Appendix C Aboriginal cultural heritage assessment

Snowy 2.0 Transmission Connection Project

Environmental Impact Assessment

(February 2021)

Snowy Hydro 2.0 Transmission Connection Project

Aboriginal Cultural Heritage Assessment Report

Rev 3

December 2020

TransGrid

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Background

TransGrid is seeking approval under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to construct and operate an overhead electricity transmission line and a substation to connect the Snowy 2.0 pumped hydroelectricity generation works (Snowy 2.0) to TransGrid's existing transmission network at Nurenmerenmong, east of Tumbarumba (the project).

Project area

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 signs of limited previous human disturbance. The previous disturbance within the project area is located on the lower terraces below the mountainous terrain and consists of existing transmission line corridors, minor access tracks, and infrastructure associated with the Talbingo Reservoir.

The eastern extent of the project is defined by the location of the proposed Snowy 2.0 cable yard at Lobs Hole Ravine in Kosciuszko National Park (KNP). From the Snowy 2.0 cable yard, the transmission connection extends west through KNP, through a landscape characterised by steep, mountainous terrain before traversing Talbingo Reservoir. The transmission connection then continues west, passing Elliott Way at three locations before entering Bago State Forest to the proposed substation site and the connection with existing transmission lines.

The project is located within the Local Government Area (LGA) of Snowy Valleys.

Purpose of this report

This Aboriginal cultural heritage assessment report has been prepared to meet the requirements of the Secretary's Environmental Assessment Requirements (SEARs) and to support the Environmental Impact Statement (EIS) for the project. It documents the desktop assessment, consultation with Aboriginal stakeholders, cultural values assessment, and archaeological surveys and assessments undertaken for the project as well as providing a significance assessment and assessment of potential impacts to Aboriginal archaeological sites. Recommendations of management measures to prevent or mitigate impacts to archaeological sites are provided.

This method of assessing Aboriginal cultural heritage has been designed to meet the requirements of the following guidelines:

- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales* (OEH 2011)
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRP) (DECCW 2010a)
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (Code of Practice)(DECCW 2010b).

Environmental and cultural context

The Australian Alps are of outstanding heritage value to the nation for the strong and enduring social and spiritual association of the Alps with at least 18 Aboriginal clan groups from across south eastern Australia for whom the Alps were part of their traditional country or as an area over which they had other rights (Johnston *et al.* 2014b).

Aboriginal occupation of the Alps is represented in the region's archaeological record, and in the cultural knowledge of the Aboriginal population. These provide information on a network of pathways, ceremonial practices and sites, and the practice of moth hunting, which together make up a unique cultural complex. The landscape, and places within it, are connected with this cultural complex and consequently with its heritage value.

An examination of environmental factors, and of cultural and spiritual practices associated with the project area reinforce the importance of the Snowy Mountains to local Aboriginal groups, along with demonstrating the presence of varying amounts of Aboriginal archaeological material. The archaeological record of the region includes a variety of site types such as occupation sites in the open and in rock shelters, as well as culturally modified trees, quarries, ceremonial places and burials. An examination of historical and cultural knowledge shows the importance of the Bogong Moth in particular, in relation to ceremonies and rites of passage.

Archaeological assessment findings

The initial desktop assessment identified five previously recorded Aboriginal sites in the project area, registered on the Aboriginal Heritage Information Management System (AHIMS). All these sites are surface scatters of stone artefacts.

The archaeological survey identified an additional four Potential Archaeological Deposits (PADs) within the project area:

- ST PAD 01, located near the eastern end of the project area. This area of PAD is associated with surface stone artefacts identified during the archaeological survey, and its area encompasses the previously recorded sites of AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, and AHIMS# 56-6-0497.
- ST PAD 02, located near the eastern end of the project area.
- ST PAD 03, located in the western portion of the project area
- Substation PAD, located at the new substation site.

Archaeological test excavation was conducted at two of the four PADs (ST PAD 03 and Substation PAD).

Substation PAD is not an archaeological site. Excavation there found no artefacts from a total of 28 shovel test pits and no Aboriginal artefacts were found during the field survey. On the basis of these results, it is concluded that while the locality had potential on the basis of its topography it is **not** an archaeological site.

ST PAD 03 is an archaeological site in the form of a sparse artefact scatter. Excavation there found two stone artefacts from nine shovel test pits in addition to the seven found during field These results show that ST PAD 03 contains an assemblage of both surface and subsurface stone artefacts.

Project impacts

The project would directly impact the following Aboriginal sites: ST PAD 01; ST PAD 02; ST PAD 03; AHIMS# 56-6-0477; AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, and AHIMS# 56-6-0497. The project would result in the destruction of the entirety of these sites.

One other site (AHIMS # 56-6-0041) is at risk of indirect impact, being 27 metres (m) outside the disturbance area. No other site is within 50 m of the disturbance area.

Management recommendations

It is recommended that:

1) The area of access track atop Sheep Station Ridge which has not been surveyed should be surveyed under consultation with the Registered Aboriginal Parties (RAPs) once suitable access to the area has been established (see **Section 8.5.2**). Any areas or items of Aboriginal cultural heritage significance identified as part of this additional investigation would be managed in accordance with measures developed in consultation with RAPs. These measures would be included in the Cultural Heritage Management Plan (CHMP) which will be prepared for the project.

2) No further archaeological work is required at Substation PAD. This area has been assessed having very low potential to contain Aboriginal objects and is not classified as an Aboriginal site.

3) No further archaeological excavation is required at ST PAD 03. While archaeological material occurs at this site it is sparse and the site is of low significance.

4) Salvage collection of surface artefacts must be carried out prior to project construction at the sites of ST PAD 03, and AHIMS# 56-6-0477.

5) Salvage surface collection excavation is to be carried out prior to project construction at ST PAD 01 and ST PAD 02. Collection of surface artefacts at ST PAD 01 will also salvage any artefacts from the previously recorded surface sites within this PAD's boundaries, these sites being AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, and AHIMS# 56-6-0497.

6) A Salvage Excavation Method Document will be prepared prior to carrying out the salvage excavation works. This document will be provided to all RAPs, who will be given a 28-day period to review the document and provide feedback.

7) A CHMP will be prepared, to guard against and manage inadvertent impacts to Aboriginal objects during project construction and maintenance. The CHMP will specify that project works will be restricted to the project disturbance area. It will have provisions to ensure workers are made aware of cultural heritage places and their value, for example through project inductions.

It is assumed that ST PAD 01; ST PAD 02; AHIMS# 56-6-0009; AHIMS# 56-6-0495; AHIMS# 56-6-0496; AHIMS# 56-6-0497; and AHIMS# 56-6-0477 are intact and have not been either destroyed through activities of Snowy 2.0, or salvaged by the Snowy 2.0 archaeological team. If these sites have been entirely salvaged or destroyed by the Snowy 2.0 works, then recommendations 5) - 6) relating to salvage collection and excavation at these sites would not apply.

Acronyms

AAR	Archaeological Assessment Report
ACHAR	Aboriginal Cultural Heritage Assessment Report
ACHCRP	*Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*
ACT	Australian Capital Territory
AGD	Australian Geodetic Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
AATORG	Australian Alps Traditional Owner Reference Group
AALC	Australian Alps Liaison Committee
BP	Before Present (years)
BTLALC	Brungle-Tumut Local Aboriginal Land Council
Cth	Commonwealth
Code of Practice	*Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*
DECCW	Department of Environment, Climate Change and Water NSW
DPIE	Department of Planning, Industry and Environment
EIS	Environmental impact statement
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environmental Protection and Biodiversity Act 1999
FCNSW	Forestry Corporation New South Wales
GDA	Geocentric Datum of Australia
ICOMOS	Australia International Council on Monuments and Sites
Jacobs	Jacobs Group (Australia) Pty Ltd
KNP	Kosciuszko National Park
kV	kilovolt
LGA	Local Government Area
m^2	square metre
NPWS	National Parks and Wildlife Services
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
OEH	Office of Environment and Heritage (now Heritage NSW)
PAD	Potential archaeological deposit
RAP	Registered Aboriginal Party
SEAR	Secretary's Environmental Assessment Requirements
SEPP SRD	State Environmental Planning Policy (State and Regional Development)
SSI	State Significant Infrastructure
TP	Test Pit
The project	Snowy 2.0 Transmission Project

1. Introduction

1.1 Project background

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 for the project 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 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 Aboriginal Cultural Heritage Assessment Report (ACHAR) has been developed in support of the Environmental Impact Statement (EIS) for the project.

1.2 Purpose of this report

This ACHAR 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 ACHAR are summarised in **Table 1-1**, along with a reference to where these requirements have been addressed.

Table 1-1: Secretary's environmental assessment requirements – Aboriginal Cultural Heritage

SEARs	Section addressed
An assessment of the cultural and heritage impacts of the project, including impacts on:	
▪ the listed heritage values of the Australian Alps National Parks and Reserves National Heritage Place;	**Sections 3** and **Section 11.3.1.2** Impacts on the values of the Australian Alps National Parks and Reserves National Heritage Place are discussed in Section 7.3 of the EIS
▪ the listed heritage values of the Snowy Mountains Scheme National Heritage Place;	Not assessed in this report: any potential impacts to this historical heritage item are assessed in (Jacobs 2020)
▪ the cultural values of the Kosciuszko National Park;	**Section11.4.1.3**
▪ Aboriginal and historic heritage items;	**Section 11**. (Historic heritage items are considered in (Jacobs 2020))

1.3 Scope and objectives

This document presents the results of an assessment of Aboriginal cultural heritage within the project area.

The Aboriginal cultural heritage assessment involved:

- Consultation with Aboriginal stakeholders following procedures outlined by DECCW (2010a) to obtain feedback on the assessment process and input on significance and cultural values associated with the project area
- A cultural values assessment, including desktop review of available ethnographic information and informal interviews with registered Aboriginal knowledge holders on site
- An archaeological assessment including a desktop study (with register search), archaeological field survey, and test excavation
- A significance assessment of Aboriginal objects and places within the project area. This includes scientific and cultural significance. Cultural significance has been informed by consultation with Registered Aboriginal Parties (RAPs)
- Assessment of the potential impact to Aboriginal archaeological sites
- Recommendation of management measures to prevent or mitigate impacts to archaeological sites.

This method of assessing Aboriginal cultural heritage was designed to meet the requirements of the following guidelines:

- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales* (OEH 2011)
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRP) (DECCW 2010a)
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (Code of Practice) (DECCW 2010b).

The objectives of this document are:

- To document the archaeological investigation undertaken to locate, identify and study Aboriginal objects, archaeological deposits and historical, oral and environmental sources to provide an assessment of the archaeological and cultural heritage significance of the project area
- To prepare an Aboriginal and Cultural Heritage Assessment Report (ACHAR) that complies with legislative requirements, codes of practice and assessment procedures relevant to the project (refer to **Section 3**)
- To respond to the SEARs issued on 1 November 2019 (refer to **Section 1.2**)
- To inform the content of the EIS.

1.4 Report outline

The report is structured as follows:

- **Section 1** introduces the project and purpose of the ACHAR
- **Section 2** provides an overview description of the project
- **Section 3** outlines the legislative and policy framework relevant to the investigation and assessment of Aboriginal heritage in New South Wales
- **Section 4** presents an overview of consultation undertaken with the Aboriginal community in relation to the project, with supporting information provided in **Appendix A**. Consultation was carried out in accordance with the ACHCRP (DECCW 2010a)

- **Section 5** presents background information relevant to the project, including environmental information (geology, soils, climate and vegetation) as well as a discussion of ethnographic data
- **Section 6** presents a summary of the identified Aboriginal cultural values associated with the project area. This information has been sourced directly from the RAPs
- **Section 7** reviews background information on the Aboriginal archaeology and heritage of the project area and its surrounding region
- **Section 8** describes the method and results of the Aboriginal archaeological survey of the project area
- **Section 9** describes the method and results of the Aboriginal archaeological test excavation program carried out at two areas of Potential Archaeological Deposit (PAD)
- **Section 10** assesses the heritage significance of the identified Aboriginal sites assessed as part of this report using the NSW heritage significance criteria
- **Section 11** assesses the project's direct and indirect impact on identified Aboriginal sites and areas of PAD, and the significance of these impacts
- **Section 12** presents recommended management measures to mitigate the impact of the project on Aboriginal sites within the project area.

1.5 Authorship

This report was authored by:

- Andrew Costello (Senior Archaeologist, Jacobs). Andrew holds a Bachelor of Arts with Honours in Archaeology from the University of Melbourne and has over 14 years experience as a cultural heritage consultant and the appropriate qualifications for undertaking the investigation as required by the Code of Practice (DECCW 2010b)
- Dr Oliver Macgregor (Senior Archaeologist, Jacobs). Oliver holds a PhD in Archaeology and Palaeoanthropology from the Australian National University and has over 10 years experience as an archaeologist
- Doug Williams (Principal Archaeologist, Jacobs). Doug holds a Bachelor of Arts with Honours in Prehistory from Australian National University, a Graduate Diploma of Applied Science (Cultural Heritage Management) from the University of Canberra and has over 28 years experience as an archaeologist and heritage manager. He is currently a PhD Candidate, Archaeology at Griffith University.
- Alexandra Seifertova (Graduate Archaeologist, Jacobs). Alexandra holds a Bachelor of Arts with Honours from the University of Sydney and has over one (1) year of experience as an archaeologist

Mapping was prepared by:

- Khali Macnab (Senior Spatial Consultant, Jacobs)

The report was reviewed by:

- Fran Scully (Principal Archaeologist, Jacobs)
- Doug Williams (Principal Archaeologist, Jacobs)
- Nicole Philps (Senior Associate Environmental Planner, Jacobs)

2. Project description

2.1 Project components

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

The key elements of the project would 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 (m) wide by 600 m long inclusive of an approximate 25 to 45 m wide cleared asset protection zone (APZ) surrounding the switchyard
- Upgrade and widening of an existing access road off Elliott Way to the new substation including the construction of a new driveway 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 (km)
  - Located in a transmission corridor ranging in width from approximately 120 m to 200 m
  - Each line would comprise approximately 21 steel lattice structures up to 75 m in height.
- Short overhead 330 kV transmission line connection (approximately 300 m in length) comprising both steel lattice structures and pole structures as required between the substation and Line 64
- Construction of approximately 10 kms of new access tracks (Option A) or 8 kms (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 the completion of construction to service ongoing maintenance activities along the transmission lines
- Establishment of a helipad (approximately 30 m wide by 30 m long) to support the transmission line construction activities carried out at higher elevations
- Ancillary activities, including the establishment of tensioning and pulling sites for conductor and earth wire stringing, crane pads, site compounds, and equipment laydown areas.

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

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 proposed Snowy 2.0 cable yard at Lobs Hole Ravine 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 characterised by steep, mountainous terrain before traversing Talbingo Reservoir. The transmission connection then continues west, passing Elliott Way at three locations before entering Bago State Forest to the proposed substation site. The location of the project is shown in Figure **2-1**.

The project is located within the Local Government Area (LGA) of Snowy Valleys.

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 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 project area and disturbance area are shown in **Figure 1-2**.

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.

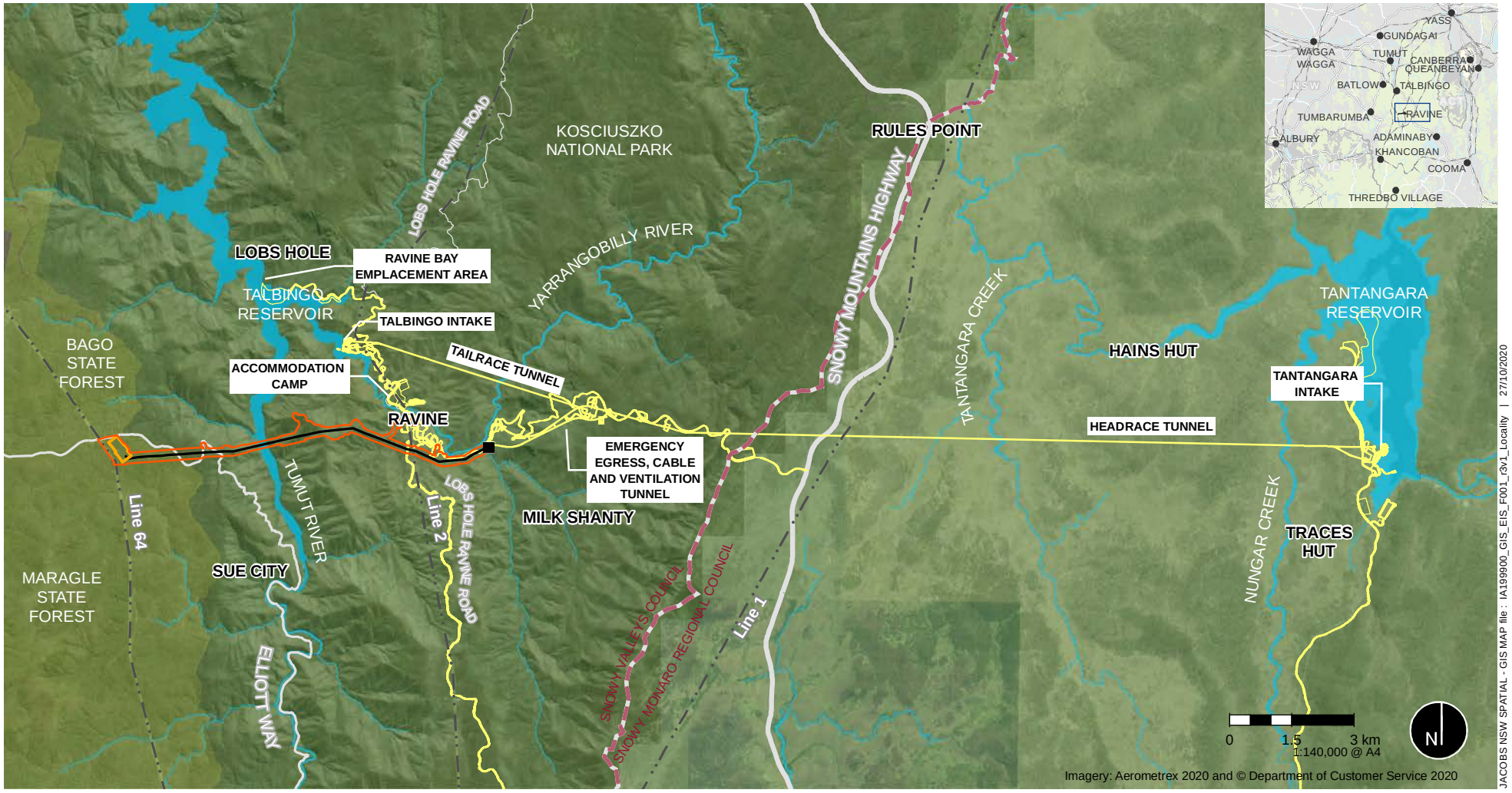
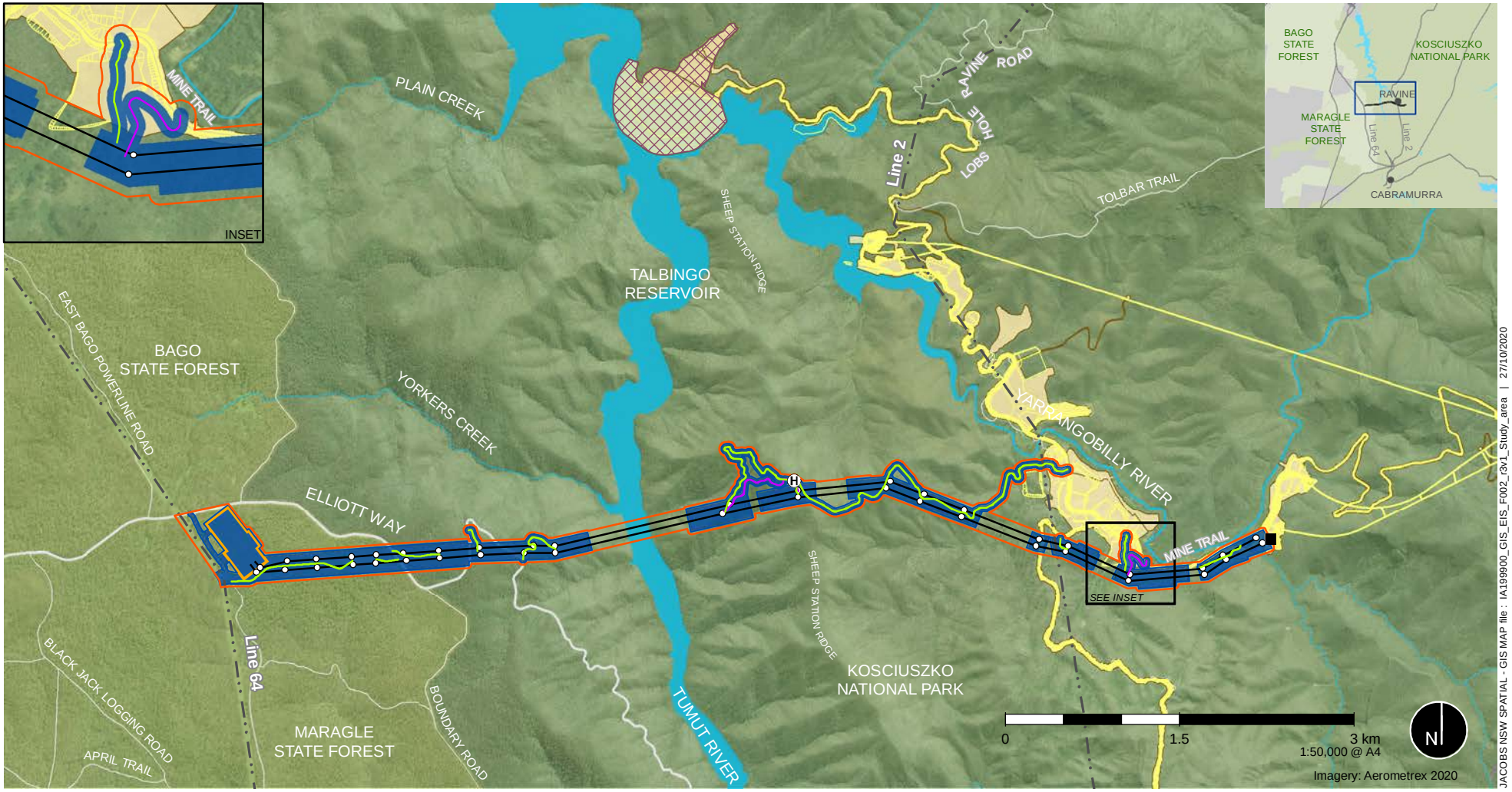


Figure 2-1 | Project location

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 will commence with the construction of the access tracks to the substation and structure locations. Construction of the helipad (if required) 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 area and any environmental avoidance areas prior to ground disturbance and vegetation clearing ▪ Installation of appropriate stormwater and diversion drainage and erosion and sedimentation control works ▪ 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 Ravine*.
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 ▪ 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

Construction activity	Description
	– 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 line	▪ Vegetation clearing within the approved transmission 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 ▪ 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 Ravine ▪ Site stabilisation and landscaping involving: ▪ Stabilisation of exposed areas and slopes

Construction activity	Description
	▪ 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 Ravine 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 39 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 proposed construction of 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.

2.4.3 Operation and maintenance

The substation and transmission connection will 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 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 requirements and policy framework

This section provides an overview of the legislation, policies and strategies relevant to the assessment of noise and vibration impacts from the project.

3.1 Commonwealth legislation

3.1.1 *Environment Protection and Biodiversity Conservation Act* 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) provides for the protection of the environment, especially in matters of national environmental significance (MNES). Under the EPBC Act, a person must not take an action that has, will have, or is likely to have a significant impact on any of the MNES without approval from the Commonwealth Minister for the Environment. The definition of the environment under the EPBC Act includes both natural and cultural elements. Under the EPBC Act, heritage items can be listed on the National Heritage List (NHL) (for items of National heritage significance) or the Commonwealth Heritage List (CHL) (for items of heritage significance on land owned or managed by the Commonwealth).

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 CHL is established under the EPBC Act. 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.

The Australian Alps National Parks and Reserves (AANP) is listed on the National Heritage List (Commonwealth of Australia Gazette No. S237, 7 November 2008). Under criterion a) of this gazette ("The place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australian natural or cultural history"), an identified value is:

> Moth Feasting: The use of an adult insect – the Bogong Moth – as the basis for past large-scale annual gatherings of different Aboriginal groups for ceremonies sets the gatherings in the AANP apart from other Aboriginal ceremonial gatherings and has captured the Australian imagination, making it exceptional in Australia. Therefore the AANP has outstanding heritage value to the nation because of the importance of Aboriginal social gatherings based on moth feasting in the course, or pattern, of Australia's cultural history (Commonwealth of Australia Gazette No. S237: 3)

Other criteria and values in the listing of the Australian Alps National Parks and Reserves do not pertain to Aboriginal heritage.

The Snowy Mountains Scheme is listed on the National Heritage List – none of the criteria or values in the listing pertain to Aboriginal heritage.

There are no other Aboriginal places or items within or near the project area that are listed on the National Heritage List.

Given the national heritage importance of the Australian Alps National Parks and Reserves, 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.

3.2 State legislation

3.2.1 *Environmental Planning and Assessment Act* 1979

The EP&A Act regulates environmental planning and assessment for NSW. Land use planning requires that environmental impacts are considered as part of the assessment of development, including impacts on Aboriginal cultural heritage.

Division 5.2 of Part 5 of the EP&A Act applies to development declared to be SSI. The project is declared to be SSI under the *State Environmental Planning Policy (State and Regional Development) 2011* (SEPP SRD). The consent authority for SSI development applications is the Minister for Planning and Public Spaces (Minister).

An Aboriginal Heritage Impact Permit (AHIP) under section 90 of the *National Parks and Wildlife Act 1974* (NPW Act) is not required for development for which an SSI development consent has been granted (Section 5.23(d) of the EP&A Act). However, an EIS is required for SSI projects and the SEARs issued for the project include provisions requiring the assessment of Aboriginal heritage, as well as consultation with Aboriginal stakeholders.

3.2.2 National Parks and Wildlife Act 1974

The NPW Act protects Aboriginal heritage within NSW. Protection of Aboriginal heritage is outlined in Section 86 of the NPW Act, as follows:

- "a person must not harm or desecrate an object that the person knows is an Aboriginal object" (Section 86(1))
- "a person must not harm an Aboriginal object" (Section 86(2)), and
- "a person must not harm or desecrate an Aboriginal place" (Section 86(4)).

Section 87(1) of the NPW Act provides that it is a defence to these provisions if the harm or desecration is authorised by an AHIP.

Harm is defined under the NPW Act as 'any act or omission that destroys, defaces or damages the object including moving the object from the land on which it has been situated or causes or permits the object to be harmed'.

As outlined in **Section 3.2.1**, an AHIP is not required for development for which an SSI development consent has been granted and the provisions of the NPW Act that prohibit an activity without such an authority do not apply (Section 5.23(d) of the EP&A Act).

3.3 Relevant procedures and guidelines

3.3.1 Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW

The *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b) (Code of Practice) sets out the detailed requirements for archaeological investigations of Aboriginal objects in NSW for activities that require assessment under Part 4, Part 5 or Part 5.1 (now Part 4, Division 5.1 and Division 5.2) of the EP&A Act.

An AHIP to undertake test excavation is not required if complying with this code, as sub-surface testing complying with it are excluded from the definition of harm to an Aboriginal object. The code sets out the following in detail:

- Minimum qualifications for anyone undertaking archaeological investigation under the code in NSW
- Assessment steps required to be undertaken for all archaeological investigations.

Assessment steps that may be required to be undertaken to adequately characterise the Aboriginal objects being investigated.

3.3.2 Aboriginal Cultural Heritage Consultation Requirements for Proponents

The ACHCRP (DECCW 2010a) establishes the requirements for consultation (under part 6 of the NPW Act) with Aboriginal stakeholders as part of the heritage assessment process to determine potential impacts of proposed activities on Aboriginal objects and places and to inform decision making for any application for an AHIP. The document comprises four stages with associated timeframes which must be adhered to:

- Stage 1 — Notification of project and registration of interest (14 days from date letter sent to register as a RAPs)
- Stage 2 — Presentation of information about the proposed project (meetings, prepare info etc)
- Stage 3 — Gathering information about cultural significance (28 days for RAPs to provide a review and feedback to consultants' methodology)
- Stage 4 — Review of draft ACHAR (RAPs have 28 days from sending of the report to make submissions).

3.3.3 Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW

The *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011) provides guidelines for the investigation and assessment of Aboriginal cultural heritage (under part 6 of the NPW Act) to explore the harm of a proposed activity on Aboriginal objects and declared Aboriginal places and to clearly set out which impacts are avoidable and which are not.

The document provides guidance on the process for investigation and assessment of Aboriginal cultural heritage in NSW and sets out the requirements for an ACHAR.

3.3.4 Kosciuszko National Park Plan of Management

The Kosciuszko National Park Plan of Management 2006 (KNP PoM) (NSW National Parks and Wildlife Service 2006) comprehensively compiles background information on the Australian Alps region, the values of KNP, and a statement of significance of these values. It then sets out management strategies for protecting the values of KNP while enabling recreational use of the national park. The document deals with both natural and cultural values, including Aboriginal heritage. The document contains specific provisions relating to areas of exceptional natural and cultural significance.

The KNP PoM incorporated input from an Aboriginal working group, consisting of 15 members and elders representing some of the Aboriginal communities that have connections with the mountains (NSW National Parks and Wildlife Service 2006: xiv). The significance of Aboriginal cultural heritage value of the national park is summarised:

> *The park is highly significant for descendants of Aboriginal people with traditional and historical links to the mountains. This is illustrated by their ongoing sense of belonging and identity, spiritual attachments, surviving traditional knowledge, and family stories and memories. Scientific evidence indicates a long history of Aboriginal use and occupation of the high country and demonstrates successful adaptations to extreme environmental conditions.* (NSW National Parks and Wildlife Service 2006: 10).

Of relevance to this ACHAR, the KNP PoM identifies the Aboriginal archaeological resource of the Australian Alps as historically and scientifically significant. The KNP PoM also identifies that the country and specific Aboriginal places can possess cultural significance due to their intangible cultural value, stating "the significance of these places to Aboriginal people encompasses both material and non-material aspects" (NSW National Parks and Wildlife Service 2006: 84).

3.3.5 Cultural Landscape Management: Guidelines for Identifying, Assessing, and Managing Cultural Landscapes in the Australian Alps National Parks

This report (Lennon and Matthews 1996) was prepared for the Cultural Heritage Working Group of the Australian Alps Liaison Committee. It provides a guide to assessing the value and significance of heritage places and cultural landscapes within the Australian Alps region. It discusses the ways in which individual places and broader landscapes can possess heritage value through their association with archaeological sites and intangible cultural heritage. The document's scope encompasses both historical and Aboriginal heritage.

The broad process for assessing and managing heritage places set out in the document consists of compiling and analysing data on the place or landscape under consideration, assessing the heritage significance of that place or landscape, and developing a conservation policy and conservation strategy which is then implemented (Lennon and Matthews 1996: 17). The process of gathering and analysing information about a heritage place, and assessing the place's heritage value and significance, are consistent with the processes detailed in the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011) and *The Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b) (see **Section 3.2.2** above).

4. Consultation

The ACHCRP (DECCW 2010a) establishes the requirements for consultation with Aboriginal stakeholders as part of the heritage assessment process to determine potential impacts of proposed activities on Aboriginal objects and places. These requirements include four stages with associated timeframes which must be adhered to:

Stage 1 — Notification of project and registration of interest (14 days from date letter sent to register as RAPs)

Stage 2 — Presentation of information about the proposed project, and the proposed method the archaeological assessment will follow (28 days from sending of method document to make a submission)

Stage 3 — Gathering information about cultural significance (28 days for RAPs to provide a review and feedback to consultants regarding project information documents, method documents, and reports)

Stage 4 — Review of draft ACHAR (RAPs have 28 days from sending of the report to make a submission).

Aboriginal stakeholder engagement and involvement is important for the identification of Aboriginal cultural values relevant to the project. This section summarises the consultation process relating to the organisation and conduct of the ACHAR. Details of consultation including meeting minutes, examples of letters sent to RAPs and knowledge holders, conversations undertaken during archaeological survey, native title search results, records of cultural heritage values interviews and a detailed consultation log are included in **Appendix A**.

This section summarises the consultation process throughout the archaeological assessment to date (**Table 4-1**) and outlines the stages of consultation.

Consultation for the project began on the 26 October 2018, with initial contact made with various Government and non-Government stakeholders including Snowy Valleys Council, Riverina Local Land Services, and Brungle-Tumut Local Aboriginal Land Council (BTLALC). The Ngarigo and Wiradjuri clans were considered to have cultural knowledge of the area and were specifically consulted and taken on fieldwork trips. Following contact, potential Aboriginal stakeholders were contacted via email, mail, and advertisement to register their interest for the project.

Table 4-1: Summary of consultation process undertaken

Task Name	Start	Finish
Stage 1- Agency Letters	26/10/2018	10/11/2018
Stage 1- Newspaper advertisements	06/12/2018	18/01/2019
Stage 1- Project notification and invitation to register supplied to potential Aboriginal stakeholders	04/12/2018	19/12/2018
Stage 1- Supply of the list of RAPs to Department of Planning, Industry and Environment (DPIE) and BTLALC	23/01/2019	23/01/2019
Stage 2- RAP review of project information and methodology	27/03/2019	24/04/2019
Stage 2- Engage Aboriginal stakeholders to undertake a site survey	20/05/2019	24/05/2019
Stage 3- Seek the names of Aboriginal people with cultural knowledge by letter or notify native title holders	26/10/2018	10/11/2018
Stage 3- Notify Aboriginal people with cultural knowledge by letter	04/12/2018	19/12/2019
Stage 3- Notify Aboriginal people with cultural knowledge by advertisement	06/12/2018	06/12/2018
Stage 2- RAP review of test excavation method document	09/08/2019	06/09/2019
Stage 4- Carry out test excavations	21/10/2019	25/10/2019
Stage 4- Present the draft ACHAR to RAPs for review and comment	8/10/2020	5/11/2020
Stage 4- Update the draft ACHAR to include inputs from RAPs review	11/11/2020	13/11/2020

4.1 Stage 1 – Notification of project and registration of interest

Stage one of the consultation process is to identify, notify and register any Aboriginal people or groups who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/ or places in the project area.

Notification was initiated on the 26 October 2018 to all relevant organisations listed under section 4.1.2 in the ACHCRP (DECCW 2010a). These relevant organisations are listed below in **Table 4-2**.

Table 4-2: List of contacted organisations

Name of Organisation	Date of Notification Sent	Date of Response Received
Office of the Registrar of the Aboriginal Land Rights Act 1983	26/10/2018	-
National Native Title Tribunal	26/10/2018	-
NTSCORP limited	26/10/2018	-
Office of Environment & Heritage	26/10/2018	19/11/2018
Snowy Valleys Council	26/10/2018	22/11/2018
Riverina Local Land Services	26/10/2018	-
Brungle Tumut Local Aboriginal Land Council	26/10/2018	27/11/2018

In accordance to Section 4.1.3 of the ACHCRP (DECCW 2010a) a notice in the local newspaper circulating in the general location of the proposed project must be completed, with information explaining the project and its exact location. Notices were placed in the Koorie Times, and the Monaro Post on the 6 December 2018. The advertisements identified a 14-day window for responses to be provided by Aboriginal parties who wished to register an interest in the project. This 14-day window closed on 18 January 2019. These advertisements provided additional opportunity for Aboriginal people who would be interested in the project to register. A copy of the advertisement is included in **Appendix A.**

Project notifications were sent to all groups and individuals identified as a result of the above consultation process. A total of 20 groups and/or individuals registered their interest, as listed in **Table 4-3**.

Table 4-3: Summary of RAPs identified through Stage 1

Organisation	Contact Person
Buru Ngunawal Aboriginal Corporation	Mr Walter Bell
Didge Ngunawal Aboriginal Corporation	Mr Paul Boyd and Ms Lilly Carroll
Griffiths Skills Training Centre and Ngumbaay Indigenous Corporation	Mr Luke Penrith
Gunjeewong Cultural Heritage Aboriginal Corporation	Ms Cherie Carroll Turrise
Koomurri Ngunawal Aboriginal Corporation	Mr Glen Freeman
Individual	Ms Janine Thompson
Individual	Ms Janice Williams
Individual	Ms Megan Considine
Merrigarn Indigenous Corporation	Mr Shaun Carroll
Muragadi Heritage Indigenous Corporation	Mr Jesse Johnson
Murra Bidgee Mullangari	Mr Ryan Johnson
Ngarigo Elders	Ms Iris White
Ngunawal Consultancy	Mr Piero Delponte
Snowy Mountains Indigenous Elders Group	Mr Ramsay Freeman

Organisation	Contact Person
Individual	Ms Shirley Marlowe
Individual	Mr Matthew Marlowe
Individual	Mr Lawrence Marlowe
Individual	Mr Ron Grovenor
Walgalu Elder	Ms Alice Williams
Yurwang Gundana Consultancy Cultural Heritage Services	Mr Dean Bell

As per Section 4.1.6 of Stage 1 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a), a list of RAPs for the project and copies of the notifications from **Section 4.1.3** were submitted to Heritage NSW (formerly OEH) and BTLALC on the 23 January 2019. A copy of the notification is provided in **Appendix A**.

4.2 Stage 2 – Provision of project information

Stage two of the consultation process is to provide RAPs with information about the scope of the proposed project and the proposed cultural heritage assessment process.

The RAPs were provided with a letter outlining the project (**Appendix A**), and a copy of the archaeological methodology (**Appendix B**). Comments were received from RAPs and they were invited to contact Jacobs and TransGrid at any time throughout the assessment process to discuss the project.

Site Officers were selected for the archaeological survey and were issued a checklist to ensure safety and preparedness for work.

4.3 Stage 3 – Gathering information about cultural significance

Stage three consultation facilitates a process whereby RAPs can contribute to culturally appropriate information gathering and the research methodology, provide information that will enable the cultural significance of Aboriginal objects and/or places on the proposed project area to be determined, and have input into the development of any cultural heritage management options.

4.4 Stage 4 – Review of draft cultural heritage assessment report

Stage four of the consultation process is to prepare and finalise an ACHAR with input from RAPs. As outlined in the ACHCRP (DECCW 2010a), a copy of this ACHAR was provided to all RAPs for the project for review and comment. A review period of at least 28 days was allowed.

No written or verbal feedback was provided by the RAPs, either supporting or criticising the recommendations and conclusion of the ACHAR.

A letter from the Brungle-Tumut Local Aboriginal Land Council (BTLALC) was received in February 2020 stating that the Aboriginal community have thoughts on extra assessment work they would like to see happen in light of the bushfires in the Snowy Mountains. Jacobs presented this information to the client but the safety issues related to survey in recently burned areas was deemed too high a risk.

The final date for comments on the ACHAR was 12 November 2020. The RAPs are aware there will be further opportunity for comment when this EIS and Technical Reports, including the AAR and ACHAR, go on public exhibition.

4.5 Sensitive cultural information and management protocol

It is possible that during the consultation process, the RAPs will provide sensitive cultural information to which access needs to be restricted.

In the event that such information was supplied, the RAP supplying the information would state to Jacobs how they wish that information to be treated, and how access to the information should be restricted.

Jacobs would follow the stated wishes provided by the RAP group in question when managing and using the information provided to Jacobs. All stated restrictions of access, communication and publication of the information would be followed. These might include:

- Restrictions on reproducing the information (in whole or in part) in reports
- Restrictions on reproducing the information in reports provided to different audiences (for example, the version provided to the client, the version provided to DPIE and the Aboriginal Heritage Information Management System (AHIMS) database)
- Restrictions on communication of the information in other ways
- Restrictions on the location/storage of the information
- Other required processes relating to handling the information
- Any names and contact details of persons authorised within the relevant Aboriginal group to make decisions concerning the information, and their degree of authorisation
- Any details of any consent given in accordance with customary law
- Any restrictions on access to and use of the information by RAPs.

