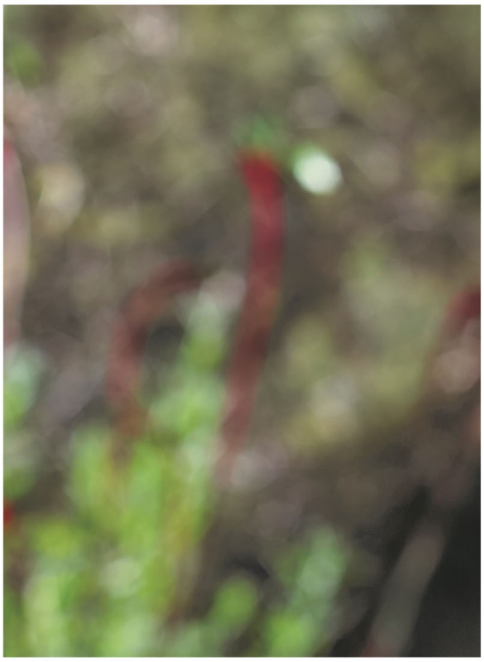
ABORIGINAL DUE DILIGENCE ASSESSMENT

Finley 5MW Solar Farm

June 2020

Project Number: 20-041



BEGA • BRISBANE • CANBERRA • GOLD COAST • NEWCASTLE • SYDNEY • WAGGA WAGGA
W. www.nghconsulting.com.au

DOCUMENT VERIFICATION

Project Title:	Finley 5MW Solar Farm
Project Number:	20-041
Project File Name:	20-041 Finley 5MW SF DD Final

Revision	Date	Prepared by	Reviewed by	Approved by
Final	12/06/2020	Amy Ziesing	Matthew Barber	Matthew Barber

NGH Pty Ltd prints all documents on environmentally sustainable paper including paper made from bagasse (a by-product of sugar production) or recycled paper.

W. www.nghconsulting.com.au
E. ngh@nghconsulting.com.au

BEGA - ACT & SOUTH EAST NSW
Suite 11, 89-91 Auckland Street (PO Box 470) Bega NSW 2550 **T.** (02) 6492 8333

NEWCASTLE - HUNTER & NORTH COAST
Unit 2, 54 Hudson Street
Hamilton NSW 2303 **T.** (02) 4929 2301

BRISBANE
Suite 4, Level 5, 87 Wickham Terrace
Spring Hill QLD 4000 **T.** (07) 3129 7633

SYDNEY REGION
Unit 18, Level 3, 21 Mary Street
Surry Hills NSW 2010 **T.** (02) 8202 8333

CANBERRA - NSW SE & ACT
8/27 Yallourn Street (PO Box 62)
Fyshwick ACT 2609 **T.** (02) 6280 5053

WAGGA WAGGA - RIVERINA & WESTERN NSW
Suite 1, 39 Fitzmaurice Street (PO Box 5464)
Wagga Wagga NSW 2650 **T.** (02) 6971 9696

GOLD COAST
PO Box 466
Tugun QLD 4224 **T.** (07) 3129 7633

BEGA • BRISBANE • CANBERRA • GOLD COAST • NEWCASTLE • SYDNEY • WAGGA WAGGA
W. www.nghconsulting.com.au
ABN 31 124 444 622 ACN 124 444 622

TABLE OF CONTENTS

FIGURES

TABLE

PLATES

ACRONYMS AND ABBREVIATIONS

AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
BCD	Biodiversity and Conservation Division (formerly OEH)
Bison	Bison Energy Australia
DA	Development Application
DPIE	Department of Planning, Industry and Environment
Ha	Hectare
JRPP	Join Regional Planning Panel
Km	kilometres
LALC	Local Aboriginal Land Council
LGA	Local Government Area
M	Metres
MW	Megawatt
NPW Act	National Parks And Wildlife Act 1974 (NSW)
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage, formerly Department of Environment, Climate Change and Water
PAD	Potential Archaeological Deposit
REP	Regional Environmental Plan

EXECUTIVE SUMMARY

NGH was commissioned by Bison Energy Australia (Bison) to undertake a Due Diligence assessment for Aboriginal heritage sites to support a Development Application (DA) and assist the Joint Regional Planning Panel (JRPP) proceed for a proposed 5 Megawatt (MW) solar energy system on Broughans Road, Finley NSW. The subject land is comprised of a portion of Lot 26 DP752299 in the Berrigan Shire Local Government Area (LGA) in the Riverina Murray region of NSW. The site currently comprises pastoral land that has been utilised for cropping and grazing for at least 100 years.

BACKGROUND AND DESKTOP ASSESSMENT

The pre-European landscape in the proposal area has undergone significant modification with the installation of the Murray Irrigation Area and laser levelling of pastoral paddocks across the district. These practices have removed micro-topographical changes in the landscape and subsequently areas that may have contained potential for Aboriginal sites to be present. The channel system likely represents the modification of previous natural creeklines and therefore do contain some potential to contain objects of Aboriginal Cultural Heritage but in a heavily disturbed context.

Based upon the initial desktop assessment, using satellite imagery and topographic data, it appears that there is low potential for Aboriginal Cultural Heritage to occur within the project area given that no natural watercourses are present and the landscape has been significantly modified from its pre-European state. The site may have been used in a transitory nature by Aboriginal people passing through the area when utilising the permanent resources of the Murray River and smaller nearby ephemeral creeklines.

FIELD ASSESSMENT

A visual inspection was completed by NGH archaeologist, Amy Ziesing on 29 May 2020 covering the entire proposal area. No sites of Aboriginal Cultural Heritage or areas of archaeological sensitivity or landforms with the potential to contain Aboriginal objects were identified across the proposal site. This is due to the widespread historic disturbances that were noted, resulting from the installation of channels and canals across the Murray Irrigation Area and the use of laser levelling across pastoral paddocks in the district. The channels have likely modified natural creeklines that previously existed in the area and laser levelling has removed any micro-topographical landforms that would have existed in the pre-European landscape and provided locations conducive for camping by Aboriginal people in the past.

IMPACT ASSESSMENT CONCLUSION

As no items of Aboriginal Cultural Heritage, archaeologically sensitive landforms or registered AHIMS sites remain within the proposal area, there is a low likelihood that the proposed solar farm will impact on unrecorded heritage sites. Therefore, no heritage impacts are anticipated for the project.

RECOMMENDATIONS

It is recommended that:

1. All works must be constrained to the areas of existing disturbance and any activity proposed outside of the current assessment area should also be subject to an Aboriginal heritage assessment.

2. If any items suspected of being Aboriginal in origin are discovered during the work, all work in the immediate vicinity must stop and BCD notified. The find will need to be assessed and if found to be an Aboriginal object an AHIP may be required.

Bison Energy Australia is reminded that it is an offence under the *NSW National Parks and Wildlife Act 1974* to disturb, damage or destroy and Aboriginal object without a valid Aboriginal Heritage Impact Permit.

1 INTRODUCTION

NGH was commissioned by Bison Energy Australia (Bison) to undertake a Due Diligence assessment for Aboriginal heritage sites for the proposed solar energy system on Broughans Road in Finley NSW.

