progressive **rehabilitation** criteria are routinely measured;
 - x. site preparation such as re-profiling, re-instating surface drainage systems;
 - xi. **top soil** management such as **top soil** handling and stockpiling to preserve soil fertility and biota, respreading techniques, planned thickness, ripping, **top soil** treatments / amendments and mulching in consideration of **analogue** data;
 - xii. flora to be established, including required species diversity, abundance and composition and projective cover in consideration of **analogue** data;
 - xiii. plant propagation and / or supply methods including using seeds / spores of local provenance where feasible;
 - xiv. establishment methods to maximise **rehabilitation** success such as seed treatments, seed spreading, timing of seeding to suit best local climatic conditions, hydroseeding, transplanting;
 - xv. weed control;
 - xvi. sourcing habitat structures for native fauna and installation methods in consideration of matching **analogue** data;
 - xvii. ongoing maintenance program for rehabilitated areas; and
 - xviii. **rehabilitation** monitoring program as required by conditions (GB8) and (GB10) of this environmental authority; and
- c) timeframes for commencing **rehabilitation of significantly disturbed areas** that are not required for the ongoing conduct of the petroleum activity(ies), not greater than three (3) **months** for the **rehabilitation** of buried pipelines and not greater than nine (9) **months** for any other **significantly disturbed area**.

*Note: The latest version of the Qld Government's Biocondition, a Condition Assessment Framework for Terrestrial Biodiversity in Queensland, Assessment Manual and accompanying document Methodology for the

Establishment and Survey of Reference Sites for Biocondition may be used to establish suitable analogue sites for like native vegetation communities.

GB3 The Rehabilitation Plan must be implemented.

Progressive rehabilitation of significantly disturbed land

GB4 Progressive **rehabilitation** of **significantly disturbed land** caused by the carrying out of the tight gas activities authorised by this environmental authority which is not required for the ongoing conduct of the petroleum activity(ies) must commence as soon as practicable, but not longer than nine (9) months following the completion of any **construction** or operational works associated with the petroleum activity(ies).

GB5 Progressive **rehabilitation** of **significantly disturbed land** caused by the carrying out of the petroleum activity(ies) must be undertaken in accordance with the Schedule of Disturbance as submitted to the administering authority as part of the financial assurance calculations.

GB6 Progressive rehabilitation of **significantly disturbed land** caused by the carrying out of the petroleum activity(ies) must:

- a) remediate any contaminated land (e.g. contaminated soils, decommissioned dams containing salt);
- b) reshape all **significantly disturbed land** to a stable landform;
- c) reprofile all **significantly disturbed land** to original contours;
- d) on all **significantly disturbed land**:
- e) re-establish surface drainage lines;
- f) reinstate the top layer of the soil profile;
- g) establish groundcover to ensure that erosion is minimised;
- h) establish vegetation of floristic species composition found in analogue sites;
- i) undertake **rehabilitation** in a manner such that any actual and potential **acid sulfate soils** in or on the site are either not disturbed, or submerged, or are treated to prevent and / or minimise environmental harm.

Final acceptance criteria for significantly disturbed land

GB7 All significantly disturbed land caused by the carrying out of the petroleum activity(ies) must be rehabilitated to meet the following final acceptance criteria:

- a) For all land use(s):
- i. all **significantly disturbed land** is reinstated to the pre-disturbed soil suitability class;
 - ii. the landform is safe for humans and fauna;
 - iii. the landform is **stable** with no subsidence or erosion gullies for at least three (3) **years**;
 - iv. all **significantly disturbed land** is reinstated so that the distribution of vegetation communities represents the **analogue site**;
 - v. the water quality of any residual **void** or water bodies constructed by the petroleum activity(ies) meets criteria for subsequent uses and does not have potential to cause environmental harm;
 - vi. there is no ongoing contamination to **waters**;
 - vii. there is no ongoing contamination to groundwater from **dams** or monocells (demonstrated via groundwater monitoring and leak detection monitoring systems); and
 - viii. the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance caused by carrying out the petroleum activity(ies).
- b) Additional requirements for sites that are being reinstated to native ecosystems:
- i. each vegetation community must be re-established so that each of the following **rehabilitation** parameters are maintained for at least three (3) **years**:
 - ii. the rehabilitated site shows distinct and progressive re-establishment of the various strata which characterise the vegetation community in the **analogue site**;
 - iii. all dominant species within each strata are re-established at densities equivalent to that of the **analogue site**;
 - iv. notwithstanding condition (GB7)(b)(i) and condition (GB7)(b)(ii), a minimum of 70% **species richness** and species diversity is observed when compared to the relevant **analogue site**;
 - v. a minimum of 50% foliage cover is observed when compared to the relevant **analogue site**;

- vi. each vegetation community must be rehabilitated and maintained until it can be demonstrated that it is resilient and self-sustaining (demonstrated by reproduction and colonisation); and
- vii. habitat structures, including but not limited to percent organic litter cover, count and density of hollow bearing logs and nest boxes and fallen woody material have been installed at numbers and densities no lower than the **analogue site**.

Rehabilitation Monitoring Program

- GB8 A Rehabilitation Monitoring Program for the tight gas activities must be developed by 11 June 2013.
- GB9 The Rehabilitation Monitoring Program must include, but not necessarily be limited to:
- a) methods to measure subsidence and erosion rates at rehabilitated buried transmission pipeline corridors and buried flow lines;
 - b) monitoring of indicators identified in the Rehabilitation Plan at **analogue sites** to measure progressive and final **rehabilitation** success relevant to the final land use(s); and
 - c) frequency and seasonality of monitoring **analogue sites** and rehabilitated areas to assess **rehabilitation** success; and
 - d) identification of the experimental design for analysing **analogue** and rehabilitated site data including statistical methods of analyses.
- GB10 The Rehabilitation Monitoring Program must be implemented.

Monitoring of Progressive Rehabilitation — Tight Gas Activities

- GB11 Regular maintenance and at least yearly monitoring of rehabilitated areas must take place to measure compliance with condition (GB8).

Monitoring of Final Rehabilitation Success — Tight Gas Activities

- GB12 Final acceptance criteria are deemed to be met when monitoring of rehabilitated areas demonstrate compliance with the requirements of condition (GB11) for three (3) consecutive years.