The above list was provided to RAPs as part of the Archaeological Methodology document (**Appendix B**) to be considered if providing a statement of requirements regarding any culturally sensitive information.

4.6 Consultation log

A log summarising all of the consultation carried out with Aboriginal parties in relation to the project to date is provided in **Appendix A**.

5. Background information

5.1 Environmental context

5.1.1 Topography

The project is located within the Snowy Mountains which is part of the Australian Alps. The Australian Alps are constituted as the highest range within the Great Diving Range with Mt Kosciuszko being the highest peak at 2228 m (Sahukar *et al.* 2003). The whole landscape is composed of peaked ranges and broad forested valleys. The topography of the project area is best described as steep to very steep (>18°) hills and mountains, interspersed with sharply incised valleys.

The Australian Alps is the only region in mainland Australia affected by the Pleistocene glaciation and therefore contains a number of glacial and periglacial landforms above 1100 m. Volcanic activity in the Tertiary period produced basalts in the Cabramurra-Kiandra region (OEH 2016). West of the Tumut River the landscape is described as a west-tilted plateau (Kiandra Tableland) with marginal drainage dissection (Abell 1998). East of the Tumut River is the Snowy Mountains National Park, also known as the Kosciuszko National Park.

5.1.2 Geology and soils

The geology of the project area is dominated by Lithologies of the East Lachlan Orogen (Colquhoun *et al.* 2020). In the west these include upper Silurian age plutonic intrusives, including the Greenhills Granodiorite and Rough Creek Tonalite. These lithologies are capped in places by Tertiary olivine basalts, however, the occurrence of tertiary basalt is limited with the project area. The plutonic lithologies are intruded against the meta-sediments and meta-volcanics of the East Lachlan Orogen. Locally this includes the Ordovician Gooandra Volcanics, lower Silurian Tumut Pond Group and Ravine Bers, and the lower Devonian Byron Range Group. Typical stratigraphy, including dominant lithologies are provided in **Table 5-1**.

Table 5-1: Stratigraphic summary

Age	Unit	Dominant Lithology	Secondary Lithologies
Tertiary	N/A	Basalt	Alkali olivine basalt.
Devonian	Byron Range Group	Limestone	Siltstone, quartzite, shale, sandstone, conglomerate.
Silurian	Ravine Beds	Shale	Slate, siltstone, conglomerate.
	Tumut Pond Group	Sandstone	Quartzite, slate, phyllite, serpentinite.
	Rough Creek Tonalite	Tonalite	Biotite granodiorite and tonalite commonly containing cordierite, common metasedimentary xenoliths.
	Greenhills Granodiorite	Granodiorite	Medium to coarse-grained biotite granodiorite, fine to medium-grained biotite-muscovite granodiorite/granite; biotite granodiorite and tonalite commonly containing cordierite, common metasedimentary xenoliths.
Ordovician	Gooandra Volcanics	Basalt	Metabasalt, basalt breccia, pillow lavas, amphibolite, chloritic schists, feldspathic sandstone; aphyric and feldspar phyric basalt, lava breccia, pillow lava, rhyolite, shale; fine feldspathic siltstone and shale.

Significant faulting, along the Tumut Ponds Fault and the Gilmore Fault Zone, occurs roughly perpendicular to the project through the steeply incised valley that holds the Talbingo Reservoir.

The soils are generally red and brown earths/structured red earths, with sandy loam and clay loan textures. Erosion was noted on poor constructed or maintained forest tracks. The soils and geology of the area indicate that there is sufficient raw material for exploitation by past Aboriginal communities. The depth of soils also indicates that there is potential for subsurface archaeological deposits to be present.

5.1.3 Vegetation and hydrology

The diversity of the Snowy Mountains landscape is reflected in its flora and fauna and can be divided into four distinct zones: lower slopes or tableland, montane, subalpine and alpine (Mason 2016: 2), all of which are traversed by the project area. The tablelands are dominated predominantly by grassy and open woodlands and dry open forests. The forests contains species such as red stringybark (*E. macrorhyncha*), white gum (*E. rossii*), broad-leaved peppermint (*E. dives*), candlebark (E. rubida), and brittle gum (*E. mannifera*), with the understorey containing diverse shrubs and grasses (Mitchell 2002; Sahukar *et al.* 2003:219). In the Montane zone there are taller and more dense forests which are populated by stringybarks and gums such as swamp gums (*Eucalyptus ovata*), peppermint forests (*narrow-leaved peppermint E. radiata*) and blue gums (*E. globulus ssp. bicostata*) on the lower slopes, to mountain gum (*E. dalrympleana*), candlebark (*E. rubida*), ribbon gum (*E. viminalis*) and alpine ash (*E. delegatensis*) (Costin 1979; Sahukar *et al.* 2003:219). The change to the subalpine zone is evident with the change to tall forests to low-growing subalpine woodlands. These woodlands are dominated by snow gum (*Eucalyptus pauciflora–E. pauciflora ssp. Niphophila*) while being interspersed with extensive open grasslands and heath (Sahukar *et al.* 2003:219). Lastly, the alpine zone experiences the coldest temperatures and as such most vegetation is ground-hugging and reaches no more than a metre in height. These include sod tussock grassland, short alpine herbfield, feldmark, bog and fen (Sahukar *et al.* 2003:219). Other communities include Tall alpine herbfield and heathland (Sahukar *et al.* 2003:219).

Within the Snowy Mountains there are significant floral communities, these include 30 exclusively alpine species and 21 locally endemic species. Trees within the project area west of the Tumut River are largely hardwood eucalypts. Significant wetlands are thought to be in near pristine condition in the area such as Blue Lake, the only dimictic lake in mainland Australia (its thermal layers are mixed completely twice each year). The alpine fens, bogs and lakes are also the only alpine wetlands in Australia. The unique biodiversity of this region indicates a favourable habitat supporting plant and animal species for hunting and gathering by past Aboriginal communities.

The project area is watered by a number of natural watercourses, both permanent and ephemeral. Major water sources include Tumut River, Yarrangobilly River, and Talbingo Reservoir, which traverse through the middle of project area. In addition to these major water sources, smaller creeks and ephemeral courses are present within the project area, including Yorkers Creek, Sheep Station Creek, Wallaces Creek, Cave Gully, Lick Hole Gully and other tributaries of Tumut River and Yarrangobilly River. The hydrology of the area indicates that there were abundant sources of water to support Aboriginal habitation.

5.1.4 Climate

The mean minimum and maximum temperatures for the project area range from 0.9°C – 3.8°C (July) to 11.5° – 21.4°C (January). Mean rainfall is heaviest in August, at 129.5 mm, and lightest in January at 59.3 millimetre (Bureau of Meteorology 2018).

These monthly climate statistics indicate a very cold winter with precipitation either in the form of rainfall or snow, with mild, moderately wet summers. Whilst the winters may have made habitation uncomfortable, the summer months indicate comfortable temperatures for habitation. The possible effects of temperature variations on the use of the area by Aboriginal people is discussed in **Section 5.2**.

5.2 Ethnographic background

5.2.1 Historical

There have been four main phases of European settlement near the project area. These are: Early European Settlement; Village of Ravine; Mining; and the Snowy Mountains Scheme. European settlers began arriving in the region in the 1820's as stockmen, graziers, and landowners.

The rise of the region as a centre for mining began with alluvial gold discovered in Adelong in 1852 (LRGM - Services 2002:9) and reef gold in 1857. In 1859 another goldfield was discovered at Gibson's Plain, later to be known as Kiandra. Following the decline of Kiandra, copper mining began in the land comprising the Lobs Hole Ravine/Ravine end in 1874. A result of the mining was the formation of the Village of Ravine which supported miner's requirements (Boot 2001: 3). Following this, a 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). Mining in the Alps was primarily for gold, which brought large numbers of people to settle in the Alps in other towns like Kiandra, approximately 13 km from Ravine. In 1874, two new areas for mining were opened: the Lobb's Hole copper lode and the New Maragle goldfield, both within the project area. Lobb's Hole was originally a resting place on the road between Tumut and the Kiandra diggings. Located in a deep valley along the Yarrangobilly River, the Lobb's Hole and village of Ravine area is spared the harsh winters experienced by the surrounding mountains. The New Maragle goldfields also opened in 1874, however no town grew up around them. Originally part of the Maragle pastoral run, the goldfields were worked intermittently from then until around 1900.

Between 1949 and 1974, the Snowy Mountains Scheme was constructed, aiming to create electricity for Australia from the high energy watercourses in the area. It involved the damming of several of the rivers to power turbines to provide electricity and to simultaneously store water for downstream agricultural irrigation.

5.2.2 Group boundaries

Aboriginal group boundaries are often analysed in relation to linguistic patterns and boundaries. The language groups identified within the Snowy Mountain region included Walgal (also spelled Walgalu, Wolgal) and Ngarigo (Sahukar *et al.* 2003; Tindale 1974). The project area is believed to be within the country of the Walgal people, whose lands occupied the northern part of the Australian Alps, near Kiandra, now referred to as Kosciuszko National Park. The Ngarigo people lived in the region around the highlands, which ranged over the Monaro Tableland region, from around Queanbeyan in the north and extending south just past the modern Victorian border, east to Nimmitabel and west to the Australian Alps.

Other Aboriginal groups, predominantly from the southern part of NSW would gather in the Australian Alps in the summer months for an annual pilgrimage to the Bogong and Snowy Mountains. These pilgrimages would result in feasts of Bogong moths (*Agrotis infusa*) that were found in abundance on the rocky outcrops of the mountains. The interactions between different tribal groups are evidenced by other activities apart from the Bogong Moths hunt. Pearse (1896), as cited in Knight (2010), describes one such interaction:

> *'The blacks used to trade from tribe to tribe for stone tomahawks, boomerangs, and other weapons made from Boree wood, which would go to the blacks who lived more than one hundred miles away; they in exchange pipeclay, done up in roles. And stone knives were placed in these rolls of clay, these knives they call kiandra because they came from Kiandra in the mountains; the pipeclay came from Moneymoney (place unknown), it in booras (sic); fighting parties also used it.'*

5.2.3 Social organisation and subsistence

Known as the mountain people, during the winter months both the Walgal and Ngarigo people would forage in the lower montane forests and on the tableland. However, unpredictable and harsh weather meant that food sources were scarce. During this time, fauna would have included macropods, wombats and possums, along with some edible tubers and rhizomes, however these were not as palatable at this time of year (Mulvaney and Kamminga 1999). A primary and releasable staple which would have been collected was the daisy yam (*Microseris lanceolate*). Additionally, honey from the hives of stingless bees and mana (sugary exudate) from the Manna Gum, Red Spotted Gums and Candlebark also provided subsistence and medicinal resources (Mulvaney and Kamminga 1999). Fungus such as field mushrooms were undoubtedly a reliable source of nourishment.

Described above Bogong moths (*Agrotis infusa*) are protein-rich insects that migrate every year in the spring from northern New South Wales and settle in the caves of the Snowy Mountains, where they would be harvested and roasted (Mulvaney and Kamminga 1999). Considered a delicacy by early Aboriginal people, the migration of the moths during the summer led to intensified harvesting for the preparation of 'cakes' composed of ground roasted insects. According to Bowdler, this was an exclusive male-related activity and strongly suggests correlation to the ceremonial practices as a 'communal food' (Bowdler 1981). Despite early settlers' exaggeration of the contribution of the moths to the diet, the Bogong moths most likely only partly contributed to a wide range seasonally mediated subsistence strategy.

Accounts indicate that fire was used for resource management by Aboriginal people in the Snowy Mountain region. An account by surveyor by the name of Thomas Townsend in 1846 recounts how many of the areas he surveyed in the Snowy Mountain region were burnt. Researchers have also speculated that fire management was utilised to smoke out the Bogong Moths as part of the summer ceremonial activities (Independant Scientific Committee 2004).

Material suitable for manufacture of stone tools is widespread within the Australian Alps. A rhyolite quarry is present on the summit of Devil's Peak in Brindabella Valley, a chert quarry has been identified in the Long Plain area, and within 8 km west of the project area is a quartz quarry. Silcrete is known to occur near Kiandra in the walls of the Eucumbene Valley, on the Adaminaby Plateau, near Jindabyne, along the Wullwye and Bobundara Creeks between Berridale and Dalgety as well as outcropping along the Cooma Creek Valley, however it is uncertain which outcrops would have been used for stone material procurement (Feary 1996).

5.2.4 Material culture

The term 'material culture' refers here to all tangible objects produced or used by Aboriginal people.

An understanding of the material culture used by Aboriginal groups pre and post European settlement is minimal and has been drawn together from negligible records produced during a context of death and dispossession. The limited knowledge of Aboriginal groups is described by (Stanner 1977) as a representation of the colonial and post-colonial attitude of a 'history of indifference'.

The toolkit of the Walgal people was described by Flood as containing several types of spears, including a 'death spear' tipped with stone barbs (Flood 1980: 51). Johnson and Paton include wooden clubs, grinding stones, scrapers, bone points and sharp-edged cutting tools as the elements of material culture within the region (Johnston and Paton 2000: 6).

5.2.5 Spiritual locations and culture

Entire landscapes hold significant cultural values. From an Aboriginal perspective land and people are inseparable. The mountains provided Aboriginal people with food, shelter, clothing, tools, utensils and medicine. Beyond this the messages underlying the stories of ancestral beings, who shaped the plant and animal communities and the landscapes themselves, governed all aspects of traditional Aboriginal society. These story lines link people and features of the mountains with those of other distant places to this day (NSW National Parks and Wildlife Service 2006).

Cultural group division appears to be somewhat mediated according to relative seasonality in the Mountain region. During the summer months, several bands joined together for ceremonial and initiation purposes. The Ngarigo people would be joined in October by their neighbours to the north, the Ngnunawal and the Jaitmatang, as well as the Yuin people from the coast. These annual ceremonies provided opportunity to solidify political, social and religious connections between the tribes. There were two ceremonial grounds, one at Jindabyne and another at Wollondibby Valley, where disputes were settled, marriages made, and young men initiated (Mulvaney and Kamminga 1999). An example of a ceremony was documented by Tom Wilkinson on the *Yallowin* run in the Tumut River valley who states:

> *'The blacks used to come in from Yass, Wallaregang, Omeo and Mitta Mitta and hold corroborees at Yallowin. I have seen 300 there at one time … On a hill in front of Yallowin there still remains the mark of a ring made by a blackfellows' corroboree. The corroboree made men of the youths after they had attained a certain age'.* (Wilkinson 1970, cited in Knight 2010).

5.2.6 European and Aboriginal interaction

By the 1850s European commodities replaced most of the traditional Aboriginal economy of the area and the only sustainable option for many Aboriginal people was to adopt European practices (Officer 1989). From 1823, Aboriginal men acted as guides to pastoralists through the mountains and they were later engaged as stockmen and brumby runners (Context Pty Ltd 2015). The expansion of pastoralism and introduction of European diseases slowly diminished much of the local Aboriginal population.

Following European settlement, winter food supplies – already sparse – diminished substantially. The effects of this were compounded by isolation from some of the most resource abundant grassland and the disbandment of many inter-tribal ceremonial and social networks. By 1835, John Lhotsky said of the Ngarigo: *'Of the tribes of the natives, which visit this hut sometimes to the number of sixty and seventy, I heard the following: the Menero (Monaro) tribe is very weak, consisting of about fifty men'* (Lhotsky, cited in Seddon 1994: 124).

Charles Sturt, however, visited the Tumut Valley ('*the Dumot river*') in 1828 and found it '*better peopled*' than the Murrumbidgee Valley, and considered it being '*little inferior to the (Morumbidgee (sic)) either in size or in the rapidity of its current*'" and that it watered '*a finer country, the principal rock-formation upon it being of limestone and whinstone*' (Sturt 1834: 25).

By the mid-19th century, the arrival of diseases and European settlers had catastrophically disrupted Aboriginal society. Some Aboriginal people remained in the area and worked within the area, however a large majority had become removed from their traditional lands. Many ended up living on government reserves. This upheaval included the separation of family members, the forced abandonment of traditional practices and a great loss of cultural knowledge (NSW National Parks and Wildlife Service 2006). Despite this, Aboriginal people of the region have retained important strands of their culture, including their sense of identity and belonging.

6. Aboriginal cultural values

6.1 Introduction

> *The Mountains are very old and an ongoing life force that strengthens the ancestral link of our people. We have a living, spiritual connection with the mountains. We retain family stories and memories of the mountains, which makes them spiritually and culturally significant to us. Our traditional knowledge and cultural practices still exist and need to be maintained...*
>
> *Our people travelled from many directions over long distances to gather peacefully on the mountains for trade, ceremony, marriages, social events and to settle differences.*
>
> *The cycle of life and many seasons influence the movement of our people through the mountains to the sea and the desert. The stars, clouds, sun and the moon guided people to and from places of importance. These travel routes continue to be used and spoken about today...*
>
> *Let us not forget the past while we look forward to the future. Past and present practices make us strong and we are committed to making this a better country for all.*

Extracts from: Kosciuszko National Park 2006, Plan of Management', A Statement from the Kosciuszko Aboriginal Working Group, (NSW National Parks and Wildlife Service 2006).

The cultural assessment in this report includes cultural information collected through consultation during survey (**Section 4.3**), a review of previous cultural heritage reports (**Section 7** and a review of the available ethnographic literature (**Section 5.2**). The Aboriginal cultural assessment was undertaken by Andrew Costello (Associate Archaeologist, Jacobs).

6.2 Method of obtaining information

The assessment involved consultation with knowledge holders as identified by the RAPs for the project. The cultural assessment was based on:

- Reviewing archaeological fieldwork and consultation from previous archaeological and cultural assessments
- Reviewing literature relevant to the boundary of the project area and surrounding landscape
- Consultation with knowledge holders for the region during survey
- Consultation with knowledge holders outside of survey (feedback from salvage methodology and ACHAR drafts).

Input and feedback can be provided by RAPs at any time throughout the assessment process. Jacobs has sought input and feedback from RAPs at several points during the process (following procedures detailed in DECCW 2010a):

- During Stage 2 – Initial presentation of information about the project
- During Stage 3 – Providing RAPs with the draft proposed methodology. RAPs were invited to provide feedback on the proposed methodology, and to identify cultural heritage values associated with the project area
- During fieldwork, including survey and test excavation
- During Stage 4 – Providing RAPs with the draft ACHAR. RAPs are invited to provide feedback on the report, and any further information they wish to be included.

The information provided has contributed to an understanding of the cultural value of the broader landscape within which the project area is located. Knowledge holders have provided information about the traditional presence of Aboriginal people in the landscape and the impact of European land management practices on their traditional land, and subsequently their culture.

6.3 Cultural landscape

Aboriginal cultural knowledge was traditionally bequeathed through oral traditions from generation to generation. Within all Aboriginal communities there was a time of dislocation and upheaval associated with the invasion of European settlers which resulted in the loss, to varying degrees, of traditional knowledge of the elements of the cultural landscape.

Aboriginal occupation and lifeways in the Australian Alps represent a unique and distinctive response to the nature and challenges of this alpine landscape (Johnston *et al.* 2014a). The wide cultural influence created through ceremonial gatherings in the mountains, supported by or linked to the practice of gathering and eating the Bogong moth, appears likely to have been important in the course and pattern of Aboriginal history across a large part of south eastern Australia. The ceremonial gatherings are already recognised as having National Heritage value, because the 'moth feasting' sets apart these 'annual gatherings of different Aboriginal groups for ceremonies' from other Aboriginal ceremonial gatherings in Australia (Garrett 2008).

> *Entire landscapes also hold significant cultural values. From an Aboriginal perspective land and people are inseparable. The mountains provided Aboriginal people with food, shelter, clothing, tools, utensils and medicine. Beyond this the messages underlying the stories of ancestral beings, who shaped the plant and animal communities and the landscapes themselves, governed all aspects of traditional Aboriginal society. These story lines link people and features of the mountains with those of other distant places to this day.* (NSW National Parks and Wildlife Service 2006)

The network of Aboriginal pathways into and through the alpine area, used for ceremonial and travel purposes, appears likely to be of considerable antiquity, linking Aboriginal clans and nations and supporting cultural exchanges and trade. The use and development of the network of traditional Aboriginal pathways by the colonial settlers, often guided by Aboriginal people, was important in the early establishment of pastoral activities in the alpine area and the development of a practice of transhumance grazing, an attribute recognised as of national heritage value.

The adoption of these Aboriginal cultural routes and the continuity of use of some routes through to today is also an aspect of their significance as it has influenced the pattern of travel into and through the mountains for over 200 years. It represents an early and important intersection between Aboriginal and colonial settler histories.

Aboriginal people who recognise themselves as having a living, spiritual connection with the mountains' (NSW National Parks and Wildlife Service 2006) value the Australian Alps as a place that is significant to their past and present:

- As the place of their ancestors from time immemorial
- As land to which they belong and where they feel at home – a place that forms part of people's personal and collective identity
- As country interconnected by dreaming stories and ceremonial paths, and where there are places of spiritual significance, including places where evidence of creation ancestors is revealed
- As a place containing an extensive and diverse range of sites and localities associated with their ancestors, d emonstrating the duration of Aboriginal association with this land and aspects of their cultural traditions
- As a living landscape where the land itself, the mountains and all creatures are respected and form part of a n inter-connected web, and where each is essential to the whole

- As land that gives life – to people, to all creatures and to the wider lands of southeastern Australia through the waters that come from the mountains
- As country to which Aboriginal people have cultural rights and responsibilities, including those connected to totemic species, to land management, to rites of passage and to lore/law
- As a totemic and symbolic environment alive with meanings able to be interpreted by Aboriginal people
- As an important meeting place for Aboriginal clans from many nations within and beyond the mountains where cultural exchanges, ceremonies and other activities occurred, probably over millennia
- As a place for learning and teaching, where Aboriginal people can reveal and demonstrate their continuing knowledge, can reconnect to the land and the lives of their ancestors, and where knowledge that has been p assed down through generations can be passed on
- As a place where traditional practices have been and should continue to be carried out
- As a landscape made up of many distinctive places, each with particular connections for individuals, families, local Aboriginal people and clan groups (Nixon 2015).

6.4 Identified cultural heritage values relevant to project area

Archaeological sites hold cultural value to Aboriginal people, due to the evidence they provide of their ancestors' occupation of the landscape. Apart from archaeological sites, there are no places where specific Aboriginal cultural values have been identified during consultation and from the cultural heritage reports, either within or in the immediate vicinity of the project area. During consultation, however, it was repeatedly expressed by the RAPs that the area was a meaningful place to the local Aboriginal communities, that there was a feeling of custodianship of the sites and objects within the project area and that the land holds specific social, spiritual and cultural values. It was expressed by representatives of the Snowy Mountains Indigenous Elders Group and the BTLALC that people had lived in the area for thousands of years, and that the high ridges, rock shelters, confluence of creeks, rivers and permanent water sources are highly significant parts of the Aboriginal landscape.

The Australian Alps are of outstanding heritage value to the nation for the strong and enduring social and spiritual association of the Alps with more than 18 Aboriginal clan groups from across south eastern Australia for whom the Alps were part of their traditional country or as an area over which they had other rights (Johnston *et al.* 2014b).

Aboriginal occupation of the Alps and the associated cultural expressions are represented in a network of pathways, ceremonial practices and sites, and in combination with moth hunting demonstrating a uniquely Australian cultural activity. These are places that have evidence of their connection to these areas.

7. Aboriginal archaeological desktop assessment

The desktop assessment included a search of the AHIMS and a review of existing data (including any previous archaeological investigations specific to the project and register searches) to identify any gaps in the assessments. Information compiled as part of the background review provided the framework for the development of a predictive model for site location.

7.1.1 Aboriginal Heritage Information Management System search results

An extensive search of the AHIMS database maintained by Heritage NSW was undertaken on 21 September 2020, by Dr Oliver Macgregor (Senior Archaeologist, Jacobs). This search superseded an earlier search undertaken on 18 January 2018 by Deborah Farina (Senior Archaeologist, Jacobs).

The 21 September 2020 search area was rectangular, stretching between eastings 615750 – 630110 and northings 6035210 – 6040860 (GDA 94, zone 55). It enclosed the entirety of the project area and a portion of the surrounding landscape (**Figure 7-1**).

The search returned 101 previously recorded sites within the search area (**Appendix C**). A total of five previously registered sites are recorded as lying within the project area as listed in **Table 7-1**. All five of these sites are also within the disturbance area.

Table 7-1: Summary of previously recorded AHIMS sites located within the project area

AHIMS ID	Site name	Datum	Coordinates Eastings (Zone 55)	Coordinates Northings (Zone 55)	Site type	Distance from disturbance area
56-6-0009	Ravine; Lobs Hole; KNP91-59	AGD	627600	6037900	Open Camp Site	Within disturbance area
56-6-0477	Ravine SU17/L1	GDA	626656	6038018	Artefact Scatter	Within disturbance area
56-6-0495	Ravine SU3/L1	GDA	627704	6038078	Artefact Scatter	Within disturbance area
56-6-0496	Ravine SU3/L2	GDA	627673	6038084	Artefact Scatter	Within disturbance area
56-6-0497	Ravine SU3/L3	GDA	627641	6038087	Artefact Scatter	Within disturbance area

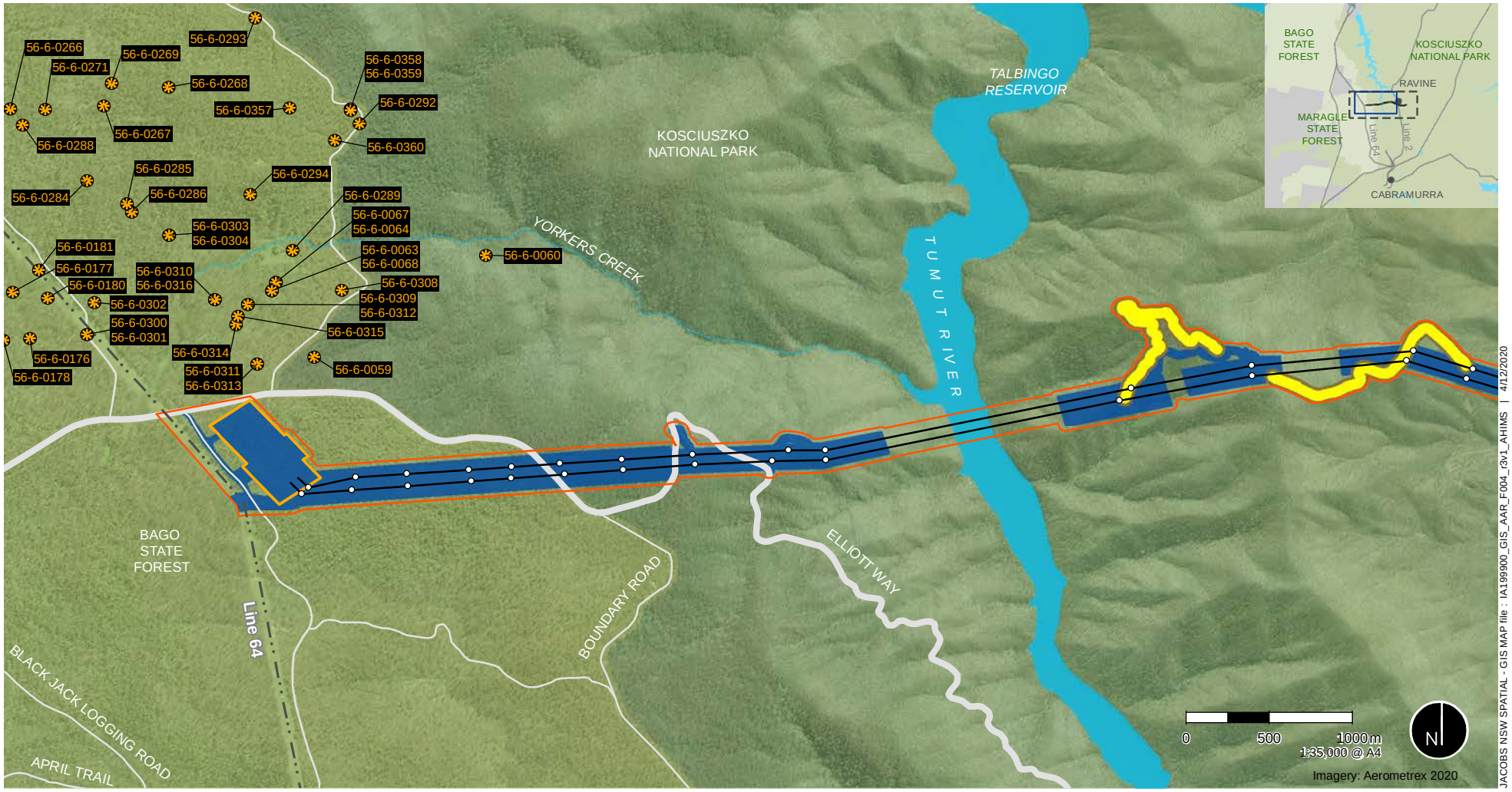


Figure 7-1 | Project area showing previously recorded sites obtained from AHIMS search

Data source:
Jacobs 2020, OEH 2019,

Project area
Disturbance area
Proposed structure
Proposed transmission line
Snowy 2.0 cable yard
Snowy 2.0 Disturbance footprint
AHIMS
AHIMS search extent (see inset map)
Future survey area
Electricity transmission line
Minor road
Major road
Trail
Waterway
Water body
NPWS estate

Figure 7-1 | Project area showing previously recorded sites obtained from AHIMS search

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

7.1.2 Previous archaeological assessments in the project area and surrounding region

In addition to the AHIMS search, a review of the previous archaeological assessments within and around the project area was completed. The most relevant archaeological assessment to the project area is Dibden's (2018) archaeological survey, and subsequent test excavations (Dibden 2019), which examined Lobs Hole Ravine, Talbingo Reservoir and the Mine Trail road. These survey areas overlap with the current project and provide the location of Aboriginal sites and artefacts.

Previous archaeological investigations have been completed both within the wider Snowy Mountain's region along within the project area. Dibden (2004a; 2018; 2019) and EMM Consulting (2018) work for the Snowy Scheme have developed an understanding of Aboriginal occupation within the Snowy Mountains.

The project most relevant to this assessment has been the work of Dibden (2019) at Lobs Hole Ravine which provides significant information which influences the understanding of the project area. Within Lobs Hole Ravine, 151 test pits were excavated, with 45 of these occurring within the project area. These test excavation areas were chosen by Dibden as a result of previous archaeological survey which identified locations of moderate/high archaeological potential. The artefacts which were recovered were widely distributed in a subsurface context. Artefact densities ranged from very low to relatively high throughout the area. The types of artefacts retrieved were pieces of flaked stone representing debitage, along with cores and retouched artefacts. The artefacts were dominated by stone material which was locally sourced, such as tuff and quartz. Dibden (2019) concluded that Lobs Hole Ravine contained stone artefacts across the whole survey area, with mean artefact density calculated to be 51 artefacts / m^2. Due to the variable densities of artefacts in the area (relatively low in some areas, and high in others) Lobs Hole Ravine is interpreted to have been utilised for relatively intensive Aboriginal occupation. Lobs Hole Ravine provides an environment that is sheltered from the elements and is atypical of the surrounding region in this respect.

Other archaeological projects and heritage assessment carried out in other regions of the Australian Alps are also of relevance to this assessment.

Flood (1973) completed one of the first archaeological surveys within the region. A one km transect, going north to south, was surveyed within Thredbo valley. Sites were noted as occurring within the Kiandra, Boggy Plain and Mount Tantangara area. Three sites were recorded within the Bogong Mountains, located in open flats.

Additional survey investigations were conducted in the lower valleys on the Snowy River and around Jindabyne. Several artefact scatters were recorded within the area, including a large site in the saddle at Connors Hill. Over 100 artefacts were recorded, with the assemblage including backed blades and manuports and a backed scraper made of glass. Flood (1980) provides a description of the (*Bora) Rings* bunan site. Located in the Bogong Mountains, the site is ceremonial and is situated within a natural frost-hollow clearing.

The archaeological investigations by Flood (1980) emphasised that these sites were likely summer camps and they would have been used in order for more efficient exploitation of the Bogong moths, understood at the time to be as a stable food source. This understanding of the moth as a stable food source has been challenged by Chapman (1977) who argued that were was a lack of evidence to support this claim and that the moth lacked nutritional value to act as a staple.

The location of sites in relation to altitude was investigated by Cooke (1988) on the Cooleman Plain. Archaeological sites were found in both low and high altitudes, however higher altitudes ranging between 1200 m- 1450 m, were found to contain more sites. The sites found within this higher altitude level were interpreted by Cooke (1988) as reflecting longer-term occupations.

An archaeological survey was conducted by Navin (1989) on the Montt Tantangara summit, which is classified as a high altitude area. The survey was associated with radio communication tower developments within the Snowy Mountains. Results from the survey included the identification of four artefact scatters. All sites were small in area and contained low artefact densities and numbers. They were located on grassed, relatively flat, well drained ground, and within sheltered contexts within or adjacent to Snow Gum woodlands.

Similarly, to the survey by Navin (1989), a survey of Mt Gooandra was conducted in association with radio communication tower developments within the Snowy Mountains. No sites were recorded and the whole area was considered to be of low archaeological potential.

Two sections of an existing transmission line easement was surveyed by Navin (1991). The easements extended from the Tooma River to Roaring Mag Mountain at Yellow Bog, and then from Scammels Ridge to Dargals Fire Trail. One site made up of four chert stone tools was recorded and interpreted as being representative of a spare scatter.

Boot (1999) completed a survey west of the Tantangara Reservoir on Quarry Road. The area examined was a 3.5 km stretch of road and resulted in nine artefacts scatters, and two isolated finds. The sites were located on flat spur crests or adjacent to creeks. The elevation of these sites were between 1240 m and 1260 m which Boot (1999) suggests was to avoid cold air drainage in the valley floor.

Quarry Road in the Tantangara Reservoir was subsequently investigated again by Taylor (2000). The sites previously identified by Boot (1999) were relocated and an additional two sites were recorded. The sites were assessed as low-density artefact scatters. One site was interpreted as a potential base camp as there was a large number of artefacts present.

An archaeological survey was conducted at Denison which is on the northwest shore of lake Eucumbene (Boot 2000). The survey re-identified two previously recorded sites by Johnson and Jones (1991), and recorded an additional four artefact scatters, and three isolated finds. All sites were within an altitude of 1200 m- 1160 m. The assemblages were small and made up of chert, and volcanic and quartz materials.

Johnston and Paton (2000) were commissioned to ensure the protection of cultural heritage along the proposed upgrade to 17 transmission towers on the 02-feeder line which goes from Cabramurra to Goobarragandra through the Kosciuszko National Park. The study area was located within the sub-alpine tract and lies within the eastern part of the Tumut River catchment. Along the proposed power line route and in an area of 5 km there were 37 previously recorded sites. Of the previously recoded sites the majority (31) were open campsite, three Bora grounds or ceremonial areas, and the remaining comprised an axe grinding groove, an isolated artefact and a scarred tree. The two largest concentrations of sites lied on a relatively flat area in the Yarrangobilly River, a concentration of 16 sites was located around the present settlement of Yarrangobilly and another group of eight sites was situated at the Lick Hole Gully. Three ceremonial grounds were located on high ground, two on Pillared Rock Ridge and the third near Bogongo Mountain in the Bogong Mountain Range. These 37 sites previously recorded in conjunction with the ethnohistorical records indicated that this area was used by the Aboriginal community who has possibly established camps and ceremonial areas in the high peaks. Results from the survey by Johnston and Paton (2000) did not identify any Aboriginal sites within the study area.

Dibden (2003) surveyed a section at Mt Selwyn due to a proposed underground power cable. Although no archaeological sites were recorded the whole area was viewed as having archaeological potential.

Dibden (2004b) investigated several proposed Snow Chain Bay locations at Mt Selwyn for potential Aboriginal Cultural Heritage. These areas were located on the Snowy Mountains Highway. A result of the survey was the identification of one artefact scatter on a hillslope near Connors Hill.

The Yaouk and Scabby Range Nature Reserves were examined by Knight (2004). The survey identified 39 Aboriginal sites, of these 24 were artefact scatters, 14 isolated finds, and one stone arrangement. All the sites were located either in association with basal slope and spur features in valley contexts, or in direct proximity to permanent water sources.

A water pipeline between Three Mile Dam and the snowmaking pond at Selwyn Quarry was proposed in 2006 and prior to its approval an archaeological assessment of the area was required. Dibden (2006) conducted the survey and did not locate any Aboriginal sites. The absence of archaeological sites was explained as most likely due to the area not possessing a range of high biodiversity or access to permanent water.

A desktop assessment was conducted for a Precinct Plan within Kiandra. The area was assessed as having a low occupation potential due to the absence of resources. Feary and Vincent (2007) suggested that though not intensively used, the area would have been utilised as a corridor of movement associated with the exploitation of Bogong moths at the high peaks, ceremonial activity, and as a possible source of stone for making toolkits.

Mt Selwyn Resort was examined by Knight (2009). The area was divided into two main region, the more elevated and steeper terrain; and the lower elevated, and gradient areas. For the higher elevated area there was a low potential of archaeological finds as there was a high level of disturbance, as well as being in an area which was exposed, steep, and had rugged terrain. Contrastingly, the less elevated area contained an isolated artefact. The results of this assessment demonstrated that areas at lower elevation and lower gradients tended to be more favourable for Aboriginal occupation.

NPWS commissioned Knight (2010) to conduct an archaeological assessment of the Kiandra precinct. Results from the survey identified 17 Aboriginal sites. Of these 10 were artefact scatters, six were isolated artefacts, and one was a cultural landscape feature. Additional to the site survey, Knight (2010) suggested that site distribution and location within the area could be explained as follows:

- Shelter would occur at locations near tree lines and on higher ridges which would have afforded shelter from wind and avoided cold drainage/ wind tunnel effects from the valley and plains
- Ecological diversity and varying locations could have provided a wider range of available food resources and/ or easier access to foods
- Strategic preference and travel would come from more elevated positions in the landscape as they would provide open views of the surrounding terrain and provide natural topographic travel routes, particularly between major watersheds
- Cultural factors would most likely have been restricted to certain parts of the local terrain and as such may reflect a purposeful, structured cultural division of the landscape that was intimately understood by those who utilised it.

Theden-Ringl (2016) examined six Namadgi rock shelters within the Namadgi ranges, located 30 km east of the Tantangara Reservoir. The rock shelters were located in altitudes ranging from 900- 1200 m. These sites have provided a broad occupation chronology from 8,000 years BP (Theden-Ringl 2016). The sites demonstrate relative continuity of occupation from the Pleistocene- Holocene transition to the recent past. Other sites within higher altitudes include Yarrangobilly Y258 (Aplin *et al.* 2010), and Nursey Swamp 2 (Rosenfeld *et al.* 1983) which have been dated to older than 3,000 years ago. Theden-Ringl (2016) argues that the presence of these sites fits a model of increased exploration and occupation within the region, by generally low populations. This would indicate a response to the opening up of ecological resources.

Theden-Ringl (2017) produced a revised model of technological change for the high country from lithics located from the Namadgi sites. No evidence was found which provided support for Flood (1980) regional model which discussed a late Holocene technological transition from chert-dominated backed artefacts to a bipolar quartz industry. Furthermore, no evidence was provided which supported the cultural change associated with a blacked artefact proliferation at circa 4,500 to 3,500 years BP (Hiscock 2008). Rather what Theden-Ringl (2017) found was that there were technological shifts in morphometric decline, raw material diversity and the appearance of backed artefacts within the last millennium.

Ongoing work by Knight (2017) examines the areas of the Yarrangobilly, Rules Point and Tantangara for a field-based PhD (Knight pers. comm. with Dibden 2018). Preliminary examination has identified two artefact scatters within Yarrangobilly. Both sites were located on an elevated spur crest and an alluvial bank overlook the river. At Rules point another two artefact scatters were recorded. One of the artefact scatters was positioned on a low gradient spur crest and contained over six artefacts. Within the Tantangara region six sites were recorded. Five of these sites were artefacts scatters, and one was an isolated find.