The assessment will support a Development Application (DA) and assist the Joint Regional Planning Panel (JRPP) to assess the application for the proposed 5 Megawatt (MW) solar farm. The project would involve significant ground disturbance for the installation of solar panels and associated trenching that would impact any potential objects of Aboriginal heritage that may be present in the proposal area. The due diligence assessment is undertaken to evaluate the presence or potential for Aboriginal objects to occur and be affected by the development activity.

1.1 SUBJECT SITE

The subject land comprises a portion of Lot 26 DP752299 in the Berrigan Shire Local Government Area (LGA) in the Riverina Murray region of NSW. The site currently comprises pastoral land that has been utilised for cropping and grazing for at least 100 years. The site also contains an existing irrigation channel that is no longer used, due to lack of available water.

1.2 PROJECT PERSONNEL

The Due Diligence assessment was carried out by qualified archaeologist Amy Ziesing of NGH. This included background research, field inspection and the completion of this report. Matthew Barber reviewed the report.

The due diligence process does not formally require consultation with Aboriginal community groups. No Aboriginal groups were contacted for this due diligence level assessment. The project area is within the boundaries of the Cummeragunja Local Aboriginal Land Council (LALC).

1.3 APPROACH AND FORMAT OFTHIS REPORT

This report has been drafted in keeping with the sequence of steps identified in the NSW Office of Environment and Heritage's Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (OEH 2010). The Code of Practice provides a five-step approach to determine if an activity is likely to cause harm to an Aboriginal object, as defined by the *NSW National Parks and Wildlife Act 1974*. The steps follow a logical sequence of questions, the answer to each question determines the need for the next step in the process.

Table 1-1 Due Diligence Steps for this report

Due Diligence Steps
Step 1. Will the activity disturb the ground surface?
Step 2a. Search the AHIMS database and use any other sources of information of which you are already aware
Step 2b. Are activities proposed in areas where landscape features indicate the presence of Aboriginal objects?
Step 3. Can you avoid harm to the object or disturbance of the landscape feature?
Step 4. Undertake a desktop assessment and visual inspection. Is it likely that Aboriginal objects will be impacted by the proposed works?

Step 5. Further investigations and impact assessment

The Due Diligence Code of Practice sets out the steps which the Proponent is required to take in order to:

- Identify whether Aboriginal objects are, or are likely to be, present in the study area;
- Determine whether or not their activities are likely to harm Aboriginal objects (if present) in the study area; and
- Determine whether an AHIP application is required.

Each section within this report follows the relevant step outlined in the Code of Practice.

