

Environmental authority

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

Permit¹ number: EPPG00784013

Project name: Silver Springs Project

Environmental authority takes effect on **30 October 2015**.

The anniversary date of this environmental authority is **24 May**.

An annual return and the payment of the annual fee will be due each year on this day.

Environmental authority holder(s)

Name	Registered address
AGL Gas Storage Pty Limited ABN: 27 009 203 463	Level 22 101 Miller Street NORTH SYDNEY NSW 2060

Environmentally relevant activity and tenure details

Environmentally relevant activity (ERA)	Relevant Tenure
A resource activity that is a petroleum activity that includes the following: Item 6, Schedule 2A of the Environmental Protection Regulation 2008 – a petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam. Item 8, Schedule 2A of the Environmental Protection Regulation 2008 – a petroleum activity or greenhouse gas (GHG) storage activity, other than an activity mentioned in any of items 1 to 7, that includes 1 or more activities mentioned in schedule 2 for which an aggregate environmental score (AES) is stated, namely: - Chemical storage – storing more than 500m³ of chemicals of Class C1 or C2 combustible liquids under AS 1940 or dangerous goods Class 3. - Hydrocarbon gas refining – refining 200,000,000m³ or more of natural gas in a year. - Fuel burning – use of fuel burning equipment that is capable of burning at least 500kg of fuel in an hour. - Regulated waste treatment – operating a facility for receiving and treating regulated waste or contaminated soil to render the waste or soil nonhazardous or less hazardous.	Petroleum Lease (PL) 446

¹ Permit includes licences, approvals, permits, authorisations, certificates, sanctions or equivalent/similar as required by legislation

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| <ul style="list-style-type: none">- Waste disposal - operating a facility for disposing of, in a year, 50,000t to 100,000t of general and regulated waste.- Sewage treatment - operating sewage treatment works, other than no-release works, with a total daily peak design capacity of 21 to 100 equivalent persons (EP). | |
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Signature

Andrew Langford
Delegate of the Administering Authority
Environmental Protection Act 1994



Date

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Additional information

Environmentally relevant activities

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

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

Contaminated land and notifiable activities

It is a requirement of the *Environmental Protection Act 1994* (EP Act) that if an owner or occupier of land becomes aware a notifiable activity (as defined in Schedule 3) is being carried out on the land, or that the land has been, or is being, contaminated by a hazardous contaminant, the owner or occupier must, within 22 business days after becoming so aware, give written notice to the chief executive.

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)

The environmental authority consists of the following schedules:

Schedule A	General
Schedule B	Underground Gas Storage
Schedule C	Water
Schedule D	Dams
Schedule E	Land
Schedule F	Environmental Nuisance
Schedule G	Air
Schedule H	Waste
Schedule I	Rehabilitation
Schedule J	Monitoring Programs
Schedule K	Community Issues
Schedule L	Notification Procedures
Schedule M	Definitions

SCHEDULE A – GENERAL

Authorised Petroleum Activities

- (A1) In the carrying out of the petroleum activity(ies), the holder of this environmental authority must not exceed the number and maximum size for each of the specified petroleum activities listed in **Schedule A: Table 1 – Authorised Petroleum Activities** for each petroleum tenure.

Schedule A: Table 1 – Authorised Petroleum Activities

Tenure No.	Petroleum Activity	Number of Existing Petroleum activities	Number of Proposed Petroleum activities	Capacity/Disturbance
PL446	Seismic (kms)	818.5	1,150	788ha
	Total Development wells	57	15	18ha
	Gas Injection Wells	1	4	5.2ha
	Compressor Station(s)	4	0	15ha
	Regulated dam(s)	1	0	3ha
	Low Consequence dam(s)	13	2	55.5ha
	Water treatment Facility(ies)	0	1	0.8ML/day
	Sewage Treatment Plant(s)	1	0	6 KL/day 24 EP

Schedule A: Table 2 – Existing Dam Structures

Low Consequence Dam Name	Latitude	Longitude	Dam Type/Purpose
Silver Springs Tank Drain Pond	27°36'0.34"S	149° 6'33.87"E	Aggregation Dam
Silver Springs Oily Water Interceptor Pond	27°36'2.37"S	149° 6'49.81"E	Aggregation Dam
Silver Springs Pond 1	27°36'4.47"S	149° 6'51.64"E	Aggregation Dam
Silver Springs Pond 2	27°36'6.76"S	149° 6'46.74"E	Aggregation Dam
Silver Springs Pond 3	27°36'6.52"S	149° 6'41.19"E	Aggregation Dam
Silver Springs Interceptor Pond 3A	27°36'2.66"S	149° 6'42.32"E	Aggregation Dam
Silver Springs Interceptor Pond 3B	27°36'3.27"S	149° 6'42.39"E	Aggregation Dam
Silver Springs Pond 4	27°36'10.85"S	149° 6'58.60"E	Aggregation Dam
Glenmore Interceptor Pit	27°37'40.37"S	149° 8'3.07"E	Aggregation Dam

Beechwood Interceptor Pit	27°30'2.91"S	149°15'27.97"E	Aggregation Dam
Beechwood Satellite	27°30'3.15"S	149°15'28.69"E	Aggregation Dam
Taylor Satellite Stage 2 Pond	27°35'51.36"S	149°13'33.60"E	Aggregation Dam
Taylor Satellite Stage 3 Pond	27°35'55.43"S	149°13'29.62"E	Aggregation Dam
Glenmore Stage 1 Pond	27°37'30.99"S	149° 8'5.10"E	Aggregation Dam
Boggo Creek 2	27°33'33.79"S	149° 7'55.19"E	Aggregation Dam
Regulated Dam Name	Latitude	Longitude	Dam Type
RD01	27°36'6.62"S	149° 6'58.36"E	Aggregation Dam

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).

Operational Plan

- (A5) Within 6 months from the date of issue of this approval, an Operational Plan must be developed that provides detailed information about the petroleum activity(ies) to be carried out under this environmental authority.
- (A6) The petroleum activity(ies) identified in the Operational Plan must set out the maximum scope of the petroleum activity(ies) and incorporate the petroleum activities set out in the approved Work Program and/or Development Plan for the relevant petroleum authority as required under the *Petroleum and Gas (Production and Safety) Act 2004*.
- (A7) The Operational Plan must be consistent with the requirements of this environmental authority and include, but not be limited to:

- (a) a stated period for the Operational Plan which is at least one year but does not exceed 3 years duration and which specifies an end date
- (b) a description of the existing and all proposed petroleum activities under the period of the Operational Plan
- (c) a map or series of maps that:
 - i. record the location of all infrastructure and its unique reference name/number that exists at the commencement of the period of the Operational Plan, including but not necessarily being limited to:
 - aa. regulated dams
 - ab. development wells
 - ac. gas injection wells
 - ad. flow lines
 - ae. gas processing facilities
 - af. water treatment facilities
 - ag. sewage treatment facilities
 - ah. compressor stations; and
 - ai. roads.
 - ii. show the location of all programmed and approved infrastructure that will be developed during the period of the Operational Plan, including the items listed under condition (A7)(c)(i) and their unique reference name/number, if applicable
 - iii. show major environmental features such as waters, sensitive places and environmentally sensitive areas
- (d) spatial datasets (GIS) which depict those requirements under condition (A7)(c)(i), (A7)(c)(ii) and (A7)(c)(iii) in shapefile format
- (e) proposed maximum area of disturbance during the period of the Operational Plan
- (f) details on the scale and extent of any proposed disturbance to, or vegetation clearing in any Category A, B or C Environmentally Sensitive Area
- (g) a rehabilitation plan for disturbance to land for all existing and programmed and approved infrastructure during the period of the Operational Plan, including but not necessarily limited to the following:
 - i. a description of:
 - aa. location (e.g. tenure, coordinates) including general site characteristics (e.g. topographic parameters including but not limited to landscape position, grade, aspect) and disturbance type (e.g. well lease, flow line, access track)
 - ab. pre-disturbance land use for each area
 - ac. vegetation communities present including, but not limited to, species composition and regional ecosystem type for native vegetation communities, within each disturbed site, including a map of their distribution
 - ad. *Note: Ecosystem type should be established using the most current version of the Queensland Governments' "Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland." Assessment of the vegetation communities should be sufficient to establish any inherent variation within a single regional ecosystem type*
 - ae. baseline information for each vegetation community present within a disturbed site including, but not limited to:
 - i. flora species richness and diversity

- ii. a description of the structural strata present (i.e. within each strata the dominant species present, associated stem count densities (woody vegetation); and
 - iii. percent foliage cover (accounting for seasonal variation and excluding any declared pests under the *Land Protection (Pest and Stock Route Management) Act 2002*)).
 - af. information with respect to general habitat features, including but not limited to:
 - i. percentage of litter cover
 - ii. hollow bearing logs; and
 - iii. fallen woody material;
 - ag. soil types and defining characteristics, including a map of their distribution, present within each of the areas to be rehabilitated
 - ah. proposed revegetation methods, including but not limited to:
 - i. re-profiling
 - ii. re-spreading soil
 - iii. soil ameliorants or amendments
 - iv. surface preparation; and
 - v. method of propagation.
 - ai. area to be rehabilitated; and
 - aj. post disturbance land use.
 - (h) a monitoring program to measure rehabilitation success, which identifies:
 - i. for disturbance caused by petroleum activity(ies) prior to the 24 May 2011, analogue sites to be used for measuring rehabilitation success that represent the surrounding land uses and vegetation communities, including regional ecosystems 11.4.7 and 11.5.13, of each area significantly disturbed from carrying out of the petroleum activity(ies)
 - ii. for disturbance caused by petroleum activity(ies) after the 24 May 2011, benchmark parameters determined from assessments conducted in accordance with:
 - aa. the Queensland Governments' "BioCondition a Condition Assessment Framework for Terrestrial Biodiversity in Queensland Assessment Manual"
 - ab. "Methodology for the Establishment and Survey of Reference Sites for BioCondition"; and
 - ac. condition (A7)(g).

Note: to be used for measuring rehabilitation success that represents the pre-disturbed land uses and vegetation communities, including regional ecosystems 11.4.7 and 11.5.13, of each area to be significantly disturbed from carrying out the petroleum activity(ies); *Note: The latest version of the Queensland Governments' "BioCondition, a Condition Assessment Framework for Terrestrial Biodiversity in Queensland, Assessment Manual" and accompanying document, "Methodology for the Establishment and Survey of Reference Sites for BioCondition" should be used to establish suitable analogue sites for native vegetation communities. The pre-disturbance site should be used as the analogue site to establish benchmark parameters.*

 - iii. the parameters to be measured on a yearly basis in analogue sites for determining rehabilitation success, including but not limited to:
 - aa. flora species richness and diversity
 - ab. descriptions of the structural strata present
 - ac. dominant species within each strata
 - ad. associated stem count densities; and
 - ae. percent foliage cover.

- iv. the experimental design for analysing analogue and rehabilitated site data including statistical methods of analysis; and
 - v. performance criteria.
 - (i) a description of progressive rehabilitation carried out including performance in relation to the requirements set out in the environmental authority and the proposed rehabilitation activities set out in the previous operational plan
 - (j) a high level rehabilitation strategy, including final land use, for all proposed infrastructure;
 - (k) the results and a description of monitoring undertaken on progressive rehabilitation carried out under the previous Operational Plan(s) in relation to the requirements and acceptance criteria set out in this environmental authority; and
 - (l) the calculation of financial assurance for the proposed maximum disturbance expected during the period of the Operational Plan.
- (A8) The commencement of the first Operational Plan period is 6 months from the date of issue of this environmental authority.
- (A9) The holder of this environmental authority must implement the Operational Plan.
- (A10) A subsequent Operational Plan must be submitted to the administering authority not less than 20 business days prior to the expiry of the current Operational Plan.

