



Dartbrook Coal Mine

Modification 7

Bord and Pillar Mining

*Section 75W
Modification*

(DA 231-7-2000 MOD 7)



January 2019

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Cover photo

Coal train near Muswellbrook, NSW (Department of Planning and Environment)

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Executive Summary

AQC Dartbrook Management Pty Ltd (AQC), a wholly owned subsidiary of Australian Pacific Coal Limited, has lodged a modification application for the Dartbrook Underground Mine which is located approximately 4.5 kilometres (km) southeast of Aberdeen in the Upper Hunter Valley. The mine has been in care and maintenance since 2006. The modification proposes to:

- recommence underground coal mining on the site using bord and pillar methods;
- use a varied coal clearance system, including transport of mined coal by trucks using a private haul road to a new coal delivery shaft connecting to an existing underground conveyor to the existing coal handling and preparation plant; and
- extend the project duration by five years to 2027.

The modification and supporting Environmental Assessment were exhibited in June and July of 2018 and attracted 42 objections, including an objection from Upper Hunter Shire Council (UHSC), which has a policy position of objecting to all coal mining within its local government area. As a result, the modification must be referred to the Independent Planning Commission of NSW for determination.

Key community concerns raised by submitters relate to:

- effects of the project on air quality and climate change, particularly in relation to cumulative impacts;
- concerns that the project would affect the availability and quality of local ground and surface water resources;
- social impacts associated with the project and concerns that the project is incompatible with the local character and identity of the Upper Hunter region, including its reputation for thoroughbred horse breeding, viticulture and tourism; and
- concerns about the potential for a future open cut coal mining project at the site.

UHSC and Muswellbrook Shire Council (MSC) also raised concerns relating to the cumulative impacts of mining, air quality and noise impacts and the proposed five-year extension to operations.

Ten Government agencies provided advice on the modification. All issues identified by agencies have been resolved, except for OEH, which maintains residual concerns over potential risks to the new coal clearance infrastructure in a Probable Maximum Flood event. To address these concerns, the Department has recommended that AQC prepare a Flood Response Plan prior to construction of the delivery shaft to mitigate any flood safety risk to on-site personnel.

The Department has assessed the merits of the proposed modification, including detailed consideration of the concerns raised by the community and advice provided by Government agencies.

The proposed modification is straightforward in scope but complicated by the fact that Dartbrook has been in care and maintenance for the last 12 years and that AQC has publicly announced its intentions to investigate open cut mining opportunities at the site. While the Upper Hunter Valley is known for its coal mining developments, Dartbrook is located on the northern extremity of this region, and members of local communities (within 25 km of

Dartbrook) comprised approximately 80% of submitters objecting to the potential reopening of Dartbrook, despite the socio-economic benefits (especially jobs) that are likely to accrue to members of these communities.

Dartbrook received development consent in 1991 and again in 2001 and has the right to reinstate underground mining operations under its existing consent. The proposed bord and pillar mining method would reduce the mine's subsidence, ground and surface water impacts compared to the presently approved longwall mining method. The proposed varied coal clearance system and associated surface truck haulage would marginally increase air quality and noise impacts compared to the approved Hunter Tunnel coal clearance system. Nevertheless, the proposed modification would not result in any significant adverse impacts on the environment or local community.

The Department is recommending strict conditions requiring compliance with revised air quality standards and updated air quality, noise, subsidence and water management practices. Where AQC has made commitments to mitigate or reduce impacts from the modification, the Department has also recommended conditions to ensure those commitments are realised. The Department has also recommended contemporising a broad range of existing management, monitoring, reporting and regulatory conditions in the underlying consent, which has not been modified since 2005.

AQC has negotiated with UHSC and MSC to enter into a Voluntary Planning Agreement (VPA) with each Council. The Department understands that both Councils have, in principle, accepted the VPA terms offered by AQC.

The modification would, under the worst-case revenue scenario, provide a net benefit of \$71 million net present value to the State and potentially create social opportunities including:

- creation of up to 26 construction jobs, for which AQC is targeting 5 local hires (LHs) and 21 non-local hires (NLHs);
- creation of up to 88 operational jobs, for which AQC is targeting 70 LHs and 18 NLHs;
- use of LHs would reduce the local unemployment rate and minimise additional demand on community infrastructure and services;
- support for local and regional businesses through direct and indirect procurement; and
- provision of additional revenue for Muswellbrook and Upper Hunter Local Government Areas through VPA development contributions.

On balance, the Department considers that the modification's benefits would outweigh its costs and that the modification would improve the overall viability of the mine by enabling underground mining operations to recommence, thereby allowing its potential social and economic benefits to be realised. Importantly, many of the modification's impacts are reduced in comparison to the existing consent.

The Department concludes that the impacts of the modification can be managed to achieve an acceptable level of environmental performance and the proposal is approvable, subject to the proposed recommended conditions of consent.



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1. Introduction

AQC Dartbrook Management Pty Ltd (AQC), a wholly owned subsidiary of Australian Pacific Coal Limited, acquired the Dartbrook Underground Coal Mine (Dartbrook) in 2017 from Anglo American plc and Marubeni Coal Pty Ltd.

Dartbrook is located in the Upper Hunter Valley, approximately 4.5 kilometres (km) southwest of Aberdeen and 10 km north of Muswellbrook within both the Upper Hunter and Muswellbrook local government areas (LGAs) (see **Figure 1**). Surrounding land uses comprise coal mining, rural residential uses, tourism and agricultural enterprises including farming on alluvial land, cattle grazing, dairying and thoroughbred horse activities.

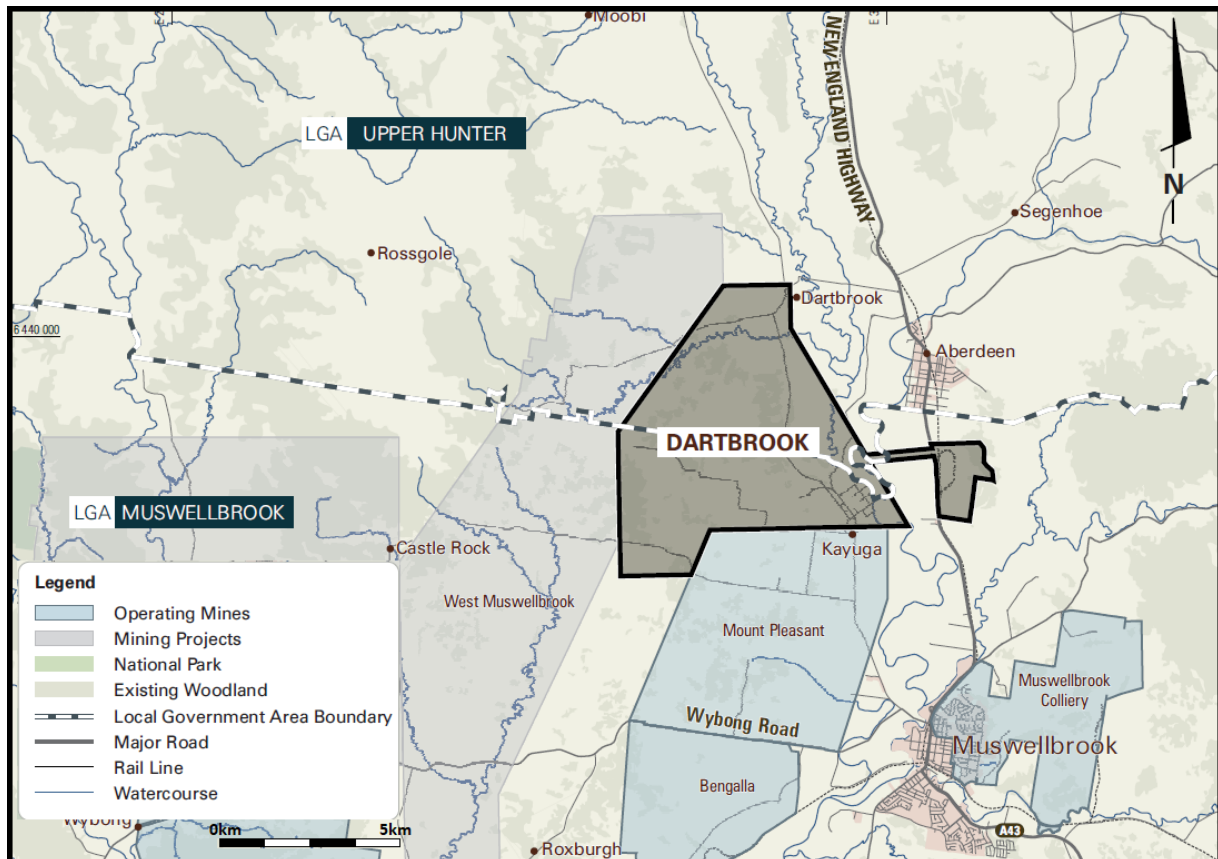


Figure 1 | Project location

Underground mining operations at Dartbrook were originally approved by the then Minister for Planning in December 1991, and longwall mining of the Wynn seam commenced in 1996. Geological and geotechnical constraints and the presence of high levels of gas (methane) led the former owner to later seek approval to shift mining to the shallower Kayuga, Mt Arthur and Piercefield seams.

On 28 August 2001, the then Minister for Urban Affairs and Planning approved extended mining operations under DA 231-7-2000. Longwall mining shifted from the Wynn seam to the Kayuga seam in 2004 and continued there until late 2006 when the mine was placed into care and maintenance due to a combination of operational difficulties and lower coal prices.

DA 231-7-2000 (as modified) remains the current consent until 2022, although the mine has remained in care and maintenance for the past 12 years. Dartbrook's approval history is further set out in **Table 1**, below.

Table 1 | Approval history

Approval / Modification	Approval Date	Scope of Approval
DA N91/00424/003	2/09/1991	<ul style="list-style-type: none"> Longwall mining of the Wynn seam until 2012 Construction of surface facilities including the coal handling and preparation plant (CHPP), rail loop and rail loading facilities Establishment of a reject emplacement area (REA) at the base of Browns Mountain Construction of the Hunter Tunnel
DA 231-7-2000	28/08/2001	<ul style="list-style-type: none"> Longwall mining of the Kayuga, Mt Arthur and Piercefield seams until 2022 Extraction of 6 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal Continued use of the CHPP, rail loop and rail loading facilities Installation of a paste plant to blend coarse and fine rejects Construction of a pipeline to transfer reject paste to the REA and expansion of the REA Construction of a new access portal to the Kayuga Seam, the 'Kayuga Entry' (previously 'Kayuga Seam Access Slot') Temporary transportation of ROM coal overland via private haul road to the CHPP, until underground roadways are connected to the Hunter Tunnel
Mod 1	19/06/2002	<ul style="list-style-type: none"> Reduced blast notification and structural inspection zones
Mod 2	16/06/2003	<ul style="list-style-type: none"> Construction and use of an emergency tailings storage cell
Mod 3	04/11/2003	<ul style="list-style-type: none"> Alteration of road access restrictions to allow employees, contractors and suppliers to use local roads
Mod 4	30/03/2004	<ul style="list-style-type: none"> Extension of temporary overland ROM coal haulage by three months to facilitate completion of underground roadways and conveyors to connect the Kayuga workings with the Hunter Tunnel
Mod 5	04/05/2005	<ul style="list-style-type: none"> Co-disposal of fine and coarse rejects within the existing REA
Mod 6	16/11/2005	<ul style="list-style-type: none"> Expansion of ROM coal stockpiles near the CHPP to accommodate 350,000 tonnes of permanent capacity and 50,000 tonnes of emergency capacity Disposal of CHPP tailings within the Wynn seam goaf via a tailings slurry pipeline in the Hunter Tunnel Use of a Nitrogen Injection Plant to replace oxygen gas in the Kayuga seam goaf to reduce risk of spontaneous combustion

Operations at Dartbrook are generally split between two sites separated by four linear surface features, being the Hunter River, Dart Brook, New England Highway and Main Northern Rail Line. Underground mining occurs at the West Site, while the East Site contains the major surface facilities including the CHPP and rail loading facilities. The sites are connected by the Hunter Tunnel, which previously housed an underground coal conveyor system to transfer ROM coal underground without disruption to the major surface infrastructure and waterways. During the extended care and maintenance period most of the site has been maintained, except for the removal of the longwall mining equipment and the Hunter Tunnel conveyor system.

Since acquiring Dartbrook in 2017, AQC has announced its intention to recommence underground mining operations and investigate open cut mining opportunities at the site. The Department notes that any such future open cut mining proposal would be subject to a separate State Significant Development application under Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).



2. Proposed Modification

AQC is preparing to restart underground mining operations at Dartbrook. To avoid previous operational difficulties experienced with longwall mining, AQC has lodged a modification application to extract up to a total of 10 million tonnes (Mt) of ROM coal from the Kayuga seam within the approved mining area using the bord and pillar mining method (see **Figure 2**). The Kayuga seam is being targeted because of its relatively low gas content and accessibility. The maximum production rate using this method would be 1.5 Mtpa until 2027, extending operations for an additional five years.