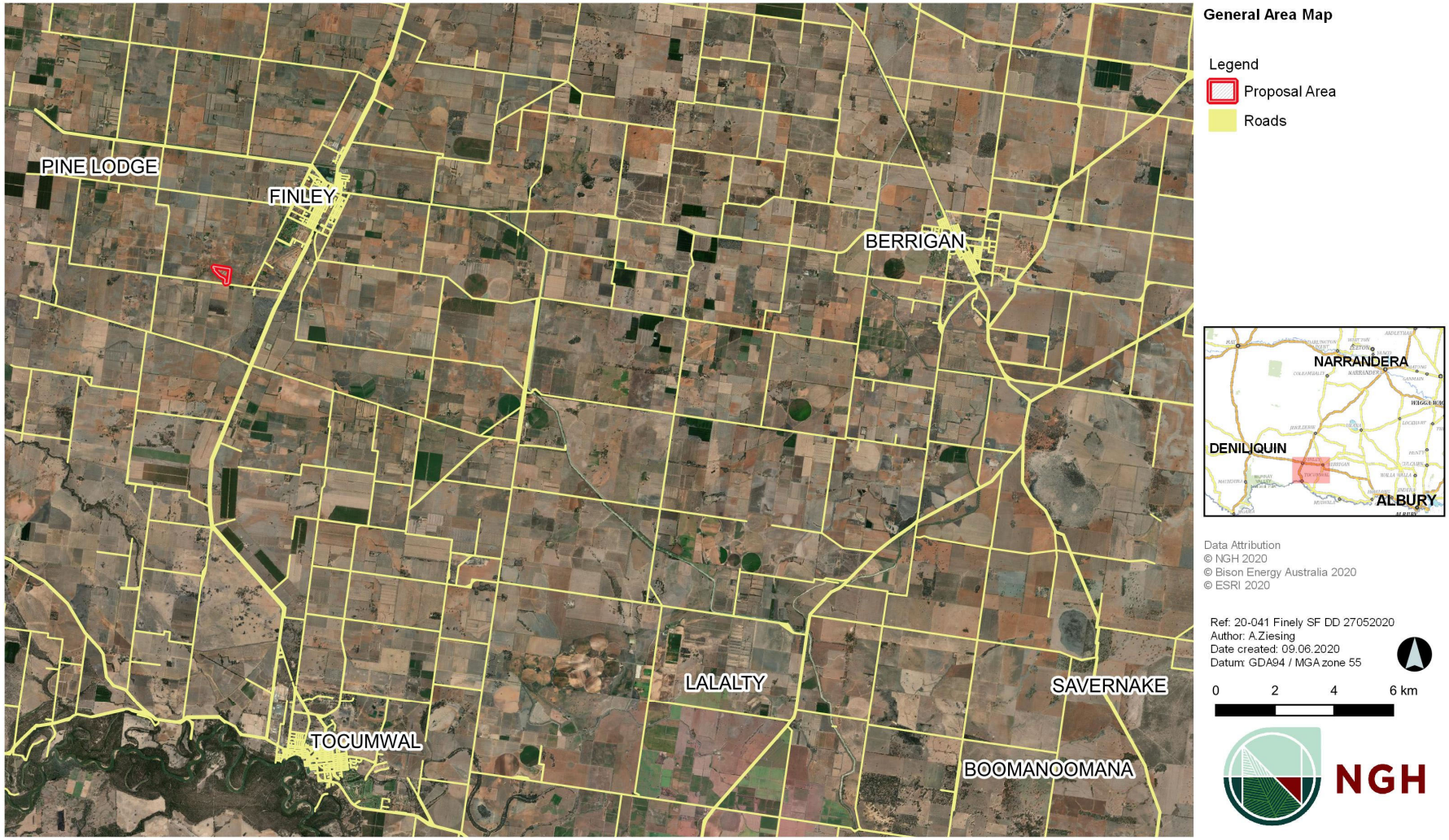


Figure 1-1 General Project Location

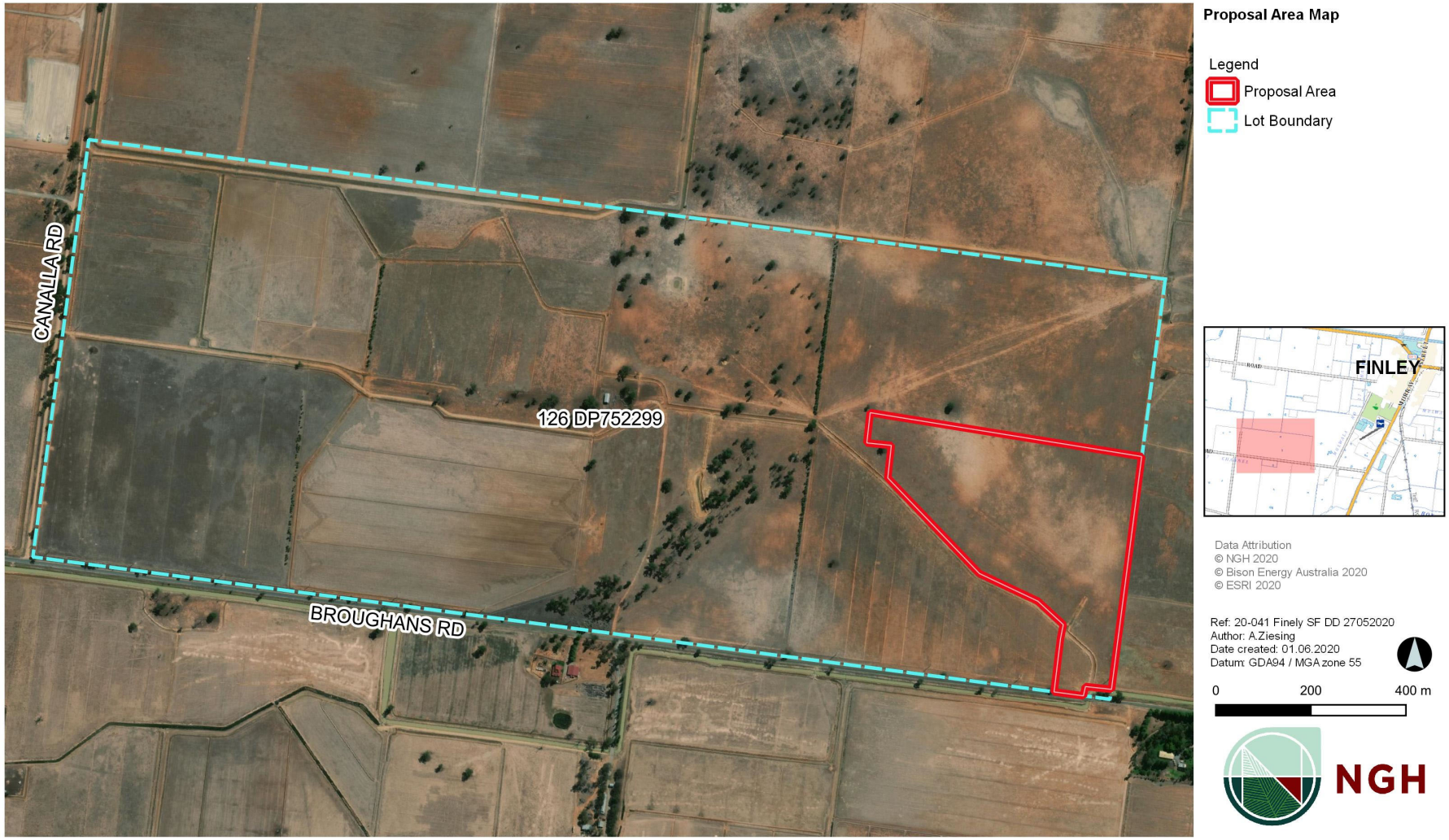


Figure 1-2 Finley 5MW Solar Farm Project Area

2 LEGISLATION

In NSW, Aboriginal heritage is principally protected by two legislative acts:

- The *National Parks and Wildlife Act 1974* (NSW) (NPW ACT); and
- The *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).

2.1 THE NATIONAL PARKS AND WILDLIFE ACT 1974

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. All Aboriginal material receives blanket protection under the NPW Act of NSW. 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 AHIMS site cards for all sites located during heritage surveys.

The strict liability offence of harming Aboriginal objects has a number of defences and include the statutory defence of due diligence (Section 2.4) through complying with an adopted industry code of practice, or compliance with the conditions of an AHIP.

2.2 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The *Environmental Planning and Assessment Act 1979* (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. It provides for the identification, protection and management of heritage items through inclusion of these items into schedules off planning instruments, such as Local Environmental Plans (LEPs) or Regional Environmental Plans (REPs). 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.

2.2.1 Berrigan Shire Local Environmental Plan 2013

The study area is located within the Berrigan Shire LGA. Schedule 5 of the LEP 2013 details the included environmental heritage items covered by the plan. No Aboriginal sites or places are identified within close proximity to the project area in the Berrigan Shire LEP.

3 GROUND DISTURBANCE

Step 1. Will the activity disturb the ground surface or any culturally modified trees?

The proposed work to be undertaken by Bison at the subject site within Lot 126 DP752299 on Broughans Road, Finley will disturb the ground surface. The project proposal will involve the following.

- Installation of solar (PV) panels
- Construction of site substation
- Installation of boundary security fencing
- Construction of access and internal roads
- Construction of a waste area
- Construction of a laydown area
- Construction of new culvert channel crossing
- Construction of emergency access gate
- Temporary site compound and parking areas
- Temporary site bus and worker drop off zone

These activities require significant ground disturbance, the use of heavy machinery and laydown areas. Any Aboriginal sites within the disturbance footprint could therefore be subject to harm. The affirmation that ground disturbance will occur requires the next step in the due diligence process.

4 REGISTER SEARCH AND LANDSCAPE ASSESSMENT

Step 2a. Search the AHIMS Database and other information sources

A search of relevant heritage registers for Aboriginal sites and places provides an indication of the presence of previously recorded sites. A register search is not conclusive however, as it requires that an area has been inspected and any sites are provided to the relevant body to add to the register. However, as a starting point, the search will indicate whether any sites are known within or adjacent to the investigation area. The Aboriginal Heritage Information Management System (AHIMS) provides a database of previously recorded Aboriginal heritage sites. A search provides basic information about any sites previously identified within a search area. The results of the search are valid for 12 months for the purposes of a due diligence level assessment.

On 1 June 2020, a search of the AHIMS database was undertaken over an area ~20 km by ~20 km centred on the study area. The AHIMS Client Service Number was (509554). There were 35 Aboriginal sites recorded within this search area and no declared Aboriginal Places. Table 4-1 below shows the breakdown of site types and Figure 4-1 shows the location of the AHIMS sites in relation to the project area.

Table 4-1 Breakdown of previously recorded Aboriginal sites in the region.

Site Type	Number
Modified Tree	24
Artefact	6
Earth Mound, Hearth	4
Artefact, PAD, Burial	1
TOTAL	**35**

None of the archaeological sites currently recorded on AHIMS are located within or directly adjacent to the project area. The closest registered site is located approximately 7.1 km south east of the proposal area (AHIMS # 55-4-0195). None of the registered sites will be impacted by the proposed solar farm.

