

APPENDIX 11

Historical Heritage Assessment

**LYNWOOD QUARRY
EXTRACTION AREA
MODIFICATION HISTORICAL
HERITAGE ASSESSMENT**

FINAL

November 2015



LYNWOOD QUARRY EXTRACTION AREA MODIFICATION HISTORICAL HERITAGE ASSESSMENT

FINAL

Prepared by
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on behalf of
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This report was prepared using
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Glossary and Acronyms

Approved Operations	Lynwood Quarry Project as approved under DA 128-5-2005 (as modified)
Approved Project Area	Lynwood Quarry project area as approved under DA 128-5-2005 (as modified) as shown on Figure 1.2 .
Approved Pit	The currently approved (under DA 128-5-2005, as modified) ignimbrite pit
Granite Pit	The proposed modified extraction area to the west of the Approved Pit as shown on Figure 1.3 quarrying a granite resource.
Modification Project	The Proposed Extraction Area Modification, which includes the proposed development of an additional quarry resource to the west of the currently approved quarry area and associated components
Modification Project Area	The Approved Project Area plus the area required for the proposed Granite Pit, associated haul roads, emplacement areas, amenity bund and water management structures as shown on Figure 1.3 .
Granite Pit Area	The proposed modified extraction area (the Granite Pit) plus the area required for associated haul roads, emplacement areas, amenity bund and water management structures on Lot 2 DP 1107232 (and an enclosed Crown road reserve) located to the west of the existing Approved Lynwood Quarry as shown on Figure 1.3 .
AHC	Australian Heritage Council
EA	Environmental Assessment
EP&A	<i>Environmental Planning and Assessment Act 1979</i>
ICOMOS	International Council on Monuments and Sites
IFLA	International Federation of Landscape Architects
LEP	Local Environmental Plan
OEH	Office of Environment and Heritage
RNE	Register of the National Estate
SHR	State Heritage Register

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1.0 Introduction

Holcim (Australia) Pty Ltd (Holcim Australia) was granted development consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in December 2005 by the NSW Minister for Planning to construct and operate Lynwood Quarry west of Marulan, NSW (refer to **Figure 1.1**). Lynwood Quarry is approved to produce a maximum of 5 million tonnes per annum (Mtpa) of product at the site. Construction of the quarry commenced in late 2010, with operations commencing in late 2015.

As discussed in **Section 1.1**, Holcim Australia is seeking approval to quarry a granite resource located to the west of the existing Lynwood Quarry extraction area. This approval is being sought via a modification to the existing development consent under Section 75W of the EP&A Act. Umwelt (Australia) Pty Limited (Umwelt) has prepared this Historical Heritage Assessment as part of the Environmental Assessment (EA) that has been prepared to accompany the modification application.

1.1 Overview of the Approved Lynwood Quarry and the Modification Project

Holcim Australia has development consent (DA 128-5-2005) to construct and operate Lynwood Quarry to produce up to 5 million tonnes per annum (Mtpa) until 1 January 2038 (the Approved Operations). The approved quarry includes a quarry pit, overburden and excess product emplacement areas, processing facilities, road and rail loading facility and associated infrastructure and activities (refer **Figure 1.2**). Lynwood Quarry is approved to produce up to a total of 5 Mtpa, of which up to 1.5 Mtpa may be transported by truck and up to 5 Mtpa by rail. DA 128-5-2005 was most recently modified in 2011 to provide for reconfiguration of the rail line from a balloon loop to a rail spur and associated changes to the infrastructure layout.

Holcim Australia commenced operational readiness works in the approved quarry pit (an ignimbrite resource) in 2012 as part of the construction phase of the quarry and is now in the commissioning phase with operation of the quarry planned to commence in mid to late 2015. Material extracted from the approved Lynwood Quarry pit (the Approved Pit) was used in the onsite civil works and to prepare the quarry pit ready for operation (e.g. removing overburden to expose the ignimbrite resource).

During the operational readiness works, further drilling and material testing has revealed that the resource in the Approved Pit is more variable and substantial areas are characterised by more significant concentrations of either intense fracturing, alteration, clay, or a combination of these characteristics, than was detected during the earlier resource assessment investigations. The variability and complexity of the approved Lynwood Quarry resource will challenge Holcim Australia's ability to consistently supply in-specification products from Lynwood Quarry to the market.

Holcim Australia is therefore seeking approval to extract quarry resources on Holcim Australia owned land, which adjoins the Approved Project Area to the west of the Approved Pit. The proposed additional extraction area (the Granite Pit) is a granite resource and has different properties and mineralogy to the currently approved ignimbrite resource. Extensive drilling and testing of the granite resource has revealed that it is homogeneous, relatively unaltered and unfractured. The proposed granite resource will enable Holcim Australia to consistently produce in-specification products required to be delivered by Lynwood Quarry to supply the local, regional and Sydney markets.



FIGURE 1.1
Locality Plan

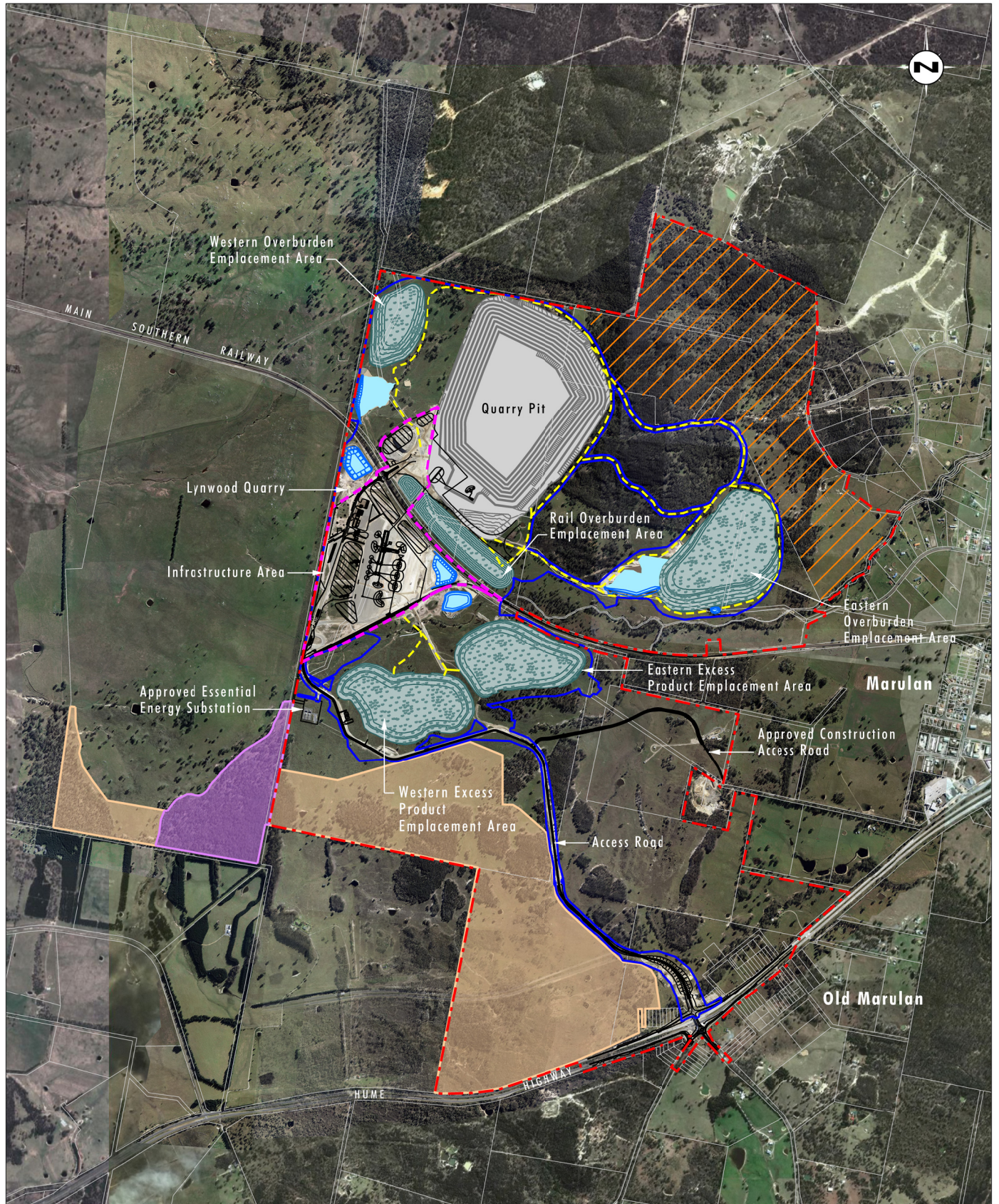


Image Source: Holcim Australia (Aerial Photo March 2012)
Data Source: LPI 2014

0 0.5 1.0 1.5 km
1:30 000

Legend

- | | |
|--|--|
| Approved Project Area | Dam |
| Lynwood Infrastructure Facilities | Existing Biodiversity Offset Area (EPBC) |
| Haul Road | Existing Habitat Management Area (EPBC) |
| Approved Disturbance Footprint | Existing Habitat Management Area |
| Quarry Pit | |
| Rehabilitated Area | |

File Name (A4): R13/3330_130.dgn
20151027 14.49

FIGURE 1.2

Approved Conceptual
Quarry Plan
(Year 30)

1.2 Extraction Area Modification

The proposed Extraction Area Modification (hereafter Modification Project) comprises development of the following key features:

- A Granite Pit extraction area (the Granite Pit) to the west of the existing Approved Pit.
- Reduction in the extent of the Approved Pit to reflect limitations within the ignimbrite resource.
- Revised overburden emplacement areas.
- Additional haul roads and water management system structures.
- Additional visual bund and vegetative screen.

These features are shown in **Figure 1.3**. Other than the proposed changes to the layout or footprint of the development, Lynwood Quarry from an operational perspective will be largely unchanged from the currently approved operations. **Table 1.1** compares the proposed modified development to the existing approved operations.

Table 1.1 Comparison of Approved Project and the Modification Project

Major Project Components/Aspects	Approved Project	Proposed Modification Project
Quarry Life	Development consent to cease on 1 January 2038	No change.
Limits on Production	5 Mtpa saleable product	No change.
Maximum Transportation of Product by Rail	5 Mtpa	No change.
Maximum Transportation of Product by Road	1.5 Mtpa	No change.
Rail Facilities	Rail spur and loading facility as shown on Figure 1.3	No change.
Infrastructure	As shown on Figure 1.2	No change to approved infrastructure. Additional haul road to connect to new Granite Pit (refer to Figure 1.3) and water management structures.
Hours of Operation	24 hours per day, 7 days per week. Restrictions on some operations to minimise potential noise impacts.	No change.

Major Project Components/Aspects	Approved Project	Proposed Modification Project
Employment	Employment at maximum production of approximately 115 people (including road transport drivers).	No change.
Quarry Footprint	As shown on Figure 1.2	Development of new Granite Pit to the west of the existing Approved Pit (refer to Figure 1.3). Reduction of the Approved Pit footprint by approximately 55 hectares.
Overburden and Excess Product Emplacement Areas	As shown on Figure 1.2	<p>The approved Western and Eastern Overburden Emplacement Areas will no longer be required.</p> <p>Instead, emplacement areas to handle overburden from the Granite Pit will include backfilling the Approved Pit (refer to Figure 1.3), emplacement within part of the currently approved quarry limit, and a proposed emplacement area adjacent to the Granite Pit.</p> <p>A visual bund will also be developed to west of the Granite Pit (refer to Figure 1.3).</p>
Total Disturbance Footprint	As shown on Figure 1.2 (approximately 383 hectares)	The disturbance footprint will extend to the west to provide for the proposed Granite Pit and associated infrastructure and decrease in the east through a reduction in the Approved Pit disturbance footprint and associated overburden storage and haul roads to the east. Total disturbance footprint approximately 499 hectares.
Construction Phase	Largely completed, quarry currently in commissioning phase.	Construction limited to construction of haul road to proposed extraction area, visual bund and water management infrastructure.