Financial Assurance

- (A11) The holder of this environmental authority must:
- (a) provide to the administering authority financial assurance in the amount and form required from time to time by the administering authority; and
 - (b) review and maintain the amount of financial assurance based on the maximum disturbance from the proposed and existing petroleum activity(ies).
- (A12) The calculation of financial assurance must be in accordance with the administering authority's Guideline "Financial assurance for petroleum activities", as amended from time to time.
- (A13) The financial assurance is to remain in force until the administering authority is satisfied that no claim is likely to be made on the assurance.

Existing Petroleum Activities

- (A14) Conditions (E2) to (E19) in *Schedule E – Land* relating to disturbance and Conditions (D6) and (D8) in *Schedule D - Dams* only apply to the petroleum activity(ies) which commenced after 24 May 2011 subject to:
- (a) the holder of this environmental authority conducting an audit of the existing petroleum activity(ies) which commenced before 24 May 2011 against the land disturbance conditions and dam conditions of the previous integrated authority 150120 dated 10 August 2004; and
 - (b) the audit report being provided to the administering authority with the subsequent annual return following the issue of this environment authority.

Third Party Audit

- (A15) A third party auditor, nominated by the holder of this environmental authority and accepted by the administering authority, must audit compliance with the conditions of this environmental authority at a minimum frequency of every 3 years.
- (A16) Notwithstanding condition (A15), the holder of this environmental authority may, prior to undertaking the third party audit, negotiate with the administering authority the scope and content of the third party audit.
- (A17) An audit report must be prepared by the third party auditor presenting the findings of each audit carried out.
- (A18) The third party auditor must certify the findings in the audit report.
- (A19) The holder of this environmental authority must immediately act upon any recommendations arising from the audit report by:
 - (a) investigating any non-compliance issues identified; and
 - (b) as soon as reasonably practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.
- (A20) The holder of this environmental authority must attach to the audit report, a written response to the audit report detailing the actions taken or to be taken on stated dates:
 - (a) by the holder to ensure compliance with this environmental authority; and
 - (b) to prevent a recurrence of any non-compliance issues identified.
- (A21) The audit report required by condition (A17) and the written response to the audit report required by condition (A20) must be submitted with the subsequent annual return.
- (A22) The financial cost of the third party audit is to be borne by the holder of this environmental authority.

Contingency Plan for Emergency Environmental Incidents

- (A23) A Contingency Plan for Emergency Environmental Incidents which has been certified by a suitably qualified person must be developed within 3 months of the date of issue of this authority.
- (A24) The Contingency Plan for Emergency Environmental Incidents must include, but not necessarily be limited to:
 - (a) a clear definition of what constitutes an environmental emergency incident or near miss for the petroleum activity(ies) authorised to be carried out under this environmental authority
 - (b) identification of the types of environmental incidents that may occur, relevant to the petroleum activity(ies) authorised to be carried out under this environmental authority
 - (c) response procedures to be implemented to prevent or minimise the risk of environmental harm arising from environmental incidents or emergency events
 - (d) response procedures to minimise the extent and duration of environmental harm caused by environmental incidents or emergency events
 - (e) communication procedures and lines of communication within and beyond the organisation to be employed in responding to environmental incidents or emergency events
 - (f) the resources to be used in response to environmental incidents or emergency events
 - (g) procedures to investigate the cause of any incidents, including releases, and where necessary,

- (h) the remedial actions to be implemented to reduce the likelihood of recurrence of similar events
- (i) a receiving environment monitoring program, to be specifically implemented in the event of an emergency event or incident to examine/assess environmental impacts
- (j) the provision and availability of documented procedures to staff attending any environmental incidents or emergency events to enable them to effectively respond
- (k) training of staff that will be called upon to respond to environmental incidents or emergency events to enable them to effectively respond
- (l) timely and accurate reporting of the circumstance and nature of environmental incidents or emergency events to the administering authority in accordance with conditions of this environmental authority
- (m) procedures for accessing monitoring locations during environmental incidents or emergency events; and
- (n) procedures to notify any potentially affected landholder, occupier and/or their nominated representative.

(A25) The holder of this environmental authority must implement the Contingency Plan for Emergency Environmental Incidents.

Documentation and Records Management

(A26) A record of all documents required by this environmental authority must be:

- (a) kept for a minimum of 5 years; and
- (b) be made available to an authorised person upon request.

(A27) The holder of this environmental authority must develop all documents in a way this is consistent with the requirements of this environmental authority.

Infrastructure

(A28) Within 6 months from the date of issue of this approval, the following infrastructure must be clearly and permanently marked for the life of the petroleum activity(ies) with a unique reference name/number in such a way that it is clearly observable:

- (a) regulated dams
- (b) development and gas injection wells
- (c) gas processing facilities
- (d) water treatment facilities
- (e) sewage treatment facilities
- (f) authorised discharge points to air
- (g) any chemical storage facility associated with the environmentally relevant activity of chemical storage; and
- (h) compressor stations.

SCHEDULE B – UNDERGROUND GAS STORAGE

- (B1) The only gas authorised to be stored underground is natural gas and coal seam gas.
- (B2) The authorised gas must only be injected at the location(s) and within the formation(s) and impact zones listed in **Schedule B: Table 2 – Details of Authorised Storage Formation**.

Schedule B: Table 2 – Details of Authorised Storage Formation

Well Location latitude and longitude (GDA94)	Well Number Reference	Target Formation	Gas Injection Impact Zone
27° 36' 42.7" S 149° 06' 45.4" E	Silver Springs 3	Showgrounds	Refer to Appendix 1
27° 35' 09.5" S 149° 06' 21.2" E	Silver Springs 11		
27° 35' 54.69" S 149° 06' 57.54" E	Silver Springs 12		
27° 37' 36.8" S 149° 07' 55.8" E	Renlim 5A		
27° 37' 49.2" S 149° 07' 16.7" E	Renlim 4		

- (B3) Gas injection must not result in:
- (a) fracturing the target formation; or
 - (b) surface migration of the injected gas; or
 - (c) loss of containment from within the impact zones; or
 - (d) ingress to buildings and structures; or
 - (e) fugitive emissions.
- (B4) If the holder of this environmental authority becomes aware that environmental harm is caused or threatened to be caused, as a result of gas injection activities, the holder of this authority must immediately implement appropriate measures to prevent or minimise the harm in accordance with the Contingency Plan required under condition (A23).
- (B5) The maximum quantity of gas authorised to be stored underground under this environmental authority is 44Bscf.
- (B6) The maximum formation pressure permitted is 2,780psia.
- (B7) Tracers must not be injected underground.

Reporting Requirements for Operational Gas Injection

- (B8) An operational gas injection report which has been certified by a suitably qualified person must be submitted to the administering authority with each annual return.

- (B9) The operational gas injection report must summarize the results of the Underground Gas Storage Monitoring Program and provide interpretation and analysis of the information as required by condition (J37) including but not necessarily being limited to:
- (a) the results of the monitoring program as required by condition (J37)
 - (b) monthly summaries of injection conditions
 - (c) well head injection rates versus formation pressure
 - (d) the effectiveness of aquitards (including the stability of the aquitard) and aquicludes of confining the injected gas within the target formation
 - (e) a detailed interpretation of the logs and other tests conducted during drilling and construction or refurbishment of the well against their specific objectives
 - (f) analysis of monitoring and operational data in terms of
 - i. validation of conceptual framework for injection; and
 - ii. additional hazards that were not identified earlier.
 - (g) a revised risk analysis that identifies all potential hazards, likelihood of various risk elements and associated consequences.
 - (h) a re-evaluation of the gas injection impact zone; and
 - (i) location details of any wells closed and decommissioned (GDA94).

Operational Gas Injection Cessation Report

- (B10) A gas injection cessation report which has been certified by a suitably qualified person must be submitted to the administering authority within 2 months of final completion of gas injection activities.
- (B11) The gas injection cessation report must include, but not necessarily be limited to:
- (a) volumes of gas injected at each well
 - (b) a risk assessment statement providing details on identified hazards including their inherent risk, summary of the results from the verification monitoring, preventative measures and the residual risk; and
 - (c) a monitoring report outlining the methods and results of verification monitoring undertaken to assess the performance of the operational injection activities and preventative measures for identified hazards.

SCHEDULE C – WATER

Contaminant Release

- (C1) Contaminants must not be directly or indirectly released to any waters.

Erosion and Sediment Control Plan

- (C2) An Erosion and Sediment Control Plan which has been certified by a suitably qualified person must be developed within 3 months from the date of issue of this authority.
- (C3) 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 where erosion and sediment control measures occur within 100m of the high bank of a watercourse
 - (k) identification of remedial actions required to ensure compliance with the conditions of this environmental authority; and
 - (l) details of landholder consultation strategies and processes to be used in further developing and implementing the Erosion and Sediment Control Plan.
- (C4) The holder of this environmental authority must implement the Erosion and Sediment Control Plan.
- (C5) A copy of the Erosion and Sediment Control Plan must be submitted to any potentially affected landholders upon request by that landholder.

Maintenance and Cleaning

- (C6) The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where the resultant contaminants cannot be released into any waters.

Floodplains

- (C7) Where the petroleum activity(ies) is carried out on floodplain areas, the holder of this environmental authority must ensure that the petroleum activity(ies) does not:
- (a) concentrate flood flows in a way that will or may cause or threaten an adverse environmental impact
 - (b) divert flood flows from natural drainage paths and alter flow distribution
 - (c) increase the local duration of floods
 - (d) increase the risk of detaining flood flows
 - (e) pose an unacceptable risk to the safety of persons from flooding; or
 - (f) pose an unacceptable risk of damage to property from flooding.

Groundwater

- (C8) The extraction of groundwater as part of the petroleum activity(ies) from underground aquifers must not directly or indirectly cause environmental harm to any watercourse, lake, wetland or spring.

Well Drilling and Completion

- (C9) Oil based drilling muds must not be used in the carrying out of the petroleum activity(ies).
- (C10) Synthetic based drilling muds must not be used in the carrying out of the petroleum activity(ies).

Well Stimulation

- (C11) Well stimulation activities are not authorised under this environmental authority.

SCHEDULE D – DAMS

Management of Low Consequence Dams

- (D1) All low consequence dams must be designed and constructed, operated and maintained in accordance with accepted engineering standards currently appropriate for the purpose for which they are intended.
- (D2) The consequence category of each low consequence dam must be determined by a suitably qualified and experienced person:
 - (a) prior to its construction; or
 - (b) within 120 business days of the date of grant of this environmental authority for existing low hazard dams; and
 - (c) prior to any change in its purpose or stored contents.
- (D3) Where the consequence category of a low consequence dam is for the first time assessed as significant or high, the holder of this environmental authority must ensure that the dam meets the hydraulic performance required of the assessed consequence category within 12 months of that assessment.
- (D4) In the event of early signs of loss of structural or hydraulic integrity of a low hazard dam, the holder of this environmental authority must immediately take action to prevent or minimise any actual or potential environmental harm.
- (D5) Low consequence dams must be designed with a floor and sides made of material to contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life, including any period of decommissioning and rehabilitation.

Requirements for New Regulated Dams

- (D6) All regulated dams must be designed by, and constructed under the supervision of a suitably qualified and experienced person in accordance with the requirements of the most recent version of the "Manual for Assessing Consequence Categories and Hydraulic Performance of Structures".
- (D7) The holder of this environmental authority must ensure that regulated dams constructed by a suitability qualified and experienced person to prevent:
 - (a) floodwaters from entering the regulated dam from a watercourse or drainage line to the annual exceedance probability specified for determining spillway capacity in the "Manual for Assessing Consequence Categories and Hydraulic Performance of Structures"
 - (b) wall failure due to erosion by floodwaters arising from the watercourse or drainage line to the annual exceedance probability specified for determining spillway capacity in the "Manual for Assessing Consequence Categories and Hydraulic Performance of Structures"; and
 - (c) overtopping as a result of a flood event of the annual exceedance probability specified for determining spillway capacity in the "Manual for Assessing Consequence Categories and Hydraulic Performance of Structures".

