Appendix G Non-Aboriginal heritage assessment

Snowy 2.0 Transmission Connection Project

Environmental Impact Assessment

(February 2021)

Snowy 2.0 Transmission Connection Project

Non-Aboriginal Heritage Assessment

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TransGrid

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Contents

List of figures

List of Photos

List of tables

Executive Summary

TransGrid is seeking approval under Part 5 Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the construction and operation of an overhead transmission connection and substation to enable the grid connection of the proposed Snowy 2.0 pumped hydro generation project (Snowy 2.0) (the project).

The project has been declared critical State Significant Infrastructure (SSI) under the State Environmental Planning Policy (State and Regional Development) 2011 and is subject to assessment and determination by the Minister for Planning and Public Spaces.

On 5 April 2019, the project was determined to be a 'controlled' action on the basis of potential impacts to the heritage values of a National Heritage place (under section 15B & section 15C of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Secretary's Environmental Assessment Requirements (SEARs) for the project have included the requirement to consider impacts on these places of national heritage.

This Non-Aboriginal Heritage Assessment has been developed in support of the Environmental Impact Statement (EIS) for the project in accordance with the SEARs. The EPBC Act requirements have been included in the SEARs.

The project is located within the Kosciuszko National Park (KNP) and Bago State Forest which crosses the Talbingo Reservoir and is 88 kilometres south west of Canberra. The eastern extent of the project is defined by the location of the proposed Snowy 2.0 cable yard at Lobs Hole in KNP. The cable yard serves as the transition point between the underground cables carrying electricity generated by Snowy 2.0 to the overhead transmission connection. From the cable yard, the transmission connection extends west through KNP and up Sheep Station Ridge which is characterised by steep, mountainous terrain before traversing Talbingo Reservoir. The transmission connection then continues west, passing over Elliott Way at three locations before entering Bago State Forest to the proposed substation site.

The existing landscape character of much of the project area consists of undisturbed and mountainous terrain, forested valleys, and is the only true alpine environment in NSW (NPWS 2003). Much of the landscape contains limited human disturbance, however some development within and in proximity to the project includes an existing transmission line, minor access tracks, and infrastructure associated with the Talbingo Reservoir. Additionally, there are remnants of early European pastoral activity and mining scattered throughout Lobs Hole.

The project area is within the curtilage of two items on the National Heritage List (NHL), being the Australian Alps National Parks and Reserves, and the Snowy Mountain Scheme. It is assessed that no significant impact is caused to either the Australian Alps National Parks and Reserves and the Snowy Mountain Scheme pursuant to s15B of the EPBC Act.

As part of the Snowy 2.0 Main Works EIS, 20 items of non-Aboriginal heritage were identified within the current project area, with 10 of those located within the disturbance area. Of those, one item is assessed as having heritage significance under the NSW Heritage Significance Criteria, being the Lobs Hole Copper Mine Water Race. A site survey of available areas did not identify any additional items.

All of the items within the disturbance area are associated with the former township of Lobs Hole (now known as Ravine) and its copper mine. In relation to archaeology, it is assessed that five of the 10 items identified within the disturbance area also have archaeological potential.

Impacts to the heritage items will be as a result of the following activities: site establishment and vegetation clearance; development of access tracks; earthworks; civil and building works; site rehabilitation; and demobilisation. The effect of these activities will vary, depending on location and methodologies employed. It has been assessed that where impacts to heritage items located in the disturbance area are minor, there will be no adverse effect on any item. Where impacts will be moderate or major, the effect will be increasingly detrimental to the significance of the item., As a result of this, several measures have been identified to mitigate

any harm that may occur and should be applied as appropriate. These include avoidance where possible, archival recording and archaeological excavation where avoidance cannot occur.

Accordingly, the following recommendations are made:

Recommendation 1

It is recommended that all heritage items within the disturbance area must be subject to archival recording and archaeological excavations prior to the commencement of works, as recommended in Section 6.2.2 of the Historic and Natural Heritage Management Plan (Future Generation, 2019:39).

Please note: Some heritage items may have already been subject to this, as a result of work undertaken by NSW Archaeology as part of the Snowy 2.0 program. Jacobs has made numerous attempts to identify which items these are but has not been successful in obtaining this information to date. We will continue to pursue this information. Notwithstanding, a method of archival recording and archaeological excavations will be designed that can be applied to any site within the disturbance area as required.

Recommendation 2

It is recommended that vegetation at R45 (Lobs Hole Copper Mine Water Race) is cleared with supervision by an appropriately qualified archaeologist. An assessment of the effect of vegetation removal on the stability of the item must occur and be managed appropriately.

If the vegetation removal and construction methodology employed in the vicinity of the site will result in a minor impact to the item, exclusion fencing must be installed to protect the site for the duration of construction. Archival recording of the item must occur, as discussed in Recommendation 1.

If the construction methodology employed in the vicinity of the site will have a moderate or major impact to the item, archival recording and archaeological excavation must occur prior to the commencement of construction.

An archaeological research design and methodology must be produced in keeping with the *Historical Archaeology Code of Practice* (Heritage Council of NSW 2006). This will ensure that a robust methodology is developed, proportionate to the significance of the item and extent of impact.

However, as this project has been declared critical State Significant Infrastructure, there is no requirement for consent under the *Heritage Act 1977* to be in place prior to the commencement of the archaeological excavations.

Please note: This recommendation is made on the basis that no impacts have occurred to R45 (Lobs Hole Copper Mine Water Race) as a result of Snowy 2.0. Jacobs has made numerous attempts to identify if R45 (Lobs Hole Copper Mine Water Race) has been disturbed but has not been successful in obtaining this information to date. We will continue to pursue this information. Once it has been identified if disturbance has already occurred, this recommendation will apply to any undisturbed elements.

Recommendation 3

It is recommended that all contractors, subcontractors and other site staff be informed of their obligations under the EPBC Act and Heritage Act, including the locations of the known heritage items and their protection. Explicit information regarding penalties for damage to these items should also be provided.

Recommendation 4

An *Unexpected Finds Protocol* should be developed as part of a Construction Environmental Management Plan (CEMP). This should include specific and detailed information regarding management of unexpected finds uncovered during construction.

Recommendation 5

This Non-Aboriginal heritage assessment considers heritage items that are within the disturbance area. There are heritage items in the wider project area, but not within the disturbance area. These have not been included in this assessment. During detailed design, if the disturbance area changes but is still within the project area, a consistency assessment will be prepared to confirm if impacts are consistent with the EIS. If the footprint of the current disturbance area changes, an addendum to this assessment will be prepared. Where impact to heritage items cannot be avoided as a result of the change to the disturbance footprint, management and mitigation measures described in this report will apply.

1. Introduction

1.1 Overview

TransGrid is the manager and operator of the major high-voltage electricity transmission network in New South Wales (NSW) and the Australian Capital Territory (ACT).

TransGrid is seeking approval under Part 5 Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) for the construction and operation of an overhead transmission connection and substation to enable the grid connection of the Snowy 2.0 pumped hydro generation project (Snowy 2.0).

The Snowy 2.0 Transmission Connection Project (the project) has been declared critical State Significant Infrastructure (SSI) under the State Environmental Planning Policy (State and Regional Development) 2011 and is subject to assessment and determination by the Minister for Planning and Public Spaces. This non-Aboriginal heritage assessment has been developed in support of the Environmental Impact Statement (EIS) for the project.

1.2 Purpose of this technical report

This technical report has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) issued for the project on 1 November 2019 by the Planning Secretary of the NSW Department of Planning, Industry and Environment (DPIE).

The SEARs relevant to this non-Aboriginal heritage assessment are presented in **Table 1-1**.

Table 1-1: Secretary's environmental assessment requirements – non-Aboriginal heritage

SEARs	Section addressed
An assessment of the cultural and heritage impacts of the project including impacts on:	For Aboriginal heritage, see Aboriginal Cultural Heritage Assessment Report (ACHAR)
▪ the listed heritage values of the Australian Alps National Parks and Reserves National Heritage Place;	**Section 7.2.1**
▪ the listed heritage values of the Snowy Mountains Scheme National Heritage Place;	**Section 7.2.1**
▪ the cultural values of the Kosciuszko National Park;	See **Section 6** and ACHAR
▪ Aboriginal and historic heritage items;	For Aboriginal heritage, see ACHAR. For historic heritage items, see **Section 7.2.2**

1.3 Assumptions and limitations

The results of this assessment are based on maps, plans and scope of works provided by TransGrid. Any subsequent change to these maps, plans and/or scope of works may affect the results of this report and a review of the report would be recommended.

This report has been prepared for the sole use of TransGrid. No liability is accepted for any use or reliance on the report by third parties.

This report should be read in full. No excerpts are to be taken as representative of the findings.

1.4 Authorship

This report was prepared by Senior Heritage Consultant, Deborah Farina. A technical review was performed by Principal Archaeologist, Fiona Leslie (in 2018), Heritage Technical Director Dr Karen Murphy and Principal Archaeologist Fran Scully in 2020. Further additions to the reporting were by Alexandra Seifertova. Mapping was prepared by Senior Spatial Consultants, Kasia Dworniczak, Ajay Arcot and Kahli McNab.

The assessment team would like to acknowledge the assistance of Jacobs' Senior Environmental Scientist, Tina Donovan, in the preparation of this report.

2. Description of the project

2.1 Project components

The project would involve the construction and operation of an overhead transmission line connection and substation to connect Snowy 2.0 to the National Electricity Market.

The key elements of the project include:

- A new 500/330 kilovolt (kV) substation (the substation) located within Bago State Forest and adjacent to TransGrid's existing Line 64, which forms a 330 kV connection between Upper Tumut and Lower Tumut switching stations. The substation would occupy a footprint of approximately 300 metres by wide 600 metre long inclusive of an approximate 25 metre to 45 metre wide cleared asset protection zone (APZ) surrounding the switchyard
- Upgrade and widening of an existing access road off Elliott Way to the substation including the construction of new driveways into the 330 kV and 500 kV switchyards
- Two new 330 kV overhead double-circuit transmission lines from the Snowy 2.0 cable yard to the new substation:
  - Total length of each line is approximately nine kilometres
  - Located in a corridor ranging in width from approximately 120 metres to 200 metres
  - Each line would comprise approximately 21 steel lattice structures up to 75 metres in height
- Short overhead 330 kV transmission line connection (approximately 300 metres in length) comprising both steel lattice structures and pole structures as required between the substation and Line 64
- Construction of up to 10 kilometres of new access tracks (Option A) or eight kilometres (Option B) to the transmission structures and upgrade to existing access tracks where required. Option A minimises disturbance within a mapped high risk naturally occurring asbestos (NOA) zone. The access tracks would remain following completion of construction to service ongoing maintenance activities along the transmission lines
- Establishment of a helipad (approximately 30 metres wide by 30 metres long) to support the transmission line construction activities carried out at higher elevations and steep terrain.
- Ancillary activities, including the establishment of tensioning and pulling sites for conductor and earth wire stringing, construction benches, site compounds, and equipment laydown areas.

The project location and key components of the project are shown in **Figure 2-1** and **Figure 2-2**.

A complete project description which includes a consolidated summary and discussion of the construction and operation of the project is provided in Chapter 5 of the EIS.

2.2 Project location

The eastern extent of the project is defined by the location of the Snowy 2.0 cable yard at Lobs Hole in Kosciuszko National Park (KNP). The cable yard serves as the transition point between the underground cables carrying electricity generated by Snowy 2.0 to the overhead transmission connection. The cable yard forms part of Snowy 2.0.

From the cable yard, the transmission connection extends west through KNP and up Sheep Station Ridge which is characterised by steep, mountainous terrain before traversing Talbingo Reservoir. The transmission connection then continues west, passing over Elliott Way at three locations before entering Bago State Forest to the proposed substation site, refer to **Figure 2-1**.

2.3 Project area

For the purposes of predicting environmental impacts of the project, a **disturbance area** has been defined. The disturbance area encompasses the extent of physical disturbance likely to be required to accommodate construction activities and infrastructure needed to build the overhead transmission line, the permanent substation and access roads and vegetation clearing along the transmission line corridor.

A broader **project area** has also been defined. The project area represents the limits of where disturbance may occur during construction to allow for flexibility for the final siting of project infrastructure. Final siting of the infrastructure (i.e. the disturbance area) can move within the assessed project area subject to recommended environmental management measures and provided it does not exceed the limits defined by the project area.

The project traverses Talbingo Reservoir, which naturally splits the project area into two. When defining the area of works, the terms 'project area east' and 'project area west' have been used where required for the purpose of the EIS. These are defined as follows:

- **Project area east:** includes the project area and existing surrounding access roads in the area east of Talbingo Reservoir
- **Project area west**: includes the project area and existing surrounding access roads in the area west of Talbingo Reservoir.

The existing landscape character of much of the project area consists of undisturbed and mountainous terrain, forested valleys, and is the only true alpine environment in NSW (NPWS 2003). This landscape contains limited human disturbance, however existing transmission line easements, minor access tracks, and infrastructure associated with the Talbingo Reservoir are located within and surrounding the project area.

The project area and disturbance area are shown in **Figure 2-2**.

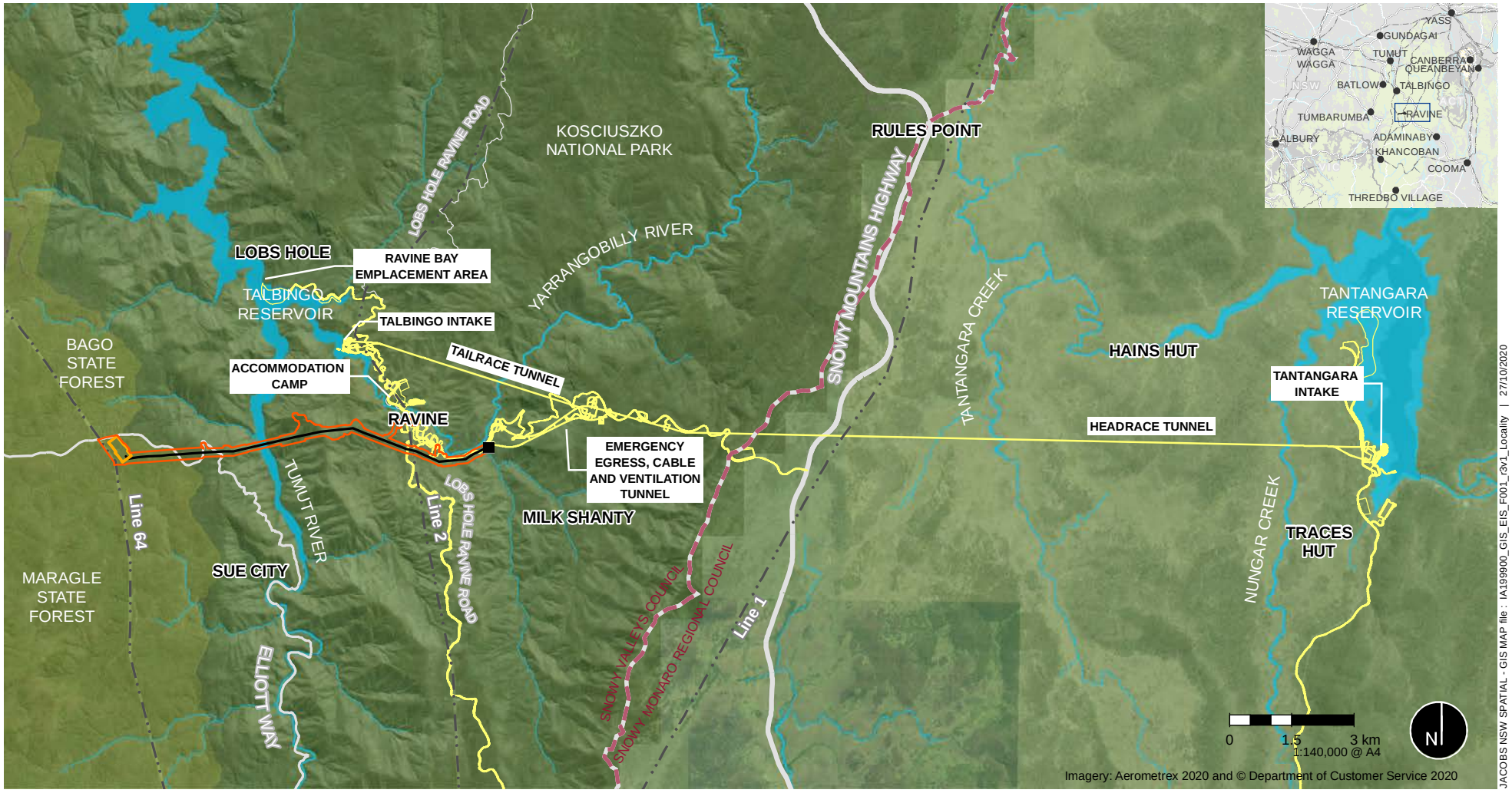
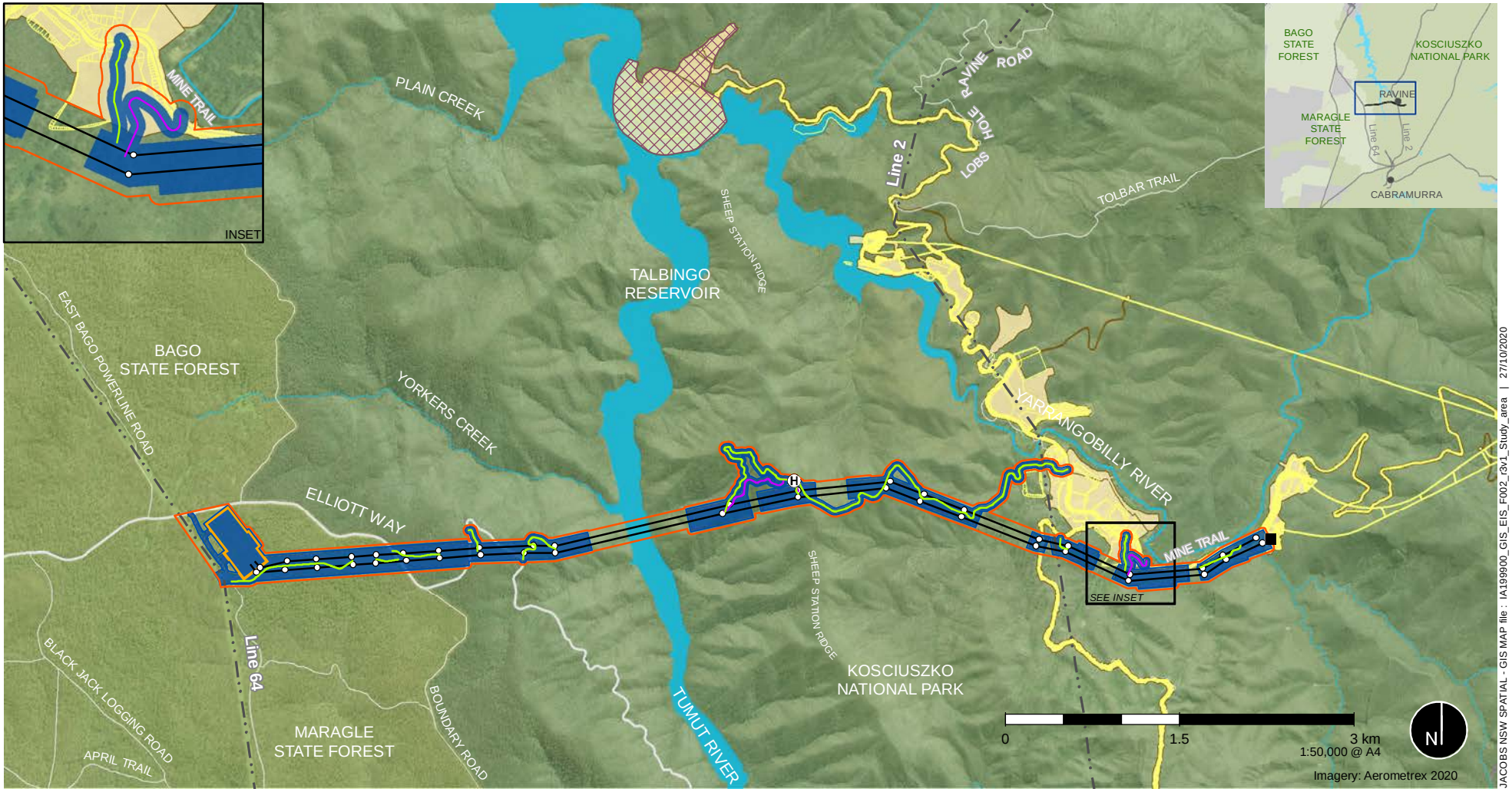


Figure 2-1 | Project location

Data source:
Jacobs 2020, TransGrid, EMM 2020
© Department Finance, Services and Innovation 2018



- Project area
- Disturbance area
- Proposed 500kV substation
- Potential helipad location
- Proposed structure
- Proposed transmission line
- Proposed access track - Option A
- Proposed access track - Option B
- Snowy 2.0 cable yard
- Snowy 2.0 element
- Ravine Bay Emplacement Area
- Snowy 2.0 Disturbance footprint
- Electricity transmission line
- Waterway
- Water body
- State forest
- NPWS estate

Figure 2-2 | Project overview

Data source:
Jacobs 2020, TransGrid, EMM 2020,

2.4 Construction activities

The construction works would commence with the construction of the access tracks to the substation and structure locations. Construction of the helipad is also expected to commence in the initial stages. Once suitable access has been established, construction of the substation and transmission line would commence and occur concurrently.

