Appendix 5

Hume Coal Project

– Response to community concerns regarding impacts on tourism (Judith Stubbs & Associates 2017)

Hume Coal Project:

Response to Community Concerns regarding impacts on tourism

14 November 2017

This report has been prepared for
Hume Coal Pty Limited

by

JUDITH STUBBS & ASSOCIATES

The Old Post Office
231 Princes Hwy, Bulli NSW 2516
Ph: 02 4283 7300
info@judithstubbs.com.au
www.judithstubbs.com.au

This Report has been prepared by:

Judith Stubbs BSW PhD MPIA

John Storer, BE (Civil), Grad Dip (Econ)

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List of Acronyms and Abbreviations

ABS: Australian Bureau of Statistics.

EIS: Environmental Impact Statement.

LGA: Local Government Area (Shire, Municipality or City).

NPV: Net Present Value. The current value of a string of future cash flows using an appropriate discount rate.

POW: Place of work. Census employment data is represented either by place of work, or by place of residence, with place of work reflecting actual jobs in an area.

ROM: Run of Mine. Unprocessed coal taken from a mine.

SA1: The smallest geographical area used by ABS for reporting data, typically containing around 300 people.

SA2: Statistical Area Level 2. The SA2s are a general-purpose medium-sized geographical area built from whole SA1s. Their aim is to represent a community that interacts together socially and economically.

SA3: Statistical Areas Level 3 (SA3) are geographical areas built from whole Statistical Areas Level 2 (SA2). They have been designed for the output of regional data. SA3s create a standard framework for the analysis of ABS data at the regional level through clustering groups of SA2s that have similar regional characteristics. Whole SA3s aggregate to form Statistical Areas Level 4 (SA4).

SSC: State Suburbs. An ABS approximation of localities gazetted by the Geographical Place Name authority in each State and Territory.

SEIFA: Socio-economic indicators for areas. This is a number, or series of 4 numbers, which describe the relative level of socio-economic advantage or disadvantage in an area. Advantage is defined in terms of "access to material and social resources and ability to participate in society".

STE: State.

1 Executive Summary

1.1 Introduction

Judith Stubbs and Associates has been retained by Hume Coal to respond to concerns in community submissions regarding the impact of the Hume Coal Project on Tourism. In summary, the impacts of the Hume Coal Project on Tourism are likely to be small, and any adverse impacts will be offset by the greater number of higher value jobs provided by the Hume Coal Project.

Four questions are addressed in this report. These are:

1. The extent of tourism related employment in the Southern Highlands compared with other relevant industry sectors, and the **implications of significant incompatibility** between the proposed mine and tourism related employment *should* they prove to be incompatible. This involves an analysis of net impacts on tourism activity under different scenarios;
2. The extent to which General and Heavy Industrial uses are currently compatible with tourism in the locality. This involves an analysis of the **existing character and amenity** of the Moss Vale-Berrima locality, including existing features of the 'industrial landscape' and land uses, their proximity and visibility from sensitive tourism 'receivers', and the level of current 'co-existence' of these sectors;
3. The extent to which tourism-related activities are likely to be incompatible with the proposed mine in the future. This involves considerations of *current* compatibility between potentially conflicting land uses from the above; and an understanding of the likely **future amenity impacts in the locality,** in particular, on sensitive tourist 'receivers' and attractors from the proposed mine including visual, noise and air quality impacts related to mine operations; and
4. The **statistical relationship** between mining and tourism employment more generally in NSW, and observations from a relevant **case study area,** to validate conclusions from the above analysis.

1.2 The Project

The Hume Coal Project is located near Berrima NSW, with the above ground works located to the west of the Hume Highway and south of Medway Road. Above ground works and the administration centre occupy a surface area of around 114 ha.

The rail spur and loop will extend the existing freight line into Berrima Cement Works along an existing alignment south of Taylor Avenue and Medway Road. Grade separated crossings will be provided at the Old Hume Highway and Berrima Road.

1.3 Importance of the Tourist Industry in the Locality

The first question relates to the **relative importance** of tourism-related industries in the locality, and the implications for the locality *should* there be significant negative impacts upon tourism and related employment. This also provides a context to later discussions about the relative compatibility of tourism and existing and likely future industrial uses in the locality.

We have estimated tourism employment in Berrima-Moss Vale SA2 at 196 direct jobs or 131 full time equivalent jobs. By comparison, the mine is expected to provide 300 full time equivalent jobs. The mining jobs are likely to be of higher value, with median individual weekly income in coalmining more than $2,000 per week compared to $400-$599 in tourism industries. While the mining jobs are of shorter duration, with an expected life of 19 years, this is offset by the greater value, with the Net Present Value of a mining job over 19 years $1.1 million compared to a Net Present Value of a tourism job over 60 years of $0.4 million.[1]

Taking a **worst-case assumption** (that the two industries, coal mining and tourism, are *totally* incompatible, that the impacts of coal mining will be experienced across the Moss Vale-Berrima SA2 and at considerable distance from the proposed mine headworks and that the tourism jobs will not be recovered in the future following the end of mining and rehabilitation of the site), 196 direct tourism jobs (131 full time equivalent jobs) would be lost in the tourism industry. In this *worst case*, this would be offset by a gain of 300 direct full time equivalent jobs in the SA2 due to the operation of the mine. Using Net Present Value, those jobs would be worth $330 million compared to a value of $78 million for the tourism jobs.

It is noted in this regard that the Moss Vale-Berrima SA2 contains around one-fifth of the tourism related jobs in the Wingecarribee LGA. The Moss Vale-Berrima SA2 itself is a large area that extends well beyond the Berrima/New Berrima locality. It has a population of around 10,000 people, around 10% of whom live in Berrima-New Berrima and surrounds. Similarly, a very high proportion of tourism-related jobs are located outside of the Berrima/New Berrima locality, and geographically remote from the proposed mine. As such, the loss of *all* jobs from tourism related activities in the SA2 (or the closure of all cafes, restaurants, hotels, clubs, accommodation, etc in Moss Vale, Sutton Forest, etc as well as Berrima and surrounds) appears extremely unlikely.

At the lower end of the scale, a 5% reduction in tourism would mean the loss of 10 direct jobs (7 full time equivalent jobs), with a Net Present Value of $4 million, and a 10% reduction in tourism would mean the loss of 20 direct jobs (13 full time equivalent jobs) with a Net Present Value of $8 million. Again, this is contrasted with the $330 million for the locality from the mining jobs in terms of NPV. It is noted that a 10% reduction in tourism jobs would essentially mean *all* of the tourism jobs would be lost in the Berrima locality.

Significant adverse impacts on tourism due to conflicts in land use also appear to be highly unlikely considering the existing amenity of Moss Vale-Berrima, the current co-existence of General and Heavy Industrial uses and tourism uses in the New Berrima-Berrima locality, as well as statistical testing of this relationship at the NSW State level.

[1] The 60 years for tourism jobs recognises that these jobs are likely to continue well into the future.

1.4 Current Co-Existence of Industrial and Tourism Uses and Activities in the Locality

The second question relates to the existing character and amenity of the Moss Vale-Berrima locality, including existing features of the 'industrial landscape' and land uses, their proximity and visibility from sensitive tourism 'receivers', and the level of current 'co-existence' between industrial and tourist uses.

The Moss Vale-Berrima locality has long been associated with tourism-related activities such as accommodation, restaurants, specialty retail, sightseeing and outdoor recreational activities, and the locality currently enjoys above average employment in tourism-related industries. Balanced against this is the higher than average employment in Manufacturing and related industries, the locality's existing density of and long association with industrial uses, and the historical identification of this part of the Southern Highlands with heavier industrial uses including the Cement Works, Berrima (Medway) Colliery that closed in 2013 and major transport infrastructure.

Moreover, tourism and Heavy and General Industrial uses and activities have co-existed with tourism uses and activities historically, and are clearly not incompatible now from the employment data and research undertaken in the preparation of this report. It is unlikely that the mine as proposed will be incompatible with tourist uses and activities in the future, or will have a significant impact upon these uses in the wider or immediate locality.

1.5 Future Impacts of the Proposed Mine on Tourism Uses and Activities in the Locality

A third question relates to the likelihood of future impacts on the character and amenity of the locality from the **proposed mine** including visual, noise and air quality impacts related to mine operations. Particular concerns relate to the proximity and visibility of the mine to potentially sensitive tourism 'receivers' and related impacts within the wider locality.

As noted above, the mine is less proximate to a number of sensitive 'receivers' (locations and uses) than existing General and Heavy Industrial uses, some of which are more visible, more concentrated and arguably more prominent as land uses than the proposed mine. It is also relevant that a large area proximate to New Berrima and to the Neighbourhood Zone of Berrima itself is zoned for General Industrial use and prioritised for future industrial expansion.

As such, there would have to be visual and other amenity impacts specifically related to the proposed mine that are significantly greater than existing industrial uses. Drawing upon relevant studies in the Applicant's EIS as well as our own observations, impacts on character, air quality, noise and vibration and heritage are likely to be negligible as discussed below.

Of the various amenity impacts, the most likely impact is to be visual. These impacts will be experienced by cars travelling along Medway Road towards Medway Village, west of the Hume

Motorway and by residents living along Medway Road west of the Hume Motorway, with the impact moderate to low with planting; and by cars travelling along the Hume Motorway in the region of the Medway Road overbridge, with these impacts assessed as moderate. These impacts will be experienced in the context of the Hume Motorway and the associated Medway Road interchange, itself a significant man made visual impact on the landscape. Importantly, visual impacts will not be experienced by southbound traffic (coming from Sydney) exiting the Hume Motorway for Berrima.

It seems unlikely that these visual impacts will adversely affect tourism industries given the spatial separation from tourist uses in the locality (with the exception of the Zen Oasis Vegetarian Restaurant); the generally transient experience of visual impacts by visitors to the locality; the context of the visual impacts in an area with significant man made industrial elements including the motorway and cement works; and the continued existence of tourism uses in the locality despite the existing visual impacts associated with industrial uses, the Hume Motorway and the Main Southern Railway.

1.6 Statistical Relationship between Coal Mining and Tourism Industries in NSW

A fourth question relates to the **statistical relationship** between mining and tourism employment more generally in NSW and Australia. This enables a more objective assessment to be made based on a statistically robust assessment.

At the national scale, there is little evidence that the presence of coal mining is related to either increases or decreases in tourism industries. Using a cross-sectional data set for all LGAs in Australia, our analysis predicts that each 3 coal mining jobs would result in one additional tourism job per 100,000 population. However, the result is not statistically significant at the 95% confidence level, and the best conclusion is, at the LGA scale, there is no discernible relationship between coal mining and employment in tourism, either positive or negative.

Considering NSW LGAs with active coal mining (open cuts and underground), a number of these have significant employment in tourism industries, suggesting that the two uses are not incompatible.

Further analysis was carried out using longitudinal employment data in active coal mining LGAs in NSW, considering the relationship between changes in coal mining employment and employment in the categories of Retail Trade and Accommodation and Food Services for the periods 2001-2006 and 2006-2011.

The analysis shows a 0.7% reduction in employment in Retail Trade; and a 0.3% increase in employment in Accommodation and Food Services for each additional 100 people employed in coal mining at the LGA level. There is considerable variation in the data, and neither coefficient is statistically significant as different to zero at the 95% level of confidence.

Using the results of this analysis, the expected 300 coal mining jobs from the proposed development will result in a loss of 50 jobs in Retail Trade, and a gain of 16 jobs in

Accommodation and Food Services. The net gain in jobs is calculated at 266 jobs, noting that the jobs lost will be of lower value than the coal mining jobs and will include around 50% part time jobs. If jobs are expressed as full time equivalents, the net gain at the LGA level is calculated at 277 full time equivalent jobs.

2 Compatibility of Mining with Tourism-Related Activities in the Locality

2.1 Overview

One of the concerns raised in community submissions in response to the Hume Coal Project Environmental Impact Statement is the assertion that tourism-related activities such as accommodation, restaurants, specialty retail, sightseeing and outdoor recreational activities are not compatible with a heavy industrial use, in this case an underground, first workings coal mine. Related to such assertions is a view that industrial activities and related infrastructure will affect the character of the locality and the quality of the experience of those visiting the area, leading them to avoid an area that they have previously enjoyed visiting, and will thus have a major impact upon tourist employment and uses.

Implicit in such assertions is the assumption that the locality of Moss Vale-Berrima (which currently has higher than average employment in tourism-related industries) is a relatively pristine environment with no existing amenity impacts or land use conflicts related to industrial uses. A further related assumption is that the proposed mine will affect the quality of the visitor experience and amenity in a way that is significantly different to other existing land uses, including General and Heavy Industrial land uses in the Moss Vale-Berrima locality.

These assertions raise four main questions related to:

5. The extent of tourism related employment in the Southern Highlands compared with other relevant industry sectors, and the **implications of significant incompatibility** between the proposed mine and tourism related employment *should* they prove to be incompatible. This involves an analysis of net impacts on tourism activity under different scenarios;
6. The extent to which General and Heavy Industrial uses are currently compatible with tourism in the locality. This involves an analysis of the **existing character and amenity** of the Moss Vale-Berrima locality, including existing features of the 'industrial landscape' and land uses, their proximity and visibility from sensitive tourism 'receivers', and the level of current 'co-existence' of these sectors;
7. The extent to which tourism-related activities are likely to be incompatible with the proposed mine in the future. This involves considerations of *current* compatibility between potentially conflicting land uses from the above; and an understanding of the likely **future amenity impacts in the locality,** in particular, on sensitive tourist 'receivers' and attractors from the proposed mine including visual, noise and air quality impacts related to mine operations; and
8. The **statistical relationship** between mining and tourism employment more generally in NSW, and observations from a relevant **case study area,** to validate conclusions from the above analysis.

Simply stated, it would be expected that, if **existing tourist uses and activities can co-exist with existing and future industrial uses** of similar proximity and scale without affecting the character and perception of the Moss Vale-Berrima locality, then the proposed mine could also be expected to co-exist with such tourist uses, areas and activities provided amenity impacts were relatively similar. Conclusions in relation to this specific locality are further tested objectively through a statistical and case study analysis of the relationship between tourism and mining activities and employment in Australia, and relevant areas of NSW more generally.

A basic description of the proposal is first provided. This is followed by an overview of the demography of relevant areas as a context to the development; and an examination of each of the four questions set out above.

2.2 Overview of the Proposal

The Hume Coal Project is located near Berrima NSW, with the above ground works located to the west of the Hume Highway and south of Medway Road. Above ground headworks and administration centre occupy a surface area of around 114 ha.

The Hume Coal Project consists of development of three key components - the mine and associated facilities, a new rail spur and loop and an activity approval for electricity supply works. Each of these components is covered by a separate approvals process.

The mine itself is expected to have a productive life of 19 years, producing up to three Mtpa of metallurgical and thermal coal. The mine will not remove pillars, thereby minimising subsidence; and coal reject will be emplaced underground to avoid the creation of permanent above ground reject emplacement areas. Surface infrastructure will comprise:

- Access via Mereworth Road using the existing Hume Highway exit;
- Surface access to the mine for personnel and for conveyors;
- Ventilation shafts;
- Overland conveyors;
- Coal processing plant;
- Administrative offices, workshops and workforce facilities;
- Water treatment plant;
- Stock pile areas with associated stackers for ROM coal, product coal and rejects stockpile; and
- Train loading plant.

The rail spur and loop will extend the existing freight line into Berrima Cement Works along an existing alignment south of Taylor Avenue and Medway Road. Grade separated crossings will be provided at the Old Hume Highway and Berrima Road.

2.3 Demographic Context

2.3.1 Overview

The locality, and a number of townships in the LGA, have a high degree of socio-economic polarisation in relation to key indicators of personal and community well-being. In particular, New Berrima and many smaller communities in Moss Vale and Mittagong show very high levels of vulnerability in relation to relevant ABS Indexes (SEIFA Disadvantage and SEIFA Education and Occupation), levels of educational attainment and unemployment.

More disadvantaged and lower educational and employment status tends to be associated with communities that are younger and have a higher proportion of families with children in the locality. In particular, the contrast between New Berrima and Berrima is stark, with the former being in the lowest 8% of areas for overall educational and occupational status in NSW, the latter in the upper 15% of NSW suburbs. New Berrima, a younger than average community, has more than 4 times the unemployment rate, whilst Berrima is much older than NSW and advantaged across a range of relevant indicators.

2.3.2 Relevant Localities

Selected demographic indicators have been analysed for areas closest to the proposed mine (Berrima and New Berrima State Suburbs (SSC)), and for Moss Vale – Berrima SA2 within which the urban area of these suburbs are located. They have also been provided for the adjacent Southern Highlands SA2, Wingecarribee LGA and NSW.

The mine's surface development will cross the ABS 2016 borders of two SSCs - Berrima SSC and Medway SSC. However, Medway SSC contained only 119 persons at the time of the 2016 Census, and so many ABS demographic indicators are not available for it due to data randomisation. As such, only limited data is reported for Medway SSC.

Different localities have been used to understand the context of the Hume Coal Project. Typically a progression of geographical areas has been selected, with suburbs and localities (Berrima, New Berrima and Medway) showing the local context, the Moss Vale – Berrima SA2 used to understand the community that interacts together socially and economically, and Wingecarribee LGA to understand the regional context.

The suburb boundaries, SA2 boundaries and LGA boundaries are shown in the following maps.

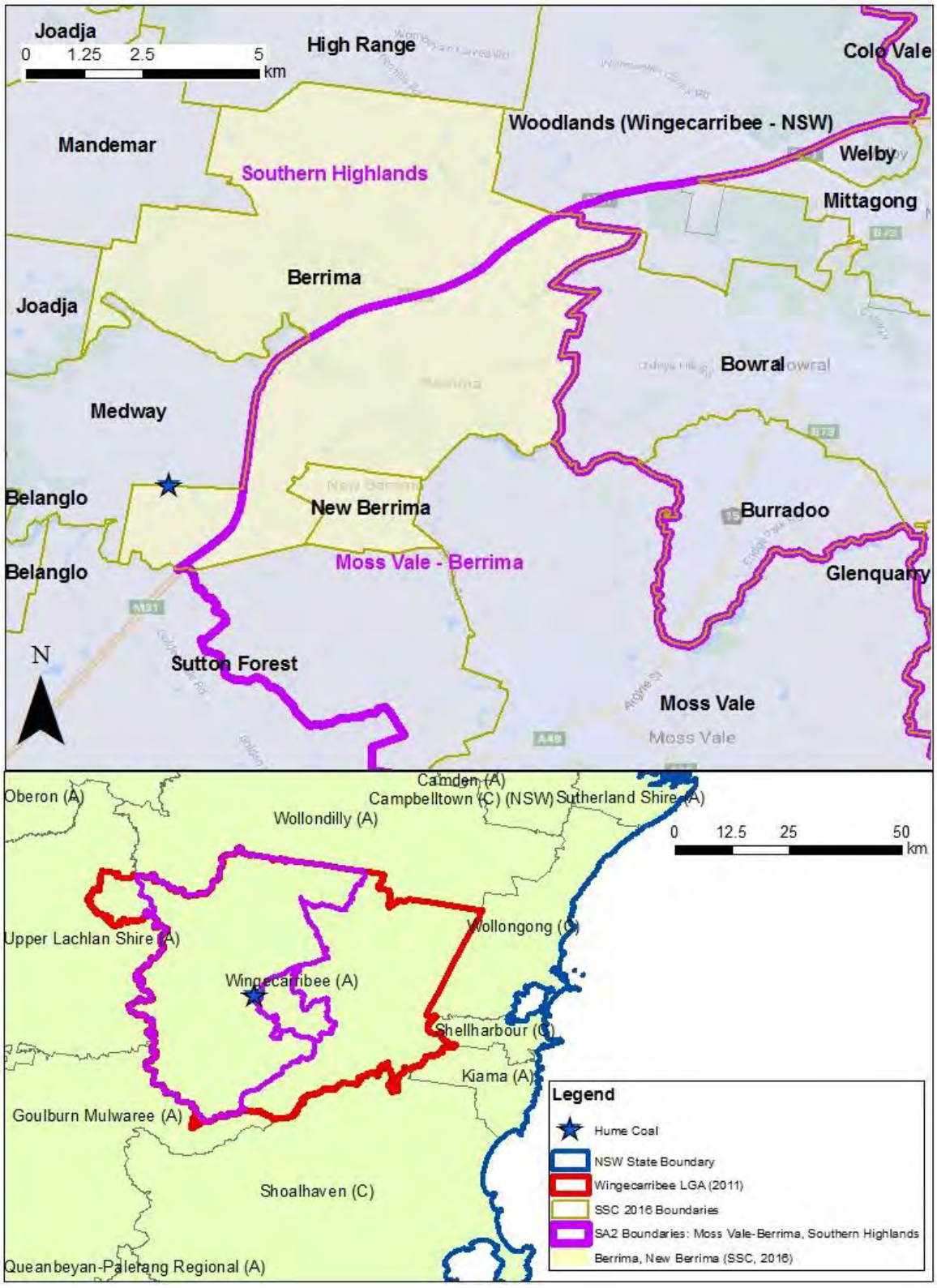


Figure 2-1: Maps showing selected localities used in demographic analyses.
Source: JSA 2017, using ABS 2016 digital geometries and GoogleMaps.

2.3.3 ABS 2016 and ABS 2011 data

Our demographic analysis draws upon ABS 2011 and 2016 Census data. Where available, 2016 Census data had been used, and 2011 data has been provided where this was not available at the

time of preparation of this report (in the case of SEIFA Indices and employment data). The following table provides ABS 2016 codes, total resident populations, areas and calculated population densities for the selected localities.

Table 2-1: Selected ABS 2016 census localities, their ABS codes, 2016 total populations (based on usual residence), areas and calculated population densities.

LOCALITIES	ABS CODE (2016)	Population (persons)	Area (km^2)	Population Density (persons/km^2)
New South Wales (STE)	GCP_1	7,480,228	800810.8	9.3
Wingecarribee (LGA)	LGA18350	47,882	2689.3	17.8
Moss Vale - Berrima (SA2)	114021287	9,797	118.1	83.0
Southern Highlands (SA2)	114021289	6,589	1409.7	4.7
Berrima (SSC)	SSC10320	666	54.4	12.2
New Berrima (SSC)	SSC12938	584	3.4	171.8

Source: JSA 2017, based on ABS 2016 General Community Profile data (G 01a).

2.3.4 Socio-economic Indexes for Areas (SEIFA 2011)

The following figure provides percentiles for the SEIFA Index of Relative Socio-economic Disadvantage (SEIFA Disadvantage) and SEIFA Index of Education and Occupation (EO) for the selected localities. These Indexes bring together a range of indicators related to the socio-economic status of communities at various scales in a weighted index. ABS 2011 data is used as SEIFA Indexes have not yet been provided for 2016.

New Berrima is a markedly more disadvantaged than Berrima on these Indexes of socio-economic wellbeing. New Berrima's SEIFA Disadvantage was at the 38th percentile (among the most disadvantaged 30% of SSCs in NSW, and New Berrima was in the lowest 8% of areas in NSW for overall educational and occupational status (SEIFA EO). **Berrima** had a very different socio-economic profile, with SEIFA Disadvantage at the 86th percentile, and SEIFA EO at the 85th percentile, meaning that Berrima was in the *least* disadvantaged 14% of areas, and among the *upper* 15% of areas with regard to educational and occupational status.

Overall, Moss Vale-Berrima SA2 is also quite disadvantaged, and significantly more disadvantaged on these Indexes of community wellbeing than Wingecarribee LGA or Southern Highlands SA2, as shown in the following figure.