SCHEDULE H – WELL CONSTRUCTION, MAINTENANCE AND HYDRAULIC FRACTURING ACTIVITIES

Drilling Activities

- H1 **Oil based drilling muds** must not be used in the carrying out of the petroleum activity(ies).
- H2 **Synthetic oil-based drilling muds** must not be used in the carrying out of the petroleum activity(ies).
- H3 Drilling activities must not result in the connection of the target gas producing formation and another aquifer.
- H4 Practices and procedures must be in place to detect, as soon as practicable, any fractures that have or may result in the connection of a target formation and another aquifer as a result of drilling activities.

Hydraulic Fracturing Activities — Tight Gas Activities

- H5 The authority holder must submit a copy of the first Stimulation Risk Assessment undertaken for tight gas activities required by condition (H12) at least 40 business days prior to the commencement of the stimulation activities.
- H7 Notwithstanding condition (H6) recycled hydraulic fracturing fluid containing trace polycyclic aromatic hydrocarbons above the reporting limit may:
- a) be used in stimulation of the same formation that it was produced from; and
 - b) be used in stimulation of different formations where the stimulation risk assessment required by condition (H13) has identified that the use of hydraulic fracturing fluid containing polycyclic aromatic hydrocarbons above the reporting limit is not likely to result in environmental harm.
- H8 Notwithstanding condition (H6) recycled hydraulic fracturing fluid may be used in stimulation into the same formation that it was produced from and may contain trace polycyclic aromatic hydrocarbons above the reporting limit.
- H9 Stimulation activities must not negatively affect water quality at:

- a) any active landholders' groundwater bores (subject to access being permitted by the landholder) that are located within a two (2) kilometre horizontal radius from the location of the stimulation initiation point; and
- b) any active landholders' groundwater bores within 200m vertically of the stimulation initiation point; and
- c) any other bore that could potentially be adversely impacted by the stimulation activity(ies) in accordance with the findings of the risk assessment required by conditions (H12) and (H13).

H10 Hydraulic fracturing activities must not cause the connection of the target gas producing formation and another aquifer.

H11 The holder of this authority must ensure the internal and external mechanical integrity of the well system prior to and during hydraulic fracturing such that there is:

- a) no significant leakage in the casing, tubing, or packer; and
- b) there is no significant fluid movement into another aquifer through vertical channels adjacent to the well bore hole.

H12 Practices and procedures must be in place to detect, as soon as practicable, any fractures that cause the connection of a target gas producing formation and another aquifer.

Stimulation Risk Assessment

H13 Prior to undertaking hydraulic fracturing activities, the holder of this environmental authority must develop a risk assessment to ensure that hydraulic fracturing activities are managed to prevent environmental harm.

H14 The stimulation risk assessment required by condition (H12) must include, but not necessarily be limited to:

- a) a process description of the **hydraulic fracturing** activity to be applied, including equipment and a comparison to best international practice;
- b) provide details of where, when and how often **hydraulic fracturing** is to be undertaken on the tenures covered by this environmental authority;

- c) a geological model of the field to be stimulated including geological names, descriptions and depths of the target gas producing formation(s);
- d) naturally occurring geological faults;
- e) seismic history of the region (e.g. earth tremors, earthquakes);
- f) proximity of overlying and underlying aquifers;
- g) description of the depths that aquifers with environmental values occur, both above and below the target gas producing formation;
- h) identification and proximity of **landholders' active groundwater bores** in the area where **hydraulic fracturing** activities are to be carried out;
- i) the environmental values of groundwater in the area;
- j) an assessment of the appropriate **limits of reporting** for all indicators relevant to **hydraulic fracturing** monitoring in order to accurately assess the risks to environmental values of groundwater;
- k) description of overlying and underlying formations in respect of porosity, permeability, hydraulic conductivity, faulting and fracture propensity;
- l) consideration of barriers or known direct connections between the target gas producing formation and the overlying and underlying aquifers;
- m) a description of the well mechanical integrity testing program;
- n) process control and assessment techniques to be applied for determining extent of **hydraulic fracturing** activities (e.g. microseismic measurements, modelling etc.);
- o) practices and procedures to ensure that the **hydraulic fracturing** activities are designed to be contained within the target gas producing formation;
- p) groundwater **transmissivity**, flow rate, hydraulic conductivity and direction(s) of flow;
- q) a description of the chemicals used in **hydraulic fracturing** activities (including estimated total mass, estimated composition, chemical abstract service numbers and properties), their mixtures and the resultant compounds that are formed after **hydraulic fracturing**;
- r) for hydraulic fracturing of coal seam gas wells a mass balance estimating the concentrations and absolute masses of chemicals that will be reacted, returned to the surface or left in the target gas producing formation subsequent to **hydraulic fracturing**;
- s) for hydraulic fracturing of tight gas wells a mass balance estimating the concentrations and absolute masses of chemicals that will be reacted, returned to the surface or left in the target gas producing formation subsequent to stimulation, subject to the risk assessment demonstrating that providing this information materially reduces the risk and alters the management strategies to be applied beyond that intended in monitoring of returned fluids detailed in the Stimulation Impact Monitoring Program required in condition

(H19);an environmental hazard assessment of the chemicals used including their mixtures and the resultant chemicals that are formed after hydraulic fracturing including:

- i. toxicological and ecotoxicological information of chemicals used;
 - ii. information on the persistence and bioaccumulation potential of the chemicals used;
 - iii. identification of the **hydraulic fracturing** fluid chemicals of potential concern derived from the risk assessment;
- t) an environmental hazard assessment of use, formation of, and detection of polycyclic aromatic hydrocarbons in **hydraulic fracturing** activities;
- u) identification and an environmental hazard assessment of using radioactive tracer beads in **hydraulic fracturing** activities;
- v) an environmental hazard assessment of leaving chemicals used in **stimulation fluids** in the target gas producing formation for extended periods subsequent to **hydraulic fracturing**;
- w) human health exposure pathways to operators and the regional population;
- x) risk characterisation of environmental impacts based on the environmental hazard assessment;
- y) potential impacts to landholder bores as a result of **hydraulic fracturing** activities;
- z) an assessment of cumulative impacts, spatially and temporally of the hydraulic fracturing activities to be carried out on the tenures covered by this environmental authority; and
- aa) potential environmental or health impacts which may result from **hydraulic fracturing** activities including but not limited to water quality, air quality (including suppression of dust and other airborne contaminants), noise and vibration.

