

Permit

Environmental Protection Act 1994

Environmental authority EPPG00704113

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

Environmental authority number: EPPG00704113

Environmental authority takes effect on 24 February 2021

Environmental authority holder(s)

Name(s)	Registered address
HAMILBENT PTY LTD	Level 17 300 Queen Street BRISBANE CITY QLD 4000 Australia
Westside ATP 688P Pty Ltd	Level 17 300 Queen Street BRISBANE CITY QLD 4000 Australia

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Non-Scheduled Petroleum Activity Authority to Prospect - ATP	ATP688

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.

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.

Tristan Roberts
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

Date issued: 24 February 2021

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Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Location: ATP688

Relevant activity: Resource Activity – Petroleum – Authority to Prospect

The environmentally relevant activity conducted at the location as described above must be conducted in accordance with the following site specific conditions of approval.

This environmental authority consists of the following Schedules:

Schedule A	General Conditions
Schedule B	Water
Schedule C	Dams
Schedule D	Land
Schedule E	Environmental Nuisance
Schedule F	Waste
Schedule G	Rehabilitation
Schedule H	Stimulation Activities
Schedule I	Community Issues
Schedule J	Notification Procedures
Appendix A	Definitions
Appendix B	Locality Map of ATP688
Appendix C	Drilling and Exploration Locations within Category B Protection Zones on ATP688

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) limited petroleum activities;
 - (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.

Prevent or Minimise Likelihood of Environmental Harm

- (A2) This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

Maintenance of Measures, Plant and Equipment

- (A3) 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.
- (A4) 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

- (A5) 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

- (A6) 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.
- (A7) The audit of existing petroleum activities required by condition (A6) 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.
- (A8) The audit report required by condition (A7)(b) must be provided to the administering authority with the first annual return following the issue of this environmental authority.
- (A9) Conditions (D4) to (D18) 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 (A6), (A7) and (A8).

Monitoring Program

- (A10) 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.

Protection of Riverine Areas

- (B2) 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.

River Improvement Areas

- (B3) 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.

Wild river areas

- (B4) In a declared Wild River Area, the petroleum activity(ies) must be consistent with the conditions stated in the relevant Wild River Declaration.

SCHEDULE C — DAMS**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 an existing low hazard dam, within 1 year of the date of grant of this environmental authority.
- (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 authorised on ATP688.

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,

Monitoring of Low Hazard Dams

- (C9) 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
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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) and drilling in accordance with condition (D15)	Limited petroleum activities permitted subject to conditions (D5), (D6), (D8), (D11), and (D15)
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), (D15) and (D16).	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 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 Heritage Protection's website at: www.ehp.qld.gov.au.

- (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 minimise 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) The holder of the environmental authority may undertake:

- (a) drilling within the primary and secondary protection zones of a Category B Environmentally Sensitive Area based on the survey undertaken by the holder of this authority indicating non-remnant vegetation at the following locations:
 - (i) MSMS at latitude -20.7295, longitude 147.8882 as depicted in Figure 1, Appendix D;
 - (ii) MSM6-2 at latitude -20.849, longitude 147.9651 as depicted in Figure 2, Appendix D. ML8 at latitude -20.9255, longitude 147.9498 as depicted in Figure 3, Appendix D.
- (b) exploration activities within the primary and secondary protection zones of a Category B Environmentally Sensitive Area based on the survey undertaken by the holder of this authority indicating non-remnant vegetation within the 100mx100m impact area for the drill site at the following location: ML8-alt at latitude -20.9255, longitude 147.9496 as depicted in Figure 4, Appendix D, providing:
 - (i) mitigation measures are employed to avoid direct and indirect impacts on ESAs; and
 - (ii) rehabilitation is undertaken in accordance with conditions (G1) and (G2) are implemented.

Disturbance to Land — Offsets

- (D17) The environmental authority holder must enter in to an environmental offset agreement with the administering authority where disturbance to land caused by the carrying out of the petroleum activities will have a remaining adverse environmental impact on an environmental value of an environmentally sensitive area or primary protection zone.
- (D18) The environmental offset agreement must be entered in to within six (6) months after submitting the record of disturbance required by condition (D14), unless otherwise agreed to by the administering authority.

