Sapphire Solar Farm

Environmental Impact Statement

Volume 3 - Appendices

Appendix C

Aboriginal Cultural Heritage Assessment Report (including Historic Heritage Assessment)

New South Wales Archaeology Pty Ltd ACN 106044366

Sapphire Solar Farm
Kings Plains via Inverell, NSW
Aboriginal Cultural Heritage Assessment Report

Date: 8 January 2018
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Proponent: CWP Solar Pty Ltd
Local Government Area: Inverell

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EXECUTIVE SUMMARY

This Aboriginal Cultural Heritage Assessment Report (ACHAR) has been prepared for CWP Solar Pty Ltd (CWP Solar) on behalf of Sapphire Solar Farm Pty Ltd (SSF) to support a Development Application to build and operate a utility-scale photovoltaic solar farm with battery storage at Kings Plains, 30 km east of Inverell in northern NSW.

The proposal to construct and operate the Sapphire Solar Farm requires development consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). In accordance with Section 89C of the EP&A Act, an activity will be State Significant Development (SSD) if it is declared to be SSD by a State Environmental Planning Policy (SEPP). *State Environmental Planning Policy (State and Regional Development) 2011* declares the Sapphire Solar Farm to be SSD (SSD 8643) as it is development for electricity generating works with a capital cost of greater than $30 million (clause 20, Schedule 1).

The Department of Planning and Environment (DP&E) Secretary's Environmental Assessment Requirements (SEARs 1129) identifies *Heritage* to be a specific issue to be addressed in the Environmental Impact Assessment (EIS). This ACHAR has been prepared to address the SEARs. In respect of heritage, the following specific issues are required:

> *… an assessment of the likely Aboriginal and historic heritage (cultural and archaeological) impacts of the development, including adequate consultation with the local Aboriginal community.*

The objective of the cultural heritage assessment is to prepare an ACHAR which would form a component of the EIS. The assessment of historic impacts is also presented in this document. The management and mitigation measures outlined in this report in respect of the cultural heritage should inform the Statements of Commitments (SoCs) which would condition the approval process.

The heritage assessment has been conducted in accordance with the NSW Office of Environment and Heritage (NSW OEH) *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011) and *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (NSW DECCW 2010a). The historic heritage assessment has referred to the NSW Heritage Manual.

A process of Aboriginal community consultation has been undertaken in accordance the NSW OEH's *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW DECCW 2010b).

The study has sought to identify and record Aboriginal cultural areas, objects or places, assess the archaeological potential of the proposal area and formulate management recommendations based on the results of the community consultation, background research, field survey and a significance assessment.

A search of the NSW OEH Aboriginal Heritage Management Information System (AHIMS) has been conducted (AHIMS Reference: 300555). Twenty seven Aboriginal object sites (some are duplicate listings) are listed for the search area, none of which occur in the subject area. No listed historic heritage is present in the subject area (Appendix 4).

A field survey for Aboriginal areas, objects and places has been conducted. The subject area was found to be highly disturbed by agricultural land use and, in some areas, by previous sapphire mining. A total of 15 low density stone artefact locales, most of which are isolated finds, were recorded. Generally, the subject area has been found to be of relatively low archaeological sensitivity and significance. As a result of some minor layout changes, several locales are now outside the proposed impact area.

One historic item has been recorded. It does not satisfy criteria for heritage listing and is situated outside areas of impact.

As a result of the assessment, the following conclusions and recommendations are made (see Sections 7 & 9 for detailed recommendations):

- The Aboriginal object locales and the low density artefact distribution in the subject area do not surpass archaeological significance thresholds which would act to preclude the proposal.
- The majority of recorded Aboriginal object locales are assessed to be representative of a low density distribution of stone artefacts in their respective Survey Units. However, several artefacts are relatively rare types and hence their significance is elevated. Accordingly, mitigated impact whereby these items are salvaged (surface collection) is appropriate.

Acknowledgments

Ed Mounsey, CWP Solar Pty Ltd;
Lisa Duncan & Samantha Duncan, Edgerton-Kwiembal EHCAC;
Vicki Duncan & Diane Marlowe, Aboriginal Cultural Site Services; and
Greg Livermore, Aniwan Local Aboriginal Land Council

Archaeological evidence confirms that Aboriginal people have had a long and continuous association with the region for thousands of years. We would like to acknowledge and pay our respects to the traditional owners of the country which is encompassed by the proposal.

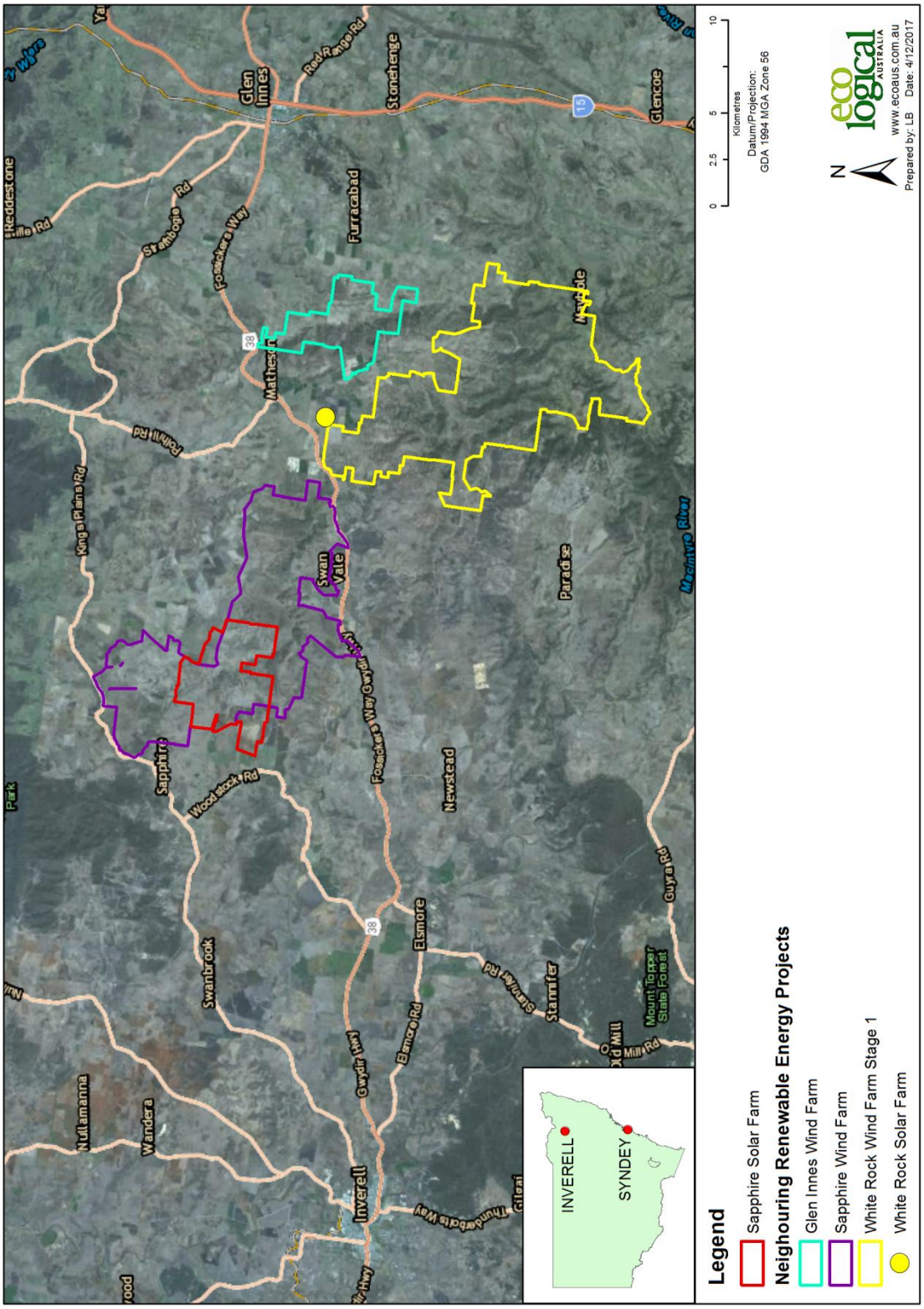


Figure 1 Location of the subject area (map supplied by client).

1. INTRODUCTION

CWP Solar Pty Ltd propose to construct a ~180MW Solar Farm located 30 km east of Inverell (Figure 1). The proposed development is located on land, some of which includes the same parcels as the Sapphire Wind Farm (SWF) project.

The proximity of SWF provides the opportunity to co-locate certain facilities and share the same point of connection to the TransGrid 330 kV network through the SWF substation (the Substation). This connection option will minimise the overall impact of the development while maximising the use of an existing connection asset.

The SSF would generate electricity through the conversion of solar radiation to electricity using PV panels laid out across the proposed site in a series of modules, mounted on steel racks with piled supports. Other infrastructure would include battery-based storage facilities, electrical power conversion units, underground and/or above ground electrical cabling, telecommunications equipment, amenities and storage facilities, vehicular access and parking areas, along with security fencing and gates.

The SSF will connect to the TransGrid Substation constructed to connect Sapphire Wind Farm to the electricity network. While the SSF could operate as a stand-alone generator/battery-based storage facility, it is proposed that the project may operate in parallel with the Sapphire Wind Farm project to provide firm, dispatchable electricity to the National Electricity Market (NEM). The connection configuration considered within the project accommodates for both scenarios which will allow the battery-based storage facility within SSF to be available to charge from SSF, SWF and/or the NEM, and to discharge all its stored electricity to the NEM.

Fully constructed, the Proposed Development would have an electricity generation capacity of approximately 180 megawatts at the point of connection, producing enough energy (390GWh) to power the equivalent of 68,000 average NSW households each year.

The identified land is currently used for grazing and/or cultivation. Some portions have been subject to open-cut sapphire mining and have been recently rehabilitated with a topsoil application.

The footprint and scale of the SSF will be refined through the development of the Environmental Impact Assessment (EIA).

The content and format of the report is set out in accordance with the NSW OEH (2011) *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* document. The report aims to document:

- The Aboriginal objects and declared Aboriginal places located within the area of the proposed activity, as relevant;
- The cultural heritage values, including the significance of the Aboriginal objects and declared Aboriginal places that exist across the whole area that will be affected

by the proposed activity, and the significance of these values for the Aboriginal people who have a cultural association with the land, as relevant;

- How the requirements for consultation with Aboriginal people have been met (as specified in clause 80C of the NPW Regulation);
- The views of those Aboriginal people regarding the likely impact of the proposed activity on their cultural heritage (if relevant);
- The actual or likely harm posed to the Aboriginal objects or declared Aboriginal places from the proposed activity, with reference to the cultural heritage values identified, as relevant;
- Any practical measures that may be taken to protect and conserve those Aboriginal objects or declared Aboriginal places (if relevant); *and*
- Any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm, or, if this is not possible, to manage (minimise) harm (if relevant).

This heritage assessment has been conducted by Dr Julie Dibden (ANU: BA honours; PhD), Andrew Pearce (UNE: BA Archaeology and Palaeoanthropology) and Tom Knight (ANU: BA; MLitt; MPhil), NSW Archaeology Pty Ltd. Assistance in the field was provided by Vicki Duncan and Diane Marlowe, Aboriginal Cultural Site Services, and Samantha Duncan, Edgerton Kwiembal EHCAC. Greg Livermore, Anaiwan Local Aboriginal Land Council (LALC), was unable to provide anyone to assist in the field but endorsed the Aboriginal Cultural Site Services group to represent the LALC. The fieldwork work was undertaken in early November 2017 over four days.

2. DESCRIPTION OF THE AREA – BACKGROUND INFORMATION

In this section, background and relevant contextual information is compiled, analysed and synthesized. The purpose of presenting this material is to gain an initial understanding of the cultural landscape; the following topics are addressed (*cf*. NSW OEH 2011: 5):

- The physical setting or landscape;
- History of peoples living on that land; *and*
- Material evidence of Aboriginal land use.

2.1 The Physical Setting or Landscape

Aboriginal people have occupied NSW for more than 42,000 years (Bowler *et al*. 2003). Evidence and cultural meanings relating to occupation are present throughout the landscape (NSW OEH 2011: iii). A consideration of landscape is particularly valuable in archaeological modelling for the purposes of characterising and predicting the nature of Aboriginal occupation across the land. 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 environmental context is valuable for predicting the type and nature of archaeological sites which might be expected to occur. Factors that typically inform the archaeological potential of landscape 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 and geomorphologically stable will prevent the detection of archaeological material, while places which have suffered disturbance may no longer retain artefacts or stratified deposits. A consideration of such factors is necessary in assessing site significance and formulating mitigation and management recommendations.

The following information describes the locational and landscape context of the subject area.

The subject area is on the Sapphire 9138 IS 1:25,000 topographic map. For mapping purposes, it is in Zone 56.

The SSF would be built in the Parishes of Buckley, Swanvale and Swamp Oak, in the County of Arrawatta.

The proposed SSF is located between Glen Innes and Inverell in northern NSW (Figure 1). The area is a rural landscape and is predominantly utilised for sheep and cattle grazing, cultivation and pasture production. Previously, open-cut sapphire mining occurred on certain areas which have recently been rehabilitated.

The area falls within the New England Fold Belt and is underlain with volcanic geology of the Late Permian – Middle Triassic periods. Within the subject area this manifests as an underlying granite formation capped with basalt (Branagan and Packham 2000). Throughout, basalt comprises the predominant surficial geology. The soils located on crests and simple slopes are primarily a brown or reddish-brown duplex silty loam which is found in association with the predominant surficial basalt capping geology. On flat areas of low local relief, especially those associated with drainage depressions, generally the soils are brownish black light clays.

Landforms

All drainage lines present are minor first or second order streams. Major streams in the district which contain more permanent sources of water are located outside the study area, and drain to the north or west. To the east of the subject area, Wellingrove Creek flows north into the Severn River. To the west, Frazers Creek flows west and then north, and is also a tributary of the Severn River. South of the area, Swan Brook flows west into the Macintyre River.

Prior to European settlement, the area would have primarily been comprised of a mosaic of both open and thickly treed woodland. However, almost the entire proposal area has subsequently been impacted by agricultural activities. Tree clearance has been extensive with the vast majority of trees now present being regrowth. Landowner Norman Whitaker (pers. comm. 2011) indicates that the farmland in the district was initially substantially cleared at the beginning of the 1900s and then again later as part of the employment and settlement on the land of returned soldiers.

Present day vegetation includes stands and isolated examples of grey box (*Eucalyptus moluccana*), apple box, stringy bark (*E. eugeniodes*) in cleared paddocks.

Many of the crests originally incorporated large areas of exposed surface rock or rock subsequently exposed on the surface following erosion. There is evidence across the site, in the form of pushed up rock piles, of mechanical grading to clear the paddocks. In addition, most flats and gentle simple slopes have been ploughed and cultivated, as well as some areas on the crests. Contour banks have also been constructed on numerous slopes within the study area to stem erosion. Drainage depressions were either highly eroded, as the result of clearance and subsequent accelerated water runoff, or completely re-modelled after sapphire mining rehabilitation.

Summary

The proposal area is located on crests and adjoining landforms that, prior to European settlement, would have primarily been comprised of a mixture of open and thickly treed woodland possessing low biodiversity values. While potable water would have been seasonally available from the lower order watercourses, more reliable water sources were found in the more major surrounding waterways such as Wellingrove Creek, higher up Frazers Creek, Swan Brook, the Severn River and the Macintyre River. At times following rainfall when water was accessible within the subject area, it would have been widely obtainable throughout the broader region. In winter, the area would have experienced cold temperatures and strong winds.

In an Aboriginal land use context the area is likely to have been utilised by Aboriginal people for a limited range of activities which may have included hunting, gathering and foraging excursions by small groups, and travel through country. Such activities are likely to have resulted in generally low levels of artefact discard.

Elevated landforms located adjacent to the aforementioned major waterways 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. Such areas are located outside the area of proposed impacts.

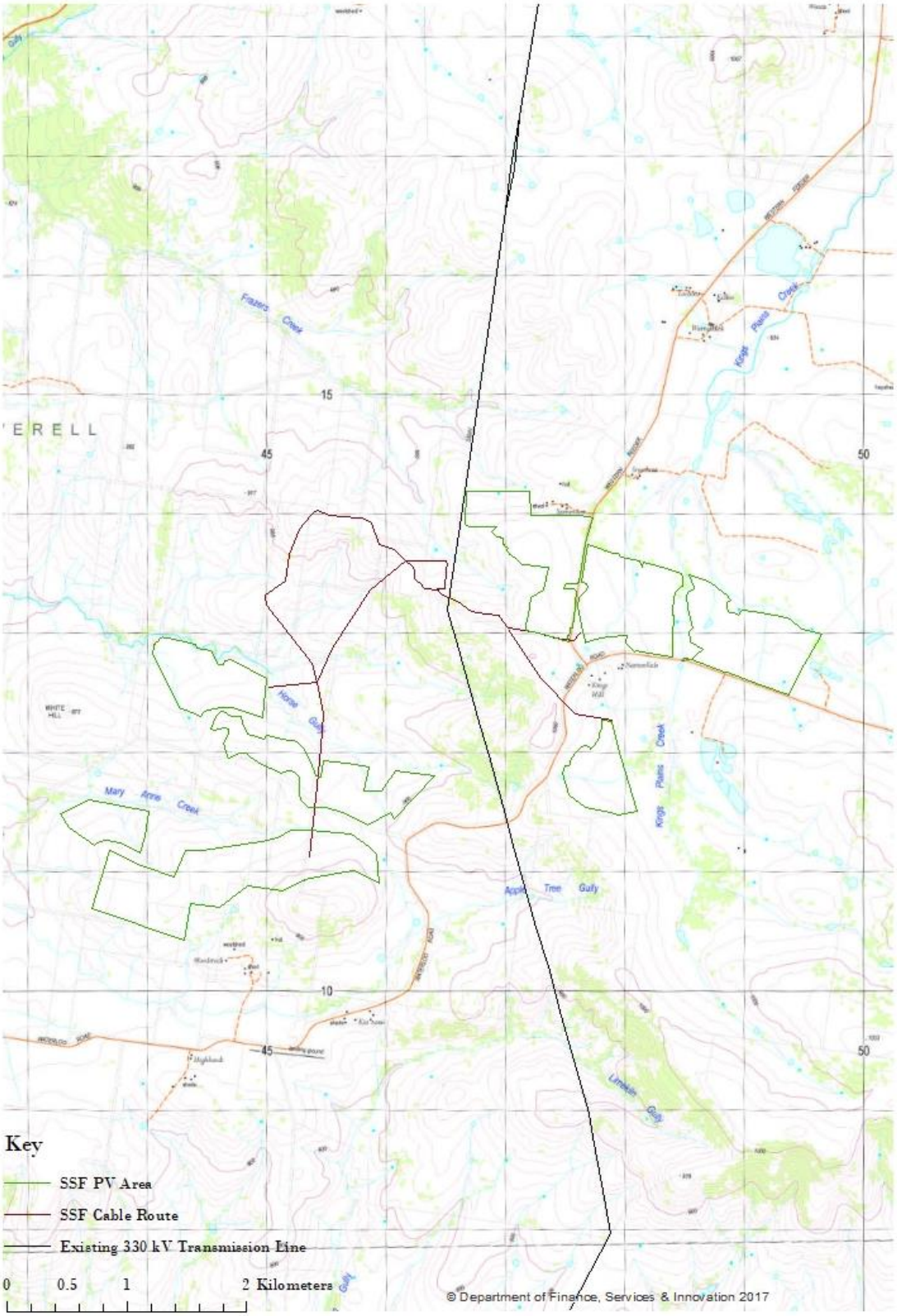


Figure 2 The subject area in its topographic context.

2.2 History of Peoples Living on the Land

Aboriginal people have occupied Australia for at least 40,000 years and possibly as long as 60,000 (Bowler *et al.* 2003; Mulvaney and Kamminga 1999: 2). By 35,000 years before present (BP), all major environmental zones in Australia were occupied, including periglacial environments of Tasmania (Mulvaney and Kamminga 1999: 114). At the time of early occupation, Australia experienced moderate temperatures. However, between 25,000 and 12,000 years BP (the Last Glacial Maximum), dry and either intensely hot or cold temperatures prevailed across 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 metres below present and, accordingly, the continent was correspondingly larger. With the cessation of glacial conditions, temperatures rose with a concomitant rise in sea levels. By c. 6,000 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[1] 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.*

Our knowledge and understanding of Aboriginal social life and organisation in south-eastern New South Wales at the time of European occupation is limited. Our ethnographic understanding of Aboriginal people in this area, and the historical dimension of the colonial encounter, has been reconstructed from scant historical records produced during a context of death and dispossession (Swain 1993: 115), and is sketchy and biased. Stanner (1977) has described the colonial and post-colonial past as a 'history of indifference', and this portrays both the substantive situation which prevailed at that time, and the subsequent lack of regard for this history. For a considerable period of time after Europeans arrived in Australia, no concerted ethnographic investigations were undertaken to learn about the culture and society of Aboriginal peoples. As a result, in trying to reconstruct the complex traditional cultures of varying Aboriginal groups, investigators of today are necessarily required to piece together, as best as possible, fragmentary information derived from the generally incidental annotations of disparate early observers.

It is understood that the subject area was traditionally occupied by numerous differing Aboriginal groups. The attribution of the occupation of land by these groups was made

[1] Sahul is the name given to the single Pleistocene era continent which combined Australia with New Guinea and Tasmania.

by Tindale (1974) based on notions of group affiliation through shared language. The traditional Aboriginal language groups which are understood to have occupied the Inverell/Glen Innes region include the Aniwan (Tingha), the Jukambal (Pindari, Inverell), the Bigambul (Yetman), the Wirrayaraay (Wallangra), the Kwiambal (Ashford), and the Ngarrabal (near Ashford and west of Glen Innes). Of these, the Sapphire Solar Farm subject area falls on land which is attributed to have been the traditional terrain of the Ngarrabal (Castlereagh Lachlan Environmental Services 2007).

However, Tindale's (1974) modelling was based on an uncritical adoption of the Radcliffe-Brown model of social organization in which the band is perceived as the most important structural feature in Aboriginal social organisation. Tindale's tribal boundaries were largely defined according to what he understood to be language groups (Flood 1980: 107). His work was conceptualized according to a model of band social organisation in which the 'horde' or clan was considered to be the group which possessed political power and proprietary rights to land (Rumsey 1989: 70). The 'tribes' which Tindale determined to have existed were seen as coterminous with language groups with the implication that these groupings were territorial units.

The assumptions inherent in this conflation of language group with tribe are no longer seen to be relevant and, furthermore, the concept of tribe as a territorial group is not regarded as being correct or useful. In Aboriginal society people were multilingual rather than monolingual. Therefore conceiving of language groups as bounded social groupings is not appropriate (Rumsey 1989: 74). In the Radcliffe-Brown model, the land/language relationship was seen as indirect: the estate of a tribe was seen as the aggregation of all the clan estates who spoke the same language. This relationship is now viewed to be direct – it is recognised that the importance of land/language relations in Aboriginal society is that particular languages and particular tracts of country were directly linked according to Dreaming activity (Rumsey 1989: 74-75).

While it was previously assumed that tribes or language groups functioned as politically cohesive corporate groups, more recently it has been recognised that linguistic groupings do not structure the Aboriginal social and geographical landscape. Sutton and Rigsby (1979: 722) argue that Tindale's tribal boundaries are not meaningful at either a demographic or political level. In order to overcome Tindale's limited and flowed tribal boundary model, recourse must be made to more contemporary anthropological concepts and understanding.

A person's identity is likely to have included totemic identity and specific relationships to country inherited via birth rights, place of birth and so on. People would have travelled to and resided in different tracts of country, forging temporary groups of varying personnel and clan composition for the fulfilment of a variety of economic, familial and ceremonial purposes. Archaeological conceptions of social groupings need to consider the multidimensional nature of groups based on clan, gender and age identities which are likely to have been both contemporaneously and generationally fluid.

Botanist and explorer, Allan Cunningham, was the first European to provide detailed reports of the Inverell/Glen Innes districts following his scientific expedition overland from the Hunter region, north to the Darling Downs, which he undertook between 20th January and late August 1827 (McBryde 1974). However, he was not the first European to enter these lands. Cunningham recorded cattle and a hut which, extrapolating from his detailed exploration report, was most likely located in the south-east corner of the Stonehenge State Forest, near the present-day Gwydir Highway some four kilometres south-east of Warialda (Howard 2009).

