

Appendix M

Non-Aboriginal heritage

Great Western Highway Blackheath to Little Hartley

Appendix M – Technical report – Non-Aboriginal heritage

Client: Transport for NSW

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Glossary and abbreviations

Term	Description
AECOM	AECOM Australia Pty Ltd
CHL	Commonwealth Heritage List
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
GWH	Great Western Highway
HCA	Heritage Conservation Area
HVSS	Heavy Vehicle Safety Station
ICOMOS	International Council on Monuments and Sites
kV	Kilovolt
LCVIA	Landscape Character and Visual Impact Assessment
LEP	Local Environmental Plan
LGA	Local Government Area
NHL	National Heritage List
REF	Review of Environmental Factors
RTA	Roads and Traffic Authority (now Transport for NSW)
SEARs	Secretary's Environmental Assessment Requirements
SEPPs	State Environment Planning Policy
SHI	State Heritage Inventory
SHR	State Heritage Register
SoHI	Statement of Heritage Impact
SSI	State Significant Infrastructure
TBM	Tunnel Boring Machine
Transport	Transport for NSW
WHL	World Heritage List

Executive summary

The Great Western Highway is the key east-west road freight and transport route between Sydney and Central West New South Wales (NSW). Together, the Australian Government and the NSW Government are investing more than \$4.5 billion towards upgrading the Great Western Highway between Katoomba and Lithgow (the Upgrade Program). Once upgraded, over 95 kilometres of the Great Western Highway would be two lanes in each direction between Emu Plains and Wallerawang.

The Upgrade Program comprises the following components:

- Great Western Highway Upgrade – Medlow Bath (Medlow Bath Upgrade): upgrade and duplication of the existing surface road corridor with intersection improvements and a new pedestrian bridge (approved)
- Great Western Highway East – Katoomba to Blackheath (Katoomba to Blackheath Upgrade): upgrade, duplication and widening of the existing surface road corridor, with connections to the existing Great Western Highway east of Blackheath (approved)
- Great Western Highway Upgrade Program – Little Hartley to Lithgow (West Section) (Little Hartley to Lithgow Upgrade): upgrade, duplication and widening of the existing surface road corridor, with connections to the existing Great Western Highway at Little Hartley (approved)
- Great Western Highway Blackheath to Little Hartley: construction and operation of a twin tunnel bypass of Blackheath and Mount Victoria and surface road works for tie-ins to the east and west of the tunnel (the project).

Transport for NSW (Transport) is seeking approval under Division 5.2, Part 5 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) to upgrade the Great Western Highway between Blackheath and Little Hartley (the project).

The project would comprise the construction and operation of new twin tunnels around 11 kilometres in length between Blackheath and Little Hartley, and associated surface road upgrade work for tie-ins to the east and west of the proposed tunnel portals.

The project would be located around 90 kilometres northwest of the Sydney CBD and located within the Blue Mountains and Lithgow Local Government Areas (LGA).

The majority of the project would be located below ground generally along or adjacent to the west of the existing Great Western Highway between around Blackheath and Little Hartley.

This technical report provides an assessment of the heritage significance of listed and potential items of non-Aboriginal heritage, including their landscape and setting, and the potential impact of the project on those items and proposed management and mitigation measures to address these impacts.

Although the project has been designed to avoid or minimise direct and indirect impacts to non-Aboriginal heritage where possible, some impacts have not been entirely avoidable through design. The assessment presented in this technical report has identified the following key potential impacts (being impacts assessed as being greater than negligible) on heritage items, conservation areas and areas of archaeological potential:

- the Greater Blue Mountains Area – Additional Values National Heritage List nomination – minor direct impacts associated with the Blackheath and Soldiers Pinch construction footprints
- Rosedale (Lithgow LEP, I024) – moderate indirect visual/ setting impacts during construction (Little Hartley construction footprint) and operation (permanent operational infrastructure at Little Hartley)
- site of the Plough Inn (archaeological site) – subject to confirmation of the precise location of this archaeological site, potential major direct impact on archaeology. This site may also be impacted by the Little Hartley to Lithgow upgrade prior to potential disturbance by the project
- Mount Victoria Convict Stockade site (archaeological site) – potential moderate direct impacts on archaeology during construction (Little Hartley construction footprint).

The project would not directly affect the Greater Blue Mountains Area (World Heritage List, National Heritage List) during construction or operation. Indirect impacts from the project during construction and operation of the project would also be unlikely, particularly given the distance of the project footprints at Blackheath and Little Hartley. Although the Soldiers Pinch construction footprint is only separated from the Greater Blue Mountains Area by the existing Great Western Highway, the potential for indirect impacts would be limited by the temporary nature of disturbance (there would be no permanent operational infrastructure established at Soldiers Pinch), and the implementation of robust construction environmental management measures. The need for such construction environmental management measures at Soldiers Pinch is reflected in the recommendations of this assessment and the proposed environmental management measures for the project).

Based on the outcomes of the assessment presented in this technical report, the following recommendations are made to mitigate and manage potential direct and indirect impacts on non-Aboriginal heritage. These recommendations have been reflected in the proposed environmental management measures for the project (refer to Section 6.2).

1. Given the proximity of the Soldiers Pinch construction footprint to the Greater Blue Mountains Area (World Heritage List and National Heritage List), it is recommended that the Construction Environmental Management Plan for the project include specific measures to minimise the risk of potential indirect impacts (such as incidents, accidents, leaks, spills etc on the site or from construction traffic). Site inductions and environmental training should include specific reference to the Greater Blue Mountains Area (refer to environmental management measure **NAH1**)
2. Owing to its potential National heritage significance, it is recommended that native vegetation clearance within the boundaries of the Greater Blue Mountains Area (Additional Values) National Heritage List nomination be minimised (refer to environmental management measure **NAH2**)
3. If any archaeological remains are uncovered during construction, it is recommended that they be managed in accordance with the *Unexpected Heritage Items Procedure* (Transport for New South Wales, 2022) (refer to environmental management measure **NAH3**)
4. Prior to any ground disturbance works within the Little Hartley construction footprint, a detailed historical archaeological assessment should be carried out in line with Heritage Council guidelines to establish the potential for disturbance of any archaeological remains relating to the Mount Victoria Stockade site. That archaeological assessment should include a methodology and research design to assess the potential impact of the works on the former road alignments and to guide physical archaeological test excavations and include the results of these excavations. This detailed historical archaeological assessment should be carried out by a suitably qualified archaeologist and should discuss the likelihood of significant historical archaeology on the site, identification of any relics that are likely to be present and their significance and how these may be impacted by the project, and measures to mitigate any impacts. If any archaeological remains are deemed to be impacted, a management plan should also be prepared (refer to environmental management measure **NAH4**)
5. Prior to any ground disturbance works within the Soldiers Pinch construction footprint site, a detailed historical archaeological assessment should be carried out in line with Heritage Council guidelines to establish whether any remains of the 1814 alignment of Cox's Road survive within that site. That archaeological assessment should include a methodology and research design to assess the impact of the works on the former road alignments and to guide physical archaeological test excavations and include the results of these excavations. This detailed historical archaeological assessment should be carried out by a suitably qualified archaeologist and should discuss the likelihood of significant historical archaeology on the site, identification of any relics that are likely to be present and their significance and how these may be impacted by the project, and measures to mitigate any impacts. If any remains of that former road alignment do survive, a management plan should also be prepared (refer to environmental management measure **NAH5**)
6. Minimum separation distances for vibration intensive plant and equipment are to be achieved for the Rosedale homestead, through construction planning and selection of plant and equipment. Where minimum separation distances cannot be achieved, the Rosedale homestead should be subject to vibration monitoring, and condition/ dilapidation surveys prior to and at the conclusion of construction activities (refer to environmental management measure **NAH6**)

7. The project should be designed and constructed so that tunnelling does not exceed the structural damage criteria (peak particle velocity) for structures that are particularly sensitive to vibration and have intrinsic value, as detailed in German standard *DIN 4150-3: 1992-02 Vibration in Buildings – Part 3: Effects on Structures*, at any heritage building/ structure (refer to environmental management measure **NAH7**)
8. It is recommended mature vegetation be retained within and along the Great Western Highway corridor at Little Hartley to provide a visual screen for the Rosedale property. If this is not possible, it is recommended that alternative vegetation screening measures be identified and implemented (refer to environmental management measure **NAH8**).

1.0 Introduction

1.1 Project context and overview

The Great Western Highway is the key east-west road freight and transport route between Sydney and Central West NSW. Together, the Australian Government and the NSW Government are investing more than \$4.5 billion towards upgrading the Great Western Highway between Katoomba and Lithgow (the Upgrade Program). Once upgraded, over 95 kilometres of the Great Western Highway will be two lanes in each direction between Emu Plains and Wallerawang.

The Upgrade Program comprises the following components:

- Great Western Highway Upgrade – Medlow Bath (Medlow Bath Upgrade): upgrade and duplication of the existing surface road corridor with intersection improvements and a new pedestrian bridge (approved)
- Great Western Highway East – Katoomba to Blackheath (Katoomba to Blackheath Upgrade): upgrade, duplication and widening of the existing surface road corridor, with connections to the existing Great Western Highway east of Blackheath (approved)
- Great Western Highway Upgrade Program – Little Hartley to Lithgow (West Section) (Little Hartley to Lithgow Upgrade): upgrade, duplication and widening of the existing surface road corridor, with connections to the existing Great Western Highway at Little Hartley (approved)
- Great Western Highway Blackheath to Little Hartley: construction and operation of a twin tunnel bypass of Blackheath and Mount Victoria and surface road works for tie-ins to the east and west of the tunnel (the project).

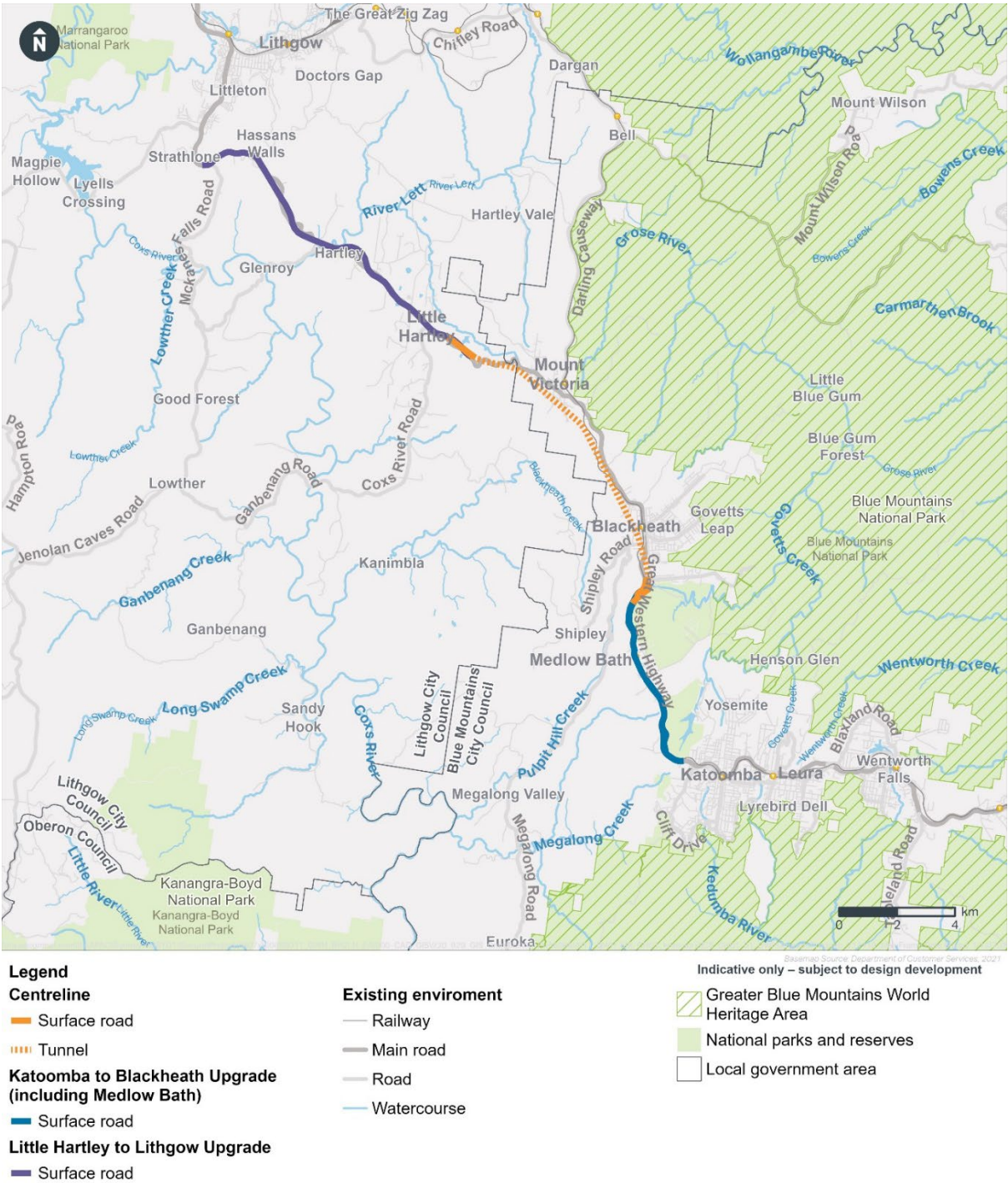
The components of the Upgrade Program are shown in Figure 1-1.

Transport for NSW (Transport) is seeking approval under Division 5.2, Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) to upgrade the Great Western Highway between Blackheath and Little Hartley (the project).

The project would comprise the construction and operation of new twin tunnels around 11 kilometres long between Blackheath and Little Hartley, and associated surface road upgrade work for tie-ins to the east and west of the proposed tunnel portals.

The project would be located around 90 kilometres northwest of the Sydney CBD and primarily located within the Blue Mountains Local Government Area (LGA), with a small portion within the Lithgow LGA.

The majority of the project would be located below ground generally along or adjacent to the west of the existing Great Western Highway between around Blackheath and Little Hartley.



1.2 The project

1.2.1 Key components of the project

Key components of the project are summarised in Table 1-1 and shown in Figure 1-2. These components are described in more detail in Chapter 5 (Project description) of the environmental impact statement (EIS).

The indicative operational configuration of the surface road network at Blackheath and Little Hartley is shown in Figure 1-3 and Figure 1-4.

Subject to approval, the project is anticipated to be open to traffic in 2030.

Table 1-1 Key components of the project

Key project component	Summary
Tunnels	Twin tunnels around 11 kilometres in length between Blackheath and Little Hartley, connecting to the upgraded Great Western Highway at both ends. Each tunnel would include two lanes of traffic and road shoulders and would range in depth from just below the surface near the tunnel portals, to up to around 200 metres underground at Mount Victoria.
Surface work	Surface road upgrade work would be required to connect the tunnels and surface road networks south of Blackheath and at Little Hartley. The twin tunnels would connect to the surface road network via: <ul style="list-style-type: none"> mainline carriageways and on- and off-ramps at the Blackheath portal, located adjacent to the existing Great Western Highway and south of Evans Lookout Road mainline carriageways at the Little Hartley portal, located adjacent to the existing Great Western Highway at the base of the western escarpment below Victoria Pass and southwest of Butlers Creek.
Operational infrastructure	Operational infrastructure provided by the project would include: <ul style="list-style-type: none"> a tunnel operations facility adjacent to the Blackheath portal in-tunnel ventilation systems including jet fans and ventilation ducts connecting to the ventilation facilities one of two potential options for tunnel ventilation currently being investigated, being: <ul style="list-style-type: none"> ventilation design to support emissions via ventilation outlets; or ventilation design to support emissions via portals drainage and water quality infrastructure including sediment and water quality basins, an onsite detention tank at Blackheath and a water treatment plant at Little Hartley fire and life safety systems, emergency evacuation and ventilation infrastructure and closed circuit television lighting and signage including variable message signs and associated infrastructure such as overhead gantries.
Utilities	Key utilities required for the project would include: <ul style="list-style-type: none"> an electricity substation at Little Hartley for construction and operational power supply a pipeline between Little Hartley and Lithgow for construction and operational water supply other utility connections and modifications, including electricity substations in the project tunnels.
Other project elements	The project would also include: <ul style="list-style-type: none"> integrated urban design initiatives landscape planting.

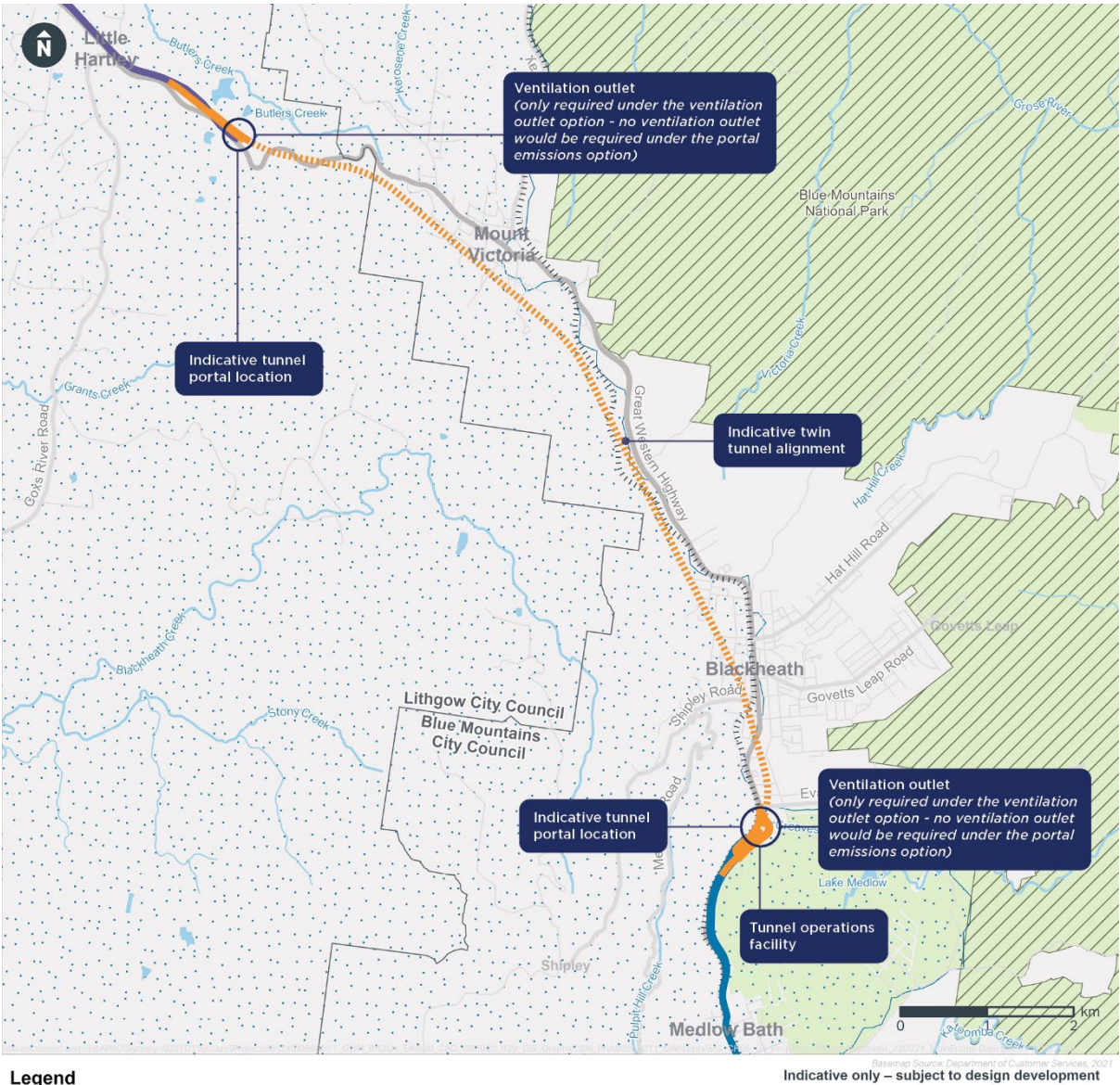


Figure 1-2 Overview of the project



Figure 1-3 Indicative operational configuration at Blackheath

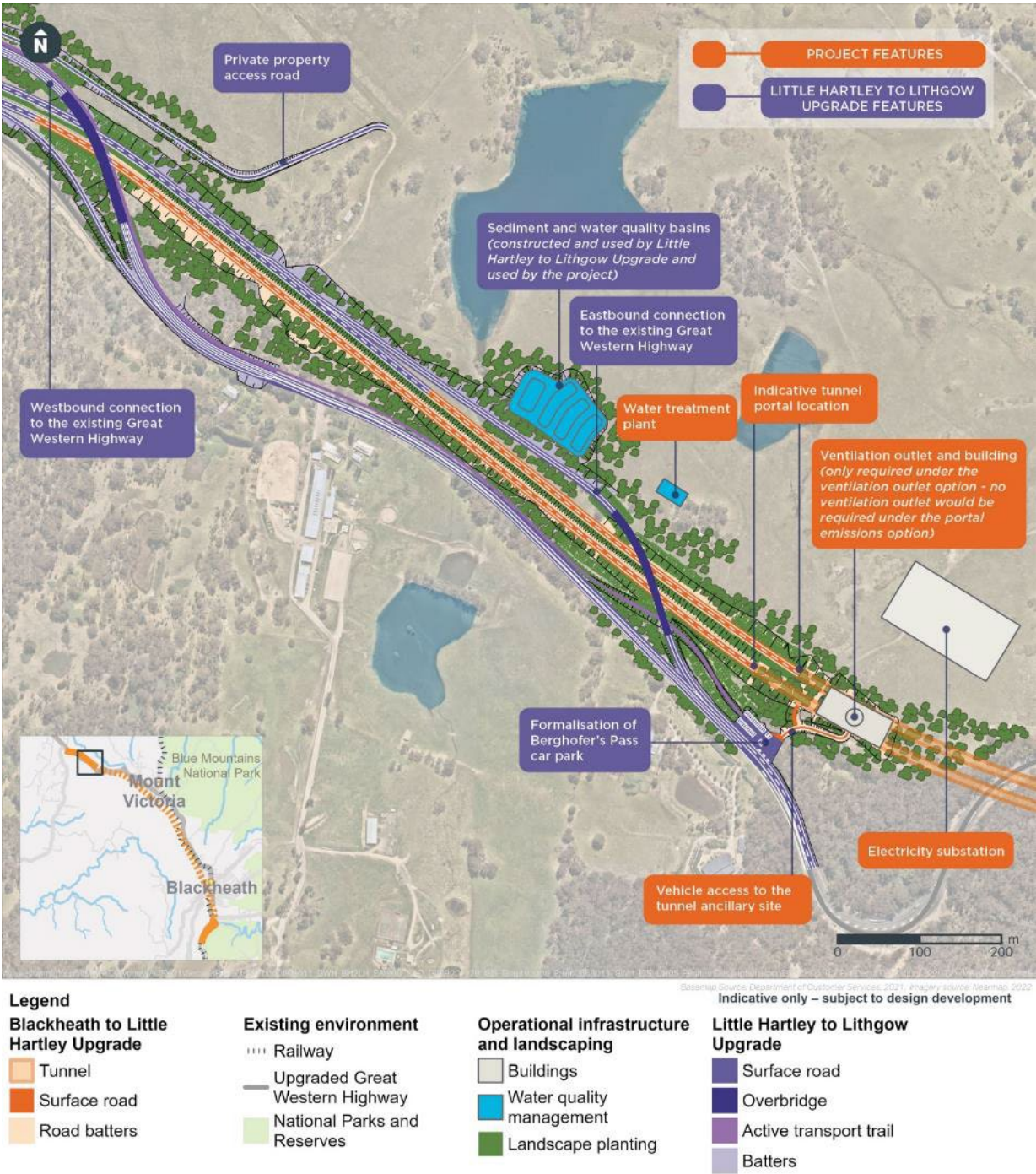


Figure 1-4 Indicative operational configuration at Little Hartley

1.2.2 Project construction

Construction of the project would include:

- site establishment and enabling works
- tunnel portal construction
- tunnelling and associated works
- surface road upgrade works
- operational infrastructure construction and fit-out, including construction of operational environmental controls
- finishing works, testing, and commissioning.

These activities are described in more detail in Chapter 6 (Construction) of the EIS.

The indicative construction footprint for the project is shown on Figure 1-5 to Figure 1-7. These figures also show the construction footprints for the Katoomba to Blackheath Upgrade and Little Hartley to Lithgow Upgrade adjoining the project to the east and west respectively that will be under construction when construction of the project commences.

Construction of the project is expected to take around eight years. Subject to planning approval, construction is planned to commence in 2024 and be completed by late 2031; however, the project would be open to traffic by 2030.



Figure 1-5 Indicative construction footprint at Blackheath

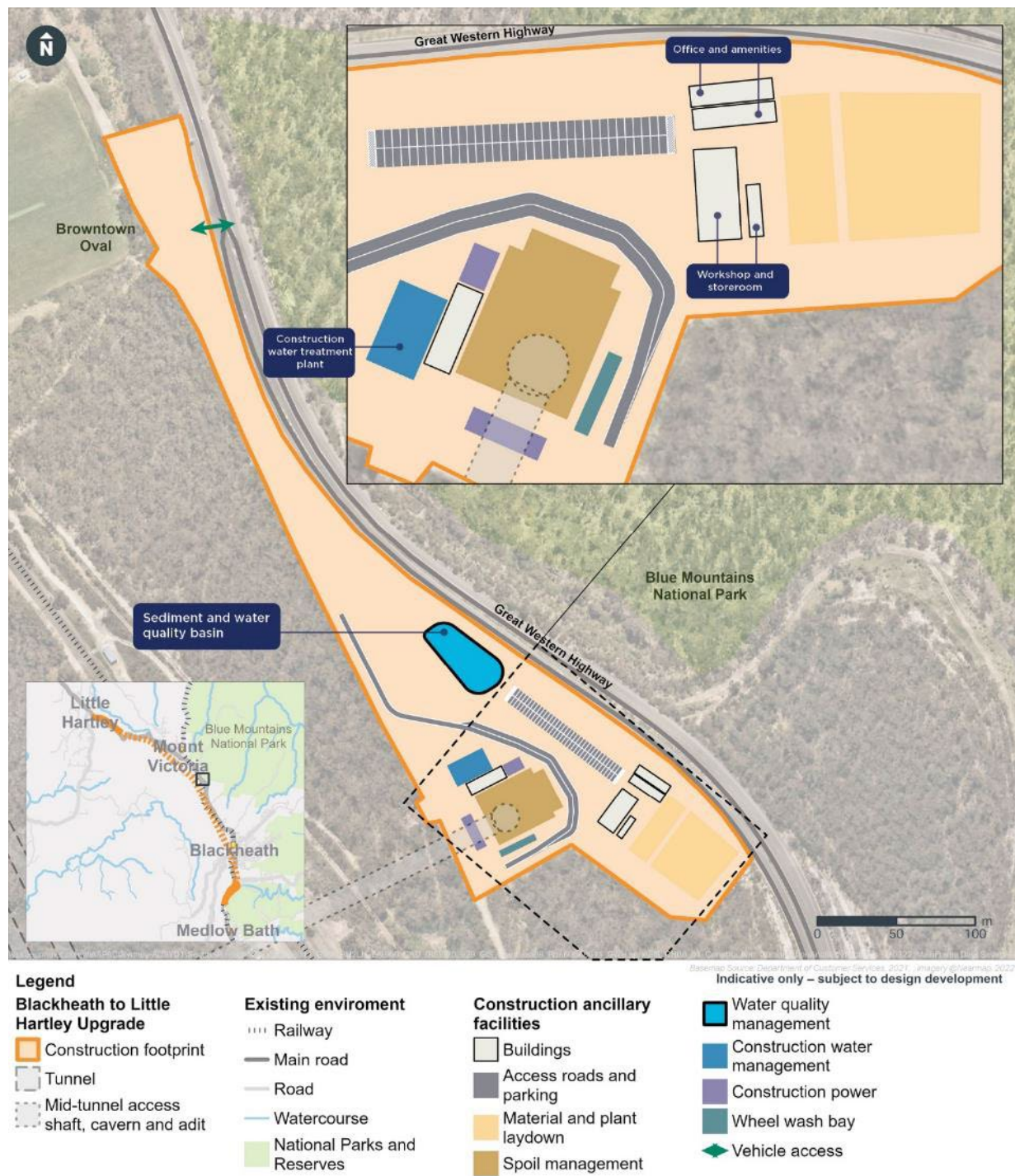


Figure 1-6 Indicative construction footprint at Soldiers Pinch

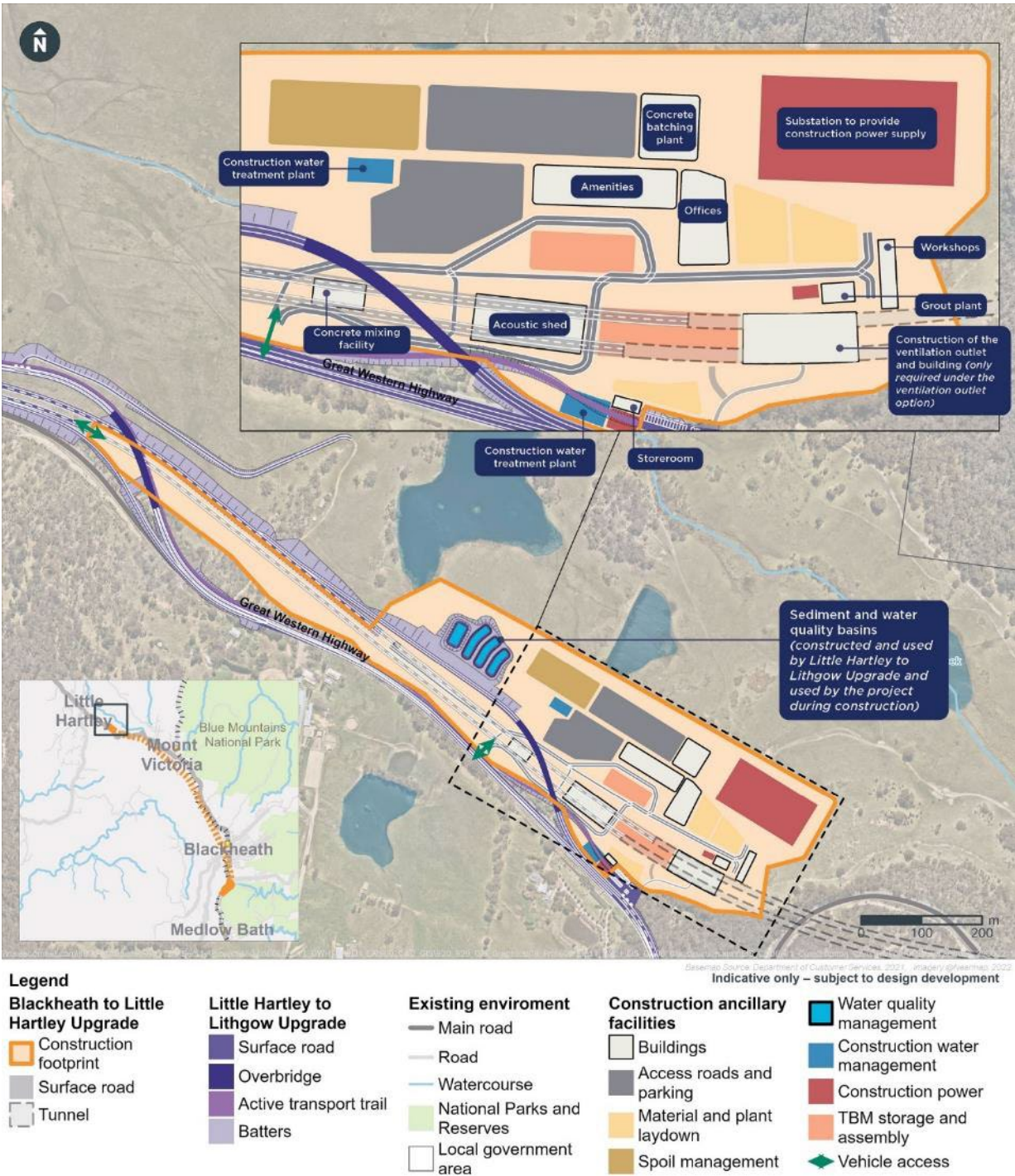


Figure 1-7 Indicative construction footprint at Little Hartley

1.2.3 Baseline environment

The Katoomba to Blackheath and Little Hartley to Lithgow Upgrades adjoining the project to the east and west respectively would be under construction when construction of the project commences (refer to Figure 1-8). While construction on these projects would be ongoing, construction work in the areas directly adjacent to the project would be complete. To minimise environmental impacts, the construction compounds used for the Katoomba to Blackheath and Little Hartley to Lithgow Upgrades would be repurposed to support construction of the project.

As a result, certain areas of the Blackheath and Little Hartley construction compounds would already be prepared for use as part of the Katoomba to Blackheath and Little Hartley to Lithgow Upgrades, such that the site would be in the following condition:

- vegetation would be cleared
- topsoil would be levelled and compacted
- site access tracks would be established
- water quality controls such as water quality and sediment basins would be installed.

The environmental impacts associated with these works have been assessed through separate planning approvals for the Katoomba to Blackheath Upgrade and the Little Hartley to Lithgow Upgrade.

The construction footprint for these projects are shown in Figure 1-9 and Figure 1-10 and form the baseline environment considered at Blackheath and Little Hartley for this EIS.

No work is proposed at Soldiers Pinch as part of the Katoomba to Blackheath Upgrade or the Little Hartley to Lithgow Upgrade and therefore the existing environment forms the baseline environment for this EIS.

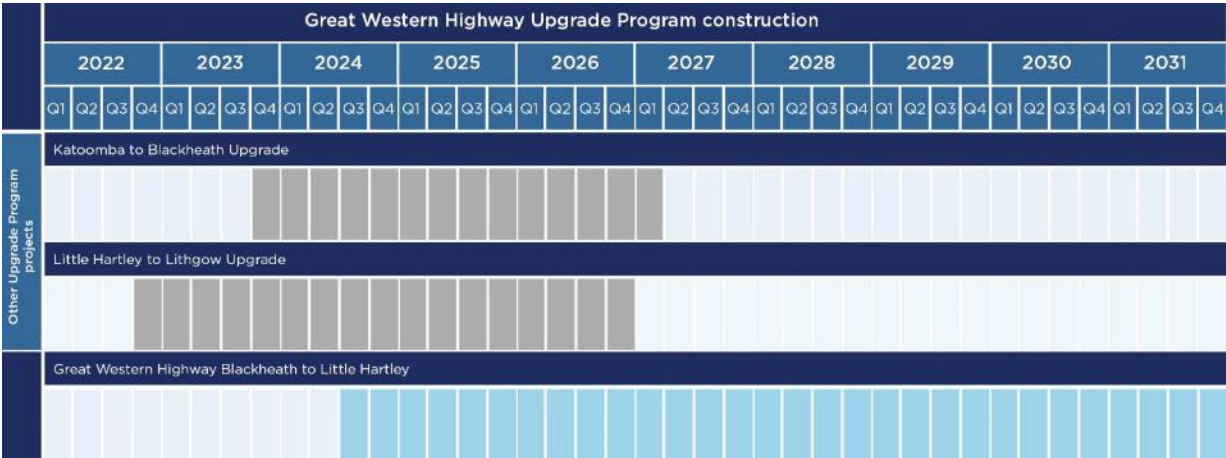


Figure 1-8 Great Western Highway Upgrade Program construction



Figure 1-9 Baseline environment at Blackheath

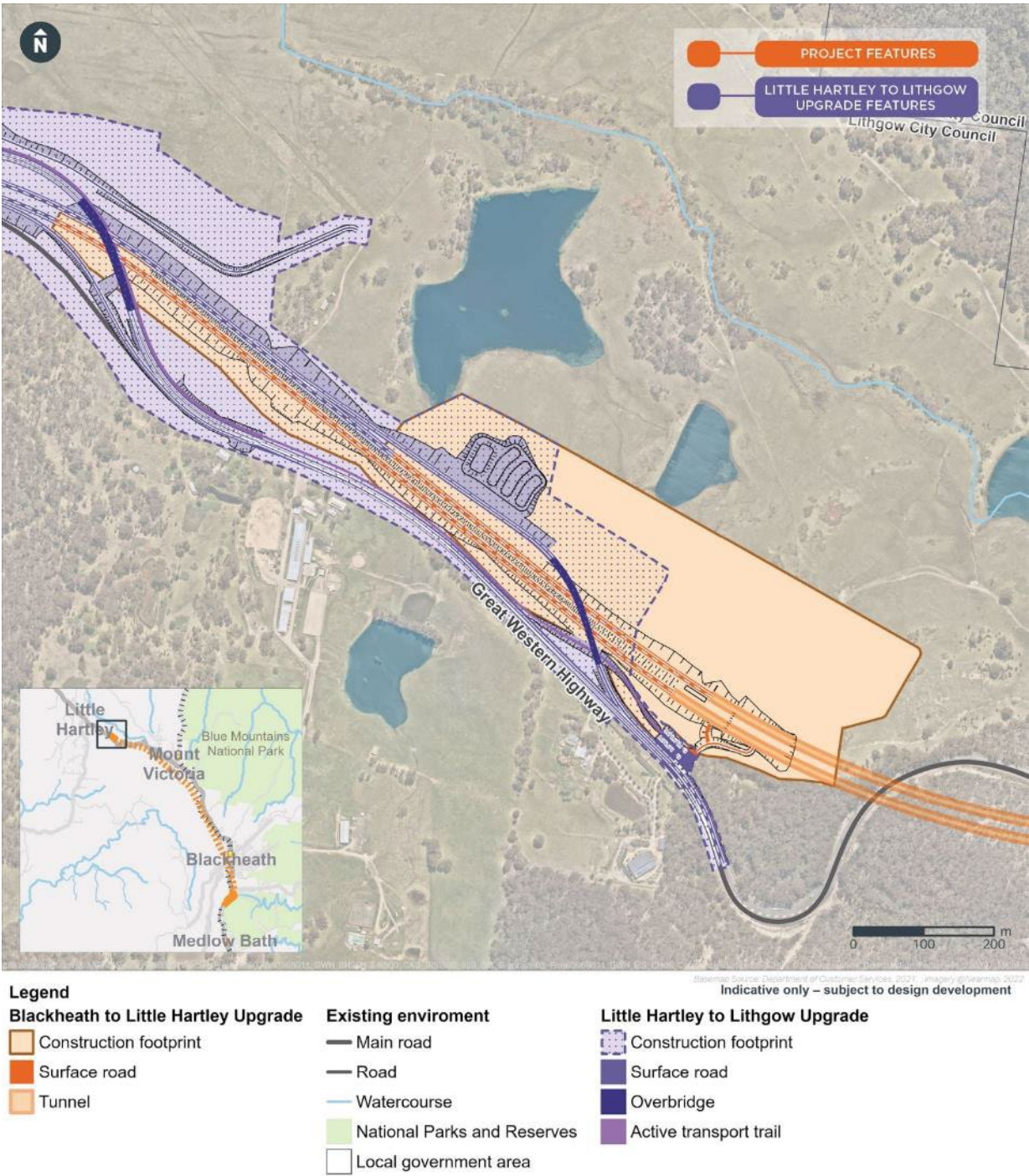


Figure 1-10 Baseline environment at Little Hartley

1.3 Purpose of this report

This non-Aboriginal heritage technical report is one of the technical documents that forms part of the EIS. The purpose of this technical report is to provide a non-Aboriginal heritage impact assessment which addresses the requirements outlined in Section 1.3.2. This technical report provides an assessment of the non-Aboriginal heritage impacts associated with the construction and operation of the project.

1.3.1 Authors of this report

This assessment has been carried out by Senior Heritage Consultant, Deborah Farina and Heritage Consultant, Matilda Stevens with technical review provided by Principal Heritage Consultant, Chris Lewczak and by Principal Heritage Consultant and AECOM Lead Verifier Dr Darran Jordan. All are suitably qualified heritage consultants.

1.3.2 Assessment requirements

The Secretary's environmental assessment requirements (SEARs) issued by the NSW Department of Planning and Environment (DPE), relating to non-Aboriginal heritage and where these requirements are addressed in this technical report are outlined in Table 1-2.

Table 1-2 Secretary's environmental assessment requirements – Non-Aboriginal heritage

SEARs		
Non-Aboriginal heritage		
Desired performance outcome	Requirement	Section where addressed in report
9. Heritage – non-Aboriginal The design, construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of environmental heritage value. The design, construction and operation of the project avoids or minimises impacts, to the greatest extent possible, on the heritage significance of environmental heritage value.	1. Identify and assess the direct and/or indirect impacts to the significance of:	
	(a) Environmental heritage , as defined under the <i>Heritage Act 1977</i> (including potential items of heritage value, conservation areas, open space heritage landscapes, built heritage landscapes and archaeology)	Sections 3.0, 4.0 and 5.0
	(b) Items listed on the State, National and World Heritage lists, and	Sections 3.0, 4.0 and 5.0
	(c) Heritage items and conservation areas identified in local and regional planning environmental instruments covering the project area	Sections 3.0, 4.0 and 5.0
	2. Where impacts to National, State or locally significant heritage items are identified, the assessment must:	
	(a) Include a significance assessment, a statement of heritage impact for all heritage items and a historical archaeological assessment	Section 4.0 and Appendix B
	(b) Provide a discussion of alternative locations and design options that have been considered to reduce heritage impacts	Section 4.0

SEARs		
	(c) In areas identified as having potential archaeological significance, undertake a comprehensive historical archaeological assessment and management plan in line with Heritage Council guidelines which includes a methodology and research design to assess the impact of the works on the potential archaeological resource and to guide physical archaeological test excavations and include the results of these excavations. This is to be carried out by a suitably qualified archaeologist and is to discuss the likelihood of significant historical archaeology on the site, identification of any relics that are likely to be present and their significance and how these may be impacted by the project, and measures to mitigate any impacts.	Sections 3.0 and 4.0
	(d) Consider impacts to the item of significance caused by, but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, increased traffic, visual amenity, landscape and vistas, curtilage, subsidence, and architectural noise treatment (as relevant)	Section 4.0
	(e) Provide a comparative analysis to inform the rarity and representative value of any heritage places proposed for demolition	Not applicable (no heritage places proposed for demolition)
	(f) Outline mitigation measures to avoid, mitigate and/or minimise impacts identified in accordance with the current guidelines; and	Section 6.0
	(g) Be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria)	Section 1.3.1

1.3.3 Agency engagement

During preparation of the EIS, the then Commonwealth Department of Agriculture, Water and the Environment (now the Department of Climate Change, Energy, the Environment and Water) was provided an initial briefing on the project and the potential for the project to affect matters of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). This included confirming that the project would not directly affect the Blue Mountains World Heritage Area (a protected matter of national environmental significance), and would be designed to avoid or minimise potential indirect impacts to the world heritage area.

Based on further, more detailed assessments, Transport has formed the view that the project would not significantly affect the Blue Mountains World Heritage Area or other matters of national environmental significance, and would therefore not require approval under the EPBC Act. Notwithstanding, Transport has made a referral under the EPBC Act to confirm that the project would not be a controlled action.

Further details of engagement with agencies are provided in Chapter 7 (Community and stakeholder engagement) of the EIS.

2.0 Assessment methodology

2.1 Relevant guidelines and policies

A number of planning and legislative documents govern how heritage is managed in NSW and Australia. The following section provides an overview of the requirements under each as they apply to the heritage component of the project.

2.1.1 Commonwealth legislation

Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), proposed 'actions' that have the potential to significantly impact on matters of national environmental significance (MNES) or the environment of Commonwealth land, or 'actions' that are being carried out by a Commonwealth agency, require the approval of the Commonwealth Minister for the Environment and Water. Any approval that may be required under the EPBC Act is separate and in addition to State approval(s).

Under the EPBC Act protected heritage items are listed on the National Heritage List (items of significance to the nation) or the Commonwealth Heritage List (items belonging to the Commonwealth or its agencies). These two lists replaced the Register of the National Estate, which although it is no longer a statutory list, remains as an archive.

There are two MNES of relevance to the project:

- listed threatened species and communities (refer to Chapter 12 and Appendix H – Technical report – Biodiversity of the EIS)
- World Heritage, notably the Blue Mountains World Heritage Area and curtilage (assessed in this technical report). The project would be located outside the World Heritage Area and its curtilage.

In addition to these MNES, the project would be located within the curtilage of the Greater Blue Mountains Area – Additional Values which has been nominated for, but is not currently on, the National Heritage List.

Transport has carried out assessments of the potential impacts of the project on relevant MNES, and the nominated Greater Blue Mountains Area – Additional Values, and has formed the view that project would not have a significant impact on any of these matters. The project would therefore not require approval under the EPBC Act.

Notwithstanding, Transport has formally referred the project to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) to confirm the view that approval would not be required. At the time of preparation of this technical report, the referral was under assessment by DCCEEW and its advice on whether the project would require approval under the EPBC Act was pending.

2.1.2 State legislation

Environmental Planning and Assessment Act 1979

The NSW *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) and its associated regulations provide, among other things, the framework for assessment and approval of developments and activities in New South Wales.

Transport for NSW is seeking State significant infrastructure and critical State significant infrastructure declaration for the project by the Minister for Planning. As part of this declaration, Schedule 4 and 5 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP) will be amended to include the project. The Minister for Planning is the approval authority for development declared to the State significant infrastructure. Sections 5.16 and 5.17 of the EP&A Act require that Transport, as the proponent for the project, prepare an EIS for the project.

The EP&A Act also provides for the making of environmental planning instruments, including State Environmental Planning Policies (SEPPs) and local environmental plans. Environmental planning

instruments provide more detailed requirements relating to the permissibility of development, development control, and provisions for the protection of environmental values, such as heritage items and heritage conservation areas. The project would be located within the Blue Mountains and Lithgow local government areas, in which the *Blue Mountains Local Environmental Plan 2015* (Blue Mountains LEP) and the *Lithgow Local Environmental Plan 2014* (Lithgow LEP). Both local environmental plans include heritage items and heritage conservation areas, which have been considered as part of the assessment in this technical report. There are no SEPPs applicable to the project that include relevant heritage provisions.

Heritage Act 1977

The *Heritage Act 1977* aims to conserve the environmental heritage of New South Wales. Under section 32, places, buildings, works, relics, moveable objects, or precincts of heritage significance are protected by means of either Interim Heritage Orders (IHOs) or by listing on the NSW State Heritage Register (SHR). Proposals to alter, damage, move or destroy places, buildings, works, relics, moveable objects, or precincts protected by an IHO or listed on the SHR require an approval under section 60 of the *Heritage Act 1977*. The project would not affect any heritage item protected under an IHO or listed on the SHR.

Under section 170 of the *Heritage Act 1977*, NSW Government agencies (such as Transport for NSW) are required to maintain a register of heritage assets. Obligations are placed on NSW Government agencies to maintain heritage assets registered under section 170. The project would not affect any heritage item listed on a section 170 heritage register.

Because the project has been declared to be State Significant Infrastructure, section 5.23 of the EP&A Act relieves the need to obtain approval under Part 4 (to impact a heritage item protected under an IHO or listed on the SHR) or under section 139 (to carry out excavation in an area known or suspected to contain a relic) under the *Heritage Act 1977*.

2.1.3 Policies and guidelines

The policies and guidelines listed in Table 2-1 have been applied in the preparation of the non-Aboriginal heritage impact assessment, including Statements of Heritage Impact (SoHIs), presented in this technical report.

