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Aboriginal Cultural Heritage Assessment

SUNRAYSIA SOLAR FARM BALRANALD

DECEMBER 2016

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EXECUTIVE SUMMARY

INTRODUCTION

NGH Environmental has been contracted by Sunraysia Solar Farm Two Pty Ltd (Sunraysia) to prepare an Aboriginal Cultural Heritage Assessment Report (ACHAR) for the proposed Sunraysia Solar Farm near Balranald in south western New South Wales.

The solar farm proposal would involve ground disturbance that has the potential to impact on Aboriginal heritage sites and objects which are protected under the NSW *National Parks and Wildlife Act 1974* (NPW Act). The purpose of the Aboriginal Cultural Heritage Assessment (ACHA) is therefore to investigate the presence of any Aboriginal sites and to assess the impacts and management strategies that may mitigate any impact.

The Secretary of the DPE Environmental Assessment Requirements (SEARs) relating the Aboriginal heritage were as follows:

> The EIS must identify and describe the tangible and intangible Aboriginal cultural heritage values that exist across the whole area that will be affected by the Sunraysia Solar Project and document these in the EIS. This may include the need for surface survey and test excavation. The identification of cultural heritage values should be guided by the *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECC 2011)* and consultation with Office of Environment and Heritage (OEH) regional officers.
>
> Where Aboriginal cultural heritage values are identified, consultation with Aboriginal people must be undertaken and documented in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW)*.
>
> Impacts on Aboriginal cultural heritage values are to be assessed and documented in the EIS. The EIS must include an assessment of the likely Aboriginal and historic (cultural and archaeological) impacts of the development, including adequate consultation with the local Aboriginal community (SEARS for Sunraysia Solar Farm 17/06/16).

This ACHA Report was prepared in line with the following:

- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011);
- *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH 2010a), and
- *Aboriginal cultural heritage consultation requirements for proponents 2010* (ACHCRP) (OEH 2010b) produced by the NSW Office of Environment and Heritage (OEH).

The assessment area of the proposed solar farm comprises Lot 9/ DP 751179, Lot 10/ DP 751179, Lot 11/ DP 751179 and Lot 14/ DP 751179 with transmission lines along Lot 7301/ DP 1157986 to an existing substation on Lot 48/ DP 1015985 in the Balranald Shire Council Local Government Area.

PROJECT PROPOSAL

The Sunraysia Solar Farm proposal site covers approximately 1,000 hectares (ha) of land. Sunraysia Solar Farm Pty Ltd proposes to develop approximately 800 ha of the 1000 ha proposal site. Key infrastructure components would comprise the installation of a 200 MWAC solar plant and would include the following elements:

- PV modules using polycrystalline technology with solar tracking system;
- A site office and maintenance building;
- An access road from Yanga Way to the site;
- Internal access tracks to allow for site maintenance;
- Perimeter security fencing;
- Grid connection to the substation to the north via an overhead powerline (22-66kv); and
- Native vegetation screening, where required to break up views of infrastructure.

The proposed development may be undertaken in stages. In total, the construction phase of the proposal is expected to take 7 to 12 months. The Sunraysia solar farm is expected to operate for around 30 years.

ABORIGINAL CONSULTATION

OEH acknowledges that Aboriginal people are the determinants of the significance of Aboriginal cultural heritage and should be involved in the assessment process, as the source of information about the cultural significance of Aboriginal cultural heritage, and how Aboriginal cultural heritage is best protected and conserved. Moreover, OEH acknowledges that Aboriginal people should control how cultural information (including sensitive information) is used. Consultation is regarded as an integral part of the process of investigating and assessing Aboriginal cultural heritage (OEH 2011:2).

The consultation with Aboriginal stakeholders was undertaken in accordance with clause *80C of the National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2010* following the consultation steps outlined in the (ACHCRP) guide provided by OEH.

The registered Aboriginal parties (RAPs) for this project are:

- The Balranald Local Aboriginal Land Council;
- Wakool Indigenous Corporation;
- Mutthi Mutthi Nations;
- The Pappin Family Corportation; and
- Mr John Jackson.

The full list of consultation steps, including those groups and individuals that were contacted and a consultation log is provided in Appendix A.

ARCHAEOLOGICAL CONTEXT

The assessment included a review of relevant information relating to the existing landscape of the proposal area. Included in this was a search of the OEH AHIMS database. No Aboriginal sites had previously been recorded within and adjacent to the proposal area. The closest sites to the proposal area are four hearths with PADs (AHIMS # 47-6-0603, # 47-6-0604, # 47-6-0605 and # 47-6-0606) located north-east of the existing substation between 100 and 500 metres away from the originally proposed transmission line. Assessment of Aboriginal site models suggest that there appears to be a pattern of site location that relates

to the presence of a water source. While the proposed Solar Farm has lack of permanent water sources Aboriginal people have lived in the region for tens of thousands of years and there is potential for archaeological evidence to occur. As sites have previously been recorded within the Perekertin landscape in close proximity to the existing substation it is likely that other sites will also occur in this area. The proposal area would most likely only contain stone artefacts, hearths and scarred trees.

SURVEY RESULTS

Survey transects were undertaken on foot and traversed the all of the proposal area including the arrays, infrastructure and powerline easement. The survey was impeded by poor visibility within the northern paddock but there was good visibility in the southern paddock.

Between the survey participants, over the course of the field survey, approximately, 277.8 km of transects were walked across the main solar farm proposal area. Allowing for an effective view width of 5 m each person, this equates to a surface area of 138.9 ha, representing 17.4.9% of the 800 hectare proposal area. However, allowing for the visibility restrictions, the effective survey coverage is reduced to 48.6 ha, or 5.6% of the project area. The survey for the powerline examined 4.4 ha of the 11 ha easement, representing 40% but allowing for visibility restrictions, the effective survey coverage was 1.3 ha or 12% of the corridor.

Despite the variable visibility encountered during the survey, there were eight stone artefacts found across the proposal area and three hearths as well as two clusters of burnt clay recorded as ovens. The hearths and seven of the artefacts were recorded as a single site, Sunraysia Solar Open Site1, while the two ovens were recorded separately, Sunraysia Solar Oven 1 which included a stone artefact and Sunraysia Solar Oven 2.

In terms of the current proposal, extrapolating from the results of this survey, it is possible that additional artefacts and hearths could occur within the proposed development footprint. However, based on the land use history of the proposal area, and an appraisal of the area from the field survey, there is low potential for the presence of intact subsurface deposits.

The models of site location for the Sunraysia area have been shown to be accurate, with the current survey confirming the predicted distribution and nature of archaeological material.

The research potential of the site Sunraysia Solar Open Site 1 is assessed as moderate and the cultural significance of this groups of features was described as important by the Aboriginal representatives on site. The two oven sites, consisting of scattered material are considered to have low scientific significance and negligible research potential.

The cultural significance of the sites is only determined by the local Aboriginal community.

POTENTIAL IMPACTS

The proposal involves the construction of a solar farm and includes connection to the nearby substation with an above ground transmission line. The development will result in disturbance of almost all of the 800 hectares of the 1,000 hectare property. The impact is likely to be most extensive where earthworks occur and would involve the removal, breakage or displacement of artefacts. This is considered a direct impact on the Aboriginal objects by the development in its present form.

The impact to the scientific values if the sites within the proposal area were to be impacted by the current proposal is considered low. The sites have little research value apart from what has already been gained from the information obtained during the present assessment. This information relates more to the

presence of the artefact and heat retainers and in the development of Aboriginal site modelling, which has largely now been realised by the recording.

Sunraysia Solar Open Site 1 will now be avoided by the powerline and therefore there will be no impact to these cultural features.

Proposal is classified as State Significant Development under the EP&A Act have a different assessment regime. As part of this process, Section 90 harm provisions under the NPW Act are not required, that is, an AHIP is not required to impact Aboriginal objects.

Site name	Site integrity	Type of harm	Degree of harm	Consequence of harm	Recommendation
Sunraysia Solar Oven 1	Poor – 100+ year history of agricultural use	Direct	Complete	Minimal loss of value	No action
Sunraysia Solar Oven 2	Poor – 100+ year history of agricultural use	Direct	Complete	Minimal loss of value	No action
Sunraysia Solar Open Site 1	Good – eroding from in situ deposit	Nil- outside works corridor using the revised transmission alignment	Nil - outside works corridor using the revised transmission alignment	Not applicable- outside works corridor using the revised transmission alignment	Avoid

RECOMMENDATIONS

It is recommended that:

1. The proposed work can proceed with caution within the footprint of the revised transmission line easement that avoids the site Sunraysia Solar Open Site 1 as described in this report.
2. The development proposal should be able to proceed with no additional archaeological investigations. No areas of potential archaeological deposits have been identified and the significance of the two Aboriginal sites (Sunraysia Solar Oven 1 and Sunraysia Solar Oven 2) within the solar farm area have been assessed as low.
3. If complete avoidance of the recorded sites within the proposed solar farm area (Sunraysia Solar Oven 1 and Sunraysia Solar Oven 2) is not possible, the artefact identified should be collected and moved to a safe area within the property, as close as possible to their original location, but which will not be subject to ground disturbance. The collection and relocation should be undertaken by representatives of the registered Aboriginal parties. A new AHIMS site card will need to be completed identifying the new location of the moved artefacts.
4. The proposed powerline alignment identified and mapped in this assessment should be used. If the former easement is adopted and the complete avoidance Sunraysia Solar Open Site 1 is not possible, further archaeological research should be undertaken in the form of surface salvage, which should be accompanied by excavations in order to establish the presence or absence sub surface deposits. Surface salvage and excavations would need to be conducted prior to any earthworks taking place. A technical report should be produced describing the surface salvage and excavations methodology and results.

5. Sunraysia prepares a Cultural Heritage Management Plan (CHMP) to address the potential for finding additional Aboriginal artefacts during the construction of the Solar Farm. The CHMP will outline an unexpected finds protocol to deal with construction activity. Preparation of the CHMP should be undertaken in consultation with the registered Aboriginal parties.
6. In the unlikely event that human remains are discovered during the construction, all work must cease in the immediate vicinity. OEH, the local police and the registered Aboriginal parties should be notified. Further assessment would be undertaken to determine if the remains were Aboriginal or non-Aboriginal.
7. Further archaeological assessment would be required if the proposal activity extends beyond the area of the current investigation. This would include consultation with the registered Aboriginal parties and may include further field survey.

1 INTRODUCTION

Sunraysia Solar Farm Two Pty Ltd (Sunraysia) proposes the development of a commercial scale solar photovoltaic (PV) farm near Balranald in south western New South Wales (the Sunraysia Solar Farm proposal), approximately 17km south Balranald, NSW (Figure 1). The proposal site is 1,000-hectares in size and would have a capacity of around 200 Mega Watt AC (MWAC). NGH Environmental has been contracted by Sunraysia to prepare an Aboriginal Cultural Heritage Assessment (ACHA) to investigate and examine the presence, extent and nature of Aboriginal heritage for the proposal.

The solar farm proposal would involve ground disturbance that has the potential to impact on Aboriginal heritage sites and objects which are protected under the NSW *National Parks and Wildlife Act 1974* (NPW Act). The purpose of the Aboriginal Cultural Heritage Assessment (ACHA) is therefore to investigate the presence of any Aboriginal sites and to assess the impacts and management strategies that may mitigate any impact.

1.1 DEVELOPMENT CONTEXT

The development of renewable energy projects is considered to be one of the most effective ways to achieve the commitments of Australia and a large number of other nations under the Kyoto Protocol to reduce greenhouse gas emissions. The Sunraysia Solar Farm would provide the following benefits:

- Reduction in greenhouse gas emissions.
- Provision of embedded electricity generation to supply into the Australian grid close to a main consumption centre.
- Provision of social and economic benefits through the provision of direct employment opportunities.

The establishment of a Solar Farm would therefore have both local, National and International benefits.

As part of the development impact assessment process, the proposed development application will be assessed under part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The proposed solar farm is classified as "state significant development" (SSD) under Part 4 of the EP&A Act. SSDs are major projects which require approval from the Minister for Planning and Environment. The EIS has been prepared in accordance with the requirements of the Secretary of the Department of Planning and Environment (DPE).

The Secretary of the DPE Environmental Assessment Requirements (SEARs) relating to Aboriginal heritage were as follows:

> Include an assessment of the likely Aboriginal and historic (cultural and archaeological) impacts of the development, including adequate consultation with the local Aboriginal community (SEARS for Sunraysia Solar Farm 17/06/16).

The assessment area of the proposed solar farm comprises Lot 9/ DP 751179, Lot 10/ DP 751179, Lot 11/ DP 751179 and Lot 14/ DP 751179 with transmission lines along Lot 7301/ DP 1157986 to an existing substation on Lot 48/ DP 1015985 in the Balranald Shire Council Local Government Area. It is proposed to use 800 hectares of the 1,000-hectare site.

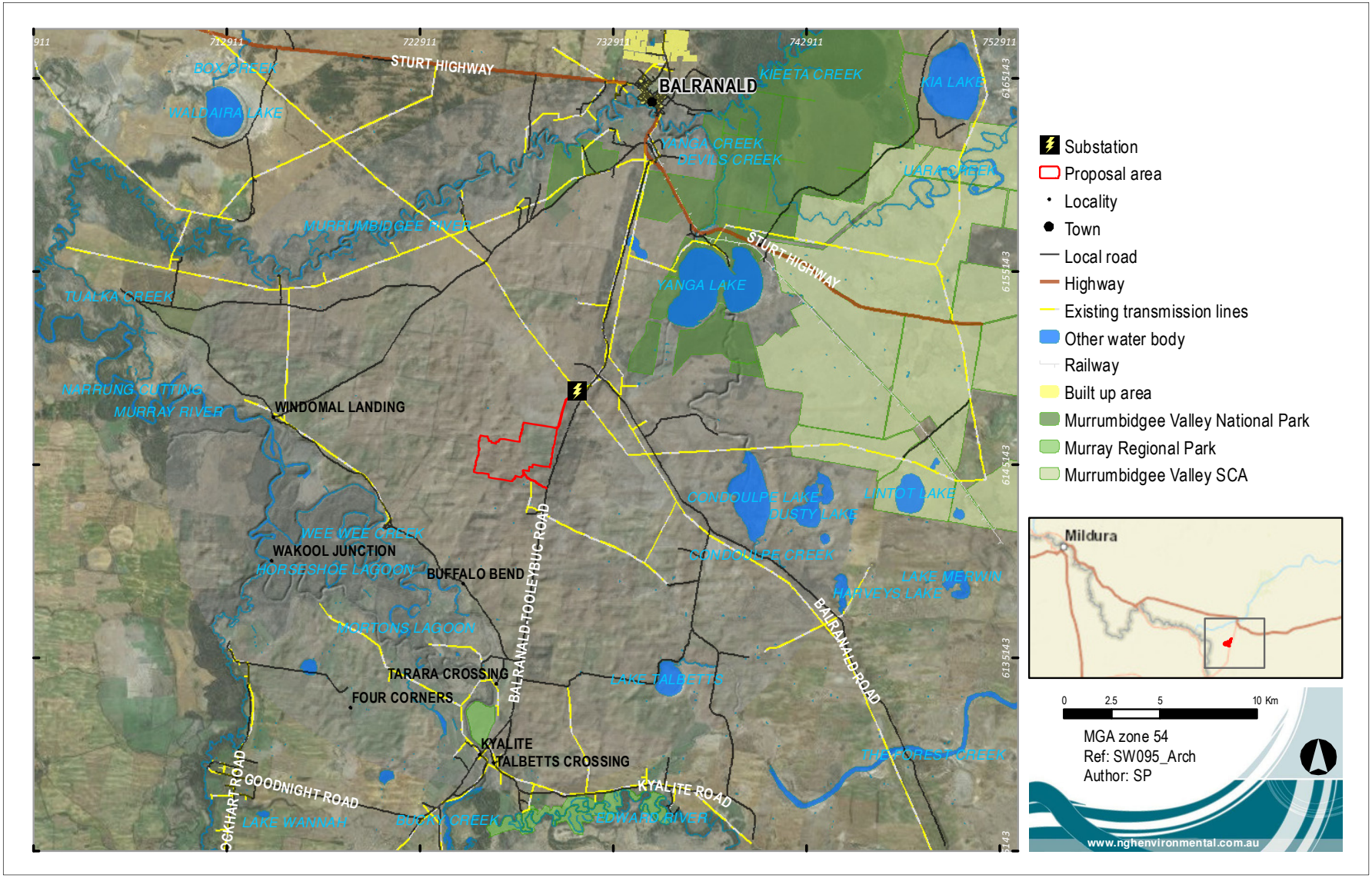

Figure 1. Location of proposal site.