Construction and Operational Requirements for New Regulated Dams

- (D8) All regulated dams must:
 - (a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation



- (b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam; and
- (c) either be capable of repair to rectify any passage of the wetting front through either the floor or sides of the dam, or else be decommissioned and rehabilitated.

Requirements for Existing Regulated Dams

- (D9) The audit report required under Condition (A14) must include a dams assessment report which includes but is not necessarily limited to:
 - a) the hazard category of each dam on PL446 in accordance with the most recent version of *"Manual for Assessing Consequence Categories and Hydraulic Performance of Structures"*
 - b) the condition and adequacy of each dam for dam safety; and
 - c) each dams structural, geotechnical and hydraulic integrity.
- (D10) The holder of this environmental authority must, upon receipt of the results of the assessment, consider the report and its recommendations and take action to ensure that each dam will safely perform its intended function.
- (D11) The audit report required under Condition (A14) must include notification to the administering authority of the outcomes and recommendations of the dam assessment report required under Condition (D9) and the actions taken to ensure the integrity of each dam as required under Condition (D10).
- (D12) Within 6 months of a dam being identified as being a regulated dam, the holder of this authority must:
 - (a) ensure that the name of the regulated dam is clearly sign posted at the dam location at all times
 - (b) the Mandatory Reporting Level is marked on each Regulated Dam in such a way that it is clearly observable
 - (c) ensure the dam is appropriately certified and the certification is lodged with the administering authority; and
 - (d) enter the relevant details into the regulated dam register as per Condition (D15).
- (D13) All existing dams on PL446 must be maintained:
 - (a) in accordance with generally accepted engineering standards and practices
 - (b) to prevent the release of contaminants to waters; and
 - (c) to ensure the stability of the pond's construction.

Requirements for Regulated Dam Repair

- (D14) Where the holder of this environmental authority detects any passage of the wetting front through the floor or sides of a regulated dam, the holder of this environmental authority must, as soon as practicable, either:
 - (a) repair the dam to rectify the detected passage of the wetting front through the floor or sides of the dam; or
 - (b) decommission and rehabilitate the dam.

Regulated Dam Register

- (D15) The holder of this environmental authority must maintain a register of regulated dams that must include, as a minimum, the following information for each regulated dam:
 - (a) dam name, the coordinates (in GDA94) for its location and date of entry in the register
 - (b) dam purpose and its proposed/actual contents

- (c) hazard category assessed using the "Manual for Assessing Consequence Categories and Hydraulic Performance of Structures", as amended from time to time
- (d) details of the composition and construction of any liner
- (e) the system for detection of leakage through the floor and sides of the dam
- (f) dimensions (metres) and surface area (hectares) measured at the footprint of the dam
- (g) maximum operational volume (megalitres)
- (h) dam crest volume (megalitres)
- (i) spillway crest level (metres AHD)
- (j) design storage allowance at 1 November each year (megalitres)
- (k) mandatory reporting level (metres)
- (l) design plan title and reference
- (m) date construction was certified as compliant with the design plan for dams constructed after the date of this authority
- (n) name and qualifications of certifier
- (o) dates on which the dam was inspected for structural and operational adequacy
- (p) dates on which the report of the annual structural and operational adequacy inspection was provided to the administering authority
- (q) dates on which the dam was inspected for the detection of leakage through any liner
- (r) dates on which the dam was inspected for the purpose of annually ascertaining the available storage capacity on the 1 November each year; and
- (s) dam water quality as obtained from monitoring required under conditions (I43) to (I45) as at 1 November each year.

- (D16) The holder of this environmental authority must provisionally enter the required information in the register of regulated dams when a design plan for a regulated dam is submitted to the administering authority.
- (D17) The holder of this environmental authority must make a final entry of the required information in the register of regulated dams once compliance with condition (D25) has been achieved.
- (D18) The holder of this environmental authority must ensure that the information contained in the register of regulated dams is always current and complete.
- (D19) All entries in the register of regulated dams must be certified by the chief executive officer for the holder of this environmental authority, or their delegate, as being accurate and correct.
- (D20) The holder of this environmental authority must submit the register of regulated dams or information contained in the register available to the administering authority at each annual return.
- (D21) Construction of any dam or modifications to an existing dam determined to be in the high hazard or significant hazard category in accordance with the "Manual for Assessing Consequence Categories and Hydraulic Performance of Structures", is prohibited unless the required design plan details have been entered into the regulated dam register and certified by the chief executive officer for the holder of this environmental authority, or their delegate, as being accurate and correct

Regulated Dam Design Plan and 'As Constructed' Certification

- (D22) The construction and operation of new regulated dams is prohibited unless the holder of this environmental authority has submitted to the administering authority a copy of the design plan, together with the certification of a suitably qualified and experienced person that the regulated dam:
- (a) will deliver the performance stated in the design plan
 - (b) has had its hazard category assessed and been designed in accordance with the requirements of the "Manual for Assessing Consequence Categories and Hydraulic Performance of Structures", as amended from time to time; and
 - (c) when constructed and operated, will be compliant in all respects with the relevant conditions of this environmental authority.
- (D23) The design plan must include, but not necessarily be limited to:
- (a) a statement of the relevant legislation, regulatory documents and engineering practice relied upon in the design plan
 - (b) a statement of the facts and data being used in the design plan and the limitations to the application and interpretation of that material
 - (c) an assessment of the hazard category of the proposed dam based on the identification of potential impacts on any relevant sensitive places for any applicable dam failure scenarios, including the cumulative impact should all dams fail at once
 - (d) detailed specifications for the design, operation, maintenance and decommissioning of the dam;
 - (e) an operational plan that includes contingency/emergency response procedures designed to avoid/minimise discharges resulting from any overtopping or loss of structural integrity of the dam
 - (f) design, specification and operational rules for any related structures and systems used to prevent the overtopping of the proposed dam
 - (g) a detailed plan for the decommissioning and rehabilitation of the dam at the end of its operational life
 - (h) any other matter required by the certifying suitably qualified and experienced person; and
 - (i) evidence supporting the claims of the certifier that they are a suitably qualified and experienced person.
- (D24) If, within the 20 business days following the lodgement of a certified design plan the administering authority notifies the holder of this environmental authority, in writing, that the design plan is not compliant with either:
- (a) the conditions of this environmental authority; or
 - (b) the requirements set out in the "Manual for Assessing Consequence Categories and Hydraulic Performance of Structures".
- Then the construction and operation of the regulated dam is prohibited until the administering authority provides written advice that its construction may proceed.
- (D25) When construction of any regulated dam is complete, the holder of this environmental authority must submit to the administering authority one hard copy and one electronic copy of a set of 'as constructed' drawings, together with the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in the design plan and at the time of certification it is compliant in all respects with conditions (D6) to (D9), (D22) and (D23) of this environmental authority.

- (D26) Each regulated dam must be maintained and operated in a manner that is consistent with the design plan and the certified 'as constructed' drawings for the duration of its operational life and until decommissioned and rehabilitated.
- (D27) Upon any change in the purpose or stored contents of a regulated dam, the hazard category of that dam must be determined by a suitably qualified and experienced person prior to any such change.

Mandatory Reporting Level

- (D28) The mandatory reporting level must be marked on each regulated dam in such a way that it is clearly observable during routine inspections of each dam.
- (D29) If the contents of a regulated dam reaches the mandatory reporting level, the holder of this environmental holder must immediately act to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.

Annual Inspection and Report

- (D30) Each regulated dam must be inspected annually by a suitably qualified and experienced person.
- (D31) At each annual inspection, each regulated dam must be assessed for:
- (a) its hazard category in accordance with the "Manual for Assessing Consequence Categories and Hydraulic Performance of Structures"
 - (b) its' condition and adequacy for dam safety; and
 - (c) its' structural, geotechnical and hydraulic performance against the criteria contained in the certified design plan.
- (D32) An assessment of the adequacy of the available storage in each regulated dam is to be made, based on an actual regulated dam level observed in the month of May in each year.
- (D33) The estimated level in any regulated dam as at 1 November in each year must be equal or less than the design storage allowance for the dam.
- (D34) Where the assessment of the adequacy of the available storage in any regulated dam indicates that the design storage allowance will be exceeded, or at any other time the holder of this environmental authority becomes aware that the design storage allowance has been or will be exceeded, the holder of this environmental authority must immediately act to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.
- (D35) For each annual inspection, a report on the condition and adequacy of each regulated dam must be prepared and certified by the suitably qualified and experienced person and include any recommended actions to be taken to ensure the integrity of each regulated dam.
- (D36) The holder of this environmental authority must, upon receipt of the annual inspection report, consider the report and its recommendations and take action(s) as necessary to ensure that each regulated dam will safely perform its intended function.

- (D37) Within one month of receiving the annual inspection report, the holder of this environmental authority must advise the administering authority in writing of the recommendations of the inspection report and the actions taken to ensure the integrity of each regulated dam.

SCHEDULE — LAND

General

- (E1) Contaminants must not be directly or indirectly released to land except as permitted under this environmental authority.

Disturbance to Land – General

- (E2) Prior to conducting petroleum activities that involve significant disturbance to land, 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.
- (E3) The assessment required by condition (E2) must be undertaken by a suitably qualified person and include an assessment of the biocondition of the vegetation to be disturbed, the carrying out of field validation surveys, observations and mapping of any Category A, B or C Environmentally Sensitive Areas and the presence of species classed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992*.
- (E4) If the assessment required by conditions (E2) and (E3) indicates that a Regional Ecosystem mapped as Endangered or Of Concern by the Queensland Herbarium should be in a different conservation value classification, the holder of this environmental authority must advise the administering authority in writing before any significant disturbance to land takes place.
- (E5) If, within the 20 business days following the lodgement of the notification under condition (E4) the administering authority notifies the holder of this 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.
- (E6) The holder of this environmental authority, when carrying out the petroleum activity(ies) must:
- (a) avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value
 - (b) minimise disturbance to land that may otherwise result in land degradation
 - (c) ensure that for land that is to be significantly disturbed by the petroleum activity(ies):
 - i. the top layer of the soil profile is removed
 - ii. soils is stockpiled in a manner that will preserve its biological and chemical properties; and
 - iii. soils are used for rehabilitation purposes.
 - (d) avoid clearing mature trees; and
 - (e) prior to carrying out field based petroleum activities, make all relevant staff, contractors or agents carrying out those petroleum activities, aware of the location of any Category A, B or C Environmentally Sensitive Areas and the requirements of this environmental authority.
- (E7) Despite condition (E6), significant disturbance to land caused by the carrying out of the petroleum activities must not involve clearing vegetation or placing 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. potential impacts associated with edge effects or introduced species)

- (b) on slopes greater than 10% for the petroleum activity(ies) other than for pipelines and wells; or
- (c) in discharge areas.

(E8) Clearing of remnant vegetation shall not exceed 10m in width for the purpose of establishing tracks or 20m in width for dual carriageway roads.

(E9) Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements.