(D19) The environmental authority holder must implement any environmental offset agreement entered in to in accordance with conditions (D17) and (D18) as soon as practicable after finalisation.

Note: Offset requirements will be determined in accordance with principles and guidelines of the "Queensland Government Environmental Offsets Policy" June 2008 and when the 'Queensland Biodiversity Offset Policy' becomes available.

Clearing Vegetation

(D20) 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.

(D21) 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.

(D22) Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not significantly impede vehicle, stock or wildlife movements.

(D23) 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.

(D24) 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 (e.g. impacts associated with edge effects or introduced species);
- (b) on dispersible soils or highly erodible soils to the greatest practicable extent;
- (c) on slopes greater than 10% for activities other than limited petroleum activities; or
- (d) in discharge areas.

Erosion and Sediment Control

- (D25) For the first six (6) months from the date of grant of the environmental authority, an Interim Erosion and Sediment Control Plan must be implemented for the activities to be undertaken under this environmental authority.
- (D26) The Interim Erosion and Sediment Control Plan must:
- (a) prevent or minimise the release of contaminants from disturbed areas to avoid environmental harm from being caused; and
 - (b) include similar types of measures and devices as described in condition (D28).
- (D27) A revised Erosion and Sediment Control Plan, which has been certified by a suitably qualified person, must be developed within six (6) months of the date of grant of this environmental authority.
- (D28) The Erosion and Sediment Control Plan must include but 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 months from November to April;
 - (i) additional erosion and sediment control measures for construction of wells and pipelines on slopes >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 strategies and processes to be used in further developing and implementing the Erosion and Sediment Control Plan.
- (D29) The holder of this environmental authority must implement the Erosion and Sediment Control Plan.
- (D30) A copy of the Erosion and Sediment Control Plan must be made available to any potentially affected landholders upon request by that landholder.
- (D31) A copy of the Erosion and Sediment Control Plan must be submitted to EHP at any time upon request.

Heritage places and archaeological artefacts

(D32) 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

(D33) 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

(D34) 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.

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 As LAeq adj.*

- (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*;
 - (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 as $L_{Aeq, adj}$

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

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

L_{ABG} 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 $L_{Aeq, adj}$, 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 (E11), 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, $Max\ L_{pZ, 15\ mins}$; 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 Heritage Protection'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.

(E26) Blast and Vibration Monitoring

(E27) Monitoring and recording of the air blast overpressure and ground borne vibration of blasting which has the potential to impact on sensitive receptors.

(E28) 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 2000 Water Quality Guidelines for Stock and Domestic Purposes.

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 **250mm** 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 G – REHABILITATION**Rehabilitation**

- (G1) As soon as practicable and within 6 months (or longer period agreed in writing with the administering authority) of the completion of petroleum activities 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; and
 - (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;
 - (i) re-establish surface drainage lines;
 - (ii) reinstate the top layer of the soil profile;
 - (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

- (G2) 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) 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 (G3)(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 H — STIMULATION ACTIVITIES**Well Drilling, Completion and Stimulation**

- (H1) The holder of this environmental authority must ensure that restricted stimulation fluids are not used in stimulation.
- (H2) Polycyclic aromatic hydrocarbons or products that contain polycyclic aromatic hydrocarbons must not be used in stimulation fluids in concentrations above the reporting limit.
- (H3) Oil based drilling muds must not be used in the carrying out of the petroleum activity(ies).
- (H4) Synthetic based drilling muds must not be used in the carrying out of the petroleum activity(ies).
- (H5) Accurate and current material safety data sheets for all fluids used in stimulation activities must be published on the environmental authority holder's website.
- (H6) 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 (H11) and (H12).
- (H7) Stimulation activities must not cause the connection of the target gas producing formation and another aquifer.
- (H8) The holder of this authority must ensure the mechanical integrity of the well system prior to well stimulation 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.
- (H9) 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.
- (H10) Rectification measures must be taken immediately if the holder of this environmental authority either becomes aware that stimulation activities have resulted in a change in water quality at any of the bores that are referred to in condition (H6), or that stimulation activities have caused the connection of the target gas producing formation and another aquifer.

