

Permit¹

Environmental Protection Act 1994
Environmental Authority EPML00961613
Springsure Creek Coal Project

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

Permit¹ number: EPML00961613

Environmental authority takes effect: 30 July 2018

Anniversary date: 30 July

Environmental authority holder(s)

Permit Holder(s)	Name	Registered address
Principal Holder	Springsure Creek Coal Pty Ltd ABN 34 009 356 665	Level 4, 260 Queen Street Brisbane QLD 4001

Environmentally relevant activity and location details

Environmentally relevant activities	Location
13 Mining Black Coal Schedule 2A – <i>Environmental Protection Regulation 2008</i>	ML70486
8 (1) (a) Chemical Storage Storage of 50t or more of chemicals of dangerous goods class 1 or class 2, division 2.3 in containers of at least 10m ³ . <i>Schedule 2 – Environmental Protection Regulation 2008</i>	
16 (2) (b) Extractive and Screening Activities Extracting, other than by dredging, in a year, the following quantity of material: - 5000t to 100000t <i>Schedule 2 – Environmental Protection Regulation 2008</i>	
31 (1) Mineral Processing Processing 1000t or more of coke in a year. <i>Schedule 2 - Environmental Protection Regulation 2008</i>	
33 (1) Crushing, Milling, Grinding or Screening Crushing, grinding, milling or screening more than 5000t of material in a year. <i>Schedule 2 - Environmental Protection Regulation 2008</i>	
63 (2) (a) Sewage Treatment Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of: - 21 to 100EP. <i>Schedule 2 - Environmental Protection Regulation 2008</i>	

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



Additional information for applicants

This environmental authority authorises environmental harm referred to in the conditions. Where there is no condition or this environmental authority is silent on a matter, the lack of a condition or silence does not authorise environmental harm.

Definitions

Words and phrases used throughout this environmental authority are defined at the end of this environmental authority. Where a definition for a term used in this environmental authority is not provided within this environmental authority, but is provided in the **Environmental Protection Act 1994** or subordinate legislation, the definition in the EP Act or subordinate legislation must be used. If a word remains undefined it has its ordinary English meaning.

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.

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

Contaminated land

It is a requirement of the EP Act that if an owner or occupier of land becomes aware a notifiable activity (as defined in Schedule 3 and Schedule 4) 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)



Signature

Gillian Naylor
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

30 July 2018

Date

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Conditions of environmental authority

Schedule A - General	
Condition number	Condition
A1	Scope of activity This environmental authority authorises a coal extraction rate of up to 11 million tonnes per annum (Mtpa) of run of mine (ROM) coal from the Springsure Creek Coal Mine located on ML70486 in accordance with this environmental authority (permit number EPML00961613).
A2	In carrying out the mining activity authorised by this environmental authority, the holder of this environmental authority must comply with Table A1: Mine domains. The mine domains must not exceed the area of disturbance specified in Table A1: Mine domains. <i>Note: Variation of mining activities identified in Table A1: Mine domains is permitted providing it does not result in an increase in environmental harm.</i>
A3	Maintenance and operation of plant and equipment The holder of this 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 a proper and efficient condition c) operate such measures, plant and equipment in a proper and efficient manner d) ensure all instruments and devices used for the measurement or monitoring of any parameter under any condition of this environmental authority are properly calibrated.
A4	Monitoring Except where specified otherwise in another condition of this environmental authority, all monitoring records or reports required by this environmental authority must be kept for a period of not less than five (5) years.
A5	Financial assurance Provide financial assurance in the amount and form required by the administering authority in accordance with the EP Act, prior to the commencement of activities proposed under this Environmental Authority.
A6	The amount of financial assurance must be reviewed by the holder of this environmental authority when a plan of operations is amended or replaced or the environmental authority is amended.
A7	Risk Management The holder of this environmental authority must develop and implement a risk management system for mining activities which mirrors the content requirement of the Standard for Risk Management (ISO31000:2009), or the latest edition of an Australian standard for risk management, to the extent relevant to environmental management, within three (3) months from date of issue of this environmental authority.
A8	Notification of emergencies, incidents and exceptions The holder of this environmental authority must notify the administering authority by written notification within twenty-four (24) hours, after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this environmental authority.

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A9	Within ten (10) business days following the initial notification of an emergency or incident, or receipt of monitoring results, whichever is the latter, further written advice must be provided to the administering authority, including the following: a) results and interpretation of any samples taken and analysed b) outcomes of actions taken at the time to prevent or minimise unlawful environmental harm c) proposed actions to prevent a recurrence of the emergency or incident.
A10	Complaints The holder of this environmental authority must record all environmental complaints received about the mining activities including: a) name, address and contact number for of the complainant b) time and date of complaint c) reasons for the complaint d) investigations undertaken e) conclusions formed f) actions taken to resolve the complaint g) any abatement measures implemented h) person responsible for resolving the complaint.
A11	The holder of this environmental authority must, when requested by the administering authority, undertake relevant specified monitoring within a reasonable timeframe nominated or agreed to by the administering authority to investigate any complaint of environmental harm. The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures, where implemented, must be provided to the administering authority within ten (10) business days of completion of the investigation, or no later than ten (10) business days after the end of the timeframe nominated by the administering authority to undertake the investigation.
A12	Third-party reporting The holder of this environmental authority must: a) within one (1) year of the commencement of this environmental authority, obtain from an appropriately qualified person a report on compliance with the conditions of this environmental authority; b) obtain further such reports at regular intervals, not exceeding three (3) yearly intervals, from the completion of the report referred to above; and c) provide each report to the administering authority within ninety (90) days of its completion.
A13	Where a condition of this environmental authority requires compliance with a standard, policy or guideline published externally to this environmental authority and the standard is amended or changed subsequent to the issue of this environmental authority, the holder of this environmental authority must: a) comply with the amended or changed standard, policy or guideline within two (2) years of the amendment or change being made, unless a different period is specified in the amended standard or relevant legislation, or where the amendment or change relates specifically to regulated structures referred to in Schedule G. b) until compliance with the amended or changed standard, policy or guideline is achieved, continue to remain in compliance with the corresponding provision that was current immediately prior to the relevant amendment or change.

Table A1: Mine Domains

Mine domain	Description	Location	Maximum Area of Disturbance (ha)
1. Subsided areas	Irrigated/non-irrigated cropping land, underground mining.	ML70486 (refer to Figure 2: Springsure Creek Coal Project Final Rehabilitated Landform)	8,711
2. Infrastructure	Includes MIA (bathhouse, administration buildings, workshop, fuelling facilities, rescue and emergency), CHP, ROM, sewage/water treatment plant, stockpiles, helipad, mine site access and hardstand.		34.3
	Environmental dams, raw water dam, sediment dams and mine water dams.		26
3. Mine void	Drift portal entry.		2.7
4. Other land	Exploration, groundwater monitoring bores.		1,877
Total			10,651

Schedule B - Air	
Condition number	Condition
B1	Dust nuisance The holder of this environmental authority shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the dust and particulate matter emissions generated by the mining activities do not exceed the following levels when measured at any sensitive or commercial place: - dust deposition of 120 milligrams per square metre per day, averaged over 1 month, when monitored in accordance with the most recent version of Australian Standard AS3580.10.1 Methods for sampling and analysis of ambient air—Determination of particulate matter—Deposited matter – Gravimetric method. - a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM₁₀) suspended in the atmosphere of 50 micrograms per cubic metre over a 24 hour averaging time, for no more than 5 exceedances recorded each year, when monitored in accordance with the most recent version of either: - Australian Standard AS3580.9.6 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM₁₀ high volume sampler with size-selective inlet – Gravimetric method; or - Australian Standard AS3580.9.9 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM₁₀ low volume sampler—Gravimetric method. - a concentration of particulate matter with an aerodynamic diameter of less than 2.5 micrometres (PM_{2.5}) suspended in the atmosphere of 25 micrograms per cubic metre over a 24-hour averaging time, when monitored in accordance with the most recent version of AS/NZS3580.9.10 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM (sub) 2.5 (/sub) low volume sampler—Gravimetric method. - a concentration of particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time, when monitored in accordance with the most recent version of AS/NZS3580.9.3:2003 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—Total suspended particulate matter (TSP)—High volume sampler gravimetric method or using an alternative sampling methodology determined in consultation with the administering authority.
B2	An Air Quality Management Plan must be developed by a suitably qualified and experienced person and submitted to the administering authority for approval at least three (3) months prior to the commencement of mining activities.

B3	The Air Quality Management Plan must: a) provide for the effective management of actual and potential environmental impacts resulting from air management associated with mining activities carried out under this environmental authority; b) be developed by an appropriately qualified and experienced person; c) identify all major sources of dust emissions that may occur as a result of mining activities; d) identify all potential sensitive and commercial locations that may be affected by air quality impacts from mining activities; e) describe the procedures that will be used to manage dust emissions; f) detail the collection of air quality and meteorological data in accordance with the administering authority's Air Quality Sampling Manual; g) identify the adverse meteorological conditions likely to produce elevated levels of PM10 at a sensitive or commercial place due to mining activities; h) detail the protocols for regular maintenance of plant and equipment to minimise the potential for fugitive dust emissions; and i) describe the procedures to be undertaken if any non-compliance is detected.
B4	The holder of this environmental authority must undertake air quality monitoring in accordance with condition B1 at the locations specified in Table B1: Air quality monitoring locations .

Table B1: Air quality monitoring locations

Monitoring Point	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)
Springton Homestead	-23.9384	148.3764
Den-Lo Park Homestead	-23.9447	148.3666
AM1	-23.9007	148.3725
AM2	-23.9227	148.35395
AM3	-23.9747	148.3515
AM4*	-23.8771	148.3100
AM5*	-23.8559	148.3329

*Monitoring locations to be confirmed.

Schedule C - Waste management	
Condition number	Condition
C1	All general and regulated waste must only be removed and transported from site by a person who has the authority to transport such wastes to a facility that is lawfully able to accept the waste under the <i>Environmental Protection Act 1994</i>. <i>Note: It is an offence under the Stock Act 1915 and Stock Regulation 1988 to allow or fail to take every reasonable measure to prevent stock access to animal matter or animal contaminated matter.</i>
C2	A Waste Management Plan must be developed and implemented at least three (3) months prior to the commencement of mining activities.
C3	The Waste Management Plan must include: - a description of the mining activities that may generate waste; - waste management control strategies such as: - the types and amounts of wastes generated by the mining activities. - segregation of the wastes. - storage of the wastes. - transport of wastes. - monitoring and reporting matters concerning the wastes. - the hazardous characteristics of the wastes generated including disposal for hazardous wastes; - a program for reusing, recycling or disposing of all wastes; - how the waste will be dealt with in accordance with the waste management hierarchy, including a description of the types and amounts of waste that will be dealt with under each of the waste management practices in the waste management hierarchy (that is, avoidance, reuse, recycling, energy recovery and disposal); - procedures for identifying and implementing opportunities to minimise the amount of waste generated, promote efficiency in the use of resources and improve the waste management practices employed; - procedures for dealing with accidents, spills and other incidents; - details of any accredited management system employed, or planned to be employed, to deal with waste; - how often the performance of the waste management plan will be assessed; - the indicators or other criteria on which the performance of the waste management plan will be assessed; - staff training and induction to the waste management plan.
C4	The Waste Management Plan must be made available to the administering authority on request.
C5	Storage of tyres Scrap tyres waiting to be transported off site for disposal, recycling, take-back or waste-to-energy options must be stockpiled in volumes less than 3m in height and 200m² in area and at least 10m from any other tyre storage area or combustible or flammable material, including vegetation.
C6	Unless otherwise permitted by the conditions of this environmental authority or with prior approval from the administering authority and in accordance with a relevant standard operating procedure, waste must not be burnt.

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C7	The holder of this environmental authority may burn vegetation cleared in the course of carrying out extraction activities provided the activity does not cause environmental harm at any sensitive place or commercial place.
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Schedule D – Noise	
Condition number	Condition
D1	Noise limits The holder of this environmental authority must ensure that noise generated from the mining activities must not cause the criteria in Table D1: Noise limits to be exceeded at any sensitive or commercial place.
D2	Airblast overpressure The holder of this environmental authority must ensure that blasting does not cause the limits for peak particle velocity and airblast overpressure in Table D2: Blasting noise limits to be exceeded at any sensitive or commercial place.
D3	Monitoring and reporting Noise monitoring and recording must include the following descriptor characteristics and matters: a) LAN,T (where N equals the statistical levels of 1, 10 and 90 and T = 15 mins) b) background noise LA90 c) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels d) atmospheric conditions including temperature, relative humidity and wind speed and directions e) effects due to any extraneous factors such as traffic noise f) location, date and time of monitoring g) if the complaint concerns low frequency noise, Max L_{nl}LN,T and one third octave
D4	A noise and vibration monitoring program must be developed by a suitably qualified and experienced person to monitor compliance with Table D1: Noise limits and Table D2: Blasting noise limits. The noise and vibration monitoring program must be implemented at least three (3) months prior to the commencement of mining activities.
D5	The noise and vibration monitoring program must be made available to the administering authority on request.

Table D1: Noise limits

Noise level dB(A)	Monday to Sunday (including public holidays)		
	7am - 6pm	6pm - 10pm	10pm - 7am
	Noise measured at a 'sensitive or commercial place'		
L _{Aeq} , adj, 15 mins	RBL ₃ + 5	RBL ₃ + 5	RBL ₃ + 5
L _{A1} , adj, 15 mins	45	45	45

Table D2: Blasting noise limits

Blasting noise limits	Sensitive or commercial blasting noise limits	
	Monday – Sunday 8am - 5pm	Other times and public holidays
Airblast overpressure	115 dB (Linear) Peak for 4 out of 5 consecutive blasts initiated and not greater than 120 dB (Linear) Peak at any time.	No blasting impacts to occur
Ground vibration peak particle velocity	10mm/s for ground vibrations of no more than 35Hz and 25mm/s for ground vibration of more than 35Hz.	No blasting impacts to occur

Schedule E – Groundwater	
Condition number	Condition
E1	The holder of this environmental authority must not release contaminants to groundwater.
E2	Monitoring and reporting A groundwater quality and biological monitoring and management program must be developed by an appropriately qualified and experienced person and implemented at least three (3) months prior to the commencement of mining activities.
E3	The groundwater quality and biological monitoring and management program must include: a) description of potential impacts of mining activities on groundwater; b) groundwater monitoring bore locations and construction details; c) justification for the location of proposed groundwater monitoring locations; d) the collection of representative groundwater samples from aquifers identified as being potentially affected by mining activities, including but not limited to quality characteristics, groundwater flow rates, hydraulic conductivity within the aquifer and connection with other aquifers and surface waters and impacts to groundwater levels over the life of the mine; e) a sampling regime for determining background groundwater quality; f) the identification of natural groundwater levels and fluctuation; g) three (3) yearly investigations into the presence of Groundwater Dependent Ecosystems (GDEs), including stygofauna. h) identification and monitoring of areas having the potential to support groundwater dependent vegetation.
E4	The groundwater and biological monitoring and management program must be made available to the administering authority on request.
E5	The groundwater monitoring locations must be submitted to the administering authority for inclusion in Table E1: Groundwater monitoring locations and frequency at least three (3) months prior to the commencement of mining activities.
E6	Groundwater quality triggers and limits as per Table E2: Groundwater quality triggers and limits must be finalised and submitted to the administering authority at least three (3) months prior to the commencement of mining activities.
E7	Groundwater quality and levels must be monitored at the locations and frequencies defined in Table E1: Groundwater monitoring locations and frequency for quality characteristics identified in Table E2: Groundwater triggers and limits .
E8	Exceedance investigation If quality characteristics of groundwater exceed any of the trigger levels stated in Table E2: Groundwater triggers and limits at any of the monitoring locations identified in Table E1: Groundwater monitoring locations and frequency , the holder of this environmental authority must complete an investigation in accordance with the ANZECC and ARMCANZ 2000 and notify the administering authority within twenty-eight (28) days of receiving the results of the laboratory analysis.
E9	Results of monitoring of groundwater at the bores identified in Table E1: Groundwater monitoring locations and frequency must not exceed any of the limits defined in Table E2: Groundwater triggers and limits .

