DARTBROOK UNDERGROUND

MINING OPERATIONS PLAN

Continuation of Care and Maintenance

January 2018 – December 2020

Prepared by:

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October 2017

For:

AUSTRALIAN PACIFIC COAL LIMITED (AQC)
Dartbrook Mine
Stair Street
KAYUGA NSW 2333

Table 1
MOP Title Block

Dartbrook Mine **Mining Operations Plan**		
Name of Mine	Dartbrook Mine	
MOP Commencement Date	1 January 2018	
MOP Completion Date	31 December 2020	
Mining Authorisations (Lease/Licence No.)	CL 386, ML 1497, ML 1381 & ML 1456	
Name of Authorisation/Authorisation holder(s)	AQC Dartbrook Pty Ltd	
Name of Mine Operator (if different)	Australian Pacific Coal Limited	
Name and Contact Details of the Mine Manager (or Equivalent)	**Name:**	Gregory T. Kukla
	Position:	General Manager – Project Development
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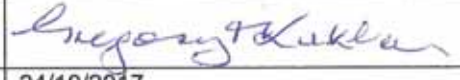
Name and Contact Details of the Environmental Representative	**Name:**	Doug Stewart
	Position:	SHEC Coordinator
	Postal Address:	PO Box 517 MUSWELLBROOK NSW 2333
	E-mail:	dstewart@aqcltd.com
	Phone:	+61 2 6540 8852; or 0429 701 534
Name of Representative(s) of the Authorisation Holder(s)	Greg Kukla	
Title of Representative(s) of the Authorisation Holder(s)	General Manager - Project Development	
Signature of Representative(s) of the Authorisation Holder(s)		
Date	24/10/2017	
Version	2	

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1 INTRODUCTION

1.1 HISTORY OF OPERATIONS

This section provides a brief history of previous mining operations and previous MOPs submitted to provide further context to the MOP.

Dartbrook Mine (Dartbrook) is an underground coal mine located 10 kilometres (km) north of Muswellbrook and 4 km south-west of Aberdeen in New South Wales (NSW) (see **Figure 1** and **Plan 1A**).

On 29 May 2017, Australian Pacific Coal Limited (AQC) completed the acquisition of Dartbrook from Anglo American and Marubeni Coal Pty Ltd (Marubeni) by way of transfer of Marubeni's interest to Anglo Coal (Dartbrook) Pty Ltd and the transfer of Anglo Coal (Dartbrook) Pty Ltd to AQC. Anglo Coal (Dartbrook) Pty Ltd has since undertaken a name change to AQC Dartbrook Pty Ltd. Dartbrook is now owned by AQC and managed by its subsidiary, AQC Dartbrook Management Pty Ltd.

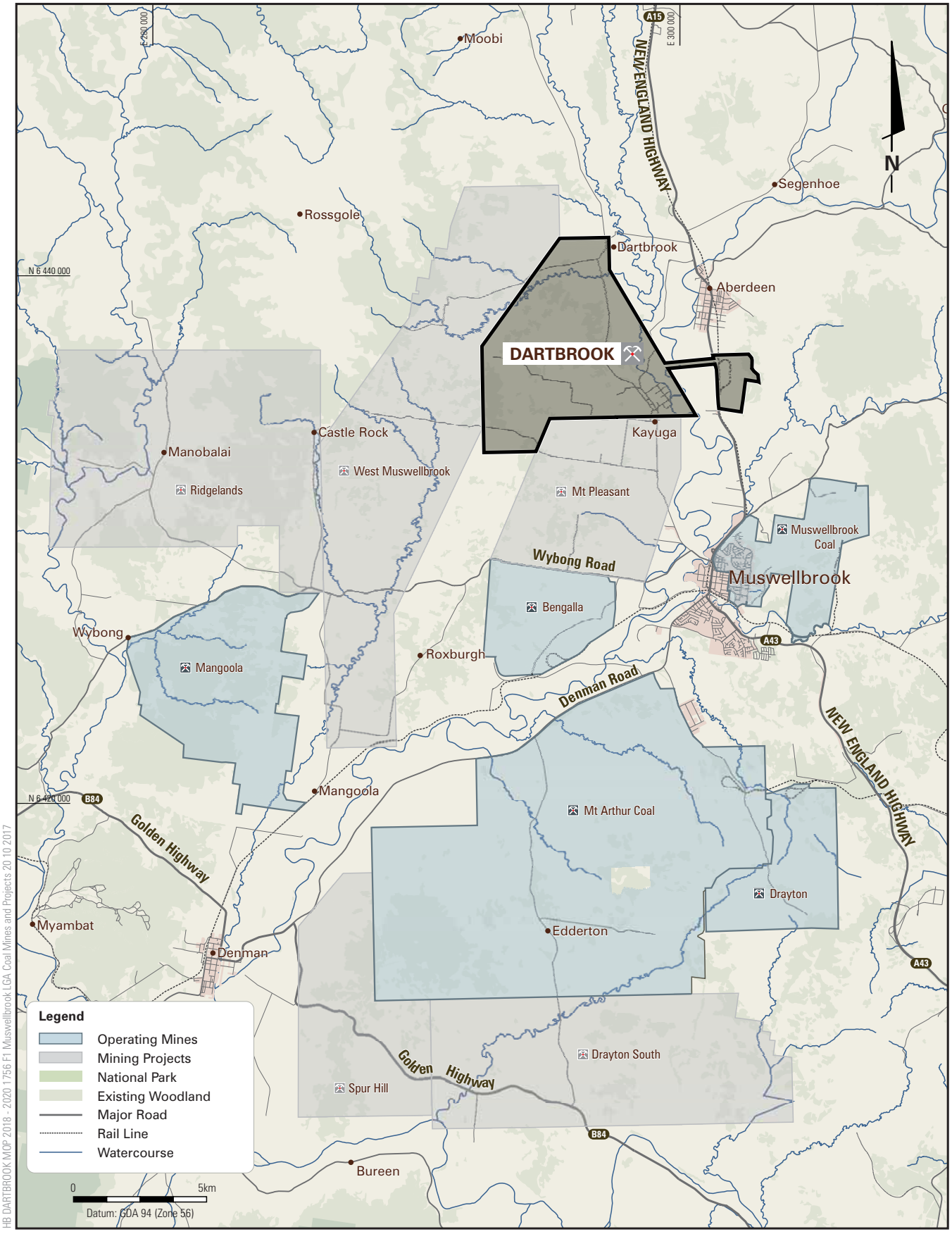
Underground longwall coal mining operations commenced in the Wynn Seam in 1996 and ceased in May 2004. At this time the longwall was relocated from the Wynn Seam to the Kayuga Seam. Construction of mine access and development roadways for the Kayuga Seam commenced in 2001.

Mining of the Kayuga seam ceased in October 2006 due to ongoing geological difficulties, and the mine was placed on "Care and Maintenance" from 1 January 2007. As shown on **Figure 2**, under Care and Maintenance, the operation generally consists of:

- The Hunter Tunnel, which along with the Kayuga interseam drift, are the only areas of the underground mine that are still accessible. The Hunter Tunnel and Kayuga interseam drift connect to the Eastern and Kayuga Western mine entrances, respectively;
- The western facilities (West Site), which are located west of the New England Highway and include the administration office, a small workshop, and Wynn and Kayuga mine entrances to the underground mine; and
- The eastern facilities (East Site), which are located east of the New England Highway and include the maintained Coal Handling and Preparation Plant (CHPP), rail load out facilities, cleared coal stockpiles and the rehabilitated Reject Emplacement Area (REA).

During Care and Maintenance, mining approvals, licences and permits have been retained, with Dartbrook continuing to maintain compliance with these.

A list of the previous Mining Operations Plans for Dartbrook during Care and Maintenance is presented in **Table 2**. This Mining Operations Plan (MOP) is the 5th prepared since the operation went into Care and Maintenance. It is the first MOP presented by AQC as the owner of Dartbrook.



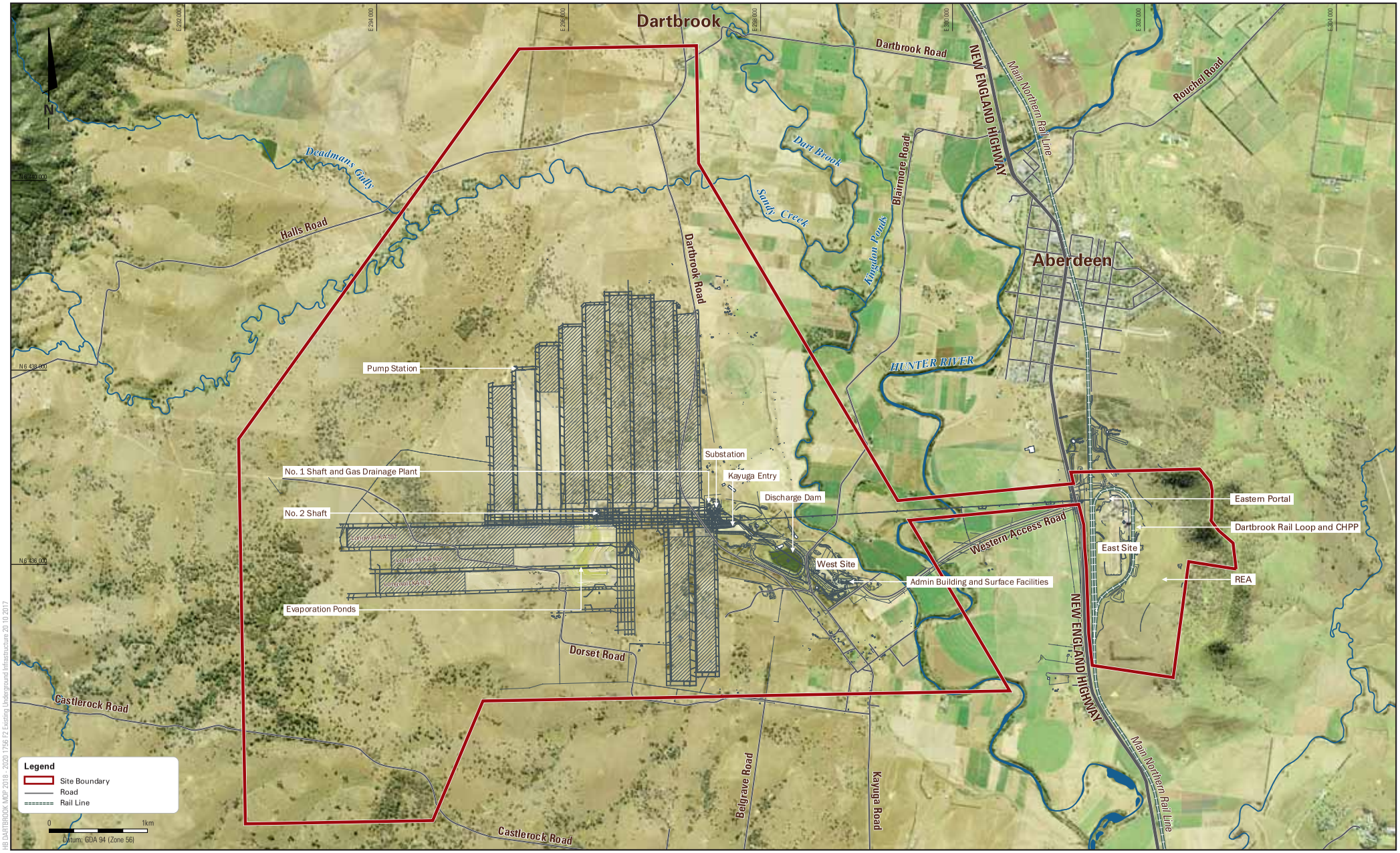
HB DARTBROOK MOP 2018 - 2020 1756 F1 Muswellbrook LGA Coal Mines and Projects 20 10 2017

DARTBROOK

Hansen Bailey
ENVIRONMENTAL CONSULTANTS

Muswellbrook LGA Coal Mines and Projects

FIGURE 1



HB DARTBROOK MOP 2018 - 2020 1756 F2 Existing Underground Infrastructure 20 10 2017

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Australian Pacific Coal

DARTBROOK MINE

Existing Underground Infrastructure

FIGURE 2

Table 2
Previous Dartbrook Care and Maintenance MOPs

MOP Commencement Date	MOP Completion Date	Name of Mine Operator
January 2007	December 2008	Anglo Coal (Dartbrook Management) Pty Ltd
January 2008	December 2010	Anglo Coal (Dartbrook Management) Pty Ltd
January 2011	December 2013	Anglo Coal (Dartbrook Management) Pty Ltd
January 2013	December 2017	Anglo Coal (Dartbrook Management) Pty Ltd

The MOP has been developed as required by condition 3 of the Dartbrook Extended Mining Leases and condition 2.1 of the Dartbrook Extended Development Consent (DA 231-07-2000). The MOP has been prepared in accordance with The NSW Trade & Investment, Department of Resources and Energy (DRE) *ESG3: Mining Operations Plan (MOP) Guidelines, September 2013* (ESG3 Guidelines).

Table 3
Dartbrook MOP Conditions

Condition	Requirement	Addressed
DA 231-07-2000		
2.1a	No mining undertaken in accordance with this consent shall occur until the Applicant has submitted and had accepted by the DMR, a Mining Operations Plan (MOP) in accordance with current guidelines issued by DMR. The Plan covers mining operations for a period of up to seven years.	N/A – no mining. This plan is for care and maintenance.
2.1 b	The MOP shall:	-
2.1 b i	be prepared in accordance with DMR Guidelines for the Preparation of Mining Operations Plans (Document 08060002.GUI or its most recent equivalent);	Section 1.1
2.1 b ii	demonstrate consistency with the conditions of this consent and any other statutory approvals;	Section 1.1, Section 4.0
2.1 b iii	demonstrate consistency with the Environmental Management Plans for the project site;	Section 3.2
2.1 b iv	provide the basis for implementing mining operations, environmental management, and ongoing monitoring;	MOP (Section 2, 3, 7 and 8)
2.1 b v	include a mine rehabilitation and land use management plan; and	MOP/ Appendix B
2.1 b vi	identify a schedule of proposed mine development for the period covered by the plan and include: • the area proposed to be impacted by mining activity and resource recovery mining methods and remediation measures, • areas of environmental, heritage or archaeological sensitivity and mechanisms for appropriately minimising impact, • water management, and • proposals to appropriately minimise surface impacts.	Section 2, MOP Plans 3A to 3C

Condition	Requirement	Addressed
2.1 c	In preparing the Mine Operations Plan, the Applicant shall consult with affected service authorities and make arrangements satisfactory to those authorities for the protection or relocation of those services.	N/A for this MOP period
2.1 d	A copy of the MOP, excluding commercial in confidence information, shall be forwarded to MSC, SSC (now the Upper Hunter Shire Council) and the Director-General within 14 days of acceptance by DMR.	Section 1.4
2.1 e	At least two years prior to the cessation of mining operations the Applicant shall investigate, determine and report, taking account of the potential community benefits, on a final strategy for the future use of the mine site, weirs, dams and any other infrastructure in consultation with DUAP (now the Department of Planning & Environment (DP&E)), DLWC, MSC and SSC (now UHSC) for approval of DMR and the Director-General.	Section 2.3.7 & 4.2
ML1497, ML1456, ML1381 and CL386		
3 (a)	Mining operations must not be carried out otherwise than in accordance with a Mining Operations Plan (MOP) which has been approved by the Director General.	This MOP (once approved)
3 (b)	The MOP must:	
(i)	identify areas that will be disturbed by mining operations;	Section 2, Plans 3A to 3C
(ii)	detail the staging of specific mining operations;	Section 2, 4 to 7 and MOP Plans
(iii)	identify how the mine will be managed to allow mine closure;	Section 4 to 8
(iv)	identify how mining operations will be carried out in order to prevent and or minimise harm to the environment;	Section 3
(v)	reflect the conditions for approval under:	Section 1.2, Section 1.1 (ESG3 Guidelines), incorporated into MOP & referenced Management Plans.
	• *Environmental Planning and Assessment Act 1979*	
	• *The Protection of the Environment Operations Act 1997*	
	• and any other approvals relevant to the development including the conditions of this lease; and	
	• have regard to any relevant guidelines adopted by the Director-General.	
3 (c)	The leaseholder may apply to the Director-General to amend an approved MOP at any time.	Noted
3 (d)	It is not a breach of this condition if:	Noted
(i)	The operations constituting the breach were necessary to comply with a lawful order or direction given under the *Mining Act 1992*, the *Environmental Planning and Assessment Act 1979, Protection of the Environment Operations Act 1997, Mine Health and Safety Act 2004 / Coal Mine Health and Safety Regulation 2006* or the *Occupational Health and Safety Act 2000;*	Noted
(ii)	The Director-General had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out.	Noted

Condition	Requirement	Addressed
3 (e)	A MOP ceases to have effect 7 years after the date of approval or other such period as identified by the Director-General.	Noted

1.2 CURRENT CONSENTS, AUTHORISATIONS AND LICENCES

Table 4 lists the Mining and Exploration Authorisations, Development Consent and other approvals and licences issued by Government Agencies in respect of Dartbrook including the date of grant and expiry for each.