When Cunningham made his journey, the region was suffering from severe drought and water was scarce. He had minimal contact with the local people and in his log he exhibited a sweeping lack of knowledge about their culture or conduct. On July 7, 1827 Cunningham recorded (cited in Lee 1925):

> *It is to be wonder'd at, that the Interior of this vast Continent, as far as our Knowledge of it has extended, should be found to be so thinly peopled, when not withstanding its rivers teem with fish, and its forests abound in Kangaroos & Emus, its few inhabitants are in possession of so few of the Arts of Life, that they neither take the one by hooks, or rarely secure the others, by reason of their fleetness, by spears, but they rather have recourse to the larva of Insects, from which they can at best derive but a miserable support.*

Following Cunningham's expedition, European pastoralists quickly moved into the region and took up land. While some accounts portray the early encounters between these farmers and the local Indigenous groups as amicable (*cf.* Campbell 1978), it is apparent that the arrival of Europeans in the district catastrophically impacted the local Aboriginal people. Not only did the effects of introduced disease take a heavy toll, but the subsequent frontier conflict, of which the Myall Creek Massacre in 1838 is just one example, served to dispossess these peoples of the use of their traditional lands (Elder 1988). However, in the latter half of the nineteenth century when European landowners desperately sought replacement workers for those who had decamped having been swept up in the gold rushes, the labour of local Aboriginal people became an integral part of the pastoral system. In exchange for work, Aboriginal people could reside on 'station camps', and, in this way, were able to remain on country and, on those stations where it was tolerated, to practice traditional activities (Castlereagh Lachlan Environmental Services 2007).

Despite the severe downturn in population numbers brought about by the impact of introduced diseases, their dislocation from traditional lands and cycles of activity resulting from the restrictions imposed by European settlement, many Aboriginal people were able to perpetuate traditional knowledge and practices, and through this, connection to country.

While the number of Aboriginal studies conducted within the local area has been limited, numerous have been undertaken in the broader New England region, both in an academic and consultancy context. A major contributing reason for this is existence of

the University of New England at Armidale, with its faculty of Archaeology and Palaeoanthropology, which has given rise to several such research studies over the years.

As a focus of her landmark PhD research, McBryde (1968; 1974) investigated the Aboriginal prehistory of the New England region. This was the first comprehensive regional archaeological study to be carried out within Australia, entailing not only surface survey but also subsurface excavation. As part of her research, McBryde (1968; 1974) excavated rock shelter sites, recorded rock art and identified the metamorphosed basalt quarry source at Gragin Peak from which stone hatchets had been manufactured. At Graman, McBryde (1968) dated the oldest Aboriginal occupation site in the region with a radiocarbon age of 5,450 ± 100 years BP. Her subsequent petrographic analysis of stone hatchets from Gragin Peak, Graman and other New England Tableland sites was groundbreaking in its resultant exploration of prehistoric trade routes and exchange networks in Australia (Binns and McBryde 1972; Davidson 1982).

Ensuing from McBryde's initial work, studies in the broader region of northern New South Wales that followed focused primarily on areas to the east of the subject area or in regions towards the southern extent of the New England Tablelands. These studies (e.g. Bowdler 1981; Davidson 1982) sought to address questions which were of currency at the time, dealing predominantly with issues concerning occupation and settlement patterns within northern New South Wales that had taken place during the Holocene.

The most recent archaeological research projects conducted in the region (e.g. Balme and Beck 2002; Martin 1995; Theunissen 1995; Guilfoyle 1997; and Bloxham 1998) focus on areas to the north-west of the subject area, outside the New England Tablelands and in the Nandewar and Brigalow Belt South bioregions (Castlereagh Lachlan Environmental Services 2007).

Pearson (1981) conducted a comprehensive study in relation to his PhD research which examined the distribution of Aboriginal archaeological sites in the landscape. While the region encompassed in his research, being situated to the south, did not take in the subject area, it nevertheless examined a region which possesses comparable environmental and topographic contexts. Accordingly, it is considered that the results of his work are applicable in relation to the current study and can be used as a corollary for inferred patterns of Aboriginal land usage in the Inverell/Glen Innes districts prior to European occupation.

In addition to carrying out extensive research of historical sources and reviewing ethnographic data Pearson (1981) excavated three rock shelters and compiled information about other known archaeological sites in his study area. He determined that the Aboriginal population functioned primarily in small groups of variable size, dependent on the season. These groups were comprised of immediate relations, the smallest being the basic family unit, but groupings could coalesce to form a collective band of between 80-150 people during feasting in times of plentiful food, or for ceremony.

Between them, in smaller groups of up to 20 people, they exploited the resources of a common territory which had a radius of up to 65 km, but which was generally centred on a particular home base location that possessed a reliable watercourse (Pearson 1981). However, given the generally ephemeral nature of the local catchments and creek lines, the locus of that bands' place of habitation would be closer to a more permanent source of water.

Pearson (1981) developed a pattern of Aboriginal occupation through the analysis of site location attributes in relation to just over 40 recorded open campsites within four sample areas. He found that archaeological sites could be grouped into two main types: occupation sites, and non-occupation sites which included scarred or carved trees, ceremonial sites, grinding grooves and burial sites. Through analysis of the location of these sites he proposed the following model for the prediction of site location (Pearson 1981):

- The distance of sites from water ranged from 10 to 500 m. However, larger sites were generally located nearer to water (Pearson's average distance from water being 90 m);
- The attributes of good soil drainage and views over watercourses were important site location factors;
- The majority of sites were situated in places that would originally have been comprised of open woodlands in order to source adequate fuel;
- Level ground, shelter from prevailing winds, and elevation above cold air (Pearson's average elevation being 9.1 m) also influenced site location;
- Burial sites and grinding grooves were located as close to habitation as possible. However, grinding grooves occur only where there is suitable outcropping sandstone, and burial sites are generally found in areas where soils are of sufficient depth and penetrability for the purposes of interment;
- Ceremonial sites such as earth rings were situated away from campsites;
- Similarly, stone arrangements were also located away from campsites, in isolated places, and were more likely to be located on small hills or knolls, although they can also occur on flat land;
- Scarred or carved trees were distributed with no obvious patterning other than their proximity to watercourses, and in areas more frequently used for camps;
- Quarry sites were located where known outcrops of serviceable stone were reasonably accessible;
- Pearson suggests that Aboriginal campsites were rarely used for longer than three nights and that sites with evidence of extensive archaeological deposit probably represent accumulations of material over a series of short visits.

Hall and Lomax (1996) undertook a study which examined the location and management of stone artefact sites in forested uplands in Eastern Australia. Through the analysis of eight regional scale archaeological studies that employed similar survey methodologies, encompassing a total surveyed distance that extended for 352 linear kilometres, as well as closer examination of the findings of one State Forest survey undertaken in north-eastern

New South Wales, Hall and Lomax (1996) were able to draw some conclusions with regard to site location in forested environments. Hall and Lomax (1996) found that:

- While rock shelter occupation and art sites, quarries, axe grinding grooves, scarred trees, stone arrangements, Bora rings, rock engravings and burials may be present in forested areas they are rare site types in this environment;
- Open campsites or activity sites, indicated by the presence of stone artefacts, are more common site types. Stone artefact scatters are present in all forest types and in many, if not most areas, occurring more or less continuously as a low density distribution across the landscape with infrequent high density nodes. One to three artefact occurrences may be expected to be present for each linear kilometre of forest environment, regardless of forest type;
- Larger and generally more diverse stone artefact sites are rare, while small sites of low diversity characterise the stone artefact record of forested environments;
- While in some land systems there was a high correlation between site location and ridgelines, this did not obtain in other land systems. Factors which influenced the presence of sites on ridgelines were the level of constraint of human movement imposed by the terrain, and the relative abundance of stone artefact raw materials in high relief areas relative to areas of low relief.
- The majority of 'sites' have little or no inherent research potential. However, considerable potential exists for examining the human response to forested environments based on an examination of the regional spatial patterning of sites.

2.3 Material Evidence

A search of the NSW OEH Aboriginal Heritage Management Information System (AHIMS) has been conducted for this project on the 8 September 2017 (AHIMS Reference: #300555). The search area measured 432 km² and encompassed the area between eastings 339000 – 363000, and northings 6703000 – 6721000. Twenty seven Aboriginal object sites are listed for the search area, although three are duplicate recordings – see below (Table 1, Appendix 2). The location of Aboriginal object sites, as per the AHIMS grid references are shown in Figure 3. There are no previously recorded Aboriginal objects in the proposed impact area listed on the AHIMS register.

It is noted that the AHIMS register only includes sites which have been reported to the NSW OEH. Generally, sites are only recorded during targeted surveys undertaken in either development or research contexts. Accordingly, this AHIMS search is not an actual or exhaustive inventory of Aboriginal objects situated within the local area or indeed within the study area.

It is also noted that sites listed on AHIMS may be variable in their accuracy; it is not uncommon for grid references and/or the datum to be incorrect.

Searches have been conducted of the NSW State Heritage Inventory and the Australian Heritage Database. No Aboriginal sites for the area were listed in either database.

Table 1 AHIMS sites (AHIMS Reference: #300555). Note duplicate recordings not listed.

Site ID	Site Name	Datum	Easting	Northing	Recording	Description
12-4-0003	Matheson	AGD	361500	6707900	McBryde	Rock engraving; carved kangaroo tracks on a flat rock near the Gwydir Highway
12-4-0023	PAD5 (GLEN INNES)	GDA	361478	6708602	Wheeler	Potential Archaeological Deposit (PAD)
12-4-0024	PAD6 and PAD7 (GLEN INNES)	GDA	356063	6705686	Wheeler	Potential Archaeological Deposit (PAD)
11-6-0090	PAD8(GLEN INNES)	GDA	354862	6705458	Wheeler	Potential Archaeological Deposit (PAD)
11-6-0091	PAD9 (GLEN INNES)	GDA	349130	6705220	Wheeler	Potential Archaeological Deposit (PAD)
11-6-0084	CG-OS-1 (Chinamans Gully Associated Pad 10 & Pad 11)	GDA	352050	6705311	Wheeler	Artefact:4; Potential Archaeological Deposit (PAD)
11-6-0085	RC-OS-1 Redbank Creek (Associated with Pad 12)	GDA	340185	6703465	Wheeler	Artefact:2; Potential Archaeological Deposit (PAD)
11-6-0092	PAD10 and PAD11 (GLEN INNES)	GDA	352050	6705311	Wheeler	Potential Archaeological Deposit (PAD)
11-6-0093	PAD12 (GLEN INNES)	GDA	340185	6703465	Wheeler	Potential Archaeological Deposit (PAD)
12-4-0030	RPS WHITE ROCK02	GDA	361207	6703892	Boer-Mah	Artefact
12-4-003	RPS WHITE ROCK03	GDA	361374	6704084	Boer-Mah	Artefact
11-6-0097	SWF-	GDA	345445	6717748	NSW	Artefact: 2

Site ID	Site Name	Datum	Easting	Northing	Recording	Description
	SU19/L1				Archaeology	
11-6-0098	SWF-SU14/L1	GDA	345450	6708898	NSW Archaeology	Artefact: 3
11-6-0099	SWF-SU21/L1	GDA	342970	6714240	NSW Archaeology	Artefact: 1
11-6-0101	Kings Plains L&H P1	GDA	348605	6720688	Appleton	Potential Archaeological Deposit (PAD)
11-6-0052	S30	AGD	346644 (ahims); 034660 (site card)	6714657 (ahims); 6714650 (site card)	Paton	1 Hornfels flake; on a flat; 25m east of a small creek
11-6-0054	S31	AGD	347702 (ahims); 034770 (site card)	6709110 (ahims); 6709113 (site card)	Paton	1 Quartzite flake; on a slightly raised area; 150m west of a small creek
12-4-0017	Gwydin Scar Tree	AGD	354160	6705610	Moorhouse	Carved tree; canoe/ shield tree; dead tree with scar adjacent to Gwydir Highway
11-6-0029	Ashgrove; Swan Pond	AGD	351400 (ahims); 351449 (site card)	6704800 (ahims); 6704312 (site card)	Pearson	Site artefacts (flakes, cores, ground edge axes, grinding slabs); along "several" 100 "yards" of banks of Swan brook
11-6-0065	EL25	AGD	345550	6708990	Paton	3 artefacts (1 x Quartzite flake/p; 2 x Quartzite flakes); raised knoll above a large ephemeral creek; site area 5 x 3m
11-6-0062	EL23	AGD	345300	6705400	Paton	10 stone artefacts; raised knoll on a gently undulating hill; site area 10 x 6m
11-6-0063	EL24	AGD	345950	6706900	Paton	6 stone artefacts; raised knoll; site area 12 x 3m

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 Inverell Shire Council *State of the Environment Report* (2009/2010) identifies 304 known Aboriginal sites within the shire. Of these, the majority (60.5%) are comprised of stone artefact sites, with art sites (13.5%), grinding grooves (22%), scarred trees (5.26%), and ceremonial/dreaming sites (4.93%) making up the other. In addition, a lesser number of burials, ceremonial rings, conflict sites, areas of potential archaeological deposit (PADs), stone arrangements, stone quarries and ochre quarry are also listed.

The following discussion in Section 2.3 will present a review of previous archaeological investigations in the region for the purposes of producing a predictive model of site type and location relevant to the subject area.

2.3.1 Previous Archaeological Assessment

Robert Paton Archaeological Studies Pty Ltd (1998) undertook a survey in relation to TransGrid's proposed Queensland Interconnection Transmission Line Project. The route extended from the Armidale area, north to the vicinity of Texas in Queensland, some 215 kilometres. Paton (1998) subdivided the route into four 'Zones' in accordance with the broad general environmental characteristics of each sector and the assessed associated differences with regard to site distribution patterning for each 'Zone'. These differences in patterning were derived from predictive modelling. A section of the now extant transmission line route, which falls within Paton's (1998) 'Zone 2', traverses part of the subject area.

'Zone 2' measures c. 40 kilometres in length and was typified by Paton (1998) as being comprised of moderately undulating terrain with more pronounced ephemeral waterways. Paton predicted that 'Zone 2' would have an archaeological sensitivity rating of medium. During the subsequent sample survey of 'Zone 2', which varied in length from 1 – 3 kilometres and focused on areas of high archaeological visibility and likely site locations, five sites and five isolated finds were located. In all, the length of the surveyed area in 'Zone 2' was 35 kilometres, so that the frequency of sites located was 1 per 3.5 per linear kilometre. Paton (1998) concluded that the survey results indicated that as predicted, there was a moderate distribution of sites in 'Zone 2'. However, given the length of the surveyed area, the survey sampling methodology, and the findings of artefact locales spaced at slightly less than one every three linear kilometres, this distribution of artefacts could be considered to be reasonably sparse.

McCardle Cultural Heritage Pty Ltd (2007) conducted an assessment of the Glen Innes wind farm situated to the south-east of the SSF study area and situated on comparable landforms of similar relief. In conditions of moderate (24.92%) effective survey coverage,

along a survey corridor that encompassed ridges, crests, slopes, flats and creeks and extending c. 8.5 kilometres, McCardle (2007) recorded one isolated stone artefact. McCardle (2007) attributed the scarcity of Aboriginal objects to the distance from sources of permanent water. McCardle (2007) indicates that despite the prevalence of exploitable stone materials within that study area, as well as the presence of numerous 1st and 2nd order streams, sites would be expected to be found away from the study area and in closer proximity to reliable water sources.

Castlereagh Lachlan Environmental Services (2007) undertook a survey in relation to the proposed replacement of the Swan Brook Bridge, located south of the subject area. Over an area of 13.5 ha located immediately adjacent to Swan Brook, in conditions which afforded a high 2.05 ha of effective survey coverage, no Aboriginal objects were located and no areas of potential archaeological deposit identified. These findings were attributed to both high levels of disturbance in certain areas adjacent to the existing highway, as well as high water flow velocities across the Swan Brook floodplain which are indicated to have removed by scouring any potential stone artefacts that may have originally been deposited there.

RPS (2010) conducted an assessment of the White Rock Wind Farm, south of the subject area. Three modified trees and two artefact scatters were recorded. Materials in the lithic assemblage included silcrete, quartz and basalt. An additional isolated artefact was recorded at the wind farm site by ERM (2015).

Dibden (2011a) conducted the assessment of the Sapphire Wind Farm. A total of three Aboriginal object locales, SU14/L1, SU19/L1 and SU21/L1 were recorded. All three were very low density stone artefact distributions located within Survey Units assessed to be of low archaeological potential and sensitivity. Effective Survey Coverage encountered during the survey was low. It was predicted that additional stone artefacts were highly likely to be present in areas of proposed impacts other than those identified, either on ground surfaces or in subsurface contexts. However, in all Survey Units artefact density was predicted to be either very low or low. Accordingly, all Survey Units were assessed to be of low archaeological sensitivity.

nghenvironmental (2016) conducted an assessment of the White Rock Solar Farm. No Aboriginal objects or areas of potential were recorded.

2.3.2 Predictive Model

Stone artefact sites are the most common site type found within the region, totalling in excess of 60% of known Aboriginal sites (The Inverell Shire Council 2009/2010; Glen Innes Severn Shire Council 2010).

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

(Pearson 1981; Hall and Lomax 1996). Artefact density and site complexity is expected to be greater near reliable water and the confluence of a number of different resource zones (Pearson 1981). 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 SSF which encompasses areas of low biodiversity with several lower order watercourses originating from minor catchment areas, but no relatively reliable higher order streams, stone artefacts are predicted to be present in very low to low densities across the subject area. This prediction is supported by the results of McCardle's (2007) survey in relation to the proposed Glen Innes Wind Farm, located to the southeast. McCardle (2007) recorded one stone artefact in conditions of moderate (24.92%) effective survey coverage in terrain comprised of comparable landforms of similar relief, including numerous 1st and 2nd order streams.

Grinding Grooves

Grinding groove sites contain grooves in rock surfaces that are produced through the shaping and/or sharpening of ground-edge stone hatchet heads or other tools (Attenbrow 2004). Groove size and morphology can be variable which suggests that they can result from the sharpening of a variety of different tools, and the preparation of food (*cf.* Attenbrow 2004: 43). Generally, groove dimensions indicate that grinding grooves result for the sharpening of stone hatchet heads.

A broad temporal framework for the age of grinding groove sites can be inferred on the basis of the age of ground-edge hatchet heads found within archaeological deposits. Across Australia, there is significant variation in the timing of the introduction of ground-edge hatchet technology, and in the south-east, the earliest hatchet heads date to the fourth millennium BP (Dibden 1996: 35; Attenbrow 2004: 241), and no earlier than 3,500 years ago (Hiscock 2008: 155). Grinding groove sites in the south-east can be no older than 3,500 years. Given that hatchets were used at the time of European occupation, the use of some grinding groove sites may have spanned this temporal range.

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

Grinding grooves are only found on abrasive sedimentary rocks such as sandstone. Given the probable absence of suitable rock exposures in the subject area, grinding groove sites are unlikely to be present.

Burials sites

Burial sites have been recorded within the wider region. This site type is rarely located during field survey and given the topography, nature of the soils and geology, the potential for burials to be present in the area is negligible.

Rock Shelter Sites

Rock shelters sites are unlikely to be present in the 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 subject area has been extensively cleared although some trees of moderate age remain. While not impossible, this site type is unlikely to have survived and therefore be extant.

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.

The bedrock geology which underlies the study area is predominantly basaltic. Basalt stone was used by Aboriginal people for the manufacture of certain tool types, including hatchet heads and grinding implements. Basalt grinding implements were generally made from broad flattish coarse-grained stone, while hatchet heads were fashioned from either pebbles or large flakes struck from rock outcrops. The best basaltic raw materials for hatchet manufacture, selected for their suitability for use in cutting, scraping, pounding and chopping, occur in relatively few places and were extracted from specific quarry locations (Mulvaney & Kamminga 1999). Given that most basalt is of a quality poorly suited for tool manufacture, a stone quarry is unlikely to be recorded during the current study, although it is possible.

Ceremonial Places and Sacred Geography

Burbung and ceremonial sites are places which were used for ritual and ceremonial purposes. Possibly the most significant ceremonial practices known were those which were concerned with initiation and other rites of passage such as those associated with death. Sites associated with these ceremonies are burbung grounds and burial sites. Additionally, secret rituals were undertaken by individuals such as clever men. These rituals were commonly undertaken in 'natural' locations such as water holes.

In addition to site specific types and locales, Aboriginal people invested the landscape with meaning and significance; this is commonly referred to as a sacred geography. Natural features are those physical places which are intimately associated with spirits or the dwelling/activity places of certain mythical beings (*cf.* Knight 2001; Boot 2002). Boot (2002) refers to the sacred and secular meaning of landscape to Aboriginal people which has '… legitimated their occupation as the guardians of the places created by their spiritual ancestors'.

Knight's (2001) Masters research conducted in the area of the Weddin Mountains examined the cultural construction and social practice of inhabiting a sacred landscape. This approach is a departure from a consideration of the land and its resources as being a determinant of behaviour, to one in which land is regarded as a *text;* – within this conception, land and its individual features, are redolent with meanings and significances which are religiously and ritually centred, rather than economically based.

Knight's (*cf.* 2001:1) work was possible in great measure by the historical record which explicitly defines Weddin as a site of ritual significance. However, the research was additionally driven by a theoretical approach to 'cultural landscapes'. Landscape is redefined away from considerations of its material features which provide a backdrop to human activity, towards a view that a landscape *is rather*, a conceptual entity. According to this view the natural world does not exist outside of its conceptual or cognitive apprehension. The landscape becomes known within a naming process or narrative; thus the landscape is brought into being and understanding – within this process: - '… explanatory parables…' such as legends and mythology are the embodiment of the landscape narrative (Knight 2001: 6).

These narratives are relative to a particular culture, and it is this which makes an archaeological investigation of the cultural landscape such a thorny one. At distance in time and cultural geography, and especially in the absence of specific ethnographic information, how can the archaeologist attempt to investigate and know these narratives? Knight (2001: 11) employed the concept of the landscape as *mentifact,* whereby archaeological interpretation is concerned with the reconstruction of the landscape as a reflection of prehistoric cosmologies. He argued that this can be reconstructed by exploring the systematic relationships between sites and their topographic setting. This is defined as an *inherent* approach as it is concerned with the role of landscape in both everyday and sacred life. This view is concerned with an integration of the sacred and profane rather than their existence as separate categories of social life: - where "Cult activity may have existed as an inextricably 'embedded' component of daily life, where significant locations and ritual aspects of material culture were thoroughly incorporated into secular ranges and uses" (Knight 2001:13). In this regard Knight (2001: 14) correctly points out that no dichotomy between the material and ideational world existed within Aboriginal life.

Knight (2001: 15) argued that the notion of sacred space is of central concern within an inherent perspective on interpreting cultural landscape. Within human cosmologies locales within the landscape are constructed as being sacred space; this process of the construction of sacred space has been termed *hierophany* by Eliade (1961 in Knight 2001: 15). However, while Knight (2001: 15) suggests that physical entities such as stones, trees, or topographic features such as mountains, caves and rocky outcrops may be subject to such processes of transformation or construction, in reality in Aboriginal society any natural feature of less obvious significance can and should be included within this listing. Aboriginal constructions of heirophany can include the most insignificant landscape features and objects of less fixed temporal existence such as animals and plants. While the outside observer readily 'sees' and apprehends mountains and rocky features, more subtle elements of the natural world are easily passed 'unseen'. This point is one which suggests that the personal cultural geography of the archaeologist can severely impact upon the interpretation of the sacred landscape (*cf.* also, Boot 2002: 288). Knight (2001) does acknowledge this to some extent illustrating the issue by referring to the example of "Jump Up Rock" situated north of Weddin. This place is only understood to have been an important landscape feature by recourse to prior knowledge regarding the meaning of the site name; the hill itself is insignificant and therefore not readily apprehended through an outsiders gaze as being of special significance.

Knight (2001: 16) refers to the issue of peculiarities of form (e.g. shape, colour, size or texture) and natural distinctiveness (e.g. isolated mountains or rocky features within a plains context) as being an important distinguishing feature of sacred locales. Knight (2001: 16) argues that the construction of sacred space in such a manner is particularly relevant to people for whom the natural domain is the dwelling place of/or the manifestation of their deities. Knight (2001: 16) again draws from Eliade (1964) to suggest that it is at the sacred place that the three fundamental cosmological worlds, the everyday, the upper and underworld may converge; typically the upper world will be associated as a point of 'access' with tall things such as trees while the underworld will be

associated with pools and caves. Eliade contends that places where all three worlds can possibly connect, the *axis mundi*, are of a heightened order of sacredness. Hierophanies are therefore natural features which are ascribed sacredness. Additionally, Knight (2001: 17) refers to their ability to provide a landscape based opportunity for people to commune with other worldly deities and associated power because they may constitute spatial access between worlds via ritual.

Guided by these theoretical considerations Knight (2001: 20) engaged with Bradley's (cited in Knight 2001) model of the 'archaeology of natural places' in order to provide guidance for investigating the cultural landscape of the Weddin Mountains and its environs. Bradley (2000) has argued that natural places can be explored archaeologically in order to determine the nature of their role in human cosmologies by attending to four archaeological categories: - Votive offerings, rock art, production sites and monuments. This model was developed within a European context, with its attendant biases of concepts and archaeological categories; clearly not all concepts, some of which are clearly Eurocentric, will be applicable in Australia. Nor will all these data sets be found within the Australian context.

