Proposed Development of

Boco Rock Wind Farm

South-Eastern, New South Wales

Environmental Assessment

Volume 3: Part 3 of 3

Appendices

November 2009

Prepared for Boco Rock Wind Farm Pty Ltd by Wind Prospect CWP Pty Ltd

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Proposed Boco Rock Wind Farm Archaeological and Cultural Heritage Assessment

New South Wales Archaeology Pty Ltd

Proposed Boco Rock Wind Farm
Archaeological and Cultural Heritage Assessment

A report to Wind Prospect CWP Pty Ltd

April 2009

Dhau-up wullo yapang yabung goorookma
Ngarigo language meaning *place where plenty big wind*
(kindly provided by John Dixon)

Julie Dibden
New South Wales Archaeology Pty Limited

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1. SUMMARY

1.1 Introduction

New South Wales Archaeology Pty Ltd was commissioned by Wind Prospect CWP Pty Ltd in December 2008 to undertake an archaeological and cultural heritage assessment of the proposed Boco Rock Wind Farm.

The Boco Rock Wind Farm is designed to be located along the high altitude plateau of the Monaro Plains. The nearest township is Nimmitabel, located approximately six kilometres east of the proposed site.

Two potential turbine layout designs within the same envelope of land are proposed. These layouts are based on a number of technical, environmental, social factors and results of site assessments. The layouts ensure optimum, undisturbed use of the measured and predicted wind resource, after accommodating constraints, for the range of turbines currently being considered.

Given the scale of the proposed wind farm it is likely that 'clusters' of turbines will be constructed and commissioned in stages; these are defined as follows:

- Yandra: the north-east cluster;
- Springfield: the north-west cluster;
- Boco: the south-east cluster, and
- Sherwins: the south-west cluster.

The proposal would involve the installation and operation of up to 125 wind turbines. The turbines would be placed along a series of plateau and ridge landforms on private properties which are currently utilised for grazing.

The proposed wind farm is defined as a Major Project under Part 3A of the Environmental Planning and Assessment Act 1979. This report addresses the Director-General's requirements (DGRs) for the preparation of the Environmental Assessment for the project.

1.2 Partnership with Aboriginal Communities

This assessment has been conducted in accordance with consultation process as outlined in the Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants (NSW DEC 2004). The field survey has been undertaken with the assistance of Yukembruk Merung Ngarigo Consultancy Pty Ltd (YMNC) and Eden Local Aboriginal Land Council (ELALC).

1.3 Description of Impact

The impacts relating to the construction of the proposed Boco Rock Wind Farm will result from the installation of wind turbines, an onsite underground electrical cable network, one collector substation comprising cable marshalling, switchgear and transformer, access tracks, crane hardstand areas, up to four wind monitoring masts, site operations facilities, concrete batch plants, internal electrical interconnection lines between each of the turbine clusters and appropriate site signs.

The proposed wind farm is to have an installed capacity of between 254 to 360 MW, depending on the model of the turbine selected. The output of the wind farm will, via a new 132,000 volt double-circuit overhead transmission line, connect to existing Country Energy owned lines situated east of the wind farm site. This new line and associated switchgear at the point of connection to the existing Country Energy lines will be assessed separately from the wind farm and will be subject to a separate approval process.

The proposed works entail ground disturbance and accordingly the construction of the wind farm has the potential to cause impacts to any Aboriginal objects or Non-Indigenous items which may be present within the zones of direct impact. Impact areas will occur in a development footprint measuring approximately 157 hectares. Impacts will be generally confined to cleared areas currently utilised for grazing and cultivation, and existing road easements; where possible existing access roads will be used for site access. Electrical connections and communications cabling will be installed adjacent access roads.

The proposed impacts are discrete in nature and will occupy a relatively small footprint within the overall area; accordingly impacts to the archaeological resource across the landscape can be considered to be partial in nature, rather than comprehensive.

1.4 Objectives and Methods

The study has sought to identify and record Aboriginal objects and Non-Indigenous items, to assess the archaeological potential of the landscape and to formulate management and mitigation strategies based on the results of background research, a field survey and significance assessment.

The investigation has included a literature review, field survey and analysis of results. Field work was undertaken over an eight day period in February and March 2009. The field survey entailed a comprehensive survey of proposed impact areas.

Indigenous

The approach to archaeological recording in the current study has been a 'nonsite' methodology: the elementary unit recorded is an artefact (described as artefact locales) rather than a site. It is assumed that stone artefacts will be distributed across the landscape in a continuum with significant variations in artefact density and nature in different landforms. While cultural factors will have informed the nature of land use, and the resultant artefact discard, environmental variables are those which can be utilised archaeologically in order to record and analyse archaeological variability across the landscape.

A landscape based approach and methodology has therefore been implemented during this study. The proposal area has been divided into a number of Survey Units defined according to landform morphological type. Survey Units are utilised as a framework for recording, analysis and the formulation of management and mitigation strategies.

The New South Wales National Parks and Wildlife Service has prepared a draft document which provides a series of guidelines regarding the assessment and management of Aboriginal cultural heritage in New South Wales. This report has been prepared in accordance with these draft guidelines (NSW NPWS 1997).

Additionally the study has been conducted in accordance with the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (NSW DEC July 2005). The Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation have been prepared specifically for development applications assessed under Part 3A of the Environmental Planning and Assessment Act 1979.

Non-Indigenous

The Non-Indigenous component of this assessment has been conducted with reference to literature relating to the European occupation area, a review of Parish maps and a field inspection aimed at locating historical items, features and potential archaeological sites.

The NSW Department of Urban Affairs and Planning and the NSW Heritage Office have produced guidelines for preparing archaeological and heritage assessments as set out in Archaeological Assessment Guidelines 1996 and Heritage Assessments 1996. Where relevant this

report has been prepared in accordance with these guidelines and those most recently defined as a result of the 1998 amendments to the NSW Heritage Act 1977.

The historical component of this project aims to provide an assessment of the historical heritage status of the proposal area. Accordingly the current project aims to document the results of relevant heritage database searches, an archaeological surface survey and results, list statements of significance for recorded sites and to formulate a series of management and mitigation strategies.

1.5 Heritage context

A review of heritage databases and previous archaeological investigations has been undertaken in order to provide an analytical context to the assessment.

A search of the New South Wales Department of Environment and Climate Change (the NSW DECC) Aboriginal Heritage Information Management System (AHIMS) has indicated that there are no previously recorded Aboriginal objects located within the proposed impact area (AHIMS #24771: 15th January 2009).

Searches of historical databases have been conducted. There are no previously recorded heritage items on the *Australian Heritage Database*, or the *Register of the National Trust* listed as being present within the study area. The search of the *State Heritage Inventory* (28 January 2009) revealed that the 'Avon Lake' farm complex and the 'Yandra' homestead and farm buildings are listed on the Cooma-Monaro heritage schedule for the *Local Environmental Plan 1999 – (Rural)*. These sites are located outside proposed impact areas.

1.6 Results and Impact Assessment

The development area has been divided into 41 Survey Units; the total Survey Unit area measured approximately 882.9 hectares. It is estimated that approximately 539 hectares of that area was subject to survey inspection. Ground exposures inspected are estimated to have been 213 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 61 hectares. Effective Survey Coverage is therefore calculated to have been 7% of the development envelope.

Indigenous

A total of 56 Aboriginal object locales have been recorded. The majority of these are low or very low density stone artefact distributions located within Survey Units assessed to be of low archaeological potential and sensitivity; these are assessed to be of low archaeological significance. A small number of Aboriginal object locales have been identified which are assessed to be of low/moderate or moderate archaeological significance.

The construction of the Boco Rock Wind Farm will result in substantial physical impacts to any Aboriginal objects which may be located within direct impact areas - *irrespective of their archaeological significance*. That is, any Aboriginal object situated within an area of direct impact will be comprehensively disturbed, and/or destroyed during construction.

As with any development the chances of impacting Aboriginal objects, particularly stone artefacts, is high given that they are present in a continuum across the landscape and located on or within ground surfaces. However in regard to the majority of Aboriginal object locales such as artefact scatters assessed to be of low significance, the impacts can be viewed as being of correspondingly low significance. On the other hand, impacts to any object locales which are assessed to be of higher archaeological significance can be viewed as being of correspondingly higher significance. This assessment forms the basis for the formulation of management strategies which aim to mitigate development impact to the archaeological resource.

Non-Indigenous

A total of 29 potential heritage items were recorded in and adjacent to areas of proposed impacts at the Boco Rock Wind Farm. These recordings include one camp site, one homestead ruin, two sheepfolds and 25 fences including one old wire fence and the remains of various dry stone fences.

The camp site, house ruin and two recorded sheepfolds are located outside areas of proposed works, although they are situated relatively close to proposed impact areas. Impacts relating to the fences will be minimal and partial in nature.

1.7 Mitigation and Management Strategies

Details of archaeological sensitivity, suitable management strategies and accompanying rationale for each Survey Unit, Indigenous and Non-Indigenous heritage item are outlined in Section 12 of this report.

Indigenous

The Survey Units and Aboriginal object locales recorded in the proposal area do not surpass scientific significance thresholds which would act to preclude the construction of the proposed wind farm.

Based on a consideration of the predictive model applicable to the environmental context in which impacts are proposed, and the results of the study, it is concluded that the proposed impact areas do not warrant further investigation such as subsurface test excavation. The environmental contexts in which the turbines (and associated impacts) are proposed are not predicted to contain artefact density sufficient to warrant test excavation. It is considered that subsurface testing is unlikely to produce results which would differ significantly to predictions made in respect of the archaeological potential of the landforms in question.

Given the nature and density of the majority of artefact locales recorded in the proposal area and the low scientific significance rating they been accorded, unmitigated impacts is considered appropriate; a strategy of impact avoidance is not warranted in regard to these locales.

Several Aboriginal object locales however are assessed to be of low/moderate or moderate archaeological significance. Accordingly it is generally recommended that avoiding or limiting the extent of impacts to these locales, if at all feasible, should be given consideration.

As a form of mitigation of overall construction impact to the archaeological resource within the proposal area it is proposed that a program of salvage archaeological excavation and analysis be undertaken in a sample of Survey Units prior to construction.

Non-Indigenous

The majority of Non-Indigenous heritage items recorded are stone fences dating to the mid 1800s. It should be noted that many of the recorded stone fences are highly disturbed and/or in a poor state of repair; in terms of individual recordings these items do not warrant heritage listing. Nevertheless, these items are part of a broader cultural landscape that dates to the late nineteenth century that appears to be associated with the introduction of the Robertson Land Acts, the conversion of Bibbenluke Station from leasehold to freehold land and the activities of Chinese workers in the local area. There are a number of potential research questions that relate to these items, which increases their overall research significance at a local level. Given the historical associations and the research potential that exists for these items as a complex of sites and features it is preferable to minimise impacts as much as possible. In many instances this means restricting impacts to sections of fence lines that are already disturbed or avoiding fences all together where feasible.

Given that the proposed wind farm will materially impact the existing cultural landscape of which the fences form a strong visual component it is recommended that an appropriate form of mitigation would entail a research program relating to the stone fences.

1.8 Recommendations

Management and mitigation strategies are outlined and justified in Section 12 of this report. The following recommendations are provided in summary form:

- Management and mitigation recommendations are listed in respect of each Survey Unit, Aboriginal object locale and Non-Indigenous heritage item in Section 12 of this report.

- No Survey Units have been identified in the proposal area to warrant further archaeological investigation such as subsurface test excavation; the Effective Survey Coverage achieved during the field survey was relatively high and can be considered to have been generally adequate for the purposes of determining the archaeological status of the proposed impact areas.

- None of the Survey Units, Aboriginal object locales or Non-Indigenous heritage items in the proposal area have been assessed to surpass archaeological significance thresholds which would act to entirely preclude proposed impacts.

- It is recommended that ground disturbance impacts associated with the proposal be kept to a minimum and to defined areas so as to ensure as little impact as possible to the Aboriginal objects (stone artefacts) which can be expected to extend in a relatively continuous albeit very low to low density distribution across the broader landscape encompassed by the proposal.

- The majority of the Aboriginal object locales recorded are very low or low density distributions of stone artefacts. The archaeological significance of these locales is assessed to be low; accordingly a management strategy of unmitigated impact is considered to be appropriate.

- In regard to the Aboriginal object locales which are assessed to be of low/moderate or moderate archaeological significance it is generally recommended that avoidance of impacts, or limiting the extent of impacts to these locales, if at all feasible, should be given consideration.

  As a form of mitigation of overall construction impact to the archaeological resource within the development footprint it is proposed that a program of salvage archaeological excavation and analysis be undertaken prior to construction.

  The development of an appropriate salvage project should be undertaken in consultation with an archaeologist, the relevant Aboriginal communities and the NSW Department of Conservation and Climate Change.

- It is recommended that additional archaeological assessment is conducted in any areas which are proposed for impacts that have not been surveyed during the current assessment. Significant Aboriginal objects can occur anywhere in the landscape and accordingly if present they need to be identified and impact mitigation strategies implemented prior to impacts.

- It is recommended that particular care is carried out to avoid impacts, as much as practicable, to the more intact stone fences such as SU14/H1, SU14/H2, SU16/H2 and SU20/H1.

- It is recommended that an appropriate form of mitigation relating to impacts to the stone fences would entail a research program.

- The proponent should, in consultation with an archaeologist, develop a Cultural Heritage Management Protocol, which documents the procedures to be followed for impact avoidance or mitigation. The development of an appropriate Cultural Heritage Management Protocol should be undertaken in consultation with an archaeologist, the relevant Aboriginal communities and the NSW Department of Conservation and Climate Change.

- Personnel involved in the construction and management phases of the project should be trained in procedures to implement recommendations relating to cultural heritage where necessary.

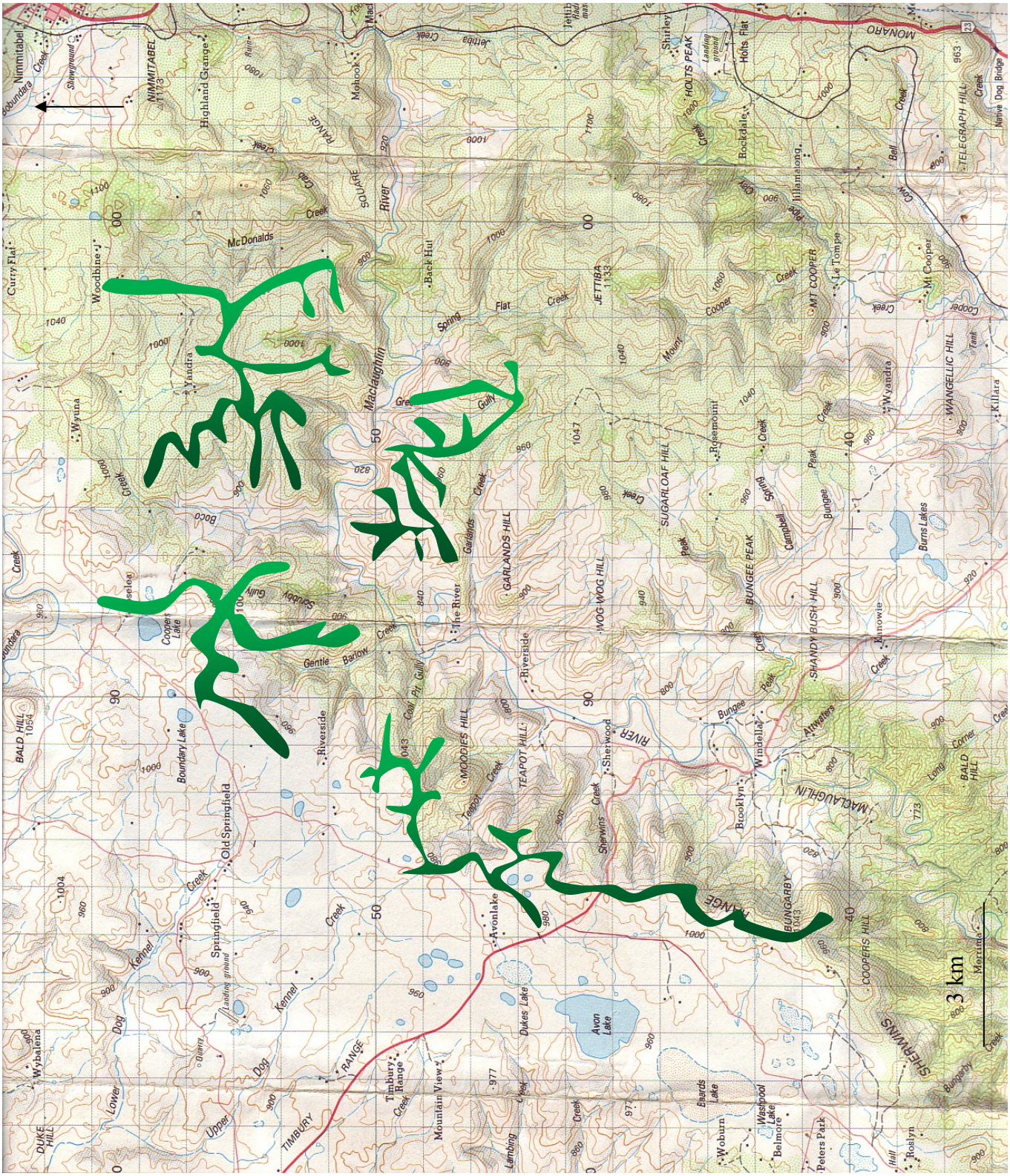

Figure 1. Location of the proposed Boco Rock Wind Farm clusters in a local context (Bombala 1:100 000 topographic map ed 1).

2. INTRODUCTION

2.1 Introduction

New South Wales Archaeology Pty Ltd was commissioned by Wind Prospect CWP Pty Ltd in December 2008 to undertake an archaeological and heritage assessment of the proposed Boco Rock Wind Farm. The Boco Rock Wind Farm would be located to the west and south-west of Nimmitabel, New South Wales (Figure 1). The proposal would involve the construction and operation of up to 125 wind turbines. The turbines would be placed along a series of plateau/ridge landforms on private properties which are currently utilised for grazing.

The project description is based on current planning; site layout may change as a result of issues which might arise in relation to ongoing assessments including biodiversity, archaeology, geology, wind regime, wind turbine availability and transmission connection design issues.

The proposed wind farm is defined as a Major Project under Part 3A of the Environmental Planning and Assessment Act 1979. The Director General, Department of Planning has issued requirements for the preparation of an Environmental Assessment in which it is stated that an archaeological and cultural heritage assessment is required to be prepared which addresses the potential impact of the proposal on Aboriginal heritage values.

In accordance with the NSW NPWS guidelines for archaeological reporting (NSW NPWS 1997) and the NSW DECC Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (NSW DEC 2005) this report aims to document:

- The Aboriginal consultation process undertaken for the project and the involvement in the project of the Aboriginal community (Section 3);
- A description of the proposal and whether or not it has the potential to result in impacts to Aboriginal cultural heritage or Non-Indigenous heritage items (Section 4);
- A description of the impact history of the proposal area (Section 4);
- The methodology implemented during the study (Section 5);
- The landscape and natural resources of the study area in order to establish background parameters (Section 6);
- A review of archaeological and relevant literature and heritage listings on the NSW DECC Aboriginal Heritage Information Management System (Section 7);
- A synthesis of local and regional archaeology (Section 7);
- A predictive model of Aboriginal object type and location relevant to the proposal area (Section 7);
- The cultural and archaeological sensitivity of the landforms subject to proposed impacts (Section 7);
- A review of Non-Indigenous history of the proposal area and the results of relevant heritage database searches (Section 8);
- The field survey results (Section 9);
- The significance of Aboriginal objects and Non-Indigenous items (Section 11);
- An assessment of the impact of the proposal on Aboriginal objects and Non-Indigenous items (Section 12);
- A description and justification of the proposed management and mitigation strategies (Section 12); and
- A series of recommendations based on the results of the investigation (Sections 12 and 13).

This project has been managed by Julie Dibden. The field work component of this project has been conducted by NSW Archaeology Pty Ltd and members of Yukembruk Merung Ngarigo Consultancy Pty Ltd and Eden Local Aboriginal Land Council. This report has been written by Julie Dibden and Rebecca Parkes.

3. PARTNERSHIP WITH THE ABORIGINAL COMMUNITY

The NSW Department of Conservation and Climate Change (NSW DECC) manages Aboriginal cultural heritage in NSW in accordance with the National Parks and Wildlife Act 1974. Part 6 of the Act provides protection for Aboriginal objects and Aboriginal Places. When an activity is likely to impact Aboriginal objects or declared Aboriginal Places approval of the Director-General of the NSW DECC under s90 or s87 of the NPW Act is usually required. The decision as to whether or not issue s90 or s87 *or general approval* is based on the supply to the NSW DECC by a proponent of adequate information in regard to Aboriginal consultation to enable the Director-General to make an informed decision (NSW DEC 2004).

The NSW DECC requires proponents to undertake consultation with the Aboriginal community "…as an integral part of the impact assessment" process (NSW DEC 2004). While it is recognised that under Part 3A, Environmental Planning and Assessment Act, National Parks and Wildlife Act 1974 Part 6 approvals are not required, the consultation process as outlined in the DECC (2004) policy document relating to Aboriginal consultation has nevertheless been implemented for this project.

When administering its approval functions under the NPW Act the NSW DECC requires applicants to have consulted with the Aboriginal community about the Aboriginal cultural heritage values (cultural significance) of Aboriginal objects and places present in the area subject to development (NSW DEC 2004).

The NSW DECC requires consultation with the Aboriginal community because it recognises the following:

- That Aboriginal heritage has a cultural and archaeological significance and that both should be the subject of assessment to inform its decision process;
- That Aboriginal people are the primary determinants of the significance of their heritage;
- That Aboriginal community involvement *should occur early* in the assessment process to ensure that their values and concerns can be taken into account and so that their own decision making structures can function;
- That the information arising from consultation allows consideration of Aboriginal community views about significance and impact and allows for management and mitigation measures to be considered in an informed way (NSW DEC 2004).

The community consultation process as outlined in the IGACC document aims to improve the assessment by providing the Aboriginal community with an opportunity to:

- Influence the design of the assessment of cultural and scientific significance;
- Provide relevant information about cultural significance values of objects/places;
- Contribute to the development of cultural heritage management recommendations; and
- Provide comment on draft assessment reports (NSW DEC 2004).

The role of the Aboriginal Community is outlined by the NSW DECC (2004) as follows:

- The Aboriginal community is the primary determinant of the significance of their heritage;
- The Aboriginal community may participate in the process via comment on the assessment methodology and contribution of cultural knowledge; and
- The Aboriginal Community may comment on cultural significance of potential impacts and/or mitigation measures.

In order to fulfil the consultation requirements as outlined in the IGACC document NSW Archaeology Pty Ltd and the proponent have adopted the following procedure:

1. Notification and Registration of Interests

NSW Archaeology Pty Ltd and the proponent have actively sought to identify stakeholder groups or people wishing to be consulted about the project and have invited them to register their interest.

Following direct consultation with the NSW DECC written notification about the project dated 19th September 2008 has been supplied to the following bodies:

- Ngunnawal Local Aboriginal Land Council;
- Bega Local Aboriginal Land Council;
- Eden Local Aboriginal Land Council;
- Yurwang Gundana Consultancy Cultural Hertiage Services;
- Carl and Tina Brown, Queanbeyan Ngunawal Organisation;
- Ngunnawal Heritage Aboriginal Corporation;
- Ngunawal Elders Corporation;
- Konanggo Consultancy.

Further written notification dated 9th January has been supplied to the following bodies:

- Native Title Services; and
- Bombala and Cooma Monaro Shire Councils.

The Registrar of Aboriginal Owners was not notified of the project given that the proposal area is not situated within a National Park which possesses a register of Aboriginal owners.

Advertisements have been placed in the following papers:

- Cooma Monaro Express (& Summit Sun);
- Monaro Post; and
- Bombala Times.

A proposed methodology and Invitation to Tender Provision of Aboriginal Assessment and Advisory Services dated 9th January 2009 was sent to the following groups who had expressed an interest in the project:

- Eden Local Aboriginal Land Council;
- Yurwang Gundana Consultancy Cultural Hertiage Services;
- Ngunnawal Heritage Aboriginal Corporation;
- Konanggo Consultancy;
- Yukembruk Merung Ngarigo Consultancy Pty Ltd;
- Buru Ngunawal Aboriginal Corporation.

The proposal area is situated within both the Bega Local Aboriginal Land Council and Eden Local Aboriginal Land Council boundaries. In accordance with Part C of the NSW DECC Interim Guidelines for Aboriginal Community Consultation - Requirements for Applicants, given the scale and nature of the project, the proponent engaged the services of the Eden Aboriginal Land Council and Yukembruk Merung Ngarigo Consultancy Pty Ltd to assist in fieldwork component of the project. Two representatives from each organisation conducted the field survey on each day. Draft copies of this report have been made available to all stakeholders who have registered an interest in the project. A written response to this report has been received from ELALC and is attached as Appendix 4.