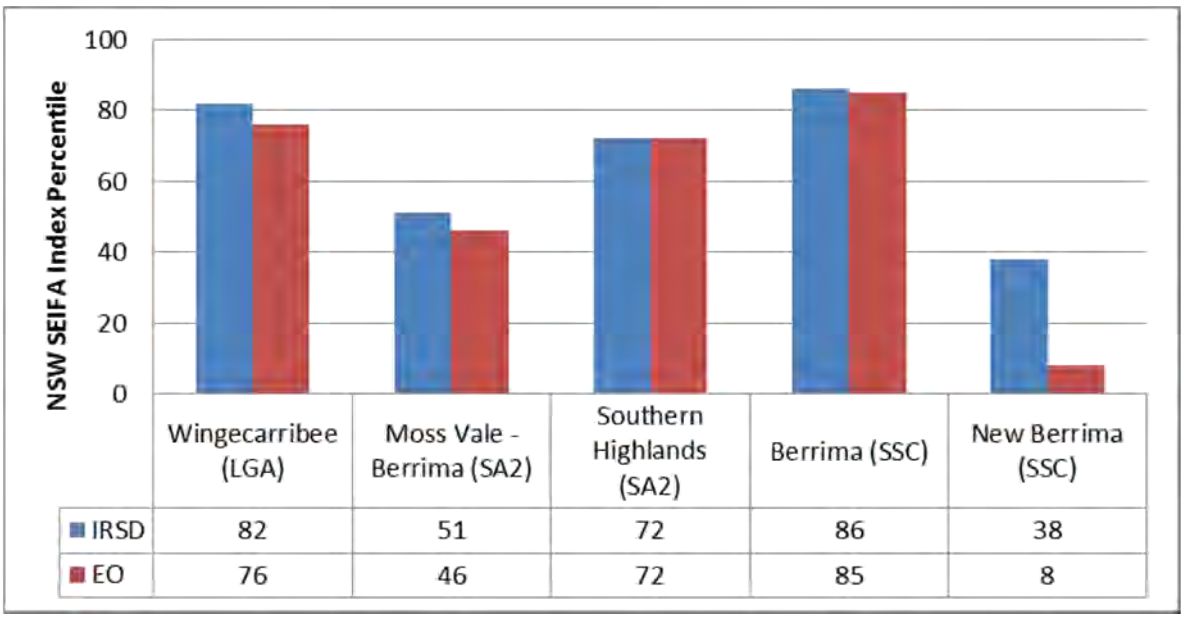


Figure 2-2: NSW percentiles for SEIFA socio-economic indices IRSD (index of relative socio-economic disadvantage) and EO (index of education and occupation) of Wingecarribee LGA, Moss Vale – Berrima SA2, Southern Highlands SA2, Berrima SSC and New Berrima SSC in 2011.

Source: JSA 2017, based on 2011 ABS SEIFA datacubes.

The following maps show the breakdown of these two Indexes at the smallest Census scale of analysis (SA1s). These maps provide a more detailed view of the high level of social polarisation that characterises the communities within Moss Vale-Berrima SA2 (and as well as areas like Mittagong), with small communities within Moss Vale township having SEIFA Disadvantage scores that place them in the most disadvantaged 2% and 12% of NSW suburbs (mainly located in the Western and more industrial part of the urban area); and in the lowest 2%, 10% and 13% of NSW suburbs for SEIFA EO, also noting that most of Moss Vale township ranks relatively low in terms of educational and occupational status across many of its small communities.[2]

[2] White polygons on maps are areas where no data exists, usually because of low or no population, for example areas dominated by industrial uses.

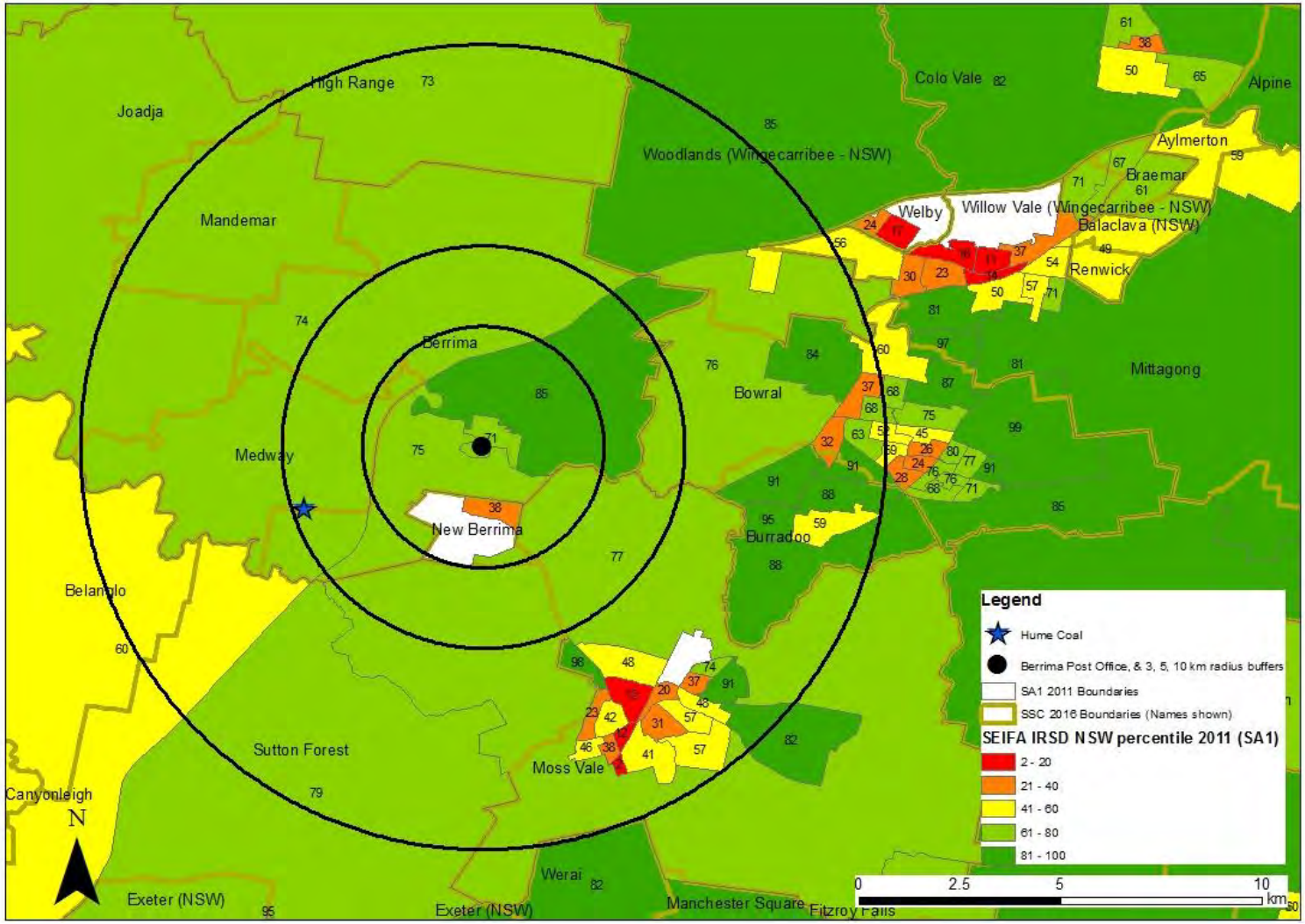


Figure 2-3: SEIFA 2011 Index of Relative Socio-economic Disadvantage (IRSD) at SA1 level in the vicinity of Hume Coal and Berrima. (White areas indicate SA1s without any IRSD score).

Source: JSA 2017, based on GoogleMap coordinates and 2011 ABS SEIFA SA1 data.

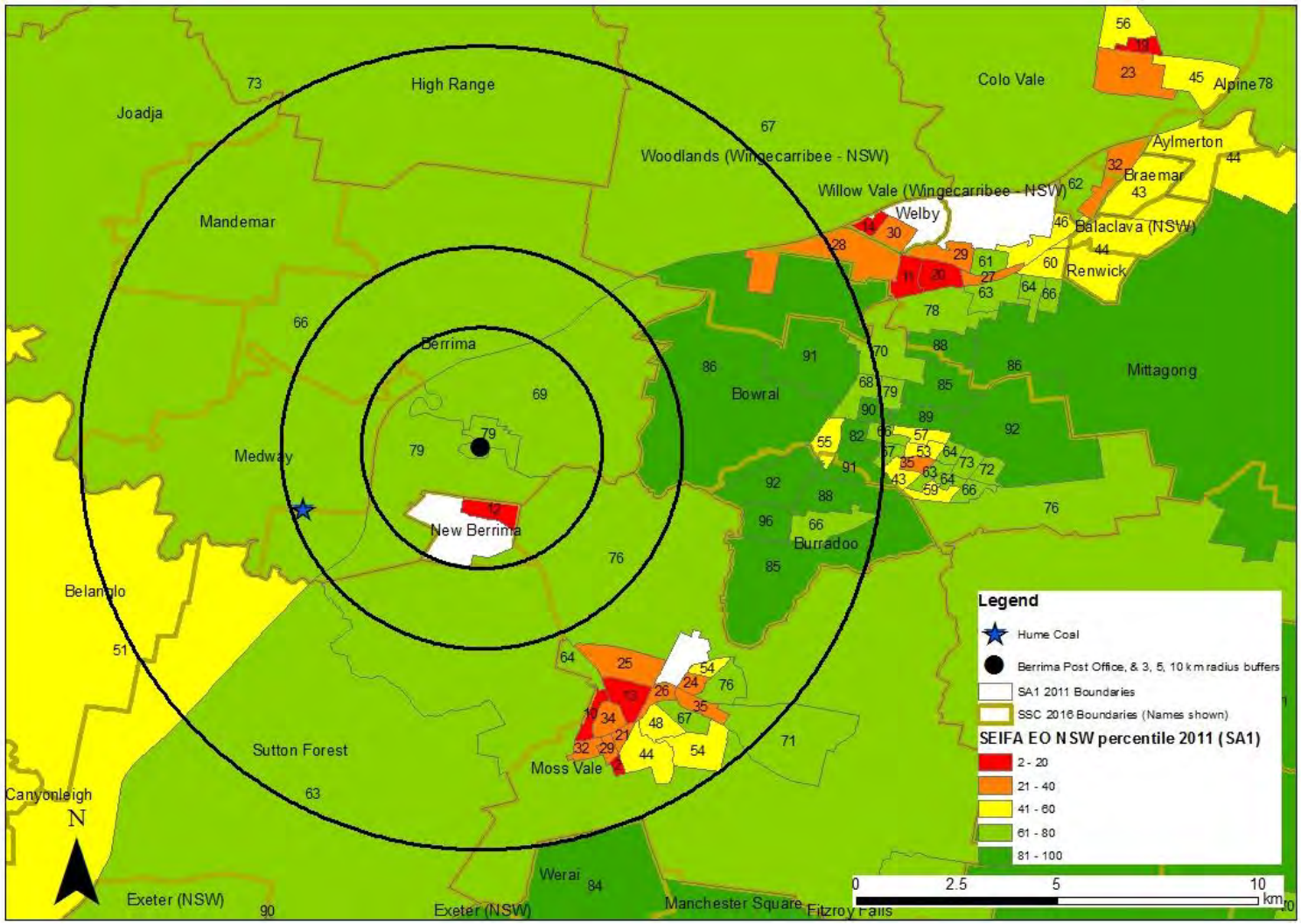
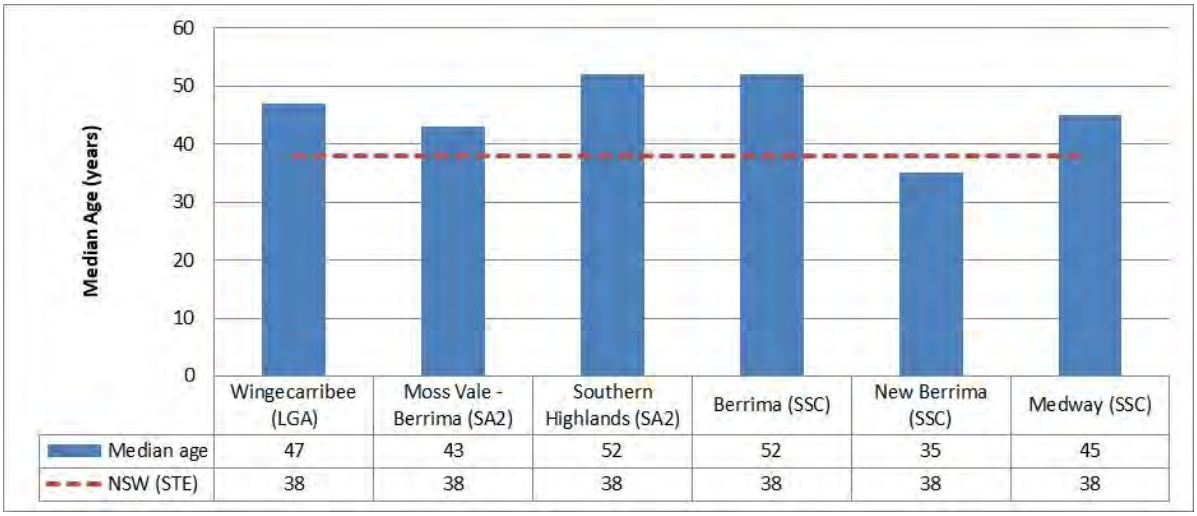


Figure 2-4: SEIFA 2011 Index of Education and Occupation (EO) at SA1 scale (White areas indicate SA1s without any EO).
Source: JSA 2017, based on GoogleMap coordinates and 2011 ABS SEIFA SA1 data.

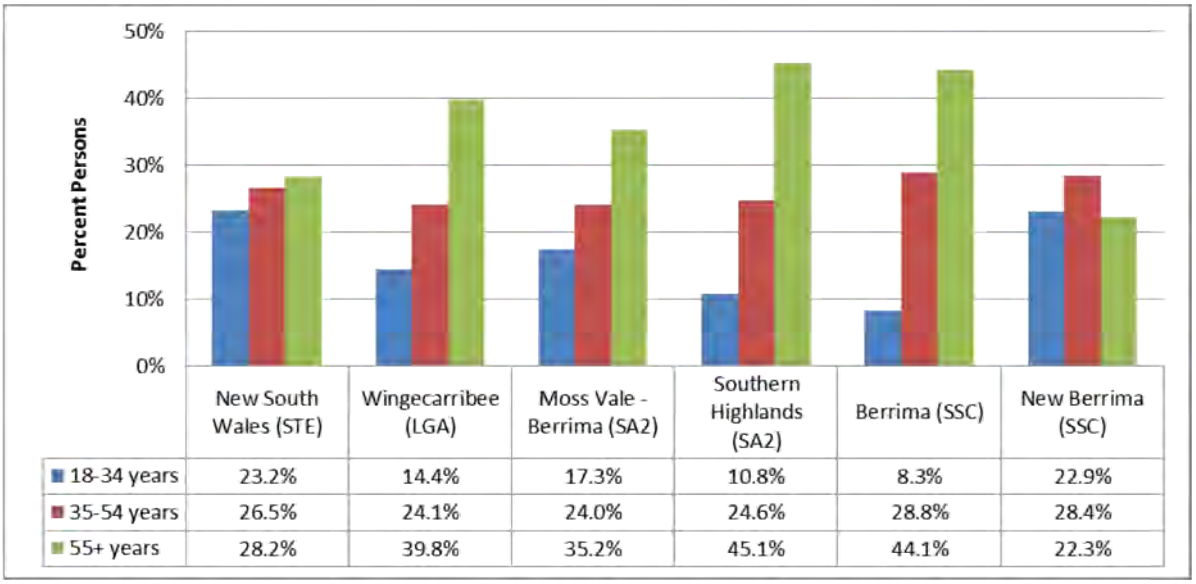
2.3.5 Age Profile

Wingecarribee LGA, and many areas within it, had a much older than average age profile compared to NSW, as shown in the figures below. **New Berrima** is the exception among the selected areas examined, with a median age of only 35 compared with 38 years for NSW. The population of Berrima is comparatively very old, with a median age of 52 years, and almost half of its population aged 55+ years. The population of the LGA and relevant SA2s is also aging far more rapidly than NSW, as shown in the following figures.



	Wingecarribee (LGA)	Moss Vale - Berrima (SA2)	Southern Highlands (SA2)	Berrima (SSC)	New Berrima (SSC)	Medway (SSC)
Median age	47	43	52	52	35	45
NSW (STE)	38	38	38	38	38	38

Figure 2-5: Median age at 2016 ABS Census of the populations (based on place of usual residence and excluding overseas visitors) of NSW, Wingecarribee LGA, Moss Vale – Berrima SA2, Southern Highlands SA2, Berrima SSC, New Berrima SSC and Medway SSC.
Source: JSA 2017, based on 2016 ABS General Community Profile data (G 02).



	New South Wales (STE)	Wingecarribee (LGA)	Moss Vale - Berrima (SA2)	Southern Highlands (SA2)	Berrima (SSC)	New Berrima (SSC)
18-34 years	23.2%	14.4%	17.3%	10.8%	8.3%	22.9%
35-54 years	26.5%	24.1%	24.0%	24.6%	28.8%	28.4%
55+ years	28.2%	39.8%	35.2%	45.1%	44.1%	22.3%

Figure 2-6: Age group proportions at 2016 ABS Census of usually resident populations of NSW, Wingecarribee LGA, Moss Vale – Berrima SA2, Southern Highlands SA2, Berrima SSC and New Berrima SSC.
Source: JSA 2017, based on 2016 ABS General Community Profile data (G 04).

Figure 2-7: Percentage increases in median age, 2016 values relative to 2006 values, for populations of NSW, Wingecarribee LGA, Moss Vale – Berrima SA2, Southern Highlands SA2, Berrima SSC and New Berrima SSC.

Source: JSA 2017, based on 2011 TSP data (T 02, place of enumeration) and 2016 GCP data (G 02, place of usual residence)

The following maps again show the high level of polarisation evident in Moss Vale-Berrima SA2 as well as between New Berrima and Berrima, this time in relation to age. It is also evident that the more youthful areas tend to coincide with areas of greatest disadvantage, whilst areas with the older profile tend to coincide with areas of greatest advantage.

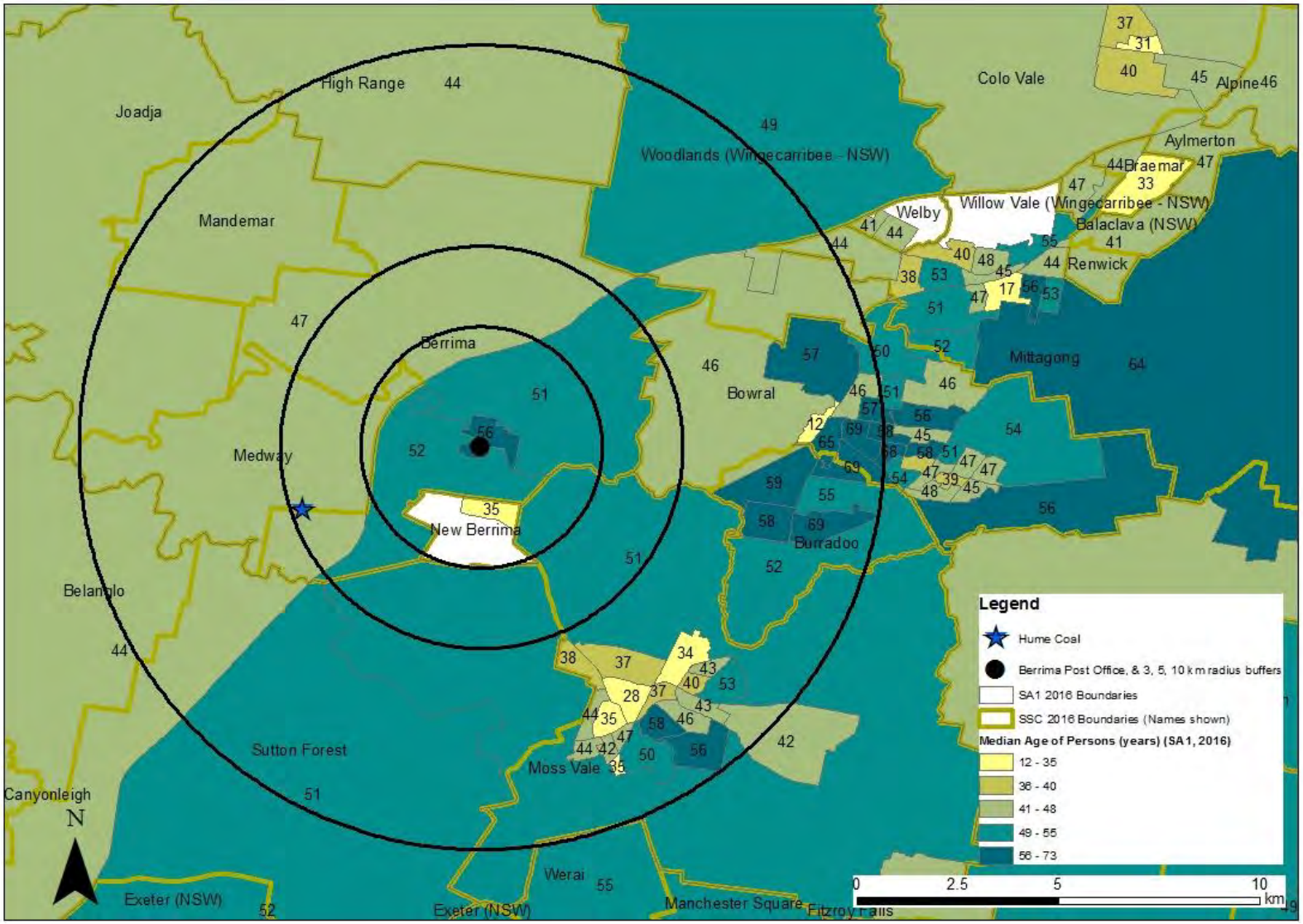


Figure 2-8: Median age of persons in 2016 at SA1 scale (White areas indicate SA1s without data).

Source: JSA 2017, based on GoogleMap coordinates and 2016 ABS SA1 General Community Profile data (datacube G 02).