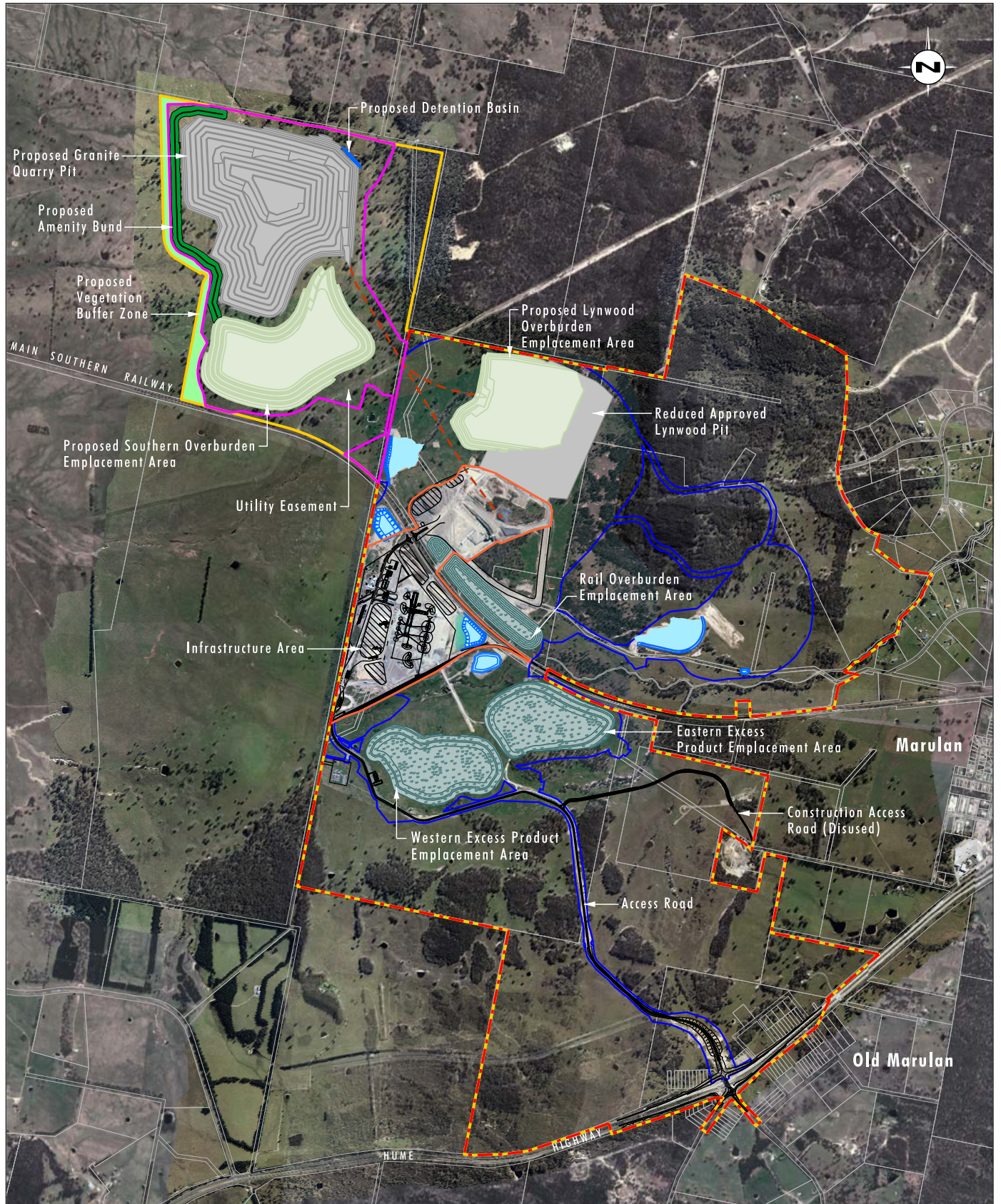


Image Source: Google Earth (2012), Holcim (2012, 2014)
Data Source: LPI (2014), Holcim Australia (2015)

0 0.5 1.0 1.5 km
1:30 000

Legend

- Approved Project Area
- Modification Project Area
- Lynwood Infrastructure Area
- Approved Disturbance Footprint
- Proposed Granite Pit Disturbance Footprint
- Lynwood Infrastructure Layout

- Quarry Pit
- Emplacement Area
- Dam
- Proposed Overburden Emplacement Area
- Proposed Vegetation Buffer Zone
- Proposed Amenity Bund

- Proposed Haul Road

FIGURE 1.3

Proposed Extraction Area
Modification Project
Conceptual Stage 6 (Life of Project)

2.0 Historical Heritage Assessment

2.1 Historical Heritage Assessment

This Historical Heritage Assessment has been prepared as part of the EA to support the 75W modification application for the Modification Project.

This report examines the historical (non-Aboriginal) heritage issues associated with the Project with the aim of assessing and evaluating the potential heritage impacts associated with the Project. The report identifies the heritage sites contained within and in the vicinity (within 3 kilometres) of the Granite Pit Area (refer to **Figure 1.3**) and assesses the significance of any impacts on these sites potentially resulting from the Project.

This assessment has been undertaken in accordance with guidelines set out in the NSW Heritage Manual 1996 (Heritage Office and Department of Urban Affairs & Planning), including *Archaeological Assessments*, *Assessing Heritage Significance*, *Statements of Heritage Impact* and with consideration of the principles contained in *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 1999* (Australia ICOMOS. 2000) and the *Historical Archaeology Code of Practice* (2006).

2.2 The Heritage Act 1977 (NSW)

As discussed in **Section 1.0**, the proposed approval path for the Project is to modify the existing consent under Section 75W of the EP&A Act.

In addition to the EP&A Act, the *Heritage Act 1977* (NSW) (the Heritage Act) is the primary statutory control protecting historical/European heritage (non-Aboriginal) within New South Wales.

The Heritage Act affords automatic statutory protection to items of heritage significance which form part of the heritage record of NSW (except where these provisions are suspended by other prevailing legislation). The Heritage Act defines a heritage item as a place, building, work, 'relic', moveable object or precinct.

An archaeological 'relic' is defined as any deposit, object or material evidence that:

- a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement; and
- b) is of State or local heritage significance.

2.3 Statutory Heritage Listings

In order to identify if any historical heritage items are located within or in the immediate vicinity of the Granite Pit Area, desktop searches were conducted of the NSW State Heritage Register (SHR) and State Heritage Inventory, the Australian Heritage Database (including Commonwealth and National Heritage lists and the Register of the National Estate (RNE)), and local planning instruments (Goulburn Mulwaree 2009 LEP). No items listed on the SHR were identified during the searches.

The Granite Pit Area is located within the boundary of the Lockyersleigh Homestead and Gardens as listed as an item of local significance on the Goulburn Mulwaree 2009 LEP and associated Heritage Maps (Sheets HER_001 and HER_003) with the [former] property description of Lot 1 DP 574255 (refer to **Figure 2.1** and **Table 2.1**). The Granite Pit Area comprises the eastern portion of the Lockyersleigh boundary as listed on

the Goulburn Mulwaree 2009 LEP. The portion of land comprising the Granite Pit Area was formerly owned by Onions Investment (the current owners of Lockyersleigh) but was purchased by Holcim Australia in 2006. At the time of the sale of the portion of land comprising the Granite Pit Area Lot 1 DP 574255 was subdivided and the Granite Pit Area now comprises Lot 2 DP 1107232; with the remainder of the Lockyersleigh area as listed on the 2009 LEP now within Lot 1 DP 1107232 (refer to **Figure 2.2**). As such, the subdivision of land that comprised the listed Lockyersleigh holding (Lot 1 DP 1107232) has not been reflected on the heritage databases.

The Lockyersleigh Homestead is located approximately 1.7 kilometres from the closest western boundary of the Granite Pit Area. The edge of the wider area of associated outbuildings and gardens is located approximately 1.3 kilometres from the closest western edge of the Granite Pit Area (refer to **Figure 2.2**).

The Lockyersleigh Homestead and Lockyersleigh Garden are registered as separate items on the RNE. The RNE is a non-statutory heritage list of natural, Indigenous and historical heritage places throughout Australia. Many places in the RNE are now included in other statutory lists, such as the state heritage lists, or local government heritage registers. As a result, those places receive protection under the relevant federal, state, territory or local legislation.

Table 2.1 Goulburn Mulwaree 2009 LEP Listing Details

Item Name	Address	Property Description	Significance	Item No.
Lockyersleigh Homestead, Gardens	1092 Towrang Road	Lot 1, DP 574255	Local	I033

No other items with a historical heritage statutory listing were identified within the Granite Pit Area and there are no other listed items within a 3 kilometre radius of the Granite Pit Area. Advice from Enviro Strata Consulting Pty Ltd (Enviro Strata, the blasting consultant for the Modification Project) regarding distance from the Granite Pit Area where the predicted range of ground vibration resulting from blasting associated with the Modification Project would be less than 3 mm/s is less than 1.5 kilometres. As such the search area for listed items in the vicinity of the Granite Pit Area was limited to a conservative distance of 3 kilometres. Indirect impacts such as vibration potentially resulting from blasting are further discussed in **Section 6.2**.

The township of Old Marulan is located 3.5 kilometres south-southeast of the Granite Pit Area (refer to **Figure 1.3**) and is listed on the State Heritage Register as Old Marulan Town (listing number 00127). A portion of Old Marulan Town was subject to an archaeological excavation in 2007 in accordance with the Development Consent for Lynwood Quarry; the results of which are reported in the *Old Marulan 2007 Final Report* (Banksia / Umwelt 2015). As a result of its distance from the Granite Pit Area, Old Marulan Town is not considered further in this report except where relevant to the historical context of the Granite Pit Area. Note for the purposes of this report the current town of Marulan is referred to as Marulan while Old Marulan Town is referred to as Old Marulan.

The Main Southern Railway is located immediately adjacent to the Granite Pit Area (refer to **Figure 2.2**). The railway is not subject to a statutory heritage listing in its entirety, however a number of individual stations along the railway are subject to a statutory listing. For example, Marulan Railway Station and Yard Group is listed on the State Heritage Register, with the listing defined as the east and west end of the station platform. Marulan Railway Station is located over 4 kilometres from the Granite Pit Area and as such is not considered further in this report.

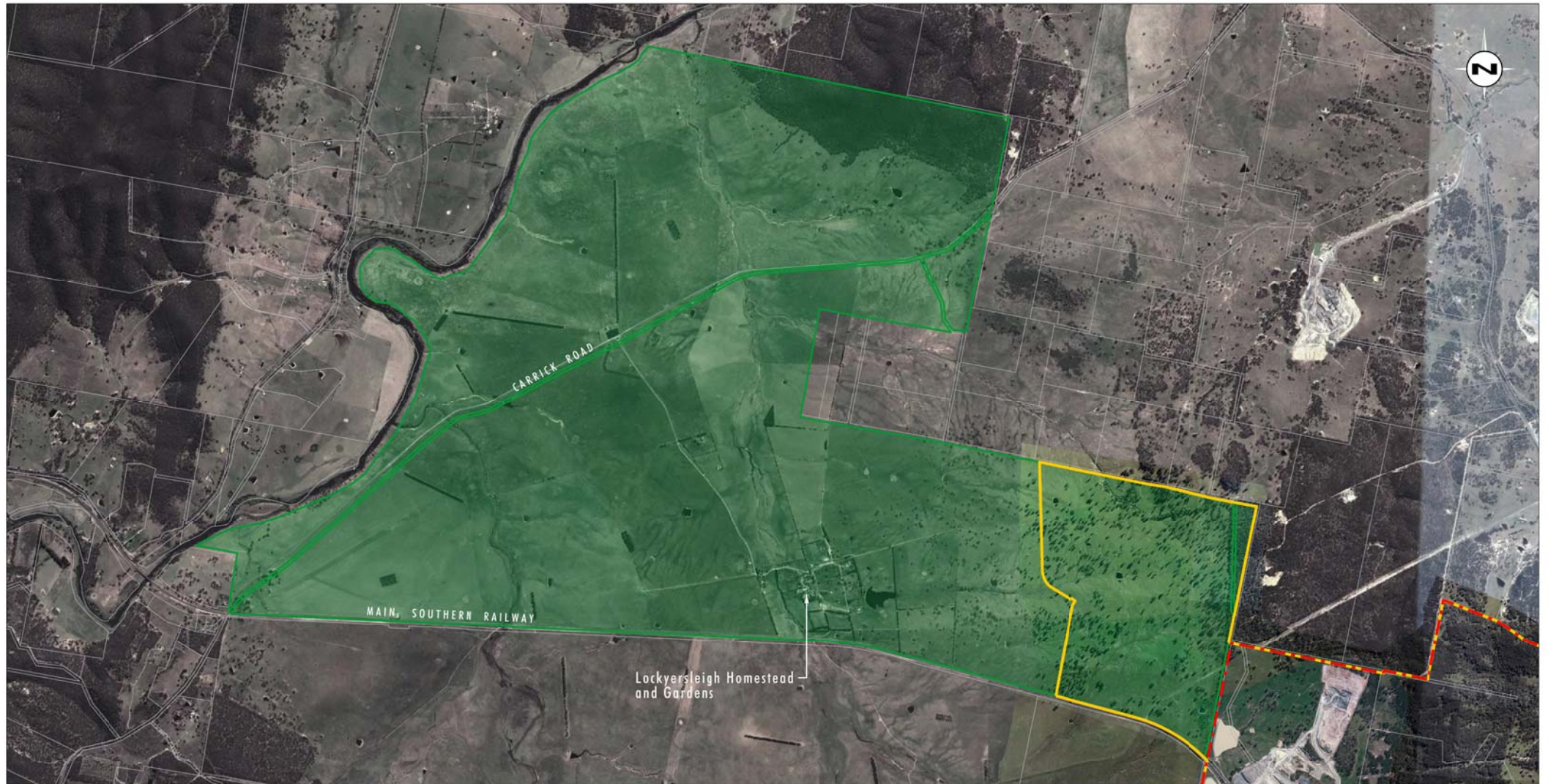


Image Source: Google Earth (2013), Holcim Australia (2014)
Data Source: LPI (2014), Holcim Australia (2014)

Legend

- Approved Project Area
- Modification Project Area
- Lockyersleigh Property Boundary Listed on Goulburn Mulwaree 2009 LEP

FIGURE 2.1

Lockyersleigh Property Boundary
Listed on Goulburn Mulwaree 2009 LEP
as Lot 1 DP 574255