4. DESCRIPTION OF IMPACT

The information contained in this section of the report is provided in accordance with the NSW NPWS (1997) guidelines for archaeological survey reporting. A full description of the proposal and its potential impact on the landscape and heritage resource is described below. This information includes a summary of the impact history of the study area. These prior and existing land uses have caused significant changes to geomorphological processes in the area, with an associated effect on the archaeological resource.

The proposed wind farm is to have an installed capacity of between 254 to 360 MW depending on the model of the turbine selected. The output of the wind farm will connect, via a new 132,000 volt double-circuit overhead transmission line, to existing Country Energy owned lines situated to the east of the wind farm site. This new line and associated switchgear will be assessed separately from the wind farm and will be subject to a separate approval. Operation of the wind farm is to be carried out by a combination of remote computer control and local operations and maintenance staff.

This project description is based on the current wind farm design concept (Figure 2). It is noted that some minor changes to the layout have been made since the field survey has been undertaken. These are summarized as follows:

1. A reduction in turbine numbers from 127/109 to 125/107;
2. Two turbines have been removed from west of Avon Lake road (western side of the site);
3. Amendments to the location of three turbines in the Springfield Cluster, north west of the Rockybah dwelling;
4. Amendments to the Boco Cluster.

It is noted that the revised locations of turbines as set out above, have not been subject to additional assessment at this stage; given the generally low archaeological sensitivity of the plateau landforms in which these changes are situated, additional survey at this planning stage was not considered to be warranted. Nevertheless, in accordance with the recommendations made in Section 13, the revised turbines locations (and any associated infrastructure changes) will be addressed prior to construction, within the Cultural Heritage Management Protocol process.

4.1 Impact justification

In Australia wind farms have become viable propositions because of renewable energy policies of the Federal and State Governments requiring electricity retailers to source a certain percentage of electricity from renewable sources. Renewable energy targets have been established in legislation to assist the development of this new industry in Australia, and to reduce greenhouse gas emissions from power generation. By doing so, these renewable targets (and wind farms) would provide a base for cheaper and cleaner power into the future.

In Australia, the cost of wind energy is more than the cost of coal-fired electricity at the wholesale level. In the past, wind farms have become economically viable as a result of the introduction of the Federal Government's Mandatory Renewable Energy Target (MRET). The MRET has required electricity retail companies to purchase a percentage of their power from renewable energy sources.

The Federal Government has recently announced its commitment to expand the renewable energy target to 20 per cent by 2020. This would require in the order of 45,000GWh of new renewable energy generators to be built across Australia by 2020. To deliver on this commitment, the Government is working in cooperation with the states and territories through the Council of Australian Governments (COAG) to implement an expanded national Renewable Energy Target (RET) that will bring the MRET and existing and proposed state and territory targets into a single national RET scheme.

The NSW State Government introduced new legislation to parliament in 2007 called the Renewable Energy (NSW) Bill as part of the Government's Greenhouse Policy to encourage additional generation of renewable energy. The NSW renewable target is referred to as NRET and requires 10 per cent of electricity to be sourced from renewable energy by 2010 and 15 per cent by 2020. Once operational, the NSW RET scheme will be absorbed into the National RET scheme.

The output of the Boco Rock Wind Farm will be directed to primarily supply the population to the north of Cooma, however depending on the final configuration adopted by Country Energy, supplies will also flow to the local area and to the substations at Bega and Bombala.

The Boco Rock Wind Farm will offer the following benefits to the environment and local community:

- This project will directly inject funds into the local economy (both during construction and during the operational phase);
- The project will provide an opportunity for regional investment in the Nimmitabel area as the renewable energy sector and the businesses that supply and service it, grow;
- The wind farm will provide electricity into the NSW grid that would assist in meeting ongoing load growth in NSW;
- The project will reduce greenhouse gas emissions, helping to reduce the impact of climate change; and
- The project will supply renewable energy that would assist NSW electricity retailers fulfill their obligations under the Federal and State renewable energy targets.

4.2 Impact History

The proposed impacts relating to the Boco Rock Wind Farm are situated on farm land. The impact history of the area is therefore related to previous and current farming activities including grazing and cultivation. Given that the most common Aboriginal objects expected to be present within the proposal area are stone artefacts located in or on ground surfaces, the following review is focused on describing the impact to soils and soil profiles which has resulted from agriculture practice.

The local area has been utilised for stock grazing since the early 1830s. The majority of the proposal area is situated on treeless plains comprised of grassland however the eastern sections of the Yandra and Boco clusters contain some remnant woodland. The effects of grazing across the proposal area have included vegetation loss and subsequent erosion primarily by wind, and soil compaction due to stock treadage. In addition to grazing, much of the proposal area has been cultivated for pasture improvement and annual fodder production.

Land clearance and subsequent erosional processes are likely to have resulted in varying levels of prior impacts to Aboriginal objects. Trees hosting evidence of cultural scarring will have been completely destroyed while Aboriginal objects located in or on the ground will have been disturbed and/or moved, resulting in loss of their original depositional context (both spatially and vertically).

4.3 Proposed Impacts

The proposed Boco Rock Wind Farm consists of the installation of up to 125 wind turbines, an onsite underground electrical cable network, one collector substation comprising cable marshalling, switchgear and transformer, access tracks, crane hardstand areas, up to four wind monitoring masts, site operations facilities, concrete batch plants, internal electrical interconnection lines between each of the turbine clusters and appropriate site signs. A description of the individual components and their related impacts are outlined as follows:

Turbines

The turbines proposed could vary from between 1.5 MW and 3.3 MW, depending on the turbine selection; the Suzlon S88, 2.1 MW machine (as installed at the Capital Wind Farm, east of Lake George, NSW) is typical of the type of wind turbine that would be installed. Alternative turbines would be very similar in appearance, size and all major characteristics.

The turbines are three-bladed, semi-variable speed, pitch regulated machines, with the rotor and nacelle mounted on a reducing cylindrical steel tower. The largest turbines under consideration will rise up to 135 m from the ground to the tip of the blade, with typical tower heights of between 80 and 85 m, and rotor diameters between 77 and 104 m in length.

Two types of foundations for the turbines will be considered depending on the ground conditions at the site. Slab foundations would involve the excavation of approximately 450m^3 of ground material (of which 200m^3 would be used as back fill around the turbine bases) to a depth of approximately 2m. If slab plus rock anchor foundations are required, the construction of the foundation for each machine would involve the excavation of approximately 300m^3 of ground material to a depth of approximately 2m. Alternatively, if a mono-pile turbine foundation is required, approximately 50m^3 (of which 30m^3 would be used as back fill) of ground material would be removed by a rock drill to a depth of approximately 10 m.

A slab foundation would involve installation of shuttering and steel reinforcement, followed by the pouring of concrete. Slab plus rock anchor foundations require shuttering and steel reinforcement, drilling of rock anchor piles up to a depth of approximately 20m, concrete pour, after which the rock anchors are stressed and secured once the concrete has cured sufficiently. If a mono-pile foundation is used, a tubular section with tower connection flange attached is inserted in the hole and concrete is then poured *in situ*.

Site access tracks would have areas of hardstand (measuring approximately 45 m by 45 m) adjacent to each wind turbine for use by cranes during construction. An overall area of impact associated with turbine installation and hardstand area can be considered to measure approximately 50 x 50 m.

Wind Monitoring Masts

Four permanent wind monitoring masts will be installed on-site each of which will measure up to 80 m in height. The purpose of the monitoring masts is to provide necessary information for the performance monitoring of the wind turbines. The wind monitoring masts would be of a guyed, narrow lattice or tubular steel design.

Access Roads

On-site tracks between turbines are proposed. The on-site access track system where possible, will follow existing farm tracks that traverse the ridgelines and plateaus. All tracks leading from main and secondary roads and all on-site access tracks are likely to require a full upgrade to accommodate the construction traffic loads, as well as for maintenance purposes during operation. Some new tracks are proposed for areas in which none now exists.

Access tracks will measure at least 12 m wide (and up to 14 m wide on corners) and will be surfaced with compactable, engineered base material.

Site Electrical System

The electrical works, other than those incorporated in the wind turbine structures, will include underground cables, an overhead transmission line, switchgear, earthing systems and a substation. The electrical works for the wind farm will involve:

- approximately 70 km of 33,000 volt underground cables;
- approximately 8 km of 33,000 volt overhead transmission lines;
- a 33,000 to 132,000 volt substation including a main transformer with rating of about 250 to 360 MVA;
- 33,000 volt switchgear; and
- control and communications equipment to be located in the facilities building.

The output from each of the turbines will be directed to 33,000 volt underground cables that link to the 33,000/132,000 volt substation.

Underground cabling will be installed between the turbines. Markers may be placed along the route of the underground cables. Cable installation would involve the cutting or excavation of trenches measuring 0.45 m wide by 1.2 m deep. The majority of the underground cabling will be located adjacent to the access tracks.

Control cables will interconnect the wind turbine generators and the facilities building. Computerised controls within each wind turbine will automatically control start-up, speed of rotation and cut-out at high wind speeds. Recording systems will monitor wind conditions and energy output at each of the turbines. Remote monitoring and control of the wind farm will also be possible. Control cables will consist of optic fibre, twisted pair or multicore cable and will be located underground within the groups of turbines and either underground or above ground between the Yandra, Springfield and Boco clusters and the facilities building within the Sherwins group. Above ground control cables, if used, would be strung from the poles of the internal 33,000 volt overhead line located between the clusters.

The installation of buried earthing conductors and electrodes will also be required in the vicinity of the turbines, the facilities building and the substation.

Facilities Building

A facilities building measuring approximately 30 m by 6 m is proposed. The building will house instrumentation, electrical and communications equipment, routine maintenance stores, a small work area and staff amenities. The structure is proposed to be a slab on ground construction with steel frame, metal or brick walls and a sheet steel roof.

Substation

The substation will involve a transformer, nominally of between 250 and 360 MVA capacity, to step-up the voltage from 33,000 to 132,000 volts, together with ancillary equipment. It will occupy an area approximately 100 m by 100 m and will be surrounded by a two m high security fence, surmounted by four strands of barbed wire. A buried earth grid will extend one metre beyond the fence on all sides. The ground surface within the substation enclosure will be covered partly with a 120 millimetre layer of crushed rock and partly by concrete slabs.

Detailed design and development works

Once approvals have been obtained and tenders for the design and construction have been awarded the project design will be finalized. This stage takes account of updated wind resource monitoring, revised energy modelling and the latest equipment and technology that is potentially available to the proponent at that stage.

Project environmental commitments, including undertakings arising from the impact assessment, consent conditions and any licensing conditions will be compiled and used to prepare the Project Environmental Management Plans (EMPs) as outlined in the Draft Statement of Commitments. The Project EMPs would also be incorporated into the Contract Specifications for the required construction works and equipment supply to ensure compliance and achieve the project's environmental objectives.

Prior to the main construction commencing, a number of enabling works and further site planning would be undertaken by the selected Contractor, including:

- Detailed site investigation including geotechnical investigations involving a series of trial pits and/or boreholes;
- Upgrading the surfaces of local roads and access tracks where required;
- Widening the junctions or corners of local roads, entrance/access points where required;
- Widening the existing gateways, or inserting new gateways as necessary along fencelines;
- Stripping and careful storage of existing soil from the areas which would be affected by construction activities, including the tower bases, switchgear/substation yards, access track areas, crane hardstand areas and temporary laydown/carpark areas;
- The construction of a secure works facility, with project owner and subcontractors field offices (portables), carpark, laydown yard and toilet facilities (temporary);
- Erection of signage on roads;
- Enabling works for the locating of a mobile concrete batching plant (temporary, if required);
- Enabling works for the locating of a rock crushing plant (temporary, if required);
- Environmental survey and refinement (if necessary) of the Environmental Management Plan in line with the Draft Statement of Commitments, Health and Safety Plan, Traffic Management Plan and any other documentation as required under the planning authorisation;
- Survey of critical boundaries and pegging of infrastructure locations;
- Additional cultural heritage and flora/fauna surveys across the site (if required); and
- Preparation of works procedures and Project Implementation Plan.

4.4 Potential Impacts

Table 1 presents the calculated area of the site proposed to be impacted by the project based on the proposed turbine layout. Some of these impacts would be for the duration of the wind farm operation and some are temporary impacts during the construction phase. In total approximately 157 hectares would suffer disturbance as a result of the project.

Project Component	**Approximate Dimensions**
Permanent facilities	
Turbine footings	15 x 15 m (ea.)
Turbine assembly / crane hardstand areas	45 x 45 m (ea.)
Substation	100 x 100 m
Facilities building	30 x 6 m
Site access: new roads	70 km x 12 m
Site access: upgrade of existing internal roads/tracks	9 km x 6 m
Underground cabling on-site	64 km x 1m
Under or above ground cabling on-site	4 km x 30m
Internal overhead electrical interconnection / easement	14 km x 30 m
Temporary construction facilities	
Concrete batch plant (2)	50 x 100 m (ea.)
Rock crushing facility	50 x 60 m
Site office	40 x 100 m
Construction compound (1)	150 x 200 m

Table 1. Individual components of the proposal and their impact area.

Impacts will be located on land currently utilised for sheep and cattle grazing and cultivation. Previous land uses in the region have resulted in relatively significant environmental impacts and a generally highly degraded landscape. European activated geomorphological processes and other actions will have caused significant prior impacts to Aboriginal objects within the region.

However irrespective of prior impacts the proposed works entail ground disturbance and accordingly the project has the potential to cause additional impacts to any Aboriginal objects or historical items which may be present within the individual components of the proposal. Impact areas can be considered as being small and discrete in area.

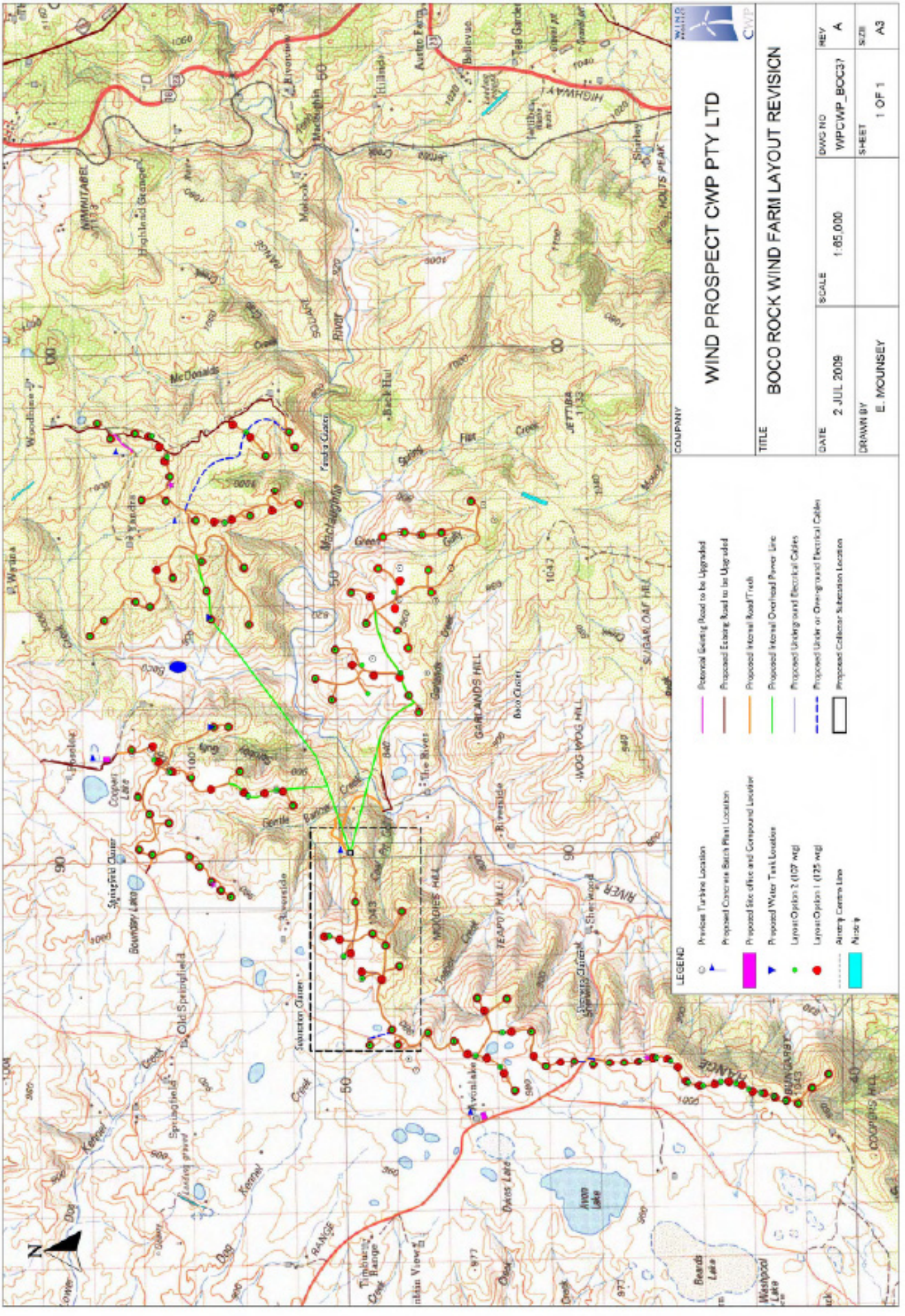

Figure 2. Proposed development layout (supplied by client).

5. STUDY METHODOLOGY

This archaeological and cultural heritage study has included the following components:

- A NSW DECC Aboriginal Heritage Information Management System site search to determine whether or not previously recorded Aboriginal objects are present in the proposal area and to give consideration to the type of sites known to be present within the local area.
- A review of Non-Indigenous heritage registers to determine whether or not historic items present in the proposal area are listed.
- A review of local and regional archaeological reports and other relevant documents in order to provide a contextual framework to the study and heritage management process.
- An historical overview of the region and local area.
- A review of impacts relating to the construction of the Boco Rock Wind Farm aimed at determining the potential nature and extent of impacts to any potential Aboriginal objects which may be present.
- A comprehensive field survey of the proposal area aimed at locating Aboriginal objects and cultural values, Non-Indigenous items, recording survey coverage data and assessing the archaeological potential of the landforms present.
- Documentation of survey results.
- A discussion of survey results.
- A site significance assessment.
- The formulation of management and mitigation strategies ensuing from the above.

5.1 Literature Review

Background research has been conducted to determine if known Aboriginal objects and Non-Indigenous items are located in the proposal area and to assist in the construction of a relevant model of site type and location.

The following information sources were accessed for this study:

- NSW DECC Aboriginal Heritage Information Management System;
- Relevant archaeological reports held in the NSW DECC Cultural Heritage Unit;
- Historical sources and databases;
- Relevant topographic maps;
- Parish maps; and
- GIS data relating to proposed impacts.

5.2 Field Survey and Methodology

The field survey entailed a comprehensive pedestrian survey and was undertaken by six people on each day. Survey coverage is described in Section 9 of this report.

The field survey was aimed at locating Aboriginal objects and Non-Indigenous heritage items. An assessment was also made of prior land disturbance, survey coverage variables (ground exposure and archaeological visibility) and the potential archaeological sensitivity of the land.

Field survey was designed to assess the archaeological sensitivity of the entire proposal area. The survey methodology entailed walking parallel transects across individual Survey Units with each surveyor situated ca. 10 – 20 m apart. Each Survey Unit was surveyed until the entire area had been systematically inspected. This methodology enabled direct visual inspection of as much of the ground surface of the proposal area as practicable.

The approach to recording in the current study has been a 'nonsite' methodology: the elementary unit recorded is an artefact rather than a site (*cf* Dunnell 1993; Shott 1995). The rationale behind this approach is that artefacts may be directly observed however 'sites' are a construction within

an interpretative process. Given that it can be expected that full archaeological visibility will not be encountered during the survey the process of identifying site boundaries (if they exist at all) will not be possible.

The density and nature of the artefact distribution will vary across the landscape in accordance with a number of behavioural factors which resulted in artefact discard. While cultural factors will have informed the nature of land use, and the resultant artefact discard, environmental variables are those which can be utilised archaeologically in order to analyse the variability in artefact density and nature across the landscape. Accordingly in this study while the artefact is the elementary unit recorded it is the Survey Unit which is utilised as a framework of recording, analysis, and management (*cf* Wandsnider and Camilli 1992). The study area has been divided into 41 Survey Units each of which have been defined according to broad landform morphological types.

The field recording and mapping has been conducted using a mobile GIS system. The location of Indigenous and Non-Indigenous locales and Survey Units has been made using ArcGIS software and a Trimble GPS. In order to ensure consistency in data collection all field records were made in Microsoft Access databases formulated specifically for the Boco Rock Wind Farm project. Three separate forms were used for recording Survey Unit data, Aboriginal Object data and Historical features data. The data collected forms the basis for the documentation of survey results outlined in Section 9. The variables recorded are defined below:

Survey Unit Variables

Landscape variables utilised are conventional categories taken from the *Australian Soil and Land Survey Field Handbook* (McDonald *et. al* 1998). The following landform variables were recorded:

Morphological type:
- Crest: - element that stands above all or almost all points in the adjacent terrain – smoothly convex upwards in downslope profile. The margin is at the limit of observed curvature.
- Simple slope: - element adjacent below crest or flat and adjacent above a flat or depression.
- Flat: - planar element, neither crest or depression and is level or very gently inclined.

Slope class and value:
- Level 0 - 1%.
- Very gentle 1 - 3%.
- Gentle 3 – 10%.
- Moderate 10 – 32%.
- Steep 32 – 56%.

Geology
The type of geology has been recorded and as well the abundance of rock outcrop – *as defined below*. The level of visual interference from background quartz shatter was noted.
- No rock outcrop - no bedrock exposed.
- Very slightly rocky - <2% bedrock exposed.
- Slightly rocky - 2-10% bedrock exposed.
- Rocky - 10-20 % bedrock exposed.
- Very rocky - 20-50% bedrock exposed.
- Rockland - >50% bedrock exposed.

Soil
Soil type and depth was recorded. The potential for soil to contain subsurface archaeological deposit (based on depth) was recorded. This observation is based solely on the potential for soil to contain artefacts; it does not imply that artefacts will be present or absent.

Geomorphological processes
The following gradational categories were recorded:

- eroded
- eroded or aggraded
- aggraded

Geomorphological agents
The following geomorphological agents were recorded:
- precipitation: *creep; landslide; sheet flow*
- wind
- biological: *human; nonhuman*

Survey coverage variables were also recorded; these are described further below in Section 5.3. The archaeological sensitivity of each Survey Unit was defined according to assessed artefact density as negligible, very low, low, low/moderate or moderate. The proposed impacts are also noted for each Survey Unit.

Aboriginal Object Recording

The proposal area was found to contain generally discrete distributions of stone artefacts despite usually continuous exposure. For the purposes of defining the artefact distribution in space it has been labeled as a locale (eg. Survey Unit 1/Locale 1). GPS referenced locational information was captured as WGS84 readings and transformed to GDA coordinates.

The measurable area in which artefacts were observed has been noted and if relevant, a broader area encompassing both visible and predicted subsurface artefacts has been defined. In addition locale specific assessments of survey coverage variables have been made. The prior disturbance to the locale has been noted as low, moderate or high. Artefact numbers in each locale have been recorded and a prediction of artefact density noted, based on observed density taking into consideration Effective Survey Coverage, and a consideration of the environmental context.

Artefact density has been defined in arbitrary categories (based on a consideration of artefact density calculated in detailed subsurface work conducted elsewhere) as follows;

- Negligible: insignificant
- Very low: <1 artefact per square metre;
- Low: between 1 and 10 artefacts per square metre;
- Low/moderate: between 11 and 30 artefacts per square metre;
- Moderate: between 31 and 50 artefacts per square metre.

The potential for soil to contain subsurface archaeological deposit (based on depth) was recorded. Similarly to Survey Unit recordings this observation is based solely on the potential for soil to contain artefacts; it does not imply that subsurface artefacts will be present or absent, nor does it refer to a prediction of artefact density.

5.3 Survey Coverage Variables

Survey Coverage Variables are a measure of ground surveyed during the study and the type of archaeological visibility present within that surveyed area. Survey coverage variables provide a measure with which to assess the effectiveness of the survey so as to provide an informed basis for the formulation of management strategies.