Aboriginal sites are distributed densely within Thredbo Valley. In particular, excavations of the flats above the river uncovered thousands of artefacts (Mulvaney and Kamminga 1999). These large sites could have been formed by large camps of Aboriginal people converging and travelling through the area as part of the historically and culturally recorded ceremonial gatherings in the mountains.

7.1.3 Previous predictive models

Within the Snowy Mountain region several archaeological predictive models have been developed which examine general trends and assemblage patterns (Johnson 1992; Knight 2010). These trends typically assess site location and assemblage size in relation to altitude.

For the project area the following predictive features have been used to assist in analysis and site fieldwork.

- A modal elevation value of 1,300 m with a noticeable 'peak' in site numbers in the 1,000 m – 1,400 m range typical of the elevated areas of low relief in the Park's north (Johnson 1992: 81)
- Highest levels of artefact scatter complexity were apparent in lower altitude, broad river valleys (Johnson 1992: 94)
- A strong tendency for sites to occur in areas of low gradient, generally in the 3-6 degree range (Johnson 1992: 84)
- Artefact scatters displayed the highest level of raw material diversity in the north of the Park, with a notable range of cherts. Quartz remained ubiquitous throughout all assemblages and possible external sources of stone, including a Namadgi chert, were also apparent (Johnson 1992: 94).

Knight (2010) found that in the Kiandra Precinct study, the fact that most of the sites were located within snow grass/snow gum ecotones is potentially of considerable significance and appears to parallel archaeological findings in nearby and comparable montane and inter-montane zones such as Cooleman Plain and the Yaouk/Scabby Range area (Knight 2004) and further supports Feary and Vincent's (2007) (Feary and Vincent 2007) predictive statement for the precinct. However, Knight (2010) cautioned that the degree to which the current tree line and vegetation species distribution have been altered by historical activity remains unknown and this must be acknowledged. Site distribution according to study area zone also showed a strong bias toward the higher elevation areas. The evidence suggests that substantial activity in the study area's highest locations, such as the elevated ridges over the riverine valley, were preferred locations. Landscape positions such as prominent hilltops and flanks and elongated ridgelines exhibit the highest archaeological signatures. However, this is not universally reflected, and a substantial exception occurs in the apparent total lack of Aboriginal sites along the top of the Kings Cross ridge. Knight (2010) suggests possible explanations for the Kiandra site distribution may include the following:

- Shelter camping locations at the tree line and in the lee of higher ridges and hills may have afforded shelter from wind, while avoiding cold air drainage and possible 'wind-tunnel' effects in the riverine valley and open grassy plains terrain
- Ecological diversity: Ecotone locations could have provided a wider range of available food resources and/or more easily accessible foods than the open grassland
- Strategic preference and travel: More elevated positions in the landscape provide open views of the surrounding terrain and in many cases comprise natural topographic travel routes, particularly between major watersheds. The ridgeline forming the route for the Wallace's Creek Fire Trail for example is a natural landscape 'pathway' connecting the steep creek and riverine zones of the west with the upper Three Mile Creek catchment and Gibsons Plain. The correspondingly high number of artefact scatters along the ridge top and the proximity of a significant natural cultural feature may reflect the importance of this natural landscape continuity and provide physical evidence of the Aboriginal 'pathway'

- Cultural factors: Restriction of certain activities to particular parts of the local terrain may reflect a purposeful, structured cultural division of the landscape that was intimately understood by those who utilised it. Given Kiandra's potential importance as a route of travel to and from ceremonies and as a meeting place associated with such ritual activity, there is scope for the local archaeology to reflect social convention including 'acceptable' and 'preferred' places for travel or activities undertaken by visitors or members of specific groups/gender
- Taphonomy: There is substantial potential for extensive site destruction to have occurred in the areas subject to mining activity in the historical period. Archaeological evidence of Aboriginal use of the riverine zones and other alluvial landforms in the study area may well be lacking simply because it has been obliterated by gold extraction methods such as sluicing, dredging and paddocking

Following her archaeological surveys in the lower valleys of the Snowy River and around Jindabyne, Flood (1980) proposed a regional site location model. Part of this model divided site types into five distinct types, these were: large lowland base camps, medium size lowland camps, montane valley camps, high summer camps, and camps above winter snow-line. Overall it was stated that sites would be:

- Most likely located 50-100 m from a river bank and above flood levels;
- Located on well drained ground (sometimes of a steep gradient) rather than low lying poorly drained alluvial flats;
- To have a northerly or easterly aspect in which protection from prevailing westerly and southerly winds is possible;
- To be clustered with larger sites situated around bends in rivers.

Flood (1980) further proposes that for sites in higher elevations the following characteristics will be found:

- Small sites and isolated finds could be found above the winter snowline (at c.1,525 m above sea level (asl)). These sites would consist of pebble tools representative of moth exploitation;
- Small campsites would be located below the tree line and winter snowline (1,525 – 1,200 m asl). These sites would be representative of men's base camps related to the exploitation of the moth; and
- Larger campsites would be located below 1,200 m asl within montane valley contexts. These sites would be related to summer usage (though may have also been used in other seasons).

These models developed specifically for the Australian Alps are focused on higher elevations typically encountered in project area west than the lower elevations generally encountered in project area east. Lobs Hole Ravine and Talbingo are mostly below 600 m above sea level and it is only the south end of the Lobs Hole Ravine Road that approaches elevation contexts considered by Johnson (1992) and Knight (2010).

7.2 Predictive model of site distribution for the project area

While the predictive model of site type and location presented in this section considers a comprehensive range of Aboriginal sites, stone artefact distributions are likely to be the most common. Because of high levels of previous European impacts, other site types such as scarred trees, are less likely to have survived in the project area. Other types such as rock shelters are unlikely to be present simply because of the nature of the local geology in the project area.

The predictive model was used to assist in the identification of areas which would contain potential higher archaeological sensitivity. Based on previous predictive models, previous archaeological results, past land use history, and the environmental descriptions, the following predictions for Aboriginal sites to be present within the project area were made:

- Stone artefact occurrences (isolated or in clusters) are likely to be the most common site types
- Scarred trees and ceremonial structures are less likely to be present due to European land-use practices

- Rock shelters and art sites are unlikely to be present due to the surrounding geology not being conducive to shelter formation
- Stone artefacts are predicted to be present on the surface and under the ground. Artefact density and site complexity is expected to be greater near reliable water, areas of low gradient and the confluence of a number of different resource zones
- Both low density surface and subsurface artefacts may occur across the entire project area.

7.2.1 Expected site types

Stone artefacts

Stone artefacts are most often the only cultural material that remains in archaeological sites in this region. They are not affected by decomposition processes to the same extent that organic objects are. Within the project area stone artefacts occur as the most common artefact type (see **Section 7**). Previously recorded stone artefacts in the region are representative of tools utilised by Aboriginal people, as well as debris resulting from flaking stone. These include unmodified and retouched flakes, cores and flaked pieces. In some areas it is possible to find stone tools such as scrapers, backed artefacts or adzes and pieces with evidence of use. It is also expected that a wide range of implement types will be present as representing a range of diverse behavioural activities and resource utilisation.

Stone artefacts are found either on the ground surface and/or in subsurface contexts. Stone artefacts will be widely distributed across the landscape but with significant variations in density in relation to different environmental factors. Artefact density and site complexity is expected to be greater near reliable water and the confluence of a number of different resource zones.

Typically, stone artefacts recorded in open contexts are representative of debris which results from flaking stone and will include unmodified flakes, cores and flaked pieces. Utilised and/or specially shaped implements such as scrapers, backed blades or adzes, or pieces which possess evidence of use, generally occur in low frequencies. The ability to detect artefact scatters depends on ground surface factors and whether the potential archaeological bearing soil profile is visible. Prior ground disturbance, vegetation cover and sediment/gravel deposition can act to obscure artefact scatter presence.

Generally, stone artefact distributions represent a range of stages in what can be conceptualised as a 'reduction sequence' – the reduction of stone by stages of flaking and/or grinding to make stone tools. The debitage (or debris) from tool making, including partly fashioned implements and finished implements, was discarded or lost on the ground and subsequently incorporated into the archaeological record.

The results of the AHIMS search show that scatters of stone artefacts are the most commonly recorded type of site recorded in the region. In relation to the project area, previously recorded stone artefacts are concentrated in and around project area east, primarily on areas consisting of level topography and in valley floor contexts near to the existing surface waters including Yarrangobilly River and its tributaries. Given the different environmental contexts present, stone artefacts are predicted to be present in variable densities ranging from very low to high. The extensive prior disturbance from Non-Aboriginal settlement, and from geomorphological impacts, is certain to have impacted the artefact distribution but the extent of these impacts is unknown.

Given the diverse and potentially resource rich environmental context of Lobs Hole Ravine, it is expected that a wide range of implement types will be present reflecting the range of behavioural activities likely to have been undertaken.

Grinding grooves

Grinding grooves are always located on sandstone exposures and are the result of the manufacture and maintenance of ground edge tools. Such tools were generally made of stone; however, bone and shell were also ground to fine points. The location of sites with grinding grooves is dependent on the presence of a suitable rock

surface, a fine-grained homogeneous sandstone and a water source. Given the general absence of sandstone exposures in the activity areas (rough, blocky sandstone does however occur nearby), this site type is unlikely to be present. However, given the requirement to maintain ground edged implements, portable whetstones which satisfy this need may well be found (cf. Dibden 2005a).

Grinding groove sites may consist of a single groove, or a large number which are sometimes arranged in patterns. They commonly occur as an open site particularly in creek beds, although are sometimes found in rock shelters with suitable geological conditions. Usually grinding grooves are located on horizontal sandstone exposures, but they can occasionally be found on inclined or vertical surfaces.

A broad temporal framework for the age of grinding groove sites can be inferred on the basis of the age of ground-edge hatchet heads found within archaeological deposits. Across Australia, there is significant variation in the timing of the introduction of ground-edge hatchet technology, with the oldest evidence of such technology being 44,000-49,000 BP (Hiscock *et al.* 2016) although in the south-east there are no archaeological examples dating earlier than 3,500 years ago(Hiscock 2008: 155). Grinding groove sites in the local area are unlikely to be older than 3,500 years as a consequence. Given that hatchets were used at the time of European occupation (Dickson 1976; Flood 1980; McBryde 1984), the use of some grinding groove sites may have spanned this temporal range.

Grinding hatchet heads on stone creates indelible marks on the rock surface and land. Grinding groove sites may have become significant and meaningful locales over time given their reference to an important item of material culture and their strong material presence in the landscape. Sites containing high groove counts are now visually significant marked locales. While the original motivation which led people to choose to grind hatchet heads at a specific place is now not well understood, it is possible that over time and as a place became increasingly embellished with grooves, the meaning and significance of that locale was changed correspondingly. Grinding groove sites may have provided a physical and conceptual reference to the ancestral past and activities of previous generations (Dibden 2011). Because of the enduring materiality of grinding grooves, they may have been meaningfully constituted expressions of place and mnemonic of past events and personal and group history (cf. Peterson 1972: 16).

Burials

Burial/interment sites have been recorded within the wider region. On the Monaro Plains and in the Snowy Mountains, human remains have been found buried in excavated ground contexts (Feary 1996; Helms 1895: 404 - 406), in limestone caves (Spate 1997: 39) (eg. Spate 1997: 39) and deposited in standing hollow trees (Flood 1980: 120; Helms 1895: 399).

Prehistoric burials are present within the wider region. An Aboriginal site was found near Cooma in 1991 which contained skeletons of two individuals dated to ca. 7000 years Before Present (BP). Associated with the remains were grave goods which contained 327 pierced kangaroo and wallaby teeth (possibly part of a necklace), stone tools, polished bone points and eight macro pod mandibular rami (Feary 1996). The site is considered to be of extreme importance due to the associated grave goods and its age.

No burials are known to be present in the project area or the immediately surrounding landscape. Aboriginal burials are rarely encountered during field survey. They are not expected to be found in the project area, but the potential cannot be discounted.

Rock shelter sites

Rock shelter sites consist of any form of rock overhang that contains artefacts, archaeological deposit and/or art. Common archaeological features of rock shelter sites are: surface artefacts, archaeological deposit including stone artefacts, shell, bone and charcoal, rock drawings, paintings and stencils, engraved imagery and grinding grooves. No rock shelters have been recorded in the project area. The tufa formations located in the cliff lines south and east of Lobs Hole Ravine, outside the project area, do form small caves and may have been used by Aboriginal people.

Scarred and carved trees

Scarred and carved trees result from the removal of bark by Aboriginal people for either domestic or ceremonial purposes. These site types can occur anywhere that trees of sufficient age are present, however, in an Aboriginal land use context would most likely have been situated on flat or low gradient landforms in areas suitable for either habitation and/or ceremonial purposes. Bark removal by European people through the entire historic period and by natural processes such as fire blistering and branch fall, make the identification of scarring from a causal point of view very difficult. Accordingly, given the propensity for trees to bear scarring from natural causes their positive identification is problematic unless specific variables such as stone hatchet cut marks or incised designs are evident and rigorous criteria with regard to tree species/age/size and specific characteristics with regard to regrowth are adopted. The potential for scarred trees to be present in the project area is considered possible but low.

Stone quarry and procurement areas

A stone quarry is the location of an exploited stone source (Hiscock and Mitchell 1990; 1993). Sites will only be located where exposures of a stone type suitable for use in artefact manufacture occur. These sites will commonly have evidence of exploitation including extraction and preliminary flaking. e. Quarries are a rare site type in this region although Comber (1988) recorded numerous quartz quarries on the Monaro. No quarries are known to be present in the project area. The potential for quarries to be present in the project area is considered possible but unlikely. The abundance of pebbles in the Yarrangobilly River may have been utilised as a stone source, but it would be difficult to determine this with certainty.

Ceremonial places and sacred geography

Burbung, Bora grounds and ceremonial sites are places which were used for ritual and ceremonial purposes. Possibly the most significant ceremonial practices were those concerned with initiation and other rites of passage such as those associated with death. Sites associated with these ceremonies are burbung grounds and burial sites. Where these sites are raised earth rings they may persist if left undisturbed, but they are susceptible to disturbance from land clearing and cultivation.

Additionally, secret rituals were undertaken by individuals such as clever men. These rituals were commonly undertaken in 'natural' locations such as water holes. In addition to site specific types and locales, Aboriginal people invested the landscape with meaning and significance; this is commonly referred to as a sacred geography. Natural features are those physical places which are intimately associated with spirits or the dwelling/activity places of certain mythical beings (Boot 2002). Boot (2002) refers to the sacred and secular meaning of landscape to Aboriginal people which has '… *legitimated their occupation as the guardians of the places created by their spiritual ancestors*'.

While many places in the high country are known with respect to their 'sacredness' (NSW National Parks and Wildlife Service 2006), none are reported for the project area.

Contact sites

These sites are those which contain evidence of Aboriginal occupation during the period of early European occupation. Evidence of this period of 'contact' could potentially be Aboriginal flaked glass, burials with historic grave goods or markers, and debris from 'fringe camps' where Aboriginals who were employed by, or traded with the white community, may have lived or camped. The most likely location for contact period occupation sites would be places adjacent to permanent water and located in relative proximity to centres of European occupation such as towns and homesteads. No contact sites are known to be present. The potential for contact sites to be present in the project area is considered possible but low.

8. Archaeological survey

8.1 Aims

The primary aim of the archaeological survey was to undertake systematic survey of the project area to detect the presence of Aboriginal cultural heritage. This was completed in order to develop strategies for avoiding and/or mitigating potential harm to Aboriginal heritage values and included the inspection of any registered Aboriginal heritage sites located within the project area. In order to achieve consistency of data collection, the archaeological survey method was based on the approach adopted for the investigations undertaken for the Snowy 2.0 Works in 2018 (Dibden 2018) and the *Guidelines for Identifying, Assessing and Managing Cultural Landscapes in the Australian Alps National Parks* (Lennon and Matthews 1996).

8.2 Archaeological survey method

The archaeological survey was conducted by foot with two archaeologists leading groups of up to four Aboriginal site officers and RAP /BT LALC representatives. This arrangement maximised site documentation and Aboriginal personnel involvement. An assessment was made of land disturbance, survey coverage variables (ground exposure and archaeological visibility) and the potential archaeological sensitivity of the project area.

During the archaeological survey, all previously recorded AHIMS sites within the study corridor were visited. All data was recorded on a GIS application being run on 4G hand-held iPad devices and photographs were taken with high definition cameras or georeferenced iPad photographs through the ArcCollector application. All Aboriginal archaeological sites/objects identified during the survey were recorded to a standard required by the Code of Practice (DECCW 2010b).

In accordance with Requirement 5 of the Code of Practice (DECCW 2010b), the archaeological survey adopted a sampling strategy which targeted survey on each distinct landform within a given soil landscape. The archaeological survey was a non-random design as a randomised survey design was not possible for this size of project, where the expected area to be surveyed would be much less than 10 per cent of the total area. The disturbance area was divided into survey units (see **Section 8.5.1**) defined on the basis of landform type. This correlated largely to access tracks, structure pads and any potential ancillary sites identified as required for construction.

AHIMS site recording forms have been completed for all newly identified PADs and Aboriginal sites recorded during the archaeological survey and these will be submitted to AHIMS after this draft ACHAR has been approved by the RAPs. Measures of number, density and distribution of Aboriginal objects or sites were the main data gathered for a range of standard 'site types' such as artefact scatters and scarred trees.

8.3 Timing and personnel

Several site visits, inspections and a systematic archaeological survey were undertaken by Jacobs as part of the archaeological assessment and the dates and individuals involved are shown in **Table 8-1**. The first preliminary visit was undertaken on 21-22 March 2018 by Deborah Farina (Senior Archaeologist, Jacobs) in conjunction with Lukas Clews (Senior Ecologist, Jacobs). Glenn Stroud of the National Parks and Wildlife Service accompanied the Jacobs team on 21 March 2018 and provided an introduction to the geology, landscapes and history of the Kosciusko National Park. The purpose of the preliminary site visit was to investigate the terrain and disturbance in the vicinity of the various corridor options and to gauge the Aboriginal and non-Aboriginal heritage potential within multiple alternative corridor options being considered at that time.

The second site visit was undertaken by Ildike Piercy (Senior Archaeologist, Jacobs) on 16-19 April 2018 with Lukas Clews (Senior Ecologist, Jacobs), and representatives from TransGrid. The purpose of this visit was to ground-truth and assess the constructability of various transmission alignment options in crossing Sheep's Station Ridge and the Tumut River. An inspection for Aboriginal and non-Aboriginal heritage was also undertaken during this visit.

The archaeological survey of the project area was carried out by Jacobs on 19-25 May 2019. The site survey was carried out with nominated site officers from BTLALC and Andrew Costello and Ildike Piercy. Details of fieldwork activities and the participation of the nominated site officers are provided in **Table 8-1**.

A further site visit was made to the location of identified areas of PAD in project area west (ST PAD 03 and Substation PAD), to assess for the potential presence of NOA by Max Foweraker (Principal Engineering Geologist, Jacobs), accompanied by Andrew Costello on 24 September 2019. The purpose of the site visit was to understand the geological conditions at the proposed archaeological investigation sites and to assess whether these conditions were consistent with the published mapping, or whether different conditions were present, with rock types that may be associated with NOA mineralisation.

An archaeological survey and program of test excavation was carried out by Dr Oliver Macgregor (Senior Archaeologist, Jacobs) and Alexandra Seifertova (Project Archaeologist, Jacobs) from October 21 to October 25, 2019. The purpose of this visit was to investigate the potential for subsurface Aboriginal objects in two areas identified during the survey as PAD: the substation and a second area within the transmission corridor in project area west referred to as ST PAD 03. The method and results of the test excavation program are detailed in **Section 9**.

A further site survey was carried on the 12 November 2020 with the intent to survey the top of Sheep Station Ridge and access tracks in the is location. Due to the steep terrain, safety concerns and adverse weather the top of this ridge was not reached. This area would be surveyed at a later day.

The results of all of the site visits and archaeological survey have been used to inform an assessment of the Aboriginal cultural heritage risks for the project area.

Table 8-1: Archaeological survey and test excavation timing and personnel

Date	Purpose	Jacobs personnel	Aboriginal stakeholder involvement	Agency / TransGrid
21-22 March 2018	Project site inspection	Deborah Farina (Senior Archaeologist) Lukas Clews (Senior Ecologist)		Glen Stroud (NSW NPWS)
16-19 April 2018	Archaeological field survey and impact assessment	Ildike Piercy (Senior Archaeologist) Lukas Clews		Glen Stroud (NSW NPWS)
19/25 May 2019	Archaeological survey and impact assessment	Andrew Costello (Associate Archaeologist) Ildike Piercy (Senior Archaeologist)	Janice Williams, Bradley Freeman, Ronald Grovener, Roxanne Williams, Matthew Marlowe, Lawrence Marlowe, Olivia Williams, Glen Freeman, and Ryan Johnson	Glen Stroud (NSW NPWS)
24 September 2019	Archaeological field survey and NOA inspection	Max Foweraker (Principal Engineering Geologist) Andrew Costello (Associate Archaeologist)		
21 – 25 October 2019	Archaeological survey and test excavation	Dr Oliver Macgregor (Senior Archaeologist) Alex Seifertova (Project Archaeologist)	Janice Williams, Bradley Freeman, Ronald Grovener, Roxanne Williams, Matthew Marlowe, Lawrence, Renee Williams, Marlowe Williams, Olivia Williams, Ramsay Freeman	
12 November 2020	Archaeological survey and impact assessment	Andrew Costello (Associate Archaeologist)	Rod Penrith, Robert Herrington, Olivia Williams, Nirakai Williams	Willy Kroker (TransGrid)

8.4 Constraints

The survey was hampered by thick vegetation in most areas, particularly throughout project area west. Surface visibility across the project area was universally poor (five per cent or less), with thick undergrowth, leaf litter, grass, and patches of logging debris obscuring the ground surface (**Photo 8-1**).

Steep terrain was also challenging with survey in some areas limited to those who self-assessed as having sufficient level of fitness. . The decision to limit field teams in this way was preceded by discussions in the field, to ensure that all groups and representatives were satisfied that the decisions were not adversely affecting the quality of the archaeological survey or Aboriginal representation and input to the archaeological assessment process.

Photo 8-1: Typical ground surface visibility at the Substation

8.5 Archaeological survey results

One hundred per cent effective survey coverage of the project area could not be achieved as discussed above, primarily due to the difficult terrain and challenging conditions typical of the Australian Alps Bioregion. The topography of the project area is best described as steep to very steep (>18°) hills and mountains, interspersed with sharply incised valleys.

Attempts were made to find a previously-recorded cluster of sites within and in close proximity to the project area east, in the Lobs Hole Ravine area. These sites were:

- AHIMS# 56-6-0009 (Ravine; Lob's Hole; KNP91-59)
- AHIMS# 56-6-0495 (Ravine SU3/L1)
- AHIMS# 56-6-0496 (Ravine SU3/L2)
- AHIMS# 56-6-0497 (Ravine SU2/L3)
- AHIMS# 56-6-0477 (Ravine SU17/L1)

The recorded locations of these sites are shown in (**Figure 7-1**).

The archaeological survey found ten surface artefacts, all within the area of the previously recorded site cluster consisting of sites AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, and AHIMS#56-6-0497. It is assumed that the artefacts found during the survey relate to one or more of these previously recorded sites, which are located within 70 m of one another.

The previously recorded site AHIMS# 56-6-0477 could not be located during the archaeological survey.

The archaeological survey identified four areas of PAD. These were:

- ST PAD 01, located in the far eastern extent of the project area (see **Figure 8-1**). This PAD encompasses four previously recorded AHIMS sites: AHIMS# 56-6-0009, 56-6-00495, 56-6-0496 and 56-6-0497.
- ST PAD 02, in the far eastern extent of the project area (see **Figure 8-1**)
- Substation PAD, located at the proposed substation site (see **Figure 9-3**)
- ST PAD 03, located within the proposed transmission corridor in project area west (see **Figure 9-4**).

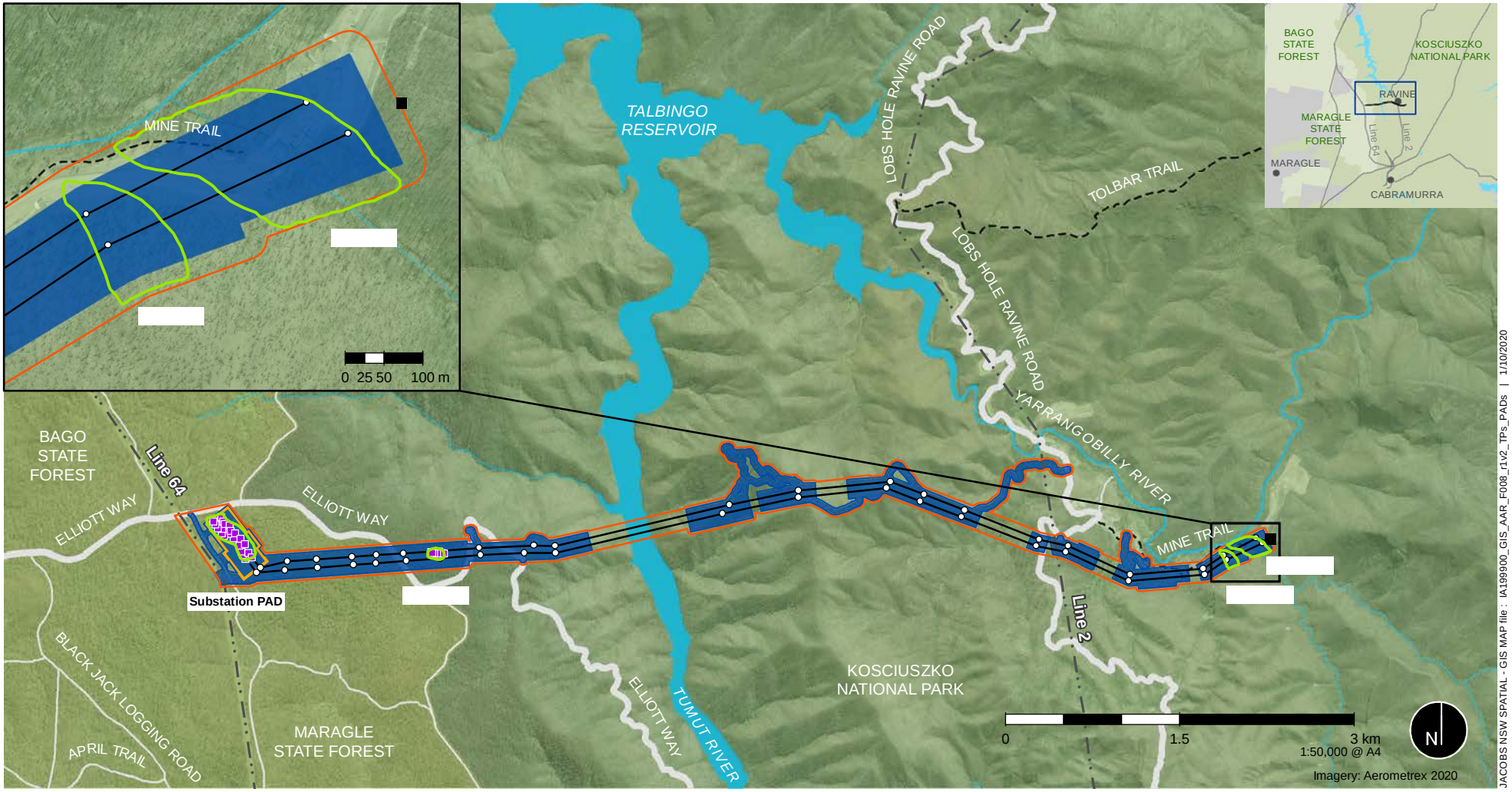


Figure 8-1 Project area showing location of ST PAD 01 and ST PAD 02

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

ST PAD 01 occurs on the floor of a valley near Lobs Hole Ravine, approximately 1 km southeast of the former Ravine Township at Lobs Hole. It is a flat, relatively open area adjacent to Wallaces Creek, and its confluence with the Yarrangobilly River. The presence of these two watercourses would have created a variety of natural resources for Aboriginal groups to utilise. The area's location in the sheltered valley landscapes of Lobs Hole Ravine, and the presence of previously recorded Aboriginal sites in similar valley floor contexts in nearby areas of Lobs Hole Ravine, increases its potential as a site with subsurface Aboriginal objects. The previously recorded sites AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, and AHIMS#56-6-0497 are all located within this area of PAD. These sites are all surface scatters of stone artefacts.

ST PAD 02 is an area of level to gently sloping terrain on the crest of a low spur. This area of PAD is located to the west of ST PAD 01, and is approximately 80 m south of the Yarrangobilly River. This PAD, being in a similar landform to ST PAD 01, is also likely to have been in an area rich in natural resources for Aboriginal groups to utilise. It is also within the sheltered valley landscapes of Lobs Hole Ravine. The presence of previously recorded sites on similar landforms within Lobs Hole Ravine indicates that this site is likely to have subsurface deposits that contain Aboriginal objects.

ST PAD 03 is an area of gently sloping ground on the crest of a ridge, and adjacent to a small drainage line. A detailed description of this area of PAD is provided in **Section 9.2.2.1**.

Substation PAD is an area of level or gently sloping terrain near Yorkers Creek. A detailed description of this area of PAD is provided in **Section 9.2.1.1**.

The results of the archaeological survey were in agreement with the predictive model, identifying areas of ground adjacent to the waterways of the Yarrangobilly River and its tributaries as areas of relatively high archaeological potential.

8.5.1 Effective survey coverage

The area inspected during the survey, divided by survey units, is depicted in **Figure 8-2**. In grassed paddocks there is typically near zero effective coverage. The total effective survey coverage for the project area was calculated to be four per cent which is considered to be low. To address the limited coverage of the surface survey method of assessing Aboriginal archaeological heritage, test excavation has been proposed in areas of PAD (see **Section 9**).

Table 8-2: Effective survey coverage

Survey Unit (SU)	Landform	Project element	Survey unit area (m^2)	Visibility %	Exposure %	Effective coverage (m^2) D = A x B x C	Effective Coverage % E = D/A x 100
			A	B	C	D	E
SU 1	Gentle Slope	Substation	170000	6.0	15	1530	0.9
SU 2	Steep slope	Transmission corridor, access tracks	344000	2.0	5	344	0.1
SU 3	Steep slope	Transmission corridor, access tracks	157000	2.0	10	314	0.2
SU 4	Steep slope	Transmission corridor, access tracks	229000	1.0	10	229	0.1

Survey Unit (SU)	Landform	Project element	Survey unit area (m^2)	Visibility %	Exposure %	Effective coverage (m^2) D = A x B x C	Effective Coverage % E = D/A x 100
			A	B	C	D	E
SU 5	Steep slope	Transmission corridor, access tracks	203,000	2.0	5	203	0.1
SU 6	Gentle Slope	Transmission corridor, access tracks	862,000	2.0	5	862	0.1
SU 7	Gentle Slope	Transmission corridor, access tracks	117,000	5.0	25	1,462.5	1.25
SU 8	Flat	Transmission corridor, access tracks	90,000	5.0	25	1,125	1.25
Total			**2,172,000**			**6,069.5**	**4**

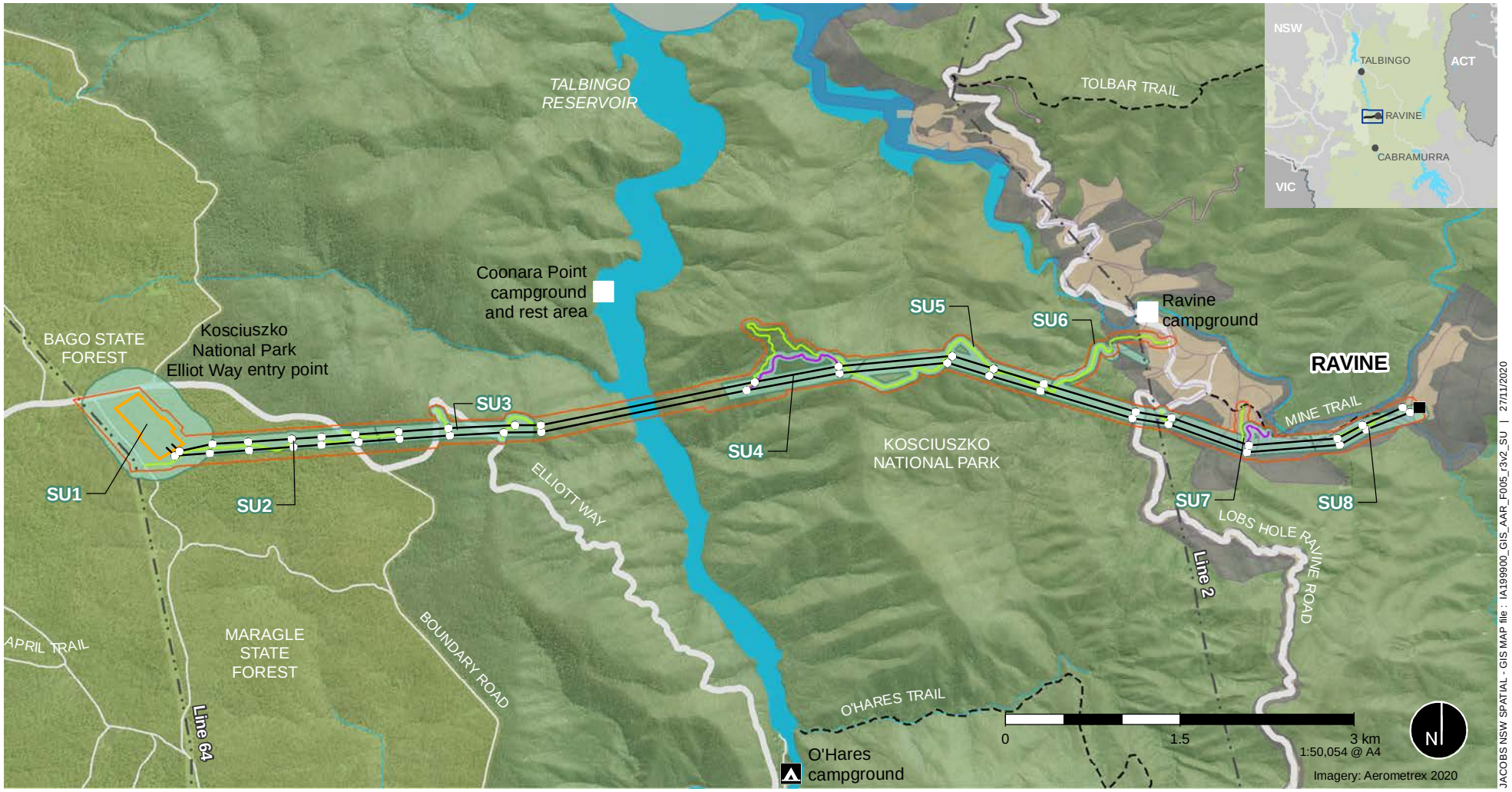
Table 8-3: Landform summary

Landform	Landform area	Area effectively surveyed	% of landform effectively surveyed
Steep slope	933,000	1,090	0.12%
Gentle slope	1,149,000	3854.5	0.34%
Flat	90,000	1,125	1.25%
Total	**4,052,869**	**76,328**	**1.88**

8.5.2 Survey coverage gap

The design of access tracks has been amended subsequent to the completion of the archaeological survey. As a consequence, there is a length of access track on the northern edge of Survey Unit 4 and Survey Unit 5 (**Figure 8-2**) that has not yet been surveyed. This portion of the project area will be surveyed prior to construction of the project once suitable and safe access has been established as to allow the area to be accessed via vehicle. It is considered unlikely that any archaeological sites will be present in the higher parts of this area, as the landform consists of steeply sloped terrain on a high ridge, a landform that has a low potential to contain Aboriginal objects (see **Section 7.2**).

In the event that Aboriginal sites are discovered within this area, management recommendations will be developed for these sites that are consistent with the recommendations made for other sites within the project area (see **Section 12**). The recommendations will be communicated to RAPs and Heritage NSW, to seek their advice and satisfaction with the recommendations.



Project area
Proposed 500kV substation
Proposed structure
Proposed transmission line
Proposed access track - Option A
Proposed access track - Option B
Survey area

Snowy 2.0 cable yard
Snowy 2.0 Archaeological survey unit
Snowy 2.0 Disturbance footprint

Campground
Kosciuszko National Park Elliot Way entry point
Electricity transmission line
Minor road
Major road
Trail

Waterway
Water body
State forest
NPWS estate

Figure 8-2 | Survey units

Data source:
Jacobs 2020, EMM 2020,
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9. Archaeological test excavation

9.1 Archaeological test excavation method

The archaeological test excavation program aimed to determine whether any Aboriginal objects were present in subsurface deposits within two of the identified areas of PAD (see **Section 8.5**): ST PAD 03, and Substation PAD. The placement of test excavation squares was determined by following the Test Excavation Method (**Appendix B**).

ST PAD 01 and ST PAD 02 were not test excavated as part of this project. This decision was due to the fact that both areas are within the project area of Snowy 2.0. The Snowy 2.0 area was an active construction site during the archaeological excavation, and was the subject of a separate archaeological assessment (Dibden 2018; 2019). In order to not duplicate the results of the Snowy 2.0 archaeological assessment, it was decided to leave the testing and salvage of sites within their project area to their archaeological team, and to use the results of their assessment to inform the recommendations of this ACHAR relating to the area of overlap between the two project areas.

Test excavation squares were placed along linear transects which spanned the disturbance area, where it overlapped with the area of PAD. The disturbance area encompasses the maximum area anticipated to be impacted by the project, either directly or indirectly (inadvertently).

Squares were spaced a minimum of 5 m apart. Any areas assessed as having negligible archaeological potential (for example, areas of ground where the underlying bedrock was exposed, and no soils or sediments were present) were not tested. Excavation squares were 0.5 m by 0.5 m in dimension.

Multiple transects were laid to adequately test the areas where they were large enough to warrant this. Transects were placed parallel to one another. Where parallel transects were employed, the locations of excavation squares on adjacent transects were offset from one another to minimise the area of unexcavated ground between excavation squares (following Kintigh 1988; Kraker *et al.* 1983).

In-field decisions were made on the precise location of squares, in response to areas of boggy ground, thick blackberry undergrowth, localised ground disturbance from burrowing animals or fallen trees, or the presence of thick treefall debris. Avoiding areas where these features were present meant that pits were not regularly spaced along transects or placed along the precise 'line' of the transect (as anticipated in the excavation method). The effect of these small-scale variations in pit location was the creation of a randomised patterning of pits across the two areas, rather than a regimented alignment and spacing of pits. This distribution of pits across areas most closely conforms to a strategy of 'systematic random sampling' (Drennan 2010: 242) or 'stratified random sampling' (Cowgill 1964; Plog *et al.* 1978; Read 1986; Rootenberg 1964; Schiffer *et al.* 1978), in which pits have been placed at semi-regular intervals, but the precise location of each pit (or 'sample') has been determined by random factors – in this case, characteristics of the ground surface.

Squares were excavated by hand, using shovels, trowels, and mattocks. The first square excavated at each area was excavated in five centimetre (cm) spits (following the requirements of DECCW 2010b). Other squares were excavated in 10 cm spits. The stratigraphy of the deposit was observed during excavation in order to ensure excavation followed stratigraphic units as well as arbitrary spits. Excavation of a square ceased when deposits were encountered that were assessed as having no potential to contain Aboriginal objects, and were deemed to be archaeologically sterile in accordance to the test excavation section of the Code of Practice (DECCW 2010b).

All excavated material was dry sieved using a 5 millimetre mesh sieve. Sieving occurred over a tarpaulin, as close as practical to the square being excavated, to ensure that the square could be backfilled following the excavation with minimal loss of excavated sediments. Each square was backfilled as soon as was practical after the excavation and field recording of that square was ceased.

Each excavation square was recorded photographically to capture images of the excavated sections and record information on the nature of the deposit and any stratigraphic or soil formation patterning.

