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[redacted]

27th February 2019

SUBMISSION TO THE INDEPENDENT PLANNING COMMISSION PUBLIC HEARING ON THE HUME COAL PROJECT (SSD 7172) and BERRIMA RAIL (SSD 7171) PROJECTS

This submission is in addition to that made to the exhibition of the Environmental Impact Statement (EIS) and is up dated according to data in the Hume Coal Response to Submissions (RTS), the Department of Planning & Environment's (DPE) Assessment Report and documents lodged with the Independent Planning Commission (IPC).

Background and Disclosure

I am a resident of the Southern Highlands and have acted as a part time advisor to Hume Coal.

This submission is made in my personal capacity as a local resident, advocate for new jobs and investment, and to address the issues in a measured manner to balance some of the distortions in the current debate.

Since 1981, I have acted for proponents of major projects on four Continents, six Australian States and one Territory, creating extensive employment and economic wellbeing. Many of those projects were in the resources sector, including metalliferous and coal mines in NSW.

I have represented the resources sector as the Executive Director, NSW Chamber of Mines, Metals, and Extractive Industries (predecessor of the NSW Minerals Council) with coverage of the mining, steel, aluminium, and extractive industries.

The projects to which I have been attached, have created many thousands of jobs and delivered the orderly development of mineral resources in NSW for "*the purpose of promoting the social and economic welfare of the State* [Mining SEPP 2007 (1a)].

The Hume Coal project is the most benign of any resource project to which I have been associated, both in terms of balancing the extraction of coal for the benefit of the State and dependent industries against impacts on environmental assets and directly impacted communities.

Where my experience and knowledge are outside my expertise, I rely on the scientific knowledge of competent experts in their respective fields. Notwithstanding this, I have managed large scale water projects involving water modelling in NSW, Queensland and Western Australia. In addition, I have direct experience in negotiation of 'make good' agreements in Queensland, representing industry and landowners.

The views in this submission are not necessarily those of Hume Coal and based on my own review of the evidence.

Submission Structure **Page**

Submission in Support

This submission is in support of the proposal as outlined in the Hume Coal EIS and the interdependent Berrima Rail Project(s)

The projects, as designed, meet the requirements of the planning law; namely,

- *The Environmental Planning and Assessment Act (EP&A Act).*
- *State Environmental Planning Policy (Mining, Petroleum Production, and Extractive Industries) 2007 (Mining SEPP).*

Given the level of impact mitigation undertaken within the project design and inherent environmental protections, I support the project being approved, with appropriate conditions, to minimise "the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality"

The project will be a substantial boost to the local economy, have negligible or immeasurable impact on the agriculture and tourism industries. Insignificant, negligible and/or manageable impacts on environment assets (water, air quality, noise). On balance, the project is in the public interest.

The Hume project provides a competitive supply of coking and industrial coal to the domestic cement, steel manufacturing, foundry, ethanol, and power industries. It meets the ACCC requirements of maintaining competition on the Southern Coalfields. Despite being assessed as an export only project, there is considerable interest from potential domestic users, subject to appropriate commercial terms.

The mine design, mitigation measures, underground reject disposal and water management regime ensures the Hume project is consistent with the amenity of the immediate locality and poses no risk to current or future allowable land uses.

Section 1:

Environmental Planning and Assessment Act 1979 'Public Interest'

Aside from the normal environmental heads of consideration EP&A Act, the Consent Authority is also required to consider 'the public interest'.

The Consent Authority needs to apply a 'public interest' test that accounts for its obligations to all the NSW people as the coal is a State resource mined under licence for the benefit of all the citizens of NSW.

The primary purpose of a planning approval assessment is to limit or mitigate development impacts to those directly affected, balanced against the 'public interest' and to ensure where impacts do occur, they are mitigated to the fullest practical extent.

The Hume Coal project is in an area with the limited land use conflict.

Much of the land is either State Forest or private land in the project area zoned for agriculture, limiting above ground activities to agricultural pursuits and will not impacted by underground mining. The surface infrastructure occupies 115 ha.

Most other businesses, other than agriculture, are limited by zoning restrictions. The Mining SEPP allows for approval of the projects where part of the project is prohibited in the LEP. Agriculture will continue to occur over the 3,400-ha underground mine.

The Hume mining area nor the surface infrastructure is not open for urban expansion. No houses are undermined by the Hume project and no listed heritage items are impacted.

Surface infrastructure is limited to a 115-ha area west of the Hume highway with very limited visual and amenity impact.

Hume surface infrastructure is remote from most immediate towns and villages and the environmental impacts are limited in scope and area.

The benefits accruing to the State through increased employment and GSP, as well as royalties and payroll taxes paid by Hume Coal, over the life of the project are relevant to the assessment of 'public interest'.

Mining royalties are the fourth largest contributor to NSW Treasury revenue from State activities. Coal is the largest contributor to the NSW mineral royalty income stream. Hume Coal will contribute more to the budget revenue (royalties, land and payroll taxes) of the NSW government than all other businesses in the Wingecarribee LGA combined.

It is contented that the 'public interest' obliges the State to grant access to explore for and exploit the mineral resources of NSW, being the property of the all the people of NSW. The regulatory framework is provided by the Mining SEPP, Environmental Planning and Assessment Act and Mining Act.

Denial of access to legally explore for, extract minerals and coal, and to apply mitigation measures to manage impacts is contrary to the 'public interest'. It denies benefits to be shared by all NSW residents from mining State owned resources.

Continued access to mine coal and minerals, in an environmentally appropriate manner, is a key consideration in applying the 'public interest' test.

The Hume Coal project, if approved, will be the largest contributor to NSW government revenue of any business in the Wingecarribee LGA and likely more revenue than all other businesses in the Shire combined. It will be one of the largest single employers, providing employment and revenue for local mining related manufacturers, service entities and non-mining businesses alike.

Total Hume project revenue from royalties and payroll taxes will be $345 million ($Au2018 inflation adjusted) or an average of $17.2 million annually over the mine life.

Should the Consent Authority not uphold the 'public interest', revenue forgone from resource projects, such as Hume Coal, must be sourced from other NSW taxpayers if government spending on essential health, education and other services is to be maintained.

Section 2:

State Environmental Planning Policy (Mining, Petroleum Production, and Extractive Industries) 2007 (Mining SEPP).

No private landowner has an inherent right to prohibit access to minerals and coal, either at the exploration or development stage, without fettering the implementation of the Mining SEPP. To do otherwise, impacts upon the orderly development of the State's resources and the application of the Mining SEPP.

From time to time, governments impose legislative requirements under other non-planning legislation for the way exploration and mining authorities are granted in certain circumstances. However, from a planning perspective, the Consent Authority is required to give pre-eminence to the EP&A Act and the Mining SEPP. Any subsequent Mining Lease may only be granted upon the prior grant of a planning approval.

The Consent Authority does have an obligation to ensure development is designed to minimise impacts on existing activities, landowners, and residents through appropriate conditions of consent and mitigation strategies, balanced against the 'public interest' and the Mining SEPP.

The Mining SEPP also imposes an obligation (Clause 12A) on the Consent Authority to consider the Application of the *Voluntary Land Acquisition and Mitigation Policy* in deciding on noise and air quality impacts.

Management of mining development is conducted through legally enforceable conditions of consent and mining lease conditions. The purpose is to minimise impacts and, where possible, provide mitigation measures for noise, air quality and water impacts in accordance with government policy and practice.

The Mining SEPP is pre-eminent over other environmental planning instruments such as Local Environment Plans that may prohibit mining in certain zones, as is the case with the Hume Coal infrastructure, principally located in land zoned E3.

The Consent Authority is urged to consider the Mining SEPP in applying the 'public interest' test and to account for the wider significance of the resource.

Notwithstanding the general requirements of the EP&A Act for a Consent Authority in assessing mining applications, there are other important legislative 'tests' to be applied to mining developments.

Of relevance are the aims of the Mining SEPP; namely,

- *To provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State [2(a)].*
- *To facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources[2(b)].*
- *To promote the development of significant mineral resources [2(b1)].*
- *To establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive resources [2(c)].*
- *To establish a gateway assessment process for certain mining, petroleum (oil and gas) development …[2(d)].*[1]

In addition, the Consent Authority, before determining the application, must assess the proposal in accordance with the requirements of the Mining SEPP.

Unfortunately, the DPE Assessment Report is unhelpful in determining if the Consent Authority can determine the application by having regard to the following general terms in the Mining SEPP as the Report is not properly structured to address to legislative regime.

Clause 12 Compatibility of proposed mine, petroleum production or extractive industry with other land uses:

The consent authority must consider:

- the existing uses and approved uses of land in the vicinity of the development, and 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
  any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and
- evaluate and compare the respective public benefits of the development and the land uses, and
- evaluate any measures proposed by the applicant to avoid or minimise any incompatibility.
  .

Clause 13 Compatibility of proposed development with mining, petroleum production or extractive industry

The consent authority must consider:

- compatibility of the development in the vicinity of an existing mine, petroleum production facility or extractive industry, or
- the existing uses and approved uses of land in the vicinity of the development, and
- whether or not the development is likely to have a significant impact on current or future extraction or recovery of minerals, petroleum or extractive materials (including by limiting access to, or impeding assessment of, those resources), and
- any ways in which the development may be incompatible with any of those existing or approved uses or that current or future extraction or recovery, and

[1] Not applicable as a Site Verification Certificate (SVC) was issued on 2 April 2016.

- evaluate and compare the respective public benefits of the development and the uses, extraction and recovery referred, and
- evaluate any measures proposed by the applicant to avoid or minimise any incompatibility

Clause 14 Natural resource management and environmental management

The consent authority must consider:

- the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following:
- that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,
- that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,
- that greenhouse gas emissions are minimised to the greatest extent practicable.
- 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.
- must consider any measures to mitigate or offset the biodiversity impact of the proposed development will be adequate.

Clause 15 Resource recovery

The consent authority must consider:

- the efficiency or otherwise of the development in terms of resource recovery.
- whether or not the consent should be issued subject to conditions aimed at optimising the efficiency of resource recovery and the reuse or recycling of material.
- to refuse to grant consent to development if it is not satisfied that the development will be carried out in such a way as to optimise the efficiency of recovery of minerals, petroleum or extractive materials and to minimise the creation of waste in association with the extraction, recovery or processing of minerals, petroleum or extractive materials.

Clause 16 Transport

The consent authority must:

- require that some or all of the transport of materials in connection with the development is not to be by public road,
- limit or preclude truck movements, in connection with the development, that occur on roads in residential areas or on roads near to schools,
- require the preparation and implementation, in relation to the development, of a code of conduct relating to the transport of materials on public roads.

Clause 17 Rehabilitation

The consent authority must consider:

- whether or not the consent should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development.
- whether conditions of the consent should:
  (a) require the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated, or

(b) require waste generated by the development or the rehabilitation to be dealt with appropriately, or
(c) require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines or
(d) require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardize public safety.

Section 3:

Economic Contribution of the Hume Coal Projects to NSW and the Local Area.

The economic contribution of the Hume Coal project is assessed in the EIS and updated in the RTS, in accordance with DPE Cost Benefit Analysis Guidelines. This provides an NPV assessment based on contributions and costs. It accounts for the benefits as well as the external costs applicable to the project. It has been prepared by expert economists in accordance with established guidelines and economic practice.

This assessment is based on an updated cost-benefit analysis of the Hume projects by BA Economics (Oct 2018) taking account of escalations in wage and material costs and a recovery in long term coal prices, since the EIS assessment in 2016. It also incorporated the technical Notes, where appropriate, relating to the Economic Assessment of Mining and Coal Seam Gas Proposals (2018).

However, it has become evident, since the release of the EIS that few in the community understood the NPV approach to valuing the project that is heavily discounted using a 7% real discount, being equivalent to a nominal rate of over 9%, when inflation adjusted and compounded annually over the life of the project

The updated results are presented in discounted dollars (NPV) in Table 1, using a 9 percent annual compounding nominal annual rate and in undiscounted real (cash) 2018 dollars in

Table 1

Discounted Cost-Benefit of the Hume Projects

	DIRECT	INDIRECT	TOTAL
Net Benefit to NSW (NPV)	$373 million	$119 million	$492 million
Local Area Benefits (NPV)	$107 million	$54 million	$162 million
Royalties to NSW (NPV)			$132 million

DPE has assessed the project on the basis of direct net benefit to NSW of $373 million and Local Area Benefits of $107 million, ignoring the indirect benefits to NSW of an additional $119 million and $54 million in Local Area Benefits.