Coal Seam Gas Stimulation Risk Assessment

- (H11) Prior to undertaking coal seam gas well stimulation activities, the holder of this environmental authority must develop a risk assessment to ensure that stimulation activities are managed to prevent environmental harm.
- (H12) The stimulation risk assessment required by condition (H11) must include, but not necessarily be limited to:
- (a) a process description of the stimulation activity to be applied, including equipment and a comparison to best international practice;
 - (b) provide details of where, when and how often stimulation 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) the environmental values of groundwater in the area;
 - (i) description of overlying and underlying formations in respect of porosity, permeability, hydraulic conductivity, faulting and fracture propensity;
 - (j) consideration of barriers or known direct connections between the target gas producing formation and the overlying and underlying aquifers;
 - (k) a description of the well mechanical integrity testing program;
 - (l) process control and assessment techniques to be applied for determining extent of stimulation activities (e.g. microseismic measurements, modelling etc.);
 - (m) practices and procedures to ensure that the stimulation activities are designed to be contained within the target gas producing formation having regard to its identification under condition (H12)(j);
 - (n) locations of landholders' active groundwater bores;
 - (o) groundwater transmissivity, flow rate, hydraulic conductivity and direction(s) of flow;

- (p) a description of the chemicals used in stimulation activities (including estimated total mass, estimated composition, chemical abstract service numbers and properties), their mixtures and the resultant compounds that are formed after stimulation;
- (q) 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;
- (r) an environmental hazard assessment of the chemicals used including their mixtures and the resultant chemicals that are formed after stimulation 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 stimulation fluid chemicals of potential concern derived from the risk assessment;
- (s) an environmental hazard assessment of use, formation of, and detection of polycyclic aromatic hydrocarbons in stimulation activities;
- (t) an environmental hazard assessment of leaving stimulation chemicals in the target gas producing formation for extended periods subsequent to stimulation;
- (u) human health exposure pathways to operators and the regional population;
- (v) risk characterisation of environmental impacts based on the environmental hazard assessment; and
- (w) potential environmental or health impacts which may result from stimulation activities including but not limited to water quality, air quality (including suppression of dust and other airborne contaminants), noise and vibration.

(H13) The stimulation risk assessments must be carried out for every well or group of wells in an area of like geological and hydrogeological characteristics to be stimulated prior to stimulation activities being carried out at that well.

Stimulation Baseline Monitoring

(H14) Prior to undertaking any stimulation activity, the holder of this environmental authority must undertake a baseline bore assessment of the quality of:

- (a) all 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) all active landholders' groundwater bores identified pursuant to condition (H14)(a) and within 200 vertical metres 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 (H11) and (H12).
- (H15) Prior to undertaking any stimulation activity(ies), the holder of this environmental authority must have sufficient water quality data to accurately represent water quality in the well to be stimulated. The data must include as a minimum the results of analyses for the parameters in condition (H16).
- (H16) The 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) total suspended solids [mg/L];
 - (d) evolved (produced) gas (i.e. methane, carbon dioxide, hydrogen sulphide) [mg/L];
 - (e) alkalinity (bicarbonate, carbonate, hydroxide and total as CaCO_3) [mg/L];
 - (f) sodium adsorption ratio (SAR);
 - (g) anions (chloride, fluoride, sulphate) [mg/L];
 - (h) cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L];
 - (i) dissolved metals (including but not necessarily being limited to: aluminium, barium, borate (boron), cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, and zinc) [$\mu\text{g}/\text{L}$];
 - (j) total arsenic [$\mu\text{g}/\text{L}$];
 - (k) total petroleum hydrocarbons [vig/L];
 - (l) BTEX (as benzene, toluene, ethylbenzene, and total xylene) [ng/L];
 - (m) polycyclic aromatic hydrocarbons (including but not necessarily being limited to: naphthalene, phenanthrene, benzo[a]pyrene) [$\text{p.g}/\text{L}$];
 - (n) sodium hypochlorite [mg/L];
 - (o) sodium hydroxide [mg/L];

- (p) formaldehyde [mg/L];
- (q) ethanol [mg/L]; and
- (r) gross alpha or gross beta or radionuclides by gamma spectroscopy [Bq/L].