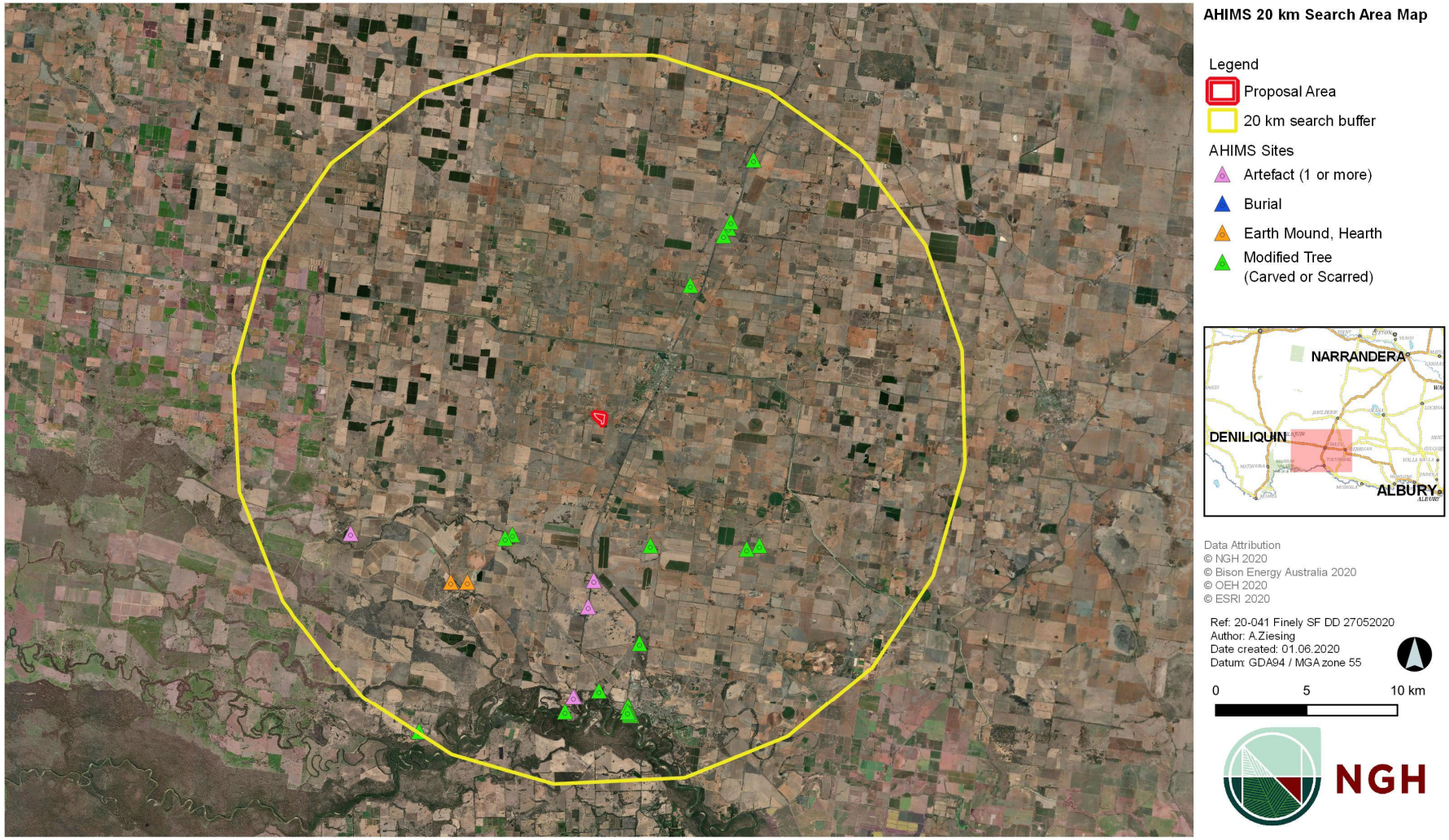


Figure 4-1 AHIMS sites within 20 km of the project area.

4.1 ARCHAEOLOGICAL CONTEXT

4.1.1 Regional Context

4.1.2 Murray Valley Regional Archaeological Studies

There have also been several archaeological surveys conducted in the broader Murray Valley and Murrumbidgee Province with a focus on burials and mounds that contribute to our understanding of the nature of Aboriginal occupation. The major relevant studies are summarised below.

In the 1970's Buchan surveyed the Murray Valley between Albury and Mildura for Aboriginal archaeological sites for the National Parks and Wildlife Service over a two year period (Buchan 1974). The aim was to locate and record as many sites as possible to increase the data pool in the area and to identify sites that required protection. Over 200 sites were recorded across the 16,000 square metre study area. Many of these had been disturbed by long-term European settlement practices and were therefore not recommended for conservation. Oven mounds were the dominant site type (n=94) recorded across the Murray Valley, especially clustered together in areas associated with water sources (Buchan 1973: 38). Most were large mounds with baked clay, shell, bone, charcoal and stone artefact inclusions. Some examples also included complete burials. Scarred trees were the second most common site type (n=75) followed by burials (n=16), surface artefact scatters (n=12), shell middens (n=7), ceremonial sites (n=2) and archaeological deposits (n=1). Burials were mostly identified in sand dunes, creek banks or claypans with two being found in oven mounds. Four sites were located in prior stream channels and the archaeological deposit was capping a dune. No site was found further than 1.6 km from a water source.

Simmons (1980) identified 75 mounds, 17 scarred trees and a range of other site types including isolated artefacts, hearths, shell middens and burials within the Murray floodplain and along channels. 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.

In 1984, Berryman and Frankel completed investigations into Aboriginal mounds on the Wakool River approximately 120 km west of the current assessment area. The study included identification and documentation of the mounds and a two-week excavation season. A total of 95 mounds and 11 scarred trees were identified across the study area in varying states of preservation. Disturbance from rabbits, landscaping for water control, roadworks and stock tracks had resulted in significant impact to many of the mounds. Analysis of the data collected showed a direct correlation between the diameter of the mound and the size of the associated water body. Three mound sites were selected for excavation including a riverside mound, ephemeral creek mound and a remote mound situated away from a defined watercourse. The mounds ranged in size from 8-48 m in diameter. Four radiocarbon dates were obtained from the three mounds ranging from 4,160 ±300 Before Present (BP) and 2,250 ±105 BP. It is suggested that the earliest date may be an anomaly as the additional sample dated this mound to 2,490 ±60 BP.

In 1990, Bonhomme completed an archaeological survey of the Barham Forest, approximately 130 km east of the current assessment area. The area comprises 24,800 ha of red gum forest and 700 ha of box forest including grey box, yellow box and black box. The remaining land is comprised of swamps, lakes and open grassland. The survey recorded a total of 182 new Aboriginal heritage sites; 86 mounds (76 intact, one with a burial, 10 destroyed) 5 middens, one burial, 88 scarred trees and two artefact scatters). For this survey, mounds included ovens, habitations, cultural deposits and middens. Most of these sites were located on the floodplain in association with wetlands, sandy rises or levees. Areas of archaeological sensitivity were

identified as elevated land in proximity to ephemeral or permanent water sources with long-term camps expected adjacent to rivers, reed beds and lagoons. The lack of artefact scatters was associated with low ground surface visibility and a lack of flakeable natural stone resources across the floodplain. It was inferred that the reuse of these rare materials would continue until their working capabilities were exhausted and discard of these items would have been minimal. The procurement of wood, shell and bone implements was hypothesised by Bonhomme. As these raw materials are more readily degradable and preservation and location of these items would be rare.

In 1997, Bonhomme completed an assessment of Aboriginal burial sites across the Riverine Plain, focusing on sand bodies. The study area extended from Condobolin and Albury in the east to Mildura in the west. The aim of the study was to collate previous literature on burials across the Riverine Plain and to select a portion of sites to determine common landform characteristics. The results of the study found that burials in sand bodies on the Plain were very common, but the location of these finds is variable and most readily associated with water sources. This may reflect occupation patterns, conscious choice or the close relationship between sand and water sources across the Plain (Bonhomme 1997:5). The number of sites and the density of burials seems to increase to the south west of the Riverine Plain. Lunettes and some source-bordering dunes seem to contain the greatest density of burials, used over long periods of time, but these appear to be unrelated to each other. Burial grounds were defined based on the locational patterns identified and appear to be restricted to the Holocene period, possibly reflecting a change in social organisation during this time (Bonhomme 1997: 9). These were found on source-bordering dunes, prior stream levees and pointbar sediments of lake outlet channels.