All recovered material was catalogued in the field to track archaeological data in real time and guide continuation or cessation of excavation. In-field cataloguing entailed recording the number of artefacts per square, and the types of artefact recovered. During fieldwork, all excavated material was available for inspection and comment by RAP representatives.

Digitised recording using a hand-held tablet was the primary recording system in the field, with a second dedicated GPS unit, and manual field recording forms used as a backup. The digitised recording system was employed in order to minimise transcription errors through standardised recording conventions and create efficiency in post-excavation reporting.

Artefacts recovered from excavations were secured in zip-lock bags, which were labelled with relevant contextual information. Artefact bags were double-bagged within a larger grouping bag, to guard against potential loss during transport.

Following excavation, all artefacts were transported to Jacobs' Canberra office, and were kept in Jacobs' care while further analysis was undertaken (see **Section 9.1.1**). Artefacts will remain in temporary storage with Jacobs prior to consultation with RAPs determining their long-term safekeeping and an application for a Care Agreement under the *National Parks and Wildlife Act 1974* being prepared. The *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b) states that Aboriginal objects moved during test excavation must be reburied as soon as practicable in accordance with Requirement 26. In this event, the location of each reburial must be submitted to AHIMS with a site update record card for the site. The person/s carrying out the test excavations are responsible for ensuring that procedures are put in place so that Aboriginal objects that are reburied are not harmed.

9.1.1 Lithic artefact analysis method

Most of the lithic items were lightly cleaned to remove sediment encrusted on their surfaces. This cleaning involved briefly running under cold water, and lightly brushing sediments off the objects with a soft-bristled brush or paper towel. No attempt was made to thoroughly remove all sediment from the surfaces of the objects by prolonged scrubbing.

Objects were analysed mostly using low-power magnification (hand lens) to identify small features such as fine retouch scars, or to examine objects of quartz with surfaces that were reflective in a way that impeded identification of fracture features by the naked eye.

The method employed to record the nature of the stone artefact assemblage was developed to answer the aims of the analysis. The variables measured were accordingly selected to enable questions relating to the raw material composition of the assemblage, technological patterns of artefact production, and spatial distribution of artefacts to be answered. The variables recorded for each stone specimen in the assemblage are outlined in **Table 9-1**.

Table 9-1: Variables recorded on artefacts, with a description of how observations were recorded for each variable.

Variable	Observation recorded
ID	Each specimen was allocated a sequential number.
Pit	Pit number
Spit	Spit number
Technological type	Flake, core, retouched flake, flaked piece, indeterminate shatter, hammer, eraillure, anvil, ground artefact, non-artefact, European artefact.
Completeness	Complete, proximal fragment, medial fragment, distal fragment, LCS left, LCS right
Material	Silcrete, quartz, quartzite, chert, FGS, volcanic, sandstone
Initiation	Hertzian, bending, axial
Platform type	Single surface, multiple surfaces, shattered, cortical, facetted

Variable	Observation recorded
Termination	Feather, step, hinge, inflex, retroflex, outrepasse
Retouched	Retouch scars present or absent
Heat damage	The presence of heat damage, in the form of crazing fractures, crenated fractures, potlid fractures or exfoliation surfaces.
Length	Length along percussion axis in millimetre (to nearest 0.01 mm)
Width	Width perpendicular to percussion axis in millimetre (to nearest 0.01 mm)
Thickness	Thickness perpendicular to length and width in millimetre (to nearest 0.01 mm)
Platform thickness	Thickness of platform in millimetre (to nearest 0.01 mm)
Platform width	Width of platform in millimetre (to nearest 0.0 1mm)
Overhang removal	Presence or absence of overhang removal scars on a flake's dorsal surface.
Number of negative scars	(Cores only) The total number of complete and partial negative scar surfaces visible.
Number of rotations	(Cores only) The number of times a core was rotated during manufacture, based on the orientations of complete and partial negative scars visible.
Implement type	Typological category (if any) within which the artefact could be classified
Notes	Ad-libitum recording of any points of interest not recorded elsewhere

Further definition of the variables and attributes listed in **Table 9-1** are provided below to assist readers with interpretation of the results of the artefact analysis.

Technological type – Classification of artefacts was based on technological criteria. The term "technological type" is used instead of "type" in this document, as "type" is often used to refer to formal tool types such as backed artefacts. The following categories have been identified in the assemblage:

- Core: Cores are a piece of stone from which flakes have been detached. Cores are characterised by one or more identifiable negative flake scars, which are surfaces created when flakes have been detached. Cores do not have a positive (ventral) fracture surface
- Flake: A piece of stone detached by fracture from a core, through the application of force. Flakes have a positive, or ventral, fracture surface which is characterised by a number of features which may include a bulb of percussion, a bulbar scar, ripple marks and fissures on the ventral surface and negative flake scars on the dorsal surface. A complete flake retains its platform surface and termination
- Retouched flake: A flake which has had flakes removed from it, subsequent to its original manufacture. A retouched flake has an identifiable ventral surface, and negative scars that are derived from or intrude onto this ventral surface
- Flaked piece: A flaked piece is an artefact that exhibits negative flake scars, and one surface which could possibly be a ventral surface. A flaked piece does not have any other features that would enable identification as a flake, a retouched flake or core. This category is therefore an ambiguous one, and is used only for artefacts which cannot confidently be categorised more specifically
- Hammer: A piece of stone, usually a pebble, which possesses pitting or furrowing indicative of hammer impacts
- Anvil: A piece of stone which possesses pitting usually on a wide flat surface, indicating that it was struck repeatedly
- Ground artefact: Any piece of stone showing an area or areas which have been ground or polished
- Eraillure: A lens-shaped piece of stone which shatters off the bulb of a flake as the flake is struck (Faulkner 1972).

Material – The following material categories were employed to classify the assemblage:

- Chert: A cryptocrystalline siliceous rock of organic or inorganic origin. Chert is isotropic and homogenous (Luedtke 1994), and has a low fracture toughness compared with most other rock types (Domanski *et al.* 1994). It is accordingly a highly favoured rock for artefact manufacture
- Quartz: The mineral quartz is crystalline silica with a hardness value of 7 (Mohs hardness scale). Because of this property, quartz flakes possess highly durable sharp edges (Caruana and Mtshali 2018b; Domanski *et al.* 1994). Because quartz often possesses internal flaws and cleavage planes, however, it typically flakes in an unpredictable manner (Cotterell and Kamminga 1987; Diez-Martin *et al.* 2011; Driscoll 2011; Manninen 2016; Spott 2005; Tallavaara *et al.* 2010)
- Silcrete: This rock is formed by the impregnation of a sedimentary layer with silica; it consists of quartz grains in a matrix of either amorphous or fine-grained silica (Hughes *et al.* 1973; Webb *et al.* 2013). The fracture properties of silcrete are dependent largely of the size of the quartz grains, with finer-grained silcretes having superior fracture properties (Domanski and Webb 1992; Domanski *et al.* 1994; Webb and Domanski 2008)
- Hornfels: A contact metamorphic rock, formed when the original rock is exposed to heat or pressure by the presence of an igneous body nearby. Hornfels is often fine-grained and silica-rich, is tough and fractures well. Hornfels can retain banding and other colouration derived from its parent rock
- Quartzite: Quartzite is formed by the cementing together of siliceous grains through pressure, heat and chemical processes (Caruana and Mtshali 2018b; Hughes *et al.* 1973). Fracture properties and flaking quality are variable, depending on how cohesively the individual grains have been cemented together.
- FGS: Acronym for fine grained siliceous rocks, covering chert, siltstones, mudstones, hornfels, tuff etc. where identification is unclear without petrological analysis
- Sandstone: sand grains cemented together by a siliceous matrix. Usually friable and crumbly
- IMSTC: (Indurated Mudstone, Silicified Tuff, Chert). An acronym for fine-grained siliceous rock types including chert, mudstone and other indurated fine-grained sedimentary rock, and silicified tuff (White 2018). Distinguishing between these different rock types is often impossible in the field, and confident classification requires petrological analysis (Hughes 2011). These fine-grained rock types are all isotropic and are consequently favoured materials for artefact manufacture.

Initiation type – The type of primary fracture initiation, recorded as one of the following:

- Hertzian: Formed when stone is struck by a hammer forming a ring crack; the ring crack forms a cone that bends backward towards the surface of the core (Cotterell and Kamminga 1987; Lawn and Marshall 1979). Hertzian initiations lead to a ventral surface with a convex bulb under the initiation point – the ventral surface is often referred to as "conchoidal" (shell-like), and flakes with Hertzian initiations are often referred to as "conchoidal flakes"
- Bending: (also known as opening fracture) Formed when the angle between the platform and surface of the core is acute. Initiation results from a simple opening fracture which forms on the platform surface. Flakes do not possess clear ring cracks or well defined bulbs of percussion (Cotterell and Kamminga 1979; Tsirk 1979). Bending initiated flakes are also known as "lipped flakes" (Inizan *et al.* 1999)
- Axial: (also known as wedging fracture) Formed as a result of the compressive stress created by the hammerstone or indenter pressing into the platform surface. This compressive stress causes the material under the indenter to bifurcate in a symmetrical fashion (Lawn and Marshall 1979), which leaves no ring crack or bulb of force as found on Hertzian initiations. Axial initiations are commonly called "wedging" initiations by archaeologists (Cotterell and Kamminga 1979; 1987; Cotterell *et al.* 1985).

Platform type – The platform surface is the surface from which fractures begin propagating. The following classifications of platform surfaces were used:

- Single: The platform is a single fracture surface
- Multiple: The platform is made up of two or more fracture surfaces
- Cortical: The platform is partially or fully composed of a cortical surface
- Shattered: The platform has been sheared away during flake production: platform attributes cannot be identified
- Facetted: The platform includes multiple small flake scars, initiated from the dorsal surface, which were removed prior to the flake being struck
- Focalised: Fracture initiates close to the edge of the platform, and only a very small platform surface is present (usually no more than twice the area of the ring crack formed at the initiation point).

Termination type – Termination refers to the manner in which the fracture ceases to propagate by running to meet a free surface. The termination type is classified according to how the fracture surface and the free surface (i.e. the distal surface of the flake) meet (Cotterell and Kamminga 1987).

- Feather: Exhibits minimal thickness at the distal end and acute angle between ventral and dorsal surface
- Hinge: Forms when the fracture curves sharply and meets the surface of the core at c. 90º to the longitudinal axis of the flake
- Step: Forms when flake terminates abruptly in a right-angle break

Inflex: A hinge termination on which the fracture surface deviates in the distal direction just before termination, leaving a "finial" or "lip" on the flake

- (Cotterell and Kamminga 1986; Sollberger 1986). Also known as a "languette" fracture (Bordes 1970a; 1970b; Lenoir 1975).
- Retroflex: Similar to an inflex, except that the deviation of the fracture surface is toward the proximal end of the flake: that is, the fracture curves back in the direction of the platform surface (Cotterell and Kamminga 1979; Cotterell and Kamminga 1986)
- Outrepassé: Forms when the fracture plane curves away from the face of the core and terminates on the opposite side of the core, removing the core's base. Also known as a plunging termination (Inizan *et al.* 1999; Whittaker 1994).

Completeness – This category records whether an artefact is complete or a fragment of a complete artefact. Cores were coded simply as complete or incomplete. Flakes (including retouched flakes) were coded as one of the following categories (following Hiscock 2002):

- Complete: A complete flake, in which the platform surface and all original flake margins are intact.
- Distal fragment: A broken flake which is missing its proximal end. These fragments do not possess their original platform surface.
- Medial fragment: A broken flake that is missing its proximal and distal ends. This fragment is the original flake's mid-section, exhibiting dorsal scars and ventral surface features.
- Proximal fragment: A broken flake which is missing its distal margin, but retains the platform and initiation.
- Longitudinal cone spit (LCS left and right): A flake broken longitudinally, in which the break bifurcates the bulb of force and the ring crack (Inizan *et al.* 1999). This distinctive breakage pattern occurs during flaking event. Separate categories for left and right LCS portions were used to facilitate artefact number estimates. Note that the LCS category can only be applied if the bifurcated ring crack and bulb of force are present. Also known as a 'Siret' break, or (historically) a 'burin de Siret' (Inizan *et al.* 1999; Waechter *et al.* 1970)

- Marginal fragment: A flake broken transversely or longitudinally, which is lacking both its initiation and termination, and has a section of only one of the original flake's lateral margins
- Margin missing: A flake which has been broken and is missing a portion, or several portions of its lateral margins, but which has retained both its platform and its distal margin.

Heat damage: The presence or absence of recognisable heat-induced fractures was recorded. *Potlidding* is the presence of round dished scars, thickest in their centre, created when expansion or contraction of a surface causes small round spalls to slough off. *Crenated fracture* is the presence of rough, jagged or chaotically wavy fracture surfaces characteristic of heat-induced fracture. *Crazing* is the presence of incipient, irregularly oriented fractures visible within the artefact. *Exfoliation* is the presence of rounded fracture surfaces, usually concentrated around sharp corners, caused when elongated flake-like pieces are sloughed off a rock's surface due to expansion or contraction of that surface.

Percentage dorsal cortex: The amount of cortex on flakes in an assemblage is indicative of the amount of reduction that nodules of stone underwent prior to being transported onto the site being analysed (Ditchfield 2016).

Length: On flakes (including retouched flakes) this measurement was taken from the initiation point, along the percussion axis (**Figure 9-1**).

Width: On flakes (including retouched flakes) this measurement was taken perpendicular to length, and half way along length, from one margin of the flake to the other (**Figure 9-1**).

Thickness: On flakes (including retouched flakes) this measurement was taken at the intersection of length and width, and perpendicular to both length and width.

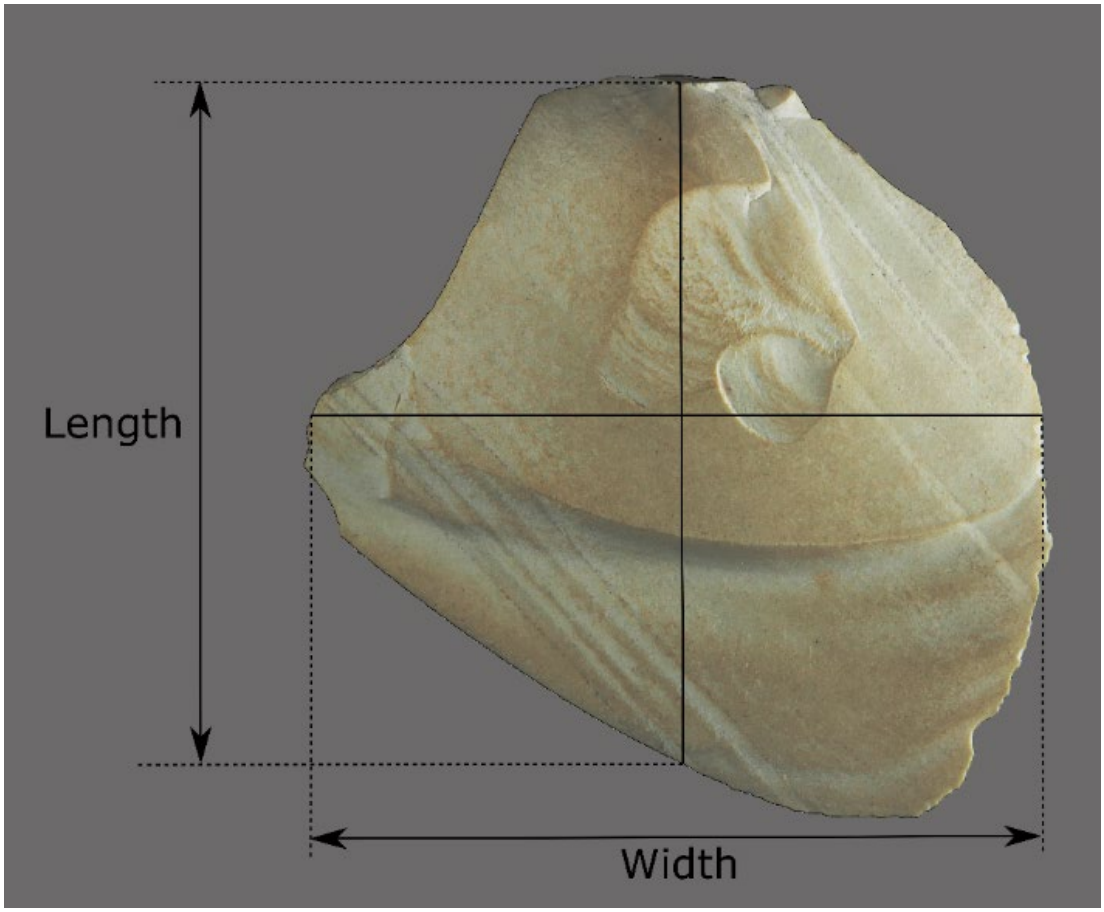


Figure 9-1: Length and width measurements on a flake.

Platform width: On flakes (including retouched flakes) this measurement was taken across the platform, from one margin of the flake to the other (**Figure 9-2**).

Platform thickness: On flakes (including retouched flakes) this measurement was taken perpendicular to platform width, from the initiation point to the dorsal surface of the flake.

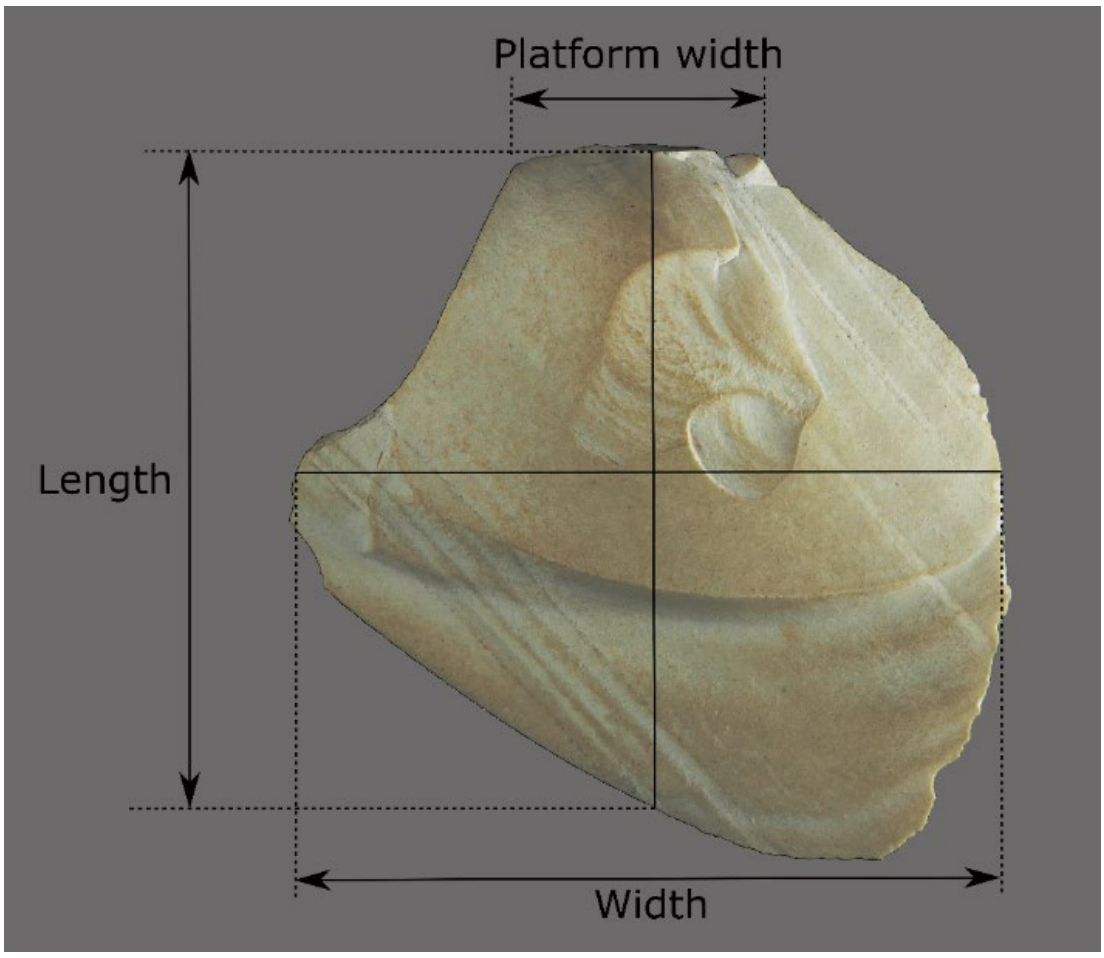


Figure 9-2: Length, width and platform width measurements on a flake

Implement type: If artefacts had a suitable morphology to be classified into any existing formal tool types, this was recorded. Only types which are commonly in use in Australia were employed. These include backed artefacts (triangles, trapezes, crescents, trapezoids, bondi points), juan knives, tula adzes, burren adzes, gravers, horsehoof cores, scrapers, unifacial points, pirri points and bifacial points.

9.2 Test excavation results

9.2.1 Substation PAD

9.2.1.1 PAD description

Substation PAD is located on a relatively level section of ground on the top of a north-south oriented ridgeline. To the east, the terrain falls steeply away to the top of Talbingo Reservoir. To the west and south, the terrain is undulating. To the north, the terrain slopes downward toward the west-east valley that Yorkers Creek travels through in its path eastward toward the reservoir.

The largest watercourses near the PAD are Yorkers Creek, Native Dog Creek, and Tumut River. Yorkers Creek is a 2nd order drainage line that passes approximately 300 m to the northwest of the PAD, flowing to the northeast and then east, to meet the Tumut River. Native Dog Creek is a 2nd order drainage that passes approximately 400 m to the south of the PAD, flowing east and then south to join New Maragle Creek, which then flows into Tumut River. Tumut River, a 3rd order drainage, is the major watercourse in the immediate region, passing approximately 3.5 km to the east of the PAD. Tumut River flows from the south to the north, through a steep-sided linear valley. The PAD is approximately 600 m higher than the Tumut River at its nearest point, approximately 20 m higher than Yorkers Creek at its nearest point, and approximately 10 m higher than Native Dog Creek at its nearest point.

The terrain within the PAD consists of low ridges, oriented more or less east-west, that are round-topped and have very low-gradient sloped sides. Surface gradients within the PAD do not exceed 1:5, with the majority of the PAD consisting of level ground or slopes that are less than 1:10 gradient. Two drainage lines run through the PAD, both running in an east-west direction. The northern of these two drainage lines is unnamed, and feeds into Yorkers Creek to the west of the PAD. The southern of the two drainage lines is named New Zealand Gully, and feeds into Native Dog Creek to the south of the PAD. Within the PAD, the two drainage lines are shallow, dished gullies with no erosional down-cutting. Neither drainage line had surface water during the test excavation fieldwork.

Vegetation within the PAD and its immediate surrounds consists of open forest, defined as a forest in which tree crowns are either touching or are less than one-quarter crown-width apart (Walker and Hopkins 1990). The tree community in the area consists of alpine ash, snow gum shrubby tall open forest, and mountain gum, snow gum, and broad-leaved peppermint shrubby open forest. Mature trees in the PAD have a modal girth at chest height of approximately one metre. A small number (around one per cent) of trees are up to 3 m in girth at chest height. Immature trees less than 30 cm in girth are common within the PAD, often occurring in clusters, probably where mature trees have fallen or have been removed by logging operations (**Photo 9-1** to **Photo 9-4**).

Photo 9-1: Typical forest structure at Substation PAD, showing mixed mature and immature trees

Photo 9-2: Typical forest structure at the Substation PAD, showing mature trees (left) and clustered immature trees (right)

Photo 9-3: Typical forest structure at Substation PAD

Photo 9-4: Typical forest structure at Substation PAD

The ground surface within Substation PAD typically has a cover of leaf and bark litter that ranged from sparse to thick in density. At the sparse end of the range, leaf and bark litter cover less than one quarter of the ground surface (**Photo 9-5**), while at the thick end of the range, more than three quarters of the surface is covered (**Photo 9-6**). Areas of ground without leaf and bark litter coverage typically have thick grass cover. The coverage of the ground surface in leaf and bark litter, grass, and low-lying shrub vegetation resulted in extremely low ground surface visibility. Across the PAD it is estimated that ground surface visibility was less than one per cent.

Thickets of blackberry bush are patchily distributed across the area of PAD. Blackberry bush covered the base of the two shallow dished drainage gullies that run across the PAD (**Photo 9-7**). The likely reason for preferential blackberry growth in these two drainage gullies is the higher moisture content of the ground in these areas. Patches of blackberry also occur on more elevated areas of ground within the PAD, however. The patchy distribution of blackberry in these areas is probably the result of colonisation of areas disturbed and opened up by natural treefalls or by tree removals through logging activity.

9.2.1.2 Constraints on placement of test pits

In some areas of Substation PAD the ground surface is covered by thick accumulations of treefall debris. This debris typically consists of splintered fragments of tree trunks and branches of varying thickness, which are randomly oriented. The density of the debris is variable (**Photo 9-9**, **Photo 9-10**, **Photo 9-11**). Treefall debris occurs patchily across the PAD, being dense in some areas and absent in others. Many of the patches are elongated or linear in shape suggesting logging activities have created them, although natural tree fall may account for some patches. In some areas, the underlying ground surface shows evidence of extensive disturbance, similar to ploughing, indicating that trees have been dragged across the ground and have scuffed and scraped the ground surface.

Test excavation pits were placed in areas of open ground that were free of thick blackberry growth and treefall debris. The avoidance of areas of blackberry resulted primarily from health and safety concerns associated with accessing these areas, and the amount of time and effort that would have been required to clear the thick blackberry vegetation and make an area safe prior to carrying out excavation. Avoidance of treefall debris resulted from a desire to avoid areas in which the ground surface had been disturbed. A precautionary assumption was made that treefall debris is mainly the result of European logging, and that this logging would frequently disturb the ground surface. Avoiding areas of treefall debris consequently avoided areas that are likely to have been subject to European disturbance. Test excavation pits were preferentially placed on areas of open ground, where ground cover consisted of leaf and bark litter, grass and other low-lying vegetation (**Photo 9-12**).

Photo 9-5: Sparse leaf/bark litter and patches of open grassed ground at Substation PAD

Photo 9-6: Thick leaf/bark litter and treefall debris on ground surface at Substation PAD

Photo 9-7: Low lying ground with dense blackberry undergrowth at Substation PAD

Photo 9-8: Patches of blackberry and open grassed ground at Substation PAD

Photo 9-9: Treefall debris on ground surface at Substation PAD

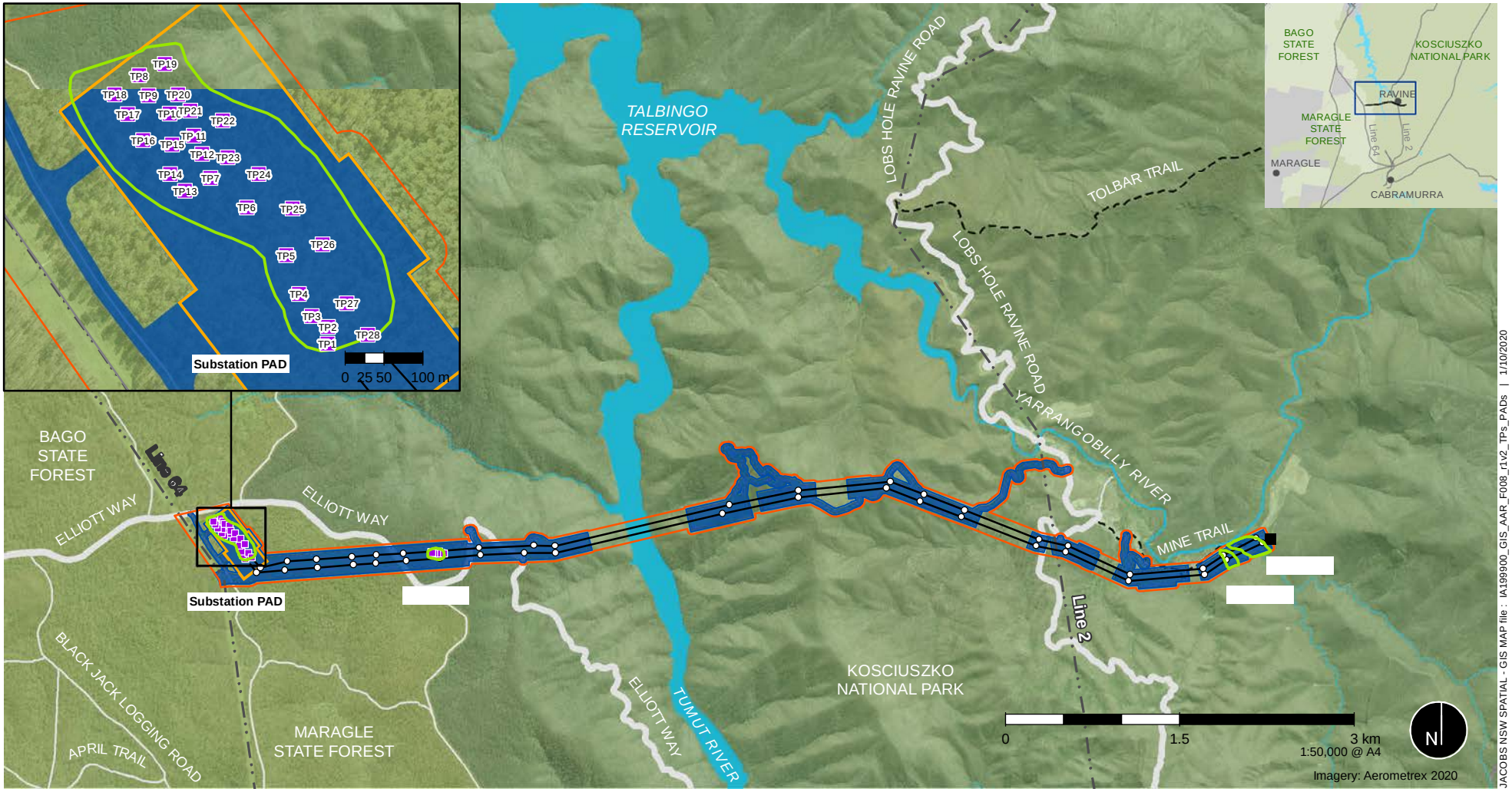
Photo 9-10: Treefall debris on ground surface at Substation PAD

Photo 9-11: Dense treefall debris on ground surface at Substation PAD

Photo 9-12: Test excavation pit being excavated on open grassed ground at Substation PAD

9.2.1.3 Test pit location and findings

At Substation PAD, 28 tests pits were excavated for a total excavated surface area of 7 m^2. The location of test excavation squares is shown in **Figure 9-3**.



Project area
Disturbance area
Proposed 500kV substation
Proposed structure
Proposed transmission line
Snowy 2.0 cable yard
Test pit location (Jacobs, October 2019)
PAD boundary
Electricity transmission line
Minor road
Major road
Trail
Waterway
Water body
State forest
NPWS estate

Figure 9-3 Substation PAD showing location of test excavation pits

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

The subsurface profile showed little variation across the area of PAD (**Photo 9-13**). The immediate subsurface consisted of thick leaf litter, plant roots and other organic material. This material was soft and spongy, with mould and fungus growing within it. Typically, this material extended to a depth of 2 to 5 cm below the surface. With increasing depth, it graded into a dark brown, humic topsoil. This soil was rich in organic material and had abundant plant roots. The topsoil consisted of a fine silt-clay mixture, with sand present in very low (less than five per cent by volume) quantities.

Photo 9-13: North wall of test pit 3, Substation PAD, showing typical soil profile

The topsoil graded to a red-brown subsoil. The subsoil consisted of a fine silt-clay mixture, indistinguishable in texture from the topsoil above it other than the lack of humic material. Small nodules, dark grey or red or yellow in colour, were present but rare within this subsoil. Nodules became slightly more common with increasing depth. The subsoil became heavier and more clay-rich with depth. At the base of each pit's terminal spit, the subsoil had all the properties of clay. It was highly malleable, with surfaces that could be smoothed to a shiny polished texture.

The transition between the profile zones described above was always gradational. None of the excavated pits showed evidence of past erosion or the creation of lag deposits. No sign of stratigraphic discontinuities, indicating successive layering of sediments, was identified in any of the pits. The subsurface profile is interpreted as one that has developed entirely through in-situ soil formation processes. The subsoil is probably derived from an underlying bedrock that has degraded and decayed over time, breaking down to form a clay-rich deposit. At the top of this deposit a soil horizon has developed predominantly through biological processes: the action of plant roots, the deposition of leaf litter and other organic material on the ground surface, and the incorporation of this organic material into the underlying deposit through the activities of burrowing animals such as earthworms (Wood and Johnson 1978).

Angular pebbles and cobbles of igneous rock were present in varying quantities in the excavated pits. In most pits, angular pieces of rock were less than 5 cm in maximum dimension and made up less than 10 per cent of the volume of material excavated. Pieces of rock generally occurred at the base of spit 1 and the top of spit 2 – in other words, at a depth of between five and 15 cm. In pits at the northeast end of the PAD, pieces of rock in the excavated deposit were both larger and more abundant. In these squares, angular cobbles up to 30 cm in maximum dimension were present, and overall pebbles and cobbles composed up to 30 per cent of the volume of excavated spits. Exposed tors of igneous rock occur on the ground surface just outside the PAD adjacent to these pits, and it is likely that the pebbles and cobbles found in the pits are derived from these formations. As in other areas, fragments of rock most commonly occurred at depths of between 5 and 15 cm below the surface. The occurrence of pebbles and cobbles at this depth is probably due to bioturbation agents which move small particles upwards and allow larger objects to move downwards – for example earthworms, ants, termites and burrowing spiders and wasps (Balek 2002; Darwin 1840; Wicksten 1989).

Details of the nature of deposits excavated from each pit are provided in **Appendix D**.

No artefacts were recovered from any of the test pits excavated at Substation PAD.

No artefacts were identified on the ground surface within the PAD during the test excavation program.

On the basis that no Aboriginal objects have been identified at Substation PAD, either during the survey or test excavation program, it is concluded that this area is not an archaeological site.

9.2.2 ST PAD 03

9.2.2.1 PAD description

ST PAD 03 is located on a relatively level section of ground that contrasts with the moderate to steeply sloped terrain that surrounds the PAD. The PAD sits on the midslope of a finger ridge extending from the southwest to the northeast. The terrain in this area generally slopes downward to the northeast, dropping away from high ground to the southwest of the PAD, toward an east-west running valley to the northeast of the PAD, through which Yorkers Creek runs before joining Tumut River to the east. In the immediate area of the PAD, the ground falls steeply away to the north and the east, falls gently to the south and rises steeply to the west.

The largest watercourses near the PAD are Yorkers Creek, Native Dog Creek and Tumut River. Yorkers Creek is a 3rd order drainage that passes approximately 700 m to the north-northeast of the PAD, flowing to the east to meet Tumut River. Native Dog Creek is a 2nd order drainage that passes approximately 1.2 km to the southwest of the PAD, flowing south to join New Maragle Creek, which then flows into Tumut River. Tumut River is a 3rd order drainage passing approximately 1.5 km to the east of the PAD, flowing from south to north. The PAD is approximately 550 m higher than Yorkers Creek at its nearest point, and 500 m higher than Tumut River at its lowest point. The PAD is approximately the same height as Native Dog Creek at its nearest point, with a 500 m high ridgeline between the PAD and Native Dog Creek. In short, accessing 2nd and 3rd order watercourses from the PAD would involve travelling half a kilometre or more, and ascending or descending several hundred vertical metres.

Two unnamed 1st order drainages pass within 100 m of the PAD, one to the north of the PAD, and the other to its south and east. Both drainages are ephemeral and run north to join Yorkers Creek.

The terrain within the PAD slopes gently to the north-northwest at a gradient of around 1 in 20. At the PAD's eastern edge, the terrain begins to fall away more steeply to the east, at a gradient of around 1 in 5.

Vegetation of the PAD and its immediate surrounds consists of open forest, defined as a forest in which tree crowns are either touching or are less than one-quarter crown-width apart (Walker and Hopkins 1990). The tree community in the area consists of Mountain Gum, Snow Gum and Broad-leaved Peppermint open forest. Mature trees in the PAD have a modal girth at chest height of between 1 and 2 m. A small number (around one per cent) of trees have a girth at chest height of up to 3 m. Immature trees less than 30 cm in girth are common within the PAD and are evenly distributed across the PAD (see **Photo 9-14** to **Photo 9-17**).

Photo 9-14: Typical forest structure at ST PAD 03

Photo 9-15: Typical forest structure ST PAD 03

Photo 9-16: Typical forest structure at ST PAD 03

Photo 9-17: Typical forest structure at ST PAD 03. Note test excavation pit, backfilled, on patch of open ground in centre of frame

The ground surface of the area of PAD had a cover of leaf and bark litter that was typically thick in density. In areas where the overhead tree canopy was open, sparse grass cover was present. Thick undergrowth was present across approximately half of the PAD, distributed unevenly in patches. Ground surface visibility ranged from zero to ten per cent across the PAD, with the average ground surface visibility estimated as being five per cent.

9.2.2.2 Constraints on placement of test pits

Patches of ground within ST PAD 03 showed signs of disturbance through digging by animals, most probably pigs. In these areas the ground surface and immediate subsurface deposit had been ripped and turned over.

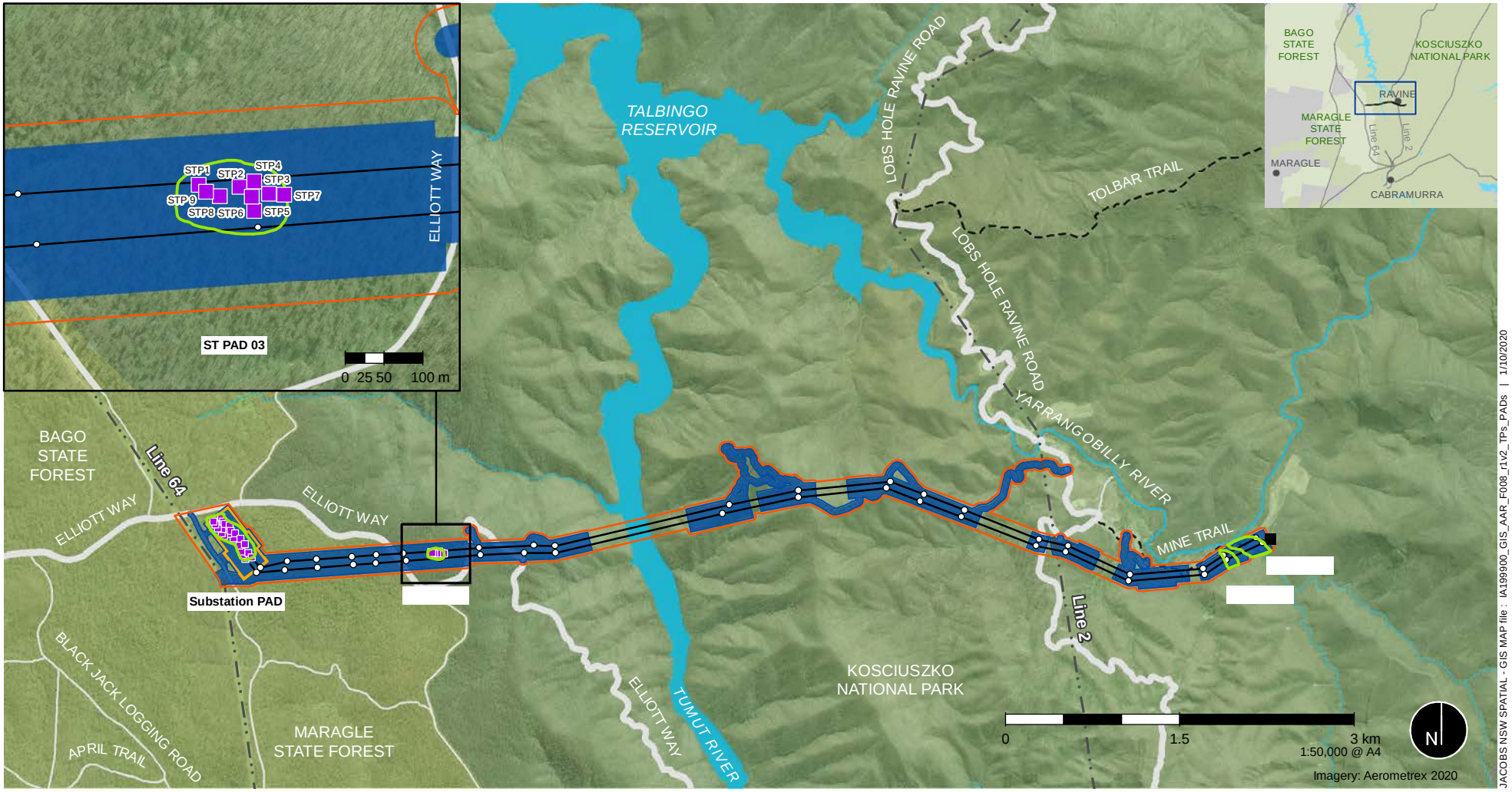
Test excavation pits were placed in areas of open ground that were free of thick undergrowth and visible signs of ground disturbance from animal digging (**Photo 9-18**, **Photo 9-19**). Avoidance of thick undergrowth was as a result of health and safety concerns and a desire to limit the ecological impact of test excavations. Avoidance of areas with visible signs of ground disturbance was because of a desire to carry out excavations in areas that were as free from post-depositional disturbance as possible. The preferential placement of pits on areas of open ground resulted in variations in the spacing between pits, and the alignment of pits along transects, as anticipated in the Test Excavation Method (see **Appendix B**).