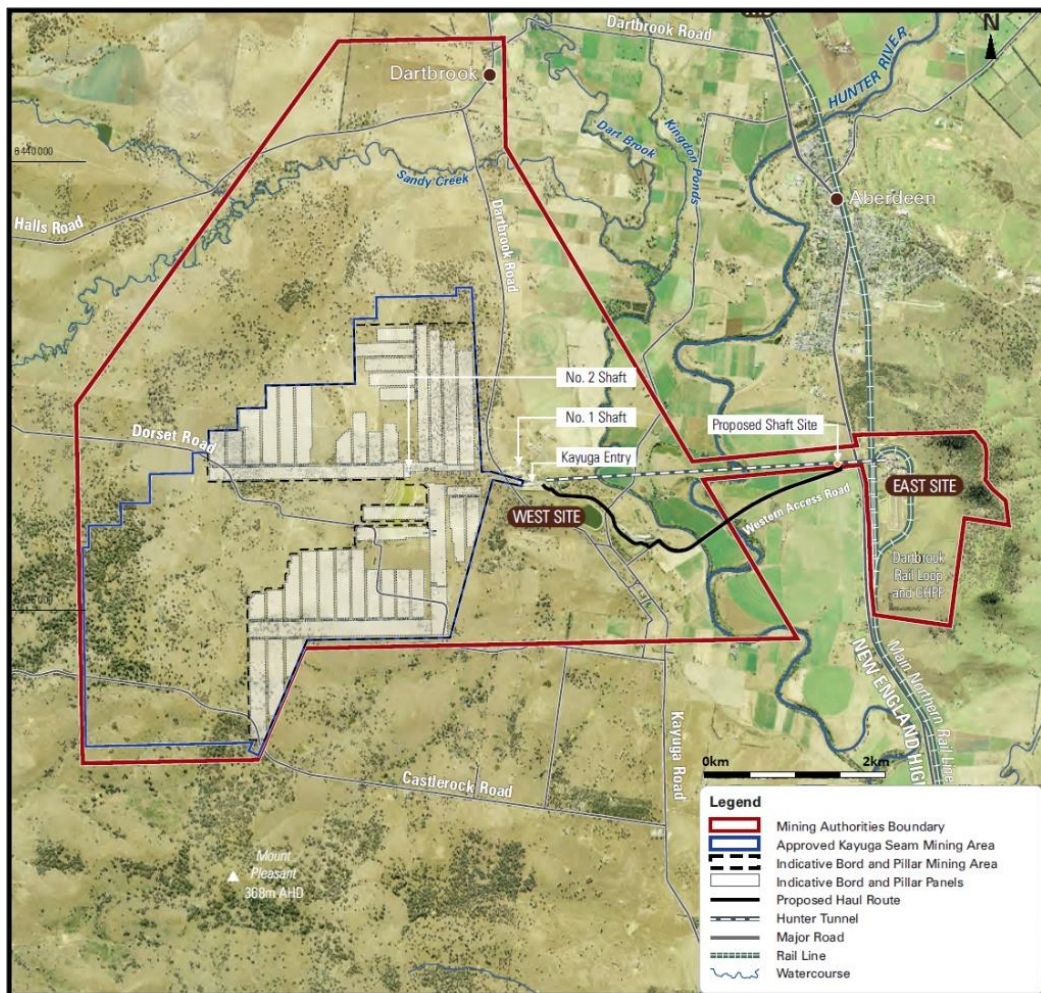


Figure 2 | Proposed bord and pillar mining area and new shaft site

AQC is also proposing to alter the coal clearance system to partially transport ROM coal overland instead of using the full length of the Hunter Tunnel. ROM coal would initially be transported approximately 4 km via existing private

haul roads from the Kayuga Entry at the West Site over Dart Brook and the Hunter River to a new coal delivery shaft that would reconnect to the eastern 550 m section of the Hunter Tunnel.

AQC would reinstate a conveyor in this section of the tunnel to transfer ROM coal under the New England Highway and Main Northern Railway Line to the surface facilities at the East Site. The new shaft site would be located on approximately 2 hectares (ha) of land owned by AQC that is currently being used by the Garoka Dairy (see **Figure 3**). Construction of the proposed coal delivery shaft and surface infrastructure would occur over a 16 week period.

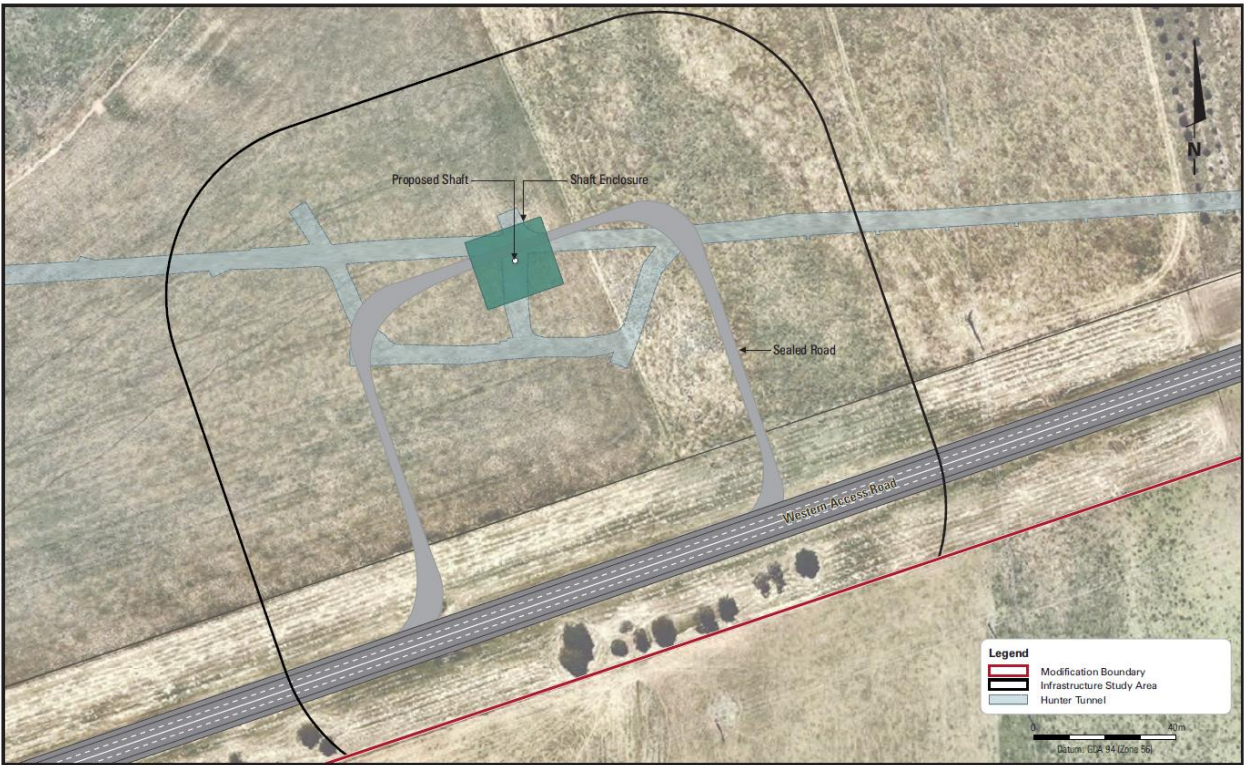


Figure 3 | Coal delivery shaft layout

To recommence longwall mining operations under the existing consent, AQC would need to reinstate the longwall mining equipment, repair the Hunter Tunnel and reinstate the conveyor system. This would require significant time and capital expenditure. AQC is proposing to use the bord and pillar mining method and alternate coal clearance system to facilitate earlier and more economically feasible recommencement of mining with reduced environmental impacts compared to the approved longwall operation.

To enable the proposed mining activities to be undertaken, AQC is also proposing to extend the life of mining operations by a further 5 years, until December 2027. AQC states that the proposed extension of the approval period is required to justify the capital expenditure involved in recommissioning the mine. The key aspects of the proposal are further summarised in **Table 2**. Importantly, AQC is not seeking to relinquish its development rights to undertake the approved longwall mining or use of the Hunter Tunnel under the current consent.

Table 2 | Comparison of existing operations and proposed modification

Aspect	Approved	Proposed
Life of project	<ul style="list-style-type: none"> 21 years (2022) 	<ul style="list-style-type: none"> Additional 5 years (2027)
Hours of operation	<ul style="list-style-type: none"> 7 days per week, 24 hours per day 	<ul style="list-style-type: none"> No change to mining operational hours Private road haulage of ROM coal Monday to Friday between 7 am and 6 pm

Aspect	Approved	Proposed
		<ul style="list-style-type: none"> Construction hours limited to 7 am to 6 pm on weekdays and 8 am to 1 pm on Saturdays, except drilling the shaft which would be undertaken 24 hours/day
Project area/ mining area	<ul style="list-style-type: none"> Mining leases (CL 386 and ML 1497) Some ancillary infrastructure located outside mining leases 	<ul style="list-style-type: none"> No change
Mining method	<ul style="list-style-type: none"> Longwall mining 	<ul style="list-style-type: none"> No change Additional approval of bord and pillar mining of the Kayuga seam
Mine plan	<ul style="list-style-type: none"> Kayuga seam: 20 longwall panels (3 previously mined) Mt Arthur seam: 3 longwall panels Piercefield seam: 28 longwall panels (or 19 depending on panel width) Wynn seam: 11 longwall panels (9 previously mined) 	<ul style="list-style-type: none"> Kayuga seam: additional bord and pillar mining within approved mining area (as an alternative to longwall mining) No change to Mt Arthur, Piercefield or Wynn seam
Coal reserves	<ul style="list-style-type: none"> Mt Arthur seam: 11.3 Mt Kayuga seam: 57.2 Mt Piercefield seam: 76.2 Mt 	<ul style="list-style-type: none"> Kayuga seam: 10 Mt via bord and pillar mining method No change to Mt Arthur or Piercefield reserves
Production rate	<ul style="list-style-type: none"> 6 Mtpa of ROM coal 	<ul style="list-style-type: none"> No change 1.5 Mtpa is expected during bord and pillar mining
Surface infrastructure	<u>East Site</u> <ul style="list-style-type: none"> ROM and product coal stockpiles CHPP and ROM hopper Conveyors Rail loop and loadout facilities Tailings storage facilities Water management infrastructure 	<u>East Site</u> <ul style="list-style-type: none"> No change other than minor refurbishments
	<u>West Site</u> <ul style="list-style-type: none"> Mine entry portals including the Kayuga Entry Administration buildings and bathhouse Ventilation shafts (No. 1 Shaft and No. 2 Shaft) Nitrogen Injection Plant above the Kayuga seam goaf (now decommissioned) Gas drainage boreholes Drop-holes and associated pipelines Effluent ponds Water management infrastructure including dewatering boreholes, tailings decant water pipelines and pumping system Internal haul roads, including the Western Access Road 	<u>West Site</u> <ul style="list-style-type: none"> Minor refurbishment/reinstatement of existing infrastructure Upgrade/sealing of internal haul roads Establishment of a new 8,000 tonne, 8 m high ROM coal stockpile at the Kayuga Entry Construction of a new shaft site including a 6 m wide and 70 m deep coal delivery shaft that connects to the Hunter Tunnel and associated infrastructure including: <ul style="list-style-type: none"> ROM coal bin Partially enclosed 9 m high shed Vehicle turning bay Electricity infrastructure Water reticulation Flood protection

Aspect	Approved	Proposed
Coal transport	<p><u>Onsite</u></p> <ul style="list-style-type: none"> ROM coal transported by conveyors from West Site to East Site via the Hunter Tunnel coal clearance system (which connects to the Wynn seam) <p><u>Offsite</u></p> <ul style="list-style-type: none"> Product coal transported to Newcastle via Main Northern Rail Line 	<p><u>Onsite</u></p> <ul style="list-style-type: none"> Transport of ROM coal by B-double trucks from the Kayuga Entry along existing private haul road to the new shaft site Average of 96 truck movements per day (192 one-way trips), operating between 7 am to 6 pm Monday to Friday <p><u>Offsite</u></p> <ul style="list-style-type: none"> No change
Water management	<ul style="list-style-type: none"> Mine water dams including: <ul style="list-style-type: none"> Staged Discharge Dam (SDD) with licensed discharge under the Hunter River Salinity Trading Scheme (HRSTS) Western Holding Dam (WHD) Eastern Holding Dam (EHD) Diversion and contour drains Sediment dams Clean water dams Evaporation ponds Dewatering bores and pipelines Use of Wynn seam goaf for water storage Water Access Licences (WALs) to account for surface and groundwater take 	<ul style="list-style-type: none"> No change
Processing	<ul style="list-style-type: none"> Crushing, screening and washing of ROM coal using the CHPP 	<ul style="list-style-type: none"> No change, however ROM coal extracted from the Kayuga seam via bord and pillar mining would not be washed
Reject management	<ul style="list-style-type: none"> Coarse and fine rejects emplaced at the REA at the East Site or pumped via tailings slurry pipeline to the Wynn seam goaf 	<ul style="list-style-type: none"> No change, however there would be no generation of coarse or fine rejects if ROM coal is unwashed (ie bypass product)
Employment	<ul style="list-style-type: none"> Approximately 30-40 full time equivalent (FTE) construction personnel Approximately 292 FTE personnel, comprising 192 permanent employees and 100 contractors (currently 11 FTE personnel during care and maintenance) 	<ul style="list-style-type: none"> Approximately 26 FTE personnel during construction of the new surface infrastructure Approximately 99 FTE personnel during the operational phase (2019-2027), comprising 69 permanent employees and 30 contractors



3. Statutory Context

3.1 Scope of Modification

DA 231-7-2000 was originally approved in 2001 under Part 4 of the EP&A Act. This modification request was made prior to 1 March 2018 under the former section 75W of the EP&A Act and can continue to be assessed under this pathway in accordance with Schedule 2 of the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*.

The Department considers that the application is within the scope of section 75W and may be determined accordingly as the proposal would not change the dominant use of the site and the mining area, and would not significantly increase the scale, intensity or environmental impacts of the approved project.

3.2 Approval Authority

The Minister for Planning is the approval authority for this application; however, under the instrument of delegation dated 14 September 2011, the Minister has delegated this determination function under section 75W to the Independent Planning Commission of NSW (IPC), given that:

- more than 25 public submissions in the nature of objections were received; and
- Upper Hunter Shire Council (UHSC) objected to the proposal in its submission dated 31 July 2018.

