

SoC	Impact	Objective	Mitigation tasks	Project phase	Auditing
			required onsite. The establishment of shade tolerant perennial groundcover across the cropping and exotic dominated grazing paddocks prior to the installation of the PV arrays.		
28	Operational impacts	Minimise biodiversity impacts	If localised erosion is detected, effective treatments would be applied without delay, such as hardening with mulch, reseeding and covering with an open weave jute matting, gypsum application to improve structure and infiltration, protection with geotextile fabric or localised flow dispersal and diversion structures.	Operation	OEMP
29	Operational impacts	Minimise biodiversity impacts	The space between the PV array rows should be maintained and kept clear to enable access by vehicles for ongoing weed control, and pasture renovation if required.	Operation	OEMP
30	Operational impacts	Minimise biodiversity impacts	Monitoring of fauna site habitat usage pre and post construction is recommended but not considered essential.	Operation	OEMP

6.2 INDIGENOUS HERITAGE

6.2.1 Methodology

New South Wales Archaeology Pty Ltd has undertaken the Indigenous archaeological and heritage assessment of the proposed Nyngan Photovoltaic Solar Farm. This assessment has been conducted in accordance with consultation process as outlined in the NSW Department of Environment, Climate Change and Water's (NSW DECCW) newly introduced Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.

Prior to conducting the field assessment, NSW Archaeology Pty Ltd has undertaken consultation with relevant NSW DECCW personnel in regard to the archaeological context and potential of the proposal site. The field survey and assessment has been undertaken with a representative from Nyngan Local Aboriginal Land Council.

The study has sought to identify and record Aboriginal objects, to assess the archaeological potential of the landform encompassed by the proposal site, and to formulate management recommendations based on the results of background research, a field survey and significance assessment.

The investigation has included a NSW DECCW AHIMS Site Search, literature review, field survey and analysis of results. Field work was undertaken in August 2010. A landscape based approach has been implemented during this study; the proposal site is comprised of a single landform, this being part of the Bogan floodplain. This landform is utilised as a framework of recording, analysis and the formulation of management and mitigation strategies.

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

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

The archaeological and heritage report (see Appendix G) documents the following:

- The Aboriginal consultation process undertaken for the project and the involvement in the project of the Aboriginal community
- A description of the proposal and whether or not it has the potential to result in impacts to Aboriginal cultural heritage
- A description of the impact history of the proposal site
- The methodology implemented during the study
- The landscape and natural resources of the proposal site in order to establish background parameters
- A review of archaeological and relevant literature and heritage listings on the NSW DECCW Aboriginal Heritage Information Management System
- A synthesis of local and regional archaeology
- A predictive model of Aboriginal object type and location relevant to the proposal site
- The cultural and archaeological sensitivity of the landform subject to proposed impacts
- The field survey results
- The significance of recorded and predicted subsurface Aboriginal objects
- An assessment of the impact of the proposal on Aboriginal objects and places
- A description and justification of the proposed outcomes and alternatives
- A series of recommendations relating to management and mitigation based on the results of the investigation

6.2.2 Existing environment

A review of previous investigations in the area has been undertaken in order to define the existing information relating to Indigenous archaeology and heritage and to provide an analytical context to the assessment. This information is reviewed in Section 7 of the archaeological report (Appendix G).

A search of the NSW DECCW Aboriginal Heritage Information Management System (AHIMS) has indicated that there are no previously recorded Aboriginal objects located within the proposed impact area (AHIMS #30670). The search area measured 72 km² and encompassed eastings 514000 –523000, and northings 6502000 –6510000 (GDA). While no previously recorded Aboriginal objects are listed on AHIMS to be present in the proposal site, 27 sites are listed in the site search, most of which are located to the east and north-west of the Nyngan township.

The Aboriginal objects on AHIMS for the site search area are listed in Table 1, and the location of those sites nearest to the proposal site is shown in Figure 3 in the archaeological report (Appendix G). The majority of sites listed in the AHIMS search are scarred trees.

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

There are no previous archaeological studies known to have been conducted within the proposal site itself and few have been undertaken within the immediate local area. The construction of a relevant predictive model of Aboriginal site type and location is therefore based on a review of research conducted across the broader region. This review suggests that the most common Aboriginal object recordings in the region are distributions of stone artefacts and scarred trees. In the region a general correlation between different types of watercourses and the nature of the evidence of past Aboriginal occupation is evident. Higher artefact density sites are located near to permanent water sources and low density artefact distributions are found elsewhere. Rare site types include rock shelters, quarry and procurement sites, burials, stone arrangements, carved trees, contact sites and traditional story or other ceremonial places.