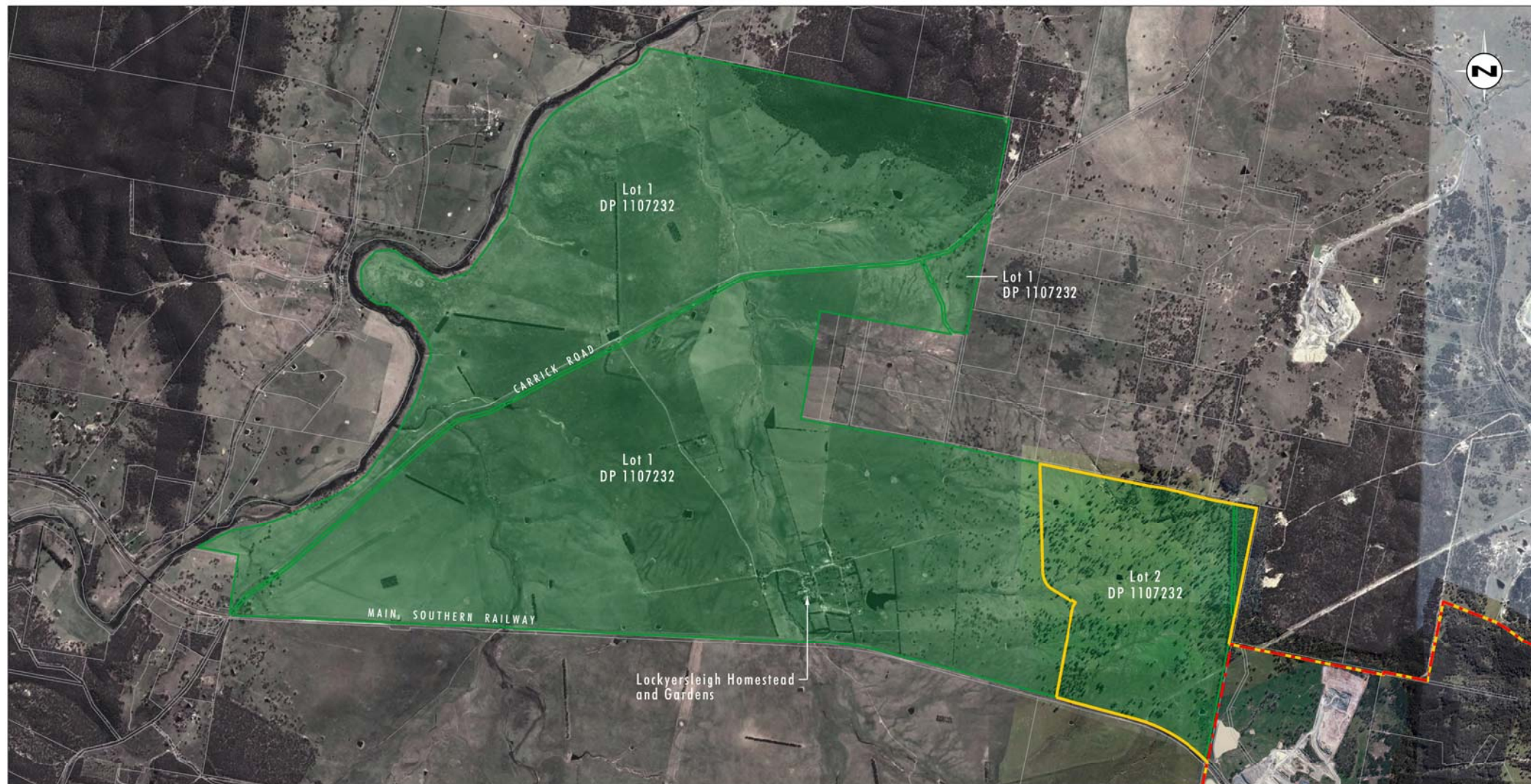


Image Source: Google Earth (2013), Holcim Australia (2014)
Data Source: LPI (2014), Holcim Australia (2014)

Legend

- Approved Project Area
- Modification Project Area
- Lockyersleigh Property Boundary Listed on Goulburn Mulwaree 2009 LEP

FIGURE 2.2

Current Property Boundaries of
Lots 1 and 2 DP 1107232

3.0 Historical Background

As part of NSW heritage assessment procedures it is essential to have a full understanding of a site or item based on its historical and physical context. This section of the report comprises a historical context for the Granite Pit Area and its broader locality to provide an understanding of the significance of any heritage sites within or in proximity to the Granite Pit Area.

Extensive research has previously been undertaken for the Lynwood Quarry Project, including the reporting on the historical heritage excavations at Old Marulan undertaken in accordance with the heritage conditions of the Lynwood Quarry development consent. As such, the historical context discussed below has been prepared utilising the *Old Marulan 2007 Volume 2 Archaeological Investigations Final Report* (Banksia / Umwelt 2015a) focusing on the early settlement of the area and the Lockyersleigh grant in which the Granite Pit Area is located.

3.1 European Contact

It is noted that care must be taken with the use of ethnographic observations of Aboriginal people in the early contact period. The European surveyors and explorers who wrote the majority of the earliest recordings carried with them a notion of racial superiority which tainted their perspective. It must also be recognised that by the time of the first ethnographic observations the traditional Aboriginal ways of life had already been altered due to loss of territory and introduced disease (Umwelt 2015:19).

Drawing on research by Tindale (1974) in relation to tribal boundaries, Eddie (1985: 5) states that the area was at the junction of four major tribes. These were the:

- Ngunawal who inhabited the area from Canberra to Yass and north to Goulburn
- Wandandian who inhabited the area from Ulladulla to Nowra and west to the mountains
- Wodi Wodi who inhabited the area north of the Shoalhaven River to Wollongong, and
- Gandangara (alternatively spelt Gundungurra) who inhabited the area from Camden to just south of Marulan.

Smith (1992) also reports there were up to six bands belonging to the Gundungurra, with the band from the Marulan locality one of the larger bands known as the Parramarragoo (the Bungonia band).

Tindale (1974) drew his information from recordings made by early explorers and settlers. Early exploration of the area was begun in 1798 when an expedition by John Wilson reached Mt Towrang (about 9 kilometres northeast of Goulburn). Members of the exploration team commented on the scarcity of Aboriginal people in the area and reported; ‘...we really believe that there never was a native in this part of the country’ (Collins 1798-1802: 87-91).

The Aboriginal people seemed to be purposefully avoiding contact with the explorers, evidenced in the sighting of fires by the early explorers. As white settlement began to take hold in the Marulan area, there were accounts of attacks on the white settlers by Aboriginal people and retaliatory attacks on Aboriginal people by the settlers. In 1826 Governor Darling sent 30 troopers to the Bungonia area (approximately 1.4 kilometres southeast of the Project Area) to act as a peace force following reports of ‘bands of angry natives gathering’. Governor Darling later wrote in a despatch to England (Governor Darling to Earl Bathurst Despatch No. 34 per Ship Toward Castle Government House, 23 May 1826 quoted in Eddie 1985:7):

My Lord,

1st I have much satisfaction in stating to your Lordship, in reference to my despatch No. 28 that the Natives, who had assembled in the County of Argyle, have been dispersed without committing any depredation or act of violence. It is supposed that the prompt and unexpected appearance of the Troops in that distant part of the County had some effect in producing this desirable end. If so it may be hoped that it will be attended with still further beneficial consequences by checking any disposition they might feel to re-assemble.

2nd The steps that have been taken will I trust ensure the native from further aggression, as there can be no doubt of their friendly disposition, when unmolested, and, though it may be politic to prove our superiority, it would be painful to punish an Act of retaliation with the severity necessary to prevent recurrence of such proceedings on their part.

From the dispatch it can be seen that the Aboriginal people of the area were being driven from their land by 1826. Further European settlement of the Marulan area followed and by 1832 there were already 12 properties listed between Marulan and Bungonia (NSW Calendar and General Post Office Directory).

3.2 Exploration and Early Settlement

3.2.1 Exploration and Road Surveying

The *ad hoc* nature of the settlement of the Southern Tablelands can be seen in the development of the early routes used by Europeans through the area, developed to suit local users with no clear sense of what was the best line to develop a through road, nor indeed where it should head (Banksia / Umwelt 2015a:58).

The Southern Tablelands were explored to increase awareness of the region to colonists. 1798 saw the first explorations south of Sydney, the first to the present day region of Bowral and the second to Mount Towrang led by John Wilson (Eddie, 1985:8). Both journeys were recorded in detail by John Price, a member of both parties. Further expeditions were undertaken by Hamilton Hume, Charles Throsby, James Meehan and John Oxley in 1817-1829 (Heritage Office 1996a: 109). Through the 1820s land grants were promised to settlers to encourage settlement of the region.

The road south from Sydney was the first formal road constructed beyond the Cowpastures; the area of present Camden and Campbelltown seen as being where Sydney ended and rural regional NSW began. From the Cowpastures crossing the road ran in a fairly straight line south through Bargo Brush and beyond to the Little Forest, where it rose over the eastern part of the Mittagong Range, before dropping down towards the Wingecarribee River, which was crossed at Bong Bong. The road then veered southwest and passed through the gently rolling hills before falling into scrubby land, called the Wombat Brush. The route then went down the descent referred to as the Devil's Hole, to reach the Wollondilly River and Eden Forest (Umwelt 2005: 2.1; Banksia / Umwelt 2015a:57). The road is variously named Wild's Pass, the Government Road or Argyle Road in contemporary use or Macquarie's Road by later historians. The first road was just a cleared line, wide enough for a cart, but with no drainage or consideration of the slopes or wet ground (Umwelt 2005: 2.1; Banksia / Umwelt 2015a:57).

As land was granted in the Southern Tablelands region it tended to fall in two groups, the first centred on the southern bank of the Wollondilly River, with the large estates being Lockyersleigh (Edmund Lockyer's estate) and Advance Australia (Robert Howe's estate) (refer to **Figures 3.1** and **3.2**). The second area was focused along the eastern side of the Shoalhaven Gorge (Banksia / Umwelt 2015a:57). Land taken up was, as far as can be determined, of the best quality available, well-watered and lightly timbered. It occasionally included rougher ground, which still provided fodder when necessary. Two roads were developed as a result of settlement that serviced these groups of farms; both of which continued down to the more

attractive grasslands beyond Goulburn. The result for graziers was the choice of two routes, neither of which was well made, or easily travelled. One of the two roads, Riley's Road, was developed in the early 1820s and ran westwards from Sutton Forest, past the Ploughed Ground and descended to the southern bank of the Wollondilly River. The road followed the river towards Towrang, where it crossed the river before heading to Goulburn. It accessed Lockyersleigh and other nearby properties (**Figures 3.1 and 3.2** show the routes crossing Lockyer's grant) (Banksia / Umwelt 2015a:57). The approximate area of the LEP listing of the Lockyersleigh Property is also shown on **Figure 3.2**.

In the early 1830s three routes for an alternate road south were surveyed after complaints were made in 1829 that Major Lockyer, then Surveyor of Roads, was not putting the road in the best direction. It was ordered that no roads were to be constructed until the Surveyor General had surveyed and approved them. In 1829 Major Thomas Mitchell became Surveyor General. Mitchell had a more strategic view of the role of roads in the colony, seeing great roads radiating from Sydney and connecting the pastoral settlements with the centre (Banksia / Umwelt 2015a:58- 59). Mitchell preferred to travel using the most efficient route, which meant along watersheds and ridge lines, which reduced the amount of bridge building, but this tended to avoid existing grants and settlements, angering landholders (Banksia / Umwelt 2015a:59). In 1832 Governor Bourke toured Argyle, inspecting Mitchell's proposed road and listening to the varied opinions of the route. Governor Bourke instructed Mitchell to finalise a route as he was anxious to get the work underway (Banksia / Umwelt 2015a:59). Mitchell chose the northernmost route near the Nepean River and at Moorooaulin (Old Marulan) he divided the road, with the Great Road to head south towards Lake Bathurst and a branch to head to Goulburn. The name Moorooaulin was originally used to describe the locality. The name Marulan was initially given in approximately 1829 by Mitchell to a small mountain several kilometres to the southwest of the Old Marulan Town site as a simplification of Moorooaulin (Banksia / Umwelt 2015a:71).

Even though Mitchell had carefully planned his road to minimise climbs and creek crossings and take the shortest practicable route, there were some landowners who were unhappy that the road moved traffic away from their land. These landowners lobbied the next governor, Governor Darling, to investigate yet another route, which headed due west from Wingello to cross north of Old Marulan, through Lockyersleigh and rejoin the main route near Towrang (Banksia / Umwelt 2015a:62). In his complaint of the lobbyists chosen route, Mitchell noted that a publican, Joseph Peters, had moved his establishment from Riley's Road near Arthursleigh, and bought and built a brand new substantial inn at Old Marulan, which would be bypassed if the new route went ahead. Peters had written to say that he felt his investment of £500 was imperilled, should the change of route occur (Banksia / Umwelt 2015a:58). In 1836 Joseph Peters addressed letters from Old Marulan as 'Junction of the Great Roads', but eventually it was only the line to Goulburn that became the Great South Road (Banksia / Umwelt 2015a:59-60).

As discussed, the routes of early roads would often cross properties or large pastoral stations like Lockyersleigh. Some historical properties in the region, for example Glenrock (located on Bundanoon Road Marulan) and Reevesdale (346 Inverary Road Bungonia) retain former road routes as current farm access tracks (E. Higginbotham 2009 Vol 1:140). Although tracks leading off Riley's Road are known to have been located within Lockyersleigh, there is no evidence of these tracks having been within the Granite Pit Area (E. Higginbotham nd).