Total Net Benefit to NSW (NPV) is $492 million and Total Local Area Benefits (NPV) is $162 million

DPE Assertion:

"the Applicant's estimated net economic benefits of $373 million is relatively low in comparison to many other coal mining projects in the Southern Coalfield and across NSW" *(DPE Assessment Report Executive Summary)*

DPE, in its Assessment Report, sought to down play economic significance of the Hume projects by stating "*the Applicant's estimated net economic benefits of $373 million is relatively low in comparison to many other coal mining projects in the Southern Coalfield and across NSW"*[i].

This is incorrect and misleading. DPE have recommended other approvals, some with less net benefits, as having 'major or significant' benefits.

- Springvale ($200m)
- Airly ($125m)
- Russell Vale – Southern Coalfield ($23m royalties only)
- Wongawilli – Southern Coalfield ($57m Royalties only)
- Metropolitan – Southern Coalfield ($436m).

Notwithstanding the governments CBA requirements, the community has a right to know just how much the Hume projects are worth in undiscounted (cash) terms. Table 2.

The revised assessment considered changes in forward coal prices, increased wages and material costs.

Table 2: Benefits of the Hume Projects in Undiscounted (Cash) Terms[ii]

Undiscounted (Cash) Benefits[iii]

	TOTAL OVER PROJECT LIFE	**TYPICAL YEAR BENEFITS (Post Ramp up)**
Initial Capital[iv]	**$650 million (Hume +Berrima Rail)**	
Total Operating Expenditure[v]	**$2.89 billion**	**~$104 million/annum**
Royalties[vi]	**$345 million**	**~$18 million/annum**
Wages/Salaries/Super[vii]	**$764 million**	**~$ 32 million/annum**

Wages and salaries paid to the Hume workforce will total $764 million in cash terms. During operations this is likely to be around $45m per annum, given the higher wages paid to mining operational personnel.

During the life of the mine, including construction, operation and closure (24 years), the annual average wages/salaries paid by Hume will be $32 million. Much of that will be spent in the regional community, particularly during operation, where employees will be required to live within 45 minutes of the project.

Contribution to NSW Government Revenue

In actual cash terms, Hume will pay $345 million in royalties (undiscounted) or $17.2 million averaged annually. The discounted figure is $132 million. When combined with payroll and land taxes, Hume will be the largest contributor to NSW government revenue in the Southern Highlands.

Hume will be the largest contributor to NSW government revenue of any local business and possibly more than all other businesses in the Southern Highlands combined.

Inappropriate Interpretation of NSW Treasury Cost-Benefit Guidelines

DPE Assertion:

"employment benefits and associated tax benefits….should not be included in the cost-benefit analysis. This is based on NSW Treasury Guidelines…..that labour should be considered a cost rather than a benefit". *(DPE Assessment Report p.35)*

DPE's Assessment Report cites its economic expert, BIS Oxford, as stating that labour should be totally excluded from the cost-benefit analysis, if one applies the NSW Treasury Guidelines for Cost-Benefit Analysis. There is no-where in the guideline that "labour should be considered a cost rather than a benefit".

Either Mr Tessler made a unilateral decision to remove labour from the CBA analysis or DPE have wrongly interpreted the Guideline.

Firstly, major projects in NSW are economically assessed according to the DPE Guidelines for Cost-Benefit Analysis. Secondly, DPE should have questioned if Treasury Guidelines are appropriate for an economic assessment for a private sector commercial investment.

The NSW Treasury Guidelines on Cost Benefit Analysis says the following

> *"The purpose of this Treasury policy and guidelines paper is to provide guidance and promote a consistent approach to appraisal and evaluation of* ***public projects, programs and policies across the NSW Government****. Agencies should use this NSW Government Guide to Cost-Benefit Analysis (Guide) when assessing all significant* ***government projects****, programs, policies and regulations. (Preface).*
>
> ***Who needs to know about and/or comply with this?***
>
> - *Departments*
> - *Executive Agencies related to Departments*
> - *Government Advisory Entities (including Boards and Committees)*
> - *Separate Government Agencies*
> - *State Owned Corporations*
> - *Statutory Authorities/Bodies*
> - *Subsidiaries of the NSW Government established under the Corporations Act*
> - *Local Councils under the Local Government Act*
> - *Universities"*

No mention is made of utilising NSW Treasury Guidelines for private sector projects.

The notes attached to the NSW Treasury Guidelines make it explicitly clear they are for the cost-benefit of government projects and programmes where labour is a full cost to the taxpayer, hence

Treasury, in conducting a CBA for government, treat labour as a full cost to the taxpayer. However, despite the Treasury Guideline stating the need to define a 'reservation wage' that this is an opportunity cost This is same methodology used by BAEconomics to calculate the 'reservation wage'. DPE has deliberately excluded labour costs as a benefit – this is arrant nonsense, even to a casual observer, and is not what the Treasury Guideline states.

Using Treasury Cost Benefit Guidelines for private sector projects misrepresents the benefits flowing to the State and local area by significant commercial investments in major projects where the private sector, not government, bears the commercial risk.

The Department of Planning has its own Guidelines for Cost Benefit Analysis and should be the appropriate benchmark for assessing economic returns from private sector projects. Even DPE, in its Assessment Report, begrudgingly recognises the benefits of the Hume project.

All CBA's have generic ways of dealing with comparative costs and benefits, including labour, where the cost of labour in a CBA is its opportunity cost, which is the 'reservation wage' – i.e. the lowest wage rate that a worker would be willing to accept for doing a particular job.

It is unfortunate that the DPE and/or their economic expert dismissed the total labour component of the Hume project as a cost, on the basis that Hume employees will simply replace similarly paid people from elsewhere in the economy. DPE has done this to downplay the economic significance of the Hume projects.

If DPE insists on utilising NSW Treasury Guidelines, as applied to government projects and programmes, then any project with a cost-benefit ratio of 1:1 should proceed. If applied to the Hume projects the ratio is around 187:1 (my emphasis). However, it is contended that NSW Treasury Guidelines are inappropriate for the Hume projects.

Hume has distinct characteristics:

- All operational employees are to reside within 45 minutes of the project area for occupational and safety reasons. No FIFO that has a turnover rate of up to 40%.
- Over 600 resumes have been received for employment. There is a significant local pool available for employment. Some are local people who FIFO elsewhere and wish to be employed closer to their families. Others have left the region to work in better paid jobs than that on offer in the local area. However, many are underemployed, working several part-time, casual jobs and are seeking higher wages and security in the local region.
- Emphasis will be given to upskilling local employees, given the mining method and use of remote and semi-autonomous technology. It is clear there is a sufficient pool of people with basic skills available for upskilling. This may involve the use of underutilised TAFE facilities in the Southern Highlands.

The issue of contention between the economic experts is the 'reservation wage', being the lowest an employee will accept for doing a particular job.

The reservation wage in mining is significantly higher than that applying in other sectors of the economy, especially those in the Wingecarribee Shire, where employment is characterised by lower paying jobs in the accommodation, food services and retail. However, the aged care sector is, or has become, the largest local employer, and well recognised as having the lowest level of 'take home' pay.

The 'reservation wage' for the Hume project must be bench marked against the industry average. For example, ABS data[viii] (See Figure 1) shows the disparity between income levels for various industries:

- ABS average weekly earnings show mining was the nation's most lucrative industry, with workers taking home an average weekly pay of $2764.80 ($60.60 per hour).
- Australia's lowest-paid industry was accommodation and food services, where workers made just over $616 a week ($25.90 per hour).

Both the Department's economic expert (BIS Oxford) and Hume's expert (BA Economics) recognise the accepted treatment labour in the cost-benefit assessment. However, by applying the logic of labour being a full cost, as is the case with government projects and programmes, there is no attribution that the payment of higher wages paid in the mining industry delivers, orders of magnitude higher benefits to both NSW and the local area, when compared with prevailing wages paid by other industries.

DPE has wrongly devalued the importance of labour and this has played into the concocted narrative of its Assessment Report. The mischaracterisation of labour costs/benefits, based on a definition applied to public sector projects, is largely the reason there is a discrepancy between the NPV calculated by BA Economics of $373 million and $127 million attributed to BIS Oxford

Figure 1

Source: Australian Bureau of Statistics *Employee Earnings and Hours (May 2018)*

It is patently absurd that $764 million (undiscounted) in wages and salaries, paid to the Hume workforce over the life of the projects, is not a benefit to NSW and the local region. BA Economics, Hume's economic expert, has applied the current application of the reservation wage to determine the opportunity cost of labour as a benefit to NSW and the local region.

In addition, and in order to make a comparative determination about cost-benefit flowing from the Hume project, it is also necessary to examine the relative employed income levels of those seeking employment, as opposed to those who are retired on superannuation or on some form of income support.

It is generally believed that the Southern Highlands is a 'wealthy' area, however, an examination of the available ABS data[ix] (Table 3) would suggest otherwise.

Table 3

Statistical Area (SA3 level)	Median Total Employee Income
Southern Highlands (Wingecarribee)	$44,250
Wollondilly	$52,092
Goulburn/Mulwarree	$46,597

This shows that Wingecarribee employee income is 15% below that of Wollondilly to the north and 5% below Goulburn/Mulwaree, immediately to the south. It is also significantly below the NSW and National median.

Despite the use of an inappropriate Cost-Benefit guideline, and the mischaracterisation of labour costs, DPE still regards the project favourably in economic terms but is mischievous in the way it devalues the economic contribution of the projects.

DPE Comment:

"the Department considers that the project is likely to have some level of economic benefits for the State of NSW" *(DPE Assessment Report p.35)*

Employment Characteristics and Industry Profile

The local area (Wingecarribee LGA) characterised by:

- the highest proportion of people over 65 (33 percent) – the highest of any LGA in the RDASI Region[2], most of whom are no longer employed or on reduced hours.
- high levels of those underemployed people, working part-time jobs and seeking more hours, part of the 1.1 million Australians (8.9% of the available employment pool) either unemployed or underemployed. Whilst full time jobs have increased over other parts of the economy, this has not happened in the regions, including the Southern Highlands.
- high youth unemployment that remains stubbornly high. According to the Brotherhood of St Laurence[x], the local area was one of the five highest nationally for youth unemployment, including Mittagong and its environs. Anecdotally, social welfare workers say a similar situation applies to Moss Vale and some of the villages throughout the LGA.

There is a lot of discussion about social impact of major development projects, but little consideration is given to the nexus between large capital investment projects, providing significant opportunities for full time employment and the flow on social impacts of providing higher wages and contribution to a diverse range of other businesses that benefit from a substantial injection of funds in the local community.

The design of the Hume projects mitigates impacts on existing land uses, allowing for the co-existence of agricultural, rural pursuits, tourism and other industries, including the nearby Berrima Cement Works, the approved Austral Brickworks manufacturing facility and new open cut quarry (1.5 kms from Berrima) and the Moss Vale Enterprise Zone.

[2] RDASI Strategic Plan 2017-20 p.13.

Regional employment has undergone significant change. This reflects, in part, what is happening in the Australia wide economy. Between 2000 and 2016 nationwide employment in manufacturing jobs declined by 130,000, closely followed by agriculture with 120,000.

Employment in the local region fell most in the Agriculture, Forestry, and Fishing sectors in the Regional Development Australia Southern Inland (RDASI) region from 2001 to 2011[3], including the Wingecarribee LGA.

Overall employment in the Wingecaribee LGA has been problematic and erratic.

This is consistent with anecdotal evidence of many people commuting to the Sydney region for employment and concern by many locals of being underemployed i.e., working more than one job and/or commuting long distances to the Sydney region due to the lack of local full-time jobs locally. The construction industry has been a life saver for many local families, but the signs of a downturn are evident.