1.2 PROJECT PROPOSAL

The Sunraysia Solar Farm proposal site covers approximately 1,000 hectares (ha) of land. Sunraysia Solar Farm Pty Ltd proposes to develop approximately 800 ha of the 1000 ha proposal site. The layout is shown in Figure 2.

The proposal would comprise the installation of a 200 MWAC solar plant and would include the following elements:

- PV modules using polycrystalline technology with solar tracking system;
- A site office and maintenance building;
- An access road from Yanga Way to the site;
- Internal access tracks to allow for site maintenance;
- Perimeter security fencing;
- Grid connection to the substation to the north via an overhead powerline (22-66kv); and
- Native vegetation screening, where required to break up views of infrastructure.

The proposed development may be undertaken in stages. In total, the construction phase of the proposal is expected to take 7 to 12 months. The Sunraysia solar farm is expected to operate for around 30 years. The solar farm would be decommissioned at the end of its operational life, removing all above ground infrastructure and returning the site to its original site condition, as far as practicable.

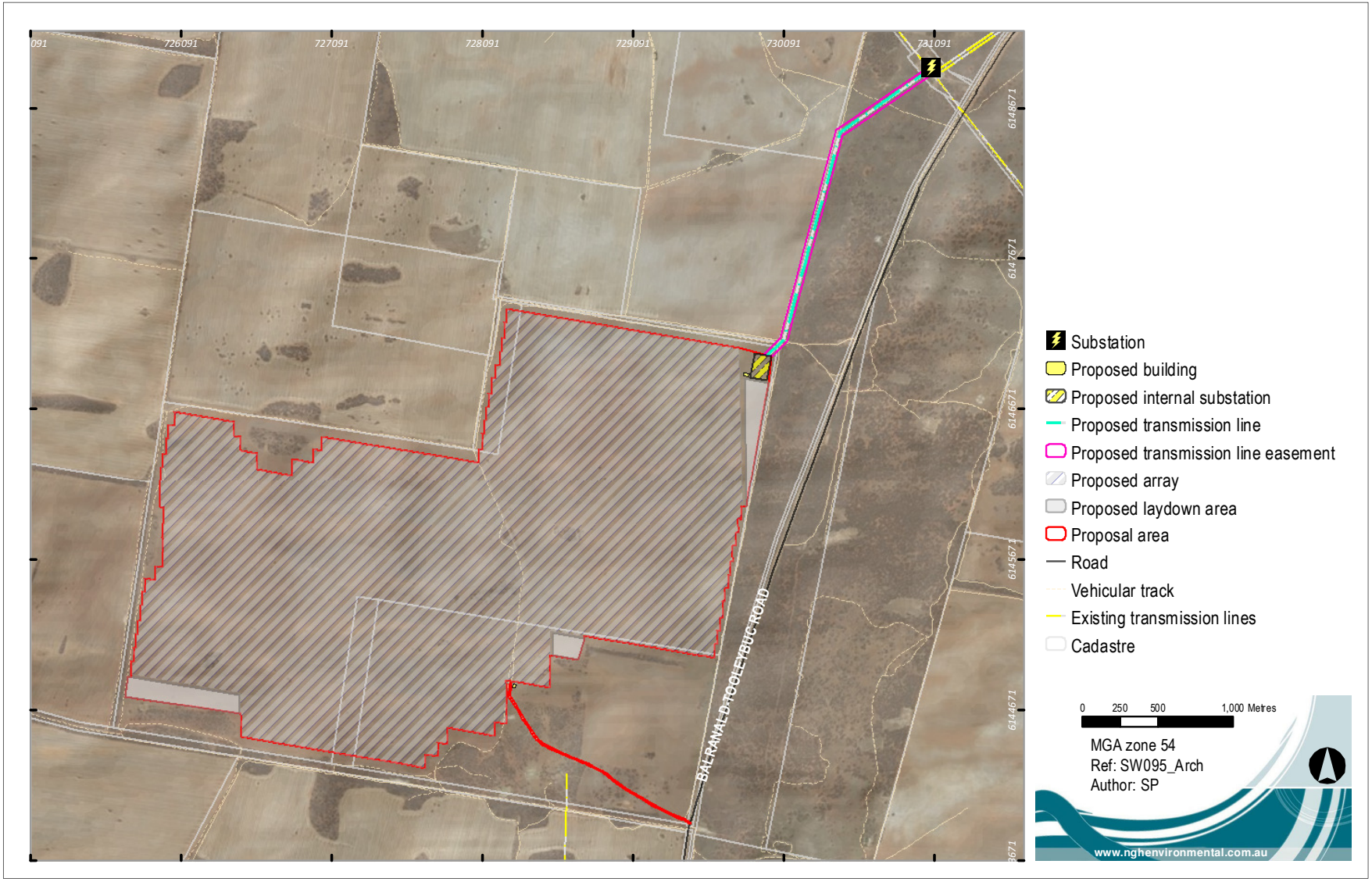

Figure 2. Proposed Solar Farm Detail.

1.3 PROJECT PERSONNEL

The assessment was undertaken by archaeologists Matthew Barber, Jakob Ruhl and Kirsten Bradley of NGH Environmental, including research, Aboriginal community consultation, field survey and report preparation.

Consultation with the Aboriginal community was undertaken following the process outlined in OEH's *Aboriginal cultural heritage consultation requirements for proponents 2010.* Five Aboriginal groups registered their interest in the proposal. The groups where:

- Balranald Local Aboriginal Land Council;
- Mutthi Mutthi Nations Aboriginal Corporation;
- Pappin Family Corporation;
- Wakool Indigenous Corporation, and
- John Jackson.

Further detail and an outline of the consultation process is provided in Section 2.

1.4 REPORT FORMAT

For the purposes of this assessment of the Sunraysia Solar Farm, we have prepared the report in line with the following:

- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011);
- *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH 2010a), and
- *Aboriginal cultural heritage consultation requirements for proponents 2010* (ACHCRP) (OEH 2010b) produced by the NSW OEH.

The purpose of this ACHA Report is therefore to provide an assessment of the Aboriginal cultural values associated with the study area and to assess the cultural and scientific significance of any Aboriginal heritage sites. This conforms to the intention of the SEARs.

The objectives of the assessment were to:

- Conduct Aboriginal consultation as specified in clause 80c of the *National Parks and Wildlife Regulation 2009*, using the consultation process outlined in the ACHCRP*;*
- Undertake an assessment of the archaeological and cultural values of the study area and any Aboriginal sites therein;
- Assess the cultural and scientific significance of any archaeological material, and
- Provide management recommendations for any objects found.

2 ABORIGINAL CONSULTATION PROCESS

The consultation with Aboriginal stakeholders was undertaken in accordance with clause *80C of the National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2010* following the consultation steps outlined in the ACHCRP guide provided by OEH. The guide outlines a four stage process of consultation as follows:

- Stage 1 – Notification of project proposal and registration of interest.
- Stage 2 – Presentation of information about the proposed project.
- Stage 3 – Gathering information about cultural significance.
- Stage 4 – Review of draft cultural heritage assessment report.

The full list of consultation steps, including those groups and individuals that were contacted and a consultation log is provided in Appendix A. A summary of actions carried out in following these stages are as follows.

Stage 1. Letters outlining the development proposal and the need to carry out an ACHA were sent on 28 September 2016 to the Balranald Aboriginal Land Council (Balranald LALC), and various statutory authorities including:

- NSW Office of Environment and Heritage;
- Native Title Services Corporation;
- Native Title Tribunal;
- Office of Registrar *Aboriginal Land Rights Act;*
- Western Local land services; and
- The Balranald Shire Council.

As a result of this process, NGH Environmental was recommended to contact the following groups directly:

Aboriginal Stakeholder Name	Action	Response
Balranald Local Aboriginal Land Council	14/10 - NGH emailed BLALC.	Registered as interested party in the project.
Kullila Site Consultants	14/10 – An email and express post letter were sent.	No response received.
Mutthi Mutthi Nations	14/10 – An email and express post letter were sent.	Registered as interested party in the project.
Wakool Indigenous Corporation	14/10 – An email and express post letter were sent.	Registered as interested party in the project.
Willandra Lakes World Heritage Area (WLWHA)	14/10 – An express post letter was sent.	WLWHA did not wish to register an interest in the project as it falls outside of the world heritage area for Willandra Lakes.
National Koorie Site Management	14/10 – An express post letter was sent.	No response received.
Mr Arthur Kirby	14/10 – An express post letter was sent.	No response received.

Pappin Family Corporation	14/10 – An express post letter was sent.	Registered as interested party in the project.
Mr Gary Pappin	14/10 – An express post letter was sent.	No response received until a phone call on 2 December 2016. Gary was satisfied that the Mutthi Mutthi people were being represented by Wakool Indigenous Corporation and the Pappin Family Corporation, both of which he is a member
Barkinji #8 Native Title Determinants	14/10 – An express post letter was sent.	No response received. The project area is not within the Barkinji #8 Native Title determination area.
Ivanhoe Local Aboriginal Land Council	None - The proposed work is not within the ILALC boundary.	

An advertisement was placed in the Guardian local newspaper on 30 September 2016 seeking registrations of interest from Aboriginal people and organisations. No Aboriginal stakeholders contacted NGH Environmental in relation to the newspaper advertisement. However, during the 2 week period required to receive registration from interested parties after publishing a newspaper advertisement NGH Environmental was contacted by Mr John Jackson who registered his interested in the project.

As a result of this consultation process, the following groups registered themselves as Registered Aboriginal Parties (RAPs) for the project:

- Balranald LALC;
- Wakool Indigenous Corporation;
- Pappin Family Corporation;
- Mutthi Mutthi Nations; and
- John Jackson.

NGH Environmental was provided on 25 November 2016 by the Balranald LALC with two additional parties who were interested in the project, Mr David Edwards and the Yita Yita/Nari Nari Tribes Aboriginal Corporation. NGH Environmental was unable to contact the Yita Yita/Nari Nari and did not receive any correspondence from them. NGH Environmental spoke to Mr David Edwards who was interested in participating in fieldwork, however he was not able to provide a schedule of fees or insurances in time to be considered for inclusion in the survey team. Future project correspondence will be provided to the Balranald LALC for the information of it's members.

No other party registered their interest, including the entities and individuals recommended by OEH. Some of the contact details were either unavailable or out-of-date.

Stage 2. On the 31 October 2016 an Assessment Methodology document for the Sunraysia Solar Farm was sent to all registered parties. This document provided details of the background to the proposal, a summary of previous archaeological surveys and the proposed heritage assessment methodology for the proposal. The document invited comments regarding the proposed methodology and also sought any information regarding known Aboriginal cultural significance values associated with the subject area and/or any Aboriginal objects contained therein. More than the minimum of 28 days was allowed for a response to the

document as only two groups provided comment within minimum period. As the consultation log provided as appendix to this document shows NGH Environmental phoned, texted and emailed all of the RAPs numerous times to get comment on the methodology. Below is a summary of responses provided:

Aboriginal Stakeholder Name	**Response**	**Date of response**
Balranald Local Aboriginal Land Council	The report does not consider how artefacts will be protected if they remain in situ, or stored if they are removed from site. If artefacts are to be removed and stored, what are the long-term plans for their repatriation?	25/11/2016
Mutthi Mutthi Nations	No written response provided. Bernadette Pappin informed Jakob Ruhl (NGH) over the phone that she had no issues with the methodology.	28/11/2016
Wakool Indigenous Corporation	Cynthja Pappin provided comment on the methodology that NGH had missed several recent archaeological reports for the area in the background research. Otherwise there was no further comment upon the methodology.	31/10/2016
Pappin Family Corporation	No written response provided. Mary Pappin (snr) informed Jakob Ruhl (NGH) over the phone that she was satisfied with the methodology but said that she felt it may be useful to include some form of test excavation as part of the methodology.	11/11/2016
Mr John Jackson	No response regarding the methodology was provided.	

Stage 3. The *Assessment Methodology* outlined in Stage 2 included a written request to provide any information that may be relevant to the cultural heritage assessment of the study area. It was noted that sensitive information would be treated as confidential. The Balranald LALC provided NGH Environmental on 25 November 2016 with contact details for two groups who might be interested in the project as well as participating in fieldwork. Both of these groups, Mr David Edwards and the Yita Yita/Nari Nari Tribes Aboriginal Corporation, were contacted but were unable to provide the requisite schedule of fees and insurances to be considered for participation.

NGH Environmental and the proponent (Maoneng) attempted to give all respondents and interested parties the opportunity to participate in fieldwork. Each RAP was requested to provide between 1-2 nominations for field representatives. Mutthi Mutthi Nations, Wakool Indigenous Corporation and the Pappin Family Corporation were represented during the survey fieldwork.

Stage 4 This stage will involve the provision of a draft version of this *Aboriginal Cultural Heritage Assessment Report* to all RAPs inviting comment on the results, the significance assessment and the recommendations. Comments received will be provided in the following section, 2.1 *Aboriginal Community Feedback*.

2.1 ABORIGINAL COMMUNITY FEEDBACK

This draft report will be made available to all of the Registered Aboriginal Parties (RAPs) for their review and comment in accordance with stage 4 of the NSW Office of Environment and Heritage guidelines for *Aboriginal cultural heritage consultation requirements for proponents 2010*. NGH Environmental (NGH) will contact each of the RAPs by phone to ensure that they have received the draft report and to discuss the project and the report findings.

According to section 4.4.4 of the guidelines for Aboriginal cultural heritage consultation, each RAP will be afforded a minimum of 28 days in which to respond and provide comment on the draft report. NGH will contact each RAP at least 2 weeks prior to the end of the provisional 28 day review period to provide any further information or clarification regarding the project and the draft report as required.

All comments received from the RAPs will be responded to and included in the final version of this report.

3 BACKGROUND INFORMATION

3.1 REVIEW OF LANDSCAPE CONTEXT

3.1.1 Geology and Topography

The landscape context assessment is based on a number of classifications that have been made at national and regional level for Australia. The national IBRA system identifies the proposal area as located within the Murray Darling Depressions Bioregion and the South Olary Plain Subregion (IBRA v.7 2012). This region is situated within the south western portion of NSW, extending into Victoria and South Australia and accounts for 10% of NSW. The bioregion lies within the Murray Basin, a depression that has been infilled with marine and terrestrial sediments over a 50-60 million year period when shallow seas have oscillated across the plains creating beach ridges and limestone sediment under the dunefields. The coast was at one stage as far inland as Balranald but the landscape now comprises dunefields, sandplains and undulating plains of brown calcareous soils (NPWS 2003).

There are two subregions identified within the Murray-Darling Depression. The proposal is within the within the South Olary Plain Subregion. The geology is characterised by Quaternary aeolian sands and lake sediments formed into dunefields, sandplains on siliceous and calcareous sands, brown texture contrast soils on dunes and gypseous and calcareous clays in lake beds with a mixture of soils in lunettes (NPWS 2003).

Two Mitchell Landscapes occur within the proposal area; Murrumbidgee Depression Plains and Mallee Cliffs Sandplains.

- Murrumbidgee Depression Plains occurs throughout the majority of the proposal area.
- Mallee Cliffs Sandplains occurs in the western section of the proposal area.

The Mitchell Landscape descriptions are provided below in Table 1.

