NSW GOVERNMENT | Mining & Petroleum Gateway Panel

Drayton South Coal Project Advisory Report

10 December 2013

Contact

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Executive Summary

The Mining & Petroleum Gateway Panel has determined the significance of potential impacts from the Drayton South Project on nearby Critical Industry Clusters, both equine and viticulture, and proposed additional mitigation measures. The State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, Section 17, provides the *relevant criteria* for the Panel in assessing a Gateway Application. Whilst this advisory report does not relate to a Gateway Application, the *relevant criteria* provide an appropriate framework for this report. The relevant criteria are that the proposed development will not have a significant impact on Critical Industry Clusters based on consideration of impacts to land, water and agricultural resources, support services and infrastructure, transport routes, and scenic and landscape values

The Panel finds the potential impacts of the proposed mine on the Critical Industry Clusters are significant. These potential impacts include those from dust, noise, vibration and blast overpressure, and most importantly, loss of landscape values through diminished visual amenity. Loss of landscape values is considered the most material potential impact, as landscape values underpin the core businesses of both Critical Industry Clusters, e.g. the nearby Coolmore and Woodlands (Darley) thoroughbred horse studs and the Arrowfield Estate vineyard and winery.

With respect to the equine cluster, it is the Panel's view that open-cut coal mining as proposed at Drayton South, and thoroughbred horse breeding studs of the nature, scale and importance of Coolmore and Woodlands (Darley), are incompatible land uses that cannot coexist in close proximity. The potential impacts of the proposed mine would be significantly deleterious to these horse studs and the equine cluster, to the extent that it may cause these studs to exit the region and demise of the cluster.

The Panel is of the view that an alternative, reasonable and feasible mitigation strategy could be implemented to materially reduce the project's potential impacts on the Critical Industry Clusters. This would take the form of a suitable portion or distance of *buffer* land between the proposed mining activities and the cluster businesses, specifically Coolmore and Woodlands (Darley) thoroughbred horse studs and Arrowfield Estate vineyard and winery. A suitable buffer distance is considered by the Panel to be one that would nullify all potential impacts of the proposed mine on the continued viability of Coolmore and Woodlands (Darley) studs and Arrowfield Estate vineyard and winery. To this end, the Panel advises that mining disturbance should be restricted to an area north of a natural ridgeline that exists on the project land in order to preserve, in particular, the landscape values that are important to both Critical Industry Clusters.

The Panel further advises that, should the mine be approved, and in addition to an appropriate distance of buffer land, an additional mitigation strategy that provides for monitoring and management of actual impacts is considered necessary. In this strategy, and amongst other things, if potential impacts on the Critical Industry Clusters are realised, then mining operations must be discontinued.

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1 Contents and Terms of Reference

1.1 Contents and Terms of Reference

On 13 November 2013, the Director General of the Department of Planning & Infrastructure (DP&I) issued a request for advice to the Chairperson of the Mining & Petroleum Gateway Panel (the Panel) regarding the Drayton South Coal Project. The advice sought is on:

- *the significance of the project's potential impacts on the nearby CICs; and*
- *whether any additional reasonable and feasible mitigation measures could be implemented to materially reduce the potential impacts of the project on these CICs.*

The Director General requested this advice be provided by 10 December 2013.

1.2 Methods

1.2.1 The Panel

All six members of the Panel considered this request for advice and contributed to this report.

1.2.2 Panel Meetings

The Panel has held the following meetings:

- The Panel was briefed by DP&I staff members on 13 November 2013; and,
- The Panel met subsequently on 22 November to discuss issues relating to the request for advice.

1.2.3 Document review

At the briefing, DP&I provided the Panel with the following documentation (listed in the order the material was provided):

- Muswellbrook Shire Council, 2013. Submission on the Drayton South Coal Project to Department of Planning and Infrastructure, 9 January 2013.
- Imine, Mining and Environmental Consultants, 2012. Adequacy assessment of Drayton South Coal Project Agricultural Impact Statement. Draft Report NSE Department of Planning and Infrastructure, 27 September 2012.
- Richard Lamb and Associates, 2013. Advice on Part 3A Application of Drayton South Coal Project: Visual Impact Assessment Test of Adequacy to NSW Department of Planning and Infrastructure, 13 September 2012.
- Runge Pinock Minarco, 2013. Expert Review of Drayton South Open Cut Coal Project, Report to NSW Department of Planning and Infrastructure, July 2013.
- Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, 2012. Advice to decision maker on coal mining project. Proposed action: Drayton South Coal Mine (2011/5911), Requesting agency, Department of Sustainability, Environment, Water, Population and Communities, 1 February 2013.

- Department of Primary Industries, 2012. Advice from Office of Agricultural Sustainability and Food Security to Department of Planning and Infrastructure, 21 December 2012.
- Department of Primary Industries, 2013. Drayton South Coal Project (MP 11_0062) Response to exhibition of Environmental Assessment, Comments by NSW Office of Water, 15 March 2013.
- Hunter Thoroughbred Breeders Association, 2013. Submission on Anglo American's Drayton South Environmental Assessment, Comments to NSW Department of Planning and Infrastructure, 18 January 2103.
- Hunter Valley Wine Industry Association, 2912. Re: Objection to the Anglo American Drayton South Open Cut Mine Proposal, Comments to NSW Department of Planning and Infrastructure, 21 December 2012.
- Coolmore Australia, 2013. Drayton South EA submission, 2013. Comments to NSW Department of Planning and Infrastructure, 21 December 2012.
- Hensen Bailey, 2012. Anglo American Coal Pty Ltd, Drayton South Coal Project, Response of Adequacy Submission, Agricultural Impact Statement, December 2013.
- Hensen Bailey, 2012. Drayton South Coal Project, Response of Adequacy Submission, Visual Impact Statement for Anglo American Coal Pty Ltd, December 2012.

The Panel has through its own enquiry, also considered additional information that is cited throughout this report and fully referenced in Section 6.

1.2.4 Field inspection

The Panel did not conduct a field inspection specific to this request for advice.

2 The Proposed Project

Anglo American Metallurgical Coal Pty Ltd (the proponent) is the controlling partner in a joint venture that currently operates the Drayton Mine near Jerry's Plains in the Upper Hunter Valley of New South Wales (NSW). Other partners in the joint venture include Mitsui Coal Development (Australia) Pty Limited, Mitsui Mining Australia Pty Limited, Hyundai Australia Pty Limited and Daesung Australia Limited.