E10	The construction, maintenance and management of groundwater monitoring bores must be undertaken in a manner that prevents or minimises impacts to the environment and ensures the integrity of the bores to obtain accurate monitoring.
E11	No impact to groundwater levels within the groundwater aquifers is to occur other than where authorised under an approval of the Water Act 2000 .

Table E1: Groundwater monitoring locations and frequency

Monitoring Point	Location		Surface RL (m)	Monitoring Frequency
	Longitude (decimal degree, GDA94)	Latitude (decimal degree, GDA94)		
TBA	TBA	TBA	TBA	TBA
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	
TBA	TBA	TBA	TBA	

Table E2: Groundwater quality triggers and limits

Parameter	Contaminant triggers ¹	Contaminant limits ¹
Standing water level (m)	TBA	TBA
pH (Units)	TBA	TBA
Electrical Conductivity (µS/cm)	TBA	TBA
Total Dissolved Solids (mg/L)	TBA	TBA
Calcium (mg/L)	TBA	TBA
Magnesium (mg/L)	TBA	TBA
Sodium (mg/L)	TBA	TBA
Potassium (mg/L)	TBA	TBA
Chlorine (mg/L)	TBA	TBA
SO ₄ (mg/L)	TBA	TBA
CO ₃ (mg/L)	TBA	TBA
HCO ₃ (mg/L)	TBA	TBA
Iron (mg/L)	TBA	TBA
Aluminium (mg/L)	TBA	TBA
Silver (mg/L)	TBA	TBA
Arsenic (mg/L)	TBA	TBA
Mercury (mg/L)	TBA	TBA
Antimony (mg/L)	TBA	TBA
Molybdenum (mg/L)	TBA	TBA
Selenium (mg/L)	TBA	TBA
Total Petroleum Hydrocarbons (mg/L)	TBA	TBA

¹Limits and triggers to be determined based on background monitoring program of representative groundwater samples from aquifers identified as potentially affected by mining activities, including at least 12 sampling events (with sampling distribution to ensure sufficient samples are obtained in all seasons, and is submitted to the administering authority in accordance with condition E3. Triggers to be determined on 85th percentile of background. Limits to be determined based on 99th percentile of background.

Schedule F – Water	
Condition number	Condition
F1	Contaminant release Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters as a result of the authorised mining activities, except as permitted under the conditions of this environmental authority.
F2	Unless otherwise permitted under the conditions of this environmental authority, the release of mine affected water to waters must only occur from the release points specified in Table F1: Mine affected water release points, sources and receiving waters and depicted in Figure 18-19 Dam Spillway, Piped Release points & Associated Monitoring Locations attached to this environmental authority.
F3	The release of mine affected water to internal water management infrastructure installed and operated in accordance with a water management plan that complies with condition F28 is permitted.
F4	The release of mine affected water to waters in accordance with condition F2 must not exceed the release limits stated in Table F2: Mine affected water release limits when measured at the monitoring points specified in Table F1: Mine affected water release points, sources and receiving waters for each quality characteristic.

Table F1: Mine affected water release points, sources and receiving waters

Release Point (RP)	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)	Mine Affected Water Source and Location	Monitoring Point	Receiving waters description
RP1	-23.911293	148.375171	Environmental Dam 1	Spillway	Drummond Gully (unnamed Creek 1)
RP2	-23.910996	148.378535	Environmental Dam 1	Outfall pipe	Drummond Gully (unnamed Creek 1)
RP3	-23.904165	148.375589	Environmental Dam 2	Spillway	Drummond Gully (unnamed Creek 1)
RP4	-23.903735	148.377334	Environmental Dam 2	Outfall pipe	Drummond Gully (unnamed Creek 1)
RP5	-23.900955	148.371795	Environmental Dam 3	Spillway	Drummond Gully (unnamed Creek 1)
RP6	-23.900746	148.371804	Environmental Dam 3	Outfall pipe	Drummond Gully (unnamed Creek 1)
RP7	-23.931248	148.366391	Environmental Dam 4	Spillway	Drummond Gully (unnamed Creek 1)
RP8	-23.931555	148.367142	Environmental Dam 4	Outfall pipe	Drummond Gully (unnamed Creek 1)
RP9	-23.921164	148.371815	Mine Water Dam	Spillway	Drummond Gully (unnamed Creek 1)
RP10	-23.921605	148.378492	Mine Water Dam	Outfall pipe	Drummond Gully (unnamed Creek 1)

F5	The release of mine affected water to waters from the release points must be monitored at the locations specified in Table F1: Mine affected water release points, sources and receiving waters for each quality characteristic and at the frequency specified in Table F2: Mine affected water release limits and Table F3: Release contaminant trigger investigation levels, potential contaminants. <i>Note: The administering authority will take into consideration any extenuating circumstances prior to determining an appropriate enforcement response in the event condition F5 is contravened due to a temporary lack of safe or practical access. The administering authority expects the environmental authority holder to take all reasonable and practicable measures to maintain safe and practical access to designated monitoring locations.</i>
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Table F2: Mine affected water release points

Quality Characteristic	Release Limits	Monitoring Frequency
Electrical conductivity ($\mu\text{S}/\text{cm}$)	Release limits specified in Table F4 for variable flow criteria.	Daily during release (the first sample must be taken within 2 hours of commencement of release)
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	
Turbidity (NTU)	<50	
Sulphate (SO_4^{2-}) (mg/L)	Release limits specified in Table F4 for variable flow criteria.	

F6	If quality characteristics of the release exceed any of the trigger levels specified in Table F3: Release contaminant trigger investigation levels, potential contaminants during a release event, the environmental authority holder must compare the downstream results in the receiving waters to the trigger values specified in Table F3: Release contaminant trigger investigation levels, potential contaminants and: a) where the trigger values are not exceeded then no action is to be taken; or b) where the downstream results exceed the trigger values specified Table F3: Release contaminant trigger investigation levels, potential contaminants for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and: 1. if the result is less than the background monitoring site data, then no action is to be taken; or 2. if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority within ninety (90) days of receiving the result, outlining: i. details of the investigations carried out ii. actions taken to prevent environmental harm. <i>Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with F6 b (2) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.</i>
F7	If an exceedance in accordance with condition F6 b (2) is identified, the holder of the environmental authority must notify the administering authority in writing within twenty-four (24) hours of receiving the result.

F8	Mine affected water release events The holder must ensure a stream flow gauging station/s is installed, operated and maintained to determine and record stream flows at the locations and flow recording frequency specified in Table F3: Release contaminant trigger investigation levels, potential contaminants.
F9	Notwithstanding any other condition of this environmental authority, the release of mine affected water to waters in accordance with condition F2 must only take place during periods of natural flow in accordance with the receiving water flow criteria for discharge specified in Table F4: Mine affected water release during flow events for the release point(s) specified in Table F1: Mine affected water release points, sources and receiving waters.
F10	The release of mine affected water to waters in accordance with condition F2 must not exceed the Maximum Release Rate (for all combined release point flows) for each receiving water flow criterion for discharge specified in Table F4: Mine affected water release during flow events when measured at the monitoring points specified in Table F1: Mine affected water release points, sources and receiving waters.
F11	The daily quantity of mine affected water release from each release point must be measured and recorded.
F12	Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build-up of sediment in such waters.

Table F3: Release contaminant trigger investigation levels, potential contaminants

Quality Characteristic	Trigger Levels (µg/L)	Comment on Trigger Level	Monitoring Frequency
Aluminium	55	For aquatic ecosystem protection, based on LOR for ICPMS	Commencement of release and weekly thereafter during release (the first sample to be taken within 2 hours of commencement of a release)
Arsenic	13	For aquatic ecosystem protection, based on SMD guideline	
Cadmium	0.2	For aquatic ecosystem protection, based on SMD guideline	
Chromium	1	For aquatic ecosystem protection, based on SMD guideline	
Copper	1.4	For aquatic ecosystem protection, based on LOR for ICPMS	
Iron	300	For aquatic ecosystem protection, based on low reliability guideline	
Lead	3.4	For aquatic ecosystem protection, based on LOR for ICPMS	
Mercury	0.6	For aquatic ecosystem protection, based on LOR for CV FIMS	
Nickel	11	For aquatic ecosystem protection, based on SMD guideline	
Zinc	8	For aquatic ecosystem protection, based on SMD guideline	
Boron	370	For aquatic ecosystem protection, based on SMD guideline	
Cobalt	90	For aquatic ecosystem protection, based on low reliability guideline	
Manganese	1900	For aquatic ecosystem protection, based on SMD guideline	
Molybdenum	34	For aquatic ecosystem protection, based on low reliability guideline	
Selenium	11	For aquatic ecosystem protection, based on LOR for ICPMS	
Silver	0.05	For aquatic ecosystem protection, based on LOR for ICPMS	
Uranium	1	For aquatic ecosystem protection, based on LOR for ICPMS	
Vanadium	10	For aquatic ecosystem protection, based on LOR for ICPMS	
Ammonia	900	For aquatic ecosystem protection, based on SMD guideline	
Nitrate	700	For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN	
Petroleum hydrocarbons (C6-C9)	20	For aquatic ecosystem protection, based on LOR for Lab Analysis	
Petroleum hydrocarbons (C10-C36)	100	For aquatic ecosystem protection, based on LOR for Lab Analysis	
Sodium	2000	Protection of livestock and short term irrigation	

Note: Local trigger values to be developed prior to commencement of mining.

1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.
2. The quality characteristics required to be monitored as per Table F3: Release contaminant trigger investigation levels, potential contaminants can be reviewed once the results of two (2) years monitoring data is available, or if sufficient data is available to adequately demonstrate negligible environmental risk, and it may be determined that a reduced monitoring frequency is appropriate or that certain quality characteristics can be removed from Table F3: Release contaminant trigger investigation levels, potential contaminants by amendment.
3. SMD – slightly moderately disturbed level of protection; guideline refers ANZECC & ARMCANZ (2000).
4. LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.

Table F4: Mine affected water release during flow events

Receiving waters	Release Point (RP)	Gauging station	Gauging station Latitude (decimal degree, GDA94)	Gauging station Longitude (decimal degree, GDA94)	Receiving water flow recording frequency	Receiving water flow criteria for discharge (m³/s)	Maximum release rate (for all combined RP flows)	Electrical conductivity Release Limits
Drummond Gully (unnamed Creek 1)	RP1	Monitoring Point 1	-23.8755	148.3616	Continuous	Low Flow < 1.0 m³/s for a period of 28 days after natural flow events that exceed 1.0 m³/s	0.1 m³/s	Electrical Conductivity: 375 µS/cm Sulphate: 250 mg/L
	RP2	Monitoring Point 2	-23.9503	148.3471				
	RP3							
	RP4	Monitoring Point 3	-23.8900	148.3547		Medium Flow ≥ 1.0 m³/s	0.563 m³/s	Electrical Conductivity: 1,500 µS/cm Sulphate: 250 mg/L
	RP5							
	RP6							
	RP7					High Flow ≥ 5.0 m³/s	2.831 m³/s	Electrical Conductivity: 1,500 µS/cm Sulphate: 250 mg/L
	RP8							
	RP9							
	RP10							

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F13	Notification of release event The environmental authority holder must notify the administering authority as soon as practicable and no later than twenty-four (24) hours after commencing to release mine affected water to the receiving environment. Notification must include the submission of written advice to the administering authority of the following information: a) release commencement date/time b) details regarding the compliance of the release with the conditions of Department Interest: Water of this environmental authority (that is, contaminant limits, natural flow, discharge volume) c) release point/s d) release rate e) release salinity f) receiving water/s including the natural flow rate. <i>Note: Notification to the administering authority must be addressed to the Manager and Project Manager of the local Administering Authority via email or facsimile.</i>
F14	The environmental authority holder must notify the administering authority as soon as practicable and nominally no later than twenty-four (24) hours after cessation of a release event of the cessation of a release notified under condition F13 and within twenty-eight (28) days provide the following information in writing: a) release cessation date/time b) natural flow rate in receiving water c) volume of water released d) details regarding the compliance of the release with the conditions of Department Interest; Water of this environmental authority (i.e. contaminant limits, natural flow, discharge volume) e) all in-situ water quality monitoring results f) any other matters pertinent to the water release event. <i>Note: Successive or intermittent releases occurring within 24 hours of the cessation of any individual release can be considered part of a single release event and do not require individual notification for the purpose of compliance with conditions F13 and F14, provided the relevant details of the release are included within the notification provided in accordance with conditions F13 and F14.</i>
F15	Notification of release event exceedance If the release limits defined in Table F2: Mine affected water release limits are exceeded, the holder of the environmental authority must notify the administering authority in writing within twenty-four (24) hours of receiving the results.
F16	The environmental authority holder must, within twenty-eight (28) days of a release that is not compliant with the conditions of this environmental authority, provide a report to the administering authority detailing: a) the reason for the release b) the location of the release c) the total volume of the release and which (if any) part of this volume was non-compliant d) the total duration of the release and which (if any) part of this period was non-compliant e) all water quality monitoring results (including all laboratory analyses) f) identification of any environmental harm as a result of the non-compliance g) all calculations h) any other matters pertinent to the water release event.

F17	Monitoring of water storage quality Water storages listed in Table F5: Water storage monitoring, which are associated with release points must be monitored for the water quality characteristics specified in Table F6: Onsite water storage contaminant limits at the monitoring locations and frequencies stated in Table F5: Water storage monitoring.
F18	In the event that water storages listed in Table F5: Water storage monitoring exceed the contaminant limits specified in Table F6: Onsite water storage contaminant limits, the holder of this environmental authority must implement measures to prevent access to waters by all livestock.
F19	Receiving environment monitoring and contaminant trigger levels The quality of the receiving waters must be monitored at the locations specified in Table F8: Receiving water upstream background sites and downstream monitoring points for each quality characteristic and at the monitoring frequency stated in Table F7: Receiving waters contaminant trigger levels.

Table F5: Water storage monitoring

Water storage description	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)	Monitoring locations	Frequency
Environmental Dam 1	-23.911293	148.375171	Spillway	Quarterly
Environmental Dam 2	-23.904165	148.375589	Spillway	Quarterly
Environmental Dam 3	-23.900955	148.371795	Spillway	Quarterly
Environmental Dam 4	-23.931248	148.366391	Spillway	Quarterly
Mine Water Dam	-23.921164	148.371815	Spillway	Quarterly

Table F6: Water storage contaminant limits

Quality characteristic	Test value	Contaminant limit ¹
pH	Range	Greater than 4.0, less than 9.0 ²
Electrical conductivity (µS/cm)	Maximum	5970
Sulphate (mg/L)	Maximum	1000
Aluminium (mg/L)	Maximum	5
Copper (mg/L)	Maximum	1
Lead (mg/L)	Maximum	0.1
Nickel (mg/L)	Maximum	1
Uranium (mg/L)	Maximum	20
Zinc (mg/L)	Maximum	20

Note: Total measurements (unfiltered) must be taken and analysed.

¹Contaminant limit based on ANZECC & ARMCANZ (2000) stock water quality guidelines.

