HTBA
HUNTER THOROUGHBRED BREEDERS ASSOCIATION

HUNTER VALLEY THOROUGHBRED BREEDING INDUSTRY ECONOMIC SIGNIFICANCE

Internationally Significant	
1 of 3	International Centres of Thoroughbred Breeding Excellence in the World – alongside Kentucky in the USA and Newmarket in the UK
Largest	Concentration of thoroughbred studs in the world outside Kentucky USA
Largest	Australian producer & supplier of premium thoroughbreds
Largest	Australian exporter of premium thoroughbreds, representing:
• 80.35%	Imports from Australia to New Zealand
• 58.65%	Imports from Australia to the Philippines
• 51.63%	Imports from Australia to Macau
• 43.54%	Imports from Australia to Malaysia
• 38.83%	Imports from Australia to Hong Kong
Nationally significant	
$5b	Contribution to national GDP annually
230,000	Jobs generated and sustained nation wide
State Significant	
$2.6b	Contribution to NSW economy annually
53,696	People employed or participating in thoroughbred breeding and racing in NSW
34,000	People directly involved in breeding, racing or training in NSW
21,837	Thoroughbred owners in NSW
134	Racing Clubs in NSW
$175m	Investment in NSW Racing infrastructure underpinned by the quality of bloodstock & racing product produced in the NSW Hunter Valley

HUNTER VALLEY THOROUGHBRED BREEDING INDUSTRY

REGIONAL SIGNIFICANCE

Regionally Significant	
55% +	Of the $2.6b total value added occurs in regional NSW
Largest	Agricultural industry in the Hunter Valley:
2 times	The value of irrigated agriculture
4.5 times	The value of dairy
10 times	The value of meat and cattle
200	Stallion and Broodmare farms
Sophisticated	Network of equine support industries dependent on Hunter Valley stud farms – including farriers, fodder producers, saddlers, equine transport companies and the Southern Hemisphere's largest equine veterinary practice, Scone Equine Hospital
Significant Regional Employer	
42,586	Employees and participants in regional NSW:
• 5,745	in the Hunter
• 10,159	in Sydney
• 5,633	in Western Sydney
• 9,693	in Mid North Coast, Central Coast, Illawara, Southern Inland and South Coast
• 11,356	throughout the rest of regional NSW
Significant Regional Investor	
$5b +	Invested in the Hunter Valley's thoroughbred breeding industry in the past 10 years (and rising)
85%	Of breeders' operational expenditure occurrs within the local region.

SOURCE: IER Pty Ltd Report 2006; IER Pty Ltd Report 2014, Marsden Jacob Associates Report 2014, Australian Stud Book

AT A GLANCE

Hunter At A Glance	
470	Breeders
5, 745	Employees and Participants*
6	Race Clubs
78	Race Meetings – including the only Saturday Stand Alone meeting in regional Australia
595	Races
3,080	Racing Club Members
100,416	Attendances
$564.6m	Value added injected in the local economy by the thoroughbred breeding & racing industry

* Participants are the lifeblood of the industry. They provide investment, time, skills and passion that underpins the horse racing industry in the State.

Source: IER Pty Ltd, Size and Scope of the NSW Racing Industry, 2014

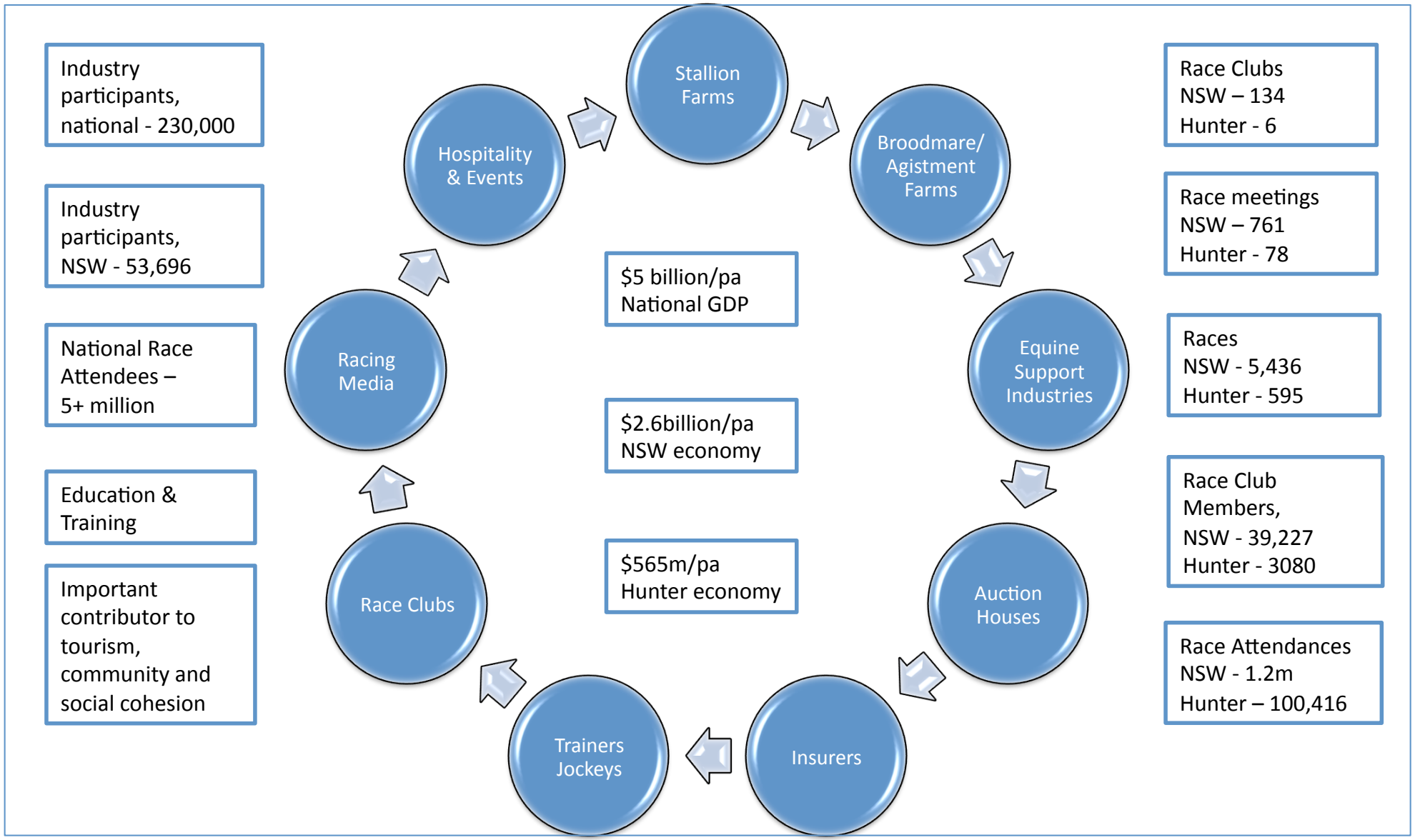
Sydney At A Glance	
10,159	Employees and Participants
3	Race Clubs
66	Race Meetings
494	Races
7,550	Racing Club Members
291, 858	Attendances
$11.1 billion	Value added injected into the economy by the thoroughbred breeding & racing industry

Western Sydney At A Glance	
5, 633	Employees and Participants
1	Race Club
76	Race Meetings
392	Races
8,149	Racing Club Members
237, 411	Attendances
$321.9 million	Value added injected into the Western Sydney by the thoroughbred breeding & racing industry

* Participants are the lifeblood of the industry. They provide investment, time, skills and passion that underpins the horse racing industry in the State.

Source: IER Pty Ltd, Size and Scope of the NSW Racing Industry, 2014

THOROUGHBRED BREEDING VALUE CHAIN



Dartbrook Mine MOD 7 Application

Kayuga Bord and Pillar Mining Operations Mining Review

Prepared for Independent Planning Commission Submission

Report prepared April 2019

Michael White
P: 0408 487 117
E: boomery57@icloud.com

The Author

Michael White is a Resources Consultant. He holds an honours degree in Mining Engineering and an MBA. He has over 25 years' experience in operational and technical roles working for major mining companies in Australia and internationally. He has 16 years' experience working in the coal industry in New South Wales and Queensland, including eight years in the roles of Operations Manager and General Manager at BHP's Mt Arthur Coal, Muswellbrook NSW.

Contents

1 Executive Summary 4
1.2 Review Findings 4
1.3 Key Issues Summary 5
Project Profitability and Economic Viability 5
Coal Quality 5
Capital Requirements 5
Production Rates and Headcount 6
Operating Costs 6
Operation of the Coal Washery 6
Coal Clearance 7
An Interim Step towards Open Cut Mining 7
2 Key Issues 8
2.1 Coal Quality 8
Issue as per RTS document 8
AQC Response to Submission 8
This Review 8
2.2 Capital Requirements 13
Issue as per RTS document 13
AQC Response to Submission 13
This Review 14
2.3 Production Rates and Headcount 15
Issue as per RTS document 15
AQC Response to Submission 15
This Review 15
2.4 Operating Cost 20
2.5 Coal Processing Infrastructure 21
Issue as per RTS document 21
AQC Response to Submission 21
This Review 21
2.6 Coal Clearance – Coal Stockpile at West Site 22
Issue as per RTS document 22
AQC Response to Submission 22
Issue as per RTS document 22
AQC Response to Submission 22
This Review 22

2.7 ROM Coal Haulage by truck 22
3 Reference Material 23
[PAGE INTENTIONALLY LEFT BLANK] 24
Appendix 1 – Initial Mining Review July 2018 25

1 Executive Summary

1.1 Background

This report is a review of the Australia Pacific Coal Ltd (AQC) application to commence a bord and pillar mining operation in the Kayuga seam at the Dartbrook mine.

The Dartbrook mine has been under a care and maintenance status since December 2006 when longwall operations conducted by Anglo were halted due to operational problems.

The AQC application is designated as MOD7 under the existing development consent DA 231-7-2000 and is supported by an Environmental Assessment document, the Dartbrook MOD7 EA.

This report has been prepared for submission to the Independent Planning Commission. It addresses key mining related issues for this project following review of the proponent's MOD7 EA, Response to Submissions (RTS), the Department of Planning Dartbrook Mod 7 Assessment Report, and associated, publicly available documents.

Issues identified in this review were included in submissions to DPE by Hunter Thoroughbred Breeders Association (HTBA) during the MOD7 EA public exhibition period. The body of this report reviews these issues point by point, the AQC Response to Submissions and then makes further comment.

Appendix 1 contains the author's July 2018 initial analysis of the difference between the 2017 Kayuga seam Bord and Pillar Feasibility Study and the MOD 7 EA project. It then identifies MOD7 mining issues.

1.2 Review Findings

This review finds that in the author's opinion the application by Australia Pacific Coal should not be approved by the IPC

1. The key product quality assumption that drives project profitability and the stated project economics is that this mine will produce **10 million tonnes of unwashed product coal *"ranging from 15%-24% ash and averaging 5,500 kcal/kg energy content."****
   The applicant's own coal reserves information published in 2017 does not support this project product quality assumption. *(Applicants Response to Submissions)

2. The impacts of this project have not been fully assessed by the Applicant or by the Department of Planning and Environment.

1.3 Key Issues Summary

Project Profitability and Economic Viability

In 2017 AQC conducted a detailed feasibility study for underground bord and pillar mining in the Kayuga seam and concluded that the project was not economically feasible. The MOD7 project proposal was subsequently proposed. (Appendix 1 of this review contains detail of the differences between the feasibility study and MOD7).

This project as described in the EA has major risks in revenue assumptions due to coal quality, in production rate assumptions, in operating costs and in capital assumptions. As a stand-alone project, profitability looks to be unlikely and the product coal quality assumption is a fatal flaw.

Coal Quality

MOD 7 Response to Submissions (RTS) describes an unwashed coal product ranging from 15 – 24% ash and averaging 5,500 kcal/kg energy. This quality has been assumed for the entire 10 million tonnes of coal from the Kayuga Seam in the project. It has been used for revenue assumptions and for the cost benefit analysis.

The JORC Coal Reserves Statement lists the average ROM (run of mine) Ash for these same 10 million tonnes at 26.16% (including inherent ash, interburden and roof dilution).

Because this project proposes to produce a 100% unwashed product, the product coal quality is the same as the ROM coal quality.

The project will not be able to consistently produce their targeted coal product. Some planned areas within the mine are capable of producing this target unwashed product, but across the ten million tonnes this will not be possible. Producing some coal at lower than the overall 26% ash average is termed high grading. The remaining tonnes will then have a higher average ash as a result.

This quality “gap” will put pressure on the project to improve coal quality by washing coal or by blending with a lower ash coal sourced elsewhere.

Capital Requirements

This review estimates that the required capital for the project is $162M. Details of the estimated capital requirements are included in the body of this report.

The MOD 7 EA stated capital requirements as $15 million. This number has been used in the MOD 7 EA Appendix I Economic Impact Assessment.

The RTS (Response to Submissions) stated capital requirements at $45 million. There is no detail provided by AQC on the makeup of the MOD 7 capital estimate.

This review finds that project capital in MOD 7 has been underestimated by $117M and the extra capital required would negatively impact the project NPV.

Production Rates and Headcount

This review finds that the headcount requirement of 99 FTE (full time equivalent) employees in the MOD7 EA and the AQC Dartbrook Kayuga Seam Underground Reserves Statement 2017 is insufficient to achieve the desired production levels.

This detailed review of headcount requirements estimates the headcount requirement to produce 1.0-1.5 million tonnes per year at 140-158 FTE employees.

The impact of this would be:

- If the headcount is maintained at 99 employees, there would be a negative impact on production levels.
- If the headcount is increased to achieve the desired production, there would be an increase in the overall operating cost for the project.

Operating Costs

The operating cost levels for the underground-mining-to-surface is estimated by this review at $48.50/ROM tonne. This operating cost is aggressive and at the lowest end of operating costs achieved by other bord and pillar operations in Australia.

It is not however regarded as being achievable by this project, because of headcount and product quality issues.

Operation of the Coal Washery

It is the author's opinion that the Independent Planning Commission (IPC) cannot approve this project because its impacts have not been fully assessed.

The proponent has assumed in this application that coal will not be washed. Air quality and noise impacts of washery operation have not been included into the MOD7 Environmental Assessment.

Not washing coal and thereby not running the washery delivers capital savings, avoids operating cost and avoids the need to assess the environmental impacts of operating the wash plant. It avoids the production of coarse and fine rejects, avoids disturbing rehabilitated land in the Rejects Emplacement Area, avoids equipment operations in the Rejects Emplacement Area and avoids increased water consumption by the Washery.

In reviewing the RTS, the proponent clearly wishes to maintain all the approvals it has under the existing Conditions of Consent including the ability to conduct longwall mining operations and the ability to wash coal.

Further to this, on reviewing the transcript of discussions involving the IPC and AQC, it is clear that washing coal is still very much an option that is under consideration by Dartbrook Mine.

Coal Clearance

The project proposes utilising 60 tonne B-double trucks to haul coal by road from the Kayuga Portal to a new bin and shaft facility established adjacent to the New England Highway.

It does not appear that the surface conveyor structure, transfer points, stacker and stockpile of coal at the Kayuga portal have been included in the Air Quality impact assessment.

Previous approval for road transport of coal has only been granted to the mine as a temporary measure. Road haulage despite all mitigation measures proposed will result in increased noise and will negatively impact air quality.

The mine has an existing approval to transport coal via the Hunter tunnel conveyor. To minimise impacts this should remain the required coal transport method.

An Interim Step towards Open Cut Mining

The DP&E recognises, as per the transcript of its discussions with the IPC, that this proposed operation is an “interim step” to generate cash flow to allow further work to be conducted on the feasibility of building a larger mine.

In the author’s view it remains likely that in the next couple of years following a MOD 7 approval, AQC will attempt to make the case to the DP&E that an operational Dartbrook Underground Mine with 100 plus employees (not yet employed) needs continuity and job security and therefore an open cut Dartbrook mine should be approved.

2 Key Issues

The AQC Response to Submissions document wording has been reproduced here to describe both the issue raised and the AQC response. This review then provides a detailed discussion of each issue.

2.1 Coal Quality

Issue as per RTS document

HTBA contended that the Modification will not be able to produce a Newcastle Benchmark Export Thermal Product without use of the washery. HTBA acknowledged that the coal price assumed in the CBA (USD75/tonne) is less than the price for a Newcastle Benchmark Export Thermal Product (USD90/tonne), but questions whether this is a realistic discount to reflect the unwashed nature of the coal product.

AQC Response to Submission

The Modification will target the highest quality coal plies within the Kayuga Seam. The in situ ash content for these plies varies from 9-24%. Based on the in situ coal quality of these plies, the modification will be able to produce a coal product ranging from 15-24% ash and averaging 5,500 kcal/kg energy content.

Although the Modification will produce an unwashed coal product, the product is not an “inferior” quality product. Thermal coal is a commodity which is primarily purchased for its energy content, which is influenced by its ash content (amongst other factors). The coal quality of an export thermal product can be managed for different customers through blending with different coals. The CBA assumed an achieved coal price of USD75/tonne. This is a conservative assumption, as the coal product will generally meet the requirements for a Newcastle 5500 NAR Export Thermal Product, which has recently been trading in excess of USD75/tonne.

It is common practice for mining operations to bypass the washing process (where the coal quality is suitable for customer requirements and it is economically efficient to do so). Within the Muswellbrook LGA, Mt Arthur Coal Mine, Bengalla Mine, Mangoola Mine and Muswellbrook Coal Mine all have systems that allow for higher quality coals to bypass the washery component of their CHPPs.

This Review

MOD 7 EA did not detail the estimated ash or energy levels for the ROM Bypass product. The MOD 7 RTS provides the first prediction of a ROM Product ranging from **15 – 24% ash** (it is assumed in this review that this must include interburden between coal plies and out of seam dilution) for 10 Mt coal from the Kayuga Seam.

The Dartbrook Kayuga Seam Underground JORC Coal Reserves Statement 2017 lists the average **ROM Ash at 26.16%** (including inherent ash, interburden and roof dilution) for the 10Mt total for Measured, Indicated and Inferred Classifications (see Table 2-1, p.16, Extractable Tonnes by Panel and Coal Ply)

This apparent and significant disconnect in forecast coal quality requires further clarification by AQC. There is no information as to how any ROM Coal that has an ash level above 24% will be physically treated or financially accounted for.

This is the reason that the ability to consistently produce a ROM Product of 15-24% from the Kayuga Seam, and the ability to consistently achieve a 5500 NAR Export Thermal Product is being challenged in this review.

It is agreed that it is common practice for mining operations to bypass the washing process where the coal quality is suitable for customer requirements and it is economically efficient to do so. Typically in the author's experience of export thermal coal operations in the Hunter Valley most mines produce a smaller percentage of export bypass coal compared to washed coal. The author is not aware of any Hunter Valley thermal coal mines solely producing a 100% export unwashed coal product.

It is also agreed that it is possible for the bord and pillar mining method to target the highest quality coal plies. A review of both MOD 7 EA and the Dartbrook Kayuga Seam Underground JORC Reserves Statement, Coal Reserves as at February 2017 (JORC Coal Reserves Statement) have the same following assumptions for the Kayuga Seam Extraction:

- 10Mt coal reserves
- Mining operations to target the highest quality coal plies.
- Extraction height of the production panels between 3.0 and 3.5m

The JORC Coal Reserves Statement provides the following additional information:

- It states, that to successfully utilise the In-place mining method using the Bolter Miners it would be a requirement to leave 300mm of coal on the floor of the seam.
- Where the coal seam was less than 3.3m, there would be a requirement to extract up to 300mm of stone roof to achieve the minimum extraction height of 3.0m while still maintaining the 300mm coal on the floor of the seam

The JORC Coal Reserves Statement shows in Table 3-1 the average coal quality parameters for each of the 7 seven coal plies.

Table 3-1: Kayuga Average As-Received Coal Ply Quality Parameters

Kayuga Seam Ply	Thickness (m)	In-situ Relative Density (t/m^3)	Raw Ash (arb) (%)
kya11	0.37	1.52	24.48
kya12	0.73	1.45	18.39
kya21	0.52	1.38	11.41
kya22	0.92	1.36	9.39
kyb11	0.28	1.43	16.65
kyb12	0.83	1.37	11.65
kyb2	0.23	1.62	32.71

The cumulative thickness of the seven coal plies and the interburden plies in the Kayuga Seam ranges from 3m to in excess of 6m in some areas of the deposit, attributable to the seam splits towards the sub-crop. The majority of the seam thickness ranges between 3.5m and 5m.

If bord and pillar mining targets the top 6 plies, the average ash for these plies fall within the range of 9 to 24% as stated in the Response to Submissions, however the actual ROM production would also include additional ash made up from:

- The stone interburden between the coal plies
- Roof dilution from the mining process

The JORC Reserves Statement provides the following information regarding the ROM Coal properties when the additional ash dilution is included:

- Average ROM RD – 1.51 (Inclusive of coal, interburden and roof dilution)
- Average ROM Moisture – 6.18%
- **Average ROM Ash – 26.16% (Inclusive of coal, interburden and roof dilution)**
- Working section ash ranges from 10% to 40%

In the JORC Reserves Statement, the Kayuga Seam has been divided up into 4 working areas, 100s Series to 400s Series as shown in Figure 1. (Figure 3-4, JORC Reserves Statement p.35)

As the ply and seam thickness vary across the lease, the ROM Ash levels have a similar variation. Modelling for the proposed working sections, undertaken as part of the preparation for the JORC Reserves Statement, show that the Mining Section average ROM Ash varies between 10 and 40% as shown in the Figure 2 below (Figure 3-20, JORC Reserves Statement, p.54).

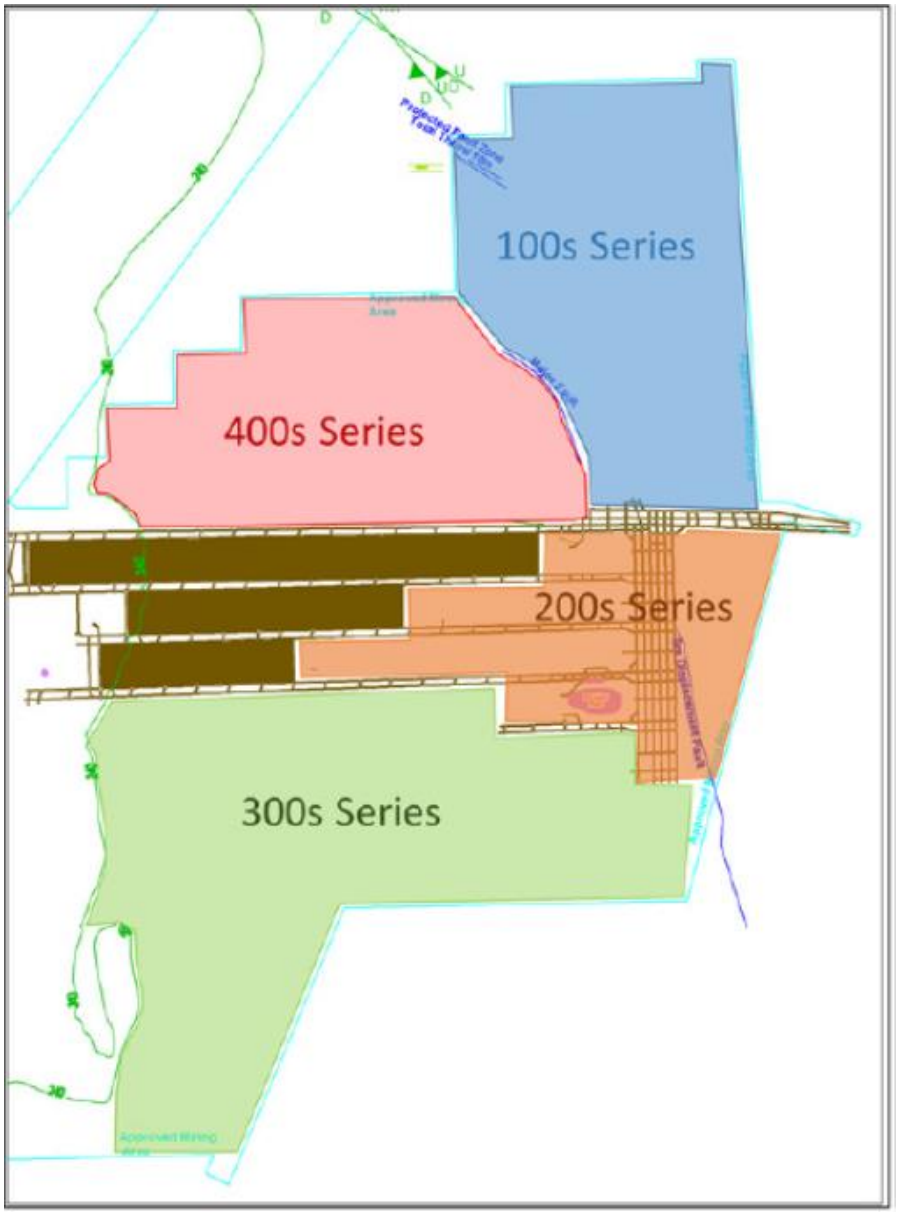


Figure 1: Kayuga Planned Underground Areas

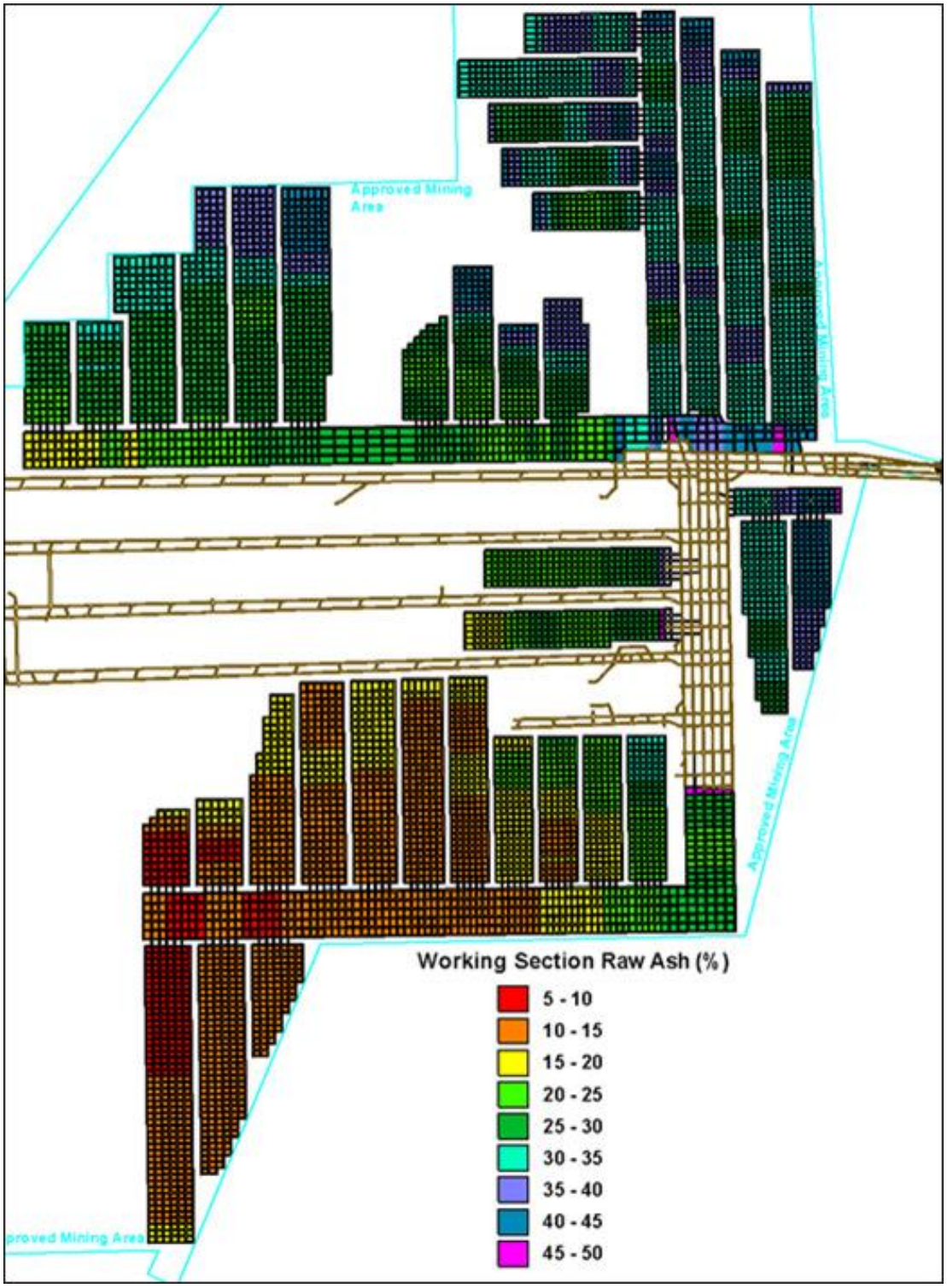


Figure 2: Bord and Pillar Panels Mining Section Raw Ash

A review of the working section ash as shown in Figure 2 above, shows each of the Mining areas have different working section ash levels.

- Area 1 (thinner working section) has an Ash range of 25 – 40%
- Area 2 (thinner working section) has an ash range of 20 – 40%

- Area 3 (thicker working section and allows a coal roof) has a range of 10 – 30% ash range with the majority appears to be in the 10 – 20% ash range
- Area 4 (thicker working section) Ash range 15 – 40% with the majority in the 15 – 30% range

It may well be possible to produce the target 5500 kcal/kg high ash product in the early period of the project by "high grading" the minable tonnes. High grading means deliberately mining coal that is lower ash content than the overall 10 year average for the 10 million tonnes. This would then increase the average ash of the remaining tonnes above the overall average 26% ash and increase the challenge to market this remaining higher ash (greater than 26%) coal.

It will not be possible to produce 10 million tonnes of unwashed 5500NAR product with ash range 17%-23% without upgrading the product by either washing or blending with a lower ash coal sourced elsewhere.

2.2 Capital Requirements

Issue as per RTS document

HTBA argued that capital costs have been underestimated in the economic analysis of the Modification. HTBA notes that the JORC Reserves Statement prepared for the Dartbrook Mine estimates capital expenditure at $258M, substantially higher than the capital costs assumed in the EA.

AQC Response to Submission

HTBA refers to the JORC Reserves Statement prepared by MCS in February 2017. This Reserves Statement was a component of a Feasibility Study (FS) into recommencing mining operations at Dartbrook Mine. Although the FS considered a proposition for bord and pillar mining, the FS scenario differs materially from the Modification in the following important respects:

- The FS scenario assumed a target production rate of 2.5 Mtpa, whereas the Modification proposes a maximum production rate of 1.5 Mtpa;
- The FS scenario assumed that ROM coal would be transferred to the CHPP via the Hunter Tunnel; and
- The FS scenario assumed that coal would be washed and that upgrades to the CHPP were necessary.