Disturbance to Land – Environmentally Sensitive Areas

(E10) The holder of this environmental authority must ensure that the petroleum activity(ies) is only conducted in accordance with **Schedule E: Table 1 – Environmentally Sensitive Areas (ESAs)** below for each of the ESA categories and associated primary and secondary protection zones

Schedule E: Table 1 – Environmentally Sensitive Areas (ESAs)

ESA Category	Within the ESA	Primary protection zone of the ESA	Secondary protection zone of the ESA
All Category A ESAs	No petroleum activities permitted	No petroleum activities permitted	Limited petroleum activities permitted subject to E11 and E12
Category B ESAs excluding 'Endangered' regional ecosystems	No petroleum activities permitted	No petroleum activities permitted	Limited petroleum activities permitted subject to E11 and E12
Category B ESAs: 'Endangered' regional ecosystems	Limited petroleum activities permitted subject to E12, E13 E14, E15 and E16	Limited petroleum activities permitted subject to E12, E13 E14, E15 and E16	Limited petroleum activities permitted subject to E11 and E12
Category C ESAs excluding 'Of Concern' regional ecosystems, State Forests and Timber Reserves	No petroleum activities permitted	No petroleum activities permitted	Limited petroleum activities permitted subject to E11 and E12
Category C ESAs: State Forests, Timber Reserves and 'Of Concern' regional ecosystems	Limited petroleum activities permitted subject to E12, E13 E14, E15 and E16	Limited petroleum activities permitted subject to E12, E13 E14, E15 and E16	Limited petroleum activities permitted subject to E11 and E12

(E11) Limited petroleum activities carried out in the secondary protection zone in accordance with condition (E10) 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.

(E12) Limited petroleum activities carried out within an environmentally sensitive area, primary protection zone or secondary protection zone as authorised under Condition (E10) must not be conducted where there is overlap with another environmentally sensitive area or primary protection zone where limited petroleum activities are not authorised.

- (E13) Where limited petroleum activities are proposed to be undertaken within the primary protection zone of, or in the Category B and C Environmentally Sensitive Area as authorised in Condition (E10), 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) pre-existing cleared areas or significantly disturbed land within the primary protection zone of a Category B Environmentally Sensitive Area
 - (c) undisturbed areas within the primary protection zone of a Category C Environmentally Sensitive Area
 - (d) undisturbed areas within the primary protection zone of a Category B Environmentally Sensitive Area
 - (e) 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)
 - (f) pre-existing areas of significant disturbance within a Category B 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)
 - (g) areas where clearing of a Category C Environmentally Sensitive Area is unavoidable; and
 - (h) areas where clearing of a Category B Environmentally Sensitive Area is unavoidable.
- (E14) Notwithstanding Conditions (E10) and (E13), where limited petroleum activities are proposed to be undertaken within the primary protection zone of, or in a Category B or C Environmentally Sensitive Area, 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 Endangered or Of Concern Regional Ecosystem, 10% of the remnant unit of Endangered or Of Concern Regional Ecosystem as ground truthed and mapped as per Conditions (E2) and (E3) of this environmental authority; and
 - (b) more than 30m² for the construction of a sump; or
 - (c) more than 6m in width for tracks; or
 - (d) more than 12m in width for flow pipeline construction purposes.
- (E15) For each well site within the primary protection zone of, or in a Category B or C Environmentally Sensitive Area specified in condition (E10), all reasonable and practical measures must be taken to minimize the area cleared which must include but not be limited to, for each well site, ranked constraints mapping and a risk assessment which considers safety and environmental impacts.
- (E16) Details of any significant disturbance to land undertaken within the primary protection zone of, or in a Category B or C Environmentally Sensitive Area, along with a record of the assessment required by conditions (E2) and (E3) must be kept and submitted to the administering authority with each annual return.

Soil Management Plan

- (E17) A Soil Management Plan which has been certified by a suitably qualified person must be developed within 6 months of the date of issue of this approval.

- (E18) The Soil Management Plan must include, but not necessarily be limited to:
- (a) establishing baseline soils information for areas to be disturbed including soil depth, pH, electrical conductivity (EC), chloride, cations (aluminium, calcium, magnesium, potassium and sodium), exchangeable sodium percentage (ESP), particle size and soil fertility (including carbon, nitrogen, phosphorous, potassium, sulphur and micronutrients)
 - (b) a soils monitoring program outlining parameters to be monitored, frequency of monitoring and acceptable ranges for each parameter
 - (c) identification of soil units within areas to be disturbed by the petroleum activity(ies) at a scale of 1:50,000, in accordance with the "Guidelines for Surveying Soil and Land Resources, 2nd Edition" (McKenzie et al. 2008), "Australian Soil and Land Survey Handbook, 3rd Edition" (National Committee on Soil and Terrain 2009) and "The Australian Soil Classification" (Isbell 2002), as amended from time to time
 - (d) development of soil descriptions that are relevant to assessment for agricultural suitability, topsoil assessment, erodibility and rehabilitation, for example:
 - i. black earths
 - ii. shallow cracking clay soils
 - iii. deep cracking clay soils
 - iv. deep saline and/or sodic cracking clay soils with melonholes
 - v. thin surface, sodic duplex soils
 - vi. medium to thick surface (i.e. > 15cm), sodic duplex soils; and
 - vii. non-sodic duplex soils.
 - (e) detailed horizon and soils compaction management procedures, including top soil and top soil stockpile management procedures to minimise the impacts of soil disturbance and promote successful rehabilitation
 - (f) detailed mitigation measures and procedures to manage the risk of adverse soil disturbance in the carrying out of the petroleum activity(ies)
 - (g) for pipelines, methods of keeping soil horizons separate on excavation, storage and backfilling; and
 - (h) for areas of good quality agricultural land, detailed methods to be undertaken to minimise potential impacts to soil productivity.
- (E19) The holder of this environmental authority must implement the Soil Management Plan.
- (E20) A copy of the Soil Management Procedures must be submitted to any potentially affected landholder upon request by that landholder.

Fauna Management Procedures

- (E21) Fauna management procedures must be developed within 6 months from the date of issue of this approval.
- (E22) The fauna management procedures must be certified by a suitably qualified person.
- (E23) The fauna management procedures must ensure that the petroleum activity(ies) (including, but not necessarily limited to: pipeline construction, dam construction and operation) are carried out in a manner that minimises the risk of injury, harm, or entrapment to wildlife and stock.

- (E24) Well lease infrastructure and dams must be securely fenced and/or screened after construction is completed to:
- (a) exclude and prevent the entrapment of livestock and terrestrial wildlife; and
 - (b) limit habitats for the introduction or spread of pests.
- (E25) The fauna management procedures must include training and awareness of staff and contractors.
- (E26) Planned fauna handling must be undertaken by a suitably qualified person.
- (E27) The holder of this environmental authority must implement the fauna management procedures.

Note: The procedures required by conditions (E21) and (E27) should consider the "Australian Pipeline Industry Association Code of Environmental Practice – Onshore Pipelines" March 2009, as amended from time to time.

Chemical and Fuel Storage

- (E28) Within 6 months from the date of issue of this approval, all explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids (including petroleum products and associated piping and infrastructure) must be stored and handled in accordance with the relevant Australian Standard where such is available.
- (E29) Notwithstanding the requirements of any Australian Standard, any liquids stored on site that have the potential to cause environmental harm must be stored in, or serviced by, an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land.
- (E30) Where no relevant Australian Standard is available for the chemical and/or fuel storage activity, the following requirements apply:
- (a) storage tanks must be bunded so that the capacity and construction of the bund is sufficient to contain at least 110% of a single storage tank or 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and
 - (b) drum storages must be bunded so that the capacity and construction of the bund is sufficient to contain at least 25% of the maximum design storage volume within the bund.
- (E31) All containment systems must be designed to minimise rainfall collection within the system.

Flowlines

- (E32) Flowlines constructed after the date of issue of this approval, must be preferentially located alongside existing linear infrastructure such as roads, tracks and powerlines.
- (E33) Flowline trenches must only be left open for the minimum time practicable.
- (E34) The length of flowline trench open at any one time must be minimised as far as practicable.

Release of Treated Sewage Effluent Contaminants to Land

- (E35) Sewage pump stations must be fitted with a stand-by pump and a visible or audible high level alarm.

- (E36) Treated effluent may only be released to land at the designated, fenced and delineated contaminant release area(s).
- (E37) The contaminant release area(s) must be maintained in a proper and efficient condition so as to provide adequate assimilation, percolation, evaporation and transpiration of the released contaminants.
- (E38) Treated effluent must not be applied by spray irrigation.
- (E39) Treated effluent must be applied in a manner that does not cause ponding or runoff of effluent beyond the contaminant release area(s).
- (E40) When weather conditions or soil conditions preclude the release of contaminants, the contaminants must be directed to on-site storage or lawfully disposed of off-site.

SCHEDULE F– ENVIRONMENTAL NUISANCE

Odour, dust and other airborne contaminants

- (F1) 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.

Noise

- (F2) A Noise Management Plan which has been certified by a suitably qualified person must be developed within 6 months from the date of issue of this approval.
- (F3) The Noise Management Plan 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 F: 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 10:00pm and 6:00am) are likely to exceed 25dBA
 - (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 F: 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 (F3)(j); and
 - (l) mediation processes to be used in the event that noise complaints are not able to be resolved.
- (F4) The holder of this environmental authority must implement the Noise Management Plan.
- (F5) 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) to ensure that noise emissions will not exceed the noise levels specified in **Schedule F: Table 1 – Noise limits at Sensitive Receptors**.

- (F6) 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 F: Table 1 – Noise limits at Sensitive Receptors** in the event of a valid complaint about noise being made to the administering authority.

Schedule F: Table 1 – Noise Limits at Sensitive Receptors

Time Period	Metric	Short Term Noise Event	Medium Term Noise Event	Long Term Noise Event
7:00am – 6:00pm	$L_{Aeq,adj,15min}$ Max $L_{pA, 15mins}$	$L_{ABG} + 10dBA$ 55dBA	$L_{ABG} + 8dBA$ 51dBA	$L_{ABG} + 5dBA$ 45dBA
6:00pm – 10:00pm	$L_{Aeq,adj,15min}$ Max $L_{pA, 15mins}$	$L_{ABG} + 10dBA$ 50dBA	$L_{ABG} + 8dBA$ 46dBA	$L_{ABG} + 5dBA$ 40dBA
10:00pm – 6:00am	$L_{Aeq,adj,15min}$ Max $L_{pA, 15mins}$	$L_{ABG} + 3dBA$ 38dBA	$L_{ABG} + 3dBA$ 36dBA	$L_{ABG} + 3dBA$ 33dBA
6:00am – 7:00am	$L_{Aeq,adj,15min}$ Max $L_{pA, 15mins}$	$L_{ABG} + 10dBA$ 50dBA	$L_{ABG} + 8dBA$ 46dBA	$L_{ABG} + 5dBA$ 40dBA

L_{Aeq} 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 F: Table 1 - Noise Limits at Sensitive Receptors are:

7:00am - 6:00pm: 35dBA

6:00pm – 10:00pm: 30dBA

10:00pm – 6:00am: 25dBA

6:00am – 7:00am: 30dBA

- (F7) If the noise subject to a complaint is tonal or impulsive, the adjustments detailed in **Schedule F: 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 F: Table 2 – Adjustments to be Added to Noise Levels at Sensitive Receptors

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

- (F8) Where alternative arrangements are in place with an affected person(s) at a sensitive receptor as referred to by condition (F3)(j), the noise limits in *Schedule F: 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

- (F9) Notwithstanding condition (F6), emission of any noise below 315Hz must not cause an environmental nuisance.
- (F10) Low frequency noise from the petroleum activity(ies) is not considered to be an environmental nuisance under condition (F9) if monitoring shows that noise emissions do not exceed the following limits:
- 50dB(Z) measured inside the sensitive receptor; and
 - the difference between the internal A-weighted and Z-weighted noise levels is no greater than 15dB.