A summary of the construction activities is provided in **Table 2-1**.

Table 2-1: Summary of construction activities

Construction activity	Description
Pre-construction, site establishment and vegetation clearance	▪ Site mobilisation once relevant approvals have been granted, property acquisitions have been finalised with Forestry Corporation of NSW (FCNSW) and National Parks and Wildlife Service (NPWS) and agreements with construction contractors has been achieved ▪ Surveying and marking out the approved disturbance footprint and any environmental avoidance areas ▪ Installation of appropriate stormwater and diversion drainage and erosion and sedimentation control works prior to ground disturbance and vegetation clearing ▪ Inform recreational users of KNP, Bago State Forest and Talbingo Reservoir of the construction activities, the extent of work areas and the locations of environmental exclusion areas with project notifications, including warning signs of construction activities and notifications of access restrictions ▪ Establishment of the construction compound and equipment laydown areas at the substation site and at Lobs Hole*.
Access tracks	▪ Vegetation clearing within the approved corridor. This is expected to be carried out both manually in the areas of steeper slopes and machine clearing where access can be safety achieved ▪ Grubbing and bulk earthworks (cut and fill) using an excavator ▪ Installation of suitable drainage structures and sediment retention basins where required ▪ Laying and compaction of a suitable rock aggregate/road base ▪ Grading and/or reshaping of existing tracks where required, within the existing access track width (no road widening) ▪ Minor excavations followed by laying and compaction of crushed rock or gravel, to improve the existing track surface and drainage.
Substation	▪ Vegetation clearing across the substation site and surrounding APZ. This would involve the stripping and stockpiling of topsoil for later use. Vegetation clearing is expected to be carried out utilising a bulldozer equipment with a tree pusher, however would be confirmed in consultation with FCNSW ▪ Establishment of a site compound and laydown area within the cleared APZ. The site compound would be in place throughout the construction period and is expected to contain a demountable office, meal room, and toilet/shower facilities, equipment laydown areas, vehicle and equipment storage, maintenance sheds, chemical/fuel stores and stockpile areas ▪ Minor earthworks to establish the site amenities; which would include cut and fill to establish a level area for the site facilities and temporary storage areas and establishment of the permanent site access road

Construction activity	Description
	▪ Earthworks: - Excavation works to remove excess material, provide a level surface, and create the required trenches for drainage, earthing, and electrical conduits. Some spoil from the excavation may be reused on site for filling and compaction (including benching areas of the site where required). Excavation works would be carried out using equipment such as excavators, dozers and crushing plant. Furthermore, depending on the underlying geology, blasting may be required to facilitate the break-up of rock, should it be present - Bulk earthworks to establish the level surface for the substation bench - Approximately 11,300 cubic metres of excess spoil would be generated from the levelling of the substation site and construction of the access road. Any soil which cannot be reused onsite as fill material, landscaping or other means would be disposed of off-site at a suitably licenced facility and/or at a location(s) as agreed with FCNSW - Where excavated spoil is not appropriate for reuse on site, additional spoil would be imported to site. ▪ Civil and building works: - Civil works involving the establishment of concrete footings for the high voltage equipment and buildings, construction of stormwater drainage and oil containment infrastructure and cable trenches and subsurface cables - Construction of onsite buildings (e.g. control room) and services installed including general lighting, power and ventilation.
Transmission connection	▪ Vegetation clearing within the approved corridor where the overhead conductors would not meet safe clearance heights above the underlying vegetation ▪ Grading and/or reshaping of existing access tracks where required ▪ Vegetation clearing and bulk earthworks to establish the level helipad ▪ Establishment of the transmission structure work sites involving: - Clearing of an approximate 40 m by 60 m area around each transmission structure location to allow for the laydown of materials and equipment and facilitate access for vehicles, plant and machinery during structure construction - Bulk earthworks (cut and fill) to establish level construction benches within the worksite to allow for the safe operation of plant and equipment (namely elevated works platforms and cranes) during structure construction - Geotechnical investigation works using a mobile drill rig at each structure location to determine the most appropriate footing design - Bulk earthworks and excavations to establish the structure footings involving the installation of steel framework and backfilling with concrete or pile type footings involving boring four boreholes at each structure leg location and backfilling with concrete - Steel lattice structures would be transported to each structure location via heavy vehicle in parts and assembled on site using mobile cranes

Construction activity	Description
	▪ Stringing of conductor and overhead earth wire which would involve: - Establishment of level tensioning and pulling sites within the approximate 40 m by 60 m structure worksite or at suitable locations within the transmission corridor - Attachment of sheaves (or pulleys) to the top of the structures in readiness for stringing work using an elevated work platform - Pulling out a light weight draw wire across the section of line being strung using a drone or vehicle/machine (such as dozer), followed by the placement of the draw wire through the sheaves - Attachment of the draw wire to the earth wire or conductor drum (depending on which is being strung) and pulling it through the sheaves under tension using specialised tensioning and pulling equipment - Termination of the conductor/earth wire at each end clipping it into position followed by the removal of the sheaves.
Commissioning	▪ Testing of all high voltage equipment at the substation and ensuring all protection, control and metering equipment is operating correctly ▪ Completion of all necessary cut-in works to Line 64 and relevant testing undertaken ▪ Placement of the new transmission lines and substation into standby in readiness for Snowy 2.0 to be completed ▪ Once Snowy 2.0 becomes operational, energisation of the high voltage equipment and the project placed into service.
Rehabilitation and demobilisation	▪ Removal of all non-permanent infrastructure and equipment from the work sites and site compounds ▪ Decommissioning and dismantling of the site compounds at the substation and Lobs Hole ▪ Site stabilisation and landscaping involving: ▪ Stabilisation of exposed areas and slopes ▪ Installation and maintenance of erosion and sediment controls at the work sites to manage impacts post-construction ▪ Seeding soil slopes to assist stabilisation ▪ Planting vegetation on any higher risk slopes ▪ Mulching of stabilised and revegetated areas where required.

*The site compound at Lobs Hole would be located within the approved disturbance footprint of Snowy 2.0

2.4.1 Construction staging and timing

Construction of the project is anticipated to commence in early 2022 and take approximately 30 months to complete. Estimated timing for the main construction activities is set out in **Table 2-2**. Further details on the estimated timing and staging of the main project activities is described in Section 5.3 of the EIS.

Table 2-2: Indicative timing for the construction of key project components

Construction works	2022				2023				2024				2025
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Access tracks, roads and helipad													
330 kV Switchyard													
500 kV Substation													
Transmission connection													

2.4.2 Construction working hours

Given the isolated location and the construction of the Snowy 2.0 occurring in parallel, construction works are expected to be carried out 12 hours per day, seven days per week between the hours of 6 am and 6 pm.

2.5 Operation and maintenance

The substation and transmission connection would be inspected by field staff on a regular basis. Key activities undertaken during operation would include:

- Regular inspection and maintenance of electrical equipment at the substation including structural integrity of all footings and support structures
- General inspection and maintenance of other components within the substation including the stormwater management system, fire detection system, onsite buildings and drainage infrastructure
- Regular inspection and maintenance of the transmission structures, footings, fittings, conductors and overhead earth wires
- Vegetation removal and trimming along the transmission corridor and APZ surrounding the substation to maintain appropriate clearances between ground vegetation and the overhead transmission lines and around the substation to manage bushfire risk
- Removal of trees which have the potential to strike the overhead conductors if they were to fall (referred to as hazard trees) as required.

It is expected that only light vehicles and small to medium plant would need to access the substation site and the transmission line corridor for these activities. The substation would not accommodate full-time staff or contractors, and the regular collection of waste would not be required. Any waste generated during operation of the substation would be minimal and disposed of on an 'as need' basis.

3. Legislative context

This legislative context contains a brief and general overview of applicable heritage law as relevant in NSW.

The protection and administration of heritage in Australia is mainly legislated by the States. There is, however, a national heritage scheme as per the *Environment Protection and Biodiversity Act 1999* (EPBC Act) which governs World, National and Commonwealth heritage. This applies to both Aboriginal and non-Aboriginal heritage.

In NSW, non-Aboriginal heritage is administered by separate Acts. The *Heritage Act 1977* (Heritage Act) administers non-Aboriginal heritage of State and/or local heritage significance.

Other Acts also contain some heritage administrative functions, and these are outlined below.

3.1 Commonwealth heritage

3.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is a key piece of legal framework for the protection and management of matters of national environmental significance (that is flora, fauna, ecological communities and heritage places). Heritage places are protected through their inclusion on the World Heritage List (WHL), the National Heritage List (NHL) or Commonwealth Heritage List (CHL).

The following is a description of each of the heritage lists and the protection afforded to places listed on them.

3.1.1.1 Commonwealth Heritage List

The CHL is a list of properties owned by the Commonwealth that have been assessed as having significant heritage value. Any proposed actions on CHL places must be assessed for their impact on the heritage values of the place in accordance with *Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies (Significant Impact Guidelines 1.2).* The guidelines require the proponent to undertake a self-assessment process to decide whether or not the action is likely to have a significant impact on the environment, including the heritage value of places. If an action is likely to have a significant impact, an EPBC Act referral must be prepared and submitted to the Minister for approval.

3.1.1.2 National Heritage List

The NHL is a list of places with outstanding heritage value to Australia, including places overseas. Any proposed actions on NHL places must be assessed for their impact on the heritage values of the place in accordance with *Matters of National Environmental Significance (Significant Impact Guidelines 1.1)* (Department of Environment, 2013).The guidelines require the proponent to undertake a self-assessment process to decide whether or not the action is likely to have a significant impact on a Matter of National Environmental Significance, including the national heritage value of places. If an action is likely to have a significant impact, an EPBC Act referral must be prepared and submitted to the Minister for approval.

The project area intersects two items on the NHL – Australian Alps National Parks and Reserves and the Snowy Mountains Scheme.

Given the national heritage importance of the Australian Alps National Parks and Reserves and the Snowy Mountains Scheme, an EPBC Act referral (2018 / 8363) was made to the former Commonwealth Department of Environment and Energy (DoEE) (now the Department of Agriculture, Water and the Environment (DoAWE)) on 28 February 2019 due to the potential for significant impacts on both ecological and heritage values. On 5 April 2019, the former DoEE determined the project to be a 'controlled' action on the basis of potential impacts to the heritage values of a National Heritage place (under section 15B & section 15C of the EPBC Act). The SEARs for the project have included the requirement to consider impacts on these places of national heritage.

3.1.1.3 Register of the National Estate

The Register of the National Estate (RNE) was formerly compiled as a record of Australia's natural, cultural and Aboriginal heritage places worth keeping for the future. The RNE was frozen on 19 February 2007, which means that no new places have been added or removed since that time. From February 2012, all references to the RNE were removed from the EPBC Act. The RNE is maintained on a non-statutory basis as a publicly available archive.

3.2 NSW heritage

3.2.1 Environmental Planning & Assessment Act 1979

The EP&A Act requires that environmental impacts are considered in land-use planning, including impacts on Aboriginal and non-Aboriginal heritage. Part 5 Division 5.2 of the EP&A Act applies for projects designated as State Significant Infrastructure. This influences the way in which other legislation, including the Heritage Act is applied.

The EP&A Act also requires that each local government area (LGA) creates and maintains a Local Environmental Plans (LEP) that identifies and conserves Aboriginal objects and historical heritage items, with the aim to conserve their heritage significance, including associated fabric, settings, views and archaeological potential. These items are protected under the EP&A Act. Heritage items within each LGA are listed in Schedule 5 of the LEP and are subject to the planning controls and provisions set out in Clause 5.10 (Heritage Conservation).

3.2.2 Heritage Act 1977

The Heritage Act provides a number of mechanisms by which items and places of heritage significance may be protected. The Heritage Act is designed to protect both listed non-Aboriginal heritage items and potential non-Aboriginal archaeological remains or relics. Currently, non-Aboriginal heritage is administered by the Heritage NSW.

3.2.2.1 State Heritage Register

Section 31 of the Heritage Act creates the State Heritage Register (SHR). Only those items which have been designated as being of state heritage significance in NSW by the Minister are listed on the SHR. Listing on the SHR controls activities such as alteration, damage, demolition and development of SHR listed items. When a place is listed on the SHR, the approval of the Heritage Council of NSW is required for any major work, including:

- Demolishing the building or work
- Carrying out any development in relation to the land on which the building, work or relic is situated, the land that comprises the place, or land within the precinct
- Altering the building, work, relic or moveable object.

Ordinarily, an application under section 60 of the Heritage Act must be made to Heritage NSW in order to carry out any such activities. However, s 5.23 (1) (c) of the EP&A Act specifically excludes the necessity for applying either a permit under s60 or any other approval under Part 4 of the Heritage Act for SSI projects.

3.2.2.2 Archaeological relics

Part 6 Division 9 of the Heritage Act protects archaeological 'relics' from being 'exposed, moved, damaged or destroyed' by the disturbance or excavation of land. This protection extends to the situation where a person has 'reasonable cause to suspect' that archaeological remains may be affected by the disturbance or excavation of the land. It applies to all land in NSW that is not included in the SHR. A 'relic' is defined at s 4 by the Heritage Act as:

> *Any deposit, artefact, object or material evidence that:*
>
> *(a) Relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and*
>
> *(b) Is of State or local heritage significance.*

Ordinarily, s 139 of the Heritage Act requires any person who knows or has reasonable cause to suspect that their proposed works will expose or disturb a 'relic' to first obtain an Excavation Permit from the Heritage Council of NSW (pursuant to Section 140), unless there is an applicable exception (pursuant to Section 139(4)). However, under s 5.23 (1) (c) of the EP&A Act, the requirement for an approval under s139 is specifically excluded for projects designated as SSI

The provisions under Division 5.2 of the EP&A Act, however, apply only to approvals in Part 4 of the Heritage Act. All other sections of the Heritage Act, such as s146 of the Heritage Act (requiring any person who is aware or believes that they have discovered or located a relic notifying the Heritage Council of NSW and providing details of the location and other information required) remain unchanged by the EP&A Act.

3.2.2.3 Local heritage

Items of local heritage significance are administered by local councils, under their LEPs. Many of the LEPs now follow a standard format, which requires development consent prior to the demolition, moving or alteration of a heritage item or potential archaeological deposits (cl. 5.10, standard LEP). However, as a SSI project, development consents relating to items listed under an LEP are not applicable.

3.3 Other considerations

3.3.1 Kosciuszko National Park Plan of Management 2006

The Kosciuszko National Park Plan of Management 2006, amended in 2010 and 2014, was prepared by the then Department of Environment and Conservation (DEC) as part of its legislative obligations to national parks in NSW under the NPW Act. The Plan of Management sets out the park's known environmental values and sets out strategies to manage foreseeable and potential impacts on its unique environment. In addition, separate requirements are set out for the Snowy Hydro scheme as well as the standards required for surveys and assessments within the KNP.

Management Objective 7.01 states its aim as:

> *The cultural heritage values of the park are protected and managed in a strategic, comprehensive and integrated way.*

In protecting and managing these heritage values, the following policies and actions are listed:

- Conserve the cultural values of the park in accordance with the Australian ICOMOS Charter (2013)
- Ensure the relative levels of significance are the overriding consideration in management of particular cultural landscapes, places or objects
- Acknowledge the inseparability of natural and cultural values
- Lessees to be responsible for the assessment, management and maintenance of the cultural values located within their lease areas in accordance with the management strategies prescribed elsewhere in the plan (the Snowy Mountain Management Plan for the Snowy Mountain Hydro).

4. Historical context

4.1 Chronology of settlement

The chronology of settlement in the locality is provided in **Table 4-1**.

Table 4-1: Chronology of non-Aboriginal heritage

Date	Event(s)
1820s	European exploration and sporadic settlement begins. Settlement at this time is outside the limits of the recognised "Colony" of NSW.
1830s	Intensification of European settlement and grazing
1851	Gold is discovered in Kiandra
1874	Discovery of copper in Lobs Hole
1880s	Decline of Kiandra
1891	Construction of copper smelt at Ravine
1910	Proclamation of the village of Ravine (Lobs Hole)
1921	Abandonment of village of Ravine
1949-1974	Snowy Mountains Scheme constructed
1986	Ravine included in KNP

4.2 Early European settlement

While the Wangal and Ngarigo peoples occupied the high plains during the summer months for the Bogong moths, and the lower slopes for small game year-round, from around the 1830s European pastoralists began arriving on the grassy plains. According to Seddon, these treeless plains were not used much, except where ochre or stone was required (Seddon 1994:112-113). One of the first explorers in the Snowy Mountains/Monaro area was Captain Currie, who in 1823 speaks of "a tribe of natives, who fled at our approach, never having seen Europeans before" (Seddon, 1994:112-113).

In 1834, when Polish explorer John Lhotsky travelled to the Monaro, it was outside of what was termed 'the Colony' of NSW, with the "Moneroo (Monaro) Squattage District" added in 1840 (**Figure 4-1**). However, the census of 1828 showed 20 people on the Monaro, all servants working in the Canberra area, perhaps as far down as the Monaro (the Monaro district is a plateau east of the Snowy Mountains). In addition, a letter from Richard Brooks stated that he had been working with stock and men at Berridale since 1827 (Plowman, 2007:10). Lhotsky included information regarding squatters he had encountered in 1834, along with the times they had been present in the area, refer to **Figure 4-1**. There were also a number of other squatters who had only been established for a few months. Lhotsky also noted still more stations around the Snowy and McLaughlin Rivers (Plowman 2007:10).