Specifically, an analysis of survey coverage is necessary in order to determine whether or not the opportunity to observe stone artefacts in or on the ground was achieved during the survey. In the event that it is determined that ground exposures provided a minimal opportunity to record stone artefacts it may be necessary to undertake archaeological test excavation for determining whether or not stone artefacts are present. Conversely, if ground exposures encountered provided an ideal opportunity to record the presence of stone artefacts, the survey results may be considered to be adequate and accordingly no further archaeological work may be required.

The survey coverage data includes an estimate of the area surveyed within a Survey Unit, that is, the area subject to actual inspection; the surveyed area is always less than the Survey Unit in area given that not all parts of a Survey Unit are visually examined.

Two variables were used to measure ground surface visibility during the study; the area of ground exposure encountered and the quality and type of ground visibility (archaeological visibility) within those exposures. The survey coverage variables estimated during the survey are defined as follows:

Ground Exposure – an estimate of the total area inspected which contained exposures of bare ground; and

Archaeology Visibility – an estimate of the average levels of potential archaeological surface visibility within those exposures of bare ground. Archaeological visibility is generally less than ground exposure as it is dependent on adequate breaching of the bare ground surface which provides a view of the subsurface soil context. Based on subsurface test excavation results conducted in a range of different soil types across the New South Wales southeast it is understood that artefacts are primarily situated within 10 - 30 cm of the ground profile; reasonable archaeological visibility therefore requires breaching of the ground surface to at least a depth of 10 cm (see Dibden 2005a; 2005b, and 2005c).

Based on the two visibility variables as defined above, an estimate (Net Effective Exposure) of the archaeological potential of exposure area within a Survey Unit has been calculated. The Effective Survey Coverage (ESC) calculation is a percentage estimate of the proportion of the Survey Unit which provided the potential to view archaeological material.

6. LANDSCAPE CONTEXT

A consideration of the landscape is necessary in archaeological work in order to characterise and predict the nature of Aboriginal occupation across the land (NSW NPWS 1997). In Aboriginal society landscape could be both the embodiment of Ancestral Beings and the basis of a social geography and economic and technological endeavour. The various features and elements of the landscape are/were physical places that are known and understood within the context of social and cultural practice.

Given that the natural resources that Aboriginal people harvested and utilised were not evenly distributed across landscapes Aboriginal occupation and the archaeological manifestations of that occupation will not be uniform across space. Therefore, the examination of the environmental context of a study area is valuable for predicting the type and nature of archaeological sites which might be expected to occur. Factors which typically inform the archaeological potential of a landform include the presence or absence of water, animal and plant foods, stone and other resources, the nature of the terrain and the cultural meaning associated with a place.

Additionally, geomorphological and humanly activated processes need to be defined as these will influence the degree to which archaeological sites may be visible and/or conserved. Land which is heavily grassed will prevent the detection of archaeological material while land which has suffered disturbance may no longer retain artefacts or stratified deposits. A consideration of such factors is necessary in formulating site significance and mitigation and management recommendations.

The following sections provide information in regard to the landscape context of the study area.

6.1 Topography, geology and vegetation

The proposed Boco Rock Wind Farm is located west and southwest of Nimmitabel (Figures 1 and 2). The area is a rural landscape and is predominantly utilised for sheep and cattle grazing. It is situated on the Monaro in New South Wales and is part of the Eastern Uplands of southeastern Australia (Jennings and Mabbutt 1977). The Eastern Uplands consists of a wide plateau which extends from the coastal escarpment on the east, to the slopes of its western side. The landscape has low relative relief, lies generally below 600m altitude and slopes generally less that 5º with about 20% of the area containing steeper hills and ranges.

The Monaro is an area of high tablelands and mountains; it is bounded on the north by the Namadgi ranges, on the west by the alpine watershed, the east by the Kybeyan and Gourock escarpment and the south by the Victorian border (Flood 1980). Four distinct natural environments have been defined by Costin (1954) for the Monaro; the alpine, sub-alpine, montane and tableland. The proposal area is situated within the latter. The tableland is generally located at elevations between 610 - 915m (Flood 1980).

The area has a strongly seasonal thermal climate (Jennings and Mabbutt 1977). Nimmitabel experiences a range of temperature; the mean temperature of the coldest month is 2.8 (C), while the mean temperature of the warmest month is 15.8 (C). Average rainfall annual is 688mm (Flood 1980). Flood (1980) draws attention to the phenomena of cold air drainage, frost and wind as affecting human occupation in the region. High winds and frost occur frequently; Flood (1980) argues that in particular the combination of cold temperature with wet winds was probably more significant in regard to human occupation than cold in itself. Given the location of the majority of the proposed impact area on a treeless plateau, being exposed to cold, wet wind, it is unlikely to have been favoured country for Aboriginal occupation.

The proposal area is primarily situated on Tertiary basalt which extends for over 100 kilometres from Cooma, south to Bombala (Branagan and Packham 2000). The basalt overlies Ordovician shale which is exposed in limited areas of the proposal area, notably at Scrubby Gully Creek and in small areas immediately north of the McLaughlin River in the vicinity of Boco homestead. Where shale is exposed milky quartz veins are present.

Basalt cobbles and low outcrops occur extensively across the proposal area. The rocky nature of much of the turbine ridge lines is likely to have made these landforms unfavourable camp locations for Aboriginal people. Soils within the proposal area are highly eroded. This has significant ramifications in regard to the stability and integrity or otherwise, of artefact bearing soil formations in the proposal area both on crests and within valleys.

The majority of the proposal area is situated on treeless grassland. Natural Temperate Grassland (NTG) and Snow Gum Woodland (SGW) are the dominant vegetation types on site. The NTG is characterised by dense to open tussock grasses including the genera *Austrodanthonia, Austrostipa*, *Bothriochloa*, *Poa* and *Themeda;* Poa species are dominant. SGW is dominated by *Eucalyptus pauciflora* on site and occurs on the slopes leading from the ridges to the valley floors. Flood (1980) indicates that treeless plains are not favourable habitats for either hunter-gatherers or for most game.

Summary

The proposal area is located predominantly of a treeless plateau and accordingly possesses low biodiversity values. Potable water is generally absent from the plateau and is only available in major rivers such as the Maclaughlin which flows though the wider development area. The area experiences cold temperatures and strong winds. In an Aboriginal landuse context the area is likely to have been utilised by Aboriginal people for a limited range of activities which may have included hunting and gathering and travel through country. Such activities are likely to have resulted in low levels of artefact discard. The nature of stone artefacts discarded can be expected to have been correspondingly limited in terms of artefact diversity and complexity.

Elevated landforms located adjacent to the Maclaughlin River are likely to have been utilised by Aboriginal people for camping while they occupied the local area. These areas would have provided more sheltered contexts and ready access to drinking water. Artefact discard is likely to have been greater in such areas reflecting more frequent and/or sustained occupation. It is possible that artefact diversity may also be greater in such areas.

7. ARCHAEOLOGICAL CONTEXT - INDIGENOUS

7.1 Social geography

On the basis of archaeological research it is known that Aboriginal people have occupied Australia for at least 40,000 years and possibly as long as 60,000 years (Mulvaney and Kamminga 1999: 2). By 35,000 years before present (BP) all major environmental zones in Australia, including periglacial environments of Tasmania, were occupied (Mulvaney and Kamminga 1999:114).

At the time of early occupation Australia experienced moderate temperatures. However, between 25,000 and 12,000 years BP (a period called the Last Glacial Maximum) dry and either intensely hot or cold temperatures prevailed over the continent (Mulvaney and Kamminga 1999: 114). At this time the mean monthly temperatures on land were 6 - 10ºC lower; in southern Australia coldness, drought and winds acted to change the vegetation structure from forests to grass and shrublands (Mulvaney and Kamminga 1999: 115-116).

During the Last Glacial Maximum at about 24 - 22,000 years ago, sea levels fell to about 130 m below present levels and accordingly, the continent was correspondingly larger. With the cessation of glacial conditions, temperatures rose with a concomitant rise in sea levels. By ca. 6000 BP sea levels had more or less stabilised to their current position. With the changes in climate during the Holocene Aboriginal occupants had to deal not only with reduced landmass, but changing hydrological systems and vegetation; forests again inhabited the grass and shrublands of the Late Glacial Maximum. As Mulvaney and Kamminga (1999: 120) have remarked:

> *When humans arrived on Sahul's shores and dispersed across the continent, they faced a continual series of environmental challenges that persisted throughout the Pleistocene. The adaptability and endurance in colonising Sahul is one of humankinds' inspiring epics.*

Human occupation of south east NSW dates from at least 20,000 years ago as evidenced by dated sites including the Burrill Lake rock shelter (Lampert 1971), Cloggs Cave (Flood 1980) and New Guinea 2 (Ossa *et. al* 1995). The Bulee Brook 2 and Bobs Cave sites in the south coast hinterland ranges, excavated by Boot (1994; 1996), provides evidence that occupation of this zone had occurred by at least 18,000 years ago.

Aborigines have lived in the Cooma-Monaro district and its environs for at least 21,000 years (Flood *et. al* 1987). In the south-eastern highlands the Birrigai rock-shelter has provided dates of occupation from 21,000±200 years BP (Flood *et. al* 1987: 16). During the Pleistocene the environment of the region would have been cold steppe grassland with vegetated shrubs and scattered groups of Eucalypts located in protected positions (Mulvaney and Kamminga 1999). Between 23,000 and 15,000 years ago harsh conditions prevailed and the mountain peaks were glaciated above 1900 metres; periglacial conditions were present to at least 1000 metres above sea level. The alpine zone was a cold desert with scattered fields of perennial *Plantago* herb fields which may have provided some bulbs and tubers for human consumption (Mulvaney and Kamminga 1999). Over time, the Aboriginal people experienced and adapted to steady and considerable changes in conditions associated with gradual climatic warming, including the alteration of vegetation and variation in the distribution of wildlife (Young 2000).

At the time of European contact the major part of what is now called the Monaro was inhabited by at least 500 Ngarigo speaking Aborigines (Helms 1895: 388). According to Tindale (1974) the Ngarigo speakers occupied land which included the Nimmitabel region. This group exploited the resources of the riverine, grassland and open forests of the region, including those located in the environs of the study area. Their choice of camp-site was influenced by several factors, and from archaeological evidence Flood (1980: 158) indicates that in this region camp-sites will be typically

found within one kilometre of reliable water sources, most usually within 100 metres from water, though never at the waters edge.

The Ngarigo people maintained social relationships with neighbouring groups including Ngunnawal, Djilamatang, Jamathang and coastal groups including the Yuin (Howitt 1904). Some information is recorded about the nature of Aboriginal occupation of the region during the early period of European occupation. The literature which does exist has presented a biased view of Aboriginal life within the mountains which is focused particularly on Bogong Moth exploitation. Indeed, the ethnohistoric literature has implied to some readers that seasonal exploitation of the moth was the major reason for Aboriginal usage of the Alpine region (Flood 1980).

Flood (1973, 1980) was heavily influenced by the extant ethnohistoric literature which focused on moth exploitation in her seminal study of the region. She constructed a hypothesis of seasonal usage of the highlands based on the exploitation of the moth. The moth, she argued, was important as an economic food source and its exploitation may have been causal as the impetus for the initial usage of the highlands. Flood (1980) suggested that the Ngarigo people occupied low altitude valleys (< than 600 m) in winter, moving into higher areas in summer primarily for the purpose of exploiting the Bogong Moth. She argued that the occupation pattern which resulted from the exploitation of moths is one in which a series of camps extended from the lowest valleys below 300 m up to the alpine treeline zone at 1830 m.

A contrary viewpoint to Flood's (1980) model has been provided by Chapman (1977) who argued that there was no evidence which pointed to the moth as being a staple food source; Chapman argued that the importance of the moth as a food resource has been over emphasized by early commentators. She argued that in addition to the lack of evidence that the moth was a reliable food source, moths lack the nutritional value to act as a staple and that the moth, in any case was primarily consumed by men. Chapman (1977) instead argued that the significance of moth exploitation was that it fostered social cohesion within the region. Likewise, Kamminga *et. al* (1989) have argued that the large inter tribal gatherings which were associated with moth exploitation acted to mediate and foster political and social linkages between the different language and tribal groups which came together during these occasions.

Researchers such as Bowdler (1981), Cooke (1988), Gott (1982) and Kamminga *et. al* (1989) have drawn attention to a variety of vegetable products available locally which are likely to have been utilized as food resources. Bowdler (1981) has argued that the importance of the moth was more ideological than economic and that the yam daisy would have provided a more reliable food source.

A model of seasonal usage of the high country nevertheless continues to have currency within the literature. The seasonal migration to higher altitudes in summer months is accepted (*cf* Navin 1991). During winter small groups of Aboriginal people would have occupied the lower montane valleys and the adjacent tablelands (Mulvaney and Kamminga 1999: 298). The region would have opened up considerably however, in summer. It was during this time that people from other areas gathered to perform inter-tribal ceremonies (Mulvaney and Kamminga 1999: 299). Although ceremonial activities are not known to have taken place in the study area, nevertheless these affiliated groups moved through various corridors in order to congregate in the Alps, and while making their way through country they may have traversed the region where the survey area is situated (*cf* Howitt 1904; Payten 1949; Flood 1980).

Using historical records as well as considerations of access and thoroughfare, Blay (2005) has explored the old Aboriginal pathways, campsites, moth-hunting localities and gathering places in the New South Wales south-east. In so doing, some reconstructed travelling routes are indicated to have passed through the region where the study area is situated. Blay (2005) identifies the 'WerriBerri Pass' path way as extending from near present-day Bega to Nimmitabel. The 'Wadbilliga' path is defined as crossing from the Yowrie region to the high country along a ridge north of the present Razorback fire trail. This route is indicated to have been the favoured way

from this coastal area to the Upper Tuross and Kybeyan region, but used little to travel further inland. A less annotated trail is mapped as passing on the eastern side of the Upper Tuross headwaters, extending from the Boggy Plains locale and eventually linking with the Brogo district. These various proposed routes support the existing understanding that movement between the coastal regions and the high country in which the study area is located was fluid.

White settlers began to move into the Monaro region during the early 1800s. European settlement ultimately resulted in the alienation of Aboriginal people from their traditional lands and changes in regard to cultural and economic relationships with country. In the local area Aboriginal people worked as shepherds and sheep washers on Bibbenluke Station (which encompassed parts of the study area *see Section 8*) in the mid 1800s (Dawson 1996).

7.2 Previously Recorded Sites

A search of the NSW DECC Aboriginal Heritage Management Information System has been conducted for this project on the 15th January 2009 (AHIMS # 24771). The search area measured 306 km² and encompassed eastings 683000 – 701000, and northings 5938000 – 5955000.

There are no previously recorded Aboriginal objects in the proposal area as listed on the AHIMS register. The AHIMS register only includes sites which have been reported to NSW DECC. Accordingly, this search cannot be considered to be an actual or exhaustive inventory of Aboriginal sites situated within the local area. Generally, sites are only recorded during targeted surveys undertaken in either development or research contexts. It can be expected that sites will be present within the local area but that to date they have not been recorded and/or reported to NSW NPWS/DECC.

The most common Aboriginal object recordings in the region are distributions of stone artefacts. Rare site types include rock shelters, scarred trees, quarry and procurement sites, burials, stone arrangements, carved trees and traditional story or other ceremonial places. The distribution of each site type is related at least in part to variance in topography and ground surface geology.

The following discussion in Section 7.3 will present a review of previous archaeological work in the region for the purposes of producing a predictive model of site type and location relevant to the study area.

7.3 Archaeology – The local area

While archaeological studies conducted within the local area have been limited in number, a greater number of studies have been carried out within the broader region. The following discussion includes archaeological work and its results conducted within the wider Monaro area.

On the tablelands around Cooma, Flood (1980) recorded two artefact scatters which she described as being indications of transitory camp sites. One was positioned on a slope beside Cooma Creek, south of Cooma, while the other was recorded on a slope above Rock Flat in association with a quartzite deposit and mineral spring. Flood's (1980: 181) survey on the Monaro Tablelands was 'rather uneven', however she argued that the site distribution patterns were significant. Flood (1980) found that few sites were recorded on the treeless parts of the tablelands and explained this as being due to the unfavourable nature of such an environment. Flood (1980) suggested that the location of sites in the area indicated an intention to exploit local raw material such as quartzite and basalt and could also be '…in the nature of transit camps'.

Djekic (1982) recorded twelve sites while surveying the route for a proposed transmission line between Cooma and Jindabyne. These sites were comprised of six scarred trees, four artefact scatters and two isolated artefact finds.

Lance and Hughes (1983) surveyed an area of ca. six hectares in the northern area of the Cooma township for the proposed site of the Snowy Mountains Hydro-Electric Authority head office.

Visibility was limited and no sites were found. However, Lance, formerly a Cooma resident, noted his previous observation of artefact scatters on slopes one kilometre from Cooma Creek near North Cooma, comprised of quartz and quartzite flakes and flaked pieces.

Paton (1985) recorded fourteen artefact scatters, six isolated finds and one stone quarry while surveying for the proposed Cooma-Royalla 132 kV transmission line north of Cooma. One site extensive site recorded covered an area of 1,000 sq. metres; artefact density is calculated to have been in the order of one artefact per two square metres. Paton (1985) attributed the location and size of these sites to their aspect and proximity to the nearby Numeralla River.

Navin (1990) surveyed a small area south of Cooma on the summit of Mt Gladstone for a proposed communication facility. No sites were found.

In 1991 two burials were found in an alluvial terrace north-east of Bunyan. The skeletal remains were dated to about 6000 years BP and were accompanied by grave goods, including 327 pierced macropod teeth from Eastern Grey, Red Neck and Swamp Wallabies, as well as 450 grams of red ochre (Feary and Pardoe 1992). Stone artefacts, including hammerstones, and bone implements were also found at the site.

Oakley (1994) conducted a survey of four proposed Optus sites in the Cooma area at Mt Gladstone, Nanny Goat Hill, the Cooma Repeater Site and Jinderboine Hill. Good visibility was encountered in all locations, however no sites were found and each area was assessed to be of low potential.

Navin (1994) conducted a survey for a proposed Cooma sewerage augmentation program. This survey included planned pumping stations at Cooma North, Central Cooma, Cooma South and Polo Flats, as well as several kilometres of linking mains and a four hectare area beside Cooma Creek known as 'The Glen'. The survey located three Aboriginal sites adjacent to Cooma Creek, two of which were small low density artefact scatters. The third site located on basal spur slopes on the western side of the ridgeline at 'The Glen', contained '…numerous concentrations of surface artefacts of varying density, surface area and artefact rock type' (Navin 1994:12). These included flakes, cores and flaked pieces of vein and crystal quartz, silcrete, volcanics and chert. Subsequent subsurface testing revealed a similar assemblage of raw materials present in the deposit (English and Gay 1994).

Kuskie, Navin and Officer (1996) surveyed the proposed route of the Eastern Gas Pipeline. On the Monaro section of their study area 101 sites were recorded; several artefact scatters were located in the local area. It was concluded that sites were situated on elevated, relatively level ground adjacent a permanent water source, that larger sites occurred in proximity to major fluvial corridors or in areas where high quality quartz occurred and that sites tended to be situated in elevated contexts away from cold air drainage and tend to be found on north facing slopes.

Saunders (2003) surveyed an area of 4.047 hectares at North Cooma in response to a subdivision proposal, finding an extensive Aboriginal artefact scatter, comprised predominantly of chert and silcrete, in multiple exposures.

Carter (2003) recorded an isolated find while surveying an area of ca. 2.5 hectares for a proposed subdivision of Lot 4 DP 845442, North Cooma. Carter (2003) assessed the study area to be of low potential generally.

The principal study which has been carried out within some proximity to the study area was conducted by NSW NPWS as part of the South East Forest Regional Agreement Committee Project. In the vicinity of the study area two routes were surveyed, one along Tom Groggin Road, to the south-west of the Wadbilliga National Park, and a second along Kybeyan Road, to the west of the study area. Nine Aboriginal sites were recorded on Tom Groggin Road, consisting of six open artefact scatters and three isolated finds, while thirteen sites were recorded along

Kybeyan Road, comprised of eight open artefact scatters and five isolated finds (Heffernan and Boot 2000).

Dearling (2004) conducted a preliminary study of ten selected nature reserves in the Monaro region as part of the preparation of a plan of management by the NPWS. In total, 167 artefacts were recorded in 13 open artefact scatters as well as 2 probable Aboriginal Scarred Trees, within six of the ten nature reserves. Included in this study are the Kybeyan Nature Reserve and the Kybeyan State Conservation area. From the results Dearling (2004) determined that the findings supported an assumption that more complex assemblages are located close to ecological boundaries and that in forested mountainous areas major sites will be found close to permanent water sources on locally elevated well-drained land features.

Dibden (2005d) conducted a survey of a proposed fence at Kybeyan. Seven Aboriginal sites were located, and although the area was generally assessed to have low archaeological potential, some certain locales were assessed to be of moderate archaeological sensitivity.

The studies conducted in closest proximity to the study area were undertaken primarily in association with proposed pine plantations in the Ando area. Stone and Duncan (1999) surveyed 1193 hectares in this area and recorded three Aboriginal scarred trees were recorded on the crest of a hill, with one open artefact scatter recorded within 10 metres of Bennetts Creek.

In a survey covering some 124 hectares Stone (1998) recorded three open artefact scatters on spur crests and ridgelines some 200 metres west of the Undowah River. In addition, one possible Aboriginal scarred tree was noted.

Stone (2000) surveyed an additional 875 hectares in an area near Ando. A total of six open artefact scatters were recorded, three on high ridgelines above a creek, two adjacent to the Undowah River, and one in an elevated area above the river. In all three of these surveys, open artefact scatters were found to be comprised of varying percentages of chert, silcrete and quartz, with some minor representation of quartzite.

Dibden (2005e) conducted an assessment of simple slopes located on either side of Native Dog Creek 22 kilometres south of Nimmitabel. The survey was hampered by low exposure and ground visibility. No sites were recorded however given the topographic and broader environmental context the area was assessed to be of low archaeological potential.

Surveying for a proposed sawmill complex just to the south of Bombala, in an area of 96 hectares, Stone (2001) recorded two open artefact scatters, both situated on ridgelines overlooking watercourses.

Further to the southwest Lewis (1976) conducted a survey of an area of the Lower Snowy River measuring 100 kilometres. The northern boundary of that survey area is situated c. three kilometres below Dalgety. Lewis recorded over 56 sites within the survey area which was focused on the margins of the Snowy River. Lewis found that sites along the Snowy River were present on *any* flat or gently sloping area situated above the flood level. Often sites were found where creeks joined the Snowy River. The majority of sites recorded by Lewis comprised stone artefact scatters. The main source of raw material encountered within sites was found to be river pebbles.

Geering (1981) systematically surveyed an area along the Lower Snowy River, finding a high density of Aboriginal sites which she described as being 'continuous from Dalgety to the Victorian border'. In all, 130 sites were located adjacent to the riverine system. These consisted of 119 open campsites, 21 scarred trees and two stone arrangements. The open campsites ranged in the number of stone artefacts they contained, from three to 367, with about 33% of the scatters comprised of less than 10 artefacts and 18% comprised of more than 100 artefacts. It should be noted however that quartz pieces were not included in the artefact count; this is likely to have lessened overall artefact numbers.

Geering (1981) noted that the majority of open campsites located consisted of 'extensive scatters of artefacts with an average density of *only* one or two artefacts per square metre'. All campsites were located on gently sloping or flat ground above the flood level; most level areas along the river were found to contain artefacts. Geering (1981) indicates that the majority of the 21 scarred trees recorded could quite possibly have been the product of Non-Indigenous activity and expresses similar reservations with regard to the two stone arrangements. The findings of high site density are described as being atypical in the Southern Uplands, suggesting that the Lower Snowy River valley and its major tributaries were 'a favoured location for Aboriginal occupation'. Geering (1981) notes however, that given the absence of surveys conducted in the surrounding hills it is not possible to consider whether or not occupation was focused exclusively on the river corridor.

Lewis (1985) conducted a surface survey of Portion 72 Dalgety in response to a proposed tourist development. The survey area is situated on the east side of the Snowy River immediately south of Dalgety township. Lewis located one artefact scatter which extended along the river bank for a distance of 200 metres. The site consisted of flakes, cores and pebble artefacts including three choppers and one possible hammerstone. The stone materials in the artefact assemblage included silcrete and quartzite. Some artefacts possessed pebble cortex and Lewis (1985) indicated that some raw materials present had been sourced from the Snowy River.

Grinbergs (1992) investigated the prehistory of the Highlands, focusing on the valleys and ranges adjoining the Lower Snowy River, for the purposes of a B.A. Honours thesis research project. The study area was bounded by the Snowy River and the Suggan Buggan and Ingeegoodbee Rivers and encompassed some 165 sq km. The field survey was principally conducted on areas of exposure provided by vehicle access tracks. In total 22 open stone artefact scatters and one stone arrangement were identified. The conclusions drawn from analysis of the findings challenge notions of a limited seasonal exploitation of high altitude resources and instead Grinbergs (1992) proposed a more complex scenario of occupation and resource exploitation of the region. This proposal suggested a dynamic system of movement and resource exploitation between Lower Altitude, Upper Altitude and High Altitude occupation zones, which took place on a year round basis.