H15 The stimulation risk assessment must be carried out for every well or group of wells in an area of like geological and hydrogeological characteristics to be hydraulically fractured prior to hydraulic fracturing activities being carried out at that well.

Water Quality Baseline Monitoring

H16 Prior to undertaking any hydraulic fracturing activity at any , a baseline bore assessment must be undertaken of the water quality of:

- a) all **landholders' active groundwater bores** (subject to access being permitted by the landholder) that are spatially located within a two (2) kilometre horizontal radius from the

location of the **hydraulic fracturing** initiation point within the target gas producing formation; and

- b) all **landholders' active groundwater bores** (subject to access being permitted by the landholder) in any aquifer that is within 200 metres above or below the target gas producing formation and is spatially located with a two (2) kilometre radius from the location of the **hydraulic fracturing** initiation point; and
- c) any other **bore** that could potentially be adversely impacted by the **hydraulic fracturing** activity(ies) in accordance with the findings of the risk assessment required by conditions (H12) and (H13).

H17 Prior to undertaking hydraulic fracturing activities at a coal seam gas well, there must be sufficient water quality data to accurately represent the water quality in the well to be stimulated. The data must include as a minimum the results of analyses for the parameters in condition (H17)).

H18 Baseline bore and well assessments must include relevant analytes and physico-chemical parameters to be monitored in order to establish baseline water quality and must include, but not necessarily be limited to:

- a) pH;
- b) electrical conductivity [$\mu\text{S}/\text{m}$];
- c) turbidity [NTU];
- d) total dissolved solids [mg/L];
- e) temperature [$^{\circ}\text{C}$];
- f) dissolved oxygen [mg/L];
- g) dissolved gases (e.g. methane, chlorine, carbon dioxide, hydrogen sulfide) [mg/L];
- h) alkalinity (bicarbonate, carbonate, hydroxide and total as CaCO_3) [mg/L];
- i) sodium adsorption ratio (SAR);
- j) anions (bicarbonate, carbonate, hydroxide, chloride, sulphate) [mg/L];
- k) cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L];
- l) dissolved and total metals and metalloids (including but not necessarily being limited to: aluminium, arsenic, barium, borate (boron), cadmium, total chromium, copper, iron, fluoride, lead, manganese, mercury, nickel, selenium, silver, strontium, tin and zinc) [$\mu\text{g}/\text{L}$];
- m) total petroleum hydrocarbons [$\mu\text{g}/\text{L}$];

- n) BTEX (as benzene, toluene, ethylbenzene and total xylene) [$\mu\text{g/L}$];
- o) polycyclic aromatic hydrocarbons (including but not necessarily being limited to: naphthalene, phenanthrene, benzo[a]pyrene) [$\mu\text{g/L}$];
- p) sodium hypochlorite [mg/L];
- q) sodium hydroxide [mg/L];
- r) formaldehyde [mg/L];
- s) ethanol [mg/L]; and
- t) gross alpha + gross beta or radionuclides by gamma spectroscopy [Bq/L].

H19 If sampling required by condition (H17) indicates that Total Xylene exceeds 75ppb, then the holder of this environmental authority must undertake further speciation for levels of ortho-xylene, para-xylene, and meta-xylene.

Stimulation Impact Monitoring Program

H20 A Stimulation Impact Monitoring Program which has been certified by a suitably qualified person must be developed prior to the carrying out of stimulation activities.

- H21 The Stimulation Impact Monitoring Program must be able to detect adverse impacts to water quality from stimulation activities and must consider the findings of the risk assessment required by conditions (H12) and (H13) that relate to stimulation activities and must include:
- a) the stimulation fluids to be used in stimulation activities at sufficient frequency and which sufficiently represents the quantity and quality of the fluids used; and
 - b) flow back waters from stimulation activities at sufficient frequency and which sufficiently represents the quality of that flow back water; and
 - c) flow back waters from stimulation activities at sufficient frequency and accuracy to demonstrate that 150 % of the volume used in stimulation activities of coal seam gas wells has been extracted from the stimulated well;
 - d) all active landholders' groundwater bores (subject to access being permitted by the landholder) that are:
 - i. within a two (2) kilometre horizontal radius from the location of the stimulation initiation point; and
 - ii. that draw water from the target gas producing formation; or

- iii. within 200 vertical meters of the stimulation initiation point; and
- e) any other bore that could potentially be adversely impacted by the stimulation activities in accordance with the findings risk assessment required by conditions (H12) and (H13).

H22 The Stimulation Impact Monitoring Program must provide for monitoring of:

- a) analytes and physico-chemical parameters relevant to baseline bore and well assessments to enable data referencing and comparison including, but not necessarily being limited to the analytes and physico-chemical parameters in condition (H17); and
- b) any other analyte or physico-chemical parameters that will enable detection of adverse water quality impacts and the inter-connection with a non-target aquifer as a result of stimulation activities including chemical compounds that are actually or potentially formed by chemical reactions with each other or coal seam materials during stimulation activities.

H23 The Stimulation Impact Monitoring Program must provide for monitoring of the bores in condition (H20)(d) at the following minimum frequency:

- a) monthly for the first six (6) months subsequent to the stimulation activity(ies) being undertaken; then
- b) annually for the first five (5) years subsequent to the stimulation activity(ies) being undertaken or until analytes and physico-chemical parameters listed in condition (H17) are not detected in concentrations above baseline bore monitoring data on two (2) consecutive monitoring occasions.

H24 The holder of this environmental authority must implement the Stimulation Impact Monitoring Program.

H25 The results of the Stimulation Impact Monitoring Program must be made available to any potentially affected landholder upon request by that landholder.

SCHEDULE I - AIR

Fuel Burning or Combustion Equipment — General

- I1 No equipment capable of burning more than 500kg of fuel an hour is permitted to be used under this environmental authority.

SCHEDULE J – COMMUNITY ISSUES

- J1 A record of all valid complaints and incidents causing environmental harm, and actions taken in response to the valid complaint or incident must be kept.
- J2 The following details for all valid complaints received must be recorded:
- a) name, address and contact number for valid complainant;
 - b) time and date of valid complaint;
 - c) reasons for the complaint as stated by the complainant;
 - d) investigations undertaken in response to the valid complaint;
 - e) conclusions formed;
 - f) actions taken to resolve valid complaint;
 - g) any abatement measures implemented to mitigate the cause of the valid complaint; and
 - h) name and contact details of the person responsible for resolving the valid complaint.