Tommy Ryan of the Nyngan Local Aboriginal Land Council has indicated that the proposal site is of extremely low archaeological potential and that locally, sites would most likely be situated in closer proximity to the Bogan River. Mr Ryan also noted that given that the site has been cleared and cultivated for decades, anything that may once have been present would now be destroyed. Based on the advice of Mr Ryan, a consideration of the high levels of prior impacts and disturbance which includes land clearance and cultivation, and the predictive model constructed from the review of previous archaeological research in the region, the proposal site is predicted to be of very low archaeological potential and sensitivity. A detailed predictive model of Aboriginal object type and location is set out in Section 7 of the archaeological report (Appendix G).

Results

The proposal site encompasses a single landform comprised of a floodplain with level gradient and open aspect. The western boundary of the proposal site is located c 1.2 kilometres east of the Bogan River. The proposal site surveyed during the assessment measures approximately 208 hectares in area. It is estimated that approximately 83 hectares of that area was subject to survey inspection. Ground exposures inspected are estimated to have measured approximately 4.92 hectares in area. Of that ground exposure area archaeological visibility (the potential artefact bearing soil profile) is estimated to have been 2.25 hectares. Effective Survey Coverage is therefore relatively low and is calculated to have been 1.08% of the proposal site.

Two Aboriginal object locales were recorded during the field survey, each comprised of a single stone artefact. While the Effective Survey Coverage for the surveyed area is calculated to have been relatively low at the time of survey, many extensive areas of good ground exposure possessing reasonable archaeological visibility were distributed throughout the proposal site. These exposures enabled a reasonable characterisation of artefact distribution within the proposal site.

6.2.3 Impact assessment

Construction and decommissioning

As noted above, the Aboriginal object locales recorded in the proposal site are two single and isolated stone artefacts; these are assessed to be of low archaeological significance. Undetected or subsurface stone artefacts are assessed to be present in very low density. The Effective Survey Coverage achieved during the survey is considered to have been sufficient to characterise the nature of artefact distribution in the proposal site. The survey results are therefore assessed to be a relatively accurate reflection of the artefact density in the proposal site. Accordingly, based on the relevant predictive model of site distribution for the area, and the results of the field survey, artefact density in the proposal site is assessed to be very low. The proposal site is assessed to be low archaeological potential and significance.

The construction of the solar farm would result in physical impacts to any Aboriginal objects which may be located within direct impact areas - *irrespective of their archaeological significance*. That is, any Aboriginal object situated within an area of direct impact would be comprehensively disturbed, and/or destroyed during construction. As with any development the chances of impacting Aboriginal objects, particularly stone artefacts, is high given that they are present in a continuum across the landscape and located on or within ground surfaces. The Nyngan Solar Farm is no exception in this regard and it would be impossible to have a development of this nature without causing direct physical impact. However, given that the installation of the solar panels is via a pole driven mechanism, the proposed impacts relating to construction is minimal and is not extensive.

Given that both the two recorded Aboriginal objects and the predicted undetected and subsurface artefacts are assessed to be of low significance, the impacts can be viewed as being of correspondingly low significance. This assessment forms the basis for the formulation of recommendations relating to the proposal.

The Aboriginal object locales recorded in the proposal site do not surpass scientific significance thresholds which would act to preclude the construction of the proposed solar farm. Based on a consideration of the predictive model applicable to the environmental context in which impacts are proposed, and the results of the study, it is concluded that the proposed impact area does not warrant further investigation such as subsurface test excavation. The environmental context in which the impacts are proposed is predicted to contain sparse and very low artefact density. It is considered that subsurface testing is unlikely to produce results different to predictions made in respect of the archaeological potential of the landform in question.

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

Since conducting the fieldwork for this project an additional area of possible proposed impacts has been added to the proposal. This area is situated to the east of the surveyed area. Based on the results of the investigation, and an extrapolation of these to the eastern area, it is predicted that the additional eastern area is of low archaeological sensitivity and potential. Nevertheless it is recommended below that if this area is to be impacted a field inspection should take place prior to construction in order to confirm its archaeological and cultural heritage status and to implement appropriate management strategies as necessary.