Knight (2001) gives consideration to the types of natural places which might be ascribed sacred significance. These include mountains, woodlands and groves, springs, pools and lagoons, rock outcrops and caves and sinkholes. He argues that Aboriginal cosmology is expressed via the natural landscape and sacred places were those which were directly related to the Dreaming. He says that these sacred sites typically are those which are remarkable or important physiographically such as caves, rocks and so on.

Given the potential for natural features to have been important places within an Aboriginal cosmological frame of reference, the survey has sought to identify outstanding natural features present in the study area. It is, however, noted that the landscape of the subject area is significantly disturbed, reasonably amorphous and relatively indistinct in the surrounding topography so that places are unlikely to standout as unusual or significant in this setting. No cultural knowledge relating to the subject area has been received during the formal process of consultation we have undertaken.

Contact Sites

These sites are those which contain evidence of Aboriginal occupation during the period of early European occupation in a local area. Evidence of this period of 'contact' could potentially be Aboriginal flaked glass, burials with historic grave goods or markers, and debris from 'fringe camps' where Aborigines who were employed by, or traded with the white community may have lived or camped. The most likely location for contact period occupation sites would be camp sites adjacent to permanent water, and located in relative proximity to centres of European occupation such as towns and homesteads. The potential for such sites to be present in the subject area is possible but considered unlikely.

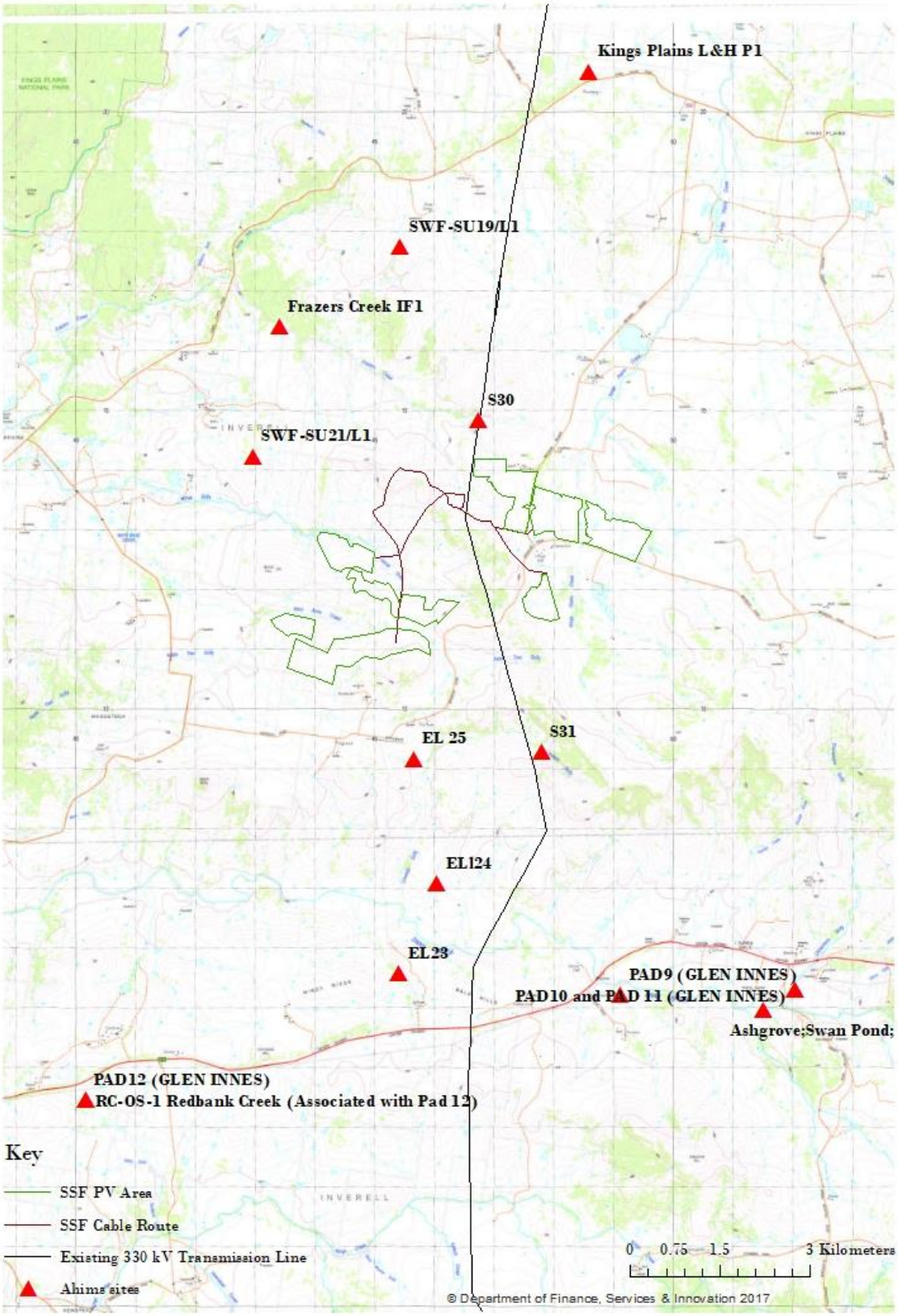


Figure 3 Location of AHIMS sites in relation to the proposal area (AGD datum changed to GDA for mapping, as relevant).

2.3.3 Field Inspection – Methodology

The methodological approach adopted in this assessment attends particularly to location and relationality as a means of contextualising the material evidence of cultural practice across space. Given the nature of the physiography, different places within the region are likely to have been utilised for different purposes, and also by different categories of people. Landscape is more than a set of 'objective' topographic features. Landscapes are constructed out of cultural and social engagement; they are '... topographies of the social and cultural as much as they are physical contours' (David & Thomas 2008: 35). The conceptual approach to understanding landscape in this assessment is based on a concern with experience, occupation and bodily practice (*cf.* Thomas 2008: 305). The location of material evidence in different environmental and topographic contexts across the subject area has the potential to be informative of different activities and social contexts. Landform and environmental elements, as measurable empirical space, will be employed methodologically to explore landuse, occupation and the nature of both recorded and unseen (ie subsurface) material evidence. Given the vast space encompassed by the study area, this methodology allows for the identification, at a fine level of spatial resolution, of elements representative of the patterns of social life and how these may vary over space.

The approach to recording in the current study has been a 'nonsite' methodology (*cf.* Dunnell 1993; Shott 1995). 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, Landform Units (morphological types - see below) are utilised as a framework of recording, analysis (*cf.* Wandsnider and Camilli 1992) and ultimately, the formulation of recommendations.

The data collected during this field assessment forms the basis for the documentation of survey results outlined in the section below. 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 with drainage depression: - association of a level or very gently inclined planar element which is not a crest, with an element that stands below all points in the adjacent terrain.
- Drainage depression: - a landform element, concave upwards, that stands below all points in the adjacent terrain.

Slope class and value:

- Level 0 - 1%.
- Very gentle 1 - 3%.
- Gentle 3 – 10%.

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.

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. The archaeological sensitivity of each Survey Unit was defined according to assessed artefact density as negligible, very low, low, low/moderate or moderate.

Aboriginal Object Recording

The subject area was found to contain discrete distributions of stone artefacts. For the purposes of defining the artefact distribution in space, it has been labelled as a locale (eg. Survey Unit 1/Locale 1).

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.

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, nor does it refer to a prediction of artefact density.

Survey Coverage Variables

Survey coverage variables were also recorded; these are described further below. 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 to determine whether or not the opportunity to observe stone artefacts in or on the ground was achieved during the survey. If 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 if 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 adequate and, accordingly, no further archaeological work may be required.

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 (GE) – an estimate of the total area inspected which contained exposures of bare ground; and

Archaeology Visibility (AV) – 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 south-east 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.

Based on the two visibility variables as defined above, an estimate (Net Effective Exposure - NEE) 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.

2.3.4 Field Inspection – Results

In accordance with the OEH *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*, the purpose of a field survey is to record the material traces and evidence of Aboriginal land use that are:

- Visible at or on the ground surface, or
- Exposed in section or visible as features (e.g. rock shelters with rock-art),

and to identify those areas where it can be inferred that, although not visible, material traces have a high likelihood of being present under the ground surface (DECCW 2010a: 12).

Survey Coverage and Results

A field assessment has been conducted by Andrew Pearce and Tom Knight, NSW Archaeology Pty Ltd, Vicki Duncan and Diane Marlowe, Aboriginal Cultural Site Services and Samantha Duncan. Edgerton Kwiembal. The assessment was conducted on 6, 7, 8 and 9 November 2017.

The field survey was aimed at locating Aboriginal objects. 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. Each Survey Unit was systematically and comprehensively surveyed.

Certain areas of cabling have been surveyed previously during the assessment of the Sapphire Wind Farm (see Dibden 2012: Survey Unit 21). These have not been inspected during the current survey. The area encompassed by Survey Unit 15b was introduced to the project after the field survey had been completed and, accordingly, has been assessed by recourse to predictive modelling.

Survey results are summarised in Tables 2 and 3. Survey Units are shown in Figures 4 and 5.

A total of 19 Survey Units have been defined based on morphological type landforms. They are described individually in Table 2 below.

Table 2 Survey Unit descriptions.

SU	Landform	Environmental context	Slope	Aspect	Geology	Abundance of Rock	Soil	Deposit Potential	Geomoph -ology	Agents	Prior Impacts	Disturbance Levels	Predicted Artefact Density
SU1 Plate 1	Flat; broad and gently undulating; boggy at N.E. extent	Low biodiversity; grasses, weeds, scattered eucalypts	Very gently inclined	Open	Basalt	Mainly very slightly rocky, with rocky areas	Silty clay loam	Yes	Eroded	Precipitation, wind, mechanical	Ploughing, grazing, mining, road construction	Moderate to the E. Very high from mining to the W.	Very low
SU2 Plate 2	Drainage depression	Low biodiversity; grasses, weeds, sparse eucalypts	Very gently inclined	Open	Basalt	No visible rock	Silty clay loam	Negligible	Highly eroded and mined	Precipitation, fluvial, mechanical	Mining	Very High	Negligible
SU3 Plate 3	Flat	Very low biodiversity; grasses, weeds,	Very gently inclined	Open	Basalt	No visible rock	Silty clay loam	Negligible	Eroded	Precipitation, mechanical	Mining, road construction	Very High	Negligible
SU4 Plate 4	Simple slope	Low biodiversity; grasses, weeds, sparse eucalypts	Gently inclined	E	Basalt	Slightly rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing	Moderate	Very low
SU5 Plate 5	Flat; broad and gently undulating	Very low biodiversity; grasses, weeds	Very gently inclined	Open	Basalt	No visible rock	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing, road construction, probable mining	Moderate	Very low / low
SU6 Plate 6	Simple slope	Low biodiversity; grasses, weeds, sparse eucalypts	Gently inclined	E	Basalt at S. end	Originally rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing, probable mining, graded up rock	Moderate	Very low / low
SU7 Plate 7	Simple slope	Low biodiversity; lucerne hay, grasses, weeds, sparse eucalypts	Moderately inclined	E	Basalt	Moderately rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing, graded up rock, contour drainage swales	High	Negligible / very low
SU8 Plate 8	Crest	Low biodiversity; grasses, weeds, sparse eucalypts	Level to very gently inclined	Open	Basalt	Slightly rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing	Low	Very low

SU	Landform	Environmental context	Slope	Aspect	Geology	Abundance of Rock	Soil	Deposit Potential	Geomoph-ology	Agents	Prior Impacts	Disturbance Levels	Predicted Artefact Density
SU9 Plate 9	Simple slope	Low biodiversity; grasses, weeds, sparse eucalypts	Moderately inclined	Open	Basalt	Very slightly rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing	Low	Negligible
SU10 Plate 10	Crest	Low biodiversity; grasses, weeds, sparse eucalypts	Very gently inclined	Open	Basalt	Very slightly rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing	Low	Very low
SU11 Plate 11	Crest; broad and gently undulating	Low biodiversity; grasses, weeds	Level to very gently inclined	Open	Basalt	Slightly rocky to rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing, road and hardstand construction, underground cabling installation	Moderate / high	Low
SU12 Plate 12	Flat; broad and gently undulating, with minor drainage depression	Low biodiversity; poisoned wheat stubble, some grasses and weeds	Very gently inclined	Open	Basalt	Slightly rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing, contour drainage swale	Moderate	Low
SU13 Plate 13	Simple slope with minor drainage depression	Low biodiversity; poisoned wheat stubble, grasses, weeds, sparse eucalypts	Gently inclined	N-NW	Basalt	Very rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing, contour drainage swale	Moderate / high	Very low
SU14 Plate 14	Simple slope	Low biodiversity; grasses, weeds, lucerne hay	Gently inclined	N	Basalt	Moderately rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing, contour drainage swale	Moderate	Very low
SU15 Plate 15	Simple slope	Low biodiversity; lucerne hay	Very gently inclined	W - NW	Basalt	Moderately rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing, contour drainage swale	Moderate	Very low
SU15 b	Simple slope (Not surveyed)	Low biodiversity; grassland; native	Gently inclined	NW	Basalt	-	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing, contour	Moderate	Very low

SU	Landform	Environmental context	Slope	Aspect	Geology	Abundance of Rock	Soil	Deposit Potential	Geomoph -ology	Agents	Prior Impacts	Disturbance Levels	Predicted Artefact Density
		pasture, weeds									drainage swale		
SU16 Plate 16	Simple slope	Low biodiversity; lucerne hay	Very gently inclined	SW	Basalt	Slightly rocky to rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing, contour drainage swale, graded up rock	Moderate	Very low
SU17 Plate 17	Flat, gently undulating	Low biodiversity; poisoned wheat stubble	Level to very gently inclined	Open	Basalt	Very slightly rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing, underground cabling installation	Moderate	Low
SU18 Plate 18	Simple slope	Low biodiversity; grasses, weeds, sparse eucalypts	Gently inclined	S	Basalt	Slightly rocky	Silty loam	Yes	Eroded	Precipitation, wind	Ploughing, grazing	Low	Very low

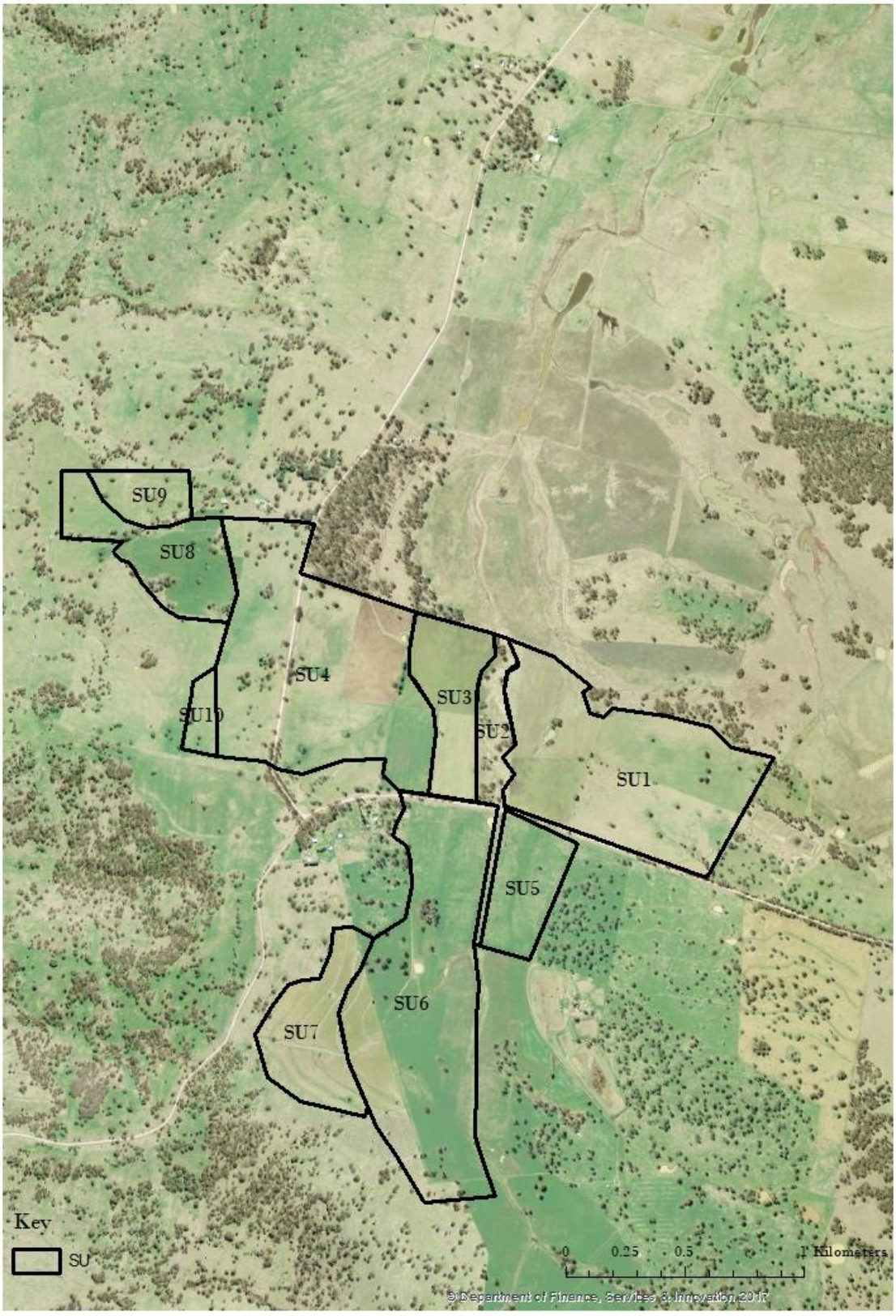


Figure 4 Survey Unit locations; east end.

Figure 5 Survey Unit locations; west end.

Plate 1 Survey Unit 1; looking 310°.

Plate 2 Survey Unit 2; looking 20°.

Plate 3 Survey Unit 3; looking 190°.

Plate 4 Survey Unit 4; looking 85°.

Plate 5 Survey Unit 5; looking 325°.

Plate 6 Survey Unit 6; looking 330°.

Plate 7 Survey Unit 7; looking 290°.

Plate 8 Survey Unit 8; looking 100°.

Plate 9 Survey Unit 9; looking 50°.

Plate 10 Survey Unit 10; looking 190°.

Plate 11 Survey Unit 11; looking 225°.

Plate 12 Survey Unit 12; looking 260°. Note contouring.

Plate 13 Survey Unit 13; looking 260°.

Plate 14 Survey Unit 14; looking 230°.

Plate 15 Survey Unit 15; looking 270°.

Plate 16 Survey Unit 16; looking 20°.

Plate 17 Survey Unit 17; looking 270°.

Plate 18 Survey Unit 14 looking to Survey 14 in distance; looking 0°.

Survey coverage variables are described in Table 3. The assessment survey area measured 570.9 hectares. Of that, c. 79 hectares of ground exposure was present and, within that, archaeological visibility is estimated to have been approximately 49 hectares ie the potential artefact bearing soil profile. Effective survey coverage achieved during the field survey is calculated to be 8.7%. This reasonably high ESC is due to the relatively high levels of ground exposure and archaeological visibility within that exposure.

Table 3 Effective Survey Coverage.

Name	Area sq m	GE %	GE sq m	AV %	NEE sq m	ESC %
SU1	613413	1	6134	50	3067	0.5
SU2	106773	60	64064	10	6406	6.0
SU3	179533	35	62837	10	6284	3.5
SU4	729361	0.01	73	20	15	0.0
SU5	151209	2	3024	10	302	0.2
SU6	723807	1	7238	40	2895	0.4
SU7	209471	0	0	0	0	0.0
SU8	216741	0	0	0	0	0.0
SU9	83534	0.1	84	20	17	0.0
SU10	39875	0	0	0	0	0.0
SU11	99316	5	4966	50	2483	2.5
SU12	197270	50	98635	80	78908	40.0
SU13	879873	30	263962	80	211170	24.0
SU14	334511	10	33451	70	23416	7.0
SU15	514049	20	102810	70	71967	14.0
SU15b	235010	0	0	0	0	0.0
SU16	191854	30	57556	70	40289	21.0
SU17	172043	50	86022	60	51613	30.0
SU18	31052	0	0	0	0	0.0
	5708695		790855		498831	8.7

A total of 15 Aboriginal object locales were recorded during the field survey, as listed in Table 4 and described in detail further below. Their location is shown on Figures 6 and 7.

Table 4 A summary of Aboriginal object locales recorded during the field survey.

SU	Locale	Easting	Northing	Area	Exposure	Context	Exposure	Visibility	Artefact Number	Predicted Density	Integrity	Subsurface potential at site	Subsurface potential away from site
SU6	L1	348334	6711414	1 x 1	Grassed area adjacent to ephemeral watercourse: area: 1 x 1m	On west side of ephemeral watercourse on simple slope; aspect: E; very gentle gradient	1	40	1	Very low	Moderately disturbed: ploughing, eroding	Yes	Yes
SU6	L2	348337	6711241	1 x 1	Grassed area 100m from ephemeral watercourse: area: 1 x 1m	On west side of ephemeral watercourse on simple slope; aspect: E; very gentle gradient	1	40	1	Very low	Moderately disturbed: ploughing, eroding	Yes	Yes
SU6	Tree 1	348142	6712390	-	-	-	-	-	-	-	-	-	-
SU8	L1	347290	6713969	1 x 1	Pastured paddock: area: 1 x 1m	On a crest; aspect: Open; very gentle gradient	1	30	1	Very low	Moderately disturbed: ploughing	Yes	Yes
SU12	L1	344159	6712771	70 x 60	Ploughed area 20m from ephemeral watercourse: area: 100 x 80m	On a flat, adjacent to an ephemeral watercourse, 200m from 2nd order watercourse;	50	80	3	Very low	Highly disturbed: ploughing, eroding	Yes	Yes

SU	Locale	Easting	Northing	Area	Exposure	Context	Exposure	Visibility	Artefact Number	Predicted Density	Integrity	Subsurface potential at site	Subsurface potential away from site
						level gradient							
SU12	L2	344345	6712731	1 x 1	Ploughed area: area: 10 x 10m	On a flat, 180m from 2nd order watercourse; level gradient	50	80	1	Very low	Highly disturbed, ploughing, eroding	Yes	Yes
SU12	L3	344412	6712835	1 x 1	Ploughed area: area: 10 x 10m	On a flat, adjacent to a 2nd order watercourse; level gradient	50	60	1	Very low	Highly disturbed: ploughing, eroding	Yes	Yes
SU13	L1	344276	6712516	50 x 20	Ploughed area 20m from ephemeral watercourse: area: 60 x 30m	Contour drainage swale on eastern side of ephemeral watercourse on simple slope; aspect: NW; very gentle gradient	60	80	2	Very low	Highly disturbed: Contour drainage swale construction, ploughing, eroding	Yes	Yes
SU13	L2	344795	6712965	1 x 1	Ploughed area: area: 10 x 10m	Between contour drainage swales near top of simple slope; aspect: N; very gentle	60	80	1	Very low	Highly disturbed: Contour drainage swale construction, ploughing, eroding	Yes	Yes

SU	Locale	Easting	Northing	Area	Exposure	Context	Exposure	Visibility	Artefact Number	Predicted Density	Integrity	Subsurface potential at site	Subsurface potential away from site
						gradient							
SU15	L1	344187	6710882	1 x 1	Ploughed area sown to lucerne hay: area: 10 x 10m	Contour drainage swale on simple slope; aspect: NW; gentle gradient	40	70	1	Very low	Moderately disturbed: Contour drainage swale construction, ploughing, eroding	Yes	Yes
SU17	L1	345319	6712519	1 x 1	Ploughed area with poisoned wheat stubble: area: 10 x 10m	On northern side of 2nd order watercourse on a flat; aspect: open; level gradient	60	60	1	Low	Highly disturbed: eroding and mechanical	Yes	Yes
SU17	L2	345133	6712493	1 x 1	Ploughed area with poisoned wheat stubble: area: 10 x 10m	On northern side of 2nd order watercourse on a flat; aspect: open; level gradient	60	60	1	Low	Highly disturbed: eroding and mechanical	Yes	Yes
SU17	L3	345227	6712425	70 x 50	Ploughed area with poisoned wheat stubble: area: 80 x 60m	On northern side of 2nd order watercourse on a flat; aspect: open; level gradient	60	60	4	Low	Highly disturbed: eroding and mechanical	Yes	Yes

SU	Locale	Easting	Northing	Area	Exposure	Context	Exposure	Visibility	Artefact Number	Predicted Density	Integrity	Subsurface potential at site	Subsurface potential away from site
SU17	L4	345298	6712337	80 x 40	Ploughed area with poisoned wheat stubble: area: 100 x 50m	On northern side of 2nd order watercourse on a flat; aspect: open; level gradient	60	60	5	Low	Highly disturbed: eroding and mechanical	Yes	Yes
SU17	L5	345442	6712285	10 x 10	Ploughed area with poisoned wheat stubble: area: 10 x 10m	On northern side of 2nd order watercourse on a flat; aspect: open; level gradient	60	60	2	Low	Highly disturbed: eroding and mechanical	Yes	Yes

Survey Unit 6/Locale 1 grid reference: Hand GPS (GDA): 348334e 6711414n

This recording consists of one stone artefact situated some 20 metres away from an ephemeral 2nd order watercourse located adjacent to Survey Unit 6 (Plate 19). The locale has a very gentle gradient and an easterly aspect. Soils are a dark brown silty clay loam. The locale is eroded due to vegetation clearance and subsequent farming activity. While originally this watercourse would have been a shallow depression, sapphire mining activity followed by rehabilitation has resulted in the stream being a modified landscape feature.

