

416 Berrima Road, New Berrima

Economic Impact Assessment

PREPARED FOR Brickworks Land & Development

November 2019



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Executive Summary

The existing Brickworks plant, located in Bowral township, has operated in the area for a long time and has been a steady source of local employment. Modern technology and automation have seen labour productivity rise and the current operation employs about 35 direct FTE jobs. However, this includes a high proportion of skilled workers.

The current plant produces about 35 million bricks per annum, with output at about 1 million bricks per worker. We would also note that modern brick facilities typically produce about 50 million bricks per annum which suggests that a new, larger plant offers scope for increased efficiency and lower cost. The relocation to Berrima is an opportunity to upgrade the facility and we understand the new plant will have a capacity for about 50 million bricks.

The brick plant in Bowral operates within a constrained area in Bowral so that expansion of the plant is probably not an option. Indeed, if the plant did not exist and there was a proposal to establish a plant in Bowral, it is doubtful that it would receive public support. Bowral is very much a 'residential' township today, with a high retiree population and focus on tourism, education and health as the principal activities in the township.

Brick plants are typically located immediately adjacent to their source of clay/shale material which minimises the cost of transporting this primary low-value, high weight material. With the Bowral clay source running out, sourcing this material from the Berrima quarry would be costly. It would also mean a significant number of daily truck movements in and via largely residential areas.

We would also note that location of a plant in proximity to main arterial roads can also be a locational consideration, in terms of shipping finished bricks to market. The nearby Hume Highway means that the Brickworks plant is in close proximity to the major residential construction market in southwest Sydney. The location in Bowral is about 12 minutes to the Hume Highway via Berrima township or 15 minutes through Bowral and Mittagong. The location at Berrima would be less than 5 minutes to the Hume Highway and would not pass through Berrima. That is, from a shipping perspective, there is also a cost advantage but also a significant advantage in terms of taking large trucks out of residential areas.

If relocation of the plant to Berrima were not allowed, the higher cost of production (i.e. older plant, higher transport costs) might see the long-term viability of the plant in question. This would cost 35 jobs directly. It would cost about 10 jobs indirectly and 23 jobs in terms of lost induced spending which would reflect the adverse impact on local businesses. All up 68 jobs in total would be lost. While some of these workers might in time find work in the area, the likelihood is that some with specialist skills will be forced to move to find work. This will be a cost borne by those workers and their families. If relocation is to Sydney, then these workers will face either higher housing costs or long commutes.

Relocation of the plant to Berrima will see these jobs staying in the local area. While the new, larger plant will only marginally increase the number of direct jobs, the larger volume of output will mean more jobs in shipping product to market (i.e. higher productivity), so that there will be some increase in jobs in the local area. The operation will support directly and indirectly about 78 jobs, a net increase of 10 jobs. The job certainty which the new plant would offer the workforce and local businesses will be a significant positive.

In addition to the increased productivity which a new, modern plant offers, relocation also offers potential for Brickworks to explore more options to increase their level of circular economy.

In addition to delivering a superior employment outcome for the Wingecarribee Shire, the new brick plant will also generate a number of social and economic benefits, which are discussed in more detail in Sections 3 & 4.

- The project approval is further estimated to generate an industry value-added (IVA), incorporating its direct and indirect jobs generation, of more than \$6 million per annum. If relocation of the plant to Berrima were not allowed, the higher cost of production (i.e. older plant. higher transport costs) might see the long-term viability of the plant in question. This would see these jobs lost.
- The project approval would allow processing to be undertaken on the future quarry at New Berrima. That is, from a shipping perspective, there is also a cost advantage but also a significant advantage in terms of taking large trucks out of residential areas. Moreover, the subject at New Berrima is more accessible to highway traffic which will effectively bring down transport cost.
- The shift to the new Berrima site, will increase the revenue for the Council as higher rates apply to industrial land. Based on land value of \$3,860,000, this will generate \$58,738 per annum. In addition, the potential increase in intensity of use of the existing site in Bowral could be expected to increase the value of that land which will in turn increase the revenue for the Council.
- The new site involves agricultural land, which is exempt from land tax, becoming industrial land which will increase land tax for the NSW Government. Based on land value of \$3,860,000, this will generate \$49,304 per annum.
- The expanded Brick works operation will increase efficiency but with increased volume shipped, it will nonetheless marginally increase payroll tax revenues. Based on our direct and indirect jobs creation analysis, Macroplan estimated that this would generate another \$40,000 to \$45,000 on top of the current tax revenue.
- Given that the current Bowral bricks is due to cease (i.e. if relocation of the plant to Berrima is allowed), the intensity of industrial use of the existing Bowral site is likely to increase. The current operation is a low density use of the land. With a mix of industrial and commercial uses (e.g. tourism, education and health), Macroplan estimated that the existing site could directly employ about 300 persons. Indirectly, this would add another 150 jobs. In aggregate this would generate \$1.5 to \$1.6 million in payroll revenues.
- The employment factors which drive payroll tax revenues will also lead to increased spending which in turn will increase GST revenues. Based on the projected direct and indirect employment at New Berrima site, we estimate that it will generate another \$100,000 to \$120,000 i.e. additional GST revenue for the State.

Section 1: Introduction

Macroplan has been commissioned by Brickworks Land & Development (i.e. the applicant) to assess the potential economic impacts of a proposed State Significant Development application (SSD) the new brick factory for Bowral Bricks at 416 Berrima Road, New Berrima.

The application seeks to develop the subject site for a brick plant with production capacity of 50 million bricks per annum. It is a dry press brick plant with a reduction kiln which will allow for the production of premium dry pressed brick products including 'Bowral Blues' that only can be made at Bowral. The brick plant comprises:

- Factory building - around 25,600 m² of gross floor area with associated plant and equipment
- Factory amenities (within Factory building) including lunchroom, factory manager's office and control room
- Laboratory
- Raw materials shed
- Yard storage
- Export yard and container area
- An ancillary office area
- Carpark for 36 staff and 2 visitors (and plus disabled parking)
- 24/7 Operation

The capital investment value of the proposed development is estimated to be \$80 million. The development will employ approximately 60 to 65 FTE direct jobs during construction and installing equipment. The new plant could employ about 40 FTE direct jobs once operational.