3.3 Permissibility

The proposed bord and pillar mining would occur within AQC's existing approved mining area, therefore there is no need to reconsider permissibility for this activity. The proposed new shaft site is located on Lots 1 and 2 DP 835733, owned by AQC, and zoned RU1 'primary production'. Development for the purposes of agriculture is permissible in RU1 and pursuant to clause 7(1)(b) of the *State Environmental Planning Policy (SEPP) (Mining Petroleum Production and Extractive Industries) 2007* (Mining SEPP), mining may also be carried out on this land.

3.4 Other Approvals

The proposed bord and pillar mining would occur within AQC's existing mining leases (ML 1497 and CL 386) issued under the *Mining Act 1992*. AQC does not hold a surface mining lease over the proposed new shaft site; however, AQC has advised that a mining lease is not required for this activity as:

- it does not fall within the definition of 'mining' or 'designated ancillary mining activity' under Sections 5 and 6 of the *Mining Act 1992*; and
- section 81(1) of the *Mining Act 1992* allows certain surface activities, including a shaft, to be undertaken in relation to a subsurface lease with the consent of the landholder.

Consequently, the proposal is not 'mining or petroleum development' under clause 17A of the Mining SEPP and does not require a Gateway Certification or Site Verification Certificate.

AQC also holds an Environment Protection Licence (EPL 4885) issued under the *Protection of the Environment and Operations Act 1997* (POEO Act). This EPL would likely require a variation if this modification is approved.

On 12 September 2018, AQC referred the proposal (EPBC 2018/8295) to the Commonwealth Government for its decision as to whether the proposal is a controlled action requiring further approval under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). On 17 December 2018, the

Commonwealth Government determined that the referral was not a controlled action and therefore no further approvals under the EPBC Act are required.

3.5 Mandatory Matters for Consideration

Environmental Planning Instruments

Under section 4.15 of the EP&A Act, the consent authority is required to take into consideration any environmental planning instrument (EPI) that is of relevance to the development. The following EPIs apply to the site:

- SEPP (*State and Regional Development*) 2011;
- Mining SEPP;
- SEPP No.55 – *Remediation of Land* (SEPP 55);
- *Muswellbrook Local Environment Plan 2009* (Muswellbrook LEP);
- *Upper Hunter Local Environmental Plan 2013* (Upper Hunter LEP); and
- *Upper Hunter Regional Plan 2036*.

The Department has assessed the proposed modification against the relevant provisions of these instruments. The Department is satisfied that the proposed modification can be carried out in a manner that is consistent with the aims, objectives and provisions of these instruments.

Objects of the EP&A Act

The objects of the EP&A Act are the underpinning principles upon which the assessment is conducted, and consideration of the objects must be considered by the consent authority when making a decision. The Department has assessed the proposed modification against the current objects of the EP&A Act, which were updated on 1 March 2018. **Table 3** summarises how the most relevant objects have been considered.

Table 3 | Consideration of the proposal against relevant objects of the Act

Objects of the EP&A Act	Consideration
(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources;	<ul style="list-style-type: none"> • The modification would facilitate reopening of Dartbrook which would: <ul style="list-style-type: none"> ○ provide socio-economic benefits to the people of NSW and employment opportunities for the region; ○ allow recovery of the State's coal resources in a safe and efficient manner; and ○ have a better environmental outcome than the currently approved longwall mining.
(b) to facilitate ecologically sustainable development (ESD) by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,	<ul style="list-style-type: none"> • The modification can be carried out in a manner that is consistent with the principles of ESD. The Department's assessment has sought to integrate all significant environmental, social and economic considerations.
(c) to promote the orderly and economic use and development of land;	<ul style="list-style-type: none"> • The modification would allow for the economic recovery of a coal resource, rather than the mine remaining in care and maintenance; and • The modification would largely use existing infrastructure.
(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats;	<ul style="list-style-type: none"> • The modification would not significantly impact any threatened species, populations or ecological communities.

(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage);	<ul style="list-style-type: none"> The modification would not impact on Aboriginal cultural heritage or historic heritage.
(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State	<ul style="list-style-type: none"> The Department publicly exhibited the proposal (see Section 4.1) and consulted with both affected Councils and other public authorities. The Department has considered all responses in its assessment.
(j) to provide increased opportunity for community participation in environmental planning and assessment	<ul style="list-style-type: none"> The Department publicly exhibited the proposal and made the modification application and accompanying EA publicly available on its website (see Section 4).



4. Engagement

4.1 Department's Engagement

The Department exhibited the modification application and supporting Environmental Assessment (EA, see **Appendix B**) from 28 June 2018 to 25 July 2018, for a period of 28 days. The Department advertised the exhibition in the *Hunter Valley News* and *Muswellbrook Chronicle* on 27 June 2018 and 29 June 2018, respectively. The EA was publicly available:

- on the Department's website;
- at the Department's offices;
- at Muswellbrook Shire Council (MSC) and UHSC administration centres; and
- at the Nature Conservation Council's office.

The Department notified relevant State Government agencies and both local councils and requested their advice on the content of the EA. The Department considers that the notification process met the requirements of the EP&A Act and the EP&A Regulation.

4.2 Submissions and Response to Submissions

The Department received advice from 10 Government agencies. MSC provided comments on the proposal and UHSC objected to the proposal.

The Department received 43 submissions from the public and special interest groups (SIGs), comprising:

- 1 submission in support of the modification;
- 1 submission providing comment; and
- 41 submissions objecting to the modification.

A summary of the issues raised in submissions is provided below. Copies of all submissions are included in **Appendix C**.

AQC submitted its Response to Submissions (RTS) on 31 August 2018 (see **Appendix D**). The RTS responded to issues raised by both the public and government agencies, with some changes to the proposal to reduce air quality and noise impacts.

4.3 Government Agencies' Advice

Office of Environment and Heritage (OEH)

OEH advised that it was satisfied with the biodiversity assessment and that the proposal would have minimal biodiversity impacts. OEH recommended that the Aboriginal Archaeological and Cultural Heritage Impact Assessment (AACHIA) be extended to cover the potential upgrades to the private haul road, and that a procedure for managing unexpected archaeological finds be developed. OEH also raised concerns with the location of the proposed new shaft site within the Hunter River floodplain and potential flood risk to this shaft. OEH recommended that a detailed flood assessment be conducted for the modification and that floodplain risk management procedures be developed to minimise flood risk.

In its RTS, AQC clarified that sealing part of the haul road would not require any further surface disturbance and therefore there was no potential to encounter any Aboriginal heritage sites. OEH disagreed with this conclusion and considered that potential impacts had not been adequately assessed. Upon further investigation, AQC identified that two extant sites were in fact located near the road within fenced enclosures. In response to the issues raised by OEH, AQC has committed to maintaining these enclosures and managing construction works to avoid undisturbed areas adjacent to the road, and including an unexpected finds protocol in its Aboriginal Heritage Management Plan for the project. OEH is satisfied with this approach and a condition has been recommended accordingly. The Department's consideration of Aboriginal cultural heritage impacts is further discussed in **Section 5.8**.

In response to OEH's concerns about flooding, AQC reiterated in its RTS that the 100-year average recurrence interval (ARI) flood depth of 0.4 m would not pose any risk to human life as the infrastructure would be constructed on an elevated mound and the shaft would be lined to avoid water ingress. Nevertheless, AQC committed to preparing an emergency evacuation procedure for floods up to the Probable Maximum Flood (PMF) event. OEH accepted that an emergency evacuation procedure would be appropriate for a 100 year ARI flood event; but would not suffice for PMF events that could experience flood depths in excess of 5 m. OEH further considered that the risk of floodwaters entering the shaft and Hunter Tunnel had not been adequately addressed and that the shaft should be relocated outside the PMF extent or alternate methods of coal transfer be pursued.

In response to OEH's residual flood risk concerns, AQC proposed manufacturing a cover for the shaft to prevent flood water from entering the Hunter Tunnel. OEH remains concerned with the location of the shaft in the Hunter River floodplain. The Department's consideration of flooding impacts is further discussed in **Section 5.5**.

Environment Protection Authority (EPA)

The EPA noted that the proposed overland coal haulage would account for the majority of the project's dust emissions and requested that AQC further consider feasible and reasonable mitigation measures to reduce emissions, including reinstatement of the previous coal clearance system or sealing the remainder of the haul road. The EPA also requested clarification of weather data and modelling scenarios used in the EA's Noise Impact Assessment (NIA).

In its RTS, AQC clarified that recommissioning the Hunter Tunnel and conveyor was not economically feasible, given the smaller quantity of coal being extracted. AQC acknowledged concerns raised by the EPA and the community concerning the unsealed section of the haul and in its RTS committed to seal the full length of the haul road. AQC also clarified the NIA matters in its RTS.

Following review of the RTS, EPA acknowledged AQC's commitment to seal the remainder of the haul road and recommended a condition requiring ROM coal to be kept sufficiently moist to prevent or minimise dust emissions. The Department's consideration of air quality impacts is further discussed in **Section 5.1**.

Department of Industry – Water (Dol Water)

Dol Water sought clarification on the predicted water take and questioned if AQC held adequate WALs for this take. In its RTS, AQC confirmed that it holds sufficient WALs for both the Hunter River alluvial aquifer and Permian aquifer water sources. Following review of the RTS, Dol water confirmed that AQC had adequately addressed its submission and had no further comments on the proposal.

Rural Fire Service (RFS)

RFS requested that an assessment under the *Planning for Bush Fire Protection 2006* be undertaken as part of the site occurs on bushfire-prone land. The RTS clarified that a Bushfire Management Plan is currently in place at Dartbrook in accordance with condition 3.9 of DA 231-07-2000. On this basis, RFS requested that this management plan be updated following determination of Modification 7 to reflect the recommencement of operations.

The Department's Division of Resources and Geosciences (DRG)

DRG advised that the proposal represented efficient development of coal resources which would provide appropriate royalty return to the State. DRG determined that sustainable, efficient and optimised resource outcomes could be achieved as a result of the modification and that identified risks or opportunities could be effectively regulated through the conditions of mining leases issued under the *Mining Act 1992*. DRG also asked to be further consulted in the event that any land-based offsets are required to avoid sterilising any land with future resource potential.

Resources Regulator

The Resources Regulator was satisfied with the EA and raised no specific concerns over the proposal.

Subsidence Advisory NSW (SA NSW)

SA NSW raised no specific concerns over the proposal but noted that it intends to redefine Dartbrook as an active mining area under the *Coal Mine Subsidence Compensation Act 2017*. SA NSW also noted that there are no predicted subsidence impacts from the proposed bord and pillar mining; however, should in the unlikely event subsidence occur, AQC would be liable for any damage under the *Coal Mine Subsidence Compensation Act 2017* and/or the *Mining Act 1992*.

Dams Safety Committee (DSC)

DSC advised that the proposed mining area is within the notification area for Dartbrook's own prescribed dam (SDD) and therefore AQC would require endorsement from DSC before recommencing mining activities within the notification area.

DSC also requested further details of the other two existing holding dams, EHD and WHD, to assess whether these are prescribed dams. AQC provided these details in the RTS, and DSC provided no further comments.

Other Agencies

Submissions were received from **Roads and Maritime Services** and the **Heritage Council of NSW**, neither of which raised any specific concerns over the proposal.

Upper Hunter Shire Council (UHSC)

UHSC raised concerns over the cumulative impacts of mining and objected to the proposal. In March 2015, UHSC adopted its *Position Statement Coal and Coal Seam Gas Activities March 2015* which identifies its commitment to protecting agricultural land, surface and groundwater resources, air quality and the community's health and amenity by opposing coal mining activities within its LGA. UHSC specifically objected to the proposed 5-year extension as it would extend the period of social and environmental impacts of the mine on the local community.

UHSC raised concerns over AQC's long term plans to pursue open cut mining at Dartbrook and questioned the economic viability of the proposed modification on its own. The Department's consideration of economic impacts is further discussed in **Section 5.7**.

Specific recommendations made by UHSC to mitigate noise and air quality impacts included the sealing of the unsealed section of the haul road and use of water sprays and screens at the new shaft site. A recommendation was also made to conduct additional night-time noise monitoring at affected residences west of the New England Highway following recommencement of mining operations to confirm Dartbrook's compliance with noise criteria or else support provision of additional mitigation measures.

UHSC noted that AQC has offered to enter into a Voluntary Planning Agreement (VPA) with UHSC. The Department understands that UHSC has accepted, in principle, the VPA terms. This matter is further discussed in **Section 5.6**.

In its RTS, AQC responded to UHSC's concerns and committed to implement UHSC's proposed noise and air quality mitigation and monitoring measures. UHSC acknowledged these commitments but continued to raise concerns over the cumulative impacts of mining in the LGA and the extended impacts on the community by way of influencing investment decisions, property values and land use potential.

Muswellbrook Shire Council (MSC)

MSC expressed concerns over the cumulative environmental and social impacts of the proposal, particularly as the background setting has changed significantly since the mine was originally approved. MSC raised concerns over offsite noise and air quality impacts, particularly from the broader rail network that connects to the Port of Newcastle.

MSC also raised concern that the 24-hour averaging period for dust emissions is too long and has the ability to obscure elevated night-time levels. MSC recommended that the NSW Government initiate a rail network wide dust and noise monitoring program and commission a study into the human health effects of exposure to elevated night-time dust levels in the Upper Hunter.

The Department recognises MSC's concerns but notes that that these recommendations go beyond the responsibility of an individual mine and go beyond the scope of this modification. Nevertheless, the Department is committed to working with the responsible public authorities (Transport for NSW, Australian Rail Track Corporation and the EPA) to address these broader issues.

MSC also raised concerns over the potential generation of dust from the unsealed section of haul road and the handling of unwashed coal. In its RTS, AQC committed to undertaking dust mitigation strategies that would assist in reducing air quality impacts, including keeping coal wet during handling and transport, and sealing the unsealed section of the private haul road.