The total capital expenditure for the FS scenario was estimated at $258 million (MCS, 2017). The capital expenditure for the Modification is significantly lower because it does not involve refurbishment of the Hunter Tunnel or upgrades to the CHPP. The Modification will also require less equipment due to the lower coal production rate. Therefore, the capital expenditure value of $258 million is not applicable to the Modification.

The capital expenditure required for the Modification is estimated at $45 million. The Economic Impact Assessment (Appendix I of the EA) was based on this value. It is noted that the estimated cost of sealing the gravel section of the haulage route (see **Section 2.1.5**) is approximately

$80,000. This additional cost is immaterial compared to the total expenditure and therefore does not alter the conclusions of the Cost-Benefit Analysis (CBA).

This Review

It is understood that the capital estimate for MOD 7 would be lower than the $258 million detailed in the Coal Reserves Statement for the reasons given, however the actual amount and make-up of the Capital estimate for MOD 7 was not made clear in the MOD 7 documentation. The RTS states the capital requirement has been estimated at $45 million for the MOD 7, however the actual make-up of this amount has not been made available.

This review estimates that $162M would be required for the operation described in MOD 7:

- Require Shaft, Bin and coal clearance at Eastern portion of Hunter Tunnel – cost of $15M
- Require purchase, installation and commissioning drift conveyor to surface and a truck loading stock pile at Western Mine Site – Assume $5M expenditure
- Coal Clearance system, including electrics for the Mains and panel belts to service 2 bord and pillar operations – $40M
- Diesel, gas monitoring and Electrical requirements - $20M required to service a workforce and 2 bord and pillar operations.
- Ventilation Fan, including electrics and monitoring equipment - $12M
- Development Mining equipment - $70M for 2 Super Panels

This figure is $117M higher than the $45M stated by AQC in their RTS.

There are 2 potential scenarios which could explain the $117M variation between the estimates for Project Capital:

1. The total capital requirement has been underestimated
2. The procurement strategy includes a combination of Capital expenditure and other means of financing including a mixture of:
    - Equipment Leasing
    - Having a Contractor provide the equipment and pay in contract rates
    - Enter into a BOOT (Build, Operate, Own and Transfer) leasing deal
    - Enter into a whole of Mine lease deal – White Oak Mine in Illinois in the US entered into a whole of mine lease deal with a major OEM provided they purchased all the mining equipment from that OEM

While the alternate financing option could explain the $117M variance in capital estimates, the reduced capital expenditure would be reflected by a much higher operating cost (OPEX), which does not appear to be the case given the low operating cost estimate.

This review finds that $45 million of capital expenditure is not sufficient to meet the MOD 7 production requirements.

2.3 Production Rates and Headcount

Issue as per RTS document

HTBA contended that the proposed production rate for bord and pillar mining will be difficult to maintain, based on experience at other bord and pillar mining operations.

AQC Response to Submission

The feasibility studies undertaken by AQC and its mining experts indicate that the proposed production rate can be achieved through bord and pillar mining operations.

The production rate that is achieved by a mining operation is dependent on various factors including geological and geotechnical conditions, equipment fleet and size of workforce.

Given that these factors are unique to each mining operation, comparisons between different operations are not appropriate.

This Review

The Mining section for the MOD 7 Application details the following:

- Production will utilise up to 3 BM (Bolter miner) Super Units and 1 single BM Unit for Mains Development
- Will utilise the same working section assumptions and mine layout as specified in the JORC Reserves assessment
- Will operate on a 24/7 basis
- Will use the same productivity assumptions as specified in the JORC Reserves Statement
- Will average 1 Mtpa for 10 years with a maximum annual production of 1.5Mtpa
- Will employ 99 employees

The above assumptions when compared to those in the JORC Statement have the following major differences:

- Mine life has been extended by 5 years
- Annual production has been capped at 1.5 Mtpa and the annual average has been reduced to 1 Mtpa
- Total Mine manning has been reduced from 262 to an estimated 99 employees.

As stated in the RTS, mining rates have been calculated and show that they are achievable by bord and pillar at Dartbrook having site specific regard to:

- the localised geological and geotechnical environment
- the specified equipment
- the size of the workforce

In Section 3.2 of the JORC Coal Reserves Statement the following production levels are calculated:

- Super Panel – between 650,000 and 720,000 tonnes per annum (tpa)
- Mains unit – 320,000 tpa

MOD 7 states the average annual production to be 1Mtpa with a maximum production of 1.5Mtpa.

Utilising the above AQC sourced information the following calculations are now straightforward.

To achieve 1 Mtpa would require:

- 1 Super Panel producing 700,000tpa
- 1 Mains Panel producing 300,000tpa

To achieve 1.5Mtpa would require:

- 2 Super Panels

The JORC Reserves Statement also details the following shift rosters to achieve the production levels required:

- Monday to Friday – 3 * 9 hour production shifts per day – total of 14 production shifts per week
- Friday – Sunday - 2 * 12 hour maintenance shifts per day – total of 6 maintenance shifts

The requirement is for production to be undertaken during the 14 production shifts Monday to Friday, with maintenance, belt moves and other activities to be undertaken on the weekend maintenance days.

Headcount for these shifts are as follows.

For a Super Panel:

- Production Shift – 16 employees (detailed in JORC Coal Reserves Statement) per shift
- Maintenance Shifts – 6 employees (this review's assumption – 1 Deputy, 3 trades, 2 miners)
- Total 48 production personnel (3 shifts per day) and 12 (2 shifts per day) Maintenance personnel
- Total 60 employees per Super Panel

For a Mains Panel:

- Production Shift – 10 employees (this review's assumption – 1 Deputy, 1 supervisor, 2 trades, 6 miners
- Maintenance Shifts – 6 employees (this review's assumption – 1 Deputy, 3 trades, 2 miners)
- Total 30 production employees and 12 Maintenance employees
- Total 42 employees per Mains Unit

Therefore for 1 Mtpa the total headcount required would be:

- 60 employees (Super Panel) plus 42 employees (Mains Panel)

- Total 102 employees for the Production areas of the mine
- Additional personnel would also be required for:
    - Maintaining the other areas of the mine
    - Delivering supplies to the panel
    - Maintaining the coal clearance system underground
    - Maintaining the diesel equipment
    - Management of the project

For 2 Super Panels would require:

- 120 employees for the production panels, plus
- Additional personnel would also be required for:
    - Maintaining the other areas of the mine
    - Delivering supplies to the panel
    - Maintaining the coal clearance system underground
    - Maintaining the diesel equipment
    - Management of the project

For the stated headcount of 99 employees, the productivity levels would by necessity be:

- 10,000 tonnes per employee per year for the average annual production level of 1Mtpa, and
- 15,000 tonnes per employee per year for the maximum annual production of 1.5Mtpa

These productivity levels are at the highest level when bench marked against other Australian B&P operations. These productivity levels must be considered aggressive and difficult to maintain on a regular basis considering:

- The basis on benchmarking results, and
- The productivity modelling undertaken in the Feasibility Study

This review finds that using the manning requirements in the JORC Coal Reserves Statement, 99 employees are insufficient to achieve the desired production levels. The impact of this would be:

- If the manning levels are maintained at 99 employees, there would be a negative impact on production levels
- If the manning levels are increased to achieve the desired production, there would be an increase in the overall operating cost for the project.

This Review's Headcount Calculations

Case: 1 Mtpa	Shift Manning	No. Shifts	Total	Comments
Super Panel #1				
Production Mon - Friday	16	3	48	As per JORC Coal Reserves Statement: 1 Deputy, 1 Supervisor, 2 trades, 12 miners
Maintenance Fri - Sunday	6	2	12	Assumption: 1 Deputy, 3 trades, 2 miners
Mains Panel				
Production Mon - Friday	10	3	30	Assumption: 1 Deputy, 1 Supervisor, 2 trades, 6 miners
Maintenance Fri - Sunday	6	2	12	Assumption: 1 Deputy, 3 trades, 2 miners
UG Support Manning Monday - Friday	7	3	21	(1 Undermanager, 1 Deputies, 3 Miners (conveyors, roadways, pumping and supplies), 2 tradesman)
Friday - Sunday	0	0	0	
Surface operations including train loading	3	3	9	Assumption: weekend trainloading covered by overtime
Management & Staff	8	1	8	(Manager, Elecrical and Mechanical Managers, Accountant, Office Support, Stores,)
Total			140	

Case: 1.5 Mtpa	Shift Manning	No. Shifts	Total	Comments
Super Panel #1				
Production Mon - Friday	16	3	48	As per JORC Coal Reserves Statement: 1 Deputy, 1 Supervisor, 2 trades, 12 miners
Maintenance Fri - Sunday	6	2	12	Assumption: 1 Deputy, 3 trades, 2 miners
Supers Panel #2				
Production Mon - Friday	16	3	48	As per JORC Coal Reserves Statement: 1 Deputy, 1 Supervisor, 2 trades, 12 miners
Maintenance Fri - Sunday	6	2	12	Assumption: 1 Deputy, 3 trades, 2 miners
UG Support Manning Monday - Friday	7	3	21	(1 Undermanager, 1 Deputies, 3 Miners (conveyors, roadways, pumping and supplies), 2 tradesman)
Firday - Sunday	0	0	0	
Surface operations including train loading	3	3	9	Assumption: weekend trainloading covered by overtime
Management & Staff	8	1	8	(Manager, Elecrical and Mechanical Managers, Accountant, Office Support, Stores,)
Total			158	

It should also be noted that the following issues could also negatively impact the production levels achieved:

- Insufficient labour to provide adequate support – rectifying this would have a negative impact on operating cost and productivity levels.
- Adverse geological conditions requiring additional support to be installed at the production face. This would have:
    - Negative impact on operating costs
    - Negative impact on production rates which would impact both annual production and increasing unit operating costs on a per tonne basis, cutting into the margin.
- Incorrect production assumptions requiring an additional mining unit. This would require additional capital, manning levels and productivity levels. This would have:
    - Negative impact on operating costs
    - Negative impact on production rates which would impact both annual production and increasing unit operating costs on a per tonne basis, cutting into the margin.

- Adverse geological conditions resulting in the reduction of panel lengths or areas of mining.
    - This would result in a reduction of mine life or a loss of revenue for the project and reduce the amount of tonnes available to repay the initial capital expenditure.

2.4 Operating Cost

Appendix I Economic Impact Assessment of MOD 7 EA states that the average operating cost for the operation is $65M per annum. If the average annual production is assumed at 1Mt, the production cost, excluding Royalties is $65/tonne FOB.

This review estimates the following incremental costs, either provided in the documentation reviewed or estimated from a data base reference:

- Rail and Port Charges - $10.00 per product tonne (JORC Reserves Statement)
- Marketing costs - $2.00 per product tonne (JORC Reserves Statement)
- Stockpile Management for both East and West Infrastructure - $2.00 per product tonne
- Trucking cost West side to Hunter Tunnel Shaft and haul road maintenance – $4.50 per product tonne

Deducting these incremental costs from the $65/tonne FOB cost gives mining cost to Surface of $48.50 per ROM tonne – which in this case is also per product tonne given no coal is washed.

The $48.50 is in line with one of the lowest costs for a similar Bord & Pillar (B&P) mine, however the similar mines are owner operated mines and the equipment is owned by the mine.

This review included building up an operating cost by first principles using reference to a cost data base for 1 Mtpa B&P operation. This resulted in an operating cost value of $52.00 per ROM tonne.

This indicates that the operating cost of $48.50, while achievable is aggressive and does not include any major leasing or hire costs.

As discussed in previous sections of this review, the operating cost would be negatively impacted by adverse productivity results, poor geological environment or additional manning being required.

The assumed operating cost for the Underground Mining to surface appears aggressive and could easily suffer upward pressure.

2.5 Coal Processing Infrastructure

Issue as per RTS document

HTBA contends the right to use the washery should be removed from the development consent.

AQC Response to Submission

As explained in Section 4.8 of the EA, the activities proposed by the Modification are sought as alternatives to, rather than substitutes for, the approved activities under DA 231-7-2000. The Modification does not derogate from AQC's right to undertake the approved activities under DA 321-7-2000.

DA 231-7-2000 permits the use of the existing washery facility at the East Site. Although the washery is not required for the bord and pillar mining proposed by the Modification, the Modification does not relinquish the right to use the washery for other approved activities under DA 231-7-2000.

This Review

Under the existing Conditions of Consent AQC retains the ability to operate the washery. This is unaffected by this modification. As per the AQC discussion with the IPC in February 2019 coal washing clearly remains under consideration.

> MR ROBINSON: At that point, we decided that having unwashed ROM coal to start the operation was the best use of capital, not to say that we wouldn't wash coal at a later stage under the current consent that's in place now.

Transcript of IPC Meeting with Applicant, 18th February 2019 p.6

This review finds that there is a high likelihood of the coal washery being utilised to process ROM coal for this project. Washery operation will:

- Increase project noise
- Increase project dust impacts
- Increase project water consumption
- Produce coarse reject waste
- Produce fines reject waste
- Increase the project disturbed area
- Increase visual impacts.

Coal washing will result in the production of coarse and fine rejects as waste product. This will require disturbing currently rehabilitated land in the Rejects Emplacement Area, place the coarse reject, truck and earth moving equipment operations in the Rejects Emplacement Area and increased water consumption by the project.

The noise impacts, air quality impacts and change to water balance arising from washing coal have not been included in any of the assessments in the MOD7 application.

2.6 Coal Clearance – Coal Stockpile at West Site

Issue as per RTS document

DP&E requested further information regarding stockpiling of ROM coal at the West Site.

AQC Response to Submission

Coal that is extracted from the Kayuga seam will be conveyed to the surface at the Kayuga Entry. A ROM coal stockpile is proposed to be re-established adjacent to the Kayuga Entry. The stockpile will have a maximum capacity of approximately 8000 t. At full capacity the height of the stockpile will be approximately 8 m.

The ROM coal stockpile at the West Site will be sited within an existing hardstand area adjacent to the Kayuga Entry. Accordingly no additional surface disturbance will be required for the establishment of this stockpile. The stockpile will be partially screened by existing bunds on the northern and southern sides of this hardstand area. The radial stacker will be fitted with water sprays to manage dust emissions from the stockpile.

Issue as per RTS document

HTBA argued that a coal stockpile will need to be established near the Kayuga Entry and that the environmental impacts of such a stockpile have not been assessed.

AQC Response to Submission

Details of the proposed stockpile at the West Site are provided in Section 2.1.3

The dust emissions associated with loading of coal from the stockpile into trucks were included in the dust and noise modelling undertaken for the EA.

This Review

The RTS does not address the air quality impacts of the portal conveyor, the transfer point, the radial stacker or the ROM stockpile itself. The EA Air Quality Assessment did not include these emitters in the modelling. This means air quality impacts will be understated in the Air Quality Assessment for MOD7.

2.7 ROM Coal Haulage by truck

Previous approvals for surface road haulage have only been given to Dartbrook Mine on a temporary basis. This occurred during the longwall relocation from the Wynn seam to the Kayuga seam in 2003-2004 and it is believed, also occurred during initial mine development prior to commissioning of the Hunter Tunnel conveyor in April 1996.

The Hunter Tunnel Conveyor was constructed to minimise environmental impacts from Dartbrook Mine. If the mine was to restart operations coal haulage should be required to again utilise this Hunter Tunnel infrastructure.

3 Reference Material

This report and the contents of Appendix 1 have been compiled for the purposes of identifying any mining related actual or potential issues related to the AQC Dartbrook Mine MOD 7 Kayuga Seam Bord and Pillar Mining Operation Proposal currently being assessed by the Independent Planning Commission in the Determination stage of the NSW Planning Approvals Process.

The documents reviewed or referenced upon which this report was based include:

- IPC Transcript of Proceedings - Meeting with Applicant 18th February, 2019
- IPC Transcript of Proceedings - Meeting with Dept. of Planning and Environment, 18th February, 2019
- Dartbrook Coal Mine Modification 7 Bord and Pillar Mining Assessment Report, January 2019, NSW Government Dept. of Planning and Environment
- Dartbrook Mine Modification 7 – Response to Submissions for Australia Pacific Coal, August 2018 prepared by Hansen Bailey
- Dartbrook Mine MOD 7 - Main Report, 15th June 2018 prepared by Hansen Bailey
- Dartbrook Mine MOD 7 - Appendix I Economic Impact Assessment
- Dartbrook Kayuga Seam Underground Reserves Statement, 27 March 2017, Australia Pacific Coal
- Dartbrook Mine MOD 6 Assessment Report - Stockpiles, Tailings disposal and Nitrogen Injection Plant November 2005, NSW Government Dept. of Planning
- Dartbrook Mine MOD 5 Assessment Report - Rejects Disposal, April 2005 NSW Government Dept. of Infrastructure Planning and Natural Resources
- Dartbrook Open Cut Prefeasibility Study 28th March 2018
- Coal Reserve Estimate for Dartbrook Project 28th March 2018

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Appendix 1 – Initial Mining Review July 2018

Review of the Dartbrook Mine MOD 7 Application
Kayuga Seam Bord and Pillar Mining Operations Background
Report prepared for HTBA July 2018

The acquisition of Dartbrook Mine from Anglo by Australia Pacific Coal Ltd (AQC) was completed in May 2017. AQC has produced a number of reports released to the market including:

Dartbrook Kayuga Seam Underground Reserves Statement **March 2017**
This report contained the feasibility study for a bord and pillar underground mining operation in the Kayuga seam producing the JORC reserves total of 6.676 million tonnes of marketable coal at 12% ash content (AR) over a five year period. In the cover letter to this study AQC advised it would not be proceeding with this plan and was continuing develop alternative underground approaches which delivered better risk-adjusted financial outcomes.

Coal Reserve Estimate for Dartbrook Project **March 2018**
This report described an overall open cut marketable JORC coal reserve of 370 million tonnes. The Open Cut Prefeasibility Study reserve contained as a subset in this report is 226 million ROM tonnes containing 140 million tonnes of marketable product coal. Two coal products are identified: a 'Dartbrook Premium" 12% ash (AR) product and a "Dartbrook Standard" 19% ash (AR) product.

Dartbrook Mine Modification 7 Environmental Assessment **June 2018**
The MOD7 EA documents were placed on public exhibition from Thursday 28th June until Wednesday 26th July 2018. This proposes an alternative approach to the operation assessed in the March 2017 feasibility study. The extractable tonnes stated in MOD7 are 10 million tonnes. No coal products are specified in this report other than the following broad statement:
"AQC's extensive pre-feasibility studies have confirmed a strong international demand for the high quality thermal coal resource at Dartbrook Mine"

Dartbrook Mine Mod 7 Main Report p.38

Approach to this review

The first parts of this review report have assessed the MOD 7 EA project against the March 2017 Dartbrook Kayuga Seam Underground JORC Reserves Statement and the associated Feasibility Study. The objective is to understand the changes the proponent has made to the operation to produce the MOD7 project proposal, and the impacts of these changes to the project since completing the Feasibility Study in 2017. The 2017 approach to bord and pillar mining of the Kayuga seam was deemed by AQC to be not economically viable.

1. The Kayuga Seam and the Proposed Bord and Pillar Operations as per the March 2017 JORC Reserves Statement

The following information has been sourced from the JORC Reserves Statement and is based on a Feasibility Study undertaken by MCS in 2017 for Bord and Pillar mining (B&P) in the Kayuga Seam at Dartbrook Mine. This section will provide a reference to the comments that will be made regarding the Mod 7 Application.

1.1. Kayuga Seam

The Kayuga Seam within the Dartbrook Mining boundary is of varying thickness with a maximum thickness of 4.5 metres. It is comprised of 7 coal plies and associated interburden between the plies, thicknesses of the coal plies and interburden vary across the lease. The average raw ash (arb) levels for the seven coal plies within the Kayuga Seam are indicated in the following Table:

Kayuga Seam Ply	Thickness (m)	In-situ Relative Density (t/m^3)	Raw Ash (arb) (%)
kya11	0.37	1.52	24.48
kya12	0.73	1.45	18.39
kya21	0.52	1.38	11.41
kya22	0.92	1.36	9.39
kyb11	0.28	1.43	16.65
kyb12	0.83	1.37	11.65
kyb2	0.23	1.62	32.71

The immediate roof of the Kayuga Seam consists of a variety of weaker materials such as mudstone, claystone, carbonaceous mudstone, as well as stronger siltstone and sandstone in areas. The consistency of roof material is particularly varied across the deposit. Where the Mt Arthur Seam coalesces with the Kayuga Seam, a coal roof exists which will be favourable for mining.

The floor of the Kayuga Seam is dominated by a 1m thick sequence of clay-rich siltstone interbedded with thin bands of coal, carbonaceous mudstone and tuffaceous claystone, and below this a more competent sequence of siltstones and sandstones. Considering the amount of weak material anticipated in the immediate floor and based on previous mining experience, at least 300mm of coal will be left in the floor during mining.

1.2. Proposed Working Section

From the geotechnical assessment of the Kayuga Seam it was recommended to leave 300mm of coal in the floor to provide a stable floor for mining operations. The mining height selection for the Kayuga Seam was selected as 3m to 3.5m based on typical practical limitations on Bolter Miners, and to achieve the optimal selection of reserve recovery, productivity and roof dilution where the select seam horizon is less than 3.3m in thickness.

Based on the available geological data and modelling the working section thickness would vary as shown in Figure 1.

1.3. Mine Layout

Dartbrook Mine was undertaking longwall operations in the Kayuga Seam until 2006 when adverse longwall mining conditions led to a cessation of operations and a move to Care and Maintenance. During 2016, following the acquisition of Dartbrook Mine, AQC commissioned MCS to undertake a range of studies, culminating in the Feasibility Study looking at the underground opportunities for the Kayuga Seam. The outcome of the Concept Study and subsequent Feasibility Study was to utilise Bord and Pillar Mining with the pillar size increasing as the Depth of Cover increases.

The bord and pillar panels have been designed with between five and nine roadways with square pillars of between 17.5m x 17.5m (down to a depth of cover (DOC) of approximately 187m), and pillars of 22.5m x 22.5m at a DOC of 240m. The selected roadway width is 5.5m with the approximate in-panel extraction varying between 35% and 42%.

The mine design and pillar sizes are based on industry recognized geotechnical design parameters and appear to be adequate for the proposed layout. The proposed layout is shown in Figure 1.

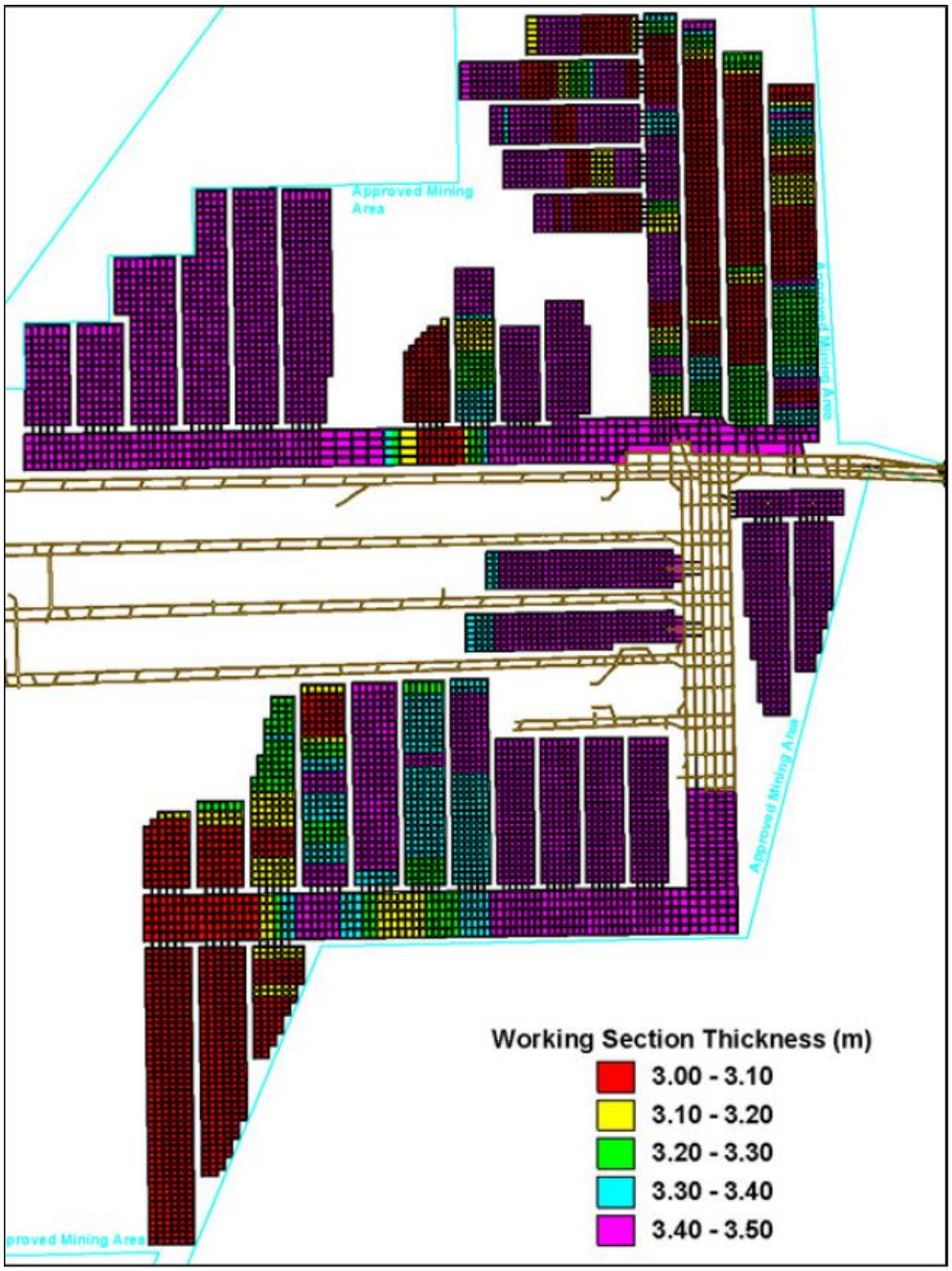


Figure 1. Mining Section Thickness for Bord and Pillar Panels

1.4. Mining Method

The B&P mining method was selected based on the size of the resource, nature of the deposit and time scale of the project.

Most B&P operations in the coal industry utilise the place changing methodology, where a continuous miner cuts out 10 to 15 metres of roadway or a “place” and then is flitted to the next “place” to continue mining and a mobile roof bolter is trammed in to support the freshly exposed roof.

For the Kayuga Seam, it was decided to use Bolter Miners (BM) where the continuous miner is fitted with roof bolters and the BM cuts out 1 to 4 metres of roadway and then use the roof bolters on the machine to support the roof in what is called “in place mining” due to geotechnical considerations requiring initial roof support to be installed as close to the mining face as possible.

The use of In-place mining for B&P is not a new concept and is utilised in the majority of the other B&P operations within the Hunter Valley.

To achieve the required production rate of 2 Mtpa, it was decided to operate the BM units in a “super panel” configuration to achieve higher productivity and flexibility. It incorporates two bolter-miners (BMs) to mine coal (one at a given time) and install primary support, while supplementary and secondary support will be installed by a separate mobile roof bolter. Run-of-mine (ROM) coal is transported to the feeder breaker with three 16 tonne capacity shuttle cars from the two BMs, i.e. whichever machine is cutting at the time.

It has been reported that the two primary reasons for selecting bord and pillar mining without secondary extraction, was to avoid roof caving to minimise the risk of spontaneous combustion in the goaf, and to plan for higher productivity and production levels with smaller pillars from start-up of the operation.

1.5. Manning Roster

The proposed roster was selected as a 9-hour x 3 shifts per day on a 5-day per week basis for production crews, resulting in an estimated average of 78.5 operating hours per week. Maintenance and outbye activities will be scheduled from Friday day-shift to Sunday day-shift. At full production the mine will employ 262 people with 16 people per production crew including operators, tradesmen, deputies (focusing on statutory duties) and team leaders to manage the production process. This would require approximately 48 employees for the Monday to Friday production shifts and 12 employees for the weekend roster for a total of 60 employees per super unit.

The single BM unit for the Mains would require 30 employees for the production shifts and 12 employees for the weekend rosters – 42 employees in total.

The Roster proposed is utilised at several NSW underground operations.

1.6. Productivity Assumptions

Productivity assumptions have been derived from first principles. It has been purported that by implementing two BMs in a panel, allowing one machine to be relocated and prepared for the next cutting sequence while the other machine produces, and by allocating three shuttle cars

behind the BM while cutting, it delivers an approximate base mining rate of 213 to 216 ROM tonnes per operating hour.

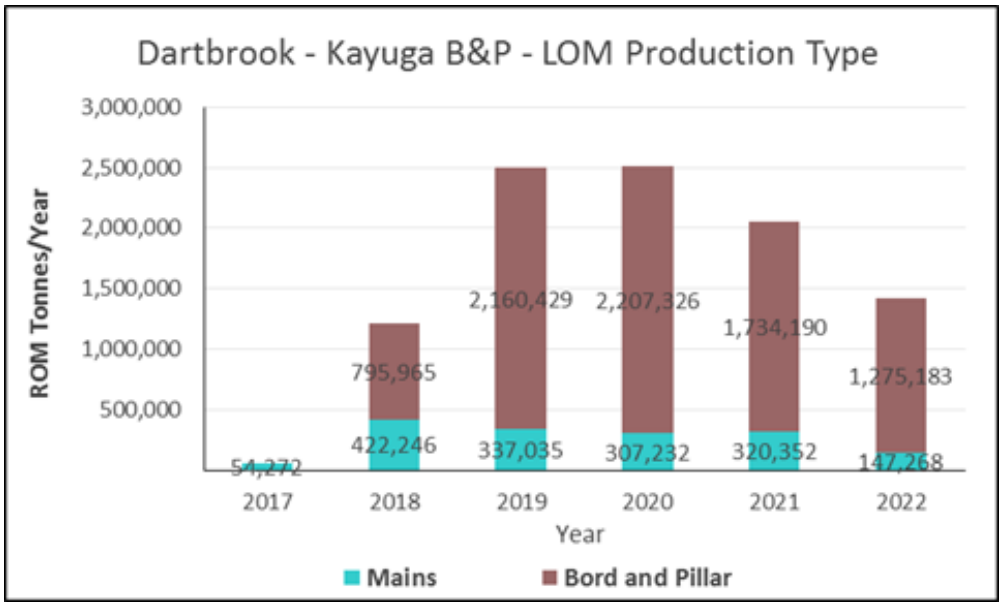
Allowing for an operator efficiency factor of 85%, a base mining rate of approximately 181 to 184 ROM tonnes per operating hour was derived and used in the modelling for the feasibility study results.