Table 2-1 Policies and guidelines

Title	Author	Purpose
Greater Blue Mountains World Heritage Area Strategic Plan (2009)	NSW National Parks and Wildlife Service	Provides broad principles for integrated management, protection, interpretation and monitoring of the GBMWhA
The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance (2013)	Australia ICOMOS	Provides guidance for the conservation and management of places of cultural significance as an outcome of the International Charter for the Conservation and Restoration of Monuments and Sites (Venice, 1964) and the Resolutions of the 5 th General Assembly of the International Council on Monuments and Sites (ICOMOS) (Moscow, 1978).
NSW Skeletal Remains: Guidelines for Management of Human Remains (1998)	Heritage NSW	Provides guidance on the appropriate management of unexpected human remains in an archaeological context.
Care agreement application form: Criteria for the assessment of excavation directors (2011)	Heritage NSW	Sets out the criteria to be accepted as an excavation director for non-Aboriginal archaeology in NSW.
NSW Heritage Manual (various)	Heritage NSW	A collection of guidelines for appropriate heritage management and archaeology in NSW
Assessing Heritage Significance (2001)	NSW Heritage Office (now Heritage NSW)	Guideline setting out the steps in assessing the heritage significance using the NSW heritage significance criteria.

Title	Author	Purpose
Statements of Heritage Impact (2002)	NSW Heritage Office (now Heritage NSW) & Department of Urban Affairs & Planning (DUAP)	Guideline for the preparation of Statements of Heritage Impact.

2.2 Overview of methodology

This heritage assessment has been carried out in accordance with the Heritage NSW documents *Assessing Heritage Significance* (NSW Heritage Office, 2001) and *Statements of Heritage Impact* (NSW Heritage Office & Department of Urban Affairs & Planning, 2002). It includes:

- desktop searches of heritage registers:
 - Australian Heritage Database (World Heritage List, National Heritage List, Commonwealth Heritage List (CHL))
 - State Heritage Register
 - Section 170 Heritage Registers held on the State Heritage Inventory
 - Schedule 5 of the Lithgow LEP
 - Schedule 5 of the Blue Mountains LEP
- background research into the historical development of the construction footprint using the historic plans, historical photographs, newspapers, and other primary and secondary historical sources as relevant
- vehicular site inspection on 18 January 2022 by AECOM staff to ground truth and photograph known heritage items within the construction footprint, as well as assessing the existing character of the construction footprint, archaeological potential, and surrounding land uses. Note: all photographs within this report were taken during the site inspection unless otherwise stated
- preparation of written report detailing the above and fulfilling the requirements of the SEARs, including assessment of significance of non-Aboriginal heritage (refer to Section 3.5), assessment of potential construction and operation impacts (refer to Section 4.0) and identification of measures to mitigate these impacts.

2.3 Impact assessment

Potential impacts to heritage items have been assessed based on:

- the nature of the impact, either a direct impact or an indirect impact
- the anticipated magnitude of the impact.

2.3.1 Nature of the impact

Potential impacts to heritage items have been assessed as either directly affecting the item, or indirectly affecting the item, as outlined below.

Direct impacts

Direct impacts are those that cause a direct physical adverse impact to a heritage item, such as those caused by machinery or vehicles that damage the fabric of a heritage item or one of its features or elements within its curtilage. These may occur during general construction of road or ancillary elements within the curtilage of a heritage item, or by the use of machinery and/or vehicles in close proximity of a heritage item, for example including accidental damage.

Indirect impacts

Indirect impacts are activities which indirectly cause an adverse impact to a heritage item. They may include impacts associated with vibration, settlement, a change in use/ association/ access, or visual/ landscape elements, as outlined in Table 2-2.

Table 2-2 Indirect impacts

Mode of impact	Potential effect
Vibration	Impact from vibration can arise from the use of a single machine or multiple machines concurrently in the vicinity of a heritage item. Appendix G – Technical report – Noise and vibration of the EIS assesses the potential vibration impacts of the project on heritage items, with relevant impacts also presented in this technical report.
Settlement	Settlement of the ground surface may occur following tunnelling activities and as a result of groundwater drawdown or geological slumping, thereby potentially affecting the structural integrity of heritage items above the tunnel. Appendix I – Technical report – Groundwater of the EIS provides further discussion of potential settlement mechanisms.
Change in use, association of access	Any change to the use of a heritage item, its association with other nearby heritage items and/or landscapes or access to the heritage item is considered an indirect impact. There are no heritage items identified that would be impacted by a change of use, association or access as a result of this project.
Visual/ landscape	While most of the project would be underground, some elements such as the tunnel portals at Blackheath and Little Hartley, ventilation outlets (if this ventilation option is selected), road embankments and/or temporary construction sites have the potential to cause a visual impacts to surrounding heritage item(s). Appendix N – Technical report – Landscape and visual of the EIS considers the visual impacts of the project on heritage items, with relevant impacts also presented in this technical report.

2.3.2 Anticipated magnitude of impact

For the purpose of the assessment presented in this technical report, the anticipated magnitudes of direct and indirect impacts have been defined as summarised in Table 2-3.

Table 2-3 Magnitude of impact

Anticipated magnitude of impact	Definition
Negligible	Direct or indirect impacts that do not alter or change the heritage item. No change to the heritage significance of the item.
Minor	Direct or indirect impacts that are small or affect a small area, or an alteration to a minor feature or element. No loss of significant fabric, changes may be temporary or reversible, overall heritage significance values are intact.
Moderate	Direct or indirect impacts that result in a partial loss of a heritage item's significant fabric or setting. Heritage significance of the item may be impacted.
Major	Direct or indirect impacts that result in a substantial loss of fabric of a heritage item or to its setting. Loss is permanent and/or irreversible. Substantial or total loss of heritage significance.

3.0 Existing environment

3.1 Historical context

3.1.1 Greater Blue Mountains Area

The Greater Blue Mountains Area consists of around one million hectares of mostly forested landscape on a sandstone plateau spread across an area that extends from around 60 to 180 kilometres west of Sydney. In recognition of its outstanding natural values of universal significance, it was inscribed on the World Heritage List and National Heritage List in 2000 (NSW National Parks and Wildlife Service, 2009:7). The location of the GMBA (World Heritage Area) relative to the project is shown in Figure 1-2.

The Greater Blue Mountain Area is an area of breathtaking views, rugged tablelands, sheer cliffs, deep, inaccessible valleys and swamps which support a rich and diverse ecosystem. The unique plants and animals that live in this natural place tell the story of Australia's antiquity, its diversity of life and its superlative beauty. This area demonstrates the evolution of Australia's unique eucalypt vegetation and its associated communities, plants and animals.

In addition to its biodiversity values, the Greater Blue Mountain Area also contains ancient, relict species of global significance such as the Wollemi pine (*Wollemia nobilis*) which was thought to have been extinct. The few surviving trees of this ancient species are known only from three small populations located in remote, inaccessible gorges within the Greater Blue Mountain Area. There are no non-Aboriginal heritage values described in the Statement of significance for the Greater Blue Mountain Area.

Beyond the current Greater Blue Mountain Area, an additional area has been nominated for inclusion on the National Heritage List, referred to as the Greater Blue Mountains Area – Additional Values (Greater Blue Mountain Area (Additional Values)). The Greater Blue Mountain Area (Additional Values) has only been nominated for inclusion on the National Heritage List, and not the World Heritage List. Notwithstanding, for the purpose of the assessment presented in this technical report, it has been assumed that the Greater Blue Mountain Area (Additional Values), if listed, would have identical or similar significance to the current Greater Blue Mountain Area World Heritage List and National Heritage List entries.

3.1.2 Crossings of the Blue Mountains

Crossing of the Blue Mountains has played a significant role in the history and development of the Blue Mountains, and the Central West region. A chronology for road crossings of the Blue Mountains in areas relevant to the project is provided in the table below.

Table 3-1 Chronology of road crossings of the Blue Mountains in areas relevant to the project

Year	Event
1814	William Cox oversees the construction of the first road across the Blue Mountains (Cox's Road)
1823	Sections of Cox's Road are realigned
1828-1830	Sir Thomas (then Major) Mitchell's upgrade of Cox's Road and marking of new line from Mount Victoria to Bathurst (known as Western Road/Mitchell's Road)
1832	Opening of Victoria Pass
1845	Realignment of Cox's Road at Soldiers Pinch

Cox's Road

Only a few years after the initial arrival of Europeans in Sydney Cove in 1788, expeditions to cross the Blue Mountains and access the lands beyond took place. This was in part due to drought, insect plagues and lack of grazing vegetation on the Cumberland Plain (Karskens, 1988:6). The first European thought to have entered the Blue Mountains was John Wilson in 1792. The best-known expedition was undertaken by Gregory Blaxland, William Lawson and William Charles Wentworth in 1813, the first

Europeans to successfully cross the mountains. This was most likely achieved by following paths previously established by Aboriginal people (Jacobs Group (Australia) Pty Ltd, 2021:240).

This expedition resulted in the construction of Cox's Road between 1814 to 1815 which was the first built road through the Blue Mountains. Construction was overseen by William Cox and employed convict labour to complete the massive undertaking in just one year (Jacobs & Transport for NSW, 2021:25). This was even more impressive since Cox was only allocated 50 convicts to serve as his labour force. They used excavation and gunpowder to construct the road from the Nepean River through Emu Ford (now Emu Plains), over Mount York and Mount Blaxland, terminating at Bathurst (Karskens, 1988:22).

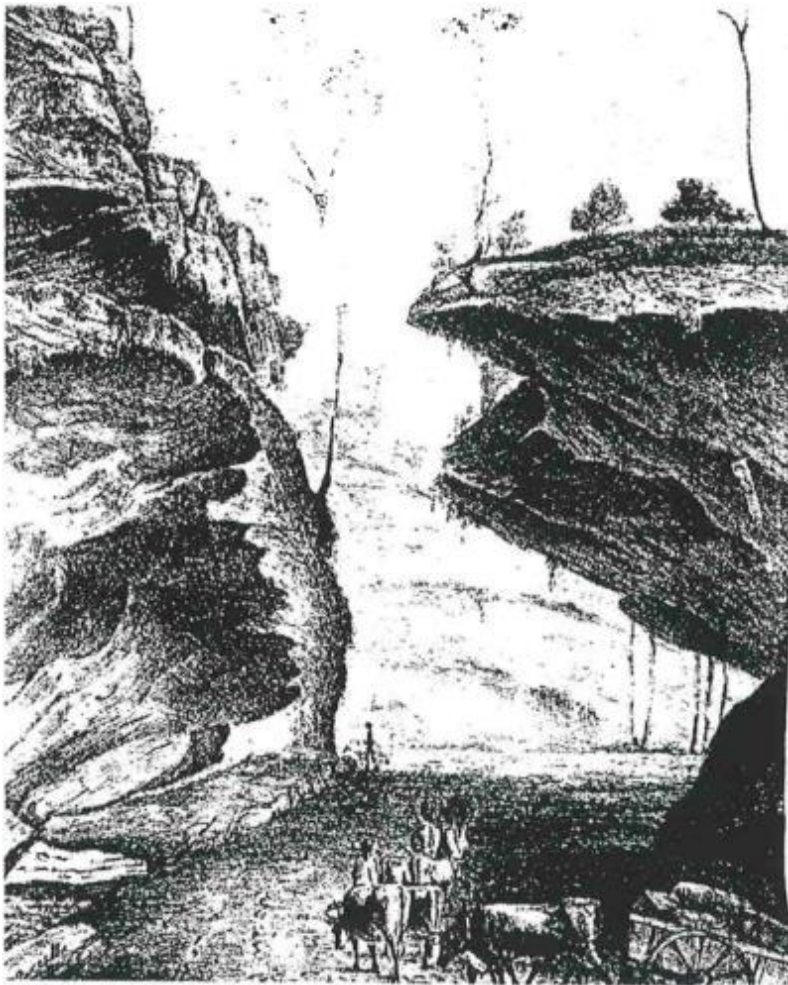


Figure 3-1 E Purcell “Part of Coxs Pass” 1821 (Source: Mitchell Library)

In 1822 William Lawson cut a new road around 2.5 miles (around four kilometres) before Mount York and ended in Bathurst. This route was around eight to 10 miles (12.9 to 16 kilometres) shorter than the original Cox's Road. This deviation was probably the result of private settlement on the east side of the Macquarie River. This new route continued to be used until at least 1827. A descent off Mount York was built in 1824 and was called Lawsons Long Alley. In 1827 another route was planned between Cox's Road and Lawsons Long Alley, descending from Mount York along a ridge. Work on the road started in 1829 which became known as Lockyers Road (after the man overseeing the work). It involved heavy cutting, filling and Type 2b masonry along with drains and stone box culverts (Karskens, 1988:50).

Mitchells Road/the Western Road/Great Western Highway

While Cox's Road opened the interior to settlers, many found the descent at Cox's Pass difficult and dangerous. Further, with the increase of traffic, the road began to deteriorate, therefore making the road more dangerous (Karskens, 1988a:3).

After explorer and surveyor Major Thomas Mitchell arrived in the colony and took up his post as Assistant Surveyor General of New South Wales (later Surveyor-General), he set about improving roads in the colony, and the Western Road was one of the earliest, running from Emu Ford (now Emu Plains) to Bathurst. The current Great Western Highway largely follows Mitchell's route, with a few exceptions. One such exception exists at Little Hartley, with the access road from the Great Western Highway to Nioka being part of Mitchell's original road (see Section 3.3.4).

Victoria Pass

In 1827, Hamilton Hume crossed the Blue Mountains following the route now known as Bells Line of Road. Mitchell was sent to assess this route, and in doing so settled on a route that avoided Mount Blaxland and descended Mount York not far from Cox's Pass. Construction began on this line of road in 1829, under the surveyor of Roads and Bridges, Edmund Lockyer. The road required extensive engineering, including considerable cutting and filling and heavy masonry retaining walls, side drains and culverts. This road became known as Lockyers Road (Karskens, 1988a:4-5).

While surveying another road, Mitchell noted that the descent to Hartley could be achieved by spanning the deep abyss at Mount Victoria, thereby bypassing the descent from Mount York altogether. Despite conflict between Mitchell and Governor Darling, work at Lockyers Road was halted and work on the new pass began in early 1830.

Victoria Pass (also called "the Pass of Victoria") was opened by Governor Darling in 1832.



Figure 3-2 Mitchell's sketch of cleared line of road at Victoria Pass, 31 July 1830 (Source: State Library of New South Wales, Preservation Copy Identifier FL3250599/FL3250693)

In the 1830s substantial works were carried out to upgrade and realign the Western Road. In 1835 work was carried out around the old Bluff Bridge at Linden and a road gang, supervised by Captain Bull, was used to realign the road between Blaxland and Leura. Thomas Mitchell identified the route of the current highway to Captain Bull at Weatherboard (Wentworth Falls) during this time.

In the 1840s, the realigned Western Road from Pulpit Hill to Hartley was opened, taking the area between Blackheath and Mount Victoria. By 1862, the whole section had been cut to the present alignment of the highway, with little of the original Cox's Road in use (Karskens, 1988:51).

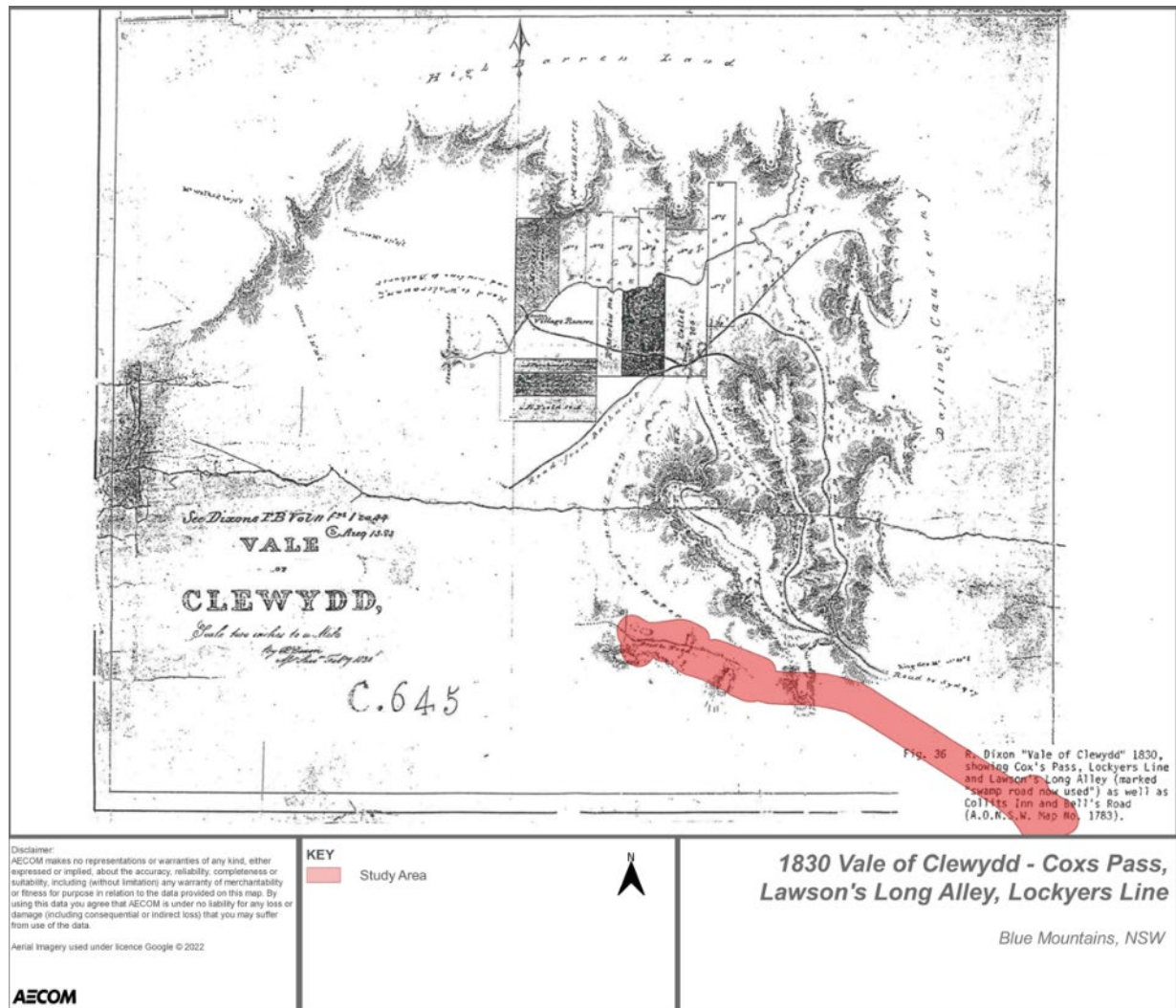


Figure 3-3 1888 Parish map of Hartley. The indicative construction footprint is noted in red (Source: Historical Land Records Viewer)

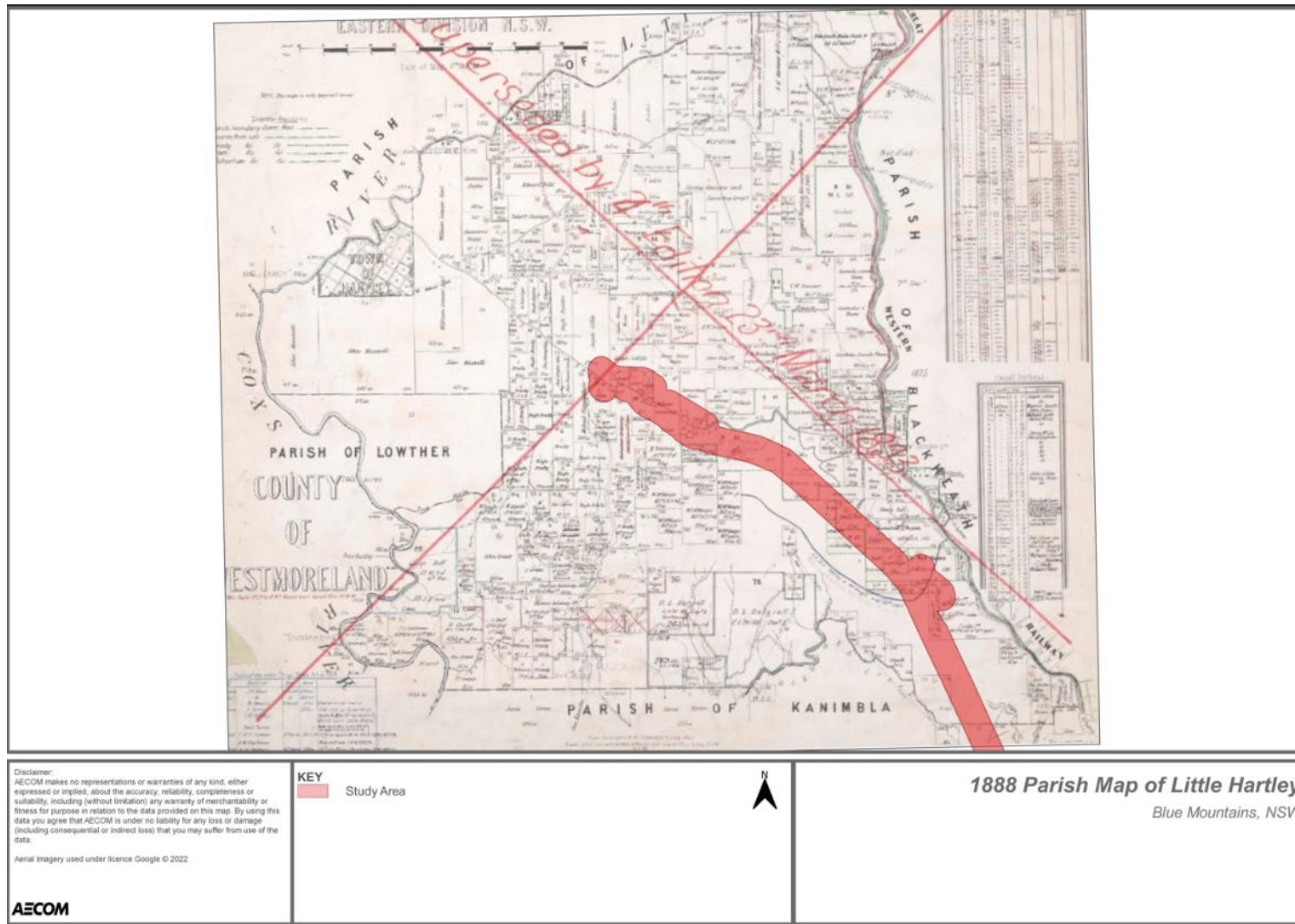


Figure 3-4 1830 map showing Cox's Pass, Lawson's Long Alley (marked "Swamp road now used") and Lockyers Line, construction footprint is marked in red (Source: NSW Archives & Records, Item No. 1783)

3.1.3 Stockades

Cox's Western Road, Lockyers Road, Mitchells Western Road and Victoria Pass were all built using convict labour, which required accommodation for both the convicts and their military guards. There were numerous stockades built along the alignments of these roads, including:

- Glenroy (Jenolan Caves Road, Hartley) (c.1815-c.1832)
- Mount Walker (also known as the No. 2 Cox's River Stockade), (1832-c.1839)
- Mount Victoria, Hartley (c.1830 – c.1836)
- Hassans Walls, Hartley (1835-c.1839)
- Stoney Range (1832-c.1839)
- Honeysuckle Hill (1832-c. 1839)
- Diamond Swamp (1833 – c.1839)
- Bulls Camp, Woodford (1833-1848)
- Bowens Hollow (1835 -c.1838)
- Mount Clarence (dates not known)
- Blackheath (1844-1849) (Dollin, 2012).

The Mount Victoria stockade site is within the project construction footprint of the Little Hartley surface works. The project tunnels would run beneath a portion of the Blackheath stockade site.

The principal stockade for the road gang for the construction of Victoria Pass was the Mount Victoria stockade, located at the foot of Mount Victoria (sometimes Vittoria), or the "No. 1 Stockade, Mount Victoria/Vittoria". A description by Surveyor William Romaine Govett from 1835 survives:

"The narrow valley between the high ranges of Mount Victoria and Mount York, is noted for being the situation of the first Stockade erected for the use of iron-gangs, and men employed to work in chains upon the roads for punishment. It was situated about half a mile from the Pass, upon a gentle rising ground above the swamp at the bottom. Near the Stockade were the barracks for the soldiers, constables' huts, and a small cottage &c., for the officers; on the opposite side of the swamp was the residence of the commissariat officer, a neat thatched cottage, and a store-house built of logs" (Govett in Casey and Lowe Pty Ltd, 2009:151).

As well as the buildings noted by Govett, contemporary newspaper articles note that the Mount Victoria stockade also had a hospital and cook house, both of which featured in a highway robbery committed by members of the iron-gang. Iron gangs were gangs of convicts who performed hard labour tasks, such as road building, in iron fetters, usually on the legs. It was stated in the report that the hospital had been constructed for the treatment of members of the iron gang. In addition, a hut was mentioned as having been built for the surgeon (The Sydney Gazette and New South Wales Advertiser, 1833:2).

Naturalist George Bennett's account of crossing the Blue Mountains provided the following description of the iron gang at Victoria Pass:

"The iron gang employed upon this pass was just leaving for dinner when we passed, so we availed ourselves of the opportunity to visit the Barracks, to see them mustered, and the messes passed out. The clothes of these men were in bad condition, from the quarry work, in which most of them were employed; but as far as their personal state was concerned, they appeared plump and thriving. The barrack was a temporary stockade, in which the bark huts were situated and around these a barricade was erected, outside which sentinels were stationed" (Bennett, 1834:107).

There are no known images of the stockade, however an artist captured the nearby No. 2 Stockade, Cox's River in 1831, whose inmates were responsible for the construction of the Western Road to Bathurst. Having been established at around the same time, it is likely that the No. 1 Stockade Mount Victoria was of similar appearance. The boundaries and location of the No. 1 Stockade Mount Victoria are discussed in Section 3.3.2.



Figure 3-5 Convict Stockade at Cox's River Crossing near Hartley, c. 1831, author unknown (Source: State Library of New South Wales, File No. FL1792197)

The stockade remained in use until 1833, after which many of the convicts were redistributed to other stockades along the Western Road. It was reopened briefly in 1836 to make repairs to Victoria Pass, then closed permanently.

In 1844, a stockade was built at Blackheath to house convicts working on the new Western Road after the closure of the stockades at Mount Victoria and Woodford. Commanded by Captain Bull of the 99th Regiment, it became the largest stockade in the mountains, covering around 30 acres and containing at least 20 buildings, encompassing areas now occupied by Blackheath Station and the public school (Draft Inventory Sheet, Blackheath Stockade):

"Blackheath stockade occupied an extensive area, with the principal buildings more or less on the line of the present railway and highway between the later Prince George Street and Govett Street. The line of Mitchell's Road in that part of Blackheath lay to the east of the present highway, between the Great Western Highway and Wentworth Street. The stockade lay immediately to the west of the 1840s Bathurst Road" (Blue Mountains City Council, 2016).



Figure 3-6 Detail of plan of Blackheath stockade overlaying a modern map, prepared by J F Campbell of the Royal Australian Historical Society in 1923, showing principal buildings of the stockade and the position of Mitchell's Line of Road (outlined in red)

At its height, the stockade housed around 130 convicts and 40 personnel. A cemetery for the military and convicts was also set aside in the vicinity of modern-day Railway Avenue, Blackheath, however these graves were removed to the present Blackheath cemetery in 1911.

After the military left the area in 1849, the police took over the site (Thorpe in Rod Howard Heritage Conservation Pty Ltd, n.d.:15). The site is now registered as a heritage item and archaeological site with high local significance.

3.1.4 Blackheath

During their crossing of the Blue Mountains in 1813, Blaxland, Wentworth and Lawson are thought to have camped on land that is now part of the village of Blackheath. Now known as the “41-mile tree”, its location is thought to be in the vicinity of the Great Western Highway entrance to the Blackheath Gardens, now known as “the Gardens”, at 267-269 Great Western Highway, Blackheath. It marked 41 miles from Emu Plains (then known as Emu Ford) and was an important location. A stone cairn erected by the Royal Australian Historical Society marks the approximate location of the 41-mile tree; the cairn is made from stone used in the first structure in Blackheath, the “Scotch Thistle” inn (c.1831) (see below).



Figure 3-7 Scotch Thistle Inn, c. 1920 (Source: Rickwood, 2016:59)

On his tour over the Blue Mountains in 1816, Governor Lachlan Macquarie first named the area “Hounslow” after camping at the 41 mile tree, then apparently changed the name on his return journey to Blackheath after observing the type of heath that grew there (Rickwood, 2008). In 1823, Cox’s Road passed through Blackheath, the precise route of that road appears to deviate each side of the existing Great Western Highway.

The first known building in Blackheath appears to have been the “Scotch Thistle Inn”, built by Andrew Gardiner, a former convict and prosperous farmer who was granted 20 acres in 1829 for the express purpose of opening an inn. Opened in 1831, the inn was described as being a substantial single-storey stone structure with a shingled roof (Rickwood, 2008). One of the inn’s more celebrated guests was Charles Darwin, who stayed there in January 1836. He wrote:

“In the evening, we reached The Blackheath... The Blackheath is a very comfortable inn, kept by an old soldier and it reminded me of the small inns in North Wales” (Darwin, 1836).

The original inn stood until 1938, when it was demolished to make way for additions to the modern Gardners Inn (The Sydney Morning Herald, 1939:10). A plaque at Gardners Inn commemorates Darwin’s visit.

In 1846, Colonel Mundy, while accompanying Governor Fitzroy in a journey westward, wrote of his approach to Blackheath:

“Suddenly the highway became as smooth as a bowling green, beautifully macadamized, and our carriages trundled on the nails of their new tire irons into Blackheath, for here resides Captain Bull of the 99th Regiment – a Colossus of roads in his way, as is testified by the great improvements he has wrought upon them to a considerable distance on either side of his station” (Mundy in Campbell, 1923:215).

Following the closure of the Blackheath Stockade in 1849, settlement did not begin in the area until the coming of the railway (see below), which reached Blackheath in 1868. Land began to be sold in 1879, with subdivisions following from the late nineteenth/early twentieth centuries.

By the early 20th century, tourists from Sydney began coming to Blackheath. A 1908 tourist map shows the area south of Evans Lookout Road as the beginning of a signposted walk to Lake Medlow (see Figure 3-8). This walking trail still exists in the landscape and is now known as “B6 Lake Medlow Trail”. It forms the eastern boundary of the Blackheath construction compound.

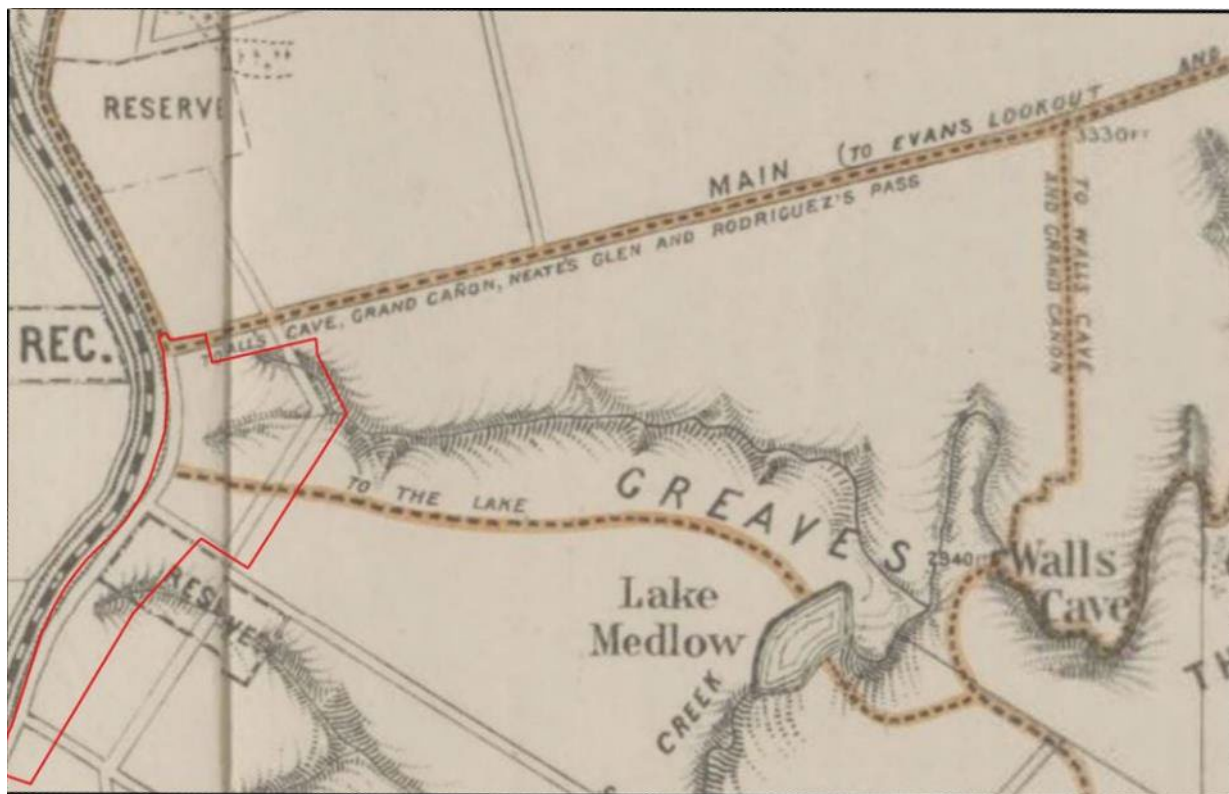


Figure 3-8 Detail of 1908 tourist map of Blackheath published by NSW Department of Lands, showing route of a tourist route to Lake Medlow (Source: State Library of New South Wales, Call Number MAP RM2469).

The area comprising the Blackheath construction footprint would be located within part of area comprising the Greater Blue Mountains Area – Additional Values nomination for the National Heritage List. As can be seen in Figure 3-9, the proposed site of the Blackheath construction footprint was, during the last century, cleared of bushland and contained several houses, with several informal tracks traversing the area. While the bushland has since regenerated, many of the tracks remain.

The Blackheath construction footprint would be located land that formed part of a parcel of land dedicated as the Blue Mountains National Park on 25 September 1959 (McMahon, 1959:2953). The land affected by the construction footprint was revoked from the National Park by Act of Parliament in August 2022.



Figure 3-9 Land south of Evans Lookout Road with indicative location of Blackheath construction footprint circled in red, c. 1958 (Source: Historical Imagery Viewer)

3.1.5 Soldiers Pinch

This disused section of the main western road between Blackheath and Mount Victoria has been known as “Soldiers Pinch” since at least 1839, when it was described by a traveller:

In one place we came to an almost precipitous descent in the road, called “Soldier’s Pinch” or “Pitch”, most probably from some accident which happened there.

(Louisa Anne Meredith in Rickwood, 2017:35)

Meredith described the road in 1839 as “a mass of loose stones, continually rolling from under the horse’s feet” and that it was “...so steep as to be very fatiguing even to walk down...” (Meredith in Rickwood, 2017:38).



Figure 3-10 “Bathurst Road from Soldiers Pinch”, Conrad Martens, c. 1840 (Source: National Library of Australia, Call No. PIC Solander Box A4 #R4459)

Despite some researchers connecting the original Soldiers Pinch section of road with Cox’s 1814 road, it is more likely that it was part of Mitchell’s new road to Bathurst (see Figure 3-11).

Owing to its grade and hazardous condition, the road was subsequently realigned by Mitchell in 1845, and works carried out by Captain Bull’s Blackheath iron gang in 1847 (Karskens, 1988b:51). In 2002, the sharp turn characterising the Great Western Highway at Soldiers Pinch was bypassed by a new line of road, which remains in use today (see Figure 3-12).

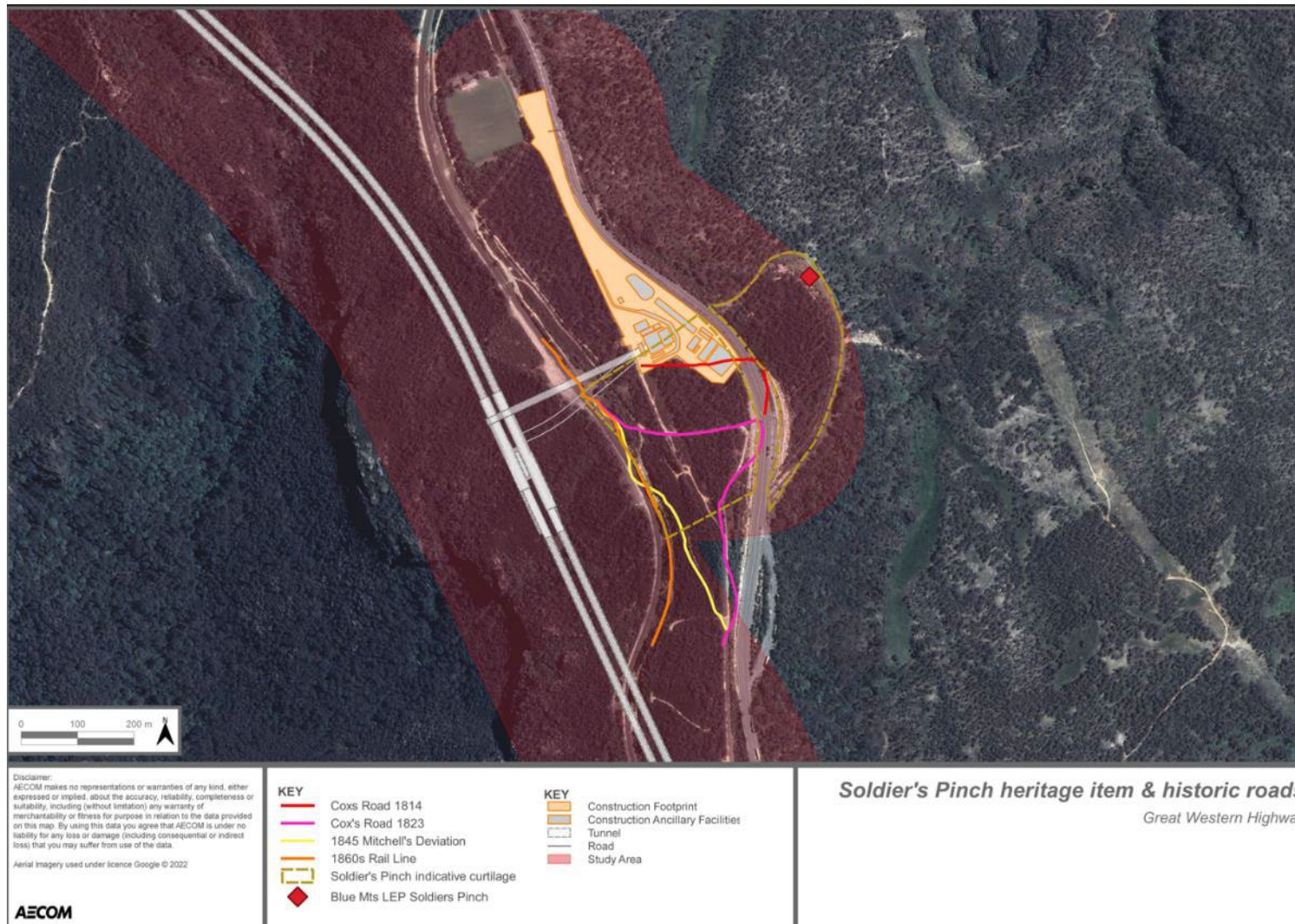


Figure 3-11 Soldiers Pinch, showing Cox's Roads, Mitchell's Western Road and later realignment



There are several versions of how the road came by its name. In 1841, Mrs Sophia Stranger wrote that it was because a soldier had been asked to “block the wheel” of a cart, put his foot instead of a stone behind the wheel, and had it crushed (Stringer in Rickwood, 2017:36). By 1848, this story had expanded:

A soldier – more probably someone known by the nick-name of The Soldier – was travelling with a heavily laden dray; in going up that pinch – an ugly one it is too – the driver requested him “to block up”; the poor man having no block to block up with, he put his foot behind the wheel, which immediately pinched it clean off...

(Anonymous in Rickwood, 2017:36)

Alternatively, it is suggested that the “pinch” probably refers to a geological feature, such as a hill, or steep section of road (Rickwood, 2017:36).

3.1.6 Mount Victoria

Mount Victoria was originally marked as “One Tree Hill” by Blaxland, Wentworth and Lawson in the mapping of their 1813 journey. Sir Thomas Mitchell, when working on Victoria Pass, named the mountain and the pass “Victoria”, “...named by me after the youthful Princess” (Mitchell, 1839).

By the 1840s, the area began to be called “Mount Victoria”, although both “Vittoria” and “Victoria” were used over the ensuing decades, including in official documentation. Interestingly, when the announcement of the extension of the Great Western Railway to Mount Victoria was reported, the name “One Tree Hill” was included in brackets, indicating that the village was still known locally by that name (Empire, 1868:5).

The earliest buildings in Mount Victoria were the Toll House and Welcome Inn. The Toll House was constructed in c.1849 to collect tolls from road users. George Sheppeard was the lessee of the Toll House and also constructed the adjacent Welcome Inn and store. The Toll House still survives however the Welcome Inn and store are an archaeological site within the curtilage of Karawatha House.

The first post office was opened in 1866, known as One Tree Hill Post Office (changed to “Mount Victoria” in 1876). The Church of England and the Grand Hotel (formerly Mount Victoria Manor, built by the Fairfax family) are also still extant, both dating from the 1870s and therefore postdating the railway. A hut that served as a school once stood where the imposing Hotel Imperial now stands but was demolished in 1877 to make way for the hotel. The current school dates from c.1877.

3.1.7 Little Hartley

Little Hartley comprises a series of widely spaced buildings stretching along both sides of the Great Western Highway at the foot of Victoria Pass. Passing through Little Hartley in 1862, the Reverend John Dunmore Lang observed:

“Hartley lies like a wounded snake along the highway – all length, and no breadth or thickness. There is, as usual in such cases, a “Little Hartley”, before the great one has been properly developed – like the snake’s head or tail, which some stockman has struck off with his whip, and left lying at some distance from the body” (Lang, 1862:3).

Many of the early buildings along the highway at Little Hartley started as inns, constructed to capitalise on the needs of travellers for refreshment, both for themselves and for their animals, either before or after traversing Victoria Pass.

3.1.8 Historic inns and gatehouses

The construction of Cox's Road, roads through the mountains and, later, the highway, spurred development in the area in the form of inns and accommodation for travellers along the route westward to Bathurst. Townships often followed these inns at sites such as Weatherboard (Wentworth Falls), Blackheath, Mount Victoria, and Little Hartley. The Weatherboard Inn was one such site which served as a staging post in the area currently called Pitt Park. Macquarie stayed there in 1815 and it became well known in the area, initially as The Weatherboard Hut and eventually just as "Weatherboard". The land was originally owned by John Mills and consisted of one hundred acres. It had several owners from 1829 onwards when Mills sold it to settle some debts. It was eventually closed in the 1860s, most likely due to the arrival of the railway reducing foot traffic in the area (Thorp, 1985:10). The area around the inn was used as a military depot and gradually became more populated between 1820 and 1840 (Blue Mountains City Council, 2004:4). The site of the inn is listed on the Blue Mountains LEP (Weatherboard Inn Archaeological Site, MV067).

Little Hartley was similarly formed around popular travellers' inns such as the Golden Fleece Inn at the foot of Mount York and the Royal Garter Inn (currently Billsdene Grange – listed on the Blue Mountains LEP, I023). However, this development was more sprawling rather than clustered and took the form of an elongated hamlet along the Great Western Highway in the 1830s. Other inns began to populate the area such as the Royal Garter Inn (LEP I028) in 1832, the Plough Inn in 1839 (see Section 3.3.3), the Victoria Inn (now Rosedale – LEP I022) in 1839, the Rose Inn (now Ambergmere – LEP I022) in the 1840s, Joseph Collit's Inn in 1846, which became the Edward Field's Hotel (Jacobs & Transport for NSW, 2021:240), and the Farriers Arms (now Nioka – LEP I025) in 1856. Of these, only the site of the Plough Inn, Rosedale and Nioka are within proximity of the project construction footprint (less than 60 metres).



Figure 3-13 Rosedale, formerly the Victoria Inn, 1978 (Source: Department of Agriculture, Water and the Environment Photo database, barcode rt33397)



Figure 3-14 Edward Field's Hotel (originally Joseph Colli's Inn 1846), Little Hartley (Source: Mitchell Library, State Library of New South Wales, IE Number IE242857)

3.2 Statutory listings

A search of the Australian Heritage Database (World, National and Commonwealth heritage), the State Heritage Register (State heritage), the Lithgow and Blue Mountains LEPs (local heritage) and the State Heritage Inventory (items on the s170 heritage lists) was carried out on 25 July 2022. The search was based on a study area measuring 200 metres from:

- the boundary of the project construction footprint
- the outer edge of the project tunnels.

The search identified 44 listings covering 43 individual heritage items or heritage conservation areas. The Victoria Pass heritage item is listed under both the Lithgow LEP and the Blue Mountains LEP. Identified heritage items and heritage conservation areas are listed in Table 3-2 and shown relative to the project in Figure 3-15 to Figure 3-21.

Table 3-2 lists the individual heritage items and heritage conservation areas identified through the search, their listing details and proximity to project construction sites or the project tunnels. It also identifies whether each item or area would be located:

- within part of the project construction footprint and therefore may experience direct project impacts
- within 60 metres of the project construction footprint, being the distance within which vibration from construction activities may affect a heritage structure (based on Appendix G – Technical report – Noise and vibration of the EIS).

Only two heritage items or heritage listing nominations were identified within the project construction footprint:

- the Greater Blue Mountain Area (Additional Areas) nomination for the National Heritage List covers most of the land within the Blackheath construction footprint, and a small area of land within the Soldiers Pinch construction footprint (refer to Figure 3-15 and Figure 3-18, respectively)
- part of the curtilage around the Soldiers Pinch heritage item (Blue Mountains LEP, MV009) overlaps with the Soldiers Pinch construction footprint (refer to Figure 3-18).

No listed heritage items or heritage conservation areas were identified within the Little Hartley construction footprint, although areas of archaeological potential may occur on this land (refer to Section 3.3). The Rosedale and Nioka heritage items (Lithgow LEP, I024 and I025, respectively) were identified outside, but in proximity to, the Little Hartley construction footprint.

Most of the identified heritage items and heritage conservation areas were identified in relation the project tunnels. These items and areas would not be directly affected by the project, but may be subject to indirect impacts during construction in some cases (refer to Section 4.2).