In the 2010/11 to 2014/15 period, the number of locally available full-time jobs declined across the whole RDASI Region.

The decline in full time jobs in the Wingecarribee LGA (down 372) was the highest of all LGA's in the RDASI Region.

In recent years the number of low paid jobs as a percentage of the overall workforce has increased, due to the rapid growth of the aged care sector, that has a high proportion of low paid positions.

However, in terms of the definition of full employment it now rests at around 3%, but not including underemployment, that is at a record high. Some estimates suggest a 40-year record.

Opportunities identified in the Wingecarribee Council's Economic Summit (2015), such as Food and Wine Clusters are sporadic, casual, part-time and limited in aggregation and scale. These activities are small scale and will never meet Wingecarribee Shire's job replacement or maintenance target. Nevertheless, they should be allowed to flourish as part of a diversified economy and should be supported and not incompatible with a low impact underground mine.

There have been no State Significant Development (SSD) projects in the Wingecarribee Shire other than the mining, extractive industry and related cement industries, or for that matter, any large-scale renewable energy projects.

Wingecarribee Shire Council has estimated that 8,000 – 10,000 jobs will require replacement or maintenance in the next 15 years. It has no concrete benchmarks or a business plan, except vague references to various industry sectors in its Community Strategic Plan (2031).

[3] Regional Development Australia Southern Inland (RDASI) Strategic Plan (2017-2020)

From 2001 to 2011, in the Wingecarribee LGA, there was an increase in employment in accommodation, food services, real estate, administration support services, professional and technical, education, construction, health care and public administration.

Notably, from 2011 to 2015, the number of businesses in the accommodation and food sector remained stable, contrasting with the growth 2001-2011, suggesting a stagnation in growth or market saturation.

The total number of businesses in the agriculture sector in the Wingecarribee LGA, between 2011 and 2015, fell by nearly 9 percent.

Working agriculture has been gradually replaced by lifestyle farms and smaller acreages with a significant reduction in overall agricultural revenue.

Section 4:

Strategic Significance of the Hume Coal Project

The Hume Resource

The total mineable resource is estimated at 50Mt, comprising an estimated 55 percent washed, on average, 10% ash coking coal. The remaining 45 percent being a domestic quality industrial coal (22% ash) suitable for cement production, foundry use, electricity generation.

POSCO has developed an alternative steel making process called FINEX that allows for steel to be made using industrial/thermal coal blended with coking coal using fluidised bed reactors and a non-blast furnace melter gasifier. Molten iron is produced directly using iron ore fines and a wider specification of coal types not able to be used in traditional blast furnaces. Gases produced by the process can be used to generate electricity (200 – 250 MW) with a substantial reduction in emissions of NOX, SOX and CO^2.

Hume Coal's resource (coking 55% and thermal 45%) is suitable for use in the POSCO developed FINEX steel plant, using a blend of industrial/thermal and coking coal. The process leads to substantial reductions in emissions of NOX, SOX and CO^2 and has been recognised by the IEEFA expert commissioned by Coal Free Southern Highlands (CFSH) in expert evidence before the Gloucester Coal LEC case.

The potential of the FINEX process was recognised by the Coal Free Southern Highlands (CFSH) expert, Tim Buckley from Institute for Energy Economics and Financial Analysis (IEEFA) in his submission to the Hume EIS and in expert evidence to the recent Gloucester Coal LEC case. Although the Hume product coking coal is suitable for blast furnace operations, both locally and

offshore, the product can be used in the FINEX process to substantially reduce greenhouse and other emissions.

Flexibility provided through the FINEX process, broadens the coal specifications used, increasing the overall market for Southern Coalfield coal and ensuring the coking fraction is being utilised in existing blast furnace steel production, that worldwide produces some 70 percent of all steel.

Once coal is separated from natural rock, shale and sandstone, about 20 percent of the mined resource (11Mt), such as natural rock and shale, will be returned underground rather than being deposited in above ground emplacements and tailings dams.

The strategy to protect the groundwater system results in a modest ratio of resource to reserve conversion.

Progressive rehabilitation of the rock, that would otherwise remain in surface emplacements, reduces end of mine rehabilitation costs and allows for the return of the land to essentially its former state within a couple of years of the end of mine life. The mine design and operation strategy deliver minimal impact upon the water resource and minimises surface subsidence impacts to imperceptible levels. i.e., within the natural ground movement.

Progressive rehabilitation of the rock, that would otherwise remain in surface emplacements, reduces end of mine rehabilitation costs and allows for the return of the land to essentially its former state within a couple of years of the end of mine life.

The relative shallowness of the resource, absence of gas and resulting minimal geological stress reduces the costs of extraction compared with high gas and deep mines elsewhere in the Southern Coalfield. The mine plan maximises the resource extraction within the context of the environmental, legislative, and operational constraints.

Mine economics are dictated by initial capital, operational costs, and productivity per employee. Mine design and productivity allow for the project to make an economic return based on limited extraction and, at the same time, mitigating environmental impacts. The capital cost is

The Mining SEPP imposes, amongst other things, a requirement for the ‘proper management and development of mineral resources. Clause 2(b1) mandates a requirement for the consent authority ‘to promote the development of ‘significant’ mineral resources’.

Traditionally, resource significance is narrowly defined, failing to examine ‘significance’ in the macro-context of the market, the independency of other industries on a planning approval and long-term economic regional and national implications.

ACCC Findings on the Strategic Significance of the Southern Coalfield

On February 23, 2017, the Australian Competition and Consumer Commission (ACCC) released a statement of issues[4] on the proposed acquisition of Metropolitan Colliery by South 32. The ACCC issues paper explored the nature of the market, availability of suitable substitutable coal and costs likely to be imposed on local steel producers

The ACCC determined the Southern Coalfield represents its own distinct market and essential for the supply of competitive coal to the Australian steel industry.

The acquisition did not proceed; however, the matters raised by the ACCC are critical in the application of the Mining SEPP Clause 2(b1). In this context, the Hume Coal resource is a 'significant mineral resource' in the broader market and essential for the supply of competitive coal to the Australian steel industry.

The ACCC reached a view the South 32 acquisition would have resulted in a 'substantial lessening of competition' in the supply of competitive coal to domestic steel producers, BlueScope (Port Kembla) and Arrium (Whyalla).

Both these steelmakers depend the availability of competitively priced coking coal from the NSW Southern Coalfield. BlueScope has the benefit of locally sourced blended coal from the Wongawilli and Bulli seams. Arrium also sources coal from the Southern Coalfields which is transported by rail to Whyalla, including the Tahmoor Mine.

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The ACCC determined that if the cost of obtaining coal from another coking coal region, such as Queensland, is 5-10% higher than the current supply then it meets the threshold test of constituting its own geographic market.

Key factors, amongst other things, are the cost of coastal shipping and port terminal costs. The ACCC found transporting caking coal from the Bowen Basin to Port Kembla would likely to be $10-$15 per tonne. Anecdotal evidence suggests a higher margin, with the main difficulty obtaining shipping space to Port Kembla and Whyalla, suitable infrastructure for unloading and restrictions of Australian cabotarge laws.

It is generally conceded that lack of competitiveness of Australian coastal shipping limits the ability to easily substitute equivalent coal from one region to another.

The ACCC made some key observations about the resource significance of coking coal from Southern Coalfields are:

- *'Australian customers of coking coal currently benefit from local competition between coal producers in the Illawarra region…..The proposed acquisition would remove competitive rivalry…..*
- *'The Illawarra region is not expected to have, in the medium to long term, other producers capable of supplying material volumes of technically substitutability coking coals.'*

[4] ACCC Statement of Issues: South 32 Proposed Acquisition of Metropolitan, 23 Feb 2017.

- *'There is significant additional cost associated with mining transporting substitutable coking coals from alternative sources to the Australian steelmakers as well as potential capacity constraints limiting the ability of one steelmaker to import large volumes of coal by ship.'*

The ACCC also discussed the barrier to entry for new competitors and, along with constraints on existing mines in sensitive environments such as the Sydney Water Catchment Special Areas and was concerned that planning approval difficulties could contribute to further lack of competitiveness.

Steel producers are facing challenges, along with other manufacturers, of escalating energy and resource input costs. Over the medium to long term, uncompetitive input costs threaten long viability. BlueScope is required to make a major investment to reline its Port Kembla blast furnace for operation beyond 2026.

The ACCC investigation demonstrates the strategic significance of the Hume resource within the Southern Coalfields to provide a potential supply of competitive coal to underpin viable input costs for the future of the Australian steel industry at Port Kembla and Whyalla.

Considering the ACCC findings, it is incomprehensible to understand the DPE Assessment Report dismissing the strategic significance of the Southern Coalfield and the interdependence of steel making with competitive supply of coking coal.

DPE Assertion:

"The department does not consider that there is any existing shortage of coking and thermal coal that needs to be filled. The Southern Coalfield already produces up to 15 million tonnes of coking coal per year……" *DPE Assessment Report p.35*

Unfortunately, the true state of coal supply is not accurately reflected in the DPE glib assertion.

Using data from Coal Services there has been a substantial reduction in coal availability from the Southern Coalfield. This has impacted on the viability of the Port Kembla Coal Terminal (PKCT) that has a design capacity of 18MT, with current underutilised capacity of some 13MT.

The DPE Assessment Report was deliberately obtuse about declining production in the Southern Coalfield. Table 4.

Table 4

Coal Production for the Southern Coalfield

Calendar Year	Saleable Coal (MT)	Raw Coal (MT)
CY2016	11.7	14.7
CY2018	7.9	9.8
Tonnage reduction	**3.8**	**4.9**

The ACCC has determined the Southern Coalfield to be its own market in terms of competition law, and declining production from existing mines for geological, environmental and other constraints requires new entrants to maintain competition for the benefit of the Australian steel industry.

Hume is not affected by land use constraints, depth of mining, gas drainage, potential impacts on WaterNSW Special Areas or on quality and yield of water flowing into the Sydney Water Catchment.

The Commission is required by the Mining SEPP to consider the impact of its determination on related industries. Failure to approve the Hume projects will affect the future of related industries and mines and the viability of the Port Kembla Coal Terminal (PKCT).

Hume Coal to Supply Open Market

The EIS for the Hume projects was prepared on default assumption that all the product coal would be exported. However, since the display of the EIS, considerable domestic interest has been shown in the availability of some production being directed to local users, including the steel, cement and power industries.

Notwithstanding the domestic interest in Hume product coal, there is a need for new entrants into the market for competition reasons and for existing mines to maintain a level of production necessary improve the viability of the Port Kembla Coal Terminal (PKCT).

In the event Hume production, or part thereof, is not sold to the open market on suitable commercial terms, it will be exported through the Port Kembla Coal Terminal (PKCT).

It is understood POSCO has agreed to provide Hume Coal with an offtake for that component of production not sold for domestic use.

It is understood Hume Coal advised the ACCC that its commercial policy, endorsed by its parent company POSCO, is to make Hume production available on the open market, including domestic users, such as local cement, domestic steel industries and other regional customers on appropriate commercial terms.

However, it is a matter of public record, BlueScope will need to make critical investment decisions to reline its blast furnace due in 2026. Mt Piper power station has announced it is seeking approval for a rail unloader to secure future coal supplies, given likely local coal production constraints in the Lithgow area, for the Mt Piper design life to 2043. Difficulties of transporting coal through the Sydney network limit access to the Hunter Valley resource, making the Southern Coalfield more access able to supply some of its annual 5MT coal requirements. The design life for Mt Piper power station coincides with the mine life of the Hume project. The Hume project would only be able to supply a portion of Mt Piper requirements. Mt Piper is unable to access coal from the mid-western region due to the lack of a rail line.

Section 5:

Interdependency of the Hume Project with Non-Steel Industries.

The importance of supplying competitive coal to a range of other industries (not just the steel industry) need to be a further consideration in the Hume planning period from 2021 to 2040.

The ACCC South 32/Metropolitan investigation was limited to impacts on the domestic steel industry. Nevertheless, the same ACCC competition logic is relevant to other industries such as the cement, foundry and power industries.