Ground exposure in this locale was negligible due to a consistent thick vegetation cover, with the artefact sitting proud on the ground surface presumably having been turned up through ploughing. The ground surface visibility was assessed to be 1% and archaeological visibility 40%.

The artefact recorded is described as follows:

- Brown silicified sandstone grinding topstone stone measuring 70 x 93 x 85 mm. The artefact is comprised of a heavy rounded pebble with a flattened, bruised base which has resulted from use (Plate 20).

It is likely that additional artefacts are present within this locale, however, it is predicted that any additional artefacts will be present in very low numbers and density.

This artefact recording is situated outside the proposed development envelope and will therefore not be subject to impacts relating to the solar farm proposal.

Plate 19 Survey Unit 6/Locale 1, looking southeast.

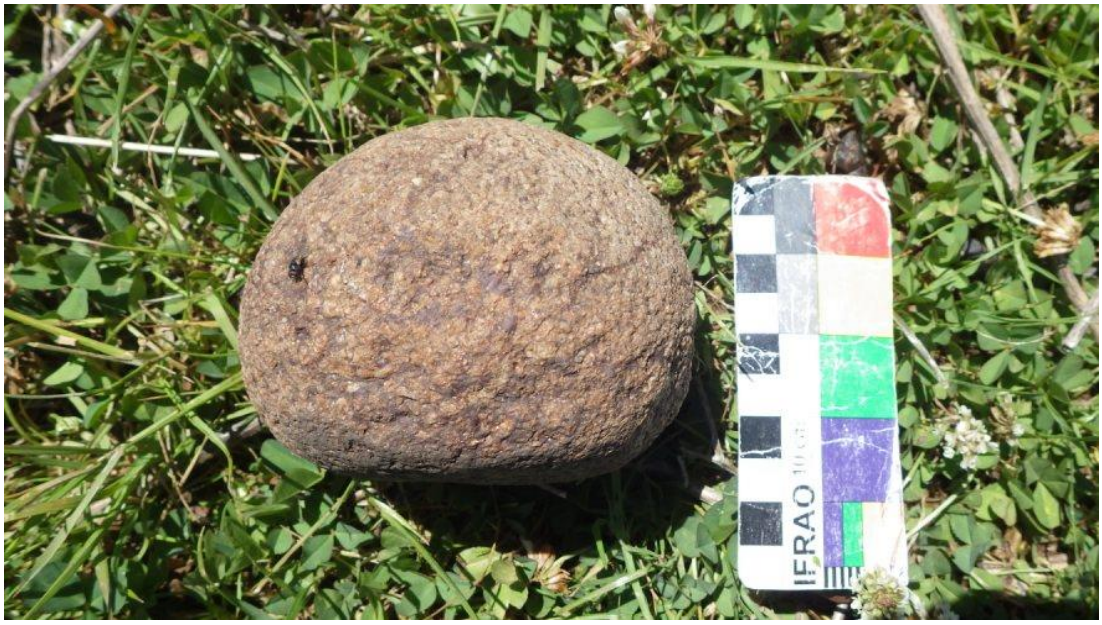


Plate 20 Survey Unit 6/Locale 1, topstone.

Survey Unit 6/Locale 2 grid reference: Hand GPS (GDA): 348337e 6711241n

This recording consists of one stone artefact situated some 100 metres away an ephemeral 2nd order watercourse located adjacent to Survey Unit 6 (Plate 21). The locale has a very gentle gradient and an easterly aspect. Soils are a dark brown silty clay loam. The locale is eroded due to vegetation clearance and subsequent farming activity. While originally the watercourse would have been a shallow depression, sapphire mining activity followed by rehabilitation has resulted in the stream being a modified landscape feature. The area where the artefact was located appears to have been graded to remove basalt cobbles with pushed up piles of rock nearby.

Ground exposure in this locale was negligible due to a consistent thick vegetation cover, with the artefact located sitting proud on the ground surface presumably having been turned up through ploughing. The ground surface visibility was assessed to be 1% and archaeological visibility 40%.

The artefact recorded is described as follows:

- Brown volcanic broken pebble hammerstone measuring 89 x 102 x 65 mm. The artefact has a flattened area at one end measuring 50 x 30 mm, consistent with pounding usewear, adjacent to which two areas have chipped (Plate 22).

It is likely that additional artefacts are present within this locale, however it is predicted that any additional artefacts will be present in very low numbers and density.

This artefact recording is situated outside the proposed development envelope and will therefore not be subject to impacts relating to the solar farm proposal.

Plate 21 Survey Unit 6/Locale 2, looking southwest.

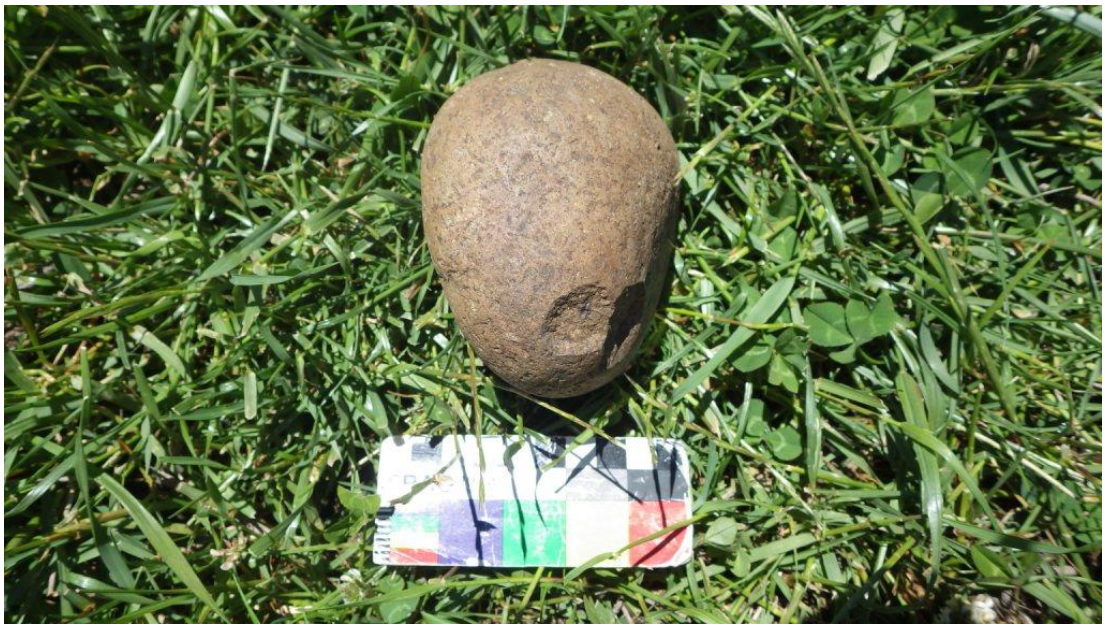


Plate 22 Survey Unit 6/Locale 2, hammerstone.

Survey Unit 6/Tree 1 grid reference: Hand GPS (GDA): 348142e 6712390n

This recording is of a possible scarred tree, located at the edge of a sparse stand of eucalypts in Survey Unit 6 (Plate 23). The tree consists of a remnant stump and appears to have been dead for a considerable time, having been felled. The species of tree is unknown but is presumably a eucalypt. The scarring present has been sawn through, leaving the bottom section only. The scar is on the southern side of the tree, and the portion which remains is elongated and reasonably symmetrical in shape. The scar measures 62 cm in length and 23 cm in width at its widest point. The base of the scar is located 18 cm above the ground. The tree trunk has a circumference of 168 cm and a diameter of 52 cm. This tree is located outside any areas of impact and accordingly will be avoided.

Plate 23 Survey Unit 6/Tree 1, looking northwest.

Survey Unit 8/Locale 1 grid reference: Hand GPS (GDA): 347290e 6713969n

This recording consists of one stone artefact situated on a crest (Plate 24). The locale has a very gentle gradient and a northerly aspect. Soils are a dark brown silty clay loam. The locale has been impacted by vegetation clearance and subsequent farming activity.

Ground exposure in this locale was negligible due to a consistent thick vegetation cover, with the artefact located sitting proud on the ground surface presumably having been turned up through ploughing. The ground surface visibility was assessed to be 1% and archaeological visibility 30%.

The artefact recorded is described as follows:

- Grey volcanic (poor quality) core measuring 64 x 48 x 37 mm. The artefact has 20% terrestrial cortex.

It is likely that additional artefacts are present within this locale, however it is predicted that any additional artefacts will be present in very low numbers and density.

Plate 24 Survey Unit 8/Locale 1, looking northeast.

Survey Unit 12/Locale 1 grid reference: Hand GPS (GDA): 344159e 6712771n

This recording consists of three stone artefacts situated on a flat (Plate 25). The locale is of level gradient with open aspect. Soils are a dark brown silty clay loam. The locale has been impacted by vegetation clearance and subsequent farming activity giving rise to erosion.

Ground exposure in this locale was good due to ploughing, the recent subsequent harvesting and poisoning of wheat stubble. The ground surface visibility was assessed to be 50% and archaeological visibility 80%.

The artefacts recorded are described as follows:

- Grey volcanic core measuring 85 x 72 x 41 mm (Plate 26). The artefact has three negative scars and appears to have sustained some damage as the result of being struck by a plough.
- Grey chert core measuring 59 x 30 x 24 mm. The artefact has 25% terrestrial cortex.
- Grey/green tuff flake measuring 32 x 35 x 7 mm. The artefact has 5% terrestrial cortex.

It is likely that additional artefacts are present within this locale, however it is predicted that any additional artefacts will be present in very low numbers and density.

Plate 25 Survey Unit 12/Locale 1, looking northeast.

Plate 26 Grey volcanic core located in Survey Unit 12/Locale 1.

Survey Unit 12/Locale 2 grid reference: Hand GPS (GDA): 344345e 6712731n

This recording consists of one stone artefact situated on a flat. The locale is of level gradient with open aspect. Soils are a dark brown silty clay loam. The locale has been impacted by vegetation clearance and subsequent farming activity giving rise to erosion.

Ground exposure in this locale was good due to ploughing, the recent subsequent harvesting and poisoning of wheat stubble. The ground surface visibility was assessed to be 50% and archaeological visibility 80%.

The artefact recorded is described as follows:

- Grey chert flake measuring 30 x 22 x 7 mm. The artefact has a Hertzian initiation, crushed platform and feather termination.

It is likely that additional artefacts are present within this locale, however it is predicted that any additional artefacts will be present in very low numbers and density.

Survey Unit 12/Locale 3 grid reference: Hand GPS (GDA): 344412e 6712835n

This recording consists of one stone artefact situated on a flat (Plate 27). The locale is of level gradient with open aspect. Soils are a dark brown silty clay loam. The locale has been impacted by vegetation clearance and subsequent farming activity giving rise to erosion.

Ground exposure in this locale was good due to ploughing, the recent subsequent harvesting and poisoning of wheat stubble. The ground surface visibility was assessed to be 50% and archaeological visibility 60%.

The artefact recorded is described as follows:

- Cream quartzite core measuring 71 x 23 x 46mm (Plate 28). The artefact has 30% rough pebble cortex, one platform and nine negative flake scars.

It is likely that additional artefacts are present within this locale, however it is predicted that any additional artefacts will be present in very low numbers and density.

Plate 27 Survey Unit 12/Locale 3, looking northeast.

Plate 28 Quartzite core located in Survey Unit 12/Locale 3.

Survey Unit 13/Locale 1 grid reference: Hand GPS (GDA): 344276e 6712516n

This recording consists of two stone artefacts located in a ploughed and sown field in Survey Unit 13 (Plate 29). The locale has a gentle gradient and a north-westerly aspect. Soils are a dark brown silty loam. The locale is eroded due to vegetation clearance and subsequent farming activity, including contour drainage swale creation.

Ground exposure in this locale was good due to ploughing, the recent subsequent harvesting and poisoning of wheat stubble. The ground surface visibility was assessed to be 60% and archaeological visibility 60%.

The artefacts recorded are described as follows:

- Grey volcanic bifacially flaked piece, lenticular in shape, measuring 110 x 66 x 33 mm (possible hatchet preform).
- Grey chert core measuring 49 x 52 x 23 mm. The artefact has 65% terrestrial cortex and is flaked on one face.

It is likely that additional artefacts are present within this locale, however it is predicted that any additional artefacts will be present in very low numbers and density.

Plate 29 Survey Unit 13/Locale 1, looking southwest.

Plate 30 Bifacially flaked piece located in Survey Unit 13/Locale 1.

Survey Unit 13/Locale 2 grid reference: Hand GPS (GDA): 344795e 6712965n

This recording consists of one stone artefact located in a ploughed and sown field in Survey Unit 13 (Plate 31). The locale has a gentle gradient and a north-westerly aspect. Soils are a dark brown silty loam. The locale is eroded due to vegetation clearance and subsequent farming activity, including contour drainage swale creation.

Ground exposure in this locale was good due to ploughing, the recent subsequent harvesting and poisoning of wheat stubble. The ground surface visibility was assessed to be 80% and archaeological visibility 60%.

The artefact recorded is described as follows:

- Brown volcanic bifacially flaked piece, lenticular in shape (possible hatchet preform), measuring 110 x 69 x 31 mm (Plate 32).

It is likely that additional artefacts are present within this locale, however, it is predicted that any additional artefacts will be present in very low numbers and density.

Plate 31 Survey Unit 13/Locale 2, looking south.

Plate 32 Bifacially flaked piece located in Survey Unit 13/Locale 2.

Survey Unit 15/Locale 1 grid reference: Hand GPS (GDA): 344187e 6710882n

This recording consists of one stone artefact located in a ploughed and sown field in Survey Unit 15 (Plate 33). The locale has a gentle gradient and a north-westerly aspect.

Soils are a dark brown silty loam. The locale is eroded due to vegetation clearance and subsequent farming activity.

Ground exposure in this locale was negligible due to a consistent thick vegetation cover, with the artefact located sitting proud on the ground surface presumably having been turned up through ploughing. The ground surface visibility was assessed to be 40% and archaeological visibility 70%.

The artefact recorded is described as follows:

- Dark brown silicified sandstone manuport, possibly a core, measuring 125 x 115 x 65 mm. The material is heavy and has some scarring on the margins.

It is likely that additional artefacts are present within this locale, however it is predicted that any additional artefacts will be present in very low numbers and density.

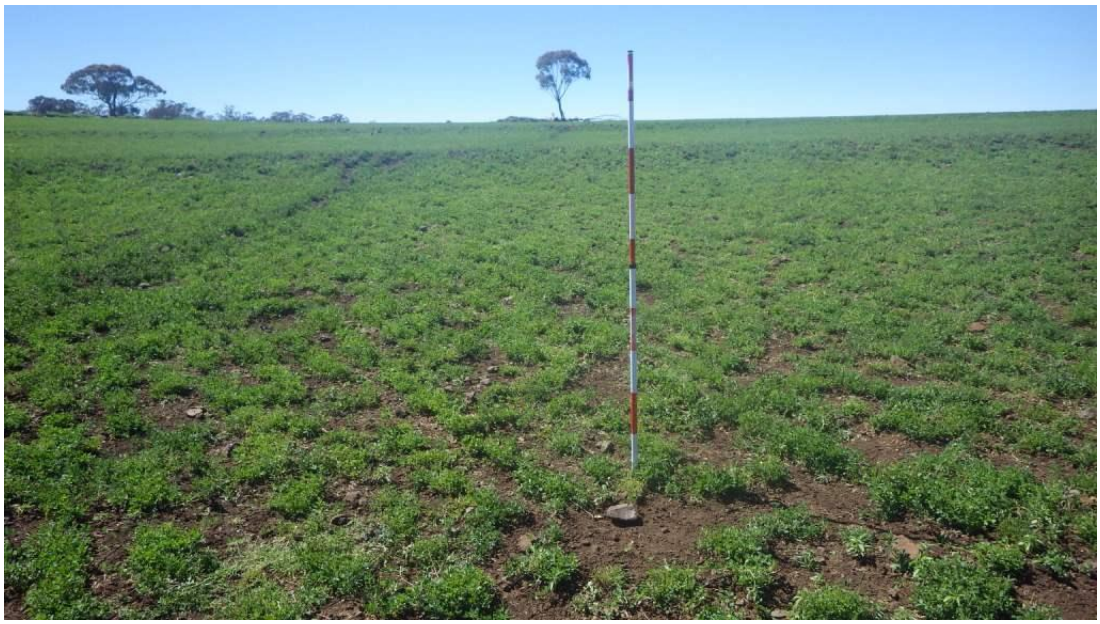


Plate 33 Survey Unit 15/Locale 1, looking east.

Survey Unit 17/Locale 1 grid reference: Hand GPS (GDA): 345319e 6712519n

This recording consists of one stone artefact located in a bare ploughed field in Survey Unit 17 (Plate 34). The locale is a gently undulating flat with open aspect. It is situated to the north of a 2nd order stream that sporadically holds water. Soils are a dark brown silty loam. The locale is eroded due to vegetation clearance and subsequent farming activity.

Ground exposure in this locale was good due to ploughing and the recent subsequent harvesting and poisoning of wheat stubble. The ground surface visibility was assessed to be 60% and archaeological visibility 60%.

The artefact recorded is described as follows:

- Black volcanic distal flake portion measuring 35 x 11 x 6 mm with hinge termination.

It is likely that additional artefacts are present within this locale, however it is predicted that any additional artefacts will be present in low numbers and density.

Plate 34 Survey Unit 17/Locale 1, looking south.

Survey Unit 17/Locale 2 grid reference: Hand GPS (GDA): 345133e 6712493n

This recording consists of one stone artefact located in a bare ploughed field in Survey Unit 17 (Plate 35). The locale is a gently undulating flat with open aspect. It is situated between a 2nd order stream to the south that sporadically holds water, and an incised 1st order drainage line to the north. Soils are a dark brown silty loam. The locale is eroded due to vegetation clearance and subsequent farming activity.

Ground exposure in the area of this locale was good due to ploughing and the recent subsequent harvesting and poisoning of wheat stubble. The ground surface visibility was assessed to be 60% and archaeological visibility 60%.

The artefact recorded is described as follows:

- Grey volcanic hammerstone/anvil measuring 84 x 89 x 47 mm (Plate 36). The artefact is the central portion of the tool which is broken at both ends but has bruising on both remaining margins and anvil pitting on both faces.

It is likely that additional artefacts are present within this locale, however it is predicted that any additional artefacts will be present in low numbers and density.

Plate 35 Survey Unit 17/Locale 2, looking southwest.

Plate 36 Hammerstone/anvil located in Survey Unit 17/Locale 2.

Survey Unit 17/Locale 3 grid reference: Hand GPS (GDA): 345227e 6712425n

This recording consists of four stone artefacts located in a bare ploughed field in Survey Unit 17 (Plate 37). The locale is a gently undulating flat with open aspect. It is situated between a 2nd order stream to the south that sporadically holds water, and an incised 1st order drainage line to the north. Soils are a dark brown silty loam. The locale is eroded due to vegetation clearance and subsequent farming activity.

Ground exposure in this locale was good due to ploughing and the recent subsequent harvesting and poisoning of wheat stubble. The ground surface visibility was assessed to be 60% and archaeological visibility 60%.

The artefacts recorded are described as follows:

- Black chert flake measuring 28 x 33 x 6 mm. The artefact has a Hertzian initiation, focal platform and step termination.
- Black chert flake measuring 35 x 14 x 5 mm. The artefact has a Hertzian initiation, focal platform and feather termination.
- Brown volcanic flake fragment measuring 60 x 58 x 20 mm.
- Grey chert core measuring 37 x 24 x 17 mm.

It is likely that additional artefacts are present within this locale, however it is predicted that any additional artefacts will be present in low numbers and density.

Plate 37 Survey Unit 17/Locale 3, looking southwest.

Survey Unit 17/Locale 4 grid reference: Hand GPS (GDA): 345298e 6712337n

This recording consists of five stone artefacts located in a bare ploughed field in Survey Unit 17. The locale is a gently undulating flat with open aspect. It is situated between a 2nd order stream to the south that sporadically holds water, and an incised 1st order drainage line to the north. Soils are a dark brown silty loam. The locale is eroded due to vegetation clearance and subsequent farming activity.

Ground exposure in this locale was good due to ploughing and the recent subsequent harvesting and poisoning of wheat stubble. The ground surface visibility was assessed to be 60% and archaeological visibility 60%.

The artefacts recorded are described as follows:

- Black coarse-grained volcanic core measuring 42 x 73 x 54 mm (Plate 38). It is made from a pebble and possibly previously a hammerstone and the has three negative flake scars.
- Grey chert flake fragment measuring 17 x 23 x 9 mm.
- Grey chert flake fragment measuring 16 x 25 x 10 mm, with 40% terrestrial cortex.
- Grey silcrete flake fragment measuring 24 x 24 x 8 mm, with 40% terrestrial cortex.
- Grey chert flake fragment measuring 30 x 18 x 9 mm.

It is likely that additional artefacts are present within this locale, however it is predicted that any additional artefacts will be present in low numbers and density.

Plate 38 Black volcanic core situated in Survey Unit 17/Locale 4.

Survey Unit 17/Locale 5 grid reference: Hand GPS (GDA): 345442e 6712285n

This recording consists of two stone artefacts located in a bare ploughed field in Survey Unit 17 (Plate 39). The locale is a gently undulating flat with open aspect. It is situated between a 2nd order stream to the south that sporadically holds water, and an incised 1st order drainage line to the north. Soils are a dark brown silty loam. The locale is eroded due to vegetation clearance and subsequent farming activity.

Ground exposure in this locale was good due to ploughing and the recent subsequent harvesting and poisoning of wheat stubble. The ground surface visibility was assessed to be 60% and archaeological visibility 60%.

The artefacts recorded are described as follows:

- Grey silcrete flake, longitudinally split, measuring 32 x 24 x 7 mm.
- Grey volcanic flake fragment measuring 73 x 71 x 19 mm.

It is likely that additional artefacts are present within this locale, however it is predicted that any additional artefacts will be present in low numbers and density.

Plate 39 Looking southwest across to Survey Unit 17/Locale 5.

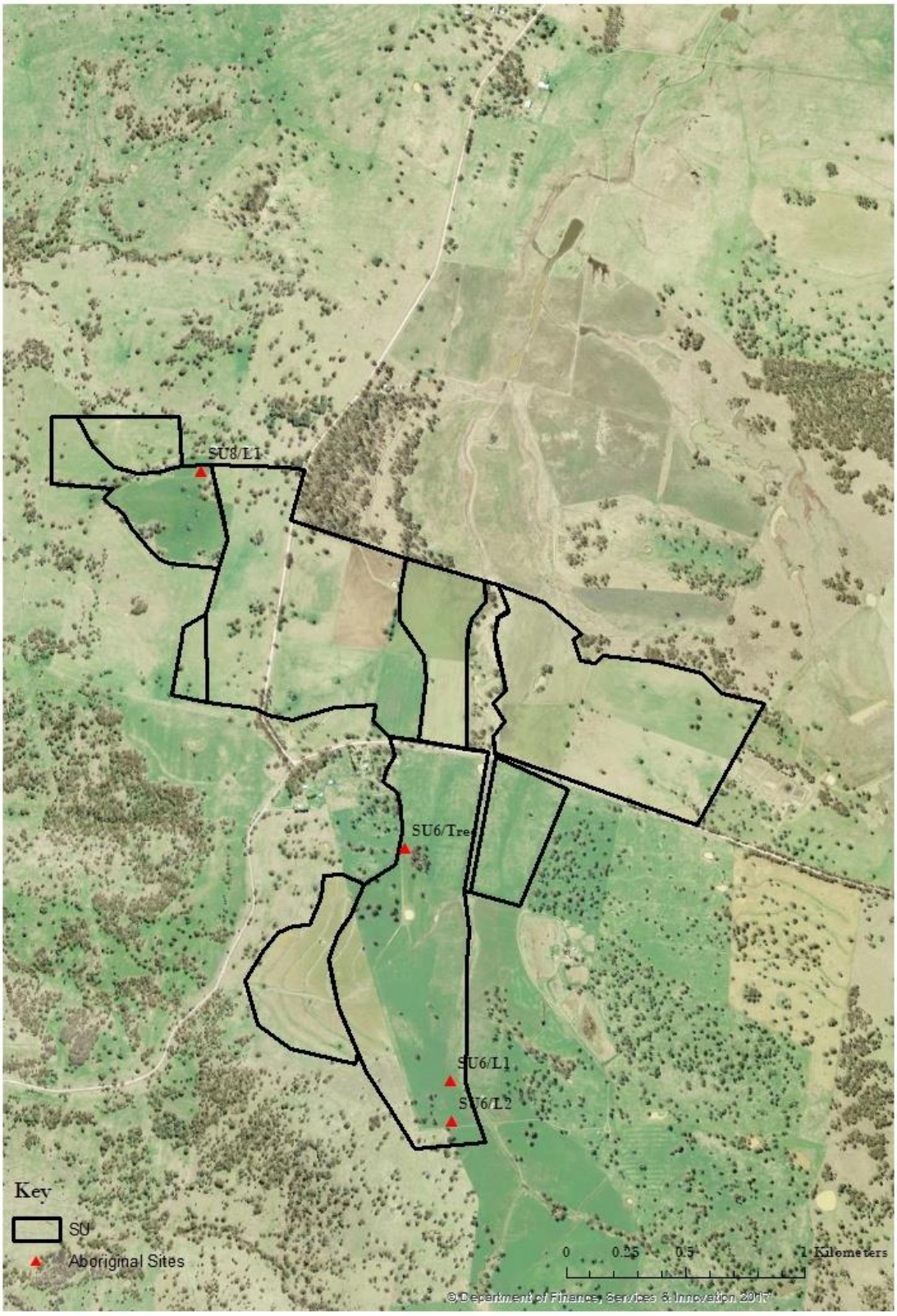


Figure 6 Location of Aboriginal object sites; east end.