SCHEDULE K - NOTIFICATION

- K1 The Department of Environment and Heritage Protection Pollution Hotline must be telephoned as soon as reasonably practicable, but within 48 hours after becoming aware of:
- a) any non-compliance with any condition of this environmental authority other than in relation to a release of contaminants; or
 - b) a potential or actual loss of structural or hydraulic integrity of a dam; or
 - c) any incident where there is a potential or actual loss of well integrity (e.g. when the annulus pressure during hydraulic fracturing increases by more than 3.5 MPa from the pressure immediately preceding hydraulic fracturing); or
 - d) any detection of restricted stimulation fluids from stimulation fluid monitoring; or
 - e) any analyses result from baseline bore, well or stimulation impact monitoring that exceeds a water quality objective for the protection of an environmental value of that water resource; or
 - f) any analyses result from groundwater monitoring that exceeds trigger action investigation levels, if provided in this environmental authority.
- K2 The Department of Environment and Heritage Protection Pollution Hotline must be telephoned as soon as reasonably practicable, but within 48 hours after becoming aware of the following releases (or their mixtures):
- a) releases of any volume of contaminants to water;
 - b) releases of volumes of contaminants to land greater than:
 - i. 200 L of hydrocarbons; or
 - ii. 200 L of **stimulation** additives; or
 - iii. 500 L of **stimulation fluids**; or
 - iv. 5000 L of **coal seam gas water**;
- K3 The notification of emergencies or incidents as required by conditions (K1) and (K2) must be submitted to the administering authority within 48 hours using a Notice Duty to Notify Harm (EM468).
- K4 Unless a longer time is agreed to in writing by the administering authority, a written report must be provided to the administering authority within 10 business days of notification under condition (K3) including the following (where relevant to the emergency or incident):
- a) the root cause of the emergency or incident;

- b) the confirmed quantities and types of any contaminants involved in the incident;
- c) results and interpretation of any analysis of samples taken at the time of the emergency or incident (including the analysis results of any impact monitoring);
- d) a final assessment of the impacts from the emergency or incident including any actual or potential environmental harm that has occurred or may occur in the longer term as a result of the release;
- e) the success or otherwise of actions taken at the time of the incident to prevent or minimise environmental harm;
- f) results and current status of landholder consultation, including commitment to resolve any outstanding issues / concerns; and
- g) actions and / or procedural changes to prevent a recurrence of the emergency or incident.

Definitions

accepted engineering standards, in relation to dams, means those standards of design, construction, operation and maintenance that are broadly accepted within the profession of engineering as being good practice for the purpose and application being considered. In the case of dams, the most relevant documents would be publications of the *Australian National Committee on Large Dams* (ANCOLD), guidelines published by Queensland government departments and relevant Australian and New Zealand Standards.

acid sulfate soils means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides (actual acid sulfate soils) and / or soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised (potential acid sulfate soils). The term acid sulfate soil generally includes both actual and potential acid sulfate soils. Actual and potential acid sulfate soils are often found in the same soil profile, with actual acid sulfate soils generally overlying potential acid sulfate soil horizons.

administering authority means:

- a) for a matter, the administration and enforcement of which has been devolved to a local government under section 514 of the *Environmental Protection Act 1994* — the local government; or
- b) for all other matters — the Chief Executive of the Department of Environment and Heritage Protection; or
- c) another State Government Department, Authority, Storage Operator, Board or Trust, whose role is to administer provisions under other enacted legislation.

AHD means Australian Height Datum and is the datum used for the determination of elevations in Australia. The determination uses a national network of benchmarks and tide gauges and sets mean sea level at zero elevation.

alternative arrangement means a written agreement between the holder of this environmental authority and an affected or potentially affected person at a sensitive receptor for a defined noise nuisance impact and may include an agreed period of time for which the arrangement is in place. An agreement for alternative arrangement may include, but not necessarily be limited to a range of noise abatement measures to be installed at a sensitive receptor and / or provision of alternative accommodation for the duration of the defined noise nuisance impact.

analogue site means an area of land which contains values and characteristics representative of an area to be rehabilitated prior to disturbance. Such values must encompass land use, topographic, soil, vegetation and other ecological characteristics. Analogue sites can be the pre-disturbed site of interest where significant surveying effort has been undertaken to establish benchmark parameters such as that ground truthing assessment which may be required under the environmental authority.

analytes means a chemical parameter determined by either physical measurement in the field or by laboratory analysis.

annual exceedance probability or **AEP** is the probability that a given rainfall total accumulated over a given duration will be exceeded in any one year.

appraisal well means a petroleum well to test the potential of one (1) or more natural underground reservoirs for producing or storing petroleum. For clarity, an appraisal well does not include an exploration well.

associated works in relation to a dam, means:

- any kind and all things associated with the construction and operation of a dam; and
- any land used for those operations.

Australian Standard 1055 means Australian Standard 1055.1:1997 *Description and Measurement of Environmental Noise — General procedures*.

Australian Standard 2187 means Australian Standard 2187.0:1998 *Explosives—Storage, transport and use, Part 0*, Australian Standard 2187.1:1998 *Explosives—Storage, transport and use Part 1* and Australian Standard 2187.2:2006 *Explosives—Storage and use, Part 2* or any updated versions that becomes available from time to time.

Australian Standard 2885 means Australian Standard 2885.0:2008 *Pipelines — Gas and Liquid Petroleum General Requirements*, Australian Standard 2885.1:2007 *Pipelines — Gas and Liquid Petroleum Design and Construction* and Australian Standard 2885.3:2001 *Pipelines — Gas and Liquid Petroleum Operation and Maintenance*, or any updated versions that becomes available from time to time.

Australian / New Zealand Standard 5667.11 means Australian / New Zealand Standard 5667.11:1998 *Water Quality — Sampling — Guidance on sampling at Groundwaters*.