²Page 4.2-15 of the ANZECC & ARMCANZ (2000) 'Soil and animal health will not generally be affected by water with pH in the range of 4-9'

Table F7: Receiving water contaminant trigger levels

Quality Characteristic	Trigger Level	Monitoring Frequency
pH	6.5 – 9.0	Daily during the release
Electrical Conductivity (µS/cm)	1000	
Suspended Solids (mg/L)	< 30	
Sulphate (SO ₄ ²⁻)(mg/L)	1000 (Protection of irrigation environmental value)	

Table F8: Receiving water upstream background sites and downstream monitoring points

Monitoring Points	Receiving Waters Location Description	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)
Upstream Background Monitoring Points			
Monitoring Point 2 (MP2)	Drummond Gully (unnamed Creek 1) – upstream	-23.9503	148.3471
Monitoring Point 3 (MP3)	Turkey Creek/Springton Gully – Upstream	-23.8900	148.3547
Downstream Monitoring Points			
Monitoring Point 1 (MP1)	Turkey Creek - downstream	-23.8755	148.3616

F20	If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table F5: Receiving waters contaminants trigger levels during a release the environmental authority holder must compare the downstream results to the upstream results in the receiving waters and: a) where the downstream result is the same or a lower value than the upstream value for the quality characteristic, then no action is to be taken; or b) where the downstream results exceed the upstream results, provide the administering authority written notification within twenty-four (24) hours of becoming aware of the exceedance and then complete an investigation into the potential for environmental harm and provide a written report to the administering authority within twenty (20) business days of receiving the results, outlining: 1. details of the investigation carried out, and 2. actions taken to prevent environmental harm. <i>Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with condition F20 (b) of this condition, no further reporting is required for subsequent trigger events for that quality characteristics.</i>
F21	Receiving Environment Monitoring Program (REMP) The environmental authority holder must develop and implement a Receiving Environment Monitoring Program (REMP) to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from site. For the purposes of the REMP, the receiving environment is the waters of Drummond Gully and connected or surrounding waterways within 10km downstream of the release. The REMP should encompass any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be directly affected by an authorised release of mine affected water.
F22	A REMP Design Document that addresses the requirements of the REMP must be prepared and made available to the administering authority upon request.
F23	A report outlining the findings of the REMP, including all monitoring results and interpretations must be prepared annually and made available on request to the administering authority. This must include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of current discharge limits to protect downstream environmental values.
F24	Water General All determinations of water quality and biological monitoring must be: a) performed by an appropriately qualified and experienced person; b) made in accordance with the methodologies in the most recent version of the administering authority's monitoring and sampling manual; c) collected from the monitoring locations specified in this environmental authority; d) carried out on representative samples; and e) analysed at an accredited laboratory (e.g. NATA).

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F25	The release of any contaminants as permitted by this environmental authority, directly or indirectly to waters, other than internal water management infrastructure that is installed and operated in accordance with a water management plan that complies with conditions F28 to F30 inclusive: a) must not produce any visible discolouration of receiving waters; and b) must not produce any slick or other evidence of oil, grease, petrochemicals, scum, litter or other objectionable matter.
F26	Annual water monitoring reporting The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format: a) the date on which the sample was taken b) the time at which the sample was taken c) the monitoring point at which the sample was taken d) the measured or estimated daily quantity of mine affected water released from all release points e) the release flow rate at the time of sampling for each release point f) the results of all monitoring and details of any exceedances of the conditions of this environmental authority g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.
F27	Temporary Interference with waterways Destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining operations must be undertaken in accordance with Department of Natural Resources and Mines (or its successor) Guideline – Activities in a Watercourse, Lake or Spring associated with Mining Activities.
F28	Water management plan A Water Management Plan must be developed by an appropriately qualified and experienced person and implemented at least three (3) months prior to the commencement of mining activities.
F29	The Water Management Plan must include: a) a study of the source of contaminants; b) a water balance model for the site; c) a water management system for the site; d) measures to manage and prevent saline drainage; e) measures to manage and prevent acid rock drainage; f) contingency procedures for emergencies; and g) a program for monitoring and review of the effectiveness of the water management plan.
F30	The Water Management Plan must be made available to the administering authority on request.
F31	Saline drainage The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of saline drainage.
F32	Acid rock drainage The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of acid rock drainage.

F33	Stormwater and water sediment controls An Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to receiving waters and contamination of stormwater.
F34	Stormwater, other than mine affected water, is permitted to be released to waters from: a) erosion and sediment control structures that are installed and operated in accordance with the Erosion and Sediment Control Plan required by condition F33; and/or b) water management infrastructure that is installed and operated, in accordance with a Water Management Plan that complies with condition F28, for the purpose of ensuring water does not become mine affected water.
F35	The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any receiving waters.
F36	Overflow of mine affected water from regulated structures The overflow of mine affected water from one or more of the dams listed in the Register of Regulated Dams must only occur if: a) the holder of this environmental authority has complied with ALL conditions listed in Schedule G – Regulated Structures; and b) the overflow is a direct result of rainfall events which since the preceding 1 November have generated a total rainfall depth in excess of that determined under the Design Storage Allowance (DSA) annual exceedance probability (AEP) event in condition G18 for the relevant dam (or network of interconnected systems); c) the dam and release point is listed in Table F9: Overflow release to the receiving environment; d) the holder of this environmental authority has taken all reasonable and practicable measures to prevent an outflow from the relevant dam; and e) the overflow of mine affected water does not cause serious environmental harm.
F37	Any release of mine affected water resulting from an overflow from one or more of the dams listed in the Register of Regulated Dams and Table F9: Overflow release to the receiving environment to receiving waters must be monitored at the locations specified in Table F9: Overflow release to the receiving environment and Table F10: Monitoring locations for overflow releases for those quality characteristics at the frequencies specified in Table F11: Release contaminant trigger investigation levels – overflow releases.

F38	If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table F11: Release contaminant trigger investigation levels – overflow releases during an overflow release, the environmental authority holder must compare the downstream results in the receiving waters to the trigger values specified in Table F11: Release contaminant trigger investigation levels – overflow releases and: a) where the trigger values are not exceeded at the downstream locations then no action is to be taken; or b) where the downstream results exceed the trigger values specified in Table F11: Release contaminant trigger investigation levels – overflow releases for any quality characteristics, compare the results of the downstream site to the data from background monitoring sites and from the release point and: i. if the result is less than the background monitoring site data, the no action is to be taken; or ii. if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority within twenty-eight (28) days of the cessation of the release, outlining: - details of the investigation carried out; and - actions taken to prevent environmental harm. Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with condition F38 (b) of this condition, no further reporting is required for subsequent trigger events for that quality characteristics.
F39	The environmental authority holder must notify the administering authority as soon as practicable and no later than twenty-four (24) hours after the commencement of an overflow release of mine affected water to the receiving environment in accordance with conditions F37 and F38 of this environmental authority. Notification must include the submission of written advice to the administering authority of the following information: a) release commencement date/time b) details including available data regarding likely impacts on the receiving environment. c) release point/s d) release rate e) release salinity f) receiving water/s including the natural flow rate. Note: Notification to the administering authority must be addressed to the Manager and Project Manager of the local Administering Authority via email.
F40	The environmental authority holder must notify the administering authority as soon as practicable and no later than twenty-four (24) hours after the cessation of a release notified under condition F39. Notification must include the submission of written advice to the administering authority of the following information: a) release cessation date/time b) volume of water released c) all in-situ water quality monitoring results; and d) any other matters pertinent to the water release event. Note: Successive or intermittent releases occurring within twenty-four (24) hours of the cessation of any individual release can be considered part of a single release event and do not require individual notification for the purpose of compliance with conditions F39 and F40, provided the relevant details of the release are included within the notification provided in accordance with conditions F39 and F40).

F41	Within twenty-eight (28) days of a release notified under condition F39 , the holder of this environmental authority must provide a report to the administering authority demonstrating compliance with condition F36 .
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Table F9: Overflow release to the receiving environment

Release Point (RP)	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)	Contaminant Source and Location	Receiving waters description
RP1	-23.911293	148.375171	Environmental Dam 1 Spillway	Drummond Gully (unnamed Creek 1)
RP3	-23.904165	148.375589	Environmental Dam 2 Spillway	Drummond Gully (unnamed Creek 1)
RP5	-23.900955	148.371795	Environmental Dam 3 Spillway	Drummond Gully (unnamed Creek 1)
RP7	-23.931248	148.366391	Environmental Dam 4 Spillway	Drummond Gully (unnamed Creek 1)
RP9	-23.921164	148.371815	Mine Water Dam Spillway	Drummond Gully (unnamed Creek 1)

Table F10: Monitoring locations for overflow releases

Monitoring Point (MP)	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)	Associated Release Point	Monitoring point description	Location description
Upstream					
MP2	-23.9503	148.3471	RP1 RP3 RP5 RP7 RP9	Drummond Gully (unnamed Creek 1) - upstream	5.4 km upstream of RP1, 6.0 km upstream of RP3, 6.3 km upstream of RP5, 2.9 km upstream RP7 and, 4.5 km upstream of RP9.
MP3	-23.8900	148.3547	RP1 RP3 RP5 RP7 RP9	Turkey Creek/Springton Gully	3.4 km upstream of RP1, 2.8 km upstream of RP3, 2.1 km upstream of RP5, 4.8 km upstream RP7 and 4.3 km upstream of RP9.
Downstream					
MP1	-23.8755	148.3616	RP1 RP3 RP5 RP7 RP9	Turkey Creek - downstream	4.3 km downstream of RP1, 3.5 m downstream of RP3, 2.9 km downstream of RP5, 6.2 km downstream of RP7, and 5.4 km and downstream of RP9.

Table F11: Release contaminant trigger investigation levels – overflow releases

Quality Characteristic	Trigger Levels (µg/L) ³	Monitoring Frequency
Electrical conductivity (µS/cm)	1000	Commencement of release and weekly thereafter during release (the first sample to be taken within 2 hours of commencement of a release)
pH (pH Unit)	6.5 – 8.5	
Turbidity (NTU)	<50	
Suspended Solids (mg/L)	<30	
Sulphate (mg/L)	<100	
Aluminium ¹	0.055	
Arsenic ¹	<0.024	
Cadmium ¹	<0.0002	
Chromium ¹	<0.001	
Copper ¹	<0.0014	
Iron ¹	0.3	
Lead ¹	<0.0034	
Mercury ¹	<0.0006	
Nickel ¹	<0.011	
Zinc ¹	<0.008	
Boron ¹	0.37	
Cobalt ¹	0.09	
Manganese ¹	1.9	
Molybdenum ¹	0.034	
Selenium ¹	0.01	
Silver ¹	0.001	
Uranium ¹	0.001	
Vanadium ¹	0.01	
Ammonia ¹	<0.02	
Nitrate ¹	1.1	
Petroleum hydrocarbons (C6-C9) ¹	0.02	
Petroleum hydrocarbons (C10-C36) ¹	0.1	
Fluoride ²	2	
Sodium ¹	N/A	

¹All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloid apply if dissolved results exceed trigger.

²Fluoride must be measured as total (unfiltered).

³Levels below the LOR to be classified as non-detects.

Schedule G: Regulated structures	
Condition number	Condition
G1	Assessment of consequence category The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635) at the following times: - prior to the design and construction of the structure, if it not an existing structure; or - if it is an existing structure, prior to the adoption of this schedule; or - prior to any change in its purpose or the nature of its stored contents.
G2	A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.
G3	Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635).
G4	Design and construction of a regulated structure Conditions G5 to G9 inclusive do not apply to existing structures.
G5	All regulated structures must be designed by, and constructed under the supervision of a suitably qualified and experienced person in accordance with the requirements of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635). Note: Construction of a dam includes modification of an existing dam. Certification of design and construction may be undertaken by different persons.
G6	Construction of a regulated structure is prohibited unless the holder has submitted a consequence category assessment report and certification to the administering authority that has been certified by a suitably qualified and experienced person for the design and design plan and the associated operating procedures in compliance with the relevant condition of this authority.
G7	Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635), and must be recorded in the Regulated Dams/Levees register.
G8	Regulated structures must: - be designed and constructed in accordance with and conform to the requirements of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635); - be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of: - floodwaters from entering the regulated dam from any watercourse or drainage line; and - wall failure due to erosion by floodwaters arising from any watercourse or drainage line. - have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.

G9	Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that: a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure; b) construction of the regulated structure is in accordance with the design plan.
G10	Operation of a regulated structure Operation of a regulated structure, except for an existing structure, is prohibited unless: a) the holder has submitted to the administering authority: i. one paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with condition G6, and ii. a set of 'as constructed' drawings and specifications, and iii. certification of those 'as constructed drawings and specifications' in accordance with condition G7, and iv. where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan. v. the requirements of this authority relating to the construction of the regulated structure have been met. vi. <u>the holder has entered the details required under this authority into a Register</u>
G11	Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in a manner that is consistent with the current operational plan, and if applicable, the current design plan and associated certified 'as constructed' drawings.
G12	Mandatory reporting level Conditions G13 to G16 inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.
G13	The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.
G14	The holder must, as soon as practical and within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.
G15	The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.
G16	The holder must record any changes to the MRL in the Register of Regulated Structures.
G17	Design storage allowance The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.
G18	By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).

G19	The holder must, as soon as possible and within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
G20	The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.
G21	Annual inspection report Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
G22	At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include recommended actions to ensure the integrity of the regulated structure.
G23	The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures</i> (EM635).
G24	The holder must: a) within twenty (20) business days of receipt of the annual inspection report, provide to the administering authority: i. the recommendations section of the annual inspection report; and ii. if applicable, any actions being taken in response to those recommendations; and b) if, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the annual inspection report from the holder, provide this to the administering authority within ten (10) business days of receipt of the request.
G25	Transfer arrangements The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.
G26	Decommissioning and rehabilitation Dams must not be abandoned but be either: a) decommissioned and rehabilitated to achieve compliance with Appendix 1: Rehabilitation requirements; or b) be left in-situ for a beneficial use(s) provided that: i. it no longer contains contaminants that will migrate into the environment; and ii. it contains water of a quality that is demonstrated to be suitable for its intended beneficial use(s); and iii. the administering authority, the holder of the environmental authority and the landholder agree in writing that the dam will be used by the landholder following the cessation of the environmentally relevant activity(ies).
G27	Register of Regulated Dams A Register of Regulated Dams must be established and maintained by the holder for each regulated dam.
G28	The holder 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.

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G29	The holder must make a final entry of the required information in the Register of Regulated Dams once compliance with condition G10 has been achieved.
G30	The holder must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.
G31	All entries in the Register of Regulated Dams must be approved by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.
G32	The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Dams, in the electronic format required by the administering authority.

Schedule H – Sewage Treatment	
Condition number	Condition
H1	Treated sewage effluent is not permitted to be released to land or waters.
H2	Treated sewage effluent must be directed to wet weather storage identified in the Plan of Operations or alternative measures must be taken to store/lawfully dispose of effluent.
H3	Treated sewage effluent must only be supplied to another person or organisation that has a written plan detailing how the user of the treated sewage effluent will comply with their general environmental duty under section 319 of the Act whilst using the treated sewage effluent.

Schedule J – Land and rehabilitation	
Condition number	Condition
J1	Strategic cropping land If there is any inconsistency between the Strategic Cropping Land Protection Decision made pursuant to the Strategic Cropping Land Act 2011 and this environmental authority, the Strategic Cropping Land Protection Decision prevails to the extent of the inconsistency.
J2	Topsoil management Topsoil must be strategically stripped ahead of mining in accordance with a Topsoil Management Plan.
J3	A topsoil inventory that identifies the topsoil requirements and availability of suitable topsoil on site must be detailed in the Plan of Operations.
J4	Topsoil and subsoil must be managed to ensure stability and to minimise the release of contaminants. a)
J5	Rehabilitation Land disturbed by mining must be rehabilitated in accordance with Appendix 1: Rehabilitation Requirements and Figure 2: Springsure Creek Coal Project Rehabilitated Final Landform .