Figure 7 Location of Aboriginal object sites; west end.

3. CONSULTATION PROCESS

A process of Aboriginal community consultation has been undertaken in accordance with the guidelines as set out in the OEH's *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW DECCW 2010b).

3.1 Consultation

In order to identify, notify and register Aboriginal people who may hold cultural knowledge relevant to determining the cultural significant of Aboriginal objects and/or places in the area of the proposed project, the following procedure was implemented (Appendix 3).

Correspondence dated 7 September 2017 was sent to:

- NSW OEH Dubbo office
- Anaiwan Local Aboriginal Land Council
- the Registrar, Aboriginal Land Rights Act 1983
- the National Native Title Tribunal, requesting a list of registered native title claimants, native title holders and registered Indigenous Land Use Agreements
- Native Title Services Corporation Limited (NTSCORP Limited)
- Inverell Shire Council
- Northern Tablelands Local Land Services

In addition, an advertisement was placed in the local newspaper (Inverell Times) on 12 September 2017.

Correspondence was received from the Office of Environment and Heritage (dated 12/9/17) furnishing a list of two Aboriginal parties who may have an interest in the area. Correspondence dated 19 September 2017 was sent to these groups.

A response was received from Inverell Shire Council with a list of two Aboriginal parties who may have an interest in the area. Correspondence dated 18 September 2017 was sent to one party (A letter had been sent previously to the other).

The Office of the Registrar, Aboriginal Land Rights Act, advised on 4 October 2017 that Mt Yarrowick National Park has registered Aboriginal Owners. We note that the subject area does not traverse this National Park.

There are three Registered Aboriginal Parties (RAPs) in the formal process of consultation:

- Harry White on behalf of the Northern Land Care Services Aboriginal Reference Group.

- Vicky Duncan and Diane Marlowe, Aboriginal Cultural Site Services.
- Ashford LALC.

In accordance with Section 4.2 and 4.3 of the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW DECCW 2010b) guidelines, information with regard to the project, proposed consultation process and assessment methodology was furnished to the RAP's for comment and were requested to provide feedback within 28 days. No responses were received.

A draft copy of this report will be provided to the RAPs for review and comment. One response has been received via email on 3/12/17 from Vicky Duncan, as follows:

> *HI Julie.*
> *Page 20 of draft states Vicky Hudson Diane Marlow ,Edgerton Kwiembal is wrong it needs to say*
>
> *Aboriginal Cultural Site Services*
> *Vicky Duncan, Diane Marlow*
>
> *Edgerton-Kwiembal EHCAC*
> *Samantha Duncan*
>
> *I recommend to relocate Aboriginal Objects to a safe Area close to were found.*
>
> *Say Hi to all and merry Xmas to yo all.*

4. SUMMARY AND ANALYSIS OF BACKGROUND INFORMATION

In the previous section the results of the background research and information have been outlined. The purpose of this section of the Aboriginal Cultural Heritage Assessment Report is to explain the results.

It is noted that no information about Aboriginal places, areas or objects has been identified as a result of the process of Aboriginal consultation which has been undertaken (as specified in clause 80C of the NPW Regulation).

No previously recorded Aboriginal object sites are known to be present in the subject area.

A total of 15 Aboriginal object locales were recorded during the field survey, most of which are single stone artefacts. Artefact density was found to be very low. The exception, was Survey Unit 17 where artefact density was defined as low.

The stone artefacts exhibited some variability. The majority were flakes, flake fragments and cores, as typically encountered. The presence of two bifacially flaked pieces, two hammerstones and a grinding top stone are notable. Their presence indicates some functional diversity across the subject area.

Effective Survey Coverage for the surveyed area is calculated to have been relatively high at the time of survey. The good exposure and visibility enabled a reasonable characterisation of artefact distribution within the area.

The Effective Survey Coverage achieved during the survey is considered to have been sufficient to characterise the nature of artefact distribution in the study area. The survey results are therefore assessed to be a relatively accurate reflection of the artefact density in the subject area. Accordingly, based on the relevant predictive model of site distribution for the area, and the results of the field survey, artefact density is assessed to be very low or low.

Archaeological test excavation has not been undertaken in respect of the proposal as it could not be justified (*cf.* NSW DECCW 2010a: 24). Effective Survey Coverage was adequate during field survey. Furthermore, given the high levels of previous disturbance and predicted low density of stone artefact distribution, subsurface test excavation is not warranted. The predictions regarding the nature of any undetected (subsurface) archaeology is made with relatively high confidence.

It is concluded there are no information gaps which are of a significant magnitude to warrant further consideration.

5. CULTURAL HERITAGE VALUES AND STATEMENT OF SIGNIFICANCE

The following significance assessment criteria is derived from the relevant aspects of ICOMOS Burra Charter (Australian ICOMOS 1999).

Aboriginal cultural heritage sites are assessed under the following categories of significance:

- Social or cultural value to contemporary Aboriginal people;
- Historical value;
- Scientific/archaeological value;
- Aesthetic value.

Aboriginal cultural significance

The Aboriginal community will value a place in accordance with a variety of factors including contemporary associations and beliefs and historical relationships. Most heritage evidence is highly valued by Aboriginal people given its symbolic embodiment and physical relationship with their ancestral past. It will almost certainly be the case that the value Aboriginal people feel for Aboriginal objects will differ to archaeological considerations.

Archaeological value

The assessment of archaeological value involves determining the potential of a place to provide information which is of value in scientific analysis and the resolution of potential archaeological research questions. Relevant research topics may be defined and addressed within the academy, the context of cultural heritage management or by Aboriginal communities. Increasingly, research issues are being constructed with reference to the broader landscape rather than focusing specifically on individual site locales. In order to assess scientific value sites are evaluated in terms of nature of the evidence, whether or not they contain undisturbed artefactual material, occur within a context which enables the testing of certain propositions, are very old or contain significant time depth, contain large artefactual assemblages or material diversity, have unusual characteristics, are of good preservation, or are a part of a larger site complex. Increasingly, a range of site types, including low density artefact distributions, are regarded to be just as important as high density sites for providing research opportunities.

In order to assess the criteria of archaeological significance further, and also to consider the criteria of rarity, consideration can be given to the distribution of stone artefacts across the continent. There are two estimates of the quantity of accumulated stone artefacts in Australia (Wright 1983:118; Kamminga 1991:14; 2002). Wright estimated an average of 500,000 débitage items and 24,000 finished tools per square kilometre, which equates to a total of about 180 billion finished stone tools and four trillion stone débitage items in Australia. Kamminga's estimates, which were determined from a different set of

variables, provide a conservative estimate of 200 billion stone tools and 40 million tonnes of flaking débitage (see Kamminga 1991:14; 2002). These two estimates are similar, and suggest that the actual number of stone tools and items of flaking débitage in Australia is in the trillions. The stone artefacts distributed in the proposed activity area cannot, therefore, be considered rare.

Most stone artefacts found in Australia comprise flaking debris (termed débitage) from stone tool making. While it can be reasonably inferred from a range of ethnographic and archaeological evidence that discarded stone artefacts and flaking debris was not valued by the maker, in certain circumstances these objects may to varying degrees have archaeological research potential and/or Aboriginal social value. However, only in very exceptional circumstances is archaeological research potential high for sites (Kamminga, J. pers. comm. June 2009).

Aesthetic value

Aesthetic value relates to aspects of sensory perception. This value is culturally contingent.

5.1 Statement of Significance

The scientific significance of the recorded Aboriginal artefact locales in the project area is set out in Table 5.

Table 5 Archaeological significance assessment of Aboriginal object sites.

Site	Significance	Criteria
SU6/L1	Low/moderate local significance	Common site type; however, the top stone artefact is of some significance Low educational value Low aesthetic value Low research potential: disturbed; predicted very low density.
SU6/L2	Low/moderate local significance	Common site type; however, the hammerstone artefact is of some significance Low educational value Low aesthetic value Low research potential: disturbed; predicted very low density.
SU6/Tree	Potentially moderate significance	Its status as an Aboriginal scarred tree is not confirmed
SU8/L1	Low local significance	Common site type Low educational value Low aesthetic value Low research potential: disturbed; predicted very low density.
SU12/L1	Low local significance	Common site type Low educational value

Site	Significance	Criteria
		Low aesthetic value Low research potential: disturbed; predicted very low density.
SU12/L2	Low local significance	Common site type Low educational value Low aesthetic value Low research potential: disturbed; predicted very low density.
SU12/L3	Low local significance	Common site type Low educational value Low aesthetic value Low research potential: disturbed; predicted very low density.
SU13/L1	Low/moderate local significance	Common site type; however, the bifacially flaked piece is of some significance Low educational value Low aesthetic value Low research potential: disturbed; predicted very low density.
SU13/L2	Low/moderate local significance	Common site type; however, the bifacially flaked piece is of some significance Low educational value Low aesthetic value Low research potential: disturbed; predicted very low density.
SU15/L1	Low local significance	Common site type Low educational value Low aesthetic value Low research potential: disturbed; predicted very low density.
SU17/L1	Low local significance	Common site type Low educational value Low aesthetic value Low research potential: disturbed; predicted low density.
SU17/L2	Low/moderate local significance	Common site type; however, the hammerstone/anvil is of some significance Low educational value Low aesthetic value Low research potential: disturbed; predicted low density.
SU17/L3	Low local significance	Common site type Low educational value Low aesthetic value Low research potential: disturbed; predicted low density.
SU17/L4	Low local significance	Common site type Low educational value Low aesthetic value Low research potential: disturbed; predicted low density.
SU17/L5	Low local significance	Common site type Low educational value

Site	Significance	Criteria
		Low aesthetic value Low research potential: disturbed; predicted low density.

6. THE PROPOSED ACTIVITY

In this section, the nature and extent of the proposed activity and any potential harm to Aboriginal areas, objects and/or places is identified.

6.1 Previous Impacts

The subject area has undergone very high levels of prior disturbance associated with original land clearance, cultivation, mining and other forms of landscape modification. Accordingly, the archaeological context of Aboriginal objects/sites will be correspondingly disturbed, and this will act to lessen their value and significance.

6.2 Proposed Impacts

SSF would generate electricity through the conversion of solar radiation to electricity using PV panels laid out across the proposed site in a series of modules, mounted on steel racks with piled supports. Other infrastructure on site would include battery-based storage facilities, electrical power conversion units, underground and/or above ground electrical cabling, telecommunications equipment, amenities and storage facilities, vehicular access and parking areas, along with security fencing and gates.

SSF will connect to the TransGrid Substation constructed to connect Sapphire Wind Farm to the electricity network. While SSF could operate as a stand-alone generator/battery-based storage facility, it is proposed that the project may operate in parallel with the Sapphire Wind Farm project to provide firm, dispatchable electricity to the National Electricity Market (NEM). The connection configuration considered within this EIS accommodates for both scenarios, which will allow the battery-based storage facility within SSF to be available to charge from SSF, SWF and/or the NEM, and to discharge all its stored electricity to the NEM.

The Proposed Development would include, but not necessarily be limited to, the following elements (Figure 8):

- Solar arrays: solar panels supported by a mounting system installed on piles driven or screwed into the ground;
- Battery-based storage facilities;
- Power Conversion Units (PCUs) inclusive of Inverters/Rectifiers, Ring Main Units, LV/MV step-up Transformers located throughout the Proposed Development;
- Collector systems: above and/or below ground onsite cabling and electrical connections between the existing SWF substation (the Substation) and the respective PCU's.
- Operation and maintenance (O&M) building including workshop, warehouse, offices, ablutions, and carpark;
- Site access and onsite access tracks;
- Fencing and security system;
- Meteorological stations;

- Vegetation buffers (if required) for visual screening; and
- Firebreaks.

In addition to the key components outlined above, there would be a temporary construction compound required to facilitate the construction and decommissioning phases of the Proposed Development. Here, consideration has been given to utilising the temporary construction compound currently in use for construction of SWF.

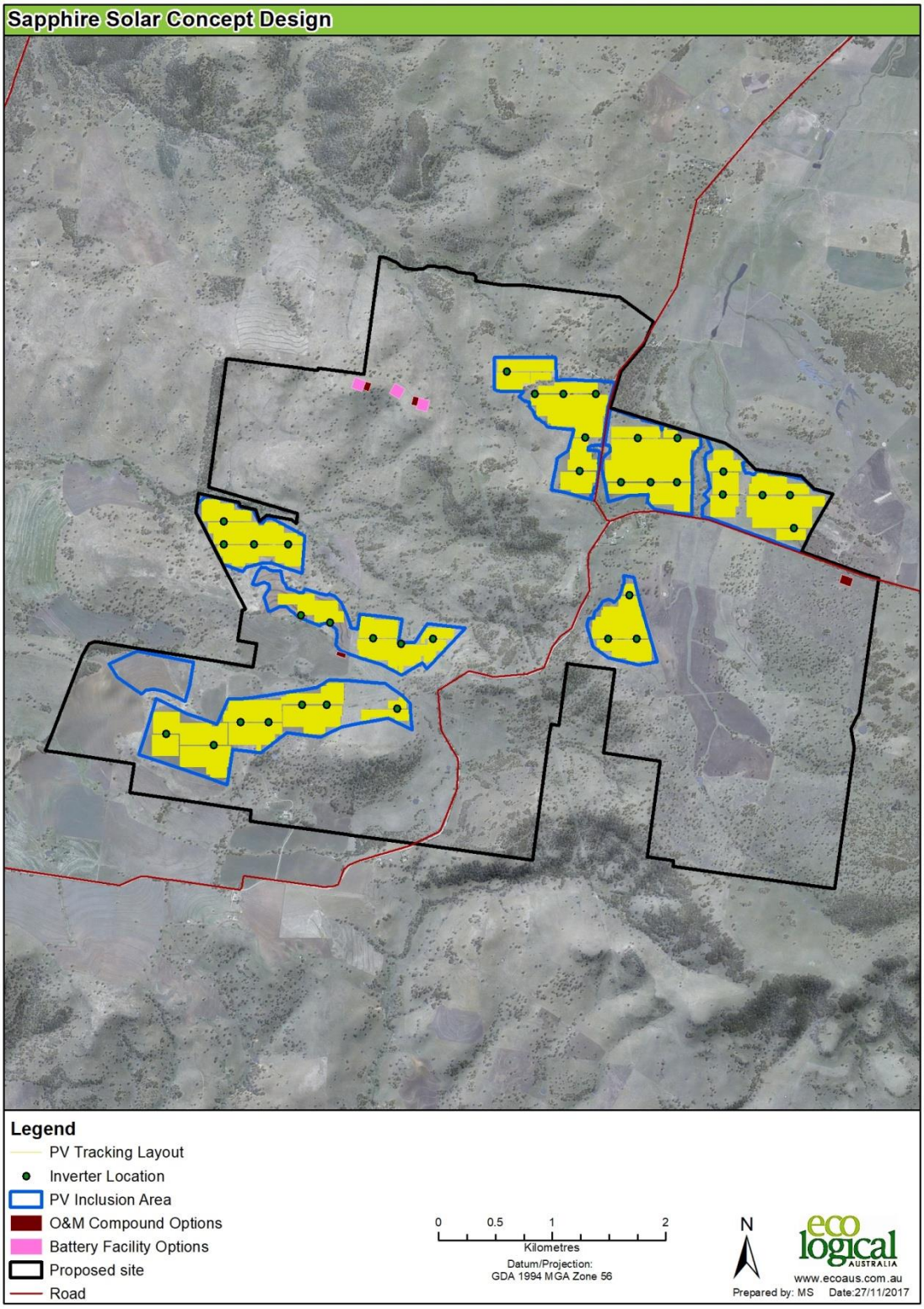


Figure 8 The project layout (supplied by proponent).

6.3 Type of Harm

An impact assessment is set out below in Table 6. The location of Aboriginal object sites in respect of the proposed impacts is shown in Figures 9 and 10.

Table 6 Impact assessment of Aboriginal object locales within the proposal area.

Aboriginal object site	Significance	Type of harm	Degree of harm	Consequence of harm
SU6/L1 Layout has changed, and this site is outside impact area	Low/moderate local significance	nil	nil	nil
SU6/L2 Layout has changed, and this site is outside impact area	Low/moderate local significance	nil	nil	nil
SU6/Tree Layout has changed, and this site is outside impact area	Potentially moderate significance	nil	nil	nil
SU8/L1	Low local significance	direct	whole	total loss of value
SU12/L1	Low local significance	direct	whole	total loss of value
SU12/L2	Low local significance	direct	whole	total loss of value
SU12/L3	Low local significance	direct	whole	total loss of value
SU13/L1	Low/moderate local significance	direct	whole	total loss of value
SU13/L2 Outside impact area	Low/moderate local significance	nil	nil	nil
SU15/L1	Low local significance	direct	whole	total loss of value
SU17/L1 Nil impacts in accordance with current layout	Low local significance	nil	nil	nil
SU17/L2 Nil impacts in accordance with current layout	Low/moderate local significance	nil	nil	nil
SU17/L3 Nil impacts in accordance with current layout	Low local significance	nil	nil	nil
SU17/L4 Nil impacts in accordance with current layout	Low local significance	nil	nil	nil
SU17/L5 Nil impacts in accordance with current layout	Low local significance	nil	nil	nil

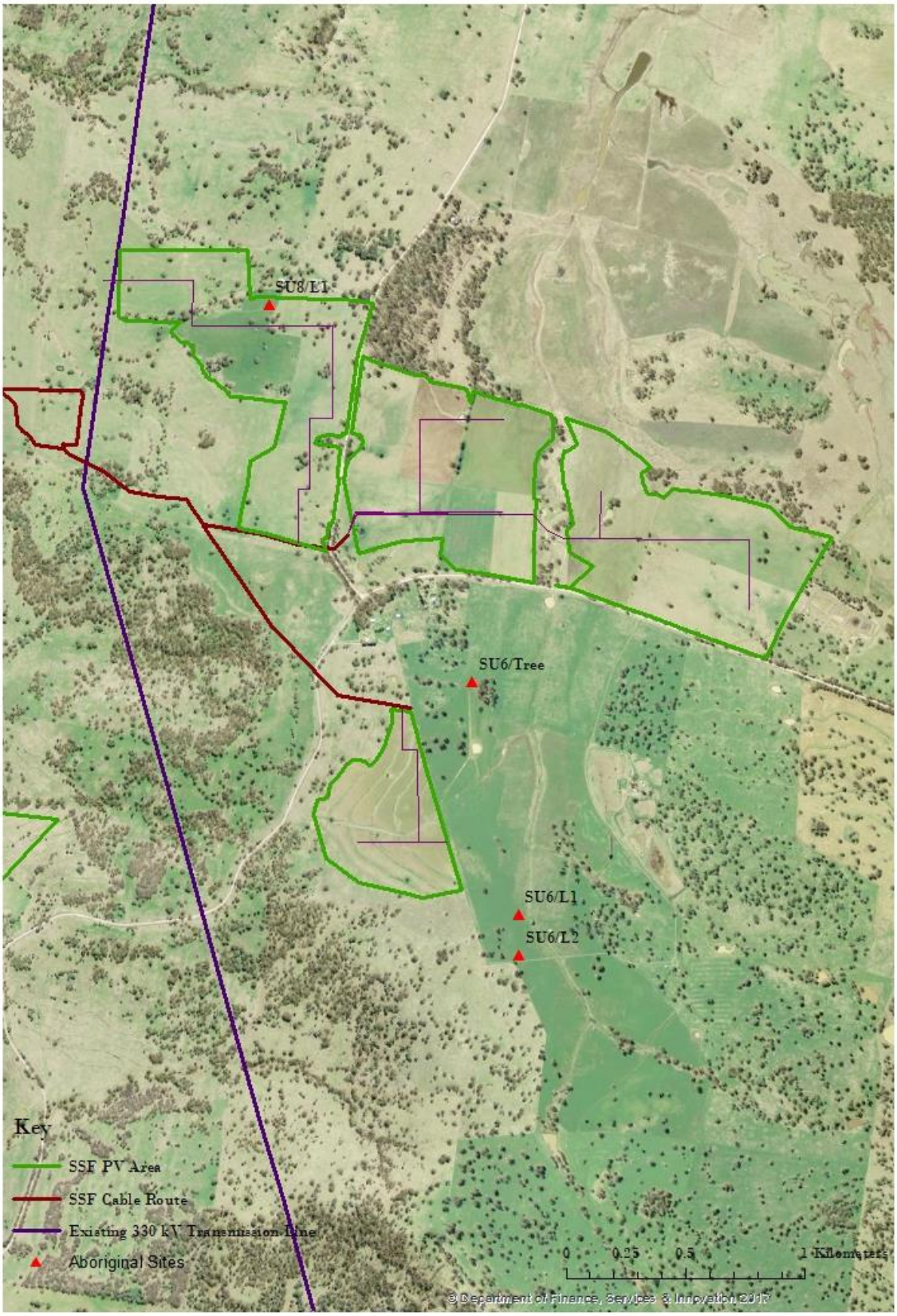


Figure 9 Location of Aboriginal objects in respect of proposed layout; east end.

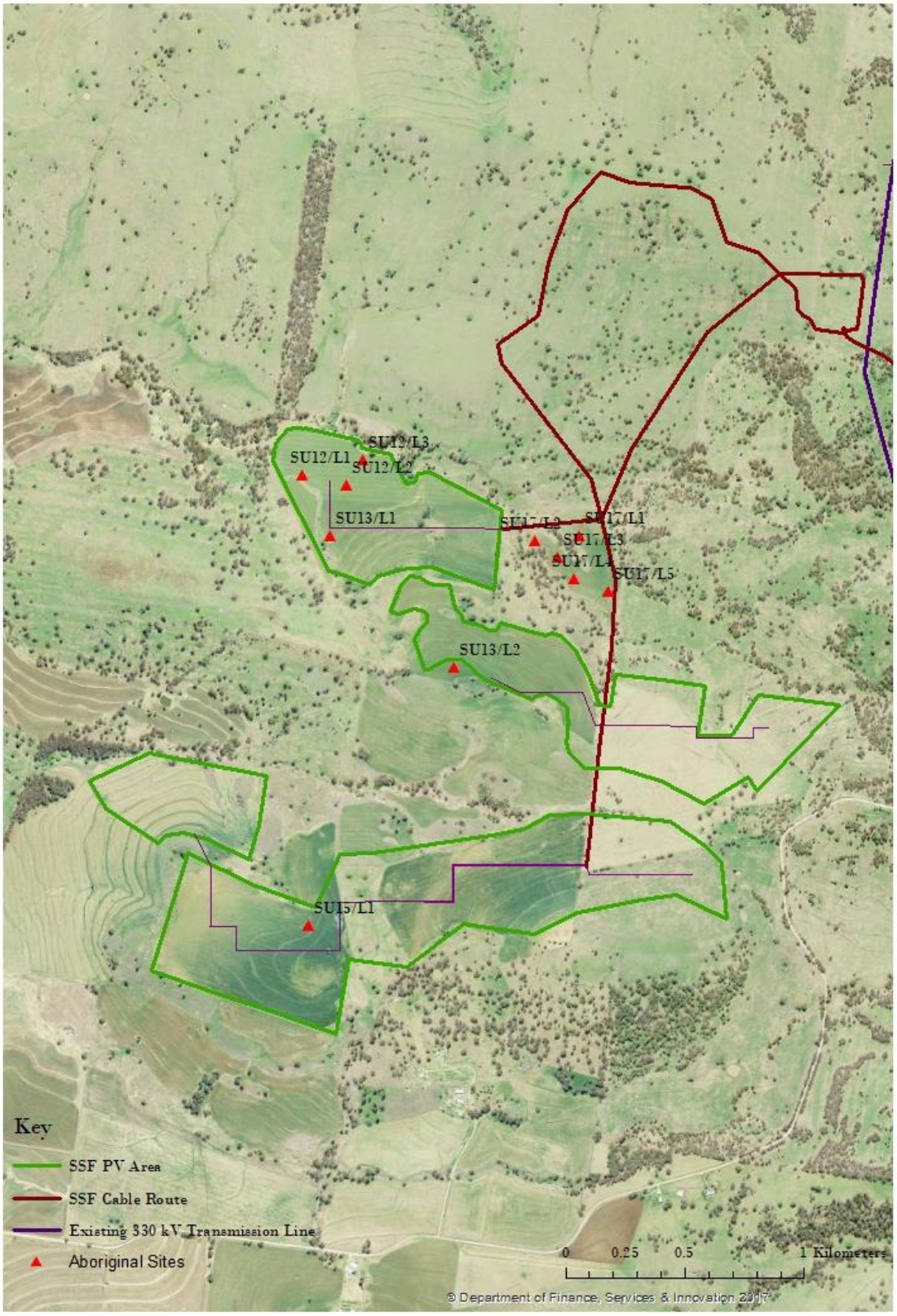


Figure 10 Location of Aboriginal objects in respect of proposed layout; west end.

