



HUMECOAL
PROJECT



VOLUME 3C

Hume Coal Project

Environmental Impact Statement

Appendix D
Berrima Rail Project Environmental Impact Statement
– Appendices I to J

Prepared for Hume Coal Pty Limited
March 2017



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Appendix D

Berrima Rail Project Environmental Impact Statement
– Appendices I to J





Statement of Heritage Impact

Appendix I



Appendix I — Statement of Heritage Impact



Berrima Rail Project

Statement of Heritage Impact

Prepared for Hume Coal Pty Limited | 2 March 2017



Berrima Rail Project

Statement of Heritage Impact

Prepared for Hume Coal Pty Limited | 2 March 2017

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Berrima Rail Project

Final

Report J12055RP1 | Prepared for Hume Coal Pty Limited | 2 March 2017

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Date 2 March 2017

Date 2 March 2017

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Document Control

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1 Introduction

1.1 Overview

Hume Coal Pty Limited (Hume Coal) is seeking approval for the construction and operation of a new rail spur and loop (the Berrima Rail Project) in the Southern Highlands region of New South Wales (NSW). Hume Coal is also seeking approval in a separate State significant development application to develop and operate the Hume Coal Project; an underground coal mine and associated mine infrastructure in the NSW Southern Coalfields. Coal produced by the Hume Coal Project will be transported to port for export or to domestic markets by rail via a new rail spur and loop, constructed as part of the Berrima Rail Project.

Approval for the Berrima Rail Project (the project) is being sought under Part 4, Division 4.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). An environmental impact statement (EIS) is a requirement of the approval processes. This historic heritage assessment and statement of heritage impact forms part of the EIS. It documents the methodology and results of the assessment, the measures taken to avoid and minimise impacts and the additional mitigation and management measures proposed.

Development consent for the Berrima Rail Project is one of three approvals required under the EP&A Act for the Hume Coal mine to operate. Hume Coal is therefore seeking:

- development consent for the mine and associated facilities (ie the Hume Coal Project) under Part 4, Division 4.1 of the EP&A Act;
- development consent for the construction and use of a new rail spur and loop (the rail project which is the subject of this report) under Part 4, Division 4.1 of the EP&A Act; and
- an activity approval for proposed electricity supply works under Part 5 of the EP&A Act.

All three projects are inextricably linked, in that one will not be developed without the other two. Approval for the three projects is therefore being sought simultaneously, and construction will occur concurrently.

The location of the project is shown in Figure 1.1, and the local context around the project area is illustrated in Figure 1.2.

1.2 Project description

The Berrima Rail Project will enable the transportation of coal produced by the Hume Coal Project to various customers. The new rail spur and loop will be connected to the western end of the existing Berrima Branch Line; a privately owned line branching off the Main Southern Rail Line at the Berrima Junction approximately 2.5 km north of Moss Vale. The Berrima Branch Line is owned and used by Boral Cement Ltd (Boral) for the transportation of cement, limestone, coal and clinker to and from the Berrima Cement Works. It is also used by Inghams Enterprises Pty Limited (Inghams) for the transportation of grain to its feed mill east of the cement works, and by Omya (Australia) Pty Ltd (Omya) for the transportation of limestone to their Moss Vale plant at the Berrima Junction.

In addition to the construction of the new rail spur and loop, the project also involves upgrades to the Berrima Branch Line and the use of the rail infrastructure by Hume Coal and Boral. The rail project and the Hume Coal Project are the subject of separate development applications as the rail project involves rail infrastructure used by users other than Hume Coal, as noted above.

Hume Coal will transport product coal by rail, primarily to Port Kembla for export, and possibly to the domestic market depending on demand. Hume Coal will transport up to 3.5 Million tonnes per annum (Mtpa) of product coal which will require up to eight train paths per day (four in each direction), with a typical day involving four to six paths (two to three in each direction).

In summary the project involves:

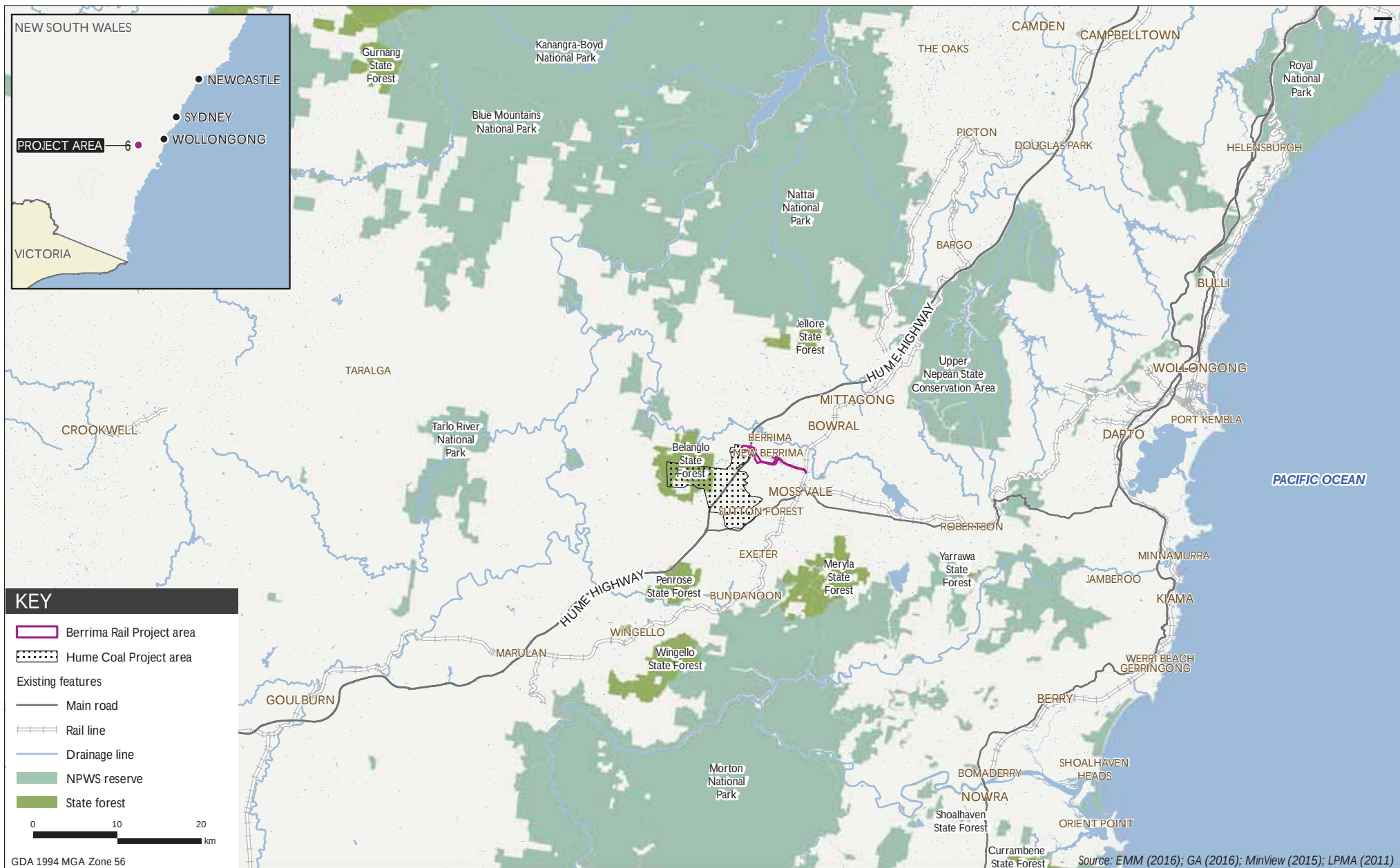
- upgrades to Berrima Junction (at the eastern end of the Berrima Branch Line) to improve the operational functionality of the junction, including extending the number 1 siding, installation of new turnouts and associated signalling on the branch line. This does not involve any work at or beyond the interface with ARTC-controlled track;
- construction and operation of a railway bridge over Berrima Road;
- construction and operation of a new rail connection into the Berrima Cement Works from the railway bridge;
- decommissioning of the existing rail connection into the Berrima Cement Works including the Berrima Road level rail crossing;
- construction and operation of a new rail spur line from the Berrima Branch Line connection to the Hume Coal Project coal loading facility;
- construction and operation of a grade separated crossing (railway bridge) over the Old Hume Highway;
- construction and operation of maintenance sidings, a passing loop and basic provisioning facility on the western side of the Old Hume Highway, including an associated access road, car parking and buildings;
- construction and operation of the Hume Coal rail loop within the Hume Coal Project area, adjacent to Medway Road; and
- construction and operation of associated signalling, services (including water, sewerage drainage), access tracks, power and other ancillary infrastructure.

The conceptual project layout is illustrated in Figure 1.3. As shown, approval is sought for two alignments of the new rail line where it will cross Berrima Road. The preferred option is the blue rail alignment shown in Figure 1.3, which includes construction of a railway bridge over Berrima Road as described in the points above. This preferred project design has been developed in consultation with Boral as the owner of the Berrima Branch Line.

The alternative option (orange alignment in Figure 1.3) accounts for a proposal by Wingecarribee Shire Council (WSC) to realign approximately 700 m of Berrima Road between Taylor Avenue and Stony Creek to replace the T-intersection at Berrima Road and Taylor Avenue with a roundabout, and to replace the existing rail level crossing into the Berrima Cement Works with a rail overbridge. If WSC relocates Berrima Road to the alignment shown in Figure 1.3, then the following project components will vary:

- the turnout for the new spur line to service the Hume Coal Project would be installed on the existing Berrima Branch Line approximately 1000 m east of the cement works. A short section of the existing Berrima Branch Line would be shifted north, within the rail corridor on Boral-owned land, to accommodate the spur line;
- the construction of a railway bridge over Berrima Road would be replaced by a railway underpass beneath the realigned Berrima Road, constructed through the elevated embankment for the road;
- the construction of a new rail connection into the Berrima Cement Works from the railway bridge would no longer be required, and the cement works access would remain unchanged; and
- the existing rail connection into the Berrima Cement Works and the Berrima Road level crossing would not be decommissioned, since the road would be realigned to pass over the existing rail alignment using a bridge.

This assessment has considered the impacts of both options shown in Figure 1.3.

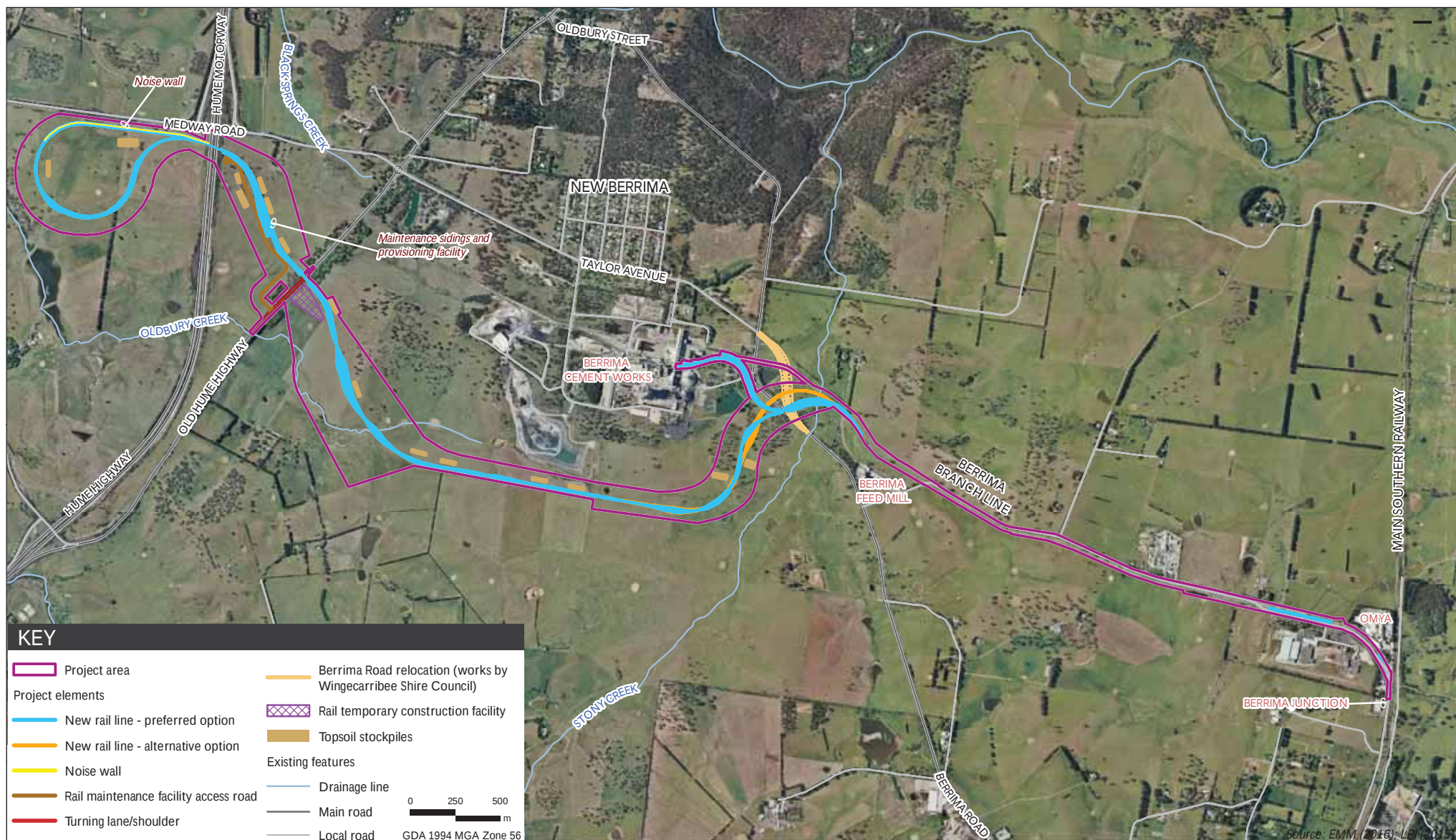


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Locality plan
Berrima Rail Project
Statement of heritage impact
Figure 1.1



Local context
Berrima Rail Project
Statement of heritage impact
Figure 1.2



Conceptual project components

Berrima Rail Project
Statement of heritage impact

Figure 1.3

1.3 Project area

The project area is located in the Southern Highlands region of NSW in the Wingecarribee local government area, approximately 100 km south-west of Sydney. It occupies a corridor that is around 8 km long, stretching from the Berrima Junction on the outskirts of Moss Vale, heading west in parallel with Douglas Road past the Berrima Feed Mill, around the southern side of the Berrima Cement Works, across the Old Hume Highway and under the Hume Highway through an existing underpass into the Hume Coal Project area, south of Medway Road.