Table 4
Dartbrook Approvals

Name	Grant Date	Expiry Date	Duration from original grant (as at 20 October 2017)
Mining & Exploration Authorisations			
Authorisation 256	16/12/1980	02/05/2015**	36 years, 10 months, 5 days
Coal Lease (CL) 386	19/12/1991	19/12/2033	25 years, 10 months, 2 days
Mining Lease 1381	23/10/1995	23/10/2016**	21 years, 11 months, 28 days
Mining Lease 1456	27/09/1999	26/09/2020	18 years, 24 days
Mining Lease 1497	06/12/2001	05/12/2022	15 years, 10 months, 15 days
Exploration Licence 4574	13/08/1993	07/04/2015**	24 years, 2 months, 8 days
Exploration Licence 4575	13/08/1993	23/05/2016**	24 years, 2 months, 8 days
Exploration Licence 5525	22/09/1998	21/09/2016**	19 years, 29 days
Development Consent			
Development Consent DA 231-07-2000 (as modified 16 November 2005)	28/08/2001	5/12/2022	16 years, 1 month, 23 days
Emplacement Area Approvals			
Approval for an Emplacement Area (s126 approval)	13/03/1996	N/A	21 years, 7 months, 8 days
Stage 4 Reject Emplacement Approval C95/2265 (s126 approval)	02/01/2000	N/A	17 years, 9 months, 19 days
Approval for 14° slopes in the REA Stage 4 (s126 approval)	08/04/2004	N/A	13 years, 6 months, 13 days
Application for Discontinuance of Use of Emplacement Areas (s101 approval)	13/08/2007	Ongoing	10 years, 2 months, 8 days
Licences			
Environmental Protection Licence (EPL) 4885	Granted 30/11/2000 Amended: 30/03/2017	N/A	16 years, 10 months, 21 days
Notification to Work Cover for storage and handling of Dangerous Goods	10/11/2005	N/A	
Notification and Declaration to WorkCover that no dangerous goods stored or handled at Dartbrook	Submitted 13/12/2006	N/A	

Name	Grant Date	Expiry Date	Duration from original grant (as at 20 October 2017)
Radiation Licence 5061080	01/07/2013	14/08/2017*	4 years, 3 months, 20 days
Surface Water Licences	Various	5 years from date of issue or perpetuity	
Bore Water Licenses for Stock, Water and/or Domestic Use	Various	5 years from date of issue or perpetuity	

** Renewal request sent to the Environment Protection Authority (EPA) on 20/07/17.*

*** Renewal Pending.*

In October 2015, approval was granted by the Minister under the provisions of Section 168 (1) of the *Mining Act 1992* (Mining Act) (now schedule 1B), for the suspension of Condition No 9 – Working Requirement relating to ML 1381, ML 1456 and ML 1497 effective from 31 December 2014 to 31 December 2017. On 22 June 2017, in accordance with provisions of Schedule 1B Clause 14 of the Mining Act, the Minister approved the suspension of Condition No. 9 (Working Requirement) relating to ML 1456 which took effect from 22 June 2017 to 31 December 2018.

In October 2015, approval was granted by the Minister under the provisions of Section 70 (1)(a) of the Mining Act (now schedule 1B), for the suspension of mining operations, being limited to mineral extraction only, in relation to CL 386, ML 1381, ML 1456 and ML 1497 effective from 31 December 2014 to 31 December 2017.

AQC will continue to comply in general with the requirements of the conditions of the mining leases, Development Consent and other approvals for the duration of the MOP in the context that the mine is on care and maintenance and an approval to suspend operations under Schedule 1B of the Mining Act is current.

Under the definitions of the ESG3 Guidelines, the Dartbrook Mine is a Level 1 being a State Significant Development.

1.3 LAND OWNERSHIP AND LAND USE

Plan 1C shows land ownership within the Dartbrook mining leases, including real property descriptions of all properties. AQC currently owns 3,402 ha of land of which 2,288 ha are above current Mining Leases.

1.3.1 Historic Land Use – West Site

The majority of the area covered by Dartbrook Mining Tenements was used for beef and/or dry dairy cattle grazing. There were many small holdings and several major holdings. The eastern side of the West Site is within the flood plain and was used predominantly for intensive agriculture, dairy farming and irrigated crop cultivation.

1.3.2 Historic Land Use – East Site

The majority of the land east of the New England Highway was undeveloped or used for beef and/or dry dairy cattle grazing and occurs above the alluvial plain.

1.3.3 Current Land Use

The Dartbrook Mine, currently in Care and Maintenance, maintains surface infrastructure on the eastern and western sides of the New England Highway.

Dartbrook currently has seven major leaseholders and agistees that occupy the Dartbrook owned land surrounding the mine. There are also 18 tenants who occupy the residences that were acquired to enable the mine to commence.

The Garoka Dairy has been operating on Dartbrook's land since 1992 and is located on the alluvial lands between the Dartbrook CHPP and the workshop and portal entry. The dairy currently supports 600 to 700 head of cattle. The Garoka Dairy is an amalgamation of the four farms that were originally established to the east of the Hunter River and Dartbrook's administration office, and one farm at the confluence of the Hunter River and Dart Brook. Garoka dairy continues to be operational under the Care and Maintenance phase of the operation.

Beef cattle grazing also occurs within the mining leases and a cattle grazing trial occurred on the REA rehabilitation area in 2015/2016 (see **Section 8.6.1** for details of this trial).

1.3.4 Proposed Final Land Use

Once Dartbrook moves into a post operational phase, the rehabilitation indicators will support the final and pre-mining land use goal of livestock grazing of native/improved pastures on land class capability IV and V lands.

1.4 STAKEHOLDER CONSULTATION

Table 5 provides a summary of consultation undertaken by AQC in relation to the development of the MOP and rehabilitation and decommissioning objectives of the mine. The MOP is based on the objectives and outcomes developed with stakeholder involvement.

Table 5
Stakeholder Consultation Relevant to the MOP Development

Stakeholder	Date	Summary of Consultation
Local Community	01/07/2017	Issue 1 of the AQC Community Newsletter was distributed to local residents via letterbox drop and published to AQC's website. This indicated the submission of a new MOP at the end of 2017.
Division of Resources and Geoscience (DRG)	27/07/2017	Meeting arranged to discuss and confirm a strategy for development of the MOP. MOP to be prepared in accordance with the (2013) ESG3 Guidelines including a review of the rehabilitation closure criteria (and other aspects) against the new guidelines.
	08/08/2017	Representation at the Dartbrook Community Consultative Committee (DCCC) Meeting (see below).
DCCC Includes representatives from: • Muswellbrook Shire Council (MSC) • Upper Hunter Shire Council (UHSC) • Muswellbrook Community • Upper Hunter Community • DRG (invited guest) • Dartbrook	08/08/2017	Regular meetings are held to discuss regulatory compliance and environmental management at Dartbrook Mine. AQC will continue these regular meetings. A general update was presented and discussed regarding the MOP preparation for the 2018 – 2020 term. Discussion regarding the current rehabilitation and closure planning was also held with additional feedback to the planning process invited. The meeting was also attended by a DRG representatives who participated in discussion and answering questions on the MOP process.
DCCC	07/09/2017	Special meeting to consult with DCCC on MOP development including desired post mining land use, rehabilitation objectives and completion/relinquishment criteria for Dartbrook. DP&E was also present.
DRG	20/10/2017	Submitted MOP to the DRG for review/approval
Stakeholders identified under Condition 2.1 of DA 231-07-2000: • DMR (now DRG)	20/10/2017	2.1 (a) requires the MOP be prepared according to the current guidelines issued by Department of Mineral Resources (DMR) (now DRG) and submitted/accepted by DMR. • This plan has been prepared according to the ESG3 Guidelines (confirmed with DRG). This plan was submitted on 20 October 2017 and subsequently approved as per signed final version of the MOP.
Stakeholders identified under Condition 2.1 of DA 231-07-2000: • Affected service authorities	(N/A for the MOP period)	2.1 (c) requires the applicant consult with "affected service authorities" regarding protection relocation of services. The MOP period applies to Care and Maintenance activities at Dartbrook and there are no mining activities planned that would require protection or relocation of services. Therefore, there are no affected service authorities requiring additional consultation for the MOP term.

Stakeholder	Date	Summary of Consultation
Stakeholders identified under Condition 2.1 of DA 231-07-2000: • MSC • UHSC • Director-General	Within 14 days of DRG acceptance.	2.1 (d) states a copy of the MOP, excluding Commercial in Confidence information, shall be forwarded to MSC, Scone Shire Council (SSC) (now UHSC) and the Director-General within 14 days of acceptance by DMR (now DRG). The MOP will be provided to the above within 14 days with evidence attached as **Appendix A**.
Consultation required under Mining Leases (Condition 2)	20/10/2017	MOP must be satisfactory to the Director-General (DG) and prepared according to DG's guidelines current at the time of lodgement. The MOP has been developed as per the current ESG3 Guidelines and submitted to the DRG. The DG receives a DRG approved copy of the MOP as per Condition 2.1(d) of the DA 231-07-2000.

The consultation in relation to Dartbrook mining operations also included proposed mine rehabilitation which was conducted with government and community stakeholders during the preparation of the *'Dartbrook Extended Environmental Impact Statement'* (EIS) (HLA Envirosciences, 2000) and during the Commission of Inquiry.

Consultation regarding the rehabilitation of the REA was also conducted during the preparation of the relevant Statement of Environmental Effects (SEE) and applications for Modifications:

- '*Dartbrook Coal Mine SEE for Modification to Rejects Disposal System'*, (Hansen Consulting, 2004),
- '*Dartbrook Mine Statement of Environmental Effects for New ROM Coal Stockpiles, Underground Tailings Disposal & Nitrogen Injection Plant',* (Hansen Consulting, 2005'.

Consultation with landowners and infrastructure owners was conducted during the preparation of Property Subsidence Management Plans (PSMP) (also known as Extraction Plans) and the Longwall Subsidence Management Plan (SMP). These plans identified the effects of subsidence on infrastructure, natural and man-made features of private properties and specified management measures developed in consultation with the property owners.

Consultation was undertaken with the relevant stakeholders during the preparation of the first Care and Maintenance MOP to address that phase of the operations. Specifically, consultation was undertaken with DRG (formerly DRE), DP&E (formerly DP&I), MSC, UHSC, Office of Environment and Heritage (OEH) and local landholders impacted by Dartbrook operations.

2 PROPOSED MINING ACTIVITIES

2.1 PROJECT DESCRIPTION

Operations in the Kayuga Seam were challenging due to ongoing geological and mining conditions and as such the mine ceased all operations in October 2006. No further mining is proposed during the three-year term of the MOP. The site will continue to be operated under a Care and Maintenance strategy by a contracted engineering company, currently UGM Engineers. UGM also supplies the Statutory Manager as required under the Mining Act.

This MOP addresses all Dartbrook operations while continuing on Care and Maintenance for a nominal term of three years. Any changes to the Care and Maintenance operating strategy would trigger the production of a new MOP.

There will be no extraction of mineral underground during the MOP term and no washing of coal material at the CHPP. There will be limited activities undertaken, such as inspections and maintenance of the CHPP, conveyors, and pumps in association with maintaining infrastructure and rehabilitation activities.

2.2 ASSET REGISTER

Table 6 presents a list of the Domains within the Dartbrook MOP area, their size and a summary of the major assets located within each domain. These are based on a current snap shot of the current usage and disturbance and largely reflects disturbance over the life of the MOP term due to Dartbrook being in Care and Maintenance with minimal changes to infrastructure and no disturbance proposed.

Table 6
Dartbrook Asset Register

Major Assets	Use	Footprint Area	Required Activities for Removal/Demolition
1: INFRASTRUCTURE AREAS			
Fan Housing			
Fan House 2	Previously used to provide ventilation to underground.	0.4ha	Surface infrastructure decommissioned/removed. Complete final capping and sealing as per DRG requirements. Rehabilitation to improved and/or native pastures. Scattered trees to incorporate into surrounding land use.
Fan House 1	Current ventilation to underground.		Decommission, remove, cap and seal as per DRG requirements
Mine Entries and Portals			
Eastern Portal	Access to the Hunter Tunnel from the East Side	1.8ha	Mine entries sealed to the satisfaction of DRG. Surface infrastructure removed.
Kayuga Seam Access Slot	Previous access to Kayuga seam – now decommissioned and secured.		
Wynn Seam Portal	Access to the underground from the West Side.		
Western Drift Portal Sheds	Sheds above portal entries.		

Major Assets	Use	Footprint Area	Required Activities for Removal/Demolition
Administration Office and Car Park			
Main Store & Workshop – West Side	Servicing of mine vehicles and equipment. Use is only for care and maintenance.	1.2ha	Removed except that with a demonstratable market or community value.
Main Admin Office and Car park – West Side	Office. Currently used by a small number of care and maintenance staff.		
Hardstand Areas			
Hardstand areas on the West Side and East Side.	Various uses but mainly for parking/laydown areas/storage	2.6ha	Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)
Coal Preparation Plant			
CHPP (including washplant, admin and other related buildings)	Previously used for coal handling and processing. Now under care and maintenance.	31.7ha	Disconnect and terminate services. Demolish and remove CHPP.
Coal Stockpile areas	Previously stored product coal. Coal has been removed and remaining carbonaceous material has been removed.		Decommission/deconstruct remaining infrastructure (e.g. conveyors, sprays, stackers) and rehabilitate.
Conveyors, transfer stations and gantries	This includes conveyor to rail load out areas of conveyor from hoppers feeding back to the CHPP.		Demolish and remove.

Major Assets	Use	Footprint Area	Required Activities for Removal/Demolition
Concrete pads and footings	Concrete pads and footings from surface area of CHPP.	31.7ha (as per above)	Remove carbonaceous material (spillage or otherwise) from footprint of the CHPP (and ROM & Product stockpiles, conveyors and workshops). Demolish & Remove. Final trim, rock rake & deep rip. Source, cart and spread topsoil. Spoil amelioration and supply and spread seed and fertiliser.
Thickener (35m diameter)			Deconstruct Large Tanks
Stackers/reclaimers	Stacking coal on stockpiles/reject stacker and reclaim.		Deconstruct, rehabilitate footprint (as part of CHPP footprint).
Rail Loop & Spur	Former use: Coal Transport. No coal is currently being transported under care and maintenance.		Remove Rail Loop and spur. This item includes the pulling up and removal from site of railway line and sleepers. ***Note that AQC are in discussion with ARTC who have confirmed that they wish to retain the rail loop infrastructure.***
Rail Loadout Industrial Buildings	Train loading (and associated) infrastructure.		Demolish and remove. Reshape. Final trim, rock rake & deep rip. Spoil amelioration and supply and spread pasture seed and fertiliser.
Main Store & Workshop – East Side			
Mine Access Road			
Main Access Road	Currently used as an access from the CHPP and rail facilities east of the New England Highway to the Western Facilities Area	13ha	Road with 2 bridge overpasses. To remain for community benefit (provides a direct route from the New England Highway to the village of Kayuga/Dartbrook area.