(H17) If sampling required by condition (H16) 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

(H18) 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.

(H19) 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 (1111) and (H12) 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 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 (H11) and (H12).

(H20) 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 (H16); 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.
- (H21) The Stimulation Impact Monitoring Program must provide for monitoring of the bores in condition (H19)(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 (H16) are not detected in concentrations above baseline bore monitoring data on two (2) consecutive monitoring occasions.
- (H22) The holder of this environmental authority must implement the Stimulation Impact Monitoring Program.
- (H23) The results of the Stimulation Impact Monitoring Program must be made available to any potentially affected landholder upon request by that landholder.

SCHEDULE I – COMMUNITY ISSUES

- (I1) The holder of this environmental authority must maintain a record of all valid complaints and incidents causing environmental harm, and actions taken in response to the valid complaint or incident.
- (I2) The holder of this environmental authority must record the following details for all complaints received:
- (a) name, address and contact number for 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 J – NOTIFICATION PROCEDURES

- (J1) The holder of this environmental authority must telephone the Department of Environment and Heritage Protection Pollution Hotline (telephone: 1300 130 372) and any affected landholder, occupier or their nominated representative as soon as reasonably practicable, but within 24 hours after becoming aware of:
- (a) any release of contaminants not in accordance with the conditions of this environmental authority; or
 - (b) any event where environmental harm (excluding environmental nuisance) has been caused or may be caused; or
 - (c) any detection of restricted stimulation fluids from stimulation fluid monitoring; or
 - (d) any result from baseline bore, well or stimulation water impact monitoring that exceeds a water quality objective for the protection of an environmental value of that water resource.
- (J2) Notwithstanding condition (J1), the holder of this environmental authority must telephone the Department of Environment and Resource Management's Pollution Hotline (telephone: 1300 130 372) as soon as reasonably practicable, but within 24 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;
 - (b) a potential or actual loss of structural or hydraulic integrity of a dam;
 - (c) when the level of the contents of any regulated dam reaches the mandatory reporting level; or
 - (d) any incident where there is a potential or actual loss of well integrity (e.g. when the annulus pressure during stimulation increases by more than 3.5 MPa from the pressure immediately preceding stimulation).
- (J3) Subject to condition (J1), the holder of this environmental authority must report spills of contaminants (including but not limited to hydrocarbons, coal seam gas water or mixtures of both) of the following volumes or kind:
- (a) releases of any volume of contaminants to water;
 - (b) releases of volumes of contaminants to land greater than:
 - (i) 200L of hydrocarbons;
 - (ii) 200L of stimulation additives;
 - (iii) 500L of stimulation fluids;
 - (iv) 1000 L of brine; or

- (v) 5 000 L of coal seam gas water;
 - (c) releases of any volumes of contaminants where potential serious or material environmental harm has occurred or may occur.
- (J4) The notification of emergencies or incidents as required by conditions (J1), (J2) and (J3) must include but not be limited to the following information:
- (a) the environmental authority number and name of the holder;
 - (b) the tenure type and number where the emergency or incident occurred;
 - (c) the name and telephone number of the designated contact person;
 - (d) the location of the emergency or incident (GDA94);
 - (e) the date and time that the emergency or incident occurred;
 - (f) the date and time the holder of this environmental authority became aware of the emergency or incident;
 - (g) details of the nature of the event and the circumstances in which it occurred;
 - (h) the estimated quantity and type of any contaminants involved in the incident;
 - (i) the actual or potential suspected cause of the emergency or incident;
 - (j) a description of the land use at the site of the emergency or incident (e.g. grazing, pasture, forest etc) and / or the name of any relevant waters and other environmentally sensitive features;
 - (k) a description of the possible impacts from the emergency or incident;
 - (l) description of whether stock and / or wildlife were exposed to any contaminants released and measures taken to prevent access for the duration of the emergency or incident;
 - (m) any sampling conducted or proposed, relevant to the emergency or incident;
 - (n) landholder details and details of landholder consultation;
 - (o) immediate actions taken to control the impacts of the emergency or incident and how environmental harm was mitigated at the time of the emergency or incident; and
 - (p) whether further examination / root cause analysis is required and if so, the expected date by when this examination will be completed and reported to the administering authority.
- (J5) Within 10 business days following the initial notification unless a longer time is agreed to by the administering authority, a written report must be provided to the administering authority, including the following (where relevant to the emergency or incident):
- (a) the information required by condition (J4);