Photo 9-18: Test excavation pit being excavated on patch of open ground at ST PAD 03

Photo 9-19: Test excavation pit being excavated on patch of open ground at ST PAD 03

9.2.2.3 Test pit location and findings

At ST PAD 03, 9 test pits were excavated for a total excavated surface area of 2.25 m^2. The location of test excavation pits is shown in **Figure 9-4**.



Project area
Disturbance area
Proposed 500kV substation
Proposed structure
Proposed transmission line
Snowy 2.0 cable yard
Test pit location (Jacobs, October 2019)
PAD boundary
Electricity transmission line
Minor road
Major road
Trail
Waterway
Water body
State forest
NPWS estate

Figure 9-4 ST PAD 03 showing location of test excavation pits

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

The subsurface profile showed little variation across ST PAD 03 (**Photo 9-20**). The immediate subsurface consisted of thick leaf litter, plant roots, and other organic material. This material was soft and spongy, with mould and fungi growing within it. This organic material extended to a depth of between two and 5 cm below the surface, where it graded to a humic topsoil, typically dark brown in colour. This topsoil was rich in organic material and had abundant plant roots growing through it. The topsoil consisted of a fine silt-clay mixture, with sand present in very low (less than five per cent by volume) quantities.

Photo 9-20: North wall of STP8, ST PAD 03, showing typical soil profile

The humic topsoil graded to a red-brown subsoil, consisting of a fine silt-clay mixture indistinguishable in texture from the topsoil above it, other than in its lack of humic material. The subsoil became heavier and more clay-rich with depth. At the base of each pit the subsoil had all the properties of clay. It was highly malleable, with surfaces that could be smoothed to a shiny polished texture. The subsoil contained small nodules, dark grey, red or yellow in colour. These were generally rare within the subsoil and were more common toward the base of each pit.

The transition between the profile zones described above was gradual in all excavated pits. None of the pits showed any evidence of discontinuity, or even a rapid transition zone between the humic leaf-litter, topsoil and subsoil. None of the pits exhibited concentrations of sand or gravel that could be evidence of lag deposits created through surface erosion. The subsurface profile is interpreted as one that has developed through in-situ soil formation processes. The subsoil is probably derived from an underlying bedrock that has degraded and decayed over time, breaking down to form a clay-rich deposit. At the top of this deposit a soil horizon has developed, predominantly through biological processes: the action of plant roots, the deposition of leaf litter and other organic material on the ground surface, and the incorporation of this material into the underlying deposit through the activities of burrowing animals such as earthworms (Wood and Johnson 1978).

Angular pebbles and cobbles of igneous rock were present in varying quantities in the excavated pits. These angular pieces were less than 5 cm in maximum dimension and made up less than five per cent of the volume of material excavated. Pieces of rock occurred most frequently toward the base of spit 1 and the top of spit 2 – at a depth of between five and 15 cm. The occurrence of pebbles and cobbles within this zone of the deposit is probably due to the action of earthworms, which cause rocks to sink downwards through a deposit (Darwin 1840). The concentration of rock between five and 15 cm below the surface corresponds to the depth of the deposit that has been subject to bioturbation by earthworms and other burrowing animals.

Details of the nature of deposits excavated from each pit are provided in **Appendix D**.

Nine surface stone artefacts were identified and recorded within ST PAD 03 during the test excavation program. All of these surface artefacts are made from quartz (**Photo 9-21**). One of the artefacts was located on the surface of one of the test excavation pits (STP4).

Photo 9-21: Four quartz flakes found on the ground surface at ST PAD 03

Two stone artefacts were recovered from subsurface deposits excavated from separate pits. Both artefacts were recovered from spit 2 (depth between 10 and 20 cm). One is a core, the other a retouched flake (**Table 9-2**). Measurements taken on artefacts recovered from the test excavation pits, and analysed in the lab, are provided in **Appendix E**.

Table 9-2: Descriptive data for all artefacts identified at ST PAD 03

Pit	Spit	Type	Material	Completeness	Length (mm)	Width (mm)	Thickness (mm)
STP3	2	Unretouched flake	Quartz	Proximal	5.89	14.34	4.86
STP9	2	Core	Quartz	Complete	22.65	27.95	16.65
STP4	Surface	Unretouched flake	Quartz	Distal	33.59	31.65	9.68
NA	Surface	Core	Quartz	Complete	20	20	15
NA	Surface	Unretouched flake	Quartz	Complete	10	10	5
NA	Surface	Unretouched flake	Quartz	Distal	10	10	5
NA	Surface	Unretouched flake	Quartz	Complete	20	10	5
NA	Surface	Unretouched flake	Quartz	Complete	30	15	5
NA	Surface	Unretouched flake	Quartz	Complete	35	20	10

9.2.2.4 Discussion of results

The sample of artefacts identified at ST PAD 03, though very small, indicates that quartz was the main material used by the Aboriginal people that inhabited the site. The dominance of quartz in the identified assemblage is replicated on many sites in the Australian Alps (e.g. Dibden 2019), and probably results from its ubiquity and its material properties.

Quartz occurs in a variety of rock formations and is ubiquitous in the igneous formations of the Australian Alps. It commonly occurs in veins of milky quartz, white to grey in colour. It is a durable rock, resistant to weathering, and consequently often crops out of less resistant rock formations, subsequently being transported through colluvial or alluvial movement. As a result, it is found in rock outcrops as well as in colluvial and alluvial gravel deposits.

Quartz is a hard material, with a score of 7 on the Mohs hardness scale. It has a fracture toughness similar to flint, chert, and other fine grained siliceous materials (Domanski *et al.* 1994). It can be easily flaked by prehistoric knappers, and when it fractures it produces durable sharp edges (Caruana and Mtshali 2018a; Knight 1991). The macro structure of quartz varies considerably – quartz is generally anisotropic to some extent, meaning that it contains cleavage planes, or weak interfaces along which fractures will preferentially travel (Cotterell and Kamminga 1987; de la Peña *et al.* 2013; de Lombrera-Hermida 2008; Wadley and Kempson 2011). In some crystal quartz pieces, these weak interfaces are rare or absent, and the material fractures in a predictable fashion similar to glass (Ballin 2008: 44). In some pieces of milky quartz, weak interfaces are both common and extremely weak compared to the surrounding rock, and fractures tend to follow these interfaces and fragment the rock unpredictably (Ballin 2008: 44). Individual pieces of quartz can fall anywhere along a range of variability between these two extremes (Driscoll 2010: 8; Knight 1991). Procuring quartz that is suitable for knapping usually requires the knapper to discriminate between quartz that will or will not fracture with sufficient predictability to be suitable for flake production. The quality of the quartz required will be dependent upon the types of artefacts the knapper wishes to produce, and the knapping behaviours that will be employed (Knutsson *et al.* 2016; Manninen 2016). Variability in quartz quality can occur within individual nodules, and can be difficult to assess prior to carrying out knapping. For this reason, knapping quartz often produces a mixture of conchoidally fractured flakes, flake fragments, and fragmented irregularly fractured fragments (Driscoll 2011; Spott 2005; Tallavaara *et al.* 2010).

Despite the typically unpredictable, or varyingly predictable, behaviour of fracture propagation in quartz, and the consequent frequency of flake breakage during manufacture or unpredictable splintering of the piece being knapped, quartz is a material that was frequently utilised by knappers in Australia and around the world. The ubiquity of quartz in many geological landscapes is certainly one reason for this. This ubiquity, together with the typical variability in quality of quartz, means that knappers could often find pieces of quartz that were of sufficiently high quality to be suitable for flaking (Hiscock 1982). The cost, in time and energy, of procuring quartz is low compared with other materials in landscapes where quartz is common. The tendency of quartz flakes to break during manufacture could be mitigated by adopting knapping strategies such as preferentially producing small or thick flakes (Manninen 2016). In short, Aboriginal people living in quartz-rich environments could mitigate the generally low quality of this material through procurement and knapping strategies.

The hardness of quartz would have made it an attractive material for the production of tools with functional cutting edges. The durability of a cutting edge, or the rate at which it becomes blunt through use, determines the amount of work that can be carried out using that edge before a tool must be replaced or resharpened (Clarkson *et al.* 2015; Shott and Sillitoe 2005). Flaked quartz artefacts, due to their hardness, have edges that are durable and resistant to blunting (Caruana and Mtshali 2018a; Douglas *et al.* 2016; Wadley and Kempson 2011). A durable cutting edge is desirable because it decreases the frequency with which tools need to be resharpened or replaced, and can therefore be advantageous in situations where the costs of spending time and energy in tool resharpening or replacement are high. The preferential selection of materials on the basis of their high durability, and despite a lower fracture predictability than other available materials, has been demonstrated archaeologically in at least one case (Braun *et al.* 2009). In some situations, therefore, the use of quartz might have been preferable even when other materials were available, due to its high durability.

The predominance of quartz artefacts within ST PAD 03 and other sites in the Australian Alps (e.g. Dibden 2018; 2019) is likely to be the result of a combination of the material's ubiquity in the landscape and its hardness and consequent durability of flaked cutting edges.

Both of the artefacts recovered from excavations were found in spit 2, at a depth between 10 and 20 cm. As described above, this depth is below the leaf litter-topsoil horizon and is within the topsoil-subsoil horizon. The lack of stratigraphic breaks in the deposit mean that there is no possibility of determining whether the subsurface artefacts were deposited during a different time period from the surface artefacts, or whether both derive from the same assemblage and are in their current locations due to movement upward and downward through the deposit over time.

The number of artefacts identified at ST PAD 03 indicates that the artefact assemblage on this site varies in density between the portion of the assemblage on the ground surface and in the subsurface deposits. The two subsurface artefacts were recovered from the excavation of nine test pits, each one quarter of a square metre in area. This equates to a density of 0.89 artefacts /m^2 across the total area excavated.

The uniformity of the landform across the PAD provides confidence that the nine test pits excavated provide a representative sample of the subsurface archaeological deposits across the PAD. ST PAD 03 consists of a continuous gently sloped ground surface, with no obvious discontinuities in slope angle, ground surface morphology, or visible geology. It is reasonable to conclude that processes of sedimentation, soil formation, and the aggrading or erosion of regolith (sediments and soils) over time would have been uniform across the PAD. Similarly, the chance of Aboriginal people depositing artefacts on the ground surface is likely to have been uniform across the PAD – there are no features in the current environment that would lead to people preferentially utilising any one area over another.

The surface artefacts identified during the test excavation program can be used to generate an estimate of the density of the overall surface artefact assemblage across ST PAD 03. The total area of the PAD is approximately 12 200 m^2. Of this area, it is estimated that ground surface visibility averaged five per cent. The total area with ground surface visibility is consequently 610 m^2. The seven surface artefacts found within this visible area equates to a density of 0.011 surface artefacts /m^2 of ground surface. On this basis, it can be concluded that the density of surface artefacts across the PAD (including in areas with no ground surface visibility) is lower than the density of subsurface artefacts. The higher observed density of artefacts in subsurface deposits probably results from artefacts being incorporated downward into the soil profile through bioturbation.

The area of PAD sampled by the nine test excavation pits is sufficient to conclude that subsurface Aboriginal artefacts are present across this PAD, and likely occur in a density of around one artefact /m^2 across the PAD.

9.3 Summary

Two areas have been subject to a program of test excavation, these being Substation PAD and ST PAD 03, both located in project area west, on elevated ground west of Tumut River.

- Substation PAD yielded no artefacts, from a total of 28 excavated pits. No Aboriginal artefacts have been identified within this PAD, either during the survey fieldwork or the test excavation fieldwork
- Based on the lack of any Aboriginal artefacts found at Substation PAD, it is concluded that Substation PAD is not an archaeological site
- ST PAD 03 yielded nine artefacts, of which two were recovered from subsurface deposits in excavated pits. The remaining artefacts were found on the ground surface
- The stone artefact assemblage at ST PAD 03 has a surface density of 0.011 artefacts /m^2 and a subsurface density of 0.89 /m^2. On the basis that these surface and subsurface finds are representative of the PAD, it is concluded that an assemblage consisting of both surface and subsurface artefacts is present within ST PAD 03, and that the density of artefacts across the PAD is around one artefact /m^2
- The majority of artefacts at ST PAD 03 are likely to be in subsurface deposits, with a minority of artefacts occurring on the ground surface
- All of the artefacts identified at ST PAD 03 are made from quartz, indicating a predominant use of this material by the Aboriginal group or groups that inhabited the site. The dominance of quartz at ST PAD 03 is replicated on many sites in the Australian Alps.

10. Significance assessment

10.1 Method of assessing significance

10.1.1 Basis for assessment

A significance assessment is made up of several significance criteria that attempt to define if and why a site is important, and to what degree. Such assessments recognise that sites may be important for different reasons to different people, and even at different times. The assessment of Aboriginal cultural heritage in this assessment is based upon the four values of the Australia International Council on Monuments and Sites (ICOMOS) Burra Charter (Australia ICOMOS 2013).

- Social values
- Historical values
- Scientific values
- Aesthetic values.

Each of these values is assessed below for Aboriginal sites in or adjacent to the project area, and an overall significance is assigned based on an average across the values. This is inherently a reductive process and oversimplifies what is important for different reasons to a range of different stakeholders but is a necessary process in being able to create comparative values between sites. The significance of each site ultimately informs the management of sites and places.

It should be noted that only existing Aboriginal sites within the project area are assessed for significance here. Aboriginal sites within or adjacent to the project area that could not be re-found during the archaeological survey are not assessed in this chapter. The cultural significance of specific Aboriginal sites is discussed in Section 6.4.

10.1.2 Social significance

The significance of a heritage item does not relate only to its scientific or research value. Aboriginal people's views on the significance of archaeological sites are usually related to traditional, cultural and educational values, although some Aboriginal people also value any scientific information a site may be able to provide.

Aboriginal cultural significance was assessed from consultation with the nominated site officers for the relevant RAPs during and following field assessments. It should be noted that Aboriginal significance assessed in this manner may not reflect the views of all members of the community.

10.1.3 Historic significance

The historic value of a site is determined through its association with historically important people, events or activities.

10.1.4 Scientific significance

A concept, place or object can have cultural significance if it is significant in exhibiting particular scientific characteristics. Such as:

- It has demonstrable potential to yield information that will contribute to an understanding of the natural or cultural history of the region, state or nation
- Importance for information contributing to a wider understanding of natural or cultural history by virtue of its use as a research site, teaching site, type locality, reference or benchmark site

- Importance for its potential to yield information contributing to a wider understanding of the history of human occupation of the locality, region, state or nation
- It is significant in demonstrating a high degree of technical innovation or achievement.

Research potential or scientific significance of an Aboriginal archaeological site can be assessed by using the criteria set out below. Each criterion is rated as low, moderate or high.

- Site integrity – The integrity of a site refers to its state of preservation, or condition. A site can be disturbed through a number of factors including natural erosion processes, destructive land use practices or repeated use of a site in the past by both humans and animals
- Site structure – Structure refers to a site's physical dimensions, that is, size and stratigraphy. A large site or a site with stratified deposits has more research potential than small sites and/or surface scatters. Sometimes however, specific research questions may be aimed at smaller sites in which case they would be rated at a higher significance than normal. Site structure cannot be assessed for scarred trees or isolated artefacts
- Site contents – This category refers to the range and type of occupation debris found in a site. Generally, complex art sites, extensive quarries with associated debris and surface sites that contain a large and varied amount of organic and non-organic materials are considered to have greater research potential than those sites with small, uniform artefacts, single motif art sites and small quarries with little or no debris. For scarred trees, contents may refer to the size and type of scar and/or how many scars there are on the one tree
- Representativeness and rarity – Representativeness refers to how much variability exists between the subject site and others inside or outside the subject area. It also considers the types of sites already conserved in the area and how much connectivity between sites exists. Rarity considers how often a particular site type occurs in an area. Assessment of representativeness and rarity requires some knowledge of the background archaeology of the area or region in which a study is being carried out. Rarity also relates to whether the subject site or area is important in demonstrating a distinctive way of life, custom, process, land use, function or design which is no longer practiced (OEH 2011).

10.1.5 Aesthetic significance

This refers to the sensory value of a place, and can include aspects such as form, texture, and colour, and can also include the smell and sound elements associated with use or experience of a site (Australia ICOMOS 2013). Aesthetic significance can be closely linked to the social value of a site.

A place or object can have cultural significance if it is significant in exhibiting particular aesthetic characteristics, such as:

- Importance to a community for aesthetic characteristics
- Importance for its creative, design or artistic excellence, innovation or achievement
- Importance for its contribution to the aesthetic values of the setting demonstrated by a landmark quality or having impact on important vistas or otherwise contributing to the identified aesthetic qualities of the cultural environs or the natural landscape within which it is located.

10.2 Statements of significance

The assessment of archaeological significance presented here is based on the results of archaeological survey, and test excavations at Substation PAD and ST PAD 03. The significance of all sites in the project area is summarised in **Table 10-1**.

Two of the areas of PAD (ST PAD 01 and ST PAD 02) have not, at the time of writing, been subject to archaeological excavation. The reasons for excluding these two areas of PAD from the test excavation program are discussed in **Section 9.1**. For these areas, archaeological significance is assessed through extrapolation from similar areas of the landscape that have been subject to excavation. Results of excavations carried out for the

Snowy 2.0 Main Works (Dibden 2019) are used to assess the likely significance of ST PAD 01 and ST PAD 02, given that these two areas of PAD are located in low-elevation areas near Yarrangobilly River, which are similar to the landforms assessed by Dibden.

10.2.1 Substation PAD

The archaeological survey and test excavation program have found no Aboriginal artefacts within this area of PAD. Both the surface survey and the test excavation program represent information from a sub-sample of the total PAD area.

The absence of any Aboriginal artefacts detected during survey or test excavation means that the Substation PAD is now assessed as not being an Aboriginal site. It is unlikely that the area contains Aboriginal objects, given the lack of artefacts found during survey and test excavation, and consequently this area has no heritage significance.

10.2.2 ST PAD 03

Nine artefacts were identified within this PAD, seven of which were identified on the ground surface, and two of which were recovered from test pits. It is possible that the surface and subsurface artefacts are derived from the same deposition event – in the absence of stratigraphic breaks within the subsurface profile, it cannot be stated that they must have been deposited at different times.

The test excavations indicate that artefacts are present in subsurface deposits at a density of 0.89 artefacts /m^2, while the surface finds indicate that artefacts are present on the ground surface at a density of 0.011 artefacts / m^2.

The artefacts are cores and unretouched flakes. All are made from quartz, a ubiquitous material commonly used for the production of artefacts on sites across the Australian Alps. In short, the artefacts identified do not signal that ST PAD 03 was a site that is unusual in the region, in terms of the stone material that was exploited and in terms of the types of artefacts that were discarded there.

ST PAD 03 is of low significance. It has low density and diversity of archaeological remains in comparison to nearby sites. It is one of an exceedingly numerous class of site in the Australian Alps and has limited ability to contribute to scientific inquiry beyond this current recording. It is not regarded as particularly important by the Aboriginal Community.

On the basis of the sparse artefact assemblage, and the lack of any unusual aspects of artefact morphology or artefact production technology, the archaeological significance of ST PAD 03 is assessed as low.

10.2.3 ST PAD 01

This area of PAD, identified in a valley floor context near Lobs Hole Ravine, was not subject to test excavation as part this assessment as NSW Archaeology were conducting salvage excavation nearby as part of the Snowy 2.0 Main works heritage assessment.

The area of PAD is a flat, relatively open area adjacent to a creek which is a tributary of the Yarrangobilly River. Its proximity to Lobs Hole Ravine and previously recorded Aboriginal sites increases its potential to possess subsurface deposits containing Aboriginal heritage (see Section 8.5).

ST PAD 01 encompasses the recorded location of several previously recorded surface artefact scatters: AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, and AHIMS# 56-6-0497. During the archaeological survey, surface artefacts were found near these previously recorded sites, but it was unclear which site or sites they were related to. The scatter of stone artefacts discovered within this area of PAD during the archaeological survey, and the cluster of sites have been previously recorded within the area of ST PAD 01, establish the area of PAD as having moderate archaeological significance, and a high potential to contain subsurface artefacts.

ST PAD 01 (and its associated surface scatters of stone artefacts) is assessed as having the potential to be of moderate significance.

Although the significance of any subsurface Aboriginal objects that might be present within ST PAD 01 cannot be comprehensively assessed prior to archaeological test excavation, the probable significance of this site can be extrapolated from results from excavation of sites nearby, located in similar landform contexts. Dibden's (2019) test excavations of sites within Lobs Hole Ravine, located on similar elevated terrain within the valley floor adjacent to the Yarrangobilly River, recovered subsurface assemblages of stone artefacts that were assessed as having significance levels ranging from low to moderate. ST PAD 01 is located within Dibden's Survey Unit 3 (SU3). Test excavations within this survey unit recovered a total of 151 artefacts, with an average density of 23 artefacts /m^2. The significance of material within SU3 was assessed as being low to moderate in terms of its research potential, and low in terms of its education and aesthetic value (Dibden 2018: 157). On the basis of these results, there is a likelihood that subsurface deposits at ST PAD 01 could contain an assemblage of Aboriginal objects of moderate significance.

10.2.4 ST PAD 02

This area of PAD, identified on level and gently sloping ground on a low ridge within a valley floor context, was not subject to test excavation as part of this assessment, as NSW Archaeology were conducting salvage excavations nearby as part of the Snowy 2.0 Main works heritage assessment.

ST PAD 02 is located on a low spur ridge within an area of low alluvial terraces along the southern side of the Yarrangobilly River. Tracks, erosion and disturbance related to mining nearby have impacted the area. The area has high been assessed as having the potential to contain subsurface artefacts (see **Section 8.5**).

Although the significance of any subsurface Aboriginal objects that might be present within this area of PAD cannot be comprehensively assessed prior to archaeological test excavation, the probable significance of this site can be extrapolated from results from excavation of sites nearby, located in similar landform contexts. Dibden's (2019) test excavations of sites within Lobs Hole Ravine, located on similar elevated terrain within the valley floor adjacent to the Yarrangobilly River, recovered subsurface assemblages of stone artefacts that were assessed as having significance levels ranging from low to moderate. ST PAD 02 is located within Dibden's Survey Unit 3 (SU3). Test excavations within this survey unit recovered a total of 151 artefacts, with an average density of 23 artefacts / m^2. The significance of material within Survey Unit3 was assessed as being low to moderate in terms of its research potential, and low in terms of its education and aesthetic value (Dibden 2018: 157). On the basis of these results, there is a likelihood that subsurface deposits at ST PAD 02 could contain an assemblage of Aboriginal objects of low to moderate significance.

10.2.5 AHIMS# 56-6-0477

This previously recorded site (Dibden 2018: 103) was documented as a scatter of four flakes, all made of tuff, in a bare rocky area on a flat crest. The site was assessed as having no potential for subsurface archaeological deposits, as the area had eroded down to exposed bedrock.

The site was assessed (Dibden 2018: 161) as being of low significance, due to its being a common site type, containing a small low density and disturbed artefact assemblage.

This site could not be re-found during the archaeological survey. This assessment follows Dibden (2018) in assessing this site as having low significance.

10.2.6 Statement of significance summary

The significance of all sites in the project area is summarised in **Table 10-1**.

Table 10-1: Assessment of site significance

Site name	Assessed significance	Relevant notes
Substation PAD	Nil	No artefacts found. This area of PAD is assessed as not being an Aboriginal site.
ST PAD 03	Low	Low density assemblage of quartz cores and unretouched flakes, on ground surface and subsurface deposits
ST PAD 01 (incorporating previously recorded sites AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, and AHIMS# 56-6-0497)	Moderate (surface artefact assemblage). Archaeological significance of subsurface deposits unknown. Potential to have moderate significance, based on results of Dibden's (2018) excavations nearby.	This PAD encompasses several previously recorded surface artefact scatters. These consist of a medium density assemblage of tuff and quartz cobbles and cores and unretouched flakes, on ground surface.
ST PAD 02	Archaeological significance of subsurface deposits unknown. Potential to have moderate significance, based on results of Dibden's (2018) excavations nearby.	
AHIMS# 56-6-0477	Low	Site could not be re-found during the archaeological survey. Significance assessment follows Dibden (2018: 161).

11. Impact assessment

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 km 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 Aboriginal heritage items. All of these components are considered impacts of the project. The following sections explore the nature and significance of anticipated impact to the heritage items within or near the disturbance area.

As noted in **Section 2**, the disturbance area is a subset of the project area. In other words, not all heritage items within the project area would necessarily be impacted by the project. Instead, impacts are anticipated only to heritage items within the disturbance area, or which are sufficiently near to the disturbance area to have the potential to be at risk of indirect (or inadvertent) impacts.

11.1 Project impact

Four Aboriginal sites (ST PAD 01 to ST PAD 03 and AHIMS# 56-6-0477) lie within the disturbance area (**Table 11-1**). One of these (ST PAD 01) incorporates within its boundaries four previously identified AHIMS sites.

All four of these areas would be directly impacted by the project. Impacts would result in the destruction of the entirety of all four sites.

It should be noted that Substation PAD, an area that was recorded as PAD during the archaeological survey and subjected to test excavation, has been assessed as not being an Aboriginal site (see **Section 9.2.1**). The assessment of this area as not being an Aboriginal site is based on the finding of no Aboriginal objects in this area, either during the archaeological survey or the subsequent test excavation program. On this basis, it is unlikely that any Aboriginal objects are present in the area, and that the area should no longer be regarded as a potential Aboriginal site. Substation PAD is included in **Table 11-1**, but the proposed impact to this area would not represent an impact to Aboriginal heritage.

Table 11-1: potential impact to Aboriginal sites in the project area

Name	Site type	Type of harm	Degree of harm	Consequence of harm	Notes
ST PAD 03	Artefact scatter and PAD	Direct	Entirety of site	Destruction	-
ST PAD 01 (incorporating previously recorded sites AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, and AHIMS# 56-6-0497)	Artefact scatter and PAD	Direct	Entirety of site	Destruction	

Name	Site type	Type of harm	Degree of harm	Consequence of harm	Notes
ST PAD 02	PAD	Direct	Entirety of site	Destruction	
AHIMS# 56-6-0477	Artefact scatter	Direct	Entirety of site	Destruction	This previously recorded site could not be found during the archaeological survey.
Substation PAD	Not an Aboriginal site (see **Section 9.2.1**)	Direct	Entirety of area	No impact to Aboriginal heritage	This area of PAD has been demonstrated, through survey and test excavation, to not contain Aboriginal objects. Destruction of this area would not represent an impact to Aboriginal heritage.

One site is potentially at risk of indirect impact during project construction and ongoing use/maintenance. This is a site within 50 m of the disturbance area (**Table 11-2**).

Table 11-2: Site at risk of indirect impact

Name	Site type	Type of harm	Distance of site from project disturbance area (metres)	Notes
AHIMS # 56-6-0041	Artefact scatter	Indirect	27	Further assessment and investigation to occur prior to construction if impact is likely

11.2 Existing prior impact

The Snowy 2.0 works overlap the eastern end of the project area. Impacts to the landscape are ongoing at the time of writing, and there is the potential that these impacts have impacted the two areas of PAD identified in this ACHAR in project area east (ST PAD 01 and ST PAD 02). Archaeological investigations (Dibden 2018; 2019), and ongoing archaeological salvage work, have been carried out as part of Snowy 2.0.

A recent aerial photograph (**Figure 11-1**) indicates the extent of impact from Snowy 2.0, and where these impacts overlap with the project area (**Figure 11-1:**). The image indicates that a wide road has been constructed which passes through the eastern end of the project area. This road crosses through the centre of ST PAD 01 from west to east, and probably crosses through the northern end of ST PAD 02. This road consequently likely represents an existing partial impact to both of these areas of PAD. It does not seem likely that the impact has resulted in the complete destruction of either PAD, however further archaeological investigation, including salvage should be conducted at those portions of the PAD which have not been excavated previously and which are likely to be impacted through the conduct of the project. .

On the basis of the aerial imagery available, it is likely that both ST PAD 01 and ST PAD 02 are partially intact. It is unclear whether the previously recorded surface artefact scatters within the area of ST PAD 01 (AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, and AHIMS# 56-6-0497) are still intact, or whether these sites have been salvaged and/or impacted by the Snowy 2.0 project. For the purposes of this ACHAR, it is assumed that all of the sites and areas of PAD identified in project area east are still intact.

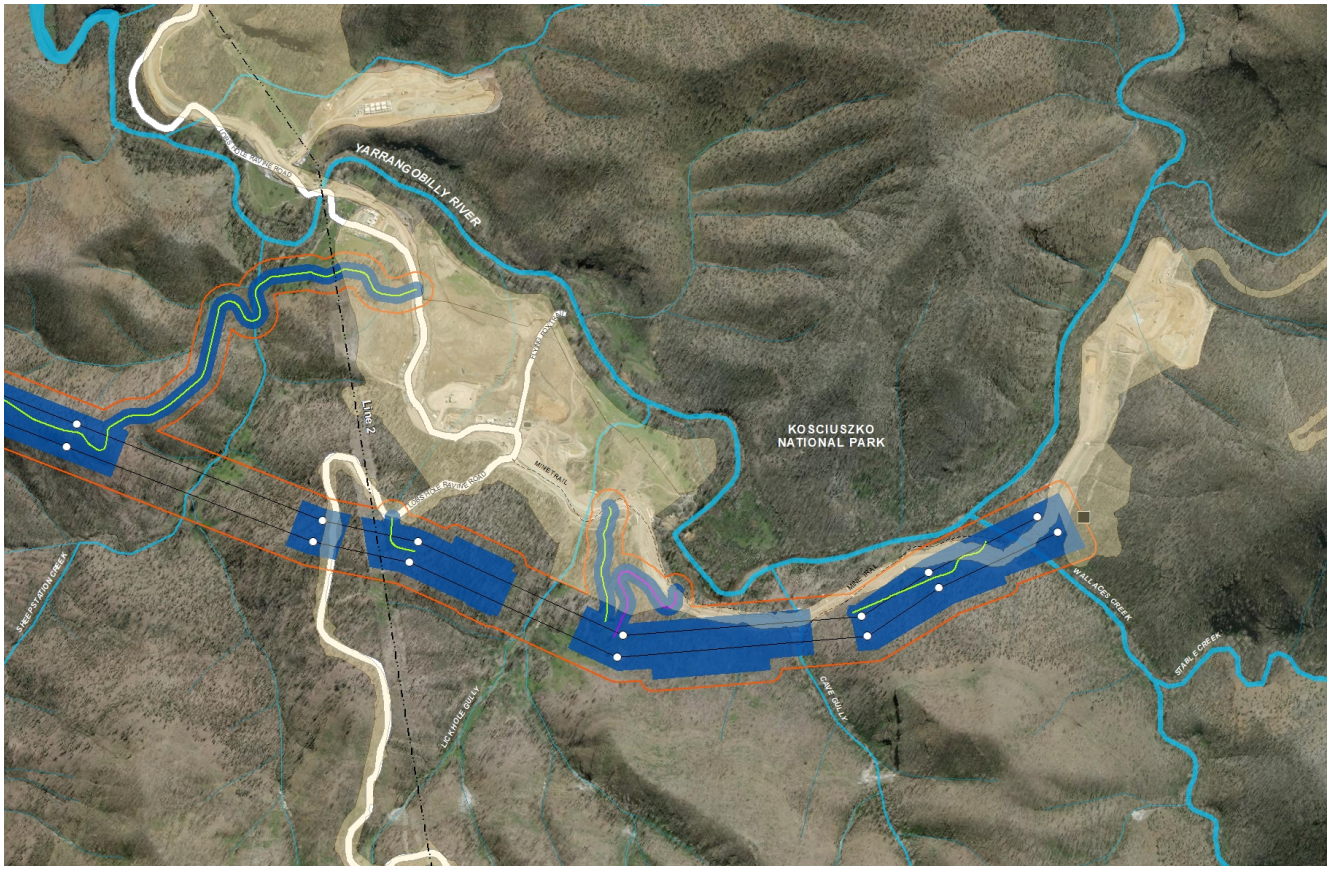


Figure 11-1: Aerial photograph of project area's eastern end, showing impacts as of 12/04/2020

11.3 Impact avoidance measures

The disturbance area minimises impacts to Aboriginal sites and areas of archaeological sensitivity as far as is practical. The project's alignment is primarily determined by terrain, with transmission line structures generally located on elevated ground. A consequence of this targeting of elevated ground is that impact to areas of higher archaeological potential, on valley floors and near to watercourses, is minimised. The alignment of the transmission line follows the shortest practical route linking Snowy 2.0 with the nearest existing transmission line outside of KNP. Similarly, the placement of access tracks has focused on selecting the shortest possible routes. The project's design consequently minimises, as far as practical, the overall area of ground being impacted, a measure which likely minimises the project's impact to Aboriginal sites and areas of archaeological sensitivity.

The substation, which represents the largest single area of ground to be impacted by the project, is located on an area that has been demonstrated by this archaeological assessment to be unlikely to contain Aboriginal objects. A comprehensive program of test excavation has established an absence of Aboriginal objects in the subsurface deposits in this area. No surface artefacts have been found, either during the archaeological survey or the test excavation program. Locating the substation in this area consequently avoids impact to Aboriginal sites.

The project generally avoids areas of high archaeological potential, such as areas close to waterways (see **Section 7.2**). The transmission corridor travels mostly across areas of elevated ground such as hilltops and ridgelines, which have a comparatively low potential to contain Aboriginal sites.

The project will take steps to avoid indirect impacts to Aboriginal sites outside the project disturbance area. This ACHAR's recommendations (**Section 12**) propose that a Cultural Heritage Management Plan (CHMP) will be produced, and that this document would set out the measures that would be taken to ensure inadvertent impacts are avoided. These measures would include making project workers aware of Aboriginal sites and their cultural value and ensuring that works would be limited to the designated disturbance area.

11.4 Significance of impacts

11.4.1.1 Impacts to sites

The significance of the sites identified within the disturbance area is discussed on **Section 10**.

The potential impact to sites within the disturbance area is discussed in **Section 11.1**.

The project would directly impact four Aboriginal sites, one of which (ST PAD 01) is a complex of several surface artefact scatters and an area of PAD (**Table 11-3:**). ST PAD 01 (including its associated surface sites) has been assessed as having moderate significance; ST PAD 03 and AHIMS# 56-6-0477 are assessed as low significance; and ST PAD 02 is of unknown significance as no test excavations of subsurface deposits have been carried out.

Based on the results of test excavations carried out on sites within the same landform context as ST PAD 01 and ST PAD 02 (Dibden 2018), these sites have a likelihood of containing subsurface assemblages of Aboriginal artefacts, which could be of moderate significance (see **Section 10.2**).

The impact of the project to Aboriginal sites would consist of the destruction of sites currently assessed as having low to moderate archaeological significance. In the absence of any mitigation measures, the project's impact to Aboriginal heritage is assessed as being moderate on this basis.

Table 11-3: Anticipated impact to sites within the project area, and their significance

Site	Type of harm	Degree of harm	Assessed significance of site
ST PAD 03	Direct	Entirety of site	Low
ST PAD 01 (incorporating previously recorded sites AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, and AHIMS# 56-6-0497)	Direct	Entirety of site	Moderate (surface artefact assemblage). Archaeological significance of subsurface deposits unknown. Potential to have moderate significance, based on results of Dibden's (2018) excavations nearby.
ST PAD 02	Direct	Entirety of site	Archaeological significance of subsurface deposits unknown. Potential to have moderate significance, based on results of Dibden's (2018) excavations nearby.
AHIMS# 56-6-0477	Direct	Entirety of site	Low
Substation PAD	Direct	Entirety	None (area is assessed as not being an Aboriginal site)

11.4.1.2 Impacts to identified heritage values of Australian Alps National Parks

The Australian Alps National Parks and Reserves (AANP) is listed on the National Heritage List (Commonwealth of Australia Gazette No. S237, 7 November 2008). Under criterion a) of this gazette ("The place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australian natural or cultural history"), an identified value is:

> *Moth Feasting: The use of an adult insect – the Bogong Moth – as the basis for past large-scale annual gatherings of different Aboriginal groups for ceremonies sets the gatherings in the AANP apart from other Aboriginal ceremonial gatherings and has captured the Australian imagination, making it exceptional in Australia. Therefore the AANP has outstanding heritage value to the nation because of the importance of Aboriginal social gatherings based on moth feasting in the course, or pattern, of Australia's cultural history (Commonwealth of Australia Gazette No. S237: 3)*

There are no other values included in the listing of the Australian Alps National Parks on the National Heritage List that pertain to Aboriginal heritage (see **Section 21**).

It is possible that some or all the archaeological sites that would be impacted by the project are associated with moth feasting, although here is no evidence to support such a conclusion beyond their location in the Alps. Nonetheless the possibility cannot be discounted and information provided by RAPs during the review of this ACHAR might shed some light on this question. It is possible that these sites could provide information on Aboriginal settlement and mobility in the mountains during moth feasting events, as these sites constitute part of the region's archaeological landscape. The loss of these sites might have an adverse impact on future study of the region's archaeological site distribution patterns and the information that the region's sites provide on moth feasting events, but with regard to sites assessed as no or low significance this loss of information will be negligible. In more general terms, the landscape as a whole has a connection with moth feasting, and the impact to the within the disturbance area consequently represents an impact to this identified value of the Australian Alps National Park. The small proportion of the Australian Alps National Parks being impacted mean that the extent of this impact to heritage value is minor.

11.4.1.3 Impacts to identified heritage values of Kosciuszko National Park

The KNP POM lists the features and qualities that endow the region with heritage value. The document notes that the National Park holds heritage value through both tangible objects, such as archaeological sites, landscape features, and identified places, and also through intangible cultural heritage. Intangible cultural heritage refers to traditions or living expressions of culture, such as oral traditions, cultural knowledge, social practices, rituals, and stories. Intangible cultural heritage can be connected to tangible objects or places – for example, stories can be related to particular sites, animals, plants, or landscape features. As a consequence, intangible heritage can bestow heritage value on tangible objects or places.