The 181 ROM tonnes per operating hour relates to 6m roadway developed per operating hour. This would be achievable for a Super unit, but could be considered aggressive.

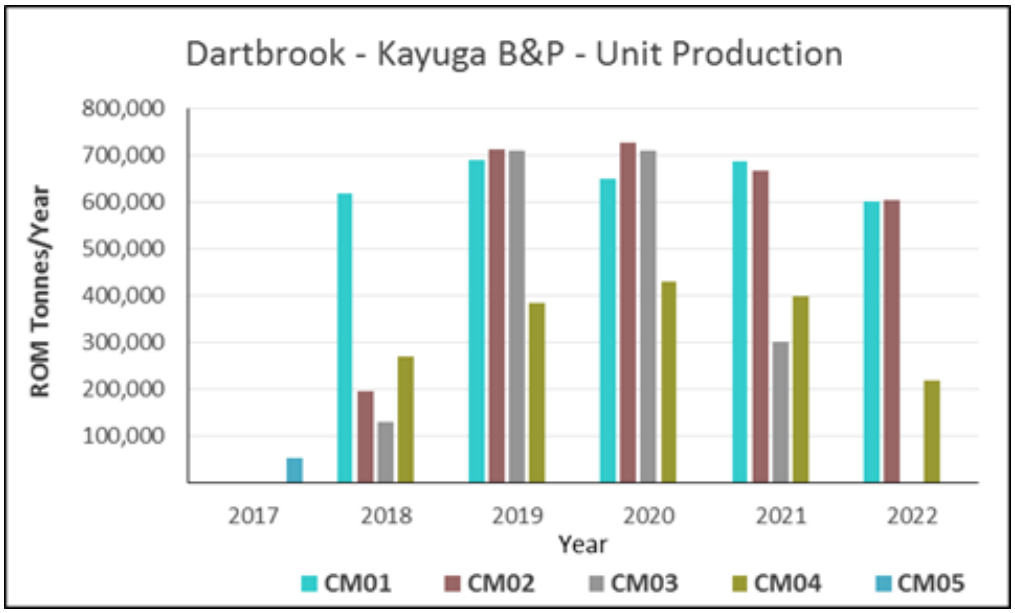
Production in normal mining conditions has been scheduled at between 14,000 to 15,000 ROM tonnes per week per super panel unit, with an average of between 650,000 and 720,000 ROM tonnes per annum per production unit. The mine will consist of three super panel production units and one single BM mains development unit.

With three super units operating plus a single BM unit operating the Mains, the study showed the mine operating with an average annual production of 2.34Mtpa for the 5 years operation. With a work force of 262 employees, this gave an average productivity level of approximately 9,000 ROM tonnes per employee per year (ROM tpey). This level of productivity is at the higher level of productivity when benchmarked against other B&P operations using similar mining methods, so while achievable it is aggressive.

Annual Production levels are shown in the attached graph.



Kayuga Underground ROM Tonnes per Method per Year



Kayuga Underground ROM Tonnes per Unit per Year

1.7. Mining Areas

The project terms specified a mine life of four to five years at an output of 2.2Mtpa to 2.5Mtpa ROM during steady-state production operations. The mine design had to integrate with existing workings and provide sufficient pit room to accommodate the required number of continuous miner (CM) production units to achieve the stated production requirement. The proposed underground mine is divided into four districts (i.e. 100s, 200s, 300s and 400s as illustrated in Figure 2), dictated by various boundaries, geological anomalies and cut-offs:

- The 100s area incorporates reserves to the north of the existing east-west mains headings in the Kayuga Seam – the area is bounded on the western side by a major fault and to the north by higher ash values and the approved mining area
- The 200s area includes reserves to the east of the existing north-south Kayuga mains headings and up to the approved mining area, as well as remnant coal left behind in the old Kayuga Seam longwall blocks
- The 300s area constitutes all reserves to the south of the existing workings in the Kayuga Seam up to the lease boundaries and the seam split zone in the west
- The eastern 400s area (east of the seam split zone) is cut off in the north by the major fault and higher ash values, and the western 400s area (west of the seam split zone) is truncated by the DOC cut-off of 250m

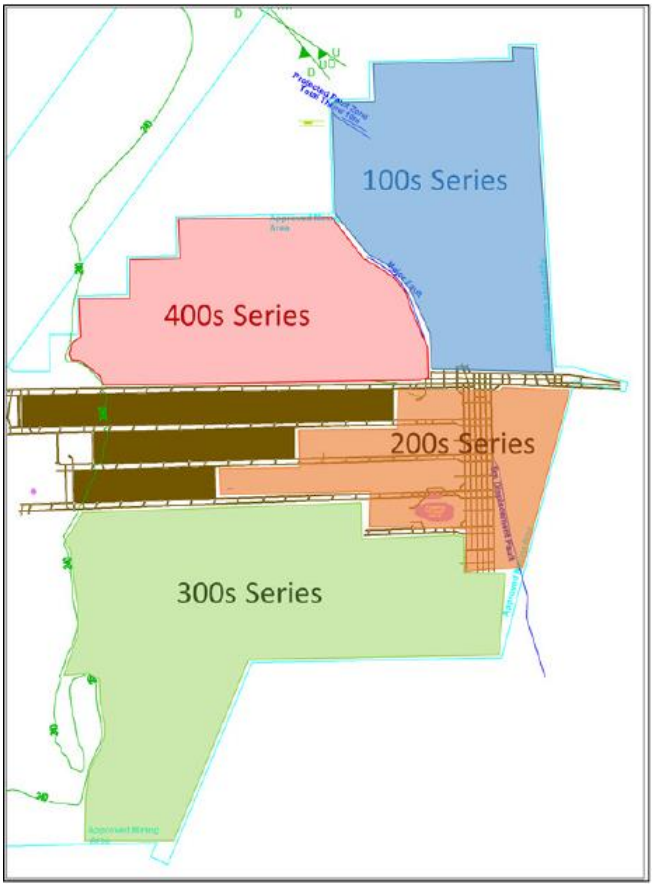


Figure 2. Kayuga Planned Underground Areas

1.8. Coal Quality Assumptions

With the varying ply and seam thickness across the lease, the ROM Ash levels have a similar variation. Modelling for the proposed working sections show that the ROM Ash varies between 10 and 40% as shown in Figure 3 below.

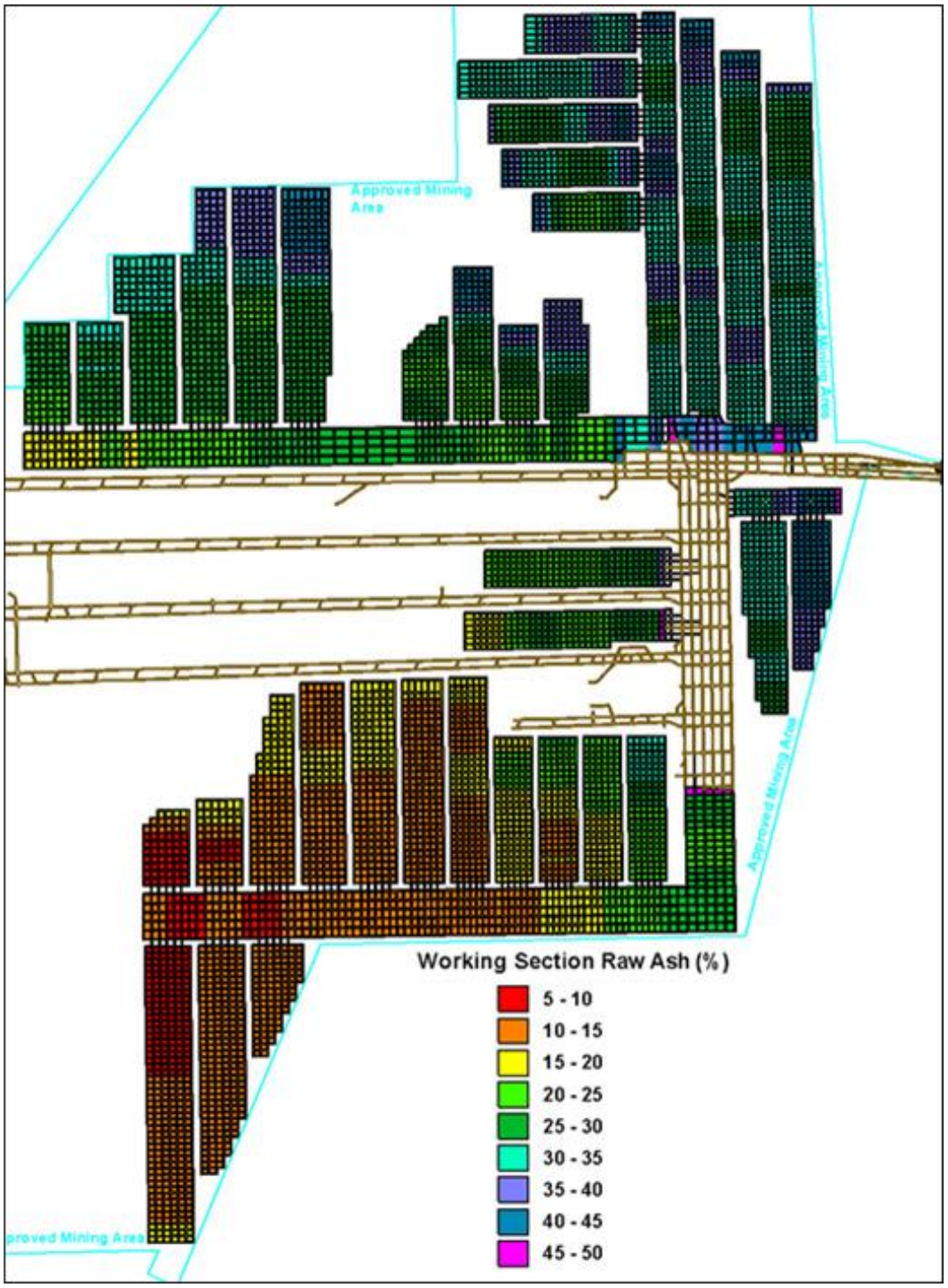


Figure 3. Bord and Pillar Panels Mining Section Raw Ash

Dartbrook coals are classed as high volatile bituminous coal, with the raw coal inherent moisture ranging from 2.0% to 8.0% and averaging 4.3%. The average raw ash on an as-received basis (arb) for the seven coal plies within the Kayuga Seam ranges from approximately 9% to 33% (arb), and the coal will require beneficiation for export markets to produce a range of thermal coal products between 10% and 18% air-dried basis (adb). It has been reported that markets for thermal coal products at between 11% ash (adb) and 12% ash (adb) are targeted for this project.

Modelling of the ROM Coal showed the following average ROM Values:

- Average ROM RD – 1.51 (Inclusive of coal, interburden and roof dilution)
- Average ROM Moisture – 6.18%
- Average ROM Ash – 26.16% (Inclusive of coal, interburden and roof dilution)

The product coal quality from the underground mine after beneficiation has been modelled as part of the FS at product ash values of 9% (adb) and 12% (adb) respectively – a CPP efficiency of 96% has been quoted, and with the selection of mining horizons during the mining process to minimise the ash percentage from combined coal and stone plies, average yields of 68.6% at 9% product ash and 74.8% at 12% product ash were modelled.

Historical product coal quality for the Kayuga Seam during longwall production was:

- Ash (as received) – 10.4%
- Total Moisture (as received) – 12.7%
- Volatile matter (as received) – 30.6%
- Calorific value (gross as received) – 6,252kcal/kg

The FS and JORC Statement showed that for the Project there was 8.98M ROM tonnes producing 6.68M Product tonnes

Category	Run-of-Mine Tonnes (Mt)	Run-of-Mine Tonnage Percentage	Product Tonnes at 12% Ash (Mt) *	Tonnage Percentage at 12% Ash
Kayuga Seam				
Proved	4,740,065	52.8%	3,444,839	51.6%
Probable	4,240,248	47.2%	3,231,274	48.4%
JORC Reserves	**8,980,313**	**100%**	**6,676,113**	**100%**

* Product tonnes calculated only on practical yield estimation, i.e. product ash requirement (adb) and plant yield

1.9. Capital Expenditure

The JORC Reserves Statement says that the total capital estimate for the Project was $258M (excluding Rail and Port) and 7.5% contingency applied to mine capital cost, with very little detail of the allocation of this capital amount.

An estimate of the expenditure makeup is provided below:

- Refurbishment of the CHPP and Reject dewatering system: $10M
- Coal clearance – expenditure will be required to:
- Refurbish and install the existing Drift and Hunter Tunnel conveyors
- Purchase and install the Trunk and Panel Conveyors
- Estimated at $70M based on database reference
- Surface Fans for No. 2 Shaft: $12M (estimated based on database reference)

- UG Electrical and Gas Monitoring: $10M (estimated based on database reference)
- Diesel vehicles: $20M (estimated based on database reference)
- Development Mining Equipment: $126M (estimated based on database reference)
- Refurbishment of the Hunter Tunnel: $10M (estimate)

1.10. Financial Modelling

During the Feasibility Study a financial analysis was undertaken of the Project. The following assumptions have been reported in the JORC Statement:

- Discount rate: 8%
- Contingency for Capital: 7.5%
- Sale Price per product tonne: 90.00 USD
- Exchange Rate: AUD:USD = 0.76
- Marketing Cost per Product tonne: AUD 2.00
- Rail and Port Cost per Product tonne: AUD10.00
- Residual Capital
- CHPP Capital recovered 100% in Project life assume carried on open cut phase
- UG Infrastructure establishment: 40% recovered at end of 5 year life
- Production and ancillary equipment: 30% recovered at end of 5 year life
- NSW Coal Royalties: 7.2%

The analysis of the Project Base Case returned a negative NPV.

Another NPV evaluation was undertaken to estimate the cost of care and maintenance for the next 5 years – this was compared to the Base Case and showed an additional discounted outflow of approximately 106%.

A sensitivity analysis of both assessments was undertaken showing for the Project Case, a 10% improvement in Coal Price or exchange rate or ROM Tonnes was required to achieve a positive NPV.

These results indicate that economic modelling for the Dartbrook Underground project exhibits no economical return for the base case assumptions however with slight changes in commercial and operating parameters, the project could prove some economic benefit as a stand-alone project.

2. Main points of the MOD 7 EA Mining Section

2.1. Production and Productivity Assumptions

The Mining section for the MOD 7 Application details the following:

- Production will utilise up to 3 BM (Bolter Miner) Super Units and 1 single BM Unit for Mains Development
- Will utilise the same working section assumptions and mine layout as specified in the JORC Reserves assessment
- Will operate on a 24/7 basis
- Will use the same productivity assumptions as specified in the JORC Reserves Statement
- Will average 1 Mtpa for 10 years with a maximum annual production of 1.5Mtpa
- Will employ 99 employees

The above assumptions when compared to those in the JORC Statement have the following major differences:

- Mine life has been extended by 5 years
- Annual production has been capped at 1.5 Mtpa and the annual average has been reduced to 1 Mtpa
- Total Mine manning has been reduced from 262 to an estimated 99 employees.

Looking at these figures it could be assumed from the headcount that there will be 1 Super Unit and 1 single BM for Mains development:

- Average annual production is made up of 1 Super Unit producing approximately 700kt and the Mains unit producing 300kt giving the 1 Mtpa
- The maximum annual tonnage of 1.5 Mtpa could be met if both units were in a Super Unit configuration in panel development (would require an additional BM)
- Productivity for this case would be:
  - 10,000 tonnes per employee per year for the average annual production level, and
  - 15,000 tonnes per employee per year for the maximum annual production

These productivity levels are at the highest level when benchmarked against other Australian Bord and Pillar operations.

These productivity levels must be considered aggressive and difficult to maintain on a regular basis.

The following factors could negatively influence the ability to meet the productivity requirements:

- Insufficient labour to provide adequate support – rectifying this would have a negative impact on operating cost and productivity levels.
- Adverse geological conditions requiring additional support to be installed at the production face. This would have:
    - Negative impact on operating costs
    - Negative impact on production rates which would impact both annual production and increasing unit operating costs on a per tonne basis, cutting into the margin.
- Incorrect production assumptions requiring an additional mining unit. This would require additional capital, manning levels and productivity levels. This would have:
    - Negative impact on operating costs
    - Negative impact on production rates which would impact both annual production and increasing unit operating costs on a per tonne basis, cutting into the margin.
- Adverse geological conditions resulting in the reduction of panel lengths or areas of mine. This would result in a reduction of mine life, a loss of revenue for the project and reduce the amount of tonnes available to repay the initial capital expenditure.

2.2. Coal Quality

The Mod 7 Application has stated that it is the intention to operate without the washery and sell a ROM (run of mine) Bypass Product. A review of the ROM Ash details provides the following information:

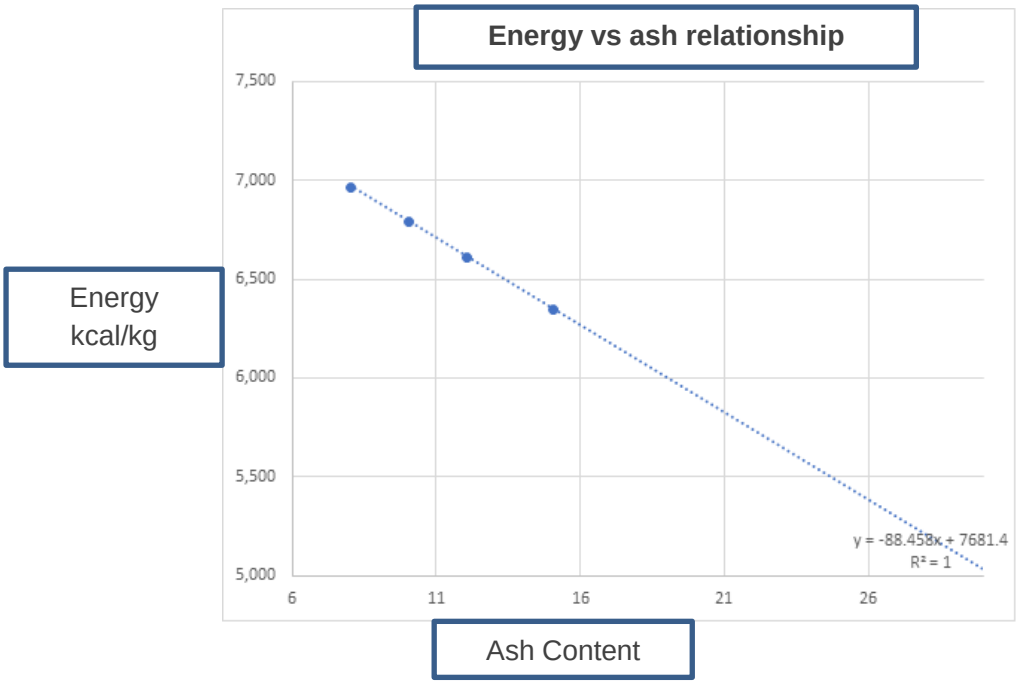
The average ROM feed is:

- Average ROM RD:1.51 (Inclusive of coal, interburden and roof dilution)
- Average ROM Moisture: 6.18%
- Average ROM Ash: 26.16% (Inclusive of coal, interburden and roof dilution)
- Working section ash ranges from 10% to 40%

Additionally, by reviewing the working section ash as shown in Figure 3 above, it shows each of the Mining areas have different working section ash levels:

- Area 1 (thinner working section) has an Ash range of 25 – 40%
- Area 2 (thinner working section) has an ash range of 20 – 40%
- Area 3 (thicker working section where the Mt Arthur Seam coalesces with the Kayuga Seam and allows a coal roof) has a range of 10 – 30% ash range with the majority appears to be in the 10 – 20% ash range
- Area 4 (thicker working section, not as good as Area 3) Ash range 15 – 40% with the majority in the 15 – 30% range (the pillar panels have a major increase in ash at the northern extents.

Information provided in the JORC Resources Statement shows the following relationship for ash to kcals on an air-dried basis.



For the Washed product of 10.4% ash (Kayuga Product) showed an air-dried Kcal of 6,761 kcal/kg and a 6,250 Kcal on an as-received basis showing a difference of approximately 510 kcal/kg reduction for an as-received basis.

Using this relationship, the air-dried calorific values for each area has been calculated:

- Area 1: Ash range 25 – 40% - Calorific Range equates to 5,470 (25% ash) to 4,143 (40% ash)
- Area 2: Ash range 20 – 40% - Calorific Range equates to 5,910 (20% ash) to 4,143 (40% ash)
- Area 3 Ash range 10 – 20% - Calorific Range equates to 6,796 (10% ash) to 5,910 (20% ash)
- Area 4: Ash range 15 – 40% - Calorific Range equates to 6,350 (15% ash) to 5,910 (20% ash)

The immediate impact of the ROM Bypass feed could be summarized as follows:

Positives from a ROM Bypass Product:

- Reduction in initial Capital required of $10M for the CHPP and Rejects water recovery system refurbishment
- Reduction in operating costs of an estimated $6.00 per product tonne for CHPP Costs
- Reduction in product moisture of approximately 6%
- Increase in product available of 3.2Mt over the 12% Ash product.
- Have 2 product stock piles available at the CHPP to allow some product blending

Negatives from a ROM Bypass Product::

- Higher ash levels reducing coal price received
- Variation in ROM ash make difficult to get set up ongoing contracts
- High exposure to increased out-of-seam dilution through adverse geological conditions.

The following mitigation strategies are available to minimise the impact of the increased “Product Ash”:

- Modify the area mining sequence to Area 3 first, then Area 4 followed by Area 1 and Area 2 so that the best ash levels are mined first and then in decreasing order so that the initial year have the best product, therefore highest revenue in earlier years reducing over mine life, or
- Minimise the overall product ash levels by operating the Super Unit in Area 3 and the Single BM in Area 1 enabling the 2 ROM feeds to be blended producing a more even high ash product
- Utilising the 2 Product stock piles at the CHPP to have a high and low ash stock piles to enable blending before going on the train.

It will not be possible to produce a 12% Newcastle Benchmark Export Thermal Product from a 100% ROM bypass production process. At best this process would deliver a consistently high ash product, or at worst a variable high ash product with the initial years having a mid-range 15-20% ash product.

In either case the Project will receive a significant reduction in coal price when compared to the Newcastle Benchmark coal price and may have to trade on the spot market and suffer associated price fluctuations.

The assumed coal price used in the EA economic analysis is USD$73/tonne. In the previous 2017 Feasibility study which did aim to produce a Newcastle Benchmark quality coal the price used was USD$90/tonne. It is unclear if this discount of $17/tonne for the MOD7 product is realistic because forecast product coal ash content over the life of the project is not disclosed by the proponent.

2.3. Capital Requirements

Mod 7, Appendix I Economic Impact Assessment details Capital for the Project of $15M for the price for the bin and shaft facility over the Hunter Tunnel and the shortened East side conveyor.

This is a substantial reduction from the $258M capital outlay in the JORC Reserves Statement and the documentation does not provide any real detail of how this is achieved.

The following reductions could be estimated using the information from both the JORC Reserves Statement and the Mod 7 Documentation:

- Require Shaft and Bin at Eastern portion of Hunter Tunnel – cost of $15M
- $10M reduction from not having to refurbish the CHPP or Rejects Water Management system
- Not having to refurbish and install 4km of the Hunter Tunnel conveyor – estimate $10M saving
- Will require installing drift conveyor to surface and install a truck loading stock pile at Western Mine Site – Potential $5M expenditure
- Not having to recover the full Hunter Tunnel – estimate saving $10M
- Coal Clearance – $40M – reduction of $20M for 2 less B&P units
- Diesel, gas monitoring and Electrical requirements - $20M required for reduced number of panels – reduction of $10M
- Ventilation Fan – stay same at $12M
- Development Mining equipment - $70M for 2 Super Units – saving of $56M

This would mean that the total Capital could be $162M, or a reduction of $96M over the Capital expenditure when compared to the JORC Reserves Feasibility Study.

There is no detail provided for the MOD 7 Capital expenditure of the $15M as listed in MOD 7 EA Appendix I and the difference to the estimated $162M in this review is $147M.

One possibility is that the capital has been planned to be replaced by other means of financing including a mixture of:

- Equipment Leasing
- Having the Contractor provide the equipment and pay in contract rates
- Enter into a BOOT (Build, Operate, Own and Transfer) leasing deal
- Enter into a whole of Mine lease deal – White Oak Mine in Illinois in the US entered into a whole of mine lease deal with a major OEM (Original equipment manufacturer) provided they purchased all the mining equipment from that OEM

All of these options would be reflected in the operating cost which does not appear to be the case given the low operating cost predicted as per section 2.4 of this report.

2.4. Operating Cost

Appendix I of Mod 7 EA states that the average operating cost for the operation is $65M per annum. If we assume the average annual production is 1Mt it could be assumed the production cost, excluding Royalties is $65/tonne FOB. Using the following incremental costs, either provided in the documentation reviewed or benchmarked against industry performance:

- Rail and Port Charges - $10.00 per product tonne (JORC Reserves Statement)

- Marketing costs - $2.00 per product tonne (JORC Reserves Statement)
- Stockpile Management for both East and West Infrastructure - $2.00 per product tonne
- Trucking cost West side to Hunter Tunnel Shaft and haul road maintenance – $4.50 per product tonne
- This leaves mining cost to Surface of $48.50 per ROM tonne – which in this case is also per product tonne

The $48.50 is in line with one of the lowest costs for a similar B&P mine, however that similar mine is an owner operated mine and the equipment is owned by company. Building up an operating cost by first principles using reference to a cost data base for 1 Mtpa a value of $52.00 per ROM tonne was achieved.

Therefore, the operating cost of $48.50, while achievable is aggressive and does not include any major leasing costs.

Also, from previous sections of this report, the operating cost level could be negatively impacted by adverse productivity results, poor geological environment, additional manning required or various other impacts.

The operating cost levels for the Underground Mining to surface appear aggressive and vulnerable to upward pressure.

2.5. Would the Mod 7 Proposed operation be economically viable?

While there is a very little data available to make a detailed evaluation, when comparing the Mod 7 Proposed mining process and ROM Bypass product to the Production model provided in the JORC Reserves document the following comments could be made:

The JORC Reserves option has:

- Lower Life of Mine total production, but higher annual production levels
- Higher overall capital cost
- Trucking costs and washing costs
- Lower ash product able to achieve a higher sale price
- Higher annual revenue,
- The JORC Reserves Option had a reported negative NPV

The Mod 7 Option has:

- Higher Life of Mine total production, but lower annual production levels
- Lower overall capital cost
- Trucking cost positively offset by no washing costs
- Higher ash product resulting in lower sale price
- Lower annual revenue due to lower production

Experience from previous project evaluations shows that two of the biggest value drivers are coal sale price and production levels, with Project Capital and Operating costs having less impact on value.

Whether the additional 3.3Mt over the Life of Mine, reduced Capital expenditure and lower Operating cost offset the lower coal sale price and lower coal annual production levels is difficult to assess with the available data, but if the JORC Reserves case had a negative NPV, it is difficult to believe that the Mod 7 Option would provide a positive NPV, especially considering that both productivity levels and operating costs are likely to be subject to negative pressures.

MARSDEN JACOB ASSOCIATES

economics
public policy
markets
strategy

26 April 2019

President
Hunter Thoroughbred Breeders Association

Dartbrook Mine Modification 7 – Review of the economic impact assessment

Dear President

Marsden Jacob Associates (Marsden Jacob) has been engaged by the Hunter Thoroughbred Breeders Association (HTBA) to review the economic impact assessment undertaken of the proposed modification to the Dartbrook Mine – Dartbrook Mine Modification 7. The following details the outcomes of the review which has identified several critical issues with the current assessment.

The review has been undertaken with reference to the following:

- NSW Government (2015) Guidelines for the economic assessment of mining and coal seam gas proposals (the Guidelines)
- NSW Government (2017) Guide to Cost-Benefit Analysis, TPP17-03
- Gillespie Economics (June 2018) Dartbrook Modification 7 Economic Impact Assessment (Appendix I of the Environmental Impact Statement)
- Hansen Bailey (2018) Modification 7 Response to Submissions for Australian Pacific Coal Limited, August 2018
- Australian Pacific Coal Limited (2017) Dartbrook Kayuga Seam Underground JORC Reserves Statement, Coal Reserves as at February 2017 (focused on Section 4.4)
- White M (2019) Review of the Dartbrook Mine MOD 7 Application Kayuga Seam Bord and Pillar Mining Operations
- Stephenson Environmental Management Australia (2018) Review of Documents Relating to Air Quality
- OD Hydrology (2019) Review of Dartbrook Mine – Modification 7 Environmental Assessment
- Arup (2019) Dartbrook Mine Modification 7 – Preliminary Review of Noise Impacts

The Guidelines state that the following procedure is to be used to estimate the net present value of a project attributable to NSW: "The project's net present value to the NSW community accounts for all direct and indirect costs and benefits. It is the total direct net benefits (royalties, company tax and net

Suite 203, 84 Alexander St
Crows Nest NSW 2065
0418 765 393
economists@marsdenjacob.com.au

ABN 66 663 324 657

producer surplus), plus the indirect benefits minus the net environmental, social and transport related costs and the net public infrastructure costs." (page 17)

Due to limited time and a lack of transparency in the proponent's economic analysis we did not attempt to replicate all of the calculations, however, the sensitivity of the outcome to key variables have been explored in the review.

1. Summary of the findings from the review of the economic analysis

The results of the economic analysis are reported at both National and NSW scales. In line with the Guidelines, the population group for the NSW assessment and in our view the report correctly identifies the classes of benefits and costs relevant to NSW as set out in the Guidelines.

However, the review has identified several critical issues that affect both the National and NSW scale results and mean that the benefits are over-stated, and the costs are under-stated. The results of the economic assessment are negative at both National and NSW scales when assumptions based on expert analysis and input are used.

The key issues that have been identified with the economic analysis are summarised in Table 1 (National scale) and Table 2 (NSW scale).