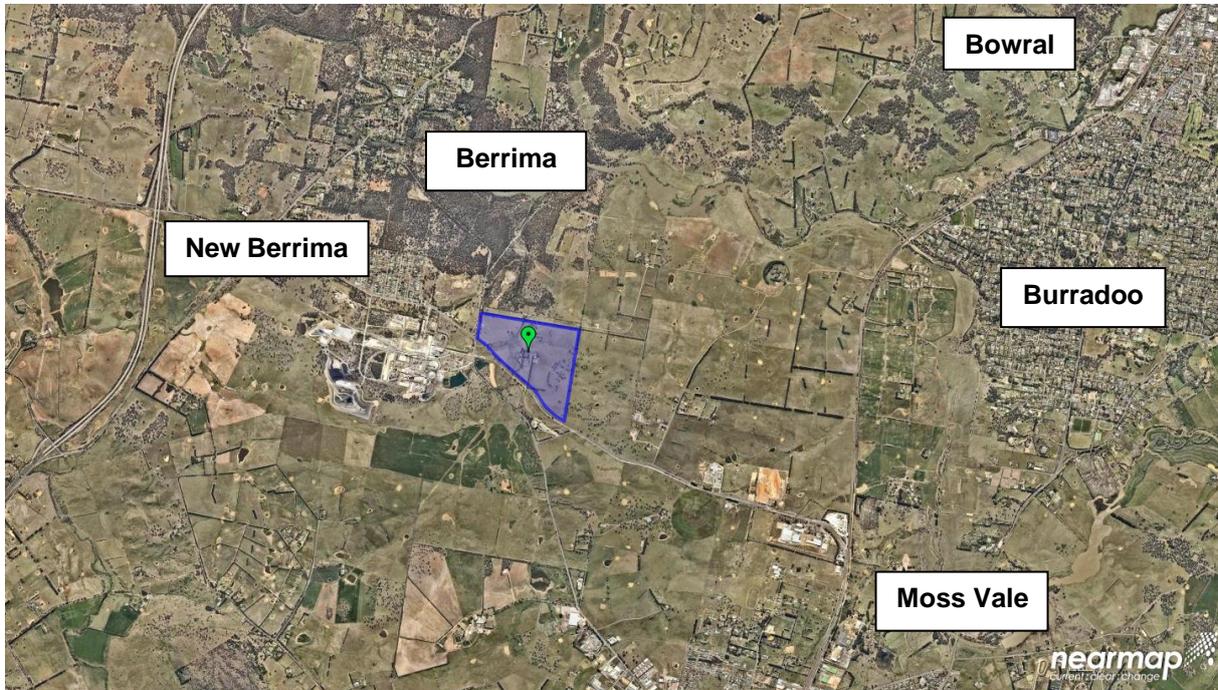
The report is structured as follows:

- **Section 2** examines the benefits of introducing new brick factory on the subject site including direct and indirect jobs created.
- **Section 3** considers any other economic and community impacts that are achievable as a result of development.
- **Section 4** estimates the effect of the development in terms of its effects on taxation and duty revenues to the Local and State Government.
- **Section 5** Appendices & References.

1.1 Regional and Locational Context

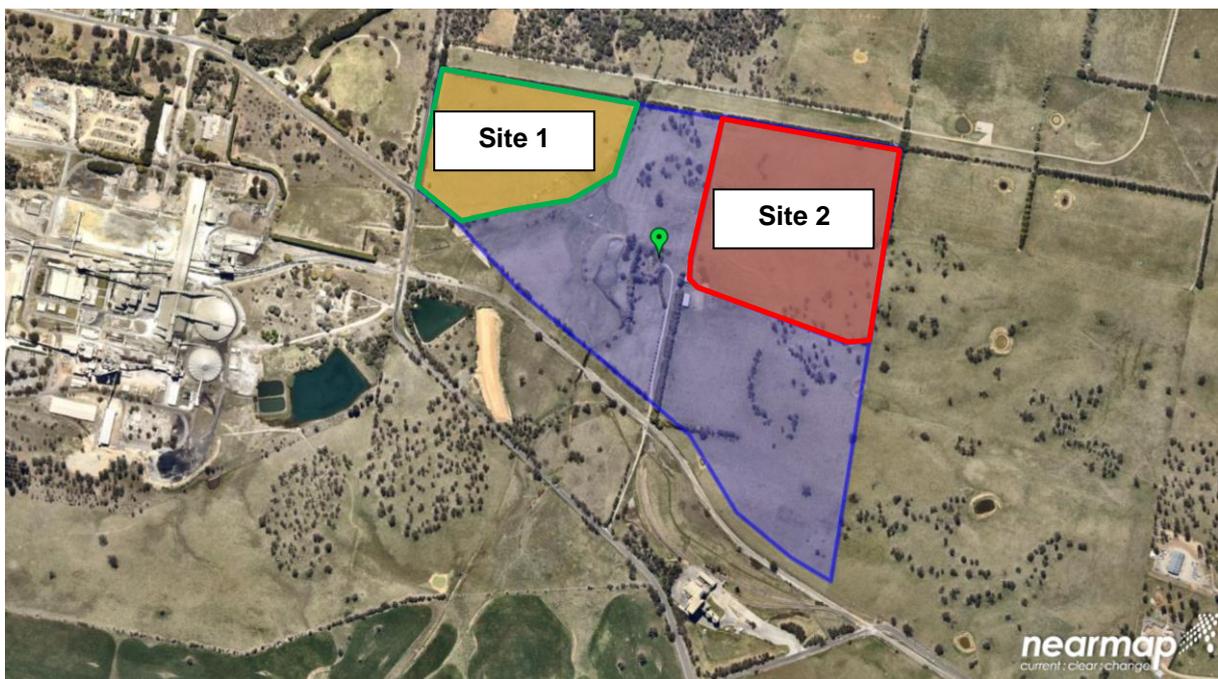
The proposal is for the development of a vacant site within the existing Chelsey Park Farm. Figures 1 to 3 illustrate the land's location and general layout (see location below).