With regards to the proposed shed enclosure over the shaft, MSC noted that it would require a Construction Certificate and recommended that it be painted Woodland Gray to blend in with the surrounding landscape. MSC expressed concern that the shaft could intersect the alluvium and recommended that a test bore be drilled prior to construction of the shaft to ascertain if alluvial groundwater is present. In its RTS, AQC committed to drilling this test bore and installing appropriate sleeving or casing if alluvial groundwater is present to prevent seepage into the Hunter Tunnel.

MSC requested that AQC undertake downstream water quality monitoring of the Hunter River. In its RTS, AQC noted that such sampling has historically been undertaken and that it had recently installed eight additional surface monitoring sites to collect baseline data on water quality.

MSC noted that AQC has offered to enter into an updated VPA with MSC. The Department understands that MSC has in principle, accepted the VPA terms. As part of its proposed VPA, AQC has committed to contributing to the review of MSC's Mining Affected Roads – Road Network Plan (to replace the 1997 Western Roads Strategic Traffic Study) and any necessary upgrades relevant to the project's impacts on road infrastructure. The VPA is further discussed in **Section 5.6**.

MSC also requested that the proposed B-double haul trucks, whilst being roadworthy, should avoid using public roads, that employees should continue to use the Western Access Road to access the West Site unless they live locally (as per the existing condition 7.2(f)(ii)) and that AQC should continue to maintain sections of Kayuga Road and Dartbrook Road (as per condition 7.2(f)(v)). AQC accepted these recommendations.

4.4 Public Submissions

Of the 43 submissions from the general public and SIGs, 34 were from the nearby towns of Kayuga, Aberdeen, Muswellbrook and Scone, three were from the broader Hunter Valley, and six were from elsewhere within the State. The geographic distribution of submissions received for this modification is shown in **Figure 4** below.

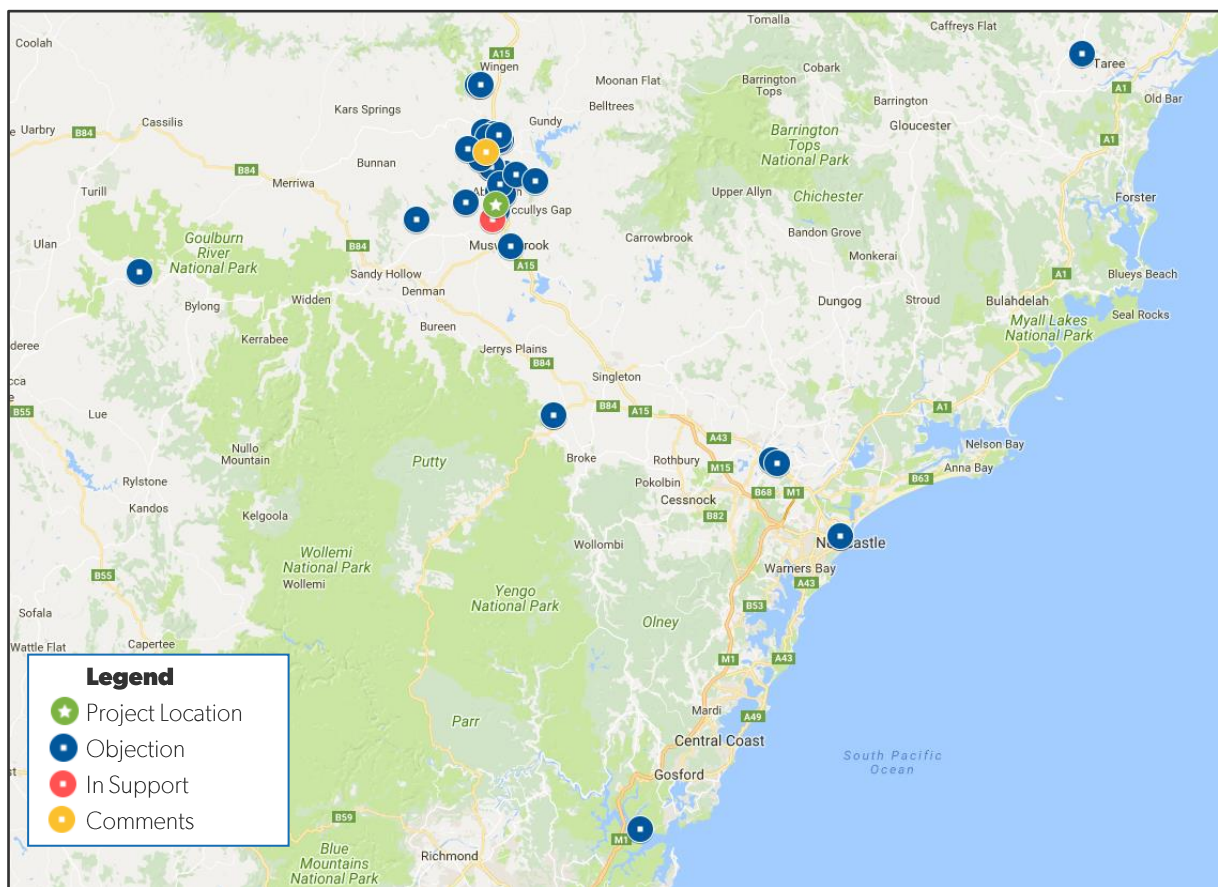


Figure 4 | Geographic distribution of public submissions

Key issues raised by objectors are summarised in **Figure 5** below. The primary concerns related to:

- the effect of the project on air quality and climate change, particularly in relation to cumulative impacts;
- concerns that the project would affect the availability and quality of local ground and surface water resources;
- social impacts associated with the project and concerns that the project is incompatible with the local character and identity of the Upper Hunter region, including its reputation for thoroughbred horse breeding, viticulture and tourism; and
- concerns about the potential for a future open cut coal mining project at the site.

Air Quality, Greenhouse Gases and Climate Change

The community was most concerned over the potential air quality impacts of the modification, with 81% of objectors raising this issue in submissions. A key concern focused on the cumulative impact that mining projects in the region have on dust generation, particularly in the Muswellbrook area. Other concerns raised related to the predicted exceedances of the annual average PM_{2.5} standard at some local residences. The Department acknowledges that air quality is significant concern for the community and has carefully considered the modification's health and amenity impacts in **Section 5.1**.

Several community members and SIGs objected to the modification on the grounds that additional coal mining would result in further greenhouse gas emissions, contributing to human-induced climate change. Many referenced the *Paris Agreement*, which sets out a global action plan between 195 countries to limit global warming and avoid climate change. The Department notes that the proposed modification would not significantly increase Dartbrook's allowable greenhouse gas emissions, as the resource has previously been approved for extraction (see **Section 5.8**).

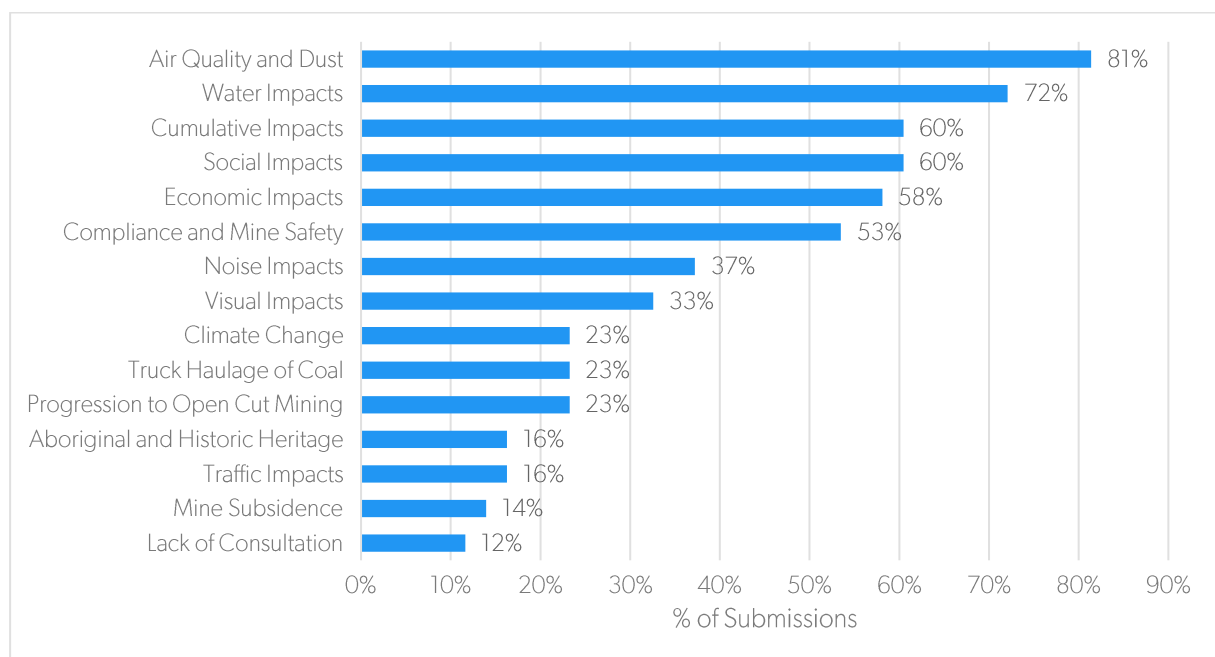


Figure 5 | Issues raised in community submissions objecting to the modification

Water Impacts

Several community members and SIGs raised concerns over the potential impacts of this proposal on water resources. Many submitters shared MSC's concerns regarding the potential impact on the highly productive alluvial aquifer. Many local residents and businesses rely on this water source for domestic, agricultural and/or livestock uses. Concerns were also raised over the cumulative effect of mining projects on regional groundwater levels, with reference to the Commonwealth's recent *Hunter Subregion Bioregional Assessment 2018*.

Submissions raised concern over the adequacy of the water assessment in the EA and a perceived non-compliance with the objectives of the *Water Management Act 2000*. Other concerns raised by the community included Dartbrook's water consumption and worsening water quality in the Hunter River. The Department's assessment of potential ground and surface water impacts is discussed further in **Sections 5.4** and **5.5**.

Cumulative Impacts

Several community members and SIGs raised concerns over the potential cumulative impacts of mining on human health and the environment.

Social and Economic Impacts

Social impacts were a key area of concern for the community. Many submissions raised concerns over insufficiencies in the EA's social impact assessment (SIA) and considered that it did not sufficiently address community concerns in line with the Department's *Social impact assessment guideline for State significant mining, petroleum production and extractive industry development* (SIA Guideline).

Many expressed concern that they did not want to see overdevelopment of coal resources in the Upper Hunter. Many highlighted the region's successful tourism, agriculture, viticulture and equine industries, which form a strong part of the regional identity. Some submitters expressed their concern regarding a perceived incompatibility of these local industries with coal mining, and that the regional identity may be jeopardised by approval of the modification.

Particular concerns were also raised over potential impacts on the Upper Hunter Equine Critical Industry Cluster (CIC), the thoroughbred breeding industry and general horse health. The Upper Hunter Equine CIC is a geographically mapped area of highly productive equine industries that contribute to the identity of the region and provide significant employment opportunities. The creation of this CIC in 2014 was aimed at protecting this highly productive industry cluster from negative impacts by coal seam gas and mining projects. The modification would not disturb any land mapped as CIC; however, the Department recognises that indirect impacts may still occur. Submissions highlighted that the equine industry relies on the Upper Hunter's clean water, clean air and topography for its success. The Department's assessment of social impacts is discussed further in **Section 5.6**.

Some SIGs also raised issues over the adequacy of AQC's economic assessment, including concerns that its capital costs were underestimated and its forecast coal prices overly optimistic. Submissions also questioned if the modification is feasible as a standalone project. The Department's assessment of economic impacts is discussed further in **Section 5.7**.

Progression to Open Cut Mining

The Department notes that AQC has publicly expressed a desire to investigate the feasibility of open cut mining at the site. Many submissions from both the community and SIGs expressed concern that, if approved, this modification would increase the likelihood of an open cut operation occurring at Dartbrook.

The Department acknowledges these concerns and notes that any potential open cut operation at Dartbrook would be subject to a separate State Significant Development application, supported by its own detailed Environmental Impact Statement. Approval of this modification does not presume the approval of any future development on the site.

Compliance and Mine Safety

Some members of the community expressed concern over the safety of the proposed mining operations, particularly given the history of operational difficulties and hazards associated with underground mining (geotechnical constraints, water management, gas and spontaneous combustion). AQC acknowledged in its RTS that one of its reasons in pursuing bord and pillar mining in the Kayuga seam is to avoid some of these issues. The Department notes that, since Dartbrook entered care and maintenance in 2006, the State has reformed its work health and safety legislation. The Resources Regulator regulates mine safety under the *Work Health and Safety Act 2011* and the *Work Health and Safety (Mines and Petroleum Sites) Act 2013* and associated regulations. Under this legislation, AQC is responsible for ensuring the safety of its workers and contractors and mining operations would be closely monitored by the Resources Regulator.

Other Issues

Other concerns were raised over:

- adequacy of the noise assessment;
- traffic safety impacts;
- flooding impacts;
- lack of consideration of visual impacts;
- coverage of the AACHIA; and
- lack of community engagement.

The Department considers that all submissions have been addressed in the RTS, additional information responses and/or this assessment report.



5. Assessment

The Department has assessed the merits of the proposed modification in accordance with the relevant objects and requirements of the EP&A Act. As part of this assessment, the Department has considered the:

- modification application and accompanying EA;
- agency advice, public submissions received and the RTS;
- additional information provided by the Applicant (see **Appendix E**);
- existing conditions of consent; and
- relevant EPIs, policies and guidelines.

A full list of relevant documents provided by AQC is provided in **Appendix A**. The Department considers that the key issues associated with the proposed modification are air quality, noise, social, economic, subsidence and water impacts. These matters are discussed below in **Sections 5.1 to 5.7**. Other minor issues are addressed in **Section 5.8**. The Department's recommended conditions are summarised in **Section 6**.