The project area is in a semi-rural setting. It is surrounded by grazing properties, small-scale farm businesses, scattered rural residences, and large and small industries and is traversed by the Hume Highway. The project area contains predominately cleared agricultural land consisting of improved pasture for grazing, and over a third of the area comprises the existing Berrima Branch Line.

The villages of New Berrima, Berrima and Moss Vale are located in the general area. Medway is also located nearby while Bowral and Mittagong are located between 6 and 10 km north-east of the eastern end of the project area, respectively. There are also scattered homesteads, dwellings and other built structures associated with agricultural production surrounding the project area.

1.4 Assessment guidelines and requirements

This assessment was conducted using the principles of *The Australian International Council on Monuments and Sites, Charter for Places of Cultural Significance* (also known as the *Burra Charter*, Australia ICOMOS 2013) and the *NSW Heritage Manual* (Heritage Office 1996 and 2006).

The Burra Charter defines the concept of cultural significance as “aesthetic, historic, scientific, social or spiritual value for past, present or future generations” (Australia ICOMOS 2013, Article 1.2). It identifies that conservation of an item of cultural significance should be guided by the item’s level of significance.

The Heritage Manual provides guidelines for the assessment of heritage significance and the listing of heritage items in local environmental plans (LEPs) or on the State Heritage Register. The components of the Heritage Manual are informed by the values and definitions in the Burra Charter (Australia ICOMOS 2013). OEH provides other leading practice guides which have informed this assessment including:

- *Statements of Heritage Impact* (NSW Heritage Office and Department of Urban Affairs & Planning 2002);
- *Investigating Heritage Significance* (NSW Heritage Office 2004);
- *Assessing Heritage Significance* (Heritage Office 2001); and
- *Assessing Significance for Historical Archaeological Sites and ‘Relics’* (Heritage Branch Department of Planning 2009).

This assessment has also been prepared in accordance with the SEARs issued for the project (refer to Appendix B of the EIS (EMM 2017)). Table 1.1 lists the individual requirements relevant to the historic heritage assessment and identifies where they are addressed in this report.

Table 1.1 **Historic heritage - relevant SEARS**

Requirement	Section addressed
Heritage - including an assessment of the likely Aboriginal and historic heritage (cultural and archaeological) impacts of the development, having regard to OEH's requirements	This report covers matters relating to historic heritage. Aboriginal cultural heritage has been addressed in a separate report prepared by EMM (2017a).

To inform the preparation of the SEARs, DP&E invited other government agencies to recommend matters to address in the EIS. OEH raised matters relevant to this assessment of heritage impact, being mostly standard considerations for projects of this nature. The matters raised are listed in Table 1.2 and have been addressed in this assessment.

Table 1.2 **Historic heritage - OEH's environmental assessment recommendations**

Office of Environment and Heritage	Where addressed
The EIS must provide a heritage assessment including but not limited to an assessment of impacts to <i>State</i> and <i>local heritage</i> including conservation areas, natural heritage areas, places of Aboriginal heritage value, buildings, works, relics, gardens, landscapes, views, trees should be assessed. Where impacts to state or locally significant heritage items are identified, the assessment shall:	All of these aspects related to heritage are addressed in this report except for Aboriginal values, which are addressed in a separate report (EMM 2017a).
a. outline the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the mitigation measures) generally consistent with the NSW Heritage Manual (1996),	Section 7.4.
b. be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria),	This report has been prepared by a suitably qualified heritage consultant – Pamela Kottaras BA (Hons) with assistance from the heritage team at EMM including Ryan Desic, Andrew Crisp and Pamela Chauvel.
c. include a statement of heritage impact for all heritage items (including significance assessment),	Statements of heritage impact are in Chapter 7 of this report; assessments of significance are in Chapter 6.
d. consider impacts including, but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, landscape and vistas, and architectural noise treatment (as relevant), and	Chapter 7.
e. where potential archaeological impacts have been identified develop an appropriate archaeological assessment methodology, including research design, to guide physical archaeological test excavations (terrestrial and maritime as relevant) and include the results of these test excavations.	Areas of historical archaeological sensitivity have been identified within the project area; the remnants of a timber rail bridge over Stony Creek are likely to be avoided by the project (management measure 1 for the project preferred and project alternative designs).

In accordance with the SEARS, the objectives of the historic heritage assessment are:

- to investigate the potential for items of heritage value, including relics, to exist in the project area;
- to assess the significance of historic heritage items in the project area;
- to assess the potential impacts of the project on items of historic heritage in the project area; and
- to formulate management measures for the protection of historic heritage items in the project area.

The subject of this historic heritage impact assessment is the project area and the immediate surrounds, as shown in Figure 1.1 and 1.2.

2 Assessment method

2.1 Identifying listed heritage items

The first step in identifying historic heritage items in and around the project was to review statutory and non-statutory registers. Listing on statutory registers provides a legal basis under which the item or place is protected and any change is managed through conditioned approvals.

Non-statutory listing is an acknowledgment of a site's or place's importance to sections of the community. Listings on such registers do not place legal requirements on development but nevertheless influence the future of such listed items.

All registers were searched online as outlined below:

- Statutory:
 - The National Heritage List (NHL). This register is made under the EPBC Act;
 - The Commonwealth Heritage List (CHL). This register is also made under the EPBC Act;
 - The State Heritage Register (SHR). This register is made under Part 3A of the Heritage Act;
 - The Heritage and Conservation Register (s170 register). This register is made under Section 170 of the Heritage Act;
 - Schedule 5 of the Wingecarribee LEP. Division 4 of the EP&A Act includes provision for the making of LEPs by the Minister; and
 - The State Heritage Inventory (SHI), which was cross-checked with Schedule 5 of the Wingecarribee LEP and the s170 register. The SHI is not a single statutory register but a central collection of heritage items listed on statutory instruments. The SHI is maintained by the Heritage Division of OEH.
- Non-statutory:
 - National Trust of Australia, NSW (NT); and
 - Register of the National Estate (RNE). The RNE is an archived list of heritage items that were protected under the repealed *Australian Heritage Commission Act 1975*, which was replaced by the EPBC Act.

2.2 Research

Primary research was undertaken by investigating archives that may hold original material which included field books/diaries, newspaper articles, photographs, land titles information, maps, plans, sketches, and current and historic aerial photography.

Secondary research was conducted using published material such as books, journals and interpretive material, as well as unpublished sources such as university theses. Information was also obtained from people local to the area, which led to further research. The references section contains citations for all sources used.

2.3 Field survey

A field survey, informed by background research, was conducted over a number of days. Refer to Section 5 for methods and results.

3 Existing environment

3.1 Overview

The project area includes a property that is listed in Schedule 5 of the Wingecarribee LEP (LEP 2010: I351). The listing in the schedule describes the item as “Mereworth” house and garden, and is of local significance. The broader Mereworth property covers Lot 100 DP 839316 and Lot 200 DP 839314. A more detailed assessment has been undertaken as part of this SOHI, finding that the areas of heritage value at “Mereworth” are the house and garden itself, as described in Section 6.1 of this report.

Other registered heritage sites in proximity to the project area include Austermere House and Grounds (I398), the Berrima Landscape Conservation Area (C1843) and the Burradoo Landscape Conservation Area (C1834) which includes Bong Bong Common (A1191), site of the 1820 township of Bong Bong.

Two unlisted historic items were identified in the project area: an old railway bridge (refer to Section 5.2.6) recorded during field survey; and the Berrima Cement Works garden on Berrima Road, which was designed by Paul Sorensen.

3.2 Mereworth house and garden

The significant components of the Mereworth property, being the house and garden, comprise a small part of the overall property, all of which is owned by Hume Coal. The portion of the project area containing the rail loop and the rail maintenance facility and provisioning siding (refer to Figure 1.3), is within the Mereworth property. The house and garden is not in the project area. The Mereworth property is bisected by the Hume Motorway, which was constructed in the late 1980s.

The Mereworth house, which was constructed in 1965, was designed by John Amory (spelled Armoury in the SHI listing) in a French Provencal style. It is accessed by a long drive flanked by conifers and golden elms and is set in a large pastoral landscape with conifer windbreaks, rolling hills and dammed creeks.

The style and layout of the garden by renowned landscape designer Paul Sorensen is an important example of twentieth century taste. Planted approximately two years before the house was built, the garden embraces the house to create an experience that is secluded from the surrounding farmland. The avenue of trees creates a sense of arrival into a space that is unexpectedly European, even for the Southern Highlands.

Views from inside the gardens are predominantly retained within the garden as the tightly planted and now mature pines on the edge obscure views to the paddocks outside. The only place where views to the outside are possible is across the ha-ha, which defines the outer edge of the north terrace (refer to Plate 5.7).

3.3 Former Berrima Coal rail corridor

The former Berrima Coal rail corridor is partially within the project area. It is not a listed heritage item but has been considered in this report as it was part of the Berrima Coal and Southern Portland Cement operations. Both of these industries were seminal in the development of the Berrima area.

3.4 Remembrance Driveway plantings

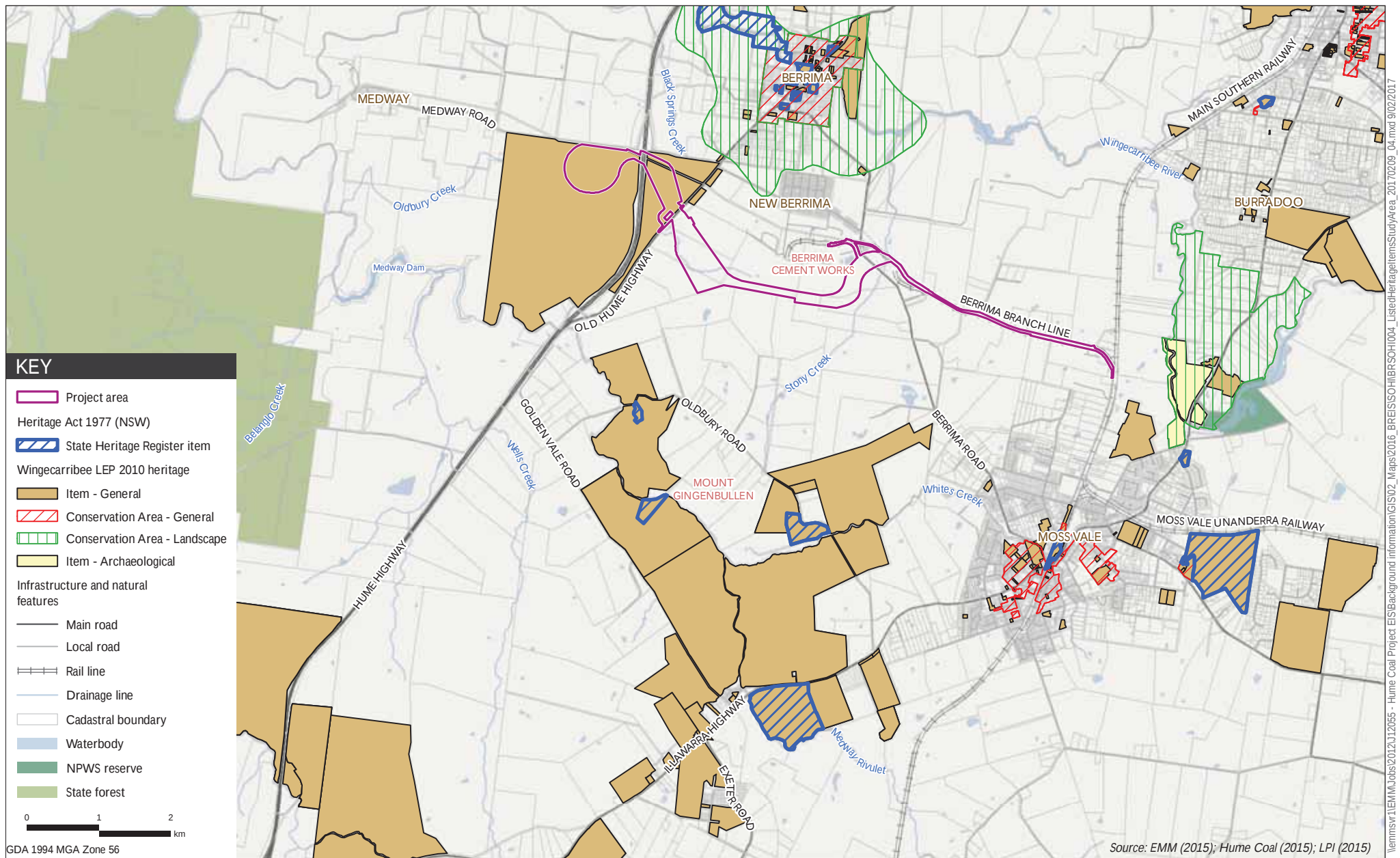
The Remembrance Driveway is a commemoration of Australia's fallen soldiers. The idea came from Margaret David MBE (founding president of the Garden Clubs of Australia) and the living memorial was launched in 1954 by the Queen and Prince Philip who planted two plane trees in Macquarie Place.

The Remembrance Driveway starts in Sydney at Macquarie Place and follows the Hume Highway to Canberra. In some places where the Hume Motorway has duplicated the route, the memorial plantings survive on the Old Hume Highway.

Three road gardens have recently been listed on the Wingecarribee LEP as 'Remembrance Driveway Plantings' (Figure 5.2). While the recent listings do not identify the origin of their significance, sources indicate that they were designed and sponsored by Sir Cecil Hoskins and planted by Paul Sorensen (Ratcliff 1990, p.64, Remembrance Driveway n.d item 26). Read and AGHS (2008) notes that the 'Remembrance Driveway plantations' on the Old Hume Highway are Sorensen gardens and based on inspection of aerial photographs, these plantings comprise species that Sorensen used.

3.5 Boral Cement garden

The garden within the boundary of the Boral Cement Works, fronting Berrima Road, New Berrima, was designed and planted by Paul Sorensen and Claude Crowe. The garden is not listed but is known to be one of Sorensen's works.



Regional historical heritage context

Berrima Rail Project
Statement of heritage impact

Figure 3.1

3.6 Former Southern Blue Metal Railway Bridge

In 1927 the Southern Blue Metal Company built a branch line that ran from a siding on the Southern Portland Cement Railway line, and served a blue metal quarry at Mount Gingenbullen.

Throughout the nineteenth and early twentieth centuries, timber beam road and rail-bridges were commonly built across creeks and rivers in order to move rural produce, goods and passengers. Their construction made use of readily available local hardwoods, and was relatively quick and inexpensive. It was not until the 1950s that prestressed concrete and steel were widely used instead (Cardno MBK 2000, pp. 17-18). Timber beam bridges built after 1894, including this one, generally followed Percy Allan's design which simplified construction and maintenance and reduced the amount of timber needed (Cardno MBK 2000, pp. 19-21).

The railway bridge and the remnants of the rail line, the embankment and cuttings, are part of the mining and transportation history of the region and contribute to the cultural landscape of the area.