Table 3-2 Statutory listings within 200 metres of the project construction footprint or tunnel alignment

Heritage item	Address	Heritage list and identifier	Blackheath construction footprint			Soldiers Pinch construction footprint			Little Hartley construction footprint			Tunnel alignment	
			Within footprint	≤60m	>60-≤200m	Within footprint	≤60m	>60-≤200m	Within footprint	≤60m	>60-≤200m	≤60m	>60-≤200m
Greater Blue Mountains Area	Katoomba, NSW	World Heritage List, National Heritage List		●			●						
Greater Blue Mountains Area – Additional Values	Katoomba	Nominated Place – National Heritage List	●	●		●	●						
Soldiers Pinch	Near Great Western Highway, Blackheath/Mount Victoria	Blue Mountains LEP, MV009				●	●						
Rosedale	Great Western Highway, Little Hartley	Lithgow LEP, I024								●			
Nioka	2209 Great Western Highway, Little Hartley	Lithgow LEP, I025								●			
Blackheath Stockade and the Western Road – archaeological sites	Blackheath	Blue Mountains LEP, BH034										●	
Lookout Hill Heritage Conservation Area	Blackheath	Blue Mountains LEP, BH215										●	
Thornington and Gardens	8-12 Staveley Parade, Blackheath	Blue Mountains LEP, BH083											●
St Mounts	1A and 3 Abbott Street and 194-196 Great Western Highway, Blackheath	Blue Mountains LEP, BH052										●	

Heritage item	Address	Heritage list and identifier	Blackheath construction footprint			Soldiers Pinch construction footprint			Little Hartley construction footprint			Tunnel alignment	
			Within footprint	≤60m	>60-≤200m	Within footprint	≤60m	>60-≤200m	Within footprint	≤60m	>60-≤200m	≤60m	>60-≤200m
Gwandoban	24 Lookout Street, Blackheath	Blue Mountains LEP, BH096											●
Blackheath West Heritage Conservation Area	Blackheath	Blue Mountains LEP, BH214										●	
Blackheath Public School and certain interiors	1A Leichhardt Street, Blackheath	Blue Mountains LEP, BH033											●
Former teacher's residence	207 Great Western Highway, Blackheath	Blue Mountains LEP, BH161											●
Norwood	209 Great Western Highway, Blackheath	Blue Mountains LEP, BH056											●
Horse trough	Great Western Highway	Blue Mountains LEP, BH134											●
Kerry's Service Station and Interiors (IGA)	211 Great Western Highway, Blackheath	Blue Mountains LEP, BH162											●
Kia Ora	213 Great Western Highway, Blackheath	Blue Mountains LEP, BH163											●
Garage building and interior	215 Great Western Highway, Blackheath	Blue Mountains LEP, BH164											●
Inter war bungalow	217-221 Great Western Highway, Blackheath	Blue Mountains LEP, BH165											●
Baptist Church	6 Bundarra Street, Blackheath	Blue Mountains LEP, BH040											●

Heritage item	Address	Heritage list and identifier	Blackheath construction footprint			Soldiers Pinch construction footprint			Little Hartley construction footprint			Tunnel alignment	
			Within footprint	≤60m	>60-≤200m	Within footprint	≤60m	>60-≤200m	Within footprint	≤60m	>60-≤200m	≤60m	>60-≤200m
Guinness Lodge/Evanville	1-5 Waragil Street, Blackheath	Blue Mountains LEP, BH059										●	
Dover Hall and interiors	124 Station Street, Blackheath	Blue Mountains LEP, BH192											●
Cottage	1 Haviland Avenue, Blackheath	Blue Mountains LEP, BH175											●
Weatherboard semi-detached cottage	3 Haviland Avenue, Blackheath	Blue Mountains LEP, BH074											●
Semi-detached cottage	5-7 Haviland Avenue, Blackheath	Blue Mountains LEP, BH176											●
Braemar	132 Station Street, Blackheath	Blue Mountains LEP, BH075											●
Group of cottages	8-14 Railway Avenue, Blackheath	Blue Mountains LEP BH191											●
Tree Tops and garden	16 Clyde Avenue, Blackheath	Blue Mountains LEP BH065										●	
Brick cottage	18 Waragil Street, Blackheath	Blue Mountains LEP BH193											●
Ban Tigh, Brewery site and Garden	26-34 Waragil Street, Blackheath	Blue Mountains LEP BH060										●	
Osborne Cottage (site only)	52-106 Thirroul Avenue, Blackheath	Blue Mountains LEP, BH039										●	

Heritage item	Address	Heritage list and identifier	Blackheath construction footprint			Soldiers Pinch construction footprint			Little Hartley construction footprint			Tunnel alignment	
			Within footprint	≤60m	>60-≤200m	Within footprint	≤60m	>60-≤200m	Within footprint	≤60m	>60-≤200m	≤60m	>60-≤200m
Magellan	18-20 Ada Road, Blackheath	Blue Mountains LEP, BH068											●
Majorca	22-24 Ada Road, Blackheath	Blue Mountains LEP, BH069											●
Montana	37 Ada Road, Blackheath	Blue Mountains LEP, BH071										●	
Currong	13-15 Ada Road, Blackheath	Blue Mountains LEP, BH066											●
Trig Station (MV001)	5-9 Apex Avenue, Blackheath	Blue Mountains LEP, MV001											●
Central Mount Victoria Heritage Conservation Area	Mount Victoria	Blue Mountains LEP, MV023										●	
Fermoy	39-43 Victoria Street, Mount Victoria	Blue Mountains LEP, MV050											●
Mount Victoria Public School and certain interiors	105-107 Great Western Highway, Mount Victoria	Blue Mountains LEP, MV014											●
Post war fibro duplex	19 Kanimbla Valley Road, Mount Victoria	Blue Mountains LEP, MV076											●
Mitchell's Ridge Monument Reserve	Great Western Highway, Mount Victoria	Blue Mountains LEP, MV015										●	

Heritage item	Address	Heritage list and identifier	Blackheath construction footprint			Soldiers Pinch construction footprint			Little Hartley construction footprint			Tunnel alignment	
			Within footprint	≤60m	>60-≤200m	Within footprint	≤60m	>60-≤200m	Within footprint	≤60m	>60-≤200m	≤60m	>60-≤200m
Victoria Pass	Great Western Highway, Mount Victoria	Blue Mountains LEP, MV087, Lithgow LEP, A183										●	●
Berghofer's Pass	Berghofer Drive and 2-4 Great Western Highway, Mount Victoria	Blue Mountains LEP, MY001										●	●

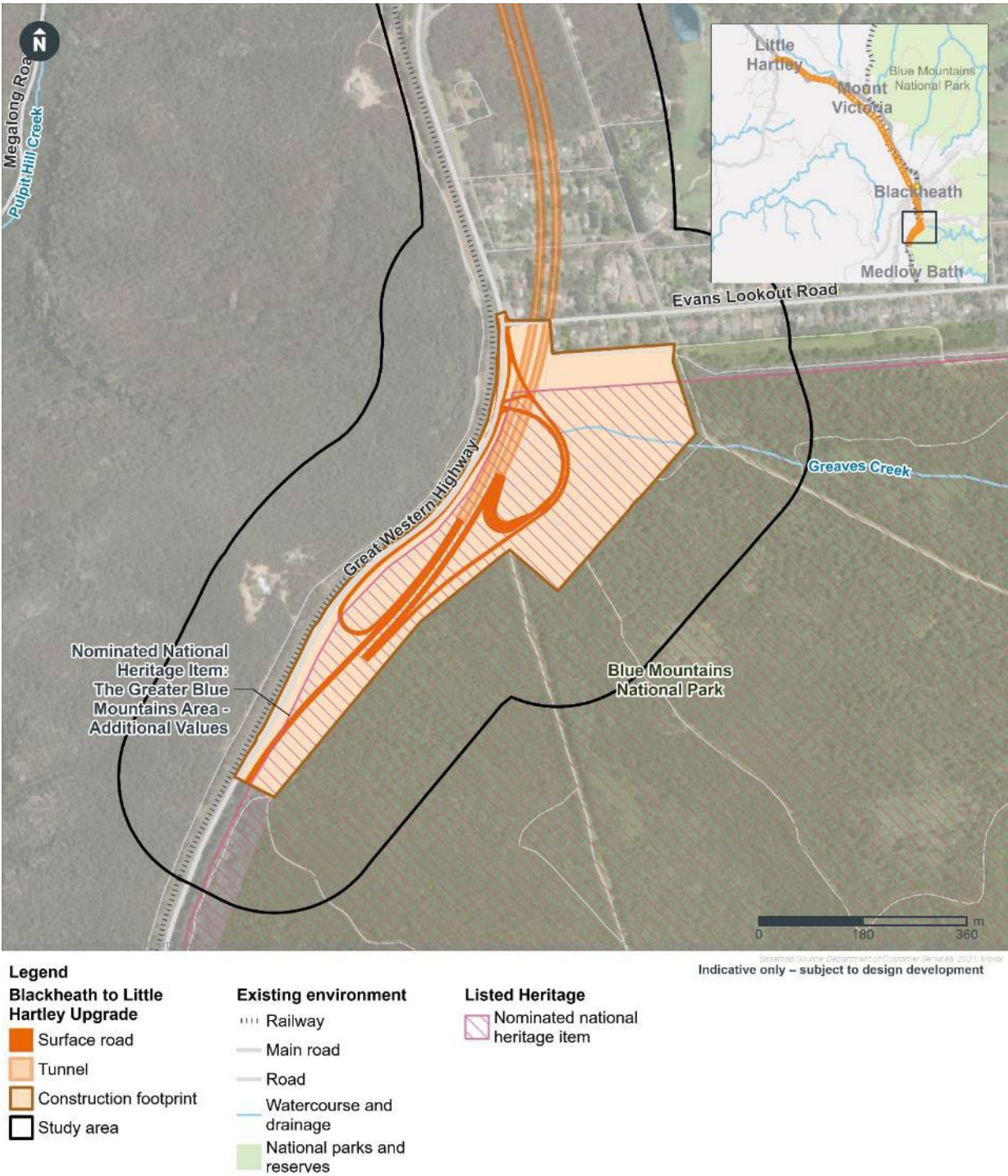


Figure 3-15 Heritage items and conservation areas on statutory lists (map 1 of 7)

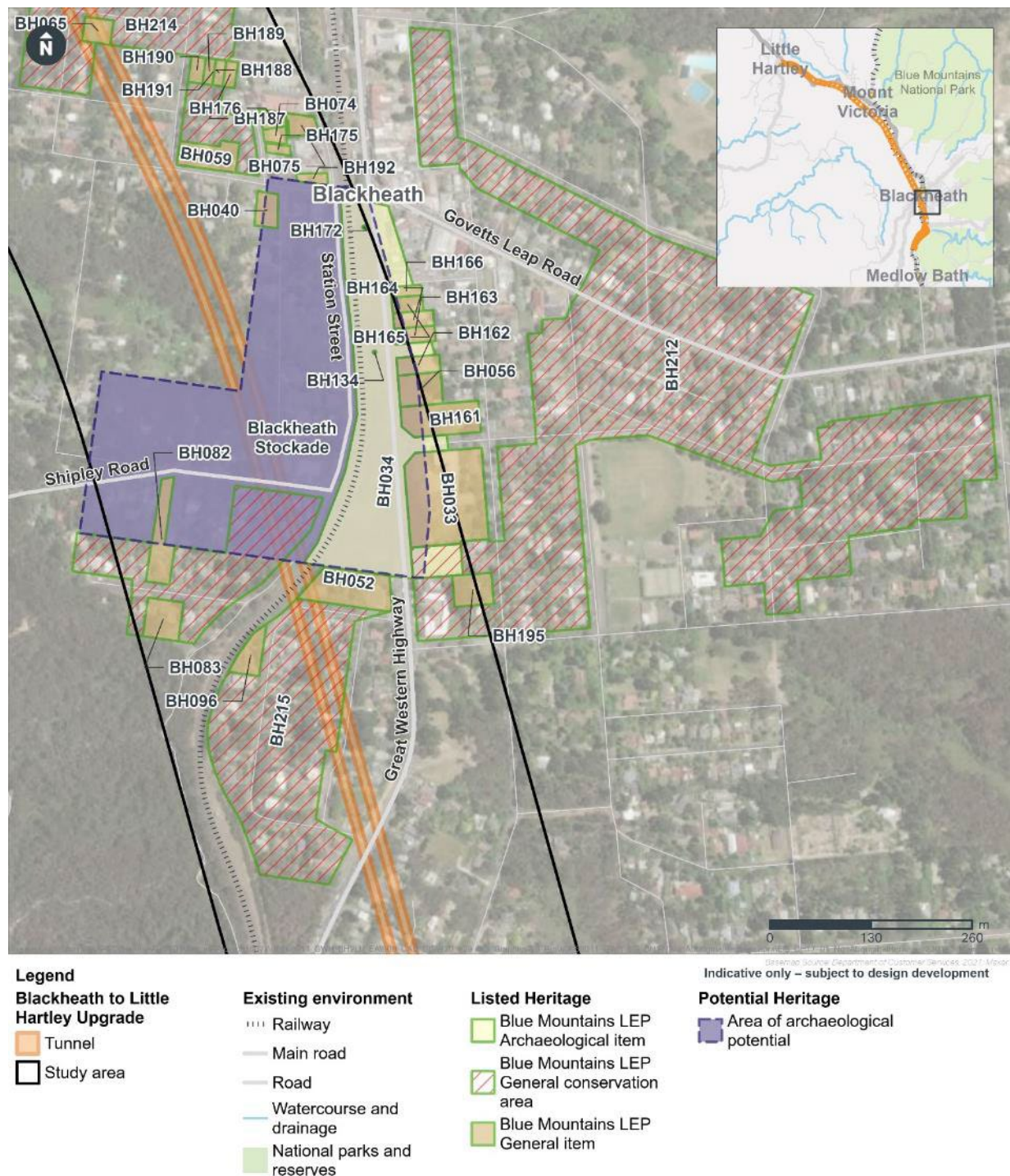


Figure 3-16 Heritage items and conservation areas on statutory lists (map 2 of 7)

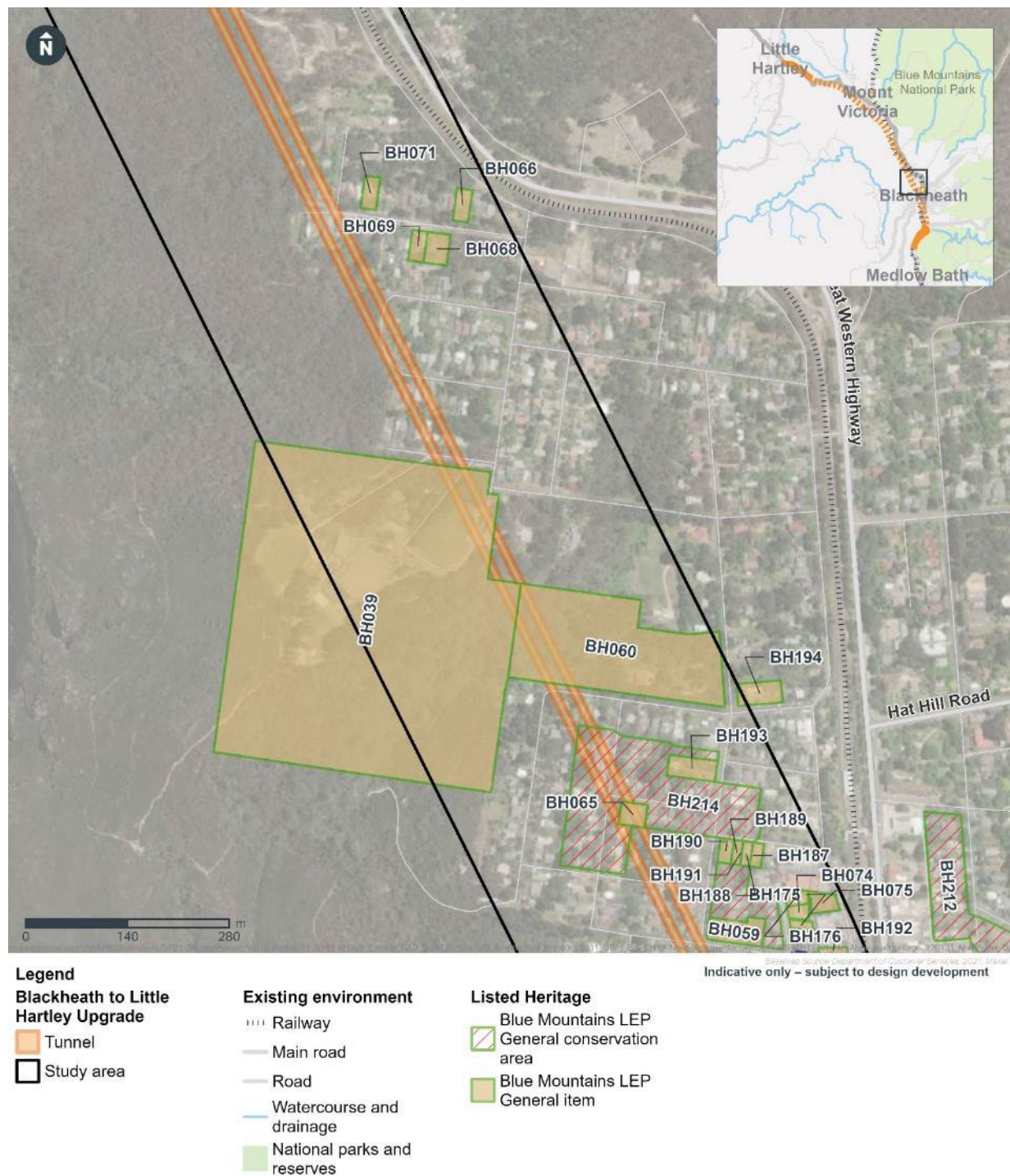


Figure 3-17 Heritage items and conservation areas on statutory lists (map 3 of 7)

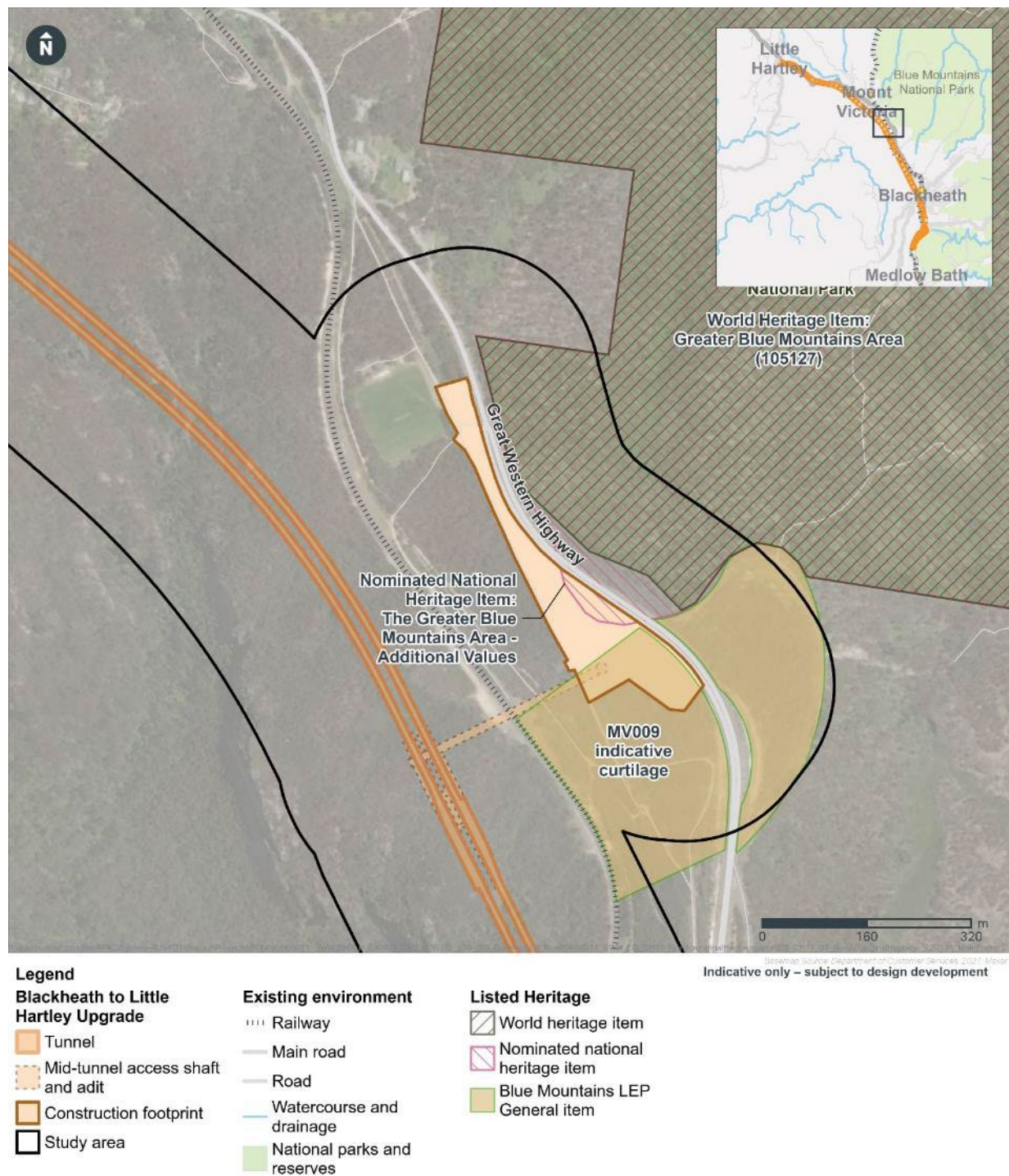


Figure 3-18 Heritage items and conservation areas on statutory lists (map 4 of 7)

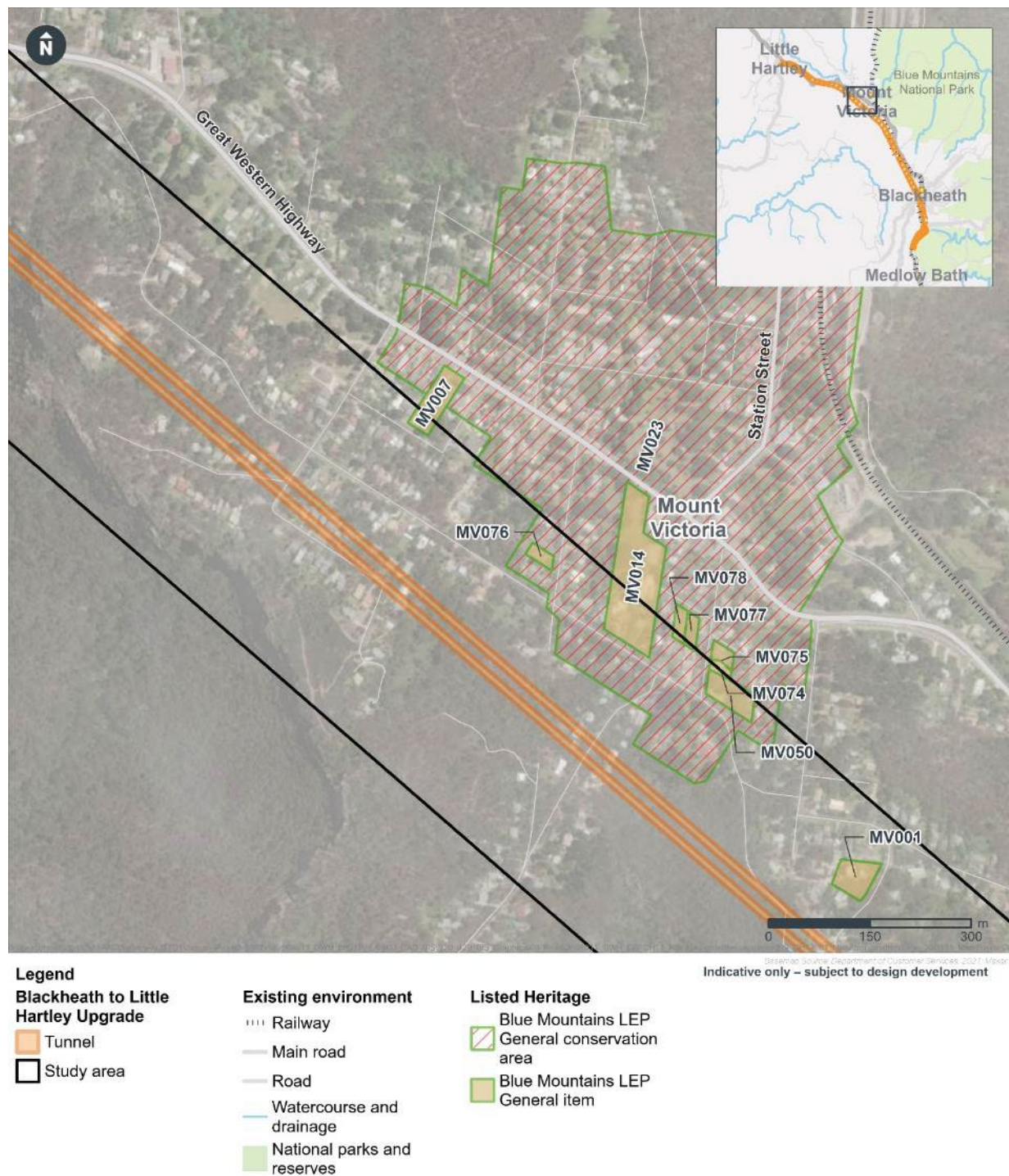


Figure 3-19 Heritage items and conservation areas on statutory lists (map 5 of 7)

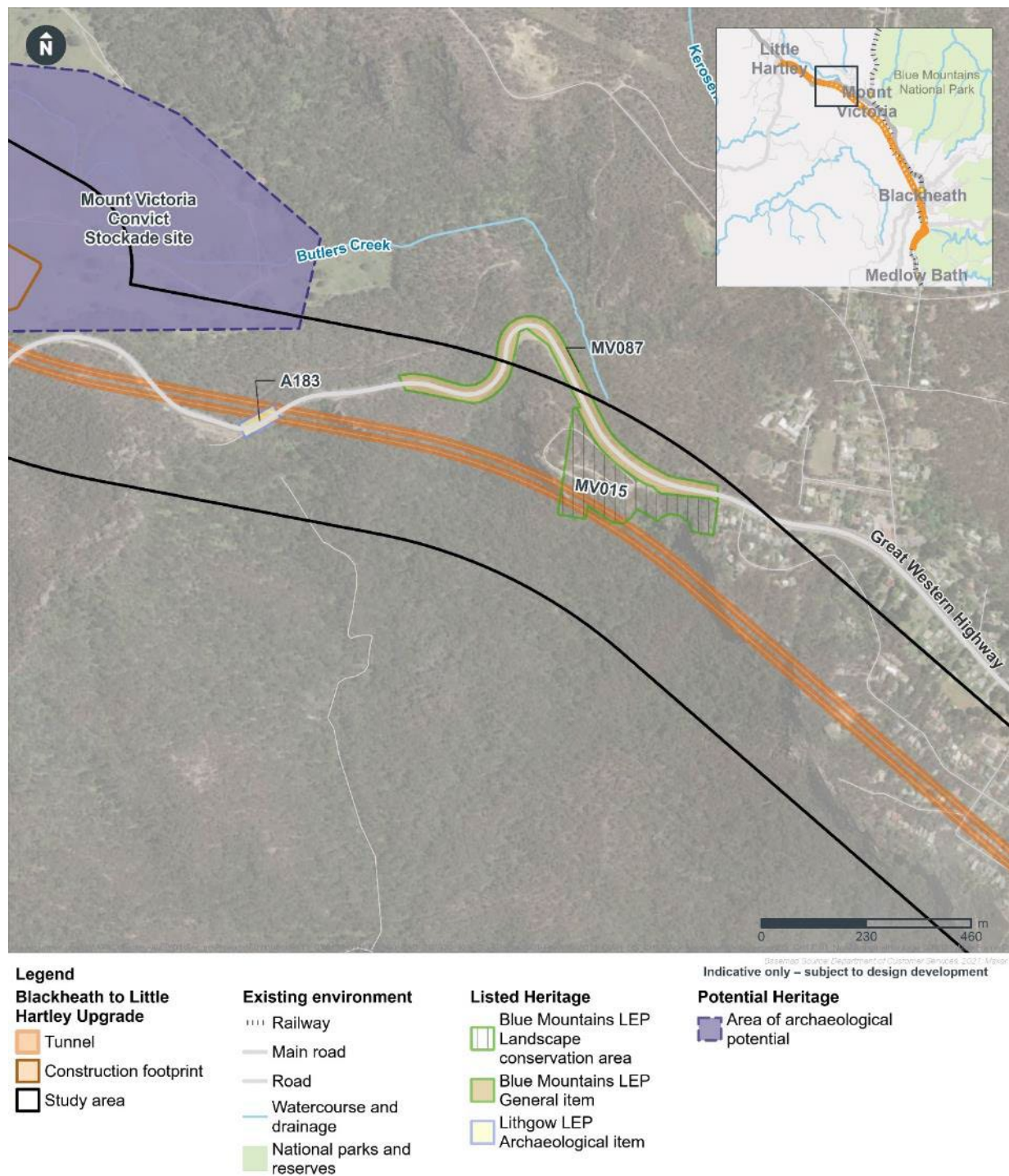


Figure 3-20 Heritage items and conservation areas on statutory lists (map 6 of 7)

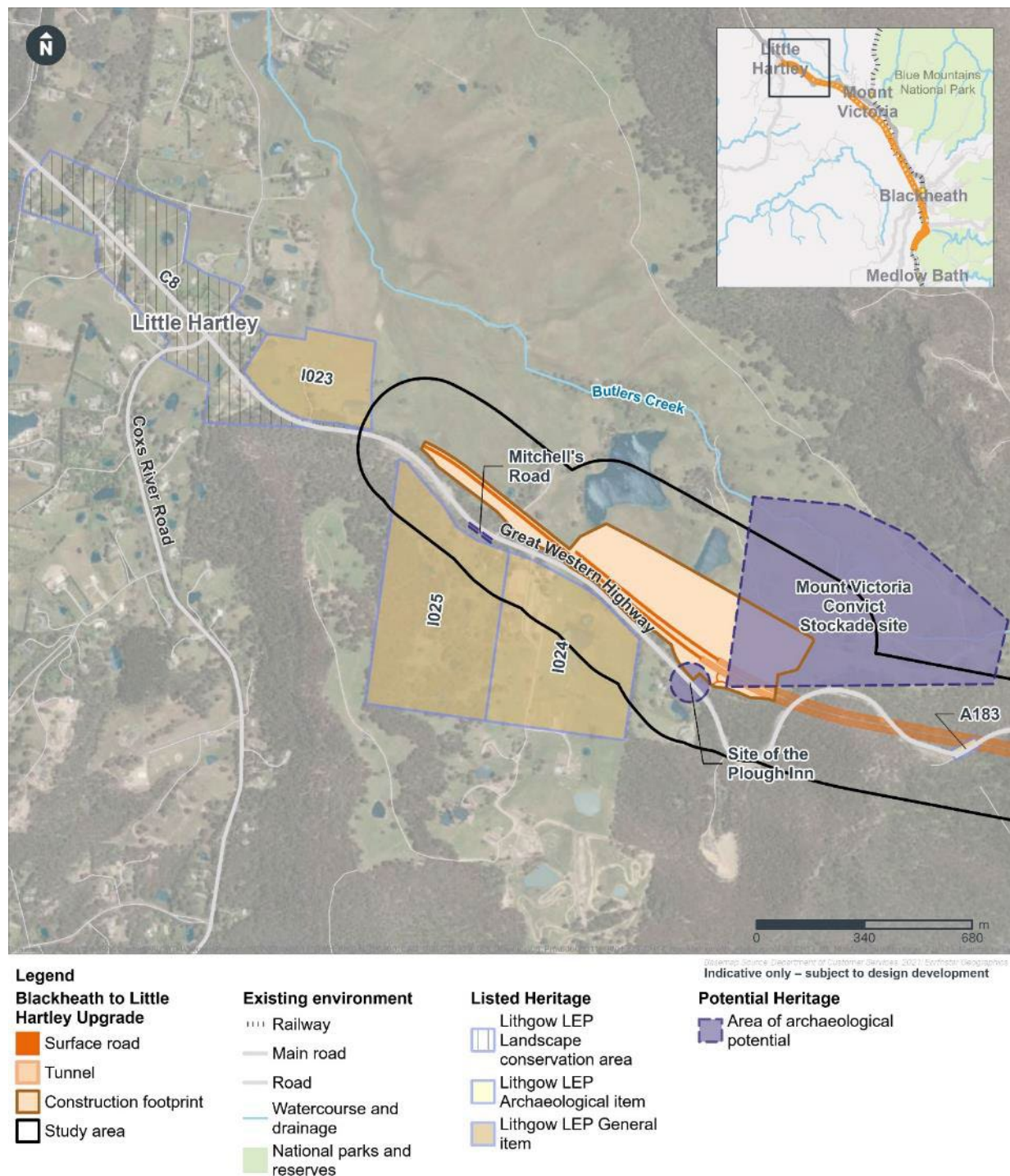


Figure 3-21 Heritage items and conservation areas on statutory lists (map 7 of 7)

3.3 Archaeological potential

In addition to heritage items and heritage conservation areas included on or nominated for inclusion on statutory lists, two areas of known archaeological potential have been identified within the study area:

- Blackheath Stockade (also listed on the Blue Mountains LEP as a locally significant heritage item (BH034)) (refer to Figure 3-16), located above and adjacent to the project tunnels. The project tunnels would be around 60 metres below the ground surface in this location
- Mount Victoria Stockade (refer to Figure 3-21), located partly within the Little Hartley construction footprint. As discussed in Section 3.3.2, if present, archaeological remains within the stockade site would be considered to be of State significance (although there is not currently a statutory listing to this effect).

A further two sites within the study area have also been identified as having archaeological potential:

- the Plough Inn site (refer to Figure 3-21), located across the boundary of the Little Hartley construction footprint
- original sections of Mitchell's Road (refer to Figure 3-21), located outside but in proximity to the Little Hartley construction footprint.

Each of these areas of archaeological potential are discussed further below.

3.3.1 Blackheath Stockade

Discussion of the history of stockades, including the Blackheath Stockade, is provided in Section 3.1.3. The site dates from 1844, and was built to house convicts working on the new Western Road. It became the largest stockade in the mountains with an area of 30 acres and including at least 20 buildings. It has high local significance.

The area of archaeological potential associated with the Blackheath Stockade site is shown relative to the project in Figure 3-22. The project tunnels would be located around 60 metres below ground as they pass beneath the Blackheath Stockade site.

3.3.2 Mount Victoria Stockade

The Mount Victoria Stockade site would overlap with part of the Little Hartley construction footprint. The area of archaeological potential, and important areas within it including the site of the Stockade Commissariat Building, are shown in Figure 3-23.

As noted in **Section 3.1.3**, the Mount Victoria Stockade (also known as the "No. 1 Stockade, Mount Vitoria/Victoria") was constructed in the early 1830s to house iron gangs engaged in the construction of Victoria Pass. Most historical information comes from Surveyor William Romaine Govett, writing in 1836, who visited the stockade during his surveys. He also visited Mount Walker Stockade, and as noted by Casey & Lowe, some of his observations related to that stockade (Casey and Lowe Pty Ltd, 2009:153). It should be noted that owing to access restrictions, this site has not been inspected as part of this assessment and the accuracy of previous research is therefore relied on by the authors.

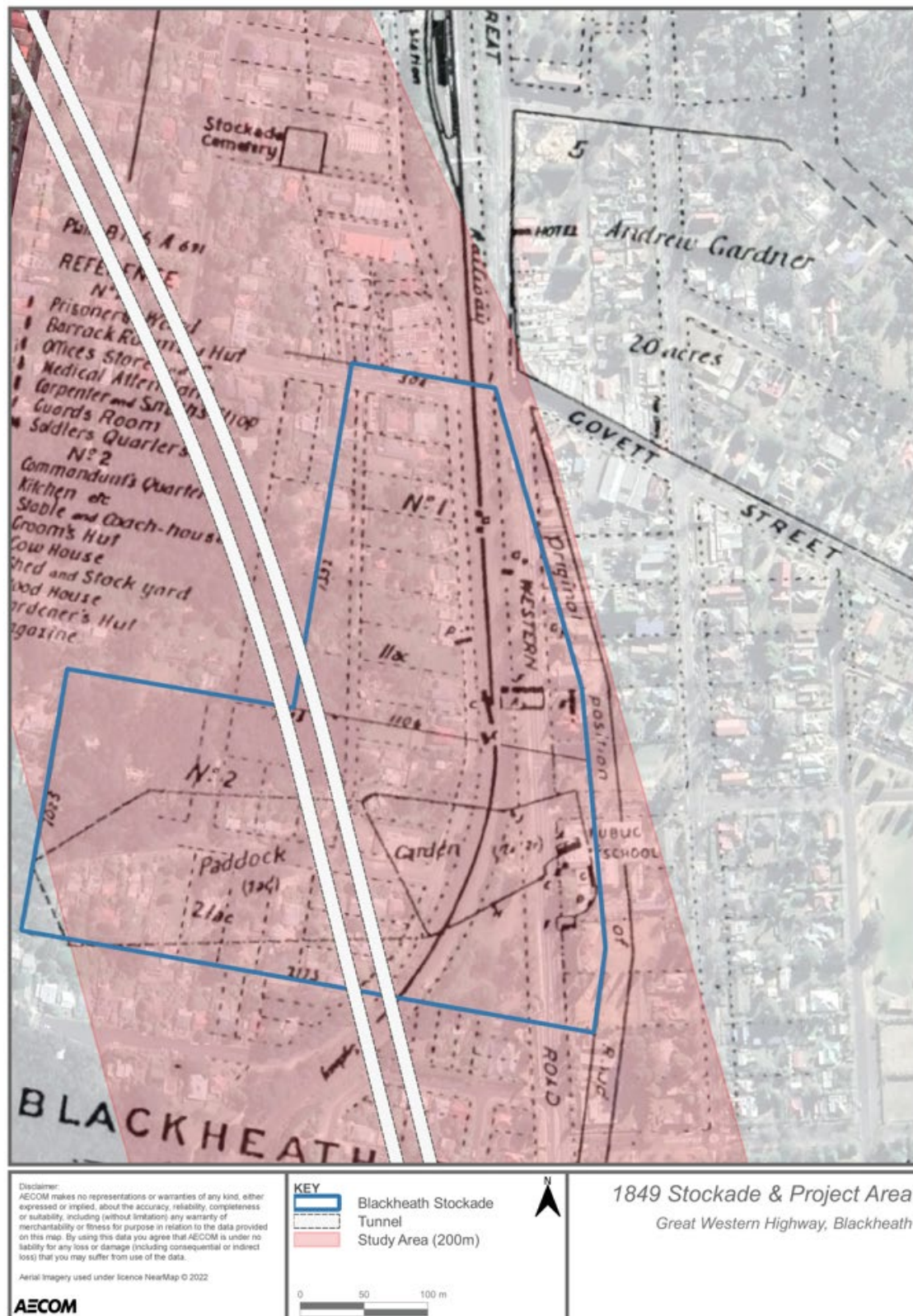


Figure 3-22 Area of archaeological potential – Blackheath Stockade site

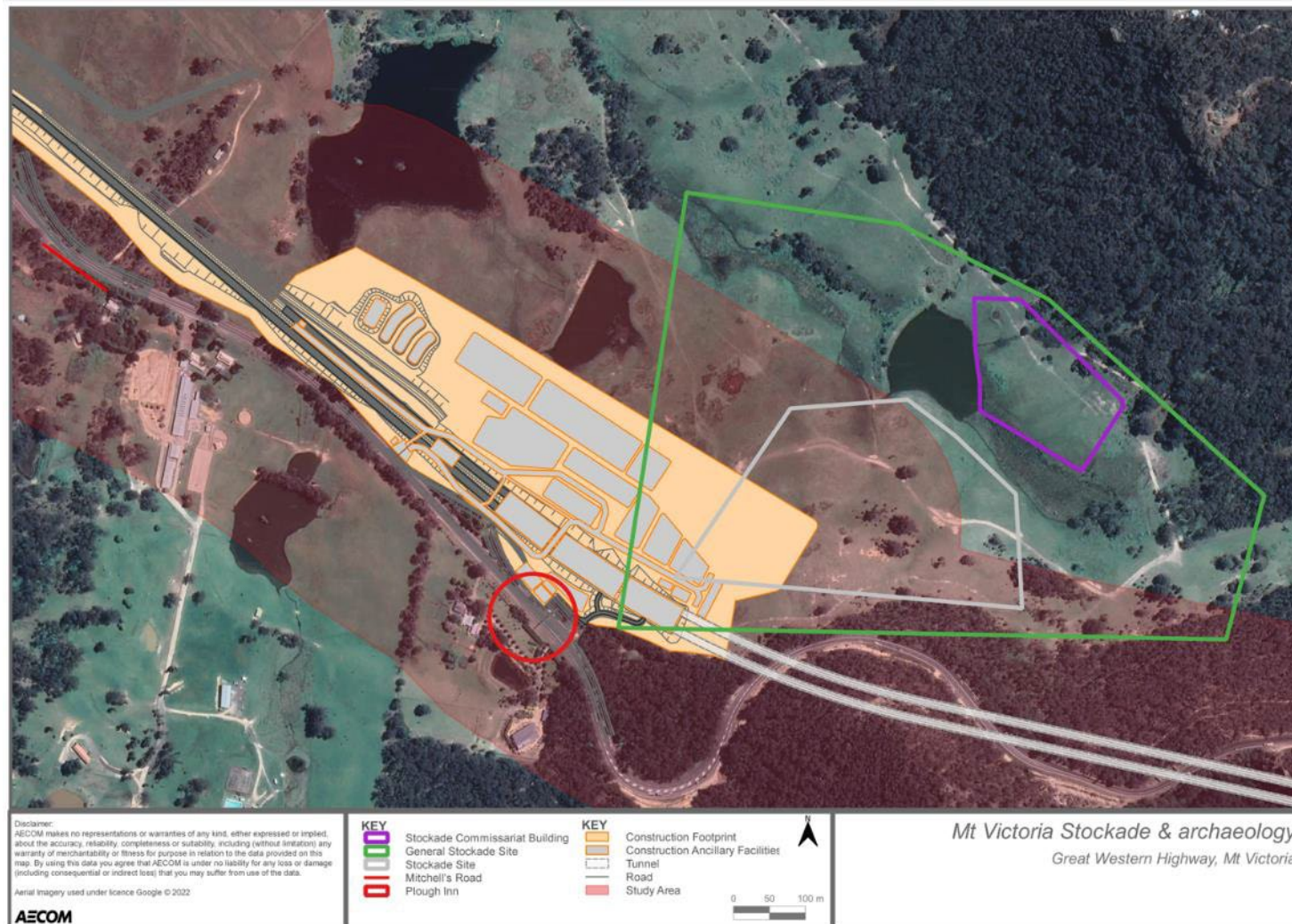


Figure 3-23 Areas of archaeological potential – Mount Victoria Stockade, Plough Inn, Mitchell's Road

In 1981 after fossicking at the Mount Walker stockade site, local researcher Ollie Leckbandt set out to locate the Mount Victoria Stockade site. Local resident and associate of Leckbandt, Tom Skeene, read Govett's description and together they identified the site near Butlers Creek at the foot of Mount Victoria by following a bridle track mentioned by Govett. The site contained three large mounds, containing rough sandstone blocks which they interpreted as the remains of chimneys from timber slab buildings, and depressions that were interpreted as the foundations of timber huts. Using a metal detector, various metal objects were located and excavated, with several surface finds removed from the site (Leckbandt, 1999:83-85).

In 1999, a non-Aboriginal archaeological assessment was carried out by Siobhan Lavelle as part of MUSEcape's assessment of the Great Western Highway Upgrade at Little Hartley. The location and significance of the Mount Victoria Stockade site was assessed, with a sketch of the site in 1999 (refer to Figure 3-24) completed by Mr. Brian Myers, a photogrammetry officer with the then Roads and Traffic Authority (RTA) ((MUSEcape Pty Ltd, 1999)).

In 2009, the site was again inspected by Casey & Lowe as part of their non-Aboriginal heritage assessment of corridor options for the Great Western Highway. The mounds described by Leckbandt were still there, although Casey & Lowe noted that the owner at the time, Mrs Osterberg-Olsen, claimed these were the rubble of an old gardener's house that had been knocked down by her brother-in-law. It was suggested that perhaps the gardener's cottage was built from reused stones from the stockade (Casey and Lowe Pty Ltd, 2009:151).

As a result of the previous investigations and Casey & Lowe's site inspection, the following was noted regarding the site and its potential archaeological features (Casey and Lowe Pty Ltd, 2009:153):

- the stockade is located on rising ground above the swamp (now Butlers Creek)
- there was a large stockade fence 15 feet (c.5 metres) high, possibly with two large gates and a ditch around the outside. Inside the fence were:
- an outer square of bark-clad huts for the convicts
- central square used for various activities
- cook house, tool house, overseer's house and blacksmiths' shops
- there were two rows of soldiers' barracks situated at the front gates to the stockade, possibly to the down slope to the north or to the west where there is some evidence of terracing
- constables' huts
- small cottage for officers
- hospital
- food preparation area – cooks shed, butchers' and bakers' huts.

On the opposite side of Butlers Creek were:

- residence for the commissariat officer – possibly the "neat, thatched cottage"
- storehouse built of logs containing government rations
- bridge across the swamp
- wells.

In addition, there may have been a bridle path commencing near the junction of Cox's Road and Mitchells Road at the top of the mountain.

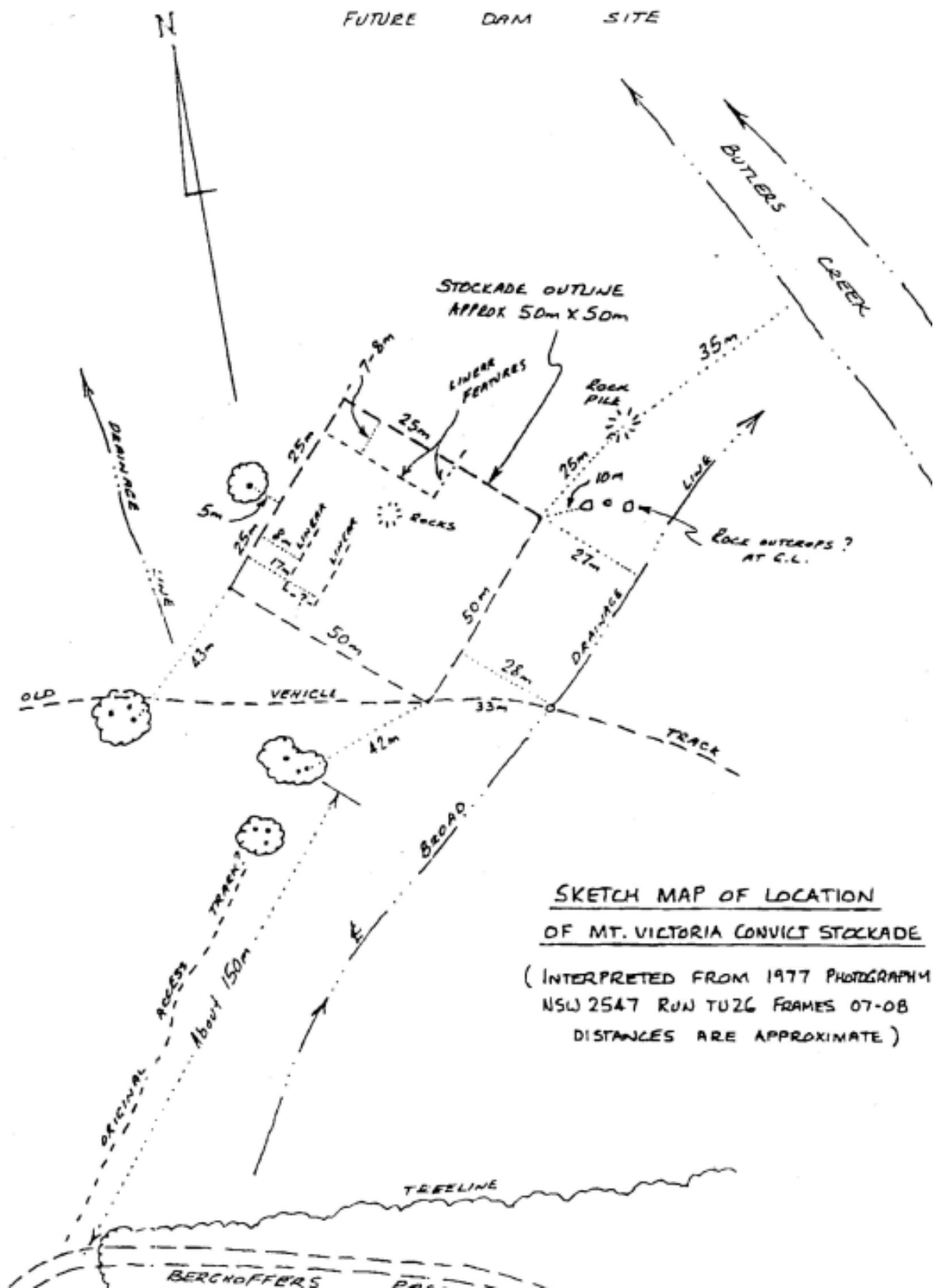


Figure 3-24: Sketch plan of Mount Victoria Stockade site, c. 1999 (Source: MUSEcape, 1999, Appendix A to Appendix 4.1)

Given the descriptions of the site and its archaeological potential, Casey & Lowe prepared a curtilage diagram that they believe would encapsulate all potential archaeological features associated with the stockade site. As shown in Figure 3-23, the area of archaeological potential (indicated in white) overlaps with the north east corner of the Little Hartley construction footprint, as does the broader Mount Victoria Stockade site (indicated in green).