Australian / New Zealand Standard 5667.12 means Australian / New Zealand Standard 5667.12:1999 *Guidance on Sampling of Bottom Sediments for permanent, semi-permanent water holes and water storages*.

authorised person means a person holding office as an authorised person under an appointment under the *Environmental Protection Act 1994* by the chief executive or chief executive officer of a local government.

background noise level means the sound pressure level, measured in the absence of the noise under investigation, as the **LA90, T** being the A-weighted sound pressure level exceeded for 90 percent of the measurement time period T of not less than 15 minutes, using Fast response.

bed and banks for a watercourse or wetland means land over which the water of the watercourse or wetland normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed or banks that is from time to time covered by floodwater.

beneficial use means

- with respect to dams, that the current or proposed owner of the land on which a dam stands, has found a use for that dam that is:
 - of benefit to that owner in that it adds real value to their business or to the general community
 - in accordance with relevant provisions of the *Waste Reduction and Recycling Act 2011*

- sustainable by virtue of written undertakings given by that owner to maintain that dam, and
 - the transfer and use have been approved or authorised under any relevant legislation, or
- with respect to coal seam gas water, refer to the Department of Environment and Resource Management's *Operational Policy - Management of water produced in association with petroleum activities* and *Notice of decision to approve a resource for beneficial use — CSG water* as amended from time to time.

black earth means a type of soil, also known as vertosols and is a soil order of the Australian Soil Classification. These are clay soils with shrink / swell properties that display strong cracks when dry and / or lenticular structural aggregates at depth. They have high soil fertility and a large water holding capacity.

bore means a water observation bore or a water supply bore that is either sub-artesian or artesian.

brine means saline water with a total dissolved solid concentration greater than 40,000 mg/l.

brine dam means a regulated dam that is designed to receive, contain or evaporate brine.

bund or banded in relation to spill containment systems for fabricated or manufactured tanks or containers designed to a recognised standard means an embankment or wall of brick, stone, concrete or other impervious material which may form part or all of the perimeter of a compound and provides a barrier to retain liquid. Since the bund is the main part of a spill containment system, the whole system (or banded area) is sometimes colloquially referred to within industry as the bund. The bund is designed to contain spillages and leaks from liquids used, stored or processed above ground and to facilitate clean-up operations. As well as being used to prevent pollution of the receiving environment, bunds are also used for fire protection, product recovery and process isolation.

business day has the meaning in the *Acts Interpretation Act 1954* and means a day that is not—

- a Saturday or Sunday; or
- a public holiday, special holiday or bank holiday in the place in which any relevant act is to be or may be done.

BTEX means benzene, toluene, ethylbenzene, ortho-xylene, para-xylene, meta-xylene and total xylene..

Category A Environmentally Sensitive Area means any area listed in Section 25 of the *Environmental Protection Regulation 2008*.

Category B Environmentally Sensitive Area means any area listed in Section 26 of the *Environmental Protection Regulation 2008*.

Category C Environmentally Sensitive Area means any of the following areas:

- Nature Refuges as defined under the *Nature Conservation Act 1992*;
- Koala Habitat Areas as defined under the Nature Conservation (Koala) Conservation Plan 2006;
- State Forests or Timber Reserves as defined under the *Forestry Act 1959*;
- Declared catchment areas under the *Water Act 2000*;
- Resources reserves under the *Nature Conservation Act 1992*

- An area identified as "Essential Habitat" or "Essential Regrowth Habitat" under the Vegetation Management Act 1999 for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the Nature Conservation Act 1992; or
- Of Concern Regional Ecosystems identified in the database called 'RE description database' containing Regional Ecosystem numbers and descriptions;

certification or **certified by a suitably qualified and experienced person** in relation to a **design plan**, 'as constructed' drawings or an annual report regarding dams, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- exactly what is being certified and the precise nature of that certification;
- the relevant legislative, regulatory and technical criteria on which the certification has been based;
- the relevant data and facts on which the certification has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.

certify or **certification** or **certified** in relation to any matter other than a design plan, 'as constructed' drawings or an annual report regarding dams in this environmental authority means a Statutory Declaration by a suitably qualified person accompanying the written document stating that:

- all relevant material has been considered in the written document; and
- that the content of the written document is accurate and true; and
- that the written document meets the requirements of the relevant conditions of the environmental authority.

clearing for vegetation means removing, cutting down, ringbarking, pushing over, poisoning or destroying in any way including by burning, flooding or draining; but does not include destroying standing vegetation by stock, or lopping a tree.

coal seam gas water means underground water brought to the surface of the earth, or otherwise interfered with, in connection with exploring for or producing coal seam gas. Coal seam gas water is a waste, as defined under s13 of the *Environmental Protection Act 1994*.

coal seam gas water concentrate means the concentrated saline water waste stream from a water treatment process that does not exceed a total dissolved solid concentration of 40 000 mg/L.

coal seam gas water dams include any type of dam (storage or evaporation) used to contain groundwater that is necessarily or unavoidably brought to the surface in the process of coal seam gas exploration or production.

construction in relation to a dam includes building a new dam and modifying or lifting an existing dam but does not include investigations and testing necessary for the purposes of preparing a design plan.

dam means a land-based structure or a void that is designed to contain, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works. A dam does *not* mean a fabricated or

manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container.

dam crest volume means the volume of material that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls without regard to flows entering or leaving (e.g. via a spillway).

Declared pest plants are listed in Schedule 2 of the *Land Protection (Pest and Stock Route Management) Regulation 2003*.

Deed of agreement means a legal agreement between the holder of the environmental authority and the administering authority. The deed of agreement governs the obligations of the holder of the environmental authority in relation to the *Queensland Biodiversity Offset Policy*. For clarity, the term deed of agreement in this environmental authority includes any subsequent version or amendment of the signed deed of agreement.

design plan is the documentation required to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, and the criteria to be used for operating the dam. The documents must include design and investigation reports, specifications and certifications, together with the planned decommissioning and rehabilitation works and outcomes. A design plan may include 'as constructed' drawings.

design storage allowance or **DSA** means an available volume, estimated in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, published by the Department of Environment and Resource Management, as amended from time to time, that must be provided in a dam to an annual exceedance probability specified in that Manual.

development well means a petroleum well which produces or stores petroleum. For clarity, a development well does not include an appraisal well.

discharge area means:

- that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater; and
- identified by an assessment process consistent with the document *Salinity Management Handbook*, Queensland Department of Natural Resources, 1997, as amended from time to time; or
- identified by an approved salinity hazard map held by the Department of Environment and Heritage Protection.

dispersible soils are structurally unstable soils that readily break down into their constituent particles in water (e.g. the clay material disintegrates into particles less than 2 microns across within 24 hours when soil crumbs are submerged in distilled water). These soils are also known as sodic soils and have a high percentage of sodium ions (in soluble or exchangeable form).