Major Assets	Use	Footprint Area	Required Activities for Removal/Demolition
Topsoil Stockpiles			
N/A – no infrastructure. Topsoil stockpiles.	To be used as growth medium in final rehab.	0.5ha	Generally <3m height. Will be utilised in rehabilitation of other areas. Final surface level will be rehabilitated to improved and/or native pastures. Scattered trees to incorporate into surrounding cattle grazing land use.
Goaf Dewatering			
Goaf Dewatering Pumping System	Operational Infrastructure to pump out water from the goaf (underground) and transfer to mine water storages on site (e.g. Staged Discharge Dam).	0.7ha	Infrastructure decommissioned, removed, site rehabilitated to improved and/or native pastures. Scattered trees to incorporate into surrounding cattle grazing land use.
Area Serviced by Goaf Drainage Facilities	Standing non-operational infrastructure. Area is currently grazed by cattle.	(Subsurface)	Infrastructure decommissioned to DRG Guidelines, top of pipe removed, site rehabilitated to improved and/or native pastures. Scattered trees to incorporate into surrounding cattle grazing land use.
2: OVERBURDEN EMPLACEMENT/BUNDS			
No infrastructure. O/B stockpiles/bunds.	Overburden removed as part of site infrastructure preparation	6.6ha	Most of the material will be used in reshaping activities. Kayuga bund and bund at East Side (along New England Highway) will remain. Site will be rehabilitated to improved and/or native pastures. Scattered trees to incorporate into surrounding cattle grazing land use.

Major Assets	Use	Footprint Area	Required Activities for Removal/Demolition
3: PRIMARY WATER MANAGEMENT			
Evaporation Ponds			
Evaporation Ponds	Removal of excess mine water through evaporation.	29.2ha	Decommission ponds. Cap with suitable material, reshape (minor earthworks), final trim/rock rake/deep rip, apply growth medium, ameliorate, pasture seed and fertiliser. Includes sourcing suitable material as required.
Industrial Sedimentation Dams	Semi industrial and sediment control. Example: Eastern Holding Dam, Western Holding Dam, Staged Discharge Dam (and associated water management infrastructure)	8.8ha total	Dams to remain secondary water management for sediment control/stock water. Will be desilted if required plus any minor earthworks/controls to make safe.
4: SECONDARY WATER MANAGEMENT			
Rural stock water/sedimentation dams	These dams either collect clean surface water runoff or sediment laden runoff.	8.0ha total	Dams to continue being used for rural purposes and stock water. Clean water dams to be retained and made safe (minor earthworks if required). Dirty water dams will be desilted if required.
5: REHABILITATED GRASSLAND			
REA	Rehabilitated Reject Emplacement Area	31.0ha	Max RL: 248. No demolition required. The area has been rehabilitated to grassland and is a stable landform being sustainably grazed.
6: FORESTRY AREAS			
Forestry	Forestry plot established in 2003, a joint project with State Forests NSW, to	75ha	Preserve for biodiversity/ community benefit.

	create a sustainable timber resource in the future.		
Major Assets	Use	Footprint Area	Required Activities for Removal/Demolition
Forestry: Red Gum Restoration Project Area	Enhance and protect a population of *Eucalyptus camaldulensis* (River Red Gum) listed as endangered in the Hunter Valley.	42.2ha	Preserve for biodiversity/ community benefit.
7: CEMETERY			
Kayuga Cemetery	Currently maintained to preserve history/public access.	0.9ha	Preserve for community benefit.
Riverview Homestead	Currently maintained. Currently not in use as a residence or office.		Single story homestead. Preserve for community benefit.

2.3 ACTIVITIES OVER THE MOP TERM

The longer-term future of the mine is currently under review, with a number of alternate mining options being considered. AQC will work with the New South Wales government, local governments, the local community and all other stakeholders to ensure the responsible and productive further development of the valuable world class Dartbrook coal resource.

To this end:

- A geological assessment of the entire coal resource within the Dartbrook Mining Authorities has been undertaken by AQC during the acquisition process;
- A Pre-Feasibility Study is exploring the potential for further limited underground mining and to determine how best to manage the existing underground workings and infrastructure moving forward; and
- A Pre-Feasibility Study is underway to explore how part of the coal resource could potentially be mined by modern, low impact open cut mining technologies not previously used in the Hunter Valley.

Until future mine plans are determined, the majority of surface mine infrastructure will continue to be maintained, as detailed in the MOP.

2.3.1 Exploration

As outlined above, a geological assessment of the coal resource within the Dartbrook Mining Authorities has been undertaken during the acquisition process. This is currently being finalised.

There will be further exploration activity during the MOP period however a schedule has not been determined at the time of the MOP submission. Any exploration activities at Dartbrook will be subject to the investigation/planning, assessment and approval processes (as described in ESG5, ESG2, ESF4 and conditions of the relevant Authority). Exploration Activities conducted during the MOP period will be summarised in the Annual Review and annual exploration report.

2.3.2 Construction

Section 2.2 describes the current key infrastructure. There are no scheduled construction or demolition activities proposed over the MOP period. There is planned removal of the plate and frame filter equipment in the CHPP and continued removal of remnant scrap metal including longwall equipment.

2.3.3 Underground Mining Operations

There will not be any coal extraction via underground mining during the term of the MOP.

Following the completion of longwall extraction in the Kayuga seam in late September 2006, equipment was recovered and seals were installed in the underground workings such that the only parts of the underground workings that remain accessible are the:

- Hunter Tunnel;

- Interseam decline between the Wynn Seam and Kayuga seam workings;
- Kayuga seam workings outbye of 7 Cut-through in the Mains West panel, and
- Wynn Seam workings outbye of 6 CT including No1 shaft.

The workings are ventilated by a fan up-casting at No 1 shaft with the No 2 shaft being capped with a steel plate in 2009. The ventilation fan was removed from No 2 shaft and relocated to No 1 shaft in early 2007.

The underground workings have retained the services of electricity, phones, DAC tannoys, compressed air and firefighting water. Underground activities are limited to such things as inspections and maintenance of equipment and services.

AQC is currently investigating options for further sealing of underground workings. This will be undertaken in consultation and with the approval of the DRE and other relevant authorities.

No previously rehabilitated mine subsidence areas are proposed to be disturbed during the MOP term (excluding any required maintenance works).

2.3.4 Rock / Overburden Emplacement

There will not be any new rock or overburden emplacement areas constructed during the MOP period within the care and maintenance phase of the operation. Dartbrook's existing emplacement areas were revegetated over 10 years ago and will continue to be managed under care and maintenance (which mainly comprises inspections and weed control where required with strategic grazing).

2.3.5 Processing Residues and Tailings

AQC has a CHPP at the East Site, which includes washplant, product coal stockpile pads (currently empty), train loading facility and rehabilitated REA (see **Plan 2**). The CHPP previously had approved capacity to process up to 6 Mtpa of raw coal. The CHPP will be maintained throughout the period of the MOP.

During the term of the MOP, Dartbrook management does not anticipate any plans for the beneficiation of coal from Dartbrook operations.

2.3.6 Waste Management

2.3.6.1 Process Waste

The Rejects Emplacement Area is operated in accordance with clause 33 of the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014*. The REA was filled to designated capacity in November 2006, with final rehabilitation completed in mid-2007. The REA was rehabilitated by capping with approximately 1.2 m of compacted clay with topsoiling and revegetated with improved grasses. An application for the discontinuance for an Emplacement Area, under Section 101 of the *Coal Mines Health Safety Act, 2002* was submitted to the Department of Primary Industries (DPI) in 2007.

The location and layout of the REA is shown in the Plans 2 to 4 in **Appendix B**. It is located at the East Site and comprises an area of approximately 29 hectares with a maximum RL of 248 m.

No further surface drainage works are proposed for the REA under the MOP. The rehabilitation has established groundcover and provides a stable surface.

A grazing trial of the REA rehabilitation occurred in 2015 to 2016. The results of this trial are further discussed in **Section 8.6.1.** The overall outcome was that excellent cattle weight gains were achieved and the trial was considered a success.

No tailings material will be disposed of during the term of the MOP.

2.3.6.2 Non-Process Waste

All non-process waste will continue to be managed in accordance with the Dartbrook Waste Management Plan. The WMP was prepared in consultation with MSC and was approved by DP&E (formerly DIPNR).

There will be minimal waste generated from the operations during Care and Maintenance. However, Dartbrook management have commenced a site-specific operation to remedy and remove unnecessary existing equipment (long wall). There will be a continual scheduled removal of materials and equipment associated with ongoing site clean-up activities (e.g. surplus scrap steel) when the opportunity arises.

2.3.6.3 Material Stockpiles

There is no intention for materials to be beneficiated during the term of the MOP. Consequently, a provisional production and waste schedule is not provided.

The CHPP has total raw coal stockpile capacity of 400,000 t and total product stockpile capacity of 400,000 t. All coal material has been removed from the stockpiles as a dust control measure and grasses have largely established on the pads. The ancillary raw coal stockpile pads were also revegetated with a grass cover to further reduce the potential for dust emissions. The stockpile areas will continue to be maintained, with water runoff collected in drains and directed to the Eastern Holding Dam.

The temporary clay and topsoil stockpiles that were located to the north and south of the current REA have generally been utilised in the rehabilitation of the REA. There are minor clay and topsoil stockpiles located around the vicinity of the CHPP which have been vegetated with a grass cover, with water runoff collected and directed into water dams.

2.3.6.4 Water Management

The management of site drainage and erosion and sediment control measures for the Dartbrook mining operations is described in the *'Erosion and Sediment Control Plan*' (ESCP). The ESCP was prepared in consultation with the relevant government authorities, as required under the Development Consent.

Site water management for the Dartbrook care and maintenance operations is currently conducted in accordance with the Dartbrook Site Water Management Plan (SWMP). The

SWMP plan was prepared in consultation with the relevant government authorities, as required under the Development Consent.

2.3.6.5 Hazardous Materials

Table 7 lists the hazardous material storages at Dartbrook. During the term of the MOP, there has not be any hazardous materials required on site. The underground fuel tanks have been decommissioned in accordance with the *Occupational and Health Safety Regulation, 2001* (current at the time of decommissioning) and the WorkCover "*NSW Storage and Handling of Dangerous Goods Code of Practice 2005"*. The above ground bulk fuel storage tanks located at the East site will be maintained during the term of the MOP to store minimal quantities of diesel fuel for Care and Maintenance operations. All other tanks and storage facilities have been decommissioned.

Table 7
Hazardous Materials Storage Areas

Hazardous Material	Storage	Location	Status/ Proposed
Bulk Fuel Storage	44 kL aboveground tank	CHPP	Maintain for ongoing use
Explosives – Blasting Type E	200 kg External Magazine	West Site Hardstand Area	Inactive magazines
Explosives – Electric Detonators	20,000 No. External Magazine	West Site Hardstand Area	Inactive magazines

AQC holds a radiation licence to sell/possess/store or give away regulated material (including radiation apparatus and substances), Licence No 5061080 issued by the NSW EPA under the *Radiation Control Act 1990*. There are five radioactive material sources located at the CHPP for density control. The five sources are registered with the EPA (Radiation Regulated Material ID numbers 8669, 8670, 8671, 9144, and 9145) under the *Radiation Control Act 1990*. These radiation sources will continue to be maintained during the term of the MOP.

There are minor quantities of chemicals required on site during the term of the MOP, such as cleaning and water treatment products. AQC will maintain a site chemical register and Safety Data Sheets for all hazardous materials used on site during Care and Maintenance of the operation. There will be no explosives stored on site during this time.

2.3.7 Decommissioning and Demolition Activities

There are no decommissioning or demolition activities planned in the MOP period. However, a detailed Mine Closure Plan will be prepared for the site in consultation with relevant stakeholders and submitted to DRG by 30 June 2019.

2.3.8 Temporary Stabilisation

There are no planned temporary stabilisation activities over the MOP term however if routine care and maintenance tasks (including monitoring and inspections) identifies any areas where temporary stabilisation is required, this will be undertaken and reported in the Annual Review.

2.3.9 Progressive Rehabilitation and Completion

All remaining disturbed areas at the commencement of the MOP are in a care and maintenance phase and are unavailable for rehabilitation at this stage.

All previously rehabilitated areas will continue to be monitored/inspected with maintenance measures implemented as required (such as erosion and sediment control, weed control, pest management etc.).

Cattle grazing of selected rehabilitated areas will continue periodically over the MOP period.

2.3.10 Material Production Schedule during MOP Term

Scheduled material production is not proposed over the life of the MOP term due to the operation being under Care and Maintenance as indicated in **Table 8**.

Table 8
Material Production Schedule During the MOP term

Material	Unit	Year 1	Year 2	Year 3
Stripped topsoil	m3	0	0	0
Rock/Overburden	m3	0	0	0
Ore or ROM Coal	Mt	0	0	0
Reject Material	Mt	0	0	0
Product	Mt	0	0	0

3 ENVIRONMENTAL ISSUES MANAGEMENT

3.1 ENVIRONMENTAL RISK ASSESSMENT

The identification and assessment of risks associated with activities at Dartbrook has been undertaken in accordance with standard risk assessment practices outlined in '*AS/NZS ISO 31000:2009 Risk Management - Principles & Guidelines'*.

A comprehensive risk assessment was undertaken for the Care and Maintenance phase.

There were no significant risks involved during the Care and Maintenance period and the key risks identified as requiring control strategies included surface water, groundwater, air quality and visual impacts. A review of the Care and Maintenance phase risk assessment was last conducted in January 2017. The Revised Risk assessment did not identify any additional risks to that presented in the previous risk assessment.

The risk Matrix is presented in **Appendix C**.

AQC will continue to review risks associated with Dartbrook on a regular basis.

3.2 ENVIRONMENTAL RISK MANAGEMENT

3.2.1 Management Systems

A Safety, Health and Environment Management System (SHEMS) has been developed and implemented for Dartbrook generally in accordance with '*AS/NZS ISO14001: Environmental Management Systems'* and *'AS 4801: Occupational Health and Safety Management System'*. This provides a risk based systematic approach to the management of safety, health, and environment aspects associated with the operation.

In relation to the environment, the system:

- Identifies significant environmental risks arising from processes or sub-processes at the operation, which require controls;
- Provides the framework for meeting environmental objectives and targets;
- Facilitates effective planning, communication, documentation, review and feedback;
- Defines accountabilities and provides decision making tools;
- Provides a system to ensure ongoing compliance with legislative and regulatory requirements; and
- Facilitates continual improvement.

The SHEMS has been revised where necessary for the new AQC ownership and maintained during the term of the MOP.

3.2.2 Management Plans and Procedures

Control strategies for environmental risks are contained in a series of environmental management plans and subsidence management plans as listed in **Table 9**. These plans

describe environmental risks, outline control strategies and monitoring programs and provide reporting requirements.

Table 9 identifies the documents that provide control strategies for potential risks associated with Dartbrook mining operations and their relevance to the operation during Care and Maintenance. A summary of Management Plans is also presented in **Appendix B**.

Table 9
Risk Control Strategies

Risk	Description of Existing Control Strategies	Applicability to Care and Maintenance
Air Quality	Dust Management Plan	Ongoing management
Erosion and Sediment Control	Erosion and Sediment Control Plan	Ongoing management
Surface Water Pollution	Site Water Management Plan	Ongoing management
Groundwater Impacts	Site Water Management Plan	Ongoing management
Contaminated Polluted Land	Not an identified risk – dealt with under Incident management	Not applicable. All underground storages removed and cleared of contamination.
Acid Mine Drainage	Not an identified risk - no known sites.	Not applicable
Flora and Fauna	Flora and Fauna Management Plan	Ongoing, though minimal land disturbance anticipated.
Weeds/Feral Animals	Land Management Plan	Ongoing management
Blasting	Blast Management Plan	Not applicable as no blasting to be undertaken
Operational Noise	Noise Management Plan	Ongoing, though minimal noise impacts anticipated
Visual, Stray Light	Landscape and Lighting Management Plan	Ongoing, though minimal impacts anticipated
Aboriginal and non-Aboriginal Heritage	Archaeology and Cultural Heritage Management Plan	Ongoing, though minimal land disturbance anticipated
Spontaneous Combustion (REA, stockpiles)	Surface Spontaneous Combustion Management Plan	Not applicable as no coal will be mined and/or stockpiled
Bushfire	Bushfire Management Plan	Ongoing management
Surface Subsidence Effects	Property Subsidence Management Plans and LSMP	Not applicable as no subsidence impacts anticipated
Security	UGM onsite daily weekdays. Muswellbrook Security services after business hours and weekends. Fulltime care takers onsite from Jan 1, 2018.	General public safety is detailed in **Section 3.2.3**
Methane Drainage/ Ventilation	Section 138 Application	Not applicable as no goaf drainage anticipated

3.2.3 Site Security and Public Safety

All employees and contractors working on the site, as a minimum, are required to complete an Induction Program prior to commencing work. In general, visitors to the site must be escorted by Mine personnel.