7. AVOIDING AND/OR MINIMISING HARM

Ecologically Sustainable Development (ESD) is defined in the Protection of the Environment Administration Act 1991. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

(a) the precautionary principle,

(b) inter-generational equity,

(c) conservation of biological diversity and ecological integrity,

(d) improved valuation, pricing and incentive mechanisms.

The principles of ecologically sustainable development and the matter of cumulative harm have been considered for this project. The proposed impacts will take place within an area that has sustained a high level of prior impacts. The works would therefore occur in areas which have already received a certain level of impact and harm. Accordingly, considerations of ecologically sustainable development and cumulative impacts can be considered largely irrelevant in the matter at hand.

Avoidance or the mitigation of harm has not been considered as an option in relation to the proposed activities. The cultural and archaeological significance of the proposal area has not been assessed to be of sufficient significance to warrant the implementation of avoidance or mitigation strategies. However, given the significance of certain Aboriginal objects, salvage (surface collection) is warranted.

Proposed management and mitigation strategies are discussed below and present in Table 7.

7.1 Management and Mitigation Strategies

Further Investigation

The field survey has been focused on recording artefactual material present on visible ground surfaces. Further archaeological investigation would entail subsurface excavation undertaken as test pits for the purposes of identifying the presence of artefact bearing soil deposits and their nature, extent, integrity and significance. Further archaeological investigation in the form of subsurface test excavation can be appropriate in certain situations. These generally arise when a proposed development is expected to involve ground disturbance in areas which are assessed to have potential to contain high density artefactual material and when the Effective Survey Coverage achieved during a survey of a project area is low due to ground cover, vegetation etc.

No areas of the proposal area have been identified which warrant further archaeological investigation in order to formulate appropriate management and mitigation strategies.

No Aboriginal objects or survey units with potential conservation value have been identified to have a high probability of being present in the impact area. Accordingly, test excavation conducted under OEH's *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010: 24) is not necessary.

Conservation

Conservation is a suitable management option in any situation, however, it is not always feasible to achieve. Such a strategy is generally adopted in relation to sites which are assessed to be of high cultural and scientific significance, but can be adopted in relation to any site type.

In the case at hand, the development of a conservation strategy could not be justified.

Mitigated Impacts

Mitigated impact usually takes the form of partial impacts only (i.e. conservation of part of an Aboriginal site or landform) and/or salvage in the form of further research and archaeological analysis prior to impacts. Such a management strategy is generally appropriate when Aboriginal objects are assessed to be of moderate or high significance to the scientific and/or Aboriginal community and when avoidance of impacts and hence full conservation is not feasible. Salvage can include the surface collection or subsurface excavation of Aboriginal objects and subsequent research and analysis.

A surface collection of certain artefacts is considered justified given their relative rarity.

Elsewhere, unmitigated impact would be appropriate.

Unmitigated Impacts

Unmitigated impact to Aboriginal objects can be given consideration when they are assessed to be of low archaeological and cultural significance and otherwise in situations where conservation or limiting the extent of impacts is simply not feasible.

In the case at hand, unmitigated impact is considered appropriate in regard to the majority of Aboriginal object locales.

Monitoring

Monitoring during construction for the purposes of identifying cultural material that may be uncovered during earth disturbance can be implemented as a management strategy. However, monitoring is a reactive rather than proactive strategy, and as such, is not an ideal management tool in cultural heritage management. Monitoring for artefacts is not a widely accepted method of management because sites of significance can be destroyed as monitoring is taking place and because it can result in lengthy and costly delays to development works if significant cultural material is uncovered. In the case at hand, the development of a monitoring strategy is not considered necessary or appropriate.

Table 7 Management and mitigation.

Aboriginal object site	Significance	Impacts	Management
SU6/L1 Layout has changed, and this site is outside impact area	Low/moderate local significance	nil	If layout changes and impacts proposed, artefact should be salvaged
SU6/L2 Layout has changed, and this site is outside impact area	Low/moderate local significance	nil	If layout changes and impacts proposed, artefact should be salvaged
SU6/Tree Layout has changed, and this site is outside impact area	Potentially moderate significance	nil	If layout changes, site should be subject to active conservation
SU8/L1	Low local significance	direct	Unmitigated impact
SU12/L1	Low local significance	direct	Unmitigated impact
SU12/L2	Low local significance	direct	Unmitigated impact
SU12/L3	Low local significance	direct	Unmitigated impact
SU13/L1	Low/moderate local significance	direct	Salvage artefact (surface collection)
SU13/L2 Outside impact area	Low/moderate local significance	nil	If layout changes and impacts proposed, artefact should be salvaged
SU15/L1	Low local significance	direct	Unmitigated impact
SU17/L1 Nil impacts in accordance with current layout	Low local significance	nil	nil
SU17/L2 Nil impacts in accordance with current layout	Low/moderate local significance	nil	If layout changes and impacts proposed, artefact should be salvaged
SU17/L3 Nil impacts in accordance with current layout	Low local significance	nil	nil
SU17/L4 Nil impacts in accordance with current layout	Low local significance	nil	nil
SU17/L5 Nil impacts in accordance with current layout	Low local significance	nil	nil

8. STATUTORY INFORMATION

The NPW Act provides statutory protection for all Aboriginal objects and Aboriginal Places.

An 'Aboriginal object' is defined as

> 'any deposit, object or material evidence (not being a handicraft for sale) relating to Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains'.

An Aboriginal place is an area declared by the Minister to be an Aboriginal place for the purposes of the Act (s84), being a place that in the opinion of the Minister *is or was of special significance with respect to Aboriginal culture*.

Part 6 of the National Parks and Wildlife Act 1974 (NPW Act) provides specific protection for Aboriginal objects and declared Aboriginal places by establishing offences of harm. Harm is defined to mean destroying, defacing, damaging or moving an object from the land. There are a number of defences and exemptions to the offence of harming an Aboriginal object or place. One of the defences is that the harm is carried out under an Aboriginal Heritage Impact Permit (AHIP).

However, under Section 89J of the Environmental Planning and Assessment Act 1979, the following authorisations are not required for State Significant Development that is authorised by a development consent granted after the commencement of this Division (and accordingly the provisions of any Act that prohibit an activity without such an authority do not apply):

- an Aboriginal heritage impact permit under section 90 of the National Parks and Wildlife Act 1974.

However, the management and mitigation strategies proposed in this report should form Statement of Commitments for inclusion in any Development Approval documents.

9. RECOMMENDATIONS

The recommendations are made on the basis of:

- A consideration of the relevant legislation (see Section 8 Statutory Information).
- The results of the investigation as documented in this report.
- Consideration of the type of development proposed and the nature of proposed impacts.
- The discussion in Section 7 regarding impact mitigation and management.

The following recommendations are made:

1. No further archaeological investigations are required in respect of the proposal. No areas were identified that could be characterised as places with a high probability of possessing subsurface Aboriginal objects with high potential conservation value. Accordingly, archaeological test excavation has not been undertaken in respect of the proposal as it could not be justified (*cf.* NSW DECCW 2010a: 24).

2. Management and mitigation strategies are set out in Section 7. These should be used to formulate appropriate Statement of Commitments to condition Development Approval.

3. 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. It is predicted that significant Aboriginal objects can occur anywhere in the landscape and, accordingly, they need to be identified and impact mitigation strategies implemented prior to impacts. The assessment may be conducted by predictive modelling, if appropriate.

   It is noted that layout changes may occur within the wide survey corridors (measuring 200m) and areas encompassed by individual Survey Units as the survey has been comprehensive. Further assessment is only required for any layout changes that would fall outside the Survey Units as described and mapped in this report.

4. The proponent should develop a Aboriginal Heritage Management Plan (AHMP) for the appropriate management and mitigation of development impacts during any further planning and project construction. The development of an AHMP should be undertaken in consultation with the project archaeologist, the Registered Aboriginal Parties and the NSW Office of Environment and Heritage.

   The AHMP would be prepared to guide the process for management and mitigation of impacts to Aboriginal cultural heritage and to set out procedures relating to the conduct of additional archaeological assessment, if required, and

the management of any further Aboriginal cultural heritage values which may be identified.

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

6. Cultural heritage should be included within any environmental audit of impacts proposed to be undertaken during the construction phase of the development.

10. REFERENCES

Back to Glen Innes Week Committee (BGIWC) 1988 *Glen Innes and District: a century and a half of memories*, Back to Glen Innes Week Committee, Glen Innes.

Balme, J and Beck, W 2002 Starch and Charcoal: Useful Measures of Activity Area in Archaeological Rock Shelters. Journal of archaeological science. 29 (2): 157-166

Binns, R. & McBryde, I. 1972 A petrological Analysis of Ground Edge Artefacts from Northern New South Wales. AIAS, Canberra.

Bloxham, B 1998 Bones That Lay Scatter'd: the Spatial Patterning of Faunal Remains an Petzkes Cave, Northern NSW. Unpublished BA (Hons) Thesis, Department of Archaeology and Palaeoanthropology University of New England, Armidale.

Bowdler, S 1981 Hunters in the Highlands: Aboriginal Adaptation in the Eastern Australian Uplands. *Archaeology in Oceania* 16, 99-111.

Bowler, J.M., Johnston, H., Olley J.M., Prescott J.R., Roberts R.G., Shawcross, W. & Spooner, N.A. 2003 New ages for human occupation and climatic change at Lake Mungo, Australia. *Nature* Vol. 421, No. 30, pp. 837-840.

Branagan, D. and G. Packham 2000 *Field Geology of New South Wales*. NSW Department of Mineral Resources: Sydney.

Brown, Dale January 2011 personal communication.

Burrows, G. E. 1999 A survey of 25 remnant vegetation sites in the South Western Slopes, NSW. *Cunninghamia* 6 (2); 283-314.

Campbell, I.C. 1978. Settlers and Aborigines: The pattern of contact on the New England Tableland 1832-1860. In I. McBryde (Ed.), *Records of Times Past*. Australian Institute of Aboriginal Studies, Canberra.

Cannon, M. 1988 *Life in the Country*. Viking O'Neill: Melbourne.

Carter, C. 1994 *The Archaeology of the Robertson Land Acts*. Unpublished BA Honours Thesis, Australian National University.

Carter, C. 2003 *Report to NSW National Parks & Wildlife Service on the Archaeological Survey & Assessment of Lot 4 DP 845442, North Cooma, NSW*.

Castlereagh Lachlan Environmental Services 2007 Aboriginal Archaeological Survey Swan Brook Bridge Replacement (Project No. A/00841/01). A Report to New South Wales Roads and Traffic Authority.

Coe, M. 1989 Windradyne : a Wiradjuri Koorie. Aboriginal Studies Press, Canberra.

David, B. & J. Thomas 2008 Landscape Archaeology: Introduction. In David, B. & J. Thomas (eds). *Handbook of Landscape Archaeology*. pp. 27 – 43. Left Coast Press Inc., Walnut Creek.

Davidson, I. 1982 Archaeology of the New England Tablelands: a Preliminary Report. Armidale and District Historical society. Vol. 15:44-46.

Dibden, J. 1996 Hatchet Hatchment: A study of style in a collection of ground-edge hatchet heads from South Eastern NSW. ANU Honours thesis.

Dibden, J. 2011a Proposed Sapphire Wind Farm Archaeological and Cultural Heritage Assessment. A report to Wind Prospect CWP Pty Ltd.

Dibden, J. 2011b Drawing in the Land: Rock-art in the Upper Nepean, Sydney Basin. Unpublished PhD thesis; Australian National University.

Dunnell, R. 1993 The Notion Site in J. Rossignol and L. Wandsnider eds Space, Time and *Archaeological Landscapes*. New York: Plenum, pgs 21-41.

Dorrough, J., A Yen, V. Turner, S. Clark, J. Crosthwaite and J. Hirth 2004 Livestock grazing management and biodiversity conservation in Australian temperate grassy landscapes. *Australian Journal of Agricultural Research*. Vol 55; pp 279 – 295.

Elder, B. 1988, *Blood on the Wattle: Massacres and Maltreatment of Australian Aborigines since 1788*, National Book Distributors: Brookvale.

ERM 2015 White Rock Wind Farm Modification Aboriginal Heritage Assessment.

Flood, J. 1980 *The Moth Hunters. Aboriginal Prehistory of the Alps*. Canberra: Australian Institute of Aboriginal Studies.

Gott, B. 1983. Murnong – Microseris scapigera: a study of a staple food of Victorian Aborigines. *Australian Aboriginal Studies* 1983/2: 2-18.

Glenn Innes Severn LGA (2010) Aboriginal Heritage Study, Final Report, prepared by Australian Museum Business Services, accessed 7/02/2011 <http://www.gisc.nsw.gov.au/files/56427/File/SOE2009.pdf>

Guilfoyle, D 1997 Technological Responses to Risk during the Late Holocene in New England, Northern New South Wales. Unpublished BSc (Hons) Thesis, University Western Australia, Perth, W. A.

Haglund, L. 1985 Assessment of the Prehistoric Heritage in the Mudgee Shire.

Hall, R and Lomax, K. 1996 A Regional Landscape Approach to the Management of Stone Artefact Sites in Forested Uplands in Eastern Australia. *Australia and Archaeology* 42: 35-42.

Heritage Council of New South Wales 2008 *Levels of Heritage Significance*, Heritage Office, NSW Department of Planning, Sydney.

Heritage Office and Department of Urban Affairs and Planning (HO&DUAP) 1996 *Regional histories: regional histories of New South Wales*, Department of Urban Affairs and Planning, Sydney.

Hiscock, P. 2008 *Archaeology of Ancient Australia*. Routledge, London.

Hiscock, P. & Mitchell, S. 1993 *Stone Artefact Quarries and Reduction Sites in Australia: Towards a Type Profile*. AGPS: Canberra.

Howard, A 2009 'Bingera Run', accessed 8/02/2011 <http://www.bingara.nsw.gov.au/files/uploaded/file/binger_run_booklet.pdf>

Howitt, A. 1904 *The Native Tribes of South East Australia*. London: Macmillan & Co Limited.

Inverell Shire Council 2009/2010 *State of the Environment Report*, accessed 7/02/2011 <http://www.inverell.nsw.gov.au/images/stories/ISC/Publications/State%20of%20environment%20report/10%2023772%20%202009%202010%20State%20of%20the%20Environment%20Report.pdf>

Jeans, D. N. 1966 *A Historical Geography of New South Wales*. Reed Education: Sydney.

Jeans, D. N. 1972 *A Historical Geography of New South Wales*. Reed Education: Sydney.

Lee, I. 1925 Early Explorers in Australia : From the Log-books and Journals, including the Diary of Allan Cunningham. Methuen: London.

Long, A. 2005 *Aboriginal Scarred Trees in New South Wales. A Field Manual*. New South Wales Department of Environment and Conservation. Hurstville, NSW.

Kamminga, J. 1991 Report on the Archaeological Collection, National Museum of Australia. Report to the National Museum of Australia, Canberra. April 1991. (3 vols).

Kamminga, J. 1992 Aboriginal Settlement and Prehistory of the Snowy Mountains. In Scougall, B. (ed) *Cultural Heritage of the Australian Alps: Proceedings of the symposium held at Jindabyne, New South Wales, 16-18 October 1991, Australian Alps Liaison Committee*. CPN Publications: Canberra pp 101-124.

Kamminga, Jo. Personal communication Oct 2007.

Kamminga, Jo. Personal communication 19th June 2009.

Knight, T. 2001 *Stepping Stones to the Sky Archaeological Perspectives on the Cultural Significance of the Weddin Mountains in Recent Prehistory*. Unpublished Master of Arts by Research Thesis. School of Archaeology and Anthropology Australian National University, Canberra.

Koettig, M. 1985 Assessment of Aboriginal Sites in the Dubbo City area. Report to Dubbo City Council.

Lourandos, H. 1997 *Continent of Hunter Gatherers* Cambridge University Press: Cambridge.

Martin, C 1995 The Taphonomy of Charcoal in Rockshelters: an Investigation of the Horizontal Distribution of Charcoal in Petzkes Cave, Yetman. BA (Hons) thesis, University of New England, Australia.

Molony, J. 1988 *The Penguin History of Australia*. Penguin: Melbourne.

McBryde, I. 1968 Archaeological Investigations in the Graman District. *Archaeology and Physical Anthropology in Oceania*, Volume III (2), 77-93.

McBryde, I. 1974 *Aboriginal Prehistory in New England: an Archaeological Survey of Northeastern New South Wales*. Sydney University Press, Sydney Australia.

McCardle Cultural Heritage Pty Ltd 2007 *Proposed Wind Farm at Glen Innes. Indigenous Archaeological Assessment*. A Report to Connell Wagner Pty Ltd.

McDonald, R. Isbell, R, Speight, J. Walker, J. and M. Hopkins 1998 *Australian Soil and Land Survey Field Handbook*. CSIRO Australia.

Mulvaney, J. and J. Kamminga 1999 *Prehistory of Australia*. Allen and Unwin: St Leonards.

New South Wales Department of Environment, Climate Change and Water 2010a *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010*.

New South Wales Department of Environment, Climate Change and Water 2010b *Aboriginal cultural heritage consultation requirements for proponents 2010*.

New South Wales Office of Environment and Heritage 2011 *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*.

Nghenvironmental 2016 White Rock Solar Farm Aboriginal Cultural Heritage Assessment.

OzArk 2009 Environmental and Heritage Management P/L *Indigenous and Nonindigenous Heritage Review. Identification of Constraints and Preferred Coracle Assessment-Dumaresq-Lismore 330 KV Electricity Transmission Line*. A Report for URS on Behalf of TransGrid.

Oxley, J. 1820. Journals of two expeditions into the interior of New South Wales, by order of the British Government in the years 1817-1818.

Pearson, M. 1981 Seen Through Different Eyes: Changing Land Use and Settlement Patterns in the Upper Macquarie River Region of NSW from Prehistoric Times to 1860. Ph.D. Thesis, Department of Prehistory and Anthropology, Australian National University, Canberra.

Perry, T. M. 1965 *Australia's First Frontier*. Melbourne University Press: Melbourne.

Robert Paton Archaeological Studies Pty Ltd 1998 *Baseline Aboriginal and European Heritage Investigations for the New South Wales Portion of the Queensland Interconnection Transmission Line Project*. A report to Dames and Moore Pty Ltd.

RPS 2010 Aboriginal Heritage Assessment White Rock Wind Farm. Report to Epuron.

Rumsey, A. 1989 Language Groups in Australian Aboriginal Land Claims. *Anthropological Forum*. Vol. VI No 1 pp 69-79.

Shaw, A. 1970 *The Economic Development of Australia*. Longman: London.

Shott, M. 1995 Reliability of Archaeological Records on Cultivated Surfaces: A Michigan Case Study. *Journal of Archaeological Field Archaeology*. Vol 22; pgs 475 – 490.

Stanner, W. E. H. 1977 'The History of Indifference Thus Begins'. *Aboriginal History*. Vol. 1; No. 1; pp. 3 – 26.

Sutton, P. & B Rigsby 1979. Linguistic communities and social networks on Cape York Peninsula. In S. Wurm (ed) *Australian Linguistic Studies*. pp 713-732. Canberra: ANU.

Swain, T. 1993 *A Place for Strangers Towards a History of Australian Aboriginal Being*. Cambridge University Press, Cambridge.

Theunissen, R 1995 The Influence of Cave Topography on the Special Patterning of Stone Artefact: a Study in Horizontal Taphonomay at Petzkes Cave, Northern New South Wales. Unpublished BA (Hons) thesis, Department of Archaeology and Palaeoanthropology, UNE Armidale, NSW

Tindale, N. 1974 *Aboriginal Tribes of Australia*. ANU Press, Canberra.

Thomas, J. 2008 Archaeology, Landscape and Dwelling. In David, B. & J. Thomas (eds). *Handbook of Landscape Archaeology*. pp. 300 – 306. Left Coast Press, Walnut Creek, CA.

Wandsnider, L and E. Camilli 1992 The Character of Surface Archaeological Deposits and Its Influence on Survey Accuracy. *Journal of Field Archaeology*. Vol. 19 pgs 169 - 188.

Whitehead, J. 2003. *Tracking and Mapping The Explorers*. Volume 1 The Lachlan River Oxley, Evans, and Cunningham. Southern Cross University Printery: Lismore.

Wright, R. 1983 Stone implements. In G. Connah (ed.), *Australian field archaeology: a guide to techniques*. Australian Institute of Aboriginal Studies, Canberra, pp. 110-25.

Whitaker, Norman January 2011 personal communication.

Wiedemann, E. 1981 *World of its own: Inverell's early years 1827 - 1920*, Inverell Shire Council and Devill Publicity, Inverell.

Wiedemann, E. 1996 *Where rivers meet: a short account of Inverell's early years*, Inverell Friends of the Library, Inverell.

Wiedemann, E. 1998 *Holding its own: the Inverell district since 1919*, Inverell Shire Council, Inverell.

APPENDIX 1 GLOSSARY

Aboriginal object - A statutory term, meaning: '… any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises NSW, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains' (s.5 NPW Act).

Declared Aboriginal place - A statutory term, meaning any place declared to be an Aboriginal place (under s.84 of the NPW Act) by the Minister administering the NPW Act, by order published in the NSW Government Gazette, because the Minister is of the opinion that the place is or was of special significance with respect to Aboriginal culture. It may or may not contain Aboriginal objects.

Development area - Area proposed to be impacted as part of a specified activity or development proposal.

Harm - A statutory term meaning '… any act or omission that destroys, defaces, damages an object or place or, in relation to an object – moves the object from the land on which it had been situated' (s.5 NPW Act).

Place - An area of cultural value to Aboriginal people in the area (whether or not it is an Aboriginal place declared under s.84 of the Act).

Proponent - A person proposing an activity that may harm Aboriginal objects or declared Aboriginal places and who may apply for an AHIP under the NPW Act.

Proposed activity - The activity or works being proposed.

Subject area - The area that is the subject of archaeological investigation. Ordinarily this would include the area that is being considered for development approval, inclusive of the proposed development footprint and all associated land parcels. To avoid doubt, the subject area should be determined and presented on a project-by-project basis. In this instance, the subject area refers to the area in which impacts are proposed.