Plate 3.1 The railway bridge that spans Stony Creek to the south of the proposed rail spur, with embankments. View south-west.



Plate 3.2 **The old railway bridge. View north-east.**

3.7 Heritage items in the vicinity of the project area

The Hume Coal rail loop, maintenance facility and provisioning siding are located within the northern curtilage of a locally registered site, Mereworth House and Garden. At the eastern end of the Berrima Rail project, several other listed heritage items occur within 100 m of the proposed development.

Austermere House and Grounds (I398) is approximately 500 m south-east of the eastern-most extent of the project area at Berrima Junction and is well screened from it by trees and plantings. Bong Bong Common and the Burradoo Landscape Conservation Area are to the east and north-east of Berrima Junction, approximately 1.5 km away; the edge of the Berrima Landscape Conservation Area is approximately 900 m north of the project area at its closest point (at the northern provisioning point) and around 1.7 km to the Berrima Conservation Area. The development is unlikely to have any physical or visual impact on these areas.

Landscape conservation areas (LCAs) are areas that display unifying attributes or elements of heritage significance. Berrima and Burradoo LCAs include historic buildings and spaces, pastoral and rural landscapes. Remnants of the original township of Bong Bong are located within the Burradoo LCA. The Berrima conservation area is one of the few intact villages in NSW from the nineteenth century demonstrating town development from convict settlement to the Victorian period (SHI 2680148). Identifying cultural landscapes recognises the historical and social values of these places to the community.

4 Historical background

4.1 Historic themes

The Australian and NSW heritage systems employ a series of historic themes to guide the understanding of history and historical investigation in the nation and state. As part of any historic heritage assessment, it is important to review the historic themes when undertaking research on an area or place to provide proper context. The state and national themes are complementary to enable the historian to present an unified understanding of how an area fits into Australian history. The historic themes are also an important guide when assessing an item's heritage significance. They provide information on how an item may be historically significant at the local, state or national level. Finally, historic themes help to develop interpretation and management strategies for items of heritage significance. A full list of these themes can be found on the Heritage Division website (refer to reference section for details). Historic themes in the study area were identified based on the historical background (as described below) and the results of the historical survey (Section 5.2). The Australian and NSW historic themes relevant to the study area and used in this report are listed in Table 4.1 (refer to Heritage Council New South Wales Historical Themes Oct 2001).

Table 4.1 Historic themes

Australian historic themes	NSW historic themes
2. Peopling Australia	Aboriginal cultures and interactions with other cultures Convict Migration
3. Developing local, regional and national economies	Agriculture Commerce Communication Environment – cultural landscape Events Exploration Forestry Industry Mining Pastoralism Technology Transport
4. Building settlements, towns and cities	Towns, suburbs and villages Land tenure Accommodation
5. Working	Labour Education Law and order
8. Developing Australia's cultural life	Domestic life Leisure Religion Birth and death
9. Marking the phases of life	Persons

4.2 Historical background

The earliest colonial presence in the Southern Highlands dates back to 1798 when several explorers visited the area near the Wingecarribee River (Jervis 1986). Several other expeditions were made to the area between 1798 and 1814 prior to settlement by pastoralists in 1819. However, it was not until 1864 that settlement in the region began in earnest.

Initial colonial settlement in the Southern Highlands was in the town of Bong Bong. It was laid out in 1821 adjacent to the line of the original South Road. However, the difficult micro-environment of strong winds and high rainfall made it an undesirable place to reside and following the construction of the Great Southern Road, a new area opened up, to where the government buildings from Bong Bong were moved. This became the town of Berrima in 1829 (Jack 1997, p. 36). In 1843 the area of Bong Bong was sold to Charles Throsby and became part of his large estate (Jack 1993, pp. 6-7).

The earliest pastoralist in the area was John Oxley who moved cattle from Camden to the Southern Highlands in 1815. In 1819, he was granted 2,400 acres. Early pastoral activity focused on grazing and cattle rearing for dairy and beef, and crops such as wheat, maize, barley, rye, peas, potatoes and turnips. While the majority of these crops were used for animal feed, wheat was processed in mills such as the one at Throsby Park (built 1849).

In 1817 two years after Oxley arrived, Charles Throsby and Hamilton Hume travelled through the region. Throsby then passed through again with James Meehan (surveyor) in the same year. Throsby settled in the area that later became Moss Vale in the 1860s (ADB online, Vivienne Parsons; Geographical Names Board).

Throsby was followed by more settlers, one of whom was James Atkinson who arrived in the region in 1822 and built and resided at Oldbury with his wife Charlotte and children. One of his children, Louisa Atkinson, became a journalist, author and botanist and it was Louisa and James, who in their own filtered ways, provided descriptions of Aboriginal life in the area (see Lawson 1989; Atkinson reprinted 1979). James' brother John followed in the same year and established a home, which he called Mereworth. This house was converted to an inn which he named 'The Kentish Arms', later upon its sale to be renamed 'The Three Legs of Man'. The house that now stands on a ridge surrounded by a dense, mature garden was built in 1965 by John Amory; the garden was designed and planted by Paul Sorensen two years before that. Somewhere within the curtilage of the residence and surrounding buildings is likely to be the remains of John Atkinson's second home, built after he sold the Kentish Arms. Early land grants are shown in Figure 4.1.

In 1834, convict gangs constructed the South Road which ran roughly parallel and west of the original alignment through the region, the Argyle Road. The South Road was renamed the Great Southern Road in 1858 and renamed again as the Hume Highway in 1928. The current alignment of the Hume Highway crosses earlier sections of the road.

Railways were an essential part of the development of towns and industry in the region (Plate 4.1). The original Picton to Mittagong section of the Main Southern Railway opened in January 1867, although it was inefficient and slow due to the gradient, and delays were caused by the single line. By 1915, a deviation had been approved and the new double rail line, with its improved gradient, required far fewer engines and represented a significant improvement in efficiency. The relationship of coal with rail cannot be overlooked as one industry relied on the other during the early period of their development.



Project area overlaid on County of Camden map c.1895 showing land grants

Berrima Rail Project
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Figure 4.1

The earliest mention of coal in the area was through the ‘accidental discovery’ in 1845 by a Mr Atkinson (*Sydney Mail and New South Wales Advertiser* 25 March 1882, p.481). Mr Atkinson was probably John Atkinson who built *Mereworth*. The region was initially commercially exploited for coal in the 1850s with a small mine opening at Black Bobs Creek to supply the Fitzroy Ironworks at Mittagong. In 1867, the Cataract mine was opened on the banks of Medway Rivulet to supply the Fitzroy Iron Works until the late 1860s when the iron works first started experiencing financial distress and attempts to revive it lasted until the late 1870s (SHI 2681711). The mine was located in a picturesque area near a waterfall south of Medway (Berrima) Coal Mine (Plate 4.2). Refer to Figure 4.3 for the location of early mines in the region.

A mine was opened at Medway in 1880 by James John Atkinson (son of James Atkinson who built Oldbury). It primarily supplied coal to the NSW Railways for their steam locomotives. The company became official on 31 March 1881, when an act called “The Berrima Coal-mining and Railway Company (Limited)” was created so that a railway from the Berrima Coal mine to the Great Southern Railway near Moss Vale could be built. The rail line was built on a standard gauge and connected the coal mine at a gorge of the Wingecarribee River to the Government rail line at Bong Bong. The formal opening of the Berrima coal mine and railway took place in March the following year (SMH 2 March, 1882 p.6).

During the 1920s, three new mines opened in the West Berrima area (now Medway). The Loch Catherine Colliery (1923), the Flying Fox Mine and the Medway Colliery. The Medway Colliery was opened in 1924 by Arnold Stanley “Stan” Taylor who also took over the Loch Catherine mine, although some of the workings significantly pre-date this and are thought to be part of the earlier “Rock Roof Colliery” which commenced in 1872, and used a flying fox to access the river gorge. The coal from his mine was used mainly for his cement works. He also owned limestone leases in Marulan, as limestone is a significant component in Portland Cement manufacture. The village of Medway is a result of Taylor’s Medway mine and railway (refer to Government Gazette 19 February, 1932, p. 729).

Taylor was a local industrialist – his first company was Australian Blue Metal Quarries Pty Ltd established at the base of Mount Gingenbullen, which was serviced by a short rail line that joined the Berrima rail line and then the Southern Railway at Berrima Junction (*Southern Highland News* 30 July 2012; Photograph 4.1). The branch line ran from a siding on the Southern Portland Cement Railway line and turned south to the quarry. Even though it only operated for a few years and was largely dismantled in 1942 (Matthews 1959, p.23), the alignment is visible on the 1949 aerial photograph (photograph 11.6 and Figure 4.2) as well as current aerial photography.

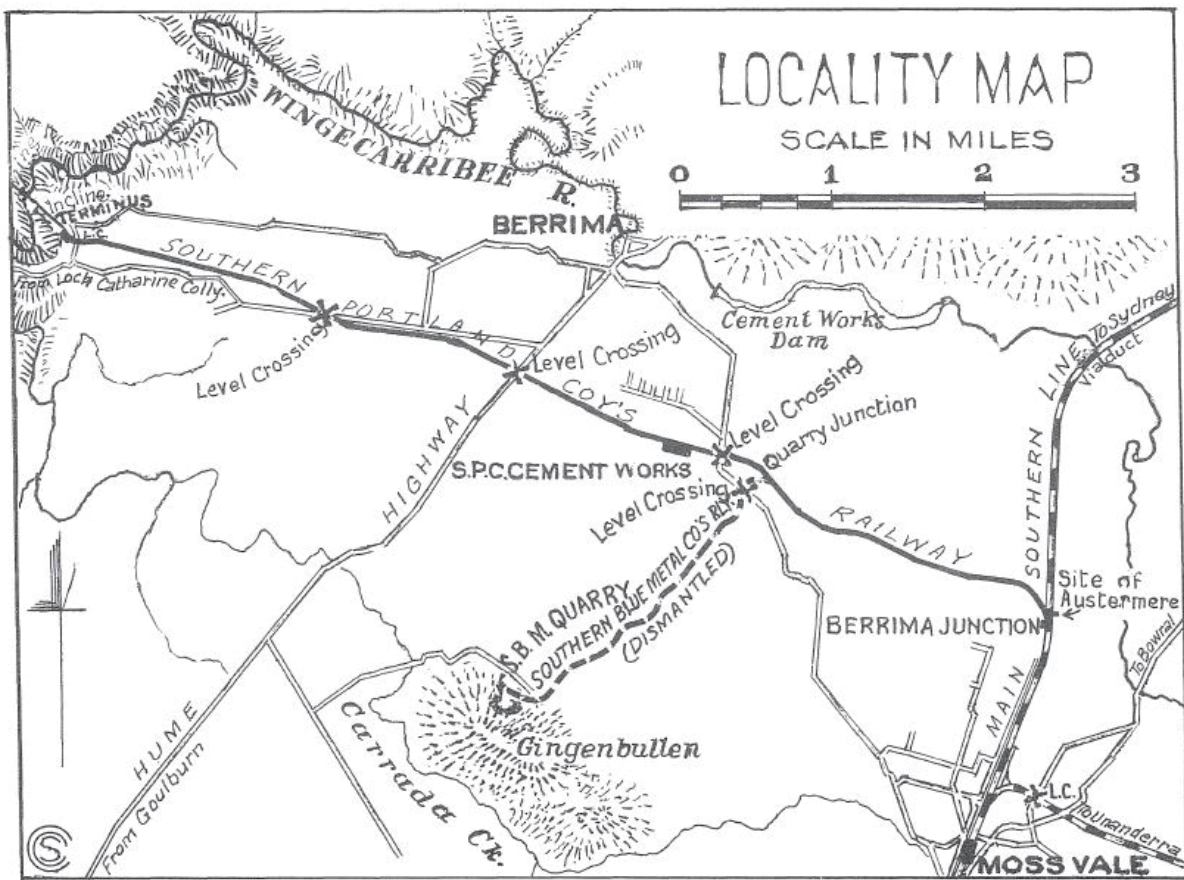


Plate 4.1 Rail lines associated with local industry. Source *The Australian Railway Historical Society, Bulletin no.256* February 1959.