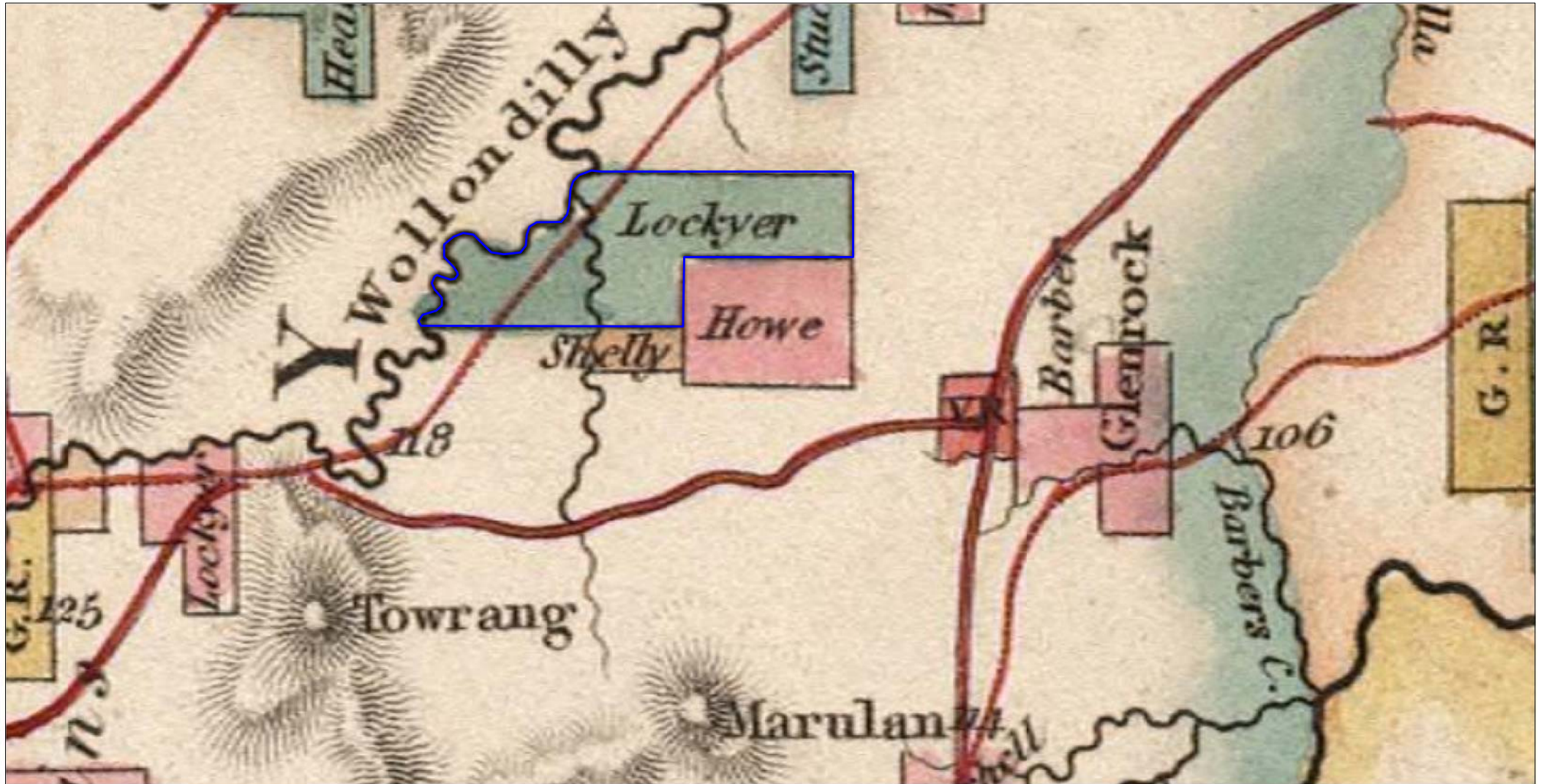


Image Source: National Library of Australia

Legend

Lockyer's Grant

FIGURE 3.1

1837 Plan showing Early Land Grants

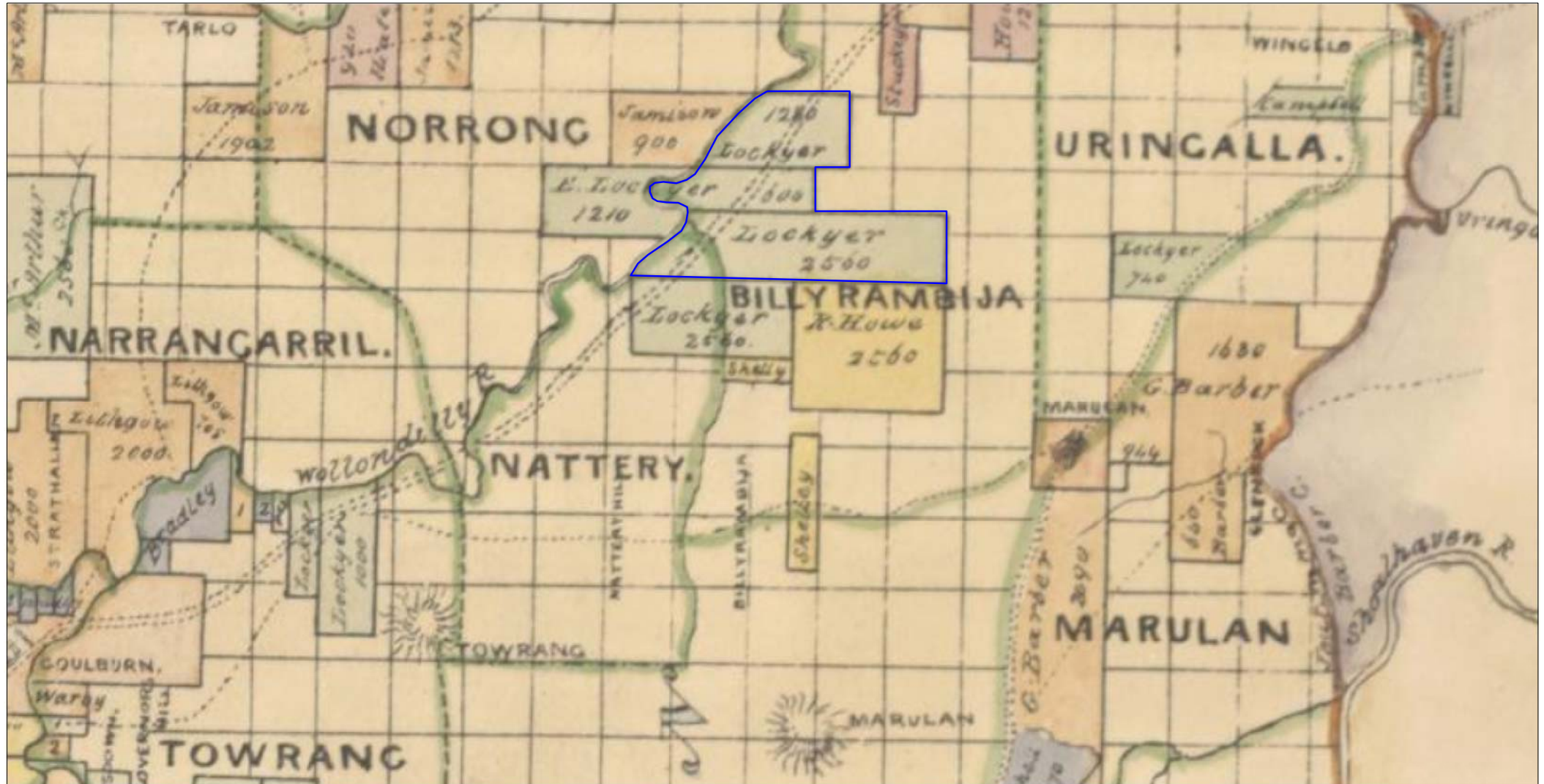


Image Source: National Library of Australia

Legend

Area of Lockyer's Estate Approximately Corresponding to Boundary Listed on Goulburn Mulwaree 2009 LEP

FIGURE 3.2

Early Routes and Land Grants from 1820 to 1837
Note Lockyer's Extensive Properties

3.3 Early Settlement

Towns could be founded by the government by establishing a village reserve and granting town lots for sale, or they could be created by private landowners subdividing their own property and offering lots for sale (Banksia / Umwelt 2015a:67). A number of towns were being established along the Great Southern Road in the 1830s, for example Camden on the Macarthur family estate or Picton on a subdivided property of Major Antill Jarvisfield (Banksia / Umwelt 2015a:68). In 1829 the first formal regulations for forming towns in NSW were established. These set out a template for towns, focussing on the size and arrangement of blocks.

Notably they were to be half acre blocks, measuring where possible 1 x 5 chains, with the short frontage facing the street. Separate lots were to be provided for churches, parsonages and cemeteries for the three main faiths. Set-backs from the street line were to be maintained to the house frontages, and drainage was provided for. These regulations were simple in operation. Once a town site was decided upon, a plan was drawn up in conformity with the regulations to the satisfaction of the Surveyor-General. Then it was passed to the Executive Council. Once they approved it or any changes, the town was official. Blocks could then be sold. Individuals could make submissions for a specific block or go through an auction system. Once a purchase was made, it had to be approved, money changed hands and finally a deed was issued, giving ownership to the person (Banksia / Umwelt 2015a:68-69).

When Mitchell laid out the Great Southern Road he laid out towns along its route, including Old Marulan, which was surveyed in 1833 and was laid out in 1834-1835 on the junction of the roads to Goulburn and Bungonia. The intention was to develop the route to Braidwood, however a lack of maintenance of the existing infrastructure caused the development of Bungonia to be slowed (Heritage Office 1996a:109).

Surveyor Hoddle was instructed to survey the streets and allotments in Old Marulan and submit a finished plan to the Governor. The design of the village was very simple, containing no side streets, with all allotments having frontages to the roads. The plan was approved in 1834 and notified in the Government Gazette in 1835. One of the first buildings in the village was the Woolpack Inn, constructed by Joseph Peters in 1835. Peters was appointed Postmaster in 1838. A blacksmith's shop was established about this time and together with the Inn and the Post Office, the basic needs of travellers were well provided (Umwelt 2005:2.2).

The town of Goulburn was marked out in 1828, and as late as 1836 there was still only one small inn, slab courthouse, police huts and a lock-up at North Goulburn. By 1841 there were 655 people living in the town, which almost doubled just four years later (Heritage Office 1996a:109).

Goulburn flourished in the years up to 1845, with churches of four denominations established by 1867 alongside five stores, five inns and over 20 hotels (Heritage Office 1996a:110). While Goulburn flourished, Old Marulan did not. In 1847 it was a small cluster of houses, two inns, post office, four stores, a school and an Anglican Church. Old Marulan's prospects changed in 1868, when the Main Southern Railway line to Goulburn was built two kilometres away, resulting in the slow demise of Old Marulan.

Soon after the first settlement mining and quarrying commenced in the wider Goulburn area. This included quarrying limestone, slate and marble and mining for gold, silver, iron and copper (E. Higginbotham 2009 Vol 1:141). During the short period of Old Marulan's operation there was mining of marble at the limestone reserve south of the Wollondilly River, modest gold discovery at Shelly's Flats and a much larger late 19th century gold rush at Bungonia and both iron and silver at Lockyersleigh and copper at Arthursleigh (E. Higginbotham 2009 Vol 1:141, Banksia / Umwelt 2015a:32). The site of the Lockyersleigh silver mine is reported as being 'undisturbed on a remote ridge' and not identified as being within the Granite Pit Area (E. Higginbotham 2009 Vol 1:141).

3.3.1 The Pastoral Landscape

Old Marulan was located in a landscape of existing land grants. At the time Old Marulan was established George Barber, stepson of Thomas Throsby, was its only immediate neighbour, to the south and east, but during the 1830s a number of other grants were purchased around the town (Banksia / Umwelt 2015a:58). Other nearby properties included Lumley, owned by Robert Futter, and Inverary Park, owned by David Reid. Inverary Park was granted to Reid in 1824. Lumley was immediately next to Inverary and the property was granted to Futter in 1828 (Banksia / Umwelt 2015a:64). Barber, Reid and Futter lived on their properties, making them unusual for the time, when most properties were used for stock (Banksia / Umwelt 2015a:65).

These homesteads became head stations for managing flocks and herds that occupied adjoining runs, as well as using annual grazing licenses for vacant land and flocks that were grazed on the Monaro or Murrumbidgee Rivers. Stations were largely self-sufficient due to the large number of workers and the distance to Sydney. Not all of the labour they used was convict assignees, with an increasing number of tickets-of-leave convicts during the 1830s. These convicts were given a form of parole that allowed them to work on their own, often as wage labour for established contracts. This could be more secure for the landowner than the lottery of an assigned convict. The convict labourers were known to take part of their wages in stock, so that they had the makings of their own herd (Banksia / Umwelt 2015a:65).

Only about one third of the land in the region was granted during the first half of the nineteenth century, with Edmund Lockyer being the largest landowner with his Lockyersleigh Estate and other nearby grants. (Banksia / Umwelt 2015a:66).

3.3.2 Great Southern Railway

The coming of the Great Southern Railway changed the southern region, and resulted in the death of Old Marulan. The railway was promoted as being good for the economy and the farmers of the region, however not everyone succeeded with it. The railways carried a greater promise than just fast transport and cheaper freight. Some saw them as a cleansing force of modernity that would obliterate the ways of life too closely associated with the old convict order. John Dunmore Lang thought that the railways would break down what he saw as an outdated and corrupt rural society (Banksia / Umwelt 2015a:150).

The first large public meeting in the colony to lobby for the establishment of a railway line took place on 29 January 1846. It was chaired by James Macarthur, the son of John Macarthur. Many of the speakers discussed whether or not a railway would be a paying proposition or too risky, an important point, as at that stage all of Britain's railways were private companies funded by private investors. Some positive motions for action were passed, creating subcommittees to examine routes to the north, west and south but the meeting was essentially inconclusive (Banksia / Umwelt 2015a:152).

A second meeting was held on 6 August 1846, where the only sub-committee to report was that looking at a south-western railway. The meeting launched the Great Southern and Western Railway Company [GSWRC], led by a provisional committee, to push for a railway line from Sydney to Goulburn. The interest in the railway was centred on how the railway would help Sydney, rather than the growing southern region. The cost of building the railway was unknown, needing detailed surveying (Banksia / Umwelt 2015a:152).

Thomas Woore, a naval officer with a grazing run near Goulburn, volunteered to prepare a survey for a route at his own expense. His two conditions were that his expenses were to be paid and if the route was taken up, he would be paid a sum to cover his labour. Woore surveyed the area from June 1846 to January 1848, with an initial concept showing the viable routes, followed by a detailed survey providing costings for bridges, culverts and tunnels. As a private company there was no expectation by the government that it would be involved in the initial route survey. Mitchell was still the Surveyor General, but was unable to

keep up with the demand for routine survey and land management, let alone major projects in support of private capital (Banksia / Umwelt 2015a:153).