Table 1 Description of the Mitchell Landscape relevant to the proposal (DECC 2002)

Mitchell Landscape
Murrumbidgee Depression Plains
Quaternary alluvial plains with numerous circular depressions interpreted as high floodplains or low terraces beyond the reach of average floodwaters, relief to 10 m. Grey to brown clays and clay loams with linear patterns of sandy prior streams. Now extensive grasslands of white-top, windmill grass, sand broom, and spear grasses, heavily grazed and invaded by exotic species. Reported to have originally been myall *Acacia pendula*, old man saltbush *Atriplex nummularia* and bladder saltbush *Atriplex vesicaria*. Sandy ridges of prior streams support patches of white cypress pine *Callitris glaucophylla*, with needlewood *Hakea leucoptera*, western pittosporum *Pittosporum phylliraeoides* and spear grasses *Austrostipa* sp.
Mallee Cliffs Sandplains
Mallee Cliffs Sandplains landscape includes parts of twelve land systems: Ashmont, Bulgamurra, Frenchmans, Gulthul, Hatfield, Menilta, Mulurulu, Overnewton, Quambi, Roo Roo, Trelega and Wilkura. Extensive, slightly undulating sandplain of Quaternary aeolian sands with east-west trending dunes, often with blowouts, partly scalded broad swales and small depressions, relief 6 to 10 m. Solonized brown soils, calcareous loamy sand, and texture-contrast soils on the plain, red and brown sands on dunes, non-cracking grey or brown clays in depressions. Rosewood *Alectryon oleifolius*, white cypress pine *Callitris glaucophylla*, sugarwood *Myoporum platycarpum*, belah *Casuarina cristata*, dense clumps of black bluebush *Maireana pyramidata*, or pearl bluebush *Maireana sedifolia*, with variable speargrass *Austrostipa variabilis*, bottlewashers *Enneapogon* sp. and copperburr *Sclerolaena* sp. on plains. Scattered rosewood, belah, mallee patches *Eucalyptus* sp., with isolated porcupine grass *Triodia irritans*, white cypress pine, narrow-leaf hopbush *Dodonaea attenuata*, punty bush *Senna eremophila* and grasses on dunes. Annual saltbush *Atriplex* sp., canegrass *Eragrostis australasica*, lignum *Muehlenbeckia cunninghamii* and nitre goosefoot *Chenopodium nitrariaceum* in depressions usually fringed by black box *Eucalyptus largiflorens*.

The dominant Mitchell Landscape affected by the proposal is Murrumbidgee Depression Plains.

In earlier work on the NSW landscape, parts of western NSW were also divided into land systems (Walker 1991). The proposal area for the solar farm is mostly within the Condouple system characterised as a sandplain between dunefields and the Riverine Plain. Other notable elements of this system include the aeolian east-west dunes with relief to 5m.

The northern end of the transmission line is within the Perekertin system which is characterised as a transitional riverine plain on the western margins of the Riverine Plain with Quaternary fine textured alluvium overlain with more recent aeolian material as well as cracking clays a red-brown texture contrast soils (Walker 1991). Figure 3 shows the location of these landscapes in relation to the proposal area.

There is small topographic variation within the land for the proposed Solar Farm. The presence of east-west orientated dunes is more pronounced in the western portion of the proposal area, although still present in the eastern area. The relative height difference between the crest and swales varies but is approximately 5m. The amplitude between dune crests also varies but is in the order of 400-500m. The proposal area does not however comprise a consistent and regular dune sequence but rather an irregular and variable array of dunes, some running almost continuously across the proposal area while others fade into low swales at their eastern or western extremities.

The main feature to note within the proposal area is the lack of permanent water and the absence of any identifiable water sources such as soaks, although clearing and cultivation of the proposal area may have altered and removed trace of any such features.

It was also noted during the field survey that calcrete was prevalent in many locations across the landscape but appeared to be more common in the northern section of the proposed solar arrays, which corresponded with slightly lower dune heights and potentially wider swales. The calcareous sands that were observed were also occasionally burnt, a result of European ground clearance activities

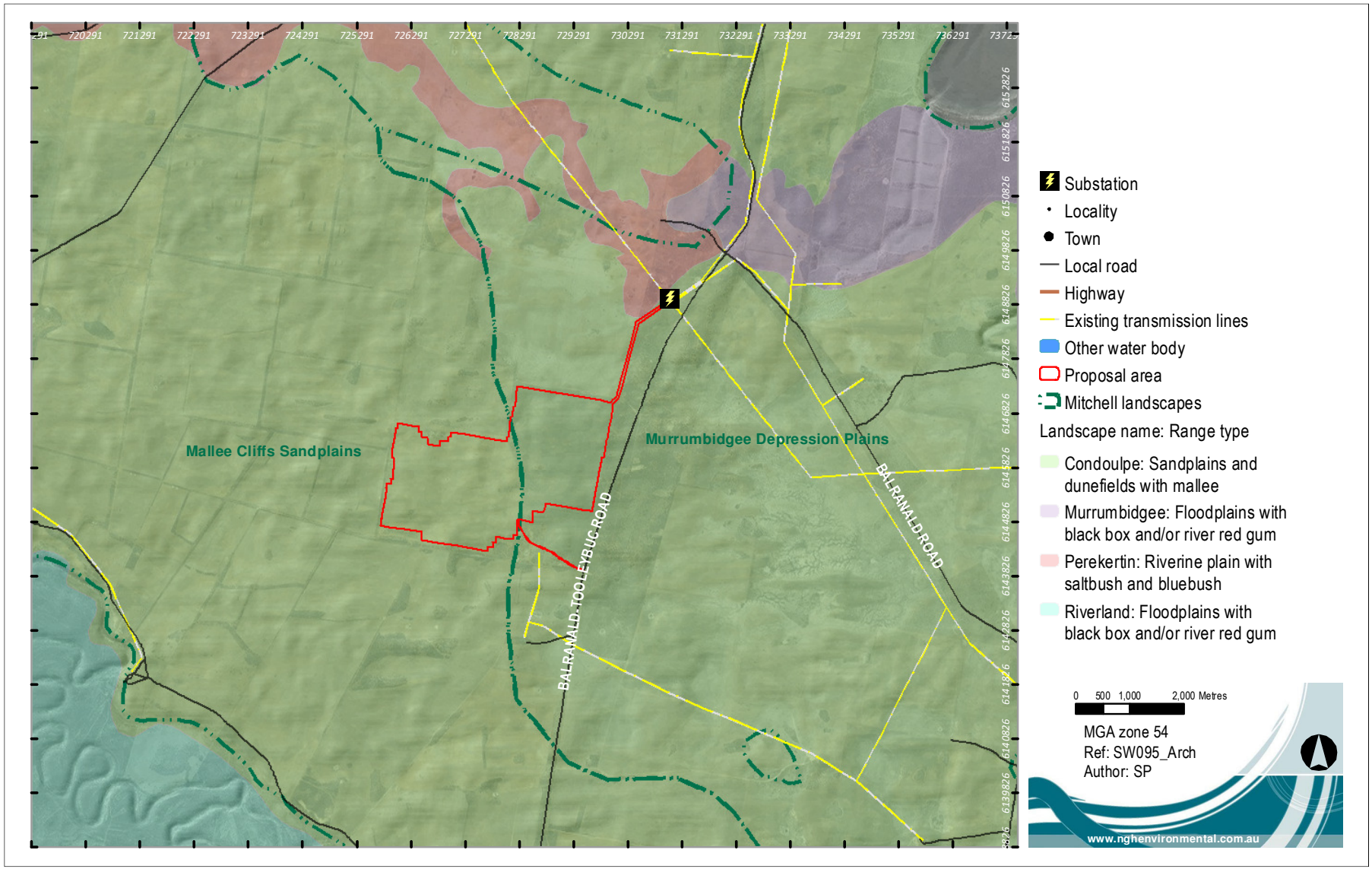

Figure 3. Location of landscape features mentioned in text.

3.1.2 Flora and Fauna

The biodiversity assessment carried out by NGH Environmental identified four plant communities within the proposal area. These include:

1. Chenopod sandplain mallee woodland/shrubland. The dominant tree species in the community consisted of White Mallee *Eucalyptus dumosa* and Red Mallee *E. socialis*. The mid-storey was generally open, with sparse shrubs including Thorny Saltbush *Rhagodia spinescens*, Ruby saltbush *Enchylaena tomentosa*, Emubush *Eremophila longifolia*, Black Bluebush *Maireana pyramidata* and Grey Copperburr *Sclerolaena diacantha*. This community occurred in parts of the transmission line easement and as remnant patches within the proposed area of the solar arrays.
2. Black Oak - Western Rosewood open woodland on deep sandy loams mainly in the Murray Darling Depression Bioregion. The over-storey component of this community was dominated by Black Oak *Casuarina pauper*. The open mid-storey consisted of shrubs including Copperburr (*Sclerolaena obliquicuspis*), Ruby saltbush *Enchylaena tomentosa* and Grey Copperburr *Sclerolaena diacantha*. This community occurs within a small section of the proposed powerline easement, within the TSR.
3. Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW (mainly Riverina Bioregion and Murray Darling Depression Bioregion). The over-storey component of this community was dominated by Black Box *E. Largiflorens*. The mid-storey was dominated by shrubs including Copperburr *Sclerolaena obliquicuspis* and Thorny Saltbush *Rhagodia spinescens*. The understorey was dominated by exotic species including Barley Grass *Hordeum leporinum* and Smooth Mustard *Sisymbrium erysimoides*. This community occurs just outside the southern area of the proposed arrays.
4. Yarran tall open shrubland of the sandplains and plains of the semi-arid (warm) and arid climate zones. This over-storey component of this community was dominated by Yarran *Acacia melvillei*. The understorey consisted of a diverse assemblage of native and exotic species including Grey Copperburr *Sclerolaena diacantha*, Copperburr *Sclerolaena obliquicuspis*, Wolly Burr-medic *Medicago minima*, Wards Weed *Carrichtera annua*, Speargrass *Austrostipa scabra*, *Brachyscome dentate*, Hairy Rupturewort *Herniaria cinerea* and Perennial Ryegrass *Lolium perenne*. This community occurs in patches within the powerline easement and also in remnant areas on the southern periphery of the solar array proposal area.

The majority of the proposal area is cleared and cropped farmland containing exotic species of grass and commercial crops such as wheat.

The vegetation communities provides numerous habitat types for fauna. Canopy trees provide foraging and nesting/resting habitat for birds and arboreal fauna. The mid-storey provides foraging and nesting habitat for smaller birds, as well as refuge for small-medium sized mammals and reptiles. Ground cover plants, logs and fallen leaves also provide shelter and foraging habitat for terrestrial fauna.

3.1.3 Historic Landuse

The proposal area has a history of intensive agricultural and pastoral use. The majority of the area has been utilised for grazing and crop production since European settlement in the mid 1800's. The location of the proposed Sunraysia Solar Farm is within mostly cleared paddocks, and 500 ha of the 800 ha proposal area is

a recently harvested wheat paddock. The remaining 300ha has not been sown to crop recently although it has definitely been sown to pasture and crops in the past. The impacts from farming activities over many decades has meant that any cultural material within the proposal area has been extensively disturbed and potentially destroyed. The alignment of the powerline has been subject to less disturbance, with only a portion of the easement parallel to the property fenceline disturbed through construction of a graded track. The track has been repeatedly graded, most likely as a fire break and probably ripped as well. Other sections of the easement are however much less disturbed.

Overall, the proposal area would be categorised as disturbed through consistent farming practices and land clearing.

3.1.4 Landscape Context

Topographic variation can lead to differences in the assessment of archaeological potential and site modelling for the location of Aboriginal archaeological sites. Based on land system mapping compiled in "Land Systems of Western New South Wales" (Walker 1991), two local land systems have been identified within the assessment area. These land systems are Condoulpe and Perekertin. A brief description of these land systems is provided below.

Condoulpe- The Condoulpe land system accounts for the entire proposed solar farm area and the majority of the transmission alignment to the existing substation. It consists of sand plains and dune fields with dense to scattered mallee near Balranald. The sand plains comprise aeolian material with large areas of east-west trending dunes; open flats and terminal drainage basins (locally depressed to 2m). The plains and flats have predominately solonized brown soils with areas of red soils; dunes are brownish sands while drainage basins generally have grey cracking clays with dense black box vegetation.

Perekertin- The Perekertin land system accounts for a small portion of the proposed transmission line alignment closest to the existing substation. It consists of transitional riverine plans with saltbush and bluebush vegetation on the western margins of the Riverine Plain. The extensive riverine plains comprise of Quaternary alluvium and areas of parallel dunes, remnant lakes and terminal drainage basins. The plains have a mosaic of grey cracking clays with brown and red soils and solonized brown soils.

3.2 REVIEW OF ABORIGINAL ARCHAEOLOGICAL CONTEXT

3.2.1 Ethnohistoric Setting

Cultural areas are difficult to define and "must encompass an area in which the inhabitants have cultural ties, that is, closely related ways of life as reflected in shared meanings, social practices and interactions" (Egloff *et al*. 2005:8). Depending on the culture defining criteria chosen - i.e. which cultural traits and the temporal context (historical or contemporary) - the definition of the spatial boundary may vary. In Australia, Aboriginal "marriage networks, ceremonial interaction and language have been central to the constitution of regional cultural groupings" with the distribution of language speakers being the main determinate of groupings larger than a foraging band (Egloff *et al*. 2005:8 & 16).

The Balranald area is identified as within the Muthi Muthi language group (Tindale 1974). as with a number of Aboriginal groups in the lower reaches of the Murrumbidgee, Lachlan and Darling river, the groups were known by their repeated word for 'no'.

The Muthi Muthi language group has also been grouped into a broad language group identified as the Kulin family that also comprises of the Watthi Watthi, Wemba Wemba and Nari Nari languages (Tindale 1974,

Horton 1994). There are numerous variations to the spelling of the Muthi Muthi group which include: Madi Madi, Muti Muti, Mutti Mutti, Mardi, Maadi, Muttee, Muttu Muttu and Murdi (Wakool Indigenous Corporation 2016a).

The Muthi Muthi people occupied the area around Balranald and their country extends to include sections of the Murray and Murrumbidgee Rivers. These rivers were reliable and abundant resources that sustained some the densest populations of Aboriginal people in Australia with the area from Echuca to the Murray Darling junction occupied by a number of Aboriginal clans with relatively small territories that included a portion of the river and back country. The close proximity to each other also meant that people likely spoke multiple languages and dialects and the ethnographic records show that people travelled extensively.

It was the small family group that was at the core of Aboriginal society and the basis for their hunting and gathering life. The immediate family camped, sourced food, made shelter and performed daily rituals together. The archaeological manifestations of these activities are likely to be small campsites, characterised by small artefact scatters and hearths across the landscape. Places that were visited more frequently would develop into larger site complexes with higher numbers of artefacts and possibly more diverse archaeological evidence.

The small family units were part of a larger band which comprised a number of families. They moved within an area defined by their particular religious sites. Such groups might come together on special occasions such as pre-ordained times for ceremonies, rituals or simply if their paths happened to cross. They may also have joined together at particular times of the year and at certain places where resources were known to be abundant. The archaeological legacy of these gatherings would be larger sites than small family camps. They may include large hearth or oven complexes, contain a number of grinding implements and a larger range of stone tools and raw materials. The regular flooding of the region would also have influenced the distribution of resources and campsites at certain times of the year.

Identification and differentiation of such sites are difficult in the field. A family group and their antecedents and descendants occupying a particular campsite repeatedly over a long period of time may leave a similar pattern of archaeological signatures as a large group camped over a shorter period of time.

Like everywhere in Australia, the Muthi Muthi people were adept at identifying and utilising resources either on a seasonal basis or all year round. Terrestrial animals such as the possum was noted by many early observers as a prime food source and the skins were made into fine cloaks that evidently were very warm (Evans 1815, Oxley 1820, Mitchell 1839). Kangaroos were also eaten and their skins made into cloaks as well. A range of reptiles and other mammals were also food sources. Fish, crayfish and mussels would have been prevalent from the rivers and creeks. Insects were also a common food type; in particular grubs, ants and ant eggs (Pearson 1981, Fraser 1892). Birds including emus and their eggs were common as a food source. Water birds would have been a significant food resource that was also likely to be influence by the seasonal flooding.

Plant foods were equally as important and mostly consisted of roots and tubers, leaves, seeds and fruit. Niche list 13 different plants which had a range of uses from medicine to food and raw material within their project area north of Balranald. Some of those plants are found within the current proposal area including Rosewood, and there were other plants noted during the field survey that were also utilised as a food resource such as ‘Hop Bush’ (M Pappin snr pers. comm.).

The first account of European exploration into the Balranald areas was by Charles Sturt in 1829-30 as he explored the Lower Murrumbidgee and Murray Rivers (Sturt 1833). Sturt was followed by Mitchell who passed through the area in 1836. European settlers started arriving in the district from 1848 with the township of Balranald gazetted on the 4th of April 1851. The Burke and Wills expedition also crossed the Murrumbidgee River at Balranald in 1860. (Wakool Indigenous Corporation 2016a).

At this point the Aboriginal population in most parts of NSW was in decline, due to disease such as small pox and influenza as well as dispossession from traditional lands. Acts of violence against Aboriginal people meant there was great social upheaval and partial disintegration of the traditional way of life. This meant that access to traditional resource gathering and hunting areas, religious life and marriage links and access to sacred ceremonial sites were disrupted or destroyed.