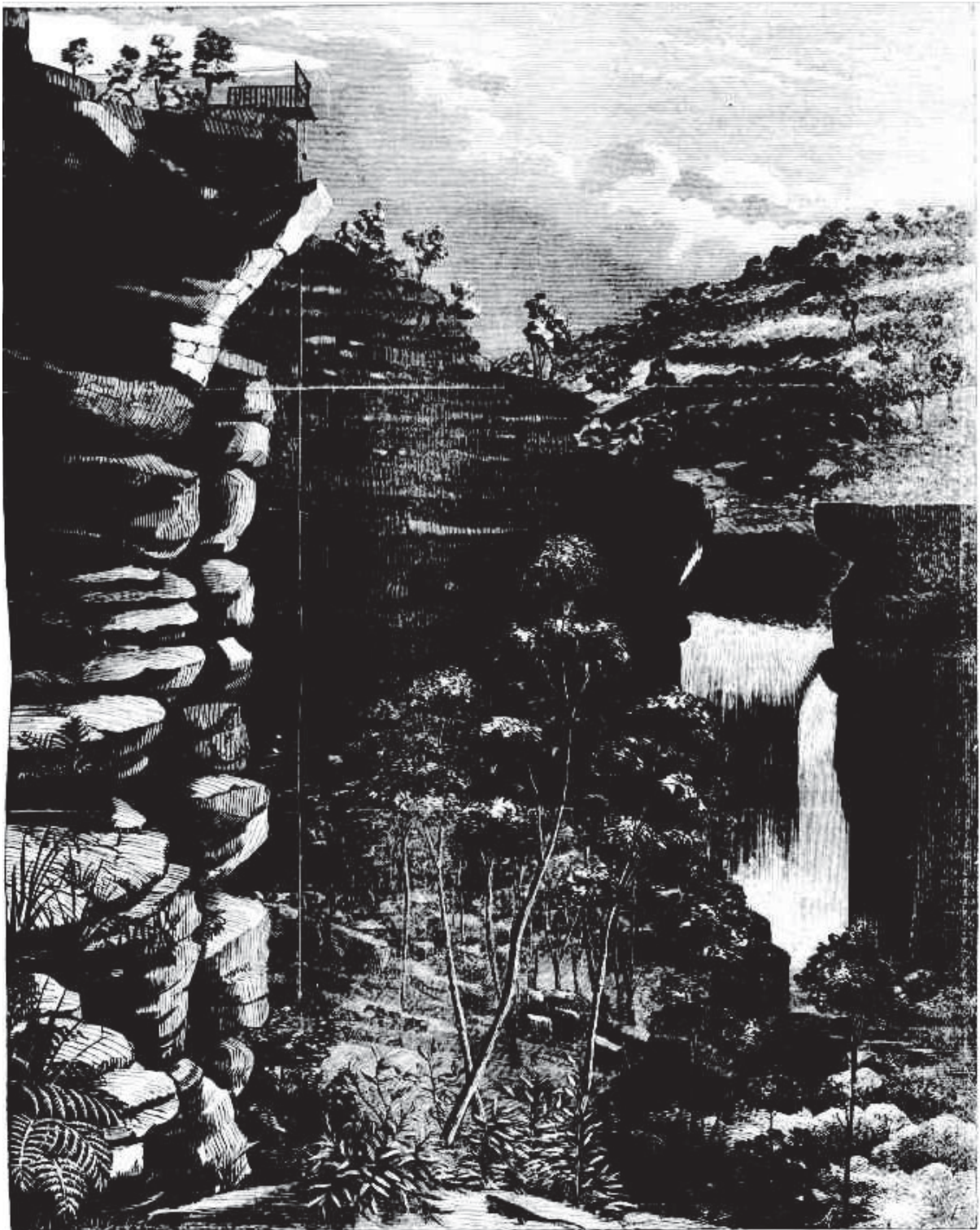
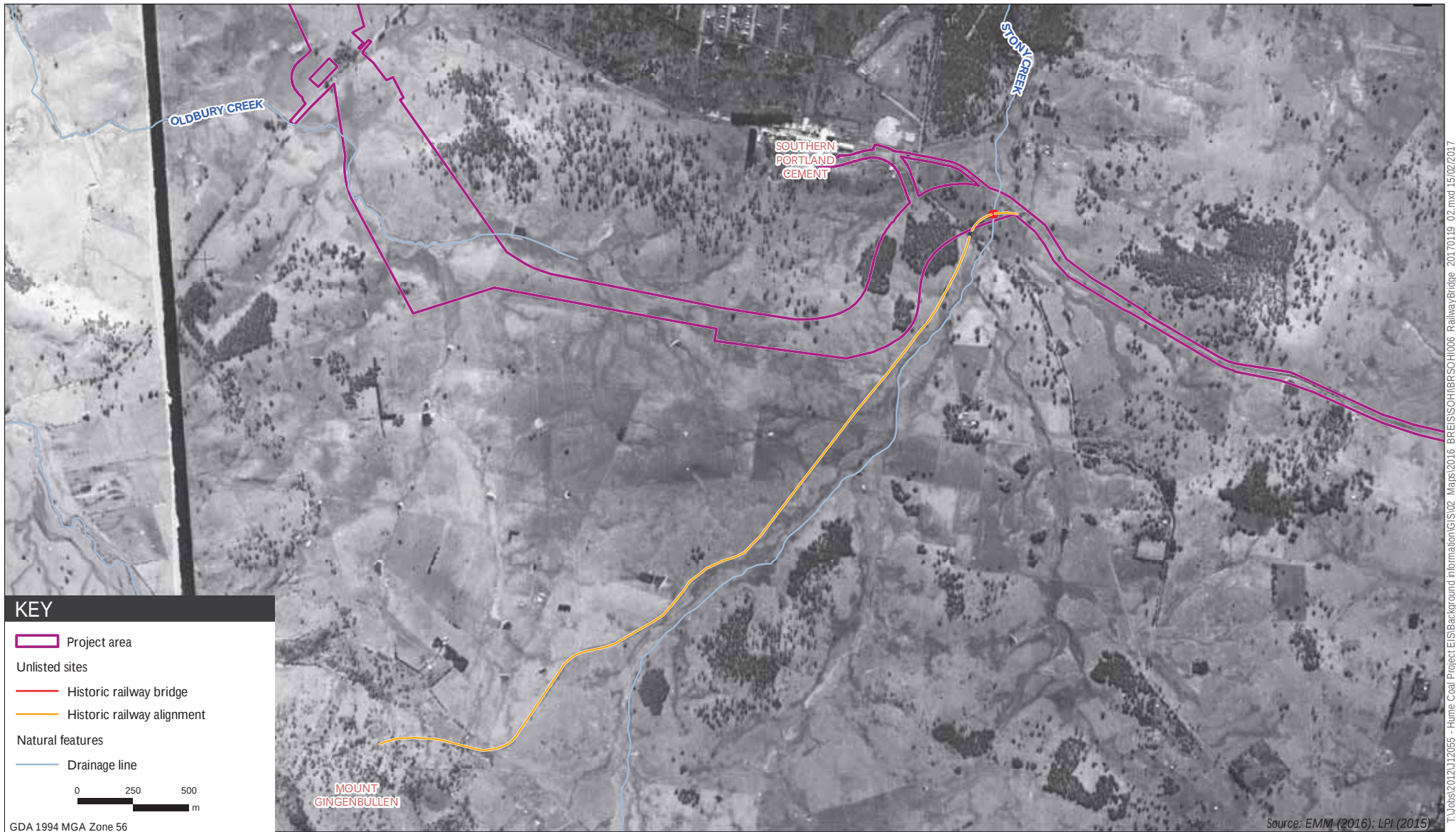


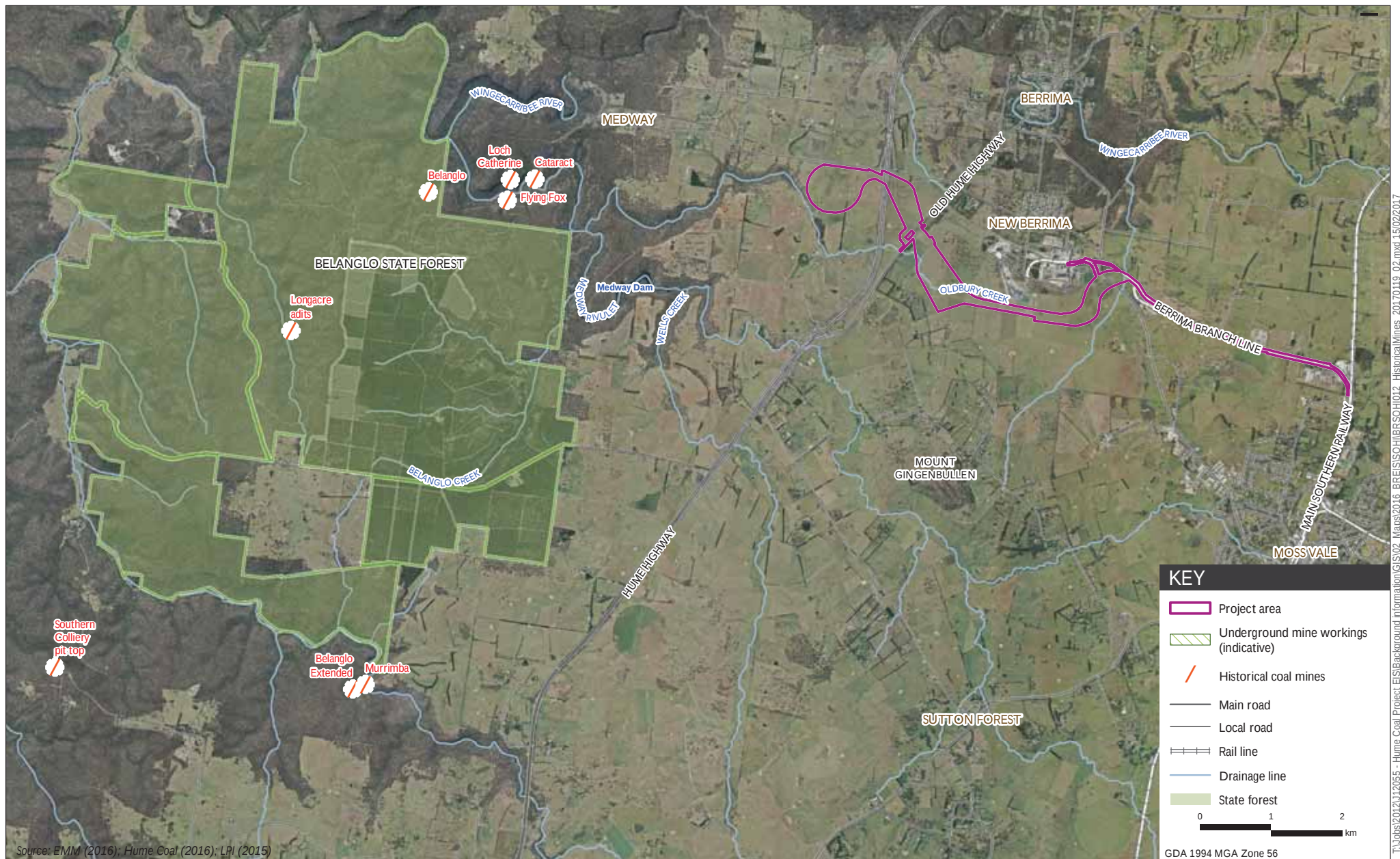
Plate 4.2 The 'magnificent scenery' around the Cataract mine. Source: *Australian Town and Country Journal*, Saturday, 25 March 1876, p.20



Southern Blue Metal Company rail line and bridge in 1949

Berrima Rail Project
Statement of heritage impact

Figure 4.2



Historical mining activity in the region
Berrima Rail Project
Statement of heritage impact
Figure 4.3

The onset of the Great Depression (October 1929-1939) forced Taylor to sell the Southern Portland Company Limited to Southern Portland Cement Limited, headed by (Sir) Cecil Hoskins, which also bought the Medway Colliery and Railroad Company (SMH 17 December 1972, p. 19). The Broken Hill Proprietary Company (BHP) acquired Southern Portland Cement Limited in 1935 as a result of a financing arrangement (Ozark 2015, p. 11), with Cecil Hoskins remaining as chair until the 1950s (*Southern Highland News* 20 May 2010, online).

The company was then purchased by Blue Circle Southern in 1974, which was an amalgamation of a number of Australian cement companies (including Portland Cement) in a joint venture between BHP and United Kingdom Company Blue Circle. Blue Circle Southern was sold to Boral Limited in 1988.

Berrima Colliery (also known as Medway Colliery) was the primary source of fuel for the kilns at Berrima Cement Works until its closure in 2013.

Until the 1960s, pit ponies hauled coal from the coal face to a clipping where it was transported out on a rope skip way over the river by bridge and up to the railhead. Berrima Colliery became mechanised in 1968 when modern mining machinery, conveyor belts and electrically hauled cable shuttle cars were introduced. As a result, it was reported that mechanisation replaced 60 men and 36 horses (SHN, 6 November 2013). Transportation of coal switched from rail to road.

The closure of Berrima Colliery, formerly Medway Colliery, was announced in 2014 after initially halting production in 2013. So ended operations at what has been described as one of the oldest and smallest collieries in NSW (Ozark 2015, p. 12; Boral 2002 online).

Railways in the Southern Highlands followed the establishment of industry – the Fitzroy Ironworks, the Cataract and Black Bobs Creek mines were all established before the railway. Soon all industry in the area, including the shale mine at Joadja, relied on rail (Jack 1997, p. 39-40). These rail lines joined the Main Southern Railway that connected Mittagong to Sydney from 1867, and which extended further to the south in later years.

The Hoskins family, starting with Charles Henry, were industrialists in the Southern Highlands. Charles and his son Cecil, who received a knighthood in 1960, were instrumental in the growth of iron and steel works in NSW (ABD 'Hoskins, Sir Cecil Harold). Cecil acquired Taylor's Southern Portland Cement and Coal Company, and he and his brother became joint managing directors of Hoskins Iron & Steel, which was established in Port Kembla (later to be acquired by BHP).

With a trend in greening industrial sites beginning in the twentieth century the Hoskins brothers engaged Paul Sorensen to design and plant gardens in their private residences and commercial establishments. Sorensen, a Danish immigrant, was a landscape architect who was active in the Southern Highlands and designed a large number of gardens in NSW. His focus was on the Blue Mountains, where he established a nursery, the Illawarra, and the Southern Highlands.

In addition to designing residential gardens, Sorensen played a role in the beautification of industrial and public sites. The former Australian Iron & Steel Co (established 1928, later BHP), the former Southern Portland Cement Company (now Boral Cement), New Berrima, and the Remembrance Driveway plantation on the Old Hume Highway south of Berrima are three of Sorensen's designs. Not of Sorensen's design, but nevertheless examples of industrial sites with designed gardens, are those such as the gardens of Potts Hill Reservoir in Sydney (Sydney Water Corporation S170 Register 4573701; SHR 01333), the BHP Administration Building in Newcastle, the Capral Aluminium at Rose Hill and the former Bedford Brickworks Group in Alexandria.

At least part of the garden at the Boral cement works in New Berrima was planted by Claude Crowe, a garden designer and nurseryman based in Berrima who is known to have worked with Sorensen (Read 2008). There was clearly a strong business relationship between Cecil Hoskins and Paul Sorensen, which is evident in the gardens designed for the Hoskins' businesses in the Southern Highlands and Port Kembla as well as the residence 'Invergowrie' at Exeter, 'Glennifer Brae' in Wollongong, Australian Iron & Steel executive houses at Green Hills and Hillside, the Hoskins Memorial Church in Lithgow and 'Redlands' in Mittagong, which was the residence of a Hoskins employee, Cedric Rouse (ABD Sorensen, Paul Edwin Beilenberg).

As early as 1918, the ideal factory was neat with adjacent grounds devoted to gardens and playing fields, as well as having other healthful properties such as good ventilation (Proud 1918, p.256 in Long 2010, p.4). Industrial gardens in Australia followed a trend set in Britain at the end of WWI. This trend moved toward improving workers' productivity and health by organising spaces around factories to achieve this. As described by Long,

Model factories constructed in the aftermath of the War (WWI) tapped into a vein of utopian thought which reconfigured factory space into a pivotal site in which the relationship between work, leisure, production, consumption, health and citizenship could be reframed.

Long 2010, p.3

Still in Britain, in 1943 the deputy Chief Medical Officer of the Ministry of Supply described the environment of a Royal Ordnance Factory as "set in a lovely garden, with hanging baskets of flowers" ('The Doctor in Dungarees', *Public Health* 1943, p.88, in Long 2010, p.28). The idea of industrial gardens in NSW gained momentum around the time that Sorensen was designing factory landscapes for the Hoskins.

The concept of planting trees as road memorials originated in Great Britain in 1918 as a way to transform existing highways "to the dignity of Roads of Remembrance adorned with trees" (Remembrance Driveway Committee Inc.). While the concept did not take off in Great Britain, it was adopted by Australia and Canada. The Hume Highway forms part of a larger road of remembrance that starts in Macquarie Place in Sydney and ends at the Australian War Memorial in the Australian Capital Territory.

The Remembrance Driveway program was launched in 1953 by the Premier of NSW, J J Cahill and donations were accepted resulting in plantings occurring from 1955 to 1979. New plantings declined while the committee maintained existing plantings and because the new Hume Highway alignment design had to be decided.