document has the meaning in the *Acts Interpretation Act 1954* and means:

- any paper or other material on which there is writing; and
- any paper or other material on which there are marks; and
- figures, symbols or perforations having a meaning for a person qualified to interpret them; and

- any disc, tape or other article or any material from which sounds, images, writings or messages are capable of being produced or reproduced (with or without the aid of another article or device).

ecosystem functioning means the interactions between and within living and non-living components of an ecosystem and generally correlates with the size, shape and location of an area of vegetation.

end means the stopping of the particular activity that has caused a significant disturbance in a particular area. It refers to, among other things, the end of a seismic survey or the end of a drilling operation. It does not refer to the end of all related activities such as rehabilitation. In other words, it does not refer to the 'completion' of the petroleum activity(ies), the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority.

equivalent person or **EP** means an equivalent person under volume 1, section 2 of the *Guidelines for Planning and Design of Sewerage Schemes*, October 1991, published by the Water Resources Commission, Department of Primary Industries, Fisheries and Forestry.

evaporation dam means an impoundment, enclosure or structure that is designed to be used to hold CSG water for evaporation.

exploration well means a petroleum well that is drilled to:

- explore for the presence of petroleum or natural underground reservoirs suitable for storing petroleum; or
- obtain stratigraphic information for the purpose of exploring for petroleum. For clarity, an exploration well does not include an appraisal or development well.

exploring for petroleum means carrying out an activity for the purpose of finding petroleum or natural underground reservoirs as per section 14 of the *Petroleum and Gas (Production and Safety) Act 2004* for example including:

- conducting a geochemical, geological or geophysical survey;
- drilling a well;
- carrying out testing in relation to a well;
- taking a sample for chemical or other analysis.

fill means any kind of material in solid form (whether or not naturally occurring) capable of being deposited at a place but does not include material that forms a part of, or is associated with, a structure constructed in a watercourse, wetland or spring including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.

floodplain has the meaning in the *Water Act 2000* and means an area of reasonably flat land adjacent to a watercourse that—

- is covered from time to time by floodwater overflowing from the watercourse; and
- does not, other than in an upper valley reach, confine floodwater to generally follow the path of the watercourse; and
- has finer sediment deposits than the sediment deposits of any bench, bar or in-stream island in the watercourse.

flowable substance means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other

liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

foliage cover means the proportion of the ground, which would be shaded if sunshine came from directly overhead and is defined for each stratum. It includes branches and leaves and is similar to the crown type of Walker and Hopkins (1990) but is applied to a stratum or plot rather than an individual crown.

foreseeable future is the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptably low probability of failure before that time.

geophysical survey means a systematic collection of geophysical data.

hazard in relation to a dam as defined means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.

hazard category means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, published by the Department of Environment and Resource Management, as amended from time to time.

high bank means the defining terrace or bank or, if no bank is present, the point on the active floodplain, which confines the average annual peak flows in a watercourse.

High ecological value waters is defined in the *Environmental Protection (Water) Policy 2009*.

highly erodible soils means very unstable soils that are generally described as Sodosols with hard-setting, fine sandy loam to silty clay loam surfaces (solodics, solodised solonetz and solonetz) or soils with a dispersible layer located less than 25cm deep or soils less than 25cm deep.

high value regrowth vegetation means

- any of the following:
 - an endangered regional ecosystem;
 - an of concern regional ecosystem;
 - a least concern regional ecosystem; and
- have not been cleared since 31 December 1989; and
- is shown on a regrowth vegetation map.

hub means more than one unit of fuel burning or combustion equipment capable of burning fuel at a rate of at least 500 kg/hour individually or combined, located within five (5) km of any other fuel burning or combustion equipment capable of burning fuel at a rate of at least 500 kg/hour individually or combined.

hydraulic fracturing means a technique used to create cracks in targeted underground formations to increase the flow and recovery of gas or oil out of a well. It involves pumping a fluid, comprised largely

of water and sand, under pressure, into a target formation. This action fractures the targeted formation which provides a pathway that increases the ability for gas to flow through the formation.

hydraulic performance means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, published by the Department of Environment and Resource Management, as amended from time to time.

impulsive noise means sound characterised by brief excursions of sound pressure (acoustic impulses) that significantly exceed the background sound pressure. The duration of a single impulsive sound is usually less than one second.

infrastructure means plant or works including for example, communication systems, compressors, powerlines, pumping stations, reservoirs, roads and tracks, water storage dams, evaporation or storage ponds and tanks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activity(ies) including temporary structures or structures of an industrial or technical nature, including, for example, mobile and temporary camps.

Infrastructure does not include other facilities required for the long term management of the impact of those petroleum activities or the protection of potential resources. Such other facilities include dams other than water storage dams, pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.

LA eq, adj, 15 mins means the A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within any 15 minute period has the same square sound pressure as a sound level that varies with time.

LA 90, adj, 15 mins means the A-weighted sound pressure level, adjusted for tonal character, that is equal to or exceeded for 90% of any 15 minutes sample period equal, using Fast response

lake means:

- a lagoon, swamp or other natural collection of water, whether permanent or intermittent; and
- the bed and banks and any other element confining or containing the water.

landfill monocell means a specialised, isolated landfill facility where a single specific waste type is exclusively disposed (i.e. salt).

landholders' active groundwater bores for the purposes of hydraulic fracturing baseline and impact monitoring in this environmental authority means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use. This term does not include monitoring bores owned by the administering authority of the *Water Act 2000*.

leachate means a liquid that contains soluble, suspended or miscible contaminants likely to have been derived from material which is stored, processed or disposed of on site and which the liquid has passed through or emerged from, or is likely to have passed through or emerged from.

levee means a dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable

materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or **flowable substances** at any other times.

limit of reporting means the lowest amount of an analyte in a sample that can be quantitatively determined with stated, acceptable precision and accuracy under stated analytical conditions (i.e. the lower limit of quantitation).

limited petroleum activities mean only the following petroleum activities:

- single well sites not exceeding 1 hectare disturbance and multi-well sites not exceeding 1.5 hectare disturbance.
 - Well sites may include the following infrastructure:
 - well pads;
 - water pumps and generators associated with well operations;
 - sumps for storing drilling muds;
 - flare pits;
 - ponds used to contain and / or store **stimulation** fluid;
- geophysical surveys (including seismic petroleum activities);
- ecological / geological surveys (including seismic petroleum activities);
- gathering / flow pipelines from a well head to the initial compression facility;
- supporting access tracks; and
- communication and power lines that are necessary for the undertaking of petroleum activities and that are located within well sites, well pads and pipeline right of ways without increasing the disturbance area of petroleum activities.