However, despite these disruptions, Aboriginal people continued to maintain their connections to sites and the land in the early days of European settlement. Where Aboriginal people were taken to missions, people were able to maintain at least some form of association with country and tell traditional stories. There were three missions or Aboriginal reserves in the Balranald area that operated from 1892 until 1964 (Niche 2012:33). In the 1880's the local police noted that there were 98 "full-bloods" and 8 "half-caste" Aboriginal people in the Balranald district that were employed on stations such as Yanga, Canally and Paika (Feldtmann 1976).

Some of the early settlers and pastoralists, surveyors, explorers, administrators and others observed traditional Aboriginal activities, including ceremonies, burial practices and general way of living, and recorded these in letters, journals and books. These early records of Aboriginal lifestyle and society within the region assist in understanding parts of the traditional Aboriginal way of life, albeit already heavily disrupted at the time of the observations and through the eyes of largely ignorant and uninformed observers.

Mitchell (1839) recorded what is likely to be the earliest description of heat retainers such as those found in Aboriginal mounds and hearths along the Murrumbidgee River. Mitchell described the heaps of stones used in cooking as an artificial feature in the landscape that he had not observed in other places. The mounds of burnt clay or ashes distinguished the areas frequently used by the local Aborigines for cooking.

> "*The common process of natives in dressing their provisions is to lay the food between layers of heated stones; but here, where there are no stones, the calcined clay seems to answer the same purpose, and becomes better or harder the more it is used. Hence the accumulation of heaps resembling small hills. Some of them were so very ancient as to be surrounded by circles of lofty trees; others, long abandoned, were half worn away by the river which, in the course of ages, had so far changed its bed that the burnt ashes reached out to mid-channel; others, now very remote from the river, had large trees growing out of them*." (Mitchell 1839; Ch 3.4)

Mitchell also observed the way Aboriginal people of the Murrumbidgee and Murray buried the dead noting that a small thatched hut was erected over a burial. The huts were enclosed by two or three low ridges of dirt in the shape of an ellipse with pointed ends (Mitchell 1839).

The early observations also note that some weapons and tools were carried, some made from wood such as spears, spear throwers, clubs, shields, boomerangs, digging sticks, bark vessels and canoes. Other materials were observed in use such as stone axes, shell and stone scrapers and bone needles.

In an archaeological context, few of these items would survive, particularly in an open site context. Anything made from bark and timber and animal skins would decay quickly in an open environment. However, other items, in particular those made of stone would survive where they were made, placed or dropped. Shell material may also survive in an archaeological context. Sources of raw materials, such as the extraction of wood or bark would leave scars on the trees that are archaeologically visible, although few trees of sufficient age survive in the modern context. There are no outcropping stone sources within the local area and therefore stone had to be brought in for use, most likely traded from source areas such as the Willandra Lakes and elsewhere.

3.2.2 AHIMS Search

The Aboriginal Heritage Information Management System (AHIMS) is maintained by OEH and provides a database of previously recorded Aboriginal heritage sites. A search provides basic information about any sites previously identified within a search area. However, a register search is not conclusive evidence of the presence or absence of Aboriginal heritage sites, as it requires that an area has been inspected and details of any sites located have been provided to OEH to add to the register. As a starting point, the search will indicate whether any sites are known within or adjacent to the investigation area.

Two searches of the AHIMS database were conducted, one over the project area and the other to allow sufficient information to be gathered to compile the archaeological background for the surrounding area. An area approximately 22km east-west x 38km north-south centred on the proposal area, was undertaken on the 25th of October 2016. The AHIMS Client Service Number was: 251022. There were 96 Aboriginal sites recorded within this search area. The second search area was approximately 5km east-west x 16km north-south adjoining the east of the initial search area and encompassed two large water bodies in the area; Yanga Lake and Condoulpe Lake. The AHIMS Client Service Number was: 251160. There were 111 Aboriginal sites recorded within this search area. Combined, a total of 207 Aboriginal sites and no declared Aboriginal Places were recorded in the search areas. A breakdown of the site types is shown in Table 2.

Table 2 Breakdown of previously recorded Aboriginal sites in the region.

Site Type	Number
Modified Tree	153
Hearth	11
Artefact (1 or more)	9
Shell	8
Burial	8
Hearth and PAD	3
Burial and shell	2
Earth Mound, shell, artefact	2
Artefact, shell, mound, burial	1
Artefacts and Hearth	1
Hearth and shell	1
Fish Trap	1
Earth Mound, shell, modified tree, non-human bone and organic material	1
Mound	1
Artefact, mound. hearth	1
Artefact, hearth, shell	1
Artefact, mound, habitation structure, PAD	1
Ceremonial Ring (Stone or Earth)	1
Burial, modified tree	1
TOTAL	**207**

None of the sites are located within the current proposal area. The closest sites to the project are four hearths with PADs (AHIMS # 47-6-0603, # 47-6-0604, # 47-6-0605 and # 47-6-0606) located between 100 and 500 metres away, north-east of the existing substation.

3.2.3 Archaeological Setting

Aboriginal people have occupied what we now know as the Australian continent for at least 40,000 years and perhaps 60,000 years and beyond. There have been no dated excavations in the Balranald area, although the archaeological evidence from Lake Mungo, 100 km to the north west provides ample evidence of Aboriginal occupation dating back 40,000 years (Mulvaney and Kamminga 1999, Hiscock 2007).

There have been few archaeological surveys conducted in the Balranald area and none are known to have occurred within the current proposal area. While there are a large number of sites recorded in the surrounding area, as identified during the AHIMS database search, there are very few corresponding reports in AHIMS for these surveys and very limited information about the nature of the sites beyond the information provided in site cards. However, surveys have been conducted in relative proximity to the current assessment area and are summarised below.

Edmonds (1997) identified four Aboriginal sites during the survey for Binbinette Station, approximately 40km south-east of the current assessment area, including a scarred tree, a midden with an associated scarred tree and two extensive campsites. The two campsites had stone artefacts dominated by quartzite flakes and *in situ* hearths with burnt clay heat retainers on severely scalded soils. It was estimated that both campsites contained over 1,000 artefacts. The soil around the hearths with clay heat retainers was noted as being eroded up to 15cm in depth which created a series of mounded hummocks and clay pans. These clay pans fill up with water after rain and provide a temporary water source. Edmonds suggested that these temporary water sources may have made the area an attractive camping place during winter rains as Aboriginal groups ventured further away from the rivers during autumn and winter months to hunt on the plains. Edmonds concluded from this survey that landforms associated with a water source (including temporary clay pans) were the most archaeologically sensitive and that plains have low archaeological sensitivity.

In 2003, Edmonds surveyed the proposed Balranald Levee on behalf of the Balranald Shire Council. The project area was situated on the Condoulpe and Riverland land systems and ran for approximately 3.4km along the Murrumbidgee River. The predictive model suggested that culturally modified trees, middens and camps sites were the most likely site types to be identified with the high river banks and the margins between the Condoulpe and Riverland land systems the most archaeologically sensitive landscapes in the study area. A total of 12 sites were recorded, including 10 modified trees and two shell middens.

Kamminga (2010) examined potential Aboriginal artefacts from three surface sites and an isolated find within Yanga National Park and three collections held by the National Parks and Wildlife Service (NPWS) housed at Yanga Homestead. Two of the stone artefact scatters, Waugorah Road and Lintot Lake, were confirmed to be Aboriginal in origin and comprised of 12 and 54 artefacts respectively. Kamminga noted that the raw material types identified within the Yanga assemblages were mostly quartzite, with lesser numbers of silcrete, quartz, sandstone.

Landskape conducted a preliminary cultural heritage assessment of the Atlas- Campaspe Mine area and developed a predictive site model based on the desktop research of distribution of archaeological sites in the area over various landscapes (as cited in Niche 2012:34). They predicted that stone artefacts and hearths would be the most common site types in the area and would likely be located near relict lake basins or clay pans that may intermittently hold water. The likelihood of encountering scarred trees, shell middens and burials was assessed as low as these site types are generally found near more permanent water sources.

Burials were most likely to occur in bordering dunes and lunettes adjacent to rivers and lakes. Landskape noted that silcrete stone sources have previously been recorded in the Willandra Lakes Region and that silcrete outcrops may occur in areas such as dry lakebeds (as cited in Niche 2012:38).

In 2012 Niche undertook field survey for the Atlas- Campaspe Mine projects using the Landskape predictive model noted above. The field survey included inspection of the proposed mine approximately 90km north of Balranald and the proposed Ivanhoe Rail Facility. No sites were previously recorded in the project area despite the close proximity to the Mungo National Park and Willandra Lakes Region World Heritage Area. The survey of the proposed development footprint identified 78 Aboriginal sites within the Atlas-Campaspe Mine area and 22 Aboriginal sites within the Ivanhoe Rail Facility. A number of areas of high and moderate Aboriginal heritage value were also identified, consequently the development footprint was modified to allow the conservation of some areas. Niche identified a number of isolated finds, artefact scatters, hearths and a modified tree. The majority of stone artefacts were retouched tools manufactured from silcrete which is common in the area. Less numbers of chert, sandstone and quartzite artefacts were also recorded. The sites recorded in the Atlas- Campaspe Mine area were all located on the margins of ephemeral depressions or in areas that were lower than the surrounding landscape. A raised dune on the eastern edge of a lake depression near the proposed works footprint was also noted to have archaeological potential. The proposed transport route surveyed had the highest number of sites and it was suggested that this density of sites was reflective of the close proximity to more permanent water sources in the area. Niche concluded that the sandplain and dune fields assessed contained few traces of past land use by Aboriginal people while the playas and relict lake areas contained an abundance of Aboriginal objects.

Niche (2015) undertook survey for the Balranald Mineral Sands Project for Iluka Resources Limited (Iluka) for the proposed development of a mineral sands mine 12 km north-west of Balranald between 2012 and 2014. A total of 548 sites were identified over the course of the project. A database of sites for the project was created that is referred to as the Balranald Project Aboriginal Heritage Database. Analysis of site distribution and density was used to classify areas as having high, moderate or low archaeological risk to assist in the management of the mine. Niche predicted that stone artefacts and hearths were the most likely site type to occur in the project area while middens, modified trees and burials were less likely to occur. Niche also predicted that mounds were unlikely to occur in the project area. During the field survey an emphasis was placed on visually inspecting alluvial plains, playas and basins while sand plains, sand dunes and areas with reduced archaeological visibility had less of an emphasis placed on them. While 11 land systems were identified and surveyed within the Balranald Mineral Sands Project, very few Aboriginal sites were located in the Condoulpe and Perekertin landforms, that also occur within the Sunraysia proposal area.

The artefact density per hectare of surveyed land system by Niche for the Balranald Mineral Sands Project is shown below in Table 3. Stone artefact occurrences as isolated finds and clusters were the most common site types identified. A breakdown of the site types recorded by Niche is shown in Table 4. Niche noted that there was a strong correlation between the location of sites and dunes, rises, lunettes and exposures associated with depressions or a decrease in elevation in the landscape. The majority of site (approximately 52%) contained between one to 10 stone artefacts with only eight of the recorded sites containing over 200 artefacts. Silcrete artefacts were dominate and accounted for 93.5% of the recorded assemblage. The bulk of the stone artefacts recorded were complete flakes, broken flakes and angular fragments. Retouched flakes or tools formed 7.9% of the assemblage with a number of tools types identified including burins, burrens, piecers and assorted scrapers. Niche (2015) concluded that within the project area sites fell into either short term occupation or single activity sites or specific long term seasonal nodal sites.

Table 3 Artefact density per ha of surveyed land system in the Balranald Project Aboriginal Heritage Database (Niche 2015:103).

Land System	All recorded/ estimated artefacts in the Balranald Project Aboriginal Heritage Database (ha)	Surveyed land system (ha)	Artefacts per hectare of land system surveyed
	Artefact count	Transect ha	Artefact/ha
Arumpo	2	16.7	0.1
Bulgamurra	4	7.9	0.5
Condoulpe	31	606	0.1
Gulthul	661	667.6	1
Hatfield	1619	347.5	4.7
Marma	4299	605.6	7.1
Perekertin	82	36.2	2.3
Rata	2777	1037.6	2.7
Riverland	1	19.3	0.1
Wilkurra	28	13.8	2
Youhl	884	198.4	4.5
Total	**10388**	**3556.2**	

Table 4 Summary of Aboriginal Site Types within the Balranald Project Aboriginal Heritage Database (Niche 2015:91).

Site Type	Sites in Balranald Aboriginal Heritage Database	
	Number	%
Artefacts	230	41.97
Isolated Artefact	246	44.89
Artefacts and Hearth	42	7.66
Hearth	22	4.01
Hearth and Isolated Artefact	5	0.91
Artefacts, Hearth, Culturally Modified Tree, Shell and PAD	1	0.18
Artefacts, Mound, Mound Scatter, Hearth, Hearth Scatter and PAD	1	0.18
Culturally Modified Tree	1	0.18
Total	**548**	**100.00**

Barber (2015) conducted a survey for the Nimmie-Ciara project, approximately 40 km north-west of the current assessment area. The 31.5 sqkm sample survey of the 867 sqkm project area recorded 469 heritage features comprising of mounds, burials, modified trees, hearths and artefacts at 312 locations. Mounds were the most common site (23%) but appeared to be in higher concentrations in the eastern part of the area and were often found in association with elevated ground close to waterways, or otherwise on elevated ground away from water. All of the burials were recorded either within a cultural mound or in a sand body and were

always highly disturbed, predominantly by rabbits. The majority of scarred trees recorded were on Black Box (76%), the rest were found on River Red Gums. Hearths were scattered across the landscape, with a possible correlation between hearths and mounds, where mounds were constructed in more open country and hearths in more closed wooded country. Stone artefacts were found in a range of environments but were over represented in areas of sandy rises, lunettes and prior stream formations.

Wakool Indigenous Corporation (2016a) undertook a due diligence archaeological investigation for the proposed Balranald Floating Pontoon on the northern bank of the Murrumbidgee River, near the Balranald Road Bridge, for the Balranald Shire Council. No Aboriginal sites or objects were recorded during the survey.

Wakool Indigenous Corporation (2016b) also undertook a due diligence archaeological investigation for the proposed Kyalite floating Pontoon on the northern bank of the Wakool River, near the Kyalite Road Bridge, for the Balranald Shire Council. The proposed works area covered an area approximately 20 x 30 metres along a steep slope subject to inundation during flood events. Although no Aboriginal sites or objects were recorded during the survey a known shell midden (AHIMS #is 47-8-0004) was located approximately 10m south of the project area. The close proximity of AHIMS #is 47-8-0004 suggested the possible presence of subsurface material and it was recommended that an AHIP be granted prior to works commencing.

NGH Environmental (2016) conducted an Aboriginal heritage due diligence assessment to investigate a proposed pipeline for the Mooloomoon Water Efficiency Project approximately 45km south-east of the current assessment area. A number of sites types including artefact scatters, mounds, hearths and burial all were assessed to have a moderate to high probability of occurring within the landforms present along the pipeline. The study included a sample field assessment that identified seven Aboriginal sites. The site types identified included isolated artefacts, hearths and a mound. The proposed pipeline was noted to traverses two large sand bodies that have potential to contain Aboriginal objects and sites, including burials.

Biosis undertook an initial desktop assessment of the Aboriginal cultural heritage constraints for the western parcel of land proposed for the Limondale Sun Farm (Overland 2016), this assessment area is adjacent to the northern boundary of the proposed Sunraysia Solar Farm. It was noted that the area in general has a dense background of Aboriginal cultural material and that the soil landscapes in the region, clay pans and scalds, have a high potential to contain evidence of Aboriginal occupation. Stone tools, modified trees and hearths are the most common site types in the area. Based on the initial desktop assessment, which included a search of the AHIMS database, Biosis summarized that there was potential for Aboriginal objects and sites to occur in the project area and recommended an ACHA be completed prior to the development of the land (Overland 2016).

Within the broader region, several surveys have been undertaken that have resulted in a range of Aboriginal site being recorded and shown that the riverine landforms and lunette lake systems in the Murray Basin are rich in Aboriginal cultural material. The major relevant studies are summarised below.