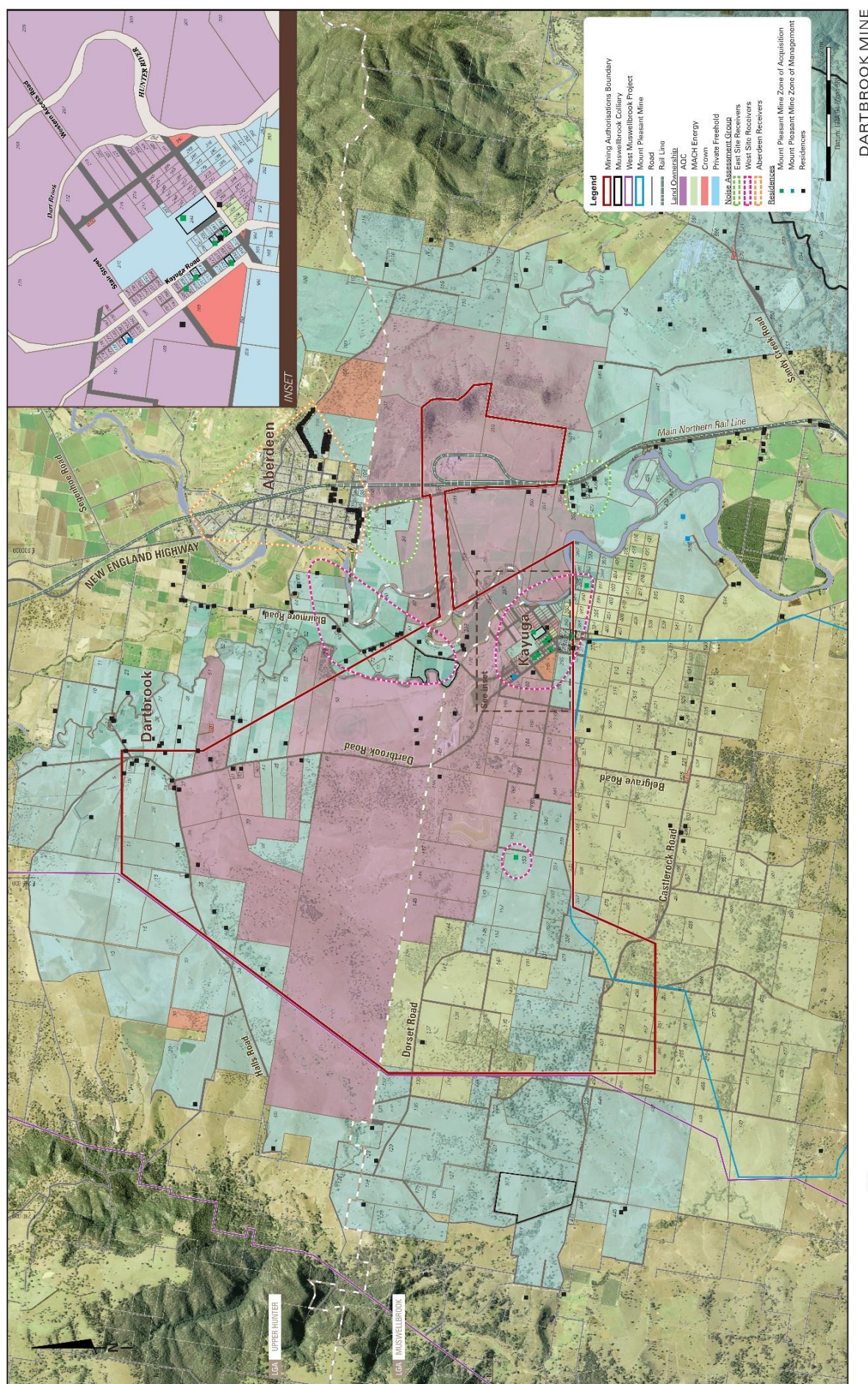
5.1 Air Quality

The proposed modification has the potential to increase air quality impacts (due to the additional surface coal handling) and to prolong these impacts (due to the 5-year extension). AQC's EA included an Air Quality Impact Assessment (AQIA) which considered these potential impacts in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (Approved Methods 2016).

The AQIA included predictions for particulate matter (TSP, PM₁₀ and PM_{2.5}) and deposited dust levels at nearby sensitive receivers, based on background data from 2014 when Bengalla, Mount Arthur Coal and Muswellbrook Coal were all operating at close to their maximum production rates. The AQIA also included predictions for Mount Pleasant, which was not in operation in 2014. These predictions were compared against the relevant criteria set out in the Approved Methods 2016 and the NSW Government's *Voluntary Land Acquisition and Mitigation Policy*.

Predicted Impacts

The AQIA predictions were that Dartbrook, as modified, would comply with all relevant criteria except for the cumulative annual average PM_{2.5} criterion of 8 µg/m³. This criterion would be exceeded at 12 receivers (11 residences and one vacant property) near Kayuga, including seven receivers with existing acquisition rights and one receiver with existing mitigation rights under Mount Pleasant's development consent (see **Table 4** and **Figure 6**).



The Department notes that these exceedances are largely due to high background levels already experienced in the area (approximately $7.6 \mu\text{g}/\text{m}^3$) which would be influenced by other coal mining operations and other sources in the region (particularly wood smoke from domestic heating, which peaks during the winter months). While Dartbrook's incremental contribution is small (<16%), it is enough to potentially trigger an exceedance of the cumulative criterion. Under the VLAMP, these receivers could be afforded voluntary acquisition rights from AQC. However, decisions about rights should only be made once the applicant has demonstrated that all reasonable and feasible avoidance and/or mitigation measures have been implemented.

Table 4 Predicted air quality criteria exceedances

Receiver ID	Cumulative Annual Average PM _{2.5} (Criterion = $8 \mu\text{g}/\text{m}^3$)		Afforded Rights under the VLAMP
	AQIA Prediction (attributable to Dartbrook)	Revised Prediction (attributable to Dartbrook)	
81A	8.1 (0.5)	7.8 (0.3)	-
81B	8.4 (0.7)	7.9 (0.3)	-
92	8.1 (0.4)	7.9 (0.3)	-
181*	9.2 (1.5)	8.2 (0.5)	Acquisition
Property 76	More than 25 %	More than 25 %	
212 [#]	8.9 (1.2)	Not provided	Acquisition if the same rights are no longer available under Mount Pleasant's development consent (DA 92/97)
228 [#]	8.6 (0.9)	Not provided	
238 [#]	8.8 (1.1)	Not provided	
242 [#]	8.7 (1.0)	Not provided	
244 [#]	9.1 (1.4)	Not provided	
374 [#]	8.4 (0.7)	Not provided	
391 [#]	8.1 (0.4)	Not provided	

* Existing mitigation rights under Mount Pleasant # Existing acquisition rights under Mount Pleasant

The dust controls initially proposed by AQC include:

- partially sealing the haul road (2.4 km sealed and 1.5 km unsealed) and turning bay at the new shaft site;
- covering haul trucks and limiting truck speeds between the Kayuga Entry and coal delivery shaft;
- constructing a shed around the ROM bin at the coal delivery shaft and installing water sprays;
- using automatic water sprays on all coal stockpiles and above-ground conveyor transfer points; and
- undertaking real time air quality monitoring.

As discussed in **Section 4**, the EPA and members of the community raised concerns over the AQIA's predicted air quality impacts and questioned if AQC had actually proposed to implement all reasonable and feasible dust controls. In response these concerns, AQC committed in its RTS to:

- sealing the remaining 1.5 km section of unsealed (gravel) haul road; and
- using additional water sprays on the coal stockpiles and all transfer (ie loading/unloading) points.

Revised PM_{2.5} predictions in the RTS (see **Table 4**) demonstrate that these controls would reduce emissions and that three receivers (81A, 81B and 92) would no longer trigger the cumulative annual average PM_{2.5} criterion. For the remaining nine receivers, the Department recommends that voluntary acquisition rights are afforded to 181 and 76 under the Dartbrook consent and that 212, 228, 238, 242, 244, 374 and 391 are also afforded acquisition rights in the consent but secondary to those already provided for in the Mount Pleasant consent.

Conclusion

The Department considers that AQC has proposed all reasonable and feasible avoidance and/or mitigation measures to minimise the modification's air quality impacts and that the residual impacts are acceptable, subject to complying with strict conditions.

Primary amongst these are the provision of acquisition rights to nine local receivers affected by PM_{2.5} air quality emissions, notwithstanding that the great majority of these emissions arise from other coal mining operations or other background sources.

Dartbrook's existing conditions of consent require AQC to comply with TSP and deposited dust criteria and to prepare a Dust Management Plan. The Department recommends that these conditions are updated to include contemporary air quality criteria (in line with the Approved Methods 2016), contemporary operating conditions and a new requirement to prepare a comprehensive Air Quality and Greenhouse Gas Management Plan.

The EPA considered the recommended conditions adequately addressed its previous concerns. With the addition of these revised and more stringent conditions, the Department considers that the air quality impacts of the modification could be appropriately managed and would not significantly change from those already approved.

5.2 Noise

The proposed modification has the potential to increase and prolong noise impacts. AQC's EA included a NIA which considered potential construction and operational noise impacts, in accordance with the *Interim Construction Noise Guideline* (ICNG) and *Noise Policy for Industry* (NPI).

Dartbrook's existing conditions include noise criteria for three noise receiver groups (see **Table 5** and **Figure 6**). Three individual receivers (86, 302 and 304) have existing acquisition rights for noise impacts. The Department understands that two of these receivers (302 and 304) have been acquired by AQC.

Table 5 Existing noise criteria (dB(A), Leq 15 minute)

Location	Day	Evening	Night
East Site receivers (includes receivers southwest of the East Site, just west of the New England Highway)	50	50	41
West Site receivers (includes receivers in Kayuga and receivers to the west and north off Blairmore Lane east of the Hunter River)	40	40	35
Aberdeen	49	42	40

Construction Noise

Construction of the coal delivery shaft and the road upgrades are expected to take approximately 16 weeks. During this time, AQC has committed to complying with criteria set out in the ICNG. Construction activities associated with the coal delivery shaft would comply with the ICNG's 'noise affected level', being operational Daytime noise criteria plus 5 dB(A) or 45 dB(A) for the West Site receivers and 54 dB(A) for Aberdeen. However, the proposed roadwork noise levels would exceed the West Site's 'noise affected level' at six receivers near Kayuga (181, 212, 228, 238, 242, 244) by up to 5 dB(A) (ie up to 50 dB(A)). East Site receivers are unlikely to be impacted by the proposed construction works.

The Department notes that the predicted construction noise levels would occur for a relatively short duration and that AQC has committed to only carry out roadworks during standard construction hours, ie 7 am to 6 pm Monday to Friday and 8 am to 1 pm on Saturdays. The Department also notes that AQC would apply reasonable and feasible mitigation measures in accordance with the ICNG. For these reasons, the Department considers that the

temporary construction noise is acceptable particularly given the long-term benefit provided by sealing the haul road, which would reduce both noise and dust emissions.

Operational Noise

The NIA's assessment of operational noise included noise modelling based on use of the alternate coal clearance system at the West Site and reduced processing at the East Site (ie not using the CHPP). AQC proposes several mitigation measures to reduce and manage operational noise, including:

- restricting ROM coal haul truck movements to day-time hours (7 am – 6 pm), Monday to Friday;
- ensuring trucks are registered as roadworthy and maintained in good condition;
- avoiding the use of compression release engine braking;
- imposing a haul road speed limit of 50 km/hr;
- partially enclosing the ROM bin at the new shaft site; and
- restricting crushing and stockpiling of ROM coal to day-time hours, Monday to Friday.

The NIA predictions demonstrate that the modified development could comply with its existing criteria, with the exception of five receivers in Aberdeen (represented by receivers 89 and 92) which could experience a 1 dB(A) exceedance above the night-time criterion of 40 dB(A) during prevailing weather conditions when the ROM stockpile dozer is operating at the same time as train loading (see **Table 6**).

Table 6 | Operational noise predictions at closest receivers compared to existing criteria (dB(A), Leq 15 minute)

Receiver ID	Location	Existing Criteria			Predicted Noise Level (prevailing weather)	
		Day	Evening	Night	Day	Evening/Night
303	East Site receivers	50	50	41	33	39
422		50	50	41	33	40
81A	West Site receivers	40	40	35	39	32
81B		40	40	35	40	33
181*		40	40	35	40	32
212^		40	40	35	35	34
228^		40	40	35	30	33
238^		40	40	35	32	34
242^		40	40	35	31	34
244^		40	40	35	39	35
89	Aberdeen	49	42	40	38	41
92		49	42	40	39	41
105		49	42	40	36	38

* Existing mitigation rights under Mount Pleasant # Existing acquisition rights under Mount Pleasant

AQC considers that these exceedances would be unlikely to occur and are negligible, and therefore do not warrant further noise mitigation measures. The Department accepts that a 1 dB(A) increase would be indiscernible to the average person and is therefore negligible in accordance with the VLAMP. The NIA further concludes that the modification is unlikely to generate notable annoying characteristics such as low frequency or tonal noise, nor is it expected to cause sleep disturbance.

The EPA recommended revised operational noise criteria, which include increasing the night-time criterion for Aberdeen to 41 dB(A) to align with the NIA's predictions and introducing a sleep disturbance criterion of 52 LA_{1,1min} for all noise groups. The Department accepts the EPA's recommended noise criteria and has recommended conditions accordingly.

Conclusion

The Department considers that AQC has proposed reasonable and feasible avoidance and/or mitigation measures to minimise the noise impacts of the modification and that the residual noise impacts are acceptable, subject to complying with strict conditions.