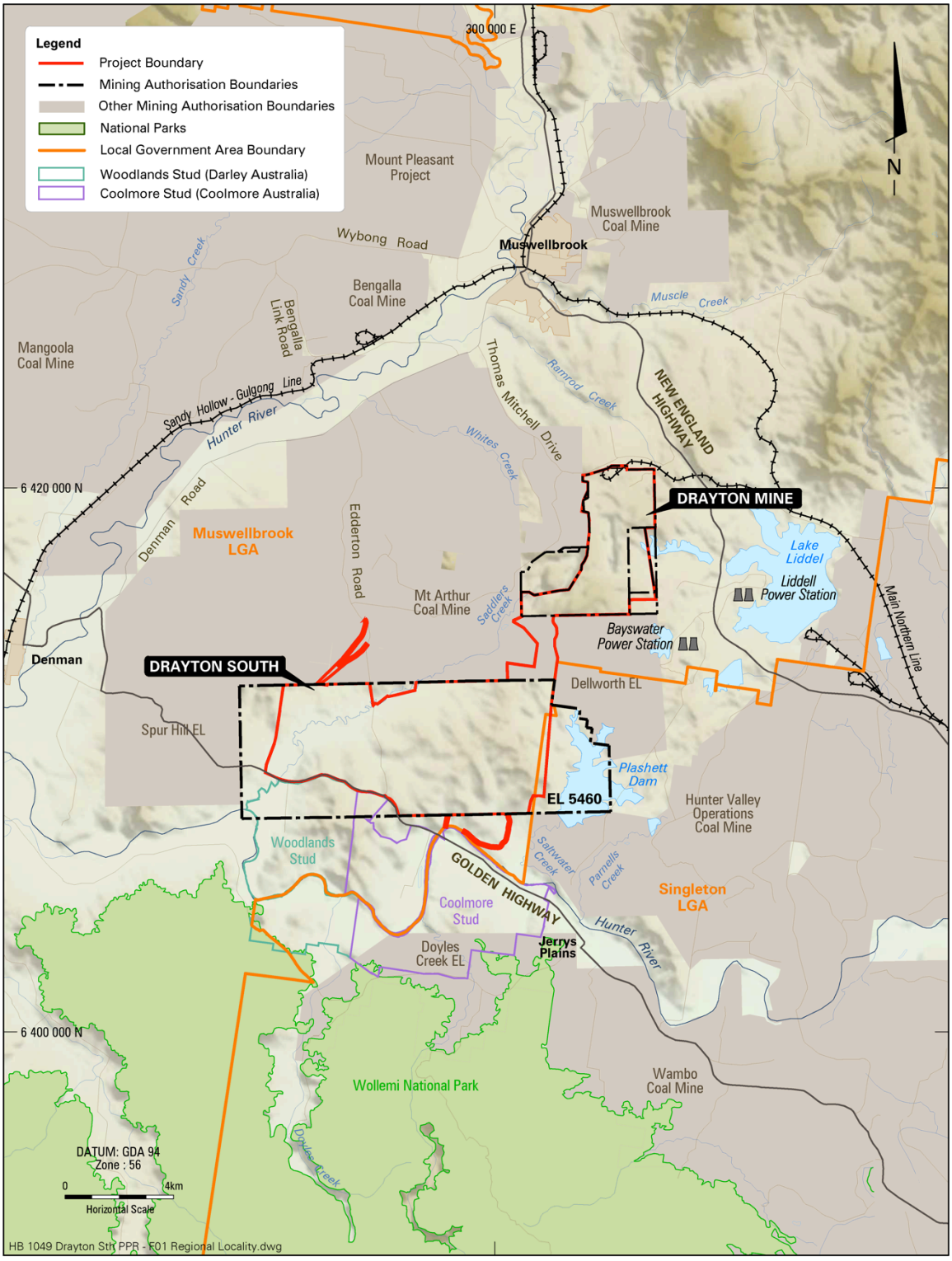
The existing Drayton Mine is an open cut enterprise that began production of steaming coal in 1983 and currently operates under Project Approval 06_0202 granted on 1 February 2008 (expiring in 2017). The steaming coal is transported to the Port of Newcastle via the Antiene Rail Spur that was approved under Development Consent 106-04-00(expires in 2025).

The proposed project (Drayton South) is the development of a further open cut and highwall mining operation in an area to the south of the current mining operation (Figure 1). This area is encompassed within Exploration Licence 5460.

The Drayton South project as stated by the proponent (see Bailey 2012) will involve the continuation of the existing Drayton Mine through the extraction of coal by both open cut and, towards the latter stages of the project, highwall mining operations in the Drayton South area. The project will maintain ongoing use of the Antiene Rail Spur for the transport of coal to the Port at Newcastle. The project will incorporate:

- The continuation of operations at Drayton Mine as presently approved with minor additional mining areas within the East, North and South Pits;
- The development of an open cut and highwall mining operation extracting up to 7 Million tonnes per annum (Mtpa) of Run of Mine coal over a period of 27 years within the Drayton South area;
- The utilisation of the existing Drayton Mine equipment fleet with the addition of a highwall miner and coal haulage fleet;
- The continuation of the existing workforce of up to 530 employees and contractors;
- The use of Drayton Mine's final landform voids for rejects and tailings disposal and water storage;
- The utilisation of the existing Drayton Mine infrastructure including the Coal Handling and Preparation Plant (CHPP), rail loop and associated loading infrastructure, workshops, bath houses and administration offices;
- The construction of a transport corridor between the Drayton South mining area and the existing Drayton Mine;
- The continued utilisation of the Antiene Rail Spur off the Main Northern Railway to transport product coal to the Port of Newcastle for export;
- The realignment of a section of Edderton Road; and
- The installation of further water management and power reticulation infrastructure to support mining in the Drayton South area.

The project will disturb a small area of Biophysical Strategic Agricultural Land (BSAL), about 3 hectares (ha), and involve mining within 500 metres (m) of equine and viticulture Critical Industry Clusters (CICs), including the Coolmore and Woodlands thoroughbred horse studs and Arrowfield Estate vineyard and winery.



DRAYTON SOUTH COAL PROJECT
PREFERRED PROJECT REPORT

Regional Locality Plan

AngloAmerican | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Figure 1. Regional locality plan for the Drayton and Drayton South mine project (after Bailey (2013) Drayton South Coal Project – Preferred Project Report)

3 Critical Industry Clusters (CICs)

CICs are complex socio-economic systems. Agricultural CICs typically appear as geographic concentrations around a natural resource (Garkovich, 2009), e.g. soils and water. Much literature exists about the theory and practice of CIC function (e.g., Kleinhardt-FGI, 2002; Johnston, 2003; and Garkovich, 2009). Importantly, CICs have a lifecycle: they are initiated, grow, mature and can die. Regardless of their type, agricultural or other, CICs have common components: (i) core businesses or central actors; (ii) support businesses or support actors; (iii) soft infrastructure; and, (iv) hard infrastructure. The Panel has adopted a view of the equine and viticulture CICs in accordance with these common components.

According to the NSW Government Strategic Land Use Policy (released 2012), CICs are:

> *"localised concentrations of inter-related, highly productive industries based on an agricultural product that provides significant employment opportunities and contributes to the identity of the region."*

A CIC must meet the following criteria:

- There is a concentration of enterprises that provides clear development and marketing advantages and is based on an agricultural product,
- The productive industries are interrelated,
- It consists of a unique combination of factors such as location, infrastructure, heritage and natural resources,
- It is of national and/or international importance,
- It is an iconic industry that contributes to the region's identity, and
- It is potentially substantially impacted by coal seam gas or mining proposals.

Viticulture and Equine CICs were separately identified using these criteria and the spatial extent of included land was mapped in the 2012 Strategic Regional Land Use Plan for the Upper Hunter region. Following a more detailed verification of the location of the specific enterprises in the identified clusters, revised regional location maps (Figures 2 and 3) have been exhibited as draft amendments to the State Environmental Planning Policy (Mining Petroleum Production and Extractive Industries) 2007 (Mining SEPP).