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SCHEDULE G – AIR

Fuel Burning or Combustion Equipment

- (G1) Contaminants emitted from fuel burning and combustion equipment point sources that are capable of burning at least 500kg in an hour and installed after the date of issue of this approval must be directed vertically upwards.
- (G2) Prior to the installation of any new or additional fuel burning and combustion equipment that is capable of burning at least 500kg of fuel in an hour, following the issue of this environmental authority, the holder of this environmental authority must conduct air dispersion modelling to calculate the ground level concentrations of emissions from the fuel burning or combustion equipment under maximum operating conditions within the relevant airshed and identify any potential impacts to air quality within the study area.
- (G3) The holder of this environmental authority must ensure that the calculated ground level concentrations required under condition (G2) do not exceed the criteria for each air contaminant in **Schedule G: Table 2 - Maximum Ground Level Concentration Criteria**.

Schedule G: Table 2 - Maximum Ground Level Concentration Criteria

Contaminant	Concentration at 0°C	Units	Averaging time
NOx as Nitrogen Dioxide	250	µg/m ³	1 hour
NOx as Nitrogen Dioxide	33	µg/m ³	1 year
Carbon monoxide	11	mg/m ³	8 hour

- (G4) The holder of this environmental authority must undertake verification monitoring of the air dispersion modelling post commissioning of fuel burning equipment that is capable of burning at least 500 kg of fuel in an hour.
- (G5) Where the verification monitoring required under condition (G4) demonstrates that the air dispersion modelling required under condition (G2) under-predicted actual concentrations, the holder of this environmental authority must:
- provide details to the administering authority within 10 business days
 - re-undertake the modelling based on the new information; and
 - determine and implement appropriate pollution control measures to bring the emissions into compliance with the limits specified in **Schedule G: Table 2 - Maximum Ground Level Concentration Criteria**.
- (G6) The holder of this environmental authority must maintain a register of fuel burning and combustion equipment that is capable of burning at least 500kg of fuel in an hour that must include, as a minimum, the following information for each piece of equipment:
- fuel burning or combustion equipment name and location
 - stack emission height (m)
 - minimum efflux velocity (m/s)
 - mass emission rates (g/s); and
 - contaminant concentrations (mg/Nm³ @ x %O₂ dry gas at 0°C and 1atm).

- (G7) The holder of this environmental authority must ensure that the information contained in the register of fuel burning and combustion equipment is always current and complete.
- (G8) All entries in the register of fuel burning and combustion equipment must be certified by the chief executive officer for the tenure holder, or their delegate, as being accurate and correct.

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SCHEDULE H – WASTE

General

- (H1) All general and regulated waste (other than authorised under condition (H2)) must 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*.
- (H2) The only waste that can be disposed of on site is waste generated on site and is limited to putrescible waste.
- (H3) Waste authorised to be disposed of on-site must only be disposed of into the 160m³ waste disposal facility identified in Appendix 2.
- (H4) Waste deposited in the waste disposal facility must be compacted and covered with a layer of inert material following placement of the waste in the facility.
- (H5) Litter control methods must be effectively implemented at the waste disposal facility.
- (H6) The waste disposal facility must be operated to minimise the generation of leachate including a system of diversion drains or embankments to divert surface waters away from any area where contact with wastes or sources of contamination may occur.
- (H7) 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.
- (H8) Waste must not be burned or be allowed to be burned on the site.
- (H9) All waste fluids and drilling muds resulting from drilling and exploration petroleum activities must be contained in a dam or containment structure for disposal, remediation or reuse where applicable.

Produced Water Management Plan

- (H10) The holder of this environmental authority must develop and submit a Produced Water Management Plan, within 18 months of the date of this approval.
- (H11) The Produced Water Management Plan must include, but not necessarily be limited to:
 - (a) a water management strategy that:
 - (i) addresses water management across all integrated operations
 - (ii) minimises the development footprint of water management infrastructure; and
 - (iii) identifies means, in addition to evaporation, to dispose of or re-use produced waters.
- (H12) The holder of this environmental authority must not implement or amend a Produced Water Management Plan where such implementation or amendment would result in a contravention of any condition of this environmental authority.
- (H13) The holder of this environmental authority must submit any amendments to the Produced Water Management Plan to the administering authority prior to its implementation.

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- (H14) If, within 20 business days following the submission of the amended Produced Water Management Plan, the administering authority provides comments on the amended Produced Water Management Plan, the holder of this environmental authority must:
- (a) have due regard to that comment in the finalisation of the amended Produced Water Management Plan
 - (b) submit the finalised amended Produced Water Management Plan within 40 business days after the administering authority provided comments; and
 - (c) implement the amended Produced Water Management Plan.
- (H15) The holder of this environmental authority must ensure that produced water is contained, is not released to land or waters and is only used for purposes specifically authorised:
- (a) under this environmental authority
 - (b) under Section 186 of the *Petroleum and Gas (Production and Safety) Act 2004*
 - (c) under Section 86 of the *Petroleum Act 1923*; or
 - (d) under an approval of resource for beneficial use as provided for under the *Environmental Protection Act 1994*.
- (H16) The holder of this environmental authority must ensure that the produced water to be used for domestic or stock purposes meets the ANZECC and ARMCANZ Water Quality Guidelines 2000 for stock and domestic purposes, as amended from time to time.
- (H17) Produced water released to the environment in accordance with condition (H15) must not have any properties that could cause, nor contain any contaminants in concentrations that are capable of causing environmental harm.

SCHEDULE I – REHABILITATION

Progressive Rehabilitation for Significantly Disturbed Land

- (I1) Pipelines trenches must be backfilled immediately after pipe laying and rehabilitated as soon as practicable but not longer than 3 months after completion.
- (I2) During backfilling of pipeline trenches, soils must be replaced so that the soil horizons are consistent with the soil horizons of the immediately surrounding area.
- (I3) Backfilled and rehabilitated pipeline trenches must:
 - (a) be a stable landform
 - (b) exhibit no subsidence or erosion gullies for the life of the operational pipeline; and
 - (c) be re-profiled to a level consistent with surrounding soils
 - (d) be re-profiled to original contours and established drainage lines
 - (e) be visually consistent with the surround land features; and
 - (f) be vegetated with groundcover as a minimum to ensure that erosion is minimised.
- (I4) Progressive rehabilitation of significantly disturbed land caused by the carrying out of the petroleum activity(ies) (other than constructing pipelines) which is not required for the ongoing conduct of the petroleum activity(ies) must commence as soon as practicable, but not longer than 9 months following the completion of any construction or operational works associated with the petroleum activity(ies).
- (I5) Progressive rehabilitation of significantly disturbed land caused by the carrying out of the petroleum activity(ies) must:
 - (a) remediate any contaminated land (e.g. contaminated soils, decommissioned dams containing salt)
 - (b) reshape all significantly disturbed land to a stable landform
 - (c) reprofile all significantly disturbed land to original contours
 - (d) on all significantly disturbed land:
 - i. re-establish surface drainage lines
 - ii. reinstate the top layer of the soil profile
 - iii. establish groundcover to ensure that erosion is minimised; or
 - iv. establish vegetation based upon the floristic species composition found in analogue sites (using stock of local provenance where possible) to achieve the benchmark parameters outlined in condition (A7).
 - (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

- (I6) 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) the landform is safe for humans and fauna

- (d) the landform is stable with no subsidence or erosion gullies for at least 5 years
 - (e) a minimum of 80% foliage cover of analogue sites is maintained in the rehabilitated sites for at least 3 years
 - (f) a minimum of 80% of the flora species diversity in analogue sites is maintained in the rehabilitated sites for at least 3 years
 - (g) a minimum equal density of habitat structures, including but not limited to litter cover, fallen woody material and hollow logs, as that in analogue sites
 - (h) erosion is minimised with appropriate sediment traps and erosion control measures installed as determined by a suitably qualified person
 - (i) 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;
 - (j) there is no ongoing contamination to waters
 - (k) there is no ongoing contamination to groundwater from dams or monocells (demonstrated via groundwater monitoring and leak detection monitoring systems); and
 - (l) 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).
- (17) Notwithstanding condition (16), all buried pipelines must be decommissioned in accordance with the requirements of Australian Standard 2885.
- (18) Notwithstanding condition (16), any dam may be decommissioned for a beneficial use provided that it is approved or authorised by the administering authority and the landowner.

SCHEDULE J – MONITORING PROGRAMS

General

- (J1) The holder of this environmental authority must develop and implement a monitoring program for all monitoring required by the conditions of this environmental authority.
- (J2) All monitoring under this environmental authority must be conducted by a suitably qualified person.
- (J3) All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this environmental authority must be calibrated, and operated and maintained effectively in accordance with the manufacturer's specifications.
- (J4) All laboratory analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA accreditation for such analyses and tests, except as otherwise authorised by the administering authority.
- (J5) The method of water sampling required by this environmental authority must comply with that set out in the most recent version of the Department of Environment and Resource Management's "Monitoring and Sampling Manual 2009 – Environmental Protection (Water) Policy 2009 Version 2 September 2010".
- (J6) Any management or monitoring plans, systems, programs or procedures required to be developed and implemented by a condition of this environmental authority must be reviewed for performance and amended as required but not less than once every 3 years in accordance with the requirements for the particular plans, systems, programs and procedures in the conditions of this environmental authority.
- (J7) If monitoring conducted in accordance with this environmental authority indicates a condition or contaminant level has caused, or has potential to cause, environmental harm, the holder of this environmental authority must, as soon as is practicable, take the necessary actions to rectify the condition or contaminant level so as to avoid or minimise environmental harm.
- (J8) An annual monitoring report must be prepared each year and submitted to the administering authority upon request. This report must include but not necessarily be limited to:
 - (a) a summary of the previous 12 months monitoring results obtained under all monitoring programs required under this environmental authority and a comparison of the previous 12 months monitoring results to both the limits set in this environmental authority and to relevant prior results
 - (b) the date on which the samples was taken
 - (c) the time at which the samples was taken
 - (d) the monitoring point at which the sample was taken
 - (e) the results of all monitoring and details of any exceedences with the conditions of this environmental authority and the dates and times these exceedences were reported to the administering authority
 - (f) an evaluation/explanation of the data derived from any monitoring programs
 - (g) data analyses and interpretation to assess the nature and extent of any contamination and the level of environmental harm caused as a result of the contamination and the environmentally relevant activity(ies); and

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- (h) an outline of actions taken or proposed to minimise the risk of environmental harm from any condition or elevated contaminant level identified by the monitoring or recording programs.
- (J9) The evaluation and explanation of data for the purposes of the annual monitoring report must be performed by a suitably qualified person.

Groundwater Monitoring Program for Dams and Containment Facilities

- (J10) Within 6 months of the date of grant of this approval, a Groundwater Monitoring Program must be developed and implemented which is able to detect any changes to groundwater quality as a result of storing contaminants in a containment facility(ies) (e.g. dams).
- (J11) The Groundwater Monitoring Program must be developed and implemented by a suitably qualified person in the fields of hydrogeology, groundwater sampling design and groundwater monitoring program design.
- (J12) The Groundwater Monitoring Program, must include, but not necessarily be limited to:
 - (a) locations of monitoring sites, monitoring methodology and trigger values for detecting impacts on groundwater quality
 - (b) as a minimum, sampling of the parameters and at the frequency listed in **Schedule J: Table 1 – Minimum Groundwater Monitoring Parameters and Monitoring Frequency**
 - (c) procedures to establish background groundwater quality
 - (d) a sufficient number of monitoring sites to provide information on the following:
 - (i) seepage to groundwater and surrounding soils from any regulated dam and its effect on groundwater and soils
 - (ii) background monitoring sites (i.e. groundwater quality in representative bores that have not been affected by the petroleum activity(ies) authorised under this environmental authority)
 - (ii) 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
 - (iii) the determination of groundwater flow direction, groundwater flow rate and hydraulic conductivity.
 - (e) a rationale containing details on the program purpose, program conceptualisation and verification of assumptions.
- (J13) The holder of this environmental authority must implement the Groundwater Monitoring Program.
- (J14) All groundwater monitoring bores must be installed according to the standards outlined in the Department of Environment and Resource Management's "Minimum Construction Requirements for Water Bores in Australia" 2003 or the "Minimum Standards for the Construction and Reconditioning of Water Bores that Intersect the Sediments of Artesian Basins in Queensland" 2010.
- (J15) Groundwater monitoring bores must be constructed by, or under the supervision of a licensed Queensland water bore driller who has the correct endorsements on their licence for the type of activity being performed.
- (J16) Groundwater samples must be monitored for the water quality parameters at the minimum frequencies specified in **Schedule J: Table 1 – Groundwater Monitoring Parameters and Monitoring Frequency**.