Figure 1 Subject Site (416 Berrima Road, New Berrima)



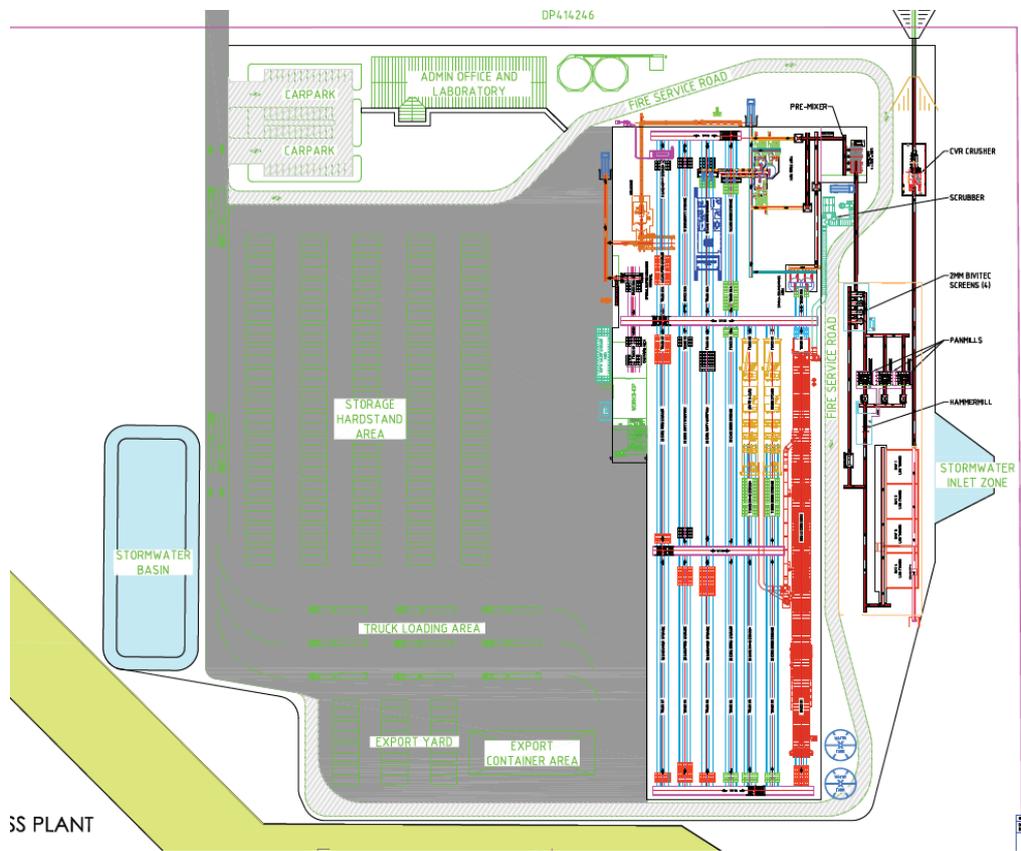
Source: Nearmap

Figure 2 Site Plan



Source: Nearmap, Brickworks

Figure 3 Layout plans



Source: Brickworks

416 Berrima Road is a 51.7ha rural lot on the eastern side of Berrima Road, around 2 km southeast of the Berrima town centre. It appears mainly used for extensive agriculture (i.e. grazing) and is also occupied by a dwelling house along with various outbuildings.

The site’s western boundary directly adjoins Berrima Road, but vehicular access is currently obtained from 372 and 475 Berrima Road (i.e. Lot 101 DP882139 & Lot 1 DP1017008, respectively) to the south of the subject site.

The land has gently undulating topography. It is traversed by Stony Creek and some unnamed minor tributaries, but the proposed development site itself does not coincide with any mapped watercourses. Vegetation on the land mainly comprises grazed pasture, along with scattered native trees and exotic tree plantings adjacent to the internal driveway and some dwelling houses.

Most surrounding properties appear used for agricultural purposes, with notable exceptions including Boral Cement Works around 800m to the southwest, and Ingham’s poultry feed manufacturing facility around 950m to the southeast.

1.2 Background

Bowral Bricks currently operates from a factory and a quarry located at Kiama Street, Bowral. The applicant has occupied this site for over 95 years. The equipment and kilns located on the site are old and inefficient. The quarry is nearing exhaustion with only 3 to 4 years of reserves left on site.

New Berrima Quarry, known as ‘Mandurama’ was purchased in 2008 as a replacement quarry for Bowral Bricks. The quarry has been approved and work has commenced on preparing the site for full time production of material in stages, as the demand for quality building products and distribution is required.

Land at New Berrima, known as “Chesley Park” was purchased in 2013 to provide the option of relocating factories to this site from Bowral.

On 16 March 2018, Wingecarribee Shire Council provided pre-lodgement advice regarding the development now proposed for a masonry factory on Site 1 of Chesley Park (refer to the Figure 2). The Council’s advice confirmed the proposed development is permitted on the land with development consent. Subsequently, a development application was lodged.

Now, the applicant seeks development consent to erect buildings and carry out works for the purpose of general industry, more specifically a new bricks plant on the Site 2 (refer to the Figure 2). For this assessment, we focus on the Site 2 (i.e. subject site).

Table 1 Lot registration details and land area (Site 2)

Address	Title Information	Developable Area	Zoning
416 Berrima Road, New Berrima	Lot 1, DP785111	14.8 ha	General Industrial (Moss Vale Enterprise Corridor)

Source: Brickworks

1.3 Scope of Work

Macroplan has assessed the value of construction and infrastructure associated with the potential development of the brick plant on the subject site, which will include:

- Assess the potential economic benefit during development phase (i.e. direct, indirect and induced employment generation and value-added estimation)
- Assess the projected benefit of the development following completion of construction
 - Projections of total ongoing jobs created as a direct result of the brick plant development
 - Projections of total full-time equivalents generated as an indirect and an induced result of the development
- Consider any other economic/community benefits (e.g. more local spending from residents and workers, employment self-containment etc.)
- Estimate the effect of the development in terms of its effects on taxation and duty revenues to the Local and State Government, including; Stamp duty, Land tax, Payroll tax and State Government GST revenue.