The mine site is clearly signed and unauthorised access to the site is prohibited.

Whilst on Care and Maintenance, additional security measures are in place. Such measures include:

- The perimeter of the CHPP and Western surface facilities are enclosed within a stockproof fence and sign posted with unauthorised access signage;
- The immediate CHPP infrastructure is enclosed within a security fence;
- The Kayuga access slot is fully enclosed within a security fence to prevent unauthorised access;
- The main gates to the Kayuga mine entrance remain closed and secured, when not in use;
- Barriers across the portals are designed to prevent unauthorised access into the underground mine; and
- A Security firm is employed to patrol the key sites during the times operational personnel are not on site.
- Fulltime caretaker will be located onsite commencing on Jan 1, 2018.

Installations such as the main ventilation shaft, electricity substations and the Dewatering Plant, which are remote from the main infrastructure, are secured by man-proof fencing with locked gates and inspected regularly.

3.2.4 Specific Risks Relating to Rehabilitation

3.2.4.1 Geology and Geochemistry

The Dartbrook coal resources are located in the northern Hunter Coalfield on the western side of the Muswellbrook Anticline. Strata of the Permian Wittingham Coal Measures outcrop in the area and dip gently to the west. Underlying marine sediments of the Maitland Group outcrop 3 kms to the east, on the eastern side of the Aberdeen Thrust. Further east lies the Hunter-Mooki Thrust (Phillips 2000).

The Jerrys Plains Subgroup is divisible into five main coal-bearing formations. The basal four consist of the Malabar, Mt Olgilvie, Mt Thorley and Burnawood Formations and occur at Dartbrook.

Seams of the subgroup show a high degree of splitting, particularly towards the east, and major seams are generally represented by several piles/splits. Interburdens in the Jerrys Plain Subgroup are generally coarse-grained in the upper sequence, above the Vaux Seam, and become progressively finer with depth to the Bayswater Seam (Phillips, 2000).

Non-coal units in the Vane Subgroup are generally fine to medium grained sandstones. An indicative typical stratigraphy column**.**

The Kayuga Fault Zone is a sub-vertical fault that trends north-northwest and extends into CL 386. A number of faults with minor throw are known from intersections in the Dartbrook underground workings and from drillhole intersections (Phillips, 2000).

Two major dykes have been identified at Dartbrook and cross the area in a north-east to south-west direction (Phillips, 2000).

3.2.4.2 Material Prone to Spontaneous Combustion

The risks posed by surface spontaneous combustion at Dartbrook generally remain 'low' to 'very low' and are limited to the REA. Dartbrook has an approved 'Spontaneous Combustion Management Plan' for the REA, which outlines measures for monitoring and mitigating potential spontaneous combustion issues.

The REA was rehabilitated more than 10 years ago. Thermocouples have been installed to monitor heating within the REA. Spontaneous combustion has not been detected within the REA based on the readings to date. The area was capped with approximately 1 m of suitable material prior to rehabilitation. There has been no visual indication of heating (e.g. vegetation dieback, steam on cold mornings, surface ash, etc.) Temperature levels are recorded by thermocouples in the REA and are reported in Annual Reviews.

Additionally, there are currently no raw or product coal stockpiles on site. This is not planned to change for the MOP term. Therefore, there is zero risk of spontaneous combustion spreading to other areas from stockpiled material.

3.2.4.3 Material Prone to Generating Acid Mine Drainage

This is not applicable for Dartbrook as it is not an identified risk and there are no known sites or incidences of acid mine drainage.

3.2.4.4 Mine Subsidence

Dartbrook has operated in accordance with Longwall Subsidence Management Plan (LSMP) and Property Subsidence Management Plans (PSMPs) developed for the site. These plans are required under Condition 3.3 of DA 231-07-2000 (as modified) and document the strategies developed in consultation with affected private property owners and relevant stakeholders to manage subsidence impacts. Historically, there have been areas where mine subsidence has occurred these areas have been rehabilitated.

Treated areas are re-inspected in accordance with the KA102 - KA107 Subsidence Monitoring Program to determine if further subsidence has occurred however recent inspections have not revealed any further issues. Monitoring will continue throughout the MOP term, as required by the SMP.

3.2.4.5 Erosion and Sediment Control

Dartbrook maintains an Erosion and Sediment Control Plan (ESCP). During the MOP term, there are no major areas of disturbance or rehabilitation activities planned.

Sediment structures will continue to be maintained (as required). Water runoff from any disturbed areas will continue to be directed into existing sediment dams until areas are adequately revegetated with grass cover. As the rehabilitation areas are now well established, the erosion potential is reduced.

Under the ESCP for the site, some of the controls that the site implements as required include:

- Diversion of clean water around the site;
- Collection of dirty water runoff in catch drains to sediment traps and/or settling dams;
- Progressive mine rehabilitation;
- Inspection of controls following significant runoff events;
- Maintenance of erosion and sediment control (E&SC) structures; and
- Maintaining freeboard on E&SC structures to contain relevant design storm event.

The ESCP also outlines examples of remedial works that are implemented as necessary to manage the effects of subsidence in relation to erosion potential and include:

- Rehabilitation of surface cracks by ripping and seeding;
- Remedial drainage works to direct drainage paths, where necessary;
- Cut and/or fill drainage earthworks to re-establish free drainage in ponding areas; and
- Drainage works or stabilisation works to remediate any areas prone to erosion.

3.2.4.6 Soil Type(s) and Suitability

The parent rocks for the landscape are calcareous shale and sandstone with some alluvial sediments. There is minor to moderate potential for sheet erosion on some hillslopes. The soil profile at the Kayuga Seam Access Slot is described as Calcareous Red Duplex soil (Phillips, 2000). Soil profiles in the locality of the REA were identified in the EIS 2000 as follows:

- Hardsetting Calcereous Duplex Soils being on the upper sideslopes and footslopes;
- Dark Cracking Clays; and
- Skeletal Soil.

The land surface above underground mining consists predominantly of Class III, IV, V and VI land which is suitable for dry land grazing and occasional cropping. The REA site consists of Class VI and VII land which is of slopes suitable for limited managed grazing. Dartbrook has avoided constructing any mining infrastructure on land capability Classes I & II.

There are no major surface disturbance activities scheduled for the term of the MOP. There is a possibility an exploration drilling program may recommence during the MOP term. Exploration drillers will separate any topsoil for use in rehabilitation upon completion of the drilling.

Dartbrook has a *'Soil Stripping Management Plan'* which documents the management strategies designed to ensure the appropriate management of topsoil for use in all areas of rehabilitation with the objectives of excellent rehabilitation through maximum retrieval of

topsoil, use of appropriate stripping techniques and appropriate management of topdressing stockpiles.

There are several topsoil stockpiles at Dartbrook which are available for post mining rehabilitation.

During the MOP period, there are no planned rehabilitation activities on the mine lease authorities.

3.2.4.7 Flora and Fauna

Dartbrook's *'Flora and Fauna Management Plan'* (FFMP) outlines the flora and fauna management strategies for all components of Dartbrook's Operations which are currently under Care and Maintenance. Generally ongoing vegetation clearing is not required as part of the care and maintenance strategy of Dartbrook's operations. If it is required, a "Permit to Disturb" must be completed and the Vegetation Clearing Procedure adhered to.

The Biodiversity Action Plan which is part of the FFMP provides a framework for ongoing monitoring, review and the establishment of partnerships with external organisations to address biodiversity issues at Dartbrook.

Dartbrook's *'Land Management Plan'* generally addresses land management issues for the site during the care and maintenance period (including vermin and weed control).

Livestock grazing is permitted on rehabilitated land as well as other areas (as required) to crash graze for management of fuel loads and promoting other groundcover species to emerge. Other areas, such as the River Restoration Project, generally have stock exclusions.

3.2.4.8 Other Risks

Overburden Characterisation

As an underground mine in the care and maintenance phase, overburden characterisation is not considered to be a risk for Dartbrook during the MOP term.

Slopes and Slope Management

The last area of the REA was rehabilitated 10 years ago and vegetation is well established with generally no erosion or instability issues observed. The grazing trials did not introduce any slope stability issues at the stocking rate and duration of the trial (see **Section 8.6.1**).

The Kayuga Access Slot has been fenced off with security mesh. In final rehabilitation, there would be additional work required to shape batters down to a stable and safe landform.

Bushfire

Annual audits of bushfire fuel load are conducted in accordance with Dartbrook's *'Bushfire Management Plan'*. The site will implement hazard reduction techniques as required (for example slashing or crash grazing).

Air Quality

This is a low risk for Dartbrook being an underground operation and currently in Care and Maintenance for the MOP term.

Additionally, there is no rehabilitation or demolition works scheduled for the MOP term. Dartbrook does have a Dust Management Plan (DMP) which aims to manage and minimise the impact of dust from Dartbrook care and maintenance operations on the environment and nearby residences. The DMP will continue to be implemented during the MOP term.

Surface and Groundwater Quality

Dartbrook has established a network of monitoring points for surface and groundwater monitoring. Dartbrook operates in accordance with the SWMP which has been developed in accordance with the conditions of the Mine's Development Consent.

Dartbrook will continue to implement the control measures where applicable during care and maintenance.

Contaminated Land & Hazardous Materials

Dartbrook has removed the underground fuel tanks and surrounding hydrocarbon contamination and has also completed further sampling for contaminants in 2017. Typically contamination would occur in areas around workshops, fuel transfer points and storage areas.

Existing controls include bunding, concrete aprons, spill kits, training and contamination investigation. The site's WMP also outlines the process for the management of hydrocarbon/chemical waste.

4 POST MINING LAND USE

4.1 REGULATORY REQUIREMENTS

Regulatory requirements and consequent commitments specifically affecting rehabilitation and post mining land use have been considered in development of the MOP. These requirements deal with requirements from the Development Consent, EIS and Mining Leases 386, 1381, 1456 and 1497. Key approval documents can be found at the ACQ website at http://www.aqcltd.com/irm/content/dartbrook-environment.aspx?RID=460 .

Generally, the requirements are for rehabilitation that is progressively established, compatible with the surrounding area, stable, safe and "returning the land to a similar productive capacity to that which existed prior to mining" (EIS Section 7 Page 6).

4.2 POST MINING LAND USE GOAL

The proposed post-mining land capability for Dartbrook will be similar to the pre-mining land use capability. A conceptual final landform design and rehabilitation plan is shown on **Plan 4**.

The land surface above the underground mining area consists predominantly of Class III, IV, V and VI land which is suitable for dry land grazing and occasional cropping. Disturbance of the site due to the Dartbrook mine has been limited to surface subsidence and the location of surface infrastructure. Proven rehabilitation techniques have been used to rehabilitate mine subsidence areas and decommission mine infrastructure areas so that the post-mining land capability of the site is not significantly altered.

The REA site consists of Class VI and VII land which is of slopes suitable for limited managed grazing. The decommissioned REA landform consists of generally 5 to 1 batters which are not suitable for prolonged grazing. However, cattle grazing has been successfully trialled on the REA. The rehabilitation of the REA area was designed to enhance the current habitat value of the Browns Mountain area. The post-mining land use of the REA will be open grassland habitat.

Dartbrook has deliberately avoided constructing any mining infrastructure on land capability Classes I & II. These cropping lands have continued to support dairy farming prior to and throughout the mining operations and it is Dartbrook's intention to continue to do so following the decommissioning of the Mine.

The future final use of those "Forest" areas sown to Red River Gums (see **Plan 4**) or planted to Forest species as part of Dartbrook's past discretionary biodiversity projects is still to be resolved. This will be investigated further in developing the detailed closure plan in Year 2 of the MOP period.

Plan 4 assumes the infrastructure at Dartbrook will be decommissioned and dismantled/demolished. As part of Dartbrook's Development Consent commitments and the requirements of the ESG3 Guidelines, Dartbrook has also been engaging with the local community regarding input into post mining land use and rehabilitation objectives.

During consultation for development of the MOP (refer to **Section 1.4**, the main concerns raised relevant to land rehabilitation related to the removal of any contaminants prior to rehabilitation and preserving and managing the topsoil resource (including ideas for importing suitable growth medium as required). Species selection and weed management aspects have also been discussed without significant variation from what has been proposed for use in rehabilitation of the site. Through this consultation process there have been no recorded objections to the proposed final land use of rehabilitated land during consultation for the MOP. One stakeholder has suggested an alternative crop, industrial hemp (low/ no THC content hemp), that could be considered, however if this requires cultivation on the alluvial land, it is currently used for dairy farming/cropping.

During the CCC MOP Consultation meetings (refer to **Section 1.4**), post mining use of infrastructure was also discussed with the local community representatives and other key stakeholders. It was requested the Western Access Road remain as it is both a useful link road for dairy farmers and the local community to access their properties from the New England Highway (see **Plan 4** – Proposed Public Road). Emergency Services may also use it for detours on occasion. There was also interest expressed in the possibility of retaining the administration building and workshop for a community centre or business (subject to correct zoning). The Australian Rail Track Corporation, which is currently responsible for the rail loop on Dartbrook owned land, has also expressed strong interest in retaining this infrastructure to allow the strategic temporary park up of carriage trains.

The pre-existing Riverview Homestead, Cemetery and other associated pre-mining structures would remain post mining. Under the Care and Maintenance phase, Dartbrook will continue to maintain them.

Such ideas will be explored further in development of the Closure Plan for Dartbrook (and additional feedback from ongoing consultation with key stakeholders).

4.3 REHABILITATION OBJECTIVES

The overall objectives of rehabilitation and mine decommissioning at Dartbrook Mine, both on and off the mine site, are to ensure that the rehabilitation:

- Does not result in any adverse long term environmental impacts;
- Is stable in the long term; and
- Is capable of the sustainably supporting the post-mining land use which is compatible with surrounding lands and with similar maintenance requirements.

Specific performance criteria for mine rehabilitation associated with the decommissioning of Dartbrook has been included in **Section 6** the MOP.

As an underground mine, Dartbrook has a small surface footprint on primarily land capability classes IV and V which have been generally targeted for grazing.

Almost all broad scale rehabilitation has been completed to a standard acceptable to the DRG with only those areas occupied by infrastructure requiring to be rehabilitated.

Final site rehabilitation at decommissioning will be to a standard acceptable to the DRG, in consultation with the local stakeholders and the Community. The DRG's annual inspection of the mine site is used as a checking mechanism to ensure any rehabilitation completed meets appropriate standards. Monitoring will be conducted in the post closure phase for a sufficient period to demonstrate achievement of the agreed site decommissioning performance criteria.

Infrastructure Areas

Dartbrook's strategy for mine rehabilitation is to rehabilitate all disturbed areas following decommissioning and removal of the existing infrastructure. Following the completion of removing the remaining long wall from the designated hard stand, Dartbrook management is committed to refencing and restoration of the existing hard stand area.

Existing rehabilitation has primarily been establishing exotic grasses and pastures on broad acre areas with cattle grazing as the targeted final land use. The rehabilitation proposed for the infrastructure areas will be native grasses and trees, which have been proven as successful rehabilitation areas on other mines in the Hunter Valley.

The overall rehabilitation objective will be to return disturbed land to the pre-mine land use of grazing except for rehabilitated infrastructure areas on which it is proposed to create a stable landform of native trees, shrubs and grasses, which will, at the same time, lead to preservation of downstream water quality. As part of this strategy the rehabilitated areas would be fenced off specifically to exclude the grazing of native bushland to help create a stable landform with self-sustaining vegetation.

This strategy is consistent with the previously approved MOP.

Subsidence Areas

There has generally been little subsidence since September 2006, when longwall mining ceased. In total, 818 ha of land have been subsided since mining began at Dartbrook. Previously treated areas have remained stable. Any disturbed areas were sown with a pasture seed mixture and now have good cover established. There has been no change to agricultural land capability resulting from underground mining.