For example, there are some reasonable hypothetical assumptions that could apply to the Hume Coal project in the planning period:

- Boral owns and operates the Berrima Cement Works that is part of an integrated concrete and extractive industry in the region. The Berrima Works supplies 60 percent of NSW and ACT cement requirements. Integrated operations in the wider southern region makes Boral one of the major extractive material, cement, and concrete suppliers to the NSW market.

  Following the closure of the Berrima Colliery in 2013 Boral has been required to truck coal from other mines in the region. Hume Coal will be able to supply suitable industrial/thermal coal on a competitive basis through the planned life of the mine as its rail will join the Boral Berrima Branch line at the cement works, some one kilometre from the Hume project. Proximity means it is logical coal required for the cement kiln can be secured on more favourable terms than transporting coal from alternate sources.

- Projected high gas prices are now a major burden on the future viability of local manufacturing in the region. At least two regional major users of gas (confidential) are investigating the conversion of their energy sources from gas to industrial/thermal coal in the Hume planning period.

Section 6:

Critical Mass of Production Supporting Rail and Port Infrastructure

There are other factors that determine the ability of an industry to compete, either at a regional or macro market level.

Industry competitiveness requires the maintenance of a 'critical mass' of regional production to ensure the viability and costs necessary for a competitive supply to end users, either domestically or internationally.

Sufficient production to maintain a 'critical mass' of coal mining to support competitive coal supply, including amortising fixed port costs over a higher number of tonnes, is necessary to maintain the competitiveness of regional coal exports for all producers. Contraction of exports through Port Kembla will impact on the viability of the coal loader and reasonable usage charges to the Port Authority.

The current operating budget for Port Kembla Coal Terminal is around $56M per annum and amortised over total tonnes. In addition, the terminal has undertaken a $300 million 'restoration and compliance' capital works program. Recovery of this cost over many years is also necessary.

Traditionally, throughput for the coal terminal includes coal from South 32's Bulli Seam Operations, Springvale, Tahmoor, Metropolitan, Wongawilli and Russell Vale. Port Kembla Coal Terminal's tonnage has dropped from approximately 17Mtpa to around 5 Mtpa or less, having an impact on access costs for all producers. Some coal previously directed to Port Kembla is being routed to Newcastle.

Better utilisation of the rail network (where applicable) is important to replace declining tonnage from other sources and maintaining volumes necessary to lower unit costs. ARTC requires revenue from rail access charges to support rail line maintenance. Rail revenue from the Moss Vale to Unanderra rail line includes coal from Tahmoor. Trains transporting steel from Port Kembla to former car manufacturers in Geelong have ceased along with the demise of the car manufacturing industry.

Critical mass is also required to maintain skills and mining service industries in the local area, such contract mining companies, equipment manufacturers, equipment service centres, professional engineering services, and mining support contractors.

Coal from the Southern Coalfield mines is contributing to maintaining a 'critical mass' of export coal production from all mines Reducing supply from any mine or stopping new entrants will impact the commercial viability of rail and port terminal infrastructure and local mining service businesses.

Section 7:

Structural Issues in the Southern Coalfields Affecting Future Coal Supply

There are structural issues likely to affect Southern Coal Field terms coal supply from 2021 to 2040 Hume Coal planning period.

Some of the existing approved mines are reaching the end of their viable life due to reserves being deeper, subject to high gas levels, beset by quality issues and increasing costs of production.

Future mine extensions will have challenges of mine depth, geological stresses, and high gas level. Improving productivity and maintaining a competitive cost profile are significant challenges for existing market operators.

Existing approved resources are not being replaced with new mines and/or additional mineable reserves and planning restrictions will impact availability.

- Tahmoor is seeking new approvals for a southern extension under areas of extensive existing and future urban development and will likely be subject to considerable constraints.

- South 32 Dendrobium mine has recently applied for additional approvals in the 'Special Areas' of the Sydney Water Catchment. Those people who oppose the Hume Coal project also oppose mining within the water 'Special Areas'. DPE recently received a report on mining in water 'Special Areas' (Dec2018) that will influence the extent and volume of future production.

- High gas levels at the Appin mine resulted production suspensions that is likely to have a flow on to overall production from the Southern Coalfields.

- Analysts are projecting significantly lower forecasts for production from existing mines in the Southern Coalfields. Without Hume Coal's contribution to the market, the long-term projections from the Southern Coalfields are unlikely to be met.

Available resources are being increasingly quarantined by planning refusals (Russell Vale), pressure on government to eliminate or restrict mining in Sydney Water 'Special Areas' and other sensitive natural environments.

Increasing urban development over known coal reserves in the Tahmoor, Bargo and Wilton areas will reduce coal availability to the market. Rezoning of rural land for urban settlement by State and local authorities has accelerated in areas with known coal resources.

The Hume projects are not constrained by competing above ground land uses

Section 8:

Proximity to Existing Infrastructure: Port Kembla Coal Terminal and Rail Network

The project utilises existing infrastructure with a connecting rail loop to be built at the mine on land owned by Hume Coal with a 1 km connection under the Hume Highway to link with the Berrima Branch line at the Boral Cement works.

Existing capacity is available to utilise the Moss Vale to Port Kembla rail line for the full complement of the proposed production levels. Part of the existing network, under the control of the Australian Rail Track Corporation (ARTC), is underutilised.

Projected rail demand dictates future track upgrades and removal of level crossings. Static rail usage militates against road/rail upgrades and removal of level crossings.

Very few mines in NSW and Australia enjoy the advantages of such proximity to existing export coal loading facilities and relatively short rail distances from the mine using existing rail infrastructure.

Hume Coal is to cover its rail wagons to avoid any potential fugitive dust emissions (Australian coal industry first). New rolling stock will be acquired using latest technology locomotive systems with best available emissions technology and electro-pneumatic brakes to improve safety and reduce noise impacts for the benefit of residents on the existing Moss Vale to Unanderra line.

Section 9:

Relationship of the resource to any existing mine, petroleum production facility or extractive industry

The Berrima Colliery, which ceased operation in 2013, is to the northwest and adjacent to the proposed Hume Coal exploration area.

Part of the mine's rail spur runs through Boral's ML1723, which is a mining lease for the shale quarry that feeds the Berrima Cement works. The rail line hugs the southern boundary of the property in an area where there are no current plans to extract shale, and no plans within the foreseeable life of the Hume project.

Other parts of the current and planned rail spur coincide with CCL748, which is the mining lease for Berrima Colliery and the associated MPLs 603 and 604. Berrima Colliery was closed in 2013 requiring the Berrima Cement Works to source coal from elsewhere.

Replacing resources from other mines, and/or substituting resources subject to environmental and planning restrictions, must be part of the Consent Authority's consideration in accordance with the Mining SEPP.

In addition, there are existing quarries in the general vicinity of the proposed rail line from Hume Coal to the Berrima Cement Works. The rail route avoids the existing Boral quarry supplying the cement plant and the site of the approved Austral brickworks quarry adjacent Berrima road.

No known extractive resources are sterilised by the Hume Coal mine or railway route.

Section 10:

Coexistence with and impact on existing Agricultural and Tourism Industries

Impact on Agriculture

The Hume project underground footprint covers an area of 3,400 ha. It is an underground mine with virtually no surface expression (ventilation shaft on Hume owned land excepted). Existing agricultural productivity will remain unaffected

he Hume EIS predicts that 94 bores belonging to 72 landowners will experience changes in water table drawdown and de-pressurisation greater than the 'minimal harm' threshold in the NSW Government Aquifer Interference Policy (AIP) requiring Hume Coal to provide 'make good' water supply.

No landowner will be left without water with recognised 'Make Good' mitigation and enshrined standard conditions of consent like other resource approvals. These are offered in advance of predicted impacts.

The subject area does not contain Biophysical Strategic Agricultural Land (BSAL) and a Site Verification Certificate was issued on 2 April 2016. Soil analysis and the Wingecarribee land classification confirms land used for agriculture is Class 3 land.

Hume Coal is the largest landowner (1300 ha), including the surface infrastructure area (115 ha).

Since Hume licenced agricultural production to an independent company, Princess Pastoral, agricultural production has significantly improved with a 10-fold increase in sheep and 3-fold increase in cattle production annually. 250 tonnes of Canola have been grown and harvested in the Southern Highlands for the first time. This production profile has been achieved without utilising groundwater for irrigation. During the drought the bore water has been used to top up stock dams

Gross agricultural production in the Southern Highland SA2 statistical area in 2011 was $44 .8[5] million. Only $8.6 million in agricultural production was attributed to the Moss Vale/Berrima area.

Total people employed in agriculture in the local area was 635 in 609 businesses. Average production per business was $73,500 per business and $70,551 per employee. By comparison, Hume Coal is estimated to achieve over $800,000 of production per employee annually from one business.

The agricultural impacts of the Hume project and the Berrima rail project are directly due to the displacement of agriculture during mine construction and operation, including any soil impacts on soil productivity from the surface infrastructure site. Bore drawdowns and the 'make good' mitigation and external costs have been factored into project costs evaluated in the EIS economic assessment.

[5] ABS Southern Highlands SA2 area agricultural production.

Agriculture will continue to be an important contributor to the local economy undiminished by the Hume project. Even before its approval and construction, the Hume project, driven by its farming partner, has achieved a dramatic improvement in agricultural productivity.

There is no evidence to support claims that existing agricultural pursuits will be adversely impacted, or the rural amenity of the local area destroyed.

Rural pursuits and tourism (where allowed) have co-existed with the Berrima Cement Plant, Quarries and the Moss Vale Enterprise zone for many decades.

Forgone value of agriculture is estimated to be $2 million in NPV terms. Forgone income for NSW and the Southern Highlands SA3 Region (assuming agriculture labour is sourced locally) is $260,000 NPV. Converted to an annual amortised value over the mine life, this is $22,000 per annum. Using an average regional wage of $46,000, this corresponds to a loss of FTE jobs of less than 0.5 jobs per annum in agriculture.

Impact on Tourism

Tourism is an important industry in the Southern Highlands; however, a sanguine examination needs to be undertaken to determine if the Hume project will impact on existing tourism businesses in terms of proximity and amenity.

From 2011 to 2015, the number of businesses in the accommodation and food sector remained stable, contrasting with the growth 2001-2011 suggesting a stagnation in growth or market saturation. This correlates with a decline in the number of total businesses in the Wingecarribee LGA of 3% between 2009 and 2013, compared to an increase in total number of NSW businesses of 1% in the same period (ABS2015).

In the year ending June 2016, there were 1.7 million visitors to the Wingecarribee LGA with 98% of those being domestic visitors.

According to the ABS 2011 Census, employment in accommodation and food services in the Southern Highlands SA3 Region totalled 1,263 or 8% of total employment. Destination Southern Highlands claims that tourism supports 2,500 jobs. The higher figure appears to equate all jobs in accommodation and retail sectors as being wholly attributed to tourism, without accounting for existing jobs servicing the local resident population, purchasing from local retail, entertainment, food, beverage and service businesses.

Local tourism has co-existed with the mining, quarrying and cement industry for over a century.

The growth of lifestyle or rural pursuit enterprises has grown significantly despite the close proximity of industrial enterprises. A number of properties have changed ownership in the mine footprint area, despite knowing of the potential for an underground mine.

The villages of Berrima and Medway have co-existed with many coal mines, commencing in 1854 and the Berrima Colliery from 1927 to 2013. Mining has been part of the Berrima's heritage for 160 of the 186 years of Berrima's existence.

There have been many exaggerated claims regarding the impact of the Hume project on existing tourism establishments and future visitations.

As of June 2015, there were three (3) tourist accommodation establishments in the Southern Highlands SA2 Region (where the mine is proposed). In 2014-15, revenues from tourist accommodation in the Southern Highlands SA2 Region, where the mine is located, accounted for 2 percent of the total for the Wingecarribee LGA.

The Southern Highlands SA2 Region has few tourist venues, compared with the wider area. They will not be impacted as the proposed mine is underground, surface infrastructure located away from areas of major tourism activity and access with a zero to negligible visual impact from the main areas of visitation.

The Hume project is not a significant factor in impacting upon the character, amenity, and tourism values of the wider Southern Highlands.