1.4 Data and Information Sources

Our research draws on a wide range of information sources including: various planning and strategic documents (Local, State and Federal), NSW Department of Planning, Industry and Environment Projections, Department of Jobs and Small Business data, TPA Population & Employment Projections; Australian Bureau of Statistics – Census data (2011 & 2016) and various latest statistics; and relevant experience throughout NSW and Australia, with particular reference to socio-economic profiles, industry trends, and recent property market trends in Berrima and Wingecarribee.

1.5 Limitations

The information in this report have been obtained from, and opinions herein are based on, sources believed to be reliable. Although great care has been taken to ensure accuracy and completeness in this report, Macroplan has not independently verified and does not accept responsibility for its completeness and accuracy of the factual information on which its opinions and assumptions are based. Further, as the report involves future forecasts, it can be affected by a number of unforeseen variables. It represents for the party to whom or which it is addressed the best estimates of Macroplan, but Macroplan can give no assurance that any forecasts will be achieved.

Section 2: Employment Generation

In this section of our report, we examined the spatial context of the subject land, and considered its employment dividend and its potential role in contributing to the employment future of the Wingecarribee Shire generally. The assessment considered the employment returns that are achievable as a result of development compared to the current employment dividend potential (i.e. 'Do nothing' vs 'proposed development').

The proposed development can support local employment by maintaining employment/industrial land stocks and local employment objectives, while promoting key local industries and can generate more employment during the planning, construction, operation and maintenance stages.

There are three elements to the impact of expansion of a particular industry:

- First, there is the direct employment, value-added (income), and output in that industry.
- Secondly, there is the indirect employment, value-added (income), and output of other industries supplying inputs into the industry.
- The third element is the induced spending impact. This comes from the economic ripples that result from added consumption generated by the added income spent by those employed directly and indirectly. For example, employees spend their incomes at local supermarkets, car dealerships and hotels and these local firms have workers of their own.

2.1 Development Phase

Based upon details provided, the estimated project cost of the brick plant at New Berrima is expected to be approximately \$80 million, which comprises site works, construction and equipment installation. This development will generate 60 to 65 full-time equivalent jobs per annum directly in the construction industry and a further 95 to 100 full-time equivalent jobs per annum indirectly (for example, jobs in transport, manufacturing, fabrication, design etc).

2.2 Post-development

2.2.1 Direct Employment

As previously observed, the existing Bowral Bricks represents the main business format at the current site in Bowral. The current land use at Bowral Bricks is consistent with the current planning intended outcome. The Bowral brick plant currently supports close to 35 FTE workers¹.

Given that the Bowral quarry is nearing exhaustion, distant from key economic access and logistics infrastructure (i.e. Hume Highway), and physically isolated by a number of constraints such as narrow road shared with local residents and adjoining residential areas; Macroplan envisages that the future of the Bowral Bricks' current operation and employment is likely to be in some doubt.

¹ Macroplan – Site Inspection 18th October 2019

The plant in Bowral operates within a constrained area in Bowral so that expansion of the plant is probably not an option. Indeed, if the plant did not exist and there was a proposal to establish (or expand) a plant in Bowral, it is doubtful that it would receive public support. Bowral is very much a 'residential' township today, with a high retiree population and focus on tourism, education and health as the principal activities in the township.

The project approval at New Berrima will allow for continuing and expanded employment outcome, compare to the current operation of the existing factory at Bowral. Based on the given information from the applicant, the proposed brick plant at New Berrima can accommodate about 40 FTE workers, equating to about 15% increase in direct employment.

Further to this, the subject site at New Berrima has additional amounts of land available, which presents the applicant with options for future expansion whilst providing sufficient room for planting buffers to minimise land use conflicts.

2.2.2 Indirect and Induced Employment

The following analyses of the brick manufacturing sector indicate the linkages with other sectors within the Wingecarribee Shire. This includes the current labour input from the existing brick factory at Bowral.

Presently, Bowral Bricks employs 35 direct jobs, on this measure total impact is 68 jobs, implying a ratio of 1.94 jobs for each direct job. Therefore, the total employment multiplier is 1.94 (i.e. 100 direct jobs at the brick factory will generate about 94 indirect and induced jobs outside the factory).

Table 2 Total Impact of Current Brick Making Operation, Bowral Bricks, Wingecarribee LGA

	Direct	Indirect	Induced	Total Impact	Ratio Total to Direct
Output (\$'m)	18.3	3.1	6.6	28.0	1.53
Value Add (\$'m)	5.8	1.3	3.0	10.0	1.74
Employment (jobs)	35	10	23	68	1.94

** all figures are rounded to decimal point*

Source: ABS, Macroplan

Looking at the current make-up of total impact on employment, of the 32 indirect and induced jobs created from brick making operation about one-third are indirect jobs with the remaining two-third are induced jobs.

- The brick making operation is highly capital-intensive with most of its value-added generated by highly skilled direct workers onsite (e.g. machine operators, engineers). According to our assessment, this sector is not heavily dependent on the supplies of other sectors/industries except the quarry mining (and transportation).
- Spending multipliers of the workforce will be bigger factors because these highly skilled workers are high-income earners. Through consumption of goods and services (i.e. food catering, fresh food, eateries, local services), more local jobs could be supported in Berrima and Wingecarribee generally.

From the Government's perspective, retaining expenditure and expanding on it through population and employment growth must be facilitated in the local area. This type of worker is likely to work and live close to your place of work (i.e. family obligation, prefer short commute etc.). Our view is that large proportion of its workforce would be local residents from nearby towns in the southern highlands. It would mean that they are more likely to spend their income within the Wingecarribee Shire.