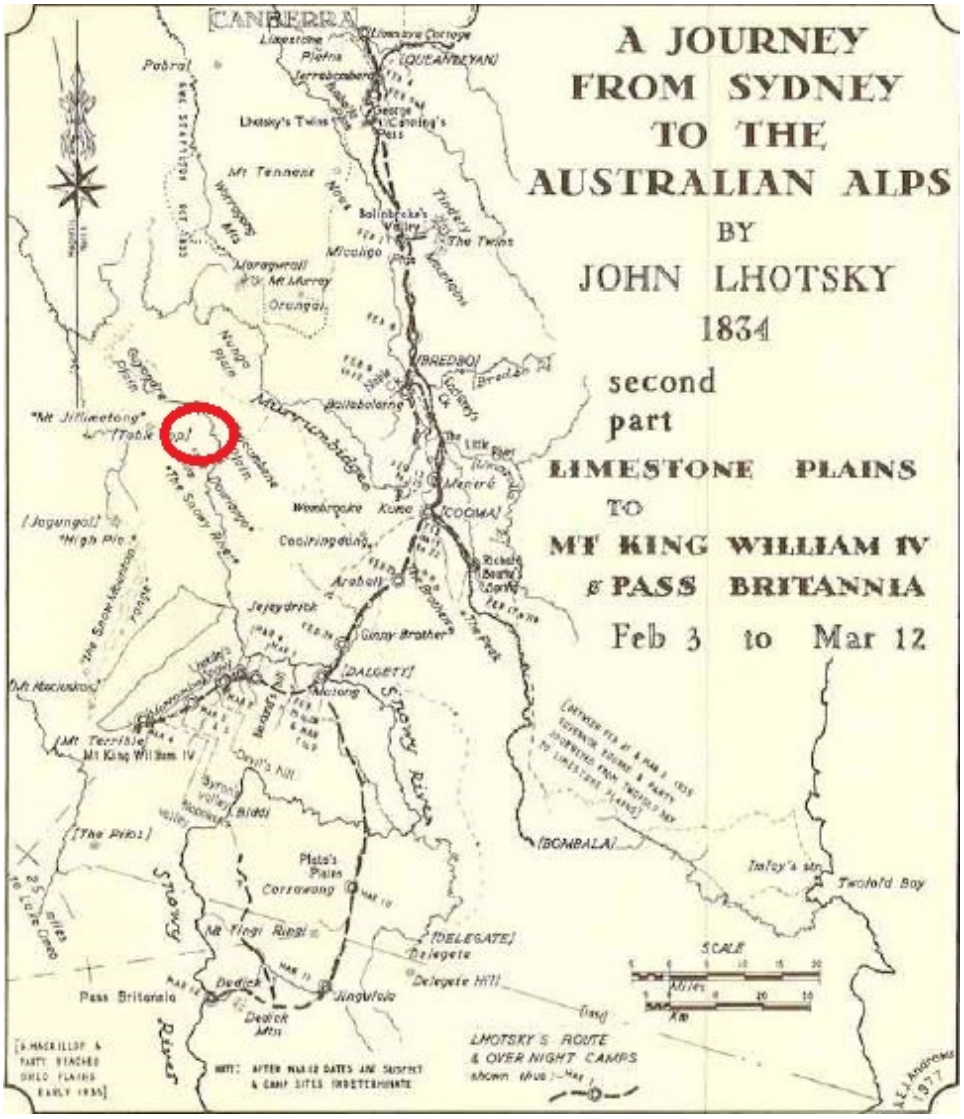


Figure 4-1: Lhotsky's route in 1834 showing approximate location of the project area (red circle is the project area) (per Andrews in Plowman 2007:11)

Table 4-2: Squatters in the Monaro before 1834 (Plowman, 2007:10)

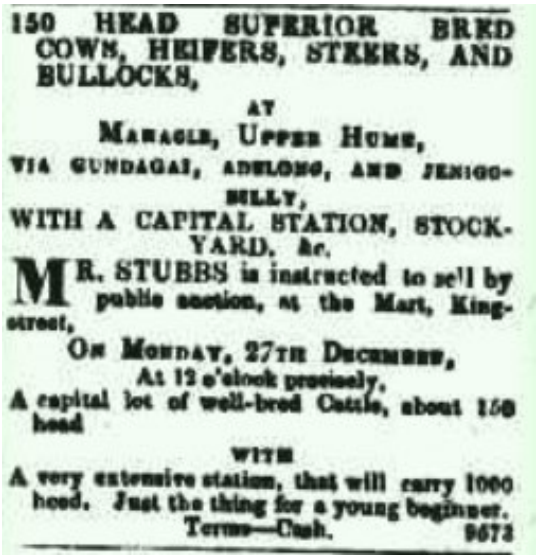
Squatter	Property	Time in Monaro (ex 1834)
R Campbell	Waterholes (north of Machelago)	7 years
Cooper & Levy	Kuma (Cooma)	5 years
Bunyan	Pindjera	4-5 years
R Brooks	Jijedery (Gegedzerick)	6 years
Sherwin	Yinibrothers	2 years
White	Tomgrogin (near Nimmitabel)	4 years
York	Benilingra (Billilingera)	5 years
Bradley	Blulungewaing (south of Bredbo)	2 years

To the west of the Snowy Mountains, Hume and Hovell passed within 20 kilometres of the western end of the project area in 1824, when exploring for a track between Hume's Cooma Cottage and the Albury area. Spennermann describes the pastoral development in the Maragle/Bago area as falling into three main phases (Spennemann 2016:2), shown in **Table 4-3**.

Table 4-3: Pastoralism in the Snowy Mountains

Date(s)	Event(s)
1840-1875	Establishment of squatting runs
1875-1945	Intensification of agricultural via small to medium acreage farms
1945-present	Consolidation of larger holdings as part of the Soldier Settlement Scheme

The effect of these explorations and the resultant publishing of accounts of the expeditions resulted in an influx of squatters to the region. Still outside of the Colony, the land was not subject to payment of any duties, however it was likewise outside of the jurisdictions of courts and policing. The Maragle run, located near modern day Tumbarumba to the west of the project, was first taken up by Dr Thomas Bell in 1839 (Spennermann, 2016:2). Bell lived at Braidwood and hired managers to work the run. By 1847, the land was offered for sale, with an advertisement appearing in the Sydney Morning Herald (refer to **Figure 4-2**).



150 HEAD SUPERIOR BRED COWS, HEIFERS, STEERS, AND BULLOCKS,

AT

MARAGLE, UPPER HUME,

VIA GUNDAGAI, ADELONG, AND JENIGGBILLY,

WITH A CAPITAL STATION, STOCK-YARD, &c.

MR. STUBBS is instructed to sell by public auction, at the Mart, King-street,

ON MONDAY, 27TH DECEMBER,

At 12 o'clock precisely,

A capital lot of well-bred Cattle, about 150 head

WITH

A very extensive station, that will carry 1000 head. Just the thing for a young beginner.

Terms—Cash. 9673

Figure 4-2: Advertisement in the *Sydney Morning Herald*, 16 December 1847, page 4 (Courtesy: National Library of Australia)

Of note in the advertisement is the cattle headlining the sale, "with a very extensive station" as by the 1850s the practice of grazing stock within the Snowy Mountains in the summer became common. A stock route ran across the range from New Maragle to Kiandra. Pastures in the alpine and subalpine regions were particularly verdant at this time of year, following the burning of native vegetation, thus establishing the "green pick" (Crabb 2003:12). It is believed that Banjo Paterson's composite "Man from Snowy River" and "Clancy of the Overflow" characters came from this time period.

The presence of pastoral runs and the movement of stock in the area is evidenced by the presence of a Travelling Stock Reserve (TSR) in/near the project area. TSRs are Crown Land reserves used for the droving, watering and grazing of livestock along specific routes to allow movement of stock between properties or to market. The closest TSR to the project area is shown in **Figure 4-3** below, designated as TSR 265. It is of note that the map is from c.1888, evidence that the stock route was in use at that time. A search of the NSW Government Sharing and Enabling Environment Data (SEED) showed an additional TSR located on the north of Elliott Way, to the east of Powerline Road (see **Figure 4-4**). This is located outside of the project area approximately three kilometers southeast.

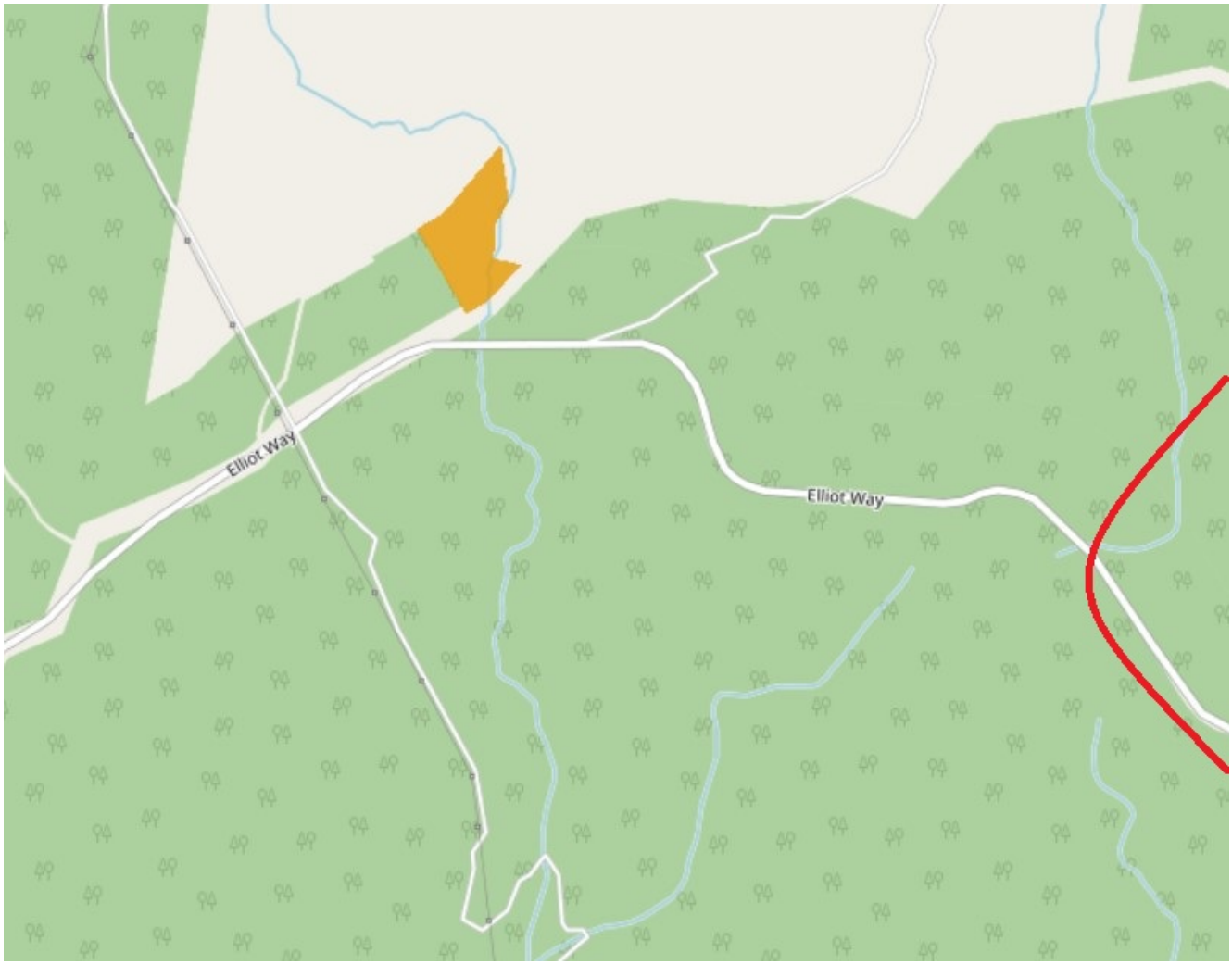


Figure 4-3: Travelling Stock Reserve (in orange). The approximate western extent of the project area is shown in red (Courtesy: SEED)

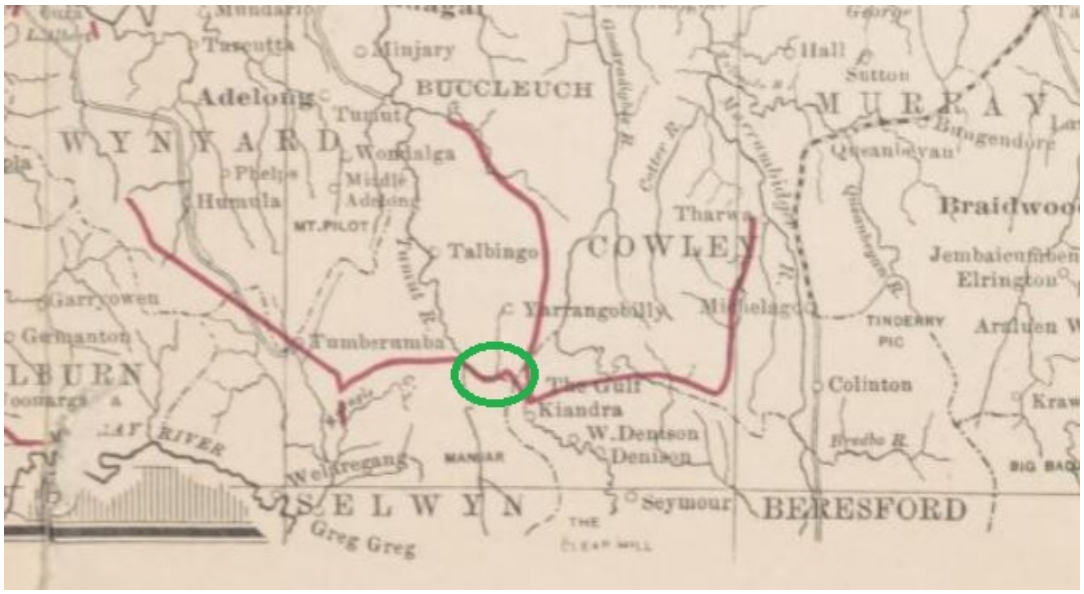


Figure 4-4: Map showing TSR265 (in red), c.1888. Approximate location of the project is shown in green (Courtesy: National Library of Australia)

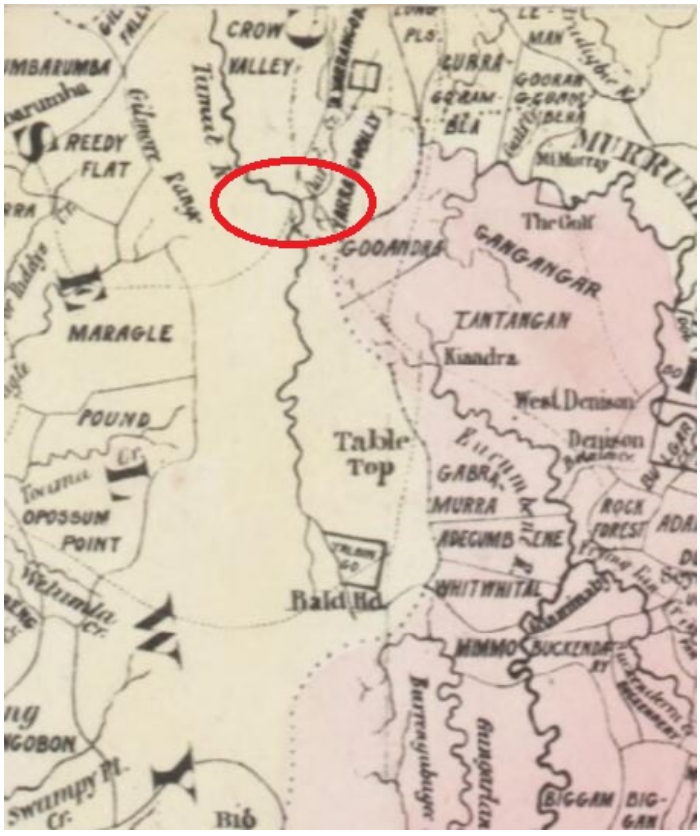


Figure 4-5: Pastoral map c.1860 showing pastoral runs and approximate location of the project in red (Courtesy: Ruess & Browne, National Library of Australia)

The TSRs are the subject of recent interest in terms of conservation. In their submission to the NSW Travelling Stock Reserves Draft State Planning Framework 2016-2019 Committee, Landcare New South Wales noted that the TSRs had high heritage values as a result of the large number of communities and landholders who have a strong history and connection to the TSRs. According to Landcare, TSRs are:

> *…valuable assets for stock movement, seed collection, apiary, stock watering points, recreational activities and numerous other activities. A number of significant Aboriginal cultural sites are also located in TSRs and TSRs are vital for biodiversity connectivity and wildlife refuge.* (Landcare NSW Inc. 2015:2).

However recent mapping, including SEED, does not list TSR265 as an item of potential conservation. One of the reasons that TSRs are of conservation interest is because they are a rapidly diminishing item; it would appear that TSR 265 shown above is no longer extant.

4.3 Mining

The importance of mining in the Australian Alps is well-established. Mining in the Alps was primarily for gold, which brought large numbers of people to settle in the Alps in towns like Kiandra, approximately 13 kilometres from Ravine (project area east) (**Figure 4-9**). Kiandra was the epicentre of mining in KNP, and was dominated by alluvial gold mining (LRGM Services, 2002:v).

4.3.1 Kiandra

Alluvial gold was discovered in Adelong (14 kilometres west of Tumut and 70 kilometres north west of Ravine) in 1852 (LRGM - Services 2002:9; NSW Archaeology 2018), and reef gold in 1857. The discovery of gold at Adelong brought thousands of men to the Snowy Mountains district and motivated others to search nearby. This precipitated the discovery in 1859 of another goldfield, at Gibson's Plain, later to be known as Kiandra. Although the new diggings at Kiandra were said to be attracting considerable attention, newspaper reports of the time

discouraged people "from a distance" to go there – less than three months after discovery, there were already "about 700 persons on the spot" with numbers increasing daily (Empire 1860:8). The rush of miners to the district spearheaded a rush to find new goldfields, which were eventually discovered at Tumbarumba in 1855 and Adelong in 1857 (LRGM Services, 2002:9).

The area surrounding Kiandra was settled by the Pollock brothers, who brought sheep to the high country in the summer for grazing. While there, they undertook prospecting and discovered rich deposits at Kiandra. Already a magnet for miners, the Pollocks reported their find at Tumbarumba and so began the biggest gold rush in the Australian Alps. By 1860 anywhere between 5,000 and 15,000 people descended on Kiandra hoping to "strike it rich" in the gold rush, but numbers are generally agreed at 10,000. The winter drew many of the miners away, and while the government began planning for around 150,000 people to rejoin the Kiandra gold rush in the spring, it never happened. The gold disappeared quickly and in 1861 when gold was discovered at Lambing Flat (Young), the diggers left for good (LRGM Services 2002:9-10).

By early 1860, the numbers of people in Kiandra had ballooned to around 10,000 people. Prospectors from Victoria and NSW descended on Kiandra as news of the gold yields spread. Nuggets of up to 400 ounce-weight were found, and fortunes were made (LRGM - Services 2002:10).