In addition to the proposed minor changes to noise criteria discussed above, the Department recommends that the noise-related conditions are updated to include contemporary operating conditions and a requirement to prepare a comprehensive Noise Management Plan. Under this plan, AQC would be required to implement best practice management measures to minimise the noise impacts of the development and to undertake real-time and supplementary attended noise monitoring to guide day-to-day operations and to evaluate noise performance.

With the addition of these revised and more stringent conditions, the Department considers that the operational noise impacts of the modification could be appropriately managed and that the limited increases over existing approved levels (see **Table 6**) would be negligible.

5.3 Subsidence

As described in **Section 2**, multi-seam longwall extraction is currently approved under DA 231-7-2000. Longwall extraction of the Wynn and Kayuga seams was undertaken up until 2006 when the mine was placed on care and maintenance. AQC is now proposing to continue extraction of the Kayuga seam using bord and pillar methods as an alternative to longwall mining methods (see **Figure 7**). AQC proposes to use the "in-place" bord and pillar method or first workings to extract up to 10 Mtpa of ROM coal. The Department understands that this method is being pursued to limit potential subsidence and subsidence impacts and to avoid some of the geotechnical issues previously experienced during longwall mining. A conceptual diagram of the proposed bord and pillar mining layout is shown in **Figure 8**.

AQC's EA included a specialist Subsidence Study by SCT Operations Pty Ltd to identify appropriate pillar designs to minimise subsidence and to ensure the workings remain stable over the long-term. To minimise subsidence (ie < 100 mm) and to avoid pillar instability, a factor of safety (FoS) of 2.11 was considered sufficient for coal pillars with more than 150 m of cover. Pillar size is relative to the depth of cover in order to ensure the FoS of 2.11 is maintained. As shown in **Table 7**, vertical subsidence is predicted to occur, however the estimated subsidence is always less than 100 mm and therefore unlikely to have any measurable impact on surface features.

Table 7 | General pillar design for Kayuga seam (southern panels)

Depth of Cover (m)	Pillar Size (m)	Maximum Estimated Subsidence (mm)
>150	23	30
160	29.5	60
180	31.5	60
200	33	70
220	34.5	80
240	36	80

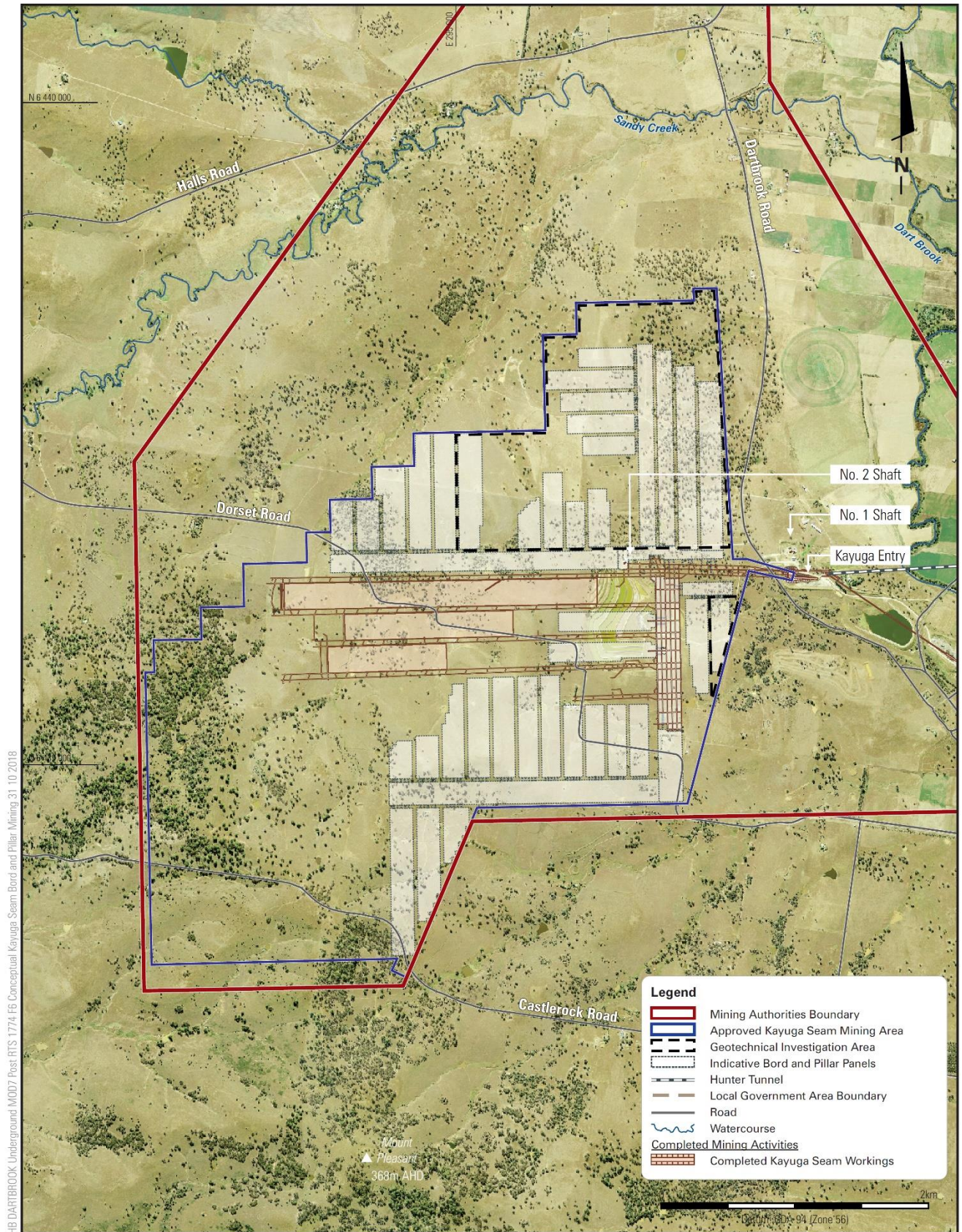


Figure 7 | Proposed Kayuga seam bord and pillar extraction area

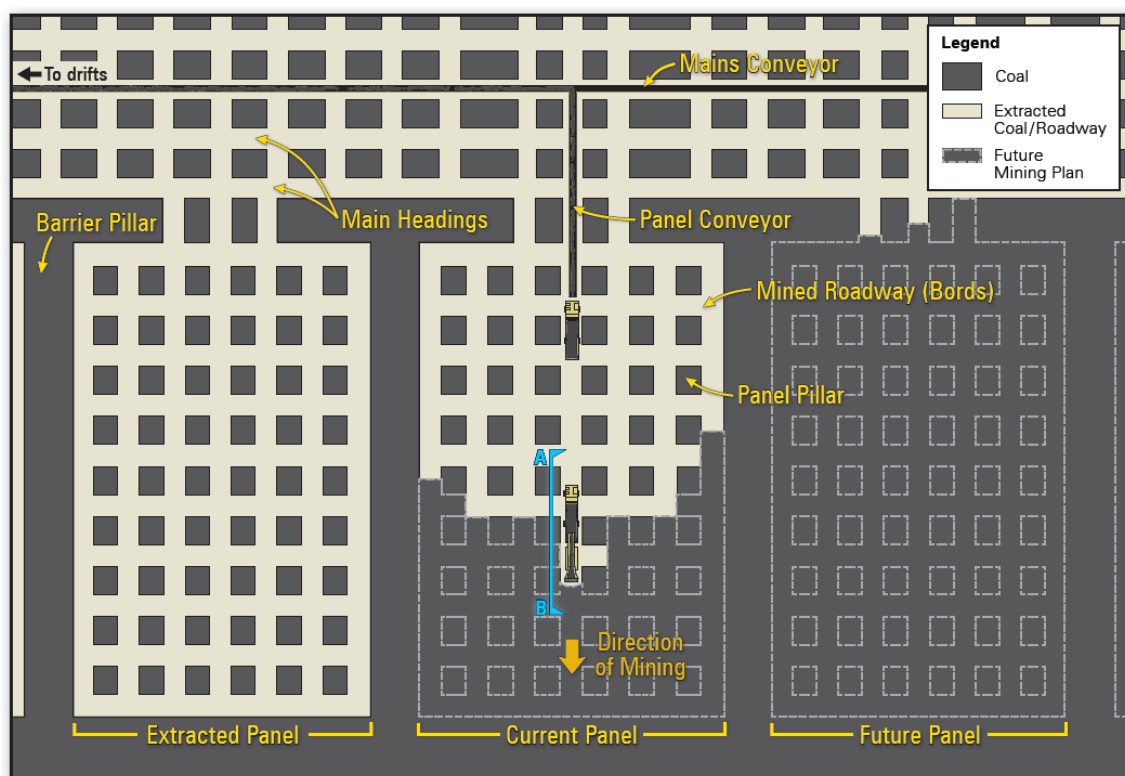


Figure 8 | Conceptual plan view of bord and pillar mining

Table 8 compares predicted subsidence for approved longwall extraction versus proposed bord and pillar extraction. Bord and pillar extraction would result in a 2 m reduction in predicted vertical subsidence, with associated reductions in predicted tilts and strains.

Table 8 | Proposed subsidence impacts compared to approved

Mining Method	Predicted Maximum vertical subsidence (m)	Predicted Maximum tilt (mm/m)	Predicted Maximum Tensile strain (mm/m)	Predicted Maximum Compressive Strain (mm/m)
Bord and Pillar (Proposed)	<0.1	Negligible	Negligible	Negligible
Longwall Mining (Approved)	2.2	61.0	13.5	20.3

However, in the northern area, where extraction overlies the former and already subsided (up to 1.6 m) Wynn seam longwall panels, the pillar dimensions would need to be more carefully designed to limit surface subsidence to <100 mm. AQC proposes to undertake further geotechnical investigations using numerical modelling, exploration boreholes and exploratory in-seam headings to better understand the existing stress conditions so that the pillar dimensions can be carefully designed. To ensure this is achieved the Department has recommended a condition requiring AQC to undertake this geotechnical study prior to mining in this area.

Conclusion

The Department considers that proposed modification would result in significant reductions in approved subsidence and therefore greatly-reduced subsidence impacts and environmental consequences. The Department notes that the Resources Regulator did not raise any concerns.

Nevertheless, because AQC is proposing to retain its approval for longwall mining, the Department has taken the opportunity to contemporise all relevant conditions of consent to include second workings subsidence impact

performance measures for both natural and built features, and to replace the existing Property Subsidence Management Plan with a more comprehensive and contemporary requirement to prepare Extraction Plans¹ for all second workings (ie longwall extraction).

5.4 Groundwater

AQC's EA included a specialist Groundwater Impact Assessment (GIA) to assess the potential impacts of the modification on local groundwater resources. These resources are characterised by three aquifer systems: a productive alluvial aquifer system, weathered bedrock (regolith) aquifer and a less productive, saline Permian hard rock aquifer. Previous longwall mining has reduced groundwater levels and pressures within the regolith and Permian aquifer; however, the alluvium has remained unaffected.

Alluvial Aquifer

The alluvium should continue to remain unaffected by underground mining. The alluvium is constantly recharged by surface water from rainfall and regulated releases of the Glenbawn Dam into the Hunter River. The majority of private bores in the area access water from the alluvium. The modification is not expected to cause any detectable drawdown in these shallow aquifers, particularly as the bord and pillar mining method would not result in any significant fracturing of overburden strata.

The proposed location of the coal delivery shaft is on the fringe of the Hunter River alluvium and it is unclear whether the alluvium at this location contain any water. As discussed in **Section 4.3**, AQC has committed to drilling a test bore and installing appropriate sleeving or casing if alluvial groundwater is present, in order to prevent seepage from the aquifer into the Hunter Tunnel.

Existing seepage from the Hunter River alluvium into the Hunter Tunnel is expected to continue at a rate of 156 ML/year, regardless of the modification. To account for this take, AQC currently holds a WAL under the Hunter Unregulated – Hunter Regulated River Alluvial Water Source.

Permian Aquifer

Under the proposed bord and pillar mining method, the Permian groundwater system would continue to experience drawdown, albeit to a lesser degree than from the approved longwall mining. Previous modelling of longwall mining impacts identified five private bores within the modelled 1 m drawdown contour of the 'less productive' porous rock aquifer. AQC would continue to monitor these bores and provide compensatory measures if impacts are identified.

The GIA also included a water balance for the Wynn seam goaf to ensure that there is sufficient capacity to store Permian groundwater seepage from the existing and proposed workings in the Kayuga seam. The Wynn seam goaf plays an important role in water management for the mine. Groundwater seepage into the Hunter Tunnel and existing underground workings is stored in the Wynn seam goaf along with excess surface water (see **Figure 9**). This water is either pumped to the surface facilities for operational use or passively released using evaporation ponds.

The GIA identifies that groundwater seepage into the Kayuga bord and pillar workings would be substantially less than in respect of the approved longwall extraction. The predicted groundwater take from drawdown and seepage of the Permian aquifer is expected to be <20 ML/year. To account for this take, AQC currently holds a WAL for 180 units, under the North Coal Groundwater– Sydney Basin-North Coast Groundwater Source.

¹ Extraction Plans provide a detailed assessment process describing how the performance measures for natural and built features would be achieved and the management and/or mitigation measures to be applied.