- (b) the root cause of the emergency or incident;
 - (c) the confirmed quantities and types of any contaminants involved in the incident;
 - (d) 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);
 - (e) 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;
 - (f) the success or otherwise of actions taken at the time of the incident to prevent or minimise environmental harm;
 - (g) results and current status of landholder consultation, including commitment to resolve any outstanding issues / concerns; and
 - (h) actions and / or procedural changes to prevent a recurrence of the emergency or incident.
- (J6) As soon as reasonably practicable, but not more than 48 hours, after becoming aware of one of the circumstances described in conditions (H6) or (H13) that relate to stimulation activities, the holder of this environmental authority must give written notice of the event, its nature and the circumstances in which it happened:
- (a) to the administering authority; and
 - (b) to each owner and occupier of land that is, has been, or is reasonably likely to be, affected by the event.
- (J7) As soon as reasonably practicable after becoming aware of one of the circumstances described in conditions (H6) or (H7), that relate to stimulation activities, the holder of this environmental authority must give the administering authority written notice of:
- (a) the rectification measures implemented under condition (H10);
 - (b) the results of any monitoring carried out on those rectification measures; and
 - (c) the success of the rectification measures implemented.
- (J8) Within 10 business days following the initial notification of an emergency or incident or receipt of monitoring results indicating any significant changes in groundwater quality caused by the petroleum activity(ies) other than that relating to the circumstances described in condition (H6), then the analysis results indicating these changes, including any proposed actions to mitigate the changes in groundwater quality information must be submitted to the administering authority.
- (J9) If groundwater contamination caused by the petroleum activity(ies) is encountered, the following must be reported to satisfy requirements under condition (J8):
- (a) the level of environmental harm caused as a result of such contamination to soils and groundwater;

- (b) the conduct of a geodetic survey of all monitoring bores to determine the relative water surface elevations of each bore and reported in metres relative to the AHD; and
- (c) the determination of groundwater flow direction, groundwater flow rate and hydraulic conductivity.

END OF CONDITIONS

APPENDIX A – DEFINITIONS

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.

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.

Active for the purposes of landholders' groundwater bores 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.

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 Resource Management; 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 the pre-disturbance site. Such values must encompass land use, topographic, soil, vegetation and other ecological characteristics. Note: Analogue sites can be the pre-disturbed site of interest where significant surveying has been undertaken to establish benchmark parameters.

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.

Appropriately 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.

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.

Archaeological artefact means:

- (a) any artefact that is evidence of an aspect of Queensland's history, whether it is located in, on or below the surface of land, and not
- (b) a thing that is Aboriginal cultural heritage under the *Aboriginal Cultural Heritage Act 2003* or Torres Strait Islander cultural heritage under the *Torres Strait Islander Cultural Heritage Act 2003*.

Archaeological investigation means a physical investigation of the place carried out by a person or persons with recognised qualifications, experience or standing in historical archaeology, mining history, cultural heritage management, or related discipline for the purpose of investigating, recording or conserving archaeological artefacts on the place.

Archaeological place means a place entered in the Queensland heritage register under Part 5 of the *Queensland Heritage Act 1992*.

Assessed or assess by a suitably qualified and experienced person in relation to a hazard assessment of a darn 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:

- (a) what has been assessed and the precise nature of that assessment;
- (b) the relevant legislative, regulatory and technical criteria on which the assessment has been based;
- (c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and

- (d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

Associated works in relation to a dam means:

- (a) operations of any kind and all things constructed, erected or installed for that dam; and
- (b) 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 $L_{A90, T}$ 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:

- (a) 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:
 - i. of benefit to that owner in that it adds real value to their business or to the general community,
 - ii. in accordance with relevant provisions of the *Environmental Protection Act 1994*,

- iii. sustainable by virtue of written undertakings given by that owner to maintain that dam, and
 - iv. the transfer and use have been approved or authorised under any relevant legislation; or
- (b) with respect to associated water, see EHP's *Coal Seam Gas Water Management Policy and Notice of decision to approve a resource for beneficial use — associated water* which can be accessed on Department of Environment and Heritage Protection's website at www.ehp.qld.gov.au.