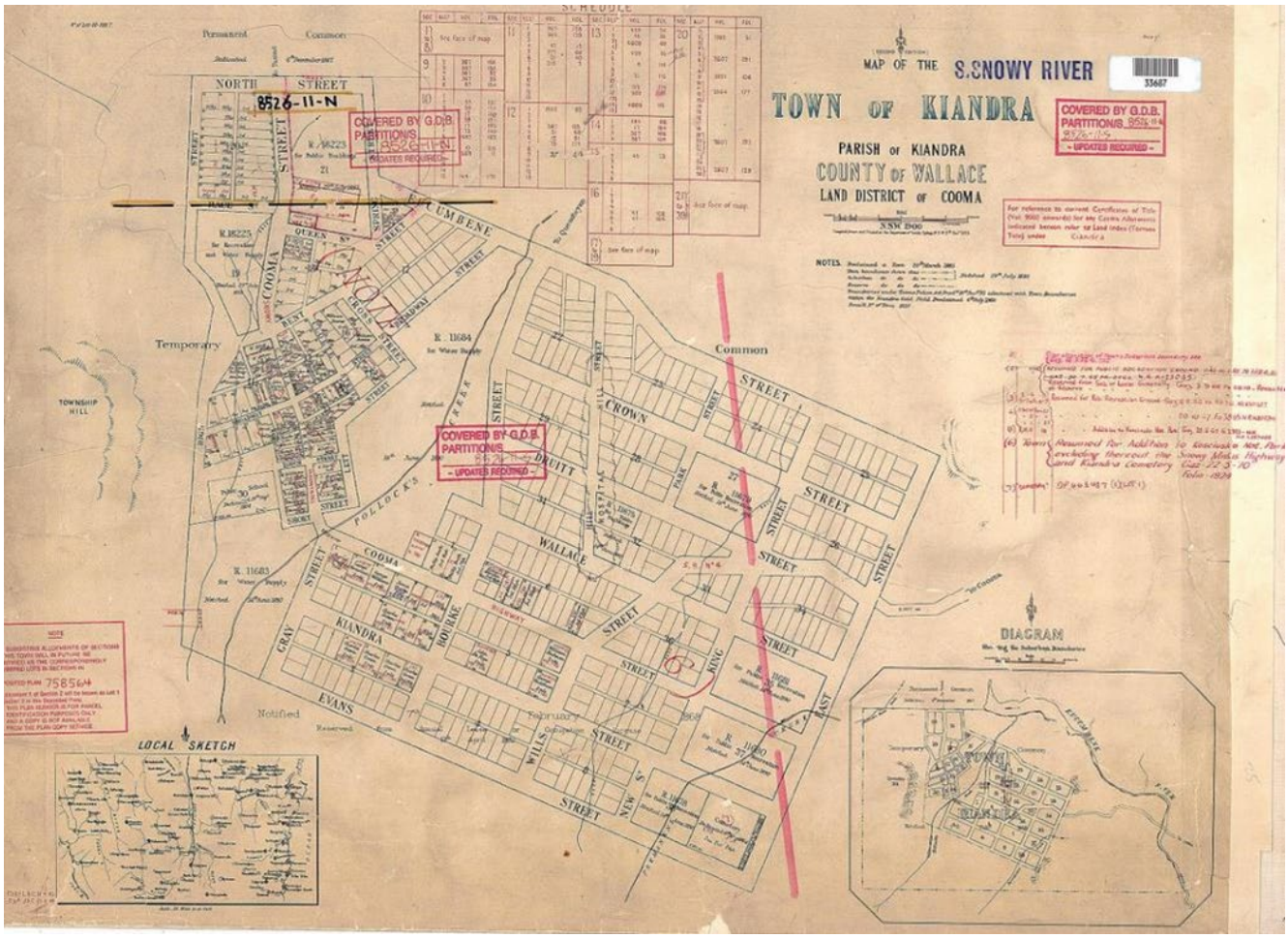


Figure 4-6: Township of Kiandra (c.1900) (Courtesy: Historical Land Records Viewer, File name: 3368701.jp2)

The prosperity of Kiandra did not last. The gold-bearing lodes were quickly worked, and in 1861 the gold rush at Lambing Flat, now known as Young, drew many of the miners there. However, prospecting continued in the Snowy Mountain region, with smaller fields opening. The New Maragle field, partially within the project area west, was opened in 1874 and copper at Lobs Hole, in the east of the project area, in the same year (LRGM - Services 2002:10).

4.3.2 Lobs Hole/Ravine

The land comprising the Lobs Hole/Ravine end of the project (project area east) was part of the Yarrangobilly Run in the land district of Tumut. In 1885 the southern portion of the run was resumed to be made available for selection (Australian Town and Country Journal Supplement 1885:1). Following resumption, the land was selected by Frank William Yan, who farmed the area from around the 1880s. His son, George, became postmaster at Lobs Hole (also known as Ravine) (**Figure 4-7**).

Figure 4-7: Lobs Hole (Ravine) Post Office, c.1920. George Yan is pictured at right (Courtesy: State Library of NSW, Reference Code 393956)

With the commencement of mining for copper in 1874, a settlement began to support both the miners and the facilities required by them. By 1908, the village of Ravine contained a number of temporary buildings, but a school, butcher's shop, blacksmiths' shop and a boarding house was also built (**Figure 4-8** and **Figure 4-10**). The village of Ravine was proclaimed in 1910, the same year that Julius Forsstrom took over the Lobs Hole Central Mine (Boot 2001:3). The General Cemetery of Ravine was notified the same year, with at least 22 people known to have been interred in the cemetery (NSW Archaeology 2018:100).

A correspondent wrote of the copper at Lobs Hole in 1872:

> *The copper is turning out rich here, and active work will be gone into before long. A tin mine has been discovered not far from the river… Native dogs are flocking to the hole in swarms this winter. Poison baits are destroying them in large numbers. (Monaro Mercury and Cooma and Bombala Advertiser 1872:2).*

Further shafts were opened up in 1891, 1892 and 1897. In the 1890s, the equipment from Kiandra was purchased and moved to Lobs Hole, and by 1899 six men were employed at the mine (Boot, 2001:2).

A contemporary mining report states that while the Lobs Hole (Ravine) workings were successful, they were not aided by the topography of the land:

> *Lobs Hole is awkwardly situated with respect to the outside world. Kiandra, a few miles away, is 3,000 feet above the mine, and a gorge 3,300 feet-deep has to be ascended before reaching the town.*
>
> *The ore at present is packed by horses up a track reaching an altitude of 2,400 feet some 2½ miles from the mine. Thence bullock teams convey the copper over rough mountains through Talbingo to Gundagai.* (NSW Planning and Environment, undated).

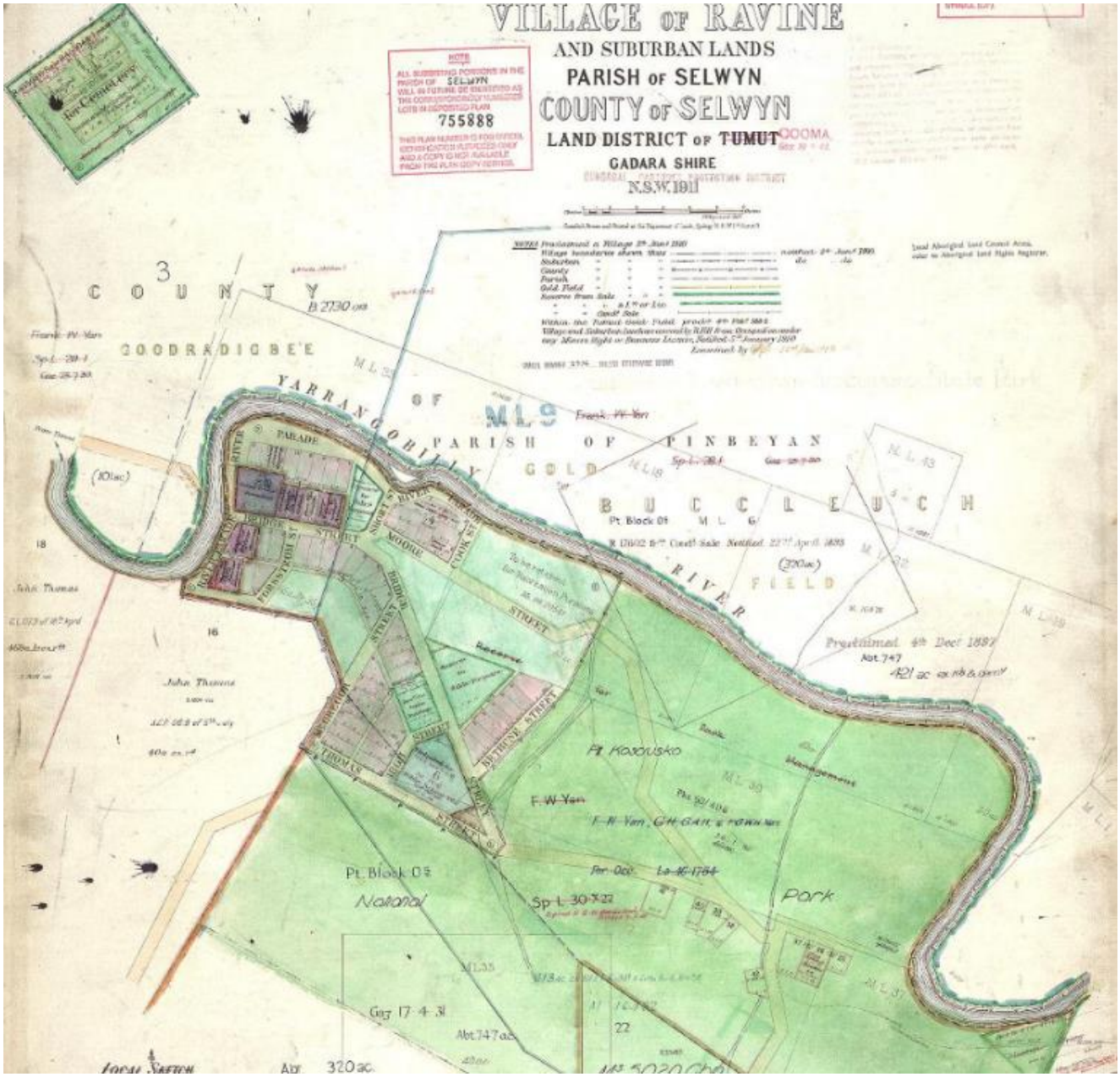


Figure 4-8: Layout of Ravine township, undated (Courtesy: Historical Land Records Viewer, File name: tnRavine.jp2)

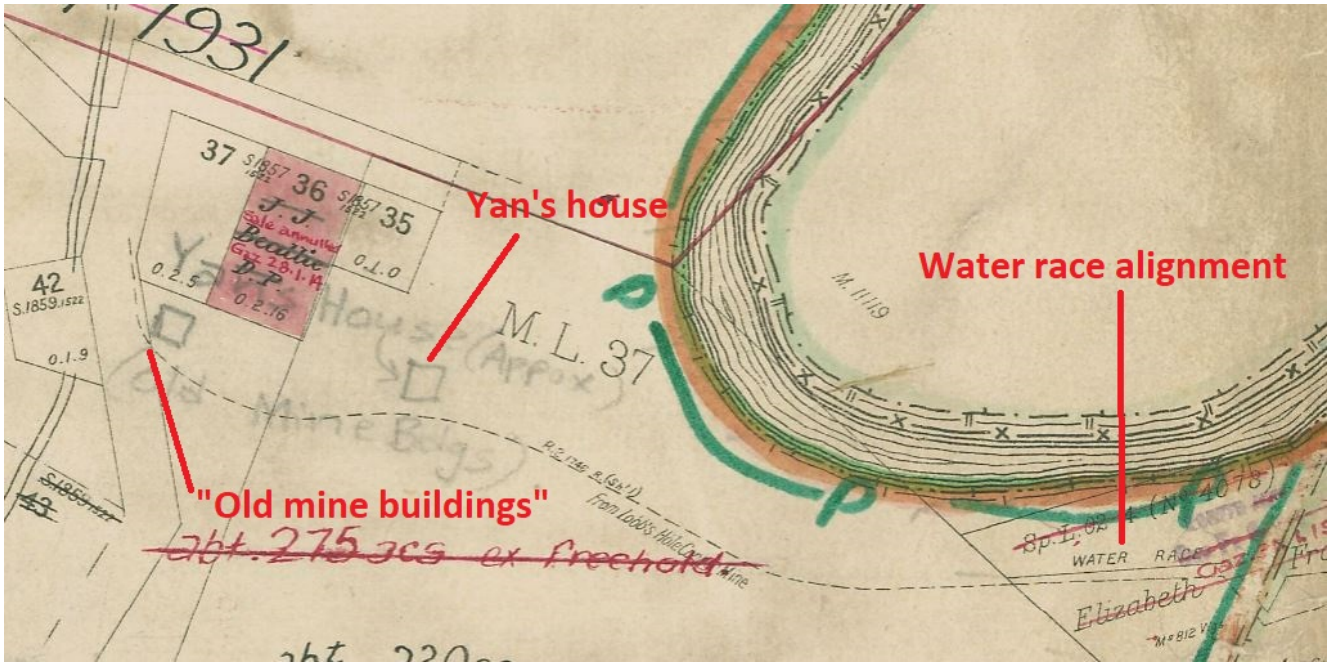


Figure 4-9: Detail of "Map of the Village of Ravine and Suburban Lands", c. 1911 showing the locations of Yan's house, the old mine buildings and the alignment of the water race from the copper mine (Courtesy: Historical Land Records Viewer, File Name: gb_tnRavine.jp2).

Figure 4-10: Washington Hotel, c.1912 (Courtesy: Piper 2015)

In 1912 copper prices plummeted, leading to the abandonment of the Lobs Hole Central Mine. The following year, Forsstrom bought out the Lobs Hole Copper Mining Company and employed six men to mine it, however the outbreak of the First World War in 1914 led to a shortage of workers. Forsstrom, a Finnish national, also faced sabotage from his workers who mistakenly thought he was German.

From 1915, the village of Ravine began its decline. The lease for the Washington Hotel ceased and was not renewed. The building continued to be used for traveler's accommodation. By 1917, Forsstrom concentrated his mining enterprises elsewhere, and Ravine began to decline. At its height, 500 people lived there. In 1919 Forsstrom wound up all Lobs Hole operations, the Washington Hotel became a private residence and the police station closed. The school closed the following year and burnt down in 1928. The postal service also closed in 1921, and the Forsstrom family left the area for good (Boot, 2001:4).

The village of Ravine was added to the KNP on 19 February 1986 (New South Wales Government 1986:886). The ruins associated with the former village are not listed separately on any available heritage databases.

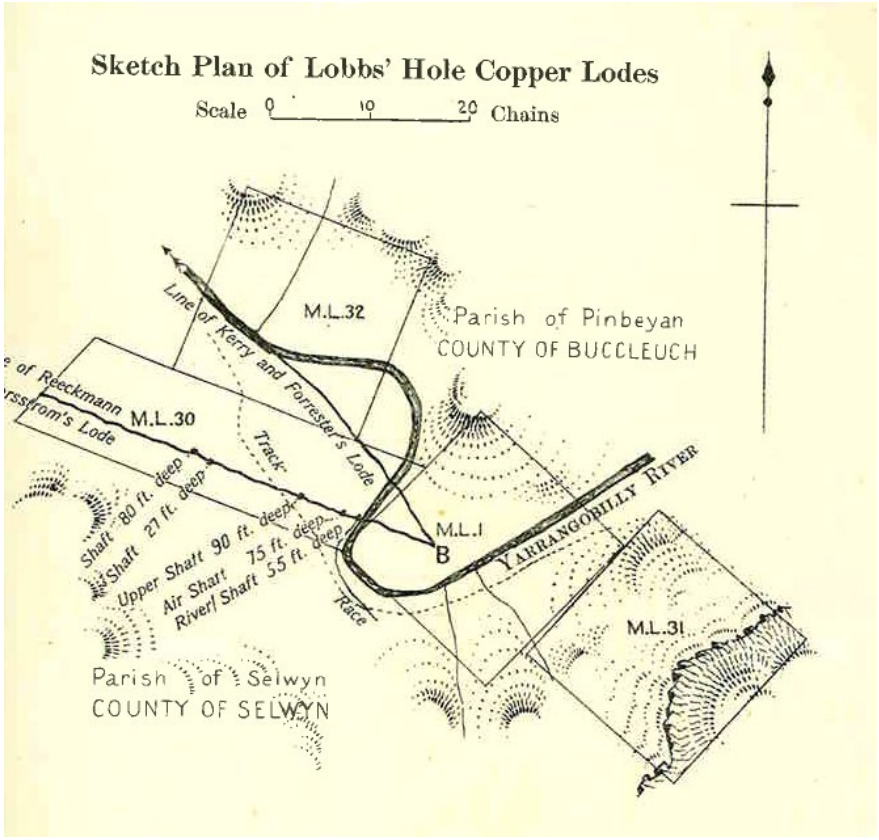


Figure 4-11: Plan of Lobs Hole/Ravine mining activities (c.1901) (NSW Planning & Environment, nd.)

4.3.3 New Maragle Goldfields

The New Maragle goldfields was proclaimed on 22 November 1872 and opened in 1874, however unlike Lobs Hole, no town grew up around them (**Figure 4-12**). Originally part of the Maragle pastoral run, the goldfields were worked intermittently from then until the revocation of the proclamation in 1899 (Beauchamp 1899:5303).

In 1876, the following report on the "New Maragle Creek" goldfield stated:

> *The only quartz line of reef in this locality is the Pilot Reef, on which a number of leases have been surveyed but little or no work done to develop the ground. No. 1 on the line was prospected some years ago, and a considerable amount of work done. Two tunnels driven from the base of the hill to cut the supposed Reef, but from want of funds and other difficulties work was discontinued for two years. About six months ago the Pilot Reef Company commenced work again and have been successful in cutting a gold-bearing leader below the line of the Pilot Reef…*
>
> *Machinery to the value of £3,500 has been placed on the ground consisting of pumping, winding and crushing plant, race and large dam for saving water and conveying it to the mill for pumping purposes…*
>
> *The company employs ten to twelve men, besides contractors for the delivery of firewood.*
>
> *The roads between this and Tumbarumba are very bad, and of course all the materials made use of for the mine and consumption are very expensive. £500 laid out judiciously would improve this road, and induce a larger population to settle down.* (Langford, 1876, in NSW Planning & Environment, nd).

By 1891, the Warden of the Tumbarumba Mining District, J. F Makinson, reported that Mr Richard Cook, the lessee of the Maragle lease, yielded the most gold in the district at £7 per week per man. The gold yielded from that lease was also described as the coarsest, and of the highest value. By 1894, thirty men are listed as working the New Maragle lease (NSW Planning and Environment, undated). No mention of the New Maragle diggings were mentioned after this date. A delegation from the Department of Mines toured the gold mines in the Snowy Mountains in 1911; the New Maragle diggings were not mentioned.