Although disturbed, the site has never been subjected to detailed archaeological investigation. The site therefore retains the potential to yield information regarding the layout of the stockade, artefacts evidencing the use of the stockade by both convicts and the military and the site's overall use during the construction of Victoria Pass. The removal of some surface and subsurface material by Leckbandt has disturbed the site but are not thought to have been extensive enough to obscure the archaeological evidence that the site may still hold. If present, the archaeological remains associated with this stockade site would be considered to be of State significance.

3.3.3 Plough Inn, c.1837

This potential archaeological site is located on the northern side of the Great Western Highway at the foot of Victoria Pass. Little is known of the inn or its precise location, however its historical descriptions potentially place it across the boundary of the Little Hartley construction footprint (refer to Figure 3-23).

Andrew Gardner, who built the first structure in Blackheath (the “Scotch Thistle Inn”) was one of the early entrepreneurs who spotted the business potential following the opening of Victoria Pass and was awarded a liquor licence in 1837. His inn, “The Plough Inn”, was in operation by 1839. A newspaper report in August 1839 states:

“At the bottom of Mount Victoria, we halted for a few minutes to light our cigars, at “The Plough Inn” by Andrew Gardner. Now, as our stay would not justify us in saying much with regard to its general economy, we must merely observe, that the means exhibited are highly neat, extensive and commodious, nothing doubting that every other comfort is kept in sight, where the trouble in the outward appearance of the accommodation of the inn has been attended to with so much industry” (Commercial Journal and Advertiser, 1839:3).

This description of a “neat, extensive and commodious” building suggests that the Plough Inn was a substantial building that had been built and tended to with obvious care. Other inns opened around the same time that are extant include the Victoria Inn (c.1839, now Rosedale), the Farriers Arms (c. 1856 now Nioka), the Royal Garter (c. 1831-1832, now Billesdene Grange), the Rose Inn (c. 1846, now Ambermere) and the Harp of Erin (c.1832). However, at the time of its construction (c. 1836/1837), only the Royal Garter and the Harp of Erin were present.

The precise location of Gardner’s “Plough Inn” is unknown, however Rickwood believed that rather than building a new inn, he had occupied and renamed an existing one (Rickwood, 2016:61). If correct, a review of known licensees of the other inns at the time suggest that Gardner’s “Plough Inn” could only be the Harp of Erin, since all other licensees can be accounted for. However, the original licensee for the Harp of Erin, Michael Flanagan, only held the licence until 1834, making it possible that Gardner’s Plough Inn was the Harp of Erin.

Bates, however, states that:

“...in 1835 (Gardiner) applied for land at the bottom of Mt Victoria Pass on the Bathurst Road, opposite the old stockade on the left hand side proceeding to Bathurst in order to establish another inn, to catch the coaching trade on Mitchell’s new road. This inn was built and called the “Plough Inn” and Gardiner held the licence in the years 1837, 1838 and 1840” (Bates, 1981:20).

If Bates is correct, Gardiner built his inn rather than occupied an existing one. If the location is correct, this would place the Plough Inn within part of the Little Hartley construction footprint at the base of Victoria Pass. However, a review of parish maps for the area do not show Gardiner as a grantee for any land in the parish of Hartley. In December 1835, the following was published in the NSW Government Gazette:

“33. COOK, [100, One Hundred Acres or less, parish unnamed at Mount Victoria; bounded on the west by the Village Reserve; on the north by the swamp, and on the east by the section line; and on the south by the new line of road. Applied for by John Andrew Gardiner” (McLeay, 1835:869).

The location given by Bates as being “opposite the old stockade” is supported by the description given in the gazette in that an area of swamp is adjacent to the old stockade, and the new line of road forming the land’s southern boundary places it on the north side of the road. However, the “village reserve” and the “section line” have not been located, nor has any documentation confirming Gardiner’s ownership of land in the vicinity.

Conversely, Figure 3-25 is described as “Rosedale” in the recorded information for the image in the Blue Mountains City Council’s archives. However, Rosedale is located approximately 650 metres from the base of Victoria Pass, whereas the inn depicted is clearly located at the base of Victoria Pass. It is also on the left-hand side of the Great Western Highway proceeding to Bathurst, and therefore opposite the stockade site. This description matches Bates’ description of the Plough Inn’s location. It is therefore possible that Figure 3-25 depicts the Plough Inn. If this is correct, it demonstrates that the inn was still standing at least until the date of the photograph (c.1897).



Figure 3-25 Attributed as Rosedale, c. 1897, with Victoria Pass in the background (Source: Blue Mountains City Library, 000996.jpg)

As noted above, the precise location of the former Plough Inn has not yet been established. Given the historical descriptions of its location, it is possible that it is within the Little Hartley construction footprint. However, it is also possible that the former inn may have already been destroyed by the construction and widening of the existing Great Western Highway (refer to Figure 3-26), potentially as early as construction of the Berghofer’s Pass deviation in 1907-1912, or during the major upgrade of Victoria Pass carried out in 1933-1934. Depending on the former inn’s location, any archaeological deposits for the inn may have already been removed. Such archaeological deposits would be considered significant however the level of their significance would depend upon their nature and extent.



Figure 3-26 View from existing Great Western Highway towards Victoria Pass with Rosedale at right (Source: Google Maps)

3.3.4 Mitchell's Road

Two sections of Thomas Mitchell's original road alignment were identified in 1992 by Siobhan Lavelle (Appendix 4.1 in MUSEcape Pty Ltd, 1999:12) as once being part of Mitchells Road. The first is immediately east of Billesdene Grange, and described as having been subjected to recent modifications in the form of:

"...straightening of corners... and the creation of a more uniform gradient for the road by cutting away of high points or hillocks, and the filling of low points with embankments" (Lavelle, Appendix 4.1 in MUSEcape Pty Ltd, 1999:12).

Another section was identified near Nioka:

"...immediately east of the Nioka driveway entrance and between the access track and the present highway formation... The formation has been cut away by the more recent modern highway cutting, but includes remnants of an earlier twentieth century bitumenised macadam aggregate surface, above a Telford type sub-pavement of large 6 inch square stone pieces. There is also a small section of sandstone side cutting on the high (south) side of the remnant formation which includes one jumper mark" (Lavelle, Appendix 4.1 in MUSEcape Pty Ltd, 1999:12).

Lavelle also notes that while much of Mitchells Road has been obscured by the current Great Western Highway and various upgrades, it was considered possible that some remnants of Mitchells Road will still be present.

The Mitchell's Road site is located outside but in proximity to the Little Hartley construction footprint, as shown in Figure 3-21 and Figure 3-23.

3.4 Literature review

A significant volume of literature relating to non-Aboriginal heritage values and archaeological potential exists owing to substantial recent upgrade works (proposed and delivered) along the Great Western

Highway between Katoomba and Lithgow. The following literature review focuses on results and conclusions relevant to the project and its construction footprint.

Sue Rosen and Dr Michael Pearson, *The No. 2 Stockade Cox's River – its Life and Times: An Historical and Archaeological Investigation*, 1997

This assessment was carried out on behalf of Pacific Power between 1992 to 1997 ahead of the proposed upgrade of Lyell Dam. The assessment included five stages; a heritage assessment in 1992, additional archival work in early 1994, a detailed survey of surface features in April 1994, a magnetometry survey to identify likely location of features in April 1994 and an archaeological excavation in June 1994, continued in January 1995. Rosen and Pearson's excavation provide rare information regarding such stockade sites.

Like the Mount Victoria Stockade, The No. 2 Cox's River Stockade site was divided into two areas, being the Military/Stockade area and the Commissariat area. Each area was investigated, recorded and reported separately.

Referred to as the "Mount Walker Stockade" by Leckbandt (see below), it was located around 15 kilometres north west of the Mount Victoria Stockade. Based on surviving surface remains, the Military/Stockade area was located on an eastern peninsula of Lyell Lake. A total of 12 discrete sites were identified, most comprising stone mounds and concentrations of rubble and clay. Most were above the 1994 water line. The Commissariat area was located on a western peninsula of Lyell Lake.

Excavations of the Military/Stockade area included two building sites that did not correlate to known plans of the site and were interpreted as a kitchen or other such building and one of the two known military barracks. Artefacts included clay pipe fragments, glass, ceramics and wrought iron nails. In the Commissariat area, four building sites were excavated, all dating to the convict occupation of the area and correlating with four of the five buildings shown on existing plans.

The site is now partially submerged beneath Lyell Lake. The section of Mitchell's Road in the vicinity of the stockade site was already beneath the water at the time of the excavation.

MUSEcape Pty Ltd, *Little Hartley Future Highway Upgrading: Assessment of Impacts on Non-Indigenous Heritage*, 1999

The MUSEcape report was prepared by Gutteridge, Haskins & Davey Pty Ltd on behalf of Roads and Traffic Authority (now Transport for NSW) ahead of a proposed widening and realigning of 4.5 kilometres of the Great Western Highway from the base of Victoria Pass through to Little Hartley, with most of the 1999 study area contained within the Little Hartley construction footprint. The purpose of the 1999 study was to evaluate the potential impacts of the proposed route on heritage items and values within that study area. The report also contains an archaeological assessment.

The MUSEcape report contains extensive significance assessments for items within the current project study area, such as the Harp of Erin, Rosedale, Ambermere, Nioka, Billesdene Grange and the former Victoria Stockade site. These were used for the State Heritage Inventory in a very truncated form; the significance assessments in this report are based on those in the MUSEcape report.

Ollie Leckbandt, *Convict Stockades from Mount Walker to Mount Victoria*, 1999

This booklet reports on the search and investigation of convict stockades constructed in the early 1800s to house convicts working on the Western Road. The booklet covers three convict stockades, being Bowens Hollow, Hassan Walls and Mount Victoria, although some information is presented regarding the Mount Walker Stockade, otherwise known as the Cox's River Stockade (see Rosen & Pearson 1997 above).

The Bowens Hollow stockade was located at South Bowenfels on the Old Bathurst Road, around 12 kilometres north west of the Mount Victoria Stockade at Little Hartley. The Hassans Walls Stockade was located around nine kilometres northwest of the Mount Victoria site on the banks of Boxes Creek.

Leckbandt also collected surface artefacts from the three sites and used a metal detector to retrieve some subsurface finds from the Mount Victoria Stockade site. The assemblages at all three stockade sites are relatively similar, comprising musket balls, coins, buttons, spoons and buckles. Other artefacts identified at the Mount Victoria Stockade site included bottle glass, ceramics, nails and metal tools such as shovels and picks.

Siobhan Lavelle, *Mount Victoria – Soldiers Pinch, Historical Archaeological Assessment of Highway Corridor*, 2000

Lavelle's assessment was undertaken as part of a Review of Environmental Factors (REF) for a realignment of the Great Western Highway at Soldiers Pinch, between Blackheath and Mount Victoria. Lavelle's study area covers the entirety of the Soldiers Pinch construction footprint.

The locality has been known as Soldiers Pinch since at least the 1830s. One of the first roads, Cox's Road (1814) passed through this location, as did later upgrades, including an upgrade of Cox's Road in 1823, Mitchell's Western Road in the 1830s and his deviation to remove the sharp bend at Soldiers Pinch in 1845. In 1868, the railway also passed through Soldiers Pinch, to the west of Mitchell's 1845 realignment of the Western Road.

Lavelle concluded that the realignment of the Great Western Highway at Soldiers Pinch would likely impact on the alignment of Cox's Road. However, it was also concluded that there would be little tangible or diagnostic evidence surviving of Cox's Road and that its significance is largely historical. It was recommended that a detailed survey of that portion of Cox's Road should be undertaken prior to any construction and that the survey should map and record all surviving remnants of the 1814 and 1823 alignments of Cox's Road that would be impacted.

Casey & Lowe, *Corridor Options, Historic Heritage – Mount Victoria to Little Hartley*, 2009

Casey & Lowe's assessment was prepared for the Roads and Traffic Authority (now Transport) ahead of proposed upgrades to the Great Western Highway between Mount Victoria and Lithgow. It followed from an earlier "Study Area Investigations and Corridors Identification" report and sought to identify non-Aboriginal heritage items, archaeological sites and areas of historic and archaeological potential within the identified corridor options for the proposed works.

Casey & Lowe's methodology included a review of heritage databases, historical data, a review of previous investigations and fieldwork to confirm known and potential items and sites. Parts of Casey & Lowe's study area overlap with the Little Hartley construction footprint and areas above the project tunnels near Mount Victoria.

Of particular note is Casey & Lowe's review and assessment of the Mount Victoria Stockade site. Having had the opportunity to review Siobhan Lavelle's archaeological assessment in the appendix of MUSEcape's report, Casey & Lowe were able to conduct a targeted pedestrian survey of the site and produce a curtilage map. A later report (Casey & Lowe, 2011:1) indicated that the purpose of the curtilage map and assessment was to allow for registration of the site on the Lithgow LEP's heritage register, however, this does not appear to have occurred.

Casey & Lowe, *Statement of Heritage Impact: Hartley Valley Safety Upgrade – Non-Aboriginal Heritage*, 2013

Casey & Lowe's 2013 assessment was prepared for Sinclair Knight Merz (SKM) on behalf of Roads and Maritime Services (now Transport) ahead of proposed safety upgrades to the Great Western Highway within Hartley Valley from the base of Victoria Pass to the end of the River Lett Hill eastbound overtaking lane (approximately 7.8 kilometres). Casey & Lowe's 2013 study area overlaps with part of the Little Hartley construction footprint, in particular from the base of Victoria Pass, and includes some of the 1830s inns along the Great Western Highway at Little Hartley.

Rosedale and Nokia were assessed as being within the impact area of the safety upgrade works and potentially impacted by vibration. It was recommended that further study be undertaken regarding vibration impacts and that mitigation strategies be developed to protect the two items from damage. The two inns, Harp of Erin and Ambermere at Little Hartley and the Little Hartley Heritage Conservation Area were also within Casey & Lowe's assessment area; however, it was assessed that the safety upgrade works did not encroach on the heritage curtilages of those items.

Paul Davies Heritage Architects, *Review of Period Housing Areas in the Blue Mountains: Background to the Study*, 2018.

This study was prepared for the Blue Mountains City Council to assist council in designating heritage conservation areas where required. Davies' focus was on the historic, aesthetic and community values of period houses in the Blue Mountains area and two areas of his study included Blackheath and Mount Victoria.

In relation to Blackheath, the study noted that period housing extended over the town's core and included a wide range of building forms and types that demonstrated the evolution of 100 years of residential development. A high proportion of pre-1943 housing was noted, including some early summer retreats. Few houses had been demolished. Four sub-precincts were identified with distinct heritage values, including Blackheath Village, Blackheath's Country Retreats, Blackheath West and Lookout Hill. All four precincts were recommended to be designated as Heritage Conservation Areas. Two areas are within the current study area, above the project tunnels, in Blackheath West and Lookout Hill.

In relation to Mount Victoria, the study noted that the eastern and western edges to the village play an important role in defining its boundaries and continue to provide clear evidence of the historic role of Mount Victoria as a staging point for movement of goods and people between Sydney and the State's interior. A high proportion of pre-1943 fabric survived, mostly intact with some rare examples of their type. It was recommended that the existing heritage conservation area be extended to include the eastern and western edges of the village. The Central Mount Victoria Heritage Conservation Area is outside but within 20 metres of the construction footprint.

Jacobs Group (Australia) Pty Ltd, *Great Western Highway Upgrade Program, Little Hartley to Lithgow (West Section) – Technical Working Paper, Non-Aboriginal Heritage, 2021*

This non-Aboriginal heritage assessment was prepared by Jacobs ahead of the proposed upgrade of the Great Western Highway between Little Hartley and Lithgow, with the eastern part of its study area from the base of Victoria Pass to Little Hartley overlapping with the western-most portion of this project (Little Hartley construction footprint).

As with Casey & Lowe's 2013 study, Jacobs' study considered the heritage significance and impact of items at Little Hartley, including Rosedale, Nokia, Billesdene Grange and the Little Hartley Heritage Conservation Area, as well as other related items outside the study area for this project, such as the Harp of Erin and Ambermere. Of these items, Billesdene Grange was assessed to be impacted both directly and indirectly, whereas Rosedale and Nokia were assessed as being visually impacted indirectly.

Recommended mitigation measures included archival recording of the Billesdene Grange property. A structural assessment for its convict-built causeway was also recommended to establish its structural capability and its vulnerability to the proposed impacts. An archaeological investigation of the causeway area of impact was also proposed to understand the structure and to inform an archival recording.

In relation to items visually impacted, mitigation measures included the design of batter slopes and embankments to blend with existing topography. Where construction required removal of vegetation, these embankments were recommended to be of an obtuse angle to enable new landscape plantings. Such new plantings were recommended to match previously existing vegetation, with tall height species not to be introduced in areas where they were not previously present.

Niche Environment & Heritage, *Statement of Heritage Impact – Great Western Highway East, Katoomba to Medlow Bath (K2M), Medlow Bath to Blackheath (M2B), 2022*

This Statement of Heritage Impact (SoHI) was prepared for the upgrade of the Great Western Highway between Katoomba and Blackheath (known as "Katoomba to Blackheath Upgrade"). The construction footprint of Katoomba to Blackheath Upgrade overlaps with this project at Blackheath. The SoHI was prepared to support a Review of Environmental Factors (REF) for the Katoomba to Blackheath Upgrade project.

The Katoomba to Blackheath Upgrade construction footprint is broken into two main groups, being Katoomba to Medlow Bath (K2M) and Medlow Bath to Blackheath (M2B). A total of 15 heritage items were identified as being impacted by the Katoomba to Blackheath Upgrade project. Ten items were assessed as having minor impacts, two with moderate impacts, two with high impacts and one with no impact.

The items assessed as having high impact were Pulpit Hill and Environs and Stone Arrangements near Pulpit Hill. The two items with moderate impacts were the House and Orchards site at Medlow Bath and the Explorer's Tree and Environs (assessed as having minor-moderate impacts). The Shepherd and His Flock Inn site along the Great Western Highway near was assessed as having no impact as a result of the Katoomba to Blackheath Upgrade project. The remainder of the sites with minor impact are the

Bonnie Doon Reserve (Katoomba), a GWH alignment change between Katoomba and Medlow Bath, an old alignment of the GWH (Katoomba), three culverts, “the Pines” (Medlow Bath), Gatekeeper’s Cottage (Medlow Bath), a quarry between Medlow Bath and Blackheath and the Greater Blue Mountains Area – Additional Values nomination for the National Heritage List.

A range of general recommendations were made for the management of heritage items within the Katoomba to Blackheath Upgrade footprint, including refinement of design to avoid impacting heritage items, re-evaluation of non-Aboriginal heritage following detailed design, that heritage constraints be included in induction of contractors, following the Transport for New South Wales Unexpected Heritage Finds Guidelines, minimisation of vegetation removal in the Blue Mountains National Park and an archival recording of any items impacted by the works. Additional recommendations were made for individual items.

3.5 Significance assessment

As detailed in Section 3.2, there are 43 non-Aboriginal heritage items and conservation areas (44 statutory listings) and four areas of archaeological potential within the study area. Of these, 18 heritage items/ conservation areas and four areas of archaeological potential (noting that Blackheath Stockade is recorded twice as both a listed heritage item and an area of archaeological potential) have been identified as relevant to the project because:

- the item/ conservation area/ area of potential archaeology is located within the project construction footprint and may be affected by direct or indirect impacts
- the item/ conservation area/ area of potential archaeology is within 60 metres of the project construction footprint or the outer edge of the project tunnels and may be affected by indirect impacts. As noted in Section 3.2, the distance of 60 metres has been adopted from Appendix G – Technical report – Noise and vibration of the EIS as the distance within which vibration may affect a heritage structure.

Notwithstanding, landscape scale indirect impacts on the Greater Blue Mountains Area (World Heritage Area) and the Greater Blue Mountains Area – Additional Values nomination (for the National Heritage List) have also been considered, particularly in relation to landscape and visual impacts beyond 60 metres from the project.

Table 3-3 lists the heritage items, conservation areas and areas of archaeological potential identified as relevant to the project, their significance, and location relative to the project. The significance of these items is considered here to provide a basis for assessing impacts to heritage values. Owing to recent extensive investigations along the route of the Great Western Highway, the significance of many of these items have already been assessed, particularly those in Little Hartley.

Detailed significance assessments for each of these items/ conservation areas/ areas of archaeological potential are provided in Appendix B.

Table 3-3 Non-aboriginal heritage items, conservation areas and areas of archaeological potential relevant to the project

Listing ID	Name	Address	Heritage significance	Location relative to the project
Blackheath construction footprint				
105127	The Greater Blue Mountains Area	Great Western Highway, Katoomba	World Heritage	Near – more than 1 kilometre from the boundary of the Blackheath construction footprint, but included in relation to landscape scale indirect impacts
-	The Greater Blue Mountains Area – Additional Values	Great Western Highway, Katoomba	Nominated for National Heritage List	Within – covers the majority of the Blackheath construction footprint (refer to Figure 3-15)
Soldiers Pinch construction footprint				
-	The Greater Blue Mountains Area – Additional Values	Great Western Highway, Katoomba	Nominated for National Heritage List	Within – covers part of the Soldiers Pinch construction footprint (refer to Figure 3-18).
MV009	Soldiers Pinch	455 Great Western Highway, Blackheath	Historical, associative, rarity, representative	Within – the curtilage of this item covers the southern portion of the Soldiers Pinch construction footprint. The item is located outside and around 10 metres to the north east of the boundary of the construction footprint (refer to Figure 3-18).
Little Hartley construction footprint				
I024	Rosedale	Great Western Highway, Little Hartley	Historical, associative, aesthetic, social, research potential, rarity, representative	Near – the item is around 30-40 metres from the southern boundary of the Little Hartley construction footprint (refer to Figure 3-21).
I025	Nioka	2209 Great Western Highway, Little Hartley	Historical, aesthetic, research potential, representativeness	Near – the item is around 30-40 metres from the southern boundary of the Little Hartley construction footprint (refer to Figure 3-21).
-	Site of the Plough Inn	Great Western Highway, Little Hartley	Historical, research potential, rarity	Within – this item is assumed (refer to Section 3.3.3) to be located across the boundary of the Little Hartley construction footprint (refer to Figure 3-21). This item may be affected by construction of the Little Hartley to Lithgow Upgrade prior to commencement of construction of the project.

Listing ID	Name	Address	Heritage significance	Location relative to the project
-	Mount Victoria Convict Stockade site	Little Hartley	Possible State heritage significance, historical, associative, research potential	Within – this area covers part of the Little Hartley construction footprint (refer to Figure 3-21).
-	Mitchell's Road	Great Western Highway, Little Hartley	Historical, rarity	Near – this area is around 30-40 metres from the southern boundary of the Little Hartley construction footprint (refer to Figure 3-21).
Tunnel alignment				
BH034	Blackheath Stockade	Blackheath	Historical, associative, aesthetic/technical, social, research potential and rarity	Above – this site and area are above the project tunnels (refer to Section 3.3.1 and Figure 3-16).
BH215	Lookout Hill Heritage Conservation Area Blackheath	Blackheath	Historical, aesthetic, research potential and representativeness	Above – this area is above the project tunnels (refer to Figure 3-16).
BH052	St Mounts	1A and 3 Abbott Street and 194-196 Great Western Highway, Blackheath	Historical, aesthetic, research potential, representativeness	Above – this item is above the project tunnels (refer to Figure 3-16).
BH214	Blackheath West Heritage Conservation Area	Blackheath	Historical, aesthetic, research potential, rarity, representativeness	Above – this area is above the project tunnels (refer to Figure 3-16).
BH059	Guinness Lodge/Evanville	1-5 Waragil Street, Blackheath	Historical, aesthetic, representativeness	Near – this item is above and around 20 metres from the outer edge of the project tunnels (refer to Figure 3-16).
BH065	Tree Tops and garden	16 Clyde Avenue, Blackheath	Historical	Above – this item is above the project tunnels (refer to Figure 3-17).
BH060	Ban Tigh, Brewery site and Garden	26-34 Waragil Street, Blackheath	Historical	Above – this item is above the project tunnels (refer to Figure 3-17).
BH039	Osborne Cottage (site only)	52-106 Thirroul Avenue, Blackheath	Historical	Above – this item is above the project tunnels (refer to Figure 3-17).

Listing ID	Name	Address	Heritage significance	Location relative to the project
BH071	Montana	37 Ada Road, Blackheath	Historical, aesthetic, representativeness	Near – this item is above and around 40 metres from the outer edge of the project tunnels (refer to Figure 3-17).
MV023	Central Mount Victoria Heritage Conservation Area	Mount Victoria	Historical, associative, aesthetic, social, research potential, rarity, representativeness	Near – this item is above and around 35-40 metres from the outer edge of the project tunnels (refer to Figure 3-18).
MV015	Mitchell's Ridge Monument Reserve	Great Western Highway, Mount Victoria	Historical, associative, aesthetic, representativeness	Above – this item is above the project tunnels (refer to Figure 3-20).
MY001	Berghofer's Pass	Near Great Western Highway, Mount Victoria	Historical, associative, technical, social, representative	Above – this item is above the project tunnels (refer to Figure 3-20).
A183	Victoria Pass	Great Western Highway, Mount Victoria	Historical, associative, technical, social, research potential, rarity, representative	Above – this item is above the project tunnels (refer to Figure 3-21).

4.0 Impact assessment

The project has been designed to avoid direct impacts and minimise potential indirect impacts to heritage items and particularly the Greater Blue Mountain Area. This has included:

- selection of the project over other strategic options such as upgrading Bells Line of Road (refer to Section 3.3 of the EIS) which would have direct impacts on the Greater Blue Mountains Area
- the majority of the project has been designed to be underground in a tunnel to avoid surface impacts to the Greater Blue Mountains Area, particularly from vegetation clearance and other heritage items
- the construction footprints are mainly located in areas within or adjacent to the existing road corridor
- the project would repurpose the construction sites used for the Katoomba to Blackheath Upgrade and the Little Hartley to Lithgow Upgrade to minimise surface disturbance including vegetation clearance
- the proposed tunnel alignment has been adjusted to avoid intersecting with the subsurface stratum of the Greater Blue Mountains Area
- the majority of the tunnel would be tanked to minimise groundwater drawdown and associated impacts to groundwater dependent ecosystems within the Greater Blue Mountains Area
- the operational infrastructure including the tunnel portals, ventilation outlets (if required for the preferred ventilation design option), water treatment facilities and tunnel operations facility have been designed to minimise visual impacts to the Greater Blue Mountains Area as much as possible
- selecting a single long tunnel, rather than two shorter tunnels has substantially reduced the surface construction footprint, especially in areas closer to the Greater Blue Mountains World Heritage Area
- proposals for landscape design and revegetation that would be peer reviewed through the NSW State Design Review Panel, including the Government Architect.

Notwithstanding the approach to minimise impacts to the Greater Blue Mountain Area, the project has the potential to impact on non-Aboriginal heritage through:

- direct impacts during construction, particularly for heritage items, conservation areas and areas of archaeological potential located within the project's construction footprint (surface works)
- indirect impacts during construction for heritage items, conservation areas and areas of archaeological potential located in proximity to the project's construction footprint (surface works) or to tunnelling activities
- indirect impacts during operation.

The following sections assess the potential direct and indirect impacts of construction and operation of the project on non-Aboriginal heritage, including Statements of Heritage Impact, where relevant. Further detail is provided in significance assessments presented in Appendix B.

The *Statements of Heritage Impact* guideline (NSW Heritage Office, 2002) poses a series of questions as prompts to aid in the consideration of impacts on heritage items based on the type of impacts contemplated. These process questions are grouped according to whether the potential impact is major or minor, and whether it is demolition or additions proposed. These process questions are also considered below for each of the heritage items identified as potentially impacted by the project. These process questions are not applicable to archaeological sites.

4.1 Direct construction impacts

4.1.1 Potential direct construction impacts

Direct construction impacts may occur in relation to the project's construction footprint (surface), notably within:

- the Blackheath construction footprint
- the Soldiers Pinch construction footprint
- the Little Hartley construction footprint.

The construction water supply pipeline between the Little Hartley construction footprint and Lithgow (refer to Figure 4-1) would be located wholly within road reserves of the existing Great Western Highway and the upgraded Great Western Highway (as part of the Great Western Highway Upgrade Program – Little Hartley to Lithgow). Its current indicative alignment has been designed to avoid impacts to non-Aboriginal heritage and as such, it does not pose an additional impact to non-Aboriginal heritage for this project. However, should this alignment change during design development, or the location of ancillary infrastructure, such as pumping station(s), pressure valves and other infrastructure, impacts to non-Aboriginal heritage would be further assessed.

Construction activities to be carried out within the Blackheath, Soldiers Pinch and Little Hartley construction footprints would include:

- portal construction
- stockpiling and spoil handling
- surface road upgrade works including landscaping
- construction worker amenities/facilities and parking
- construction material and equipment storage
- construction water treatment plant
- construction power and ventilation
- construction of new water pipeline between Little Hartley and Lithgow
- construction ventilation plan including clean air intake (fans and ducting)
- construction of operational infrastructure, including:
 - tunnel operations facility (Blackheath construction footprint only)
 - ventilation building and ventilation outlet (only for the ventilation outlet option if progressed) (Blackheath and Little Hartley construction footprints only)
 - tunnel deluge system
 - permanent electricity substation (Little Hartley construction footprint only)
 - surface and tunnel drainage infrastructure (Blackheath and Little Hartley construction footprints only).

Construction activities to be undertaken at these sites are described in detail in Chapter 6 (Construction) of the EIS.

Construction of the mainline tunnel would be underground and is not anticipated to have a direct impact on heritage items.

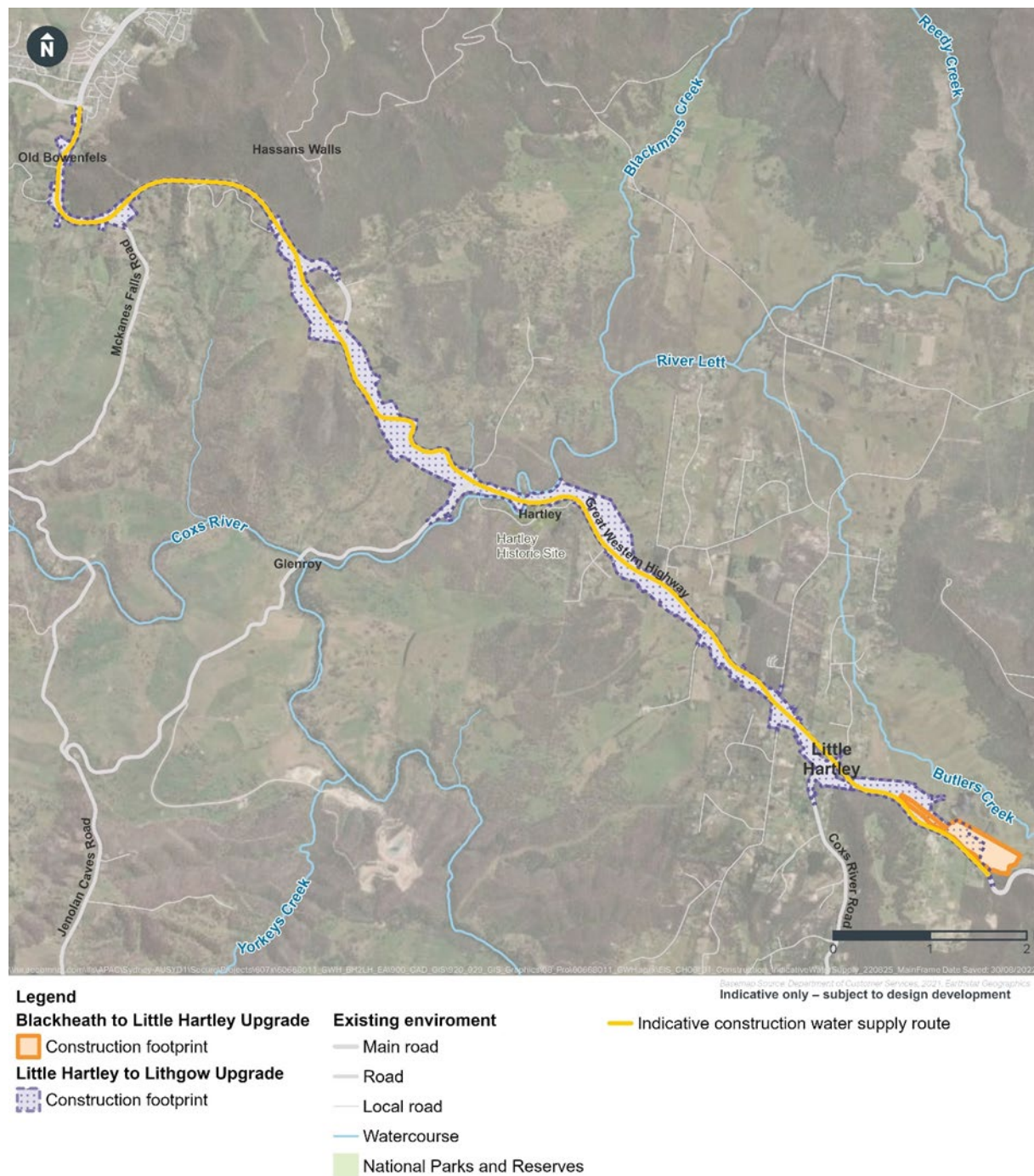


Figure 4-1 Indicative construction water supply pipeline route

As noted in Section 3.5, two listed/ nominated heritage items and two areas of archaeological potential are located within parts of the project's construction footprint and would therefore be subject to potential direct impacts. Heritage items and areas of archaeological potential that may be directly impacted by construction of the project are identified in Table 4-1 and Table 4-2, respectively, and assessment in Section 4.1.2. Heritage items located above the project tunnels would not be directly impacted by the project, but may be subject to indirect impacts (refer to Section 4.2).

Table 4-1 Identification of heritage items with potential direct impacts

Item	Significance	Potential direct impact
Blackheath construction footprint		
Greater Blue Mountains Area	World Heritage	No
Greater Blue Mountains Area – Additional Values	Nominated for National Heritage List	Yes
Soldiers Pinch construction footprint		
Soldiers Pinch	Local	Yes
Greater Blue Mountains Area – Additional Values	Nominated for National Heritage List	Yes
Little Hartley construction footprint		
Rosedale	Local	No
Nioka	Local	No

Table 4-2 Identification of areas of archaeological potential with potential direct impacts

Item	Significance	Potential direct impact
Tunnel alignment		
Blackheath Stockade	Local	No
Construction footprint, Little Hartley		
Mount Victoria Stockade site	Possible State (unlisted)	Yes
Site of the Plough Inn	Probable local (unlisted)	Yes (noting that the Little Hartley to Lithgow Upgrade project may have already impacted this site prior to construction of the project)
Mitchell's Road	Probable local (unlisted)	No

4.1.2 Assessment of potential direct construction impacts

As identified in Section 4.1.1, construction of the project has the potential for direct impacts on:

- Greater Blue Mountains Area – Additional Values (nomination for the National Heritage List)
- Soldiers Pinch
- Mount Victoria Stockade site (archaeological potential)
- Site of the Plough Inn (archaeological potential).

Given the significance of the Greater Blue Mountains Area (World Heritage listing), it has also been assessed for potential direct construction impacts for completeness.

Greater Blue Mountains Area (World Heritage List and National Heritage List)

The Greater Blue Mountains Area (as included on the World Heritage List and National Heritage List) would not be directly affected by construction of the project. All construction work as part of the project would take place outside the World Heritage curtilage; therefore, this World Heritage List item would not be directly impacted by the project.

The Greater Blue Mountain Area satisfied World Heritage List criteria relating to its natural heritage values, in particular its significant ongoing ecological and biological processes relating to its predominantly eucalypt plant communities (Criterion ix) and because of its important and significant diversity of *in situ* natural habitats, including threatened species of outstanding universal value (Criterion x) (see Appendix A for the world heritage criteria and Table B 1 of Appendix B for significance assessment).

Table 4-3 Assessment of impacts on World Heritage values of Greater Blue Mountain Area

World Heritage List value	Relevant construction activities	Assessment	World Heritage List values impacted
Criterion (ix) - outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals	Construction activities at Blackheath and Soldiers Pinch	All construction activities are located outside the Greater Blue Mountain Area	No
Criterion (x) - contains the most important and significant natural habitats for <i>in situ</i> conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation	Construction activities at Blackheath and Soldiers Pinch	All construction activities are located outside the Greater Blue Mountain Area	No

The Greater Blue Mountain Area is also listed on the National Heritage List for its national heritage significance (see Appendix A for the National heritage significance criteria and Table B2 in Appendix B). The footprint of both the World Heritage List and National Heritage List entries are identical, as are the reasons for heritage listing.

The following table assesses the impacts of the project on the National Heritage values of the Greater Blue Mountain Area.

Table 4-4 Assessment of impacts on National Heritage values of Greater Blue Mountain Area

National Heritage List Value	Relevant construction activities	Assessment	National Heritage List values impacted
A - The place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history	Construction activities at Blackheath and Soldiers Pinch	All construction activities are located outside the Greater Blue Mountain Area	No
B – The place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history	Construction activities at Blackheath and Soldiers Pinch	All construction activities are located outside the Greater Blue Mountain Area	No
C - The place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history	Construction activities at Blackheath and Soldiers Pinch	All construction activities are located outside the Greater Blue Mountain Area	No
D - The place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of: (i) a class of Australia's natural or cultural places, or (ii) a class of Australia's natural or cultural environments	Construction activities at Blackheath and Soldiers Pinch	All construction activities are located outside the Greater Blue Mountain Area	No

Greater Blue Mountain Area (Additional values) (National Heritage List nomination)

Although not yet included on the National Heritage List, the Greater Blue Mountain Area (Additional Values) is nominated for containing outstanding natural and cultural values. It is understood that while the nomination for the Greater Blue Mountain Area for World Heritage listing in 2000 included Aboriginal cultural values, these were not accepted by UNESCO but the biodiversity values were. The nomination for the National Heritage List in 2005 also did not succeed for geodiversity, scenic or cultural values but was accepted for outstanding biodiversity. This nomination for additional values therefore includes Aboriginal cultural values, and other natural values not covered by the World Heritage listing, such as scenic values and geological formations (Greater Blue Mountains Advisory Committee, 2015:13-14). In relation to cultural values, further research has come to light since the World Heritage List and National Heritage List entries, providing additional evidence for cultural values, such as rock art and the importance of the Greater Blue Mountain Area to the contemporary Aboriginal community (Greater Blue Mountains Advisory Committee, 2015:10).

Extent of impacts

The footprint of the nominated item covers the entire area of the Greater Blue Mountain Area with extended boundaries in some areas. Two of those additional areas are at Blackheath and Soldiers Pinch. Although nominated c.2000, it is understood that this item has not yet been assessed by the Australian Heritage Council.

The majority of the Blackheath construction footprint and operational infrastructure would be located within the nominated Greater Blue Mountain Area (Additional Values) curtilage. The landscape of the Blackheath construction footprint is predominantly regenerated bushland, having been previously cleared and small parts used for housing and recreational purposes from early in the 20th century. Tracks cut at that time to allow for public access to tourist attractions, such as Lake Medlow, are still present within and around the Blackheath construction footprint. It is bordered on the north by residential housing on the southern side of Evans Lookout Road and at the west by the current alignment of the Great Western Highway.

The north-eastern portion of the Soldiers Pinch construction footprint is within the curtilage of the Greater Blue Mountain Area (Additional Values). This would result in a direct impact to the perimeter of the Greater Blue Mountain Area (Additional Values) through native vegetation clearance and construction of components of the Soldiers Pinch construction footprint, in particular by the construction of a sediment pond in its curtilage.

It is also noted that the area of impact of the Greater Blue Mountain Area (Additional Values) (as shown in Figure 3-18) is bordered by the 2002 alignment of the Great Western Highway at Soldiers Pinch and the native vegetation within the construction footprint is disconnected from the remainder of the nominated item by the 2002 alignment. It is likely that the boundaries of the Greater Blue Mountain Area (Additional Values) predate the 2002 Great Western Highway alignment, and the area impacted by the construction footprint would likely not have been included in the nominated item's curtilage had it been drawn today. This is evidenced by the fact that the curtilage of the Greater Blue Mountain Area (Additional Values) follows the northern and north-western alignment of the previous Great Western Highway alignment, which was, prior to 2002, the active road corridor. However, other nearby areas of similar vegetation south of the former road alignment are not included in the nominated listing. Since the construction of the new Great Western Highway alignment at Soldiers Pinch, the impacted section of the Greater Blue Mountain Area (Additional Values) is now spatially disconnected from the rest of the nominated item.

The Soldiers Pinch construction footprint would impact an area of approximately 0.3 hectares of the nominated item, an area of regenerated bushland. Considering the area of the nominated item is estimated at over one million hectares, it is considered that impact by the construction of the compound through the loss of vegetation would be negligible. Nonetheless, given the potential significance of the nominated item, it is recommended that vegetation removal is minimised where feasible.

It is also noted that the location proposed for the Soldiers Pinch construction footprint has recently been used as a stockpiling area and has been since the construction of the new Great Western Highway alignment in 2002 (see "Soldiers Pinch (heritage item)" below). It is highly disturbed, with minimal remaining native vegetation.

Biodiversity impacts

The item has been nominated for the National Heritage List based in part on its national heritage significance for biodiversity. Appendix H – Technical report – Biodiversity (Biodiversity Development Assessment Report) of the EIS presents a detailed assessment of the project's impacts on biodiversity. Relevant aspects of that assessment are summarised here.

In relation to impacts to biodiversity, the project would involve removal of around 9.74 hectares of native vegetation including around 7.44 hectares of high condition native vegetation, along with at least 20 hollow bearing trees. Some of this vegetation removal would occur in the Greater Blue Mountain Area (Additional Values) at Blackheath and Soldiers Pinch. Significant Impact Assessments have been completed for threatened fauna recorded or considered likely to have potential habitat within the biodiversity assessment area, including for the Spotted-tailed Quoll (*Dasyurus maculatus*) and Koala (*Phascolarctos cinereus*). These assessments found that no significant impact is likely to result for these species as a result of the project.

The Additional Values area at Blackheath includes areas of impacted habitat for Purple Copper Butterfly (*Paralucia spinifera*), Large-eared Pied Bat (*Chalinolobus dwyeri*) and Greater Glider (*Petauroides volans*), while the additional values area at Soldiers Pinch only includes impacted habitat for Large-eared Pied Bat and Greater Glider. Vegetation removal for the project would impact on habitat for threatened species listed under the EPBC or *Biodiversity Conservation Act 2016* (NSW). A total of around 0.35 hectares of Purple Copper Butterfly habitat, around 9.13 hectares of Large-eared Pied Bat habitat, and around 7.33 hectares of Greater Glider habitat would be removed as part of the project.

Given that the areas of retained native vegetation within and adjacent to the project are known and predicted to support the same native vegetation as those being directly impacted, the biodiversity impact assessment concluded that these direct impacts to threatened species would be minor (refer to Appendix H (Technical report – Biodiversity) of the EIS).

Assessment of impacts

Assessment of project impacts on the GMBA (Additional Values) against National Heritage List values is summarised in Table 4-6.

Table 4-5 Assessment of impacts on Greater Blue Mountain Area (Additional Values)

National Heritage List values	Relevant construction activities	Assessment	National Heritage List value impacted
A - The place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history	Construction activities at Blackheath and Soldiers Pinch	Construction activities at Blackheath are wholly within the Greater Blue Mountain Area (Additional Values). Vegetation is regenerated bushland and highly disturbed. No Aboriginal sites are recorded within the Blackheath construction footprint. Construction activities at Soldiers Pinch are partially within the Greater Blue Mountain Area (Additional Values). Less than half of a hectare of the over one million hectares of the Greater Blue Mountain Area	Yes

National Heritage List values	Relevant construction activities	Assessment	National Heritage List value impacted
		(Additional Values) would be impacted.	
B - The place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history	Construction activities at Blackheath and Soldiers Pinch	Construction activities would not affect this value. Refer also to Appendix H (Technical report – Biodiversity) of the EIS, which concludes that the project would not significantly affect rare or endangered species, populations, communities and their habitats.	No
C - The place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history	Construction activities at Blackheath and Soldiers Pinch	Both the Blackheath and Soldiers Pinch construction footprints comprise regenerated bushland and no known Aboriginal sites. There is no potential for additional information that would contribute to an understanding of Australia's natural or cultural history.	No
D - The place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of: (i) a class of Australia's natural or cultural places, or (ii) a class of Australia's natural or cultural environments	Construction activities at Blackheath and Soldiers Pinch	Construction activities would not affect this value.	No
G – The place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons	Construction activities at Blackheath and Soldiers Pinch	There are no known social, cultural or spiritual values attached to either the Blackheath or Soldiers Pinch construction footprints.	No.

National Heritage List values	Relevant construction activities	Assessment	National Heritage List value impacted
I - The place has outstanding heritage value to the nation because of the place's importance as part of indigenous tradition	Construction activities at Blackheath and Soldiers Pinch	No Aboriginal sites are identified within either the Blackheath or Soldiers Pinch construction footprints.	No

Process questions

Potential impacts have been identified for the Greater Blue Mountain Area (Additional Values) during construction at Blackheath and Soldiers Pinch in the form of vegetation removal. This impact is interpreted as a minor partial demolition (within the meaning of the *Statements of Heritage Impact* guideline (NSW Heritage Office, 2002)). Consideration of the process questions for a minor partial demolition are contained in Table 4-6.

Table 4-6 Process questions for minor partial demolition at Greater Blue Mountain Area (Additional Values)

Process question	Assessment
Is the demolition necessary for the heritage item to function?	No.
Are important features of the item affected by demolition?	The vegetation proposed for removal is part of much larger vegetation communities. In relation to the removal of vegetation at Blackheath and Soldiers Pinch, these areas are on the edge between the larger area of the Greater Blue Mountain Area (Additional Values) and have been previously disturbed and further affected by bushfires. A biodiversity assessment undertaken for this project has indicated the impacts to biodiversity would be minor. There are no known Aboriginal sites within either the Blackheath or Soldiers Pinch construction footprints.
Is the resolution to partially demolish sympathetic to the heritage significance of the item?	No. However, it should be noted that the partial demolition of vegetation would not impact the heritage significance of the nominated item.
If the partial demolition is a result of the condition of the fabric, is it certain that the fabric cannot be repaired?	Not applicable.

Statement of Heritage Impact

Construction of the project would be carried out within this item at Blackheath and Soldiers Pinch. At Blackheath, works would include establishment of a construction site and construction of operational infrastructure. Soldiers Pinch would be used for construction only and would not be occupied by operational infrastructure. Vegetation removal would take place at both Blackheath and Soldiers Pinch.

The heritage values of Greater Blue Mountain Area (Additional Areas) relate to its biodiversity, scenic value in places like gorges, and cultural values. While the vegetation communities that would be impacted by the project are native, the impact to threatened species is considered minor.

The potential direct impact to the Greater Blue Mountain Area (Additional values) is therefore assessed as **minor**.

Soldiers Pinch (heritage item)***Extent of impacts***

Soldiers Pinch is a locally significant heritage item. Chiefly significant because of the historical road and rail routes that crossed through this area, the project's construction footprint covers some of the item's curtilage raising the potential for direct impacts.

Lavelle's assessment of the area in 2000 ahead of the realignment of part of the Great Western Highway identified remnant sections of both Cox's Road (1814 and 1823 alignments) and Mitchell's 1845 realignment (refer to Figure 3-11). The Cox's Road 1823 alignment follows a modern track alignment and is located well outside the Soldiers Pinch construction footprint. The 1814 alignment of Cox's Road, however, may pass within the south-eastern section of the construction footprint.