Concerned that towns along the route of the Great Southern Road were suffering from lack of road exposure (Thomas Woore's route into Argyle for the Southern Railway ignored Old Marulan entirely), Mitchell provided a surveyor who investigated an alternate route that followed the line of the Great Southern Road (Banksia / Umwelt 2015a:152).

Difficulty plagued the railway early on. In 1848 NSW Parliament convened a sub-committee to examine the issue of railway development. Chaired by Charles Cowper, it set important preconditions for further development of the railway. In October the Sydney Tramroad and Railway Company was founded with Cowper as its president, taking over from the GSWRC. Progress was slow and a petition presented to the NSW Parliament in 1855 urged the government to get moving on the project (Banksia / Umwelt 2015a:153). By 1857 work had still not commenced, with Parliament establishing a select committee considering the options for developing railways, between rapid and cheap, with low capacity, or more developed lines requiring greater capital outlay (Banksia / Umwelt 2015a:153).

Woore's mapping of the route identified some areas where any train line would need to pass, such as the Mittagong Gap, which was the only viable crossing point of the Mittagong Range. At other locations decisions between more direct routes with greater engineering works or easier grades with increased distance were made. Woore chose the shortest routes, even where this meant avoiding an established town (Banksia / Umwelt 2015:154).

The route closely followed the old road alignment, past the Ploughed Ground down to the Devil's Hole to then cross Paddy's river. From there it passed to the west of the Wingecaribbee, along the base of the Cookbundon Ranges until a short distance before Towrang, where it crossed to the east of the river. From there it is a short and relatively level trip to cross the Mulwaree Ponds and enter Goulburn Township (Banksia / Umwelt 2015a:154).

The turn westwards followed the line of the old Argyle road and was justified as being due to topography. There were, however, other considerations, for example it conveniently took the line right past Lockyersleigh. Major Lockyer was important to Woore in a number of respects and supported the establishment of a railway to Goulburn. At a public meeting in Goulburn in 1846 Lockyer moved the motion to set up a railway committee, and this was seconded by Woore (Banksia / Umwelt 2015a:154). Woore's selection of stations indicates that he was less concerned about the way the land worked than assisting the land owners. Stations were proposed for either Bong Bong or Sutton Forest, near Paddys River and then at the Wollondilly, near Lockyersleigh (Banksia / Umwelt 2015a:154).

In 1854 more than half of the capital held by the Sydney Tramroad and Railway Company was in the form of a government loan and it faced further costs of about the same amount again. The Company opted to dissolve itself and sell its interests to the government, making it the world's first government-owned railway line. Following the takeover the Government appointed John Whitton to review the proposed route (Banksia / Umwelt 2015a:154).

In 1860 Sir Charles Cowper became the governor of New South Wales. The Engineer-in-Chief of the NSW Railways, John Whitton said the proposed route could not be constructed for the funds estimated by Parliament, even for horse trams. However, a carefully engineered route that adopted better gradients than those used for the existing roads would deliver a viable steam railway to the region. Parliament approved the construction of the segment of railway line from Picton to Goulburn in April 1864 (Banksia / Umwelt 2015a:156). A contract was given to construct the line from the railhead at Picton to Goulburn in 1864. It ruined the first three contractors engaged to build it but the fourth, Mark Faviell, successfully completed the line from Barber's Creek to Goulburn (Banksia / Umwelt 2015a: 156).

The construction of the railway line between Marulan and Goulburn took place from 1865 when Marulan became the rail head to the opening of the Goulburn terminus station and railway yards in 1867. The initial line was a single track, which was upgraded to a double line by 1922 (Banksia / Umwelt 2015b:156).

A section of the (now-named) Main Southern Railway forms the southern boundary of the Granite Pit Area.

3.4 Lockyersleigh Estate

3.4.1 Edmund Lockyer

Edmund Lockyer was born in Plymouth on 21 January 1784. He became an ensign in the army in 1803 and was promoted to lieutenant in early 1805. Later in 1805 he was promoted to captain and posted to Ceylon in Sri Lanka where he was promoted to major in 1819. In 1825 Lockyer was transferred to Sydney, where he went with his wife and 10 children. In late 1825 and early 1826 he was assigned to investigate and protect King George Sound and the Swan River from French colonisation (Australian National University, 1967).

In 1827 Lockyer decided to settle in NSW and sold his commission. He was granted 2560 acres of land which became the Lockyersleigh Estate. When Lockyer left the army he was appointed police magistrate at Parramatta, and in 1828 he was appointed principal surveyor of roads and bridges. Soon after Lockyer's appointment, the Secretary of State abolished the office, and in 1829 he became police magistrate again. As noted in **Section 3.2.1** for a time Lockyer was established as Inspector of Roads. In 1842 Lockyer became a member of the association formed to gain permission to import labourers from India and in 1852 he was appointed sergeant-at-arms to the Legislative Council. Lockyer died 10 June 1860 at his home in Woolloomooloo and was buried in the Camperdown cemetery (Australian National University 1967).

3.5 Lockyersleigh

The Lockyersleigh property was one of the earliest land grants in the area (refer to **Figures 3.1** and **3.2**) and is an example of how farming and pastoral estates grew from the 1820s (E. Higginbotham 2009 Vol 2:98). The property has been subject to 187 years of agricultural activities including land clearance, cultivation and the introduction of hard-hoofed grazing animals such as sheep, cattle and horses. These past and current agricultural land use practices (with the exception of cultivation) appear to have occurred across the entire Granite Pit Area.

The Lockyersleigh homestead and its immediate gardens are situated west of the Granite Pit Area, with the original land grant extending into the Granite Pit Area (refer to **Figure 2.1**). The 1892 Billrambula Parish Map shows the large area of Lockyer's land grant and the likely area of the Lockyersleigh homestead site and gardens constructed to the west of the Granite Pit Area (refer to **Figure 3.3**).

As discussed, the original land grant was to Major Edmund Lockyer in 1827. By 1837 he had added 3630 acres to the grant and by 1853 the estate totalled 11,810 largely connected acres. In 1828 Lockyer had a comparable amount of stock to the nearby resident landowners and 24 convicts; a much larger number than other resident landowners. Lockyer's land was poor and required drainage and the convicts were employed draining the low-lying floodplain along the Wollondilly with ditches, which may also have been used instead of fences for paddocks (Banksia / Umwelt 2015a:66).

The road to Lockyersleigh was built in 1826, known as Riley's Road (Banksia / Umwelt 2015a:72). In 1829 Lockyersleigh homestead was built as the Lockyer family home, which it held until 1853. In 1848 small scale iron mining was undertaken on the property, though it collapsed with the start of the gold rush in 1851 (OEHL, nd; a).

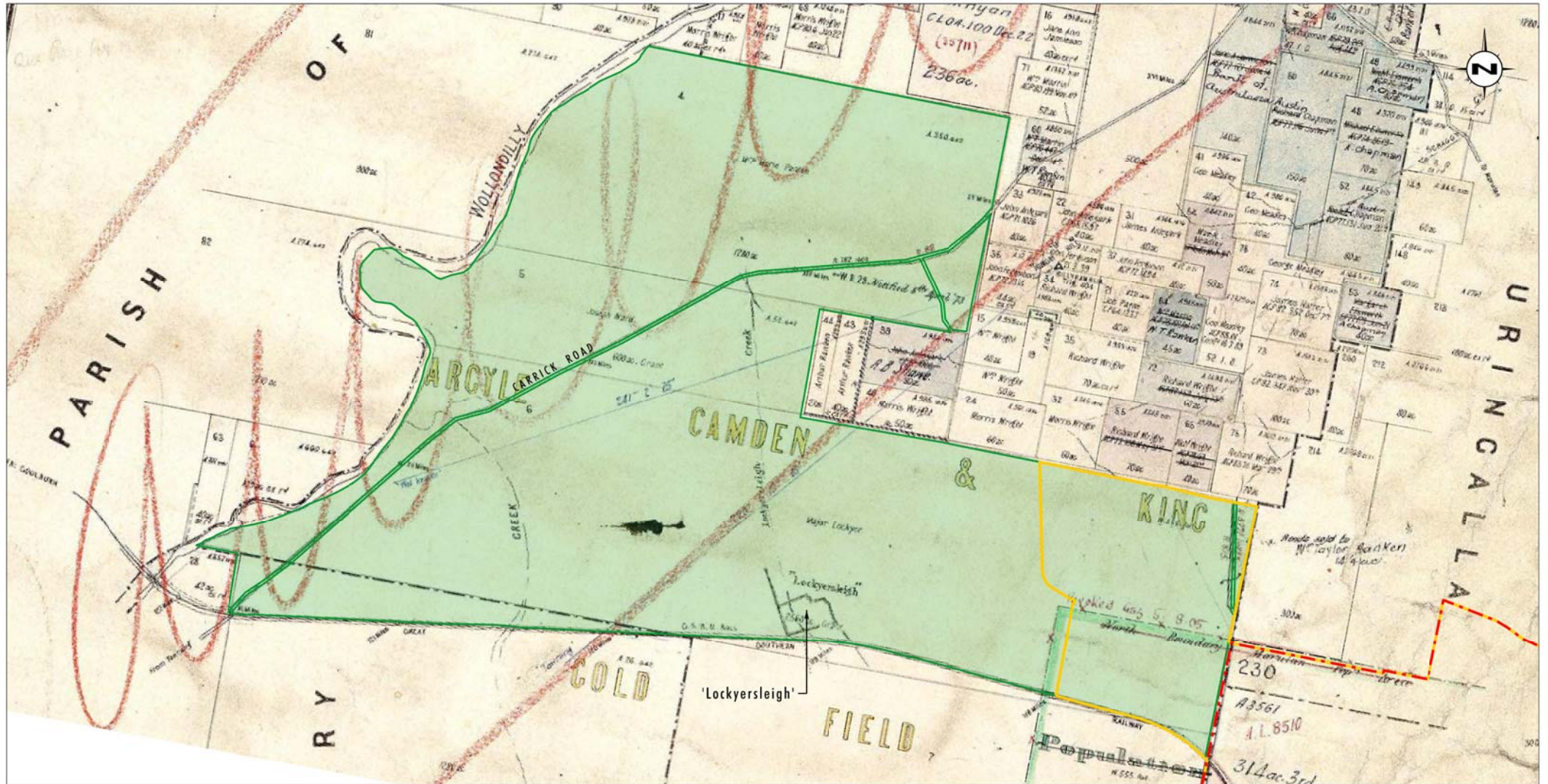


Image Source: Google Earth (2013), Holcim Australia (2014)
Data Source: LPI (2014), Holcim Australia (2014)

Legend

- Approved Project Area
- Modification Project Area
- Lockyersleigh Property Boundary Listed on Goulburn Mulwaree 2009 LEP

FIGURE 3.3

1892 Billrambula Parish Map showing
the listed Lockyersleigh Homestead
and the Project Area

Lockyer lived beyond his means, with the original homestead costing 1,200 pounds, an amount which required Lockyer to sell the property to John Edge before moving to Ermington House, near Parramatta (Banksia / Umwelt 2015a:65). In 1856 Edge sold the property to Arthur Ranken, a Scottish immigrant who was leasing the property at the time. In 1844, before purchasing Lockyersleigh, Ranken constructed the first house to be built on the Lachlan River. When this house flooded three years later he lost all his possessions except for a sideboard and desk, which remain in Lockyersleigh (Lockyersleigh Australia, nd). The estate has remained in the Ranken family for four generations, with Jean Ranken marrying Tony Onions (Lockyersleigh Australia, nd).

Today Lockyersleigh homestead is a combination of Georgian architecture on the ground floor with a Victorian Filigree upper storey (NPWS 2008). The Georgian ground floor comprises the original house built by Lockyer in 1827, with the upper floor added by Ranken in 1860. The ground floor is of rendered stone while the upper storey is rendered brick (Lockyersleigh Australia, nd; OEH, nd; a). The ground floor has a colonnaded, flagged verandah which has stone columns with Fuscian capitals and bases. The upper floor verandah has cast iron columns and lace work. The roof is hipped and clad with corrugated iron (OEH, nd; a). There are various outbuildings constructed of stone with white mortar joins and brick quoins (OEH, nd; a). The outbuildings include a, coach house and stables, blacksmith's shop, meat house, dairy, servants' quarters, shearers' quarters, wool shed and honey house. The house is surrounded by extensive gardens, which include an oval shaped lawn in front of the house (refer to **Figure 3.4**). The gardens contain many mature trees and a vine covered tunnel of wire hoops, timber bridges and Gothic influenced outhouses (OEH, nd; a).

A horse stud was started in 1968 by Tony Onions (married to Jean Ranken), which is the foundation for today's equine facility. The horse stud was displaced in 1995, however, the Onions family still live at Lockyersleigh and produce meat, wool and grain. Lockyersleigh today is used for tourism, an equestrian centre, agriculture, film shoots, landcare and a rural consultancy (Lockyersleigh Australia, nd).



Image Source: Google Earth - DigitalGlobe (2015)

0 50 100 200m
1:4 000

Legend

- Approved Project Area
- Modification Project Area
- Lockyersleigh Property Boundary Listed on Goulburn Mulwaree 2009 LEP

FIGURE 3.4

Detail of Lockyersleigh
Homestead and Outbuildings

3.6 Historical Themes

A historical theme is a research tool, which can be used at the national, state or local level to aid in the identification, assessment, interpretation and management of heritage places (AHC 2001:1). Nine national historical themes have been identified by the Australian Heritage Commission (AHC now Australian Heritage Council). The Heritage Division, OEH has identified 35 historical themes for understanding the heritage of NSW. The development of the Granite Pit Area is broadly reflective of the history of the local region, and can be assessed in the context of the broader historic themes defined by the Heritage Division, OEH and AHC. In accordance with the Heritage Division and AHC framework of historic themes, the themes in **Table 3.1** are relevant to the Granite Pit Area and locality.