Existing tourist facilities and rural lifestyle properties in the immediate vicinity have co-existed with the location of and visual presence of the Berrima Cement Plant since its construction.

According to Destination NSW, occupancy rates for short stay accommodation for the year ending June 2015 was an average 51% that, by comparative levels for tourism occupancy rates, is very low. Anecdotal evidence suggests this has not changed in the intervening period.

It is contended, that proximity to major population centres of Sydney and Canberra is a factor in achieving saturation occupancy rates on weekends and public holidays, when it is difficult to find vacancies.

Low occupancy rates during the week are a significant constraint on obtaining a suitable return on investment, and is an impediment to new investment, so important in providing new visitor experiences and underpinning the viability of the accommodation industry.

Some proposals for new tourism and retail investment have met with considerable community opposition that, along with zoning restrictions, limits the growth potential of the sector. It also denies the opportunities from achieving a critical mass required to grow the tourism sector. None of these factors can reasonably be attributed to the Hume project.

Proximity to Sydney and Canberra attracts most domestic short stay or no-stay day visitors. That proximity is also a disincentive to longer stay occupancy unless the visit is attached to other attractions, such as conferences and weddings.

Time spent in a tourist location is also influenced by the time available to inbound visitors as well as distance from major centres. This is reflected in the demographics of the domestic visitor profile – 55+ (53%), 35-54(25%) and <35(22%). Primary activities are, eating out, sightseeing, and shopping,

being short duration activities. Recently, the area has focussed on the wedding market to increase the duration of visitor stays.

The evidence that mining can co-exist and be mutually beneficial is shown by an examination of mining and tourism statistics in other mining provinces in NSW, particularly in the Hunter Valley and Mudgee. Visitation growth and multi day stays have grown at a rate greater in Mudgee and the Hunter Valley than the Southern Highlands, despite record increases in mine approvals and production, mostly from open cut mines in those areas. The Hunter Valley has also developed a well-established wedding celebration industry of greater scale, unaffected by mining.

Hume Coal's underground mine will have significantly lower production than the average open cut mine with total annual production being less than 3 percent of Hunter Valley production.

The area of economically recoverable coal in the Southern Highlands is constrained.

Surface infrastructure is visually obscure and remote from the main tourist areas and the visual impact is zero to negligible, depending on distance from the mine.

Surface infrastructure is not visible from the main tourist areas or zero to negligible from the main access roads being the Hume Highway (old and new).

Trains from the Hume project will be visible from the new one-kilometre extension of the Berrima Branch line and along parts of the existing rail line to Port Kembla. However, it will traverse under the Hume expressway (existing underpass built to service the Medway Mine), over the old Hume Highway and under/over the Berrima Road diversion. Removal of the Berrima cement rail crossing, either by Council or Hume Coal, will enhance visitor access to Berrima, Moss Vale and beyond.

Disposable income is a major driven in the time spent in tourist locations, spend per visitor, and return frequency. Existing retail and food businesses are also sustained by local resident as well as visitor populations.

Domestic visitors, according to Destination Southern Highlands, in the year ending June 2016, spent some $261m[6], including;

- $70m on restaurants and take away meals
- $14m on groceries for self-contained accommodation
- $30m on shopping (other than food and drink)
- $15m on alcohol and drinks.

The Hume Coal project by comparison will be investing $650 million in upfront capital with total operating expenditure over the mine life of $2.4 billion. Of that, $764 million will be paid in wages and salaries. Much of this expenditure will be spent locally in tourist and general retail businesses.

[6]Destination Southern Highlands Tourism Snapshot, June 2016.

A significant proportion of Hume Coal attributed wages, salaries, goods, and services expenditure will be spent locally, including local businesses that also service the tourist market – restaurants, cafes, grocery stores, newsagents, health care providers and general retail outlets.

Section 11:

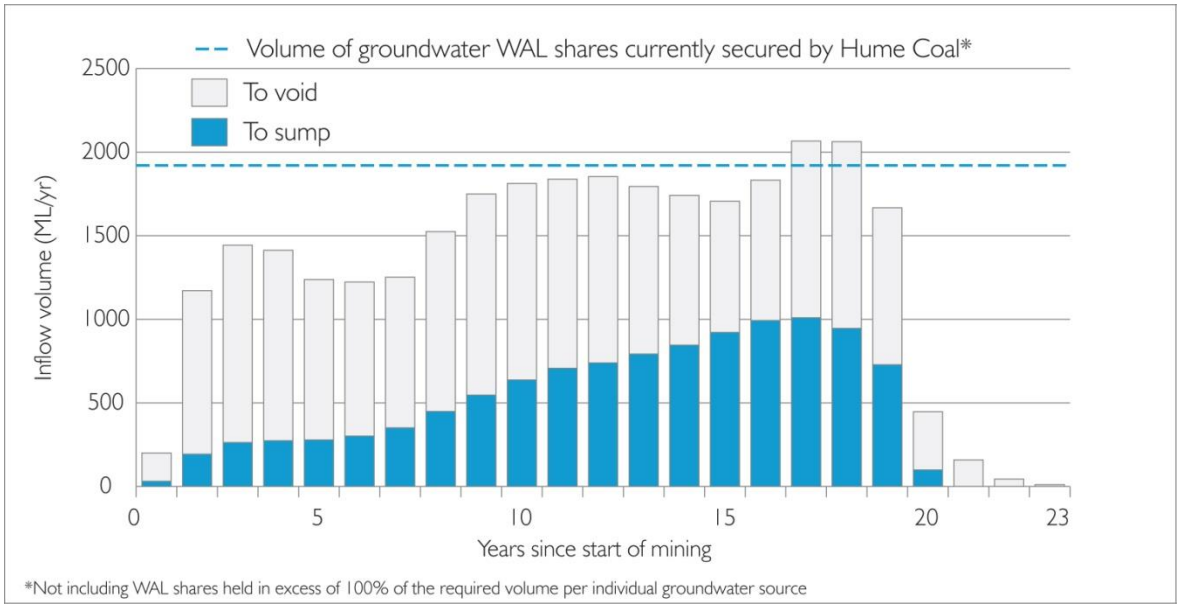
Impact on Surface and Groundwater Resources

Mine Water Use and Interception of Groundwater Interception

The volume of inflow to the active mining area (i.e. water that is physically taken) is represented in blue in Figure 2. Most of the groundwater that inflows into the sealed void remains within the groundwater source and is not physically extracted. A small volume of the inflow to void will be extracted in some years to make-up operational water supply in those years, should that be required.

Figure 2

Expected Inflow Volumes to sealed panels (void) and active mine workings (sump) over mine life:



The volume of inflow predicted in the revised assessment is very similar to what was presented in the EIS.

The average annual volume of water inflow to the mine sump is 463ML and to the mine void is 798ML, totalling 1261 ML. Of that, around 274ML/year will be returned underground with the reject (natural rock and shale) material as water-based slurry, avoiding the need for permanent above ground emplacements and tailings dam.

The maximum extraction of water from the Hume mine is around 1GL and occurs only in Year 17 for which water licences are required.

The essential arithmetic can be summarised thus:

- Inflows to the mine void will occur throughout the mine life, ceasing two years after mining concludes (22 years).

- Two-thirds of the water volume (grey shaded area above) remains in the ground, not extracted, remains for use by other users but is still licenced by Hume Coal.

The Hume project only uses water underground for mine operations. The water transported back underground is for the purpose of placing the natural rock separated from coal back into the void created by mining. The water is used to create a slurry that can be easily transported by a pipeline. The natural rock is treated with 1 percent limestone to ensure the quality of water is maintained. Overtime water quality will revert to than of the surrounding groundwater system.

It is a peculiarity of the AIP that mining companies are required to licence every molecule of water predicted to be intercepted or moved within the groundwater system, even though most is not physically extracted.

If Hume were an agricultural company holding over 2 GL of water licences it has the legal right, as the owner of those licences, to extract 2GL of water each and every year for irrigation purposes. The impact of irrigation on that scale on surrounding water bore users would be far more significant than the impact of mining being proposed by the Hume project.

Impact on Sydney Water Catchment

It is claimed Hume Coal will have a deleterious impact on the Sydney Water Catchment and therefore the quality and quantity of water available for town water supply through WaterNSW storages.

The Sydney Water Catchment is 16,000 Km2 and extends from near Lithgow to almost Cooma. It comprises major catchments for storages, including 'Special Areas', where surface activities and human access is prohibited or restricted.

The project area is located mostly within the catchment of the Wingecarribee River which is part of the Upper Nepean and Upstream Warragamba Water Source.

The area of the Hume surface infrastructure is 115 ha or 0.01 percent of the Sydney Water Catchment.

There will be a minimal reduction, of approximately 94.2 ha (0.8%), of the total catchment of Medway Rivulet (including Oldbury Creek) in which the surface infrastructure area will be located. This reduction in catchment area will have almost imperceptible impact on the contribution to catchment inflows.

The main source of flows in the surface infrastructure are the Moss Vale sewerage treatment plant to Medway Rivulet flowing into Medway Dam and, to a lesser extent, Oldbury Creek with indirect flows from Berrima sewerage treatment plant.

The project's impacts on surface water resources will be negligible, and the Hume project will comply with NorBE requirements, as is the case for all developments in the Sydney Water Catchment, thereby complying with the Drinking Water SEPP.

All potential impacts to surface water users and stream environments have been assessed as insignificant in accordance with the Significant impact guidelines (DoE 2013).

Hume Coal's surface impacts are downstream of the main catchment areas for local storages used to supply drinking water to the local communities of the Southern Highlands.

Groundwater, in the project area, does not meet drinking water standards without treatment. Other groundwater areas outside the project area, not affected by mining, have higher water quality suitable for natural mineral water production

Groundwater from the Sydney Basin Nepean Groundwater source is not extracted for town water supply. In any case, the sustainable yield (LTAAEL) allocates an insignificant 11ML (4.5 Olympic pools) for town water supply and has not been accessed for that purpose.

There is no shortage of groundwater in the Nepean groundwater system as 75 percent of the of the Sustainable Yield (LTAAEL) is unassigned (Figure 3).

Due to a licence embargo in Management Zone 1, where the Hume projects are located, Hume has been required to purchase water licences from the open market and, to date has acquired 93 percent of its requirements. There are additional water licences in the area available for purchase. Most of the licences have been acquired from willing sellers, demonstrating significant depth in the market. It is evident many water licences are not used, particularly with the demise of the dairy industry and the growth of the lifestyle property market.

Surface Water and Medway Dam

WaterNSW in its submission that it was concerned about the impact of the Hume project, despite there being no induced leakage, based on the 67th percentile, uncertainty analysis.

Those opposing Hume Coal claim the Hume Coal project will also impact on the drinking water supplies from the Medway Dam, 'used to supply 8200 people with drinking water'. This is totally incorrect.