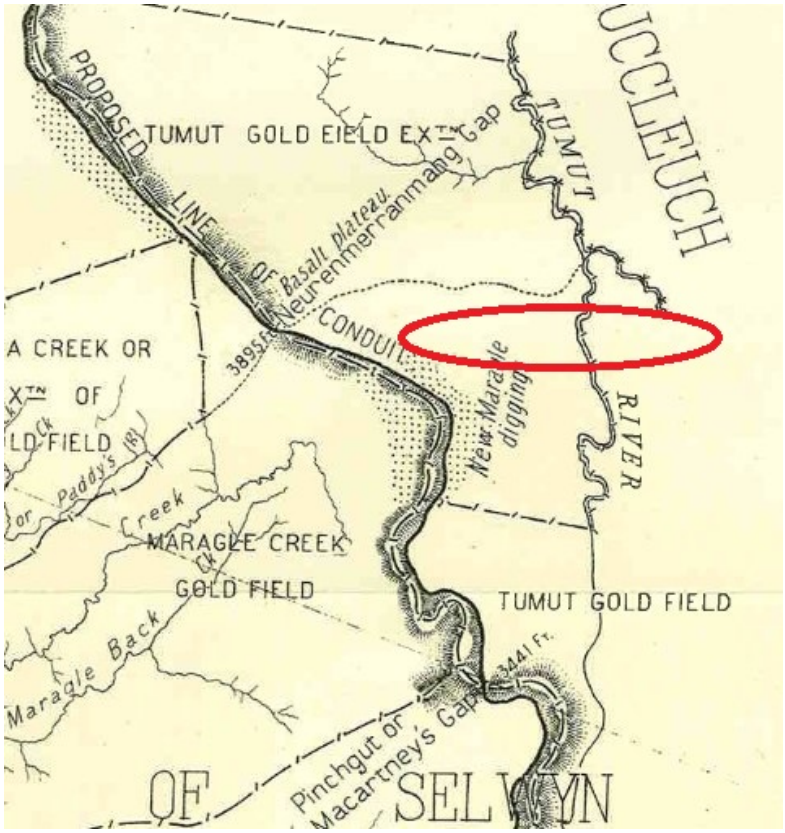


Figure 4-12: Location of New Maragle diggings, c. 1894, with approximate location of project area (New South Wales Planning and Environment undated)

4.4 Snowy Mountains Scheme

In 1949, a grand, bold scheme was developed to create electricity for Australia from the rushing rivers in the Snowy Mountains area. According to newspapers of the time, however, the Snowy Mountains Scheme had been in the planning since 1884 (Murrumbidgee Irrigator 1949:2). It involved the damming of several of the rivers to power turbines to provide electricity and to simultaneously provide drought-prone areas with additional water. According to Snowy Hydro:

> *The Scheme diverts the headwaters of the Snowy, Eucumbene and Murrumbidgee Rivers westward through the Great Dividing Range, releasing waters into the Murray and Murrumbidgee Rivers.* (Snowy Hydro ud.).

The passage of the *Snowy Mountains Hydro-Electric Power Act 1949* (Cth) established the Snowy Mountains Hydro-Electric Authority. Construction of the scheme commenced shortly thereafter.

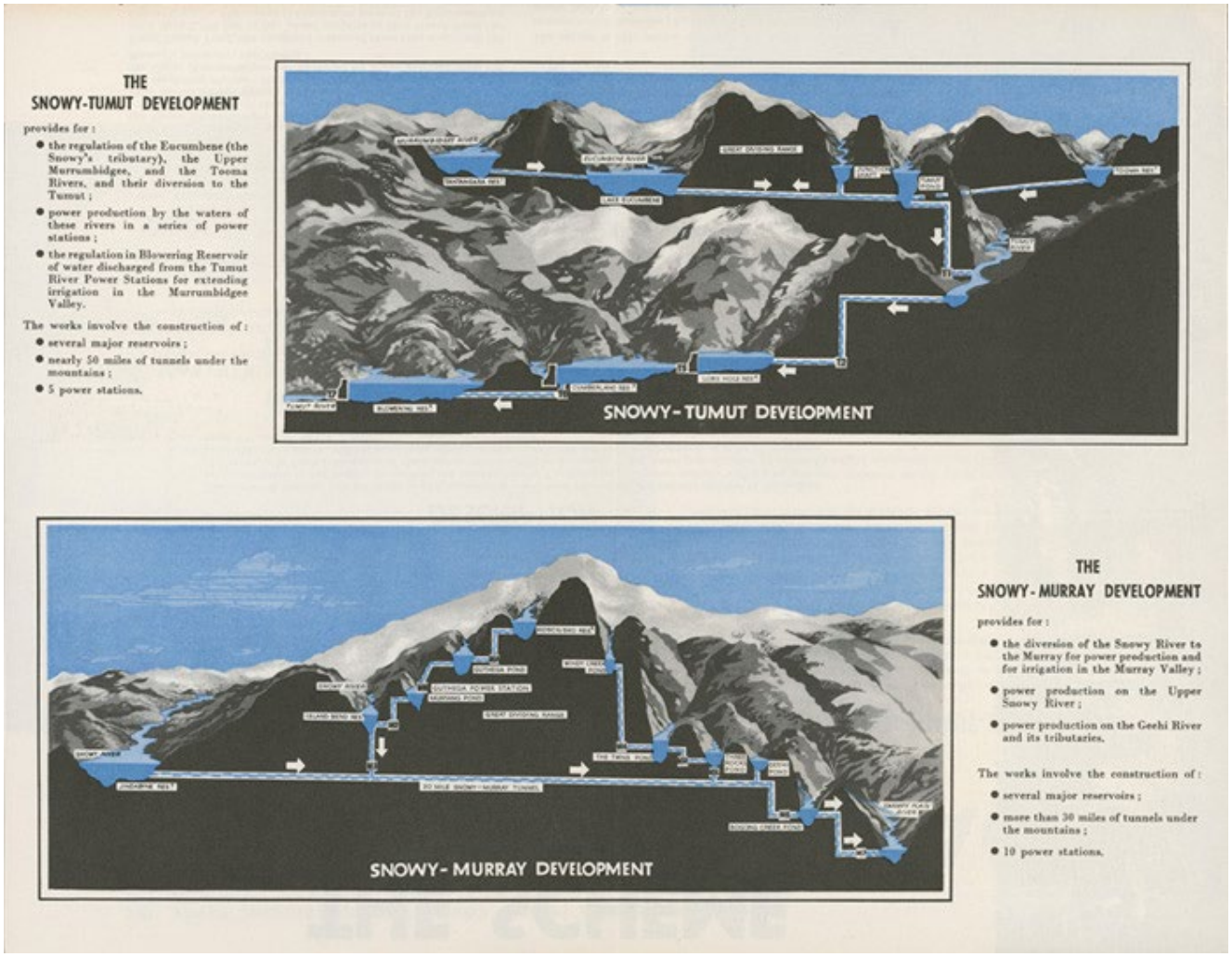


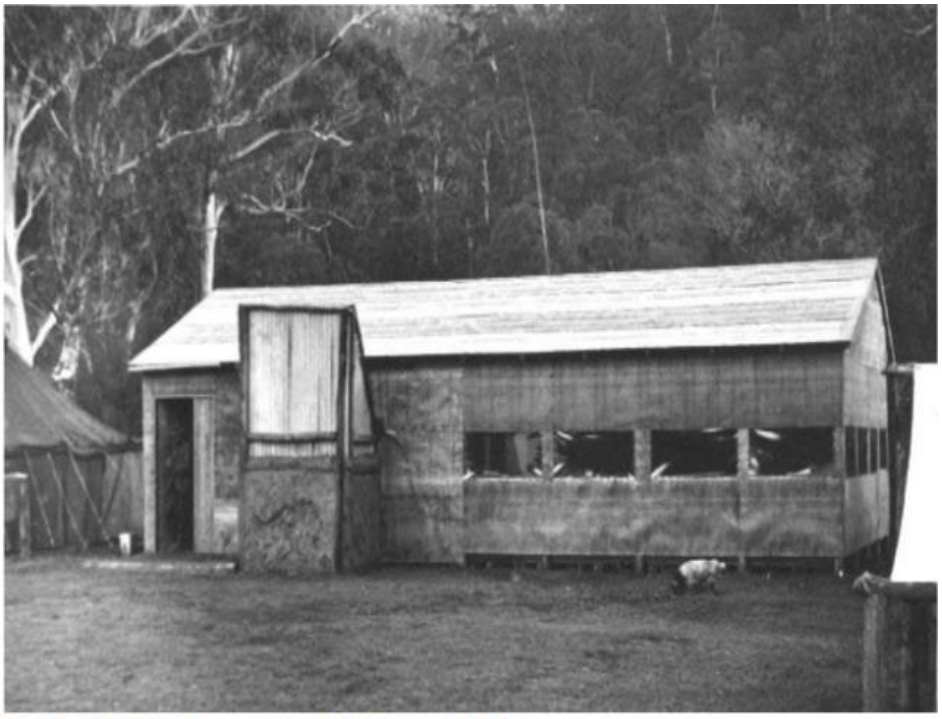
Figure 4-13: Two development works as part of the Snowy Hydro Scheme (Courtesy: National Archives of Australia)

By the time of its completion in 1974, a total of seven power stations, 16 dams and 225 kilometres of tunnels, pipelines and aqueducts had been constructed. The town of Adaminaby was drowned under Lake Eucumbene, with the new town relocated above its high waterline. The relocation included moving the town's church stone-by-stone to its new location (National Archives of Australia 1955-1963:4).

The construction workforce was made up of local and overseas workers. Many post-war European migrants were enticed to Australia based on the promise of steady work, and the Snowy Mountains Scheme was one of the largest employers of new migrants.

Most areas within KNP were subject to some form of works, including the construction of new transmission lines from the hydro-electric generator sites. A survey camp was erected at Lobs Hole (Ravine) in the early 1950s in order to house surveyors working on the Snowy Hydro scheme, headed by Major Hugh Clews of the Snowy Mountains Authority (formerly of the Royal Australian Surveying Corps) (see **Figure 4-14** and **Figure 4-15**).

Figure 4-14: Snowy Hydro Electric Scheme – Lobs Hole Survey Camp, c.1952 (Courtesy: National Archives of Australia, Series A11016, 1636. Item barcode 4441699)



Lobs Hole drawing Office, 1951.
Building clad with "Malthoid" paper, using transparent drawing paper as glass windows.
SMA Photo

Figure 4-15: Lobs Hole Survey Camp, 1951 (Gough 2004:66)

4.5 Literature review

Future Generation, 2019. Historic and Natural Heritage Management Plan – Snowy 2.0 Exploratory Works, Stage 2

This Historic and Natural Heritage Management Plan (HNHMP) was prepared to form part of an Environmental Management Strategy for the Snowy 2.0 Exploratory Works Stage 2 and was approval condition for a Snowy 2.0 Exploratory Works. Its purpose was to identify the project's management measures for historic and natural heritage within that study area.

The HNHMP also contains a review of management measures for the individual heritage items identified in NSW Archaeology (2018, see below) (pp. 17-19). As part of the Snowy 2.0 study area overlaps with this project's disturbance area, their management measures are relevant to the management measures outlined in **Section 7** and **Section 8** below.

NSW Archaeology, 2019. Snowy 2.0 Exploratory Works: Historic Cultural Heritage Assessment Report

NSW Archaeology prepared Aboriginal and non-Aboriginal heritage assessments for the Snowy 2.0 Exploratory Works, part of which covers the Lobs/Hole Ravine complex. The assessment was undertaken through extensive historical research and a thorough site inspection.

NSW Archaeology noted that of the 315 items on the Historical Heritage Information Management System (HHIMS) maintained by Heritage NSW (formerly OEH), 11 were in the vicinity of the Snowy 2.0. In addition, a total of 127 heritage items were identified as part of their assessment. Of these, 20 sites are concentrated within the project area east, refer to **Figure 4-16**).

NSW Archaeology categorised the sites in the Lobs Hole/Ravine area into complexes of sites connected with the development of the area. These were the pastoralist stage, Lobs Hole Copper Mine, "Struggle Street" (residential area on a hillside above Lobs Hole/Ravine near the mine) and the Yan complex (a complex of built and archaeological sites relating to the Yan family who lived in the area after the closure of the mine).

Spennermann, D H R, 2016, The Junction of Maragle Back Creek and Reedy Creek, Maragle: European Context and Land Use History

This report was prepared as an historical investigation of the Maragle pastoral run and the surrounding area, part of which falls within the western end of the project area. Spennermann reviews historical newspapers, mapping and secondary historical sources to illustrate the history of the run. Spennermann also provides details on the alienation of the Maragle run, and the development of the gold mining industry and other industries in the area. As an historical investigation, no field inspections were undertaken as part of this study.

LRGM – Services, 2002, Australian Alps Mining Heritage Conservation & Presentation Strategy

This report was prepared for the Cultural Heritage Working Group of the Australian Alps Liaison Committee to provide an action plan for the protection of heritage assets relating to mining within the Australian Alps National Park. The report provides a brief historical background to mining within the Australian Alps together with an inventory of surviving and potential heritage. Relevant to the purposes of this investigation, LRGM notes that historic mining took place at both Lobs Hole (Ravine) (copper) and New Maragle (gold).

LRGM note that mining landscapes in the alpine regions are unique owing to the terrain and conditions; the remains are therefore likewise unique:

> *In general, Alpine adaptations will not interpret well in the historic fabric, unless the site is exceptionally well preserved, with remnant plant, equipment and infrastructure. For the overwhelming bulk of historic mining sites within the Australian Alps, a distinctive Alpine character will be demonstrated in their context, not their fabric.* (LRGM - Services 2002:8).

The report lays out a staged, co-ordinated program of interpretation and conservation of the mining heritage within the Australian Alps. The only site listed in the report that is within the project area is Ravine/Lobs Hole.

Boot, P, 2001, An archaeological assessment of mining relics at Lobs Hole/Ravine, Kosciusko National Park

This assessment was prepared by the National Parks and Wildlife Service (NPWS) to monitor the condition of mining relics. Boot provides a useful chronology of the development of the mining town and draws on the work of two previous assessments undertaken by the NPWS. Part of Boot's investigation area is within the survey area.

As described in its title, this assessment was focused on the mining relics rather than the town of Lobs Hole/Ravine. Most of the discussion centred on the remaining relics, in particular the former mining and air shafts still extant. Boot recommended that interpretation was required of the site, as well as the installation of interpretative signage, however the most important work required was the covering of uncovered pits and the construction of a safe public walking track.

4.6 Heritage databases

Searches of State and Federal heritage databases were undertaken to establish known heritage items within the vicinity of the project area. At the national level, the DoAWE administers the Australian Heritage Database, which records items of World, National and Commonwealth heritage significance. It also records items on the defunct RNE. Although having no legislative protection, the RNE is a useful repository of past heritage items.

4.6.1 National/Commonwealth heritage

A search was undertaken of the Australian National Heritage database in 17 September 2020 for items of National and/or Commonwealth heritage significance. Two items of National significance were identified (see **Table 4-4**).

Table 4-4: Items on the Australian Heritage Database

Item name	Address	Listing	Within project area
Australian Alps National Parks and Reserves	The Alpine Way, Thredbo	NHL – listed place	Partially
Snowy Mountains Scheme	Various	NHL – listed place	Partially

4.6.1.1 Register of National Estate (RNE)

A search of the Australian Heritage Database was undertaken on 17 September 2020 for items on the former RNE, with three results. As noted above, these items do not have any legislative protection (see **Table 4-5**).

Table 4-5: Items on the RNE

Item	Address	Item type	Within project area
Four Mile Hut	Kiandra Road, Cabramurra	Historic hut	No
KNP (1981 boundary)	Snowy Mountains Highway, Tumut	National park registered in 1981 (now part of the Australian Alps National Parks and Reserves)	Partially
Snowy Mountains Scheme	Snowy Mountains Highway, Cabramurra	Historic, engineering	Partially

4.6.2 State Heritage Register

A search of the SHR was undertaken on 17 September 2020 for items of State Heritage significance within or near the project area. Two items in the vicinity of the project area were identified (see **Table 4-6**).

Table 4-6: Items on the SHR

Item	Address	Listing ID	Within project area
Matthews Cottage	Kiandra, KNP	SHR00998	No, approx. 10 kilometres east
Kiandra Courthouse/ Chalet	Kiandra, KNP	SHR00994	No, approx. 10 kilometres east

4.6.3 Local heritage searches

Searches of Schedule 5 of the *Tumut Local Environmental Plan 2012* and Schedule 5 of the *Snowy River Local Environmental Plan 2013* were undertaken on 17 September 2020 for items of local heritage significance within or near the project area. There were two items of local heritage significance listed within or near the project area in the Snowy River LEP, refer to **Table 4-7**.

Table 4-7: Local heritage items

Item	Address	Listing ID	Within project area
Matthews Cottage	Kiandra, KNP	SHR00998	No, approx. 10 kilometres east
Kiandra Courthouse/ Chalet	Kiandra, KNP	SHR00994	No, approx. 10 kilometres east

4.6.4 Historic Heritage Information Management System (HHIMS)

This database is administered by Heritage NSW for historic items held within the National Parks and Wildlife Service Estate. It enables the NSW government to meet its obligations under Section 170 of the Heritage Act. A search of this database was requested 18 September 2020. The following items were identified (see **Table 4-8**).

Table 4-8: HHIMS sites in the vicinity of the project area

Item	Location	Significance	Within project area
Sue City	O'Hares Camping Ground, Elliott Way	Local	No – 2.5 kilometres south
Items relating to New Maragle goldfield	Elliott Way	Local	No – over 1 kilometre south

4.7 NSW Archaeology, 2019, Historic Cultural Heritage Assessment

In 2018, NSW Archaeology undertook a heritage assessment of non-Aboriginal heritage as part of the Snowy 2.0 Exploratory study area, 20 of which are within this assessment's project area, refer to **Figure 4-16**. Of these 20 items, 10 are within the disturbance area (see **Table 4-9** and **Figure 4-16**) and the remaining 10 are within the project area but outside the disturbance area (see **Table 4-10**). The 10 items within the project area but not within the disturbance area would not be impacted, therefore no further assessment is required or these items.

Table 4-9: Heritage items within disturbance area (NSW Archaeology, 2018)

ID	Site Name
R45	Lobs Hole Copper Mine Water Race
R46	Large excavation
R54	Site of bridge
R55	Brick hearth
R56	Excavated ditch
R57	Old road alignment
R106	Old road
R107	Building platform
R120	Building platform
R128	First school at Lobs Hole

4.7.1 R45 – Lobs Hole Copper Mine Water Race

This water race is cut into the base of the hill slope on the southern side of the Yarrangobilly River. It extends from Wallaces Creek in the east to the Lobs Hole Copper Mine. It was constructed in 1907 and was originally described as measuring two miles in length, with a dam at its eastern end. The race itself is approximately 0.5 metres deep and up to two metres in width (NSW Archaeology, 2018: 330).

4.7.2 R46 – Large excavation

This large excavation measuring approximately 40 metres long, 20 metres wide and approximately four metres deep, lies along a north-south axis on the western side of Ravine Road. It is heavily overgrown and its purpose is unknown. Without knowing its purpose, it is difficult to assess its archaeological potential, although it is predicted to be low (NSW Archaeology, 2018: 333).

4.7.3 R54 – Site of bridge

This was once the site of a bridge crossing of the Yarrongabilly River at the end of the mine trail. It is thought to have been part of the infrastructure associated with the Snowy Mountains Authority and of relatively recent construction. There are no archaeological remains of the bridge.

4.7.4 R55 – Brick hearth

This hearth is interpreted as belonging to a former picnic site. It comprises machine-made bricks dating from the early 20th century (NSW Archaeology, 2018: 349).

4.7.5 R56 – Excavated ditch

This excavated ditch measures seven metres in length, 1.5 metres in width and 1.4 metres deep. It is located in the "Struggle Street" area of the former Lobs Hole township but does not appear to be associated with any other known structure. It is assessed as having limited archaeological potential (NSW Archaeology, 2018: 350).

4.7.6 R57 – Old road alignment

This feature appears as an old cut and benched road alignment in the Struggle Street area. It measures approximately two metres wide, but is overgrown with regenerating bushland (NSW Archaeology, 2018: 352).