3.1 Viticulture CIC

The spatial extent of the land included in the Viticulture CIC is shown in Figures 2 and 3. The industry enterprises that form the CIC are:

- Vineyards where vines are grown for wine production;
- Wineries and cellar doors where wine is made and/or wines are sold through enterprises that are commercially linked to wineries; and,
- Wine industry-related tourism that has developed from wine production, wine tasting and the sale of wine.

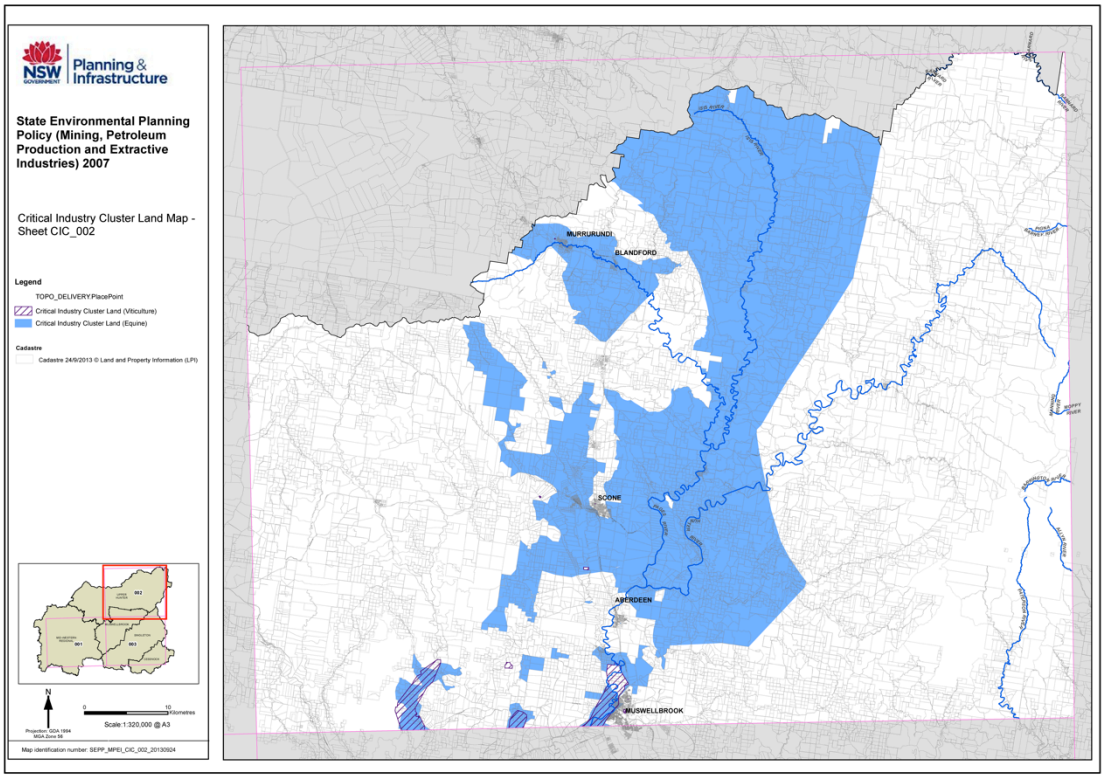


Figure 2. Proposed equine and viticulture Critical Industry Cluster land map for the Upper Hunter and Muswellbrook local government areas (source: NSW Planning and Infrastructure - www.planning.nsw.gov.au/critical-industry-clusters-in-the-upper-hunter)

Within the Viticulture CIC, the Arrowfield vineyard and winery (until recently part of Hollydene Estate) is located within 500 m of the proposed mine.

3.1.1 Role of Arrowfield Estate Vineyard in the Viticulture CIC

The Arrowfield Estate Vineyard was established in 1969 (Hollydene, 2013) and is one of only four major viticulture establishments in the Muswellbrook Shire (MSC, 2013). It is therefore an important component of the Upper Hunter Viticulture CIC. It is a core business in the cluster.

In 2013, the Muswellbrook Shire Council approved a Development Application (DA161/2012) for the construction of 23 tourist cabins and two function centres with chapels at the vineyard. It was reported that lawyers for Anglo Coal, the proponent for the Drayton South Project, opposed the DA for numerous reasons including that for 10 to 15 years Drayton South may cause dust exceedances up to 20 per cent above Environment Protection Authority guidelines rendering the site of the $14 million tourist project ''unsuitable'' (Heber, 2013).

The neighbouring Coolmore thoroughbred stud is thought to have recently purchased the Arrowfield Estate (e.g. Singleton Argus, 2013). The Panel does not know if the approved development of tourist cabins and other infrastructure will proceed under this new ownership.

3.2 Equine CIC

The spatial extent of the land included in the Equine CIC is shown in Figures 2 and 3. The industry enterprises that form the CIC are:

- Horse breeding enterprises that are involved in selective reproduction of horses to achieve specified desired traits that define a particular breed. The two breeds of primary interest are the Thoroughbred and the Australian Stock Horse;
- Horse husbandry enterprises that are involved in horse spelling, brood mare / foal agistment, yearling sale preparation, foaling down services for resident mares, equine training, horse transport or specialised horse care, such as vets and farriers; and,
- Businesses that are involved in horse sales.

Following Kleinhardt-FGI (2002), it is possible to better portray the Equine CIC in its four-components (Table 1), i.e. core businesses, support businesses, and soft and hard infrastructure. The *core business* of the CIC is horse breeding to produce foals. These businesses are also termed central actors. Central actors are supported by an interdependent array of support businesses, and soft and hard infrastructure. Recognising the importance of geographical proximity, example cluster components are limited to those within a one-hour journey by road. Kleinhardt-FGI (2002) suggests that this is the effective geographic spread of a cluster, as anything greater inhibits regular, informal interaction that is essential for an effective cluster.