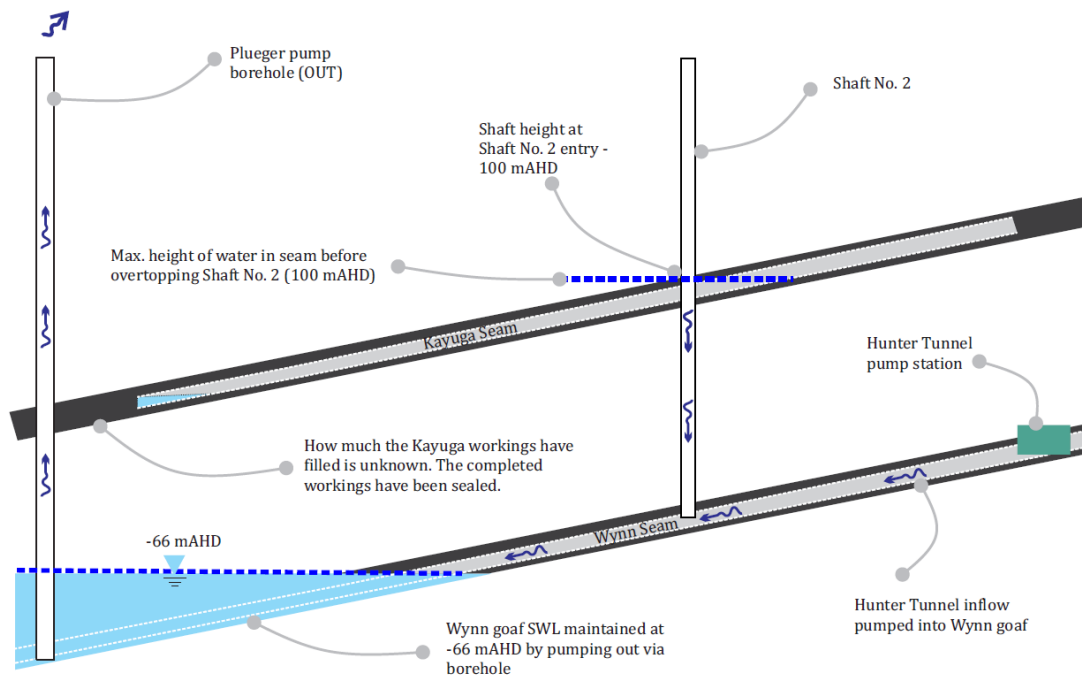


Figure 9 | Conceptual groundwater management system

Conclusion

The Department considers that the proposed modification would result in substantially reduced groundwater seepage and drawdown than already approved to take place during longwall mining. The Department is also satisfied that AQC has sufficient WALs to account for all licensed water take.

AQC has committed to updating its Site Water Management Plan. The Department agrees that this should be updated prior to recommencing activities on the site. The Department has also recommended that AQC comply with contemporary water performance measures and expand the Site Water Management Plan to include specific impact assessment criteria, a description of the water management system and a water balance. The Department has also recommended conditions to clarify AQC's compensatory water supply obligations and to ensure sufficient water is available for its operations, or else that it scales its operations accordingly.

5.5 Surface Water and Flooding

The modification is unlikely to result in additional surface water impacts or necessitate changes to the existing water management system. AQC has sufficient water supply to fulfil the demands of the modification. In the event that additional water is required, Dartbrook holds WALs to extract 3,053.8 ML from the Hunter Regulated River Water Source. Any excess water may also be discharged from the site through AQC's Hunter River Salinity Trading Scheme (HRSTS) credits, although the preferred water management strategy is to store surplus water within the Wynn seam goaf or release through evaporation.

As discussed in **Section 4.3**, the proposed delivery shaft is located within the 100 ARI and PMF flood events associated with the Hunter River and Dart Brook. OEH raised concerns over the proposed location of the shaft and the risk to human life should the shaft be inundated by floodwaters. To minimise these risks, AQC has proposed to construct a bund or elevated mound to protect the shaft and ancillary infrastructure from any 100 ARI flood event, to cover the shaft and to prepare an emergency evacuation procedure to ensure worker safety.

While OEH remains concerned with the location of proposed delivery shaft, the Department considers that AQC has proposed all reasonable and feasible measure to mitigate flood risks. Due to the location and dip of the Hunter

Tunnel there is no better placement for the proposed delivery shaft. The only alternative would be to not construct the shaft and instead to haul ROM coal across the New England Highway to the East Site. The Department understands that AQC did not pursue this option due to the likely road safety impacts.

The Department has recommended a condition requiring AQC to prepare a Flood Response Plan prior to construction of the delivery shaft to mitigate any flood safety risk to on-site personnel.

5.6 Social

The Department's *Social Impact Assessment Guideline for State Significant Mining, Petroleum Production, and Extractive Industry Developments* (SIA Guideline) applies to modifications where the social impacts are new or different (in terms of scale and/or intensity) to those approved under the original consent. AQC did not initially provide a SIA for the proposed modification. This absence of an SIA was a key concern for the community and the Department therefore requested that AQC prepare an SIA, particularly given the length of time that had passed since social impacts were last considered (in 2000) and that mining operations are proposed until 2027.

AQC provided an SIA in its RTS. The SIA considered the social impacts and opportunities relating to the modification on the local communities of Kayuga, Dartbrook and Aberdeen, extending out to the regional communities of Scone and Muswellbrook. AQC anticipated that the workforce required for the modification would be drawn from these communities, and these communities are also likely to experience the most direct impacts and opportunities.

Importantly, the identified potential impacts and opportunities are compared with the development's current care and maintenance status rather than the approved project, as it assumes that recommencing longwall mining operations, as approved, is not currently feasible. As the mine has been in care and maintenance for some time, this comparison also gives a better indication of how the community would actually experience the proposed modification.

Opportunities

The SIA identified the following potential social opportunities of the modification:

- creation of up to 26 construction jobs, for which AQC is targeting 5 local hires (LHs) and 21 non-local hires (NLHs);
- creation of up to 88 operational jobs, for which AQC is targeting 70 LHs and 18 NLHs;
- use of LHs would reduce the local unemployment rate and minimise additional demand on community infrastructure and services;
- support for local and regional businesses through direct and indirect procurement; and
- provision of additional revenue for Muswellbrook and Upper Hunter LGAs through VPA development contributions.

Impacts

The SIA identified the following potential social impacts arising from the modification:

- reduced accessibility to private rental accommodation for low to moderate income households due to competition from permanent operational NLHs moving to the area;
- reduced availability of short-term accommodation for competing local industries, businesses and tourists due to competition from temporary construction NLHs staying in the area;
- minor changes in residential amenity for near-neighbours in Kayuga and Aberdeen due to audible operational and construction noise, dust emissions and cumulative mining impacts; and
- emigration of some near-neighbours and Aberdeen residents to avoid potential impacts.

Public submissions and the SIA identified that the local communities are highly concerned over potential impacts to their amenity, health and well-being, particularly from mine-related dust and noise emissions. While specialist studies indicate that these impacts would be acceptable and manageable in accordance with standards set under NSW Government policy, community perceptions of these impacts are notably worse.

Proposed Mitigation and Management

To mitigate and manage the potential negative impacts of the modification, AQC has proposed to:

- implement VPAs with each council to provide public benefit contributions to maintain or improve local facilities and services;
- provide community sponsorships through AQC's Corporate Sponsorship and Donations Fund;
- continue operation of the Dartbrook Mine Community Consultative Committee (CCC) which provides a regular platform to raise and address community concerns;
- offer direct communication with near-neighbours;
- continue distribution of the Dartbrook Newsletter to near-neighbours and Aberdeen community;
- develop a complaints handling protocol;
- preferentially source local content including local employment, supplies and services;
- consult with local real estate agents and short-term accommodation providers to prepare for and manage additional housing demand from NLHs; and
- prepare a community and stakeholder engagement strategy in the lead up to eventual mine closure.

With regards to the VPA, the Department understands that AQC has made formal VPA offers to both councils to and that both councils have accepted these terms, in principle.

The terms of the VPA offer to MSC include a \$0.068 per tonne levy on product coal to be used towards public infrastructure and services, \$10,000 per annum to be used towards an Environmental Officer, a commitment to hire and train two local apprentices and a commitment to contribute to the revision of the *Muswellbrook Western Roads Strategic Traffic Study* and any relative upgrades identified in this study.

The terms of the VPA offer to UHSC include a \$100,000 per annum community enhancement fund to be used towards public infrastructure and services, \$10,000 per annum to be used towards an Environmental Officer and a commitment to hire and train two local apprentices.

Conclusion

The Department notes, that due to the long period of inactivity at Dartbrook (ie 10+ years of care and maintenance), any recommencement of mining operations, regardless of the modification, would lead to social impacts. While the modification itself represents a minor alteration to an approved underground mine, the social impacts actually experienced would be more akin to a new mine opening. AQC has appropriately considered the social impacts in this context. AQC has proposed a number of mitigation measures and community enhancement strategies to minimise these social impacts and maximise the local benefits of the mine. In addition to the measures proposed by AQC, the Department considers that the following recommended conditions would further ensure that social impacts are minimised:

- if a private landowner considers that the relevant air quality or noise impact assessment criteria have been exceeded on their land, they may request that an independent review is undertaken to verify compliance or else to implement mitigation measures to ensure compliance moving forward;
- AQC must provide compensatory water supply to any private landowner whose rightful water supply is adversely and directly impacted by the development (see **Section 5.4**);

- AQC must prepare an Environmental Management Strategy that sets out the procedures to be implemented to keep the local community informed about the operation and environmental performance of the development, to receive, record, handle and respond to complaints, and to resolve any disputes that may arise during the course of the development;
- AQC must continue to operate the Dartbrook CCC in line with the Department's 2016 *Community Consultative Committee Guidelines: State Significant Projects*; and
- AQC must enter into VPAs with MSC and UHSC within six months of approval of this modification, based on the terms described above.

5.7 Economic

AQC's EA included an Economic Impact Assessment (EIA) that included a cost benefit analysis (CBA) and local effects analysis (LEA), prepared in accordance with the Department's 2015 *Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals*. The EIA considered the proposed modification's economic costs and benefits to NSW relative to the base case, being continued care and maintenance and mine closure in 2022 (ie the same approach used in the SIA).

Key inputs to the EIA include capital expenditure of \$15 million, opportunity costs of \$35 million, operating costs of \$59.5 million per annum (less care and maintenance costs) and revenue of \$95 million per annum.

Cost Benefit Analysis

AQC estimates that the proposed modification would generate an overall benefit to NSW of \$130 million net present value (NPV), assuming a discount rate of 7%, including \$38 million NPV in royalties over the proposed 10-year life of the modification (see **Table 9**). DRG separately verified that the predicted royalty estimates were reasonable based on the proposed production rate, bypass coal quality, thermal coal price assumptions and allowable royalty deductions.

As can be seen from Table 6, the indirect environmental, social and transport-related costs are not significant enough at a State-wide level to materially impact the CBA.

Table 9 Costs and benefits of the modification to NSW

Aspect	\$ million (present value)	Attributable Group
Benefits to NSW		
Royalty payments	38	State of NSW
Other benefits (net producer surplus and company tax)	44	AQC and its NSW shareholders State of NSW
Indirect benefits (net benefits to workers, landowners and suppliers)	49	Regional and State suppliers and State of NSW
Total	131	
Costs to NSW		
Groundwater (cost of WALs)	0.01	
Greenhouse gas emissions (369 Mt CO ₂ -e of Scope 1 and 2 emissions)	0.1–0.4	Local and NSW households
Air quality - particulate emissions	Minor cumulative exceedances	Adjacent local landowners
Ambient noise	No material impact	Adjacent local landowners
Surface water	No material impact	AQC
Transport	No material impact	Local residents
Subsidence	No material impact	AQC and adjoining landholders

Biodiversity	No material impact	Local and NSW households
Aboriginal heritage	No material impact	Aboriginal people and other local and NSW households
Historic heritage	No material impact	Local and NSW households
Visual amenity	Limited views of shaft site from New England Highway	Motorists on the New England Highway
Agriculture	AQC owned dairy farm - no impact on profitability	AQC
Net public infrastructure costs	No material impact	NSW Government and NSW households
Loss of surplus to other industries	No material impact	NA
Total Costs	0.41	
Net Benefit to NSW	130.59	

A sensitivity analysis of the CBA indicates that it is most sensitive to changes in revenue (ie production rate, coal price and USD/AUD exchange rates). Even under the worst-case revenue scenario, the project would still result in a net benefit of \$71 million NPV.

Local Effects Analysis

The LEA followed a similar framework to the CBA but focused on the net economic impacts to the local area (ie Singleton, Muswellbrook and Upper Hunter LGAs). The findings of the LEA identified that the local area would be better off with the modification, due to the incremental expenditure by LHs (see **Table 10**) and non-labour expenditure of \$25 million NPV to local suppliers. Even at this smaller scale, the indirect environmental costs would have minimal material impact on the LEA.

Table 10 Summary of employment and local effects

Aspect	Year 1 Construction	Year 2 – 5 Operations	Year 6 – 10 Operations
Employment in region	26	88	99
LHs	5	70	76
Average increase in disposal wages from LHs	\$0.17 m	\$2.30 m	\$2.50 m
Incremental direct effects to the local economy			
Output	\$9.5 m	\$89.3 m	\$94.8 m
Value-added	\$3.1 m	\$52.4 m	\$53.7 m
Gross income			
<i>Generated in region</i>	\$3.1 m	\$10.6 m	\$11.9 m
<i>Paid to labour residing in region</i>	\$0.6 m	\$8.4 m	\$9.2 m

Conclusion

The CBA and LEA demonstrate that the modification would provide net benefits at both a State and local scale. The Department considers that the most affected communities of Kayuga and Aberdeen would be compensated by way of direct mitigation/acquisition by AQC or indirect community enhancement funding through the VPAs.

The Department acknowledges that public submissions raised significant concerns over the financial viability of the modification and AQC's motives for potentially reopening and running Dartbrook at a loss. AQC's EIA and the Department's assessment focus on the net benefits of the modification to the NSW community rather than to AQC and its shareholders. While the profitability of a project does have flow-on benefits to NSW by way of company

tax, the Department generally does not consider the applicant's financial model as it is ultimately a business decision (rather than a public decision) to proceed with the proposal. Regardless, for this modification, the key source of benefits to NSW is coal royalties which are paid based on revenue rather than profits.