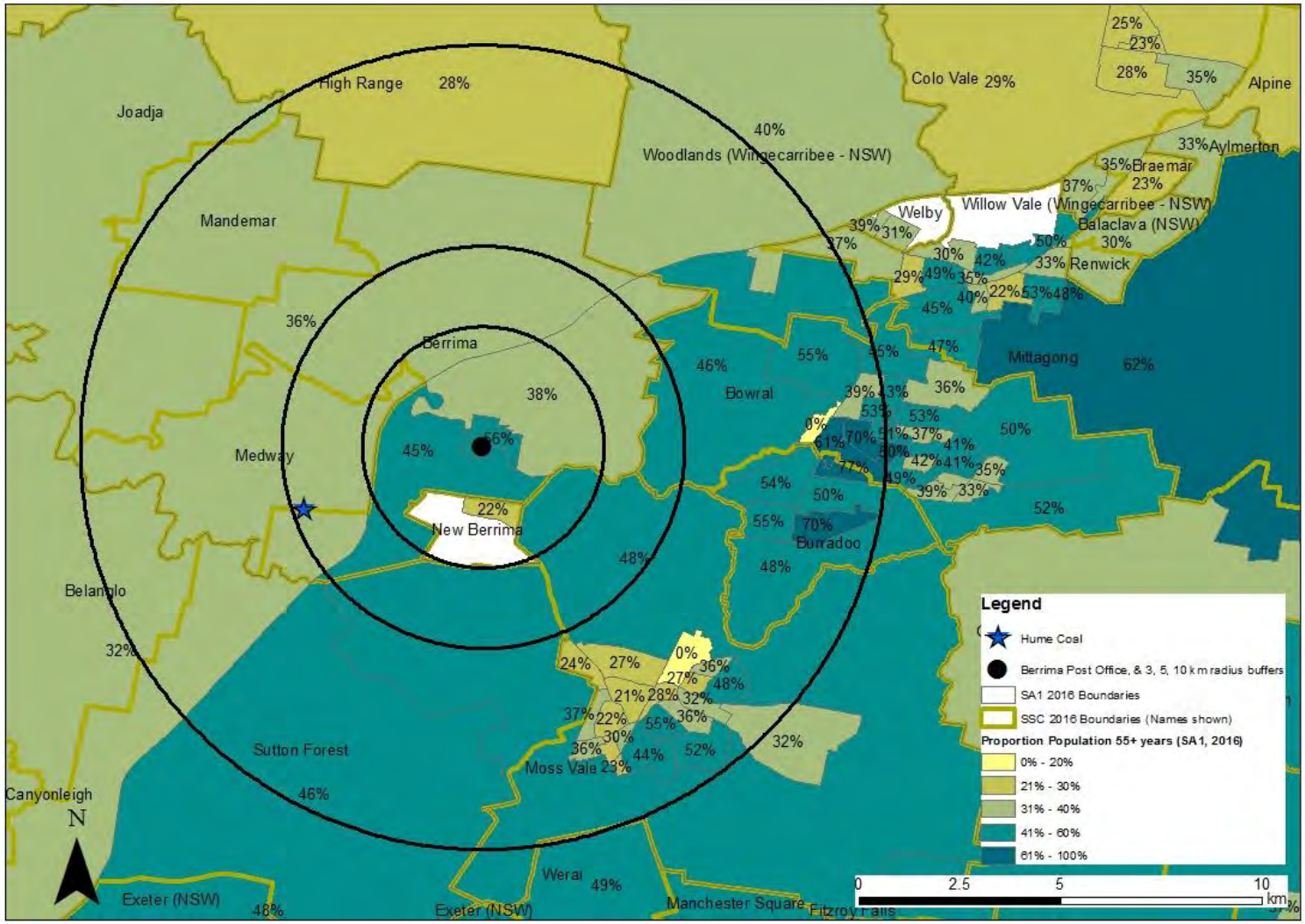
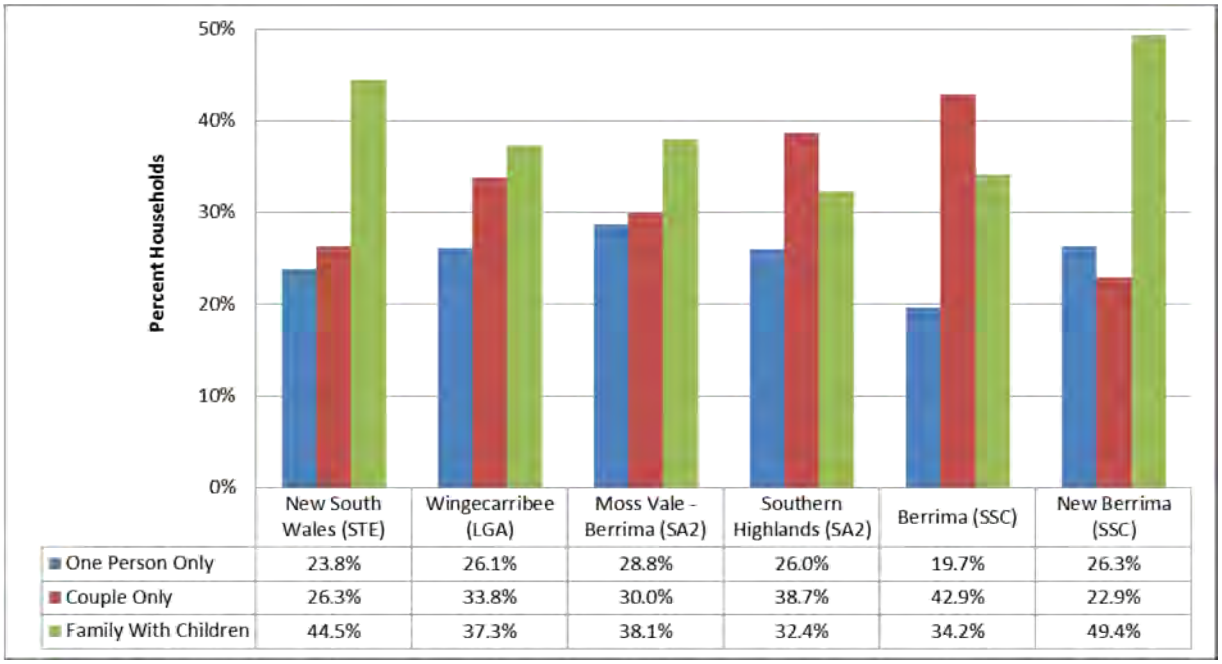


Figure 2-9: Proportions of persons aged 55years or over in 2016 at SA1 scale (White areas indicate SA1s without data).

Source: JSA 2017, based on GoogleMap coordinates and 2016 ABS SA1 General Community Profile data (datacube G 02).

2.3.6 Household Occupants Profile

Consistent with the age profile outlined above, household typology in **New Berrima** is quite different to that of the LGA and relevant SA2s, with a higher than average proportion of families with children in New Berrima. In contrast, **Berrima** had a very high proportion of older couple only households, and all other selected areas have a much lower than average proportion of families, as shown in the following figure.



	New South Wales (STE)	Wingecarribee (LGA)	Moss Vale - Berrima (SA2)	Southern Highlands (SA2)	Berrima (SSC)	New Berrima (SSC)
One Person Only	23.8%	26.1%	28.8%	26.0%	19.7%	26.3%
Couple Only	26.3%	33.8%	30.0%	38.7%	42.9%	22.9%
Family With Children	44.5%	37.3%	38.1%	32.4%	34.2%	49.4%

Figure 2-10: Proportions of household types in occupied private dwellings in 2016 in NSW, Wingecarribee LGA, Moss Vale – Berrima SA2, Southern Highlands SA2, Berrima SSC and New Berrima SSC.

Source: JSA 2017, based on 2016 ABS General Community Profile data (G 25, G 31).

2.3.7 Educational and Unemployment Profile

The following figures again show the contrast between Berrima and **New Berrima**, with the latter having a much higher than average proportion of residents who did not complete school than NSW, and a very low proportion of people with a degree or higher qualification.

Moss Vale-Berrima SA2 was also quite different to the LGA as a whole, and also had quite a low level of school completion and of people with higher qualifications, as shown below.

As would be expected from the educational, age and socio-economic profile outlined above, there is again a stark contrast between Berrima and New Berrima with regard to **unemployment,** with New Berrima having more than 4 times the rate of unemployment of Berrima (6.5% compared with 1.5% of the local workforce. The map that follows shows that there are particularly high rates of unemployment within some communities in Moss Vale township (as well as Mittagong).

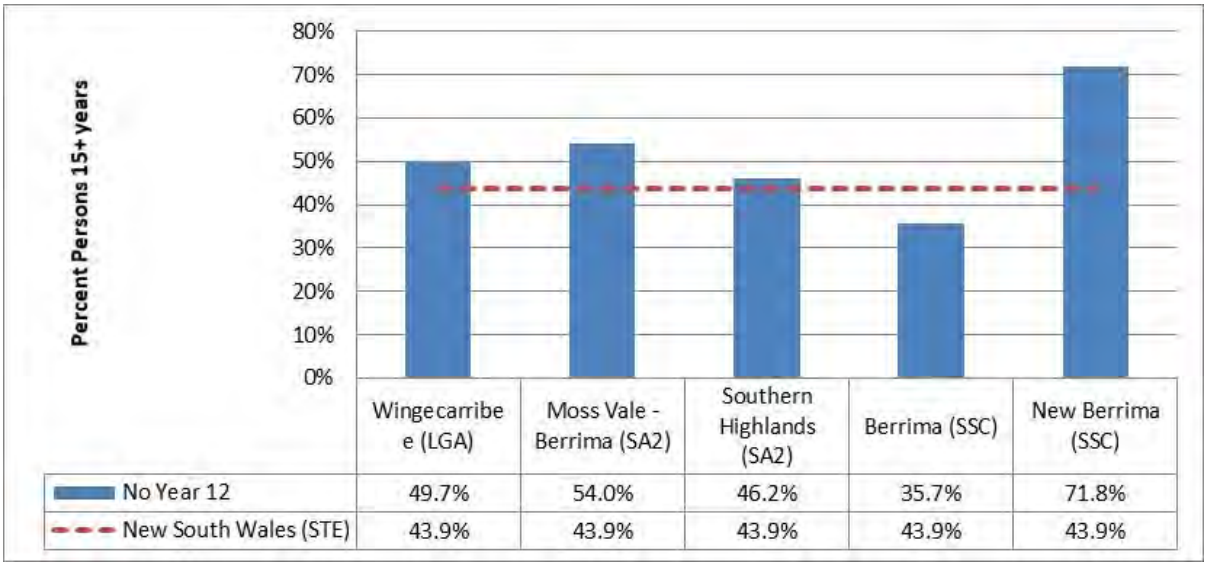


Figure 2-11: Proportions of usually-resident persons aged 15-or-more years, whose highest year of school completed was less than year 12, in NSW, Wingecarribee LGA, Moss Vale – Berrima SA2, Southern Highlands SA2, Berrima SSC and New Berrima SSC in 2011.
Source: JSA 2017, based on 2011 ABS Basic Community Profile data (B 01).

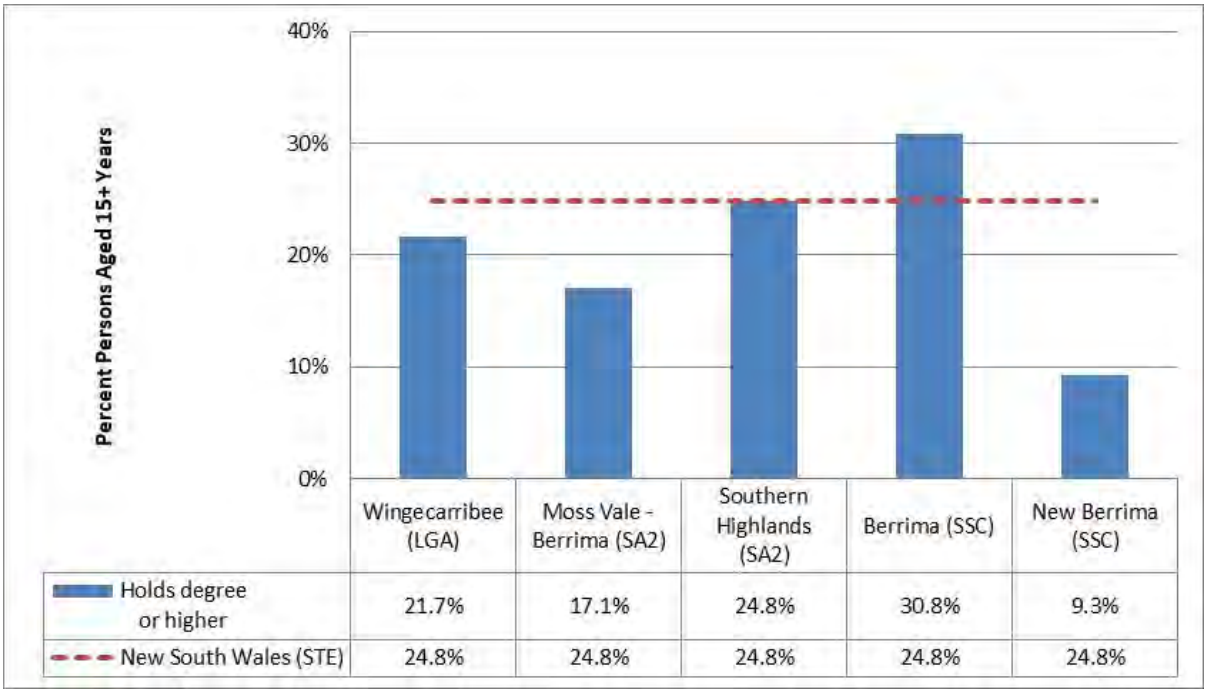
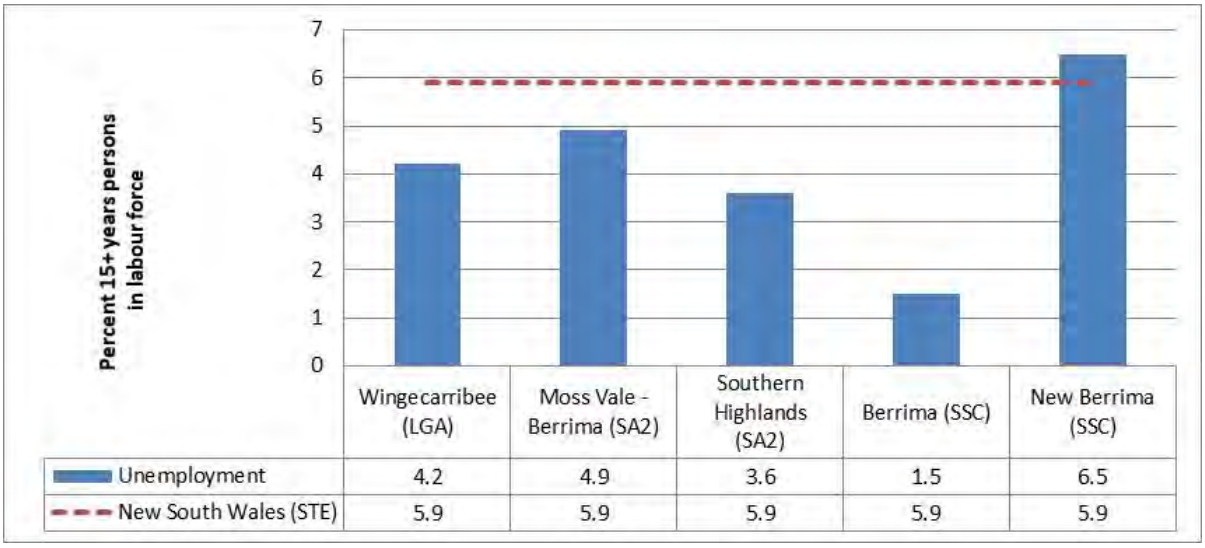


Figure 2-12: Proportions of usually-resident persons aged 15-or-more years, holding a degree or higher, in NSW, Wingecarribee LGA, Moss Vale – Berrima SA2, Southern Highlands SA2, Berrima SSC and New Berrima SSC in 2011.
Source: JSA 2017, based on 2011 ABS Basic Community Profile data (B 40).



	Wingecarribee (LGA)	Moss Vale - Berrima (SA2)	Southern Highlands (SA2)	Berrima (SSC)	New Berrima (SSC)
Unemployment	4.2	4.9	3.6	1.5	6.5
New South Wales (STE)	5.9	5.9	5.9	5.9	5.9

Figure 2-13: Unemployment rates (2011) among usually-resident persons aged 15-or-more years in the labour force, in NSW, Wingecarribee LGA, Moss Vale – Berrima SA2, Southern Highlands SA2, Berrima SSC and New Berrima SSC.

Source: JSA 2017, based on 2011 ABS Basic Community Profile data (B 37).

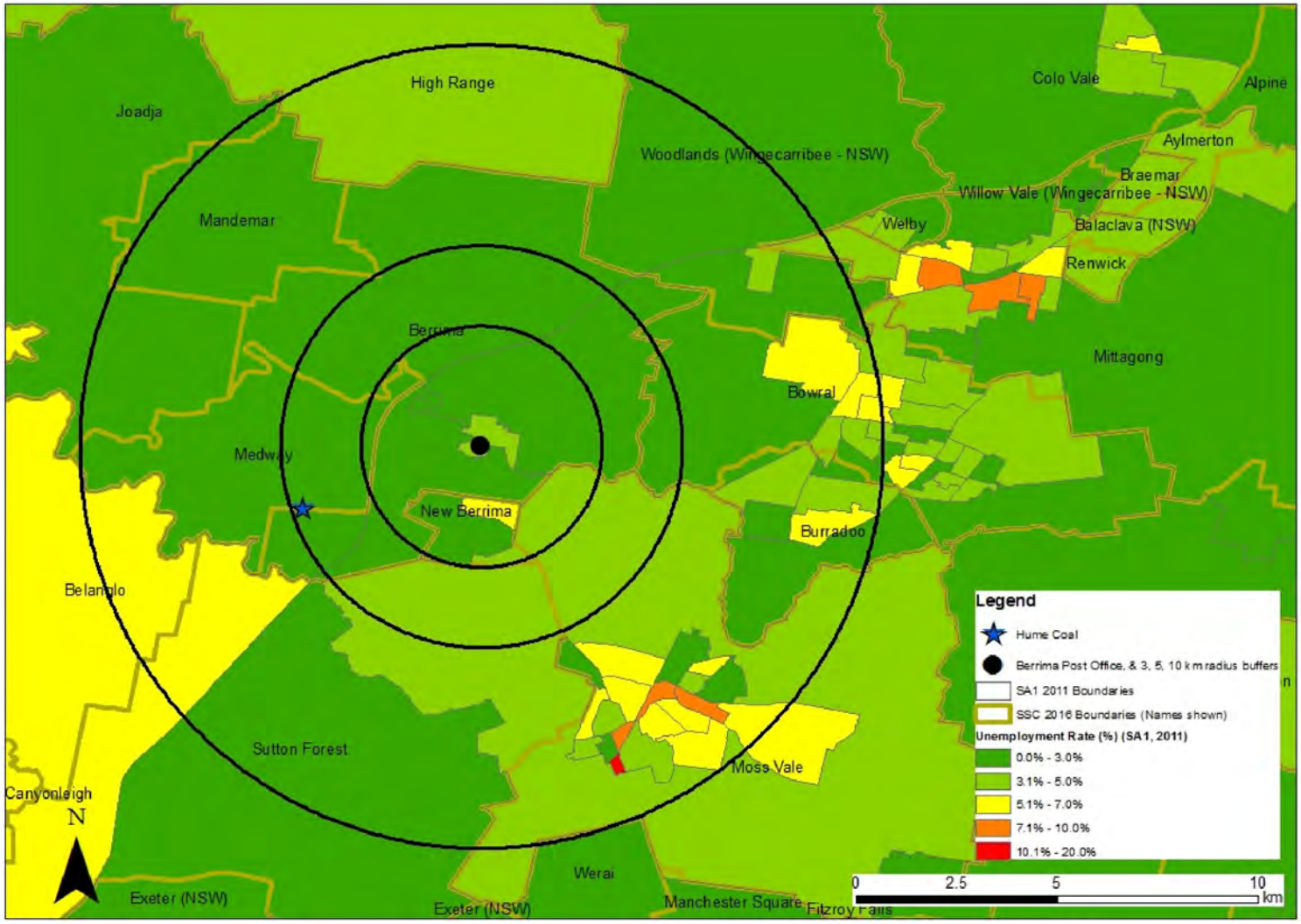


Figure 2-14: Unemployment rates (2011) among usually-resident persons aged 15-or-more years in the labour force, at SA1 scale.
Source: JSA 2017, based on 2011 ABS Basic Community Profile data (datacube B 37).

2.4 Importance of the Tourist Industry in the Locality

2.4.1 Overview

The first question relates to the **relative importance** of tourism-related industries in the locality, and the implications for the locality *should* there be significant negative impacts upon tourism and related employment. This also provides a context to later discussions about the relative compatibility of tourism and existing and likely future industrial uses in the locality.

We have estimated tourism employment in Berrima-Moss Vale SA2 at 196 direct jobs or 131 full time equivalent jobs. By comparison, the mine is expected to provide 300 full time equivalent jobs. The mining jobs are likely to be of higher value, with median individual weekly income in coalmining more than $2,000 per week compared to $400-$599 in tourism industries. While the mining jobs are of shorter duration, with an expected life of 19 years, this is offset by the greater value, with the Net Present Value of a mining job over 19 years $1.1 million compared to a Net Present Value of a tourism job over 60 years of $0.4 million.[3]

Taking a **worst-case assumption** (that the two industries, coal mining and tourism, are *totally* incompatible, that the impacts of coal mining will be experienced across the Moss Vale-Berrima SA2 and at considerable distance from the proposed mine headworks and that the tourism jobs will not be recovered in the future following the end of mining and rehabilitation of the site), 196 direct tourism jobs (131 full time equivalent jobs) would be lost in the tourism industry. In this *worst case*, this would be offset by a gain of 300 direct full time equivalent jobs in the SA2 due to the operation of the mine. Using Net Present Value, those jobs would be worth $330 million compared to a value of $78 million for the tourism jobs.

It is noted in this regard that the Moss Vale-Berrima SA2 contains around one-fifth of the tourism related jobs in the Wingecarribee LGA. The Moss Vale-Berrima SA2 itself is a large area that extends well beyond the Berrima/New Berrima locality. It has a population of around 10,000 people, around 10% of whom live in Berrima-New Berrima and surrounds. Similarly, a very high proportion of tourism-related jobs are located outside of the Berrima/New Berrima locality, and geographically remote from the proposed mine. As such, the loss of *all* jobs from tourism related activities in the SA2 (or the closure of all cafes, restaurants, hotels, clubs, accommodation, etc in Moss Vale, Sutton Forest, etc as well as Berrima and surrounds) appears extremely unlikely.

At the lower end of the scale, a 5% reduction in tourism would mean the loss of 10 direct jobs (7 full time equivalent jobs), with a Net Present Value of $4 million, and a 10% reduction in tourism would mean the loss of 20 direct jobs (13 full time equivalent jobs) with a Net Present Value of $8 million. Again, this is contrasted with the $330 million for the locality from the mining jobs in terms of NPV. It is noted that a 10% reduction in tourism jobs would essentially mean *all* of the tourism jobs would be lost in the Berrima locality.

As discussed later, significant adverse impacts on tourism due to conflicts in land use also appear to be highly unlikely considering the existing amenity of Moss Vale-Berrima, the current co-

[3] The 60 years for tourism jobs recognises that these jobs are likely to continue well into the future.

existence of General and Heavy Industrial uses and tourism uses in the New Berrima-Berrima locality, as well as statistical testing of this relationship at the NSW State level.

The **relative importance** of tourism and distribution of tourism related employment, and implications for tourism under different impact scenarios are first discussed below. This is followed by an assessment of the **likelihood** of significant adverse impacts occurring in the sections that follow.

2.4.2 Tourism Estimates by Others

The Southern Highlands Tourist Snapshot[4] states that the Southern Highlands[5] catered for 1.7 million visitors in the year to June 2016, with a total expenditure of $261 million and with that expenditure supporting 2,500 jobs. Domestic visitors (from Australia) account for 98% of total visitors.

Estimates of visitor numbers and expenditure estimates are drawn from *Tourism Research Australia's National Visitor Survey and International Visitor Survey* for the year ending June 2016. Employment is estimated using expenditure estimates implicit in the Capital Country Tourism Satellite Account 2013/14.

There can be significant measurement error in estimates of visitation and expenditure. We have calculated the 95% confidence interval for estimates of visitors and of expenditure as follows: [6]

- Domestic Overnight Visitors: 435,000-590,000
- Domestic Day Visitors: 1.02 million – 1.24 million
- Domestic Overnight Expenditure: $108 million - $224 million
- Domestic Day Expenditure: $132 million - $244 million.

The estimate of employment is derived from estimates for Capital Country, which is a larger tourism region including Wingecarribee LGA.[7] Deloitte Access Economics (DAE) estimates 3,700 people were directly employed by tourism in Capital Country, with another 1,900 indirect jobs supported, a total of 5,600 jobs. The source of these estimates is *Deloitte Access Economics' Regional TSA Model*.

We have not been able to source any further information on this model, and are unable to test underlying assumptions or validate conclusions as no such detail is provided by DAE. The estimate of 2,500 jobs for Southern Highlands appears to be a simple pro-rata estimate based on estimates of tourism expenditure, with rounding up to the nearest 100 jobs.[8]

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[4] Destination Southern Highlands *Southern Highlands Tourism Snapshot Tourism in the year ending 2016*.
[5] Data are stated to relate to Wingecarribee Local Government Area.
[6] https://www.tra.gov.au/Research/Domestic-tourism-by-Australians/national-visitor-survey-methodology Table 2 accessed 31 July 2017 and JSA calculation.
[7] Deloitte Access Economics *Capital Country Tourism Satellite Account 2013-14*.
[8] 5,600 jobs in Capital Country (including indirect jobs), expenditure in capital country year ended December 2016 was $606 million (http://www.destinationnsw.com.au/wp-content/uploads/2017/04/Capital-Country-time-series-YE-Dec-16.pdf accessed 21 July 2017), Southern Highlands expenditure year ending June 2016 $261 million (Destination Southern Highlands *Southern*

A considerable part (46%) of the tourist economy of the Southern Highlands arises from people visiting friends and relatives, and it is doubtful that this part of the tourist economy would be disrupted if there was a change in the character of the area to make it less desirable to visitors.[9]

Due to the importance of this issue, we have undertaken our own analysis below.