As discussed before, the project approval will allow for expanded employment outcome in terms of direct jobs which means it can generate additional indirect jobs. Based on our multiplier assessment, 40 FTE direct jobs at the brick factory will generate 38 indirect and induced jobs outside the factory, equating to about 19% increase in the current indirect and induced employment.

Table 3 Total Impact of Brick Making Operation, New Berrima (with approval), Wingecarribee LGA

	Direct	Indirect	Induced	Total Impact	Ratio Total to Direct
Output (\$'m)	20.9	3.5	7.6	32.1	1.53
Value Add (\$'m)	6.6	1.5	3.4	11.5	1.74
Employment (jobs)	40	12	26	78	1.94

** all figures are rounded to decimal point*

Source: ABS, Macroplan

Section 3: Other Economic Impacts

In this section of the report considered other economic and community impacts that are achievable as a result of development.

3.1 Transport Cost

Quarrying minerals are of relatively low unit-value compared to the costs of transportation. For example, the costs associated with extracting and processing of aggregate on site will often be less than the costs of transporting the aggregate into a nearby urban location. This has an important implication that processing may need to be undertaken on the quarry-site or near to the quarry site due to the relatively high costs of transport.

Bowral Bricks currently operates from a factory and a quarry co-located at 1 Kiama Street, Bowral. The applicant has occupied this site for over 95 years, but the existing quarry is nearing exhaustion with only 3 to 4 years of reserves left on site. Further to this, the onsite equipment and kilns at Bowral Bricks are economically inefficient due to ageing and obsolescence.

Macroplan has been informed that the new Berrima quarry (Mandurama) would ensure a continued supply of shale to the Bowral brick plant after Bowral quarry closes in the next few years, allows the extraction of up to 150,000 tonnes of clay/shale material a year for up to 30 years.

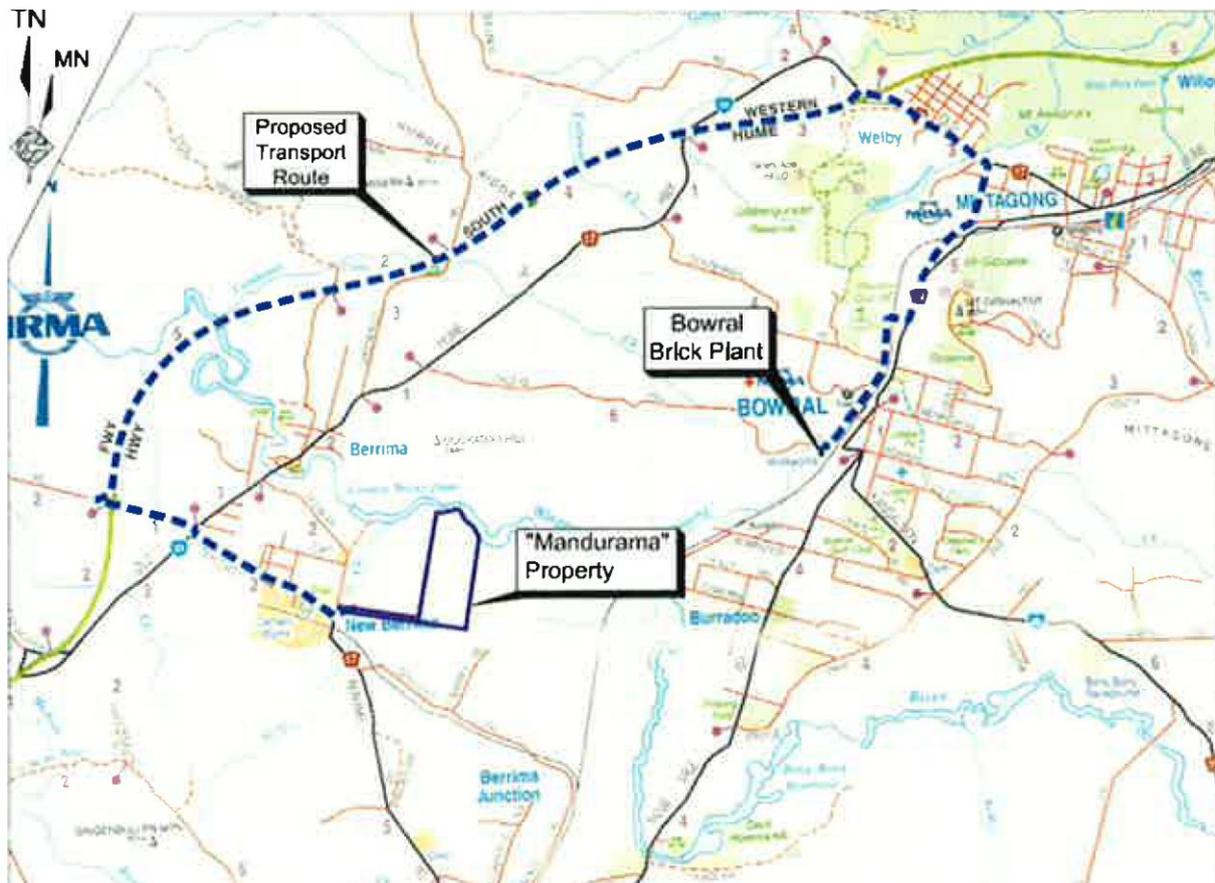
Figure 4 Bowral Bricks (1 Kiama St, Bowral)



Source: Nearmap

Without the project approval on Site 2 of Chesley Park, however, the shale from 'Mandurama' (New Berrima) still need to be trucked to Brickwork's Bowral brick plant for the production of dry-pressed bricks. The new quarry and the existing Bowral brick plant are spatially separated and distant by a number of constraints including a narrow road shared with local residents and adjoining residential lands in Bowral (and Mittagong). Restrictions on road services not only hinder the efficient and timely operation of brick production itself, but also incur high transport cost of manufactured bricks to the markets.