Table 3.1 Historical Themes Relevant to the Granite Pit Area and Locality

National	National Sub Themes	NSW Themes	Local Themes	Examples
Peopling Australia	Living as Australia's earliest inhabitants Adapting to diverse environments	Convict	Activities relating to incarceration, transport, reform, accommodation and working during the convict period in NSW	Landscapes of control, convict built structure
Developing local, regional and national economies	Developing Primary Production	Pastoralism	Activities associated with the breeding, raising, processing and distribution of livestock for human use	Rural landscape, hay barn, dairy, vineyard, farmstead, fencing, shed, orchard
Developing local, regional and national economies	Moving Goods and People	Transport	Activities associated with moving goods and people from one place to another, and systems for the provision of such services	Highway, railway, lane, stock route, bridge, footpath, horse yard
Developing local, regional and national economies	Building and maintaining the railway	Exploration	Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements.	Railway station, highway, train.

National	National Sub Themes	NSW Themes	Local Themes	Examples
Building settlements, towns and cities	Making settlements to serve rural Australia	Land Tenure	Activities and processes for identifying forms of ownership and occupancy of land	Fence, survey mark, subdivision pattern, stone wall
	Supplying Urban Services	Utilities	Activities associated with the provision of services, especially on a communal basis	Bridge, culvert, weir, well, cess pit, reservoir, dam
		Accommodation	Activities associated with the provision of accommodation, and particular types of accommodation	Homestead, cottage, house site (archaeological site)

4.0 Physical Context

4.1 Physical Context of the Granite Pit Area

The Modification Project Area lies within the catchments of Joarimin, Lockyersleigh and Marulan Creeks. Joarimin and Lockyersleigh Creeks drain to the Wollondilly River, which is part of the Warragamba Dam catchment area, forming part of Sydney's drinking water supply. Marulan Creek is part of the Shoalhaven River system which also contributes to Sydney's drinking water supplies. The Granite Pit Area is located wholly within the Lockyersleigh Creek catchment. This portion of the Modification Project Area comprises several first order tributaries of Lockyersleigh Creek, with a second order tributary present along the northern boundary.

The topography of the Modification Project Area generally consists of undulating ridges separated by drainage valleys, with elevations ranging from 710 metres Australian Height Datum (mAHD) in the north, to approximately 630 mAHD near Joarimin Creek. The majority of the topography of the Granite Pit Area slopes gently to the south or west towards Lockyersleigh Creek, with a small ridge separating the proposed Granite Pit and the Approved Pit. The north east corner of the Granite Pit Area rises towards the topographic high of this ridge located outside of the Granite Pit Area, with elevations up to approximately 710 mAHD. The Granite Pit Area is separated from Marulan Township by a southern extension of this ridge ($\approx 690 - 710$ mAHD) that extends north – south to the east of the proposed Granite Pit.

The balance of the Granite Pit Area consists of cleared grazing land with mostly isolated patches of vegetation, often comprising single stands of trees with little to no understorey, as a result of continuous grazing.

4.2 Site Survey

A survey of the Project Area was carried out in conjunction with the Aboriginal cultural heritage survey (Umwelt 2015). The survey was undertaken to identify any potential historical heritage items or archaeological sites. During the survey culverts under the Great Southern Railway, stockyards and a garden area were the only potential historical heritage items identified within the Granite Pit Area (refer to **Figure 4.1** and **Table 4.1**). No areas of historical archaeological potential or evidence of early tracks was identified. Note that the area of Lockyersleigh homestead, outbuildings and gardens located approximately 1.3 kilometres west of the Granite Pit Area was not inspected as part of the survey.

Table 4.1 Location of Potential Heritage Items Identified During Survey

Item Reference	Description	Grid Reference (MGA)
Culverts	Main Southern Railway culverts	West Culvert 769484E/ 6156720N East Culvert 769710E/ 6156653N
Garden Feature	Rectilinear area bound by low stone walls	770767E 6157838N
Stockyards	Timber and wire fenced yards with concrete sheep run	770134E 6157768N

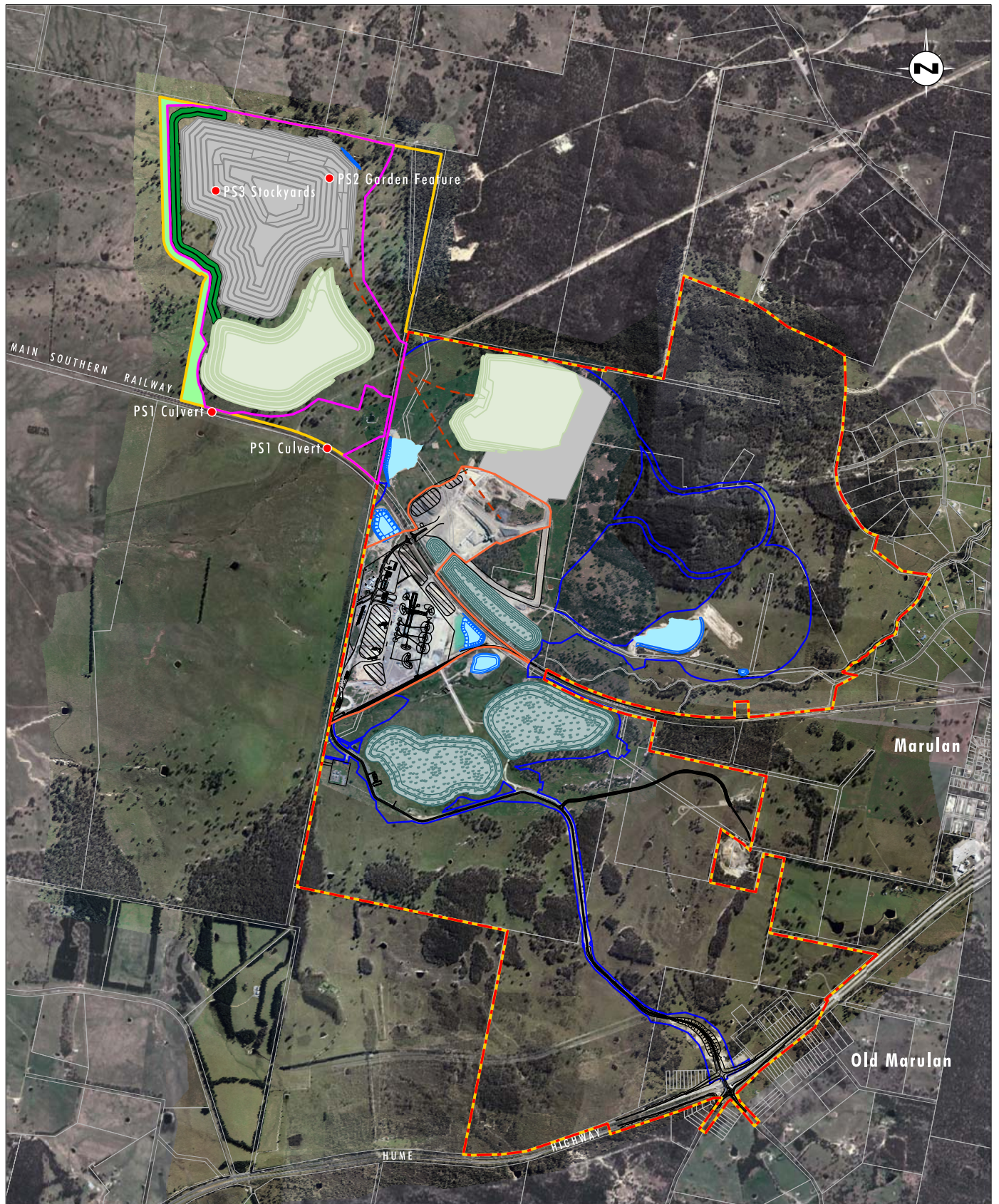


Image Source: Google Earth (2012), Holcim (2012, 2014)
Data Source: LPI (2014), Holcim Australia (2015)

0 0.5 1.0 1.5 km
1:30 000

Legend

- Approved Project Area
- Modification Project Area
- Lynwood Infrastructure Facilities
- Approved Disturbance Footprint
- Proposed Granite Pit Disturbance Footprint
- Lynwood Infrastructure Layout

- Quarry Pit
- Emplacement Area
- Dam
- Proposed Overburden Emplacement Area
- Proposed Vegetation Buffer Zone
- Proposed Amenity Bund

- Proposed Haul Road
- Potential Historical Heritage Items

FIGURE 4.1

Potential Historical
Heritage Items

4.2.1 Potential Site 1 (PS1) – Main Southern Railway Culverts

The Main Southern Railway crosses two tributaries of Lockyersleigh Creek on the southern boundary of the Project Area. There is a large culvert located on the east side of the southern boundary of the Project Area and a small culvert on the west side of the southern boundary (**Plates 4.1 and 4.2** and **Figure 4.1**).

The east culvert has two brick abutments on the banks of the creek; providing support to the earthen fill of the culvert approach embankment and the culvert structure. It has two brick pillars supporting the central span. The brick is topped with a concrete base supporting the railway structure.



Plate 4.1

Large Culvert over eastern
Lockyersleigh Creek
tributary

© Umwelt, 2015

The smaller culvert comprises a brick arch oviform culvert. Rail ballast is directly on top of the brick culvert structure, while the brick abutments are capped with concrete. The respective chainage is painted on the centre of the arch.



Plate 4.2

Small Culvert over western
Lockyersleigh Creek
Tributary

© Umwelt, 2015

The Main Southern Railway is outside of the Granite Pit Area and forms the southern boundary of the Project Area. The culverts and rail line itself will not be impacted by the Project as discussed in **Section 6.0**.

4.2.2 Potential Site 2 (PS2) – Garden Feature

A rectilinear area, approximately 15 metres by 15 metres, edged with a low one course high rough field stone wall and chicken wire was identified in the northeast portion of the Granite Pit Area (**Plate 4.3** and **4.4** and **Figure 4.1**). The chicken wire is located both over and under some stones in addition to being dug into the soil. There are a number of wombat burrows along the edge of the area. The feature appears to comprise an isolated garden area which had a protective chicken wire cover.

As discussed in **Section 6.2**, the garden feature will be removed as part of the Modification Project.



Plate 4.3

Stone Wall Edging Area

© Umwelt, 2015



Plate 4.4

Wombat Burrows and
Chicken Wire

© Umwelt, 2015

4.2.3 Potential Site 3 (PS3) – Stockyards

Site PS3 comprises an approximately 30 metre square area of post-and-rail-and-wire fenced stockyards located in the northwest portion of the Granite Pit Area (**Plate 4.5** and **4.6** and **Figure 4.1**). The interior area of the yards is divided up by wire fences, while the edges of the yards are wire and edged with timber. A central passageway splits the yards in two. There is a concrete sheep run, which was originally edged with timber (now collapsed) near an opening in the exterior yard fence and a corrugated iron water tank just outside of this opening in the fence. The stockyard area is predominantly cleared, with the occasional established tree near the fence.

A post-and-rail-and-wire fence is a common hybrid of post-and-rail fencing where wire substitutes one or more of the rails, making it a simpler and faster erection. The wires are run through holes in the posts. The primary advantage of using wire rather than timber rails is the cost and time savings.

Most farmers moved straight to post-and-wire fencing rather than post-and-rail-and-wire as adding a rail cost more, required a shorter panel length and gave the fence a shorter life. Many post-and-rail-and-wire fences survive relatively intact in rural areas of NSW or have been converted to post-and wire (Pickard 2005: 38-39).

As discussed in **Section 6.2**, the stockyards will be removed as part of the Modification Project.



Plate 4.5

Stock yards

© Umwelt, 2015



Plate 4.6

Sheep run

© Umwelt, 2015

4.3 Previously Identified Heritage Items in the Vicinity of the Modification Project Area

A number of heritage items were identified in the vicinity of the Modification Project Area as part of previous assessment undertaken for the Lynwood Quarry Project (Umwelt, 2005). Note these items have all been archivally recorded in accordance with the heritage conditions of DA 128-5-2005 (*Archival Recording Old Marulan 2007 - Volume 3 Banksia / Umwelt 2015*) and removed as part of the construction of the quarry. As such these sites are not considered in this report

4.4 Summary of Historical, Archaeological and Physical Contexts of the Granite Pit Area

The potential historical heritage resource of the Granite Pit Area generally reflects the documented history of the surrounding region (discussed in **Section 3.0**) which indicates that the land has predominantly been utilised by graziers and pastoralists. The land containing the Granite Pit Area has been part of the Lockyersleigh Estate since the early-mid 1800s. There is no physical or textual evidence that this part of the grant was used for activities other than stock and pastoral activities.

4.5 Lockyersleigh Homestead and Gardens

As discussed in **Section 2.2** and listed in **Table 2.1**, the Granite Pit Area is located within the boundary of the Lockyersleigh Homestead and Gardens heritage site as listed on the Goulburn Mulwaree 2009 LEP (refer to **Figures 2.1** and **2.2**). The actual Homestead and garden area is located approximately 1.3 kilometres to the west of the Granite Pit Area.

Potential indirect impacts to the Homestead, its associated outbuildings and garden area such as vibration resulting from blasting, impacts to the setting and visual impacts are further discussed in **Section 6.2**.

4.5.1 NSW Rural Homestead Gardens

Lockyersleigh is listed as a 1820s rural residential garden in the Arcadian style on the *Inventory of Heritage Gardens and Parklands, Australia* prepared for the ICOMOS-IFLA International Scientific Committee for Cultural Landscapes. The Inventory comprises

Landscapes designed and created intentionally by humans to cover garden and parkland landscapes constructed for aesthetic reasons which are often (but not always) associated with religious or other monumental building and ensembles (ICOMOS-IFLA 2007:1).