5 REHABILITATION PLANNING AND MANAGEMENT

5.1 DOMAIN SELECTION

Being an underground mine Dartbrook has a considerably smaller land surface footprint than an open cut mine and consequently a much smaller rehabilitation requirement. The location of surface infrastructure deliberately targeted lower quality grazing land with the stated aim to return the land to the same capability that existed prior to mining. Further undertakings were to avoid disturbing the prime agricultural land and to support the continuation of agricultural activities on this land. The primary domains are based on their operational function as shown in **Table 10** and **Plan 2**.

Table 10
Primary Domains (Operational Domains)

Label	Primary Domain
1	Infrastructure Areas
2	Overburden Emplacement/Bunds
3	Primary Water Management
4	Secondary Water Management
5	Rehabbed Grassland
6	Forestry
7	Cemetery

Secondary domains are land management units with a similar post mining land use objective and are shown in **Table 11**. The rehabilitation status of the various domains at the beginning and end of the current MOP is shown in **Table 12**.

Table 11
Secondary Domains (Post Mining Land Use)

Label	Secondary Domain	Final Land use
A	Rehabilitated Grassland	Native Vegetation (also suitable for Livestock grazing)
B	Woodland Area	Native Vegetation (also suitable for Livestock grazing)
C	Forestry Area	Environmental / Biodiversity values
D	Cemetery	Community benefit
E	Secondary Water Management	Livestock use

Table 12
Primary Domains

Label	Primary Domain	Status December 2017	Status December 2020
1	Infrastructure Area	All areas are considered active/operating infrastructure with exception of Fan house 2 which is sealed, the CHPP (not processing coal but is in care and maintenance) and the area serviced by the goaf drainage facilities which is currently grazed by cattle.	All areas are considered active/operating infrastructure with exception of Fan house 2 which is sealed, the CHPP (not processing coal but is in care and maintenance) and the area serviced by the goaf drainage facilities which is currently grazed by cattle.
2	Overburden Emplacement/Bunds	Operating infrastructure	Operating infrastructure
3	Primary Water Management	Operating infrastructure	Operating infrastructure
4	Secondary Water Management	Operating infrastructure	Operating infrastructure
5	Rehabilitated Grassland	Rehabilitation Complete	Rehabilitation Complete
6	Forestry	Existing & protected	Existing & protected
7	Cemetery	Existing & protected	Existing & protected

5.2 DOMAIN REHABILITATION OBJECTIVES

The rehabilitation objectives for each domain and the relationship to the project and the post mining land use are shown in **Table 13**.

Table 13
Rehabilitation Objectives

Label	Primary/Secondary Domain	Asset	Rehabilitation Objective / post mining land use
1B	Infrastructure/Woodland Area	Fan Housing – Fan House 1 is operational	Infrastructure decommissioned and removed, site rehabilitated to Improved and/or Native pastures with scattered trees to be incorporated into the surrounding cattle grazing land use.
1B	Infrastructure/Woodland Area	Mine Entries and Portals	To be decommissioned, shaped and rehabilitated to Improved and/or Native pastures with scattered trees to be incorporated into the surrounding cattle grazing land use.
1B	Infrastructure/Woodland Area	Administration Office and car park	It is assumed it will be decommissioned, shaped and rehabilitated to woodland with native/ improved pasture. However, stakeholders have expressed retaining the infrastructure which could be considered further in the future.
1B	Infrastructure/Woodland Area	Hard Stand Areas	To be decommissioned and rehabilitated to Improved and/or Native pastures with scattered trees to be incorporated into the surrounding cattle grazing land use.
1B	Infrastructure/Woodland Area	Coal Preparation Plant	To be decommissioned and rehabilitated to Improved and/or Native pastures with scattered trees to be incorporated into the surrounding cattle grazing land use.
1B	Infrastructure/Woodland Area	Topsoil stockpiles	To be decommissioned and rehabilitated to Improved and/or Native pastures with scattered trees to be incorporated into the surrounding cattle grazing land use.
1	Infrastructure (Proposed Public Road)	Main access road	To remain to assist the local residents
1B	Infrastructure/Woodland Area	Goaf dewatering pumping system	Infrastructure decommissioned and removed, site rehabilitated to Improved and/or Native pastures with scattered trees to be incorporated into the surrounding cattle grazing land use.
1B	Infrastructure/Woodland Area	Area serviced by goaf drainage facilities.	Area is currently grazed by cattle. Infrastructure decommissioned, top of pipe removed, site rehabilitated to

Label	Primary/Secondary Domain	Asset	Rehabilitation Objective / post mining land use
			improved and/or Native pastures with scattered trees to be incorporated into the surrounding cattle grazing land use.
2B	Overburden Emplacement & Bunds/Woodland Area	Overburden stockpiles / bunds	To be decommissioned and rehabilitated to Improved and/or Native pastures with scattered trees to be incorporated into the surrounding cattle grazing land use.
3B	Primary Water Management/ Woodland Area	Evaporation Ponds	Ponds decommissioned, filled in rehabilitated to Improved and/or Native pastures with scattered trees to be incorporated into the surrounding cattle grazing land use.
3E	Primary Water Management/Secondary Water Management	Industrial Sediment dams	Dams remaining for sediment control/water containment and livestock
4E	Secondary Water Management/ Secondary Water Management	Rural stock water / sedimentation dams	Dams to continue being used for rural purposes and stock water
5A	Rehabilitated Grassland/Rehabilitated Grassland	Reject Emplacement Area	Already rehabilitated to Improved and/or Native pastures incorporated into the surrounding cattle grazing land use. Rehabilitation currently strategically grazed by cattle.
6C	Forestry/Forestry	Forestry and Red Gum areas	To remain a biodiversity or community asset.
7D	Cemetery/Cemetery	Cemetery (and Riverview Homestead)	Pre-existing building/cemetery. Preserve for community benefit

5.3 REHABILITATION PHASES

The information presented in **Table 14** represents the rehabilitation phase the domain was in at the commencement of the MOP. As Dartbrook is in a Care and Maintenance phase for the duration of the MOP, the rehabilitation phase at the completion of the MOP term is planned to be the same as at the commencement.

5.3.1 Active Mining Area

There is no active mining proposed for the MOP period (and any change to this would require a new MOP before commencement). Any domains that are being maintained in such a state that they could be re-commissioned for mining purposes in the future (subject to all relevant approvals being in place), are considered as "Active Mining Area" for the purpose of **Table 14**. Likewise, any Administration Buildings (or other domains) that are being used by mine personnel and contractors with Care and Maintenance responsibilities are considered to be in the "Active Mining Area" rehabilitation phase.

5.3.2 Decommissioning

Any decommissioning that could be undertaken without reducing the future mining and processing options has been completed to the appropriate rehabilitation phase at this time. There are no further decommissioning activities planned in the MOP term.

5.3.3 Landform Establishment

Since care and maintenance began in 2006/7 there has been no further landform establishment. This will only occur when the decommissioning of the infrastructure is proposed following the decision to cease mining at Dartbrook.

5.3.4 Growth Medium Development

Likewise, no revegetation is proposed under the term of the MOP (other than in a Care and Maintenance capacity if monitoring and inspections identify a requirement (e.g. erosion repair).

5.3.5 Ecosystem and Land Use Establishment

The existing rehabilitated areas have progressed beyond the establishment phase. The post mining land use is livestock grazing on native / improved grassland.

5.3.6 Ecosystem and Land Use Sustainability

Rehabilitated areas are now over 10 years old. As referenced in the '*2016 Annual Review*' (Anglo Coal Dartbrook Management, 2017), the established grasses have developed to greater than 70% ground cover and provide forage for cattle. Trees have not been sown in these areas. To the east of the site, cattle grazing has been trialled on the REA rehabilitation with success. Over 90% groundcover was maintained during the grazing trial. This activity will likely continue during the MOP term subject to livestock market conditions and landholder interest.

5.3.7 Relinquished Lands

There are no areas that have been relinquished. There are unlikely to be any areas of Dartbrook where relinquishment will be sought during the MOP period.

Table 14

Summary of Rehabilitation Phases Proposed for Completion by the end of the MOP Period (by Domain)

Domain / Rehabilitation Phase	Fan Housing (1B)	Mine Entries and Portals (1B)	Administration Office and car park (1B)	Hard Stand Areas (1B)	Coal Preparation Plant (1B)	Topsoil stockpiles (1B)	Main access road (1)	Goaf dewatering pumping system (1B)	Area serviced by goaf drainage facilities. Area is currently grazed (1B)	Overburden stockpiles / bunds (1B)	Evaporation Ponds (3B)	Industrial Sedimentation dams (3E)	Rural stock water / sedimentation dams (4E)	Rehabilitated areas (5A)	Forestry and Red Gum areas. (6C)	Cemetery and Heritage buildings (7C)
Active Mining Area (C&M)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓
Decommissioning	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Landform Establishment	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Growth Medium Development	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Ecosystem and Land Use Establishment	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Ecosystem and Land Use Sustainability	×	×	×	×	×	×	×	×	×	×	×	×	×	✓	×	×
Relinquished Lands	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×

✓ = Some areas of this domain are in this phase at the commencement of the MOP term (see Note below).

× = Domain not expected to enter this rehabilitation phase during the MOP term (see Note below).

Note: There are no scheduled changes to rehabilitation phases from the commencement to the completion of the MOP term.

6 PERFORMANCE INDICATORS, COMPLETION / RELINQUISHMENT CRITERIA

Dartbrook is not proposing any decommissioning or rehabilitation under the term of the Care and Maintenance MOP. Existing rehabilitation has been deemed satisfactory by way of annual inspections by DRG. **Table 15** provides rehabilitation indicators relevant to each rehabilitation phase. Once Dartbrook moves into a post operational phase, the rehabilitation indicators will support the final and pre-mining land use goal of livestock grazing of native / improved pastures on the class capability IV and V lands. **Table 16** presents objectives, indicators and criteria for the various Rehabilitation Phases**.**

Table 15
Rehabilitation Indicators

Rehabilitation Phase	Indicator
Decommissioning	• Mine entries and portals to be appropriately sealed • Infrastructure (including the CHPP): removed or reused, recycled where possible and appropriately disposed of, concrete recycled or disposed of in the base of the Kayuga entry, ground contamination decontaminated or removed appropriately, services decommissioned. The retention of workshop and Administration building for approved post mining land use such as rural or light industry may be a future option • Evaporation Ponds and unwanted dams to be decommissioned
Landform establishment	• Mine entries and portals to be shaped to suit Class IV Capability (slope grade and compatibility with the surrounding area) • Areas of removed infrastructure to be shaped to generally match the local contours and suit the existing and constructed drainage lines • Evaporation Ponds and not required dams and would be infilled and conform to the existing topography. Saline material to be salvaged, removed and disposed appropriately
Growth Medium Development	• Shaped mine entries and areas of removed infrastructure to be ripped to >600mm and topsoil or topdressing medium to be spread to >100mm (subject to soil tests) with gypsum and fertiliser where required • Shaped Evaporation Ponds as above
Ecosystem Establishment	• Top-soiled and top-dressed areas are to be sown to a mixture of improved and native grass species that have been proven to both stabilise rehabilitated areas and provide livestock grazing opportunities (species presence and germination rate) • Strategic areas will be sown to a native tree species seed mixture such as ironbark, yellow box, spotted gum and acacia spp. Tree areas to be fenced out.
Ecosystem development	• The grass seed mixture has proven to successfully germinate and grow to maturity while stabilising the area in approx. 2 years and available for rotational grazing in about 4-5 years • The strategic tree planting has also been successful in the Hunter with nutrient cycling and seed development within 3-5 years. (species growth rates and density, nutrient re-cycling, grazing resilience)

Table 16
Rehabilitation Table

Domain	Regulatory Requirement	Domain Objective	Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Link to TARP	Progress at Start of MOP
Rehabilitation Phase - Decommissioning								
1B	Safety is a top priority. *Work Health & Safety Act 2011*	Majority of infrastructure is removed except that with a demonstrable market value.	All services removed to that infrastructure being decommissioned	Yes	Section 6 Page 23 of EIS (2000) Page 12 of ACDM Mine Closure Plan DA condition 1	No	N/A	Not Commenced
			Office remains	Yes		No	N/A	Not Commenced
			Workshop remains	Yes		No	N/A	Not Commenced
			Misc. Infrastructure removed	Yes		No	N/A	Not Commenced
			CPP & load in/out facilities removed	Yes		No	N/A	Not Commenced
			Rail loop removed[1]	Yes		No	N/A	Not Commenced
			Rail loop removed[1] Mine entries sealed	Yes		No	N/A	Not Commenced
		Entries sealed to the satisfaction of DRE	West, eastern and Kayuga entries sealed to DRE satisfaction	Yes	Condition 11 of ML 386	No	N/A	Not Commenced

[1] *Note that AQC are in discussion with ARTC who have confirmed that they wish to retain the rail loop infrastructure.*

Rehabilitation Phase - Landform Establishment								
1B	Site to be stable and capable of sustainable support of post mining land use	Landform compatible with surrounding land's shape and land use (grazing).	Class IV land capability	<10 % slope	Page 12 of ACDM Mine Closure Plan	No	Table 22: Landform	Not Commenced
			Stable and comparable drainage systems	2% slope Grass or rip rap	Section 7 Page 6 EIS (2000)	No	Table 22: Landform	Not Commenced
	Site to conform to Synoptic Plan for Integrated Landscapes with appropriate bunding.		Landform compatible with existing adjacent landforms.	Landscape/ Aesthetics' Consultant report	Section 5 Page 26 EIS (2000) 3.8 a x l Development Approval	No	Table 22: Landform	Not Commenced
	At cessation of mining will return the land to a similar productive capacity as existed prior to mining		Establishment of Class IV lands	<10%	Section 9 page 5 EIS (2000)	No	Table 22: Landform	Not Commenced
	Erosion and Sediment Control			70 % veg. cover. No evidence	Condition 3.6 DA Section 9 Page 8	No	Table 22: Vegetation	Not Commenced

Domain	Regulatory Requirement	Domain Objective	Indicator	Completion Criteria	Justification/ Source	Complete (Yes/No)	Link to TARP	Progress at Start of MOP
Rehabilitation Phase - Growth Medium Development								
1B	Site to be stable and capable of sustainable support of post mining land use	Landform compatible with surrounding land's shape and land use (grazing).	Depth Topsoil Gypsum depth (0-200mm) Biosolids	10mm check Rip in 200mm Soil Sample and test	Section 5 Page 43 EIS (2000)	No	Table 22: Landform	Not Commenced
		Class IV lands require pasture improvement, stock control, and fertiliser application	Fulfil soil test recommendations	Comparable to adjacent grazing land	Section 3 Page 13 EIS (2000)	No	Table 22: Landform/ Vegetation	Not Commenced
		100mm to 200mm topsoil applied		Measure and test	Section 4 Page 14 EIS (2000)	No	Table 22: Vegetation	Not Commenced
		Application of fertilizer, gypsum and other ameliorants		Soil Sample and test	Section 4 Page 14 EIS (2000) Condition 3.5 g DA	No	Table 22: Vegetation/ Landform	Not Commenced
Rehabilitation Phase - Ecosystem establishment								
1B	Land to be returned a similar productive capacity as existed prior to mining	Successful cover with target spp.	Timing Varieties % germination	Inspection by an expert Varieties germinated with % as appropriate Carry > 1 head / 5 ha	Section 9 Page 5 EIS (2000) Condition 3.5 f DA Analogue site	No	Table 22: Landform	Not Commenced
	Undulating foothills used for dryland grazing of cattle				Section 9 Page 5 EIS (2000)	No	Table 22: Vegetation	Not Commenced
Rehabilitation Phase - Ecosystem development								

1B	Land to be returned a similar productive capacity as existed prior to mining	Landform compatible with surrounding land's shape and land use (grazing).	Cattle carrying capacity	Carry > 1 head / 5 ha	Section 9 Page 5 EIS (2000)	No	Table 22: Landform/ Vegetation	Not Commenced