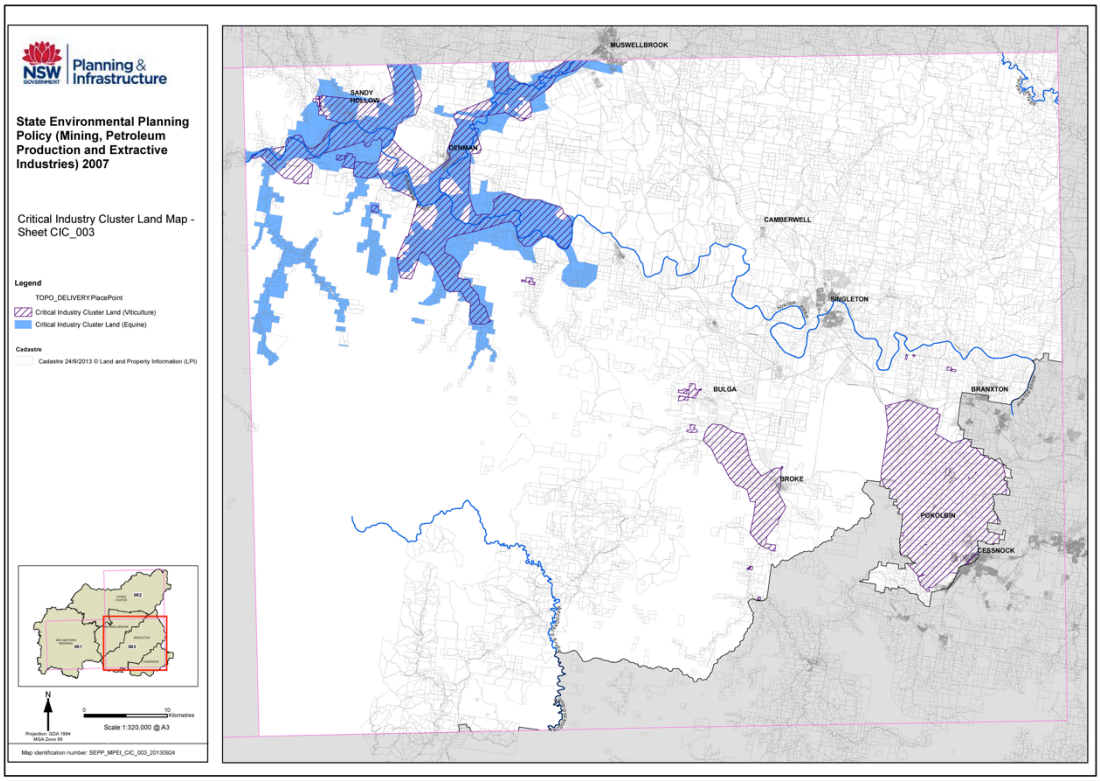


Figure 3. Proposed equine and viticulture Critical Industry Cluster land map for the Upper Hunter and Muswellbrook, Singleton and Cessnock local government areas (source: NSW Planning and Infrastructure - www.planning.nsw.gov.au/critical-industry-clusters-in-the-upper-hunter)

Table 1 Upper Hunter Equine CIC – cluster components and example businesses

Cluster Components	Type	Example
Core business (central actors)	Thoroughbred Stallion Studs[1, 2]	Arrowfield, **Coolmore**, Bengalla, Byerley, Emerites Park, Kelvinside (Darley), Kitchwin Hills, Patinack Farm, Toolooganvale Farm, Turangga Farm, Vinery, Widen, Yarraman Park
	Thoroughbred Broodmare Studs[1, 2]	Amarina Farm, Ashleigh, Attunga, Barador, Baramul, Bellerive, Chatsworth Park, Cressfield, Crowningstone, Edinglassie, Flame Tree, Glastonbury Farms, Golden Grove, Goodwood Farm, Holbrook, Kia Ora, Middlebrook Valley Lodge, Middlebrook Station, Monarch, Murrulla, Redman Park, Riversdale Farm, Riverslea Farm, Segenhoe, Sledmere, Timor Creek, Willowpark, **Woodlands (Darley)**
	Other breed Studs[3]	Australian Stock Horses: JR Poole, TJ Blake, BW Brooker, DF and JF Mcintyre, Glew Family Partnership, Barsham, Haydon, PA and JM Cutler, SM Fitzpatrick, NJ and L Holz Australian Quarter Horses: Our Range Arabian Horses: Alabama Stud
Support business (support actors)	Equine health	Scone Equine Hospital, Scone Brooks Veterinary Services, Scone Stenhouse Equine Dentistry, Scone Equine Podiatry and Lameness Centre, Muswellbrook
	Equine R&D	Hunter Valley Equine Research Centre, Scone
	Equine legal	Equilaw, Muswellbrook
	Bloodstock agents	Scone Blookstock Service, Scone William Inglis & Son Bloodstock Agents, Scone
	Farriers	A & B Jones, Scone; Brian Atfield Farrier Service, Jerry's Plains; Shannon Smith, Glendonbrook; Ben Anderson Farrier, Denman
	Feed suppliers	Various feed supply merchants in Scone and Muswellbrook
	Feed producers	Numerous including lucerne farmers along the Hunter River
	Horse transport	RB Horse Transport, Scone; Signature Equine Transport, Scone
	Landscape architecture	Ladd-Hudson Architects, Sydney; Timothy Court & Company, Sydney.
	Trades/technical	Carpenters, plumbers, electricians, painters, horticulturalists, greenkeepers
Soft support infrastructure	Education	Tocal Agricultural College, Tocal Scone TAFE, Scone
	Tourism	Hunter Valley Thoroughbred Tours
	Government policy	State level, e.g. NSW Strategic Regional Land Use Plan; Local, e.g. Muswellbrook Shire Council Community Strategic Plan
Hard support infrastructure	Racing facilities	Scone Race Club
	Transport infrastructure	Roads, rail, air (private), Scone Airport

Source: [1] HTBA (2013), [2] MSC (2013), [3] Australian Stock Horse Society (2013)

Within the Equine CIC, Coolmore and Woodlands (Darley) thoroughbred horse studs are located within about 500 m of the proposed mine.

3.2.1 Role of Coolmore and Woodlands in the Equine CIC

Both Coolmore and Woodlands, as Darley Australia and operated in conjunction with the Kelvinside stallion stud near Aberdeen, are central actors in the core business of the Upper Hunter Equine CIC (refer to Table 1). More than that, these two businesses are likely the most important of all central actors, as most of Australia's leading thoroughbred sires are standing at these two studs (Table 2).

All 15 of Australia's leading sires stand in the Upper Hunter Equine CIC. Noting that two of these stallions are no longer standing at stud, eight of the leading 13 available sires stand at either Coolmore or Darley, with 3/13 at Coolmore and 5/13 at Kelvinside. Kelvinside stallions service all Woodlands mares.

Table 2 Season 2013-14 Australian leading sires by earnings (adapted from Thoroughbred Breeders Australia, 2013)

Rank	Name	Stud	Location
1	Snitzel	Arrowfield	Upper Hunter region
2	Fastnet Rock	**Coolmore**	Upper Hunter region
3	Exceed and Excel	**Kelvinside (Darley)**	Upper Hunter region
4	Reset	**Kelvinside (Darley)**	Upper Hunter region
5	Stratum	Widden	Upper Hunter region
6	Redoute's Choice	Arrowfield	Upper Hunter region
7	Commands	**Kelvinside (Darley)**	Upper Hunter region
8	Northern Media[1]	Widden	Upper Hunter region
9	Street Cry	**Kelvinside (Darley)**	Upper Hunter region
10	Mossman	Vinery	Upper Hunter region
11	Lonhro	**Kelvinside (Darley)**	Upper Hunter region
12	Choisir	**Coolmore**	Upper Hunter region
13	More Than Ready	Vinery	Upper Hunter region
14	Flying spur[2]	Arrowfield	Upper Hunter region
15	Encosta de Lago	**Coolmore**	Upper Hunter region

In 2013, Coolmore stands Fastnet Rock (Figure 4) for $275,000. This fee is about $100,000 dearer than the second most expensive stallion in Australia. On this basis, Fastnet Rock is arguably the most important and valuable stallion standing in Australia this season.

As reported by Carr (2013), total stallion standing fees in Australia summed to $249M in 2011. Of this total amount, $185M is attributed to Upper Hunter sires and $100M of this to Coolmore and Darley.