Based on the above review and a consideration of the elevation, geology, hydrology and topography of the study area the type of sites known to occur in the region and the potential for their presence within the study area are described in Section 7.4 below.

7.4 Predictive Model of Site Type and Location

Stone artefact scatter sites are the most common site type found within the region. Flood (1980) found that few sites were recorded on the treeless parts of the tablelands and explained this as being due to the unfavourable nature of such an environment. While this assertion was based on limited survey and analysis, it is possible that it is nevertheless generally correct. Surveys conducted by Lewis (1976) and Geering (1981) along the Lower Snowy River suggest that river valleys in the Monaro were favoured occupation areas. Grinbergs (1992) refined occupation patterning further suggesting that a variety of ecological niches in a range of latitudes were exploited during different times of the year.

The type of sites known to occur in the region and the potential for their presence within the study area are listed as follows:

Stone Artefacts

Stone artefacts are found either on the ground surface and/or in subsurface contexts. Stone artefacts will be widely distributed across the landscape in a virtual continuum, 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. In the region sheltered contexts are likely to have been utilised for

camping. The detection of artefacts during a surface survey depends on whether or not the potential archaeological bearing soil profile is visible.

Given the environmental context of the proposed Boco Rock Wind Farm stone artefacts are predicted to be present in a highly variable density across the landscape. On elevated plateau and ridge crests, generally artefacts are likely to be present in a highly patchy distribution and low to very low densities only. In elevated landforms situated closer to the MacLauchlan River it is predicted that artefact density is likely to be higher.

Walkington (1986) recorded many sites at various lakes in the Berridale area including Killamacoola Lagoon and Wishing Lake. This work was undertaken within a research context for an Honours thesis. The complex artefacts recorded in some of the sites indicate that lakes in the area are likely to have been utilised by Aboriginal people as base camp locations. The results of that study indicate that the lakes located within the local area will have the potential to contain archaeological sites reflecting Aboriginal usage of these environmental features. However it is noted that the only lakes located close to proposed impact areas are very small and are unlikely to have been focal points in the region.

Grinding Grooves

Grinding grooves are found in rock surfaces and result from the manufacture and maintenance of ground edge tools. Grinding grooves are only found on sedimentary rocks such as sandstone. Given the absence of suitable rock exposures in the study area grinding groove sites are unlikely to be present. Portable whetstones have been recorded on the Monaro (*cf* Dibden 2004; Young 2000); given the absence of suitable bedrock stone, these artefacts will have been utilised for sharpening hatchets and other ground edge tools.

Burials sites

A number of different burial practices have been recorded in the Monaro including below ground burials covered with an earthen and stone mound, and within hollow trees and caves (Young 2000). Burials are generally only visible in areas where the deposit has been disturbed either by natural erosion or human activity. This site type is not usually found during field survey however there is some potential for their presence in deep soils adjacent to water sources.

Rock Shelter Sites

Rock shelters sites are unlikely to be present in the study area given the absence of large vertical stone outcrops.

Scarred and Carved Trees

Scarred and Carved trees result from either domestic or ceremonial bark removal. Carved trees associated with burial grounds and other ceremonial places have been recorded in the wider region. In an Aboriginal land use context this site type would most likely have been situated on flat or low gradient landform units 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 impossible unless culturally specific variables such as stone hatchet cut marks or incised designs are evident and rigorous criteria in regard to tree species/age/size and it specific characteristics in regard to regrowth is adopted.

Nevertheless, the likelihood of trees bearing cultural scarring remaining extant and in situ is low given events such as land clearance and bushfires. Generally scarred trees will only survive if

they have been carefully protected (such as the trees associated with Yuranigh's grave at Molong where successive generations of European landholders have actively cared for them).

The study area is primarily located on what is and was a treeless plateau; scarred trees are unlikely to be found in this area. Elsewhere in the east, tree clearance, at least at the time of original European occupation, is likely to have occurred. While not out of the question, this site type is unlikely to have survived and therefore be extant in the study area.

Stone Quarry and Procurement Sites

A lithic quarry is the location of an exploited stone source (Hiscock & Mitchell 1993:32). Sites will only be located where exposures of a stone type suitable for use in artefact manufacture occur. Quarries are rare site types in the region. Boot (2000) refers to the likely presence of a chert quarry within the vicinity of Denison. A stone quarry is unlikely to be recorded during the current study although it is possible.

8. ARCHAEOLOGICAL AND HERITAGE CONTEXT – NON-INDIGENOUS

8.1 Alienation of lands within the colony of New South Wales

When New South Wales was settled as a British Colony in 1788, all lands became the property of the Crown. A major component of the colonial process was the creation and maintenance of spatial order (Jeans 1966:205). The alienation of land was controlled at the discretion of the colonial government, initially under direction of the Colonial Office in London. Grants, in the first instance, were offered to officers and civil servants as both reward and incentive to relocate. This was later extended after Governor Phillip was instructed to grant land for farming to discharged soldiers, free settlers and convicts who had served their term (Shaw 1970:11).

As the population and demand for land increased, measures were adopted by both the government and settlers to enable the spread of settlement and an increase in agricultural production. With a further increase in the population of settlers and livestock numbers after 1800, the demand for land continued to grow.

In 1822, J. T. Bigge filed his Report to the Commissioner of Inquiry into the State of the Colony of New South Wales. Bigge had been dispatched to the Colony in 1819 by the British government to establish, among other things, if the Colony was achieving its aims as a penal settlement and to consider its development and commercial viability. Bigge recommended an increase in land grants, but only to those who could contribute to an increase in pastoral production (Molony 1988:45). Assigned convict labour was intended to assist with the maintenance of pastoral properties granted under such a system.

Governor Macquarie continued to grant land to cater for the needs of increasing livestock numbers. Although alienation was not allowed without survey, by 1821 about 340,000 acres of land grants could not be located, as their issue had outpaced the ability of surveyors to accurately determine their placement (Perry 1965:44). The three-man survey department was not able to cope with the demands made on it, and the number of uncompleted surveys of the country beyond the immediate vicinity of Sydney began to mount. This situation became more problematical in 1825 when officialdom declared that the area to be settled was to be divided into counties and parishes and, in 1826, temporarily restricted land that could be granted to the first nineteen counties created around Sydney, which became known as the 'Limits of Location'. The southern boundary of the nineteen counties was the latitude of Batemans Bay on the coast (Ellis 1997:27, Gibbney 1989:17-19). A redefinition of the Limits of Location took place in 1829 when the south western part was defined near to the Tinderies (this came to be known as 'where Mrs Keefe has a farm' [Andrews 1998]).

In order to allow occupation of new lands, satisfy demand and maintain some control on the spread of settlement, in 1827 the government introduced 'tickets of occupation' to allow graziers rights over the lands they occupied (Carter 1994:9-10). These were replaced in 1828 by grazing licences. From that time, through a variety of means, there was a spread of both official and unofficial settlement, and Crown Lands began to be broken up into smaller portions.

Grants and sales, either directly or at auction, permitted the alienation of land. However, demand outstripped supply. 'Squatters' began to occupy large tracts of land outside the settled districts beyond the control of the colonial government (Cannon 1988:9, Carter 1994:10-12). In order to wrest back control, various regulations were introduced to allow land to be leased or licensed for a fee to depasture stock. Sales as a result of improvements to land occurred later, along with sales at auction for a set minimum price per acre. Access to and availability of land, along with insufficient capital for many prospective landowners restricted expansion. The majority of suitable land remained in the hands of a wealthy few.

By 1850, settlement had spread throughout New South Wales and Victoria (Shaw 1970:45) and at that time 3,000 squatters had the use of over 70 million acres of Crown Land (Jeans 1966:212).

It was during this period that political support increased for small rural landholders. Support came from a number of groups, including:

- land owners seeking to restrict the squatters and capitalise on their own investments;
- tenant farmers seeking access to rural land;
- successful gold-miners with capital to invest in land;
- independent shopkeepers who resented the squatters use of Sydney wholesalers; and
- agitated politicians fearful of the growing power of the 'squattocracy'.

In 1861, Sir John Robertson, the Minister of Lands, introduced legislation (Crown Lands Occupation Act 1861 and Crown Lands Alienation Act 1861) to allow selection of land by any person under certain conditions, at a set price of one pound per acre. One quarter of the purchase price was required with the balance deferred as long as certain conditions were met. This legislation set minimum and maximum sizes for portions as well as orientation and boundary proportions. Selection could also take place prior to survey. The intention of this legislation was to allow access to land on fair and easy terms and promote closer settlement throughout the colony. Despite these intentions, the legislation failed in that loopholes and indiscriminate practices allowed the original landholders to maintain control of much of their original 'runs' (Carter 1994:21). By 1874 "... deserted farms are everywhere visible to the traveller ..." (Jeans 1972:213). Nevertheless, the policy of closer settlement continued and by the 1890s large land holdings had gradually given way to a myriad of smaller farms. As a result of World War I, the first half of the twentieth century saw Soldier Settlement land programs in place throughout Australia.

The modern landscape not only reflects a sequence of occupation and activity through a number of phases of ownership, improved technology and changing farm management practices, but evidence of the legislative and administrative controls governing alienation and land use.

8.2 Regional History

Exploration and Pioneers

Much of the impetus for early exploration in NSW was driven by the need for new land for grazing (*cf* Andrews 1998). In 1823 a group of experienced explorers gathered at the Throsby property at Bong Bong, Moss Vale to prepare for their next expedition. The men in question were Charles Throsby, Captain Mark Currie, Major John Ovens, Throsby's overseer Joseph Wild and an Aboriginal guide. Together they set out to explore the land south of Lake George, which had been partially explored in previous years by Throsby and Wild, who had discovered the Queanbeyan River and the Murrumbidgee. The party attempted to follow the Murrumbidgee south but upon encountering rugged terrain they elected to travel a few kilometres to the east through a chain of clear downs that is thought to correspond to the Michelago, Colinton and Bredbo valleys. It was during this part of the journey that they came across an Aboriginal tribe near Billilingra. After overcoming some apparent initial fear of the newcomers the Aboriginal people engaged in conversation with the assistance of the guide accompanying Throsby's party, and amongst other things they informed the explorers that the area of the rolling downs was the 'Monaroo'. The group continued on and crossed a river they presumed to be the Murrumbidgee but that is thought to have more likely been the Numeralla and made it to an area in the vicinity of present day Bunyan before having to turn back on account of their limited supplies. They named the treeless rolling downs 'Brisbane Downs' after the governor of the time however the Aboriginal name proved the more popular name in time (Neal 1976: 5-6; Plowman 2007: 6, 8-9).

European settlement of the area began in the late 1820s as various farmers made the decision to take their chances with squatting. As noted above the Limits of Location at that time ended at Michelago, so all settlement south of that was technically illegal. Census records from 1828 indicate that there were already 20 new settlers on the Monaro, although there is some confusion regarding this number since the people listed were all servants living on the Limestone Plains. Nevertheless, Richard Brooks it known to have had stock and men at Gegedzerick near Berridale in 1827. In 1832 William Glanville came to the area to work for Joseph Ward at Wambrook and

he reported that at that time there was a hut at Cooma (Kuma) belonging to Cooper and Levy and that Coolringdon, Gegedzerick and Wambrook were the only stations to the west of this. Two years later, John Lhotsky relayed information from Mr Bath, the manager of Kuma Station, that R. Campbell had been established at Waterholes, near Michelago for seven years, Richard Brooks had been at Jijedery (Gegedzerick) for six years, Cooper and Levy had been at Cooma for five years and Dr Reid had been at Bunyan for a similar period of time. Similarly, the White family had been at Tom Grogin near Nimmitabel for around four years and other families were established at Yinibrothers, Billilingra, Bulungewaing and various other stations around the Snowy and Maclaughlin Rivers (Neal 1976; Plowman 2007: 10). According to Andrews (1998) an area on the McLaughlin River was occupied by Sherwin in 1830; this area corresponds to the area occupied by the 'Sherwins' southwest cluster and Boco Rock south east cluster of the proposal area.

When John Lhotsky traveled through the region in 1834 he considered himself 'surrounded by absolute anarchy and lawlessness' (cited in Andrews 1998). At that time the majority of men living on the Monaro during the 1830s were assigned servants either serving their sentence, ticket of leave, or freed and in employment (Andrews 1998). The theft and resale of livestock was common practice.

The 1830s and 1840s saw an expansion of squatting and some fierce competition for land. With the introduction of the Squatting Act in 1836 squatters were able to pay a £10 annual licence to secure land. John Lambie, the Commissioner for Maneroo was sent out to collect the fees and ensure correct implementation of the Squatting Act. Between 1839 and 1840 he compiled a relatively comprehensive list of all the stations in his area. In the 1839 census six stations, all named Nimitybell, were recorded by Lambie in the general area occupied by the proposed wind farm. All were recorded as carrying cattle while three were also identified as carrying sheep. One of the licensees was identified as a woman.

The first official survey of the region was undertaken by Stuart Ryrie, who produced plans, sketches, compass bearings and astronomical observations relevant to the location of the various squatting runs across the Monaro. In 1848 a list of applicants for land on the Monaro was published in the Government Gazette. The largest of the applicants was William Bradley, who had laid claim to around 40,000 hectares. By 1850 his claims extended from Coolringdon and Cooma in the north to Bibbenluke in the southeast (Figure 3). Of particular note to the current project is the fact that these lands included the runs of Myalla, Boco Rock and Gennong to the west and southwest of the Nimmitybelle run. By the late 1840s there were 1,900 Europeans, 307,000 sheep and 113,000 cattle on the Monaro (CMHS 1988; Plowman 2007: 12).

With the introduction of the Robertson Land Acts in the early 1860s considerable tracts of land on the squatter runs became available for free selection as lots of land between 40 and 320 acres. This resulted in renewed competition for land, this time between the established squatters and the 'new comers', or selectors. Both engaged in tactics that exploited loopholes in the system so that they could purchase multiple blocks of land. In particular there was the practice of 'dummying' whereby multiple family members, including infants, had land selected in their name that was later amalgamated into a single property. Alternate tactics for controlling land included strategic selection of properties, known as "peacocking", so as to isolate new comers or impede access to vital resources such as water (Carter 1994). The result in the Monaro region was that by 1866 the list of stations was very similar to that of 1848. Bradley for instance had by that time claimed 20 stations with a total area of around 120,000 hectares across some of the best basalt rich land (Hancock 1972; Plowman 2007: 14).

Towns and Settlements

Initially Bunyan was the first European settlement on the Monaro; this was where Dr Reid had established a station and the location also became known as Reid's Flat and later as Jew's Flat on account of the Jewish families who settled there. An inn and store were established in 1838 by Abraham Moses and the settlement quickly became the main supply point for the district. This

role was soon usurped however by Cooma. Around the same time that Reid's Flat developed an inn was also opened at Michelago, which was at the time the first inn encountered by those making their way south onto the Monaro. As with Reid's Flat however, Michelago was soon eclipsed by Cooma as the regional centre.

The Kuma run was originally owned by Cooper and Levy and later taken over by James Kirwan. With the arrival in 1842 of John Lambie, the Crown Lands Commissioner, 1,280 acres (512 hectares) of Kirwan's Kuma run was claimed as the location for Lambie's residence and office at the south end of what was to become Lambie Street. Kirwan then built an inn on the main road at the junction of the Cooma and Back Creeks, just a few hundred metres from Lambie's office and house. By 1849 when the official town plans were drawn up there was the lock-up, office and house at Lambie's and an inn, stores, blacksmith, school, stable and stockyards on Kirwan's land with two constables' huts in between. Settlement then developed along Lambie and Sharp Streets with additional bark and slab stores and inns. Development of the town was then given renewed impetus from the discovery of gold at nearby Kiandra. The town saw growth in response to the gold rush and the associated provision of services and then with the decline of the goldfields it enjoyed an increase in population from people seeking new work. During the late nineteenth century Cooma saw the construction of various banks and public buildings, new hotels, two newspapers and the arrival of the railway in 1888. It continued into the twentieth century as a fairly successful rural centre that relied heavily on local sheep and cattle markets. Following World War II and the development of the Snowy Hydro Scheme Cooma enjoyed a new phase of development and growth as the chosen headquarters for the scheme. This role, together with the development of the ski industry and associated mountain tourism has seen Cooma continue as the commercial centre of the Monaro (Neal 1976: 37-44; Plowman 2007: 16-19).

The settlement of Nimmitybelle (Nimmitabel) was established in the early 1830s at the junction of the roads to Bombala, Cooma and the coast; it was known variously as Nimmitybelle, Nimmithybelle and Nimoitehool (Batten 1993; Blyton, Blyton and Weston 2006; Plowman 2007: 20). The earliest settlers at Nimmitabel were Joe Cooper, who was running 2450 sheep in 1837 and Nancy O'Hara and William Scott, who had a station called Nimity Bell in 1840 (Batten 1993). The first hotel, the 'Nimmitable Inn', was opened in the 1840s by John William Stanton, who moved there after working as inn keeper at Reid's Flat in the 1830s. The town was officially surveyed in 1858, by which time there was a small village of slab and bark huts established. With the development of local mining and increased settlement from the Robertson Land Acts in the 1860s it enjoyed substantial growth with the establishment of various stores, hotels and a stone church and courthouse. It was at this time that John Geldmacher built the stone flourmill that he operated briefly and which still stands as an icon of the town. The following is a description of the town that was published in the 1872 Town and Country Journal (Blyton, Blyton and Weston 2006: 3-4):

> Nimmitybelle is 32 miles from Bombala and 26 from Cooma. It is an incipient township with a population of a little over 100 persons. It has a stone R. C. Church, a Court House, a P. O. & Telegraph Office, two hotels and two stores, all in one street which is called Bombala Street, and is the continuation of Cooma road…
> On the small mount above the street of the town, an industrious German, Mr. John Geldemacher thought to build a windmill as there were none nearer than Bombala or Cooma, and set about the work seven years ago by getting the necessary timber. He then commenced his stone tower, and almost unaided has by his indomitable perseverance raised a vast circular building 40 feet high (4 stories), 25 feet diameter at foundation an 16 feet on the top. This work was only completed the other day, and he is now told he cannot work his wind mill; for the reason that legislative passed an Act some 40 years ago by which he renders himself liability to a penalty of five pounds daily for working it, as it is within the prescribed distance of a public road. It is alleged that the shadow of the mill vanes frightens horses when passing along roads. It was erected in ignorance of

> the law, and it is a wonder the point was ever discovered in this out of the way place. There is not the remotest chance of danger by its peculiar position. It is a case of extreme hardship to an honest hard working man who has expended his all on the work.

The town continued to grow through the turn of the century and the railway from Cooma was extended through Nimmitabel to Bombala, at which time the name was officially changed from Nimmitybelle to Nimmitabel. Prior to the arrival of the railway in 1912 transport from Nimmitabel was either by private means to Cooma, then on via train, or by private means to one of the coastal ports where steamboats could be boarded (CMHS 1988).

As with most other settlements on the Monaro, Nimmitabel has functioned largely as a rural centre for local pastoral industries. Following the Great Depression work in the area largely comprised shearing and fencing, although rabbit trapping and construction of the Ingebyra Road also provided work opportunities. There was a brief period in which a meat works were established on the Maclaughlin River, adjacent the railway, however these closed by 1942. During the 1940s Nimmitabel saw the opening of a successful general store and a general development in the pastoral industry that was encouraged by assistance from the Department of Agriculture. It was also during this period that the timber mill started operation with the opening of the Rayner Brothers' Mill in 1948, which sold out to Tablelands Sawmills Pty Ltd in 1974 and eventually closed in 1992. Nimmitabel continued to grow through the 1950s as the Snowy Hydro Scheme brought new migrants to the area and electricity was connected in 1954. This decade also saw tragedy with a fire through the business end of town in 1950 and an explosion at the Rock Flat silica mine in 1954. Nimmitabel continues to play a part in local industry with the opening of the Monaro Basalt Quarries and it continues as an important stopping point on the road from Cooma to Bombala, Victoria and the South Coast (Blyton, Blyton and Weston 2006; Plowman, Dixon and Rushton 1999; Plowman 2007: 20-21).

Granite, porphyry, diorite, marble, slate and basalt all occur across the Monaro region and were exploited as building materials. Stone was used for constructing houses, inns, stores, churches and public buildings. Around the Nimmitabel area basalt was the main source available. As a whole the stone buildings of the Monaro that date to the first 100 years of European settlement were generally constructed of granite or basalt. By the 1870s brick was also becoming increasingly common which was initially due to the introduction of transportable brick making plants. Brick factories were then established in Cooma by J. J. Mawson and Joseph Hain and these began to supply the local area. Timber production was crucial for the region as a whole and many areas provided quite good quality timber. At Nimmitabel, the flour mill built by Geldmacher was converted to a timber mill and operated for some years. Following a fire at George Rayner's mill on Brown Mountain in the early twentieth century, Rayner moved his milling operations to Nimmitabel, where timber production continued until near the end of the century (Plowman 2007: 27-28).

While mining, particularly gold mining and to a lesser extent copper, has been of some importance in the history of the Monaro as a whole, the areas where this industry really made a mark were places such as Kiandra, Gegedzerick, Cootralanta, Bombala, and Big Badja (HO&DUAP 1996; Plowman 2007).

Pastoralism

It was the search for grazing land that brought the first European settlement to the Monaro. Stockmen drove herds of cattle and sheep for their landowners and established themselves on the open plains, where rainfall was good and there was no need for clearing the land. Nevertheless, it meant isolation and exposure to some extreme temperatures, particularly in winter. For the cattle introduced to areas such as Kiandra in the 1830s the snow and extreme cold meant a sure death. This, together with the small land holdings resulting from the Robertson Land Acts and the effects of drought in later years meant enforced transhumance, with cattle grazed above the tree line during summer. This practice was formalised through the introduction of snow leases in

1890, which were transformed into 14 year leases in 1917. While grazing in the boundaries of Kosciuszko National Park is now forbidden, summer grazing on crown land has become a Monaro tradition (HO&DUAP 1996; Plowman 2007: 23-24).

Yards and fencing were essentially structures for successful pastoralism and were particularly important for the lamb and wool industries. Initially yards and fencing were fairly basic structures built of wood. Given the abundance of local stone however, it is perhaps not surprising that stone fencing became common in some areas, many of which were purportedly erected by the Chinese miners following the decline of the Kiandra and Bombala goldfields. By the 1870s though, following the increased and more secure settlement resulting from the Crown Land Acts and the technological developments with regard to wire, boundary fences became more common and shepherding declined. Other significant developments in the local pastoral industry around this time included a breeding program for sheep specific to the Monaro environment. These animals still suffered the effects of drought however and the droughts of the late 1880s-1890s saw an economic depression across the whole colony. The situation was further exasperated by the outbreak of plagues of rabbits (Plowman, Dixon and Rushton 1999; Plowman 2007: 23).

Sheep and the wool industry have been very important to the Monaro region, as have the various developments in the infrastructure associated with this industry. During the days of early settlement sheep were washed prior to cleaning by herding them through deep waterholes, with the animals rubbed dry and clean on the other side prior to shearing. This practice changed around the end of the nineteenth century when shearing sheds began to become more common and the practice of sheep washing was abandoned as unnecessary. The introduction of the shearing shed was accompanied by developments in stock yard design and with time the shed itself became more elaborate with shelter for the animals underneath and chutes, pens, stands and wool classing areas inside (Plowman 2007: 24-25).

Wheat growing on the Monaro was initially an essential component of a squatter's farm with flour necessary for making bread. One of the problems however was the susceptibility of the crop to frosts, which could ruin entire harvests if a frost came late in the season. As a result, towards the end of the nineteenth century some farmers began to produce wheat commercially in areas that were not as frost prone and large flour mills were also constructed. The first mill was built by Alexander Montague on Cooma Creek, while the most famous was probably that of Geldmacher at Nimmitabel. Geldmacher's mill was a form of windmill, however it was thought to be a hazard to safety that frightened horses and so it was converted to horsepower. A more successful mill was set up by Mawson on the Murrumbidgee, this one was water powered and operated for around 30 years from the 1870s onwards. While there were some fairly good quality wheat crops grown and production even began to exceed the needs of the local region, the only major problem was transport, which was by bullock wagon and was slow and costly. The wheat growers were thus eager to support the lobbying for a rail line to Cooma, however the result was that grain could then be brought in more cheaply from other areas better suited to growing the crop. Around the same time as the experiments with diversifying industry and growing grain there were various butter factories established at Numeralla and Nimmitabel. The development of a dairy industry was also short lived however as it could not compete with the dairies on the South Coast and after a brief peak in the 1920s the industry dwindled (HO&DUAP 1996; Plowman 2007: 25, 29).