The Willandra Lakes World Heritage Area is a series of dry lake basins within a dune system, approximately 100km north-west of the current assessment area. Lake Mungo is part of the Willandra Lakes World Heritage Area that has been subject to ongoing archaeological research since the discovery of one of the world's oldest cremated human remains, Mungo Woman (Mungo I), in the late 60's (Tumney 2011). The 1974 discovery of a Pleistocene burial surrounded by ochre stained sands referred to as Mungo Man (Mungo III) (Bowler and Thorne 1976) further established the Willandra Lakes area as an important area that adds to the understanding of the early Aboriginal occupation in Australia. These burials are dated to 42,000 years BP and are the oldest known human remains in Australia and some of the earliest remains of modern humans outside of Africa (Tumney 2011). Littleton's study of human burials in the Willandra Lakes area indicates that most burials occur within sand dunes created from paleo-channels near permanent and ephemeral water sources (as cited by Niche 2015:52).

Furthermore, a series of 123 fossilised footprints, known as the Garnpang footprint trackway, were recorded that were impressed into hardened sediment dated to 23,000±1000 BP and 19,200±1000 BP (Webb et al 2006). A number of stone artefacts, human and faunal remains, shell middens, quarries, clay and stone heat retainers and hearths have been recorded across the Willandra Lakes World Heritage Area (Tumney 2011). Tumney's (2011) analysis of three stone artefact assemblages along the Lake Mungo lunette noted that silcrete was the most common lithology utilised for the manufacture of stone tools with lesser amounts of quartzite, quartz and sandstone. Tumney also noted the presence of a soil carbonate or calcrete nodules that occur more frequently on lunettes to have been used as heat retainers in some of the recorded hearths.

During the 1970's and 80's archaeological research in the Murray Valley region between the Edwards and Murray Rivers focused on burials and mounds. Simmons (1980) identified 75 mounds, 17 scarred trees and a range of other site types including isolated artefacts, hearths, shell middens and burials. Mounds were the most common site type and generally consisted of abundant clay nodules in association with burnt fragments of shell or bone while the scarred trees were generally all mature River Red Gums. The sites identified by Simmons were all located in close proximity and/or associated with the floodplains, anabranches and lake systems of the Murray Valley and clearly showed the importance of aquatic resources to the local Aboriginal populations in the region.

Sample surveys undertaken by Pardoe and Martin (2001) within the Murrumbidgee Province covered an area of approximately 30,000 square kilometres, extending from Balranald to Narrandera and Booligal to Jerilderie. Using an analysis of landforms and identifying gaps in the archaeological knowledge based on the sites recorded in the AHIMS database, they found that there was a bias in the distribution of sites along major waterways and some landforms such as lunettes but there were also large gaps where no sites had been recorded.

Pardoe and Martin surveyed 61 sample areas or quadrants from 22 Stations or locations across their project area. This resulted in 347 new sites being recorded. The major site types (over 90%) were scarred trees (26.2%), mounds (24.2%), open sites (14.4%), ovens (12.4%), burials (7.8%) and hearths (6.1%).

Pardoe and Martin analysed their results in order to develop a predictive model for site distribution across the Murrumbidgee Province. They found that mounds varied in size, from 4m-140m in diameter and height also varied from 2cm to 2m. Mounds were most commonly found along floodplain creeks within River Red Gum and Black Box vegetation communities. They found that as well as being situated along the major rivers, they were also located on the plains to the north and south of the Murrumbidgee, such as around the edge of depressions such as lakes and swamps and also on palaeochannel features. Mounds were often characterised as being situated on elevated ground such as lunettes, levees and dunes where silty sandy soil was prevalent (Pardoe and Martin 2001:82-87). Burials occurred mostly as individuals within mounds but there were six locations where more than one burial was recorded. Most of the burials were observed as highly fragmented bone disturbed by rabbit activity. Scarred trees were found to be quite variable in the size of the scar with the largest scars being on River Red Gums. Scars were classified into three groups, ceremonial- which were associated with a known burial, extraction- used in extracting food such as honey or grubs, and functional- all other types. The latter varied in size from 0.18m to 3.6m in length and width from 0.09m to 0.55m with an average of 0.38m.

Pardoe and Martin developed a predictive model of site distribution based on their results and an analysis of variables through the use of GIS mapping. They examined proximity to water and found that no sites were more than 12km from a major river channel (in this case the Murrumbidgee River, and the Yanco, Box and Mirool Creeks). They also found that 75% of sites were within 3.3km of such water courses. An assessment of proximity to minor stream was made difficult by the presence of irrigation channels in their GIS layer but

nevertheless, they also found that the average distance from a minor stream was 1.8km and 75% of sites were within 2.2km (Pardoe and Martin 2001:106).

Martin's PhD thesis (2006) examined the spatial, temporal and socio-cultural relationships of mounds in order to establish a model of human behaviour that could explain the linking of environment, spatial and temporal patterns and cultural change in the archaeology of the Hay Plain. She undertook excavations of two mound complexes, one at the Tchelery property, and one at Ravensworth property about 60km and 70km north east of the current assessment area respectively. The Tchelery mounds were situated north west of Dry Lake on grey cracking clays. Martin dated the mound to 4,010±170 BP (Martin 2006:119) and the Ravensworth 3 mound was dated to between 4,100±70 BP and 3,860±60 BP (Martin 2006:96).

Martin concluded that mound building commenced in the region about 4,300 years ago but there was an increase in mound building after 2000 BP and that there was a deliberate focus on wetland plants such as *Typha* and *Triglochin* that were baked and steamed in the mounds, along with animal foods.

Martin (2010) also conducted a detailed archaeological survey and modelling project for the Rivers Environmental Restoration Program (RERP). This project area was also focused on the Lowbidgee and concentrated on areas downstream (west) of Maude, areas to the east and west of Oxley on the Lower Lachlan floodplain, the Great Cumbungi Swamp and the western side of the Murrumbidgee north of Balranald. The project utilised GIS modelling to identify areas of archaeological potential and gaps in the archaeological record and targeted field survey to these locations. They recorded 1306 archaeological features at 1186 locations with the major site types being mounds (41%), scarred trees (21.7%), hearths (12.7%), artefacts (11.5%), shell middens (5.4%) and burials (4%).

The conclusions for the project were that in broad terms there appeared to be a difference in the distribution of sites across the riverine plain. Martin identified that mounds and burials were concentrated on the lower western side of the plain while ovens and artefact scatters were more common on the higher eastern side of the plain. Martin thought the difference was related to the character of the hydrological regimes, because mounds were related to the ecological diversity of the dependable wetlands as food sources. She found that mounds were situated on the higher sand bodies and palaeochannels present in the western part of the plain (Martin 2010:78).

The RERP survey found burials to be in similar landforms identified by Bonhomme (as cited in Martin 2010), namely lunettes, source bordering dunes, river levees and prior stream levees as well as sand bodies within the clay floodplain.

3.2.4 Summary of Aboriginal land use

The results of previous archaeological surveys in the Balranald region serve to show that there are sites and artefacts present throughout the landscape. There is a dominance of scarred trees especially in areas where there are remnant stands of native trees. Scarred trees provide a tangible link to the past and provide evidence of Aboriginal subsistence activities through the deliberate removal of bark or wood.

There appears to be a pattern of site location that relates to the presence of a water source. The most archaeologically sensitive areas appear to occur in association with major water sources, including ephemeral and relict lake systems. The archaeological sensitivity of source bordering dunes and lunettes to water sources is also noted, particularly for the presence of burials. Exposures associated with depressions or a decrease in elevation in the landscape are also noted to be archaeologically sensitive.

A detailed understanding of the Aboriginal land use and age of occupation of the immediate Balranald area is currently lacking, as few in depth studies have been completed. It is possible however, to ascertain that

proximity to water sources and food resources was a key factor in the location of Aboriginal sites. It is also reasonable to expect that Aboriginal people ventured away from these resources to utilise the broader landscape.

3.2.5 Archaeological Site Location Model

Based on the results of these previous archaeological investigations in the Balranald area, and studies of the Murray Valley region and Willandra Lakes World Heritage Area, it is possible to provide the following model of site location in relation to the proposed Solar Farm area.

Stone artefact scatters – representing camp sites, artefact scatters can occur across the landscape, usually in association with some form of resource or identifiable landscape unit. Within the Balranald district it is noted that locations close to major water sources, including ephemeral and relict lake systems were a desirable location for occupation. Within the proposal area, no such features exist and therefore large campsites are unlikely to occur.

Burials – are generally found in elevated sandy contexts or in association with rivers and major creeks. The proposal area is characterised by low dunes and therefore such sites may occur.

Scarred Trees – these require the presence of mature trees and are likely to be concentrated along major waterways and in stands of native trees. Stands of remnant vegetation are present within the proposal area, in particular within and adjacent to the proposed powerline route. Therefore, scarred trees may occur.

Hearths/Ovens – are identified by burnt clay used for heat retainers. These could occur either independently or in association with other Aboriginal cultural features such as campsites, often in association with resource locations. Hearths are generally considered to be limited, one-off use or reused but few times and are smaller concentrations. Ovens are considered to represent larger features, often extending over a larger area and can include other material such as bone. Hearths have been previously recorded in close proximity to the proposed powerline route near the exiting sub-station and therefore this feature is likely to occur within the proposal area.

Stone resources – are areas where people used natural stone resources as a source material for flaking. This requires geologically suitable material outcropping so as to be accessible. The proposal area contains no natural outcropping stone and such sites are unlikely to occur.

Shell Middens – are the agglomeration of shell material disposed of after consumption. Such places are found along the edges of significant waterways, swamps and billabongs. No such features occur and therefore this site type is unlikely to exist in the proposal area.

Isolated Artefacts – are present across the entire landscape, in varying densities. As Aboriginal people traversed the entire landscape for thousands of years, such finds can occur anywhere and indicate the presence of isolated activity, dropped or discarded artefacts from hunting or gathering expeditions or the ephemeral presence of short term camps.

In summary, there is limited topographic variation within the land for the proposed Solar Farm and a lack of permanent water sources. However, the absence of any identifiable water sources may have been altered or removed through clearing and cultivation practices. Nonetheless, Aboriginal people have lived in the region for tens of thousands of years and there is potential for archaeological evidence to occur. As sites have previously been recorded within the Perekertin landscape in close proximity to the northern portion of the proposed transmission line it is likely that other sites will also occur in this area. This is most likely to be in the form of stone artefacts, hearths and scarred trees.

3.2.6 Comment on Existing Information

The AHIMS database is a record of those places that have been identified and had site cards submitted to OEH. It is not a comprehensive list of all places in NSW as site identification relies on an area being surveyed and on the submission of site forms to AHIMS. There are likely to be many areas within NSW that have yet to be surveyed and therefore have no sites recorded. However, this does not mean that sites are not present.

Within the Balranald area there have been few archaeological investigations. The information relating to site patterns, their age and geomorphic context is little understood.

The robustness of the AHIMS survey results are therefore considered to be only moderate for the present investigation. There are likely to be many sites that exist that have yet to be identified.

With regard to the limitations of the information available, archaeologists rely on Aboriginal parties to divulge information about places with cultural or spiritual significance in situations where non archaeological sites may be threatened by development. To date, no such places have been identified within the archaeological reports carried out within the broader Balranald area. No such places have been identified through the consultation process for this solar farm proposal area.

4 ARCHAEOLOGICAL INVESTIGATION RESULTS

4.1 SURVEY STRATEGY

The intention for the heritage survey was to cover as much of the ground surface as possible, given that the project was going to cover most of the 800 hectares identified, within the 1,000 hectare property. Although the actual ground impact from the construction method was likely to be low, the placement of solar arrays across the landscape has the potential to cover any cultural heritage sites.

The strategy therefore was to walk a series of transects across the landscape to achieve maximum coverage. Because landforms were generally the same across the location of the arrays, that is, rolling east west orientated dunes, transects were spaced evenly with the survey team spread apart between 25 and 50 m, walking in parallel lines. The open and cleared nature of the project area and the gentle topography made this an ideal survey strategy. The team were able to walk in parallel lines, at a similar pace, allowing for maximum survey coverage and maximum opportunity to identify any heritage features. The size of the survey team, ranging from six to eight people, allowed large tracts of the project area to be surveyed with each transect. At the end of each transect, the team would reposition along a new transect line at the same spacing and walk back on the same compass bearing.

We believe that the survey strategy was comprehensive and the most effective way to identify the presence of Aboriginal heritage sites. Discussions were held in the field during each day between the archaeologists and Aboriginal community representatives to ensure all were satisfied and agreed with the spacing and methodology.

The proposal area was divided into two sections as follows:

- The solar farm proposal area- comprising approximately 800 hectares.
- The linking overhead powerline – approximately 2.2 km in length with an easement width of approximately 50 m, along the boundary of the travelling stock reserve to the substation.

It should be noted that the powerline easement that was surveyed was subsequently realigned due to the location of Aboriginal heritage sites. The alternative alignment was also surveyed while in the field with the Muthi Muthi representatives and has since been adopted. The alternative alignment is shown in the figures in this report.

The survey was undertaken by the team between the 6th and 9th of December 2016. Notes were made about visibility, photos taken and any possible Aboriginal features identified were inspected, assessed and recorded if deemed to be Aboriginal in origin. All mature trees within the property were also inspected for evidence of Aboriginal scarring.

4.2 SURVEY COVERAGE

The solar farm area comprised dunes of varying heights and swales, with gentle slopes in between. The landforms were therefore similar and there was no clear differentiation to be made during the survey, apart from crest, swale and slopes. However, as the dune formations were part of the same overall landform unit, differentiation with regard to dune topography was not considered warranted. This was especially so as the low gradient, gently sloping terrain did not provide any marked differentiation in the soils, vegetation or other variable that may have led to differing Aboriginal site use of the environment.

The only definition was between the recently harvested wheat paddock and the uncultivated paddock. The difference was in the effective visibility, where the wheat paddock was on average 50% and the uncultivated paddock about 10%.

Survey transects were undertaken on foot and traversed all the infrastructure areas proposed for the solar farm site and the original and alternate powerline easement. Visibility within the project area was variable. The paddocks in the northern section, comprising approximately 360 ha, had not been cultivated in some time and there was a moderately thick cover of dry grass across the area, limiting visibility on average to about 10%. However, within the wheat paddock in the central and western portion of the project area, comprising about 500 ha, the wheat had been harvested only a week prior to survey. Visibility in this area was variable but overall was quite good and averaged 50%. There were also some stands of native vegetation left on the crest of the dunes and individual scattered trees across the project area. The stands of trees and indeed some of the isolated trees offered a good perspective of the nature of the undisturbed landscape and often had good visibility of uncultivated deposits. These areas were also closely inspected to ascertain if there were any surface cultural material.

The proposed powerline easement leaves the solar farm in the north eastern corner and is proposed to follow a fenceline northwards to the substation. The alignment runs parallel to the fence, inside the travelling stock reserve (TSR) for approximately 1.8km before turning to the north east and crossing the TSR for 480m and connecting with the substation. Visibility along the fenceline was enhanced by a well used vehicle track which offered 90% visibility over about a 8m wide track. Off the track, vegetation restricted the visibility to about 25%.

Table 5 below shows the calculations of effective survey coverage and plates 1-6 show examples of the transects within the proposal area.

Between the survey participants, over the course of the field survey, approximately, 277.8 km of transects were walked across the main solar farm proposal area. Allowing for an effective view width of 5 m each person, this equates to a surface area of 138.9 ha, representing 17.4.9% of the 800 hectare proposal area. However, allowing for the visibility restrictions, the effective survey coverage is reduced to 48.6 ha, or 5.6% of the project area.

The survey for the powerline examined 4.4 ha of the 11 ha easement, representing 40% but allowing for visibility restrictions, the effective survey coverage was 1.3 ha or 12% of the corridor.

Overall, it is considered that the surface survey of the solar farm proposal area and the powerline easement had excellent and effective survey coverage. For such a large project area, the effective survey coverage is quite high with the consequence that the results identified are considered a true reflection of the nature of the Aboriginal archaeological record present within the proposal area.

	
Plate 1 Northern paddock, looking north, note low dune and visibility.	Plate 2 Northern paddock, looking east, note wide shallow swale.
	
Plate 3 Southern paddock, looking south from crest of dune to another crest, note excellent visibility.	Plate 4 Southern paddock, looking east note even terrain and variable visibility.
	
Plate 5 Southern section of powerline looking north, note the excellent visibility on the track.	Plate 6 Northern section of revised powerline looking north east towards substation.

Table 5. Transect information.