Table 1: National scale economic analysis – summary findings

	Summary remarks
Capital cost – under-estimated	Mining experts have determined that the capital cost should be $162 million (not $15 million in the economic analysis).
Operating cost – under-estimated	Mining experts have assessed that the workforce count needs to be significant higher.
Externalities – under-estimated	Externality impacts are either ignored or under-estimated, including: - exceedances of air and noise criteria - significant hydrological risk - significant visual impacts for local residents, tourists, travellers and agricultural industries - significant greenhouse gas emissions - material impacts on equine and viticultural CICs.
Sale value – coal price too high	High ash coal means it trades at a significant discount (ranging from $20 to 50 per tonne) to Newcastle benchmark coal. The assumed coal value used in the analysis is neither conservative nor does it reflect current price outlooks and discounting.

	Summary remarks
Sale value of coal – production risks not assessed	A number of risks are present, including hydrological and incendiary, that could slow the production schedule.

Table 2: NSW scale economic analysis – summary findings

	Summary remarks
Royalties – over-estimated	Benefits from royalties are over-stated with coal price and NSW share of project ownership both affecting this calculation.
Company Income Tax – over-estimated	Benefits from company tax are over-stated, because mines actively minimise their tax.
Net Producer Surplus – over-estimated	Benefits from net producer surplus are over-stated, with higher costs and lower revenue affecting the producer surplus.
Externalities – under-estimated	Externality impacts are either ignored or under-estimated, including: - exceedances of air and noise criteria - significant hydrological risk - significant visual impacts for local residents, tourists, travellers and agricultural industries - significant greenhouse gas emissions - material impacts on equine and viticultural CICs.
Economic benefit to suppliers – over-estimated	Currently based on generalised assumptions and there are no means to ensuring that they will eventuate from this project.

2. Capital and operating costs are under-estimated

Marsden Jacob is concerned that the economic analysis is not based on realistic cost estimates for the mine and the assessment suffers from optimism bias.

Several key cost assumptions in the National scale and producer surplus economic indicators appear to be materially under-estimated, with the findings of the economic analysis contradicting the findings as reported in a recent JORC statement which concluded that *"These results indicate that economic modelling for the Dartbrook Underground project exhibits no economical return for the base case assumptions"* (page 65).

Where the capital cost is concerned the economic analysis is based on an assumed capital cost of $15 million. This amount was increased to $45 million in the Response to Submissions: *"The total capital expenditure for the Modification is estimated at $45 million. The Economic Impact Assessment (Appendix I of the EA) was based on this value".* Because the economic analysis is based on the former value this is the comparison point used in the analysis.

Independent mining expert White (2019) has undertaken a detailed analysis of the capital costs for the mine and estimated that the required capital for the project is $162 million, which means the capital cost has been underestimated by $147 million in the economic analysis.

Low capital costs could potentially be reasonable if these costs are captured in operating costs, but this is not the case as White (2019) states that the operating costs "appear to be aggressive and could easily suffer upward pressure particularly if headcount was to increase or production rates were to be below plan". Furthermore, White (2019) notes that the workforce for the mine needs to be increased by at least 40 full-time equivalents (FTEs), which equates to approximately $5 million per annum or a present value cost increase of nearly $40 million.

Finally, Marsden Jacob notes that the economic analysis is based on the assumption that the coal produced from the mine is not washed. However, based on the response to submission the applicant appears to be reserving the right to use the existing washery facility at the East Site. White (2019) finds that in order to meet the coal specification there is a high likelihood of the CPP (washery) being utilised to enhance the coal quality to meet its proposed market specification. Using the washery would materially change the economic outcomes. From a cost perspective the (i) operating, (ii) waste management, and (iii) water requirements would all materially increase. While this would raise the unit costs of production, it may also raise the unit value of the coal itself and thereby increase the royalties that accrue to NSW. The net impact of the differential impact on costs and benefits is not clear, but this uncertainty further highlights the gaps in the economic analysis.

In summary, increases to the capital and operating costs affect both the National and NSW scale analysis:

- National: At the National scale they directly impact the Net Production Benefit, Australian Net Production Benefit and Australian Net Social Benefits
- NSW: At the NSW scale they directly impact Net Producer Surplus benefit and the Company Tax benefit.

3. Net producer surplus benefit is over-stated

Net producer surplus is a key benefit in the NSW scale analysis. The guidelines state that the "net producer surplus attributable to NSW is the economic rent attributable to NSW owners of capital" (page 12, Guidelines), calculated using the following formula:

Net producer surplus = Revenue – costs – tax – royalties

This means that the economic analysis needs to demonstrate that there are NSW owners of capital in the project to whom a producer surplus accrues. To assist with this calculation the guidelines identify an approach to estimating the proportion that is attributable to NSW, including that the proponent should firstly estimate the Australian share of the project's ownership (with an example of 20% used in the guidelines), and then estimate the NSW share of ownership, with 32% identified as an example percentage (page 12, Appendix I).

The NSW scale economic analysis for Dartbrook mine currently assumes a benefit of $30 million associated with net producer surplus. This is based on the assumption that "32% of the residual net producer surplus to Australia i.e. net production benefits minus company tax minus royalties, is attributed to NSW based on NSW's share of the Australian population" (page 19, Appendix I).

Marsden Jacob's review finds that the net producer surplus is over-estimated, because:

- the assumed revenue is based on coal prices that are too high (see Section 4)
- the assumed capital and operating costs have been materially under-estimated (see Section 2)
- the Australian share of project ownership (assumed to be 100%) is without empirical justification.
- the NSW share of capital ownership (assumed to be 32%) is not justified and the current assumption that it is proportional to NSW' share of the Australian population is without empirical basis.

Our analysis indicates that the net producers surplus needs to be reduced by at least half when adjustments are made to the revenue, costs, tax and royalty calculations.

4. Assumed coal price is too high

The assumed coal price is an important input to both the National and NSW scale economic analyses:

- National: Changes in the assumed coal price affect the sale value of coal in the analysis, which comprises over 90 percent of the benefits from the project
- NSW: Changes in the assumed coal price affect: (i) the Net Producer Surplus benefit (ii) Royalties and (iii) Company Tax benefit.

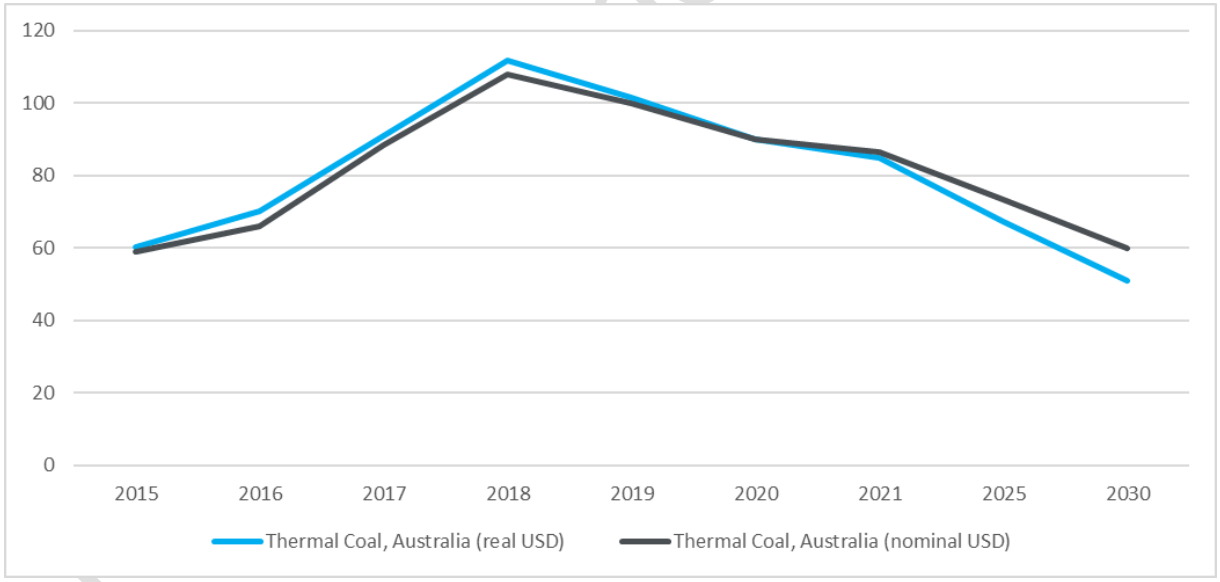
The economic analysis states that "Incremental revenues associated with the expected production profile are estimated at approximately $95M per annum (on average) over the nine-year operational phase. This is based on an assumed realised coal price of United States Dollar (USD) 73/t and an Australian Dollar (AUD)/USD exchange rate of 0.77." (page 10, Appendix I).

Given the uncertainty around future coal prices, the central case in the economic analysis should be based on lower bound or best conservative coal prices, to mitigate any optimism bias. The lower bound refers to the lowest point estimates within a likely range of forecasts and does not necessarily reflect an estimate of how far prices can fall. It is not a 'worst case scenario' in comparison to historical prices. Rather, it should represent a reasonable but pessimistic view of future prices. (LEC, 572)

Marsden Jacob's review finds that the assumed coal price is too high from both price outlook and price discounting perspectives. The World Bank recently forecast that the price of benchmark thermal coal from Australia (see Figure 1) will fall over the coming decade from a peak of $100 per tonne to $50 per tonne by 2030, and S&P Global Platts (see Figure 2) identifies that coal of a similar quality that which is proposed to be mine at Dartbrook is trading for a discount of between $20 and $50 per tonne.

While it is not possible to accurately estimate how great the differential will be in the future, conservatively applying a 20% price differential (at the lower end of the historic differential) would result in an average forward price of USD$65 per tonne, over 10% below the coal price in the economic analysis (USD$73 per tonne).

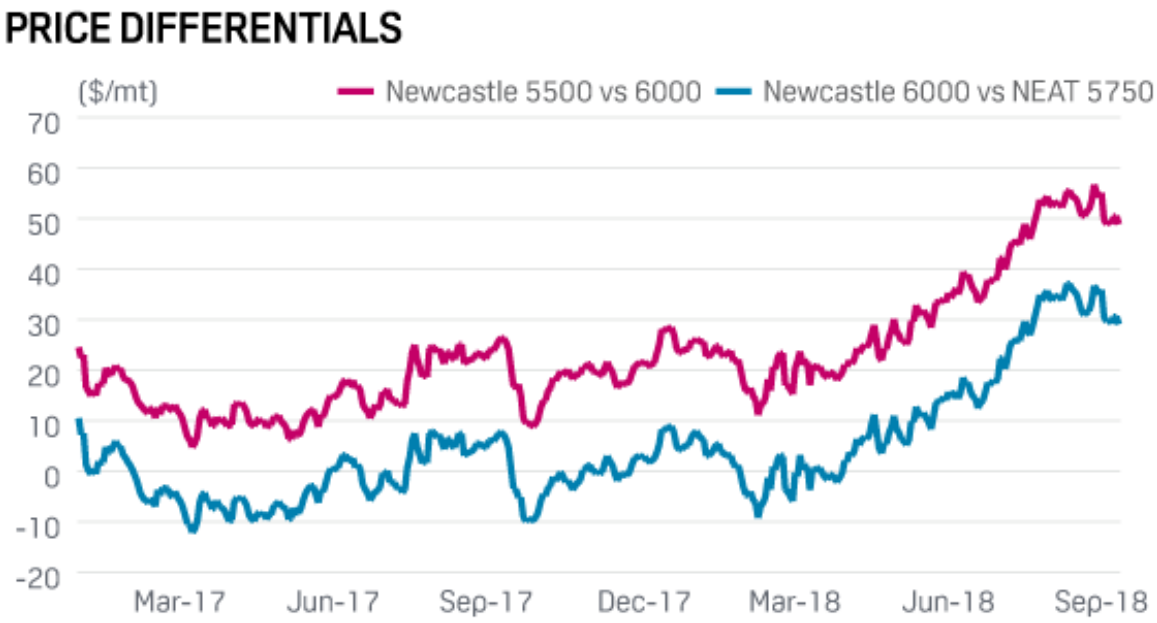
Figure 1: World Bank Thermal Coal forecasts, benchmark coal



Source: World Bank (October 2018)

Note: Coal (Australia), thermal, f.o.b. Newcastle, 6,000 kcal/kg, spot.

Figure 2: Price differential, 5,500 (high ash) vs 6,000 (benchmark)



Source: S&P Global Platts

It is also noteworthy, that analysis by White (2019) also draws into questions the proponent's ability to meet their stated coal ash specification which means that the coal price could be even lower.

5. Royalty benefit is over-stated

Marsden Jacob's review finds that the benefit from royalties has been materially over-estimated, because:

- the coal price and revenue assumptions are optimistic (discussed in Section 3),
- the analysis does not factor in environmental or market risks that could shutdown mining and delay royalty payment, and
- no attempt has been made to adjust for the NSW share of project ownership, to correct for any wealth transfer.

In the CBA, royalties have been included in the analysis as a direct economic benefit at the NSW scale, with a value of $38 million (present value at 7% discount rate). However, any reduction in the price of coal or delay in the production schedule reduces the present value of royalty payments.

The expert review by OD Hydrology (2019) has identified material flood related risks, such that flood exceedances present safety, economic and environmental consequences that have not been factored into the cost benefit analysis. For instance, OD Hydrology (2019) identifies that:

- The potential for a flood event exceeding the proposed level of protection is some 10% over the proposed 10-year project life, which is neither "very low probability" nor representative of an "extreme event".
- No updated/contemporary flood assessment has been reported, with all conclusions regarding flood levels based on information undertaken and reported in 2011. This is despite significant changes to Australian Rainfall & Runoff published in July 2016 with implications for estimated design flood levels and probabilities which have not been recognised or considered in the EA reporting.

Furthermore, no allowance has been made for NSW share of project ownership. NSW share of project ownership is important, because this proportion should be netted off the estimated benefit from royalty payments to the NSW Government.

The NSW Government Guide to Cost Benefit Analysis explains the reasoning most clearly when it states that "Government revenues accrued within the State that are an expense for another party within the State should be considered a transfer rather than a cost or benefit. This should be noted in the CBA but will have no net effect on the final result" (page 13).

In summary, Marden Jacob finds that the royalty benefit to NSW is over-stated, because:

- the assumed coal price is over-estimated.
- the assumed benefit from royalties has not been reduced to reflect the proportion of NSW ownership.
- no risk factor has been included to reflect the potential for disruptions to production (such as from flooding or fire), which could delay extraction and thereby affect the present value royalty calculation.

6. Company income tax benefit is over-stated

In the NSW scale economic analysis, annual company income tax payable is included as a benefit of $14 million (present value).

Marsden Jacob's review finds that the direct benefits from company income tax are over-stated because:

- the economic analysis assumes a 30% company tax rate, whereas recent analysis identifies that based on a review of "*information on mining companies' total income and tax payments for the last three financial years (2014, 2015 and 2016) and found that the tax paid by these companies ranged from around 2.7% to 6.8% on total income".*(Section 583)[1]

[1] Gloucester Resources Limited v Minister for Planning [2019] NSWLEC 7, https://www.caselaw.nsw.gov.au/decision/5c59012ce4b02a5a800be47f

- the Australian Pacific Coal Ltd Annual Report (2017-18) reveals that in both 2017 and 2018 financial years the company did not pay any tax.
- it must be assumed that the mine would take such steps as are lawfully available to it to minimise the tax that it had to pay.

Finally, if there is any NSW ownership (as previously discussed in Section 5) then as with royalties and net producer surplus this proportion should also be netted off the assessment of company income tax as a benefit, because it is a transfer not a benefit.

7. Externality impacts are under-estimated in the analysis

Mining projects cause environmental impacts to air quality, noise, biodiversity, greenhouse gas emissions, groundwater, surface water, aboriginal heritage, non-aboriginal heritage, visual amenity, and public infrastructure (such as water supply, roads and energy).

The economic analysis needs to consider all of these issues to be compliant with the NSW Guidelines, when assessing the net present value to the NSW community in a manner that accounts for all direct and indirect costs and benefits. This has not occurred, because the currently analysis either assumes that impacts have been mitigated or applies very conservative cost estimates which bias the results in favour of the project.

Greenhouse gases

Where greenhouse gas (GHG) emissions are concerned, very conservative assumptions are used. Appropriately only Scope 1 and 2 emissions (369,000 $tCO_{2\text{-}e}$ per year) are included, but conservatively the analysis then only includes Australia's share of the global population (around 0.3%) and NSW's share of the Australian population (32%) in the valuation of greenhouse gas emissions for the National and NSW scale analysis.

The consequence of this is that the externality cost associated with greenhouse gases included in the National and NSW scale economic analyses are only $0.3 million and $0.1 million (present value) respectively. What the economic analysis doesn't reveal is the true cost of the Scope 1 and 2 greenhouse gas emissions from the project, which if conservatively valued at $25 per $tCO_{2\text{-}e}$ would equate to over $8.5 million per annum or present value over the mining period of $60 million.

Marsden Jacob's review of the various NSW Government guidelines for economic appraisal confirms that this approach (only including a NSW share) runs counter to the approach commonly recommended by the NSW Government. For instance, the Transport for NSW: Transport Economic Appraisal Guidelines identify a carbon value of over $57.30 per tonne[2], and no factor adjustment is

[2] Transport for NSW (2018) Principles and Guidelines for Economic Appraisal of Transport Investment and Initiatives, https://www.transport.nsw.gov.au/system/files/media/documents/2018/Principles_and_Guidelines_for_Economic_Appraisal_of_Transport_Investment_and_Initiatives_Combined_0.pdf

recommended to be applied either for: (i) the Australian population, relative to the global population, or (ii) the NSW population, relative to the Australian population.

Furthermore, we note that the NSW Government has endorsed the Paris Agreement and has committed to "Implement emission savings policies that are consistent with achieving the Commonwealth Government's interim and long-term emissions savings objectives and are fair, efficient and in the public interest"[3]. So, Marsden Jacob finds that the approach being used to valuing the externality cost of greenhouse gases, which effectively externalises nearly all of the cost, is biased in favour of the project and does not align with the NSW Government's declared policy position on greenhouse gases.

Other externalities

The economic analysis does not quantify any costs associated with noise, air quality, surface water, subsidence, biodiversity, aboriginal heritage or historic heritage, and it only includes a very small value for groundwater impact.

Noise

Where noise is concerned, Arup (2019) notes that no noise assessment has been undertaken in accordance with the Section 2.3 Project intrusiveness noise level of the NPfI. So, the request from NSW EPA has not been adequately addressed and remains outstanding. Arup (2019 further state that "Based on Justice Preston's findings in the matter Gloucester Resources Limited v Minister for Planning, the NSW EPA is to recommend that an assessment of adverse noise and social impacts be completed based on the "current" background noise levels. If noise mitigation is to be implemented, then the extent of the noise mitigation is to be disclosed and considered with respect to visual amenity" (page 8) These noise impacts should be factored into the economic analysis as an externality.

Air

Where air quality is concerned Stephenson (2018) identifies that the background PM2.5 is close to IAC (Air Quality Index) and that the modification contributes to exceedances of this level.

Epidemiological studies worldwide have shown that increases in particle pollution are associated with a range of health outcomes, including increases in daily mortality, hospital admissions and attendances at emergency rooms. Problems from short-term exposures include respiratory symptoms, such as irritation of the airways, coughing and difficulty breathing; aggravated asthma; irregular heartbeat; heart attacks; and premature death in people with heart or lung disease. Long-term exposures may result in decreased lung function, the development of chronic bronchitis and increased cardiovascular risk. Significantly, there is no safe concentration threshold for exposure to $PM_{2.5}$ at which adverse health effects have not been observed. This means that even low levels may have an adverse impact on human health (Pope & Dockery 2006).

[3] https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Climate-change/nsw-climate-change-policy-framework-160618.pdf

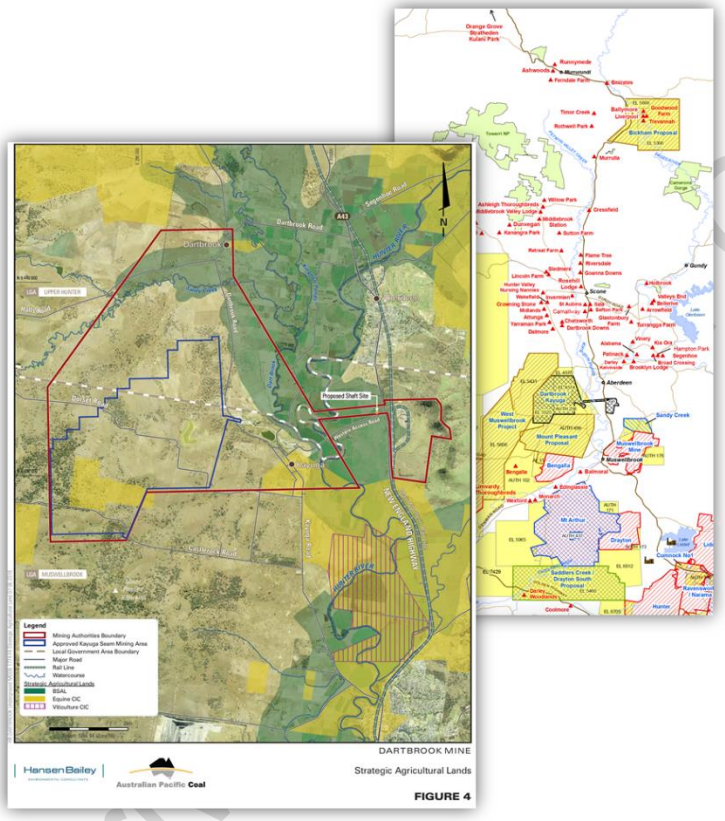
As a result, Marsden Jacob finds that the health impacts have not been adequately assessed – particularly if air quality criteria are going to be exceeded. No attempt has been made to assess the incremental impact of PM2.5 from the project.

The Department's report confirms this when it stated that Dartbrook's incremental contribution "is enough to trigger an exceedance of the cumulative criterion. Under the VLAMP, these receivers could be afforded voluntary acquisition rights from AQC." (page 18)

Critical industry cluster

The project is located in the middle of two NSW Government recognised Critical Industry Clusters (CICs): Equine CIC and Viticulture CIC.

Figure 3: Mine locality compared to the equine and viticulture CICs



Despite this close proximity the current analysis effectively assumes no impact for these industries, even though there is clear evidence that these industries consider the project is adversely affecting business certainty and resulting in delayed investment.

This is an important consideration in the economic analysis, because economic diversification is critical to maintaining the economic resilience of the region particularly as the time is approaching when it will start transitioning away from mining and coal fired power stations. Illustrating this, AGL has

announced that it will be closing down Liddell and Bayswater power stations in 2022 and 2035, respectively.

This critical importance of the CIC and sustainable long term economically diverse industries in the Upper Hunter are reflected in numerous NSW government planning documents and decisions.

Water

Where water resources are concerned, the review by OD Hydrology (2019) has identified a number of important issues that have a bearing on the economic analysis, including:

- no consideration of climate change impacts on water supply, water management or flood risks have been undertaken
- no assessment of the range of operating approaches has been considered, particularly with respect to the potential use of the coal wash plant
- alluvial impacts have not been adequately assessed to reach the definitive conclusion
- despite being acknowledged that the modification could result in a decline in groundwater pressure, no quantification of clarification of the water level or pressure declines are presented
- aquifer interference approvals are applicable to the activity. These water resource impacts should be more comprehensively factored into the economic analysis as an externality.

In summary, Marsden Jacob's review finds that the externality impacts are materially under-estimated in the current economic analysis.

8. Economic analysis results

Marsden Jacob has not comprehensively remodelled the project. However, we have considered key assumptions and our review highlights that the results at National and NSW scales are highly sensitive.

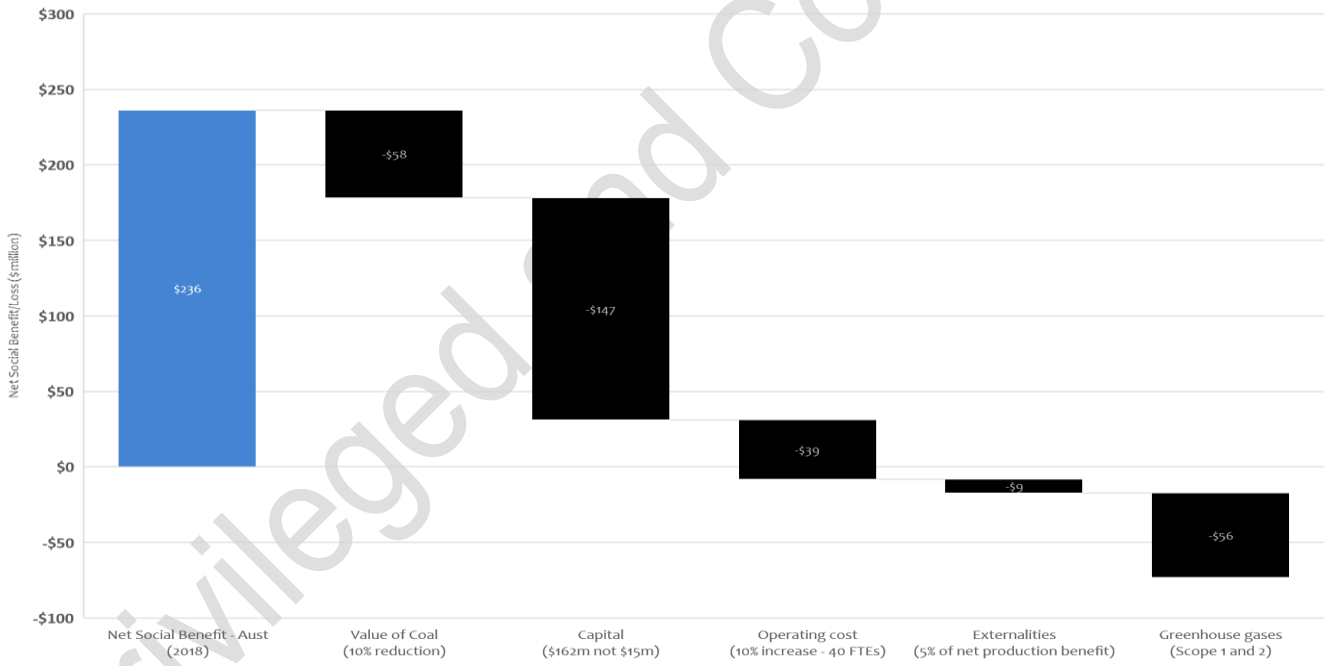
National scale

At the National scale the net result is negative $73 million (see Table 3 and Figure 4), when the changes discussed earlier in this review are made to the assumptions.

Table 3: Impact of assumption changes on the National scale economic analysis, $million[4]

	Central Case
Net Social Benefit - Aust (2018)	$236
Value of Coal (10% reduction[5])	-$58
Capital ($162m not $15m)	-$147
Operating cost (10% increase - 40 FTEs)	-$39
Externalities (5% of net production benefit[6])	-$9
Greenhouse gases ($25 per tCO_{2-e}, Scope 1 and 2)	-$56
Net Social Benefit	**-$73**

Figure 4: Economic analysis, National



[4] Note no allowance has been made for the cost of coal washing.
[5] This is a conservative reduction, particularly when it is noted that the economic analysis includes a 30% decrease in value in the sensitivity analysis.
[6] Economic analysis notes that references to 'no material impact' do not mean that there are no impacts, but that impacts are likely to be no more than 5% of quantified net production benefits of the project (page 20). Reflecting this uncertainty, the externality impacts has been revalued at 5% of the net production benefit to illustrate the importance of this cost item.

NSW scale

At the NSW scale the net result is marginal, when compared to the central assumptions (see Figure 5), whereas when the result is compared to the worst-case revenue scenario the result is negative $15 million (see Figure 5). This illustrates how sensitive the outcome is to changes in key assumptions a point that was missed in the Department's assessment (see Table 4).

Table 4: Impact of assumption changes on the NSW scale economic analysis, $million[7]

	Central Case	Worst Case
Net Social Benefit – NSW (2018)	$130	$71
Producers Surplus	-$15[8]	-$15[9]
Royalties (10% reduction in the value of coal)	-$4	0[10]
Company Tax (5% due to tax minimisation)	-$12	-$6
Economic benefit to workers (conservatively, no change)	$0	0
Economic benefit to suppliers (conservatively, no change)	$0	$0
Externalities (5% of net production benefit)	-$9	-$9
Greenhouse gases ($25 per $tCO_{2\text{-}e}$, Scope 1 and 2)	-$56	-$56
Net Social Benefit	**$34**	**-$15**

[7] Note no allowance has been made for the cost of coal washing.
[8] 50% reduction in producer surplus
[9] Reduction would be higher in the worst case but held constant to maintain conservatism.
[10] No further reduction to royalties because net social benefit starting point for this scenario reflects a 30% reduction in the value of coal.