2.4.3 JSA Estimates of Tourism Activity

Methodology

Four digit data on 'industry of employment by place of work' is available from the ABS 2011 Census.[10] That data contains more than 700 industry classifications and allows for a fine-grained analysis of the nature of employment in geographical areas down to SA2 level.

While some industries are clearly associated with tourism (such as accommodation and restaurants and the like), there will be underlying demand from the resident population and from tourists who are visiting friends and relatives for personal reasons rather than visiting an area due to tourist attractions such as site seeing, specialty shopping or outdoor recreation and the like.

Deloitte Access Economics' Regional TSA model identifies the following industries as providing direct tourism employment:[11]

- Cafes, restaurants and takeaway food services
- Retail trade
- Accommodation
- Clubs, pubs, taverns and bars
- All other industries
- Travel agency and tour operator services
- Education and training
- Road transport and transport equipment rental
- Other sports and recreation services
- Air, water and other transport
- Cultural services
- Rail transport
- Casinos and other gambling services

Highlands Tourism Snapshot Tourism in the year ending 2016.); 5,600 * 261/606 = 2,411. Of these, 3,700/5,600 * 2,411 = 1,593.

[9] Destination Southern Highlands *Southern Highlands Tourism Snapshot Tourism in the year ending 2016*.

[10] Employment classification can be obtained at different levels. Classifications ae in the form X.XXX. One digit classification contains 19 classifications, with these further broken down to a total of 105 classifications at two digit level, some hundreds at three digit level and over 700 at four digit level.

[11] Deloitte Access Economics *Capital Country Tourism Satellite Account 2013-14*, Table 1.5.

No further detail is provided with respect to sub categories, nor to apportionment between local underlying demand and day and overnight visitation for tourist-specific purposes. The table below shows the four digit employment categories that we have assumed are associated with these categories.

Table 2.2: Industries Providing Direct Tourism Employment

Deloitte Access Category	**ABS four digit subcategories**
Cafes, restaurants and takeaway food services	Accommodation and Food Services (All four digit categories)
Retail trade	Retail Trade (All four digit categories)
Accommodation	Accommodation and Food Services (All four digit categories)
Clubs, pubs, taverns and bars	Accommodation and Food Services (All four digit categories)
All other industries	Property Operators and Real Estate Services, nfd Property Operators, nfd Residential Property Operators Real Estate Services
Travel agency and tour operator services	Travel Agency and Tour Arrangement Services
Education and training	Sports and Physical Recreation Instruction
Road transport and transport equipment rental	Motor Vehicle and Transport Equipment Rental and Hiring, nfd Passenger Car Rental and Hiring Other Motor Vehicle and Transport Equipment Rental and Hiring
Other sports and recreation services	Sports and Recreation Activities, nfd Sports and Physical Recreation Activities, nfd Health and Fitness Centres and Gymnasia Operation Sports and Physical Recreation Clubs and Sports Professionals Sports and Physical Recreation Venues, Grounds and Facilities Operation Sports and Physical Recreation Administrative Service Horse and Dog Racing Activities, nfd Horse and Dog Racing Administration and Track Operation Other Horse and Dog Racing Activities Amusement and Other Recreation Activities, nfd Amusement Parks and Centres Operation Amusement and Other Recreational Activities nec

Deloitte Access Category	ABS four digit subcategories
Air, water and other transport	Road Passenger Transport, nfd Interurban and Rural Bus Transport Urban Bus Transport (Including Tramway) Taxi and Other Road Transport Water Passenger Transport Air and Space Transport Scenic and Sightseeing Transport
Cultural services	Museum Operation Parks and Gardens Operations, nfd Zoological and Botanical Gardens Operation Nature Reserves and Conservation Parks Operation Performing Arts Operation Performing Arts Venue Operation
Rail transport	Rail Passenger Transport
Casinos and other gambling services	Casino Operation

Source: ABS Census 2011, JSA analysis

We have considered employment on a population weighted basis, that is, employment in relevant industries per 100,000 resident population. In order to understand underlying (non-tourist) demand in the various industries, we have used employment data for NSW.

In the categories shown in Table 1.2 above, in 2011 there were 9,606 people per 100,000 population employed in NSW by Place of Work. In 2015-16, there were 164,000 direct tourism related jobs in NSW,[12] equivalent to 2,534 jobs per 100,000 population. This give a net underlying (non-tourist) demand of 7,072 jobs per 100,000 population.[13]

Applying this methodology to Wingecarribee LGA, and adjusting for Place of Work and Census undercounting, 1,510 direct tourism jobs are estimated for Wingecarribee LGA. By comparison, the estimate using Tourism NSW data is 1,593. The difference in the two estimates may be for a number of reasons, including omission of some categories by ourselves or the sampling error in tourist visitation and expenditure in Tourism NSW estimates. Considering the latter, our estimate is well within the lower bound estimate using Tourism NSW data of 1,465 direct tourism jobs.[14]

Applying this methodology to Moss Vale-Berrima SA2 (a large geographic area that extends well beyond the primary locality of the mine but the smallest area at which Place of Work[15] data is available), 196 direct tourism jobs are estimated for the SA2. The mine will provide

[12] http://www.destinationnsw.com.au/our-industry/economic-value accessed 11 August 2017.
[13] 9,606 – 2,534 = 7,072.
[14] (108 + 132)/606 *5,600 *3,700/5,600 = 1,465 (bottom of 95% confidence interval).
[15] Place of Work data enables a calculation of jobs in the actual area as distinct from the resident work force who may, for example, commute outside the area for work.

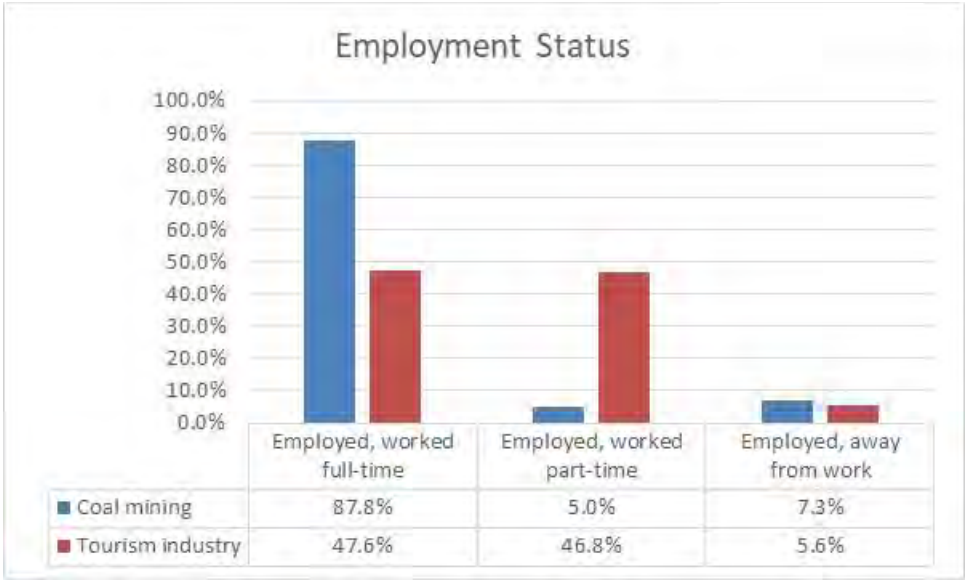
approximately 300 full time equivalent jobs. Each of these industries would be expected to support further indirect jobs, although these are difficult to calculate.[16]

Taking the **worst case assumption** that the two industries, coal mining and tourism, are incompatible and that the impacts will be experienced across the whole of the Moss Vale-Berrima SA2 (with many areas of more concentrated employment at considerable distance from the proposed mine), 196 direct tourism jobs would be lost in the tourism industry during the period in which visual and other impacts would be present from the mine operations. This would be offset by a gain of 300 direct full time equivalent jobs in the SA2 due to the operation of the mine.

The coal mining jobs are likely to be of much greater value, as shown in the figures below.

Personal income in coal mining is at least three times greater than in tourism industries, with a median individual income in coal mining of greater than $2,000 per week compared to a median income in tourism industries of $400-$599 per week.

Jobs in tourism industries are much more likely to be part time or casual, with most jobs in coal mining full time, compared to just half of jobs in tourism industries being full time.



	Employed, worked full-time	Employed, worked part-time	Employed, away from work
Coal mining	87.8%	5.0%	7.3%
Tourism industry	47.6%	46.8%	5.6%

Figure 2.15: Employment Status by Industry
Source: ABS Census 2011 and JSA calculation

[16] The estimation of indirect jobs has some major concerns. To the degree such estimates are based on multipliers, often jobs can be double counted, with the same indirect jobs claimed by different industries. Where indirect jobs relate to personal or industry consumption, the degree to which the indirect jobs will be found in the locality will depend on the degree to which workers or businesses spend in the locality. For example, operation of a restaurant will support jobs in the food supply industry, but the restaurant may source the bulk of their supplies from outside the locality. Similarly, a worker may spend a large part of their income on interest on a housing loan, and this may support jobs in a bank head office outside the locality.

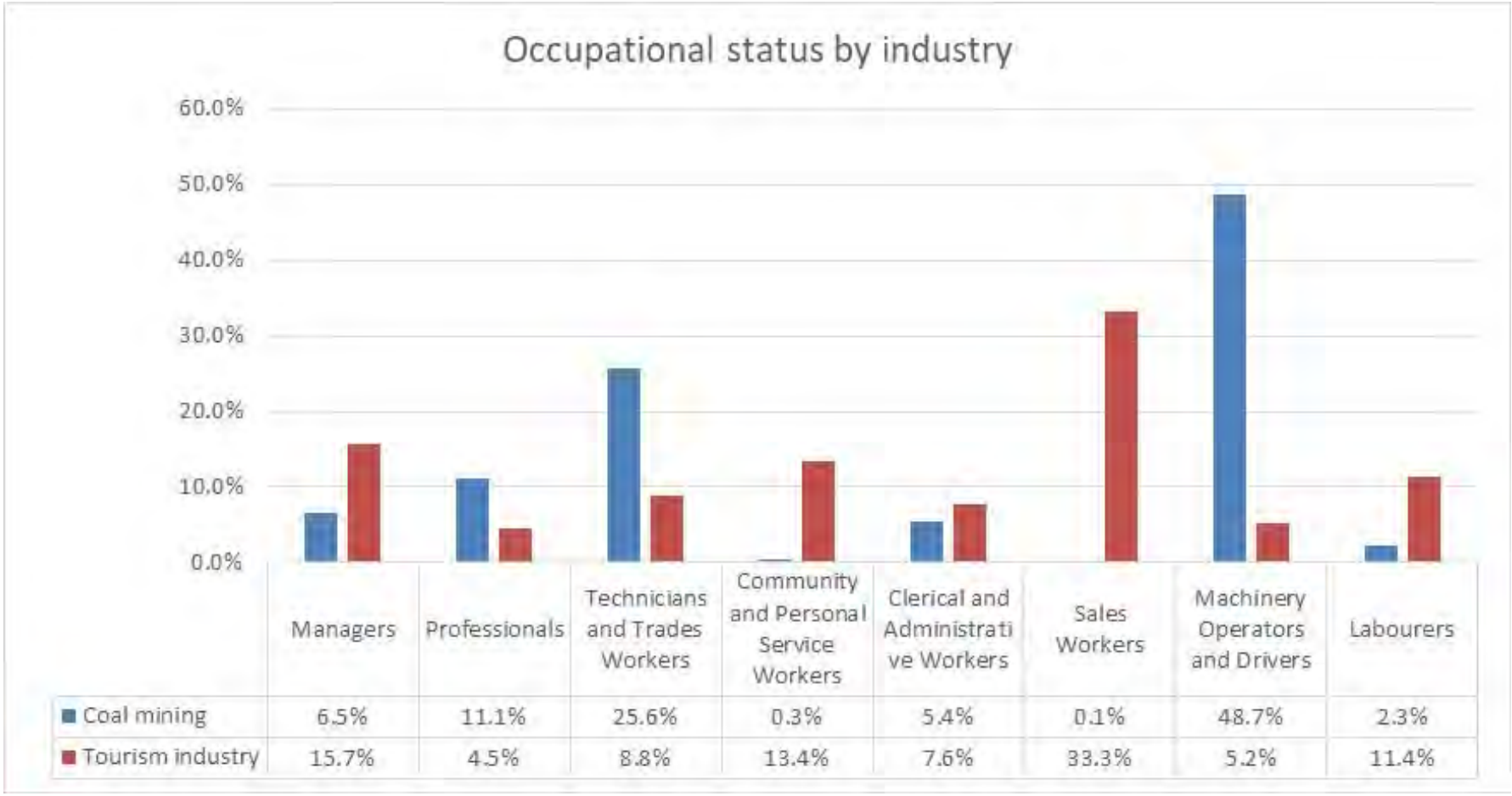
	Negative income	Nil income	$1-$199 ($1-$10,399)	$200-$299 ($10,400-$15,599)	$300-$399 ($15,600-$20,799)	$400-$599 ($20,800-$31,199)	$600-$799 ($31,200-$41,599)	$800-$999 ($41,600-$51,999)	$1,000-$1,249 ($52,000-$64,999)	$1,250-$1,499 ($65,000-$77,999)	$1,500-$1,999 ($78,000-$103,999)	$2,000 or more ($104,000 or more)
Coal mining	0.1%	0.5%	0.2%	0.2%	0.3%	1.0%	1.8%	2.7%	5.5%	8.1%	22.5%	57.1%
Tourism industry	0.3%	1.1%	14.6%	8.4%	9.7%	17.3%	17.5%	11.1%	7.9%	4.3%	4.0%	3.8%

Figure 2.16: Total Personal Weekly Income by Industry (Equivalent annual income shown in brackets).
Source: ABS Census 2011 and JSA calculation

While it can be argued that the tourism jobs will be long term compared to the expected 19 year time frame for the coal mining jobs, the net present value of a median coal mining job[17] over a 19 year period is estimated at $1.1 million compared to $0.4 million for a median tourism industry job over 60 years,[18] showing that the higher value of the jobs in coal mining more than offset the shorter time frame.

Job status between the two industries differs markedly, with much higher proportions of professionals, technicians and trades workers, and machinery operators and drivers in the coal industry; and much higher proportions of managers, community and personal service workers, sales workers, and labourers in the tourism industry. Importantly, the two industries target different skill sets and so would not be expected to compete with each other for labour.

[17] Using a discount rate of 7% in accordance with treasury guidelines.
[18] This assumption is conservative as it assumes tourism jobs are not compatible with coal mining and that the tourism jobs will not recover with the cessation of coal mining.



	Managers	Professionals	Technicians and Trades Workers	Community and Personal Service Workers	Clerical and Administrative Workers	Sales Workers	Machinery Operators and Drivers	Labourers
Coal mining	6.5%	11.1%	25.6%	0.3%	5.4%	0.1%	48.7%	2.3%
Tourism industry	15.7%	4.5%	8.8%	13.4%	7.6%	33.3%	5.2%	11.4%

Figure 2.17: Occupational Status by Industry
Source: ABS Census 2011 and JSA calculation

It would also be expected that the increase in income related to an increase in mining jobs would support both the food and accommodation service industries in the Moss Vale-Berrima SA2, with relatively high disposable income enabling increased consumption of dining out and take away meals, as well as increased visitation of family and friends of miner relocating to the areas and requiring accommodation, and the need for causal accommodation during the week for mining contractors and workers not resident in the Southern Highlands. The net effect would again be expected to be positive for local accommodation and food services, including in localities closest to the mine.

Predominant Industries – Southern Highlands SA3

The predominant industries in the Southern Highlands SA3 (which roughly equated to Wingecarribee LGA in 2011)[19] using ABS employment data are listed in the table below. The assessment has been carried out using 1, 2, 3 and four digit employment data.[20] Estimates of tourism employment are provided for comparison. Based on one digit employment data, significant employers in the Southern Highlands are Health Care and Social Assistance, Manufacturing, and Education and Training, with each of these industries equivalent in size or somewhat larger then tourism. The data suggest a mixed economy, rather than an economy dominated by tourism, although tourism is a significant employer in the Southern Highlands.

Table 2.3: Top ten industries in Southern Highlands SA3 including no. of people employed

	One digit	Two digit	Three digit	Four digit
Tourism	1,510	1,510	1,510	1,510
	Retail Trade (2,216)	Other Store-Based Retailing(1,264)	School Education (1001)	Secondary Education (489)
	Health Care and Social Assistance (2,082)	Food and Beverage Services (1,204)	Cafes, Restaurants and Takeaway Food Services (936)	Cafes and Restaurants (483)
	Manufacturing (1,805)	Preschool and School Education (1,119)	Residential Care Services (468)	Hospitals (except Psychiatric Hospitals) (443)
	Accommodation and Food Services (1,591)	Professional, Scientific and Technical Services (except Computer System Design and Related Services) (864)	Hospitals (441)	Aged Care Residential Services (441)

[19] The differences in geographical area typically relate to inclusion of additional rural areas, water board catchment and national parks.

[20] ABS uses the *The Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006* to classify industries. As the number of digits increases, the fineness of detail also increases, for example at the one digit level there are nineteen classifications, whereas at the four digit level these are further subdivided into 715 categories.

	One digit	Two digit	Three digit	Four digit
	Education and Training (1,417)	Machinery and Equipment Manufacturing (687)	Supermarket and Grocery Stores (423)	Takeaway Food Services (424)
	Construction (983)	Food Retailing (654)	Accommodation (390)	Supermarket and Grocery Stores (423)
	Professional, Scientific and Technical Services (971)	Medical and Other Health Care Services (640)	Specialised Machinery and Equipment Manufacturing (373)	Primary Education (391)
	Other Services (636)	Construction Services (605)	Pharmaceutical and Other Store-Based Retailing (355)	Accommodation (390)
	Agriculture, Forestry and Fishing (626)	Agriculture (587)	Allied Health Services (310)	Mining and Construction Machinery Manufacturing (364)
	Public Administration and Safety (534)	Residential Care Services (468)	Sheep, Beef Cattle and Grain Farming (307)	Beef Cattle Farming (Specialised) (284)

Source: ABS census 2011 (POW) and JSA calculation

The figure below shows the proportion of employment at the one digit employment data level for Wingecarribee LGA compared to NSW. Compared to NSW, Wingecarribee has much higher levels of employment in agriculture, forestry and fishing (76% higher); accommodation and food services (49% higher); manufacturing (36% higher); retail trade (34% higher); rental, hiring and real estate services (31% higher); health care and social assistance (11% higher); education and training (11% higher); and other services (7% higher).

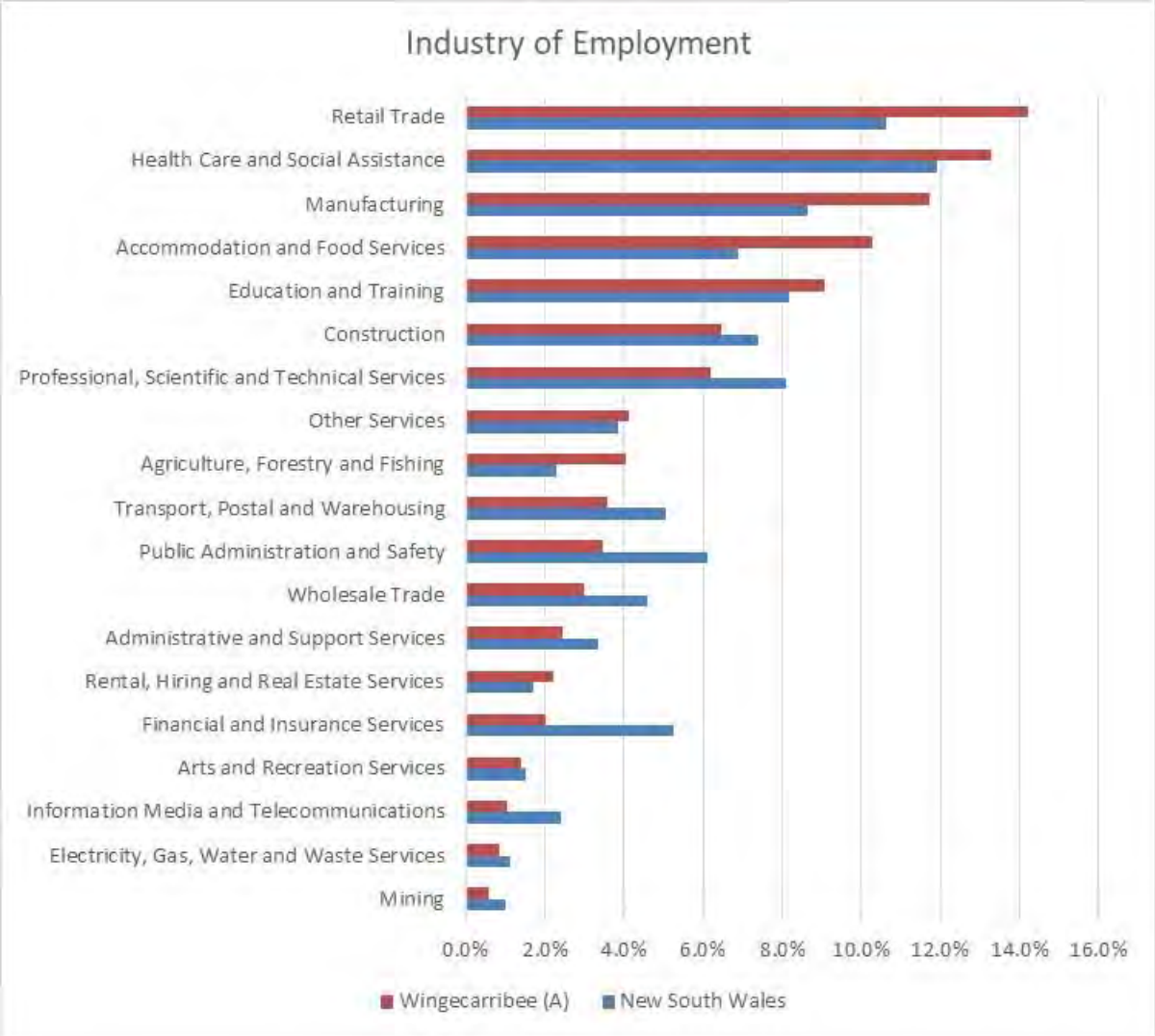


Figure 2.18: Industry of employment by proportion of workforce (POW), Wingecarribee LGA and NSW

Source: ABS Census 2011 and JSA calculation

As noted earlier, the elimination of *all jobs* related to tourism in Moss Vale-Berrima SA2 is a scenario that is difficult to envisage even under the absolute worst case. The SA2 is a large, diverse area, with most employment remote from the proposed mine and having no geographic relationship to it.

At a smaller scale, if all tourism employment were lost from the Berrima locality itself due to the mine, a 10% loss of tourism jobs in the Moss Vale-Berrima SA2 would be expected, and a 5% loss would represent a loss of around half the tourist-related jobs in the immediate locality. It is likely that the amenity impacts would need to be very severe indeed to have such impacts, and would also likely need to occur in an environment in which there were currently no such industrial uses or land use conflicts.

The following sections therefore explore the next part of this question – how likely is it that significant impacts will occur in relation to existing tourism uses and employment in the locality?

2.5 Current Co-Existence of Industrial and Tourism Uses and Activities in the Locality

2.5.1 Overview

The second question relates to the existing character and amenity of the Moss Vale-Berrima locality, including existing features of the 'industrial landscape' and land uses, their proximity and visibility from sensitive tourism 'receivers', and the level of current 'co-existence' between industrial and tourist uses.