Survey Section/Unit	Survey transect numbers	Topography	Landscape	Exposure type	Surveyed area (length m x width m)	Survey Area m^2	Visibility	Effective coverage (area x visibility) m^2	Project Area (ha)	Percentage of Project area	Archaeological result
Solar farm proposal area uncultivated land	14	Low gradient dunes with wide spaced crests and swales	Condoulpe, Murrumbidgee Depression Plains	Plough lines, soil mounds, vehicle tracks, denuded ground	104,200 x 5	521,000	10% average	52,100	372	0.65	1 isolated artefact; 2 scatters of burnt clay
Solar farm proposal area wheat paddock	16	Low gradient dunes with wide spaced crests and swales	Condoulpe, Mallee Cliffs	Plough lines, soil mounds, vehicle tracks, denuded ground	173,600 x 5	868,000	50% average	434,000	525	5.4	Nil
Powerline	1	Low gradient dunes with wide spaced crests and swales Level plain	Condoulpe, Murrumbidgee Depression Plains Perekertin	Track and erosion scalds	8800 x 5	44,000	30%	13,200	11	12	7 artefacts; 3 hearths

4.3 SURVEY RESULTS

Despite the variable visibility encountered during the survey, there were eight stone artefacts found across the proposal area and three hearths as well as two clusters of burnt clay recorded as ovens. The hearths and seven of the stone artefacts were recorded within close proximity and have been mapped as one site with multiple features.

The details of the sites are outlined below, their location is shown in Figure 4 and artefact characteristics provided in Table 6 and photographs are provided in Plates 7-16.

Sunraysia Solar Oven 1

This site consisted of about six pieces of burnt clay, all less than 5cm in diameter in a cluster within an area of 11m x 5m. One stone artefact was also found at this location. The site was situated on a very gentle slope at the base of a north facing dune slope, just elevated above the swale. The deposits consisted of a red silty sand and visibility within the areas was 15%, limited by a low grass cover. The clay pieces were scattered and no single identifiable concentration or source was found. The site has been designated as an oven based on the size of the clay pieces and the broad scatter of the material, although equally it could be termed a disturbed hearth. The area has been subject to disturbance from ploughing in the past and the site was on the edge of a vehicle track.

Assigning the burnt clay to Aboriginal origin was made on the association with the stone artefact, although it is possible that other factors such as stump burning produced the burnt clay and subsequent movement by clearing and ploughing dispersed the pieces. The site has low integrity and there is negligible potential for subsurface deposits, given the history of landuse. The presence of the artefact indicates that at the very least the location was probably used as a single camp.

Plate 7. View north to oven site 1, flags show location of burnt clay.

Sunraysia Solar Oven 2

This site was situated 130m to the north west of site 1. It is possible that the two are linked and have been dispersed through ploughing. However, the main concentration of the sites was determined to be different in the field and subsequently it was decided to record them as separate locations.

This larger cluster of burnt clay is spread over an area of about 60 x 30m, within the same gentle basal dune face and into the swale as site 1. Soils were similar, a red silty sand and visibility was also about 15%. This cluster contained over 40 pieces, with additional outliers also noted but not included in the site boundary. The size of the burnt clay pieces was mostly under 5cm in diameter but there were some larger pieces. No stone artefacts were associated with this cluster.

It is likely that this feature represents a disturbed and dispersed oven, but the central and original part of the site could not be identified. The integrity of the site was low and with no single identifiable central point, the potential for subsurface deposits in the context of the disturbed paddock is considered low.

Plate 8. View west to oven site 2, pink flags show sample of burnt clay locations.

Sunraysia Open Site 1

Within the original powerline easement, a cluster of three hearths and seven associated stone artefacts were identified. They were found in erosion scalds/clay pans. The site was mapped as a single area, comprising individual cultural features. Each feature is described below.

Sunraysia Solar Hearth 1

This site comprises a small concentration of burnt clay heat retainer in an erosion scald, eroding from the edge of the plain. The central hearth feature measures 40 x 30cm but burnt clay extends at least two metres to the east and west along the eroding edge of the deposit. The underlying substrate is a silty sand, and the burnt clay is likely to extend into the uneroded deposit. Visibility in the erosion scald is 90% but limited to 15% on the grassy uneroded portion. The site has been recorded as a hearth based on the small concentration of burnt clay observed *in situ* within the eroding surface.

The integrity of the site is considered to be fair as some erosion has removed part of the deposit and scattered the material. There is some residual subsurface deposit but this is not considered extensive. No other elements such as shell or bone were observed within the hearth or the wider exposure.

Plate 9. View south east to hearth 1 eroding from the deposit.

Sunraysia Solar Hearth 2

This feature was eroding from residual deposit in the centre of an eroding clay pan scald. The central part of the hearth feature was 30 x 20cm in size but a larger areas of burnt clay heat retainer was scattered over a 5 x 4m area within the scald, showing evidence of disturbance through erosion. The burnt clay pieces were generally less than 5cm in diameter but some larger pieces were also present. There is little residual deposit left and the site is unlikely to be larger or contain other cultural material. The integrity of the site is considered to be low, there is negligible intact deposit remaining and low potential for subsurface deposits.

Plate 10. View north to hearth 2 eroding from the deposit.

Sunraysia Solar Hearth 3

This feature was eroding from deposits of a shallow clay pan, with a concentration of burnt clay heat retainer in an area about 30x15cm surrounding a tuft of remnant silty sandy deposit and grassy vegetation. Scattered burnt clay extended over a 5x5m area and the pieces were generally quite small <3cm in diameter. Visibility was fair at about 40% in the immediate area and the clay heat retainer was moderately dispersed. This particular hearth is likely to be limited to the remaining silty sandy deposit within the residual mound of deposit. The integrity of the site is considered to be moderate, it is clearly a small site with some residual deposit likely to exist beneath the grass over, although this would be limited in depth and area.

Plate 11. View north to hearth 3 eroding from the deposit.

Sunraysia Solar Artefact Scatter 1

Within the vicinity of the three hearth features and the eroding clay pans, seven stone artefacts were also recorded. The artefacts were spread over an area of approximately 70 x 30m, exposed within the eroding deposits either on the edge of the clay pans or within it. It is likely that the general site area, inclusive of the artefacts and the hearths, contain more artefacts that were either obscured by vegetation or remain buried within the uneroded deposits. Visibility within the site area was variable, ranging from 0-90%. The presence of the artefacts in association with at least three and possibly more hearths indicates that the locality was likely used repeatedly. There were no obvious sources of water but the terrain was different to the sand dunes in the main part of the proposal area.

The artefact characteristics are outlined in Table 6. The artefacts were typical of the region and no definitive artefact types were recorded. Two of the artefacts revealed evidence of retouch, which together with the presence of the hearths, implies that people were probably camped at the location for at least a short term and that some tool maintenance activity probably occurred at the site

AHIMS site cards have been submitted to OEH and site numbers are pending.

Table 6. Artefact characteristics

Artefact Number	Artefact Type	Raw Material	Dimensions (mm)	Comment
1	Flake	silcrete	47 x 26 x 15	Broad platform, feather termination
2	Flake	silcrete	51 x 23 x 13	Broad platform, feather termination
3	Retouched flake	chert	26 x 25 x 10	Broad platform, feather termination, retouch on lateral and distal margins
4	Retouched flake	chert	19 x 14 x 4	Broad platform, feather termination, 6 negative scars from distal end
5	Flaked piece	Petrified wood	22 x 13 x 3	Laterally flaked
6	Broken flake	tuff	<20	
7	Broken flake	tuff	<10	
8	Broken flake	tuff	<10	

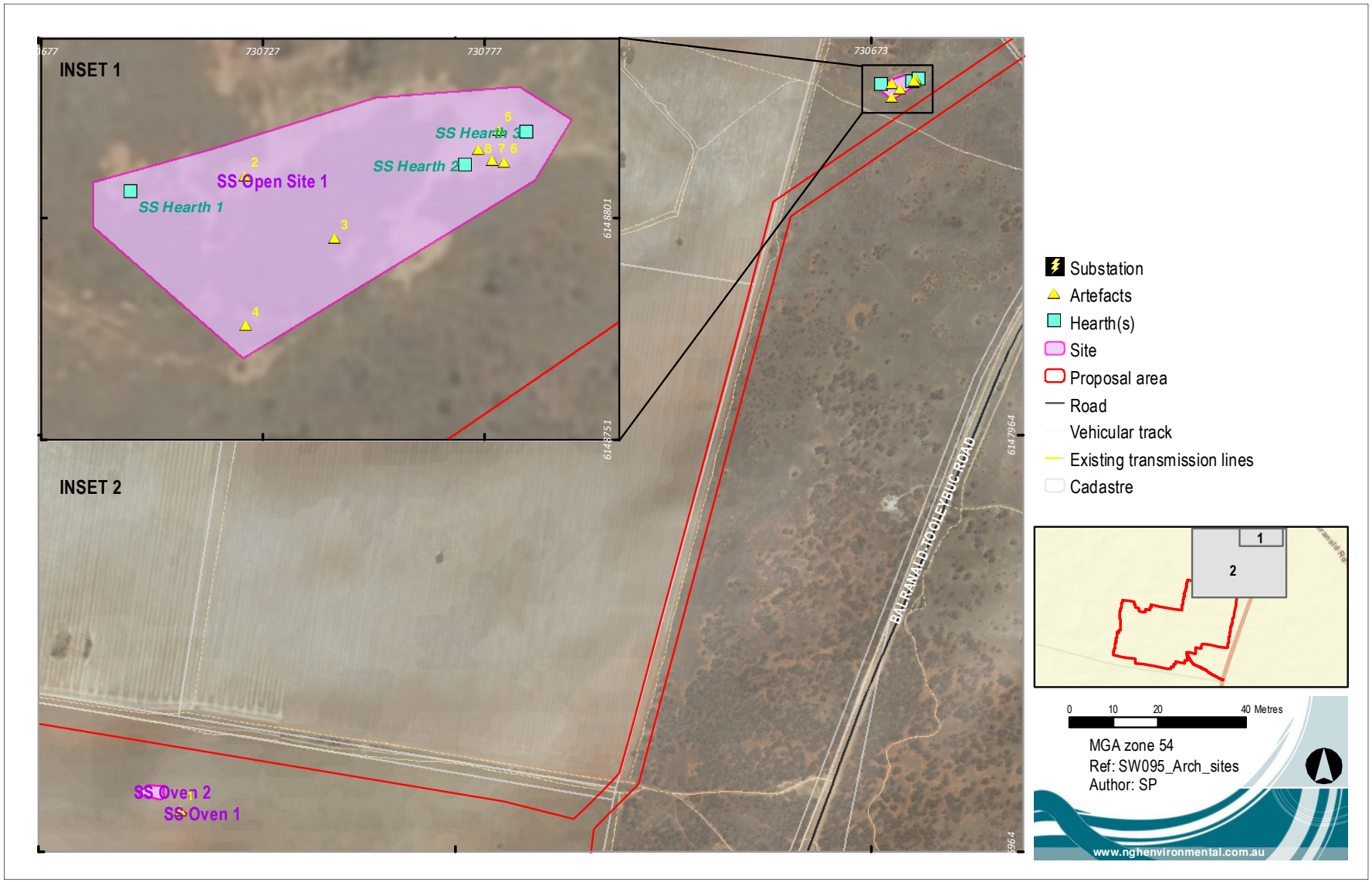

Figure 4. Location of recorded sites.

4.4 DISCUSSION

The predictions based on the modelling for the proposal area were that stone artefacts, hearths and scarred trees were the most likely manifestation of Aboriginal occupation of the area. It was noted that the northern portion of the proposed transmission line was likely to have sites given the presence of four known hearth sites in close proximity to the area. The survey results have confirmed this prediction with stone artefacts and three hearth features recorded in an open site (Sunraysia Solar Open Site 1) along the originally proposed transmission line. Two sites were also recorded within the solar farm area.

These results indicate that while sites can occur throughout the landscape, even in areas of highly disturbed farming activities, there is a dominance of Aboriginal cultural material recorded within the Perekertin landscape system and in relativity undisturbed landscapes in the area. The Perekertin landscape is characterised as a transitional area on the riverine plain. The area was likely used intermittently over a period of time for camping. This is evident by the presence of multiple hearths of varying sizes and a low density scatter of artefacts.

Based on this assumption, there is every chance that there are similar stone artefacts and hearths across similar landscapes in the Balranald district and that these site types could be more prevalent in the landscape than previously envisaged.

The sites identified in this assessment are not in close proximity to water sources and are representative of the opportunistic use and movement of people through the broader landscape. They are most likely representative of the use of the back country between larger known water sources in the area with the Wakool River approximately 10km south, the Murrumbidgee River approximately 13 km north and Yanga Lake approximately 6km north-east.

The absence of scarred trees identified within the proposal area may be the result the previous land clearing and the lack of mature trees in the area. However, it should also be noted that the majority of scarred trees recorded in the Balranald area were located in close proximity to a permanent water source and no water sources were noted within or in close proximity to the proposal area.

While the sites themselves and the distribution of cultural material provide an indication that the area was used more than once, the dominance of clay heat retainers, hearths and artefact manufactured from silcrete and chert is common for the Balranald area. The presence of two retouched flakes indicates that tool maintenance probably occurred onsite.

Given the concentration of hearths and stone artefacts along the originally proposed transmission line easement near the substation, it appears that camping and cooking activities were the focus of activity in the area. The implication from the hearths and artefacts present is that the area was probably used by small family groups on multiple occasions as they moved through the landscape.

In terms of the current proposal therefore, extrapolating from the results of this survey, it is possible that additional artefacts and hearths could occur within the proposed development footprint. These would most likely occur within the northern paddock where visibility was reduced by pasture grasses. The potential for undetected sites to occur within the southern paddock of recently harvested wheat is considered low. The area of the sand dunes associated with the Condoulpe landform would appear to have generally low archaeological potential.

Consideration must also be given to the level of disturbance of any such sites. Based on the land use history of the proposal area, and an appraisal of the results from the field survey, there is negligible potential for

the presence of intact subsurface deposits with high densities of objects or cultural material within the solar farm area.

Within the powerline easement, most of the area also contains low potential for intact subsurface deposits and high densities of cultural material. The potential for cultural material within the section from the fenceline to the substation is likely to be slightly higher, but no features were identified by the survey and the revised alignment was acceptable to the Aboriginal community representatives on site.

5 CULTURAL HERITAGE VALUES AND STATEMENT OF SIGNIFICANCE

The assessment of the significance of Aboriginal archaeological sites is currently undertaken largely with reference to criteria outlined in the ICOMOS Burra Charter (Marquis-Kyle & Walker 1994). Criteria used for assessment are:

- *Social or Cultural Value*: In the context of an Aboriginal heritage assessment, this value refers to the significance placed on a site or place by the local Aboriginal community – either in a contemporary or traditional setting.
- *Scientific Value*: Scientific value is the term employed to describe the potential of a site or place to answer research questions. In making an assessment of Scientific Value issues such as representativeness, rarity and integrity are addressed. All archaeological places possess a degree of scientific value in that they contribute to understanding the distribution of evidence of past activities of people in the landscape. In the case of flaked stone artefact scatters, larger sites or those with more complex assemblages are more likely to be able to address questions about past economy and technology, giving them greater significance than smaller, less complex sites. Sites with stratified and potentially in situ sub-surface deposits, such as those found within rock shelters or depositional open environments, could address questions about the sequence and timing of past Aboriginal activity, and will be more significant than disturbed or deflated sites. Groups or complexes of sites that can be related to each other spatially or through time are generally of higher value than single sites.
- *Aesthetic Value*: Aesthetic values include those related to sensory perception, and are not commonly identified as a principal value contributing to management priorities for Aboriginal archaeological sites, except for art sites.
- *Historic Value*: Historic value refers to a site or place's ability to contribute information on an important historic event, phase or person.
- *Other Values*: The Burra Charter makes allowance for the incorporation of other values into an assessment where such values are not covered by those listed above. Such values might include Educational Value.

All sites or places have some degree of value, but of course, some have more than others. In addition, where a site is deemed to be significant, it may be so on different levels or contexts ranging from local to regional to national, or in very rare cases, international. Further, sites may either be assessed individually, or where they occur in association with other sites the value of the complex as a whole should be considered.

Social or cultural value

While the true cultural and social value of Aboriginal sites can only be determined by local Aboriginal people, as a general concept, all sites hold cultural value to the local Aboriginal community. An opportunity to identify cultural and social value was provided to the Aboriginal representatives for this proposal through the fieldwork and draft reporting process.

While in the field examining the sites adjacent to the powerline easement, Mary Pappin snr observed that the number of hearths in a concentrated area with the stone artefacts indicated the place was important and was probably used as a meeting place and therefore was important to the Mutthi Mutthi people. In recognition of this, the original powerline alignment was moved to avoid the sites.