APPENDIX 2 AHIMS SITE SEARCH

Office of Environment & Heritage

AHIMS Web Services (AWS)
Extensive search - Site list report

Your Ref/PO Number : Sapphire
Client Service ID : 300555

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
12-4-0003	Matheson;	AGD	56	361500	6707900	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	Isabel McBryde					Permits		
12-4-0023	PAD5 (GLEN INNES)	GDA	56	361478	6708602	Open site	Valid	Potential Archaeological Deposit (PAD) : -		101915
	Contact	Recorders	Jim Wheeler					Permits		
12-4-0024	PAD6 and PAD7 (GLEN INNES)	GDA	56	356063	6705686	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Jim Wheeler					Permits		
11-6-0090	PAD8 (GLEN INNES)	GDA	56	354862	6705458	Open site	Valid	Potential Archaeological Deposit (PAD) : -		101915
	Contact	Recorders	Jim Wheeler					Permits		
11-6-0091	PAD9 (GLEN INNES)	GDA	56	349130	6705220	Open site	Valid	Potential Archaeological Deposit (PAD) : -		101915
	Contact	Recorders	Jim Wheeler					Permits		
11-6-0084	CG-OS-1 (Chinamans Gully Associated Pad 10 & Pad 11)	GDA	56	352050	6705311	Open site	Valid	Artefact : 4, Potential Archaeological Deposit (PAD) : -		101915
	Contact	Recorders	Jim Wheeler					Permits		
11-6-0085	RC-OS-1 Redbank Creek (Associated with Pad 12)	GDA	56	340185	6703465	Open site	Valid	Artefact : 2, Potential Archaeological Deposit (PAD) : -		101915
	Contact	Recorders	Jim Wheeler					Permits		
11-6-0092	PAD10 and PAD 11 (GLEN INNES)	GDA	56	352050	6705311	Open site	Valid	Potential Archaeological Deposit (PAD) : -		101915
	Contact	Recorders	Jim Wheeler					Permits		
11-6-0093	PAD12 (GLEN INNES)	GDA	56	340185	6703465	Open site	Valid	Potential Archaeological Deposit (PAD) : -		101915
	Contact	Recorders	Jim Wheeler					Permits		
12-4-0030	RPS WHITE ROCK02	GDA	56	361207	6703892	Open site	Valid	Artefact : -		
	Contact	Recorders	Ms.Tessa Boer-Mah,RPS Australia East Pty Ltd -Hamilton					Permits		
12-4-0031	RPS WHITE ROCK03	GDA	56	361374	6704084	Open site	Valid	Artefact : -		
	Contact	Recorders	Ms.Tessa Boer-Mah,RPS Australia East Pty Ltd -Hamilton					Permits		

Report generated by AHIMS Web Service on 08/09/2017 for Julie Dibden for the following area at Datum :GDA, Zone : 56, Eastings : 339000 - 363000, Northings : 6703000 - 6721000 with a Buffer of 50 meters. Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 27

Office of Environment & Heritage

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Sapphire
Client Service ID : 300555

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
11-6-0097	SWF-SU19/L1	GDA	56	345445	6717748	Open site	Valid	Artefact : 2		
	Contact	Recorders	NSW Archaeology Pty Ltd,Mr.Andrew Pearce					Permits		
11-6-0098	SWF-SU14/L1	GDA	56	354450	6708898	Open site	Valid	Artefact : 3		
	Contact	Recorders	NSW Archaeology Pty Ltd,Mr.Andrew Pearce					Permits		
11-6-0099	SWF-SU21/L1	GDA	56	342970	6714240	Open site	Valid	Artefact : 1		
	Contact	Recorders	NSW Archaeology Pty Ltd,Mr.Andrew Pearce					Permits		
11-6-0101	Kings Plains L&H P1	GDA	56	348605	6720688	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Mr.John Appleton					Permits	3893,4108	
11-6-0052	S30	AGD	56	346644	6714657	Open site	Valid	Artefact : -	Isolated Find	
	Contact	Recorders	Robert Paton					Permits		
11-6-0054	S31	AGD	56	347702	6709110	Open site	Valid	Artefact : -	Isolated Find	
	Contact	Recorders	Robert Paton					Permits		
12-4-0017	Gwydin Scar Tree	AGD	56	354160	6705610	Open site	Valid	Modified Tree (Carved or Scarred) : -	Carved Tree	
	Contact	Recorders	Karen Moorhouse					Permits		
11-6-0029	Ashgrove;Swan Pond;	AGD	56	351400	6704800	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Mr.Warwick Pearson					Permits		
11-6-0065	EL 25	AGD	56	345550	6708990	Open site	Valid	Artefact : -		
	Contact	Recorders	Robert Paton					Permits		
11-6-0062	EL23	AGD	56	345300	6705400	Open site	Valid	Artefact : 10		
	Contact	Recorders	Robert Paton					Permits		
11-6-0063	EL24	AGD	56	345950	6706900	Open site	Valid	Artefact : 6		
	Contact	Recorders	Robert Paton					Permits		
11-6-0075	S 31	AGD	56	347702	6709110	Open site	Valid	Artefact : 1		
	Contact	Recorders	Robert Paton					Permits		
11-6-0102	SWF- SU14/L1	GDA	56	354450	6708898	Open site	Valid	Artefact : 1		
	Contact	Recorders	NSW Archaeology Pty Ltd,Mr.Andrew Pearce					Permits		
11-6-0103	SWF- SU19/L1	GDA	56	345445	6717748	Open site	Valid	Artefact : 1		
	Contact	Recorders	NSW Archaeology Pty Ltd,Mr.Andrew Pearce					Permits		
11-6-0104	SWF- SU21/L1	GDA	56	342970	6714240	Open site	Valid	Artefact : 1		
	Contact	Recorders	NSW Archaeology Pty Ltd,Mr.Andrew Pearce					Permits		
11-6-0105	Frazers Creek IF1	GDA	56	343426	6716408	Open site	Valid	Artefact : -		
	Contact	Recorders	Umwelt (Australia) Pty Limited,Mr.Kirwan Williams					Permits		

Report generated by AHIMS Web Service on 08/09/2017 for Julie Dibden for the following area at Datum :GDA, Zone : 56, Eastings : 339000 - 363000, Northings : 6703000 - 6721000 with a Buffer of 50 meters. Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 27

Office of Environment & Heritage

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Sapphire
Client Service ID : 300555

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports

Report generated by AHIMS Web Service on 08/09/2017 for Julie Dibden for the following area at Datum :GDA, Zone : 56, Eastings : 339000 - 363000, Northings : 6703000 - 6721000 with a Buffer of 50 meters. Additional Info : Archaeological assessment. Number of Aboriginal sites and Aboriginal objects found is 27

APPENDIX 3 CONSULTATION DOCUMENTS

Example of 1st Stage letters sent to agencies:

New South Wales Archaeology Pty Limited ABN 53106044366

PO Box 2135
Central Tilba NSW 2546
Ph 02 44737947
www.nswarchaeology.com.au

7 September 2017
Team Leader Aboriginal Heritage - North West
Office of Environment and Heritage
NSW Department of Premier and Cabinet
PO Box 2111
Dubbo NSW 2830

Dear Sir/Madam

Re: Sapphire Solar Farm - Aboriginal Cultural Heritage Assessment

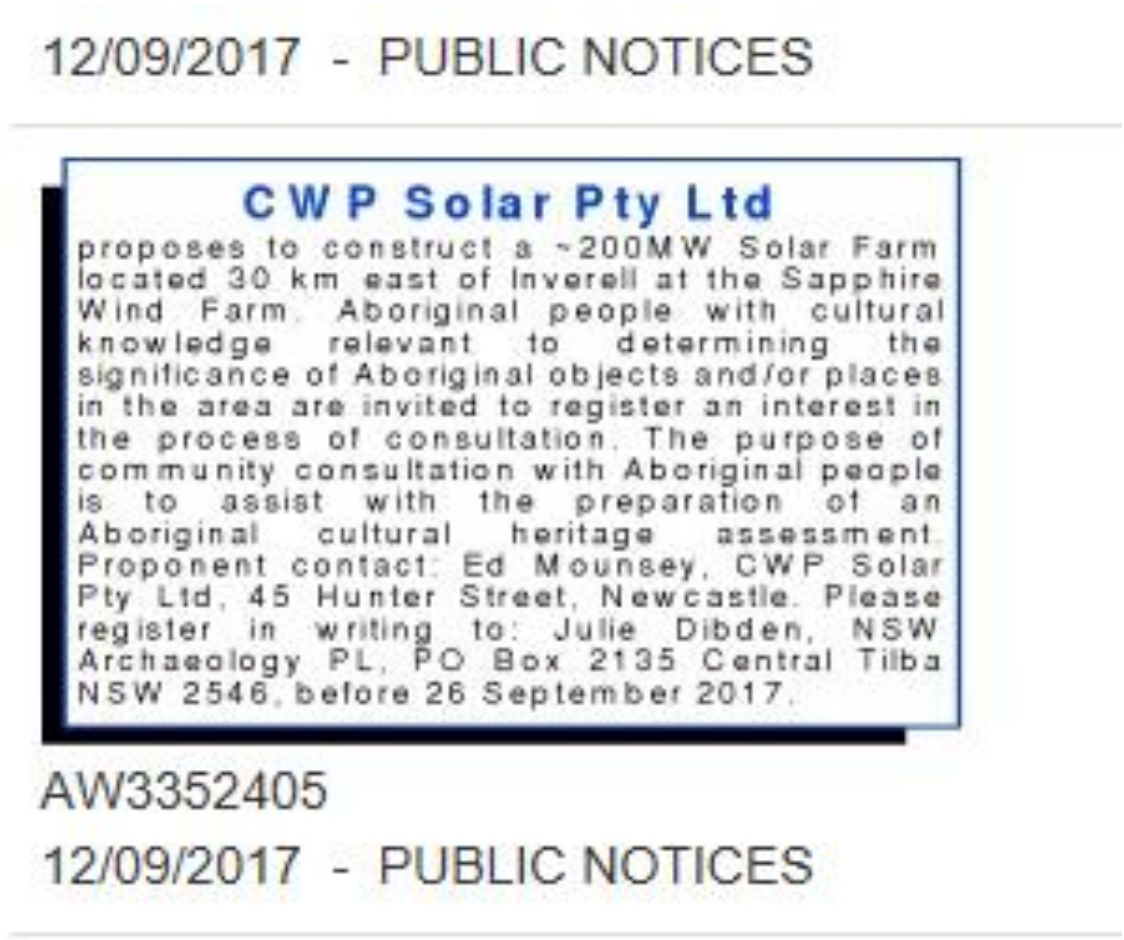
CWP Solar Pty Ltd proposes to construct a 200MW Solar Farm located 30 km east of Inverell at the Sapphire Wind Farm. NSW Archaeology Pty Ltd is undertaking a process of consultation with Aboriginal people on behalf of the proponent according to the requirements stipulated in the former NSW DECCW *Aboriginal cultural heritage consultation requirements for proponents, 2010*. The purpose of Aboriginal community consultation is to assist the proponent in understanding Aboriginal people's views and concerns about the project, and to understand cultural values present in the area, and to assist the NSW Office of Environment and Heritage (OEH) in a determination of an AHIP application.

We are seeking to identify Aboriginal persons who hold cultural knowledge relevant to this project area and who may wish to register an interest in the process of community consultation. Those who choose to register will have the opportunity to provide culturally appropriate information and to comment on the cultural heritage significance of Aboriginal objects and the area. If you are aware of Aboriginal people or groups who you believe may wish to register an interest in the process of Aboriginal consultation please provide contact details to NSW Archaeology Pty Ltd on behalf of the proponent before the 21 September 2017.

Yours faithfully

Dr Julie Dibden
New South Wales Archaeology Pty Limited

Copy of Advertisement:



12/09/2017 - PUBLIC NOTICES

CWP Solar Pty Ltd

proposes to construct a ~200MW Solar Farm located 30 km east of Inverell at the Sapphire Wind Farm. Aboriginal people with cultural knowledge relevant to determining the significance of Aboriginal objects and/or places in the area are invited to register an interest in the process of consultation. The purpose of community consultation with Aboriginal people is to assist with the preparation of an Aboriginal cultural heritage assessment. Proponent contact: Ed Mounsey, CWP Solar Pty Ltd, 45 Hunter Street, Newcastle. Please register in writing to: Julie Dibden, NSW Archaeology PL, PO Box 2135 Central Tilba NSW 2546, before 26 September 2017.

AW3352405

12/09/2017 - PUBLIC NOTICES

Example of 2nd batch of letters sent to potential Aboriginal stakeholders:

New South Wales Archaeology Pty Limited ABN 53106044366

PO Box 2135
Central Tilba NSW 2546
Ph 02 44737947
www.nswarchaeology.com.au

19 September 2017

Mr Aaron Broad
1 Waratah Ave
Albion Park Rail NSW 2527

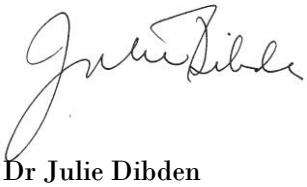
Dear Aaron

Re: Sapphire Solar Farm - Aboriginal Cultural Heritage Assessment

CWP Solar Pty Ltd proposes to construct a ~200MW Solar Farm located 30 km east of Inverell at the Sapphire Wind Farm. NSW Archaeology Pty Ltd is undertaking a process of consultation with Aboriginal people on behalf of the proponent according to the requirements stipulated in the former NSW DECCW *Aboriginal cultural heritage consultation requirements for proponents, 2010*. The purpose of Aboriginal community consultation is to assist the proponent in understanding Aboriginal people's views and concerns about the project, and to understand cultural values present in the area, and to assist the NSW Office of Environment and Heritage (OEH) in a determination of an AHIP application or otherwise terms of approval .

We are seeking to identify Aboriginal persons who hold cultural knowledge relevant to this project area and who may wish to register an interest in the process of community consultation. Those who choose to register will have the opportunity to provide culturally appropriate information and to comment on the cultural heritage significance of Aboriginal objects and the area. The NSW OEH provided your details to us. If you wish to register an interest in the process of Aboriginal consultation please provide contact details to NSW Archaeology Pty Ltd on behalf of the proponent (Ed Mounsey, CWP Solar Pty Ltd, 45 Hunter Street, Newcastle) before the 3 October 2017.

Yours faithfully



Dr Julie Dibden
New South Wales Archaeology Pty Limited

Documents provided to RAPS regarding project, proposed consultation process and assessment methods:

PROPOSED CULTURAL HERITAGE ASSESSMENT PROCESS
THE PROPOSED ACTIVITY
Sapphire Solar Farm (SSF)

CWP Solar Pty Ltd proposes to construct a ~200MW Solar Farm located 30 km east of Inverell at the Sapphire Wind Farm. NSW Archaeology Pty Ltd has been commissioned to conduct an Indigenous heritage (archaeological and cultural) assessment of the project (the proposed activity area – see attached map).

Access to the site is via either the Gwyder Highway or Kings Plains Road with immediate access via Woodstock Road, Waterloo Road and Western Feeder Road.

The project would be comprised of solar photovoltaic (PV) modules, steel racking and piled supports, electrical transformers, battery storage, electrical cabling, telecommunication equipment, security fencing and site office, maintenance buildings and car parking facilities.

The identified land is currently used for grazing and/or cultivation. Some portions have been subject to open-cut sapphire mining and have been recently rehabilitated with a topsoil application.

The footprint and scale of the SSF will be refined through the development of the Environmental Impact Assessment (EIA).

PROPOSED CULTURAL HERITAGE ASSESSMENT PROCESS
This document is being provided to Registered Aboriginal Parties for the purposes of agreeing on outcomes relating to the assessment process.

The cultural heritage assessment process for this project would be conducted in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (NSW DECCW). The NSW Office of Environment and Heritage - OEH (formally DECCW) manages Aboriginal cultural heritage in NSW in accordance with the National Parks and Wildlife Act 1974. Part 6 of the Act provides specific protection for Aboriginal objects and Aboriginal places by administering offences for harming them without authorisation. When an activity is likely to impact Aboriginal objects or declared Aboriginal Places, approval of the OEH is required, issued in the form of an Aboriginal Heritage Impact Permit (AHIP) or via other forms of approval.

NSW OEH requires effective consultation with Aboriginal people because it recognises that:

- Aboriginal people should have the right to maintain culture, language, knowledge and identity;
- Aboriginal people should have the right to directly participate in matters that may affect their heritage; and
- Aboriginal people are the primary determinants of the cultural significance of their heritage.

The purpose of the NSW OEH Aboriginal Cultural Heritage Consultation Requirements for Proponents document (NSW DECCW 2010) is to facilitate positive Aboriginal cultural heritage outcomes by:

- affording an opportunity for Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to be involved in consultation so that information about cultural significance can be provided to NSW OEH to inform decisions regarding AHIP applications and approvals; and
- providing Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) in the area of the project with the opportunity to participate in decision-making regarding the management of their cultural heritage by providing proponents with information regarding cultural significance and inputting into management options (NSW DECCW 2010).

The ACHCRP requirements outline four main consultation stages to be implemented in the course of consultation undertaken with Aboriginal people (these are outlined below). In summary the consultation process involves getting the views of, and information from, Aboriginal people and reporting these.

In order to fulfil the consultation requirements, NSW Archaeology Pty Ltd, on behalf of the proponent, proposes to implement the following procedure:

Stage 1 Notification of project proposal and registration of interest.
This stage is already underway and the aim is to identify, notify and register Aboriginal people who hold cultural knowledge relevant to determining the cultural significance of Aboriginal objects and/or places in the proposal area.

- NSW Archaeology, on behalf of the proponent, has sought to identify the names of Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places. An

advertisement has been placed in the local paper and letters have been written to various agencies.

- As we receive registrations of interest, NSW Archaeology is making a record of the names of each Aboriginal person or group who has registered an interest. Unless it is specified by a registered Aboriginal party that they do not want their names released, the list of names will be provided to the NSW OEH and the relevant Local Aboriginal Land Council.

- Where an Aboriginal organization representing Aboriginal people who hold cultural knowledge has registered an interest, a contact person for that organization must be nominated. Where Aboriginal cultural knowledge holders have appointed a representative to act on their behalf, this information must be provided in writing to NSW Archaeology.

Stage 2 Presentation of information about the proposed project
The aim of this stage is to provide registered Aboriginal parties with information about the scope of the proposed project and the proposed cultural heritage assessment process.

The proponent has engaged NSW Archaeology to conduct the consultation process. It is therefore the role of Julie Dibden, NSW Archaeology, to co-ordinate the assessment process. Aboriginal parties are invited to define their role, function and responsibility in this process.

- All registered Aboriginal parties are invited to identify, raise and discuss any cultural concerns, perspectives and assessment requirements (if any). In this regard registered Aboriginal parties should contact Julie Dibden, and this may be done in writing or by telephone.
- Provision of project information and proposed cultural heritage process is provided to registered Aboriginal parties as per this document and the accompanying *Methodology* document.
- If further information is required in regard to the proposal this will be provided to Aboriginal parties upon request. If necessary, additional information about the project will be provided; this may entail a project site visit.
- A record will be made that the proposed project information has been submitted. A record of any agreed outcomes and any contentious issues that may require further discussion to establish mutual resolution (if applicable) will be kept and a record will be provided to registered Aboriginal parties.

- All comments and feedback in regard to the Consultation Process and Project Methodology should be provided to NSW Archaeology within 28 days.

Stage 3 Gathering information about cultural significance

The aim of stage 3 is to facilitate a process whereby Aboriginal parties can contribute to culturally appropriate information gathering and the project methodology, provide information that will enable the cultural significance of Aboriginal objects and/or place in the proposal area to be determined, and to have input into the development of cultural heritage management options.

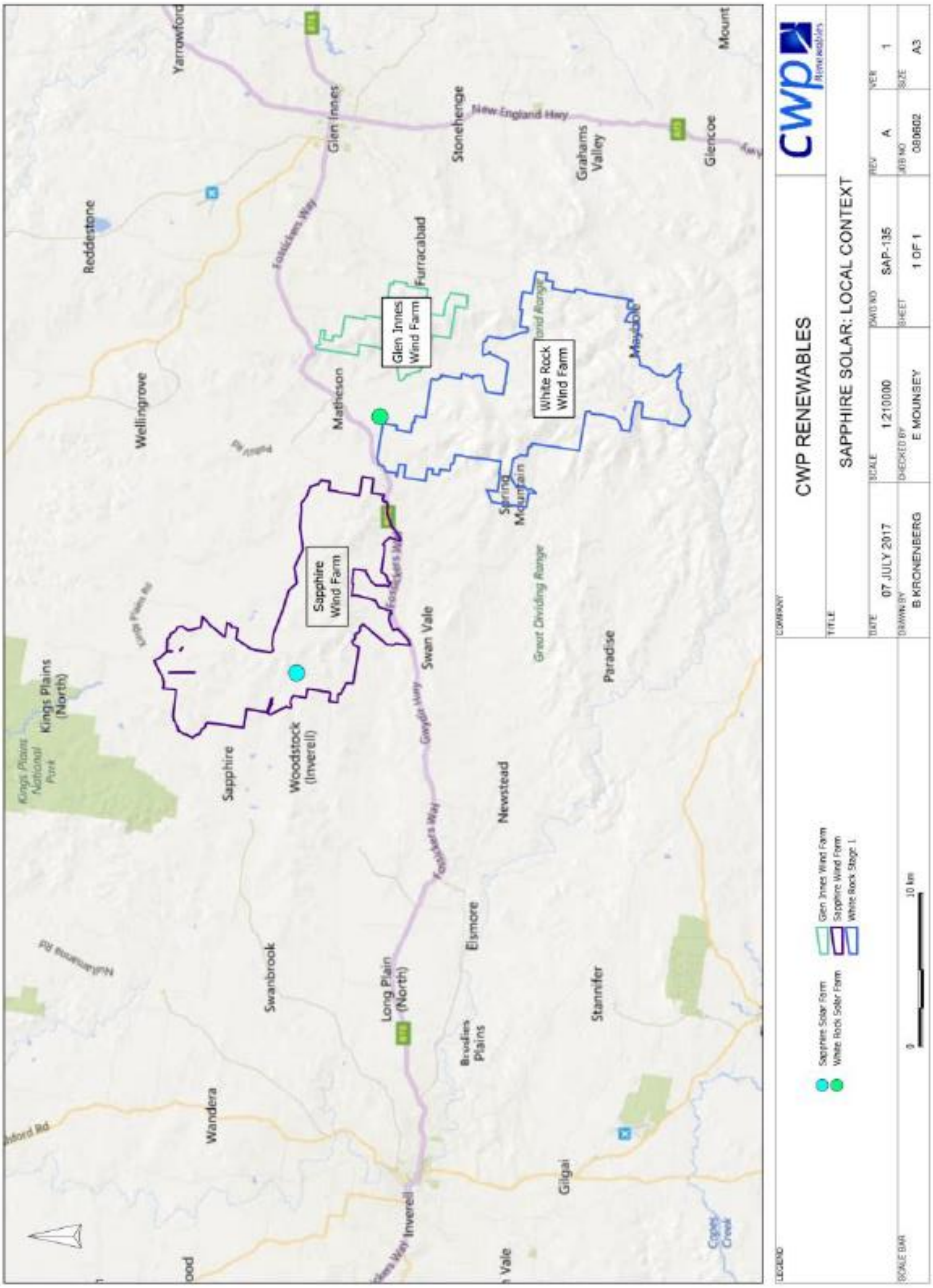
- A proposed methodology for the cultural heritage assessment will be provided to registered Aboriginal parties for review. Any comments in regard to the methodology should be provided to Julie Dibden, NSW Archaeology, within 28 days. Any protocols that registered Aboriginal parties wish to be adopted into the information gathering process and assessment methodology, and any other matters should be provided in writing or may be sought by the consultant.
- As a part of consultation, NSW Archaeology, on behalf of the proponent, seeks cultural information from registered Aboriginal parties to identify whether there are any Aboriginal objects or places of cultural value to Aboriginal people in the proposal area and, if so, to uncover knowledge about their context in order to reveal their meaning and significance. Registered Aboriginal parties who wish to contribute to this process should make contact with Julie Dibden (within 28 days) so that appropriate arrangements regarding collecting cultural knowledge can be made.
- If any information obtained is sensitive, appropriate protocols will be developed and implemented for sourcing and holding sensitive information.
- Registered Aboriginal parties are invited to identify, raise and discuss any cultural concerns, perspectives and assessment requirements by telephone or in writing to Julie Dibden, NSW Archaeology, within 28 days.
- All feedback received from registered Aboriginal parties will be documented in the Aboriginal cultural heritage assessment report as appropriate.

Stage 4 Review of Draft Cultural Heritage Assessment Report

The aim of this stage is to prepare and finalise an Aboriginal cultural heritage assessment report with input from registered Aboriginal parties.

- A draft report will be compiled which sets out a series of management options for consideration.

- The draft report will be provided to registered Aboriginal parties for review and comment.
- Any comments in regard to the report should be provided to Julie Dibden, NSW, within 28 days.
- After considering comments, the report will be finalised and copies will be provided to registered Aboriginal parties. The final report will include copies of any submissions made and the proponents response to any submissions.


CWP RENEWABLES
SAPPHIRE SOLAR: LOCAL CONTEXT
DATE 07 JULY 2017
SCALE 1:210000
DWG NO SAP-135
REV A
VER 1
DRAWN BY B KRONENBERG
CHECKED BY E MOUNSEY
SHEET 1 OF 1
JOB NO 080602
SIZE A3
Sapphire Solar Farm
White Rock Solar Farm
Glen Innes Wind Farm
Sapphire Wind Farm
White Rock Stage 1
10 km
Glen Innes Wind Farm
White Rock Wind Farm
Sapphire Wind Farm
Glen Innes
Inverell
Matheson
Swan Vale
Elsmore
Newstead
Paradise
Stannifer
Gilgai
Wandera
Swanbrook
Sapphire
Woodstock (Inverell)
Kings Plains (North)
Kings Plains National Park
Wellingrove
Reddestone
Furracabad
Stonehenge
Grahams Valley
Glencoe
Yarrowford
Long Plain (North)
Brodies Plains
Spring Mountain
Great Dividing Range
New England Hwy
Gwydir Hwy
Fossickers Way

PROPOSED METHODOLOGY FOR THE INDIGENOUS HERITAGE (CULTURAL AND ARCHAEOLOGICAL) ASSESSMENT

Sapphire Solar Farm - Aboriginal Cultural Heritage Assessment

CWP Solar Pty Ltd proposes to construct a ~ 200MW Solar Farm located 30 km east of Inverell at the Sapphire Wind Farm. NSW Archaeology Pty Ltd has been commissioned to conduct an Indigenous heritage (archaeological and cultural) assessment.

NSW Archaeology Pty Ltd is undertaking consultation with Aboriginal people on behalf of the proponent according to the requirements stipulated in the former NSW DECCW *Aboriginal cultural heritage consultation requirements for proponents, 2010*.