4.7.7 R106 – Old road

This road is fragmentary and appears as an extension of a road in the Struggle Street area (NSW Archaeology, 2018: 432).

4.7.8 R107 – Building platform

This level platform measuring approximately 10 metres long and four metres wide is located in the Struggle Street area. It follows a north-south axis, with a scatter of tin in its vicinity. The platform is overgrown with regenerating bush and the ground's surface is obscured by leaf litter, providing low visibility. This building platform, however, is in the general area of the "old mine buildings" noted on a 1911 map of the area, reproduced at **Figure 4-9**. It is assessed as having limited archaeological potential (NSW Archaeology, 2018: 433).

4.7.9 R120 – Building platform

This platform on a prominent knoll at the top of Struggle Street is described as "slightly level", however no evidence of cutting or filling is evident. An alignment of stone two metres in length is noted along the northern edge. It is assessed as having limited archaeological potential (NSW Archaeology, 2018: 452).

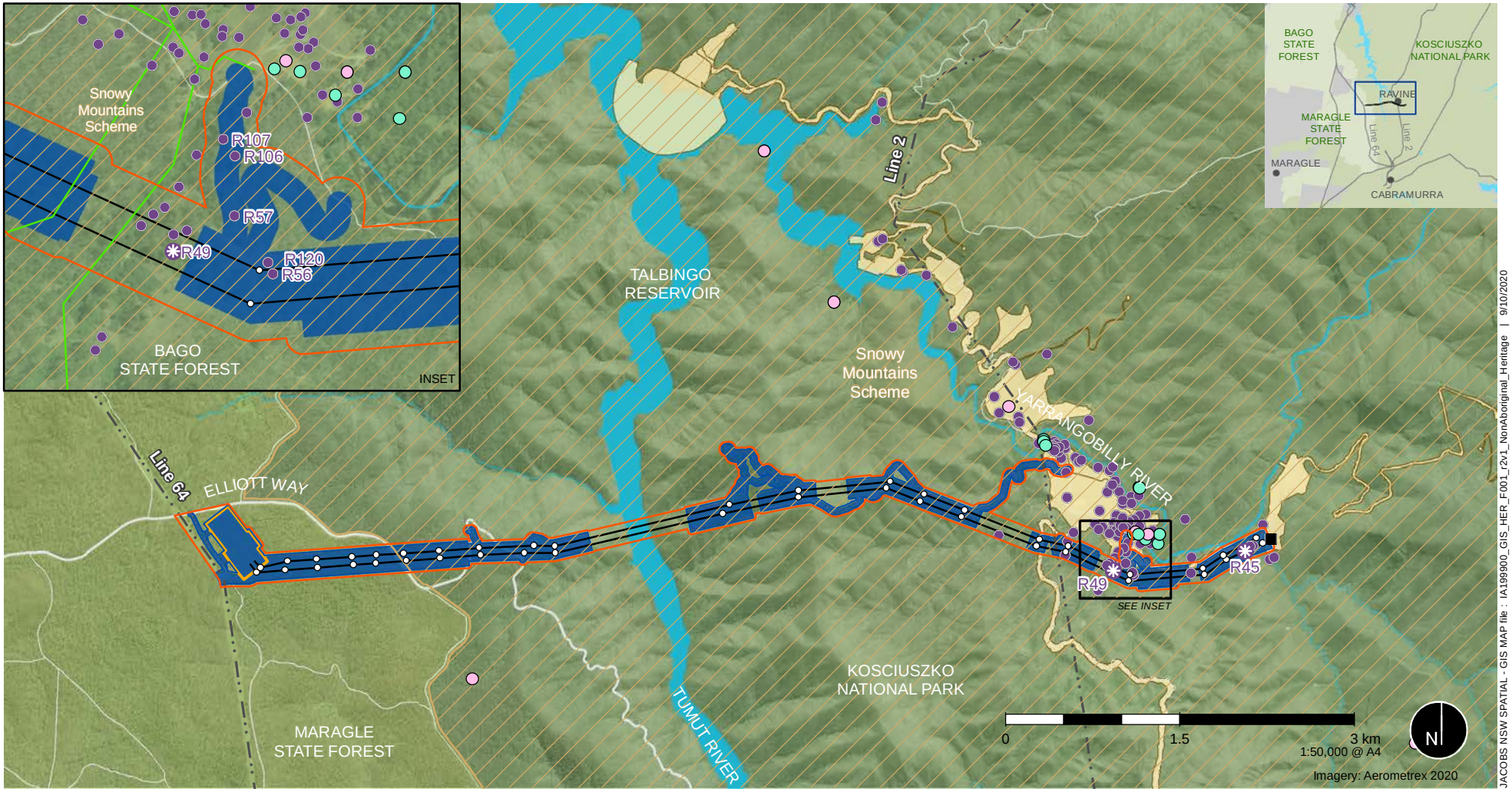
4.7.10 R128 – First school site

The site given for the first school is uncertain, however the coordinates given for the first school site are based on historical research and observations in the field. It was described as being a single structure measuring 14 ft x 12 ft x 9 ft on the top of a steep hill. The school building was of wooden construction, with the walls being constructed from split palings and floorboards of green timber and a wooden shingled roof. There was a stone-lined wooden chimney and two windows. The first teacher was appointed in 1892. In 1908 the district inspector recommended that the school be decommissioned owing to its poor condition. A new school site was procured in the proposed village site and the new school opened in 1909 (NSW Archaeology, 2018: 104-105).

In addition to those within the disturbance area, there are an additional 10 non-Aboriginal heritage items identified by NSW Archaeology in 2018 within the project area, but outside the disturbance area. These are listed below in **Table 4-10** and shown on **Figure 4-16**.

Table 4-10: Heritage items outside disturbance area but within project area (NSW Archaeology, 2018)

ID	Site name
R48	Excavation (possible shed)
R49	Circular stone wall
R50	Shed with bullock wagon frame
R65	Thomas house
R75	Mine shaft on ML 31
R76	Scatter of tin, glass and brick
R110	Building platform
R111	Path to creek
R115	Stone-lined channel
R132	Old track



Project area
Disturbance area
Proposed structure
Proposed transmission line
Proposed 500kV substation
Snowy 2.0 cable yard
Snowy 2.0 Disturbance footprint

Heritage
Potential heritage
Section 170 heritage
Historic heritage (NSW Archaeology 2019)
Historic heritage - local significance (NSW Archaeology 2019)
National Heritage List

Electricity transmission line
Waterway
Water body
State forest
NPWS estate

Figure 4-16 | Non-Aboriginal heritage items

Data source:
Jacobs 2020, TransGrid, EMM 2020, HHIMS 2020,

4.8 NSW Archaeology, 2019 Historic Cultural Heritage Assessment, Snowy 2.0 Main Works

This assessment was carried out for the Snowy 2.0 Main Works. No additional historic heritage items were identified in the project area to those already recorded and assessed as part of the Snowy 2.0 Exploratory Works (as detailed in the 2019 NSW Archaeology report).

4.9 Archaeological items

Although there is only sporadic evidence, the historical context above demonstrates that European settlers have been living and working within the project area since the early 19th century. The historical record shows that there have been phases of land use, commencing with pastoralism and subsumed by mining, of both copper and gold. The construction of the Snowy River Scheme brought another wave of habitation into the area, although it is likely that it also destroyed much of the earlier heritage.

Although some non-Aboriginal heritage may exist throughout the project area, there are two main areas where the potential is higher: Lobs Hole/Ravine and Bago State Forest. These are described further in the following subsections.

4.9.1 Lobs Hole/Ravine

The types of remains to be found in this area are associated with both the copper mine and the habitation sites in the township that grew up around it.

As noted in **Table 4-9**, as part of their heritage investigations for Snowy 2.0, NSW Archaeology identified 10 potential heritage items within the disturbance area. Of those 10 items, five items also have archaeological potential as outlined in **Table 4-11**.

Table 4-11: Items with archaeological potential within the disturbance area

Item	Item name	Archaeological potential	Archaeological significance
R46	Large excavation	Limited – The purpose of the item is not known and appears to be heavily disturbed. Without understanding its former purpose, assigning significance is difficult. However, test excavations may provide evidence of the purpose of the item and clarify the item's significance	Low
R56	Excavated ditch	Limited – The purpose of this item is unknown, overgrown and disturbed. There is mound of earth and rock on its downhill side.	Low
R107	Building platform	Limited – This item was marked on a 1911 map as being "old mine buildings". All that remains is a building platform, although a scatter of tin was noted on the surface by NSW Archaeology in 2018. Excavations may indicate whether the old mine buildings did once occupy the site, however given the small area (10 m x 4 m) it is uncertain whether the research potential would be of sufficient significance to meet NSW heritage significance criteria.	Low

Item	Item name	Archaeological potential	Archaeological significance
R120	Building platform	Although features on this platform were described as 'vestigial' in the inventory sheets for the Exploratory Report (NSW Archaeology, 2018), the main works report lists the item as being of moderate heritage significance and of high archaeological significance (NSW Archaeology, 2019:368). This later assessment was based on the presence of building material on the site, relatively intact soils and its apparent association with other buildings on "Struggle Street".	High
R128	First school at Lobs Hole	Moderate - Being of wooden construction, the wooden school is unlikely to have left much in the archaeological record, however as it was operational for a period of approximately 16 years, there may be potential for remains of the stone-lined chimney and perhaps items belonging to the teachers and/or children. These have the potential to answer questions regarding the location of the school and life in the early years of the Lobs Hole settlement. However, without excavation to examine the subsurface deposit, this cannot be confirmed.	Moderate – High

It should be noted that the area has been opened to the public for recreational purposes for many years, with accidental and wilful damage occurring since that time. In addition, being open to the harsh and variable climate of the area is likely to have caused deterioration to above-ground heritage items.

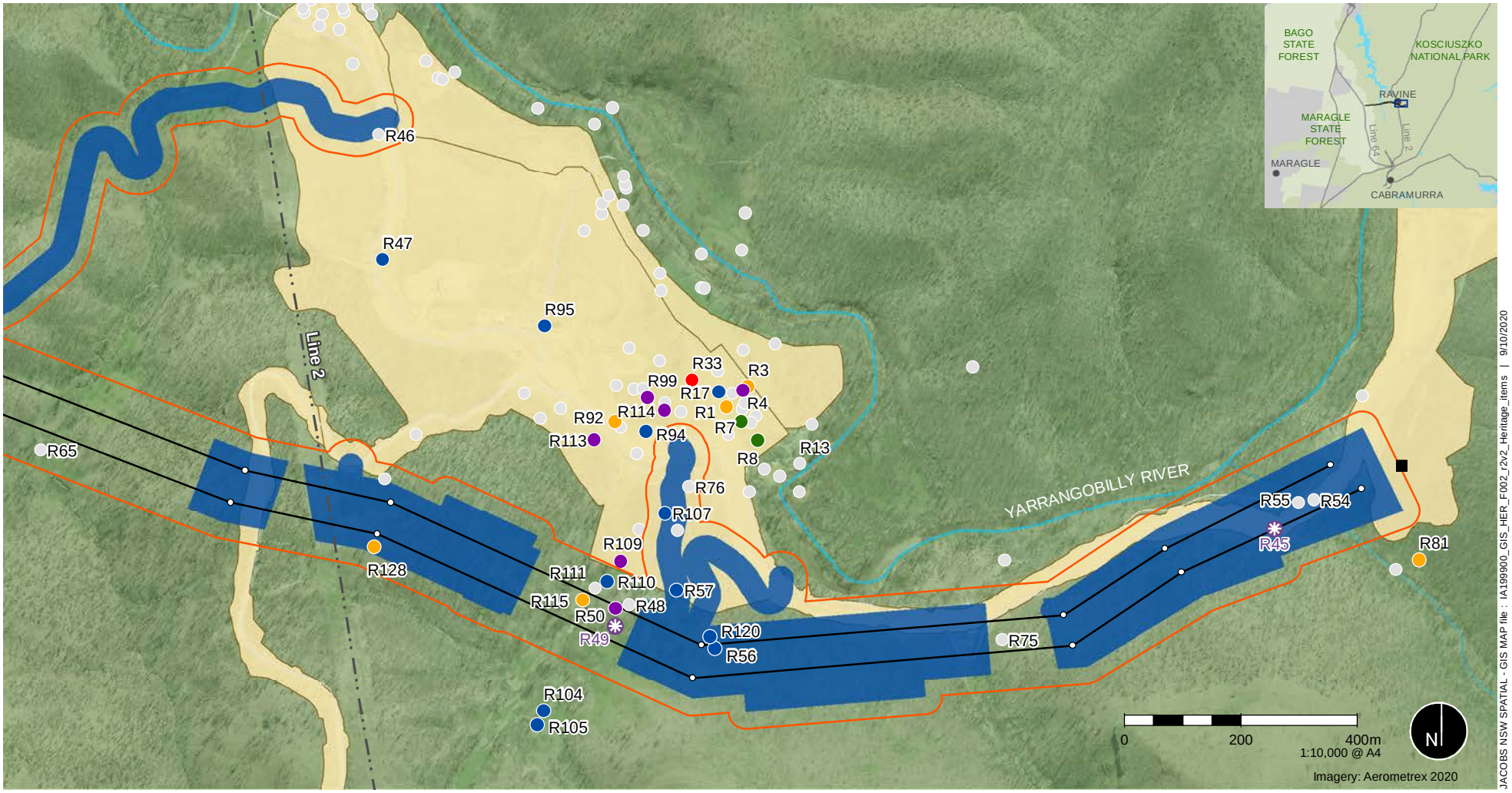
However, given that the Lobs Hole settlement was active for many years, archaeological artefacts may still be present within the study area. Visibility limitations were noted during the site visit due to extensive vegetation, and although the area was heavily affected by bushfires in late 2019 and early 2020, it is still possible that archaeological remains relating to the Lobs Hole settlement may be identified during any earthworks.

4.9.2 Bago State Forest

Part of project area is within the Bago State Forest. The New Maragle goldfields once covered the area to the west of the Tumut River, including parts of the Bago and Maragle State Forests. Descriptions of the mining activities of the New Maragle diggings list installed machinery as well as the areas subject to extraction. As noted in **Table 4-8**, there are items associated with the goldfields listed on the NPWS Section 170 register along Elliott Way. It is therefore possible that some evidence of these workings remains, particularly in more remote pockets of the area.

As a State Forest, this area has also been subject to extensive recreational use. Any equipment connected with the mine may still remain, although it was common at the time for equipment to be sold and reused at other mining sites, as Julius Forsstrom did in purchasing redundant equipment at Kiandra for use at Lobs Hole/Ravine (Boot, 2001:2).

The topography of the New Maragle diggings, however, was part of the deeply incised valley of the Tumut River. Being less accessible, it is possible that more heritage features and archaeological sites may have remained undisturbed. However, it is also more exposed than Ravine, and therefore more susceptible to deterioration.



Project area
Disturbance area
Proposed structure
Proposed transmission line

Snowy 2.0 cable yard
Snowy 2.0 Disturbance footprint

Archaeological potential
High
Moderate
Low-Moderate
Low
Limited
Historic heritage - local significance (NSW Archaeology 2019)
Historic heritage (NSW Archaeology 2019)

Electricity transmission line
Major road
Waterway
NPWS estate

Figure 4-17 | Heritage items with archaeological potential

Data source:
Jacobs 2020, TransGrid, EMM 2019,

5. Site inspection

5.1 Site inspection

A site inspection for non-Aboriginal heritage was undertaken from 20 May 2019 until 24 May 2019 by Jacobs Senior Heritage Consultant, Ildike Pierce, accompanied by Jacobs Senior Archaeologist Andrew Costello and NPWS representative, Glenn Stroud. The purpose of the site inspection was to ground-truth known non-Aboriginal heritage sites and to assess the potential for unrecorded non-Aboriginal heritage items and non-Aboriginal archaeological potential within the disturbance area. The inspection commenced at the western end of the project area, at the site of the proposed substation and concluded at Lobs Hole/ Ravine.

5.2 Methodology

Following a desktop assessment of known European heritage items and archaeological potential, a targeted inspection of all known heritage items within the disturbance area was undertaken to assess the likelihood and, if relevant, the extent of impact on those items. Potential areas for unrecorded non-Aboriginal heritage items and non-Aboriginal archaeological potential within the disturbance area was also undertaken. All identified heritage items were assessed by NSW Archaeology during their investigations for Snowy 2.0 and all are located in the Lobs Hole area. All of these potential heritage items were associated with the township of Lobs Hole (later known as Ravine) and its copper mine.

Table 5-1 lists the 10 heritage items identified within the disturbance area by desktop research. These are also shown on **Figure 4-17**.

Table 5-1: Potential non-Aboriginal heritage items within disturbance area

ID	Site name	Description (NSW Archaeology 2018: 131-149)	Complex
R45	Lobs Hole Copper Mine Water Race	Extends from an unspecified source on Wallaces Creek (believed to be near junction with Stable Creek) to Lobs Hole Copper Mine. It is on south side of Mine Trail Road and mostly intact until it becomes truncated by the existing road at grid ref: 627406.6038061. It appears that Mine Trail Road has been built on the race from that point, and west to where the race would have joined the steel pipe (R74) to take the water down eastwards to the mine.	Lobs Hole Copper Mine
R46	Large excavation	Large pit up to four metres deep, at least 20 metres across and 40 metres long, along a north-south axis. Function unknown.	Uncertain
R54	Site of bridge	At end of Mine Trail probably Snowy Mountains Authority	-
R55	Brick hearth	Possibly Snowy Mountains Authority (SMA) or shire picnic site at end of Mine Trail; machine pressed bricks: early 20th century and other.	-
R56	Excavated ditch	7m x 1.5w x 1.4 deep; function unknown. Earth and rock mounded on downhill side.	Unknown
R57	Old road alignment	Old cut and benched road alignment. Aligned 30°/210°, measures two metres wide.	“Struggle Street”
R106	Old road	Easterly extension of old road	“Struggle Street”
R107	Building platform	Level platform, 10 metres long and four metres wide, aligned north-south on contour with a scatter of tin. In the same location as notation of “old mine buildings” on 1911 map of Ravine (see **Figure 4-9**).	Struggle Street

ID	Site name	Description (NSW Archaeology 2018: 131-149)	Complex
R120	Building platform	Building platform with short (2 metres long) single course of cobbles on north side. No obvious cut and fill.	"Struggle Street"
R128	First school	Grid ref. nominal.	Ravine township

5.3 Results

No additional items were identified within the disturbance area during the site inspection. Of the 10 items identified in **Table 5-1**, only five items were identified by ground-truthing during the site inspection. The steep terrain and dense vegetation of the project area led to limited accessibility in some areas. Additionally, early investigative works relating to Snowy 2.0 were also underway at the time of the site inspection, preventing access in some areas. Photos of the items visited during the site inspection are provided in **Table 5-2**. The items that were not able to be re-located by ground- truthing are listed in **Table 5-3**).

Table 5-2: Non-Aboriginal heritage items identified within the disturbance area during the field survey

Item identifier	Location	Image
R45 (Lobs Hole Copper Mine Water Race)	Between the first two sets of structures at the eastern end of the project (under overgrown vegetation). (Image: Jacobs, 2019).	
R54 (Site of bridge)	Far eastern extent of the disturbance area and associated with Wallaces Creek, Ravine (Image: Jacobs, 2019).	