This brief analysis indicates the leading role of Coolmore and Darley (as both Woodlands and Kelvinside) in the Upper Hunter equine CIC, and their significance to the Australian thoroughbred

breeding industry. In summary, Coolmore and Darley are the most important of all central actors in the core business because:

- Coolmore and Darley are the two largest thoroughbred breeding operations in the Equine CIC and Australia;
- Coolmore and Darley stand the best stallions in the Equine CIC and Australia; and,
- Coolmore and Darley generate 55% of stallion standing fees in the Equine CIC and 40% nationally.

Importantly, DP&I (2012) afford the Upper Hunter Equine CIC a level of protection from impacts of resource development but not all components of it. Undoubtedly some thoroughbred studs make a larger contribution to the sustainability of the CIC than do others. With this in mind, and with regard to the Upper Hunter Equine CIC, the Panel considers that the continued viability of the Coolmore and Woodlands (Darley) studs is essential to the sustainability of the cluster. If these studs were to exit the Upper Hunter region, the consequence would be deleterious to the equine CIC, possibly initiating its demise.

Figure 4 Coolmore stallion *Fastnet Rock*

4 Panel Assessment

The State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (the Mining SEPP), Section 17, provides the *relevant criteria* for the Panel in assessing a Gateway Application. Whilst this advisory report does not relate to an Application, the *relevant criteria* provide an appropriate framework for providing advice.

The relevant criteria are that the proposed development will not have a significant impact on the CIC based on a consideration of impacts to land, water and agricultural resources, support services and infrastructure, transport routes, and scenic and landscape values. The Panel has assessed the potential impacts on nearby CICs as follows.

4.1 Significance of the project's potential impacts on the nearby CICs

4.1.1 Any impacts on the land through surface area disturbance and subsidence

According to the Preferred Project Report (PPR) by Bailey (2013), the proposed mine will disturb about 1,900 ha of land. Whilst only a small portion of this disturbance footprint is mapped as potential CIC land, the mining footprint adjoins considerable areas of mapped equine and viticulture CIC land, and is within a few hundred metres of the Coolmore and Woodlands thoroughbred studs and Arrowfield Estate vineyard and winery. Due to the proximity of the proposed mine to the horse studs, in particular, and the importance of these studs to the Equine CIC (refer to Section 3.2.1), the Panel considers that surface area disturbance by the Project will have significant impacts on the adjoining Equine CIC land, Coolmore and Woodlands in particular, and deleterious flow-on consequences for the Equine CIC.

It is the Panel's opinion that these impacts will include dust, noise, vibration and blasting overpressure, and loss of visual amenity and landscape values. The proponent has failed to properly address these impacts and much uncertainty exists as to the extent that these can be adequately mitigated. Potential impacts of the proposed mine on the adjacent thoroughbred studs is poorly considered. Analysis of potential impacts on the Equine CIC is absent.

The Panel considers that the consequences of these impacts are twofold:

1. Unquantified implications on horse health and behaviour, specifically in the context of thoroughbred breeding, and stallion, broodmare and foal management; and,
2. Deterioration of landscape values (discussed further in Section 4.1.5 of this Report).

4.1.2 Reduced access to, or impacts on, water resources and agricultural resources

The Panel has assessed the potential impacts on water resources and agriculture in relation to nearby Critical Industries Clusters and finds that while the proposed mine has impacts on local groundwater levels and surface flows, they are not considered significant for the CICs.

The Panel does have concerns regarding the potential long-term salinity increases in the Hunter River (300+ years) that requires further clarification.

The assessment considered:

- the rules and criteria of the Aquifer Interference (AI) Policy (NOW 2012);

- the rules in the relevant water sharing plans (NOW 2004, 2009);
- the advice from the Independent Expert Scientific Committee;
- data and analyses contained in the EA and the PPR;
- information contained within submissions on the EA; and
- information contained within responses to submissions.

The following discussion provides an insight into the Panel's thoughts and highlights some areas of concern with the water aspects of the project.

Groundwater

The project correctly identifies the groundwater resources of Hunter River alluvium as "highly productive" as it has total dissolved salts that are less than 1,500 mg/L and can yield water at a rate greater than 5 L/sec to a bore or well. The "less productive" groundwater resources are the alluvium of Saddlers Creek and the Permian coal measures, both of which contain brackish to moderately saline groundwater (up to 9,000 mg/L TDS) and are only capable of yielding small amounts or water (generally 0.1 to 1.0 L/sec) to a bore or well.

The construction of an open cut mine at the proposed location will cause impacts to both the "highly productive" and "less productive" groundwater systems (aquifers). This will occur both during and post mining activities. The assessment of hydraulic impacts (water level variations) on both the water table and groundwater pressure surface, in the area of the CICs, are based on the model results provided.

The MODFLOW-SURFACT software that was used to estimate pit inflows and local water level impacts is considered appropriate. The model has been peer reviewed by Heritage Computing (Merick, 2013) who found it to be fit for purpose. The Panel agrees that the model is a Class 2 model (Barnet et al, 2012) and that the model statistics are adequate for it to be used as a predictive tool. The Panel notes that changes to the model occurred following the final landform changes, as set out in the PPR and that these changes have not been subject to peer review. These changes affect the temporal water filling predictions for the final void and also the long-term river salinity predictions. This should be corrected by the proponent.

Some of the areas of uncertainties in the model are:

- How geological faulting is handled,
- The relatively low specific yield values used for the spoil
- The vertical conductivity being tied to the horizontal conductivity value;
- Recharge estimates;
- The location of the no flow boundary at the Hunter River; and,
- The lack of groundwater pumping data for the transient model.

Notwithstanding the above, the model statistics show that the MODFLOW model results are acceptable for predictions in a complex aquifer system (18 layers).

The Drayton South Project mining impacts on the "highly productive" groundwater resources are not considered significant. Likewise the impact on the "less highly productive" Saddlers Creek alluvium and Permian rocks are also not considered to be significant in terms of the CICs. The Coolmore horse stud has two wells in the alluvial aquifers and one excavation registered on the NOW

database. It is highly unlikely that there will be any measurable change in water level at these sites as a result of the proposed mine.

Whilst the mining proposal appears to meet the minimal impact considerations for aquifer interference activities required by the Minister for Primary Industries in respect of impacts to the water table and groundwater pressure, it is not clear if it meets the water quality criteria on connected waters in the long term (about 300 years). The AI policy allows a 1% increase in the salinity of connected waters, per activity. This is discussed further below.

Surface Water

The PPR has a changed final landform with only one final void. The inflow rates to the mine both during mining and post mining remain unchanged with the largest impact being on Saddlers Creek (0.27ML/day loss) and a minor impact on the Hunter River (0.01ML/day loss). The mine will be a sink for groundwater for a period of about 300+ years.

The revised long-term (300+ years) discharge rates from the void under the new preferred landform option differ to those predicted for the previous final landform within the EA. The new proposed void has a higher final water level (153m RL), which in the long term results in more discharge via groundwater flow to both Saddlers Creek and the Hunter River. The increased discharge is more substantial for Saddlers Creek where base flows will increase by 30%. The Hunter River will increase by 0.05%.