Figure 5: Economic analysis, NSW with central assumptions

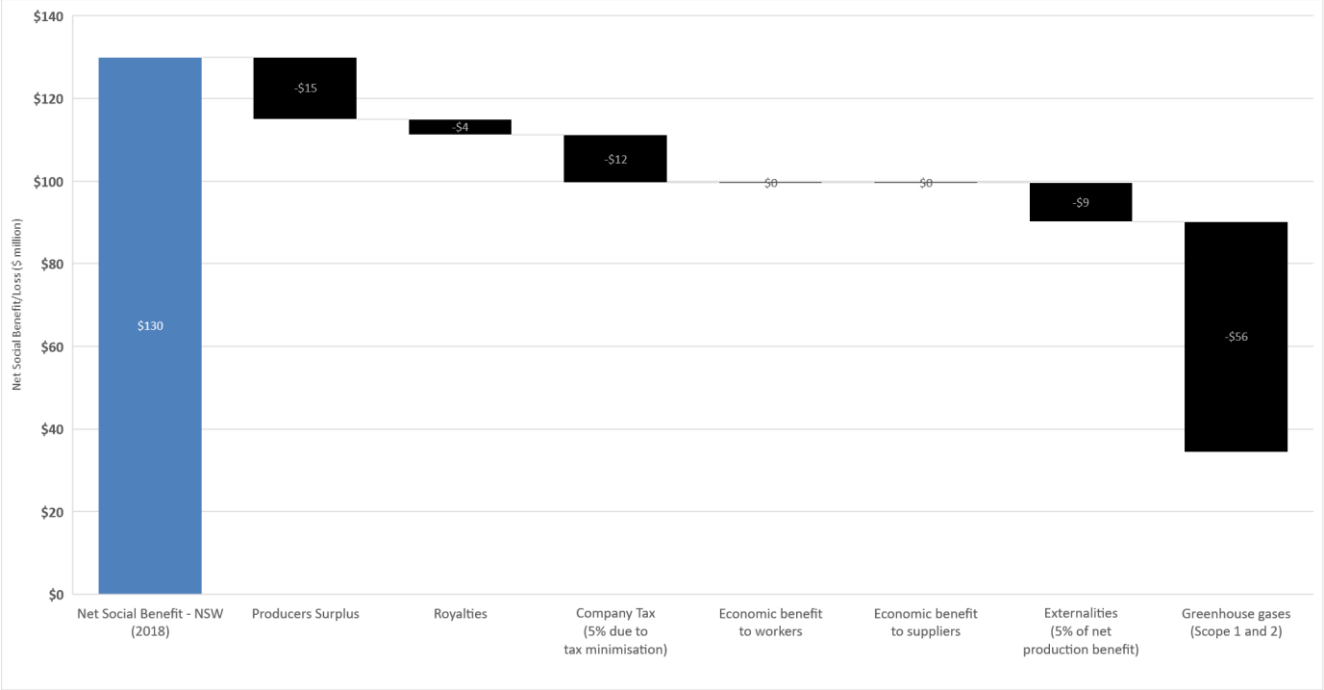
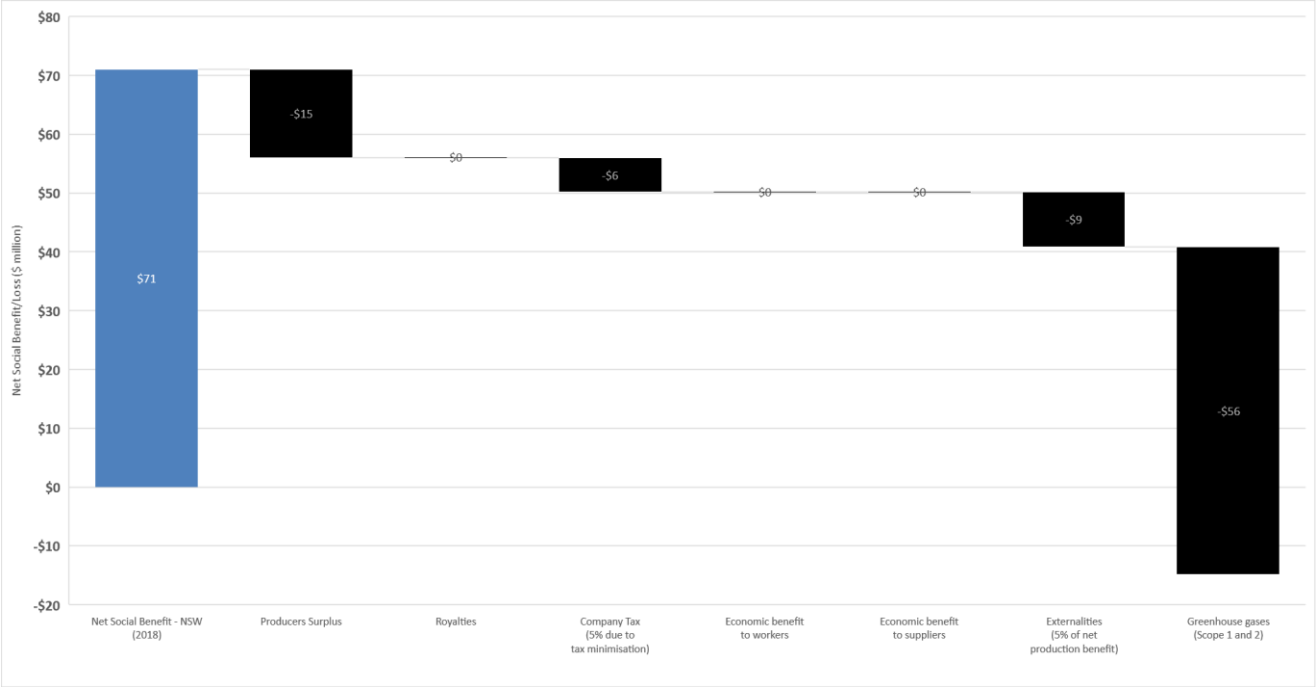


Figure 6: Economic analysis, NSW with low revenue assumptions



9. Concluding remarks

Under the *Environmental Planning and Assessment Act 1979* the consent authority must evaluate a number of factors, with both the quantitative and qualitative findings of the cost-benefit analysis and local effects analysis to be included – alongside other information.

While the economic methods used in the economic analysis align with the guidelines, Marsden Jacob's review has identified several critical issues with the cost and benefit assumptions that underpin the analysis, which systematically bias the results in favour of the project.

Our review has identified that the results of the economic assessment quickly become negative at both National and NSW scales when assumptions based on expert analysis and input are used:

- National = -$73 million (NPV)
- State = -$15 million (NPV)

Marsden Jacob further asks how the project could be considered for approval when the average royalty payments ($5.6 million p.a.[11]) is less than the annual greenhouse gas emissions cost alone ($8.5 million p.a.)?

Yours sincerely,

Rod Carr, Director

[11] Economic analysis states that the total value of royalty payments is $56 million over 10 years (page 17, Appendix I).

Dartbrook Mine Modification 7
Noise Impacts

Frank Butera
Associate – Acoustics
frank.butera@arup.com

ARUP

Introduction (Environmental Assessment Uncertainty)

- Bridges Acoustics have prepared a brief *Acoustic Impact Assessment* for the proposed project, dated 5 June 2018.
- Mach Energy Australia currently operate Mount Pleasant open cut coal mine located to the abutting south of the Dartbrook Mine. Wilkinson Murray completed a noise and blast vibration assessment dated 25 May 2017.
- In particular the Bridges Acoustics assessment does not investigate:
    - Intrusiveness Noise Levels in accordance with the NSW *Noise Policy for Industry.* There is inefficient information within the Bridges Acoustics report to complete the Intrusiveness Assessment.

Introduction (Environmental Assessment Uncertainty)

- Blasting is anticipated, however there is no ground-borne vibration, blast noise or blast overpressure completed within environmental assessment.
- An accumulative impact assessment acknowledging the abutting Mount Pleasant open cut mine has not been completed.

- The noise limits proposed by Bridges Acoustics are significantly higher than the noise limits proposed by Wilkinson Murray for the same residential dwellings surrounding the Dartbrook Mine.

- There is no understanding or acknowledgement of the existing ambient noise levels in the vicinity of residential properties

- Social impacts associated with operational noise from Dartbrook Mine have not been assessed.

Project Noise Limits

(No Consistency)

- The noise limits assigned to this project are inconsistent with the noise limits for Mount Pleasant.

- For identical receiver positions surrounding Dartbrook Mine, Bridges Acoustics presents project noise limits 6 dB higher than the Wilkinson Murray report. This is a significant difference for operational noise limits.
- There is no clear and concise understanding that links the relevance of noise limits detailed by DA 231-7-2000 issued two decades ago to the current application.

Project Noise Limits

(No Consistency)

- There are no background noise measurements or reference to other background noise measurements. This is considered be in an usual approach considering it is a requirement of the noise policy to understand the existing background noise levels.
- In summary, a conflict exists when comparing the Mount Pleasant and Dartbrook Mine noise limits.

Noise Sources (Misleading and Ambiguous)

- The noise source data for the acoustic modelling by Bridges Acoustics is inconsistent with other Bridges Acoustics noise assessment reports for similar mining projects in the region. The noise source levels presented for Dartbrook mine are lower.
- For example, haul truck noise levels considered by Wilkinson Murray for Mount Pleasant are similar to industry standard and DEFRA noise levels for extractive industries. The Mount Pleasant haul truck noise levels have been modelled using data that is up to 7 dB higher than noise levels for Dartbrook Mine.
- This approach results in an environmental assessment that has the potential to misrepresent the actual noise levels.
- Bridges Acoustics has adopted lower equipment noise source levels and has adopted significant operational restrictions.

Noise Sources (Misleading and Ambiguous)

- There is insufficient information with respect to the origins, make or repeatability of the noise data relied on for the noise assessment.
- Use of higher noise source data similar to Mount Pleasant or adopting alternative assumptions with respect to haulage operations will demonstrate an exceedance of the project noise limits.

Noise Modelling

(Unable to be verified)

- Bridges Acoustics have undertaken noise modelling using ENM software. The developer of ENM no longer supports or maintains the software and it has not been commercial available for over a decade.
- Since the developer of ENM no longer supports the product additional noise conditions issued by NSW Departments have not been implemented or verified for the software. This includes newly released metrological data detailed in *Fact Sheet D: Accounting for noise-enhancing weather conditions* from the *Noise Policy for Industry 2017* (NPfI).
- Bridges Acoustics have not validated or calibrated the noise model, as a result the noise model is not representative of local conditions. For the Commission, this is important because the modelling has assessed against local conditions.

Accumulative Noise Impacts (Not compliant with the policy)

- The Bridges noise assessment presents an exceedance of the DA noise limits.
- There is no accumulative noise impact assessment that acknowledges other nearby extractive industries or the abutting Mount Pleasant Mine. It is a requirement of the noise policy to assess accumulative impacts.
- For residential properties located in Kayuga, combining the Dartbrook and Mount Pleasant operations will increase the exceedance when compared to the noise limits of the DA. For Kayuga there will be a greater exceedance when considering the lower Mount Pleasant noise limits.
- The compounding noise impact of simultaneous mine site operations and inadequate noise modelling will result in continual exceedance of the project noise limits.

Noise Intrusiveness (Not assessed)

- A noise intrusiveness assessment in accordance with *Section 2.3 Project intrusiveness noise level* of the NPfI has not been completed. The intrusiveness limit is often determined as the measured background noise level plus 5 dB.
- There is the likelihood that operational mine noise levels will be 15 – 20 dB higher than ambient background noise levels for Kayuga.
- Considering the findings in the matter *Gloucester Resources Limited v Minister for Planning [2019] NSWLEC 7*, Chief Judge, Justice Preston commented that operational noise emitted from the Rocky Hill Coal Project had the potential to contribute to adverse social impacts to the nearby noise sensitive community. Justice Preston acknowledged that background noise levels of less than 30 dB(A), will result in operational mine noise levels to be *"more noticeable and likely to impact the residents acoustic amenity"*

Noise Intrusiveness **(Not assessed)**

- It is expect that ambient noise levels surrounding the Dartbrook Mine to result in low background noise levels, most likely less than 30 dB(A).
- Acknowledging that background noise levels are required to address Social Impact and noting that the Bridges Acoustics Report omits the data, the presented Social Impact Assessment remains incomplete and inaccurate.

Summary

- The noise assessment is incomplete and fails to be provide an intrusiveness assessment, accumulative noise assessment or social noise assessment. The report lacks information to accurately assess the noise impacts of the project.
- The noise impact report demonstrates that the project noise limits will be exceeded.
- The noise assessment does not demonstrate a true representation of current or future noise and blast vibration impacts. In my opinion the Commission can not rely on the findings of the current state of the noise assessment.

Dartbrook MOD7 IPC

Muswellbrook – 9 April 2019

Water resources

Owen Droop

B.E.(Civil)(Hons) / B.Nat.Res

Sean Murphy

B.App.Sci (Geology) / B.App.Sci (Hons) (Hydrogeology)

Surface water/Groundwater Review

Objective: Independent review and provision of advice regarding whether the available information:

1. Clearly describes and assesses the potential range of operational conditions and behaviour of the project over it's projected life?
2. Recognises and defines the associated risks, potential consequences and impacts of the project?
3. Provides clear and robust management and mitigation plans/strategies to meet those risks/impacts?

Conclusion:

- No. It does not meet any of the above fundamental requirements.

1. Assessment of potential range of management conditions?

- **No assessment of the project water balance under potential range of climatic conditions** - average-only values provided for an incomplete list of site water balance inflows/outflows
- **No assessment of project flood risk** - Noting OEH recommendations for appropriate assessment (not undertaken) and subsequent concerns following response to submissions (not addressed).
- **No assessment of the project under potential range of operation**, in particular under conditions in which washery is in operation.
- **No recognition of the impact of climate change** on supply security, groundwater conditions/impacts or flood risk
- **No current groundwater model** – Groundwater conditions are based on the results of a previous model for an essentially different proposal, leading to a lack of quantification of risk and potential impacts to associated groundwater.

Example - Water resource risk

Greater Hunter Regional Water Strategy (NSW DPI, 2018) has identified that:

- Climatic conditions similar to those experienced in the 1940s would see allocations reduced to zero for approximately 12 consecutive years.
- The Upper Hunter is likely to experience less rainfall than previously used for water supply security estimates (i.e. including 1940s).
- Risk of drought is greatly increased due to:
  - Climate change (i.e. increased risk of extreme dry conditions); and,
  - Mine-related reductions in base flows - a direct indication of changed groundwater conditions.

There has been no consideration by the Proponent of these recognised, increased risks

2. Recognise and define the associated risks and potential consequences/impacts of the project?

- Lack of project-specific water balance
  - No valid understanding of drought or flood risk – **operational and financial risks to Project**
  - No quantification of potential groundwater impacts – **risks to other water users**
- Lack of water quality data and analyses
  - despite intended site wide use for dust suppression and as spray curtains on the new shaft – **risks to local water resources**
- Lack of meaningful flood risk assessment
  - Relies on outdated flood assessment - changes to ARR flood estimation guidelines & OEH guidelines for flood risk management (both in 2016)
  - Misrepresents and significantly underestimates project flood risk - **risk to life, as well operational and financial risk to the Project**

3. Clear and robust management and mitigation plans/strategies to meet those risks/impacts?

Proposed approach is ‘reactive’. For example:

•If shaft intercepts Hunter River alluvial aquifer “appropriate sleeving or casing will be installed within the shaft” – no detail given

•No response plan provided if flood levels exceed proposed design level and inundate shaft and/or haul road

•Impact on groundwater described as being addressed “as they occur” and “made good” - no details given.

•No assessment of the impacts on the Weathered Bedrock Aquifers is provided despite being nominated as “the most readily accessible unit for landholders outside the flood plain”

Implications

1. **Project has not been assessed under the credible range of climatic and operational conditions for planned project.**

2. **Risks and potential consequences/impacts of the project are therefore unable to be robustly defined and understood.**

3. **There are no clear and robust management and mitigation plans/strategies to meet those risks/impacts – reactive management.**

Review outcomes

- We, the Proponent, the Department and the IPC still can't be sure what the real impacts would be:
  - No adequate baseline;
  - The Project hasn't been assessed for the range of actual possible conditions;
  - Critical parts of the analysis are outdated; and,
  - Adopts a reactive, 'fix as we go' approach to risks and impacts
- The available information does not support the conclusion that the projects impacts would be manageable or acceptable

Dartbrook MOD7 IPC

Muswellbrook – 9 April 2019

Water resources

Owen Droop

B.E.(Civil)(Hons) / B.Nat.Res

Sean Murphy

B.App.Sci (Geology) / B.App.Sci (Hons) (Hydrogeology)

Dartbrook Mine Modification 7—Strategic Review of Heritage—Environmental Assessment Report

Sydney Office
Level 6
372 Elizabeth Street
SURRY HILLS NSW Australia 2010
T +61 2 9319 4811
E heritage@gml.com.au

Canberra Office
2A Mugga Way
RED HILL ACT Australia 2603
T +61 2 6273 7540
E heritage@gml.com.au

GML Heritage Pty Ltd
ABN 60 001 179 362

GML Heritage has been commissioned to prepare a high-level review of cultural heritage matters relating to the Hansen Bailey Environmental Assessment of Modification 7 for the Dartbrook Mine and the Response to Submissions, from both Hansen Bailey and relevant government agencies. This short report reviews both Aboriginal and historical (non-Aboriginal) heritage and concludes that with respect to Modification 7:

- historical heritage has not been assessed;
- Aboriginal archaeology is constituted as Aboriginal heritage;
- the whole of mine impacts on heritage sites and values should be have been assessed;
- the Social Impact Assessment does not consider the local and regional Aboriginal community; and
- there are past performance issues connected with the Dartbrook management of aboriginal heritage and compliance with existing consent conditions.

In addition, for the IPC the PCWP has provided permission to disclose the presence of a male bora or ceremonial area to the north of the mining authority boundary. The LIDAR survey used to record part of the area, defines a series of concentric earth rings on the western side of a creek corridor. These concentric circles have a diameter of approximately 20m. The Aboriginal community has stated that the extent of landscape connections for such a ceremonial site is likely to extend over kilometres.

The central bora area is located inside the mining subsidence district. The site has not been assessed or considered as part of the values assessment for Modification 7. Impacts to the bora area as a result of future subsidence are unknown. The impacts resultant from mining on social and traditional Aboriginal values are unknown because the Aboriginal community has not been asked.

Background

The project proponent for the Dartbrook Mine is Australian Pacific Coal (AQC) Dartbrook Management Pty Ltd. AQC purchased Dartbrook Mine in May 2017 which has been in maintenance mode since 2006.

The Dartbrook Mine was granted development consent (DA 231-7-2000) and operated as an underground long-wall mine. Modification 7 proposes a change to the method of mining (long-wall to bord and pillar) in the Kayuga Coal Seam, a change in the sub-surface method of coal extraction, and the construction of a new shaft site and access road to the shaft site, to be constructed west of the

New England Highway. The modification proposes to extend the life of the mine by 5 years to 2027. The modification study area is approximately 3.2ha in size. The land is currently used for grazing.

Hansen Bailey 2018 states:

> *AQC acquired Dartbrook Mine in May 2017 with the objective of reinstating mining operations at the site. AQC proposes to modify DA 231-7-2000 to allow for an alternative method of underground mining, an alternative coal clearance system and an extension to the approval period (the Modification). The modification application has been made under Section 75W of the Environmental Planning and Assessment Act 1979. (2018:i)*

In consideration of Aboriginal and historical heritage, Modification 7 may impact sites, places and values in connection with construction of the new shaft site and associated access road, road haulage of coal along the existing service corridor and new shaft access road. Intangible cumulative social impacts to local Aboriginal non-Aboriginal people, resultant from impacts to heritage are unknown.

The mine footprint includes an East and West site (Figure 1). Modification 7 supporting documentation includes:

- Environmental Assessment, Hansen Bailey. June 2018. *Dartbrook Mine Modification 7.*
- Aboriginal heritage, AECOM 2018. *Dartbrook Mine Modification 7. Aboriginal Archaeological and Cultural Heritage Impact Assessment* (Appendix H).
- NSW Department of Planning and Environment. January 2019. Dartbrook Coal Mine Modification 7 Bord and Pillar Mining. DA 231-7-2000 MOD 7.
- Response to Submissions. Hansen Bailey August 2018. *Dartbrook Mine Modification 7.*
- Dartbrook Coal Mine Modification 7. OEH 3 October 2018. *Response to Submission*.

DA Conditions of Consent for Cultural Heritage

The preparation of an Archaeological and Cultural Heritage Management Plan was a condition of consent (3.4) of DA 231-07-2000. Under 3.4 the requirements for Heritage Assessment, Management and Monitoring are set out and are quoted in full below:

> *Assessment and Management*
>
> *The Applicant shall prior to the commencement of construction or Mining Operations:*
>
> *(a) prepare an Archaeology and Cultural Management Plan to address Aboriginal and European cultural heritage issues. The Plan shall be prepared in consultation with the Upper Hunter Wonnarua Tribal Council, Wannaruah Local Aboriginal Land Council and NPWS, and to the satisfaction of the Director-General. The Plan shall include but not be limited to:*
>
> *(i) provision of management strategies for known Aboriginal heritage sites for all parts of the DA area not affected by mining;*
>
> *(ii) identification of any future salvage, excavation and monitoring programs for any known heritage/archaeological sites within the DA area, prior to and during construction;*
>
> *(iii) set out management procedures and protocols for issues relating to Aboriginal heritage for all stages of the development (induction of employees on archaeological and heritage issues; training of field crews, Upper Hunter Wonnarua Tribal Council and Wannaruah Local Aboriginal Land Council participation; staging of works; salvage etc);*
>
> *(iv) details of a program for salvaging known Aboriginal sites;*

(v) details of consultation undertaken with the Upper Hunter Wonnarua Tribal Council and Wannaruah Local Aboriginal Land Council in the preparation of this Plan;

(vi) details of the measures to fully document, in accordance with the NSW Heritage Council guidelines, any non-indigenous heritage sites that will be required to be removed as a result of the development;

(vii) details of proposed monitoring that will be undertaken in the areas adjacent to the non-indigenous heritage sites identified within the DA area during their excavation and removal, to identify any further cultural material that may exist;

(viii) details of the methods to dispose of the excavated non-indigenous heritage sites in a manner approved by the NSW Heritage Council, and following consultation with MSC and the Muswellbrook and Upper Hunter Historical Society;

(ix) details of how public access to the Kayuga Cemetery shall be maintained at all times; and (x) details of the measures to mitigate any potential impacts resulting from the mine on the heritage homesteads Old Kayuga, New Kayuga, Riverview, the Macintyre family cemetery, Kayuga Cemetery and the Kayuga Estate and details of any maintenance procedures proposed to preserve their heritage value in accordance with the NSW Heritage Council requirements.

(b) Within six months of the commencement of construction or Mining Operations, the Applicant shall make a $50,000 contribution towards the establishment of a trust fund set up by the Department of Urban Affairs and Planning through the Public Trustee. The funds are to be used for a regional study of Aboriginal sites and other cultural heritage projects as defined by the Trust Deed.

(c) If, during the course of construction of any surface facilities or mining activities, the Applicant becomes aware of any heritage or archaeological sites not previously identified, all work likely to affect the site shall cease immediately and the relevant authorities consulted about an appropriate course of action prior to recommencement of work. The relevant authorities may include NPWS, the NSW Heritage Office, the Upper Hunter Wonnarua Tribal Council and Wannaruah Local Aboriginal Land Council. Any necessary permits or consents shall be obtained and complied with prior to recommencement of work.

(d) The Applicant is to consult regularly with the Upper Hunter Wonnarua Tribal Council and Wannaruah Local Aboriginal Land Council using consultation principles and strategies consistent with those outlined in the "Guidelines for best practice community consultation in the NSW Mining and Extractive Industries". The results of these consultations shall be documented in the AEMR.

(e) Any proposed works that will affect non-indigenous heritage items, (including the items listed in Section 3.9.2 of the EIS) including demolition of the items, will require an approval under section 139 of the Heritage Act 1977 and an application for an excavation permit under section 140 of the Heritage Act 1977 to disturb the relics will be required. This may also require additional approvals from MSC if the items are listed on the Heritage Schedule of the Local Environmental Plan.

(f) The Applicant shall engage an appropriately qualified person to prepare an oral history of the mining lease prior to the dispersal of local residents. This will include an investigation of: all buildings and sites within the lease area; •

- *areas that will be affected by the mine;*
- *the former Dartbrook authorisation area; and*
- *the Kayuga cemetery.*

The investigation will be carried out in consultation with a member of the Muswellbrook and Upper Hunter Historical Society, who is to be allowed reasonable access to the Applicant's properties for the purposes of assessing European archaeological features. The report shall be made available to the Muswellbrook and Upper Hunter Historical Society, MSC and the Director General.

Monitoring

(g) The Applicant shall monitor the effectiveness of the measures outlined in the Archaeology and Cultural Management Plan [Condition 3.4(a)]. A summary of monitoring results shall be included in the AEMR.

(h) The Applicant shall prepare a monitoring program of known indigenous heritage sites identified within the DA area, during the period of construction and mining operations. The monitoring program shall be included in the Archaeology and Cultural Heritage Management Plan (Condition 3.4 (a)) and a summary of results will be included in the AEMR. The program shall: (i) 3monitor all known archaeological sites 12 months after undermining for the effects of subsidence and report on the results of these inspections in the Archaeology and Cultural Heritage Management Plan;

ii) 4monitor the construction of sediment and erosion control works to identify new archaeology sites;

(iii) 5monitor locations in the subsidence area in order to assess the impacts of subsidence on the land surface, in areas that the Applicant has identified as being potentially affected by the following processes:

- *erosion;*
- *rilling;*
- *knickpoint initiation; and*
- *areas prone to pooling.*

Note No Aboriginal archaeological sites, that have been identified, shall be destroyed without the approval of the Director-General of NPWS, under section 90 of the National Parks and Wildlife Act 1974, prior to any disturbance of the identified sites by Construction or Mining Operations.

Given the incomplete technical documentation presented by the proponent, and notably the Archaeology and Cultural Management Plan required under the conditions of consent, that has been provided by the proponent for Modification 7 particularly in regard to historic heritage, a full review of the proposal has not been possible. A search for the Archaeology and Cultural Management Plan, including consultation with local residents and Aboriginal groups failed to identify the document.

GML's Review of the 2018 Aboriginal Heritage Assessment

Following a review of AECOM (2018) GML makes the following observations and comments for Aboriginal heritage:

- only the specific 'site' associated with the new proposed mine shaft has been subject to heritage assessment and/or physical survey;
- the proposed mine shaft areas has been subject to agricultural impacts for the past 40 years (AECOM 2018: Figures 9-12);
- AECOM (2018:27) states there are no water courses in the 'study area', but also that 'a single unnamed 1st order ephemeral drainage line is mapped in the study area' (2018:17). 2018: Figure 5 shows a number of drainage lines converging to the south of the 'study area', which conflicts with statements on page 27, which states the 'closest' watercourse is the 'Hunter River, located 1.1km to the west';
- 'Prior to European settlement, the floral and faunal resources of the study area and environs will have been sufficient to facilitate intensive and/or repeated occupation by Aboriginal people.' (2018:27);

- prior Aboriginal heritage surveys has included some land associated with parts of the Modification 7 area (2018: Figure 20), but no holistic survey, adhering to OEH 2010 Code of Archaeological Practice standards (current NSW best practice) has been undertaken across the whole of mine area, including locations that could be impacted by upgrades to roads and/or subsidence impacts consequent of recommencing mining;
- the OEH Aboriginal Heritage Information Management Sydney (AHIMS) database identifies 121 Aboriginal 'sites' in a 10km by 10km area surrounding the 'study area'. The nearest is located 330m east (2018: 56 and Figure 17). AHIMS patterning shows a regular distribution of sites across lands to the east, 1.5km from the Hunter River. GML notes this is likely a consequence of past Aboriginal archaeological mitigation work, not a long term reflection of traditional Aboriginal land use.
- The Aboriginal heritage survey did not identify further archaeological sites inside the 'study area'—survey visibility of the ground was described as 'good'. **"**No Aboriginal objects were identified during the field survey. Subsurface archaeological sensitivity was assessed as low due to its distance from any watercourse." (2018:61)
- Aboriginal community consultation followed OEH 2010 guidelines. Objections to the project were raised by Mr Scott Franks, as the representative of the 'Registered Native Title party Scott Franks and Anor on behalf of the Plains Clans of the Wonnarua People NSD1680/2013'.
  - Mr Franks contends that an anthropological assessment should have been undertaken to determine who is a "proper Knowledge holder to assess the land within our registered Native title area" (2018:14)
  - "Hansen Bailey provided Mr Franks with an opportunity to provide cultural knowledge on several occasions and agreed to engage the group to complete a cultural values report for the Modification. During discussions with AECOM archaeologist Andrew McLaren, Mr Franks indicated that it was difficult to complete a cultural values report for the Modification due to the small size of the study area, and that cultural values reporting should be reserved for future proposals at Dartbrook Mine where a larger landscape could be assessed." (2018:15)
  - Clarification with Mr Franks (by GML in 2019) identified that the Plains Clans of the Wonnarua People (PCWP) required a whole of mine area survey to be undertaken, where regional sites and values could be contextualised and described. GML note this is the cultural landscape approach required by the OEH in their 2011 policy document *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW.*
- The assessment of Aboriginal heritage determined that:
  - "No Aboriginal objects or cultural values were identified during the assessment." (2018:65)
- The Aboriginal heritage report concluded that:
  - "The proposed bord and pillar mining will not result in any measurable subsidence (<20 mm). As such, there are no anticipated direct or indirect impacts associated with subsidence."
  - "Given that no Aboriginal objects were identified within the study area, no impacts to Aboriginal objects or heritage values are anticipated to result from the Modification." (2018:66)

GML's Review of the 2018 Historic Heritage Assessment

Historical heritage is not specifically addressed or assessed in Appendix H of the AECOM 2018 report. In the 2016 Annual Review of Dartbrook Mine prepared by Anglo American it is noted that management is undertaken in accordance with Dartbrook's Archaeology and Cultural Heritage Plan. This includes items such as the Riverview and Kayuga Homesteads, and the Macintyre, Kayuga and Dartbrook cemeteries. The Dartbrook Archaeology and Cultural Heritage Plan has not been sighted and the technical documentation provided by ACQ for Modification 7 does not include or reference this report. A search for this document was unsuccessful.

Hansen Bailey 2018 does not identify any historical heritage sites in connection with the modification area, or in the vicinity. A review of the State heritage register confirms that no State listed heritage items are located near Dartbrook or Aberdeen. A search of the *Upper Hunter Shire Local Environmental Plan* identifies ~40 locally listed heritage items within or near the town of Aberdeen.

Potential Impact from Modification 7

Any archaeological sites located within the footprint of the Dartbrook Coal mine and its activities could be impacted. With respect to physical heritage sites (both Aboriginal and historical) a key issue is unknown impacts from subsidence.

Subsidence impacts may be considerably wider and affect heritage places in surrounding areas. The Upper Hunter Shire has provided mapping for the local subsidence zone (Figure 2). Hansen Bailey (2018: 79) states that "Previous longwall mining in the Wynn Seam has resulted in subsidence of up to 1.6 m and is expected to have caused variable stress conditions and voids within the strata", and "subsidence due to elastic strata compression is typically less than 100 mm" (2018:80), and "If vertical loads result in pillar failure, higher levels of subsidence (typically 0.5-1.5 m) would be expected to occur." (2018:80). In summary it was concluded that "By adopting the nominal factor of safety of 2.11, the pillars can be designed such that pillar failure does not occur. As a result, subsidence can be maintained at the low levels associated with elastic strata compression subsidence" (2018:80).

The assumption made in the assessment documents is that direct impacts to the ground surface, resultant from Modification 7, can be assumed to be 'less than' 100mm across the 'Mining Authority Boundary' (Figure 1). This is not supported by the proponent's self-reported extent of subsidence, nor that impacts across the 'Northern Area', are yet to be understood and need to be assessed with extensive further geotechnical work being required.

The NSW Government Modification 7 Assessment Report, Jan 19, pp23 states that:

> *However, in the northern area, where extraction overlies the former and already subsided (up to 1.6m) Wynn seam longwall panels, the pillar dimensions would need to be more carefully designed to limit surface subsidence to <100mm. 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 undertaken this geotechnical study prior to mining this area.*

GML notes that 'exploration boreholes and exploratory in-seam headings' could impact the areas over which they are taken. These areas detailed for geotechnical study are not inside the specific locations identified under Modification 7 as having been 'investigated' for heritage. Any study which could result in a ground impact and/or uncontrolled subsidence has the potential to impact unrecorded Aboriginal heritage sites and values.