As assessed by Lavelle in 2000, while Cox's Road was the first road that crossed the Blue Mountains and therefore has high historical significance, the remaining road is ephemeral with little diagnostic or significant physical evidence remaining. Retention of those segments was therefore not considered necessary (at the time of realigning the highway at Soldiers Pinch in 2002). As noted in Section 3.4, Lavelle recommended that prior to the construction of the new alignment of Great Western Highway at Soldiers Pinch, a detailed ground survey to map and record all surviving elements within the construction zone. It is not known whether this was undertaken, or whether those records covered the area to be impacted by the construction footprint for this project.

The condition of the south-eastern section of the Soldiers Pinch construction footprint site is highly disturbed and is currently in use as a stockpile. Given its current condition and past and present use as a construction footprint, it is considered unlikely that the 1814 alignment has survived within that site. However, the historical significance of Cox's Road is considered high, and the Soldiers Pinch site. Consistent with the recommendation made as part of the assessment of the realignment of the Great Western Highway at Soldiers Pinch in 2002, a detailed survey should be carried out prior to commencement of ground-disturbing works in the construction footprint to record and assess the significance of any surviving remnants or features of the 1814 alignment of Cox's Road.

Assessment of impacts

Assessment of project impacts on the Soldiers Pinch heritage item against NSW Heritage values is summarised in Table 4-7.

Table 4-7 Assessment of impacts on Soldiers Pinch (heritage item)

NSW heritage value	Potential impact	Assessment	NSW heritage values impacted
(a) historical significance	Construction of compound at Soldiers Pinch	The historical significance of the item would not be altered by the construction activities at Soldiers Pinch	No
(b) Associations	Construction of compound at Soldiers Pinch	The associative significance would not be altered by the construction activities at Soldiers Pinch	No
(c) Aesthetic/technical	Construction of compound at Soldiers Pinch	This value is embodied in the presence of early road alignments in its curtilage. The disturbance of the site suggests that there is little potential for these road alignments to be present within the	No

NSW heritage value	Potential impact	Assessment	NSW heritage values impacted
		construction footprint at Soldiers Pinch.	
(e) Research potential	Construction of compound at Soldiers Pinch	The construction of the compound elements is within the curtilage of the item and may impact ephemeral traces of historical road alignments.	Yes
(f) Rarity	Construction of compound at Soldiers Pinch	The historical destruction of sections of Cox's Road means that any surviving sections are considered rare.	Yes
(g) Representativeness	Construction of compound at Soldiers Pinch	The establishment and use of the construction site would not alter the character of the item as a general collection of former road alignments.	No

Process questions

As the construction footprint is proposed for an area adjacent and partially within the Soldiers Pinch heritage item, there would be a direct impact to the item. Given the scale of the construction footprint relative to the area of the heritage item, the relevant process questions considered are therefore related to major additions (within the meaning of the *Statements of Heritage Impact* guideline (NSW Heritage Office, 2002)).

Table 4-8 Process questions for major additions at Soldiers Pinch

Process question	Assessment
How is the impact of the addition on the heritage significance of the item to be minimised?	The majority of the additions would take place on existing disturbed ground, currently used as a construction site and stockpiling area. The elements making up the Soldiers Pinch heritage item are located outside the construction footprint with some potential for unrecorded sections of Cox's Road at its eastern extremity. However, as noted by Lavelle in 2000, these unrecorded sections are likely to be ephemeral.
Can the additional area be located within an existing structure? If not, why not?	Yes. Most of the construction footprint would be outside the curtilage of the heritage item, with a small section of incursion at the eastern edge of the construction footprint.
Will the additions tend to visually dominate the heritage item?	Being a collection of historical road alignments and associated features, the setting of the item is not considered significant and therefore amenable to change.
Are the additions sympathetic to the heritage item? In what way (e.g. form, proportions, design)?	Not applicable.

Statement of Heritage Impact

This item comprises a collection of historical road alignments and associated infrastructure. Construction of the project would take place to the west of this item's curtilage, with its western boundary partially within the footprint of the construction site. The area proposed for the construction site has been used as a compound and stockpiling area at least since the construction of the 2002 realignment of the Great Western Highway and is highly disturbed.

While some potential for unrecorded sections of Cox's Road is possible in the interface area between the heritage item's curtilage and the construction footprint, these unrecorded sections are likely to be ephemeral.

The potential direct impact to the Soldiers Pinch heritage item is therefore assessed as **negligible**.

Site of the Plough Inn

Extent of impacts

As discussed in Section 3.3.3, given the modification of the landscape over the past century, the precise location of the Plough Inn in the modern landscape is not certain. It was described as being at the foot of Victoria Pass and opposite the Mount Victoria Stockade site (refer to Figure 3-21), which is partially within the construction footprint.

Given the disturbance in the vicinity of the site through roadworks, residential development and agricultural land uses, it is uncertain whether any archaeological remains relating to the Plough Inn site would survive. The significance of any surviving deposits would depend on their nature and extent. However, it is likely that they would be of local heritage significance. Any disturbance of the archaeological remains during construction would likely be major.

As detailed in Section 1.2.3, it is anticipated that surface works associated with the Little Hartley to Lithgow Upgrade would be carried out ahead of the project in the area identified as potentially containing archaeological remains associated with the Plough Inn. In this case, if archaeological remains do in fact exist, they are likely to be encountered during the construction of the Little Hartley to Lithgow Upgrade and would have been appropriately managed prior to ground disturbing works for the project.

Notwithstanding, given the uncertainty around the precise location of the Plough Inn site, all project construction works in this area should be managed through unexpected heritage items protocols (Transport for New South Wales, 2022).

Assessment of impacts

Assessment of project impacts on the site of the Plough Inn against NSW Heritage values is summarised in Table 4-9.

Table 4-9 Assessment of impact – site of the Plough Inn

NSW heritage value	Potential impact	Assessment	NSW heritage values impacted
(a) Historical	Construction activities at Little Hartley	The construction activities at Little Hartley would not alter the historical significance of the archaeological site.	No
(b) Associations	Construction activities at Little Hartley	The construction activities at Little Hartley would not alter the associative significance of the archaeological site.	No

NSW heritage value	Potential impact	Assessment	NSW heritage values impacted
(e) Research potential	Construction activities at Little Hartley	The precise location of the site of the Plough inn is not certain. However, any disturbance of the archaeological remains during construction would likely be a major impact.	Yes
(f) Rarity	Construction activities at Little Hartley	Should the construction activities disturb the archaeological site, it would likely cause major impact.	Yes

Statement of Heritage Impact

The exact location of the Plough Inn is not certain. However, one of the sites identified as its potential location lies partly within the footprint of the Little Hartley construction footprint.

The potential impact to any archaeological remains, if they exist, would therefore be **major**.

Mount Victoria Stockade

Extent of impacts

The Little Hartley construction footprint would be partially located within the curtilage of the Mount Victoria Stockade site, a site of high archaeological potential. Although the Mount Victoria Stockade site is not recorded on either the State Heritage Register or under the Lithgow LEP, its heritage significance has consistently been assessed as potentially being of State heritage significance since its identification in the 1990s.

As noted in Section 3.3.2, little archaeological work has been undertaken on stockade sites. This makes the assessment of impact difficult to ascertain, particularly as this site has not been visually inspected as part of this investigation and reliance is therefore placed on the observations made by other researchers regarding archaeological potential and the physical extent of the site. However, as noted in Section 3.3.2, previous assessments have indicated that there is a high potential for archaeological deposits to be present relating to the stockade buildings and their use. As these deposits are related to the convict iron gangs who built both Victoria Pass and Mitchell's Road to Bathurst, they would potentially be of State heritage significance.

As the site is of potential State heritage significance yet remains poorly understood from an archaeological perspective, it is recommended that refinement of the design of the surface works and operational infrastructure be undertaken to avoid impacting this site. If this is not feasible, it is recommended that a full archaeological assessment of the portion of the site to be impacted be undertaken prior to any ground disturbing works taking place on the site.

Assessment of impacts

Assessment of project impacts on the Mount Victoria Stockade site against NSW Heritage values is summarised in Table 4-10.

Table 4-10 Assessment of impact – Mount Victoria Stockade

NSW heritage value	Potential impact	Assessment	Values impacted (Y/N)
(a) Historical	Construction activities at Little Hartley	The construction activities would not alter the site's historical significance	No

NSW heritage value	Potential impact	Assessment	Values impacted (Y/N)
(b) Association	Construction activities at Little Hartley	The construction activities would not alter the site's historical significance	No
(e) Research potential	Construction activities at Little Hartley	Any impact on archaeological deposits associated with the stockade site would impact the overall research potential of the site.	Yes
(f) Rarity	Construction activities at Little Hartley	Any impact on the archaeological deposits associated with the stockade site would impact the overall rarity of the site.	Yes
(g) Representativeness	Construction activities at Little Hartley	The construction activities are unlikely to impact the overall representative characteristics of the site.	No

Statement of Heritage Impact

This archaeological site is the site of the former Mount Victoria Stockade, which housed convicts and their guards during construction of Victoria Pass and sections of the Western Road (now the Great Western Highway). The Little Hartley construction footprint would be located partially within the curtilage of the site.

The potential impact to this item is assessed as **moderate**.

4.2 Indirect construction impacts

The project has the potential to indirectly impact heritage items and conservation areas during construction through:

- generation of vibration from tunnelling and other construction activities
- ground settlement from tunnelling and groundwater drawdown
- introduction of visual elements within heritage curtilages.

Areas of archaeological potential are unlikely to be affected by these types of indirect impacts.

4.2.1 Potential indirect vibration impacts

Appendix G – Technical report – Noise and vibration of the EIS presents a detailed assessment of the potential noise and vibration impacts of the project during construction and operation. The following discussion of potential vibration impacts on heritage items relies on information presented in that technical report.

The noise and vibration technical report identifies that construction of the project may generate vibration impacts in two main ways:

- associated with the operation of tunnel boring machines (TBM) during construction of the project tunnels
- associated with surface construction activities, particularly the use of vibration intensive plant and equipment.

The noise and vibration assessment notes the absence of an Australian Standard relating to potential damage to structures from vibration, and has instead adopted vibration criteria from the German standard *DIN 4150-3: 1992-02 Vibration in Buildings – Part 3: Effects on Structures*. DIN 4150 includes the following structural damage criteria (peak particle velocity) for structures that are particularly sensitive to vibration and have intrinsic value (such as buildings that are under a preservation order/ heritage listed):

- for frequencies less than 10 Hz – 3 mm/s (at building foundation)
- for frequencies 10 Hz to 50 Hz – 3 to 8 mm/s (at building foundation)
- for frequencies 50 Hz to 100 Hz – 8 to 10 mm/s (at building foundation)
- for all frequencies – 8 mm/s (at the horizontal plane of the highest floor).

Vibration caused by tunnelling (tunnel boring machines)

The noise and vibration technical report presents modelling of vibration generated by the operation of two tunnel boring machines (TBMs) during construction of the project. Annexure F to the technical report includes maps that show the magnitude and spatial extent of vibration generated during tunnelling for the project. Vibration generated by operation of TBMs would be higher than vibration from use of roadheaders, which are anticipated to have a negligible surface vibration impact based on Appendix G – Technical report – Noise and vibration of the EIS.

Modelled vibration levels (peak particle velocity) at heritage items and conservations areas within 60 metres of the outer edge of the project tunnels are summarised in Table 4-11. The modelled vibration levels confirm that the DIN 4150 vibration criteria for the protection of vibration sensitive structures would not be exceeded at any heritage building/ structure and in most cases, heritage buildings/ structures would not be affected by any tunnelling vibration. Only two areas within listed heritage items have been identified as potentially affected by vibration in excess of 3 mm/s (peak particle velocity) as a consequence of project tunnelling, with neither of these areas occupied by a heritage building/ structure:

- a small area in the south west corner of the Ban Tigh, Brewery site and Garden (Blue Mountains LEP BH060)
- a small area in the south east corner of the Osborne Cottage (site only) (Blue Mountains LEP, BH039).

On the basis of the modelling presented in the noise and vibration technical report, indirect vibration impacts to heritage items and conservation areas is not anticipated as a consequence of tunnelling during construction of the project.

Table 4-11 Modelled tunnelling vibration at heritage items and conservation areas (peak particle velocity) (Appendix G – Technical report – Noise and vibration of the EIS)

Heritage item	Address	Heritage list and identifier	Estimated tunnelling vibration (peak particle velocity, mm/s)
Lookout Hill Heritage Conservation Area	Blackheath	Blue Mountains LEP, BH215	0 mm/s
Thornington and Gardens	8-12 Staveley Parade, Blackheath	Blue Mountains LEP, BH083	0 mm/s
St Mounts	1A and 3 Abbott Street and 194-196 Great Western Highway, Blackheath	Blue Mountains LEP, BH052	0 mm/s
Gwandoban	24 Lookout Street, Blackheath	Blue Mountains LEP, BH096	0 mm/s

Heritage item	Address	Heritage list and identifier	Estimated tunnelling vibration (peak particle velocity, mm/s)
Blackheath West Heritage Conservation Area	Blackheath	Blue Mountains LEP, BH214	≤2.8 mm/s (north east corner of conservation area)
Blackheath Public School and certain interiors	1A Leichhardt Street, Blackheath	Blue Mountains LEP, BH033	0 mm/s
Former teacher's residence	207 Great Western Highway, Blackheath	Blue Mountains LEP, BH161	0 mm/s
Norwood	209 Great Western Highway, Blackheath	Blue Mountains LEP, BH056	0 mm/s
Horse trough	Great Western Highway	Blue Mountains LEP, BH134	0 mm/s
Kerry's Service Station and Interiors (IGA)	211 Great Western Highway, Blackheath	Blue Mountains LEP, BH162	0 mm/s
Kia Ora	213 Great Western Highway, Blackheath	Blue Mountains LEP, BH163	0 mm/s
Garage building and interior	215 Great Western Highway, Blackheath	Blue Mountains LEP, BH164	0 mm/s
Inter war bungalow	217-221 Great Western Highway, Blackheath	Blue Mountains LEP, BH165	0 mm/s
Baptist Church	6 Bundarra Street, Blackheath	Blue Mountains LEP, BH040	0 mm/s
Guinness Lodge/Evanville	1-5 Waragil Street, Blackheath	Blue Mountains LEP, BH059	0 mm/s
Dover Hall and interiors	124 Station Street, Blackheath	Blue Mountains LEP, BH192	0 mm/s
Cottage	1 Haviland Avenue, Blackheath	Blue Mountains LEP, BH175	0 mm/s
Weatherboard semi-detached cottage	3 Haviland Avenue, Blackheath	Blue Mountains LEP, BH074	0 mm/s
Semi-detached cottage	5-7 Haviland Avenue, Blackheath	Blue Mountains LEP, BH176	0 mm/s
Braemar	132 Station Street, Blackheath	Blue Mountains LEP, BH075	0 mm/s
Group of cottages	8-14 Railway Avenue, Blackheath	Blue Mountains LEP BH191	0 mm/s
Tree Tops and garden	16 Clyde Avenue, Blackheath	Blue Mountains LEP BH065	≤2.2 mm/s
Brick cottage	18 Waragil Street, Blackheath	Blue Mountains LEP BH193	0 mm/s
Ban Tigh, Brewery site and Garden	26-34 Waragil Street, Blackheath	Blue Mountains LEP BH060	0 mm/s (building) >3 mm/s (south west corner of property)
Osborne Cottage (site only)	52-106 Thirroul Avenue, Blackheath	Blue Mountains LEP, BH039	0 mm/s (building) >3 mm/s (south east corner of property)

Heritage item	Address	Heritage list and identifier	Estimated tunnelling vibration (peak particle velocity, mm/s)
Magellan	18-20 Ada Road, Blackheath	Blue Mountains LEP, BH068	0 mm/s
Majorca	22-24 Ada Road, Blackheath	Blue Mountains LEP, BH069	0 mm/s
Montana	37 Ada Road, Blackheath	Blue Mountains LEP, BH071	0 mm/s
Currong	13-15 Ada Road, Blackheath	Blue Mountains LEP, BH066	0 mm/s
Trig Station (MV001)	5-9 Apex Avenue, Blackheath	Blue Mountains LEP, MV001	0 mm/s
Central Mount Victoria Heritage Conservation Area	Mount Victoria	Blue Mountains LEP, MV023	0 mm/s
Fermoy	39-43 Victoria Street, Mount Victoria	Blue Mountains LEP, MV050	0 mm/s
Mount Victoria Public School and certain interiors	105-107 Great Western Highway, Mount Victoria	Blue Mountains LEP, MV014	0 mm/s
Post war fibro duplex	19 Kanimbla Valley Road, Mount Victoria	Blue Mountains LEP, MV076	0 mm/s
Mitchell's Ridge Monument Reserve	Great Western Highway, Mount Victoria	Blue Mountains LEP, MV015	0 mm/s
Victoria Pass	Great Western Highway, Mount Victoria	Blue Mountains LEP, MV087, Lithgow LEP, A183	0 mm/s
Berghofer's Pass	Berghofer Drive and 2-4 Great Western Highway, Mount Victoria	Blue Mountains LEP, MY001	0 mm/s

Vibration caused by surface construction activities

The noise and vibration technical report presents minimum separation distances that vibration intensive construction plant and equipment can be located from structures that are particularly sensitive to vibration or have intrinsic value (such as buildings that are under a preservation order/ heritage listed) before the vibration criteria in DIN 4150 may be exceeded. These minimum separation distances for a range of construction plant and equipment are reproduced in Table 4-12.

At the Blackheath and Soldiers Pinch construction footprints, there are no heritage buildings/ structures within the minimum separation distances from the construction footprint boundaries. Although the majority of the Blackheath construction footprint and part of the Soldiers Pinch construction footprint are covered by the Greater Blue Mountains Area (Additional Values) nomination for the National Heritage List, there are no heritage buildings/ structures associated with this nomination. Further, at the Soldiers Pinch construction footprint, the Soldiers Pinch heritage item (Blue Mountains LEP, MV009) is around 200 metres from the boundary of the construction footprint and only the curtilage around the item (rather than any heritage building/ structure) would be affected by construction activities. Indirect vibration impacts on heritage items at Blackheath and Soldiers Pinch are therefore not expected.

There are two heritage items, both around 30-40 metres from Little Hartley construction footprint at the closest point (measured from boundary to boundary) potentially within minimum working distances for cosmetic damage from vibration:

- Nioka (Lithgow LEP, I025)

- Rosedale (Lithgow LEP, I024)

The heritage buildings/ structures associated with Nioka would be located around at least 70-80 metres from the boundary of the Little Hartley construction footprint. They are therefore not anticipated to be affected by indirect vibration impacts based on the minimum separation distances summarised in Table 4-12.

The closest heritage buildings/ structures associated with Rosedale property would be located around 60-70 metres from the boundary of the Little Hartley construction footprint. Depending on construction planning, including the selection of plant and equipment and its location within the construction footprint, the potential for indirect vibration impacts may arise. In this context:

- construction planning and selection of plant and equipment should proceed with the aim of avoiding the location of vibration-intensive plant and equipment within the minimum separation distances in Table 4-12
- where it is not reasonable or feasible to achieve minimum separation distances, vibration monitoring at potentially affected Rosedale buildings/ structures should be carried out during construction, and the relevant buildings/ structures should be subject to condition surveys prior to the commencement and following the completion of construction.

Table 4-12 Minimum separation distances for vibration intensive construction plant and equipment before DIN 4150 vibration criteria for sensitive structures may be exceeded (Appendix G – Technical report – Noise and vibration of the EIS)

Plant item	Rating/Description	Minimum working distance
		Cosmetic damage (DIN 4150) - heritage and other sensitive structures
Vibratory roller	< 50 kN (Typically 1-2 t)	14 metres
	< 100 kN (Typically 2-4 t)	16 metres
	< 200 kN (Typically 4-6 t)	33 metres
	< 300 kN (Typically 7-13 t)	41 metres
	> 300 kN (Typically 13-18 t)	54 metres
	> 300 kN (> 18 t)	68 metres
Small hydraulic hammer	(300 kg - 5 to 12 t excavator)	5 metres
Medium hydraulic hammer	(900 kg – 12 to 18 t excavator)	19 metres
Large hydraulic Hammer	(1600 kg – 18 to 34 t excavator)	60 metres
Vibratory pile driver	Sheet piles	50 metres
Pile boring	≤ 800 mm	4 metres
Jackhammer	Hand held	2 metres

4.2.2 Potential indirect visual impacts

Appendix N – Technical report – Landscape and visual of the EIS presents an assessment of potential landscape and visual impacts of the project during construction and operation. The following discussion of potential visual impacts on heritage items relies on information presented in that technical report.

Potential visual impacts to heritage items and conservation areas during construction would be temporary, with ongoing impacts associated with operational infrastructure (refer to Section 4.3.1). At both the Blackheath and Little Hartley construction footprints, construction activities associated with adjacent Great Western Highway Upgrade projects will have already introduced construction works and associated changes to the landscape and visual setting ahead of any construction activities for the project. The extent of construction disturbance associated with adjacent upgrade projects is shown in Figure 1-9 (Blackheath) and Figure 1-10 (Little Hartley).

Blackheath construction footprint

At Blackheath, the relevant heritage item that may be affected by visual impacts during construction of the project is the Greater Blue Mountains Area (Additional Values) nomination for the National Heritage List. Based on the assessment of visual catchments presented in Appendix N – Technical report – Landscape and visual of the EIS, other heritage items and conservations areas to the north in Blackheath would be visually screened from the Blackheath construction footprint by topography, vegetation and buildings.

The Blackheath construction footprint, and the construction activities that would occur within it, would introduce a major change to the visual setting of the area. During construction, this would mainly relate to the removal of native vegetation, soil disturbing activities and the temporary presence of construction plant and equipment. While these elements would be visible from the Greater Blue Mountains Area (Additional Values) area, it is relevant to note that the National Heritage List nomination does not include a visual setting as part of its heritage values, with the exception of the nominated item's deep gorges/ canyons and associated forest cover. There are no gorges/ canyons within the Blackheath construction footprint or within the visual catchment around it. Therefore, although the Blackheath construction footprint would be visible from parts of the Greater Blue Mountains Area (Additional Values) area, it would not have an indirect visual impact on the nominated values of the heritage item.

Soldiers Pinch construction footprint

The Soldiers Pinch construction footprint would introduce a temporary visual element within the curtilage of the Soldiers Pinch heritage item (Blue Mountains LEP, MV001) and would affect part of the Greater Blue Mountains Area (Additional Values) area nomination for the National Heritage List.

The Soldiers Pinch heritage item comprises historical road alignments and associated infrastructure and does not rely on its setting for its significance. The Soldiers Pinch construction footprint and the activities that would be carried out within it would therefore not pose an indirect impact the heritage value of the item.

As noted above in relation to the Blackheath construction footprint, the Greater Blue Mountains Area (Additional Values) area does not include visual and landscape setting in its heritage values, with the exception of deep gorges/ canyons and associated forest cover. There are no deep gorges/ canyons within the Soldiers Pinch construction footprint or its visual catchment.

Little Hartley construction footprint

The Little Hartley construction footprint would be in proximity to and has the potential to affect the visual and landscape setting of:

- Nioka (Lithgow LEP, I025)
- Rosedale (Lithgow LEP, I024).

Although the boundary of the Nioka heritage item would be around 30-40 metres from the Little Hartley construction footprint at its closest point, the heritage buildings/ structures are further away (around 70-80 metres from the construction footprint at the closest point). They are screened from the existing Great Western Highway by mature vegetation along the north eastern and south western elevations from the property. This vegetation would also screen the property from the Little Hartley construction footprint and would mitigate the potential for temporary indirect visual impacts on the heritage item during construction.

The Rosedale heritage item is closer to the Little Hartley construction footprint, with the closest heritage buildings/ structures around 60-70 metres from the boundary of the construction footprint. As outlined in Appendix N – Technical report – Landscape and visual of the EIS, the Rosedale homestead is located on slightly elevated ground and surrounded by extensive pastures. It has uninterrupted views across the existing Great Western Highway and would experience similar views towards the Little Hartley construction footprint. The landscape and visual assessment identified that the Rosedale heritage item would be highly sensitive to visual change. Although the Little Hartley construction footprint and associated construction activities would be a temporary intrusion within the vista from Rosedale, the magnitude of the temporary visual impact to Rosedale's setting would be similar to that experienced from permanent project infrastructure (refer to Section 4.3.1). The landscape and visual assessment has assessed this magnitude of visual impact to be **moderate**.

Consistent with the recommendations made in relation to visual impacts on Rosedale from operational infrastructure (refer to Section 4.3.1), it is recommended that opportunities be investigated to provide early visual screening of Rosedale from the Little Hartley construction footprint and construction activities. This may involve early establishment of operational landscaping/ screening during the construction phase to allow for that landscaping/ screening to be well developed prior to completion of project construction. Subject to construction planning, and noting the anticipated timing of adjacent highway upgrade projects, there may be an opportunity to implement early landscaping/ screening as part of the adjacent Little Hartley to Lithgow upgrade project.

4.2.3 Potential indirect settlement impacts

Ground settlement relevant to the project may occur through two possible mechanisms:

- removal rock/ soil as part of tunnelling, leading to a weakening and slumping of the overlying geology
- groundwater drawdown, leading to a weaking and slumping of the affected geology.

The potential for these types of settlement have been considered as part of the design of the project (refer to Chapter 13 (Groundwater and geology) of the EIS), and through the groundwater modelling and impact assessment carried out for the project (Appendix I – Technical report – Groundwater of the EIS). The following discussion of potential settlement impacts on heritage items relies on information presented in those documents.

Appendix I – Technical report – Groundwater of the EIS presents the outcomes of groundwater modelling, which indicate that the project would lead to groundwater drawdown around the project tunnel portals and around the mid tunnel access shaft used during construction at Soldiers Pinch. Groundwater drawdown would be experienced within Banks Wall Sandstone, Mt York Claystone and Burra-Moko Head Sandstone formations. The groundwater impact assessment explains that given the strength and integrity of these geological formations, groundwater drawdown would not lead to weakening and slumping, and would therefore not result in settlement impacts.

Design development for the project has involved assessment of potential settlement impacts resulting from the removal of rock/ soil as part of tunnelling activities. This assessment is presented in Chapter 13 (Groundwater and geology) of the EIS. An initial screening assessment was carried out to identify areas and structures within those areas that may be affected by settlement greater than 5 millimetres as a result of construction of the project. Five heritage items were identified through the initial screening assessment for more detailed consideration (refer to Table 4-13).

For each heritage item, the predicted maximum settlement, angular distortion and equivalent strain were calculated and compared to the criteria recently applied to sensitive structures (such as heritage buildings) through conditions of approval for other recent road tunnel projects in Sydney. These criteria (for sensitive structures) are:

- maximum settlement – 20 millimetres
- maximum angular distortion – 1:500
- maximum equivalent strain – 0.1%.

The calculations reproduced in Table 4-13 show that predicted maximum angular distortion and maximum equivalent strain at all heritage items would be well below these criteria. The heritage item the most affected by settlement (Tree Tops and garden (Blue Mountains LEP BH065) may experience settlement of up to 16.8 millimetres, which would be below the settlement criterion of 20 millimetres for sensitive structures. All assessed heritage items would be affected by angular distortion and equivalent strain well below applicable criteria.

Based on the settlement calculations carried out as part of the design of the project, as presented in Chapter 13 (Groundwater and geology) of the EIS, material indirect settlement impacts to heritage items is not expected.

Table 4-13 Predicted settlement impacts at affected heritage items (refer to Chapter 15 (Groundwater and geology) of the EIS)

Heritage item	Maximum settlement (millimetres)	Maximum angular distortion	Maximum equivalent strain (%)
St Mounts (Blue Mountains LEP, BH052) 1A and 3 Abbott Street and 194-196 Great Western Highway, Blackheath	2.1	1:8700	0.0066
Guinness Lodge/Evanville (Blue Mountains LEP, BH059) 1-5 Waragil Street, Blackheath	6.5	1:4200	0.0078
Tree Tops and garden (Blue Mountains LEP BH065) 16 Clyde Avenue, Blackheath	16.8	1:5000	0.0030
Montana (Blue Mountains LEP, BH071) 37 Ada Road, Blackheath	10.5	1:4900	0.0044

4.3 Operational impacts

The project has the potential to indirectly impact heritage items and conservation areas during operation through permanent changes to the landscape and visual setting. These changes would occur at Blackheath and Little Hartley. No permanent operational infrastructure is proposed at Soldiers Pinch (construction only), and the Soldiers Pinch construction footprint would be rehabilitated following completion of construction.

Potential indirect settlement impacts have been discussed in Section 4.2.3. The project is not anticipated to generate substantial vibration levels during operation (refer to Appendix G – Technical report – Noise and vibration of the EIS).

4.3.1 Potential indirect visual impacts

Appendix N – Technical report – Landscape and visual of the EIS presents an assessment of potential landscape and visual impacts of the project during construction and operation. The following discussion of potential visual impacts on heritage items relies on information presented in that technical report.

Heritage items that may be affected by visual impacts from permanent operational infrastructure would include:

- Greater Blue Mountains (Additional Values) nomination for the National Heritage List (Blackheath end of the project)
- Nioka (Lithgow LEP, I025) (Little Hartley end of the project)
- Rosedale (Lithgow LEP, I024) (Little Hartley end of the project).

At its closest points, the Greater Blue Mountains World Heritage area would be:

- more than one kilometre to the north east (with Blackheath between) and more than two kilometres to the east of the Blackheath surface works
- more than three kilometres to the east of the Little Hartley surface works.

Based on the assessment of visual catchments in Appendix N – Technical report – Landscape and visual of the EIS, permanent operational infrastructure would not be visually discernible from the World Heritage Area through a combination of distance, topography and intervening vegetation/ structures.

Greater Blue Mountains Area (Additional Values)

Permanent operational infrastructure at the Blackheath end of the project may visually affect the Greater Blue Mountains Area (Additional Values) nomination for the National Heritage List. The following project elements have the potential to result in visual impacts:

- tunnel portals

- Blackheath tunnel operations facility
- ventilation outlet (if the project is ventilated using outlets rather than portal emissions)
- urban design initiatives
- utility connections/substations
- landscaping.

The landscape and visual assessment considers a series of viewpoints around the Blackheath surface works. For viewpoints immediately within or adjacent to the operational boundary of the project (and therefore comparable to the level of impact anticipated at the closest points of the Greater Blue Mountains Area (Additional Values) nomination), the assessment identifies that the sensitivity of the viewpoints would be high, the magnitude of visual change would be high and the overall visual impact rating would therefore be high. It also identifies a lower visual impact if the project adopts portal emissions rather than construction of a ventilation outlet, and recognises the mitigating effects of intervening vegetation screening which may be provided through site rehabilitation and landscaping.

Although it is likely that the closest parts of the Greater Blue Mountains Area (Additional Values) nomination to the Blackheath surface infrastructure would experience a high visual impact, it is unlikely that this visual impact would translate into a material effect on heritage values. Importantly, the nominated values of the Greater Blue Mountains Area (Additional Values) do not include a visual setting, with the exception of the nominated item's deep gorges/canyons and associated forest cover, none of which are present within the visual catchment of the Blackheath permanent operational infrastructure. The project would therefore not cause a visual impact nor diminish the existing heritage values of the nominated item. This is distinguished from the ecological impacts of the project and implications for the ecological heritage values of the item (refer to Section 4.1).

Nioka (I025) and Rosedale (I024)

Permanent operational infrastructure at the Little Hartley end of the project would be located in proximity to and may visually affect Nioka (Lithgow LEP, I025) and Rosedale (I024). The following project elements have to potential to result in visual impacts:

- tunnel portals
- Little Hartley operational infrastructure
- ventilation outlet (if the project is ventilated using outlets rather than portal emissions)
- urban design initiative
- utility connections/substations
- landscaping.

Appendix N – Technical report – Landscape and visual of the EIS characterises the visual catchment around the Little Hartley surface works as comprising three main landscape character zones (LCZs):

- LCZ1 – along the existing Great Western Highway corridor
- LCZ3 – land to the north and south of the existing Great Western Highway corridor, referred to as the 'Butlers Creek Valley'
- LCZ4 – land to the east of the Little Hartley surface works, characterised as 'bushland' along Victoria Pass.

LCZ3 (Butlers Creek Valley) is the most relevant landscape character zone for the assessment of potential indirect visual impacts on heritage items, and both Nioka and Rosedale are located in this zone.

The landscape and visual impact assessment describes LCZ3 (Butlers Creek Valley) as comprising a wide, open pastoral landscape partially framed by the steep, densely vegetated ridge line of Mount York to the north east and Mount Sugarloaf to the south. The valley has a gently undulating topography and paddocks dotted with occasional farm dams and houses in stark contrast to the steep, rugged slopes of the surrounding mountains. Vegetation in the valley is mostly pasture grasses with small pockets of

native vegetation. The landscape and visual assessment highlights that LCZ3 (Butlers Creek Valley) is highly sensitive to landscape and visual changes given the open nature of the valley and the central location of the project works within the valley.

The landscape and visual impact assessment identifies a high to moderate adverse impact on the landscape of LCZ3 (Butlers Creek Valley) as a result of permanent project infrastructure, irrespective of whether ventilation outlets or portal emissions are employed to ventilate the project tunnels. The landscape impact assessment for LCZ (Butlers Creek Valley) is reproduced below.

Table 4-14 Landscape impact assessment for LCZ3 (Butlers Creek Valley) (reproduced from Appendix N – Technical report – Landscape and visual of the EIS)

Measure	Emissions via ventilation outlet	Emissions via portals
Sensitivity	High	High
Magnitude	Moderate	Moderate
Landscape character impact rating	High to moderate	High to moderate
Qualitative rating	Adverse	Adverse

Nioka

The boundary of the Nioka heritage item would be around 100 metres from the closest permanent infrastructure associated with the project (the upgraded highway carriageway), with upgrade works to the existing highway delivered as part of the Little Hartley to Lithgow upgrade project located between the two (refer to Figure 1-4). It would be located around 650-700 metres from the tunnel portals, and around 800 metres from the ventilation outlet (if implemented as part of the project).

The Nioka property is screened from the existing Great Western Highway, and would be screened from permanent project infrastructure, by mature vegetation along the north east and south west elevations of the site. This mature vegetation would not be affected by the project, and would continue to provide an effective screening mitigation against potential visual impacts on Nioka. On this basis, the potential for adverse visual impacts from the project on Nioka during operation would be low. The project would be unlikely to affect the heritage values of Nioka through indirect visual impacts.

Rosedale

Unlike Nioka, Rosedale does not benefit from existing vegetation screening. Rosedale fronts the existing Great Western Highway, and although set back from the road corridor, it is located on slightly elevated ground. Its elevation and setting within extensive pastures provides uninterrupted views across the landscape, including to the north across the existing Great Western Highway and land that would be occupied by permanent project infrastructure. Rosedale is of local heritage significance and its setting is listed in its statement of significance as a feature of the heritage item.

Appendix N – Technical report – Landscape and visual presents a visual impact assessment from Rosedale, including an artist's impression of the anticipated change in the vista from the site as a result of the project. The following figures are reproduced from the landscape and visual assessment and show the existing view from Rosedale (Figure 4-2), an artist's impression of the view from Rosedale once the project is completed (Figure 4-3), and an indication of the changes in view attributable to the project and the adjacent Little Hartley to Lithgow upgrade (Figure 4-4).



Figure 4-2 Existing view from Rosedale (viewpoint 15, Appendix N – Technical report – Landscape and visual of the EIS)



Figure 4-3 Artist's impression of the view from Rosedale, including project infrastructure (viewpoint 15, Appendix N – Technical report – Landscape and visual of the EIS)



Figure 4-4 Artist's impression of the view from Rosedale, including project infrastructure (viewpoint 15, Appendix N – Technical report – Landscape and visual of the EIS), showing project components and components delivered as part of the Little Hartley to Lithgow upgrade

The landscape and visual impact assessment includes an assessment of the visual impact of permanent project infrastructure on the Rosedale property (reproduced in Table 4-15). It recognises that the heritage item is highly sensitive to change, and assesses the magnitude of visual change from the project as moderate, irrespective of whether the project tunnels are ventilated using ventilation outlets or portal emissions. In assigning a moderate magnitude of visual change, the landscape and visual assessment recognises that the view from Rosedale is currently affected by existing Great Western Highway infrastructure and would also experience visual changes due to the Little Hartley to Lithgow upgrade project. Overall, the landscape and visual assessment concludes that Rosedale would be subject to a high to moderate adverse visual impact.

Table 4-15 Visual impact assessment for Rosedale (viewpoint 15) (reproduced from Appendix N – Technical report – Landscape and visual of the EIS)

Measure	Emissions via ventilation outlet	Emissions via portals
Sensitivity	High	High
Magnitude	Moderate	Moderate
Visual impact rating	High to moderate	High to moderate
Qualitative rating	Adverse	Adverse

As seen in Figure 4-3, the elevation of permanent project infrastructure would mean that it would be highly visible from the Rosedale homestead. This would include the safety barriers, signage, passing traffic and tree and shrub planting. The landscape and visual impact assessment highlights the potential to use vegetation screenings to reduce the visual impact of the project at Rosedale, and this would contribute to mitigation of the associated heritage impact. Vegetation screenings could be achieved through the retention of existing mature trees (such as those circled in red in Figure 4-2), if possible, replacement of those mature trees, or otherwise planning project landscaping to include larger/ denser species between Rosedale and the most visually prominent elements of the project.

Statement of Heritage Impact - Rosedale

The construction of the new carriageway for the Great Western Highway and the operational facilities at Little Hartley would introduce discordant visual features to the existing open, pastoral landscape. This landscape is an important part of the setting of Rosedale.

Given its proximity, the proposed works would have a **moderate** visual impact on Rosedale.

4.4 Matters of National Environmental Significance

Potential impacts of the project have been considered against the Matters of National Environmental Significance: Significance impact guidelines 1.1 (Australian Government, 2013) to identify potential impacts of the project on World Heritage properties or National Heritage places.

4.4.1 World heritage properties

The project is located outside of the World Heritage listed Greater Blue Mountain Area.

In the guideline, Matters of National Environmental Significance: Significant impact guidelines 1.1 (Australian Government, 2013), significance impact criteria for WHL properties include actions that will cause:

- one or more of the World Heritage values to be lost
- one or more of the World Heritage values to be degraded or damaged, or
- one or more of the World Heritage values to be notably altered, modified, obscured or diminished.

The project has been designed to avoid direct impacts to the World Heritage listed Greater Blue Mountain Area. The World Heritage List criteria the Greater Blue Mountain Area satisfies (refer to Section 4.1.2) relate to its natural heritage values, in particular its significant ongoing ecological and biological processes relating to its predominantly eucalypt plant communities (Criterion ix) and because of its important and significant diversity of in situ natural habitats, including threatened species of outstanding universal value (Criterion x). The project would take place outside the Greater Blue Mountain Area curtilage and therefore there would be no direct impact on this item.

In relation to indirect impacts, these largely relate to permanent visual impacts. The tunnel portals at Blackheath and Little Hartley are around 1.6 kilometres and three kilometres from the Greater Blue Mountain Area respectively. The tunnel portals would be designed to integrate with the surrounding landscape as far as possible. Furthermore, views to and from the Greater Blue Mountain Area and the project are not available and the project is not located within or near any views which include the Greater Blue Mountain Area, nor any viewpoint where important or notable views to the Greater Blue Mountain Area are seen from. Therefore no visual impact is expected to occur.

The Soldiers Pinch construction footprint at its closest point is around 50 metres from the World Heritage listed Greater Blue Mountain Area. The Soldiers Pinch construction footprint would only be used during construction of the project and there would be no permanent project infrastructure at this site. The Soldiers Pinch construction footprint has been highly disturbed, having been used as a construction and laydown site since around 2002.

4.4.2 National Heritage places

The National Heritage List and World Heritage List for the Greater Blue Mountain Area comprises the same heritage curtilage, there impacts are consistent with those described in Section 4.4.1 for the World Heritage listing.

In regards to the National Heritage List nomination for the Greater Blue Mountains Area (Additional Values), there are expected to be some minor impacts (refer to Section 4.1.2). This item covers broadly the same curtilage as World Heritage and National Heritage listed Greater Blue Mountain Area, with slight extensions at Soldiers Pinch and Blackheath.

Although not yet listed on the National Heritage List, this item has been nominated for the National Heritage List since at least 2005. As of April 2022, the Greater Blue Mountain Area (Additional Values) nomination is on the Australian Heritage Council's Proposed Priority Assessment List (PPAL) for 2022-23.

In the guideline, Matters of National Environmental Significance: Significant impact guidelines 1.1 (Australian Government, 2013), significance impact criteria for National Heritage listed properties include actions that will cause:

- one or more of the National Heritage values to be lost
- one or more of the National Heritage values to be degraded or damaged, or
- one or more of the National Heritage values to be notably altered, modified, obscured or diminished.

Two small areas of the Greater Blue Mountain Area (Additional Values) would be directly impacted. The heritage values attached to this nominated item are related to cultural values, scenic values and geological values. Impacts to the nominated item within the Blackheath and Soldiers Pinch construction footprints are assessed as minor, with no cultural, scenic or geological values impacted, but minor impacts to biodiversity (refer to Section 4.1.2).

As a result of the project:

- no National heritage values associated with the nominated item would be lost
- no National heritage values associated with the nominated item would be degraded or damaged, and
- no National heritage values associated with the nominated item would be notably altered, modified, obscured or diminished.

Accordingly, it is assessed that the project would not have a significant impact on the Greater Blue Mountains Area (Additional Values) item.

4.5 Summary of potential impacts

Table 4-16 summarises the outcome of the assessment of potential direct and indirect impacts from the project on heritage items, conservation areas and areas of archaeological potential. Key potential impacts (being impacts assessed as being greater than negligible) include:

- the Greater Blue Mountains Area – Additional Values National Heritage List nomination – minor direct impacts associated with the Blackheath and Soldiers Pinch construction footprints
- Rosedale (Lithgow LEP, I024) – moderate indirect visual/ setting impacts during construction (Little Hartley construction footprint) and operation (permanent operational infrastructure at Little Hartley)

- site of the Plough Inn (archaeological site) – subject to confirmation of the precise location of this archaeological site, potential major direct impact on archaeology. This site may also be impacted by the Little Hartley to Lithgow upgrade prior to potential disturbance by the project
- Mount Victoria Convict Stockade site (archaeological site) – potential moderate direct impacts on archaeology during construction (Little Hartley construction footprint).

Table 4-16 Summary of potential direct and indirect heritage impacts

Listing ID	Name	Address	Heritage significance	Potential direct impact	Potential indirect impact
105127	The Greater Blue Mountains Area	Great Western Highway, Katoomba	World Heritage	None	Negligible (Soldiers Pinch, visual, temporary during construction)
-	The Greater Blue Mountains Area – Additional Values	Great Western Highway, Katoomba	Currently not listed but nominated for National Heritage List	Minor (Soldiers Pinch, Blackheath)	None
MV009	Soldiers Pinch	455 Great Western Highway, Blackheath	Local	None (item) Negligible (curtilage)	None
I024	Rosedale	Great Western Highway, Little Hartley	Local	None	Moderate (visual, construction and operation) Negligible (vibration, construction)
I025	Nioka	2209 Great Western Highway, Little Hartley	Local	None	None
-	Site of the Plough Inn	Great Western Highway, Little Hartley	Unlisted, probable local significance (archaeological)	Major (archaeological, subject to confirmation of precise location, may also be affected by Little Hartley to Lithgow upgrade)	None
-	Mount Victoria Convict Stockade site	Little Hartley	Unlisted, potentially State significant (archaeological)	Moderate (archaeological)	None
-	Mitchell's Road	Great Western Highway, Little Hartley	Local	None	None
BH034	Blackheath Stockade	Blackheath	Local	None	None

Listing ID	Name	Address	Heritage significance	Potential direct impact	Potential indirect impact
BH215	Lookout Hill Heritage Conservation Area Blackheath	Blackheath	Local	None	None
BH052	St Mounts	1A and 3 Abbott Street and 194-196 Great Western Highway, Blackheath	Local	None	Negligible (settlement, construction)
BH214	Blackheath West Heritage Conservation Area	Blackheath	Local	None	Negligible (tunnelling vibration, construction)
BH059	Guinness Lodge/Evanville	1-5 Waragil Street, Blackheath	Local	None	Negligible (settlement, construction)
BH065	Tree Tops and garden	16 Clyde Avenue, Blackheath	Local	None	Negligible (tunnelling vibration, construction) Negligible (settlement, construction)
BH060	Ban Tigh, Brewery site and Garden	26-34 Waragil Street, Blackheath	Local	None	Negligible (tunnelling vibration, construction, curtilage only)
BH039	Osborne Cottage (site only)	52-106 Thirroul Avenue, Blackheath	Local	None	Negligible (tunnelling vibration, construction, curtilage only)
BH071	Montana	37 Ada Road, Blackheath	Local	None	Negligible (settlement, construction)
MV023	Central Mount Victoria Heritage Conservation Area	Mount Victoria	Local	None	None
MV015	Mitchell's Ridge Monument Reserve	Great Western Highway, Mount Victoria	Local	None	None
MY001	Berghofer's Pass	Near Great Western Highway, Mount Victoria	Local	None	None

Listing ID	Name	Address	Heritage significance	Potential direct impact	Potential indirect impact
A183	Victoria Pass	Great Western Highway, Mount Victoria	Local	None	Negligible (settlement, construction)

5.0 Assessment of cumulative impacts

Cumulative impacts have the potential to occur when benefits or impacts from a project overlap or interact with those of other projects, potentially resulting in a larger overall effect (positive or negative) on the environment or local communities. Cumulative impacts may occur when projects are constructed or operated concurrently or consecutively. Once the project is operational, other projects which interrelate may enhance the project and create positive cumulative benefits.

Cumulative impacts may also arise within the project in circumstances where a heritage item, conservation area or area of archaeological potential is either affected by different parts of the project, or different modes of impact (eg a combination of vibration and visual impacts).

5.1 Cumulative impacts within the project

Based on the summary of assessed direct and indirect impacts presented in Table 4-16, heritage items with the potential to be impacted by more than one project component, or through more than one mode of impact would include:

- The Greater Blue Mountains Area – Additional Values – minor direct impacts on this nominated heritage item have been identified in relation to the Blackheath and Soldiers Pinch construction footprints. Taken together, the cumulative impact to this heritage item has also been assessed as minor
- Rosedale (Lithgow LEP, I024) – assessed as being subject to moderate indirect visual impacts during construction and operation, and with the potential to experience negligible vibration impacts during construction. Given the negligible level of impact and potential to avoid vibration impacts through construction planning, the cumulative impacts to this heritage item have been assessed as moderate, consistent with the identified indirect visual impacts during construction and operation
- Tree Tops and garden (Blue Mountains LEP, BH065) – negligible indirect impacts on this local heritage item through tunnelling vibration and settlement have been identified. Taken together, the cumulative impact to this heritage item has also been assessed as negligible.

5.2 Cumulative impacts with other projects

Other projects that may raise the potential for cumulative impacts have been identified and screened against the following criteria:

- spatially relevant (i.e., the development or activity overlaps with, is adjacent or in close proximity to the project)
- timing (i.e., the expected timing of its construction overlaps or occurs consecutively to construction and/or operation of the project)
- scale (i.e., large-scale major development or infrastructure projects that have the potential to result in cumulative impacts with the project)
- status (i.e., projects in development with sufficient publicly available information to inform this environmental impact statement and with an adequate level of detail to assess the potential cumulative impacts).

Three projects, being other components of the Great Western Highway Upgrade Program were identified as meeting these criteria:

- Katoomba to Blackheath Upgrade (excluding Medlow Bath Upgrade)
- Medlow Bath Upgrade
- Little Hartley to Lithgow Upgrade.