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 either saline water with a total dissolved solid concentration greater than 40 000 mg/l. or coal seam gas water after it has been concentrated through water treatment processes and/or evaporation.

Bund or bunded 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 bunded 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; or
- a day between the 26th of December through to the 1st of January in the following year.

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

Category A Environmentally Sensitive Area means any area listed in Schedule 12, Section 1 of the Environmental Protection Regulation 2008.

Category B Environmentally Sensitive Area means any area listed in Section 12, Section 2 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" 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*;
- Any wetland shown on the Map of Referable Wetlands available from the Department of Environment and Resource Management's website; or
- Of Concern Regional Ecosystems identified in the database maintained by the Department of Environment and Resource Management called 'RE description database' containing RE 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:

- (a) exactly what is being certified and the precise nature of that certification;
- (b) the relevant legislative, regulatory and technical criteria on which the certification has been based;
- (c) 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
- (d) 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 means:

- (a) in relation to grass, scrub or bush - the removal of vegetation by disturbing root systems and exposing underlying soil (including burning), but does not include—
 - i. the flattening or compaction of vegetation by vehicles if the vegetation remains living; or

- ii. the slashing or mowing of vegetation to facilitate access tracks; or
- iii. the clearing of noxious or introduced plant species; and

(b) in relation to trees - cutting down, ringbarking, pushing over, poisoning or destroying in any way.

Coal Seam Gas (CSG) water means groundwater that is necessarily or unavoidably brought to the surface in the process of coal seam gas exploration or production. CSG water typically contains significant concentrations of salts, has a high sodium adsorption ratio (SAR) and may contain other contaminants that have the potential to cause environmental harm if released to land or waters through inappropriate management. CSG water is a waste, as defined under section 13 of the *Environmental Protection Act 1994*.

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.

Cultural heritage significance means aesthetic, architectural, historical, scientific, social or other significance, to the present generation or past or future generations, as assessed against the following criteria:

- i. the place is important in demonstrating the evolution or pattern of Queensland's history;
- ii. the place demonstrates rare, uncommon or endangered aspects of Queensland's cultural heritage;
- iii. the place has potential to yield information that will contribute to an understanding of Queensland's history;
- iv. the place is important in demonstrating the principal characteristics of a particular class of cultural places;
- v. the place is important because of its aesthetic significance;
- vi. the place is important in demonstrating a high degree of creative or technical achievement at a particular period;
- vii. the place has a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- viii. the place has a special association with the life or work of a particular person, group or organisation of importance in Queensland's history.

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).

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', prepared 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.

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

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.

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 Resource Management.

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, 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 means an equivalent person as defined in item 63 of Schedule 2 in the *Environmental Protection Regulation 2008*.

Existing low hazard dam means any low hazard dam that was constructed, or where a low hazard dam's construction had substantially commenced, on 9 September 2011; as captured by the audit of existing petroleum activities and audit report requirement of conditions (A6), (A7) and (A8) of this environmental authority.

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.

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.

Financial assurance means a security deposit, either cash or a bank guarantee, held by the administering authority to cover the potential costs of preventing or minimising environmental harm from, or rehabilitating areas significantly disturbed by, the petroleum activities.

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.

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.

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", prepared by the Department of Environment and Resource Management, as amended from time to time.

Heritage place means any place that may be of **cultural heritage significance**, or any place with potential to contain **archaeological artefacts** that are an important source of information about Queensland's history.

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.

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.

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 in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (Version 1.0, 2008)* published on EHP's website under www.ehp.qld.gov.au.

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 water storage dams, roads and tracks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activities, but does not include other facilities required

for the long term management of the impact of those activities or the protection of potential resources. Such other facilities include dams other than water storage dams (e.g. evaporation ponds), pipelines and assets that have been decommissioned, rehabilitated and lawfully recognised as being subject to subsequent transfer with ownership of the land.

L_{Aq, 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.

L_{Aso, 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.

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.