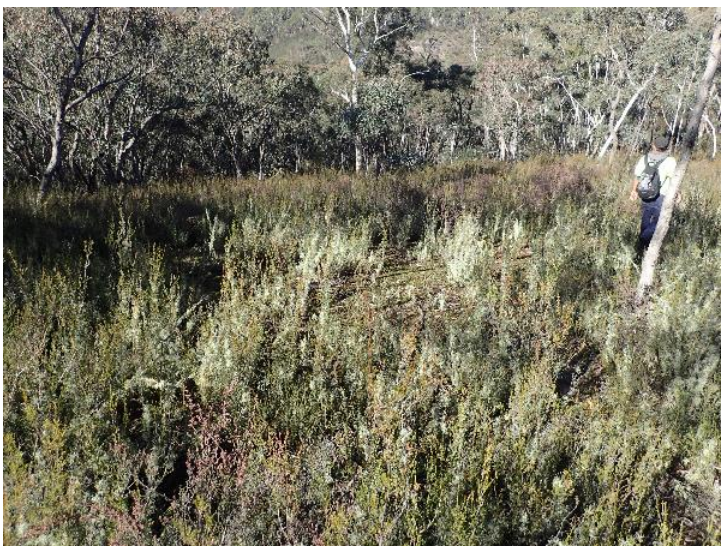
Item identifier	Location	Image
R55 (Brick hearth)	(Image: Jacobs, 2019).	
R120 (Building platform)	(Image: Jacobs, 2019).	
R128 (First School)	(Image: Jacobs, 2019).	

Table 5-3: Non-Aboriginal heritage items not located during the field survey

Identifier	Name	Location
R46	Large excavation	Commencement of proposed track, off Lobs Hole Ravine Road
R56	Excavated ditch	20 metres east of the fourth set of structures from the eastern end of the project
R57	Old road alignment	100 metres north west of the fourth set of structures from the eastern end of the project
R106	Old road	200 metres north of the fourth set of structures from the eastern end of the project
R107	Building platform	230 metres north of the fourth set of structures from the eastern end of the project

5.4 Summary

The site inspection noted that the only area within the project area with a high potential for non-Aboriginal heritage items was in the Lobs Hole/Ravine area (project area east). A total of 10 heritage items were previously identified by NSW Archaeology and mapped within the disturbance area of the project area east, however of those only five were able to be ground-truthed.

The steep terrain and dense vegetation of the project area led to limited accessibility in some areas. Early investigative works relating to Snowy 2.0 were also underway at the time of the site inspection, preventing access in some areas. It is therefore possible that some items relating to mining infrastructure and, less likely, pastoral activity in the form of huts/sheds and/or their sites, may remain within the project area. There is also a limited possibility that items relating to the construction of the Snowy Mountains Scheme in the 1950s remain in some areas within the project area, obscured by dense vegetation. The terrain, remote location and minimal disturbances may have conserved some of these items, although the harsh climate may also have aided in deterioration and/or destruction of any organic or metal items. Overall, whilst some items of non-Aboriginal heritage may remain in the areas not surveyed, it is considered a low likelihood that they do.

6. Significance assessment

6.1 National Heritage Significance Criteria

As noted in **Section 4.6.1**, there are two nationally significant heritage items within the project area, being the Australian Alps National Parks and Reserves, and the Snowy Mountains Scheme. In order to establish whether any the project will have a significant impact on the National heritage values, the following sections set out the values of both of these items. The heritage significance of the items has been assessed against the National Heritage Significance Criteria (see **Table 6-1**). These values must be taken into account when assessing the impact of the project on these items.

Table 6-1: National Heritage Significance Criteria

Criterion	Values
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: ▪ a class of Australia's natural or cultural places; or ▪ 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.

6.1.1 Australian Alps National Parks and Reserves

This significance assessment has been reproduced from the NHL as presented in **Table 6-2**.

Table 6-2: Australian Alps National Parks and Reserves significance assessment

Criterion	Values
Criterion A – Events, processes	The values listed under this criterion largely relate to the natural environment, such as glacial/periglacial features, fossils, karst and biological heritage. However, historic cultural events, such as the moth feasts, transhumant grazing, scientific research and water harvesting, were known to occur within the boundaries of the Park.
Criterion B – Rarity	The item satisfies this criterion based on the unique natural environment.
Criterion D – Principal characteristics of a class	The item is nationally significant because of the use of the mountains for grazing during the pastoral phase of post-contact human occupation. The north east of KNP was especially noted for its importance.
Criterion E - Aesthetic characteristics	The item satisfies this criterion mostly because of its natural beauty, however the landscapes of huts and the effect on human artistic output is also mentioned.
Criterion G – Social value	The item satisfies this criterion based on its importance to the Australian people as the only alpine region in the country. It has also been the setting for many favourite Australian poems and novels, such as Banjo Paterson's *Man from Snowy River*, and Elyne Mitchell's *Silver Brumby* series. The mountain huts are also assessed as being of high social value.
Criterion H – Significant people	There are a number of significant people attached to the item, such as Baron Ferdinand von Mueller (botany), Eugen von Guerard (art), Banjo Paterson (author) and Elyne Mitchell (author).

6.1.2 Snowy Mountains Scheme

This significance assessment has been reproduced from the NHL as presented in **Table 6-3**.

Table 6-3: Snowy Mountains Scheme significance assessment

Criterion	Values
Criterion A – Events, processes	This item was one of the biggest post-war infrastructure projects in the country. It has become regarded as a symbol of Australia's place as a multicultural, independent and resourceful country.
Criterion B – Rarity	The item fulfils this criterion because of the size and scale of the engineering involved in the planning and delivery of the project. It incorporated a number of innovative features, such as underground power stations, enormous earth-filled dams, and two examples of pumped storage capacity, using off-peak power, which are the only two examples in Australia.
Criterion D – Principal characteristics of a class	The item is nationally significant as it is a continuously operating, intact hydro-electric scheme. It is also the largest and most complex of its kind in the country.
Criterion F – Creative or technical achievement	The item is considered one of the engineering wonders of the world, featuring technical achievement and innovation. It therefore satisfies this criterion.
Criterion G – Social value	The item satisfies this criterion based on its importance to the construction, surveying, hydrology, electrical and civil engineering industries.
Criterion H – Significant people	There are a number of significant people attached to the item, such as Sir William Hudson, called the "father of the Snowy" and Olav Olsen, the Chief Investigating Engineer for the project.

6.2 NSW Heritage Significance Criteria

Heritage significance in NSW is assessed using the Heritage Significance Criteria (**Table 6-4**), which are based on principles laid down in the Burra Charter. To be considered as having heritage significance, an item must fulfil at least one of the following heritage significance criteria.

Table 6-4: NSW Heritage Significance Criteria

Criterion	Short title
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)	Historical significance
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)	Associative significance
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)	Creative/technical significance
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	Social significance
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)	Research potential
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)	Rarity
g) An item is important in demonstrating the principal characteristics of a class of NSW's: ▪ Cultural or natural places; or ▪ Cultural or natural environments (Or a class of the local area's: ▪ Cultural or natural places; or ▪ Cultural or natural environments.)	Representativeness

6.3 Lobs Hole/Ravine

In 2018, NSW Archaeology undertook an assessment of non-Aboriginal heritage within the larger Snowy 2.0 Exploratory Works area, where the study area overlaps the project area in parts of the Lobs Hole/Ravine township. Overall, NSW Archaeology identified 127 items within their project area, of which 16 were assessed as having local heritage significance. NSW Archaeology also note that despite each item not meeting the threshold of heritage significance to be listed on the SHR, they are all nonetheless of interest and collectively of value to the local community and individuals with ties to the local area (NSW Archaeology, 2018:4).

Of the16 items assessed as having heritage significance in the Snowy 2.0 study area, only one of those items is located within the disturbance area for this project: Lobs Hole Copper Mine Water Race (see **Figure 4-16**).

The significance of the items at Lobs Hole/Ravine are assessed below. As they are within the KNP and managed by the NPWS, they are assessed under the NSW heritage significance criteria, as described in the following subsection.

6.3.1 Lobs Hole Copper Mine Water Race

The significance of the Lobs Hole Copper Mine Water Race was assessed by NSW Archaeology as part of Snowy 2.0 Exploratory Works (NSW Archaeology, 2018:332). The assessment in **Table 6-5** is based on the assessment by NSW Archaeology for this item which is within the disturbance area for this project.

Table 6-5: Significance assessment of Lobs Hole Copper Mine Water Race (NSW Archaeology 2018)

Criterion	Values
a) Historical significance	The water race for the Lobs Hole Copper Mine was constructed in 1900 as part of the mine's infrastructure. Its purpose was to channel water to the Pelton water wheel to dewater the mine. It is therefore part of the mine's essential functions and of historical significance. The water race **satisfies** this criterion.
b) Associative significance	The race was built by the Lobs Hole Copper Mine, of whom Forsstrom and Reeckman are strongly associated. As a component of the Lobs Hole Copper Mine infrastructure, this item therefore has a strong or special association with the life or works of a people of historical importance to the local area. The item is assessed **to meet** the threshold against criterion b.
c) Technical aesthetic significance	The aesthetic characteristics, creative and technical achievement associated with the water channel is unremarkable. The item is assessed **to not meet** the threshold against criterion c.
d) Social significance	This item is largely unknown and cannot be classified as having a strong or special association with a community or cultural group. There are no known social associations for this item. The item is assessed **to not meet** the threshold against criterion d.
e) Research potential	Archaeological deposits are not expected to occur with this item. Therefore, there is no reason to assume that the item has potential to yield information that would contribute to tan understanding of local or NSW history. The item is assessed **to not meet** the threshold against criterion e.
f) Rarity	Water races are common in KNP and the wider local area. This item cannot be classified as uncommon or rare. The item is assessed **to not meet** the threshold against criterion f.
g) Representativeness	The item cannot be classified as important in representing a particular class or theme. The item is assessed **to not meet** the threshold against criterion g.

Statement of significance

The Lobs Hole Copper Mine is an important component of the mining history at Lobs Hole. It has a strong association with Reeckmann and Forsstrom, who were important in developing mining at Lobs Hole and as central figures in the Lobs Hole Copper Mining Company. The Lobs Hole Copper Mine Water Race is assessed to be of local significance against criteria a and b.

6.4 Significance of heritage items outside of disturbance area

As noted in **Section 4.7** , in addition to the 10 items within the disturbance area, there are also 10 heritage items located in the project area but outside the disturbance area. Of those 10 items , only one of those items was assessed by NSW Archaeology as having heritage significance, being the circular stone feature (R49) (NSW Archaeology 2018:242-463)**.**

6.5 Summary

The Australian Alps National Parks and Reserves and the Snowy Mountain Scheme are both items listed on the NHL, which recognises heritage items of national importance. Although historical resources indicate an early settlement of the Snowy Mountains area, remaining evidence is confined to the lower elevations such as Lobs Hole/Ravine former township within the KNP. KNP, as part of the Australian Alps National Parks and Reserves, is itself part of a national heritage item.

Other unregistered heritage items relate to the early mining pursuits at Lobs Hole/Ravine. Assessments undertaken by NSW Archaeology partially covering the project area identified 16 items of heritage significance. As noted in **Section 4.7,** there are 10 items within the disturbance area that were identified by NSW Archaeology (2018), however of those only one, Lobs Hole Copper Mine Water Race (R45), within the disturbance area was assessed as being of heritage significance (local). A further item with heritage significance, circular stone feature (R49), is located within the project area but outside the disturbance area.

Accordingly, the impact from the project will be assessed for the following items only (see **Section 7**):

- Australian National Parks and Reserves
- Snowy Mountain Scheme
- Lobs Hole Copper Mine Water Race.

7. Impact assessment

In order to consistently identify the potential impact of the project, the impact levels used in this assessment are defined in **Table 7-1**. These levels have been defined based on the scale and permanence of the potential impact to the heritage items within the disturbance area.

Table 7-1: Definitions of level of impact to heritage items

Level of impact	Definition
Neutral	Actions or activities that would result in a very minor change or impact to the heritage item. Generally, no mitigation is required.
Minor	Actions or activities that would result in a minor alteration to the heritage item. Generally, these actions can be mitigated.
Moderate	Actions or activities that would result in a modification to the heritage item, including its setting or landscape. These impacts may be partially mitigated.
Major	Actions or activities that would result in a long-term or otherwise substantial modification to a heritage item, its setting or landscape. These actions cannot be fully mitigated.

7.1 Summary of impacts

As noted in **Section 2**, the key components of the project are:

- A new substation located within Bago State Forest and adjacent to TransGrid's existing Line 64
- Two 330kV double-circuit transmission lines from the Snowy 2.0 generator site to the new substation of about nine kilometres long with approximately 21 pairs of structures
- Short transmission line connection between the substation and Line 64
- New and upgraded access tracks
- Ancillary infrastructure.

All of the above components of the project would require ground disturbance and vegetation clearance, which would generate potential impacts on non-Aboriginal heritage items. The following sections assess the level of impact to the heritage items within the disturbance area.

7.2 Assessment of impacts

Following the desktop assessment and site inspection, three items of non-Aboriginal heritage have the potential to be impacted by the project; two of national significance and one of local significance:

- Australian Alps National Parks and Reserves (National)
- Snowy Mountains Scheme (National)
- Lobs Hole Copper Mine Water Race (Local) (R45).

The potential impact of the project on the significance of each of these items is assessed in the following subsections.

7.2.1 National heritage

The Australian Alps National Parks and Reserves and the Snowy Mountains Scheme are both items of National significance and listed on the NHL. As such, the governing legislation is the EPBC Act. Section 15B (1) of that Act states:

> *A constitutional corporation, the Commonwealth or a Commonwealth agency must not take an action that has, will have or is likely to have a significant impact on the National Heritage values of a National Heritage place.*

To assess the impacts of the project on nationally significant items, the Act requires that the assessment evaluates the following elements:

- The impacts of an action AND
- Whether that action will, will have or is likely to cause impact AND
- Whether those impacts will cause a *significant* impact to the listed heritage values of the item.

Section 523 of the EPBC Act defines "action/s" as including a project, a development, an undertaking, an activity or series of activities and an alteration of any of the foregoing.

In this case, the "action" is the project (as described in **Section 2.1**) to support Snowy 2.0. These activities comply with the EPBC Act definition of an action.

According to Significant Impact Guidelines (Department of Environment 2013:19) a significant impact on a National Heritage place is one which causes:

- 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.

The guidelines note that in determining whether an action will cause a *significant* impact is dependent upon a number of factors, such as:

> *The sensitivity, value and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.* (Department of Environment 2013:2).

7.2.1.1 Australian Alps National Parks and Reserves

The Australian Alps National Parks and Reserves is listed on the NHL on the basis of its natural environment (events/processes, rarity), the principal characteristics of a mountainous area used for pastoral purposes, (particularly in the north east of the KNP), the aesthetics of its natural beauty, the social value of the alpine regions in the country (for example, Banjo Paterson's *Man from Snowy River* and Elyne Mitchell's *Silver Brumby* series), and its association with significant people, including Paterson and Mitchell. The curtilage of the item covers the extent of the project area within KNP. The remaining structures and substation are outside of the curtilage of this item.

The primary heritage values of the item are connected to its natural beauty. Most of the item is natural bushland with few intrusions by manmade objects as shown in **Photo 7-1** to **Photo 7-3**. Note, these images were taken prior to the bushfires of late 2019 and early 2020.

Photo 7-1: View north toward project area from Wallace Creek Lookout, KNP (Jacobs, 2018).

Photo 7-2: View north towards Lobs Hole from an access track leading from Ravine Road. Note existing transmission line (TransGrid Line 2) in centre frame (Jacobs, 2018).

Photo 7-3: Existing transmission structure viewed from ground level at Lobs Hole, with ruins of former Washington Hotel in foreground (Jacobs, 2018).

Direct physical impacts to KNP from the project would primarily result from vegetation clearing and ground disturbance associated with the:

- Establishment of the transmission line and its transmission corridor ranging in width from approximately 120 metres to 200 metres wide over a distance of about nine kilometres
- Construction of access tracks and the helipad site
- Construction of the transmission structures
- Establishment of ancillary construction features including tensioning and pulling sites for conductor and earth wire stringing, construction benches, site compounds, and equipment laydown areas.

It is estimated that approximately 100 hectares of KNP would be directly affected by the project. Impacts would include:

- Clearing of the transmission corridor
- Construction of the transmission structures
- Access tracks to allow for the movement of plant, machinery and construction staff
- Infrastructure to allow for construction, including:
  - a helicopter landing pad
  - construction benches
  - site compounds
  - laydown areas.

The principal indirect impact would be a visual impact caused by the clearing of the transmission corridor, access tracks and transmission structures introduced into the landscape. **Photo 7-4** shows an existing cleared transmission line easement within KNP, while **Photo 7-5** shows a view taken from the Lobs Hole/Ravine Road of an existing TransGrid transmission line which generally run north-south through the Lobs Hole area.

Photo 7-4: Existing corridor and transmission structures in KNP (Jacobs, 2018).

Photo 7-5: Photomontage of the transmission structures

In terms of the overall impact, it is unlikely that the project would cause a significant negative impact to the heritage significance of the Australian Alps National Parks and Reserves. However, the project would have a physical impact to vegetation communities within the project area, which in turn has the potential to adversely affect the item's natural history (criterion A), rare plants (criterion B) and the aesthetic values (criterion E). Given the size of the item, however, this adverse impact is assessed to be minor.

The item (Australian Alps National Parks and Reserves) is made up of 11 national parks and covers approximately 1,653,180 hectares. The size of the item suggests that there is ample scope for change within its curtilage provided that its heritage values are not diminished. Part of the project area is within the KNP, which covers approximately 690,000 hectares. Within that area, the total project area is approximately 195 hectares, representing 0.028 per cent of the KNP. The disturbance area which would be directly impacted by the construction is about 103 hectares and includes transmission corridor. It is considered that the values

engendered by criterion A would not be adversely impacted, given the project's relatively small footprint within the larger curtilage of the item.

In relation to the rarity values, these relate to the landscape, the glacial/periglacial features, fossils, Alpine/subalpine ecological communities and the Eucalypt floral community. In relation to the landscape, the proposed transmission structures would cross the saddles and ridge lines similar to that depicted in **Photo 7-5**. As that image demonstrates, against the dense surrounding vegetation the transmission structures recede in prominence. At the time of this assessment, it was considered that they would have little potential to cause an impact to the aesthetic values of the item, particularly given the size and density of the vegetation and remoteness of location. Since that time, catastrophic bushfires have resulted in substantial alterations to the vegetation. As a result of this, the transmission connection will be prominent from some areas of the park and public viewpoints, however, this prominence is temporary. Once the bush has regenerated, this prominence will diminish. Any impact to the aesthetic value, therefore, is temporary.

In relation to the glacial/periglacial features and fossils, there are no known glacial/periglacial features, (such as fossils or limestone karst areas) that would be impacted by the project. In relation to the Alpine/subalpine ecological communities and Eucalypt flora communities, these impacts are assessed in the Snowy 2.0 Transmission Connection Project – Biodiversity Development Assessment Report (BDAR) (Jacobs, 2020).

The project is adjacent to the existing Snowy Mountains Scheme works and represent a relatively minor addition to these works and are of an identical character to existing infrastructure. Using the *Significant Impact Guidelines for National Heritage Places* (Department of Environment 2013*)*, it is concluded that:

- None of the heritage values will be lost as a result of the project
- None of the heritage values will be degraded or damaged as a result of the project
- None of the National heritage values will be notably altered, modified, obscured or diminished as a result of the project.