Since the early 1990s, the practice has been renewed with the Roads and Traffic Authority (RTA, now Roads and Maritime Services) taking on the sponsorship of the Remembrance Driveway Committee. This has led to a large number of plantings in Villawood, Bass Hill and on the Narellan Road interchange at Kenny Hill. The latest plantation was established in 2010 when 45,000 trees were planted along 15.5 km between Prestons and the Mount Annan Botanic Garden.

5 Field survey

5.1 Method

Survey is an important aspect to assessing the potential and significance of heritage items and is used to either verify the existence of sites or to discover sites that archival research was not able to identify. Survey methods are adapted to the type and size of the project area and the outcomes of archival research. The most common survey method is one that is targeted to areas identified in historical research, and through visual information such as remnant buildings and landform.

The survey strategy was developed using the information gathered in the background research for this report, including the historical summary and the heritage listings. Field survey was conducted on foot, and targeted areas that were predicted to hold tangible evidence of the historical development of the project area, as well as the locations that will be physically impacted by the project. Further survey for historical values was conducted in tandem with the Aboriginal survey.

Items and places were recorded through digital photography, GPS coordinates and written descriptions.

The purpose of the field survey was to:

- identify the potential or known relics in the project area;
- ascertain the existence of structures across or in close proximity to the project area;
- identify significant cultural landscapes within the project area;
- assess views and vistas relating to heritage listings and the cultural landscape; and
- identify potential historical sites suggested by the presence of exotic plantings, glass and ceramic where survey was undertaken.

Field survey associated with the Aboriginal heritage survey was completed on various dates in 2014 and 2015 with supplementary site visits undertaken in 2016. Targeted field surveys for historical and Aboriginal heritage were completed on 25 – 27 March 2015 during which the project area was walked and recorded. Targeted field survey of nearby historic heritage sites was undertaken in locations where access was permitted. This included the Mereworth property, in particular the house and gardens, and the paddocks on which project infrastructure is proposed.

The Boral Cement Works garden, designed by Paul Sorensen, was inspected on 17 November 2016. The purpose was to assess the general condition of the garden and inspect the location of the proposed rail alignments.

5.2 Results

5.2.1 Summary

The results of the field survey are presented below and divided into property units rather than landform units, as the main focus was on the areas of surface impacts. The results are discussed in detail below. Generally, the highest heritage values were found to be on the Mereworth property and within Boral Cement Works garden facing Berrima Road.

5.2.2 Mereworth house and garden

Mereworth house and garden were surveyed on various days between March 2015 and October 2016. During this time, the garden surrounding the house, the avenue of trees, the driveway from Mereworth Road and the surrounding paddocks were surveyed.

Infrastructure associated with the Berrima Rail Project, specifically the rail loop, does not encroach on the house and garden, which have been assessed to be the significant parts of the property. A detailed assessment of the house and garden at Mereworth was prepared for the Hume Coal Project (EMM 2017). Survey of the Mereworth paddocks where the Berrima Rail Project infrastructure is proposed did not yield any material heritage values.

Views and vistas from Mereworth house were assessed from the second floor of the house and from the gardens. The view from the master bedroom veranda, across the northern lawn area and beyond the ha-ha was photographed (Plate 5.3) and is discussed in the impact assessment chapter (Section 7.2.2).



Plate 5.1 View north from the ha-ha at Mereworth. The rail loop will be visible from this vantage point and on the far side of the dam.

Views from the house to the farmland are rare and only toward the north where they can be glimpsed across the ha-ha and the frame of weeping elms. The ha-ha is double-level and constructed of extruded brick laid English bond (Plate 5.6). The lower wall of the ha-ha is approximately 130 cm in height and the top wall is approximately 60 cm. It has been suggested that Sorensen's intention was for the trees along the ha-ha to be pruned to keep the view to the north open (Ratcliffe 1990, p.98), which is an intention that is being maintained. Plate 5.1 shows the view from in front of the ha-ha, away from the nucleus of the house and garden and out to the north-east.

Views in other directions, including to the north-west are obscured by the densely planted perimeter trees, some of which were planted prior to 1949. The tall perimeter trees of Bhutan cypress, set against the golden elms, create a striking contrast in the colour (Plate 5.2). The Bhutan cypresses form not only a barrier to the outside, but also to the strong westerly winds. The view from the south crosses a large expanse of paddock to fall on the garden, signalling the possibility of a substantial residential complex amongst the farmland; ancillary buildings visible on the outskirts add to this picture.



Plate 5.2 View to the avenue of trees from the west; this is not the view from the rail loop. The colour of the golden elms offsets the deeper shade of the Bhutan cypresses behind them.



Plate 5.3 View northwards from Mereworth house looking towards the proposed rail loop site. The photograph was taken from the master bedroom balcony.



Plate 5.4 Views to the north from the north lawn within the Mereworth garden. The rail loop is proposed to be built to the right behind the dam.



Plate 5.5 View to the north-east towards the dam and the hills that will largely obscure the rail loop from the house and garden at Mereworth.



Plate 5.6 View north-west from the ha-ha. Note the double wall.



Plate 5.7 View east from the north lawn to the farm buildings of Mereworth.

5.2.3 Former Berrima Coal rail corridor

The rail corridor that runs along the northern boundary of Mereworth and through Mereworth to the east of the Hume Motorway is a remnant of the former Berrima Coal rail line. This rail line was used to move coal from the Berrima and Loch Catherine collieries to the Southern Portland Cement Company at New Berrima (Ozark 2015, p.10). Some of the former rail corridor is within the project area (as shown in Figure 7.3). The rail line was built in 1927 by the Medway Colliery and Railway Company and partly built on a rail spur originally built in 1881 through an Act of parliament (Oberg, 1980; <http://www.legislation.nsw.gov.au/acts/1881-bcm.pdf>). The rail line operated until 1978.

All that remains of the old rail line is an easement, including earthworks formation and an underpass beneath the Hume Motorway that was built to accommodate the railway corridor. The existing underpass will be used by Hume Coal's new rail line eliminating the need to construct a new crossing over or under the highway as part of the project.

5.2.4 Remembrance Driveway plantings

In addition to the recently listed Remembrance Driveway plantings, a number of other groups of trees display characteristics that are very similar to Sorensen's style. Those that are on the western side of the Old Hume Highway are on the Mereworth property. These plantings are also likely to be designed by Hoskins and planted by Sorensen (Ratcliff 1990, p.64). Ratcliff commented that the roadside garden species were selected by Hoskins against the advice of Sorensen so failures were 'considerable' (Ratcliff 1990, p.64).

The photograph below (Plate 5.8) is of the garden adjacent to the Old Hume Highway which is outside the project area (Figure 5.2). Note the trees on the other side of the road. The photograph was taken looking north-east. A section of the Remembrance Driveway was inspected, specifically to locate plantings by Paul Sorensen which will be avoided by the project.



Plate 5.8 One of the groups of trees along the Remembrance Driveway on the Old Hume Highway alignment

5.2.5 Boral Cement garden

The mature trees on the Boral Cement front lawn screen the industrial plant from the road to a great extent. These trees are another Paul Sorensen garden in the Southern Highlands (Read and AGHS 2008; Sorensen diary July 1938). The garden has been identified by the Australian History Garden Society (AGHS) as a “landscape at risk” citing inappropriate native tube stock infill and the lack of recognition of the Sorensen design/character (AGHS Landscapes at risk: watch and action list April 2016).

The garden was planted over 1937 and 1938 on land that had previously been a saw mill (established by Stanley Taylor) when the plant changed hands and went to the Hoskins' Australian Iron and Steel Ltd (AI&S). The hard-packed earth was overlaid with topsoil and planted with a variety of exotics in keeping with Sorensen's choice of species. A survey of the garden identified the following species listed in Table 5.1.

Table 5.1 Boral 'Sorensen' garden species

Common name	Species	Common name	Species
Japanese maple	<i>Acer palmatum</i>	Swamp Spanish oak	<i>Quercus palustris</i>
Japanese cherry	<i>Prunus serrulata</i>	Weeping elm	<i>Ulmus glabra pendula</i>
Bald cypress	<i>Taxodium distichum</i>	Copper beech	<i>Fagus sylvatica (purpurea)</i>
Strawberry tree	<i>Arbutus unedo</i>	Liquidamber	<i>Liquidambar styraciflua</i>
European ash	<i>Fraxinus excelsior aurea pendula</i>	Bhutan or Himalayan cypress	<i>Cupressus torulosa</i>
Giant sequoia	<i>Sequoiadendron giganteum</i>	Coast redwood	<i>Sequoia semprevirens</i>
Douglas fir	<i>Pseudotsuga menziesii</i>	Cypress	<i>Cupressus sp</i>
Pine	<i>Pinus sp</i>	Creagaeus or Mexican hawthorn	<i>Crataegus mexicana</i>
Deodar cedar	<i>Cedrus deodara</i>	Blue atlas cedar	<i>Cedrus atlantica glauca</i>
Spruce	<i>Picea sp</i>	Oak	<i>Quercus sp</i>
False cypress	<i>Chamaecyparis sp</i>	Golden elm	<i>Ulmus glabra 'Lutescens'</i>

Notes: 1. Adapted from a list provided to Boral by the Australian Garden History Society (Southern Branch).

The current extent of the garden is shown in Figure 5.1. Research did not uncover documents identifying the curtilage of the garden therefore what is shown in Figure 5.1 is based on visual inspection and descriptions only. Historic aerial photography suggests that the garden extended to the edge of the original cement plant buildings to the west. To the south, the garden extended to the edge of the gentle slope visible in the 1949 aerial photograph (Plate 5.14).

Changes brought about by additions to the cement plant have removed some of the original plantings and reduced the size of the garden. More recently, new tube stock has been planted in rows (note blue tubes in Plate 5.9). These new plantings are a response to a requirement of the Environmental Protection Licence of the cement works.

The front section of garden was inspected on Thursday 27 November 2016 by Pamela Kottaras (EMM) and Chris Mitchell (Strata Gardens, engaged by Hume Coal to care for the garden at Mereworth) accompanied by Marco Benischek (Hume Coal) and Rod Wallace (Boral). It is currently in an area that is seldom used by the cement plant but is directly adjacent (south) to the existing rail line.

At the centre of the site, in front of the Boral archive building, the garden is in variable condition. Many trees appear to be in good health; the large Giant sequoias (Plate 5.9) have a robust appearance as do the copper beeches and golden and weeping elms. Likewise, the spruce and ash trees fronting Berrima Road also appear to be in good health. However, a number of trees, such as the Japanese Maples in the front centre of the garden, are stunted and in poor health (Plate 5.11).

Inspection confirmed that the integrity of the garden varies across the site, with parts in poor condition and other areas supporting healthy trees. Trees in good health include the trees at the edge of the garden that are now between the dam and wire fence on the southern side of the site. The trees along the northern side of the site fence are also in good condition and include weeping elms (with numerous suckers), golden elms and Japanese cherries.

The row of Bhutan pines (Plate 5.13) on the northern side of the rail siding contribute to the garden aesthetic of the area but do not form part of the core garden complex under investigation.



Sorenson garden – Berrima Cement Works
 Berrima Rail Project
 Statement of heritage impact
 Figure 5.1



Plate 5.9 Sorensen's garden from Berrima Road looking into the Boral Cement plant. View west.



Plate 5.10 The spruce and ash trees on the boundary with Berrima Road. These trees will be removed by the proposal. View south-east.



Plate 5.11 Japanese maples (foreground) are typical Sorensen species; the two in the front have not grown to their full potential. Sequoias and copper beech can also be seen in this photograph.



Plate 5.12 View along the proposed rail line in the central section of the garden. The pine tree on the right will be removed.



Plate 5.13 The row of Bhutan pine trees screening the Boral Cement plant from Berrima Road when viewed north of the railway level crossing. View west.

5.2.6 Former Southern Blue Metal Railway Bridge

A dilapidated timber beam railway bridge was identified during the field survey (Plate 3.1). It lies within the project area (refer to Figure 7.2) and, at its closest point, is 6 m from the proposed rail spur in the preferred option and 60 m from the proposed rail spur in the alternative option.

The timber beam railway bridge spans Stony Creek. It consists of vertical concrete piers abutting the banks on either side of the creek and another row in the centre of the bridge. It has a total span of approximately 10 m. While the rail line embankment leading to the bridge remains, the iron rails and sleepers do not (Plate 3.2).

The bridge was built in 1927 as part of the Southern Blue Metal Company's branch line that ran from a siding on the Southern Portland Cement Railway line, and served a blue metal quarry at Mount Gingenbullen.