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J6	Rehabilitation must be undertaken without unnecessary delay, or as soon as possible. So as to minimise the amount of time land is out of production or not in a suitably stable form, rehabilitation must commence as soon as it safe and practical to do so after the causative disturbance has ceased, and once there are no further physical or biological impediments to the successful rehabilitation of the subject area of land. .
J7	Rehabilitation work must be completed on or before 30 July 2048.
J8	A Rehabilitation Management Plan must be developed by an appropriately qualified and experienced person and submitted to the administering authority for approval at least three (3) months prior to the commencement of mining activities.
J9	The Rehabilitation Management Plan must: a) provide for the effective management of actual and potential environmental impacts and for the rehabilitation of significantly disturbed land resulting from the mining activities carried out under this environmental authority; b) be developed in accordance with the administering authority's Guideline – Rehabilitation requirements for mining projects and must include: 1. measures to ensure that rehabilitation objectives defined in Appendix 1: Rehabilitation requirements are met; 2. justification of the rehabilitation indicators defined in Appendix 1: Rehabilitation requirements, including how the relationship between the indicator and the objective has been established; 3. justification of the completion criteria defined in Appendix 1: Rehabilitation requirements, including their suitability for determining post mine land use; 4. rehabilitation methods applied to each domain; 5. landform design criteria; 6. schematic representation of final landform; 7. rehabilitation monitoring and maintenance requirements including how rehabilitation indicators and completion criteria will be monitored, measured and reported; and 8. a program for monitoring all progressive rehabilitation including sampling intensity and statistical analysis.
J10	A Post Closure Management Plan for the site must be developed by a suitably qualified and experienced person and submitted to the administering authority for approval at least eighteen (18) months prior to the finalisation of coal mining on site and implemented for a nominal period of: a) at least thirty (30) years following the finalisation of coal mining on site; or b) a shorter period if the site is proven to be geotechnically and geochemically stable and it can be demonstrated to the satisfaction of the administering authority that no release of contaminants from the site will result in environmental harm.

J11	The Post Closure Management Plan must include the operation, monitoring and maintenance of the following: a) wastewater collection and reticulation systems; b) wastewater treatment systems; c) groundwater quality monitoring network; d) surface water quality; e) groundwater quality; f) seepage rates; g) erosion rates; h) integrity and stability of slopes, ramps and voids; and i) the health and resilience of vegetation cover.
J12	Subsidence A Subsidence Management Plan must be developed by an appropriately qualified and experienced person and submitted to the administering authority for approval at least three (3) months prior to the commencement of mining activities.

J13	The Subsidence Management Plan must: a) provide for the proper and effective management of the actual and potential environmental impacts resulting from the mining activity and to ensure compliance with the conditions of this environmental authority; b) be developed in accordance with Appendix 2: Watercourse Subsidence; c) describe the proposed impacts of subsidence on any land, watercourse and floodplain including but not limited to: i. physical condition of surface drainage: • erosion; • areas susceptible to higher levels of erosion such as watercourse confluences; • incision processes; • stream widening; • tension cracking; • lowering of bed and banks; • creation of instream waterholes; • changes to local drainage patterns; ii. overland flow: • capture of overland flow by subsided long-wall panels; • increased overbank flows due to lowering of high bank of watercourses; • the portion of local and large scale catchment likely to be captured by subsided long-wall panels and the associated impacts on downstream users; iii. water quality: • surface water; • groundwater; iv. land condition: current land condition to be impacted by subsidence; v. infrastructure: detail of existing infrastructure (pipelines, railway, powerlines and haul roads) should be identified where there is a potential impact from effects of land subsidence; d) propose options for mitigating any impacts associated with subsidence and how these mitigation methods will be implemented; e) describe cumulative impacts on watercourses or catchments; f) describe impacts on groundwater; g) describe contingency procedures for emergencies; and h) include a program for monitoring and review of the effectiveness of the Subsidence Management Plan.
J14	The Subsidence Management Plan must be reviewed each calendar year and a report prepared by an appropriately qualified and experienced person. The report must: a) assess the plan against the requirements under condition J13; b) include recommended actions to ensure actual and potential environmental impacts are effectively managed for the coming year; and c) identify any amendments made to the Subsidence Management Plan following the review.
J15	The holder of this environmental authority must attach to the review report required by condition J14, a written response to the report and recommended actions, detailing the actions taken or to be taken by the environmental authority holder on stated dates: a) to ensure compliance with this environmental authority; and b) to prevent a recurrence of any non-compliance issues identified.

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J16	The review report required by condition J14 and the written response to the review report required by condition J15 must be submitted to the administering authority upon request.
J17	Annual inspection of subsidence The holder of this environmental authority must arrange for each subsided longwall panel to be inspected annually by a suitably qualified and experienced person, in accordance with conditions J18 through J20 .
J18	The annual inspection must be conducted between 1 April and 1 November each year.
J19	At each annual inspection, the condition of each subsided longwall panel must be assessed, including the structural, geotechnical and hydraulic adequacy of the subsided longwall panel and the adequacy of the works with respect to the Subsidence Management Plan.
J20	For each inspection, copies of a report certified by the suitably qualified and experienced person, including any recommendations to ensure the integrity of each subsided longwall panel must be provided to the administering authority upon request.
J21	Overland flow The subsided longwall panels must not result in the capture of significant overland flow and must allow water to drain from the panel. Ponding greater than 200m² is not to occur over subsided longwall panels after the adjacent panel has been completed or after a period of twelve (12) months if there is no adjacent panel to be developed.
J22	Contaminated land Contaminants must not be released to land, other than contaminants that are authorised to be released under this environmental authority.
J23	The environmental authority holder must ensure that vehicle loads (including trains) are secure prior to transporting materials off the mining lease to minimise windblown emissions (i.e. coal dust) or spillage of any material during transport.
J24	Before applying for surrender of a mining lease, the holder must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the mining lease which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use.
J25	Before applying for progressive rehabilitation certification for an area, the holder must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the area the subject of the application which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use under condition J1 .
J26	Chemicals and flammable or combustible liquids All explosives, hazardous chemicals, corrosive substances, toxic substances, gases and dangerous goods must be stored and handled in accordance with the current Australian standard where such is applicable. Where no relevant Australian standard exists, such materials must be stored within an on-site containment system and controlled in a manner that prevents environmental harm.
J27	Mining waste Any mine waste generated as a result of mining activities must not be stored or disposed of on site.

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J28	Acid mine drainage and leachate management Subject to the release limits defined in Schedule C - Water , all reasonable and practicable measures must be implemented to prevent hazardous leachate being directly or indirectly released or likely to be released as a result of the activity to the environment.
J29	Infrastructure All buildings, structures, mining equipment and plants erected and/or used for the mining activities must be removed from the site prior to surrender, except where agreed in writing by the administering authority.
J30	Exploration Disturbance due to exploration activities in areas not scheduled to be mined must be rehabilitated in accordance with the administering authority's Code of Environmental Compliance for Exploration and Mineral Development Projects .

Schedule K: Biodiversity	
Condition number	Condition
K1	Biodiversity offsets The holder of this environmental authority must provide a biodiversity offset for impacts on applicable state significant biodiversity values consistent with the requirements for an offset as identified in the Biodiversity Offset Strategy (as per condition K2): a) prior to impacting on state significant biodiversity values; or b) where a land based offset is to be provided, within twelve (12) months of the later of either of the following: i. the date of issue of this environmental authority; or ii. the relevant stage identified in the Biodiversity Offset Strategy submitted under condition K2; or c) where an offset payment is to be provided, within four (4) months of the later of either of the following: i. the date of issue of this environmental authority; or ii. the relevant stage identified in the Biodiversity Offset Strategy submitted under condition K2.
K2	A Biodiversity Offset Strategy must be developed and submitted to the administering authority within either thirty (30) days , or a lesser period agreed to by the administering authority, prior to impacting on the applicable state significant biodiversity values.

Schedule L: Cultural heritage	
Condition number	Condition
L1	No excavation, construction or other activity that may cause harm to Aboriginal cultural heritage may take place on ML70486 without the development and approval of a Cultural Heritage Management Plan under the <i>Aboriginal Cultural Heritage Act 2003</i> .

END OF PERMIT CONDITIONS

Appendix 1: Rehabilitation requirements

Mine Domain	Rehabilitation Goal	Rehabilitation Objectives	Indicators	Completion Criteria
Subsided areas	Sustainable land use	Maintain or improve agricultural productivity on subsided land	Agricultural productivity	Certification by an appropriately qualified and experienced person that areas nominated for agriculture are maintaining an equal to or better production rate based on comparison to reference sites.
			Landform stability when cropped	Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A: support the best possible class of agricultural land; (b) Class B: support the best possible class of agricultural land; (c) Class C1: its predevelopment condition; and (d) Class C3: its predevelopment condition.
			Landform stability when grazed	Land maintenance requirements are comparable to designated reference sites. Safety of landform for stock and for undertaking management activities associated with stock.
			Access to water sources	Water used by agriculture and landholders meets land use requirements in terms of quality and availability.
		Soil properties support the desired land use	Chemical properties (e.g. pH, salinity, nutrient content, sodium content) of topsoil and subsoil to support the proposed vegetation and land use.	Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A: support the best possible class of agricultural land; (b) Class B: support the best possible class of agricultural land; (c) Class C1: its predevelopment condition; and (d) Class C3: its predevelopment condition.
			Physical properties of topsoil and subsoil to support the proposed vegetation	Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A: support the best possible class of agricultural land;

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			and land use.	(b) Class B: support the best possible class of agricultural land; (c) Class C1: its predevelopment condition; and (d) Class C3: its predevelopment condition.
			Top soil thickness	Evidence that topsoil has been re-spread such that it meets the criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A and Class B: such that soil is reinstated and restored to its predevelopment condition, or where that is proven to be unreasonable, progressively rehabilitate the impacted land so it can support the best possible class of agricultural land and; (b) Class C1 and Class C3: such that topsoil is at the predevelopment depth.
			Soil site characteristics	Certification that the soil site characteristics have acceptable levels of surface roughness, infiltration capacity, aggregate stability and surface condition. Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A and Class B: such that soil is reinstated and restored so it can support the best possible class of agricultural land; and (b) Class C1 and C3: such that soil represents its predevelopment condition.
		Establish self-sustaining natural vegetation or habitat	Presence of key plant species	Certification by an appropriately qualified and experienced person that key species identified prior to mining are present and within relevant reference sites.
			Density of key plant species	Certification by an appropriately qualified and experienced person that the density of the key species is consistent with relevant reference sites.
			Composition of key plant species	Vegetation types and densities and the composition of key plant species are comparable with the relevant reference site.
		Self-sustaining natural vegetation or habitat	Native fauna species	Certification by an appropriately qualified person that native fauna species identified within the Springsure Creek Coal Project (the 'Project') Environmental Impact Statement (EIS) and Supplementary Environmental Impact Statement (SEIS) are present or indicators of the of these species or key microhabitat elements are developing within the rehabilitated areas.

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			Plant regeneration	Species in rehabilitated areas show evidence of flowering, viable seed setting, germination and emergence.
			Abundance of declared plants (weeds) identified through surveys	Certification by an appropriately qualified and experienced person that declared plants within rehabilitation areas have been identified and managed in accordance with the <i>Land Protection (Pest and Stock Route) Act 2002</i> .
			Abundance of exotic grasses	Certification by an appropriately qualified and experienced person that the abundance of exotic grass invasion is no greater than the baseline condition as assessed against reference sites.
			Actions taken to manage declared plants under local or State legislation	Evidence that actions have been undertaken to manage declared plants in accordance with the <i>Land Protection (Pest and Stock Route) Act 2002</i> .
			Abundance of declared animals identified through surveys	Certification by an appropriately qualified and experienced person that the abundance of declared animals has not increased significantly since baseline surveys and/or that a vertebrate pest control program is being implemented to reduce pest numbers.
			Management actions taken to control animals declared under local or State legislation	Records indicating that the holder has actively been managing animals declared under local or State legislation on the site.
			Weed hygiene procedures	Records indicating that all machinery, plant and equipment used for rehabilitation was free of declared plant seed and reproductive material prior to entering the site.
			Agricultural Productivity	Certification by an appropriately qualified and experienced person that areas nominated for agriculture are maintaining an equal to or better production rate based on comparison to reference sites.

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	Stable landform	Landform design achieves appropriate erosion rates	Engineered structures to control water flow	Evidence in the Subsidence Management Plan (SMP) that required contour banks, channel linings, surface armour, etc. are in place and functioning.
			Rates of soil loss	Certification by a suitably qualified and experienced person that all land disturbed by the mining activities does not exhibit any signs of continued erosion greater than that exhibited in the reference site.
		Vegetation cover for self-sustaining community and to minimise erosion	Vegetation type and density	Evidence that the vegetation species type and densities are suited to the slope, aspect, climate and other factors, and that the soil erosion meets the goals set in the site Rehabilitation Management Plan (RMP).
				Vegetation types and density are comparable with the relevant reference sites.
		Run off drainage lines mirror natural stream functions	Design and stability of drainage lines	Document how drainage lines have changed over the course of the Project and that they are stable at closure and are likely to remain that way into the foreseeable future.
		Surface water drainage	Stable drainage works	Certification by a suitably qualified and experienced person that local drainage works have been properly designed and constructed.
		No significant changes to hydrological conditions	Ponding	Evidence that ponding has been managed as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A and Class B: (i) Monitor subsidence-related ponding; (ii) Investigate any landholder's complaint regarding ponding; (iii) Relieve any ponding identified in complying with Item (a)(ii) (above); (iv) Ensure that changes in surface water and soil hydrology as a

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				result of subsidence do not materially increase deep drainage, cause an abnormal rise in shallow water tables or an increased risk of soil salinization, and; (v) Record and maintain a Complaints Register, detailing of all complaints received regarding water ponding. (b) Class C1 and Class C3: As per the SMP.
		No significant changes to hydrological conditions	Cracking	Evidence that no subsidence cracks greater than 25 mm occur (that are attributable to subsidence) and that ripping and seeding of all subsidence cracks greater than this threshold have been undertaken.
	Non-polluting	Stable geomorphic system.	Geomorphic environment survey	A geomorphic environment survey report (at the end of the mine life) is undertaken by a suitably qualified and experienced person stating that a stable geomorphic system is able to continue to evolve into the future.
		Mine affected water contained on site	Downstream surface water quality	Certification by an appropriately qualified and experienced person that surface water quality at monitoring locations is not negatively impacted compared to the baseline monitoring results by the rehabilitated landform.
			Groundwater quality	Certification by an appropriately qualified and experienced person that groundwater monitoring indicates that the groundwater quality is not negatively impacted compared to the baseline monitoring results by the rehabilitated landform.
			All permanent regulated structures will meet approved design criteria	The regulated structures are certified by a suitably qualified and experienced person.
			All non-permanent regulated structures decommissioned appropriately	Regulated structures are decommissioned in accordance with the administering authority requirements.

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		Hazardous materials adequately managed	Exposure to and availability of heavy metals and other toxic materials.	Certification by a suitably qualified and experienced person that includes predictions about future changes and that specified cover thickness is in place.
	Long term safety	Rehabilitation or conversion of exploration drill holes and groundwater monitoring bores	All non-artesian exploration drill holes undertaken on the Mining Lease (ML 70486) have been rehabilitated or converted to water bores	Certification by an appropriately qualified and experienced person that all non-artesian exploration drill holes not converted to either a water bore or a groundwater monitoring bore have been rehabilitated.
				Certification by an appropriately qualified and experienced person, that all sub-artesian aquifers have been isolated where non-artesian exploration drill holes have intersected more than one sub-artesian water bearing strata, in accordance with the 'Minimum Construction Requirements for Water Bores in Australia' (Australian Government, February 2012) or latest edition.
				Certification by an appropriately qualified and experienced person that all non-artesian exploration drill holes converted to a water bore have been converted in accordance with the 'Minimum Construction Requirements for Water Bores in Australia' (Australian Government, February 2012) or latest edition.
			All monitoring bores undertaken on the Mining Lease (ML 70486) have been rehabilitated	Certification by an appropriately qualified and experienced person that all non-artesian exploration drill holes converted to water bores are compliant with the requirements of the Water Act 2000 . Certification by an appropriately qualified and experienced person that all monitoring bores have been rehabilitated in accordance with the 'Minimum Construction Requirements for Water Bores in Australia' (Australian Government, February 2012) or latest edition.
			Safety assessment of landform stability (geotechnical studies)	Certification by an appropriately qualified and experienced person that site slopes are now safe and will remain so.
				Risks assessment has been completed and risk mitigation measures have been implemented. Where risk mitigation measures include bunds, safety fences and warning signs, these have been erected in accordance with relevant guidelines and Australian Standards.