Schedule J: Table 1 – Groundwater Monitoring Parameters and Monitoring Frequency

Groundwater parameter	Units	Monitoring frequency
Water level	m	Quarterly
Groundwater pressure in geological strata	kPa	Biannually
pH	-	Biannually
Electrical conductivity	µS/m	Biannually
Total dissolved solids	mg/L	Biannually
Temperature	°C	Biannually
Dissolved oxygen	mg/L	Biannually
Alkalinity (bicarbonate, carbonate, hydroxide and total as CaCO ₃)	mg/L	Biannually
Residual alkali	mg/L	Biannually
Sodium adsorption ratio	SAR	Biannually
Anions (bicarbonate, carbonate, hydroxide, chloride, fluoride, sulphate)	mg/L	Biannually
Cations (aluminium, calcium, magnesium, potassium, sodium)	mg/L	Biannually
Silica	mg/L	Biannually
Dissolved and total metals including but not necessarily being limited to: aluminium, arsenic, barium, boron, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, and zinc	[µg/L]	Biannually
Total phosphorus as phosphorus	mg/L	
Ammonia, nitrate and nitrite as nitrogen	mg/L	Biannually
Total recoverable hydrocarbons	mg/L	Biannually
BTEX as benzene, toluene, ethylbenzene, ortho-xylene, para-xylene, meta-xylene and total xylene	[µg/L]	Biannually
Polycyclic aromatic hydrocarbons including but not necessarily being limited to: naphthalene, phenanthrene, benzo[a]pyrene	ug/L	Biannually

(J17) All groundwater monitoring bores must be maintained in an operative condition and be accessible at all times to any authorised person.

Air Monitoring (Point Source)

(J18) The holder of this environmental authority must conduct a monitoring program of contaminants released to the atmosphere at each release point recorded in the register of fuel burning and combustion equipment (condition (F6), for the contaminants listed in **Schedule F: Table 1 – Maximum Ground Level Concentration Criteria** and at the frequencies specified in **Schedule J: Table 3 – Monitoring Frequency for Contaminants**.

Schedule J: Table 3 – Monitoring Frequency for Contaminants

Contaminant	Monitoring frequency
NOx as Nitrogen Dioxide	• During commissioning; • Annually thereafter
Carbon monoxide	• During commissioning • Annually thereafter

(J19) The monitoring program must include, but not necessarily be limited to:

- monitoring provisions for the release points which complies with the most recent edition of Australian Standard 4323.
- tests for each sample taken at each release point specified in the register of fuel burning or combustion equipment (condition (F6)) including:
 - gas velocity, volume and mass flow rate
 - temperature; and
 - water vapour concentration (for non-continuous sampling).

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- (c) representative samples of the contaminants discharged when operating under maximum operating conditions
- (d) the collection of production rate and plant status during sampling periods; and
- (e) monitoring of contaminant release carried out in accordance with the latest edition of the administering authority's "Air Quality Sampling Manual" 1997, as amended from time to time.

Noise Monitoring

- (J20) The holder of this environmental authority must undertake noise monitoring as soon as practicable when requested by the administering authority.
- (J21) The holder of this environmental authority must report the results of noise monitoring to the administering authority within 3 business days of completion of the monitoring event.
- (J22) 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
 - (h) if the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200Hz range for both the noise source and the background noise in the absence of the noise source.
- (J23) The method of measurement and reporting of noise levels and background sound pressure levels must comply with the administering authority's "Noise Measurement Manual" 2000 or Australian Standard 1055 as amended from time to time.

Nuisance Monitoring (other than Noise)

- (J24) 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.
- (J25) The holder of this environmental authority must advise the administering authority in writing of the action proposed or undertaken to resolve the complaint within 3 business days of completing the complaint investigation.
- (J26) 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 harm at any sensitive place.

- (J27) 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 5 business days of receiving the advice under condition (J26), unless a longer time is agreed to by the administering authority.
- (J28) If monitoring in accordance with condition (J26) and (J27), 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) do not result in further environmental nuisance.

Monitoring of Low Consequence Dams

- (J29) The condition of all low consequence 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 consequence assessment based on the particular circumstances of each dam.

Annual Regulated Dam Water Quality Monitoring

- (J30) The holder of this environmental authority must monitor the quality of water in all regulated dams on the petroleum tenure(s) covered by this environmental authority in the month of October every year.
- (J31) The monitoring of regulated dam water must include sufficient analytes and physico-chemical parameters to characterise water quality in the dam and must include, but not necessarily be limited to:
- (a) pH
 - (b) electrical conductivity [$\mu\text{S/m}$]
 - (c) turbidity [NTU]
 - (d) total dissolved solids [mg/L]
 - (e) temperature [$^{\circ}\text{C}$]
 - (f) dissolved oxygen [mg/L]
 - (g) alkalinity (bicarbonate, carbonate, hydroxide and total as CaCO_3) [mg/L]
 - (h) residual alkali [mg/L]
 - (i) sodium adsorption ratio (SAR)
 - (j) anions (bicarbonate, carbonate, hydroxide, chloride, fluoride, sulphate) [mg/L]
 - (k) cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L]
 - (l) silica [mg/L]
 - (m) dissolved and total metals (including but not necessarily being limited to: aluminium, arsenic, barium, boron, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, and zinc) [$\mu\text{g/L}$]
 - (n) total phosphorus [mg/L]
 - (o) ammonia, nitrate, nitrite as nitrogen [mg/L]
 - (p) total recoverable hydrocarbons [$\mu\text{g/L}$]
 - (q) BTEX (as benzene, toluene, ethylbenzene, ortho-xylene, para-xylene, meta-xylene and total xylene) [$\mu\text{g/L}$]; and
 - (r) polycyclic aromatic hydrocarbons (including but not necessarily being limited to naphthalene, phenanthrene, benzo[a]pyrene) [$\mu\text{g/L}$].

- (J32) Water quality samples of regulated dams must be representative of produced water in the dam. Water samples shall be taken as far as practicable from the edge of the regulated dam

Buried Flow Lines Rehabilitation Monitoring

- (J33) The holder of this environmental authority must monitor rehabilitated buried flow lines for subsidence and erosion after 20 business days and then at 120 business days after rehabilitation.

Progressive Rehabilitation Monitoring

- (J34) Regular maintenance and at least yearly monitoring of rehabilitated areas must take place to measure compliance with the requirements of condition (H5).

Monitoring of Rehabilitation Success

- (J35) At least yearly monitoring must be undertaken to demonstrate compliance with the requirements of condition (H6) for a minimum of 5 years after rehabilitation is completed.

Gas Injection Impact Monitoring Program

- (J36) The holder of this environmental authority must implement the Underground Gas Storage Monitoring Program required under condition (B9).

- (J37) The Underground Gas Storage Monitoring Program must include but not necessarily be limited to:
- (a) based on a risk assessment to ensure that injection activities are managed to prevent environmental harm and meet the additional requirements within this environmental authority;
 - (b) establishment of baseline data including but not limited to:
 - i. identification of the gas injection impact zone
 - ii. estimated volume and rates of gas to be injected
 - iii. development of a hydrogeological conceptualisation that includes:
 - aa. characterisation of aquifer geometry
 - ab. physiochemical and hydraulic properties (including groundwater levels/pressure) of the target formation as well as surrounding geological formations; and
 - ac. associated recharge and discharge processes that may influence movement and storage of the injected gas.
 - (c) validation of assumptions, predicted impacts and effectiveness of preventative measures (including details of any control or reference sites, methods for analysis and interpretation including a description of the statistical basis on which conclusions are drawn)
 - (d) operational monitoring to manage potential hazards including details on sampling and analysis methods (including frequency and locations) and quality assurance and control including but not limited to:
 - i. continuously recording injection pressure, flow rate, cumulative volume of the gas and pressure of the target formation
 - ii. daily monitoring and keeping of records of the quantity of gas injected into the formation;
 - iii. a temperature survey
 - iv. monitoring of gas water contact or saturation changes using a pulsed neutron-neutron method or equivalent technique approved by the administering authority
 - v. a casing integrity assessment technique such as:
 - aa. cement integrity log
 - ab. Ultra Sonic Imaging tool (USIT) log

- ac. Sonic Volume Density log (VDL); or
- ad. an equivalent survey technique approved by the administering authority.
- vi. profiling of the gas plume including rate of movement
- vii. weekly surface gas detectors
- viii. monthly for the first 12 months of operation and then quarterly groundwater level monitoring thereafter, of the target formation and other potentially affected aquifers
- ix. bi-annual monitoring of potentially affected landholder bores
- x. hydraulic gradient of the target formation within the Petroleum Lease (PL) 446; and
- xi. verification to assess the performance of the injection activities and compliance.

(J38) The injection monitoring program must be certified by a suitably qualified person.

SCHEDULE K – COMMUNITY ISSUES

- (K1) The holder of this environmental authority must maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident.
- (K2) 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 complaint
 - (c) reasons for the complaint as stated by the complainant
 - (d) investigations undertaken in response to the complaint
 - (e) conclusions formed
 - (f) actions taken to resolve complaint
 - (g) any abatement measures implemented to mitigate the cause of the complaint; and
 - (h) name and contact details of the person responsible for resolving the complaint.

SCHEDULE L - NOTIFICATION PROCEDURES

- (L1) The holder of this environmental authority must telephone the administering authority's 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 has been caused or may be caused.
- (L2) Notwithstanding condition (L1), the holder of this environmental authority must telephone the administering authority'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.
- (L3) Subject to condition (L1), the holder of this environmental authority must report spills of contaminants (including but not limited to hydrocarbons, produced 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 greater than 200L of hydrocarbons, or 5,000L of produced water to land; or
 - (c) releases of any volumes of contaminants where potential serious or material environmental harm has occurred or may occur.
- (L4) The notification of emergencies or incidents as required by conditions (L1), (L2) and (L3) 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) a 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.
- (L5) 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 (L4)(a) – (L4)(p)
 - (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.
- (L6) 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), 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.
- (L7) If groundwater contamination caused by the petroleum activity(ies) is encountered, the following must be reported to satisfy requirements under condition (L6):
 - (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.

Gas Injection Notification

- (L8) The holder of this environmental authority must telephone the administering authority's Pollution Hotline (telephone: 1300 130 373) as soon as reasonably practicable, but within 24 hours of becoming aware of:
 - (a) an injection or formation pressure reading exceeding the pressure limits calculated in accordance with condition (B6); or
 - (b) migration of injected gas out of the target formation; or
 - (c) hydraulic connection or potential hydraulic connection with any groundwaters; or
 - (d) detectable levels of the injected gas in the air; or
 - (e) the detection of groundwater contaminants that were not detected in background samples.