Level 1 environmental authority means an environmental authority (chapter 5A activities) for a level 1 chapter 5A activity pursuant to section 23 of the *Environmental Protection Regulation 2008*.

Limited petroleum activities mean only the following petroleum activities:

- 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:

- 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 authorized 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.

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.

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", prepared by the Department of Environment and Resource Management, as amended from time to time; and
- that contains contaminants in concentrations which exceed the values or range shown in Table 3 of the "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams", prepared by
- the Department of Environment and Resource Management, as amended from time to time at any time.

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_{pA} , 15 min means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.

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 Heritage Protection called 'Regional ecosystem description database' containing regional ecosystem numbers and descriptions. The database is available for inspection on EHP's website at www.ehp.qld.gov.au.

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.

Overland flow water means water, including floodwater, flowing over land, other than in a watercourse or lake:

- (a) after having fallen as rain or in any other way; or
- (b) after rising to the surface naturally from underground.

Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads, pipelines etc) which is to be left by agreement with the landowner.

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.

Petroleum authority is:

- (a) a 1923 Act petroleum tenure granted under the *Petroleum Act 1923*; or
- (b) a resource authority granted under the *Petroleum and Gas (Production and Safety) Act 2004*; or
- (c) a licence, permit, pipeline licence, primary licence, secondary licence or special prospecting authority granted under the *Petroleum (Submerged Lands) Act 1982*.

Populated area includes towns and cities which have a populated 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.

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", prepared by the Department of Environment and Resource Management , as amended from time to time.

Regulated waste means non-domestic waste mentioned in Schedule 7 of the *Environmental Protection Regulation 2008* (whether or not it has been treated or immobilised), and includes—

- (a) for an element — any chemical compound containing the element; and
- (b) anything that has contained the waste.

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

Release of a contaminant into the environment includes:

- (a) to deposit, discharge, emit or disturb the contaminant; and
- (b) to cause or allow the contaminant to be deposited, discharged, emitted or disturbed; and
- (c) to allow the contaminant to escape; and
- (d) to fail to prevent the contaminant from escaping.

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. 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.

Remnant unit means a continuous polygon of remnant vegetation (as defined by the QLD 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.

Restricted stimulation fluids means fluids used for the purpose of stimulation, including fracturing, that contain the following chemicals, unless otherwise provided for under 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.

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 area within the petroleum authority or authorities to which this environmental authority relates.

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.

State heritage place means a place entered in the Queensland heritage register under Part 4 of the *Queensland Heritage Act 1992*.

Stimulation means a technique used to increase the permeability of a natural underground reservoir, including for example, 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.

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.

Suitably qualified and experienced person in relation to dams means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the *Professional Engineers Act 2002*, or at the relevant time holds a 'deemed registration' within the meaning of the *Mutual Recognition (Queensland) Act 1992*; and has knowledge, suitable experience and demonstrated expertise in relevant fields, as set out below:

- (a) knowledge of engineering principles related to the structures, geomechanics, hydrology, hydraulics, chemistry and environmental impact of dams; and
- (b) a total of five years of suitable experience and demonstrated expertise in the geomechanics of dams with particular emphasis on stability, geology and geochemistry, and
- (c) a total of five years of suitable experience and demonstrated expertise each, in three of the following categories:
 - investigation and design of dams.
 - Construction, operation and maintenance of dams.
 - hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology.

- hydraulics with particular reference to sediment transport and deposition, erosion control, beach processes.
- hydrogeology with particular reference to seepage, groundwater.
- solute transport processes and monitoring thereof.
- dam safety.

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.

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:

- a form of unconventional gas found up to 4500m in depth from the surface; and
- is located in relatively impermeable hard rock, impermeable/non porous sandstone, or impermeable limestone.

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.

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.

Wetland means a wetland as defined under the Queensland Wetlands Program and are areas 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 Heritage Protection, 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.

Wild river declaration is a statutory instrument under the *Wild Rivers Act 2005*. A declaration lists the relevant natural values to be preserved and delineates certain parts of the wild river area and the different constraints that may apply in these areas. With reference to environmental authorities for petroleum, each declaration also specifies conditions to be included in a new [environmental] authority if the activity is to be located within the wild river area.