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			Creek bank erosion	Evidence in the SMP that all creek banks are stable at closure and are likely to remain that way into the foreseeable future.
Infrastructure (including dams and surface water features)	Sustainable land use	Maintain or improve agricultural productivity	Agricultural Productivity	Certification by an appropriately qualified and experienced person that areas nominated for agriculture are maintaining an equal to or better production rate based on comparison to reference sites.
			Landform stability when cropped	Certification by an appropriately qualified and experienced person that the final land forms represent the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A: support the best possible class of agricultural land; (b) Class B: support the best possible class of agricultural land; (c) Class C1: its predevelopment condition; (d) Class C3: its predevelopment condition.
		Soil properties support the desired land use	Chemical properties (e.g. pH, salinity, nutrient content, sodium content) of topsoil and subsoil to support the proposed vegetation and land use.	Certification by an appropriately qualified and experienced person that the final land use represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A: support the best possible class of agricultural land; (b) Class B: support the best possible class of agricultural land; (c) Class C1: its predevelopment condition; (d) Class C3: its predevelopment condition.
			Physical properties of topsoil and subsoil to support the proposed vegetation and land use.	Certification by an appropriately qualified and experienced person that the final land use represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A: support the best possible class of agricultural land; (b) Class B: support the best possible class of agricultural land; (c) Class C1: its predevelopment condition; (d) Class C3: its predevelopment condition.

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			Top soil thickness	Evidence that topsoil has been re-spread such that it meets the criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL, for: (a) Class A and Class B: such that soil is reinstated and restored so it can support the best possible class of agricultural land; and (b) Class C1 and Class C3: such that topsoil is at the predevelopment depth.
			Soil site characteristics	Certification that the soil site characteristics have acceptable levels of surface roughness, infiltration capacity, aggregate stability and surface condition. Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL, for: (a) Class A and Class B: such that soil is reinstated and restored so it can support the best possible class of agricultural land; and (b) Class C1 and C3: such that soil represents its predevelopment condition
		Establish self-sustaining natural vegetation or habitat	Presence of key plant species	Certification by an appropriately qualified and experienced person that key species identified for each reference site are present.
			Density of key plant species	Certification by an appropriately qualified and experienced person that the density of the key species is consistent with that identified for each reference site.
			Composition of key plant species	Certification by an appropriately qualified and experienced person that groundcover, shrub and canopy structure is similar or trending towards that of each reference site.
		Self-sustaining natural vegetation or habitat	Native fauna species	Certification by an appropriately qualified and experienced person that native fauna species identified within the EIS and SEIS are present or indicators of these species or key microhabitat elements are developing within the rehabilitated areas.

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			Plant regeneration	Species in rehabilitated areas show evidence of flowering, viable seed setting, germination and emergence.
			Abundance of declared plants (weeds) identified through surveys	Certification by an appropriately qualified and experienced person that declared plants in rehabilitation areas are identified and managed in accordance with <i>Land Protection (Pest and Stock Route) Act 2002</i> .
			Abundance of exotic grasses	Certification by an appropriately qualified and experienced person that the abundance of exotic grass invasion is no greater than baseline condition as assessed against reference sites.
			Actions taken to manage declared plants under local or State legislation	Evidence that actions have been undertaken to manage declared plants in accordance with <i>Land Protection (Pest and Stock Route) Act 2002</i> .
			Abundance of declared animals identified through surveys	Certification by an appropriately qualified and experienced person that the abundance of declared animals has not increased significantly since baseline surveys and/or that a vertebrate pest control program is being implemented to reduce pest numbers.
			Management actions taken to control animals declared under local or State legislation.	Records indicating that the holder has actively been managing animals declared under local or State legislation on the site.
			Weed hygiene procedures	Records indicating that all machinery, plant and equipment used for rehabilitation was free of declared plant seed and reproductive material prior to entering the site.

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	Stable landform	Landform design achieves appropriate erosion rates.	Slope angle and length	Evidence that the rehabilitated slopes have been designed to the specifications outlined in the SMP.
			Engineered structures to control water flow	Evidence that required contour banks, channel linings, surface armour, etc. are in place and functioning.
			Rates of soil loss	Certification by a suitably qualified and experienced person that all land disturbed by the mining activities does not exhibit any signs of continued erosion greater than that exhibited pre-mining. Reference and control sites will be established to monitor land disturbance which will be outlined in the Project's SMP.
		Natural vegetation cover for self-sustaining community and to minimise erosion	Natural vegetation type and density	Evidence that the natural vegetation type and density are of species suited to the slope, aspect, climate and other factors, and that the soil erosion meet the goals set in the SMP. Reference and controls sites to monitor and assess vegetation type and density will be outlined in the Project's Rehabilitation Management Plan (RMP).
				Natural vegetation types and densities are comparable with the relevant reference site.
		Run off drainage lines mirror natural stream functions	Design and stability of drainage lines	Document how drainage lines have changed over the course of the Project and that they are stable at closure and are likely to remain that way into the foreseeable future.
	Non-polluting	Mine affected water contained on site	Downstream surface water quality	Certification by an appropriately qualified and experienced person that surface water quality at monitoring locations is not negatively impacted compared to the baseline monitoring results by the rehabilitated landform.

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			Groundwater quality	Certification by an appropriately qualified and experienced person that groundwater monitoring indicates that the groundwater quality is not negatively impacted compared to the baseline monitoring results by the rehabilitated landform.
			Final dams (agreed to be retained by landholder) are contained on site	Certification by an appropriately qualified and experienced person that surface water monitoring indicates that surface water quality is not negatively impacted compared to the baseline monitoring results by the rehabilitated landform.
				Receiving waters affected by surface water runoff have contaminant limits in accordance with the EA.
			All permanent drainage channels will meet approved design criteria	Certification by a suitably qualified and experienced person that the permanent drainage channels have been constructed and are operating in accordance with approved design criteria.
			All permanent regulated structures will meet approved design criteria	The regulated structures are certified by a suitably qualified and experienced person.
			All non-permanent regulated structures decommissioned appropriately	Regulated structures are decommissioned in accordance with the administering authority requirements.
	Long term safety	Hazardous materials adequately managed	Exposure to and availability of heavy metals and other toxic materials	Evidence that measures required to remediate contaminated land have been implemented and waste disposed of appropriately.
		Rehabilitation or conversion of exploration drill holes and	All non-artesian exploration drill holes undertaken on the Mining Lease (ML	Certification by an appropriately qualified and experienced person that all non-artesian exploration drill holes not converted to either a water bore or a groundwater monitoring bore have been rehabilitated.

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		groundwater monitoring bores	70486) have been rehabilitated or converted to water bores	Certification by an appropriately qualified and experienced person, that all sub-artesian aquifers have been isolated where non-artesian exploration drill holes have intersected more than one sub-artesian water bearing strata, in accordance with the 'Minimum Construction Requirements for Water Bores in Australia' (Australian Government, February 2012) or latest edition. Certification by an appropriately qualified and experienced person that all non-artesian exploration drill holes converted to a water bore have been converted in accordance with the 'Minimum Construction Requirements for Water Bores in Australia' (Australian Government, February 2012) or latest edition.
			All monitoring bores undertaken on the Mining Lease (ML 70486) have been rehabilitated	Certification by an appropriately qualified and experienced person that all non-artesian exploration drill holes converted to water bores are compliant with the requirements of the Water Act 2000 . Certification by an appropriately qualified person that all monitoring bores have been rehabilitated in accordance with the 'Minimum Construction Requirements for Water Bores in Australia' (Australian Government, February 2012) or latest edition.
		Structurally safe with no hazardous materials	Safety assessment of landform stability (geotechnical studies)	Certification by an appropriately qualified and experienced person that site slopes are now safe and will remain so. Risks assessment has been completed and risk mitigation measures have been implemented. In the unlikely event where risk mitigation measures are included e.g. bunds, safety fences and warning signs, these have been erected in accordance with relevant guidelines and Australian Standards.
		Site is safe for humans and animals	Appropriate decommissioning of infrastructure	Certification by an appropriately qualified and experienced person that the infrastructure has been decommissioned and rehabilitated. Buildings, water storage(s), roads (except those used by the public), and other infrastructure have been removed unless stakeholders have entered into formal written agreements for their retention. Areas are readily accessible and conducive to safe cattle management and cropping activities.
Void – cut and cover (Drift entry)	Sustainable land use	Agricultural cattle grazing	Cattle stocking rates	Certification by an appropriately qualified and experienced person that areas nominated for cattle grazing are meeting and maintaining an equal to or better stocking rate than that calculated for each reference site.

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			Landform stability when grazed	Land maintenance requirements are comparable to designated reference sites. Safety of landform for stock and for undertaking management activities associated with stock.
			Stock access to water sources	Stock only allowed access to water sources that meet stock water requirements as detailed in the EA.
		Soil properties support the desired land use	Chemical properties (e.g. pH, salinity, nutrient content, sodium content) of topsoil and subsoil to support the proposed vegetation and land use	Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A: support the best possible class of agricultural land; (b) Class B: support the best possible class of agricultural land; (c) Class C1: its predevelopment condition; and (d) Class C3: its predevelopment condition.
			Physical properties of topsoil and subsoil to support the proposed vegetation and land use.	Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A: support the best possible class of agricultural land; (b) Class B: support the best possible class of agricultural land; (c) Class C1: its predevelopment condition; and (d) Class C3: its predevelopment condition.
			Top soil thickness	Evidence that topsoil has been re-spread such that it meets the criteria as per the following areas on Figure 2: Springsure Creek Coal Project Final Rehabilitated Landform , for: (a) Class A and Class B: such that soil is reinstated and restored so it can support the best possible class of agricultural land; and (b) Class C1 and Class C3: such that topsoil is at the predevelopment depth.

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			Soil site characteristics	Certification that the soil site characteristics have acceptable levels of surface roughness, infiltration capacity, aggregate stability and surface condition. Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL, for: (a) Class A and Class B: such that soil is reinstated and restored so it can support the best possible class of agricultural land; and (b) Class C1 and C3: such that soil represents its predevelopment condition.
			Media characterisation studies	Certification by an appropriately qualified and experienced person that planting media characteristics do not pose significant constraints to plant growth following amelioration. Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL, for: (a) Class A: support the best possible class of agricultural land; (b) Class B: support the best possible class of agricultural land; (c) Class C1: its predevelopment condition; and (d) Class C3: its predevelopment condition.
	Stable landform	Landform design achieves appropriate erosion rates	Engineered structures to control water flow	Evidence that required contour banks, channel linings, surface armour, etc. are in place and functioning.
			Rates of soil loss	Certification by a suitably qualified and experienced person that all land disturbed by the mining activities does not exhibit any signs of continued erosion greater than that exhibited in the reference site.
			Dimensions and frequency of occurrence of erosion rills and gullies	Evidence that dimensions and frequency of occurrence of erosion rills and gullies are no greater than that in the corresponding reference sites.

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	Non-polluting	Run off drainage lines mirror natural stream functions	Design and stability of drainage lines	Document how drainage lines have changed over the course of the Project and that they are stable at closure and are likely to remain that way into the foreseeable future.
		Mine affected water contained on site.	Downstream surface water quality	Certification by an appropriately qualified and experienced person that surface water quality at monitoring locations is not negatively impacted compared to the baseline monitoring results by the rehabilitated landform.
			Groundwater quality	Certification by an appropriately qualified and experienced person that groundwater monitoring indicates that the groundwater quality is not negatively impacted compared to the baseline monitoring results by the rehabilitated landform.
			All permanent regulated structures will meet approved design criteria	The regulated structures are certified by a suitably qualified and experienced person.
			All non-permanent regulated structures decommissioned appropriately.	Regulated structures are decommissioned in accordance with the administering authority requirements.
			Voids protected from flooding.	Certification by a suitably qualified and experienced person that the final voids have an adequate protection system to prevent inundation from a 1:1000 AEP event.
	Long term safety	Structurally safe with no hazardous materials	Safety assessment of landform stability (geotechnical studies)	Certification by a suitably qualified and experienced person that site slopes are now safe and will remain so.
			Exposure to and availability of heavy metals and other toxic materials	Certification by a suitably qualified and experienced person in the Rehabilitation Report that specified cover thickness is in place and predictions about future changes.

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		Site is safe for humans and animals now and in the foreseeable future	Creek bank erosion	Evidence that all creek banks are stable at closure and are likely to remain that way into the foreseeable future.
			Safety assessment of landform stability (geotechnical studies)	The void is certified by a suitably qualified and experienced person as being decommissioned appropriately.
			Adequacy and predicted long-term performance of safety barriers	Evidence that an adequate Safety Plan has been implemented.
			Installation of safety barriers and human/wildlife exclusion fencing of final void	Fencing or other suitable barrier installed around the perimeter of the final void to restrict access, if required following safety assessment.
Other Lands (lands not impacted by subsidence, voids, cuts and/or the placement of surface infrastructure)	Sustainable land use	Agricultural cattle grazing	Agricultural productivity	Certification by an appropriately qualified and experienced person that areas nominated for agriculture are maintaining an equal to or better production rate based on comparison to reference sites.
			Landform stability when cropped	Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A: support the best possible class of agricultural land; (b) Class B: support the best possible class of agricultural land; (c) Class C1: its predevelopment condition; and (d) Class C3: its predevelopment condition.
			Landform stability when grazed	Land maintenance requirements are comparable to designated reference sites. Safety of landform for stock and for undertaking management activities associated with stock.

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		Soil properties support the desired land use	Access to water sources	Water used by agriculture and landholders meets land use requirements in terms of quality and availability.
			Chemical properties (e.g. pH, salinity, nutrient content, sodium content) of topsoil and subsoil to support the proposed vegetation and land use.	Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A: support the best possible class of agricultural land; (b) Class B: support the best possible class of agricultural land; (c) Class C1: its predevelopment condition; and (d) Class C3: its predevelopment condition.
			Physical properties of topsoil and subsoil to support the proposed vegetation and land use.	Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A: support the best possible class of agricultural land; (b) Class B: support the best possible class of agricultural land; (c) Class C1: its predevelopment condition; and (d) Class C3: its predevelopment condition.
			Top soil thickness	Evidence that topsoil has been re-spread such that it meets the criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A and Class B: such that soil is reinstated and restored so it can support the best possible class of agricultural land; and (b) Class C1 and Class C3: such that topsoil is at the predevelopment depth.
			Soil site characteristics	Certification that the soil site characteristics have acceptable levels of surface roughness, infiltration capacity, aggregate stability and surface condition. Certification by an appropriately qualified and experienced person that the final land form represents the equivalent GQAL criteria as per the following areas on Figure 6: Existing Land Suitability – GQAL , for: (a) Class A and Class B: such that soil is reinstated and restored so it can support the best possible class of agricultural land; and

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				(b) Class C1 and C3: such that soil represents its predevelopment condition.
		Establish self-sustaining natural vegetation or habitat	Presence of key plant species	Certification by an appropriately qualified and experienced person that key species identified prior to mining are present and within relevant reference sites.
			Density of key plant species	Certification by an appropriately qualified and experienced person that the density of the key species is consistent relevant reference sites.
			Composition of key plant species	Vegetation types and densities and the composition of key plant species are comparable with the relevant reference site.
		Self-sustaining natural vegetation or habitat	Native fauna species	Certification by an appropriately qualified and experienced person that native fauna species identified within the Project EIS and SEIS are present or indicators of these species or key microhabitat elements are developing within the rehabilitated areas.
			Plant regeneration	Species in rehabilitated areas show evidence of flowering, viable seed setting, germination and emergence.
			Abundance of declared plants (weeds) identified through surveys	Certification by an appropriately qualified and experienced person that declared plants within the rehabilitation area are identified and managed in accordance with the Land Protection (Pest and Stock Route) Act 2002 .
			Abundance of exotic grasses	Certification by an appropriately qualified and experienced person that the abundance of exotic grass invasion is no greater than the baseline condition as assessed against reference sites.