Scientific (archaeological) value.

The research potential of the site located during this assessment along the original transmission line is considered to be moderate with some scientific opportunities for further research. The un-eroded deposits around the hearths and artefacts of Sunraysia Solar Open Site 1 has potential for occurrences of *in situ* artefacts and other cultural material. There is also potential that the undisturbed subsurface deposits of the hearth features may contain unequivocal cultural charcoal that would provide a means for dating of the sites.

While the artefacts themselves are intrinsically interesting in terms of their base technical information their current lack of temporal context and the absence of information about local resources makes further conclusions about land use difficult. The lack of diversity also inhibits undertaking detailed technological analyses.

Sunraysia Solar Open Site 1 has the highest potential for additional Aboriginal information to be obtained from the sites recorded during the current assessment. This location is likely to yield the best information about Aboriginal site use and to potentially contain unequivocal cultural charcoal that could potentially be dated.

The research potential of the sites located within the proposed solar farm area during this assessment (Sunraysia Solar Oven 1 and Sunraysia Solar Oven 2) is considered to be low. While their presence can be used to assist in the development of site modelling for the local landscape, their scientific value for further research is limited due to the disturbed nature of the landscape and the subsequent movement of objects by clearing and ploughing activities.

Aesthetic value.

There are no aesthetic values associated with the archaeological sites *per se*, apart from the presence of Aboriginal artefacts, hearths and heat retainers in the landscape. The modified and heavily disturbed landscape within the solar farm however detracts from this aesthetic setting.

Other Values

There are no other known heritage values associated with the subject area. The sites may have some educational value (not related to archaeological research) through educational material provided to the public about the Aboriginal occupation and use of the area. There is also the possibility that Sunraysia Solar Open Site 1 may be used by the local Aboriginal community to educate and train the younger generation given the public access to the traveling stock reserve area. The two sites (Sunraysia Solar Oven 1 and Sunraysia Solar Oven 2) within the proposed solar farm footprint are however located within private property and not readily accessible by the public.

6 PROPOSED ACTIVITY

6.1 HISTORY AND LANDUSE

It has been noted above that historically the solar farm proposal area has been impacted through landuse practices, in particular clearing, ploughing and grazing.

The implications for this activity is that the archaeological record has been compromised in terms of the potential for scarred trees to remain. The implication for stone artefacts and heat retainers is that they may have been damaged or moved but they are likely to be present and remain in the general area they were discarded by Aboriginal people.

The alignment of the proposed overhead transmission parallel to the fence line of Lot 4/DP 751179 has been heavily impacted by the grading of a fire break, although the adjacent traveling stock reserve vegetated area has been subject to much less disturbance.

The alignment of the transmission line from the fence of Lot 4/DP 751179 to the substation, through the vegetated traveling stock reserve, has been subject to limited visible disturbance or clearing. This portion of the proposed transmission line did not show any obvious signs of disturbance through farming practices or large scale land clearing, although a graded track was observe.

Despite these impacts, Aboriginal artefacts and cultural material remain in the area, indicating the presence of past Aboriginal people and providing indications of their use of this landscape.

6.2 PROPOSED DEVELOPMENT ACTIVITY

As noted above in section 1.2, the proposal involves the construction of a solar farm and includes connection to the nearby substation via an overhead transmission. The development will result in disturbance of approximately 800 ha of the 1,000 ha property.

Disturbances will largely be in the removal of surface vegetation for the solar farm, which is all crop stubble or weeds, for preparation of the ground. Piles would be driven or screwed into the ground in order to support the solar array's mounting system, which has considerably less impact than the installation of concrete footings.

Up to 100 PV Boxes or PV Skids would be installed and spread across the site. Each of them would contain an inverter and a transformer.

Trenches would be dug for the installation of a series of underground cables linking the arrays across the proposal site.

Some internal access tracks would also be required, and typically these would comprise or a compacted layer of gravel laid on stripped bare natural ground.

Some ancillary facilities would also be required including material laydown areas, temporary construction offices, parking facilities, staff amenities and offices.

A perimeter fence and a vegetation buffer would also be constructed around the solar farm.

A 220kV overhead power line would be installed to connect the solar farm to the existing Balranald Transgrid substation.

The proposed construction timetable is 7-12 months duration and the operational life of the solar farm is estimated to be 30 years. Once operation ceases, the site will be rehabilitated and decommissioned

The development activity will therefore involve disturbance of the ground during the construction of the solar farm and transmission line to the existing Balranald Transgrid substation. Once established however, there would be minimal ongoing disturbance of the ground surface.

The final details and timing of the proposed construction activity have yet to be finalised but it is anticipated that construction could commence in early 2017.

6.3 ASSESSMENT OF HARM

As described in this report, three archaeological sites were located within the proposal area and along the original transmission line easement. The following table provides a summary of the degree of harm and the consequence of that harm upon the heritage value of each site resulting from the proposed works for the solar farm and transmission line alignment. A revised transmission alignment was surveyed during the field assessment to avoid the site Sunraysia Solar Open Site 1. The revised alignment avoids the hearth features and stone artefacts identified along the original transmission alignment. The realigned transmission line alignment is preferred by the Aboriginal community members present during the fieldwork. The use of the realigned transmission alignment would avoid the site Sunraysia Solar Open Site 1 thus negating any harm to the site.

Table 7 Identified risk to known sites and assessment of harm

Site name	Site integrity	Type of harm	Degree of harm	Consequence of harm	Recommendation
Sunraysia Solar Oven 1	Poor – 100+ year history of agricultural use	Direct	Complete	Minimal loss of value	No action
Sunraysia Solar Oven 2	Poor – 100+ year history of agricultural use	Direct	Complete	Minimal loss of value	No action
Sunraysia Solar Open Site 1	Good – eroding from in situ deposit	Nil- outside works corridor using the revised transmission alignment	Nil - outside works corridor using the revised transmission alignment	Not applicable- outside works corridor using the revised transmission alignment	Avoid

There is Aboriginal archaeological material present within the proposal area and the original transmission line alignment and the assessment is that there are likely to be other artefacts and cultural material present as well, although in similar low densities and highly disturbed. The level of disturbance for the construction of the proposal could impact the artefact and oven sites recorded during the field survey and others that may be present within other areas of the development site.

The impact is likely to be most extensive where earthworks occur such as the installation of cabling and the transmission line poles, which may involve the removal, breakage or displacement of artefacts and cultural material. This is considered a direct impact on the sites and the Aboriginal objects by the development in its present form.

The proposed construction methodology for the proposal will however results in only small areas of disturbance. The construction of access and maintenance tracks may involve some grading but given the nature of the terrain, this is likely to be minimal. The installation of the solar arrays involves drilling or screwing the piles into the ground and no widespread ground disturbance work such as grading or footings are required.

The assessment of harm overall for the project is therefore assessed as low given the use of the revised transmission alignment to avoid Sunraysia Solar Open Site 1 near the substation.

6.4 IMPACTS TO VALUES

The values potentially impacted by the development are any social and cultural values attributed to the artefacts and the sites by the local Aboriginal community. The extent to which the loss of the sites or parts of the sites would impact on the community is only something the Aboriginal community can articulate.

The impact to the scientific values if the sites were to be impacted by the current proposal is considered low within the solar farm area and low along the revised transmission line.

The impact to values for this development are summarised in Table 7 above.

Solar Farm

The low density of artefacts and heat retainers within the proposal area means there is little research value apart from what has already been gained from the information obtained during the present assessment. This information relates more to the presence of the sites Sunraysia Solar Oven 1 and Sunraysia Solar Oven 2 and the development of Aboriginal site modelling, which has largely now been realised by the recording. The integrity of the sites is already low and any additional disturbance is therefore unlikely to make a meaningful difference to the status of these two sites.

The intrinsic value of the artefact and the heat retainers themselves may be affected by the development of the solar farm. Any removal of the artefact and heat retainers, or their breakage would reduce the low scientific value they retain.

No other values have been identified within the proposed solar farm area that would be affected by the development proposal.

Transmission Line

A concentration of hearths and stone artefacts (Sunraysia Solar Open Site 1) were recorded along the original transmission line alignment. To avoid the site Sunraysia Solar Open Site 1 a revised alignment was surveyed. Following the completion of the survey, Sunraysia has since advised NGH Environmental that the revised transmission line alignment, as surveyed during the field assessment, will be used. This will ensure the avoidance of the site Sunraysia Solar Open Site 1. The use of the revised transmission alignment was also the preferred route proposed onsite by the Aboriginal community members during the survey.

Given the use of the realigned transmission line the intrinsic value of the stone artefacts and hearth features of Sunraysia Solar Open Site 1 will no longer be affected by the construction of the transmission line.

No other values have been identified along the proposed realigned transmission line that would be affected by the development proposal.

7 AVOIDING OR MITIGATING HARM

7.1 CONSIDERATION OF ESD PRINCIPLES

Consideration of the principles of Ecologically Sustainable Development (ESD) and the use of the precautionary principle was undertaken when assessing the harm to the site and the potential for mitigating impacts to the artefacts recorded for the Sunraysia Solar Farm proposal. The main consideration was the cumulative effect of the proposed impact to the site and the wider archaeological record. The precautionary principle in relation to Aboriginal heritage implies that development proposals should be carefully evaluated to identify possible impacts and assess the risk of potential consequences.

In broad terms, the archaeological material located during this investigation is similar to what has been found previously within the Balranald region and in the immediate local area, comprising of stone artefacts and hearths.

Currently there is no clear regional synthesis of the nature, number, extent and content for archaeological sites within the Balranald LGA. Nevertheless, given the size of the geographical area, it is certain that there would be similar artefacts present within the region. The result of this Aboriginal heritage assessment has confirmed the proposed model of site location and site distribution, whereby more artefacts and hearths could be expected to occur in Perekertin landscapes and in relativity undisturbed landscapes in the area.

The implications for ESD principles is that other artefacts and hearths are likely to be present in the district.

As noted above, the archaeological values of the sites, considering the scientific, representative and rarity values was deemed to be low within the solar farm and moderate along the transmission line. It is believed therefore that the proposed impacts to the sites through the development would not adversely affect the broader archaeological record for the local area or the region.

The principle of inter-generational equity requires the present generation to ensure that the sites and diversity of the archaeological record is maintained or enhanced for the benefit of future generations. We believe that the diversity of the archaeological record is not compromised by development of this particular solar farm proposal.

We therefore consider, that while the current development proposals will impact sites, the overall cumulative impact on the archaeological record for the region is likely to be minimal.

It is argued that the cumulative impacts of the proposal are not enough to reject outright the development proposal.

7.2 CONSIDERATION OF HARM

Avoiding harm to the three sites is technically possible through avoidance. However, the position of Sunraysia Solar Oven 1 and Sunraysia Solar Oven 2 would pose serious design constraints on the solar farm proposal. Where possible the design has been altered to avoid sites, this is evident along the transmission line which has now been realigned to avoid Sunraysia Solar Open Site 1 near the substation along the original transmission line easement.

Based on the assessment of the sites and artefact, and in consideration of discussions with the Aboriginal representatives during the field survey, it is not considered necessary to prevent all development at the solar farm location, or for total avoidance of the two sites identified within the solar farm area. The sites have been shown to be highly disturbed with little remaining scientific value.

The sites Sunraysia Solar Oven 1 and Sunraysia Solar Oven 2 are situated within the area of the proposed solar arrays. The most likely cause of harm to the artefact and heat retainers will be through ground preparation such as vegetation clearance, installation of the posts and construction activity.

The question remains about possible occurrence of artefacts and cultural material within the balance of the solar farm site. It is possible, and considered likely that additional artefacts will be present. Without knowing their exact locations, it is difficult to manage the impacts. We do not consider that the risk of such disturbances means the development should be abandoned. The archaeological material identified in the survey, and potentially present in the balance of the development site is not of sufficient value to reject the development proposal.

Mitigation of harm to cultural heritage sites generally involves some level of detailed recording to preserve the information contained within the site. Mitigation can be in the form of minimising harm, through slight changes in the development plan or through direct management measures of the sites and Aboriginal objects.

Mitigation of harm to cultural heritage sites often involves some level of detailed recording to preserve the information contained within the site. Mitigation can be in the form of minimising harm, through slight changes in the development plan or through direct management measures of the artefacts. It is argued here that mitigation in the form of alteration is not feasible within the proposal area in this situation and that the sites are not conducive to salvage or other mitigation strategies. The alignment of the transmission has been altered to avoid the site Sunraysia Solar Open Site 1 to minimising harm to the site deemed to have high significance to the Aboriginal community members present during the survey.

Feedback from the Aboriginal community members present during the field survey has indicated that they would like to undertake monitoring of the construction as a way of mitigating the potential impacts to heritage objects. As identified above however, there would only be limited areas requiring grading, with the installation of the arrays done through drilling of piles into the ground.

8 LEGISLATIVE CONTEXT

Aboriginal heritage is primarily protected under the NPW Act and as subsequently amended in 2010 with the introduction of the *National Parks and Wildlife Amendment (Aboriginal Objects and Places) Regulation 2010*. The aim of the NPW Act includes:

> The conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including but not limited to: places, objects and features of significance to Aboriginal people.

An Aboriginal object is defined as:

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

Part 6 of the NPW Act concerns Aboriginal objects and places and various sections describe the offences, defences and requirements to harm an Aboriginal object or place. The main offences under section 86 of the NPW Act are:

- A person must not harm or desecrate an object that the person knows is an Aboriginal object.
- A person must not harm an Aboriginal object.
- For the purposes of this section, "circumstances of aggravation" are:
    - that the offence was committed in the course of carrying out a commercial activity, or
    - that the offence was the second or subsequent occasion on which the offender was convicted of an offence under this section.
- A person must not harm or desecrate an Aboriginal place.

Under section 87 of the NPW Act, there are specified defences to prosecution including authorisation through an Aboriginal Heritage Impact Permit (AHIP) or through exercising due diligence or compliance through the regulation.

Section 89A of the Act also requires that a person who is aware of an Aboriginal object, must notify the Director-General in a prescribed manner. In effect this section requires the completion of OEH AHIMS site cards for all sites located during heritage surveys.

Section 90 of the NPW Act deal with the issuing of an AHIP, including that the permit may be subject to certain conditions.

The EP&A Act is legislation for the management of development in NSW. It sets up a planning structure that requires developers (individuals or companies) to consider the environmental impacts of new projects. Under this Act, cultural heritage is considered to be a part of the environment. This Act requires that Aboriginal cultural heritage and the possible impacts to Aboriginal heritage that development may have are formally considered in land-use planning and development approval processes.

Proposals classified as State Significant Development or State Significant Infrastructure under the EP&A Act have a different assessment regime. As part of this process, Section 90 harm provisions under the NPW Act are not required, that is, an AHIP is not required to impact Aboriginal objects. However, the Department of Planning and Environment is required to ensure that Aboriginal heritage is considered in the environmental impact assessment process. The Department of Planning and Environment will consult with other departments, including OEH prior to development consent being approved.

The Sunraysia Solar Farm proposal is a State Significant Development and will therefore be assessed via this pathway, which does not negate the need to carry out an appropriate level of Aboriginal heritage assessment or the need to conduct Aboriginal consultation in line with the requirements outlined by the OEH *Aboriginal cultural heritage consultation requirements for proponents 2010* (OEH 2010b).

9 RECOMMENDATIONS

The recommendations are based on the following information and considerations:

- Results of the archaeological survey;
- Consideration of results from other local archaeological studies;
- Results of consultation with the registered Aboriginal parties;
- The assessed significance of the sites;
- Appraisal of the proposed development, and
- Legislative context for the development proposal.