NSW rural homesteads of the nineteenth century were the residences of the more wealthy settlers. A homestead would likely have a homestead garden; generally developed within the 'arcadian' landscape setting style with lawns and some flower beds close to the house, and vegetable and utilitarian garden areas to the rear (ICOMOS-IFLA 2007:11).

The Arcadian landscaping style was adopted by Australian settlers in the early nineteenth century. The gardens created green settings for the homes of the more wealthy settlers, generally located on a rise and approached by a curving carriage drive that culminated in a loop. The Arcadian gardens involved clearing the native flora (often with the exception of any mature eucalyptus trees) and planting deciduous broad leaf tree species (particularly as windbreaks) and hardy shrubs. The intention was to create scenes of pastoral and parkland harmony recalling Arcadia, a legendary place in ancient Greece known for its quiet pastoral beauty (ICOMOS-IFLA 2007:13).

4.5.2 Setting

The Lockyersleigh Homestead retains its 1820s established garden setting located immediately around the Homestead and defined by the formal arrangements of exotic trees around the main homestead and outbuildings area (refer to **Figure 3.4**). The exotic trees also form boundaries along the edge of the paddocks immediately adjacent to the main homestead and garden area. The garden setting created around the homestead survives intact within the wider cultural landscape of the Lockyersleigh Estate and also creates a separation from the surrounding pastoral landscape of the wider Lockyersleigh Estate.

Article 1.12 Definitions of the *Burra Charter* defines setting as 'the area around a place, which may include the visual catchment'. The Charter's Conservation Principles for setting expands on this definition:

Conservation requires the retention of an appropriate setting. This includes retention of the visual and sensory setting, as well as the retention of spiritual and other cultural relationships that contribute to the cultural significance of the place.

New construction, demolition, intrusions or other changes which would adversely affect the setting or relationships are not appropriate (Marquis-Kyle & Walker. 2004:37).

Setting is further explained in the *Illustrated Burra Charter*:

At many places there is no clear distinction between the place and its setting. Only rarely is a culturally significant place self-contained inside boundaries without some link- visible, functional or historical – to the world around it.

A place is seldom separable from its setting. For most places, aspects of the setting contribute to the significance of the place, and the place may contribute to the setting and other places within it.

The setting often explains why a place came to be where it is – for example, its setting might also reveal former physical characteristics of the place (Marquis-Kyle & Walker. 2004:37).

5.0 Significance

5.1 Introduction

An assessment of significance is undertaken to explain why a particular place is important and to enable appropriate site management to be determined. This section comprises a significance assessment of the historic heritage items within the Granite Pit Area and immediate vicinity.

The Australian ICOMOS *Burra Charter* 1999 (the *Burra Charter*) defines cultural significance as meaning 'aesthetic, historic, scientific or social value for past, present or future generations' (Article 1.2). The *Burra Charter* was written to explain the basic principles and procedures that should be followed in looking after important places. Cultural significance is defined as being present in the 'fabric, setting, use, associations, meanings, records, related places and related objects'. The fabric of a place refers to its physical material and can include built elements, sub surface remains and natural material (Australia ICOMOS 2000).

5.2 Basis of Assessment

The *NSW Heritage Manual* (1996), published by the then NSW Heritage Office and Department of Urban Affairs and Planning, sets out a detailed process for conducting assessments of heritage significance. The manual provides a set of specific criteria for assessing the significance of an item, including guidelines for inclusion and exclusion.

The seven criteria defined by the Heritage Division, OEH, and used by the NSW Heritage Council as an assessment format within NSW are outlined below:

- Criterion (a)** an item is important in the course, or pattern, of NSW's cultural or natural history;
- Criterion (b)** an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history;
- Criterion (c)** an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW;
- Criterion (d)** an item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons;
- Criterion (e)** an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history;
- Criterion (f)** an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history; and
- Criterion (g)** an item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments.

The following significance assessment is based upon the above seven criteria.

As a component of the holistic concept of significance, archaeological significance has been described as a measure by which a site may contribute knowledge, not available from other sources, to current research themes in historical archaeology and related disciplines (Bickford and Sullivan, 1984: 19-26). Archaeology is concerned with material evidence and the archaeological record may provide information not available

from other sources. An archaeological study focuses on the identification and interpretation of material evidence to explain how and where people lived, what they did and the events that influenced their lives.

Considerations material to the study of the archaeology include:

- whether a site, or the fabric contained within a site, contributes knowledge or has the potential to do so. If it does, the availability of comparative sites and the extent of the historical record should be considered in assessing the strategies that are appropriate for the management of the site, and
- the degree and level at which material evidence contributes knowledge in terms of ‘current research themes in historical archaeology and related disciplines’.

Following Bickford and Sullivan’s work on archaeological significance (1984, 19-26) the following questions can be used as a guide to assessing the significance of an archaeological site:

- Can the site contribute knowledge that no other resource can?
- Can the site contribute knowledge that no other site can?
- Is this knowledge relevant to general questions about human history or other substantive questions relating to Australian history, or does it contribute to other major research questions?

The Heritage Council of NSW recognises four levels of significance for heritage in NSW: Local, State, National and World. An item has local heritage significance when it is important to the local area. An item has state heritage significance when it is important in NSW. Most heritage in NSW is of local significance.

The significance of the Granite Pit Area as a whole is considered in the Statement of Cultural Significance in **Section 5.4**.

5.3 Significance of the Heritage Items/Sites within the Granite Pit Area

5.3.1 Statement of Significance

The potential and known heritage sites/items located within the Granite Pit Area (refer to **Section 4.0**) are assessed in **Table 5.1** below.

Table 5.1 Statement of Significance

Heritage Division Standard Criteria	Statement of Significance
Criterion (a) Historical	<p>While the Granite Pit Area has the potential to demonstrate the pattern of land use and development from its exploration and settlement in the early nineteenth century it is unlikely to contain historical archaeological remains associated with this development history. Archaeological evidence associated with the use and development of the Granite Pit Area (such as for grazing, agriculture and land clearing) is likely to be patchy at best, and it would be impossible to specify what such remains may entail and where they would be located.</p> <p>Evidence of extant yards and other rural infrastructure demonstrate the pattern of land use and historical development of the area.</p> <p>The development of the Main Southern Railway, which forms the southern boundary of the Granite Pit Area, transformed the southern region of NSW. However the short section of the rail line, and its associated culverts, which forms the southern boundary of the Granite Pit Area is typical of the rail line and its associated infrastructure.</p> <p>As a result, in general, the potential heritage items/sites present within the Granite Pit Area and the Granite Pit Area itself, are unlikely to provide information not already known from the historical record.</p>
Criterion (b) Associative	<p>The Granite Pit Area has association with Edmund Lockyer, and the subsequent owners of Lockyersleigh; including the current owners.</p> <p>However, while the Granite Pit Area has this associative significance due to its land tenure history, the potential heritage sites/items identified within the Granite Pit Area, and the Granite Pit Area itself, are unlikely to provide evidence of these associations.</p> <p>Note this report does not consider any Aboriginal historic associations with the Granite Pit Area, refer to the Aboriginal Cultural Heritage Assessment for the proposed Granite Pit (Umwelt, 2015) for consideration of any such associations or connections.</p> <p>The Granite Pit Area is not known to have any other associations of particular significance.</p>
Criterion (c) Aesthetic	<p>The Granite Pit Area may demonstrate some aesthetic significance as a rural landscape through the creation of a pastoral landscape via the clearing of the native vegetation and construction of fences.</p> <p>The potential heritage items identified within the Granite Pit Area do not demonstrate distinctive aesthetic qualities or technical innovations, other than those typical of rural areas characterised by rural landholdings.</p> <p>The Granite Pit Area forms part of the wider rural setting of the Lockyersleigh Estate. However, the immediate setting of the homestead and its gardens (located approximately 1.3 kilometres away from the Granite Pit Area) provides the most significant contribution to the significance of Lockyersleigh rather than boundaries of the wider rural property.</p> <p>In general the Granite Pit Area does not meet this criterion.</p>

Heritage Division Standard Criteria	Statement of Significance
Criterion (d) Social	<p>The Granite Pit Area demonstrates the pattern of settlement and development in the area from the early to mid nineteenth century, and is typical of a large rural landscape within the wider regional area. In general, it would be considered unlikely that the Granite Pit Area, or the potential heritage sites/items identified within it, would have a strong association with any previous or contemporary community or group.</p>
Criterion (e) Scientific	<p>There are unlikely to be any intact archaeological remains associated with the nineteenth and twentieth century development and occupation of the Granite Pit Area. A high degree of intactness in the archaeological resource is necessary before a substantive contribution can be made to the research potential and hence, the ability of the archaeological resource to answer research questions for the site. Generally any archaeological remains that may be present would be unlikely to have any research potential and would at best provide only a minor contribution to the significance of the area.</p> <p>Evidence of clearing would support the known history of clearing in the area and is unlikely to provide any additional information to that already known for the area.</p> <p>General evidence of rural yards and fences etc. demonstrate the pattern of land use and historical development of the area and could provide information about how the landscape was used and changed during its use as pastoral land. However, in general as individual items they have little research potential.</p> <p>In general, the potential historical heritage items extant on site are typical of the area as a large rural landscape and are unlikely to provide further unknown information regarding the history and development of the area.</p>
Criterion (f) Rarity	<p>The potential heritage items identified within the Granite Pit Area, including any extant structures, are typical of structures and other sites/items typically found within rural landscapes such as that of the Granite Pit Area and are unlikely to meet this criterion.</p> <p>The potential heritage resources associated with the Granite Pit Area are not associated with an unusual or remarkable aspect of the region's history. Farm owners often create makeshift garden areas from stones or wire collected from around the property. Stockyards are common and expected to be located on large rural properties. Although any heritage resource within the Granite Pit Area is part of an ever decreasing resource, in general the resource does not meet this criterion.</p> <p>The Main Southern Railway culverts located on the southern boundary of the Granite Pit Area are typical of the culverts found along the rail line.</p>
Criterion (g) Representativeness	<p>The potential heritage items identified within the Granite Pit Area are representative of the structures and items typically found in a rural landscape with a history of pastoral and agricultural activities, however they are not outstanding examples of their type.</p>

5.3.2 Archaeological Significance

Archaeological significance is directly linked to the archaeological (or scientific) research potential of an archaeological site or resource. An archaeological site broadly comprises below ground physical evidence of building foundations, occupation/archaeological deposits, features and artefacts (Heritage Office and DUAP, 1996b:2). No potential historical archaeological resource has been identified within the Granite Pit Area. As a result, the three questions derived from Bickford and Sullivan's work on archaeological significance (discussed in **Section 5.2**) have not been considered further.

5.4 Lockyersleigh Homestead and Gardens

5.4.1 Significance of Lockyersleigh Homestead and Gardens

As discussed, the Granite Pit Area is located in the eastern portion of the Lockyersleigh Homestead and Gardens listed area as listed on the Goulburn Mulwaree 2009 LEP (refer to **Figures 2.1** and **2.2**).

Lockyersleigh Homestead and Gardens are assessed as being locally significant

...for possessing a Georgian ground floor topped by a Victorian Filigree upper storey. The combination of styles is successful and the house is an elegant one, especially in its garden setting. The house is also rare in that extensions were usually horizontal rather than vertical...The house is an early one in the region and Lockyersleigh has a strong association with a wide span of the area's rural history...Lockersleigh garden is a Homestead Garden established in the 1820s, and it is important for exhibiting a richness of cultural features as follows: a large oval shaped carriage loop; small latticed bridges; a timber garden house, a Pigeon House and former privies; and mature tree specimens... The garden demonstrates characteristics of the Arcadian style popular in nineteenth century rural gardens, by the following: an oval carriage loop with a long central axis extending into the driveway; the formal arrangement and selection of exotic trees; and the trellised timber work and use of arbours and pergolas ...The garden exhibits a continuum of history by the following: the dominance of the early Arcadian style; the later additions of the pergolas and herbaceous beds, which became popular at the end of the nineteenth century; and the modern swimming pool ...The garden has significant aesthetic qualities as follows: it is strongly evocative of nineteenth century, due to the dominance of the original layout, the mature major tree species and style of the timber garden structures...The garden is important for its design excellence, and has a bold structure focusing on the carriage loop and emphasised by the formally arranged exotic trees (NSW State Heritage Inventory 2008).

5.5 Summary Statement of Significance

The Granite Pit Area is typical of a rural landscape within regional NSW. The history of the area from the early nineteenth century, including its settlement by Europeans and subsequent use as cleared pastoral and agricultural land is reflected in the low potential of the archaeological resource.

The potential heritage items within the Granite Pit Area have been assessed as having no significance with no research potential.

The Main Southern Railway culverts located on the southern boundary of the Granite Pit Area are typical of the culverts found along the rail line and have been assessed as having no heritage significance as individual items.

The Granite Pit Area comprises the eastern portion of the listed Lockyersleigh Homestead and Gardens area and forms part of the wider cultural landscape of Edmund Lockyer's extensive Lockyersleigh Estate.

However, the Granite Pit Area itself is separate from and does not form an integral part of the significant garden setting of the Lockyersleigh Homestead.

Any additional, as yet unidentified, potential heritage sites/items that may be present within the Granite Pit Area are likely to comprise of evidence of former rural structures and infrastructure. If present, these are likely to be typical of those found throughout rural NSW and of no or at best local significance.

6.0 Heritage Impact Statement

This section provides a heritage impact statement and management strategy for the heritage sites/items within and in the vicinity of the Granite Pit Area. The heritage impact statement identifies the potential impacts from the proposed Granite Pit on all known and potential heritage sites/items identified within, and where relevant within the vicinity of, the Granite Pit Area. The impacts are assessed against the significance of the respective elements.