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			Actions taken to manage declared plants under local or State legislation	Evidence that actions have been undertaken to manage declared plants in accordance with the <i>Land Protection (Pest and Stock Route) Act 2002</i> .
			Abundance of declared animals identified through surveys	Certification by an appropriately qualified and experienced person that the abundance of declared animals has not increased significantly since baseline surveys and/or that a vertebrate pest control program is being implemented to reduce pest numbers.
			Management actions taken to control animals declared under local or State legislation	Records indicating that the holder has actively been managing animals declared under local or State legislation on the site.
			Weed hygiene procedures	Records indicating that all machinery, plant and equipment used for rehabilitation was free of declared plant seed and reproductive material prior to entering the site.
	Stable Landform	Landform design achieves appropriate erosion rates	Engineered structures to control water flow	Evidence that required contour banks, channel linings, surface armour, etc. are in place and functioning.
			Rates of soil loss	Certification by a suitably qualified and experienced person that all land disturbed by the mining activities does not exhibit any signs of continued erosion greater than that exhibited in the reference site.
		Vegetation cover for self-sustaining community and to minimise erosion	Vegetation type and density	Evidence that the vegetation type and density are of species suited to the slope, aspect, climate and other factors, and that the soil erosion meets the goals set in the site RMP.

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		Run off drainage lines mirror natural stream functions	Design and stability of drainage lines	Document how drainage lines have changed over the course of the Project and that they are stable at closure and are likely to remain that way into the foreseeable future.
	Non-polluting	Mine affected water contained on site	Downstream surface water quality	Certification by an appropriately qualified and experienced person that surface water quality at monitoring locations is not negatively impacted compared to the baseline monitoring results by the rehabilitated landform
			Groundwater quality	Certification by an appropriately qualified person that groundwater monitoring indicates that the groundwater quality is not negatively impacted compared to the baseline monitoring results by the rehabilitated landform.
			Final landform water storages are contained on site, with no overflows into external surface water systems	Certification by an appropriately qualified and experienced person that surface water monitoring indicates that surface water quality is not negatively impacted compared to the baseline monitoring results by the rehabilitated landform.
				Receiving waters affected by surface water runoff have contaminant limits in accordance with the EA.
			All permanent drainage channels will meet approved design criteria	Certification by a suitably qualified and experienced person that the permanent drainage channels have been constructed and are operating in accordance with approved design criteria.
			All permanent regulated structures will meet approved design criteria	The regulated structures are certified by a suitably qualified and experienced person.
			All non-permanent regulated structures decommissioned appropriately	Regulated structures are decommissioned in accordance with the administering authority requirements.

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	Long term safety	Rehabilitation or conversion of exploration drill holes and groundwater monitoring bores	All non-artesian exploration drill holes undertaken on the Mining Lease (ML 70486) have been rehabilitated or converted to water bores	Certification by an appropriately qualified and experienced person that all non-artesian exploration drill holes not converted to either a water bore or a groundwater monitoring bore have been rehabilitated.
				Certification by an appropriately qualified and experienced person, that all sub-artesian aquifers have been isolated where non-artesian exploration drill holes have intersected more than one sub-artesian water bearing strata, in accordance with the 'Minimum Construction Requirements for Water Bores in Australia' (Australian Government, February 2012) or latest edition.
				Certification by an appropriately qualified and experienced person that all non-artesian exploration drill holes converted to a water bore have been converted in accordance with the 'Minimum Construction Requirements for Water Bores in Australia' (Australian Government, February 2012) or latest edition.
		Structurally safe with no hazardous materials	All monitoring bores undertaken on the Mining Lease (ML 70486) have been rehabilitated	Certification by an appropriately qualified and experienced person that all non-artesian exploration drill holes converted to water bores are compliant with the requirements of the Water Act 2000 . Certification by an appropriately qualified and experienced person that all monitoring bores have been rehabilitated in accordance with the 'Minimum Construction Requirements for Water Bores in Australia' (Australian Government, February 2012) or latest edition.
				Certification by a suitably qualified and experienced person that site slopes are now safe and will remain so.
				Risks assessment has been completed and risk mitigation measures have been implemented. Where risk mitigation measures include bunds, safety fences and warning signs, these have been erected in accordance with relevant guidelines and Australian Standards.

Note: It is an offence under the Land Protection (Pest and Stock Route Management Act) 2002 to fail to control Class 1 or Class 2 pests on a Mining Lease or to move or transport a vehicle containing the reproductive material of a declared pest.

Appendix 2: Watercourse subsidence

When to use

This appendix is to be used by the Environmental Authority (EA) holders in the preparation of a Subsidence Management Plan (SMP) where a watercourse, as defined under the **Water Act 2000**, is to be impacted as a result of underground longwall mining. For a feature to be defined as a watercourse under Chapter 1, Part 2 of the **Water Act 2000**, the feature must possess particular characteristics. Watercourse determinations are regularly undertaken across Central Queensland by the Department of Natural Resources, Mines and Energy as it is the determining factor in the requirement for approvals under the **Water Act 2000**.

In addition, this appendix is to be used by the department when providing advice and assessing Subsidence Management Plans submitted by EA holders or proposed EA holders.

Purpose

The purpose of this appendix is to detail the information to be provided in a SMP and the legislative basis of the requirement for approval. The SMP forms the major reference document regarding subsidence impacts on watercourses as a result of underground longwall mining and is required to accompany proposals for watercourse subsidence.

The objective of the SMP is to ensure that the impacts of subsidence are properly managed. Where surface subsidence intersects a watercourse, it is important for the situation to be managed effectively to ensure no long-term maintenance is required within the watercourse, and to ensure that naturally occurring processes are not impaired.

A SMP should include the following information:

- § Location of proposed longwall panels and modelled subsidence effects on the watercourse;
- § Pre-subsidence management of watercourses proposed to be subsided;
- § Monitoring methods pre and post-subsidence to detect and document any impacts on watercourses;
- § Post-subsidence management of impacted watercourses through remediation and rehabilitation;
- § Agreed outcome for proposed future landscape between the department and the proponent.

Governing legislation

Subsidence on mining leases is managed under two separate Government Departments; the Department of Environment and Science (DES) and the Department of Natural Resources, Mines and Energy (DNRME).

Environmental impact associated with mining activities is regulated under the **Environmental Protection Act 1994**. While this legislation does not identify longwall mining as a specific mining activity, it provides a definition of a 'mining activity' and 'environmental harm'. The process of longwall mining and resultant subsidence is governed by the legislation and authorised under a proponent's EA.

The holder or holders of a mining tenement issued under the **Mineral Resources Act 1989** must hold an EA for the mining activities to be carried out on the tenement. When applying for an EA, a number of environmental management documents must be in place describing the proposed project and the management of any environmental impacts.

A Plan of Operations describes the actions and programs required to achieve compliance with the conditions of an EA. All activities carried out on a mining lease must be carried out in accordance with the submitted Plan of Operations. A Plan of Operations describes an action program for complying with the conditions of the associated EA, contains a plan showing where all activities are to be carried out on the land, and includes a rehabilitation program for land disturbed or proposed to be disturbed.

Whilst management of subsidence will be included in the Plan of Operations, the Subsidence Management Plan is a stand-alone document authorised under the conditions of the EA.

Background

Throughout the Bowen Basin, economically viable coal deposits frequently extend beneath watercourses. Consequently, underground mining operations targeting the associated coal seams often also extend beneath watercourses. Underground mining is not a new concept in the extraction of coal throughout the Bowen Basin. This form of mining is preferred when economic constraints reduce the feasibility of mining using open cut

methods. Whilst coal deposits located beneath watercourses contribute to total extractable coal, more importantly, extraction of this coal facilitates underground mining activities to continue along a coal seam uninterrupted across both sides of a watercourse. This provides for a more cost effective extraction of coal that might otherwise be uneconomic to mine.

Technological improvements in underground mining methods have provided the ability to extract coal in areas previously inaccessible for mining. Modern day underground coal mining operations commonly utilise longwall mining techniques which allow extraction of more of the coal seam. Longwall mining allows access to the coal seam via a shaft, a decline or a highwall portal and system of underground workings, without the need to remove overburden. This technique is used to extract the coal seam via a series of 'panels', which can be hundreds of metres wide and kilometres in length. As the coal shearer removes the coal in the seam along the length of a panel, the overlying strata is collapsed behind, filling the void (goaf) left by the extracted coal. The collapse and settlement of the overlying strata can extend to the land surface above, resulting in localised lowering of the surface profile, and depressions in the landscape (commonly referred to as subsidence troughs).

Where a watercourse is located above a longwall panel, extraction of the coal seam causes subsidence of the panel can have a number of impacts on the watercourse. Some of these impacts include:

- § Lowering of bed and banks
- § Creation of in-stream waterholes
- § Changes to local drainage patterns
- § Incision processes
- § Stream widening
- § Erosion
- § Increased overbank flows due to lowering of the high banks
- § Tension cracking through both shallow and deeper underlying strata (including aquifers)
- § Root shear and loss of riparian vegetation
- § Changes to water quality (surface water and groundwater).

The degree of subsidence is generally a function of thickness of coal extracted, depth of overburden, strata type and panel width. The point of maximum subsidence generally occurs along the centreline of an extracted panel, whilst the pillar zones located between panels remain at natural surface level. Experience gained through widespread adoption of longwall mining processes in the Bowen Basin has seen advancement in the modelling and ability to predict the likely impacts of a subsidence event. This technology has also facilitated improved design and implementation of mitigation measures (engineered structures and associated earthworks) and highlighted potential short and long term maintenance issues which may require specific management intervention.

Subsidence Management Plan

The objective of the SMP is to ensure that the impacts of subsidence are properly managed. Where surface subsidence intersects a watercourse, effective management is required to ensure no long-term maintenance is required within the watercourse, and to ensure that naturally occurring processes are not unduly impaired. Consideration must be given for potential impacts on erosion, groundwater and surface water as a result of a proposed subsidence event.

A Subsidence Management Plan must address the following issues:

1. Description of Pre Subsidence Situation & Survey

- i) A general description of the area pre subsidence including photographic record should be provided.
- ii) Survey of cross-section and longitudinal profiles should be undertaken on all watercourses with potential to be impacted through subsidence. Permanent transects should be detailed within the proposed Subsidence Management Plan. Surveys should include the confluence with any other watercourses in the impacted area as well as any infrastructure spanning the watercourse. Surface drainage patterns should be investigated to determine current paths of water movement through the landscape. This path of water movement should be maintained where possible post-subsidence.

2. Predicted Subsidence

The degree of anticipated subsidence should be provided, including the length of watercourse to be impacted and the average depth of subsidence across individual panels. The predicted subsidence should be modelled to indicate the change in surface elevations expected. The volumes of water expected to be captured within the bed of the watercourse due to creation of waterholes should be provided. Consequences of any lowering of the high banks of the watercourse should be discussed, including impacts associated with greater floodplain interaction and potential for creation of new channels.

3. **Infrastructure**

Prior to mining, the anticipated impacts from subsidence should be determined on all infrastructure located within or above the watercourse to be subsided along with measures to be implemented to mitigate any impacts. Priority should be given to infrastructure which provides services to external parties (other mines, towns, industry). Measures for dealing with any interruption to such services should be outlined. Relocation of infrastructure may be necessary should the proposed subsidence pose sufficient risk.

4. **Preventative Works**

Where preventative measures are required to ensure the stability of the bed and banks of the watercourse (establishment of pile fields, exclusion of cattle, bentonite treatment) these should be discussed in the Subsidence Management Plan, including supporting evidence outlining the legitimacy of such works. These works may be required where self-repair by natural processes will not provide adequate remediation of impacted areas. Where there is potential for root shear to result in significant loss of riparian vegetation, mitigation measures may be required.

5. **Engineered Structures**

Engineered works may be required to maintain the stability and function of a watercourse impacted by subsidence. These works are often constructed prior to subsidence occurring within the watercourse. Such works can include timber pile fields, rock revetment, reshaping of existing stream banks, and river bed treatment to prevent increased ingress of surface water into underground aquifers. Where subsidence mitigation measures require engineered structures be installed, the design, monitoring and maintenance of these structures should be detailed in the Subsidence Management Plan. The plan should detail the purpose of each structure and any consequences should the structure fail to be installed. Appropriate design plans including the location of each structure will be required. As a minimum, fourth and fifth order watercourse will require the installation of engineered structures. Works undertaken within the bed and banks of a watercourse aimed at mitigating or remediating any physical impacts pre or post-subsidence are authorised under the conditions of the Environmental Authority. Where a separate report has been produced for engineered structures, this should be included as an appendix to the Subsidence Management Plan.

6. **Erosion**

The Subsidence Management Plan should detail the current watercourse condition to be impacted by subsidence. Identification of erosion zones which are likely to be exacerbated through tension cracking should be stabilised using appropriate methods. Such areas may include reaches with elevated rates of bed and bank erosion, access tracks and areas with poor quality, sparsely populated riparian vegetation. Sufficient riparian vegetation should be established prior to subsidence to assist with initial stabilisation of the bed and banks. Removal of grazing animals to allow establishment or recovery of riparian vegetation may be required for an extended period prior to subsidence.

7. **Groundwater**

Where groundwater aquifers exist beneath the mine plan area, investigations should be undertaken regarding the potential for impacts on these aquifers as a result of subsidence. The Subsidence Management Plan should discuss these aquifers, any anticipated impacts on each aquifer and proposed measures for mitigating these impacts. Any anticipated movement of surface water into underlying aquifers should be discussed, as this can result in loss of surface water from the system and impacts on water quality in these aquifers. Geotechnical assessment across the bed and banks of the watercourse should be undertaken to provide an indication of potential permeability issues related to sub-surface cracking and interaction with local groundwater tables. Monitoring bores should be established in each aquifer prior to subsidence and monitored for a period of time sufficient for obtaining background water levels and trends. Monitoring of these bores should continue post-subsidence to aid the detection of impacted aquifers.

8. **Surface Water**

i) **Baseline** Monitoring

The Subsidence Management Plan should detail baseline condition monitoring of all watercourses likely to be impacted through subsidence. The preferred monitoring assessment technique for stream condition in the Bowen Basin is the Index of Diversion Condition. This methodology was established as a result of the Australian Coal Association Research Program (ACARP) Project C9068. Monitoring of watercourses should extend a minimum of 1km upstream and downstream of the proposed area to be impacted and should include a geomorphic assessment of the entire reach. Where a baseline monitoring assessment has been undertaken as part of an Environmental Impact Statement (EIS) process, this may be considered sufficient provided there has been no subsequent modification or interference to the watercourse. The condition of riparian vegetation should also be detailed.

ii) **Cumulative Impacts on Watercourses**

With an increasing number of mines being established in close proximity to watercourses, a proponent utilising longwall mining methods may be requested to investigate the cumulative impact of these activities on the watercourse.

Monitoring and Reporting Requirements

The following criteria have been developed to provide detailed direction regarding monitoring and reporting requirements associated with subsidence of watercourses.