The Panel has concerns that the salinity of the groundwater discharging from the final void may be considerably higher than predicted in the PPR. The earlier work on void salinities in the EA predicted salinities of 5,600 mg/L rising to 13,000 mg/L over time. The new work in the PPR predicts a salinity of 750 mg/L rising to 1,300 mg/L over time. These estimates are substantially different and only the lower figures pass the 1% minimal impact criteria for connected surface waters, in the AI policy.

Final void impacts on groundwater and surface water

The final void water balance modelling using OPSIM is also considered appropriate for the task of assessing the long-term water levels and salinity in the final void post-rehabilitation. The use of results from MODFLOW for input to OPSIM is appropriate to the task, though it does entail some assumptions about within-spoil chemistry, and how the final void lake and the groundwater interact. These assumptions are outlined below. Accordingly there are a number of uncertainties in the OPSIM modelling that cannot be clarified from the modelling models presented in the PPR.

The main area of uncertainty is in the salinity of the final void lake, and the interpretation of the kinetic leach column tests (KLC) use to determine the salinity of recharge water though the mine spoil (RGS, 2011). Due to the way KLC tests are conducted they indicate the salinity of water after it has been in contact with the spoil for a maximum of 2 weeks. Practical experience shows this is an appropriate way to characterize the chemistry of water as it flows through the mine spoil on its way down to the water table in the rehabilitated pit.

The KLC does not however characterize the salinity of pore water when it is continually exposed to the spoil, as occurs below the water table. The PPR indicates that it takes about 160 years to saturate the pit spoil before the final void lake starts to form. In this period the mine spoil is in constant contact with the void water and the salinity of the pore water will be higher than the KLC tests indicate. This highlights the major deficiency in the OPSIM modelling when calculating the salt

balances, and thus the change of salinity over time in the final void lake. OPSIM models the salt load coming into the lake from two sources (1) the infiltration down to the water table through the rehabilitated spoil, and (2) the inflowing Permian groundwater. It models the outflow from the lake into the groundwater by assuming that the water in the lake and within the spoil are well mixed and well mixed between the lake and the spoil. OPSIM does not model the increase in pore water salinity that will occur over time within the spoil as a result of the pore water being in contact with the spoil over the long term (i.e. 160 years before the lake begins to form). This means that the OPSIM results are, at best, an underestimate of the salinity of the pit lake.

The panel considers that the predicted salinities for the final void lake are likely too low (the PPR predicts it to be in the range 800-1300 mg/l). If the final void lake is more saline than predicted by the PPR then the salt load into the surrounding aquifers, Hunter River and Saltwater Creek will also be higher than indicated in the PPR. The report does not provide the data required to assess the potential scale of this effect.

It is recommended that further work be undertaken to justify the low salinity predictions in the final void. In particular re-saturation of the spoil material where matrix flow predominates and the salt release from the spoil to the pore water as a result of long term exposure to mine spoils should be considered in more detail. Comparisons should also be made with water quality data from existing final voids in the Upper Hunter Valley so that realistic final void salinity values can be arrived at.

An IESC concern is that the Hunter River should not be further impacted by saline discharges. This is interpreted to mean from surface water runoff by both controlled and uncontrolled water releases during and after mining. The Panel has the same concern, as low salinity clean water is a key requirement of both the Coolmore and Darley (Woodlands) horse studs. Both studs make extensive use of Hunter River water for irrigation and for stock use.

The detail around this issue will be presented in the Water Management Plan and the Water Quality Management plan, if the mine is approved, and is not available for review now. The Panel considers that this issue can be adequately addressed through appropriate management and monitoring so that there will be no significant changes in surface water quality of the Hunter River with respect to the CIC in the short term.

Other relevant comments

The mining induced reduction in flows to both Saddlers Creek and the Hunter River needs to be accounted for through holding the appropriate water licences. Some water sources such as Jerrys Plains (Saddlers Creek) are over allocated and it has not been demonstrated that the necessary water shares can be obtained through the water trading market. Mine inflows that come from the Permian sediments will require a license from NOW which in turn may require a controlled water allocation by the Minister for Primary Industries. Runoff water that is captured because of mining will also need to be licensed. The NOW has advised that the mine will need to obtain licences for the maximum predicted pit inflows not the average. NOW has some unresolved issues regarding water licences, which needs to be addressed by the proponent.

The IESC considers that the site specific water impacts may be minimal and that the modelling undertaken for the project is not regional so cannot be used to evaluate the cumulative water related impacts. The Panel agrees with these comments. It should be noted that a discussion on cumulative impacts was provided in the EA but it was not presented sufficiently well for a detailed

assessment to be made. The cumulate impacts mostly affect Saddlers Creek where base-flow is predicted to stop for a lengthy period in the upper reaches. Saddlers Creek is not used directly by the CICs. The unquantified flow on affects to Hunter River flows would be small and the proponent will need to obtain licenses for this loss of water.

4.1.3 Reduced access to support services and infrastructure

Impact of the proposed project on CIC social support services is anticipated through the increased workforce and the overall demand for increased social support and infrastructure, as other regional research by Franks et al. (2010) also indicates. The project would have a direct impact upon CIC support services if it were to threaten the core components of the Equine CIC comprising the Coolmore and Woodlands (Darley) businesses.

The current limited capacity and ageing infrastructure of local wastewater processing facilities to support an increased mining workforce is raised by Muswellbrook Shire Council (2013) as a major challenge as major improvements are not presently planned before 2022. The panel notes this as an 'off mine site' issue which the project would impact upon. The Panel considers the project should, if approved, provide financial support for any necessary upgrade in proportion to the incremental demand.

4.1.4 Reduced access to transport routes

Existing roads are the key form of transport linkage between elements of exiting CICs in the Upper Hunter region. Any incremental volume increase in traffic or size of loads carried by the project will impact on CIC enterprises in the region, in variety of ways. Two particular impacts are noted here - by slowing travel times and by reducing the quality of the process of transport for CICs and all other transport users.

The project proposes realignment of 'Edgerton Road' to accommodate mining. According to Muswellbrook Shire Council (2013) this alone will reduce traffic efficiency. The Council contends the current state of all roads, major and local, are such that major remediation and improvements are required to support present traffic patterns and the project would place incremental demand on traffic levels and exacerbate deficiencies presently occurring in the region.

On this basis, the project would impact upon local traffic levels and add to the burden, which the exiting transport networks would incur. Road traffic and use patterns make significant upgrades to major intersections, noted above, necessary. The project would add to traffic issues and reduce the present level of transport efficiency between elements of the CICs in the region.

4.1.5 The loss of scenic and landscape values

The physical landscape, comprised of soils, water, topography and land use, is important to both CICs. Fertile soils, rolling topography and clean water are prerequisites to successful horse breeding (Watson, 2013) and viticulture. However, landscape value extends far beyond its physical characteristics.

MacManus et al. (2011) identify four landscape values that are important to the Upper Hunter Equine CIC. Understanding how the CIC values landscape provides insight to its serious concerns about competing land uses that alter the physical landscape and thereby threaten these landscape values. Each of the landscape values is engineered at considerable cost. Whilst this cost burden is

not evenly apportioned across the industry, i.e. studs like Coolmore and Woodlands have invested heavily, the outcomes create a positive externality enjoyed by the whole cluster. Each landscape value is intrinsically linked to stud and cluster economics. These landscape values are rural idyll, landscapes of conspicuous consumption, brandscapes and landscapes of work.