It is concluded further that any impacts of the project would not be considered significant enough so as to violate s15B of the EPBC Act.

7.2.1.2 Snowy Mountain Scheme

The Snowy Mountains Scheme covers much of the same curtilage as the Australian Alps National Parks and Reserves. While the dominant heritage significance of the Australian Alps National Parks and Reserves is anchored in its natural beauty, the heritage significance of the Snowy Mountain Scheme is firmly attached to the ambitious post-war hydro-electric scheme, known variously as the Snowy Hydro, Snowy Hydro-Electric Scheme and Snowy Mountain Scheme.

The Snowy Mountains Scheme is listed on the NHL for its history (Criterion A, also known as "events and processes"), its rarity (Criterion B), its display of the principal characteristics of such a place (Criterion D), its creative and technical achievement (Criterion F), its social value (Criterion G) and its association with significant people (Criterion H). The project has the potential to impact its rarity and its principal characteristics. Any significant impact to these two criteria may subsequently cause impact to its social value.

In relation to the heritage value of rarity, the scheme as a whole is considered rare, however several of its components are also considered rare, being the underground power stations, large earth-filled dams, and two examples of pumped storage capacity, which uses off-peak power to top up supply reservoirs. Neither the Snowy Mountains Scheme as a whole or any of these rare components would be impacted by the project.

In relation to the principal characteristics, the National heritage listing describes it as:

> *…a currently operating, intact hydro-electric scheme that is the largest and most complex example of such schemes in Australia… The Snowy Mountains Scheme retains all the characteristics of a complex hydro-electric and irrigation scheme with a very high degree of integrity. The technology and features that were used to construct the Snowy Mountains Scheme demonstrate the principal characteristics of a dual hydro-electric and irrigation scheme, with each component an excellent and representative example of its particular type.*

The purpose of Snowy 2.0 is to augment the existing hydro scheme, not to replace it. As such, the project would not physically affect any existing components or heritage attributes of the existing scheme.

It is therefore concluded that:

- None of the heritage values would be lost as a result of the project
- None of the heritage values would be degraded or damaged as a result of the project, and
- None of the National heritage values would be notably altered, modified, obscured or diminished as a result of the project.

The project therefore does not represent a non-compliance of s15B of the EPBC Act.

7.2.2 NSW heritage

As noted in **Section 4.7,** individual heritage items are assessed under the NSW Heritage Significance Criteria. Lobs Hole Copper Mine Water Race (R45) is assessed as being of local heritage significance within the project area. The Heritage NSW guideline, *Statements of Heritage Impact* (Heritage Branch, 2002), suggests a number of questions that need to be answered when assessing the impact of a new development adjacent to a heritage item, the most relevant of which are addressed below.

7.2.2.1 R45 – Lobs Hole Copper Mine Water Race

During the Snowy 2.0 Exploratory Works, this item was archivally recorded and fenced off for its protection. The heritage assessment for the Snowy 2.0 Main Works indicated that no additional impact was expected as part of the main works construction phase.

For the purposes of this assessment, this item is located between the first two sets of structures at the eastern end of the project (see Figure 7-1) within the disturbance area. This item is not within the vicinity of a structure sites, however the construction actives would be occurring in and around this location.

While the construction of the structures is unlikely to impact this item, it is within the disturbance area. Construction activities are likely to result in moderate or major impacts to the item, depending on construction methodologies employed.

In order to meet operating requirements for the transmission line, at worst case the entire width of land must be cleared of vegetation within the disturbance area at this location. As identified in **Section 5.2**, the item is located under thick vegetation. Vegetation removal may have a detrimental effect of the stability of the item, which will only be identified once it occurs.

Table 7-2: Assessment of impact for Lobs Hole Copper Mine Water Race (R45)

Questions	Assessment
How is the impact of the new development on the heritage significance of the item or area to be minimised?	The project was designed to avoid the principal items of non-Aboriginal heritage within the project area, in particular, items in the former township of Ravine. Following a non-Aboriginal heritage assessment by NSW Archaeology in 2018 for Snowy 2.0, the project was moved to avoid as many of the identified items as possible. Every effort has been made to ensure that impact to the item will be avoided or minimised where possible, however, impact may be unavoidable once the final construction methodology is known. If impact cannot be avoided, appropriate mitigations will be employed to address this.
Why is the new development required to be adjacent to a new heritage item?	The item is located underneath the span between two transmission structures and therefore would not be impacted by their construction. However, it is within the transmission corridor, where vegetation will be cleared.

Questions	Assessment
How does the new development affect views to, and from, the heritage item? What has been done to minimise	At the time of the site survey, the water race was mostly obscured by excess vegetation. It was assessed that the views to and from remnant infrastructure associated with the Lobs Hole Copper Mine would not be impacted by the project. However, since the survey, NSW was subject to devastating bushfires, which destroyed the majority of the vegetation in this area. Aa a result, views to and from this item will be moderately impacted until the vegetation regrows.

Based on the location of 10 sites within the disturbance area, accidental damage during construction is possible from the establishment of new access tracks, structure footings and associated crane pads and works area. It is recommended that for all remaining heritage items are fenced off during construction and their locations communicated to all staff prior to the commencement of the project. During detailed design, efforts must be implemented to avoid impacts where appropriate. Any sites or items, where impacts could not be avoided through the siting of project infrastructure and ancillary works, would be archived in accordance with an approved archival recording program and subject to archaeological excavation, where appropriate.

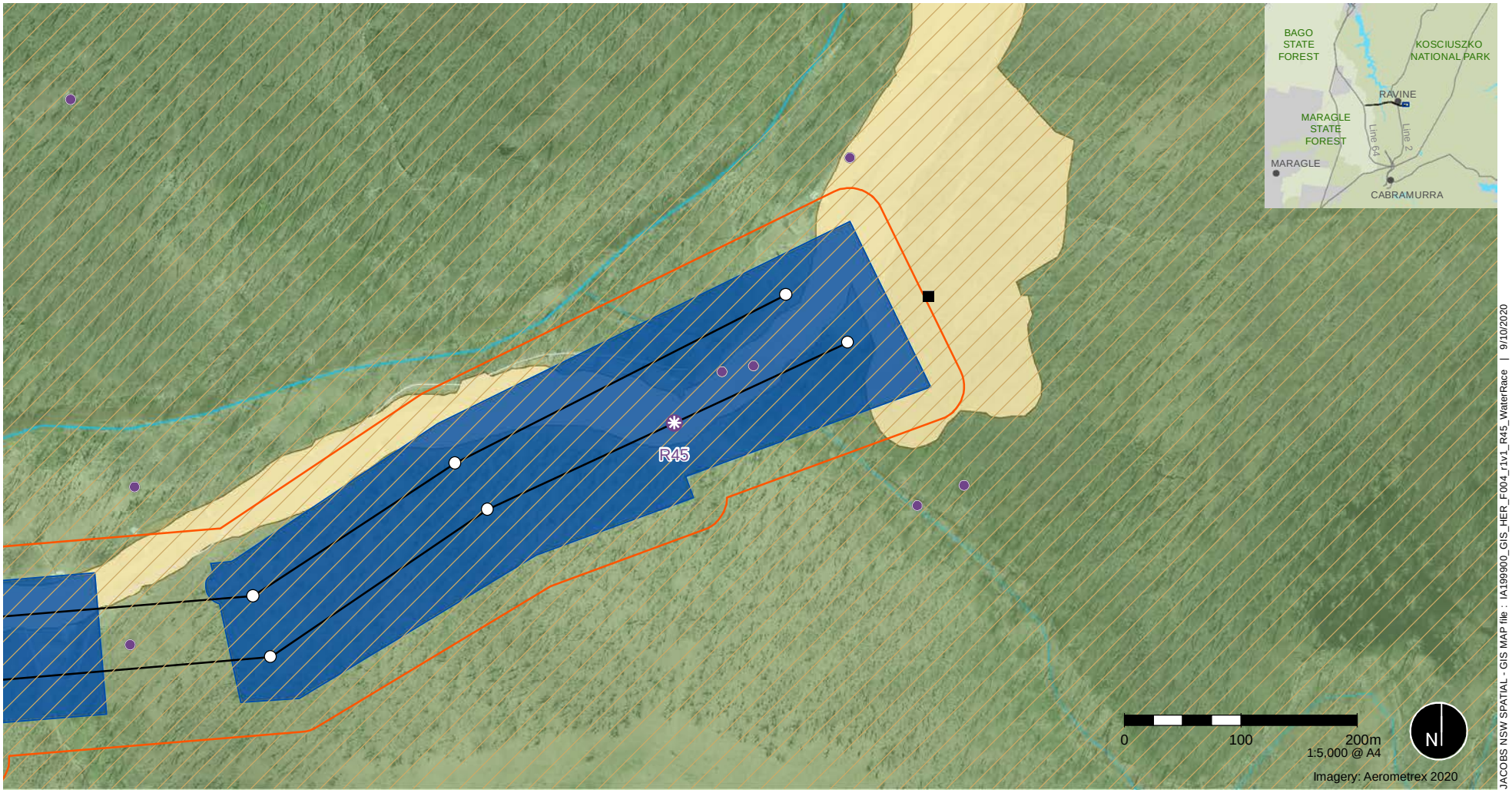


Figure 7-1 | Location of Lobs Hole Copper Mine Water Race

Data source:
Jacobs 2020, TransGrid, EMM 2019,
© Department Finance, Services and Innovation 2018

7.2.3 Archaeological items

As noted in **Table 4-11**, there are five sites of archaeological potential located within the disturbance area. Four (R46, R56, R107, R120) are assessed as having limited archaeological potential and one (R128) is of moderate potential. As sites with archaeological potential, these have the potential to be impacted by ground disturbance activities only.

7.2.3.1 R46 – Large excavation

This site was archivally recorded as part of the Snowy 2.0 Exploratory Works.

This site is located within the alignment of the proposed new track leading north west from Lobs Hole Ravine Road. As it is within the new access track, the site is expected to be completely disturbed.

However, as it is of limited archaeological potential and has been archivally recorded under the Snowy 2.0 Exploratory Works, no further investigation is required. It is recommended, however, that unexpected finds protocols be followed should significant archaeological deposits be uncovered during construction.

7.2.3.2 R56 – Excavated ditch

R56 is located to the east of the fourth set of structures and would likely be impacted by its construction. The impact to this site is likely to be total. However, as it is of limited archaeological potential, no further investigation is required. It is recommended, however, that unexpected finds protocols be followed should significant archaeological deposits be uncovered during construction.

7.2.3.3 R107 – Building platform

This feature is located within the corridor of an access track leading to the fourth set of structures. The impact to this site is likely to be total. It is therefore recommended that test excavations be undertaken prior to construction. While it was previously assessed as being of limited archaeological potential (NSW Archaeology, 2018), should these test excavations indicate a site of moderate, high or outstanding significance, methods of avoiding impact should be explored. If no methods can be identified, appropriate mitigation must be undertaken, including archaeological salvage of the site.

7.2.3.4 R120 – Building platform

This feature is located to the east of transmission fourth set of structures and would likely be completely disturbed. It is assessed as being of high archaeological potential. It is therefore recommended that test excavations be undertaken prior to construction. Should these test excavations indicate a site of moderate, high or outstanding significance, methods of avoiding impact should be explored. If no methods can be identified, appropriate mitigation must be undertaken, including archaeological salvage of the site.

7.2.3.5 R128 – First school site

This site is located to the south of fifth set of structures and would likely be completely impacted by the project. It is therefore recommended that test excavations be undertaken prior to construction. Should these test excavations indicate a site of moderate, high or outstanding significance, methods of avoiding impact should be explored. If no methods can be identified, appropriate mitigation must be undertaken, including archaeological salvage of the site.

7.3 Management and mitigation measures

A Historic and Natural Heritage Management Plan would be prepared for the project, which clearly outlines the extent of impact to each recorded historic heritage item within the disturbance area and potential impacts to those sites located within the broader project area. The plan should clearly outline measures for their protection (where applicable) and details of further investigation and archaeological archiving archival recording where appropriate.

Table 7-3 incorporates the impact assessment of all ten sites within the disturbance area and the recommendations for their management for inclusion in the HNHMP.

Table 7-3: Management recommendations

Item	Heritage significance	Archaeological potential	Impacted by Snowy 2.0	Degree of impact by this project	HNHMP Management Measures for Snowy 2.0	Management measures for this project
Sites within the disturbance area						
R45	Local	No	Yes (Partial)	Moderate to major	Archival recording, limit impacts as much as possible	Protective fencing, archival recording and archaeological excavation (test and salvage, if warranted)
R46	No	Yes	Yes	Major	Archival recording	Archival recording has occurred, no further recommendations
R54	No	No	Yes	Neutral to minor	Archival recording	As recommended in HNHMP if not already undertaken*
R55	No	No	Yes	Neutral to minor	Archival recording	As recommended in HNHMP if not already undertaken*
R56	No	Yes	No	Major	Archival recording	Archival recording has occurred, no further recommendations
R57	No	No	No	Neutral to minor	Archival recording	As recommended in HNHMP if not already undertaken*
R106	No	No	No	Neutral to minor	Archival recording	As recommended in HNHMP if not already undertaken*
R107	No	Yes	Potential	Major	Archival recording, test excavations and salvage (if warranted).	Archival recording and archaeological excavation (test and salvage, if warranted)
R120	No	Yes	No	Major	Archival recording	Archival recording and archaeological excavation (test and salvage, if warranted)
R128	No	Yes	No	Major	Archival recording	Archival recording and archaeological excavation (test and salvage, if warranted)

*Archival recording may have been undertaken. Jacobs are obtaining confirmation of this with Archaeology NSW. Once it has been identified if archival recording has already occurred, no further actions are recommended, unless specified.

As can be seen from **Table 7-3**, of the ten heritage items within the disturbance area, four of those are also impacted by Snowy 2.0. In relation to R45, this site was within an area of impact during Snowy 2.0 Exploratory Works. Jacobs has made numerous attempts to identify if R45 (Lobs Hole Copper Mine Water Race) has been disturbed but has not been successful in obtaining this information to date. We will continue to pursue this information. Once it has been identified if disturbance has already occurred, this management and mitigation will apply to any undisturbed elements.

7.4 Summary

It is concluded that the project works represent a relatively small footprint and would not impact the existing heritage values of either the Australian Alps National Parks and Reserves or the Snowy Mountains Scheme. Standard construction management measures during construction, such as limiting vegetation clearing, and undertaking rehabilitation of disturbed areas, that are recommended in the BDAR (Jacobs, 2020) and EIS would help to minimise potential impacts on the heritage values of these important places.

The ten items in the disturbance area would be directly impacted and include R45, R46, R54, R55, R56, R57, R106, R107, R120 and R128. Of these ten items, one has heritage significance (R45) and five have archaeological potential (R46R56, R107, R120 and R128). R45, the Lobs Hole copper Mine Race, is considered to be of local heritage significance and mitigation measures have been provided in **Section 7.3** Of the five items with archaeological potential, none of these have archaeological significance.

There are an additional 10 items located within the project area, but outside the disturbance area. Of these, one is of local significance (Circular Stone Feature (R49)). Though these items will not be impacted by the project, management measures have been proposed to minimise potential impacts.

While other non-Aboriginal heritage items and areas of archaeological potential may be present within the project area, the steep topography, density of vegetation and works associated with Snowy 2.0 prevented a thorough site inspection. Although unlikely, there is a low potential for additional non-Aboriginal heritage items and areas of archaeological potential to be present in the project area, most likely in the Lobs Hole/Ravine locality. Unexpected finds protocols should be followed for the entire disturbance area.

8. Conclusions and recommendations

8.1 Conclusion

The project is located in KNP and Bago State Forest. The majority of the project falls within the boundaries of the Australian Alps National Parks and Reserves NHL area and the Snowy Mountains Scheme NHL area. The project is not expected to have a significant impact on the heritage values of these important places.

A desktop assessment, literature review, historical research and a site inspection concluded that non-Aboriginal heritage items and areas of archaeological potential identified in the project area were primarily located in the Lobs Hole/Ravine locality (project area east). The identified items are connected with the locality's prior uses as a pastoral station, copper mine and residential area. One heritage item (R45) and five archaeological sites would potentially be impacted by the construction of the project. Management and mitigation measures have been proposed to reduce the potential impacts on these sites and the values of the project area.

It is concluded that while there may be impacts to the heritage items as a result of the project, these would be minor and would not have an adverse impact on any item. Nonetheless, several actions have been identified to mitigate any harm that may occur. These include avoidance where possible, archival recording and archaeological excavation.

The following specific and general recommendations are made regarding the management of non-Aboriginal heritage within the project area.

8.2 Recommendations

Recommendation 1

It is recommended that all heritage items within the disturbance area must be subject to archival recording and archaeological excavations prior to the commencement of works, as recommended in the Historic and Natural Heritage Management Plan (Future Generation, 2019).

Please note: Some heritage items may have already been subject to this, as a result of work undertaken by NSW Archaeology as part of the Snowy 2.0 program. Jacobs has made numerous attempts to identify which items these are but has not been successful in obtaining this information to date. We will continue to pursue this information. Notwithstanding, a method of archival recording and archaeological excavations will be designed that can be applied to any site within the disturbance area as required.

Recommendation 2

It is recommended that vegetation at R45 (Lobs Hole Copper Mine Water Race) is cleared with supervision by an appropriately qualified archaeologist. An assessment of the effect of vegetation removal on the stability of the item must occur and be managed appropriately.

If the vegetation removal and construction methodology employed in the vicinity of the site will result in a minor impact to the item, exclusion fencing must be installed to protect the site for the duration of construction. Archival recording of the item must occur, as discussed in Recommendation 1.

If the construction methodology employed in the vicinity of the site will have a moderate or major impact to the item, archival recording and archaeological excavation must occur prior to the commencement of construction.

An archaeological research design and methodology must be produced in keeping with the *Historical Archaeology Code of Practice* (Heritage Council of NSW 2006). This will ensure that ensure that a robust methodology is developed, proportionate to the significance of the item and extent of impact.

However, as this project has been declared critical State Significant Infrastructure, there is no requirement for consent under the Heritage Act to be in place prior to the commencement of the archaeological excavations.

Please note: This recommendation is made on the basis that no impacts have occurred to R45 (Lobs Hole Copper Mine Water Race) as a result of Snowy 2.0. Jacobs has made numerous attempts to identify if R45 (Lobs Hole Copper Mine Water Race) has been disturbed but has not been successful in obtaining this information to date. We will continue to pursue this information. Once it has been identified if disturbance has already occurred, this recommendation will apply to any undisturbed elements,

Recommendation 3

It is recommended that all contractors, subcontractors and other site staff be informed of their obligations under the EPBC Act and Heritage Act, including the locations of the known heritage items and their protection. Explicit information regarding penalties for damage to these items should also be provided.

Recommendation 4

An *Unexpected Finds Protocol* should be developed as part of a Construction Environmental Management Plan (CEMP). This should include specific and detailed information regarding management of unexpected finds uncovered during construction.

Recommendation 5

This Non-Aboriginal heritage assessment considers heritage items that are within the disturbance area. There are heritage items in the wider project area, but not within the disturbance area. These have not been included in this assessment. During detailed design, if the disturbance area changes but is still within the project area, a consistency assessment will be prepared to confirm if impacts are consistent with the EIS. If the footprint of the current disturbance area changes, an addendum to this assessment will be prepared. Where impact to heritage items cannot be avoided as a result of the change to the disturbance footprint, management and mitigation measures described in this report will apply.

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