5.8 Other Issues

Consideration of other minor assessment issues is set out in **Table 11**, below.

Table 11 | Other assessment issues

Issue	Findings	Recommendation
Biodiversity	<ul style="list-style-type: none"> Construction of the new shaft site would require 2.28 ha of surface disturbance, on land covered by exotic grassland with minimal habitat value. AQC notes that it would update its existing Flora and Fauna Management Plan to detail: <ul style="list-style-type: none"> the extent of vegetation clearance; weed control measures; and site inductions for employees and contractors. The Department notes that the modification would not result in any additional subsidence. Any subsidence-related biodiversity impacts would be reduced compared to the approved project. OEH is satisfied with the EA's assessment of biodiversity impacts. 	<ul style="list-style-type: none"> The Department considers that the modification is unlikely to result in any significant impacts on biodiversity. Department recommends that AQC update its Flora and Fauna Management Plan prior to recommencing activities on the site. The Department has also recommended that AQC prepare an Extraction Plan for any future second workings including a Biodiversity Management Sub-Plan to manage any subsidence-related impacts or environmental consequences to biodiversity.
Contaminated Land	<ul style="list-style-type: none"> The proposed new shaft site is located on land currently used by the Garoka Dairy for grazing. The modification would therefore result in a change of land use from agriculture to mining purposes. As this land has been subject to potentially contaminating agricultural activities (such as cattle dips), the relevant provisions under SEPP 55 apply to this modification. AQC considers that it is unlikely that this land has been contaminated and that the former agricultural activities are unlikely to affect the suitability of the land for the proposed ancillary mining infrastructure. To minimise potential contamination issues, all soil excavated during construction would be reused as fill material (ie no material taken off site). Further, erosion and sediment controls would be established to divert clean runoff around the disturbed area, as well as capture sediment laden water. 	<ul style="list-style-type: none"> The Department considers that new shaft site is unlikely to contain contaminated land and no further conditions are considered necessary.
Visual Impacts	<ul style="list-style-type: none"> The proposed new shaft site would be located on AQC-owned land just west of the New England Highway and Main Northern Railway Line. Travelers along this transport corridor would have fleeting views of the site; however, their visual sensitivity would be 	<ul style="list-style-type: none"> The Department accepts that the visual impacts of the new shaft site and haul road would be minor and able to be mitigated. Existing conditions of consent require AQC to prepare a Landscape Management Plan that includes a landscaping strategy to screen views of

Issue	Findings	Recommendation
	<p>low due to their travel speeds and intervening vegetation.</p> <ul style="list-style-type: none"> AQC has committed to enclosing the shaft and ROM coal bin with a Colourbond shed, similar to those commonly used in the area for agricultural or industrial uses. A suitable colour for the shed enclosure would be selected in consultation with MSC. 	<p>the site from the New England Highway and to design and construct new buildings/ structures to present a neat and orderly appearance and to blend as far as practicable with the surrounding landscape.</p> <ul style="list-style-type: none"> Under the recommended conditions of consent, AQC would have to update its Landscape Management Plan prior to recommencing activities on the site. The Department considers that these conditions remain appropriate for the modification and that no additional conditions are required.
Greenhouse Gas Emissions	<ul style="list-style-type: none"> AQC estimates that, over the 10-year life of the modification, it would emit approximately 3.69 Mt CO₂-e from electricity use and fuel consumption (ie Scope 1 and 2 emissions). 	<ul style="list-style-type: none"> Given that the modification generally represents a continuation of existing mining operations, the Department considers that the predicted greenhouse gas emissions would be similar to the approved project. Nevertheless, the Department recommends that AQC continue to investigate and implement measures to minimise greenhouse gas emissions, such as improving energy efficiency and/or reducing fuel consumption. AQC would be required to document these measures in a new Air Quality and Greenhouse Gas Management Plan (see Section 5.1), and report on the effectiveness of these measures in its Annual Review.
Aboriginal Cultural Heritage	<ul style="list-style-type: none"> The AACHIA in the EA found that there were no identified Aboriginal sites in or near the new shaft site and that they were unlikely to be present due to the highly modified nature of the land. As discussed in Section 4.3, following advice from OEH, AQC learned that its records of known Aboriginal sites may not be up-to-date and that there remained extant sites in the vicinity of the proposed roadworks. AQC has committed to protecting these extant sites from construction works and to preparing an unexpected finds protocol within its Aboriginal Cultural Heritage Management Plan required for the development. OEH is satisfied with this approach and recommended that the Aboriginal Cultural Heritage Management Plan be updated in line with its current guidelines. 	<ul style="list-style-type: none"> The Department considers that the modification is unlikely to impact any Aboriginal cultural heritage and agrees that the Aboriginal Cultural Management Plan should be updated prior to recommencing activities on the site.



6. Recommended Conditions

The Department has recommended conditions of consent to specifically address the environmental, economic and social impacts of the proposed modification. These recommendations are summarised in **Table 12**.

Table 12 | Summary of recommended conditions to address key issues

Issue	Recommended Conditions
<ul style="list-style-type: none"> Air Quality <ul style="list-style-type: none"> Cumulative impacts of mining; Health and amenity impacts; and Climate change 	<ul style="list-style-type: none"> Updated air quality criteria to be consistent with the Approved Methods 2016 for PM₁₀, PM_{2.5} and TSP, including procedures for voluntary acquisition for receivers subject to potential exceedances of the PM_{2.5} criterion (see Section 5.1). Revised operating conditions to ensure that mitigation measures proposed are implemented and monitoring is undertaken so compliance with air quality criteria can be demonstrated. AQC are to describe these measures in an Air Quality and Greenhouse Management Plan, to be approved prior to recommencing mining operations. These conditions address cumulative impacts, amenity and health concerns.
<ul style="list-style-type: none"> Noise <ul style="list-style-type: none"> Amenity impacts 	<ul style="list-style-type: none"> Condition requiring AQC to manage construction noise in accordance with the ICNG. Updated noise criteria reflecting the modification. One receiver retains acquisition rights. Relevant procedures updated to reflect contemporary drafting standards. Revised operating conditions to ensure AQC uses all reasonable and feasible measures to reduce noise emissions, and frequent monitoring undertaken to show compliance with noise criteria. Mitigation measures and monitoring program must be described in the recommended Noise Management Plan. These conditions address amenity issues associated with noise from the site.
<ul style="list-style-type: none"> Subsidence <ul style="list-style-type: none"> Compliance and mine safety Water Impacts 	<ul style="list-style-type: none"> While bord and pillar mining would result in reduced subsidence, AQC would retain approval for longwall mining, subject to new performance criteria for both natural and built features, consistent with contemporary condition standards for longwall mining. Extraction Plans include several sub-management plans to outline performance criteria for specific features and mitigation and management measures that would be undertaken to ensure the criteria are met. Specific to the modification, a condition requiring AQC to undertake a pillar design geotechnical study before mining in the northern area.
<ul style="list-style-type: none"> Water <ul style="list-style-type: none"> Cumulative impacts of mining on water resources Hunter River water quality 	<ul style="list-style-type: none"> AQC would retain the ability to undertake longwall mining. The proposed bord and pillar mining would have a reduced impact on water resources compared to longwall mining, leading to updated conditions outlining water management performance measures and compensatory water supply. Conditions requiring AQC to ensure it has sufficient water for all stages of development and to report on any water extracted from the site each year. These conditions would provide safeguards to water resources should longwall mining recommence, while also ensuring management measures are in place for bord and pillar mining.
<ul style="list-style-type: none"> Flooding 	<ul style="list-style-type: none"> To address potential flood risks, a condition requiring AQC to prepare and implement a Flood Response Plan which would describe flood risks and mitigation and management procedures to mitigate these risks and ensure the safety of on-site personnel.

Issue	Recommended Conditions
<ul style="list-style-type: none"> Coal Transport <ul style="list-style-type: none"> Air and Noise Emissions Road Safety 	<ul style="list-style-type: none"> Conditions including: <ul style="list-style-type: none"> limiting the annual tonnage of ROM coal that can be transported on the haul road; restrict operating hours for coal haulage; and requiring the entire length of haul road to be sealed. These changes reflect AQC's commitments, limit impacts and provide certainty to the community.
<ul style="list-style-type: none"> Rehabilitation 	<ul style="list-style-type: none"> Contemporary updates to the rehabilitation objectives.
<ul style="list-style-type: none"> Aboriginal heritage 	<ul style="list-style-type: none"> Updates to the existing Archaeology and Cultural Heritage Management Plan to reflect OEH's recommendations.
<ul style="list-style-type: none"> Social and Economic 	<ul style="list-style-type: none"> Revised VPA conditions with each Council, the specifics of which are included as a separate appendix.
<ul style="list-style-type: none"> Bushfire Management 	<ul style="list-style-type: none"> Additional safety requirements to align with best practice.

Additionally, the Department has taken this opportunity to recommend replacement of out-dated conditions and/or new conditions to reflect contemporary drafting standards and best practice, as summarised in **Table 13**.

Table 13 | Summary of recommended administrative conditions

Issue	Recommended Conditions
<ul style="list-style-type: none"> Definitions 	<ul style="list-style-type: none"> Updates to several definitions to either reflect the modification or clarify or update previous definitions.
<ul style="list-style-type: none"> Agency names 	<ul style="list-style-type: none"> Agency names are updated to ensure consultation and any other requirements are undertaken correctly.
<ul style="list-style-type: none"> Timing 	<ul style="list-style-type: none"> Conditions are updated to require submission and/or approval of documents prior to recommencing mining. Changes are recommended to extend the project life by five years.
<ul style="list-style-type: none"> Compliance, Monitoring and Management 	<ul style="list-style-type: none"> To reflect contemporary drafting standards, updates and/ or revisions to: <ul style="list-style-type: none"> overall environmental management of site, including staging or combining management plans, consulting with stakeholders and revising existing management plans; requirements for independent environmental audits; requirements for an on-site meteorological station to enable compliance with the Approved Methods 2016 and NPfl; requirements for Annual Reviews; reporting of incidents and non-compliances; operation of a Community Consultative Committee; and providing information to stakeholders.
<ul style="list-style-type: none"> References 	<ul style="list-style-type: none"> Updating of references to other conditions as appropriate, legislation and policies.
<ul style="list-style-type: none"> Schedules 	<ul style="list-style-type: none"> Updates to sensitive receiver locations and development layouts, reflecting the modification.



7. Evaluation

The Department has assessed the merits of the proposed modification having close regard to concerns raised by the community and advice provided by key Government agencies. The Department acknowledges that the proposed modification is straightforward in scope but complicated by the fact that Dartbrook has been in care and maintenance for the last 12 years and that AQC has publicly announced its intentions to investigate open cut mining opportunities at the site. While Upper Hunter Valley is known for its coal mining developments, Dartbrook is located on the northern extremity of this region, and members of the local communities (within 25 km of Dartbrook) comprised approximately 80% of submitters objecting to the potential reopening of Dartbrook. However, the Department must note that other members of the local community are likely to accrue socio-economic benefits (especially jobs and related income) from the proposal.

While a modification is not required to recommence operations, this modification would facilitate an earlier and more cost-effective reopening of the mine, albeit at the cost of recovering less coal. The proposed bord and pillar mining method would reduce the mine's subsidence and groundwater impacts compared to the presently approved longwall mining method. However, the proposed alternate coal clearance system and associated surface truck haulage would marginally increase air quality and noise impacts compared to the approved Hunter Tunnel coal clearance system. Nevertheless, the proposed modification would not result in any significant adverse impacts.

On balance, the Department considers that the modification's benefits would outweigh its costs and that the modification would improve the overall viability of the mine by enabling underground mining operations to recommence, thereby allowing its potential social and economic benefits to be realised.

The Department concludes that the impacts of the modification are acceptable and the proposal is approvable, subject to the proposed recommended conditions of consent. The Department has taken this opportunity to contemporise much of the consent to align with current drafting standards rather than the standards set when the consent was last modified in 2005. The recommended conditions represent current best practice for the regulation of open cut coal mining projects in NSW and provide a high level of protection for the local environment and the amenity and health of the local community.

This assessment report is hereby presented to the Commission for determination.

Endorsed by:

Howard Reed

Director

Resource Assessments

22.1.19

Endorsed by:

Ben Harrison

A/ Executive Director

Resource Assessments and Compliance

23.1.19.



Appendices

Appendix A – Relevant Supporting Information

Dartbrook Mine Modification 7 Environmental Assessment, Hansen Bailey, June 2018

Dartbrook Mine Modification 7 Response to Submissions, Hansen Bailey, August 2018

Dartbrook Mine Modification 7 Additional Information Letter, Hansen Bailey, 12 October 2018

Dartbrook Mine Modification 7 Additional Information Economic Impact Assessment Letter, Gillespie Economics, 16 October 2018

Dartbrook Mine Modification 7 Additional Information Letter, Hansen Bailey, 26 October 2018

Dartbrook Mine Voluntary Planning Agreement Letter to Muswellbrook Shire Council, Australian Pacific Coal, 9 November 2018

Dartbrook Mine Modification 7 Response to Issues Raised by OEH Letter, Hansen Bailey, 13 November 2018

Dartbrook Mine Voluntary Planning Agreement Letter to Upper Hunter Shire Council, Australian Pacific Coal, 19 September 2018, as amended by email from James Bailey of 21 November 2018

Dartbrook Mine Modification 7 Inquiries Regarding the Proposed Shaft Facility, Hansen Bailey, 6 December 2018

Dartbrook Mine Modification 7 Consideration of SEPP 55 email, Hansen Bailey, 7 December 2018

Appendix B – Environmental Assessment

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=9157

Appendix C – Submissions

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=9157

Appendix D – Response to Submissions

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=9157

Appendix E – Additional Information

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=9157

Appendix F – Notice of Modification

Appendix G – Consolidated Consent