The Chairman of Coolmore Advisory Board recently stated: *"the visual quality of both Coolmore and Woodlands and the surround landscape setting is fundamental to the successful operation of our stud farms"* (Coolmore, 2013b).

The Panel considers:

- The importance of landscape values to Coolmore and Woodlands (Darley) studs cannot be overstated;
- That the proposed mine will cause significant deterioration of landscape values which underpin the Coolmore and Woodlands (Darley) stud businesses. As this threatens the viability of these two businesses in the Upper Hunter region, then the sustainability of the Equine CIC itself is threatened by the proposed mine; and,
- Landscape values are similarly important to the Arrowfield Estate vineyard and winery as this business, and the Viticulture CIC, is dependant on wine tourism for much of its revenue.

4.2 Whether any additional reasonable and feasible mitigation measures could be implemented to materially reduce the potential impacts of the project on these CICs

Previous sections of this report have determined that several of the project's potential impacts on the Coolmore and Woodlands thoroughbred horse studs are significant. These impacts are likely to be highly deleterious to the future viability and sustainability of these two iconic horse studs and therefore by definition, the entire Upper Hunter Equine CIC which has these two stud farms at its head.

The relevant mining impacts are summarised as follows:

- Visual impact of the proposed mine workings and associated mining equipment via the loss of an *"idyllic rural landscape"*, this being an established foundation of the business model of the thoroughbred horse studs which rely heavily on third party investors either locating their horses at the farms or utilising other equine services.
- Dust from open cut mining (due to blasting, truck movements and other mining activities) blowing onto the farms where both pregnant broodmares and other prime thoroughbred horse stock are located. As future "athletes" in training, the potential impact of mining produced dust (as opposed to that from hay and feedstock) on lung function appears to be undefined, presumably due to a lack of comparable case studies whereby open cut mining has been allowed to occur in very close proximity to thoroughbred horse farms. Furthermore, the impact of mining produced dust being visibly obvious to third party investors is unknown, but again is potentially highly deleterious to the stud farms business model and attracting investment.
- The effect of vibration and overpressure due to nearby open cut blasting activities on thoroughbred horses is subject to significant debate and disagreement. The project proponents have argued that horses living on the farms will inevitably become accustomed to blasting activities over time, therefore the overall impact is negligible. However the stud farms have asserted that the proponents have failed to recognise the transient or short-term nature of many of the horses arriving and leaving the farms on a regular basis. It is also argued by the farm owners that there are attendant safety risks to personal handling horses if they become alarmed or distressed (for whatever reason) and again, the likely impact on third-party investors is un-quantified, but potentially highly significant.

As compared to underground mining, open cut mining offers far fewer opportunities to mitigate mining impacts by external hard controls, particularly those related to visual amenity, mining dust and blasting induced vibrations/overpressures. Therefore, a relevant consideration in the overall impact assessment process is the proponent's decision, that was made largely on resource recovery and economic grounds (rightly or wrongly), to proceed with an open cut project with (a) high surface disturbances and (b) few options in terms of highly effective mitigating controls.

Artificially formed bunds can be used to "*hide*" the mine workings and equipment from view, but by definition the construction of such bunds will materially change the visual landscape as viewed from the CICs and stud farms. Therefore such bunds can hardly be considered as an effective control against the defined visual impact of mining in this particular instance. The only apparent method by

which the mine workings can be hidden from the farms and an idyllic or natural landscape be retained, is to utilise any "natural" bunds that may exist such as ridgelines.

Once dust is liberated from mining activities (noting that blasting, whilst representing the most visible source of dust, is usually a relatively low proportion of the total dust load generated by open cut mining), the only feasible controls against it impacting the farms are wind direction(s), distance from the site and any natural barriers that may exist.

In terms of open cut blasting and the associated impacts upon horse stock, potential controls are specific blast designs according to defined maximum criteria relating to the vibration levels and overpressures as can be tolerated at the farm sites. However such criteria have not been determined or considered by the project proponent at the current time.

In terms of hiding the mine workings behind a natural feature and so eliminating the issue of visual impact, a natural ridgeline exists towards the southern extremity of the proposed mining pits. In their submission to the EIS, Coolmore (2013a) state that "*at the very minimum, the mine should remain behind existing natural ridgelines i.e. that the Houston Pit should be excluded and that the Whynot Pit should be reduced such that it does not breach the natural ridgeline to the south*". Similarly, in their submission to the proponents EIS, Darley (2013) state that in their opinion, a buffer zone around coal mining activities should be applied in the same manner as the recently stipulated 2 km exclusion zone or buffer around CSG operations.

At face value it would appear that the stud farms themselves have put forward a potential minimum solution to the issue of eliminating unacceptable visual impacts, if adopted this would then represent the maximum permissible encroachment of mining towards the stud farms. It is a matter for the proponent to then determine whether such a mining limit provides the necessary coal reserves and mine life to justify any capital investment in the project.

The next obvious question is whether this same mining limit is able to reduce the other relevant impacts of dust and blasting vibrations/overpressures, both of which are an inevitable consequence of open cut mining, to acceptable and tolerable levels at the stud farms?

All that can be stated at the current time is that it is conceptually feasible that both mining dust and blasting impacts on the stud farms could potentially be managed and evaluated via stringent approval conditions that are rigorously adhered to during mining operations. This type of approach is possible as a result of the mine workings commencing in the north and incrementally moving to the south towards the stud farms over time. Hence the impact of mining on the stud farms will gradually increase over time from the current negligible levels and therefore is well suited to a "monitor and manage" approach.

The specifics of such a process are well beyond the scope of this report, but may include the following considerations:

- Setting and agreeing on reasonable maximum criteria for dust concentrations, blasting vibrations and overpressures, all of which can be measured as both baseline pre-mining studies and during actual mining activities.
- Having the mine provide the stud farms with sufficient advanced warnings of blasting activities so that they are able to (a) manage any associated safety threats with livestock and (b) arrange for visitors to attend the farms outside of such periods.

- Have the entire process overseen and controlled by a committee including representatives of the mine, the stud farms and the NSW Government (perhaps the Land and Water Commissioner).

The Panel accepts that using a process whereby mining could theoretically be stopped prior to the planned mining limits being reached, introduces an element of investment risk on behalf of the project proponent. However the responsibility must rest with the proponent (not the stud farms) to undertake the necessary pre-mining investigations to satisfy themselves as to where the credible limits of mining (according to mining impacts on the stud farms) are likely to be located as part of making their investment decision. However, if the current state of the art in terms of making credible predictions in these critical mining impact areas is insufficient to allow the proponent to make their investment decision with confidence under this scenario, this in itself would lead to the inevitable conclusion that the project should not be given a mining approval due to the existence of demonstrable uncertainties regarding the predicted impacts upon the CICs generally, and the neighbouring thoroughbred studs and vineyard specifically.