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 were scarred trees (26.2%), mounds (24.2%), open sites (14.4%), ovens (12.4%), burials (7.8%) and hearths (6.1%) as shown on **Error! Reference source not found.**.

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).

Table 4-2 Sites recorded in Murrumbidgee Province survey (Pardoe and Martin 2001: Table 5.4).

Site Type	Number	%
Modified trees	91	26.2
Mound	84	24.2
Open Site	50	14.4
Oven	43	12.4
Burial	27	7.8
Hearth	21	6.1
Midden	9	2.6
Isolated artefact	6	1.7
Dinner camp	5	1.4
Shell midden	3	0.9
Historic	3	0.9
Soak	1	0.3
Myth	1	0.3
Historic burial	1	0.3
Bora ring	1	0.3
Artefact scatter		0.3
Total	**347**	**100.0**

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 0.38 m (Pardoe and Martin 2001).

Pardoe and Martin (2001) 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 12 km 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 3.3 km of such water courses. An assessment of proximity to minor streams 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 1.8 km and 75% of sites were within 2.2 km (Pardoe and Martin 2001).

As no sand bodies or micro-topographical changes are expected in the current assessment area, it is unlikely that burials or mounds will be present.

4.1.3 Local Context

A number of archaeological surveys have been identified to be within proximity of the proposed Finley 5MW Solar Farm and are summarised below.

In 1995, Hamm completed an extensive survey for the proposed construction of an optic fibre cable between Finley, Jerilderie, Argoon, Fairley Grange, Coleambally, Darlington Point, Rowan and Gidgell. Only the areas from Finley to Jerilderie and Darlington Point to Coleambally were subject to field survey. Areas of archaeological sensitivity were identified for the Jerilderie to Finley route at a small lake depression just south of Jerilderie and to the west of a small sand dune (Hamm 1995: 5). Generally, sites were considered most likely in proximity to water sources (lake, creek or dry swamp), such as Berrigan Creek, or in elevated flat land such as sand dune crests, lunette or hummocky dune. Locations near water sources were predicted to contain artefact scatters or open camp sites and sand dune or lunettes to contain burials. Scarred trees were predicted in areas of road reserves, where old growth native trees remain. Due to the extensive historic disturbance seen in this region from grazing, farming and irrigation for rice production, it was deemed unlikely that surface sites would be identified. The surveys resulted in three scarred trees located between Darlington Point and Coleambally. A further 17 scarred trees were identified along the Newell Highway between Finley and Jerilderie. These trees lined the Travelling Stock Route next to the highway between the Finley Canal and Berrigan Creek (Hamm 1995: 7). No sites were found next to Berrigan Creek as initially predicted in the site model.

In 1996 Edmonds of Archaeological Consulting Services undertook a pedestrian and vehicular survey for a proposed drainage channel through the Pinelea Drainage Basin between Finley and Tocumwal. This channel is approximately 5 km south of the current assessment area and was proposed to provide water to 30 farms in the region to improve their agricultural productivity. It was expected that mounds, scarred trees and burials would be the sites most likely to occur. Six scarred trees were recorded during survey on Grey Box trees associated with swamps, depressions and floodplains, river red gums associated with creek banks and C*allitri*s pine associated with a sandhill.

In 1999 Biosis (Biosis 1999a) conducted a vehicle and pedestrian survey of Willeroo, Wollamai West and Wollamai East storm water escape channels for the Berriquin Irrigation District approximately 23 km north-west of the current proposal area. The length of the three proposed channels was approximately 60 km in total. The channel was proposed to assist in removing floodwaters into natural watercourses after heavy rainfall. As the survey area was located on the open plains to the south of Billabong Creek and east of the Edward River it was suggested that the landscape would have provided resources that may have supported small groups of people as they moved away from the major water courses for short period of time, particularly during less flood prone months (Biosis 1999a). It was noted that large artefact scatters and mounds were not predicted to occur in the area given that larger sites are generally associated with permanent water sources. No sites were identified during the survey and it was noted that the land along the proposed channel routes had been extensively disturbed by agricultural land use and consequently was not considered likely to contain any Aboriginal sites. Additionally, mature trees in the area were noted to have been removed during land clearing in the 19th century. While no Aboriginal sites were identified three survey marker trees were recorded.

Additional survey of the Willeroo, Wollamai West and Wollamai East storm water escape channels for the Berriquin Irrigation District was conducted by Biosis (Biosis 1999b) in 1999 following an alteration to the initial

route surveyed. A single artefact scatter site (AHIMS# 54-3-0020) was recorded on a vehicle track. The site consisted of a broken silcrete flake and a quartz core fragment approximately 30m apart. The remains of two potential hearth features were also noted along the track however these appear to not have been recorded as sites.

In 2002, Navin Officer completed an Aboriginal heritage survey for the proposed redevelopment of the Australian Defence Industry Mulwala Facility approximately 50 km south east of the current assessment area. Four Aboriginal heritage sites were identified including three artefact scatters and one scarred tree. A further three isolated finds had previously been recorded in the Mulwala Facility area. A previously recorded scarred tree was re-located and noted to be in very poor preservation and close to collapse. No further sites were recorded, and no information provided on site distribution.

In 2008, OzArk completed an assessment of the proposed route for the Mulwala to Finley 132 KV electricity transmission line, stretching for 68 km and running approximately 4.8 km north east of the current assessment area. No new sites of Aboriginal cultural heritage were identified, and it was determined that there was low potential for intact, subsurface archaeological material in the assessment area. This was due to the area comprising predominantly plains with clay soils which experience periodic inundation during flooding events, making them unsuitable for long term occupation. Further to this no permanent water or rock sources were present in the study area, which has undergone extensive disturbance through clearing of native vegetation and agricultural cropping.

In 2017, NGH Environmental completed an assessment for the proposed Currawarra Solar Farm near Deniliquin, approximately 50 km north west of the current proposal area (NGH 2017a). The solar farm extended over an area of approximately 620 ha and contained similar clearance of native vegetation and laser levelling for irrigation and cultivation as the Finley South area. Six additional areas proposed for road intersection upgrades were also surveyed. Despite the variable visibility encountered during the survey, there were two stone artefact sites (Currawarra Solar IF 1 and Currawarra Solar AS 1), two scarred trees (Currawarra Solar ST 1 and Currawarra Solar ST 2) and one possible and one confirmed European survey Marker tree found across the proposal area and the road intersection upgrade areas. Based on the land use history, an appraisal of the landscape, soil, level of disturbance and the results from the field survey it was concluded that there was negligible potential for the presence of intact subsurface deposits with high densities of objects or cultural material within the proposal area.