NSW Archaeology Pty Ltd is a consultancy specialising in Indigenous cultural heritage management, and aims to prepare assessments of a high standard to satisfy all stakeholders including the local Aboriginal community and the NSW Office of Environment and Heritage (NSW OEH).

The project will be conducted in accordance with the requirements of the OEH *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* and the *DECCW 2010 Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*. In addition, the study is being undertaken following the requirements for *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRP) (NSW DECCW 2010).

In accordance with the process as outlined in *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRP) (NSW DECCW 2010), this methodology is being provided to all Aboriginal groups/individuals who have registered an interest in this process of consultation. The purpose of providing registered stakeholders with this methodology is for stakeholders to review and provide feedback to the consultant, including identification of issues/areas of cultural significance that might affect the methodology. Stakeholders are invited to make a written response to this proposed methodology within 28 days.

The methodology which is proposed to be implemented during this project is set out below.

It is proposed that the assessment of cultural heritage values of the project area will entail the following aspects as defined in the OEH *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*:
Review of background information: Definition and mapping of the physical landscape; reviewing historic values via recourse to written and oral histories and existing heritage data bases; and define the material evidence of Aboriginal land use via review of previous research, development of predictive model and a field inspection, survey and, if required,

test excavation (the latter to be documented in an Aboriginal Cultural Heritage Assessment Report). Any information received from registered Aboriginal parties will be used in this process. Registered Aboriginal parties are invited to inform Julie Dibden in regard to areas, objects and places of cultural value in the proposed activity area.

Initiate ongoing consultation in accordance with the OEH's Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010. Information is sought from registered Aboriginal parties on whether there are any Aboriginal areas, objects or places of cultural value to Aboriginal people in the proposed activity area.

Identify and assess the cultural heritage values: Upon receipt of information that would enable the cultural significance of Aboriginal areas, objects and/or places in the proposed activity area to be determined, the range of social, historical, scientific and aesthetic values present across the study area would be identified, mapped, and assessed as to why they are important.

A field survey would be undertaken in accordance with the OEH Code of Practice.

If necessary, a small program of test excavation may be carried out. The following is an outline of an indicative proposed methodology:

A number of parallel test transects (TT) would be excavated.

Six or more Test Squares would be excavated at 5m intervals along each TT.

The excavation would be conducted by hand, utilising spades and hand trowels. The Test Squares would be excavated in ten centimetre spits. Excavation will be concluded when bedrock, dense clay, or sediments which are indicative of an environment of low archaeological potential is encountered. Maximum depth of excavations will be dependent upon stratigraphy encountered.

Buckets containing excavated sediment will be transferred by vehicle to a wet sieving station. The sieving station will ideally be set up adjacent to a farm dam and pending agreement, the water from the dam will be used for sieving. In the event that dam water is unavailable a water truck will be contracted to supply water for sieving. Sediment traps will be installed as required.
All excavated deposit recovered will be wet sieved using water-pump fed hoses through 5 millimetre mesh sieves.

If wet sieving is impracticable, sediment would be dry sieved adjacent to the excavated squares.

All stone material retrieved in sieves will then be hand sorted by a qualified archaeologist on sorting tables. All artefacts or stone suspected of being artefactual, including very small artefacts will be retrieved. All stone determined or suspected to be humanly modified will be bagged for transportation off site.

On completion of excavation in each Test Transect, stratigraphy in all the Test Squares would be examined and recorded. At least one section face of each excavated square would be cleaned by trowel prior to recording and photography. Representative sections would then be recorded and photographed. Test Pit stratigraphy would be recorded using standard sedimentological descriptive terms and criteria (McDonald et al. 1998). Colour would be described using a Munsell Soil Colour Chart (Munsell 1992). A stratigraphic description of soil texture, coarse fragments and structure would be made. Sediment descriptions would note trends down the profile.

It is proposed that Test Excavation Units will be backfilled at the completion of the program or earlier if required.

Stone artefacts excavated from the study area would be identified and analysed off-site by Julie Dibden. The analysis would entail inspection under low powered stereoscopic magnification, measuring, and description according to technological attributes.

Analysis of the data resulting from this identification and recording process would be conducted to address the following issues:

Artefact density.

- Technological and behavioural activities represented by the lithic material.
- The organisation and use of stone resources in the area.
- Spatial variability in archaeological deposits across the test area.
- Vertical integrity of deposits.
- The significance of the subsurface deposits so that further management recommendations can be developed in relation the proposed development.

An ACHAR report will be prepared to OEH standards in which the results of the excavation will be documented. In addition, appropriate management recommendations would be formulated.

Aboriginal Site Recording Forms and Aboriginal Site Impact Recording Forms will be completed and provided to OEH.

Assess harm of the proposed activity: Identification of the nature of the proposed activity and any potential harm to Aboriginal areas, objects and/or places. This would take into consideration the principles of ecologically sustainable development (ESD).

Develop harm avoidance and/or minimisation strategies: Registered stakeholders would be invited to have input into the development of cultural heritage management options. The development of avoidance and/or minimisation strategies would be developed within an Aboriginal cultural heritage assessment report review process.

Documentation of Findings: An Aboriginal cultural heritage assessment report would be prepared. The report would be prepared in accordance with the report outline as set out in OEH's *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*.

A draft copy of the report will be provided to all Aboriginal groups or individuals who register an interest in this project for review and consideration of management options.

Upon review of this proposed methodology, registered stakeholders are invited to make submissions relating to the information gathering and assessment methodology, and any matters such as issues/areas of cultural significance that might affect, inform or refine the assessment methodology, to Julie Dibden within 28 days. All feedback received will be documented in the cultural heritage assessment report, which will include copies of submissions received and the proponents response to issues raised.

APPENDIX 4 HISTORIC HERITAGE ASSESSMENT

Heritage Context

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 demand 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 the state administration 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 northern boundary of the nineteen counties was the Manning River (Ellis 1997: 27, Gibbney 1989: 17-19).

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 permit 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.

Regional History

Exploration and Pioneers

John Oxley passed through the southern extremities of the New England area in 1818 and camped at the site of Walcha (HO & DUAP 1996), however it was another decade before exploration of the region really began. By the late 1820s the Hunter Valley was effectively fully settled by Europeans and there was pressure to open up new land for pastoralism (RES 1986) and accordingly, colonial exploration of the New England area was prompted as the result of pastoralists seeking new lands. The first written accounts of the area come from the diaries of Allan Cunningham, who passed through the area in 1827. Cunningham had set out with an exploration party from Peter Macintyre's

property near Scone in search of an overland route to Moreton Bay. On the way north Cunningham's party passed through the site of Barraba, approximately 80km to the south-west of Inverell, then on their return they followed the Dumaresq River and came within about 40km of the site of Inverell. During this return journey they also came across a large shed that was clearly of European construction with a thatched roof but no walls. So while Cunningham provided the first written accounts of the region it would appear that European exploration and settlement in the district had already begun prior to 1827 (Wiedemann 1996).

Non-Indigenous settlement began in earnest in the 1830s as squatters moved into the area. H. C. Sempill is thought to have established the first squatting run in 1832 (RES 1986). Following the reports from Cunningham of the rich soils to the north, Peter Macintyre also sent one of his overseers, Alexander Campbell, out to claim land in the northern district in 1835 (Wiedemann 1996). Other Hunter Valley pastoralists such as the Dumaresqs, Cory, Dangar, Collins and Hewitt families also made their way north (RES 1986). Squatting licences were made available in 1836 at a price of £10 per station, however, since the district was administered from the distant Macleay River there were not many who actually took them up. This changed in 1839 when the New England pastoral district was formed, and a new commissioner of crown lands set up in Armidale where there was soon a court house, commissioner's home, police barracks and lockup. At this stage in the settlement the main concerns for the government were to define the pastoral runs and issue licences. A subsidiary concern was finding a suitable transport route to the coast that would provide an alternative to the current overland route to Maitland. A convict built road was established from Walcha to Port Macquarie, however this proved to be short lived as erosion on the steep sections soon made it impassable. Various other routes were also established with the link between Tenterfield and Grafton proving the most successful. By 1839 there were some 46 stations in the region; this had increased to 178 by 1852, at which time there were an estimated one million sheep being grazed in the district. Essentially all of the grassy land on the rich basalt soils through the centre had been taken up by this time, leaving only the wooded country around the eastern and western falls, which was better suited to cattle (HO & DUAP 1996).

Towns and Settlements

During the initial arrival of the squatters there was a group who set out from Sydney on an expedition to find new land in 1838. This particular expedition was of note because the guides used were the original "Beardies" - ex-convict shepherds John Duval and Chandler, who guided many of the early settlers to the area. Other members of the 1838 expedition included representatives of Archibald Boyd, Windeyer and Oswold Bloxsome, who each drew lots and then chose land for their stations before sending people in to settle the area. Settlers then came from Sydney on bullock wagons bringing sheep and cattle with them (BGIWC 1988). Many of these early settlers in the area around Glen Innes and Inverell were Scots, which is why so many of the place names have Scottish origins (HO & DUAP 1996).

In 1846 Armidale had a population of 76, at which time it already had a post office, various inns, a steam flour mill and a church, in addition to the judicial buildings associated with the seat of the commissioner of crown lands. The town plan was gazetted in 1849, and by the early 1850s the population was in excess of 500. The Catholic and Anglican churches were replaced with cathedrals in the 1850s, a hospital was built in 1853, and a newspaper published from 1856. The population of Armidale was 4,200 in 1861, and the town saw major growth over the rest of the nineteenth century. Following the arrival of the railway in 1883 the town also enjoyed the luxury of gas lit streets (HO & DUAP 1996).

Settlement at Tenterfield begun at a similar time to Armidale, with George Inn and a store built in the 1840s, and a town surveyed in 1851. The population of Tenterfield continued to grow following gold discoveries in nearby Timbarra and Drake. While growth at Tenterfield was somewhat slower during the second half of the nineteenth century than that experienced at Armidale and Glen Innes, it was also lucky enough to be joined into the rail network in 1886.

Wellingrove, which is situated just to the northeast of the study area, was the original location chosen for the court of petty sessions, however following land sales in 1854, when Glen Innes proved a more popular locale, settlement at Wellingrove declined in preference to the emerging centre at Glen Innes. Glen Innes enjoyed good growth in the second half of the nineteenth century, as it benefited from the effects of increased trade from the new tin fields. In the 1870s the town was incorporated, a road was built to Grafton and a hospital established. The railway then arrived in 1884, which also saw competition between Glen Innes and Guyra for local trade.

Inverell started off as Green Swamp, the location of Colin Ross' store situated at the intersection of fairly major north-south and east-west travel routes. It was settled slightly later than the other towns though, with the town surveyed in 1858 and the courthouse and lock up built by 1861. In 1891 there were 576 dwellings in Inverell, of which 476 were wood, 60 brick, 10 iron and 39 canvas (RES 1986; HO & DUAP 1996).

Essentially, the towns of the New England district developed at centres associated with farming, dairying, mining and the railways. However, it was pastoralism and mining that had the biggest impacts on the establishment and growth of settlements. The pastoral towns have generally continued as settlement centres to the present day, while the mining towns have largely been abandoned. Common industries in the towns themselves included tanneries, saddleries, mills, soap and candle makers, brickmaking, foundries, wheelwrights, coach builders and tailors. The landscapes of New England country towns were largely established between 1861 and 1914, and are thus a product of Victorian and Federation architectural styles (RES 1986; BGIWC 1988; HO & DUAP 1996).

Most of the towns in the region were built of timber, although brick also saw increasing popularity with time; in particular there is a characteristic local 'blue' brick (HO & DUAP 1996). As a rule however, brick making was not common, although quarries are known to have been located at King's Plain (1908-1912), and Wallangra Station (1876) (RES 1986). Slab houses were generally very common, particularly prior to the 1920s, although bark huts were also still common well into the twentieth century (Wiedemann 1998). The slab houses often had a bark roofed kitchen located adjacent and joined to the main building by a landing. Chimneys were normally constructed of stone, brick, slabs, kerosene tins or iron (BGIWC 1988). Unfortunately, few of the original homesteads are still extant (HO & DUAP 1996).

Mining

Gold discoveries in the north took off quite quickly following the success of finds at Ophir and the declaration by Reverend W. B. Clarke that the area was auriferous. There was a rush in 1851 at Rocky River, near Uralla, with 3,400 miners attracted to the area. By 1855 companies and bands had established deep lead mines and there were 5,000 on the field. More substantial gold deposits were then discovered in the headwaters of the Gwydir and the town of Barraba on the western fall was declared in 1852. Barraba continued to grow as a result of various successful gold mining ventures in the area and it eventually became a railhead and the centre of a wheat growing district. Another town that enjoyed growth due to gold discoveries was that of Bingara, where the All Nations Gold Mine operated from 1880 to 1948 (HO & DUAP 1996).

While gold continued to be mined from the 1850s onwards and enjoyed small revivals at various locations throughout the nineteenth century, the mining of tin was an important new development in the 1870s following discovery of alluvial tin on the western fall. Tin was eventually found to be quite widespread, and Glen Innes in particular benefited from the development of tin mining (HO & DUAP 1996). The Chinese played an important role in mining throughout the district; they were instrumental in the mining of both gold and tin. (HO & DUAP 1996; Wiedemann 1996).

In terms of mining, the area is renowned not only for tin and gold, but also for sapphires (BGIWC 1988). The mining of various gems including sapphires, emeralds and diamonds saw an increase in significance when the Boer War (1889-1902) interrupted South African trade (RES 1986). Sapphires were also mined during the 1920s but the markets at the time did not favour the local industry as high quality stones were produced in areas such as Kashmir and Cambodia. As a rule, sapphires are rare in Australia; the only commercial fields are at Inverell, Glen Innes and near Anakie in Queensland. The stones occur in alluvial deposits in basalt country, and are usually of relatively low quality. However, Horse Gully which runs through the subject area, a tributary of Frazer's Creek, is reputedly one of the richest sapphire bearing areas in the world (Wiedemann 1998).

As an industry, sapphire mining saw a revival in the second half of the twentieth century. This was brought about by the employment of new and more profitable extraction techniques using earth moving machinery, and by changes in fashion that increased demand for this gemstone. The high quality gems were sold to markets in Europe, while the poorer quality stones were sold into the Asian market, with many stones seeing their way into the workshops of Bangkok. The local boom in the sapphire mining industry took place in the 1960s and 1970s with buyers from Thailand coming into Inverell each month to buy up the gems. Indeed, the majority of local sapphires were eventually cut in Thailand (Wiedemann 1998). Today the gemstone trade continues to be important for local tourism (RES 1986).

Pastoralism and Agriculture

Initially the land around Inverell and Glen Innes was not fenced and natural features such as valleys and watersheds were used as boundaries, with trees also marked to signify ownership (BGIWC 1988). The nature of land ownership and property boundaries changed quite radically however with the introduction of the Robertson Land Acts.

Around this time the side effect of the success associated with gold mining was also felt through an increased demand for pastoral produce. By 1861 there were 4,000 acres in cultivation and nearly every town had its own steam flour mill. New England was a pastoral district up until 1874 when it was divided up into counties. In this region the effect of the Robertson Land Acts was somewhat different to that experienced elsewhere in New South Wales. In the New England district the run-holders tended not to have the financial power of squatters in other areas, and as a result there were more inroads made by the new selectors and most of the large early stations had shrunk by half their size by the 1880s (HO & DUAP 1996).

Most of the Robertson Land Acts selections were between 50 and 100 acres in size, with settlement focused on the basalt soils in the west, as well as the central tablelands. The new selectors also used dummying techniques to build up grazing runs of up to 4,000 acres with sheep often being run at one head per acre. Ringbarking and fencing, which had been introduced in 1851 at Rockvale Station, increased in use and shepherding decreased. By 1880 the majority of the district was fenced (HO & DUAP 1996).

Cultivation of various crops was undertaken in areas where land could be cleared and wheat proved particularly successful. However, when the arrival of the railway to

Armidale in 1883 allowed cheap transport of better quality milling wheat from South Australia, the central and eastern plateau began to be used for growing maize, oats and potatoes instead. Subsidiary industries included orchards at Armidale and Glen Innes and dairying, the latter largely proving unsuccessful in comparison to the butter industry from the coastal regions (HO & DUAP 1996).

Essentially the Robertson Land Acts enabled the establishment of a new class of small-scale graziers as well as the development of crop and orchard cultivation and to a lesser extent dairying (HO & DUAP 1996). Subdivision and soldier settlement also brought about closer settlement patterns in the early twentieth century (RES 1986). The growth in agriculture saw a peak of population in 1911. Evidence of the dense settlement that once existed can be found in aerial photos and by abandoned homesteads, plantations and graves (HO & DUAP 1996).

Overgrazing and the rabbit plague in the late nineteenth century combined to see New England change from breeding country to wool production, although that has since changed somewhat thanks to the introduction of new pasture and better control of rabbit numbers. Other aspects of the agricultural industry have also changed, with wheat cultivation shifting further west and orchards declining in importance. Potatoes and maize both continue to be important however. The pattern of settlement has also changed with many of the smaller towns and villages declining in size or being abandoned while the main centres such as Armidale have enjoyed substantial growth (HO & DUAP 1996).

Railways and Roads

Early on in the settlement of the district bullock and horse teams were used for transport. The first roads in the district were fairly basic tracks with maintenance carried out by pick and shovel (BGIWC 1988).

The two biggest changes to transport in the local area were the arrival of the railway and the introduction of automobiles. Inverell competed with Armidale for the railway that was planned in the late 1800s, and although the agricultural land around Armidale was arguably not as rich as that of Inverell, the wealthy sheep breeders in that area lobbied heavily for the railway and eventually won. Inverell did not join the railway until 1901, by which time the role of Armidale as the major regional centre was well established. Prior to the turn of the century much of the local trade from Inverell went via bullocks to Glen Innes and then on to Grafton (Wiedemann 1996).

Since the turn of the twentieth century the Glen Innes to Inverell and Glen Innes to Grafton bus services have continued to be important for transporting both passengers and produce. These services began as a Cobb and Co. horse drawn service and were later replaced by motorised transport around 1914 (BGIWC 1988).

Sapphire Solar Farm Study Area

The SSF project area straddles various County, Parish and Land District Boundaries.

Based on the information available on the early parish maps it would appear that there were a number of key families that were major players in land selection and settlement within the study area. In particular, the Vivers family is well represented across the Parish of Buckley and the Parish of Swamp Oak, while the McAllisters and Blankenbergs selected and purchased land in the northeast in the Parish of Wellingrove. Much of the study area coincides with land that formed part of the larger Vivers' estate of Kings Plains.

Previously Recorded Heritage Items

Searches have been conducted for previous heritage listings in and around the SSF 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 revealed that there are no heritage items within the Sapphire Solar Farm proposal area listed on the Australian Heritage Database (AHD). There is however one item listed within the Inverell Local Government Area that is situated to the north of the subject area. Details of this item are provided below.

LGA	Item	Address	Listing
INVERELL	Kings Plains Private Cemetery	Nullamanna-Wellingrove Rd Kings Plains	(Indicative Place) Register of the National Estate

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 revealed that there are no items within the SSF proposal area that are currently listed on the State Heritage Inventory (SHI). There are however two previously identified items that are located nearby and details of these items are provided below.

LGA	Item Name	Suburb	Significance
INVERELL	Kings Plains Castle	Kings Plains	LGOV
GLEN INNES SEVERN	Presbyterian Church	Wellingrove	LGOV

The Kings Plains Castle was identified in the Inverell Heritage Study (RES 1986); it is listed in Volume 2 of that document as item RUR005. The abovementioned Kings Plains Private Cemetery, which is listed on the Register of the National Estate, is a component of the larger site complex at Kings Plains Castle.

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 revealed that while there are various items listed within the Inverell LGA there are no heritage items currently listed in the SSF. The Kings Plains Private Cemetery, which is situated to the northwest is however listed on the Register Index for the Inverell LGA. This item is also listed on the Register of the National Estate.

LGA	Locality	Address	Item Name
INVERELL	Wellingrove	Kings Plain Property 30 km west of Glen Innes, past Wellingrove	Kings Plains Private Cemetery

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.

The table below provides a summary of themes that are applicable to the SSF area.

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
	Ethnic influences	Chinese
Developing local, regional and	Agriculture	Fencing

Australian Theme	NSW Theme	Local Theme
national economies		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
	Mining	Prospecting
		Mine claims
		Extraction of ores
		Processing plants
		Transport of supplies and ore
		Mining settlements
		Mining equipment/machinery
		Mining landscapes
		Aboriginal stone procurement
	Pastoralism	Pastoral homesteads
		Sheds and yards
		Travelling stock reserves
		Fencing and boundaries
		Pastoral workers' camps
		Water sources
	Technology	Communication networks
	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

Australian Theme	NSW Theme	Local Theme
		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

Predictive Statements

While the table above lists a wide variety of themes that are important contextually to the history and heritage of the study area, not all of these themes are of direct relevance to this project. A previous study of local heritage within the Inverell LGA (RES 1986) identified the following themes as being the most significant to patterns of local history:

- Pre-European
- Exploration
- Squatter
- Settlers/Pastoral
- Mining
- Village/Town
- Cereal cropping

These themes have been adapted somewhat for the Sapphire study area; the following broad thematic categories encompass all of the major themes relevant to the history and heritage in and around the SSF area:

- Agriculture/Pastoralism
- Mining
- 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, orchards and wheat growing have also

contributed to the local economy. Initially the area in which the Sapphire Wind Farm is proposed would have corresponded to portions of a variety of squatter runs, however, as a result of the introduction of the Robertson Land Acts, the land has been subdivided into a series of small portions. Nevertheless, selection tactics employed by some families, most notably the Vivers on the Kings Plains, did enable the establishment of substantial and expansive grazing runs.

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. 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.

Mining

While gold and then tin were the first minerals to be mined in the broader Glen Innes/Inverell region, it was the mining of sapphires that grew to dominate the industry locally. These sapphires usually occurred in Quaternary and Tertiary alluvial deposits, in both existing and palaeo-alluvial channel systems. The first commercial mining of sapphires in the district was undertaken by C. L. Smith on Frazers Creek near Inverell in 1919, where alluvial stream deposits were worked by hand using relatively simple equipment. Following suit, a number of other small-scale mining enterprises soon started up, establishing themselves throughout the Glen Innes and Inverell region. However, these endeavours were short lived, continuing for just 10 years before failing with the onset of the Great Depression. Sapphire mining saw a resumption in the district in the 1960s and 1970s, when it was made viable and profitable through the introduction of new extraction techniques using earth moving equipment combined with a boom in demand from Asian markets.

There is a moderate potential for items associated with this theme to be present in the study area. Potential heritage item types are likely to include impacted areas of ground bearing marks arising from extraction works, dam structures associated with the sapphire processing, mullock heaps, standing or ruined structures, and machinery items including material used for piping or pumping. These items may be present as extant/standing features or ephemeral remnants. As indicated, sapphire mining in the region was conducted by way of alluvial extraction so that it is predicted that any material remnants associated with this mining would usually be located in close association with drainage lines.

Domestic life

Homesteads are one of the key testaments to the success of the agricultural industry. They were as a rule, single story affairs with various outbuildings and outstations. As with most of the buildings in the New England district homesteads were usually built of wood. While very few of the original houses are still standing (HO&DUAP 1996), the potential for sites associated with this theme is high. There is 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 within the Sapphire Wind Farm study area 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 to water sources. All such items may have archaeological research potential and historical/social

significance.

Transport/Communications

The study area is between Inverell and Glen Innes and is bordered in the south by the Gwydir Highway, which links these two towns, and continues east to Grafton. The main routes within the study area are Waterloo Road, which extends east to west through the southern half and the Eastern and Western Feeder Roads, which join Waterloo Road with Kings Plains in the north. There is a moderate to high potential for sections of older road alignments to occur adjacent these existing roads. In addition, there are various old access roads shown on various maps that appear to correspond to road reserves established during the nineteenth century when the land was sold off under the Robertson Land Acts. Some of these roads are probably no longer in use however they may still be evidenced by fence lines and/or subtle earthworks.

Other potential heritage items associated with this theme may include old cars, drays and carts, internal farm access roads, creek crossings, culverts and old telegraph and electricity poles. 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 the potential that potential heritage items might be present within the study area. The themes that such items are most likely associated with are agriculture/pastoralism, mining, domestic life and transport/communications. 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 to existing homesteads, good water supplies and existing or former road alignments.

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

Survey Results

Survey Unit 6/H1 grid reference: Hand GPS (GDA): 348159e 6712802n

This recording is of an old telephone pole located adjacent to Waterloo Road in Survey Unit 6. The pole is still standing between the tall current electricity pole to the right, and the stand of eucalypts in the paddock (see photo below). It is formed from an undressed tree trunk and has two glass insulators affixed to its upper section. The pole is well outside areas of proposed impacts.

Conclusion

The old telephone pole does NOT satisfy any criteria for heritage listing. Furthermore it is outside the proposed activity area. Impact mitigation is not required.