SCHEDULE M - DEFINITIONS

Note: Where a term is not defined in this environmental authority the definition in the Environmental Protection Act 1994, its regulations and Environmental Protection Policies, or the Acts Interpretation Act 1954, or the Macquarie Dictionary or the Petroleum and Gas (Production and Safety) Act 2004 or its regulations must be used in that order.

accepted engineering standards	in relation to dams, means those standards of design, construction, operation and maintenance that are broadly accepted within the profession of engineering as being good practice for the purpose and application being considered. In the case of dams, the most relevant documents would be publications of the Australian National Committee on Large Dams (ANCOLD), guidelines published by Queensland government departments and relevant Australian and New Zealand Standards.
acid sulfate soils	means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides (<i>actual acid sulfate soils</i>) and/or soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised (<i>potential acid sulfate soils</i>). 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.
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.
aggregation dam	means a regulated dam that receives and contains coal seam gas water or coal seam gas concentrate. The primary purpose of the dam must not be to evaporate the water even though this will naturally occur.
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 arrangements 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 undisturbed area of land against which land significantly disturbed by the carrying out of petroleum activities may be compared.
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 or more natural underground reservoirs for producing or storing petroleum. For clarity, an appraisal well does not include an exploration well.
associated works	in relation to a dam, means:

	- any kind and all things associated with the construction and operation of a dam; and - any land used for those operations.
Australian Standard 1055	means Australian Standard 1055.1:1997 "Description and Measurement of Environmental Noise – General procedures".
Australian Standard 2187	means Australian Standard 2187.0:1998 "Explosives—Storage, transport and use, Part 0", Australian Standard 2187.1:1998 "Explosives—Storage, transport and use Part 1" and Australian Standard 2187.2:2006 "Explosives—Storage and use, Part 2" or any updated versions that becomes available from time to time.
Australian Standard 2885	means Australian Standard 2885.0:2008 "Pipelines – Gas and Liquid Petroleum General Requirements", Australian Standard 2885.1:2007 "Pipelines – Gas and Liquid Petroleum Design and Construction" and Australian Standard 2885.3:2001 "Pipelines – Gas and Liquid Petroleum Operation and Maintenance", or any updated versions that becomes available from time to time.
Australian Standard 4323	means Australian Standard 4323.1:1995 "Stationary source emissions method 1: Selection of sampling positions".
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 <i>Environmental Protection Act 1994</i> 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: - with respect to dams, that the current or proposed owner of the land on which a dam stands, has found a use for that dam that is: - of benefit to that owner in that it adds real value to their business or to the general community - in accordance with relevant provisions of the <i>Environmental Protection Act 1994</i>, - sustainable by virtue of written undertakings given by that owner to maintain that dam, and - the transfer and use have been approved or authorised under any relevant legislation. Or

	with respect to coal seam gas water, refer to the Department of Environment and Resource Management's "Operational Policy - Management of water produced in association with petroleum activities" and "Notice of decision to approve a resource for beneficial use – CSG water" as amended from time to time.
black earth	means a type of soil, also known as vertosols and is a soil order of the Australian Soil Classification. These are clay soils with shrink/swell properties that display strong cracks when dry and/or lenticular structural aggregates at depth. They have high soil fertility and a large water holding capacity.
bore	means a water observation bore or a water supply bore that is either sub-artesian or artesian.
brine	means saline water with a total dissolved solid concentration greater than 40,000mg/l.
brine dam	means a regulated dam that is designed to receive, contain or evaporate brine.
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.
BTEX	means benzene, toluene, ethylbenzene, ortho-xylene, para-xylene, meta-xylene and total xylene.
business day	has the meaning in the <i>Acts Interpretation Act 1954</i> 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.
Category A Environmentally Sensitive Area	means any area listed in Section 12, Part 1, section 1 of the Environmental Protection Regulation 2008.
Category B Environmentally Sensitive Area	means any area listed in Section 12, Part 1, 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 <i>Nature Conservation Act 1992</i> - Koala Habitat Areas as defined under the <i>Nature Conservation (Koala) Conservation Plan 2006</i> - State Forests or Timber Reserves as defined under the <i>Forestry Act 1959</i> - Declared catchment areas under the <i>Water Act 2000</i> - Resources reserves under the <i>Nature Conservation Act 1992</i> - An area identified as "Essential Habitat" under the <i>Vegetation Management Act 1999</i> for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the <i>Nature Conservation Act 1992</i>



	- Any wetland shown on the Map of Referable Wetlands available from the administering authority's website; or - Of Concern Regional Ecosystems identified in the database maintained by the administering authority 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: - exactly what is being certified and the precise nature of that certification - the relevant legislative, regulatory and technical criteria on which the certification has been based - the relevant data and facts on which the certification has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and - the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.
"certify" or "certification" or "certified"	in relation to any matter other than a design plan, 'as constructed' drawings or an annual report regarding dams in this environmental authority means a Statutory Declaration by a suitably qualified person accompanying the written document stating that: - all relevant material has been considered in the written document - 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: - 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— - the flattening or compaction of vegetation by vehicles if the vegetation remains living; or - the slashing or mowing of vegetation to facilitate access tracks; or - the clearing of noxious or introduced plant species; or - destroying standing vegetation by stock ; and - in relation to trees—cutting down, ringbarking, pushing over, poisoning or destroying in any way, but does not include – - lopping a tree.
coal seam gas water	means groundwater that is necessarily or unavoidably brought to the surface in the process of coal seam gas exploration or production. Coal seam gas water typically contains significant concentrations of salts, has a high sodium adsorption ratio and may contain other contaminants that have the potential to cause environmental harm if released to land or waters through inappropriate management. Coal seam gas water is a waste, as defined under section 13 of the <i>Environmental Protection Act 1994</i>.
coal seam gas water concentrate	means the concentrated saline water waste stream from a water treatment process that does not exceed a total dissolved solid concentration of 40,000mg/L.

consequence 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 the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
construction	in relation to a dam includes building a new dam and modifying or lifting an existing dam but does not include investigations and testing necessary for the purposes of preparing a design plan.
dam	means a land-based structure or a void that is designed to contains, 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 <i>not</i> 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.
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.
document	has the meaning in the <i>Acts Interpretation Act 1954</i> and means: • any paper or other material on which there is writing • any paper or other material on which there are marks • 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 nonliving 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 petroleum activities such as rehabilitation. In other words, it does not refer to the 'completion' of the petroleum activity(ies), the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority.
equivalent person or EP	means an equivalent person under volume 1, section 2 of the "Guidelines for Planning and Design of Sewerage Schemes", October 1991, published by the Water Resources Commission, Department of Primary Industries, Fisheries and Forestry.
evaporation dam	means a land based structure designed to contain or impound coal seam gas water, the purpose of which is to contain or impound the water, until the water content has been removed by evaporation.
Existing dam	Means an existing evaporation, aggregation or brine dam and any dam that is constructed and/or whose construction had substantially commenced on the approval/issue date 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.
exploring for petroleum	means carrying out an activity for the purpose of finding petroleum or natural underground reservoirs as per section 14 of the <i>Petroleum and Gas (Production and Safety) Act 2004</i> for example including: • conducting a geochemical, geological or geophysical survey • drilling a well • carrying out testing in relation to a well; or • taking a sample for chemical or other analysis.
fill	means any kind of material in solid form (whether or not naturally occurring) capable of being deposited at a place but does not include material that forms a part of, or is associated with, a structure constructed in a watercourse, wetland or spring including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.
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	means 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.
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	means very unstable soils that are generally described as Sodosols with hard setting, fine

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soils	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.
hub	means more than one large compressor station and multiple items of fuel burning or combustion units located within 5km of each other and capable of burning fuel at a rate of at least 500kg/hr.
hydraulic performance	means the capacity of a regulated dam to contain or safely pass flowable substances based on the design criteria specified for the relevant consequence category in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
impulsive noise	means sound characterised by brief excursions of sound pressure (acoustic impulses) that significantly exceed the background sound pressure. The duration of a single impulsive sound is usually less than one second.
infrastructure	means plant or works including for example, communication systems, compressors, powerlines, pumping stations, reservoirs, roads and tracks, water storage dams, evaporation or storage ponds and tanks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activity(ies) including temporary structures or structures of an industrial or technical nature, including, for example, mobile and temporary camps.
	Infrastructure does not include other facilities required for the long term management of the impact of those petroleum activities or the protection of potential resources. Such other facilities include dams other than water storage dams (e.g. evaporation dams), pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.
$L_{Aeq, adj, 15 mins}$	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.
$L_{A 90, adj, 15 mins}$	means the A-weighted sound pressure level, adjusted for tonal character, that is equal to or exceeded for 90% of any 15 minutes sample period equal, using Fast response
lake	means: • a lagoon, swamp or other natural collection of water, whether permanent or intermittent; and • the bed and banks and any other element confining or containing the water.
landfill monocell	means a specialised, isolated landfill facility where a single specific waste type is exclusively disposed (i.e. salt).
leachate	means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of on-site which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.
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.
limited petroleum	mean only the following petroleum activities:

activities	• geophysical surveys (including seismic petroleum activities) • well sites • well pads • water pumps and generators associated with well operations • sumps • flare pits • gathering/flow pipelines from a well head to the initial compression facility; and • supporting access tracks. For clarity, limited petroleum activities exclude and are not necessarily limited to: • the construction of infrastructure for processing or storing petroleum or by-products • dams • borrow pits • ponds used to contain and/or store stimulation fluids • compressor stations • campsites/workforce accommodation • power supplies • 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) • waste disposal; or • other supporting infrastructure for the project (e.g. sewage treatment plants).
long term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than 5 days, even when there are respite periods when the noise is inaudible within those 5 days.
low consequence dam	means any dam that is not a high or significant consequence category as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
mandatory reporting level" or "MRL	means a warning and reporting level determined in accordance with the criteria in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures</i> prepared by the administering authority, as amended from time to time.
Max L_{pA} , 15 min	means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.
Max L_{pZ} , 15 min	means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.
mandatory reporting level or MRL	means a warning and reporting level determined in accordance with the criteria in the "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams" prepared by the administering authority, as amended from time to time.
medium term noise	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than 5 days and does not re-occur for a period of at least 4 weeks. Re-

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event	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 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.
Oil based drilling mud	means a mud where the base fluid is a petroleum product such as diesel fuel.
pest	means species: • declared under the <i>Land Protection (Pest and Stock route Management) Act 2002</i> • declared under Local Government model local laws; and • which may become invasive in the future.
prescribed storage gases	has the meaning provided in section 12 of the <i>Petroleum and Gas (Production and Safety) Act 2004</i> .
primary protection zone	means an area within a 200m buffer from the boundary of any Category A, B or C Environmentally Sensitive Area.
produced water	means groundwater that is necessarily or unavoidably brought to the surface in the process of conventional oil and gas exploration or production and the withdrawal of gas from an underground gas storage facility.
programmed and approved	means when the location of infrastructure has been approved by the authorised person(s) with the organisation(s).
regulated dam	means any dam in the significant or high consequence category as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> published by the administering authority.
rehabilitation	means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.
remnant unit	means a continuous polygon of remnant vegetation (as defined by the Queensland Herbarium) representative of a single RE type or a single heterogeneous unit.
remnant vegetation	means vegetation, part of which forms the predominant canopy of the vegetation— • covering more than 50% of the undisturbed predominant canopy; and • averaging more than 70% of the vegetation's undisturbed height; and • composed of species characteristic of the vegetation's undisturbed predominant canopy cover.
restricted	means fluids used for the purpose of stimulation, including fracturing, that contain the following chemicals, unless otherwise provided for under the Environmental Protection

stimulation fluids	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.
secondary protection zone	in relation to a Category A Environmentally Sensitive Area means an area within an 800m buffer from the boundary of a primary protection zone.
secondary protection zone	in relation to a Category B or C Environmentally Sensitive Area means an area within a 300m 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 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 12, section 4 of the Environmental Protection Regulation 2008.
spillway	means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.

spring	means the land to which water rises naturally from below the ground and the land over which the water then flows.
stable	in relation to land, means landform dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.
stimulation	means a technique used to increase the permeability of a natural underground reservoir, including for example, hydraulic fracturing/hydrofracting, fracture acidizing and the use of proppant treatments.
stimulation impact zone	means a 100m maximum radial distance from the stimulation target location within a gas producing formation.
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 a consequence assessment of a dam	means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time: • exactly what has been assessed and the precise nature of that assessment • the relevant legislative, regulatory and technical criteria on which the assessment has been based • 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 • the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

suitably qualified and experienced person in relation to dams	means one who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Engineers Act 1988, or registered as a National Professional Engineer (NPER) with the Institution of Engineers Australia, or holds equivalent professional qualifications to the satisfaction of the administering authority for the <i>Environmental Protection Act 1994</i>, and the administering authority for the <i>Environmental Protection Act 1994</i> is satisfied that person has knowledge, suitable experience and demonstrated expertise in relevant fields, as set out below: • knowledge of engineering principles related to the structures, geomechanics, hydrology, hydraulics, chemistry and environmental impact of dams; and • a total of 5 years of suitable experience and demonstrated expertise in the geomechanics of dams with particular emphasis on stability, geology and geochemistry; and • a total of 5 years of suitable experience and demonstrated expertise each, in 3 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; or ○ dam safety.
synthetic 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.
third party auditor	means a suitably qualified person who is either a certified third party auditor or an internal auditor employed by the holder of the environmental authority and the person is independent of the day to day management and operation of the petroleum activity(ies) covered by this environmental authority
threatening processes	means processes, features and actions that can have a detrimental effect upon the health and viability of an area of vegetation (e.g. altered hydrology, land use practices, invasion by pest and weed species, land degradation, edge effects and fragmentation).
tolerable limits	means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values (e.g. a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing damage and limiting infiltration and percolation).
topsoil	means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.
transmissivity	means the rate of flow of water through a vertical strip of aquifer which is one unit wide and which extends the full saturated depth of the aquifer.