Modification 7's approach with respect to understanding subsidence (which clearly should have been undertaken as part of the Modification 7 application) and its impacts to heritage values applies neither the Burra Charter's Article 3, the cautious approach (*ICOMOS Burra Charter 2013, Article 3*), or the OEH's precautionary principal (*DECC (*now OEH*), February 2009, Operational Policy, Protecting Aboriginal Heritage, 'The precautionary principal', page 26*).

The social impacts and impacts to intangible heritage are not understood, simply because they have not been considered or assessed by the Modification 7 assessments.

Specific Heritage Matters Considered

Environmental assessments by Hansen Baily (2018) and AECOM (2018) state that no heritage items will be impacted by Modification 7. This opinion is firmly re-stated in Hansen Bailey's RTS, where requests from the OEH for further Aboriginal heritage survey are dismissed.

GML finds the finding that no heritage will be impacted as a result of Modification 7 is based on an absence of review for historical heritage, and a very limited assessment for Aboriginal heritage. Some assumptions applied in the Aboriginal assessment are not correct.

Five keys heritage matters are identified and formed the basis of the presentation to the IPC, April 2019. These matters are described below.

Matter 1—Historical Heritage Has Not Been Assessed

Historical heritage has not been assessed under Modification 7. An absence of assessment for historical heritage does not mean there is an absence of historical heritage inside and/or connected with the mining authority boundary. Historical heritage may have been considered as part of the original DA and should have been the subject of assessment as part of Modification 7.

The extensive number of locally listed heritage items, set within the acknowledged historical cultural landscape of the Upper Hunter Valley, may or may not be impacted by Modification 7.

Matter 2—Aboriginal Archaeology Constituted as Aboriginal Heritage

What comprises Aboriginal heritage in the Hansen Bailey report does not adhere to OEH 2011 definitions of Aboriginal heritage. Nor is it supported by the documentary and material evidence, notably the Plains Clans of the Wonnarua People (PCWP) Native Title claim.

Aboriginal heritage is not simply defined through archaeological sensitivity or stone artefacts, it is a complex relationship between social, aesthetic, spiritual, traditional, historical and scientific values. This is evidenced through definitions under OEH 2011 and the Burra Charter 2013.

The definition of archaeological sensitivity cited by Hansen Bailey is not correct.

> *The archaeological sensitivity of an area is related to the likelihood that the land was previously occupied by Aboriginal populations. Past Aboriginal populations generally occupied areas that were close to a reliable source of water, such as a major stream. The nearest reliable source of water is the Hunter River, which is located more than 1 km from the Infrastructure Study Area.*
>
> *Figure 3 of the Aboriginal Archaeological and Cultural Heritage Impact Assessment (Appendix H of the EA) indicates the occurrence of a watercourse within the Infrastructure Study Area. This watercourse is an ephemeral drainage line within the Hunter River catchment. This drainage line would not have provided a reliable source of water for past Aboriginal*

populations. Therefore, the existence of this drainage line does not raise the archaeological sensitivity of the Infrastructure Study Area. (Hansen Bailey RTS Section 3.2.16)

Aboriginal populations occupied clan or tribal areas. Occupancy and 'use' of these areas was complex and regulated by clan groups, custom and tradition. This manifests in a range of associated values, places, sites and traditions.

Archaeological predictive modelling for sensitivity is complex. The proximity to water is only one factor to be considered (cf predictive modelling published by Owen and Cowie 2017).

The 'study area' location is at the junction of two soil landscapes, which could have created ecotones, and landscape texture changes, and may have been part of landform which was a focus for 'occupancy'.

Hansen Bailey attest that Aboriginal sites will only be located 'close' to the Hunter River (1km away). This is clearly not the case, demonstrated by contrasting AECOM Figures 5 and 6 (water and landforms, water and soils) against AECOM Figure 21. These figures clearly demonstrate an absence of recorded Aboriginal sites close to the Hunter River; rather nine sites are located at 1km (as a linear band) from the Hunter River. GML notes that regional Aboriginal site patterning was presented 15 years ago in the 2004 Upper Hunter Valley Aboriginal Heritage Baseline Study, Figure 3.3 (ERM 2004). This clearly demonstrates the density, extent and range of Aboriginal sites in this area.

Matter 3—Whole of Mine Impacts Should be Assessed

The impacts arising from the mine in its entirety should have been assessed on the basis that:

- Unknown level of subsidence resultant of recommencing mining will occur. AngloAmerican, Erosion and Sediment Control Plan, 2014, Section 2.4 clearly states "Total surface subsidence in the Dartbrook mining area appears to range from 1m to 1.5m". Subsidence is discussed above under 'potential impacts', however, GML reiterates that an indicated level of subsidence at >100mm would appear disingenuous, particularly given that Modification 7 draft conditions inserted by the DoP require the mine to undertake extensive new geotechnical studies across the 'Northern Area'.
- In the context of the project approval and definitions of 'environmental consequences' of Dartbrook Mine 2001 conditions of consent, subsidence is considered to be an impact.

As explained in Section 8.5.3 of the EA, the proposed coal pillars will be designed to remain stable (i.e. the pillars will not yield). By maintaining long-term pillar stability, vertical subsidence associated with bord and pillar mining will be limited to less than 100 mm. These low levels of subsidence will be imperceptible for all practical purposes and do not have the potential to affect heritage items. Accordingly, an assessment of impacts to heritage items overlying the Approved Kayuga Seam Mining Area is not warranted, as attested by OEH's submission (see Section 2.12). (Hansen Bailey RTS Section 3.2.15)

Environmental consequences - The environmental consequences of subsidence impacts, including: damage to built features, loss of surface water flows to the subsurface, loss of standing pools, slope changes to streams, adverse water quality impacts, development of iron bacterial mats, cliff falls, rock falls, landslides, damage to Aboriginal heritage sites, impacts on aquatic ecology, and ponding. (Development Consent Conditions for the Dartbrook Extended Underground Coal Mine, Definitions, page 3)

Performance Measures – Natural and Heritage Features:

2018 (d) The Applicant must ensure that second workings do not cause any exceedances of the performance measures in Table 1 [Subsidence impact performance measures]

Aboriginal and heritage sites.

- *Negligible subsidence impacts or environmental consequences.*
- *Negligible loss of heritage value.*

(Development Consent Conditions for the Dartbrook Extended Underground Coal Mine, Definitions, Table 1)

If an assessment of significance, including all heritage values has not been made to current OEH standards, (eg not just archaeological sensitivity), it does not logically follow that the proponent can assess the level of impact on heritage value to be negligible.

Aboriginal sites and places at the regional level (ie recorded and known to non-Aboriginal people) evidences a range of Aboriginal heritage values, not just stone artefacts. This is evidenced by the 2004 *Upper Hunter Valley Aboriginal Heritage Baseline Study*, Figure 3.3 (ERM 2004), PCWP *Native Title claim* lodged with the Federal Court, and the PAC for the Drayton South Coal Project (GML October 2015).

The PCWP Native Title application identifies Aboriginal travelling routes, an Aboriginal songline, and known ceremonial grounds encompassing the cultural landscape setting of the Dartbrook Mine. This regional context is omitted in the 2000 and 2018 assessments for Aboriginal heritage.

For the IPC the PCWP has provided permission to disclose the presence of a male bora or ceremonial area to the north of the mining authority boundary. The LIDAR survey used to record part of the area, defines a series of concentric earth rings on the western side of a creek corridor. These concentric circles have a diameter of approximately 25m. The LIDAR survey provided by the PCWP also identifies other smaller circles to the east of the creek—these are possibly associated with farming activities and not identified as cultural items. The Aboriginal community has stated that the extent of landscape connections for such a ceremonial site is likely to extend over kilometres.

The LIDAR images of the Dartbrook concentric earth rings bear a visual similarity to another bora site located 15km to the southwest of Dartbrook at Wybong. The evidence from both Dartbrook and Wybong (viewed by GML) presents an outer ring with a diameter around 20m to 25m, and internal ring or raised area. Both sites are located close to a creek line, and both have been subject to similar farming impacts. GML notes the historical descriptions published in 1896 by R.H Matthews (*The Burbung of the Wiradthuri Tribe, in The Journal of the Anthropological Institute of Great Britain and Ireland, vol 25, pp 295-318*) details a 'Burbung Ground' (connected with the male ceremony of the Wiradthuri Tribe), thus:

> *The Burbung Ground—In the central part of the camp, and about 150 yards from the Bulgeraga Creek, was a slight oval space, measuring in one direction 86 feet [25m], and in the other 77 feet [23m].*

On the basis of the available evidence physical and oral evidence, the Wonnarua People identify these two similar features as directly connected with their male ceremonial activities.

The central bora area is located inside the mining subsidence district. The site has not been assessed or considered as part of the values assessment for Modification 7. Impacts to the bora area as a result of future subsidence are unknown. The impacts resultant from mining on social and traditional Aboriginal values are unknown because the Aboriginal community has not been asked.

This example demonstrates the project EA does not comprehensively or correctly assess Aboriginal heritage.

Determining a development proposal when cultural values have not been comprehensively assessed may give rise to unplanned adverse impacts on significant heritage values. Without proper assessment, these impacts cannot be dismissed as negligible. Further, the spatial relationship between the Department's 'conditioned' geotechnical investigations in the 'Northern Area' and the cultural landscape of the male ceremonial area are entirely unknown, as are the potential impacts to both tangible and intangible values.

The OEH's RTS also stated that Aboriginal heritage assessment beyond that already presented should have been undertaken. Noting this relates to a road and not the whole of mine area.

Matter 4—Local and Regional Aboriginal Community—Social Impact Assessment

The Dartbrook Mine Modification 7 includes a social impact assessment prepared by Hansen Baily (August 2018). Section 3.6 details the Aboriginal community and assesses the impacts on that community.

> *[Hansen Bailey 2018: Section 3.6]. An Aboriginal Archaeological and Cultural Heritage Impact Assessment was undertaken by AECOM Australia as a component of the EA for the Modification. This assessment included consultation with the Registered Aboriginal Parties (Table 3).*
>
> *[Section 4.3.1] The SIA has drawn on the findings of ongoing consultation conducted by AQC and Hansen Bailey, including data from landholder consultation, the Dartbrook Community Consultative Committee (CCC), consultation with Registered Aboriginal Parties and data from the complaints and feedback lines.*
>
> *[Section 5.1] Other notable socio-economic characteristics [of the communities of interest for the project] include:*
>
> - *A higher proportion of Aboriginal and Torres Strait Islander (ATSI) people in Muswellbrook LGA compared to all other areas of interest*

Section 6.2 presents an impact significance assessment for the project. Despite the above statements, the only assessment provided in connection with Aboriginal social values states:

> *The Modification involves bord and pillar mining. The proposed coal pillars will be designed to remain stable. By maintaining long-term pillar stability, vertical subsidence associated with bord and pillar mining will be limited to less than 100 mm. These low levels of subsidence do not have the potential to affect heritage items.*

Several significant matters were noted during review of this assessment, including:

- AECOM Aboriginal community consultation focussed on Aboriginal archaeology (in this instance).
- The AECOM Aboriginal consultation was not part of, nor did it consider, social impacts on the local and wider Aboriginal community.
- The AECOM Aboriginal community consultation identified 20 Aboriginal groups, including the registered Native Title claimant.
- The registered Native Title claimant objected to the assessment methodology proposed by AECOM:

> *Hansen Bailey provided Mr Franks with an opportunity to provide cultural knowledge on several occasions and agreed to engage the group to complete a cultural values report for the Modification. During discussions with AECOM archaeologist Andrew McLaren, Mr Franks indicated that it was difficult to complete a cultural values report for the Modification due to the small size of the study area, and that cultural values reporting should be reserved for future proposals at Dartbrook Mine where a larger landscape could be assessed. (AECOM 2018: Section 3.3.1)*

- Only three (3) of the Aboriginal parties participated in the 'fieldwork component' of the assessment, on a single day (6 April 2018).

With respect to the social impact assessment, and considering the request of the Native Title Claimant, their request and direction to extend the method and extent of the survey and heritage assessment have not been addressed. This is relevant in the context that potential impacts from subsidence will extend across the wider mining area, the OEH's comments that a wider heritage assessment should have been undertaken, and that the only assessment covering a wider area was in 2001, prior to all current OEH heritage standards for reporting and assessment coming into effect.

This is not an isolated instance where the registered Native Title group's requests have been ignored. There is evidence that the PCWP has made repeated representations to Hansen Bailey over the last decade for several coal mine environmental assessments across the Upper Hunter Valley within their claim area. There is now a history that Hansen Bailey does not assess Aboriginal heritage values beyond what they consider 'archaeological sensitivity' (refer to Matter 2).

There is no social values assessment that relates to Aboriginal cultural heritage (as defined by the OEH 2011 and Burra Charter 2013). Such an assessment would consider the impact of the proposed activity on Aboriginal cultural heritage and the effects of that activity on the Aboriginal community.

Further, there is no social impact assessment of mining for the Upper Hunter that specifically addresses the local and regional Aboriginal community. The effects both positive and negative resulting from the proposed mining activity on Aboriginal communities and their cultural heritage are both localised and cumulative.

In 2019 Mr Franks (PCWP) expressed concern to GML that the Dartbrook Coal Mine is located within a sensitive Aboriginal cultural landscape. He reiterated that he had asked AECOM and Hansen Bailey to undertake a whole of mine area assessment. He noted that the heritage assessment was limited to Aboriginal archaeology, and gave little or no regard to other cultural heritage values of equal or greater significance.

For instance, with reference to mining in the Hunter Valley and its impact on song lines, the PCWP have previously stated:

> *The development of the infrastructure for the mine in question will in fact and prevent our people from accessing the song line, destroying the song line that runs within it. This is against Wonnarua law, the area needs to be protected and before any more country in the Hunter Valley is destroyed by mining. Wonnarua people have very little of their traditional country left intact, in the Hunter Valley. (NTDA 2013: 0035) [This was in reference to another Coal mine, PCWP have stated this comment equally applies to all coal mines in the Upper Hunter]*

Mrs Maria Stocks (PCWP) commented on historical land use by non-Aboriginal people and current impacts of mining on Aboriginal culture:

> *From my viewpoint it is a terrible thing that these actions of white people took away the human rights, dignity and culture of some Aboriginal members of our community. They simply did not want to identify as Aboriginal because, at least from their perspective, if you did you got no respect. What's worse is that now 50-60 years down the track more of our culture, and our special spots are being taken away as they dig it all up with the mines. Places like grinding groove sites, fishing spots, ceremonial areas, story places, ancestral tracks, birth places, 'natural hospital areas', spiritual places and prayer spots, are all being destroyed. (NTDA 2013: 0091)*

Mrs Stocks described the impact mining had had on her and her culture:

> *For me and my family the land is not ours but a gift given to use because everything comes from the land…. When Annastazia and Jeremiah (my two youngest children) were about eight I took them for a drive to show them about Glennies*

Creek where I grew up, rode horses and motorbikes and went fishing. When I got there I just gasped and went "aargh' because there was nothing to see. It was all gone. There was [a] big hole from mining. I sat there and tears rolled down my cheeks. I couldn't show my children anything. It was like a part of me had been deleted. (NTDA 2013: 0091)

The decision of the NSW Land and Environment Court, [2019] NSWLEC7, 8 February 2019, is of specific relevance to the current consideration. Findings include:

340. Social impact related to culture includes shared beliefs, customs, values and stories, as well as connections to land, places and buildings. Culture includes both Aboriginal and European culture and heritage.

341. The Rocky Hill Coal Project will adversely impact on people's culture in two key ways: impacts on Aboriginal culture and connection to Country and impact on heritage-scenic quality.

342. The Social Impact Assessment for the amended EIS failed to assess the social impacts of the Rocky Hill Coal Project on Aboriginal people. Dr Lawrence observed that Aboriginal people have not been adequately addressed in the social baseline. There was no information about their socioeconomic status, their way of life, or their fears and aspirations about the future (Lawrence report, pp 18, 20). Dr Lawrence considered that community consultations and stakeholder meetings do not appear to have included specific consultations with Aboriginal people or Aboriginal organisations. This was concerning "given that culturally appropriate consultations with Aboriginal people, as a marginalised and vulnerable population, is considered best practice in SIA methodology" (Lawrence report, p 24).

343. Dr Askland also considered that the Social Impact Assessment failed to adequately assess the importance of Country and landscape that will be affected by the Project to the Aboriginal people and, as a consequence, to assess the social impact of the Project on Aboriginal people.

344. Dr Askland noted that, during her field trip to Gloucester, concerns were expressed about the impacts of the Project on "Aboriginal cultural heritage values embedded in the landscape." Aboriginal people expressed concern about three aspects. First, that Aboriginal people and Aboriginal epistemology were excluded in the consultation and assessment process….

345. Second, the area of the Project has been inadequately surveyed for Aboriginal sites. The amended EIS indicates that nine Aboriginal sites will be affected by the mine, but Aboriginal representatives say that the whole area has not been surveyed. There is a risk that unidentified Aboriginal sites might be impacted by the mine. If so, there would be a direct social impact on the Aboriginal community. But the uncertainty as to whether unidentified Aboriginal sites might be impacted itself causes social impact on the Aboriginal community.

346. Third, there has been an inadequate acknowledgement of the importance of Country and landscape to the Aboriginal people. Heritage value lies not merely in particular Aboriginal sites but in the landscape as a whole.

When considering the current coal mine, the statements previously presented by the registered Native Title claimant with respect to social impact, and the context of regional Aboriginal heritage, are directly applicable to Dartbrook coal mine:

- Social impacts have not been assessed. Representing the OEH Aboriginal community consultation process as the Aboriginal social impact assessment is misleading.
- Aboriginal heritage values related to the cultural landscape of the region have not been assessed. Consequently, any impacts on the heritage values have not been considered.

The Dartbrook Mine assessment should also consider both the cumulative impact to Aboriginal heritage sites, places, values, and the social impact to the local and regional Aboriginal community, taking into

account the long-term cumulative impact to cultural identity and wellbeing which directly affect the Aboriginal community.

Matter 5—Management of Aboriginal Heritage and Compliance with Conditions

Matter 5 relates to compliance with conditions, transparency in heritage management and reporting. The aspects of matter 5 identified are based on an absence of public records relating to the management of heritage. It is possible that Dartbrook Mine has undertaken all items described, but not made publicly available supporting evidence and documentation. GML notes there is no substantial reason why these documents should not be publicly available.

The 2001 conditions of consent required specific Aboriginal heritage management actions to be implemented. This included a 'Archaeology and Cultural Management Plan'. (Development Consent Conditions for the Dartbrook Extended Underground Coal Mine, Section 3.4 (a))

There is no evidence that an Aboriginal heritage management plan was prepared or implemented.

The 2001 conditions of consent required a trust be established for Aboriginal heritage.

> *Within six months of the commencement of construction or Mining Operations, the Applicant must [2018 addition] make a $50,000 contribution towards the establishment of a trust fund set up by the Department of Urban Affairs and Planning through the Public Trustee. The funds are to be used for a regional study of Aboriginal sites and other cultural heritage projects as defined by the Trust Deed. (Development Consent Conditions for the Dartbrook Extended Underground Coal Mine, Section 3.4 (b))*

It is assumed that the trust money was to be paid to the Upper Hunter Aboriginal Cultural Heritage Trust (the Trust), which was established in 2001.

https://www.planning.nsw.gov.au/About-Us/Our-Programs/Upper-Hunter-Aboriginal-Cultural-Heritage-Trust

We note that the word *must* has been included in the 2018 condition of consent. No evidence has been sighted verifying that the financial contribution was paid in 2001. We note that the value of the contribution to the Trust has not been adjusted for inflation (and would be $78,000, based www.inflation.com)

In conclusion, the Dartbrook mine may not previously adhered with its conditions of consent for Aboriginal heritage.

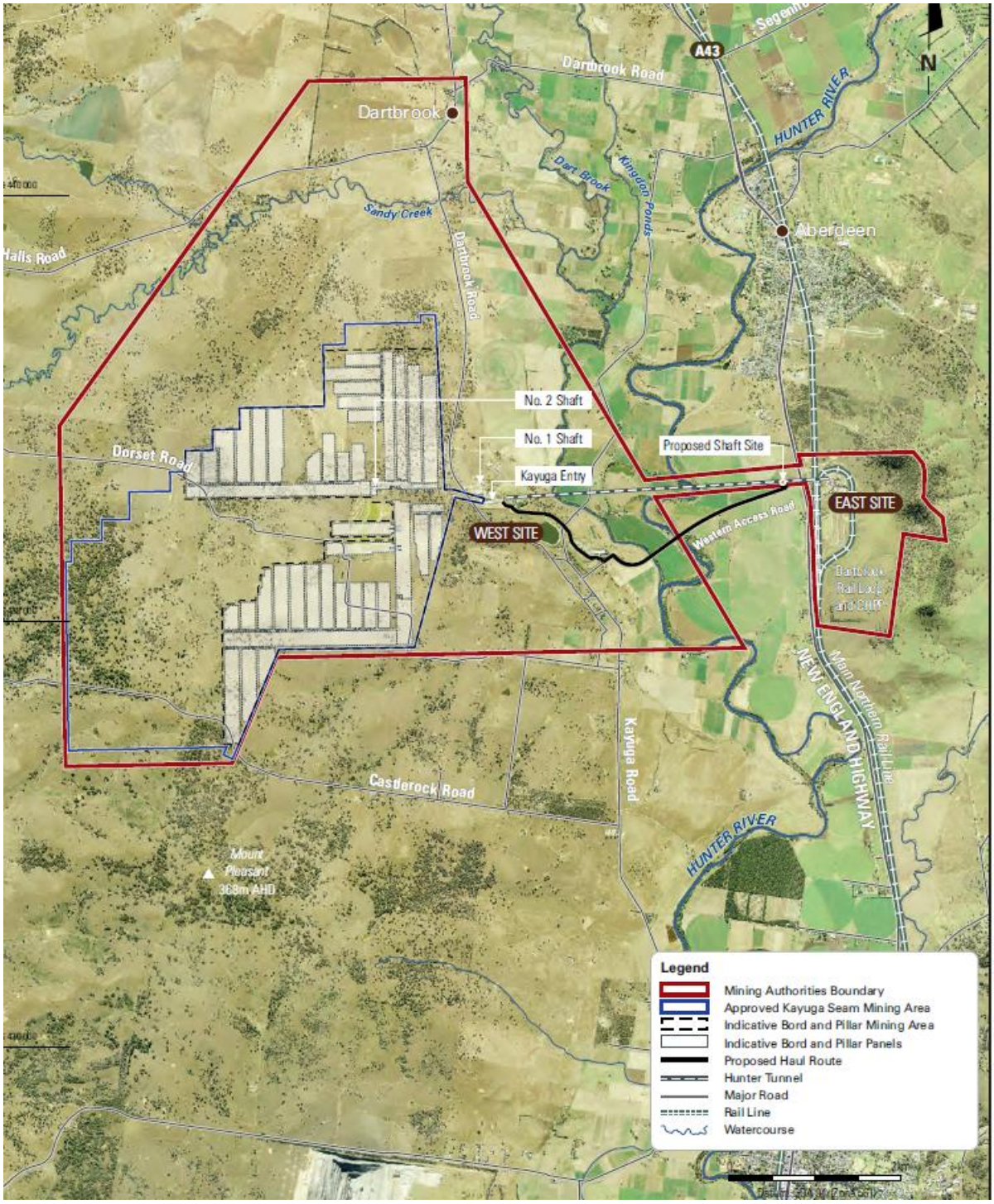


Figure 1 Dartbrook Mine Conceptual Modification Layout. (Source: Hansen Bailey 2018: Figure 2)

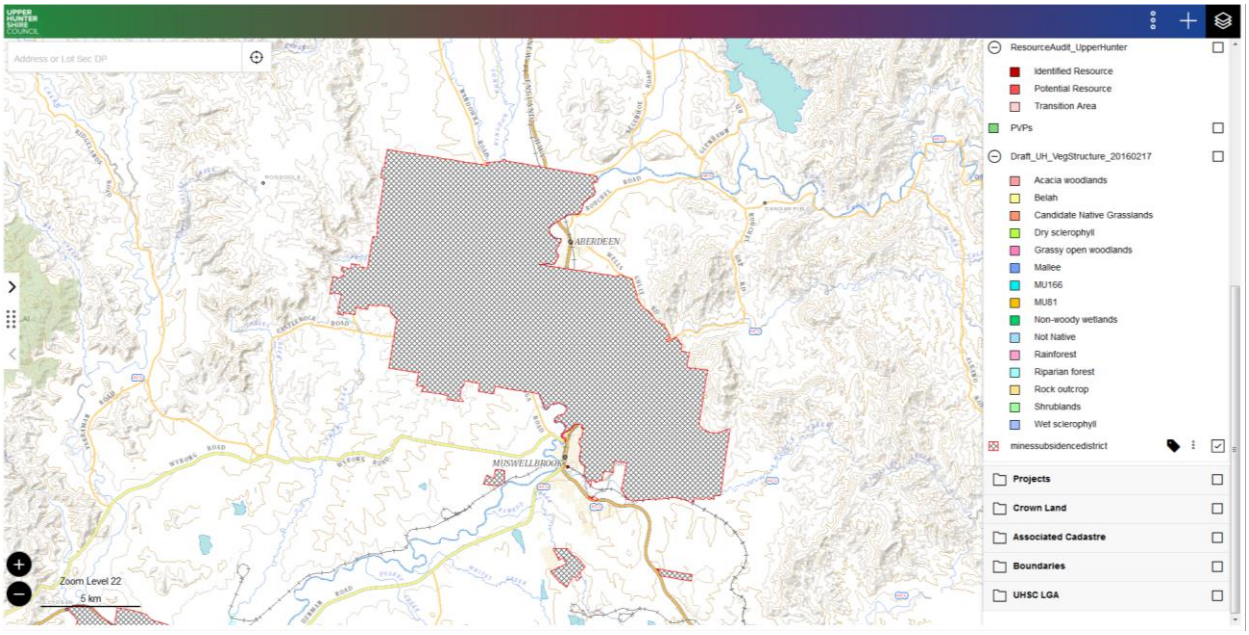


Figure 2 Upper Hunter Shire, mapping of the 'mine subsidence district'. (Source: Upper Hunter Shire online mapping tools, accessed 20 July 2018, https://maps.upperhunter.nsw.gov.au/connect/analyst/mobile/#/main?mapcfg=Public%20-%20General)

Figure 3 AECOM Aboriginal Heritage Assessment Area, with identified water courses. (Source: AECOM 2018: Figure 2)

Dartbrook Coal Mine Modification 7

IPC Presentation - Visual and Landscape Character Impacts

Michael Wright

IMPORTANCE OF LANDSCAPE

- Upper Hunter and Sedgenhoe Valleys are Rural and Highly Scenic without coal mining activities
- Proposed Dartbrook Mine Modification is the most northerly mine in the Hunter and extends into this highly scenic and valuable landscape

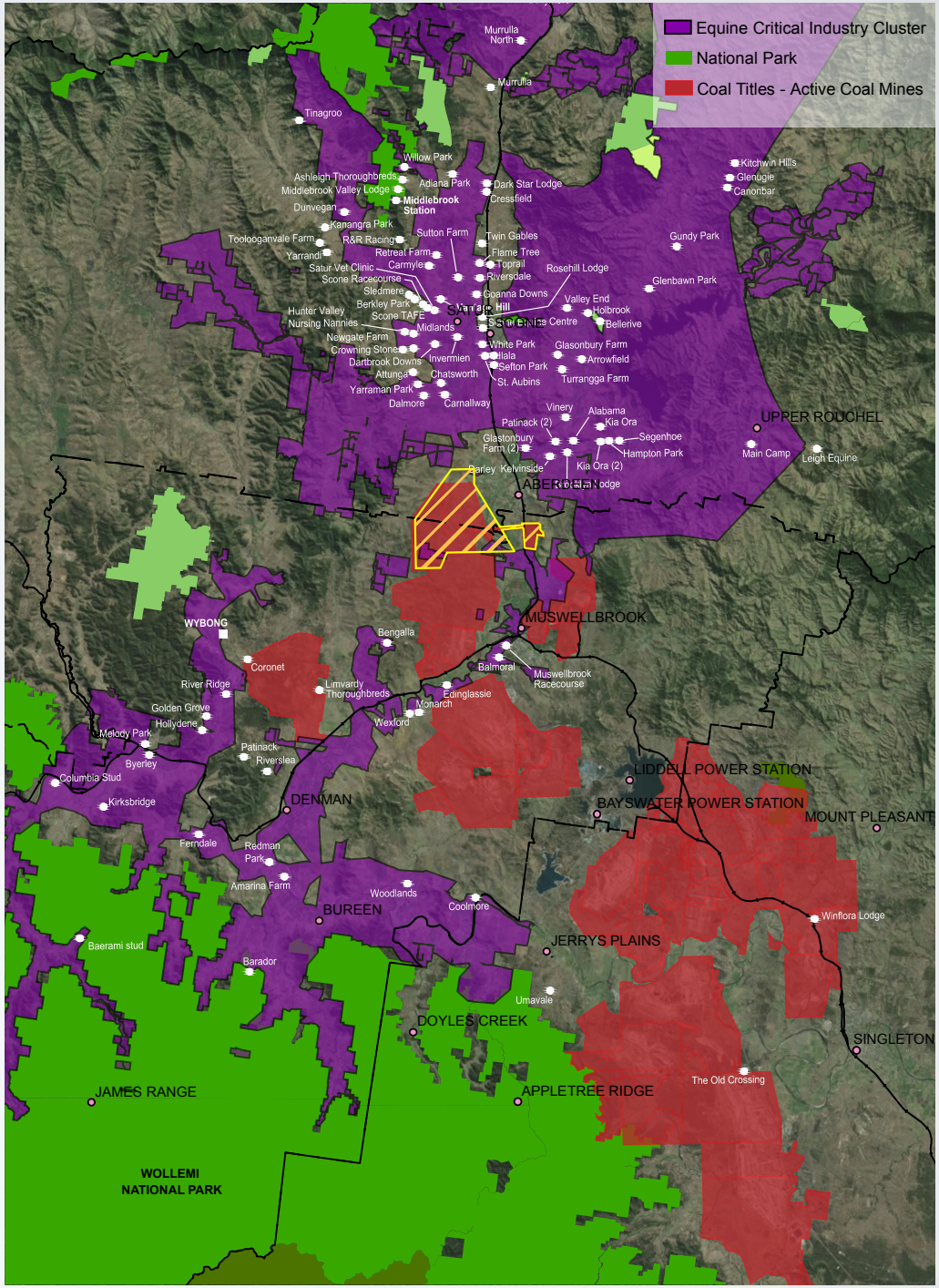
DARTBROOK COAL MINE

Mine Authorisation Boundary

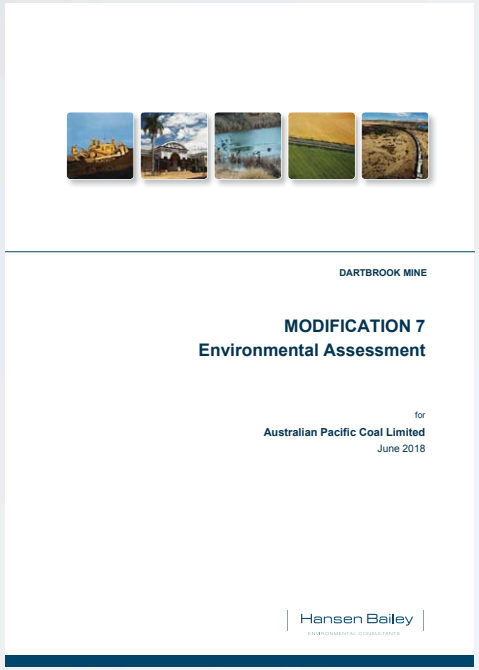
IMPORTANCE OF LANDSCAPE

AGRICULTURAL VALUES

- Landscape **recognised** by, and is **fundamental** to, the designation of **Equine Critical Industry Cluster**
- Broad **river flats**
- Rich and deep **alluvial soils**
- Abundant **water** supply
- Steeply undulating **slopes**
- Mild **climate**
- **Ideal** landscapes for horse breeding studs which are displayed in white on the adjoining map