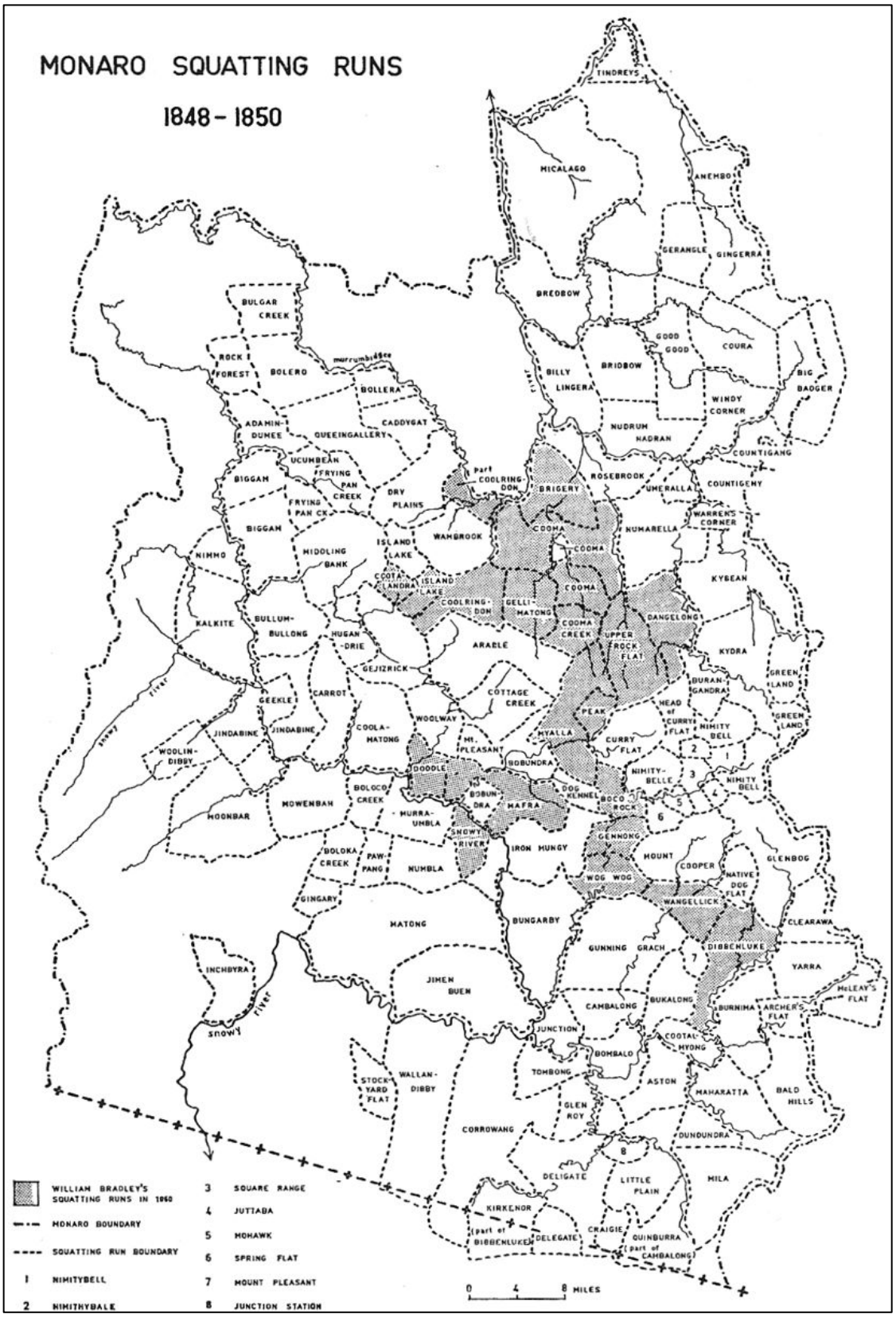

Figure 3. Map of the mid nineteenth century squatting runs on the Monaro showing the extent of William Bradley's runs (Hancock 1972: 47).

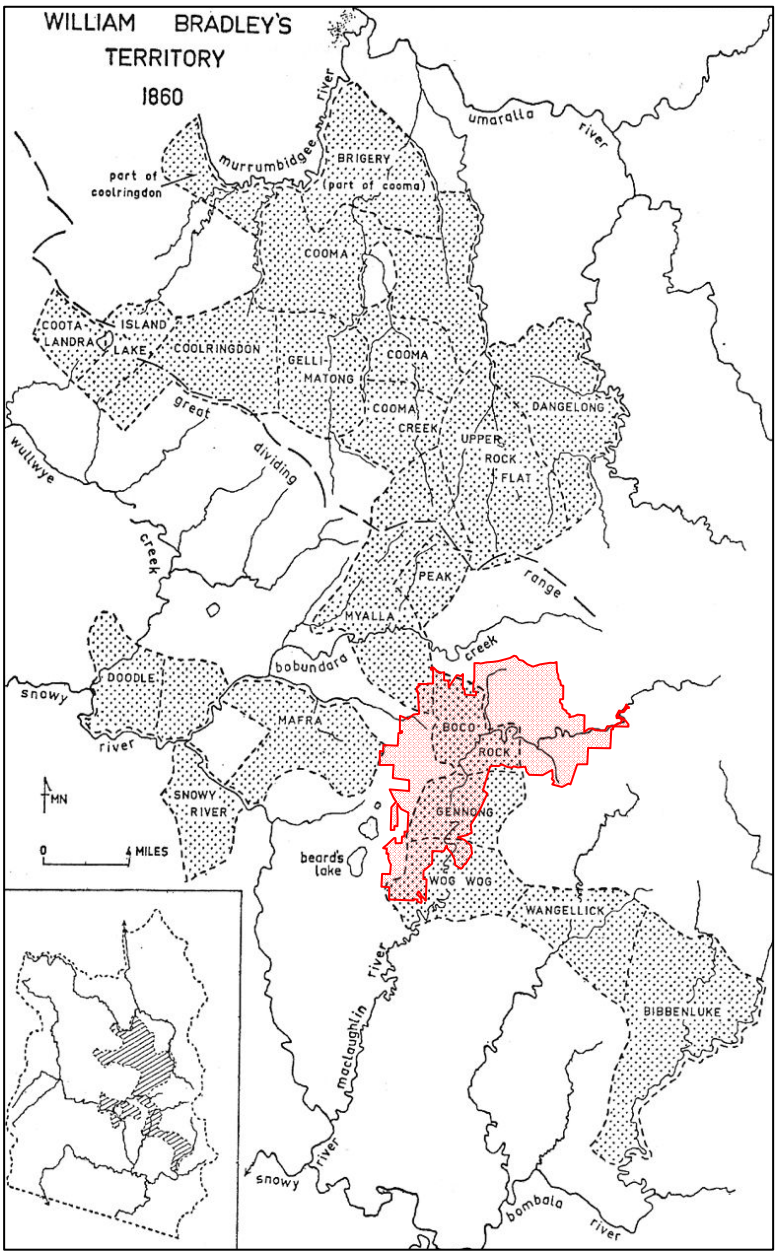

Figure 4. Map showing the extent of William Bradley's holdings in 1860 (Hancock 1972: 93). Red shaded area corresponds to approximate location of the Boco Rock study area.

Boco Rock Study Area

The 1848-1850 map of the Monaro squatting runs (Figure 4) shows Boco Rock, Nimitybelle, Spring Flat, Curry Flat, Myalla, Dog Kennel, Gennong, Wog Wog and Iron Mungy in and around the location of the current study area. Of these, Myalla, Boco Rock, Wog Wog and Gennong were all part of William Bradley's holdings (Figure 4). The study area itself appears to correspond to the southern half of Boco Rock, the western parts of Gennong, the north western limits of Wog Wog, the southwest of Nimmitybelle, the north of Spring Flat and the far eastern tip of Iron Mungy (Hancock 1972: 47). Lessees in the vicinity of Nimmitabel in 1848 included: Roberts, McDonald, O'Hara, Scott, Stanton, Thornton, Warren, Rankin, Williams, Tooth, Malady and Mackenzie. The Boco run was initially owned by Francis Cooper, who sold on to the Silk family (Neal 1976: 108). The Curry Flat Run, immediately to the north of the study area, was first leased to Andrew Badgery as a 16,000 acre property. The run was then acquired by William Jardine soon after 1860 and remained in his family from then on. William Jardine is known for having introduced South Australian blood lines into the area and breeding a good strain of sheep that won prizes at the Cooma Sheep Show (Neal 1976: 109; Batten 1993).

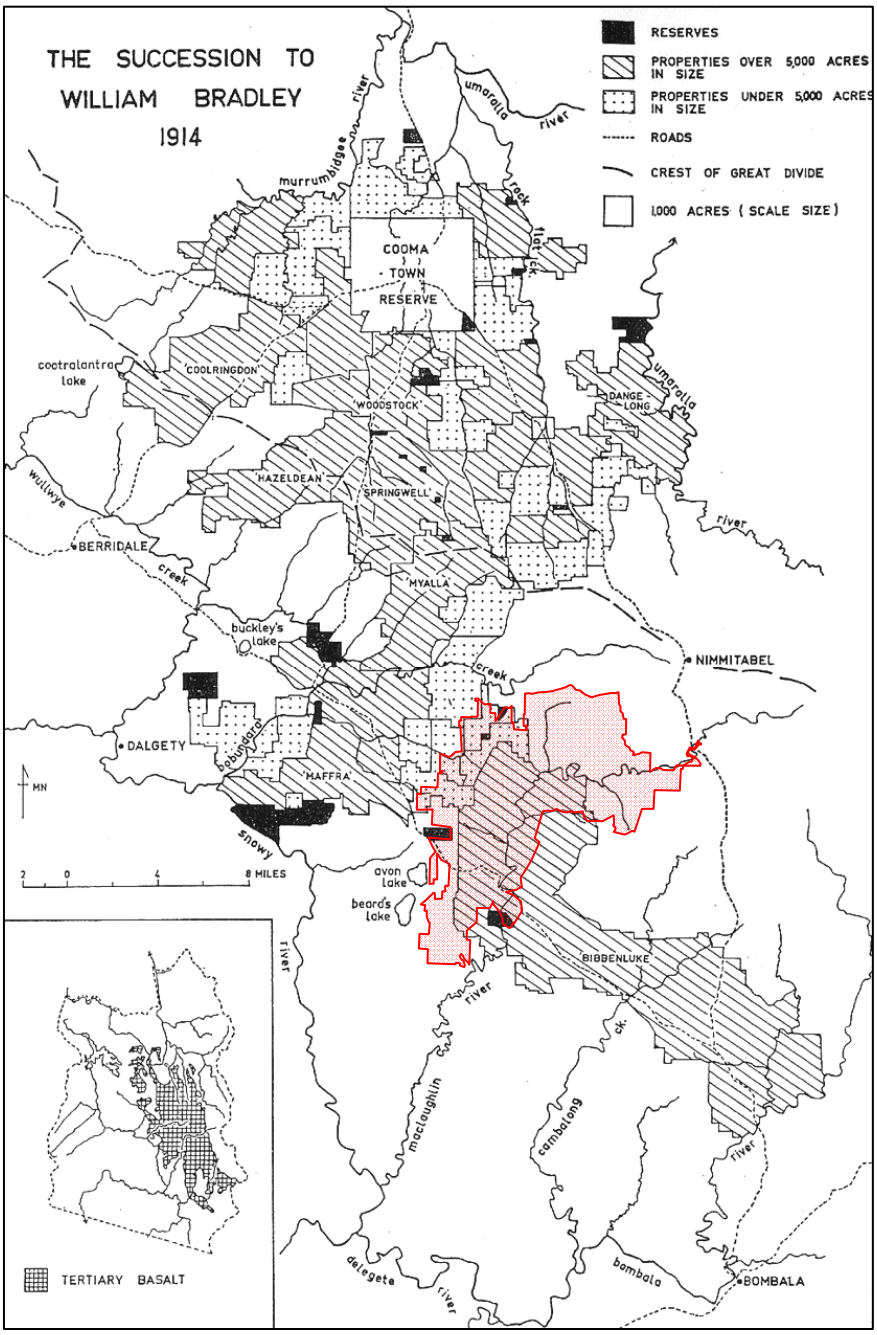

Figure 5. 1914 Map of the subdivision of the original Bradley holdings, note the extent of the Bibbenluke run in the southeast (Hancock 1972: 105). Red shaded area corresponds to approximate location of study area.

In 1866, some five years after the introduction of the Robertson Land Acts, the majority of farm holdings in the Monaro were over 10,000 acres in size and were by and large identical to the listings of the squatter runs in 1848. In some instances the owner had changed, although over a third of the original squatter families were still represented (Hancock 1972:89). The year 1866 also saw William Bradley put all his land up for sale, which totalled some twenty stations and over 300,000 acres stretching from the Murrumbidgee at Cooma southeast to the Bibbenluke run near the Bombala River. Over the years his land was divided up and parts of the leases were selected for purchase under the new land acts. By 1884 only seven of the 83 stations within his original holdings were over 5,000 acres in size. One of the notable exceptions to this trend of redistributed property was that of the Bibbenluke station in the south. Henry Tollemache Edwards was the property manager for Bradley's southern estate. In the late 1860s he joined together Boco Rock, Gennong, Wog Wog and Wangellick with Bibbenluke to create one enormous run that carried the name of the southernmost station (Figure 5). Over the following two decades he secured the property piece by piece by turning it into freehold land through the

use of dummy selectors and careful management of the property trustees (Hancock 1972: 91, 103-106).

The original holdings of the Bibbenluke Station overlapped to a certain extent with the current study area. As a result of the introduction of the Robertson Land Acts in the 1860s Bibbenluke suffered a similar predicament to other large squatter runs as new selectors came in and purchased portions of the station. Of some note is the selection of land at Ando Hill by Jigger Bulgary (Ghikas Boulgaris), a Greek immigrant who worked as a shepherd in the district. The selection of the land at Ando Hill aroused considerable anger from the manager of the Bibbenluke run, Henry Tollemache Edwards, nevertheless the land remained in Bulgary's possession and was passed on to his son William and his son James before being sold to H. T. Edwards in 1889. A grove of pines still marks the location of his original slab house, which was demolished in the 1930s (Blyton, Blyton and Weston 2006). In the late 1880s it is reported that H. T. Edwards was managing to run one sheep per acre on Bibbenluke, although this was only achieved by sending 10,000 to 20,000 sheep to graze at Kiandra every summer (HO&DUAP 1996).

Over the past century the Bibbenluke station has been subdivided up. In and around the study area there are now a variety of smaller properties, some of which can be linked to the earlier settlers and their descendants. For instance, the Jardine family at 'Roselea' (built in 1938-39), in the north of the study area are descendants of the Jardines who managed 17,000 acres encompassing 'Springfield', 'Ryedale' and 'Curry Flat' (Blyton, Blyton and Weston 2006), and 'Springfield' and 'Old Springfield' are located a short distance away in the northwestern corner of the study area. William Jardine was originally from Ryedale in Scotland. He arrived in Australia in 1841 and after living for a time at Braidwood and establishing the Jindabyne flour mill with Stewart Ryrie he bought several properties on the Monaro. One of these was the Curry Flat run that he purchased in 1862. It was here that he made his home. Jardine bred Merino sheep and in 1897 he shipped 4,500 sheep from Curry Flat to Sydney (Blyton, Blyton and Weston 2006).

8.3 Previously Recorded Heritage Items

Searches have been conducted for previous heritage listings in and around the Boco Rock River study area; these searches have included all of the relevant heritage registers for items of local through to world significance. Details of these searches are provided below.

Australian Heritage Database

This database contains information about more than 20 000 natural, historic and Indigenous places. The database includes places in:

- the World Heritage List
- the National Heritage List
- the Commonwealth Heritage list
- the Register of the National Estate

and places under consideration for any one of these lists. A search of this database (28th January 2009) revealed that there are 2 items listed on the Register of the National Estate as being at Nimmitabel (Appendix 2). Neither of these items are in or adjacent the Boco Rock proposal area.

State Heritage Inventory

The *NSW heritage databases* contain over 20,000 statutorily-listed heritage items in New South Wales. This includes items protected by heritage schedules to local environmental plans (LEPs), regional environmental plans (REPs) or by the State Heritage Register.

The information is supplied by local councils and State agencies and includes basic identification details and listing information. Consequently listings should be confirmed with the responsible agency.

A search of this database (28th January 2009) revealed that there are 27 items that are listed as being present in the local Nimmitabel-Springfield area. Of these, there are four items that are in or immediately adjacent the Boco Rock proposal area (Table 2). Minimal details are available for these sites. It appears that the items have been listed as farm complexes or parts thereof but no descriptive details or statements of significance are currently available on the State Heritage Inventory. All of the items in question are listed as being on local government registers.

It should be noted that while the study are straddles both the Cooma-Monaro and Bombala Local Government Areas there appear to be no current listings within the proposal area in the Bombala LGA.

Item Name	Suburb	LGA	Significance
Avon Lake	Springfield	Cooma-Monaro	LGOV
Old Springfield	Springfield	Cooma-Monaro	LGOV
Woodbine	Nimmitabel	Cooma-Monaro	LGOV
Yandra	Springfield	Cooma-Monaro	LGOV

Table 2. State Heritage Inventory search results

The NSW Heritage Act (1977)

The purpose of the NSW Heritage Act 1977 is to ensure that the heritage of New South Wales is adequately identified and conserved. In practice the Act has focused on items and places of non-indigenous heritage to avoid overlap with the NSW National Parks & Wildlife Act, 1974, which has primary responsibilities for nature conservation and the protection of Aboriginal objects and places in NSW. In recent years, however, the Heritage Council has targeted these other areas, working with relevant state agencies such as NPWS to identify gaps in the protection of Aboriginal and natural heritage places (for example the Cyprus Hellene Club was protected under the Heritage Act as a place of historic significance to Aboriginal people amongst other values).

Section 4 of the Act considers a heritage item to include *any place, building, work, relic, movable object, which may be of historic, scientific, cultural, social, archaeological, natural or aesthetic value.*

The Heritage Amendment Act 1998 came into effect in April 1999. This Act instigated changes to the NSW heritage system, which were the result of a substantial review begun in 1992. A central feature of the amendments was the clarification and strengthening of shared responsibility for heritage management between local government authorities, responsible for items of local significance, and the NSW Heritage Council. The Council retained its consent powers for alterations to heritage items of state significance.

The Heritage Act is concerned with all aspects of conservation ranging from the most basic protection against damage and demolition, to restoration and enhancement. It recognises two levels of heritage significance, State significance and Local significance across a broad range of values.

Generally this Act provides protection to items that have been identified, assessed and listed on various registers including State government section 170 registers, local government LEPs and the State Heritage Register. The Interim Heritage Order provisions allow the minister or his delegates (local government may have delegated authority) to provide emergency protection to threatened places that have not been previously identified. The only 'blanket' protection provisions in the Act relate to the protection of archaeological deposits and relics greater than 50 years old.

The Heritage Council of NSW

The role of the Heritage Council is to provide the Minister with advice on a broad range of matters relating to the conservation of the heritage of NSW. It also has a role in promoting heritage conservation through research, seminars and publications. The membership of the Heritage Council is designed to reflect a broad range of interests and areas of expertise.

Interim Heritage Orders

Under the provisions of Part 3 of the Act, the Minister can make an interim heritage order (IHO). A recommendation with respect to an order can come from the Heritage Council, either based on a request for the Minister, or the Council's own considerations. The Minister can also authorise Local Councils to make IHOs within their area. An interim conservation order may remain in force for up to 12 months, until such time as it is revoked or the item is listed on the State Heritage Register. A heritage order may control activities such as demolition of structures, damage to relics, places or land, development and alteration of buildings, works or relics.

The State Heritage Register

Changes to the Heritage Act in the 1998 amendments established the State Heritage Register which includes all places previously protected by permanent conservation orders (PCOs) and items identified as being of state significance in heritage and conservation registers prepared by State Government instrumentalities. Sites or places which are found to have a state level of heritage significance should be formally identified to the Heritage Council and considered for inclusion on the State Heritage Register.

National Trust of Australia (NSW) Register

The National Trust of Australia (NSW) is a non-government Community Organisation which promotes the conservation of both the built and natural heritage (for example, buildings, bushland, cemeteries, scenic landscapes, rare and endangered flora and fauna, and steam engines may all have heritage value). The Trust has approximately 30,000 members in New South Wales. Following its survey and assessment of the natural and cultural environment, the Trust maintains a Register of landscapes, townscapes, buildings, industrial sites, cemeteries and other items or places which the Trust determines to have heritage significance and are worthy of conservation. Currently there are some 11,000 items listed on the Trust's Register. They are said to be 'Classified'.

The Trust's Register is intended to perform an advisory and educational role. The listing in the Register has no legal force. However, it is widely recognised as an authoritative statement of the heritage significance of a place. The Trust does not have any control over the development or demolition of the Classified Places or Items in its Register.

While the National Trust Register does not provide any statutory obligations for protection of a site as such, the acknowledgment of a place being listed on the Register as a significant site lends weight to its heritage value. Also, the fact that the actual data for sites may be minimal does not diminish the significance of a place. In fact, many sites were listed with only basic data added, especially in the early developmental stages of the Register.

The Trust, over the last few years has been upgrading the information for places listed, with criteria for assessment for listing based on the Australian Heritage Commission Criteria of assessment for entry to the Register of the National Estate.

A search of the National Trust of Australia (NSW) Register (28th January 2009) revealed that while there are various items listed within both Cooma-Monaro and Bombala LGAs there are no heritage items currently listed as being present in or directly adjacent the proposal area.

8.4 Historical Themes

A historical theme is a way of describing a major historical event or process that has contributed to the history of NSW. Historical themes provide the background context within which the heritage significance of an item can be understood. Themes have been developed at National and State levels, but corresponding regional and local themes can also be developed to reflect a more relevant historical context for particular areas or items.

A summary of themes that are applicable to the study area are listed in the table below (Table 3).

Australian Theme	**NSW Theme**	**Local Theme**
Peopling Australia	Aboriginal cultures and interactions with other cultures	Day-to-day life
		Mythological and ceremonial
		Natural resources
		Contact period
Developing local, regional and national economies	Agriculture	Fencing
		Sheds
		Pasture
		Water provision
		Farmsteads
		Shearing
		Machinery
	Commerce	Banking
		Trade routes
		Shops
		Inns
	Communication	Postal services
		Telephone and telegraph services
		Newspapers
		Transport networks
	Environment – cultural landscape	Tree plantings
		Picnic areas
		Fishing spots
	Events	Floods
	Exploration	Camp sites
		Exploration routes
		Water sources
	Industry	Mills
		Shearing sheds
		Workshops
		Transport networks
		Mines
		Quarries
		Lime kilns
		Miners' camps
		Processing plants
	Pastoralism	Pastoral homesteads
		Sheds and yards
		Travelling stock reserves
		Fencing and boundaries
		Pastoral workers' camps
		Water sources
	Technology	Communication networks

Australian Theme	NSW Theme	Local Theme
	Transport	Railways
		Early roads
		Private tracks
		Coaches and teamsters
		Bridges
Building settlements, towns and cities	Towns, suburbs and villages	Town plan
		Neighbourhoods
	Land tenure	Fencing and other boundary markers
	Utilities	Water distribution
		Garbage disposal
		Sewage/septic systems
		Provision of electricity
		Bridges
		Culverts
	Accommodation	Inns and hostels
		Domestic residences
		Temporary encampments
		Homesteads
		Humpies
Developing Australia's cultural life	Domestic life	Domestic artefact scatters
		Residences
		Food preparation
		Gardens
		Domesticated animals
	Leisure	Show grounds
		Picnic/camping areas
		Racecourse
		Scenic lookouts
		Town halls
		Tourism
	Religion	Churches
	Social institutions	Public hall
		Social groups/associations
	Sport	Sports grounds
		Sports teams
Marking the phases of life	Birth and death	Graves
	Persons	Individual monuments
		Significant individuals/families
		Place names

Table 3. National, state and local historical themes applicable to the study area and surrounds.