In 2017, NGH Environmental completed an assessment of the proposed Tarleigh Park Solar Farm located at Blighty, approximately 24 km north west of the current proposal area. The survey area extended for 250 ha with, approximately, 13 km of transects walked across the rice and canola bays within the proposal area. The effective survey coverage was 26 ha, or 13%. Despite the variable visibility encountered during the survey no Aboriginal stone artefacts were found across the proposal area. However, two Aboriginal modified trees were recorded within the northern area of remnant vegetation. The sites were recorded as Tarleigh Park Scarred Tree 1 (fallen dead Black Box tree) and Tarleigh Park Scarred Tree 2 (living *in situ* Black Box tree). Based on the land use history, an appraisal of the landscape, soil, level of disturbance and the results from the field survey it was concluded that there was negligible potential for the presence of intact subsurface deposits with high densities of objects or cultural material within the proposal area.

In 2017, Australian Cultural Heritage Management (ACHM) conducted a Due Diligence assessment for the proposed Finley Solar Farm, approximately 6 km north west of the current assessment area. The report covered both Aboriginal and non-Aboriginal heritage. Ground surface visibility was high along channels and all areas of exposed ground were inspected for the presence of stone artefacts. A high level of disturbance and agricultural modification was noted across the area, including laser-levelling, grading and extensive irrigation drains and channels. No Aboriginal sites were identified. It was concluded that it would be unlikely for unidentified Aboriginal objects to be present in the solar farm area.

In 2017, RPS assessed the Finley Solar Farm for the same area covered in the previous due diligence assessment undertaken by ACHM, which is approximately 6 km north west of the current assessment area. This ACHA study was commissioned by ESCO Pacific. The ACHA study for the Finley Solar Farm was undertaken to meet the conditions of the Secretary of the DPE Environmental Assessment Requirements (SEARs) relating to Aboriginal heritage for the project which noted that adequate consultation with the local Aboriginal community must occur. No Aboriginal sites were identified during the subsequent study, which integrated the results of the ACHM assessment.

In summation, the Aboriginal site modelling for this region to date suggests that the most archaeologically sensitive areas occur in association with major water sources, including anabranches and ephemeral and relict lake systems and relatively intact portions of riverine red gum forests along the floodplains of major active rivers and creeks and Black Box fringed depressions. Sand bodies are also noted as archaeologically sensitive in relation to the identification of burials. The archaeological sensitivity of source bordering dunes and lunettes to water sources, prior streams and sand bodies, including scalded environments is also noted. None of these areas of sensitivity are present in the current assessment area.

4.2 LANDSCAPE ASSESSMENT

Step 2b. Are there undisturbed landscape features likely to contain Aboriginal objects?

The Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales outlines a range of landscape features that have higher potential to contain Aboriginal objects. It is also necessary to consider whether there are landscape features of undisturbed land that may contain Aboriginal objects. These include land that is:

- within 200m of water;
- located within a sand dune system;
- located on a ridge top, ridge line or headland;
- located within 200m below or above a cliff face, or
- within 20m of a cave, rock shelter or cave mouth.

The development site is agricultural land comprising a paddock that is generally flat (laser levelled) and largely cleared and cultivated for grazing and cropping. Native vegetation remains in the form of scattered paddock trees, low condition derived grassland and roadside vegetation. The development site contains a network of poorly formed irrigation channels which have been previously laser levelled. Murray Irrigation channels occur north and south of the site. There are no farm dams in the development site and the existing channel no longer contains water.

4.2.1 Geology

The geology of the proposal area is comprised of Quaternary unconsolidated riverine deposits of clay, silt, sand and gravel. This includes flood plains and black soil plains (Tuckwell 1975). No known areas of outcropping are present in the area that could be utilised for the manufacture of Aboriginal stone tools. It is likely that any raw stone material present within the proposal area would have been transported to the site from elsewhere.

4.2.2 Topography

The topography of the Riverine Plain is comprised of extensive alluvial plains averaging 400-500 feet above sea level located between the Murray and Murrumbidgee Rivers (Tuckwell 1975). The plains have been built up from flood deposits from these rivers and their associated anabranches. In the Murray Irrigation Area, extensive historical disturbance for the installation of the irrigation network and laser levelling of pastoral lands has resulted in the modification of the pre-European landscape, particularly in the current assessment area.

4.2.3 Soils

The current proposal area is comprised of red alluvial silts, sands and gravels overlying clays, which have been largely exposed in the subject site due to extensive erosion and landscape modification through laser levelling of paddocks and the removal of micro-topography.

4.2.4 Vegetation

No old growth trees are present in the current proposal area, with areas of planted vegetation present on paddock boundaries and fencelines. The remainder of the proposal area is comprised on lowlying grasslands that have been previously cropped but are currently used for grazing areas for sheep and include many exotic weed species.

4.2.5 Historic Land Use

The proposal area has undergone low to moderate degrees of historical disturbance from cropping, irrigation, road and canal construction and high degrees of disturbance from laser levelling. The Mulwala No 17 Channel extends along Broughans Road and a branch of this channel runs along the south western boundary of the proposal area. The Ulupna No 1 Channel runs east to west along the northern lot boundary. No natural watercourses exist within or in close proximity to the site. The Murray River lies approximately 15 km to the south near Tocumwal. The Box Creek Escape Channel runs approximately 1.8 km south of the site. While no natural creeklines are evident in the wider area it is possible and considered likely that the extensive canal and channel system was constructed along previous creeklines that were modified for use in irrigation. Any natural hydrology of the proposal area has been largely been replaced by irrigation, drainage channels and dams.

4.3 ABORIGINAL SITE PREDICTION

A number of Aboriginal sites have been recorded in the general region, but no sites exist within the current assessment area or within 7 km of the subject site boundary.

The pre-European landscape has undergone significant modification with the installation of the Murray Irrigation Area and the laser levelling of pastoral paddocks across the district. These practices have removed micro-topographical changes in the landscape and subsequently areas that may have contained potential for Aboriginal sites to be present. The channel system likely represents the modification of previous creeklines and therefore do contain some potential to contain objects of Aboriginal Cultural Heritage but in a heavily disturbed context.

Based upon the initial desktop assessment, using satellite imagery and topographic data, it appears that there is low potential for Aboriginal Cultural Heritage to occur within the project area given that no natural watercourses are present and the landscape has been significantly modified from its pre-European state. The site may have been used in a transitory nature by Aboriginal people passing through the area when utilising the permanent resources of the Murray River and smaller nearby ephemeral creeklines.

Previous archaeological studies and Aboriginal site modelling in the region suggest the most archaeologically sensitive areas occur in association with major water sources, including anabranches and ephemeral and relict lake systems and relatively intact portions of riverine red gum forests along the floodplains of major active rivers and creeks and Black Box fringed depressions. Sand bodies are also noted as archaeologically sensitive in relation to the identification of burials. The archaeological sensitivity of source bordering dunes and lunettes to water sources, prior streams and sand bodies, including scalded environments is also noted. None of these archaeologically sensitive landforms are present in the current assessment area.

The AHIMS sites in the region suggest that the most likely representation of Aboriginal people utilising this landscape in the past will be modified trees if old growth trees remain as scattered paddock trees. Isolated artefacts may also be present, representing the transitory nature of Aboriginal people moving through the wider landscape from permanent resource locations.

The desktop assessment, therefore, indicates that there are not landscapes present within the project area that have the potential to contain Aboriginal sites. Despite this, the nature of the works being undertaken at this site will involve significant ground disturbance and it is therefore important that a visual inspection be undertaken.