Figure 5 Location of the New Berrima Quarry & Bowral Brick Plant



Source: NSW Department of Planning, Infrastructure and Environment

The project approval would allow processing to be undertaken on the future quarry at New Berrima. That is, from a shipping perspective, there is also a cost advantage but also a significant advantage in terms of taking large trucks out of residential areas. Moreover, the subject at New Berrima is more accessible to highway traffic which will effectively bring down transport cost.

3.2 Employment Containment

Job containment refers to the proportion of working residents who are employed within their LGA to the total number of working residents. A high self-containment implies there are many jobs in an area which employ local people – evidence of a strong regional employment base.

Wingecarribee Shire currently achieves a healthy self-containment level of 60%². However, we note that a high proportion of local workers in Berrima travel to work outside of Wingecarribee Shire - only about one third of Berrima's employed residents work in Wingecarribee Shire.

If relocation of the plant to Berrima were not allowed, the higher cost of production (i.e. older plant, higher transport costs) might see the long-term viability of the plant in question. This would see these jobs lost. This would cost 40 FTE jobs directly. It would cost about 12 jobs indirectly and 26 jobs in terms of lost induced spending. All up the total jobs lost would be 78 jobs. While some of these workers might find work in the area, however, the likelihood is that some with specialist skills will be forced to move to find work. This means that Wingecarribee will have a lower self-containment rate and will become less self-contained.

Further to this, there will be a cost borne by those workers and their families who have to move from one town to another. If relocation is to Sydney, then these workers will face either higher housing costs or long commutes.

3.3 Impact on Local Market

The markets for quarry products are predominantly local markets. As such, the cost of extraction and availability of quarry sites have important implications for local development. Thus, for example, an increase in the cost of quarry operations will impact local construction costs. This is in contrast to precious metals for which prices are established by international markets.

As mentioned before, the applicant has indicated that the onsite equipment and kilns at Bowral Bricks are economically inefficient due to ageing and obsolescence. If the project approval is not granted, Brickworks will end up with higher costs of production and transport. If Brickworks choose to operate without the relocation of the plant, these higher costs will be passed on to consumers and industries (and effectively the government) in terms of higher prices of dry pressed brick products. In addition to losing direct job creation (i.e. the proposed brick plant at New Berrima can accommodate more FTE workers than the current operation at Bowral), project disapproval would also affect the large number of indirect jobs in the broader economy.

3.4 Industry Value Added

Industry Value Added (IVA) is the sum of income from labour (wages), land (rent) and capital (profit) generated by the production of economic goods and services. The development of the new brick factory requires investment (profit), resulting in the creation of jobs (wages) in different industries (e.g. brickmaking operation jobs located at 416 Berrima Road, New Berrima will contribute to the overarching Wingecarribee brickmaking industry's total income through wages and profit). The IVA in this case demonstrates the monetary value the project will contribute to the local economy.

In its developed form, the proposed brick factory will employ about 40 FTE direct workers (professionals and associated office workers). This could generate an IVA of close to \$6 million per annum³.

² ABS Census 2016

³ Refer to methodology in Appendix - 5.3

Section 4: State Government Revenues

In this section of the report, Macroplan has estimated the effect of the development in terms of its effects on taxation and duty revenues to the Local and State Government, including; Stamp duty, Land tax, Payroll tax and State Government GST revenue.

4.1 Benefit to Wingecarribee Shire Council

As noted elsewhere, the current brick factory operation employs 35 persons directly. In addition, there are 32 persons indirectly employed. This is a benefit to the local economy. The expanded Brick works operation will increase efficiency but, with increased volume shipped, it will nonetheless marginally increase employment. The new brick plant at New Berrima could directly employ 40 jobs. Indirectly, this would add another 38 jobs or equivalently boost the revenues of local businesses. In net terms the potential boost to jobs is 10 jobs. This will be another positive for the local economy.

Importantly, the investment in a modern, large scale plant will also mean increased certainty for the long-term jobs which is also be a positive for all the workers and for local businesses.

An additional point is that the intensity of industrial use of the existing site is likely to increase. The current brick making operation is a low density use of the land. With a mix of industrial and commercial uses (e.g. tourism, education and health) the existing site could directly employ about 300 persons which would be a significant boost to the local economy.

The shift to the new site, will increase the revenue for the Council as higher rates apply to industrial land (i.e. mining – 1.52%). Based on land value of \$3,860,000, this will generate \$58,738 per annum. In addition, the increase in intensity of use of the existing site could be expected to increase the value of that land which will in turn increase revenue for the Council.

Table 4 Adopted rating structure, Year 2019/20

Category	Sub-category	Rate Per \$	Minimum Rate
Residential	Ordinary	0.0046112	\$1,140.17
Residential	Renwick	0.0050723	\$1,140.17
Business	Ordinary	0.0092224	\$1,140.17
Mining	Ordinary	0.015217	\$1,140.17
Farmland	-	0.0029973	\$1,666.12
Environmental Levy	-	0.000063250	\$26.33

Source: Wingecarribee Shire Council

4.2 Land Tax

The new site involves agricultural land, which is exempt from land tax, becoming industrial land which will increase land tax for the NSW Government. Based on land value of \$3,860,000, this will generate \$49,304 per annum.

In addition, the increased intensity of land use on the existing site is likely to increase its land value which will increase the land tax generated.

Table 5 Land Value, as at 1 July 2018

Address	Land Area (sqm)	Land Value
CHESLEY PARK, 416 BERRIMA RD, MOSS VALE NSW 2577	516,800	\$3,860,000

Source: Valuer General NSW

4.3 Payroll Tax

Presently, the Brickworks operation (i.e. Bowral) employs 35 persons directly (including office/admin/managers). Based on average wage and salaries this would generate payroll tax revenue of between \$150,000 and \$200,000. In addition, there are 32 persons indirectly employed which, depending on the mix of businesses, could generate another \$90,000 to \$100,000.

The expanded Brick works operation will increase efficiency but with increased volume shipped, it will nonetheless marginally increase payroll tax revenues. Based on our direct and indirect jobs creation analysis, this would generate another \$40,000 to \$45,000.