These criteria are outlined in a four step approach:

- § Monitoring
- § Assessment
- § Reporting
- § Mitigation

Monitoring

- § Representative sites need to be identified that allow the impacts of subsidence to be assessed in a particular watercourse with particular attention to the following:
 - o Sites must be located at all pillar zones intersecting a watercourse or tributary.
 - o Sites must include representative locations at the interface of natural ground level and observed changes in surface elevation from subsidence within a watercourse.
- § Control sites beyond proposed mining extents should be established to verify pre-mining conditions. In watercourses, the sites should extend a minimum of 1km both upstream and downstream of the subsidence reach.
- § Assessment of watercourse condition: Specific monitoring assessment techniques for watercourse condition should include but not be limited to the Index of Diversion Condition, as outlined in the ACARP Project C9068.
- § Vegetation and ecological condition assessments should form part of the baseline dataset.
- § Rainfall monitoring should be undertaken within areas proposed to be impacted by subsidence. In addition, flow event monitoring should occur in watercourses proposed to be impacted by subsidence. The type of monitoring devices and locations to be installed should be detailed in the Subsidence Management Plan.
- § Where preventative works are undertaken pre-subsidence, subsequent monitoring assessments should include the integrity and effectiveness of these works in reducing the impact of subsidence within the watercourse.
- § Surveys must include cross-sectional area and bed slope throughout all monitored reaches of impacted watercourses.
- § Annual aerial photography and Digital Terrain Mapping is required to verify predicted subsidence surface profiles, and to identify potential short and long term erosion issues resulting from subsidence of watercourses.
- § Surveys pre-subsidence should quantify the following features within watercourses:

- pool/riffle sequences
 - bed controls
 - entry points of other watercourses and localised tributaries
 - existing bed and bank scour points
 - infrastructure located within the watercourse.
- § Surveys post-subsidence should quantify any changes to the pre-mining conditions including:
- erosion or deposition processes that have occurred as a result of subsidence,
 - migration of head cut erosion within watercourses and tributaries,
 - localised changes to stream bed slope,
 - localised widening of channels,
 - destabilisation of stream bed and banks including fracturing and incision,
 - localised changes to bank heights
 - size of subsidence void created within the watercourse.
- § The subsidence monitoring program for groundwater must include the following information:
- Sites must include representative locations at the interface of natural ground surface and observed changes in surface elevation from subsidence.
 - Monitoring bores should be established in each aquifer at each monitoring site.
 - Monitoring must include both water level measurements and water quality sampling in accordance with the following:
 - § water level measurement to be taken quarterly
 - § water quality field conductivity measurement to be taken 6 monthly
 - § full chemical analysis of water samples to be taken annually.

Frequency of Monitoring

A proposed timeframe should be provided by the proponent in relation to the monitoring outlined in the Subsidence Management Plan. The Department, upon review of the proposed Subsidence Management Plan will determine a suitable monitoring timeframe based on the information provided. Monitoring requirements will depend on a number of factors, including the stream order of the watercourse proposed to be impacted. As a guide:

Stream Order 1, 2 and 3

Monitoring must be undertaken at the following intervals:

- § immediately prior to subsidence,
- § within two (2) months of the initial subsidence,
- § following a rainfall event of **1 in 2 year** ARI for the duration equal to the time of concentration for the catchment at the location of the subsidence.
- § following a peak flow event of greater than a **1 in 2 year** ARI and
- § annually.

Stream Order 4 and higher

Monitoring (including surveys) must be undertaken at the following intervals:

- § immediately prior to subsidence,
- § within two (2) months of the initial subsidence,
- § following a rainfall event of **1 in 5 year** ARI for the duration equal to the time of concentration for the catchment at the location of the subsidence.
- § following a peak flow event of greater than a **1 in 5 year** ARI, and
- § annually.

Cumulative Impacts

Where subsidence is proposed in a Subsidence Management Plan, and the watercourse has already been subsided upstream or downstream, the monitoring assessment must determine not only the localised impacts on the watercourse resulting from the proposed subsidence, but also any cumulative impacts on the watercourse as a result of all other subsidence events.

Assessment

The design and assessment of engineered structures should be performed by a Registered Professional Engineer of Queensland (RPEQ). All other assessments should be performed by suitably qualified and experienced persons in the fields that they are assessing.

- § The results of all monitoring activities should be reviewed by a suitably qualified person and detailed in the associated monitoring report.
- § Recommendations should be made after assessment of the results regarding any specific treatment, remediation works, or engineered structures required post-subsidence to achieve stability in the watercourse.

Reporting

An annual report will be requested by the administering authority post-subsidence. The report should detail mining activities and all monitoring and rehabilitation activities as outlined within the Subsidence Management Plan. The reporting date will be determined in consultation with the administering authority.

- § A monitoring report should contain the results of all monitoring activities, the assessment of these results, and recommendations for any remedial works required. The report should comment on the following:
 - Watercourse condition and geomorphic processes;
 - The condition of vegetation in riparian zones;
 - Examination of pillar zones in watercourses with particular attention to potential for tension cracking;
 - The creation of in-stream waterholes;
 - Any impacts on groundwater.
- § Where preventative works were undertaken pre-subsidence, subsequent monitoring assessments should include assessment of the integrity and effectiveness of these works in mitigating the impacts of subsidence.
- § An annual report in the form of two (2) hard copies and one electronic copy shall be furnished to the administering authority. The report should in addition to addressing specific monitoring requirements provide comment on:
 - The current state of the groundwater and surface water resources;
 - Any impacts on these features;
 - Any remedial works required to be undertaken including a timetable for implementation.
 - Commitment from the proponent to addressing the recommendations in the report.

Mitigation

Where recommendations are made regarding specific treatment, remediation works, or engineered structures required post-subsidence to achieve stability in the watercourse, the proponent must ensure this work is undertaken.

Rehabilitation

The holder of the EA, if directed by the administering authority, will carry out additional remedial works deemed necessary to minimise the impacts of subsidence on the physical integrity of the watercourse.

Relinquishment

Relinquishment of monitoring and rehabilitation responsibilities conditional under a proponent's EA can only occur after the subsidence and approved mitigation and rehabilitation measures have been subjected to a suitable range of rainfall and flow events, and are deemed by the administering authority to be in a stable and functional condition. Any request for relinquishment will be negotiated with the administering authority and will require a submission containing monitoring data demonstrating stability and functionality in the watercourse over a suitable range of rainfall and flow events.

Acknowledgement

In 2007, BMA and Anglo Coal instigated discussions with the Department into a proposed assessment on the cumulative impacts of longwall mining beneath the Isaac River in Central Queensland. A final report was produced by Alluvium Consulting in July 2009 documenting the outcomes of the study. The Department greatly acknowledges the findings from this report and the assistance provided in the development of this guideline.

R Lucas, J Crerar, R Hardie, J Merritt and B Kirsch, 2009. ***Isaac River Cumulative Impact Assessment of Mining Developments***. Report by Alluvium Consulting. ACARP for Diversion assessment guideline ex C9068

Definitions

Words and phrases used throughout this environmental authority are defined below. Where a definition for a term used in this environmental authority is not provided within this environmental authority, but is provided in the **Environmental Protection Act 1994** or subordinate legislation, the definition in the EP Act or subordinate legislation must be used. If a word remains undefined it has its ordinary English meaning.

'acid rock drainage' or **'acid mine drainage'** means any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture.

'administering authority' means the Department of Environment and Science or its successor.

'airblast overpressure' means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dBL).

'annual exceedance probability or AEP' the probability that at least one event in excess of a particular magnitude will occur in any given year.

'annual inspection report' means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan);

- a) against recommendations contained in previous annual inspections reports;
- b) against recognised dam safety deficiency indicators;
- c) for changes in circumstances potentially leading to a change in consequence category;
- d) for conformance with the conditions of this authority;
- e) for conformance with the 'as constructed' drawings;
- f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems);
- g) for evidence of conformance with the current operational plan.

'ambient noise' at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

'ANZECC' means the ***Australian and New Zealand Guidelines for Fresh Marine Water Quality 2000***.

'appropriately qualified and experienced 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 on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

'ARMCANZ' means the ***Agriculture and Resource Management Council of Australia and New Zealand 2000***.

'artesian bore' includes a shaft, well, gallery, spear or excavation and any works constructed in connection with the shaft well, gallery, spear or excavation that taps an aquifer and the water flows, or has flowed, naturally to the surface.

‘assessed and assessment’ by a suitably qualified and experienced person in relation to a hazard assessment of a dam, means that a statutory declaration has been made by that person and, when 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 of the assessment:

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

‘associated works’ in relation to a dam, means:

- a) operations of any kind and all things constructed, erected or installed for that dam; and
- b) any land used for those operations.

‘authority’ means an environmental authority or development approval.

‘background’ means the average of samples taken prior to the commencement of mining from the same location that the current sample has been taken.

‘bed and banks’ for waters, river, creek, stream, lake, lagoon, pond, swamp, wetland or dam means land over which the water of the waters, river, creek, stream, lake, lagoon, pond, swamp, wetland or dam 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 and banks that is from time to time covered in floodwater.

‘beneficial use’ in respect of dams means that the current or proposed owner of the land on which a dam stands, has found a use for that dam that is:

- a) of benefit to that owner in that it adds real value to their business or to the general community;
- b) in accordance with relevant provisions of the ***Environmental Protection Act 1994***;
- c) sustainable by virtue of written undertakings given by that owner to maintain that dam; and
- d) the transfer and use have been approved or authorised under any relevant legislation.

‘biodiversity offset’ means a biodiversity offset that meets the requirements of the Queensland Biodiversity Offsets Policy.

‘blasting’ means the use of explosive materials to fracture:

- a) rock, coal and other minerals for later recovery; or
- b) structural components or other items to facilitate removal from a site or for reuse.

‘certification’, ‘certifying’ or ‘certified’ by an appropriately qualified and experienced person 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 the following aspects are addressed and are sufficient to allow an independent audit at any time:

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

‘certification’, ‘certifying’ or ‘certified’ in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by this Manual, including design plans, ‘as constructed’ drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).

‘chemical’ means:

- a) an agricultural chemical product or veterinary chemical product within the meaning of the Agricultural and ***Veterinary Chemicals Code Act 1994*** (Commonwealth); or
- b) a dangerous good under the Australian Code for the Transport of Dangerous Goods by Road and Rail approved by the Australian Transport Council; or
- c) a lead hazardous substance within the meaning of the Workplace Health and Safety Regulation 1997;
- d) a drug or poison in the Standard for the Uniform Scheduling of Drugs and Poisons prepared by the Australian Health Ministers’ Advisory Council and published by the Commonwealth; or
- e) any substance used as, or intended for use as:
 - i. a pesticide, insecticide, fungicide, herbicide, rodenticide, nematocide, miticide, fumigant or related product; or
 - ii. a surface active agent, including, for example, soap or related detergent; or
 - iii. a paint solvent, pigment, dye, printing ink, industrial polish, adhesive, sealant, food additive, bleach, sanitiser, disinfectant, or biocide; or
 - iv. a fertiliser for agricultural, horticultural or garden use; or
 - v. a substance used for, or intended for use for mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater; or
 - vi. manufacture of plastic or synthetic rubber.

‘commencement of mining activities’ means the commencement of activities permitted by the issue of a mining lease under the ***Mineral Resources Act 1989*** for the operational land.

‘commercial place’ means a workplace used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees’ accommodation or public roads.

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

‘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 ***Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)***.

‘construction’ or ‘constructed’ in relation to a regulated structure includes building a new regulated structure and modifying or lifting an existing regulated structure, but does not include investigations and testing necessary for the purpose of preparing a design plan.

‘contaminants’ means substances rendered impure by contact or mixture.

‘contaminant’ can be:

- a) a gas, liquid or solid; or
- b) an odour; or
- c) an organism (whether dead or alive), including a virus; or

- d) energy, including noise, heat, radiation and electromagnetic radiation; or
- e) a combination of contaminants.

‘control measure’ means any action or activity that can be used to prevent or eliminate a hazard or reduce it to an acceptable level.

‘dam’ means a land-based structure or a void that 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 not mean a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container.

‘dam crest volume’ means the volume of material (liquids and/or solids) 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 spillway).

‘design plan’ is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.

‘design storage allowance or DSA’ means an available volume, estimated in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an **annual exceedance probability (AEP)** specified in that Manual.

‘designer’ for the purposes of a regulated dam, means the certifier of the design plan for the regulated dam.

‘development approval’ means a development approval under the *Integrated Planning Act 1997* or the *Sustainable Planning Act 2009* in relation to a matter that involves an environmentally relevant activity under the *Environmental Protection Act 1994*.

‘disturbance’ of land includes:

- a) compacting, removing, covering, exposing or stockpiling of earth;
- b) removal or destruction of vegetation or topsoil or both to an extent where the land has been made susceptible to erosion;
- c) carrying out mining within a watercourse, waterway, wetland or lake;
- d) the submersion of areas by tailings or hazardous contaminant storage and dam/structure walls;
- e) temporary infrastructure, including any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after the mining activity has ceased; or
- f) releasing of contaminants into the soil, or underlying geological strata.

However, the following areas are not included when calculating areas of ‘disturbance’:

- a) areas off lease (e.g. roads or tracks which provide access to the mining lease);
- b) areas previously disturbed which have achieved the rehabilitation outcomes;
- c) by agreement with the administering authority, areas previously disturbed which have not achieved the rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions);
- d) areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner.

e) disturbance that pre-existed the grant of the tenure.

‘EC’ means electrical conductivity.

‘end of pipe’ means the location at which water is released to waters or land.

‘effluent’ treated waste water released from sewage treatment plants.

‘emergency action plan’ means documentation forming part of the operational plan held by the holder or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to downstream communities and the implementation of protection measures. The plan must require dam owners to annually update contact details that are part of the plan, and to comprehensively review the plan at least every five years.

‘existing structure’ means a structure that was in existence prior to the adoption of this schedule of conditions under the authority.

‘extreme storm storage’ means a storm storage allowance determined in accordance with the criteria in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority.

financial assurance’ means a security required under the *Environmental Protection Act 1999* by the administering authority to cover the cost of rehabilitation or remediation of disturbed land or to secure compliance with the environmental authority.

‘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.

GQAL’ means Good Quality Agricultural Land as defined in the Queensland *Planning Guidelines: The Identification of Good Quality Agricultural Land* (Department of Primary Industries and Department of Housing, Local Government and Planning, January 1993).

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

‘ha’ means hectares.

‘holder’ means:

- a) where this document is an environmental authority, any person who is the holder of, or is acting under, that environmental authority; or
- b) where this document is a development approval, any person who is the registered operator for that development approval.

‘hydraulic performance’ means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.

‘infrastructure’ means water storage dams, levees, roads and tracks, buildings and other structures built for the purpose of the mining activity.

'LA' means the A-weighted noise level exceeded for N% of a given measurement period denoted as LAN of that level e.g. LA1 is the noise level exceeded for 1% of the time.

'land' in the 'land schedule' of this document means land excluding waters and the atmosphere, that is, the term has a different meaning from the term as defined in the ***Environmental Protection Act 1994***. For the purposes of the ***Acts Interpretation Act 1954***, it is expressly noted that the term 'land' in this environmental authority relates to physical land and not to interests in land.

'land use' means the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

'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 at the operational land which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

'levee' means an embankment that only provides for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from releases from other works, during the progress of those stormwater or flood flows or those releases; and does not store any significant volume of water or flowable substances at any other times.

'licensed place' means the mining activities carried out at the mining tenements detailed in this environmental authority.

'low consequence dam' means any dam that is not a high or significant hazard category as assessed using the ***Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)***.

'm' means metres.

'mandatory reporting level or MRL' means a warning and reporting level determined in accordance with the criteria in the ***Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*** published by the administering authority.