Aboriginal heritage significance relating to the KNP is defined in the KNP PoM as follows:

> The Snowy Mountains are of high cultural significance to the descendants of the Aboriginal tribal groups that occupied and visited them. In particular:
>
> - The spiritual attachments, surviving traditional knowledge, and family stories and memories illustrate the ongoing cultural connection that Aboriginal people have with the mountains
> - The country – its resources, cultural places and pathways – are of special social and historic significance to Aboriginal people, with some remembered in oral tradition, some documented in nineteenth century records, and others revealed by archaeological investigation
> - Aboriginal words and place names provide markers of the presence of Aboriginal people across many of the landscapes of the park
> - Aboriginal places within the park have social and historical significance to Aboriginal people. They provide a link to a past way of life, a cultural tradition, a spiritual connection and a sense of social identity that is highly valued by many members of the Aboriginal community
> - The significance of these places to Aboriginal people encompasses both material and non-material aspects; and
> - The potential educational use of such places is a recognised component of their significance.
>
> The annual Bogong moth gathering was one of the most important Aboriginal cultural and social events in south-eastern Australia. The ethnographic evidence, continuing Aboriginal knowledge about this event and the places, routes and physical remains of the activities associated with it, are of historic, social and scientific value at a state and possibly a national level. (NSW National Parks and Wildlife Service 2006: 84).

The KNP PoM specifically refers to the heritage value of Aboriginal archaeological sites in Kosciuszko National Park. The archaeological resource of the National Park is cited as holding historical and scientific significance as it:

- Provides evidence of a long history of Aboriginal occupation of the high country
- Demonstrates successful adaptations to environments unique on the Australian mainland
- Offers opportunities to reveal important new information about the length and nature of Aboriginal occupation and use of the mountains (NSW National Parks and Wildlife Service 2006: 85).

The impact to sites by the project would represent an impact to the heritage values of KNP as defined in the KNP PoM. As discussed in **Section 10.2**, the sites that would be impacted have low to moderate significance. This significance stems from their scientific value as representative of Aboriginal sites within the landscape of the mountains, and their potential to provide information on the behaviour of Aboriginal groups and societies who occupied and travelled through the region. As a small subset of the region's archaeological resource, they have the potential to contribute to our understanding of Aboriginal people's adaptation to the mountainous environment. It is noted that none of the sites has potential to provide an age estimate of the period in which it formed. As a consequence, these sites do not have the potential to provide additional evidence of the longevity of Aboriginal occupation in the region.

The loss of the sites within the disturbance area represents a minor loss to the overall archaeological resource of Kosciuszko National Park. The proportion of the Park's area that would be impacted by the project is small, and it can be inferred that the impacts to these sites would represent an impact to a commensurately small subset of the overall population of similar archaeological sites within the Park.

12. Management recommendations

It is recommended that:

1) The area of access track atop Sheep Station Ridge which has not been surveyed must be surveyed in consultation with the RAPs once suitable access to the area has been established. (see **Section 8.5.2**). Any areas or items of Aboriginal cultural heritage significance identified as part of this additional investigation would be managed in accordance with measures developed in consultation with RAPs. These measures will be included in the CHMP prepared for the project.

2) No further archaeological work is required at Substation PAD. This area has been assessed as not being an Aboriginal site, and the area consequently has no potential to contain Aboriginal objects.

3) No further archaeological excavation is required at ST PAD 03 as the site is assessed as being of low significance.

4) Salvage collection of surface artefacts will be carried out prior to project construction at the sites of ST PAD 03, and AHIMS# 56-6-0477.

5) Salvage collection of surface artefacts, and salvage excavations will be carried out, prior to project construction, at ST PAD 01 and ST PAD 02. Collection of surface artefacts at ST PAD 01 will also salvage any artefacts from the previously recorded surface sites within this PAD's boundaries, these sites being AHIMS# 56-6-0009, AHIMS# 56-6-0495, AHIMS# 56-6-0496, and AHIMS# 56-6-0497.

6) A Salvage Excavation Method Document will be prepared prior to carrying out the salvage excavation works. This document will be provided to RAPs, who will be given a 28-day period to review the document and provide feedback. An indicative method to be followed during salvage excavations is provided in **Section 12.1** below.

7) A CHMP will be prepared to guard against inadvertent impacts to Aboriginal objects during project construction and maintenance. The CHMP will specify that project works would be restricted to the project disturbance area. It will have provisions to ensure workers are made aware of cultural heritage places and their value, for example through project inductions. The CHMP will include provisions to guard against indirect impact to AHIMS # 56-6-0041.It is assumed that ST PAD 01; ST PAD 02; AHIMS# 56-6-0009; AHIMS# 56-6-0495; AHIMS# 56-6-0496; AHIMS# 56-6-0497; and AHIMS# 56-6-0477 are intact and have not been either destroyed through activities of Snowy 2.0 or salvaged by the Snowy 2.0 archaeological team (see **Section 11.2**). If these sites have been entirely salvaged or destroyed by Snowy 2.0, then recommendations 5) - 6) relating to salvage collection and excavation at these sites would not apply.

12.1 Archaeological salvage program

The following salvage program was developed during consultation on site during survey and subsurface testing of the project area and subsequently in consultation with NSW Archaeology, the RAPs and Heritage NSW.

The proposed salvage program will allow the recovery of a sample of surface and subsurface archaeological material from within the Aboriginal sites, for the purpose of recording and analysing any artefacts and archaeological features. The salvage program will be supervised by a qualified archaeologist who will operate in consultation with representatives from the RAPs.

12.1.1.1 Aim of archaeological salvage

The primary aim of the salvage program is to investigate links between archaeology and landscape by excavating sections of the Aboriginal sites to be impacted. The research focus of the salvage strategy is to recover a sufficient sample of artefacts and archaeological features from a series of excavations in varying landforms displaying low disturbance, in order to undertake cultural, scientific and comparative analysis of the materials. These excavations are to be undertaken in a process that is comparable to archaeological work undertaken as part of Snowy 2.0.

During salvage excavation and post excavation analysis, the focus will be on the identification of assemblage characteristics (including knapping floors and hearths) associated with specific past activities and how this relates to the landforms within the project area.

12.1.1.2 Indicative archaeological salvage method

Salvage excavation will be undertaken at three of the Aboriginal sites listed in management recommendations 4 and 5 (**Section 12**). Salvage will be undertaken in consultation with attending representatives of the RAPs. Excavations will follow accepted archaeological practice, documenting stratigraphic observations, recording artefacts and features and cataloguing any cultural heritage objects.

The following excavation methodology will be followed for the salvage:

- Excavation of ten 1 m x 1 m pits (10 m^2) at each site within the project area
- Excavation of up to a further 10 m^2 (open area excavation) to occur in the project area where areas of higher artefact density (defined as greater than 40 artefacts per m^2) occur or there is determined to be a reasonable purpose to do so
- Excavation and analysis of features will be undertaken in an archaeologically appropriate way, according to material, type of feature and taphonomic influences. For example, hearths will be excavated as a single unit and bagged separately for analysis.
- All excavated sediments will be sieved using 5 millimetre aperture wire-mesh sieves
- Each stratigraphic unit will be excavated in a controlled manner and documented in 10 cm spits until sterile deposits are reached
- Soil colour and type, texture, acidity and stratification will be recorded to increase understanding of the subsurface conditions and how they may relate to site formation processes influencing the presence and condition of subsurface archaeological deposits
- Soil colours will be recorded from a representative sample of soil strata, using a Munsell colour chart to ensure consistency
- Soil acidity will be measured for a representative sample of soil types using a pH testing kit
- Photographic and scale-drawn records of the stratigraphy/soil profile, features and informative Aboriginal objects will be made for a representative sample of excavation points
- All material collected from surface collection and subsurface excavation will be bagged and appropriately labelled
- If possible and appropriate, samples suitable for radiometric dating (maximum of three samples per AHIMS site) will be collected and submitted to an appropriate facility for dating
- All artefacts excavated by hand will be recorded in detail and catalogued by an archaeologist with suitable experience in the analysis of the types of artefacts recovered.

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The sole purpose of this report and the associated services performed by Jacobs is to undertake an Aboriginal cultural heritage assessment in accordance with the scope of services set out in the contract between Jacobs and the Client. That scope of services, as described in this report, was developed with the Client.

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Appendix A. Consultation documents and consultation log

Date	To	From	Medium	Brief Description
26/Oct/18	Office of the Registrar, *Aboriginal Land Rights Act 1983*	Jacobs	Mail	Requesting details of potential RAPs - Agency Letter
26/Oct/18	Brungle-Tumut LALC	Jacobs	Mail	Requesting details of potential RAPs - Agency Letter
26/Oct/18	National Native Title Tribunal	Jacobs	Mail	Requesting details of potential RAPs - Agency Letter
26/Oct/18	NTSC	Jacobs	Mail	Requesting details of potential RAPs - Agency Letter
26/Oct/18	OEH	Jacobs	Mail	Requesting details of potential RAPs - Agency Letter
26/Oct/18	Riverina Local Land Services	Jacobs	Mail	Requesting details of potential RAPs - Agency Letter
26/Oct/18	Snowy Valleys Council	Jacobs	Mail	Requesting details of potential RAPs - Agency Letter
15/Nov/18	OEH - Jackie Taylor	Jacobs	Phone	DW called Jackie to inform hewre that we'd yet to receive any RAP lists from OEH. Jackie committed to actionining this asap.
19/Nov/18	Jacobs	Jackie Taylor (OEH)	Email	OEH list of RAPs
22/Nov/18	Jacobs	Trudy Crawford (Snowy Valleys Council)Email	Email	Advice to contact BT LALC
27/Nov/18	Jacobs	Sue Bulger	Email	BTLALC names to be contacted
3/Dec/18	Jacobs	Murra Bidgee Mullangari	Email	Request to register for project
3/Dec/18	Jacobs	Merrigarn	Email	Request to register for project
3/Dec/18	Jacobs	Muragadi	Email	Request to register for project
3/Dec/18	Jacobs	Cherrie Carrol Turrise	By phone	Request to register for project
4/Dec/18	Identified Aboriginal Parties with no mailing address	Jacobs	Email	Stage One invitation to register (based off OEH list)
5/Dec/18	Jacobs	Janine Thompson	Email	Request to register for project
6/Dec/18	Jacobs	Marilyn Carroll-Johnson	Email	Request to register for project
6/Dec/18	Jacobs	Iris White	Email	Request to register for project
10/Dec/18	Registered Aboriginal Parties to date	Jacobs	Email	Confirmation of registration as RAPs for the project
11/Dec/18	Jacobs	PD Ngunawal Consultancy	Email	Request to register for project
12/Dec/18	Jacobs	Luke	Phonecall	Inquiring about registration, will be emailing in.
13/Dec/18	Jacobs	Gunjeewong Cultural Heritage Aboriignal Corporation	Mail	Request to register for project
13/Dec/18	Jacobs	Koomuri Ngunawal Aboriginal Corporation	Email	Request to register for project
14/Dec/18	Jacobs	Yurwang	Email	Request to register for project
14/Dec/18	Jacobs	Buru Ngunawal Aboriginal Corporation	Email	Request to register for project
17/Dec/18	Jacobs	Alice Williams	Mail	Request to register for project
19/Dec/18	Jacobs	Didge Ngunawal Corporation	Email	Request to register for project
21/Dec/18	Jacobs	Griffith Skills Training Centre & Ngumbaay Indigenous Corporation	Email	Request to register for project
7/Jan/19	Jacobs	Janice Williams	Email	Request to register for project
7/Jan/19	Jacobs	Ramsay Freeman	Email	Request to register for project
7/Jan/19	Jacobs	Megan Considine	Email	Request to register for project
8/Jan/19	Jacobs	Shirley Marlowe	Email	Request to register for project
8/Jan/19	Jacobs	Matthew Marlowe	Email	Request to register for project
8/Jan/19	Jacobs	Lawrence Marlowe	Email	Request to register for project
11/Jan/19	Jacobs	Ron Grovenor	Email	Request to register for project
23/Jan/19	Oeh and LALC	Jacobs	Email	Notification of RAPS for project
27/Mar/19	Identified Aboriginal Parties	Jacobs	Email	Methodology emailed out to RAPs
27/Mar/19	Jacobs	Glen Freeman	Email	I have no issues with the methodology for this project and look forward to
27/Mar/19	Jacobs	Shaun Carroll	Email	working with you on it.
28/Mar/19	Identified Aboriginal Parties with no address	Jacobs	Mail	Methodology mailed out to RAPs
7/May/19	RAPS (with emaisl)	Jacobs	Email	Attemp to obtain a contact number for Ramsey freeman
8/May/19	Mark Saddler	Jacobs	Phonecall	Attemp to obtain a contact number for Ramsey freeman
8/May/19	Mark Saddler	Jacobs	Email	Written request for a contact number for Ramsey Freeman, or for the Snowy Mountains Indigenous Elders Group as we do not have contact details
8/May/19	Alice Williams	Jacobs	Phonecall	Unable to get onto, no voice mail. Attempt to pass on information about survey information
8/May/19	Janice Williams	Jacobs	Phonecall	Number has been disconnected
8/May/19	Megan Considine	Jacobs	Phonecall	Small message left- unable to leave full message
8/May/19	Jacobs	Megan Considine	Phonecall	Returning call. Provided email address
8/May/19	Jacobs	Mark Saddler	Email	Providing information to contact Brungle Community Centre or Tumut LALC for Ramsey Freeman's details
9/May/19	Janice Williams	Jacobs	Phonecall	Gave Clare a call in regards to Survey work
9/May/19	Jacobs	Janice Williams	Phonecall	Called Janice back to confirm Alice Williams was registered and obtained her email address
	Supply of document Snowy 2.0 Transmission - Archaeological Test Excavation Method			
9/Aug/19	Buru Ngunawal Aboriginal Corporation (BNAC)	Jacobs	email	
9/Aug/19	Corroboree Aboriginal Corporation	Jacobs	email	
9/Aug/19	Didge Ngunawal clan	Jacobs	email	

9/Aug/19	Griffith Skills Training Centre and Ngumbaay Indigenous Corporatio	Jacobs	email	
9/Aug/19	Gunjeewong Cultural Heritage Aboriginal Corporation	Jacobs	email	
9/Aug/19	Koomurri Ngunawal Aboriginal Corporation	Jacobs	email	
9/Aug/19	Merrigarn Indigenous Corporation	Jacobs	email	
9/Aug/19	Muragadi Heritage Indigenous Corporation	Jacobs	email	
9/Aug/19	Murri Bidgee Mullangari Aboriginal Corporation	Jacobs	email	
9/Aug/19	Ngarigo Elders	Jacobs	email	
9/Aug/19	Ngunawal Consultancy	Jacobs	email	
9/Aug/19	Walgalu Elder and knowledge holder	Jacobs	email	
9/Aug/19	Yurwang Gundana Consultancy Cultural Heritage Services	Jacobs	email	
9/Aug/19	Janine Thompson	Jacobs	email	
9/Aug/19	Megan Considine	Jacobs	email	
9/Aug/19	Shirley Marlowe	Jacobs	email	
9/Aug/19	Ron Grovenor	Jacobs	email	Email bounced - mailed instead (see below)
9/Aug/19	Ron Grovenor	Jacobs	Mail	
9/Aug/19	Snowy Mountains Indigenous Elders Group	Jacobs	Mail	
9/Aug/19	Janice Williams	Jacobs	Mail	
	Responses to method document			
9/Aug/19	Jacobs	Corroboree Aboriginal Corporation (Marilyn Johnson)	Phonecall	No issues with method. Wish to send site officer.
9/Aug/19	Jacobs	Corroboree Aboriginal Corporation (Marilyn Johnson)	Email	Supplied insurance documents
9/Aug/19	Jacobs	Didge Ngunnawal Clan	Email	Wishes to participate in fieldwork. Supplied insurance.
11/Aug/19	Jacobs	Muragadi	Email	Wishes to participate in fieldwork. Supplied insurance.
11/Aug/19	Jacobs	Merigarn	Email	Wishes to participate in fieldwork. Supplied insurance.
12/Aug/19	Jacobs	Murrabidgee Mullangari	Email	Stated that methodology or site officer information hadn't been received for this project.
12/Aug/19	Jacob	Murrabidgee Mullangari (Darleen Johnson)	Phonecall	Said that email of method document hadn't been received. Oliver re-sent the document to [redacted](see below)
12/Aug/19	Murrabidgee Mullangari	Jacobs	Email	Re-sent the method document following phonecall received from Darleen Johnson.
12/Aug/19	Jacobs	Murra Bidgee Mullangari	Email	Wishes to participate in fieldwork. Supplied insurance.
12/Aug/19	Jacobs	Didge Ngunnawal Clan (Paul Boyd)	Phonecall	Phoned to check that email with insurance documents had come through.
12/Aug/19	Jacobs	Didge Ngunnawal Clan (Paul Boyd)	Phonecall	[redacted]it would be appreciated if his group could be given priority supplying a site officer for the test excavation, [redacted]
13/Aug/19	Jacobs	Luke Penrith	Email	Stated that he managed the payroll for the survey phase. Wishes to know if we will engage him for this again.
13/Aug/19	Jacobs	Koomurri Ngunawal Aboriginal Corporation	Email (4 emails	Wishes to participate in fieldwork. Provided insurance
14/Aug/19	Jacobs	Olivia Williams	Phonecall	Wishes to participate in fieldwork. Didn't provide insurance, said that on previous survey they had worked through Luke Penrith who had handled insurance cover. OM responded that he would check with AC whether Luke Penrith would be similarly engaged for the test excavation phase.
14/Aug/19	Jacobs	Janice Williams	Phonecall	Wishes to participate in fieldwork. Also stated that Megan Considine and Ramsay Freeman wish to participate. Stated that she would send a follow-up email, and have Megan Considine send an email as well.
15/Aug/19	Jacobs	Luke Penrith	Email	Supplied Pre-Qual document.
15/Aug/19	Luke Penrith	Jacobs	Email	Acknowledged receipt of Pre-Qual document.
15/Aug/19	Jacobs	Luke Penrith	Email	Asked if the list of RAPs could be shared with him, and if Justine Bell is on the list of RAPs (Jacobs did not reply to these questions).
19/Aug/19	Jacobs	Megan Considine	Email	Wishes to participate in fieldwork. Stated that Ramsay Freeman and Janice Williams also wish to participate. All wish to work through Luke Penrith's organisation.
19/Aug/19	Jacobs	Olivia Williams	Email	Wishes to participate in fieldwork, representing self. Wishes to work through Luke Penrith for insurance.
20/Aug/19	Jacobs	Janice Williams	Phonecall	Stated that Roxanne Williams wishes to be involved in fieldwork. Said that Roxanne Williams was involved in the survey phase. Said that she (Janice) would send a follow-up email on Roxanne Williams' behalf requesting involvement.
21/Aug/19	Luke Penrith	Jacobs	Email	Stated that Jacobs will engage LP's organisation in the same capacity it operated during survey phase.
22/Aug/19	Jacobs	Luke Penrith	email	Acknowledged Jacobs' engagement of LP's organisation
23/Aug/19	Jacobs	Janice Williams	Phonecall	[redacted] mentioned that Jeremiah Freeman also wishes to take part in the fieldwork, and agreed to send an email to Jacobs next week to this effect.
26/Aug/19	Jacobs	Paul Boyd	Phonecall	Stated that he would personally be the field rep for Didge Ngunnawal clan. Also asked where we would be staying during fieldwork. OM said he would contact Paul back once Jacobs has organised where its fieldworkers will be accommodated.
28/Aug/19	Jacobs	Shirley Marlowe	Email	Wishes to supply site officers: Matthew Marlowe, Lawrence Marlowe, Nioka Marlowe, Shirley Marlowe, Nat Barnes. Wish to work through Luke Penrith's organisation

2/Sep/19	Jacobs	Murra Bidgee Mullangari (Darleen Johnson)	Phonecall	Inquired about fieldwork start date, and whether accommodation would be the same as it was during survey phase. OM informed her that the provisional start date is September 23rd but this isn't solidified yet, and that notification will be sent out as early as possible.
15/Sep/19	Jacobs	Olivia Williams	Email	Inquired when fieldwork is scheduled to start.
16/Sep/19	Jacobs	Gulgunya NHAC	Email	Inquired when fieldwork would start, and for any other details regarding accommodation, attendence, etc.
16/Sep/19	Gulgunya NHAC	Jacobs	Email	Informed Gulgunya NHAC that fieldwork has been delayed for an indefinite period. Indicated that Jacobs would update all groups as soon as further information on fieldwork timing is available.
17/Sep/19	Olivia Williams	Jacobs	Phonecall	Informed Olivia that fieldwork has been delayed for an indefinite period. Indicated that Jacobs would update all groups as soon as further information on fieldwork timing is available.
17/Sep/19	Luke Penrith	Jacobs	Emai	Informed Luke Penrith that fieldwork has been delayed for an indefinite period. Indicated that Jacobs would update all groups as soon as further information on fieldwork timing is available.
19/Sep/19	Jacobs	Murra Bidgee Mullangari	Email	Asked if fieldwork is still cancelled next week.
19/Sep/19	Murra Bidgee Mullangari	Jacobs	Email	Informed Murra Bidgee Mullangari that fieldwork has been postponed due to the need to test soils for hazardous materials. MBM responded acknowledging receipt of email.
19/Sep/19	Jacobs	Muragadi	Email	Asked if fieldwork is still cancelled next week. Jacobs responded to inform that fieldwork has been postponed due to the need to test soils for hazardous materials.
19/Sep/19	Muragadi Heritage Indigenous Corporation	Jacobs	Email	Informed Muragadi that fieldwork has been postponed due to the need to test soils for hazardous materials.
19/Sep/19	Corroboree Aboriginal Corporation	Jacobs	Email	Informed Corroboree Aboriginal Corporation that fieldwork has been postponed due to the need to test soils for hazardous materials. Corroboree responded acknowledging receipt of email.
20/Sep/19	Shirley Marlowe	Jacobs	Email	Informed Shirley, Matthew and Lawrence Marlowe that fieldwork has been postponed due to the need to test soils for hazardous materials.
20/Sep/19	Merrigarn Indigenous Corporation	Jacobs	Email	Informed Merrigarn Indigenous Corporation that fieldwork has been postponed due to the need to test soils for hazardous materials.
20/Sep/19	Alice and Olivia Williams	Jacobs	Email	Informed Alice and Olivia Williams that fieldwork has been postponed due to the need to test soils for hazardous materials.
20/Sep/19	Megan Considine	Jacobs	Email	Informed Oliva Considine that fieldwork has been postponed due to the need to test soils for hazardous materials.
20/Sep/19	Jacobs	Megan Considine	Email	Acknowledged Jacob's email informing of fieldwork postponement.
20/Sep/19	Jacobs	Shirley Marlowe	Email	Acknowledged Jacob's email informing of fieldwork postponement.
	Informing RAPS of rescheduling			
4/Oct/19	Luke Penrith	Jacobs	Email and phon	Informed of rescheduled fieldwork dates
4/Oct/19	Alice and Olivia Williams	Jacobs	Email	Informed of rescheduled fieldwork dates
4/Oct/19	Megan Considine	Jacobs	Email	Informed of rescheduled fieldwork dates
4/Oct/19	Shirley, Matthew, Lawrence Marlowe	Jacobs	Email	Informed of rescheduled fieldwork dates
4/Oct/19	Ron Grovenor	Jacobs	Phonecall	Informed of rescheduled fieldwork dates
4/Oct/19	Olivia Williams	Jacobs	Phonecall	Informed of rescheduled fieldwork dates
4/Oct/19	Jacobs	Corroboree Aboriginal Corporation	Email	Asked for any updates on the project
8/Oct/19	Jacobs	Shirley Marlowe	Email	Put forward three people as available Sites Officers: Matthew Marlowe, Lawrence Marlowe, and Kieren Marlowe. Asked whether there are induction processes that will need to be completed, and asked for any information on accommodation and fieldwork logistics.
8/Oct/19	Jacobs	Olivia Williams	Email	Stated that she is available for the week of October 21 to 26
9/Oct/19	Jacobs	Corroboree Aboriginal Corporation	Email	Asked for any updates on the project
9/Oct/19	Jacobs	Janice Williams	Phonecall	Stated that Janice Williams, Ronald Grovener, Megan Considine, and Ramsay Freeman are all available for the week of October 21 to 26.
9/Oct/19	Jacobs	Murra Bidgee Mullangari (Darleen Johnson)	Phonecall	Informed Murra Bidgee Mullangari that a decision has been made to limit fieldwork participation to groups based in the local area, and that an email would be sent to provide formal notification of this. MMB requested the contact details of a contact person from the client that they can discuss the decision with. Jacobs stated that this decision is one that Jacobs is responsible for, and that contact details of the appropriate contact person with the client would be supplied to MBM. MBM expressed an intention to appeal against this decision.
9/Oct/19	Jacobs	Muragadi	Email	Asked for any updates on the project
9/Oct/19	Jacobs	Merigarn	Email	Asked for any updates on the project
9/Oct/19	Murra Bidgee Mullangari	Jacobs	Email	Emailed notification of the decision to restrict fieldwork participation to groups based in the project's local area
9/Oct/19	Koomurri Ngunawal Aboriginal Corporation	Jacobs	Email	Emailed notification of the decision to restrict fieldwork participation to groups based in the project's local area
9/Oct/19	Didge Ngunawal clan	Jacobs	Email	Emailed notification of the decision to restrict fieldwork participation to groups based in the project's local area
9/Oct/19	Merrigarn Indigenous Corporation	Jacobs	Email	Emailed notification of the decision to restrict fieldwork participation to groups based in the project's local area
9/Oct/19	Muragadi Heritage Indigenous Corporation	Jacobs	Email	Emailed notification of the decision to restrict fieldwork participation to groups based in the project's local area
9/Oct/19	Corroboree Aboriginal Corporation	Jacobs	Email	Emailed notification of the decision to restrict fieldwork participation to groups based in the project's local area
9/Oct/19	Jacobs	Didge Ngunawal Clan	Phonecall	Expressed unhappiness and disappointment with the decision to exclude Didge Ngunawal Clan from the fieldwork program. Stated that their group has demonstrable geneological links with the project area. The reasons for the decision were discussed.
9/Oct/19	Jacobs	Didge Ngunawal Clan	Email	Expressed unhappiness with the decision to exclude Didge Ngunawal Clan from the fieldwork program. Outlined examples of their connection to the area through father and grandfather.

9/Oct/19	Jacobs	Merrigarn Indigenous Corporation	Email	Expressed unhapiness with the decision to exclude Merrigarn from the fieldwork program. Stated that Merrigarn was under the impression they would be included in fieldwork. Stated that they hold a cultural connection to the area, and that residence of an area isn't stated in OEH regulations as a criteria on which connection is judged. Enquired if Jacobs is a member of the archaeological association.
9/Oct/19	Merrigarn Indigenous Corporation	Jacobs	Email	Referred to previous email communication with Merrigarn, which their email to Jacobs on September 9th appeared to allude to. Discussed that the timing of this email (advising Merrigarn of fieldwork delay) was sent prior to decisions being made about fieldwork employment. The uncertainty of timing of fieldwork caused by the delay made decisions on fieldworker employment impracticable.
9/Oct/19	Jacobs	Murra Bidgee Mullangari	Email	Expressed unhappiness with the decision to exclude Murra Bidgee Mullangari from the fieldwork program. Stated that residence in an area is not a criteria on which cultural connection is judged, and they view the decision as discriminatory. Stated that they were under the impression they had already been engaged for employment for the field program. Requested the contact details for a contact person from the client.
9/Oct/19	Jacobs	Murra Bidgee Mullangari	Email	Requested that contact details for the proponent be supplied as soon as possible. Stated that Murra Bidgee Mulangari have contacted OEH and the anti-discrimination board to discuss today's decision.
9/Oct/19	Jacobs	Corroboree Aboriginal Corporation	Phonecall	Discussed the decision to restrict fieldwork participation to groups based in the project area. Corroboree expressed unhappiness and disappointment that the decision has been made, and that they feel the decision is unfair.
9/Oct/19	Jacobs	Corroboree Aboriginal Corporation	Email	Stated that Corroborree view the decision as an unfair one, and that a fair solution would be to employ all RAPs on a roster basis.
9/Oct/19	Jacobs	Corroboree Aboriginal Corporation	Email	Provided an expanded discussion outlining Corroboree Aboriginal Corporation's view that the decision is unfair and discriminates against their group on the basis of the area in which they are based. Stated that their preference for fieldwork employment would be a roster including all RAPs. Corroboree feels that this decision implies that their group is not connected to the land in question. Requested that they be employed in the event that other RAPs are unavailable.
10/Oct/19	Shirley Marlowe	Jacobs	Email	Informed Shirley that the there are no issues regarding site access applying to the potential Sites Officers she has nominated.
10/Oct/19	Jacobs	Shirley Marlowe	Email	Thanked Jacobs for information on site access. Provided suggestions on fieldwork allocation for individuals from her group.
10/Oct/19	Jacobs	Murra Bidgee Mullangari	Phonecall	Repeated Murra Bidgee Mullangari's view that the decision discriminates against their group unfairly. Requested contact details for a contact person from the client. Jacobs informed MBM that the contact details for an appropriate contact point from the client are being sought and will be forwarded as soon as possible.
10/Oct/19	Jacobs	Roxanne Williams	Phonecall	Stated that she is available for the week of October 21 to 26
10/Oct/19	Jacobs (cc'd on message to Chris Page of Transgrid)	Murra Bidgee Mullangari	Email	Referred to an earlier phone conversation between Murra Bidgee Mullangari and Chris Page. Asked who had made the decsision to limit the RAPs involved in fieldwork. Re-asserted an ancestral/family connection to the land in question. Stated that Murra Bidgee Mullangari view the decision as discriminatory, and that they were under the impression that they were to be included in the fieldwork, prior to being informed of the decision.
10/Oct/19	Jacobs (cc'd on message to Chris Page of Transgrid. Also ccd were S	Murra Bidgee Mullangari	Email	Responded to an email from Chris Page, in which Chris said he would raise MBM's concerns with Sherrie Castaldini, Transgrid's Indigenous Engagement Officer. Murra Bidgee Mullangari stated that they have contacted fair trading in regard to the decision. Re-stated that MBM would like to be involved in the fieldwork.
10/Oct/19	Jacobs	Koomurri Ngunawal Aboriginal Corporation	Email	Stated that while Koomurri do not begrudge the groups based closer to the project area being given preference in terms of fieldwork representation, Koomurri does not regard the decision as being fair to individuals or groups who have moved away from their traditional country for reasons unrelated to their cultural connection to the land.
14/Oct/19	Jacobs	Olivia Williams	Email	Asked for information on fieldwork logistics
14/Oct/19	Olivia Williams	Jacobs	Email	Indicated that fieldwork logistics information would be supplied today
14/Oct/19	All fieldworkers	Jacobs	Email	Supplied information on PPE requirements, informed RAPs that final roster would be provided as soon as possible.
14/Oct/19	Jacobs	Shirley Marlowe	Email	Thanked Jacobs for supply of information on fieldwork PPE requirements. Provided suggestions of fieldworker allocation from her group.
14/Oct/19	Jacobs	Megan Considine	Email	Thanked Jacobs for supply of fieldwork information
14/Oct/19	Jacobs	Darleen Johnson	Phonecall	Asked whether Jacobs had any further information from Transgrid regarding decision to limit field participation. Stated that if Murra Bidgee Mullangari had not received word of the decision being reversed today they would pursue legal action including action for lost income.
14/Oct/19	Jacobs	Janice Williams	Phonecall	Enquired about fieldwork logistics, and the fieldwork roster
15/Oct/19	Jacobs	Darleen Johnson	Phonecall	Asked for the contact details of the appropriate contact person at Transgrid, as Darleen understands the previous contact she was communicating with is now on leave.
15/Oct/19	Jacobs (also ccd Sherrie Castaldini, Chris Page and Paul Broad of Tr	Murra Bidgee Mullangari	Email	Asked for contact details for the project managers who had made the decision to not include MBM in fieldwork.
15/Oct/19	Jacobs	Olivia Williams	Email	Thanked Jacobs for supply of fieldwork information (email of the 14th)
15/Oct/19	Jacobs (also ccd Yasmin Williams and Paul Italiano of Transgrid)	Murra Bidgee Mullangari	Email	Stated that Murra Bidgee Mullangari understood they had been engaged to be employed on the upcoming fieldwork, prior to the decision to limit the number of groups participating. Stated that they believe the decision to be discriminatory and contravening the Racial Act 1975. Stated that Murra Bidgee Mullangari have contacted the Human Rights Commission, and are considering lodging a complaint against Jacobs and Transgrid.
15/Oct/19	Jacobs	Darleen Johnson	Phonecall	Asked for the contact details of the appropriate contact person at Transgrid, as Darleen understands the previous contact she was communicating with is now on leave. Restated her view that the decision made is discriminatory and that she is unhappy about it. Stated that she is unsure who the decision has come from. Jacobs re-stated that the decision is one that Jacobs is responsible for, being the entity carrying out the archaeological assessment and consequently the consultation process.

15/Oct/19	Jacobs	Shirley Marlowe	Email	Supplied suggestions on allocating field days between members of her group
15/Oct/19	Shirley Marlowe	Jacobs	Email	Thanked Shirley for the info she provided, and informed her that the final roster would be developed tomorrow (October 16th) after a meeting that Luke Penrith will be having with some of the RAPs.
15/Oct/19	Jacobs (cc'd on email to Sherrie Castaldini of Jacobs)	Murra Bidgee Mullangari	Email	Stated that Murra Bidgee Mullangari are going to lodge a complaint with the Human Rights Commission.
12/Feb/20	Jacobs	Olivia Williams	Email	Enquired about the current state of the project, and whether any fieldwork is planned
12/Feb/20	Olivia Williams	Jacobs	Email	Informed Olivia that the EESG is organising a meeting with Jacobs and the client to discuss the current state of the project, and future steps to be taken in assessment of heritage in light of recent bushfire impacts to the project area.
25/Feb/20	Jacobs	Janice Williams	Phonecall	Stated that the Aboriginal community have thoughts on extra assessment work they would like to see happen in light of the bushfires. Informed Jacobs that an email would be sent outlining their wishes.
27/Feb/20	Jacobs	Ramsay Freeman and Winifred Marlowe	Letter via email	Stated, as elders of the Wiradjuri/Wolgalu Nations, that they would like further archaeological works to be carried out in the project area. The bushfires in the area would have exposed the ground surface and created the potential for more sites to be uncovered. They see this as providing a 'great opportunity for the Aboriginal community to get in to carry out more extensive archaeological works in the area'.
27/Feb/20	Jacobs	Ramsay Freeman, Ronald Grovenor, Janice Williams, Matthew Marlowe, Lawrence Marlowe, Bradley Freeman, Adrian O'Brien, Megan Considine, Teisha Freeman, Brittany Minogue	Letter via email	Stated, as Sites Officers, that they would like further archaeological works to be carried out in the project area. The bushfires in the area would have exposed the ground surface and created the potential for more sites to be uncovered. They see this as providing a 'great opportunity for the Aboriginal community to get in to carry out more extensive archaeological works in the area'.
11/Jul/20	Olivia Williams	Jacobs	Phonecall	Discussed the current state of the project, for Olivia to relay to other members of the BTLALC and site officers. Informed Olivia that the project is still ongoing, with the ACHAR in preparation.

ABN 70 250 995 390
180 Thomas Street, Sydney
PO Box A1000 Sydney South
NSW 1235 Australia
T (02) 9284 3000
F (02) 9284 3456

29/10/2018

Snowy Valleys Council
76 Capper Street
TUMUT NSW 272[redacted]

Subject: Seeking Aboriginal knowledge holder to assist TransGrid to prepare cultural heritage assessment reports for the SNOWY 2.0 TRANSMISSION PROJECT.

Dear Sir/Madam,

The Snowy 2.0 pumped hydro and generation project (Snowy 2.0) is being proposed by Snowy Hydro Limited (Snowy Hydro) to provide up to 2000 megawatts (MW) of generation capacity and at full capacity, large-scale energy storage for about 350,000 MW hours. There is a fundamental requirement that generation plants need to be connected to the transmission network to be able to operate within the electricity market. In addition, a pumped hydro scheme requires the supply of electricity to enable the pumping of water to its reserves.

The Snowy 2.0 Transmission Project (the Project) would ensure that the transmission system has the capacity to efficiently and reliably transmit the additional 2,000 MW of renewable energy from Snowy 2.0 during periods of peak demand, as well as provide a supply of renewable energy to charge the Snowy 2.0 'battery' during periods of low demand.

The key features of the project include:

- A new 330/500kV substation, to the west of the Talbingo Reservoir near the existing 330kV transmission line 64 (Line 64)
- Two new 330kV double-circuit transmission lines, with easements, from the connection site with the Snowy 2.0 underground cable to overhead line termination (Snowy 2.0 cable yard) to the new substation
- Transmission line connection between the 330/500kV substation and the existing Line 64
- Establishment and upgrade of access tracks and roads to the new substation and transmission line structures, as required
- Ancillary activities, including brake and winch sites, crane pads, helicopter landing pad, site compounds and equipment laydown areas.

The location of the Project is shown in **Attachment A**.

TranGrid, as the authorised network operator and the proponent of the Snowy 2.0 Transmission Project, is currently drafting an Environmental Impact Statement in accordance with Division 5.2 of the *Environmental Planning and Assessment Act 1979 (NSW)*. TransGrid is seeking Aboriginal knowledge holders to assist in the assessment of the Snowy 2.0 Transmission Project and provide input into the preparation of a cultural heritage assessment report (CHAR).

In following section 4.1.2 of the Office of Environment and Heritage consultation requirements, it would be appreciated if your organisation could please provide a list of the names of Aboriginal

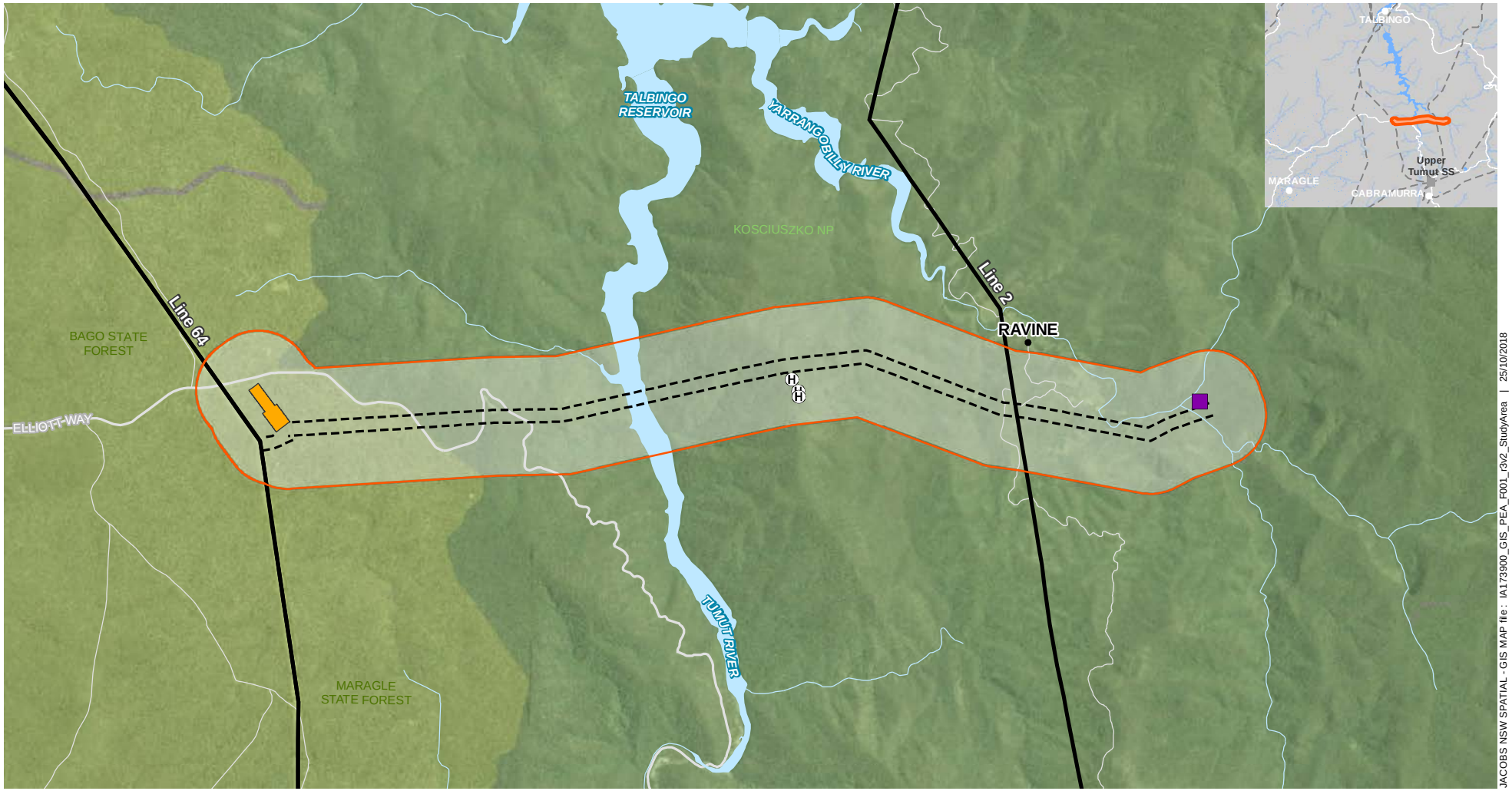
people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects or Aboriginal places for the proposal within the concept proposal area.