Table 4-3. Aboriginal Site Prediction Statements

Site Type	Site Description	Potential
Stone artefact scatters and isolated artefacts	Artefact scatter sites can range from high-density concentrations through to isolated finds.	Some potential to occur in low densities.
Potential Archaeological Deposits (PADs)	Potential subsurface deposits of archaeological material	Low potential to occur within proposal area as the site has previously been laser levelled, removing any elevated landforms.
Modified trees	Trees that have undergone cultural modification.	Some potential to occur within the project area in areas where there are remnant mature native trees.

5 IMPACT AVOIDANCE

Step 3. Can any AHIMS listed objects, or landscape features be avoided?

The proposed location of the construction and installation of the solar panels and ancillary facilities associated with the solar farm is not located in an area of potential to contain Aboriginal Cultural Heritage or an archaeologically sensitive landscape. This lack of landscape potential directly related to the previous historic disturbances carried out across the region, including the likely modification of natural creeklines for the installation of the irrigation system and the widespread use of laser levelling of paddocks on pastoral land that have removed micro-topographical changes in the pre-European landscape and subsequently landforms that would have been conducive to camping by Aboriginal people in the past.

The closest registered AHIMS site is located approximately 7.1 km south east of the proposal area and will not be impacted by the proposed works.

The project activity is able to be amended to avoid potential objects of Aboriginal Cultural Heritage that may be identified in the visual site inspection. As the development footprint boundary only extends across a small portion of the lot boundary, it is possible for elements of the proposed solar farm to be relocated if they are to impact upon potential Aboriginal Cultural Heritage sites.

The desktop assessment alone is not sufficient to conclusively appraise the archaeological potential of the landscape or the location of any sites, the next step in the process, a visual inspection, must be conducted to properly appraise the presence and potential for Aboriginal sites to occur.

6 DESKTOP ASSESSMENT AND VISUAL INSPECTION

Step 4. Does the desktop assessment confirm that there are likely to be Aboriginal objects present or below the ground surface?

The assessment process is primarily a desktop exercise, using available information such as the AHIMS search results and relevant archaeological reports that have been previously completed in the area. Visual inspection is also required where landscape features are present that may contain sites or where significant ground disturbance will result from the proposed development.

A visual inspection of the project area was undertaken on 29 May 2020 by qualified archaeologist Amy Ziesing of NGH. The extent of the survey consisted of a larger area than the proposed development footprint (Figure 6-1). This was due to the archaeologist being accompanied by the landowner, who showed her the entire paddock proposed to contain the development, despite the solar farm only extending across the south eastern corner of this paddock.

The proposal area consists of pastoral paddocks that have previously undergone rotational cropping and are now utilised for sheep grazing. An irrigation channel runs from the south east corner to the centre of the proposal area, but this is not currently functioning due to lack of water. The landowner noted to the consultants that the area has previously been laser levelled, removing any landforms that may contain archaeological sensitivity and resulting in a flat landscape. The proposal site contains no natural watercourses, although it is likely that the irrigation channels in the wider region follow the course of natural creeklines that were historically modified for irrigation purposes.

The majority of the site had been severely affected by erosion, exposing red to red-brown silty cracking clays and no stone raw material was noted across the extent of the proposed solar farm. Exotic weed vegetation was widespread across the paddock, resulting in variable ground surface visibility, with 90% in exposures from erosion and stock tracks and 5% in areas of dense vegetation.

No sites of Aboriginal Cultural Heritage were identified during the visual inspection of the proposed solar farm. Due to the lack of archaeologically sensitive landforms, natural watercourse and stone raw material across the proposal area there is a low likelihood for objects of Aboriginal Cultural Heritage to be present on or below the ground surface.

Plates 1 to 6 below provide an overview of the landscape of the proposal area during the site inspection.

Plate 1 View north east of the central portion of the proposal area.

Plate 2 View north from the south western fenceline of the proposed development footprint.

	
Plate 3 View south of historical disturbance associated with the existing channel that is no longer in use.	Plate 4 View south east of the Mulwala No 17 Channel crossing to the north of Broughans Road.
	
Plate 5 View west of north eastern corner of the proposal area.	Plate 6 View south of the existing transmission line that will be utilised for the proposed solar farm.

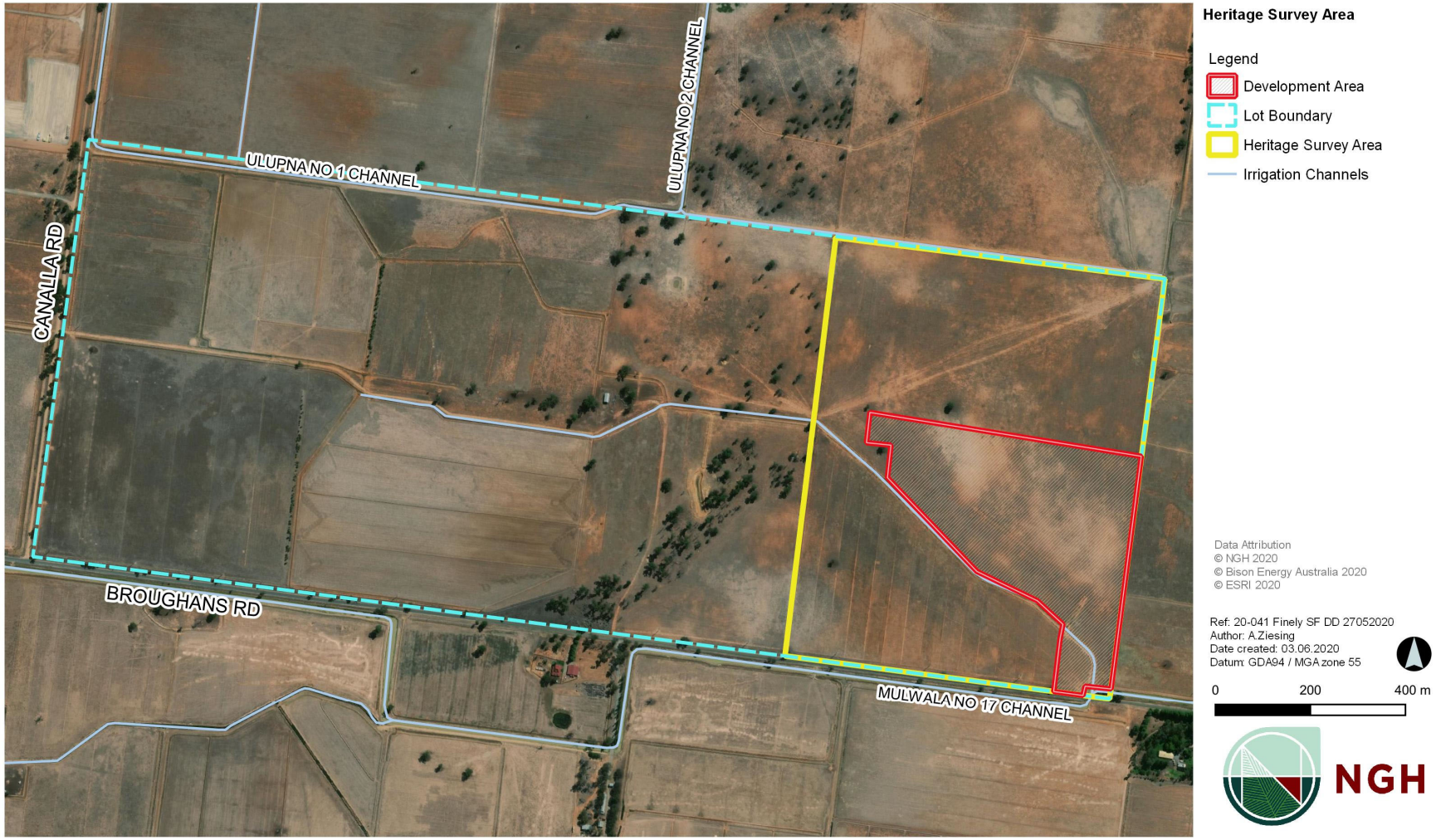


Figure 6-1 Area covered by the visual heritage site inspection.