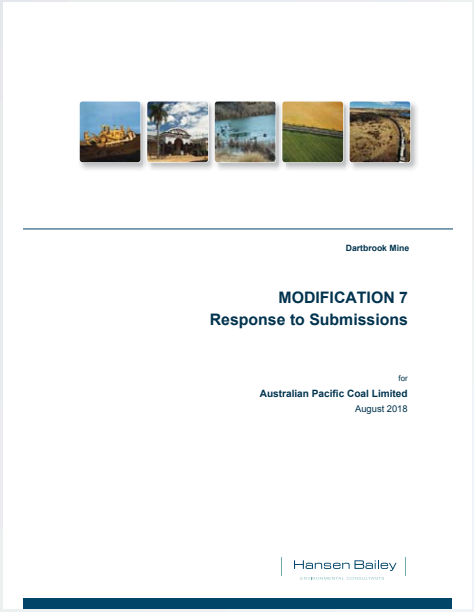
VISUAL IMPACT ASSESSMENT



Environmental Assessment Report Mod 7 (AQC) - June 2018

- One (1) paragraph on visual impact assessment plus 2 photos
- "No private residences in the vicinity"
- "The New England Highway is the only public area affected"
- "Visual effect low"
- No mention of 192 B-Double truck movements every 3.5 minutes for 11 hours, or the impacts at the Kayuga Entry or coal handling facility at East Site

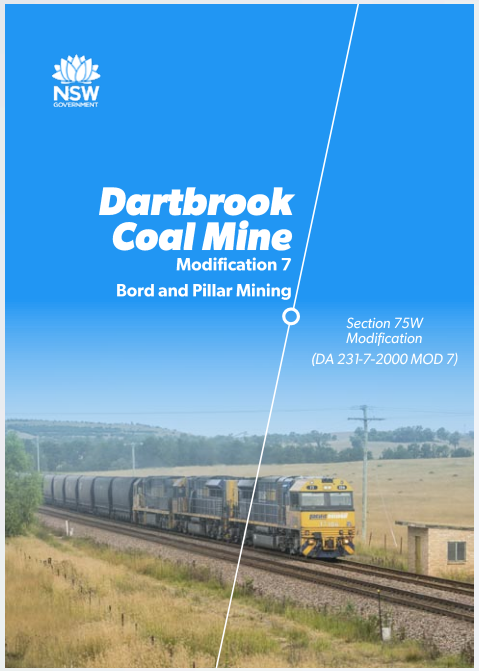
VISUAL IMPACT ASSESSMENT



Response to Submission Report (AQC) - August 2018

- 2 pages on visual impact assessment plus 1 map
- Focuses on shaft shed with inadequate assessment of truck movements, stockpiles and other facilities
- Private houses not property assessed - only 1 house identified as being impacted
- Incorrectly states that other houses are screened by topography or vegetation
- Local roads or streets were not assessed

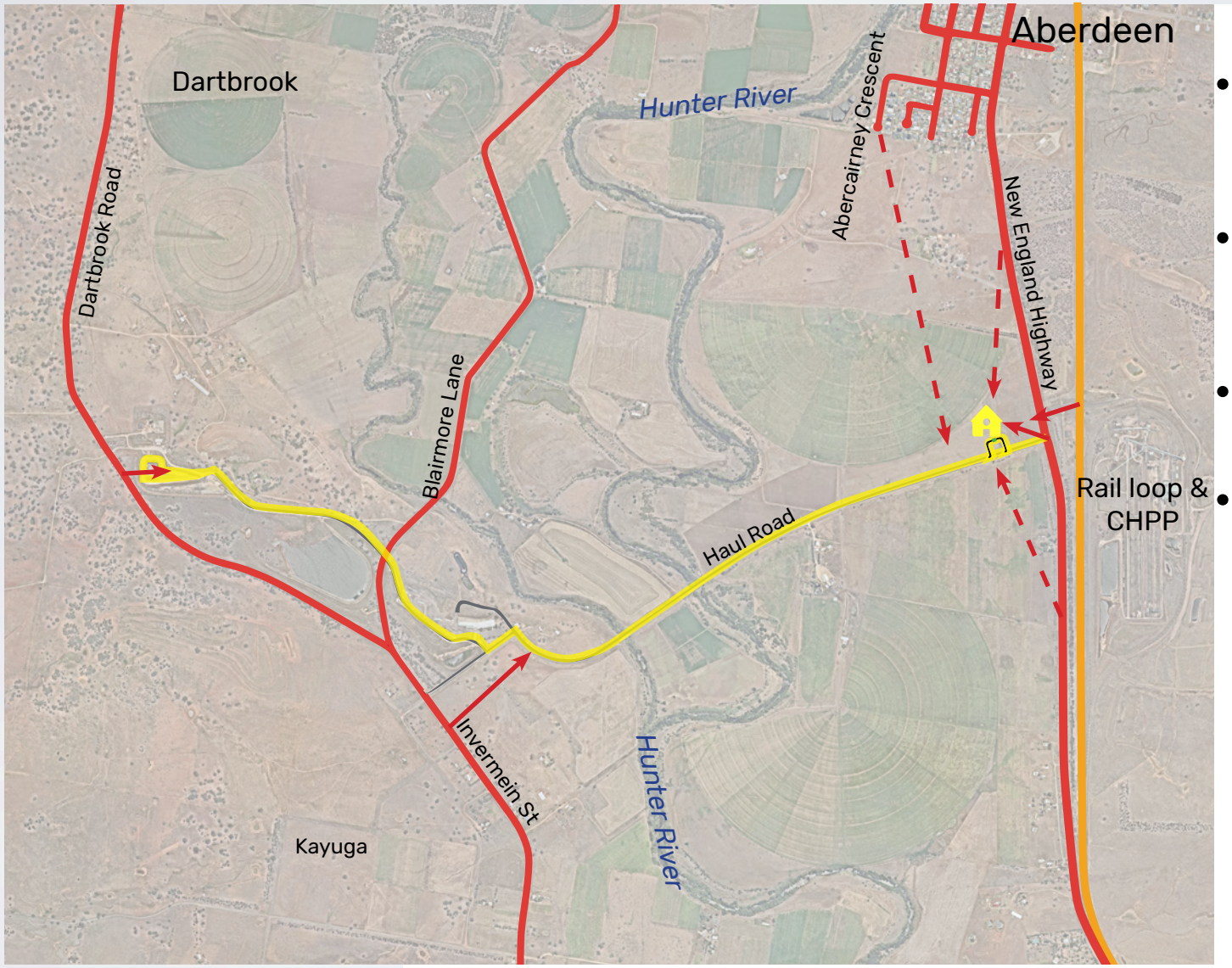
VISUAL IMPACT ASSESSMENT



Assessment Report (DPE) - January 2019

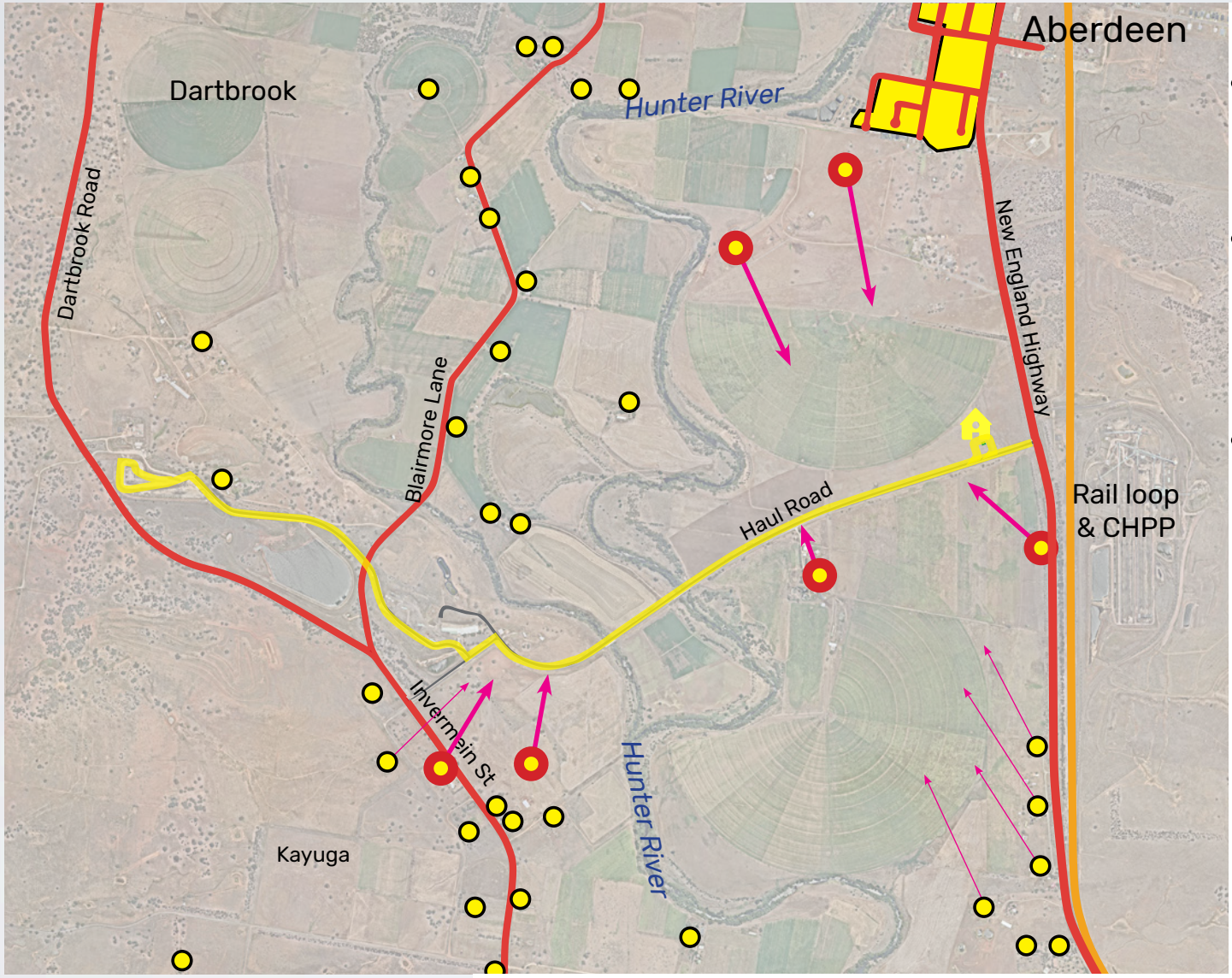
- Visual impacts are not mentioned in the report
- "Social impacts actually experienced would be more akin to a new mine"

PUBLIC AREAS



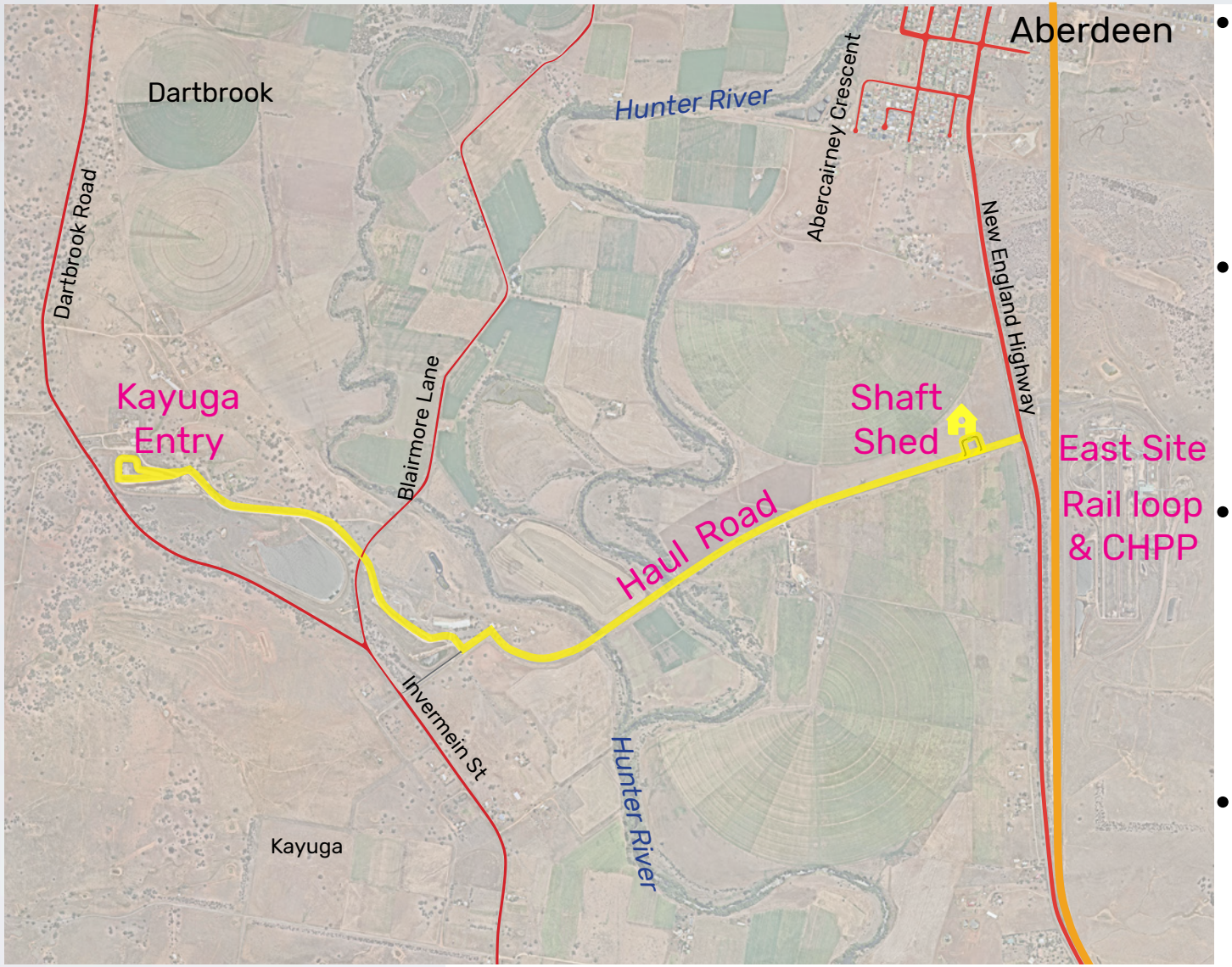
- National Highway - New England Highway
- Main Regional rail line - Main Northern Rail Line
- 3 Local rural roads
- Local Streets in Aberdeen

PRIVATE AREAS



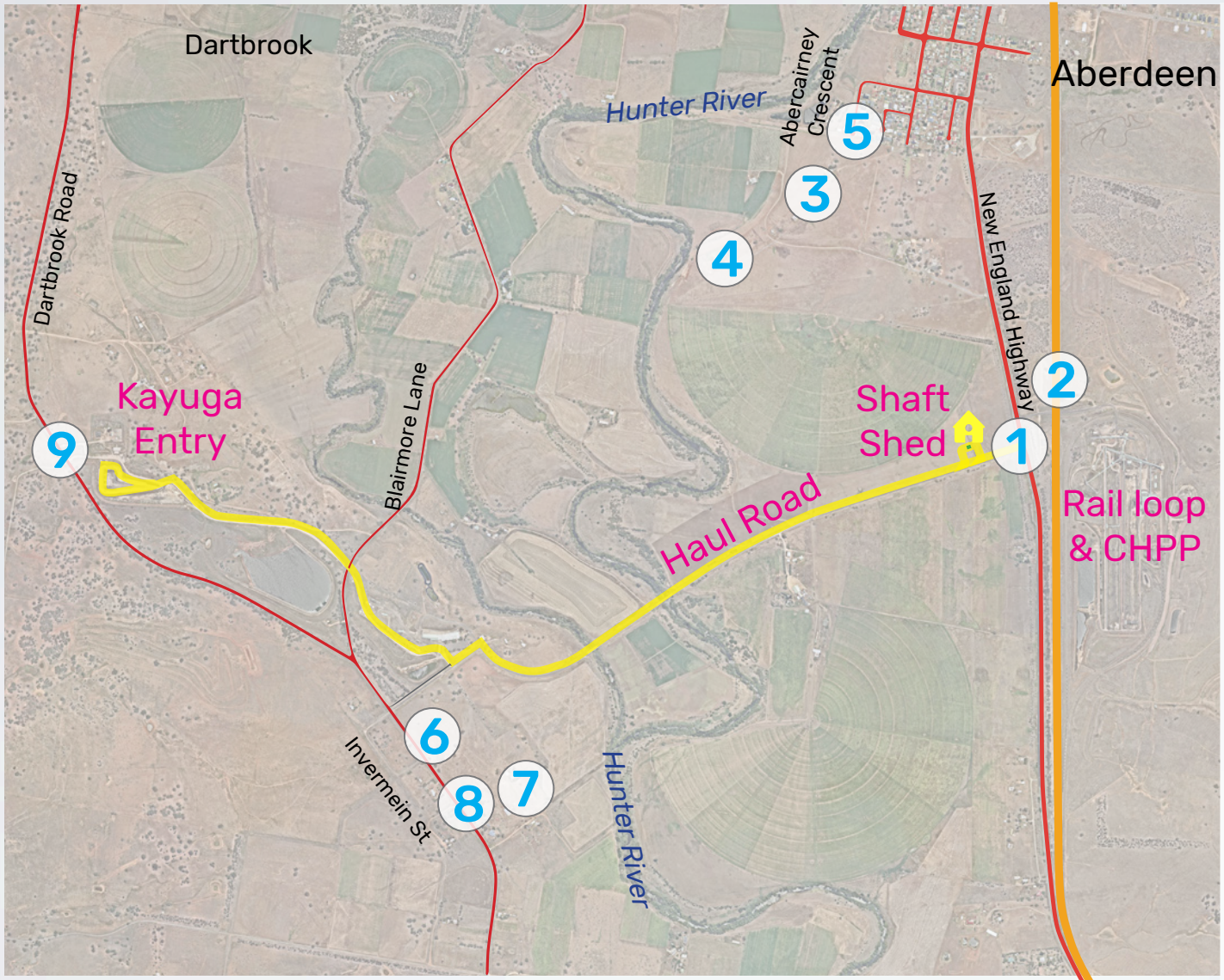
- 30 houses (approx.) in vicinity of the project
- 15 houses (approx.) have views of proposed mining activities
- 6 houses between 120m to 1200m have clear views of proposed mining activities

VISUAL EFFECTS



- Shaft Shed + New Access Road
  - No footprint dimensions
- Haul Trucks - 192 oneway trips
  - 7am-6pm (1 every 3.5min) (11 hours a day)
- Kayuga entry area
  - Stockpile ROM 8m high
  - Haul truck parking and service facilities
- Coal handling and stockpiles at East Site

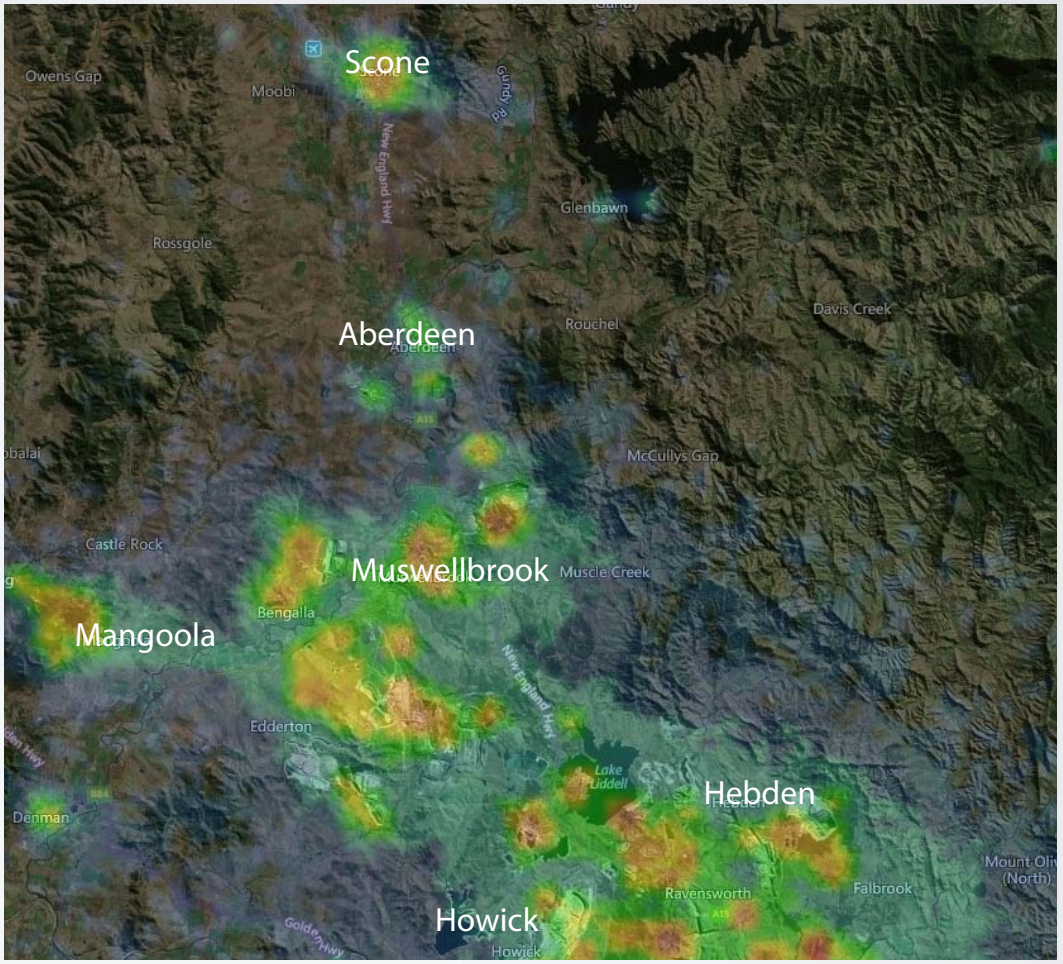
VIEWPOINTS



Viewpoints		Distances to nearest Mining Activity (metres)
1	New England Highway	240m
2	Main Northern Rail Line	400m
3	House near Aberdeen	1200m
4	House near Aberdeen	1200m
5	Aberdeen - Abercairney Crescent	1300m
6	Kayuga - Invermein St	500m
7	Houses in Kayuga	500m
8	Houses in Kayuga	500m
9	Dartbrook Road	150m

INDIRECT VISUAL IMPACTS

- Light pollution a significant and daily indirect visual impact on the areas close to mining
- Mines in a suburban to urban / industrial sky
- Rural areas outside of Aberdeen and Scone are in a dark to rural sky
- Dartbrook mine facilities are visible in this image even though the mine was inactive at the time of the photo
- Therefore when active, the mine will be yellow and red and much brighter.



Source: www.lightpollutionmap.info, Earth Observation Group, NOAA National Geophysical Data Center - Image Date: 2015

MITIGATION

- Tree Screening cannot be relied upon to provide a permanent visual barrier
- Existing tree plantings are varied in health and density
- Over time, the tree canopies will grow above the eyeline, exposing the mining activities to passing travellers on the Highway and Rail Line.

- Existing tree screens opposite the shaft shed site are growing slowly and with large gaps

- Existing tree screens on the embankment next to the rail line opposite the shaft shed site are in poor condition and quite transparent

- An example of maturing tree screens demonstrating the transparency as the canopies grow taller

CONCLUSION

- Visual impact has been overlooked throughout this assessment process
- EA - inadequate Visual Impact Assessment - lacking detail and overlooks sensitive receivers
- DPE requests Social Impact Assessment including visual impact assessment
- Response to Submissions Report - inadequate /understates impacts
- DPE Assessment Report does not mention Visual Impact and yet states that the 'Modification 7' is to be assessed as being "akin to a new mine"
- The proposed mining activities including 192 truck movement per day across the open rural floodplain, large buildings and stockpiles, and 24/7 activities at East Site, will create a significant visual impact on the rural character of the valley
- The Upper Hunter Valley landscapes and agricultural land uses need to be protected from the visual impacts of coal mining.

Beatty Legal™

T +61 2 8203 2381
E admin@beattylegal.com
Suite 2303, Level 23, Governor Macquarie Tower
One Farrer Place, Sydney NSW 2000

www.beattylegal.com

Our Ref: ARB:BES:380

26 April 2019

BY EMAIL
The President
Hunter Thoroughbred Breeders Association Inc
By email: admin@htba.com.au

Re: Dartbrook Coal Mine Modification 7

This written submission supplements the legal submissions made to the Independent Planning Commission in Muswellbrook on 9 April 2019 by Beatty Legal on behalf of the **Hunter Thoroughbred Breeders Association Inc.**

It addresses the following:

a. Limitations of the Application as made

b. Relevance of the Proposal's landscape context

c. The public interest

d. Quantification of cumulative impacts

e. Assessment of social impacts

f. The balancing of benefits and burdens

1. Limitations of the Application as made

1.1 Is the application for a s75W modification?

While the existing consent is not a Part 3A approval, due to transitional provisions it is to be assessed under the now repealed modification provisions in s75W of the *Environmental Planning and Assessment Act* 1979 (**EP&A Act**).

This proposal is materially different to that previously approved. An essential feature of the original project, namely the wholly underground conveyance of coal, does not form part of the modification. This raises the question of whether the modification truly fits within the parameters of the now repealed s75W of the EP&A Act.

In *Billinudgel Property Pty Ltd v Minister for Planning* [2016] NSWLEC 139, Justice Robson reviewed and summarised the approaches taken by Land and Environment Court and NSW Court of Appeal to the application, construction and scope of s75W. He proposed a

two-step approach involving, firstly, identifying what was approved by the Minister; and then considering whether the application seeks a modification of that approval.

In that instance Justice Robson held that a proposal to delete a condition restricting the use of land for outdoor events to a 5 year limited trial period was not relevantly a modification under s75W as that condition constituted a fundamental part of the approval and its removal would constitute something more than "changing the terms" of the approval.

Justice Robson identified the following considerations as being relevant to the question of whether an application seeks a (s75W) modification of an approval:

(1) *the making of a modification pursuant to s 75W of the EPA Act is constrained at least to some degree: Barrick at [53] (Basten JA); Williams (No 1) at [55] (Biscoe J); Meriton at [40] (Senior Commissioner Moore);*

(2) *there is no clear dividing line between what is a modification and what is not a modification: Barrick at [51] and [53] (Basten JA); Meriton at [40] (Senior Commissioner Moore);*

(3) *whether a proposed change constitutes a modification has generally been negatively defined as not being something else, whether that be:*

   (a) *a change to "an element of the underlying project": Barrick at [53] (Basten JA);*

   (b) *a "radical transformation": Williams (No 1) at [57] (Biscoe J);*

   (c) *a "radical change to the existing project" or a change that meant that the modified development was "substantially different": Williams (No 2) at [57] and [81] (Pain J), and*

(4) *it is possible to determine whether a change is a modification without recourse to what does not constitute a modification, such as whether that change can be described as having "sufficient linear descent" from the approval: Meriton at [41] (Senior Commissioner Moore).* [58]

To these four considerations Justice Robson added a further two, being:

- the natural meaning of the word "modification" which supports the proposition that a modification refers to a limited change [59]; and
- the meaning of the phrase "changing the terms", which is found twice in the definition of "modification of approval" in s 75W(1) which caused Justice Robson to conclude that: "*given its natural meaning, a modification is restricted to substituting the limiting conditions or stipulations that form part of an approval, rather than changing an underlying and essential part of the approval itself*" **[**60].

The use of the Hunter Tunnel for underground coal conveyance was and is an essential element of development approved in the Dartbrook consent. The core nature of the tunnel is demonstrated in the 2001 conditions of consent[1]. The proposed removal of the tunnel raises a question as to whether the proposal is truly a mere modification under s75W.

As noted by the NSW Court of Appeal in *Barrick v Williams:* "*Construing s 75W in its context, it is clear that the modification of an approval was something intended to have limited environmental consequences beyond those which had been the subject of assessment*."[2]

The aboveground conveyance of coal creates significant, new and fundamentally different impacts: air quality (dust and vehicle emissions) noise and visual impacts. It will transform a scenic rural floodplain into an industrial landscape. As stated in the 1991 environmental assessment materials for the project: aboveground transport of coal in this location would be "environmentally damaging" and environmentally intrusive"[3]. These impacts were recognised as unacceptable in 1991 and 2001 assessment process and, for both legal and merit reasons, should again be today.

1.2 The proposal is constrained by the terms of the application

The IPC has been asked to determine a modification application under the long repealed s75W of the EP&A Act to seek consent for a coal mine. The existing approval for the mine was granted in 2001 for a term of 21 years (expiring in 2022) but, due to safety, environmental and economic concerns, no mining has taken place for 13 years.

Modification of the consent is required to enable the mine to operate again. Your starting point is to identify what is, and is not, contained within the modification application.