Thank you for your assistance and advice in this matter. If you have any questions or would like to discuss this further, please contact Damian Williams as per the contact details below.

Yours sincerely

[redacted]

Damian Williams
Senior Associate Environmental Planner (on behalf of TransGrid)
Email: Damian.williams@jacobs.com
Phone: [redacted]



Attachment 1 | The Project location

Seifertova, Alexandra

From: Crawford, Trudy <[redacted]>
Sent: Thursday, 22 November 2018 11:30 AM
To: Williams, Damian
Cc: BTLALC
Subject: [EXTERNAL] Snowy 2.0 Transmission Project
Attachments: GetFile.pdf

Hi Damian

I am writing in response to an email sent through regarding Aboriginal contacts for the Snowy 2.0 Transmission Project. The best point of contact is the:

Sue Bulger
CEO
Brungle Tumut Local Aboriginal Lands Council
[redacted]

Kind regards

Trudy

Trudy Crawford
Coordinator Community Development

Snowy Valleys Council

76 Capper Street, Tumut, NSW 2720
P: 02 6941 2542
F: 02 6941 2583
W: www.snowyvalleys.nsw.gov.au

Leading, engaging and supporting strong and vibrant communities

Seifertova, Alexandra

From: Jackie Taylor <Jackie.Taylor@environment.nsw.gov.au>
Sent: Monday, 19 November 2018 4:45 PM
To: Williams, Damian
Cc: Farina, Deborah
Subject: [EXTERNAL] Snowy 2.0 Transmission project - Aboriginal stakeholder consultation.
Attachments: DOC18-829922 - Snowy 2-0 Transmission Project - Jacobs.pdf

Dear Damian,

Attached is the OEH list(s) of Aboriginal people who may have knowledge relevant to determining the cultural significance of Aboriginal objects and/ or places in the Snowy Monaro and Snowy Valleys local government areas.

If you have any queries about the lists please give me a call.

Regards,
Jackie

NSW GOVERNMENT Office of Environment & Heritage

Jackie Taylor
Team Leader Aboriginal Heritage
South East Branch
Conservation and Regional Delivery Division

11 Farrer Place, Queanbeyan
PO Box 733, Queanbeyan NSW 2620
T 02 62297089 **M** 0408201239

The OEH South East Region Planning Team has a group email address: rog.southeast@environment.nsw.gov.au. Please address all further email correspondence in relation to Planning and Aboriginal cultural heritage regulation matters to this address. If appropriate, emails can be marked to the attention of your usual contact in the Team.

Seifertova, Alexandra

From: Jodie Rikiti <j[redacted]>
Sent: Friday, 2 November 2018 11:23 AM
To: Williams, Damian
Subject: [EXTERNAL] Snowy 2.0 Transmission Project

Hi Damian

Thank you, I have received your requested for a heritage assessment, before I can give you an accurate search result,
I require a more in-depth description of the project location.

If you have questions please do not hesitate to call me on [redacted]

Regards
Jodie Rikiti
Administrative Support Officer,
Governance
Office of The Registrar ALRA 1983
Phone: [redacted]
Email: [redacted]
P.O Box 5068
PARRAMATTA NSW 2124
Website: www.oralra.nsw.gov.au

TransGrid

The Snowy 2.0 pumped hydro and generation project

Notice and registration of Aboriginal interests

TransGrid are proposing to construct two new 330kV double-circuit transmission lines from the connection site with the proposed Snowy 2.0 cable yard to a new 330/500kV substation west of Talbingo Reservoir. The proposal would also include a transmission line connection between the substation and the existing Line 64 in Bago State Forest. TransGrid propose to establish and upgrade access tracks and roads to the new substation and transmission line structures as required, and construct ancillary activities including; brake and winch sites, crane pads, helicopter landing pad, site compounds and equipment laydown areas.

TransGrid is seeking registrations of interest from Aboriginal people who hold cultural knowledge relevant to the work area. The purpose of consultation with Aboriginal people is to assist TransGrid to prepare advice to assist the Director General of the Office of Environment and Heritage in considering and determining the application.

TransGrid and our consultant, Jacobs, are inviting registrations of interest in the consultation process for the project from Aboriginal persons or groups who hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places at or between:

• Maragle, Nurenmerenmong, Yarangobily and Cabramurra

You can register in writing (email or letter) to:

Clare Leevers
Jacobs Engineering Group

177 Pacific Highway
North Sydney NSW 2060
Telephone: 02 9032 1815
Email: clare.leevers@jacobs.com

Registrations must be received by close of business 18 January 2016.

Koori Mail
NEWSPAPER

EDITION 691

CLIENT'S PROOF

AD SIZE:

14x2

TOTAL INCLUDING 10% GST:

$550 special

CLIENT: Transgrid

ATTENTION:

PLEASE CHECK THIS AD AND EMAIL BACK ANY CHANGES or YOUR CONFIRMATION TO PROCEED

FAX: 02 66 222 600

ASAP.

REGARDS

CHRIS
ADVERTISING DEPARTMENT

Phone: 02 66 222 666

CLIENT: Please check this ad for mistakes as we will not take any responsibility once the ad has been approved.

I have checked this ad and I also accept the price and hereby give you authorisation to place the ad in the current edition of the Koori Mail.

Authorised by:

.....

Position:

.....

Date:

.....

REPEAT EDITIONS

YES NO

Please write below how many Editions you would like this Ad to appear in.

THE SNOWY 2.0 PUMPED HYDRO AND GENERATION PROJECT

Notice and registration of Aboriginal interests

TransGrid are constructing a new 330/500kV substation to the west of the Talbingo Reservoir and establishing a new transmission line connection between the substation and the existing Line 64 in the Bago State Forest. TransGrid propose to establish and upgrade access tracks and roads to the new substation and transmission line structures, as required and construct ancillary activities, including brake and winch sites, crane pads, helicopter landing pad, site compounds and equipment laydown areas.

TransGrid is seeking registrations of interest from Aboriginal people who hold cultural knowledge relevant to the work area. The purpose of consultation with Aboriginal people is to assist TransGrid to prepare advice to assist the Director General of the Office of Environment and Heritage in considering and determining the application.

TransGrid and our consultant, Jacobs, are inviting registrations of interest in the consultation process for the project from Aboriginal persons or groups who hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places at or between:

- **Maragle, Nurenmerenmong, Yarangobily and Cabramurra**

You can register in writing (email or letter) to:
Clare Leevers
Jacobs Engineering Group
177 Pacific Highway
North Sydney NSW 2060
Telephone: 02 9032 1815
Email: clare.leevers@jacobs.com

Registrations must be received by close of business 13 January 2016.

the MONARO post™
the independent paper of the Monaro and surrounding regions

proof sheet

Advertiser: **TRANSGRID** Ad Type: **15X3** Appearance Date: **12/12/18**

The Snowy 2.0 pumped hydro and generation project
Notice and registration of Aboriginal interests

Transgrid are proposing to construct two new 330kV double-circuit transmission lines from the connection site with the proposed Snowy 2.0 cable yard to a new 330/500kV substation west of Talbingo Reservoir. The proposal would also include a transmission line connection between the substation and the existing Line 64 in Bago State Forest. TransGrid propose to establish and upgrade access tracks and roads to the new substation and transmission line structures, as required and construct ancillary activities, including brake and winch sites, crane pads, helicopter landing pad, site compounds and equipment laydown areas.

TransGrid is seeking registrations of interest from Aboriginal people who hold cultural knowledge relevant to the work area. The purpose of consultation with Aboriginal people is to assist TransGrid to prepare advice to assist the Director General of the Office of Environment and Heritage in considering and determining the application.

TransGrid and our consultant, Jacobs, are inviting registrations of interest in the consultation process for the project from Aboriginal persons or groups who hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places at or between:

- **Maragle Nurenmerenmong Yarangobily and Cabramurra**

You can register in writing (email or letter) to:

Clare Leevers
Jacobs Engineering Group
177 Pacific Highway
North Sydney NSW 2060
Telephone: 02 9032 1815
Email: clare.leevers@jacobs.com
Registrations must be received by close of business 18 January 2019.

Please check all details carefully including:
❑ Names ❑ Addresses ❑ Phone Numbers ❑ Spelling

Print Name:

If there is a change:
❑ Print the corrections beside the advert
❑ Sign & return the proof to the details below

Authorised Signature:

If everything is correct:
❑ Sign & return the proof to the details below

Date:

Please return signed proof via one of the below options:

E. sales@monaropost.com.au **F.** 02 6452 0314 **P.** PO Box 1227, Cooma NSW 2630

ABN 70 250 995 390
180 Thomas Street, Sydney
PO Box A1000 Sydney South
NSW 1235 Australia
T (02) 9284 3000
F (02) 9284 3456

4/12/2018

Subject: Seeking Aboriginal knowledge holders for the SNOWY 2.0 TRANSMISSION PROJECT.

To whom it may concern,

The Snowy 2.0 pumped hydro and generation project (Snowy 2.0) is being proposed by Snowy Hydro Limited (Snowy Hydro) to provide up to 2000 megawatts (MW) of generation capacity and at full capacity, large-scale energy storage for about 350,000 MW hours. There is a fundamental requirement that generation plants need to be connected to the transmission network to be able to operate within the electricity market. In addition, a pumped hydro scheme requires the supply of electricity to enable the pumping of water to its reserves.

The Snowy 2.0 Transmission Project (the Project) would ensure that the transmission system has the capacity to efficiently and reliably transmit the additional 2,000 MW of renewable energy from Snowy 2.0 during periods of peak demand, as well as provide a supply of renewable energy to charge the Snowy 2.0 'battery' during periods of low demand.

The key features of the project include:

- A new 330/500kV substation, to the west of the Talbingo Reservoir near the existing 330kV transmission line 64 (Line 64)
- Two new 330kV double-circuit transmission lines, with easements, from the connection site with the Snowy 2.0 underground cable to overhead line termination (Snowy 2.0 cable yard) to the new substation
- Transmission line connection between the 330/500kV substation and the existing Line 64
- Establishment and upgrade of access tracks and roads to the new substation and transmission line structures, as required
- Ancillary activities, including brake and winch sites, crane pads, helicopter landing pad, site compounds and equipment laydown areas.

The Project is located in the Snowy Valleys local government area, south of the Talbingo Reservoir, across the Tumut River and is shown in **Attachment A**.

TransGrid, as the authorised network operator and the proponent of the Snowy 2.0 Transmission Project, is currently drafting an Environmental Impact Statement in accordance with Division 5.2 of the *Environmental Planning and Assessment Act 1979 (NSW)*. Jacobs (on behalf ofTransGrid) is therefore inviting Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal objects or places in the project location to register an interest in the process of community consultation.

Community consultation with Aboriginal people will assist TransGrid in the assessment of the Snowy 2.0 Transmission Project and provide input into the preparation of a cultural heritage assessment report (CHAR). Community consultation will also assist the proponent in the preparation of an application for an Aboriginal Heritage Impact Permit (if required) and assist the Director General of the Department of Environment, Climate Change and Water in his/her consideration and determination of any such application.

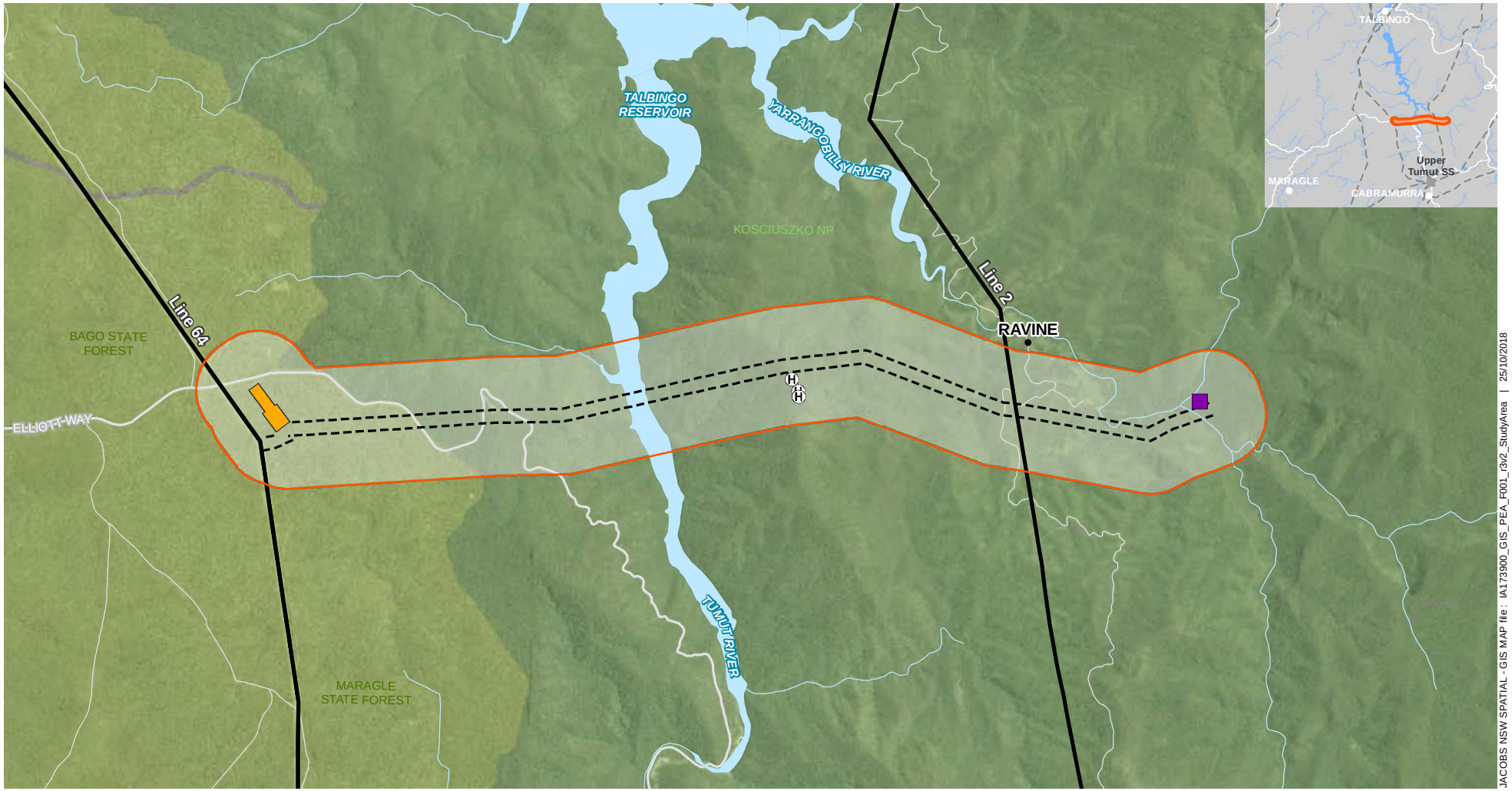
We hope you or your organisation choose to participate in this project. We enclose for your completion a Notice to Register. These completed forms can be mailed to Level 7, 177 Pacific Highway, North Sydney NSW 2060, or emailed to clare.leevers@jacobs.com by Wednesday 19th December, 2018. Should you wish to enquire further, please telephone the Jacobs' Heritage Consultant, Clare Leevers on (02) 9032-1815.

Please note that Section 4.1.6 of the *Aboriginal cultural heritage consultation requirements for proponents 2010* requires the proponent to advise OEH of Aboriginal people who have registered an interest in the project. Please advise if you **do not** want your details forwarded to OEH.

Yours sincerely

[redacted]

Damian Williams
Senior Associate Environmental Planner (on behalf of TransGrid)
Email: Damian.williams@jacobs.com
Phone: 0421 758 478



Attachment 1 | The Project location

Notice of Registration

To: Ms Clare Leevers
Heritage Consultant
Jacobs
Level 7, 177 Pacific Highway
NORTH SYDNEY NSW 2060
Email: clare.leevers@jacobs.com

I,_____(NAME)

_____(ORGANISATION)

_____(POSITION)

_____(ADDRESS)

wish to be registered by Transgrid as an Aboriginal Party to be consulted as part of the **Snowy 2.0 Transmission Project**.

I confirm that I am authorised to register on behalf of this organisation.

(Tick if relevant)

☐ I **DO NOT** wish for my details to be forwarded to OEH pursuant to Section 4.1.6 of the Aboriginal Cultural Heritage Consultation Requirements.

My preferred method of communication is *(Please tick preferred method and provide details below)*:

☐ Email ☐ Mail ☐ Fax ☐ Phone

Email Address:_____

Mailing address:_____

Fax:_____

Phone:_____

Notice of Registration

To: Ms Clare Leevers
Heritage consultant
Jacobs
Level 7, 177 Pacific Highway
North Sydney NSW 2060
Email: clare.leevers@jacobs.com

I, Ronald Grovenor (Name)

Individual (organisation)

Cultural site surveyor/ Aboriginal Rep (Position)

(Address)

Wish to be registered by Transgrid as an Aboriginal party to be consulted as part of the Snowy 2.0 Transmission project.

I confirm that I am authorized to register on behalf of this organization.

(tick if relevant)

☐ I DO NOT wish for my details to be forwarded to OEH pursuant to section 4.1.6 of the Aboriginal cultural heritage consultation requirements.

My preferred method of communication is (please tick preferred method and provide details below)

☐ Email ☐ Mail ☐ Fax ☒ Phone

Email address: [redacted]

Mailing Address: [redacted]

Fax:

Phone: [redacted]

From: Shaun Carroll <[redacted]>
Sent: Monday, December 3, 2018 8:37 AM
To: Leevers, Clare
Subject: [EXTERNAL] Snowy 2.0 Transmission Project

Follow Up Flag: Follow up
Flag Status: Completed

Dear Clare,
I Shaun Carroll of Merrigarn, Director – Secretary [redacted] confirm that I am authorised to register on behalf of this organisation. My preferred contact is by via email or mobile
Kind regards
Shaun Carroll

Sent from Mail for Windows 10

From: Muragadi <[redacted]>
Sent: Monday, December 3, 2018 8:33 AM
To: Leevers, Clare
Subject: [EXTERNAL] registration Snowy 2.0 transmission project

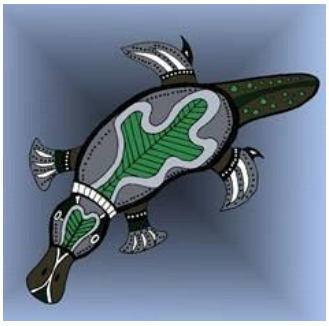
Follow Up Flag: Follow up
Flag Status: Completed

I Jesse Johnson of Muragadi Director, business address [redacted] am authorised to register our organisation. My preferred contact is via email, please feel free to contact me should you require further information.
Thanks
Jesse Johnson

From: Ryan Johnson [redacted]
Sent: Monday, December 3, 2018 8:29 AM
To: Leevers, Clare
Subject: [EXTERNAL] registration - Snowy 2.0 Transmission Project

Follow Up Flag: Follow up
Flag Status: Completed

Dear Clare,
I would like to register our organisation for the above project, I can confirm that I am authorised to register on behalf of this organisation. My preferred method of communication is via email or mobile [redacted] please contact me if you require further details.
Thanks
Ryan Johnson | **Murra Bidgee Mullangari**



Aboriginal Corporation Cultural Heritage

A: [redacted]
E: [redacted]
[redacted]

Notice of Registration

To: Ms Clare Leevers
Heritage Consultant
Jacobs
Level 7, 177 Pacific Highway
NORTH SYDNEY NSW 2060
Email: clare.leevers@jacobs.com

I, Janine Thompson (NAME)

(ORGANISATION)

Traditional Ngunawal Custodian (POSITION)

[redacted] (ADDRESS)

wish to be registered by Transgrid as an Aboriginal Party to be consulted as part of the **Snowy 2.0 Transmission Project**.

I confirm that I am authorised to register on behalf of this organisation.

(Tick if relevant)

☐ I **DO NOT** wish for my details to be forwarded to OEH pursuant to Section 4.1.6 of the Aboriginal Cultural Heritage Consultation Requirements.

My preferred method of communication is *(Please tick preferred method and provide details below)*:

☑ Email ☑ Mail ☐ Fax ☐ Phone

Email Address: [redacted]

Mailing address: [redacted]

Fax:

Phone: [redacted]

From: Iris White <i[redacted]
Sent: Thursday, December 6, 2018 7:58 PM
To: Leevers, Clare
Subject: [EXTERNAL] Re: Seeking Aboriginal knowledge holders for the SNOWY 2.0 TRANSMISSION PROJECT

Follow Up Flag: Follow up
Flag Status: Flagged

Hello Clare please be advised that the Ngarigo Elders wish to be engaged in this project and that as Traditional Owners, we do not recognize or authorize Local Aboriginal Land Councils or other stakeholders to represent our Cultural Heritage interests.

Regards

Iris White

On Tue, 4 Dec. 2018, 12:10 pm Leevers, Clare, <Clare.Leevers@jacobs.com> wrote:

> 4/12/2018
>
> Iris White
>
> Ngarigo Elders
>
> Via:[redacted]
>
> Subject: Seeking Aboriginal knowledge holders for the SNOWY 2.0 TRANSMISSION PROJECT.
>
> Dear Iris White ,,
>
> The Snowy 2.0 pumped hydro and generation project (Snowy 2.0) is being proposed by Snowy Hydro Limited (Snowy Hydro) to provide up to 2000 megawatts (MW) of generation capacity and at full capacity, large-scale energy storage for about 350,000 MW hours. There is a fundamental requirement that generation plants need to be connected to the transmission network to be able to operate within the electricity market. In addition, a pumped hydro scheme requires the supply of electricity to enable the pumping of water to its reserves.
>
> The Snowy 2.0 Transmission Project (the Project) would ensure that the transmission system has the capacity to efficiently and reliably transmit the additional 2,000 MW of renewable energy from Snowy 2.0 during periods of peak demand, as well as provide a supply of renewable energy to charge the Snowy 2.0 'battery' during periods of low demand.
>
> TransGrid, as the authorised network operator and the proponent of the Snowy 2.0 Transmission Project, is currently drafting an Environmental Impact Statement in accordance with Division 5.2 of the *Environmental Planning and Assessment Act 1979 (NSW)*. Jacobs (on behalf ofTransGrid) is therefore inviting Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal objects or places in the project location to register an interest in the process of community consultation.
>
> We hope you or your organisation choose to participate in this project. We enclose for your completion a Notice to Register. These completed forms can be mailed to Level 7, 177 Pacific Highway, North Sydney NSW 2060, or emailed to clare.leevers@jacobs.com by Wednesday 19th December, 2018. Should you wish to enquire further, please telephone the Jacobs' Heritage Consultant, Clare Leevers on (02) 9032-1815.
>
> ---
>
>

Notice of Registration

Date: 6 December 2018

To Ms Claire Leevers
Heritage Consultant
Jacobs
Level 7, 177 Pacific Highway North Sydney NSW 2060
Email: clare.leevers@jacobs.com

Name: Marilyn carroll Johnson
Organisation: Corroboree Aboriginal Corporation
Position: Director
Address: [redacted]

We wish to be registered by trans-grid as an aboriginal party to the consultant as part of the Snowy 2. 0 TransmissionProject

I confirm that I am authorised to register on behalf of this organisation. I do not wish for our details to be forwarded to OEH pursuant went to Section 4.1.6 of the Aboriginal Cultural Heritage Consultation Requirements. Please DO NOT forward my details to
The Aboriginal Land Council.
Our preferred method of communication is email
Email: [redacted]
Mailing address: [redacted]
Phone: [redacted]

From: Koomurri Ngunawal Aboriginal Corporation [redacted]
Sent: Monday, December 10, 2018 3:11 PM
To: Leevers, Clare
Subject: [EXTERNAL] Re: ROI Snowy 2.0 Transmission Project.

Dear Clare,

I am contacting you to register my interest in this Project, although I did think that our organisation had registered previously.

I am the spokesperson and contact for KNAC/GNHAC and am registering in this way because I was unable to edit the document you sent, my preferred method of communication is by either Phone or Email.

If you wish to contact me please do so by either of these methods.

Regards,

Glen Freeman Bugarabung.

From: Glen Freeman <[redacted]
Sent: Tuesday, 4 December 2018 4:54 PM
To: [redacted]
Subject: ROI

Sent from my iPhone

From: Perio Delponte <[redacted]>
Sent: Tuesday, December 11, 2018 2:27 PM
To: Leevers, Clare
Subject: [EXTERNAL] Registration of Interest for SNOWY 2.0 TRANSMISSION PROJECT.

Good afternoon.

PD Ngunawal Consultancy is pleased to express our interest in participating in the proposed Snowy 2.0 Transmission Project.

Our consultants are passionate about their Aboriginal heritage and dedicated to working with Governments, proponents, archeologists and other Aboriginal organisations to ensure that Aboriginal objects and places with Aboriginal cultural heritage significance are appropriately protected.

Our consultants have extensive experience in Aboriginal heritage assessment work, having worked on a variety of sites around the Canberra and South Eastern NSW region and have helped to identify many different types of objects and places with Aboriginal cultural heritage significance.

We look forward to your response.
If you require any further information, please do not hesitate to contact me.

Kind regards,
Peiro Delponte
[redacted]

Notice of Registration

To: Ms Clare Leevers
Heritage Consultant
Jacobs
Level 7, 177 Pacific Highway
NORTH SYDNEY NSW 2060
Email: clare.leevers@jacobs.com

I, CHERIE CARROLL TURRISE (NAME)

Gunjeewong Cultural Heritage Aboriginal Corp (ORGANISATION)

DIRECTOR CHAIRMAN GUNNAWEL ELDER (POSITION)

[redacted] ADDRESS)

wish to be registered by Transgrid as an Aboriginal Party to be consulted as part of the **Snowy 2.0 Transmission Project**.

I confirm that I am authorised to register on behalf of this organisation.

(Tick if relevant) ✓

☐ I **DO NOT** wish for my details to be forwarded to OEH pursuant to Section 4.1.6 of the Aboriginal Cultural Heritage Consultation Requirements.

My preferred method of communication is *(Please tick preferred method and provide details below)*:

☐ Email ☑ Mail ☐ Fax ☐ Phone

Email Address: _____

Mailing address: [redacted]

Fax: _____

Phone: [redacted]

[redacted]

Notice of Registration

To: Ms Clare Leevers
Heritage Consultant
Jacobs
Level 7, 177 Pacific Highway
NORTH SYDNEY NSW 2060
Email: clare.leevers@jacobs.com

I, Wally Bell (NAME)

BURU NGUNAWAL ABORIGINAL CORP. (ORGANISATION)

CHAIR/DIRECTOR (POSITION)

[redacted] (ADDRESS)

wish to be registered by Transgrid as an Aboriginal Party to be consulted as part of the **Snowy 2.0 Transmission Project**.

I confirm that I am authorised to register on behalf of this organisation.

(Tick if relevant)

☐ I **DO NOT** wish for my details to be forwarded to OEH pursuant to Section 4.1.6 of the Aboriginal Cultural Heritage Consultation Requirements.

My preferred method of communication is *(Please tick preferred method and provide details below)*:

☑ Email ☐ Mail ☐ Fax ☐ Phone

Email Address: [redacted]

Mailing address: [redacted]

Fax: _____

Phone: [redacted]

Notice of Registration

To: Ms Clare Leevers
Heritage Consultant
Jacobs
Level 7, 177 Pacific Highway
NORTH SYDNEY NSW 2060
Email: clare.leevers@jacobs.com

I, Dean Bell (NAME)

Yurwang Gundana Consultancy Cultural Heritage Services (ORGANISATION)

Manager (POSITION)

[redacted] (ADDRESS)

wish to be registered by Transgrid as an Aboriginal Party to be consulted as part of the **Snowy 2.0 Transmission Project**.

I confirm that I am authorised to register on behalf of this organisation.

(Tick if relevant)

☑ I **DO NOT** wish for my details to be forwarded to OEH pursuant to Section 4.1.6 of the Aboriginal Cultural Heritage Consultation Requirements.

My preferred method of communication is *(Please tick preferred method and provide details below)*:

☑ Email ☑ Mail ☐ Fax ☐ Phone

Email Address: [redacted]

Mailing address: As Above

Fax: —

Phone: [redacted]

Notice of Registration

To: Ms Clare Leevers
Heritage Consultant
Jacobs
Level 7, 177 Pacific Highway
NORTH SYDNEY NSW 2060
Email: clare.leevers@jacobs.com

I, Alice Williams (NAME)

Wolgalu Elder & Knowledge Holder (ORGANISATION)

(POSITION)

[redacted] (ADDRESS)

wish to be registered by Transgrid as an Aboriginal Party to be consulted as part of the **Snowy 2.0 Transmission Project**.

I confirm that I am authorised to register on behalf of this organisation.

(Tick if relevant)

☐ I **DO NOT** wish for my details to be forwarded to OEH pursuant to Section 4.1.6 of the Aboriginal Cultural Heritage Consultation Requirements.

My preferred method of communication is *(Please tick preferred method and provide details below)*:

☐ Email ☒ Mail ☐ Fax ☐ Phone

Email Address:

Mailing address: [redacted]

Fax:

Phone: [redacted]

From: lilly carroll <[redacted]>
Sent: Wednesday, December 19, 2018 12:12 PM
To: Leevers, Clare
Subject: [EXTERNAL] EOI

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Clare,

DNC would like to register an interest into connection site proposed Snowy 2.0 cableyardWest of Talbingo reservoir as Line 64 in Bago State Forest for Transgrid,

Kind regards
Paul Boyd & Lilly Carroll
Directors DNC

Notice of Registration

To: Ms Clare Leevers
Heritage Consultant
Jacobs
Level 7, 177 Pacific Highway
NORTH SYDNEY NSW 2060
Email: clare.leevers@jacobs.com

I, LUKE PENRITH (NAME)

GRIFFITH SKILLS TRAINING CENTRE (ORGANISATION)

& NGUMBAAY INDIGENOUS CORPORATION (POSITION)

[redacted] (ADDRESS)

wish to be registered by Transgrid as an Aboriginal Party to be consulted as part of the **Snowy 2.0 Transmission Project**.

I confirm that I am authorised to register on behalf of this organisation.

(Tick if relevant)

☐ I **DO NOT** wish for my details to be forwarded to OEH pursuant to Section 4.1.6 of the Aboriginal Cultural Heritage Consultation Requirements.

My preferred method of communication is *(Please tick preferred method and provide details below)*:

☑ Email ☐ [redacted]

Email Address: [redacted]

Mailing address: [redacted]

Fax:

Phone: [redacted]

Notice of Registration

To: Ms Clare Leevers
Heritage consultant
Jacobs
Level 7, 177 Pacific Highway
North Sydney NSW 2060
Email: clare.leevers@jacobs.com

I, Janice Williams (Name)

Individual (organisation)

Cultural site surveyor/ Aboriginal Rep (Position)

(Address)

Wish to be registered by Transgrid as an Aboriginal party to be consulted as part of the Snowy 2.0 Transmission project.

I confirm that I am authorized to register on behalf of this organization.

(tick if relevant)

☐ I DO NOT wish for my details to be forwarded to OEH pursuant to section 4.1.6 of the Aboriginal cultural heritage consultation requirements.

My preferred method of communication is (please tick preferred method and provide details below)

☐ Email ☐ Mail ☐ Fax ☒ Phone

Email address:

Mailing Address: [redacted]

Fax:

Phone: [redacted]

Notice of Registration

To: Ms Clare Leevers
Heritage consultant
Jacobs
Level 7, 177 Pacific Highway
North Sydney NSW 2060
Email: clare.leevers@jacobs.com

I, Megan Considine (Name)

Individual (organisation)

Cultural site surveyor/ Aboriginal Rep (Position)

(Address)

Wish to be registered by Transgrid as an Aboriginal party to be consulted as part of the Snowy 2.0 Transmission project.

I confirm that I am authorized to register on behalf of this organization.

(tick if relevant)

☐ I DO NOT wish for my details to be forwarded to OEH pursuant to section 4.1.6 of the Aboriginal cultural heritage consultation requirements.

My preferred method of communication is (please tick preferred method and provide details below)

☒ Email ☐ Mail ☐ Fax ☐ Phone

Email address: [redacted]

Mailing Address: [redacted]

Fax:

Phone: [redacted]

Notice of Registration

To: Ms Clare Leevers
Heritage consultant
Jacobs
Level 7, 177 Pacific Highway
North Sydney NSW 2060
Email: clare.leevers@jacobs.com

I, Ramsay Freeman (Name)

Individual (organisation)

Cultural site surveyor/ Aboriginal Rep (Position)

(Address)

Wish to be registered by Transgrid as an Aboriginal party to be consulted as part of the Snowy 2.0 Transmission project.

I confirm that I am authorized to register on behalf of this organization.

(tick if relevant)

☐ I DO NOT wish for my details to be forwarded to OEH pursuant to section 4.1.6 of the Aboriginal cultural heritage consultation requirements.

My preferred method of communication is (please tick preferred method and provide details below)

☐ Email ☐ Mail ☐ Fax ☒ Phone

Email address: [redacted]

Mailing Address: [redacted]

Fax:

Phone: [redacted]

From: Shirley Marlowe [redacted]
Sent: Tuesday, January 8, 2019 12:26 PM
To: Leevers, Clare
Subject: [EXTERNAL] Re: The Snowy 2.0 Pumped Hydro and Generation Project

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Clare,

I am registering the following people as Aboriginal Cultural Knowledge Holders, these are:

Shirley Marlowe
Matthew Marlowe and
Lawrence Marlowe.

We have all worked with Kelleher and Nightingale on the Hume Highway and for Julie Dibden at Cabramurra. If you require further information please let me know.

You can contact me on [redacted]

Thanking you,

Shirley Marlowe

Seifertova, Alexandra

From: Seifertova, Alexandra
Sent: Thursday, 9 May 2019 11:23 AM
To: [redacted]
Cc: [redacted]
Subject: FW: Snowy Hydro Archaeological Survey - 20-24 May

Good morning,

We have set dates and details for the Snowy survey for the 20th until the 24th May. Thank you for responding with your details.

Given the number of RAPs we are aiming to split the work up for this phase, with an expectation there will be further investigation including test excavation later on.

If there is a preference for the days you can work, please let me or Luke Penrith know – Luke will be coordinating payroll payments and details, and may need information from you such as bank account details etc. Luke's email is as follows [redacted]

We have booked three cabins at the Cool Mountain Lodge - 68 Providence Rd, Providence Portal NSW 2629, Australia from Sunday 19 to Sat 25. Please indicate if you would need to stay there, and which nights.

Finally, be prepared for some challenging walking and survey. The terrain is steep and the bush is thick, we will be doing physically demanding work. Please let me know if you or your nominated site officer may find long days of hiking too much of a challenge.

More detail to follow, looking forward to a safe and rewarding survey for this exciting project.

Regards,

Andrew Costello | Jacobs | Senior Archaeologist

Andrew.costello@jacobs.com

| +61 9928 2269 | +61 458 325 345 | www.jacobs.com

I acknowledge the Traditional Owners of Country upon which I work, and pay my respects to them, their culture and their Elders past, present and emerging

Seifertova, Alexandra

From: Costello, Andrew
Sent: Wednesday, 27 March 2019 3:04 PM
To: Seifertova, Alexandra
Subject: FW: Snowy 2.0 Aboriginal Heritage methodology

From: Shaun Carroll [redacted]
Sent: Wednesday, 27 March 2019 3:01 PM
To: Costello, Andrew <Andrew.Costello@jacobs.com>
Subject: [EXTERNAL] Re: Snowy 2.0 Aboriginal Heritage methodology

Hi Andrew

I have read the Archaeological methodology for the above project, I agree with the recommendations made by Jacobs if you require further details please feel free to email me.

Kind regards

Shaun Carrol

Sent from my iPad

On 27 Mar 2019, at 10:59 am, Costello, Andrew <Andrew.Costello@jacobs.com> wrote:

> Dear Sir/ Madam,
>
> Jacobs (on behalf of TransGrid) are providing the attached archaeological methodology to all registered Aboriginal knowledge holders for the Snowy Hydro 2.0 project.
>
> Fieldwork is being planned for late April or early May. Further details and requirements for site officers will be issued before fieldwork commences. There will be moderate level of fitness required to participate in field survey as there is steep terrain and long walking sections which will require carrying equipment, water and food.
>
> Please see attached document for further information about the planned survey. Any feedback or correspondence about the methodology is appreciated. For any questions or queries please email the me on my contact details provided below.
>
> Andrew Costello
> Senior Archaeologist
> +61 9928 2269
> Andrew.Costello@Jacobs.com
>
> Regards,
>
> Andrew Costello | Jacobs | Senior Archaeologist
>
> | +61 9928 2269 | www.jacobs.com

Seifertova, Alexandra

From: Costello, Andrew
Sent: Wednesday, 27 March 2019 1:51 PM
To: Seifertova, Alexandra
Subject: FW: Snowy 2.0 Aboriginal Heritage methodology

From: Glen Freeman <[redacted]
Sent: Wednesday, 27 March 2019 1:37 PM
To: Costello, Andrew <Andrew.Costello@jacobs.com>
Subject: [EXTERNAL] Re: Snowy 2.0 Aboriginal Heritage methodology

Afternoon Andrew,

I have no issues with the methodology for this project and look forward to working with you on it.

Regards

[redacted]len.

Sent from Outlook

From: Costello, Andrew <Andrew.Costello@jacobs.com>
Sent: Wednesday, 27 March 2019 10:59 AM
Cc: Williams, Damian; Jackie.Taylor@environment.nsw.gov.au; Leevers, Clare
Subject: Snowy 2.0 Aboriginal Heritage methodology

Dear Sir/ Madam,

Jacobs (on behalf of TransGrid) are providing the attached archaeological methodology to all registered Aboriginal knowledge holders for the Snowy Hydro 2.0 project.

Fieldwork is being planned for late April or early May. Further details and requirements for site officers will be issued before fieldwork commences. There will be moderate level of fitness required to participate in field survey as there is steep terrain and long walking sections which will require carrying equipment, water and food.

Please see attached document for further information about the planned survey. Any feedback or correspondence about the methodology is appreciated. For any questions or queries please email the me on my contact details provided below.

Andrew Costello
Senior Archaeologist
+61 9928 2269
Andrew.Costello@Jacobs.com

Regards,

Andrew Costello | Jacobs | Senior Archaeologist

| +61 9928 2269 | www.jacobs.com

I acknowledge the Traditional Owners of Country upon which I work, and pay my respects to them, their culture and their Elders past, present and emerging

27th February 2020

Oliver McGregor
JACOBS

Dear Oliver,

As Elders of the Wirdajuri/Wolgalu Nations we am writing in support for more Archaeological Works to be carried out in the Cabramurra Area.

As you are aware there has been bushfires in this area and we feel that there is a great possibility that more sites would be uncovered, due to less vegetation on the ground surface.

This provides a great opportunity for the Aboriginal community to get in to carry out more extensive Archaeological works in the area.

We are aware that there has been some survey work carried out in the past and artefacts have been recovered, therefore, this provides a great opportunity to do a refined survey and archaeological works for the area.

I, Ramsay Freeman, have done considerable work with Transgrid in the past and we would greatly appreciate if you could give this some serious consideration.