'manual' means the ***Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*** published by the administering authority.

'measures' includes any measures to prevent or minimise environmental impacts of the mining activity such as bunds, silt fences, diversion drains, capping and containment systems.

'mine affected water':

- a) means the following types of water:
 - i. pit water, tailings dam water, processing plant water;
 - ii. water contaminated by a mining activity which would have been an environmentally relevant activity under Schedule 2 of the ***Environmental Protection Regulation 2008*** if it had not formed part of the mining activity;
 - iii. rainfall runoff which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan to manage such runoff, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water;

- iv. groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated;
 - v. groundwater from the mine's dewatering activities;
 - vi. a mix of mine affected water (under any of paragraphs i)-v) and other water.
- b) does not include surface water runoff which, to the extent that it has been in contact with areas disturbed by mining activities that have not yet been completely rehabilitated, has only been in contact with:
- i. land that has been rehabilitated to a stable landform and either capped or revegetated in accordance with the acceptance criteria set out in the environmental authority but only still awaiting maintenance and monitoring of the rehabilitation over a specified period of time to demonstrate rehabilitation success; or
 - ii. land that has partially been rehabilitated and monitoring demonstrates the relevant part of the landform with which the water has been in contact does not cause environmental harm to waters or groundwater, for example:
 - a) areas that are been capped and have monitoring data demonstrating hazardous material adequately contained with the site;
 - b) evidence provided through monitoring that the relevant surface water would have met the water quality parameters for mine affected water release limits in this environmental authority, if those parameters had been applicable to the surface water runoff; or
 - iii. both.

'mine domain' means land management units within a mine site, usually with similar geophysical characteristics.

'mine waste' means waste rock, spoil, overburden, tailings and rejects.

'modification or modifying' see definition of 'construction'.

'NATA' means National Association of Testing Authorities, Australia.

'natural flow' means the flow of water through waters caused by nature.

'non-polluting' means having no adverse impacts upon the receiving environment.

'operational plan' includes:

- (a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA allowance);
- (b) contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.

'peak particle velocity (PPV)' means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mm/s).

'protected area' means – a protected area under the *Nature Conservation Act 1992*; or

- a) a marine park under the *Marine Parks Act 1992*; or
- b) a World Heritage Area.

'RBL' means Rating Background Noise Level.

‘receiving environment’ in relation to an activity that causes or may cause environmental harm, means the part of the environment to which the harm is, or may be, caused. The receiving environment includes (but is not limited to):

- a) a watercourse;
- b) groundwater; and
- c) an area of land that is not specified in this environmental authority.

The term does not include land that is specified in this environmental authority.

‘receiving waters’ means the waters into which this environmental authority authorises releases of mine affected water.

‘reference site’ means a site with the same chemical and physical characteristics including:

- slope and slope length;
- fire regime;
- production rate or stocking rate;
- land maintenance requirements;
- type, density and composition of key vegetation species;
- abundance of exotic grass invasion;
- signs of continued erosion and dimensions and frequency of occurrence of erosion rills and gullies;
- groundcover, shrub and canopy structure; and
- Agricultural Land Class

as that of the targeted rehabilitated land.

‘register of regulated dams’ includes:

- a) Date of entry in the register;
- b) Name of the dam, its purpose and intended/actual contents;
- c) The consequence category of the dam as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635);
- d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam;
- e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings;
- f) For the regulated dam, other than in relation to any levees –
 - i. The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam;
 - ii. Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area
 - iii. Dam crest volume (megalitres);
 - iv. Spillway crest level (metres AHD).
 - v. Maximum operating level (metres AHD);
 - vi. Storage rating table of stored volume versus level (metres AHD);
 - vii. Design storage allowance (megalitres) and associated level of the dam (metres AHD);
 - viii. Mandatory reporting level (metres AHD);
- g) The design plan title and reference relevant to the dam;
- h) The date construction was certified as compliant with the design plan;
- i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan;

- j) Details of the composition and construction of any liner;
- k) The system for the detection of any leakage through the floor and sides of the dam;
- l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;
- m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority;
- n) Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.

'regulated dam' means any dam in the significant or high hazard category as assessed using the ***Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*** published by the administering authority.

'regulated structure' includes land-based containment structures, levees, bunds and voids, but not a tank or container designed and constructed to an Australian Standard that deals with strength and structural integrity.

'rehabilitation' means the process of reshaping and revegetating land to restore it to a stable landform.

'release event' means a surface water discharge from mine affected water storages or contaminated areas on the licensed place.

'RL' means reduced level, relative to mean sea level as distinct from depths to water.

'representative' means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

'saline drainage' means the movement of waters, contaminated with salts, as a result of the mining activity.

'sensitive place' means:

- a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- b) a motel, hotel or hostel; or
- c) an educational institution; or
- d) a medical centre or hospital; or
- e) a protected area under the ***Nature Conservation Act 1992***, the ***Marine Parks Act 1992*** or a World Heritage Area; or
- f) a public park or gardens.

Note: The definition of 'sensitive place' and 'commercial place' is based on Schedule 1 of EPP Noise. That is, a sensitive place is inside or outside on a dwelling, library & educational institution, childcare or kindergarten, school or playground, hospital, surgery or other medical institution, commercial & retail activity, protected area or an area identified under a conservation plan under ***Nature Conservation Act 1992*** as a critical habitat or an area of major interest, marine park under ***Marine Parks Act 2004***, park or garden that is outside of the mining lease and open to the public for the use other than for sport or organised entertainment. A commercial place is inside or outside a commercial or retail activity.

A mining camp (i.e. accommodation and ancillary facilities for mine employees or contractors or both, associated with the mine the subject of the environmental authority) is not a sensitive place for that mine or mining project, whether or not the mining camp is located within a mining tenement that is part of the mining project the subject of the environmental authority. For example, the mining camp might be located on

neighbouring land owned or leased by the same company as one of the holders of the environmental authority for the mining project, or a related company. Accommodation for mine employees or contractors is a sensitive place if the land is held by a mining company or related company, and if occupation is restricted to the employees, contractors and their families for the particular mine or mines which are held by the same company or a related company.

For example, a township (occupied by the mine employees, contractors and their families for multiple mines that are held by different companies) would be a sensitive place, even if part or all of the township is constructed on land owned by one or more of the companies.

‘strategic cropping land’ or ‘SCL’ means land defined as strategic cropping land under the ***Strategic Cropping Land Act 2011***.

‘strategic cropping land protection decision’ means a decision made under the ***Strategic Cropping Land Act 2011*** in relation to a resource activity on SCL or potential SCL.

‘structure’ means dam or levee.

‘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.

‘state significant biodiversity values’ are those values listed in Appendix 1 of the Queensland Biodiversity Offsets Policy.

‘subsidence’ means the gradual caving in or sinking of an area of land.

‘suitably qualified and experienced 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 on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

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

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

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

‘system design plan’ means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.

‘targeted rehabilitated land’ means land with targeted rehabilitation requirements, for which a reference site must be identified such that the reference site has same site characteristics as those required for the land after rehabilitations is complete. For example, if rehabilitated land is required to be of Agricultural Land Class A1 (the target of the rehabilitated land is class A1), the reference site must be of class A1, and similarly of other characteristics.

‘the Act’ means the ***Environmental Protection Act 1994***.

'µS/cm' means micro siemens per centimetre.

'void' means any constructed, open excavation in the ground.

'waste' has the same meaning given in the ***Environmental Protection Act 1994***.

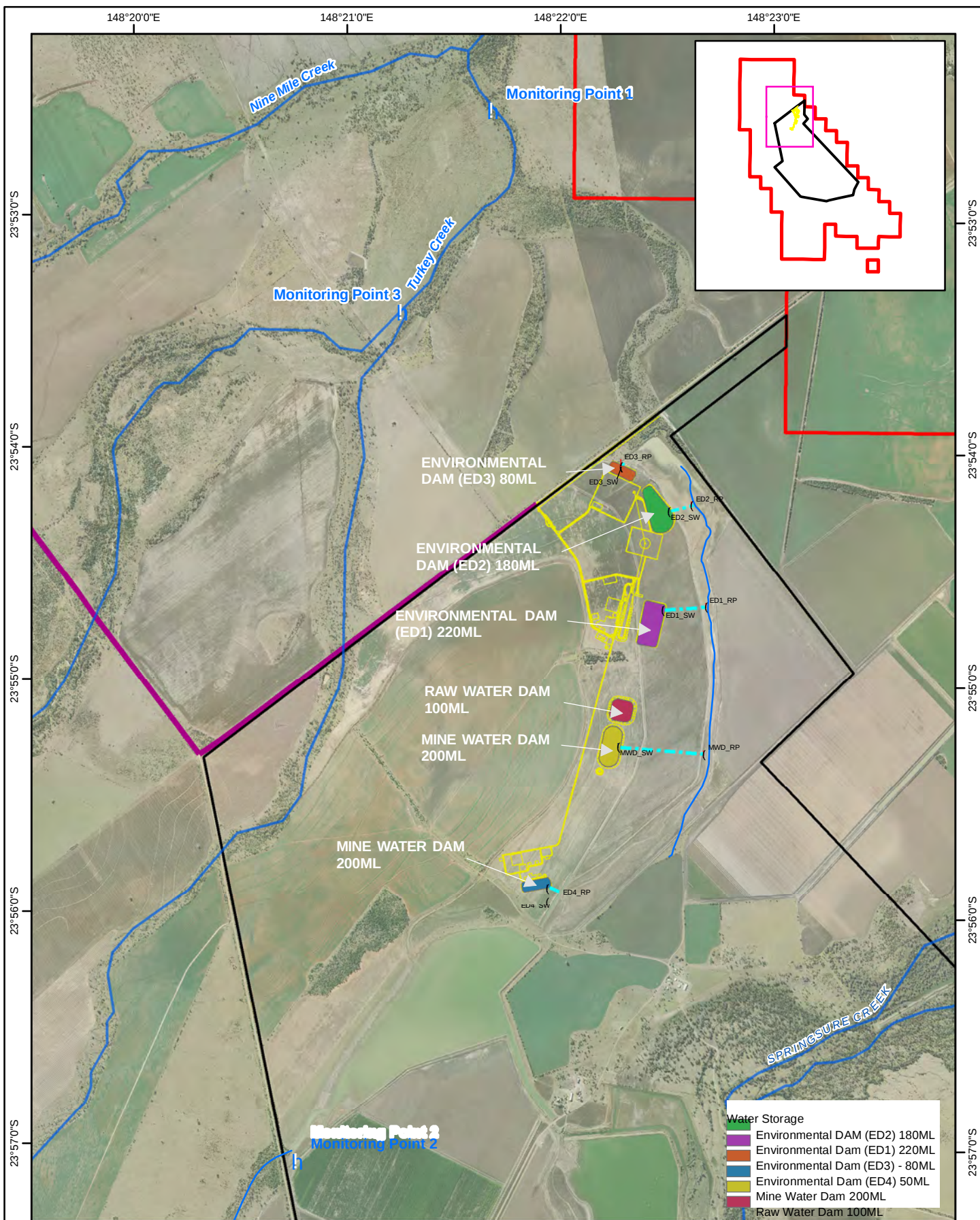
'watercourse' has the same meaning given in the ***Water Act 2000***.

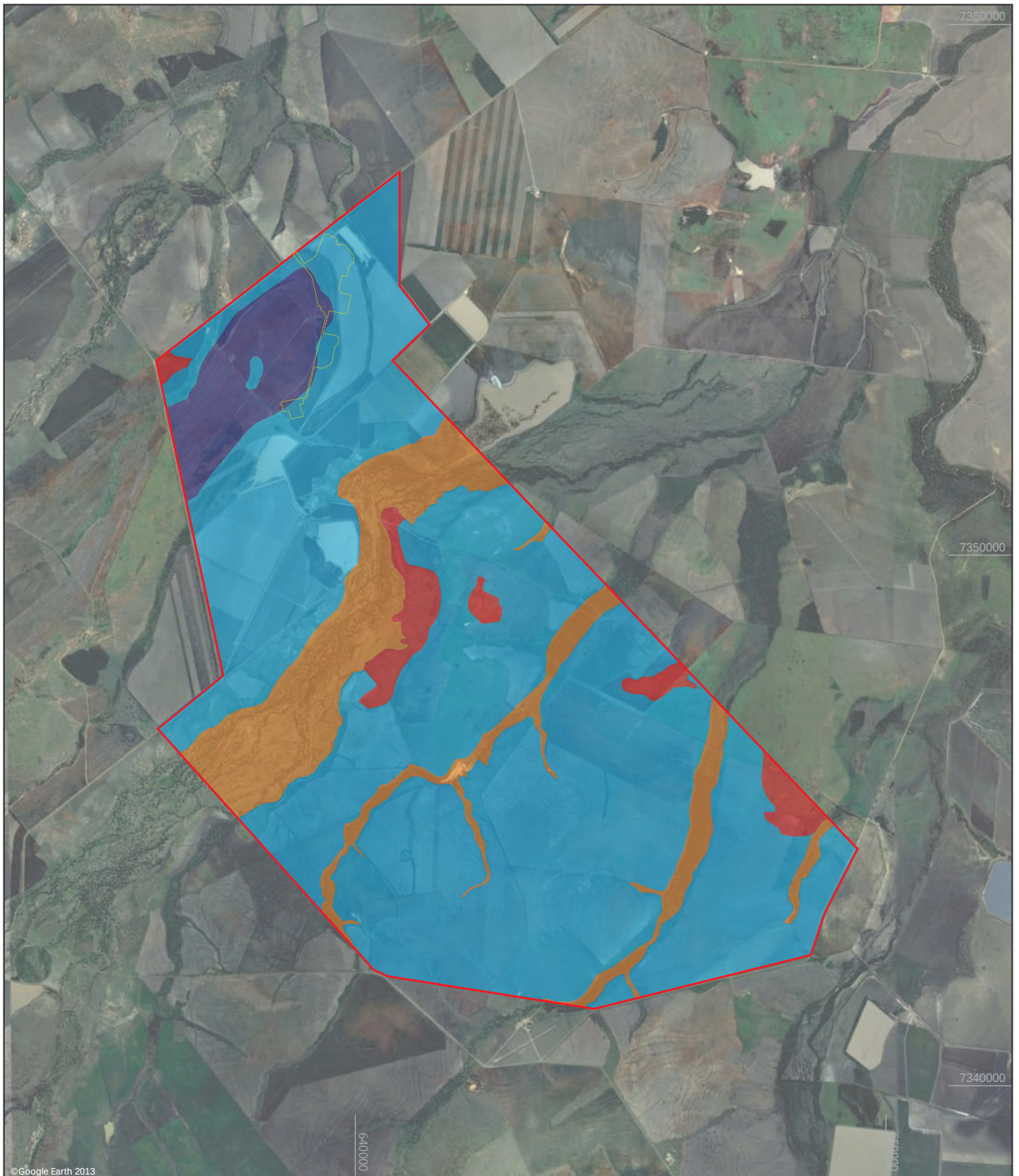
'water quality' means the chemical, physical and biological condition of water.

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

'water year' means the 12 month period from 1 July to 30 June.

'wet season' means the time of year, covering one or more months, when most of the average annual rainfall in a region occurs. For the purposes of DSA determination this time of year is deemed to extend from 1 November in one year to 31 May in the following year inclusive.





Legend

- MLA 70486
- Proposed Mine Disturbance
- Class A
- Class B
- Class C1
- Class C3



Springsure Creek Coal Mine Project Figure 6: Existing Land Suitability - GQAL

Drawn:	GREG TUCK	12-06-2013
Checked:	GRAHAM TUCK	12-06-2013
Size A4		Revision 1
Page 1 of 1		Scale 1:100,000



Projection: GDA94 Zone 55



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END OF PERMIT