The Moss Vale-Berrima locality has long been associated with tourism-related activities such as accommodation, restaurants, specialty retail, sightseeing and outdoor recreational activities, and the locality currently enjoys above average employment in tourism-related industries. Balanced against this is the higher than average employment in Manufacturing and related industries, the locality's existing density of and long association with industrial uses, and the historical identification of this part of the Southern Highlands with heavier industrial uses including the Cement Works, Berrima (Medway) Colliery that closed in 2013 and major transport infrastructure.

Moreover, tourism and Heavy and General Industrial uses and activities have co-existed with tourism uses and activities historically, and are clearly not incompatible now from the employment data and research undertaken in the preparation of this report. It is unlikely that the mine as proposed will be incompatible with tourist uses and activities in the future, or will have a significant impact upon these uses in the wider or immediate locality. The evidence for this conclusion is set out in the following sections.

2.5.2 Existing Industrial Land Uses and Activities

Wingecarribee Shire has a relatively diverse economy, with well above average employment in industries such as Accommodation and Food Services that are strongly associated with tourism, as well as in industrial uses such as Manufacturing. Although the higher than average employment in Accommodation and Food Services and in Retail may be expected from an attractive area on the 'Sydney drive route', the above average performance in Manufacturing, which is a larger employer than the hospitality sector in the Shire, is not generally characteristic of regional economies. This is shown for selected regions below.

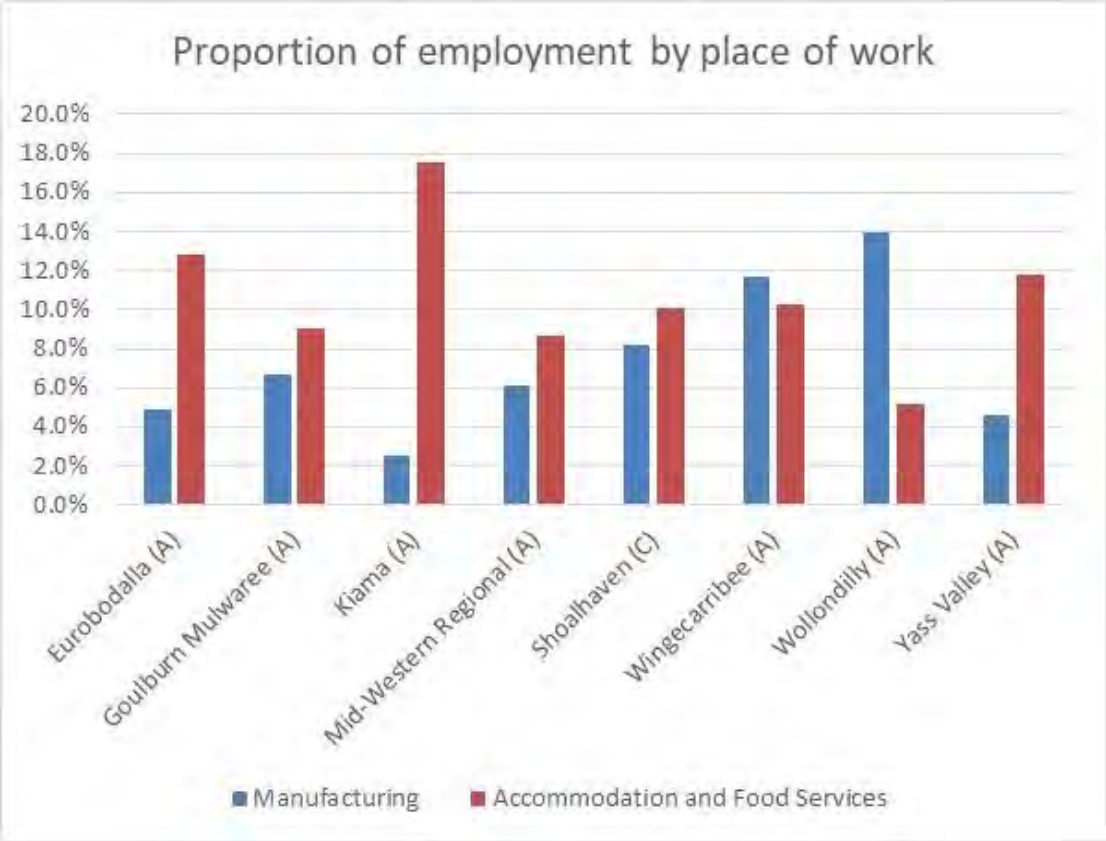


Figure 2.19: % of Local Jobs in Accommodation and Food Services and in Manufacturing for Wingecarribee LGA and Selected Regional LGAs
Source: ABS Census 2011 'Place of Work' data and JSA calculation

The concentration of employment in Manufacturing in Wingecarribee Shire, and the Shire's strong performance in attracting manufacturing-related industries, is likely due to a range of factors including the strategic location of Wingecarribee Shire on the Sydney-Canberra-Melbourne transport corridor, the relatively low cost of industrial land compared with Sydney, and the proactive policies of Council, historically and as expressed in its *Economic Development Strategic Plan 2008-2016*.[21]

However, General and Heavy Industrial lands and uses are not evenly distributed across the LGA. They are disproportionately clustered in the Moss Vale-Berrima locality largely due to zoning decisions of Council in relation to the Moss Vale Enterprise Zone, and the strategic decisions of relevant industries. Excellent access to the Hume Motorway, and the Main Southern Rail Line from Sydney to Melbourne, including freight and passenger services, also likely underpin the configuration of industrial uses and investment decisions. This is likely to expand in the future, including on vacant industrial zoned land in the immediate locality of New Berrima-Berrima.

[21] Wingecarribee Shire Council, *Economic Development Strategic Plan 2008-16*

The distribution of local jobs in a proxy Census category of 'tourism' (Accommodation and Food Services) and of existing 'industrial' uses (Manufacturing) are shown in the following graph. This shows that the locality has a highly industrial profile. Although the Moss Vale-Berrima SA2 has around 20% of the LGA's population and 15% of its Accommodation and Food Service jobs, it has around 52% of the LGA's Manufacturing jobs.

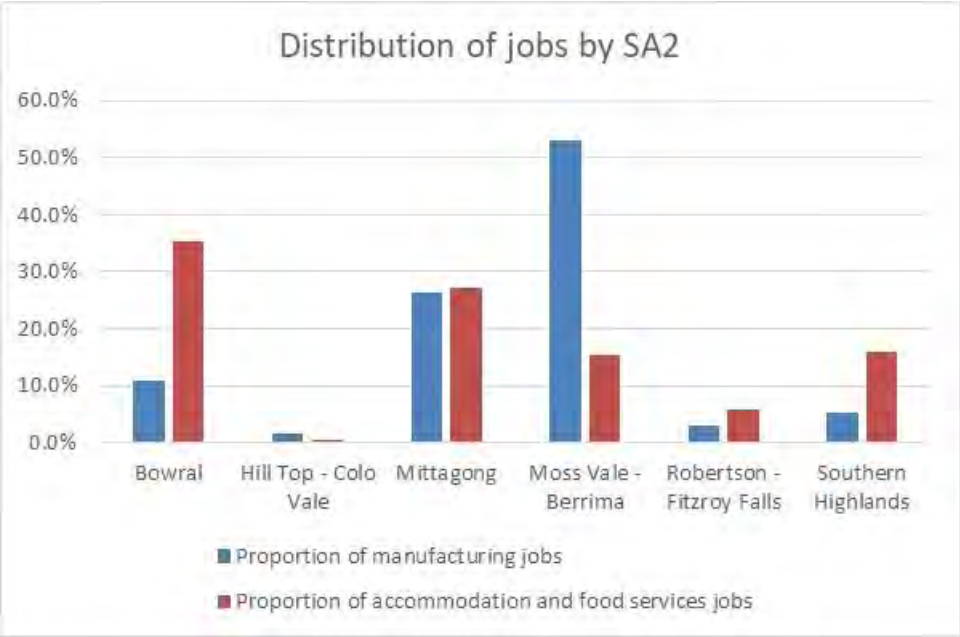


Figure 2.20: % of Local Jobs in Accommodation and Food Services and in Manufacturing for SA2s in the Wingecarribee LGA
Source: ABS Census 2011 'Place of Work' data and JSA calculation

Relevant features of the industrial landscape of the Moss Vale-Berrima locality are described below.

2.5.3 Moss Vale Enterprise Zone

The major area of industrial zoned land in the Wingecarribee Shire is located to the immediate Northwest of Moss Vale town centre. Described in strategic Council documents as the Moss Vale Enterprise Zone, the area comprises around 1,100 ha of industrial zoned land, most of it IN1 General Industry zoned land. Interestingly, industrial zoned land makes up around 10% of the total land area of the Moss Vale-Berrima SA2.[22]

The Moss Vale Enterprise Zone is noted in Council's *Economic Development Strategic Plan 2008-16* as the 'major location for future industrial development in the Shire'.[23] The *Plan* reports that the Enterprise Zone has been designated 'regionally significant employment lands by the NSW State Government', and is strategically positioned between Canberra, Sydney and the Illawarra as

[22] Scaled off relevant maps.
[23] Wingecarribee Shire Council, *Economic Development Strategic Plan 2008-16,* p. 15.

'Australia's biggest roundabout'.[24] Future related opportunities include the establishment of an Intermodal and Logistics Hub at Moss Vale akin to an 'Inland Port', and major expansion of related industrial uses including manufacturing, transport and warehousing on undeveloped areas of the Enterprise Zone.[25]

IN1 General Industrial zoned land is located around 100 metres from residential development in New Berrima, with the IN3 Heavy Industrial zoned land located around 400 metres to the south of this residential development. This portion of the Shire's industrial zoned land is also located around 1.2 kilometres from the southern edge of the B1 Neighbourhood Centre zone of the historic town of Berrima. This is shown in the zoning maps below.

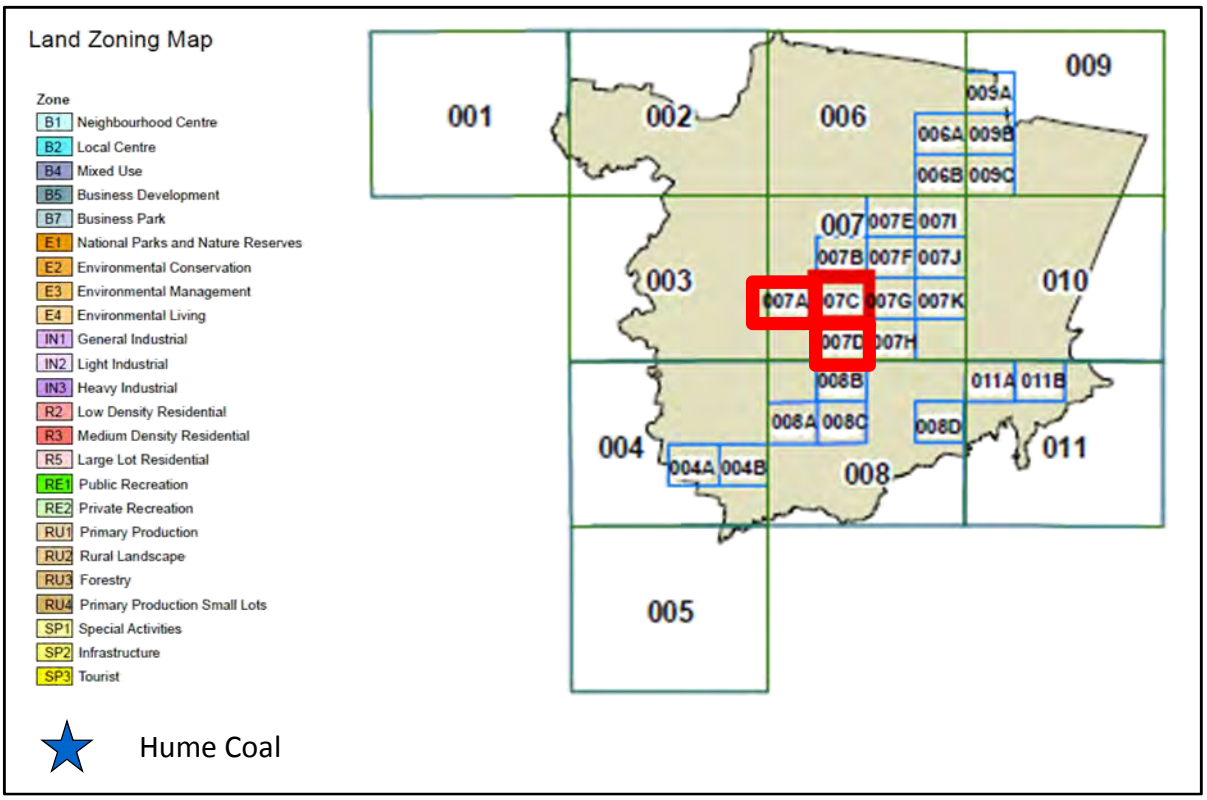


Figure 2-21: Wingecarribee LGA land zone maps 007A, 007C and 007D, showing position of these maps within Wingecarribee LGA area, and land zone use types above, and map 007A (showing location of Hume Coal headworks), map 007C and map 007D on the pages that follow.

Source: JSA 2017, using Wingecarribee Local Environment Plan 2010 land zone maps accessed at https://www.legislation.nsw.gov.au/#/view/EPI/2010/245/maps 18/08/2017, and GoogleMaps coordinates for Hume Coal headworks.

[24] Wingecarribee Shire Council, *Economic Development Strategic Plan 2008-16,* p. 15.
[25] Wingecarribee Shire Council, *Economic Development Strategic Plan 2008-16,* p. 16.

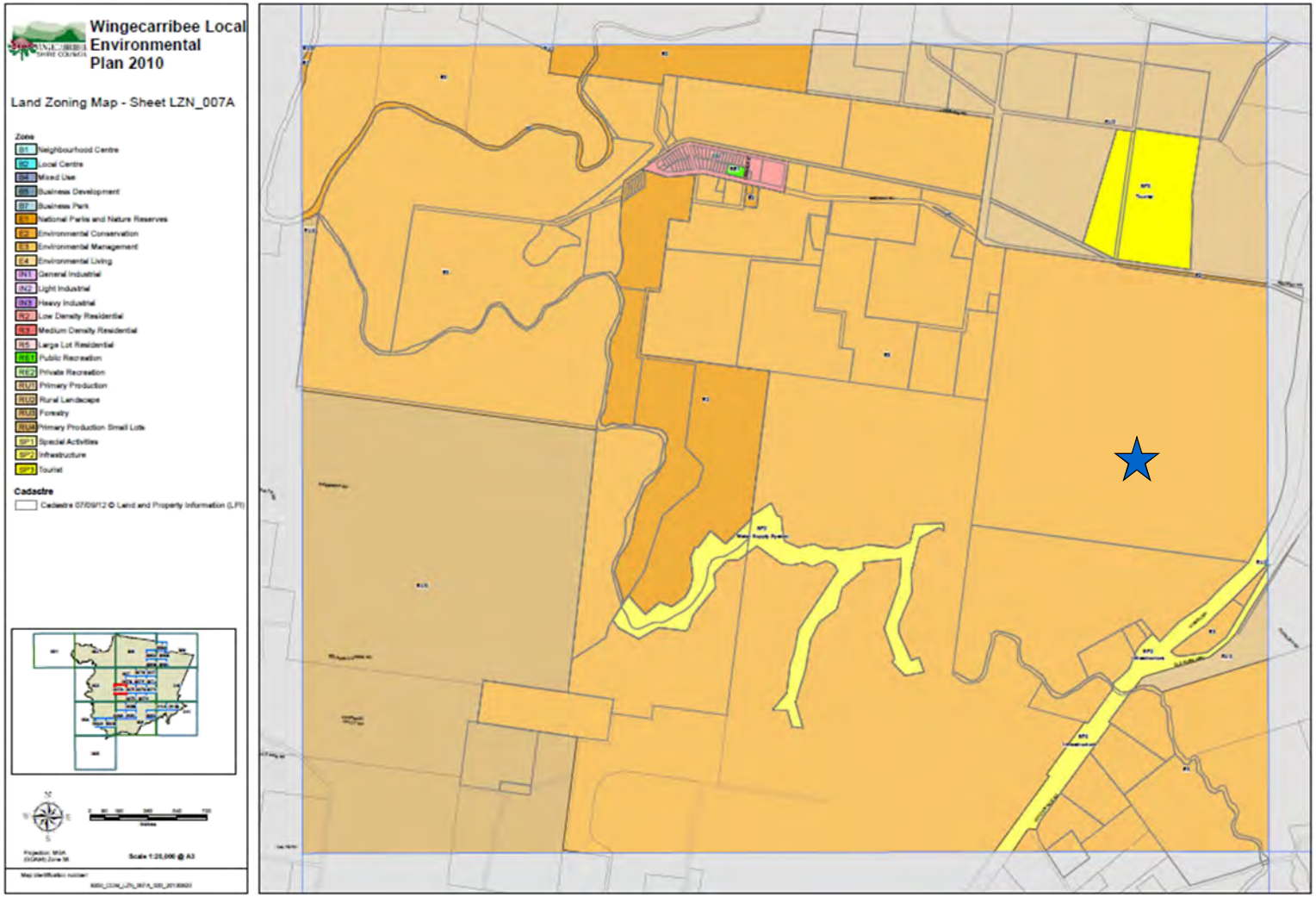


Figure 2-22: Wingecarribee LGA land zone maps 007A showing location of Hume Coal headworks and Medway Village to the Northwest. (See figure 2-21 above for legend).

Source: JSA 2017, using Wingecarribee Local Environment Plan 2010 land zone maps accessed at https://www.legislation.nsw.gov.au/#/view/EPI/2010/245/maps 18/08/2017, and GoogleMaps coordinates for Hume Coal headworks.

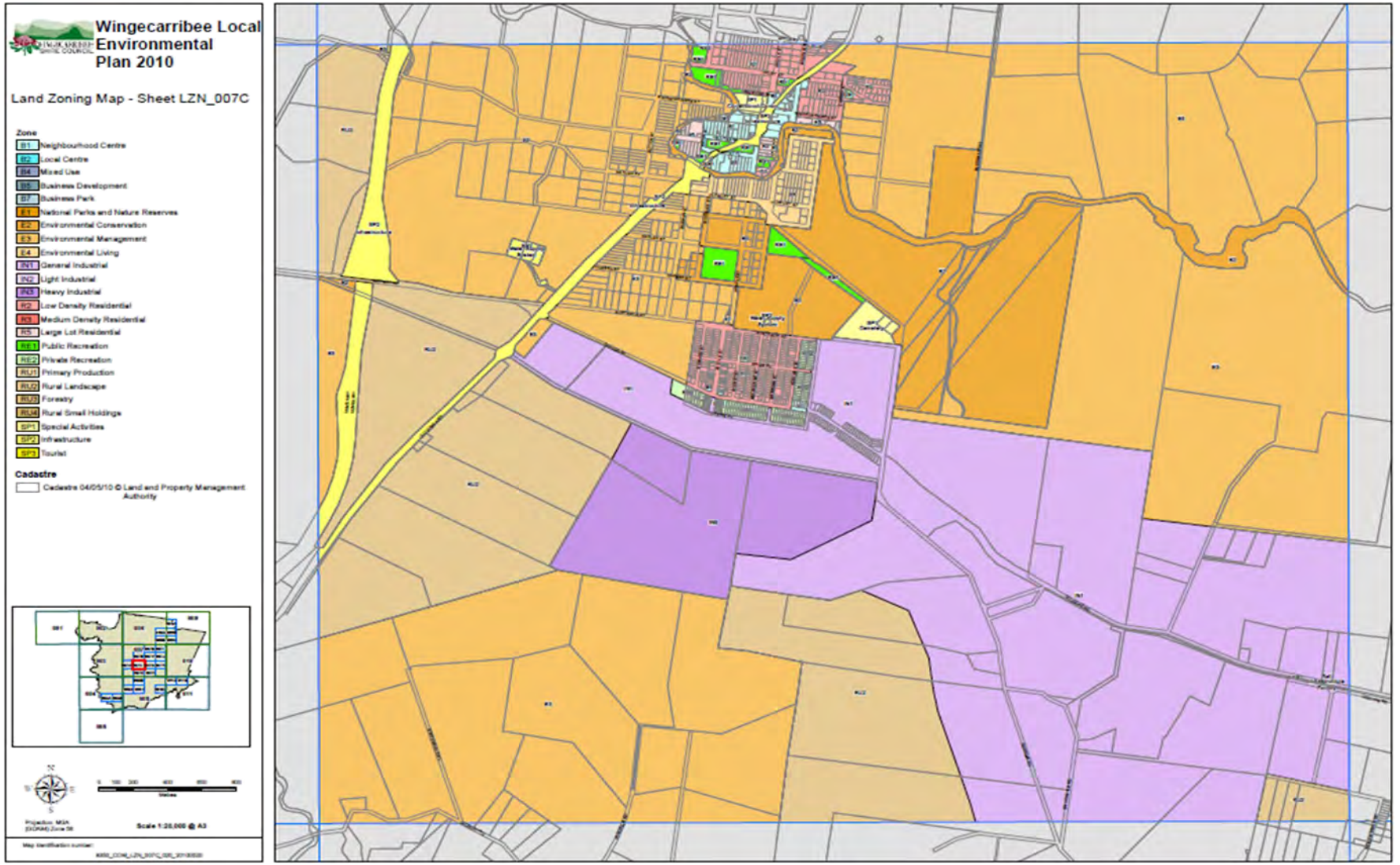


Figure 2-23: Wingecarribee LGA land zone maps 007C showing location of industrial zoned land in relation to Berrima and New Berrima (See figure 2-21 above for legend).

Source: JSA 2017, using Wingecarribee Local Environment Plan 2010 land zone maps accessed at https://www.legislation.nsw.gov.au/#/view/EPI/2010/245/maps 18/08/2017.

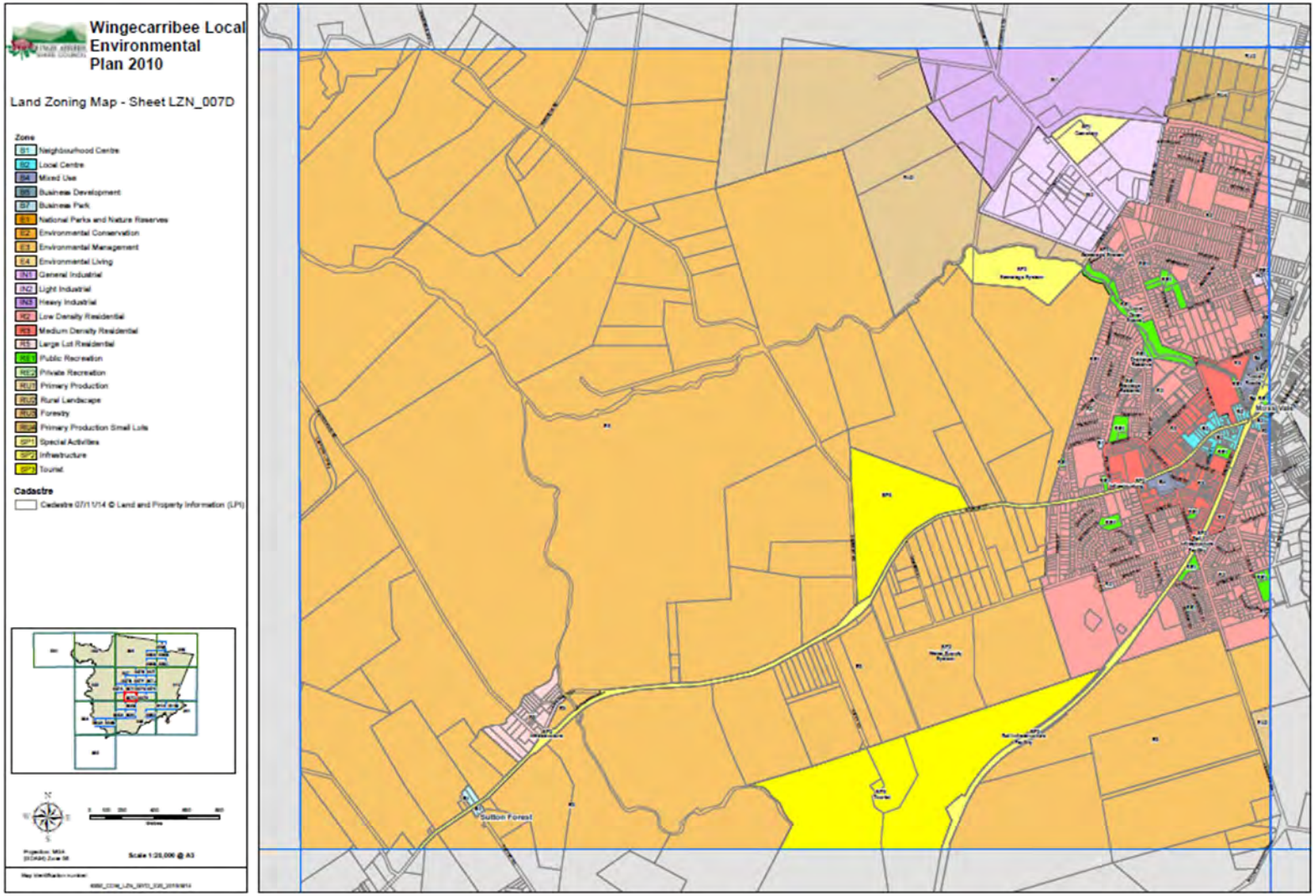


Figure 2-24: Wingecarribee LGA land zone maps 007D showing location of industrial zoned land in relation to Moss Vale . (See figure 2-21 above for legend).