8.5 Predictive Statements

While the table above lists a wide variety of themes that are important contextually to the history and heritage of the Boco Rock proposal area, the themes of direct relevance to this project can be broken down into the following broad categories:

- Agriculture/Pastoralism
- Domestic life
- Transport/Communications

Agriculture/Pastoralism

The land in and around the study area has been used by Europeans for agricultural purposes for over 160 years. Sheep grazing has been the primary industry during that period however cattle grazing, dairying and wheat growing have also contributed to the local economy. Initially the area in which the Boco Rock wind farm is proposed would have corresponded to portions of a variety of squatter runs; the area then overlapped with the northern limits of the Bibbenluke Station and has since been subdivided into over ten different holdings. Based on the names of the current homesteads it would appear that at least some of these, such as 'Boco', 'Roselea' and 'Old Springfield' correspond to stations from the nineteenth and early twentieth century. Two of the existing farm complexes, 'Avonlake' and 'Yandra' are currently listed on the Cooma-Monaro Heritage Schedule.

There is a high potential for additional items associated with this theme to be present in the study area. Potential heritage item types are likely to include homesteads (see below), sheds, yards, fences, plough-lands, dams, gardens, roads and tree plantings. These items may be present as extant/standing features or ephemeral remnants. In either case such items may have archaeological research potential and historical/social significance. The location of such features is difficult to predict, although it might be expected that the potential will increase in and around existing homestead complexes, and along property boundaries and drainage lines.

Domestic life

Homesteads are one of the key testaments to the success of the agricultural industry across the Monaro. They were as a rule single story affairs with various outbuildings and outstations. As with many of the more substantial buildings in the towns many of the structures were built of local stone (HO&DUAP 1996). Residences and homestead complexes are also two of the more common site types currently listed on the Bombala and Cooma-Monaro heritage schedules. As discussed above, the 'Avonlake' and 'Yandra' complexes are currently listed on the Cooma-Monaro Heritage Schedule. Given that there are at least a further twelve properties within the study area there is a high potential that additional heritage items associated with this theme might be present.

There is also a high potential for more ephemeral sites such as shepherd huts or other types of camps to be located throughout the study area.

Elements associated with domestic life that might be present include, standing structures, ruins, gardens and tree plantings, fences, toilet pits, and rubbish disposal areas. These sorts of items are generally likely to occur on relatively level ground, either on hill crests or locally elevated ground adjacent water sources. All such items may have archaeological research potential and historical/social significance.

Transport/Communications

The study area is largely located between the Nimmitabel-Bombala and Berridale-Bombala roads; the latter cuts through the southwestern portion of the proposal area. Another road links this one at the 'Avonlake' property and cuts through the northwest of the study area through to Nimmitabel. There is a moderate to high potential for sections of older road alignments to occur adjacent these existing roads. In addition, there are numerous old access roads marked on the map that appear to correspond to the original access roads from the nineteenth century when the land was sold off under the Robertson Land Acts. Some of these roads are probably no longer in use but they may still be evidenced by fencelines and subtle earthworks.

Other potential heritage items associated with this theme that might be present include old cars, drays and carts, internal farm access roads, creek crossings, culverts and old telegraph and electricity poles. Generally speaking the location of such items is difficult to predict. The alignments of old communication and transport routes should however be evidenced as linear

features linking elements of farm complexes together and with neighbouring settlements and transport networks. These sorts of items similarly have potential to be of heritage significance.

Summary

There is a high probability that additional potential heritage items might be present within the study area. The themes that such items are most likely associated with are agriculture/pastoralism, domestic life and transport/communications. Additional items may be present as extant/standing structures or ephemeral sites and ruins. The location of such items is difficult to predict, although the potential generally increases on level ground adjacent existing homesteads, good water supplies and existing or former road alignments.

It should be noted that while there is a high potential for such items to occur this does not necessarily indicate that any items which may be present will be of sufficient significance to warrant heritage listing.

9. SURVEY RESULTS

9.1 Survey Coverage

The development area has been divided into 41 Survey Units. These Survey Units are described in Table 4; their location is shown in Appendix 3.

The proposal area includes four separate turbine clusters defined as:

- *Yandra*: the north-east cluster;
- *Springfield*: the north-west cluster;
- *Boco*: the south-east cluster, and
- *Sherwins*: the south-west cluster (including the Substation cluster – see Figure 2).

The environmental context of each of the four clusters and the Survey Units defined within them are discussed in the following section.

The Yandra cluster is located southwest of Nimmitabel and north of the Maclaughlin River. Access is via Yandra Road, off Springfield Road. Springfield Road is located on the watershed between the Bobundra Creek drainage to the north and the Maclaughlin River catchment to the south. The turbines, their associated roads and electrical connections, are located on either ridge crests of varying width or broader plateau landforms. The Yandra cluster is encompassed by Survey Units 1- 11 and the eastern end of SU34 (see Appendix 3: maps 1, 2 and 3).

The majority of the Yandra cluster is grassed with minor patches of scattered trees; its current landuse is sheep and cattle grazing. It is uncertain how wooded the area was prior to European occupation however some clearance can be expected to have occurred. The site possesses evidence of active wind erosion on crests and hillslopes and ground surfaces are disturbed as a result of a long history of grazing. At the time of the field survey the area was largely devoid of grass cover due to drought. The underlying geology is basalt which is present as extensive cobbles. Soils are silty loams and in exposures were often found to be soft, friable humic (from animal manure) soils overlying harder, eroded surfaces. Some areas have been recently cultivated and much of the remainder is likely to have been so in the past.

Survey Unit 1 (SU1) is located on a gently undulating and relatively narrow ridge crest which extends southward from Springfield Road. Existing road access to various properties follows the crest and a series of turbines are proposed on either side of the road (Plate 1). Various services traverse the ridge including an underground communications cable and overhead powerline. SU2 extends southward from SU1 (Plate 2) as a lower elevation, broad plateau landform. SU2 terminates at its southern end at approximately 700 m north of the Maclaughlin River. Steep slopes fall to the south from SU2 to the river. SUs 3, 4 (Plate 3) and 5 are located on a series of simple (lower) slopes located in a 1st order drainage context and encompass a proposed road interconnecting various turbine groups within the Yandra cluster. SU7 (Plate 4) is located on a ridge crest which extends westward from SU1; it contains scattered trees and is notable due to the presence of extensive disturbance and undulations in the ground caused possibly by rabbit burrows. From SU7 the ridge extends southwards and includes SU6, a long saddle, and SU8 an undulating, narrow, largely treed crest (Plate 5). From SU8 the landform drops down to a lower elevation and broader plateau landform (SU9). SU10 extends to the west from SU8 on a broad, very gently undulating plateau landform; it is grassland and generally devoid of trees (Plate 6). SU11 is a narrow ridge crest which slopes to the west from the plateau towards Boco Creek (Plate 7). SU34 is on a ridge crest landform which extends southwest from SU10 towards Boco Creek and the Maclaughlin River.

The proposed impact areas within the Yandra cluster are all assessed to be of low archaeological potential and sensitivity. The landforms are large amorphous features with low biodiversity values and an absence of any potable water. These landforms are likely to have been utilised by

Aboriginal people on occasional and a generally limited basis for activities such as hunting and gathering forays and travel through country. Such activities are likely to have resulted in the discard of isolated and discrete clusters of stone artefacts in low densities only.

The Springfield cluster is located to the west of the Yandra cluster and is northwest of the Maclaughlin River. Access to the Springfield cluster is from Springfield Road. Boco Creek, a tributary of the Maclaughlin River drains southward between the Springfield and Yandra clusters. The turbines, their associated roads and electrical connections, are located primarily on broad plateau landforms in this cluster. Two 3rd order streams (Gentle Barlow Creek and Scrubby Gully), both of which are ephemeral, flow southward into the Maclaughlin River from the plateau. The slopes off the plateau and ridges are steep. The Springfield cluster is encompassed by Survey Units 12 - 14 (see Appendix 3: maps 4 and 5).

The majority of the Springfield cluster is grassland dominated by tussocks; its current landuse is sheep and cattle grazing. The underlying geology on the plateau and ridges is basalt which is present as extensive cobbles. Soils are silty loams and in exposures were generally hard, eroded and rocky surfaces. In the lower reaches of Scrubby Gully shale bedrock is exposed below the basalt and milky quartz veins are present; this quartz is likely to have been utilised by Aboriginal people for implement manufacture.

Survey Unit 12 is a located at the north end of Sherwins Range (Plate 8). It is on a broad, very gently undulating plateau which is a watershed between Dog Kennel Creek which drains to the northwest and the Maclaughlin River to the south. SU13 is a narrow ridge crest which slopes from the plateau encompassed by SU12, in a south south-easterly direction towards the junction of Boco Creek and the Maclaughlin River (Plate 9). Some scattered trees are present on SU13. SU14 is a broad, gently undulating plateau landform which extends to the south from SU12 at on a lower elevation. Similarly to SU12, SU14 is comprised of grassland dominated by tussocks.

The proposed impact areas within the Springfield cluster are assessed to be of low archaeological potential and sensitivity. The landforms are large, amorphous and exposed features with low biodiversity values and an absence of any potable water. It is however noted that eight locales contain stone artefacts (albeit in low density) were recorded in SU13 and it is concluded that this environmental context would seem to have sustained greater levels of occupation than those situated at higher elevation. This is possibly explained by the ridge facing southeast and possibly being somewhat sheltered from prevailing weather compared to the higher elevation, treeless, plateau contexts. Additionally, SU13 is on elevated landform, relatively close to fresh water in Boco Creek (c. 1.3 km) which may have made it a more favourable occupation site.

Plate 1. SU1 in Yandra cluster.

Plate 2. SU2 in Yandra cluster; taken from south end of SU1 looking southeast.

Plate 3. SU4 in Yandra cluster; taken from east end looking west.

Plate 4. SU7 in Yandra cluster; looking northeast.

Plate 5. SU8 in Yandra cluster.

Plate 6. SU10 in Yandra cluster: northwest end; looking west.

Plate 7. SU11 in Yandra cluster; from west end looking east.

Plate 8. SU12 in Springfield cluster.

Plate 9. SU13 in Springfield cluster.

Plate 10. SU21 in Boco cluster.

The Boco cluster is located to the south and east of the Maclaughlin River, which in this area bends to the south. Access to the Boco cluster is along Boco Road which follows the Maclaughlin River. The turbines, their associated roads and electrical connections, are located on a broad plateau landform and several ridge crests. The Boco cluster is encompassed by Survey Units 21, 40 and 41 (see Appendix 3: maps 12 and 13).

The majority of the Boco cluster is grassland however the eastern area contains scattered trees; its current landuse is sheep and cattle grazing. The site possesses evidence of active wind erosion on crests and hillslopes. At the time of the field survey the area was largely devoid of grass cover due to drought. The underlying geology is basalt which is present as extensive cobbles. Soils are silty loams and in exposures were found to be hard, eroded and rocky surfaces. Some areas have been recently cultivated.

SU21 is a broad, gently undulating plateau (Plate 10) and is comprised of grassland dominated by tussocks. The land both to the north and south of the plateau falls steeply to the Maclaughlin River and Garlands Creek respectively. From the east end of SU21 the land rises to the east as a series of ridge crests (SU40); scattered trees are present. SU41 extends northward as a narrow ridge crest from SU40 and is divided from the plateau to the west by Greek Gully; it is comprised of grassland and appears to have always been treeless.

Similarly to the Yandra and Springfield clusters, the proposed impact areas within the Boco cluster are assessed to be of low archaeological potential and sensitivity. The landforms are also broad, amorphous and exposed features with low biodiversity values and an absence of any potable water.

The Sherwins cluster is located in the southwest of the proposal area and to the west of the Maclaughlin River. Access is from Avon Road. This cluster is located on Sherwins Range which extends in a north south alignment; it is the watershed between Ironmongy and Smithfield Creeks which flow to the west and the Maclaughlin River to the east. At its eastern margin Sherwins Range falls steeply to the east; the range extends to the west as a plateau landform. Numerous ephemeral creek lines drain to the southeast from the main plateau. The turbines, their associated roads and electrical connections, are located on either ridge crests or broader plateau landforms. The Sherwins cluster is encompassed by Survey Units 15 - 20 (see Appendix 3: maps 6, 7, 8 and 9).

The majority of the Sherwins cluster is comprised of grassland dominated by tussocks; its current landuse is sheep and cattle grazing. The site possesses evidence of active wind erosion on crests and hillslopes. The underlying geology is basalt which is present as extensive cobbles. Soils are silty loams and in exposures were found to be hard, eroded and rocky surfaces. Some areas have been recently cultivated.

Survey Unit 16 is located on a gently undulating broad plateau landform comprised of grassland (Plate 11). SU15 is a relatively narrow ridge crest which slopes to the east between various 1st order drainage lines (Plate 12). SU17 is a broad ridge crest which is gently undulating as a series of low knolls and associated saddles (Plate 13). At its southern end this ridge crest opens to a broad plateau landform and is encompassed by SU18. From SU18 Sherwins Range continues south as a gently undulating broad ridge crest (SU19: Plate 14); the land falls steeply to the east from the crest and gently to the west as a broad plateau. SU20 is a narrow, very rocky and exposed ridge crest landform.

The Sherwins cluster area is assessed to be of low archaeological potential and sensitivity generally. The landforms are large amorphous and exposed features with low biodiversity values and an absence of any water. It is noted however that SU15 and SU19 were each found to contain a number of low density artefact locales. Similarly to SU13 in the Springfield cluster SU15 is a ridge crest which slopes to the southeast from a plateau; the presence of artefacts in this environmental context may be explained comparably; that is, south east facing landforms situated at lower elevations may have been sheltered and hence desirable locations for camping. The presence of seven artefact locales along the central part of the high and exposed ridge crest of SU19 is less easy to explain, however it is suggested that the vantage (to all cardinal points) provided by this location may be relevant.

Plate 11. SU16 in the Sherwins cluster.

Plate 12. SU15 in the Sherwins cluster.

Plate 13. SU17 in the Sherwins cluster.

Plate 14. SU19 in the Sherwins cluster.

In addition to the four turbine clusters Survey Units were recorded to encompass impacts proposed by a transmission line connecting the eastern and western clusters and a possible road access to the Boco cluster along Boco Road (*current and revised planning indicates this to be unlikely*). The Survey Units along the transmission line include part of SU34 (west end), and SUs 35-39 (see Appendix 3: Maps 3, 4, 10, 12 and 6).

The west end of SU34 falls steeply on a ridge crest to Boco Creek. The proposed transmission line then traverses a series of lower simple slopes, ridge crests and flats located to the north of the Maclaughlin River. A number of artefact locales were recorded on elevated landforms and none were found on flats. This result is consistent with the predictive model applicable to the environmental context; it can be expected that people would have utilised landforms located close to reliable water and elevated above the river corridor and cold air drainage.

The Survey Units along Boco Road providing access to the Boco cluster include SUs 22-33 (see Appendix 3: Maps 10 and 11). These Survey Units traversed either cultivated flats or lower simple slopes situated in close proximity to the river. Despite high levels of archaeological visibility along these Survey Units no artefact locales were recorded. This result is explained by the low elevation of these landforms within corridors of cold air drainage.

SU	Proposed Impacts	Landform	Environmental context	Slope	Aspect	Geology	Abundance Rock	Quartz Background	Soil	Deposit Potential	Geomoph -ology	Agents	Disturbance Levels	Predicted Artefact Density
SU1	Turbines road and electrical	Ridge crest; (c. 200m) wide; gently undulating	Low biodiversity; scattered trees; 2.5 km from reliable water in Maclaughlin R.	gently inclined	open	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU2	Turbines road and electrical	crest; broad plateau	Low biodiversity; scattered trees; 1 km from reliable water in Maclaughlin R.	gently inclined	open	Basalt	Slightly rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU3	Road	lower slope	Low biodiversity; 2.5 km from reliable water in Maclaughlin R	very gently inclined	SW	Basalt	Slightly rocky	Negligible	silty loam	Yes	eroded or aggraded	precipitation	moderate	very low
SU4	Road	lower slope	Low biodiversity; 3 km from reliable water in Maclaughlin R	very gently inclined	S	Basalt	Slightly rocky	Negligible	silty loam	Yes	eroded or aggraded	precipitation	moderate	very low
SU5	Road	simple slope	Low biodiversity; 3 km from reliable water in Maclaughlin R	moderately inclined	E	Basalt	Slightly rocky	Negligible	silty loam	Yes	eroded or aggraded	precipitation	moderate	very low
SU6	Turbines road and electrical	Ridge crest; saddle	Low biodiversity; 3 km from reliable water in Maclaughlin R	very gently inclined	open	Basalt	Slightly rocky	Negligible	silty loam	Yes	eroded or aggraded	wind	moderate	very low
SU7	Turbines road and electrical	Ridge crest; (c. 150m) wide; gently undulating	Low biodiversity; scattered trees; 2.5 km from reliable water in Maclaughlin R.	gently inclined	open	Basalt	Slightly rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU8	Turbines road and electrical	Ridge crest; (c. 100m) wide; gently undulating	Low biodiversity; scattered trees; 2 km from reliable water in Maclaughlin R.	gently inclined	open	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU9	Turbines road and electrical	Ridge crest; broad (c. 250m); very gently undulating	Low biodiversity; scattered trees; 1 km from reliable water in Maclaughlin R.	very gently inclined	open	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU10	Turbines road and	Crest; wide plateau;	Low biodiversity; scattered trees; >1	very gently inclined	open	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low

SU	Proposed Impacts	Landform	Environmental context	Slope	Aspect	Geology	Abundance Rock	Quartz Background	Soil	Deposit Potential	Geomoph -ology	Agents	Disturbance Levels	Predicted Artefact Density
	electrical	very gently undulating	km from reliable water in Maclaughlin R.											
SU11	Turbines road and electrical	Ridge crest; narrow; sloping to west towards Boco Ck	Low biodiversity; 1.5 km from reliable water in Maclaughlin R.	gently inclined	W	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU12	Turbines road and electrical	Crest; wide plateau; very gently undulating	Low biodiversity; grassland; >2 km from reliable water in Maclaughlin R.	very gently inclined	open	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU13	Turbines road and electrical	Ridge crest; narrow; sloping to SSE	Low biodiversity; grassland; 1.5 km from reliable water in Maclaughlin R.	gently inclined	N	Basalt	Rockland	Negligible	silty loam	Yes	eroded	wind	moderate	low moderate
SU14	Turbines road and electrical	Crest; wide plateau; very gently undulating	Low biodiversity; grassland; 1.5 km from reliable water in Maclaughlin R.	very gently inclined	open	Basalt	Very rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU15	Turbines road and electrical	Ridge crest; narrow; sloping to SE	Low biodiversity; grassland; 2 km from reliable water in Maclaughlin R.	gently inclined	N	Basalt	Rockland	Negligible	silty loam	Yes	eroded	wind	moderate	low
SU16	Turbines road and electrical	Crest; wide plateau; very gently undulating	Low biodiversity; grassland; 2.5 km from reliable water in Maclaughlin R.	very gently inclined	open	Basalt	Slightly rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU17	Turbines road and electrical	Ridge crest; broad (c.250m); gently undulating	Low biodiversity; grassland; 2.5 km from reliable water in Maclaughlin R.	gently inclined	open	Basalt	Rockland	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU18	Turbines road and electrical	Crest; wide plateau; very gently undulating	Low biodiversity; grassland; 3.5 km from reliable water in Maclaughlin R.	very gently inclined	open	Basalt	Slightly rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU19	Turbines road and electrical	Ridge crest; broad (c. 250m); gently undulating	Low biodiversity; grassland; 2.5 km from reliable water in Maclaughlin R.	gently inclined	open	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	moderate	low

SU	Proposed Impacts	Landform	Environmental context	Slope	Aspect	Geology	Abundance Rock	Quartz Background	Soil	Deposit Potential	Geomoph -ology	Agents	Disturbance Levels	Predicted Artefact Density
SU20	Turbines road and electrical	Ridge crest; narrow (c. 100m); gently undulating	Low biodiversity; grassland; 2 km from reliable water in Maclaughlin R.	gently inclined	open	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU21	Turbines road and electrical	Crest; wide plateau; very gently undulating	Low biodiversity; grassland; 0.5 km from reliable water in Maclaughlin R.	gently inclined	open	Basalt	Very rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low
SU22	Road	simple slope	Low biodiversity; grassland; 200m from reliable water in Maclaughlin R.	gently inclined	SW	Shale	Slightly rocky	moderate	silty loam	Yes	eroded	wind	high	very low
SU23	Road	Crest; saddle	Low biodiversity; grassland; 600m from reliable water in Maclaughlin R.	very gently inclined	open	Shale	Slightly rocky	Moderate	clay loam	Yes	eroded	wind	moderate	low
SU24	Road	Simple slope	Low biodiversity; grassland; 600m from reliable water in Maclaughlin R.	moderately inclined	S	Basalt	Slightly rocky	moderate	silty loam	Yes	eroded	wind; precipitation	moderate	very low
SU25	Road	Ridge crest; narrow (c. 100m); gently undulating	Low biodiversity; grassland; 600m from reliable water in Maclaughlin R.	.gently inclined	open	Basalt	Rocky	Moderate	silty loam	Yes	eroded	Wind	moderate	very low
SU26	Road	lower slope	Low biodiversity; 100m from reliable water in Maclaughlin R.	gently inclined	SW	Shale	Rocky	Moderate	Silty loam	yes	eroded	Mechanical (road) wind; precipitation	moderate	very low
SU27	Road	Very narrow flat (<20m)	Low biodiversity; adjacent reliable water in Maclaughlin R.	gently inclined	SW	Shale	Rocky	Moderate	Silty loam	yes	eroded	Mechanical (road); precipitation	high	very low
SU28	Road	lower slope	Low biodiversity; adjacent reliable water in Maclaughlin R.	very gently inclined	W	Shale	Rocky	Moderate	Silty loam	yes	eroded	Mechanical (roads); precipitation	high	very low
SU29	Road	flat	Low biodiversity; adjacent reliable water in Maclaughlin R.	very gently inclined	W	Shale	Rocky	Moderate	Silty loam	yes	eroded	Mechanical (road, ploughed); precipitation	high	very low
SU30	Road	lower slope	Low biodiversity;	gently	NW	Basalt	Rocky	low	Silty	yes	eroded	Mechanical	high	very low

SU	Proposed Impacts	Landform	Environmental context	Slope	Aspect	Geology	Abundance Rock	Quartz Background	Soil	Deposit Potential	Geomoph -ology	Agents	Disturbance Levels	Predicted Artefact Density
			adjacent reliable water in Maclaughlin R.	inclined					loam			(road, ploughed); precipitation		
SU31	Road	flat	Low biodiversity; 300m from reliable water in Maclaughlin R.	very gently inclined	W	Basalt	Rocky	Low	Silty loam	yes	aggraded	Mechanical (road, ploughed); precipitation	high	very low
SU32	Road	lower slope	Low biodiversity; adjacent reliable water in Maclaughlin R.	gently inclined	E	Basalt	Rocky	Low	Silty loam	yes	eroded	Mechanical (road); precipitation	high	very low
SU33	Road	lower slope	Low biodiversity; 400m from reliable water in Maclaughlin R.	very gently inclined	E	Basalt	Rocky	Low	Silty loam	yes	eroded	Mechanical (road, ploughed); precipitation	high	very low
SU34	Turbines road and electrical	Ridge crest; undulating	Low biodiversity; 400m from reliable water in Maclaughlin R	moderately inclined	SW	Basalt	Very rocky	Negligible	silty loam	Yes	eroded or aggraded	wind	moderate	very low
SU35	Trans- mission line	lower slope	Low biodiversity; 300m from reliable water in Maclaughlin R.	gently inclined	SE	Basalt	Rocky	low	silty loam	No	eroded or aggraded	precipitation	Moderate	low moderate
SU36	Transmission line	Ridge crest; sloping south to river	Low biodiversity; 400m from reliable water in Maclaughlin R.	moderately inclined	S	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	Moderate	low
SU37	Transmission line	Flat	Low biodiversity; 300m from reliable water in Maclaughlin R.	very gently inclined	open	Basalt/ Shale cobbles	Rocky	low	silty loam	Yes	eroded or aggraded	Wind/ mechanical (ploughed)	High	very low
SU38	Transmission line	Ridge crest; sloping south to river	Low biodiversity; grassland; 600m from reliable water in Maclaughlin R.	moderately inclined	S	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	Moderate	low moderate
SU39	Transmission line; substation and turbine	Ridge crest; wide; sloping eastward towards river	Low biodiversity; grassland; 1 km from reliable water in Maclaughlin R.	moderately inclined	E	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	Moderate	very low
SU40	Turbines road and	Ridge crest; broad;	Low biodiversity; 1.5km from reliable	gently inclined	NW	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low

SU	Proposed Impacts	Landform	Environmental context	Slope	Aspect	Geology	Abundance Rock	Quartz Background	Soil	Deposit Potential	Geomoph -ology	Agents	Disturbance Levels	Predicted Artefact Density
	electrical	undulating	water in Maclaughlin R											
SU41	Turbines road and electrical	Ridge crest; narrow undulating	Low biodiversity; 900m from reliable water in Maclaughlin R	gently inclined	N	Basalt	Rocky	Negligible	silty loam	Yes	eroded	wind	moderate	very low

Table 4. Survey Unit descriptions.