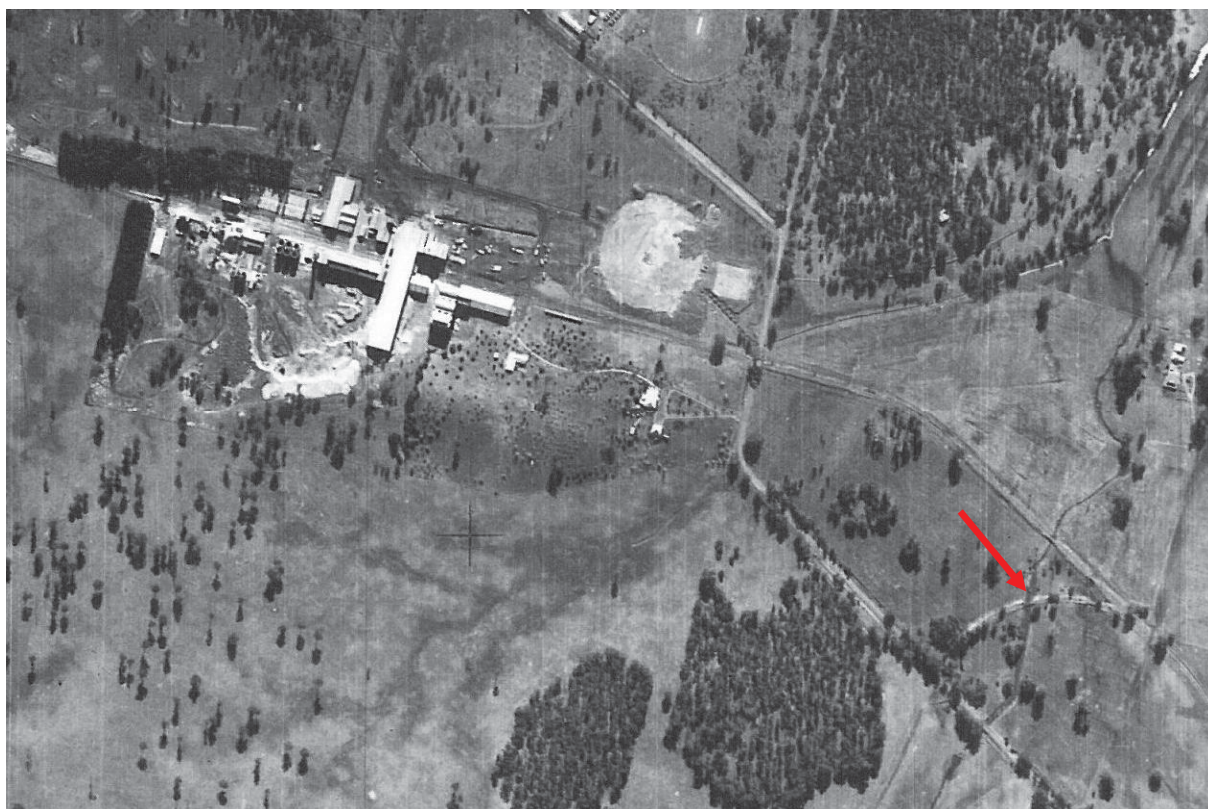
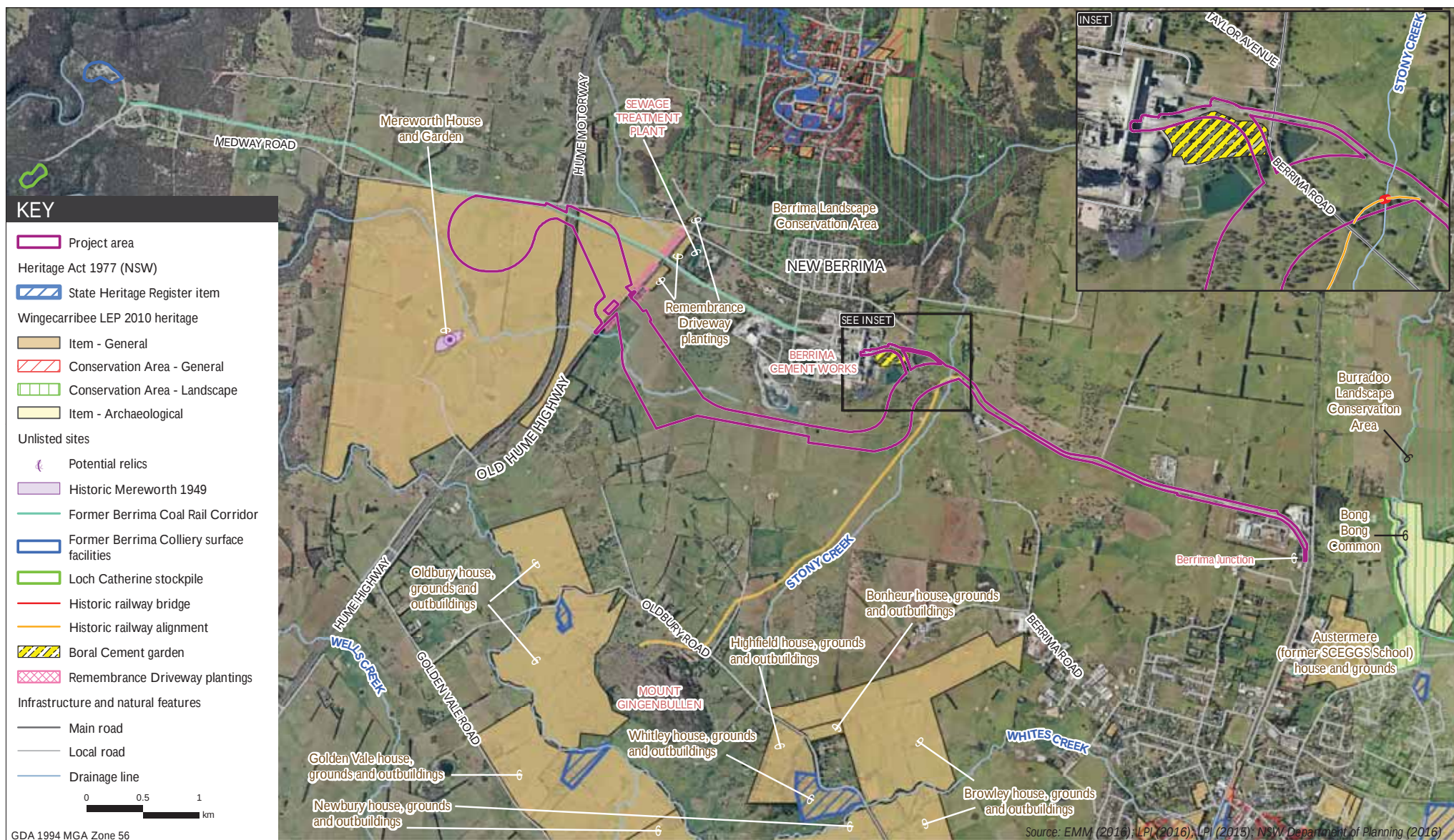


Plate 5.14 Aerial photograph over the project area (1949) showing the location of the railway alignment and bridge (red arrow). The early phase of Sorensen's garden is visible on the mound to the east of the cement plant (Moss Vale Run 1 June 1949 Landsphoto).



Listed and newly discovered heritage items in proximity to the project area

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Figure 5.2

6 Assessments of significance

In NSW the assessment of heritage significance is based on the *Burra Charter* (Australia ICOMOS 1999) and further expanded upon in the Heritage Manual's Assessing Heritage Significance (Heritage Office 2001). It lists seven criteria to identify and assess heritage values that apply when considering if an item is of state or local heritage significance as set out in Table 6.1. The assessments of significance presented below have been evaluated against these criteria.

Table 6.1 NSW heritage assessment criteria

Criterion	Explanation
a)	<i>An item is important in the course or pattern of NSW's (or the local area's) cultural or natural history (Historical Significance).</i>
b)	<i>An item has strong or special association with the life or works of a person, or group of persons of importance in NSW's (or the local area's) cultural or natural history (Associative Significance).</i>
c)	<i>An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area) (Aesthetic Significance).</i>
d)	<i>An item has a strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons (Social Significance).</i>
e)	<i>An item has the potential to yield information that will contribute to an understanding of NSW's (or the local area's) cultural or natural history (Research Significance).</i>
f)	<i>An item possesses uncommon, rare or endangered aspects of NSW's (or the local area's) cultural or natural history (Rarity).</i>
g)	<i>An item is important in demonstrating the principle characteristics of a class of NSW's (or the local area's) cultural or natural places or environments (Representativeness).</i>

6.1 Mereworth house and garden

Table 6.2 Significance assessment – Mereworth house and garden

Criterion	Explanation
a) Historical significance	The property is part of the 1823 land grant of 2000 acres to John Atkinson, one of the earliest colonial landowners in the district and who had strong ties in the area; his brother, James, established 'Oldbury' on the other side of the road to the south. The current house and garden have significance as they demonstrate the continued importance placed on the "homestead" in the Southern Highlands. The garden has historical significance for the longevity of many of the plantings, particularly the trees, and for its ability to demonstrate the development of the garden character of the Southern Highlands. The garden is historically significant for its ability to demonstrate a mid-twentieth century landscape design that was made popular by Paul Sorensen, but remained singular in quality. The item meets the threshold for local significance under this criterion.
b) Associative significance	The garden is important for its connection with Paul Sorensen, the renowned twentieth century cold-climate garden designer who is responsible for a number of notable gardens in NSW and in the Southern Highlands. The item meets the threshold for local significance under this criterion.

Table 6.2 **Significance assessment – Mereworth house and garden**

Criterion	Explanation
c) Aesthetic significance	The house has aesthetic significance in its design which incorporates a range of styles and materials that work together to create the French Provencal architectural style. The house can only be viewed from inside the garden with a different perspective from each side of the building. The garden and house also respond to each other at the four elevations – entry to the house is via the courtyard; the eastern elevation faces the densest part of the cold climate ‘forest’ giving it an unexpectedly European character; the eastern elevation overlooks a swimming pool and beyond to the formal rose garden with gazebo and fountain. On the northern elevation, the porch with classically proportioned columns looks out beyond a pear tree to the north lawn and a variety of plantings. The eye is then swept to the north-east through the golden elm trees across the ha-ha and glimpses of the farm paddocks. The garden is an imposing cold climate collection of plantings, reminiscent of a northern hemisphere forest. From within, the garden envelopes the house and grounds and obscures views out, except in selected places. From the outside, the garden is visible from a distance and identified by the tall evergreens in ordered rows located in a pastoral landscape. The long envelope of evergreens has a landmark effect on the landscape. This effect has been diminished by the construction of the Hume Highway, the 110 km speed limit and the obscuring effect of the road cuttings. The item meets the threshold for local significance.
d) Social significance	The house and garden do not have a known special association with a particular community or cultural group in the local area but the significance of Sorensen’s gardens is acknowledged by the Australian Garden History Society as a significant cultural site. The item meets the threshold for local significance under this criterion.
e) Technical/research significance	The style and layout of the garden reflect mid- twentieth century tastes and includes significant landscape elements. The item meets the threshold for local significance under this criterion. Evidence of John Atkinson’s homestead may have survived in archaeological form within the curtilage of the house and garden complex. If archaeological resources have survived, they are likely to be of local significance.
f) Rarity	The gardens include historic plantings and a distinctive garden layout design created by Paul Sorenson. Sorenson was a significant twentieth century figure in landscape design and renowned for his cold-climate gardens. However, Sorensen did not commit his designs to paper, which may have resulted in some of his work being overlooked and therefore not reported widely. The item meets the threshold for local significance under this criterion.
g) Representativeness	The garden at Mereworth is representative of Sorensen’s work, which uses a recognisable palette of species and spatial organisation. The style and layout of the garden also reflect mid-twentieth century tastes and includes significant landscape elements. The item meets the threshold for local significance under this criterion.

6.2 Summary statement of significance - Mereworth house and garden

The house and garden at Mereworth are significant collectively as they signify the continuation of the homestead group, which was so much more prevalent in the early colonial period. The garden is particularly significant for its aesthetic qualities and association with the respected cold-climate landscape architect, Paul Sorensen. The garden is also rare in the context of NSW as Sorensen designed and planted his gardens while on site and committed little to paper.

The item is of local significance.

6.3 Former Berrima Coal rail corridor

Table 6.3 Significance assessment – Former Berrima Coal rail corridor

Criterion	Explanation
a) Historical significance	The former Berrima Coal rail corridor has some historical significance as a demonstration of the region's coal mining history. The item does not meet the threshold for local significance under this criterion.
b) Associative significance	The former Berrima Coal rail corridor has some associative significance in its relationship to Arnold 'Stan' Taylor, an important industrialist in the Southern Highlands who owned the Medway Mine, the Southern Blue Metal Quarry, Southern Portland Cement and the rail line that linked these business ventures to the government-owned Southern Railway. The rail corridor also has associations with Boral, which purchased many of Taylor's industrial ventures and has a long history in Australian building manufacturing. The item does not meet the threshold for local significance under this criterion.
c) Aesthetic significance	The former rail corridor is a remnant on a landscape that is a palimpsest of uses dating from the first Australians, through to colonial Australia and the industrial revolution of the nation. It is a reminder of the many elements that combine to create the landscape as it is today. The item does not meet the threshold for local significance under this criterion.
d) Social significance	There is no information to support significance under this criterion. The item does not meet the threshold for local significance under this criterion.
e) Technical/research significance	The research significance of the former rail corridor does not reach the threshold for this criterion. The item does not meet the threshold for local significance under this criterion.
f) Rarity	The former rail corridor is one of many smaller branch lines that serviced local industry in the past and connected them to the Main Southern Railway Line. The item does not meet the threshold for local significance under this criterion.
g) Representativeness	The former rail corridor is representative of decommissioned rail lines in NSW. The item does not meet the threshold for local significance under this criterion.

6.4 Summary statement of significance – Berrima Coal rail corridor

Whilst the former Berrima Coal rail line responds to some of the criteria for local significance, it does not meet the threshold; therefore it is not considered to be of local significance.

6.5 Remembrance Driveway plantings

Table 6.4 Significance assessment – Remembrance Driveway plantings

Criterion	Explanation
Historical significance	The Remembrance Driveway plantings have historical significance as one type of commemoration of Australia's war dead. While the program of roadside war memorials commenced in the mid-twentieth century, what they represent is significant to the development of the nation. The item meets the threshold for local significance under this criterion.
Associative significance	The plantings in the vicinity of the project are associated with the landscape architect Paul Sorensen who is recognised as an important figure in the industry. His designs, that he also planted, occur elsewhere in the Southern Highlands, the Illawarra and the Blue Mountains. The item meets the threshold for local significance under this criterion.
Aesthetic significance	The groups of trees along the Remembrance Highway that are associated with Paul Sorensen have aesthetic significance as they are cold-climate plantings, which is unusual along the length of the Remembrance Driveway. The groups of trees are reminiscent of little forests that are more familiar in the northern hemisphere but create a point of difference when juxtaposed to native trees and the more common monocultural plantings of liquid ambers found elsewhere along the alignment, The item meets the threshold for local significance under this criterion.
Social significance	The Remembrance Driveway has a high degree of social significance as it represents Australians who fell in the great wars. The item meets the threshold for local significance under this criterion.
Technical/research significance	Further research will be able to establish if these copses are Paul Sorensen gardens. The item meets the threshold for local significance under this criterion.
Rarity	Rare as the value of Sorensen's work is not widely appreciated and therefore may be prone to being destroyed. Sorensen's lack of records means that his gardens are, in many cases, his only legacy. The item meets the threshold for local significance under this criterion.
Representativeness	The Remembrance Driveway represents the trend in Australia to commemorate its war dead. It is a practice that was adopted by countries belonging to the British Commonwealth and is therefore representative across a number of nations. The item meets the threshold for local significance under this criterion.

6.6 Summary statement of significance – Remembrance Driveway plantings

The groups of trees along the Remembrance Driveway are of local significance for the ability to demonstrate the historical decision to commemorate the nation's war dead. They have a high level of aesthetic and associative significance and are rare for their association with Paul Sorensen.

6.7 Boral Cement garden

Table 6.5 Significance assessment – Boral Cement garden

Criterion	Explanation
Historical significance	The garden comprising of cold-climate forest species is historically significant for its contribution to beautification programs of industrial sites. The garden has a relationship with other gardens that were planted to enhance the “European” character of the area. The item meets the threshold for local significance under this criterion.
Associative significance	The garden is important for its connection with Paul Sorensen, the renowned twentieth century cold-climate garden designer who is responsible for a number of notable gardens in NSW and in the Southern Highlands. The item meets the threshold for local significance under this criterion.
Aesthetic significance	The garden has aesthetic significance, for not only is it a collection of European cold climate species in a region known for its introduced deciduous species (and autumnal changes), it is a beautification of an industrial site, which was a common twentieth century practice in NSW. The garden's condition varies from good to poor, which has implications on its aesthetic significance. A number of trees are stunted and potentially not viable into the short-term future. The aesthetic significance is in the process of being diminished through the new plantings on site. The item meets the threshold for local significance under this criterion.
Social significance	The Boral Cement garden does not have a known special association with a particular community or cultural group in the local area but the significance of Sorensen's gardens is acknowledged by the Australian Garden History Society and has the potential to be significant to the local community if it was better known. The item meets the threshold for local significance under this criterion.
Technical/research significance	The garden has the potential to contribute to a better understanding of Paul Sorensen, his work and the historical aesthetic treatments of industrial sites. The item meets the threshold for local significance under this criterion.
Rarity	Rare as the value of Sorensen's work is not widely appreciated. Sorensen's lack of records means that his gardens are, in many cases, his only legacy. The item meets the threshold for local significance under this criterion.
Representativeness	Representative of a disappearing type with respect to industrial gardens and mature cold-climate species. The item meets the threshold for local significance under this criterion.