Source: JSA 2017, using Wingecarribee Local Environment Plan 2010 land zone maps accessed at https://www.legislation.nsw.gov.au/#/view/EPI/2010/245/maps 18/08/2017.

A wide range of industrial uses are currently located within industrial zoned land more proximate to Moss Vale town centre. These include Joy Mining, Dunsteel, Omya and Moss Vale Recycled Building Centre.

Pictured: Ingham's Berrima Feed Mill from Berrima Rd

Other industrial uses are located along Douglas Ave and Berrima Rd moving West from Moss Vale toward Berrima including Dux Hot Water, Cromford Pipe Manufacturers, the Resource Recovery Centre, the Southern Rural Livestock Saleyards and Ingham's Feed Mill. These are generally quite prominent from Berrima Rd and/or Douglas Ave.

Pictured: Boral Cement Works from Berrima Rd

Immediately to the South of New Berrima on Taylor Ave is the **Boral's Berrima Cement Works** located on IN3 Heavy Industrial zoned land. The Cement Works is a prominent feature visible within the Berrima locality including from Berrima Road and a range of surrounding rural properties. It is around 140 ha in size (or around 20% larger than the surface area of the proposed mine).

Established in 1927 and acquired by Boral from 'Blue Circle in 1987, the Berrima Cement Works directly employs around 130 people, with more employed indirectly as contractors and in related servicing industries. The town of New Berrima, immediately to the North, was established in 1928 to house the cement works and mine employees and their families.

The Cement Works is the largest such works in NSW, and supplies more than 60 percent of the total need for cement products in NSW and the ACT. Works conducted on the site includes the importation of limestone by rail from Boral's quarry at Marulan South, materials stockpiling, production of clinker (in Kiln 6), grinding of clinker (in Mill 7), and transportation of cement product by truck and by rail. Maintenance of plant and equipment is also carried out at the site.

The process means that it is designated as 'Heavy Industry', with limestone burnt to a high temperature after it is blended with other material to produce clinker pellets, which are ground to produce cement powder for sale and distribution. The Cement Works operates 24 hours per day, 7 days per week.[26]

Boral notes that the ability to transfer large volumes of raw resources and finished products is essential to the company's success. As such, Boral operates a 'significant fleet of heavy vehicles and is a customer of a range of haulage contractors across Australia. The company is also a prolific user of rail services'.[27]

Up until October 2013 the Berrima Cement Works had its own Colliery, the Berrima (Medway) Coal Mine that supplied coal used in manufacturing the cement. The coal mine had been in operation for more than 90 years and provided up to 220,000 tonnes of coal a year to satisfy production needs. At this stage the Medway Colliery has been placed on 'care and maintenance', with the company stating the falling coal price and colliery inefficiency as the main reasons. Coal is now purchased and transported in from other producers.

Future expansion of industrial uses will include those on the IN1 General Industrial zoned land that wraps around New Berrima between Taylor Ave and the Old Hume Highway to its South and Southeast, and between Taylor Ave and Berrima Rd to its East (see Figure 1.23 above). This will bring significant intensification of industrial uses related to manufacturing, transport and warehousing to the area immediately surrounding New Berrima, and bring such uses closer to Berrima itself.

Selected industrial uses and their relationship to New Berrima, Berrima and Moss Vale are shown in the following maps, which should be looked at in conjunction with zoning maps above.

[26] Interview with Boral Public Relations Officer, 2 September 2017.
[27] Interview with Boral Public Relations Officer, 2 September 2017

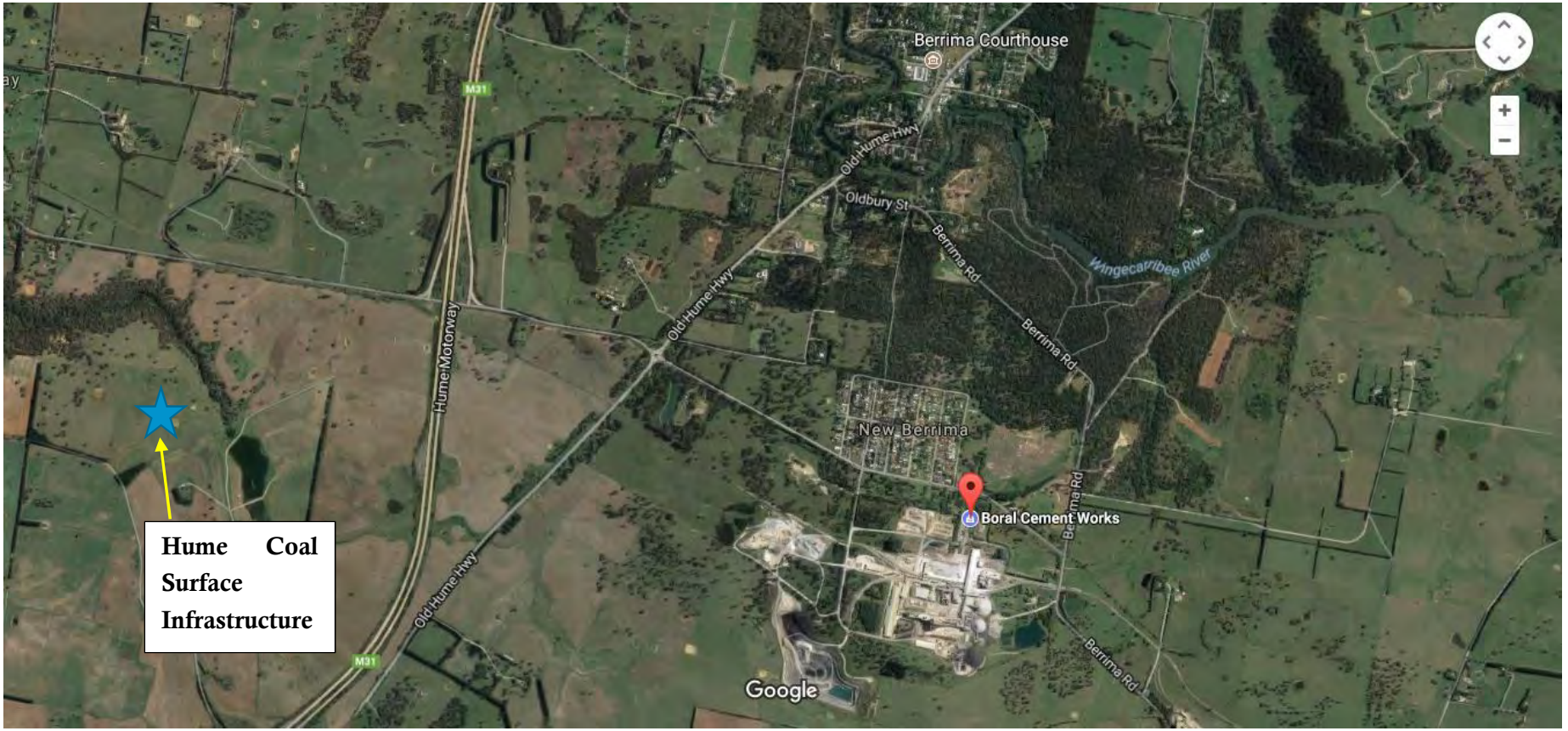


Figure 2-25: Geographic relationship between Berrima-New Berrima, the proposed mine and Boral Cement Works.
Source: JSA 2017, using Wingecarribee Local Environment Plan 2010 land zone maps accessed at https://www.legislation.nsw.gov.au/#/view/EPI/2010/245/maps 18/08/2017.

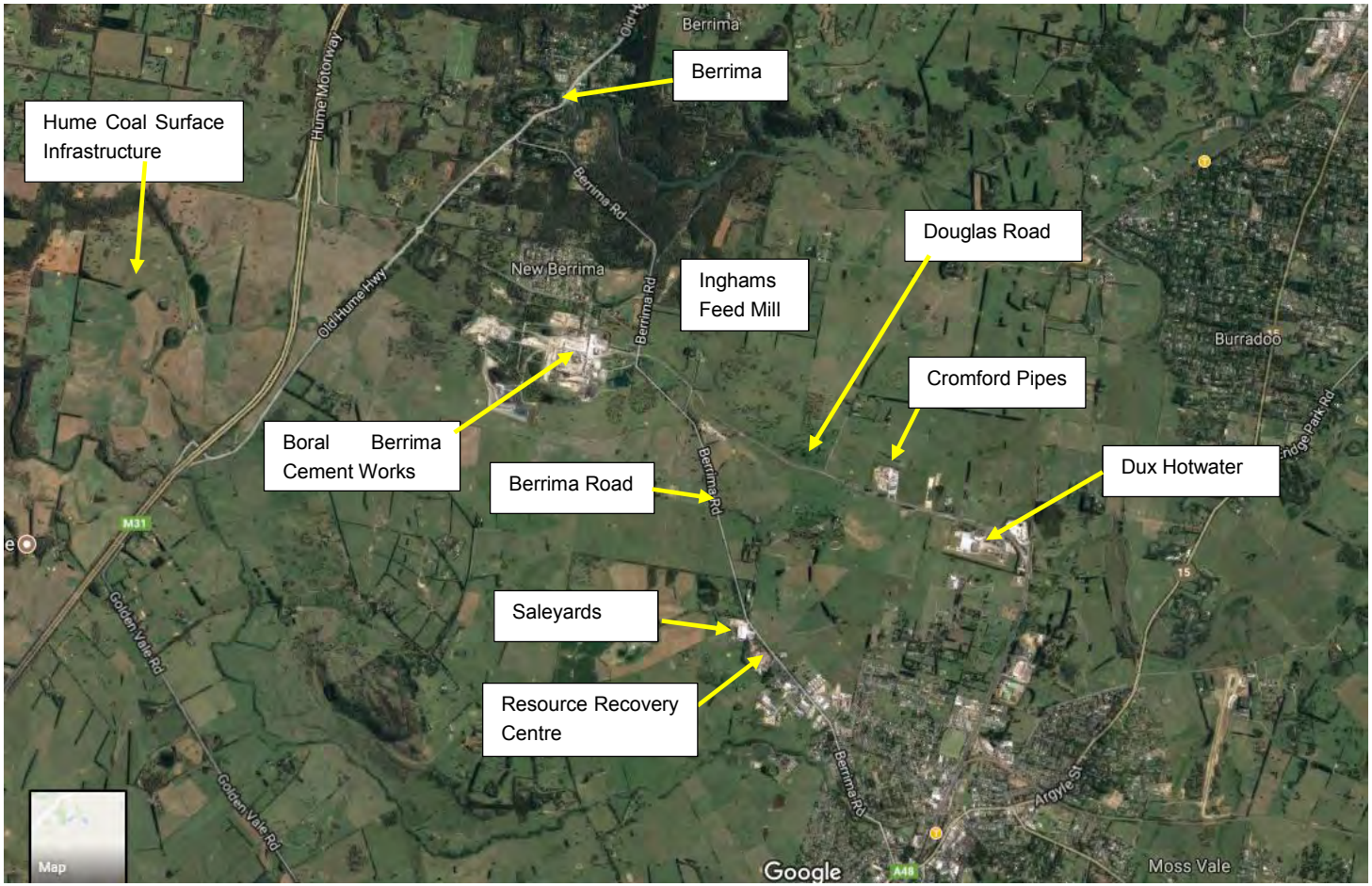


Figure 2.26: Selected General and Heavy Industrial uses in the locality of Berrima-New Berrima.
Source: JSA 2017

2.5.4 Other Proximate Industrial Uses and Transport Infrastructure

A number of other industrial, commercial and major transport infrastructure uses are located in relatively close proximity to New Berrima and Berrima.

There are abandoned mine workings from the old Berrima (Medway) Colliery located at the end of Medway Rd around 400 metres from Medway Village and six kilometres from Berrima 'as the crow flies'. Although the mine is not visible from Medway village or from Berrima and was an underground operation, it is understood that there had been significant heavy vehicle movements through Medway Village and along Medway Rd and en route to the Cement Works until the mine's closure in 2013.

The Hume Motorway and its overpass of the old Hume Highway and interchange with Medway Road to the West and Southwest of Berrima and New Berrima are prominent features of the locality's landscape. The Hume Motorway is located around 1.8 kilometres from the edge of B1 zoned land in Berrima and two kilometres from New Berrima and the Cement Works. The Motorway is heavily trafficked with light and heavy industrial vehicles 24 hours per day, being the major transport route between Sydney, Canberra and Melbourne. Medway Road is also used by heavy vehicles accessing the industrial area to the east, including cement tankers delivering cement to Sydney markets.

To the East is the main rail line providing services between Sydney and Melbourne. The Main Southern Railway is a dual line using diesel locomotives and passes through Mittagong, Bowral and Moss Vale, with stabling yards at Moss Vale. The line is five kilometres from Berrima and New Berrima.

2.5.5 Tourism-Related Businesses in the Locality

Overview

As would be expected from employment in tourism-related industries in the Moss Vale-Berrima SA2 locality and the Wingecarribee Shire, there are a wide range of tourism-related businesses in the locality and the LGA. These are of varying physical relationship and proximity to existing industrial uses and Industrial zoned land, due to varying distance, topography and connectivity.

However, car travel routes to many of these tourist uses and localities take the resident and visitor past a range of industrial uses, as well as Industrial zoned land which will be subject to future development, depending on which route is taken, and the order of visiting different tourist uses and attractors. As noted above, these industrial uses vary in prominence from both surrounding properties and routes (e.g. Medway Road, Old Hume Highway, Berrima Road and Douglas Avenue).

Past impacts including significantly greater general and heavy vehicle movement (prior to the bypassing of Berrima, and the more recent closure of Medway Colliery) have been significant compared with the use of trains to freight coal under the current proposal; and perceptual associations with a coal mine have also been a feature of the immediate locality until Medway Coal Mine's closure in 2013.

Moreover, again it must be concluded that industrial and tourist uses in the immediate and wider locality have co-existed historically, and continue to be compatible without any apparent disadvantage to employment in either sector.

Localities Associated with Tourism

A review of employment data in sectors related to tourism indicates that there are four main urban centres where tourist activity is more prominent. These are shown in the following table, with radial distances to the edge of Commercial zoned areas (B1 or B2). Of these, Bowral has by far the greatest density of tourism related jobs.[28]

Table 2-4: Distance of Commercial Zoned Land from proposed mine headworks.

Urban Centre	**Distance to Nearest Commercial Zoned Edge**
Berrima	3.9 kms
Sutton Forrest	8.0 kms
Moss Vale	8.8 kms
Bowral	11.3 kms

Source: JSA derived from Google Earth 2017

Of the localities most associated with tourism, Berrima is the most proximate to the proposed mine (at around four kilometres from the edge of B1 zoned land, and around 5kms from the town centre), and the centre most likely to experience negative impacts on tourist uses and tourist-related employment. Berrima is therefore looked at more closely below.

Berrima Historic Village

Berrima is recognised as one of the best preserved examples of a Georgian village in Australia. The period from 1831 to the 1860s was a time of significant growth, which came to an abrupt end when the railway bypassed the village in 1867. For the next hundred years there was little or no development in the village, which contributed to its preservation.

From the 1950s onward, cars and trucks were taking more passenger and freight traffic away from the railway, and the village quiet was reported to be increasingly disturbed by heavy traffic along the Hume Highway. Travellers, and especially those journeying between Canberra and Sydney, 'found Berrima a convenient stopping point for a break and a meal, with a strip of eateries and shops straddling the highway and catering to the passing trade'.

A significant change to the amenity of the town centre came in 1989, when Berrima was bypassed by the Hume Motorway (South Western Freeway). This has resulted in Berrima as being a destination location for visitors, rather than a locality which was visited by passing trade, although each function brought tourist visitation to the locality.

[28] ABS Census 2011

Berrima is situated adjacent to the Wingecarribee River in a bend of the river and so is in the bottom of the river valley. As a result, there are intervening ridges between Berrima and a range of visual impacts such as the Cement Works, the Hume Motorway and the proposed Hume Coal Mine, so that visitors to Berrima are unaware of surrounding industrial uses from the tourist uses located *within* the town.

Accommodation Businesses

The following maps show that registered accommodation services tend to be clustered within or close to the towns of Berrima, Moss Vale and Sutton Forrest, and along the Old Hume Highway, the Illawarra Highway and Argyle/Moss Vale Road.

There are no accommodation businesses proximate to or visible from the proposed mine, with the closest publicised accommodation service around five kilometres away as the crow flies within the cluster of accommodation in Berrima, and Highfield Cottage Sutton Forest around seven kilometres away. There is no relationship between these closest services and the proposed mine, being separated from the mine by distance, favourable topography, and the Hume Motorway.

Moreover, existing accommodation services tend to be more proximate to and/or have a greater physical relationship to industrial uses elsewhere in the locality (see industrial land use maps above).

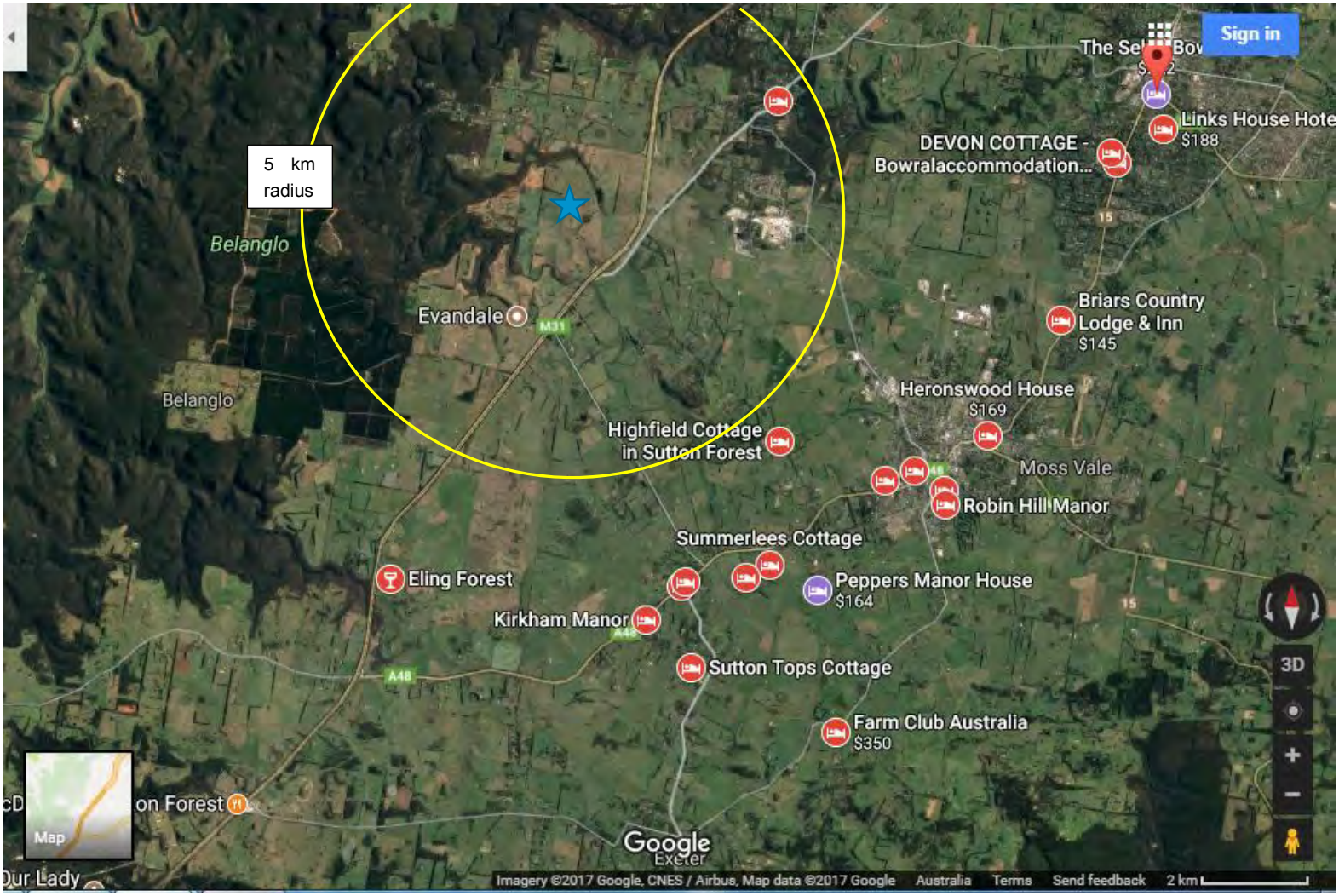


Figure 2.27: Google Earth Search of 'Accommodation Services' in 'Sutton Forest' Locality
Source: JSA 2017