Domain	Regulatory Requirement	Domain Objective	Indicator	Completion Criteria	Justification/ Source	Complete (yes/No)	Link to TARP	Progress at Start of MOP
Rehabilitation Phase - Decommissioning								
3B, 4E, 3E, 2B, 1B	Undulating foothills used for dryland cattle grazing	REA constructed to stable slopes with sufficient coverage to contain rejects.	REA constructed in 4m benches, covered by >500mm of inert material, achieves slopes of 10-14 degrees	Measure indicators during construction	Section 4 Page 14 EIS (2000) Condition 5.1 a I DA	Yes	Table 22: Spoil/ Waste/ Landform	Not Commenced
		Landform compatible with surrounding land's shape and land use (grazing).	Evaporation ponds remove salinity, salvage topsoil where possible and fill voids	Soil and salinity testing	Section 9 Page 5 EIS (2000)	No	Table 22: Spoil/ Waste	Not Commenced
Rehabilitation Phase - Landform Establishment								
3B, 4E, 3E, 2B, 1B	Land to be returned a similar productive capacity as existed prior to mining	Landform compatible with surrounding land's shape and land use (grazing).	Class IV land capability	<10 %	Page 12 ACDM Mine Closure Plan	No *	Table 22: Landform	Not Commenced
	Site to be stable and capable of sustainable support of post mining land use		Stable and comparable drainage systems	2% Grass or rip rap	Section 7 Page 6 EIS (2000)	No *	Table 22: Landform	Not Commenced

	Site to conform with Synoptic Integrated Landscape Plan with appropriate bunding		Landform compatible with existing adjacent landforms.	Landscape/ Aesthetics' consultant report	Section 5 Page 26 EIS (2000) Condition 3.8 a x I DA	No *	Table 22: Landform/ Vegetation	Not Commenced
Rehabilitation Phase - Growth Medium Development								
3B, 4E, 3E, 2B, 1B	Site to be stable and capable of sustainable support of post mining land use	Landform compatible with surrounding land's shape and land use (grazing).	Depth Topsoil Gypsum depth Biosolids Fulfil soil test recommendations	100mm check Rip in 200mm Soil sample and test	Section 5 Page 43 EIS (2000)	No *	Table 22: Landform/ Vegetation	Not Commenced Not Commenced
		Class IV lands require pasture improvement, stock control, and fertiliser application		Comparable to adjacent grazing lands	Section 3 Page 13 EIS (2000)	No *	Table 22: Landform/ Vegetation	Not Commenced
		100mm to 200mm topsoil applied		Measure and test	Section 4 Page 14 EIS (2000)	No *	Table 22: Landform/ Vegetation	Not Commenced
		Application of fertilizer, gypsum and other ameliorants		Soil sample and test	Section 4 Page 14 EIS (2000) Condition 3.5 g DA	No *	Table 22: Landform/ Vegetation	Not Commenced
Rehabilitation Phase - Growth Medium Development								
3B, 4E, 3E, 2B, 1B	Land to be returned a similar productive	Successful cover with target spp.	Timing Varieties % germination	Inspection by expert	Section 9 Page 5 EIS (2000) Condition 3.5 f DA Analogue site	No *	Table 22: Landform/ Vegetation	Not Commenced

	capacity as existed prior to mining			Varieties germinated and % as appropriate Carry > 1 head / 5 ha	Section 9 Page 5 EIS (2000)		Table 22: Landform/ Vegetation	Not Commenced
	Undulating foothills used for dryland grazing of cattle	Landform compatible with surrounding land's shape and land use (grazing).	Cattle carrying capacity	Carry > 1 head / 5 ha	Section 9 Page 5 EIS (2000)	No *	Table 22: Landform/ Vegetation	Not Commenced
*5A The REA has been tested under grazing conditions with the first trial in 2015/2016. The Wattus Ponds area has been grazed as part of a normal cattle grazing operation as carried out on adjoining land not affected by mining. 1B The Goaf dewatering system is subsurface with normal grazing carried out on the surface of these lands.								

7 REHABILITATION IMPLEMENTATION

7.1 STATUS AT MOP COMMENCEMENT

Table 17 shows the status of each domain at the commencement of the MOP term. This information is also shown in **Plan 2**.

Table 17
Domain Status at MOP Commencement

Domain ID	Primary Domain Asset	Current Status
1B	Fan Housing – Fan house 1 is operational	Fan house 2 is partly decommissioned and has been capped and sealed to prevent greenhouse gases escaping. Fan house 1 is active.
3B	Evaporation Ponds	Ponds are active and assist with reducing the inflow of groundwater on site.
4E	Rural stock water / sedimentation dams	Currently active.
3E	Industrial Sedimentation dams	Currently active.
1B	Mine Entries and Portals	Currently active.
1B	Administration Office and car park	Currently active.
5A	Rehabilitated areas	Already rehabilitated to Improved and/or Native pastures with scattered trees to be incorporated into the surrounding cattle grazing land use. REA has been constructed at 3-4 meter lifts, shaped, covered to >1.2 m of inert clay to 95% standard compaction, ripped to 200 mm with organic matter and gypsum, and covered with 100 mm of topsoil prior to sowing with pasture seed.
1B	Hard Stand Areas	Currently active.
1B	Coal Preparation Plant	Currently active under care and maintenance.
2B	Overburden stockpiles / bunds	Currently active.
1B	Topsoil stockpiles	Currently active.
1	Main access road	To remain to assist the local residents
1B	Goaf dewatering pumping system	Currently active.
1B	Area serviced by goaf drainage facilities.	Currently active. Area is currently grazed by cattle
7C	Cemetery, Riverview homestead.	Preserve for community benefit
6C	Discretionary Biodiversity – Forestry and Red Gum areas	Existing. Maintained for environmental/biodiversity values

7.2 PROPOSED REHABILITATION ACTIVITIES DURING THE MOP TERM

Under the term of the MOP Dartbrook will be under care and maintenance activities only. Should Dartbrook gain any approval to vary from this management strategy the term of the MOP will cease and a new MOP will be applied for. Consequently, the proposed rehabilitation status is the same as above as shown in **Table 18**. This is also reflected in **Plans 3A** to **3C**.

Table 18
Proposed Rehabilitation Activities

Domain ID	Primary Domain Asset	Status
1B	Fan Housing – Fan House 1 is operational	Fan house 2 is partly decommissioned and has been capped and sealed to prevent greenhouse gases escaping. Fan House 1 is active.
3B	Evaporation Ponds	Ponds are active and assist with reducing the inflow of groundwater on site.
4E	Rural stock water / sedimentation dams	Currently active.
3E	Industrial Sedimentation dams	Currently active.
1B	Mine Entries and Portals	Currently active.
1B	Administration Office and car park	Currently active.
5A	Rehabilitated areas	Already rehabilitated to Improved and/or Native pastures with scattered trees to be incorporated into the surrounding cattle grazing land use. REA has been constructed at 3-4 meter lifts, shaped, covered to >1.2m of inert clay to 95% standard compaction, ripped to 200mm with organic matter and gypsum, and covered with 100mm of topsoil prior to sowing with pasture seed.
1B	Hard Stand Areas	Currently active.
1B	Coal Preparation Plant	Currently active under care and maintenance.
2B	Overburden stockpiles / bunds	Currently active.
1B	Topsoil stockpiles	Currently active.
1	Main access road	To remain to assist the local residents
1B	Goaf dewatering pumping system	Currently active.
1B	Area serviced by goaf drainage facilities.	Currently active. Area is currently grazed by cattle
7C	Cemetery, Riverview homestead	Preserve for community benefit
6C	Discretionary Biodiversity – Forestry and Red Gum areas.	Existing. Maintained for environmental/biodiversity values

Additionally, as there are not any demolition, disturbance or rehabilitation activities planned during the MOP term, the cumulative disturbance and rehabilitation areas shown in **Table 19** remain unchanged.

Table 19
Disturbance and Rehabilitation Progression during the term of the MOP

Year	Total Disturbance Area (ha)*	Total Rehabilitation Area (ha) (per MOP Year)**	Cumulative Rehabilitation Area	Comments/ Explanation
Start of MOP (1 Jan 2018)	118	0	31.0	Care and Maintenance
1 (31 Dec 18)	118	0	31.0	Care and Maintenance
2 (31 Dec 19)	118	0	31.0	Care and Maintenance
End of MOP (31 Dec 20)	118	0	31.0	Care and Maintenance

** Total Disturbance Area includes areas of land which are in the following phases: Active and Decommissioning. Temporary rehabilitation is to be considered as an active mining area for the purposes of this table.*

*** Total Rehabilitation Area includes areas of land which are within the following phases: Landform Establishment and Growth Medium Development, Ecosystem and Land Use Establishment and ecosystem and Land Use Sustainability.*

7.3 SUMMARY OF REHABILITATION AREAS DURING THE MOP TERM

During the term of this MOP the area and status of each Domain is unlikely to change. Any significant changes will require a change to Dartbrook's Approvals which would trigger a new MOP. **Table 20** shows primary and secondary domains, rehabilitation phases and areas at commencement and completion of the MOP.

Table 20
Rehabilitation Summary

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Area at Start of MOP (ha)	Area at End of MOP (ha)
Infrastructure Areas: Fan Housing – Fan house 1 is operational	Woodland Area: Improved &/or Native pastures with scattered trees	1B	Active	0.4	0.4
Primary Water Management: Evaporation Ponds	Woodland Area: Improved &/or Native pastures with scattered trees	3B	Active	29.2	29.2
Secondary Water Management: Rural stock water / sedimentation dams	Stock Water Dams	4E	Active	8.0	8.0
Primary Water Management: Industrial Sedimentation dams	Infrastructure/ Industrial/ Residential/ Rural	3E	Active	8.8	8.8
Infrastructure Areas: Mine Entries and Portals	Woodland Area: Improved &/or Native pastures with scattered trees	1B	Active	1.8	1.8
Infrastructure Areas: Administration Office and car park	Woodland Area: Infrastructure/ Industrial/ Residential/ Rural	1B	Active	1.2	1.2
Rehabilitated Grassland: REA	Improved &/or Native pastures with scattered trees	5A	Ecosystem and Land Use Sustainability	31.0	31.0
Infrastructure Areas: Hard Stand Areas	Woodland Area: Improved &/or Native pastures with scattered trees	1B	Active	2.6	2.6
Infrastructure Areas: Coal Preparation Plant	Woodland Area: Improved &/or Native pastures with scattered trees	1B	Active	31.7	31.7
Overburden Emplacement/Bunds	Woodland Area: Improved &/or Native pastures with scattered trees	2B	Active	6.6	6.6
Infrastructure Areas: Topsoil stockpiles	Woodland Area: Improved &/or Native pastures with scattered trees	1B	Active	0.5	0.5

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Area at Start of MOP (ha)	Area at End of MOP (ha)
Infrastructure Areas: Main access road	Proposed Public Road	1	Active	13	13
Infrastructure Areas: Goaf dewatering pumping system	Woodland Area: Improved &/or Native pastures with scattered trees	1B	Active	0.7	0.7
Infrastructure Areas: Area serviced by goaf drainage facilities	Woodland Area: Improved &/or Native pastures with scattered trees	1B	Active	Drainage holes are subsurface	Drainage holes are subsurface
Cemetery: Cemetery, Riverview homestead	Community benefit: Community Issues, Buildings, Roads	7C	Active	0.9	0.9
Forestry: Forestry and Red Gum areas	Forestry Area: Environmental /Biodiversity Values	6C	Active	117.2	117.2

7.4 RELINQUISHMENT PHASE ACHIEVED DURING MOP PERIOD

There are no areas of rehabilitation that are anticipated to be relinquished during the MOP Period.

8 REHABILITATION MONITORING AND RESEARCH

8.1 OVERVIEW

Rehabilitation is currently monitored as required in Dartbrook's *'Landscape Management Plan'*, the *'Flora and Fauna Management Plan'* and *'Biodiversity Action Plan'*. Generally all relevant issues are monitored and reported on a monthly basis and also in the Annual Review report.

Consistent with current practices, under the terms of this MOP only Care and Maintenance activities are to be carried out. Consequently rehabilitation status is not expected to change quantity but improve in quality with the passing of time.

The sections below provide further detail on the current monitoring and research projects at Dartbrook which include the following:

- River Restoration (including fish habitat restoration);
- Red Gum Restoration;
- Forestry Planting; and
- Shelter Belts/Visual Screen.

8.2 RIVER RESTORATION

Areas where the Dartbrook operations are undertaken have low impacts in terms of threatened fauna distribution and habitat. The areas, in proximity to the mine, have been highly modified with limited under storey species present and low tree diversity.

The Dartbrook River Restoration Project was originally established in 2005 and is aimed at increasing the density and diversity of native vegetation, as well as providing a habitat corridor for fauna within the area. Activities completed to date include the strategic removal of introduced willow trees, placing stabilising woody debris in the Dart Brook, the control of weeds and feral animals, the establishment of native seedlings along the riparian corridor and the placement of fish "hotels" in the Hunter River.

Maintenance work has continued on the River Restoration Project including the exclusion of stock from tree seedlings, noxious weed and feral animal control and ongoing monitoring of rehabilitated areas. This care and maintenance activity will continue during the MOP period. In 2015, both the River Red Gum area and the Native Forest Plantation were surveyed by qualified ecologists as part of the ongoing two-yearly monitoring of these areas. Both areas were found to be progressing satisfactorily.

8.2.1 Fish Restoration

The strategic placement of fish hotels in the Hunter River during 2010 by DPI – Water (formerly the Department of Trade and Investment, Regional Infrastructure and Services, Department of Mines and Energy) and Hunter Central Rivers Catchment Management Authority were designed to encourage the establishment of native fish stocks and improve the diversity of the local aquatic habitat.

In July 2016, the Hunter LLS conducted an inspection of river stabilisation works, River Red Gums and 20 Log Jams constructed in the Hunter River. Hunter LLS found that the bank stabilisation was progressing satisfactorily.

Two Fish-Hotels and about 20 Log Jams have been constructed over a 6.5 km stretch of the Hunter River that interfaces with Dartbrook owned land. These structures create pool and riffle sequences as well as stabilise the bank. This more diverse habitat favours native fish species.

8.3 RED GUM RESTORATION

This project is to enhance and protect a population of *Eucalyptus camaldulensis* (River Red Gums) listed as being endangered in the Hunter Valley. The area is remote from any mine related infrastructure, has been fenced to exclude stock and has over 4,000 River Red Gums planted amongst the mature population.

Currently the River Red Gums that had naturally regenerated as a result of artificial flooding in 2007 continue to thrive within the constructed bunds. As outlined in **Section 8.2**, two-yearly monitoring by qualified ecologists found this area progressing well.

The Scientific Licence issued under Section 132C of the *National Parks and Wildlife Act 1974* (NPW Act) has been renewed regularly, to allow rehabilitation and restoration activities to continue in the River Red Gum area.

8.4 FORESTRY PLANTING

In 2003, a joint project with State Forests NSW was commenced which established a forestry plantation on undulating grazing land north of the CHPP, and south of the town of Aberdeen. This project involved the establishment of a 75 ha forestry plantation consisting of a total of 75,000 native eucalypt trees planted within the area. The plantation was part of a regional plan to create a sustainable resource in the Upper Hunter Valley for the future on land that is owned by mining companies.

Monitoring of the plantation is also undertaken by ecologists every two years. The last monitoring found that the most successful species were Spotted Gum and Grey Box. To date, the project has also been successful at achieving the additional objectives of establishing a biodiversity corridor, visual screening and stabilising the soil.

8.5 SHELTERBELTS / VISUAL SCREEN

An additional shelter belt / visual screen was planted in 2011 to the west of the New England Highway and included approximately 20% River Red Gums in the heavier alluvial soils. These trees are progressing satisfactorily and will continue to be monitored during the MOP period. This planting is blending with the earlier tree plantings on the bunds to the east of the New England Highway.

8.6 RESEARCH AND REHABILITATION TRIALS

8.6.1 Grazing Trial – REA

In 2015, Dartbrook conducted a cattle grazing trial to demonstrate that the rehabilitated land, in this case the REA at Dartbrook East Site, could sustain grazing by livestock, be productive and blend with the land use of adjacent areas (Hansen Bailey, 2016).