Survey Coverage

The development area surveyed during this assessment measured approximately 882.9 hectares in area (Table 5). It is estimated that approximately 539 hectares of that area was subject to survey inspection. Ground exposures inspected are estimated to have been 213 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 61 hectares. Effective Survey Coverage is therefore calculated to have been 7% of the survey area.

SU	SU Area	Area Inspected %	Area Inspected sq m	Ground Exposure %	Ground Exposure sq m	Visibility %	Net Effective Exposure sq m	Effective Survey Coverage %
SU1	281094	70	196766	60	118059	40	47224	17
SU2	434251	70	303976	50	151988	25	37997	9
SU3	12719	85	10811	60	6487	30	1946	15
SU4	16823	85	14300	70	10010	10	1001	6
SU5	7090	85	6027	50	3013	30	904	13
SU6	23077	70	16154	40	6462	40	2585	11
SU7	179333	70	125533	60	75320	40	30128	17
SU8	248598	70	174019	35	60907	30	18272	7
SU9	137845	60	82707	60	49624	25	12406	9
SU10	564727	70	395309	75	296482	40	118593	21
SU11	101652	65	66074	50	33037	50	16518	16
SU12	767492	50	383746	30	115124	30	34537	5
SU13	211711	70	148198	40	59279	60	35567	17
SU14	273598	50	136799	30	41040	30	12312	5
SU15	47261	60	28357	40	11343	30	3403	7
SU16	212016	60	127210	40	50884	25	12721	6
SU17	670223	60	402134	30	120640	20	24128	4
SU18	534188	50	267094	30	80128	20	16026	3
SU19	673652	60	404191	20	80838	15	12126	2
SU20	61245	65	39809	30	11943	20	2389	4
SU21	1665057	55	915781	30	274734	15	41210	2
SU22	15189	75	11391	60	6835	20	1367	9
SU23	7957	75	5968	60	3581	25	895	11
SU24	70699	50	35350	40	14140	15	2121	3
SU25	59221	75	44416	40	17766	20	3553	6
SU26	2439	80	1951	60	1171	50	585	24
SU27	13850	80	11080	50	5540	30	1662	12
SU28	7967	70	5577	70	3904	60	2342	29
SU29	41246	80	32997	90	29697	60	17818	43
SU30	10569	80	8455	45	3805	60	2283	22
SU31	46794	80	37435	35	13102	60	7861	17
SU32	31973	80	25578	40	10231	60	6139	19
SU33	34585	80	27668	60	16601	30	4980	14
SU34	285790	70	200053	50	100026	20	20005	7
SU35	71461	70	50023	25	12506	20	2501	4
SU36	34833	70	24383	35	8534	25	2134	6
SU37	53765	70	37636	60	22581	15	3387	6
SU38	118667	70	83067	40	33227	25	8307	7
SU39	274047	70	191833	35	67141	20	13428	5
SU40	445731	60	267439	35	93604	25	23401	5
SU41	78512	60	47107	30	14132	25	3533	5
Total	**8828950**		**5394401**		**2135466**		**610296**	**7**

Table 5. Survey Coverage Data.

9.2 Survey Results - Indigenous

A total of 56 Aboriginal object locales have been recorded in the survey area (Table 6); their location is shown in Appendix 3. Stone artefacts were found in all environmental contexts surveyed except for flats beside the Maclaughlin River. Generally plateau and ridge crest landforms were found to contain sparse and isolated stone artefact distributions only, and in many Survey Units on such landforms, no artefacts were found at all. More consistent artefact distribution was found on lower elevation landforms including crests and slopes which fall away from the plateau, or otherwise, are situated above but in close proximity to the Maclaughlin River. This pattern of artefact density and distribution is generally consistent with the predictive model of site type and location applicable to the area.

It is noted that artefacts were not recorded in half of the Survey Units (#21). It is expected that stone artefacts are likely to be present in most, if not all these Survey Units, however it is assessed that artefact density will be low, very low or negligible.

As noted above no artefacts were recorded on flats situated in Survey Units adjacent to the Maclaughlin River. This result is in keeping with the predictive model of site type and location relevant to the local area in which it is considered that camp site locations in the vicinity of reliable water are likely to have been on elevated landforms above cold air drainage. While it is unlikely that there are no artefacts in flat landforms the survey results suggest that artefact density is likely to be very low in flats; effective survey coverage was consistently and considerably higher in flats than elsewhere in the study area (Table 5).

Approximately half of the artefact recordings consist of either single stone artefacts (#26: 46%) or otherwise very low numbers (26 locales consist of between 2 and 10 artefacts). The results are assessed to be a reflection of the low artefact density present in the landforms in which they are situated.

The majority of artefacts recorded are flakes, flake portions, flaked pieces and cores made from a range of materials including quartz, silcrete, chert, quartzite and volcanics (Appendix 1). The majority of artefacts are made from milky quartz with a minor presence of translucent quartz. Quartz is locally available in pebble form in the Maclaughlin River and also in terrestrial exposures in shale bedrock. All cortex on quartz artefacts is of pebble form. The dominance of this material is likely to be a reflection of the local availability of this stone. It is noted that the majority of the Survey Units are situated on basalt bedrock and autochthonous quartz was found to be generally absent (see Table 4). Accordingly the majority of fractured quartz found in these contexts is likely to be artefactual.

Silcrete in many different colours and textures was recorded. Silcrete artefacts possessed both terrestrial and pebble cortex indicating that this material has come from a variety of regional sources. A distinctive, fine grained silcrete with brown and grey mottles was recorded; this same or very similar material has been observed in assemblages at Jindabyne (pers. observation). Other materials were found in very minor frequencies.

As already noted the majority of artefacts recorded are representative of flaking debitage. The majority of artefacts are the result of hard hammer percussion flaking however a small number of bipolar flaked artefacts were also observed.

In addition to flaking debitage a number of other artefact types or implements were recorded including a silcrete retouched artefact, three amorphous flaked pieces with evidence of usewear (possible scrapers) two hammerstones, an anvil and a large chopper. These implements were found in all landform contexts.

SU	Locale	Easting	Northing	Area	Exposure	Context	Exposure	Visibility	Artefact Number	Predicted Density	Integrity	Subsurface potential at site	Subsurface potential away from site	Impacts
SU1	L1	698556	5954485	1 x 1	bare earth in ploughed area: 50 x 80m	On west side of Yandra Rd; broad ridge; aspect: open; very gentle gradient	70	50	1	very low	moderately disturbed: ploughed	Yes	Yes	Access track and electrical cabling
SU2	L1	698019	5952153	1 x 1	bare earth area: 30 x 30 m	On broad plateau; aspect: open; very gentle gradient	90	20	1	very low	moderately disturbed	Yes	Yes	Nil
SU8	L1	696942	5951768	1 x 1	bare earth continuous	On side slope of bridge crest; aspect: NE; moderate gradient	30	50	1	very low	moderately disturbed	No	Yes	Nil
SU9	L1	697265	5951392	30 x 2	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	40	25	2	very low	moderately disturbed	Yes	Yes	Access track and electrical cabling
SU10	L1	695117	5954475	1 x 2	bare earth in area 10 x 10	On broad plateau; aspect: open; very gentle gradient	90	90	4	low; possible single knapping event	moderately disturbed	Yes	Yes	Nil; adjacent access track and electrical cabling
SU10	L2	694698	5954875	1 x 1	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	10	80	1	very low	moderately disturbed	Yes	Yes	Nil
SU10	L3	696044	5952779	1 x 1	bare earth continuous	On broad plateau; aspect: west; very gentle gradient	50	40	3	very low	moderately disturbed	Yes	Yes	Turbine
SU12	L1	691817	5953182	1 x 1	bare earth; area 20 x 20	On north side of low knoll	80	20	1	very low	moderately disturbed	Yes	Yes	Nil
SU12	L2	689710	5952719	20 x 10	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	50	60	3	very low	moderately disturbed	Yes	Yes	Access track and electrical cabling
SU12	L3	689592	5952380	20 x 10	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	40	60	3	very low	moderately disturbed	Yes	Yes	Nil

SU	Locale	Easting	Northing	Area	Exposure	Context	Exposure	Visibility	Artefact Number	Predicted Density	Integrity	Subsurface potential at site	Subsurface potential away from site	Impacts
SU12	L4	689483	5952324	10 x 5	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	60	40	2	very low	moderately disturbed	Yes	Yes	Nil
SU12	L5	689435	5952317	20 x 10	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	50	40	2	very low	moderately disturbed	Yes	Yes	Turbine
SU12	L6	689979	5952936	1x 1	bare earth continuous	On broad plateau; aspect: SW; gentle gradient	30	10	1	very low	moderately disturbed	Yes	Yes	Nil
SU13	L1	692319	5953559	1 x 1	bare earth continuous	On narrow spur crest; aspect to east; gentle gradient	5	40	1	low	moderately disturbed	Yes	Yes	Nil
SU13	L2	692371	5953471	1 x 1	bare earth continuous	On narrow spur crest; aspect to SE; gentle gradient	5	40	1	low	moderately disturbed	Yes	Yes	Nil
SU13	L3	692431	5953371	2 x 1	bare earth continuous	On narrow spur crest; aspect to SE; gentle gradient	10	50	4	low	moderately disturbed	Yes	Yes	Access track and electrical cabling
SU13	L4	692443	5953415	2 x 2	bare earth continuous very rocky	On narrow spur crest; aspect to SE; gentle gradient	50	50	5	low	moderately disturbed	No	Yes	Nil
SU13	L5	692438	5953328	100 x 100	bare earth continuous	On narrow spur crest; aspect to SE; gentle gradient	40	60	44	low moderate	moderately disturbed	Yes	Yes	Access track and electrical cabling
SU13	L6	692544	5953080	20 x 10	bare earth continuous	On narrow spur crest; aspect to SE; gentle gradient	50	40	5	low	moderately disturbed	Yes	Yes	Nil
SU13	L7	692602	5952983	10 x 5	bare earth continuous	On narrow spur crest; aspect to W; gentle gradient	50	40	2	low	moderately disturbed	Yes	Yes	Nil
SU13	L8	692609	5952898	5 x 5	bare earth continuous	On narrow spur crest; aspect to W; gentle gradient	70	50	6	low moderate	moderately disturbed	Yes	Yes	Nil
SU14	L1	691305	5951198	1 x 1	bare earth continuous	On broad plateau;	40	70	1	very low	moderately disturbed	Yes	Yes	Nil

SU	Locale	Easting	Northing	Area	Exposure	Context	Exposure	Visibility	Artefact Number	Predicted Density	Integrity	Subsurface potential at site	Subsurface potential away from site	Impacts
						aspect: open; very gentle gradient								
SU14	L2	691486	5952157	1 x 1	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	40	60	1	very low	moderately disturbed	Yes	Yes	Nil
SU15	L1	688576	5949222	2 x 2	Mechanical; track and pipeline; bare earth continuous	Narrow spur crest; aspect to SE; moderate gradient	80	60	2	very low	highly disturbed	Yes	Yes	Nil
SU15	L2	688680	5949148	80 x 10	bare earth; mechanical; vehicle	Narrow spur crest - saddle; aspect: open; very gentle gradient	60	60	8	low	moderately disturbed	Yes	Yes	Nil; adjacent access track and electrical cabling
SU15	L3	688810	5949088	15 x 5	bare earth; mechanical; vehicle continuous	Narrow spur crest; aspect: open; very gentle gradient	40	60	2	low	moderately disturbed	Yes	Yes	Access track and electrical cabling
SU15	L4	688881	5949021	1 x 1	bare earth continuous; erosion; mechanical	Narrow spur crest; aspect: open; very gentle gradient	60	60	1	low	moderately disturbed	Yes	Yes	Nil
SU15	L5	689001	5948986	1 x 1	bare earth continuous; mechanical; vehicle	Narrow spur crest; aspect: open; very gentle gradient	70	60	1	low	moderately disturbed	Yes	Yes	Nil; adjacent access track and electrical cabling
SU16	L1	688372	5949338	80 x 5	mechanical; vehicle; bare earth continuous	On broad plateau; aspect: open; very gentle gradient	80	70	5	low	highly disturbed	Yes	Yes	Turbine
SU16	L2	687953	5949047	1 x 1	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	30	20	1	very low	moderately disturbed	Yes	Yes	Nil; adjacent turbine
SU16	L3	687781	5949347	1 x 1	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	20	20	1	very low	moderately disturbed	Yes	Yes	Nil
SU16	L4	687871	5949762	1 x 1	bare earth continuous	On broad plateau; aspect: open;	50	30	1	very low	moderately disturbed	Yes	Yes	Access track and electrical cabling and turbine

SU	Locale	Easting	Northing	Area	Exposure	Context	Exposure	Visibility	Artefact Number	Predicted Density	Integrity	Subsurface potential at site	Subsurface potential away from site	Impacts
						very gentle gradient								
SU16	L5	687874	5949805	1 x 1	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	60	30	1	very low	moderately disturbed	Yes	Yes	Turbine
SU16	L7	687767	5949789	1 x 1	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	40	30	1	very low	moderately disturbed	Yes	Yes	Turbine
SU16	L6	687717	5949794	1 x 1	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	40	30	1	very low	moderately disturbed	Yes	Yes	Turbine
SU16	L8	688151	5950164	10 x 10	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	90	60	7	low	moderately disturbed	No	Yes	Turbine
SU17	L1	686735	5949188	10 x 20	bare earth continuous	On broad plateau; knoll; aspect: open; very gentle gradient	30	25	4	very low	moderately disturbed	Yes	Yes	Turbine
SU17	L2	686340	5948184	1 x 1	animal track bare earth continuous	On broad plateau; aspect: open; very gentle gradient	25	20	1	very low	moderately disturbed	Yes	Yes	Access track and electrical cabling and turbine
SU19	L1	686016	5943813	1 x 1	bare earth continuous	Ridge crest; aspect: open; gentle gradient	75	10	3	very low	moderately disturbed	Yes	Yes	Turbine
SU19	L2	685878	5943665	60 x 40	bare earth continuous	Ridge crest; saddle; aspect: open; very gentle gradient	15	22	50 + on surface	low/moderate	moderately disturbed	Yes	Yes	Turbine
SU19	L3	685539	5943385	20 x 30	bare earth continuous	Ridge crest; aspect: open; gentle gradient	15	10	7	low	moderately disturbed	Yes	Yes	Nil; adjacent access track and electrical cabling
SU19	L4	685513	5943258	1x1	bare earth continuous	Ridge crest; aspect: open; gentle gradient	15	10	1	low	moderately disturbed	Yes	Yes	Turbine
SU19	L5	685569	5942315	1 x 1	bare earth continuous	Ridge crest; saddle; aspect:	80	15	1	very low	moderately disturbed	Yes	Yes	Nil

SU	Locale	Easting	Northing	Area	Exposure	Context	Exposure	Visibility	Artefact Number	Predicted Density	Integrity	Subsurface potential at site	Subsurface potential away from site	Impacts
						open; gentle gradient								
SU19	L6	685366	5941922	1 x 1	bare earth continuous	Ridge crest; aspect: open; gentle gradient	40	15	1	low	moderately disturbed	Yes	Yes	Nil; adjacent turbine
SU19	L7	685268	5941700	1 x 1	bare earth continuous	Ridge crest; aspect: open; gentle gradient	40	15	1	low	moderately disturbed	Yes	Yes	Nil; adjacent turbine
SU21	L1	693851	5948477	1 x 1	bare earth continuous	On broad plateau; aspect: open; very gentle gradient	35	15	1	very low	moderately disturbed	Yes	Yes	Nil; adjacent turbine
SU21	L2	695873	5947784	2 x 25	vehicle; bare earth continuous	On broad plateau; saddle; aspect: open; very gentle	60	15	7	low	moderately disturbed	Yes	Yes	Turbine
SU23	L1	691950	5948966	1 x 1	vehicle continuous	Saddle; aspect open; gentle gradient	80	30	1	low	moderately disturbed	Yes	Yes	Access track and electrical cabling and turbine
SU35	L1	693669	5951287	1 x 1	bare earth continuous	Foot slope; aspect to SE; gentle gradient	50	20	1	low	moderately disturbed	Yes	Yes	Transmission line to substation from 'Yandra'
SU35	L2	693490	5951209	5 x 5	bare earth continuous	Foot slope; aspect to SE; gentle gradient	35	20	11	low moderate	moderately disturbed	Yes	Yes	Transmission line to substation from 'Yandra'
SU35	L3	693260	5951134	150 x 20	bare earth continuous	Foot slope; aspect to SE; gentle gradient	30	20	27	low moderate	moderately disturbed	Yes	Yes	Transmission line to substation from 'Yandra'
SU36	L1	692914	5951005	20 x 20	bare earth	Spur crest; aspect to SE; gentle gradient	40	25	6	low	moderately disturbed	Yes	Yes	Transmission line to substation from 'Yandra'
SU38	L1	691752	5950467	2 x 20	bare earth	Spur crest; aspect to SE; gentle gradient	60	30	3	low	moderately disturbed	Yes	Yes	Transmission line to substation from 'Yandra'
SU38	L2	691522	5950388	2 x 10	bare earth	Spur crest; aspect to SE; gentle gradient	35	30	10 50+	low moderate	moderately disturbed	Yes	Yes	Transmission line to substation from 'Yandra'
SU40	L1	696900	5947004	1 x 1	Animal tracks; bare earth continuous	Elevated plateau crest; aspect open; very gentle gradient	30	15	1	very low	moderately disturbed	Yes	Yes	Nil
SU40	L2	696770	5947331	1 x 1	animal bare earth	1 x 30	35	20	1	very low	moderately disturbed	Yes	Yes	Nil

Table 6. Summary of Aboriginal object recordings in the survey area.

9.3 Survey Results – Non-Indigenous

A total of 29 potential heritage items were recorded in and adjacent areas of proposed impacts during the survey (Table 7; Appendix 2). These recordings include one camp site (SU10/H1), one homestead ruin (SU18/H2), two sheepfolds (SU17/H4 and SU21/H4) and 25 fences including one old wire fence (SU19/H4) and the remains of various dry stone fences. Stone fences are common in the local area; these items vary in terms of their state of repair, length and alignment. Most however appear to be largely similar in terms of construction. The dominant form is that of two parallel lines of stone approximately 60cm apart that join together at a height of around 50-80cm (Plates 15 and 16). In some of the more intact examples there are also wooden posts *in situ* that formed the top portion of the fence (Plate 17). It should however be noted that it is unclear whether or not these wooden posts were a component of all of the fences.

Indeed, there are a number of questions surrounding the fences in terms of their age, construction and purpose. Generally the stone fences of the Monaro are assumed to have been built by Chinese workers who were seeking employment following the end of the gold rush (Plowman 2007). With regard to the fences at Boco Rock, local oral history also suggests Chinese involvement and the records from the Bibbenluke Estate indicate that Chinese workers were employed in construction and repair of stone boundary fences on at least two occasions during the late nineteenth century (Dawson 2000: 130-31). Whether or not all of these fences are a product of Chinese labour is however unclear.

It is also worth noting that many of the stone fences actually appear to correspond to property boundaries and Crown road reserves as opposed to internal paddock fences. Although in some cases the fences are also associated with small yards that appear to be sheepfolds or similar types of internal yards for keeping animals contained overnight. Another interesting point regarding the stone fences is that there are relatively few instances in which the existing wire fences follow exactly the same lines (eg. SU19/H1), although there are numerous instances in which the two fences run parallel at a distance of around five to twenty metres (eg. SU10/H2; SU12/H2; SU13/H1; SU16/H2; SU16/H3; SU17/H1; SU17/H3; SU18/H1; SU21/H1; SU21/H3). These sorts of general trends can be readily identified in the context of a preliminary survey of historical sites; however there tend to be more questions than answers regarding interpretation of the evidence at this stage. A more comprehensive understanding of the stone fences could only be achieved through additional research and fieldwork.

Evidence of domestic life within the proposal area exists in the form of an ephemeral camp site (SU10/H1) and the ruins of a small homestead (SU18/H2). None of the currently occupied head stations are within areas of direct impact associated with the proposed wind farm. The abovementioned camp site and house ruin are not in areas of proposed works, although they are situated relatively close to proposed impact areas. Similarly, the two recorded sheepfolds (SU17/H4 and SU21/H4), which are sites that may also contain evidence of domestic activities, are located adjacent proposed impact areas.

Item	Easting	Northing	Site Type	Comments	Area Estimate	Condition
SU10/H1	695362	5953683	camp site	scatter of artefacts over a level area of ground; items include: molten/fused glass; brown and clear glass, including a 1950 AGM brown bottle base; 6" nail; wire; "sardine" tin lid and key	5 x 5 metres	moderately disturbed
SU10/H2	695251	5953758	stone fence	remains of stone fences (east – west and north – south alignments) extend around at least three sides of a property/paddock, the fences are in various states of repair but generally no longer standing	extends for hundreds of metres around the eastern, southern and western sides of an old property/ paddock	highly disturbed
SU12/H1	690667	5953849	stone fence	east- west alignment	over 1000 metres	highly disturbed
SU12/H2	691856	5953268	stone fence	east- west alignment	100s of metres	highly disturbed
SU13/H1	692631	5952963	stone fence	north - south alignment	uncertain	highly disturbed
SU14/H1	691386	5951667	stone fence	east- west alignment	100s of metres	relatively intact
SU14/H2	691492	5952805	stone fence	east- west alignment; relatively intact example with sections of old wooden posts in situ	100s of metres	relatively intact
SU16/H1	687886	5949664	corner of stone fence,	east – west and north – south alignments; inside of road reserve	100s of metres in both directions	moderately disturbed
SU16/H2	688649	5949590	stone fence	east- west alignment; relatively intact example with stone capping still in place in some sections and some wooden posts in situ	100s of metres	relatively undisturbed
SU16/H3	688184	5950125	stone fence	north – south alignment	100s of metres	moderately disturbed
SU17/H1	686747	5949184	stone fence	north – south alignment; fence extends along western side of an old road reserve; existing wire fence runs parallel on eastern side	100s of metres	moderately disturbed
SU17/H2	686292	5948242	stone fence	east- west alignment; fence appears to coincide with some existing property/paddock boundaries	100s of metres	highly disturbed
SU17/H3	686206	5947756	stone fence	east- west alignment; fence runs parallel to an existing wire fence located approximately 5m to the south	100s of metres	highly disturbed

Item	Easting	Northing	Site Type	Comments	Area Estimate	Condition
SU17/H4	686474	5948819	sheepfolds and possible hut ruin	there are two stone enclosures of similar size located ca. 150m apart; the easternmost is adjacent an old road reserve while the western one is located further up slope with an introduced tree growing in the southwest corner; there are also the possible remains of a hut along the eastern side of this enclosure	each feature measures ca. 40 x 40 metres;	moderately disturbed
SU18/H1	686243	5946478	stone fence	north-south alignment, intact to height of ca. 0.5m; extends along western side of an old road reserve; existing wire fence runs parallel on eastern side	100s of metres	moderately disturbed
SU18/H2	685863	5945727	house ruin	remains of a stone house comprising foundations, hearth remains and a distinct building platform; various artefacts present including bottles, ceramic and glass fragments and bricks; introduced tree plantings include pines and plum trees; site displays very good excavation potential; artefactual evidence is indicative of occupation from the second half of the nineteenth century through to the mid-twentieth century	house ca. 3 x 10 metres with possible verandah to south	relatively undisturbed
SU19/H1	685965	5945378	stone fence	east - west alignment; existing wire fence running along the old fence line	100s of metres	highly disturbed
SU19/H2	685982	5945073	stone fence	north -south alignment; existing wire fence ca. 20m to east	100s of metres	moderately disturbed
SU19/H3	686040	5943852	stone fence	east- west alignment; very dispersed remains	100s of metres	highly disturbed
SU19/H4	686003	5943810	old wire fence	east - west alignment, 4 wires plus a single barbed wire run, top barbed wire run has been replaced by modern wire, star pickets added for extra support, original fence was eucalypt posts and droppers	100s of metres	moderately disturbed
SU19/H5	685113	5941606	stone fence	east- west alignment; existing farm track crosses the fence line near the proposed road	100s of metres	highly disturbed

Item	Easting	Northing	Site Type	Comments	Area Estimate	Condition
SU20/H1	685345	5941112	stone fence	northwest - southeast alignment; at the eastern end the fence splits into north-south and east-west alignments; sections of the fence still retain the original wooden posts	100s of metres	relatively undisturbed
SU21/H1	693476	5948707	stone fence	north - south alignment; existing wire fence runs parallel a short distance to the east of the stone fence remains; other wire fences also cross the stone fence	100s of metres	highly disturbed
SU21/H2	695948	5947709	stone fence	north - south alignment; existing farm track crosses the fence line near the proposed road	100s of metres	moderately disturbed
SU21/H3	694015	5949792	stone fence	northeast - southwest alignment; existing wire fence runs parallel along the southeastern side at a distance of ca. 10m	100s of metres	highly disturbed
SU21/H4	693596	5948956	stone fence and sheepfolds	fence on northeast - southwest alignment; two 40 x 40m enclosures are evidenced by demolished stone fences on the eastern and western sides; remains of wood and wire are located in and around these fences and briars are growing along the main fence line; an existing wire fence runs parallel to this along the eastern side	80m x 40m	highly disturbed
SU29/H1	691227	5947609	stone fence	northwest - southeast alignment; very dispersed remains	100s of metres	highly disturbed
SU35/H1	693561	5951237	stone fence	northwest - southeast alignment	over 100 metres	moderately disturbed
SU35/H2	693062	5951038	stone fence	east - west alignment, eastern end at recorded point	100s of metres	highly disturbed

Table 7. Summary of the potential heritage items recorded within the Boco Rock proposal area.