For clarity, limited petroleum activities exclude and exclusions are not necessarily limited to:

- single well sites of disturbance greater than 1 hectare disturbance and multi-well sites not exceeding 1.5 hectare disturbance for coal seam gas wells;
- single well sites of disturbance greater than 3 hectares or multi-well sites of disturbance greater than 3.5 hectares for tight gas wells;
- the construction of infrastructure for processing or storing petroleum or by-products;
- low hazard dams (that do not meet the limitations prescribed above);
- regulated dams;
- borrow pits;
- compressor stations;
- campsites / workforce accommodation;
- pipelines which are used to transport gas after the initial compression facility (e.g. trunk pipelines, transmission pipelines or pipelines that require a pipeline licence) except for those pipelines authorised under the conditions of Schedule D of the Environmental Authority;
- waste disposal; or
- other supporting infrastructure for the project (e.g. sewage treatment plants).

limited regulated waste means any of the following regulated wastes, asbestos, clinical waste or quarantine waste that has been rendered non-infectious, fish processing waste, food processing waste, poultry processing waste, tyres or treatment tank sludge or residue produced in the carrying out of an activity in relation to sewage treatment and water supply activities.

linear infrastructure includes powerlines, pipelines, roads and access tracks, and communication lines.

long term noise event is a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.

lopping a tree, means cutting or pruning its branches, but does not include—

- removing its trunk; and
- cutting or pruning its branches so severely that it is likely to die.

low flow means flows up to the one month average recurrence interval.

low hazard dam means any dam that is not classified as high or significant as assessed using the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, published by the Department of Environment and Resource Management, and which contains contaminants in concentrations which exceed or will exceed during the dam's operational life, the value or range shown in Table 3 of said Manual.

low impact petroleum activities means limited petroleum activities which do not result in the clearing of native vegetation, cause disruption to soil profiles through earthworks or excavation or result in significant disturbance to land. Examples of such activities include but are not necessarily limited to soil surveys, topographic surveys, cadastral surveys and ecological surveys and traversing land by car or foot via existing access tracks or routes or in such a way that does not result in permanent damage to vegetation.

Max $L_{pz, 15 \text{ min}}$ means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.

Max $L_{pA, 15 \text{ min}}$ means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.

mandatory reporting level or **MRL** means a warning and reporting level determined in accordance with the criteria in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* published by the Department of Environment and Resource Management, as amended from time to time.

medium term noise event is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five (5) days and does not re-occur for a period of at least four (4) weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.

meter means a device for measuring, or giving an output signal proportional to, quantities of water passed and/or the rate of flow in a pipe.

month has the meaning in the *Acts Interpretation Act 1954* and means a calendar month and is a period starting at the beginning of any day of one (1) of the 12 named months and ending—

- immediately before the beginning of the corresponding day of the next named month; or
- if there is no such corresponding day—at the end of the next named month.

NATA accreditation means accreditation by the National Association of Testing Authorities Australia.

noxious means harmful or injurious to health or physical well-being.

'of concern' regional ecosystem means an 'of concern' regional ecosystem identified in the database maintained by the Department of Environment and Resource Management called 'Regional ecosystem description database' containing regional ecosystem numbers and descriptions. The database is available for inspection on the Department of Environment and Resource Management's website at [www.epa.qld.gov.au/nature conservation/biodiversity/regional ecosystems/](http://www.epa.qld.gov.au/nature_conservation/biodiversity/regional_ecosystems/).

offensive means causing unreasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

oil-based drilling mud means mud where the base fluid is a petroleum product such as diesel fuel.

pest means species:

- declared under the *Land Protection (Pest and Stock Route Management) Act 2002*;
- declared under Local Government model local laws; and
- which may become invasive in the future.

populated area includes towns and cities which have a population of 200 or more people and with a minimum density of 40 people / km².

primary protection zone means an area within a 200 metre buffer from the boundary of any Category A, B or C Environmentally Sensitive Area.

programmed and approved means when the location of infrastructure has been approved by the authorised person(s) with the organisation(s).

regulated dam means any dam in the significant or high hazard category as assessed using the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, published by the Department of Environment and Resource Management, as amended from time to time.

regrowth vegetation map means a map certified by the chief executive as the regrowth vegetation map for the State and showing for the State:

- areas of regrowth vegetation, identified on the map as high-value regrowth vegetation, that—
 - are any of the following:
 - i. an endangered regional ecosystem;
 - ii. an of concern regional ecosystem;
 - iii. a least concern regional ecosystem; and
 - have not been cleared since 31 December 1989; and
- particular watercourses in the Burdekin, Mackay Whitsunday and Wet Tropics catchments, identified on the map as regrowth watercourses; and
- areas the chief executive decides under section 20AI to show on the map as high value regrowth vegetation.

rehabilitation means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

remnant unit means a continuous polygon of remnant vegetation (as defined by the Queensland Herbarium) representative of a single RE type or a single heterogeneous unit.

remnant vegetation means vegetation, part of which forms the predominant canopy of the vegetation—

- covering more than 50% of the undisturbed predominant canopy; and
- averaging more than 70% of the vegetation's undisturbed height; and
- composed of species characteristic of the vegetation's undisturbed predominant canopy cover.

reporting limit means the lowest concentration that can be reliably measured within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes, the reporting limit is selected as the lowest non-zero standard in the calibration curve. Results that fall below the reporting limit will be reported as "less than" the value of the reporting limit. The reporting limit is also referred to as the practical quantitation limit or the limit of quantitation. For polycyclic aromatic hydrocarbons, the reporting limit must be based on super-ultra trace methods and, depending on the specific polycyclic aromatic hydrocarbon, will range between 0.005 ug/L — 0.02 ug/L.

restricted stimulation fluids means fluids used for the purpose of stimulation, including fracturing, that contain the following chemicals in more than the maximum amounts prescribed under section 81B of the *Environmental Protection Regulation 2008*:

- petroleum hydrocarbons containing benzene, ethylbenzene, toluene or xylene; or
- chemicals that produce, or are likely to produce, benzene, ethylbenzene, toluene or xylene as the chemical breaks down in the environment.