27 Angus and Angus/ Herefords Cross steers were introduced in April 2015 as weaner steers, averaging 274 kg and were weighed 7 times throughout the year. The results showed the cattle averaged 462kg in December. The rate of weight gain did reduce in the winter when it was cold and dry (Hansen Bailey, 2016).

Pasture growth was also monitored on five occasions at five sites to coincide with weighing of the steers. Sites 1 and 4 were Rhodes Grass dominant pasture, exceeding 80% coverage throughout the year. Site 2 hayed off more than other sites with some lodging of the tall Rhodes Grass. Site 3 and Site 5 had other species dominating including kikuyu, couch and medics (HansenBailey, 2016).

The latter were significant in providing palatable high protein feed in July to September period when summer growing species were dormant. Phalaris, Green Panic and Lucerne are widespread throughout the REA and many native grasses observed sporadically including Queensland Blue Grass, Plains Grass, Chloris spp., Wallaby Grass, Wiregrass, Barbwire Grass and Sporobolus spp. (HansenBailey, 2016).

Based on the success of the trial, the area continues to be grazed periodically. Updates will be included in the Annual Review report.

The Hunter Valley coal mines have several grazing trials comparing grazing on rehabilitated land and undisturbed native pasture. To date, the grazing on rehabilitated land has compared favourably to that of undisturbed land. This trend is also reflected in the Dartbrook grazing trial results.

9 INTERVENTION AND ADAPTIVE MANAGEMENT

9.1 THREATS TO REHABILITATION

Table 21 presents a summary of identified potential threats which could impact on achieving the rehabilitation objectives for Dartbrook.

Table 21
Threats to Rehabilitation Success

Threat to Rehabilitation	Consequence	Key Controls
Weather	Poor germination, high mortality rates, erosion issues	Consider seasonal climate trends in timing rehabilitation phases. Species selection suitable for time of planting. Use of cover crop if required.
Failure to identify and correctly place/cap carbonaceous material and acid forming material	Spontaneous combustion (spon com), acid mine drainage, poor rehabilitation performance	Correct practices for placement of material is outlined in various site management plans (including Spon Com Management Plan, Rehabilitation Management Plan and MOP)
Inadequate landform design	Resulting in steep sections, erosion points, slumping/ unstable ground, impacts on land use capability etc.	Mine Planning Rehabilitation Management Plan MOP
Weeds/non-desirable flora species	Invasion of weeds or non-desirable species threatening rehabilitation objectives (species composition/ vegetation community)	Topsoil management (e.g. direct placement, correct stockpile management) Rehabilitation planning Weed management
Inadequate erosion and sediment control	Deep rills on rehabilitation, poor water quality from rehabilitation, exposing capped material, loss of topsoil and seed	Landform design Use of cover crops if required Use of temporary erosion and sediment control measures as required Sediment dams as required
Mine subsidence	Erosion and damage to vegetation	Monitor/remedial work as required
Unsuitable growth medium/nutrient availability	Failure to achieve germination or desired growth rates	Soil sampling Suitable material placement Application of ameliorates as required Species selection
Vegetation/Growth Medium Suitability	Failure to achieve desired germination/growth rates. Failure to meet rehabilitation objectives	Rehabilitation Management Plan MOP (site domains/rehab criteria)
Bushfire	Damage to mine rehabilitation (e.g. from high intensity fire), erosion/ sediment loss	Implement Bushfire Management Plan, maintain fire trails
Unauthorised Access	Damage to rehabilitation by trespassers (e.g. driving over new rehabilitation, fire)	Fenced perimeter, signage, security patrols, and locked main gates after hours.

9.2 TRIGGER ACTION RESPONSE PLAN

Dartbrook has developed a Trigger Action Response Plan (TARP) as shown in **Table 22** to manage the key threats to rehabilitation. The aim of this TARP is to identify proposed contingency strategies in the event of unexpected variations in rehabilitation outcomes (e.g. failure to meet completion criteria) and to mitigate potential impacts before it escalates.

The TARP:

- Summarises the key threats to rehabilitation success;
- Defines trigger levels if early trends indicate a potential risk to the rehabilitation success;
- Response action required in the event of a trigger level exceedance;
- Initiates suitable planned action responses for managing a situation before it escalates;
- Mitigation/remediation and other controls;
- Any monitoring requirements; and
- A protocol for notifying DRG and/or relevant stakeholders for major impact to rehabilitation.

Table 22
TARP for Managing Threats to Rehabilitation Success

Aspect	Threat	Action	Normal	Level 1 Trigger	Level 2 Trigger
Landform	Slope Gradient	Trigger	Slope: REA Stage 4/bunds: 0-14%[2] Other Areas: 0-10%, Class IV land capability	Slope: REA Stage 4: 14-18% Other Areas: 10-18%	Slope: Over 18%
		Response Action	No Action. Continue Monitoring.	Minor reshaping to achieve rehabilitation objectives if it does not meet criteria. Monitor signs for potential stability issues (poor ground cover, inadequate drainage, cracking or slumping and erosion and sediment controls). Repair any issues to provide stable landform.	Reshape (via blasting or earthworks) or secure with security fencing/signage. E.g. high wall.
	Erosion Control	Trigger	No evidence of rilling, sheet, gully or tunnel erosion. Controls effective.	Minor evidence of rilling, sheet, gully or tunnel erosion (less than 300mm deep or localised impact).	Significant (e.g. >300mm deep or widespread) gully or tunnel erosion present. Widespread rilling or sheet erosion present.
		Response Action	No action. Continue to monitor as required.	Monitor erosion. May require remediation. Examples may include: minor earthworks (minor reshaping and drainage control, re-seeding repaired area),	Inspection by appropriately qualified person and recommended actions. May involve more complex earthworks and drainage design, re-establishment of suitable groundcover (potentially incorporating a temporary groundcover such as mulch or cover crop). Ongoing monitoring until stable/groundcover established.

[2] Approval for 14° slopes in the REA Stage 4 (s126 approval) dated 08/04/2004 from DP&E.

Aspect	Threat	Action	Normal	Level 1 Trigger	Level 2 Trigger
	Drainage Design	Trigger	2% slope, stable and comparable drainage systems.	Minor issues with drainage that do not impact on rehabilitation success.	Significant drainage system failure impacting on rehabilitation success.
		Response Action	No action. Continue to monitor as required.	Site inspection by a suitably trained person. Investigate the root cause of the issue/s and implement recommended remedial actions as appropriate. Monitor.	Review drainage design with input from qualified person/s. Implement recommended remedial actions as soon as practicable. Monitor.
	Mine Subsidence	Trigger	No evidence of subsidence (i.e. no evidence of scarring from loss of ground cover, no large cracks, no pot holes/slumping activity).	Minor surface cracks or undulations. Landform remains stable/safe.	Cracks opening and/or inadequate drainage resulting in potential for long term issues (e.g. stock injury, inadequate drainage, and inconsistent ground cover).
		Response Action	No action. Continue to monitor and respond to any issues as required.	Inspect area to determine appropriate controls. May require remediation. Examples may include: minor earthworks (shallow ripping, re-seeding repaired area).	Inspection by appropriately qualified person and recommended actions. May involve more complex earthworks/plugs and drainage design, re-establishment of suitable groundcover. Ongoing monitoring until stable/groundcover established.
Quality of spoil/waste	Spoil/Waste Quality	Trigger	No evidence of plant toxicity, heating, leaching or contaminated material outside design parameters/controls.	Localised evidence of poor vegetation health/poor germination, early indication of potential heating (via thermocouple readings), elevated analyte levels but contained within management system.	More widespread evidence of poor vegetation health/poor germination, evidence of heating (observation or via thermocouple readings), contaminants leaching through capping or outside of controls.
		Response Action	No action. Continue to monitor (e.g.	Inspection and review of results by appropriately qualified person. May	Inspection and review of results by appropriately qualified person. Development and

Aspect	Threat	Action	Normal	Level 1 Trigger	Level 2 Trigger
			thermocouples in REA, rehab inspections, water sampling) and respond to any issues as required.	require further controls such as review of capping material, ensuring runoff/leachate water from pipes is contained and monitored for any trends. Additional testing/amelioration as required.	implementation of action plan. May include earthworks to manage heating. Construction of additional drainage collection or pumps. Possibly adding more capping material, growth media and ameliorative application/re-seeding. Ongoing monitoring, report regulators and Annual Review.
Vegetation/ Growing Conditions (weather, soil)	Poor vegetation Growth	Trigger	70% groundcover established	Less than 70% groundcover established	Less than 50% groundcover established
		Response Action	No response. Monitor as required. Continue cattle grazing (in areas) to show stocking rates can be achieved.	Investigate cause. Implement recommended remedial actions (e.g. minor preparation and re-seeding).	Investigate cause. May need to further investigate growth medium parameters and species selection/timing of seeding. Implement recommended remedial actions.
	Species Suitability	Trigger	Species composition of 2yr old rehabilitation is within 20% of analogue sites	Species composition of 5yr old rehab is within 20%-30% of analogue sites	Species composition of 5yr old rehabilitation >30% of analogue sites
		Response Action	No response. Monitor as required.	Confirm extent via field inspection & survey if required. Investigate cause. Re-seed areas or plant tube stock as required. Monitor remedial work.	Complete field survey & investigate cause. May require further advice from a consultant or soil testing. Re-seed areas, plant tube stock and/or other treatment as required. Monitor remedial work.
	Presence of Weeds	Trigger	No significant weed infestations within 2 yrs	10% to 25% cover of undesirable species within 2 years.	> 25% cover of undesirable species within 2 years.
		Response Action	No response required other than routine rehabilitation inspections and maintenance.	Certified weed management contractor to apply correct weed control measures. Record location/continue to monitor and re-treat as required. May involve re-seeding with desirable species.	Certified weed management contractor to apply correct weed control measures. Record location/s and continue to monitor and re-treat as required. May involve livestock exclusion for defined period. Potential re-seeding with cover crop and desirable species.

10 REPORTING

Dartbrook will report performance against rehabilitation objectives, the MOP Commitments and compliance with regulatory conditions on an annual basis.

The Annual Review report is submitted to DRG, DP&E, EPA, OEH (National Parks & Wildlife Service), DPI Water, MSC, UHSC and DCCC and is also publicly available on Dartbrook's website. The Annual Review is also made available to the public (through MSC library) within 14 days of submission and to any landholder within the Dartbrook vicinity upon request. This report verifies compliance with the MOP and supports progression towards the post mining land use goal and rehabilitation objectives.

The Annual Review report, required under Dartbrook's consent conditions, does not remove the requirement to submit an annual Compliance Report under mining lease conditions. A summary of reporting requirements, including other Annual reports required by the conditions of authorisations, the Mining Act and *Mining Regulation 2016*, are presented in **Table 23**.

Table 23
Annual Reporting Obligations Under the Mining Act and Authority Conditions

Report Name	Authority	Reporting Period	Due Date	Comments
Annual Activity Report (Exploration Licences)	EL 5525	Annual for the period commencing 23 September	Within one calendar month of grant anniversary date (21 October each year)	An annual Activity Report is required under section 163C of the Mining Act, clause 59 of the Mining Regulation and Condition 8 of each of EL 4574, EL 4575, EL 5525 and A256. This report consists of an annual: • Activity summary and expenditure table; • Exploration report; • Environment management and rehabilitation compliance report; and • Community consultation report. The approved work program is also required to be re-submitted annually with the Activity Report This report is prepared in accordance with the Department's Exploration Guideline: Annual activity reporting for prospecting titles (1 March 2016) and Exploration reporting: A guide for reporting on exploration and prospecting in New South Wales (1 March 2016) and contains the information required by clause 59 of the Mining Regulation. An individual report will be submitted for each exploration licence within one calendar month after the grant anniversary date of the licence.
	AUTH 256	Annual for the period commencing 17 December	Within one calendar month of grant anniversary date (15 January each year)	
	EL 4574	Annual for the period commencing 14 August	Within one calendar month of grant anniversary date (12 September each year)	
	EL 4575	Annual for the period commencing 14 August	Within one calendar month of grant anniversary date (12 September each year)	
Annual Compliance Report (Mining Leases)	ML 1456	Annual for the period commencing 28 September	Annually on the grant anniversary date of Mining Lease	An annual Compliance Report is required under Condition 4 of each of ML 1456, ML 1381, ML 1497 and CL 386. The report must be prepared in accordance with the Department's draft Compliance Report Guidelines (May 2016).
	ML 1381	Annual for the period	Annually on the grant anniversary	

Report Name	Authority	Reporting Period	Due Date	Comments
		commencing 24 October	date of Mining Lease	Condition 4 of the mining leases provides that the Compliance Report must be lodged with the Department annually on the grant anniversary date of the mining lease. A consolidated Compliance Report may be submitted with the prior written agreement of the Department. Until that approval is obtained, individual compliance reports will be submitted for each mining lease on the grant anniversary date (due dates are noted at left).[3]
	ML 1497	Annual for the period commencing 7 December	Annually on the grant anniversary date of Mining Lease	
	CL 386	Annual for the period commencing 20 December	Annually on the grant anniversary date of Mining Lease	
Rehabilitation Report - formerly known as an AEMR (Mining Leases)	CL 386, ML 1381, ML 1456 and ML 1497	Calendar year: (TBC under new owners AQC)	Within 3 calendar months (31 March of each year - TBC under new owners AQC)	An annual Rehabilitation Report is required under Condition 3(f) of each of ML 1456, ML 1381, ML 1497 and CL 386. Condition 3(f) of each mining lease provides that the Rehabilitation Report must: provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP; be prepared in accordance with any relevant annual reporting guidelines published on the Department's website; and be submitted "annually on the grant anniversary date (or at such other times as agreed by the Minister)". The previous owners of Dartbrook had approval from the Department for group reporting of what was then called an AEMR under the previous conditions of the mining leases. AQC will seek confirmation on the Department's current position on this reporting approach (with Dartbrook under new ownership). Note that State significant development consents for mining projects granted under Division 4.1 of Part 4 of the Environmental Planning and Assessment

[3] We note that Condition 4(c) of the mining leases provides that "*the Compliance Report must be lodged with the Department annually on the grant anniversary date for the life of this mining lease*" (i.e. it does not allow for submission at such other times as agreed by the Minister). We suggest this is checked with the Department when discussing the possibility of lodgement of a consolidated Compliance Report.

Report Name	Authority	Reporting Period	Due Date	Comments
				Act 1979 NSW typically contain a condition requiring an Annual Review to be completed for the project. The Department has previously advised that submission of an Annual Review (prepared in accordance with the Annual Review Guideline (October 2015)) meets the requirements of a Rehabilitation Report under mining lease conditions. However, the current development consent conditions for Dartbrook do not require an Annual Review. AQC will confirm with the Department the applicable guidelines to use (e.g. Annual Review Guideline).
Annual Report (Exploration/G Geoscientific Activities – Mining Leases)[4]	CL 386, ML 1381, ML 1456 and ML 1497	Date as per Group Reporting Arrangement - Annually Commencing 20 December (TBC under new owners AQC)	Within one calendar month of date specified by the Secretary	Dartbrook will submit an annual report (for exploration/geoscientific activities) under section 163C of the Mining Act and clause 59 of the Mining Regulation. The report will be lodged "within one calendar month of the grant anniversary date … or such other date notified by the Secretary in writing" (clause 59(2) Mining Regulation). The Department has previously approved a group reporting arrangement for the CL 386, ML 1381, ML 1456 and ML 1497 annual exploration reports (with the reporting period and due date noted at left). AQC proposes to continue this group reporting schedule and will confirm this with the Department. The group annual exploration report for the mining leases must be prepared in accordance with the Department's *'Exploration reporting: A guide for reporting on exploration and prospecting in New South Wales'* (1 March 2016) and contain the information required by clause 59 of the Mining Regulation.

NOTES:

[4] This report is additional to the Annual Activity Report required for the exploration licences.

1. The above table is current as at 14 September 2017. The conditions of the authorities, applicable provisions of the Mining Act and relevant guidelines should be checked on a regular basis.

2. The above table describes only those annual reports required under the conditions of the exploration licences and mining leases held by AQC and/or the Mining Act. It does not deal with any:

a. notifications to regulatory authorities required under conditions of the exploration licences or mining leases (such as in respect of prescribed dams or environmental incidents);

b. notifications or other reports which may be required under the Mining Act/Regulation from time to time; or

c. other reports or notices which may be due under other legislation or the conditions of other approvals held by AQC (including development consent conditions).