The project would be carried out adjacent to and integrated with the Katoomba to Blackheath Upgrade and the Little Hartley to Lithgow Upgrade. Figure 1-3 and Figure 1-4 show the integration of the project with these adjacent upgrades. Figure 1-8 shows the indicative delivery program for each project.

Further information on the identification and assessment of cumulative project impacts is provided in Chapter 24 (Cumulative impacts) of the EIS.

5.2.1 Katoomba to Blackheath Upgrade

Separate Reviews of Environmental Factors (REFs) were prepared in 2022 and 2021 (respectively) for the Katoomba to Blackheath Upgrade and the Medlow Bath Upgrade (refer to Section 5.2.2).

The Katoomba to Blackheath Upgrade comprises two areas, one between Katoomba and south of Medlow Bath village, and the second area commencing north of Medlow Bath village and terminating to the south of Blackheath. As indicated in Figure 1-1, the northern extent of the Katoomba to Blackheath Upgrade (near Blackheath) overlaps with both the footprint and the construction program of the project (at the Blackheath construction footprint and permanent surface works).

The Statement of Heritage Impact (SoHI) for the Katoomba to Blackheath Upgrade identified 16 heritage items within or in proximity to the construction footprint of that project that may be directly or indirectly impacted, as listed in Table 5-1. The only one of these items that coincides with heritage items impacted by the project is the Greater Blue Mountains Area (Additional Values) nomination of the National Heritage List.

Table 5-1 Katoomba to Blackheath Great Western Highway Upgrade – Summary of non-Aboriginal heritage impacts

Item name	Significance	Within Katoomba to Blackheath Upgrade footprint	Direct impact	Indirect impact
Greater Blue Mountains Area (Additional Values)	National (nominated)	Adjacent	Minor adverse	-
The Great Western Highway	N/A	Yes	Minor adverse	-
Pulpit Hill and environs	Local (Item K166, Blue Mountains LEP 2015) *Note – recommended for State heritage listing	Yes	Major adverse	-
Stone arrangements	Local (Item K039, Blue Mountains LEP 2015) *Note – recommended for State heritage listing	Yes	Major adverse	-
Explorer's Tree and environs	Local (Item K031, Blue Mountains LEP 2015)	Yes	Moderate adverse	-
Shepherd and His Flock Inn (site)	Local (Item K082, Blue Mountains LEP 2015)	No	Nil	Nil

Item name	Significance	Within Katoomba to Blackheath Upgrade footprint	Direct impact	Indirect impact
Bonnie Doon reserve	Local (Item K079, Blue Mountains LEP 2015)	Yes	Minor adverse	-
Alignment change	Unlisted	Yes	Minor adverse	-
Old alignment	Unlisted	Yes	Minor adverse	
Culvert XA6	Local (unlisted)	Yes	Nil	Vibration – minor adverse
Culvert XA7	Local (unlisted)	Yes	Nil	Vibration – minor adverse
Culvert XA7a	Local (unlisted)	Yes	Nil	Vibration – minor adverse
House and orchard site	Unlisted	Yes	Moderate adverse (temporary)	-
The Pines	Local (Item MB016, Blue Mountains LEP 2015)	Adjacent	-	Visual – minor adverse Vibration – minor adverse
Gatekeeper's cottage	Local (Item MB006, Blue Mountains LEP 2015)	Adjacent	-	Visual – minor adverse Vibration – minor adverse
Quarry	Unlisted	Adjacent	Minor adverse	-

5.2.2 Medlow Bath Upgrade

The Medlow Bath Upgrade covers the upgrade of the Great Western Highway in Medlow Bath village. As noted above, this area was assessed under a separate REF to that of the Katoomba to Blackheath upgrade, with a separate Statement of Heritage Impact (SoHI) assessing non-Aboriginal heritage (RPS, 2021). The upgrade has been approved.

The SoHI identified 11 listed heritage items and three potential items within or in proximity to the construction footprint for the Medlow Bath Upgrade that may be directly or indirectly impacted, as listed in Table 5-2. Of these items, only the Greater Blue Mountains Area World Heritage and National Heritage listing is relevant to the project.

Table 5-2 Medlow Bath Upgrade – Summary of non-Aboriginal heritage impact

Item name	Significance	Within Medlow Bath Upgrade footprint	Direct impact	Indirect impact
Greater Blue Mountains Area	World, National	No	Little to none	-
Medlow Bath Railway Station Group	State (SHR 01190)	Yes	Major adverse	-
Avenue of trees (formerly “Avenue of Radiata Pines)	Local (Blue Mountains LEP MB015)	Yes	Major adverse	-
Medlow Bath Hydro-Majestic original walking track complex (only the parts within the grounds of the Hydro-Majestic)	Local (Item MB026, Blue Mountains LEP 2015)	Yes	Little to none	Visual - moderate adverse
Bus shelter	Potential heritage item	Yes	Minor-moderate	Visual - moderate adverse
Advertising sign	Potential heritage item	Yes	Major adverse	-
Hydro-Majestic	Local (Item MB002, Blue Mountains LEP 2015)	Adjacent	Minor to moderate adverse	Visual - moderate to major adverse
Former Post and Telegraph Store	Local (Item MB008, Blue Mountains LEP 2015)	Adjacent	Little to none	Visual - moderate adverse
Urunga	Local (Item MB017, Blue Mountains LEP 2015)	Adjacent	Little to none	Visual - moderate to major adverse
Melbourne House, Cosy Cot, Sheleagh Cottage	Local (Item MB019, Blue Mountains LEP, 2015)	Adjacent	Little to none	Visual - moderate to major adverse
Sandstone railway culvert	Potential heritage item	Adjacent	Little to none	-
[Former] St Lukes Anglican Church	Local (Item MB010, Blue Mountains LEP 2015)	No	Little to none	Visual - moderate adverse
Horse trough	Local (Item MB013, Blue Mountains LEP 2015)	No	Little to none	-
House	Local (Item MB018, Blue Mountains LEP 2015)	No	Little to none	-

5.2.3 Little Hartley to Lithgow Upgrade

An REF for this project was determined in 2022 and works have not yet commenced. It is proposed that around 14 kilometres of the Great Western Highway would be upgraded to a four-lane divided highway, including embankments, upgrade of existing intersections and local roads, provision of some service roads, five new bridges, including twin bridges over River Lett and Jenolan Caves Road, and ancillary works.

The non-Aboriginal heritage assessment prepared to support the REF identified 18 heritage items within or in proximity to the construction footprint for the Little Hartley Upgrade that may be directly or indirectly impacted, as listed in Table 5-3. Of these items, only Rosedale would also be impacted by the project. Nioka and Mitchell's Road are also located in proximity to the project, but would not be impacted during construction or operation.

In relation to some built heritage items (Nioka, Rosedale, Harp of Erin, Meads Farm, Old Roman Catholic Cemetery, St John the Evangelist's Anglican church/Rev Troughton gravemarker, Bridge over the River Lett, Fernhill), it was noted that some these items are likely to be more sensitive to the impacts of vibration and were located close to works associated with the project. Given their sensitivity and/or proximity to vibration-intensive works, it was recommended as part of the assessment for the Little Hartley to Lithgow Upgrade that dilapidation surveys be carried out for these items and that appropriate management/mitigation measures are implemented prior to commencement of construction.

Table 5-3 Little Hartley to Lithgow Great Western Highway Upgrade – Summary of non-Aboriginal heritage impacts

Item name	Significance	Within Little Hartley to Lithgow Upgrade footprint	Direct impact	Indirect impact
Rosedale		Adjacent	Negligible	Visual - minor adverse Vibration – minor adverse
Nioka		Adjacent	Negligible	Visual - negligible Vibration – minor adverse-negligible
Mitchell's Road	Local (unlisted)	Yes	Moderate adverse	Visual - moderate adverse
Billesdene Grange	Local (1023, Lithgow LEP 2014)	Yes (partial)	Major adverse (convict-built causeway element & potential archaeology)	Visual – moderate adverse
Little Hartley Heritage Conservation Area	C8 (Lithgow LEP 2014)	Yes	Moderate adverse	Visual – moderate adverse Vibration - negligible

Item name	Significance	Within Little Hartley to Lithgow Upgrade footprint	Direct impact	Indirect impact
Section of Cox's Road	Local (unlisted)	Yes	Major adverse	Visual – negligible Vibration - negligible
Log Cabin Farmhouse village shop ("Lolly Bug")	Local (unlisted)	Yes	Moderate adverse	Visual – minor adverse
Harp of Erin inn (also within Little Hartley HCA)	Local (I028, Lithgow LEP 2014)	Yes	Negligible (however detailed archaeological assessment recommended)	Visual – major adverse
House (also within the Little Hartley HCA)	Local (I021, Lithgow LEP 2014)	Adjacent	Minor adverse	Visual – minor adverse
Meads Farm (also within Little Hartley HCA)	Local (I020, Lithgow LEP 2014)	Yes	Moderate adverse	Visual – major adverse
Lyndoch Orchard	Local (I019, Lithgow LEP 2014)	Adjacent	Major adverse	Visual – moderate adverse
Old Roman Catholic Cemetery	Local (A015, Lithgow LEP 2014)	Adjacent	Negligible	Visual – minor adverse
St John the Evangelist's Anglican Church/Rev. Troughton gravemarker	Local (I029/A078, Lithgow LEP 2014)	No	Negligible	Visual – minor adverse
Hartley Historic Site	State (SHR 00992) Local (I043, Lithgow LEP 2014)	Yes	Moderate adverse (also archaeological impacts)	Visual – moderate adverse
Bridge over the River Lett	Local (unlisted)	Yes	Major adverse	Visual – major adverse
Archaeological potential on Lot 154/DP1122453 (3055 Great Western Highway, Hartley)	Local (unlisted)	Yes	Major adverse	-

Item name	Significance	Within Little Hartley to Lithgow Upgrade footprint	Direct impact	Indirect impact
Fernhill	State (SHR 00225) Local (I043, Lithgow LEP 2014)	Yes	Moderate adverse	Visual – moderate adverse Vibration/settlement – possible minor adverse
Historical bullock track and creek crossing	Local (unlisted)	Yes	Major adverse	Visual – major adverse

5.2.4 Cumulative impact assessment

The historical Western Road, now the Great Western Highway, was the first major development in the Blue Mountains and was instrumental in people coming to the area with settlements growing along the road. Works along the Great Western Highway therefore have the potential to directly and indirectly impact heritage items along its route. However, each of the four sections of the Great Western Highway upgrade have very different characteristics. The type and level of impacts on heritage items within each section is therefore different.

In the Katoomba to Blackheath section, the upgrade works would largely follow the existing highway alignment. Although there would be some realignment, such as straightening of curves, the alignment would broadly remain. Along long stretches of this section it is bounded on one or both sides by bushland (including the Greater Blue Mountain Area (Additional Areas) and Bonnie Doon Reserve). Settlements within this section are confined to the outskirts of Katoomba and Medlow Bath, which, combined with the large areas of bushland in the section, limit the potential for non-Aboriginal heritage.

Medlow Bath is the only settlement between Katoomba and Lithgow that the upgrade works pass directly through. As noted above and in common with many villages and townships in the Blue Mountains, Medlow Bath village was historically centred around the former Western Road, which is now the Great Western Highway, and accounts for the number of items directly and indirectly impacted by the upgrade of that highway. As can be seen in Table 5-2, five of the 14 identified items would be directly impacted by the that project and seven would be visually impacted. Of those directly impacted, three were assessed as major adverse impacts, one of which is the State-heritage listed Medlow Bath Railway Station Group, with the remaining two items being minor-moderate impacts. Of the seven items visually impacted, four were assessed as moderate adverse impacts, with the remaining three as moderate to major adverse impacts.

Contrasting with the Katoomba to Blackheath section, it is noted that there are greater visual impacts than direct (physical) impacts caused by the Great Western Highway upgrade in the Little Hartley to Lithgow section, with 15 of the 18 heritage items assessed as being subject to some level of visual impact. This is unsurprising given the existing rural character, and that this setting is a significant component to the heritage values of many items impacted, particularly at the Little Hartley end of that project. Of those 15 items, four were assessed as having major adverse visual impacts, six with moderate adverse visual impacts and five with minor adverse visual impacts. Recommendations were made to ameliorate these visual impacts through strategic landscaping aimed at softening the intrusion of the upgrade works on the existing landscape. Conversely, 12 of the 18 items will be affected by direct impacts: five with major adverse direct impacts, six with moderate adverse impacts and one with minor adverse direct impact.

In relation to this project, the longest portion of the upgrade works would be made up of a tunnel between Blackheath and Little Hartley. As vibration and settlement impacts are negligible, this would limit impacts to the surface works at Blackheath, Soldiers Pinch and Little Hartley and would bypass the extensive heritage resources in the towns of Blackheath and Mount Victoria.

Despite there being 21 heritage items, conservation areas and areas of archaeological potential of relevance to the project, only four of these would be impacted by the project by more than a negligible degree:

- the Greater Blue Mountains Area – Additional Values National Heritage List nomination – minor direct impacts associated with the Blackheath and Soldiers Pinch construction footprints
- Rosedale (Lithgow LEP, I024) – moderate indirect visual/ setting impacts during construction (Little Hartley construction footprint) and operation (permanent operational infrastructure at Little Hartley)
- site of the Plough Inn (archaeological site) – subject to confirmation of the precise location of this archaeological site, potential major direct impact on archaeology. This site may also be impacted by the Little Hartley to Lithgow upgrade prior to potential disturbance by the project
- Mount Victoria Convict Stockade site (archaeological site) – potential moderate direct impacts on archaeology during construction (Little Hartley construction footprint).

In relation to the site of the Plough Inn, it should be noted that its precise location is not certain and it is possible that it would be outside of the construction footprint, reducing the overall impacts to non-Aboriginal heritage by this section of the project even further.

Table 5-3 summarises the assessed impacts from each Upgrade Program project on the heritage items that may be impacted by the project. It should be noted that the Plough Inn site was not assessed by the Little Hartley to Lithgow Upgrade, however, subject to confirmation of the precise location of this site, it is anticipated that the Little Hartley to Lithgow Upgrade would have a comparable impact on the site as assessed for this project in this report (i.e. a major direct impact). Based on current construction programming, it is expected that the Little Hartley to Lithgow Upgrade would impact the Plough Inn site prior to commencement of construction of the project.

Based on the summary of individual project impacts on heritage items and conservation areas presented in Table 5-3, it is expected that cumulative impacts to each of these items and conservation areas would be:

- the Greater Blue Mountains Area – Additional Values – directly affected by the project and the Katoomba to Blackheath Upgrade each to a minor degree, resulting in a **minor direct** cumulative impact
- Rosedale (Lithgow LEP, I024) – indirectly affected by the project and the Little Hartley to Lithgow Upgrade to a moderate degree (visual/ setting), and indirectly through vibration from the Little Hartley to Lithgow Upgrade to a moderate degree. Overall, this heritage item has been assessed as being subject to a **moderate indirect** cumulative impact
- site of the Plough Inn (archaeological site) – subject to confirmation of the precise location of this archaeological site, it would be subject to a major direct impact from either the Little Hartley to Lithgow Upgrade or the project, whichever is constructed first. Currently, the Little Hartley to Lithgow Upgrade is expected to be constructed and affect the archaeological site prior to commencement of construction of the project. Overall, this archaeological site has been assessed as being potentially subject to a **major direct** cumulative impact
- Mount Victoria Convict Stockade site (archaeological site) – this site would only be affected by the project, and potential cumulative impacts would not arise.

Table 5-4 Summary of cumulative impacts on relevant heritage items and archaeological sites

Heritage item/ site	Assessed impacts			
	Project	Katoomba to Blackheath	Medlow Bath	Little Hartley to Lithgow
Greater Blue Mountains Area – Additional Values National Heritage List nomination	Minor direct	Minor direct	-	-

Heritage item/ site	Assessed impacts			
	Project	Katoomba to Blackheath	Medlow Bath	Little Hartley to Lithgow
Rosedale (Lithgow LEP, I024)	Moderate indirect (visual/ setting)	-	-	Minor indirect (visual) Minor indirect (vibration)
Site of the Plough Inn (archaeological site)	Major direct (subject to confirmation of location)	-	-	- ¹
Mount Victoria Convict Stockade site (archaeological site)	Moderate direct	-	-	-

Table notes:

1. The assessment for the Little Hartley to Lithgow Upgrade did not consider the site of the Plough Inn. Subject to confirmation of the location of this potential archaeological site, it is anticipated that the Little Hartley to Lithgow Upgrade could have a major direct impact on the site.

6.0 Management of impacts

6.1 Performance outcomes

Performance outcomes have been developed that are consistent with the SEARs for the project. The performance outcomes for the project are summarised below in Table 6-1 and identify measurable, performance-based standards for environmental management.

Table 6-1 Performance outcomes for the project – Non-Aboriginal heritage

SEARs desired performance outcome	Project performance outcome	Timing
9. Heritage – non-Aboriginal The design, construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of environmental heritage value. The design, construction and operation of the project avoids or minimises impacts, to the greatest extent possible, on the heritage significance of environmental heritage value.	Avoid direct and avoid or minimise any indirect impacts to the World Heritage listed Greater Blue Mountains Area.	Construction
	Avoid or minimise direct and indirect impacts to existing heritage items listed on statutory heritage lists and registers. Where a direct or indirect impact cannot be avoided, develop mitigation and management measures reflecting the long term protection, conservation and management of the affected heritage item.	Design and construction
	Where disturbance of known and suspected areas of potential archaeological significance cannot be avoided, carry out investigations of the areas of potential archaeological significance in accordance with applicable guidelines, prior to disturbance and minimise the extent of disturbance.	Construction

6.2 Management and mitigation of potential impacts

A construction environment management plan (CEMP) would be prepared for the project. The CEMP would detail the proposed approach to environmental management, monitoring and reporting during construction. A number of sub-plans (and other supporting documentation, as required) would also be prepared as part of the CEMP.

A community and stakeholder engagement plan has been prepared for the Great Western Highway Upgrade Program and would be used to guide community and stakeholder engagement activities during construction of the project. Engagement during construction would include updates on planned construction activities and would respond to concerns and enquiries in a timely manner, seeking to minimise potential impacts where possible.

Management and mitigation measures to manage the potential non-Aboriginal heritage impacts of the project are outlined in Table 6-2.

Table 6-2 Non-Aboriginal heritage mitigation measures

Ref	Environmental safeguard	Timing
NAH1	The Construction Environmental Management Plan (CEMP) for the project will include measures applicable to the Soldiers Pinch construction site to minimise the risk of accidents and incidents impacting on the nearby Greater Blue Mountains World Heritage Area. The CEMP will also include provision for construction workers at the Soldiers Pinch construction site to be made aware of the location and significance of the World Heritage Area as part of site inductions and environmental awareness training.	Construction
NAH2	Opportunities to minimise the extent of native vegetation clearing within the footprint of the Greater Blue Mountains Area (Additional Values) National Heritage List nomination will be considered during further design development (refer to environmental mitigation measure B4). In areas where clearing native vegetation cannot be avoided, locally endemic native species will be used in landscaping to reflect the ecological heritage values in the nomination (refer to environmental mitigation measure LV2).	Design
NAH3	If unexpected items of potential non-Aboriginal heritage significance are discovered during construction of the project, all relevant activities in the vicinity will cease in the vicinity of the find and the Unexpected Heritage Items Procedure (Transport for NSW, 2022d) will be followed.	Construction
NAH4	A detailed archaeological survey will be carried out by a suitably qualified archaeologist within those parts of the Mount Victoria Stockade site and the potential Plough Inn site that would be directly affected by construction of the project, and which have not been previously disturbed/ surveyed by the Little Hartley to Lithgow Upgrade project. The detailed archaeological survey will be carried out prior to ground disturbance by the project, and will assess site features, potential for archaeological deposits, significance and proposed management measures.	Design
NAH5	The potential for construction activities to impact remaining sections of Cox's Road (1814) within the Soldiers Pinch construction site that have not been previously disturbed will be investigated as part of further design development. If construction activities at Soldiers Pinch are likely to affect remaining sections of Cox's Road, a detailed archaeological survey will be carried out to map those remaining sections prior to the commencement of ground disturbing works.	Design
NAH6	Construction planning for the project will aim to avoid the use of vibration intensive plant and equipment within the minimum separation distances from the Rosedale homestead, for that plant and equipment (refer to measure NV8). Where minimum separation distances cannot be achieved: <ul style="list-style-type: none"> a condition/ dilapidation survey of the Rosedale homestead will be completed prior to and at the completion of the relevant construction works vibration monitoring will be carried out at the Rosedale homestead during the relevant construction works 	Design

Ref	Environmental safeguard	Timing
NAH7	The project will be designed and constructed so that tunnelling does not exceed the structural damage criteria (peak particle velocity) for structures that are particularly sensitive to vibration and have intrinsic value, as detailed in German standard <i>DIN 4150-3: 1992-02 Vibration in Buildings – Part 3: Effects on Structures</i> , at any heritage building/structure (refer to environmental mitigation measure GW5).	Design and construction
NAH8	Opportunities to retain existing mature vegetation within and along the Great Western Highway corridor at Little Hartley will be considered in coordination with the Little Hartley to Lithgow Upgrade project. If existing mature vegetation cannot be retained, alternative vegetation screening measures will be identified and implemented, such as landscaping associated with the project and/ or the Little Hartley to Lithgow Upgrade project, or plantings on the Rosedale property in consultation and with the agreement of the property owner and will be in keeping with the existing cultural values of heritage items surrounding the project.	Design

7.0 Conclusion

The project has been designed to avoid or minimise direct and indirect impacts to non-Aboriginal heritage where possible. Notwithstanding, some impacts have not been able to be entirely avoided through design. The assessment presented in this technical report has identified the following key potential impacts (being impacts assessed as being greater than negligible) on heritage items, conservation areas and areas of archaeological potential:

- the Greater Blue Mountains Area – Additional Values National Heritage List nomination – minor direct impacts associated with the Blackheath and Soldiers Pinch construction footprints
- Rosedale (Lithgow LEP, I024) – moderate indirect visual/ setting impacts during construction (Little Hartley construction footprint) and operation (permanent operational infrastructure at Little Hartley)
- site of the Plough Inn (archaeological site) – subject to confirmation of the precise location of this archaeological site, potential major direct impact on archaeology. This site may also be impacted by the Little Hartley to Lithgow upgrade prior to potential disturbance by the project
- Mount Victoria Convict Stockade site (archaeological site) – potential moderate direct impacts on archaeology during construction (Little Hartley construction footprint).

It is recommended that opportunities to further minimise or avoid these impacts through design be considered and pursued through further design development. An important consideration, particularly in relation to potential impacts on Rosedale and the site of the Plough Inn, will be coordination with the adjacent Little Hartley to Lithgow Upgrade project.

Importantly, the most significant non-Aboriginal heritage item in the area around the project, the Greater Blue Mountains Area (World Heritage List, National Heritage List), would not be directly affected by the project. Indirect impacts from the project during construction and operation would also be unlikely, particularly given the distance of the project footprints at Blackheath and Little Hartley from the Greater Blue Mountains Area. Although the Soldiers Pinch construction footprint is only separated from the Greater Blue Mountains Area by the existing Great Western Highway, the potential for indirect impacts would be limited by the temporary nature of disturbance (there would be no permanent operational infrastructure established at Soldiers Pinch), and the implementation of robust construction environmental management measures. The need for such construction environmental management measures at Soldiers Pinch is reflected in the recommendations of this assessment (refer below) and the proposed environmental management measures for the project (refer to Section 6.2).

Based on the outcomes of the assessment presented in this technical report, the following recommendations are made to mitigate and manage potential direct and indirect impacts on non-Aboriginal heritage. These recommendations have been reflected in the proposed environmental management measures for the project (refer to Section 6.2).

Recommendations

1. Given the proximity of the Soldiers Pinch construction footprint to the Greater Blue Mountains Area (World Heritage List and National Heritage List), it is recommended that the Construction Environmental Management Plan for the project include specific measures to minimise the risk of potential indirect impacts (such as incidents, accidents, leaks, spills etc on the site or from construction traffic). Site inductions and environmental training should include specific reference to the Greater Blue Mountains Area (refer to environmental management measure **NAH1**)
2. Owing to its potential National heritage significance, it is recommended that native vegetation clearance within the boundaries of the Greater Blue Mountains Area (Additional Values) National Heritage List nomination be minimised (refer to environmental management measure **NAH2**)
3. If any archaeological remains are uncovered during construction, it is recommended that they be managed in accordance with the *Unexpected Heritage Items Procedure* (Transport for New South Wales, 2022) (refer to environmental management measure **NAH3**)
4. Prior to any ground disturbance works within the Little Hartley construction footprint, a detailed historical archaeological assessment should be carried out in line with Heritage Council guidelines to establish the potential for disturbance of any archaeological remains relating to the Mount

Victoria Stockade site. That archaeological assessment should include a methodology and research design to assess the impact of the works on the former road alignments and to guide physical archaeological test excavations and include the results of these excavations. This detailed historical archaeological assessment should be carried out by a suitably qualified archaeologist and should discuss the likelihood of significant historical archaeology on the site, identification of any relics that are likely to be present and their significance and how these may be impacted by the project, and measures to mitigate any impacts. If any archaeological remains are deemed to be impacted, a management plan should also be prepared (refer to environmental management measure **NAH4**)

5. Prior to any ground disturbance works within the Soldiers Pinch construction footprint site, a detailed historical archaeological assessment should be carried out in line with Heritage Council guidelines to establish whether any remains of the 1814 alignment of Cox's Road survive within that site. That archaeological assessment should include a methodology and research design to assess the impact of the works on the former road alignments and to guide physical archaeological test excavations and include the results of these excavations. This detailed historical archaeological assessment should be carried out by a suitably qualified archaeologist and should discuss the likelihood of significant historical archaeology on the site, identification of any relics that are likely to be present and their significance and how these may be impacted by the project, and measures to mitigate any impacts. If any remains of that former road alignment do survive, a management plan should also be prepared (refer to environmental management measure **NAH5**)
6. Minimum separation distances for vibration intensive plant and equipment are to be achieved for the Rosedale homestead, through construction planning and selection of plant and equipment. Where minimum separation distances cannot be achieved, the Rosedale homestead should be subject to vibration monitoring, and condition/ dilapidation surveys prior to and at the conclusion of construction activities (refer to environmental management measure **NAH6**)
7. The project should be design and constructed so that tunnelling does not exceed the structural damage criteria (peak particle velocity) for structures that are particularly sensitive to vibration and have intrinsic value, as detailed in German standard *DIN 4150-3: 1992-02 Vibration in Buildings – Part 3: Effects on Structures*, at any heritage building/ structure (refer to environmental management measure **NAH7**)
8. If possible, it is recommended to retain mature vegetation within and along the Great Western Highway corridor at Little Hartley to provide a visual screen for the Rosedale property. If this is not possible, it is recommended that alternative vegetation screening measures be identified and implemented (refer to environmental management measure **NAH8**).

8.0 References

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Annexure A

Significance Assessment Criteria

Annexure A – Significance Assessment Criteria

In order to understand how a development would impact on a heritage item, it is essential to understand why an item is significant. An assessment of significance is undertaken to explain why a particular item is important and to enable the appropriate site management and curtilage to be determined. Cultural significance is defined in *The Australia ICOMOS Charter for Places of Cultural Significance 2013* (ICOMOS (Australia), 2013) as meaning “aesthetic, historic, scientific, social or spiritual value for past, present or future generations” (Article 1.2). Cultural significance may be derived from a place’s fabric, association with a person or event, or for its research potential. The significance of a place is not permanently fixed, what is considered significant now may change as similar items are located, more historical research is undertaken, and community values change.

These values are reflected in the selection criteria for the World Heritage List (WHL) (UNESCO, 2014). The standard for selection is for sites of outstanding universal value and meet at least one of the following criteria.

Table A 1 World heritage significance criteria

Criterion	Detail
(i)	to represent a masterpiece of human creative genius
(ii)	to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design
(iii)	to bear a unique or at least exceptional testimony to a cultural tradition or to a civilisation which is living or has disappeared
(iv)	to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history
(v)	to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment, especially when it has become vulnerable under the impact of irreversible change
(vi)	to be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance. (The Committee considers that this criterion should preferably be used in conjunction with other criteria)
(vii)	to contain superlative natural phenomenon or areas of exceptional natural beauty and aesthetic importance
(viii)	To be outstanding examples representing major stages of earth’s history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features
(ix)	To be outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals
(x)	to contain the most important and significant natural habitats for <i>in situ</i> conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation

In relation to National Heritage, a place may be included on the National Heritage list following an assessment against the National Heritage Criteria (Australian Heritage Commission, 2009):

Table A 2 National heritage significance criteria

Criterion	Detail
A	The place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history
B	The place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history
C	The place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history
D	The place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of: (i) a class of Australia's natural or cultural places, or (ii) a class of Australia's natural or cultural environments
E	The place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group
F	The place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period
G	The place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
H	The place has outstanding heritage value to the nation because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history
I	The place has outstanding heritage value to the nation because of the place's importance as part of indigenous tradition

For State heritage, the process of assessment of an item's significance has been developed through the NSW Heritage Management System and is outlined in the guideline *Assessing Heritage Significance* (NSW Heritage Office, 2001), part of the NSW Heritage Manual (Heritage Branch, Department of Planning). The *Assessing Heritage Significance* guidelines establish seven evaluation criteria (which reflect four categories of significance and whether a place is rare or representative) under which a place can be evaluated in the context of State or local historical themes. Similarly, a heritage item can be significant at a local level (i.e., to the people living in the vicinity of the site), at a State level (i.e., to all people living within NSW) or be significant to the country as a whole and be of National or Commonwealth significance.

In accordance with the guideline *Assessing Heritage Significance*, an item would be considered to be of State significance if it meets two or more criteria at a State level, or of local heritage significance if it meets one or more of the criteria outlined in Table A 3. The Heritage Council requires the summation of the significance assessment into a succinct paragraph, known as a Statement of Significance. The Statement of Significance is the foundation for future management and impact assessment.

Table A 3 NSW State heritage significance criteria

Criterion	Inclusions/Exclusions
Criterion (a) – an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).	The site must show evidence of significant human activity or maintains or shows the continuity of historical process or activity. An item is excluded if it has been so altered that it can no longer provide evidence of association.
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 (or the cultural or natural history of the local area).	The site must show evidence of significant human occupation. An item is excluded if it has been so altered that it can no longer provide evidence of association.
Criterion (c) – an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).	An item can be excluded on the grounds that it has lost its design or technical integrity or its landmark qualities have been more than temporarily degraded.
Criterion (d) – an item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.	This criterion does not cover importance for reasons of amenity or retention in preference to proposed alternative.
Criterion (e) – an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area). Significance under this criterion must have the potential to yield new or further substantial information.	Under the guideline, an item can be excluded if the information would be irrelevant or only contains information available in other sources.
Criterion (f) – an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).	An item is excluded if it is not rare or if it is numerous, but under threat. The item must demonstrate a process, custom or other human activity that is in danger of being lost, is the only example of its type or demonstrates designs or techniques of interest.
Criterion (g) – an item is important in demonstrating the principal characteristics of a class of NSW's (or local area's): <ul style="list-style-type: none"> cultural or natural places cultural or natural environments. 	An item is excluded under this criterion if it is a poor example or has lost the range of characteristics of a type.

Annexure B

Significance assessments

Annexure B – Significance assessments**Greater Blue Mountains Area, World Heritage List**

Figure B 1 Greater Blue Mountains Area (Source: Australian Heritage Database)

This item is located outside but adjacent to the construction footprint. It is closest at the Soldiers Pinch construction footprint. As this item is listed on both the World Heritage List and National Heritage List, its significance is assessed under the World Heritage significance criteria and the National Heritage significance criteria. Both of these assessments are reproduced below.

Table B 1 Significance assessment of Greater Blue Mountains Area under World heritage significance criteria

Criterion	Assessment
(i) to represent a masterpiece of human creative genius	N/A
(ii) to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design	N/A
(iii) to bear a unique or at least exceptional testimony to a cultural tradition or to a civilisation which is living or has disappeared	N/A

Criterion	Assessment
(iv) to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history	N/A
(v) to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment, especially when it has become vulnerable under the impact of irreversible change	N/A
(vi) to be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance. (The Committee considers that this criterion should preferably be used in conjunction with other criteria)	N/A
(vii) to contain superlative natural phenomenon or areas of exceptional natural beauty and aesthetic importance	N/A
(viii) To be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features	N/A

Criterion	Assessment
(ix) To be outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals	The Greater Blue Mountains include outstanding and representative examples in a relatively small area of evolution and adaptation of the genus <i>Eucalyptus</i> and eucalypt-dominated vegetation on the Australian continent. The site contains a wide and balanced representation of eucalypt habitats including wet and dry sclerophyll forests and mallee heathlands, as well as localised swamps, wetlands and grasslands. It is a centre of diversification for the Australian scleromorphic flora, including significant aspects of eucalypt evolution and radiation. Representative examples of the dynamic processes in its eucalypt dominated ecosystems cover the full range of interactions between eucalypts, understorey, fauna, environment and fire. The site includes primitive species of outstanding significance to the earth's plant life, such as the highly restricted Wollemi pine (<i>Wollemia nobilis</i>) and the Blue Mountains pine (<i>Pherosphaera fitzgeraldii</i>). These are examples of ancient relict species with Gondwanan affinities that have survived past climate changes and demonstrate the highly unusual juxtaposition of Gondwanan taxa with the diverse scleromorphic flora.
(x) to contain the most important and significant natural habitats for <i>in situ</i> conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation	<p>The site includes an outstanding diversity of habitats and plant communities that support its globally significant species and ecosystem diversity (152 plant families, 484 genera and c. 1,500 species). A significant proportion of the Australian continent's biodiversity, especially its scleromorphic flora, occur in this area. Plant families represented by exceptionally high levels of species diversity here include Myrtaceae (150 species), Fabaceae (149 species), and Proteaceae (77 species). Eucalypts (<i>Eucalyptus</i>, <i>Angophora</i> and <i>Corymbia</i>, all in the family Myrtaceae), which dominate the Australian continent are well represented by more than 90 species (13% of the global total). The genus <i>Acacia</i> (in the family Fabaceae) is represented by 64 species. The site includes primitive and relictual species with Gondwanan affinities (<i>Wollemia</i>, <i>Pherosphaera</i>, <i>Lomatia</i>, <i>Dracophyllum</i>, <i>Acrophyllum</i>, <i>Podocarpus</i> and <i>Atkinsonia</i>) and supports many plants of conservation significance including 114 endemic species and 177 threatened species.</p> <p>The diverse communities and habitats support more than 400 vertebrate taxa (of which 40 are threatened), comprising some 52 mammal, 63 reptile, over 30 frog and about one third (265 species) of Australia's bird species. Charismatic vertebrates such as platypus and echidna occur in the area. Although invertebrates are still poorly known, the area supports an estimated 120 butterfly and 4,000 moth species, and a rich cave invertebrate fauna (67 taxa).</p>

Integrity

The seven adjacent national parks and single karst conservation reserve that comprise the Greater Blue Mountain Area are of sufficient size to protect the biota and ecosystem processes, although the boundary has several anomalies that reduce the effectiveness of its 1 million hectare size. This is explained by historical patterns of clearing and private land ownership that preceded establishment of the parks. However, parts of the convoluted boundary reflect topography, such as escarpments that act as barriers to potential adverse impacts from adjoining land. In addition, much of the property is largely protected by adjoining public lands of State Forests and State Conservation Areas. Additional regulatory mechanisms, such as the statutory wilderness designation of 65 per cent of the property, the closed and protected catchment for the Warragamba Dam and additions to the conservation reserves that comprise the area further protect the integrity of the Greater Blue Mountain Area.

Most of the natural bushland of the Greater Blue Mountain Area is of high wilderness quality and remains close to pristine. The plant communities and habitats occur almost entirely as an extensive, largely undisturbed matrix almost entirely free of structures, earthworks and other human intervention. Because of its size and connectivity with other protected areas, the area will continue to play a vital role in providing opportunities for adaptation and shifts in range for all native plant and animal species within it, allowing essential ecological processes to continue. The area's integrity depends upon the complexity of its geological structure, geomorphology and water systems, which have created the conditions for the evolution of its outstanding biodiversity and which require the same level of protection.

An understanding of the cultural context of the Greater Blue Mountain Area is fundamental to the protection of its integrity. Aboriginal people from six language groups, through ongoing practices that reflect both traditional and contemporary presence, continue to have a custodial relationship with the area. Occupation sites and rock art provide physical evidence of the longevity of the strong Aboriginal cultural connections with the land. The conservation of these associations, together with the elements of the property's natural beauty, contributes to its integrity.

Table B 2 Significance assessment of the Greater Blue Mountain Area under the National heritage significance criteria

Criterion	Assessment
A	This place is taken to meet this National Heritage criterion in accordance with subitem 1A(3) of the <i>Environment & Heritage Legislation Amendment Act (No. 1) 2003</i> , as the World Heritage Committee has determined that this place meets World Heritage criteria (ix) and (x).
B	This place is taken to meet this National Heritage criterion in accordance with subitem 1A(3) of the <i>Environment & Heritage Legislation Amendment Act (No. 1) 2003</i> , as the World Heritage Committee has determined that this place meets World Heritage criterion (x).
C	This place is taken to meet this National Heritage criterion in accordance with subitem 1A(3) of the <i>Environment & Heritage Legislation Amendment Act (No. 1) 2003</i> , as the World Heritage Committee has determined that this place meets World Heritage criteria (ix) and (x).
D	This place is taken to meet this National Heritage criterion in accordance with subitem 1A(3) of the <i>Environment & Heritage Legislation Amendment Act (No. 1) 2003</i> , as the World Heritage Committee has determined that this place meets World Heritage criterion (ix).
E	-
F	-
G	-
H	-
I	-

Statement of Significance

The Greater Blue Mountains Area was inscribed on the World Heritage List at the 24th Session of the World Heritage Committee, held in Cairns from 27 November to 2 December 2000.

It is an area of breathtaking views, rugged tablelands, sheer cliffs, deep, inaccessible valleys and swamps teeming with life. The unique plants and animals that live in this outstanding natural place relate an extraordinary story of Australia's antiquity, its diversity of life and its superlative beauty. This is the story of the evolution of Australia's unique eucalypt vegetation and its associated communities, plants and animals.

The Greater Blue Mountains Area consists of 1.03 million hectares of mostly forested landscape on a sandstone plateau 60 to 180 kilometres inland from central Sydney, New South Wales. The property includes vast expanses of wilderness and is equivalent in area to almost one third of Belgium, or twice the size of Brunei.

The property, which includes eight protected areas in two blocks separated by a transportation and urban development corridor, is made up of seven outstanding national parks as well as the famous Jenolan Caves Karst Conservation Reserve. These are the Blue Mountains, Wollemi, Yengo, Nattai, Kanangra-Boyd, Gardens of Stone and Thirlmere Lakes National Parks.

The area does not contain mountains in the conventional sense but is described as a deeply incised sandstone plateau rising from less than 100 metres above sea level to 1 300 metres at the highest point. There are basalt outcrops on the higher ridges. This plateau is thought to have enabled the survival of a rich diversity of plant and animal life by providing a refuge from climatic changes during recent geological history. It is particularly noted for its wide and balanced representation of eucalypt habitats from wet and dry sclerophyll, mallee heathlands, as well as localised swamps, wetlands, and grassland. Ninety-one species of eucalypts (thirteen percent of the global total) occur in the Greater Blue Mountains Area. Twelve of these are believed to occur only in the Sydney sandstone region.

The property has been described as a natural laboratory for studying the evolution of the eucalypts. The largest area of high diversity of eucalypts on the continent is located in south-east Australia. The Greater Blue Mountains Area includes much of this eucalypt diversity.

As well as supporting such a significant proportion of the world's eucalypt species, the property provides examples of the range of structural adaptations of the eucalypts to Australian environments. These vary from tall forests at the margins of rainforest in the deep valleys, through open forests and woodlands, to shrublands of stunted mallees on the exposed tablelands.

In addition to its outstanding eucalypts, the Greater Blue Mountains Area also contains ancient, relict species of global significance. The most famous of these is the recently-discovered Wollemi pine, a "living fossil" dating back to the age of the dinosaurs. Thought to have been extinct for millions of years, the few surviving trees of this ancient species are known only from three small populations located in remote, inaccessible gorges within the nominated property. The Wollemi pine is one of the World's rarest species.

More than 400 different kinds of animals live within the rugged gorges and tablelands of the Greater Blue Mountains Area. These include threatened or rare species of conservation significance, such as the spotted-tailed quoll, the koala, the yellow-bellied glider and the long-nosed potoroo as well as rare reptiles including the green & golden bell frog and the Blue Mountains water skink.

Greater Blue Mountains Area – Additional Values (National Heritage List nomination)

This site has been nominated for the National Heritage List. It covers additional areas outside of the existing Greater Blue Mountains Area item. The Blackheath construction footprint and surface works, and the Soldiers Pinch construction footprint, would be within this additional area.

No assessment documentation justifying the additional values outside of the World Heritage List and National Heritage List listings has been sighted, and despite being nominated c. 2000, the outcome of this nomination is not known.

While no significance assessment is currently listed on the Australian Heritage Database, a Statement of Significance by the nominator is. It cites the natural features of the nominated item (similar to the World Heritage List and National Heritage List listing) as reasons for nomination, but also includes a cultural association with Aboriginal people.

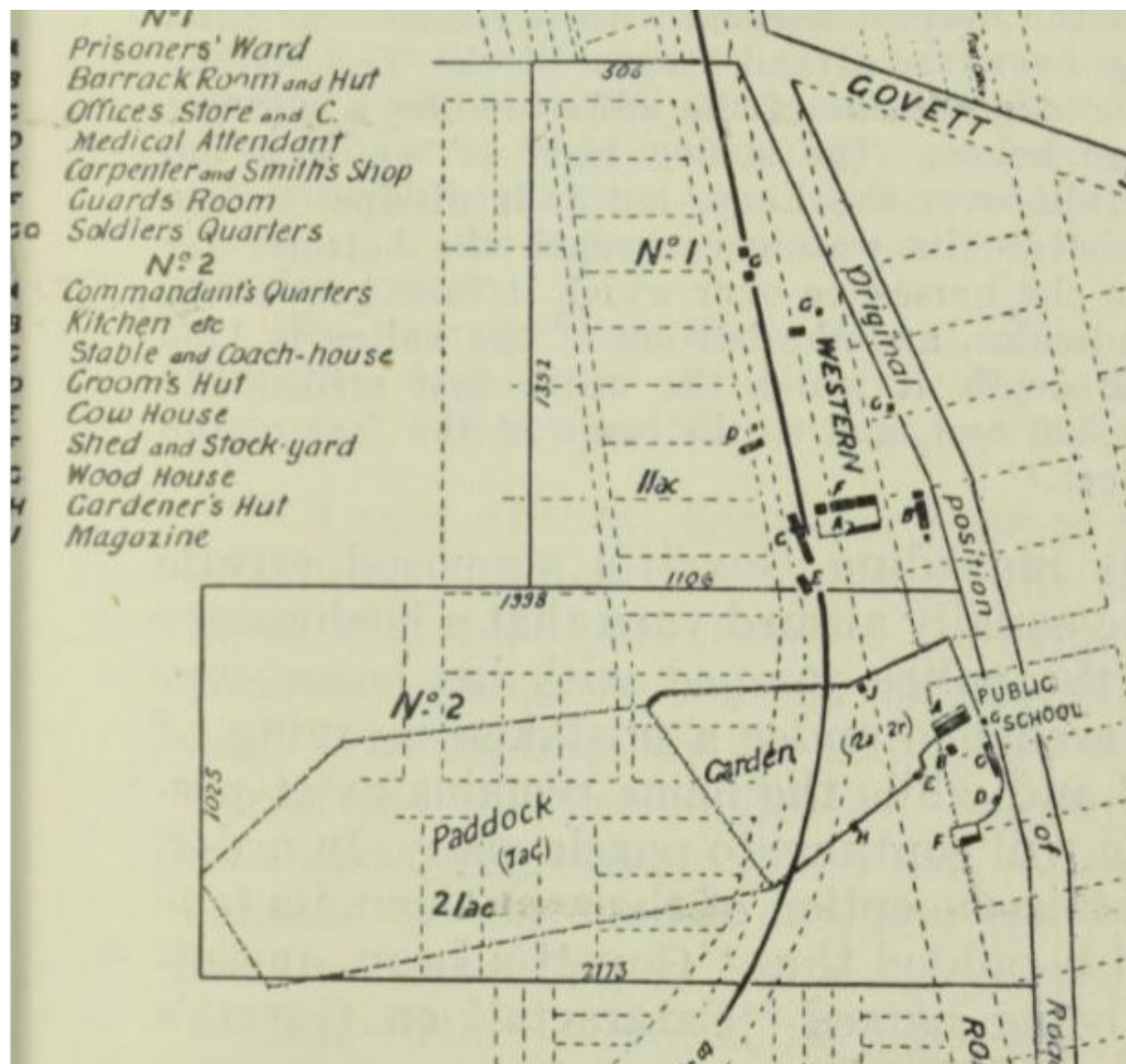
The following significance assessment has been prepared based on the World Heritage List and National Heritage List listings and the nominator's Statement of Significance for the nominated item listed in the Australian Heritage Database.

Criterion	Assessment
A	This place is taken to meet this National Heritage criterion in accordance with subitem 1A(3) of the <i>Environment & Heritage Legislation Amendment Act (No. 1) 2003</i> , as the World Heritage Committee has determined that this place meets World Heritage criteria (ix) and (x).
B	This place is taken to meet this National Heritage criterion in accordance with subitem 1A(3) of the <i>Environment & Heritage Legislation Amendment Act (No. 1) 2003</i> , as the World Heritage Committee has determined that this place meets World Heritage criterion (x).
C	This place is taken to meet this National Heritage criterion in accordance with subitem 1A(3) of the <i>Environment & Heritage Legislation Amendment Act (No. 1) 2003</i> , as the World Heritage Committee has determined that this place meets World Heritage criteria (ix) and (x).
D	This place is taken to meet this National Heritage criterion in accordance with subitem 1A(3) of the <i>Environment & Heritage Legislation Amendment Act (No. 1) 2003</i> , as the World Heritage Committee has determined that this place meets World Heritage criterion (ix).
E	-
F	-
G	The item has a direct and tangible association with a longstanding Aboriginal presence in the area, including many examples of rock art. The item therefore fulfils this criterion.
H	-
I	The item has a direct and tangible association with a longstanding Aboriginal presence in the area, including many examples of rock art. The item therefore fulfils this criterion.

Statement of Significance

The area has natural significance for containing:

1. An outstanding example of structural changes related to passive margin tectonics, sedimentary Permo-Triassic rock formation and differential erosion of a sandstone upland over 90 million years
2. An outstanding example of ongoing ecological and biological processes in the evolution of Australia's characteristic flora and fauna, particularly in relation to scleromorphic species
3. Scenery of exceptional natural beauty relating to the characteristic deeply dissected sandstone plateaus (deep gorges and canyons) with their forest cover, including the world's largest wilderness area dominated by sclerophyll forest)
4. Outstanding habitats for the conservation of highly diverse ecosystems including rare and threatened species including species with Gondwanan affinities
5. Direct and tangible associations with a longstanding Aboriginal presence in the area including many examples of rock art, and
6. A history and tangible expressions in the landscape of the revaluation of nature which has taken place over the last 140 years.

Blackheath Stockade (Blue Mountains LEP, BH034)**Figure B 2 Plan of Blackheath Stockade (Source: Campbell, 1923:213)**

This item would be located above the project tunnels and may be indirectly impacted by vibration. The following significance assessment is based on the State Heritage Inventory entry.