As discussed above, the intensity of industrial use of the existing Bowral site is likely to increase. The current operation is a low density use of the land. With a mix of industrial and commercial uses the existing site could directly employ about 300 persons and indirectly another 150 jobs. In aggregate this would generate \$1.5 to \$1.6 million in payroll revenues.

4.4 State Government GST revenue

The employment factors which drive payroll tax revenues will also lead to increased spending which in turn will increase GST revenues. Based on the projected direct and indirect employment at New Berrima site, we estimate that it will generate another \$100,000 to \$120,000 i.e. additional GST revenue for the State.

Section 5: Appendices

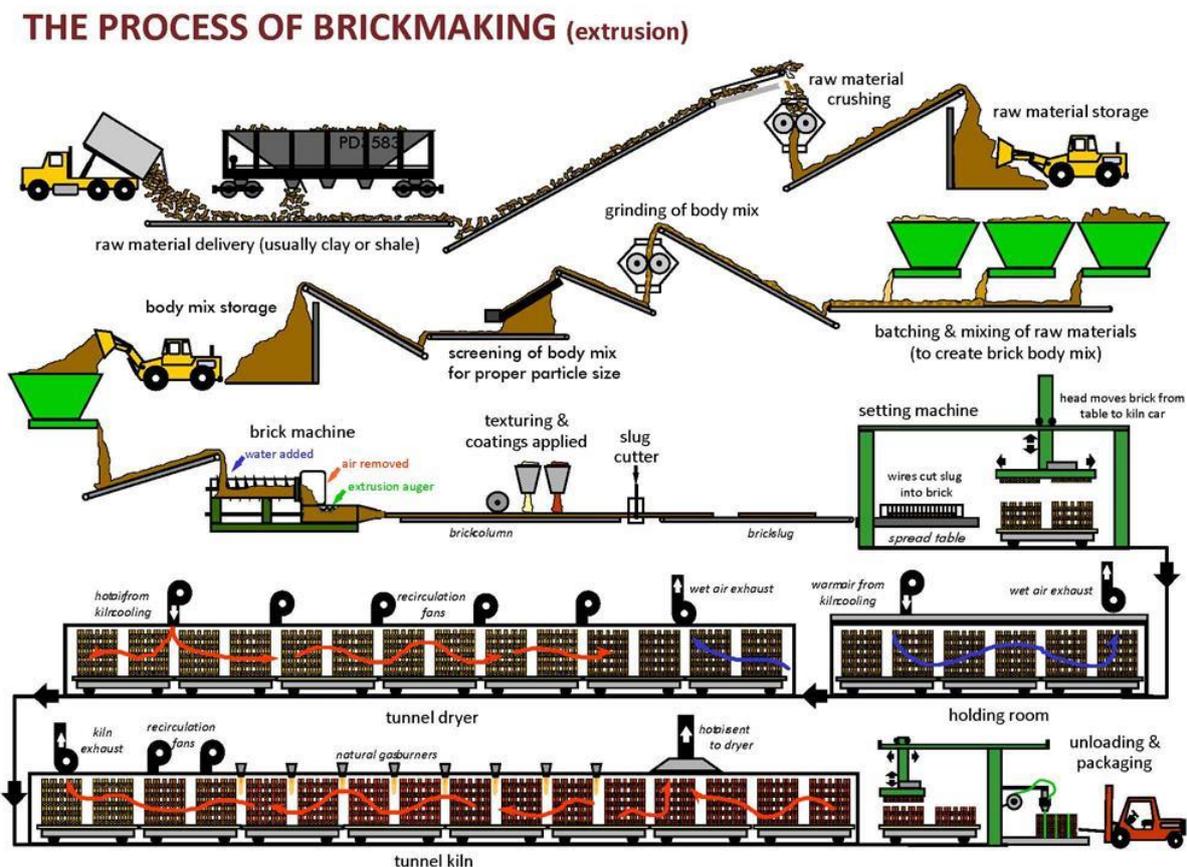
5.1 Manufacturing of Bricks

Although the basic principles of manufacture are fairly uniform, individual manufacturing plants tailor their production to fit their particular raw materials and operation. Essentially, bricks are produced by mixing ground clay with water, forming the clay into the desired shape, and drying and firing.

- Preparation of brick clay or brick earth
- Moulding of bricks
- Air drying of bricks
- Burning of bricks

The fundamentals of brick manufacturing have not changed over time. However, technological advancements have made contemporary brick plants substantially more efficient and have improved the overall quality of the products. A more complete knowledge of raw materials and their properties, better control of firing, improved kiln designs and more advanced mechanization have all contributed to advancing the brick industry.

Figure 6 Diagram of Production Process



Source: The Brick Industry Association (BIA)

5.2 Industry Profile

According to Census data, the Wingecarribee Shire accommodated 17,913 jobs as at 2016. At the time, the largest employing industry, 'Health Care and Social Assistance', supported 2,544 of these jobs (14%). Of the remaining industries, the next two largest employing industries operating in the local government area were 'Retail Trade' (11.7%) and 'Accommodation and Food Services' (11.1%). Macroplan also noted that 'Manufacturing' supported 1,331 of these jobs, equivalent to 7.4% of total jobs in the Wingecarribee Shire.

At the 4-digit level of the ANZSIC classification⁴, the following sub-sets of 'Non-Metallic Mineral Product Manufacturing' industry is available to explore:

- Non-Metallic Mineral Product Manufacturing, nfd
- Glass and Glass Product Manufacturing
- Ceramic Product Manufacturing, nfd
- Clay Brick Manufacturing
- Other Ceramic Product Manufacturing
- Cement, Lime, Plaster and Concrete Product Manufacturing, nfd
- Cement and Lime Manufacturing
- Plaster Product Manufacturing
- Ready-Mixed Concrete Manufacturing
- Concrete Product Manufacturing
- Other Non-Metallic Mineral Product Manufacturing

Key points to note from this industry profile analysis include:

- The Wingecarribee Shire accommodated 243 jobs within the Non-Metallic Mineral Product Manufacturing industry as at 2016.
- 24 of those jobs were in clay brick manufacturing (in Bowral) and 140 jobs in cement and lime manufacturing (mostly in Berrima).
- Note: the 24 jobs in brick clay manufacturing in Bowral represents jobs which are classified as (pure) manufacturing only. It is consistent with 35 persons being employed at the Bowral brickworks.
- Over the last five years to 2016, Wingecarribee saw some jobs decline within the Non-Metallic Mineral Product Manufacturing industry, from 315 jobs in 2011 to 243 jobs in 2016.