Yours in Unity,

[redacted]
(Ramsay Freeman)

[redacted]
(Winifred Marlowe)

27th February 2020

Oliver McGregor
JACOBS

Dear Oliver,

We, the Sites Officers, listed below worked with JACOBS in late 2019, carrying out Survey work and Field works.

Due to the severe bushfires in this area, we feel that there would certainly be more sites to be identified and explored with less vegetation on the ground.

This is a great chance for the Aboriginal community to get in to conduct further extensive Archaeological works in the area. We thoroughly enjoyed our time in the field and would appreciate another opportunity to carry out more survey and fieldworks in the future.

Yours in Unity,

Ramsay Freeman
Ronald Grovenor
Janice Williams
Matthew Marlowe
Lawrence Marlowe
Bradley Freeman
Adrian O'Brien
Megan Considine
Teisha Freeman
Brittany Minogue

Appendix B. Archaeological test excavation methodology

1/64 Allara Street,
Canberra City ACT 2600
PO Box 237, Civic Square ACT 2608
Australia
T +61 2 6246 2700
F +61 2 6246 2799
www.jacobs.com

August 7, 2019

Project Name: Snowy 2.0 Transmission Line Connection Project
Project Number: IA199900

Subject: Supply of test excavation methodology document

Dear [redacted]

Jacobs, on behalf of Transgrid, are providing an archaeological test excavation methodology document to all Registered Aboriginal Parties (RAPs) and cultural knowledge holders for the Snowy 2.0 Transmission Line Connection Project.

You are invited to read through the attached document, which sets out the proposed method for carrying out test excavations and the areas in which these excavations are proposed to occur. Please provide any feedback or comments you wish to make.

A field program of text excavation is scheduled to take place in the week commencing September 23rd, and is anticipated to take 5 days (Monday to Friday, inclusive). Further details and requirements for site officers can be found within the attached methodology document. Please provide the name and availability of any site officer who wishes to participate in the test excavation fieldwork. If available, provide a copy of relevant insurances to Jacobs to allow registration on our supplier database, otherwise a third party provider may have to be used to engage site officers with the requisite insurance coverage.

Please carefully review the attached document for further information and if you have any questions don't hesitate to contact me via phone, email, or postal addresses provided below.

Yours sincerely

Oliver Macgregor
Senior Archaeologist
0262462716
oliver.macgregor@jacobs.com

Snowy Hydro 2.0 Transmission Line Connection Project

TransGrid

Aboriginal Cultural Heritage Assessment Test Excavation Methodology

Draft 1

August 2019

IA199900

JACOBS

Snowy Hydro 2.0 Transmission

Project No:	IA199900
Document Title:	Aboriginal Cultural Heritage Assessment Test Excavation Methodology
Document No.:	Draft 1
Revision:	R1
Date:	July 26, 2019
Client Name:	TransGrid
Client No:	IA199900
Project Manager:	Tina-Maria Donovan
Author:	Oliver Macgregor & Andrew Costello
File Name:	\\Jacobs.com\ANZ\IE\Projects\04_Eastern\IA199900\21 Deliverables\01 Technical studies\02 Aboriginal heritage\Reporting\Methodology\Test excavation\Rev1\IA199900 Archaeological Test Excavation Method Rev1 20190807.docx

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Document history and status

Revision	Date	Description	By	Review	Approved
R0	01 August 2019	Draft archaeological test excavation method	Oliver Macgregor Andrew Costello	Andy Roberts	Tina Donovan
R1	08 August 2019	Addressing client comments	Oliver Macgregor		Tina Donovan

Contents

1. Introduction

1.1 Background and purpose of this document

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 *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.

This provision of this document gives registered Aboriginal parties (RAPs) detailed information on the proposed program of subsurface test excavations to be carried out around Structures (Str) 16L and 16R and the 330/ 500 kilovolt (kV) substation site, two areas within the project area. Additionally, it provides RAPs with an opportunity to review the proposed subsurface testing program and provide feedback and comments. This process forms part of the consultation process set out in the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a).

1.2 Objective of community consultation

Consultation provides the Aboriginal community the opportunity to improve assessment results by:

- Sharing relevant information about the cultural significance and values of Aboriginal object(s) and/or place(s)
- Contributing to the assessment of cultural and scientific significance of Aboriginal object(s) and/or place(s)
- Reviewing and commenting on the proposed methods of assessing cultural heritage within the project area
- Contributing to the development of cultural heritage management options and recommendations for Aboriginal object(s) and/or place(s) within the subject area
- Commenting and providing feedback on the draft assessment report (ACHAR) before it is submitted to the relevant government agency.

1.3 Summary of previous Aboriginal cultural heritage assessment work

Jacobs carried out an archaeological survey of the project area in consultation with the RAP site officers from 20 – 24 May 2019.Two areas were identified as requiring test excavation to investigate the possibility of subsurface Aboriginal objects being present. The two areas are around Str 16L and 16R, and the 330/ 500 kV substation (refer to **Figure 1-1)**.

Str 16L and 16R and an access track overlap an area of potential archaeological deposit (PAD) comprising a raised colluvial flat on the shoulder of a mid-slope. The total disturbance footprint of Str 16L and Str 16R as part of their construction would comprise an area of about 50 metres (m) by 50 m around each structure. The area was assessed as requiring test excavation due to the moderate archaeological sensitivity; the likelihood of intact deposit with the potential to contain Aboriginal objects; the presence of artefacts on similar landforms in the project area and a consultation request during archaeological survey from the RAPs to undertake archaeological test excavation ahead of construction at the Str 16L and 16R footprint. Archaeological test excavation would also be carried out along a proposed track location around Str 16L and 16R should the track also pass through the PAD.

The new 330/500 kV substation would be located within Bago State Forest and adjacent to TransGrid's existing Line 64. The substation would comprise an area of approximately 550 m by 350 m inclusive of an approximate 50 m wide asset protection zone. A short (approximately 250 m long) overhead transmission connection would connect the substation to Line 64. An access road would also be constructed off Elliot way to the substation site. For the purpose of this assessment an area of approximately 1000 m x 700 m has been considered to encompass ground disturbance works associated with the construction of the substation, access road and the overhead cut-in connection to Line 64.

The substation was assessed as requiring test excavation because it represents a large area of impact, taking place on a landform possessing moderate archaeological sensitivity, in the vicinity of previously recorded Aboriginal Heritage Information Management System (AHIMS) sites (**Figure 1-1**). The landform is a relatively level ridge-top, with minimal identifiable disturbance activities outside of the Line 64 operational impacts.

1.4 Summary of the Aboriginal cultural heritage assessment process

The Aboriginal cultural heritage assessment will involve the following tasks:

- Desktop assessment of what is known about the archaeological landscape of the project area and its surrounds from previous archaeological research
- Development of a method for archaeological test excavation (this document)
- Test excavations within the areas of PAD proposed to be impacted by the project
- Reporting – the information and results of the test excavations will be documented in an Aboriginal Cultural Heritage Assessment Report (ACHAR). The report will satisfy the requirements of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010b), the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a) and the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011). The report will:
    - Present the results of technical investigations, including the desktop assessment, survey and test excavation
    - Include an assessment of the significance of any Aboriginal objects and record any Aboriginal cultural heritage values identified by knowledge holders
    - Include an impact assessment and provide management and mitigations measures to inform any AHIP application as required.
- The ACHAR will be reviewed by RAPs. Information, comments and feedback received from RAPs will be incorporated into the final version of the report
- A copy of the final report will be lodged with relevant government agencies
- Site records on the AHIMS will be updated as necessary.

1.5 Aboriginal community input points during the assessment process

Input and feedback can be provided by RAPs at any time throughout the assessment process. Jacobs will specifically seek input and feedback from RAPs at several points during the process (following proceedures outlined in DECCW, 2010a):

- During Stage 2 – Initial presentation of information about the proposed project and the proposed cultural heritage assessment process
- During Stage 3 - Providing RAPs with the draft proposed methodology (this document). RAPs will be invited to provide feedback on the proposed methodology, to identify cultural heritage values associated with the project area and have input into the development of any cultural management options.

- During fieldwork
- During Stage 4 - Providing RAPs with the draft Aboriginal Cultural Heritage Assessment Report. RAPs will be invited to review and provide feedback on the report, and any further information they wish to be included.

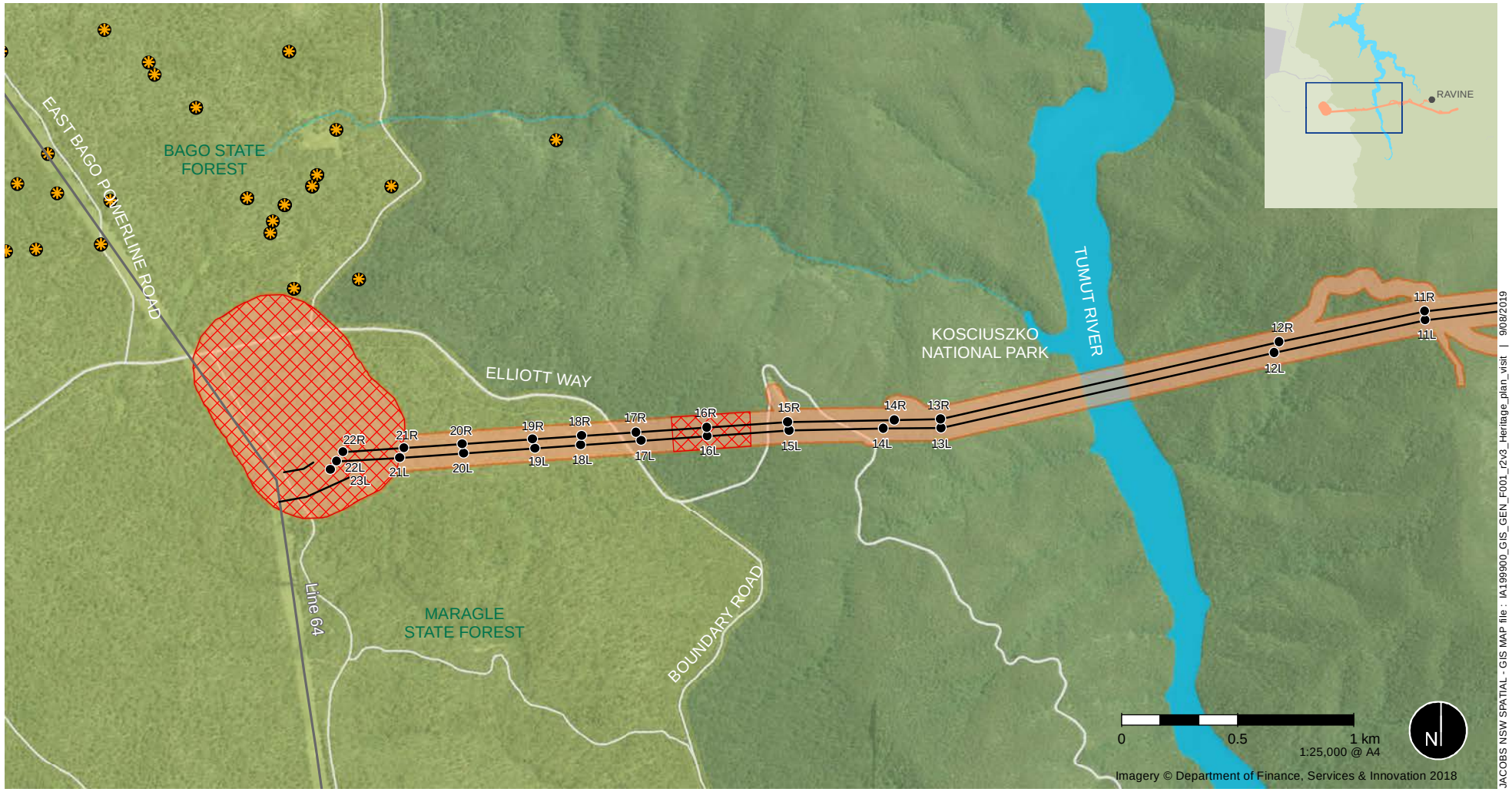

Figure 1-1 | Map showing the project area, proposed test excavation locations and previously recorded sites on the AHIMS

2. Project Description

The features of Project are presented in Figure 2-1 and would include:

- A new 330/500 kilovolt (kV) 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 substations. The substation would comprise an area of approximately 550 m by 350 m inclusive of an approximate 50 m wide asset protection zone.
- A new access road off Elliot Way to the new substation
- Two new 330 kV overhead double-circuit transmission lines from the Snowy Hydro 2.0 cable yard to the new substation
    - Total length of each line approximately nine kilometres
    - Located in a 120 m wide easement corridor
    - Each line would comprise approximately 22 steel lattice towers.
- Short overhead 330 kV transmission line connection (approximately 250 m in length) comprising approximately three transmission towers between the substation and Line 64
- Establishment of new access tracks to the transmission towers and upgrade to existing access tracks where required. The access tracks would remain following the completion of construction to service ongoing maintenance activities along the transmission lines
- Establishment of a helipad (approximately 30 m wide by 30 m long) to support the transmission line construction activities carried out at higher elevations and steep terrain along Sheep Station Ridge.
- Ancillary activities, including the establishment of tensioning and pulling sites for conductor and earth wire stringing, crane pads, site compounds, and equipment laydown areas.

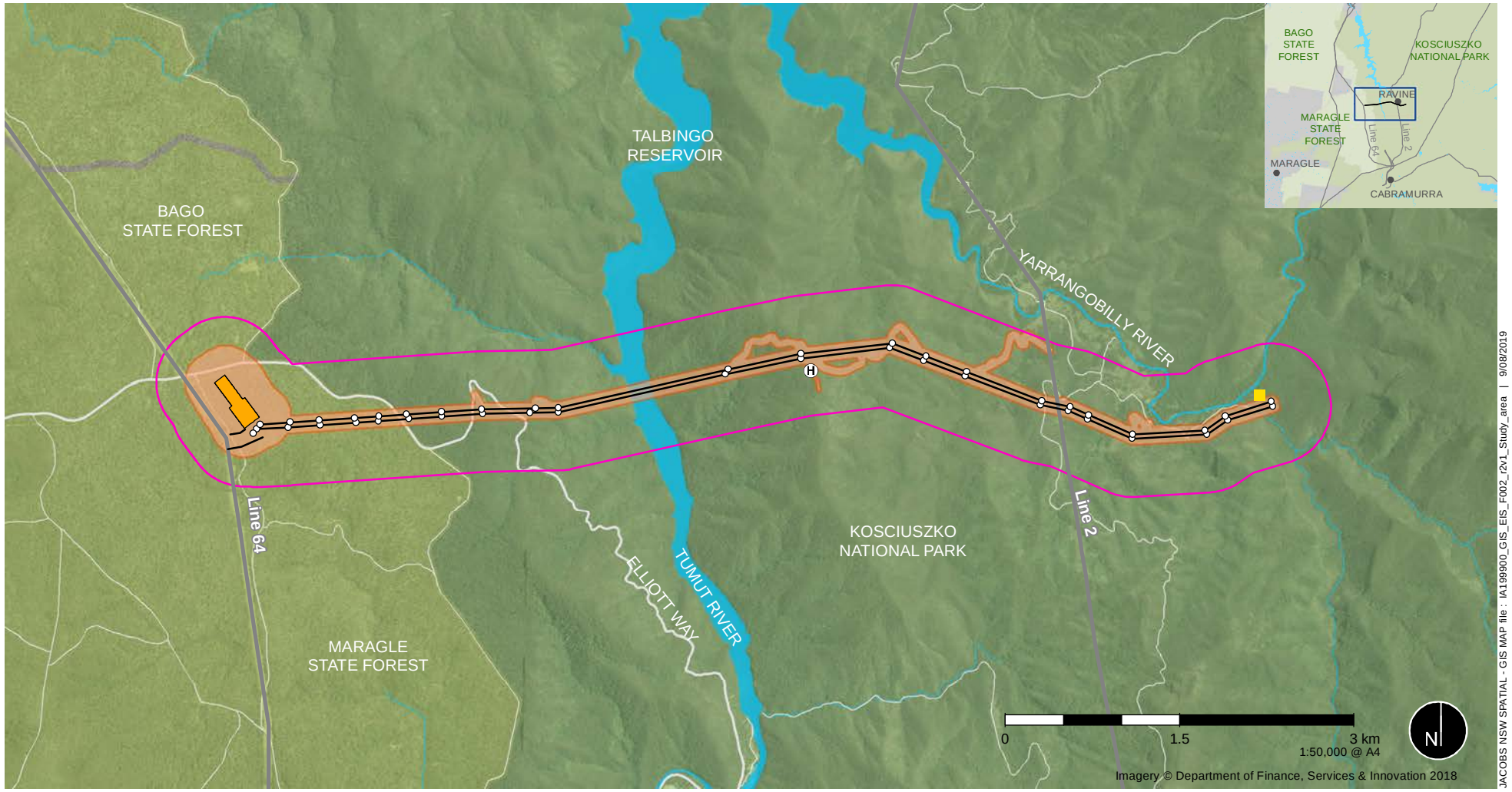

Figure 2-1 | Project overview

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

3. Proposed archaeological test excavation method

3.1 Aims of the archaeological test excavation program

The archaeological test excavation program aims to determine whether any Aboriginal objects are present in subsurface deposits within the two proposed areas: Str 16L and 16R, and the 330/500 kV substation. These two areas are proposed to be tested as they were assessed as containing PAD during the recent archaeological survey carried out by Jacobs (see **Section 1.3**). This assessment was based upon a review of previous archaeological research, a review of the landscape context, an understanding of the local and regional character of Aboriginal land use and its material traces and predictions on the nature and distribution of archaeological evidence. This research and subsequent field survey indicated there was a probability of Aboriginal objects being present in the two areas.

If subsurface Aboriginal artefacts are present, the excavation program aims to gather preliminary information on the nature of the subsurface assemblage. Excavations will provide an understanding of the nature of Aboriginal objects present, an estimate of the density of artefacts across the areas tested, the depth at which artefacts occur the type of sediment they are associated with and if possible the age of the deposits they are found within. This information will be used in the resulting ACHAR as a basis for a significance assessment of the site and its contents and any subsequent recommendations for heritage management mitigation to be taken on the two areas.

The test excavation program will adhere to the requirements of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010b).

3.2 Archaeological test excavation procedure

At each of the two areas to be investigated (Str 16L/ 16R, and the 330/500kV substation), an archaeological sampling strategy will be developed to provide a framework for sampling all potential archaeological deposits that are at risk of harm.

Test excavation squares will be placed along linear transects. Transects will span the entire area in which the footprint of proposed impacts overlaps with a zone of archaeological sensitivity or Potential Archaeological Deposit (PAD). The footprint will include any buffer zone necessary to cover inadvertent impact to the ground surface and subsurface deposits that might plausibly occur during construction.

No more than 0.5% of the maximum surface area of the PAD will be excavated. The number of squares placed along each transect, and the spacing between squares, will be decided in the field. Squares will be spaced a minimum of 5m apart. Any areas assessed as having negligible archaeological potential will not be tested. Squares will be placed to avoid features such as thick vegetation, swampy ground or outcrops of bedrock. Variations in microtopography might trigger in-field decisions to concentrate the distribution of squares on particular sections of a transect. Excavation squares will be 0.5m by 0.5m in dimension.

Depending on an area's size and on time constraints, multiple transects might be laid to adequately test the area. Transects might be parallel to one another or placed perpendicular to each other. If parallel transects are employed, the location of excavation squares on adjacent transects will be offset from one another to minimise the area of unexcavated ground between excavation squares (following Kintigh, 1988).

Squares will be excavated by hand, using shovels, trowels, mattocks or other hand tools as appropriate depending on the soils and sediments being excavated, and on the nature of any archaeological material encountered.

The first square excavated at each area will be excavated in 5 cm spits (following requirements of DECCW, 2010b). Other squares will be excavated in 10 cm spits. If stratigraphic boundaries are present in the sediments being excavated, the excavation of a spit will halt at the stratigraphic boundary when it is encountered. A new spit

will then commence below the stratigraphic boundary. In this way, spit boundaries will be made to conform to stratigraphic boundaries.

Excavation of a square will cease when deposits are encountered that are assessed by the field team as having no potential to contain Aboriginal objects.

All excavated material will be dry sieved using a 5 mm mesh sieve. Sieving will occur over a tarpaulin, as close as practical to the square being excavated, to ensure that the square can be backfilled following the excavation, with minimal loss of excavated sediments.

Each excavation square will be recorded photographically to capture images of the excavated sections and record information on the nature of the deposit and any stratigraphic or soil formation patterning. Where site features such as hearths, are encountered, additional photographic and written recordings will be made. Scaled plans of cultural features and excavated sections will be carried out if the excavation director judges this to be necessary.

Each square will be backfilled as soon as it is practical after excavation and recording of that square has ceased.

If Aboriginal objects have been recovered from a square, additional squares can be excavated nearby if the field team judges that this is necessary to adequately understand the nature of the subsurface assemblage. These additional squares could be placed adjacent to the first square, or at a distance of 5m or more from it. The number of additional squares excavated will depend on the nature of the archaeological material being recovered. Additional squares, if adjacent to one another, cannot make up a combined area of more than $3m^2$. Additional squares, if separate from one another, cannot be closer than 5m (DECCW, 2010b).

All recovered material will be catalogued in the field to track archaeological data in real time and guide continuation or cessation of excavation. In-field cataloguing will entail recording the number of artefacts per square, and the types of artefact recovered.

During fieldwork, all cultural material will be accessible for inspection and comment by RAPs.

Digitised recording systems using a hand-held tablet will be the primary recording system, with manual field recording forms used as a backup if judged necessary. The digitised recording system will minimise transcription errors through standardised recording conventions and create efficiency in post-excavation reporting.

Artefacts recovered from excavations will be secured in zip-lock bags, which will be labelled with the artefacts' date of excavation, area/site of excavation, square name/number, spit number, and other contextual information if applicable (e.g. feature or stratigaphic unit). Artefact bags will then be double-bagged within a larger grouping bag, to guard against potential loss during transport.

All artefacts will be kept in Jacobs' care while further analysis is undertaken (see Section 3.5). This will take place prior to consultation with registered Aboriginal parties in respect to their long-term safekeeping being decided upon and an application for a Care Agreement under the *National Parks and Wildlife Act 1974* being prepared.

Samples of sediments or other materials relating to Aboriginal activities, such as charcoal, will be taken if judged necessary.

If human remains, or suspected human remains, are encountered excavations will cease immediately. A standard procedure will then be followed (see **Appendix A**).

3.3 Participation of RAP representatives in the excavation program

The archaeological test excavation program would be carried out by a single excavation team composed of two Jacobs archaeologists and six Aboriginal representatives. The fieldwork team must include a balance of trained archaeologists and Aboriginal community fieldworkers. Sufficiently trained and experienced archaeologists are needed to direct the activity, maintain records and identify cultural finds. Sufficient Aboriginal community fieldworkers are required to efficiently sieve, dig and experience all aspects of the work through a task rotation roster, according to experience and ability.

Excavations would be carried out over a one-week period. Work would be carried out from Monday morning to Friday evening. The time allocated to each of the two sites will be decided in the field, based on the results of excavations as they occur.

3.4 Safety and access requirements

Prior to field staff heading to site, Jacobs will have completed and will adhere to the following:

- Complete and check and follow the Snowy 2.0 Visitor Site Access Requirements if accessing Ravine / Lobs Hole area
- Sent the Snowy 2.0 paramedic an email to advise of travel plans prior to travel - paramedicsnowy@atlasmedical.com.au
- Notify National Parks and Wildlife Services (NPWS) and State Forest on expected field survey dates and plans
- Ensure that survey work in the State forests is within the Hunting exclusion Area, https://fcnsw.maps.arcgis.com/apps/webappviewer/index.html?id=c5cb0595bb9742189da97049e334add8
- Check the RFS bushfire danger rating before heading to site http://www.rfs.nsw.gov.au/fire-information/fdr-and-tobans and understand the evacuation procedures. Do not work when bushfire hazard rating is Extreme or Catastrophic. If High, Very High or Severe fire rating re-assess work requirements and avoid areas where fires are likely.
- Check weather conditions and re-assess work requirements if extreme weather is predicted (i.e. heavy rainfall, high winds, thunderstorms).
- Verify the weather / road conditions before leaving home base.

The text excavations would be completed under the Jacobs HSE field pack. All field staff are required to sign on to this prior to commencing work.

Vehicle/ Equipment Requirements:

- If travelling on unsealed roads, 4WD vehicle - preferably Prado, Landcruiser, Hilux or equivalent with similar clearances.
- Vehicle First aid kit (type C)
- UHF radio, preferably in-car
- InReach device (one per party)
- If travelling between 1st June and 31st Oct -
    - Alpine diesel in diesel vehicles
    - Snow chains (from 1st June to 31st Oct only).

3.5 Analysis of recovered artefacts

All material collected in the field will be transported directly from the field to Jacobs' office in Canberra for analysis. This material will be kept in temporary storage by Jacobs during the analysis phase, and until a strategy for permanent storage or repatriation can be implemented.

It is anticipated that most, if not all, of the objects recovered from excavation will be stone artefacts. These will be analysed by a suitably qualified archaeologist. A number of standard attributes will be recorded for every artefact (following requirements of DECCW, 2010b):

- Heat damage
- Post-depositional weathering
- Presence/absence of fresh damage
- Material type
- Artefact type
- Platform surface type
- Platform type
- Termination type
- Cross sectional angle (spine angle) of dorsal surface (flakes only)
- Length in mm
- Width in mm
- Thickness in mm.

A number of additional attributes beyond those required by NSW Department of Planning, Industry and Environment (DPIE) (previously referred to as Office of Environment and Heritage) will also be recorded for each artefact, including:

- Flake fragment category (complete, proximal fragment, distal fragment etc)
- Type of cortex and amount of cortex on dorsal surfaces of flakes
- On retouched flakes, various observations of the retouched edges, including retouch type, invasiveness, height of retouch scars
- On cores, various observations including number of core rotations, the orientation of different platforms to one another, whether the core is bipolar or not
- On ground artefacts such as axe/hatchet heads or grindstones, various observations such as size of the ground area, angle of ground edges.

Photographs will be taken of a representative sample of artefacts, to create a visual record of the general types of artefacts within the assemblage. Atypical artefacts or artefacts of high significance will also be photographed. Images will be taken from several orientations, following procedures for archival-quality artefact photography (Fisher, 2009; Prokop, 1985).

Further analytical techniques might be employed on a sub-sample of artefacts if it is judged that these techniques have the potential to yield information. Further techniques might include functional analysis through examination of residues or use-wear, for example. Any such analyses would be carried out by a suitably qualified specialist.

Any Aboriginal artefacts that are not made from stone will be analysed using appropriate techniques. Analysis would conform to the requirements of the *Code of Practice* (DECCW, 2010b). Specific analysis procedures would be decided following excavation, and would be made from an assessment of the types of artefacts recovered, the materials from which they are made, their condition of preservation, and the information that could be obtained from them.

No destructive analysis of any artefacts will be carried out. Only measurements and observations that have no effect on an artefact's condition will be undertaken.

3.6 Management of recovered artefacts

Following transport from the excavation site to Jacobs' Canberra office, all artefacts will be securely stored in a locked cabinet. The location of the artefacts will be recorded on a Jacobs database, to create an electronic record of the date they were depositioned into this temporary storage location.

Artefacts will be stored in the double-bagged resealable bags they were placed in during the excavation program.

Durable labels made from aluminium plate or similar material will be placed inside bags to provide a resilient label of the artefacts' provenance.

Artefacts will be kept in the same temporary storage location until a strategy for repatriation or permanent storage can be implemented. At this point the artefacts will be handed over to their permanent custodian(s). The date of the handover will be recorded on the Jacobs database. If artefacts are reburied, the burial location will be recorded on an Aboriginal Site Recording Form and lodged on the AHIMS.

3.7 Documentation and reporting of excavation results

If Aboriginal objects are found during excavation at either area, that area would then be recorded as an Aboriginal site. An Aboriginal Site Recording Form would be completed by Jacobs and lodged on AHIMS.

An ACHAR will be written by Jacobs. The ACHAR will conform to the requirements of the *Code of Practice* (DECCW, 2010b), the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a) and the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011). The report will include:

- A description of the project, the area proposed to be impacted, and the landscape and environmental characteristics of the surrounding region.
- A description of the consultation process between Jacobs and RAP groups
- Background information on Aboriginal land-use in the region. This will include information from historical and ethnographic sources, information submitted to Jacobs during the consultation process, and information from previous archaeological studies.
- A detailed description of the methods used during the test excavation program
- The results of the test excavation program. This would include an inventory of all Aboriginal objects and all measurements and observations made on them, a description of subsurface assemblage(s) discovered in the two areas. A discussion of how the site contributes to our understanding of Aboriginal activities in the region, incorporating previous archaeological studies, would be included.
- An assessment of the significance of any Aboriginal objects and sites discovered by the test excavation program. This would include both scientific significance and cultural significance
- A description of any impacts to Aboriginal heritage that the project would involve, and an assessment of inadvertent impacts that might occur.

- A discussion of harm minimisation and management strategies the project proposes to employ
- Recommendations of management actions the proposal should take to avoid or minimise harm to Aboriginal cultural heritage.

The ACHAR would be circulated to all RAPs in draft form. A 28 day period to review the document and provide input and comments will be provided at this point. The final report, incorporating input from RAPs, will be lodged with DPIE.

3.8 Sensitive cultural information management protocol

RAPs will have the opportunity to provide Jacobs with information on the project area and the surrounding region, including information on cultural heritage values. Information will be accepted at any point during the cultural heritage assessment process prior to the finalisation of the ACHAR (see section **Error! Reference source not found.**).

It is possible that during this consultation process, RAPs will provide sensitive cultural information to which access needs to be restricted.

In the event that such information is supplied, the RAP supplying the information should state to Jacobs how they wish that information to be treated, and how access to the information should be restricted.

Jacobs will follow the stated wishes provided by the RAP group in question when managing and using the information provided to Jacobs. All stated restrictions of access, communication and publication of the information will be followed. These might include:

- Restrictions on reproducing the information (in whole or in part) in reports
- Restrictions on reproducing the information in reports provided to different audiences (for example, the version provided to the client, the version provided to DPIE and the AHIMS database)
- Restrictions on communication of the information in other ways
- Restrictions on the location/storage of the information
- Other required processes relating to handling the information
- Any names and contact details of persons authorised within the relevant Aboriginal group to make decisions concerning the information, and their degree of authorisation.
- Any details of any consent given in accordance with customary law
- Any restrictions on access to and use of the information by RAPs.

Please consider the above list when providing your statement of requirements regarding any culturally sensitive information.

3.9 Critical timelines

Critical timelines are outlined in **Table 3-1**. Please note that the following deadlines are estimates at this stage in the process and are provided to allow forward planning of personnel and resources.

Table 3-1 Critical timelines for the project

Project Item	Date
Provision of comments on the proposed methodology presented in this document	Within 28 days from delivery of this document
Archaeological test excavation fieldwork	Week commencing 23 September 2019
Provision of the draft ACHARs to RAPs for review.	26 October 2019
Provision of comments on draft ACHARs	Within 28 days from delivery of the draft report
Gathering of information on cultural significance and cultural values associated with Aboriginal objects and places within or relevant to the project area	Ongoing throughout the process until finalisation of the draft ACHAR
Finalisation of the ACHARs in consideration of comments received	24 November 2019

3.10 Contact details

For more information and to discuss this project, please do not hesitate to contact:

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4. References

DECCW. (2010a). *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*. Sydney: Department of Environment, Climate Change and Water

DECCW. (2010b). *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*. Sydney: Department of Environment, Climate Change and Water

Fisher, L. (2009). *Photography for Archaeologists. Part II: Artefact Recording* (Vol. 26): British Archaeological Jobs Resource.

Kintigh, K. W. (1988). The effectiveness of subsurface testing: a simulation approach. *American Antiquity, 53*(4).

OEH. (2011). *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*. Sydney: Office of Environment and Heritage

Prokop, E. (1985). A method to photograph stone tools. *Journal of Field Archaeology, 12*(2), 251 - 255.

Appendix A. Unexpected discovery of human remains

Should human remains be uncovered during works the following procedures must be followed:

a) Immediately after remains are exposed, all work is to halt at that location immediately and the Environmental Manager on site is to be immediately notified to allow assessment and management

b) The Contractor's Environmental Manager (or similar) on site is to notify the INSW Representative

c) Contact the local NSW Police

d) Contact DPIE Environment line on 131 555 and the Heritage Branch (Heritage Division) on (02) 9873 8500.

e) A physical or forensic anthropologist should inspect the remains in situ (organised by the police, unless otherwise directed by the police), and make a determination of ancestry (Aboriginal or non-Aboriginal) and antiquity (pre-contact, historic or forensic)

f) If the remains are identified as forensic, the area is deemed as a crime scene

g) If the remains are identified as Aboriginal, the site is to be secured and DPIE and all Aboriginal stakeholders are to be notified in writing

h) If the remains are identified as non-Aboriginal (historical) remains, the site is to be secured and the Heritage Branch (Heritage Division, OEH) is to be contacted

The above process functions only to appropriately identify the remains and secure the site. From this time, the management of the area and remains is to be determined through one of the following means:

a) If the remains are identified as a forensic matter, liaise with the police

b) If the remains are identified as Aboriginal, liaise with INSW, the OEH and registered Aboriginal stakeholders

c) If the remains are identified as non-Aboriginal (historical) liaise with INSW, and the Heritage Branch (Heritage Division, DPIE)

d) If the remains are identified as not being human, then work can recommence once the appropriate clearances have been given

Appendix C. AHIMS search results

The Extensive AHIMS search results have been redacted for confidentially.

Appendix D. Test Excavation Pit Descriptions

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP1	1a	Organic top soils, small rootlets and small bits of gravel throughout.			
	1b	Thick root present. Soil is clayey and compact. Dark brown.			
	2a	Roots continue. No variation in colour and same compactness.			
	2b	Getting more compact and dense. Becoming reddish brown.			
	3a	Same as above.			
	3b	Same as above.			
	4a	Same as above.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP2	1	Organic topsoil with small rootlets and larger roots present. Dark to light brown soil.			
	2	Turning into a reddish-brown colour as the soil becomes more clayey and compact.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP3	1	Dark brown organic topsoil. Roots present.			
	2	Colour of soil becomes reddish brown as it becomes clayey and compact. Mottling of colour between spits present due to roots.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP4	1	Dark brown reddish-brown clay. Compact. Rootlets present throughout.			
	2	Small change in colour between spits. Compact and clayey.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP5	1	Organic topsoil which contained small pieces of gravel. Mottled colour throughout spit – changing from light brown to darker brown soil.			
	2	Compact soil, gravel inclusions present. Small rocks also present.			
	3	Becoming clayey and more compact.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP6	1	Organic topsoil. Dark brown and slightly wetter than previous test pits.			
	2	More compact and clayey.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP7	1	Beneath grassy top there is a gravelly layer. Dark brown soil.		 	
	2	Degraded bedrock throughout spit especially in south- east side.			

Test pit	Spit	Description	Images		
			Start of excavation	**End of excavation**	**North section**
TP8	1	Organic top soil – dark brown soil. Quite compact and clayey. Rootlets present.			
	2	Roots still present. White fungus around these roots – possible indication of moist environment. Compact ground.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP9	1	Dark to light brown soil. Small rootlets present throughout.			
	2	Becoming more compact. White fungus around these roots – possible indication of moist environment.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP10	1	Light brown soil which is dry and compact. Lots of rootlets present and small pieces of gravel.			
	2	Slow transition to a reddish clay.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP11	1	Light to dark brown and reddish clay. Dry and compact.			
	2	Compact soil which is getting clayey.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP12	1	Hard compact soil. Gravel and rootlets present straight after grass covering.			
	2	Roots and small gravel present. Soil is more clayey and compact.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP13	1	Brown/ reddish brown clay which is compact.			
	2	Same as above.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP14	1	Dark brown clayey soil. Rootlets present with some small to medium roots present. Small angular rocks present.			
	2	Sandy silty clay. Roots and angular rocks continue to be present.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP15	1	Thin topsoil with sandy gravelly texture. Light to dark brown clayey soil. Compact material.			
	2	Becoming more compact and clayey.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP16	1	Dark brown compact soil. Traces of small gravel throughout but infrequent.			
	2	Becoming clayey and more compact. Becoming redder in colour.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP17	1	Dark brown soil, very earthy. Rootlets present.			
	2	Getting more clayey and compact. Roots still present.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP18	1	Reddish brown clayey soil. Compact.			
	2	Same as above.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP19	1	Dark brown to light soil. Compact and dry.			
	2	Medium sized rootlets present. Compact and dry.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP20	1	Reddish brown soil. Compact.			
	2	Same as above.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP21	1	Lots of rock present directly under grass covering. Dark brown organic earthy soil. Small traces of gravel present.			
	2	Larger rocks occurring throughout spit. Reddish brown soil (clayey) and compact.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP22	1	Grass covering with rocks directly below grass covering. Dark brown organic soil.			
	2	Getting lighter in colour. More clayey and compact with large roots present.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP23	1	Dark brown earthy soil with small rootlets present. Small pieces of gravel present throughout.			
	2	Same as above.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP24	1	Earthy soil - dark brown. Large rocks and rootlets throughout spit.			
	2	Larger roots throughout. Soil colour becoming lighter and redder. Getting clayey.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP25	1	Dark reddish-brown soil. Clayey and compact. Small rocks present throughout.			
	2	Becoming more clayey and compact.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP26	1	Dark brown soil, very earthy with small rootlets throughout spit.			
	2	Earthy soil comes down onto reddish clay.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP27	1	Reddish brown soil which is quite clayey and compact. Medium sized roots present.			
	2	Same as above.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
TP28	1	Dark grey/ brown soil. Moist and coarsely compacted soil. Large quantity of rootlets.			
	2	Getting muddier and thicker in texture. Rootlets continue.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
STP1	1	Dry, silty soil, and loose. Light brown with small pieces of gravel. Small rootlets throughout.			
	2	Reddish brown soil, getting more compact and clayey.			
	3	Clayey and more compact.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
STP2	1a	Reddish light brown soil. Quite dry and earthy. Roots present throughout.			
	1b	Becoming clayey and compact.			
	2a	Same as above.			
	2b	Becoming more moist and clayey.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
STP3	1	Reddish brown clayey soil. Lots of small pieces of gravel throughout spit.			
	2	Becoming more compact and clayey.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
STP4	1	Light brown reddish soil, quite clayey with small pieces of gravel.			
	2	Same as above.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
STP5	1	Disturbance for up to 5cm due to pig/ animal digging. Clayey and compact soil.			
	2	Light brown reddish clay which is compact.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
STP6	1	Small organic topsoil. Reddish brown clay below topsoil.			
	2	Getting more clayey and compact.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
STP7	1	Small thin layer of topsoil/ organic clay. Roots present with small pieces of gravel throughout.			
	2	Reddish clay, very compact and clumpy. Small amount of gravel throughout spit.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
STP8	1	Earthy soil with rootlets present. Quite loose and dry.			
	2	Getting more compact and clayey.			

Test pit	Spit	Description	Images		
			Start of excavation	End of excavation	North section
STP9	1	Earthy soil which is dry and friable. Lots of rootlets throughout.			
	2	Lots of small rocks and gravel throughout spit. Dry and coarse.			

Appendix E. Lithic analysis data

ID	Site	Pit	Spit	Type	Completeness	Material	Colour	Initiation	Platform type	Termination	Cortex%	Retouched	Heat damage	Length	Width	Thickness	Platform thickness	Platform width	# Negative scars	# Rotations	OHR scars	Implement type
1	STR16	STP3	2	Unretouched flake	Proximal	Quartz	White	Hertzian	Single	None	0	No	None	5.89	14.34	4.86	13.2	4.77				NA
2	STR16	STP9	2	Core	Complete	Quartz	White				0		None	22.65	27.95	16.65			3	2	No	NA
3	STR16	STP4	Surface	Unretouched flake	Distal	Quartz	White	None	None	Step	0	No	None	33.59	31.65	9.68						NA


TransGrid