In 2010, a report to Wingecarribee Council, described water from Medway and the associated treatment plant (WTP), as follows:

> *"Combined with the poor performance of the water treatment plant, it is likely that health risk associated with water borne pathogens discharged from the Moss Vale*
>
> *STP…….is between 100 and 1000 times greater than is considered acceptable where indirect potable use is planned."*[7]

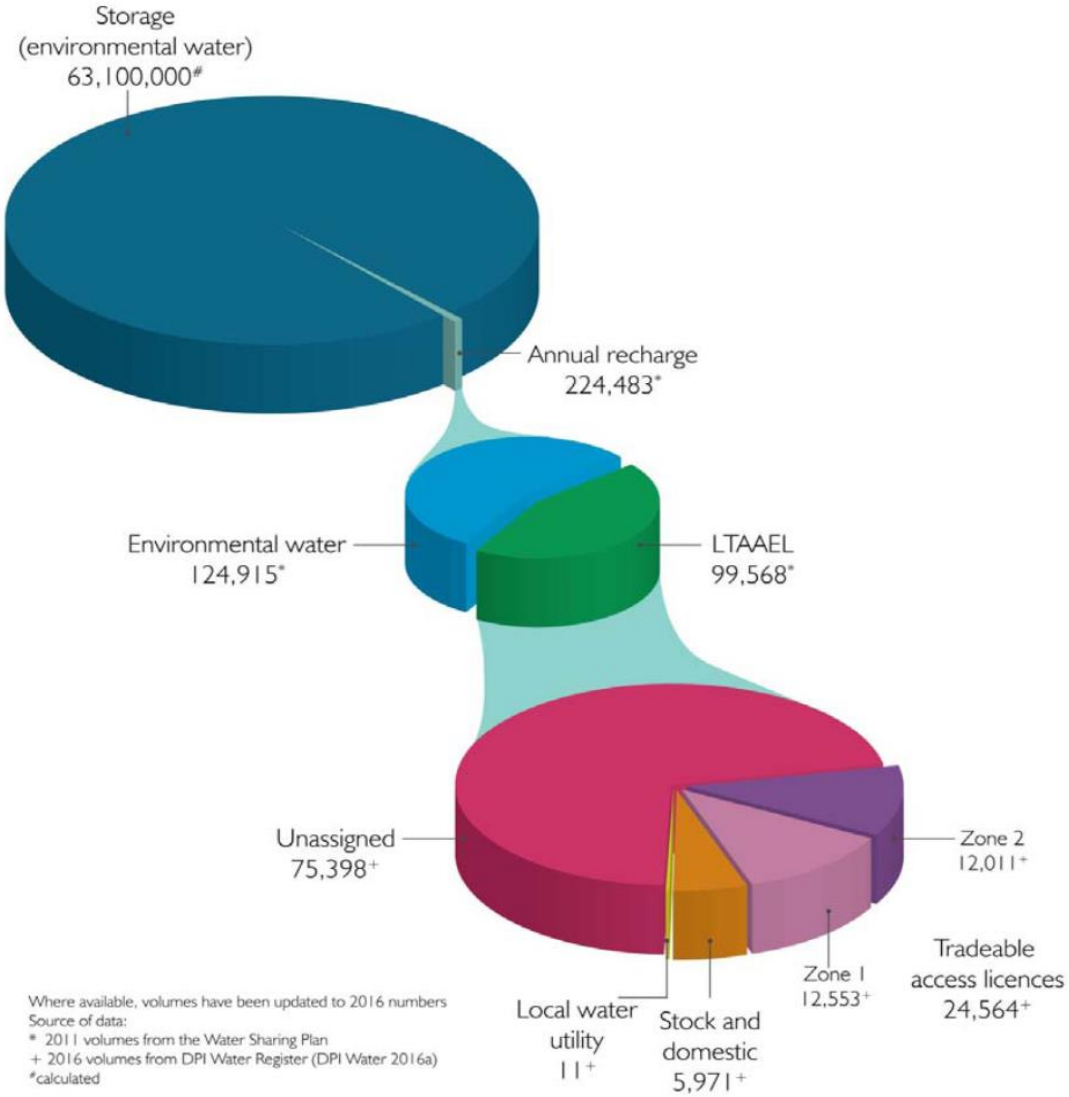
[7] Medway Dam WTP Viability Study, Prepared for Wingecarribee Shire Council, Beca Pty Ltd, 9 August 2010.

Since 2013 Medway Dam and the WTP have not been used to supply potable drinking water to the surrounding villages. All potable water is now supplied from WaterNSW storages. Medway Dam remains a third-tier storage and the WTP requires extensive capital expenditure, far in excess of WSC forward estimates, for it to be recommissioned.

Notwithstanding the above, the product stockpiles are outside the watershed of the Medway Dam and the project will have no impact on surface water entering the Wingecarribee River.

WaterNSW in its assessment of the project failed to mention that the major contributor to downstream flows into the Wingecarribee River are the statutory releases from the Wingecarribee Reservoir of 3ML/day environmental flows and 1 ML/day for riparian users. The impact of reduced flows from the Hume project area are so negligible as to be totally insignificant.

Figure 3



In addition, the major contributor to flows into Medway Rivulet is the indirect potable flow from the Moss Vale sewerage treatment plant (STP). To a lesser extent, Oldbury Ck sources flow from the Berrima STP.

Impact on Ground Water Resources

Groundwater impacts are addressed in detail in the water assessment contained in the EIS and peer reviewed by some of Australia's leading groundwater experts.

The NSW government allocates 99,568 ML/year from the Sydney Basin Nepean Groundwater Source for sustainable diversion, known as the Long-Term Annual Average Extraction Limit [LTAAEL]. Of the LTAAEL:

- 76percent (75,398 ML/year) remains unassigned.
- Only 0.01% (11ML/year) is allocated to Local Water Utilities. (not used)
- Less than 6% (5,591ML/year) is allocated to Stock and Domestic (basic landholder rights)
- 25percent (24,564 ML/year) is allocated to tradable access licences.

Hume Coal has been required to purchase water licences on the open market and has acquired 93 percent of its requirement.

DPE engaged one of Australia's leading groundwater authorities, who also co-authored he IESC Uncertainty Analysis Guidelines (December 2018). Those Guidelines have been applied to the Hume project to remove residual uncertainty. In addition, based on advice from DPE's expert, the water model was further refined, and a Monte Carlo simulation applied.

Despite this and DPE's insistence that the 90th percentile uncertainty analysis be applied to the outputs of the water model, the number of bores impacted marginally increased from 94 to 118. As these additional bores are the result of far field effects, they and will fall within the lower impact range.

The Hume project's revised water assessment adopted the 67th percentile uncertainty analysis for assessing groundwater impacts. All previous mining approvals have been assessed based on a 50th percentile. However, DPE has elected to adopt the 90th percentile uncertainty analysis for the purpose of its Assessment Report.

The 67th percentile adopted by Hume means the impacts are not '<u>not expected to happen in normal conditions</u>'. The 90th percentile adopted by DPE means the impacts are '<u>not likely to occur even in extreme conditions</u>'.

However, what is the reality of what this means in practical terms for the Hume project? There is only a marginal difference in impacts.

- Inflow increases by 196 ML/yr in the peak year, being less than a 10 percent increase
- Induced losses from Medway Dam increase from zero to 5.5ML/yr – an insignificant impact.
- Total requirement for water licences in Nepean Management Zone 1 would increase from 2,059ML to 2,255ML.
- Number of water bores impacted increase from 94 to 118.

Notwithstanding that the 90th percentile impacts are <u>unlikely even in extreme conditions</u>, and is an unreasonable test, the fact that the impacts are small, demonstrates the robustness of the Hume water model and removes the main contention of project opponents around 'uncertainty' of the water modelling.

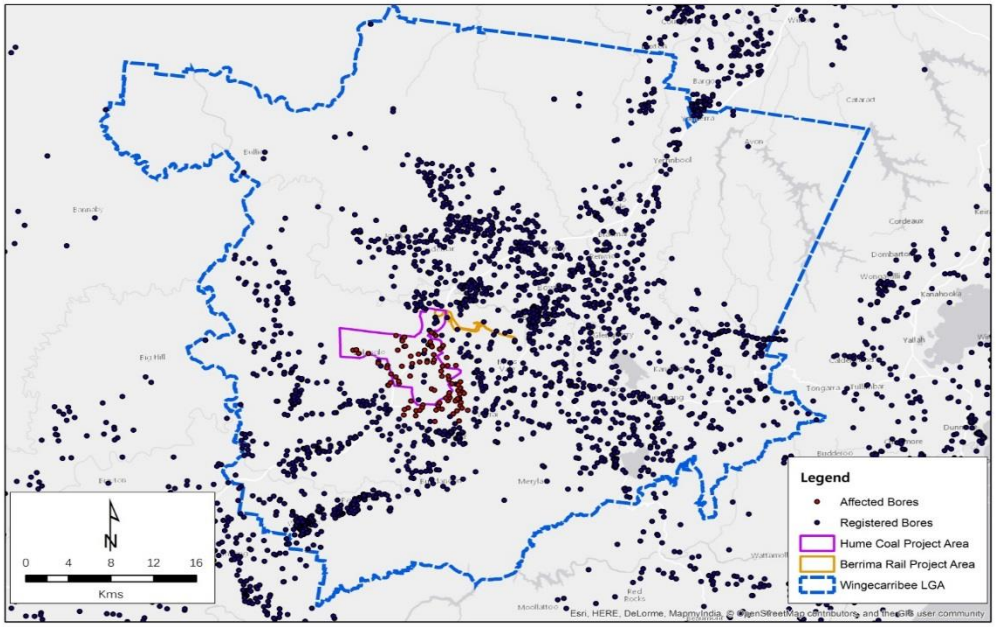
The major issue of contention is the number of bores impacted beyond the arbitrary test for 'minimal impact' defined by the Aquifer Interference Policy for the groundwater system in the project area.

The number of bores impacted beyond the AIP criteria represents 5 percent of all water bores located in the Wingecarribee LGA (1954). The Hume projects are located in an agricultural area where the density of water bores is the last dense, excluding protected crown lands and conservation areas, in the Wingecarribee LGA (Figure 3).

It is often claimed that the groundwater system is under threat from the Hume projects. If that were the case, then all irrigation bore owners would have their bores metered and the real time bore monitoring system would be extended to cover the Southern Highlands. This is not the case, as the groundwater system is robust and not under stress from overallocation, unlike many other groundwater sources across NSW.

Although existing holders of irrigation licences are granted a specific entitlement to pump, there is no policing or enforcement of whether licence holders are exceeding their entitlement or otherwise. What is evident from the market, where Hume has secured 93 percent of its licensed requirement, is that many licence holders have no need for their full entitlement and have been willing to sell those to Hume and others in the open market.

Figure 3:



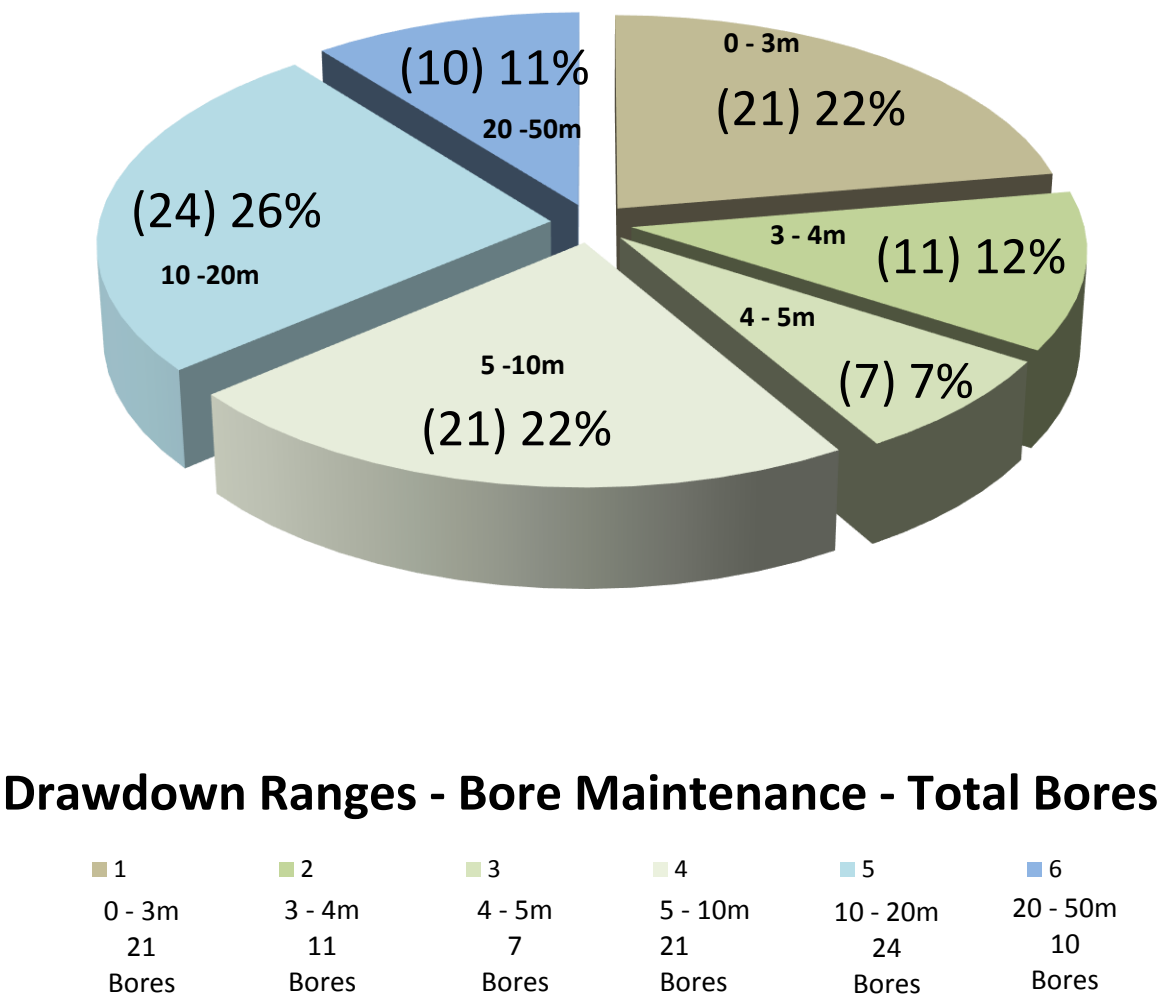
Based on the 67th percentile uncertainty analysis, maximum interception of the Nepean groundwater source is 2,066ML in Year 17 and requires water licences.