Operation

It is considered unlikely that there would be any impact to Indigenous sites during the operation of the solar farm. No additional mitigation measures are considered to be warranted.

6.2.4 Environmental safeguards

SoC	Impact	Objective	Mitigation tasks	Project phase	Auditing
31	Disturbance to a potential heritage item or relic	Minimise disturbance	An additional field survey would be undertaken in the eastern area of the site to confirm the archaeological status of that area. The additional field survey would be undertaken in consultation with Registered Aboriginal Parties.	Pre-determination	CEMP
32	Impact on local Aboriginal community	Minimise impact	Ongoing consultation would be undertaken with Registered Aboriginal Parties	All	CEMP OEMP

6.3 VISUAL AMENITY

6.3.1 Introduction

The proposed Nyngan Solar Farm will be a contrasting visual element within the existing rural landscape. The solar farm will potentially attract attention from a range of viewpoints in the area. As a result, the visual assessment is recognised as being an important component of the EA process.

Moir Landscape Architecture has been commissioned by Infigen Energy to prepare a Visual Impact Assessment (VIA) for the proposed Nyngan Solar Farm. A comprehensive VIA has been undertaken and is included as Appendix F of this EA as per DGRs.

The key aspects of the visual assessment have been summarised in this chapter of the EA.

The objectives adopted for the visual assessment were as follows:

- To identify and describe the existing visual/landscape environment and to evaluate its current qualities
- An assessment of the site in relation to any landscapes of local or regional significance
- Visibility from the general surrounds including major roads and surrounding residential areas
- Visual impacts associated with any potential development
- Proposed mitigation measures to reduce visual impacts associated with any development within the proposal site

Survey work for the study was undertaken during August 2010 using key viewpoints and locations with potential views towards the proposal site. The comprehensive report (Appendix F) details the results of

the field work, documents the assessment of the landscape character and visual setting, and makes recommendations concerning measures to mitigate any impacts arising from potential development.

The method applied to this study involved systematically evaluating the visual environment pertaining to the site and using value judgements based on community responses to scenery. The assessment was undertaken in five stages as noted below:

1. A description of the existing visual environment, including the identification and appraisal of visual catchments/landscape units
2. The undertaking of a viewpoint analysis to identify sites likely to be affected by development within the investigation zone
3. A photographic survey using a digital camera and a handheld GPS unit to record position and altitude
4. An assessment of visual impacts
5. The preparation of recommendations for impact mitigation and suggestions for suitable development to maintain the area's visual quality. The purpose of the above methodology is to reduce the amount of subjectivity entering into impact assessment and to provide sufficient data to allow for third party verification of results

The purpose of the above methodology is to reduce the amount of subjectivity entering into impact assessment and to provide sufficient data to allow for third party verification of results. A summary of the key aspects of the Visual Impact Assessment are summarised in the subsequent sections of this chapter.

6.3.2 Existing Visual Environment

The proposal site is located within approximately 1km of the town centre of Nyngan, New South Wales. The broader landscape surrounding the proposal site is generally characterised by grazing land with a moderate coverage of woodland vegetation.

The Riparian zone associated with the Bogan River to the West of the site has a dense coverage of vegetation. Minor tributaries branching from the Bogan River extend through the landscape and into the Proposal site with a moderate to dense coverage of vegetation.

Between the proposal site and the southern extent of Nyngan, a sparse coverage of vegetation exists with some cleared areas associated with infrastructure and access roads.

A key landscape feature of Nyngan is the flood levee which surrounds the developed areas of the town.

Landscape character units

The surrounding landscape was divided into Landscape Character Units, each defined by their own distinct and recognisable pattern of elements. Representative views of these Landscape Character Units are presented in the following figures.

Landscape character units for the purpose of this report have been identified in Figure 6-18.



Figure 6-14: Nyngan Town LCU



Figure 6-15: Nyngan Rural Residential LCU

Nyngan Town: The LCU includes land and associated infrastructure surrounding the Nyngan town centre. This area is characterised by older style commercial and residential buildings.

Nyngan Rural Residential: The LCU encompasses the rural residential land on the outskirts of Nyngan. This area is typified by a flat topography with mostly cleared grazing land with a mix of exotic and native trees associated with residential gardens.