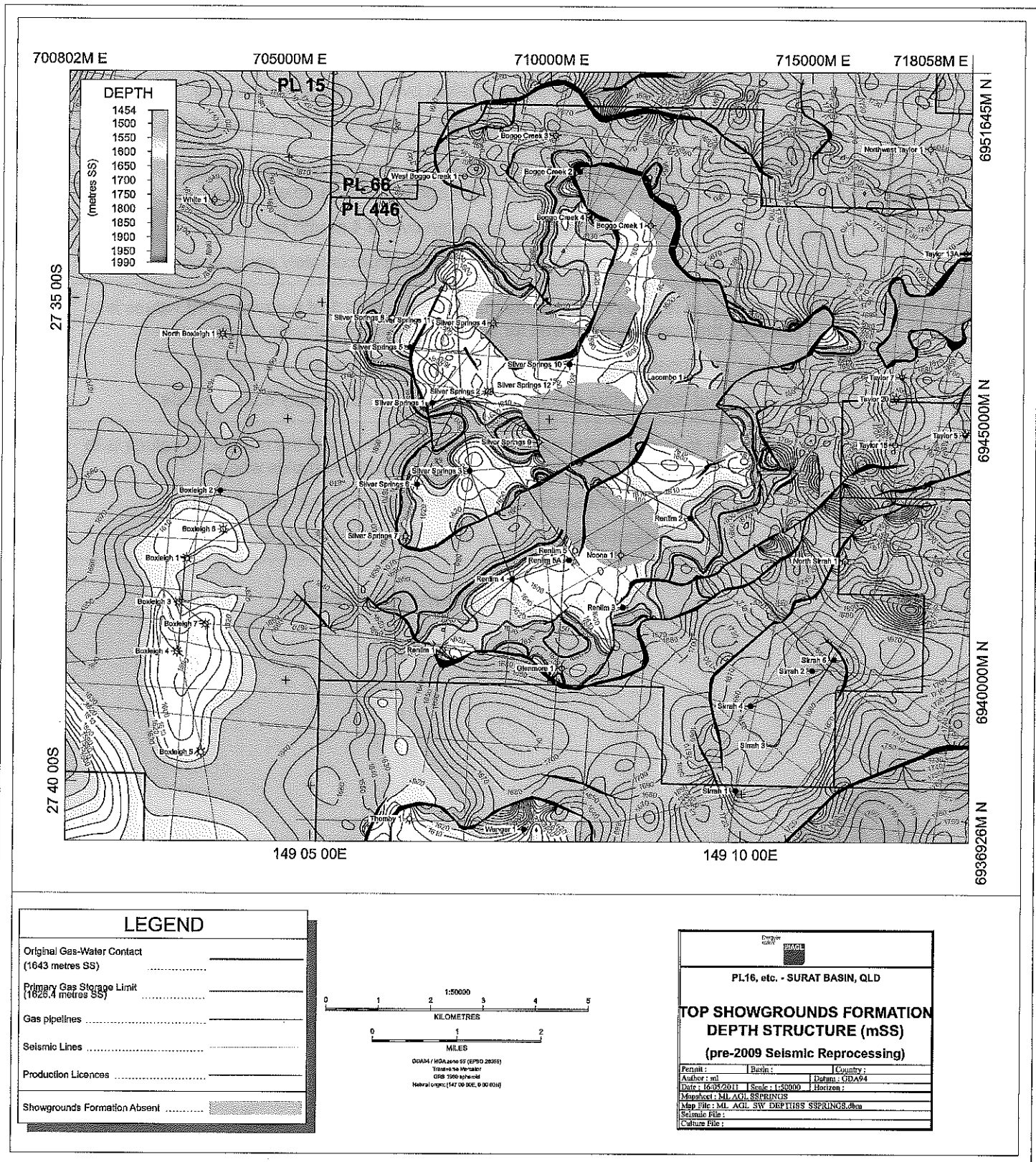
trenchless methods	means construction methods for the installation of pipelines and cables below the ground with minimal excavation. Trenchless methods can include, but not necessarily be limited to: • moling • pipe ramming method • horizontal directional drilling • utility tunneling, pipe jacking, auger boring • microtunnelling and pipe jacking; or • 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).
watercourse	has the meaning provided in section 5 of the <i>Water Act 2000</i> and includes the bed and banks and any other element of a river, creek or stream confining or containing water.
waters	includes all or any part of a creek, river, stream, lake, lagoon, swamp, wetland, spring, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any waters, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and underground water.
well lease infrastructure	means infrastructure required for the construction and completion of a well including but not limited to cellar pits, dams and drill sumps.
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 6m. 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. Examples under this definition exclude: • areas that may be covered by water but are not wetlands according to the definition • floodplains that are intermittently covered by flowing water but do not meet the hydrophytes and soil criteria • the riparian zone above the saturation level.

year	means a period of 12 months.
20th percentile	in relation to release limits means that not more than 4 of the measured values is to exceed the stated release limit for any 5 consecutive samples where: • the consecutive samples are taken over a 5 month period; and • the consecutive samples are taken at approximately equal periods.
25th percentile	in relation to release limits means that not more than 3 of the measured values is to exceed the stated release limit for any 4 consecutive samples where: • the consecutive samples are taken over a 4 month period; and • the consecutive samples are taken at approximately equal periods.
75th percentile	in relation to release limits means that not more than 1 of the measured values is to exceed the stated release limit for any 4 consecutive samples where: • the consecutive samples are taken over a 4 month period; and • the consecutive samples are taken at approximately equal periods.
80th percentile	in relation to release limits means that not more than 1 of the measured values is to exceed the stated release limit for any 5 consecutive samples where: • the consecutive samples are taken over a 5 month period; and • the consecutive samples are taken at approximately equal periods.

End of Environmental Authority

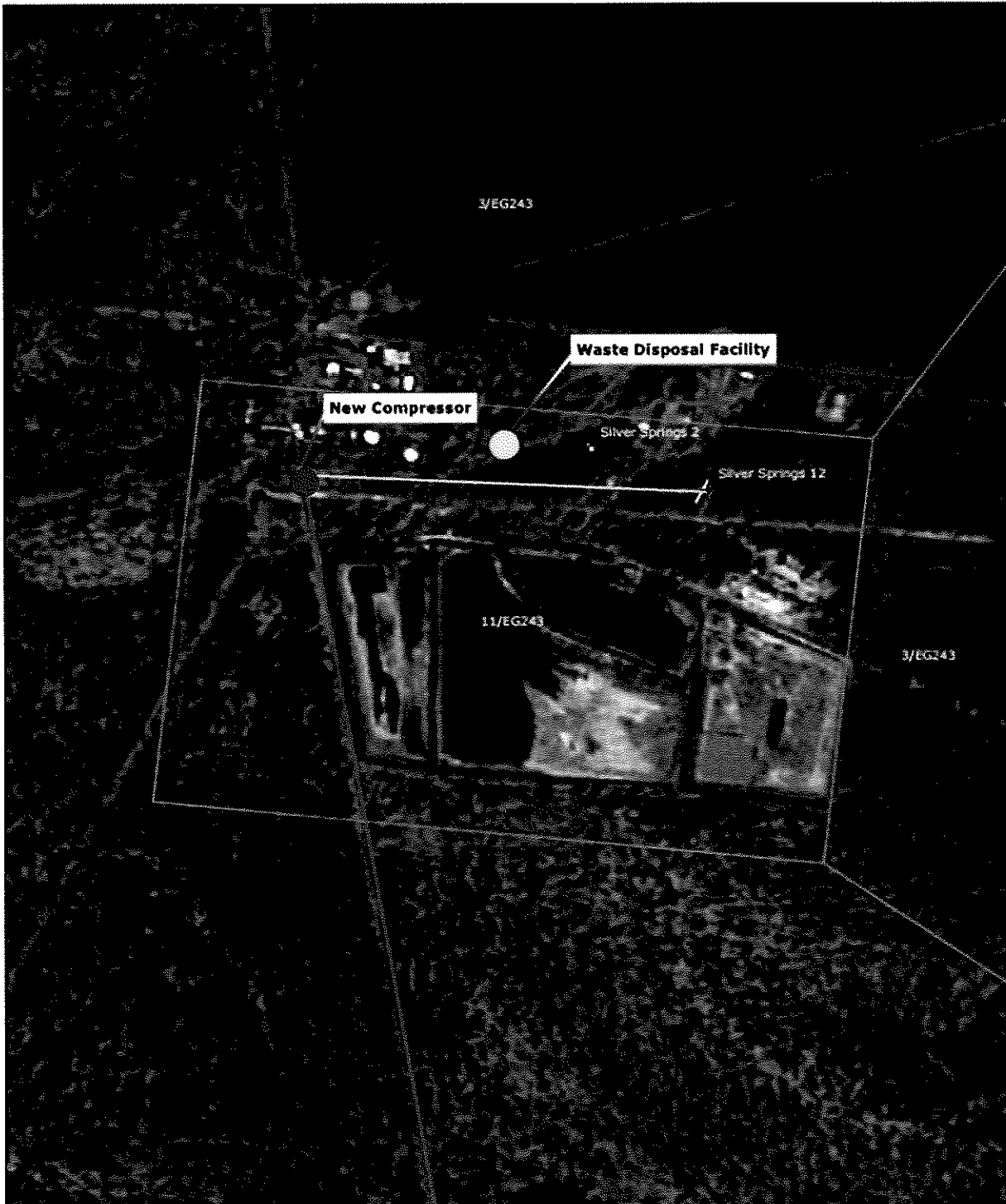
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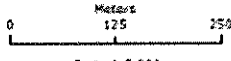
Appendix 1



Appendix 2

Silver Springs Gas Storage Project



 	Author: Upstream Gas	 Geoscience Data of Australia 1994	Legend Well  New Well  Abandon  Cadastre	 Existing Flowline  New Flowline  New Compressor  Waste Disposal Facility	
	Date: 10/05/2011				
	Ref: 2624R.3				

Disclaimer: While AGL has taken great care and attention to ensure the accuracy of the data represented on this map, no liability shall be accepted for any errors or omissions. No part of this map may be reproduced without prior permission of AGL.

Sources: AGL Energy Limited, MapData Sciences

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