Of the Nepean Groundwater Source, this is:

- ***0.003% of total water volume***
- ***0.9% of the total annual recharge***
- ***2.0% of the sustainable diversion limit (Long Term Annual Average Extraction Limit [LTAAEL]).***
- ***8.4% of the tradeable access licences (16.4% of tradable water licences in Management Zone 1)***

Figure 4

Hume Coal Drawdown Influence



Drawdown Ranges - Bore Maintenance - Total Bores

1	2	3	4	5	6
0 - 3m	3 - 4m	4 - 5m	5 - 10m	10 - 20m	20 - 50m
21	11	7	21	24	10
Bores	Bores	Bores	Bores	Bores	Bores

Impact on Licenced Water Bores

Groundwater inflows to the mine will occur during its operational life and for three years after coal extraction ceases (i.e., for approximately 22 years' duration in total). This will lower the groundwater level called a 'drawdown'. 'Drawdown' occurs through normal use of bores and influenced by amount of recharge and will be influenced by underground mining at varying times. Depressurisation will occur as a result of mining but not desaturisation of the groundwater system. This has been confirmed by DPE's groundwater expert, Mr Hugh Middlemiss.

"Make Good' Groundwater Mitigation

Hume Coal operations will directly influence 94 bores belonging to 72 landowners above and adjacent to mine operations to beyond the 'minimal impact criteria' (i.e., a drawdown of >2m) provided for in *the NSW Government Aquifer Interference Policy* (AIP) for less productive porous rock groundwater sources.

Of the impacted water bores, 15 are licenced for irrigation use and 79 are for basic landholder use (stock and domestic) for use on gardens and to fill stock water dams and troughs. Some bores are higher yielding irrigation bores, whilst others, used for periodic stock and domestic use, have generally lower yields. According to the public record the average bore yields 2 l/sec or less.

Drawdown or depressurisation on the bores, greater than the 'minimal impact' criteria, may impair the capacity of the bore to function for the purpose for which it is licenced, depending where its pump is in the strata.

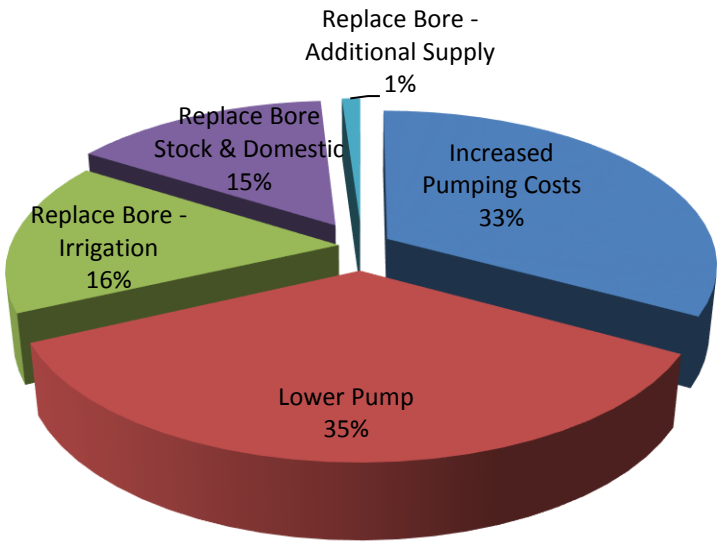
The identified bores are likely to suffer 'impaired capacity' at various times over the mine life. Not all bores will be impacted in the same way and most will recover over the life of the mine. 75 percent of the recovery will occur within the 23 years of mining commencing or 3 years after mining concludes.

Depressurisation or impaired capacity impacts are temporary, manageable, and recoverable over a short time frame, compared with open cut mining (groundwater source removed) and longwall mining (impact over hundreds of years). However, more importantly, no landowner will be without water from bores use for their licenced purpose.

The mitigation 'Make Good' mitigation will vary according to the purpose for which the bore is licenced.

The 'Make Good' measures are shown in Figure 5.

Figure 5: Make Good Break down



The key outcomes are:

- Number of water bores impacted 94
- Number of landholders affected 72
- Maximum drawdown range 2-47m
- Median maximum drawdown 6m
- Number of water bores rectified with minor measures 64
- Number of bores requiring replacement 30
- Average time for water bores to recover 75% since commencement of impact 20yrs

However, the impacts on individual water bores will occur at different times over the mine life. Table 5.

Table 5

Make Good Mitigation Measures Over Time

Stages	1	2	3	4	5	6	Total
Time when bore first impacted by 2 drawdown (years)	**0-5**	**5-10**	**10-15**	**15-20**	**20-25**	**+25**	
Make good provision							
Increased pumping costs	-	3	7	9	5	7	31
Deepen pump	6	9	13	3	2	-	33
Replace a stock or domestic bore	5	4	2	2	1	1	15
Replace an irrigation bore	5	8	1	1	-	-	15
	16	**24**	**23**	**15**	**8**	**8**	**94**

Just over 4% of the impacted bores require rectification or 'make good' measures annually over the mine life or between 4 to 5 water bores on average each year

The influence of the Hume project on water bores is temporary, reversible and occur at different times for different landholders throughout the life of the mine and until impacts return to the minimal impact criteria outlined in the Aquifer Interference Policy 2012.

In summary, Hume's 'Make Good' mitigation measures mean:

- No landholder will be materially disadvantaged as they will be eligible for "make good" arrangements, to be provided by Hume Coal before impaired capacity constraints for bores occur.
- 'Make Good' or alternative water supply arrangements, referenced in the NSW Government's 'Aquifer Interference Policy' (2012), have been incorporated in standard conditions of consent for many mining developments since 2012.
- All bores drawn down by more than 2 m due to the project will be eligible for 'Make Good" arrangements.
- Around a third of the affected bores will experience increased pumping costs but no other capital works or supplementary measures are expected to be necessary to maintain their proper functioning.

- Another third of the bores have been assessed as potentially needing their submersible pump intake depths repositioned for certain periods of time.

- The final third may need redrilling, or repositioning to maintain water supply; typically, these bores are either shallow, or screened in, or below the coal seam itself, or within proximity to the top of the seam.

- Of the 4 to 5 bores affected each year <2 require replacement.

- Hume Coal is responsible for all costs to maintain water supplies through 'Make Good' mitigation, including baseline bore assessments prior to mining and throughout mine life.

Predicted impacts to other groundwater users, including groundwater dependant ecosystems, watercourses, drainage lines, and swamps that receive baseflow, have been assessed as insignificant.

The project will not reduce the beneficial use category of the groundwater source as referenced in the AIP, including cumulative water impacts.

Section 12:

Existing NSW Government 'Make Good' Practice and Potential Framework

The Aquifer Interference Policy (2012) (AIP) provides the framework for assessing the impacts of mining developments on groundwater systems; however, it is 'silent' on 'Make Good' mitigation arrangements. No guidelines have been issued to assist Consent Authorities.

Nevertheless, there have been many mining developments approved since the AIP came into effect in 2012. These approvals contain standard conditions of consent requiring 'compensatory water supplies. These standard conditions are applicable to the Hume project and provides the necessary legal framework for 'Make Good' water supply arrangements.

'Make Good' mitigations need to be:

- ***proportionate to the predicted impact;***
- ***applicable to the licenced use of the water bore;***
- ***available for the duration of the predicted exceedance of the AIP 'minimal harm' criteria;***
- ***reasonable and feasible;***
- ***directed towards reducing the impacts of the development;***
- ***agreed to by both the Applicant and the water bore owner; or***
- ***where a dispute occurs, determined to the satisfaction of the Secretary of the Department of Planning as mirrored in other mine approval conditions.***

A framework for managing 'Make Good' in the absence of government policy of the NSW is discussed in Attachment A*: Discussion Paper: Policy Framework for Hume Coal 'Make Good' Arrangements for Potential Mining Impacts to Affected Water Supply Works.*

Section 13:

Impacts on Air Quality

Air quality impacts have been appropriately addressed in the Hume Coal and Berrima EIS using relevant experts to address community concerns about dust generation and health impacts.

However, there are some in the community who seek to portray the Hume project as being analogous to a larger scale open cut mine of the type found in the Hunter Valley.

It is important that the Consent Authority examines the scientific evidence in reaching a conclusion on the reality of the any air quality impacts from the project.

Air Quality Mitigation through Mine Design

The Hume project(s) employ several important measures that will significantly remove coal dust as an issue.

- Disposal of reject material (natural rock and shale) underground
- Use of a Stacker Reclaimer rather than bulldozers and wheeled loaders for the product stockpile.
- Use of water sprays on stockpiles and/or veneering where required
- Partially covered conveyors and fully covered transfer points.
- Use of covered coal wagons to mitigate against fugitive dust from transporting coal by rail to Port Kembla
- Hume is an underground mine

Major Sources of Dust from Coal Mining

In an EPA commissioned study of all 57 NSW operating mines, Katestone Study 2011[8], some 22 mining activities were identified as likely to cause generation of PM_{10} particles. Of those, three were responsible for 83% of large sources of dust:

- Wheel generated dust (49%)
- Handling overburden (25%)
- Wind erosion of overburden (9%)

These activities are not a feature of the Hume Coal underground mine.

Of the 22-major dust generating activities only six apply to the Hume project such as loading and unloading from stockpiles, train loading, wind erosion of stockpiles and coal crushing. All these activities are, by comparison with the other dust sources, listed by Katestone, minor contributors to PM_{10}.

[8] NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions for Particulate Matter from Coal Mining

What is Meant by Air Quality

There appears to be a great deal of misunderstanding about the nature of dust from mining and the impacts on communities. Dust is the common expression for the particulate matter (PM) in the atmosphere and is generated from a wide range of natural and human related activities. In the case of mining, there are three size fractions including in a comprehensive air quality assessment:

- Total Suspended Particulates (TSP) refers to particles less than 100 microns in diameter (one micron is one-millionth of a metre);
- PM_{10} refers to particulate matter less than 10 micron in diameter;
- $PM_{2.5}$ refers to particulate matter less than 2.5 micron in diameter.

To provide some context, fine beach sand is about 90 microns in diameter, the average human hair is 70 microns wide so the small particle pollution ($PM_{2.5}$), of most health concern, is 30 times smaller is diameter than the average human hair.

Larger particles (TSP and PM_{10}) are generated from activities such as wind erosion and wheel generated dust from agriculture, unpaved roads, and other industrial sources. Smaller particles ($PM_{2.5}$) are emitted from combustion sources such as diesel-powered vehicles, petrol, wood burning fires etc.

PM in any form is always present in the atmosphere and are both natural and human related.

Natural sources in the Southern Highlands include:

- Wind erosion from exposed ground
- Vegetation fires
- Regional scale events such as bushfires and dust storms
- Sea aerosols (a major PM component) transported from the coast.

Human related sources in the Southern Highlands include:

- Fugitive dust from agricultural activities
- Existing industrial and commercial activities
- Wood burning fires
- Truck and motor vehicle movements on sealed and unsealed roads.