Table B 3 Significance assessment of the Blackheath Stockade site

Criterion	Assessment
(a) Historical significance	<p>The site is associated with one of the major historic themes identified in the development of the Blue Mountains, 'the Western Road'. The Stockade site is also associated with the early European occupation of the Blackheath area.</p> <p>The Stockade is also historically significant as a link in the Blue Mountains stockade and road system. The site is one of a group of archaeological sites, relics, structures and other physical evidence which form a series of notable precincts surviving along the earlier alignments of the Great Western Road. The significance of each individual site is enhanced by the existence of the others, comparatively and interpretatively.</p> <p>The item fulfils this criterion.</p>

Criterion	Assessment
(b) Associative significance	<p>As a convict era site, the Blackheath Stockade also has associational links with the role of transportation and secondary punishment, and the contribution made by convicts. The road gang system and use of convict labour made a significant contribution in opening the western plains and enabling the outward expansion of the Colony.</p> <p>The Stockade has strong associations with Captain John Bull superintendent, appointed magistrate and civil engineer in charge of the western road from Penrith to Bathurst for six years from 1842 to 1848 when the Stockade was abandoned.</p> <p>The item therefore fulfils this criterion.</p>
(c) Aesthetic/technical significance	<p>The archaeological evidence of Blackheath Stockade which may survive has important scientific and research values. Few specific roadside stockade sites have been studied to date.</p> <p>Archaeological evidence may yield information about stockades which is not available from other sources. Such evidence would be relevant not only to Blackheath but also to wider research regarding convict the era.</p> <p>For Allotment 2, any surviving sub-surface evidence may also contribute additional information concerning the construction, quality, form and function of the structures.</p> <p>The item therefore fulfils this criterion.</p>
(d) Social significance	<p>The Stockade site including the school, have long been recognised by the local community as items of heritage value with important links with early settlement and development of the village of Blackheath. It therefore fulfils this criterion.</p>
(e) Research potential	<p>The archaeological potential of Blackheath stockade is no longer considerable, because of road, railway and school-building works, but the reported reuse of the stone foundations of the commandant's house in the public school on Leichhardt Street suggests that that part of the stockade site retains some archaeological potential at the local level.</p> <p>It therefore fulfils this criterion.</p>
(f) Rarity	<p>The Stockade was one of the last roadside stockades to be constructed, being built during the last phase of the convict system. It was possibly the last roadside stockade to operate in NSW and as such is unusual. The archival research completed for the 1987 NPWS comparative assessment of stockades suggest that the Blackheath Stockade may also represent the climatic example of its type. It therefore fulfils this criterion.</p>
(g) Representativeness	<p>As a rare archaeological item, it is unknown whether this item is representative of its type. It therefore does not fulfil this criterion at this time.</p>

Integrity and intactness

The Blackheath stockade is an archaeological site that has been extensively impacted by late 19th and 20th century urban development, including the construction of the western railway line. Some pockets of the stockade site may still retain archaeological deposits, particularly those that have been subjected to less development.

Statement of significance

The Blackheath Stockade site has high local significance with historic, historical association, technical and rarity values. The site is associated with one of the major historic themes identified in the development of the Blue Mountains, 'The Western Road'. The Stockade site is also associated with the early European occupation of the Blackheath area. The site is also historically significant as a link in the Blue Mountains stockade and road system. The Blackheath site is one of a group of archaeological sites, relics, structures and other physical evidence which form a series of notable precincts surviving along the earlier alignments of the Great Western Road. The significance of each individual site is enhanced by the existence of the others.

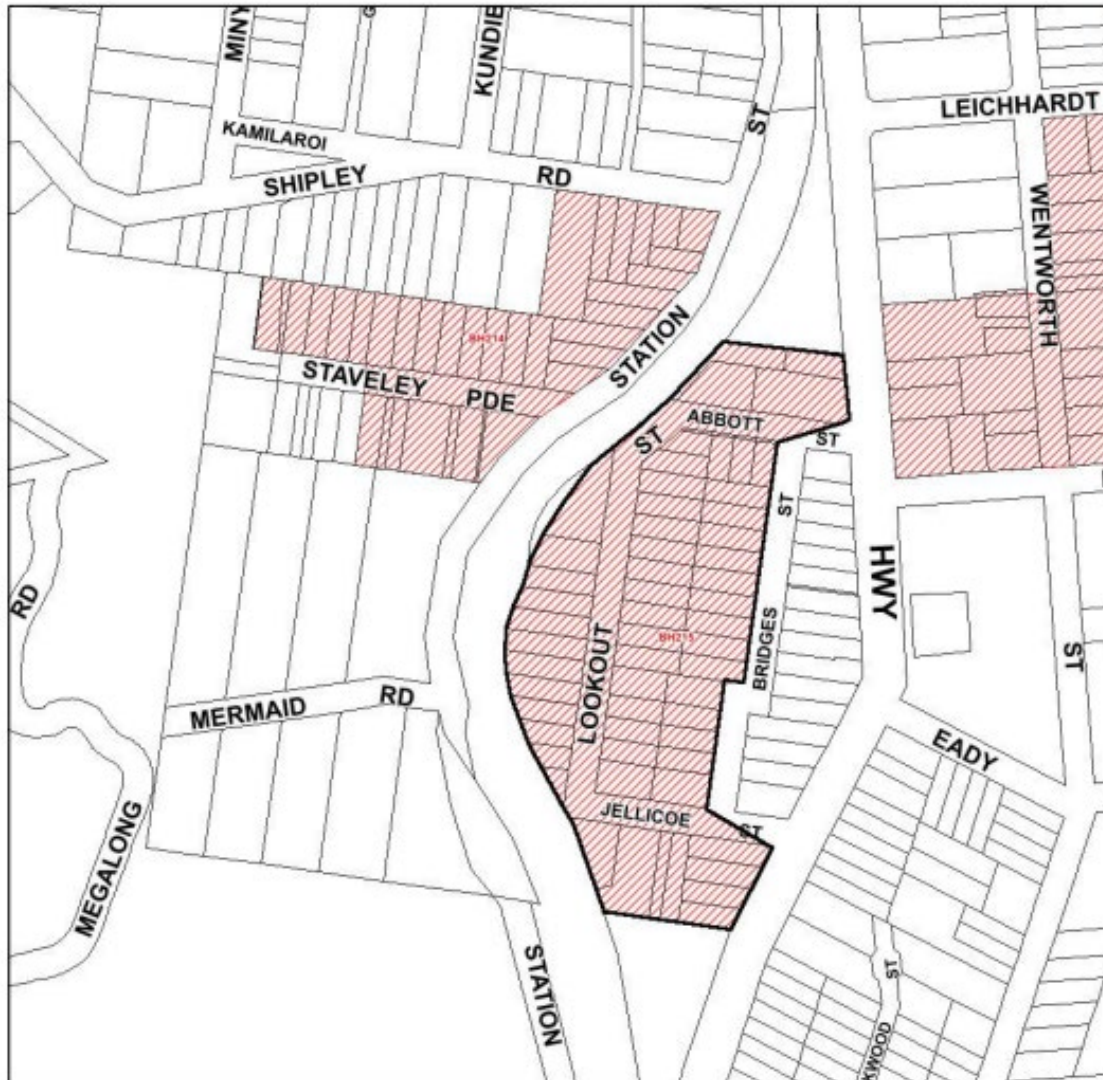
As a convict-era site the Blackheath Stockade site also has associational links with another important theme in the wider history of both NSW and south east Australia, the role of transportation and secondary punishment, and the contribution made by 'convictism'. The road gang system and use of convict labour to construct and maintain major public works such as roads made a significant contribution in opening the western plains for permanent settlement, enabling the outward expansion of the Colony away from the confines of the Cumberland Plain.

The Blackheath Stockade was one of the last roadside stockades to be constructed, being built during the last phase of the convict system. It was possibly the last roadside stockade in operation in NSW. In this historic context the Blackheath site is unusual, being of a different character to the earlier stockades. The Stockade has strong historical associations with two key historic figures, Thomas Mitchell, the Surveyor-General, and Captain Bull of the 99th Regiment. Captain Bull was responsible for much of the work on The Western Road through the Blue Mountains. The archaeological evidence which may survive has important technical and research value. The historic documents note that the section of The Western Road through Blackheath was of a high quality as compared to other sections in the Blue Mountains and fully 'macadamised'. Despite the existence of a number of documentary or archival-based overviews, including work by Thorp, Kerr and Karskens, few specific roadside convict stockade sites have been studied to date.

Although occupied for a short period, the Blackheath Stockade was an extensive site. The large size of the site means that, despite later development, some areas may still remain containing some archaeological deposits. Precisely identified and located convict-era sites which contain substantial physical evidence are rare.

Thomas Mitchell's road-making of the 1830s and the continuing maintenance and improvement of the 'great roads' in the 1840s left substantial and important heritage, not least in the Blue Mountains. Stockades were one essential element in creating better highways and Blackheath stockade was a significant element in the maintenance of the Great Western Road in the 1840s. Because its remains are so much less impressive than the archaeological site of the Victoria Stockade (in Lithgow City) or the structures surviving at Bull's Camp at Woodford (LD 010), Blackheath stockade to date has not retained a strong heritage presence.

The site has long been recognised by the local community as having social significance and heritage value with important associational links to the development of the village of Blackheath.

Lookout Hill Heritage Conservation Area (BH215)**Figure B 3 Lookout Hill Heritage Conservation Area (Source: Blue Mountains City Council)**

This item would be located above the project tunnels and may be indirectly affected by vibration during construction. The following significance assessment has been adapted from the Significance Assessment on the State Heritage Inventory.

Table B 4 Significance assessment of Lookout Hill Heritage Conservation Area

Criterion	Assessment
(a) Historical significance	<p>The Lookout Hill HCA demonstrates the principal characteristics of the development of country towns and villages in New South Wales in the early 20th century as demonstrated by the following elements:</p> <ul style="list-style-type: none"> • A functional street pattern with dual street access to properties addressing the great Western Highway • The still undeveloped character of the area provides evidence of the likely character of many of the towns of the Blue Mountains in the pre-War period, when most contained extensive areas of undeveloped land and streetscapes were dotted with vacant sites

Criterion	Assessment
	<ul style="list-style-type: none"> Incorporation of the town's water supply and communication utilities within the subdivision Range and quality of built forms Almost all of the houses that existed in 1943 have survived in substantially intact form Alterations and additions are generally relatively modest The typologies demonstrated in the Lookout Hill HCA represent the primary typologies characteristic of development in the Blue Mountains. <p>The northern end of the HCA (north of Abbott Street) is also historically significant for its location on part of the original convict Stockade and later police station.</p> <p>The item therefore fulfils this criterion.</p>
(b) Associative significance	There are no known significant associations attached to the item. It therefore does not fulfil this criterion.
(c) Aesthetic/technical significance	<p>The small, lozenge-shaped area of land at the southern entrance to the town and between the railway and highway is aesthetically distinctive for its physical separation from the remainder of Blackheath by the two transport corridors and its prominent height which affords panoramic views from the peak (known by a variety of names over the years, including Lookout Hill, Hill 33, Tank Hill and Tower Hill).</p> <ul style="list-style-type: none"> the pronounced landscape qualities of the Lookout Hill HCA continue to demonstrate its historic and utilitarian role in the development of Blackheath through the imposing scale of the water tower, a historic marker of the highest point in country towns across NSW the hilltop is dominated by Blackheath's water storage reservoir and a large communications tower, but the slopes also include a variety of houses, with several very good examples of the late Victorian and Federation periods and traditional cool climate gardens the buildings step up the hillside, the roof ridges producing a distinctive streetscape rhythm the larger lot sizes and modest building footprints of the buildings with frontage to the Great Western Highway has allowed the establishment of gardens to most properties, and in many cases, these have matured to not only provide a valuable setting for the house, but also to contribute significantly to the quality of the local streetscape as part of the sequence of arrival to the town of Blackheath most properties are notable for their modest scale and vernacular built form the built forms are mostly traditional in design and are characteristic of the more modest towns of the Blue Mountains, with the architectural styles from the early 20th Century interpreted and adapted for construction in the popular lightweight materials such as timber weatherboards (in places

Criterion	Assessment
	<p>fibro or other sheet cladding) with corrugated iron sheet roofs. The use of corrugated iron roofing means that many have a slightly lower roof pitch than is seen when terracotta tiles or slate roofing was used and adds to the distinctive aesthetic quality of the suburban streetscapes of the HCA. Some, but not all, of the later houses were built of brick with tiled roofs</p> <ul style="list-style-type: none"> the substantial house set on two acres of grounds at the northern end of the hill at 194 Great Western Highway is a locally significant 19th century Victorian guesthouse that has retained its original setting and makes a strong contribution to the aesthetic heritage values of the HCA alterations and additions are generally modest in scale and aesthetically consistent with the traditional typology of the original house one of the most notable features of the towns of the Blue Mountains, particularly when compared against other areas that may be superficially similar, is the amount of space still available around houses allow the landscape to be read clearly as a multi-dimensional one, with views not only directed along the streetscape, but also readily 'keyed' into the private domain through well-planted front, side and rear garden areas, with many houses partially or wholly hidden from casual view, and where visible, most are dominated by the surrounding vegetation. The gardens of the properties addressing the Great Western Highway demonstrate high quality aesthetic values at this important arrival point to the town the density and quality of gardens along the Great Western Highway frontage also helped to reduce the impact of the heavy traffic on the aesthetic values of the HCA verges are generally soft, with grassed swales and no formal kerbing or guttering in most of the minor streets. This adds to the Mountain town character of the streetscapes. <p>Neate Park is geographically within the HCA and contributes to its setting, but has a different and distinctive aesthetic heritage value as a simple, traditional section of open space with elements such as Arthur Murch's sculpture of the interpretation of Govett's Leap; and the unusual and distinctive wall mounted relief map of Blackheath and its surrounding attractions. The park also contains elements of active open space including a simple skateboard facility.</p> <p>The item therefore fulfils this criterion.</p>
(d) Social significance	There is no known social significance attached to this item and it therefore does not fulfil this criterion.
(e) Research potential	The area north of Abbott Street has the potential to have further research significance as part of the original convict Stockade. It therefore fulfils this criterion.
(f) Rarity	The item is not considered rare and does not fulfil this criterion.
(g) Representativeness	The Lookout Hill HCA is a representative example of the pattern of private development within the town of Blackheath. It also contains representative examples of the utilities required by country towns

Criterion	Assessment
	and the location of these utilities at the highest point in the local landscape. It therefore fulfils this criterion.

Integrity and intactness

The early 20th century subdivision pattern is substantially intact. Built forms are mostly intact, substantially intact or sympathetically altered.

Little evidence of demolition or substantial alteration to most properties. One house (18 Bridges Street) appears to have been demolished or collapsed in recent years but has retained evidence of original fence posts and garden elements.

Examples of alterations and additions that are not consistent with the heritage values of the area also exist.

Statement of significance

The Lookout Hill Heritage Conservation Area possesses heritage values that satisfy the NSW Heritage Council's criteria for listing as a locally significant heritage conservation area. Blackheath is one of the most significant towns in the Blue Mountains. It is a mature cultural landscape, as is evidenced by a comparison of the earliest European descriptions of the area as a bleak and barren one with the richly formed, complex and mature contemporary cultural landscape evident today.

The Lookout Hill HCA makes an important contribution to the setting of the town of Blackheath. It is situated at both the main entrance to the town from the east and on its highest point, giving it an aesthetic prominence that distinguishes the HCA from the remainder of the historic village area. The separation is clearly defined by the splitting of the railway line and Great Western Highway around the base of the hill before re-joining at the northern end of the park.

The significance of this natural landscape feature, of a hill, to the town, and in particular its geographic prominence, is demonstrated by the location of the trig station, Blackheath water tank and a communications tower at its highest point. These elements are utilitarian but aesthetically distinctive markers of a country town that contribute to the understanding of Blackheath's growth and development.

The HCA extends over the area of open space to the north of the hill between the highway and the railway line known as Neate Park, which contributes to the cultural landscape setting of the town and an understanding of its historic heritage values through the references and artworks contained within it, including an interpretive statue of the story of Govett's Leap by sculptor Arthur Murch and a historically significant relief map showing the context of the town within the landscape of the Blue Mountains.

The buildings, gardens and streetscapes of the Lookout Hill HCA are aesthetically significant for the evidence that they provide of the pattern of development in Blackheath and across the Blue Mountains and are distinguished by their relationship to the steep slope of the hillside, with footprints and roof forms stepping to follow the topography and establishing an aesthetically distinctive streetscape.

The HCA includes a group of substantial early houses set in large gardens with dual frontages to the Great Western Highway and Bridges Street. These include some substantially intact early 20th-century properties that demonstrate a sense of timelessness that is characteristic of the towns and villages of the upper Blue Mountains.

The more modest properties within the HCA also demonstrate aesthetic heritage values through the range of stylistic typologies and characteristic stepping of built forms to follow the grid-based street layout which takes no regard of the topographic character of the precinct. Most are relatively modest in scale and form and the precinct includes a range of early 20th-century, interwar and mid-century built forms. Most are built of the lightweight materials characteristic of development across the Blue Mountains, but several substantial early 20th-century dwellings have been built of brick, providing evidence of the understandings of status associated with access to views as well as the superior insulating qualities of brickwork in such an exposed location.

The buildings within the Lookout Hill HCA are characterised by their historic and aesthetic integrity, with many retaining their original form, or, if altered, the additions are mostly consistent with their original architectural typology.

The quality and prominence of Blackheath's gardens provides evidence of the community's ongoing commitment to the environmental quality of the town and its setting. The generous lot sizes and modest building footprints that characterise Blackheath including on Lookout Hill, have established a complex and rich spatiality to streetscape views and the integrity of the HCA. This is due largely to the setbacks of buildings from the front and side boundaries and the generous depth of lots which have allowed the view of most properties to be framed by vegetation including mature deciduous and conifer trees that rise over the ridgeline. Front gardens are often less densely planted than in other parts of Blackheath but good examples of the traditional garden typology can be found, particularly in the group between the Great Western Highway and Bridges Street.

Neate Park is geographically within the HCA and contributes to its setting but has a different and distinctive aesthetic heritage value as a simple, traditional section of open space with elements such as Arthur Murch's sculpture of the interpretation of Govett's Leap, and the unusual and distinctive wall mounted relief map of Blackheath and its surrounding attractions. The open character of the park overlooking the railway line and the view to the south links this map and the open space to the surrounding cultural landscape. The park also contains elements of active open space including a simple skateboard facility.

The area north of Abbott Street has additional historical and potential research significance as part of the site of the original convict stockade which was established in 1844.

St Mounts (Blue Mountains LEP, BH052)



Figure B 4 St Mounts (Source: Google Maps)

The following significance assessment is based on the State Heritage Inventory entry.

Table B 5 Significance assessment of St Mounts

Criterion	Assessment
(a) Historical significance	<p>St Mounts on the Great Western Highway, Blackheath has been continuously associated with providing accommodation in the Blue Mountains since the 1890s.</p> <p>The site of St Mounts includes a good example of a late nineteenth century Victorian guesthouse as well as two late nineteenth-century cottages which have been incorporated into the site. The police-station is a significant survivor of law and order in the area.</p> <p>It therefore fulfils this criterion.</p>
(b) Associative significance	<p>There are no known significant associations attached to the item. It therefore does not fulfil this criterion.</p>
(c) Aesthetic/technical significance	<p>The main building of St Mounts retains many of its late Victorian features, such as its hipped roof, corrugated metal “M” form roof, boxed eaves and weatherboard cladding. Its chimneys are rendered and coursed in ashlar with heavy corbel and torus mould. A bullnose verandah runs along the east, north and south elevations, with French doors and arched two—paned top panels and toplights opening on to the verandah. The north cottage is a hipped and gabled cottage with corrugated galvanised steel roof, corbelled brick chimney and a skillion verandah. The West cottage is a gabled single storey cottage with splayed weatherboard cladding and corrugated steel roof and corbelled brick chimneys.</p> <p>The item therefore fulfils this criterion.</p>
(d) Social significance	<p>There is no social significance attached to this item. It therefore does not fulfil this criterion.</p>
(e) Research potential	<p>St Mounts is partially located on the former Stockade site. Although unlikely, some potential for archaeological remains exists. Owing to</p>

Criterion	Assessment
	their rarity, any such remains would be of high heritage significance. The item therefore fulfils this criterion.
(f) Rarity	The item is not considered rare. It therefore does not fulfil this criterion.
(g) Representativeness	St Mounts guesthouse is a representative example of a Victorian residence which has been extended and adapted due to its use as a guesthouse. It therefore fulfils this criterion.

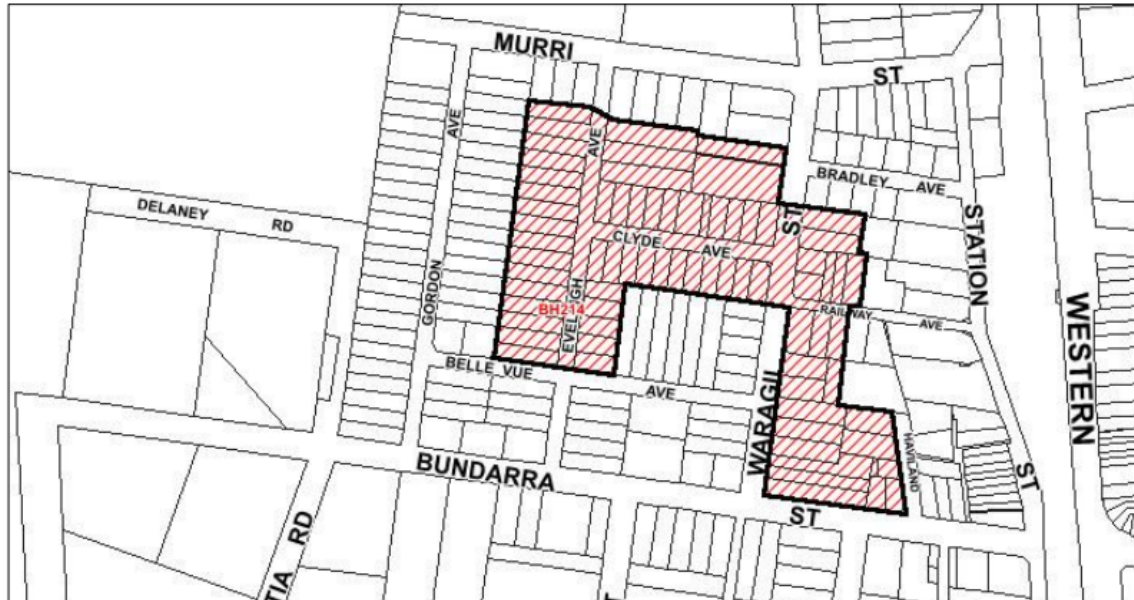
Integrity and intactness

The main guesthouse has been modified and updated since its construction, but overall has good integrity and intactness. The two cottages, however, have been modified more and are assessed as having reasonable integrity and intactness.

Statement of significance

St Mounts on the Great Western Highway, Blackheath has been continuously associated with providing accommodation in the Blue Mountains since the 1890s.

The site of St Mounts includes a good example of a late nineteenth century Victorian guesthouse as well as two late nineteenth-century cottages which have been incorporated into the site. The police-station is a significant survivor of law and order in the area.

Blackheath West Heritage Conservation Area (Blue Mountains LEP, BH214)**Figure B 5: Blackheath West Heritage Conservation Area****Table B 6 Significance assessment of Blackheath West Heritage Conservation Area**

Criterion	Assessment
(a) Historical significance	<p>The Blackheath West HCA demonstrates the principal characteristics of the development of country towns and villages in New South Wales in the early 20th century in the following ways:</p> <p>Subdivision character</p> <ul style="list-style-type: none"> • a functional street pattern formed by successive layers of subdivision • the contemporary subdivision and road layout pattern is generally consistent with an 1882 flyer for the sale of land in the precinct • areas of subdivided but not developed land. <p>Range and quality of built forms</p> <ul style="list-style-type: none"> • almost all of the houses that existed in 1943 have survived in substantially intact form • groups of very early buildings which have retained a high level of spatial integrity and allow the intimacy of the original village form to still be appreciated • a rare example of a substantial attached terrace within the Blue Mountains • the typologies demonstrated in the Blackheath West HCA represent the primary typologies characteristic of development in the Blue Mountains • alterations and additions are generally relatively modest and allow the original typology to still be read

Criterion	Assessment
	<ul style="list-style-type: none"> the HCA also includes an example of an early family holding, with several houses built as part of an earlier. <p>Convict Stockade</p> <ul style="list-style-type: none"> the HCA includes the site of the cemetery constructed for the burial of soldiers and convicts working from the Blackheath Convict Stockade. The site of this cemetery is vacant at present, which allows ready interpretation of its historic use. <p>The item therefore fulfils this criterion.</p>
(b) Associative significance	There are no known significant associations with this item. It therefore does not fulfil this criterion.
(c) Aesthetic/technical significance	<p>The Blackheath West HCA is demonstrating aesthetic heritage values through the intimacy of its streetscapes, the breadth of its views and the aesthetic qualities of its housing.</p> <ul style="list-style-type: none"> the HCA includes precincts of high-quality modest housing set close in the manner traditional of a small village. The streetscapes are of high quality due to their rhythm and the integrity of many of the built forms. Carriageways and lots are both narrow and create a strong sense of intimacy, particularly in the street block immediately to the west of the station the HCA includes some retail and service activities, many of which are located in large shed-like buildings that form a barrier between the residential areas and the railway line the short street of Havilland Avenue contains a particularly good group of cottages and early terraces another aesthetically prominent and significant terrace is at 1-5 Waragil Street, which is a very rare example of its type in the Blue Mountains the HCA includes a wide range of the building typologies that are characteristic of traditional development in the Blue Mountains the built forms are mostly traditional in design and are characteristic of the more modest towns of the Blue Mountains, with the architectural styles from the early 20th Century interpreted and adapted for construction in the popular lightweight materials such as timber weatherboards (in places fibro or other sheet cladding) with corrugated iron sheet roofs. The use of corrugated iron roofing means that many have a slightly lower roof pitch than is seen when terracotta tiles or slate roofing was used and adds to the distinctive aesthetic quality of the suburban streetscapes of the HCA. Some, but not all, of the later houses were built of brick with tiled roofs alterations and additions are generally modest in scale and aesthetically consistent with the traditional typology of the original house the Blackheath West HCA also demonstrates aesthetic heritage significance for the ready access to a range of high-quality views from within the residential areas, particularly from Station Street where the very low density of development and simplicity

Criterion	Assessment
	<p>of garden planting allows the spectacular views to the west to be interpreted by the general community</p> <ul style="list-style-type: none"> • some of the larger properties also have significant garden plantings in the traditional tradition of the Blue Mountains • verges are generally soft, with grassed swales and no formal kerbing or guttering in most of the minor streets. This adds to the Mountain town character of the streetscapes.
(d) Social significance	There is no social significance attached to the item. It therefore does not fulfil this criterion.
(e) Research potential	The former Stockade Cemetery and associated areas have the potential to yield information that will increase our understanding of this important period in the history of the Blue Mountains. That element therefore fulfils this criterion.
(f) Rarity	The former stockade Cemetery is rare. That element fulfils this criterion.
(g) Representativeness	The Blackheath West HCA is a high-quality and aesthetically interesting example of a mountain village which contains many very good examples of the building typologies that contribute to the cultural landscapes of the Blue Mountains. It therefore fulfils this criterion.

Integrity and intactness

The early 20th century subdivision pattern is substantially intact. Built forms are mostly intact, substantially intact or sympathetically altered. Examples of alterations and additions that are not consistent with the heritage values of the area also exist.

Statement of significance

The Blackheath West Heritage Conservation Area demonstrates heritage values that satisfy the NSW Heritage Council's criteria for listing as a locally significant heritage conservation area. The area within the Blackheath West HCA is situated to the west of the railway line and is historically significant for the evidence that it provides of the early private subdivision and development in the village of Blackheath. The Blackheath West HCA is also historically significant as the location of the burial ground associated with the earliest phase of occupation of the area, the 1844 to 1849 convict stockade. This site also demonstrates archaeological research potential.

The cultural landscape of Blackheath West is an evolved one which provides evidence of the pattern of development in the towns and villages of the upper Blue Mountains throughout the 19th and 20th centuries. The development of this area was contemporary with the formal Crown village on the eastern side of the line and provides the opportunity for direct comparison between the two approaches to development.

The Blackheath West HCA is historically and aesthetically significant for its many substantially intact cottages and gardens and intimately scaled streetscapes. Streetscapes are characterised by the rich variety of styles that reflect the gradual infilling of the lots created in the early subdivisions. Few houses have been demolished or even substantially extended in a form not consistent with the original building.

The HCA is able to demonstrate most of the building typologies of that contribute to the historic pattern of development in the Blue Mountains and has a high concentration of some of the earliest and rarest types, including the very modest groups of cottages of Haviland Street and the large triple-terrace at the corner of Bundarra and Waragil Streets.

The Blackheath West HCA is aesthetically significant for the quality of its views and the ease with which they can be enjoyed through both formal and informal locations, including the Paul Harris small lookout

and covered picnic table at the western end of Staveley Parade over the panorama of the valley below and the informal views that are readily available from the footpath of Station Street between the widely-spaced houses.

Guinness Lodge/Evanville (Blue Mountains LEP, BH059)**Figure B 6 Guinness Lodge/Evanville (Source: Google Maps)**

The following significance assessment has been adapted from the significance assessment on the State Heritage Inventory.

Table B 7 Significance assessment of Guinness Lodge/Evanville

Criterion	Assessment
(a) Historical significance	Historical information suggests that the item was probably built in c.1883 as holiday accommodation in a form unusual for the Blue Mountains. As such, the terrace is of historic significance. It therefore fulfils this criterion.
(b) Associative significance	There are no known significant associations with this item. It therefore does not fulfil this criterion.
(c) Aesthetic/technical significance	The terrace of three houses at 1-5 Waragil Street is a good example of a Victorian filigree style terrace. Its small scale suggests it was built either as worker's or holiday accommodation. It is an unusual form of house construction in the Blue Mountains. The location of the terrace, high above Warigal Street, gives the terrace prominence in the local streetscape. It therefore fulfils this criterion.
(d) Social significance	There is no known social significant attached to this item. It therefore does not fulfil this criterion.
(e) Research potential	There is little potential for the item to yield information that could add to existing knowledge of the settlement of Blackheath. It therefore does not fulfil this criterion.
(f) Rarity	No. 5 Warigal Street is rare in retaining its original kitchen. fireplace and stove and in having its original sheds in the rear yard. It therefore fulfils this criterion.

Criterion	Assessment
(g) Representativeness	Although the items are rare for the Blue Mountains, however, are broadly representative of late 19 th century terrace housing. It therefore is considered to fulfil this criterion.

Integrity and intactness

Both Guinness Lodge and No. 3 have been extensively modified since construction and therefore have low intactness and integrity. Evanville (No. 5), however, still retains some original features, such as its kitchen, fireplace, stove and sheds and therefore has a high level of intactness and integrity.

Statement of significance

The terrace of three houses at 1-5 Waragil Street is a good example of a Victorian filigree style timber terrace, unusual in the Blue Mountains.

No. 5 Waragil Street is rare in retaining its original kitchen fireplace and stove and in having its original sheds in the rear yard.

Tree Tops and Garden (Blue Mountains LEP, BH065)



Figure B 7 Tree Tops and Garden (Source: Google Maps)

This significance assessment has been adapted from the existing significance assessment on the State Heritage Inventory.

Table B 8 Significance assessment of Tree Tops and Garden

Criterion	Assessment
(a) Historical significance	Tree Tops and its garden were constructed in the interwar period as part of a subdivision. It therefore fulfils this criterion.
(b) Associative significance	There are no known special associations with the item. It therefore does not fulfil this criterion.
(c) Aesthetic/technical significance	Tree Tops at 16 Clyde Avenue, Blackheath is a fine Inter-war house in a garden setting. It has an unusual arrangement of corner verandahs facing the street with art nouveau detailing. The site retains the original front fence and garage. It therefore fulfils this criterion.
(d) Social significance	There is no known social significance attached to this item. It therefore does not fulfil this criterion.
(e) Research potential	There is little research potential attached to this item. It therefore does not fulfil this criterion.
(f) Rarity	The item is not considered rare. It therefore does not fulfil this criterion.
(g) Representativeness	The item is broadly representative of an interwar residence. It therefore fulfils this criterion.

Integrity and intactness

Tree Tops and its garden is considered to be of high integrity and intactness.

Statement of significance

Tree Tops and its garden at 16 Clyde Avenue, Blackheath is a fine example of an Inter-war house in Blackheath with Art Nouveau detailing. The site retains its original street fence and garage.

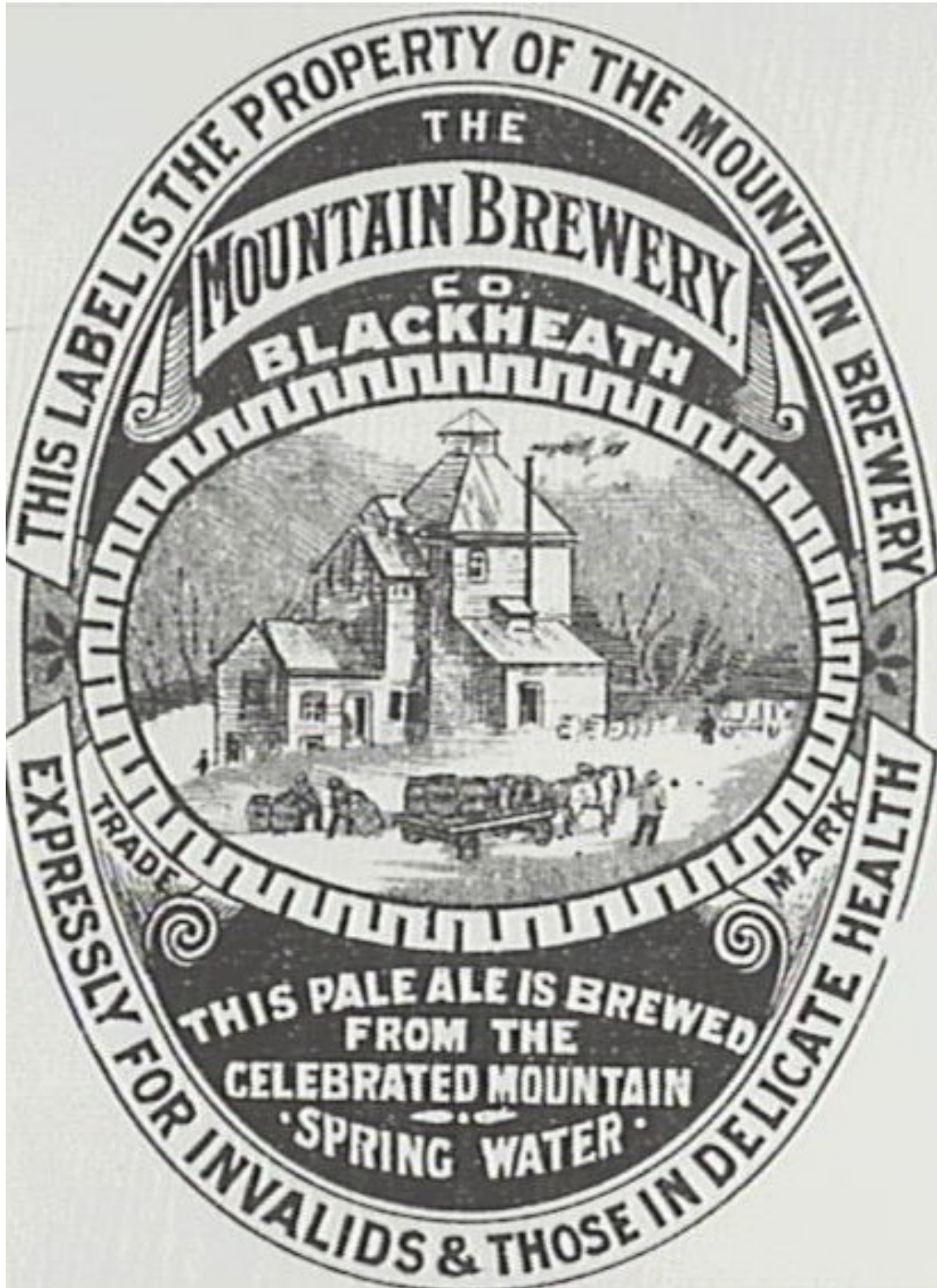
Ban Tigh, Brewery Site and Garden (BH060)

Figure B 8 Label for pale ale brewed by the Mountain Brewery Co., Blackheath (Source: Blue Mountains Library, Asset Name LS001\001128 The Mountains Brewery co., Blackheath)

The following significance assessment is adapted from the limited State Heritage Inventory entry.

Table B 9 Significance assessment of Ban Tigh, Brewery Site and Garden

Criterion	Assessment
(a) Historical significance	The item is the site of a late 19 th century brewery which operated from c. 1885 by The Mountain Brewery Co. Fed by the waters of Centennial Glen Creek, they produced a nut-brown pale ale that was widely praised. By 1892, Young & Co, brewers from Lithgow, were in possession of the site. The brewery site is of local significance as an example of a country industry now almost disappeared. Following demolition of the brewery, the house, Ban Tigh, was constructed c. 1914 to 1918 by the Joyce family as a country retreat. The item therefore fulfils this criterion.
(b) Associative significance	The item is associated with the Joyce family, who built Ban Tigh. It therefore fulfils this criterion.
(c) Aesthetic/technical significance	Ban Tigh is a fine example of an Inter-war bungalow built by a wealthy Sydney family as a holiday dwelling. As it has remained a private holiday dwelling, it has undergone few alterations and maintained its fine garden setting. The site retains substantial areas of native bushland which contribute to the amenity of the site.
(d) Social significance	There is no social significance attached to the item. It therefore does not fulfil this criterion.
(e) Research potential	There is some potential for archaeological remains associated with the brewery to be present on the site. The item therefore fulfils this criterion.
(f) Rarity	The brewery was only in operation for around 15 years but was from available descriptions a sizeable operation. Information relating to the brewery site is sparse. Any archaeological remains associated with the former brewery therefore would be considered rare. It therefore fulfils this criterion.
(g) Representativeness	Ban Tigh is considered to be a representative example of an early 20 th century country retreat. It therefore fulfils this criterion.

Integrity and intactness

The integrity and intactness of Ban Tigh is considered high.

Statement of significance

Ban Tigh is a fine intact example of a WWI bungalow in a substantial garden setting built by a wealthy Sydney family as a holiday dwelling. The remnant bushland around to the dwelling contributes to the amenity of the site. Ban Tigh is associated with the Joyce family, a prominent biscuit manufacturer in the early 20th century.

The site has evidence of the former Blackheath Brewery including the concrete lined spring which supplied fresh water for the brewing and later cordial making processes.

Osborne College (site only) (Blue Mountains LEP, BH039)

Figure B 9 Osborne Ladies College, looking east, c. 1925 to 1939 (Source: Blue Mountains Library, LS000\000811A Osborne College Prospectus, 1925 – 1939)

This assessment is adapted from the State Heritage Inventory entry.

Table B 10 Significance assessment of Osborne College (site only)

Criterion	Assessment
(a) Historical significance	Osborne College was first constructed in the 1880s as accommodation for holidaymakers and known as the Centennial Hotel. However, although finished the Hotel never appears to have opened its doors to guests. It was repossessed by a bank during the 1890s economic downturn, and after passing through a number of hands was renovated as Osborne Ladies' College in 1923. Previously at Epping in Sydney, Osborne Ladies' College operated until closure in 1958. The building was demolished shortly after. The item therefore fulfils this criterion.
(b) Associative significance	There are no known special associations with the item. It therefore does not fulfil this criterion.
(c) Aesthetic/technical significance	There are no traces of the former building. It therefore does not fulfil the criterion.
(d) Social significance	There is no social significance attached to this item. It therefore does not fulfil this criterion.
(e) Research potential	The Blue Mountains Christian College was later built on the site and likely to have removed any archaeological material associated with the former hotel/ladies' college. It therefore does not fulfil this criterion.

Criterion	Assessment
(f) Rarity	The item is not considered rare and therefore does not fulfil this criterion. However, any unexpected finds associated with the former college would be considered rare.
(g) Representativeness	The item is of historical significance only and therefore does not fulfil this criterion.

Integrity and intactness

There are no known remaining buildings associated with this item.

Statement of significance

The former ladies' college site has strong historical significance as a boarding school for ladies. While all traces of the former college are likely to have been removed with subsequent building and development, any archaeological deposits associated with either the Centennial Hotel or the Osborne Ladies' College would be of heritage significance.

Montana (Blue Mountains LEP, BH071)**Figure B 10 Montana (Source: Google Maps)**

This significance assessment is adapted from the State Heritage Inventory entry.

Table B 11 Significance assessment of Montana

Criterion	Assessment
(a) Historical significance	Montana was constructed in c. 1890 as part of an early subdivision in Blackheath. It therefore fulfils this criterion.
(b) Associative significance	There are no significant associations with the item. It therefore does not fulfil this criterion.
(c) Aesthetic/technical significance	Montana is a representative example of a late nineteenth century house in the Blue Mountains, retaining many of its original features. It therefore fulfils this criterion.
(d) Social significance	There is no social significance attached to this item. It therefore does not fulfil this criterion.
(e) Research potential	There is little research potential attached to this item. It therefore does not fulfil this criterion.
(f) Rarity	The item is not considered rare and does not fulfil this criterion.
(g) Representativeness	The item is representative of a late 19 th century residence. It therefore fulfils this criterion.

Integrity and intactness

The item is considered to be of reasonable integrity and intactness.

Statement of significance

Montana is a representative example of 1890s housing in a quiet street in a Blackheath subdivision.

Soldiers Pinch (Blue Mountains LEP, MV009)

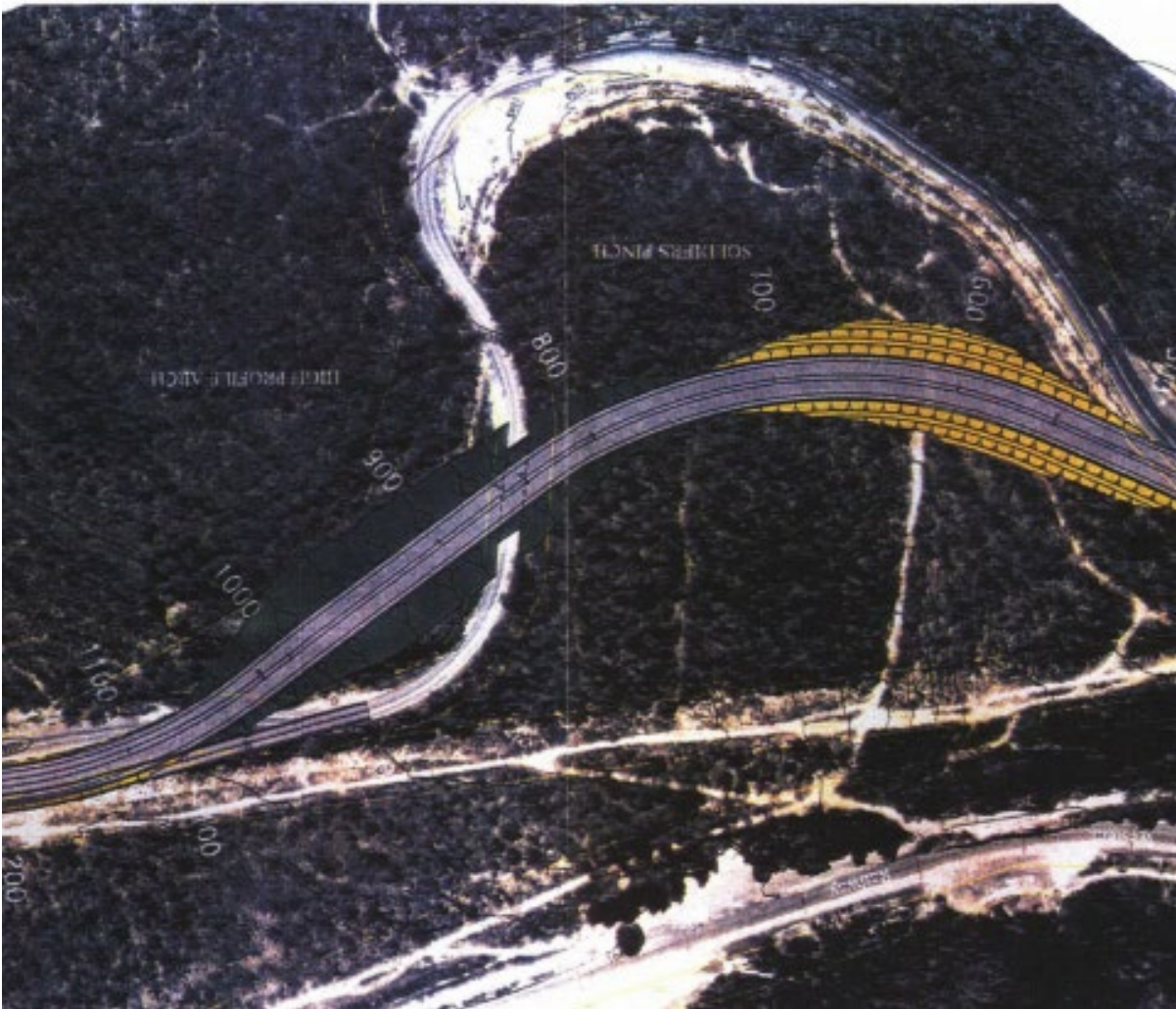


Figure B 11 Aerial of Soldiers Pinch showing old and new alignments of the Great Western Highway ((Lavelle, 2000:30)

This significance assessment is based on the limited information provided in the State Heritage Inventory.

Table B 12 Significance assessment of Soldiers Pinch

Criterion	Assessment
(a) Historical significance	<p>The area between Mount Boyce and Mount Victoria retains a number of historic sites and features relating to historic road and rail crossings over the Blue Mountains from the early 19th to present day. The Blue Mountains presented a major barrier to expansion of the settlement of NSW and therefore surviving evidence of those works are significant in illustrating the enormity of the task and their successes.</p> <p>This section of the Great Western Highway between Mt Boyce and Mt Victoria is particularly difficult because of the steep rocky terrain. There have been a number of road realignments and upgrades to the various generations of roads in this area from the earliest Colonial roads to those of the present day in an effort to improve the crossing.</p> <p>The components of the Soldiers Pinch Group include the following:</p>

Criterion	Assessment
	<ul style="list-style-type: none"> Cox's Road (1814) and its realignment (1823) Soldiers Pinch area (formerly listed as "Soldiers Pinch Abandoned Road Formations") <p>These components are illustrative of the multiple challenges in crossings of the Blue Mountains since 1814.</p> <p>The item therefore meets this criterion to a local level.</p>
(b) Associative significance	<p>This area has been associated with numerous crossings since 1813. Blaxland, Wentworth and Lawson are believed to have passed through the area in their 1813 crossing, followed by Evans later the same year. Cox's road gang constructed the first road through this area in 1814, followed by Mitchell's Western Road in the 1830s, who then redesigned the Soldiers Pinch section in 1845. All of these roads were constructed by convict iron gangs.</p> <p>The area is therefore heavily associated with William Cox and Sir Thomas Mitchell, as well as the convict workforce who constructed the roads.</p> <p>The item therefore meets this criterion at a local level.</p>
(c) Aesthetic/technical significance	<p>Some elements of Soldiers Pinch, such as surviving sections of Cox's Road and original sections and features of Mitchell's Western Road, are of technical interest. Cox's Road has mostly been overgrown and retains little technical information of road building techniques, however the overall endeavour of constructing the first road across the Blue Mountains is a significant technical achievement.</p> <p>In relation to Mitchell's Western Road, the original alignment at Soldiers Pinch comprised a sharp angle and was replaced by a realignment in 2002. It is no longer in use, however a section to the north east of the 2002 realignment still exists in the landscape and is sealed. Some original features, such as stone culverts, stone walls, cuts and kerbing still survive in this section, evidencing the technological features of the road's construction and management. Most of the original alignment to the south west of the 2002 realignment has been destroyed by the land's use as a batching plant for the Roads and Traffic Authority (now Transport for NSW).</p> <p>The item meets this criterion at a local level.</p>
(d) Social significance	<p>There is no social significance identified with this item. It does not meet this criterion.</p>
(e) Research potential	<p>It is understood that the features associated with Cox's Road were recorded in 2000 prior to the construction of the new alignment of the Great Western Highway at Soldiers Pinch. However, considering the extensive historical transport uses of the area, it is possible that other features relating to these, outside of the 2000 Great Western Highway realignment, may still be present in the landscape.</p> <p>The item meets this criterion at a local level.</p>
(f) Rarity	<p>Most of the historical routes that traversed the Soldiers Pinch area have been demolished or otherwise destroyed. Any remaining parts of these routes would be considered rare.</p> <p>The item meets this criterion at a local level.</p>

Criterion	Assessment
(g) Representativeness	<p>The item is representative of the ongoing challenge of maintaining safe and useful transport corridors. The multiple historical routes evidence the difficulty of this endeavour.</p> <p>The item meets this criterion.</p>

Integrity and intactness

Many of the historical routes are fragmentary and/or deteriorating.