6.1 SUMMARY

No sites of Aboriginal Cultural Heritage or unmodified areas of archaeological sensitivity or landforms with the potential to contain Aboriginal objects were identified across the proposal site. This is due to the historic disturbances that were noted, resulting from the installation of channels to the north and south east of the proposal area and the laser levelling for previous cropping purposes. The south eastern channel extends across a small portion of the current assessment area but is no longer utilised for irrigation purposes. The channel locations may be modified natural creeklines that previously existed in the area, which may increase the potential for Aboriginal heritage sites to occur. The density of meandering trees in the paddock to the immediate west of the proposal site suggests that a depression and possibly a former creekline may have been present in this area which also raises the potential for Aboriginal sites to occur in the immediate landscape. The vegetation clearance has resulted in only scattered paddock trees remaining in the proposal site.

Despite the presence of possible landscape features in the immediate area, laser levelling of the paddocks within the solar farm project area has removed any micro-topographical landforms that may have been the focus of occupation by Aboriginal people in the past. The removal of these landforms is also likely to have removed the archaeological signature for this region, which is generally a low-density scatter of stone artefacts.

The lack of previously identified Aboriginal Cultural Heritage sites in the Finley region, suggests that despite the low ground surface visibility during the survey, the lack of sites within the proposal area is a true representation of the archaeological record at this location.

7 FURTHER ASSESSMENT

Step 5. Is further investigation or impact assessment required?

The Due Diligence Code of Practice states that if, after the desktop research and visual inspection is completed, it is evident that harm will occur to Aboriginal objects or heritage places then further and more detailed assessment is required. However, if the research and inspection conclude that there are no, or unlikely to be any, objects impacted by the proposed activity, then the activity can proceed with caution.

The field assessment concludes that the area does not require further investigation and assessment due to the low likelihood that items of Aboriginal Cultural Heritage will be present. No known or registered items of Aboriginal Cultural Heritage or archaeologically sensitive landforms will be impacted by the proposed solar farm works, which may proceed with caution.

8 RECOMMENDATIONS

The following recommendations are based on a number of considerations including:

- Background research into the area;
- Landscape assessment;
- Field inspection;
- Consideration of the proposed works, and
- Legislative context for the development proposal.

Based on an assessment of the project, the location and previous level of disturbance, the proposed work can proceed with caution with the following recommendations.

1. All works must be constrained to the areas of existing disturbance and any activity proposed outside of the current assessment area should also be subject to an Aboriginal heritage assessment.
2. If any items suspected of being Aboriginal in origin are discovered during the work, all work in the immediate vicinity must stop and BCD notified. The find will need to be assessed and if found to be an Aboriginal object an AHIP may be required.

Bison Energy Australia is reminded that it is an offence under the *NSW National Parks and Wildlife Act 1974* to disturb, damage or destroy and Aboriginal object without a valid Aboriginal Heritage Impact Permit.

9 REFERENCES

Australian Cultural Heritage Management, 2017. *Cultural Heritage Due Diligence Assessment: Finley Solar Farm*. Report for Accent Environmental.

Biosis 1999a, *An Archaeoligcal survey of Willeroo, Wollamai West and the Wollamai East Stormwater Escape Channels Berriquin Irrigation District, NSW*, Unpublished report for GHD Pty Ltd.

Biosis 1999b, A*ddendum:An Archaeoligcal survey of Willeroo, Wollamai West and the Wollamai East Stormwater Escape Channels Berriquin Irrigation District, NSW*, Unpublished report for GHD Pty Ltd.

Bonhomme, T., 1990. *An Archaeological Survey of the Barmah Forest.* Victorian Archaeological Survey, Occasional Report No. 34, Department of Environment & Conservation.

Bonhomme, T., 1997. *Aboriginal Burial and Sand Mining on the Riverine Plain, NSW.* Report for the NSW National Parks and Wildlife Service.

Berryman, A. and D. Frankel, 1984. *Archaeological investigation of mounds on the Wakool River near Barham, NSW.* Australian Archaeology 19:21-30.

Buchan, R.A., 1974. Report on an Archaeological Survey in the Murray Valley, New South Wales 1973-4. Report to the National Parks and Wildlife Service, New South Wales.

Edmonds, V., 1996. *An Archaeological Survey of the Pinelea Drainage Basin, near Finley, southwestern NSW.* Report to Kinhill Engineers Pty Ltd.

Hamm, G., 1995. *An Archaeological Assessment of Telecom's Proposed Optical Fibre Cable Routes – Darlington Point, Coleambally, Finley, Jerilderie, Riverina South West NSW.* Report for Telecom Australia.

Long, A., 2005. *Aboriginal scarred trees in New South Wales : a field manual*. Dept. of Environment and Conservation.

Navin Officer 2002 Proposed Redevelopment of the Mulwala Facility, Southern NSW. Cultural Heritage Assessment. A Report to URSCorp for ADI.

NGH Environmental, 2017a. *Aboriginal Cultural Heritage Assessment: Currawarra Solar Farm.* Report for RES Australia Pty Ltd.

NGH Environmental, 2017b. *Aboriginal Cultural Heritage Assessment: Tarleigh Park Solar Farm*. Report for RES Australia Pty Ltd.

OEH. 24 April 2009. *Due Diligence guidelines for protection of Aboriginal objects in NSW*. Accessed online.

OEH, 2010. NPWS Act 1974. *Fact Sheet 1*. September 2010.

OEH 2010. NPWS Act 1974. *Fact sheet 2*. September 2010

OzArk, 2008. *Indigenous Heritage Assessment: Proposed Mulwala to Finley 132 KV Line Upgrade, NSW.* Report prepared for GHD Wagga Wagga on behalf of Country Energy.

Pardoe, C & Martin, S 2001, *Murrumbidgee province aboriginal cultural heritage study*, Unpublished report to NSW NP&WS.

RPS, 2017, *Cultural Heritage Assessment Report: Finley Solar Farm*. Report for ESCO Pacific.

Simmons, S 1980, 'S*ite survey of the floodplains between the Murray and Wakool Rivers, NSW*', Records of the Victorian Archaeological Survey, vol. 10, pp. 57–86.

Tuckwell, K.D., 1975. Jerilderie 1:250,000 Geological Sheet, 2nd edn. Geol. Surv. N.S.W., Sydney.