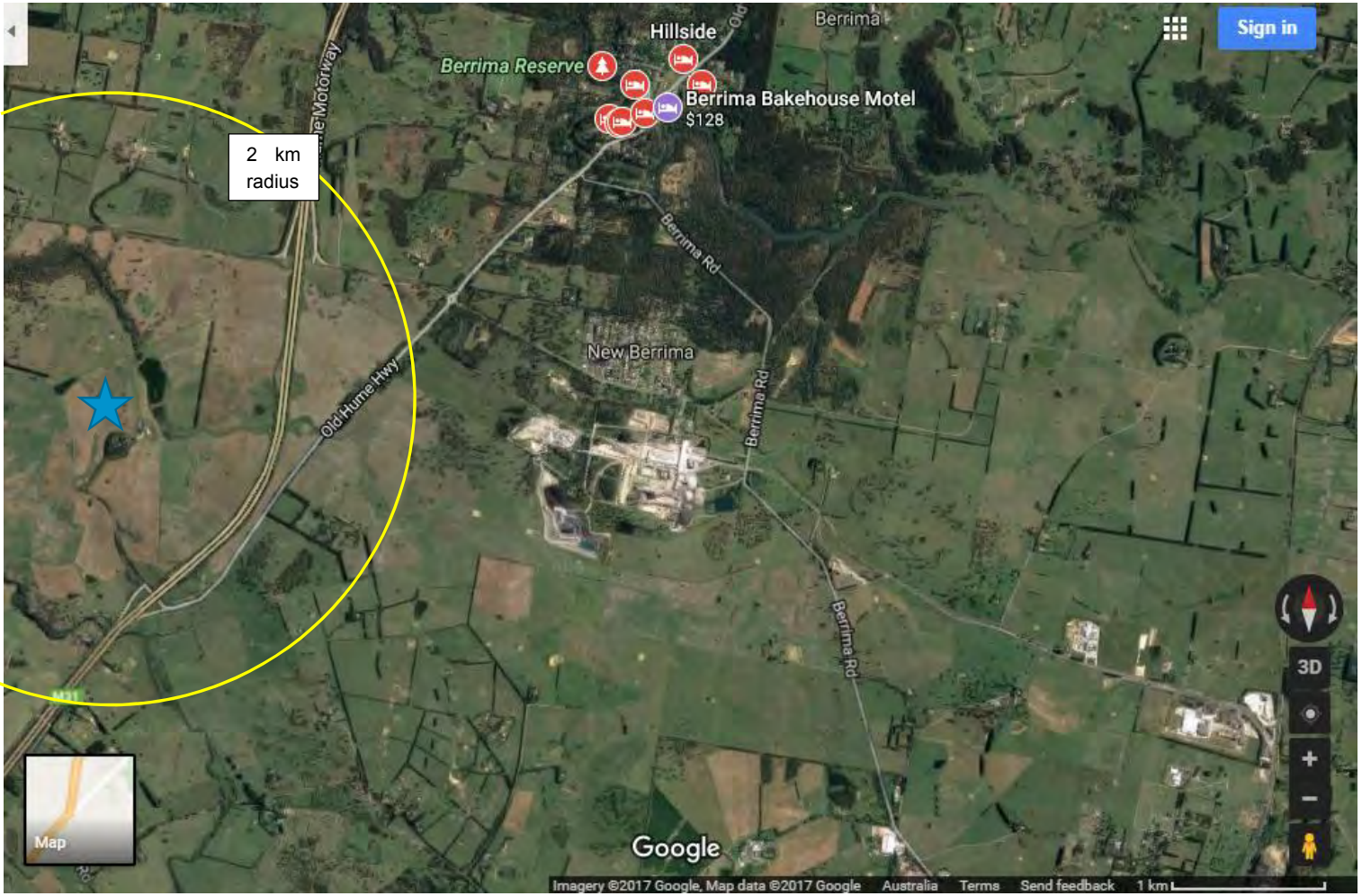


Figure 2.28: Google Earth Search of 'Accommodation Services' in 'Berrima' Locality
Source: JSA 2017

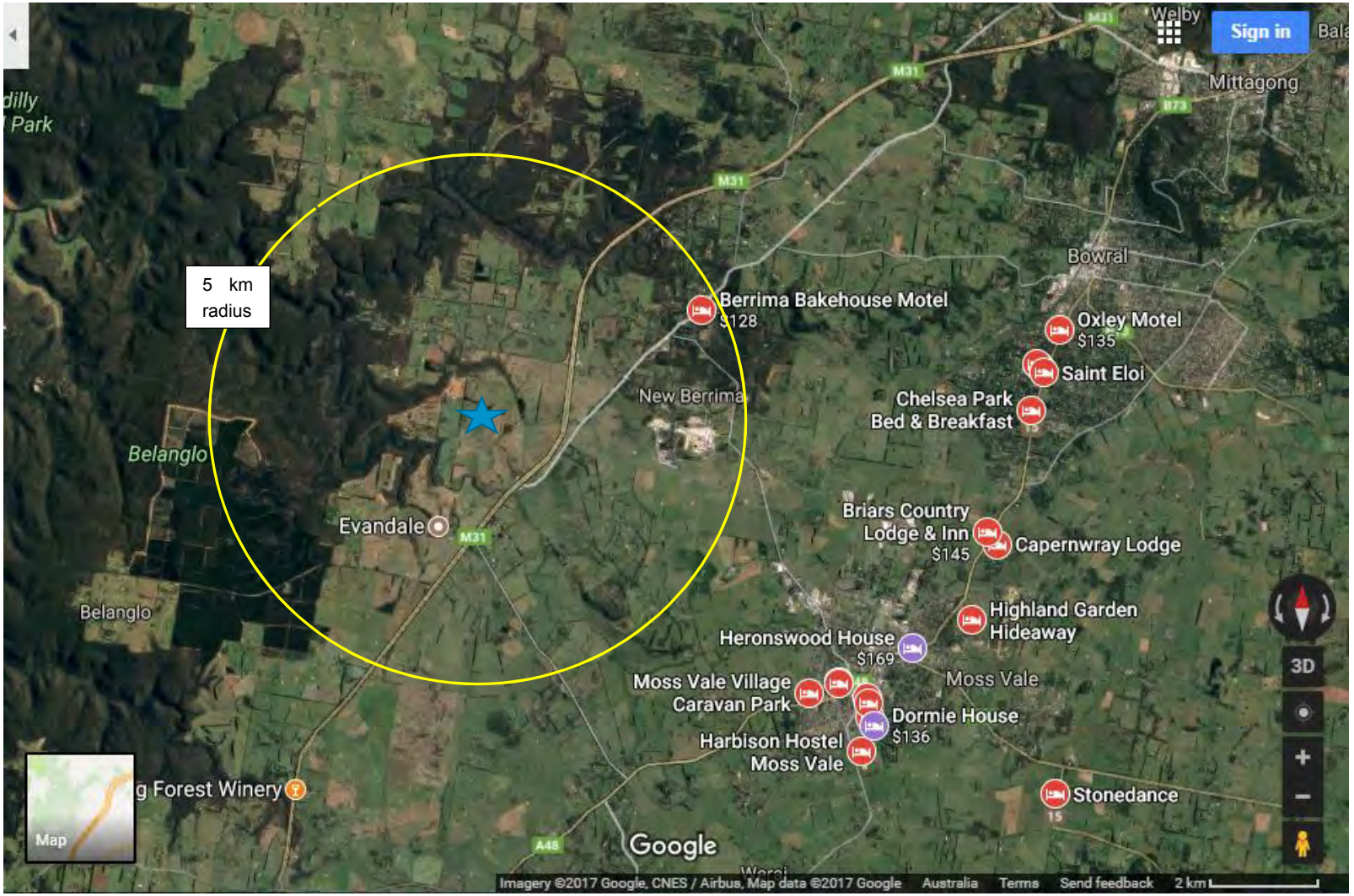


Figure 2.29: Google Earth Search of 'Accommodation Services' in 'Moss Vale' Locality
Source: JSA 2017

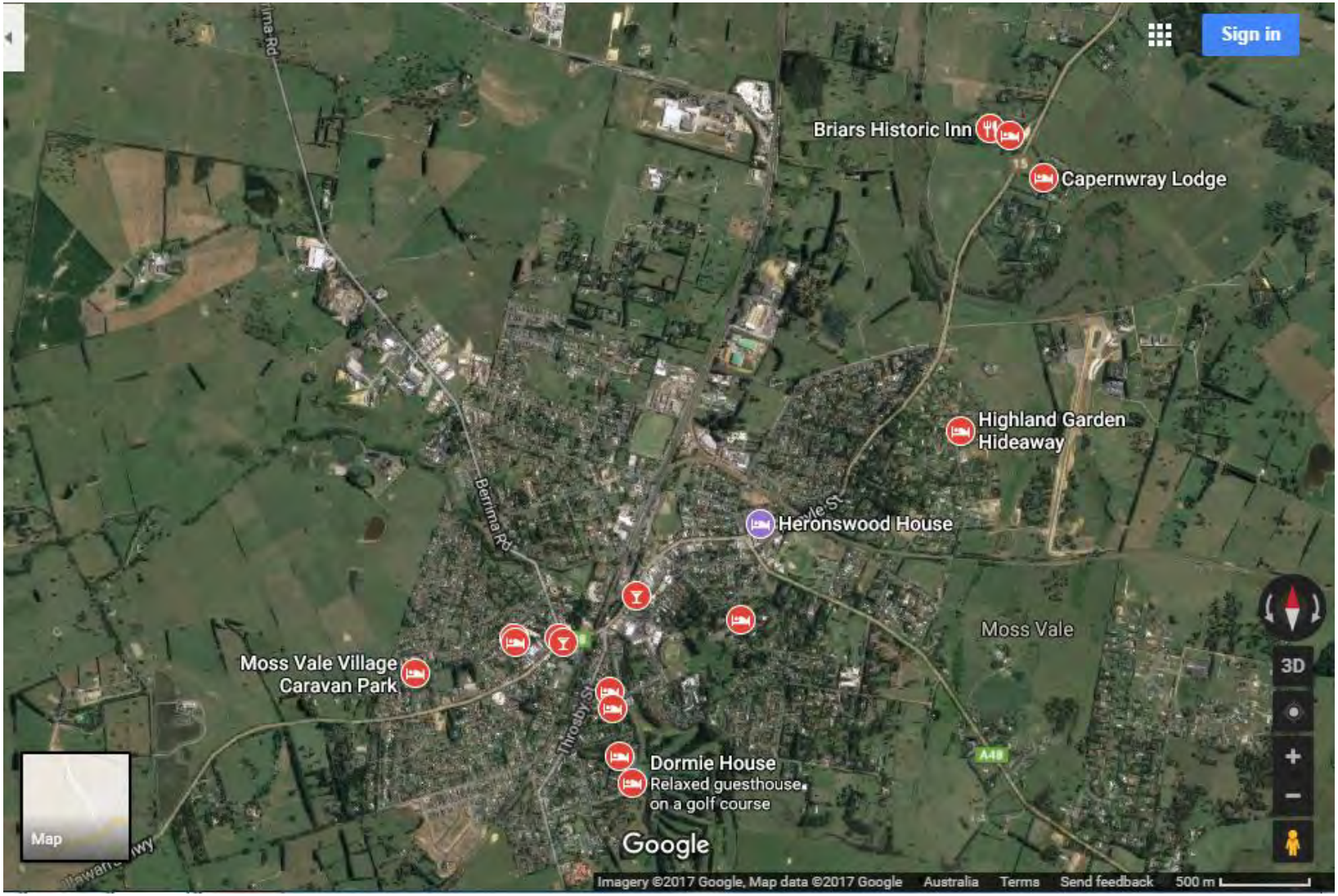


Figure 2.30: Google Earth Search of 'Accommodation Services' in 'Moss Vale' Locality (Zoom)
Source: JSA 2017

Food Services

The following maps show that registered food services also tend to be clustered within or close to the towns of Berrima, Moss Vale and Sutton Forrest, and along the Old Hume Highway, the Illawarra Highway and Argyle/Moss Vale Road. Again, there is no generally physical relationship between the proposed mine and these food services, and there is a tendency for them to be somewhat more proximate to existing industrial uses and zoned areas.

There are two exceptions - the Zen Oasis Vegetarian Restaurant, which is around one kilometre from the proposed mine cross-country, and the Briars Historic Inn, which is around 1.5 kilometres from larger industrial uses such as Dux Hot Water to the North of Moss Vale.

As such, it is likely that the Zen Restaurant would be one tourism related land use that would be affected due to proximity and topography, a point noted in studies related to EIS and discussed later.

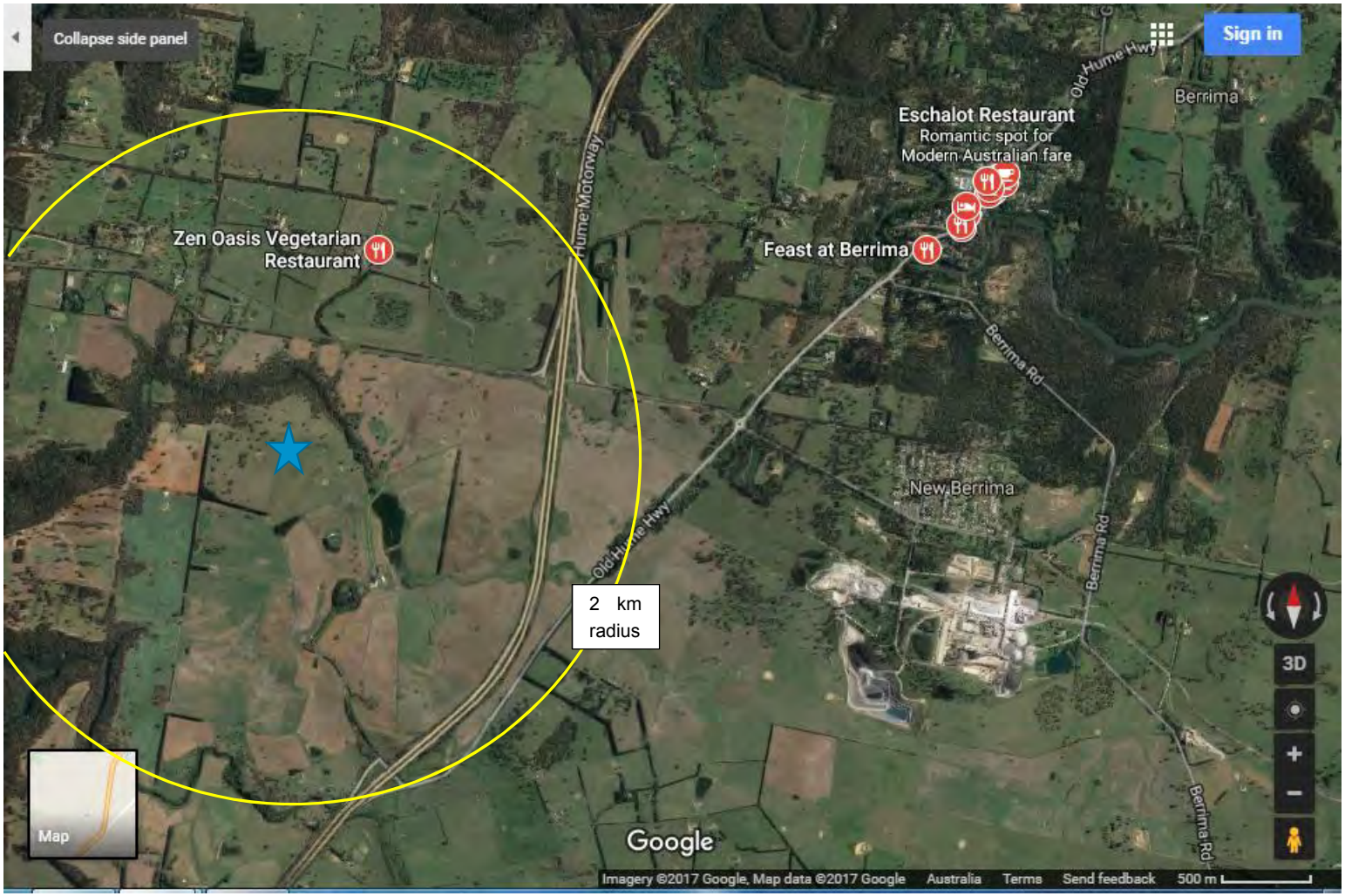


Figure 2.31: Google Earth Search of 'Food Services' in 'Berrima' Locality
Source: JSA 2017

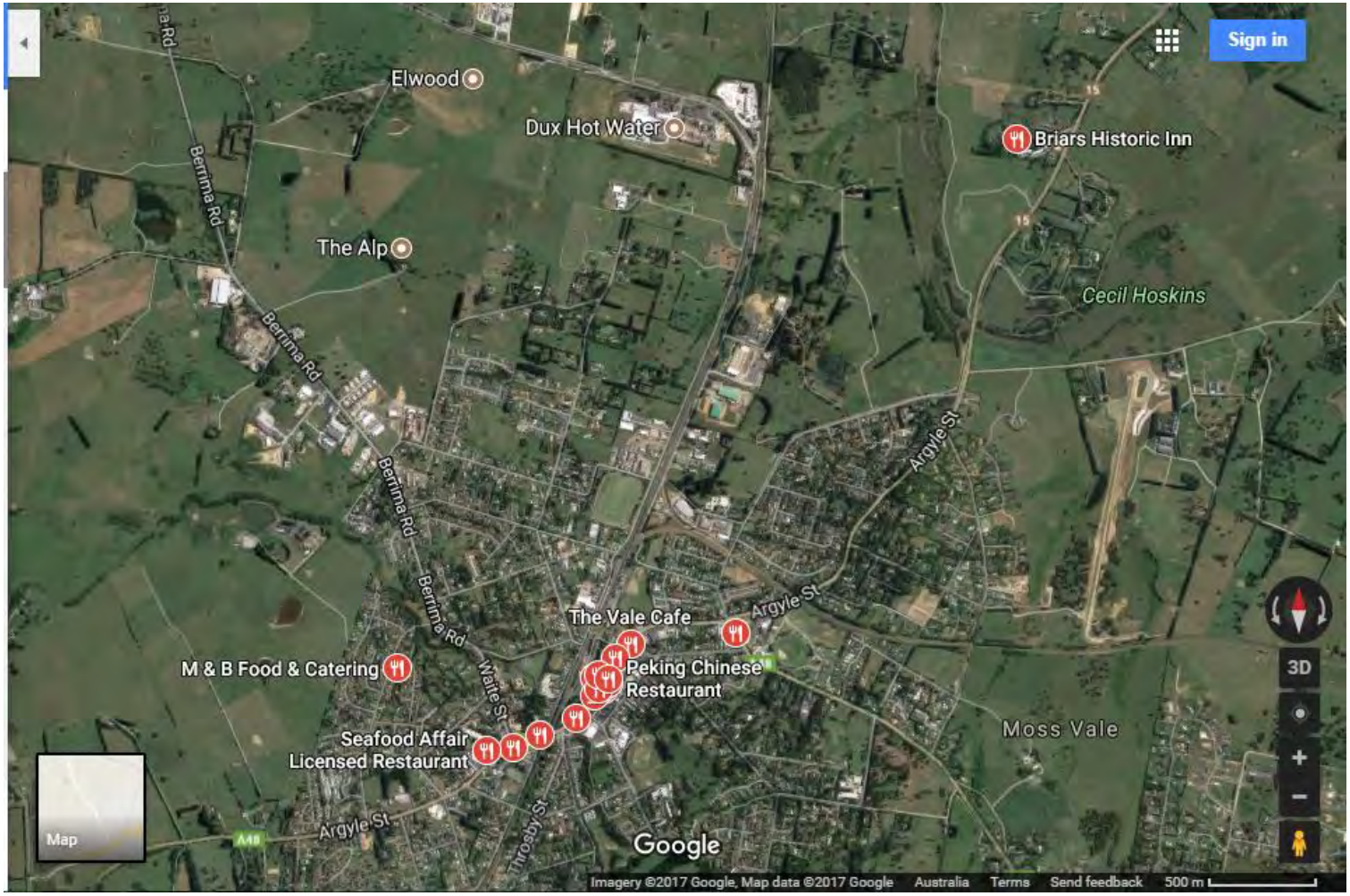


Figure 2.32: Google Earth Search of 'Food Services' in 'Moss Vale' Locality
Source: JSA 2017

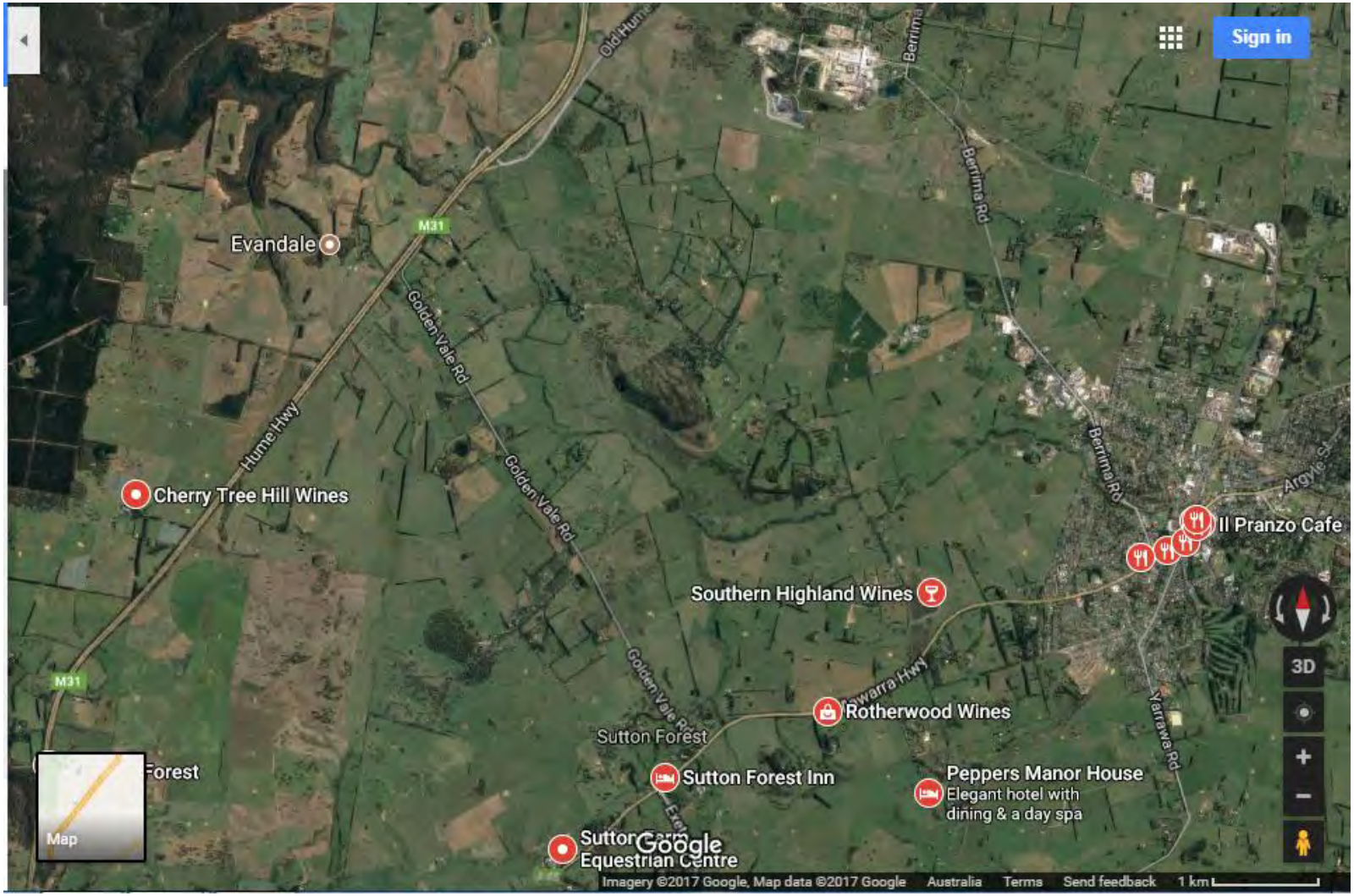


Figure 2.33: Google Earth Search of 'Food Services' in 'Sutton Forrest' Locality
Source: JSA 2017

2.5.6 Implications for Likely 'Co-Existence' of Proposed Mine

The proposed surface infrastructure and administration centre for the mine will be located around 3.6 kilometres from the nearest residential development in New Berrima, and around four kilometres from the Southwestern boundary of Berrima's B1 Neighbourhood zoned area. These centres are separated from the mine surface infrastructure by the Hume Motorway. This is far less proximate to these residential and commercial areas than the existing zoned IN1 General Industrial and IN3 General Heavy Industrial land, and the other Heavy Industrial (Boral Cement Works), which is prominent in the locality and has a larger surface area.

With regard to what could be regarded as 'sensitive tourism receivers', such as accommodation and food services, these are clustered in areas that have no physical relationship to the proposed mine, and are in fact generally more proximate to other industrial uses and zoned land in the immediate and wider locality. The exception is the Zen Vegetarian Restaurant around one kilometre to the north of the proposed mine, although it is interesting that the well-known Briars Historic Inn is also quite proximate to industrial zoned land and major uses 1.5 kilometres to its west including Dux Hot Water and a limestone handling facility.

Again, from the evidence, there is no reason to assume that the proposed mine cannot co-exist with existing tourist related uses and attractors. This raises a further question as to whether there will be significantly greater and unique amenity impacts from the mine that have not been experienced in relation to current and past industrial uses, or to those that would be expected from future industrial expansion in the immediate locality of New Berrima-Berrima. This is addressed below.

2.6 Future Impacts of the Proposed Mine on Tourism Uses and Activities in the Locality

2.6.1 Overview

A third question relates to the likelihood of future impacts on the character and amenity of the locality from the **proposed mine** including visual, noise and air quality impacts related to mine operations. Particular concerns relate to the proximity and visibility of the mine to potentially sensitive tourism 'receivers' and related impacts within the wider locality.