It is recommended that:

1. The proposed work can proceed with caution within the footprint of the revised transmission line easement that avoids the site Sunraysia Solar Open Site 1 as described in this report.
2. The development proposal should be able to proceed with no additional archaeological investigations. No areas of potential archaeological deposits have been identified and the significance of the two Aboriginal sites (Sunraysia Solar Oven 1 and Sunraysia Solar Oven 2) within the solar farm area have been assessed as low.
3. If complete avoidance of the recorded sites within the proposed solar farm area (Sunraysia Solar Oven 1 and Sunraysia Solar Oven 2) is not possible, the artefact identified should be collected and moved to a safe area within the property, as close as possible to their original location, but which will not be subject to ground disturbance. The collection and relocation should be undertaken by representatives of the registered Aboriginal parties. A new AHIMS site card will need to be completed identifying the new location of the moved artefacts.
4. The proposed powerline alignment identified and mapped in this assessment should be used. If the former easement is adopted and the complete avoidance Sunraysia Solar Open Site 1 is not possible, further archaeological research should be undertaken in the form of surface salvage, which should be accompanied by excavations in order to establish the presence or absence sub surface deposits. Surface salvage and excavations would need to be conducted prior to any earthworks taking place. A technical report should be produced describing the surface salvage and excavations methodology and results.
5. Sunraysia prepares a Cultural Heritage Management Plan (CHMP) to address the potential for finding additional Aboriginal artefacts during the construction of the Solar Farm. The CHMP will outline an unexpected finds protocol to deal with construction activity. Preparation of the CHMP should be undertaken in consultation with the registered Aboriginal parties.
6. In the unlikely event that human remains are discovered during the construction, all work must cease in the immediate vicinity. OEH, the local police and the registered Aboriginal parties should be notified. Further assessment would be undertaken to determine if the remains were Aboriginal or non-Aboriginal.
7. Further archaeological assessment would be required if the proposal activity extends beyond the area of the current investigation. This would include consultation with the registered Aboriginal parties and may include further field survey.

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APPENDIX A ABORIGINAL COMMUNITY CONSULTATION

NOTIFICATION AND REGISTRATION OF INTETEREST						
Organisation	**Contact**	**Action**	**Date Sent**	**Reply Date**	**Replied by**	**Response**
OEH	Peter Ewin	letter sent via email	28/09/2016			
NTScorp		Letter via post	28/09/2016			
National Native Title Tribunal		online search- 1 determination in LGA but not within project area	22/09/2016			
Office of Registrar *Aboriginal Land Rights Act*		Letter via post	28/09/2016			
Western Local land services		Letter via post	28/09/2016			
Balranald Shire Council		letter sent via email	28/09/2016			
Balranald LALC		letter sent via post as email bounced	28/09/2016			
Local Newspaper		The Guardian	30/09/2016			closing date 14th Oct
OEH LIST OF POTENTIAL STAKEHOLDERS						
Organisation	**Contact**	**Action**	**Date Sent**	**Reply Date**	**Replied by**	**Response**
Balranald Local Aboriginal Land Council	David Kelly - CEO	Email sent to BLALC	14/10/2016			
Kullila Site Consultants		Letter sent by express post	14/10/2016			
Mutthi Mutthi Nations		Letter sent by express post	14/10/2016			
Wakool Indigenous Corporation		Email sent to Cynthja Pappin	14/10/2016			

John Jackson		Email sent to John Jackson	14/10/2016			
Willandra Lakes World Heritage Area		Letter sent by express post	14/10/2016			
National Koorie Site Management		Letter sent by express post	14/10/2016			
Arthur Kirby		Letter sent by express post	14/10/2016			
Pappin Family Corporation		Letter sent by express post	14/10/2016			
Gary Pappin		Letter sent by express post	14/10/2016	2/12/2016	Phone call received from Gary Pappin.	
Barkinji #8 Native Title Determinants		Letter sent by express post	14/10/2016			
ivanhoe Local Aboriginal Land Council	No contact details provided	None - The proposed work is not within the ILALC boundary.				
Aboriginal Parties who registered as respondents						
Balranald LALC	David Kelly - CEO	phone call to Jakob	6/10/2016			Balranald LALC have registered an interest in the project.
Wakool	Cynthia Pappin	email to Jakob	16/10/2016		email	Cynthia registered for wakool
Pappin Family Corporation	Bernadette Pappin	email to Jakob	25/10/2016		email	Bernadette Pappin registered an interest for Pappin family
Mutthi Mutthi Nations Aboriginal Corporation	Bernadette Pappin	email to Jakob	25/10/2016		email	Bernadette Pappin registered an interest for Mutthi Mutthi nations
John Jackson						

Additional Aboriginal Parties who expressed an interested in the project						
Organisation	**Contact**	**Action**	**Date Sent**	**Reply Date**	**Replied by**	**Response**
David Edwards	David Edwards	The BLALC informed NGH on 25/11/2016 that project information and the NGH ACHA methodology had been provided to David Edwards.				Jakob phoned David Edwards on 28/11/2016 to discuss the project and explained that if he wished to be considered to participate in fieldwork that he would need to provide NGH with a schedule of fees and insurances. NGH did not receive either.
Yita Yita/Nari Nari Tribes Aboriginal Corporation	Nanette Smith	The BLALC informed NGH on 25/11/2016 that project information and the NGH ACHA methodology had been provided to Nanette Smith.				Jakob attempted to contact Nanette Smith but was unable to leave any messages. NGH never heard from Nanette Smith.
Presentation of project information and proposed Aboriginal Cultural Heritage Assessment methodology						
Organisation	**Contact**	**Action**	**Date Sent**	**Reply Date**	**Replied by**	**Response**
Mutthi Mutthi Nations	Bernadette Pappin	Proposed ACHA methodology sent by email and request for cultural knowledge; insurances and schedule of rates	31/10/2016	1/11/2016	Bernadette Pappin	
Pappin Family Corporation	Mary Pappin/Bernadette Pappin	Proposed ACHA methodology and request for cultural knowledge; insurances and schedule of rates sent by email to Bernadette Pappin who confirmed that she would be able to provide all project relevant mateirals to the Pappin Family Corporation.	31/10/2016	1/11/2016	Bernadette Pappin	

Wakool Indigenous Corporation	Cynthja and Gary Pappin	Proposed ACHA methodology sent by email and request for cultural knowledge; insurances and schedule of rates	31/10/2016	31/10/2016	Cynthja Pappin	Cynthja Pappin provided comment on the methodology that NGH had missed several recent archaeological reports for the area in the background research, which she advised could be obtained from the Balranald Shire Council: information on the 2015 and 2016 archaeological surveys of Balranald and Kyalite pontoons, and also references regarding Waldaira (Balranald) cf Doug Williams, Chris Carter (2006?) and Coral Lopez (2016). No further comments were provided regarding the methodology. A schdule of fees and information about insurances was provided.
John Jackson	John Jackson	Proposed ACHA methodology sent by email and request for cultural knowledge; insurances and schedule of rates	31/10/2016	8/11/2016	John Jackson	John asked whether the insurances he currently has with his private business would suffice. No comment on the methodology was provided.
Consultation throughout 28 day period for methodology review						
Organisation	**Contact**	**Action**	**Date Sent**	**Reply Date**	**Replied by**	**Details**
Wakool Indgenous Corporation	Cynthja Pappin	Email	1/11/2016			Jakob sent Cynthja an email in reply to her response to the ACHA methodology.
Wakool Indgenous Corporation	Cynthja Pappin	Phone call and text	10/11/2016			Jakob rang and texted Cynthja to discuss the methodology further.
Wakool Indgenous Corporation	Cynthja Pappin	Email	10/11/2016			Jakob emailed Cynthja to get any further comment on the ACHA methodology.
Wakool Indgenous Corporation	Cynthja Pappin	Phone call and text	28/11/2016			Jakob phoned Cynthja to enquire whether Wakool Indigenous Corporation would wish to and be able to provide representatives to participate in the fieldwork.

						Cynthja said that she would provide names and availability that afternoon.
Wakool Indgenous Corporation	Cynthja Pappin	Email	1/12/2016			Jakob emailed Cynthja trying to get confirmation of avaialability to conduct fieldwork on the week of December 5.
Mutthi Mutthi Nations	Bernadette Pappin	Phone call	10/11/2016			Jakob phoned Bernadette to get contact details for Gary Pappin, who is her brother.
Mutthi Mutthi Nations	Bernadette Pappin	Text	28/11/2016			Jakob sent Bernadette a text and email requestiong a response to the ACHA methodology as well as a schedule of fess and insurances. November 28 was the deadline for responses to the methodology.
Mutthi Mutthi Nations	Bernadette Pappin	Email	1/12/2016			Jakob emailed Bernadette trying to get confirmation of avaialability to conduct fieldwork on the week of December 5.
Pappin Family Corporation	Mary Pappin (snr)	Phone call	11/11/2016			Jakob phoned Mary Pappin (snr) to discuss the methodology. Mary said that she feels it may be useful to include some form of test excavation as part of the methodology.
Pappin Family Corporation	Mary Pappin (jnr)	Phone call	1/12/2016			Jakob contacted Mary Pappin (jnr) to get nominated names and availability for fieldwork. Mary provided names for both the Pappin Family Corporation and Mutthi Mutthi Nations. Jakob followed this up with an email to both Mary Pappin (jnr) and Bernadette Pappin to confirm the information.

John Jackson	John Jackson	Phone call and text	28/11/2016			Jakob tried to phone John but could not get through or leave a message. Jakob sent John a text requestiong a response to the ACHA methodology as well as a schedule of fess and insurances. November 28 was the deadline for responses to the methodology. NGH did not receive any comment on the methodology; a schedule of fees or insurances.
Balranald Local Aboriginal Land Council	David Kelly - CEO	Phone call and email	9/11/2016			Jakob rang and left messages on the BLALC office phone and the mobile of David Kelly, and emailed BLALC to remind that NGH was interested to learn whether the BLALC had any comments on the ACHA methodology as well as whether the BLALC could provide a schedule of rates and insurances.
Balranald Local Aboriginal Land Council	David Kelly - CEO	Phone call	16/11/2016			David said that there are individuals and groups that may not be able meet the requirements of supplying their own insurances and as a result may end up under the banner of the BLALC.When I spoke to him previously about providing the names of people within the BLALC organisation who might have pertinent cultural knowledge of the project area, David said that he would get back to me.

Balranald Local Aboriginal Land Council	David Kelly - CEO	Phone call	25/11/2016			Jakob phoned David Kelly. David explained that the BLALC was in administration and as such the BLALC was only in a position to provide information to it's members and that the BLALC would not be providing field representatives but rather would envourage it's members to represent themselves with their own shedule of rates and insurances. David provided information regarding two additional groups who might be interested in the project: David Edwards and the Yita Yita/Nari Nari.
Fieldwork						
Wakool Indgenous Corporation						1-2 representatives
Pappin Family Corporation						1-2 representatives
Mutthi Mutthi Nations						1-2 representatives

Public Notice placed in The Guardian on 30 September 2016.

The Guardian
Community Classifieds

Ph: 5032 2161 Fax: 5032 4013 Email: classifieds@theguardian.com.au

PUBLIC NOTICES

Notification for registration of interest for Aboriginal stakeholders

NGH Environmental has been contracted by Sunraysia Solar Farm Two Pty Ltd to undertake an Aboriginal Cultural Heritage Assessment (ACHA) for the proposed Balranald Solar Farm. The assessment area comprises land at the proposed location of the solar farm at Lot 9/ DP 751179, Lot 10/ DP 751179, Lot 11/ DP 751179 and Lot 14/ DP 751179 with transmission lines along Lot 7301/ DP 1157986 to an existing substation on Lot 48/ DP 1015985 in the Balranald Shire Council, Local Government Area.

The proponent (Sunraysia Solar Farm Two Pty Ltd) is proposing to construct a 200 MWAC solar farm including panels, electrical conduits, transformers, site office and perimeter fencing.

The purpose of this consultation, particularly with Aboriginal people, is to assist the proponent in the preparation of the ACHA and to be involved in consultation should the proponent need to apply for an Aboriginal Heritage Impact Permit (AHIP), and further to assist the Director General of the Office of Environment and Heritage in consideration and determination of such an application.

In order to fulfil the requirements set out in the OEH *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*, NGH Environmental is seeking interested Aboriginal parties who hold cultural knowledge of the assessment area to register their interest in the consultation process for the project and to assist in the determination of cultural significance of any Aboriginal objects or places located there.

Registrations should be provided in writing to:

NGH Environmental Pty Ltd
PO Box 62
FYSHWICK ACT 2609

Or via email to:

ngh@nghenvironmental.com.au

All correspondence must be received by the **14 October 2016.**

Those registering an interest will be contacted to discuss the project further. Those who do register are advised that their details will be provided to OEH and the Local Aboriginal Land Council, unless they specifically advise in writing that their details are not to be forwarded.

MURRAY RIVER COUNCIL
FLOODPLAIN RISK MANAGEMENT STUDY & PLAN
TOWNS OF BARHAM, MURRAY DOWNS & TOOLEYBUC
PUBLIC EXHIBITION & INFORMATION SESSIONS

Council is undertaking Flood Risk Management Study and Plans (FRMS&Ps) for the towns of Barham, Murray Downs and Tooleybuc. The FRMS&Ps seek to provide Council and stakeholders in these towns with Flood Risk Management Plans which clearly define flooding risks and identify preferred mitigation options to reduce impact of future floods. The FRMS&Ps are being steered through the Flood Risk Management Committee (FRMC), a section 355 committee of Council. Council adopted the Draft FRMS&Ps at its Ordinary Council Meeting of 20 September 2016.

PUBLIC EXHIBITION

The Draft FRMS&Ps will be on available for viewing on Councils Website and locations listed below from 26 September 2016 — 21 October 2016.

- Barham Council Offices, 15 Murray Street, Barham
- Murray Downs Golf & Country Club, 100 Murray Downs Dr, Murray Downs
- Tooleybuc Post Office, 57 Murray Street, Tooleybuc

INFORMATION SESSIONS

The following information sessions have been scheduled during the Public Exhibition Period

- Tuesday 11 October 2016, 7.00pm at cluBarham, 45 Murray Street, Barham
- Wednesday 12 October 2016, 7.00pm in Balcony Room, Murray Downs Golf & Country Club, 100 Murray Downs Dr, Murray Downs
- Thursday 13 October 2016, 7.00pm in the Burgundy Room, Tooleybuc Sporting Club, Lockhart Rd, Tooleybuc

Written submissions on the Draft FRMS&Ps should be received no later than 31 October 2016 to Murray River Council, Private Bag 40, Moulamein, NSW, 2733 or by email to mail@murrayriver.nsw.gov.au

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Applications close Monday, October 10, 2016.

MC DRIVER

B Double full time and casual relief drivers required for local and interstate work.

Tautliner and fridge van experience an advantage but not essential.

Must be BFM (Basic Fatigue Management) accredited or have a willingness to obtain.

A clean, honest and reliable person will be favourably considered.

Our business is a smoke free environment and this includes all company vehicles.

Applicants would preferably live in Swan Hill area but other regions may be considered.

Please call Troy on 0429 100 771.

SITUATIONS VACANT

MURRAY DOWNS GOLF & COUNTRY CLUB

APPRENTICE CHEFS

Murray Downs Golf & Country Club Limited is seeking to fill the following positions within our organisation.

Apprentice Chef located at Murray Downs Golf & Country Club

Apprentice Chef located at Swan Hill Club

If you have always dreamed of becoming a chef and maybe one day running your own restaurant then this could be your opportunity. We provide a welcoming environment to all staff and operate three venues in the Swan Hill area employing 170 locals.

To apply you will need to possess the following:

- A can do attitude
- Able to work in a team environment
- Be honest and reliable
- Be passionate about food

To apply for either position please send you applications to the attention of:

The Head Chef
Jeremy Johnson
Murray Downs Golf & Country Club
Box 496
Swan Hill 3585

The Head Chef
Scott Cornish
Swan Hill Club
5-17 McCallum Street
Swan Hill 3585

Applications close: Friday, September 30, 2016.

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Temporary Allocation Market	Buyer $/ML	Tip $/ML	Movement Trend
SA/Vic Murray Zone 7 Delivery	90	100	
Vic Murray Zone 6 Delivery	90	100	
Vic Goulburn Delivery	90	100	
NSW Murray Zone 10 Delivery	70	80	
NSW Murray Zone 11 Delivery	90	100	

Permanent Entitlement Auctions	Closing Date
100ML Vic Murray High Reliability – Zone 6	6 Oct 2016 – 11.00am
10ML NSW Murray High Security – Zone 11	4 Oct 2016 – 11.00am
60ML Vic Goulburn Low Reliability – Zone 1A	SOLD - $250.00
45.6ML Vic Campaspe Low Reliability – Zone 4A	SOLD - $220.00
35ML Vic Murray High Reliability – Zone 7	SOLD - $2900.00
Entitlement Leases	Ask

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Scott Burger (Barham) 0427 329 651
Peter Maher (Swan Hill) 0428 358 866
Adrian Peel (Barham) 0427 776 942

Prices as at September 27, 2016

Call us on 03 5453 1296 (Barham) 03 5032 9911 (Swan Hill)

ONLINE WATER AUCTIONS www.ruralcowater.com.au | Local Service, National Strength.

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