Statement of Significance

The following Statement of Significance is taken from the State Heritage Inventory entry:

The area between Mount Boyce and Mount Victoria retains a number of historic sites and features relating to historic road and rail crossings over the Blue Mountains from the early 19th to present day. The Blue Mountains presented a major barrier to expansion of the settlement of NSW and therefore surviving evidence of those works are significant in illustrating the enormity of the task and their successes. The group illustrates the NSW historic themes of transportation, exploration and settlement in NSW.

This section of the GWH between Mt Boyce and Mt Victoria is particularly difficult because of the steep rocky terrain. There have been a number of road realignments and upgrades to the various generations of roads in this area from the earliest Colonial roads to those of the present day in an effort to improve the crossing. The area has particular historic and technical significance because evidence of remnant sections of those roads still remains today. The components of the Soldiers Pinch Group include major items such as the Cox's Road and realignment, the Soldiers Pinch area, an abandoned section of the c. 1840s road, convict stone walling on the Soldiers Pinch corner and an abandoned section of a 1900 road alignment.

Central Mount Victoria Village Heritage Conservation Area (Blue Mountains LEP, MV023)



Figure B 12 Central Mount Victoria Village Heritage Conservation Area (Source: Blue Mountains Council)

The following assessment has been adapted from the State Heritage Inventory entry and the draft Heritage Inventory Sheet prepared for the item in the State Heritage Inventory.

Table B 13 Significance assessment of Central Mount Victoria Village Heritage Conservation Area

Criterion	Assessment
(a) Historical significance	<p>Mount Victoria has great historical significance because of its role as a tourist resort in the nineteenth century and place in the growth and development of the Blue Mountains. It contains numerous buildings of historic significance which provide evidence of this, such as the railway station, public school, post office and three large hotels that were first operating during the second half of the nineteenth century.</p> <p>Mount Victoria provides important evidence of the major part that road and rail transport have played in the history of the Blue Mountains. The town of Mount Victoria has played an important role in the historically and culturally significant exploration, crossing and settlement of the Blue Mountains. Evidence of the traditional (19th/early 20th century) journey over the Blue Mountains has survived in its original historic context and setting, and in particular through the clearly defined edges to the village and the alignment of the main road.</p> <p>The edges of the village:</p> <p>The original form, extent and boundaries of the village remain well defined through the clear contrast between the natural bush and settled village landscapes. Each end of the village is marked by early buildings, including the historically significant toll-house and gate-keeper's cottage at the eastern edge and the fine residential properties at the western end.</p>

Criterion	Assessment
	<p>The toll-house and gate-keeper's cottage at the eastern edge of the Village also provide rare and highly intact evidence of the historic methods of control and management of both road and rail journeys between Sydney and western NSW during the 19th century. The Toll Bar House provides physical and contextual evidence of the attempts by the Government to control access to the public road network and charging fees for the use of public infrastructure. The Gate Keeper's cottage formed a critical part of 19th century rail infrastructure by controlling and managing access at the intersection of road and rail networks. It also forms part of the group of five identical cottages that have survived in situ (with a sixth relocated) across the Blue Mountains.</p> <p>Alignment of the main western road:</p> <p>The sinuous alignment of the main road (now known as the Great Western Highway) on the eastern edge of the Village continues to follow closely the early 19th century alignment despite recent roadworks, including the winding character of the approach from the east.</p> <p>Evidence of the historic role of Mount Victoria as a place to prepare/restore on the journey between Sydney and western NSW</p> <p>The historic role of Mount Victoria as the place of transition between the Blue Mountains and western NSW can still be interpreted through the vehicular service station at the western edge of the village which provides fuel and basic supplies immediately before/after Victoria Pass.</p> <p>The rhythms of development between the service station and the town continues to demonstrate the original pattern of settlement, with the wide spacing of the original cottages (now infilled by residential development) and the relatively level ground providing spatial evidence of the earlier presence of stock-holding paddocks in this area.</p> <p>The HCA therefore fulfils this criterion.</p>
(b) Associative significance	<p>While there are numerous significant associations attached to many of the items within the HCA, they do not apply to the HCA in general.</p> <p>The HCA fulfils this criterion.</p>
(c) Aesthetic/technical significance	<p>Mount Victoria is unique amongst all the villages because of the important interrelations between its architectural stock, topography, open spaces within the village and extensive stands of mature trees and shrubs.</p> <p>The historic form and extent of the village remains clearly readable, with the edges marked by late 19th/early 20th century houses, cottages and the significant early buildings. The edges of the village are well-defined. The arrival to the village at each end demonstrates distinctive aesthetic qualities that define the abrupt transition between natural bushland and the settlement of Mount Victoria. The original Toll Bar House and the gate-keeper's cottage continue to mark the eastern edge of the village and continue to demonstrate the principal characteristics of their historic role as the place of transition between the wilderness of the bush landscape and the village settlement.</p>

Criterion	Assessment
	<p>The edges of the Village include examples of building typologies that are otherwise rare in Mount Victoria. The small group of houses situated at the eastern end of Harley Avenue are separated from the core of the village by the electrical substation, but when viewed from the highway form an important and cohesive part of the fabric of the village. This group includes one individually significant heritage item (120 Great Western Highway) and a very good pair of Inter-War residences in the cottage style that make a particularly positive contribution to the streetscape.</p> <p>The edges of the village continue to demonstrate the characteristics of the traditional serial views that mark the transition between the village settlement and the surrounding bushland. The settings of properties include mature gardens with both exotic and native eucalypts that contribute to the aesthetic heritage values of the Village. Houses are generally set back from their street boundary sufficiently to have allowed the planting and growth to maturity of gardens which in many instances play an important role in establishing and reinforcing the aesthetic qualities of the streetscape. More recently constructed residences are characterised by either exotic or native gardens, the latter including the retention of original eucalypts under which the house is nestled. This is a secondary theme of landscaping that is characteristic of the later layers of settlement in the Blue Mountains in the second half of the 20th century. The mature gardens and individual plantings play an important role in the aesthetic values of the village of Mount Victoria. The quality and density of the gardens to the properties along the highway emphasise the distinctiveness of Mount Victoria's cultural landscape and emphasises the village's aesthetic quality and character of a self-contained village surrounded by natural 'wilderness' landscape.</p> <p>The aesthetic quality of the streetscapes is distinctive. Garden plantings act to create and control the aesthetically rich arrival experience into the village with a series of close and directed views unfolding as the road rises from both directions to the centre of the village at Station Street. The gardens and mature plantings also help to reduce the less desirable impacts of the heavy vehicular traffic flow on the adjacent residences.</p> <p>The HCA fulfils this criterion.</p>
(d) Social significance	<p>Mt Victoria has great social significance because of its historical role as a major tourist resort.</p> <p>The edges of the village include St Pauls Catholic Church which has the potential to be significant to the local community (not investigated in detail).</p> <p>The HCA fulfils this criterion.</p>
(e) Research potential	<p>The Village include sites which have the potential to yield information that will contribute to the understanding of the layers of occupation and settlement of the Blue Mountains. Most properties along the route of the original highway have some degree of archaeological potential, and in particular those known to have had active uses in the mid-late 19th century, including the Toll Bar House, the railway gate-keeper's cottage and the site of the Welcome Inn and store</p>

Criterion	Assessment
	(161-165 Great Western Highway) which are located in a group at the eastern entrance to the village. The HCA fulfils this criterion.
(f) Rarity	The eastern edge of the Mount Victoria Village includes the 1849 Bathurst Road Toll Bar House and railway gate-keeper's cottage, both of which are rare early examples of transport-related infrastructure in the Blue Mountains. The Toll Bar House is one of only two such buildings to have survived in the state and is one of only two pre-1850s buildings to have survived in the Blue Mountains. The HCA fulfils this criterion.
(g) Representativeness	The Village is representative of the pattern of development in the Blue Mountains in the early 20th century and are clearly defined. The HCA fulfils this criterion.

Integrity and intactness

The townscape of the village still provides the opportunity for the visitor to enjoy vistas and views that are similar to those found in nineteenth and early twentieth century photographs. It is still possible to gain an interpretation of the village as a late nineteenth/early twentieth century resort through its physical fabric.

The integrity and intactness is good. Most buildings have survived in substantially intact form and siting. Infill development has occurred on previously undeveloped land.

Statement of significance

Mount Victoria is unique amongst all of the villages in the City of Blue Mountains. It provides a great deal of evidence of the growth and development of the Blue Mountains with the advent of the railway line during the second half of the nineteenth century and the subsequent consolidation of road transport during the twentieth century. It was a most important railway terminus for many years and a major tourist destination until the era after WWI. These aspects of its past are evident in built items such as the railway station and the large resort hotels that are still visual landmarks in the town. Its school is historically significant, being the first public school established in the Blue Mountains, and the early date of its post office underlines the importance of the village in the economy of the Blue Mountains at the end of the nineteenth century.

The village has great aesthetic significance because of the inter-relationship of its built fabric, placed in a setting characterised by open spaces and extensive stands of mature trees. This distinctive townscape is unlike any other in the City of Blue Mountains. The vistas presented on Station Street between the Great Western Highway and Montgomery Street are amongst the finest townscapes in the City of Blue Mountains.

The approaches to the village are of particular heritage significance because they include very rare examples of the main phases of transport infrastructure associated with the settlement of NSW, including one of only two original toll-houses, a representative example of a 19th century railway gate-keepers cottage, the current railway line and facilities for contemporary travellers including vehicle servicing and accommodation in a pattern consistent with the historic development of the area.

Mitchells Ridge Monument Reserve (Blue Mountains LEP, MV015)**Figure B 13 Mitchells Ridge Monument Reserve (Source: Monument Australia)**

The following significance assessment is taken from the State Heritage Inventory entry for the item.

Table B 14 Significance assessment of Mitchells Ridge Monument Reserve

Criterion	Assessment
(a) Historical significance	<p>The achievements of Surveyor General Mitchell were particularly revealed in his creation of the Great North Road and in the building of Victoria Pass as a radical approach to the problem of bringing the western road down from the Mountains to the Bathurst Plains. The commemoration of the opening of Victoria Pass in 1832 first on the centenary in 1932 and then on the sesquicentenary in 1982 is a natural and commendable perpetuation at the local level of the work of a very great, though flawed, public engineer.</p> <p>This item therefore fulfils this criterion.</p>

Criterion	Assessment
(b) Associative significance	As this item memorialises Sir Thomas Mitchell, it is considered that the item fulfils this criterion.
(c) Aesthetic/technical significance	<p>Mitchells Ridge monument is a good example of an inter-war monument using classical motifs such as an obelisk and an acanthus leaf form to support the lamp.</p> <p>When originally constructed, the monument would have served as a landmark to travellers at the top of Victoria Pass. This has been obscured by the present regeneration of trees and shrubs between the road and the monument.</p> <p>The item therefore fulfils this criterion.</p>
(d) Social significance	There is no social significance attached to this item. It therefore does not fulfil this criterion.
(e) Research potential	There is little research potential attached to this item. It therefore does not fulfil this criterion.
(f) Rarity	The item is not considered rare. It therefore does not fulfil this criterion.
(g) Representativeness	The monument is broadly representative of an inter-war monument using classic motifs, such as an obelisk and an acanthus leaf form to support the lamp. It therefore fulfils this criterion.

Integrity and intactness

The monument has not undergone significant modifications since its construction. Its integrity and intactness are therefore considered high.

Statement of significance

The achievements of Surveyor General Mitchell were particularly revealed in his creation of the Great North Road and in the building of Victoria Pass as a radical approach to the problem of bringing the western road down from the Mountains to the Bathurst Plains. The commemoration of the opening of Victoria Pass in 1832 first on the centenary in 1932 and then on the sesquicentenary in 1982 is a natural and commendable perpetuation at the local level of the work of a very great, though flawed, public engineer.

Mitchells Ridge monument is a good example of an inter-war monument using classical motifs such as an obelisk and an acanthus leaf form to support the lamp.

When originally constructed, the monument would have served as a landmark to travellers at the top of Victoria Pass. This has been obscured by the present regeneration of trees and shrubs between the road and the monument.

Berghofers Pass (Blue Mountains LEP, MY01)

This assessment is adapted from the State Heritage Inventory entry. It should also be noted that this item forms part of the group item, "Mount Victoria Escarpment Reserves Complex Heritage Conservation Area".

Table B 15 Significance assessment of Berghofers Pass

Criterion	Assessment
(a) Historical significance	<p>Berghofers Pass has historical significance at the State level as one of the longest intact lengths of road constructed prior to the introduction of heavy machinery in road making. The 2.5 kilometres of road was built using methods similar to those used on nearby convict roads nearly a century earlier. After WWII, the use of machinery in road construction began to see the end of such techniques as the use of the hand packed dry stone walls, the use of the stonemason's pick to shape walls and building stones, the building of post and rail fences from local timber and the use of horse and carts to move fill. The presence of a trough, dry stone walls and prefabricated cement pipes as well as the grading of 1:15, designed for low-powered early cars, provide a rare juxtaposition of fabric and design that locates the time of the road construction at a transitional phase between the era of handmade roads and those built by machinery and modern materials. Berghofers Pass provides important evidence of part of the history of road making and road transport in NSW.</p> <p>The item therefore fulfils this criterion.</p>
(b) Associative significance	<p>In the early 20th century, local mayor John William Berghofer, a German immigrant who became the first president of the Blaxland Shire (now Greater Lithgow), was instrumental in initiating the construction of a new road and pass at Mount Victoria, which became known as Berghofers Pass. Berghofer also owned (and named) the heritage-listed "Rosedale" at Hartley Vale.</p> <p>The item therefore fulfils this criterion.</p>
(c) Aesthetic/technical significance	<p>Berghofers Pass is of technical significance as a representative example of the transitional phase of road-building, between hand-made roads and roads formed through heavy machinery and modern materials.</p> <p>The item therefore fulfils this criterion.</p>
(d) Social significance	<p>Berghofers Pass is valued by local residents and people who live in the surrounding area as a recreational amenity and as a connection with Australia's convict history. The roads are identified as an important part of the landscape and are highly valued by local resident and people with an interest in Australia road building history.</p> <p>The item fulfils this criterion</p>
(e) Research potential	<p>While some archaeological potential may exist in the vicinity of the road, demonstrating the construction and/or use of the road, its significance is unable to be determined.</p> <p>The item therefore does not fulfil this criterion.</p>
(f) Rarity	<p>This item is not considered rare and does not fulfil this criterion.</p>

Criterion	Assessment
(g) Representativeness	Berghofers Pass demonstrates the principal characteristics of roads constructed using traditional methods just prior to the introduction of heavy machinery and modern materials. It fulfils this criterion.

Integrity and intactness

Berghofers Pass retains virtually all of the fabric and design features that contribute to its historical significance. The loss of some 50 metres of stone wall and associated road fill, and the lower section of the road (the last 500 metres) impinged on by the Great Western Highway are the main problems however these do not detract from the overall integrity of the roads.

Statement of significance

Berghofers Pass has historical significance at the State level as one of the longest intact lengths of hand-made road in NSW. Its construction, just prior to WWI, using mainly manual labour, horse drawn transport, and stonemasonry techniques little changed from the convict era makes Berghofers Pass one of the last intact roads in the state to be built prior to the introduction of mechanised techniques and modern materials. Designed to cater for early low-powered cars, Berghofers Pass provides important evidence of part of the history of road making and road transport in NSW.

Berghofers Pass has a locally significant association with the first Blaxland Shire President, John Berghofer, who designed the road and lobbied for its construction. The road also has local historical significance for the evidence it provides, in the form of the vandalised Berghofer name carving and the temporary change in the road's official name, of local anti-German feeling during WWI.

The design and construction techniques of the road exhibit a high degree of technical achievement at the local level. In particular the siting of the road within the precipitous landscape, to achieve the desired low grades within the available budget, was a difficult achievement requiring a high level of planning. Part of the fabric of the road, the almost seven metre high dry stone wall at the hairpin bend, has local historical significance as the tallest dry stone wall of its type (2b) in the region. Amongst the region's dry stone walls, it is surpassed in height only by the ashlar walls (type 3b) of Victoria Pass.

The opportunity Berghofer's Pass offers to study the road making techniques used in the region just prior to WWI give it research value at the local level. Berghofers Pass has social significance at the local level as a popular bushwalk, well interpreted in tourist literature and with on ground signage for its historic associations. It also offers the opportunity, valued by visitors, to safely view the stone walls of the adjacent Victoria Pass. Berghofers Pass is an important element in the Mount York ridge roads complex, a cultural landscape dominated by evidence of early Australian road making technology.

The heritage listing includes the horse trough.

Victoria Pass (including Causeway) (Blue Mountains LEP, MV087; Lithgow LEP, A183)

B-14: Victoria Pass and Causeway, c. 1910 (Source: Blue Mountains City Library Local Studies Collection, www.flickr.com/photos/26602074@N06/13372807463)

The following significance assessment has been adapted from the SHI inventory and an assessment of its significance by Karskens (Karskens, 1988a).

Table B-16: Significance assessment of Victoria Pass (including Causeway)

Criterion	Assessment
(a) Historical significance	<p>Victoria Pass</p> <p>Victoria Pass is the last of five early colonial mountain passes providing a means of descent from the Blue Mountains to the west. As such it is representative of the important achievements in crossing the Mountains and the resulting opening of the western plains to colonial settlement. Its construction demonstrates the need in this early phase of settlement to provide a safer and more direct descent for the increasing traffic of goods and people.</p> <p>It therefore derives some of its significance as part of the Great Western Road, which was one of three early colonial roads out of Sydney, and the repeated attempts to ease transport through difficult terrain.</p>

Criterion	Assessment
	<p>It does not have the same association with the feats of early exploration as the first line of road west over the Blue Mountains (Cox's Road) or the earliest routes north (Great North Road) and south (Main Southern Road). Victoria Pass has however been the main line of descent from the Blue Mountains to the western plains since it opened in 1832, with the exception of a brief period between 1912 and 1920 when it was temporarily superseded by Berghofer's Pass. It has therefore played a central and vital role in facilitating trade and settlement in central and western NSW for the last 175 years.</p> <p>Causeway</p> <p>The Victoria Pass Causeway derives part of its historic significance from being a key component of Victoria Pass and thus shares the aspects of significance. Its construction allowed the Pass to take a direct line of descent, ensuring its continuing longevity as the most practical route to central and western NSW from Sydney. As such, it is now the oldest of a small number of colonial masonry road works in NSW that are still in use.</p> <p>More than any other part of the Pass, the Causeway evokes the early era of colonial road building in NSW. This is due to its high degree of integrity (original form and fabric), remaining as originally built (prior to 1838) with almost no later modification. Its setting also remains largely unchanged.</p> <p>It is tangible evidence of the colonial desire to achieve impressive engineering feats as a demonstration of a progressive and civilised state with a role to play in the British Empire. It, along with parts of the Great North Road and other sections of Blue Mountains roads from this period tangibly demonstrate the work of convict road work gangs, particularly those assigned to difficult and isolated locations.</p> <p>For these reasons Victoria Pass Causeway has STATE heritage significance under this criterion. This significance is manifested in the Causeway's form, fabric and setting and is enhanced by its outstanding degree of integrity. It is also manifested in Causeway's longevity of use and the associated rock engravings and original cuttings adjacent to it.</p> <p>The item therefore fulfils this criterion.</p>
(b) Associative significance	Victoria Pass was designed and built by Major Thomas Mitchell. It therefore fulfils this criterion at a high State level.
(c) Aesthetic/technical significance	The construction of the road was considered at the time to be a technical achievement. This technological expertise was recognised by Engineering Australia in 2002, which designated Victoria Pass a National Engineering Landmark, based on its engineering solution for a difficult landform, the development of road construction in Australia with severe topographical constraints and that it was built by hand. The item therefore fulfils this criterion.
(d) Social significance	Victoria Pass has social significance in the local area as the main throughfare between the Blue Mountains and the valley of Little Hartley. Although of high amenity, it is assessed that Victoria Pass is representative of the physical link between the Blue Mountains and Little Hartley communities. It therefore fulfils this criterion.

Criterion	Assessment
(e) Research potential	While the potential for sporadic evidence associated with the construction of the pass is possible, it is unlikely to add to existing knowledge. It therefore does not fulfil this criterion.
(f) Rarity	Victoria Pass is a rare example of road construction and engineering, designed to overcome difficult terrain and allow travel and transport west of the Blue Mountains. The alignment has not altered significantly since its construction and retains many features of the original construction, such as the viaduct. It therefore fulfils this criterion.
(g) Representativeness	Victoria Pass is a fine example of a road constructed in the early years of the Colony of New South Wales, which had a profound impact on the colony's expansion. It is largely intact, with much of its original fabric retained. It therefore fulfils this criterion.

Integrity and intactness

Exceptional Integrity - the causeway exists as built. Only the balustrade, road surface and Armco railings have been added since.

Statement of significance

The following Statement of Significance is based on that of Karsken's in her historical and archaeological assessment of Victoria Pass (Karsken, 1988a: 22-24). It covers three main elements of Victoria Pass: the Pass as a whole, the viaduct and the inscriptions.

The significance of the site generally, including Victoria Pass Viaduct, Berghofer's Pass and the inscriptions in the setting of steep slopes and immense rocky outcrops, lies in the physical illustration it provides of several important historical themes. First, the site was an important link in the road which allowed European expansion to the westward over the barrier of the Blue Mountains. Second, it mirrors the development of road transport in accordance with various requirements such as volume of traffic and nature of vehicles, set within the severe topographic constraints of the area. Third, it neatly encapsulates the similarities and differences between road engineering in the 1830s and 1910s, since a direct comparison of alignment, grades and structures of the two roads is now possible.

Victoria Pass Viaduct is important because:

- 1. It is a component in the series of five roads made between 1814 and 1912 in order to achieve the descent from the mountains and is still the most impressively engineered of all. As such, it was also a vital link in the early Western Highway and has borne traffic between the coast and the inland region for over 150 years.*
- 2. It has powerful symbolic significance. It was built specifically to convey and reinforce the impression that New South Wales in the 1830s had a glorious future as part of the Empire. Engineering feats such as this, defying and defeating natural obstacles as they did, were clear evidence of a progressive and civilized state.*
- 3. It is important evidence of the advanced state of engineering in the colony during the "Great Roads" period, and of the skills and knowledge brought by men such as Assistant Surveyor Elliot.*
- 4. It is a museum of convict work and achievements, and still graphically illustrates the difficult, dangerous and laborious nature of their work on early roads.*

Inscriptions A, B and C are significant because they are most likely to be interesting and curious reminders of the areas and road's development and use.

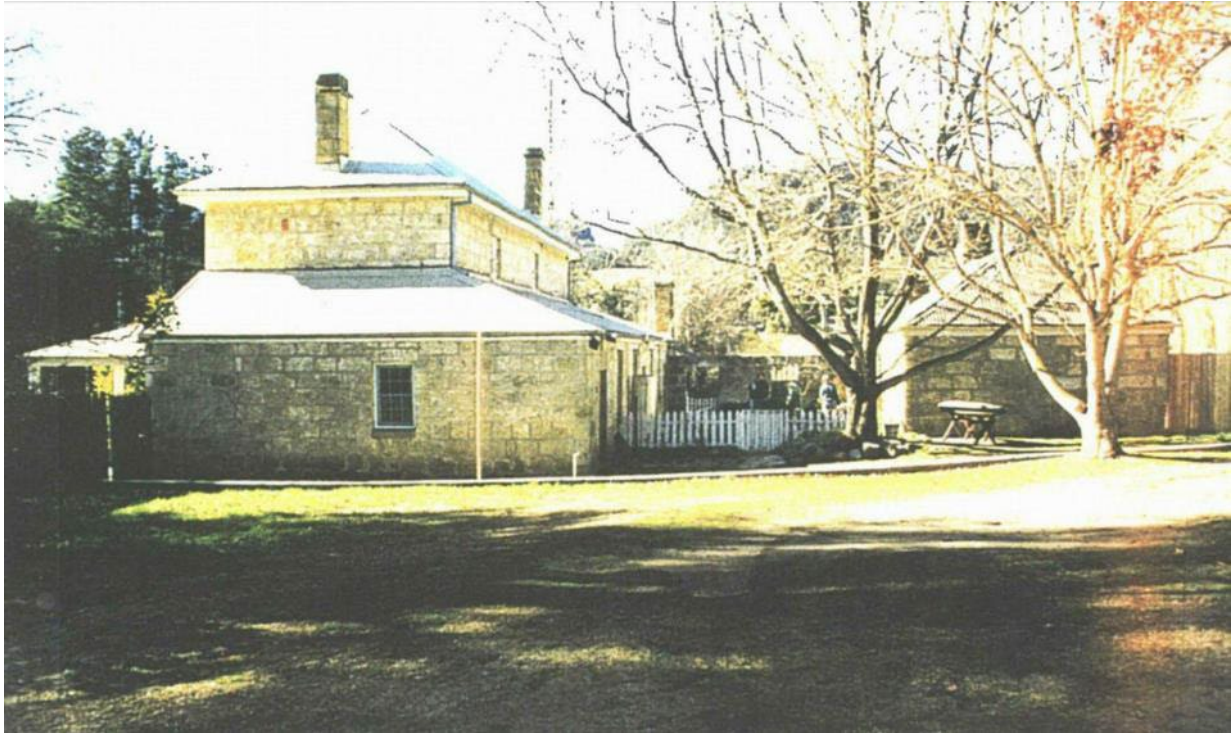
“Rosedale” (Lithgow LEP, I024)

Figure B-15: Rosedale, western (side) elevation showing main house and detached kitchen (MUSEcape Pty Ltd, 1999:15)

This significance assessment is based on a 1999 significance assessment undertaken by Associate Professor Ian Jack ahead of a proposed upgrade of the Great Western Highway.

Table B-17 Significance assessment of Rosedale (based on significance assessment on MUSEcape Pty Ltd, 1999:10-16)

Criterion	Assessment
(a) Historical significance	This former inn was also known as the Mount Victoria Inn, Victoria Inn and Rosenthal. Constructed in c.1839 for William Cummings of Bathurst, who operated the inn until his death in 1848, after which it passed to his son William, who continued to hold the licence the 1850s. Nicholas Delaney took over the licence in 1878, before transferring the licence to the adjacent inn, Nioka. Rosedale is one of the oldest surviving inns associated with the earliest roads across the Blue Mountains. It therefore fulfils this criterion at a State level.
(b) Associative significance	A former owner of Rosedale was John William Berghofer, who bought the property in 1892 and named it <i>Rosenthal</i> . As a local member, Berghofer was responsible for the construction of an alternative pass to the exceedingly steep Victoria Pass in 1912, which operated until 1933/34, which was subsequently named after him. The name of his property was changed to its English equivalent, <i>Rosedale</i> , following anti-German sentiment during World War 1. It therefore fulfils this criterion at a local level.
(c) Aesthetic/technical significance	The symmetry of the Old Colonial architectural style of Rosedale is of aesthetic significance. Its setting, in particular its physical connection to the Great Western Highway and other former inns located in the area, is also of aesthetic significance
(d) Social significance	There is no known social significance attached to the item. It therefore does not fulfil this criterion.

Criterion	Assessment
(e) Research potential	Given its extensive history it is likely that there are archaeological deposits in its surrounding vicinity.
(f) Rarity	Rosedale is considered rare, in relation to its history as a former inn and its surviving architectural aesthetics. It is considered to be rare at a State level.
(g) Representativeness	Rosedale is broadly representative of a former Georgian inn.

Integrity and intactness

Rosedale was inspected in 1999 and found to be relatively intact. Some settlement cracks were noted in the main house and the roof of the kitchen block had spread with hips dislocating and major cracks (10 millimetres) where the crosswall with the old fireplace met the external walls. The southern end of the garden wall had collapsed; however, the barn was found to be generally sound, with modifications and general repairs noted on the lintels. A dilapidation study was recommended; however, it is not known whether this has been carried out.

Statement of significance

As one of the oldest surviving inn buildings associated with one of the earliest roads across the Blue Mountains and the first settlement of the western districts, Rosedale has historical significance at a State level and is a comparatively rare example of its type. It forms part of an important group of inn buildings associated with the development of Little Hartley along Mitchell's road alignment, opened in 1832, which is essentially the line of the Great Western Highway today. The historical value of Rosedale is enhanced by the association with William Berghofer, an important figure in the development of the area, including the construction of Berghofer's Pass, a new route suitable for motor vehicles.

With its high quality joinery and stonework and substantial massing, it is a very good example of a large, well-appointed early colonial inn, reflecting the characteristics of Old Colonial Georgian architectural style. The building retains a considerable curtilage and its relationship to the Great Western Highway, although the road has been widened considerably from the original. The outlook from the front of Rosedale to Mount York is of high visual quality but the integrity of the landscape to the rear of the building has been compromised to a degree by the development of Little Hartley Farm and its associated infrastructure including stables and other buildings. Rosedale is aesthetically significant at a State level and comparatively rare.

(MUSEcape Pty Ltd, 1999)

“Nioka” (Lithgow LEP, I025)**Figure B-16: Street elevation of Nioka (MUSEcape Pty Ltd, 1999:22)**

Nioka is located adjacent to Rosedale. Given the bare information provided on the State Heritage Inventory, this significance assessment was adapted from that undertaken by Associate Professor Ian Jack in 1999.

Table B-18: Significance assessment of Nioka (based on significance assessment in MUSEcape Pty Ltd, 1999:17-21)

Criterion	Assessment
(a) Historical significance	“Nioka” is a former inn, known previously as “Farriers Arms”, (also a residence formerly known as “Clwyd” and “Rowan Tree Angora Stud”) first constructed in c. 1856, close to the Victoria Inn (Rosedale). In 1878, Nicholas Delaney transferred the licence for <i>Rosedale</i> to <i>Nioka</i> and it remained operating as an inn until 1904 when it was purchased for use as a residence. The item therefore fulfils this criterion.
(b) Associative significance	There are no known historical associations with the item. It therefore does not fulfil this criterion.
(c) Aesthetic/technical significance	The item retains its Victorian Georgian style, being a two-storey sandstock brick building with a hipped roof clad in corrugated iron. A two-storey verandah, decorated with cast iron lace extends along the main façade. Windows are four-paned, slender and rectangular. French doors with glass panels open onto the first floor balcony. A detached kitchen of sandstock brick remains in close proximity to the rear of the residence, with shingles surviving under a rusted corrugated iron roof, however it is in poor condition (1999). At least the first five or six courses of the main residence are almost certainly remnants of the Farriers Inn, which match the detached kitchen. The landscape is visually commanding. It therefore fulfils this criterion.

Criterion	Assessment
(d) Social significance	There is no known social significance attached to the item. The item therefore does not fulfil this criterion.
(e) Research potential	Some benching along the road cutting to the west is a remnant of an earlier highly alignment, which has some archaeological importance. The original entry to the property was a deviation from the highway, just west of Rosedale. It is likely that the present access road to <i>Nioka</i> from the west is part of the original entry and exit loop south of the Highway. There is also likely to be some low archaeological potential in the immediate surrounds of the former inn. The item therefore fulfils this criterion.
(f) Rarity	There are no rarity values attached to this item. It therefore does not fulfil this criterion.
(g) Representativeness	The item is considered to be broadly representative of a Victorian inn, retaining many of the architectural features of that era. It therefore fulfils this criterion.

Integrity and intactness

An inspection in 1999 found that the building is generally intact. The lath and plaster ceilings on the first floor are cracked, with the south eastern upstairs bedroom also suffering moisture damage as a result of a bird infestation in the roof. The integrity of the house was moderate, with a concrete floor installed in the south eastern rooms and converted to a kitchen, laundry and toilet. A former bedroom on the first floor had been converted to a bathroom and a hand basin installed in the front upstairs bedroom.

The detached kitchen was extant at the time of the inspection in close proximity to the rear of the residence but in poor condition. Shingles were noted beneath the rusted corrugated iron roof and the kitchen had been extended to function as a storage/farm shed. It was also noted that the first six or so courses of the house were of pink/cream sandstone bricks thought to remain from James Bergin's Farriers Arms and that these bricks matched some found in the detached kitchen.

Statement of significance

Nioka is historically significant at a regional level as a representative example of an 1850s inn with c. 1880s additions, in a hillside setting above the Great Western Highway, with a view north to Mount York. Nioka's Victoria architectural style is from a later era than the majority of other inns of the area which date from the colonial period. Closely associated with its important neighbour, Rosedale, Nokia demonstrates the continuing use of Mitchell's Highway in the late Victorian period and beyond.

It is also considered to have representative aesthetic significance at a local level derived from its distinctive Victorian characteristics of iron lacework.

(MUSEcape Pty Ltd, 1999:17)

Mount Victoria Convict Stockade site

This archaeological site is not listed on any State or local heritage lists, although Casey & Lowe note that in 2011 it was a draft heritage item for Lithgow City Council. It is, however, a known site of a convict stockade that housed the convict workforce during the construction of Victoria Pass. Local historian and researcher Olaf “Ollie” Leckbandt identified and recorded the site in 1999. In later investigations, some of the relics associated with the site were removed by Leckbandt.

In 2009, Casey & Lowe established a curtilage for the stockade site in anticipation of its listing on the Lithgow LEP. In 2011, Casey & Lowe monitored the excavation of two geotechnical test pits located within the draft curtilage of the stockade site ahead of proposed works to Victoria Pass and the Great Western Highway. These test pits were “outside the core curtilages” of the site but within the larger area defined for the site (Casey & Lowe, 2011:2). Two test pits were excavated to the depth of natural soil with no artefacts or features identified.

As far as can be established, the site has not been subject to detailed archaeological excavation.

Table B-19 Significance assessment of Mount Victoria Stockade site

Criterion	Assessment
(a) Historical significance	The Mount Victoria Convict Stockade Site was the site of a convict stockade established to house convicts constructing roads including Victoria Pass. It was established in 1830 and was closed in 1836. The site is associated with the construction of ‘the Western Road’ and early European occupation of the Mount Victoria area. It therefore fulfils this criterion to a high degree and is of possible State significance.
(b) Associative significance	The Mount Victoria Convict Stockade Site is associated with convict road gangs. Their labour was instrumental in the opening of western New South Wales to settlement. It therefore fulfils this criterion.
(c) Aesthetic/technical significance	As an archaeological site, there is little aesthetic or technical significance attached to this item. It therefore does not fulfil this criterion.
(d) Social significance	There is no social significance to this item and does not fulfil this criterion.
(e) Research potential	Although surface collections have been undertaken on the site, and test excavations undertaken away from the main site by Casey & Lowe in 2012, there is still high potential for significant archaeological remains to exist, both of the convict stockade and the Commissariat cottage on the other side of Butler’s Creek (north east of the stockade site). With the construction of the dam in 2010, it is not certain that remains of the cottage survive, but as it has never been definitively identified, it is still possible. The stockade site therefore fulfils this criterion to a high degree.
(f) Rarity	Any remains associated with convict stockades is considered rare. It therefore fulfils this criterion.
(g) Representativeness	The convict stockade site at Mount Victoria is likely to be similar in size and layout as the Cox’s River No. 2 Stockade Site excavated by Rosen and Pearson in 1997. It is therefore considered to be broadly representative of such sites and fulfils this criterion.

Integrity and intactness

As noted above, local historian Olaf “Ollie” Leckbandt has undertaken some physical investigations on the site, including metal detecting. His 1999 publication, “Convict Stockades from Mount Walker to Mount Victoria” (Industrial Printing Co., Lithgow) contains photographs and plans of the site, as well as scaled photographs of surface finds collected from the site (not in situ). This indicates that while the surface remains of the site have been disturbed, there is still archaeological potential for both buildings and artefacts associated with the stockade.

Statement of significance

The Mount Victoria Stockade Site is a rare and historically significant site associated with convict labour, road construction and the expansion of the colony of New South Wales. While its surface has been previously disturbed by surface collections, any archaeological deposits relating to the convict stockade are likely to be present and are considered to be of State heritage significance.

Site of the Plough Inn

This site is not listed on any heritage register but was identified during historical research for this project. As noted in Section 3.1.8, the Plough Inn is another of the group of inns that lined the section of the original Western Road between Victoria Pass and Little Hartley in the 1830s. The site's precise location is not known, but historical sources place it near the foot of the Victoria Pass and therefore within or adjacent to the construction footprint.



Figure B-17 Possible location of Plough Inn (Source: Blue Mountains City Library)

Table B-20 Significance assessment for site of the Plough Inn

Criterion	Assessment
(a) Historical significance	The Plough Inn was constructed in c. 1837 and was one of the earliest inns along this stretch of the Western Road. Located directly opposite the Mount Victoria Stockade and at the foot of the newly constructed Victoria Pass, it was strategically placed to cater to users of the new road. The Plough Inn was one of a group of inns at Little Hartley constructed to capture this trade, including the locally listed items the Royal Garter Inn ("Billesdene Grange", c. 1831), the Harp of Erin (c. 1832) and the Victoria Inn, or Mount Victoria Inn ("Rosedale", c. 1839). As more settlers arrived over the mountains, more inns were constructed, including the Rose Inn ("Ambermere", c. 1846), Farriers Arms ("Nioka", c.1856) and the Kerosene Hotel (Meads Farm, c. 1866), all items of local heritage significance.

Criterion	Assessment
	The site therefore fulfils this criterion.
(b) Associative significance	The Plough Inn was first constructed by Andrew Gardner, who also constructed the first inn at Blackheath, Gardners Inn. The site therefore fulfils this criterion.
(c) Aesthetic/technical significance	As a potential archaeological site, there are no known aesthetic or technical values. It therefore does not fulfil this criterion.
(d) Social significance	There is no known social significance attached to the site. It therefore does not fulfil this criterion.
(e) Research potential	As an archaeological site, there is extensive research potential for intact remains. It therefore fulfils this criterion. However, it is uncertain whether the site has already been destroyed through road works associated with the Great Western Highway or landscaping of adjacent properties.
(f) Rarity	Although there are existing former inns in Little Hartley still standing, many have been either modified or partially removed. Any archaeological remains from the Plough Inn would represent rare evidence of a relatively unmodified 1830s inn. The site therefore fulfils this criterion. Although that evidence is likely to be fragmentary, the true archaeological value can only be properly assessed after archaeological excavation.
(g) Representativeness	As an archaeological site, it does not fulfil this criterion.

Integrity and intactness

As the exact location of the site of the Plough Inn is not known, its integrity and intactness cannot be established. If it was located to the north of the present alignment of the Great Western Highway, it is likely to have been destroyed through prior road works associated with the informal car park associated with Berghofers Pass. However, if it was located to the south of the Great Western Highway, it would be located on private land and therefore more likely to be intact.

Statement of significance

The site of the Plough Inn is a historically significant site of an early inn in Little Hartley, constructed to cater to the passing trade on the newly constructed Victoria Pass and Western Road. Of the four known inns located in Little Hartley in the 1830s, it is the only one whose location is no longer known. The archaeological remains of the Plough Inn have the potential to provide information regarding its size, construction and layout. Its association with Andrew Gardner and its location as the first inn following the Victoria Pass descent (and last before ascent) made this inn of high strategic value. Archaeological data may also provide important comparative data for the early inns at Little Hartley.

Mitchell's Road

This original section of Mitchell's Western Road is located as part of an access track to Nioka. Its significance was assessed in Jacobs' non-Aboriginal heritage assessment for Little Hartley to Lithgow Upgrade and is partially reproduced here (Jacobs & Transport for NSW, 2021). The section outside Nioka is part of a much larger group of sections that make up the original alignment, stretching between the foot of Victoria Pass through to South Bowenfels.



Figure B-18 Access track from Great Western Highway to Nioka (Source: Google Maps)

Table B-21 Significance assessment of Mitchell's Road

Criterion	Assessment
(a) Historical significance	<p>Mitchell's Road (also known as the Great Western Road) was one of three "Great Roads" built in the New South Wales colony between 1815 and the 1840s. The others were the Great North Road (1826-1836) and the Great South Road (1819-mid 1840s). The three Great Roads were the primary transport routes of the colony which remained under the control of the government (rather than local road trusts).</p> <p>These Great Roads were vital early colonial infrastructure designed to open up the colony to agricultural and pastoral production and to allow European settlement beyond the Cumberland Plain westward across NSW. Prior to the colonial crossing of the Blue Mountains in 1813, road transport out of Sydney and Parramatta to the Hawkesbury/Nepean edge had focused on expansion to the north and south. The identification of a route over the Blue Mountains by colonial settlers dramatically refocused colonial attention to the fertile western plains beyond the mountains and highlighted the essential role that the various western routes played in European expansion out of the Sydney basin. The survey of the 1813 route crossing the Blue Mountains was the catalyst for greater passage west and the</p>

Criterion	Assessment
	<p>eventual establishment of the Western Road as the foremost route west to Bathurst.</p> <p>Mitchell's Road demonstrates the historical significance as an extant section of one of the three Great Roads (along with the Great North Road and Great South Road) which were constructed using convict labour. It demonstrates the expansion and development of NSW using early dray roads, as well as continued association with later motor vehicle transport. The section of Mitchell's Road in the construction footprint is an intrinsic part of this route. Several sections have been progressively by-passed during road upgrades, which has enabled the retention of some of the road's original alignment in largely undeveloped rural landscape.</p> <p>This item fulfils this criterion at a State level.</p>
(b) Associative significance	<p>Mitchell's Road is directly associated with Governor Lachlan Macquarie and the Surveyor-General of NSW at the time, Sir Thomas Mitchell. It was an important piece of colonial infrastructure stewarded by Governor Macquarie as part of his wide-ranging town planning and infrastructure improvements to 'civilise' and improve the colony.</p> <p>This item fulfils this criterion at a State level.</p>
(c) Aesthetic/technical significance	<p>Mitchell's Road has aesthetic significance for its capacity to demonstrate the experience of travel west of the Blue Mountains with significant views throughout a largely undeveloped rural landscape of Hartley Valley towards a number of prominent landscape features (such as Mount York and Hassans Walls) and many heritage properties. The setting in the vicinity of the construction footprint retains a bucolic character with its early to mid-19th century land ownership pattern, built heritage, open paddocks and some remnant tree plantings bordering the road. This is in contrast to the more extensive development elsewhere along the full extent of the Great Western Highway.</p> <p>This item fulfils this criterion at a local level.</p>
(d) Social significance	<p>Mitchell's Road has been a primary transport link west since the early colonial period. It has provided opportunities for settlement beyond the Sydney Basin, enabled agriculture and other primary production on the Bathurst Plains, and provided access past the Blue Mountains for the wider community for over 185 years. It has likely left a distinct marker in the memories and psyche of those who use the road, particularly following the development of tourism as a social pastime and the introduction of the motor vehicle in the early twentieth century.</p> <p>Mitchell's Road may have social significance to the community, frequent road users such as truck drivers, local interest groups or other stakeholders, however further research would be required in order to properly quantify and assess this.</p> <p>Mitchell' Road may possess social significance values; however further research would be required to quantify its nature and extent.</p>
(e) Research potential	<p>The bypassed sections of Mitchell's Road may have physical components or associated archaeology from the early colonial period or later phases of road construction. This is based on the premise that these sections have not been substantially widened or improved</p>

Criterion	Assessment
	<p>since the middle of the twentieth century and that road improvements prior to that time generally involved new pavements laid over older layers or surfaces. Often when early roads are disturbed, evidence of earlier road fabric and surfaces may be revealed (i.e. archaeological works) and associated archaeological deposits may also be encountered.</p> <p>The item fulfils this criterion to a local level.</p>
(f) Rarity	<p>The small sections of Mitchell's Road which may have been previously bypassed retain more historical form and remain a legible feature in a rural landscape, retaining their historical feel and integrity. They have different context, views and vistas than the modernised carriageway of the Great Western Highway. On the larger sections, it is a rare opportunity for current travellers to get a sense of how the roads would have presented.</p> <p>With past and continuing development of the road alignment and carriageway, sections of road which remain largely intact in their historical form are becoming increasingly rare.</p> <p>This item fulfils this criterion to a local level.</p>
(g) Representativeness	<p>Mitchell's Road is representative of the route planning of the Great Roads network of the early colonial period. It remains predominantly aligned with its original route (though modern upgrades have straightened many of the small bends of the historical road), with significant views throughout the Hartley Valley and potential for archaeology of convict-built or early colonial infrastructure in those sections that have been bypassed or not significantly upgraded.</p> <p>The heritage item fulfils this criterion at a local level.</p>

Integrity and Intactness

The small-scale variations of the alignment of Mitchell's Road and its form as a one or two laned gravel or asphalted roadway with minimal formalisation of road edges and verges have largely been removed through the systematic modernisation of the Great Western Highway and is now only clearly evident in those sections of the historical alignment which have been bypassed. Due to developments in road requirements and construction technology, the carriageway has been substantially widened, straightened and levelled to ease traffic congestion and increase travel speeds, which has removed much of the landscape undulations and small bends of the original landforms and roadway. Although it remains along much of the historical route alignment, the roadway itself bears little physical resemblance to the historical road. The setting of the main road does however retain its rural character and context, with minimal development along its route and a large number of historical built heritage items along its route.

The bypassed sections of Mitchell's Road retain their form as a narrow road of one or two lanes through a relatively undeveloped bucolic landscape. These sections of road are a valuable example of the historical road form and have potential for interpretation of the story of Mitchell's Road and its development, both historical and modern.

Statement of Significance

Mitchell's Road is assessed to be of State significance for its historical and associative values, and of local significance for aesthetic and research values, rarity and representativeness. It demonstrates historical significance as a section of the Western Road, one of the three Great Roads, which were constructed in the early to mid-nineteenth century by convict labour to open up the interior of the country to agricultural and pastoral production, and to encourage European settlement further afield. It demonstrates the expansion and development of NSW using early dray roads and maintains continued

association with Governor Lachlan Macquarie and the Surveyor General of NSW Major Sir Thomas Mitchell. Mitchell was responsible for the development of an alternate descent route down into Hartley Valley from the Blue Mountains (now known as Victoria Pass), which remains the primary travel route today. This greatly contrasted with existing routes which descended further north at Mount York. The route has aesthetic value for the bucolic landscapes it traverses, with minimal development along its route and further technical values may be demonstrated in its surviving historical fabric.

The alignment of Mitchell's Road within the proposal area remains an intrinsic part of the primary route west with only minor bypasses. The sections which have been bypassed are an important and intact representation of the path and form of a major historical road, being tied closely to the topography and environmental conditions of the landscape. With past and continuing development of the road alignment and carriageway, sections of road which remain largely intact in their historical form are becoming increasingly rare. Despite modifications, Mitchell's Road continues to fulfill its primary significance as the major road link west from the Blue Mountains to Bathurst and therefore retains its heritage values and significance.