⁴ The Australian and New Zealand Standard Industrial Classification (ANZSIC) is the standard classification used in Australia and New Zealand for the collection, compilation and publication of statistics by industry.

The Australian and New Zealand Standard Industrial Classification (ANZSIC) is an industry classification used to classify industries and sectors in the Australian and New Zealand labour markets, that provides a broad overall picture of the economy at the major (1 digit), sub-major (2 digit), minor (3 digit) and unit group (the most detailed 4-digit ANZSIC).

Table 6 Number of Jobs by Industry, Wingecarribee LGA (ANZSIC Digit 1, Place of Work), 2016

Industry	Bowral SA2	Moss Vale - Berrima SA2	Wingecarribee LGA
Agriculture, Forestry and Fishing	85	86	655
Mining	12	88	141
Manufacturing	145	640	1,331
Electricity, Gas, Water and Waste Services	8	62	126
Construction	365	327	1,404
Wholesale Trade	84	153	384
Retail Trade	743	461	2,089
Accommodation and Food Services	672	407	1,993
Transport, Postal and Warehousing	76	235	639
Information Media and Telecommunications	76	29	164
Financial and Insurance Services	212	35	341
Rental, Hiring and Real Estate Services	172	55	372
Professional, Scientific and Technical Services	519	193	1,139
Administrative and Support Services	200	118	608
Public Administration and Safety	158	303	576
Education and Training	606	404	1,561
Health Care and Social Assistance	1,605	324	2,544
Arts and Recreation Services	62	88	274
Other Services	263	184	780
Unclassified	226	196	788
Total	6,291	4,388	17,913

Source: ABS, Macroplan

Table 7 Number of Jobs by Industry, Non-Metallic Mineral Product Manufacturing, Wingecarribee LGA (ANZSIC Digit 4, Place of Work), 2016

Industry	Bowral SA2	Moss Vale - Berrima SA2	Wingecarribee LGA
Non-Metallic Mineral Product Manufacturing,	0	0	3
Glass and Glass Product Manufacturing	3	16	16
Ceramic Product Manufacturing, nfd	0	0	0
Clay Brick Manufacturing	24	0	24
Other Ceramic Product Manufacturing	0	0	0
Cement, Lime, Plaster and Concrete Product Manufacturing, nfd	0	0	0
Cement and Lime Manufacturing	0	129	140
Plaster Product Manufacturing	0	0	0
Ready-Mixed Concrete Manufacturing	0	3	14
Concrete Product Manufacturing	0	6	21
Other Non-Metallic Mineral Product Manufacturing	0	14	25
Total	27	168	243

Source: ABS, Macroplan

**Table 8 Number of Jobs by Industry, Non-Metallic Mineral Product Manufacturing, Wingecarribee LGA
(ANZSIC Digit 4, Place of Work), 2011**

Industry	Bowral SA2	Moss Vale - Berrima SA2	Wingecarribee LGA
Non-Metallic Mineral Product Manufacturing, nfd	0	0	0
Glass and Glass Product Manufacturing	11	0	11
Ceramic Product Manufacturing, nfd	0	0	0
Clay Brick Manufacturing	27	0	28
Other Ceramic Product Manufacturing	3	0	4
Cement, Lime, Plaster and Concrete Product Manufacturing, nfd	0	0	4
Cement and Lime Manufacturing	0	161	175
Plaster Product Manufacturing	0	0	0
Ready-Mixed Concrete Manufacturing	0	9	17
Concrete Product Manufacturing	0	0	52
Other Non-Metallic Mineral Product Manufacturing	0	15	24
Total	41	176	315

Source: ABS, Macroplan

5.3 IVA Calculation Methodology

The Australian Bureau of Statistics (ABS) constructs estimates of Industry Value Added (IVA) and Gross Regional Product (GRP) for each of the States, but not at a regional or Local Government Area (LGA) level. There is insufficient data at the regional or LGA level for the ABS to assert a degree of confidence around IVA/GRP estimates, suggesting that estimates of IVA/GRP at the LGA or suburb level need to be treated with some caution.

With that qualification, the Office of the Chief Economist of Department of Industry, Innovation and Science (OCE) has published provisional estimates of regional GRP for 2014/15. The methodology used by the OCE is set out in broad terms in its 2016 Report. It uses partial data, relative employee compensation (vs Labour Value Added and Capital Value Added for State industries) in most instances, to determine ratios and a region's share of State IVA. The methodology is reasonable and defensible but (as the OCE would agree) the results need to be treated with caution.

This report has adopted the OCE methodology, to generate 'estimates' of output by regions in Australia, in this case for the proposed brick factory. Taking the estimates of floorspace by industry, we use standard measures of space per worker to derive a potential workforce if the floorspace were fully utilised.

Total factor income measures the total income generated by the production of economic goods and services. In the case of labour this means income from wages, while income from land is rents and income from business is profits. Total factor income by industry looks at the total income generated by an industry. To calculate the Industry Value Added (IVA) by industry, ***the total factor income per worker by industry for NSW is applied to the number of workers per industry to generate an estimate of total factor income for each industry.*** Total factor income incorporates income generated from capital (profit) – the methodology incorporates the assumption of the NSW capital/labour ratio for each industry. The aggregate of income (wages) and capital (profit) from each industry is an estimate of industry value added.

The estimates of IVA generates an estimate of gross regional product (GRP) for this small area, i.e. the proposed brick factory at New Berrima, a monetary measure of the market value of all final goods and services produced in a region.

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