Cleared Grazing Land: The LCU includes land surrounding Nyngan characterised by cleared, flat, grazing land. The riparian vegetation associated with the Bogan River creates a visual backdrop to the cleared grazing land.

Figure 6-16: Cleared Grazing Land



Bogan Scrubland: The LCU is generally defined by land surrounding Nyngan covered in dense Mallee Scrub vegetation.

Figure 6-17: Bogan Scrubland LCU

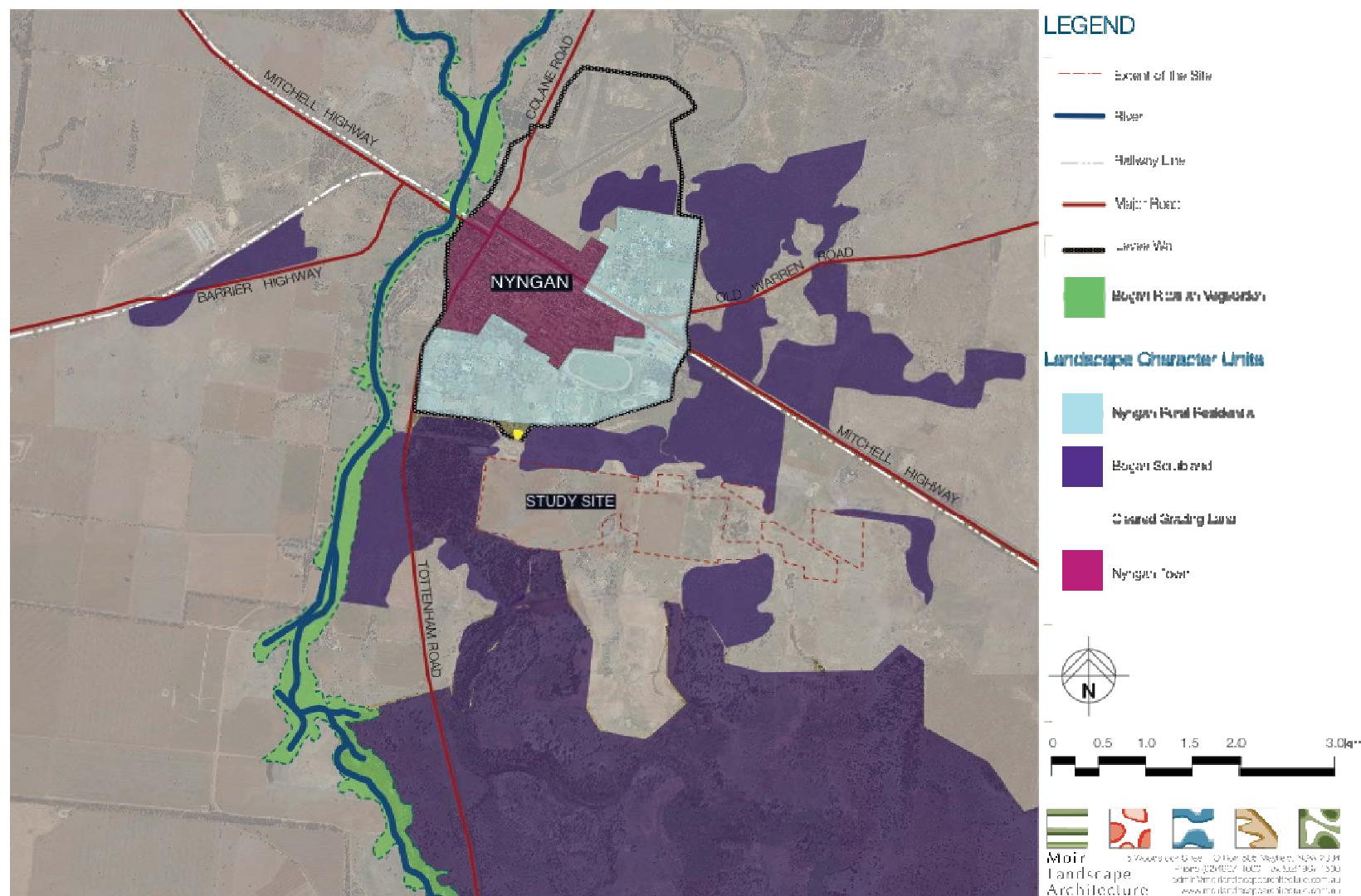


Figure 6-18: Nyngan Landscape Character Units