11 PLANS

11.1 LEVEL 1 MINES (STATE SIGNIFICANT DEVELOPMENT)

Provided with the MOP are plans required by the ESG3 Guidelines for Level 1 mines. These include those listed below (and referenced throughout this plan):

- Plans 1A, 1B and 1C – Project Locality
    - Plan 1A - Pre-Mining Environment – Project Locality;
    - Plan 1B – Pre-mining environment – Natural environment;
    - Plan 1C – Pre-mining environment – Built environment;
- Plan 2 – Mine Domains at commencement of MOP;
- Plan 3A – 3C: – Mining and Rehabilitation;
    - Plan 3A – Mining and Rehabilitation Year 1 of MOP (2018);
    - Plan 3B – Mining and Rehabilitation Year 2 of MOP (2019);
    - Plan 3C – Mining and Rehabilitation Year 3 of MOP (2019);
- Plan 4 – Final Rehabilitation and Post Mining Land Use; and
- Plan 5 – Rehabilitation and Post Mining Land Use Cross Sections.

11.2 SUPPLEMENTARY PLANS

Provided with the MOP are also the following supplementary plans:

- Plan 1D – Details of Exploration Licence Areas; and
- Plan 1E – Details of Mining Lease Areas.

12 REVIEW AND IMPLEMENTATION OF THE MOP

The following review and implementation processes allows AQC to ensure that the MOP document is being effectively implemented, highlights opportunities for improvement and reflects the current schedule of activities proposed over the MOP term.

12.1 REVIEW OF THE MOP

The MOP is valid from 1 January 2018 to 31 December 2020. AQC will conduct care and maintenance activities in accordance with the MOP as approved by DRG.

Where an activity is proposed that is not in accordance with the approved MOP, AQC would submit either a MOP Amendment or a new MOP in accordance with Section (J) of the ESG3 Guidelines. Any amendments to an existing MOP will be tracked and details of the amendment, justification and timing clearly identified as per section (K) of the ESG3 Guidelines (or equivalent latest) before submission for approval.

Performance against the MOP is also reviewed annually and reported in the Annual Review (as documented in **Section 10** above) and during each Independent Environmental Audit (or other MOP audit as may be initiated by the DRG).

Notwithstanding the above, the MOP term will expire 31 December 2020 and a replacement MOP will be required to be prepared and submitted to the DRG for approval in advance of this date (allowing sufficient time for consultation and the DRG to review and approve the MOP as per the ESG3 Guidelines, or latest equivalent, guidelines).

12.2 IMPLEMENTATION

The MOP will be implemented by the Dartbrook Safety, Health, Environment and Community (SHEC) Coordinator (or their delegate). The General Manager – Project Development will be responsible for ensuring adequate resources are available to effectively implement the MOP. Implementation of the MOP will be reported in the Annual Review as per **Section 10**.

13 ABBREVIATIONS

Abbreviation	Description
ALARP	As low as reasonably practicable (risk management term)
AQC	Australian Pacific Coal Limited (owner of Dartbrook)
CHPP	Coal Handling and Preparation Plant
DA 231-07-2000	Dartbrook Extended Development Consent (as modified)
Dartbrook	Dartbrook Mine
DCCC	Dartbrook Community Consultative Committee
DMR	Department of Mineral Resources (now DRG)
DoP	Department of Planning (now DP&E)
DP&E	Department of Planning and Environment
DRE	Department of Resources and Energy (now called DRG)
DRG	Division of Resources and Geoscience (formerly called DRE)
East Site	Eastern infrastructure area (east of the New England Highway)
EIS	Environmental Impact Statement
EL	Exploration Licence
ESG3 Guidelines	ESG3: Mining Operations Plan (MOP) Guidelines, September 2013
ha	hectares
HRSTS	Hunter River Salinity Trading Scheme
kL	Kilo litres
km	kilometres
kt	kilo tonnes
LSMP	Longwall Subsidence Management Plan
ML	Mining Lease
MOP	Mining Operations Plan
MSC	Muswellbrook Shire Council
Mtpa	Million tonnes per annum
NPW Act	*National Parks and Wildlife Act 1974*
OEH	Office of Environment and Heritage
PSMP	Property Subsidence Management Plan
REA	Reject Emplacement Area
ROM	Run of Mine
SDS	Safety Data Sheet
SEE	Statement of Environmental Effects
Spon Com	Spontaneous combustion
spp.	Species
SSC	Scone shire Council (now UHSC)
SWMP	Site Water Management Plan
TARP	Trigger Action Response Plan
UGM	UGM Engineers
UHSC	Upper Hunter Shire Council
West Site	Western infrastructure area (west of the New England Highway)

14 REFERENCES

Department of Resources and Energy (DRE) (2013). *ESG3: Mining Operations Plan (MOP) Guidelines, September 2013* (ESG3 Guidelines)

Anglo Coal (Dartbrook Management) Pty Ltd (2012). *Dartbrook Mining Operations Plan, Continuation of Care and Maintenance, January 2013 – December 2017*

Anglo Coal (Dartbrook Management) Pty Ltd (2017). *Dartbrook Mine Annual Review 2016*

HLA EnviroScience Pty Limited (2000). *Dartbrook Extended Environmental Impact Statement*

APPENDIX A

Regulatory Correspondence

Planning & Environment
Resources & Geoscience

Gregory Kukla
AQC Dartbrook Pty Ltd
PO Box 16330
City East QLD 4002

Our ref: OUT17/48337

18 December 2017

Dear Mr Kukla

CL386, ML1497, ML1456, AQC Dartbrook Pty Ltd – Approval of Mining Operations Plan

NOTICE OF APPROVAL

Pursuant to Condition 3 of Coal Lease (CL) 386 and Condition 2 of Mining Leases (ML) 1497 and 1456, the Mining Operations Plan (MOP) that was submitted to the Department of Planning and Environment – Division of Resources and Geoscience (the Department) on 20 October 2017 (Department Reference: INW17/64784) is approved for the period from the date of this approval until **31 December 2020**.

This MOP approved by the Department is limited to:

- the rehabilitation objectives and completion criteria; and,
- the schedule of rehabilitation activities proposed for the MOP period.

In addition, this approval is conditional upon the conditions set out below. These conditions relate to this approval and are in addition to those attached to CL386, ML1497 and ML1456. A breach of conditions is an offence under the *Mining Act 1992*.

- AQC Dartbrook Pty Ltd is required to undertake a topsoil audit - a detailed comparison between the identified volumes of available soil with the estimated amounts required to achieve successful rehabilitation. Commentary on the health and suitability of the available soil is also required.
- This audit is to be undertaken within the first year of the MOP period and reported in the respective Annual Environmental Management Report (i.e. 2018 AEMR to be provided by **31 March 2019**).

It is the responsibility of the Authorisation Holder to ensure that all mining and mining related operations described in this MOP are as approved within the relevant Project Approval or Development Consent and all necessary approvals, consents or permits required under the relevant NSW or Commonwealth regulations have been obtained prior to carrying out the operations.

It is the responsibility of the Authorisation Holder to fulfil their obligations and commitments to the rehabilitation outcomes and performance standards as approved by the relevant consent authority to ensure the rehabilitation outcomes identified are achieved.

ASSESSED DEPOSIT

Approval of this MOP has triggered a review of the assessment of the security deposit required to secure funding for the fulfilment of rehabilitation obligations under CL386, ML1497, ML1381 and ML1456.

Notice of the change in the security deposit condition related to this MOP approval will be provided separately.

DEFINITIONS

In this letter, words have the meaning given to those terms in the *Mining Act 1992*, unless otherwise specified below.

Department means the NSW Department of Planning and Environment.

Authorisation Holder means the holder of the relevant authorisation(s).

Mining Operations Plan means the project, mining and mining related operations described in the *Dartbrook Underground Mining Operations Plan Continuation of Care and Maintenance January 2018 – December 2020* prepared by Hansen Bailey and dated 24 October 2017.

If you have any questions, please contact Jeremy Arnott on (02) 4931 6561.

Yours sincerely,

Peter Ainsworth
Manager and Principal Inspector Environment
Division of Resources and Geoscience
NSW Department of Planning and Environment
Signed under delegation from the Minister for Resources and the Secretary of the NSW Department of Planning and Environment

APPENDIX B

List of Management Plans

Appendix B
List of Management Plans

Name	Version	Date	Main Objective
Environmental Management Strategy	7	01/11/2016	Provides the framework for environmental management of the Care and Maintenance operations of Dartbrook mine, and builds upon the information provided in the Environmental Impact Statement (EIS) for the project (HLA EnviroScience Pty Limited, 2000).
Spontaneous Combustion Management Plan	4	01/11/2016	To address the management of spontaneous combustion (sponcom) issues associated with product and run of mine (ROM) coal stockpiles and the Dartbrook Rejects Emplacement Area (REA).
Landowner Communication and Consultation Plan	3	10/12/2002	To specify the communication and consultation process that will be conducted by Dartbrook with the owners of private land that will be undermined, or affected by longwall mining subsidence, due to the Dartbrook Extended Project.
Property Subsidence Management Plans *	Various	22/12/2003	PSMPs have been developed for several properties and describe the property and property features that could potentially be affected by mine subsidence, property subsidence predictions, assessment of the effects of subsidence on property features and proposed management measures for subsidence effects for each property feature.
Longwall Subsidence Management Plans *	2	22/12/2003	Prepared for the management of subsidence effects on all private properties that will be undermined by longwall panels. PSMPs include management strategies for man-made property improvements, as well as natural features, including surface water, groundwater, flora and fauna, and cultural heritage.
Archaeology and Cultural Management Plan	5	10/08/2011	The primary objectives of the plan are to protect known Aboriginal sites and heritage items and specify procedures to be implemented in the event that new sites or heritage items are discovered during the operations.
Flora & Fauna Management Plan	6	17/10/2016	Documents flora and fauna management strategies for areas that may be affected by the Dartbrook C&M operations. The primary objective of the plan is to manage and minimise the impact of Dartbrook C&M operations on the ecological values of the site.
Erosion & Sediment Control Plan	10	21/10/2014	Documents prevention and control measures to manage erosion and sedimentation for the Dartbrook C&M operations. The primary objective of the plan is to minimise erosion on the mine site and subsequent sedimentation of downstream waterways.
Soil Stripping Management Plan	5	07/11/2016	Documents the management strategies designed to ensure the appropriate management of topsoil for use in all areas of rehabilitation including the REA. The primary objectives of the plan are to ensure

Name	Version	Date	Main Objective
			the maximum retrieval of topsoil, use of appropriate stripping techniques and appropriate management of topdressing stockpiles.
Landscape and Lighting Management Plan	7	13/07/2011	Documents visual mitigation measures for the Dartbrook Care and Maintenance operations. The primary objective of the plan is to limit the visual and night lighting impacts of the Dartbrook C&M operations on sensitive receptors in the surrounding area.
Bushfire Management Plan	6	30/06/2016	This management plan incorporates the bushfire management measures developed as part of the risk assessment process. The plan addresses all aspects of Dartbrook Care and Maintenance operations and includes bushfire management strategies for all Dartbrook Coal landholdings within Dartbrook mining leases.
Land Management Plan	6	22/04/2016	The objectives of the Land Management Plan are ensuring ongoing productive use of the company land including land within the development consent area, where possible; supporting productive use of privately owned land within the development consent area; preventing land degradation; and controlling vermin, noxious weeds, and feral animals.
Site Water Management Plan	5	20/04/2015	Documents water management measures for the care and maintenance period for Dartbrook Mine. The primary objective of the plan is to manage and minimise the impact of the mine on surface and groundwater resources.
Waste Management Plan	5	28/10/2016	Documents the waste management strategies for the Dartbrook's C&M operations. The primary objective of the plan is to ensure that the waste generated is managed responsibly and in compliance with relevant legislation.
Dust Management Plan	9	16/06/2015	Documents the dust management strategies for the Dartbrook C&M operations. The primary objective of the plan is to manage and minimise the impact of dust from Dartbrook C&M operations on the environment and nearby residences.
Blast Management Plan *	5	10/12/2002	The primary objective of the Blast Management Plan is to manage and minimise the impact of blasting on the environment and nearby privately-owned residences.
Noise Management Plan *	8	15/09/2011	The primary objective of the Noise Management Plan is to manage and minimise the impact of noise from operations on the environment and nearby residences.
Construction Noise Management Plan *	2	7/11/2001	The primary objective of the Noise Management Plan is to manage and minimise the impact of noise from mine construction and operational activities on the environment and nearby residences.

Name	Version	Date	Main Objective
Vibration Management Plan *	3	10/12/2002	Documents the management strategies designed to address ground vibration impacts from the operation of the Dartbrook CHPP and Rail Loop. The primary objective of the plan is to ensure that vibration from the CHPP and Rail Loop does not impact on neighbouring private residences.

** Generally not applicable during Care and Maintenance operations*

APPENDIX C

Risk Matrix

Loss Type		Consequence (C)				
		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
(S/H) Harm to People (Safety/Health)		First aid case. Exposure to minor health risk	Medical treatment case. Exposure to major health risk	Lost time injury. Reversible impact on health	Single fatality or loss of quality of life. Irreversible impact on health.	Multiple fatalities. Impact on health ultimately fatal.
(EI) Environmental Impact		Minimal environmental harm (L1 incident)	Material environmental harm (L2 incident remediable short term)	Serious environmental harm (L2 incident remediable within LOM)	Major environmental harm (L2 incident rediable post LOM)	extreme environmental harm (L3 incident irreversible)
(BI/MD) Business Interruption / Material Damage & Other Consequential Losses		No disruption to operation. Five percent loss of budgeted operating profit.	Brief disruption of operation. Ten percent loss of budgeted operating profit/listed assets.	Partial shutdown. Fifteen percent loss budgeted operating profit/listed assets.	Partial loss of operation. Twenty percent loss of budgeted operating profit/listed assets.	Substantial or total loss of operation. Twenty-Five percent of loss budgeted operating profit/listed assets.
(L&R) Legal & Regulatory		Low level legal issue.	Minor legal issue. Non-compliance and breaches of the law.	Serious breach of the law. Investigation/report to authority, prosecution and/or moderate penalty.	Major breach of the law. Considerable prosecution and penalties.	Very considerable penalties and prosecutions. Multiple law suits and jail terms.
(R/S/C) Impact on Reputation/ Social/ Community		Slight impact. Public awareness may exist but no public concern.	Limited impact. Local public concern.	Considerable impact. Regional public concern.	National impact. National public concern.	International impact. International public attention.
Likelihood	**Examples**	**Risk Rating**				
5 (Almost Certain)	The unwanted event has occurred frequently, occurs in order of one or more times per year and is likely to reoccur within one year.	11 (M)	16 (S)	20 (S)	23 (H)	25 (M)
4 (Likely)	The unwanted event has occurred infrequently occurs in order of less than once per year and is likely to reoccur within five years	7 (M)	12 (M)	17 (S)	21 (M)	24 (H)
3 (Possible)	The unwanted event has happened in the business at sometime or could happen within 10 years.	4 (L)	8 (M)	13 (S)	18 (S)	22 (H)
2 (Unlikely)	The unwanted event has happened in the business at sometime or could happen in the next 20 years.	2 (L)	5 (L)	9 (M)	14 (S)	19 (S)
1 (Rare)	The unwanted event has never been known to occur in the business or it is highly unlikely that it will occur within 20 years.	1 (L)	3 (L)	6 (M)	10 (M)	15 (S)
Risk Rating	**Risk Level**	**Guidelines for Risk Matrix**				
21 to 25	(Ex) - Extreme	A high risk that management's objectives may not be achieved. Appropriate mitigation strategy to be devised immediately.				
13 to 20	(S) - Significant	A significant risk exists that management's objectives may not be achieved. Appropriate mitigation strategy to be devised as part of the normal management.				
6 to 12	(M) - Medium	A moderate risk exists that management's objectives may not be achieved. Appropriate mitigation to be devised as part of the normal management.				
1 to 5	(L) - Low	A low risk exists that management's objectives may not be achieved. Monitor risk, no further mitigation required.				