> Any approval must be "*in accordance with the law and having regard to the merits of the particular development in the development application*"[4]:

The application before you is for a modified form of underground coal mine subject to the following key restrictions:

a. 1.5Mt per annum ROM coal to a maximum over the life of the mine of 10Mt;

b. ROM coal is not to be washed prior to rail transport from the site – i.e. the washery in the coal handling and preparation plant will not operate;

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[1] Eg conditions 4.1 (a) (iv), (v); 4.2 (a) (i) (2); 7.2 (b)
[2] Barrick Australia Ltd V Williams [2009] NSWCA 275 at 53 per Basten JA
[3] Primary Submission to the Commission of Inquiry, section 4.9 (page 16)
[4] *Australian Lifestyle Corp Pty Ltd v Wingecarribee Shire Council* (2008) 168 LGERA 239 at [34]-[35] (Preston CJ of LEC).
Millers Point Fund Inc v Lendlease (Millers Point) Pty Ltd, [2016] NSWLEC 166, 220 LGERA 333, 2016 WL 7451463, (23/12/2016).

c. No coarse rejects or tailings are to be generated (as the washery will not operate);

d. New 70m deep shaft and associated structure to be constructed so as to access a section of the Hunter Tunnel to convey coal under the New England Highway;

e. Road transport of coal (Monday to Friday 7am - 6pm) on internal roads (including a new road to the new shaft building) from the mine entrance to the shaft site; and

f. Consent to expire in December 2027.

Those are the parameters of the proposal before you for assessment. If you decide that the application warrants approval, it can only be for works constrained by these criteria.

There is some confusion within the mine proponent's environmental assessment materials and the Department's assessment report as to the effect of any modification of the consent. While it is true that multiple consents can run over the same land, the consents co-exist as separate and overlapping permissions and constraints - modification of a project consent is not an opportunity for a proponent to "cherry pick" between elements of different approvals.

Should consent be granted and should a proponent elect to proceed with it then it must be bound to the details of the proposal as assessed. The key features of the proposal the subject of the modification application are set out in (a) – (f) above. They do not include coal washing or rejects generation and are subject to a specific volume cap.

From the Commission's transcripts it is clear that the proponent assumes that the purpose of the modification is to provide optionality and flexibility from which it can then develop a new and unassessed form of development – this cannot be the case because, as the Commission would be aware, one of the touchstones of any planning consent is its certainty and, pending any newly assessed and approved applications, its finality.

The impacts of the operation of the coal washery (CHPP) and of the extraction of more than 1.5Mtpa have not been assessed by anyone as part of this proposal and cannot be the subject of any approval.

While the operation of a CHPP is permitted under the old approval, compliance with that approval also requires wholly underground transport of coal to the rail terminal, project completion by 2022, long wall mining (with associated greater resource efficiency) and a higher coal production rate. That is to say the operation of the CHPP was assessed in 1999 (the date of the EIS materials) for an entirely different project with very different environmental impacts.

The operation of the washery and higher coal production rate (described in the current consent) is not part of the proposal before you as the impacts of these elements have simply not been assessed. Any future potential for these activities to occur cannot form part of your assessment of the application now before you. They are, in the classic

administrative law sense, irrelevant considerations which, if taken into account, would infect the legality of any approval.

1.3 Impacts permitted under the current consent are irrelevant

Your role is to assess this proposal on its merits having regard to its contemporary economic, social and environmental impacts and benefits. You must take the project proposal as you find it **in its current context.**

It is clear that this requires an assessment of the full impact of the proposal (being the project as sought to be modified) against the backdrop of all relevant factors[5]. This requires:

a. identifying all impacts of the proposal (not just those sought to be modified); and

b. undertaking an assessment of those impacts by reference to all relevant factors and standards beyond just considering whether and how they differ from the project as approved.

That is to say: the proposal is to be assessed on its merits having regard to its impacts now - not by reference to whether the impacts differ from that which was approved 18 years ago.

No work, other than rehabilitation, has occurred on the site for 13 years. This is a mine that effectively has been shut down - over 51 hectares of land have been rehabilitated and significant infrastructure has been removed. The community and the landscape have "moved on". For an ongoing project with ongoing impacts, it could be reasonable to assess a modification by assessing the difference in impact between currently experienced and predicted modified impacts – but this is clearly not the case here.

How the modification compares with a project which has been abandoned for 13 years is an irrelevant consideration. Any impact of the proposal (other than the ongoing water seepage into mined areas and the Hunter Tunnel) will be felt as a "new" impact. The proponent (and the Department) suggest that the proposal's impacts (not benefits) ought be assessed against a "base case" established by what was approved 18 years ago (and was abandoned 13 years ago) rather than by contemporary standards and with regard to the current context of the development. Such an approach would be contrary both to your duty as a consent authority and contrary to the public interest.

In its review of the proponent's social impact assessment, the Department notes that "*the social impacts actually experienced would be more akin to a new mine opening*"[6] because the approved project has not operated for 13 years and accordingly, any social impact would be felt by the community as a "new impact". The same logic should apply to the

[5] See North Sydney Council v Michael Stanley & Associates Pty Ltd NSWCA 97 LGERA 433 at 442
[6] Departments Assessment Report p27

assessment of all social and environmental impacts of the proposal. All impacts of the proposal will be experienced by the community as "new impacts".

Your responsibility is to assess the proposal afresh: to consider whether the proposal merits approval having regard to its benefits and adverse impacts as assessed by you in 2019.

1.4 There is insufficient information to assess the proposal's impacts

Unlike the development assessment process under Part 4 of the Act, the assessment requirements under s75W are not set out in detail. The only prescriptive requirements are that:

a) the applicant is required to undertake an assessment in accordance with any environmental assessment requirements (**EARs**) issued by the Department (s75W(3)) – in this case we understand no EARs were issued; and

b) certain formalities regarding land owner consent and notification are specified. In this regard we note that it is unclear whether the applicant complied with its notification obligations under Clause 8F(3)(b), Schedule 4, Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017.

Nevertheless, it is clear that your obligations as a consent authority cannot be satisfied unless you have sufficient, credible information to enable you to quantify and assess the predicted impacts of the proposal.

Due to the failure of the Department to issue EARs you do not have the benefit of a detailed criteria by which the proposal can be assessed. Instead, you have a patchwork assessment within a scope established by the proponent.

For example:

- the proponent is unclear of the project definition,
- the assumptions in the economic assessment are unsubstantiated (and contrary to reasonable evidence),
- the water impact assessment is "non-conventional"[7] and fails to take into account climate change and no impact assessment has been undertaken of the shaft or the shaft building (the details of which are unknown);
- the heritage and visual assessments are extremely limited,

[7] See Appendix E – Groundwater Peer Review by Dr Noel Merrick at page 4

- background noise and cumulative and intrusive noise impacts have not been assessed; and
- no consideration has been given to the end of life for the mine and shaft (ie, what rehabilitation is proposed, and how much will this cost?)

On the publicly available material, no one (the Commission included) has sufficient, credible information to assess its impacts.

The Department's Assessment Report accepts and adopts a flawed approach of comparing the adverse impacts[8] of this proposal against the project as originally approved (and abandoned for 13 years) rather than evaluating it against any objective criteria. Consequently, it is of limited assistance in providing an objective analysis of the actual predicted impacts of the proposal.

2. Proposal's Landscape Context

The proposal straddles the Council boundary between Muswellbrook Shire Council and the Upper Hunter Shire Council and marks a boundary between two largely incompatible land uses being mining to the south and agricultural and tourism uses to the north. The Department has submitted that the proposal is to be assessed having regard to the criteria in s4.15 of the EP&A Act. This would include having regard to relevant environmental planning instruments including the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (**Mining SEPP**).

Under clause 12(a) of that SEPP the consent authority is required to consider three matters:

First -

"(i) the existing uses and approved uses of land in the vicinity of the development…

The existing land uses in the vicinity of the site are, within and north of the site, are agricultural, (equine, viticulture), residential and tourism. The mining use of the site has been abandoned and much of the site has been rehabilitated. But for this mothballed mine there is no coal mining in the Upper Hunter Shire. The only other [recent] coal mining proposal in the Upper Hunter Shire did not make it to a detailed assessment because the Planning and Assessment Commission determined that due to likely water impacts and the incompatibility of the proposal with surrounding uses it did not merit further consideration[9] Indeed, in that case, the concerns about that proposal in the untouched

[8] We note that the asserted (financial) benefits of the proposal are not compared against the asserted benefits of the project as approved.

[9] See Planning Assessment Commission report into the Bickham coal project dated May 2010

Upper Hunter motivated the government of the day to prohibit it through an amendment to the Mining SEPP. [10]

Agricultural uses prevail across adjoining properties immediately to the South. Past these properties is the recently commenced Mt Pleasant mine which currently marks the most northern extreme of active and approved mining in the locality.

Second -

> *(ii) whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and*

The preferred (future) land uses in the vicinity demonstrate this agricultural/rural residential/tourism trend. Since the current consent was issued in 2001 and the mine ceased operations in 2006, ***Equine, BSAL and Viticulture Critical Industry Clusters*** have all been mapped in the area (in 2012) - giving recognition to the importance both economically and culturally of these land uses. The mapping of these CICs under the Strategic Land Use Policy 2012 was intended to provide "*greater protection" to agricultural land from the impacts of mining and coal seam gas (CSG) activity*"[11] including through the additional scrutiny of the Gateway process. An Equine CIC has been declared ***within*** the project area – however, the proponent asserts, and the Department accepts that clause 17A of the Mining SEPP[12] is not triggered by the proposal and hence no Gateway Certificate or Site Verification Certificate is required.

Underground mining is prohibited by both MSC and UHSC in the zonings applicable to the site. The Upper Hunter Shire Council issued a Position Statement in 2015 on Coal and Coal Seam Gas Activities. This policy statement demonstrates the UHSC's strong opposition to coal mining and coal seam gas in its Shire. Paragraph A1 of this statement provides the following succinct summary of the current and preferred land use in the area:

> *"The Upper Hunter Shire Council (UHSC) recognises that the dominant land use in the Shire is agriculture (most notably the beef and equine industries) and further recognises its role as custodian and guardian of all its established rural enterprises, our unique 150 year old identity based around "the Horse Capital of Australia", the critical mass of thoroughbred breeding ventures and interrelated services located within the Shire and the pristine natural environment which supports those industries and enhances the Shire as a preferred place to live and work".*

[10] See item 3 in Schedule 1 to the Mining SEPP

[11] https://www.planning.nsw.gov.au/Policy-and-Legislation/Mining-and-Resources/Safeguarding-our-Agricultural-Land

[12]

This unambiguous expression by Council of the desired future character of the area must be given real weight[13] as, in many ways, it embodies what the local community itself considers is "the public interest":

> *The public interest is expressly acknowledged as a relevant consideration in s 79C(1)(e) of the Environmental Planning and Assessment Act. It was similarly acknowledged in s 91 of the Act in its original form. It must extend to any well-founded detailed plan adopted by a council for the site of a proposed development either alone or forming part of a greater area, even if it is not formally adopted as a development control plan.*[14]

The Upper Hunter Shire Council has stated its strong opposition to the proposed modification and has reaffirmed its preferred rural use of land in the area . Similarly, the views of the community expressed before you at the public meeting and in written submissions demonstrate their values and preferred land uses for the area. They do not include coal mining: open cut or underground.

Third -

> *(iii) any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses."*

As established by the evidence before the Commission, due to water, air, noise, visual, social and heritage impacts, these existing and preferred uses are entirely incompatible with mining. Previous Planning and Assessment Commissions have repeatedly identified the incompatibility (in close proximity) of mining and thoroughbred horse breeding.

3. The Public Interest

The limited case law on the application of 75W establishes that consideration by a consent authority of the public interest is fundamental to lawful decision making:

> "*the public interest is a mandatory consideration in relation to modification of a project approval under s 75W … and requires consideration of relevant ESD principles*"[15]

ESD: ecologically sustainable development (as defined in the *Protection of the Environment Administration Act* 1991) requires the effective integration of social, economic and environmental considerations in decision-making processes. It includes the precautionary principle, intergenerational equity, and requires that environmental factors be included in the valuation of assets and services[16].

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[13] See McLellan CJ in *Stockland Development Pty Limited v Manly City Council* [2004] NSWLEC 472 at paras [88]ff
[14] *Stockland* at [90]
[15] *Kennedy v NSW Minister for Planning* [2010] NSWLEC 240 at 78 per Biscoe J
[16] *Protection of the Environment Administration Act* 1991, s6(2)

The precautionary principle mandates that where there is scientific uncertainty and there is a threat of serious or irreversible environmental damage, the proponent bears the burden of proving that the threat does not exist or is negligible. Absent that proof the decision-maker must assume that the threat of serious or irreversible environmental damage is no longer uncertain but is a reality[17].

As stated by Preston CJ in *Gloucester Resources Limited v Minister for Planning* [2019] NSWLEC 7 (**Gloucester Resources**): *"The principle of intra-generational equity provides that people within the present generation have equal rights to benefit from the exploitation of natural resources as well as from the enjoyment of a clean and healthy environment: Telstra v Hornsby Shire Council at [117]. The principle of inter-generational equity provides that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for future generations (see s 6(2)(b) of the Protection of the Environment Administration Act 1991): Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Limited (2013) 194 LGERA 347; [2013] NSWLEC 48 at [486], [492]*"[18].

The principles of ESD, particularly the precautionary principle and principle of inter-generational equity, have been held to require consideration of the impact of a development on climate change and the impact of climate change on a development[19].

4. Quantifying cumulative impacts

There is a long line of judicial authority stipulating that application of the principles of ESD (and in particular the precautionary principle) necessitates the knowledge of impacts which are cumulative, on-going and long term[20].

> *"Cumulative impacts are the successive, incremental and combined impacts (both positive and negative) of activities on society, the economy and the environment. They*

[17] See *Telstra Corporation Limited v Hornsby Shire Council* (2006) 146 LGERA 10 at [150]) and its application in *SHCAG Pty Ltd v Minister for Planning and Infrastructure and Boral Cement Limited* [2013] NSWLEC 1032.

[18] Gloucester Resources at 399

[19] Gloucester Coal at 498: *"The public interest has been held to include the principles of ESD: see Telstra v Hornsby Shire Council at [124] and Minister for Planning v Walker (2008) 161 LGERA 423; [2008] NSWCA 224 at [42], [43]. In turn, the principles of ESD, particularly the precautionary principle and principle of inter-generational equity, have been held to require consideration of the impact of a development on climate change and the impact of climate change on a development: see, for example, Gray v Minister for Planning (2006) 152 LGERA 258; [2006] NSWLEC 720; Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd (2007) 161 LGERA 1; [2007] NSWLEC 59; Aldous v Greater Taree City Council (2009) 167 LGERA 13; [2009] NSWLEC 17; and Hunter Environment Lobby Inc v Minister for Planning [2011] NSWLEC 221."*

[20] Eg *Gray v Minister for Planning and Ors* (2006) 152 LGERA 258

can arise from a single activity, multiple activities or from interactions with other past, current and foreseeable activities"[21].

As stated in the SIA Guidelines: "*a resource project may generate noise and dust, consume local water resources, and increase traffic on local roads and services. The combination of these varied impacts may result in a cumulative impact on the social fabric of a locality*."[22]

Similarly, this proposal will contribute to adverse cumulative impacts on the area as a consequence of its air quality, noise, blasting, traffic, visual and social impacts.

Assessment of cumulative impacts necessarily requires the consideration of the impacts of other approved projects in in the locality:

"*The word 'cumulative' anticipates a consideration of not just the development the subject of the application, but the development in combination with other development in the locality and the effect that the accumulation of such development and successive development of a similar type, will have on the community or locality…There is also judicial support for this interpretation to include not only the effect of the subject development, but to include other developments of a similar type that might take place in the future and developments already approved; see for example BT Goldsmith Planning Services Pty Limited v Blacktown City Council [2005] NSWLEC 210, Dames and Moore Pty Ltd v Byron Council [2000] NSWLEC 46) both adopted in Gales Holdings Pty Limited v Tweed Shire Council [2006] NSWLEC 85*."[23]

Thus, assessment of cumulative impacts necessarily requires consideration of the impacts of other approved projects that affect the area. In identifying the impacts of other approved projects , it is foreseeable (and prudent to assume) that approved land uses would be undertaken to the limits authorised under their respective planning consents. That is to say the quantification of impact must assume that the surrounding development is undertaken at its approved extent.

The air quality assessment provided by the proponent has used 2014 data as a measure for estimating cumulative air impacts. There are 5 mines in the vicinity of the project site that could reasonably be considered to contribute to air quality impacts in the area. Set out below is a table identifying the actual published ROM production rates[24] of these mines

[21] Social impact assessment guideline For State significant mining, petroleum production and extractive industry development September 2017, page 6
[22] SIA Guidelines p6
[23] *Hastings Point Progress Association Inc v Tweed Shire Council* [2008] NSWLEC 180 at 77 and 78
[24] The information in this table is based on information provided by Mr Michael White based on publicly available documentation. In collating this data Mr White has needed to combine calendar year and financial year data. We note that extraction activity (ie dust generating activities) is higher than ROM production. For instance, to produce the 49.08 Mt of ROM coal in 2014, 427.28 million tonnes were moved.

in 2014 and the production rate permitted by their planning approvals (using 2022 as an example year):

Mine	2014 Production (Mt)	2022 Permitted (Mtpa)
Muswellbrook Mine	1.39	2
Mangoola	11.26	13.5
Mt Arthur Open Cut	25.74	32
Bengalla	10.69	15
Mt Pleasant (now operational)	-	10.5
TOTAL	**49.08**	**73**

You will note that:

- The existing approved mines were not operating at full capacity in 2014; and
- It is foreseeable that in the future, should the existing approved mines operate at the capacity permitted under their consents, the cumulative ROM production rate would be close to 150% of what it was in 2014.

You will recall that, based on 2014 data (and incorporating assumptions made regarding the predicted impact of Mt Pleasant), the Dartbrook air quality assessment already predicts exceedances of NEPM criteria within and in the vicinity of the project area. Air quality in Hunter Valley is increasingly of concern. **The airshed in the Hunter reaches the limit of, and often exceeds, health criteria.** This is even when the existing approved mines are not operating at their approved capacity.

This proposal will only exacerbate already poor air quality. On cumulative air impacts alone therefore, this proposal should not be approved

5. Social Impacts

Social impacts can be positive or negative; tangible or intangible; direct, indirect or cumulative; directly quantifiable, indirectly or partly quantifiable or only able to be described and assessed in qualitative terms; and experienced differentially. Social impacts need not be actual they can also be perceived[25].

[25] SIA Guideline pages 6 and 7 as summarised in Gloucester Resources at 272 and 274

The Department's Social Impact Assessment Guideline (**SIA Guideline**)[26] lists nine key categories in which social impacts may occur: way of life; community; access to and use of infrastructure, services and facilities; culture; health and wellbeing; surroundings; personal and property rights; decision-making systems; and fears and aspirations.

Changes associated with the Proposal will directly, indirectly or cumulatively impact many of the categories of social impact defined in the SIA Guidelines. The proposal will have physical impacts on scenic values and amenity, add to particulate pollution and create noise and light pollution. There will be social change and consequences for infrastructure access associated with the proposed workforce (considered most likely to be substantially drive in / drive out). There will be traffic impacts (and light pollution) associated with staff shift changes. People will be displaced either by land acquisition or due to the incompatibility of the mine with their lifestyle values. There will also be risks to existing agricultural businesses such as a number of thoroughbred horse studs. As noted by Chief Justice Preston in Gloucester Resources noise and dust can have significant adverse social impacts even where land acquisition criteria are not triggered[27].

Social impacts related to community includes changes in the composition, cohesion, character and function of community and people's sense of place[28]. Most of the people speaking to the Commission oppose the proposal and all have expressed concerns about the potential impact of the mine on the clean green values of the Upper Hunter. They have identified:

- Social impacts related to their personal and private rights – either through acquisition or concerns about the loss of value of property and/or health or amenity impacts due to proximity to an operating mine;
- Impacts on the livelihood of people who depend on the high quality of the environment in the Upper Hunter; and
- Impacts on their sense of place and the inconsistency of the proposed mine to their appreciation of the environment and scenic values of Aberdeen/the Upper Hunter.

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[26] Social impact assessment guideline For State significant mining, petroleum production and extractive industry development September 2017 (**SIA Guideline**)

[27] *"I find that the Project is likely to affect local residents' health and wellbeing in the ways explained by Dr Askland and Dr Lawrence, as well as by Dr Lyford, and the Department. The particulate, noise and light pollution from the Project may well comply with the applicable regulatory criteria, but will still be perceptible by local residents. The residents are likely to have a high level of concern about the particulate, noise and light pollution from the Project. This concern is likely to raise stress and anxiety, potentially affecting mental health and physical health. These are social impacts in themselves. They might also lead to other social impacts. People who value living, working and playing in a clean and green environment may leave the Gloucester area, adversely affecting the local community and economy*. Gloucester Resources at 367

[28] SIA Guideline p5

Expert evidence was presented to the Commission regarding the significant flaws in the SIA provided by the proponent in its Response to Submissions. In particular, the SIA demonstrated a lack of understanding of the proposal's area of social influence, a lack of consideration of impacts to vulnerable groups and a failure to consult with Aboriginal and non-Aboriginal stakeholders.

The asserted social benefits of this mine are unsubstantiated and overstated. For instance, a 75% "local" employment figure for specialised underground mine staff for a relatively short term project has been identified as unsubstantiated and unrealistic in submissions made to the Commission. Refusal of consent will not materially adversely affect the local economy and employment given the current level of approved mining in the Muswellbrook area.

In ***Gloucester Resources*** Chief Justice Preston outlined issues relating to the assessment of social impacts for that project. Most of his comments and criticisms of the SIA for that project are equally applicable to this proposed mine and the social impact assessment undertaken for it. Relevantly, many of his Honour's conclusions regarding the significant adverse social impact of the Gloucester mine were based on the views of the Department's own social researcher[29].

6. Indirect Impacts and Greenhouse Gas Emissions

The likely impacts of a development include both direct and indirect environmental impacts.

"*The principles of ESD, particularly the precautionary principle and principle of inter-generational equity, require consideration of the impact of a development on climate*

[29] For instance, Dr Lawrence, the Department's social researcher identified the following issues inadequately assessed in the SIA (Gloucester Resources 364 & 365):

- "*There is, .. a substantive literature on the psychological and mental health issues encountered by mine workers, particularly non-resident workers (for example, depression, relationship difficulties, alcohol misuse), people living near mines (loss of sense of place and solastalgia) and vulnerable population groups in the areas in which they work or are temporarily housed. ..*
- *[T]he SIA has not dealt with mental health impacts on low income families displaced by incoming mine workers, although displacement is reported as a concern for members of the community. The SIA also does not consider mental health impacts of an influx of mainly male and relatively wealthy workers on vulnerable population groups in the town, for example on unemployed or low income men, or young women, or Aboriginal people. This literature is available but has not been assessed or addressed in the section on mental health." (Lawrence report, p 28).*
- *"Moreover, the section on health refers in multiple instances to monitoring incorporated in the applicant's own Noise Vibration and Blasting Assessment and Air Quality and Risk Assessment, but with no regard for how increased noise and dust may impact upon people's well-being, sense of place or way of life more generally (regardless of whether technical thresholds are met or not). In other words, even if technical thresholds for noise and dust are not breached by the applicant during operations, there is a real concern amongst community members (evidenced in submissions to the DPE) that their well-being and way of life will be negatively affected*.

change and the impact of climate change on a development."[30]

The scope 3 emissions of the Proposal have not been assessed. Scope 3 emissions are emissions from the extraction and production of purchased materials, transportation of purchased fuels and use of sold products and services. In the case of a coal mine the scope 3 emissions would include emissions associated the transportation and combustion of product coals and with the extraction, processing and transportation of diesel[31].

Clause 14(2) of the Mining SEPP requires the consent authority to consider Scope 3 emissions.

> *"in determining a development application for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programs or guidelines concerning greenhouse gas emissions."* Clause 14(2) Mining SEPP

In ***Gloucester Resources*** the Court held that:

- consideration of the impacts of the mining project on the environment and the public interest justify considering not only the Scope 1 and Scope 2 emissions but also the Scope 3 emissions of the proposed mine[32]; and
- the GHG emissions associated with the project and their likely contribution to adverse impacts on the climate system, environment and people adds a further reason for refusal of the development[33].

In reaching this conclusion, Chief Justice Preston identified that:

- All of the direct and indirect GHG emissions of the mining project will impact on the environment. All anthropogenic GHG emissions contribute to climate change[34].
- There is a causal link between the proposed mine's cumulative GHG emissions and climate change and its consequences. The Project's cumulative GHG emissions will contribute to the global total of GHG concentrations in the atmosphere[35].

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[30] see, for example, *Gray v Minister for Planning* (2006) 152 LGERA 258; [2006] NSWLEC 720; *Taralga Landscape Guardians Inc v Minister for Planning and RES Southern Cross Pty Ltd* (2007) 161 LGERA 1; [2007] NSWLEC 59; *Aldous v Greater Taree City Council* (2009) 167 LGERA 13; [2009] NSWLEC 17; *and Hunter Environment Lobby Inc v Minister for Planning* [2011] NSWLEC 221 cited by Preston CJ in Gloucester Resources at 498

[31] Gloucester Resources at 428

[32] Gloucester Resources at 513

[33] Gloucester Resources at 556

[34] Gloucester Resources at 514

[35] Gloucester Resources at 525

- It matters not that this aggregate of the Project's GHG emissions may represent a small fraction of the global total of GHG emissions. The global problem of climate change needs to be addressed by multiple local actions to mitigate emissions by sources and remove GHGs by sinks[36].

The same logic applies in this instance to your consideration of the Dartbrook proposal.

7. Balancing the benefits and impacts of the proposal

The impacts of the Proposal need to be assessed qualitatively and balanced against the quantified net economic benefits. If you consider that you have before you a legally competent s75W application (and we submit you do not), this balancing exercise is your main task.

Your task is "*to balance the public interest in approving or disapproving the Project, having regard to the competing economic and other benefits and the potential negative impacts the Project would have if approved*"[37]:

You will need to have regard to the probability and timescale of predicted benefits or impacts and the distribution of those benefits and burdens within and across current and future generations. In this instance:

a. the asserted benefits of the Proposal (which are solely economic and patently short term) principally benefit the proponent;

b. the asserted benefits tothe broader community of NSW (via tax or royalty payments) are few and more likely negative;

c. the burdens or costs of the Proposal (such as the environmental, social and economic costs) fall squarely on the local and regional community; and

d. these adverse environmental and social consequences (such as water impacts, climate change contributions, displacement of community / long term health impacts) may persist for generations

You must weigh the claimed benefits of the mine against its demonstrated negative impacts.

Economic factors are the only possible positive for the mine. You have heard that the quantum of this asserted benefit is overstated (significantly) and there are significant risks that it will not be achieved. A more realistic analysis demonstrates that the nett present value of the mine is close to zero or is more likely to be negative.

[36] Gloucester Resources at 515

[37] *Warkworth Mining Ltd v Bulga Milbrodale Progress Association Inc* [2014] NSWCA 105 at [171].

The individual profitability of the mine is a matter for the proponent. However, where the only arguable benefit of a project rests on unproven assumptions including:

- the mine being capable of producing a marketable product at a specific price; and
- the mine maintaining continuous production at a nominated rate for its entire term

you must scrutinise the economic justification for the proposal carefully to determine if the purported economic benefits to the State are credibly determined and likely to be obtained.

In ***Gloucester Resources*** the Department's own expert's robust criticisms of the proponent's coal price and company tax assumptions were accepted by the Court. The economic assessment before you is similarly fatally flawed. In particular:

- The coal price assumptions are significantly overstated;
- the predicted 30% company tax rate is more likely to be in the order of 2.7%-6.8%[38]
- the proposal will produce a low quality (high ash bypass product) that is unlikely to meet market requirements;
- the capital expenditure, operating cost, head count and production rate assumptions are not credible; and
- the proponent has inappropriately assigned a zero value to the negative impacts of the proposal.

The manifest deficiencies in the project planning raise serious doubts as to the capacity of the proponent to deliver the project at all let alone continuously over its proposed 8 year term.

On the other side of the balancing equation, the potential adverse impacts of this mine in this location are significant, multifaceted and will be felt locally and regionally. They are unable to be completely mitigated - ie:

- Even if all mitigation is successfully and continuously implemented, it will cause local air quality to exceed NEPM criteria and will, in combination with other mines and dust generating activities, extend the zone of "dangerously dusty" land into the pristine Upper Hunter. It will place a further 9 properties on the "unliveable" acquisition list due to dust impacts.

[38]See summary of analysis provided by the Department's economist Mr Rajaratnam in Gloucester Resources at 583

- It will be visually intrusive for the surrounding community and its visitors as a consequence of the physical activity (including its dynamic nature) associated with the mine and its 24 hour operations.
- It will have adverse noise impacts and these impacts will have substantial adverse social impacts. Even if the land acquisition criteria is adopted as the relevant standard and the implausibly quiet noise source assumptions are accepted it will still exceed the "nominated" cumulative noise amenity criteria. More importantly, the noise of the mine operations is likely to be unreasonably intrusive for many residents.
- Social impacts associated with the displacement of local character and community. Through its physical and social impacts, the modification will change the character of the area. Additionally, there will be a long term legacy of remediation once mining has ceased.
- Impacts on Aboriginal heritage and non-Aboriginal heritage and the social impacts associated with those impacts.
- Reduced long term surface and groundwater water quality and quantity in the locality especially in drought when water availability is critical for agricultural users. These impacts will be greater (and irreversible) if the water impact assessment (like the previous assessment for the project) proves unreliable.
- A further loss of local, agriculturally productive land to mining.
- Long term de-investment in the locality by any businesses other than coal mining and those that serve coal mining.
- A further contribution to climate change.

8. Conclusion

Although the assessment framework under s75W is ill defined, it is clear that your role is to assess the proposal on its merits having regard to the public interest and the assessed impacts and benefits of the proposal according to contemporary standards in 2019. The limited case law on the application of 75W establishes that consideration by the consent authority of the public interest is fundamental.

The only possible potential positive impact that the Department and the proponent can point to is economic - all other impacts are negative. If the economic assessments are not robust and accurate (and they are not), the scales must be weighted towards refusal by application of the precautionary principle and by a proper consideration of the notion of intergenerational equity.

An approval of this application will relegate what the vast majority of the local community want for their livelihoods and health to second place behind yet another coal mine.

If coal mines were genuinely "compatible" with any other neighbouring land uses there would be no need for the imposition of the types of "strict" conditions which the Department says should be imposed (eg, to protect air and water) nor would the State need to sanction the private resumption of sustainable agricultural land as "buffer zones".

There is no public interest, now or in the future, in approving this application.

Beatty Legal

Andrew Beatty
Director
Beatty Legal Pty Limited
ABN 44 273 924 764