6.8 Summary statement of significance – Boral Cement front garden

The Boral garden fronting Berrima Road in New Berrima is of local significance for its aesthetic and historical significance being representative of the beautification of industrial sites during the twentieth century. Their association with the notable landscape architect, Paul Sorensen, adds a layer of significance to these gardens as his designs are aesthetically outstanding and uncommon.

6.9 Former Southern Blue Metal rail-bridge and rail corridor

Table 6.6 Significance assessment – railway bridge and Gingenbullen Quarry rail corridor

Criterion	Explanation
Historical significance	The railway bridge and the remnants of the rail line, the embankment and cuttings, are part of the mining and transportation history of the region and contribute to the cultural landscape. These elements have survived to demonstrate the industrial history of Berrima. The item meets the threshold for local significance under this criterion.
Associative significance	The bridge, associated embankments and cutting are the remnants of the Southern Blue Metal Company's rail line that transported stone from the quarry at Mount Gingenbullen to the main rail lines. It has significance for its association with Arnold 'Stan' Taylor who established a complex industrial enterprise consisting of the Medway and Loch Catherine mines, the rail line from Medway to the main Southern Railway as well as this smaller branch line to the Mount Gingenbullen Quarry. The item meets the threshold for local significance under this criterion.
Aesthetic significance	The bridge is in a dilapidated state missing important elements such as sleepers and iron tracks. The item does not meet the threshold for local significance under this criterion.
Social significance	The bridge and associated remnants of the rail line have association with the local mining industry and one of the reasons for the growth of the region. However, it is a small remnant on private property and therefore not part of the public's awareness of the history of the Southern Highlands. The item does not meet the threshold for local significance under this criterion.
Technical/research significance	The bridge and associated remnants of the rail line have the potential to yield information that will contribute to an understanding of the area's mining and transportation history, especially when studied in association with historic maps, newspapers and accounts. The item meets the threshold for local significance under this criterion.
Rarity	The bridge and associated remnants of the rail line do not possess uncommon, rare or endangered aspects for its type or of the area's cultural history. The item does not meet the threshold for local significance under this criterion.
Representativeness	This structure is typical of timber beam road and rail-bridges commonly constructed in NSW in the nineteenth and early twentieth centuries. It is in a dilapidated state and missing elements. The item does not meet the threshold for local significance under this criterion.

6.10 Summary statement of significance: timber rail-bridge and rail corridor

The rail-bridge and remnants of the Southern Blue Metal Company's rail line including embankments and cuttings are of local significance. These elements have survived to demonstrate the industrial history of Berrima and contribute to an understanding of local mining and transportation history. Despite its dilapidated state, it remains a representative example of nineteenth and early twentieth century rail-bridges.

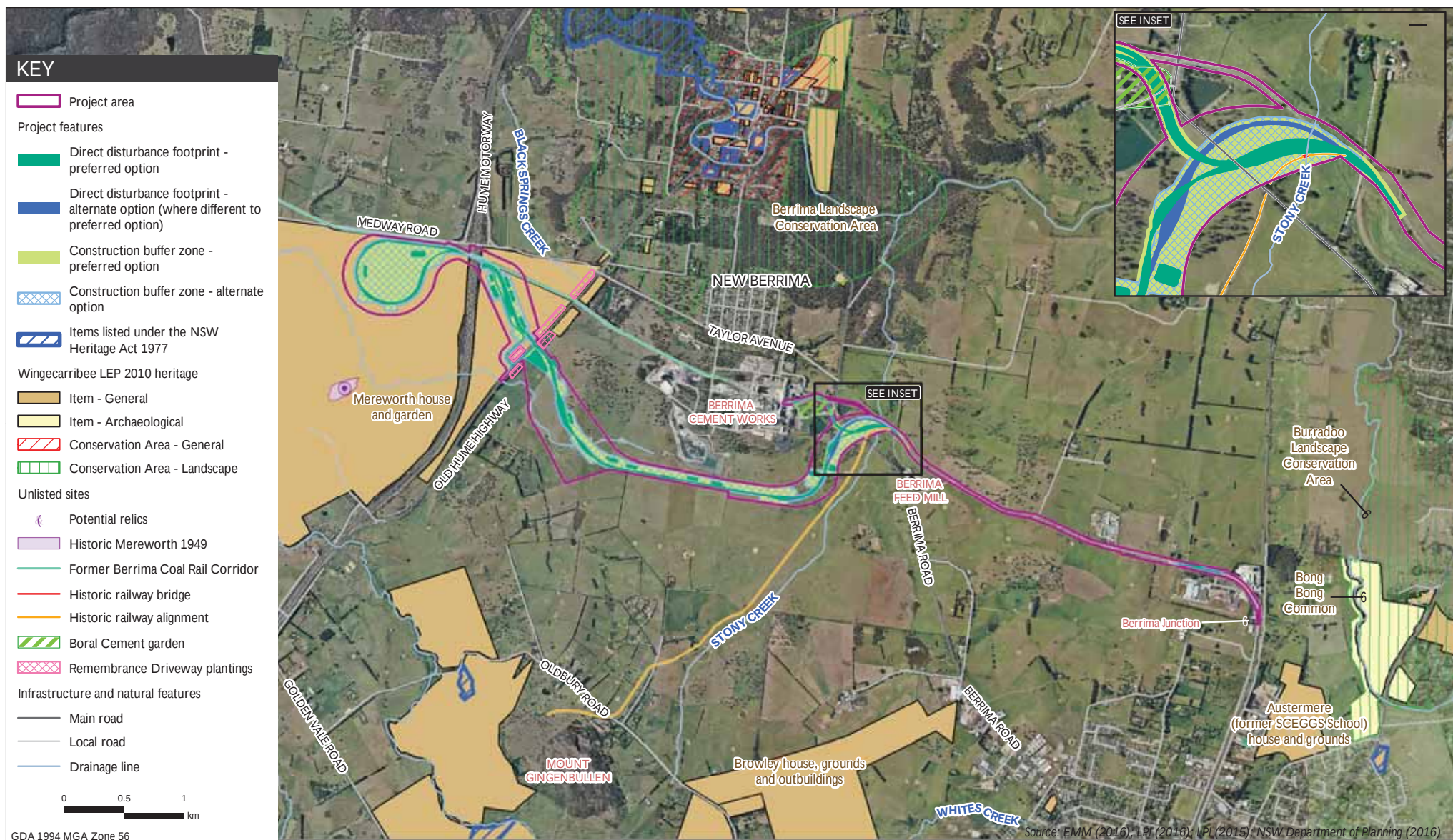
7 Statement of heritage impact

7.1 Summary statement of heritage impact

Table 7.1 provides a summary of the potential physical and visual impact of the project, including the project preferred and alternative alignment option around Berrima Road (refer to Figure 7.2). Further discussion on the assessment of impact is provided in Sections 7.2 and 7.3.

Table 7.1 Project options - potential heritage impact

Heritage item	Wingecarribee LEP	Project preferred option	Project alternative option
Mereworth House and Garden	I351	The rail loop will cut across the northern paddocks of this property but will not have any impact on the heritage value of the house and gardens. There is the potential for the views and vistas from the Mereworth House to be impacted, particularly because it is elevated on a hill overlooking the project area. However, at present any view of the project area is screened by the designed garden.	Impact as per project preferred option.
Railway bridge	Not listed	The railway bridge is in close proximity to the preferred rail alignment and will be removed by this option.	The bridge is outside of the direct disturbance footprint of the alternative option, although is within the construction disturbance footprint. The bridge will be avoided if possible during construction works.
Sorensen Garden – Boral Cement	Not listed	The new rail spur into the cement works will pass through a portion of this garden, and some trees will be removed.	No impact
Remembrance Driveway plantings	Recently listed	No impact	No impact
Former Berrima rail corridor	unlisted	The project rail line will utilise the existing corridor where it traverses the Hume Highway. The impacts are anticipated to be minor when the entire rail corridor is considered.	Impact as per project preferred option
Berrima Landscape Conservation Area	C1843	No impact	No impact
Burradoo Landscape Conservation Area	C1834	No impact	No impact
Bong Bong Common	A1191	No impact	No impact
Austermere House and Grounds	I398	No impact	No impact



Heritage impacts - project area
Berrima Rail Project
Statement of heritage impact
Figure 7.1



Heritage impacts - project area east
Berrima Rail Project
Statement of heritage impact
Figure 7.2



Heritage impacts - project area west
Berrima Rail Project
Statement of heritage impact
Figure 7.3

7.2 Statement of heritage impact: project preferred option

7.2.1 Summary

No physical impacts on significant fabric of any listed heritage items will occur as a result of the project.

The project preferred option will physically impact two items with heritage value (unlisted); the Boral Cement garden and the former Blue Metal Company timber bridge.

Impacts to the garden facing Berrima Road will necessitate the removal of a number of trees from the original design.

Management measures include changing only as much as necessary, that is, ensuring the construction impacts are kept to a minimum and, photographic archival recording prior to construction commencing.

7.2.2 Mereworth house and garden

The rail loop component and maintenance and provisioning facilities of the Berrima Rail Project will be built within the Mereworth property. Importantly, the significant components of the property, being the house and surrounding garden, are not within the project area, which is approximately 700 m north of the house and garden complex.

Impacts to the setting of the house and garden will be moderate as the rail loop will be constructed on an earthen embankment up to 4 m high. The addition of the rail loop in the vicinity of Mereworth will affect the setting but only when viewed from within the property and from Medway Road. The only place where views from the house and garden will be affected is to the north-east across the ha-ha to the surrounding paddocks and dam. When viewed from the outside edge of the ha-ha there will be some noticeable change in sections of the existing landscape, with the addition of the rail loop. Generally however, the view directly north will be to the west of the rail loop and views from inside the garden and from the house will, for the most part, be screened by the mature plantings along the perimeter of the garden.

Elements of the Hume Highway act to largely obscure views to Mereworth, with the location of road embankments. The 110 km speed at which traffic flows along the highway also does not afford many opportunities to experience specific views across the landscape.

7.2.3 Former Berrima Coal rail corridor

The former Berrima Coal rail alignment passes to the north of the Mereworth property and travels beneath the Hume Highway where it continues in a south-easterly direction until it joins the Berrima Cement Works (Figure 1.3). Impacts to the former rail alignment, demonstrated by the surviving corridor will be minimal as the rail loop will join the existing rail cutting to pass beneath the Hume Highway. At approximately 140 m to the east of the Hume Highway, the project rail line will divert to the south away from the former rail corridor.

Impacts will include cutting through the existing former rail corridor embankment to lay the project rail line. Those impacts will be confined to two discrete sections of the former rail embankment. The project impact to the former rail corridor is acceptable, particularly as a section will be used to carry coal carriages, the purpose for which it was originally intended.

7.2.4 Former Southern Blue Metal rail-bridge and corridor

The railway bridge, which was identified during the field survey, is likely to be removed by construction disturbance. It is possible to avoid physical impact to this feature and the former rail corridor by identifying its location to construction personnel and avoiding the area.

The timber rail bridge associated with Taylor's Southern Blue Metal Company will be removed through the implementation of the project preferred option but it may be possible to retain it if the alternative option is implemented. If the timber bridge cannot be retained due to construction requirements, its removal should be managed through archival recording (which may also include archaeological monitoring of its dismantling).

7.2.5 Boral Cement garden

The Boral Cement garden that fronts Berrima Road was designed by Paul Sorensen for Al&S and is one of a number of gardens he designed for the Hoskins family. It is also the result of a move towards beautifying industrial landscapes. Today it provides a screen through which the cement plant can be seen; an obvious intention of the design, as well as being aesthetically pleasing in its own right. The garden comprises a variety of trees that add colour to the landscape and define the cement plant from surrounding industry (refer to Plate 5.9).

The original design garden has been modified by the introduction of new native plantings, set out in rows rather than in any formal landscape design, but this native tube stock has been planted in compliance with EPA requirements. It would be beneficial to the aesthetic significance of the garden and its integrity if the tube stock currently within the curtilage of the Sorensen garden is removed and replanted elsewhere on the site. Further, a number of what appear to be plantings in the original design are stunted and in poor health (refer to Plate 5.11).

The preferred project option will remove some of the historical plantings that are in poor condition that would have required in the future as part of the garden's maintenance. However, some of the plants that will be removed are in good condition, and their removal will further diminish the value of the garden; appropriate amelioration measures are therefore recommended. Figure 7.1 shows the area of the garden that will be affected by the direct footprint of the preferred rail design; trees within the construction disturbance footprint will be managed to avoid impacts where possible.

The addition of the proposed rail line within the cement plant garden will negatively impact on individual plantings but as many of these are in poor condition, these impacts will generally be minor, with the exception of the spruce trees and the ash tree in the south-east corner of the garden (Plate 5.10). Other plantings, including the visually outstanding sequoias, the copper beeches, weeping elms and golden elms will be retained.

The garden is not listed on a statutory instrument but has been assessed as having significance at a local level. It was designed within an industrial plant, which produces cement to this day, and must be able to respond to changes in operational requirements. It is also a living assemblage, which means that parts of it have not thrived where other parts have successfully reached maturity to realise an aesthetic that is valued. In the last few years, the garden has diminished in quality in some areas but Boral will engage with experts to improve its quality and replace lost plantings elsewhere within its curtilage. With expert guidance, there is no reason that an historic industrial garden within an operating industrial site cannot coexist. Indeed this greening of an industrial space was clearly the original intention of both Hoskins and Sorensen.

The proposal will result in impacts to the plantings associated with Sorensen but it will remain a garden that is in keeping with the original principle of its design; it will remain a living garden, providing a screening around industrial elements.

The cement works are located on the site of an earlier saw mill, which existed for a short period of time. Relics in the garden area are not anticipated to occur; however, the unexpected finds protocol will apply in this area as in all areas of the project.

7.2.6 Remembrance Driveway plantings

The plantings occur on either side of the Old Hume Highway alignment. Some groups are listed, others are not but it has been determined that all are associated with Paul Sorensen and Sir Cecil Hoskins a part of the Remembrance Driveway program. The project has been designed to avoid these trees (Figure 1.3).

None of the plantings along the Remembrance Driveway will be impacted by the project.