The amount of any chemical is not measured in relation to water included in the restricted stimulation fluid. For clarity, the term restricted stimulation fluid only applies to fluids injected down well post-perforation.

secondary protection zone in relation to a Category A Environmentally Sensitive Area means an area within an 800 metre buffer from the boundary of a primary protection zone.

secondary protection zone in relation to a Category B or C Environmentally Sensitive Area means a area within a 300 metre buffer from the boundary of a primary protection zone.

sensitive place means:

- a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or
- a library, childcare centre, kindergarten, school, university or other educational institution;
- a medical centre, surgery or hospital; or
- a protected area; or
- a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or
- a work place used as an office or for business or commercial purposes, which is not part of the petroleum activity(ies) and does not include employees accommodation or public roads.

sensitive receptor means an area or place where noise (including low frequency, vibration and blasting) is measured investigate whether nuisance impacts are occurring and includes:

- a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or
- a library, childcare centre, kindergarten, school, university or other educational institution;
- a medical centre, surgery or hospital; or
- a protected area; or
- a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or
- a work place used as an office or for business or commercial purposes, which is not part of the petroleum activity(ies) and does not include employees accommodation or public roads.

short term noise event is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven (7) days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.

significantly disturbed land or **significant disturbance** to land or significant disturbance means disturbance to land as defined in section 28 of the *Environmental Protection Regulation 2008*.

site means the relevant petroleum activity(ies) to which the environmental authority relates.

species richness means the number of different species in a given area.

species diversity means the diversity within an ecological community that incorporates both species richness and the evenness of species' abundances.

spillway means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.

spring means the land to which water rises naturally from below the ground and the land over which the water then flows.

stable in relation to land, means landform dimensions are or will be stable within **tolerable limits** now and in the **foreseeable future**. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, **leachate** and related contaminant generation.

stimulation means a technique used to increase the permeability of a natural underground reservoir that is undertaken above the formation pressure and involved the addition of chemicals. It includes hydraulic fracturing / hydrofracking, fracture acidizing and the use of proppant treatments.

stimulation fluid means the fluid injected into an aquifer to increase the permeability of a natural underground reservoir. For clarity, the term stimulation fluid only applies to fluids injected down well post-perforation.

structure means a dam or levee.

suitably qualified and experienced person in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Engineers Act 2002, and has demonstrated competency and relevant experience:

- for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design.
- for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments.

It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.

suitably qualified person means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.

synthetic based drilling mud means a mud where the base fluid is a synthetic oil, consisting of chemical compounds which are artificially made or synthesised by chemically modifying petroleum components or other raw materials rather than the whole crude oil.

system design plan means a plan that manages an integrated containment system that shares the required DSA volume across the integrated containment system.

thing means a material object without life or consciousness or some entity, object or creature which is not or cannot be specifically designated or precisely described.

threatening processes are processes, features and actions that can have a detrimental effect upon the health and viability of an area of vegetation. For example, altered hydrology, land use practices, invasion by pest and weed species, land degradation, edge effects and fragmentation.

tight gas means natural gas located in relatively impermeable rock that usually requires some form of stimulation to flow.

tolerable limits means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing pondage and limiting infiltration and percolation.

topsoil means the surface (top) layer of a soil profile which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.

transmissivity means the rate of flow of water through a vertical strip of aquifer which is one unit wide and which extends the full saturated depth of the aquifer.

trenchless methods means construction methods for the installation of pipelines and cables below the ground with minimal excavation. Trenchless methods can include, but not necessarily be limited to:

- moling
- pipe ramming method
- horizontal directional drilling
- utility tunneling, pipe jacking, auger boring
- microtunnelling and pipe jacking
- on-line replacement

unacceptable risk is when the results of a hazard assessment indicates that there is both a high consequence and a high likelihood of an event occurring such that the risk is classified as "high", "very high" or "extreme".

valid complaint means a complaint the administering authority considers is not frivolous, nor vexatious, nor based on mistaken belief.

void means any man-made, open excavation in the ground (includes borrow pits, drill sumps, frac pits, flare pits, cavitation pits and trenches).

waters includes all or any part of a creek, river, stream, lake, lagoon, pond, swamp, wetland, spring, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and underground water.

watercourse has the meaning provided in section 5 of the *Water Act 2000* and includes the bed and banks and any other element of a river, creek or stream confining or containing water.

watercourse, wetland, lake or spring with state significant biodiversity values are those described in Appendix 1 of the *Queensland Biodiversity Offsets Policy* (Department of Environment and Resource Management, 2011).

well infrastructure means infrastructure required for the construction, completion and operation of a well including but not limited to cellar pits, dams and drill sumps.

well site means a maximum area of land disturbance for the purposes of constructing, installing and operating an exploration, appraisal or development well or such wells as part of a multi-well arrangement and includes well lease infrastructure.

wetland means a wetland as defined under the Queensland Wetlands Program and is an area of permanent or periodic / intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six (6) metres. To be classified as a wetland, the area must have one or more of the following attributes:

- at least periodically, the land supports plants or animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle, or
- the substratum is predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layers, or
- the substratum is not soil and is saturated with water, or covered by water at some time.

For the purposes of Chapter 5A activities, wetlands do not include springs and watercourse and those wetlands that are defined in the document entitled "*Wetland Mapping and Classification Methodology*" (Department of Environment and Resource Management, 2005) as:

- H2M1 Riverine or ex-riverine (lacustrine) water bodies associated with dams and weirs located in a channel;
- H2M3p Ponded pastures;
- H2M5 Palustrine / lacustrine water bodies where ecological character has changed due to gross mechanical disturbance (e.g. cropping);
- H2M6 Palustrine / lacustrine water bodies that have been converted, completely or mostly, to a ring tank or other controlled storage;
- H2M7 Riverine water bodies that have been converted mostly to canals or irrigation channels;
- H3C1 Artificial stand-alone water storages not within a natural water body or channel; or
- H3C2 Artificial Channel drain / canal —bore drains, swales, bores and irrigation channel overflows / ponding.

year means a period of 12 months.

80th percentile in relation to release limits means that not more than one (1) of the measured values is to exceed the stated release limit for any five (5) consecutive samples where:

- the consecutive samples are taken over a five (5) **month** period; and
- the consecutive samples are taken at approximately equal periods.