The potential impacts of the proposed Granite Pit are considered in terms of direct impacts and indirect impacts. Direct impacts are considered to be physical impacts to a site, including removal/destruction. Potential indirect impacts resulting from the Modification Project may comprise vibration from blasting or impacts to the setting of a heritage item.

6.1 Direct Impacts to Items Identified within the Granite Pit Area and Recommendations

This section addresses the potential impacts resulting from the Modification Project to each of the site/items identified within the Granite Pit Area and proposes a management strategy to mitigate any impacts.

6.1.1 Lockyersleigh Homestead and Gardens

As discussed, the Granite Pit Area comprises the eastern portion of the listed Lockyersleigh Homestead and Gardens and forms part of the wider cultural landscape of Edmund Lockyer's extensive Lockyersleigh Estate. As such there will be a physical impact to the listed area. However, the Granite Pit Area itself is separate from, and does not form part of, the significant garden setting of the Lockyersleigh homestead. The garden setting created around the homestead survives intact within the wider cultural landscape of the Lockyersleigh Estate and also creates a separation from the surrounding pastoral landscape. An extensive pastoral landscape, including large areas of Lockyer's Estate, will remain intact around the homestead and its associated outbuildings and garden area.

As such, there are not expected to be any direct impacts to the assessed significance of the Lockyersleigh Homestead and Gardens as a result of the Granite Pit Area being located within the eastern portion of the Lockyersleigh Homestead and Gardens listed area.

Note the main consideration in terms of potential impacts for the heritage listed Lockyersleigh Homestead and Gardens are considered to be indirect physical impacts, in terms of potential vibration impacts from blasting, impacts to setting and visual impacts. Indirect impacts to Lockyersleigh are considered in **Section 6.2**.

No further management is required for the Modification Project in relation to direct impacts resulting from its location within the eastern portion of the Lockyersleigh Homestead and Gardens listed area.

6.1.2 PS2 – Garden Feature

Site PS2 comprises a garden feature located within the Granite Pit Area. The site is proposed to be impacted as a result of the Modification Project (refer to **Figure 4.1**).

This site has been recorded as part of the preparation of this report.

This site has been assessed as having no significance and no research potential.

No further management of site PS2 is required for the Modification Project.

6.1.3 PS3 – Stockyards

Site PS3 comprises an area of stockyards located within the Granite Pit Area. The site is proposed to be impacted as a result of the Modification Project (refer to **Figure 4.1**).

This site has been recorded as part of the preparation of this report.

This site has been assessed as having no significance and no research potential.

No further management of site PS3 is required for the Modification Project.

6.2 Indirect Impacts and Recommendations

As discussed, Lockyersleigh Homestead, outbuildings and gardens and the Main Southern Railway are outside the Granite Pit Area, but where relevant are considered here in terms of potential indirect impacts such as vibration from blasting, impacts to setting and visual impacts.

Vibration from blasting has the theoretical potential to damage/destroy/disturb historical heritage items. There is little reliable information available regarding the threshold of vibration induced damage to older 'heritage' buildings and standing ruins that may be more sensitive to vibration induced damage. However, ACARP Report (No. C14057) *Effect of Blasting on Infrastructure* recommends 'safe' vibration limits for heritage structures such as those used by British Standard BS7385. Annex A of the British Standard BS7385:Part2:1993 for the *Evaluation and Measurement for Vibration in Buildings* states that:

...the age and existing condition of a building are factors to consider in assessing the tolerance to vibration. If a building is in a very unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other ground-borne disturbance British Standard BS7385:7).

The British Standard BS7385 further discusses that 'a building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive' (British Standard BS7385:5). The German standard DIN 4150: Part 3 Effects of Vibration on Structures includes a building type 'Particularly Sensitive' which is assigned vibration limits of 3 mm/s (at less than 10Hz), 3 to 8 mm/s (at 10-50Hz) and 8 to 10 mm/s (at 50-100Hz). Swiss Standard SN640 312:1978 also includes a 'Particularly Sensitive' structural type which is assigned vibration limits of 3 mm/s (at 10 to 30Hz) and 3 to 5 mm/s (at 30 to 60 Hz).

6.2.1 Lockyersleigh Homestead Heritage Impact Statement

Potential Blast Impacts

Although the Lockyersleigh homestead and a number of its outbuildings date to the early to mid 1800s, we understand that (without a building specific assessment) the homestead and all associated outbuildings are well maintained and in structurally sound condition. In the absence of a specific Australian Standard which refers to structural vibration in buildings or heritage structures specifically and with consideration of the international standards discussed in **Section 6.2**; including that the ‘the age and existing condition of a building are factors to consider in assessing the tolerance to vibration’ (British Standard BS7385) it is suggested that, once the structural integrity of the buildings has been confirmed, a maximum ground vibration with a peak particle velocity of 5 mm/s would be appropriate for the Lockyersleigh Homestead and associated outbuildings. Blasting overpressure is also not expected to impact on the structural integrity of any of the Lockyersleigh structures (Enviro Strata 2015:40).

If required by the Project, there is potential for the Lockyersleigh buildings to be examined on an individual basis and if appropriate the vibration limit of 5 mm/s increased following individual structural analysis.

As part of the *Lynwood Quarry Extraction Area Modification Blasting Impact Assessment* (Enviro Strata 2015) predicted vibration levels were identified for the Lockyersleigh Homestead and associated outbuildings. **Table 6.1** details the results of ground vibration modelling at Lockyersleigh Homestead and associated outbuildings. The location of the buildings and approximate distance to closest western edge of the Granite Pit Area are indicated on **Figure 3.4**. Predicted vibration levels at a range of potential blast sizes are also indicated. Note that all estimated maximum ground vibration levels for all stages of the Project are below 3mm/s.

Table 6.1 Predicted Ground Vibration due to Blasting at Lockyersleigh Homestead and Associated Outbuildings

Location	Minimum Distance from Blast (metres)	Estimated Max Ground Vibration (mm/s)					
		MIC (kg)					
		Stage 1		Stage 3		Stage 6	
		160	280	160	280	160	280
Woolshed	1,500	1.0	1.5	1.2	1.9	1.4	2.2
Vet yards	1,600	0.9	1.4	1.1	1.8	1.3	2.0
Homestead	1,700	0.9	1.4	1.1	1.7	1.2	1.9
Main horse stables	1,550	0.9	1.5	1.2	1.9	1.3	2.0
Hayshed	1,500	1.0	1.6	1.3	2.0	1.4	2.2
Horse complex house	1,300	1.2	1.8	1.5	2.4	1.7	2.6
Shearers' quarters	1,350	1.1	1.8	1.4	2.3	1.7	2.6
Coach house and stables	1,800	0.8	1.3	1.0	1.6	1.4	1.8

Ground vibration details sourced from Enviro Strata 2015:38

As discussed, the homestead and all associated outbuildings are well maintained and in structurally sound condition and all predicted levels of ground vibration are below 3 mm/s. As such, there are not expected to be any indirect impacts as a result of vibration from blasting at the Lockyersleigh Homestead or outbuildings as part of the Project.

Potential Impacts to Setting

As discussed, the Granite Pit Area comprises the eastern portion of the Lockyersleigh Homestead and Gardens area as listed on the Goulburn Mulwaree 2009 LEP and forms part of the wider cultural landscape of Edmund Lockyer's extensive Lockyersleigh Estate. However, the Granite Pit Area itself is separate from, and does not form part of, the significant garden setting of the Lockyersleigh Homestead.

The Lockyersleigh Homestead retains its 1820s established garden setting located immediately around the Homestead and defined by the formal arrangements of exotic trees around the main homestead and outbuildings area (**Figure 3.4**). The exotic trees also form boundaries along the edge of the paddocks immediately adjacent to the main homestead and garden area. The garden setting created around the homestead survives intact within the wider cultural landscape of the Lockyersleigh Estate and also creates a separation from the surrounding pastoral landscape. Although there will be a physical impact to the area listed on the Goulburn Mulwaree 2009 LEP, an extensive rural landscape including large areas of Lockyer's Estate will remain around the Homestead, garden and outbuildings area.

The established pastoral beauty of the homestead and garden area will be retained, as will the relationship between the Arcadian style garden and the wider cultural landscape of the Lockyersleigh Estate. As such there are not expected to be any significant impacts to the setting of the listed homestead and garden area.

Potential Visual Impacts

The Modification Project has also been designed with consideration of potential visual impacts to the west and northwest. As such, the concept design of the Project includes an amenity bund along the western boundary of the proposed Granite Pit as indicated in **Figure 1.3**. This bund will be constructed at the beginning of the Project, will be approximately 8 metres high and its external face will be vegetated with trees as soon as practical after construction to improve the visual amenity of the Lynwood Quarry and assist in shielding views of the quarry from the west. As a result, and in addition to the natural topography of the area, there are not expected to be any visual impacts to the east (the location of Lockyersleigh Homestead and Gardens) as a result of the Project.

Plate 6.1 comprises a panoramic view from approximately the centre of the Homestead and garden area to the west; towards the Granite Pit Area. As a result of the extensive tree plantings that form an integral part of the significant garden setting, and the natural topography of the area, no aspect of the Project is expected to be seen from the Lockyersleigh Homestead and garden area and there are not expected to be any visual impacts resulting from the Modification Project.



PLATE 6.1

Panoramic view from centre of Homestead and Garden area towards the Granite Pit Area

Blast Management Recommendations

The Modification Project will undertake blasting in accordance with a detailed design process that will consider operational, geological and environmental constraints and be undertaken in accordance with an approved Blast Management Plan.

As discussed, the Homestead and all associated outbuildings are well maintained and in structurally sound condition. Blasting will be designed so that vibration does not exceed 5mm/s at the Lockyersleigh Homestead and garden area.

To ensure that the quarry complies with vibration limits an ongoing vibration monitoring program will be implemented for the Lockyersleigh Homestead and garden area. The Blasting Impact Assessment (Enviro Strata 2015) recommends a permanent monitoring station be located to the west at the Lockyersleigh Homestead and garden area (on the Granite Pit Area side of the Homestead and garden area) which would monitor the Lockyersleigh property and all its structures for the life of the Project (Enviro Strata 2015:42).

It is recommended that an inspection to assess the structural integrity of the Lockyersleigh Homestead and associated outbuildings is undertaken to confirm a maximum ground vibration with a peak particle velocity of 5 mm/s would be appropriate for the Lockyersleigh structures. As recommended by ACARP Report No. C14057 the inspection should identify, note and record:

- *Unstable elements such as loose plaster and masonry that may be effected by vibration or natural forces eg wind and rain.*
- *Foundation settlement and weathering erosion and decay due to poor roof and ground damage and weather penetration (Richards 2008:60).*

General Recommendations

The Goulburn Mulwaree LEP heritage maps and listing information for Lockyersleigh Homestead and Gardens should be updated to reflect the change in the portioning of the listed lot boundaries.

With the exception of the blast management and structural assessment discussed above, no further heritage management of the Lockyersleigh Homestead and Gardens is required for the Modification Project.

6.2.2 PS1 – Main Southern Railway Culverts

Heritage Impact Statement

Site/ item PS1 is not located within the Granite Pit Area, but is immediately adjacent to the southern boundary of the Granite Pit Area (refer to **Figure 4.1**).

The culverts associated with the rail line have been assessed as having no heritage significance as individual items.

The Main Southern Railway is located approximately 590 metres from the proposed Granite Pit Boundary. The applicable vibration limit as indicated in the existing Conditions of Consent (DA 128-5-2005) is:

- 25 mm/s - for ground vibration

This vibration limit has been used as the assessment criterion for the proposed modification (Enviro Strata 2015:23). As such, there are not expected to be any impacts (either direct or indirect as a result of vibration from blasting) to the Main Southern Railway or any of the culverts associated with the rail line as part of the Project

No further management of site PS1 is required for the Modification Project.

6.3 Unexpected Finds

6.3.1 Section 146 Heritage Act 1977 (NSW)

In the unlikely event that unexpected archaeological remains or potential heritage items not identified as part of this report are discovered during the Project all works in the immediate area should cease, the remains and potential impacts should be assessed by a qualified archaeologist or heritage consultant and, if necessary, the Heritage Division, OEH notified in accordance with Section 146 of the *Heritage Act 1977* (NSW).

6.3.2 Human Skeletal Material

In the unlikely event that a potential burial site or potential human skeletal material is exposed within the Granite Pit Area, the following procedure should be followed in accordance with the *Policy Directive – Exhumation of Human Remains* (NSW Department of Health 2008), *Skeletal Remains – Guidelines for the Management of Human Skeletal Remains under the Heritage Act 1977* (NSW Heritage Office 1998) and the *Aboriginal Cultural Heritage Standards and Guidelines Kit* (NPWS 1997):

- As soon as remains are exposed, work is to halt immediately to allow assessment and management
- Contact local police, OEH and the Heritage Division
- A physical or forensic anthropologist should inspect the remains *in situ*, and make a determination of ancestry (Aboriginal or non-Aboriginal) and antiquity (pre-contact, historic or forensic)
- If the remains are identified as forensic the area is deemed as crime scene
- If the remains are identified as Aboriginal, the site is to be secured and OEH and all registered Aboriginal parties are to be notified in writing, or
- If the remains are non-Aboriginal (historical) remains, the site is to be secured and the Heritage Division is to be contacted.

The above process functions only to appropriately identify the remains and secure the site. From this time, the management of the remains is to be determined through liaison with the appropriate stakeholders (New South Wales Police Force, forensic anthropologist, OEH, Heritage Division, registered Aboriginal parties etc) and in accordance with the *Public Health Act 1991*.

7.0 References

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