Concentrations of PM fluctuates daily and are seasonal. In the Southern Highlands in winter the major source of $PM_{2.5}$ and below, and of greatest concern to health, is the burning of wood inside residences. This is exacerbated by a concentration of wood burning sources in close urban areas with micro-air sheds such as topographically constrained Berrima. Other events, such as bushfires, cause very high levels of PM concentrations.

Mining, unlike many other dust sources like agriculture, faces rigorous assessment of TSP and PM in accordance with NSW EPA criteria and the National Environmental Protection Council (NEPC) standards for $PM_{2\,5}$.

Air Quality Assessment and Mitigation

Detailed air quality assessment was undertaken and included:

- recorded wind speeds from calm conditions to wind gusts greater than 100 km/hour
- PM assessed under all conditions to determine the 'worst case' impact on the surrounding environment;

- predictions made across a 15 km^2 area centred over the project with individual predictions made at residences, schools, and urban areas.

Air quality modelling has assessed the existing air quality (no mining) as a benchmark for the Hume project.

It shows that project generated PM_{10} dust (including $PM_{2.5}$ as a component) reduces with distance from the proposed surface infrastructure area and are very low at the site boundary, compared with existing background air quality and the regulatory criteria.

Coal stockpiles are managed to minimise dust erosion, in the most difficult of climatic conditions, by use of water sprays and potentially 'veneering' with biodegradable surface treatments made from natural starch polymers.

Coal dust generally contributes a small proportion (10-15 percent) of the larger particle faction (PM_{10}) for open cut mines and significantly less for underground mines. As stated, the main activities shown to produce dust, surface waste rock emplacements, bulldozing, surface haul trucks on unsealed roads etc are not proposed for the Hume project.

Nevertheless, coal dust emissions, predominately comprising course dust particles in the range of 50 and 200 microns in size, can affect amenity and is regarded as 'nuisance' dust. Reducing the point sources of any potential dust (PM_{10} and above) will protect the surrounding environment and residential amenity.

Most of dust in a rural environment is associated with agricultural pursuits and is the main contributor to background levels of PM_{10} in the Southern Highlands. Where underground mining co-exists with agriculture, proper surface mine design can limit the point sources of dust generation in ways not able to be applied to broadacre agriculture.

The EIS air quality assessment found that dust generated from the Hume project will be negligible when compared with background levels.

Operation of the Hume mine is predicted to generate a small increase in PM_{10} and an even smaller increase in $PM_{2\,5}$ in the immediate mine vicinity. Maximum concentrations predicted in a 24-hour period of PM_{10} and $PM_{2\,5}$ are 4.7 micrograms/m^3 (compared with the regulatory criterion of 50) and 0.2 micrograms/m^3 (compared with the regularly criterion of 8).

Dust impacts on the closest communities of Berrima, New Berrima and Medway will be negligible compared with existing pre-mining background levels. Those communities further afield, Moss Vale, Burradoo and Bowral will have no measurable adverse air quality impacts.

Small Particle Pollution ($PM_{2.5}$)

Small particle pollution ($PM_{2.5}$), mainly from vehicle and equipment emissions, account for 5-10 percent of all particles emitted during the mining and transport process for open cut mines and considerably less for underground mines. The Hume project will have limited sources of $PM_{2.5}$ on the surface (trains) and exhaust filters for any underground diesel sources (vehicles).

The predicted levels of $PM_{2.5}$ from mining are lower than those in Australian cities that are very low by world standards.

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The health impacts of relative dust levels are dealt with by a leading medical Authority, Associate Professor and Respiratory Physician, Dr David Mackenzie in the Hume EIS.

Studies of coal dust in the Hunter valley provide useful input into the impact of coal dust on air quality. Two major studies[9] found:

- Coal could only contribute 5-10% of $PM_{2.5\text{-}10}$ particles, with no coal specifically identified in the $PM_{2.5}$ samples.
- Annual dust depositions rates ranged between 0.5 and 1.1 grams per m^2 per month, with coal contributing 10% on average to the total level of deposited dust.

A previous study[10] in the Upper Hunter at Muswellbrook and Singleton analysed all sources of $PM_{2.5}$. It found that all soil dust, including agriculture and mining, contributed 11-12% of $PM_{2.5}$. This is an interesting result, considering the number of large-scale open cut mines using bulldozers and haul trucks on surface emplacements in the immediate locality of the two centres.

Other key outcomes of the Upper Hunter Study relevant to the Hume project are;

- Wood smoke during the cooler months contributed up to 30% of $PM_{2.5}$ at Muswellbrook
- The bulk of coal dust emissions are courser than $PM_{2.5}$
- The amount of black carbon found in the soil factor samples (assumed to be coal) was only 1% of total $PM_{2.5}$ at Singleton and 4% at Muswellbrook. This is relatively low when compared to the major sources of $PM_{2.5}$.

Wood smoke is likely to be dominant source of $PM_{2.5}$ which can often be a brown atmospheric haze during the winter months in the Southern Highland. In the Sydney region, domestic solid fuel combustion contributes 47% of annual $PM_{2.5}$ particle pollution. The contribution of wood smoke is highest in July, contributing up to 75% of monthly$PM_{2.5}$.

Colder rural areas, where people rely on wood as major heating source in winter, have the highest rates of $PM_{2.5}$ from wood stoves and fires. For example, In Armidale it accounts for >85% of $PM_{2.5}$, Tasmania up to 97% (Tamar Valley 73%).

Evidence from the US shows that residential wood burning is the source of 50% of airborne Polynuclear Organic Material (POM) in the U.S. POM's contain a group of compounds Polycyclic Aromatic Hydrocarbons (PAH) which include many Class A carcinogens. The U.S. EPA estimates

[9] Lower Hunter Particle Characterisation Study (CSIRO and ANSTO) 2016
Lower Hunter Dust Deposition Study (AECOM) 2016

[10] Upper Hunter Particle Characterisation Study, Dept. of Health, OEH and undertaken by CSIRO and ANSTO, 2013

that the cancer risk from wood smoke is twelve times greater than from equal amounts of tobacco smoke.

Based on evidence from other cold climate areas, it is expected that wood smoke in the Southern Highlands would be the dominant contributor to total $PM_{2.5}$, particularly in places such as in all urban villages. Berrima would experience high levels of $PM_{2.5}$ from wood smoke, due to its location, surrounded by hills concentrating wood smoke in the urban area.

Notwithstanding the above, the fact is air quality in the Southern Highlands is high and the Hume project will not result in a deterioration of that air quality.

It is important put some perspective around $PM_{2.5}$ and composition from all sources.

This needs to be balance against emotive and alarmist claims about coal dust and its impact on health, particularly, as the Hume project is an underground mine with limited sources of both $PM_{2.5}$ and PM_{10}.

Section 14:

Final Rehabilitation: Underground Water Storage and Managed Aquifer Recharge

The Mining SEPP also requires the Consent Authority to consider the final rehabilitation of the Hume projects. Underground reject emplacement is a significant advance on progressive rehabilitation. Final mine rehabilitation will require closing the access drifts and demolishing the surface infrastructure and returning the land to its previous agricultural use.

There is a unique opportunity for the final rehabilitation of the underground mine to be considered as a major emergency underground water storage.

The benefits to Australia of progressing underground water storages that can be accessed during dry times are self-evident.

Many underground water storage concepts have been examined, including the Pratt Water Study on the Murrumbidgee and projects examining known aquifers suitable for storage beneath Perth, Adelaide, and Melbourne.

Some projects have demonstrated that underground water storages are viable. From 45GL of water being reinjected in the Burdekin every year for agriculture and horticulture to a 300GL 'water bank' in Orange County, California to name but two.

Most Australian States have a Managed Aquifer Recharge (MAR) policy to inject water underground during wetter periods for balancing out water needs over dry periods.

NSW does not have an MAR policy and lags decades behind other States.

Other nations have far more advanced underground storage schemes, despite Australia being the driest continent.

Water 'banking' augments natural processes of water storage. Together with MAR, the recovery of groundwater systems is accelerated by taking surplus surface water during wet periods and reinjecting it into the groundwater system.

Locally, during the Millennium drought, authorities hastily built an emergency pipeline to Goulburn to connect with water storages in the Southern Highlands. That pipeline passes close to the Hume Coal underground mine, so the synergies are obvious.

Additional surface water storages require extensive land, not available in the immediate region with proximity to potential users.

Surface storage are constantly depleted by evaporation. For example, annual evaporation from the Wingecarribee Reservoir is around 700ML and the tiny Medway Dam 100ML. Total annual evaporation from all dams and weirs servicing the Sydney region is 100GL or about 20 percent of annual usage, equivalent to one-fifth the volume of Sydney Harbour.

As part of the final rehabilitation of the Hume project, consideration should be given to the benefits of using the final underground void as a long-term water storage, available to overlying landowners with water licences and for the wider public good.

As the Southern Highlands is characterised with higher than average consistent rainfall, it is just common sense to harness excess water, where practicable, to reinject some of that to underground storage through Managed Aquifer Recharge (MAR). In the absence of an MAR policy in NSW the Hume void will recover naturally and still be a valuable public asset post mining.

Having studied the design of the Hume mine, with no unsealed adits to the outside world, the final void will decline from around 80 metres in the Belanglo State Forest to around 180 metres towards the Illawarra Highway, making it ideal for an underground water storage.

The bulkheads used to seal each panel progressively could be designed to allow the valve release of water in a homogeneous system upon final closure. A pumping void could be designed at the end of mine life, at the lowest depth, with surface pump access as part of the rehabilitation closure plan.

Post mining, the available void space will accommodate 20GL of water, or about 77 percent of the existing capacity of the Wingecarribee Reservoir (post peat swamp collapse). This calculation includes water placed back underground as part of Hume's progressive reject emplacement underground, so to avoid surface emplacements and tailings dams.

During mining, there will be constant monitoring of water recovery and quality against the Conditions of Consent, allowing for a proper assessment of the potential for a post-mining storage, generate the necessary scientific data to support Hume's post closure mine as a major new water storage.

Post mining, the available void space will accommodate 20GL of water, or about 77 percent of the existing capacity of the Wingecarribee Reservoir (post peat swamp collapse).

Construction of an above ground storage of equivalent would be around $200-300 million, even if the land were available.

The Hume project, with or without Managed Aquifer Recharge (MAR), represents a unique opportunity to deliver a significant public benefit:

- Hume would continue to own over 2GL of water licences allowing for sustainable extraction as and when required for emergency purposes.
- Local landholders with licences would have access to a water storage where water is easier to extract than relying on solely on water bores.
- Agricultural investment would be attracted to a ready source of water to underpin investment in higher value agriculture close to major markets, than is currently the case.
- Underground storage would be free of water evaporation, as is the case with surface storages. For example, it would store the equivalent of 20 percent of the annual evaporation from all Sydney water storages (100GL).
- During times of emergency the water can be treated for drinking purposes (if necessary).

To build a surface storage of 20GL capacity, assuming the land availability, would cost $200-$300 million.

The IPC should recommend that NSW Government and Hume Coal scope a pilot project to examine development of an underground water storage as a component of the mine closure and rehabilitation plan.

To ignore innovative uses of post-mining underground voids for the Hume project, in an environment of significant evaporation losses, would be a lost opportunity to protect and provide deliverable water resources in the most cost-efficient means for the greater public good and provide authorities with more flexible options during dry periods.

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[i] DPE Assessment Report, Executive Summary, page v
[ii] $ 2018 inflation adjusted.
[iii] Not including payroll tax, land tax or $1m in Council rates.
[iv] Includes initial capital for construction of mine and Berrima rail infrastructure
[v] Expenditure for mine operation only, including rehabilitation (23 years). Includes contractors, consumables, access charges, goods and services
[vi] Assuming a extraction of coal during ramp up and extraction over 20 years
[vii] Assuming a 3 year construction, 19 years operation and 2 years decommissioning.
[viii] ABS Employee Earnings and Hours (May 2018)

[ix]ABS Estimates of Personal Income for Small Areas, 2011-2016 Table 3, Statistical Area (SA3 level). SA3 areas roughly correspond to LGA boundaries.

[x] Brotherhood of St Laurence, Unfair Australia Report (March 2018)