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.

Appendix C – Drilling and Exploration Locations within Category B Protection Zones on ATP688

Figure 1 – MSM5 Drilling Location

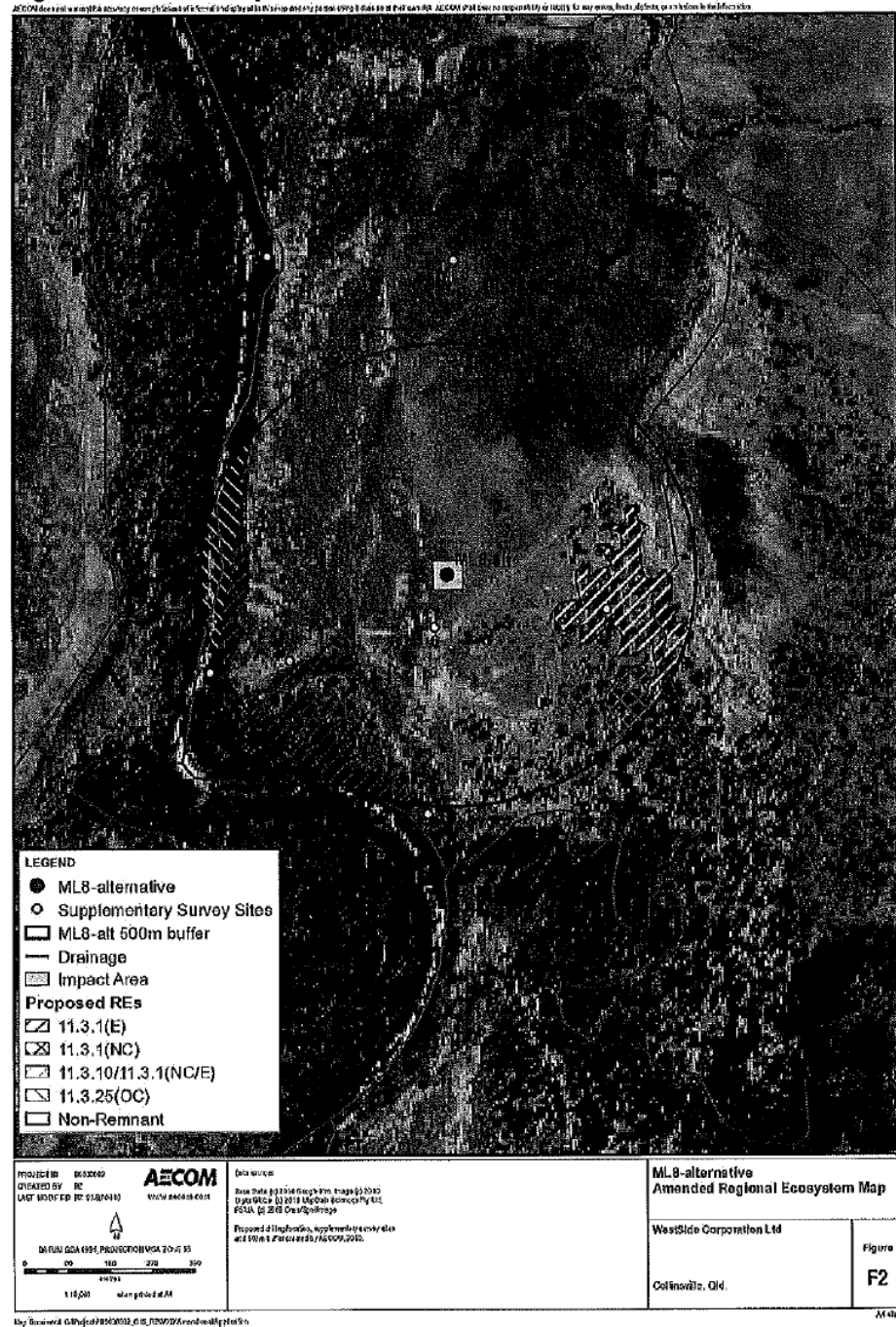


Figure 2 – MSM6-2 Drilling Location



[illegible]

Figure 4 – ML8-alt Exploration Location



END OF PERMIT