Plate 15. Remains of a demolished stone fence at SU10/H2. Note the two parallel lines of stone that formed the base of the fence; the scatter of stone to either side is all that remains of the walling that once stood at a height of ca. 50-80cm.

Plate 16. Example of a stone fence with partial stone capping in place but no obvious evidence of wooden posts. SU18/H1 looking north.

Plate 17. Relatively intact fence remains with wooden posts *in situ* at SU14/H2, looking west.

Discussion

Given the scope of this heritage assessment and the number of potential heritage items identified within or adjacent the proposal area, a detailed analysis and interpretation of each item is not possible. Instead, a few examples have been chosen to discuss in more detail as a means of providing further information about the history and heritage of the proposal area. The examples chosen include a complex of items in Survey Unit 17, the sheepfolds at SU21/H4, the house ruins at SU18/H2 and the stone fences recorded in Survey Unit 10.

In Survey Unit 17 there are three items located in close proximity to one another that are of particular interest (SU17/H1, SU17/H2 and SU17/H4). These items are the eastern and southern boundary fences and an internal sheepfold on Portion 128, Parish of Nelson (Figure 6). Based on the information available on the 2nd edition 1898 Parish Map, this 320 acre portion was initially selected under conditional purchase by Robert Shinfield in 1878. By the early twentieth century, when this particular map was undergoing updates prior to production of the 3rd edition map in 1914, Shinfield's land had become the property of the Bank of New South Wales, as had other adjacent properties selected by Robert Shinfield and his family members. This presumably indicates that the Shinfield farming ventures in this location were ultimately unsuccessful and the land taken over by the Bank before they were able to pay off their mortgage.

The existence of a sheepfold with a possible hut site associated indicates that this portion formed part of a larger grazing property with a head station situated at some distance from SU17/H4 (presumably located on land to the north). The fold and any associated hut would then have formed the dual purpose of satisfying the purchase requirements of the Robertson Land Acts by establishing a residence on the property while also providing a shelter and camp area for shepherds moving stock through this section of the property.

The land to the east of Portion 128 corresponds to a part of the Bibbenluke Estate, as is indicated by the fact that the land is listed on the Parish Map as belonging to the Executors of the late William Bradley. What is of particular interest is the fact that the Bibbenluke boundary corresponds with the old road reserve that was noted with regard to a number of the stone fences recorded in this section of the proposal area. It appears that the stone fences follow the western

side of the road reserve, while the modern wire fences follow the eastern side of this reserve. Given that an existing road (Avon Lake Road) already provided north-south access through this area it is unlikely that the road reserve was ever used in any practical sense as a road. What is unclear is whether the stone fences recorded for example in Survey Unit 17 were built as improvements to the land selected by individual farmers to the west of Bibbenluke or whether Henry Edwards had deliberately organised for stone fences to be built along the boundary of the estate in such a manner that they included the road reserve and thus extended the overall land available for grazing. This would certainly be in keeping with what is known of Edwards in terms of his character and business acumen. It could only be proven however through additional survey work that encompasses the existence or absence of stone fences around the other sides of properties such as Portion 128 and the broader patterns that exist in terms of stone fence location relative to other road reserves around the Bibbenluke Estate boundary.

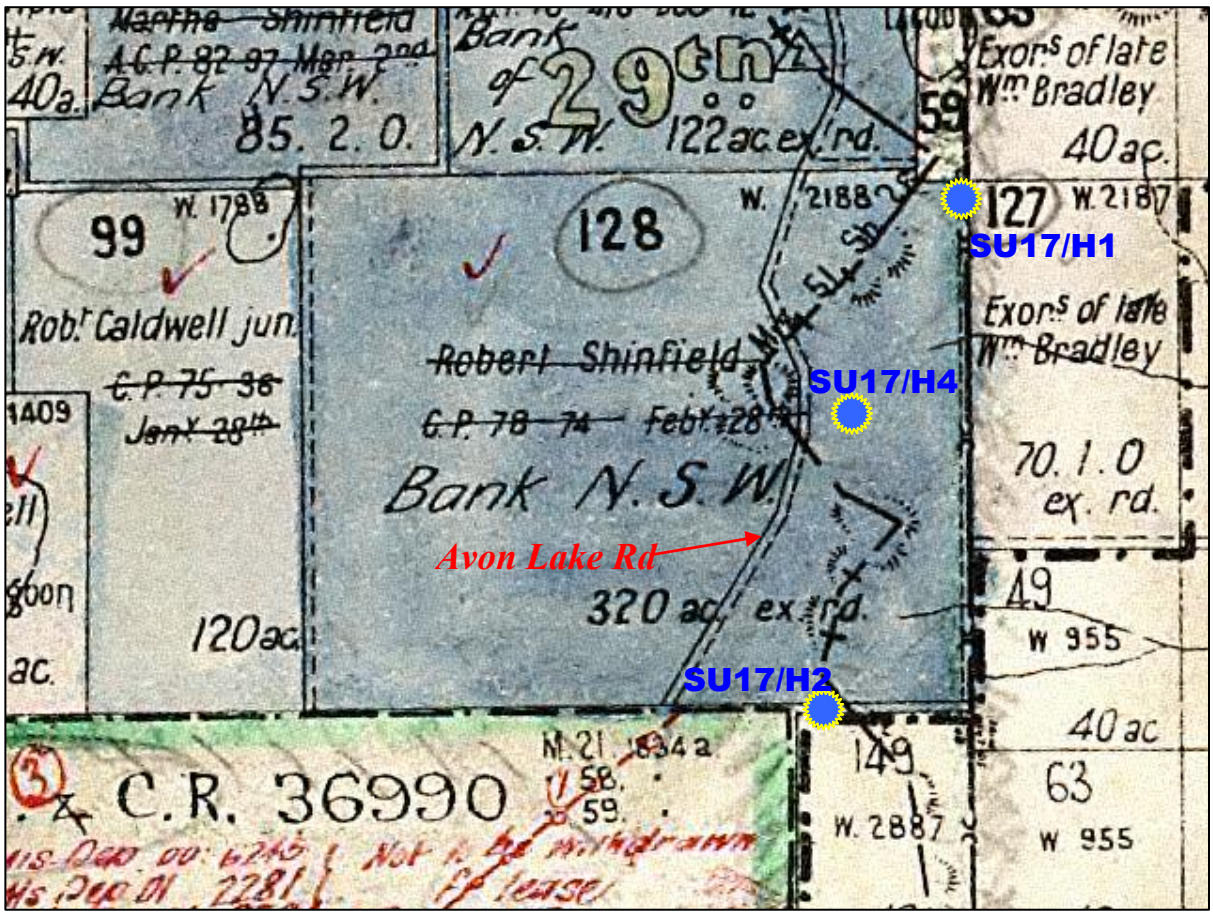

Figure 6. Extract of the Parish of Nelson 2nd Edition map (1898) showing the relative locations of SU17/H1, SU17/H2 and SU17/H4 (Department of Lands).

In contrast to the fences around the boundary of Bibbenluke SU21/H4 is an example of an item that demonstrates just how irrelevant the Robertson Land Acts selections were in the context of the internal operation of the Bibbenluke Estate. The twin stone enclosures at SU21/H4 are located either side of a fence that is on a northeast-southwest alignment (Figure 7).

When the location and alignment of this fence and associated features is compared with the Parish Map it can be seen that the notional boundaries of the small portions of land selected under the Robertson Land Acts bear no similarity to the actual fences that had been constructed in this area (Figure 8). It would thus appear that the internal paddock boundaries were determined completely separately from the process of purchasing and converting the Bibbenluke holdings to freehold land. This is an excellent example of how the archaeological evidence can provide new insights into historical events and the official historical records.

Figure 7. Aerial view of SU21/H4 showing the alignment of the fence and associated sheep enclosures (Google Earth 2009).

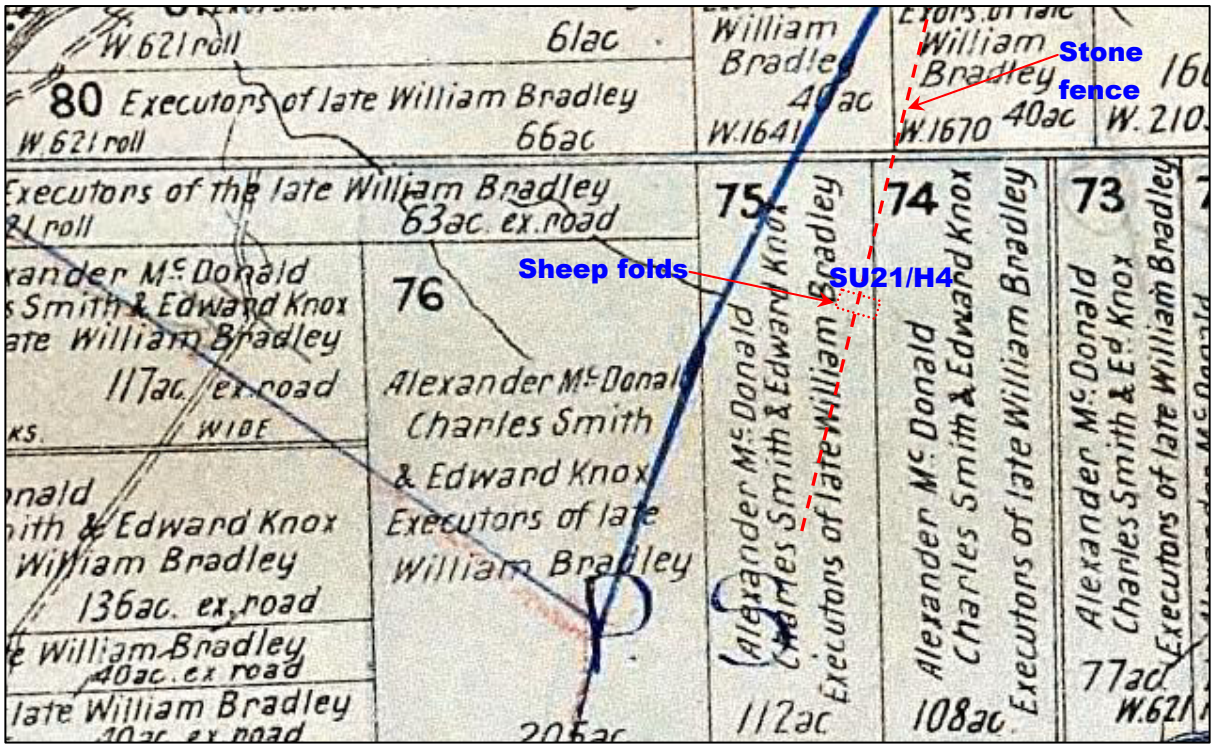

Figure 8. Extract of the Parish of Cooper 2nd Edition map (1903) showing the relative location of SU21/H4 (Department of Lands).

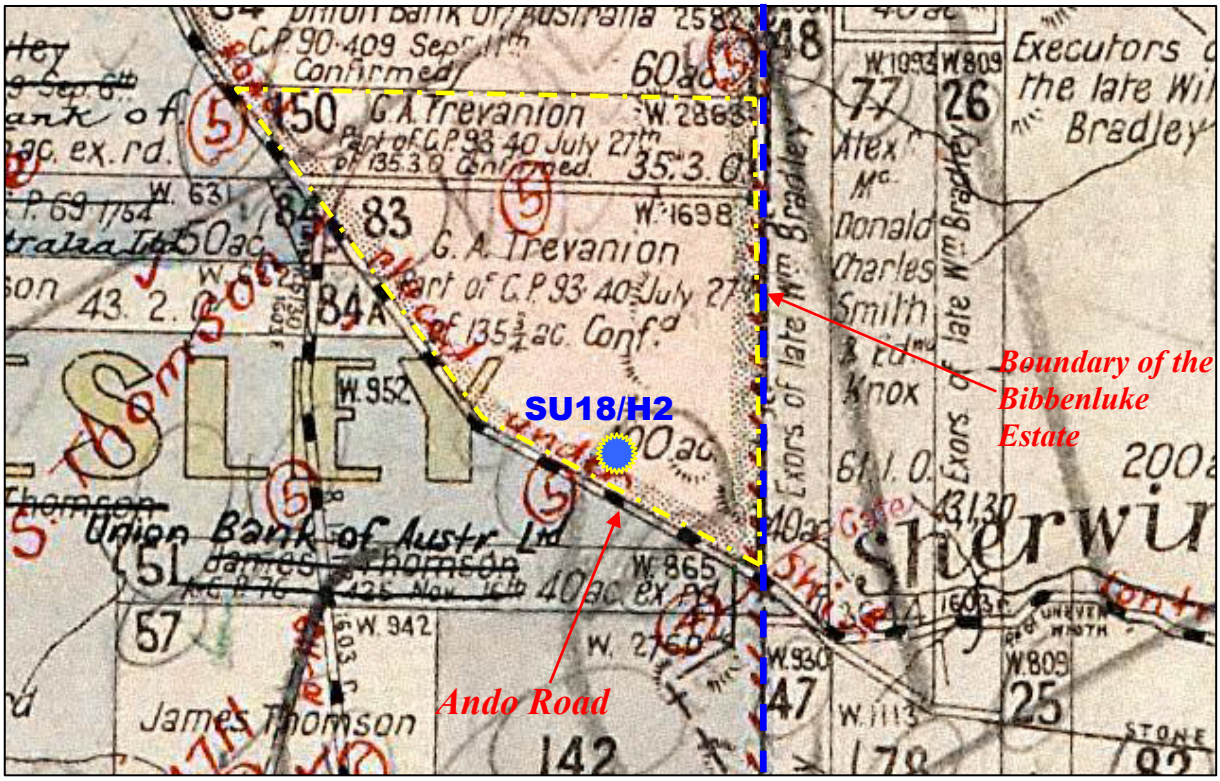

Figure 9. Extract of the Parish of Bungee 2nd Edition map (1898) showing the relative location of SU18/H2 (Department of Lands). Yellow dotted line indicates the boundary of the two Trevanion portions.

Quite a different story is evidenced at SU18/H2 where the remains of a house is present on a property neighbouring the Bibbenluke Estate. In this instance it appears that G A Trevanion selected two portions (83 and 150) in the Parish of Bungee in 1893 totalling 135 acres of land on the northern side of Ando Road and bordering the western boundary of Bibbenluke (Figure 9). The fact that there are the remains of a homestead on this property including substantial tree plantings, the ruins of a stone house and an assemblage of artefacts indicative of occupation well into the twentieth century indicates that this was probably a genuine land selection as opposed to a component of a larger land grab using dummying tactics. In this instance, rather than the property falling into the hands of the bank or becoming part of a larger pastoral holding, the title was transferred to D S Thomson during the early 1900s. It thus appears to be a relatively rare example of an individual selector making a go of a small property in the midst of an area dominated by much larger pastoral runs.

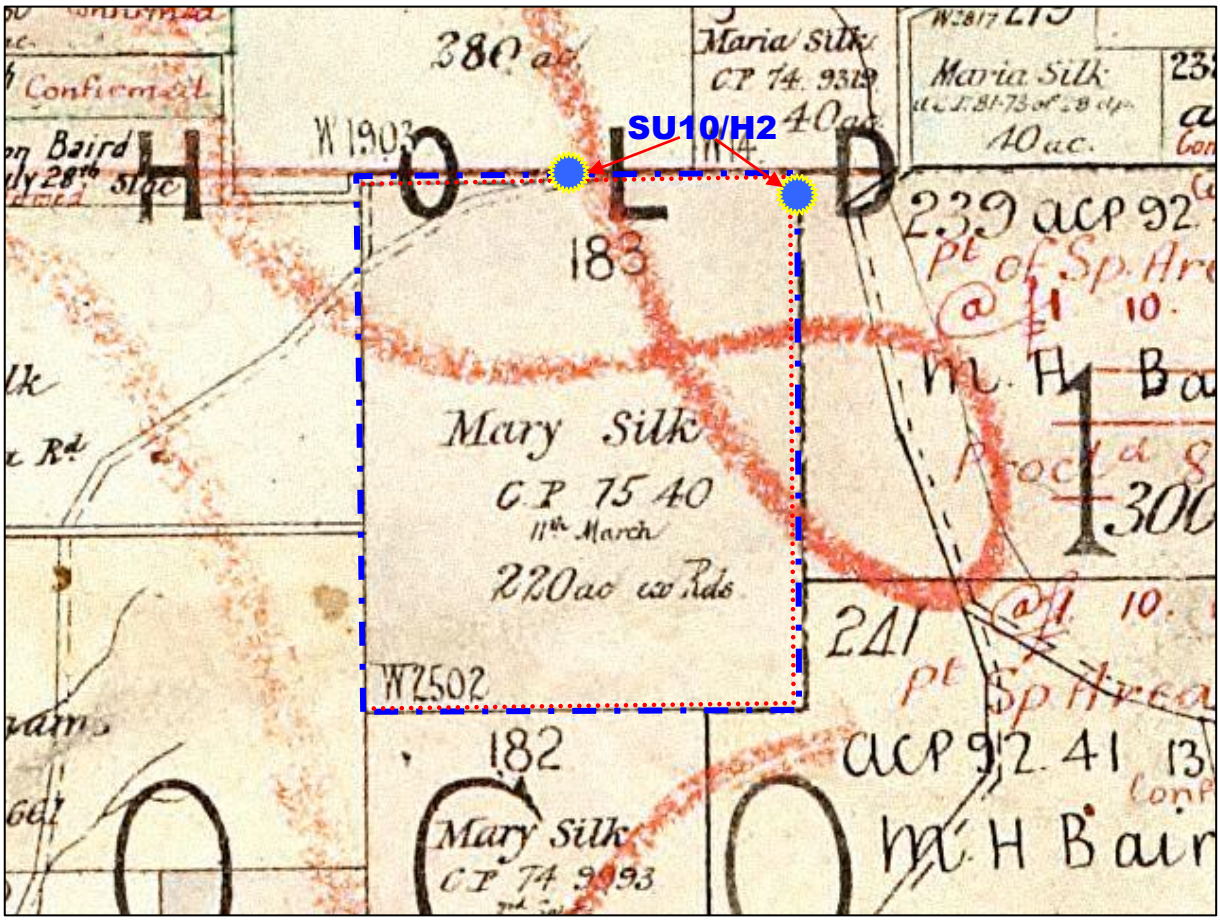

Figure 10. Extract of the Parish of Boco 2nd Edition map (1886) showing the relative location of SU10/H2 (Department of Lands). Red line indicates the sides on which stone fences were observed during survey.

In Survey Unit 10 there is evidence of yet another process that took place in the context of land alienation on the Monaro. Item SU10/H2 was noted to comprise at least three sides of stone fences around the boundary of a property or paddock. When the location of these fences is compared with the available Parish map it can be seen that the fences correspond to the northern, eastern and southern boundaries of Portion 183 in the Parish of Boco (Figure 10). This is a 220 acre property that was selected under conditional purchase by Mary Silk in 1875. What is interesting with regard to this example is that this is one of many contiguous properties in that area selected by various members of the Silk family (Figure 11). Essentially this portion was part of a larger farming property being established by the Silk family, but unlike the case of the internal selections in Bibbenluke where there was no correlation between paddock boundaries and land selections, in this case the individual selections have been fenced along the boundary. It is probable that the fencing at SU10/H2 formed an important component of the necessary land improvements that were a requirement of the conditional purchase under the Robertson Land Acts. Such fencing would also have been important in the context of securing grazing land in an environment where people were competing for access to land; in this case the Silk family appears to have been in competition with the Bairds (Figure 11).

The four examples from Survey Units 10, 17, 18 and 21 demonstrate some of the potential that exists in terms of interpreting and gathering additional information regarding the history of the Boco Rock area. These examples are representative of some of the different themes that might be evidenced such as the patterns of land selection and establishment of boundaries around the borders of the Bibbenluke Estate, the internal organization of the estate and patterns of land selection and land improvement in neighbouring areas. The above interpretations are nonetheless only a preliminary analysis of the evidence. Additional research into land titles combined with more detailed archaeological investigations is likely to yield considerably more information about the early European settlement on this section of the Monaro.

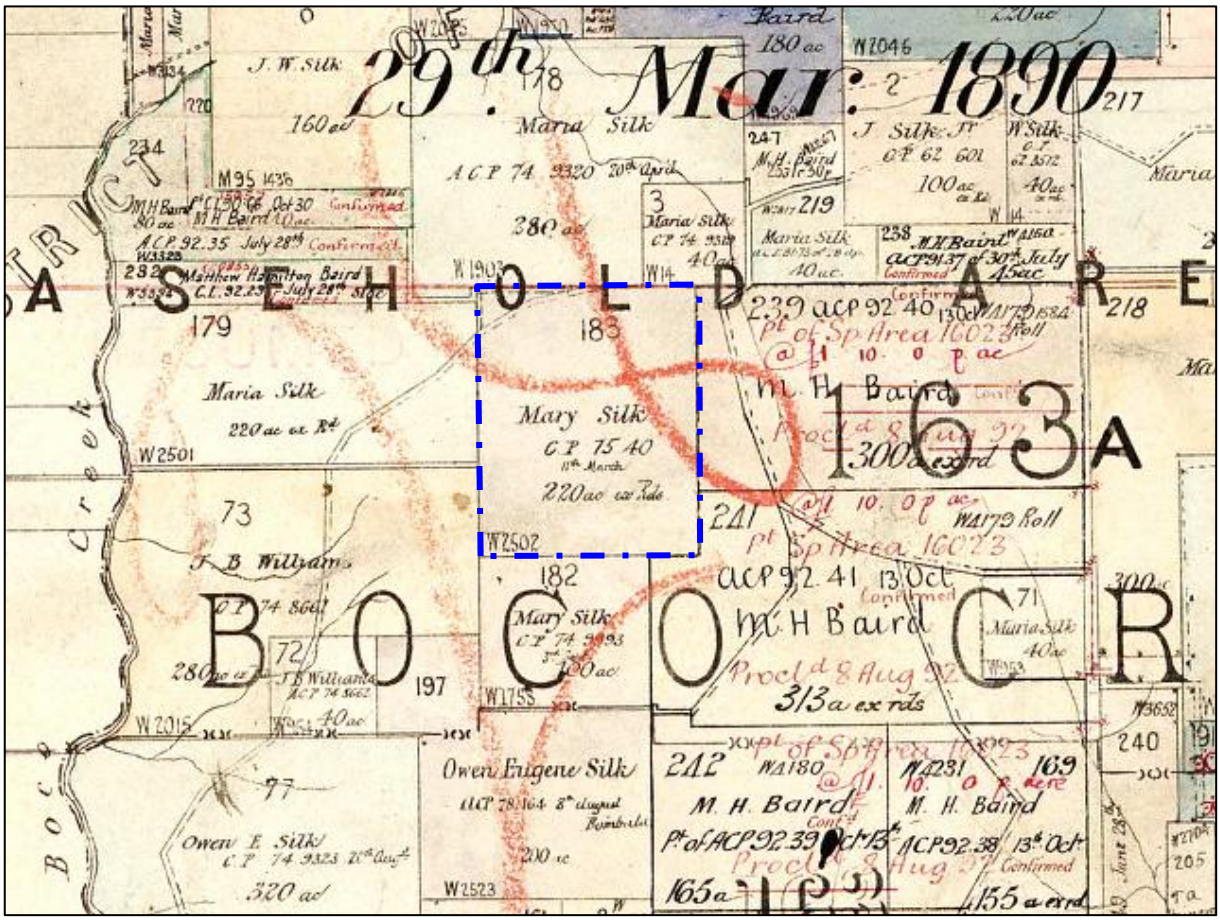

Figure 11. Extract of the Parish of Boco 2nd Edition map (1886) showing the relative location of SU10/H2 and the broader context of some of the other Silk family land selections (Department of Lands).