7.2.7 Heritage conservation areas

Berrima and Burradoo LCAs (including Bong Bong Common) are outside the project area and also partially shielded by rises in the landscape. They will not be physically impacted by the preferred project option.

7.3 Statement of heritage impacts: project alternative option

7.3.1 Summary

No physical impacts to listed heritage items will occur as a result of the project.

The project alternative option may physically impact one item of heritage significance (unlisted) in the project area; the old timber bridge and rail corridor of the former Southern Blue Metal Company adjacent to Boral Cement.

Whilst outside the direct footprint of the alternative option, the timber rail bridge is within the construction footprint. It will be avoided where possible under this option.

Visual impacts and impacts to the setting will be incurred by the house and garden of Mereworth and the general character of the project area.

7.3.2 Mereworth House and Garden

Impacts associated with the project alternative option are exactly as per the project preferred option.

The rail loop component and maintenance and provisioning facilities of the Berrima Rail Project will be built within the Mereworth property. Importantly, the significant components of the property, being the house and surrounding garden, are not within the project area, which is approximately 700 m north of the house and garden complex.

Impacts to the setting of the house and garden will be moderate as the rail loop will be constructed on an earthen embankment up to 4 m high. The addition of the rail loop in the vicinity of Mereworth will affect the setting but only when viewed from within the property and from Medway Road. The only place where views from the house and garden will be affected is to the north-east across the ha-ha to the surrounding paddocks and dam. When viewed from the outside edge of the ha-ha there will be some noticeable change in sections of the existing landscape, with the addition of the rail loop. Generally however, the view directly north will be to the west of the rail loop and views from inside the garden and from the house will, for the most part, be screened by the mature plantings along the perimeter of the garden.

Elements of the Hume Highway act to largely obscure views to Mereworth, with the location of road embankments. The 110 km speed at which traffic flows along the highway also does not afford many opportunities to experience specific views across the landscape.

7.3.3 Former Berrima Coal rail corridor

The former Berrima Coal rail alignment passes to the north of the Mereworth property and travels beneath the Hume Highway where it continues in a south-easterly direction until it joins the Berrima Cement Works.

Impacts to the former Berrima Coal rail corridor, which has been assessed to respond to the heritage criteria but not reach the threshold for local significance, cannot be avoided as the project rail line will utilise the existing corridor. The impacts are anticipated to be minor when the entire rail corridor is considered. Management measures include changing only as much as necessary, that is, ensuring the construction impacts are kept to a minimum and, photographic archival recording prior to construction commencing. Generally however, reusing the corridor for its original intended purpose is seen as a positive aspect of the proposal.

Impacts will include cutting through the existing former rail corridor embankment to lay the project rail line. Those impacts will be confined to two discrete sections of the former rail embankment. The project impact to the former rail corridor is acceptable, particularly as a section will be used to carry coal carriages, for which it was originally intended.

The corridor was not photographed from up close as it is within a restricted zone.

7.3.4 Former Southern Blue Metal rail-bridge and corridor

The rail-bridge, which was identified during the field survey, is approximately 60 m from the project alternative option rail line. Whilst outside the direct footprint, it is within the construction footprint, and will be avoided where possible under this option. If it is not possible to avoid, an investigation of the rail-bridge will be required (refer to management of impacts below).

7.3.5 Boral Cement garden

The project alternative option will avoid the garden.

7.3.6 Remembrance Driveway plantings

None of the Remembrance Driveway plantings will be impacted by the project.

7.3.7 Heritage conservation areas

Berrima and Burradoo LCAs (including Bong Bong Common) will not be impacted physically and visually by the preferred project option.

7.4 Management of impacts

The management measures presented in this chapter are in keeping with the philosophy of the *Burra Charter 2013* (Australia ICOMOS 2013), where change to items of significance is managed to ensure that as much as necessary and as little as possible is the end result. The first option is avoidance, which removes the need for mitigation or amelioration.

The following measures will apply to the Berrima Rail project with respect to historical heritage:

1. Where made possible in the detailed design, reduce the identified heritage impacts.

Archival recording of the area prior to change will be undertaken, with particular attention to:

- a) the former Berrima Coal Mine rail corridor where the project rail loop will be built;
 - b) the Remembrance Driveway trees;
 - c) the former Southern Blue Metal Company (Gingenbullen Quarry) timber rail-bridge and former railway corridor; and
 - d) the Boral Cement garden (for the project preferred option).
2. The Remembrance Driveway trees (identified as newly discovered heritage items) will be avoided during construction works. These trees will be marked out and clearly identified to ensure there are no inadvertent impacts. All trees not identified for removal will not be harmed. Identified trees are those that have been recently listed, the group that has been excised from the project area and additional groups shown as 'newly found sites' on Figure 7.3.
 3. The management of historic heritage items will be documented in the CEMP, and will include, but not limited to:
 - a) Management of the Sorensen garden in the Boral Cement property (*for the project preferred option only*) – the CEMP will include a plan of action with supporting figures that identifies the plants for removal, and sets out the location and species for replacement plants in a manner that conforms to the spirit of Sorensen's vision by prioritising cold climate species over native species. This will be done in consultation with the Southern Highlands Branch of the Australian Garden History Society.

Where practicable, impacts to mature plants will be avoided by working around the construction disturbance footprint.

The option of re-locating mature trees will be investigated. Pending the outcomes of this investigation, and where practicable, mature plants will be re-located with the advice and involvement of a reputable tree re-location consultant.

- b) Avoidance measures for the Remembrance Driveway trees – The CEMP will include a section on the Remembrance Driveway trees that clearly marks them for retention.

- c) Unexpected finds protocol - if unexpected historical archaeology is discovered during construction, work in the immediate area must cease and an archaeologist must be contacted to make an assessment of the find. If it is determined to be a relic under the Heritage Act, further investigation may be required. Examples of unexpected finds may include bricks, sandstone blocks and artefact deposits.
- d) Rehabilitation - consideration of historic values will be incorporated into the rehabilitation plan for the project.

8 Conclusion

There will be no physical impacts to listed heritage items as a result of the project.

Impacts to the existing landscape will be minor and restricted to the northern paddocks of the Mereworth property. The significant components of the property, being the house and garden, are outside the project area. "Mereworth" house and garden is listed on the Wingecarribee LEP (I351) and is of local significance.

The proposed rail loop will be visible from some locations in the public domain (refer to visual assessment – Chapter 15 of the EIS) and from Mereworth house and some parts of the gardens at the ha-ha. The project elements will not be visible from the entrance to the house and garden, and thus will not interfere with the effect produced by the avenue of trees upon arrival, nor will it be visible once inside the forest-effect of the garden.

However, the impact of the rail loop to the setting of the house and garden of Mereworth is considered to be moderate. It is anticipated that the rail loop will be partially screened by existing trees in the paddocks to the north. Impacts from the public domain will be variable depending on where it is viewed from. Generally however, views to Mereworth from most vantage points are difficult as the Hume Highway obscures view lines from the east and the 110 km speed limit prohibits close inspection of the surrounding landscape.

Parts of an unlisted garden at the Berrima Cement Works attributed to Paul Sorensen will be disturbed by the construction of the new rail siding into the cement works, under the preferred project route. However, the majority of trees to be removed are in poor condition and the garden will remain in keeping with the original principle of its design; that is a living garden providing screening around industrial elements.

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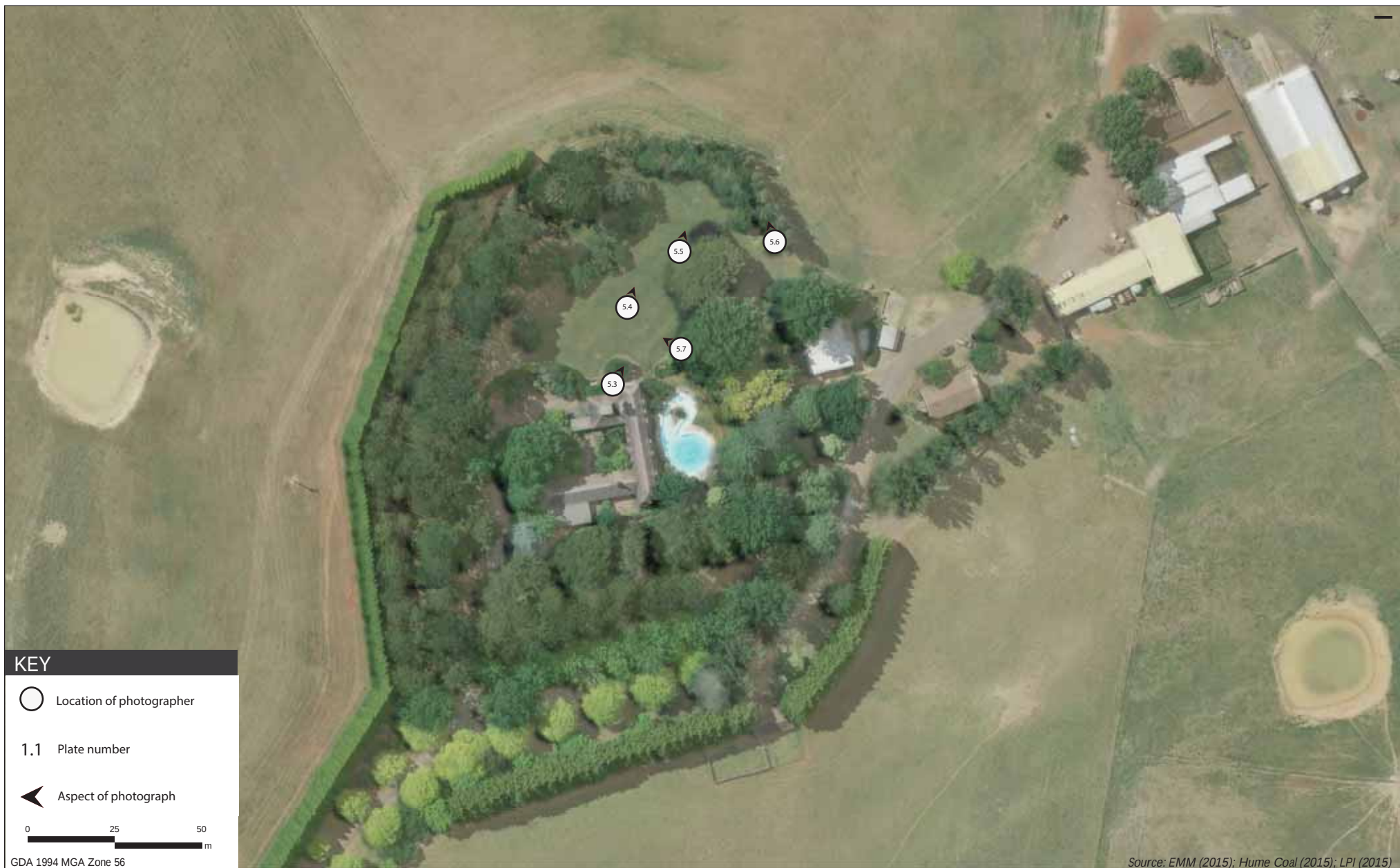
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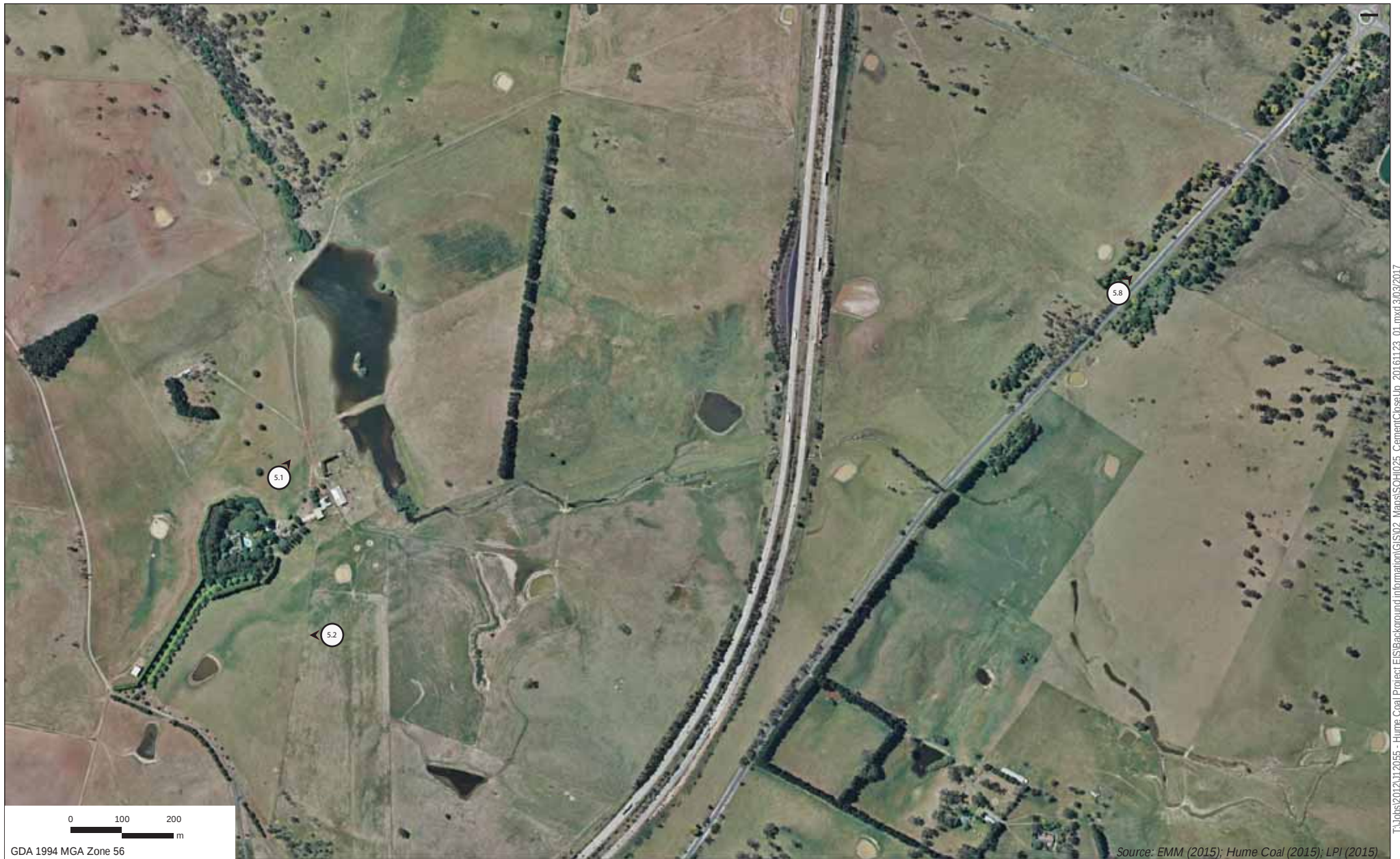
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Appendix A

Photographic plan









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