As noted above, the mine is less proximate to a number of sensitive 'receivers' (locations and uses) than existing General and Heavy Industrial uses, some of which are more visible, more concentrated and arguably more prominent as land uses than the proposed mine. It is also relevant that a large area proximate to New Berrima and to the Neighbourhood Zone of Berrima itself is zoned for General Industrial use and prioritised for future industrial expansion.

As such, there would have to be visual and other amenity impacts specifically related to the proposed mine that are significantly greater than existing industrial uses. This section draws upon relevant studies in the Applicant's EIS as well as our own observations to explore this issue.

Impacts on character, air quality, noise and vibration and heritage are likely to be negligible as discussed below.

Of the various amenity impacts, the most likely impact is to be visual. These impacts will be experienced by cars travelling along Medway Road towards Medway Village, west of the Hume Motorway and by residents living along Medway Road west of the Hume Motorway, with the impact moderate to low with planting; and by cars travelling along the Hume Motorway in the region of the Medway Road overbridge, with these impacts assessed as moderate. These impacts will be experienced in the context of the Hume Motorway and the associated Medway Road interchange, itself a significant man made visual impact on the landscape. Importantly, visual impacts will not be experienced by southbound traffic (coming from Sydney) exiting the Hume Motorway for Berrima.

It seems unlikely that these visual impacts will adversely affect tourism industries given the spatial separation from tourist uses in the locality (with the exception of the Zen Oasis Vegetarian Restaurant); the generally transient experience of visual impacts by visitors to the locality; the context of the visual impacts in an area with significant man made industrial elements including the motorway and cement works; and the continued existence of tourism uses in the locality despite the existing visual impacts associated with industrial uses, the Hume Motorway and the Main Southern Railway.

2.6.2 Visual impacts

The following is based on a review of visual impact assessments contained in the EIS,[29] a site visit conducted on 21 July 2017, an inspection of Google Street View and inspection of topographic maps for the area.

The mine works are expected to be visible from the Hume Motorway northbound and southbound in the area of the Medway Road overbridge; generally along Medway Road west of the Hume Motorway and from nearby properties along Medway Road; and from the Old Hume Highway south of Medway Road. Visual impacts are assessed respectively as moderate from the Hume Motorway; substantial to low from Medway Road reducing to moderate to low with mitigation consisting of planting; and moderate to low from the Old Hume Highway reducing to low with mitigation consisting of planting.

The rail works are expected to be visible from Medway Road west of the Hume Highway; and Medway Road east of the Hume Highway and the Old Hume Highway south of Medway Road; and the new grade separated crossing at Berrima Road will be visible from Berrima Road. Visual impacts are assessed respectively as moderate to high from Medway Road west of the Hume Highway reducing to moderate with mitigation consisting of planting; moderate to low from Medway Road east of the Hume Highway and the Old Hume Highway south of Medway Road reducing to low with mitigation consisting of planting; and low from Berrima Road.

With particular respect to visual impacts on tourist visitation, cars leaving the Hume Motorway at the Medway Road off ramp south bound and travelling to Berrima will not see the mine

[29] Hume Coal Project Environmental Impact Statement, Appendix N *Visual Amenity Assessment Report.* Berrima Rail Project Environmental Impact Statement, Appendix N *Visual Amenity Assessment Report.*

workings and will have moderate to low impact views of the rail works at the intersection with Medway Road, with this impact reducing to low as planting becomes more effective at screening. On leaving Berrima and returning to Sydney, they will have substantial to low impacts reducing to moderate to low impacts on Medway Road between the Hume Motorway underpass and the northbound on ramp, a distance of about 100 metres. These impacts will be experienced in the context of the Hume Motorway and the associated Medway Road interchange, itself a significant man made visual impact on the landscape.

For cars travelling from south of Berrima and exiting and entering the Hume Highway at the Mereworth Road interchange, the mine works will not be visible, however the rail works will provide a moderate to low visual impact from the Old Hume Highway, reducing to low as planting provides effective screening.

None of the proposed works will be visible from Berrima, due to intervening topography. Light pollution from the mine has not been assessed, however it is noted that there is existing light pollution from the cement works, about two kilometres from Berrima. By comparison the mine works are about 4 kilometres from Berrima, and so could be expected to have a lesser impact than that of the Cement Works, which operates 24 hours per day, seveb days per week.

For cars accessing Golden Vale Road via the at grade intersection or Moss Vale via the Illawarra Highway, vehicles travelling from and returning south will have no visual impacts. Vehicles travelling from and returning to the north will have moderate visual impacts in the area of the Medway Road overpass, with these impacts of short duration due to the speed of travel and the likely distance. The distance over which the works will be visible is around 300 metres for south bound traffic (due to lack of median screening trees in the vicinity of Medway Road overpass and the rail corridor overpass) or around 10 seconds at 110 km/hr. For north bound traffic the distance is about 900 metres or around 30 seconds at 110 km/hr. Again, these impacts will be experienced in the context of a four lane motorway and the Medway Road interchange, themselves significant visual impacts.

Tourist uses along Medway Road are likely to have substantial to low visual impacts, reducing to moderate to low with mitigation.

2.6.3 Character

As outlined above, the character of the locality is quite diverse. The immediate locality of the mine is semi-rural in character. The wider locality is of mixed character including grazing properties, small scale farm businesses, natural areas, forestry, scattered rural residences, villages and towns, industrial uses such as the Berrima Cement Works and Ingham's Feedmill Berrima, and some extractive industry and major transport infrastructure such as the Hume Highway and the main southern railway.[30] The Moss Vale Enterprise Zone, including future industrial uses on IN1 General Industrial zoned land is proximate to New Berrima, and much closer to Berrima than the proposed mine headworks. Given the major industrial uses in the locality, the presence of significant infrastructure such as the Hume Motorway and the existing (but disused) coal mine

[30] Hume Coal Project Environmental Impact Statement, Appendix N *Visual Amenity Assessment Report*, page 15.

at Medway a coal mine does not appear to be at odds with the character of the area, with quite different uses existing side by side.

2.6.4 Air Quality

The construction and operation of the mine will result in emissions well below applicable impact assessment criteria at neighbouring sensitive receptors.[31] Air emissions from upgrading and increased use of the Berrima Branch Line will increase, however the predicted project only air quality impacts at all receptors are well below the applicable air quality criteria for both existing and future Berrima Branch Line activities.

A range of best practice mitigations are proposed at the mine operations, and coal will be transported in covered wagons. As such, amenity and tourism related impacts arising are likely to be negligible.

2.6.5 Noise and vibration

Adverse noise impacts from the operation of the mine will be experienced at dwellings along Medway Road between Medway village and the Hume Motorway, with 12 dwellings modelled to experience noise above criteria, and three dwellings modelled to exceed sleep disturbance criteria with this impact arising from train movements at night.[32] Generally impacts are expected to be mitigatable. With respect to tourism, affected properties appear to be principally the Zen Oasis Vegetarian Restaurant due to its proximity to the proposed headworks.

Adverse noise impacts from the operation of the non-network rail line will be experienced at one dwelling on Berrima Road. Main line impacts are estimated to be below a level requiring mitigation.[33] The operation of the rail maintenance facility will have a minor impact at one location to the north of Medway road between the Hume Motorway and the Old Hume Highway.[34]

In general, the Berrima Branch Line runs through land zoned for industrial uses or through land owned be Hume Coal and the noise criteria contour is contained within that land,[35] and so would be expected to have minimal impacts on tourist uses in the locality with regard to noise. Proposed mitigations include construction of a noise wall to the north of the rail loop and a shed at the northern provision point; and procurement of locomotives with electronically controlled pneumatic brakes.

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[31] Hume Coal Project Environmental Impact Statement, Appendix K *Air Quality Impact and Greenhouse Gas Assessment*, page 95.
[32] Hume Coal Project Environmental Impact Statement, Appendix I *Noise and Vibration Assessment*, page E2-E5.
[33] Berrima Rail Project Environmental Impact Statement, Appendix E *Noise and Vibration Assessment,* Figure 5.3 and page 56.
[34] Berrima Rail Project Environmental Impact Statement, Appendix E *Noise and Vibration Assessment,* page 61.
[35] Berrima Rail Project Environmental Impact Statement, Appendix E *Noise and Vibration Assessment,* Figure 5.3.

2.6.6 Heritage Impacts

With respect to European heritage, seventeen heritage items are identified within the coal mining project area and nine are listed within the Berrima Branch Line project area. Of these items, the mine is expected to have a moderate impact on Mereworth house and garden (as it is adjacent to the surface works) and a low to moderate visual impact on the Exeter Sutton Forest Landscape. The rail works are expected to impact on views and vistas from Mereworth house and garden; on a railway bridge and the Sorensen garden at Boral Cement depending on the route option; and on the former Berrima rail corridor.[36] The remaining heritage items will not be affected, primarily due to the lack of subsidence associated with the mine.

There does not appear to be any physical impact on heritage items associated with key tourism areas such as the towns of Berrima, Sutton Forest and Burradoo, which are the main tourism destination centres in the locality. Visual impacts on tourism are discussed above.

With respect to Aboriginal heritage, 206 sites were identified in the coal mining project area and 11 within the Berrima Rail Project. The EIS assesses that 9% of the sites in the coal mining project area will be impacted, and the Berrima Rail Project will affect areas of low archaeological sensitivity.[37] Tourism in the locality does not appear to be based on Aboriginal heritage, so that tourism-specific impacts are likely to be negligible from this aspect of the proposal.

2.7 Statistical Relationship between Coal Mining and Tourism Industries in NSW

2.7.1 Overview

A fourth question relates to the **statistical relationship** between mining and tourism employment more generally in NSW and Australia. This enables a more objective assessment to be made based on a statistically robust assessment.

At the national scale, there is little evidence that the presence of coal mining is related to either increases or decreases in tourism industries. Using a cross-sectional data set for all LGAs in Australia, our analysis predicts that each three coal mining jobs would result in one additional tourism job per 100,000 population. However, the result is not statistically significant at the 95% confidence level, and the best conclusion is, at the LGA scale, there is no discernible relationship between coal mining and employment in tourism, either positive or negative.

Considering NSW LGAs with active coal mining (open cuts and underground), a number of these have significant employment in tourism industries, suggesting that the two uses are not incompatible.

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[36] Hume Coal Project Environmental Impact Statement, Appendix T *Statement of Heritage Impact,* Table 7.1; Berrima Rail Project Environmental Impact Statement, Appendix I *Statement of Heritage Impact,* Table 7.1.
[37] Hume Coal Project Environmental Impact Statement, Appendix S *Aboriginal Cultural Heritage Assessment Report,* page ES5; Berrima Rail Project Environmental Impact Statement, Appendix I *Aboriginal Cultural Assessment Report,* page 52.

Further analysis was carried out using longitudinal employment data in active coal mining LGAs in NSW, considering the relationship between changes in coal mining employment and employment in the categories of Retail Trade and Accommodation and Food Services for the periods 2001-2006 and 2006-2011.

The analysis shows a 0.7% reduction in employment in Retail Trade; and a 0.3% increase in employment in Accommodation and Food Services for each additional 100 people employed in coal mining at the LGA level. There is considerable variation in the data, and neither coefficient is statistically significant as different to zero at the 95% level of confidence.

Using the results of this analysis, the expected 300 coal mining jobs from the proposed development will result in a loss of 50 jobs in Retail Trade, and a gain of 16 jobs in Accommodation and Food Services. The net gain in jobs is calculated at 266 jobs, noting that the jobs lost will be of lower value than the coal mining jobs and will include around 50% part time jobs. If jobs are expressed as full time equivalents, the net gain at the LGA level is calculated at 277 full time equivalent jobs.

2.7.2 Statistical analysis (cross sectional data)

Using the industry classification above, a data set has been compiled for all LGAs in Australia in 2011 comparing coal mining employment (as a proxy for the intensity of coal mining within an LGA) with tourism industries per 100,000 of usual resident population. The results of the analysis are set out below. The results show an increase in tourist employment with an increase in coal mining employment, and this probably reflects the higher wages in coal mining leading to increased purchasing power. The result is not statistically significant and the best conclusion is, at the LGA scale, there is no discernible relationship between coal mining and employment in tourism, either positive or negative.

Table 2.5: Results of linear regression analysis (Tourism jobs as the dependent variable and coal mining jobs as the independent variable)

	Value	Comment
R^2	0.0006	Variability in coal mining employment accounts for around 0.06% of the variation in tourism based employment
Coefficient	0.33 p=0.56	Each additional 3 coal mining jobs predicts an additional tourism job per 100,000 people. The relationship is not statistically significant
Constant	7,533	On average, 7,533 people per 100,000 of usual resident population are employed in tourism related industries in Australian LGAs

Source: ABS Census 2011 and JSA analysis

2.7.3 LGAs with significant tourist employment and significant coal mining employment.

The table below shows NSW LGAs with active coal mining, along with estimated tourism employment using the methodology set out above. The data do not support the hypothesis that tourism and coal mining are incompatible, when assessed at the LGA scale.

Table 2.6: LGAs with active coal mining and estimated tourism employment

LGA	Coal Mining Employment	Tourism Employment
Singleton	4773	209
Muswellbrook	2408	291
Wollongong	1480	2178
Lake Macquarie	1284	589
Wollondilly	1219	-1671
Mid-Western Regional	1186	431
Lithgow	1048	97
Cessnock	518	886
Narrabri	261	52
Gunnedah	169	112
Liverpool Plains	96	-156
Gloucester	85	42
Great Lakes	32	827

Source: ABS Census 2011, MinView (NSW Planning and Environment) and JSA analysis

2.7.4 Statistical analysis (longitudinal data)

A further data set was compiled for employment in the active coal mining LGAs above in the categories of retail trade, accommodation and food services, and coal mining for the years 2001, 2006 and 2011. The data were further analysed to obtain the change in coal employment, and percentage change in employment in retail trade and accommodation and food services for the periods 2001-2006 and 2006-201, with the percentage change weighted for population and adjusted against Australian trends.[38] The results of linear regression analysis of the combined data sets for 2001-2006 and 2006-2011 are shown in the figures below.[39]

The analysis shows a 0.7% reduction in employment in retail trade; and a 0.3% increase in employment in accommodation and food services for each for each additional 100 people

[38] This was done to adjust for non-local effects on employment change such as industry restructuring and the change in the industry classification system between 2001 and 2006.
[39] The intercept has been forced to zero in both cases.

employed in coal mining at the LGA level. There is considerable variation in the data, and neither coefficient is statistically significant as different to zero at the 95% level of confidence.

In 2011, there were 2,240 jobs in retail trade and 1,616 jobs in accommodation and food services in Wingecarribee LGA.[40] Based on the expected 300 coal mining jobs from the proposed development, a loss of 50 jobs in retail trade are expected, with a gain of 16 jobs in accommodation and food services.[41] The net gain in jobs is calculated at 266 jobs, noting that the jobs lost will be of lower value than the coal mining jobs and will include around 50% part time jobs as discussed above. If jobs are expressed as full time equivalents (and taking a part time job as half a job),[42] the net gain is calculated at 277 full time equivalent jobs.

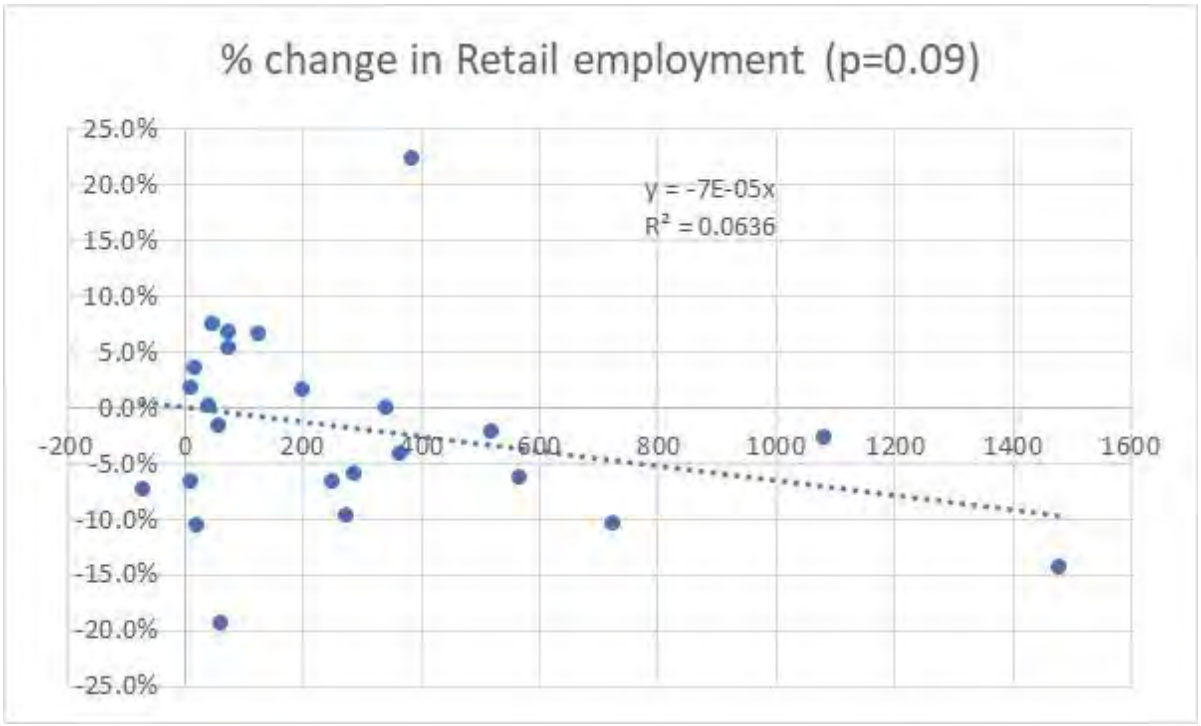

Figure 2.34: Percentage change in employment in retail trade with change in coal mining employment
Source: ABS Census 2001, 2006 and 2011; and JSA calculation

[40] ABS Census 2011.
[41] Including 6% allowance for place of work and census undercounting.
[42] For people in tourism industries working between 1 and 35 hours per week, the median worked is 16 hours.

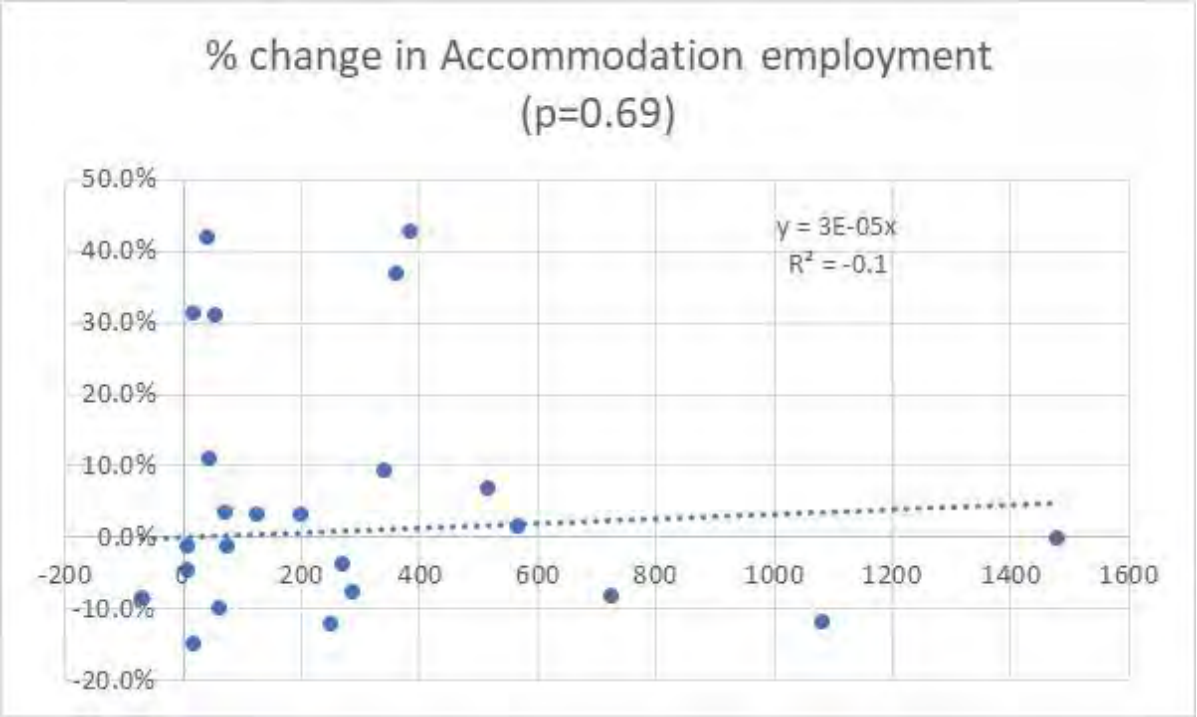

Figure 2.35: Percentage change in employment in accommodation and food services with change in coal mining employment
Source: ABS Census 2001, 2006 and 2011; and JSA calculation

2.7.5 Broke Case Study

Finally, in order to obtain insight into more local effects with respect to the co-location of tourism industries and coal mining, a case study approach has been taken. To identify a suitable case study location, all operational mines in the Hunter Valley and Lithgow Mudgee area were mapped, along with mapping of accommodation and restaurants using data from Trip Advisor.

Two locations were identified where an area with a cluster of tourism facilities was in close proximity to active coal mining. These were Muswellbrook and Broke. The table below shows comparative data for the three locations for selected indicators. Tourist facilities have been taken from Destination NSW, noting that other sources, such as Yellow Pages and Trip Advisor show different numbers of tourist facilities.

Of the two locations, Broke is most similar to Berrima in that it is a small town with a destination tourism sector. By contrast, Muswellbrook is much larger and the tourism industry there appears to be as a result of its location on the New England Highway e.g. all of the accommodation identified in Muswellbrook was Motels, suggesting that this caters to passing traffic.

By contrast, accommodation in Broke and surrounds was farm stays, holiday houses and the like. Broke provides destination tourism based on the rural landscape and proximity to wineries. It is a rural area with an active tourism industry located within around six kilometres of large scale underground and open cut coal mining. However, it is somewhat further from Sydney and so perhaps less attractive to day visitors. In August 2017, Broke had 26 accommodation facilities,

three restaurants and six facilities offering food and drink, providing further evidence that tourism and coal mining are compatible.

The case study does not support the view that coal mining and tourism are incompatible, when assessed at a local scale. Moreover, proximity to the coal mine does not appear to have had an adverse impact on tourism in Broke. Based on a search on TripAdvisor on 16 August 2017, around half of the accommodation was booked for the upcoming weekend, and the median number of days booked between 17 August and 30 September (a period of 44 days), was 11 days. Accommodation was generally expensive by comparison with motel accommodation in nearby areas such as Cessnock ($105-$140 per night), with a median daily rental of $449.

Table 2.7: Case Study Areas – Comparison of selected variables

Indicator	Berrima	Broke	Muswellbrook
Population	600	579	12,075
Distance to Sydney	125 km (1 hour 38 minutes)	168 km (2 hours 23 minutes)	253 km (3 hours 1 minute)
Distance to nearest coal mine above ground workings	4.2 km	6.3 km	5.0 km
Accommodation facilities	7	26	5
Restaurants	7	3	1
Food and Drink	3	6	0
Tours	0	1	0
Attractions	6	0	7
Nearest Mine	Hume Coal (underground)	Glencore Bulga Underground and Bulga Open Cut	Muswellbrook Coal (There are two other mines within 8 km of Muswellbrook)
Production	3.5 Mt pa ROM	16 Mt pa ROM	2 Mt pa

Source: ABS Census 2016, Google Maps, Destination NSW, Hume Coal Project Environmental Impact Statement, http://www.bulgacoal.com.au/en/Pages/home.aspx accessed 15 August 2017, https://www.idemitsu.com.au/operations/muswellbrook-coal/ accessed 15 August 2017