Given the significance of potential impacts and uncertainties with regard to mitigation, and also a dearth of scientific literature concerning the potential impacts of open-cut coal mining on nearby equine breeding enterprises, particularly with respect to environmental stressors such as noise, dust and vibration, the Panel concludes that the Precautionary Principle should be applied.

5 Panel's Recommendations to the Director General

The Panel has assessed the Drayton South Coal Project and provides the Director General with the following advice.

5.1 Significance of impacts

With regard to the significance of potential impacts on nearby CICs, the Panel determines:

1. The potential impacts of the proposed mine on the CICs are significant because the potential impacts on Coolmore and Woodlands horse studs and Arrowfield Estate vineyard and winery are significant and these are core businesses within each CIC.
2. Open-cut coal mining as proposed at Drayton South and thoroughbred horse studs of the nature and scale of Coolmore and Woodlands (Darley), and importance to the sustainability of the Upper Hunter Equine CIC, are incompatible land uses that cannot co-exist in close proximity to each other.
3. Mitigation measures currently proposed by the proponent are unlikely to be adequately effective in controlling potential impacts on the CICs.
4. Even if unlikely to occur, the consequences to the CICs of these potential impacts are so great that, in the Panel's opinion, these risks to the Upper Hunter Equine and Viticulture CICs should be avoided.

5.2 Additional mitigation measures

With regard to whether any additional reasonable and feasible mitigation measures could be implemented to materially reduce the potential impacts of the project on these CICs, the Panel provides the following two-part advice.

1. Establish an appropriate buffer
    a. A portion or distance of 'buffer' land is required between the proposed mine and Coolmore and Woodlands (Darley) studs and Arrowfield Estate as these are amongst the most important of all core businesses within the Equine and Viticulture CICs, respectively.
    b. The 'buffer' land should be sufficiently sized to negate all potential impacts of the proposed mine on the continued viability of Coolmore and Woodlands (Darley) studs and Arrowfield Estate vineyard and winery. This will include recognition of the importance of visual amenity and landscape values to both CICs and the core businesses within each.
    c. It is likely that an adequate buffer distance will be measured in kilometres, and be influenced by natural topography, i.e. the ridgeline that extends through the project site.
    d. The extent of surface disturbance by the project should be limited such that mining operations remain to the northern side of the ridgeline, to reduce potential impacts on the CICs generally, and Coolmore and Woodlands (Darley) thoroughbred studs and Arrowfield Estate specifically.

In addition to advice to limit surface disturbance, the Panel considers further mitigation in the form of a *monitor and manage* strategy is necessary.

2. Monitor and manage

    a. Set and agree reasonable maximum criteria for dust concentrations, blasting vibrations and overpressures, all of which can be measured as both baseline pre-mining studies and during actual mining activities.
    b. Have the mine provide the neighbouring CIC businesses with sufficient advanced warnings of blasting activities so that they are able to (a) manage any associated safety threats with livestock and/or (b) arrange for visitors to attend the farms outside of such periods.
    c. Have the entire process overseen and controlled by a committee including representatives of the mine, the stud farms and the NSW Government (perhaps the Land and Water Commissioner).
    d. Cease mining activities if agreed maximum impact criteria are exceeded.

The Panel considers that establishing a suitable buffer between mining activities and the CICs is the most appropriate mitigation strategy and does not recommend a *monitor and manage* strategy in isolation.

6 References

Australian Stock Horse Society (2013). Prominent Breeders List – 2013. Australian Stock Horse Society Limited, Scone, 2013.

Barnett B, Townley LR, Post V, Evans RE, Hunt RJ, Peeters L, Richardson S, Werner AD, Knapton A and Boronkay A. National Water Commission report, June 2012. Australian groundwater modelling guidelines.

Bailey, J. (2012). Drayton South Coal Project – Environmental Assessment. Hansen Bailey, Singleton.

Bailey, J. (2013). Drayton South Coal Project – Preferred Project Report. Hansen Bailey, Singleton.

Coolmore (2013a) Coolmore Australia – Submission to PAC Re Drayton South, 3 October 2013.

Coolmore (2013b) Letter dated 16 October 2013 and addressed to the Planning Assessment Commission.

Darley (2013). Submission to NSW's Planning Assessment Commission on Anglo American's Drayton South Coal Project.

DP&I (2012). Upper Hunter Strategic Regional Land Use Plan, State of New South Wales through the Department of Planning and Infrastructure, September 2012.

Franks, DM, Brereton, D Moran, CJ, Sarker, T and T, Cohen. (2010). Cumulative Impacts – A Good Practice Guide for the Australian Coal Mining Industry. Centre for Social Responsibility in Mining and Centre for Water in the Minerals Industry, Sustainable Minerals Institute, The University of Queensland. Australian Coal Association Research Program. Brisbane.

Garkovich, L. (2009). Conceptualizing the Kentucky Horse Industry as an Economic Cluster. Bluegrass Equine Digest, October, 2009.

Johnston, R. (2003). Clusters: A Review. Prepared for the 'Mapping Australia's Science and Innovation System' Taskforce, Department of Education, Science and Training by the Australian Centre for Innovation Ltd, March 2003.

Heber, A. (2013). Proposed mine too dusty for tourists: Drayton. Australian Mining, 11 February 2013. Accessed on 5 December 2013 at <http://www.miningaustralia.com.au/news/proposed-mine-too-dusty-for-tourists-drayton>.

HTBA (2013) Hunter Thoroughbred Breeders Association. Accessed on 4 December 2013 at <http://www.htba.com.au/links>.

Kleinhardt-FGI (2002). Industry Clusters a Review – History, Theory, Practice. December 2002.

MacManus, P., Albreicht, G. and Graham, R. (2011) Constructing Thoroughbred Landscapes: Manufactured Idylls in the Upper Hunter Region of Australia. In: Engineering Earth, Brunn, S.D. (Ed), Chapter 73, pp 1323-1339. Springer Science Plus Business Media, 2011.

Muswellbrook Shire Council (2013). Drayton South Coal Project, Outline of Submissions, Submitted to Department of Planning and Infrastructure, 9 January 2013.

NSW Office of Water (NOW) (2004). Water Sharing Plan for the Hunter Regulated River Water Source.

NSW Office of Water (NOW) (2009). Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources.

NSW Office of Water (NOW) (2012). Aquifer Interference Policy.

RGS Environmental Pty Ltd, (2011). **"**Geochemical Impact Assessment of Overburden and Coal Reject Materials –Drayton South Coal Project", Prepared for Hansen Bailey Pty Ltd.

Singleton Argus, (2013). Coolmore buys Hollydene estate. Singleton Argus, 5 November 2013. Accessed on 5 December 2013 at < http://www.singletonargus.com.au/story/1908665/coolmore-buys-hollydene-estate/>.

Thoroughbred Breeders Association (2013) Leading Sires List, accessed on 4 December 2013 at <http://www.stallions.com.au/statistics/sirelists/index.php>.

Watson, R. (2013) Notes for Planning Assessment Commission Denman. Anglo American Drayton South Open Cut Mine Proposal Inquiry Impacts on the Equine Industries. Notes of presentation to the PAC Public Hearing, prepared by Ross Watson, Consulting Agronomist , Ross Watson Agriculture P/L Scone, 10 October 2013.